

SECTION IV

PART 1

TECHNICAL SPECIFICATIONS FOR TENDER WORKS

**GENERAL TECHNICAL
SPECIFICATIONS
FOR
BUILDING WORKS**

SPECIFICATIONS FOR MATERIALS

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GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

GENERAL:

1.1. In the specifications, “as directed” / “approved” shall be taken to mean “as directed”/“approved” by the engineer-in-charge.

1.2. Wherever a reference to any Indian standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in Force on the date of agreement.

1.3. In “Mode of Measurement” in the specifications wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular points or aspects in the relevant Indian Standards shall be referred to.

1.4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits:

(i) Length, width and depth (height) 0.01 meters.

(ii) Areas 0.01 Sq. Mt.

(iii) Cubic Contents . 0.01 Cu.Mt.

In recording dimensions of work, the sequence of length, width and height (depth) or thickness shall be followed.

1.5. The distance which constitutes lead shall be determined along the shortest practical route and note necessary the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.

1.6. Where no lead is specific, it shall mean “all leads”.

1.7. Lift shall be measured from plinth level.

1.8. Up to “Floor level” means actual height of floor (Maxi. 4M) upto 3 Mt. above plinth level.

1.9. Definite particular’s covered in the items of work. Though not mentioned or elucidated in it specifications shall be deemed to be included therein.

1.10. Reference to specifications of materials as made in the detailed specification of the item of works is In the form of a designation containing them number of the specification of the material and prefix ‘M’ e.g. ‘M-5’

1.11. Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or material used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.

1.12. The contract rate of the item of work shall be for the work completed in all aspects.

1.13. No collection of materials shall be made before it is got approved from the Engineer-in-charge.

1.14. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work

1.4. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.

1.5. No materials shall be stored prior to, During and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.

1.6. All works shall be carried out in a workman like manner as per the best techniques for the particular item.

1.7. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the work during execution shall be kept in sufficient numbers and in good working condition on the site of the work.

1.8. The mode, procedure and manner of execution shall be such that it does not cause damage or overloading of the various components of the structure during execution or after completion of the structure.

1.9. Special modes of construction not adopted in general Engineering practice, if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-charge shall not, however, absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution or completion of the work.

1.10. All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the contractor.

1.11. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act ", and such other laws and rules prescribed by Government from time to time.

1.12. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.

1.13. The testing charges of all material shall be borne by the Contractor.

1.14. Approval to any of the executed items for the work does not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

SPECIFICATIONS OF MATERIAL

M-1 Water

6.1. Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil and injurious alkalies, salts, organic matter and other materials which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Containers for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456-1978.

6.2. As required by the Engineer-in-charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease or more than 10 per cent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

1.3. Water for curing mortar, concrete or masonry should not be too acidic or too alkaline. It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.

6.3. Hard and hot water shall not be used for curing.

6.4. Potable water will generally be found suitable for curing mortar or concrete.

M-2. Lime

2.1. Lime shall be hydraulic lime as per I.S. 712-1973. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973.

2.2. The following field tests for limes are to be carried out : (1) A rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour indicates quick lime. and solid lumps are the unburnt lime stone.

(2) Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.

8.1. Storage shall comply with I.S. 712-1973. The slaked lime, if stored, shall be kept in a weather proof and damp-proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.

8.2. Field testing shall be done according to I.S. 1624-1974 to show the acceptability of materials.

M-3 Cement

3.1. Cement shall be ordinary portland cement (53 - Grade) as per IS. 12269.

M-4. White Cement

4.1. The white cement shall conform to I.S. 8042-E-1978.

M-5. Coloured Cement

8.3. Coloured cement shall be with white or grey ponland cement as specified in the item of the work

8.4. The pigments used for coloured cement shall be of approved quality and shall not exceed 10% cement used in the mix. The mixture of pigment and cement shall be properly grounded to have uniform colour and shade. The pigments shall have such properties a.s to provide for durability under exposure to sunlight and weather.

8.5. The pigment shidi have property such that it is neither affected by the cement nor detrimental to it.

M-6 Sand

6.1. Sand shall be natural sand, clean.well graded, hard strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles shale, alkali, salts organic matter,loam. mica or other deleterious substances and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 5 per cent of silt as determined by field test. If necessary the sand shall be washed to make it clean.

6.2. Coarse Sand :

The fineness modulus of coarse sand shall not be less then 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall he as under :

I.S. Sieve weight	Percentage by weight	I.S. Sieve	Percentage by Designation
Passing sieve	Designation	Passing sieve	
4.75 mm	100	600 Micron	30-100
2.36 mm	90 to 100	300 Micron	5-70
1.18 mm	70 to 100	150 Micron	0-50

6.3 Fine Sand:

The liness modulus shall not exceed 1.0. The sieve analysis of Fine sand shall be as under :

I.S. Sieve weight	Percentage by weight	I.S. Sieve	Percentage by Designation
Passing through	Designation	Passing through	
4.75 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	75 - 100	150 Micron	0-10

M-7. Stone Dust

7.1 .This shall he obtained from crushing hard black trap or equivalent. It shall not contain more than 8 % of sill as determined by field test with mea.suring cylinder. The method of determinng silt contents by fields tesi is given as under :

7.2. A sample of stone dust lo be le.sted shall be placed without drying in 200 mm. mea.suring cylinder. Thei.nmniity otihesampleshall be such that it Fills the cylinder upto 100mm. mark. The clean water shall be liddetl uplo 15(immm. mark. The mixture shall bestirred vigorously and the content allowed to settle for 3 hours.

7.3. The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 5% silt shall be washed so as to bring the content within the allowable limit.

7.4. The Fineness modulus of stone dust shall not be less than 1.50.

M-8 Stone Grit

8.1. Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S.383-1970. Unless special stone of particular quarries is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious reaction with cement.

8.2. The grit shall conform to the following gradation as per sieve analysis :

I.S. Sieve Designation	Percentage by weight Passing sieve	I.S. Sieve Designation	Percentage by weight Passing sieve
12.50 mm	100 %	4.75 mm	0-20 %
10.00 mm	85 - 100 %	2.36 mm	0-25 %

11.1. The crushing strength of grit will be such as to allow the concrete in which it is used to build-up the specified strength of concrete.

11.2. The necessary tests for grit shall be carried out as per the requirements of I.S. 2386- (Parts I to VIII) 1963 as per instructions of the Engineer-in-charge. The necessity of test will be decided by the Engineer - in-charge.

M-9 Cinder

12.1. Cinder is well burnt furnace residue which has been fused or sintered into lumps of varying sizes

12.2. Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound clean and free from clay, dirt, ash or other deleterious matter.

93. The average grading of cinder aggregates shall be as mentioned below :

I.S. Sieve Designation	Percentage passing	I.S. Sieve Designation	Percentage passing
20 mm	100	4.75 mm	70
10 mm	86	2.36 mm	52

M-10. Lime Mortar

10.1 Lime: Lime shall conform to specification M-2. Water: Water shall conform to specification M-1. Sand : Sand shall conform to specification M-6.

10.2. Proportion of Mix :

10.2.1. Mortar shall consist of such proportions of slaked lime and sand as may be specified in item. The slaked lime and sand shall be measured by volume.

10.3. Preparation of mortar:

10.3.1. Lime mortar shall be prepared by wet process as per I. S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 150 revolutions with a sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency

of still paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

10.4. Storage:

10.4.1. Mortar shall always be kept damp, protected from sun and rain till used up, covering it by tarpaulin or open sheds.

10.5. Use:

10.5.1. All mortar shall be used as soon as possible after grinding. It should be used on the day on which it prepared. But in no case mortar made earlier than 36 hours shall be permitted for use.

M-11. Cement Mortar

19.1. Water shall conform to specification M-1. Cement : Cement shall conform to specifications M-3. Sand : Sand shall conform to M-6.

19.2. Proportion of Mix :

11.2.1. Cement and sand shall be mixed in specified proportion, sand being measured by measuring boxes. The proportion of cement will be by volume on the basis of 50 kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed or machine mixed as directed.

11.3. Proportion of Mortar :

11.3.1. In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed.

11.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

M-12. Stone Coarse Aggregate for Nominal Mix Concrete

21.1. Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

21.2. The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement concrete shall generally be as per the table given below. However, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6 mm. less than the cover whichever is

TABLE

I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size		I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size		40
mm	20 mm	16 mm	40 mm	20 mm	16 mm	

80 mm	-	-	-	12.5 mm	-	-	-	63
mm	100	-	-	10 mm	0.5	0.20	0.30	
40 mm	85-100	100	-	4.75	-	0.5	0.5	
20 mm	0-20	85-100	100	2.35 mm	-	-	-	
16 mm	-	-	-	85-100				

Note : This percentage may be varied some what by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

12.3. The attrition test shall be taken in the laboratory and at the source of source of materials. The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean.

M-13. Black Trap or Equivalent Hard Stone Coarse.

13.1. Aggregate For Design Mix Concrete : Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

22.1. The aggregates shall generally be cubical in shape. Unless special sions of particular quarries are mentioned, aggregates shall be machine crushed from the best black trap or equivalent hard stones approved. Aggregate shall have no deleterious reaction with cement.

22.2. The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the acceptability of the materials.

22.3. If aggregate is covered with dust it shall be washed with water to make it clean.

M-14. Brick Bats Aggregate

26.2. Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign underburnt or overburnt brick bats shall not be allowed.

26.3. The brick bats shall be measured by suitable boxes or as directed

M-15. Bricks

26.7. The bricks shall be hand or machine made and free from soft spots and kiln lime. They shall be free from cracks and flaws and shall be free from any sharp corners and shall be free from any surface defects. The bricks shall be made with a frog of 100 mm x 40 mm and 10 mm to 20 mm deep on one of its flat side. The bricks shall not break when thrown on the ground from a height of 600 mm.

26.8. The size of modular bricks shall be 190 mm x 90 mm x 90 mm

15.3 The size of the conventional bricks shall be under : (9" x 4.3/8" x 2.3/4") 225 x 110 x 75 mm.

(i) Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work. Length : + 1/8" (3.0 mm) Width : + 1/16" (1.50 mm) Height : + 1/16" (1.50 mm)

(ii) The crushing strength of the bricks shall not be less than 35 Kg/Sq. Cm. The average water absorption shall not be more than 20 percent by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per IS. 3495. (Part- I to IV) - 1976.

M-16 Stone the stone shall be of the specified variety such as Granite/Trap Stone / Quarzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious veins, patches of loose or soft materials etc. and weathered portion, and other similar defects or imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentages of Water absorption shall not be more than 5 % of dry weight when tested in accordance with I.S. 1134-1974. The minimum crushing strength of the stone shall be 200 Kg/Sq.Cm. unless otherwise specified

78.2. The samples of the stone to be used shall be got approved before the work is started.

78.3. The Khanki facing stone shall be dressed by Chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the hushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

M-17 Laterite Stone

17.1. Laterite stone shall be obtained from the approved quarry. It shall be compacted in lump, sound, durable and free from soft patches. It shall have minimum crushing strength of 1 IV) Kg/Sq. Cm. in its dry condition. It shall not absorb water more than 20 % of its own weight, when immersed for 24 hours in water. After quarrying the stone shall be allowed to weather for some time before using in work.

17.2. The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and edges true and square.

17.3. Those types of stone in which white clay occurs should not be used.

17.4. Special corner stones shall be provided where so directed.

M-18. Mild Steel Bars

18.1 Mild Steel bars reinforcement for R.C.C. work shall conform to I.S. 432 (Part-11) 1966 and shall be of tested quality. It shall also comply relevant part of I.S. 456-1978.

18.2. All the reinforcement shall be clean and free from dirt, paint, rust, mill scale or loose or thick rust at the time of placing.

18.3. For the purpose of payment, the bar shall be measured correct to 10mm. length and weight payable worked out at the rate specified below :-

1.	6 mm	0.22 Kg/Rmt	8 20 mm	2.47 Kg/Rmt
2.	8 mm	0.39 Kg/Rmt	9 22 mm	2.98 Kg/Rmt
3.	10 mm	0.62 Kg/Rmt	10 25 mm	3.85 Kg/Rmt
4.	12 mm	0.89 Kg/Rmt	11 28 mm	4.83 Kg/Rmt
5.	14 mm	1.21 Kg/Rmt	12 32 mm	6.31 Kg/Rmt
6.	16 mm	1.58 Kg/Rmt	13 36 mm	7.99 Kg/Rmt
7.	18 mm	2.0 Kg/Rmt	14 40 mm	9.86 Kg/Rmt

M-19 High Yield Strength Steel Deformed Bars

19.1. High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1786- 1966 and I.S. 1139 - 1966 respectively.

19.2. Other provisions and conditions shall conform to the specification No. 1-10 of Mild Steel Bars.

M-19-A Thermo Mechanical Treated (TMT) Steel Reinforcement bars.

19-A-1 Thermo Mechanical Treated (TMT) Steel Reinforcement bars shall be TMT bars FE - 415 & shall conform to IS 1786.

M-20 High Tensile Steel Wires

20.1. The high tensile wires for use in prestressed concrete work shall Conform to I.S. 2090 - 1962.

20.2. The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per para 6.1 of the I.S. 1785 - 1962. Testing shall be done as per I.S. requirements.

20.3. The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure jet containing Carborundum.

20.4. The high tensile wire shall be inclined inwards in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled.

M-21. Mild Steel Binding Wire

21.1. The mild steel wire shall be of 1.63 mm. or 1.22 mm. (16 to 18 gauge) diameter and shall conform to I.S. 280 - 1972.

21.2. The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust, oil paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-22. Structural Steel

22.1. All structural steel shall conform to I.S. 226- 1985. The steel shall be free from the defects mentioned in I.S. 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.

22.2. When the steel is supplied by the Contractor test certificate of the manufacturer shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

M-23 Galvanised Iron Sheets

23.1. The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item. The G.I. sheets shall conform to I.S. 277 - 1977. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.

23.2. The length and width of G.I. sheet shall be as directed in spec per site condition.

M-23- A; G.I. Valleys & Ridges

23.A.1. The G.I. ridges and hips shall be of plain galvanised sheets Class-3 of the thickness specified in item. These shall be 600 mm in width and properly bent up to shape without damage to the sheets in process of bending.

23.A.2. Valleys & flashings shall also be of galvanised steel of thickness as specified in item. Valleys shall be 900 mm. in width overall and flashing shall be 380 mm. wide overall. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24. Asbestos Cement Sheets

24.1. Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S. 459-1970. The thickness of the sheets shall be as specified in the item. The sheets shall be free from all defects such as cracks, holes, deformities, chipped edges or otherwise damaged.

24.2. Ridges & Hips :

24.2.1. Ridges and hips shall be of same thickness as (that of) A.C. sheets. The types of ridges shall be suitable for the type of sheets and location.

24.2.2. Other accessories to be used in roof such as flashing pieces, eaves filler pieces, valley gutters, north light and ventilator curves, barge boards etc. shall be of standard manufacture and shall be suitable for the type of sheets and location.

M-25. Mangalore Pattern Roof Tiles

25.1. The Mangalore pattern tiles shall conform to I.S. 654-1972 for Class AA or Class A type as specified in item. Samples of the tiles to be provided shall be got approved from the Engineer-in-charge, necessary tests shall be carried out as directed.

M-26. Shuttering

26.1. The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical bracing properly cross braced together so as to make the centering rigid. In places of hollow props, brick pillar of adequate section built in mud mortar may be used.

26.2. The form work shall be sufficiently strong and shall have camber so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of live load of men working over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall not permit leakage of cement grout.

26.3. If any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure the concrete shall be removed and work redone with fresh concrete and adequately rigid form work. The complete form work shall be got inspected by and got approved from the Engineer-in-charge, before the reinforcement bars are placed in position.

26.4. The props shall consist of hollowies having 100 mm. minimum diameter measured at mid length and 80 mm. at thin end and shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0.10 sq. m. laid on sufficiently hard base.

26.5. Dolly wedges shall further be provided between the sole plate and the wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete.

26.6. The timber used in shuttering shall not be so dry as to absorb water from concrete and swell or bulge nor green or wet as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.

26.7. As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.

26.8. The surface of timber shuttering that would come in contact with concrete shall be well oiled and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be

applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.

26.9. The shuttering for beams and slabs shall have camber of 4 mm. per metre (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

M-27 Expansion Joints -Premoulded filler

27.1. The item provides for expansion joints in R.C.C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler. Premoulded bituminous joint filler, i.e. performed strip of expansion joint filler shall not get deformed or broken by twisting, bending or other handling when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall be rejected.

27.2 Thickness of the pre-moulded joint filler shall be 25mm. unless otherwise specified.

27.3 Premoulded bituminous joint filler shall conform to I.S. 1838 - 1961.

M-28 Expansion joints-Copper strips & hold fasts

28.1. The item provide for expansion joints in R.C.C. frame structure for internal joint as well as for exposed joints with the use of necessary Copper strip and holdfasts.

28.2. Copper sheet shall be of 1.25 mm. thickness and of 1.25 mm. width with the "U" shape in the middle. Copper strip shall have holdfast of 3 mm. diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete work shall be 25 mm. Depth of "U" to be provided in the expansion joint, in the copper plate shall be of 25 mm.

M-29. Teak wood

29.1. The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.

29.2 Teak wood shall generally be free from large, loose, dead or cluster knots. Haws, shakes, warps, twists, bends, or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive resinous materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.

29.3 All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and uniform thickness.

29.4 The tolerances in the dimensions shall be allowed at the rate of 1.5 mm. per face to be planed.

29.5. First class teak wood :

29.5.1 First class teak wood shall have no individual hard and sound knots. More than 6 sq. cm. in size and the aggregate area of such knots shall not be more than 1 % of area of piece. The timber shall be closed grained.

29.6. Second Class Teak Wood :

29.6.1. No individual hard and sound knots shall be more than 15 sq. cms. in size and aggregate area of such knots shall not exceed 2 % of the area of piece.

M-29. A Non-teak wood

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site. Fabrication of Wooden members shall be started only after approval. For this purpose wood of Bin. Kalai. Siras. Saded. Behda, Jamiin, Sisoo will be used for door where as only Kalai. Siras, Halda, Kalam etc. Will be permitted for shutters after proper seasoning and chemical treatment. The non-teak wood shall be free from large, loose, dead or cluster knots, flaws, shakes, warps, bends, or any other defects. It shall be uniform in substance and of straight fibres as far as possible. It shall be free from rots,

decay, harmful fungi and other defects of nature which will effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be sawn in straight lines and planes in the direction of grain and of uniform thickness. The department will use its Agency to produce certificate from Forest Department in event of Dispute the decision of the Departmental shall be final and binding to the contractor. The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

M-30. Wooden flush door shutters (solid core) The Solid core type flush door shutters shall be of decorative or type as specified in the drawing. The size and thickness of the shutter shall be as specified in Iruwin's rules (Schedule). The timber species for core shall be used as per. I.S. 2202 (Part-1) 1980 The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members in which they occur may be permitted. Pitch pockets, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross-bands shall conform to I.S. 303-1275

30.1. The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross-bands and face veneers. The hopping, rebating, opening of glazing venetian etc.. shall be provided if specified in the drawing.

30.3 All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.

30.4. The shutters shall be tested for-

(1) End immersion test: The test shall be carried out as per I.S. 2202 (part-1) 1980. There shall be no delamination at the end of the test.

(2) Knife Test : The face panel when tested in accordance with I.S. 1659- 1979. shall pass the test.

(3) Glue adhesion test : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202 (part-1) 1980. The shutters shall be considered to have passed the test if no delamination occurs in the glue lines in the plywood and if no single delamination more than 80 mm. in length and more than 3 mm. in depth has occurred in

the assembly glue lines between the plywood face and the stiles and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knothole or any other permissible wood defects shall not be considered in assessing the sample.

30.5 The tolerance in size of solid core type flush door shall be as under : In Nominal thickness + 1.2 mm. In Nominal height + 3 mm.

30.6. The thickness of the shutter shall be uniform throughout with a permissible variation of not more than

0.8mm. when measured at any two points.

M-31. Aluminium doors, windows, ventilators

31.1. All minimum alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S. : 733-1975 and also to I.S. Designation WVG-WP. of I.S. 1285-1975. The section

shall be as specified in the drawing and design. The fabrication shall be done as directed.

31.2. The hinges shall be cast or extruded aluminium hinges of same type as in window but of larger size.

31.3. The hinges shall normally be of 50 mm. projecting type. Non-projecting type of hinges may also be used if directed. The handles of door shall be of specified design. A suitable lock for the door operable either from outside or inside shall be provided. In double shutter door, the first closing

shutter shall have concealed aluminium alloy bolt at top and bottom.

M-32. Rolling Shutters

32.1. The rolling shutters shall conform to I.S. 6248-1979. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters upto 3.5 m. width, not less than 1.25 mm. thick and 80 mm wide for shutters upto 3.5 m. in width and above unless otherwise specified.

32.2. Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.

32.3. Hood covers shall be made of M.S. Sheets not less than 0.90 mm. thick. For shutters having width 3.5 Meter and above, the thickness of M.S. Sheet for the hood cover shall be not less than 1.25 mm

32.4. The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc., shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.

32.5. The rolling shutters shall be of self rolling up to 8 sq.m. clear area without ball bearing and up to 12. sq.m. clear area with ball bearing. If the rolling shutters are of larger, then gear operated type shutters shall be used.

32.6 The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.

32.7. The shutters shall be completed with door suspension shafts, locking arrangements. pulling hooks, handles and other accessories.

M-33 Collapsible Steel Gate

33.1. The collapsible steel gate shall be in one or two leaves and as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels etc. Either steel pulleys or ball-bearings shall be provided in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under :

(a) Pickets. These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10 cms.

(b) Pivoted M.S. Bars shall be 20 mm. x 10 mm.

(c) Top and bottom guides shall be from tee or flat iron of approved size.

(d) The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

M-34. Welded Steel Wire Fabric

34.1. Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel wire. "as drawn " or galvanised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S. 4948 - 1974. It shall be fabricated

and finished in workman like manner and shall be free from injurious defects and shall be rust proof. The type of mesh shall be oblong or square as directed. The mesh sizes and sizes of wire for square as well as oblong welded steel wire fabric shall be as directed. The steel wire fabric in panels shall be in one whole piece in each panel as far as stock size permit.

M.-35 Expanded Metal Sheets

35.1. The expanded metal sheets shall be free from flaws, joints, broken strands, laminations and other harmful surface defects. Expanded metal steel sheet shall conform to I.S. 412-1975, except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands

(width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of 1% percent.

35.2. Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coatings to prevent corrosion.

M-36 Mild Steel Wire (Wire Gauze Jali)

36.1. Mild steel wire may be galvanised, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions, and size of wire as specified in item. The wire shall be sound, free from splits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280 - 1978.

M-37 Plywood

37.1. The plywood for general purpose shall conform I.S. 303-1975. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers. 3, 5, 7, 9, etc. The plies are placed so that grain of each layer is at right angles to the grain in the adjacent layer.

37.2. The chief advantages of plywood over a single board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.

37.3. Usually synthetic resins are used for gluing, phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C to 140 degree C and a pressure of 11 to 14 Kg/Sq. Cm. on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness.

37.4. When water glue are used the wood absorbs so much water that the finished plywood must be dried carefully. When synthetic resins are used as adhesive the finished plywood must be exposed to an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

37.5. According to I.S. 303-1975 the plywood for general purpose shall be of the grades namely BWR, WWR and CWR, depending upon the adhesives used for bonding the veneers, and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces, each face being of three kinds namely, A, B and C. After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

37.6. Thickness of plywood Boards :

TABLE

Board Thickness	Board Thickness	Board Thickness	Board Thickness	Board Thickness
3 Ply 3 mm.	5 Ply. 5mm	7 Ply.	9 mm.	9 ply 16 mm.
4 mm.	6 mm.		13 mm.	19 mm.
5 mm.	8 mm.		16 mm.	11 Ply 19 mm.
6 mm.	9 mm.	9 Ply. 13 mm.		25 mm.

M-38 Class

38.1 All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters, and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under :

38.2 Sheet Glass :

38.2.1. In absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg/Sq.m. for panes upto 600 mm x 600 mm

38.2.2. For panes larger than 600 mm. x 600mm. and upto 800 mm. x 800 mm. the glass weighing not less than 8.75 Kg/Sq.m. shall be used. For bigger panes upto 900 mm. x 900 mm. glass weighing not less than 11.25 Kg/sq. m shall be used.

38.2.3. Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes. Shall conform to I.S. : 1761-1960. Sheet glass of the specified colours shall be used. If so shown on detailed glass of specified thickness shall be used.

38.3. Plate Glass :

38.3.1. When plate glass is specified, it shall be " Polished patent plate glass" of best quality . It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed vision and reflection. The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. Shall be admissible.

38.4 Obscured Glass:

38.4.1. This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed.

38.5. Wired Glass:

38.5.1. glass shall be with wire netting embedded in a sheet of plate glass. Electrically welded 1.2 mm. Georgian square mesh shall be used. Thickness of glass shall not be less than 6 mm. Wired glass shall be of type and thickness as specified.

M-39. Acrylic Sheets

39.1 Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be. Panels may be flat or curved. It should be light in weight. It shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Usual light transmittance rate shall be about 95 % Transparency shall not be affected for the sheets of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use. The sheet shall be impact resistant also. Sheets should be of such quality that they can be cut, bent and joined as desired. Solution for the joints shall be used as per the requirement of manufacturer.

M-40 Particle board

40.1. The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to I.S. 3087 - 1976. "Specification for wood particle board for general purpose". The size and the thickness shall be as indicated.

M-41. Expanded polystyrene or framed styrofoam slabs

41.1. The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of sizes, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slab of Thermocole etc.

M-42. Resin bonded fibre glass.

42.1. The resin bonded fibre glass tiles or rolls shall be of approved make and shall be of sizes, thickness and finish as indicated.

42.2. For test of Mineral wool thermal insulation Blanket I.S. : 3144 1965 shall be followed.

42.3. Insulation wool blanket shall be with the following coverings on one or both sides as indicated :

- (1) Bituminised hessian Kraft paper suitable for use in position where moisture has to be excluded.
- (2) Hessian cloth or Kraft paper, for keeping out dust.
- (3) G.I. wire netting, suitable for surfaces to be plastered over.

M-43 Fixtures and

fastenings 43.1. General:

43.1.1. The fixtures and fastening that is, butt, hinges, tee and strap hinges, sliding door bolts, tower bolt door, door latch, bath-room latch, handles, door stoppers, casement window fasteners, casement stays and ventilators catch shall be made of the metal as specified in the item or its specification.

43.1.2. They shall be of iron, brass, aluminium, chromium plated iron, chromium plated brass, copper oxidized iron, copper oxidised brass or anodised aluminium as specified.

43.1.3. The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease of operations.

43.1.4. The samples of fixtures and fastenings shall be got approved as regards, quality and shape before providing them in position.

43.1.5. Brass and anodised aluminium fixtures and fastenings shall be bright finished.

43.2. Holdfasts:

43.2.1. Hold fasts shall be made from mild steel flat 30 cm. length and one of the holdfast shall be bent at right angle two nos. of 6 mm. diameter holes, shall be made in it for fixing it to the frame with screw. At the other end the holdfast shall be forked and bent at right angles in opposite directions.

43.3. Butt hinges :

43.3.1. Railway standard heavy type butt hinges shall be used when so specified. **43.3.2.** Tee and strap hinges shall be manufactured from M.S. Sheet

43.4. Sliding door bolts (Aldrops) :

43.4.1. The aldrops as specified in the item shall be used and shall be got approved.

43.5. Tower bolts (Barrel type) :

43.5.1. Tower bolts as specified in the item shall be used and shall be got approved.

43.6. Door Latch :

43.6.1. The size of door latch shall be taken as the length of latch.

43.7. Bathroom Latch:

43.7.1. Bathroom Latch shall be similar to lower bolt.

43.8. Handle:

The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size of the handle.

43.9. Door Stoppers :

43.9.1. Door stoppers shall be either finor door stopper type or door catch type. Floor stopper shall he of overall size. as specified and shall have a rubber cushion.

43. HI. Dour Calch :

43.10.1. Door catch shal he Fixed at a height of about 900 mm. from the floor level such that one part of the catch is fitted on the inside of the shutter and the other part is fixed in the wall with necessary wooden plus arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside lhe face of the door for easy operation of catch.

43.11. Wooden Door Stop with hinges :

43.11.1. Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall he fixed on the door frame with a hinges of 75 mm. si/e and at a height of 900 mm. from the floor level. The wooden door stop shall be provided with 3 coats of approved oil paint.

43.12. Casement Window Fastener :

43.12.1 Casement window fastener for single leaf window shutter .shall be left or right handed as directed.

43.13. Casement stavs (Straight Ped Stay) :

43.13.1. The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed. Size of lhe stay shall be 250 mm. to 300 mm. as directed.

43.14 Ventiintnr Catch :

43.14.1. The pullem and shape of the catch shall he as approved.

43.15. Pivot

43.15.1. The base and socket plate shall be made fnim minimum 3 mm. thick plale, and projected pivot shall not be less than 12 mm. diameter and 12 mm. length and shall be firmly riveted tii the base plates in case of iron pivot and in single piece base plate in the case of brass pivot.

M-44 Paints

44.1. (A) Oil Paints :

44.1.1. Oil painis shilll he of the specified colour and shade, and ax approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or lini is not availahel while ready mixed paint with approved stainer will he allowed. In such a case. the contractor, shall ensure that the shade of the paint so allowed shall he uniform.

44.1.2. All the paints shall meet with the following general requirements :

(i) Paint shall n(itshi)w excessive setting in a freshly opened lull can and shall ea-sily he redispresed with apaddle in a smooth homogeneous slate. The paint shall show no curdling, livering, caking or colour separation and shall he free from llimps and skins.

(ii) The paint a.s received shall brush easily, posses good levelling properties and show nn running or sagging tendencies.

(iii) The paint shall not skin within 48 hours in a three quarters filled closed container.

(iv) The paint shall dry to a smooth uniform Finish free lorm rooughness. grit. unevenness and other imperfections.

44.1.3. Ready mixed paint shall he used exactly a-s received from lhe manufacturers and generally according to their instructions and without any admixtures whatsoever.

44.2. (B) Enamel Paints:

44.2.1. The enamel paint shall satisfy in general requirements in speciricalion of oil paints. Enamel paint shall conform lo I.S. 2933 - 1975.

M-45 French Polish

45.1. The french polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials ;

(i) Denatured spirit of approved quality (ii) Chandra-s (iii) Pigment.

45.2. The french polish so prepared shall conform to I.S. 348 - 1968.

M-46. Marble chips for marble mosaic terrazzo

46.1. The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering.

46.2 The size of various colours of marble chips ranging from the smallest up to 20 mm. shall be used where the thickness of top wearing layer is 6 mm. or more. The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.

46.3. The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above, the chips shall conform to I.S. : 2114-1962

M-47. Flooring Tiles

47.1. (A) Plain Cement tiles ;

47.1.1. The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards. **47.1.2.** The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to pressure of not less than 140 Kg/Sq. Cm. The proportion of cement to aggregate in the backing of the tiles shall be not less than 1:3 by weight. The wearing face, through the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm. size. The proportions of cement to aggregate in the wearing layer of the tiles shall be three parts of cement to one part chips by weight. The minimum thickness of wearing layer shall be 7 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tile shall be kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. : 1237- 1980 regarding strength, resistance to wear and water absorption.

47.1.3. The wearing face of the tiles shall be plane, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.

47.1.4. The size of tiles shall generally be square shape 24.85 Cm x 24.85 Cm or 25 Cm x 25 Cm. the thickness of tiles shall be 20 mm.

47.1.5. Tolerance of length and breadth shall be plus or minus one millimeter. Tolerance on thickness shall be plus 5 mm.

47.1.6. The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S.:1237-1980

47.2. (B) Plain Coloured Tiles :

47.2.1. These tiles shall have the same specification as for plain cement tiles as per (A) above except that they shall have a plain wearing surface wherein pigments are used. They shall conform to I.S. 1237-1980.

47.2.2. The pigments used for colouring cement shall not exceed 10 percent by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete.

47.2.3. The colour of the tiles shall be specified in the item or as directed.

47.3. <C> Marble Mosaic Tiles :

47.3.1. these tiles have same specification as per plain cement tiles except the requirements as stated below:

47.3.2. The marble mosaic tiles shall conform to I.S. 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

47.3.3. Chips used in the tiles be from smallest upto 20 mm. size. The minimum thickness of wearing layer of tiles shall be 10 mm. For pattern of chips to be had on the wearing face, a few samples with and without their full size photographs as directed shall be presented to the Engineer-in-charge for approval.

47.3.4. Any particular samples, if found suitable shall be approved by the Engineer-in-charge, or he may ask for a few more samples to be presented. The samples shall have to be made by the contractor till a suitable sample is finally approved for use in the work. The Contractor shall ensure that the tiles supplied for the work shall be in conformity with the approved sample only. In terms of its dimensions, thickness of backing layer and wearing surface materials, ingredients, colour, shade, chips, distribution etc. required.

47.3.5. The tiles shall be prepared from cement conforming to Indian Standards or coloured portland cement generally depending upon the colour of tiles to be used or as directed.

47.4. (D) Chequered Tiles :

47.4.1. Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C.) except as mentioned below:

47.4.2. The tiles shall be of nominal size of 250 mm. x 250 mm. or as specified. The centre to centre distance of chequer shall not be less than 25 mm. and not more than 50 mm. The overall thickness of the tile shall be 22 mm.

47.4.3. The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be plain, coloured or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 10 mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4. Tiles shall conform to relevant I.S. 1237-

1980. 47.5.(E) Chequered Tiles For Stair Cases :

47.5.1. The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects:

- (1) The length of a tile including nose shall be 330 mm.
- (2) The minimum thickness shall be 28 mm.
- (3) The nosing shall have also the same wearing layer as at the top.
- (4) The nosing edge shall be rounded.
- (5) The front portion of the tile for a minimum length of 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm. Beyond that the tiles shall have normal chequer pattern.

M-48. Rough Kotah Stone

48.1. The Kotah stone shall be hard even, sound, and regular in shape generally uniform in colour. The colour (if the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins, cracks or flaws.

48.2. The size of the stones to be used for flooring shall be of size 600 mm. x 600 mm. and/or size 600 mm. x 450 mm. as directed. However smaller sizes will be allowed to be used to the extent of

maintaining required pattern. Thickness shall be as specified.

48.3. Tolerance of minus 30 mm. on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be + 3 mm.

48.4. The edges of stones shall be truly chiselled and laid with coarse sand before paving. All angles and edges of the stones shall be true, square and free from chipping and the surface shall be true and plain.

48.5. When machine cut edges are specified, the exposed and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall be uniform.

M-49. Polished Kota Stones

49.1. Polished Kota stone shall have the same specification as per rough kota stone except as mentioned below:

49.2. The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado skirting, sink, veneering, sills, steps, etc., where machine polishing after the stones are fixed in situ is not possible shall be double polished.

M-50. Dholpur Stone Slab

50.1. Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and of uniform colour.

50.2. The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provisions in respect of polishing as for polished kota stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiselled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.

50.3. The sample of stone shall be got approved by the Engineer-in-charge for a particular work. It shall be ensured that the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51 Marble Slab

51.1. Marble slab shall be white or of other colour and of best quality as approved by the Engineer-in-charge.

51.2. Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.

51.3. Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slab shall be minimum 450 mm. x 450 mm. and preferably 600 mm. x 600 mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.

51.4. The slab shall not be thinner than the specified thickness at its thinnest part. A few specimens of finished slab to be used shall be deposited by the Contractor in the office for reference.

51.5. Except as above, the marble slabs shall conform to I.S. 1130-1969.

M-52 Granite Stone Slab

52.1. Granite shall be of approved colour and quality. The stone shall be hard, even sound and regular in shape and generally uniform in colour. It shall be without any soft veins, cracks or flaws.

52.2. The thickness of the stone shall be as specified in the items.

52.3. All exposed faces shall be duly polished to render truly smooth and even reflecting surface.

The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

M-53. P. V. C. Flooring

53.1. P.V.C. Sheets for P.V.C. floor covering shall be of homogeneous flexible type, conforming to I.S.3462-1966. The PVC covering shall neither develop any toxic effluents while put to use nor shall give off any disagreeable odour.

53.2. thickness of flexible type covering tiles shall be as specified in the description of the item.

53.3. The flexible type shall be backed with jute or other woven fabric. The following tolerances shall be applicable on the nominal dimensions of the rolls or tiles :

(a) Thickness : + 0.15 mm

(b) Length or Width :

1. 300 mm. Square tiles + 0.20 mm. 3.900 mm. square tiles + 0.60 mm. 2. 600 mm. Square tiles + 0.40 mm. 4. Sheets and roll + 0.10 percent.

53.4. Adhesive :

53.4.1. The adhesive for PVC flooring shall be of the type and make recommended by the manufacturer of PVC sheets/tiles.

M-54. Facing Tiles

54.1. The facing tiles (Burnt- clay facing bricks) shall be free from cracks and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces; The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than four stretcher bricks each representing the texture desired. The facing tiles shall have a pleasing appearance, sufficient resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.

54.2. The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tile shall be provided with frog which shall conform to I.S. 1077-1976.

54.3. The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tile shall be provided with frog which shall conform to I.S. 1077-1976

54.4. The permissible tolerance in dimensions specified above shall be as follows :

Size	Tolerance for	
	1st class Brick	2nd Class Brick
19 cm.	+ 6 mm.	+ 10 mm.
9 cm.	+ 3 mm.	+ 7 mm.
4 cm.	+ 1.5 mm.	+ 3mm.

The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows :

Facing dimensions	Permissible tolerance	
Max. below 19 cms.	max. 2.5. mm.	-do-
above 19mm.	Max. 3.0. mm.	

54.5. The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure laid as per I.S. 1077-1976 shall be not less than 175 Kg/Sq. Cm. The average compressive strength of any individual bricks shall be not less than 160 Kg/Sq.Cm.

54.6. The average water absorption for five bricks tiles shall not exceed 12 percent of average weight brick before testing. The absorption for each individual bricks shall not exceed 25 percent.

54.7. The brick tiles when tested in accordance with I.S. 1077-1976. the rate of efflorescence shall not be more than "Slightly effloresced."

M-55. White Glazed Tiles]

55.1. The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing shall be of uniform shade.

55.2. The tiles shall be nominal size of 150 mm x 150 mm. unless otherwise specified. The maximum variation from the stated size, other than the thickness for tiles shall be plus or minus 1.5 mm. The thickness of tiles shall be 6 mm. Except as above the tiles shall conform to I.S. 777-1970.

M-56 Galvanised Iron pipes and fittings

56.1. Galvanised iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps screw and all galvanised iron fittings shall be of the standard 'R' of equivalent, make.

M-57 Bib cock and stop cock

57.1. A bib cock is a draw off tap with a horizontal inlet and free outlet. A stop cock is a valve with a suitable means of connection for insertion in a pipe line for controlling or stopping the flow.

57.2. They shall be screw down type and of brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781 - 1977 and they shall be of best Indian make. they shall be polished bright

57.3. The minimum Finished weight of bib cock and stop cock shall be as given below :

Diameter	Bib cock	Stop cock	Diameter	Bib cock	Stop cock
8 mm	0.25 kg	0.25 kg	15 mm	0.40 kg.	0.40 kg.
10 mm	0.30 kg	0.35 kg	20 mm	0.75 kg	0.75 kg.

M-58. Gun metal wheel valve

58.1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These conform to I.S. 778-1971.

M-59 White glazed procelain wash basin

59.1. Wash basin shall be of white procelain first quality best Indian make and it shall conform to IS 2556 - (Part-IV)-1972 and I.S. 771-1979. The size of the wash basin shall be as specified in the item. Wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either reamed or bevelled internally with 65 mm. diameter at top and 10 mm depth to suit the waste tiling. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.

59.2. White glazed pedestal of the quality and colour as that of the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and waste pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

M-60 European type water closet/with low level flushing

60.1. The European type water closet shall be white glazed porcelain first quality and shall be of Wash down type conforming to I.S. 2556-1973 and I.S. 771 - 1979.

60.2. S'trap shall be provided as required with water seal not less than 50 mm. The solid plastic seal and cover shall be of best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blister, and surface defects and shall have chromium plated brass hinges and rubber gasket of suitable size.

M-61. Orissa Type Water Closet

61.1. The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1981 and relevant specification of Indian type water closet except that pan will be with the integral squatting pan of size 580 mm. x 440 mm. with raised footrest.

M-62. Indian type water Closet

62.1. The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 (Part - II) 1981. Each pan shall have integral flushing. It shall also have an inlet at back or front for connecting flush pipe as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth : Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. water seal and 50 mm. diameter vent horn.

M-62. A. Foot Rests

62.A.1. A pair of white glazed earthen ware rectangular foot of minimum size 250 mm. x 130 mm. x 20 mm shall be provided with the water closet M-63. Glazed Earthen ware Sink

63.1. The glazed earthen- ware sink shall be of specified size, colour and quality. The sink, shall conform to IS. 771 part - II 1979. The brackets for sinks shall conform to I.S. 775-1970.

63.2. The pipes shall conform to I. S. 1239-Pan-11973 and I.S. 404-1962 for steel and lead pipes respectively 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

M-64. Glazed earthen-ware Lipped typed flat back urinal/ Corner type urinal

64.1. The lipped type urinal shall be Hat back or corner type as specified in the item and shall conform to I.S. 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back or corner type urinal must be of 1st quality free from any defects, cracks etc.

M-65. Low Level Enamel Flushing Tank

65.1. The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm. diameter. The outlet shall be connected with W.C Pan by lead pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over-flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

M-66. Cast Iron flushing cistern.

66.1. The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects. The flushing cistern shall have outlet of 32 mm. diameter. The lead pipe shall conform to I.S. 404 (part-I) 1962. For fixing G.I. inlet pipes and overflow pipe 20mm. dia inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive

paint and two coats of paints-The flushing cistern shall be fixed on two C.I. brackets. The C.I. brackets shall conform to I.S. 775-1970.

M-67 Flush cock

67.1 Half lum flus cock (Heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standard.

M-68. Cast iron pipes and fittings

68.1. All soil, water, vent and antisiphonage pipes and fitting shall conform to I.S. 1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fittings shall be true to shape. smooth, cylindrical, theie inner and outer surfaces being as nearly as practicable concentric. They shall be

sound and nicely cast and shall be free from cracks, laps, pinholes or other imperfectionand shall be neatly dressed and carefully fettled.

68.2. The end of pipes and fittings shall be reasonalble square to their axis.

68.3. The sand cast iron pipes shall be of the diameter as specified in the description and shall be in lengths of 1.5 M., I.K M. and 2 M. including socket ends of the pipe unless shorter lengths are cither specified or required at junctions etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

68.4 Tolerances :

68.4.1. The Standard weights and thickness of pipes shall be as shown in the following table: A tolerance upto minus 10 per cent may however be allowed against these standard weights.

Sr. No.	Nominal dia. Or bore	Thickness	Overall	Weight of Pipe	Excluding ear
			1.5 m.long	1.8m. long	2 m.long
1	75mm.	5.0 mm.	12.83 Kg.	16.52 Kg.	18.37 Kg
2	100 mm.	5.0 mm.	18.14 Kg.	21.67 Kg.	24.15 Kg.

68.4.2. A tolerance upto minus 15 percent in thickness and 20 mm. in length will he allowed. For nuings tolerance in lengths shall be plus 25 mm. and minus 10mm.

68.4.3. The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

M-69. Nahni Trap

69.1. Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which effect serviseahility. The thickness of the base metal shall not be less than 6.5 mm. The surface shall he smooth and free from craze, chips and other Haws or any other kind of defects which at feet serviceability. The size of nahni trap shall be as specified and shall be of self cleaning design.

69.2. The nahni trap shall be of quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

69.3. The nahni trap provided shall be with deep seal, minimum 50 mm. except at places where trap with deep seal cannot be accommodated. The cover shall be cast iron perforated cover shall he provided on Ue trap of appropriate size.

M'70. Gully Trap

70.1. Gully trap shall conform to I.S. 651-1980. It shall be sound, free from defects such as fire cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear not when struck with light hammer. There shall be no broken blisters.

70.2. The size of the gully trap shall be as specified in the item.

70.3. Each gully trap shall have one C. I. grating of square size corresponding to the dimensions, of inlet of gully trap. it will also have a water tight **C.I.** cover with frame inside dimensions 300 mm. x 300 mm. **the** cover with frame inside dimensions 300 mm. x 300 mm. the cover weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

M-71 Glazed Stone Ware Pipe And Fittings

71.1. The pipes and fittings shall be to best quality as approved by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The thickness of the wall shall not be less than 1/12th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe.

71.2. The pipes shall generally conform to relevant I.S. 651-1980.

M-72. Wail Peg Tail

72.1. The aluminium wall peg rail shall have three aluminium pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm. x 75 mm. x 20 mm. **The** teakwood shall be trench polished or oil painted as specified.

M-73. G.I. Water Spout

73.1. The G.I. pipes of 40 mm. dia. shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best approved quality.

73.2. The pipe shall have length as required for the thickness of wail in which it is fixed, and at outside end tee and bend cut at half the length shall be provided and at other end. coupling shall be provided to have better fixing. The water spout shall be provided as per detailed drawing or as directed.

M-74. Asbestos Cement Pipe (A.C. Pipe)

74.1. The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Special like bends, shoes, cowls, etc. shall conform to relevant Indian Standards. The interior of pipe shall have smooth finish, regular surface and regular internal **diameter**. The tolerance in

all dimensions shall be as per I.S. 1626-Part-I-1980.

M-75. Crydon Bail valve

75.1. Ball valve of screwed type including polythene float and necessary level etc. shall be of the size as **mentioned in the description of item** and shall conform I.S. 1703-1977.

M-76rt. Bitumen Felt For Water Proofing And Damp Proofing

76.1. bitumen felt shall be on the Fibre bases and shall be of type 2. self finished **felt grade-2** and shall conform to I.S. 1322-1970.

M-77. Selected Earth

77.1. The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the item. If item does not indicate anything the selected earth shall have to be brought from outside.

77.2. The selected earth **shall** be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. **It** shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of **50 mm.** or less. Contractor shall make his own arrangement at his own cost for

land for horrowing selected earth. The stacking of material shall be as directed by the Engineer-in-charge in such a way as not to interfere with any constructional activities and in proper stacks.

77.3. When excavated material is to be used, only selected stuff got approved from the Engineer-in-charge. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

M-7S. Barbed Wire

78.1. The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of type-1 whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.4 mm. The nominal distance between the barbs shall be 75 mm. unless otherwise specified in the item. The barbed wire shall be formed by twisting together two line wires, one containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed ± 0.05 mm.

78.2. The barbs shall carry four points and shall be formed by twisting two point wires, each two turns, lightly round one line wire, making altogether four complete turns. The barbs shall be so finished that the four points are set and locked at right angles to each other. The barbs shall have a length of not less than 13 mm. and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree to the axis of the wire forming the barbs.

78.3. The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanised. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be

less than 15 meters. **78.4.** The lengths per 100 Kg. of barbed wire I.S. I shall be as under: Nominal 1000 metre. Minimum 934 Metre. Maximum 1066 Metre.

SECTION - 4

Excavation

4.0.0. (A) Excavation for foundation upto 1.5 M. depth including sorting out and stacking of useful materials and disposing of the stuff upto 50 meter lead in loose or soft soil.

1.0. General

1.1. Any soil which generally yields to the application of pickaxes and shovels, spades, rakes or any such ordinary excavating implement or organic soil, gravel, silt, and turf loam, clay, peat etc. fall under this category. **2.0. Clearing the site**

2.1. The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be property of the Government and shall be conveyed and stacked as directed within 50 m. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2. The rate of side clearance is deemed to be included in the rate of earth work for which no extra will be paid.

3.0. Setting out. After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Contractor shall supply labours, materials, etc., required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0. Excavation

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be levelled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed or bringing it to level, if by mistake or any other reason excavation is made deeper or wider

than that shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up to 1.5 m. depth shall be measured under this item.

5.0. Disposal of the excavated stuff

5.1. The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

5.2. The balance of the excavated quantity shall be removed by the contractor from the site or work to a place as directed with lead up to 50 M. and all lift.

6.0. Mode of measurements & payment.

6.1. The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per section given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

6.2. The rate shall be for a unit of one cubic metre.

4.0.0. (B) : Excavation for foundation up to 1.5 M depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50 metre lead in dense or Hard Soil.

1.0. Dense or Hard Soil

Any soil which generally require close application of picks or jumpers or screwdrivers to loosen it stiff, clay, gravel, and rubble stone etc. fall under this category.

2.0. Workmanship The relevant specifications of item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out in dense or hard soil.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

3.2. The rate shall be for unit of one cubic metre.

4.0.0. (C) Excavation for foundation up to 1.5 M. depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50 metre lead in Hard Murrum.

1.0. Hard murrum

The hard murrum shall be clean of good binding quality and of approved quality obtained from approved quarries, of disintegrated rocks which contain silicious materials and natural mixture of clay of calcareous origin. The size of hard murrum shall not be more than 20 mm.

2.0. Workmanship

The relevant specification of item No. 4.0.0. (A) shall be followed except that the excavation work

shall be curied in hard murrum.

3.0. Mode of measurements & payments

3.1. The relevant specifications of item No. 4.0.0. (A) shall he followed.

3.2. The rate shall be for a unit for one cubic metre.

4.0.0. (D»: Excavation for foundation upto 1.50 M. depth including sorting out **and** stacking of useful **materials and disposing of the excavated stuff upto 50 meter lead-Soft Rock not requiring blasting.**

1.0. Workmanship

1.1. The relevant specification of item No. 4.0.0. (A) shall be followed except that the excavation shall be carried out tor foundation upon 1.5 M. lift in soft rock not requiring blasting.

1.2. The excavation in soft or disintegrateed rock shall be caried out by crow bars, **pickaxesor pneumatic** drills or any other suitable means.

13. If contractor desires to resort to blasting, he can do so with permission of the Engineer-in-charge but nothing extra shall be paid to him.

1.4. The materials available from soft rock excavation shall be properly stacked within 50 M. lead and 1.5 M-lift and shall be the properly of department.

1.5. The classification of strata of the foundation soil shall be done by the Engineer-in-charge and shall be acceptable to the cntractor.

1.6. However this shall include the type of rock and boulder which may quarried or split with crow bars. Laterite and conglomerale also come under this category.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 4.0.0.(A) shall he followed.

2.2. The rate shall be for a unit of one cubic metre.

4.0.0.(E) : Excavation for foundation upto 1.5 M. depth including sorting out and stacking of useful material and disposing of the excavated stuff upto 50 meter lead in Hard Rocks. I.f/M Workmanship

1.1. The relevant specification of item No. 4.0.0. (A) shall be followed except that the excavation for foundation work shall he carried out in hard rock.

1.2. Excavation shall he done by balsling to the dimension s shown in the drawings or as directed. The blasting shall be carried out only with written permission of the Engineer-in-charge. All the laws, regulations etc, pertaining to the precautions, acquisition, transport , landing and use of explosive shall be rigidly followed- The Magazine for

the storage for the explosive shall be built to the design and specifications of explosive authority and loaded at the approved site. No unauthorised persons shall be admitted into the magazine and when not in use it shall be kept securely locked. No matches or imflamble materials shall be allowed in Magazine. The Magazine shall have an

effective lightening conductor. The rules or explosives 1940 revised from time to time shall be followed strictly for obtaining, starting, handling, undertaking blasting work.

1.3. The contractor shall be responsible for damage to properly, workmen public due to any accident due to use of explosives and operations.

1.4. Precautions

1.4.1. The blasting operation shall remain in charge of competent and experienced supervisor and workmen who are thoroughly acquainted with the detail of handling explosives and balstin g operations. The blasting shall he arried out during fixed hours of the day, preferably during the mid-day lunch hours or at the close of the work as

ordered in writing by the Engineer-in-charge, the hours of blasting shall be notified in advanmce to the people in the vicinity. All the charges shall be prepared by the men in charge only.

1.4.2. Red danger flags shall be displayed prominently in all directions during the blasting operations.

1.4.3. People except those who actually light the fuse shall be prohibited from entering into this area. The flags **shall** be stationed at 200 m. from the firing site in all directions and all persons including workmen shall be excluded from the flagged area at least 10 minutes before the firing warning whistle being sounded for this purpose-

1.4.4. During excavation in rock by blasting, the lowest 15 cm of the strata shall be blasted with light charges so as not to shatter or weaken the underlying rock on which the foundation will be actually laid. If excavation in rock is done 10 larger widths and length than those shown on the drawings or directed, no payment shall be made for such over break. If excavation is done to depths greater than shown on the drawings or directed, excess depth shall be made up with foundation grade concrete as directed at the contractor's cost.

1.4.5. Each charged hole shall be drilled to the required depth and in suitable places when blasting is done with powder, the fuse cut to the required length shall be inserted in the holes and the powder dropped in. The powder shall be gently tamped with copper rod with rounded ends. The explosive powder shall then be covered with trapping materials which shall be tamped lightly but firmly. When blasting is done with dynamite and other high explosives, dynamite cartridges shall be prepared by inserting the square cut ends of fuse into the detonator, and finished with dippers at the open ends. The detonator should be gently pushed into the primer leaving one third of the copper exposed outside. The primer shall be housed into the explosive. Bore holes shall be of such size that the cartridges can be easily passed down. The holes shall be cleared of all debris and explosive inserted. The space for about 20 cms. above the charge shall then be gently tilled with dry clay pressed home and rest of the tamping is tinned with any convenient materials gently tilled with dry clay pressed home and rest of the tamping is firmed with any convenient materials gently packed with a wooden cover.

1.4.6. At a time not more than 10 such charges shall be prepared and fired. The man in charge shall blow a whistle in a recognised manner for cautioning the people. After the people shall then be required to move to safe distances. The charges shall be lighted by the man in charge only. The man in-charge shall count the number of explosions. He shall satisfy himself that all the charges have been exploded before allowing the workmen to go to the work site.

1.4.7. The contractor shall be fully responsible to **strictly follow the prevailing** rules and procedures regarding blasting procedures.

1.5. Misfire

1.5.1. In case of a misfire the following procedure shall be observed

1.5.2. Sufficient time shall be allowed to account for the delayed blast. The man in charge shall inspect all the charges and determine the missed charge.

1.5.3. If it is the blasting powder charge it shall be completely flooded with water. A new hole shall be drilled at a point 5m. from the old and fired. This should blast the old charge. Should it not blast the old charge, the procedure still is repeated till the old charge is blasted.

1.5.4. In case of charge of gelatine, dynamite etc., the man in charge shall gently remove the tamping and the primer with detonator and primer shall then be used to blast the charge. Alternatively the hole may be cleared of one foot of tamping and the direction then ascertained by placing a stick in the hole. Another hole may then be drilled 15cm. away and parallel to it. The man in charge shall report to the office all cases of misfire and cause of the same and what steps were taken in connection therewith.

1.5.6. If a misfire has been found to be due to defective detonator or dynamite, the whole quantity in the box from which defective article was taken must be sent to authority as directed for inspection to ascertain whether all the remaining materials in the box are also defective or not.

1.6. Accidents :

1.6.1. The contractor shall be solely responsible for any accident during the entire procedure of handling explosive and blasting and shall pay necessary compensation to persons affected or damage to lands to properly etc. due to the blasting, without extra claims on the department.

1.7. Account:

1.7.1, a careful and day today account to explosives shall be maintained by the contractor in an approved manner and shall be open to inspection of the Engineer-in-charge. Surprise visits may also be paid by the Engineer-in-charge to the storage and in case of any unaccountable shortage or unsatisfactory accounting, the contractor shall be liable to be penalised by forfeiture of part or whole of his Security Deposit or by cancellation of tender in which case he shall not be entitled for any compensation.

1.8 Disposal of Excavated Materials :

1.8.1. No materials excavated from foundation trenches of whatever kind they may be, are to be placed even temporarily nearer than 1.5 m. or distance prescribed by the Engineer from the outer edge of excavation. All materials excavated shall remain the property of Government. Rate for excavation includes sorting out of useful materials and slacking them separately as directed within the specific lead. Materials suitable and useful for backfilling or other use shall be slacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

1.8.2. Disposal of excavated materials is subject to the following :

Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead of 50 metres as directed. Useful materials obtained from clearing site and excavation shall be stacked within a lead of 50 M. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 M. from the structure for reuse. Useful stones from rock excavation shall be stacked neatly within a lead of 50 M. and will be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at a mutually agreed rates if there are no such rates in the schedule of rates.

1.8.3. If surplus materials are required to be conveyed beyond 50 M. conveyance will be paid for under a separate item.

2.0. Mode of measurements & payment

2.1. The work shall be measured for the work limited to the dimensions on drawings or directed, excavation to dimension in excess of the above will not be measured or paid for and if so ordered by the Engineer, the contractor shall have to fill up the excess depth with cement concrete specified for foundation without extra payment.

2.2. Driving of sounding bars, drill holes to explore the nature of substratum upto a total length of meter distributed in 2 or 3 places in each foundation if necessary, will be considered incidental work and will not be paid for separately.

2.3. Removal of slips and blows in the foundation trenches will not be measured or paid for.

2.4.1 If it is necessary in the opinion of the Engineer-in-charge to carry foundation below the levels shown on the plans, the excavation for the first 1.5 M. of additional depth will be included in the quantity for the particular classification and will be paid for as extra work at rate to be decided under the general conditions of contract unless the contractor is willing to accept payment at tendered rates.

2.5. The rate shall be for a unit of one cubic metre. **4.0.0.1. (A):** Excavation for foundation for depth from **1.5 M.** to 3.0 M. including sorting out and stacking of useful materials and disposing of the excavated **stuff upto** 50 M. lead loose or soft soil.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out in loose or soft soil with lift 1.5 M to 3.0 M **2.0 Mode of measurement & payment**

2.1. The relevant specification of item NO. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 1.5 M. to 3.0 M shall be measured under this item. -^

2.3. The rate shall be for a unit of one cubic metre. 4.0.0.1. (B) : Excavation for foundation for depth from 1.5 M. to **3.0 M.** including sorting out and **stacking of useful materials and disposing of the excavated stuff upto 50 M.lead in Dense or Hard soil.**

S.O. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (B) shall be followed except that the excavation work ' shall be carried out in loose or soft soil with lift 1.5 M to 3.0 M. lift in dense or hard soil.

2.0 Mode of measurement & payment

2.1. The relevant specification of item NO. 4.0.0. (A) shall **be** followed.

2.2. The excavation work of from 1.5 M. to 3.0 M shall be measured under this item.

2.3. The rate shall be for a unit of one cubic metre.

4.0.0.1. (C): Excavation for-foundatipn for depth from 1.5 M. to 3.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Hard Murrum.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out from 1.5 M. to 3.0 M. lift in hard murrum.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 1.5 M to 3.0 M. shall be measured under this item.

2.3. The rate shall be for a unit of one cubic metre.

4.0.0.1. (D): Excavation for foundation for depth from 1.5 M. to 3.0 M. including sorting our and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in soft rock not required blasting.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (D) shall be followed except that the excavation work shall he carried out in loose or soft soil with lift **1.5 M to** 3.0 M. lift in soft rock nut required blasting.

2.0 Mode of measurement & payment

2.1. The relevant specification of item NO. 4.0.0. (A) shall he followed.

2.2. The excavation work of from 1.5 M. to 3.0 M shall he measured under **this item.**

2.3. **The rate** shall be for a **unit of one cubic metre.**

4.0.0. I.(E): Excavation for foundation for depth 1.5 M. to 3.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Hard Rock.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (E) shall be followed except that the excavation work shall he carried out from 1.5 M. to 3.0 M. lift in hard rock.'

2.0. Mode of measurement & payment

2.1.The relevant specifications of item No. 4.0.0.(A) .shall he followed.

2.2. The excavation work of from 1.5 M. to 3.0 M. lift shall be measured under this item.

2.3. The rate shall be for a unit of one cubic metre.

4.002. (A): Excavation for foundation for depth from 3.0 M. to 5.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in loose or Soft Soil.

f.O. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (A) shall be followed except that the excavation work shall be carried out from 3.0 M. to 5.0 M. lift in loose or soft soil.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 3.0 M. to 5.0 M. lift shall be measured under this item.

2.3. The rate shall be for a unit of one cubic metre.

4.002. (B): Excavation for foundation for depth from 3.0 M. to 5.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Dense or Hard soil.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0. (B) shall be followed except that the excavation work shall be carried out from 3.0 M. to 5.0 M. lift in Dense or Hard soil.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 3.0 M. to 5.0 M. shall be measured under this item. **2.3.** The rate shall be for a unit of one cubic metre.

4.002. (C): Excavation for foundation for depth from 3.0 M. to 5.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Hard Murrum.

1.0. Workmanship

1.1. The relevant specification of item No. 4.0.0. (C) shall be followed except that the excavation work shall be carried out from 3.0 M. to 5.0 M. lift in hard murrum.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 3.0 M. to 5.0 M. shall be measured under this item.

2.3. The rates shall be for a unit of one cubic metre.

4.002. (D): Excavation for foundation for depth from 3.0 M. to 5.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Soft Rock not requiring blasting.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0.(D) shall be followed except that the excavation work shall be carried out from 3.0 M. to 5.0 M in soft rock not requiring blasting.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0.(A) shall be followed.

2.2. The excavation work of from 3.0 M. to 5.0 M. shall be measured under this item.

2.3. The rates shall be for a unit of one cubic metre- **4.002. (E): Excavation for foundation for depth 3.0 M. to 5.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Hard Rock.**

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0.(E) shall be followed except that the excavation work shall be carried out from 3.0 M. to 5.0 M. lift in Hard Rock.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The excavation work of from 3.0 M. to 5.0 M. shall be measured under this item.

2.3. The rate shall be for a unit of one cubic metre. **4.003. (A): Extra** for additional depth of more than 5.0 M. for excavation for foundation including sorting out and stacking of useful materials and disposing of the **Excavated stuff upto 50 M. lead in**

Loose or Soft Soil.

1.0. Workmanship

1.1. The relevant specifications of item No. **4.0.0. (A)** shall be followed except that the excavation work shall be carried out from 5.0 M. lift in loose or soft soil.

2.0 Mode of measurement & payment

2.1. The relevant specifications of item No. **4.0.0. (A)** shall be followed.

2.2. The rate shall be paid extra over and above the rate of item No. 4.002 (A) for carrying out excavation work for additional depth from 5.0 M. and above.

2.3. The rate shall be for a unit of one cubic metre per metre. **4.003. (B): Extra for additional depth more than 5.0 M. for excavation for foundation including**

sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Dense or Hard soil

1.0 Workmanship

1.1. The relevant specification of item No. 4.0.0. (B) shall be followed except that the excavation work shall be carried out from 5.0 M. lift in dense or Hard soil.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item NO. 4.0.0.(A) shall be followed.

2.2. The rate shall be paid extra over and above the rate of item NO. 4.002. (B) for carrying out excavation work for additional depth from 5.0 M. and above.

2.3. The rate shall be for a unit of one cubic metre per metre. **4.003. (C): Extra for additional depth of more than 5.0 M. for excavation for foundation including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50**

M. lead in Hard Murrum.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0.(C) shall be followed except that the excavation work shall be carried out from 5.0 M. lift in hard murrum.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0. (A) shall be followed.

2.2. The rate shall be paid extra over and above the rate of item No. 4.002(C) for carrying out excavation work of additional depth from 5.0 M. and above.

2.3. The rates shall be for a unit of one cubic metre per metre.

4.003. (D): Extra for additional depth more than 5.0 M. for excavation for foundation including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Soft Rock not requiring blasting.

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0.(D) shall be followed except that the excavation work shall be carried out from 5.0 M. lift in soft rock not requiring blasting.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.0.0.(A) shall be followed.

2.2. The rate shall be paid extra over and above the rate of item No. 4.002 (D) for carrying out excavation work for additional depth from 5.0 M. and above.

2.3. The rates shall be for a unit of one cubic metre per metre. **4.003. (E): Extra for additional depth of more than 5.0 M. for excavation for foundation including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. lead in Hard Rock.**

1.0. Workmanship

1.1. The relevant specifications of item No. 4.0.0.(E) shall be followed except that the excavation work shall be carried out from 5.0 M. lift in hard rock.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 4.U.U. (A) shall be followed.

2.2. The rate shall be paid extra over and above the rate of item No. 4.002 (E) for carrying out excavation work for additional depth from 5.0 M. and above.

2.3. The rates shall be for a unit of one cubic metre per metre.

4.12. Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations, etc., in layers not exceeding 20 CM. depth, consolidating each deposited layer by ramming and watering.

1.0. Workmanship

1.1. The earth to be used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken.

1.2. As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc., and filled with earth in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

1.3. The plinth shall be similarly filled with earth in layers not exceeding 20 Cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

1.4. The finished level of filling shall be kept to shape intended to be given to floor.

1.5. In case of large heavy duty flooring like factory flooring the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

1.6. The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for tilling the plinth.

2.0. Mode of Measurement & payment

2.1. The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

2.2. The rate shall be for a unit of one cubic metre.

4.24. Filling in plinth with sand under floors including watering, ramming consolidating and dressing etc. complete.

1.0 Materials

1.1. Sand shall conform to M.6

2.0 Workmanship

The relevant specifications of item No. 4.12 shall be followed except the sand shall be tilled in under floors, including watering, ramming, consolidating and dressing etc. complete.

3.0. Mode of measurement & payment

3.1. The relevant specifications of item No. 4.12 shall be followed.

3.2. The rate includes cost of collecting, carting sand with all lead and labour for filling the same in plinth under floors.

3.3. The rate shall be for a unit of one cubic metre.

4.004. Filling in foundation and plinth with murrum or selected soil in layers of 20 cm. thickness including watering, ramming and consolidating etc., complete.

1.0. Materials

1.1. Murrum shall be clean, of good binding quality and of approved quality obtained from approved pits/quarries of disintegrated rocks which contain siliceous material and natural mixture of clay of calcareous origin. The size of murrum shall not be more than 20 mm.

2.0. Workmanship

2.1. The relevant specifications of item No. 4.12 **shall** be followed except that the murrum or selected soil shall be filled in foundations and plinth in 20 cms. layer including consolidating, ramming, watering, dressing etc. complete.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 4.12 shall be followed.

3.2. The rate includes cost of collecting and caning murrum/ or selected earth of approved quality with all lead and labour required for filling in trenches and plinth.

3.3. Rate shall be for a unit of one cubic meter.

4.005. Filling in foundation and plinth with brick-bats/chhara in layers of 20 cms. Thickness including

watering, ramming and consolidating etc., complete.

1.0. Materials

Brick hats shall conform to M. 14.

2.0 Workmanship

.The relevant specification of item No. 4.12 shall be followed except that brick bats of burnt bricks shall be filled in foundation and plinth in 20 cms layer including watering, ramming, consolidating, etc. complete.

3.0. Mode of measurements and payment

3.1. The relevant specification item-No. 4.12 shall be followed.

3.2. The rate includes cost of collecting and carting brick bats/chhara with all lead and labour required for filling in trenches and plinth.

3.3. The rate shall be for a unit of one cubic metre.

4.27. Boring holes 3.5 M. deep in ordinary soil (for cast in situ piles) and getting out the soil and disposal of the surplus excavated soil as directed within a lead of 50 M. for following diameter for piles, (i) 200 mm. (ii) 250 mm. (iii) 300 mm.

1.0 Workmanship

1.0. The ground shall be roughly levelled and after making the position of piles, the holes shall be bored with a spiral angle to the 3.5 M. depth and specified diameter using boring guide.

2.0. The bore holes shall be truly vertical and uniform bore through out of specified diameter. After Boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M.

2.0. Mode a/Measurement & Payment

2.1. The rate for boring holes shall include :

(a) Roughly levelling the ground in positions where piles are to be provided (b) Making the position of piles by pegs and boring guide and also for shifting of boring guide, (c) Bailing out water, if any met with during boring, (d) Disposal of surplus excavated soil within a lead of 50 M. and (e) All tools, plants. equipments and labour required for satisfactory completion of work.

2.2. The rate shall be for a unit of one Number.

4.2K Extra for under ramming inside the bore holes for under rammed piles of following nominal diameter : (i) 200 mm. (ii) 250 mm. (iii) 3<H> mm.

1.0 Workmanship

The relevant specifications of item No. 4.27 shall be followed except that after boring to the required depth, the bore shall be enlarged at the bottom by an under rammer 2 to 2 1/2 times the diameter of the bore as directed. It shall be esured that the bore for the pile shall be enlarged to the correct diameter.

2.0. Mode of Measurement & Payment

2.1. The relevant specification of item No. 4.27 for under ramming the piles.

2.2. The rate shall be paid extra over and above the rate of item No. 4.27 under ramming the piles.

2.3. The rate shall be for a unit of one Number

SECTION 5

Plain & Rcc. Work

5.1.6. Providing and laying in foundation and plinth/under floors lime concrete with hard broken aggregate 40 mm. nominal size and 40 % mortar comprising of 1 Lime putty : 2 fine sand and curing complete excluding cost of form work.

1 .0. Materials

Water shall conform to M-1 .Sand shall conform to M-6. Lime shall conform to M-2. Graded aggregate 40 mm. nominal size shall conform to M-12.

2.1. General

2.1.1. Before starting the concrete the bed of the foundation trenchers shall be cleared of all loose materials and watered and rammed as directed. **2.2. Proportion of Mix**

2.2.1. The proportion of lime, sand and aggregate shall be specified in the item of the work and shall be measured by volume.

2.2.2. The lime mortar shall consist of proportion of 1 lime putty : 2 sand by volume. The lime mortar shall be prepared by wet process. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in even layer and ground for 10 revolutions with sufficient water. The water shall be added as required during grinding and care shall be taken not to add more water so that it will bring the mixed materials to a consistency of stiff paste, thoroughly wetted sand shall then be added evenly and the mixture ground for another 10 revolutions.

2.2.3. Lime mortar shall be kept, protected from sun and rain till used-up, covering it by tarpaulin or open sheds.

2.2.4. All the lime mortar shall be used as soon as possible after grinding. It should be used on the day on which it is prepared but in no case mortar made earlier than 36 hours shall be permitted for use.

2.3. Mixing:

2.3.1. The concrete shall be mixed in mechanical mixer. Mixing shall be continued until there is uniform distribution of the materials and the mass is uniform in colour and consistency but in no case mixing shall be done for less than 2 to 3 minutes.

2.4. Laying & Compacting :

2.4.1. The concrete shall always be used while quite fresh. It shall be laid (not thrown) in layers not exceeding 150 mm. in thickness and shall be well and quickly rammed with wooden or iron rammers, till the required compaction is achieved. The concrete laid shall not be of too fluid consistency. After it has been mixed no more water shall be added, but the surface during and after compaction shall be kept damp. In laying consecutive layers, the layer cast shall be well watered and made rough before the upper layer is laid. The concrete shall be kept continuously wet for period of 7 days from the date of placing or until it is built over whichever is more.

2.5. Mode of measurements & payment:

2.5.1. The concrete work shall be measured in length, breadth and depth as specified on drawing or as directed, correct up to nearest centimeter and cubical content shall be worked out nearest up to two places of decimals.

2.5.2. The rate shall be for unit of one cubic metre.

5.1.8. Providing and laying in foundation and plinth/under floors lime concrete with graded bricks

aggregate 40 mm. nominal size and 40 % mortar comprising of 1 Lime putty : 2 fine sand and curing complete, excluding cost of form work.

1.0 Materials

1.1. Water shall conform to M-I. Lime mortar shall conform to M-10. Brick bats aggregate 40 mm. nominal size shall conform to M-14.

2.0. Workmanship

2.1. The relevant specification of item No. 5.1.6. shall be followed except that brick aggregate shall be used instead of graded stone aggregate.

3.0. Mode of Measurement & Payment

3.1. The concrete work shall be measured in length, breadth and depth as specified in drawing or as directed, correct up to nearest centimeter and cubical content shall be worked out up to two places of decimals.

3.2. The rate shall be for a unit of cubic metre.

3.2. (A) Providing and laying cement concrete 1:3:6 (1 **cement**: 3 coarse **sand**: 6 graded stone aggregate 40 mm. nominal size) and curing complete excluding the cost of form work in foundations **and plinth**.

1.0. Materials

1.1. Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to **M-6**. Stones aggregate 40mm. nominal size shall conform to M-I 2.

2.0. Workmanship

2.1. General

2.1.1. Before starting concrete the bed of foundation trenches shall be cleared of all loose materials, **levelled**, watered and **rammed as directed**.

2.2 Proportion of Mix :

2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand and 6 parts of stone aggregates and shall be measured by volume. **2.3 Mixing :2.3.1.** The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break-down of machineries and in the interest of the work. it shall be carried out on a water light platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such cases 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period.

1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

2.4. Transporting & Placing the concrete :

2.4.1. The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position; compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

2.4.2. The concrete shall be laid in layers of 15 **cms.** to 20 cm. **2.5 Compacting:**

2.5.1. The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

2.6. Curing :

2.6.1. After the final set, the concrete shall be kept continuously wet if required by ponding for a period of not less than 7 days from the date of placement.

2.7. Mode of measurement & payment:

2.7.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed.

2.7.2. The rate shall be for a unit of one cubic metre.

5.3.3. (A) Providing and laying cement concrete 1:4:S f 1 cement: 4 coarse sand : 8 graded stone aggregate 40 mm. nominal size) and curing complete, excluding cost of form work in foundations and plinth.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6 Stone aggregate 40 mm. nominal size shall conform to M-I 2.

2.0. Workmanship

2.1. Relevant specifications of item No. 5.3.2. shall be followed except that cement concrete shall be mixed in the proportion of 1 : 4 : K : instead of 1 : 3 : 6 : by volume.

3.0. Mode a/measurements and payment

3.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plans or as directed.

3.2. The rate shall be for a unit of one cubic meter.

5.3.14. (A) Providing and laying cement concrete 1:3:6. (1 cement: 3 coarse sand: 6 Crushed stone aggregate 20 mm. nominal size) and curing complete including cost of formwork in wall caps/coping.

