

GENERAL TECHNICAL SPECIFICATIONS

FOR BUILDING WORKS

Name of Work- Providing ,supplying and Fixing of Furniture to
New Taluka Panchayat Office Building at Veraval Ta:- Veraval
Dist :- Gir Somnath

કામગીરી નામ

Name of Work Providing ,supplying and Fixing of Furniture to New Taluka Panchayat Office Building at Veraval Ta:- Veraval Dist :- Gir Somnath
:-

SPECIFICATIONS

Item No.	Item of work	Item No.	Page No.
	General Technical Specifications	Attached	
1	EXECUTIVE TABLE 2000mm x 850mm x 750mm with side unit 1200mm 400mm x 750mm : Providing and supplying Main Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed shall be covered with required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.	Attached	
2	OFFICE TABLE of required size : Providing and supplying Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, Soft-board, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed edges shall be covered with required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.	Attached	
3	Conference Table, Table Size: As required : Providing and supplying Conference table made with using 19mm TH Plywood . structure finshed with 1.0mm TH decorativelaminate sheet approved by architect & nylon adjustors fixed with necessary fixtures and fastening (Hardware) as per architect drawing.Top portion of conference table all edges shall be covered with required Teak wood beadig patti or Molded Laminate sheet finished with approved melamine polishing work. The table shall also provision for carrying wires & mounting electrical plug point, switches & milk etc. Complete as per architect drawings and as per instruction of architect & engineer in charge.	Attached	
4	Work Station / Operator Table of required Size : Providing and supplying Reception table made with using 19mm thk. plywood structure finished with 1.0 mm thk. decorative laminate sheet approved by architect fixed with necessary fixtures and fastening (Hardware) . Top portion of table alledges shall be covered with required teak wood beading patti finished with approved melamine polishing work. Complete as per architect drawings and as per instruction of architect & engineer in charge.	Attached	
5	STORAGE UNIT / CUPBOARD : Providing, supplying and Fixing Full size Coupboard having size of 2000mm x 450mmx 900mm , heavy-duty, double-door design with 4 adjustable shelves making 5 compartments . which include premium CRCA mild steel construction, powder-coated finishes for rust resistance, and a multi-point locking system for secure document storage.including transporting , unloading and placing on site as per instruction given by engineer in charge.	Attached	

Item No.	Item of work	Item No.	Page No.
6	HIGH BACK revolving & tilting EXECUTIVE CHAIR : Providing and Supplying High back Chair for conference with M.S frame work. Upholstered with Artificial leather/Leatherette and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years" warranty. The size of chair 53cm x 79cm (back side) and 51cm x 49cm (seat size). The PU form should be molded with density=45+ 2 kg/m3. with One piece armrests are scratch and weather resistant. The permanent contact mechanism is designed with 360° revolving type, 12° seat tilt 19° back tilt, Front pivot for tilt with feet resting on ground ensuring more comfort, Tilt tension adjustment, 5 position locking with anti-shock back mechanism, Which should prevent the backrest from impacting the user when the lock is released, static seat depth adjustment=0.5 cm 5 position locking.	Attached	
7	MEDIUM BACK revolving & tilting CHAIR : Providing and supplying Medium back chair for conference with M.S frame wrk. Upholstered with changeable fabric upholstery covers(as per requirement) and molded PU form, together with molded seat & back covers. The back form should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years' warranty. The size of chair 47.5cm x 58cm (back side) and 49cm x 48cm (seat size). The PU form should be molded with density =45 ± 2 kg/m3. With One piece armrests are scratch and weather resistant. The permanent contact mechanisms is designed with 360° revolving type, with pneumatic height adjustment & 17° maximum tilt only & tilt tension adjustment facility.	Attached	
8	LOW BACK revolving & tilting CHAIR :. Providing and supplying Low back chair for work center & other staff the seat & back are made of M.S frame work. Upholstered with changeable fabric upholstery covers (as per requirement) and molded PU form, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years warranty. The size of chair 45cm x 45cm (back side) and 45cm x 43cm (seat side). The PU form should be molded with density =45 ± 2 kg/m3. with One piece armrests. The armrests are scratch and weather resistant. The permanent contact mechanisms is designed with 360° revolving type, with pneumatic height adjustment & 17° maximum tilt only & tilt tension	Attached	
9	VISITOR CHAIR : Providing and supplying Visitor or Guest chair the seat & back are made 12mm thick hot pressed plywood upholstered with changeable fabric upholstery covers (as per requirement) and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. The size of chair 45cm x 38cm (back side) and 45cm x 43cm (seat side). The PU foam should be with powder coated MS structure as per architect selection. The seat and back fixed with MS structure with required necessary hardware.	Attached	
10	THREE SEATED SOFA : Providing and supplying sofa. (3 seated) made with using 19mm thk. plywood structure frame with S.S legs required necessary support fixed with necessary fixtures and fastening (Hardware) . it shall be covered with 32 density PU foam) with required Thickness as per design in seat & back and handle portion this should be again covered with 14mm thick PU foam with Madarpat cover on it & upholstered fabric or leather of suggested & approved by architect finished with seat, back & all visible side as per architect drawing. Complete as per architect drawing and as per instruction of architect & engineer in charge.	Attached	
11	Centre Table/ Corner Table/Tipoi. : Providing and supplying Center Table/Corner Table/Tipoi with Glass top made with 19mm thk. plywood finished with 1.0 mm thk. Decorative laminate sheet specified and approved by architect & fixed with necessary fixtures and fastening (Hardware) inclusive of approved melamine polishing work. Top part of center table covered with 8mm thk. toughened Glass with polished Edges. Complete as per architect drawing and as per instruction of architect & engineer in charge.	Attached	

Item No.	Item of work	Item No.	Page No.
12	Providing Stainless Steel Dust Bin in cylindrical shape with steel pedal and lid Garbage bin for washroom , kitchen, bathroom and office of size 7 " x 11' - 05 Litre as directed by Engineer-in-Charge.	Attached	
13	Providing and Arranging Three Seater Gang Seater having seat and back made from CRCA Tubular frame welded with perforated Diemoulded CRCA sheet. base frame made from round Tubular welded with horizontal beam Two side armrest welded with frame including finishing metal parts with epoxy polyster powder coating of 50 micron thickness Including all materials and labour etc. Complete as per drawing and instruction ofengineer- incharge & overall weight of unit shall not be less than 35 kg. 3 Seater S.S.Gang Seater: size-1590mm x 480mm x 880mm	Attached	

