

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

SPECIFICATION

1.0 General :

All Measurements shall be made in metric system. Different items of work shall be measured in accordance with the procedures set forth in relevant sections read in conjunction with General Conditions of contract. The same shall not however apply in the case of lump-sum items. All measurements and computations ; unless other wise indicated, shall be carried nearest to be following limits :

- (i) Length and breadth.....10mm
- (ii) Height, depth or thickness of earthwork, Sub-base, bases surfacing, and structural members.....5mm
- (iii) areas..... 0.01 Sq.Metre.
- (iii) Cubic contents.....0.01 Cubic Metre.

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

2.0. Measurement of lead for Materials :

Where lead is specified in the contract for construction materials, the same shall be measured as described hereunder.

Lead shall be measured over the shortest practicable route and not the one actually taken and the decision of the Engineer-in-charge in this regards shall be taken as final. Distance upto and including 100 meters shall be measured in units of 50 meters, exceeding 100 metres but exceeding 1 Km. in units of 100 metres, and exceeding 1 Km. in units of 500 metres. The half and greater than half of the units shall be reckoned as one and less than half of the units ignored. In this regard, the source of the materials shall be divided into suitable blocks and for each block the distance from the centre of the block to the centre of placing pertaining to that block shall be taken as the lead distance.

3.0 Surface Regularity of sub grade and Pavement courses :

The surface regularity of completed sub-base courses and wearing surface in the longitudinal and transverse direction shall be within the tolerances indicated in Table below. The longitudinal profile shall be checked with a 3 metre long straight edge, at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a set for three camber boards at intervals of 10 metres.

PERMITTED TOLERANCES OF SUB REGULARITY FOR PAVEMENT COURSE.

Sr.	Type of construction	Longitudinal Profile with 3 metre straight edge.					Cross Profile
		Maximum permissible undulation in mm	Maximum number of undulation permitted in any 300 m. length exceeding in				Maximum permissible variation from specified profile camber themplate mm
			18	12	10	6	
1	2	3	4	5	6	7	8
1	Earth subgrade	36	30	-	-	-	15
2	Granular/lime Cement stabilized sub base.	23	-	30	-	-	12
3	Water Bound Macadam with nominal size metal (20-50)mm	18	-	-	30	-	8
4	Semi Dense carpet	15	-	-	-	20	6

Notes :

1. These are for machine laid surfaces. If laid manually, due to unavoidable reason, tolerance upto 50 percent above these values in the columns may be permitted. However, this relaxation does not apply to the values of maximum undulation for longitudinal and cross profiles mentioned in columns 3 and 8 in the table.

2. Surface evenness requirements in respect of both the longitudinal and profiles should be simultaneously satisfied.

3. **Rectification** : Where the surface irregularity of sub grade and the various pavement courses fall out side the specified tolerances, the contractor shall be liable to rectify these in the manner described below and to the satisfaction of the Engineer- in-Charge at this own cost.

(i) **Sub grade** ; Where the surface in high, it shall be trimmed and suitably compacted. Where the same in low, the deficiency shall be corrected by adding frees material. The degree of compaction and the type of material to be used shall confirm to the specified requirements.

(ii) **Granular/Sub Base** : Same as at (i) above except that the degree of compaction and the type of material to be used shall conform to the specified requirements.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(iii) **Lime/Cement stabilized soil sub-Base** : For lime/ cement treated materials where the surface is high, the same shall be suitably trimmed while taking care that the material below is not disturbed due to this operation. However where the surface is low, the same shall be corrected as described here in below.

For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material, is less than 2 hours, the surface shall be scarified to a depth of 50mm, supplemented with freshly mixed material as necessary and recomposed to the relevant specification. When this time is more than 2 hour, the full depth of the layer shall be removed from the pavement and replaced with fresh material, to specification. In either case, the area treated shall not be less than 5 meters wide. This also apply to lime treated material except that the time criterion shall be 3 hours instead of 2 hours.

(iv) **Water Bound Macadam Base** : Where the surface is high or low, that top 75mm shall be scarified, reshaped with added material as necessary and re compacted. The area treated at a place shall not be less than 5 metres long and 2 metres wide.

(v) **Bituminous Construction** : For bituminous construction other than wearing course, where the surface is low, the deficiency shall be corrected by adding fresh material and re compaction to specifications, Where this surface is high, the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications. For wearing course, where the surface is high or low, the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications in all cases where the removal and replacement of a bituminous layer is involved, the area treated shall not be less than 5 metre long and not less than 1 lane wide.

4.0 Quality Control Test During Construction :

The materials supplied and the works carried out by the Contractor shall conform to the enclosed relevant specifications. For ensuring the requisite quality of construction, the materials and works shall be subjected to quality control test as described hereinafter, by the Engineer-in-charge. The testing frequencies set forth are the desirable minimum and the Engineer-in-charge shall have the full authority to carry out test as frequently as he may deem necessary to satisfy that the materials at work comply with the appropriated specification. Test procedures for the various quality control tests are indicated in the respective sections of the specification or for certain tests within this section. Where no specific testing procedure is mentioned, the test shall be carried out as per prevalent accepted engineering practice to the directions of the Engineer-in-charge.

5.0 Tests of Earthwork foe Embankment Construction :

5.1 Borrow Materials :

- (a) Sand content (IS : 2720 Part IV) Two test per 8000 Cubic metres of soil.
- (b) Plasticity Test (IS : 2720 Part-V) Each type to be tested. Two tests per 8000 Cubic Metres of soil.
- (c) Density test (IS : 2720 part-VII) Each soil type to be tested. Two test per 8000 Cubic Metres of Soil.
- (d) Moisture Content Test (IS : 2720 Part-II) One test for every 250 Cubic Metres of soil.