1.0 Materials & Workmanship

1.1. The relevant specification of item No. 5.3.2. (A) shall be followed except (that the work shall be carried out for coping and wall caps, except the stone aggregate 20 mm. nominal size shall be used. For the concrete work of wall caps/ coping.

2.0. Mode a/measurements and payment

1.0. the relevant specifications of item No. 5.3-2. (A) shall be followed except that the rate includes cost of necessary form work.

1.1. The rate shall be for a unit of one cubic metre.

5.3.3. Providing and laying brick bats cement 1 : 4 : 8 : (1 cement: 4 coarse sand : 8 graded bricks bats), and curing complete excluding the cost of form work in foundation and plinth.

1.0. Materials

1.1. Water shall be conform to M-I, Cement shall conform to M-3. Sand shall conform to M-6. Brickbat shall conform to M-14.

2.0. Workmanship

2.1. The specification of this item shall be followed as per item No. 5.3.14(A) except that the proportion of brick bat cement concrete shall be 1 : 4 : H : i.e. 1 part of cements, 4 parts of coarse sand and 8 parts of graded brick bat by volume using graded brick bat as coarse aggregate instead of stone aggregates.

3.0. Mode a/measurements & payment

3.1. The concrete work shall be measured in length, breadth and depth as specified on drawing limiting dimensions to those specified on drawings or as directed.

3.2. The rate shall be for a unit of one cubic metre.

5.3.4. (A) Providing and laying cement concrete 1 : 5 : 10 : (1 cement: 5 coarse sand : 10 graded stone aggregate 40 mm. nominal size) and curing complete, excluding the cost of form work, for foundation and plinth.

1.0. Materials

1.1. Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 40 mm. nominal size shall conform to M-I 2.

2.0. Workmanship

2.1. The relevant specification of **item No. 5.3.2. (A)** shall be followed for the work except that the work is to be carried out in cement concrete : 1 : 5 : 10

3.0. Mode of measurements & payment

3.1. The concrete shall be measured for its length, **breadth and depth, limiting dimensions to those specified** on plans or as directed.

3.2. The rate shall be for a unit of one cubic metre.

5.3.8. (A) Providing and laying cement concrete **1 : 5 : 10 (1 cement: 5 coarse sand : 10 graded brick bats 10 mm. nominal size)** and curing complete excluding cost of form work in foundation and plinth.

1.0. Materials

1.1. Water shall conform to M-t. Sand shall conform to M-6. Cement shall conform to M-3. Brick bats shall conform to M-14.

2.0. Workmanship

2.1. The relevant specification of item No. 5.3.4. shall be followed except that brick bats aggregate shall be used instead of stone aggregate.

3.0. Mode of measurement & payment

3.1. The relevant specification of item No. 5.3.4. shall be followed.

3.2. The rate shall be for a unit of one cubic metre.

5.3.2. (B) Providing and laying brick bat cement concrete **1 : 3 : 6 (1 cement : 3 coarse sand : 6 graded brick bats)** and curing complete excluding cost of form work in foundation and plinth.

1.0.

The specification of item No. 5.3.2. (A) shall be followed, except that the brick bats shall be used as coarse aggregate instead of graded stone aggregates.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 5.3.2. (A) shall be followed for mode of measurements and payment except that it excludes the cost of form work.

2.2. The rate shall be for a unit of one cubic metre.

5.4.18. Providing throating or plaster drip and moulding to R.C.C.

Chhajjas. 1.0 Materials

Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Cement mortar shall conform to M-I 1.

2.0. Workmanship

2.1. The work shall be carried out as directed. The proportion of mix for finishing shall be C.M. 1: 2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimeter in thickness.

5.7.5. Extra for providing and mixing Water proofing material in cement concrete in mix proportions recommended by the manufacturers.

2.0. Workmanship

2.1. The proportions of materials for the cement concrete shall be mentioned with the specifications of that item. The quantity of water proofing materials to be added and the method of addition shall be as specified by manufacturers.

2.2. Mixing :

2.2.1. The mixing of the water proofing materials in cement, water or concrete shall be done according to the specifications of the manufacturer.

3.0. Mode of measurements and payment

3.1. The payment is extra over and above the rate of concrete for mixing water proofing proper.

3.2. The rate shall be for a unit of one litre or Kg. per quintal of cement in which water proofing

material is added.

5.7.1. Providing and laying damp proof course 25 mm.thick cement concrete **1 : 2 : 4 : (1 cement : 2 coarse sand : 4 stone aggregate 10 mm. nominal size) and curing complete.**

1.0. The specifications of item No. 5.3. 13. (A) of ordinary concrete with or without reinforcement shall be followed except that the size of the stone aggregate shall be 10 mm. nominal size and the concrete work shall be carried out in 25 mm. thick damp proof course.

2.0. Mode of measurement & payment

2.1. The rate includes cost of all materials and labour required to complete the item.

2.2. The rate shall be for a unit one sq. metre.

5.3.13. Providing and laying cement concrete 1 : 2 : 4 : (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) and curing complete excluding cost of form work in (A) foundation and plinth,

(B) Independent piers, columns and pillars upto floor two level.

IM.Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6.Grit shall conform to M-K.Graded stone aggregate 20 mm. nominal size shall conform to M-12.

2.ff. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size).by volume. Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-2(M),M-250 specified as per I.S. Correspond approximate to 1:3:6,1:2:4,1:1;. 1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one bag of cement of 50 Kg. by weight (0.0342 Cu. M.) for different proportions of mix shall be as under :

Grade of concrete	Total quantity of dry aggregate by volume per 50 kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregatesw,maximum	Proportion of fine aggregate To coarse aggregate	Quantity of water per 50 Kgs. of cement maximum.
1	2	3	4
M-100 (1:3:6)	300 Litres	Generally 1:2 for fine aggregate	34 Litres
M-150 (1:2:4)	220 Litres		32 Litres
M-200 (1:1:1/2:3)	160 Litres	to coarse aggregate by volume but subject to an upper limit of 1:1.1/2 and lower limit 1:3	30 Litres
M-250 (1:1:2)	100 Litres		27 Litres

2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the Table shall be increased if the quantity of water in mix has to be increased to overcome the difficulties of placements and compaction so that the water-cement-ratio specified in the

table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater

than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

3.0. Workmanship

3.1. Proportioning ; Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 Kg. weight, the volume of one such bag being taken as 0.0342 cu. metre. Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms. deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand. allowances for bulking shall be made.

3.2. Mixing:

3.2.1. For all work, concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge For small jobs or for certain other reasons, it shall be done on the smooth water tight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign materials gets mixed with

concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate. which shall also be spread in a layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a

mix of required consistency is obtained. In hand mixing quantity of **cement** shall be increased by 10 percent above that specified.

3.2.2. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before

changing from one type of cement to another. **3.3. Consistency :**

3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80mm. when vibrators are not used.

3.4. Inspection:

3.4.1. Contractor shall give the Engineer-in-charge due notice before **placing any concrete in** the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for

results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position, for access to different parts suitable mobile platforms

shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

3.5. Transporting and faying :

3.5.1. The method of transport in and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent materials takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any **pan of the structure** until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more **than** 0.45 metre when internal vibrators are used and not exceeding 0.30 meter in all other cases.

3.5.3. Unless otherwise agreed to by the engineer-in-charge, concrete shall not be dropped in place from a height exceeding 2 metres. When trunking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristly brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being

given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators. Unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

3.6. Curing :

Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or other similar absorbent material approved soon after the initial set, and shall be kept continuously wet

for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

3.7. Sampling and testing of concrete

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made cured and tested at 7 days and 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following : Quantity of concrete in the work No. of Samples Quantity of concrete in the work. No. of samples

1-5 cum. 1 16-30 cum. 2 31-50 cum. 3 51 as above. 4 + one additional for each additional 50 m. or part thereof

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 Kg/Cm² at 28 days. 20 % of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85 % of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

3.8. Stripping:

3.8.1. The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20. C.) and where ordinary concrete is used, forms may be

struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened- Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly tapered and gradually. Where internal metal liches are permitted, they or their removable pans shall be extracted without causing any damage to the concrete and remaining holes filled with mortar-No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface-Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality-

3.8.3. Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which is pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the

opinion of the Engineer-in-charge are of such an extent or character as to effect or character as to cited the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

4.0. Mode of measurements & payment

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of sections shown on drawing or as directed shall not be measured. No deduction shall be made for - (a) Ends of dissimilar materials such as joints, beams, posts, girders, rafters, purline trusses, corbels and steps etc. upto 5(X) Sq. Cm. in section- (b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibration and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

5.4.1. Providing and laying cement concrete 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) and curing complete excluding cost of form work and reinforcement for reinforced work in : (A) Foundations, footing base of columns and mass concrete. (C) Slabs, landings, shelves, balconies, lintels, beams, girders and rafters upto floor level. (D) Columns, pillars, posts, and struts upto floor two level (E) Staircase upto floor two level (K) Vertical and horizontal fins upto floor two level.

1.0. Materials & workmanship.

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

(a) The bars shall be kept in position by the following methods :

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1 : 2. (1 cement: 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports at 1.0. to 1.2. metres centers. (ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with spacers accurately out in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc. to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 5.3.13 shall be followed.

2.2. The volume occupied by reinforcement shall not be deducted from **R.C.C. work.**

2.3. The rate shall be for a unit of one cubic metre.

5.4.4. Providing and toying cement concrete J : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) for reinforced concrete chhajjas not exceeding W cms. thickness upto floor two level including finishing the exposed surface with cement mortar 1:3 (1 cement : 3 fine sand) to give a smooth and even surface, centering and form work and curing complete excluding cost of reinforcement.

1.0. Materials & workmanship

1.1. The cement mortar shall conform to M-I 1.

1.2. The relevant specification of item No. 5.3.13 and 5.4.1. shall be followed except that the work shall be carried out for reinforced concrete chhajjas not exceeding 10 cms. in thickness.

1.3. The specifications for form work and centering shall be as per item No. 9.1.

1.4. The finishing work in cement mortar 1 : 3 (1 cement : 3 fine sand) shall be carried out as per specifications of item No. 17.59 (1). Before the plastering is done, the surface of the concrete shall be raked for proper bond.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 5.3.13 and 5.4.1. shall be followed except that the work of chhajjas upto 10 cms. shall be carried out including centering form work and finishing the surface with cement mortar 1 : 3 (1 cement : 3 fine sand)

2.2. The rate shall be for a unit of one cubic meter.

5.4.10, Providing an Mild Steel reinforcement for R. C. C. work including bending binding and placing in position etc. complete upto floor two level

1.0. Materials

1.1. Mild Steel bars shall conform to M-18. Mild Steel binding wires shall conform to **M-21.**

2.0. Workmanship

2.1. The work shall consist of furnishing and placing reinforcement to the shape and **dimensions shown as** on the drawings or as directed.

2.2. Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

2J. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified, a 'LT type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete-

2.4. All the reinforcement bars shall be accurately placed in exact position shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks

or metal chair spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals. **Bars** shall not be

allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrosive material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from

corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and 10 which other bars are to be spliced and which are **likely** to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

2.5. Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.

2.6. As far possible, bars of full length shall be used. In case this is not possible. Overlapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 1.25 times the maximum size of the coarse aggregate whichever is greater, by concrete between them. Where not feasible, overlapping bars shall be bound with annealed wire not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.

2.7. Whenever indicated on the drawings of desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less

than the normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

2.8. When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points where steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed. 3M. Mode

a/measurements & payment

3.1. For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent. Excess consumption over 5 % will be charged at penal rate.

3.2. Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place of lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of

reinforcement shall be calculated in tonnes on the same basis of as per M- IS even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3 The rate for reinforcement includes cost of steel binding wires, its carting from Departmental store to work site. cutting, bending, placing, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.

3.4. The rate shall be for a unit of One Kg.

5.4.11. High yield deform bars steel reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level.

1.0. Materials

1.1. Cold twisted steel bars (high yield strength steel deformed bars) shall conform to M. 19 Mild steel binding wires shall conform No. M-21.

2.0. Workmanship.

2.1. The specifications of item No. 5.4.10 shall be followed except that the cold **twisted steel** bars shall be used with or without hooks at the ends. Deformed bars without hooks shall. However, comply with relevant anchorage requirements.

2.2.1. Mode of measurements & payment.

2.2.2. The relevant specifications of item No. 5.4.10 shall be followed.

2.2.3. The rate shall be for a unit of One Kg. 5.4.13. The rate shall be for a unit of One Kg. 5.4.13. Extra for additional lift of concrete for work above floor level excluding cost of reinforcement. 1.0. Materials & Workmanship. The relevant specifications for item No. 5.4.1. shall be followed for the work except that the **R.C.C.** work shall be done for ground floor i.e. above plinth level to first floor level.

2.0. Mode of measurements & payment.

2.1. The relevant specifications of item No. 5.4.1. shall be followed except that rate shall be for extra lift above plinth to floor two level, over and above the rate of concrete at floor two level.

2.2. The rate shall be for a unit of one cubic metre per floor. 5.4.13. fA) Extra/or additional lift of reinforcement steel for all **R.C.C.** work above floor two level.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 5.4.10 or 5.4.11 as may be applicable shall be followed except that the work shall be carried out above floor two level for each floor.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 5.4.10 or 5.4.11 as may be applicable shall be followed except that the work shall be carried out above floor two level.

2.2. The rate shall be for a unit of one Kg. per floor.

5.6.2. Providing upto floor two level forecast cement concrete jali or grill 1 : 2 : 4 (1 cement: 2 coarse sand : 4 graded stone aggregate 6 mm. nominal size) reinforced with 1.6mm. dia mild steel wire including roughening, cleaning fixing and finishing in cement mortar 1 : 3 and curing complete. (A) 51 mm. thick (B) 40. mm. thick. (C) 25 mm. thick (D) 75 mm. thick (E) 100 mm. thick

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Mortar shall conform to M-1. Aggregates shall conform to M-12. Mild steel wire shall conform to M-21. Shuttering shall conform to M-26.

2.0.

Workmanship

It shall be of cement 1 : 2 : 4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm. nominal size) reinforced with 1.6 mm. dia mild steel wire unless otherwise specified. The thickness of the jali shall be as specified in the item. The jali shall be set in position true to line and level before the jambs sills and soffits of the opening are plastered. It shall then be properly cemented with cement mortar 1:3 (1 cement: 3 sand) and rechecked for levels. Finally the Jambs, sills and soffits shall be plastered gripping the Jali uniformly on all sides.

3.0. Mode of measurement and payment

3.1. The item shall be measured in square metre.

3.2. The rate shall be for a unit of one square metre.

5.8.1. Providing and laying controlled concrete M-I 50 and curing complete excluding the cost of form work and reinforcement for reinforced concrete work in : <A) Foundations, footings, base of columns, and mass concrete, (B) Walls from top of foundation/level upto floor two level. (C) Slabs, landing shelves. Balconies, lintels, beams, girders and cantilever, upto floor two level (D) Columns, pillars, posts and struts, upto floor two level (E) Staircase upto floor two level. (F) Vertical and horizontal fins upto floor two level.

1.0 Materials

1.1. Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Course aggregate shall conform M-12.

2.0. General

2.1. The relevant specifications of item No.5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-4(X), with prefix controlled added to it. The letter 'M' refers to mix and the numbers specify 28 days work cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Cmt.

2.2. The proportion of cement, sand and coarse aggregates shall be determined by weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under :

Grade Concrete	Compressive strength of 15 cms. Cubes in Kg./Cmt. At Concrete	
	28 days, conducted in accordance with I.S. 516-1959 Preliminary test Min.	
	Work test Min.	
M-150	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

In all cases, the 28 days compressive strength specified in above table shall be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all

purposes as concrete belonging to the lower of the grades between which its strength lies.

3. 0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of materials shall be stock piled several hours preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2. In proportioning concrete, the quantity of both cement and aggregates shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighed separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389(Part III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 Kg/M³ in plain concrete and not less than 250 Kg/M³ in reinforced concrete.

4.0. Mode of measurements & payment

4.1. The relevant specifications of item NO. 5.4.1. shall be followed except the controlled concrete R.C.C. work as specified in item shall be measured under this item. The rate excludes cost of form work.

4.2. The rate shall be for a unit of one cubic metre.

5.8.2. Providing and laying controlled cement concrete M-200 and curing complete, excluding the cost of form work and reinforcement for reinforced concrete work in : (A) foundations, footings base of columns, and mass concrete. (B) walls from top of foundation upto floor two level (C) Slabs, landings, shelves, balconies lintels, beams, girders and cantilever upto floor two level, (D) Columns, pillars, posts and struts upto floor two level (E) Stair cases upto floor two level (K) Vertical and horizontal fins upto floor two level.

1.0. Materials & Workmanship

The relevant specifications of item No. 5.8.1. shall be followed except that the grading of concrete shall be controlled concrete M-200 grades for works as specified in item.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No. 5-8.1. shall be followed.

2.2. The rate shall be for one cubic metre.

5.8.3. Providing and laying controlled cement concrete M-250 and curing complete, excluding the cost of reinforcement for reinforcement for reinforced concrete work in :

(A) foundations footings base of columns, and the like **and mass concrete. (B) Walls** from top of foundation **level upto floor two level** (C) Slabs, **landings, shelves,** balconies, beams, girders and **cantilever upto floor two level, (D) Columns, pillars, struts, upto floor two level**

1.0. Materials & workmanship

The relevant specifications of item No. 5.8.1. shall be followed except that the grading of controlled concrete shall be controlled concrete M-250 grades for the works as specified in the item.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No. 5.8.1. shall be followed.

2.2. The rate shall be for a one cubic metre.

5.00.1. Providing and laying ordinary concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregates 20 mm. nominal size) and finishing smooth with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (f) Slabs upto 8 cms. thickness (II) Slabs having more than 8 cms. and

upto 15 cms. (III) Slabs having more than 10 cms. and upto 13 cms. thickness. (IV) Slabs having more than 13 cms. and upto 15 cms. thickness. J.O. Materials & workmanship

1.1. The relevant specifications for item No. 5.4.1. shall be followed for concrete work and relevant specifications of item No. 9.1. shall be followed for form work and centering. The concrete surface shall be smooth finished with cement mortar 1 : 3 (1 cement : 3 fine sand) as per item No. 17.59 (1). The thickness shall be as specified in the item.

2.0. Mode of measurements & payment

2.1. The relevant specification for item No. 5.4.1. shall be followed except that item shall include the item providing form work and centering work as directed.

2.2. The rate shall be for a unit of one cubic meter.

5.00.2. Providing and laying controlled cement concrete M-150 and finish smooth with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (I) Slabs upto 8 cms. thickness (II) Slabs having more than 8 cms. and upto 10 cms. (III) Slabs more than 10 cms. and upto 13 cms. (IV) Slabs more than 13 cms. and upto 15 cms. 1.0 Materials & workmanship

1.1. The relevant specifications of item No. 5.5. 1. shall be followed for concrete work and item No 9.1. shall be followed for form work and centering. The concrete surface shall be smooth finished with cement mortar 1:3 (1 cement : 3 fine sand) as per No. 17.59 (I). The thickness shall be as specified in the item .

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 5.8.1. shall be followed except that the item shall include the cost and from work and centering.

2.2. The rate shall be for a unit of one cubic metre.

5.00.3. Providing and laying ordinary cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregates 20 mm. nominal size) exposed work with curing etc. complete, including the cost of work but excluding the cost of reinforcement for R.C.C. work in : (I) Slabs upto 8 cms. thickness. (II) Slabs having more than 8 cms. and upto 10 cms. thickness. (III) Slabs having more than 10 cms. and upto 13 cms. thickness. (IV) Slabs having more than 13 cms. and upto 15 cms. thickness.

1.0 Materials & Workmanship

1.1. The relevant specifications of item No. 5.4.1. shall be followed for concrete work and that of form work shall be followed as per item No. 9.1. and 9.7. The thickness of the slab shall be as specified in the item.

2.0. Mode of measurements & Payment

2.1. The relevant specifications of item No. 5.4.1. shall be followed except that form work and centering work shall be included in the item.

2.2. The rate shall be for a unit of one cubic metre.

5.00.4. Providing and laying controlled cement concrete M-150 exposed work with curing etc., complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (I) Slabs upto 8 cms. thickness (II) Slabs having more than 8 cms. and upto 10 cms. thickness (III) Slabs having more than 10 cms. and upto 13 cms. thickness. (IV) Slabs having more than 13 cms. and upto 15 cms. thickness.

1.0. Materials & Workmanship

1.1. The relevant specification of item No. 5.4.1. shall be followed for controlled concrete and the relevant specifications of item No. 9.1. and 9.7. shall be followed exposed concrete form work and centering work. The thickness of the slab shall be as specified in the item.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 5.5. 1. shall be followed except that the form work and centering work shall be included in the item.

2.2. The rate shall be for a unit of one cubic metre.

5.00.5. Providing and laying ordinary cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) for R.C.C. lintel including finishing smooth with curing etc. complete including the cost of form work but excluding the cost of reinforcement.

1.0. Materials & Workmanship

1.1. The relevant specification of item No. 5.4.1. shall be followed for concrete work, relevant specification of item No. 17.59 (I) for finishing work and relevant specifications of item No. 9.1. shall be followed for form work and centering work. The concrete work shall be followed for the form work and centering work for exposed concrete work.

2.0. Mode of measurement & payment

2.1. The relevant specification of item No. 5.8.1. shall be followed except that the item includes the cost of form work for exposed concrete work.

2.2. The rate shall be for a unit of one cubic meter.

5.00.6. Providing and laying ordinary cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate

20 mm. nominal size) and finishing smooth with curing etc., complete, including the cost of form work but excluding reinforcement for R.C.C. work in (A) Beams : (I) Having cross sectional area 0.05 to 0.08 Sq. meter. (II) Having cross sectional area more than 0.08 Sq.mt. upto 0.12 Sq. mt. (HI) Having cross sectional area more than 0.12 Sq. Mt. and upto 0.18 Sq.Mt. (B) Columns : (1) Having cross sectional area 0.05 to 0.08 Sq. Mt. (II) Having cross sectional area more than 0.12 Sq. Mt. and upto 0.18 Sq. mt. 1.0. Materials & Workmanship

1.1 The relevant specifications of item No. 5.4.1. shall be followed for concrete work and item No. 9.1. shall be followed for form work and centering work- The finishing shall be done in cement mortar 1:3 (1 cement: 3 fine sand) as per item No. 17.59(1). The cross sectional area of beam shall be specified in item.,

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 5.4.1. shall be followed but the form work and centering work shall be included in the item.

2.2. The rate shall be for a unit of one cubic metre. 5.00.7. Providing and laying controlled cement concrete M-150 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in :

(A) Beams : (I) Having cross sectional area 0.05 to 0.08 Sq. meter. (H) Having cross sectional area more than 0.08 Sq. mt. upto 0.12 Sq. mt. (HI) Having cross sectional area more than 0.12 Sq.Mt. and upto 0.18 Sq. mt. (B) Columns : (I) Having cross sectional area 0.05 to 0.08 Sq. mt. (II) Having cross sectional area more than 0.08 Sq. mt. and upto 0.12 sq. mt. (HI) Having cross sectional area more than 0.12 Sq. mt. and upto 0.18 sq. mt.

1.0 Materials & workmanship

1.1. The relevant specifications of item No. 5.8.1. shall be followed for controlled concrete work as specified in item for M-150 and relevant specifications of item 9.1 shall be followed for form work and centering work for exposed cement work.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 5.8.1. shall be followed except that the form work and centering work shall be included in the item.

2.2. The rate shall be for a unit of one cubic metre.

5.00.8. Providing and laying controlled cement concrete M-200 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in :

(A) Beams: (I) Having cross sectional area 0.05 to 0.08 sq. mt. (H) Having cross sectional area more than 0.08 sq.mt, upto 0.12 sq. mt. (HI) Having cross sectional area more than 0.12 sq.mt. and upto 0.18 sq. Mt. (B) Columns : (I) Having cross sectional area 0.05 to 0.08 sq.mt. (H) Having cross sectional area more than 0.08 sq. mt. and upto 0.12 sq. mt. (HI) Having cross sectional area more than 0.12 sq. mt. and upto 0.18 sq. mt.

1.0 Materials & Workmanship

1.1. The relevant specifications of item no. 5.8.1. shall be followed for controlled concrete work as specified in item for M-200 and relevant specifications of item 9.7 and 9.1 shall be followed for form work and centering work for exposed cement work.

2.0 Mode of measurement & payment

2.1. The relevant specifications of item No. 5.8.1. shall be followed except that the item includes the cost of form work and centering work for exposed work.

2.2. The rate shall be for a unit of one cubic metre.

5.00.9. Providing and laying controlled cement concrete M-250 exposed work with curing etc. complete, including the cost of form work but excluding the cost of reinforcement for R.C.C. work in : (A) Beams : (I) Having cross sectional area 0.05 to 0.08 sq. mt. (H) Having cross sectional area more than 0.08 sq.mt. upto 0.12 sq. mt. (HI) Having cross sectional area more than 0.12 sq.mt. and upto 0.18 sq.mt. (B) Columns : (1) Having cross sectional area 0.05 to 0.08 sq.mt. (H) Having cross sectional area more than 0.08 sq.mt. and upto 0.12 sq.mt. (HI) Having cross sectional area more than 0.12 sq.mt. and upto 0.18 sq.mt.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 5.8.1. shall be followed for controlled concrete work as specified in item for M-250 and relevant R.C.C. lintels shall be carried out.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 5.4.1. shall be followed except that the form work finishing and centering work shall be included in the item. **2A.** The rate shall be for a unit of one cubic metre.

SECTION - 6

Masonry Work

6.12. (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. Cm. in foundations and plinth in cement mortar 1:5 (1 cement: 5 fine sand) modular bricks.

1.0. Materials Water shall conform to M-I Cement shall conform to M-3. Sand shall conform to M-6. Brick shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship.

2.1. Proportion.

2.1.1. The proportion of the cement mortar shall be 1:5 (1 cement: 5 fine sand) by volume.

2.2. Wetting of bricks :

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with **water** is an indication of thorough wetting of bricks.

2.3. Laying :

2.3.1. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond; closers in such case shall be cut to required size and used near the ends of walls.

2.3.2 A layer of mortar shall be spread on full width for suitable length **of the** lower course. Each brick shall first be properly bedded and set home by gently lapping with the handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it.

On completion of course, the vertical

joints shall be fully filled from the top with mortar.

2.3.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical Joints in alternate course shall generally be **directly** one **cover the** other. The thickness of brick course shall be kept uniform.

2.3.4. The brick shall be laid with frog up wards- A set of tools comprising of wooden straight edges, mason's spirit level, square half metre rule, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.3.5. Both the faces of walls of thickness greater than 23 cms, shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be **raked** back according to bond (and not left toothed) at an angle not less than 45 degrees.

2.3.6. All fixtures, pipes, outlets of water, hold **fasts of doors and windows** etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints :

2.4.1. Bricks shall be so laid that all joints are quite **flush** with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.

2.4.2, The face of brick shall be cleaned the very day **on** which the work is laid and all mortar dropping removed.

2.5. Curing :

2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period (if seven days). The top of masonry work shall be kept well wetted at the close of the day. 2.6. Preparation of foundation **bed :**

2.6.1. If the foundation is to be laid directly on the excavated bed, the bed shall be levelled, cleared

of all loose materials, cleaned and wetted before staning masobnary. Is masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval of the foundation bed

before foundation masonry is staned. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top, by the thickness of the flooring.

3.0. Mode measurements & payment

3.1. The measurements of this item shall be taken for the brick masonry fully completed in foundation upto plinth. The limiting dimensions not exceeding those shown on the plains or as directed shall be final. Buttered tapered and curved ponions shall be measured net.

3.2. No deduction shall be made from the quantity of brick work. for **any extra payment made for embedding** in masonry or making holes in respect of following items,:

(1) Ends of joints, beams, posts, girders rafters purlins. Trusses corbel steps etc. where **cross sectional** area does not exceed 500 sq. cm.

(2) Openings not exceeding 1UOO Sq.cm.

(3) Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 cms. and the bearing does not extend to the full thickness of wall.

(4) Drainage holes, and recesses for cement concrete blocks tu embed hold fasts for doors, windows etc.

(5) Iron fixtures, pipes upto 300 mm. dia; hold fasis, and doors and windows built into masonry and pipes etc. for concealed wiring. (6) Forming chases of section not exceeding 350 sq. cm. in masonry.

3.3. Apertures for fire places shall not be duducted nor shall be paid for separately.

3.4. The rate shall be for a unit of one cubic metre.

6.12. (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. cm. in foundations and plinth in cement mortar 1:5 (1 cement ; 5 fine sand) conventional bricks.

1.0. Materials Cement moratr of proportion 1:5 shall conform to M-I 1. Conventional bricks shall conform to M-15.

2.0. Workmanship '

2.1. The relevant specification of item No. **6.12. (A)** shall be followed except lhal the masonry work shall be carried out by using conventional bricks.

3.0 Mode of measurements &. payment

3.1. The relevant specification of item No. 6.12. (A) shall be followed.,

3.2. The rate shall he for a unit of one cubic metre.

6.13. (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/sq.cm. in foundation and plinth ia cement mortar 1:6 (/ cement : 6 fine sand) with modular bricks. 1.0. Materials Cement moratar of conform to M-11. **Brick shall conform** to M-15.

2.0. Workmanship.

2.1. The relevant specifications of item No. 6.12 (A) shall be followd **exceptr that the bricks to be used** shall be moduair bricks and the proportion of cement mortar is 1:6.

3.0. Mode of measurements & payment

3.1. The relevant specification of item No. 6.12 (.A) shall be followed.

3.2. The rate shall be for a unit of one cubic metre.

6.13. (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/sq.cm. in foundation and plinth in cement mortar 1:6 (1 cement : 6 fine sand) with conventional bricks.

2.3. Materials Cement moratar of conform to M-1. Cement mortar shall conform to **M-11. Brick** shall conform to M-15.

2.0. Workmanship.

2.1. The relevant specifications of item No. 6.12 (.A) shall he followd **excepir lhal the bricks to be used** shall be conventional bricks and the proportion of cement mortar is 1:6.

3.0. Mode of measurements & payment

3.1. The relevant specification of item No, 6.12 (A) shall be followed.

3.2. The rate shall be for a unit of one cubic metre. **6.0.0.1. (A) Brick work using common burnt clay building bricks having crushing strength not less**

than 35 Kg/Sq. Cm. in foundation and plinth in cement mortar 1:8 (I cement: 8 fine sand) with Modular bricks. /O. Materials Water morair of conform to M-1. Brick shall conform to M-15. Cement monar shall be conform to M-11.

2.0. Workmanship.

2.1. The relevant specifications of item No. 6.12 (.A) shall be followed except that ihe proportiojn of cement mortar shall be cement moratar 1:8 and bricks used shall be conventional bricks.

3.0. Mode of measurements &. payment

3.1. The relevant specificaion of item No. **6.12.** (A) shall be followed.

3.2. The rate shall be for a unit of one cubic metre.

6.00.1. (B) Brick work using common burnt clay building bricks **having** crushing strength not less than **35 Kg./ Sq. Cm. in foundation and plinth in cement mortar 1:8 (I cement: 8 fine sand) with conventional bricks. 1.0 Materials** Water shall conform to M-1. Brick shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship.

2.1. The relevant specification of item No. 6.12. (A) shall be followed except that the proportion of cement moratar shall be cement mortar is 1:8.

3.0. Mode of measurements & payment

3.1. The relevant specificaion of item No. **6.12** (A) shall be followed.

3.2. The rate shall be for a unit of one cubic metre. **6.0.02 (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. Cm. in foundation and plinth in lime mortar 1:1.5 (I Lime putty : 1.5 fine sand) modular bricks. , 1.0. Materials** Lime mortar of proportion (1:1.5) shall conform to M-10. brick shall conform to **M-15.**

2.0. Workmanship.

2.1. The relevant specifications of item No. 6.12 (A) shall be followed except that the masonry work shall be carried out in lime mortar 1:1.5 (1 lime putty 1.5 fine sand) in foundation and plinth.

3.0. Mode of measurements & payment

3.1. The relevant specification of item No. 6.12. (A) shall be followed.

3.2. The rate shall he for a unit of one cubic metre.

6.0.0.2. (B) **Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in foundation and plinth in cement mortar 1:1.5(1 Lime putty : 1.5 fine sand) conventional bricks. 1.0. Materials & Workmanship**

The relevant specification of item No. 6.12 (A) and 6.0.02 (A) shall he followed except that the masonry work shall he carried out by using conventional bricks in lime mortar 1:1.5 (1 Lime putty : 1.5 fine sand) in foundation and plinth.

2.0. Mode of measurements A payment

2.1. The relevant specification of item No. 6.12. (A) shall be followed.

2.2. The rate shall he for a unit of one cubic metre.

6.0.03(A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in foundation and plinth in lime mortar 1:2 (1 Lime putty ; 2 fine sand) modular bricks. 1.0. Materials & Workmanship.

The relevant specification of item No. 6.12 (A) and 6.0.0. (A) shall be followed except that the

masonry work shall be carried out by using conventional bricks in lime mortar 1:2 (1 Lime putty ; 2 fine sand) in foundation and plinth.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 6.12 (A) shall be followed.

2.2. The rate shall be for a unit of one cubic metre.

6.0.03 (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in foundation and plinth in lime mortar 1:2 (1 Lime putty ; 2 fine sand) conventional bricks.

1.0. Materials & Workmanship

The relevant specification of item No. 6.12 (A) and 6.0.03 shall be followed except that the masonry work shall be carried out by using conventional bricks in lime mortar 1:2 (1 Lime putty : 2 fine sand) in foundation and plinth.

6.19. (A) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. for super structure above plinth level upto floor two level in cement mortar 1:5 (1 cement: 5 fine sand) modular bricks. I. Materials Bricks shall conform to M-15. **Cement mortar shall conform to M-1 1.**

2.0. Workmanship. ' '

2.1. The relevant specification of item No. 6.12 (A) shall be followed except that the masonry work shall be carried out above plinth level to floor two level i.e. for ground floor.

2.2. The frames (if doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames, hold-fasts etc., shall be left in the wall and frame embedded later on in order to avoid damage to the frames.

2.3. Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole header horizontal coarse only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

2.4. For the face of brick work where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

3.0. Mode of measurements & payment

3.1. The masonry work of G-F. i.e. above plinth level to floor two level shall be measured and paid under this item.

3.2. Brick work in parapet shall be included in the corresponding masonry item to storey immediately below the floor above which the parapet is built.

3.3. No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry or making holes in respect of following item.

(1) Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbel, steps, etc., where cross sectional area does not exceed 500 sq.cm.

(2) Opening not exceed in KMX) sq. cm.

(3) Wall plate and bed plates, bearing of slab, chhajjas and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.

(4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.

(5) Iron fixtures, pipes up to 3(X) mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.

(6) Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.

6.19. (B) Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. for super structure above plinth level upto floor two level in cement mortar J:5 fl cement: 5 fine sand) conventional bricks.

S.O. Materials & Workmanship

The relevant specification of item No. 6.19 (A) shall be followed except that brick masonry work shall be carried out with conventional bricks.

2.0. Mode measurement and payment

2.1. The relevant specification of item No. 6.19 (A) shall be followed.

2.2. The rate shall be for a unit of one cubic metre per metre.

6.20. Extra for brick in super structure above floor two level.

1.0. Materials and Workmanship.

The relevant specification of item masonry work to be carried out shall be followed except that **this work is for additional lift of one floor above two level.**

2.0. Mode of measurements and payment

2.1. The relevant specification of item No. 6.19 (A) masonry work shall be followed.

2.2. The extra payment shall be made for additional lift above floor two level to each additional floor over and above the rate of masonry work.

2.3. The rate shall be for a unit of one cubic metre per floor. 6.30.1 (A) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./sq. Cm. in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure above plinth level upto floor two level with modular bricks.

1.0. Materials.

Bricks shall conform to M-15. Water shall conform to M-I. Cement shall conform to **M-3**. Sand shall conform to M-6. Cement mortar shall conform to M-11.

2.0. Workmanship.

2.1. Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc. shall conform to item No. 6.19 (A) except that the brick work of half bricks shall be carried out. 6.19. (A) Except that the brick work of half bricks shall be carried out.

2.2. Cement mortar used in masonry work shall be in proportion of **1 part** of cement and 4 parts of sand volume.

2.3. All bricks shall be laid stretch wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All course shall be laid truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards, a set of masons tools shall be maintained on work as required for frequent checking.

3.0. Mode of measurement and payment

3.1. The half brick masonry work in foundation and plinth shall be measured under this item, the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.

3.2. The relevant specifications of item No. 6.12 shall be followed. The length shall be measured **nearest to one cm.**

3.3. The rate shall be for a unit of sq. metre.

6.30.1. (B) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./Sq.Cm. in cement mortar 1:4 (1 cement: 4 coarse sand) in super structure above plinth level upto floor two level with conventional bricks.

1.0. Materials and workmanship

1.1. The relevant specifications of item No. 6.30.1. (A) shall be followed for bricks, wetting, laying of

bricks, joints, curing , except that the bricks M* be used shall be conventional bricks instead of modular bricks.

2.0. Mode of measurements & payment

2.1. The limiting dimensions shall not exceed those shown in the plan or as directed. **Any** work done extra over specified dimensions shall be ignored.

6.30.11. (A) Hal/Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in cement mortar S:5 (1 cement: 5 coarse sand) with modular bricks in foundation and plinth.

1.0. Materials and workmanship

1.1. The relevant specifications of item No. 6.30.1. (A) shall be followed except the half brick masonry work shall be carried out in cement mortar 1:5 (1 cement; 5 coarse sand) with modular bricks in foundation and plinth.

2.0. Mode of measurement and payment

2.1. The relevant specifications of item No. 6.30.1. (A) shall be followed.

2.2. The rate shall be for a unit of one cubic metre.

6.30.11. (B) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in cement mortar 1:5 (1 cement : 5 coarse sand) in foundation and plinth using conventional bricks.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. 6.30. (I). (A) shall be followed except the half brick masonry work shall be carried out in cement mortar 1:5 (1 cement: 5 coarse sand) in foundation and plinth using conventional bricks.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 6.30. (I). (A) shall be followed.

2.2. The rate shall be for a unit of one sq.mt. **6.30.HL (A) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./Sq.Cm. in lime mortar 1:1.5(1 Lime putty : 1.5 coarse sand) in foundation and plinth with conventional bricks.**

1.0. Materials Modular bricks shall conform to M-15, water shall conform to M-I. Lime mortar or proportion **L.M. 1 : 1.5 (1 Lime putty : 1.5 coarse sand)** shall conform to M-10.

2.0. Workmanship

The relevant specifications of item No. 6.30. (I) (A) shall be followed except the half brick masonry work shall be carried out in Lime mortar 1:1.5(1 Lime putty; 1.5 coarse sand) in foundation and plinth using modular bricks.

3.0. Mode of measurements & payment

3.1. **The relevant specifications of item No. 6.30 (I)-(A) shall be followed.**

3.2. **The rate shall be for a unit of one sq. metre.**

6.30.111. (B) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./ Sq. Cm. in lime mortar 1:1.5 (1 Lime putty : 1.5 coarse sand) in foundation and plinth with conventional bricks. **1.0 Materials**

Conventional bricks shall conform to M-I 5. water shall conform to M-I. 1-lime mortar of proportion **L.M. 1 : 1.5 (1 Lime putty : 1.5 coarse sand)** shall conform to M-10.

2.0. Workmanship

The relevant specifications of item No. 6.30 (1)(A) shall be followed except the half brick masonry work shall be carried out in lime mortar 1:1.5 (1 Lime putty : 1.5 coarse sand) in foundation and

plinth using conventional bricks.

3.0. Mode of measurements and payment

3.1. The relevant specification of item No. 6.30. (I)-(A) shall be followed.

3.2. The rate shall be for a unit of one sq. mt.

6.30. IV. (A) Half Brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg./Sq. Cm. in cement mortar 1:5 (1 lime putty : 5 coarse sand) with hoop iron 25 mm. x 1.6 mm. or equivalent reinforcement at every third course embedded in cement mortar in foundation and plinth with modular bricks.

1.0. Materials Bricks shall conform to M-15 Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6- Cement mortar shall conform to M-I 1. M.S. reinforcement shall conform to M-I8.

2.0. Workmanship

Relevant specifications of bricks, wetting and laying of bricks, joints, curing, scaffolding etc. shall conform to item No. 6.30. (1) (A) except the following.

2.2. Cement mortar used in masonry work shall be in proportion to 1 part of cement and 5 part of sand by volume and shall conform to M-11 ,and this work is for half brick thickness for partition walls.

2.3. The hoop iron 25 mm. \ 1.6 mm. or equivalent reinforcement shall be provided at every third course. The ends of reinforcement shall be fully embedded in main wall sides as directed. Reinforcement shall be placed on the top of the bottommost course. Laps shall be of 15 cms. of mild steel bars or hoop iron.

2.4. The joints in the course where reinforcement is placed shall admit or mortar cover to the reinforcement,

3.0. Mode of measurements and payment

3.1. The relevant shall be for half brick masonry work including providing specified reinforcement, the limiting dimensions not exceeding those in the plan or as directed. The length shall be measured nearest to one Cm.

3.2. Any work done extra over specified dimensions shall be ignored.

3.3. The rate shall be for a unit of one sq. metre.

6.30.II. (B) Half Brick masonry in common burnt clay building having crushing strength not less than 35 Kg./Sq. Cm. in cement mortar 1:5 (1 cement: 5 coarse sand) with hoop iron 25 mm. x 1.6 mm. or equivalent reinforcement at every third course embedded in cement mortar in foundation and plinth with conventional bricks.

1.0. Materials & Workmanship.

The relevant specifications of item No. 6.30. (I) (A) shall be followed except the work is to be carried out with conventional bricks instead of Modular bricks.

2.0. Mode of measurements and payment

2.1. The rate shall be for half brick work. including providing specified reinforcement, the limiting dimensions not exceeding those shown in the plan or as directed. The length shall be measured nearest to one cms.

2.2. The work done extra over specified dimensions shall be ignored.

2.3. The rates shall be for a unit of one Sq. metre.

6.33. (A) Extra for Half brick masonry in superstructure above floor two level. Modular bricks.

1.1. The relevant specifications for item No. 6-30. (A) & 6.30. (B) shall be followed except that this work is for additional lift of each floor two level using Modular bricks.

2.0. Mode of measurements and payment.

2.1. The payment made for the half brick masonry work carried out above floor two level for each additional lift over and above the payment of work up to floor two level.

2.2. The rate shall be for a unit of one sq. metre per floor.

6.33.(B) Extra/or half brick masonry work in superstructure above floor two level. Conventional bricks.

1.0. Materials &. Workmanship

1.1. The relevant specifications for item No. 6.30. (A) & 6.30 (B) shall be followed except that this work is for additional lift of each floor two level using conventional bricks.

2.0. Mode a/measurements & payment

2.1. The relevant specification of item No. 6.33 (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre per floor.

6.55. (1) Half brick thick Honey-comb brick work with burnt clay building having crushing strength not less than 35 Kg./Sq. cm. in **C.M.** 1 :4 (1 cement: 4 coarse sand)

1.0. Materials

Bricks shall conform to M-15. Cement mortar of proportion shall conform to M-11.

2.0. Workmanship

The relevant specifications of item No. 6.32. (A) shall be followed except that the masonry work shall be carried out Honey-comb in thickness of halfbricks in cement mortar 1:4(1 cement: 4 coarse sand) and us and where directed with all lifts.

3.0. Mode o/measurements &. payment

3.1. The honey-comb work shall be measured in sq. mtres. The full area of honey comb work shall be measured without deduction for openings.

3.2. The rate shall be for a unit of one square metre of wall surface.

SECTION - 7

Rubble Masonary Work

7.6. (1) Uncoursed rubble masonry with hard stone approved quality in foundations and plinth in cement mortar 1:6(1 cement: 6 coarse sand) including levelling etc. complete.

1.0. Materials

' The cement mortar shall conform to M-I 1. Stone shall conform to M-16.

2.0. Workmanship.

2.1. Dressing to stones :

Stone used for uncoursed rubble masonarey work shall be hammer dressed on the sides, and beds in such a way as to close with the adjustment stone in the masonry work as strongly as possible, the face stone shall be dressed in such a manner as to give a specified pattern such as polygonal facing etc. The face of the stone shall be so dressed that bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on the face to be plastered, it shall not project by more than 19 mm.. nor shall have depressions more than 10 mm. from the average wall surface.

2.2. Laying:

All the stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall! be built true to plumb (or true to required batter when so specified). All connected walls in a structure shall be raised up uniformly and regularly. However if for any specific reason, one part of masonry is required to be left behind, the wall shall be racked back at an angle not steeper than 45° Vertical toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 metre in height.

2.3. The stone shall be laid in an uncoursed fashion, or random facing etc. However the masonry is required to be brought to level at various stages viz. plinth level window still level, roof level and any other level specifically shown in the drawings. This may be done first by adjusting the laying of stone to

one level and then by providing levelling coarse of cement concrete 1 : 6 : 12 (1 cement: 6 sand : 12 graded stone aggregate 20 mm. nominal size) or as otherwise specified.

2.4. Proper bonding shall be achieved by closely filling in adjacent stones as well as by using bond stones or through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be carefully set so as to break joint and avoid formation of vertical joints. The depth of stone from the face of wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 15.0 mm. internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

2.5. All stones shall be carefully laid. hammered down by a wooden mallet into position and solidly embedded in mortar, chips and spawns of stone may be used wherever necessary to avoid thick mortar beds or joints at the same time ensuring that no hollow space is left anywhere in the masonry. The chips used shall not be more than 20 % by volume of masonry. The hearting shall be laid nearly level with face stones except that at about one metre intervals vertical bond stone or plumes projecting about 150 to 200 mm. shall be firmly embedded to form vertical bonding in masonry.

2.6. Bond Stone:

Bond stones or through stones running right across the thickness of the wall shall be provided in walls upto 600 mm. thick. In thicker walls two stones overlapping each other by at least 150 mm. shall be provided across the thickness of the wall to form bond stones. There shall be at least one bond stone for every 0.5 sq. mt. of wall surface. The bond stone shall be marked by a distinguishing letter during construction for subsequent verification and shall be laid staggered in subsequent layers.

2.7. Quoins :

The quoins or corner stone shall be selected stone nearly dressed with hammer and / or chisel to form the required corner angle and laid header and stretcher alternatively. The bed top surface of quoins shall be chiselled dressed to give horizontal joints. The quoins shall have a uniform chisel draft of at least 25 mm.

width at four edges of each exposed face. all the edges of the same face being in one plane. No quoins stone shall be smaller than 0.025 cum. in volume.

2.8. Jamb Stones :

The jamb stone shall be made with stone specified for quoins, except that the stone provided on the jambs shall have their length equal to thickness of wall upto 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

2.9. Joints:

All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. when plastering or pointing is not required to be done, the joints shall be struck flush and finished simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. by a racking tool, during progress of laying while the mortar is still green.

2.10. Scaffolding:

Single or double scaffolding shall be used. The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled and made good before plastering.

2.11. Curing :

Green work shall be protected from rains by suitably covering the same. Masonry shall be kept constantly moist on all the faces for a period of at least 7 days- The top of masonry shall be flooded at close of the day. ,

3.0. Mode of measurements and payment

3.1. All work shall be measure on the basis of finished dimensions and measure net except where other wise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made, nor extra payment made for the following: (a) Ends of joints, beams, posts, girders, rafters, purloins trusses, corbels, etc. each upto 500sq. Cm. in section.

(b) Opening each upto 0.1. Sq.m.

(c) Wall plates and bed plates, bearing of chhaja and like upto 1.0 Cm. depth (bearing of floor and roof slabs shall be deducted from masonry).

(d) Drain holes and recesses for cement concrete blocks to embed hold fasts for doors windows.

(e) Building in the masonry iron fixtues pipes upto 300 mm. dia. hold fasts of doors and windows.

(f) Forming cheses in masonry upto section of 350 sq. cm.

3.2. The rate shall be for a unit of one cubic metre.

7.6. (II) Uncoursed rubble masonry with hard stone of approved quality in foundations and plinth in cment mortar 1:5 (1 cement: 5 coarse sand) including levelling up etc. complete.

1.0. Materials & Workmanship

The relevant specifcatiion of item No, 7.6. (I) shall be followed except that the proporiton of cement moratar shall be in C.M. 1.5 (1 cement: 5 coarse sand)

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 7.6 (I) shall be followed.

2.2. The rate shall be for a unit of one cubic metre.

7.6.(III) Uncoursed rubble masonry with hard s(one of approved quality in foundations and plinth in lime mortar 1:1.5 (1 lime putty : 1.5 coarse sand) including levelling up etc. complete.

1.0. Materials

Lime mortar shall conform to M-10. The rubble shall conform to M-16.

2.0. Workmanship

The relevant specification of item No. 7.6. (I) shall followed.

3.0. Mode of measurements and payments

3.1. The relevant specifications of item No. 7.6.(I) shall followed.

3.2. The rate shall be for a unit of one cubic metre. ^

7.27. (A) Course rubble masonry with hard stone of approved quality in Foundations and plinth in cement mortar 1:6 (1 cement: 6 coarse sand) etc. complete.

1. Materials

Cement mortar shall conform to M-II. The stone shall conform to M-16.

2.0. Workmanship

2.1. Dressing of stones :

The face stone shall be hammer dressed so as to give approximately rectangular blocks. They shall be squared on bed and side joints. The bed joints shall be rough chisel dressed for a depth of at least 50 mm. back from the faces and the side joints shall be so dressed to a depth of atleast 40 mm. back from the face, such that no portion of the dressed surface is more than 10 mm. from a straight edge held against the surface. The remaining poritons of surface shall not project above the chisel dressed bed and side joints. The bushing on the face shall not project by more than 40 mm. on an exposed face and 10 mm. on a face to be plastered. The hammer dressed stone shall also have a rough tooling for a minimum with of 25 mm. along the four edges of the face of the stone.

2.2. Laying:

2.2.1. All stones shall be wetted before laying. The wall shall be built up truly plumb (or to required batter where so specified). All connected masonry in a structure shall normally be raised up uniformly and regularly. However, if for any specific reasons one part of wall is required to be left behind, such wall shall be raked back at an angle not steeper than 45. Vertical Toothed joints in

masonry shall not be allowed. The work shall be carried up regularly and masonry on any day shall not be raised by more than 1 metre in height.

2.2.2. All the course shall be laid truly horizontal. The height of course shall not be less than 150 mm, nor more than 300 mm. Face stone shall be laid in alternate header and stretcher fashion. They shall be so arranged as to break joints by at least 75 mm. Stones shall be laid with grains horizontal so that the load is transmitted along with direction of their maximum crushing strength. The depth of stone shall not be less than the height or breadth. The breadth of a face stone shall also be not less than the breadth. The breadth of a face stone shall also be not less than 150 mm. Each face stone shall be of the same height in

any given course. The courses shall be built in perpendicular to the pressure which the masonry will bear. In case of battered walls (such as retaining walls) the beds of the stone and the plane of courses shall be laid with their bed perpendicular to the battered face.

2.2.3. The hearting or the interior filling of the wall shall consist of flat bedded stone carefully laid on their proper beds in mortars. chips and spawns of stone being used where necessary to avoid excessive use of mortar, care being taken to see that no hollow space is left anywhere in the masonry. Chips shall

not be used below the hearting stone to bring these up to the level of stones. The use of chips shall be restricted to be filling of interstices between the hearting stone but the volume of chips shall be limited to 15 % of the total volume of the masonry.

2.3. Bond stones :

The relevant specification of item No. 7.6. (I) para 2.6 shall be followed except that the bond stone shall be provided for at least 1.8 mm. length of every courses.

2.4. Quoins :

The quoins, which shall be of the same height as the course to which it belongs shall be formed from selected stone of at least 400 mm. length. They shall be laid square or beds as stretchers and headers alternatively. The beds shall be rough, chisel dressed to a depth of at least 100 mm. These stones shall have a minimum uniform chisel drafts of 25 mm. width at four edges. All the edge being in the same plan. quoin stone shall be not smaller than 0.025 cum. in volume, and it shall also be not less than 300 mm. in length, 25 % of them being not less 500 mm. in length.

2.5. Joints:

All the bed joints shall be horizontal and all joints shall be vertical. Face joints shall not be more than 10 mm. thick. All joints shall be properly and completely filled with mortar. On faces where no plastering nor pointing is required to be done the joint shall be struck flush and finished simultaneously while laying stones. In other cases the joints shall be raked to a minimum depth of 20 mm. by raking tools during the progress of work while the mortar is still green.

2.6 Curing :

The relevant specifications of item No. 7.6 (I) para 2.9 shall be followed. 3.0 Mode of measurements & payment

3.1. The relevant specifications of item No. 7.6.(1) shall be followed. **3.2.** The rate shall be for a unit of one cubic metre.

7.17. (B) Coarsed rubble masonry with stone of approved quality of foundations and plinth in cement mortar 1:5 (1 cement: 5 coarse sand) etc. complete.

1.0. Materials & Workmanship

The relevant specifications of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:4 (1 cement: 4 coarse sand)

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 7.17 (A) shall be followed.

2.2. The rate shall be for a unit of one cubic metre.

7.17. (C) Coarsed rubble masonry with stone of approved quality of foundations and plinth in cement mortar 1:4 (1 cement: 4 coarse sand) etc. complete.

1.0. Materials & Workmanship

The relevant specifications of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:4 (1 cement: 4 coarses sand) .

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 7.17 (A) **shall be followed.**

2.2. The rate shall be for a unit of one cubic metre.

7.17. (D) Coarsed rubble masonry with stone of approved quality foundations and plinth in C.M.

1:3 (1 cement: 3 coarse sand) etc. complete. 1.0.

Materials & Workmanship

The relevant specifications of item No. 7.17 (A) shall be followed except that the proportion of mortar shall be C.M. 1:3 (1 cement: 3 coarses sand)

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 7.17 (A) shall be followed.

2.2. The rate shall be for a unit of one cubic metre.

7.19. (A) Coarsed rubble masonry with stone of approved quality for superstructure above plinth level upto floor two level in C.M. 1:6 (1 cement: 6 coarse sand) etc. complete.

1.0. Materials & Workmanship

The relevant specifications of item No. 7,17 (A) shall be followed except that **the coarsed rubble masonry** work shall be carried out for superstructure above plinth level upto floor two level. **1.2.** Single or double scaffolding may be used. The scaffolding shall be strong and sound. In case single scaffolding is used, the holes shall be carefully made good as directed.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. **7.17 (A) shall be followed.**

2.2. The rate shall be for a unit of one cubic metre.

7.75. Precast concrete block masonry (including quoin block, jamb blocks, closer etc.) with solid concrete blocks of approved size made of cement concrete 1:3:6 Mix. (1 cement; 3coarsesand : 6 graded stone aggregate of 20 mm. and down gauge) in foundation and plinth in cement mortar

1:6.

1.0. Materials

(a) Aggregate shall conform to M-12. (b) Sand shall conform to M-6. (c) **Cement shall conform to M-3.**

1.1. The solid cement concrete blocks shall be precast with concrete of 1:3:6 mix (1 cement : **3 coarse sand** : 6 graded stone aggregate)

1.2. A block shall be deemed to be solid if the solid materials is not less than 75 % of the total volume of the blocks calculated from overall dimensions. . , .

1.3. The concrete mix used for blocks shall not **be richer** than 1 part by volume of cement to 6 parts by volume of combined aggregate.

1.4. The actual size of the block shall be one of the following : Size - A : 39 x 30 x 19 cms. Size - B 39 x 20 x 19 cms. Size - C : 39 x 10 x 19 cms. The size other than these specified above may be used with the approval of Engineer-in-charge.

1.5. The blocks may be either machine made or hand made. The concrete mix, the mixing of concrete the manufacture of blocks, curing and drying shall be in accordance with para-6 to 10 under I.S. : 2185-1967.

1.6. Faces of blocks shall be flat and rectangular. Surface finish shall be rendered smooth or plastered with cement mortar 1:3 (1 cement: 3 coarse sand)

1.7. The average compressive strength of eight blocks when determined in the manner described in

I.S.: 2185-1967 shall not be less than 50Kg./sq.cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight blocks.

1.8. Concrete blocks shall be stored and stacked properly in such a way as to avoid any contact with moisture at site. They shall be stock piled on planks or other supports free from contact with ground and covered to protect against wetting. Cement mortar of proportion 1:6 shall conform to M-I 1.

2.0. Workmanship

2.1. The blocks need not wetted before or during laying in the walls. In case climatic conditions so required. **the** top and the sides of block may only be slightly moisture so as **to prevent absorption of water from the** mortar and ensure the development of required bond with mortar.

2.2. Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in I.S : 6042-1952. The mortar shall not be spread so much of the actual laying of the units that it tends to stiffen and lose its plasticity, thereby resulting in poor bond. For most of the work, the joints, both horizontal and vertical shall be 10 mm. thick except in the case of extended joint, construction, the mortar joints shall be struck off flush with wall surface and when the mortar has started stiffening , it shall be compressed with rounded or U-shaped tool. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened in effect intimate contact between the mortar and the masonry unit and obtained a weather tight Joint.

2.3. Quoins & closers :

Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for all building blocks and slabs for external work. Proper half closures shall be cast and not cut from full size blocks. The returned ends of blocks for door windows reveals and quoins shall be finished with a fair face in the mould.

2.4. Only double scaffolding shall be used- The scaffolding be strong and sound. No holes in the masonry for supporting shall be allowed.

2.5. Curing : The encoring of concrete block masonry shall be carried out for 7 days.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 7.6. (I) shall be followed.

3.2. The work of concrete block masonry in foundation and plinth shall be measured under this item.

3.3. The rate shall be for a unit of one cubic metre.

7.82. (A) Precast concrete block masonry in partition walls 10 cms. thick with solid block of approved size (including quoins, blocks, jambs blocks closers etc.) made of C.C.I :3:6(1 cement : 3 coarse sand : 6 graded stone aggregates 20 mm. and down gauge) in C.M. 1:4

1.0. Materials

1.1. The relevant specification of item No. 7.75 shall be followed except that the precast concrete blocks shall be of size suitable for 10 cms. size partition wall i.e. size, C, and the proportions of cement mortar shall be in cement mortar 1:4 (1 cement: .4 coarse sand)

2.0. Workmanship

The relevant specifications of item No. 7.75 shall be followed except that the work shall be for precast concrete block partition walls of 10 **cms.** thickness.

3.0. Mode of measurement & payment

3.1. the relevant specifications of item No. 7.75 shall be followed.

3.2. The rate shall be for a unit of one cubic metre.

7.0.0.1. White stone bela masonry block in superstructure with stone of approved quality in lime mortar 1:1.5(1 Lime putty : 1.5 fine sand) including raking out joints etc. complete..

1.0. Materials:

1.1. The stone or bela shall be white hard sand stone or block. The stone shall be sound hard rough and durable. It shall be free from skin. The thickness of bela or block shall not be less than 15 cms. or as directed. The mortar used shall consist of one part of lime putty and 1.5 parts of fine sand.

Lime mortar

shall conform to M-10.

2.0. Workmanship

2.1. Dressing of stone :

Stone shall be chiselled on all the sides so that all six sides shall be in a rectangular shape and all the stones shall be so dressed that the bushing of the exposed face shall not project nor depressed from the general wall surfaces. The size of bela or block shall be as per thickness of the wall to be constructed or as directed.

2.2. Laying:

All the stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. All connected walls in a structure shall normally be raised up uniformly and regularly. The vertical joint shall not be allowed and also it shall not be more than 12 mm. in thickness.

2.3. Proper bonding shall be made by laying bela or block side by side each other with lime mortar on bed as well as in between two bela or block vertically.

2.4. Bond Stones:

Bond stones or through stones running right across the thickness of the wall shall be provided in walls upto 450 mm. thick. In thicker walls two bela or blocks or laying each other by atleast 150 mm. each other shall be provided across the thickness of the wall to bond stone. Such bond stone shall be atleast one for every 1.0 sq. mt. area of the wall surface.

2.5. Joints;

All the joints shall be completely Filled up with mortar and their thickness shall not exceed by 12 mm. When plastering or pointing is not required to be done, the joints shall be struck flush and finished, simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. during process of laying while mortar is still green.

2.6. Scaffolding :

Single or double. scaffolding shall be used. It shall be strong and sound: The holes left in masonry for supporting shall be made good before plastering.

2.7. Curing : .

Green work shall be cured for a period of 7 days continuously.

3.0. Mode of measurements & payment

3.1. The work shall be measured on the basis of finished dimensions. No deduction shall be made nor extra payment shall be made for the following ;

(a) Ends of joints, beams, posts, girders, rafters, purlins, corbels, etc. each upto 500 sq. cms. in section

(b) Opening each upto 0.10 sq.m.

(c) Small plates and bed plates, bearing of chhajjas and like upto 10 cms. depth (bearing on floor and roof slabs shall be deducted from masonry.

(d) Drain holes and recesses for cement concrete blocks to embed hold fasts for doors and windows etc.

3.2. The rate shall be for a unit of one cubic metre.

7.0.0.2. White stone bela masonry work in partition walls upto 15 cms. thickness in C.M. 1:4 (1, cement: 4 coarse sand.)

1.0. Materials & Workmanship.

The relevant specifications of item No. 7.0.0.1. as above shall be followed except that the proportion of mortar shall be in C.M. 1:4 (1 cement: 4 coarse sand).

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No.7.6 (I) shall be followed, **2.2.** The rate shall be for a unit of one cubic metre.

7.0.0.3. White stone bela masonry block in superstructure with stone of approved quality in C.M. 1:5 (I cement: 5 coarse sand) including raking the joints etc. complete. 1.0. Materials and workmanship. The relevant specification of item No. 7.0.0.1 as above, except that the proportion of cement mortar shall be in C.M. 1:5(1 cement: 5 coarse sand)

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 7.6. (1) shall be followed. **2.2.** The rate shall be for a unit of one cubic metre.

7.0.0.4. White stone bela masonry block in coarse in superstructure with stone of approved quality in C.M. 1:6 (1 cement; 6 coarse sand) including raking joints etc. complete.

1.0. Materials and workmanship.

The relevant specification of item No. 7.0.0.1. shall be followed except that the proportion of cement mortar shall be 1:6 (1 cement: 6 coarse sand).

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 7.6. (I) shall be followed. **2.2.** The rate shall be for a unit of one cubic metre.

SECTION - 9

Centering & Form Work

9.1. (A) Providing form work of ordinary timber planking so as to give a rough finish including centering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced concrete and plain concrete work in foundation, footings, bases of columns and mass concrete.

1.0. Materials

1.1. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26. **1.2.** The dimensions of scantling and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0 Workmanship

2.1. The form work shall conform to the shape lines and dimensions as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of tiles form –work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

2.2. Clearing and Treatment of forms :

2.2.1. All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars.

2.3. stripping time:

2.3.1. In normal circumstances and where ordinary cement is used forms may be struck after expiry

of following periods.

(a) Sides of walls columns and vertical faces of beams 24 to 48 hours.

(b) Beam soffits (props, left under) 7 days.

(c) Removal of props slabs :

(i) Slabs spanning upto 4.5 m . 7 days

(ii) Spanning over 4.5 m. 14 days

(d) Removal of props to beams and Arches :

(i) Spanning upto 6 m. 14 days

(ii) Spanning over 6 m. 21 days

2.4. Procedure when removing the form work :

2.4.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

2.5. Centering:

2.5.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

2.5.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

2.5.3. The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work for centering, contractor shall be responsible

for the damages to property.,

2.6. Scaffolding :

2.6.1. All scaffolding, hoisting arrangements and ladder etc.. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workmen etc.

2.6.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and affords easy inspection.

2.6.3. The rate is applicable to all conditions of working and height upto 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :

(a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, propping, bolting, wedging, easing striking and removal.

(b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. width to beams, columns and the like.

(c) Temporary openings in the form for pouring concrete, if required removing rubbish etc.

(d) Dressing with oil to prevent adhesion of concrete with shuttering and

(e) Raking or circular cutting. 2.7. Re-Use:

2.7.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints gone over, repaired where required.

Inside surface shall be retreated to prevent adhesion of concrete.

3.0.0. Mode of measurement and payment

3.1. Form work shall be measured as the area in square metres of shuttering in contact with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.

3.4. From work to secondary beams shall be measured upto the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

3.5. The rate is for the completed item.

3.6. The rate shall be for a unit of one sq.meter.

9.1.(A) (i) Extra for providing from work of ordinary timber planking so as to give a rough finish including centering, shuttering, and propping etc. height of propping and centering below supporting floor to ceiling is between 4 m. to 5 m. and removal of the same for in situ reinforce or plain concrete work in foundations, footings, bases of columns etc. and mass concrete.

1.0. Materials Workmanship.

1.1. The relevant specification of item No. 9.1(A) shall be followed except they the height of propping and centering below supporting floor to ceiling exceeding 4 m. but not exceeding 5 m.

2.0. Mode of measurements and payment

2.1. The payment shall be made extra over and above in payment made up to 4 mm. height. The relevant specifications of item 9.1. (A) shall be followed. The rate shall be for a unit of one sq. meter.

9.1. (B) (i) Providing from work of ordinary timber planking so as to give a rough finish including centering, below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in flat surface such as soffits of Slabs .landing and the like floors etc. upto 200 mm. in thickness.

1.0. Materials and Workmanship

1.1. Relevant specifications of item 9.1. (A) shall be followed except that work is to be carried out for flat surfaces such as soffits of slabs, landings and the like for floors etc. upto 200 mm. in thickness.

2.0. Mode of measurement and payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of sq. metre.

9.1. (B) (ii) Providing from work of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling. not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in flat surface such as soffits of slabs, landing and the like floors etc. above 200 mm. in thickness.

1.0 Materials and Workmanship

1.1. Relevant specifications of item 9.1. (A) shall be followed except that work is to be carried out for flat surfaces such as soffits of slabs, landings, and the like for floors etc. above 200 mm. in thickness.

2.0. Mode of measurement & payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed. .

2.2. The rate shall be for a unit of Sw. metre.

9.1. (C) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced concrete and plain concrete work in vertical surface as walls (any thickness) partitions.

1.0. Materials and workmanship.

The relevant specifications of item 9.1. (A) shall be followed except that the form work shall be carried out for vertical surfaces such as walls of any thickness, partitions etc.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 9.1.(A) shall be followed.

2.2. The rate shall be for a unit of sq. meter.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 9.1.(A) shall be followed.

1.2. The rate shall be for a unit of one sq. metre.

9.1. (G) (i) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in columns, pillars, posts, and struts, square rectangular, polygonal in plan.

1.0. Materials & Workmanship.

1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for columns, pillars, posts and struts, square rectangular, polygonal in plan.

2.0. Mode of measurement & payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

9.1. (H) (I) Providing form work of ordinary timber planking so as to give a rough finish including centering, shuttering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in side and soffits of beams, beam haunchings, cantilevers, girders, bressumers. and lintels not exceeding 1 m. in depth.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. m 9.1. (A) shall be followed except that the work is for sides and soffits of beams .beam haunting cantilevers, girders, bressumuers and lintels not exceeding 1 M. in depth.

2.2. Mode of measurement and payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

9.1. (H) (2) Providing form work of ordinary timber Planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in sides and soffits of beams, beam haunchings, cantilevers, girders bressumers and lintels exceeding 1 m. in depth.

1.0. Materials and Workmanship

1.1. The relevant specification of item No. 9.1. (A) shall be followed except that the work is for side and soffits beam haunting cantilevers, girders, bressumers and lintels* exceeding 1 M. in depth.

2.0. Mode of measurement and payment

2.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for side and soffits of beams, beam haunting cantilevers, girders, bressumers and lintels, exceeding 1 m. in depth.

2.2. The rate shall be for a unit of sq. metre.

9.1. (I) (i) Providing formwork of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in edges of slabs and breaks in floor and walls.

1.0 Materials and Workmanship

1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for edges of breaks in floors and walls.

2.0. Mode of measurement & payment

2.1. The length and breadth shall be measured nearest to one Cm.

2.2. The rate shall be for a unit of one sq. metre.

9.1. (K) Providing form work of ordinary timber planking so as to give a rough finish including

centering, shuttering , strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete in small surface such as cantilevers ends, brackets and ends of the steps, caps and bases to pilaster and columns and the like

1.0. Materials and Workmanship

1.1. The relevant specification of item No. 9.1. (A) shall be followed except that work is for small as cantilever ends. brackets and ends of steps, caps and bases to pilasters and columns and the like.

2.0. Mode of measurement and payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed.

2.2. The rate shall be unit of one sq. metre.

9.1. (L) Providing form work-of ordinary timber planking so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete in chullah hoods, weather sheds, chhajas, corbels etc. including edges.

1.0. Materials and Workmanship.

1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for chullah hoods weather-sheds, chhajas corbels etc. including edges of the same.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of one square metre.

9.1 (M) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced and plain concrete work in staircase with slopping or stepped soffits including risers and stringers excluding landing.

1.0. Materials and Workmanship.

1.1. The relevant specification of item No. 9.1. (A) shall be followed except that the work is for staircases with slopping or stepped soffits including risers and stringers excluding landing.

2.0. Mode of measurements & payment '

2.1. The relevant specifications of item NO. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

9.1 (Q) Providing form work of ordinary timber plankings so as to give a rough finish including centering, shuttering, strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 in. and removal of the same for in situ reinforced and plain concrete work in vertical fins and vertical sun-breakers.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. 9.1, (A) Shall be followed except that the work is for vertical fins and vertical sun breakers.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 9.1. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

9.7 Extra for providing form work with sheating of steel sheets so as to give a fair finish in :

(A) Foundation, footings, base of columns etc.mass concrete.

(B) Flat surfaces such as soffits, of slab landing and the like. (i) Floors etc. upto 200 mm. in thickness.

(ii) Floors etc. above 200 mm. in thickness.

(C) Vertical surfaces such as walls (Any thickness) partitions.

(D) Columns, pillars, posts and struts.

1. Square, rectangular, bressumers, and lintels not exceeding 1 mm. depth.

2. Sides and soffits of beams, beam haunchings, cantilevers, girders, breassumers and lintels exceeding 1 mm. in depth.

(I) Edges of slabs, and breaks in floors and walls.

(K) Small surfaces such as cantilever ends, brackets, and ends of steps, caps and bases to pillars and columns including edges.

(L) -Chollar woods, weather sheds, chhajas, coroeds etc., and the like.

(M) stair cases with sloping or stepped soffits, including risers, skingers excluding landing.

(Q) Vertical fine and vertical sun breakers.

1.0. Material and Workmanship

1.1. The relevant specification of item No, 9.1. (A) to (Q) shall be followed except that the extra rate shall be paid for using sheathing of steel sheets, and plates of steel or plywood instead of ordinary timber plank, to obtain a desired smooth exposed finish of surface. The surface shall be presentable without further treatment.

2.0. Mode of measurements & payment

2.1. The measurement of form work shall be taken for the form work done-with steel sheathing, extra over and above the rate of form work of the respective item of from work done. The relevant specification of respective item No. 9.1. (A) to (Q) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.,

SECTION – 10

Wood Work, Doors & Windows

10.1. (A) Providing wood work in frames of doors, windows, clerestory windows and other similar work, weight framed and fixed in position. Indian Teak Wood. 1.0.

Materials Wood in frames shall conform to M-

29. 2.0. Workmanship.

2.1. The item covers the requirement of frames for doors, windows, clerestory windows, their supply and fixing.

2.2. Frames:

2.2.1. All members of frames shall be exactly at right angles. The right angle shall be checked from inside surfaces of the frames of the respective members.

2.2.2. All members of frames shall be straight without any warp or bow and shall have smooth surfaces well planed on the three sides exposed at right angles to each other. The surfaces touching the wall may not be planed unless it is required in order to straighten up the member or to obtain the overall sizes within the tolerances as specified.

2.2.3. Frame shall have dovetails joins, When clerestory windows is included, it shall be provided by having full length one piece post for door or windows and clerestory window extending the frame on top at the head to the require extent. Horns shall not be provided in the head of the frame. When no sills are provided, the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonry by forming notches 10 mm. deep. Slight adjustment of spacing as necessary shall be done to have the hold fasts in the joints of masonry course. The frame shall be erected in position and held plumb with strong support form north sides and built in masonry as it is being built. The transom shall be through tenoned into the mortices of the jamb post to the full width of the jamb post and thickness of the tenon shall be not less than 15 mm.

2.3. Tolerance:

Unless specially mentioned otherwise tolerance of+ 1.5 mm. shall be allowed for each wrought face-

2.4. The tenons shall be closely fitting into the mortices and suitably pinned with wood dowels not

less than 10 mm. dia. metre. The depth of rebates for housing the shutter shall be as shown in the detailed drawing or as directed.

2.5. The contact surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.

2.6. Minimum number of three hold-fasts shall be fixed on each side of door and windows frames, one at the centre point and the other two at 30 cm. from the top and the bottom of the frames. In case of windows and ventilators frames whose height is less than 1 M. two hold-fasts, in each side shall be fixed at quarter points of the frames. The size of each hold-fast shall be 300 x 25x6 mm. and of mild-steel with split end. The hold fasts shall be fixed with screws to frames.

2.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.

3.0. Mode of measurements and payment.

3.1. The linear dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to 2 places of decimals of cu. m.

3.2. The rate shall be for a unit of 10 cu. diameter.

10.4. (A) Providing work in trusses, purlins, rafters, posts, post plates, wall plates, and like wrought, framed, hoisted and fixed in position, Indian Teak Wood.

1.0. Materials The teak wood shall conform M-29.

2.0. Workmanship

2.1. The relevant specifications of item No. 10.1. (A) shall be followed except that wood work shall be carried out in trusses, purlins, rafters, posts, post plates, wall plates and like wrought framed.

2.2. The work shall be carried out as per detailed drawings supplied by the Department as directed.

2.3. The length of the each member shall be in one piece or as directed.

3.0. Mode of measurement & payment

Unit of 10 cubic Decimeter.