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Deputy Executive Engineer
Panchayat R.& B. Sub Division
Veraval

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Executive Engineer
Panchayat R.& B. Division
Gir Somnath

SPECIFICATIONS OF MATERIALS

- 1.1** Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalies, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Container For transport, storage and handling of water shall be clean Water shall conform to the standard specified in I.S. :456-1978.
- 1.2** If 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 ad mortar strength as specified in I.S. 269-1976. Any indication of unsoundness, charge in time of setting by 30 minutes or more or decrease of more than 10 per cent in strength of mortar pre appeared with water sample when compared with 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 of those which produce objectionable stains of their unsightly deposits o concrete or mortar surfaces
- 1.4** Hard and bitter water shall not be used for curing
- 1.5** Potable water will generally found suitable 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 are to be carried out :
- (1) A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white color, lime in for of porous lumps of dirty white color indicates quick lime and solid lumps are the un-burnt lime stone.
- (2) Acid tests for determining the carbonate content in lime Excessive amount of impurities and rough determination of class of lime.
- 2.3** 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.

2.4 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 slag cement as per I.S. 269-1976 OR Portland slag cement as per I.S. 455-1976.

M-4 White Cement.

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

M-5. Colored Cement

5.1 Colored cement shall be with white of grey Portland cement as specified in the item of the work.

5.2 The pigments used for colored cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform color and shade.

5.3 The pigments shall have such properties as to provide for durability under exposure to sunlight and weather. The pigment shall have the 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 injurious amounts of dust, clay kankar nodules, soft or flaky particles shall, 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 8 percent 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 than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under :

I.S. Designation	Sieve passing sieve	Percentage by weight Designation	I.S. Sieve percentage by weight 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 fineness modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under :

I.S. Designation	Sieve passing sieve	Percentage by weight	Designation by weight	I.S. Sieve percentage by weight passing sieve.
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 be obtained from crushing hard black trap of equivalent. It shall not contain more than 8 % of silt as determined by field test will measuring cylinder. The method of determining silt contents by fields test is given as under.

7.2 A sample of stone dust to be tested shall be placed without drying in 200 mm. measuring cylinder. The quality of the sample shall be such that it fills the cylinder up to 100 mm. mark. The clean water shall be added up to 150 mm. mark. The mixture shall be stirred 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 e expressed as percentage of the height of the stone dust below. The stone dust containing more than 8 % silt shall be washed so as to bring the content within the allowable limit.

7.4 The fineness modules of stone shall not be less than 1.80.

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 flakey 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 bet black trap or equivalent hard stone as approved by the Engineer in charge. The grit shall have not deleterious with cement.

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

I.S. Designation	Percentage by weight passing sieve.	I.S. Designation	Sieve	Percentage by weight passing sieve.
12.50 mm.	100	600 Micron		0-20 %
10.00 mm.	85 - 100	300 Micron		0-25

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

8.4 The necessary tests for rit 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

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

9.2 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.

9.3 The average grading for cinder aggregates shall be as mentioned below :

I.S. Sieve Designation	Percentage passing sieve.	I.S. Sieve Designation	Percentage passing
20.00 mm.	100	4.75 mm.	70%
10.00 mm.	86	2.36 mm.	52%

M-10 Lime Mortar

10.1 Lime : Lime shall conform to specification M-2 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 & 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 180 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 stiff past. Thoroughly wetted sand shall 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

11.1 Water shall conform to specification M-1 Cement. Cement shall conform to specifications M-3 sand. Sand shall conform M-6.

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 color 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 color 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 min.

M-12 Stone Coarse Aggregate For Nominal mix Concrete.

12.1 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.

12.2 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 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 6mm. less than the minimum lateral clear distance between bars or 6mm. less than cover whichever is smaller.

TABLE

I.S. Sieve Designations	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		40 mm.	20 mm.	16
	-	-	-	12.5 mm.	-	-	-
80 mm.	100	-	-	10 mm.	0.5	0.2	0.3
63 mm.	85-100	100	-	4.75 mm.	-	0.5	0.5
40 mm.	0-20	85-100	100	2.35 mm.	-	-	-
20 mm.		85-100		mm.			
16 mm.	mm.						

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 grading test shall be taken in the beginning and at the change of source of materials. The necessary tests. Indicating I.S.:383-1970 and 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 Aggregates 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 kin and coating likely to prevent proper adhesion of mortar.

13.2 The aggregates 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 stones as approved. Aggregate shall have no deleterious with cement.

13.3 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 material.

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

M-14 Brick Bats Aggregates :

14.1 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 material. The brick bats shall be of 40mm. 50 mm. size unless otherwise specified in the item. The under burnt or over burnt brick bats shall not be allowed.

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

M-15 Bricks

15.1 The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and modules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform color.

The bricks shall be moulded with a frog of 100 mm. x 40 mm. and 10 mm. to 20mm. deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.

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

15.3 The size of conventional bricks shall be as under :

(9" x 4 3/8" x 2 3/4") 225 x 110 x 75 mm.

15.4 Only bricks of one standard size shall be used on one work. The following tolerance 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.)

15.5 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 I.S. 3495 (Part-I to IV)-1976.

M-16 Stone.

16.1 The stone shall be of the specified variety such as Granite/Trap Stone/Quartzite or any other type of good hard stones. The stones shall be only from defects like cavities, cracks, sand holes, flaws injurious veins, patches of loose or soft materials and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weight. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg./Sq. Cm. unless otherwise, specified.

16.2 The sample of the stone to be used shall be got approved before the work is started.

16.3 The khanki facing stone shall be dressed by chisel as specified in the item for khanki facing required shape and size. The face of the stone shall be so dressed that the bushing 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 texture sound, durable and free from soft patch. It shall have minimum crushing strength of 100 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 the 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 I.S. 432(Part-II)1966 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-1978.

18.2 All the reinforcement shall be clean and free from dirt, paint, grease, 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 up to 10 mm. 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.	2.00 Kg./Rmt.	14.	40 mm.	9.86 Kg./Rmt.

M-19 High Yield Strength Deformed Bars

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

19.2 Other provisions and requirements shall conform to specification No. M-18 for Mild Steel Bars.

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 box containing Carborundum.