5.2 Compaction Control :

- ❖ Control shall be exercised by taking at least one measurement of density for each 1000 square metres of **compacted** area, or closer as required to yield the maximum number of test results for evaluating day's work on statistical basis. The determination of density shall be accordance with IS : 2720 (Part XXVIII). Test locations shall be chosen only through random sampling techniques. Control shall be not be based on the result of any one test but on the mean value of set of 5-10 density determinations. The number of tests in one set of measurements shall be 5 as long as it is felt that sufficient control over borrow material and the method of compaction is being exercised. If considerable variations are observed between individual density results, the minimum number of tests in one set of measurement shall be increase to 10., The acceptance of work shall be subject to the condition that the mean dry density equals or exceeds the specified density and the standard deviation for any set of result is below 0.08 gm/cc. However for earthwork in shoulders and in top 500 mm portion of the embankment below the subgrade, at least one density measurement shall be taken for every 500 square metres of the compacted area provided further that the number of the test in each set of measurement shall be at least 10. In other respects, the control shall be similar to that described earlier.

6. Following materials shall conform to the Indian Standards shown against them ;

- | | | |
|-----|-----------------------------------|-----------|
| (1) | Cement | IS : 269 |
| (2) | Sand for masonry | IS : 2116 |
| (3) | Sand for concrete | IS : 383 |
| (4) | Coarse aggregate. | IS : 383 |
| (5) | Mild Steel. | IS : 432 |
| (6) | High yield strength deformed bars | |
| | (a) Hot Rolled. | IS : 1139 |
| | (b) Cold Twisted. | IS : 1786 |

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ પાયાનું ખોદાણકામ હાર્ડ/ડેન્સ/લુઝ વિ. તમામ પ્રકાર ની માટી માં

❖ Excavation in In all sorts of soil & murrum with All lead and lift

પાયાનું ખોદાણ કામ બતાવ્યા મુજબ દોરીમાં ઓળંભે તથા સીધી લાઈનમાં સીટી એન્જીનીયરશ્રી ફરમાવે તેટલી ઉચાઈ/ઉડાઈમાં ખોદી આપવાનું છે. ખોદાણ કરતાં જમીન કઠણ, મોરમ, માટી કે તાઇવાળી આવે કે તો તે તમામ ખોદવાનું છે કે ઈટ ચણતર / કોન્ક્રીટના ઢાળીયા તોડી આપવાના રહેશે. કોઈ જમીન નરમ આવે અથવા ખોદાણ કરતાં બાજુમાંથી ઘસી પડે તેવી હોય તો ઘસી પડતું અટકાવવા શોરીંગ કરવાનું છે. ખોદાણ કામમાં પાણી નીકળે તો તે પણ કોન્ક્રીટરે પાણી ઉલેચીને કરવાનું છે. પાણી ઉલેચવાના સાધનો જેવા કે પમ્પ, એન્જીન વિગેરે કોન્ક્રીટરે પોતાના ખર્ચે લાવવાનાં છે, અને પાણી ઉલેચવાનો "ડી વોટરીંગ" નો કંઈપણ અલગ ભાવ આપવામાં આવશે નહીં. પાણીનું વેણનું નડતર હોય તો કોન્ક્રીટરે પોતાના ખર્ચે ડાયવર્ટ કરી લેવાનું રહેશે. ખોદાણમાંથી નિકળેલ માટી, મોરમ, તાઇ વિગેરે મ્યુ. કોર્પો. સુચવે તે મુજબ ની લીડ સુધી લઈ જઈ પાથરી આપવાનું છે અથવા તો જો ખોદેલ જગ્યાએ માટી પરત નાખવાની થતી હોય તો બેક ફીલીંગ કરી આપવાનું રહેશે અને તે અંગેનો કંઈપણ અલગ ભાવ મળી શકશે નહીં. પાયાનું દરેક જાતનું કામ શોરીંગ, ડી-વોટરીંગ, વોટરકોર્સ ડાયવર્ઝન, બેક ફીલીંગ વિગેરે તથા ઉપરોક્ત વિગતો સાથેનાં તમામ કામનો સમાવેશ પાયાના ખોદાણ કામમાંજ થાય છે. તેનો ભાવ દરે એક ઘનમીટર પર સમજવાનો છે. તમામ તૈયાર કામનું માપ લેવામાં આવશે.