The length, breadth and depth shall measured nearest to 1 cm. unfinished member. The rate shall

be for a

10.5. (A) Providing wood work in frames of false ceiling, partition etc. swan and put-up in position, Indian Teak Wood. 1.0. Materials

The teak wood shall conform to M-29.

2.0. Workmanship

The relevant specification of item No. 10.1. (A) shall be followed except that the wood work shall be for a false ceiling, partitions, etc. swan and put in position.

3.0. Mode of measurement and payment.

3.1. The relevant specification of item No. 10.1 (A) shall be followed.

3.2. The rate shall be for a unit of Ten cubic Decimeter.

10.12. (A) (1) Providing and fixing 35mm. thick fully paneled shutters for doors, windows, and clerestory windows including anodized aluminum butt hinges with necessary screws. Indian Teak Wood.

1.0. Materials.

1.1. Wood for shutter shall conform to M-29. Glass shall conform to M-38- Anodized aluminum butt hinges shall conform to M-43,

2.0. Workmanship

The item covers the requirement of preparation of shutters for doors, windows, clerestory windows. their supply and fixing.

2.2. Shutters :

2.2.4. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The style and rails shall be Joined to each other by mortise and tenon joints at right angles.

2.2.5. All members of the shutters shall be straight without any warp or bow and shall have smooth. well planed faces at right angles to each other.

2.2.6. The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.

2.3. Timber panelling:

2.3.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

2.3.2. The faces of the panel as well as various pieces of the panel shall be closely fitted to the sizes of the grooves.

2.3.3. Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed.

2.3.4. The thickness specified shall be finished thickness and no tolerance will be permitted.

2.5. Fixtures and Fastenings :

2.5.1. The rate shall include anodizes aluminum butt hinges including fixing with **iron screws. The size** and number of hinges shall be as per table given in annexure -1.

3.0. Mode of measurement & payment

3.1. The rate for shutter includes cost of providing block and cleat for keeping the shutter in open position ' as directed.

3.2. The dimension of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.

3.3. The rate shall be for a unit of one sq. metre.

10.12. (A) (II) Providing and fixing 35 mm. thick fully glazed shutters for doors, windows and clear story windows including anodized aluminum butt hinges with necessary screws, Indian Teak Wood.

1.0. Materials

Teak wood shall conform to M-29. Glass shall conform to M-38. Anodized aluminum built hinges shall conform to M-43.

2.0. Workmanship

2.1. The relevant specification of item No. 12.12. (A) 1 shall be followed except that the 35 mm. thick shutters full glazed for doors, windows and clear story windows including anodized aluminum butt hinges with necessary screws.

2.2. Glazing:

2.2.1. The glass panels shall be embedded in putty and secured to the rebate by **woodsen beads, or moldings** shape and size as approved with counter sunk screws suitable size.

2.2.2. The glass panel shall be properly cut to fit the rebates of the frames **and** sashes **fully** with a slight minus margin of about 1.5 mm. on all sides. Before glazing, the frame shall be primed and prepared for painting so that wood may not draw oil out of putty. The rebate shall be putted to an extent to provide bedding all round the glass.

2.2.3. The glass shall then be bedded in putty and fitted to frames with wooden heads or moulding as directed and secured with counter sunk screws. The screws shall be spaced not more than 100 mm. from each corner and not more than 200 mm. apart.

2.2.4. The size of the rebate in the frame and size and shape of beads or moulding shall be as per detailed drawings or as directed, the beads or mouldings shall have mitered corners.

3.0. Mode of measurement & payment.

3.1. The relevant specifications of item No. 10.12.-A (I) shall be followed. **3.2.** The rate shall be for a unit of one sq. metre.

10.12.(A) (III) Providing and fixing 35 mm. thick partly paneled and partly glazed shutters For doors. Windows, including anodized butt hinges with necessary screws, Indian teak wood.

1.0. Materials

Teak wood shall conform to M-29. Glass shall conform to M-38. Anodized aluminum butt hinges shall conform to M-43.

2.0. Workmanship

2.1. The relevant specifications of item No. 10.12. (A) (I) and 10.12. (A) (II) shall be followed except that the 35 mm. thick shutters shall be partly paneled and partly glazed for doors, windows and clear story windows etc. as per drawings.

3.0 Mode of measurement and payment.

3.1. The relevant specifications of item No. 10.12. (A) (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

10.12. (A) (I) Providing and fixing 35 mm. thick full panelled,shutters for doors, windows and clear Story windows including black enameled M.S. Butt, hinges with necessary screws, Indian **Teak wood**.

1.0 Materials

1.1. Relevant specification of item No. 10.12 (A) shall be followed except that the hinges shall be of

black enameled M.S. Butt type hinges. The hinges, bolts and other item of iron mongery with moving parts shall be properly oiled by the contractor before handing over the building.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 10.12. (A) Shall be followed.

2.2. The rate shall be for unit of one sq. meter.

10.13. (A) (II) Providing and fixing 35 mm. thick fully glazed shutters for doors, windows and clear story Windows, including black enameled M.S. Butt hinges with necessary screws. Indian teak wood.

1.0. Materials & Workmanship.

The relevant specifications of item No. 10.12 (A) (II) shall be followed except that **the** hinges shall be of black enameled M.S. Butt hinges. The hinges. Bolts and other items of iron mongery with moving parts shall be properly oiled by the contractor before handing over the building.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 10.12. (A) (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

10.13. (A) (III) Providing and fixing 35 mm. thick partly paneled and partly glassed shutters for doors, Windows and clearstory windows including black enameled M.S. Butt hinges with necessary Screws, Indian Teak Wood.

1.0. Materials & Workmanship.

The relevant specifications of item No. **10.12.** (A) (III) shall be followed except that the hinges shall be of **black enameled M.S. Butt hinges, bolts and other items of iron monegery with moving parts shall be** Properly oiled by the contractor before handing over the building.

2.0. Mode of measurement & payment.

2.1. The relevant specifications of item No. 10.12. (A) (I) shall be followed.

2.2. The rate shall be for a unit of one so. Meter.

10.15. (A) (I) providing and fixing 25 mm. thick fully paneled, shutters for cup-boards etc. including Anodized aluminum butt hinges with necessary screws, Indian Teak Wood. 1.0. Materials

First class Indian teak wood for shutters shall conform to M-29. Glass shall conform to M-38. Anodized aluminum bull hinges shall conform to M-43.

2.0. Workmanship.

2.1. The relevant specifications of item No. 10.12 (A) (I) shall apply except that the thickness of shutters shall be 25 mm. for cup-boards.

3.0. Mode of measurements & payment.

3.1. The relevant specifications of item No.10.12. (A) (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

10.15. (A) (II) Providing and fixing 25 mm. thick fully glazed, shutters of cup-boards etc. including Anodized aluminum butt hinges with necessary screws, Indian teak wood.

1.0 Materials & Workmanship

The relevant specifaications of item No. 10.12. (A) (II) shall apply except that the thickness of shutters shall be 25 mm. thick and fully glazed for cupboards.

2.0. Mode of measurements & payment.

2.1. The relevant specifications of item No. 10.12 (A) (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

10.15. (A) (III) Providing & fixing 25 mm. thick partly paneled and partly glazed shutters for cup boards etc. including anodized aluminum butt hinges with necessary screws, Indian Teak Wood.

1.0. Materials & Workmanship

The relevant specification of item No.10.12. (A) (I) and 10.12. (A) (II) shall be followed except that the thickness of shutters shall be 25 mm. thick and partly paneled and partly glazed shutters as per drawings ' for cup-boards.

2.0. Mode of measurements & payment

2.1 The relevant specifications of item No. 10.12. (A) (I) shall be followed. 2.2. The rate shall be for a unit of one sq.metre.

10.16 (A) (I) providing and fixing 25 mm. thick fully paneled, shutters tor cup boards etc., including **brick enameled M.S. Butt hinges with necessary screws, Indian Teak Wood.**

1.0. Materials & Workmanship

1.1. They relevant specifications of item No. 10.12, (A) (I) shall apply except that the wood for shutters shall be Indian teak wood and black enameled M.S. Butt hinges are to be used instead of anodized aluminum butt hinges and thickness of shutter shall be 25 mm,

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No, 10.12. (A) (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

10.16 (A) (II) Providing and fixing 25 mm. thick fully glazed shutters for a cup boards etc., including black enameled M.S. Butt hinges with necessary screws, Indian Teak Wood.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 10.15 (A) (II) shall be followed except that the fully glazed shutters of 25 mm. thickness shall be of Indian Teak Wood fixed in position with black enameled butt hinges for cup board.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item no. 10.12. (A) (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

10.16. (A) (III) Providing and fixing 25 mm. thick partly paneled and partly glazed shutters for cupboards etc., including **black enameled M.S. butt hinges with necessary screws, Indian Teak Wood.**

1.0, Materials

The relevant specifications of item No. 10.15 (A) (I) & 10.15 (A) (II) shall be followed except that the shutters shall be partly paneled and partly glazed of 25 mm. thickness of Indian Teak wood fixed with black enameled butt hinges for cup-boards.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 10.12. (A) (I) shall be followed.

2.2. The rates shall be for a unit of one sq. meter.

10.23. Providing and fixing 35 mm. thick paneled glazed or paneled and glazed shutters for doors. Windows, and clearstory windows including anodized aluminum butt hinges with necessary screws. Indian Teak wood shutters with (A) Plywood, (B) Particle Board, (C) hard Board, (D) Asbestos Sheet panels.

1.0. Materials

Indian teak wood for shutters shall conform to M-29. Glass shall conform to M-38.

(A) Plywood shall conform to M-37.

(B) Particle board shall conform to M-40. Anodized aluminum butt hinges shall conform to M-43.

(C) Hard board shall of best quality and shall be as approved by Engineer-in -charge.

(D) A.C. sheet shall conform to M-24.

2.0. Workmanship

2.1. The relevant specifications of item No, 10.12 (A) (I) shall apply to this item except that the work is shuttered with (A) Plywood (B) Particle Board (C) Hard Board (D) A.C. sheets panels as specified in item.

2.2. The shutter shall be prepared by fittings styles and rails (top. **bottom, lock and frieze**) as for paneled **leaves** with simple chamber on edge only. The styles and rails shall be grooved with just sufficient width for receiving panels and plain panels of specified type panels shall be fitted into the grooves.

3.0. Mode of measurement & payment

3.1. The relevant specifications of item No- 10.12 (A) (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

10.24. Providing and fixing 35 mm. thick paneled, glazed shutters for doors, windows, and

clearstory windows including brick enameled M.S. Butt hinges with necessary screws. Indian Teak Wood shutters with (A) Plywood (B) Particle Board (C) Hard Board (D) Asbestos panels.

1.0. Materials & Workmanship.

1.1. The relevant specifications of item No. 10.23 shall be followed except that the hinges shall be of black enameled M.S. Butt hinges instead of anodized aluminum butt hinges and shutter with (A) Plywood (B) Particle board (C) hard Board (D) Asbestos sheet panels as specified in item.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 10,12. (A) (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

10.30 Providing and fixing flush door shutters, solid core construction with frame of 1st class hard Wood with cross band and face veneer or plywood face panels including anodized aluminum butt Hinges with necessary screws. (1) Non- decorative type and block board core. (2) 35 mm. thick.

1.0. Materials

Flush door shall conform to M-30. Plywood shall conform to M-37. Anodized aluminum butt hinges Shall conform to M-43.

2.0. Workmanship.

2.1. The relevant specification of item No. 10.23 shall be followed except that the shutters be non hinges shall conform to M-43.

2.0. Workmanship.

2.1. The relevant specifications of item No. 10.23 shall be followed except that the shutters be non decorative type and block board core with face veneer or plywood with 35 mm. thickness.

2.2. Ready made shutters shall be of correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc.To make up to the size shall not be allowed.

3.0. Mode of measurement & payment

3.1. The relevant specification of item No. 10.12 (A) (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

10.37. Extra for using bright finished M.S. Piano hinges instead of anodized aluminum butt hinges in flush door shutter (A) Nickel Plated Piano hinges.

1.0. Materials & Workmanship.

1.1. The relevant specification of item No. 10.30. Shall be followed except that the nickel plated piano hinges shall be provided and fixed, it shall conform to the latest Indian Standards and shall be got approved by the Engineer-in-charge.

2.0. Mode of measurements & payment

2.1. The extra payment shall be made on sq. M. basis of door over and above the item No. 10.30 for providing finish M.S. planed hinges instead of anodized aluminum butt hinges.

2.2. The rate shall be for a unit of one sq. meter.

10.39. Extra for providing vision pane/not exceeding 0.1. sq. m. in all types of flush doors. (A) Rectangular square.

1.0. Materials & Workmanship.

1.1. The relevant specification of item no. 10.30. Shall be followed except that the vision panel not exceeding 0.1. sq. m. shall be provided.

1.2. The glass panels shall conform to M-38 and this item is for extra work of providing vision panel rectangular or square not exceeding 0.1. Sq. in all types of flush doors.

2.0. Mode of measurement & payment

2.1. The payment shall be made over of item No. 10.30 for this extra work on shutter in which visions panels are provided.

2.2. The rate shall be for a unit of one sq.metre of door area.

10.51. Providing and fixing 30 mm. thick wire gauze shutters using galvanized M.S. Wire off I.S. Gauze designation 85 - G with wire of 0.56 mm. dia for doors, windows, and clearstory windows Including anodized aluminum butt hinges with necessary screws: Indian Teak Wood.

1.0. Materials

Wire gauze jail shall conform to M-36. The teak wood shall conform to M-29. Anodized aluminum butt Hinges shall conform to M-43.

2.0. Workmanship

2.1. Specifications for item NO. 10.12 (A) (I) shall be adopted for shutter, and fixtures and fastenings except that 30 mm. thick wire gauze shutter shall be provided;

2.2. Wire gauze shuttering:

2.2.1. The finished sizes of the wooden components like styles, rails, mountings shall be as per the paneled doors. Each-leaf shall have 2 panels of wire gauze as per drawings or as directed.

2.2.2. The styles, rails etc shall be rebated 12 mm. along the side where they receive the gauze. The galvanized iron webbing of 0.56 mm. dia, mesh shall be used unless otherwise specified. The webbing shall be at 90 to 12 mm. along both sides of the rebate and fixed securely to the tyles and rails and mounting by 12 mm. galvanized iron staples at about 7.5. cms, intervals staggered spacing. Teak wood fillets of the size 10 mm. x 10 mm. shall be securely and neatly fixed with small screws spaced about 7.5 cm. canters around the rebate for each panel of webbing. After the fillets are pressed well into the angel to hold the gauze in two faces, the exposed edge of fillets shall be neatly rounded. The gauze shall be tightly stretched during fixing. The space between the fillet and the rebate where the webbing is bent shall be neatly finished with putty, so that cut end of webbing may not be visible. Each shutter shall be fitted with a pair of anodized aluminum butt hinges with necessary iron screws.

3.0. Mode of measurement & payment

3.1. The relevant specification of item No. 10.12 shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

10.53. Providing and fixing 30 mm. thick wire gauze using shutters galvanized M.S. wire of wire gauze designation 85 G with wire of 0.56 mm. dia. for doors, windows, and clerestory windows including bright finished or and black enameled M.S. butt hinges with necessary screws. Mango wood or equivalent quality.

1.0. Materials and workmanship. The relevant specification of item No. 10.51 shall be followed except that the hinges to be used shall be Bright finish / or and brick enameled M.S. butt hinges with screws and the wood shall be used of Mango Wood or equivalent quality of non teak wood.

2.0. Mode of measurement & payment

2.1. The relevant specification of item No. 10.12 shall be followed.

2.2. The rates shall be for a unit of one sq. meter.

10.54. Extra for providing and fixing galvanized M.S. Wire gauze of I.S. gauge designation 140 G. to doors, windows and clerestory windows with wire of dia. 0.71 mm. instead of I.S. gauze designation **85 G. with wire of dia. 0.56 mm.**

1.0. Materials and Workmanship

1.1. The relevant specifications for item No. 10.51 & 10.53 shall be followed for this item except that the diameter of wire shall be 0.71 mm. of I.S. gauge designation 140 G. instead of 56 mm; diameter I.S. gauge designation 85 G.

2.0. Mode of measurements & payment

2.1. The payment shall be made extra over and above the payment for galvanized M.S. Wire gauge.

2.2. The rate I.S. gauge designation 85 G shall of one sq. mt. of size of doors and windows shutters.

10.74. Providing and fixing 12 mm. thick and 100 mm. wide pelmet of flat pressed 3 layer veneered

Particle board solid core with 25 mm. diameter aluminum curtain rod bracket including fixing **With 25 mm. x 3 m. M.S. flat 10 cms. Long and plugs etc. comp. 1.O.Materials**

(1) 3 layers veneered particle board solid core shall conform to M-40 25 mm diameter aluminum curtain rod and 25 mm. x 3 mm. x 10 cms. Long M.S. flat and plugs shall have best approved quality as directed.

2.0. Workmanship.

The work shall be done as per **drawing and description given in the item of work. The wooden planks** shall be planed smooth and even on the **exposed surface**.

The pelmet shall be fixed to level by means of 10 cms. Long x 25 mm x 3 mm M.S. flat brackets lent in the form of angle and wooden plug fixed in the walls using wood screws. For pelmet up to 1.5 meter long two such brackets shall be used and additional bracket provided for longer pelmet at the rate of one per meter length extra. The curtain rods are fixed by suitable brackets at the ends to the pelmet as directed.

3.0. Mode of measurement & payment

3.1. Pelmet shall be measured in running meters along the sides and face.

3.2. The rate shall be for a unit of one running meter.

10.84. Providing and fixing 40 mm. paneled, glazed or paneled and glazed partitions fixed to frames with iron screws etc., complete with Indian teak wood (Frames to be paid separately)

1.0. Materials

Indian Teak Wood shall conform to M-29. Glass shall conform to M-38. Iron screws shall have best approved quality. Plywood, asbestos shall conform to relevant specification of materials.

2.0. Workmanship

The work shall be done as per detailed drawing or as directed. The wooden frames shall be of sizes as indicated in the drawing and description of item. They shall be painted and finished smooth and even. The vertical styles and rails shall be framed by tenon and mortise joints. The panels which may be of planks, asbestos, plywood's, glass or any other materials specified shall be fixed in the grooves made in styles and rails or by means of rebate and beading fixed by suitable screws. When glazing is used as panels the glass shall be fixed by using putty in addition to beading, the putty shall be used before applying materials.

3.0. Mode of measurement & payment

Partitions shall be measured in square meters of the net area of the filler materials provided. The rate shall be for a unit of one sq. meter.

10.85. Providing and fixing decorative plywood 4 mm. thick in partitions including fixing to frames with screws etc., complete with 50 mm. x 12 mm. teak wood beading (Frames to be paid separately)

1.0. Materials

4mm. thick decorative plywood shall be of best approved quality. Teakwood beading and screws shall be best approved quality as directed.

2.0. Workmanship

The relevant specifications shall be same as per that of item No. 10.84 expects that partitions shall be with 4 mm. thick decorative plywood and with teak wood beading.

3.0. Mode of measurements & payment

Partitions shall be measure in square meters **of the** net area of the filler materials provided. The rate shall be for a unit of one sq. meter.

10.86. Providing and fixing plain Asbestos cement sheet 6 mm. thick in partition including fixing to frames with screws etc., complete with 50 mm. x 12 mm. deodar wood beading (Frames to be

paid separate)

1.0. Materials

Plain A.C. Sheets shall conform to M-24. Deodar wood beading shall conform to M-29 A

2.0. Workmanship The relevant specifications of item No. 10.84 shall be followed same except that plain asbestos cement Sheet 6 mm. thick shall be used in partition and Deodar wood beading of size 50 x 12 mm. sizes shall be Used.

3.0. Mode of measurement & payment

3.1. The relevant specifications of item No. 10.84 shall be followed except that the rate excludes cost of frame work.

3.2. The rate shall be for a unit of one square meter.

10.88. Providing and fixing in partition 4 mm. thick medium hard board of approved quality including fixing to frames with screws etc., complete with 50 x 12 mm. Teak wood beading (Frame to be paid separately)

1.0. Materials

The hard board shall be 4 mm. thick and of best quality and made as approved. Teak wood beading shall conform to M-29. '

2.0. Workmanship

The relevant specifications of item No. 18.84 shall be followed except that the hard board of 4 mm. thickness shall be used in partition and teak wood beading 50 x 12 mm. sizes shall be used.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 10.84 shall be followed, except that the rate excludes cost of frame work.

3.2. The rate shall be for a unit of one square meter.

10.96. 25 mm. thick wooden shelves supported on 40x40x6 mm. T. or L Iron brackets fixed at suitable

Distances not exceeding 75 cms. Apart with Mango wood or equivalent quality. 1.0. Materials

The mango wood shall conform to M-29-A. Structural steel shall conform to M-22. **2.0.**

Workmanship The mango wood or equivalent quality non teak wood shelves shall be prepared form 25 mm. thick planks. The planks shall be pained smooth. The planks shall be sued in single piece upto 30 cms. Width. The shelves shall be fitted in position by fixing 40 x 40 x 6 mm. T or L iron brackets. The spacing of brackets shall not be more than 75 cms. the 40 x 40 x 6 mm. T or L iron brackets shall be fixed firmly in position by embedding the same in concrete, the shelves shall be fixed as directed. The season teak wood battons of size 35 x 12 mm. shall be fixed on open side as directed.

3.0. Mode of measurement s & payment

3.1. The shelves shall be measured in sq. meter. The length and breadth of shelves shall be measured net.

3.2. The rate is inclusive of batton provided.

3.3. The rate shall be for a unit of one sq. meter.

10.97. 40 mm. thick wood shelves supported on 40 x 40x6 mm. T.or L Iron brackets fixed at suitable Distance but not exceeding 75 cms. Apart with Mango wood or equivalent quality.

1.0. Materials & Workmanship.

The relevant specifications of item No. 10.96 shall be followed except that the thickness of shelves shall be 40 mm. Thick teak wood battons shall be provided of 50 x 12 mm. on all open sides.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 10.96 shall be followed.

2.2. The rate shall be for a unit of one square meter.

10.99. Providing and fixing M.S. round or square bars with M.S. flats at required spacing in wooden **Frames of windows and clerestory windows.**

1.0. Materials M.S. bars and flats shall conform M-18. And m-22. Respectively.

2.0. Workmanship

2.1. The M.S. bars shall be fabricated as shown in the drawing or as directed. It shall conform to I.S. 226-1975 and I.S. 961 and I.S. 1977-1975. The M.S. bars shall be fixed at the required spacing in mild steel flats, after drilling holes in the latter. The diameter and spacing of these bars shall be as mentioned in the drawing or as directed. The bars shall be passed through drill holes drilled into the mild steels flats, fixed in the recess in frames.

The flats shall be fixed with iron screws.

3.0. Mode of measurements & payment

3.1. The rate shall be for the M.S. round or square bars with M.S. Flats provided and fixed in position as per the specifications for the completed item.

3.2. The rate shall be for a unit of one Kg.

10.100. (A) Providing and fixing M.S. grills of required pattern to wooden frames of windows etc., with M.S. flats at required spacing and frame around, square, or round bars with round headed Bolts and nuts or by screws: plain Grill.

1.0. Materials the structural steel shall conform to M-22.

2.0. Workmanship

2.1. The M.S. Grill shall be prepared as per the drawing or as directed for fixing to wooden frames of windows etc.

2.2. The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be riveted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The out

side strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc., The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/' screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

2.3. The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

3.0. Mode of measurement & payment

3.1. No payment shall be made for weight of screws, bolts, nuts etc. only weight of grill shall be paid.

3.2. The rate shall be for a unit of one Kg.

10.100. (B) Providing and fixing M.S. Grill of required pattern to wooden frames of windows etc. with M.S. plates, at required spacing and frame around, square or round bars with round headed Bolts and nuts or by screws and with ornamental grill.

1.0. Materials & Workmanship

1.1. The relevant specification of item No. 10.100 (A) shall be followed except that the work is for of ornamental grill.

2.0. Mode of measurement & payment

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2.1. The relevant specification of item No. 10.100 (A) shall be followed.

2.2. The rate shall be for a unit of one Kg.

10.102. Providing and fixing hard drawn steel wire fabric 75 x 25 mm. mesh of weight not less than 7.75 Kg. per Sq. M. to window frames etc. including 60 x 20 mm. beading of teak wood.

1.0. Materials

Hard drawn steel wire of 75 x 25mm. mesh shall conform to M-34. Teak wood beading shall conform to M-29.

2.0. Workmanship.

The steel wire fabric 75 x 25 mm. mesh of weight not less than 7, 75 Kg. per Sq. M. to windows frames etc. shall be fabricated as per detail drawings. The wire fabric shall be fixed to windows frame by teak wood beading of 60 x 20 mm. size by means of screws.

3.0. Mode of measurement & payment

3.1. The wire mesh (Hard drawn) shall be measured net clear opening of frame of window in which mesh is fitted. Nothing shall be paid extra for fixing mesh in groove below teak wood beading.

3.2. The rate shall be for a unit of one sq. meter.

10.103. Providing and fixing fly proof galvanized M.S. Wire gauge off I.S. Gauge designation 85 G With wire of dia. 0.56 mm. to windows and clerestory windows including 60 x 20 mm. beading of, Indian Teak Wood.

1.0 Materials

The fly proof galvanized M.S. wire gauge shall conform to M-36. Teak wood beading shall conform to M- 29.

2.0. Workmanship.

The relevant specifications of item No. 10.102 shall be followed except (hat fly proof galvanized M.S. wire Gauge off I.S. Gauge designation 85-G with wire of 0.56 mm. shall be provided.

3.0. Mode of measurement & payment

3.1. The relevant specification of item No. 10.102 shall be followed.

3.2. The rate shall be for a unit of one square meter.

10.120. Providing and fixing first class Indian Teak Wood. 75 x 60 mm. moulded hand rails m straight Lengths completed.

1.0. Materials

First Class Indian teak wood shall conform to M-29.

2.0. Workmanship

The teak wood hand rail shall be of size 75 x 60 mm. The hand rail shall be prepared from first class Indian teak wood. The hand rail shall be moulded as per detail drawings. The hand rail shall be fixed in straight length as per detail drawings with screws. The relevant specifications of item No. 1-0-4 shall be followed except that the teak wood work shall be of a railing of specified size.

3.0. Mode of measurements & payment

3.1. The hand rail shall be measured in running meter.

3.2. The rate shall be for a unit of one running meter.

10.0.0.(I) Providing and fixing glazed lowered Glass windows and ventilators with teak wood frame

10 x 75 mm. size including 3 coats of oil painting to wood work etc. complete.

1.0 Materials

Indian teak wood shall conform to M-29. Glass shall conform to M-38.

2.0. Workmanship

The relevant specifications of item No. 10.1. (A) Shall be Followed for frame work except that the frame work of 10 x 7 cms. Size of required size ventilators shall be provided with glazed glass louvers. The glass louvers shall be provided as directed. In the groove of 1.25 cms. Depth made in frames, the thickness of glass shall be 5 mm. and glass shall be glass of best quality. The ventilation

blades shall slope done towards the outside at an angle of 45°.

3.0. Mode of measurements & payment

3.1. The area of opening within the frame in which louvers are fixed shall be measured in sq-meters.

3.2. The rate included painting 3 coats to wood work with-ready mix paint.

3.3. The rate shall be for a unit of one sq. meter.

10.0.0. (II) providing & fixing with wooden louvers plank 12 mm. thick windows and ventilators with Teak wood frame 10x7 cms. Size including 3 coats of oil painting to wood etc. complete.

1.0. Materials & Workmanship

The relevant specifications of item No. 10.0.0. (I) shall be followed except that the teak wood planks 12 mm. thick louvers shall be provided.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 10. 0.0. (I) shall be followed.

2.2. The rate shall be for unit of one square meter.

SECTION-11

Steel Shutters, Windows, Ventilators

11.2(A) Steel work riveted. In built up sections, framed work including cutting, hosting fixing in positing and applying a priming coat of red lead paint. In beam and joints, channels, angles tees, flats, with connecting plates or Angle cleats as in main & cross beams. Hop and jack rafters, purling connected to common rafters and the like.

11.0.Maferials

The structured steel work shall conform to M-22. Red lead paint primer shall conform to I.S.: 102-1962.

2.0. Workmanship

2.1. The steel sections as specified or required shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length or member, except as indicated in the drawing or as directed. All straightening and shaping to foem shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted. 2.2.Steel riveted or bolted in built-up sections, frame work.

2.2.1. The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out on a level platform to full scale and to full size or in parts. A steel tape shall be used for measurements to ensure maximum accuracy.

2.2.2. Wooden templates 12 mm. to 19 mm. thick or metal sheet template shall be made to correspond to each connecting gussets plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes of the steel members shall also be marked for cutting. The base of steel columns and the position of Anchor bolts shall be carefully set out.

2.2.3. All stiffeners shall be formed by pressure and where practicable, the metal shall not to be cut and welded in making th ese. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including location, type, size, length

and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as approved. The drawings shall indicate the shop and field rivets and bolt. The steel members shall be distinctly marked or stenciled with paints with the identification mark as given in the shop drawings. The bars shall be thickened at

the ends. so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in fabrication of various member, so that these can be assembled without being unduly packed, strained, or forced into position and when build up, shall be true and free from twists, binks,

buckles, or open joints. Before making holes in individual members for fabrication the steel work intended to be riveted or bolted together shall be as embled or clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being Web splice plates and fillers under dtiffners shall be cut to fit within 3 mm. or flange. Angles Web plates or Girders shall have no cover. Plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required web planets when spiced shall have clearance of not more that 6 mm. The errection, clearance for cleated ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed section shall be provided. Pains and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flows. The roller bearing shall be provided with adequate arrangement for holding th girders of truss resting on it. In columns caps and bases, the ends of shifts together with the attached gussets Angles, channels etc. after rivetting together shall be accurately machanised so that the parts connected butt against each other over the entire surfaces of contact connecting angles or channels ashall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by machining. The ends of bearing stiffeners shall be machanised or ground to fit tightly both at the top and bottom. All holes shall generally be drilled to the required size and at required position. Sub punching shall be permitted, provided it is done 3 mm. or less in diameter and reamred thereafter to the required size. The holes for rivets and bolts shall be larger by 0.4 to 6 mm. than the nominal diameter of rivets or black bolts depending upon the diameter of rivets. Holes shall have their axis perpendicular to the surface bored through. The drilling or reamring shall be free from burrs, and the holes should be clean and accurate. Holes for counter shunk bolts shall be made in such a manner that their heads fil flush with the surface after fixing. The fabrication work shall be completed in workshop as far as it is practicable to do so. Site joints shall be done with rivets and fitted bolts or black bolts, as shown in the drawings or as directed. Generally the following principles shall govern the use of rivets turned and fitted bolts, and black bolts:

(i) Rivets and turned and fitted bolts shall be used where the connection is such that slip under load has to be Avoided.

(ii) Black bolts may be used very sparingly where a force is carried through a connection without impact, Vibration or reversal or stresses.

2.2.4. Riveting: The parts assembled for riveting shall be in close contact with each other and the bearing stiffeners shall bear tightly both at top and bottom without being drawn or caulked. Members 10 be rivetted shall be properly pinned or bolted and rigidly held to-gather while riveting. Drifting of holes shall not be permitted except to draw the parts together and the drifting tools so used shall have maximum diameter not exceeding the nominal diameter of rivets or bolts. Drifting done during assembling shall not distort the metal or enlarge- the holes. The shanks or riveis shall project beyond the plate-surface sufficiently so as to fill the hole thoroughly and from the required head after riveting.

The riveting shall be done by hydraulic or pneumatic process. However, where such facilities are not available, hand riveting may be permitted. The rivet shall be heated red hot, care being taken to control the temperature of heating so as not to bum the steel. Rivets of diameter less than 10 mm. may be fitted cold. Rivets shall be of heat

finish with heads full and replaced. The heads of rivets shall be central to shanks and shall grip the assembled members firmly. In cutting out rivets, care shall be taken so as not be injure the assem

bled members firmly. In cutting out rivets, care shall be taken so as not to injure the assembled members, caulking or reoccupying shall not be permitted. , For testing rivets, a hammer weighing approximately 0.25 Kg. shall be used. Both heads of the rivets shall be tapped; slack rivets will give a hollow sound and ajar. All rivet heads shall be painted with red lead paint within a week of other fixing.

2.2.5. All bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The screwed heads shall conform to I.S. 1363-1960 and the threaded surface shall not be tapered. The bolts shall be of such length so as to project two clear threads beyond the nuts when fixed in position and these shall fit in the holes without any shakes. The nut shall be fit in the threaded ends of bolts properly. Where turned and fitted bolts are required to be used in place of rivets there shall be provided with washers not less than 6 mm. thick so that the nut when tightened shall not bear on the unthreaded body of the bolt. Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces. The threaded portion of the bolt shall not be within the thickness of the parts bolted together. The faces of the bolt heads removed or becoming loose due to vibrations or reversal of stresses, these shall be secured from slackening by the use of locknuts, spring washers, cross-cutting or hammering down of threads as directed. Bolts, nuts, and washers shall be thoroughly cleaned and dipped in double boiled linseed oil before use. The whole steel work shall be painted with a coat of priming coat of red lead, as per relevant specification of Painting.

3.0. Mode of measurement & Payment

3.1 The steel work shall be measured in general as under :

(a) All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise.

(b) The weight of steel sections, steel rods, and steel strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to the Contractor by department or those given in relevant I.S.: if steel is arranged by the contractor.

(c) The weight of steel plates and strips shall be taken from relevant I.S. based on 7.85 Kg. /Sq. meter for every millimeter sheet thickness if steel is supplied to the contractor by department.

(d) Unless otherwise specified, weight of cleats, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators, diaphragm gusset (taking over all square dimensions) fish plates etc. shall be added to the weight of respective items.

(e) In riveted work allowance is to be made for weight of rivet heads. No deductions shall be made for rivet or bolt holes excluding holes for anchore or holding down bolts.

(f) For forged steel and steel castings, weight shall be calculated on the basis of 8750 Kg/ cum,

(g) Unless otherwise specified, addition of 2.5 percent of the weight of structure shall be made for shop and site rivet heads in riveted structure.

(h) Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure

(i) Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001. M.

(j) Mill tolerance shall be ignored when weight is determined by calculation.

3.2 The rate includes cost of all material, labour, erection. Hoisting, scaffolding, protective measure required for proper completion of the item of work. This shall also include conveyance and delivery handling, loading, unloading and storing etc., required for completing the item described above including necessary wastage involved-

3.3 The rate shall be for a unit of a unit of one Quintal

11.2(D) Steel work riveted in built up section, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint in trusses, and trussed purlins, upto 25 m.

span and 15 m. overall height.

1.0. Materials & Workmanship

The relevant specifications of item No. 11.2 (A) shall be followed except that the work shall be for trusses and Trussed purlins upto 25 m. span and 15 m. overall heights.

2.0-Mode of measurement & payment

2.1.The relevant specifications of item No. 11.2 (A) shall be followed 2.2. The rate shall be for a unit of one Quintal.

11.4(A) Steel work welded, in built up sections frame work including, cutting, hoisting, fixing in position and applying a priming coat of red lead paint. In beams and joints, channels, angles, tees, Hats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins connected to common rafters and the like.

1.2. Materials & Workman ship

1.3. The relevant specifications of item No. 11.2 (A) shall be followed except that the steel work shall be done by welding.

1.4. Welding shall generally be done by electric process. Gas welding shall be resorted to, using oxyacetylene flame with specific prior approval. Gas welding shall not be permitted for structural steel work

1.5. The work shall be done as shown is the shop drawings which should clearly indicate various details of the joints bb joints to be welded, shop and site welded as well as type of electrodes to be used. Symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit

the welding that must be done after improper welding that is likely 10 be done due to heights and difficult positions on scaffoldings etc. The welding work shall conform to I.S. 816-1969.

1.6. Preparation of surfaces: Surfaces which are to be welded to gether shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

1.7. Assembly for welding: Before welding is commenced, the plates 'shall first be brought together and Firmly Clamped or spot welded at specified distance. This temporary connection has to be strong enough to hold the Plates accurately in place without displacement.

1.8. Precautions; All operations connected with welding and cutting equipment shall conform to safety Requirement given in I.S. 818-1968. The following points shall be borne in mind during the process of welding:

(a) Welds shall be made in flat position wherever practicable.

(b) Arc length, voltage and amperage shall be suited to the thickness of material type of groove and other circumstances of the work.

(c) The segments of welding shall be such that where possible the members which offer the greatest resistance To compression are welded first.

1.7. The defective welds which shall be considered harmful to the structural strength shall cut out and rewarded.

1.8. Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all stag has been removed. Welds and adjacent parts shall be painted after the same are approved.

1.9. All the members shall be thoroughly cleaned of rust, scales, dust etc., and given a priming coat of red lead paint before fixing them in passion. Testing of welding to be added in the specification I.N. 12.2.2.12-(i) to (viii)

2.0. Mode of measurements & Payment

2.1. The relevant specification of item No. 11.2 (I) shall be followed. **2.2.** The rate shall be for unit of one Quintal.

11.4 (D) Steel work welded in built up section framed work, including cutting, hoisting, fixing in position and applying a priming coat of red lead paint in trusses and trussed purlines upto 25m. span and 15m. Over all height.

1.0 Materials & Workmanship

The relevant specification of item No.1 1.4(A) shall be followed except that the work shall be for trusses and trussed purlines upto 25. span and 15m. Overall height.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No.1 1.4 (A) shall be followed. 2.2. The rate shall be for unit of one Quintal.

11.6. Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm. bracked with flat iron diagonals 20x5 mm. size with top and bottom rails off T Iron 40x40x6 mm. with 38 mm. dia steel pulleys complete with bolts, nuts, locking arrangements, stoppers, handles, including applying a priming coat red lead paint.

1.0. Materials

The collapsible steel gate shall conform to M-33.

2.0. Workmanship

T-rails shall be fixed to the floor and to the lintel at top by means of Anchor bolts, embedded in cement concrete to floor and lintel. The anchor bolts shall be placed approximately at 45 mm. centers alternatively in the two linages of the T-iron. In the bottom runner (T-iron) shall be embedded in the floor and proper groove shall be formed along the runner for the purpose. The collapsible gate shall fixed at the sites by fixing the double channels in the T-iron rail and also by hold fasts bolted to the end double channel and fixed in the masonry of the side walls or the otherwise. In case where the collapsible gate is not required to the lintels, beams or slop above, a tee iron suitably designed may be fixed at the top embedded in masonry and provided with necessary clamps and roller arrangement at the top. All the adjoining work damaged while fixing of gate shall be made good to match the existing work without any extra payment. All the members of the collapsible gate including T-iron shall be thoroughly cleaned of rust, seals, dust etc. and given a priming coat or red lead. Before fixing them in position.

3.0. Mode of measurements & payment

3.1. The collapsible gate shall be measured in sq. meter. The height of the gate shall be measured as the length of double channels and breadth from outside to outside of the end fixed double channels in open Position of the gate. The rate includes providing handles, arrangements stoppers etc. **2.** The rate shall be for a unit of one sq. meter.

11.7. Providing and fixing 1 mm. thick M.S. sheet sliding shutters both frame and diagonal braces to 40 x 40x6 mm. Angle iron 3.15 mm. M.S. gusset plates at junctions and corners, 25 mm. dia. Pulley 40x40x6 mm. Angle and T-iron guide rail at top and bottom respectively with handles, stoppers and locking arrangements etc. including applying priming coat of red lead paint.

1.0. Materials

M.S. sliding shutters shall be fabricated of M.S. component as given in the description of item M.S. sheets 1 mm. thick shall be fixed to the frame with rivets or welds as approved. The shutters shall be provided with top and bottom guide rails of Angles or T-iron as specified and 25 mm. dia. steel pulleys at the bottom guide black with steel pulleys at the top. The frame shall be riveted and / or welded and wherever riveting shall be done 3.15 'm. gussets plates shall be provided at the junctions.

2.0. Workmanship

2.1. The shutters shall be single or double leaf shutters as specified. The guide rails shall be sufficiently long and continued along the wall on the both ends so that the sliding shutters can rest against walls, leaving full opening when so required.

2.2. The guide rails shall be fixed to the floor by means of anchor bolts embedded in the cement concrete floor. The steel section at the top shall be suitably supported from the walls, two channel section shall suitably fixed vertically below the extreme Tie clamps in the wall and floor to avoid the shutters from going out of supports at the top and bottom. A

Suitable clamping arrangement will be provided at either end of the opening to avoid the shutters from rolling back into opening.

2.3. All the adjoining work damaged while fixing shall be made good to match the existing work.

2.4. All members of the sliding shutter including T-iron shall be thoroughly cleaned of rust. Scales dust etc. and given a priming coat of red lead before fixing them in position.

3.0. Mode of measurements & payment

3.1. The sliding doors shall be measured from outside to outside of the guide, rail and width outside to outside of shutters including vertical channels in sides. The rate includes providing handles, stoppers and locking arrangements etc. complete.

3.2. The rate shall be for a unit of one sq. meter.

SECTION - 12

Labour for fixing fixtures & fastening

12.4. Fixing metallic tower bolts of sizes with necessary screws etc. complete (tower bolts and screws to be paid under separate items :)

1.0. Workmanship

1.1. This item provides for labour for fixing metallic tower bolts of any size with screws, nuts, etc.

1.2. The tower bolts shall be fixed in proper position as shown in the drawing or as directed. There shall be fixed truly vertical or horizontal as the case may be.

1.3. The screws shall be driven home with screw driver. In no case the screws shall be hammered in.

1.4. All recesses and seats shall be cut to the exact size for counter sinking etc. Where so required-

1.5. Care shall be taken to see that no gaps are left between the fitting and the surface meant to receive the fittings.

1.6. The fittings shall be properly cleaned and left in original finish after fixing.

2.1. Mode of measurements & payment

(1) Cutting of holes, recesses, and seats involved in process of fixing.

(2) Cost of filling and cushioning materials where so required for proper seating of new fittings.

(3) Cost of nails etc. for temporary positioning of fitting.

(4) Cost of cleaning materials like old washed dhoti. Stain remover, etc.

(5) Cost of making good the over cut recesses or holes if any.

(6) Cost of making hole required size on the wooden frame for housing the bolt for locking.

2.2. The rate includes cost off labout involved in all operations required for proper completion of the items, including carriage, handling fixing etc. complete.

2.3. The rate shall be for a unit of one number.

12.5. Fixing metallic Hush bolts of size with necessary screws etc., complete (flush bolts and screws shall be paid under separate items),

1.0. Workmanship.

1.1. The relevant specifications shall be followed as per item No. 12.4. except for fixing metallic flush bolts instead of tower bolts.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number.

12.8. Fixing metallic or plastic door handles of sizes with necessary screws etc. complete (door handles and screws /o be paid under separate items)

1.0. Workmanship

1.1. The relevant specifications of item No.12.4. shall be followed except fixing door handles instead of tower bolts.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number.

12.10 Fixing metallic gate and shutter hooks and eyes of sizes (hooks and eyes to be paid under separate items)

1.0. Workmanship

1.1. The relevant specifications shall be followed as per item No. 12.4. except that fixing or eye and hooks instead of tower bolts.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number. (Hook & Eye)

12.11. Fixing metallic door latches of size with necessary screws (door latches and screws to be paid under separate

itemsO:

1.0. Workmanship

1.1. The relevant specifications of item No. 12.4. shall be followed except that fixing metallic door latches Instead of tower bolts.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 12.4. Shall be followed.

2.2. The rate shall be for a unit of one Number.

12.12. Fixing metallic mortise night latches with necessary screws including making necessary screws Holes in wooden door shutters etc., complete (mortise night latches and screws to be paid under Separate Kerns):

1.0. Workmanship

1.1. The relevant specifications of item No. 12.4 above shall be followed except that the fixing of mortise Night latches instead of tower bolts.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No-12.4. Shall be followed.

2.2. The rate shall be for a unit of one number.

12.18. Fixing metallic ball catchers 100mm. dia. (Ball catchers to be paid under separate item):

1.0. Workmanship

1.1. The relevant specifications of item No.12.4. Shall be followed same except fixing of ball catchers 100 mm. dia.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. Shall be followed.

2.2. The rate shall be for a unit of one number.

12.20 Fixing metallic casement window fasteners with necessary screws etc.complete. (Casement window fasteners and screws to be paid under separate items);

1.0. Workmanship

1.1. The relevant specifications of item No. 12.4. Shall be followed except fixing metallic casement windows fast

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 12.4 shall be followed.

2.2. The rate shall be for a unit of one number.

12.21. Fixing metallic casement stays of sizes with necessary screws etc., complete (Casement stays and screws to be paid under separate items)

3.0. Workmanship

3.1. The relevant specifications of item No. 12.4. shall be followed except fixing of metallic casement stays.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number.

12.24 Fixing metallic cupboard of ward robe locks of sizes with necessary screws etc. complete (Locks and screws to be paid separately)

1.0 Workmanship

1.1 The relevant specifications of item No. 12.4. shall be followed except that fixing metallic cupboard or ward robe locks of size with necessary screws etc. complete.

2.0 Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number.

12.25. Fixing metallic or plastic cupboard or ward robe knobs of size with necessary screws/bolts etc., (knobs and screws/bolts to be paid separately):

1.0. Workmanship

1.1. The relevant specifications of item No. 12.4. shall be followed except that fixing metallic or plastic cupboard or ward robe knobs of sizes with necessary screws/ bolts etc. complete.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The shall be for a unit of one number.

12.26 Fixing metallic floor door stoppers of sizes with rubber cushion, screws etc., to suit shutter thickness complete, (floor doorstopper with rubber cushion and screws to be paid under separate items):

2.0. Workmanship

1.1. The relevant specifications of item No. 12.4. shall be followed except that Fixing metallic floor stoppers.

2.0. Mode of measurement & payment

2.1. The relevant specifications of item No. 12.4 shall be followed.

2.2. The shall be for a unit of one number.

12.28. Fixing metallic door handles or knobs for mortise locks with necessary screws etc. complete (doors, handles/knobs and screws to be paid separately):

1.0 Workmanship

The relevant specifications of item No. 12.4. shall be followed except that fixing metallic door handles or knobs for mortice with necessary screws etc. Complete.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 12.4. shall be followed.

2.2. The rate shall be for a unit of one number.

SECTION -13

GLAZING

13.1. (I) providing and fixing sheet glass, selected quality (type-c) bedded in putty and fixed with wooden Beading including cost of wooden beading of first class teak wood and necessary cutting of Glass 5 m. thick.

1.0. Materials

The glass shall conform to M-38. The wood beading shall conform to M-29. Putty shall conform to I.S. 419-1967.

2.0. Workmanship

The glass shall be sheet glass of selected quality of 5 mm. thick.

2.1. The size of glass for glazing shall allow a clearance of 2.5 mm between the edges of glass and the wood or metal surrounds. The clearance may be increased, provided the depth of the rebate of groove is sufficient to provide not less than 1.5 m. cover to the glass. The detailed process of glazing shall be as specified in I.S. 3548-1966.

2.2. All stains from the surface of glass shall be removed and cleaned with thinner or spirit without any extra payment.

2.3. Wooden beading:

2.3.1. The size of the wood beads for glass panes shall be 1.5 x 3 cms. Unless other wise specified. Beads shall be secured to wooden frames with wither panels pins or screws and to metal frames in the way provided for in the frame.

2.3.2 Sufficient putty compound shall be applied to the rebate so when the glass has been pressed into the rebate, a bed of compound not less than 1.5 mm- thick will remain between the glass and the rebate. There should also be surplus of compound squeezed out above the rebate which should be stripped at an angle not undercut to prevent water accumulating. Beads should be bedded with compound against the glass and wood bead should also be bedded against the rebate. Care should be taken to see that no voids are left between the glass and the bead.

3.0. Mode of measurements & payment

3.1. All measurements of cutting shall, unless otherwise stated, be held to include the consequent waste.

3.2. Each pane of glass shall be measured to the nearest 0.5 cms. Both in width and height/length.

3.3. Irregular shaped or circular panes shall be measured as the smallest rectangular area from which the irregular or circular pane can be cut.

3.4. The rate includes cost of materials, labour required for completion of the item including hoisting, carriage, temporary erections like scaffolding etc.

3.5. The rate also includes:

(i) The wastages and breakage involved in the process.

(ii) Straight cutting on glass and glazing sheets.

(iii) Cost of subsidiary materials required for proper fixing and functioning of glass i.e. nails, spirit putty. Teak wood beading glass, pins etc. Complete.

3.6. The rate shall be for a unit of sq. meter.

13.1. (II) Providing and fixing sheet glass selected quality (Type-C) bedded in putty and fixed with Wooden beading including cost of wooden headings of first class teak wood, and necessary Cutting of glass 6 mm. thick. 1.0 Materials & Workmanship.

1.1. The relevant specifications of item No. 13.1 (I) shall be followed except that the sheet glass of selected quality shall be 6 mm. thick.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 13.1 (I) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

13.3 (C) providing and fixing rough cast wired glass 6 mm. thick bedded in putty and fixed with wooden Beading including the cost of wooden headings of Indian teak wood and necessary cutting of Glass wired figures glass.

1.0. Materials

Wire figure glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall conform to LS. 419-1967.

2.0. Workmanship

The relevant specifications of item No. 13.1. (I) shall be followed except that the wired figured glass of 6.6 mm. thick shall be used.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 13.1. (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

13.5. (2) Providing and fixing sheet glass ordinary quality bedded in putty and fixed with wooden Beading including the cost of wooden headings of first class teak wood and necessary cutting Of glass 3 mm. thick. 1.0. Materials

Glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall conform to I.S. 419-1967.

2.0. Workmanship

The relevant specification of item No. 13.1 (I) shall be followed except that the wired figured glass of 6 mm. thick shall be used.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 13.1 (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

13.5. (3) Providing and fixing sheet glass ordinary quality bedded in putty and fixed with wooden Beading including the cost of wooden headings of first class teak wood and necessary cutting Of glass 3 mm. thick. 1.0. Materials

Glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall conform to I.S. 419-1967.

2.0. Workmanship

2.1. The relevant specification of item No. 13.1 (I) except that the sheet glass of ordinary quality shall be used and thickness of sheet glass shall be 3 mm. thick.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 13.1 (I) shall be followed.

3.2. The rate shall be for a unit of one sq. meter.

13.5. (4) providing and fixing sheet glass ordinary quality, bedded in putty and fixed with wooden

Headings including the cost of wooden headings of first class teak wood and necessary cutting Of glass 4 mm. thick.

1.0. Materials & Workmanship

The relevant specifications of item No.13.5. (3) Shall be followed, except that the thickness of ordinary sheet glass shall be 4 mm.

2.0. Mode of measurements & payment

2.1. The relevant specification of item No. 13.1. (I) shall be followed.

2.2. The **rate shall be for a unit** of one sq. meter.

13.7. Extra for using ground glass (Frosted or obscured on one side) instead of plain glass. 1.0. Materials

Glass shall conform to M-38. Wooden beading shall conform to M-29. Putty shall conform to I.S. 419- 1967.

2.0 Workmanship

the specification of this item shall be followed as per item No. 13.1 except that ground glass (Frosted or obscured on one side) shall be used.

3.0. Mode of measurements & payment

3.1. The payment shall be made on sq.mt. Basis extra over and above the payment for plain glass for using ground glass (Frosted or obscured). . '

3.2. The relevant specifications of item No. 13, 5. (III) shall be followed.

3.3. The rate shall be for a unit of one sq. meter.

13.11. (A) Difference in cost of material and labour involved in method of glazing if changed in item No. 13.1 to front and back puttied and sprigged or fixed with glazing pins:

1.0. Materials & Workmanship

1.1. The relevant specification of item No. 13.1. shall be followed except that the glazing is to be done by front and back puttied and sprigged or fixed with glazing pins.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No.13.1. (I) and 13.1. (II) shall be followed.

2.2. The extra rate for extra cost involved shall be paid over and above item No. 13.1. (I) & 13.1. (II). 2.3. The rate shall be for a unit of one sq. meter

13.12. Grinding, polishing and round of edges glass or glazing sheets.

1.0. Materials

The glass shall conform to M-38

2.0. Workmanship

The edges of glass or glazing sheets shall be grind, polished and rounded of such that it renders uniform Look throughout the length and shall be neatly finished. The work shall be carried out in best workman like Manner.

3.0. Mode of measurement & payment

3.1. The edges of glass round, polished and rounded off shall be measured in meter.

3.2. The rate shall be for a unit of one running meter.

SECTION -14

Paving & Floor finishing

14.2. (A) 40 mm, Tthick marble chips flooring rubbed and polished (i.e. Terrazzo) to granolithic finish with under layer 30 mm. thick cement concrete (1:2:4) (1 cement: 2 coarse sand : 4 graded stone aggregate 10mm. and down gauge) and

top layer, 10mm. thick with white, black or white and black marble chips of required sizes from 1 mm. to 4 mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight, in proportion of 4 :7 (4 cement : 7 marble chips by volume) : Dark shade pigment with ordinary cement (in top layer only).

1.0 Materials

Water shall conform to-M-L Cement shall conform No. M-3. Sand shall conform to M-6. Stone grit shall Conform to M-8. The pigment incorporated in terrazzo shall be of permanent colour and shall conform of requirement Mentioned in Appendix - A in IS : 2114-1962. Marble chips shall conform to M-46. The marble powder Shall pass through LS.Sieve Terrazzo - 30.

2.0. Workmanship

2.1. Terrazzo finish shall be laid over a layer of base concrete in case of ground floor. When the terrazzo floor is laid over R.C.C. slabs a cushioning layer consisting of 75 mm. thick lime concrete shall be provided below the terrazzo floor. The terrazzo flooring shall consist of an under layer of cement concrete and layer of terrazzo which shall be laid monolithically.

2.2. Under Layer:

2.2.1. The under layer shall be of cement concrete mix 1:2:4. The maximum size of aggregate used shall not exceed 10 mm. Specification for cement concrete shall be followed as per Item No.5.4.1.

2.3. Terrazzo Topping:

2.3.1. The topping shall have mix of ordinary cement and marble powder in proportion 3:1(3 cement: 1 marble powder by weight) and marble aggregate shall be mixed in proportion 4 : 7 (4 cement marble powder: 7 marble chips by volume). The thickness of concrete and cushioning layer shall not be less than 10 cms. And 7.5 cms. Respectively. The minimum thickness of under layer and topping shall be 40 mm.

2.4. Panels:

2.4.1. The floor both while laying the under layer and topping shall be divided into panels not exceeding 2 sq.m. In area so as to reduce the risk of cracking, due to differential shrinkage or expansion of terrazzo and sub-floor. The joints be so located that the layer dimensions of any panel do not exceed 2 M. The panels shall preferably be separated by means of dividing strips. However, where the butt joints are provided, the bays shall be laid alternatively allowing for an interval of at least 24 hours between the laying of adjacent bays.

2.5 Mixing of materials :

2.5.1. With a view to avoid variation in colour, mixing shall be done in trough or tub. And the complete quantities of cement and pigments required for one unit shall be mixed at the beginning of the work. Colour cement or cement and pigment mix shall be dry mixed with marble powder. The mix thus obtained shall be mixed with aggregate. Care shall be taken not to get the materials into a heap as this would result in coarser aggregates moving on the sides and cement to the centre. To the dry mix thus prepared, water shall be added in small quantities while materials are being worked to get a mix of proper consistency. The mixture shall be plastic but not so wet as to flow. The wet mix shall be used within half an hour mix of addition of water during preparation laying.

2.6. Laying:

2.6.1. The base shall be divided into panels with the help of dividing strips including the strips required for decorative design up to the finished surface level of the floor. Screed strips shall be used where the dividing strips are not used. The base shall be cleaned of all dust, dirt, laitance and any loose materials. It shall be then wetted with water mopped and smeared with cement slurry at 2.75 Kg./sq.mt. Under layer shall be then be spread and leveled with a screeding board. The top surface shall be left rough to provide a good bond to the terrazzo.

2.6.2. The terrazzo topping shall be laid while the under layer is still plastic but has hardened enough to prevent cement from rising to the surface. This is normally achieved between 18 to 24 hours after laying of under layer. A cement slurry preferably of the same colour as the topping shall be brushed on the surface immediately before laying the topping. The terrazzo mix shall be laid to a uniform thickness on the screed bed and be completed thoroughly by taping or rolling and trowelled smooth. Excessive trowel ling or rolling early stages shall be avoided as it results in working up cement to the surface which will produce a surface liable to cracking and will require more grinding to expose marble chips. The terrazzo surface shall be tamped, trowelled, and brought true to required level by a straight edge and steel floats in such a manner that the maximum amount of marble chips come up and are spread uniform over the surface and no part of the surface is left without chips.

2.7. Curing:

2.7.1. The surface shall be left dry for air curing for a period of 12 to 18 hours, thereafter, water shall be allowed to stand overnight in pools for a period of a minimum of four days. The floor shall be prevented from being subjected to extreme temperature.

2.8. Grinding and Finishing:

2.8.1. Grinding and Finishing shall be done either by hand or by machine. In case of manual grinding, the process of grinding shall begin after two days. While in case of machine grinding, the process shall be started after seven days. After completion of laying.

2.8.2. First grinding shall be done by carborundum stones of 60 grit size. The surface shall then be washed clean and grouted with a grout of cement or /and colouring matter in the same mix and proportion as the topping in order to fill any pin holes that appear. It shall be allowed to dry for 24 hours and wet cured for four days in the same manner as mentioned in Para 2.7. Above.

2.8.3. The second grinding shall be done with carborundum stone of 80 grit size. The surface shall then be prepared as after first grinding. The third grinding shall be done with carborundum stone of 120 to 150 grit size. The surface shall then be washed again and allowed to dry for 12 hours, and wet cured for four days as before. The fourth grinding shall be done with carborundum stone of 320 to 400 grif size. The surface shall agian be washed clean and rubbed hard with felt and slightly moistened Oxalic acid powder @ 5 gms. per sq. metre of floor surface. After the Finishing work is over, the surface shall be washed with dilute oxalic acid solution and dried for floor polishing. Machine fitted with felt or hession

bobs shall then be run over it until floor shines. In case wax-polished surface is required, wax-polished shall be applied on the surface with the help of soft linen over a clean bad dry surface. The polishing machine fitted with bobs shall be run over it, clean saw dust shall be spread over the floor surface and polishing machine again operated which will remove excess wax and leave glossy surface. Floor shall not be left slippery.

3.0. Mode of measurements & payment

3.1. Terrazzo flooring shall be measured as laid in sq. meters. Length and breadth shall be measured for visible area of work done. No deduction shall be made for nor extra for any opening in floor or

area up to 0.10 sq. meter. The rate shall cover laying the floor at different levels in the same room or court-yard and nothing extra shall be paid on that account.

3.2. The rate includes the cost of all materials and labour involved in all operations described above. The rate shall also not include dividing strip.

3.3. The rate shall be for a unit of one sq. meter.

14.2. (B) 40 mm. thick marble chips, flooring rubbed and polished (ie Terrazzo) to granolithic finish with under layer 30 mm. thick cement concrete (1:2:4) (1 cement: 2 coarse sand : 4 graded stone aggregate 10 mm. and down gauge) and top layer, 10 mm. thick with white, brick Of white and black marble chips of required sizes from 1 mm. to 4mm. nominal size laid in cement marble powder mix 3:1(3 cement : 1 marble powder by weight) in proportion of 4: 7(4 cement : marble powder mix : 7 marble chips by volume): light shade pigment with white cement (in top layer only).

1.0. Materials & workmanship

1.1. The relevant specifications of item No-. 14.2. (A) shall be followed except that light shade pigment with white cement shall be used in top layer.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 14.2. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

14.2. (C) 40mm. thick marbnle chips, flooring rubbed and polished (i.e. Terrazzo) to granolithic finish with under layer 30 mm. thick cement concrete (1:2:4) (1 cement: 2 coarse sand: 4 graded stone aggregate 10 mm. and down gauge) and top layer. 10 mm. thick with white, black or white and baick marble chips of required sizes from 1 mm. to 4 mm. nominal size fads in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4: 7 {4 cement: marble powder mix: 7 marble chips by volume): Medium shade pigment with approx. 50 % white cement and 50 % ordinary cement (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No.14.2 (A) shall be followed except that medium shade pigment with approximately 50 % white cement and 50 % ordinary cement in top layer only shall be used.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No.14.2. (A) shall be followed..

2.2. The rate shall be for a unit of one sq. meter.

14.2. (D) 40 mm. thick marble chips, flooring rubbed and polished (i.e. Terrazzo) to granolithic finish with under layer 30 mm. thick cement concrete (1:2:40 (1 cement: 2 coarse sand : 4 graded stone aggregate 10 mm. and down gauge) and top layer 10 mm. thick with white, black or white and black marble chips of required sizes from 1 mm. to 4 mm. nominal size laid in cement marble powder mix 3:1(3 cement : 1 marble powder by weight) in proportion of 4 : 7(4 cement: marble powder mix : 7 marble chips by volume). White cement without any pigment (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No.14.2. (A) shall be followed except that white cement without any pigment in top layer only shall be used.

2.0. Mode of measurements & payment

**2.1. The relevant specifications of item No. 14.2. (A) shall be followed. **

2.2. The rate shall be for a unit of one sq. meter.

14.2. (E)40mm. thick marble chips flooring rubbed and polished (i.e. Terrazzo) to granolithic finish with under layer 30 mm. thick cement concrete (1:2:4) (1 cement : 2 coarse sand ; 4 grded stone aggregate 10mm. and down gauge) and top layers of 10mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4:7(4 cement : marble

powder mix: 7 marble chips by volume), light shade pigment with ordinary cement (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No.14.2. (A) shall be followed except that light shade pigment with ordinary cement (in top layer only) shall be used.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 14.2. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. meter.

14.4. (A) Marble chips skirting (Terrazzo) or dedo rubbed and polished to granolithic finish top layer 6 mm. thick with white black or white and black marble chips of sizes from smallest to 4 mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4 : 7 (4 cement: 7 marble chips by volume) 20 mm. thick with under layer 14 mm. thick in cement plaster 1 : 3 (1 cement : 3 coarse sand) : Dark shade pigment with ordinary cement (in top layer only).

1.0. Materials

1.1. The relevant specifications of item No. 14.2. (A) shall be followed.

2.0. Workmanship.

2.1. Under layer: The under layer for terrazzo on vertical surfaces like skirting and dedos shall be of stiff cement mortar 1:3(1 cement: 3 coarse sand) finished rough so as to give a good bond to the topping.

2.2. Terrazzo topping shall not be less than 6 mm. thick and the combined thickness of under layer and topping shall be not less than 20 mm. The other details shall be followed same as per specifications of item No. C 24 except that the light shade pigment with white cement in top layers shall be used.

3.0. Mode of measurements & payment

3.1. The skirting and dedo shall be measured in square metres correct to two places of decimals. The height shall be measured from the finished level of floor.

3.2. The rate shall be for a unit of one sq. metre.

14.4. (B) Marble chips skirting (Terrazzo) or dedo rubbed and polished to granolithic finish top layer 6 mm. thick with white, black or white and black marble chips of sizes from smallest to 4 mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4 : 7 (4

cement: 7 marble chips by volume) 20 mm. thick with under layer 14 mm. thick in cement plaster 1:3(1 cement: 3 coarse sand) : light shade pigment with white cement (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 14.4. (A) shall be followed except that the light shade pigment with white cement in top layers only shall be used.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 14.4. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

14.4. (C) Marble chips skirting (terrazzo) or dedo rubbed and polished to granolithic finish top layer 6 mm. thick with white, black or white and black marble chips of sizes from smallest to 4 mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4: 7(4 cement: marble powder mix : 7 marble chips by volume) 20 mm. thick with

under layer 14 mm. thick in cement plaster 1 : 3 (1 cement : 3 coarse sand) : medium shade pigment with approximate 50 % white cement and 50 % ordinary cement (in top layer only).

30.. Materials & Workmanship

31.. The relevant specifications of item No. 14.4. (A) shall be followed except that the medium shade pigment with approximate 50 % white cement and 50 % ordinary cement in lop layers only shall be used.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No.14.4. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

14.4. (D) Marble chips skirting (terrazzo) or dedo rubbed and polished to granolithic finish top layer 6 mm. thick with white, black or with and black marble chips of sizes from smallest to 4 mm. nominal size laid in cement marble powder mix 3:1(3 cement: 1 marble powder by weight) in proportion of 4 : 7 (4 cement: marble powder mix : 7 marble chips by volume) 20 mm. thick with under layer 14 mm. thick in cement plaster 1 :3 (1 cement: 3 coarse sand) : light shade pigment with ordinary cement (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No.14.4. (A) shall be followed except that the light shade pigment

with ordinary cement in top layers only shall be used.

2.0. Mode of measurements & payment > **2.1.** The relevant specifications of item No.14.4. (A) shall be followed **2.2.** The rate shall be for a unit of one sq. metre.

14.4. (E) Marble chips skirting (terrazzo) or dedo rubbed and polished to granolithic finish top layer 6 mm. thick with white, black or white and black marble chips of sizes from smallest to 4 mm. nominal size laid in cement marble powder mix 3:1 (3 cement: 1 marble powder by weight) in proportion of 4 : 7 (4 cement: marble powder mix : 7 marble chips by volume) 20 mm. thick with under layer 14 mm. thick in cement plaster 1 :3 (1 cement: 3 coarse sand) : light shade pigment with ordinary cement (in top layer only).

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 14-4. (A) shall be followed except that the light shade pigment with ordinary cement in top layers only shall be used. 2.0. Mode of measurements & payment

2.0 Mode of measurements & payments

2.1. The relevant specifications of item No.14.4. (A) shall be followed and except that the light shade pigment with ordinary cement in top layers only shall be used.

2.2. The rate shall be for a unit of one sq. metre.

14.16. Providing and Saying cushioning layer on R. C. C. slab consisting of 75 mm. thick lime concrete using brick aggregate of 20 mm. nominal size 50 % mortar comprising of lime : 2 fine sand.

1.0. Materials

1.1. Water shall conform to M-1- Lime mortar of proportion 1:2 shall conform to M-10- Brick aggregate 20 mm, nominal size shall conform to M-14.

2.0. Workmanship

2.1. The relevant specifications of item No. 5.1.8. shall be followed except that the proportion of mix shall be 50 % mortar comprising of 1 lime : 2 coarse sand and the size of brick aggregate shall be 20

mm. nominal size. The lime concrete work shall be carried out in 7.5 cms. average thickness as a cushioning layer on R.C.C. slab.

3.0. Mode of measurements & payment

3.1. The lime concrete work shall be measured for visible area of work done.

3.2. The rate shall be for a unit of one sq. metre.

14.19. (A) Precast terrazzo (Mosaic) tiles 20 mm. thick with white, black or white and black marble chips of sizes up to 6 mm. Said in floors, treads of steps and landings on a bed of 25 mm. average thickness of lime mortar 1 : 1.5 (1 lime putty : 1.5 fine sand) or C.M. 1 : 6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles of light shades, using white cement.

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Lime mortar shall conform to M-10. Cement mortar shall conform to M-1. The precast terrazzo tiles of 20 mm. thick shall be of light shade using white cement and conform to M-47.

2.0. Workmanship

2.1. The work shall be carried out as per I.S. 1443-1972.

2.2. Bedding :

2.2.1. Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt, scum and loose materials and then well wetted without forming any pools of water on the surface.

2.2.2. In case of R.C.C. floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime mortar of proportion 1 : 1.5 (1 lime putty ; 1.5 fine sand) or cement mortar of proportion C.M. 1 : 6 as directed shall be then evenly and smoothly spread over the base. Bedding layer of mortar shall be not less than 10 mm. and average thickness of bedding shall be 25 mm.

2.3. Laying:

2.3.1. Before laying the terrazzo (Marble Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4. Kg. cement /sq. ml. shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level

and slope. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern.

2.3.2. The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a true surface with required slope.

2.3.3. The tiles which are fixed in the floor adjoining the wall shall go about 10 mm. under plaster. Skirting or dado shall be left unfinished for about 50 mm. above finished floor level and unfinished strip then left earlier shall be finished.

2.3.4. In places where full tiles cannot be fixed, the tiles shall be cut of the size and smoothened at edges to give straight and true joints.

2.3.5. After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.

2.3.6. The day after tiles have been laid the joints shall be cleaned of grey cement grout with a wire brush to a depth of about 5 mm. and then grouted with white cement with or without pigment to match the shade of the topping of tiles. The same cement slurry shall then be spread over the whole

surface in a thin coat to protect the surface from abrasive damage and to fill pin holes that may exist on the surface.

2.4.1. The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed atleast for 14 days. the grinding shall normally be commenced after 14 days.

2.5. Polishing;

2.5.1. After the tiles are properly cured, first grinding shall be done with carborundum stone of 48 to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall then be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept moist for a week. Thereafter second grinding shall be started with carborundum of 120 grit. Grouting and curing shall follow again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 grams per square metre on the surface and the surface rubbed with machine fitted with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed clean and dried with a soft cloth or linen. The finished floor shall not sound hollow when tapped with mallet.

2.5.2. If any tile is disturbed or damaged it shall be refitted or replaced properly jointed and polished.

2.5.3. Testing of the tiles shall be carried out by the contractor at his own cost as per IS requirement for required tests.

3.0. Mode of measurements & payment

3.1. The terrazzo tiles flooring shall be measured in sq. metre for visible area of work done.

3.2. No deductions shall be made nor extra paid for any opening in the floor area up to 0.1 sq. mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same item and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size. standard tiles or other uncut tiles.

3.3. The treads of stairs and steps paved with tiles without nosing shall also be measured under this item.

3.4. Extra rate shall however be paid for such area where width of treads does not exceed 30 cms.

3.5. The rate shall include the cost of all materials, labour involved in all the operations as described above.

3.6. The rate shall be for a unit of one sq.metre.

14.19. (B) Precast terazzo (Marble/Mosaic) tiles 20 mm. thick with white, blacker white and black marble chips of size up to 6 m. laid in floors treads of steps and landing on a bed of 25 mm. average thickness of lime mortar 1 :1.5 (1 lime putty : 1.5 finesand) or CM. 1 :6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles, including rubbing and polishing complete with precast tiles of medium shades using approximately 50 % white cement and 50 % ordinary cement.

1.0.Materials& Workmanship

1.1. The relevant specifications of item No. 14.19 (A) shall be followed except that the precast terrazzo (marble mosaic) tiles shall be medium shades using approximately 50 % white cement and 50 % ordinary cement.

2.0. Mode of measurements & payment

2.1. The rate shall be for a unit of one sq. metre.

14.19. (C) Precast terazzo marble mosaic tiles 20 mm. thick with white, black or white and black marble chips of size up to 6 mm. laid in floors treads of steps and landing on a bed of 25 mm. average thickness of lime mortar 1 :1.5 (1 lime

putty : 1.5 fine sand) or CM. 1 :6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles of dark shade using ordinary cement.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No.14.19 (A) shall be followed except that the precast tiles shall be of dark shade using ordinary Portland cement.

2.0. Mode of measurements & payment

2.1. The mode of measurements and payment shall be same as item No. 14.19 (A).

2.2. The rate shall be for a unit of one sq. metre.

14.21. (A) Precast ferazzo (Marble Mosaic) tiles 20 mm. thick with marble chips of size up to 6 mm. laid in skirting and risers of steps not exceeding 30 cms. in height on 10 mm. thick cement plaster 1:3(1 cement: 3 coarse sand) jointed with neat cement slurry' including rubbing and polishing complete with tiles of light shades using white cement.

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. The precast terrazzo (Marble/Mosaic) tiles of light shades using white cement tiles 20 mm. thick shall conform to M-47.

2.0. Workmanship

2.1. Laying :

The work shall be carried out for skirting or dedo Before fixing precast terrazzo (Mosaic marble) tiles of shade and size as specified, the surface shall be prepared by heavy scarping, making joints etc to the required line, level and plumb. The surface shall be thoroughly water before comencing the laying work. There after about 10 mm. thick backing of cement mortar in specified proportion shall be applied on the surface in true line and level generally as per specifications of plaster item.

2.2. Fixing:

The back of each tile to be fixed shall be smeared with cement paste of matching colour and the mosaic tiles shall then be gently tapped against the surface with a wooden mallet. The skirting shall be done only after the flooring is completed .Any pipes coming out of the wall through the dedo or skirting shall only be at the intersection of the horizontal and vertical joints. The tiles shall not have staggered joints. The joints shall be true to entire line both ways and vertical joints shall be in line with joints or flooring. Tiles shall be fixed as close as possible to the adjoining tiles and any difference in the thickness of the mosaic

tiles shall be evened out in the cement paste so that all the tiles faces are set in conformity with one another. The skirting shall project uniformly and not more than 6 mm. thickness beyond the finished surface above. Top of skirting or dedo shall be truly horizontal. The risers of steps, skirting or dedo shall rest on top of treads of flooring. Wherever required the tiles shall be cut (sawn) and thin edges smoothened before use.

2.3. Curing:

Curing shall be done for 7 days continuously.

2.4. Finishing:

Skirting and dedo shall be hand polished to have an even smooth and shining surface. In case of skirting only 10 mm. x 10 mm. groove shall be provided at the junction of cement plaster and cement tiles.

3.2. Mode of measurements & payment

3.3. The terrazzo tiles with light shade using white cement base shall be paid under this item. The length shall be measured along finished surface of the riser, skirting or dedo. correct to a centimeter height measured from finished level of treads, or floor to the lop (underside of treads in case of steps).

3.4. The rate shall include all materials and labour required for all the operations involved and described above.

3.3. The rate shall be for a unit of one sq. metre.

14.21 (B) Precast terrazzo tiles 20 mm. thick with marble chips of size up to 6 mm. in skirting and risers of strips not exceeding 30 cms. in height on 10 mm. thick cement plaster in C.M. 1:3 (1 cement ; 3 coarse sand) jointing with neat cement slurry including rubbing and polishing complete with tiles of : medium shades using approximately 50 % white cement and 50 % ordinary cement.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 14.21 (A) shall be followed except that the tiles of dark shade using portland cement shall be used.