20.4 The high tensile wire shall be obtained from manufactures 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 defect 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. Galvanized Iron Sheets

23.1. The galvanized 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. The shall have clean and bright surface and shall be free from dents, bends, holes, rust white powdery deposit.

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

M-23.A : G.I. Valleys gutter, ridges

23.A.2. Valleys gutters and flashings shall also be of galvanized sheet of thickness as specified in item. Valleys shall be 900 mm. wide 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, northern 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 ballies properly cross braced together so as to make the centering rigid. In places of bullie props, brick pillar of adequate section built in mud mortar may be used.

26.2. The form work shall be sufficient 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 work in over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall permit leakage of cement grout.

26.3. If at 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 bulbies having 100 mm. min. diameter measured at mid length and 80 mm. at thin end shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and min. bearing area of 0.10 sq. m. laid on sufficiently hard base.

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

26.6. The timber used in shuttering shall not be dry as to absorb water from concrete and swell or bulge nor so 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 wetted 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 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 meter (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- Pre-molded filler

27.1. The item provides for expansion joints filler shall not get deformed or broken by twisting bending or other handling when exposed to atmospheric condition. Pieces of joints filler that have been damaged shall be rejected.

27.3. Thickness of the pre-molded joints filler shall be 25 mm. unless otherwise specified.

27.4. Pre-molded bituminous joints filler shall conform to I.S. 1838-1961.

M-28. Expansion joints-copper strips and hold fasts

28.1. The item provide for expansion joints in R.C.C. frame structure for internal joints, as well as exposed joints, with the use of pre-molded bituminous joints filler.

28.2. Copper sheet shall be of 1.25 mm. width and or 1.25 mm. width and the "U" shape in the middle. Copper strip shall have holdfast of 3mm. diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. r 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 specially mentioned, good Indian teak wood as approved shall be used.

29.2. Teak wood shall generally be free from large, lose dead or cluster knots flaws shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It hall be free from not 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 color shall be uniform as far as possible. Any effort like paining using any adhesive 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 of uniform thickness.

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

29.5. 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 aggregates area of such knots shall be 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 Bio, kalai, Sires Saded Behda, Jamun, Sisoo will be used for door where as only Kalai, Sires, 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 of cluster knots, flows, shakes, warps, bends or any other defects. Its shall be uniform in substance and of straight fibers 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 color of wood shall be uniform as far as possible. The scantalings planks etc. shall be saw in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of dispute and the decision of the department 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)

30.1. The solid core type flush door shutters shall be of decorative or non decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be as specified in drawings or as directed. 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.

30.2. The face panel of the shutters shall be formed by gluing by the the hot press process on both faced the core with either plywood or cross-bands and face veneers. The hopping rebating opening of glazing venation 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 not 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 testi 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 style and rail. Delamination at the corner shall be measured corner shall be measured continuously around the corner. Delamination at the knots, knot hole and other permissible wood defects shall not be considered in assessing the sample.

30.5. The tolerance in size of slid 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 0.8 mm. when measured at any two points.

M-31. Aluminum doors, windows ventilators

31.1. Aluminum 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 aluminum 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 aluminum 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 specified in the drawings. The shutters shall be constructed with interlocking path sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters up to 3.5 m. width not less than 1.25 mm. thick and 80 mm. wide for shutters 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 not be 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 of strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M.S. of malleable C.I. brackets. The brackets shall be fixed on or under the lintel as specified with crawl 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 size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats 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. flats shall be 20 mm. x 6 mm.

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

(d) The fittings like stoppers fixing, 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 draw" or galvanized 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 workmanlike 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 or earth panel as far as stock sizes permit.

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, ply 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 to 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 and CWR, depending up to 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 & C after pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 %.

37.6. Thickness of plywood Boards

TABLE

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

M-38. Glass.

38.1. All glass shall be of the best quality, free from specks, bubbles, smoke veins, air holes blister, and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provision 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 up to 600 mm. x 600mm.

38.2.2. For panes larger than 600 mm. x 600 mm. and up to 800 mm. x 800 mm. the glass weighing not less than 8.75 Kg/Sq. m. shall be used for bigger panes up to 900 mm. x 900 mm. glass weighing not less than 8.75 Kg./Sq. m. shall be used. For bigger panes up to 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. 1762-1960. Sheet glass of the specified colors shall be used. If so shown, on detailed drawings or so specified. For important buildings and for panes with any dimension over 900 mm. plate 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 plain glass. Electrical welded 13 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 colorless or colored or opaque as specified in the item. Colorless sheet shall be as transparent as the finest optical glass. Its light transmission 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 jointed 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 phenolaldehyde adhesive. The particle boards shall conform I.S. 3087-1965 "Specification for wood particle board for general purpose". The size and the thickness shall be as indicated.

M-41. Expanded polystyrene or framed sty roper slabs.

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

M-42. Resin bonded fiber glass

42.1. Resin bonded fiber 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. Fixture and fastenings

43.1. General :

43.1.1. The fixtures and fastenings, that is butt hinges tee and strap **hinges steel door bolts, tower bolts, door latch, bath room latch, handles, door stopper**, 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, aluminum chromium plated iron, chromium plated brass copper oxidized iron, copper oxidized brass or anodized aluminum 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 anodized aluminum fixtures and fastenings shall be bright finished.

43.2. Holdfasts :

43.2.1. Holdfasts shall be mad from mild steel flat 30 cm. length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. diameter holes, shall be made in it for fixing it to the frame with screws. 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. Steel 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 tower 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 Catch :

43.9.1. Door catch shall be 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 plug arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside the face of the door for easy operation of catch.

43.10. Door Stoppers :

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

43.11. Wooden Door Stop with hinges :

43.11.1. Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall be fixed on the door frame with a hinges of 75 mm. size 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 handled as directed.

43.13. Casement stays (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 the stay shall be 250 mm. to 300 mm. as directed.

43.14. Ventilator Catch :

43.14.1. The pattern and shape of the catch shall be as approved.

43.15. Pivot :

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

M-44. Paints :

44.1. (A) Oil paints :

44.1.1. Oil paints shall be of the specified color and as approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved Steiner will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.

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

- (i) Paints shall not show excessive setting in a freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or color separation and shall be free from lumps and skins.
- (ii) 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 from roughness, grit unevenness and other imperfections.