1. Excavation for structures shall consist of the removal of material for the construction of foundations for culverts, retaining walls, cut of walls pipe culverts and other similar structures, in accordance with the requirements of these specification and the lines and dimensions shown on the drawing or as indicated by the Engineer in charge. The work shall include all necessary sheeting shoring, bracing draining and pumping and the removal of all logs stumps, grubs and other deleterious matter and obstructions necessary for placing the foundations, trimming bottoms of excavations backfilling and clearing up the site and the disposal of all surplus material.
2. After the site has been cleared the limits of excavation shall be set out true to lines, curves and slopes.
3. Excavation shall be taken to the width of the lowest step of the footing. The contractor at his own expense shall put up necessary shoring, trutting and planking or cut slopes to a safer angle or both with due regard to the safety of persons and works and to the satisfaction of the engineer in charge.
4. The depth to which the excavate on is to be carried out shall be as shown, on the drawings. unless the type of material encountered is such as to require changes. in which case the depth shall be as ordered by the Engineer in charge.
5. Where waters is met with in excavation due to stream flowm seepage springs, raining or ther reasons, the contractor shall take adequate measures such as bailing pumping, constructing, diversion channels drainage channels and other necessary work to keep the foundation trenches dry when so required and to protect green concrete/masonry against damage by erosion or sudden rising of wate level. The method to be accepted in the regard and other details there of shall be left to the choice of the contractor but subject of approval of the engineer in charge. Approval of the Engineer in charge shall, however not relieve the contractor of the responsibility for the adequacy of dewatering and protection arrangements and for the quality an safety of the work.
6. Pumping from the interior of any foundation enclosures shall be done in such manner as to preclude the possibility of the movement of water through anyfresh concrete. No pumping shall be permitted durring the placing of concrete or for any period of at least 24 hours thereafter, unless it is done from a sitable sump separated from the concrete work by a water tight wall or other similar means.
7. The botton of the foundation shall be leveled both longitudinally and transversely or stepped as directed by the Engineer in charge. Before footing is laid, the surface shall be slightly watered and remmed. In the event of excavation having been made deeper than that shown on the drawings or as otherwise ordered by the Engineer in charge, the extra depth shall be made up with concrete or masonry of the foundation grade at the cost of the contractor, Ordinary filling shall not be used for the purpose of bringing the foundation oto level. If there are any slip or blows in the excavation these shall be removed by the contractor at his own cost.
8. Near towns, villages and all frequented plances, trenches and foundation pits shall be securely fenced, provided with proper caution signs and marked with red lights at night to avoid accidents. The contractor shall gbe required to take adequate protective measures to see that the excavation operation do not affect or damage adjoining structures.
9. Backfilling shall be done with approved material after concrete or masonry is full set and carried out in such a way as not to cause under thrust on any part of the structure. All space btween foundation masonry or concrete and the sides of excavation shall be refilled to the original surface, maing due allowance for settlement in 250 mm loose layers. Which sahil be watered and compacted.
10. All the excavated materials shall be the property of the Govtrnment where the excavated material is directed to be used in the construction of embankment, it shall be directly deposied at the required locations.
11. All useful materials, not intended for use in the bank, shall be stacked neatly on Government land as directed by the Engineer in charge within 8 KM lead. Unsuitable and surplus materials not intended for use in any part of the road shall be disposed off as directed by the Engineer in charge.
12. Excavation for structures shall be measured in cubic metres for each class of material encontered, limited to the dimensions shown on the drawings or as directed by the Engineer in charge Excavation over increased width, cutting of slopes, shoring, shattering and planking shall be deemed as convenience for the contractor in executing the work and shall not measured and paid for separately.
13. The contract until rate fore for the items for excavation for structures shall be paid in full for carrying out the required operations including.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- (1) Setting out
- (2) Construction of necessary shoring and bracing and their subsequent removal :
- (3) Removal of all long stumps , grubs and other deleterious matter and obstructions for pacing the foundations including trimming of bottoms of excavation :
- (4) Foundation sealing dewatering including pumping.
- (5) Backfilling clearing up the site and disposal of all surplus material within all lifts and leads upto 100 metres :
- (6) All labour, material, tools, equipment, safeguards and incidentals necessary to completed the work to the specification .

14. Excavation shall be for ordinary soil such as vegetable or organic soil, turt slit, and loam , clay mud, plat, black cotton soil, soft shale or soft murrum a mixture of these and similar material which yields other ordinary application of pick and shovel rake of other ordinary digging equipment. Removal of gravel or any other nodular material having diametre in any one direction not exceeding 75 mm occurring in such strata shall be deemed to be covered under this category. The classification of excation shall be decided by the Engineer in charge and his decision shall be final and binding on the contractor

❖ Providing and Spreading/laying Un Screaned River sand or Granular material or 6 mm Grit Whatever material is ordered/directed by Exe. Engg. in sub base of approved river sand with gradation as per detailed specification of a compacted thickness shown in cross section and including watering, spreading, labour charges and compacting with using contractors own vibratory roller to required dry density etc. completed as directed

1. The materials for the purpose shall be of approved quality. Any materials which is found inferior shall be rejected and the contractor shall remove such rejected materials from the site at his own cost.
2. The material shall be approved by the Executive Engineer or his authorised agent. It shall be free from all rubbish, dust and any organic materials as well as cluds of black cotton soils.
3. The materials shall be stacked by filling standard steel pharas of size 5'-0 x 5'-0 x 2'-0 (1.524 M x 1.5524 M .60.96 cm) on a fairly level ground. It shall be stacked on road land beyond the toe of the bank and on a level ground. The rate includes digging the murrum from borrow pits. conveying within the specified lead and lift on the road site and stacking the same in regular pharas of the required dimensions.

❖ Supplying and stacking of quarry spauls materials at site including filling boxes with all lead and lift.



1. The quarry spauls shall be approved quarry as approved by the Ex. Engineer prior to collection. Filling of boxes. shall no be allowed till the metal is broken to the specified site.
2. The quarry spaul be as uniform in size as possible. The quarry spaul shall be hard, tough, solid, durable of black trap quarry of close texture, free from decay and weathering. The stone shall be angular and roughly cubical in shape and round elongated or flaky materials shall be rejected . No sound or long rubble or angular chips smaller than specified size shall be allowed,
3. All unsound , whethere or disintegrated stone obtained from the under surface layer of the quarry of other layers of boulders shall be rejected.
4. Wherever any doubt as to whether above requirement are stisfy in whole or part of the collection it shall be got sereened by the contractor if so ordered by the Excutive Engineer, and for which no extra payment shall be claimed by the contractor.
5. Any collection which does not fully satisfy the above requirements is liable to be rejected all together.
6. Stacking shall be made by the contractor by steel pharas of 2 m x 1.5 m 0.5 m and no deduction of voids shall be made from the gross measurements.
7. Regular stack shall be made by the contractor on a fairly level ground. All the stack shall be marked by white wash immediately on being measured and recorded by the Engineer in charge.
8. The rate includes blasting the rock, if any breaking the quarry spauls, stacking measureing in pharas etc. complete.
9. The rate shall as per actual requirements and any materials in excess shall bhave to be transported by the contractor at the places directed by the Executive Engineer at the risk and cost of the contractor.
10. While stacking materials the depositing should commence at one end of the km, and carried continuously towards the other end unless the Executive Engineer shall direct otherwise and as a rule measurements shall be taken after metal for half kilometer or km, has been fully collected. Any fraction of these distance shall be not be measured up,
11. The measurements shall be recorded in on Cum. basis & be paid accordinagly.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ Supplying and Stacking of machine crushed stone aggregate chipping etc of hand stone of 20 to 50 mm nominal size free of disintegrated pieces, deleterious and organic matter including filling boxes with all lead and lift etc. complete for road work including filling the boxes with all lead and lift etc, complete.