2.0. Mode of measurements & payment

2.1. The mode of measurements and payment shall be followed as per item No. 14.21. (A).

2.2. The rate shall be for a unit of one sq. metre.

14.21 (C) Precast terrazzo tiles 20 mm. thick with marble chips of size up to 6 mm. in skirting and risers of strips not exceeding 30 cms. in height on 10mm. thick cement plaster in C.M. 1:3(1 cement : 3 coarse sand) jointing with neat cement slurry including rubbing and polishing complete with tiles of Dark shades using ordinary cement.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 14.21 (A) shall be followed except that the tiles of dark shade using Portland cement shall be used.

2.0. Mode of measurements & payment

2.1. The mode of measurements and payment shall be followed as per item No. 14.21. (A).

2.2. The rate shall be for a unit of one sq. metre.

14.25. (A) Chequered terrazzo tiles 22 mm: thick with marble chips of size up to 6 mm.. in floor on 25 mm. thick bed of lime mortar 1:1.5 (1 lime putty: 1.5 coarse sand) or C.M. 1 : 6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc. complete light shade using white cement.

1.0. Materials Water shall conform to M-1. White cement shall conform 10 M-4. Lime mortar of proportion 1:1.5 shall conform to M-10. Cement mortar shall conform to M-1 1. Chequered tiles shall conform to M- 47. D.

2.0. Workmanship

2.1. The relevant specifications of item No. 14.21.(A) shall be followed except that chequered tiles of light shade using white cement shall be used.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 14.21. (A) shall be followed.

3.2. The rate shall be for a unit of one sq. metre.

14.25. (B) Chequered terrazzo tiles 25 mm. thick with marble chips of sizes up to 6 mm. in floor on 25 mm. thick bed of lime mortar 1 :1.5 (1 lime putty : 1.5 coarse sand) or C.M. 1 :6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing etc. complete, medium shade using approximate 50 % white cement and 50 % ordinary cement.

1.0 Materials & Workmanship

1.1. The relevant specifications of item No. 14.25 (A) shall be followed except that chequered tiles of medium shade using approximate 50 % white cement and 50 % ordinary cement shall be used.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 14.25 (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

14.25. (C) Chequered terrazzo tiles 25 mm. thick with marble chips of sizes up to 6mm. in floor-on 25 mm. thick bed of lime mortar 1:1.5 (1 Lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete : Dark shade using ordinary cement.

1.0. Materials and workmanship

1.1. The relevant specifications of item No. 14.25 (A) shall be followed except that chequered tiles or dark shade using ordinary cement shall be used.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No. 14.25 (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

14.27 (A) Chequered terrazzo tiles 28 mm. thick with Marble chips of sizes up to 6mm. in treads of stairs and staircases in 12mm. thick bed of lime mortar 1:1.5 coarse sand) of C.M. 16 jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and polishing complete, light shade using white cement.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. 14.25 (A) shall be followed except that the chequered tiles 28 mm. thick of light shade using white cement shall be used in treads, stair cases etc.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No. 14.25.(A) shall be followed. **3.2.** The rate shall be for a unit of one sq. metre.

14.27. (B) Chequered terrazzo tiles 28 mm.thick with Marble chips of sizes up to 6 mm. in treads of stairs and staircases in 12 mm.thick bed of lime mortar 1:1.5 coarse sand) ot C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of titles including rubbing and polishing complete : Medium shade of using approximately 50% white cement and 50% ordinary cement.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. 14.25 (A) shall be followed except that chequered tiles 28 mm. thick of medium shade using approximately 50% white cement and 50% ordinary cement shall be used in treads of stair, staircases etc.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No- 14.25. (A) shall be followed.

2.2. The rate shall be for a unit of one sq. metre.

14.27. (C) Chequered terrazzo tiles 28 mm. thick with marble chips of sizes up to 6 mm. in treads of stairs and staircases in 12 mm. thick bed of lime mortar: 1:1.5 (I Lime putty : 1.5 coarse sand) or C.M. 1:6 jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and polishing complete: Dark shade using ordinary cement.

1.0. Materials and workmanship

1.1 The relevant specifications of item No. 14.25 (A) shall be followed except that chequered tiles 28 mm. thick of dark shade using ordinary cement shall be used in treads of stair, staircases etc.

2.0. Mode of measurements and payment

2.1. The relevant specifications of item No. 14.25 (A) shall be followed.

2.2 The rate shall be for a unit of one sq. metre.

14.29. White glazed tiles 6 mm. thick in flooring, treads of steps and landings laid on a bed of 12 mm. thick cement mortar 1:3 (1 cement: 3 coarse sand) finished with flush pointing in white cement

1.0. Materials

Water shall conform to M-I. Cement mortar shall conform to M-I 1. White glazed tiles shall conform to M-55.

2.0. Workmanship

2.1.1. The sub grade shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1:3 The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item

2.2. Fixing tiles:

2.2.1. The tiles before laying shall be soaked in water for atleast two hours. Neat gray cement grout at 33 kg. Cement/Sq. mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a Wooden mallet till they are properly bedded and in level with the adjoining tiles- There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints- The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tiles as far as possible. Where full size tiles cannot be fixed, they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days. allowed to nature undisturbed for 7 days.

2.3. Cleaning :

2.3.1. The surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set. it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

3.0. Mode of measurements & payment

3.1. The work done shall be measured in sq. mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area up to 1). 1. sq. mt Nothing extra shall be paid for laying the floors at different levels in the same rooms.

3.2. The rate shall be for a unit of one sq. metre.

14.32. White glazed tiles 6 mm. thick in skirting, risers of steps and dado on JO mm. thick cement plaster S:3 (1 cement :3 coarse sand) and jointed with white cement slurry. **1.0. Materials**

Water shall conform to M-I. Cement mortar shall conform to M-I 1. White glazed tiles shall conform to IS-55.

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of atleast 15 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiselled and rough end with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1 : 3 mix and allowed to harden. The plaster shall be rough end with wire brushes both way. The back of tiles shall be floated with grey cement slurry and edges with white cement slurry set in bedding mortar. The tiles shall be gently tapped in position one after the other keeping the joints as thin as possible. Top of skirting or dado shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting and dado shall rest on top of treads or flooring. Where full size tiles cannot be Fixed, they shall be cut to the required size and the edges be smoothened.

2.2.3. The joints shall be cleaned and flush pointed with white cement The **surface** shall be kept wet for seven days. After curing the surface shall be washed clean.

3M. Mode a/measurements and payment

3.1. The rate shall include the cost of all material and labour required for various operations described above. Risers of steps, skirting and dado shall be measured in square metres. Length and height shall be measured along the finished face of the skirting or dado including curves, where special such as covers, internal and external angles, etc., used. The length and height shall be measured correct of the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

3.2. The rate shall be for a unit of one sq. metre.

14.34. Providing and fixing 50 mm. internal or external angles of white glazed tiles.

1.0. Materials

Water shall conform to M-I. Cement mortar shall conform M-I 1. Glazed tiles shall conform to M-55.

2.0. Workmanship

2.1. The relevant specifications of item No. 14.32 shall be followed except that the internal or external angles of glazed tiles shall be of thickness not less than the tiles with which they are used. The fixing shall be done as per directions.

3.0. Mode a/measurements and payment

3.1. Rate shall be including the cost of materials and labour involved in all the operations described above. Internal or external angles of glazed tiles shall be measured in running metres correct up to a centimeter. length being measured on the exposed face of the special at its centre line. No extra payment shall be made for corner places at angles junctions of cover beads and cornices for using cut length of special-

3.2. The rate shall be for a unit of one running meter.

14.36. (A) Providing and laying marble stone slab flooring over 20 mm. (Average) base of cement mortar 1:6 including rubbing and polishing (I

cement: 6 coarse sand) or L.M.1:5 laid and jointed with grey cement slurry
complete : Marble slab 25 mm. thick.

1.0 Materials

Water shall conform to M-I. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. Marble stone slab 25 mm. thick shall conform to M-51.

2.0. Workmanship

2.1. Dressing of slabs :

Every stone shall be cut or required size and fine chisel dressed to give a smooth and even surface on all sides to full depth. A straight edge laid along the sides of the stone shall be fully in contact with it. Chisel dressing shall also be done on top surface to remove any waviness. The sides and top surface of marble slabs shall be machine rubbed or table rubbed with coarse sand before using. All angles and edges of slabs shall be true, square and free from clippings.

2.2. The thickness of stone shall be 25 mm. The allowable tolerance shall be 2 mm. allowable. The tolerance shall + 5mm. in length and breadth.

2.3. Bedding :

Bedding or marble slabs shall either be lime mortar 1:1.5 (1 Lime putty: 1.5 coarse sand) or cement mortar 1:6 (1 cement :6 coarse sand) or average thickness 20 mm. thick as given in description of item. Minimum thickness at any place shall not be less than 10 mm.

2.4. Laying :

The surface of sub-grade shall be cleared, wetted and mopped- Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one marble slab. The slab shall be washed clean before laying. It shall be laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and laid a side. The

top surface of the mortar shall then be corrected by adding fresh mortar at hollows, or depressions. The mortar shall then be allowed to harden over this surface cement slurry of honey like consistency at 4.4 Kg. of cement per sq. metre. The edges of slabs already paved shall be buttered with grey cement. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The slab fixed in the floor adjoining [the walls shall enter not less than 10 mm. under the plaster skirting or dado. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

2.5. Curing :

The floor shall be cured for a minimum period of seven days.

2.6. Polishing and finishing :

Unevenness at the meeting edges of slab shall be removed by line chiselling. Finishing etc- shall be done as per relevant specifications of item No. 14.21 (A) of terrazzo tiles flooring except that cement slurry with/ or without pigments shall not be applied on the surface before each polishing.

3.0. Mode of measurements and payment

3.1. Marble stone flooring with various kinds of marble shall be measured in sq. metre. The length and breadth shall be measured between the finished face of skirting or dado or wall plaster. No deduction shall be made nor extra shall be paid for any opening in the floor of area up to 0.05 sq. mt. Nothing extra shall be paid for laying stone at different levels in the same room. Treads and steps of stairs paved with marble stone slabs shall also be measured under flooring.

3.2. The rate shall be for a unit of one sq. metre.

14.43. (A) Kota stone slab {Polished, Green colour} flooring over 20 mm. (average) thick base of cement mortar 1:6 (/ cement :6 coarse sand) or lime- mortar 1:1.5 laid over and jointed with grey cement slurry including rubbing and polishing complete 25 mm. thick.

1.0. Materials

1.1 Water shall conform to M-I. Lime mortar shall conform to M-10. Cement mortar shall conform to M 11. Polished kota stone shall conform to M-49.

2.0. Workmanship

2.1. Each slab shall be cut in the required size and shape and fine chisel dressed at all the edges- The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane

surface. The thickness shall be 25 mm. (Average) as specified in the item but not less than 20 mm.

at any place of the slab.

2.2. Bedding for the Kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M.I: 1.5. of average thickness 20 mm. as given in the description of the item. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive the Kota stone, slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, lapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining the walls shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stones of 22 (1 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine tilted with bobs shall be run over it.

2.5. The holes required for Nahni traps, pipes and any other linings shall be made without any extra cost.

3.0. Made of measurements &, payment

3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The Kota stone flooring shall be measured in square metres correct to two places of decimal. length and breadth shall be measured correct to a centimeter and between the Finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1. sq. m.

3.2. The rate shall be for a unit of one sq- metre.

14.43. (B) Kota stone slab flooring over 20 mm. (average) thick base of cement mortar 1:6 (1 cement: 6 coarse sand) or L.M. 1.5 laid over and jointed with grey cement slurry including and polishing complete : 30 mm. thick.

1.0. Material and Workmanship

1.1. The relevant specifications of item No. 14.43 (A) shall be followed except that the thickness of stone shall be 30 mm.

2.0. Mode of measurements &. payment

2.1. The relevant specifications of item No. 14.43 (A) shall be followed.

2.2 The rate shall be for a unit of one sq. metre.

14.44. Kota stone slab 25 mm. thick in riser of steps dado and pillars laid on 10 mm. thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry including rubbing and polishing etc. complete.

1.0. Materials

Water shall conform to M-1 Cement mortar shall conform to M-11. Kota stone 25 mm. thick shall conform to M 49.

2.0. Workmanship

2.1. The relevant specifications of item No. 14.43 (A) shall be followed except that the kola stone shall be fixed for risers of steps, dedo or skirting in **C.M. 1:3** and the polishing shall be done manually instead of machine polishing.

3.0. Mode of measurements and payment

3.1. The risers of steps, skirting or dedo shall be measured in sq metre. Length shall be measured along the finished faces of risers, skirting or dedo. Height shall be measured from finished level of treads or floor to top. Lining of pillars shall be measured under this item.

3.2. The rate shall be for a unit of one sq. metre.

14.46 (A) Rough chiselled dressed (Kota Stone green) stone flooring over 20 mm. thick base of cement mortar 1:5 (1 cement :5 coarse sand), or L.M. 1:S.5 including pointing with cement mortar 1:2 (/cement :2 stone dust) etc. complete-25 mm. thick.

1.0. Materials

Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. Rough chisel dressed stone shall conform to M-4S.

2.0. Workmanship

2.1. The relevant specifications of item No. 14.43 (A) shall be followed except that the rough chisel dressed stone of 25 nun. average thickness.

2.2 Dressing of stone slab :

Every stone slab shall be cut to the required size and shape and rough chisel-dressed on top, if required, so that the dressed surface shall not be more than 6mm. from straight edge placed on it. The sides shall also be chisel-dressed to a minimum depth of 20 mm. so that the dressed edge shall at no place be more than 30 mm. from straight edge huddled against it. Beyond this depth, the sides may be dressed slightly splayed so as to form an inverted "V shaped joint with adjoining slab. The surface shall be reasonably true and plane and all the angles and edges shall be square and free from chippings. Where the stone slabs are to be used for nosing, exposed edges shall be rough chisel-dressed to full depth and cut to the uniform thickness.

2.3. Thickness of the stone slab shall be 25 mm. with permissible tolerance of + 2 mm.

2.4. Laying :

The surface of the sub-grade concrete shall be cleaned, wetted and mopped. The bedding of specified mortar mix shall be spread under each slab to the specified thickness. The slab shall be washed clean before laying. It shall be then laid on top, pressed and so that all hollows underneath filled surplus mortar works up through the joints. The top shall be tapped and brought level to the adjoining slab. The thickness of the joints shall not exceed 5 mm. Subsequent slabs shall be laid in the same manner.

2.5. Curing & Finishing :

Any surplus mortar on the surface of the slab shall be cleaned off and joints finished flush. The joints shall be raked out uniformly to a minimum depth of 12 mm. when the mortar is still green- The slabs which are fixed in the floor adjoining the wall shall enter not less than 12 mm. under the plaster, skirting or dedo. The junction between wall plasters and floor shall be finished neatly and without waviness- The pointing shall be done with C.M. 1:2 The pointing shall be cured for a minimum period of seven days. The finished floor shall not sound hollow when tapped with wooden mallet and the finished surface shall be true to level and slopes as directed.

32.. Mode of measurements & payment

3.1. The relevant specifications of item No. 14.43 (A) shall be followed.

3.2. The rate shall be for a unit of one sq. metre.

14.46.(B) Rough chisel dressed (Kota Stone Green) stone flooring over 2f) mm. thick base of cement mortar 1:5 (1 cement :5 coarse sand) or Lime Mortar. J: 1.5 including pointing with cement **1:2 (1 cement :2 stone dust) etc., complete-40 mm. thick.**

1.O. Materials and Workmanship

1.1 The relevant specifications of item No. 14.46 (A) shall be followed except that the thickness of stone slabs shall be 40 mm. thick. **2.0 Mode a/measurements & payment**

2.1. The relevant specifications of item No. 14.46 (A) shall be followed.

14.71. (A) Cement concrete flooring for I.P.S. 1:2:4 (for Indian Patent Stones) (1 cement: 2 coarse sand: 4 graded stone aggregate 2ff mm. nominal size) laid in one layer finished with a floating coat of neat cement. 40 mm. thick.

1.O. Materials

Water shall conform to M-1 Cement shall conform to M-3 Sand conform to M-6 Stone aggregate 20 mm. nominal size shall conform to M-12. Cement concrete of 1:2:4 proportion measured by volume shall conform to relevant specifications of ordinary grade 1:2:4 concrete.

2.O. Workmanship

2.1. The cement concrete flooring of 40 mm. thick (Average) is to be laid as per the site condition. The concrete shall be mixed in a mechanical mixer at the work. Hand mixing may however be allowed for smaller quantities of work and in case of failure of machineries or as permitted by the Engineer-in-charge. It shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such cases \Y/t more cement than otherwise required shall have to be used without any extra cost. The mechanical mixing shall be done for period of 1. 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose. Flooring of specified thickness shall be laid in accordance with approved pattern or as directed. Finishing operation shall start shortly after the cessation of beating and shall be spread over a period of one to six hours depending upon the temperature and atmospheric conditions. The surface shall be mixed with water to form a thick slurry and spread over the surface while the concrete is ,still green. Use of dry cement or cement and sand mixture sprinkled on this surface to stiffen the concrete or absorb excessive moisture shall not be permitted. The cement slurry shall then be properly pressed twice by means of iron floats, once. When the slurry is applied and the second time when cement starts setting and finished floated smooth. The surface shall be marked with string or B.R.C. fabric jall to make the surface non-slippery as and when directed. The junction of floors with wall plaster, dado or skirting shall be rounder off where so required up to 22 mm radius. Flooring in lavatories & bath rooms shall be laid after fixing of water closet and squatting pans and floor traps which shall be plugged while laying the floors and opened after the floors are completed. Any damage done to water supply or sanitary fittings during execution of work shall be made good.

.2 After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

.3 The form work shall be provided if necessary as directed by the Engineer-in-charge. Concreting shall be done as per alternate bay method with necessary centering either by mastic or cement mortar as directed.

.1. Mode of measurements & payment

.2. The rate shall include the cost of all materials and labour involved in all the operations described above. No deduction shall be made or extra paid for any opening up to 0.1. sq. mt. In area in the floor, nothing extra shall be paid for laying the floor at different levels in the same room or the counter yard.

.3. The rate shall be for a unit of one sq. metre.

14.71. (B) Cement concrete flooring (Indian patent stone) 1:2:4 (1 cement :2 coarse sand :4 graded stone aggregate 20 mm. nominal size) laid in one layer finished with floating coat of neat cement: 50 mm. thick.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 14.71 (A) shall be followed except that the thickness of concrete flooring shall be 50 mm.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 14.71 (A) shall be followed.

.3. The rate shall be for a unit of one sq.metre.

14.74 Cement concrete pavement (25 mm. to 50 mm. thick) with 1:2:4 (1 cement :2 coarse sand :4 stone aggregate 20 mm. nominal size) including finishing with a floating coat of neat cement complete.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 14.71 (A) shall be followed except that the thicknesses of concrete flooring vary from 25 mm. to 50 mm.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 14.71 (A) shall be followed except that thickness shall be measured correct up to 1 mm, flooring laid in boarders, margins and treads of steps, shall be measured under item of flooring in respective of width.

.3. The rate shall be for a unit of one cubic metre.

14.81. (C) 20 mm. thick precast concrete tile with aggregate of sizes up to 6 mm. laid in floors, treads of steps and landing on 20 mm thick bed of cement mortar :1:6 (1 cement :6 coarse sand) or L.M. 1:1.5. jointed with neat cement slurry with pigment to match the shade of the tiles complete with precast tiles of Dark shades using ordinary cement

1.0. Materials

Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Lime mortar 1:1.5 shall conform to M-10. Cement mortar shall conform to M-I 1. Tiles shall conform to M-47 (A). Cement concrete tiles shall conform to I.S. 1237-1959 and pigments to be admixed with mortar or for grouting shall conform to I.S. 2114-1962.

.1. Workmanship

.2. The tiles shall be laid on the sub-grade of concrete of the R.C.C. slab. Bedding shall be in lime mortar 1:1.5 or cement mortar (1:6) The amount of water added shall be minimum required for sufficient plasticity and workability in CM. or lime mortar where the ingredients shall be thoroughly mixed dry, hard lumps removed and water added to give a good workability.

2.2 The base shall be cleaned of all dust, dirt and scum and properly wetted without allowing water pools. For a bedding of cement mortar the mortar shall be than spread evenly over the base of two rows of tiles and three to five metres in length. The top shall be kept rough so that cement slurry can be absorbed. The thickness of the bedding shall be not less than 10 mm. at any place. The laying of tiles shall be commenced with neat cement slurry of honey-like consistency and shall be spread over the mortar bed over an area sufficient to receive about 20 tiles. The tiles shall then be fixed in this grout one after the other, each tile being gently tapped and properly bedded in line and level with the adjoining tiles. The joints shall be as narrow as possible and normally shall not exceed 1.5 mm. After the day's work the excess cement slurry on top shall be cleaned as also the joints with a broom-stick and washed before the slurry sets hard. Next day the joints shall be filled with the

cement grout of the same shade as the matrix of the tiles. Tiles which are fixed in the floor adjoining the wall shall for a minimum of 10 mm. under the wall plaster, skirting or dedo. For the purposed plaster etc. may be left unfinished by about 50 mm above the proposed finished level of the floor. The unfinished strip, shall be plastered after laying the floor tiles. Where full tiles cannot be used, tiles shall be cut to the size to be used.

2.3. The flooring shall be cured for 7 days.

3.0 Mode of measurements and payment

.1. The rate shall include the cost of all materials and labour involved in all the operations described above.

.2. The rate shall be for unit of one sq. metre.

14.86. Chequered precast cement concrete tiles 22 mm. thick with aggregate of sizes upto 6 mm. in floors, treads of steps and landings on 20 mm. thick bed of C.M. 1: 6 (1 cement: 6 sand) or lime mortar 1:1.5 (1 Lime putty: 1.5 coarse sand) jointed with neat cement slurry with pigment to match the shade of tiles.

.1. Materials

.2. The relevant specifications of item No 14.25 (A) shall be followed.

2.0 Workmanship

2.1. The relevant specifications of item No. 14.21 (A) shall be followed except that chequered precast cement concrete tiles 22 mm. thick shall be used in floors, treads of steps and landings on average 20 mm. thick bed of CM. 1 :6 or L.M. 1:1.5.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 14.21. (A) shall be followed.

.3. The rate shall be for a unit of one sq. metre.

14.87. Extra for rubbing polishing the precast cement concrete tiles in flooring, skirting or dedo.

1.0 Workmanship

.1. Grinding and rubbing shall normally be commenced after 14 days of laying the tiles, except for skirting or small areas, machine shall be used for the purpose.

.2. First grinding shall be done with carborundum stones of 48 to 60 grade grit fitted in machine, water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water baring all pin holes. It shall then be covered with a thin coat of grey or white cement mixed with or without pigments to match the colour of the topping of the

tiles. Pin holes if any shall thus be filled. This grout shall be kept moist for sufficient period as directed. Thereafter, second grinding shall be started with carborundum of 120 grit. Grouting and curing shall be followed again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted as needed on the surface and the surface rubbed with machine fitted with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed, cleaned and dried with a soft cloth of linen. The finished floor shall not sound hollow when tapped with a mallet.

.3. If any tile is disturbed or damaged it shall be refitted or replaced properly jointed and polished.

.4. For skirting, dedo or small areas where it is not possible to do machine polishing all the above operations are to be done manually.

2.Q. Mode of measurements & payment

.1. The rate shall include the cost of al materials and labour involved in all the operations as

described above.

.2. The rate shall be for a unit of one sq. metre.

14.90 Providing and laying brick on edge flooring laid dry, grouted with CM. 1:6(1 cement: 6 coarse sand) including finishing the joints flush, curing etc. complete.

1.0. Materials

Water shall conform to M-I. Cement mortar shall conform to M-11. Burnt bricks shall conform to M-15.

.1. Workmanship

.2. The flooring shall be laid on concrete sub grade where so provided. The slope in the floor shall be provided in the sub-grade. Where sub-grade is not provided, the earth below shall be properly sloped, watered, rammed and consolidated. Before laying the flooring it shall be moisture. Plinth masonry offsets shall be depressed so as to allow the sub-grade concrete to rest on it.

.3. Laying:

The brick shall be laid in plain, diagonal herring bond, or other pattern as directed. The brick shall be dry laid properly and set home by gently tapping. On completion the portion of flooring the vertical joints shall be grouted with CM. 1:6 and all joints shall be finished flush. The joints shall be as fine as possible and not exceeding 5 mm. These points shall be filled with cement mortar 1 :6.

2.3.Curing:

The brick paving shall be cured for 7 days.

.1. Mode of measurements & payment

.2. The length and breadth shall be measured correct to centimeter between skirting dedo or wall plaster. No deductions shall be made not extra paid for any opening upto 0.1 sq. mt. in area in the floor. Nothing extra shall be paid for laying the floors at different levels in the same room or courtyard.

.3. The rate shall be for unit of one sq. metre.

SECTION -15

Roof Covering

15.1. Providing corrugated G.I. sheets roofing fixed with galvanized iron 'J' or 'L' hook bolts and nuts 8 mm. dia. with bitumen and G.I. limpet washers filled with white lead complete excluding the cost of purlines, rafters and trusses (1) 1.8 mm. thick sheet.

1.0. Materials Corrugated G.I. sheets shall conform to M-24.

.1. Workmanship

.2. Spacing of purlines : One purlines shall be provided at the ridge and one at the eaves. The spacing of other purlines for 1.8 mm. thick G.I. sheet shall not exceed 1.80 metres. The purlin shall coincide with the centre line of the end lap. The ridge purlins shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the spacing of purlins.

.3. The top surfaces of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coal-tar.

.4. Laying of sheets :

.1. The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flushing or by projecting drip course.

.2. The laps at end shall be provided 150 mm. minimum for roof slopes 1 in 2 (1 vertical: 2 horizontal) and steeper but 200 mm. shall be provided for flatter slopes than those above. The side lap shall be provided two ridges of corrugations at each side.

.3. The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give a straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

.4. Fixing of sheets :

2.3.4.1. Sheets shall be fixed to the purlins or other roof members such as hips or valley rafter etc. with 'J' or 'L' galvanized hook bolts, and galvanized nuts 8 mm. dia. with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm. The grip of 'J' or 'L' hook bolts on the sides of purlins shall not be less than 25 mm. There shall be minimum of three hooks bolts placed at the ridge of corrugations in each sheet in every purlin, and their spacing shall not exceed 300 mm. Coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 1 :2.5 degree (1 vertical and 2.5 horizontal). Sheets shall be jointed together at the side laps by galvanized iron bolts and nuts 25 mm. x 6 mm. size each bolt with a bitumen and G.I. limpet washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zig-zag over the two overlapping corrugations, so that the ends of the overlapping sheets are drawn tightly to wards each other. The spacing of same bolts shall not exceed 600 mm. along each of the staggered rows.

.5. Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the under side, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm. from the edge. Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the seam bolts. The nuts shall be tightened from above to give a leak-proof roof.

.6. The roof when completed shall be true to lines and slopes and shall be leak-proof.

.1. Mode of measurements & payment

.2. The measurements of C.G.I, sheet roof shall be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the C.G.I, sheets both at their ends and along the side edges shall not be measured. The overlaps of C.G.I, sheets over the valley piece and their under lap the ridge, hip and flashing piece shall be included in the measurements.

.2. No deductions in measurement shall be made for opening for chimney stacks, sky lights etc., of area up to 0.40 sq.mt. nor extra be paid for extra labour in cutting and for wastage etc., in forming such openings.

.3. The rate of roof shall include the cost of all materials and labour involved in all operations described above. The rate also includes the cost of provision/ erection and removal of the scaffolding, benching, ladders, templates and tools required for the proper execution and erection of the work. The rate includes the cost of purlins, rafters and trusses.

.4. The rate shall be for a unit of one sq.metre.

15.7. Providing ridges of hips 600 mm. overall in plain G.I. sheets fixed with G.I. 'J' or 'L' hooks bolts and nuts 8 mm. dia. G.I.limpet and bitumen washer etc. complete 0.80 mm. thick sheet.

1.0. Materials

The G.I. Valley gutters and ridges shall conform M-23- A. **2.0**

Workmanship

.1. The relevant specification of item No. 15.1. shall be followed except that the work shall be carried out for ridges or hips, the overlaps for ridges and hips on either side over the C.G.I, sheets and end legs shall be minimum 225 mm. Width of the ridges and hips shall be as described in the item.

.2. Ridges shall be fixed to the purlins with same 8 mm. dia. G.I. hook bolts and nuts and bitumen and G.I. limpet washers, which fix the sheets for the pureline. Hips shall be fixed to the roof members with the same 8 mm. dia G.I. hook bolts and nuts and bitumen and G.I. limpet washers which fixed the sheets. Atleast one of the fixing bolts shall pass through the end laps of the ridges and hips on other sides. If this is not possible extra hook bolt shall be provided. End laps of ridges and hips shall be joined together by galvanized iron seam bolts and G.I. Washers. There shall be at least two such bolts in each end lap.

.3. Ridges and hips shall fit in squarely on the sheets.

.1. Mode of measurements & payment

.2. The measurements or ridges or hips shall be taken for finished work in length along their centre lines.

.3. No laps shall be measured.

.4. The payment for ridges and hips shall be made in a similar way as in case of C.G.I, sheet roofing.

15.8. Providing valleys 900 mm. overall in plain 1.6 mm. thick G.I.sheet Class-3 fixed with 'J' or 'L' hook bolts and nuts galvanised from 'J' o r 'L' hook bolts and 8 mm. dia . G.I. limpet and bitumen wahsers complete.

.1. Materials

.2. the G.I. valleys 900 mm. overall in galvanized plain sheet of 1.6 mm. thickness shall be of class-3. The valleys shall be 90 mm. wide over all and flashing shall be 380 mm.wide overall. There shall be bent to required shape without damage to the sheets in the process of bending.

2.0 Workmanship

.1. The relevant specifications of item No. 15,1, shall be followed except that the work shall be carried out for G.I. valleys 900 mm. overall with G.I. sheets 1.6 mm. thickness.

.2. Wherever the edge of a roof sheeting or valley gutter is turned up against a wall, the edge shall be weather proofed with a flashing. Flashing shall be bent to shape and fixed. Lap over the sheet shall be not less than 150 mm. over the roofing sheets. The end laps between the flashing sheetsshall not less than 225 mm.

.3. The flashing shall be inserted into brick work or masonry joints to a depth of 50 mm. These joints shall be filled with cement mortar (1:3). The flashing shall be well secured to the masonry. Wherever flashing has to be laid at a slope, it shall be stepped at each course of masonry, the step being out back at angle of not less than 30 degrees to the vertical.

.4. Valleys shall, be bent to shape and shall have end lap and projection on either side under C.G.I, sheet not less than 225 mm. Valleys shall be fixed to the roof member below, with same 8 mm. dia. G.I. hook, bolts and nuts and bitumen and G.I. limpet washer which fix the sheets to these members. At least one of the fixing bolts shall pass through the end laps of the valley piece. If necessary extra bolts shall be provided for this purpose.

.1. Mode of measurements & payment

- .2. The measurement for valley shall be taken for finished work in length along their centre lines.
- .2. No laps shall be measured.
- .3. The rate excludes the cost of boarding underneath which shall be paid separately.
- .4. The rate of flashing includes the cost of mortar for fixing in wall and other labour and materials required for it.
- .5. The rate shall be for a unit of one running metre.

15.10. (1) Providing and fixing 150 mm. overall semi circular plain, G.I. sheets class- 3 Gutter with iron brackets 40 mm. x 3 mm. size bolts nuts, washers etc. including making necessary connections with rain water pipes: 0.80 mm. thick.

1.0. Materials

These shall be plain galavanised sheets Class-3 of 0.80 thickness. The gutter shall be designed to carry the maximum discharge from the roof without flowing over and shall be constructed wherever possible with slunk channel or gutter. .

Workmanship

- .1. The longitudinal edges shall be turned back to the extent of 12 mm. and beaten to form a rounded edge. The ends of the sheets at junctions of pieces shall be hooked into each other and beaten flush to avoid leakages.
- .2. The size of gutters shall be a specified in the item.
- .3. The gutter shall be laid with a minimum fall 1 in 120. Gutter shall be true to line and slope and shall be supported on mixed M.S. Flat iron brackets bent to shape or any other suitable bracket.

.1. Mode of measurements & payment

- .2. The measurements gutters shall be taken for finished work in length along their centre lines. No laps shall be measured.
- .3. The rate of gutter shall include the cost of all labour and materials specifed above. Including allspecials such as angeles, junctions dropends or funnelshaped connecting pieces, stop ends etc. flat iron brackets and bolts and nuts required for fixing the latter to the roof members.
- .4. The rate shall be for a unit of one running metre.

15.20 (A) (1) Providing asbestos cement sheets,roofing fixed with G.I. palin and bitumen washers complete excluding cost of purlins, rafters and trusses : 7 mm. thick, corrugated sheet.

.1. Materials:

- .2. Asbestos cement sheets shall conform to M-24.

.1. Workmanship

- .2. The maximum spacing of purlins shall be 1.6. metres in case of 7 m. thick A.C. sheets and 1.4 metres for 6 mm. thick A.C. Sheets.

.3. Laying & fixing of Sheets

The sheets shall be laid on the purlins and other roof members as per code of practice. The top bearing surfaces of all purlins and other roof members shall be in one plane so that the sheets when being fixed shall not be required to be forced down to rest on the purlins. The finished roof shall present uniform slope and the line of corrugation shall be straight and true. The sheets shall be laid with smooth side up wards. Corrugated sheets shall be laid starting at the eaves wither from left to right or right to left depending upon the direction of wind. Before actual laying of the sheets is started, the purlins spacing and the size of sheets shal be checked to ensure that the arrangements shall provide the laps required and the specified overhang at the eaves. In case the sheets are laid form right to left, the first sheet shall be laid uncut but the remaining sheets in the bottom row shall -have the top left hand corners cut or mitred. The sheets in the second and other immdiate rows

shall have bottom right hand corner of the first sheet cut. All other sheets except the last sheets shall have only top left hand corner cut. The last of the top row sheets shall have the bottom right hand corner cut with exception of the last sheet which shall be left uncut. If the sheets are laid from left to right, the first sheet shall be laid uncut and the remaining procedure shall be reversed.

.3. The free overhang of the sheets at the eaves shall not exceed 400 mm. in case of 7 mm. thick sheets and 300 mm. in case of 6 mm. thick sheets.

.4. The mitre described above is necessary to provide snug fit. Where 4 sheets meet at a lap the length of mitre shall be 150 mm. and the width of mitre shall be equal the width of the side lap. The cutting may be done with ordinary wood saw at site.

2.5. Laps:

The sheets shall be laid with an end lap of 150 mm. minimum. In case of roof with a pitch flatter than 1 vertical to 2.1/2 horizontal (Approx. 22°) or in the case of very exposed situations appropriate larger laps may be provided. The sheets shall be laid with side lap of half a corrugation.

6. Fixing Accessories:

The sheets shall be secured to the purlins and other roof members by means of 8 mm. dia. Galvanized iron bolts OT') type hook bolts in case of angle iron purlins and VL' type bolts in case of R.S. joints, precast concrete, or timber purelin and nuts bearing on galvanized iron washers and bitumen washers. The grip of J or L' bolts on the side of purlins shall not be less than 25 mm. Each galvanized iron v J' or VL' hook bolts shall have a bitumen washer and galvanized iron washer placed over the sheets before the nut is screwed down from above. On each purlin there shall be one hook bolt on the crown adjacent to the side lap on either side. Bitumen washer shall be of approved quality. The G.I. flat wahser shall be 25 mm. in diameter and 1.60 mm. thick and bitumen washer shall be 35 mm. in dia. and 1.5 mm. thick with hole to suit the required size of fixing accessory. Each nut shall be screwed lightly at first. After a dozen or more sheets are laid ,the nuts. shall be tightened to ensure a leak-proof joint and also nuts tightened only to extent so as to prevent damage to the sheets. The length of the 'J' boits or crank bolt shall be 75 mm. more than the depth of purlins for single sheet fixing and 90 mm. more where two sheet overlap or where ridges or other accessories are to be fixed. The minimum length of coach screw for timber purlins shall be 110 mm.

2.7. Holes:

The holes for fixing the sheet shall be drilled in the centre of end lap of sheets to suit the purlins i.e. on the centre line of the purlins, if these are of timber and square bead coarch screws are used, or as close as possible to the back of purlins if T or 'L' bolts are used as with steel angles or precast concrete or timber purlins. Holes for hook bolts etc. shall be 2 mm. more than the diameter of the fixing bolts. No holes shall be nearer than 40 mm. to any edge of sheet or accessory.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 15.1. shall be followed except that the over lap of the corrugated sheets over valley gutters, roof lights, caves, filler pieces and underlay of the corrugated sheets below ridges, hips, north light curves, flushing pieces, roof lght sheets and barge board shall be included in the measurement. No deduction shall be made for holes cut for extractors or cowl type ventilators. Deductions shall be made for roof light sheets. .

3. The rate shall be for a unit of one sq. metre.

15.20. (A) (HI) Providing asbestos cement sheets roofing fixed with G.I.plain and bitumen washers complete excluding the cost of purlins, rafter and trusses : 6 mm thick corrugated sheets.**1.0. Materials & Workmanship**

The relevant specifications of item No. 15.20 (A) (I) shall be followed except that the thickness of A.C. sheets shall be 6 mm.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 15.20 (A) (I) shall be followed.

.3. The rate shall be for a unit of one sq.m&re.

15.25.(D) Providing and fixing ridges and hips in asbestos cement sheets roofing with G.I. 'J' or 'L' hook, bolts, and nuts 8 mm. dia. G.I. plain and bitumen washers complete: North light adjustable ridges.

1.0 Materials

1.1. The ridges and hips of Asbestos cement sheets roofing shall conform to M-24.

2.0 Workmanship

.1. The relevant specifications of item 15.20 (A) (I) shall be followed except that the work is to be carried out for ridges and hips in A.C. Sheet roofing.

.2. The ridges shall be laid as per manufacture's instructions with rolls of the two wings in case of adjustable ridges, fitting closely and with a separation of serrated ridges registering correctly with the sheet underneath. The staggered lapping of two wings of adjustable ridge section and the lap between the adjustment pieces on the same wing of ridges shall be as per manufacturer's instructions. The end portion of the wing of the adjustable ridges which project beyond the verges of the roof shall be cut and trimmed off neatly.

2.3. Hips:

In laying hip pieces, serrations to suit the corrugations in the sheets below should be cut in them so that they shall be snug fit over the sheets. The wings of ridges shall be fixed to the sheet below with seam bolts and nuts 8 mm. dia. G.I. or 'J' or 'NL' hook bolts and bitumen and G.I. washers which fix the sheets to the purlins. In addition, in north light adjustable ridges, the roll of the two wings shall be jointed together at their crown, with 8 mm. dia G.I. seam bolts and nuts at the rate of two numbers per pair wings. Each seam bolt shall be provided with one bitumen and a pair of G.I. washers. Where the plain wing angular or plain wing adjustable ridges are used, the gaps formed by roofing corrugation and the wings shall be filled with C.C. (1:2:4) up to a full length of the overlaps. The exposed face shall be finished perpendicular to the sheeting. Wings of hips shall be fixed to the roof members below with the same 8 mm. dia G.I. T or 'L' bolts and nuts which fix the sheets to the member. In addition they shall be secured to the sheet below with 8 mm. dia. G.I. seam bolts, nuts and washers so that taken together with hook bolts, there shall be bolt on each wing at least at every fifth corrugation of the sheets below in case of corrugated and at least every second corrugation of the sheet below in case of semi corrugated sheets. Each seam bolt shall be provided with one bitumen and pair of G.I. washers.

.1. Mode of measurements & payment

.2. Measurements of ridges, hips and other accessories shall be for finished work and the length shall be taken along the centre line. The lap shall not be measured. The under lap of ridges under expansion joint pieces shall be measured.

.3. The rate of ridges and hips shall not include the cost of expansion joint pieces, closing of gap between plain ridge and the sheet corrugation with concrete.

.4. The rate shall be for a unit of one running metre.

15.26. Filling cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 12.5 mm. nominal size) in gaps of A.C. sheet corrugation and wing of ridges. 1.0. Materials

Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-6. Stone grit shall conform to M-8.

.1. Workmanship

.2. The relevant specifications of item No.5.4.1. of C.C. shall be followed except that the work shall be for filling gaps of A.C. sheet corrugation and wings of ridges.

.1. Mode of measurements & payment

.2. The measurements of filling gaps in ridges, hips of A.C. sheet corrugation and wings of ridges shall be for finished work. The length shall be measured along the centre line.

.3. The rate shall be for a unit of one running metre.

15.27. (H) Providing and fixing asbestos cement roofing accessories with galvanized iron V or 'L' hook bolts and nuts, G.L plain and bitumen washer etc., complete: North light and ventilator curves.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 15.10 (I) shall be followed except that the work is carried out for accessories for asbestos cement roofing north light and ventilator curves.

.3. The accessories such as north light and ventilator curves shall be laid and secured with same G.I. hook bolt to secure the sheets to the roof, or with separate G.I. hook bolts to the roof members below and / or with 8 mm. dia G.I. seam bolts nuts and washers to the sheeting, generally as per manufacturer's written instructions.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 15.25 (D) shall be followed.

.3. The rate shall be for a unit of one running metre.

15.29. (I) Providing and fixing asbestos cement socketed half round eaves gutter with bolts, nuts, bitumen wasehr etc. and flat iron brackets 40 mm. x 3 mm. size including asbestos rope and plastic roofing compound in joints complete : 150 mm. nominal size.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 15.10 (I) shall be followed except that the asbestos cement socketed half round eaves gutter shall be provided, the size of gutter shall be 150mm. nominal

.2. Gutters shall be laid with a minimum fall of 1 in 120 which should be increased where possible. Gutters shall be true to line and slope and shall be laid with requisite accessories such as drop ends, stop

.3. ends, nozzles angles and union slips, as directed. Teh size of outlet of drop ends and nozzles shall be the same as the size of rain water pipe into which they discharge water. Gutters and their accessories shal be supported by M.S. flat/ iron bracket. Where these are required to be fixed to the side of fagter they shall be fixed with 40 mm. by 3 mm. section bent to shape and fixed rigidly to the sides of the rafter with 3 Nos. of 10 mm. dia. bolts, nuts and washers. The brackets shall overlap the rafter not less than 300 mm. and connecting bolts shall be 115 mm. centers.

.4. Where the brackets are to be fixed with purlins, these shall consist of 40 x 3 mm. M.S. flat iron bent to shape with one/and turned at a right angle and fixed to the purlins face with a 10 mm. dia. bolt, nut and wasehr. The perpendicular overhang portion of 40 mm. x 3 mm. bracket shall be stiffened by another 40 x 3 mm. flat bent to right angle shape with its longer leg connected to the bracket with two numbers of 6 mm. dia . M.S. bolts nuts and washers and its shorter legs fixed to the face of purlins with one number 10 mm. dia. bolt, nuts and washers. The overhang of the vertical portion of the flat iron bracket from the face of the prulin shall not exceed 225 mm.

.5. Requisite slope in the gutter shall be given in the line of bracket. The brackets shall be placed at not more than 900 mm. centers.

.6. The gutters shall be fixed to the brackets with 2 Nos. 8 mm. dia. G.I. seam bolts and nuts, each nute and nut being equipped with a pair of bitumen and G.I. washers. These connecting bolts shall normally be above the water line of the gutter.

.7. Spigot and socket end of gutters of socketed half round gutter and their accessories shall be connected together at their laps with one row of 8 mm. dia. G.I. bolts and nuts. Each of the bolts and nuts shall be provided with a pair of bitumen and a pair of G.I. washers. The gap between socket and spigot shall be packed with approved plastic roofing compound and flanked on the both sides with 6.35 mm. dia. asbestos rope. The connecting g.I. Bolt shall be then tightened so that the lapped joint becomes leak proof. The outer face of packed asbestos rope shall not be further than 6 mm. from the edges of the spigot and socketed ends. Where both ends of gutters and/or their accessories to be connected together are spigot ends, they shall be laid as butt jointed with 1.5 mm. gap in between over union clips. The union clips connected to the two butt ends of the gutter or other sections with two rows. The gap between union clips and ends of gutter sections or accessories shall be packed with plastic roofing compound flanked with edges of 6.35 mm. dia. Asbestos ropes as before. The whole joint shall be made leak proof by tightening the bolts.

.1. Mode of measurements & payment

.2. The asbestos socketed half round eaves gutter shall be measured for finished work and the length shall be measured along the centre line.

.3. The rate of gutters shall include the cost of providing and fixing accessories such as drops ends, stop ends, nozzles, and fixing union clips together with bolts, nuts and washers.

.4. The rate shall be for a unit of one running metre,

15.29. (II) Providing and fixing Asbestos cement socketed half round eaves gutters with bolts, nuts, bitumen washers etc. and flat iron brackets 40 mm. x 3 mm. size including Asbestos rope and plastic roofing compound in joints etc. complete, 300 mm. nominal size.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 15.29 (I) shall be followed except that the size of the Asbestos socketed eaves half round gutter shall be 300 mm. nominal size. .

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 15.29 (I) shall be followed.

.3. The rate shall be for a unit of one running metre.

15.51. Tiled roofing with Mangalore pattern roof tiles including teak reeper of size 50 mm. x 25mm.

1.0. Materials

(1) Mangalore pattern roof tiles shall conform to M-25. (2) Teak wood batten shall conform to M-29.

.1. Laying:

.2. The maximum distance between centre to centre of rafters shall be not more than 600 mm. Teak wood reepers 50 mm. x 25 mm. long shall be nailed to each rafter at central distances suited to the size of the tiles by means of nails 50 mm. long. The reepers shall be of wellseasoned teak wood and shall be straight pieces of uniform size and colour and not shorter than the length necessary to cover at least four rafter. The under face and sides of the reepers shall be planned before fitting up. Joints shall come over the rafters. The joints of two adjacent rows or reepers shall not come over the same rafter. At the eaves, there shall be two reepers of such thickness and shape so that the uniformity of the top slope of the roof shall be preserved.

.3. The work of valleys shall be executed as under ;

Galvanised iron sheet 1200 mm. wide and 1.25 mm. thick shall be used for valleys. The sheet shall be extended by about 450 mm. under the tiles on either side in a depth of 100 mm. at centre. The sheet shall be carried 75 mm. into the wall and set with cement mortar unless flushing is specified. The laps, if any on the slope shall be 300 mm. The sheets shall be laid over the reepers and nailed.

Two reepers 50 mm. x 25 mm. each shall be fixed over the galvanised iron sheet 150 mm. away from the centre line of the valley, on either side to keep the tiles and mortar from falling into the gutter of the valley.

2.3. Laying:

The tiles shall be laid from the eaves towards the ridges after fitting of the reapers, the rebate of the tiles resting fully against the reppers. The joints of the hips and ridges tiles and also those between them and the plain tiles shall be set in and well grouted with lime mortar and the mortar surface painted and finished off with a mixture of red. paint and Portland cement to preserve uniformity of colour. The finished slope of roof shall be uniform from ridges to eaves. The eaves line shall be perfectly straight, horizontal and V parallel to each other. The end over gables shall be protected by lime borders and neatly finished.

.4. At the side of valleys and for 230 mm. on either side of the roof at valleys, cement plastering 12 mm. thick shall be done to prevent the rain water from the gutter leaking by the sides of valleys.

.5. At the eaves, wind tie shall be placed over the ends of the last tiles and secured by means of galvanized iron washers and screws 25 mm. into the rafter to prevent tiles from being blown up. Care shall be taken to put the screws in the ridges and not in the gutter or the tiles. Where full tiles are not necessary, half tiles manufactured for the purpose shall be used.

.1. Mode of measurements and payment

.2. The measurements of the roof shall be taken for finished work for superficial area flat in the plane of the roof and not girthed. Laps shall not be measured.

.3. No deduction in measurements of roof shall be made for openings of area up to 0.40 sq. mt. nor shall any extra be paid for labour and wastage in forming such openings.

.4. The rate includes the cost of all materials and labour including ridges, hips eaves and battons.

.5. The rate shall be for a unit of one square metre. '

15.75. Providing and fixing five courses water proofing treatment with bitumen felt consisting of second and fourth course of blown bitumen or/and residual bitumen applied hot 1.20 Kg./Sq. mt. of area for each course and first course with fibre base bitumen saturated underlay type and third course with fibre base self finished felt type 2 Grade-1, fifth and final course of stone grit 6 mm. and down size or pea sized gravel spreaded at 0.008 Cum./Sq. mt. including preparation of surface, excluding grading complete.

1.0. Materials

The tar felt shall conform to M-76. The bitumen primer shall conform to I.S. 3388-1965. The bitumen shall conform to I.S. 702-1961. The grit or gravel shall conform to M-8.

2.0. Workmanship

2.1. Preparation of surface :

.1. Well defined cracks other than hair cracks in the roof structure shall be cut to 'V' section cleaned and filled up with cement sand slurry or with bitumen conforming to I.S. 702-1961. The surface to be treated shall have a minimum slope of 1 in 120. The grading shall be carried out prior to the application of water proofing treatment by cement mortar or lime surkhi mortar* or as specified in description of item.

.2. The surface of roof, part of parapet and gutters, drain mouths etc. over which the water proofing Treatment is to be applied shall be cleaned of all foreign matter such as fungus, moss and dust by wire brushing and dusting.

.3. Drain outlet shall be suitably placed with respect to the roof gradient to ensure rapid drainage and prevent local accumulation of water on the roof surface. Masonary drain mouth shall be widen sufficiently and rounded with cement mortar.

.4. For cast iron drain outlets, a groove shall be cut all round to touch the treatment.

.5. When a pipe passes through a roof on which water proofing treatment is to be laid a cement concrete angle fillet shall be built round it and the water proofing treatment taken over the fillet.

2.1.6 In case of parapet wall over 450 mm. in height for tucking in the water proofing treatment, a horizontal groove 75 mm. wide and 65 mm. deep at minimum, height of 150 mm. above roof level shall be left in the vertical face at the time of construction. The horizontal face of the groove shall be shaped with cement mortar 1:4. .7. In case of low parapet where the height does not exceed 450 mm. no groove shall be provided and the water proofing treatment shall be carried right over the top.

.8. In case of existing R.C.C. and, stone walls cutting the chase for tacking in the water proofing treatment is not recommended.

.9. At the junction between the roof and vertical face of the parapet wall, a fillet 75 mm. in radius shall be constructed.

.10. At the drain mouths the fillet shall be suitably cut back and rounded off for easy application of water proofing treatment and easy flow of water.

.11. Outlet at every low dividing wall about less than 300 mm. in height cut open to full depth and the bottom and the sides shall be rounded smooth and corners rounded oil for easy application of water proofing treatment.

2.2. Priming coat:

.1. Bitumen primer shall conform to I.S. 3385-1965. A priming coat consisting of bituminous solution of low viscosity shall be applied with brush on the roof and wall surface at specified weight per unit area to assist adhesion of bonding materials as specified in the description of the item.

.2. Where a floating treatment of water proofing with self finished bitumen felt is required i.e. where water proofing treatment is required to be isolated from the roof structure, a layer of bitumen saturated felt (under lay) shall be spread over the roof surface and tucked into the flashing grooves. To keep the underlay free from the, structure no bonding materials shall bemused below underlay. Overlapping to the adjoining strip of underlay shall be minimum of 75 mm. as sides and 10 mm. at ends, and shall be sealed with the same bonding materials, as used for the self finished felt treatment. The underlay shall be of type-I saturated felt conforming to I.S. 1322-1970.

2.3.Laying felt:

2.3.1. The self-finished tar felt shall be cut to the required lengths, brushed clean of dusting materials, laid out flat on the roof to eliminate curls and subsequent stretching. The felt shall be laid in lengths running at right angles to the direction of run off gradient commencing at the lowest level and working up to crest, so that the lower laps of the adjacent felt layer offer minimum obstruction to the flow of water. The felt shall bot be laid in a'single piece of very long lengths as it is likely to shrink. 6 to 8 metres are suitable length. The roof shall be cleaned and dried before the felt treatment is begun. Each length shall be laid in position and rolled up for a distance of half its-lengths. The hot bonding materials heated to correct working temperature as specified by manufacturer shall be poured on to the roof across the full width of the felt as the letter is steadily unrolled and pressed down-. The excess of bonding materials which squeezes out at the ends shall be removed as the laying proceeds. The pouring shall be so regulated that the correct weight of the bonding material as per unit area is spread uniformly over the surface. When the first half of the tar

felt has been bouded to the roof, the other half shall be rolled up and then unrolled on the hot - bonding materials in the same way. Subsequent strips shall also be laid in the same manner. Each strip shall overlap the preceding one by at least 75 mm. at the longitudinal edges and 100 mm. at the ends. All overlaps shall be firmly bonded with hot bitumen. Streaks and trailing s of bitumen nearedges of laps shall be leveled by heating the overlaps with blow lamp and leveling down unevenness.

.2. Third layer of bonding materials in four course treatment shall be carried out in similar manner after the flashing has been complete.

3 Water proofing treatment shall be carried out in the drain pipe or out-lets by at least 100 mm. The water proofing treatment laid on the surface shall over-lap the upper edge of water proofing treatment in the drain outlets by at least 100 mm. Flashing felts shall be laid as flashing. Wherever junction of vertical horizontal surfaces occurs longitudinal laps shall be 100 mm. The lower layer of flashing felt shall overlap the roofing felt by 100 mm. on vertical and sloping faces. Last course of flashing should not be of stone or pea sized gravel but it shall be replaced by providing two coats of bitumen solution of approved quality

.4. The lower edge of flashing shall overlap the flat portion of the roof and the upper edge of the flashing shall be tucked into the horizontal groove 75 mm. thick wide, 65 mm. deep provided at minimum height of 150 mm. from top of the roof surface. The flashing treatment shall be firmly held in place in the grooves with wooden wedges at intervals and the grooves shall be filled with cement mortar 1:4 (1 cement:4 coarse sand) or cement concrete (1:2:4) (1 cement: 2 coarse sand :4 graded stone aggregate 6 mm. nominal size) and surface finished smooth with the rest of wall. The cement work shall be cured for 7 days. When dry, the exposed plaster joints of grooves shall be pointed with bitumen and two coats of bituminous solution shall be applied on the vertical and sloping surface of flashing.

.5. After the top flashing felt layer has been laid, the penultimate layer of bonding material shall be applied over the roofing felt and horizontal overlap, and vertical and sloping surfaces of flashing shall be spread uniformly over the hot bonding materials on the horizontal roof surface and pressed into it with wooden roller.

.6. The material for surface finish shall be spread as described in the item over top layer.

.7. If ballooning occurs the defects may be rectified as under :-

.8. Remove the gravel on the ballooned surface. Then cut open and squeeze out the trapped vapor by firm pressure applied by hand, seal the bitumen felt so lifted back on the surface by applying additions bitumen, finally seal the cut with piece of bitumen felt with bitumen application.

.1. Mode of measurements & payment

.2. The measurements for this item shall be taken as under :

(a) Water proofing of roof with bitumen shall be measured in sq. mt. Length and breadth shall be measured correct to centimeter.

(b) Measurement shall be taken for the superficial area of roofing and flashing treatment including flashing over the parapet wall, low dividing walls and expansion joints and at the pipe projections etc. Overlapping and tucking into flashing grooves shall bot be measured.

(c) Sloping and vertical surface of water proofing treatment shall be measured under the four of five course treatment as the case may be irrespective of the fact that the final course of grit or gravel is replaced by bitumen primer.

(d) In measurements, no deductions shall be made for either openings or recesses for chimney stacks, roof lights etc. for areas up to 0.40 sq. mt. nor anything extra shall be paid for extra labour

and materials in forming such openings. For similar area exceeding 0.40 sq. mt. deduction shall be made in measurements for full opening but nothing extra shall be paid for extra labour and materials in forming such openings.

(e) The grading (coba bedding shall be paid separately but cleaning of surface and treating the cracks shall not be paid separately.

(f) Cutting of horizontal grooves in parapet walls for tucking in water proofing treatment shall not be measured or paid separately.

.2 The rate includes cost of all materials and labour.

.3 The rate shall be for a unit of one sq. metre.

15.87. (A) Providing and fixing on wall face C.I. rain water pipe including filling the joints with spun yarn soaked in neat cement slurry and cement mortar 1:2 (1 cement :2 fine sand) 75 mm. dia.

1.0. Materials

Water shall conform to M-1. The C.I. rain water pipes and fittings shall conform to M-68. Cement mortar shall conform to M-11.

.1. Workmanship

.2. C.I. rain water pipes shall be of the specified diameter and shall be in full lengths of 1.8 metres including socket ends of the pipes unless shorter lengths are required at junctions with fittings.

2.2 Fixing :

The pipe and fittings shall be fixed in vertical alignment unless otherwise specified and shall be secured to the walls at joints with M.S. clamps. The clamps shall be M.S. sheet 30 mm. bent to required shape and size so as to fit tightly on the socket of pipe when tightened with screw bolts. It shall be formed out of two semi-circular pieces, hinged with 6 mm. dia. M.S. pin on one side and provided flanged ends on the other side with holes to fit in the screw bolt and nut 40 mm. long. The clamps shall be provided with hook made out of 275 mm. long, 10 mm. dia M.S. bar riveted to the ring at the centre of one semicircular piece. The clamps shall be fixed to the walls. The clamps shall be kept above 25 mm. clear of finished face of wall so as to facilitate cleaning and painting the pipes.

2.3 The pipe shall be fixed vertically. The spigot of the upper pipe shall be properly fitted in the socket of the lower pipe such that there is uniform annular space for filling with the jointing materials. The annular space between the spigot and socket shall be filled with a few turns of spun yarn soaked in cement slurry or blown bitumen 85/25 grade. These shall be pressed home by caulking tools. The joints shall then be filled with stiff cement mortar 1:2 (1 cement :2 fine sand) well pressed with caulking tools and finished smooth at top at an angle of 45°, sloping up. The joint shall be kept wet at least for 7 days by tying four folds of gunny bag to the pipe and keeping it moist constantly.

.1. Mode of measurements. & Payment

.2. The relevant specifications of item No. 15.93 (B) of A.C. rain water pipes shall be followed except that the C.I. rain water pipe shall be fixed.

.3. The rate shall be for a unit of one running metre,

15.88. (A) Providing and fixing M.S. Holder bat clamps at approved design to C.I. or S.C.I. pipes embedded and including cement concrete blocks (100 mm. x 100 mm. x 100 mm. size) in 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) and cost of cutting holes and making good the walls etc. complete: 75 mm. dia.

.1. Materials & workmanship

.2. The relevant specification of item No 15.94 (B) shall be followed except that the M.S. holder bat clamps of approved design shall be for C.I. rain water pipe-75 mm. dia

.3. The bat clamps shall be fixed as directed with C.C. blocks of 100 mm.x 100 mm. The relevant specifications of item No. 5.4.1. shall be followed for concrete work.

.1. Mode of measurements and payment

.2. The bat clamp of M.S. holder suitable for 75 mm. dia. shall be measured for finished item.

.3. The rate includes cost of all materials and labour etc. required for satisfactory completion of this item.

.4. The rate shall be for a unit of one Number. .

15.93. (A) providing and fixing and embedding sand C.I. rain water pipe in the mason surrounded with 12 mm. thick cement mortar of the same mix as that of masonry : 75 mm. dia. pipe.

1.0. Materials

Water shall conform to M-I. Cement mortar shall conform to M-I1. The C.I. Pipe and fittings shall conform to M-68.

.1. Workmanship

.2. The relevant specifications of item No. 15.87 (A) shall be followed except that C.I. pipe 75 mm. dia. shall be embedded in masonry surrounded with 12 mm. thick cement mortar.

.3. The pipes shall be fixed in the masonry work as it proceeds. The pipe shall be kept vertical or to the line as directed. The pipe shall have minimum surroundings of 12 mm. thick cement mortar at every portion of external surface. The length shall be caulked with spun yarn and cement mortar as soon as the next length of pipe is placed in position. The socket end of the pipe shall be kept closed till the next length of pipe is fitted and jointed to prevent and brick-bats or concrete or pieces of wood falling in and chocking the pipes.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 15.87 (A) shall be followed.

.3. The rate shall be for a unit of one running metre.

15.93 (B) Providing and fixing on wall face asbestos cement rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement: 2 coarse sand) complete: 80 mm. dia.

.1. Materials

.2. Asbestos cement pipes of 80 mm. dia shall conform to I.S.: 1626-1960 for pipes fixed on wall face. A.C. pipe shall conform to M-74.

2.0. Workmanship

2.1. Asbestos cement rain water pipes and fittings shall be of the diameter, size and type specified in the item. The pipe shall be fixed in full lengths of 2 metre as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gutties.

2.2. The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the socket and the spigot shall be filled with spun-yarn soaked in bismuthic jointing compound and shall be pressed home by means of caulking tool. The remaining 2/3 depth of the

joints shall be filled in with stiff cement mortar 1:2 and shall be pressed with caulking tool and finished smooth at top at an angle of 45° sloping up.

.1. Mode of measurements and payment

.2. The pipe shall be measured including all fittings along its length in running metre. No allowance shall be made for the portion of pipe length entering the sockets of the adjacent pipe or fittings.

.3. The rate includes the cost of all materials and labour involved in all the operations including jointing.

.4. The rate shall be for a unit of one running metre.

15.93. (C) Providing and fixing on wall face Asbestos cement rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement :2 coarse sand) complete .100 mm. dia.

.1. Materials and Workmanship

.2. The relevant specifications of item No 15.93 (B) shall be followed except that the diameter of pipes shall be 100 mm.

.1. Mode of measurements & payment

.2. The pipe shall be measured including all fittings along its length in running metre. No allowance shall be made for the portion of pipe length entered into the sockets of the adjacent pipe or fittings:

.3. The rate includes the cost of all materials and labour involved in all the operations including jointing.

.4. The rate shall be for a unit of one running metre.

15.94. (B) Providing and fixing for A. C. pipe on wall plugs and standard holder bat clamps comprising of two semi circular halves of flat iron and cast iron base screwed on wooden plugs :80 mm. dia.

.1. Materials and workmanship

.2. the bat clamps shall consist of a cast iron base with a projecting T shaped lay, teeth web of which the semicircular halves of the flat iron clamps are bolted. The base on the holder bat clamp shall be screwed on a pair of wooden plugs fixed in the wall with screw sloted driven through the holes in the base. The screws shall be not less than 75 mm. long for 80 mm. diameter pipes and 100 mm. for 100 mm. diameter pipes. The plugs shall be fixed in the wall to a depth of 150 mm. in cement mortar 1:2 centrally to the holes in the base of the bat clmps and with their front face projecting to such a length from the brick face that when the bat clamps is fixed, the outer base of its base shall be flush with the plaster face of the wall. The plugs shall be 110 mm x50 mm. wide at face increasing to 160 mm. x 70 mm. width at rear and shall be 70 mm. deep through out.

.1. Mode of measurements & payment

.2. The work shall be measured on number basis of clamps prescribed with accessories including cost of all materials and labour involved in all the operation including jointing etc. complete fixing in position etc. complete.

.3. The rate shall be for a unit of One Number.

15.94 (C) providing and fixing for A.C. Pipe on wall plugs and standard holder bat clamps comprising of two semi circular halves of flat iron and cast iron base screwed on wooden plugs: 100 mm. dia.

.1. Materials and workmanship

.2. The relevant specifications of item No. 15.94 (B) shall be followed except that the standard holder bat clamps shall be for A.C. pipe of 100 mm. dia.

.1. Mode of measurements and payment

.2. The work shall be measured on number basis of clamps including cost of all materials and labour involved in all the operation including jointing, fixing in position etc. complete.

2.2. The rate shall be for a unit of One Number.

15.95. (A) providing and fixing on wall face asbestos cement fittings for rain water pipe including Jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement: 2 coarse sand). Bend of required degree. 80 mm. dia without door. 100 mm. dia. without door.

.1. Materials

.2. The bend of required degree and size as specified in item shall be of best quality and make as approved by the Engineer-in-charge. The fittings shall conform to I.S. 1626-1960.

.1. Workmanship

.2. The fitting (bend of required degree) shall be fixed as per relevant specifications of item No. 15.93 (B) except that the A.C. bends of required degree shall be provided instead of pipe.

3.0. Mode of measurements and payment 3.1

The rate shall be for a unit of One number.

15.95. (B) Providing and fixing on wall face Asbestos cement fitting for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement: 2 coarse sand) offset 50 mm. (2) 80 mm. dia. (3) 100 mm. dia.

.1. Materials & workmanship

.2. The relevant specifications of item No. 15.95 (A) shall be followed except that off-set 75mm. of specified size of A.C. pipe shall be provided instead of bends.

2.0. Mode of measurements & payment

15.95. (J) Providing and fixing on wall face Asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement :2 coarse sand) junction equal angle. (3) 80 mm. dia. without door (5) 100 mm. dia. without-door.

1.0. Materials and workmanship

The relevant specifications of item 15.95 (A) Shall be followed that junction of equal of angle of specified size of A.C. pipe shall be provided instead of bends.

2.0. Mode of measurements & payment

2.1 The rate shall be for a unit of one Number.

15.95 (K) Providing and fixing on wall face Asbestos cement fittings for rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement :2 coarse sand) Junction of equal double angle. (3) 80 mm. dia. without door. (5) 100 mm. dia without door.

.1. Materials and workmanship

.2. The relevant specification of item 15.95 (A) shall be followed except that junction of equal double angles of A.C. rain water pipe of specified size shall be provided instead of A.C. Bend.

2.0. Mode of measurements & payment

2.1. The rate shall be for a unit of One Number

15.95. (L) Providing and fixing on wall face Asbestos cement fittings for A.C. rain water pipe including jointing with spun yarn soaked in bitumen and cement mortar 1:2 (1 cement: 2 coarse sand) : Standard shoe. (2) 80 mm. dia. (3) 100 mm. dia

1.0 Materials and Workmanship

1.1. The relevant specification of item No. 15.95 (A) Shall be followed except that the standard shoe of A.C. pipe of specified size shall be provided instead of bend.

.1. Mode of measurements & payment

.2. The rate shall be for a unit of One Number

SECTION-16

Ceiling Lining

16.3.(A) Providing and fixing wooden planks ceiling with tongued and grooved jointing and wood screws (frame work and cover fillets to be measured and paid separately : Indian Teak Wood (i) 12 mm. thick (ii) 20 mm. thick (Hi) 25 mm. thick.

.1. Materials

.2. The Indian Teak wood shall conform to M-29.

.1. Workmanship

.2. General:

The planks shall be clean sawn in the direction of the grain, cut square and straight. Each plank shall have tongued and grooved jointing. On exposed faces, it shall be planed for full face.

.2. The frame for supporting the ceiling may be wooden or metal and the size and the other details of frame work shall be as directed. Suspenders of M.S. angles or other sections may be used for suspending the frame. Use of wooden suspenders shall be permitted. The bottom surface of the frame shall be checked and corrected to true surface and slope.

.3. Fixing:

Planks of a specified timber and thickness shall be used. The width of the planks shall not be more than 100 mm. up to 20 mm. thick planks and 150 mm. for planks above 20 mm. thick and length shall not exceed 3 metres. The planks shall be of uniform width except in the first and last lines of plank's adjacent to the two walls where remaining additional odd width shall be adjusted equally on both sides. The minimum length of planks in finished work shall be such that it will span at least two spacings of the supporting frame work except where shorter lengths are unavoidable. The planks shall be planed true on the exposed sides.

.4. The longitudinal edges of the planks shall be jointed with tongued and grooved type joints as described in the item.

.5. The outer lines of planks shall be accurately fixed parallel and close to the wall. Each subsequent plank shall be carefully jointed up. The plank shall be fixed to the frame above with two screws at each end joint of frame and one at every intermediate joint. (The screws shall not be thinner than designation 8 and of a length not less than twice the thickness of the boards). The screws shall be counter sunk and the screw holes filled with putty or sloping out way. The unexposed face of planks shall be treated with wood preservative before the board is fixed.

.1. Mode of measurements & payment

.2. The supporting frame, cover fillets, and suspenders shall not be included in rate of ceiling.

.3. No deductions in measurements shall be made for opening not exceeding 0.40 Sq. m. and no extra payment shall be made for forming such openings.

3.3 Each type of work in ceiling shall be measured

separately. **3.4.** The rate shall be for a unit of One Sq. metre.

16.4. Providing and fixing fibre insulation board lining with but jointing and nails (frame work and cover fillets to be measured and paid separately, (i) 12 mm thick (ii) 18 mm. thick (Hi) 25 mm thick.

.1. Materials

.2. The fibre insulation board of specified thickness shall conform to I.S. 3348-1965.

2.1. Fixing :

The work shall be carried out as per. detailed drawings for panel arrangements.

2.2. All boards are subject to slight movements due to moisture and temperature changes, and this shall be allowed for in fixing. Preferably the board shall be stored up for at least 24 hours before use in the same environment as the one in which they are to be fixed.

2.3. Frame work:

The studs and grounds for fixing the boards shall be spaced at 300 mm. to 450 mm. centers both ways, the actual spacing selected depending on the width of the cut board in the panel arrangements. All edges of the boards shall be supported. Intermediate supports shall be provided at dado heights for picture rails and cornices etc.

2.4. Planked battens 40 mm.x20 mm. shall be used for grounds on solid walls. The batten shall be plugged to wall as described under. The batten shall be fixed on tapering plugs with 50 mm. long

wood screws. The tapering plug shall be trapezoidal in shape having base 50 x 50 mm. at bottom 38 x 38 mm. at top with depth of 50 mm. plugs shall be embedded in CM. 1:3 and shall be placed at 450 x 500 mm. centers. The plugs shall be treated with coal tar and battens shall be treated with wood preservative before use. On uneven wall faces the battens shall be plugged and fitted with packing pieces at the back where necessary. The frame shall be treated with wood preservative before boards are nailed on. Nailing shall be done by nails having a shank diameter of 2.5 mm. and head diameter of about 8 mm. Nails shall have length as per requirements. The nails shall be placed at supports at 100 mm. To 150 mm. centre to centre and at edges 75 mm. centers. Minimum clearance for nails from edges shall be 10 mm. The nails shall be recessed where the nail heads are exposed. Where the joints are to be covered with beading, flat headed (clout) nails shall be used instead of lost head nails.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 16.3 (A) shall be followed.
- .3. The rate shall be for a unit of One Sq. metre.

16.13. (I) providing and fixing plywood lining with butt jointing and nails (frame work and cover fillets to be measured and paid for separately) 6 mm. thick ply.

1.0. Materials :

6 mm. thick plywood shall conform to M-37.

2.0. Workmanship

The relevant specifications of item 16.4 shall be followed except that 6 mm. thick plywood shall be fixed in lining.

- .1. Mode of measurements and payment
- .2. The relevant specifications of item 16.4 shall be followed.
- .3. The rate shall be for a unit of One sq. metre.

16.13. (II) Providing and fixing plywood lining with butt jointing and nails (frame work and cover Fillets to be measured and paid for separately) 9 mm. thick ply.

1.0. Materials & Workmanship

1.1 The relevant specifications of item No. 16.13 (I) shall be followed except that the thickness of plywood to be fixed shall be 9 mm.

- .1. Mode of measurements & payment
- .2. The relevant specifications of item No. 16.4 (I) shall be followed.

2.2 The rate shall be for a unit of One sq. metre.

16.21. (I) providing and fixing plain asbestos sheet lining with butt jointing and wood screws (frame work and cover fillets to be paid for separately) Class-A-6.5. mm. thick.

1.0. Materials

1.1 Plain A.C. Sheets 6.5 mm. thick shall be conform to M-24.

2.0 Workmanship

- .1. The relevant specifications of item NO. 16.4 shall be followed except that the plain A.C. sheet class A of 6.5 mm. thickness shall be fixed in lining.

.2. In fixing asbestos cement sheets, care shall be taken to avoid rigid fixing as this may cause cracking if the supporting structure expands or shrinks. The sheet shall be fixed with wood screws to wooden ground and the screw holes shall be drilled slightly longer than the screws. Asbestos sheet may also be Advantageously fixed on to walls with cement plaster backing. The screws shall be fixed at 150 mm. to 200 mm. at supports. The boards shall be fitted either with wooden cover fillets or asbestos strips as described in item.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 16.4. shall be followed.

.3. The rate shall be for a unit One sq. metre.

16.21. (II) Providing and fixing plain asbestos sheet lining with butt jointing to wood screws (frame work and cover fillets to be paid for separately) Class-B-5 mm. thick.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 16.21. (I) shall be followed except that the plain A.C. sheet of Class-B, 5 mm. thick shall be fixing in lining.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 16.21 (I) shall be followed.

.3. The rate shall be for a unit of One Sq. metre.

SECTION-17

Plastering and paints

17.58. (I) 10 mm. thick cement plaster in single coat on fair side of brick concrete walls for interior Plastering up to floor two level and finished even and smooth in (i) CM. 1:3.

1.0. Materials

1.1 Water shall conform to M-I. The cement mortar of proportion 1:3 shall conform to M-13.

.1 Workmanship

.2 Scaffolding:

Wooden baulies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, is a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Application of plaster:

2.3A. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching

across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular textures required. Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be avoided. All corners, arrises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

2.3.2 Cement plaster shall be used within half an hour after addition of water. And mortar or plaster which is partially set shall be rejected and removed forthwith from the site..

.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.

.1. Mode of measurements & payment

.2. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

.2. All plastering shall be measured in square meters unless otherwise specified. Length, breadth or height shall be measured correct to a centimeter.

.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

.4. This item includes plastering up to floor two level.

.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering, being taken) for length and from the top of floor or skirting to skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

.6. Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.

.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joints, beams, posts, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq.mt.in each area deductions and additions shall be made in the following manners :

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc. (b) Deduction for openings exceeding 0.5.

sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings: - .

(i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plaster or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all is equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be

3.8 For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but j a m b s , soffits and sills shall be measured.

3.10. The rate shall be for a unit of One Sq. metre.

17.58 (II) 10 mm. cement plaster in single coat on fair side of brick/concrete walls for interior plastering up to floor two level and finished even and smooth in CM. 1:4.