44.1.3. Ready mixed paint shall be used exactly as received from the 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 specification of oil paints. Enamel paint shall conform to 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) Chandras (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 color and free from stains cracks, decay and weathering.

46.2. The size of various colors of marble chips ranging from the smallest up to 20 mm shall be used where the thickness of top wearing layer is 6 mm. size. The marble chips of approved quality and colors 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 parts of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The color and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mold, the tiles and 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 generally be square shapes 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 ± 1 mm. tolerance of thickness shall be ± 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 Colored Tiles :

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

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

47.2.3. The color 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 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 up to 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be had on the wearing face, a few samples with or without their full size photographs as directed shall be approved by 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, color, shade, chips, distribution etc. required.

47.3.5. The tiles shall be prepared form cement conforming to Indian Standards or colored Portland cement generally depending upon the color 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 250 mm. x 250 mm. or as specified. The center to center 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 colored or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 6 mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4. Tiles shall conform or 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 following respects :

(1) The length of a tile including nose shall be 300 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 stones shall be hard even sound and regular in shape and generally uniform in color. The color of the stone shall generally be green. Brown colored 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 40 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 accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be ± 3 mm.

48.4. The edge of stones shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free from chipping and 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 Kotah Stones

49.1. Polished Kotah stone shall have the same specification as per rough kotah 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 shapes and of uniform color.

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 ± 2 mm. The provision in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiseled 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 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. 460 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 specimen of finished slab to be used shall be deposited by the Contractor in the officer for reference.

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

M-52 Granite Stone slab

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

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

52.3. All exposed faces shall be double polished to tender 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 effect while put to use nor shall give off any disagreeable odor.

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 Hessian 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. Sqr. Tiles ± 0.20 mm. (3) 900 mm. Sqr. Tiles ± 0.60 mm.

(2) 600 mm. Sqr. tiles ± 0.40 mm. (4) Sheets and roll ± 0.10 mm.

53.4. Adhesive :

53.4.1. The adhesive for PVC flooring shall be of the type and make recommended by the manufactures 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 angle faces. The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than for 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 tiles shall be provided with frog which shall conform to I.S. 11077-1976.

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

Size	Tolerance for	
	1 st. class Brick	2 nd. class Brick
Length	± 6 mm.	± 10 mm.
Width	± 3 mm.	± 7 mm.
Height	± 1.5 mm.	± 3 mm.

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

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

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

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

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 sports, 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 the stated sizes. Other than the thickness of tile shall be ± 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. 1977-1970.

M-56 Galvanized iron pipes and fittings

56.1. Galvanized iron pipes shall be of the medium type and or 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 galvanized iron fittings shall be of the standard 'R' or 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 of screw down type and or 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
15 mm.	0.25 Kg.	0.25 Kg.	6 mm.	0.40 Kg.	0.40 Kg.
20 mm.	0.30 Kg.	0.35 Kg.	6 mm.	0.75 Kg.	0.75Kg.

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 shall conform to I.S. 778-1971.

M-59. White glazed porcelain wash basin

59.1. Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 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 riveted or beveled internally with 65 mm. diameter at top and 10 mm. depth to suit the waste fitting. 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 color as that to the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from floor to floor top of the rim of basin 750 mm. to 800 mm. as directed.

M-60. European type water closet/with low 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 seat and cover shall be of best Indian make conforming to I.S. 2548-1980. They shall be made of molded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and surface defects and shall have chromium plated brass hinges and rubber buffer 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. 2256(Part-III)-1981 and relevant specification of Indian type water closet except that pan will be with the integral squattig pan of size 580 mm. x 440 mm. with raised foot rest.

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 have an inlet at back and on front for connecting flush pipes 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-63. Glazed Earthen Ware Sink

63.1. The glazed earthen ware sink shall be of specified size, color and quality. They sink shall conform to I.S. 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-(part-I)1973 and I.S. 404-1962 for steel and lead pipes respectively 32 mm. brass waste coupling of standard pattern with brass chain and rubble plug shall be provided with sink.

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

64.1. The lipped type urinal shall be flat 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 of corner type urinal must 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 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. 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 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing cistern shall have outlet of 32 mm. dia. The lead pipe shall conform to I.S. 404(part-I)-1962. For fixing G.I. inlet pipes and overflow pipe 20 mm. dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanized 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 anti corrosive 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 turn flush cock (Heavy weight) shall be of gun metal chromium plated of dia. 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 fitting shall be true to shape smooth, cylindrical, their 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 the imperfection and shall be neatly dressed and carefully fettled.

68.2. The end of pipes and fittings shall be reasonable sq. to their axis.

68.3. The size of cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 m. including socket ends of the pipe unless shorter lengths are either 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 weight and thickness of pipes shall be as shown in the following table.

A tolerance up to -10% may however be allowed against these standard weights.

Sr. No.	Nominal dia of bore	Thickness	Overall		Excluding ears
			1.5 m. long	1.8 m. long.	2 m. long.
1.	75 mm.	5.0 mm.	12.38 Kg.	16.52 Kg.	18.37 Kg.
2.	100 mm.	5.0 mm.	18.44 Kg.	21.67 Kg.	24.15 Kg.

68.4.2. A tolerance up to 15 % in thickness and 20 mm. length will be allowed. For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.

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 straight pipes.

M-69. Nani Trap

69.1. Nani trap shall be of cast iron and shall be free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability. The size of nani trap shall be specified and shall be of self cleaning design.

69.2. The nani 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 provide shall be with deep seal, min. 50 mm. except at places where trap with deep seal can not be accommodated. The cover shall be cast iron perforated cover shall be provided on the trap of appropriate size.

M-70. Gully Trap

70.1. Gully trap shall conform to I.S. 651-1980. It shall be one 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 note 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 and 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 of 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 pipe shall be capable to withstand pressures or 1.5 M. lead without showing sign of leakage. 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 join of 6 mm. around the pipe.

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

M-72. Wall Peg Rail

72.1. The aluminum wall peg rail shall have three aluminum pegs 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 French polished or oil painted as specified.

M-73. G.I. Water Spot

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

73.2. The pipe shall have length as required for the thickness of will 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 its smooth finish, regular, surface and regular internal dia. The tolerance in all dimensions shall be as I.S. 1626-(part-I)1980.