1. The field of M.C. metal shall be of approved quarry as shown on the quarry chart as well as approved by the executive engineer prior to collection.
2. The M.C., Metal be hard, tough, sound, durable, black trap quarry of close texture, free from decay and weathering. The stone shall be angular and roughly cubical in shape and round elongated of flaky materials shall be rejected. No sound or long rubble or angular chips smaller than specified size shall be allowed.
3. All unsound, weathered or disintegrated stone obtained from the upper surface layer of the quarry or other layer of boulders shall be rejected. The physical requirement for standard size metal shall conform to the test results indicated in para 3 of above item.
4. The M.C. metal shall be as nearly uniform in size as possible and shall conform of following minimum requirements of passing through the rings.
5. Wherever and doubt exists as to whether the above requirement are satisfied in whole or part. the collection of M.C. metal shall be got screened by the contractor if so ordered by the executive engineer and for which no extra payments shall be claimed by the contractor.
6. Any collection which does not fully satisfy the above requirements is liable to be rejected altogether.
7. Stacking shall be done by filling in the standard steel pahras of 2.00 x 1.50 x 0.50 metre and no deduction of voids shall be made from the gross measurements.
8. Regular stacks shall be done by the contractors on a fairly level ground. All the stacks shall be marked by white wash immediately on being measured and recorded by the Engineer in charge.
9. The rate includes blasting the rock, if any, breaking the metal, stacking measuring in pahras etc, complete.

Sieve size	Percentage passing through
63mm	100
50mm	95-100
40mm	35-70
20mm	0-10

❖ Supplying & machine crushed stone aggregate chipping etc. of hard stone 25 mm to 40 mm nominal size free of disintegrated pieces. deleterious and organic matter including filling the boxes with all lead and lift etc. complete on site of the work for bituminous surface dressing filling the boxes with all lead and lift etc. complete on site of the work for bituminous surface dressing etc. as per I.R.C. code.

1. The field of M.C. metal shall be of approved quarry as shown on the quarry chart as well as approved by the executive engineer prior to collection.
2. The M.C., Metal be hard, tough, sound, durable, black trap quarry of close texture, free from decay and weathering. The stone shall be angular and roughly cubical in shape and round elongated of flaky materials shall be rejected. No sound or long rubble or angular chips smaller than specified size shall be allowed.
3. All unsound, weathered or disintegrated stone obtained from the upper surface layer of the quarry or other layer of boulders shall be rejected. The physical requirement for standard size metal shall conform to the test results indicated in para 3 of above item.
4. The M.C. metal shall be as nearly uniform in size as possible and shall conform of following minimum requirements of passing through the rings.
5. Wherever and doubt exists as to whether the above requirement are satisfied in whole or part. the collection of M.C. metal shall be got screened by the contractor if so ordered by the executive engineer and for which no extra payments shall be claimed by the contractor.
6. Any collection which does not fully satisfy the above requirements is liable to be rejected altogether.
7. Stacking shall be done by filling in the standard steel pahras of 2.00 x 1.50 x 0.50 metre and no deduction of voids shall be made from the gross measurements.
8. Regular stacks shall be done by the contractors on a fairly level ground. All the stacks shall be marked by white wash immediately on being measured and recorded by the Engineer in charge.
9. The rate includes blasting the rock, if any, breaking the metal, stacking measuring in pahras etc, complete.

Gradation of Aggregate shall be as under.

Sieve size	% by weight passing through
50 mm	95-100
40 mm	65-90
20 mm	0-10
10 mm	0-5

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ **Supplying & machine crushed stone aggregate chipping etc. of hard stone 40 mm to 63 mm nominal size free of disintegrated pieces. deleterious and organic matter including filling the boxes with all lead and lift etc. complete on site of the work for bituminous surface dressing filling the boxes with all lead and lift etc. complete on site of the work for bituminous surface dressing etc. as per I.R.C. code.**

1. The field of M.C. metal shall be of approved quarry as shown on the quarry chart as well as approved by the executive engineer prior to collection.
2. The M.C., Metal be hard, tough, sound, durable, black trap quarry of close texture, free from decay and weathering. The stone shall be angular and roughly cubical in shape and round elongated of flaky materials shall be rejected. No sound or long rubble or angular chips smaller than specified size shall be allowed.
3. All unsound, weathered or disintegrated stone obtained from the upper surface layer of the quarry or other layer of boulders shall be rejected. The physical requirement for standard size metal shall conform to the test results indicated in para 3 of above item.
4. The M.C. metal shall be as nearly uniform in size as possible and shall conform of following minimum requirements of passing through the rings.
5. Wherever and doubt exists as to whether the above requirement are satisfied in whole or part. the collection of M.C. metal shall be got screened by the contractor if so ordered by the executive engineer and for which no extra payments shall be claimed by the contractor.
6. Any collection which does not fully satisfy the above requirements is liable to be rejected altogether.
7. Stacking shall be done by filling in the standard steel pharas of 2.00 x 1.50 x 0.50 metre and no deduction of voids shall be made from the gross measurements.
8. Regular stacks shall be done by the contractors on a fairly level ground. All the stacks shall be marked by white wash immediately on being measured and recorded by the Engineer in charge.
9. The rate includes blasting the rock, if any, breaking the metal, stacking measuring in pharas etc., complete.

Gradation of Aggregate shall be as under.