.1. Materials & Workmanship

.2. The relevant specifications of item No 17.58 (I) shall be followed except that the proportion of mortar is CM. 1:4 instead of CM. 1:3

.1. Mode of measurements & payment

.2. The mode of measurements and payment shall be the same as for item NO. 17.58 (I)

.3. The rate shall be for a unit of One sq. metre.

17.58. (III) 10 mm. cement plaster in single coat on fair side of brick/concrete walls for interior plastering up to floor two level and finished even and smooth in CM. 1:6.

.1. Materials & Workmanship

.2. The relevant specifications of item NO. 17.58 (I) shall be followed except that the proportion of mortar is cement Mortar 1:6

.1. Mode of measurements & payment

.2. The mode of measurement and payment shall be followed same as item No. 17.58 (I)

.3. The rate shall be for a unit of One Square Meter.

17.61. (I) 20 mm. thick cement plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level, finished even and smooth in cement mortar 1:3 (1 cement: 3 sand) _

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 17.58 (I) shall be followed except that the thickness of cement Plaster shall be 20 mm. The plastering work shall be in single coat on rough side of half brick wall for Interior plastering up to floor two level, finished even and smooth in CM. 1:3.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.58 (I) shall be followed.

2.2. The rate shall be for a unit of One Sq. meter.

17.61 (II) 20 mm. thick plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level, finished even and smooth in cement mortar 1:4 (1 cement :4 sand).

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.59 (II) shall be followed except that the thickness of plastering shall be 20 mm. in CM. 1:4.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.59 (I) shall be followed

.3. The rate shall be for a unit of one sq. meter.

17.61. (HI) 20 mm. thick plaster in single coat on rough side of single or half brick wall for interior plastering up to floor two level, finished even and smooth in cement mortar 1:6 (1 cement :6 sand)

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.59 (III) shall be followed except that the thickness of plastering shall be 20 mm. in CM. 1:6.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.59 (I) shall be followed

.3. The rate shall be for a unit of one sq. meter. 77.69. Extra over items 51 to 65 for finishing with a floating coat of neat cement slurry.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.58 and 17.61 shall be followed for materials and workmanship except that this work is only providing smooth cement finish with floating coat of neat cement slurry.

.3. The coat of cement and fine sand mortar of proportion 1:1 (1.5. mm. thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic. 1.3 In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly junctions. 1.4. Curing: All the plaster work shall be kept damp continuously for a period of 7 days.

2.0. Mode of measurements & payment

2.1 The payment shall be made for a unit of 1.0 sq. mt. for work done over and above the finishing of work of base coat.

.2. The relevant specifications of item of base coat shall be followed for measurements and payment. The rate shall be for a unit of one sq. meter.

17.70 Extra over items 17.58 to 17.61 for providing and mixing water proofing materials in cement Mortar in proportion recommended by the manufacturers. 1.0. Materials & Workmanship

The relevant specification of item No. 17.58 to 17.61 shall be followed except that the water proofing materials of approved make shall be added to the cement at the rate specified or as directed by the Engineer-in-charge. The proportion of water proofing materials to be mixed with 50 Kg. bags shall be as recommended by the manufacturers of the water proofing material.

.1. Mode of measurements & payment

.2. The payment shall be made extra for this work over and above the plaster work.

.3. The rate shall be for a unit of 1 Kg. of water proofing materials used in 1 bag weighing 50 Kg. cement used extra over the rate of plastering work.

17.91. Extra over item No. 17.59 to 17.61 for plastering on ceiling and soffits of stair up to floor two level instead of plastering on walls.

.1. Materials & Workmanship ~

.2. The relevant specifications of item NO. 17.59 (I) shall be followed except that this work is for

ceiling, soffits of stairs up to two floor level instead of plaster on walls.

.3. The smooth concrete surface shall be suitably roughened to provide necessary bond before plastering.

.1. Mode of measurements & payment

.2. The payment shall be made for a unit of One Sq. meter of work done, extra over and above them payment of plaster work on wall surfaces.

.3. The rate shall be for a unit of one Sq. meter.

17.94 (I) Extra over item No. 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every additional storey height (i), Single coat plaster.

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 17.59 (I) shall be followed except that the whole work is to be carried out above floor two level.

.1. Mode of measurements & payment

.2. The mode of measurements and payment shall be same as item No. 17.59 (I).

.3. The extra payment shall be made over and above the floor two level rate for every additional floor height.

.4. The unit rate shall be for a unit of One sq. metre.

17.94 (II) Extra over item 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every additional storey height. Two coat plaster.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.94 (I) shall be followed except that extra payment for work shall be for a two coat plaster.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.94 (I) shall be followed.

.3. The rate shall be for a unit of one sq. metre.

17.94 (HI) Extra over item 1 to 69, 71 to 87 and 90 for interior plastering above floor two level for every Additional storey height. Floating coat of neat cement.

.1. Materials & Workmanship

.2. The relevant specifications of item 17.94 (I) shall be followed except that the extra payment shall be made for work of floating coat neat cement slurry.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.59 (I) shall be followed.

.3. The rate shall be for a unit of one sq. metre.

17.95 20 mm. thick sand face cement plaster on walls up to height of 10 mm. and above ground level Consisting of 12 mm. thick backing coating of CM. 1:3 (1 cement: 3 sand) and 8 mm. thick finishing coat in CM. 1:1 (1 cement :1 sand) etc. complete.

.1. Materials

.2. Water shall conform to M-1. Cement mortar shall conform to M-11.

.1. Workmanship

.2. The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in CM. 1:3 The relevant specifications of item No. 17.58 (I) shall be followed except that the thickness

of back coat shall be 12 mm. average. Before the first coat hardens its surface shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions, the surface shall not be allowed to dry during this period.

.3. The second coat shall be completed to 8 mm. thickness in CM. 1:1 as described above, including raising sand facing by bushing .The sample of sand face shall be got approved before the work is started, the whole work shall be carried out uniformly as per sample approved.

.4. Curing :

The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.

.1. Mode of measurements & payment

.2. The relevant specifications of item NO. 17.58 (I) shall be followed except that the sand-face plaster on outside up to 10 in. above ground level shall be measured under this item.

.3. The rate shall be for a unit of One sq. metre.

17.116 (A) Pointing on brick work with cement mortar 1:3 (1 cement: 3 coarse sand) – flush pointing

.1. Materials

.2. water shall conform to M-1. cement mortar shall conform to M-11.

.1. Workmanship

.2. The flush pointing work shall be carried out with cement mortar of proportion 1:3 (1 part of cement and 3 parts of coarse sand) by volume.

.3. Preparation of surface:

2.2.1. The joints shall be raked to such a depth that the average of new mortar measured from either the sunk surface of finished pointing or from the edge of the brick shall be average 10 mm.

2.3. Application of Mortar and Finishing:

2.3.1. The mortar shall, be pressed into the raked out joints with a pointing trowel according to the type of pointing specified in item. The mortar shall not spread over the corner edges or surface of the masonry. The pointing shall then be finished with the pointed tools.

2.4. Curing

2.4.1. The pointing shall be kept wet for 7 days. During this period, it shall be suitably protected from all damages.

.1. Mode of measurements & payment

.2. No deductions shall be made for end of joints, beams and posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits sills etc. of these openings. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq.mt. each shall be paid as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings:

(i) When both faces of walls are pointed with same type of pointing, deduction shall be made for one face only.

(ii) When two faces of walls are pointed with different type of pointing or if one face is plastered and the other is pointed, deduction shall be made in the plaster or pointing on the side of frame for door, windows etc. on which the width of reveals is less than that on the other side but no deduction shall be made from plaster or pointing on the other side.

(iii) when only one face is treated and the other face is not treated, full deduction shall be made, if the width of the reveals on the treated side is less than on the untreated side, but if the width of the

reveal is more, then no deduction shall be made not any addition shall be made for reveals, jambs, soffits sills etc.

.3. In case of openings of area above 3 sq. mt. each deduction shall be made for opening but jambs, sills, and soffits, shall be measured.

.4. The rate shall be for a unit of one Sq. metre.

17.116 (B) Pointing on brick work with cement mortar 1:3 (1 cement: 3 coarse sand) Ruled pointing

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.116 (A) shall be followed except that the pointing to be done ruled pointing as under :

.3. The joints shall be initially formed as for flush pointing and then while the mortar is still green, a groove of specified shape shall be formed by running forming tool straight along the centre line of joints till a smooth and hard surface is obtained. The vertical joints shall also be finished in a similar way. The pointing lines shall be uniform in width and truly horizontal and paralld in case of floor and ceiling..

.1. Mode of measurements & payment

.2. The mode of measurements and payment shall be the same as per item No. 17.116 (A).

.3. The rate shall be for a unit of One sq. metre.

17.117. (A) Pointing on brick work with cement mortar 1:4 (1 cement :4 sand) Flush pointing.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.116 (A) Shall be followed except that the pointing work shall be carried out with CM. 1:4.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 17.116 (A) Shall be followed.

.3. The rate shall be for a unit of One sq. metre.

17.117. (B) Pointing on brick work with cement mortar 1:4 (1 cement :4 sand) flush pointing.

.1. Materials & Workmanship

.2. The relevant specifications of item No. 17.116 (B) Shall be followed except that the proportion of CM. 1:4 shall used for ruled pointing.

.1. Mode of measurements & Workmanship

.2. The relevant specifications of item No. 17.117.(A) shall be followed

.3. The rate shall be for a unit of One sq. metre.

17.140 (A) Pointing on coursed stone masonry with cement mortar 1:3 (1 cement :3 sand) flush pointing.

.1. Materials& Workmanship

.2. The relevant specifications of item No. 17,116 (A) shall be followed except that the pointing shall be done on coursed stone masonry with CM. 1:3 and the mortal' shall be simply struck off with a trowel and the work left showing the natural irregularities in line and the surface of the stones themselves.

2.0. Mode of measurements & payment

- .1. The relevant specifications of item No. 17.116 (A) shall be followed.
- .2. The rate shall be for a unit of One sq. metre.

17.140 (B) Pointing on course stone masonry with cement mortar 1:3 (1 cement :3 sand) Ruled pointing

.1. Materials & Workmanship

- .2. The relevant specifications of item No. 17.140 (A) and 17.116 (B) shall be followed.

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 17.116 (A) shall be followed.
- .3. The rate shall be for a unit of One sq. metre.

17.144. (A) Pointing on uncoursed stone masonry with cement mortar 1:3 (1 cement :3 sand) Flushing pointing

.1. Materials & Workmanship

- .2. The relevant specifications of item No. 17.116 (A) shall be followed except that the flush pointing shall be done on uncoursed rubble masonry work in CM. 1:3 and the mortar shall be simply struck off with a trowel and the work left showing the natural irregularities in line and the surface of the stone themselves.

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 17.116 (A) shall be followed.
- .3. The rate shall be for a unit of One sq. metre.

17.144. (B) Pointing on course stone masonry with cement mortar 1:3 (1 cement :3 sand) Rules pointing

.1. Materials & Workmanship

- .2. The relevant specifications of item No. 17.116 (A) and 17.144 (A) shall be followed except that the ruled pointing work shall be carried out on uncoursed rubble masonry work in CM. 1:3.

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 17.116 (A) shall be followed.
- .3. The rate shall be for a unit of One sq. metre.

17.0.01. Providing cement vata (10 cms. 10 cms.) size quarter round in cement mortar 1:1 including neat cement finishing, watering, etc. complete.

.1. Materials

- .2. Water shall conform to M-1, Cement mortar shall conform to M-11.

.1. Workmanship

- .2. The work of cement vata of 10 cms. x 10 cms. size shall be carried out in the best workman like manner. The inter portion of rain water pipe shall be rounded off properly during constructing the vata. The work shall be cured for 7 days.

.1. Mode of measurements & payment

- .1. The work shall be measured for finished item in running metre.
- .2. The rate shall be for a unit of one running metre.

SECTION-18

White Washing & Distempering

18.11. White washing with lime on undecorated wall surfaces (two coats) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter.

.1. Materials

.2. The clear Cole shall be made from glue and boiling water by mixing. 1 Kg. mixture shall be suitably tinted where required for use under coloured distemper if directed. Glue shall conform to I.S. 852-1969 (Specifications for animal glue)

.3. Lime used shall be freshly burnt class 'C' Lime (fat lime) and white in colour conforming to I.S. 712-1973. Water shall conform to M-I. Best quality of gum shall be used in the preparations of white wash. Ultramarine blue or Indigo: this shall conform to I.S. 55-1970 for points, and shall be used for preparation of white wash. Pigments : Mineral colours, not affected by lime shall be used in preparing colour wash.

.1. Workmanship

.2. Preparation of white wash solution: Surface already white or colour : The fat lime shall be slaked as site and shall be mixed and stirred with about five litres of water for 1 Kg. of unslaked lime to make a thin cream. This shall be allowed to stand for a period of 24 hours and then shall be screened through a clean coarse cloth, 4 Kg. of gum dissolved in hot water shall be added to each cubic metre of lime cream. Small quantity of ultramarine blue (Up to 3 gms. per Kg. of lime) shall also be added to the last two coats of white wash solution and the whole solution shall be stirred thoroughly before use.

.3. Preparation of surface

2.2.1. The surface spoiled by smoke soot shall be scrapped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

.3. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushed.

.4. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.

.5. All unnecessary nails shall be removed, the holes, cracks, patches etc. shall be made good with material similar in composition to the surface to be prepared.

2.3. Scaffolding:

Wherever scaffolding is necessary it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings, proper stage scaffolding shall be erected where necessary,

2.4. Application of white wash :

.1. On the surface so prepared the white wash shall be applied with 'Moon' brush. The first stroke of the brush shall be from top downwards, another from bottom upwards over the first stroke and similarly one stroke from the right another from the left, over the first stroke brush before it dries. This will form one coat. Each coat shall be allowed to dry before next coat is applied. Number of coats as specified in item shall be applied. It shall present smooth and uniform finish free from brush marks and it should not come off easily when rubbed with finger.

.2. Splashing and dropping if any on the doors and windows, ventilators etc. shall be removed and

the surface cleaned.

.3. Priming and Alkali resistant treatments, scraping of surface washing etc. surface spoiled by smoke soot removed of oil and grease spots, treatment for infection with efflorescence moulds moss, fungi, algae and lichen and patch repairs to plaster wherever done shall not be paid extra.

.1. Mode of measurements & payment

.2. All the work shall be measured in the decimal system as under :

(a) Dimensions shall be measured to be nearest 0.01. M. .

(b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.

All the walls shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area, for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq.mt. and not exceeding 3.0 sq. mt. each in area, deductions and additions shall be made as under : No deductions shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 sq. mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around ends of joints, beams, posts, etc. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition will be made for reveals, jambs, soffits, etc. of these openings :

(a) When both the faces of walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with a different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other wise, where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc. In case of area of openings exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, sills shall be measured. No deductions shall be made for attachment such as casing, conducts, pipe, electric wiring and the like. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas :

(a) Corrugated steel sheets'. 14%

(b) Corrugated A.C.Sheets. 20%

(c) Semi corrugated A.C. Sheets. 1 (%)

(d) Nainital pattern roof (Plain sheeting with rolls) 10%

(e) Nainital pattern roof (with corrugated sheets) 25%

.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.

.8. The rate shall be, for a unit of One sq. metre. 18.12. White washing with lime on decorated wall surface (One coat) to give an even shade including Thoroughly brooming the surface to remove dirt, dust, mortar, drops and loose scales of lime wash and other foreign matter.

1.0. Materials and Workmanship

1.1. The relevant specifications of item No. 18.11 shall be followed except that the white washing work shall be carried out on decorated wall surface single coat.

.4. Mode of measurements & payment

.5. The relevant specifications of item No. 18.11 shall be followed.

.6. The rate shall be for a unit of one sq. metre. 18.13. Extra over items 18.11 and 18.12 for every subsequent coat of white washing with lime on wall surfaces.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.11 shall be followed except that this work is for extra coat over and above two coats on wall surface. .

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 18.11 shall be followed except that the payment of subsequent coat shall be made extra over and above the item No. 18.11 for every subsequent coat applied.

.3. The rate shall be for a unit of One sq. metre.

18.14. Extra over item 18.11 for white washing with the lime on ceiling and or sloping roof .**.1.0. Materials and Workmanship**

1.1. The relevant specifications of item No. 18.11 above shall be followed except that this work is for ceiling and/ or sloping roof.

2.0. Mode of measurements & payment

2.1. The relevant specifications of item No. 18.11 shall be followed except that extra payment for white washing on ceiling and/or slopping roof shall be made over and above the payment of item NO. 18.11.

?.?. The rate shall be for a unit of One sq. metre.

18.15. Extra over item 18.12 for white washing with the lime on ceiling and or sloping roof.**.1. Materials and Workmanship**

.2. The relevant specifications of item No. 18.12 shall be followed except that the white washing work shall be carried out on decorated ceiling and/ or sloping roofs.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 18.12 shall be followed except that extra payment for white washing on ceiling and/or slopping roof shall be made over and above the payment of item NO. 18.12.

.3. The rate shall be for a unit of One sq. metre.

18.16. Extra over item 18.13 for every subsequent coat of white washing with the lime on ceiling and or sloping roof.**.1. Materials and Workmanship**

.2. The relevant specifications of item No. 18.11 and 18.13 shall be followed except that this work is for extra coat over and above two coat over and above two coats of ceiling and/ or sloping roofs.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 18.11 and 18.13 shall be followed except that extra payment for white washing shall be made for ceiling and/or slopping roof for every subsequent coat applied over item NO. 18.11 and 18.13.

.3. The rate shall be for a unit of One sq. metre.

18.17. Colour washing with lime on undecorated wall surfaces (Two coats) over and including priming coat of white washing to give even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter. The relevant specifications for the materials and workmanships 18.11 shall be followed except that it shall be for colour wash.**.1. Materials**

.2. Clear-colle : This shall be made glue and boiling water by mixing 1 Kg. of glue to every 15 liters of water. The mixing shall be suitably tinted to match with colour of colour washing as directed. Glue

shall conform to I.S. 852-1969.

.3. Lime : Lime used shall be freshly burnt class 'C' lime (fat lime) and white in colour conforming to I.S. 712-1973.

.4. Water : water shall conform to M-I.

.5. Gum : Best quality of gum shall be used in the preparation of white or colour wash. The colour pigment of required tint and shade shall be mixed in lime cream. The mineral colour not affected by lime shall be used in preparing the colour wash.

.1. Workmanship

.2. Sufficient quantity of colour wash enough for the complete job shall be prepared in one operation to avoid any difference in shade, the basic white wash solution shall be prepared in accordance with item

18.11. Mineral colours not affected by lime shall be added to the white wash solution. No colour wash shall be done until a sample of the colour has been approved. It shall be noted that small samples of colour appears lighter in shade than when the same shades are applied precisely to large surface. The colour shall be of even tint, over the whole surface. If it patchy or otherwise badly applied, it shall be rejected. Preparation of the colour wash with pigment shall be as under :

(a) With Yellow and Red Ochre :

solid lumps if any in the powder shall be crushed to powder and solution in water prepared and then added to white wash sieving it through a coarse cloth, mixed evenly and thoroughly to white wash in small quantities till the required shade is obtained.

(b) With Blue Vitriol :

Fresh crystals of hydrous copper pupate (i. e. blue vitriol) shall be ground to fine powder and dissolved in small quantity of water. Sufficient quantity of solution enough to produce the colour wash of required shade shall be strained through a clean cloth, the filtrate being mixed evenly and thoroughly to the white wash.

(c) Colour wash from other coloring pigment shall be prepared in accordance with the instructions of the manufacturer.

2.2.preparation of surface:

The surface shall be prepared by removing mortar dropping and foreign matter and thoroughly cleaned with wire or fiber brush or any other suitable means as directed by the engineer – in – charge. All loose pieces and scales shall be scraped off and holes filled with mortar.

2.2.1. for scaffolding and application of colour wash, relevant specification of item no.18.11

“application of white wash for colour washing on undecorated surface ” after the surface has been prepared. The first primary coat shall represent a smooth and uniform finish. to start with , patch of 0.1 sq mt. on prepared surface shall be colour washed with first coat of white wash and subsequent coatsof colour wash solution entrie work of colour washing is taken up in hand . it shall be noted that small areas of colour wash will apper lighter in shade then when the same shade is applied to the large surface.

2.2.2 for colour washing on decorated surfaces, after the surface has been prepared ,a coat of white wash shall be applied for the patches and repairs. then one coat or more of colour wash shall be applied over the entire surfaces. Such that the colour wash surfaces shall present a uniform colour shade. No primary coat is needed for a decorated surface ,bearing colour of same shade on surface requiring change of colour after the surface has been prepared as described above. two coat of white wash shall be applied before application of specified number (minimum two) of coats of colour wash of the new shade.

2.3 protecting measure:

The surface of doors, window, floors, articles, of furniture etc. and such other part of the building

not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

3.0. Mode of measurements and payment

3.1. The relevant specifications of item no. 18.11 shall be followed.

3.2. the rate shall be for a unit of one sq. meter

18.18. Colour washing with lime on decorated wall surface (one coat) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and loose scales of line wash and other foreign matter.

1.0. Materials and workmanship

The relevant specification of item No.18.17 shall be followed.except that the colour washing shall be carried out on decorated wall surfaces in one coat.

2.0 Mode of measurement and payment

2.1 the relevant specification of item No.18.17 shall be followed.

2.2. the rate shall be for a unit of One sq. meter

18.19. Extra over item No.18.17& 18.18. for every subsequent coat of colour wash with lime on wall surfaces.

1.0. Materials and workmanship

The relevant specification of item No.18.17 shall be followed except that this work is for extra for every subsequent coat of white wash shall be made over the rate of item 18.17. & 18.18

2. the rate shall be for a unit of One sq. meter

18.20 Extra over item No.18.17& for colour washing on ceilings and / or sloping roofs.

1.0. Materials and workmanship

1.1. The relevant specification of item No.18.17 shall be followed except that this work is for colour washing on ceilings and/or sloping roofs.

2.0. Mode of measurement and payment

2.1. . The relevant specification of item No.18.17 shall be followed except that the rate shall be paid extra over the rate of item 18.17. for providing colour washing on ceilings and/or sloping roofs.

2.2. the rate shall be for a unit of One sq. meter

18.29. Cement washing with Portland cement slurry on undecorated walls surfaces,(one coat) to give a smooth finish including thoroughly brooming the surfaces to remove all dirt,dust,morta Drops and other foreign matter.

1.0 Materials

1.1. Water shall conform to M-I, Portland cement shall conform to M-3

2.0 Workmanship ' •

2.1. The relevant specifications of item No. 18.11 for preparation of surface, scaffolding, application of wash etc. shall be followed except that' the cement wash shall be applied, instead of white wash.

Cement shall be mixed to water toform slurry to the consistency of good ready mix oil paint. The slurry shall be

Applied with brusheds to form a smooth bodied opaque surface.

3. 0 Mode of measurements and payment.

.1. The relevant specifications item No. 18.11 shall be followed.

.2. The rate shall be for a unit of One Sq. metre.

18.30 Extra over item No. 18.29 for every subsequent coat of cement washing with portland cement slurry.

.1 Materials and Workmanship.

.2 The relevant specifications of item No. 18.29 shall be followed except that the work of cement slurry wash shall be provided for every subsequent coats above item No. 18.29 to be applied.

2.0 Mode of measurements and payment.

- .1. The relevant specifications of item No. 18.29 shall be followed except that the rate shall be paid for every subsequent coat applied over and above the rate of item No. 18.29.
- .2. The rate shall be for a unit of One Sq. metre.

18.33. Removing dry or oil bound distemper by washing and scraping and sand papering the wall surface smooth including necessary repairs to scratches complete.

1.0 Materials and Workmanship

1.1. All loose pieces and scales shall be removed by sand papering and surface shall be cleared of all greasy dust, dirt, etc. On decorated wall surfaces. Where heavy scaling has taken place, the entire surface shall be scrapped by means of steel scrapers so as to remove all accumulated distemper, leaving clean surfaces. Necessary repairs to the scratches shall be made as directed.

2.0 Mode of measurements and payment

- .1. The relevant specifications of item No. 18.11 shall be followed.
- .2. The rate shall be for a unit of One Sq. metre.

18.34. Extra over item No. 18.33 for removing dry oil bound distemper on ceiling and sloping roofs.

1.0 Materials and Workmanship

1.1. The relevant specifications of item No. 18.33 shall be followed except that removing dry oil bound distemper from sloping roof/ceiling is to be carried out.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 18.33 shall be followed except that the payment shall be made for removing dry/oil bound distemper from ceiling/sloping roof over and above the rate of item No. 18.33.
- .3. The rate shall be for a unit of One Sq. metre.

18.38. Distemping with dry (water bound) Distemper of approved brand and manufacture (two coats) and of required shade on undecorated wall surfaces to give an even shade, over and including a priming coat of white washing after thoroughly brooming the surface free from mortar droppings and other foreign matters.

.1 Materials

.2 The dry distemper and primer shall be of approved brand and manufacture. The dry distemper shall be of required colour and shade and the same shall conform to I.S. 427-1965. Whiting shall conform to I.S. 63-1964.

.1. Workmanship

.2. Scaffolding: Where scaffolding is required it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well "tied suspended platform (Joolas) may be used for distemping. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floors. For distemping to ceiling proper stage scaffolding shall be erected where necessary.

2.2 Preparation of surface:

2.2.1. The undecorated surface to be distempered shall be thoroughly brushed free from dust, dirt, grease, mortar, droppings and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry at least 2 months before application of distemper.

2.2.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of the colour to be used. The surface shall then be rubbed down again with a fine grades and paper and made smooth. The surface affected by moulds, moss, fungus, algae lichens, efflorescence etc. shall be treated in accordance with I.S.: 2395 (Part I) 1966 before applying

distemper. Any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including tilling up the undulations and then sand papering the same after it is dry.

2.3. Priming coat :

2.3.1. A priming coat of whiting shall be applied as per item No. 18.11 over the prepared surface in case of new work on undecorated surface. No coat of white washing with lime shall be used as a priming coat for distemper.

2.3.2. Application of plaster shall be done as under :

The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

2.3.3. Distemper is not recommended to be applied within six months of the completion of wall plaster.

.4. Proportion of Distemper :

The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturers only. Sufficient quantity of distemper required for one day's work shall be prepared.

.5. Application of Distemper coat :

.1. For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surfaces shall be lightly sandpapered to make them smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of distemper shall

be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

.2. Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.

2.5.3. 15 cm. double bristle distemper brush shall be used. After the day's work, brushes shall be thoroughly washed in hot water with soap solution and hang down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. Protective Measures : The surfaces of doors, windows, floors, articles of furniture etc. and such other parts of the building as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.

.1. Mode of Measurements and payment

.2. Priming coat of distemper primer, scraping of surface spoiled by smoke soot, removal of oil and grease spots, treatment for infection of efflorescences, mouldmoss, fungi, algee and lichens and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.

3.2 All the work shall be measured net in the decimal system as in places subject to the following limits unless otherwise stated hereinafter:

(a) Dimensions shall be measured to the nearest 0.101 m.

(b) Area in individual items shall be works out to the nearest 0.01 sq.m. All work shall be measured in sq.metre. No deduction shall be made for reveals, jambs, soffits, sills etc. of this opening snort for finish around the ends of joints, beams, posts etc.

3.3. Deduction of openings exceeding 0.5 sq.m. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.

(a) When each face of wall is provided with the same finish deductions shall be made for one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that of frame for door, windows, etc.. on which width of reveals less than that of the other side but no deductions shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of the reveal on treated side is less than that on untreated side but if the width of the reveals is equal or more than that of untreated side neither deduction nor additions to be made for reveals, jambs, soffits, sills etc.

.4. In case of openings area exceeding 3 sq.m. each, deduction shall be made for openings, but jambs, sills and soffits shall be measures.

.5. No deduction shall be made for attachments such as casing, conduits, pipes, electric wiring and the like.

.6. Item includes removing nails, making good holes, cracks, patches with materials similar in composition to the distemper.

.7. The rate includes cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading, storing etc.

.8. The rate shall be for a unit of One Sq. Metre.

18.39. Distempering with dry (water bound) distemper of approved brand and manufacture (one coat) and of required shade, on decorative wall surface to give an even shade after thoroughly brushing the surface clean of all grease dirt, loose pieces of scales including preparing the surface and evensand papered smooth. 1.0 Materials and Workmanship:

The relevant specifications of item No. 18.38 shall be followed except that the dry distemper shall be Applied on decorative wall surface in one coat.

2.0 Mode of measurements and payment

.1. The relevant specifications of item No. 18.38 shall be followed.

.2. The rate shall be lor a unit of One sq.metre.

18.40. Extra over item 38 and 39 for every subsequent coat of distemper with dry distemper of approved brand and manufacture.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.38 shall be followed except that there extra work for applying subsequent coat of dry distemper is to be carried out over and above the work of item No. 18.38 and 18.39.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.38 shall be followed except that extra rate shall be paid for every subsequent coat applied over and above the rate of item No. 18.38 and 18.39. .3. The rate shall be for a unit of One sq.metre.

18.41. Extra over item 38 for distemping with dry distemper on ceiling and sloping roofs.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.38 shall be followed except that the dry distemping shall be carried out on ceiling and sloping roofs of undecorated surface.

2.0. Mode of measurements and payment

2.1 The relevant specifications of item No. 18.38 shall be followed except that extra rate shall be paid for carrying out work in ceiling/sloping roof on undecorated surface over and above the rate of item 18.38.

2.2. The rate shall be for a unit of One Sq.metre.

18.42. Extra over item 39 and 40 for distemping with dry distemper on ceiling/sloping roofs.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.39 shall be followed except that the work shall be carried out on ceiling/sloping roofs on decorated surfaces.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.39 shall be followed except that the extra rate shall be paid for the distemping work carried out by dry distemper on ceiling/sloping roofs with decorated surfaces over and above the rate of item No. 18.39.

.3. The rate shall be for a unit of One sq. metre.

18.44. Disgtempering (two coats) with oil bound distemper of approved brand and manufacture and of required shade on undecorated wall surfaces to give an even shade, over and including a priming coat with distemper primer of approved brand and manufacture after thoroughly brushing the surface free from mortar dropping and other foreign matter and also including preparing the surface even and sand papered smooth.

.1. Materials

.2. Oil bound washable distemper and primer shall be of approved brand and manufacture. The distemper shall be of required colour and shade and the same shall conform to I.S. : 428-1969.

.1. Workmanship

.2. Scaffolding : Where scaffolding is required, it shall be erected in such way that as far as possible no part of scaffolding shall rest against the surface to be distemper. A properly secured strong and well tied suspended platform (joola) may be used for distemping. Where ladders are used, pieces

of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floor, for distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2 Preparation of surface :

.1. The undecorated surface to be distempered shall be thoroughly brushed from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for atleast 2 months before applications of distemper.

.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S. 2395 (Part-D 1966). Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

2.3. Priming coat :

2.3.1. A priming coat of distemper primer of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.

2.3.2. Application of primer shall be done as under : the primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for atleast 48 hours before oil bound distemper or paint is applied.

2.3.3. Oil bound distemper is not recommended to be applied within six months of the completion of wall plaster.

2.4. Preparation of oil bound distemper:

2.4.1. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a day's work shall be prepared.

2.5. Application of distemper coat :

2.5.1. For undecorated surface, after the primer coat is dried for atleast 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of atleast 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

.2. Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.

.3. 15 cm. double bristled distemper brush be used. After day's work brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. A Protective Measurement : The surface of doors, windows, floors, articles or furniture etc. and such other parts of the buildings as are not to be distempered shall be protected from being splashed upon. Such surface shall be cleaned of distemper splashscr if any.

3.0 Mode of measurements and payment

.1. Priming coat of distemper primer, scraping of surface spoiled by sunk soots, removal of oil and grease spots, treatment for infection of efflorescence, mould moss, fungi, algae and lichen and patch re-pairs to plaster shall be included in this item for which nothing extra shall be paid.

.2. All the work shall be measured net in the decimal system as in place subject to the following limits unless otherwise slated hereinafter ;

(a) Dimensions shall be measured to the nearest 0.01 m.

(b) Area in individual items shall be worked out to the nearest 0.01 sq.m. All work shall be made for ends of joints, beams, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts, etc.

3.3. Deductions of opening exceeding 0.5 sq.m. but not exceeding 3 sq.m. each shall be made as follows and net addition shall be made for reveals, jambs, soffits etc. of these openings :

(a) When both the faces of walls are provided with same finish, deductions shall be made for one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for doors, windows, etc. on which width of reveal is less than that of the other side but no deduction shall be made uii the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 5(Wr of area of opening on each face shall be made from area of finish .

(c) When only one face of wall is treated and the other face is not treated, full deductions shall be made if the width of the reveal on treated side is less than that on untreated side but il the width of the reveal is equal or more than that on untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc. '

.4. In case of opening of area exceeding 3 sq.m. each deduction shall be made for openings but jambs, sills and soffits shall be measured.

.5. No deductions shall be made for attachments such as casings, conduits, pipes, electric wiring and the like'

.6. Item includes removing nails, making good holes, cracks, patches with materials similar in composition of distemper.

.7. The rates include cost of all materials, labours, scaffolding, protective measures etc. involved in all the operations. described above. This shall also include conveyance, delivery, handing, unloading, scoring work etc. :

.8. The rate shall be for a unit of One sq.metre.

18.45. Distempering (two coats) with oil bound washable distemper of approved brand and manufacture and of shade required on undecorated wall surfaces to give an even shade, over and including a priming coat with alkali resistance primer of approved brand and manufacturer after thoroughly brushing the surface free from mortar droppings and other foreign matter and also including preparing the surface even and sand-papered smooth.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.44 shall be followed except that' the primer of alkali resistance primer of approved brand and manufacture shall be used instead of distemper primer.

.1. Mode of measurements and payment

- .2. The mode of measurements and payment shall be the same as for item No. 18.44 above.
- .3. The rate shall be for a unit of One sq. metre.

18.46. Distempering (one coat) with oil bound washable distemper of approved brand of required shade on decorated wall surfaces to give an even shade after thoroughly brushing the surfaces clean of all grease, dirt, loose pieces of scales and including distempering with oil bound washable distemper of preparing the surface even and smooth.

.1. Materials and Workmanship

- .2. The relevant specifications of item No. 18.44 shall be followed except that the distempering with oil bound washable distemper shall be carried out on decorated wall surfaces in one coat.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 18.44 shall be followed.
- .3. The rate shall be for a unit of One sq. metre.

18.47. Extra over items 18.44 to 18.46 for every subsequent coat of distempering with oil bound washable distemper of approved brand and manufacture.

.1. Materials and Workmanship

- .2. The relevant specifications of item No. 18.44 shall be followed except that this work is for providing extra coat of oil bound distempering over and above two coats of distempering.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 18.44 shall be followed except that the extra rate shall be paid over and above the rate for every subsequent coats over two coats of item 18.44 and 18.46.
- .3. The rate shall be for a unit of One sq. metre.

18.48. Extra over item 18.44 and 18.45 for distempering with oil bound washable distemper on ceiling and sloping roofs.

1.0. Materials and Workmanship

The relevant specifications of item No. 18.44 shall be followed except that the distempering shall be carried out on ceiling/sloping roofs,

2.0. Mode of measurements and payment

2.1.1. The relevant specifications of item No. 18.44 shall be followed except that the extra rate shall be paid for carrying out distempering work on ceiling/sloping roofs over and above the rate of item No. 18.44 and 18.45.

2.2. The rate shall be for a unit of One sq. metre.

18.49. Extra over item 18.46 and 18.47 for every subsequent coat of distempering on ceiling and sloping roofs.

.1. Materials and Workmanship

- .2. The relevant specifications of item No. 18.44 shall be followed except that the distempering work shall be carried out for subsequent coats over item No. 18.46 and 18.47.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 18.46 shall be followed except that the extra rate shall be paid for every subsequent coat of distemper applied over and above the rate of item No. 18.46 and 18.47
- .3. The rate shall be for a unit of One sq. metre.

18.51. Finishing wall with water proofing cement paint of an undecorated wall surfaces (two coats) to give an approved brand and manufacturer and of required shape, even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.

.1. Materials

.2. The water shall conform to M-I, Cement water proofing paint shall conform to I.S. 5410-1969

.1. Workmanship

.2. Scaffolding: The relevant specifications of item No. 18.11 shall be followed.

.3. Preparation of surface :

The relevant specifications of item 18.11 shall be followed except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement Water proofing paint is applied.

2.3. Preparation of paint :

Portland cement shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brush able consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, the manufacturer's instructions shall be followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thicken, affecting (lowering and finish. The lids of cement paint drums shall be kept tightly when not in use.

2.4. Application of Paint :

.1. No painting shall be done when the paint is likely to be exposed to a temperature of below 70 C within 48 hours after application.

.2. When weather conditions are such as to cause be carried out "in the shadow" as far as possible. This helps (the proper hardening of the paint film by keeping the surface moist for a longer period.

.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

.4. For undercoated surfaces, the surface shall be treated with minimum two coats of water proof cement paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the preceding coat shall be slightly moistened before applying the subsequent coat. The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops etc.

.6. The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessively heavy brush marks. The lamps shall be well brushed out. Water proof cement paint shall not be applied on surfaces already treated with white wash, colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

.5. Curing : Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coats. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application.

.6. Protection measures shall be taken as per Mm No. 18.11 para

2.6. 3. 0. Mode of Measurements and payment

.1. The relevant specifications of item No. 18.11 shall be followed.

.2. The rate shall be for a unit of One sq.metre. 18.53. Extra over item 18.51 for every subsequent coat of water proofing cement paint of approved brand and manufacture.

.1. Materials and Workmanship.

.2. The relevant specifications of item No. 18.51 shall be followed except that the work is for applying subsequent coat of cement water proofing paint.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.51 shall be followed except that the extra rate shall be paid for applying every subsequent coat of cement water proofing paint over and above the rate of item No. 18.51.

.3. The rate shall be for a unit of One sq.metre.

18.54. Extra over item 18.51 for finishing with cement paint an ceiling/sloping roofs.

.1. Materials and Workmanship.

.2. The relevant specifications of item No. 18.51 shall be followed except that the cement water proofing paint shall be applied on ceiling and sloping, roofs.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.51 shall be followed except the extra shall be paid for applying cement water proofing paint on ceiling and sloping roofs, over and above the rate of item No. 18.51."

.3. The rate shall be for a unit of One sq. metre.

18.56. Extra over item 18.53 shall be followed except that the work shall be carried out for subsequent coat on ceiling and sloping roofs.

.1. Materials and Workmanship.

.2. The relevant specifications of item No. 18.51 shall be followed except that the work shall be carried out for subsequent coat on ceiling and sloping, roofs.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.53 shall be followed except that extra rate shall be paid for every subsequent coat applied with cement water proofing paint over and above the rate of item No, 18.53.

18.57. Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undercoated wall surfaces to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand paper smooth.

1.0. Materials

Water shall be conform to VI-i, The plastic emulsion shall conform to IS. : 5411-1969(part-I) '

2.0 Workmanship .

.1. Scaffolding: The relevant specifications of item No. 18.11 para 2.1. shall be followed.

.2. Preparation of surface : The relevant specifications of item NO. 18.44 para 2.2. shall be followed

.3. Preparation of Mix .

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer's instructions.

2.4. Applications :

.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

.2. The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

.3. The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat has become sufficiently hard to resist marking by brushing being used.

.4. The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

2.5. Precautions ,

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

(b) In the preparation of walls for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surface treated with emulsion paint shall not be done within 3 to 4 weeks of application.

2.6 Protective measures : The relevant specifications of item No. 18.17 para 2.3. shall be followed.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.11 shall be followed.

.3. The rate shall be for a unit of One sq. metre.

18.59. Extra over item No. 18.57 for every subsequent coat of wall painting with plastic emulsion paint of approved brand.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 18.57 shall be followed except that the painting work shall be for subsequent coat of plastic emulsion paint.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.57 shall be followed except that the extra rate shall be paid for every subsequent coat- of plastic emulsion paint applied over and above the rate of item No. 18.57.

.3. The rate shall be for a unit of One sq. metre.

18.60. Extra over item 18.57 for painting with plastic emulsion paint of approved brand on ceiling and sloping roofs.

1.0. Materials and Workmanship.

1.1. The relevant specifications of item No. 18.57 shall be followed except that the painting shall be done on ceiling and sloping roofs.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 18.57 shall be followed except that the extra payment shall

be made for applying plastic emulsion paint on ceiling and sloping roofs over and above the rate of item NO. 18.57.

.3. The rate shall be for a unit One sq. metre.

18.62. Extra over item 18.59 for paint on ceiling and sloping roofs.

.1. materials and Workmanship

.2. The relevant specifications of item No. 18.57 shall be followed except that the work for subsequent coat of plastic emulsion paint shall be carried out on ceiling and sloping roofs.

.1. Mode of measurement and payment

.2. The relevant specifications of item No. 18. 57 shall be followed except that the extra rate shall be paid for carrying out painting on sloping roofs and ceiling with plastic emulsion paint over and above the rate of item No.

18.59.

.3. The rate shall be for a unit of One sq. metre.

SECTION -19

Paintings & Polishing

19.7. Painting two coats excluding priming coat on new steel and other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface of all dirt, dust and other foreign matter.

1.0 Materials

The enamel paint shall conform to M-44.B...

.1. Workmanship

.2. General: The materials required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums, kegs, etc. with seal unbroken.

2.1.2. All materials not in actual use shall be kept properly protected; lids of containers shall be kept to prevent formation of skin. The materials which have become state or flat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

.3. If for any reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used

.4. The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavorable weather and all the surface shall be thoroughly dry before painting work is started.

2.2. Application of paint :

.1. Brushing operations are to be adjusted to the spreading capacity advised by the manufacture of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the

first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat. .2. Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand-paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in

shade and shall be got approved from Engineer-in-charge before next coat is started.

.3. Each coat except the last coat shall be lightly rubbed down with sand-paper of fine pumice stone and cleaned of dust before the next coat is applied. No hairmarks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work.

.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved best quality brushes shall be used.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 19.12 shall be followed for mode of measurements and payment. The rate is excluding priming coat.

.3.4. The rate shall be for a unit of One sq.metre.

19.11. Painting one coat (excluding priming coat) on previously painted steel and other metal surface with enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matter.

.1. Materials and Workmanship.

.2. The relevant specification of item No. 19.7 shall be followed except that painting shall be carried out in one coat with enamel paint on previously painted steel and metal surface.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.7 shall be followed.

.3. The rate shall be for a unit of one sq.metre.

19.12. Applying priming coat new steel and other metal surface after and including preparing the surface by thoroughly cleaning oil, grease, dirt and other foreign matter and secured with brushes, fine steel, wool scrapers and sand paper, with ready mixed priming paint, brushing red lead.

.1. Materials

.2. The ready mixed primer, brushing red lead shall conform to I.S. 102-1962.

.3. The thinner (linsed oil) shall conform to I.S.75-1973. If for any reason, thinning is necessary in case of ready mix paint, the brand and of thinner recommended by manufacturer shall be used.

.1. Workmanship

.2. Preparation of surfaces : The surfaces painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers, and paper etc. This surface shall then be wiped, finally with mineral turpentine which shall also remove grease and perspiration of hand marks. The surface shall then be allowed to dry.

.3. Application of primer :

.1. After the preparation of the surface painting shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing, alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

.2. During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush shall be opened up by striking the brush against portion of the unpainted surface with the end of the bristles, held at right angle into a paint container. The priming coat shall be allowed to dry completely before painting is started. .3. No hair marks from the brush or clogging at paint puddles in the corner of panels angles of moulding etc. shall be left on the work.

.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

.5. The container when not in use shall be kept close and free from air so that paint does not thicken and also be kept guarded from dust.

.1. Mode of measurements & payment

.2. The new steel and other metal surface shall be measured under this item.

.3. All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter.

(a) Dimensions shall be measured to the nearest 0.01 metre.

(b) Areas shall be worked out to the nearest 0.01 sq.metre.

3.3. No deductions shall be made for opening not exceeding 0.5 sq.mt. Each and addition shall be made for painting to headings, moldings, edges, jambs, soffits, sills etc. of such opening.

3.4. In case of fabricated structural steel and iron work, priming coat of paint shall be included with . Fabrication. In case of trusses if measured in sq.m. Compound girders, stanchions,, lattices, girder and Similar work, actual area shall be measured in. sq.m. and no extra shall be paid for painting on bolts heads, nuts," washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at side.

3.5. The different surface shall be grouped into one general item, areas of uneven surface being converted into equivalent plain areas in accordance's with the table given as per Annexure - II for payment. '

3.6. The rate shall be for a unit of One sq.metre.

19.15. Extra over item No. 19.7 and 19.11 for every subsequent coat of paint.

.1. Materials and Workmanship.

.2. The relevant and specifications of item No. 19.7 shall be followed except that the work of painting shall be carried out for subsequent coat.

.1. Mode of measurements' and payment

.2. The relevant specifications of item No. 19.7 shall be followed except that the extra rate shall be paid for every subsequent coat of paints applied over and above the rate of item No. 19.7 and 19.11.

.3. The rates shall be for a unit of One sq.metre.

19.19. Painting two coats (excluding priming coat) on new steel and other metal surfaces with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matter.

1.0. Materials

Synthetic enamel paint shall conform to I.S. 1932-1964.

.1. Workmanship

.2. The relevant specification of item No. 19.7 shall be followed except that the painting shall be carried out with synthetic enamel paint.

.1. Mode of measurements & payment

.2. The relevant specification of item No. 19.7 shall be followed.

.3. The rate shall be for a unit of One sq.metre.

19.21. Painting one coat (excluding priming coat) on previously painted steel and other metal surface with synthetic enamel paint brushing to give an shade including cleaning the surface of all dirt, dust and other foreign matter.

.1. Materials and Workmanship.

.2. The relevant specification of item no. 19.19 shall be followed except that the painting shall be carried out on previously painted steel and other metal surfaces using synthetic enamel paint in one coat.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.19 shall be followed.

.3. The rate shall be for a unit of One sq. metre.

19.13. Extra over item No. 19.19 and 19.21 for every subsequent coat of paint.

.1. Materials and Workmanship.

.2. The relevant specification of item No. 19.19. shall be followed except that the work shall be carried out for subsequent coat of paint.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.19 shall be followed except that the extra rate shall be paid for applying subsequent coat of oil paint over and above the item No. 19.19 and 19.21. ,

19.50.(B) Painting two coats (excluding priming coat) on external surfaces of new rain water soil, waste and vent pipes and fittings with ready mixed bituminous paint, brushing, black anticorrosive to give an even shade including cleaning of all dirt, dust and other foreign matter (75 mm dia.).

.1. Materials

.2. Ready mixed bituminous paint shall conform to I.S. 158 : 1968.

.1. Workmanship

.2. The relevant specification of item No. 19.7 shall be followed except that the painting work of external surfaces of 75 mm dia, rain water pipe, soil, waste, and vent pipe and fittings with ready mixed bituminous shall be for a unit of one running metre.

19.50 (C) Painting two coats (excluding priming coat) on external surface of rain water, soil, waste and vent pipe and fittings with ready mixed bituminous paint brushing, black anticorrosive to give an even shade including cleaning off all dirt, dust and other foreign matter : 100 mm. dia

.1. Materials and Workmanship

.2. The relevant specification of item No. 19.50 (B) shall be followed except that the pipes to be painted on is 100 mm. dia. metre. 2.. ode of measurements and payment

.1. The relevant specification of item No. 19.50 (B) shall be followed. The rate is excluding the cost of priming coat but including cost of painting all fittings coming in line.

.2. The rate shall be for a unit of one running metre.

19.59. (B) Applying priming coat over new wood and wood based surfaces after and including preparing the surface is thoroughly, cleaning oil, grease, dirt and other foreign matter, sand papering and knotting : Ready mixed paint, brushing wood primer pink.

1.0. Materials

1.0. The ready mixed paint, brushing, wood primer pink shall conform to I.S. 3536-1966.

2.0. Preparation of Surfaces:

.1. All wood work shall be dry and free from any foreign matter incidental to building operations. Nails shall be punched well below the surface to provide a firm key for stopping. Mouldings shall be carefully smoothened with abrasive paper and projecting fibers shall be removed. Flat portions shall be smoothened off with abrasive paper used across the grain prior to painting and with the grain prior to staining or if the wood is to be left in its natural colour, wood work which is to be stained may be smoothened by scraping instead of by glass papering if so required.

.2. Any knots, resinous, stricks or blueish sap wood that are not large enough to justify cutting out shall be treated with two coats of pure shellac knotting applied thinly and extended about 25 mm. beyond the actual area requiring treatment.

2.2. Application of primer:

2.2.1. The relevant specification of item No. 19.12 (A) shall be followed for application of primer.

.1. Mode of measurement & payment

.2. The relevant specification of item No. 19.12 shall be followed excel that work done on wood and

wood based surfaces shall be paid under this item.

.3. The rate shall be for a unit of One sq.metre.

19.59. (D) Applying priming coat over new wood and wood based surface after and including preparing the surface by thoroughly cleaning oil, grease, dirt and other foreign matter sand papering and knotting: Ready mixed paint brushing priming, for enamel.

.1. Materials

.2. The ready mixed paint for brushing priming for enamels wood shall conform to I.S. 106-1962.

.1. Workmanship

.2. The relevant specification of item No. 19:59 (B) shall be followed except that ready mixed paint brushing priming lor enamel shall be used instead of ready mixed paint brushing wood primer pink.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.12 shall be followed.

.3. The rate shall be for a unit of One Sq.metre.

19.62.(B) Extra -over item 19.59 (B) for every subsequent coat of priming coat. Ready mix paint, brushing wood primer pink.

.1. Materials and Workmanship.

.2. The relevant specification of item No. 19.59(B) shall be followed except that the painting work shall be carried out with ready mix paint, brushing wood primer pink for subsequent coai

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.59 (B) shall be followed except that the extra rate shall be paid for every subsequent coat applied with Ready mix paint, brushing wood primer pink over and above the rate of item No. 19.59 (B) 19.62 (D) Extra over item No. 19.59 (D) for every subsequent coat of reay mix paint brushing priming for enamel.

.1. Materials and Workmanship,

.2. The relevant specifications of item No. 19.59 (D) shall be followed except that the painting work shall be carried out with ready mix paint brushing priming for enamel.

.1. Mode of measurements and .payment

.2. The relevant specification of item No. 19.59 (D) shall be followed except that the extra rate shall be paid for every subsequent coats of priming coats of priming coat with ready mixed paint, brushing priming lor enamel

.3. The rate shall be for a unit of One sq.metre.

19.71. Painting two coats (excluding priming coat) on new wood and wood based surfaces with enamel paint interior to give an even shade including cleaning the surface off all dirt, dust and other foreign matter sand papering and stopping.

.1. Materials

.2. The enamel paint shall conform to I.S. 133-1975.

.1. Workmanship.

.2. The relevant specification of 19.16 shall be followed for general and application of paint, except that the enamel paint shall be used for painting on new wood/wood based surfaces.

.3. In painting doors and windows, the putty, round the glass panes also be painted but care shall be taken to see that no paint, stain etc. are left on the glass. Top of shutters and surfaces in similar hidden locations shall not be left out in painting.

.1. Mode of measurements and payment

.1. The relevant specification of item No. 19.12 shall be followed, for mode of measurements and payments. The rate excludes cost of priming coat.

.2. The rate shall be for a unit One sq.metre.

19.73. Painting one coat (excluding priming coat) on previously painted wood and wood based surfaces with enamel paint to give even shade including cleaning of all dirt, dust and other foreign matter.

.1. Materials and Workmanship.

.2. The relevant specifications of item No. 19.71 shall be followed except that the painting work shall be carried out on previously painted wood and wood based surfaces with enamel paint to give even shade in one coat.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.71 shall be followed.

.3. The rate shall be for a unit of One sq.metre.

19.75. Extra over item 19.71 and 19.73 for every subsequent coat of paint.

.1. Materials and workmanship.

.2. The relevant specification of item No. 19.71 shall be followed except that painting work shall be for subsequent coat with paint,

2.0. Mode of measurements and payment

.1. The relevant specification of item No. 19.71 shall be followed except that the extra rate shall be paid for every subsequent coat, applied over and above the item No. 19.71 and 19.73.

.2. The rate shall be for a unit of One sq.metre.

19.77. Painting two coats (excluding priming coat) on new wood and wood based surfaces with ready mixed paint brushing, oil gloss, semi-gloss, to give an even shade including cleaning of all dust, dirt and other foreign matter sand papering and stopping.

1.0. Materials

The ready mixed paint shall conform to M-44. The ready mixed brushing gloss, semi-gloss shall conform to I.S. 129-1962 and I.S. 117-1964.

.1. Workmanship

.2. The relevant specification of item No. 19.71 shall be followed for general and applications of paint. except that ready mixed paint brushing, oil gloss and semi-gloss shall be used of approved colour and shade instead of enamel paint.

3. 0. Mode of measurements and payment :

.1. The relevant specifications of item 19.12 shall be followed for measurements and payment. The rate

excludes cost of priming coat.

.2. The rate shall be for a unit of One sq.metre.

19.84. Varnishing two coats (excluding priming coat_) on new wood and wood based surfaces undercoating with flatting varnish and finishing coat with varnish to give an even surface cleared of all dirt, dust and sand papering so as to produce a smooth dry surface.

1.0. Materials

The varnish shall conform to I.S. 338-1962.

2.0. Mode of measurements & payment

.1. The surface to be varnished shall be prepared to produce a smooth, dry neat surface, the previous coat of paint or stair, if any shall be allowed to dry and rubbed down slightly wiped off and allowed to dry.

.2. The operation of varnishing calls for careful attention to cleanliness. All dust and dirt shall be removed from the surface to be varnished and also from the neighborhood. If surfaces are dampened to avoid raising of dust, they shall be allowed to dry thoroughly before varnishing is

commenced. Damp atmosphere and draughts shall be avoided. For exterior work, a normal dry day should be chosen. Exposure to extreme of heat or cold or to a damp atmosphere will spoil the work.

.3. In handling and applying and applying varnish care should be taken to avoid forming froth or air bubbles. Brushes and containers shall be kept scrupulously clean.

2.2. Application

2.2.1. The varnish shall be applied liberally with a brush and spread evenly over a portion of the surface with a short light strokes to avoid frothing. It shall be allowed to flow out while the next section is being laid in. Excess varnish then be scrapped out of the brush and the first section be crossed, recrossed and then laid off lightly. Too much or too little varnish left on the surface will mar the appearance of the finish. The varnish, once it has begun to set, shall not be retouched. If a mistake is made, the varnish shall be removed and the work started afresh.

2.2.2. In case of two coats of varnish work, the first shall be hard drying, under coating or flattening varnish this shall be allowed to dry hard and then be flattened down before applying the finishing the finishing coat 11 two coats are applied, sufficient time shall be allowed between two coats.

2.2.3. When Hat varnish is used for finishing a preparatory coat of hard drying under coating or flattening varnish shall be first applied and shall be allowed to harden thoroughly. It shall then be lightly rubbed down before the Hat varnish is applied. Section of the work such as panels, shall be cut in clearly, so as to avoid any over lapping during applications, as this is likely to impart some measure, of gloss to partially dried area, worked up in lapping. On larger area of the flat varnish shall be applied rapidly and the edges of each patch applied shall not be allowed to set but shall be followed up whilst in free working conditions.

.1. Mode of measurements & payment

.2. The relevant specifications of item 19.71 shall be followed.

.3. The rate shall be for a unit of One sq. metre.

19.86. Extra over item 19.84 for every subsequent coat of varnish. 1.0. Materials and Workmanship.

1.1. The relevant specifications of item 19.84 shall be followed except that the work shall be for subsequent coat of varnishing.

.1. Mode of measurements and payment

.2. The relevant specifications of item 19.84 shall be followed except that the extra rate shall be paid for every subsequent coat of varnishing done over and above the rate of item No. 19.84.

.3. The rate shall be for a unit of One sq.metre.

19.87. Polishing with French polish on new wood and wood based surface to give an even surface including cleaning the surface of all dirt, dust and sand papered smooth and including a coat of wood filler.

.1. Materials

.2. The French polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials: (i) Denatured spirit of approved quality, (ii) Chandras (iii) Shellac (iv) Pigment. The French polish so prepared shall conform to I.S. 348-1968.

.1. Workmanship

.2. Preparation of surface : •

2.1.1. All unevenness shall be rubbed down to smoothness with sand paper and the surface shall be well dusted. The pores in the wood shall be filled up with filler made of a paste or whiting in water or methylated spirit (with a suitable pigment like Burnt sienna or number if required): Otherwise the French polish will get absorbed and a good gloss will be difficult to obtain.

2.2. Application

2.2.1. A pad of wooden cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with polish and rubbed hard on the surface in a series of overlapping circles applying the polish sparingly but uniformly over the entire area to give an even surface. A trace of lin seed oil on the face of the pad may be added which shall facilitate this operation. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cloth, slightly dampened with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall present a uniform texture and high gloss.

3. 0. Mode of measurements and payment

.1. The relevant specifications of item 19.12 shall be followed for mode of measurements and payment.

.2. The rate includes cost of wood filler etc. complete.

.3. The rate shall be for a unit of One sq.metre.

19.88. Polishing with French polish on previously polished wood and wood based surface to give an even surface including cleaning the surface of all dirt, dust and sand papered smooth including a coat of wood filler.

.1. Materials and Workmanship.

.2. The relevant specifications of item 19.87 shall be followed except that the French polish shall be applied on previously polished wood and wood based surface.

.1. Mode of measurements and payment

.2. The relevant specifications of item 19.87 shall be followed.

.3. The rate shall be for a unit of One sq. metre.

19.91. Applying wax polish on new wood work and wood based surfaces with bee's wax polish in proportion 2:1:5:1:0.5 (2 Bees Wax : 1.5 linseed oil: 1 Turpentine oil: 0.5 varnish by weight) by give an even surface including cleaning the surface of all dirt, dust and sand papered smooth.

1.0. Materials

Bee's Wax shall conform to I.S. : 1504-1968. Linseed oil shall conform to I.S.: 75-1967. Turpentine shall

Conform to I.S. 83-1950, Varnish shall conform in I.S.: 337-1952.

.1. Workmanship.

.2. Preparation of bees wax :

.1. In case of bee's wax it shall be prepared locally with following specifications :

.2. Pure bees wax free from paraffin or other adulterants shall be used. The polish shall be prepared from mixture of bees wax, linseed oil, turpentine, and varnish in proportion 2:1 5:1: 0.5 by weight. The bees wax and boiled linseed oil shall be heated over a slow fire. When the wax is completely dissolved the mixture shall be cooled till it is just warm and turpentine and varnish added to

it in the required proportions and entire mixture shall be well stirred. **2.2. Preparation of surfaces:**

2.2.1. The surface to be waxed shall be prepared to produce a smooth, dry, matt surface. Previous coat of paint or stain if any shall be allowed to dry and be rubbed down lightly wiped off and allowed to dry. All dust and dirt shall be removed from the surface to be waxed, and also from the neighborhood. Damp atmosphere and draughts shall be avoided. For waxing, normal dry day shall be chosen.

2.3. Application:

2.3.1. The polish shall be applied evenly with clean soft pad of cotton cloth in such a way that the surface is completely and fully covered. The surface shall then be rubbed continuously for half an hour. After well rubbing in one coat of wax polish, the work shall be covered with dust proof sheet. (Cloth for preventing dust falling on the work). Subsequent coat shall be applied after the surface is

quite dry and shall be rubbed -off with soft flannel until the surface has assumed a uniform gloss and in dry showing no sign sickness.

2.3.2. The final polish depends largely on the amount of rubbing which shall be continuous and with uniform pressure with frequent changes in the direction.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 19.12 shall be followed.

.3. The rate shall be for a, unit of One sq.metre.

19.92. Applying wax polish on previous wax polished wood and wood based surfaces with bees wax polish in proportion of 2:1:5:1:0.5 (2 Bees Wax : 1.5 linseed oil : 1 Turpentine : 0.5 Varnish by m eight) to give an even surface including cleaning the surface of all dirt, dust and sand papered smooth.

.1. Materials and Workmanship.

.2. The relevant specifications of item No. 19.91 shall be followed except that the wax polishing shall be carried out on previously wax polished wood and wood based surfaces with bees wax polish.

.1. Mode of measurements and payment.

.2. The relevant specifications of item No. 19.91 shall be followed.

.3. The rate shall be for a unit of One sq.metre.

19.98. Coal tarring two coats on new wood and wood based surf pees using 0.15 and 0.12 liters of coat tar per sq.m. In the first and second coat respectively to five an even shade including cleaning of all dirt, dust and other foreign matter:

1.0 Materials:

The coal tax shall conform to I.S. - 290-1961. '

.1. Workmanship.

.2. 200 cms. of unslaked lime shall be added to every liter of coal tar and heated till it begins to bolt. It shall then be taken off the fire and kerosene oil added to if slowly at the rate of 1 part kerosene oil and 6 parts or more parts of coal tar by volume and stirred thoroughly. The addition of lime is for preventing the tar from runnings.

.3. Preparation of Surface :

2.2.1. The surface to be painted shall be allowed to dry sufficiently. Any exciting fungus or mould growth shall be completely removed. All major cracks of defects in the plaster shall be cut out and made good before primer is applied holes and undulations shall be filled up with plaster of Paris and rubbed smooth.

2.3. Application of paint:

2.3.1. The coal tar shall be applied as per relevant specifications of applying mixed paint item No. 19.7 except coal tarring is used instead of enamel paint.

.1. Mode of measurements & Payment

.2. The relevant specifications of item No, 19.12 shall be followed.

.3. The rate shall be for a unit of One sq.metre.

19.119(1) Writing letter of figures on any surface with black Japan paint (stops, comas, hyphens' and the like not to be measured and paid for separately): Block (letters/figures).

.1. Materials

.2. Ready mixed the black Japan paint shall conform to I.S. 341-1952.

.1. Workmanship

.2. The letters and figures shall be to the heights and widths as per approved drawings or as directed. These shall be stenciled or drawn in pencil and got approved before painting. They shall be of uniform size and finished neatly. The edges shall be straight or in pleasant smooth curves.

.1. Mode of measurements and payment

.2. Letters, figures and similar items etc. stops, commas, hyphens, and the like shall be deemed to be included in the item.

.3. The rate per cm. height of letter shall hold good irrespective of width of the letters or figures or the thickness of the lettering.

.4. The rate shall be for a unit of per letter per cm. height.

19. 1 19(11) Writing letter of figures on any surface with black Japan paint (Stops* commas, hyphens and The like not to be measured and paid for separately: Indian (Letters/Figures).

1.0. Materials and Workmanship

The relevant specifications of item No. 19.119(1) shall be followed except the writing of letter shall be Indian letters/figures.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.119(1) shall be followed.

19.126(1) Painting lines, dashes, arrows, letters etc. on roads, airfields and like in two coats with road marking paint, brushing, including cleaning the surface of all dirt, dust and other foreign matter : Over 10 cms. in width.

.1. Materials

.2. The road marking paint shall conform to I.S. 164-1951.

.1. Workmanship

.2. The relevant specification of item No. 19.119(1) shall be follows except that the painting lines, dashes, arrows and letters on roads, air fields and like shall be carried out with road marking paint in two coats : over 10 cms. in width.

3.0. Mode of measurements and payment

.1. The relevant specification of item No. 19.119 (I) shall be followed.

.2. The rate shall be for unit of One sq. metre.

19.126(11) Painting lines, dashes, arrows, letters etc. on roads, fields and like in two coats with road Marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter Upto 10 cms. in width.

1.0. Materials and Workmanship

1.1. The relevant specification of item No. 19.126(1) shall be followed except that painting work shall be upto 10 cms. width.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.119(1) shall be followed.

.3. The rate shall be for a unit of one running metre.

19.127(A) Painting lines, dashes, arrows, letters etc. on roads, airfields, and like in one coat with road marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter : Over 10 cms. in width.

1.0. Materials and Workmanship

The relevant specification of item No. 19.126(1) shall be followed except that the painting shall be done in One coat over 10 cms. in width.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 19.126(1) shall be followed.

.3. The rate shall be for a unit of One sq. metre.

19.127. (B) Painting lines, dashes, arrows, letters etc. on roads, airfields and like in one coats with road marking paint brushing including cleaning the surface of all dirt, dust and other foreign matter: Upto 10 cms. in width.

.1. Materials and Workmanship

.2. The relevant specifications of item No. 19.126(1) shall be followed except that the painting shall

be done in one coat upon 10 cms. In width.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 19.126(1) shall be followed.

.3. The rate shall be for a unit of the running metre.

SECTION-20

Demolition & Dismantling

20.1. (i) Demolition and disposal of unserviceable materials with all leads and lifts : Lime Concrete :

.1. Workmanship

.2. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

.3. The demolition shall always be planned before hand and shall be done in reverse order of the one

in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demolition.

.4. Necessary propping, shoring and under pinning shall be provided for the safety of the adjoining work or property. Which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining property?

.5. Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.

.6. Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.

.7. All materials obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.

.8. Any serviceable materials obtained during dismantling or demolition shall be separated out and stacked properly as directed with all lead and lift. All unserviceable materials, rubbish etc. shall be stacked as directed by the Engineer-in-charge.

.9. On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.

.1. Mode of measurements and payment

.2. Measurements of all work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work.

.3. All work shall be measured on decimal system as fixed in its place subject to the following limits, unless otherwise stated hereinafter: (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Areas shall be worked out to the nearest 0.01 sq.mt. (c) Cubical contents shall be worked out to the nearest 0.01 Cu.m.

.4. The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures where considered necessary.

.5. The rate shall be for a unit of one cubic metre.

20.1. (ii) Demolition and disposal of unserviceable materials with all leads and lifts : unreinforced cement Concrete.

1.0. Workmanship

The relevant specifications of item 20.1. (i) Shall be followed except that the unreinforced cement concrete work is to be demolished instead of" lime concrete.

.1. Mode of measurements and payment

.2. The relevant specification of item 20.1.(i) shall be followed **2.2** The rate shall be for a unit of one cubic metre.

30.3. Demolition including stacking of serviceable materials disposal of unserviceable materials with all leads and lifts : R.C.C. Work.

.1. Workmanship

.2. The relevant specifications of item 20.1.(i) shall be followed except that demolition of R.C.C. work is to be done.

.1. Mode of measurements and payment

.2. The relevant specifications of item 20.1 (i) shall be followed except that the demolition of reinforced concrete structure is to be done. The unserviceable materials shall be disposed of at all leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement.

.3. The rate shall be for a unit of one cubic metre.

20.11. (ii) Demolition of brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all leads and lifts : in lime mortar.

.1. Workmanship

.2. The relevant specifications of item No. 20.1.(i) shall be followed except that demolition of brick or stone masonry in lime mortar is to be done.

.1. Mode of measurements and payment

.2. The relevant specification of item No. 20.1. (i) shall be followed except that the wall and independent piers or columns of brick or stone masonry shall be measured in cubic metres. All copings, corbels, cornices and other projections shall be included with the wall measurements.

.3. In measuring thickness of plastered walls, the thickness of plaster shall be included. The unserviceable materials shall be disposed off with all lead and lift. Ashlar face stones dressed stone etcf., if required to be taken down intact shall be dismantled and measured separately in cubic metres.

.4. The rate is exclusive of cleaning of bricks or stones. Honey comb works or hollow block walling shall be measured as solid.

.5. The rate shall be for a unit of one cubic metre.

20.11. (Hi) Demolition of brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all leadsx and lifts: in cement mortar.

.1. Workmanship

.2. The relevant specifications of item No. 20.11 (ii) shall be followed. The unserviceable materials shall be stacked as directed by Engineer-in-charge with all leads and lifts.

20.22. Demolition in terrace including stacking of serviceable material and disposal of u n s e r v i c e a b l e materials with all lead and life : Brick tiles covering

.1. Materials

.2. The relevant specifications of item No. 20.1. (i) shall be followed except that the demolition of terrace brick tiles is to be done.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 20.1 (i) shall be followed except that the brick tiles covering of terrace shall be measured in sq.mt. The unserviceable materials shall be stacked as directed all leads and lifts.

.3. The rate shall be for a unit of One sq.metre.

20.23. Dismantling tiled or stone floors laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lead and lifts.

.1. Workmanship

.2. The specifications of item-No. 20.1(i) shall be followed except the dismantling of tiled or stone floors laid on mortar shall be done. Dismantling implies carefully taking up or down or removing without damage. The articles shall be passed by hand where necessary and lowered and where these are fixed by nail, screws, bolts, etc. these shall be taken out with proper tools.

2.0.Mode of measurements and payments

.1. The supporting materials such as joints, beams if any etc. shall be measured separately. The relevant specifications of item No. 20. (ii) Shall be followed. The rate shall include stacking the unserviceable materials as directed with all lead and lift.

.2. The rate shall be for a unit of One sq.metre.

20.25. Dismantling of wooden floors, including stacking of serviceable materials and disposal of unserviceable materials with all lead and lifts.

.1. Materials

.2. The relevant specifications of item No. 20.1 (i) shall be followed except that wooden floors shall be dismantled.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 20.1.(i) shall be followed. The supporting members such as joints, beams etc. shall be measured separately. The rate shall include disposal of unserviceable materials as directed for and with all lead and lift.

.3. The rate shall be for a unit of One sq.metre.

20.27. (i) Dismantling of sheet roofing including ridges, valleys gutters etc. stacking of serviceable Materials and disposal of unserviceable materials with all leads with lifts : G.I. Sheet roofing.

1.0. Materials

1.1. The relevant specification of item No. 20.1 (i) shall be followed except that G.I. sheet roofing shall be dismantled instead of concrete work.

.1. Mode of measurements and payment

.2. The area of G.I. sheet roofing shall be measured in sq.metre. Ridges, hips and valleys shall be girthed and included with roof area. Corrugated and semi-corrugated surfaces shall be measured flat

and not girthed.

.3. Supporting members as ratters, purlins, beams, joints, trusses etc. shall be measured separately.

.4. The rate shall include disposal of unserviceable materials with all leads and lifts and stacking the serviceable materials as directed.

.5. The rate shall be for a unit of one sq.metre.

20.27. (ii) Dismantling of sheet roofing including ridges, hips, valleys, gutters, etc. stacking of serviceable materials and disposal of unserviceable materials with all leads and lifts : A.C. Sheet roofing.

.1. Workmanship

.2. The relevant specifications of item No. 20.270) shall be followed except that dismantling work of A.C. Sheet roofing is to be down.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.276 (j) shall be followed except that the A.C. Sheets roofing shall be measured in this item.
- .3. The rate shall be for a unit of one sq.metre.

20.28. Dismantling Mangalore or country tile roofing with battns, boarding etc. including stacking of serviceable materials and disposal of unserviceable materials with all lead and lifts.

.1. Workmanship

- .2. The relevant specifications of item No. 20.1 (i) shall be followed except that the country tile roof or Mangalore roof shall be dismantled.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.1 (i) shall be followed.
- .3. The supporting members shall be measured under separate item.
- .4. The rate includes labour required of disposal of unserviceable item with all leads and lifts.
- .5. The rate shall be for a unit of one sq.metre.

20.30. Dismantling cement asbestos/harde board in ceiling or partition walls, wooden trellis work including farnies, stacking of the serviceable materials and disposal of unserviceable materials with all leads and lifts.

.1. Materials

- .2. The relevant specifications of item No. 20.1. (i) Shall be followed except that the cement asbestos hard board in ceiling or partition walls, wood trellis, work etc. shall be dismantled.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.1. (i) Shall be followed. The serviceable materials shall be stacked as and where directed and the unserviceable materials shall be disposed off with all leads and lifts.'
- .3. The rate shall be for a unit of One sq.metre.

20.35. Dismantling wood work, wrought framed and fixed in frames, trussed including stacking the materials with all lead and lift.

.1. Workmanship

- .2. The relevant specification of item No. 20.1 (i) shall be followed except that the wood work, wrought framed and fixed in frames, trusses etc. shall be dismantled.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.1. (i) shall be followed.
- .3. The materials shall be stacked as and where directed with all leads and lifts.
- .4. The rate shall be for a unit of one cubic metre.

20,39. Disincarnating expalided metal or I.R.C. fabric with necessary battens and beadings including frame Work and stacking the serviceable materials with all lead and lift.

1.0. Workmanship

The relevant specifications of item No. 20.1. (i) shall be followed except that the dismantling of expanded metal or I.R.C, fabric shall be done.

.1. Mode of measurements & payment

- .2. The relevant specifications of in Item No. 20.1. (i) shall be followed.
- .3. The rate shall be for a unit of One sq.metre.

20.43. Dismantling steel work including dismembering and stacking the materials with all leads and lifts.

.1. Materials

- .2. The relevant specifications of item No. 20.1. (i) shall be followed except that (he dismantling of

steel work shall be carried out.

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 20.1(i) shall be followed.
- .3. The weight of the member shall be computed from standard tables unless the actual weight can be readily determined.
- .4. Riveted works where rivets are required to be cut, the same shall be carried out under this item and nothing extra shall be paid.
- .5. In framed steel gate, the weight of any covering material or filling such as iron sheets and expanded metal shall be added to the weight of the main articles if such covering is not ordered to be taken out separately.
- .6. The rate includes stacking the materials as and where directed with all leads and lifts.
- .7. The rate shall be for a unit one Kg.

20.49. (I) Dismantling doors, windows, ventilators etc. (wood or steel) shutters including chowkhats, Architraves, hold fasts and other attachments etc. complete and stacking them within all leads & lifts. Not exceeding 3 sq. metres in area.

1.0. Workmanship:

The relevant specifications of item No. 20.1. (i) shall be followed except that the door, windows, ventilators etc. (wood or steel shutters including chowkhats, architraves, hold fasts and other attachments etc. are to be dismantled.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.1. (i) shall be followed.
- .3. The doors, windows, ventilators etc. not exceeding 3 sq.mt. in area (each) including shutters and chowkhats, Architraves, hold fasts and other attachment to frames etc. will be dismantled and measured under this item.
- 2.3.**,The rate includes stacking the serviceable materials as and where directed with all leads and lifts.
- 2.4. The rate shall be for a unit of One number,

20.49. (II) Dismantling doors, windows, ventilators etc. (wood or steel) shutters including chowkhats, Architraves, hold fasts and other attachments etc. complete and stacking them within all leads & lifts. Exceeding 3 sq.metres in area.