M-75. Cyrdon Ball 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 to I.S. 1703-1977.

M-76. 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 items. 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 borrowing selected earth. The stacking of material shall be done as directed by the Engineer in charge in such a way 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 shall be used. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

M-78 Barbed Wire

78.1. The barbed wire shall be of galvanized steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of type I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two 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 ± 0.08 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 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 of 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 galvanized. 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 meters.

78.4. The lengths per 100 Kg. of barbed wire I.S. type-I shall be as under.

Nominal 1000 meter Minimum 934 Meter Max. 1066 M.

SPECIFICATIONS

Item No.1 EXECUTIVE TABLE 2000mm x 850mm x 750mm with side unit 1200mm 400mm x 750mm : Providing and supplying Main Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed shall be covered with required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.

EXECUTIVE TABLE 2000mm x 850mm x 750mm with side unit 1200mm 400mm x 750mm : Providing and supplying Main Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed shall be covered with required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.

1.0 Materials:-

- 1.2 Plywood should conform to M-4
- 1.3 Polish shall conform to M-9
- 1.4 Paint shall confirm to M-8

2.0 Workmanship:-

2.1 The item covers the requirement of frames, plywood, oil paint for office table their Supply and fixing.

2.2 Frames

2.2.1 All members of frames shall be exactly at right angles. The right angles shall be checked from inside surface of the respective members

2.2.2 All members shall straight without any warp or bow and shall have smooth surface well planned on the three sides exposed at right angles to each other. The surfacing touching the wall may not be paned unless it is required in order to straightening up the member or to obtain overall size with tolerance specified.

Joints: - Frame shall have standard, moisture and tender dovetail, dowel, cross halved, mitered, tongued, grooved and rebated joints. Nailed or glued but joints will not be permitted.

Tolerance: - Unless specially mentioned otherwise tolerance of 5mm shall be allowed for each wrought face.

2.3 Plywood with required size shall be fixing to frame with use of synthetic resin adhesive as well as screws, nails as directed by engineer in charge and as per drawing.

2.4 Oil paint./ Laminated

All exposed member of table should be painted with three coats of oil paint as per relevant specification of paint of General Technical Specification for Building work booklet or laminate conforming to relevant IS should be fixed as per detailed or as directed by Engineer in charge.

3.0 Mode of Measurement and payment:-

3.1 The rate includes cost of materials, all labors, tools tackles etc. required for satisfactory completion of item.

3.2 The Office table shall be supplied at site of work in store as directed.

3.3 The necessary vouchers bill of purchase of materials shall be produced if demanded by the engineer in charge.

3.4 Rate shall be in unit of One set.

Item No.2 OFFICE TABLE of required size : Providing and supplying Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, Soft-board, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed edges shall be covered with required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.

OFFICE TABLE of required size : Providing and supplying Table made with 19mm thk. plywood structure as per architect drawing finished with 1.0mm thk. decorative laminate on outside portion & 0.8mm thk. liner Laminate inside as specified & approved by architect fixed with necessary fixtures and fastening (Hardware) as per architect drawing. Provide Plastic Computer Desk Table Grommet Cable Wire Outlet Hole Cover 60mm, Key-board tray, Soft-board, S.S legs, Drawers with telescopic roller channels , Handle and Locking arrangements with all necessary fixtures and fastening . Provide shutters as per drawing fixe with handle , Hinges , magnet , complete with bidding patties and all required hardware . provide footrest as per drawing. all exposed edges shall be covered with

required Teak wood beading patti finished with approved melamine polishing work. complete as per architect drawing and as per instruction of architect & engineer in charge.

1.0 Materials:-

1.2 Plywood should conform to M-4

1.3 Polish shall conform to M-9

1.4 Paint shall confirm to M-8

2.0 Workmanship:-

2.1 The item covers the requirement of frames, plywood, oil paint for office table their Supply and fixing.

2.2 Frames

2.2.1 All members of frames shall be exactly at right angles. The right angles shall be checked from inside surface of the respective members

2.2.2 All members shall straight without any warp or bow and shall have smooth surface well planned on the three sides exposed at right angles to each other. The surfacing touching the wall may not be panned unless it is required in order to straightening up the member or to obtain overall size with tolerance specified.

Joints: - Frame shall have standard, moisture and tender dovetail, dowel, cross halved, mitered, tongued, grooved and rebated joints. Nailed or glued but joints will not be permitted.

Tolerance: - Unless specially mentioned otherwise tolerance of 5mm shall be allowed for each wrought face.

2.3 Plywood with required size shall be fixing to frame with use of synthetic resin adhesive as well as screws, nails as directed by engineer in charge and as per drawing.

2.4 Oil paint./ Laminated

All exposed member of table should be painted with three coats of oil paint as per relevant specification of paint of General Technical Specification for Building work booklet or laminate conforming to relevant IS should be fixed as per detailed or as directed by Engineer in charge.

3.0 Mode of Measurement and payment:-

3.1 The rate includes cost of materials, all labors, tools tackles etc. required for satisfactory completion of item.

3.2 The Office table shall be supplied at site of work in store as directed.

3.3 The necessary vouchers bill of purchase of materials shall be produced if demanded by the engineer in charge.

3.4 Rate shall be in unit of on payment length and width of top will be multiplied.

Item No.3 Conference Table, Table Size: As required : Providing and supplying Conference table made with using 19mm TH Plywood . structure finshed with 1.0mm TH decorativelaminate sheet approved by architect & nylon adjustors fixed with necessary fixtures and fastening (Hardware) as per architect drawing.Top portion of conference table all edges shall be covered with required Teak wood beadig patti or Molded Laminate sheet finished with approved melamine polishing work. The table shall also provision for carrying wires & mounting electrical plug point, switches & milk etc. Complete as per architect drawings and as per instruction of architect & engineer in charge.

Conference Table, Table Size: As required : Providing and supplying Conference table made with using 19mm TH Plywood . structure finshed with 1.0mm TH decorativelaminate sheet approved by architect & nylon adjustors fixed with necessary fixtures and fastening (Hardware) as per architect drawing.Top portion of conference table all edges shall be covered with required Teak wood beadig patti or Molded Laminate sheet finished with approved melamine polishing work. The table shall also provision for carrying wires & mounting electrical plug point, switches & milk etc. Complete as per architect drawings and as per instruction of architect & engineer in charge.