Sr. No	Size Range	Slave designation	Percentage by weight passing through the sieve
1.	40 mm to 63 mm	75 mm	100
		63 mm	90-100
		50 mm	60-80
		40 mm	0-15
		25 mm	0.5



❖ **Supplying and Stacking murrum binding materials including materials on road side including filling boxes with all lead & lift etc. complete.**

1. Material for the purpose shall be of approved quality. Any material which is found inferior shall be rejected and the contractor shall remove such rejected material from the site at his own cost. The material shall be collected from quarries approved by the Executive Engineer. The material shall be granular and gritty.
2. The material shall be got approved by the Executive Engineer prior to collection on site. It shall be free from all fubbish dust and any organic materials as well as clods of black cotton soils. Materials shall not be allowed to be collected from within the road boundary. Material to be used as crust and for side shoulders shall be as per CBR report and that to be used as bindage in WBM road construction shall have P.I. value of less than 6 as determined in accordance with IS 2720 (part -V). The material to be used should be got tested prior to its use in construction. Testing charges shall be borne by the contractor.
3. River or nala or sea sand required for the work shall be clear, sound, properly, free from organic materials silt clay etc. and shall be got approved by the Engineer-in-charge. The sand shall be obtained and brought from the source approved by the Engineer-in-charge. The sand shall be well graded. The Payment shall be made on Cubic Metre basis.
4. Stacking shall be done by filling in the standard steel boxes of 2m x 1.5m x 0.5m size which shall be supplied by the Department if available on rent. Otherwise contractor shall be made from the grade measurements. Where any doubt exists as to whether the quantity of stacks of murrum in a hectometre is not confirming with the cubic content of the standard pharas (2x1.5x0.5m) the same shall be got corrected by the contractor if so ordered by the Engineer-in-charge for which no extra payment shall be claimed by the contractor. If the quantity of murrum in any stack in a particular hectometre is found to be less than the standard measurements viz., 1.5 cmt. the entire collection in the hectometre shall be paid on the basis of the quantity so found. Regular stacks shall be done by the Contractor on a fairly level ground. Stacking of the murrum shall be done in a manner as directed by the Engineer-in-charge.
5. For road work completed stacking of murrum as per requirement shall be carried out in 2 k.m length before spreading. The collection shall always be commenced at one end of the K.M. and be carried continuously towards the other end unless the Engineer in charge shall direct otherwise.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

6. The Payment shall be made on cubic metre basis without deduction for voids. The contractor shall maintain all stacks in regular and proper size till the whole materials are collected. measured and finally accepted by the department. The spreading of materials shall not be allowed till the materials are fully stacked and completed kilometer wise.
7. The rate includes cost of collection, conveyance to the site with all lead and lift and filling the boxes including all labour, tools, equipment and other incidental expenses.
8. The rate quoted are inclusive of all such tools, duties, fees, royalties, taxes etc.

❖ **Spreading(Only)the stone aggregates and quarry spauls for soiling and WBM including filling the interstices to required camber and gradient (excluding spreading of blindage) (i) 40 mm to 63 mm size H.B. stone aggregates *H.B.) (ii) 25 mm to 90 mm size H.B. stone aggregate (iii) Chipping varying from 6 mm to 25 mm size (iv) 20 mm to 50 mm size crushed.**

1. Metal shall not be spread without permission of the Engineer in charge. Material shall be only be allowed to be spread after the written permission of the Executive engineer is obtained. The permission for spreading the metal shall be given by the Executive Engineer if

- (i) The full quantity of a particular mile (Milometer) is completely collected.
- (ii) The collection of metal is also completed in the adjoining two miles (kilometers)
- (iii) The measurements are recorded in the Measurement book

Metal should be spread under careful supervision by trained coolies. Contractor shall see that, Uniform spreading as per collection of metal is done. The contractor shall spread the metal fully from the stacks without keeping any balance unless directed by the Engineer in charge to keep some stack in balance for making good unevenness or depressions during rolling works. To ensure that the material is spread to the required thickness. The road surface shall be marked out in to length over which the contents of heaps are to be spread. The bounds of earth murrum (one on either side) shall be laid with a distance between them equal to the width of road to be metalled and shall be enough to prevent the loose metal from spreading during consolidation as well as to retain water used for consolidation. Payment for bunds will be made in the respective item.

2. The metal (including old metal) shall be screened and rubbish, dust, grass shall be removed and spread evenly on the prepared surface in grade and camber by using camber board etc. so as to ensure that the surface is true to camber and grade. At least two camber by using camber boards shall be in use at site. The surface shall be checked at every 50 ft. by means of template while the correctness of the camber in between shall be tested by string and corrected as required. Between the straight lengths and the curves in camber of road to superelevation shall be made very gradually as may be directed by the engineer in charge.

3. The spreading of metal shall proceed only 200 mt. (max) advance of the rolling operations. The collection and spreading of the metal shall not be carried out in one and the same kilometer.

4. At the time of rolling all surface irregularities, hollows, depressions, humps etc. shall be straight. The spreading of metal in required layer shall be done by the contractor.

❖ **Spreading With Rolling and consolidation the stone aggregates and quarry spauls for soiling and WBM including filling the interstices to required camber and gradient (excluding spreading of blindage) (i) 40 mm to 63 mm size H.B. stone aggregates *H.B.) (ii) 25 mm to 90 mm size H.B. stone aggregate (iii) Chipping varying from 6 mm to 25 mm size (iv) 20 mm to 50 mm size crushed.**

1. Metal shall not be spread without permission of the Engineer in charge. Material shall be only be allowed to be spread after the written permission of the Executive engineer is obtained. The permission for spreading the metal shall be given by the Executive Engineer if

- (i) The full quantity of a particular mile (Milometer) is completely collected.
- (ii) The collection of metal is also completed in the adjoining two miles (kilometers)
- (iv) The measurements are recorded in the Measurement book

Metal should be spread under careful supervision by trained coolies. Contractor shall see that, Uniform spreading as per collection of metal is done. The contractor shall spread the metal fully from the stacks without keeping any balance unless directed by the Engineer in charge to keep some stack in balance for making good unevenness or depressions during rolling works. To ensure that the material is spread to the required thickness. The road surface shall be marked out in to length over which the contents of heaps are to be spread. The bounds of earth murrum (one on either side) shall be laid with a distance between them equal to the width of road to be metalled and shall be enough to prevent the loose metal from spreading during consolidation as well as to retain water used for consolidation. Payment for bunds will be made in the respective item.