1.0. Workmanship:

The relevant specifications of item No. 20.49 (i) shall be followed except that the door, windows, ventilators exceeding 3 sq. metres is to be dismantled under this item.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.49 (i) shall be followed.
- .3. The rate shall be for a unit of One number.

20.51. Dismantling barbed wire fencing including making rolls and also including dismantling fencing posts including all earth work, concrete in the base and making good the disturbed ground, stacking useful materials as directed and disposing all the unserviceable materials with all leads and lifts.

1.0. Workmanship:

The relevant specifications of item No. 20. 1 (i) shall be followed except that the dismantling of barbed wire fencing shall be carried out.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 20.1. (i) shall be followed.
- .3. The rate includes making rolls of dismantled wires and including dismantling fencing posts, concrete work, in base and making good the disturbed ground etc. complete.

.4. The serviceable materials shall be stacked as and where directed and end unserviceable materials shall be disposed with all leads and lifts.

.5. The rate shall be for a unit of one running metre. . '

20.56. Dismantling (C.L Pipes, G.S.W. Pipes and A.C. rain water pipes with fittings and clamps, including

Stacking the materials with all lead and lift, (for any dia. of pipe). 1.0. Workmanship:

The relevant specifications of item No. 20.23 shall be followed except that the dismantling work of pipes Lines of C.I., G.S.W. & A.C. Pipes with fitting shall be carried out.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 20.1. (i) shall be followed.

.3. Water pipe lines, including rain water pipes, with clamps and specials, sewer pipe lines, (Salt glazed ware or concrete) etc. shall be measured in running metre inclusive of joints (The measurements shall be taken along the centre line of pipe and fittings)

.4. The rate shall be for a unit of One running metre.

20.00.1. Dismantling sanitary fittings like wash basin, W.C. Pan, Indian & European Type flushing Tank, etc. including stacking the materials with all lead lift.

1.0. Workmanship:

The relevant specifications of item No. 23.23 shall be followed except that the dismantling work of sanitary Fittings such as wash basin, W.C. Pan (all type of Pans), flushing tanks etc. shall be carried out.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 20.1. (i) shall be followed

.3. The rate shall be for a unit of one number.

20.002. Scraping oil paint from steel and other metal surfaces and making the surface even (with hand Scraping).

1.0. Workmanship:

The odd paint from steel and other metal surface shall be scraped thoroughly with hand scraper followed by wire brushing (first with coarse and then with fine brushes) and finally sand papering with coarse and paper

(No.3) steel wood (No.2) or emery paper (No.3) or with emery clothes. This shall then be wiped finally with mineral turpentine to remove grease and perspiration of hand marks etc. and allowed to dry. The Surface shall be made even and smooth.

.1. Mode of measurements and payment

.2. The work shall be measured in actual area of work done.

.3. The rate shall be for a unit of one sq. metre.

SECTION - 21

Repairs to Buildings

21.8. Providing and fixing M.S. fan clamps of shape and size as specified in existing R.C.C. slab including cutting chase and making good.

.1. Materials

.2. M.S. Bar shall conform to M-18,

.1. Workmanship

.2. The shape and size of fan clamp shall be as directed.

.3. The fixing M.S. fan clamp in existing R.C.C. slab a chase of size 150 mm x 75 mm shall be cut from the ceiling so as to expose the reinforcement and upto 25 mm. clear round the reinforcement bar.

This shall be done without any damage to adjoining portion of ceiling. The two arms of the ends of the clamp shall be passed through the space over reinforcement bar from the bottom of the slab. Then the two arms shall be bent down about 15 mm. by means of crow bar. The clamp shall be held in position and the chase in the ' ceiling filled with cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size). The ceiling shall be then finished to match the existing surface and properly cured.

.1. Mode of measurements and payment

.2. The rate includes cost of all materials and laboaur required for completion of this item as described above.

.3. The rate shall be for a unit of one number.

21.23. Cutting out cracks, of roof terrace to V. Section, Cleaning out, wetting, grouting with cement and sand slurry 1:3 (1 cement: 3 sand)

1.0. Materials

(1) Water shall conform to M-1(2) Cement shall conform to M-3. (3) Sand shall conform to M-6.

.1. Workmanship

.2. The cracks shall be cleaned out and trimmed to V shaped cuts at least 6 mm wide on top. The cracks shall be cleaned off and then cracks and shall be thoroughly flooded with water, water allowed to a soak in cracks, and then grouted with cement and sand slurry in proportion 1:3 The required cracks shall be cured atleast 7 days.

.1. Mode of measurements and payment

.2. The rate shall includes cost of all materials and labour required for satisfactory completion of item as described above. .

.3. The rate shall be for a unit of One running metre.

21.24. Cutting out cracks of roof terrace to V-Section cleaning out, and fillting solidly with hot mixtures of bitumen and clean dry sand (1:1 weight).

1.0. Materials

(1) Bitumen shall be 85/25 penetration (2) Sand shall conform to M-6.

.1. Workmanship

.2. The relevant specifications of item No. 21.23 shall be followed for opening cracks and cleaning.

.3. The cracks shall be absolutely dried and cleaned and filled solidly with hot mixtures of 85/25 penetration and sand in ratio of 1:1 by weight. The filler shall be well filled in to cracks with the edges of a trowel and left flush with surface of roof. Repaired cracks shall cause no ridges across the direction of the siope of roof..

.1. Mode of measurements & Payment

.2. The relevant specifications of item No. 21.23 shall be followed.

.3. The rate shall be for a unit of One running metre.

SECTION-22

Misc. Building items

22.20. Providing and fixing 1.20 metre high fencing with 2 metre long M.S angle posts 40 mm. x 40 mm. x 6 mm. and oil painting 3 coats fixed at 2.5 M C/C with five horizontal lines, and two diagonals of galvanized and fixed to posts with G.I. staples including fixing the posts in ground with 0.5 M x 0.5 M x 0.5 m block in C C 1:5:10 (1 cement: 5 sand; 10 graded brick aggregate 40 mm. nominal size) etc. complete.

1.0. Materials

(1) Water shall conform to M-1. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6. (4)

Brick bats aggregate shall conform to M-14. (5) Oil paint shall conform to M-44. (6) Barbed wire shall conform to M-78.

.1. Workmanship

.2. The pits of the size 0.5 m x 0.5 m x 0.5 m shall first be excavated, true to line and level to receive the post at 2.5 m C/C. the relevant specifications of item 4.00. 1 shall be followed for excavation work.

.3. The pits shall be filled with a layer of 0.15 m thick with lean concrete 1:5:10 (1 cement: 5 sand: 10 graded brick bat aggregates 40 mm. nominal size). The M.S angles 40 mm x 40 mm x 6 mm shall be filled in with clean concrete 1:5:10 and rammed properly so as to form total 0.5 m x 0.5 m x 0.5 m concrete block. The concrete shall be cured for 7 days to allow it to set.

.4. The barbed wire shall be stretched and fixed in 5 horizontal rows and tow diagonals. The bottom row shall be 140 mm. above ground and the rest at 125 mm centre to centre. The diagonal shall be stretched between adjacent post from top wire of one post to the bottom wire of 2nd post. The wires shall be fixed to posts by means of staples. The M.S. Angle posts shall be painted with 3 coats of oil paint of approved tint and shade.

.1. Mode of measurements and payment

.2. The work shall be measured for the finished work from centre to centre of the posts.

.3. The rate shall include the cost of all labour and materials involved in the operations described above.

.4. The rate shall be for a unit of One running metre.

22.00.1 Constn. of B B. masonry paniara 23 cm x 75 mm wall including fixing precast R.C.C. marble Mosaic (terrazzo) slab of 75 mm. thickness on top and smooth finishing to walls in cement plaster in C.M. 1:3 curing etc. complete including drainage out, waste water arrangements.

1.0 Materials

(1) Water shall conform to M-1. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6. (4) Burnt bricks shall conform to m-15. (5) Precast marble mosaic terrazzo paniara of 75 mm thickness shall be of best quality. The width of paniara shall be directed.

.1. Workmanship

.2. The brick masonry shall be constructed for paniara for the size as directed in C.M. 1:6. The thickness of wall shall be 23 cms. thick and height shall be 75 cms. The relevant specifications of B.B. masonry at item 6.13. (b) shall be followed for B.B. masonry work.

.2. The B.B. masonry work shall be covered with precast marble terrazzo paniara at top, of width and length as specified or as directed. The terrazzo mosaic paniara shall be 75 mm. thickness.

.2. The whole masonry work shall be finished smooth with CM. 1:3 on both sides. The relevant specifications of item No. 17.59.(1) shall be followed.

.3. The drainage outlet and water arrangement shall be made as directed.

.1. Mode of measurements and payment

.2. The work shall be measured for the finished work.

.3. The rate shall include the cost of all labour and materials involved in the operations described above.

.4. The rate shall be for a unit of One Running metre.

22.00.2 Constucting, a chowkadi with C C over 12 cm. thick B B masonry in front and dwarf wall 1 m high and 23 cms. thick cement plaster to masonry in CM. (1.3) and cement concrete flooring in 1:2:4 with 5 cm. dia A.C Drain pipe etc. complete.

.1. Materials

.2. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Burnt

bricks shall conform to M-15. Stone aggregate 20 mm. nominal size shall conform to M-12. (a) A.C. Drain pipe of 5 cms. dia. shall conform to M-74.

2.0. Workmanship

.2.1, The chowkadi shall be constructed of specified size and as directed. The slab shall be cast on B.B. masonry wall 12 cms. thick and dwarf wall 1 m high and 23 cms. thick shall be constructed in proportion of CM. 1:6. The relevant specifications of item 6.3. (I) shall be followed for masonry partition work and

5.4.1.

(C) Shall be followed for reinforced concrete work.

.2.2 The whole masonry work shall be finished with cement mortar 1:3 and finished smooth. The relevant specifications of item No. 17.59 (I) shall be followed for plastering work.

.2.3. The A.C. pipe of 5 cms. dia. shall be fixed as drainage pipe. The bottom shall be finished with C.C. 1:2:4 finished with cement slurry..

3.0. Mode of measurements and payment

.3.1. The work shall be measured for finished work.

.2. The rate includes cost of all materials, labour etc. required for carrying out satisfactory completion of work.

.3. The rate shall be for a unit of one square metre.

22.00.3 (I) Constructing cooking platform 60 cm. width and 70 cm. height resting on B.B. Masonry wall 23 cms. Thick in CM. 1:6 with fixing of precast 1:2:4. R.C.C. 0.08 M. thick slab with marble mosaic chips set in GM. (Terrazzo) with plastering on exposed faces to wall in CM. 1:4 etc. complete.

1.0. Materials

Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Burnt brick shall Conform to M-I5 Marble Mosaic chips shall conform to M-46. Stone aggregate 20 mm. nominal size shall conform to M-I2. (a) M.S. Bars shall conform to M-I8.

.1. Workmanship

.2. The cooking platform of size as directed shall be constructed in 60 cms. width and 70 cms. Height. The brick masonry wall in CM. 1:6 shall be constructed in 23 cms. Thickness upto full depth, the relevant specifications of item 6.13. (B) shall be followed for masonry work.

.2.2 .the R.C.C. slab of 8 cms. Thickness and of adequate design and size shall be precast and the same shall be put up on the B.B. masonry work.

.3. The top and exposed sides of the R.C.C slab shall be finished with marble mosaic terrazzo 8 mm. thick with require colour pigment. The work of terrazzo shall be carried out as per relevant specification of item 14.4. (E).

.4. The whole masonry work shall be finished with cement mortar in CM. 1:4. the relevant specification of item 17.59 (II) shall be followed.

.1. Mode of measurements and payment

.2. The work of cooking platform shall be measured for finished work.

.3. The rate include cost of all labour and materials, etc. required for satisfactory completion of this item as described above.

.3.3. The rate shall be for a unit of One running metre.

22.00.3. (II) Constructing cooking platform of 60 cm with and 70 cms. Height resting on B.B. masonry walls 23 cm thick in CM. 1:1 with fixing black kapada stone surface laid on precast R.C.C. slab 1:2:4 with plastering on exposed faces to wall in CM. 1:4 etc. complete.

1.0. Materials and Workmanship

.1.1. The relevant specification of item No. 22.00.3 (I) shall be followed except that the cooking

platform shall be constructed by providing black kapada stone of 25 mm to 30 mm thickness on precast R.C.C 1:2:4 slab 8 cms. thick. The black stone shall be provided in single piece upto 1.8 M in length and specified width. All the exposed edges of stone shall be machine cut.

- .1. Mode of measurements and payment
- .2. The relevant specifications of item 22.00.3 (I) shall be followed.
- .3. The rate includes provide machine cut edges on exposed face of kapada stone. **2.3.** The rate shall be for a unit of One running metre.

22.00.4. Providing and fixing Rajula stone 75 mm. thick 60 cm x 45 cms. size including fixing incement mortar as directed.

1.0. Materials

water shall conform to M-1. Cement mortar shall conform to M-11. Rajula stone of specified size shall be of best quality and free from any defects. The stone shall not be less than 75. mm in thickness.

.1. workmanship

- .2. The Rajula stone of size 60 x 45 cms. size shall be fixed as and where directed in cement mortar in 1:3 All the edges of the stone shall be fixed with cement mortar in C.M. 1:3 and sloped at 45 and finished smooth. The work shall be cured for 7 days after fixing.
- .1. Mode of measurements and payment
- .2. The work shall be measured for finished work.
- .3. The rate includes cost of all labour and materials required for satisfactory completion of this item.
- .4. The rate shall be for a unit of one number.

22.00.5. Providing and laying Bilimora type brick facing in CM. 1:1 laid over bedding of cement mortar 1:3 (13 mm. thickness) including cleaning, watering, scaffolding etc. complete.

1.0. Materials

1.1 .Water shall conform to M-1. Cement mortar of specified proportion shall conform to M-11. Bilimora type bricks shall be approved before collecting the same on site.

.1. Workmanship

- .2. The surface on which the Bilimora type bricks is to be provided shall be cleaned of all dust, dirt, etc. and finished with CM 1:3 in 13 mm. thickness. The relevant specifications of item 17.59 (I) shall be followed except that the thickness of finishing shall be 13 mm. The top surface shall be roughened by wire brushes to give proper grip to the tiles to be fixed.
- .3. The Bilimora type bricks shall be fixed with CM 1:1. The tiles shall be properly wetted before fixing. The horizontal and vertical joints shall be maintained in true line and level by providing 12 mm or 20 mm sq. bars as directed. The tiles shall be tamped by trowel so that there shall not be any hollows left behind the tiles.
- .4. The tiles shall be cut to the required size on ends or at top bottom of beams in best workman like manner.
- .5. The whole work shall be curred for 7 days.

.1. Mode of measurements and payment

- .2. The work shall be measured as per relevant specification of item No. 17.58 (I)
- .3. The rate includes cost of all materials, wastage etc. occurring due to cutting of tiles and ends as top and bottom of beams etc. including base coat.
- .4. The rate shall be for a unit of One sq. metre.

22.006. Providing and fixing teakwood rail of 60 mm. x 20 mm. size and 50 cms. length incl. 3 coats of

oil paint to wood work with set of 3 pags. 1.0. Materials : Teak wood battens of specified size shall

conform to M-29. Oil paint shall conform to M-44 Wall pegs of aluminum 3 Nos. of approved quality and make shall be provided.

.1. Workmanship

.2. The teakwood battens of size 60 mm. x 20 mm. and 50 cms. long shall be planed on all sides. The anodized aluminum wall pegs of approved make shall be fixed on wooden batten prepared with screws as directed. The wall pegs unit shall be fixed on wall with wooden gutties and screws as directed. The wooden battens shall be painted with 3 coats of ready-mix paint of approved colour and shade.

.1. Mode of measurement and payment

- .2. The work shall be measured for finished work.
- .3. The rate shall be for a unit of one number.

22.00.7. Treating the bottom and sides (upto a height of 300 mm.) of the excavations made for the masonry foundations and basement with chemical emulsion at the rate of 5 liters per Sq. metre of the surface area.

1.0. Materials : The chemicals used for the soil treatment shall be only one of the following with concentration shown against each in aqueous emulsion.

Chemicals Concentration
1. Aldrin 0.50% (by weight)

2. Heptachlor 0.50% (by weight)

3. Chlordane 1.00% (by weight)

.1. Workmanship

.2. The chemical barrier shall be complete and continuous under whole of the structure to be protected.

.3. The bottom and the sides of foundations upto a height of 30 cms. from the bottom of excavation made for masonry foundation and for basement column pits shall be treated with the chemical emulsion at the rate 5 liters/Sq. metre of the surface area.

.4. The chemical treatment shall be carried out when the surface is quite dry. Chemical treatment shall not be carried out when it is raining or when the soil is wet with rain or sub soil water.

.5. Once formed, treated soil barriers shall not be disturbed. If by chance treated soil barriers are disturbed, immediate steps shall be taken to restore the continuity and compactness of the barrier system.

.6. The treatment against termite infection shall remain fully effective for a period not less than 10 years from date of issue of the final certificate of completion of work. If at any time during this period, any defects in treatment are revealed or any evidence of infection in any part of the building or structure is noticed, the contractor shall rectify the concerned defects within 14 days on receipt of notice from Engineer-in charge. On contractor's failure to do so, the Engineer-in charge may get the same rectified through any other agency at contractor's risk and cost, and decision of Engineer-in charge as to the cost payable by the contractor for the same shall be final and binding to the contractor.

.7. A guarantee bond on appropriately stamped paper shall be given by the contractor to the department in the manner and form prescribed below.

FORM OF GUARANTEE BOND

"I/We(Contractor) hereby guarantee that work will remain

Unaffected and will not be in any way damaged by termite or any other germs of similar types, for a period of 10 years after completion of the work of anti-termite as per the terms and conditions of the contract and contractor hereby indemnifies and agrees to save harmless the Government of Gujarat from any loss and or damage that might be caused on account of termite and or other similar type of germs and hereby Guarantees to make good any loss or damages suffered by the

Government of Gujarat and further guarantee to re-do the effective work without claiming any extra cost".

.7. This guarantee shall remain in force for the period of 10 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 10 years.

.8. The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and retained for the first one year after completion of the work and 10% shall be retained for the balance of guarantee period and shall be refunded only after the completion. of the guarantee period.

3.0. Mode of measurements & payment

3.1 The length and breadth shall be measured correct to a cm. as per the dimensions of sanctioned plans. No deduction shall be made nor extra paid for any opening for pipes etc. upto 0.1. sq. mt The rate shall include the cost of all labour and materials required for the operation involved for satisfactory completion of this item. The sides of the trenches 30 cms. each side and bottom shall be measured under this item **3.2.** The rate shall be for a unit of One sq. metre.

22.00.8. Treating the backfill immediately in contact with foundation structure with chemical emulsion at the rate 7.5. liters per sq. mt of vertical surface of the sub structure for each side (in case of R.C.C. basement walls, treating the sides of 50 metre).

.1. Materials

.2. The specification of the item 22.00.7. shall be followed

.1. Workmanship

.2. After masonry foundations and retaining walls of basement come up, the backfill immediate in contact with foundation shall be treated with the chemical emulsion at the rate of 7.5 liters per sq. m. of

the vertical surface of the sub structure for each side. The filling of earth is usually carried out in layers and the treatment shall be directed towards the concrete or masonry surfaces of the columns and walls so that the earth in contact with these surfaces is well treated with chemical.

.3. In case of R.C.C. framed structure with columns and plinth beams, and R.C.C. basements the treatment shall start at the depth of 50 cms. Below ground level. From this depth backfill around the columns, beams, and R.C.C. basement walls shall be treated at 7.5 lit/sq. m. of vertical surface. The relevant specifications shall be followed same as item 22.00.7.

.1 Mode of measurements and payments

.2 The area of substructure in contract with backfill to be measured. The length and breadth shall be measured correct to a cm. as per dimension of sanctioned plans for the surface in contact with backfill.

.3 No deduction shall be made nor extra paid for any opening for pipes, etc. upto 0.1. sq. m.

.4 The rate includes cost of all labour, materials required for satisfactory completion of this item.

3.4. The rate shall be for a unit of One sq. metre.

22.00.9. Treating the top surface of the plinth filling with chemical emulsion at rate of 5 liters sq. metre before the sand bed or sub grade is laid.

1.0. Materials : The relevant specifications of item 22.00.7 shall be followed.

.1. Workmanship

.2. The relevant specifications of item 22.00.7 shall be followed except that the top surface of the consolidated earth within the walls, shall be treated with the chemical emulsion at the rate Of 5 liters/sq. metre of the surface before the sand bed or sub-grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes upto 50 to 75 mm. deep at 150 mm. centers both ways may be made with 12 mm. dia. M.S. rod on the surface to facilitate absorption of the emulsion.

.1. Mode of measurements & payment

- .2. The length and breadth shall be measured clean for the area actually treated.
- .3. No deduction shall be made nor extra paid for any opening for pipes, etc. upto 0.1 sq.m.
- .4. The rate shall be for a unit of one sq. metre.

22.00.10. Treating the junctions of walls and floor area with chemical emulsion at the rate of 7.5 liter/ sq. mt by making holes at junction of walls, and columns, with the floor before laying sub grade to a depth of 15 cms. by making holes.

1.0. Materials: The relevant specifications of item 22.00.7 shall be followed.

.1. Workmanship

- .2. The relevant specifications of item 22.00.7 shall be followed except that the junction of walls columns with the floor shall be treated with the chemical emulsion at the rate 7.5 liters/sq. metre. Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from the ground level upto the level of filled earth surface. To achieve this, a small channel 3 x 3 cm. shall be made at the channels upto the ground level 15 cms. apart and the rod moved backward and forward to breakup the earth and chemical emulsion poured along the channel at the rate of 7.5 liters per sq. m. of the vertical walls or column surfaces of sub-structures so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.

.1. Mode of measurements and payment

- .2. The relevant specifications of the item 22.00.7 shall be followed.
- .3. The vertical area of sub-structure in contact with filled up earth above ground level to top of filled up earth shall be measured for payment.

22.00.11. Treating the earth along the external perimeter of the building by making holes 15 cms. apart upto a depth of 30 cms. With chemical emulsion at the rate of 7.5. liters per sq. metre along the wall.

1.0. Materials: The relevant specification of item 22.00.7 shall be followed.

.1. Workmanship

- .2. The relevant specifications of the item 22.00.7 shall be followed except that the external perimeter of the building shall be treated with chemical emulsions. After building is complete, the earth along the external perimeter of the building should be rodded at intervals of 15 cms. and to a depth of 30 cms. The rods shall be moved backward and forward parallel to the wall to breakup the earth and chemical emulsion poured along the wall at the rate of 7.5 liters per sq. metre of vertical surfaces. After the treatment the earth shall be tamped back into place, the earth out side of the building should be graded on completion of building, this treatment shall be carried out on the completion of such grading. In event of filling being more than 30 cms. the external perimeter and treatment shall be extended to the full depth of filling upto ground level so as to ensure continuity of the chemical barrier.

.1. Mode of measurements and payment

- .2. The relevant specifications of item No. 22.00.7 shall be followed.
- .3. The vertical surface area of sub-structure 30 cms. in depth from finished ground level in external periphery only shall be measured and paid under this item. The depth of wall treated under back filled shall not be included in this item.
- .4. The rate shall be for a unit of One sq. metre.

22.0.12. Providing treatment along outside of foundation using chemical emulsion at 7.5 liters per sq.m. of vertical surface (for each side) of sub-structure.

1.0. Materials : The chemical used for the soil treatment shall be any one of the following with concentration shown against each in aqueous emulsion :

Chemicals Concentration

1. Aldrin 0.50% (by weight)
2. Heptachlor 0.50% (by weight)
- 3 Chlordane 1.0%(by weight)

.1. Workmanship

.2. The surface of consolidated earth around the existing building shall be treated with chemical emulsion at the rate 7.5 liters/sq. m. of vertical surface of sub-structure. The minimum height to sub structure shall be considered 60 cms. for treatment. If the earth along the perimeter does not allow emulsion to seep through, holes upto 300 mm. deep at 150 mm. centers both ways be made by 12 mm. dia. mild steel rod on the surface to facilitate saturation of the soil with chemical emulsion.

.3. The chemical barrier shall be complete and continuous under whole on the structure to be protected.

.4. The chemical treatment shall be carried out when the surface is quite dry. Chemical treatment shall

not be carried out when it is raining or when the soil is wet with rain or sub soil water.

.1. Mode of measurements and payment

.2. The length shall be measured along the prefer of substructure. The depth shall be taken 0.60m.

.3. No deduction shall be made nor extra paid for any opening for pipes etc. upto 0.1. sq. m.

.4. The rate includes cost of all labour and material required for the operations involved for satisfactory completion of this item.

.5. The rate shall be for a unit of One sq. metre.

22.0.13. Providing treatment along external wall perimeter below concrete or masonry apron using Chemical at 5 lit./per liner including drilling and plugging etc.

1.0. Materials: The relevant specification of item Mo. 22.0. 12. Shall be followed.

.1. Workmanship

.2. The relevant specification of item No. 22.0.12 shall be followed except that the treatment shall be carried out along external wall perimeter below concrete or masonry apron, using chemical at rate of 5 lit/running metre.

.1. Mode of measurements and payment

.1. The relevant specifications of item No. 22.0.12 shall be followed.

3.2. The rate includes drilling and plugging holes in apron etc.

complete. **3.3.** The rate shall be for a unit of One running metre.

22.0.14 Treatment of soil below existing floor using chemical at 1 liter per hole at 300 mm. apart including drilling plugging holes etc.

1. Materials :

2. The relevant specifications of item No. 22.0.12 Shall be followed.

.1. workmanship

.2. The relevant specifications of item No. 22.00.9 shall be followed except the termite control treatment shall be carried out in soil below existing floors.

.3. the holes of 12 mm. dia. rod shall be drilled in floor upto 150 mm. depth at 300 mm. part both ways. the chemical shall be then injected with pressure at the rate of 1 liters/hole of the surface area.

.1. Mode of measurements & payment

.2. The relevant specifications of item 22.0.9 shall be followed

.3. The rate shall include cost of drilling holes and plugging.

.4. The rate shall be for a unit of One sq. metre.

22.0..15. Treatment of voids in masonry using chemical at 1 Lit/hole at 300 mm. apart including

drilling holes and plugging.

1.0. Materials : The relevant specifications of item 22.0.12 shall be followed.

.1. Workmanship

.2. The walls affected by termite shall be cleaned of all forms binding inside and the holes of voids in masonry wall surface shall be treated by chemical emulsion at rate 1 Lit. hole The holes in cracks in surface of wall shall be drilled at 300 mm. apart.

.1. Mode of measurements & payment

.2. The rate shall be for a unit of One number of voids treated.

22.0.16 Treatment to wood work by chemical emulsion in oil or kerosine based including 6 mm. dia downward slanted holes 150 mm. C/C and plugging the same with cement mortar.

1.0. Materials : The relevant specifications of item No. 22.00.7 shall be followed.

.1. workmanship

.2. the wood work effected by Ants shall be cleaned of all lives form hinding inside. The whole wood surface shall be then treated with oil or kerosine based chemical emulsion. The holes of 6 mm. dia. Shall be drilled slanted downwards at 150 mm. centers to centers and chemical emulsion shall be poured into holes by means of funnels specifically prepared for the same and allowed to seep. After funels become empty another does of chemical shall be poured in them this process shall be done repeatedly till the whole wood work is fully saturated with chemical.

.3. The holes drilled in wood work shall be filled in with putty and other similar materials as directed and the whole wooden surface shall be made good as before.

.1. Mode of measurements & payment

.2. the work shall be measured for the finished work in sq. metre including frame.

.3. The out to out of frame shall be measured as width and from top of flooring to top of frame shall be as height. This area includes for treating frame and shutters both.

3.3 The rate includes cost of all labours and materials required for satisfactory completion of this item

.4. The rate includes drilling holes plugging the same after treatment completed and making good as before.

.5. The rate shall be for a unit One sq. metre.

SECTION-23**Water Supply, Plumbing and Sanitary Fittings**

23.2 Providing and fixing to wall, ceiling and floor galvanized mild steel tube (Medium grade) of the following nominal bore, tube fittings and clamps including making good the wall ceiling and floor (A) 15 mm. dia.(B) 20 mm. dia (C) 25 mm. (D) 32 mm. (E) 40 mm. (F) 50 mm.

.1. Materials

.2. Galvanized mild steel tubes of specified dia. nominal bore shall conform to I.S. 1239-1968.

.3. The galvanized fittings, clamps, etc. required for specified dia. bore pipes shall be of best quality and make as approved by the Engineer-in-charge.

.1. workmanship**.2. Cutting, Laying & Jointing**

.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bor in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

.2. The taps and dies shall be used only for straightening screw threads which have becoming bent

or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.

.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust and dirt during fixing. Burr from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temporarily plugged to prevent access of water, soil, or any other foreign matter.

.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing of tube fittings to wall ceilings & floors

22.1. In case of fixing of tubes and fittings to the walls or ceilings, these shall run on the surface of the wall or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors: where unavoidable, pipes may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passing through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

2.2.2. All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely, these clamps shall be spaced at regular intervals in straight lengths at 2 M C/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. upto 25 mm. dia brick work or concrete. However for bigger diameter pipes the holes shall be

carefully made of the smallest required size. After fixing the pipe, the holes shall be made good with cement mortar 1:3 (1 cement : 3 coarse sand) and properly finished to match the adjacent surface.

2.3. Testing of joints:

2.3.1. After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone, and all leaking pipes removed and replaced without extra cost.

2.3.2. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/sq. cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work of laying proceeds, keeping the joints exposed for inspection during the testing.

.1. Mode of measurements and payment

.2. The description of each item shall; unless otherwise stated, be held to include where necessary, conveyance, and delivery, handling, unloading, storing, fabrication, hoisting, all labour for finishing

to required shape and size, setting, fitting in position, straight, cutting and waste, return of packings etc.

.3. The length shall be measured on running metre basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to walls, ceiling, floors etc. shall be measured and paid under this item.

.4. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.

(i) Dimension shall be measured to the nearest 0.01 metre,

(ii) Area shall be worked out to the nearest 0.01 metre.

.4. All measurements of cutting shall unless otherwise stated be held to include the consequent waste.

.5. In case of fitting of unequal bore, the largest bore shall be measured for the test.

.6. Testing of pipe lines, fittings, and joints include for providing all plant and appliances necessary for obtaining access to the work to be tested and carrying out the tests.

.7. The rate includes galvanized steel tubing with screwed socket joints, together with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs unions etc.) and fixing complete with clamping wall-hooks, wooden plugs etc. and also cutting, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted, where required or directed. The rate also includes cutting through walls, floors, etc. and their making good and painting expose threads with anti-corrosive paint as above and testing. Where tubes are to be fixed to wall, ceiling and flooring. the rate shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made

.8. The rate shall be for a unit of One running metre.

23.4. providing and laying in trenches galvanized mild steel tubes (Medium grade) of the following nominal bore and tube fittings-earth work in trenches to be measured and paid for separately :

(A) 15 mm. dia. (B) 20 mm. (C) 25 mm. (E) 60 mm. (F) 80 mm.

.1. Materials

.2. Galvanized mild steel tube of specified dia. nominal bore and fittings shall conform I.S. 1239-1968.

.1. Workmanship

.2. The relevant specifications of item 23.2. (A) shall be followed for cutting, laying and jointing testing of joints except that the fixing of tube shall be done in trenches

.3. The width and depth of the trenches shall be 30 cms. and depth of trenches 60 cms.

.4. At joints, the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line, and gradient in accordance with general specifications of earth work in trenches.

.5. The pipes shall be painted with two coats of anti-corrosive bitumastic paint of approved quality. The pipe shall be laid on a layer of 75 mm. sand filled upto 150 mm. above the pipe if so specified. The remaining portion of trench shall be then filled with excavated earth. The surplus earth shall be disposed of as directed. **2.5.** When the excavation is done in rock the bottom shall be cut deep enough to permit the pipe to be laid and cushion of sand 75 mm. In case of bigger diameter of tube where the pressure is very high, thrust block of cement concrete 1:2:4 (1 cement :2 coarse sand:4 grade stone aggregate of 20 mm. nominal size) shall be constructed on all bends to transmit the hydraulic thrust without in pairing the ground and spreading it over' a sufficient area if so specified.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 23.2. (A) shall be followed. The authorized quantities shall

be measured.

.3. For purpose of calculating cubic content cross section shall normally be taken at suitable intervals i.e. at manhole or wall chamber intervals except in abnormal cases like sudden change in strata or undulating ground etc, when they may be taken at closer intervals as approved by the Engineer-in-charge whose decision shall be final, conclusive and binding.

.4. Authorized width:

(a) Upto one metre depth, the width of the trenches for the purpose of measurements of excavation shall be arrived at by adding 40 cms. to the external diameter of the tube (not the socket). where a pipe is laid on concrete bed/cushioning layer, the authorised width shall be the external diameter of tube plus 40 cms. or the width of the concrete bed cushioning layer whichever is more.

(b) For depths exceeding one metre an allowance of 5 cms. per metre of depth for each side of the trench shall be added to the authorised width (i.e. external diameter of pipe of plus 40 cms.) This allowance shall apply to the entire depth of the trench. The authorised width in such cases shall therefore be, equal to the depth of trench, plus external diameter or tube plus 40 cms.

(c) Where more than one tube is laid, the diameter shall be reckoned as the horizontal distance for outside to outside of the outermost pipes.

(d) where sheeting etc. has been provided the authorised width of the trenches at bottom shall be increased to accommodate for sheeting etc. so that the clear width available between faces of sheeting is as per provisions of (a), (b) & (c) above

(e) If the sides of the trench are not vertical, the toes of the side slopes shall end at the top of the pipe and vertical sided trench of authorised width as per (a), (b), (C) and (d) above shall be excavated from these down to the bed of trenches.

.4. Where the tubes are laid in trenches, the work of excavation and refilling all round tubes for which separate payment shall be made, the length shall be measured on running metre basis.

.5. The rate shall be for a unit of One running metre.,

23.6. Making connection of galvanised M/S. distribution branch with galvanised mild steel main 50 mm. to 80 mm. nominal bore by providing and fixing tee including, cutting and threading the pipes etc. complete.

1.0. Materials

the fittings required of specified dia. of pipe shall conform to I.S. 1237-1986.

.1. Workmanship

.2. A pit of suitable dimensions shall be dug at the point where the connection is to be made with the main and earth removed upto 150 mm. below the main. The flow of water in water main shall also be disconnected by closing the sluice or wheel valves on the mains. The main shall first be cut. Water if any, collected in the pit shall be bailed out and ends of the pipe threaded.

.3. The connections of distribution pipe shall be made by fixing malleable galvanised mild steel tee of the required size and fittings such as jam nut, socket, connecting piece etc.

.4. The testing of the joints shall be done as per relevant specifications of item No. 23.2. (A).

.1. Mode of measurements and payment

.2. The rate includes cost of al labour, materials, tools and plant required for satisfactory completion of this item.

.3. The rate shall be for a unit of One number.

23.8. providing and fixing to wall ceiling and floor 6 Kgs/Sq. Cm. working pressure polythene pipes of the following outside diameter, low density complete with special flange compression type fittings wall clips etc. including making good the wall/ceiling and floor. (A) 20 mm. dia. (B) 24 mm.

dia. (C) 32 mm. dia. (D) 40 mm. dia. (E) 50 mm. dia.

.1. Materials

.2. The low density polythene pipe of specified diameter with 6 Kg/Sq. cm. working pressure shall conform to I.S.3076-1968. The specials and fittings required shall be to best quality.

.1. Workmanship

.2. The P.V.C. pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.D. pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

.2. Above ground installation of rigid P.V.C. pipe should be undertaken after preparations are observed for their protection against direct sun rays and mechanical damage.

.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public places railway lines, road side and footpaths.

.4. P.V.C. pipes shall be supported at the following intervals : -20 mm. dia. 500 mm..-25 mm. dia. 750 mm. -32 mm. dia. 900 mm.

.5. Closer support spacings shall be provided if recommended by the manufacture.

.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

.7. P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.

.8. Jointing the pipes:

.1. The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper and then solvent cement joint. Since solvent cement is aggressive to P.V.C. care must be wiped off after jointing. Empty solvent cement tins, brushes, rags, or paper unregnated with cement should not be buried in the trenchyes. They should be gathered not left scattered about, as they can prove to be a hazard to animals, which may chew them.

.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in Trenches :

2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

.1. Mode of measurements & payment

.2. The relevant specifications of item 23.2. (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

.3. The unit rate shall be for a unit of One running metre.

23. 111. (A) (I) Providing and fixing water closet squatting pan (Indian type W. C. pan) size 580 mm. (Earth work, bed concrete, foot-rests and trap to be measured and paid for separately). Vitreous china. Long pattern white colour.

.1. materials

.2. Water closet squatting pan (Indian type W.C. Pan) shall conform to M-62. Cement mortar shall conform to M-11.

.1. Workmanship

.2. The pan shall be sunk into the floor and embedded in a cushion of average 15 cm. cement

concrete 1:5 :10 (1 cement :5 fine sand :10 graded stone aggregate or brick aggregate 40 mm. nominal size) or as specified. This concrete shall be left 115 mm. below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably sloped so that the waste water is drained into the pan. The pan shall be provided with 100 mm. 'P' or 'S' trap as specified in the item No. 23.113. with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement: 1 fine sand)

.1. mode of measurements and payment

- .2. The rate shall include the cost of all materials and labours involved in the operations described under workmanship.
- .3. The rate shall be for a unit of One number.
- .4. The 'P' or 'S' trap shall be paid separately.

23.70. Providing and fixing cast iron spigot and sockets soil, waste, water and ventilating pipes of the following normal size (B) 75 mm. dia. (C) 100 mm. dia.

1.0. Materials

1.1. The specified dia. C.I. Spigot and socket soil or waste pipe shall conform M-68.

.1. Workmanship

- .2. The fixing of C.I. spigot and sockets soil, waste and ventilating pipe shall be carried out as per relevant specifications of item 15.93 (B) except the C.I. spigot and socket shall be fixed. The joints shall be filled with cement mortar 1:2 (1 cement :2 sand) and spun yarn. The pipes without ears shall be fixed to wall with M.S. clamps. The pipes with ears shall be fixed to wall with M.S. clamps. The pipes with ears shall be secured with 40 mm. before steel or iron barrel distance pieces or bobils and strout galvanized iron nails 10 cms. long into hand wool plugs fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packings and secured without screws to make air and water tight.
- .2. All soil pipes shall be carried up above the roof and shall have a wire balloon guard or a cowl.
- .3. The ventilating pipe or shaft shall be carried out to height of atleast one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or adormer windows, it shall be carried upto a ridge of the roof or atleast two metres above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out upto a height of atleast one metre above the parapet or two metres measured vertically from the top of any windows or opening which may exist upto a horizontal distance of five metres from the vent pipe into such building and in no case shall be carried out to a height less than three metres.
- .4. Where ventilating pipes are carried in pipe shafts the shaft shall be of a minimum size of one metre. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five metre from the site of the shaft.
- .5. The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5 mm. thick M.S. flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia. M.S. Bars. One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm.x 100 mm. in 1:2:4 mix The concrete shall be finished to match the surrounding surfaces.
- .6. The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.
- .7. The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floor. The waste stack of lavatories shall be connected

directly to main hole while the waste stack of other shall be separately discharged over gulley trap.

.1. Mode of measurements and payment

.2. The length of pipe shall be measured including all fitting along its length in running metres correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the

.3. The rate includes all labour, and materials, tools and plant etc. required for satisfactory completion of this item.

.4. The rate shall be for a unit of One running metre.

23.87. providing and fixing cast iron (spun) Nahni trap of the following nominal diameter of self cleaning design with C.I. Screwed down or hinged grating including cost of cutting and making good the walls and floors : 100 mm. Inlet and 50 mm. outlet.

.1. Materials

.2. The cast iron (spun) Nahni trap shall conform to M-69. The C.I. hinged or screwed down cover shall be of best quality.

.3. Workmanship

.1. The Nahni trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

.2. The Nahni trap shall be jointed with C.I. Pipe, 75 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

.1. Mode of measurement and payment

.2. The rate includes cost of all labour, materials, tools and plants etc. required for satisfactory completion of this item including lead jointing and testing.

3.2. The rate shall be for a unit of one number.

23.112. (A) (1) Providing and fixing wash down water closet (European type W.C. Pan) with integral 'P' or 'S' trap including jointing the trap with soil pipe in CM. 1:1 (1 cement :1 fine sand)(seat and cover to be measured and paid for separately) : Vitreous china pattern : In white . colour. 1.0. Materials

wash down water closet (European type W.C. Pan) shall conform to M-60. Cement mortar shall conform to M-11.

.1. Workmanship

.2. The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or fibre washers so as not to allow any lateral displacement. The joint between the trap of W.C. and soil pipe shall be made with CM. 1:1(1 cement :1 VAGHODIYA Urban Development Authority 169 of 199 fine sand).

.1. Mode of measurement and payment

.2. The rate includes cost of all materials and labour involved in all the operations described under workmanship.

.3. The rate includes cost of all labour for fixing pans and seat and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.

.4. The rate shall be for a unit of One number.

23.113. (A) Providing and fixing 100 mm. size 'P' or 'S' trap for water closet squatting pan incl

**uding jointing the trap with the pan and soil pipe in cement mortar 1:1 (1 cement :1 fine sand)
Vitreous China. 1.0. Materials:**

The 100 mm. size 'P' or 'S' trap for water closet shall conform to M-62. Cement mortar shall conform to M-11.

Workmanship

.1. The 'P' or 'S' trap shall be fixed with pan cast iron pipe with CM. 1:1. The pan shall be provided with a 100 mm. 'P' or 'S' trap as specified in the item with an approximately 50 mm. seal. The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement: 1 fine sand)

.1. Mode of measurements & payment

- .2. The rate shall include the cost of all materials and labour involved in the operations described under workmanship including testing.
- .3. The rate shall be for a unit of One number.

23.114. Providing and fixing in CM. 1:3 (1 cement: 3 coarse sand) a pair of white vitreous china 250 mm. x 130 mm. x 30 mm. foot rest for long pattern squatting pan water closet.

.1. Materials:

.2. The pair of white vitreous china foot-rests shall conform to M-62. Cement mortar shall conform to M-11.

.1. Workmanship

.2. After laying the floor, the floor shall be suitably sloped so that the waste water is drained into the pan. A pair of foot-rests of size 250 mm x 130 mm x30 mm of white vitreous china shall be set in cement mortar 1:3 (1 cement :3 coarse sand). The foot-rests shall be fixed at a distance of 175 mm. from the inner edge of the back side of the pan and shall be fixed at convenient angle.

.1. Mode of measurements & payment

- .2. The rate shall include the cost of all materials and labours involved in all the operations described under workmanship.
- .3. The rate shall be for a unit of One pair.

23.115. (A) Providing and fixing 12.5. liters low level flushing cistern with a pair of C.I. or mild steel brackets complete with fittings such as lead valveless syphon, 15 mm. nominal size brass ball valve with polythene float, C.P. brass ball handle, unions and couplings for connections with inlet, outlet and overflow pipes, 40 mm. dia. porcelain enamelled flush bend including cutting holes in walls and making good the same and connecting the flush bend with cistern and closet (overflow pipe to be measured and paid for separately) :

Vitreous China. In white colour.

.1. Materials

.2. The low level vitreous china (Enamel) flushing tank shall conform to M-65 except that the flushing cistern shall be 12.5 liters low level type as mentioned in the item.

2. Workmanship

.1. The low level cistern shall be firmly fixed on two C.I. or mild steel, brackets which shall be firmly embedded in the wall in CM. 1:4 (1 cement :4 fine sand)

.2. The height of the bottom of the cistern from the top of the pan shall be 30 cms or low level flushing cistern shall be connected to the closet by means of 40 mm. dia. white porcelain enamelled flush bend using Indian rubber adaptus joint. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive materials, non-ferrous metal or galvanised steel. The flush pipe from the cistern shall be connected to the closet by means of

cement or red-lead.

.1. Mode of measurements & payment

- .2. The rate shall include the cost of all materials, fitting and labour involved in all the operations described under workmanship including testing.
- .3. The rate shall be for a unit of One number.

23.116. Providing and fixing 12.5 liters high level C.I. flushing cistern with a pair C.I. or mild steel brackets, complete with fittings such as syphonic arrangement, 15 mm. nominal size brass ball valve withy polythene flat, lever, G.I. China (60 cms.) and pull unions and couplings for connections with inlet, outlet and overflow pipes etc. including cutting holes in walls and making good the same (overflow pipe to be measured and paid for separately).

.1. materials

- .2. The high level C.I. flushing cistern shall conform to M-66, except that the flushing cistern shall be of 12.5 liters high level C.I. flushing cistern as mentioned in the item.

.1. Workmanship

- .2. The cistern shall be fixed on two C.I. or mild steel brackets which shall be firmly embedded in the wall in cement mortar 1:4 (1 cement :4 fine sand)
- .3. The height of the bottom of the cistern from the top of the pan shall be two metres.
- .4. The W.C. Pan shall be connected to the cistern by galvanised steel flush pipes of 32 mm. nominal internal diameter. The flush pipe shall be fixed to wall by using clamps. The flush pipe from the cistern shall be connected to the closet by means of cement or red-lead. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive material non-ferrous metal or galvanised steel.
- .5. The chain and the pull union shall be fixed to the protruding lever arm of the flushing cistern.
- .6. The whole installation shall be tested for leak-proof joints and satisfactory functioning.

.1. Mode of measurements & payment

- .2. The rate shall include the cost of all materials, fittings and labour involved in all the operations described under workmanship including testing.
- .3. The rate shall be for a unit of One number.

23.117. providing and fixing in position with clamps etc. 32 mm. nominal internal dia. Galvanized steel tube flush pipe for level flushing cistern including connecting the flush pipe with cistern and closet and making good the walls and floors.

1.0. Materials

1.1 The 32 mm. nominal internal dia. galvanised steel tube flush pipe shall conform to M-56.

.1. Workmanship

- .2. The W.C. pan shall be connected to the cistern by galvanised steel flush pipe of 32 mm. nominal internal diameter. The flush pipe shall be fixed to wall by using clamps.
- .3. the flush pipe from the cistern shall be connected to the closet by means of cement or red-lead.
- .4. The flush pipe shall be securely connected to the cistern outlet by means of coupling nut made of any non-corrosive materials, non-ferrous metal or galvanised steel.

.1. Mod of measurements & payment

- .2. The rate shall include the cost of all materials, fitting and labour involved in all the operations described under workmanship including testing.
- 3.2.** The rate shall be for a unit of One running metre.

23.120. Providing and fixing G.I. inlet connection for flush pipe with W.C. Pan.

.1. Materials

.2. The G.I. inlet connection for flush pipe shall conform to M-56.

.1. Workmanship

.2. The flush pipe from the cistern shall be connected to the closet by means of cement of red-lead.

.1. Mode of measurements & payment

.2. The rate shall include the cost of all materials, fittings and labour involved in all the operations described under workmanship including testing.

.3. The rate shall be for a unit or One number.

23.127. Providing and fixing wash basin with single hole for pillar top white C.I. or M.S. brackets painted white including cutting holes, and making good the same but excluding fitting, vitreous china flat back wash basin 550 mm.x 400 mm. in white colour.

.1. materials

.2. The white glazed earthenware wash basin shall be 550 mm. x 400 mm. of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

.1. Workmanship

.2. The wash basin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in CM. 1:3 (1 cement :3 sand). The bracket shall conform to I.S. : 775-1962. The wall plaster on the rear shall be cut to rest the top edge of the wash basin. After fixing the basin, plaster shall be made good and surface finished to match with the existing one.

.3. The bracket shall be painted white with ready-mixed paint.

.4. The C.I. brass trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct into the gullytrap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under the basin and the waste is discharged into vertically.

5. The height of the front edge of the wash basin from the floor level shall be 80 cms.

2.5. The necessary inlet, outlet connections and fittings such as pillar cocks, CP brass waste trap waste pipe, stop cock, chain with rubber plug etc. shall be fixed.

2.6. The payment of fittings shall be made separately under separate items.

.1. Mode of measurements & payment

.2. The rate shall be for a unit or One number.

23.130. (C) Providing and fixing kitchen sink with C. I. or M. S. brackets painted white including cutting holes in walls and making good the same but excluding fittings. Vitreous china sink 600 mm. x 450 mm. x 150 mm. size.

.1. Materials

.2. White glazed vitreous china sink 600 mm. x 450 mm. 150 mm. size shall conform to M-63.

.1. Workmanship

.2. The Kitchen sink shall be supported on a pair of M.S. or C.I. brackets fixed in cement mortar 1:3 (1 cement :3 coarse sand). The M.S. or C.I. brackets shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest over the top edge of the sink. After fixing the sink, plaster shall be made good and the surface finished to match with the existing one.

.3. The C.P. brass trap and union shall be connected to 40 mm. dia. nominal bore galvanised mild

steel waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully-trap or direct into the gully-trap on the ground floor and shall be connected to a waste pipe or a floor trap is placed directly under the sink and the waste is discharged to it vertically.

2.3. The height of front edge of the wash basin from the floor, level shall be 80 cms.

.1. Mode of measurements & payment

.2. The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship.

.3. The rate shall be for a unit of One number.

23.135. (A) Providing and fixing 32 mm. dia. C.P. brass waste for wash basin or sink.

.1. Materials

.2. The C.P. brass trap and unions shall be of 32 mm. dia. and of best quality and make as approved by the Engineer-in-charge.

.1. Workmanship

.2. C.P. brass waste trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into drain through a floor trap. The C.p. brass waste trap shall be provided for wash basin or sink as the case may be.

.1. Mode of measurements & payment

.2. The rate includes all labours and providing C.P. brass waste trap and union including waste couplings of 32 mm.dia. The rate excludes the cost of waste pipe of 32 mm. dia.

.3. The rate shall be for a unit of One number.

23.135. (B) Providing and fixing 40 mm. dia. C.P. Brass waste for wash basin or sink.

.1. Materials & Workmanship

.2. The relevant specifications of item 23.135 (A) shall be followed except that the diameter of C.P. brass waste is 40 mm. dia.

.1. Mode of measurement & payment

.2. The rate shall be for a unit of One number.

23.136 (A) Providing and fixing 32 mm. dia. M.I. fisher union for wash basin or sink.

.1. Materials

.2. The 32 mm. dia. M.I. fisher union shall be of best quality and make as approved by the Engineer-in-charge.

.1. Workmanship

.2. The 32 mm. dia. M.I. Fisher union shall be fixed to wash basin or sink in best workman like manner.

.1. Mode of measurements and payment

.2. The rate includes all labours and materials, tools and plants etc. required for satisfactory completion of the item.

.3. The rate shall be for a unit of One number.

23.136. (B) Providing and fixing 40 mm. dia. M.I. fisher union for wash basin or sink

.1. Materials and Workmanship

.2. The relevant specifications of item No. 23.136 (A) shall be followed except that the diameter of M.I.Fisher union shall be 40 mm. dia.

.1. Mode of measurements of payment

.2. The rate shall be for a unit of One number.

23.139 Providing and fixing 100 mm. dia. sand cast iron grating for gulley, floor or Nahni trap.**.1. Materials**

.2. The 100 mm. dia. sand cast iron gratings for gulley, floor or Nahni trap shall be of best quality and make as approved.

.1. Workmanship

.2. The cast iron grating shall be providing to gulley trap floor or Nahni trap as the case may be in best workman like manner.

.1. Mode of measurements and Payment

.2. The rate includes cost of all labour, materials, tools and plants, etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of One running metre.

23,141. (A) Providing and fixing 100 mm. dia C.P. brass shower rose with 15 mm or 20 mm. inlet.**.1. Materials**

.2. 100 mm. dia. C.P. brass shower rose shall conform, to I.S; 2556-1972 part-XI and best quality and make as approved by the Engineer-in-charge. The inlet of shower rose shall be 15 mm. dia. or 20 mm. dia as directed.

.1. Workmanship

.2. The C.P. brass shower rose shall be fixed as directed with 15 mm. dia. or 20 mm. dia. G.I. inlet pipe as the case may be.

.1. Mode of measurements and payment

.2. The rate includes all labour and materials, tools and plant etc. required for satisfactory completion of this item.

.3. The rate shall be for a unit of One number.

23.143. Providing and fixing 600 mm. x 450 mm. bevelled edge mirror of superior glass mounted on 6 mm. thick A.C. Sheet or plywood sheet and fixed to wooden plugs with C.P. brass screws and washers.**.1. Materials**

.2. The 600 mm. x 450 mm. size mirror shall be of superior glass with edge rounded off for beveled as specified. It shall be free from flaws specks, or bubbles and its thickness shall not be less than 6 mm. The glass for the mirror shall be uniformly silver plated at the back and shall be free from silvering defects. Silvering shall have a protective uniform covering of red lead paint. The 6 mm. thick plywood shall conform to M-37 the 6 mm. thick A. C. Sheets shall conform to M-24. •

2.0. Workmanship

2.1. The mirror of 600 mm. x 450 mm size mounted on A.C. Sheet or plywood 6 mm. thick with C.P. brass,, clips shall be fixed as directed, by fixing wooden plugs in wall and C.P. brass screws and washers. The work shall be carried out in best workman like manner.

.1. mode of measurments & payment

.2. The rate includes cost of all labour and materials tools and plant etc. required for satisfactory completion of this item. The rate shall be for a unit of One number.

23.144 (B) Providing and fixing 600X20 mm. C.R brass towel rail complete with C.R brass brackets

fixed to wooden plugs with and C.P. brass screws.

.1. Materials

.2. The C.P. brass towel rail shall be 600 X 20 mm. of best quality as approved by the Engineer-in-Charge. . The brackets shall be of C.P. brass. The rail shall conform to I.S. 1068-1958.

2.0. Workmanship

2.1. The brackets of the towel rail shall be fixed by means of C.P. brass screws to wooden plugs firmly embedded in the wall with CM. 1:3 (1 cement : 3coarse sand). The towel rail shall be fixed as and w h e r e directed.

.1. Mode of measurements and payment

.2. This rate includes cost of all labour and materials, tools and plant etc. required for satisfactory completion of this item.

.3. The rate shall be for a unit of One number.

23.145. Providing and fixing 600 mm.x 120 mm. glass shelf with C.R brass brackets and guard rail complete, fixed to wooden plugs with C.R brass screws.

1.0. Materials

The glass shelf of 600 mm. x 120 mm. size shall be of 5mm. thick plate glass. The edge of the glass shall be grounded. The C.P. over brass guard rail shall be of best quality and make.

.1. Workmanship

.2. The C.P. brass brackets of the glass shelf shall be fixed with C.P. screws to wooden plug firmly embedded in the wall CM. 1:3 (1 cement : 3 coarse sand). The C.P. guard rail shall be fixed to glass shelf as directed.

.1. Mode of measurements and payment

.2. The rate includes all labor and materials tools and plant etc. required for satisfactory .completion of this item.

3,2. The rate shall be for a unit of One number

23.146. (A) Providing and fixing C.P brass toilet paper holder. 1.0. Materials :

The toilet paper holder shall be of best quality and make chromium plating shall be of grade 'B' type conforming to I.S. 1068-2958. '

.1. Workmanship

.2. The toilet paper holder shall be fixed in position be means of screws and wooden plugs embedded in wall with cement 1:3 (1 cement : 3 coarse sand)

Mode of measurements and payment

.1. The rate includes cost of ail labour and materials, tools and plant etc. required for satisfactory completion of this time.

.2. The rate shall be for a unit of One number.

23.92(A) (I) Providing and fixing brass screw down bib taps of following size. Polished bright: 14 mm. dia.

1.0. Materials

15mm. dia. brass screw down with bright polished finish shall conform to I.S. 781-1977. The bib cock shall be best Indian make and quality.

.1. Workmanship

.2. The screw down bib cock 15 mm. dia. as specified above shall be fixed as directed. The threaded

portion shall be smeared with white or red lead and around with a few turns* of fine spun yarn round the screwed end of the pipe. The bib cock shall be then screwed and fixed to water tight position

.1. Mode of measurement and payment

.2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.

.3. The rate shall be for a unit of One number.

23.92(A) (II) Providing and fixing brass screw down bib taps of following size : Polished bright : 20 mm dia

1.0. Materials and Workmanship "

The relevant specifications of item 23.92 (A) (I) shall be followed except that the bib taps of 20 mm. dia. shall be fixed.

.1. Mode of measurements & payment

.2. The relevant specification of item 23.92 A (i) shall be followed.

.3. The rate shall be for a unit of One number.,

23.92 (B) (I) Providing and fixing chromium plated brass screw down bib taps of the following size : 15 mm. dia.

1.0. Materials and workmanship

The relevant specification of item No. 23.92 (A) (I) shall be followed except that the brass chromium plated screw down tap of 20 mm. dia. shall be fixed.

.1. Mode of measurements & payment

.2. The rate shall be for a unit One number.

23.92 (B) (II) Providing and laying chromium chromium plated brass screw down bib taps of following size : 20 mm. dia.

1.0. Materials and workmanship

The relevant specification of item No. 23.92 (A) (I) shall be followed except that the brass chromium plated screw down tap of 20 mm. dia. shall be fixed.

.1. Mode of measurements and payment

.2. The rate shall be for a unit of One number.

23.92 (C) (I) Providing and fixing gun metal screw down bib taps of the following size ; 15 mm. dia.

.1. Materials and workmanship

.2. The relevant specification to item No. 23.92 (A) (I) shall be followed except that the 15 mm. dia. gun metal screw down bib tap shall be fixed.

.1. Mode of measurements and payment

.2. The rate shall be for a unit of One number.

23.92 (C) (II) Providing and fixing gun metal screw down bib taps of the following size : 20 mm. dia.

.1. Materials and workmanship

.2. The relevant specification to item No. 23.92 (A) (I) shall be followed except that the 20 mm. dia. gun metal screw down bib tap shall be fixed.

.1. Mode of measurements & payment

.2. The rate shall be for a unit of One number.

23.95 (A) Providing and fixing biller tap capstan head screw down high pressure with screw shank and back nuts : (A) 15 mm. dia. (B) 20 mm. dia.

1.0. Materials :

The capstan head piller tap of specified dia. of C.P. over brass shall be of best quality and shall conform to I.S. : 1795-1961. The piller taps shall be of tested quality.

.1. Workmanship

.2. The capsten head piller tap of specified dia. shall be fixed as directed with required washers of selected leather of rubber asbestos composition or of plastic as directed. The cock shall fixed with pipe line with white zinki end spun yarn, to make joint water tight. The work shall be carried out in best workman like manner.

.1. Mode of measurements and payment

- .2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.
- .3. The rate shall be for a unit of One number.

23.96 (A) Providing and fixing brass screw down stop cock (A) 15 mm. dia. (B) 20 mm. dia. (C) 25 mm. dia.

1.0. Materials :

The brass screw down stop cock of specified dia shall conform to I.S. : 781-1977. The slop cock shall be of tested quality.

.1. Workmanship

.2. The stop cock shall be fixed in position by means of jam but and socket. The stop cock shall be fixed near the inlet of the water meter or as directed. The joints shall be done with white zinc and spun yarn. The joint shall be tested for leak proofing.

.1. Mode of measurements and payment

- .2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.
- .3. The rate shall be for a unit of One number.

23.99 Providing and fixing gun metal check or non-return valve. (A) 15 mm. dia. (B) 20 mm. dia. (C) 25 mm. dia. (D) 32 mm. dia. (E) 40 mm. dia.

1.0. Materials :

The gun metal check or not return full way wheel valve or specified dial, shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality.

.1. Workmanship

.2. The gun metal check or non return shall be fully cleared of all foreign matter before fixing. The fixing of shall be done by means of bolts nuts and 3mm. rubbe insertions with flanges of spigot and socketed tail pieces, drilled to the same specification as in case of socket and spigot flanges in case of Hanged pips. The jointing shall be done leak proof.

.1. Mode of measurements and payment

- .2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory

completion of this item.

.3. The rate shall be a unit of One number.

23.00 Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. (I) 20 mm. dia. (II) 25 mm. dia. (III) 32 mm. dia.

1.0. Materials : ..

Chromium ploated brass half turn flush cock shall conform to M-67.

2.0. Workmanship

The hall turn flush cock of specified diameter shall be fixed as directed. The flush cock shall be fixed in G.I. pipe line with necessary fittings. The joints shall be made leak proof by using spun yarn and white zink. The fixing work shall be carried out as per relevant specifications of item No. 23.2. (4).

.1. Mode of measurments and payment

.2. The rate includes cost of all labour and materials, required for satisfactory completion of this item including fittings.

3.2. The rate shall be a unit of One number.

23.00, 4 Providing and fixing chromium plated bottle trap with necessary coupling of approved quality for wash basin.

1.0. Materials :

The chromium plated bottle trup shall be of approved make and of best quality. The bottle trap shall be provided with coupling.

2.0. Workmanship

The bottle trap shall be fixed on wash hand basin with wooden gullies and screws as directed. The world shall be carried out in best workman like manner.

.1. Mode of measurements and payment

.2. The rate includes cost of all labour and materials for satisfactory completion of this item.

3.2. The rate shall be a unit of One number.

23.122. (A) Providing and fixing urinal of approved quality including connecting the urinal with waste pipe, trac etc. complete : white earthen ware flat back or corner type size 430 mm. x 260 mm. x 350 mm.

1.0, Materials :

The white earthenware flat back or corner type urinal of size 430 mmx 260 mm. x 350 mm. shall conform to M-64.

.1. Workmanship

.2. The urinals shall be fixed in position by using wooden plugs and screws and shall be at a height 65 cms. from the floor level to the top of the lip of urinal, unless otherwise directed. The wooden plugs shall be of 50 mm. x 50 mm. at base lapparing to 38 mm. x 38 mm. at top and 50 mm. in length shall be fixed in wall in -cement mortar 1:3 (1 cement : 3 coarse sand) The urinal shall be connected to 32 mm. dia. galvanised miled steel waste pipe which shall discharge in the channel or floor trap. The connection between the urinal and flush or waste pipe shall be made by means of putty or white lead mixed with chooped hemp.

.1. Mode of measurements and payment

.2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be a unit of One number.

23.124(A) Providing and fixing urinal of approved quality including connection with trap and with integral longitudinal flush pipe squatting plate pattern white earthenware 550 mm. x 300 mm.

1.0. Materials :

The squatting plate pattern, white glazed earthenware urinal of 550mm. x 300 mm. shall conform to IS. 771-1063. It "shall be of best Indian make.

2.0. Workmanship

2.1. The squatting plate urinal shall be fixed as directed.

2.2. The top edge of the squatting plate shall be flush with the finished floor level adjust to it. It shall be embedded on a layer of 25mm. thick cement mortar 1:8 (1 cement : 8 fine sand) laid over a bed of burnt brick at cement 1:5:10 (1 cement : 5 fine sand, 10 graded brick aggregate 20 mm. nominal size). There shall be 100 mm. dia. glazed earthenware or vitreous china channels as specified with stop and outlet pieces suitably fixed in floor in cement mortar 1:3 (1 cement : 3 coarse sand) and joint finished with white cement. The earthenware vitreous china shall discharge into 65 mm. C.P. brass outlet grating. The trap and fitting shall be fixed as directed.

.1. Mode of measurements and payment

.2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be a unit of One number.

23.134. Providing and fixing rubber plug for sink or wash basin.

1.0. Materials :

The rubber plug for sink or wash hand basin shall be best quality and make as approved by the Engineer-in-charge.

.1. Workmanship

.2. The rubber plug with chain shall be fixed in wash basin or sink as directed.

3.0 Mode of measurements and payment

3.1. The rate shall be a unit of One number.

23.00. 5.(A) Providing and fixing ball cock of approved quality as directed (Copper metal) : (I) 25 mm dia. (II) 50 mm, dia.

1.0. Materials :

The ball cock of specified diameter shall conform to M- 75.

2.0. Workmanship

The ball cock of specified diameter shall be fixed as directed. The fixing of ball cock shall be carried out as per relevant specification of item No. 23 (A) for joints etc.

.1. Mode of measurements & payment

.2. The rate includes cost of all materials and labour involve for carrying out satisfactory work.

.3. The rate shall be for a unit of One number.

23.00.5. (li) Providing and fixing ball cock of approved quality as directed:- Abonite. (I) 25 mm. dia. (II) 50 mm. dia)

1.0. Materials & Workmanship : The relevant specifications of item No. 23.00.5 (A) shall be followed except that the ball cock of specified dia of Abonite shall be fixed.

.1. Mode of measurement & Payment

.2. The relevant specifications of item No. 23.00.5 (A) shall be followed.

.3. The rate shall be for unit of One number.

23.00.6. Providing and fixing C.I. Manhole cover 0.60 cm. x 0.45 cm. size having weight not less than 35 kg.

1.0. Materials

C.I. Manhole cover of 0.60 x 0.45 cms. size shall be of best quality. The weight of C.I. cover and frame shall not be less than 35 kg. The C.f. manhole cover shall be of light duty and conform relevant I.S.

.1. Workmanship

.2. The C.I., Manhole cover shall be fixed as per relevant specifications of item No. 24.44 except that the C.I. cover shall be fixed as and where directed.

3.0. Mode of measurements & payment

3.1.. The rate includes cost of all labour and materials required for satisfactory completion of this item.

3.2. The rate shall be for a unit of One number.

23.00.7. Providing and fixing G.I. rain water spout of 50 mm. dia. and 30 cms. length.

1.0. Materials :

G.f.M.S. tube of 50 mm. dia. shall conform to M-56.

2.0. Workmanship :

2.1. The G.I. pipe of 30 cms. fixed as rain water pipe as directed. The pipes shall be fixed about 1/4 dia below the floor level so as to make approach of water easy. The inlet of pipe shall be rounded off for easy entry of rain water pipe. The pipe shall be fixed in CM. 1:3.

3.0. Mode of measurements & payment

.1. The rate includes of all labour and materials required for satisfactory completion of this item.

.2. The rate shall be for a unit of One number

23.8. Providing and fixing to wall ceiling and floor 6 Kg. F/Sq.cm. working pressure outside diameter, low density completion with special flange compression type fittings wall clips etc. including making good the wall, ceiling and floor. (A) 20 mm. dia. (B) 25 mm.dia. (C) 32 mm.dia. (D) 40 mm. dia. (E) 50 mm.

dia. 1.0. Materials: -

The low density polythene pipe of specified diameter with 6 Kg/F.Sq.Cm. working pressure shall conform to I.S. 3076-1986. The specials and fittings required shall be of best quality.

.1. Workmanship

.2. The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due allowance shall be made particularly in over-ground pipe line for any change in length of pipe line which may occur during installation or when pipe line is in service. .3. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed or their protection against dirt, sun rays and mechanical damage.

.3. The rigid P.V.C. lines should not be kept exposed above ground when it passes through public places, railway lines, roads, road side and footpaths.

.4. P V.C. pipes shall be supported at the following intervals :

-20 mm. dia. 500 mm. -25mm. dia. 750 mm. - 32mm. dia. 900 mm.

.5. Close support spacing shall be provided if recommended by the manufacturer.

.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

.7. P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.

.8. Jointing the pipes :

.1. The pipes and sockets shall be accurately cut the ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after joining. Empty solvent cement tins, brushes, rags and paper impregnated with cement should be buried in the trenches, they should be gathered, not left scattered about, as they can prove to be a hazard to

animals, which may chew them

.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge. 'v

2.9. Laying pipes in trenches :

.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such as large fints, rocky projections, large tree roots, etc. The width of the trenches shall be minimum width required for working.

.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to retraction. Any deviation required shall to be obtained by using proper type of rubber ring joints.

.1. Mode of measurements & payment

.2. The relevant specifications of item No. 23.2.(A) shall be followed except that the RVC. pipes of specified dia. shall be paid under this item.

.3. The unit rate shall be for a unit-of One running metre.

SECTION - 24

Drainage & Sewerage

24.1. (A) Providing any laying (two level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone-ware pipes, following nominal internal diameters including testing of pipes and joints complete : 100 mm. dia.

1.0. Materials

(I) Water shall conform to M-I (2) Cement mortar of proportion 1:1 shall conform to M-II (3) 100 mm. dia. glazed stoneware pipe shall conform to M-71.

.1. Workmanship

.2. The trenches for stoneware pipe drains shall be carried out as per relevant specifications of item No. 23.4 (A) except that the work is for stoneware pipes of 100 mm. dia.

.3. Laying :

2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.3.. Jointing :

.1. Tarred gask in or yarn soaked in neat cement slurry shall first be placed around the spigot of each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home so as to fill not more than 1/4th of the total depth of (13 mm. in depth) of the socket.

.2. The remainder of the sockets shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 45° with the barrel of the pipe.

.3. The mortar shall be mixed as necessary for immediate use.

.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or "badger". The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking of other suitable materials which shall be used the purpose.

.5. The mortar shall be cured for 1,0 days. 2.4. Testing of joints :

.1. If any leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.

.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

.1. Mode of measurements and payment

.2. Pounding or bottoming of the trenches bed to fit the lower part of the pipe and "Grips" dug to take socket; collars etc. are included in the rate of laying the pipes.

.3. The measurements shall be net without any allowance for cutting, and waste. The length of bends. Junctions and other connections shall be included in the total length of drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete.

.4. The rate shall be for a unit of One running metre.

24.1. (B) Providing and laying and jointing salt glazed stoneware pipes with lime concrete 1:2:4 (1 lime : 2 fine sand : 4 graded brick aggregate 40mm. nominal size) bedding with necessary form work and curing etc. complete : 150 mm. dia.

1.0. Materials & Workmanship : The relevant specifications, of item

24. (A) Shall be followed except that the diameter of pipe shall be 150 mm. dia.

.1. Mode of measurements and payment

.2. The relevant specifications of item No. 24.1 (A) shall be followed. .

.3. The rate shall be for a unit of One running metre.

24.2. (A) Providing and laying cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone: aggregate. 40 mm. nominal size) bedding for stoneware pipe of following internal diameter with necessary formwork and curing complete : 100 mm. dia. 300 mm. width (112 mm. average bed thickness).

1.0. Materials :

(1) Water shall conform to M-I. (2) Cement shall conform to M-3. (3) Sand shall conform to M-6 (4) Stone aggregate 40 mm. nominal size shall conform to M-I2.

.1. Workmanship

.2. The relevant specifications of item 5.3.4. shall be followed except that the concrete work shall be carried out in trenches as bedding for stoneware pipes. The width of concrete shall be 300 mm. and average, thickness of bedding shall be 112 mm. The concrete shall be brought up atleast to the invert level of the pipe to form a cradle and to avoid line contact between the pipe and the bed.

3.0. Mode of measurements & payment

.1. The rate includes cost of all labour and materials required for satisfactory completion of this item.

.2. The rate includes cost of necessary form work required if any.

.3. The rate shall be for a unit of One running metre.

24.2. (B). Providing and laying cement concrete 1:5:10 (1 cement: 5 fine said : 10 graded stone aggregate 40 mm. nominal size) bedding for stoneware pipe of following internal diameters with necessary form-work and curing complete : 150 mm. dia. 450 mm. width (166 mm. average bed thickness).

1.0. Materials & Workmanship :

The relevant specifications of item 24.2 (A) shall be followed except that the cement concrete work shall be carried out for bedding of stoneware pipe of 150 mm. dia. The average thickness of bedding shall be 166 mm. and width shall be 450 mm.

- .1. Mode of measurements & payment
- .2. The relevant specifications of item 24.2 (A) shall be followed.
- .3. The rate shall be for a unit of One running metre.

24.19 (I) Providing and fixing S.W. gully trap with C.I. grating brick masonry chamber and watertight C.I. cover with frame of 300 mm. x 300 mm. size (Inside) with standard weight: (A) square mount taps 100 ,mm. x 100 mm. size P. type.

1.0. Materials

(1) Water shall conform to M-I. (2) Cement mortar of proportion 1:5 shall conform to M-II. (3) Burnt brick shall conform to M-15. (4) The S.W. Gully trap of 100 mm. x 100 mm. size shall conform to M-70.

.1. Workmanship

.2. Excavation for gully trap shall be done true to dimensions and levels as indicated on plans or as directed. The excavation work shall generally be done as per relevant specification of item 4.0.0. of earth work,

.3. Fixing :

2.2.1. The gully trap shall be fixed over cement concrete 1:5:10 (1 cement : 5 and : 10 graded brick bats aggregate, 40 mm. nominal size) foundation, 650 mm. square and 100 mm. thick. The depth of top of concrete below the ground level shall be 675 mm. The jointing of gully outlet to the branch drain shall be done similar to jointing of S.W. pipe as described in item No". 24.1. (A)

2.4. Brick masonry chamber : After fixing and testing gully and branch drain, a brick masonry 300 x 300 mm. inside with bricks in CM 1:5 (1 cement: 5 sand) shall be built with a 100 mm. brick work round the gully trap from the top of the concrete upto ground level. The space between the chamber walls and the trap shall be filled with cement concrete 1:5:10. The upper portion of the chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1:3 (1 cement : 3 sand) finished with floating coat of neat cement. The corners and bottom of the chamber shall be rounded of so as to slope towards the grating.

2.5. C.I. cover with frame 300 mm. x 300 mm. (inside) size shall then be fixed on the top of the brick masonry with C.C 1:2:4 (1 cement : 2 coarse sand : 4 graded aggregate 20 mm. nominal size) 40 mm. thick and rendered smooth. The finished top of the cover shall be left about 40 mm. above the adjoining ground level so as to exclude the surface water from entering the gully trap.

.1. Mode of measurements & payments

- .2. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as described above.
- .3. The rate shall be for a unit of One number basis.

24.22. Providing and laying (to level or slopes) and jointing reinforced concrete light duty non-pressure

pipe IS. class N.R 2 of the following internal diameters with cottars and butt ends prepared for collar joints including testing of joints etc. complete. (B) 150 mm. (C) 250 mm. (3) 300 mm. (E) 450 mm. (f) 500 mm. (G) 600 mm. (H) 900 mm. (K) 1000 mm. (M) 1200 mm.