1.0 Materials:-

- 1.2 Plywood should conform to M-4
- 1.3 Polish shall conform to M-9
- 1.4 Paint shall confirm to M-8

2.0 Workmanship:-

2.1 The item covers the requirement of frames, plywood, oil paint for office table their Supply and fixing.

2.2 Frames

2.2.1 All members of frames shall be exactly at right angles. The right angles shall be checked from inside surface of the respective members

2.2.2 All members shall straight without any warp or bow and shall have smooth surface well planned on the three sides exposed at right angles to each other. The surfacing touching the wall may not be panned unless it is required in order to straightening up the member or to obtain overall size with tolerance specified.

Joints: - Frame shall have standard, moisture and tender dovetail, dowel, cross halved, mitered, tongued, grooved and rebated joints. Nailed or glued but joints will not be permitted.

Tolerance: - Unless specially mentioned otherwise tolerance of 5mm shall be allowed for each wrought face.

2.3 Plywood with required size shall be fixing to frame with use of synthetic resin adhesive as well as screws, nails as directed by engineer in charge and as per drawing.

2.4 Oil paint./ Laminated

All exposed member of table should be painted with three coats of oil paint as per relevant specification of paint of General Technical Specification for Building work booklet or laminate conforming to relevant IS should be fixed as per detailed or as directed by Engineer in charge.

3.0 Mode of Measurement and payment:-

3.1 The rate includes cost of materials, all labors, tools tackles etc. required for satisfactory

completion of item.

3.2 The Office table shall be supplied at site of work in store as directed.

3.3 The necessary vouchers bill of purchase of materials shall be produced if demanded by the engineer in charge.

3.4 Rate shall be in unit of on payment length and width of top will be multiplied.

Item No.4 Work Station / Operator Table of required Size : Providing and supplying Reception table made with using 19mm thk. plywood structure finished with 1.0 mm thk. decorative laminate sheet approved by architect fixed with necessary fixtures and fastening (Hardware) . Top portion of table all edges shall be covered with required teak wood beading patti finished with approved melamine polishing work. Complete as per architect drawings and as per instruction of architect & engineer in charge.

Work Station / Operator Table of required Size : Providing and supplying Reception table made with using 19mm thk. plywood structure finished with 1.0 mm thk. decorative laminate sheet approved by architect fixed with necessary fixtures and fastening (Hardware) . Top portion of table all edges shall be covered with required teak wood beading patti finished with approved melamine polishing work. Complete as per architect drawings and as per instruction of architect & engineer in charge.

2.0 Materials:-

1.2 Plywood should conform to M-4

1.3 Polish shall conform to M-9

1.4 Paint shall conform to M-8

2.0 Workmanship:-

2.1 The item covers the requirement of frames, plywood, oil paint for office table their Supply and fixing.

2.2 Frames

2.2.1 All members of frames shall be exactly at right angles. The right angles shall be checked from inside surface of the respective members

2.2.2 All members shall be straight without any warp or bow and shall have smooth surface well planned on the three sides exposed at right angles to each other. The surfacing touching the wall may not be planed unless it is required in order to straightening up the member or to obtain overall size with tolerance specified.

Joints: - Frame shall have standard, moisture and tender dovetail, dowel, cross halved, mitered, tongued, grooved and rebated joints. Nailed or glued but joints will not be permitted.

Tolerance: - Unless specially mentioned otherwise tolerance of 5mm shall be allowed for each wrought face.

2.3 Plywood with required size shall be fixed to frame with use of synthetic resin adhesive as well as screws, nails as directed by engineer in charge and as per drawing.

2.4 Oil paint./ Laminated

All exposed member of table should be painted with three coats of oil paint as per relevant specification of paint of General Technical Specification for Building work booklet or laminate conforming to relevant IS should be fixed as per detailed or as directed by

Engineer in charge.

3.0 Mode of Measurement and payment:-

3.1 The rate includes cost of materials, all labors, tools tackles etc. required for satisfactory completion of item.

3.2 The Office table shall be supplied at site of work in store as directed.

3.3 The necessary vouchers bill of purchase of materials shall be produced if demanded by the engineer in charge.

3.4 Rate shall be in unit of on payment length and width of top will be multiplied.

Item No.5 STORAGE UNIT / CUPBOARD : Providing, supplying and Fixing Full size Cupboard having size of 2000mm x 450mmx 900mm , heavy-duty, double-door design with 4 adjustable shelves making 5 compartments . which include premium CRCA mild steel construction, powder-coated finishes for rust resistance, and a multi-point locking system for secure document storage.including transporting , unloading and placing on site as per instruction given by engineer in charge.

The item itself specifies the requirement for **double door stainless steel cupboard size 2000mm x 450mmx 900mm , 24 gauge number of racks 5 and key lock** Storage cupboard and shall be supplied to store or directed by Engineer in charge.

Dimensions: 2000mm x 450mmx 900mm

Gauge: 24

Assembly: Assembly by Brand

Primary Material: Steel

Cupboard Type: Storage

Doors: Two Door

Numbers Of rack : 5

Key Lock.

The necessary vouchers bill for purchase of storage cupboard shall be produced if demanded by Engineer in charge.

The payment shall be made on No. basis.



Double door stainless steel cupboard

Item No.6 HIGH BACK revolving & tilting EXECUTIVE CHAIR : Providing and Supplying High back Chair for conference with M.S frame work. Upholstered with Artificial leather/Leatherette and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years" warranty. The size of chair 53cm x 79cm (back side) and 51cm x 49cm (seat size). The PU form should be molded with density=45+ 2 kg/m³. with One piece armrests are scratch and weather resistant. The permanent contact mechanism is designed with 360° revolving type, 12° seat tilt 19° back tilt, Front pivot for tilt with feet resting on ground ensuring more comfort, Tilt tension adjustment, 5 position locking with anti-shock back mechanism, Which should prevent the backrest from impacting the user when the lock is released, static seat depth adjustment=0.5 cm 5 position locking.

The item itself specifies the requirement for high back chair and shall be supplied to store or directed by Engineer in charge.

HIGH BACK revolving & tilting EXECUTIVE CHAIR is in the modern design with wonderful comfort in net back. The back has Stainless Steel Finish which gives the Chair a wonderful look.