2. The metal (including old metal) shall be screened and rubbish, dust, grass shall be removed and spread evenly on the prepared surface in grade and camber by using camber board etc. so as to ensure that the surface is true to camber and grade. At least two camber by using camber boards shall be in use at site. The surface shall be checked at every 50 ft.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

by means of template while the correctness of the camber in between shall be tested by string and corrected as required. Between the straight lengths and the curves in camber of road to superelevation shall be made very gradually as may be directed by the engineer in charge.

3. The spreading of metal shall proceed only 200 mt. (max) advance of the rolling operations. The collection and spreading of the metal shall not be carried out in one and the same kilometer.

4. At the time of rolling all surface irregularities, hollows, depressions, humps etc. shall be straight. The spreading of metal in required layer shall be done by the contractor.

Rolling & consolidating

1. Immediately following the spreading of the coarse aggregates rolling shall be with thrwheeled vibratory power rollers of 8 to 10 tonne capacity The weight of the roller shall depend upon the type of the aggregate and be indicated by Engineer in charge.

2. Except on super elevated portion where the rolling shall proceed from inner edge to outer. rolling shall being from the edges gradually progressing towards the centre. First the edge / edges shall be compacted with roller running forward and backward. The roller shall then move inwards parallel to center line of the road , in successive passes uniformly lapping preceding tracks by at least one half the width.

3. Rolling shall continue until the aggregate is throughly keyed and te creeping of the aggregate ahead of the roller is no longer visible. During rolling slight sprinkling of water may be done, if necessary. Rolling shall not bedone when the sub-grade is soft or yielding or when it causes a wave like motion in the sub grade or sub base coures.

4. The rolled surface shall be checked transversely and longitudianal with tempates and any irregularities corrected by loosening the surface, adding or removing necessary amounts of aggregate and rerolling until the entire surface conforms to desired camber and grade. In no case shall the use of screening be permitted to make up depression.

5. The blindage material where it is required to be used shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept. in with hand brooms or mechanical brooms to till the works properly and rolled, during which water shall be applied to the wheels of the roller if necessary to wash down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the moveing roller.

6. After the final compaction of water bound macadam course the road shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings of binding materials as directed. lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the macadam has set. The engineer in charge shall have the discretion to stop hauling traffic from using the completed water bound macadam course it in his opinion it would cause excessiove damage to the surface,

7. Finished work shall include cost of watering, rent of machinery cost fuel, wages of divers and cleaners and murrum bound etc.

❖ Spreading blindage or road crust /soft murrum / murrum / sand / yellow /earth filling the gaps in metal and leveling to camber and gradient as directed.

Spreading of material shall be started after the full supply in a particular Km is collected, measured and recorded in the measurement books, Permission of the Engineer in charge shall be obtained before spereading. It shall be seen that the formation is dressed to the required camber and grade. If the murrum is to be spread over the metated surface then the speading shall be uniform and as its had as its hasto act as bindingsurface, it shall be used for filling the interstices of metal and forming a smooth running surface as for as possible Murrum blindagte shall be specified as blindage shall be spread evenly with a twisting motion of the baskets. No more Murrum shall be used then specified as blindage. The rate is for gross measurements and no deducation of voids shall be made. I the murrum is to be spread ovearthen embankment as a sub base or for side shoulders or as blindage, it shall be spread in a manner as directed by the Engineer in charge and as per required width and thickness. The contractor shall make good all unevenness, depression, projections etc. during consolidation work.

❖ Rolling and consolidating water bound macadam (except letebite and kankar) including watering not exceeding 150 mm thickness (main layer including binding materials) including filling in depression which occurs during the process With power roller exceeding 8.0 M.T but not exceeding 12.0 M.T.

1. Immediately following the spreading of the coarse aggregates rolling shall be with thrwheeled vibratory power rollers of 8 to 10 tonne capacity The weight of the roller shall depend upon the type of the aggregate and be indicated by Engineer in charge.

2. Except on super elevated portion where the rolling shall proceed from inner edge to outer. rolling shall being from the edges gradually progressing towards the centre. First the edge / edges shall be compacted with roller running forward and backward. The roller shall then move inwards parallel to center line of the road , in successive passes uniformly lapping preceding tracks by at least one half the width.

3. Rolling shall continue until the aggregate is throughly keyed and te creeping of the aggregate ahead of the roller is no longer visible. During rolling slight sprinkling of water may be done, if necessary. Rolling shall not bedone when the sub-grade is soft or yielding or when it causes a wave like motion in the sub grade or sub base coures.

4. The rolled surface shall be checked transversely and longitudianal with tempates and any irregularities corrected by loosening the surface, adding or removing necessary amounts of aggregate and rerolling until the entire surface conforms to desired camber and grade. In no case shall the use of screening be permitted to make up depression.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

5. The blindage material where it is required to be used shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept in with hand brooms or mechanical brooms to till the works properly and rolled, during which water shall be applied to the wheels of the roller if necessary to wash down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the moving roller.
6. After the final compaction of water bound macadam course the road shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings of binding materials as directed. lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the macadam has set. The engineer in charge shall have the discretion to stop hauling traffic from using the completed water bound macadam course if in his opinion it would cause excessive damage to the surface,
7. Finished work shall include cost of watering, rent of machinery cost fuel, wages of divers and cleaners and murrum bound etc.

❖ **Supplying and stacking of hand broken stone coarse aggregates chippings etc of hard stone of size 25 mm to 90 mm size nominal size free of disintegrated places, deleterious and organic matter including filling boxes with all lead and lift etc complete for WBM road.**

1. The Stone metal shall be obtained from quarried approved by the Executed Engineer prior to collections. The metal shall be of approved quality with all lead and lift the metal shall be obtained from hard tough, sound durable, stone of close texture as is locally available and reasonable free from decay and weathering. Pieces of the stone shall be angular and roughly cubical in shape and round, elongated or flaky materials shall be allowed The size of metal shall be 25 mm to 90 mm and shall be hand broken, All unsound whethered or disintegrated stone obtained from the upper surface layer of the quarry or other layers of boulders shall be rejected.
2. The samples of metal collected from approved quarries shall be got tested at Govt. recognized laboratory as may be directed to the contractor at his own cost. The test results shall conform to the standard requirements laid down for metal to be used for WBM work.
3. The physical requirement for standard size metal shall conform to the test results indicated in the Table below.