10. Materials :

The reinforced concrete light duty non-pressure pipes of specified diameter shall conform to I.S. 458-1971.

.1. Workmanship

.2. The relevant specifications of item No. 24.1, shall be followed for work of trenches except that the excavation in trenches shall be for reinforced concrete pipes of specified diameter.

.3. Laying :

.1. The pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Where necessary pipe shall be laid in straight lines or with easy curves and true to line and gradient as specified. The laying of pipe shall proceed up grade of a slope. In the pipe spigot and socket joints, the socket ends shall face upstream. In case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid.

.2. In case where the foundation conditions are unusual such as the proximity of trees or holes, under existing or proposed around in 150 mm. thick cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm. nominal size) or compacted sand or gravel.

.3. In case where the natural foundation is inadequate the pipes shall be laid either in concrete cradle, supported on proper foundations or on any other suitably designed structure. If concrete bedding is used, the depth of concrete, below bottom of the pipe shall be at least 1/4 of the internal diameter of the pipe subject to a minimum of 100 mm. and a maximum 300 mm. The concrete shall be extended up the sides of the pipe at least to a distance of 1/4 of the outside diameter for pipes 300 mm. and over in diameter.

2.2.4. The pipes shall be laid in the concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly and as far as up to the haunches of the pipe as to safely transmit the load expected from the back fill through the pipe to the bed. This shall be done either by excavating the bottom of the trenches to fit the curve of the pipe or by compacting the earth under a round curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.

2.3. Jointing :

2.3.1. The joints shall be done by slipping the collar over and clear of the end of the pipe. The recess of the end of the pipe shall be filled with jute threading in hot bitumen. The new pipe shall then be brought forward until the bitumen ring in recess of first pipe is set into the recess of the second pipe. The process shall be repeated for two or three pipes which shall then be jacked up so as to thoroughly compress the bitumen. The quantity of jute and bitumen shall be just enough to fill the recess when pressed hard by jacking, care being taken that no offset of the jute braiding shall be visible either outside or inside of pipe. The collar shall then be set up over the joints covering equally both the pipe and leaving an even caulking space all round. Cement and sand mortar 1:1:1/2 shall then be well punched or pressed home with a caulking tool within this caulking space. Care shall be taken that the underside of the joints is properly filled with mortar.

2.4. Curing :

2.4.1. Every joint shall be kept wet for about 10 days for maturing. The section of the pipe line laid and jointed shall be covered immediately to protect from weather effects. Minimum bore of 100 mm. is considered adequate.

2.4.2. The joints shall be left exposed for observation.

2.5. Testing of joints :

2.5.1. The testing of joints shall be done as per relevant specifications of item No. 24.1 (A) except

that the testing of reinforced concrete pipes shall be done.

3.0. Mode of measurements & payment

.1. The relevant specifications of item 24.1, (A) shall be followed except that the rate includes for laying to level or slope in trenches etc. (measured separately), making the joints as indicated and testing to stand the water test.

.2. The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connections (measured along the centre line) shall be included in the total length of the pipes, the connections being numbered after-wards and paid for extra over pipes.

.3. The size of the bends, junctions, etc. shall suit the size of pipe. The bore (internal diameter of pipe) shall be the criterion for payment .

.4. Nothing extra shall be paid separately for the use of mechanical appliances, where necessary, as described above.

.5. The rate shall be for a unit of one running metre.

24.27. Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. size) inside plastering 15 mm. thick with CM. 1:5 (1 cement : 5 coarse sand) finished with floating coat of neat cement and making channels in CC. 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20 mm. nominal size) finished smooth complete including curing and testing (I) Inside size 900 mm. x 120 mm. and 1.5 mm. deep, including CI cover with frame size 560 mm. diameter, total weight of cover and frame to be not less than 128 Kgs. (Wt. of cover 64 kg. and Wt. of frame 64 Kg.) (A) with 230 mm. thick walls of brick masonry using bricks having crushing strength not less than 35 Kg/Sq.cm. in CM. 1:5 (1 cement : 5 coarse sand)

- | | | | |
|-----|--------------|------------|-------------------|
| i | A type depth | 0.90 metre | for 150 mm. sewer |
| ii | B type depth | 1.50 metre | for 150 mm. sewer |
| iii | C type depth | 2.25 metre | for 150 mm. sewer |
| iv | D type depth | 3.15 metre | for 150 mm. sewer |

Materials :

1.0 Materials :

Water shall conform to M-I. Cement shall conform to M-6. Burnt bricks shall conform to M-156. Brick bats of 40 to 50 mm. size shall conform to M-14. Stone coarse aggregate of 20 mm. nominal size shall conform to M-I2. Grit shall conform to M-8. Cement mortar of specified proportion shall conform to M-11. The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S. 1726-1966.

.1. Workmanship

.2. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawing or as directed.

.3. Bed Concrete :

2.2.1. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawing or as directed.

2.2. Bed Concrete

.1. The manhole shall be built on a bed of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats) (40 to 50 mm. nominal size) to the thickness of the bed concrete shall be 15 cms. For manhole upto I.M. depth and 20 cms. for manholes over metre and upto 2 metres. depth and 30 cms. For manhole upto 1.M. depth and 20 cms. for manholes over metre and upto 2 metres, depth and 30 cms. for manholes of greater depth.

.2. Projection of bed concrete beyond the masonry wall shall be 15 cms.

2.3. Walls :

2.3.1. The walls of manhole shall be carried out with burnt bricks using bricks, having crushing strength not less than 35 Kg/Cm² in CM. 1:5 (1 cement : 5 coarse sand). The thickness of brick masonry wall shall be 230 mm. The jointing face of such brick shall be well buttered with cement mortar before laying so as to ensure full joints.

2.4.. Plaster :

2.4.1. The inside of walls shall be plastered 15 mm. thick with CM. 1:5 (1 cement : 5 coarse sand) are finished with floating coat of neat cement. All angles shall be rounded to 7.50 cms. radius and all rendered in internal surface shall have hard in pervious finish obtained by using a steel trowel. The external joints of masonry shall be finished smooth.

2.5. Channels & Benching :

.1. Channels shall be semicircular in the bottom half and of diameter equal to the sewer. Above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the out going pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given.

.2. The channel and benching shall be done in C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) rising at a slop in line from edges of channel. The channels of the bottom of the chamber shall be plastered with CM. 1:2 (1 cement : 2 coarse sand) and steel trowelled smooth.

2.6. Cover Slab :

2.6.1. The cover slab of R.C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width of wall shall be given to the slab on all sides The frame of manhole cover shall be embedded firmly in R.C.R., slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.7. Testing :

- .1. Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.
- .2. After completion of work, manhole covers shall be scaled by means of thick grease.

.1. Mode of measurements and payment

- .2. The depth of man holes shall be distance between the lop of the manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools,m and plant etc. required for satisfactory completion of this item as directed above.
- .3. The rate shall be for a unit of One number.

24.28. (I) Extra rate for constructing B.B. masonry for every additional depth of 0.1 M. or part thereof over item 24.27 (I) for depth from 0.90 M. to 1.5. M.

1.0. Materials and Workmanship :

The relevant specifications of item No. 24.27 (I) shall be followed for excavation except that the depth of manhole shall be done 0.1. M. or part thereof more than 0.90 metre upto 1.5. M. The extra payment shall be made for additional depth of 0.1. M. or part thereof manhole done over and above the depth 0.90 metre.

.1. Mode of measurements and payment :

- .2. The relevant specifications of item No. 24.27 (I) shall be followed except that the extra rate shall be paid for every additional depth of 0.1. M. and part thereof shall be paid over and above the rate of item No. 24.27 (I)

2:2. The rate shall be for a unit of One number.

24.28. (11) Extra rate for constructing B.B. masonry for every additional depth of 0.1. M. and part thereof over item 24.27 (ii) for depth from 1.5 M. to 2.25 M.

1.0. Materials and Workmanship :

The relevant specifications of item No. 24.27 (II) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 1.5. M. upto 2.25 M. The extra payment shall be made for additional depth of 0.1.M. or part thereof manhole done over and above the depth 1.50.m. upto 2.25 M.

2..0. Mode of measurements & payment

- .1. The relevant specifications of item No. 24.27 (II) shall be followed except the extra rate shall be paid for 0.1.M. or part there of additional depth of manhole provided over and above item 24.27 (II).
- .2. The rate shall be for a unit of One number.

24.28 (III) Extra rate for constructing B.B. masonry for every additional depth of 0.1. M. or part thereof over item 24.27 (III) for depth from 2.25 to 3.15 m.

1.0. Materials and Workmanship :

Thevante rel specifications of item No. 24.27 (III) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 2.25.M. upto 3.15.M. The Extra payment shall be made tor additional depth of 0.1. M. or part thereof manhole done over and above the depth 2.25,M. upto 3.15 M. '

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 24.27 (III) shall be followed except that the extra rate shall be paid 0.1. M. or part there of additional depth of manhole provided over and above item 24.27 (III).
- .3. The rate shall be for a unit of One number.

24.28. (IV) Extra rate for constructing B.li. masonry for eveiy additional depth 0.1. M. or part thereof over item 24.27 (IV) for depth above 3.15 M.

1.0. Materials and Workmanship :

The relevant specifications of item No. 24.27 (IV) shall be followed except that the depth of manhole shall be done 0.1. M. or part thereof more than 3.15 M. upto

- .1.2. The Extra payment shall be made for additional depth in manhole 0.1. M. or part thereof done above 3.15 M. and above depth.

.1. Mode of measurements & payment

- .2. The relevant specifications of item No. 24.27 (IV) shall be followed except that the extra shall be paid for every additional 0.1. m. or part thereof depth provided for and above item 24.27 (IV).
- .3. The rate shall be for a unit of One number.

24.33. Providing and fixing C.I. steps of size 500 x 150 mm. 22.5 m. and painting with two coats of anti-corrosive paint etc. complete. 1.0. Materials : The C.I. steps of size 500 x 500 x 22.5 mm. size shall conform I.S. 5455-1969. Paint shall conform to M-44.

.1. Workmanship :

- .2. The C.I. steps of size 500 x 150 x 22.5 mm. size shall be fixed in manhole as and where directed. The steps shall be staggered in vertical runs 38()*mrii. apart horizontally. The top step shall be 450 mm. below the manhole cover and lowest not more than 300 mm above the benching. The steps shall be embedded in wall of manhole with C.C. 1:3:6 upto 200 m. depth and the surface finished with cement plaster 15 mm. thick in CM. - 1:5. The steps shall be painted with two coats of anti-corrosive paint.

3.0. Mode of measurements & payment

- .1. The rale includes all labour, materials,-tools and plants etc. required for satisfactory completion of this item.
- .2. The rate shall be for a unit of One Number.

24.39. Providing and erecting at the site of work steel ventilating column of 150 mm. dia. and 12.20 M. high from G.L. to bottom of top grill, including C.I. grill and base plate, bolts and nuts etc. and excavations in foundation of size 120 x 120 x 165 cms. and filling the pit with 1st layer or cement concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm. nominal size) of size 120 x 120 x 90 cm. and remaining pit with B.I.C.C. 1:3:6 mix (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. size) and providing filled in cement concrete : 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) at G.L. and 3 coats of silver paint etc. complete.

1.0. Materials :

The steel ventilating column internal dia. 150 mm. 12.20 M. high shall be of standard make and best quality as approved. Stone aggregate of 20 mm. nominal size shall conform to M-12. Brick-bats 40 to 50 mm. nominal size shall conform to M-14 Cement shall conform to M-3 Water shall conform to M-1. Silver (aluminum) paint shall conform to IS. 2339-1963.

1.1. Workmanship

2. The vent Shaft shall be provided at the starting point of main sewer and at such points where the flow of sewerage is disturbed i.e. at falls, syphons etc. As far as possible, the location shall be at such a place where it receives sunrays for the maximum period, of the day. 3. A pit of 120 x 120 x 165 mm. size shall be dug. The cement concrete of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm. nominal size) shall be first laid in the pit to form 90 cms. thick concrete foundation which shall be allowed to set for 24 hours. The vent shaft shall then be erected at the centre of the pit truly in plumb by means of such as shear legs, pulleys, backless and rope etc.

2.3. The connection with sewer man-hole shall be made using 150 mm. diameter cement concrete pipe. After the connection is completed, the pit shall be filled with cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats 40 to 50 mm. nominal size) round the vent shaft up to ground level except top 150 mm. which shall be filled with C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and rendered smooth, The junction of vent shaft with cement concrete shall be grouted with cement mortar 1:1 (1 cement : 1 sand) The concrete work shall be cured for 7 days.

2.4. The steel shaft shall be painted with silver paint (aluminum paint) 3 coats. The relevant specification of item of painting shall be followed for painting.

3. 0. Mode of measurement and payment

3.1. The rate shall include the cost of all labours and materials, tools and plant etc. required for satisfactory completion of this item as directed above.

3.2. The rate shall be for a unit of One number.

24.00.1. (A) Providing and laying lime concrete 1:2:4 (1 lime putty : 2 fine sand : 4 graded brick aggregates 40 mm. nominal size) bedding for stoneware pipes of following internal diameters with necessary form work and curing complete : 100 mm. dia. (112 mm. average bed thickness).

1.0. Materials :

Water shall conform M-1. Lime mortar shall conform to M-10. Brick aggregate 40 mm. nominal size shall conform to M-14.

2.0. Workmanship

The relevant specifications of item No. 5.1.8 shall be followed except that the proportion of mix shall be 1:2:4 (1 Lime putty : 2 fine sand : 4 graded brick aggregate 40 mm. nominal size) and the concrete work shall be done in trenches for bedding of stoneware pipes of 100 mm. dia. The width of concrete shall be 300 mm. and the thickness of bedding shall be 112 mm. average.

3.0. Mode of measurements and payment

3.1. The rate shall be for a unit of One running metre.

24.00.i (B) Providing and laying lime concrete 1:2:4 (1 lime poutty : 2 fine sand : 4 graded brick aggregates 40 mm. nominal size) bedding for stoneware pipes of following internal diameters with necessary form work and curing complete : 150 mm. dia. (166 mm. average bed thickness).

1.0. Materials and Workmanship : The relevant specification of 24.00 (A) shall be followed except that the concrete bedding shall be carried out for 150 mm. dia. stoneware pipe. The width of concrete bedding shall be 450 mm. and the average thickness shall be 166 mm.

2.0. Mode of measurements and payment

2.1. The relevant specification of item 24,2. (A) shall be followed.

2.2. The rate shall be for a unit of One running metre.

24.27. (1) Extra over item 24.1. for providing salt glazed stoneware fittings : Bends of required degree (Any Radius) of following internal diameters : A-100 mm. dia. B-150 mm. dia.

1.0. Materials & Workmanship : The relevant specifications of item 24.1. (A) shall be followed except that the salt glazed stoneware bends of any degree of specified diameter shall be provided.

2.0. Mode of measurements & payment :

2.1. The relevant specifications of item No. 24.1 (A) shall be followed except that extra payment shall be made for providing salt glazed stoneware bend of specified diameter of required degree of any radius over and above the of item No. 24.1.

2.2. The rate shall be for a unit of one number.

24.27. (II) Extra over item 24.1. for providing salt glazed stoneware fittings : Taper bends of required degree of following internal diameters : 100 mm. x 150 mm.

1.0. Materials & Workmanship:

The relevant specifications of item 24.1. (A) shall be followed except that the salt glazed stoneware taper bend of required degree of 100 mm x 150 mm. shall be fixed.

.1. Mode of measurement & payment :

.2. The relevant specifications of item No. 24.1. (A) shall be followed except that extra payment shall be made for providing salt glazed stoneware taper bend of required degree of 100 mm x 150 mm. size over and above the rate of item No. 24.1.

.3. The rate shall be for a unit of One number.

24.27. (III) Extra over item 24.1. for providing salt glazed stoneware fittings : Single junction of required angle of following internal diameters : A-100 mm. dia B-150 mm. dia.

1.0. Materials & Workmanship

The relevant specifications of item 24.1. (A) shall be followed except that the salt glazed stoneware junction of required angle of specified diameter shall be fixed.

.1. Mode of measurement & payment :

.2. The relevant specifications of item No. 24.1 (A) shall be followed except that extra payment shall be made for providing salt glazed stoneware single junction of required angle for specified diameter over and above the of item No. 24.1.

.3. The rate shall be for a unit of One number.

24.18. Providing and laying, jointing and pointing with stiff mixture of CM. I : (1 cement: 1 fine

sand) 150 mm. internal diameter salt glazed stoneware half round c.

1.0 Materials & Workmanship :

The relevant specifications of item 24.1. (A) shall be followed except that the half round channels of 150 mm. internal diameters shall be fixed in cement mortar 1:1.

.1. Mode of measurement & payment :

- .2. The relevant specifications of item No. 24.1. (A) shall be followed.
- .3. The rate shall be for a unit of One running metre.

24.35. Supplying and fixing C.I. cover 300 x 300 mm. without frame for gully trap (Standard pattern). The weight of cover to be not less than 4.53 Kg.

1.0. Materials :

The C.I. cover of 300 x 300 mm. size without frame shall be fixed on top of the brickmasonry with cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 20 mm. nominal size) 40 mm. thick and rendered smooth. The finished top of the cover shall be left about 40 mm. above the adjoining ground level so as to exclude the surface water from entering the gully trap..

.1. Mode of measurement and payment :

- .2. The relevant specifications of item 24.19 shall be followed..
- .3. The rate shall be for a unit of One number.

24.40. Constructing brick masonry road gully chamber 500 x 600 mm. including 600 mm. x 450 mm. C.I. horizontal gratings with frame complete.

1.0. Materials :

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Brick shall conform to M-15. C.I. Grating of 500 x 450 mm. size of standard make shall be of approved quality. Stone aggregate 40 mm. nominal size shall conform to M-12. coal tar shall conform to relevant M-5.

.1. Workmanship

- .2. The chamber shall be of size 500 mm. x 450 mm. internal clear dimensions between the masonry wall faces. The height of 500 mm. shall be measured from the top of the bed concrete to the top of the C.I. frame. The size of grating indicate the clear internal dimensions of the C.I. frame of the grating.
- .3. The excavation shall be done to true dimensions and levels.
- .4. The foundation concrete shall consist of 150 cms x 100 cms x 15 cms. thick C.C. 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm. nominal size).
- .4. The wall of the chamber shall be constructed in brick work with CM. 1:5 and 23 cms thick as per relevant specifications of item 6.12 (B)
- .5. The walls and the bed concrete of chambers shall be plastered inside with 12 mm. thick cement plaster 1:3 (1 cement : 3 coarse sand) finished smooth.
- .6. The gully grating cover shall be hinged to frame to facilitate its opening for cleaning and repairs. The frames of the gully grating shall be fixed on the top of masonry wall of the chamber in 15 cms. thick CC. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) laid over the full thickness of walls.
- .7. The chamber shall have connection pipe, the length of which in metre between the road gully chamber and the manhole of the drain shall not be less than 1/40 times the nominal diameter of the pipe in MM. i.e. For 150 mm. connection pipe, the length shall not be less than 3.75 metre. The invert of the pipe at the junction with the wall shall be flush with the top of the cement plaster on the bed concrete.
- .8. Painting :** After the completion of the work of the exposed surface of the grating of the frame

shall be painted with a thick coat of coal tar.

.1. Mode of measurements and payment

.2. The cost of connection pipes is not included in the item and shall be paid separately. However, fixing the connection pipes in the walls of gully chamber is included in the rate for gully chambers and nothing extra shall be paid for this separately.

3.3. The rate shall be for a unit of One number.

24.41. Constructing brick masonry road gully chamber 450 mm. x 450 mm. x 775 mm. with vertical grating complete.

1.0. Materials and Workmanship :

The relevant specifications of item 24.40 shall be followed same except the size of road gully chamber is 450 mm. 775 mm. with vertical grating complete.

.1. Mode of measurements and payment :

.2. The relevant specifications of item 24.40 shall be followed.

.3. The rate shall be for a unit of One number. '

24.42. Constructing brick masonry road gully chamber 1100 mm x 500 mm x 775 mm. including 500 mm x 450 mm. C.I.. horizontal grating with frame and vertical grating complete.

1.0. Materials & Workmanship :

The relevant specifications of item 24.40 shall be followed except that the size of road gully chamber shall be 1100 mm x 500 mm x 775 mm. including 500 mm. x 450 mm. C.I. horizontal grating with frame and vertical grating complete.

.1. Mode of measurement & payment :

.2. The relevant specifications of item No. 24.40 shall be followed.

.3. The rate shall be for a unit of One sq. metre.

24.44 (I) Constructing brick masonry chamber for underground C.I. inspection chamber and bends with brick having crushing strength not less than 35 kg./Cm² in CM. 1:5 C.I. cover with frame (light duty) 455 x 610 mm. internal dimensions, total weight of cover with frame to be not less than 38 Kg. (Wt. of cover 23 Kg. and Wt. of frame 15 Kg.) R.C.C. top slab CC 1:2:4 Mix (1 cement : 2 coarse sand : 4 graded aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm. thick with CM. 1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete : Inside dimensions 455 mm. x 610 mm.

and 450 mm. deep for single pipe-line.

1.0. Materials & Workmanship:

Water shall conform to M-I Cement shall conform to M-3. Coarse sand shall conform to M-5 Brick shall conform to M-15. Stone aggregates shall conform to M-12. Brick bat shall conform to M-14 Ms. Bat shall conform to M-I8.

.1. Workmanship :

.2. C.I. inspection chamber with provision of C.I. bends of specified size with bolts, nuts and felt washers for underground drain shall be enclosed in masonry chamber which shall be constructed as under :

.2. The excavation shall be done true to dimensions and levels shown on the plans or as directed. ..

.3. Bed concrete shall be 15 cms. thick C.C. 1:5:10 (1 cement : 5 coarse sand : 10 graded brick bat aggregates. The projection of bed concrete beyond the masonry walls shall be 7.5 cms.

.4. Masonry walls and plaster work shall be carried out as per relevant specifications of item 24.40.

.5. The cover slab shall be constructed as per relevant specifications of 24.27

3.0. Mode of measurements and payment

- .1. The earth work in excavation, providing and laying C.I. inspection chamber and bends shall be measured and paid for separately.
- .2. The rate shall be for a unit of One number. •

24.44. (II) Constructing brick masonry chamber for underground C.I. inspection chamber and bends with brick having crushing strength not less than 35 Kg./Cm.2 in CM. 1:5 C.I. cover with frame (light duty) 455 x 610 mm. internal dimensions, total weight of cover with frame w be not less than 38 kg. (Wt. of cover 23 kg. and Wt. of frame 15 Kg.) R.C.C top slab C.C. 1:2:4 mix (1cement : 2 coarse sand : 4 graded aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm

thick with CM. 1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete ; Inside dimensions 500 mm. x 700 mm. and 450 mm. deep for pipe-line, with one or two inlets.

1.0. Materials & Workmanship:

The relevant specifications of item 24.44 (I) shall be followed except that the inside dimension of brick masonry chamber shall be 500 mm. x 700 mm. and 450 mm. deep for pipe line with one or two inlets.

2.0. Mode of measurement & payment :

2.1. The relevant specifications of item No. 24.44 (I) shall be followed **2.2.** The rate shall be for a unit of One number.

24.44. (I) Constructing brick masonry chamber for underground CI. inspection chamber and bends with brick having crushing strength not less than 35 Kg. /Cm 2 in CM. 1:5 CI. cover with frame (light duty) 455 X 610 mm. internal dimensions, total weight of cover with frame to be not less than 38 Kg. (Wt of cover 23 Kg. and Wt of frame 15 Kg.) R.C.C top slab C.C 1:2:4 mix (1 Cement : 2 , coarse sand : 4 graded aggregate 20 mm. size) foundation concrete 1:5:10 inside plaster 15 mm. thick with CM. 1:3 finished smooth with a finishing coat of neat cement on walls and bed concrete etc. complete : Inside dimensions 600 mm. x 850 mm. and

450 mm. deep for pipeline. 1.0.

Materials & Workmanship :

The relevant specifications of item 24.44 (I) shall be followed except that the inside dimension of chamber shall be 600 mm. x 850 mm. and 450 mm. deep for pipe line with three or more inlets.

.1. Mode of measurement & payment :

- .2. The rate shall be for a unit of. one number.

24.46. Extra over item 24.44 for every additional depth of 1. M. or part there of beyond 450 mm. depth for brick masonry chamber, (i) for 455 mm. x 610 mm. size, (ii) for 500 mm. x 700 mm. size. (Hi) For 600 mm. x 850 mm. size.

1.0. Materials & Workmanship :

The relevant specifications of item 24.44 (i), (ii),(iii) shall be followed same except that extra depth of 0.1. M. or part thereof shall be constructed over and above the depth of respective items.

.1. Mode of measurement & payment :

- .2. The relevant specifications of item 24.44 (i) shall be followed except that extra shall be paid for providing additional depth of 0.1. M. or part thereof over and above the Heir. No. 24.44 (i), 24.44(h), 24.44(iii) as the case may be.

2,2. The rate shall be for a unit of one number.+

24.00.2.(A) Providing soak pit of 2 cum. volume including excavating and filling brick bas with dry masonry work at top 450 cms. height including covering, the top with stone including providing Vatas in CM. 1:3 with finishing curing etc. complete as directed.

1.0. Materials :

Water shall conform to M-I. Cement mortar shall conform to M-II. Burnt Bricks shall conform to M-15. Rough stone slab 40 x 50 mm. thick shall conform to M-48. Brick bat shall conform to M-I4.

.1. Workmanship

.2. The excavation for soak pit shall be carried out as per relevant specifications of item. 4.00.1 (A) except that the size of soak pit such that th clear, volume shall remain 2 cum. The diameter and depth shall be as directed.

.3. The periphery of the soak pit shall be provided with dry masonry wall with burnt bricks in 23 cms. thick. The masonry wall shall be done with best workman like manner in true line and plumb.

.4. The soak pit shall be done with best workman like manner in true line and plumb.

.3. The soak pit shall be fille in with brick bats of burnt brick 40 mm. nominal size in 45 cms. height. The work of filling brick-bats shall be done in such a way that no dry masonry shall be damaged during filling of brick bats.

.4. The top of the soak pit shall be covered with rough kotah stone slab 40 to 50 mm. thickness. The length of the stone shall be in single piece in length.

.5. The cement mortar 1:3 shall be used to fill up the joints and preparing vata as directed.

.6. The cement work shall be cured for 4 days.

.1. Mode of measurement & payment :

.2. The rate includes costs of all labour and materials required for satisfactory completion of this item as described above.

.3. The rate shall be for a unit One number.

24.00.2.(B) Providing sock pit of 5 cum. volume including excavating and filling brick bast with dry masonry work at top 45 cms. height including covering, the top with stone including providing Vatas in CM. 1:3 with finishing curing etc. complete as directed.

1.0. Materials and workmanship:

The relevant specifications of item 24.00.2.(A) shall be followed except that the volume of soak pit shall be 5 cum, clear.

.1. Mode of measurement & payment :

.2. The relevant specifications of item 24.00.2(A) shall be followed.

.3. The rate shall be for a unit One number.

EQUIVALENT PLAIN AREAS OF UNEVEN SURFACES
(Vide specifications for items relating to : Painting & Polishing)

Sr. No.	Description of work	How measured	Multiplying Factor
	panellae or framed an barced on ledged and battened or ledged and braced joinery	Measured flat (not girthed) including Chowkat or frame Edges. Chocks cleats etc. shall be deemed to be included in item	1.30 (For each side)
	Flush Joinery	Measured flat (not girthed) including Chowkat or frame Edges. Chocks cleats etc. shall be deemed to be included in the item	1.20 (For each side)
	Fully glazed or gauzed Joinery	Measured flat (not girthed) including Chowkat or frame Edges. Chocks cleats etc. shall be deemed to be	0.80 (For each side)
	Partly paneled and partly Glazed or gauzed joinery.	Measured flat (not girthed) including Chowkat or frame Edges. Chocks cleats etc. shall be deemed to be	1.00 (For each side)
	Fully venetioned or Louvered joinery	Measured flat (not girthed) including Chowkat or frame Edges. Chocks cleats etc. shall be deemed to be	1.80 (For each side)
	Weather boarding	Measured flat (not girthed) Supporting frame work shall not be measured separately	1.20 (For each side)
	Wood single roofing	Measured flat (not girthed)	1.05 (For each side)
	Boarding with cover fillets at match boarding	Measured flat (not girthed)	1.05 (For each side)
	Tile (or Jafri) work One eway or two way	Measured flat, over all. No deduction shall be made for open space	0.80(For painting Over)
	Trellis (or Jafri) Work One eway or two way	Measured flat, over all. No deduction shall be made for open space. Supporting members shall not be measured separately.	1.00(For painting Over)
	Guard bar, balustrades, Gates,gratings, grills, Expanded metal and railings.	Measured flat, over all. No deduction shall be made for open space. Supporting members shall not be measured separately	1.00(For painting Over)
	Gates and open palisade Fencing including standards.	Measured flat, over all. No deduction shall be made for open space. Supporting members shall not be measured separately.(see note)	1.00(For painting Over)
	Curved or enriched work	Measured flat	2.0 (For each side)
	Steel roller shutter	Measured flat (size of opening) over all, jamb bottom rail and locking arrangement etc.shall be include in the item (top cover shall be measured separately)	1.10 (For each side)
	Plain sheet steel door and window	Measured flat (not girthed) including Frame.	1.10 (For each side)
	Fully glazed or gauze steel door & window	Measured flat (not girthed) including Frame edges etc.	1.10 (For each side)
	Partly paneled and partly Glazed or gauzed steel door	Measured flat (not girthed) including Frame edges etc	0.08 (For each side)
	Collapsible gate	Measured flat (Size of opening) no Separate measurements shall be taken for the top and bottom guide rail,rollers,ittings.etc.	1.50 (For each side)

Note :- The height shall be taken from the bottom of the low east rail if the palisades do not go below in (or from the lower end of palisades , if they protect below the lowest rail) upto the top of palisades, But not upto the top of sat dared if they are higher than the palisades.

NOTE: PLEASE READ CAREFULLY :

(1) Where detailed specification of an item provides for specific size of any fixture or fastening, that shall prevail over the provisions in this schedule.

(2) Fixtures and fastenings (except hold fasts which shall be of m.s. Plate only) shall be of brass, copper, oxidized brass, chromium plated, brass. Iron, copper oxidized iron, or chromium plated iron as specified in the item of the work or detailed specifications.

(3) External door and door falling in staircase excepting the door in balcony shall have sliding door bolt of size 300mm x 18mm in place of 250mm x 16mm as shown in this schedule.

(4) The length of lower bolt shown is for a door having shutter height upto 2100 mm. only. For door having shutter height more than 2100 mm. the length of lower bolt to be increased to the extent of increase of door shutter height beyond 2100 mm.

(5) 150 mm. x 150 mm. size glass vision panel shall be provided in the door of Officer's chamber in addition to the scheduled provisions if so directed by the Engineer-in-charge.

(6) Diamond shape chromium plated brass peeping plate of approved quality shall be provided in one entrance door in residential building in addition to the scheduled provisions.

(7) Drawer in a wardrobe shall be provided with one furniture handle and one drawer lock (4 levers) in addition to its scheduled provision.

(8) For door and window with steel frame, 75 mm. size screw, shall be provided both in top bottom frame for fixity as shown below :

(a) For width upto 1200 mm. _____ 2 Nos.

(b) For width above 1200 mm. and upto 1800 mm. _____ 3 Nos.

(c) For every additional width of 500 mm. over and above 1800 mm. _____ 1 No.

(9) When the mortise lock (6 levers) and latch is specified to be provided to a door either in the item of work itself or by a separate item. The requirement of providing sliding door bolt, Door latch and handles as per this schedule shall be dispensed with.

(10) For door/window with ventilator at top, fixtures and fastenings of door/window plus Those Of ventilator (excluding hold fasts) shall be used.

(11) Where the item of the work, or its specification provides for anodized aluminum fixtures, all the fixtures except hinges and screw will be of anodized aluminum and chromium plated iron hinges and screws shall be used.

(12) For door, window, or cupboard frame abutting concrete section, instead of hold fasts as Shown in the schedule, coach screw of size as mentioned below shall be used :

(a) Teak wood frame _____ 00.125mm.

(b) Steel frame _____ 00.75 mm.

13) The locking etc. in the door latch shall be so positioned that the door can be properly locked Even it part of the latch, when fully, sliced, remains, in the frame or masonry.

14) Showcase cupboard having single shutter shall be provided with the ball catcher instead of Lower bolt (barrel type) as per schedule.

15) The size of the handle shown in the schedule indicates grip length.

16) Door stopper shall be either floor door stopper or door catches directed by the engineer-in- Charge. 17) Piano hinges shall be for the height of the shutter.

18) Shutters with piano arrangements shall be provided with two pivots of approved size instead of hinges as per the schedule.

19) For butt hinges, only lengths are indicate in the schedule. The width of each flap being 5mm less than the thickness of the shutter to which they are to be fixed and the thickness of the flap shall be as specified in the relevant I.S.S. heavy medium or light as specified in the detailed specification of the item of work.

SCHEDULE FOR TESTING OF MATERIAL (BUILDING)

For ensuring quality control and workmanship, various tests prescribed below corresponding to material concerned shall be taken at periodic intervals as stipulated below. The material shall be got tested at GERI or GOVT. recognized laboratory of GERI for which 1% of the estimated amount to tender shall be recovered from the contractor from the R.A. Bill and final Bill as the testing charges shall be paid by the Govt. to the laboratory. However if the charges increase over 1% no excess recovery shall be made from the contractor as per resolution of B & C department date 10th May, 1985, vide TNC/1085 (4)S.

Item No. as per Sch.B	Brief Description of material to be tested	Prescription of test which shall be carried out	Frequency @ which test shall be carried out (as per GERI Q.C.Vol.I,2002)	Qty. Of material	Total No. of test to be carried out
	Coarse, Aggregate (metal, Gravel etc.)	Gradation test, impact value, flakiness index, water absorption, stripping value.	1/150 M3 for concrete or as per specification		

	Fine aggregate (sand)	Gradation, fineness modulus, specific gravity, water absorption, silt content	1/150 M3 for concrete or as per requirement of relevant specification		
	Bricks	Dimension and tolerance, water absorption, compressive strength, efflorescence.	1 test per 50,000 Bricks 5 bricks from sample 5 bricks from sample 5 bricks from sample		
	C.C. Tiles	Water absorption, Transverse strength abrasion.size tolerance	1/2000 tiles (18 tiles for sample)		
	Cement concrete	Compressive strength (I.S. 516-1959)	Qty of C.C. M3 No of test 1-5 1test 6-15 2test 16-30 3test 31-50 4test 51& above 4+1 for each Addnl. 50M3 or part the roof		
	Cement	Consistency, setting time, compressive strength, fineness, chemical	Upto 50T 1test 50-100T 2test 100-200T 3test 200-300T 4test		

		analysis, soundness	300-500T 5test 500-800T 6test 800-1300T 7test And 8 test for large consignmen		
	Steel	Tensile strength, yield stress, Elongation	1/40 tones / per category		
	Teak Wood	Anatomy test, density test, Moisture content test.	1 test		

DETAIL SPECIFICATION FOR EXTRA ITEMS

Item no 20 & 41:

Providing and laying ceramic vitrified tiles at all floors levels in flooring treads of step and landing laid on a bed of 12 mm thick CM 1:3 (1 Cement : 3 coarse sand) finished with flush pointing in white cement . The item provides for flooring of ceramic vitrified tiles of approved standard brand and of colour . Ceramic tiles shall be of general purpose type and shall conform to relevant I.S in respect of constituent materials, shape, dimension, tolerances, wearing layer, colour, general appearance, general quality of tiles, strength, and resistance to wear, water absorption and tests ect. The size of a tile shall be 300mm x 300 mm and shall be as approved by the Executive Engineer. If there is any doubt about the quality of tiles, they shall be tested and the cost of the test shall be born by the contractor, samples of the tiles shall be got approved by the Executive Engineer who shall keep them in office for reference. The supply shall conform to the sample. Cement mortar for the bedding and cement mortar for pointing shall be of the proportion 1 : 3 the bedding shall conform to I.S 1443 and work shall be carried out as per the direction of the engineer-in-charge. The joints of the tiles after laying them shall be filed with colour cement slurry. Cleaning of the whole floor shall be done according to the provision in relevant. I.S flooring shall be kept wet as directed by the Engineer. The item includes-

1. Cleaning the base and laying the bedding mortar of average thickness of 12 mm in c.m 1:3 and leveling it in level or required slope.
2. P/F the tiles in neat cement float on the bedding mortar.
3. Filling the joints of tiles with colour cement slurry as directed.
4. All labour, materials and tools required for carrying out item in a satisfactory manner.

The payment shall be made per smt of the floor area covered by the flooring of the tiles. All work shall be measured net. The length and width of flooring shall be measured net between the faces of skirting or plastered faces of the walls as the case may be. Paving under the dedo, skirting or plaster shall not be measured and shall not be pai.

item no 25 & 46:

Providing and fixing 35 mm finished thick P.V.C. doors in bath & w.c.at all floor levels including cement concrete frames shall be 12cm x 7 cm with necessary rebates and holes. Including medium quality anodized aluminium fixtures and fastening etc comp as directed by engineer - incharge.

The doorframe shall be pre-cast R.C.C (1:2:4). The size of the frame shall be 12 cm x 7 cm with

necessary rebates and holes up to adequate depth for proper fixing up of hinges and other required fixtures and fastening like aldop, tadi, stopper, handle, wind stopper etc. The steel bars used as reinfo cement in the frame shall be as per the design and shall be painted with anti corrosive enamel paint as directed by the engineer. The surface of frame shall not have any voids or pores Minimum 3 no. of holdfasts shall be fixed on each side of door and window frames, one at the centre point and the other two at 30 cms. From the top and the bottom of the frame. The size of each holdfast shall be 300 x 25 x 6 mm and of mild steel with spit end. The holdfasts shall be fixed with screw to frames. Mild steel holdfasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating. All fixtures and fastenings of approved quality shall be provided with necessary screws. The hinges, bolts and other items of aluminum with moving part shall be properly oiled by the contractor before handing over building. The PVC door shutter of 35 mm thick or approved brand & colour with providing sufficient size of locking rail for fixing of locking device and aldrops and sufficient size of top rail, lock rail and bottom rail. The surface shall be cleaned and rubbed with sand paper to bring it in the one plane. When finished, no scratches from the sand paper shall be visible. After preparing the surface, one coat of white paint shall be applied as printing coat. Little white lead bing worked in other mixing to help hardening of putty. The work shall be rubbed down smooth with sand paper and the consequent coats pf paint of the specified shade approved by the Engineer- in – charge shall be applied. The paint shall be applied with brush. It shall be spread as smoothly as possible

Final coat shall be very crossed and laid off, so that brush marks are not visible. Each coat of paint shall be allowed to dry thoroughly and shall be little rubbed in before the next one is laid. Finish surface shall not show any hair marks, ridges or dry patches of paint and no puddles shall be left in the corners of panels, angles or the moldings etc. For measurement, the dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to 2 places of decimals for rounding. The item includes all materials, labours and necessary and fastenings, oil painting in three coats of approved paint. The payment shall be made on number basis. The rate shall be for a unit of one square meter.

Item no 45

Providing and fixing 35 mm thick boiling solid core non-decorative type flush door shutters at all floor level, for doors including concrete frames shall be 12 cm x 7 cm with necessary rebates and holes including medium quality anodized aluminum fixtures and fastenings etc. complete as directed by Engineer-in-charge The doorframe shall be pre-cast R.C.C (1:2:4). The size of the frame shall be 12 cm x 7 cm with necessary rebates and holes upto adequate depth for proper fixing up of hinges and other required fixtures and fastening like aldop, tadi, stopper, handle, wind stopper etc. The steel bars used as reinforcement in the frame shall be as per the design and shall be painted with anti corrosive enamel paint as directed by the engineer. The surface of frame shall not have any voids or pores at all. Minimum 3 no. of holdfasts shall be fixed on each side of door and window frames, one at the centre point and the other two at 30 cms. From the top and the bottom of the frame. The size of each holdfast shall be 300 x 25 x 6 mm and of mild steel with spit end. The holdfasts shall be fixed with screw to frames. Mild steel holdfasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating. All fixtures and fastenings of approved quality shall be provided with necessary screws. The hinges, bolts and other items of aluminum with moving part shall be properly oiled by the contractor before handing over building. Wooden solid core type water proof flush door shutters shall conform with M-30 specification including providing sufficient size of wooden lock at appropriate place for fixing locking device and aldrops. The surface shall be cleaned and rubbed with sand paper to bring it in the one plane. When finished, no scratches from the sand paper shall be visible. After preparing the surface, one coat of white paint shall be applied as printing coat. Little white lead being worked in other mixing to help hardening of putty. The work shall be rubbed down smooth with sand paper and the consequent coats pf paint of the specified shade approved by the Engineer- in – charge shall be applied. The paint shall be applied with brush. It shall be spread as smoothly as possible> Final coat shall be very crossed and laid off, so that brush marks are not visible. Each

coat of paint shall be allowed to dry thoroughly and shall be little rubbed in before the next one is laid. Finish surface shall not show any hair marks, ridges or dry patches of paint and no puddles shall be left in the corners of panels, angles or the moldings etc. For measurement, the dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to 2 places of decimals for rounding. The item includes all materials, labours and necessary and fastenings, oil painting in three coats of approved paint. The payment shall be made on number basis. The rate shall be for a unit of one square meter.

Item no 51:

Providing and fixing kitchen platform of 2.75m x 0.75 m black kaddapa a stone (sandwich pattern) on pillar of double side polished kotah stone of 25 mm thick of with S.S sink of medium quality with standard brand of 0.75 mt height glazed tiles dedo on wall etc. complete as directed by engineer-in-charge The kitchen platform of 2.75 m x 0.75m size shall be provided of sandwich pattern of black kaddapa stone, one side polished . There will be two (2) polished kaddappa and between filled up with cement mortar of 1:6 and with support on 2 nos. of pillar of double size polish kota stone of 25 mm thick so as to have (3) components below the plat form, The item includes making of necessary grooves of required depth in to the masonry to have adequate support of kaddapa stone. The item also includes providing and fixing 25mm to 40mm tk. Black kadappa flooring with 100mm wide vertical border having half round polished top, joints properly filled in with colour cement, p/f kitchen sink of 0.46m X 0.46m size and waste complain and waste water pipe from the sink to the N.T etc. The item also includes p/f dedo of white glazed tiles of eight of 0.75m above the platform on facing front wall and side of wall. The payment shall be made per no. of platform which includes all the necessary material and labour for the items mentioned above and for the works ancillary to the same.

Item no: - 56

Providing and fixing U-P.V.C Nnhi trape of all floor level, of the fowling nominal diameter of self cleaning design screwed down or highed grating including cost of cutting and making good the wall and floors 100 mm inlet and 50 mm outlet ect. The nanhi trape of size 100 mm inlet and 50 mm outlet of P.V.C material shall utilize and work is to be carried as per specification of booklet of building work.

Item no. : 72 (A) –

(A) Providing water proofing treatment on terrace of different levels, preparing roof surface for laying fresh brick bats of quarter or half brick size cement mortar 1:4 with special water proofing compound in necessary gradient for easy flow of rain water, brick bats is finally covered by joint less cement plaster in C.M 1:3 added with special water proofing

compound and top smooth finished with trowel, with false chquered marking of 300mm size The treatment is carried along the vertical surface of the parapet and other adjoining upto height of about 300 mm in shape of quarter round vata. The average thickness of the water proofing treatment is about 140 mm minimum thickness. At rainwater outlets points. being 75 mm including etc. comp. As per specification and instruction including water proofing test as directed

.(The work to be executed by approved agency) with a guarantee of ten years given on a prescribed Performa duly stamped . a) Applying & grouting a slurry coat of neat cement using 2.75 kg / sqm of cement admixture with approved water proofing compound conforming to IS 2645 over RCC slab including cleaning the surface before

treatment. b) Laying cement concrete using broken bricks/brick bats of approved quality having 25mm to 100mm size with 50% of cement mortar 1:4 (1 cement : 4 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 to required slope & treating similarly the adjoining walls up to 300mm height including rounding of junction of walls & slabs. c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water

proofing compound conforming to IS 2645. d) Finishing the surface with 20mm thick joint-less cement mortar of mix 1:3 (1 cement : 3 coarse sand) admixed with proprietary water proofing compound conforming to IS :2645 & finally finishing the surfaces with trowel with neat cement slurry & making of 300 X 300mm square. e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing & for final test. All above operations to be done in order & as directed & specified by the engineer in charge. f) The whole work is to be executed through specialized agency with guarantee of 10 years given on a prescribed proforma duly stamped , Suda shall also retain 2% of amount of this item. It shall be released after successful completion of 10 years defect liability period as mention in guarantee bond.

Item no :- 72(B)

Preparing the floor and walls or w.c,bath wash area for water proofing work as per company's

requirement , providing a layer of plaster with water proofing Component about 25mm thick in the floor of depression and above 18mm thick on the side wall of depression the walls above the floor level for a height of 600mm with suitable to receive further treatment as per specification and instruction of engineer-in-charge. The water proofing treatment to the floors and walls of w.c. bath , avd wash area shall be carried out as under (a) The surface to be treated shall be first cleaned of loose mortar or dust, it should be watered and kept damp. There after a layer of plaster in C.M 1:1 admixture with approved brand of water proofing component confirming to IS2645 , over RCC slab and wall surfaces in thickness of 25mm in floor and 18mm thick on wall of depression upto the height of 600mm shall be applied. b) Laying cement concrete using broken bricks/brick bats of approved quality having 25mm to 100mm size with 50% of cement mortar 1:4 (1 cement : 4 coarse sand) admixed with proprietary water proofing compound conforming to IS: 2645 to required slope & treating similarly the adjoining walls up to 300mm height including rounding of junction of walls & slabs. c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to IS 2645. d) Finishing the surface with 20mm thick joint-less cement mortar of mix 1:3 (1 cement : 3 coarse sand) admixed with proprietary water proofing compound conforming to IS :2645 & finally finishing the surfaces with trowel with neat cement slurry & making of 300 X 300mm square. e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing & for final test. All above operations to be done in order & as directed & specified by the engineer in charge. f) The whole work is to be executed through specialized agency with guarantee of 10 years given on a prescribed proforma duly stamped , Suda shall also retain 2% of amount of this item. It shall be released after successful completion of 10 years defect liability period as mention in guarantee bond.

SPECIFICATION FOR ELECTRICAL INSTALLATION

SUPPLY:

The supply mains will be brought in at places marked drawing and will be 3 phase 50, cycles, 4 wires system 415 volts between phase and 230 volts between phase and neutral.

SAMPLES:

The contractor shall submit to the Engineer-in charge for approval samples of accessories and apparatus they (the contractor) propose to use for installation. The tenderer shall submit a list of important contracts carried out by them to Engineer – in – charge.

DRAWINGS:

Samples to be submitted by the contractor and this specification shall not be departed from without the instructions of the Engineer-in-charge in writing. No approval given by Engineer-in-charge approval to any drawings or samples submitted by contractor shall any way exonerate the contractor from his liability out the work in accordance with terms of this contract.

SUPERVISION:

The whole of the work shall be carried out to the satisfaction of engineer-in-charge. Under the constant supervision of the contractor's competent qualified and experience Electrical Engineer. The contractor shall if require, furnish the full details of the Engineer's qualification.

GENERAL SPECIFICATION

1. WIRING RULES:

The installation generally shall be carried in conformity with the Indian Electricity Act/Rules and the latest edition of the wiring rules of the installation of Electrical Engineer (London) but where this specification differs from those rules the specifications shall be followed.

2. DEFINITION:

The definition of terms the I.E.C wiring rules shall apply.

3. PRESSURE AND FREQUENCY:

The supply will be three phase 50 cycles A.C 4 wire system 415 volts between phase and 230 volts between phase and natural and apparatus required shall be suitable for this supply.

4. SYSTEM OF WIRING:

Wiring for lights, fans wall sockets, refrigerators and bells shall be carried out as described in the items and details shall be confirmed with the specification herein.

5. All wiring must be done on the distribution system with main and branch distribution board at convenient centers and without isolated fuse. All conductors shall be run as far as possible so as to be easily accessible and capable of being inspected. Facility for maintenance shall be particularly provided for and balancing or circuits carefully arranged.

6. CONDUCTORS :

All conductors shall be of copper as set for in the I.E.C wiring rules 11 th edition and no insulated conductor shall have across section less than of $1/0.044$ and every such conductor of greater gross section shall be standard.

7. FALL OF POTENTIAL :

The cross sectional area of all conductor inside the building shall be so proportioned to their loads that the drop in pressure between the main fuses and the nearest consuming appliance shall not exceed 2% with divider in use.

8. CIRCUITS :

No final lighting or fan circuits from a distribution in boards shall carry more than 3 amperes or 6 points and as far as possible the loading shall be arranged so as to obviate the necessity of using various sizes of fuse wires on sub-circuit.

9. TESTS :

The installation with fittings complete shall before current is switched on satisfactorily pass the following test.

(a) All the lamps and appliance having been connected to the conductors and all switches and all switches and fuses be (on a pressure not less than twice the working pressure) (subject to a limit of 500 volts) shall be applied and the installation resistance of the whole or any part of the installation to earth must be less in megohms than 25 divided by the number of points.

10. JOINTS :

All joints in conductors shall be made by means of approved mechanical connector in suitable approved joints boxes but as far as possible looping back shall be adopted.

11. SWITCHES :

(a) All main switches shall be of quick make and break combined switch and fuse ironclad type of reliable make and subject to approval.

(b) All branch switches controlling not more than 5 amperes shall be of quick and break push button or tumbler pattern and shall be 'NO' when the knob is down the attachment of covers to the base of the switch must be by means of machine screws. All fan and wall socket shall provide with controlling switches.

12. DISTRIBUTION BOARDS :

All distribution boards shall be fitted with hard grain pattern Home office Type porcelain fuses one on positive side of circuit, the neutral being connected to a common bus bar of copper in such away that the circuit can be easily isolated from the distribution boards of substantial make and at least of 5/10 Amp.

Capacity porcelain 5 amp. Round cut-outs will not be allowed to be used as fuse holder. All distribution board shall be fitted with the wall enclosed in box approved pattern (to be supplied by the contractor) when cancelled system is adopted and the pattern shall be submitted to the Engineer-in-charge for approval. Load on each floor shall be distributed on required distribution boards.

13. CELLING ROSES AND SOCKETS:

Celling roses and wall sockets shall be of reliable make and subject of the approve. The subsuspension of flexible wire for light pendants shall be so executed that the weight of the pendant will not be carried by the terminals of ceiling rose

14. LAMP HOLDERS :

Lamp holders for use on brackets shall have not less than a half inch female nipple. All cases must be solid and substantial and of bayonet pattern. Pendant lamp holder shall have good grips fitted on them so as to carry the weight of the pendant.

15. INTERCHANGE ABILITY :

Similar parts of all the switches, lamp holder, ceiling rose, brackets, pendants and all other fittings of same type shall be interchangeable.

16. CONDUIT TO BE CONTINUOUS :

Conduit shall be of rigid P.V.C.

17. BUNCHING OF WIRES :

The wires of a circuit must be each together in a conduit.

18. JOINTS IN CONDUIT:

The lengths of conduit shall be jointed by means of adhesive solution.

19. PRECAUTION AGAINST INSECTS AND DAMP :

All cutlets of conduit system shall be properly drained and ventilated but in such a manner as to prevent the entry of insects.

20. PROTECTION OF CONDUIT :

The conduits and fittings shall be joined by means of adhesive solutions.

21. CONDUCTOR :

All conductors used in conduit wiring shall be standard conforming to I.S. 694 1988 part-II.

22. ERECTION AND EARTHING OF CONDUIT :

Conduit shall be electrically continuous through out and shall be permanently and efficiently connected to earth by means of solid or standard copper wire having a cross sectional area not less than that of NO 8 S.W.G in conduit system the pipe must be continuous when passing through wall of 1 floor and earthlings shall extend to the metal frame of all main and branch switches and distribution boards, gas pipes must not be used for obtaining and earth connection.

23. EARTH WIRE AND PLATES :

The earthings wire and the connection with earth shall be of 8 SWG G.I. as per specified instructed by Engineer-in-charge and shall be so constructed and laid as to avoid the formation of any electronic couple. All earthing wired shall be efficiently protected against mechanical damages.

24. PASSING THROUGH WALLS :

The conductor shall be carried in an approved heavy gauge solid drawn or lapweld conduit tube or porcelain the ducts. Where a wall tube passes outside a building so as to be exposed to the weather the other end shall be bell mouthed and turned down wards.

25. ATTACHMENT TO WALLS AND CEILINGS :

In the case of lead covered or Cab-Type sheathed system the conductors shall be fixed on varnished teak wood battens not less than inch in thickness by means of metal clips (of approved make) spaced at intervals of not more than 4.1/2 inches. The clips shall be fixed to T.W. battens by means of brass screws or pins set level with the surface of the clips. Pawl plug may be used for fixing battens to walls and ceiling, but only taper T.W. plugs (see clause 24) shall be used for fixing T.W. base blocks for switches regulator and ceiling rose.

26. ATTACHMENT OF FITTINGS AND ACCESSORIES:

All ceiling roses well socket switches, regulators, brackets, pendants and accessories attached to wall or ceiling shall be mounted on substantial teak wood varnished blocks having solid backs not less than

quarter inch thick. All accessories shall be fixed to such base blocks by means of brass screw.

27. PASSING THROUGH FLOORS :

All wires passing through floor shall be efficiently protected by means of metal or T.W covering box extending not less than 8 fts. Above floor level Conduit or porcelain tubes shall be used for lading the wires through the floor.

28. FITTINGS:

No wire shall be buried directly in plaster.

29. FITTINGS:

Fans, regulators, lighting, fixtures etc whether supplied by the employer or conductor shall be erected in position by the contractor in such manner as not expose any unsightly fittings necessary for suspension from the ceiling or walls and in conformity with the surrounding architectural design.

30. RATING :

The rating of consuming devices unless indicated on the drawings will be as follows:-

Ceiling Fans 150 watts. Desk fans 80 watts Lights 60 watts Wall sockets 80 watts

31. LOCATION OF CONTROL BOARDS:

The control boards shall be fixed in consultation with the Engineer-In-Charge 32. All makings on the switches and distribution boards shall comply with rule 510 of Indian Electricity Act.

33. All control switches shall be located as far as possible on walls.

34. In wiring work should be used approved by I.S.I.

SPECIFICATION

CONCEALED CONDUIT WIRING SYSTEM

1. All conduit used shall be completely concealed and suitable outlet boxes shall be provided to facilitate easy repairs and maintenance.
2. As far as possible the conduit system shall be so designed and erected on to obviate one use of tees, elbow and sharp bends.
3. All the conduit-system shall be thoroughly cleaned after completion of erection and before the cable is pulled in. No length of conduit shall have more than the equivalent of two quarter bends from outlet to outlet.
4. The conduit shall be of ample cross sectional area to facilitate the pulling in of wires. In no case shall the total cross section of the wires (Measured over the insulation) be more than the half the area of conduit bore except in short lengths of straight conduit pipe.

5. CUTTING AWAY AND MAKING GOOD :

The tender is to include all necessary cutting away and making good for the purpose of the Electrical contract. The Electrical contractor will be held responsible for, and will have to

make good at his own expense to the satisfaction of the Engineer-in-charge any damage to or disfigurement of the site which may have been caused by acts of commission of him self or his servants or agent in connection of carrying out of the contract.

6. DRAWINGS:

The contractor shall supply to the Engineer-in-charge a complete set wiring diagrams showing the run of concealed conduits, outlet boxes, Distribution boards, main switch etc. so as to facilitate the future maintenance of the installation.

7. OUTLET BOXES:

The outlet boxes shall be of metal and so designed as maintain the continuity of the conduit system throughout and the conduits shall be attached to the boxes either by screw joints or nuts on either side of the wall of the outlet box.

8. SWITCHES DISTRIBUTION BOARDS ETC :

The position of distribution board, fan regulators and control, switches shown in the Drawings shall be adhered to. If desired by the Engineer-In-charge the position of these shall be changed without any extra charges. The height of wall socket points shall be fixed in consultation with the Engineer-in-charge.

9. CABLES:

All cable used for wiring shall be standard and circuit wire shall be 3/029 V.I.R.

10. MAINS:

All mains from service board leading up to other floors shall be in Concealed conduit system.

11. MARKING :

(More than 3 pin one place) be clearly marked to indicate which consuming device each controls.

12. MAIN DISTRIBUTION BOARDS:

Main distribution boards for concealed wiring shall be fixed in position flush with walls shown on the drawing and shall consist of:-

- (a) One main switch (controlling each section).
- (b) Hungarian type circuit fuse (1 per circuit and a common bus) control boards with switches and fan regulators shall be fixed flush with the walls and in a manner as to expose only the switch knob and fan regulators handle for operation.

GENERAL

1. Meters for power points and light and fan points shall be separate mains shall be brought to the position indicated on the planned the line shall be taken there from to type distribution boards on various floors.
- 2. Electric company's charges for bringing the main cables to position indicated together with the connection for meters are payable by the owners.**
3. It will be the responsibility the contractor to get power connection from supply co. The application shall be signed by the contractor & service connection charges shall be paid by the SUDA. The SUDA will not take over the installation unless power supply permanent connection is received and the entire installation is energized.
4. The contractor having electric contract license of Gujarat State shall only be eligible to tender.

Chief officer

VAGHODIYA Nagar Palika

I have tendered after studying the above specification.

Signature of the Contractor

Address:

Date:

SPECIFICATION OF MATERIAL**WIRE :- FINOL EX / HAGER / HAVELES / STANDARD/ ANCHOR / BEECAD****CABLE:- TROPODURE / CLOSTER / ICC / TORRENT / CCI / UNIVERSAL****S.P SWITCHES****PLUGS,CELLING****ROSE ETC. :- ANCHOR / POINTER / VINAY / JAINEX /****STRERCCO / ALLWYS / MCB****DISTRIBUTION****BOARDS****SWITCHES :- SEIMENS / L& T / HAVELES / STANDARD / CROMOTON****FLURESCENT****FITTINGS :- PHILIPS / CROMPTION / BAJAJ / GE / OSRAM / OPEL.****CELLINGS FANS :- ORIENT / CROMPTON / USHA / BAJAJ / ORTAM / GE.****I here by agree to supply as above make materials of your choice.****SPECIAL CONDITION**

- (1) Point wiring shall be from the distribution fuse board, no sub main shall be measured.
- (2) Sample of material shall be given to Engineer-In-Charge and approval should be taken in writing before its use.
- (3) Fabrication drawing should be get approved from the Engineer- in- charge prior to manufacturer.
- (4) Pipe lying lay out shall be as per consultant drawings.
- (5) There shall be no junction in wiring out let box shell be used after bond.
- (6) Electrical contractor shall make good the civil work if chased or damaged.
- (7) Electrical Engineer-In-Charge opinion shall be final and binding on contractor.
- (8) Qualified labour and supervisor shall work at site.
- (9) Electrical Contractor shall not permit unqualified labour contractor of work at site He shall observe Govt rules regarding control labour. He shall submit test Report and carry out tests as required and furnish detailed drawings on completion of work. The responsible authorized person by the contractor should be available of site daily work in progress.
- (12) The work shall be carried out during working days between 8.00 A.M to 6.00 P.M only. The cable trench should not remain open for more than 24 hours after excavation. If contractor intends to work on holiday or outside working hours specified he shall take prior permission from the Engineer-In-Charge. The Electrical appliance-materials shall be bear the ISI mark or declaration indicating manufacture's names and appliances material used having been manufactured in accordance with the manufacturer's certificate issued by the Government of Gujarat and confirming to the standard specified by the I.S.I shall be given by the contractor. The condition laid down under House Hold Electrical appliances (Quality control Act 1981) shall be followed.

CONTRACTOR

SIGNATURES

CHIEF OFFICER

SECTION G

SPECIFICATION FOR EARTHING.

1. Installation of Earthing Plates :

All installation of earthing shall conform to Indian Electricity Rules, 18.3043 latest edition and IEE. The copper earth plates should be tinned before installation. The earth plates of copper 60 cm x 60 cm x 3.515 mm thick size as mentioned in the schedule be in separate pits at least 150 cms to 300 cms. away from the building at a depth necessary to reach moist earth surface but with a minimum depth of 2.5 mtr from the finished ground level up to the top vertical edge of earth electrode. The earth plate shall be thoroughly cleaned to remove all dirt from the surface and be tinned properly for electrical contact with the main ground. Each earth pit should be provided with 38 mm. dia G.I. pipe 2.5 Mts. long or more depending up to the depth of pit, put over the vertical edge of earth plate (with top end of pipe provided with a closed coupler). Alternative layers of salt and coke shall be provided surrounding the plate. The pits shall be filled when the plates are in position and with the approval of Engineer-in-charge.

To facilitate watering the pit, a concrete compartment should be made with funnel with mesh and cover plate as per rules provided in ISI regulation. The masonry end users shall be 25 cm x 25 cm x 25 cm (deep) with C.I. lid of 23 cm x 30 cms size. After installation, the earthing resistance of each earth plate should be measured by resistance meter in the presence of Engineer-in-charge, three days after the completion of earthing work, and the value should conform to regulations.

Signature of Contractor/s

CONTRACTOR

SIGNATURES

CHIEF OFFICER

RISING MAIN

DETAILS SPECIFICATION

ITEM No.1 & 2 EXCAVATION FOR PIPE LINE TRENCHES

'EXCAVATION FOR PIPE LINE TRENCHES FOR WATER SUPPLY, SEWERAGE LINE, MANHOLE ETC. ALL WITH SHORING AND STRUTTING IF REQUIRED AS PER REQUIRED GRADIENT AND LINE INCLUDING SAFETY PROVISIONS USING SITE RAILS AND STACKING EXCAVATED STUFF INCLUDING UP TO ALL REQUIRED LEAD CLEANING THE SITE ETC. COMPLETE FOR ALL LIFTS AND STRATA AS SPECIFIED.

- A) IN ALL SORTS OF SOIL AND SOFT MURRUM
- b) IN HARD MURRUM, BOULDERS INCLUDING MACADAM ROAD
- c) IN SOFT ROCK AND/OR MASONRY IN CM OR L M OR LIME CONCRETE.
- d) IN HARD ROCK AND / OR IN C. C. 1:2:4 OR RCC WITH BLASTING, BREAKING, CHISELING, OR BY CHISELING/BREAKING ONLY.

1.0 GENERAL

1.1 THE EXCAVATION FOR TRENCHES WILL GENERALLY, REFER TO OPEN EXCAVATION FOR TRENCHES IN WET / DRY CONDITIONS FOR PIPE LAYING WORK.

2.0 CLEARING OF SITES:

2.1 THE SITE ON WHICH THE PIPELINES ARE TO BE LAID AND SHOWN ON PLAN AND THE AREA REQUIRED FOR SETTING OUT AND OTHER OPERATIONS SHALL BE CLEARED AND ALL OBSTRUCTION LOOSE STONES AND MATERIALS, RUBBISH OF ALL KINDS, STUMPS, BRUSHWOOD AS TREES SHALL BE REMOVED AS DIRECTED THE ROOTS SHALL BE ENTIRELY GRUBBED UP.

2.2 THE PRODUCTS OF THE CLEARING TO RESTOCKED IN SUCH A PLACE AND IN SUCH A MANNER, AS DIRECTED BY THE ENGINEER IN CHARGE.

2.3 IN JUNGLE CLEARINGS, ALL TREES NOT SPECIALLY MARKED FOR PRESERVATION, BAMBOO'S JUNGLE WOOD AND BRUSHWOOD SHALL BE CUT DOWN THEIR ROOTS GRUBBED UP. ALL WOOD AND MATERIALS FROM THE CLEARING SHALL BE THE PROPERTY OF THE LOCAL BODY SHALL BE ARRANGED AS DIRECTED BY THE ENGINEER-IN-CHARGE OR HIS AUTHORIZED AGENT, THE MATERIAL PRONOUNCED AS USEFUL BY THE ENGINEER WILL BE CONVEYED AND PROPERLY STACKED AS DIRECTED WITHIN THE SPECIFIED LIMIT. UNLESS MATERIALS WILL BE BURNT OR OTHERWISE DISPOSED OFF AS DIRECTED.

2.4 ALL HOLES OR HOLLOWES WHETHER ORIGINALLY EXISTING OR PRODUCED BY DIGGING UP ROOTS, SHALL BE CAREFULLY FILLED UP WITH EARTH, WELL EARTH, WELL RAMMED LEVELED OFF, AS MAY BE DIRECTED.

3.0 SETTING OUT:

THE CENTER LINES OF ALL PIPE TRENCHES ETC. SHALL BE GIVEN BY THE ENGINEER-IN-CHARGE AND IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL SUBSTANTIAL REFERENCE

CONTRACTOR

SIGNATURES

CHIEF OFFICER

MARKS, BENCH MARKS, ETC. AND MAINTAIN THEM AS LONG AS REQUIRED TRUE TO LINE, LEVEL CURVE AND SLOPES. THE CONTRACTOR SHALL ASSURE FULL RESPONSIBILITY FOR ALIGNMENT, AND DIMENSION OF TRENCH.

THE LABOR MATERIALS ETC. REQUIRED FOR SETTING OUT AND ESTABLISHING BENCHMARKS AND OTHER REFERENCE MARKS SHALL BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST.

4 EXCAVATION

4.1 THE EXCAVATION INCL. BAILING OUT OF WATER FOR THE PIPE TRENCHES SHALL ALSO INCL. REMOVAL OF ALL MATERIALS OF WHATEVER NATURE AND WHETHER WET OR DRY CONDITION NECESSARY FOR LAYING OF PIPELINES EXACTLY IN ACCORDANCE WITH ALIGNMENT, LEVELS GRADES AND CURVES SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER-IN-CHARGE. TRENCHES SHALL BE EXCAVATED TO THE EXACT WIDTH AND DEPTH ACCORDING TO THE SIZE OF PIPE AND THE SIDES SHALL BE LEFT VERTICAL AS FAR AS POSSIBLE OR ACCORDING TO THE ANGLE OF REPOSE VARIOUS SOILS. UNLESS THERE IS A SPECIFIC EXTRA PROVISION IN THE CONTRACT FOR SHORING AND STRUTTING OR FOR CUTTING SIDE SLOPES THE CONTRACTOR SHALL AT HIS OWN COST DO THE NECESSARY SHORING AND STRUTTING OR CUTTING OF SLOPES TO A SAFE OF REPOSE OR BOTH APPROVED BY THE ENGINEER-IN-CHARGE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE STARTING EXCAVATION TO ENABLE HIM TO TAKE CROSS SECTIONAL LEVELS FOR PURPOSE OF MEASUREMENTS BEFORE THE GROUND IS DISTURBED. THE BOTTOM OF THE TRENCHES SHALL BE LEVELED BOTH LONGITUDINALLY AND TRANSVERSELY OR SLOPPED AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL AT HIS OWN COST TO REMOVE SUCH PORTIONS OF BOULDERS OR ROCKS, AS ARE RECTIFIED TO MAKE THE BOTTOM OF THE TRENCH LEVEL. NO FILLING SHALL BE ALLOWED TO BRING THE TRENCH TO LEVEL. IF BY CONTRACTOR'S MISTAKE EXCAVATION IS MADE DEEPER THAN SHOWN ON THE PLANS AND IF ORDERED BY THE ENGINEER THE EXTRA DEPTH SHALL HAVE TO BE MADE WITH SELECTED EXCAVATED STUFF ONLY WITH WATERING, REMEDYING ETC. AS DIRECTED, BY THE ENGINEER AND AT THE COST OF THE CONTRACTOR. OTHER HARD EXCAVATION SHALL BE CLEARED OF ALL SORTS AND LOOSE MATERIALS AND CUT TO FIRM SURFACE, EITHER LEVEL, STEPPED AS DIRECTED BY THE ENGINEER. THE ENGINEER MAY ORDER SUCH CHARGES IN THE DIMENSIONS AND ALIGNMENT OF PIPE TRENCH AS MAY BE DEEMED NECESSARY TO SECURE SATISFACTORY COVER OVER PIPELINE. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, MAKE PROVISION FOR BAILING OUT OF DRAINING WATER AND THE TRENCHES SHALL BE KEPT FREE OF WATER, DURING LAYING WORK.

AFTER EACH EXCAVATION IS COMPLETED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO THAT EFFECT AND NO LAYING OF PIPELINE WILL BE ALLOWED TO LAID UNTIL ENGINEER HAS APPROVED THE DEPTH AND DIMENSIONS OF TRENCHES LEVEL AND MEASUREMENTS.

5.0 SHORING AND STRUTTING:

5.1 SHORING & STRUTTING AND DEWATERING IF REQUIRED SHALL HAVE TO BE CARRIED OUT BY THE CONTRACTOR, FOR WHICH ANY EXTRA CHARGE WILL NOT BE PAID

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5.2 DURING EXCAVATION IF WATER CONNECTIONS, SEWAGE CONNECTIONS, TELEPHONE LINES KHALKUVA (SOAK PITS) ETC. ARE DAMAGED BY THE CONTRACTOR, THE SAME SHALL HAVE TO BE RESTORED BY THE CONTRACTOR WITHOUT ANY EXTRA PAYMENT.

6.0 PROTECTION

6.1 THE TRENCHES SHALL BE STRONGLY FENCED AND RED LIGHT SIGNAL SHALL BE KEPT AT NIGHT AND ARRANGEMENT OF WATCHMAN TO PREVENT ACCIDENTS SHOULD BE DONE, SUFFICIENT CARE PROTECTIVE MEASURE SHALL BE TAKEN TO SEE THAT THE EXCAVATION SHALL NOT AFFECT OR DAMAGE THE ADJOINING STRUCTURE. THE CONTRACTOR SHALL BE ENTIRELY RESPONSIBLE FOR ANY INJURY TO LIFE AND DAMAGE TO THE PROPERTIES ETC. NECESSARY PROTECTION WORK SUCH AS GUIDE ROPES, CROSSING PLACES, BARRICADES, CAUTION BOARDS ETC. SHALL BE PROVIDED BY THE CONTRACTOR.

7.0 THE EXCAVATION IN ALL SORTS OF SOIL, HARD MURRAM, SOFT ROCK OR HARD ROCK OR ANY TYPE OF SOIL SHALL HAVE TO BE CARRIED OUT UP TO THE REQUIRED DEPTH BY THE AGENCY

8 DISPOSAL OF EXCAVATED STUFF

8.1 NO EXCAVATED STUFF FROM TRENCH ARE TO BE PLACED EVEN TEMPORARILY NEARER THAN 1.5 METER OR GREATER DISTANCE UP TO 90 METER OR AS PRESCRIBED BY THE ENGINEER FROM THE OUTER EDGE OF TRENCH. ALL EXCAVATED MATERIAL WILL BE THE PROPERTY OF THE BOARD. THE RATE OF EXCAVATED INCLUDES SORTING OUT OF USEFUL MATERIALS AND STACKING THEN SEPARATELY AS DIRECTED WITHIN SPECIFIED LEAD. THE EXCAVATED STUFF SUITABLE AND USEFUL FOR REFILLING OR FOR OTHER USE SHALL BE STACKED AT CONVENIENT PLACES. THE MATERIALS NOT USEFUL IN ANY WET SHALL BE DISPOSAL OFF AS DIRECTED BY THE ENGINEER FROM THE OUTER EDGE OF TRENCH.

8.2 THE SITE SHOULD BE CLEARED OFF ON COMPLETION OF WORK.

9.0 ADDITIONAL REQUIREMENTS

9.1.1 AT THE JOINTS OF PIPES, THE TRENCH SHALL BE EXCAVATED TO AN ADDITIONAL DEPTH OF 15 CM. AND WIDTH OF 30 CM. AND LENGTH OF 15 CM. BEYOND THE EDGE OF COLLAR ON BOTH THE SIDES OR AS DIRECTED. THE RATE INCLUDE FOR SUCH EXTRA EXCAVATION MADE AT THE JOINTS. THE TRENCHES SHALL BE EXCAVATED PERFECTLY IN STRAIGHT LINE. THE BOTTOM OF THE TRENCH SHALL BE KEPT AS PER INVERT LEVEL OR AS DIRECTED. TO MAINTAIN THE PROPER SLOP THE USUAL METHOD OF SITE RAILS AND BONING RODS SHALL BE ADOPTED. THE CONTRACTOR SHALL HAVE TO PROVIDE AND FIX AND MAINTAIN SIGHT RAILS AND BONING ROD WITHOUT ANY EXTRA COST.

IF THE CONTRACTOR FAILS OR MAKES DELAY TO GIVE HYDRAULIC TEST OF THE PIPE LINE LAID IN ANY OF THE SECTION, WITHOUT ANY GENUINE REASON, HE SHALL BE RESPONSIBLE TO GET ANY PART OF THE LENGTH TRENCHES REFILL IN SUCH CASE I.E. BEFORE TASTING FOR SAFETY OF PEDESTRIAN AND/OR VEHICULAR TRAFFIC AS FOUND NECESSARY BY THE ENGINEER-IN-CHARGE WITHOUT ANY EXTRA COST. IF FOUND NECESSARY ANY DIRECTED BY THE ENGINEER-IN-CHARGE. THE CONTRACTOR SHALL HAVE TO EXCAVATE THE REFILLED TRENCHES, DURING HYDRAULIC TEST WITHOUT ANY EXTRA COST.

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AT ALL ROAD CROSSINGS, TRENCHES SHALL BE EXCAVATED ONLY FOR HALF WIDTH OF THE ROAD AND PIPE SHALL BE LAID. THE OTHER HALF SHALL BE EXCAVATED ONLY AFTER BACK FILLING OVER THE LAID PIPELINE IS DONE SO AS TO MAKE IT SUITABLE FOR THE TRAFFIC. THE CONTRACTOR SHALL PROVIDE DIRECTION WHEN THE PIPELINE IS TO BE LAID ALONG THE ROAD AS REQUIRED AND SHALL MAINTAIN THE DIVERSION OR ANY PART OF IT, WITHOUT ANY EXTRA COST. AT ALL ROAD CROSSINGS, THE PIPE SHALL BE LAID BELOW THE CREST OF ROAD.