Taluka Panchayat Office furniture

The seat of the Chair is in PU Molded Foam with arm rest, Syncro Mechanism, Hydraulic Gas Lift, Revolving Base with twin castors and five legs.

The Chair has a youthful looks and is liked by young entrepreneurs and managers.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.

The payment shall be made on No. basis.



HIGH BACK revolving & tilting EXECUTIVE CHAIR

Item No.7 MEDIUM BACK revolving & tilting CHAIR : Providing and supplying Medium back chair for conference with M.S frame wrk. Upholstered with changeable fabric upholstery covers(as per requirement) and molded PU form, together with molded seat & back covers. The back form should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years' warranty. The size of chair 47.5cm x 58cm (back side) and 49cm x 48cm (seat size). The PU form should be molded with density = 45 ± 2 kg/m³. With One piece armrests are scratch and weather resistant. The permanent contact mechanisms is designed with 360° revolving type, with pneumatic height adjustment & 17° maximum tilt only & tilt tension adjustment facility.

The item itself specifies the requirement for medium back chair and shall be supplied to store or directed by Engineer in charge.

MEDIUM BACK revolving & tilting CHAIR is in the modern design with wonderful comfort in net back. The back has Stainless Steel Finish which gives the Chair a wonderful look.

The seat of the Chair is in PU Molded Foam with arm rest, Syncro Mechanism, Hydraulic Gas Lift, Revolving Base with twin castors and five legs.

The Chair has a youthful looks and is liked by young entrepreneurs and managers.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.

The payment shall be made on No. basis.



MEDIUM BACK revolving & tilting CHAIR

Item No.8 LOW BACK revolving & tilting CHAIR ∴ Providing and supplying Low back chair for work center & other staff the seat & back are made of M.S frame work. Upholstered with changeable fabric upholstery covers (as per requirement) and molded PU form, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. Caster of high durability & hydraulic. The chair should have cylinder with 5 years warranty. The size of chair 45cm x 45cm (back side) and 45cm x 43cm (seat side). The PU form should be molded with density = 45 ± 2 kg/m³. with One piece armrests. The armrests are scratch and weather resistant. The permanent contact mechanisms is designed with 360° revolving type, with pneumatic height adjustment & 17° maximum tilt only & tilt tension

The item itself specifies the requirement for medium back chair and shall be supplied to store or directed by Engineer in charge.

LOW BACK revolving & tilting CHAIR is in the modern design with wonderful comfort in net back. The back has Stainless Steel Finish which gives the Chair a wonderful look.

The seat of the Chair is in PU Molded Foam with arm rest, Syncro Mechanism, Hydraulic Gas Lift, Revolving Base with twin castors and five legs.

The Chair has a youthful looks and is liked by young entrepreneurs and managers.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.



LOW BACK revolving & tilting CHAIR

Item No.9 VISITOR CHAIR : Providing and supplying Visitor or Guest chair the seat & back are made 12mm thick hot pressed plywood upholstered with changeable fabric upholstery covers (as per requirement) and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. The size of chair 45cm x 38cm (back side) and 45cm x 43cm (seat side). The PU foam should be with powder coted MS structure as per architect selection. The seat and back fixed with MS structure with required necessary hardware.

The item itself specifies the requirement for Providing and supplying Visitor or Guest chair the seat & back are made 12mm thick hot pressed plywood upholstered with changeable fabric upholstery covers (as per requirement) and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. The size of chair 45cm x 38cm (back side) and 45cm x 43cm

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(seat side). The PU foam should be with powder coted MS structure as per architect selection. The seat and back fixed with MS structure with required necessary hardware.

VISITOR CHAIR is in the modern design with wonderful comfort in net back. The back has Stainless Steel Finish which gives the Chair a wonderful look.

The Chair has a youthful looks and is liked by young entrepreneurs and managers.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.



VISITOR CHAIR

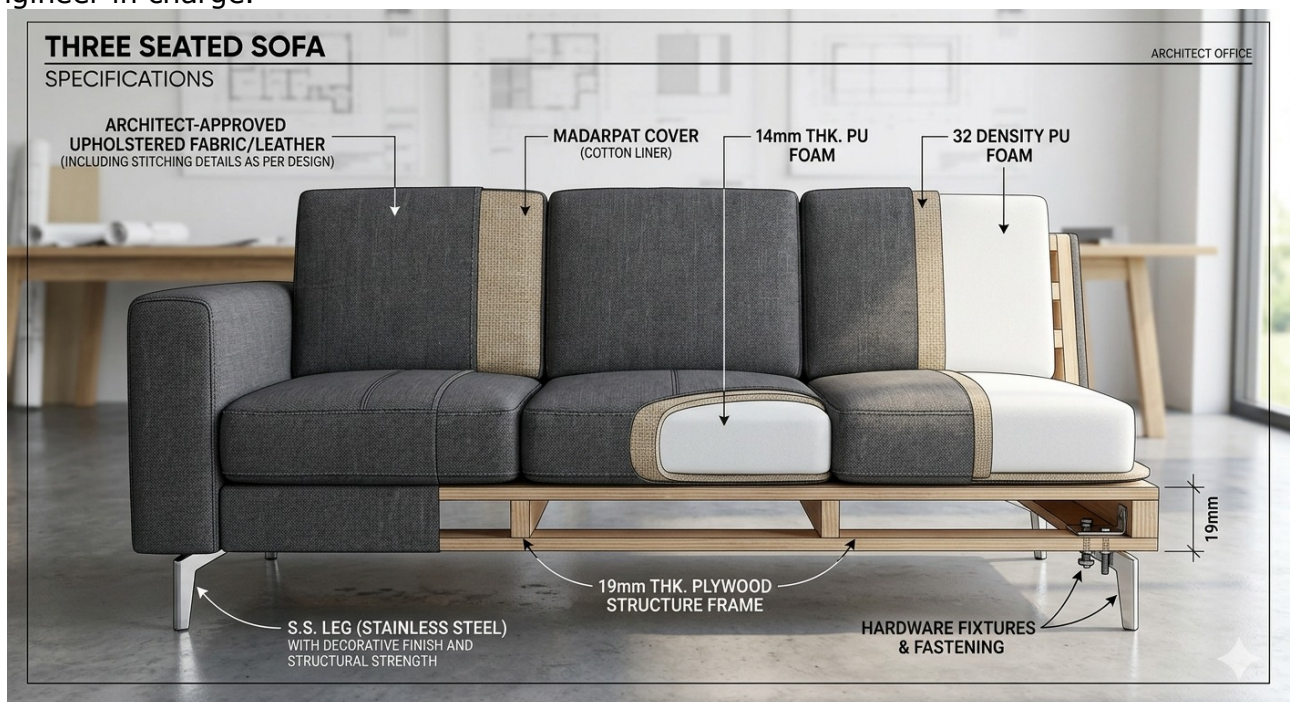
Item No.10 **THREE SEATED SOFA** : Providing and supplying sofa. (3 seated) made with using 19mm thk. plywood structure frame with S.S legs required necessary support fixed with necessary fixtures and fastening (Hardware) . it shall be covered with 32 density PU foam) with required Thickness as per design in seat & back and handle portion this should be again covered with 14mm thick PU foam with Madarpatt cover on it & upholstered fabric or leather of suggested & approved by architect finished with seat, back & all visible side as per architect drawing. Complete as per architect drawing and as per instruction of architect & engineer in charge.