Type of Const	Test	Test Method	Requirement
Base	(a) Los Angeles Abrasion Value Aggregate Impact value	IS 2386 part IV IS2386 Part IV or IS5640	50% (Maximum) 40% (Maximum)
	(b) Flakiness index	IS 2386 Part I	15% (Maximum)

Frequency of test shall be as per Ministry of Surface Transport Specifications.

4. The grading requirements of the metal to be used for WBM shall be as under.

Sr. No	Size Range	Slave designation	Percentage by weight passing through the sieve
1.	25 mm to 90 mm	100 mm	100
		90 mm	90-100
		50 mm	40-60
		25 mm	0-10
		20 mm	0.5

The size of metal for WBM shall be 25mm to 90 mm wherein tolerance limit for oversize shall be up to 10 % and that for lower size should be up to 10 %.

5. Wherever any doubt exists as to whether the above requirements are satisfied in whole or any part of the collection, metal shall be got screened by the contractor at his own cost, if so ordered by Engineer in charge.
6. Stacking shall be done by filling in the standard steel boxes of 2m x 1.5 m 0.5 m size which shall be supplied by the Dept, if available on rent. Otherwise contractor shall make his own arrangement. No deduction for voids shall be made from the gross measurements. Where any doubt exist as to whether the quantity of stacks of metal in any hectometre is not confirming with the cubical content of the standard pharas (2 m x 1.5 m x 0.5 m) shall be got corrected by the contractor if so ordered by the Engineer in charge for which no extra payment shall be claimed by the contractor. If the quantity of metal in any stack in a particular. Hectometre shall be paid on the basis of the quantity so found. Regular stack shall be done by tele contractor on a fairly level ground. Stacking of the metal shall be done in a manner as directed by the Engineer in charge. Collection of metal shall be completed in two hectometre wise as per the final requirement and measurement shall be recored two hectometre wise. Untill the quantity of metal as per the final requirement is not collected in any two consecutive HM. and std., boxes are not filled in completely in two hectometres, measurements shall not be recorded and payments shall not be done.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

7. For road work complete staking of metal as per requirement shall be carried out in 2 km length before spreading. The metal stacks shall be measured and recorded and got cross checked by other Deputy Executive Engineer as per rules before spreading. The collection shall always. Commence at one end of the Km and be carried continuously towards the other end unless the Engineer in charge shall direct otherwise.
8. The Payment shall be on cubic metre basis without deduction for voids. The contractor shall maintain all stacks in regular and proper size till the whole materials shall not measured and finally accepted by the dept. the spreading of materials shall not be allowed till the materials are fully stacked and completed kilometer wise.
9. The rate includes cost of collection convey to the site with all lead and lift and filling the boxes including all labour, tools, equipment and other incidental expenses. The rates quoted are inclusive of all such tools, duties fees, royalties, taxes etc.

❖ **Surface dressing / Metal Grouting with paving bitumen using 15 kg. of bitumen per 10 sq.m. with 0.1 cu.m. of Stone Chipping 6 to 10 mm nominal size per 10 sq.m. of road surface complete as directed Including Cost of Bitumen, Stone chipping, water etc. comp. BUT Excluding cost of Spreading of Quarry Spall & Machine Crushed Metal, Rolling and consolidation**

❖ **સરફેસ ડ્રેસીંગ / મેટલ ગ્રાઉટીંગ કરવાનું કમ્પલીટ કામ. (જેમાં મેટલ સ્પ્રેડીંગ તથા રોલીંગના ભાવ/રકમ અલગથી ચુકવાશે જ્યારે ડામર, પાણી અને ગ્રીટના ભાવ/રકમ અલગથી ચુકવાશે નહિ.)**

આ કામમાં સૌ પ્રથમ સપ્લાય કરેલ મેટલને આ પાયલા માપ કરેલ મેટલનું બતાવવામાં આવે તે રીતે સુચના મુજબની જાડાઈમાં પહોળાઈ, લાઈન લેવલમાં તથા કેમ્બરમાં પાથરી આપવાની છે. ત્યારબાદ રોડ રોલરથી રોલીંગ રસ્તાની ધારેથી શરુ કરી સેન્ટર સુધી લાવવાનું છે. આ રીતે રોલીંગ પૂર્ણ થયા બાદ તમામ કામને પુષ્કળ પાણીથી તર કરી ચીલા ન પડે ત્યાં સુધી રોલીંગ કરવાનું છે. (પાણીનું પ્રમાણ ૧૨૦૦ ચો.મી.માં ૮૦૦૦ લીટર) આમ કરતા જો જોબ પડે તો મેટલ નાંખી લેવલ કરવાનું છે. ત્યારબાદ ૧૦ ચો.મી.માં ૧૫ કીલો ૮૦/૧૦૦ ગ્રેડનો ડામર તથા ગ્રીટ સપ્લાય કરી ડામર ટેકકોટ માટે નાંખી ૧૦ ચો.મી.માં ૦.૧૦ ઘ.મી. ગ્રીટ ને દાજીયા ન રહે તે રીતે પાથરી આપવાની છે. રોલીંગ બાદ દાજીયા રહે તો વધારાની ગ્રીટ નાંખી દાજીયા પુરવાના છે. આ રીતે કમ્પલીટ કામનો ભાવ ફક્ત ૧ ચો.મી. મુજબ આપવામાં આવશે જેમાં મેટલ સ્પ્રેડીંગ તથા રોલીંગના ભાવ/રકમ અલગથી ચુકવાશે જ્યારે ડામર, પાણી અને ગ્રીટના ભાવ/રકમ અલગથી ચુકવાશે નહિ. આ સિવાય કોઈમાલ મજૂરીનું અલગ માપ રકમ આપવામાં આવશે નહીં.