- 9.2** THE CONTRACTOR SHALL BREAK THE ROAD SURFACE BY EXCAVATION CHISELING TO THE EXACT WIDTH AND LENGTH AS SHOWN ON THE DRAWING OR AS DIRECTED BY THE ENGINEER-IN-CHARGE.

THE EXCAVATED STUFF SHALL BE DEPOSITED IN UNIFORM LAYERS TO AVOID MIXING WITH OTHER KIND OF MATERIALS AT NON-OBJECTIONABLE PLACE OR AS DIRECTED BY THE ENGINEER-IN-CHARGE.

10.0 MEASUREMENT AND PAYMENT

- 10.1** THE PAYMENT OF EXCAVATION SHALL BE MADE AT THE UNIT RATE PER CUBIC METER FOR THE QUANTITY ACTUALLY EXCAVATED AND ACCEPTED BY THE ENGINEER IN CHARGE LIMITED TO DIMENSIONS SHOWN IN THE SANCTIONED PLANS OR AS DIRECTED BY THE ENGINEER. EXCAVATION IN EXCESS OF THE SANCTIONED DIMENSIONS SHALL NOT BE MEASURED NOT PAID FOR AND IF AN ORDERED BY THE ENGINEER THE CONTRACTOR SHALL HAVE TO FILL UP THE EXCESS DEPTH WITH EXCAVATED STUFF WITH WATERING RAMMING ETC. (COMPLETED AS SPECIFIED) FOR TRENCH WITHOUT ANY EXTRA PAYMENT TO THE CONTRACTOR.

- 10.2** DIMENSION SHALL BE CORRECT TO TWO PLACES OF DECIMALS OF A METER AND INDIVIDUAL QUANTITY SHALL OF DECIMALS OF A METER AND INDIVIDUAL QUANTITY SHALL BE CALCULATED TO TWO PLACES OF DECIMALS OF A CUBIC METER.

- 10.3** THE RATE FOR THE ITEM OF EXCAVATION SHALL INCLUDE UNLESS AND OTHERWISE MENTIONED.

- (A) CLEARING OF SITE
- (B) SETTING OUT WORK INCLUDING ALL MATERIALS AND LABOUR.
- (C) PROVIDING AND SUBSEQUENTLY REMOVING, SHORING AND STRUTTING OUTING SLOPES ETC.
- (D) EXCAVATION AND REMOVAL AND STAKING OF ALL EXCAVATED STUFF AS DIRECTED.
- (E) NECESSARY PROTECTION INCLUDING LABOUR MATERIALS EQUIPMENT ETC. TO ENSURE SAFETY AND PROTECTION AGAINST RISK OR ACCIDENT.
- (F) PROVIDING FACILITIES FOR INSPECTION AND DAMAGE TO PROPERTY IF CAUSED DURING PROGRESS OF WORK.
- (G) COMPENSATION FOR INJURY TO LIFE AND DAMAGE TO PROPERTY IF CAUSED DURING PROGRESS OF WORK.
- (H) RESTORING OF WATER SUPPLY CONNECTIONS, SEWER CONNECTIONS, TELEPHONE LINES, KHALKUVA SOAPIEST ETC. IF DAMAGED BY CONTRACTOR WITHOUT EXTRA PAYMENT.

- (I) DEWATERING OF EXCAVATED PIT TRENCH DURING THE PROGRESS OF WORK.
- (J) CLEARING THE SITE ON COMPLETION OF WORKS DIRECTED BY THE ENGINEER.

ITEM No.3 & 5 D.I. PIPE

PROVIDING AND SUPPLYING D. I. K-7 GRADE PIPES FOR FOLLOWING NOMINAL BORE DIAMETER WITH INTERNAL CEMENT MORTAR LINING INCLUDING ALL TAXES, INSURANCE, TRANSPORTATION, FREIGHT CHARGES, OCTROI, INSPECTION CHARGES, LOADING, UNLOADING, CONVEYANCE TO DEPARTMENTAL STORES, STACKING ETC. COMPLETE. (IS 8329-2000). RATE FOR DI PIPE BASED ON WHOLESALE PRICE INDEX OF PIG IRON AS 114.20 FOR THE MONTH OF FEBUAURY-2019.

250MM DI, 200 MM DI & 150MM DI.

A] DUCTILE IRON PIPES:

Note: Wherever International Standards or Indian standards / specifications are mentioned, their equivalent or higher standards / specifications are also acceptable

Supply and Delivery of **Ductile Iron Pipe K-7 / K9 as per IS:8329-2000** or its latest revision or amendments if any including jointing material as EPDM ring as per IS 5382-1985 and ISO: 4633-1996 or its latest revision or amendments if any

Standards

The following standards, specifications and codes are part of this specification. In all cases, the latest revision of the including all applicable official amendments and revisions shall be referred to. In case of discrepancy between this specification and those referred to herein, this specification shall govern.

- 1) ISO: 10803-1997 Design method for ductile iron pipes
- 2) IS:8329-2000 Centrifugally Cast (spun) ductile iron pressure pipes for water, gas and sewage
- 3) ISO:2531-1991 Ductile iron pipes, fittings and accessories for pressure pipelines.
- 4) ISO:4179-1985 Ductile iron pipes for pressure and non pressure-Centrifugal cement mortar lining – General requirements.
- 5) IS:8112 Specification for 43 Grade ordinary Portland cement.
- 6) BS:3416 Bitumen based coatings for cold application, suitable for use in contact with potable water.
- 7) ISO:8179-1995 Ductile iron pipes-External coating-Part-1 Metallic Zinc with finishing layer.
- 8) IS:638 Sheet rubber jointing and rubber insertion jointing.
- 9) ISO:4633-1996 Rubber seals-Joint rings.
- 10)IS:5382-1985 Specification for Rubber sealing rings for gas mains, water mains and sewers.
- 11)AWWA C600 Installation of ductile iron water mains and their appurtenances.

1.0 Internal Diameter:

The nominal values of the internal diameters of pipe, expressed in millimeters are approximately equal to the number indicating their nominal sizes DN.

2.0 Length:

The working length of socket and spigot pipes shall be 5 m ,5.5 m, or 6 metres.

3.0 Thickness:

The wall thickness of pipe 'e' in mm shall be calculated as a function of the nominal diameter by the following equation with minimum of 5 mm

$$e = K(0.5 + 0.001 \text{ DN})$$

where : e = wall thickness in mm, DN = the nominal diameter, K = the whole number coefficient

4.0 EPDM Rubber Gasket:

Rubber Gasket shall be suitably for Push-on-Joint.

The spigot ends shall be suitably chamfered or rounded off to facilitate smooth entry of pipe in the socket fitted with the rubber gasket

Rubber Gasket shall confirm to IS 5382-1985 and ISO : 4633-1996 its latest revision or amendments if any

5.0 Sampling Criteria:

Sampling criteria for various tests, unless specified in IS 8329-2000, shall be as laid down in IS 11606. Mechanical test, Brinell Hardness test, Hydrostatic test etc are shall be as per IS 8329-2000

6.0 Tolerances on External Diameter:

The nominal external diameter (DE) of the spigot end of socket and spigot pipes and when measured circumferentially using a diameter tape shall confirm to the requirements specified as follow. The positive tolerance is +1 mm and applies to all thickness classes of pipes. The maximum negative tolerance of the external diameter are specified as follow:

DN	Nominal	Positive Tolerance	Negative Tolerance
80	98	+1	-2.2
100	118	+1	-2.8
125	144	+1	-2.8
150	170	+1	-2.9
200	222	+1	-3.0
250	274	+1	-3.1
300	326	+1	-3.3
350	378	+1	-3.4
400	429	+1	-3.5
450	480	+1	-3.6
500	532	+1	-3.8
600	635	+1	-4.0

7.0 Tolerance on Ovality:

Pipes shall be as far as possible circular internally and externally. The tolerance for out-of-roundness of the socket and spigot ends is given below:

Nominal Diameter in mm	Allowable Difference Between Minor Axis and DE in mm
80 to 300	1.0
350 to 600	1.75
700	2.0
750 to 800	2.4
900 to 1000	3.5

8.0 Tolerance in thickness

The tolerance on wall thickness (e) and the flange thickness (b) of the pipes shall be as below:

Dimensions	Tolerance in mm
Wall thickness (e)	- (1.3 + 0.001 DN) ¹⁾
Flange thickness (b)	+ (2+0.05b) & - (2+0.05b)

9.0 Coating

Pipe shall be delivered internally and externally coated.

External Coating: Pipe shall be metallic zinc coated and after that it shall be given a finishing layer of bituminous paint as per IS - 8329-2000

Zinc coating shall comply with IS:8329/EN 545/ ISO 8179. Only molten zinc spray coating shall be acceptable. The average mass of sprayed metal shall not be less than 130 g/sqm with a local minimum of 110 g/sqm.

Bitumen overcoat shall be of normal thickness of 70 microns unless otherwise specified. It shall be a cold applied compound complying with the requirements of BS 3416 Type II suitable for tropical climates factory applied preferably through an automatic process.

Damaged areas of coating shall be repainted on site after removing any remaining loose coating and wire brushing any rusted areas of pipe.

Internal lining: Internally pipe shall be Portland Cement mortar lined (as per IS - 8329-2000). The mortar shall contain by mass at least one part of cement to 3.5 part of sand.

All pipes and fittings shall be internally lined with cement mortar using high speed centrifugal process in accordance with IWO 4179/IS 8329. Cement mortar lining shall be applied at the pipe manufacturing shop in conformity with the aforesaid standards. No admixtures in the mortar shall be used without the approval of the Engineer. The sand to cement proportion of sand if justified by the sieve analysis.

Pipe lining shall be inspected on site and any damage or defective areas shall be made good to the satisfaction of the Engineer.

Nominal Pipe Size (mm)	Nominal lining thickness (mm)
Up to 300	3
350-600	5
700-1200	6
1400-2000	9

10.0 Joint

Joining of DI pipes and fittings shall be push-on type

Push-on-joints

The Contractor shall source the push-on-joint gaskets only from the pipe manufactures. In turn the pipe manufacturer shall supply at least 10% additional quantity of gaskets over and above the requirement to the Contractor at no extra cost.

The gasket used for joints shall be suitable for natural and purified water conveyance. In joining DI pipes and fittings, the Contractor shall take into account the manufacturer's recommendations as to the methods and equipments to be used in assembling the joints. In particular the Contractor shall ensure that the spigot end of the pipe to be jointed is smooth and has been properly chamfered, so that once the rubber ring is correctly positioned before the joint is made, does not get damaged by friction or sharp edges of the spigot Chamfer. The rubber rings and the recommend lubricant shall be obtained only through the pipe manufacturer.

Rubber ring bundles form every lot shall carry with them manufacturers test certificate for the following mechanical properties.

Lining shall be uniform in thickness all along the pipe. The minimum thickness of factory applied cement mortar lining shall be as per IS: 8329 Annex-B or ISO 4179. This is given below.

1. Hardness
2. Tensile strength
3. Compression set
4. Accelerated again test
5. Water absorption test
6. Stress relaxation test

Rubber rings shall be clearly labeled in bundles to indicate the type of ring, the type of joint, the size of the pipe with which they are to be used, the manufacturer's name and trade mark, the month and year of manufacture and the shelf life.

11.0 Testing of Pipe:

The main test among others to be conducted shall be as per IS:8329-2000 or with its latest revision/amendments.

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[a] Mechanical Tests

Mechanical tests shall be carried out during manufacture of pipes as specified in the Standards. The frequency and sampling of tests for each batch of pipes shall be in accordance with IS 11606-1986. The test results so obtained for all the pipes and fittings of different sizes shall be submitted to Engineer. The method for tensile tests and the minimum tensile strength requirement for pipes and fittings shall be as per IS:8329/EN 545 for pipes and IS:9523/EN 545 for fittings.

[b] Brinell Hardness Test

For checking the Brinell hardness the test shall be carried out on the test ring or bars cut from the pipes used for the ring test and tensile test in accordance with IS:1500. The test shall comply with the requirements specified in IS:1500/ISO 6506.

[c] Re-tests

If any test piece representing a lot fails in the first instance, two additional tests shall be made on test pieces selected from two other pipes from the same lot. If both the test results satisfy the specified requirements the lot shall be accepted. Should either of these additional test pieces fail to pass the test, the lot shall be liable for rejection.

[d] For hydrostatic test at works, the pipes and fittings shall be kept under test pressure as specified in the standard for a period of minimum 15 seconds during which the pipes shall be struck moderately with a 700 g hammer for conformation of satisfactory sound. They shall withstand the pressure test without showing any leakage, sweating or other defect of any kind. The hydrostatic test shall be conducted before surface coating and lining.

12.0 Quality Assurance

The manufacturer shall have a laid down Quality Assurance Plan for the manufacture of the products offered which shall be submitted along with the tenders.

13.0 DI specials shall be conforming to IS 9523-2000 and flanges shall be of PN-10 class. The rates includes providing DI specials suitable to DI K-9 pipes in all categories as per requirement.

Mode of Payment : As per schedule B.

Item No.1.1

Manufacture, supply & delivery of D.I./CI specials plain & Socket or flanged suitable to D.I.K-7

A) Manufacture, supply and delivery of Ductile Iron Flange Socket spigot bends, tees, reducers or any other specials as per BS-EN-545 / 1995 class-A series K-12 suitable for use with DI pipes manufactured as per IS 8329/1994 delivery of specials is to be made to site of works including all taxes, loading, unloading, carting, stacking, insurance, inspection charges, Octroi etc. complete with internal cement mortar lining with EPDM rubber gaskets.

DI Specials with all types of diameters suitable of K9-K7 grade pipes with inner cement mortal lining

The necessary DI Specials required during the lowering & lying of Ductile Iron Pipe shall be supplied by the agency and shall be as per standard specification. And per IS specification

It shall be of best quality as per requirement Rate shall be including loading, unloading, carting, insurance and labour charge etc. complete.

The payment shall be made on kg. Basis.

Item No.4&6

Lowering laying and jointing D I – pipe

Lowering, laying and jointing C. I. S & S Spun pipes suitable for Tyton joints / Mortar lined D. I. Pipes of various classes with CI / MS specials of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including hydraulic testing etc. comp.

250MM DI, 200 MM DI & 150 MM DI.

GENERAL:

The trenches shall be well leveled so that pipes are laid evenly along them. The pipes shall be fixed within two rubber rings to be supplied by department at the place shown in schedule A, if directed by the Engineer-in-charge or mentioned in item of schedule B. .

The contractor shall make his own arrangement for obtaining permission for

The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.

storing & stacking of pipes etc. from land boards whether they are Government, Municipal Local Bodies or Private land owner.

Every pipes before lowering into the trenches shall be got checked and thoroughly cleaned and the beds of the trenches shall be properly graded and leveled as required on the line, without any claim for extra cost whether it is required. The pipe shall be carefully lowered into the trenches with the help of a suitable type of chain pulley blocks, which shall first be approved by the Engineer-in-Charge. Each pipe shall be properly jacked and the spigot perfectly fixed into the socket. No jointing operation shall be started unless the gradients levels are approved by the Engineer-in-Charge or his representatives.

The pipes shall be laid complete in centerline ranged accurately by means of a string attached to both marked center of site rails and no deviation shall be

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permissible without the permission of Engineer-in-Charge. The pipe shall be laid in reasonably dry trenches and no circumstances on slushy bedding.

The pipes shall be brushed before lowering any laying or remove any soil or dirt etc. that may have accumulated.

The inside socket and outside of the spigot-shall be carefully cleaned. The pipe shall be lowered carefully with socket and toward and the flow of water or up till or as directed and spigot and should be carefully inserted into the socket and the space shall be filled with the joint.

DI specials shall be conforming to IS 9523-2000 and flanges shall be of PN-10 class.

TESTING OF WATER PIPES:

After each section of the pipeline has been completed it shall be tested for water tightness before being covered. The contractor shall at his own cost fill up water in pipe line and given necessary hydraulic test section by section and the pipe line shall stand the pressure which shall exceed the working pressure by (a) 50% of the highest pressure in the section. (b) 30m whichever is less without showing any leakage or sweating any where in the pipes joints specials valves etc. if any defect are found the contractor shall be made good the same at his own cost.

Any leaking joints shall be made good and above test pressure in to be lowered gradually after satisfactory test is & over.

Local body will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

The hydraulic test shall be given again if considered necessary by the Engineer or his representative to show that no further leakages or sweating is there. The contractor shall have to make necessary arrangements for water testing as well as plugging the opened of pipes etc. as directed without claiming any extra cost. The pipelines shall be kept filled with water for a work lines shall be kept filled with water for a week or till it is situated for testing is done.

If the pipe lines are laid in detached sanctioned & not in continuous length due to any reasons such as non availability of specials or due to obstacle etc. The contractor shall see that no end of pipes length is kept open-ends are immediately covered up either by suitable blank flange or cap slug or by means of double layer gunny bags clothes tied properly by mild steel wire without any claim for extra-cost.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending

upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method. The rate includes fixing of DI specials as per requirement.

Mode of measurement and payments

Payment will be as per payment schedule

Item No.7 Refilling

Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km.

- Refilling materials shall be from excavated stuff.
- Excavated stuff to be used shall be cleared off all rubbish, large size stone bricks bats etc. big clods shall 50 mm or less. The selected soil sand or any other materials shall be got approved before filling, Refilling shall be done in a systematic manner in layers by the contract. Before refilling the trenches the contractor shall got checked the trenches, ready for refilling.
- All space between pipe line and the sides of excavation shall be refilled to the original surface with earth or selected material in layers of 15 cms to 10 cms, well watered and rammed. Each layers shall be watered and compacted with heavy manner, before the upper layer is laid till the final level is reached to the thoroughly compacted base.
- Refilling on top of pipe shall be carried out carefully with selected soft stuff out of the excavated stuff. The filling shall be raised about 15 cms. to take care of subsequent settlement.
- The contractor shall be responsible for any settlement. The contractor shall be responsible for any settlement during passage of time during monsoon and the same shall be refilled with stuff brought from the outside if necessary at his cost.
- The process of refilling trenches, watering, ramming shall be carried out in such a way that no damage is done to the pipe line already laid.
- Disposal of the Excavated Stuff:

THE EXCAVATED STUFF OF THE SELECTED TYPE SHALL BE USED FOR FILLING THE TRENCHES AND PLINTH OR LEVELING THE GROUND IN LAYERS INCLUDING RAMMING AND WATERING ETC. COMPLETE. THE CONTRACTOR SHALL REMOVE THE BALANCE OF THE EXCAVATED FROM THE SITE OF WORK TO A PLACE AS DIRECTED WITHIN A LEAD UP TO 3 KM.

ITEM No.8 VALVES:

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'PROVIDING AND SUPPLYING ISI MARK CL D/F SLUICE VALVES , BUTTERFLY VALVES & REFLUX VALVES OF FOLLOWING CLASS AND DIAMETER INCLUDING ALL TAXES, INSURANCE, TRANSPORTATION, FREIGHT CHARGES, OCTROI, INSPECTION CHARGES, LOADING, UNLOADING, CONVEYANCE TO DEPARTMENTAL STORES, STACKING ETC. COMPLETE.

PN-1.6 WITH HAND/WHEEL CAP OPERATED (ALT-1 TYPE LONG BODY)

250 SV, 200 SV & 150 SV

Sluice Valve

SLUICE VALVE AS PER I.S: 780 & 2906/1984

1.0 GENERAL

THE CONTRACTOR SHALL BE COVERING MANUFACTURING, SUPPLYING AND DELIVERY OF:

SLUICE VALVE CONFORMING TO IS: 2906-1984 & IS: 780-1984 OR ITS LATEST REVISION (SPECIFICATION FOR SLUICE VALVES (50 TO 900 MM SIZE) WITH ISI CERTIFICATION

2.0 STANDARDS

THE C.I. SLUICE VALVES TO BE MANUFACTURED, SUPPLIED AND DELIVERED UNDER THE SCOPE OF THIS CONTRACT SHALL BE MANUFACTURED IN ACCORDANCE WITH AND CONFORMING TO INDIAN STANDARD SPECIFICATIONS AS GIVEN BELOW: WITH ISI CERTIFICATION MARK ON EACH SLUICE VALVES.

3.0 TEMPERATURE VARIATION

ALL SLUICE VALVES MANUFACTURED, SUPPLIED AND DELIVERED SHALL BE SUBJECTED TO DRINKING WATER UNDER VARIABLE TEMPERATURE CONDITION RANGING FROM 4⁰ TO 45⁰ C.

4.0 MARKING

THE LEGIBLE AND IN DENIABLE MARKING UPON EACH VALVE SHALL INDICATE THE FOLLOWING:

- (1) ISI CERTIFICATION MARK ON EACH SLUICE VALVE ONLY.
- (2) MANUFACTURE'S BRAND NAME AND/OR TRADE MARK.
- (3) SIZE OF VALVE AND NOMINAL PRESSURE OF VALVE.
- (4) SERIAL NUMBER OF CAST.
- (5) SERIAL NUMBER IN PUNCH
- (6) WHERE A VALVE HAS BEEN TESTED FOR ONLY OPEN AND TEST, IT SHOULD BE MARKED '0' DISTINCTLY AND PERMANENTLY.
- (7) ANY OTHER IMPORTANT MATTER THAT THE MANUFACTURER DEEMS FIT TO BE INSCRIBED EMBOSSED.

5.0 TEST CERTIFICATE

- 5.1 THE CONTRACTOR SHALL ALWAYS PROVIDE MANUFACTURE'S TEST CERTIFICATE IN ACCORDANCE WITH EVERY BATCH/ LOT AS VALVES SO MANUFACTURED AND SUPPLIED.

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- 5.2 THE CONTRACTOR SHALL ALSO PRODUCE, IN ADDITION TO MANUFACTURE'S TEST CERTIFICATE THE INSPECTION CERTIFICATE ISSUED BY THE AUTHORIZED PERSON /AGENCY APPOINTED BY LOCALBODY FOR THE SAME PURPOSE.

6.0 NOMINAL PRESSURE

- 6.1 SLUICE VALVES SHALL BE DESIGNED BY NOMINAL PRESSURE (PN) DEFINED AS THE MAXIMUM PERMISSIBLE GAUGE WORKING PRESSURE IN MPA AS "PN-II" (MPA= 10 KGF/M² APPROX)
- 6.2 THE NOMINAL SIZE SHALL REFER TO THE NOMINAL BORE AT ANY POINT, SHALL NOT BE LESS THAN THE NOMINAL SIZE REQUIRED.

7.0 MATERIAL:

- 7.1 THE MATERIALS FOR THE DIFFERENT COMPONENT PARTS OF THE SLUICE VALVE SHALL CONFIRM TO REQUIREMENTS GIVEN IN TABLE

MATERIALS FOR COMPONENTS PARTS OF SLUICE VALVE

Sr. No	COMPONENT	MATERIAL	REF. TO	GRADE OF DESIGNATION
1	BODY, BONNET WEDGE STUFFING BOX, GLAND THRUST PLATE, CAP.	GREY CAST IRON	210-FG 1978(1)	
2	STEAM	HIGH TENSILE BRASS	320-1962(2)	ALLY 1 OF 2
3	WEDGE NUT	LEADED TIN BRONZE	318-1962(3)	2
4	BODY SEAT RING, WEDGE FACING RING	LEADED TIN BRONZE	318-1962(3)	2
5	BOLTS	CARBON STEEL	1367-1967(4)	CLASS 4.6
6	NUTS	CARBON STEEL	1367-1967(4)	CLASS 4
7	BONNET GASKET	COMPRESSED FIBER BOARD	2712-1971(5)	C
8	GLAND PACKING	JUTE & HEMP	5414-1969(6)	--

- (1) SPECIFICATION FOR GREY IRON CASTINGS (THIRD REVISION).
- (2) SPECIFICATION FOR HIGH TENSILE BRASS RODS AND SECTIONS (REVISED).

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- (3) SPECIFICATION FOR LEADED TIN BRONZE INGOTS AND CASTING (REVISED).
- (4) SPECIFICATION FOR TECHNICAL SUPPLY CONDITION THREADED FASTENERS (FIRST REVISION)
- (5) SPECIFICATION FOR COMPRESSED ASBESTOS FIBER JOINTING (FIRST REVISION)
- (6) SPECIFICATION FOR GLAN PACKING, JUTE AND HEMP.

8.0 MANUFACTURE

SLUICE VALVE BODIES FOR 80 MM TO 900 MM SIZE VALVES SHALL BE PROVIDED WITH DOUBLE FLANGED ENDS CONNECTION.

9.0 FLANGES

THE FLANGES AND THEIR DIMENSIONS OF DRILLING SHALL BE IN ACCORDANCE WITH PART IV AND VI OF I.S. 1538 (PART I TO XXII) 1976 (SPECIFICATION FOR CAST IRON FITTINGS FOR PRESSURE PIPES FOR WATER GAS AND SEWAGE) OR ITS LATEST REVISION.

10.0 MODE OF MEASUREMENT AND PAYMENT

MEASUREMENT SHALL BE PAID ON NUMBER BASIS AS PER RELEVANT DIA OF THE ITEM IN SCHEDULE '1' OF THE TENDER AND AS PER PAYMENT SCHEDULE.

Butterfly valves

Butterfly valves as per **IS - 13095 / 1991**

1.0 SCOPE – FABRICATED VALVE WILL NOT BE CONSIDERED.

- 1.1 THIS STANDARD COVER DOUBLE FLANGED AND WAFER TYPE OF METAL SEATED, RESILIENT SEATED CAST IRON, DUCTILE IRON, AND CARBON STEEL AND LINED BUTTERFLY VALVES FOR GENERAL PURPOSE. VALVES COVERED UNDER THIS STANDARD ARE MANUALLY, PNEUMATICALLY, HYDRAULICALLY OR ELECTRICALLY OPERATED.
- 1.2 IT COVERS VALVES OF NOMINAL PRESSURE DESIGNATIONS UP TO AND INCLUDING 4 MPA. AND CLASS 300 WITH ENDS FLANGED IN ACCORDANCE WITH APPROPRIATE TABLE OF I.S 6418 : 1971 'CAST IRON AND MALLEABLE CAST IRON FLANGES FOR GENERAL ENGINEERING PURPOSE' OR WAFER TYPE VALVES WITH BODIES DESIGNED TO BE ACCOMMODATE BETWEEN PIPE WORK FLANGES IN ACCORDANCE WITH APPROPRIATE TABLE OF IS 6418 : 1971 OR IS 6392 : 1971 'STEEL PIPE FLANGES' IN NOMINAL SIZE DN 40 TO DN 2000. IT ALSO COVERS VALVES UP TO CLASS 300 AND FLANGES AS PER THE PRESSURE/TEMPERATURE RATINGS GIVEN IN IS 13159 (PART 1) : 1991 'STEEL PIPE FLANGES AND FLANGED FITTINGS : PART I DIMENSIONS' AND IS 6418 : 1971 'CAST IRON AND MALLEABLE CAST IRON FLANGES FOR GENERAL ENGINEERING PURPOSES'.

2.0 REFERENCE

THE INDIAN STANDARDS LISTED IN ANNEX A ARE NECESSARY ADJUNCTS TO THIS STANDARD.

3.0 TERMINOLOGY AND DEFINITIONS

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TERMINOLOGY AND DEFINITION COVERED IN IS 4854 (PART3) : 1974 ARE GENERALLY APPLICABLE.

4.0 VALVE END CONNECTIONS

4.1 DOUBLE FLANGED VALVES

A VALVE HAVING FLANGED ENDS FOR CONNECTION TO PIPE FLANGES BY INDIVIDUAL BOLTING AS SHOWN IN FIG. 1

4.2 WATER VALVE

A VALVE FOR CLAMPING BETWEEN TWO PIPE FLANGES USING THROUGH BOLTING THIS MAY BE SINGLE FLANGE, LUG TYPE, U- SECTION OR FLANGELESS TYPE AS SHOWN IN FIG 2,3,4,5 & 6.

5.0 SERVICE APPLICATIONS

5.1 VALVES SHALL BE SUITABLE FOR ONE OR MORE OF THE FOLLOWING APPLICATIONS.

- (A) **TIGHT SHUT OFF** - A VALVE HAVING NO VISIBLE LEAKAGE PAST THE DISC IN CLOSED POSITION UNDER TEST CONDITIONS.
- (B) **REGULATING** - A VALVE INTENDED FOR REGULATING PURPOSE AND WHICH MAY HAVE A CLEARANCE BETWEEN THE DISC AND THE BODY IN CLOSE POSITION.
- (C) **LOW LEAKAGE** - A VALVE WHICH HAS SPECIFIED MAXIMUM LEAKAGE RATE PAST THE DISC IN THE CLOSED POSITION.

5.2 VACUUM CONDITION

WHERE VALVE ARE TO BE USED UNDER VACUUM CONDITIONS, PURCHASER SHALL MENTION SPECIFICALLY AND THE DETAILED DESIGN PROVISION SHALL BE MUTUALLY AGREED BETWEEN THE PURCHASER AND THE MANUFACTURER.

6.0 NOMINAL SIZES

THE RANGE OF NOMINAL VALVE SIZE (DN) IN MM SHALL BE AS FOLLOWS:

40,50,65,80,100,150,200,250,300,350,400,450,500,600,700,800,900,1000,1200,1400,1600,1800 AND 2000

7.0 NOMINAL PRESSURES

7.1 VALVE SHALL BE DESIGNATED BY NOMINAL PRESSURE (PN) DEFINED AS THE MAXIMUM PERMISSIBLE WORKING PRESSURE (MPA) AT 20 ° C TEMPERATURE AS FOLLOWS:

PN 0.25, PN0.6, PN1.0, PN1.25 AND PN4.0

7.2 THE CLASS DESIGNATION FOR VALVES SPECIFIED BY NOMINAL PIPE SIZE SHALL BE CLASS 125, CLASS 150 AND CLASS 300.

8.0 PRESSURE/TEMPERATURE RATINGS

MAXIMUM PERMISSIBLE GAUGE WORKING PRESSURE AND OPERATING TEMPERATURES SHALL BE IN ACCORDANCE WITH IS 6418 : 1971 AND IS 13159 (PART I) : 1991 EXCEPT THAT RESTRICTION ON TEMPERATURE MAY BE PLACED BY THE MANUFACTURER ON VALVES IN ACCORDANCE WITH THIS STANDARD BY REASON OF VALVE TYPE, TRIM MATERIALS OR OTHER FACTORS. HOWEVER, ALL VALVES SHALL BE SUITABLE FOR CONTINUOUS USE AT THEIR PN DESIGNATION WITHIN THE TEMPERATURE RANGE OF -10°C TO 65°C .

9.0 BODY ENDS

9.1 DOUBLE FLANGED BODY ENDS

THE DIMENSIONS OF FLANGED BODY ENDS AND DRILLINGS SHALL BE IN ACCORDANCE WITH THE REQUIREMENT GIVEN IN ANNEX B. FLANGES AS PER ANY OTHER SPECIFIC REQUIREMENTS OF THE PURCHASER MAY ALSO BE GIVEN AS AGREED TO BETWEEN THE MANUFACTURER AND THE PURCHASER OR AS PER I.S. 13159 (PART I) : 1991.

9.1.1 FLANGES SHALL BE AT RIGHT ANGLES TO THE AXIS OF THE BORE AND CONCENTRIC WITH THE BORE. FLANGES SHALL BE DRILLED UNLESS OTHERWISE SPECIFIED AND BOLT HOLES SHALL BE OFF CENTERS. TAPPED BY THE DESIGN OF THE VALVE

9.2 WAFER BODY ENDS

9.2.1 BODY ENDS SHALL BE CAPABLE OF BEING FITTED BETWEEN THE PIPE FLANGES COMPLYING WITH THE REQUIREMENTS OF ANNEX B FLANGE DRILLING.

9.2.2 THE JOINT FACES SHALL BE AT RIGHT ANGLES TO THE AXIS OF THE BORE AND CONCENTRIC WITH THE BORE.

9.2.3 HOLES MAY BE PROVIDED, WHERE REQUIRED BY THE DESIGN, FOR THE PASSAGE OF THE BOLTS SECURING THE FLANGES AND THE VALVE. WHERE THROUGH BOLTING IS NOT PRACTICABLE DUE TO THE PRESENCE OF VALVE SHAFT, BEARING HOUSING, TAPPED HOLES MAY BE PROVIDED FOR INDIVIDUAL BOLTING OF EACH FLANGE.

10.0 FACE TO FACE DIMENSIONS

10.1 FACE TO FACE DIMENSIONS OF DOUBLE FLANGED AND WAFER TYPES OF VALVE SHALL BE AS PER TABLE 1.

10.2 FACE TO FACE DIMENSIONS GIVEN IN TABLE 1 ARE EXCLUSIVE OF THE SEALING GASKETS AT BOTH ENDS.

10.3 THE MANUFACTURER SHALL ENSURE THAT ADEQUATE SPACE WILL BE AVAILABLE BETWEEN VALVE FLANGES FOR BOLTING WHEN FLANGED VALVE WITH SHORT BODY FACE TO FACE TO FACE OR WAFER LONG FACE TO FACE ARE MANUFACTURED.

10.4 TOLERANCE ON FACE TO FACE DIMENSION IN TABLE 1 SHALL BE AS FOLLOW

FACE TO FACE DIMENSION OF UNLINED VALVE	TOLERANCE
---	-----------

MM		MM
OVER	UP TO AND INCLUDING	
0	250	± 2
250	500	± 3
500	800	± 4
800	100	± 5
1000	2400	± 6

11.0 BODIES

BODIES END PORTS SHALL BE CIRCULAR AND THE NUMERICAL VALVES OF THE DIAMETER SHALL BE AS CLOSE AS POSSIBLE TO THE VALVE OF DN.

12.0 DISC AND SHAFT

THE DISC AND SHAFT SHALL BE DESIGNED TO WITHSTAND THE MAXIMUM PRESSURE DIFFERENTIAL ACROSS THE VALVE IN EITHER DIRECTION OF FLOW. THE SHAFT MAY BE OF ONE PIECE DESIGN OR IN TWO PIECES SEPARATELY ATTACHED TO THE DISC. ANY MEANS OF ATTACHMENT BETWEEN THE SHAFT AND THE DISC SHALL BE SUCH AS TO PRECLUDE COMPONENTS BECOMING LOOSE IN SERVICE.

13.0 SEATING AND LININGS

NON-INTEGRAL SEATING, AND LINING WHERE USED, AND THEIR MEANS OF ATTACHMENT SHALL BE SUCH AS TO PRECLUDE THEIR BECOMING LOOSE IN SERVICE.

14.0 BEARINGS

14.1 THE BEARINGS SHALL BE SUITABLE FOR THE MAXIMUM LOADS IMPOSED BY THE SHAFT DURING TESTING AND IN SERVICE.

14.2 FOR VALVES DN 350 AND ABOVE, A BEARING SHALL BE PROVIDED TO TAKE THE AXIAL THRUST, SPRING RETAINING CLIPS (CIRCLIPS) SHALL NOT BE USED AS THRUST BEARING.

14.3 SUITABLE SEALING SHALL BE PROVIDED FOR THE SHAFT WHERE IT PASSES OUTSIDE THE PRESSURE CONTAINING EN CLOSER.

15.0 MATERIALS

THIS STANDARD IS BASED ON MATERIALS SPECIFIED IN TABLE 2. UNLESS OTHERWISE AGREED, THE MATERIALS SHALL BE OF A GRADE EQUIVALENT TO THOSE GIVEN IN TABLE 2 OR SUPERIOR. OTHER MATERIAL MAY BE USED AS PER AGREEMENT BETWEEN THE MANUFACTURER AND THE PURCHASER.

16.0 OPERATION

16.1 MANUAL OPERATION

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ALL VALVES SHALL BE CAPABLE OF OPERATED AT A DIFFERENTIAL PRESSURE ACROSS THE DISC AS MARKED ON THE VALVE. LEVER, WORMS GEAR/TRAVELING NUT TYPE OR ANY OTHER SUITABLE TYPE OF OPERATOR CAN BE USED.

16.1.1 DIRECTION

UNLESS OTHERWISE, SPECIFIED MANUALLY OPERATED VALVES SHALL BE CLOSED BY TURNING HAND WHEEL OR LEVER IN A CLOCKWISE DIRECTION WHEN FACING THE HAND WHEEL OR LEVER. THE DESIGN OF LEVER WHEN FITTED SHALL BE SUCH THAT THE LEVER MAY ONLY BE ASSEMBLED TO THE VALVE SO THAT IT IS PARALLEL TO THE DIRECTION OF FLOW WHEN THE VALVE IS OPEN.

16.1.2 ALL GEAR TRAVELING NUT OPERATORS SHALL BE PROVIDED WITH SUITABLE STOPS TO PREVENT MOVEMENT OF THE SHAFT BEYOND THE LIMIT CORRESPONDING TO THE FULLY CLOSED POSITION OF THE DISC.

16.1.3 ALL GEAR TRAVELING NUT OPERATORS SHALL BE PACKED WITH GREASE FOR LIFE TIME OPERATION. GEAR/TRAVELING NUT OPERATORS SHALL BE TOTALLY ENCLOSED AND WEATHER PROOF FOR GENERAL APPLICATION. FOR SPECIAL APPLICATIONS SUCH AS MARINE, SUBMERGED SERVICE ETC. THE PURCHASER MAY SPECIFY SPECIAL EN-CLOSER.

16.1.4 ALL GEAR/TRAVELING NUT OPERATORS SHALL BE SELF LOCKING TYPE. ALL LEAVER OPERATED VALVE SHALL BE CAPABLE OF BEING LOCKED AT LEAST THREE INTERMEDIATE POSITION.

16.2 THE OPERATING HAND-WHEELS SHALL BE MARKED 'CLOSE' OR 'SHUT' TO INDICATE THE DIRECTION OF CLOSER.

16.3 THE OPERATOR SHALL BE PROVIDED WITH ARRANGEMENT TO INDICATE THE DISC POSITION.

17.0 TESTING

ALL VALVES SHALL HYDROSTATICALLY TESTED BY THE MANUFACTURER BEFORE DISPATCH. THE PRESSURE SHALL BE OBTAINED WITHOUT ANY SIGNIFICANT HYDRAULIC SHOCK. TESTING SHALL BE CARRIED ON BEFORE APPLICATION OF PAINT OR OTHER SIMILAR TREATMENT UNLESS OTHERWISE AGREED BETWEEN THE PURCHASER AND THE MANUFACTURER. THERE SHALL BE NO AIR ENTRAPPED WITHIN THE PART OF THE VALVES SUBJECTED TO TEST PRESSURE.

17.1 PERFORMANCE TESTING

EACH VALVE SHALL BE SHOP OPERATED FROM FULLY CLOSED TO FULLY OPEN POSITION AND REVERSE, UNDER NO PRESSURE AND NO FLOW CONDITION TO DEMONSTRATE THAT THE COMPLETE ASSEMBLY IS WORKABLE.

17.2 BODY TEST

COMPLETELY ASSEMBLED VALVE SHALL BE TESTED AS FOLLOWS:

'THE BODY ENDS SHALL BE BLANKED SO THAT THE VALVE IS SUBJECTED TO THE FULL PRESSURE IN ALL DIRECTIONS INCLUDE BY THE TEST PRESSURE WAFER VALVES MAY BE TESTED IN ANY SUITABLE

MANNER AGREED BETWEEN THE PURCHASER AND THE MANUFACTURER. THE VALVE DISC SHALL BE IN SLIGHTLY OPEN POSITION AND PRESSURE EQUIVALENT TO 1.5 TIMES THE MAXIMUM PERMISSIBLE WORKING PRESSURE SHALL BE APPLIED WITH WATER. THE DURATION OF THIS TEST SHALL BE AS IN TABLE 3.'

17.3 SEAT TEST

THE SEATING SURFACE OF THE VALVE SHALL BE CLEANED UNLESS A SURFACE TREATMENT FORMS AN INTEGRAL PART OF THE DESIGN OR THE USE OF A TEMPORARY SURFACE TREATMENT HAS BEEN AGREED BETWEEN THE MANUFACTURER AND THE PURCHASER TO AVOID THE POSSIBILITY OF DAMAGE UNDER THE CONDITION OF THE TEST.

TABLE-3

NOMINAL DIA MM	MINIMUM TEST DURATION IN MINUTES	
	BODY TEST	SEAT TEST WHEN APPLICABLE
UP TO AND INCLUDING 50	0.25	0.25
65 TO 150	1.00	1.00
200 TO 300	2.00	2.00
350 TO 1000	5.00	2.00
1200 TO 2000	5.00	3.00

17.3.1 EACH VALVE SHALL BE SHOP TESTED FOR LEAKS IN CLOSE POSITION. THE TEST SHALL BE CONDUCTED WITH THE BODY FLANGES IN A HORIZONTAL POSITION. PRESSURE SHALL BE APPLIED TO THE UPSTREAM END OF THE VALVE, THE DOWNSTREAM BEING OPEN TO ATMOSPHERE. THE DURATION OF TEST SHALL BE AS PER TABLE 3. THERE SHALL BE NO INDICATION OF LEAKAGE PAST THE VALVE DISC DURING TEST AND VALVES SHALL BE DROP TIGHT. SEAT TEST SHALL BE CARRIED OUT IN BOTH THE DIRECTION OF VALVE IF AGREED BETWEEN THE MANUFACTURER AND THE PURCHASER. THE SEAT PRESSURE APPLIED ON UPSTREAM SIDE SHALL BE EQUIVALENT TO 1.1 TIMES THE MAXIMUM PERMISSIBLE WORKING PRESSURE AT 20 ° C AND SHALL BE APPLIED WITH WATER.

17.3.2 FOR REGULATING TYPE VALVES SEAT TEST SHALL NOT BE APPLICABLE.

17.4 DISC STRENGTH TEST

THE TEST SHALL BE CONDUCTED WITH THE BODY FLANGES IN HORIZONTAL POSITION. THE TEST PRESSURE SHALL BE 1.5 TIMES THE MAXIMUM PERMISSIBLE PRESSURE AT 20 ° C WITH DISC IN CLOSED POSITION, HYDRO TEST PRESSURE SHALL BE APPLIED TO THE LOWER FACE OF THE DISC FOR DURATION AS PER TABLE-3. THERE SHALL BE NO DAMAGE TO THE VALVE DISC NOR SHALL ANY

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PART OF VALVE OR DISC BE PERMANENTLY DEFORMED BY THE TEST. THE PURPOSE OF THIS TEST IS TO PROVIDE EVIDENCE OF THE ADEQUACY AND STRUCTURAL INTEGRITY OF DISC AND BODY. ANY LEAKAGE PAST THE SEAT SHALL NOT BE THE CRITERIA FOR REJECTION OF THE VALVE (SAMPLING TEST SAMPLE AS PER IS 2500). FOR REGULATING TYPE VALVES, DISC STRENGTH SHALL NOT BE APPLICABLE.

17.5 MAXIMUM PERMISSIBLE LEAKAGE SHALL BE AS GIVEN IN TABLE-4

18.0 TEST CERTIFICATES

WHEN SPECIFIED BY THE PURCHASER, THE MANUFACTURER SHALL ISSUE AT TEST CERTIFICATE CONFIRMING THAT THE VALVES HAVE BEEN TESTED IN ACCORDANCE WITH THIS STANDARD AND STATING THE ACTUAL PRESSURES AND MEDIUM USED IN THE TEST.

VALVE TYPE	LEAKAGE RATE
TIGHT SHUT-OFF	NO VISIBLE LEAKAGE FOR DURATION OF TEST
LOW LEAKAGE	0.1 MM ² /S X DN (SEC 5)
REGULATING	NOT SPECIFIED. OUTSIDE THE SCOPE OF THIS STANDARD.

19.0 INSPECTION

IF INSPECTION IS REQUIRED, THIS SHALL BE STATED IN THE ENQUIRY/ORDER. THE PURCHASER OR HIS AUTHORIZED REPRESENTATIVE SHALL HAVE ACCESS TO THE MANUFACTURER'S WORKS AT ALL REASONABLE TIMES TO INSPECT ASSEMBLED VALVE TO HIS ORDER.

20.0 WITNESSING OF TESTS

WHEN THE PURCHASER DESIRES TO WITNESS THE TESTS, THIS SHALL BE SPECIFICALLY AGREED IN ADVANCE.

21.0 MARKING

MARKING SHALL BE CAST INTEGRAL ON THE BODY OR ON A PLATE SECURELY ATTACHED TO THE BODY. THE MARKINGS SHALL BE IN ACCORDANCE WITH I.S. 9866: 1981.

22.0 PREPARATION FOR DESPATCH

- (A) VALVE SHALL BE COMPLETE IN ALL RESPECT WHEN SHIPPED. EACH VALVE SHALL BE DRAINED, CLEANED, PREPARED AND SUITABLE PROTECTED WITH 2 COATS OF RED OXIDE ON UN MACHINED SURFACES AND RUST PREVENTIVE COATS ON MACHINED AND FLANGED SURFACES FOR DISPATCH IN SUCH A WAY AS TO MINIMIZE THE POSSIBILITY OF DAMAGE AND DETERIORATION DURING TRANSIT AND STORAGE. PAINTING OTHER THAN SPECIFIED ON THE FINISHED VALVE SHALL BE AS PER THE AGREEMENT BETWEEN THE MANUFACTURER AND THE PURCHASER.
- (B) DISC SHALL BE UNSEATED WHEN DISPATCHED, BUT CARE SHALL BE TAKEN TO ENSURE THAT THERE IS NO RISK OF DAMAGE TO THE DISC.

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- (C) *WHEN SPECIFIED, THE BODY ENDS SHALL BE SUITABLY SEALED TO EXCLUDE FOREIGN MATTER DURING TRANSIT AND STORAGE.*

(d) Components shipped unattached shall be adequately protected and identified to permit correct field assembly.

ITEM NO. 9.

Lowering, Laying And Jointing In Position Following C. I. / D/F Reflux Valves, Butterfly Valves, Sluice Valves And Air Valves Including Cost Of All Labour, Jointing Material, Including Nut Bolts And Giving Satisfactory Hydraulic Testing, Etc. Complete.

REFLUX VALVES, BUTTERFLY VALVES, SLUICE VALVES AND AIR VALVES

LOWERING, LAYING AND JOINTING IN POSITION FOLLOWING C.I./ D/F REFLUX VALVES, BUTTERFLY VALVES, SLUICE VALVES AND AIR VALVES INCLUDING COST OF ALL LABOUR, JOINTING MATERIAL, INCLUDING NUT BOLTS AND GIVING SATISFACTORY HYDRAULIC TESTING, ETC. COMPLETE (RATE FOR ALL CLASS OF VALVES)

[A] SLUICE VALVES, BUTTERFLY VALVES, REFLUX VALVE, SCOUR VALVE

1.0 SUPPLY OF MATERIAL

- 1.1 *CAST IRON DOUBLE-FLANGED SLUICE VALVE/BUTTERFLY VALVES WITH TWO TAILPIECES SUITABLE TO PIPE SHALL BE SUPPLIED AND CARTED BY THE CONTRACTOR AS PER LATEST IS. THE RATE SHALL INCLUDE LOADING, UNLOADING AND STACKING AT SITE.*
- 1.2 *THE SLUICE VALVE/BUTTERFLY VALVES AND TAILPIECES SHALL BE EXAMINED BEFORE LAYING FOR CRACKS AND OTHER FLOWS. THEY SHALL BE UNDAMAGED IN ALL RESPECT.*
- 1.3 *THE SLUICE VALVES/BUTTERFLY VALVES SHALL BE OPERATED BEFORE LAYING.*
- 1.4 *ALL GRITS AND FOREIGN MATERIALS SHALL BE REMOVED FROM THE INSIDE OF THE VALVES BEFORE PLACING.*
- 1.5 *ALL THE FOUR FACES SHALL BE THOROUGHLY CLEANED AND COATED WITH A THIN LAYER OF MINERAL GREASE.*
- 1.6 *THE TIGHTENING OF GLAND SHALL BE CHECKED WITH A PAIR OF INSIDE-CALIPERS. CLEARANCE BETWEEN THE TOP OF STUFFING BOX AND THE UNDERSIDE OF THE GLAND SHALL BE UNIFORM ALL THE SIDES.*

2.0 JOINTING MATERIAL

- 2.1 *THE CONTRACTOR SHALL PROVIDE ALL NECESSARY JOINTING MATERIALS SUCH AS NUTS BOLTS, RUBBER PACKING WHITE ZINC JUTE LEAD WOOL ETC.*
- 2.2 *ALL TOOLS AND PLANT REQUIRED FOR INSTALLATION OF SLUICE VALVE SHALL BE PROVIDED BY THE CONTRACTOR.*
- 2.3 *ALL JOINTING MATERIALS SHALL BE NOT APPROVED FROM THE ENGINEER-IN-CHARGE BEFORE USE*

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2.4 THE NUT AND BOLTS SHALL CONFORM TO ITEM No MSP-19 OF SPECIFICATION OF MATERIALS.

2.5 THE RUBBER PACKING SHALL CONFORM ALL SPECIFICATIONS AS NARRATED IN ITEM No MSP-20 OF SPECIFICATIONS OF MATERIALS.

3.0 INSTALLATION

3.1 THE SLUICE VALVE/BUTTERFLY VALVE SHALL BE LOWERED IN TO THE TRENCH CAREFULLY, SO THAT NO PART IS DAMAGED DURING LOWERING OPERATION.

3.2 IF NECESSARY TAILPIECES SHALL BE FITTED WITH SLUICE VALVE FIRST OUTSIDE THE TRENCH AND THEN LOWERED IN TO THE TRENCH.

3.3 THE RUBBER PACKING SHALL BE THREE PLY AND OF APPROVED THICKNESS. THE PACKING SHALL BE OF FULL DIAMETER OF THE FLANGE WITH NECESSARY HOLES AND THE SLUICE/BUTTERFLY VALVE BORE. IT SHALL BE EVEN AT BOTH THE INNER AND OUTER EDGES.

3.4 THE FLANGE FACES THOROUGHLY GREASED.

3.5 IF FLANGE FACES ARE NOT FREE, THE CONTRACTOR SHALL USE THIN FIBERS OF LEAD WOOL.

3.6 AFTER PLACING THE PACKING, NUTS AND BOLTS SHALL BE INSERTED AND TIGHTENED TO MAKE THE JOINT.

3.7 THE VALVE SHALL BE TIGHTLY CLOSED WHEN BEING INSTALLED TO PREVENT ANY FOREIGN MATERIALS FROM GETTING IN BETWEEN THE WORKING PARTS OF THE VALVE.

3.8 EACH FLANGE BOLT SHALL BE TIGHTENED A LITTLE AT A TIME TAKING CARE TO TIGHTEN DIAMETRICALLY OPPOSITE BOLTS ALTERNATIVELY.

3.9 THE SLUICE VALVE/BUTTERFLY VALVE SHALL BE INSTALLED IN SUCH A WAY THAT ITS SPINDLE SHALL REMAIN IN TRULY VERTICAL POSITION.

3.10 THE OTHER END OF TAILPIECE SHALL BE FITTED WITH PIPES SO THAT CONTINUOUS LINES CAN WORK.

3.11 EXTRA EXCAVATION REQUIRED FOR FACILITY OF LOWERING AND FIXING SLUICE VALVE SHALL NOT BE PAID FOR.

4.0 TESTING

4.1 AFTER INSTALLATION OF SLUICE VALVE/BUTTERFLY VALVE THE SAME IS TESTED TO 1 1/2 TIMES OF ITS TEST PRESSURE.

4.2 THE JOINTS SLUICE VALVE/BUTTERFLY VALVE SHALL WITHSTAND THE TEST PRESSURE OF PIPELINES.

4.3 DEFECTS NOTICED DURING TEST AND OPERATION OF SLUICE VALVE SHALL BE RECTIFIED BY THE CONTRACTOR AT HIS OWN COST WITHOUT ANY EXTRA CLAIM TO THE ENTIRE SATISFACTION OF THE ENGINEER-IN-CHARGE.

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Item No.10 M-100

THE PAYMENT SHALL BE MADE AS PER THE CUBIC METRE OF CEMENT CONCRETE EXECUTED. NO DEDUCTION FOR STEEL VOLUME IS TO MADE.

Item No.11 Concrete Encasing:

Providing and casting in situ C.C. in grade M-20 (proportions as per mix design or as per table 9 of IS 456 2000 in masses by weigh batching) using granite, quartzite trap metal of size 6 mm to 20 mm for RCC work, including scaffolding centering, formwork, needle vibrated consolidation, curing complete up to 6 meter depth or height (excluding cost of reinforcement and neat finishing) with centering and shuttering/deshuttering etc. complete for structure other than water retaining (Below G.L) 1. Footing (with form work).

THE PAYMENT SHALL BE MADE AS PER THE CUBIC METRE OF CEMENT CONCRETE EXECUTED. NO DEDUCTION FOR STEEL VOLUME IS TO MADE.

Item No.12 MS Reinforcement

Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters deformed (TMT) bars

Providing and casting in situ mass concrete of concrete grade M-100 (approx. to prop. 1:3:6) using granite quartzite trap metal of size 12 mm to 25 mm and consolidation curing etc. complete. 2.2 Without Forms Work
 Anchor Thrust/Thrust Block/ Column/ Footings for Pipeline shall be carried out in cement concrete M-150 using trap metal as per instructions and specifications of the engineering in charge. Materials and workmanship shall be given in concrete section." The reinforcement as per IS Standard and specifications for Pipeline are as under.

Anchor Thrust/Thrust Block/ Column/ Footings for Pipeline
 This item also includes the designing of Thrust Block where necessary and got approval before Execution from the Employer's Representative. Reinforcement bars to be used in RCC work shall have to be supplied by the contractor as per schedule-B. The rates include providing, cutting, bending, binding, hooking and placing in position including cost of binding wire. The bars shall be fusion bonded and epoxy coated.

This Item also includes the designing of Thrust Block where necessary and got approval before Execution from the Employer's Representative.

confirming to relevant IS Fe – 500 grade for all diameters.

Reinforcement bars to be used in RCC work shall have to be supplied by the contractor as per schedule-B. The rates include providing, cutting, bending, binding, hooking and placing in position including cost of binding wire. The bars shall be fusion bonded and epoxy coated.

Depending upon the type of reinforcement steel proposed in design (i.e. M.S. or deformed etc.) the steel shall conform to relevant ISS codes in practice. Contractor shall produce necessary test certificate in absence of which the steel bars shall be get tested by the Department at the contractor's cost.

Steel bars shall be cut, bent up, hooked bound with wires and then placed in position as per approved drawing. The steel shall be got checked through Engineer-in-charge. Before any concrete is placed in formwork advance intimation shall be given to the Engineer-in-charge for this purpose. The steel shall be cleared of any dust or rust that might have been deposited on bars.

Reinforcement shall be accurately fixed and maintained firmly in the correct position by the use of blocks, spacers, chairs, binding wire etc. to prevent displacement during placing and compaction of concrete. The tied in place reinforcement shall be approved by the engineer-in-charge prior to concrete placement. Spacers shall be of such materials and designs as will be durable, not lead to corrosion of the reinforcement and not cause scaling of the concrete cover.

Binding wire shall be 16 gauge soft annealed wires. Ends of the binding wire shall be bent away from the concrete surface and in no case encroach into the concrete cover.

THE RATE SHALL BE PAID AS PER PAYMENT SCHEDULE.

Item No.13

Manufacture, supply and delivery of cast iron Detachable joints (Short & long) complete with joint flanges duly drilled, synthetic rubber sealing rings manufactured from styrene butadiene rubber (SBR) and other required accessories such as nut, bolts etc. conforming to IS specification 8794-1988 or its latest revision if any suitable for use with A.C. Pressure pipes. Delivery of joints including its accessories including loading, unloading, carting, stacking, insurance, all taxes, octroi etc. complete.

Long Collar Over size without ISI Mark

Class- 15 , 150 MM DIA, 200 MM DIA & 250 MM DIA

1. SCOPE OF CONTRACT

The contract shall be covering manufacturing, supplying and delivering of :

"CAST IRON DETACHABLE JOINTS WITH SYNTHETIC RUBBER RINGS CONFIRMING TO RELEVANT INDIAN STANDARDS."

2. STANDARDS :

- a) CID joints confirming to IS:8794-1988 or its latest revision.
- b) Rubber sealing rings confirming to IS:5382-1969 and IS:10292(Part - II) 1982.

3. TENDER PRICE :

The prices are inclusive of all labor, material and machinery cost necessitated to be utilized for :

- a) Proper manufacturing of the cast iron detachable joints.
- b) All tests required to be undertaken at manufacturer's premises.
- c) Transportation of the joints wither by Rail and/or Road services with all the covers duly and appropriately insured;
- d) Delivery of joints with proper loading, unloading stacking at local body store as indicated by Engineer-in-charge.
- e) Further towards proper discharge of all contractual obligations. The storage of all joints to be manufactured, supplied and delivered under the scope of contracts shall be in general be made as described in technical specification attached in this tender document.

4) **MARKING :**

The methods of marking all the joints to be delivered under scope of contract shall ensure that all the information will remain legible even after transportation storage in open space, etc. In general the legible and indelible marking upon the goods shall indicate the followings :

- i) manufacturer's brand name and/or trade mark.
- ii) Diameter and class of joints.
- iii) Any other important matter that the manufacturer deems fit to be inscribed.
- iv) ISI certification mark on each joints in case of joints with ISI mark.

5) **PACKING AND HANDLING :**

- 5.1 The materials shall always be packed separately and dispatch a from manufacturer's works with adequate protective measures to prevent damages and deterioration while in transport or stored at any place.
- 5.2 When the materials are transported at Railway Risk. Special packing as per IRCA Rules are absolutely necessary for which the extra cost, if any, shall be borne in total by supplier only.
- 5.3 The supplier shall use proper handling instrument /equipment and shall follow to a suitable method of handling of joints as may be approved by Engineer, while unloading and stacking material in the stores.

6) **MATERIAL AND WORKMANSHIP :**

- 6.1 General requirements of materials and workmanship shall mean any material or article either raw or finished one required to be used in the manufacturing process of joints.
- 6.2 All the material shall be new and of high quality.
- 6.3 In case, if materials is not specified by relevant ISS for manufacturing part or the whole as item, the supplier shall also produce in addition to manufacturer and shall seek an approval of Engineer prior to its use in the manufacture.

7) **TEST CERTIFICATE :**

- 7.1 The supplier shall always provide manufacturer's test certificate in accordance with every batch/lot of goods so manufactured and supplied.
- 7.2 The supplier shall also produce in addition to manufacturer's test certificate as mentioned in para 8.1 above, the inspection certificate issued by the authorized agency/person appointed by authority for the same purpose.

Item No.14

Job Work - Connection of new D.I. pipe to Existing pipe(DI pipe or MS pipe upto 700 mm dia) including all materials & labour etc. wherever require welding, excavation, de-watering, tools & testing of joint etc complete as per engineer-in-charge.

Connection of new pipe to existing main pipe line in all strata with required length incl. providing & fixing of required all kind of materials and labour etc. complete

incl. providing and fixing of required size of G.I. / M.S. specials as per instruction engineer in charge. Specification of excavation as per Item No-1 & Refilling as per item no-7.

The rate shall have to pay as per Job basis & as per payment schedule of this tender.

Item No.15

Manufacture, Supply & Delivery of Ductile Iron Flange socket spigot bends, tees, reducers or any other specials as per BS-EN-545/1995 Class-A series K12 suitable for use with D.I. Pipes manufactured as per IS:8329/1994 delivery of specials is to be made to GWSSB store or site of works any where in Gujarat including all taxes, loading, unloading, carting, stacking, insurance, inspection charges, octroi etc. complete. Socket & Spigot Type

80 to 300mm dia

Scope:

This standard is applicable to all ductile iron fittings having spigots, sockets or flanges as specified in this standard and also to fittings with other type of joints, the general dimensions of which except those relating to the joints, conform to this standard.

Supply Of Material:

The general requirements relating to the supply of the material shall be as laid down in IS:1387-1967*.

Manufacture:

The metal used for the manufacture of fittings shall be good quality cast iron. It shall be prepared, at the discretion of the manufacturer, in a cupola or an active mixer or other suitable furnace.

The fittings shall be stripped with all precautions necessary to avoid warping or shrinking defects. The fittings shall be free from defects, other than any unavoidable surface imperfections which result from the method of manufacture and which do not affect the use of the fittings. By agreement between the purchaser and the manufacturer, minor defects may be rectified.

The fittings shall be such that they could be cut, drilled or machined and shall be accepted provided the hardness of the external unmachined surface does not exceed the Brinell hardness of 250 HB.

In the case of spigot and socket joints, the socket may be with or without the centering ring.

In the case of flanged joints, the flanges shall be at right angles to the axis of the joint and machined in face. The bolt holes shall be drilled.

The bolt hole circle shall be concentric with the bore and shall be located off the center lines, unless otherwise specified by the purchaser. The two flanges of the fittings shall be correctly aligned

Mechanical Tests:

Mechanical tests shall be carried out during manufacture. Two tests per 24 hours of casting shall be adequate. The results obtained shall be taken to represent all the fittings of all sizes made during that period.

Tensile Test:

Two tensile tests made on bars cast from the same metal, heat-treated along with the castings, if any when testing in accordance with the method specified in

Appendix A shall satisfy the following requirements:

Grade	Nominal Diameter DN	Tensile strength Min Mpa	Percentage Elongation in Gauge
1	All	400	10
2		400	5

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Brinell hardness tests:

For checking the Brinell hardness specified in 3/3, Brinell tests shall be carried out on the test bars cut from the fitting used for the test under 4.1 in accordance with IS:1789-1961*. The test shall be carried out by applying either a load of 3000 kg to a ball of 10mm diameter for 15 seconds, or a load of 750 kg to a ball of 5 mm diameter for 10 seconds.

Sampling:

The scale of sampling and the criteria for conformity for the various requirements in the standard shall be as per IS.

Hydrostatic Tests:

For hydrostatic tests, all fittings shall be kept under pressure for 15 seconds; they may be struck moderately with a 700g hammer. They shall withstand the pressure test without showing any leakage, sweating or other defect of any kind. As far as possible, hydrostatic test shall be conducted before coating the fittings.

Works and Installation Test Requirements:

All fittings shall withstand hydrostatic test pressure specified in Table

Table 1 Hydrostatic Test Pressure for Fittings				
Nominal Diameter (DN)	Hydrostatic Test Pressure at Works			
	Grade 1		Grade 2	
(1)	(2)	(3)	(4)	(5)
	Mpa	(kgf/cm ²)	MPa	(kgf/cm ²)
Up to 300	6.0	(60)	3.5	(35)
NOTE: When required the fittings can be ordered to meet higher test pressure at works.				

When fittings are required for higher test pressures, the test pressures shall be subject to agreement between the purchaser and the manufacturer.

Tolerances on lengths:

The tolerances on lengths of fittings, normally manufactured, are as follows:

Type of fitting	Nominal Diameter	Tolerance mm
Socket fittings and flange and spigot	Upto and including 450 mm	+/- 20
	Over 450	+ 20
		- 30
Flanged fittings	All diameters	+/- 10

Should smaller tolerances be required, they shall be as agreed between the purchaser and the manufacturer.

Mass:

The masses have been calculated by taking the density of cast iron as 7.15 kg/dm³.

The permissible tolerances on standard mass of fittings shall be = 8 percent for bends, fittings with more than one branch, and non-standard fittings, in which case the tolerance shall be +/- 12 percent.

Fittings of a heavier mass than the maximum be accepted provided they comply in every other respect with the requirement of this standard.

Marking:

- Manufacturer's name, initials or identification mark;
- The nominal diameter;
- Class reference;
- Mass of fitting;
- The number of this Indian Standard; and

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- f) The last two digits of the year of manufacture.
Marketing may be done on the barrels of fittings or on the outside of the sockets.
Any other mark required by the purchaser may be painted on.
The material may also be marked with the ISI Certification Marks.

ITEM NO.16 : Construction of valve chambers:

Construction of valves chambers in brick or bela stone masonry, locally available in C. M. 1:6. Foundation concrete 150 mm thick in C. C. 1:4:8 of trap metal size 25 mm to 40 mm thick, inside cement plaster in C. M. 1:3 and cement pointing outside in C. M. 1:3 and top cover of precast RCC slab 100 mm thick (with key hole in two parts, each with handles or MS Bar etc. complete as given size) Upto 1 Mt. depth from G. L. to pipe invert level incl. complete civil works but excl. cost of excavation and refilling, with cast in situ RCC slab in one single piece with fixing of CI-MH Frame and cover (excl. cost of CI-MH Frame and cover) with 23 mm thick brick masonry wall in C.M.1:6 Size of chamber 0.90 m x 0.90 m and 1.0 mt. deep with single piece 10 cm with fixing M. H. cover. For 1 Mtr. Extra Depth

Inside size of chamber shall be as above.

Additional excavation required to be done shall be carried out as per instruction of Engineer-in-charge. For foundation chamber 15 cm. thick 1:4:8 PCC shall be provided and 23 cm. up to 1.5 m. depth and beyond 1.5 m. depth 35 cm thick BB masonry walls in CM 1:6 shall be constructed.

Second Class bricks of Standard size shall be brought by the Contractor & shall got approval before use in the work from the Engineer-in-charge.

12 mm thick cement plaster in CM 1:3 shall be provided on inside and outside of walls upto 20 cm below from G.L. Cement pointing in CM 1:3 shall be provided for outside below G.L. from 20 cm.

20 mm dia MS bar steps shall be provided and fixed in wall at 30 cm c/c for facilitating access into the chamber. First step should be at a depth of 0.5 m from top and last step should be 0.5 m above bottom.

Chamber shall be covered with cast in situ RCC slab in one single piece with providing and fixing of CI MH frame and cover with 20 cm. thick BM wall in C.M.1:6

Reinforcement for the cover slab shall be provided considering heavy traffic load.

Curing of concrete, BB masonry, RCC etc. shall be done using chemical or water for 14 days.

12 mm dia MS bar handles minimum two nos. shall be provided to each piece of slab during the time of casting of slab.

Sides of chamber shall be refilled properly with selected excavated earth.

All the above items shall be carried out in workman like manner as per prevalent sound engineering practice and instruction of Engineer-in-charge.

PAYMENT:

Payment shall be made at the rate quoted in schedule '1' per number of chamber constructed as above and rate covers cost of supply of all materials and labours. The rates excludes manhole frame and cover.

ITEM No. : Extra Depth:

EXTRA DEPTH OF M.H. BEYOND 2.00 MT. DEPTH.

EXTRA DEPTH OF MANHOLE IS REQUIRED TO BE DONE AS PER REQUIREMENTS LOOKING TO THE DEPTH OF TRENCH. SPECIFICATION FOR ADDITIONAL HEIGHT IS AS PER ITEM NO.5A ABOVE.

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PAYMENT WILL BE MADE ON MTR. BASIS.

Item No.17 RCC precast M.H. Frame & Cover

**RCC precast M.H. Frame & Cover Manufacture, supply & Delivery at store or at site of work precast RCC M.200 Frame & cover suitable to drainage M.H. and as per type design & Drawing including cost of reinforcement M.S. Angles or Flat, curing mold work etc.
(B) Light Duty Frame & Cover suitable for 50cm opening of MH**

Precast RCC Manhole Frame & cover shall be as per IS: 12592 (part – I & II). The M.H. Frame & Cover shall be of Heavy duty of Grade designation HD- 20 – Rectangular in shape with clear opening of Manhole.

Materials such as cement, aggregate, water, reinforcement shall be of standard as prescribed in the material part. Other materials to be used for Frame & Cover shall be as under:

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing, etc.(IS: 456 – 1978). The minimum cement content in the concrete shall be 360 Kg/m³ with a maximum water content ratio of 0.45. Concrete weaker than grade M 30 shall not be used. Compaction of concrete shall be done by table machine vibration.

The diameter/equivalent diameter of steel fibers shall not be greater than 0.75 mm. The aspect ratio of the fibers shall be in the range of 50 to 80. The minimum volume of fibers, where used, shall be 0.5 percent of the volume of the concrete.

Additives or admixtures may be added either as additives to the cement during manufacture, or as admixtures to the concrete mix. Additives or admixtures used for covers may be:

Accelerating, water-reducing and air-entertaining admixtures conforming to IS: 9103- 1979.

Coloring pigments

Fly ash conforming to IS: 3812-1981

Water proofing agents conforming to IS: 2645-1975.

Length, breadth and diameter of precast concrete manhole covers shall be such that the maximum clearance at top between the cover & frame of corresponding grade and shape shall be 5 mm. The top surface of frame & cover is in level within a tolerance of ± 5 mm.

Concrete shall be mixed in a mechanical mixer. Mixing shall be continued until there is a uniform distribution of the material and the mass is uniform in colour and consistency.

Placing of reinforcement, compaction of concrete, curing, edge protection and finishing shall be attended as per IS: 12592. Edge Protection & Finishing shall be provided as per relevant IS.

The minimum diameter of mild steel rod used as lifting device shall be 16 mm for heavy duty covers. The lifting device shall be protected from corrosion by hot dip galvanizing or any other suitable means approved by the purchaser or shall be made of naturally corrosion resistant metal rods.

All the frame & covers shall be sound and shall be free from cracks & other defects, which interferes with the proper placing of the units or impair the strength or performance of the units. Minor chippings resulting from the customary methods of handling and transportation shall not be deemed ground for rejection.

Each Cover shall have following marking:

Date of manufacture

Grade Designation

ISI mark

as specified - Identification mark

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Frame & covers will be tested at factory by owner / consultant & accepted goods shall be procured on site of work.

The rate shall be paid on number basis for set of Frame & Cover.

Item No.18

Drilling of 500mm dia Horizontal borehole for watermain pipeline crossing under the road incl in all strata with required length incl fixing of 400mm dia M.S/RCC casing pipe with pushing etc complete various size of pipe for 193.7 to 244.5mm dia watermain (For 45 mt Length)

9.3 Without Eater main & with MS casting Pipe-400 thick:6

Drilling of required dia size Horizontal bore hole for water main pipe line under the highway road in all strata with required length incl. providing & fixing of required dia M.S. casing pipe with welding pushing etc. complete incl. providing and fixing water main of required size of G.I. / M.S. pipe for highway road as per instruction of highway authority & under supervision of highway authority incl. providing and supplying fixing of ISI make sluice valve of required size at bore & highway boundary with construction of brick edge pavement incl. providing & fixing of M.S. / Iron manhole frame with cover for valve chamber with locking arrangement etc. complete with all materials labour fabrication, hydraulic testing of pipe & valve etc. complete (45mt. length) for required size of water main.

Drilling of required dia horizontal bore hole for water main pipe line under Road in all strata with required length. The work is to be carried out under the supervision of highway authority after taking necessary permission from railway department. As per drawing given by the highway department.

Necessary permission from highway authority shall have to arranged by agency. Necessary help will be given by Nagar Seva Sadan.

The Drilling of horizontal bore work is to be carried out by necessary augur and by mechanized method.

M. S. casing pipe of required dia (both side epoxy painting) shall have to be brought by the agency incl. necessary pushing, welding etc. complete. The specification of M.S. pipe are same as per schedule. cost of M.S. pipe & specials are included in this work.

2 Nos. of required dia sluice valve shall have to be supplied and fixed at the both ends of highway crossing. The specification of sluice valve of are same as per detailed specification of sluice valve of this tender.

Construction of B.B. Masonry chamber sizes 1.30 x 1.30 x 3.0 Mt. should be constructed at the both end of the highway crossing for sluice valve. The work is to be carried out as per specification of item for tender including providing & fixing M.S. manhole frame & cover with lacking arrangement etc. complete.

Necessary excavation and C. C. M - 100 block at the ends of highway crossing work shall have to be carried out by agency without any extra cost. As per approved drawing & requirement from highway Authority.

Necessary brick edge pavement in C.M. 1:6 and cement pointing work shall have to carried out for damaged pavement on both side of highway road.

Necessary refilling work shall have to carried out after completion of highway crossing work. The rates are inclusive of considering required size & length of M.S. casing pipe, required size & length of D.I. pipe for water main, required size of

sluice valve & valve chamber for both side of highway & necessary charges of highway authority to be paid to the highway authority for permission.

CROSSING

GENERAL SPECIFICATIONS

At highway crossing the construction drawings issued by the department pipe line shall be installed in M.S. casing pipes conforming to the specifications given herein.

The casing pipes shall be installed in accordance with the details given in drawing and the casing, bushing and insulators, etc., shall be installed on the carrier pipe as detailed in drawings. Casing pipe size shall be about 100mm (Hundred millimeters) larger than the carrier pipe to facilitate the insertion of the later without disturbing the casing pipe and to provide adequate drainage, casing shall be installed with even bearing throughout its length and shall slope towards one end, as specified or desired by the engineer - in charge. The ends of the casing shall be sealed to outside of carrier pipe in accordance with the details given in drawing.

Before installation, holes for installing vent pipes shall be cut and burrs if any shall be removed. The welding of both carrier pipe and casing pipe shall be done in accordance with the welding specifications, given herein. Before installing the casing pipe, it should be cleaned of all internal obstructions and during installation care should be taken to keep the inside clean.

The section of carrier pipe to be placed in any casing shall be closed at each end, hydrostatically tested preferably with dead weight tester for at least two hours. Only on successful completion of this test, shall the carried pipe section be inserted in the casing pipe. The installation of casing may open cut as circumstances may permit or require as directed by the engineer - in - charge.

The installation of casing in bended section of the carrier pipe shall be performed by meter bends of the casing pipe provided that the length of each meter cut out of casing pipe shall be such as to provide a clearance of at least 1-1 / 2" between the inside of the casing pipe and the outside of the coated carrier pipe.

Excavation for casing installation shall be immediately backfilled at the completion of the work with suitable solid matter and packed thoroughly to prevent seepage of water into the excavation.

The rate shall have to pay as per Job basis & as per payment schedule of this tender.