The item itself specifies the requirement for Providing and supplying Visitor or Guest chair the seat & back are made 12mm thick hot pressed plywood upholstered with changeable fabric upholstery covers (as per requirement) and molded PU foam, together with molded seat & back covers. The back foam should be designed with contoured lumber support for extra comfort. The size of chair 45cm x 38cm (back side) and 45cm x 43cm (seat side). The PU foam should be with powder coated MS structure as per architect selection. The seat and back fixed with MS structure with required necessary hardware.

THREE SEATED SOFA is in the modern design with wonderful comfort in net back. The back has Stainless Steel Finish which gives the Chair a wonderful look.

The Chair has a youthful looks and is liked by young entrepreneurs and managers.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.



THREE SEATED SOFA

Item No.11 Centre Table/ Corner Table/Tipoi. : Providing and supplying Center Table/Corner Table/Tipoi with Glass top made with 19mm thk. plywood finished with 1.0 mm thk. Decorative laminate sheet specified and approved by architect & fixed with necessary fixtures and fastening (Hardware) inclusive of approved melamine polishing work. Top part of center table covered with 8mm thk. toughened Glass with polished Edges. Complete as per architect drawing and as per instruction of architect & engineer in charge.

The item itself specifies the requirement for **Centre Table/ Corner Table/Tipoi** Table and shall be supplied to store or directed by Engineer in charge.

The necessary vouchers bill for purchase of Center Table shall be produced if demanded by Engineer in charge.

The payment shall be made on No. basis.



Centre Table/ Corner Table/Tipoi

Item No.12 Providing Stainless Steel Dust Bin in cylindrical shape with steel pedal and lid Garbage bin for washroom , kitchen, bathroom and office of size 7 " x 11' - 05 Litre as directed by Engineer-in-Charge.

The item itself specifies the requirement for Providing Stainless Steel Dust Bin in cylindrical shape with steel pedal and lid Garbage bin for washroom , kitchen, bathroom and office of size 7 " x 11' - 05 Litre as directed by Engineer-in-Charge.

The necessary vouchers bill for purchase of chairs shall be produced if demanded by Engineer in charge.



Stainless Steel Dust Bin

Item No.13 Providing and Arranging Three Seater Gang Seater having seat and back made from CRCA Tubular frame welded with perforated Diemoulded CRCA sheet. base frame made from round Tubular welded with horizontal beam Two side armrest welded with frame including finishing metal parts with epoxy polyster powder coating of 50 micron thickness Including all materials and labour etc. Complete as per drawing and instruction of engineer-in-charge & overall weight of unit shall not be less than 35 kg. 3 Seater S.S.Gang Seater: size-1590mm x 480mm x 880mm

- 1. Description:** This item shall govern the provision of fabrication, supply and installation of stainless steel benches with or without back rest as per design and drawing approved by Engineer in-charge.
- 2. General Requirement:** The stainless steel benches with or without back rest shall be fabricated in accordance with the design requirements and detailed as per drawing, in conformity with the requirements of this specification and item no. 172040 & 172050 of USSOR.
- 3. Materials description:** The benches shall be manufactured using Stainless Steel 304/316 grade conforming to IS:6911/ASTM A240/A240M.
- 4. Fabrication description:** The 3/4 Seater Bench with or without back rest, shall be manufactured using Stainless Steel 304/316 grade matt finished as per design. Stainless Steel sheet/plate shall be of 16 gauge, round pipe shall be of 50/40mm dia and 2mm thickness, square pipe shall be of size 50mm x 50mm and 2mm thickness, base plate shall be 8mm thick and Stainless Steel fastener shall be of size 10mm x 100mm. The punching/perforation in seating plate and back rest shall be done by Turret punching machine as per approved sample for punching pattern. All fabrication work shall be done on roller machine by CNC Laser cutting and Argon welding. The Argon welding shall be done by TIG (Tungsten inert gas) Arc welding method as per IS:9604. Joints shall be welded under controlled condition to avoid formation of crack and metal flow at welding point by using tungsten electrodes as per IS:13907 and SS304/SS304L/SS316 grade filler material. Welds should be treated with K-2 solution. All the joints shall be finished and polished using automatic polishing machine to match

with parent material.

Bench Detail:

overall weight of unit shall not be less than 35 kg.

3 Seater S.S.Gang Seater: size-1590mm x 480mm x 880mm

Back rest detail:

Seat and back rest connecting pipe shall be of 50/40mm dia and 2mm thickness.

Clear Height of bench with back rest: 880mm

5. **Finish:** All the surface of bench should be uniform smooth mirror finish as per table 8 of IS:6911, polished with automatic polishing machine and free from crack and seam. Welding joints shall be finished ensuring that no welding marks are visible.
6. **Tolerance:** All dimensions (except thickness of SS plate/pipe) shall be as per drawing :t2 mm. Stainless steel plate thickness tolerance shall be as specified in IS:6911-1993 with latest amendment.
7. **Measurement:** The unit of measurement shall be in Kg as per Item No. 172040 & 172050 of USSOR.
8. **Payment:** Payment will be done as per **Item No. 172040 & 172050 of USSOR**. This price shall be cover the fabrication, handling and installation including labour, material and equipments. Manufacturer should provide maintenance manual and basic material test report for steel grade certification.



*****THE END*****