આ સાથે ના રોલીંગ કામ માટે નીચે મુજબ સુચના / સ્પેસીફિકેશન અમલ માં રહેશે.

Rolling & consolidating water bound macadam (except laterite & kankar) incl. watering, Layers not exceeding 150 mm thickness (main layer including binding materials) including filling in depression which occur during the process with vibratory power roller exceeding 8.0 M.T but not exceeding 12.0 M.T.

1. Immediately following the spreading of the coarse aggregates rolling shall be with thrwheeled vibratory power rollers of 8 to 10 tonne capacity The weight of the roller shall depend upon the type of the aggregate and be indicated by Engineer in charge.
2. Except on super elevated portion where the rolling shall proceed from inner edge to outer. rolling shall being from the edges gradually progressing towards the centre. First the edge / edges shall be compacted with roller running forward and backward. The roller shall then move inwards parallel to center line of the road , in successive passes uniformly lapping preceding tracks by at least one half the width.
3. Rolling shall continue until the aggregate is throughly keyed and te creeping of the aggregate ahead of the roller is no longer visible. During rolling slight sprinkling of water may be done, if necessary. Rolling shall not bedone when the sub-grade is soft or yielding or when it causes a wave like motion in the sub grade or sub base courses.
4. The rolled surface shall be checked transversely and longitudianal with tempates and any irregularities corrected by loosening the surface, adding or removing necessary amounts of aggregate and rerolling until the entire surface conforms to desired camber and grade. In no case shall the use of screening be permitted to make up depression.
5. The blindage material where it is required to be used shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept. in with hand brooms or mechanical brooms to till the works properly and rolled, during which water shall be applied to the wheels of the roller if necessary to wash down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the moveing roller.
6. After the final compaction of water bound macadam course the road shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings of binding materials as directed. lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the macadam has set. The engineer in charge shall have the discretion to stop hauling traffic from using the completed water bound macadam course it in his opinion it would cause excessiove damage to the surface
7. Finished work shall include cost of watering, rent of machinery cost fuel, wages of divers and cleaners and murrum bound etc.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- ❖ **Providing and laying Bituminous Grout 37.50 / 50 / 75 mm thick compacted BSG using Aasphalt - Bitumen of grade VG 30 (60/70) for Tackcoat (usibg rapid setting asphalt) at the rate of 5.0 kg/ 10 sqmt on B.T. Surface and For Mixing at the rate of 19.9 Kg/MT by weight of mix and using BT stone aggregate as per required gradation including cleaning the surface and heating asphalt premix materials in drum mix process in proper specification including transportation, Laying Laying with paver finisher and consoladation by vibratory roller. The work should be as per MOST specification including cost of labour, Materials, equipment and plant, fuel, oil, etc complete**

Scope :

The work shall consist of construction, in a single course, of compacted crushed aggregates premixed with a bituminous binder, to serve as base / binder course, laid immediately after mixing on a base prepared previously in accordance with the requirement of these specifications and in conformity with the lines, grades and cross-sections shown on the drawing or as directed by the Engineer. Built-up grout shall be used in a single course in a pavement structure.

Materials :

Bitumen : The Bitumen shall be paving bitumen of suitable penetration grade (30/40 to 80/100) as per IS 73. The actual grade of bitumen to be used shall be decided by the Engineer appropriate to the region, traffic, rainfall and other environmental conditions Guidelines on selection of the grade of bitumen are given in Appendix-4.

Aggregates :-

The aggregates shall consist of crushed stone of type black trap only. They shall be clean, strong, durable, of fairly cubical shape and free from desegregated pieces, organic or other deleterious matter and adherent coating the bitumen shall preferably be treated with anti-stripping agents of approved quality in suitable does as Appendix-5. The aggregates shall satisfy the physical requirements set forth in Table.

PHYSICAL REQUIREMENTS OF AGGREGATES FOR BITUMINOUS GROUT.

No.	Test	Test Method	Requirement
01	Los Angles Abrasion Value.	IS : 2386(Part – 4)	40 % Maximum
02	Aggregate Impact Value.	IS : 2386(Part – 4)	30 % Maximum
03	Flakiness and Elongation indices (Total)**	IS : 2386(Part – 1)	30 % Maximum
04	Coating and stripping of bitumen aggregate mixtures.	AASHTO T 182	Minimum retained coating 95 %.
05	Soundness (i) Loss with sodium sulphate 5 cycles. (ii) Loss with Magnesium sulphate 5 cycles.	IS : 2386(Part – 5)	12 % Maximum
06	Water absorption.	IS : 2386(Part – 3)	2 % Maximum

- Aggregates may satisfy requirements for either of the two tests.
- To determine this combined proportion, the flaky stone from a representative sample should first be separated out. Flakiness index is weight of flaky stone metal divided by remaining(non flaky) stone metal elongation index is weight of elongated particles divided to total non flaky particles. The value of flakiness index and elongation index to found are added up.

Proportioning of materials :

The bitumen content for premixing shall be 1.99 percent by weight of the total mix except when otherwise directed by the engineer. The maximum compacted thickness of a layer shall be 100 mm. The quantities of aggregates to be used shall be sufficient to yield the specified thickness after compactions.

AGGREGATE GRADING FOR BITUMINOUS GROUT.

IS Sieve Designation	Percent by weight passing the sieve.
53.0 mm.	100
26.5 mm.	75-100
22.4 mm.	50-85
13.2 mm.	20-40
5.6 mm.	5-20
2.8 mm.	0-5

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Variation in proportioning of material : The contractor shall have the responsibility for ensuring proper proportioning of materials and producing a uniform mix. A variation in binder content $\pm 0.3\%$ by weight of total mix shall be permissible for individual specimens taken for quality control test vide Section 900.

Construction Operations :

Weather and seasonal limitations : The work of laying shall not be taken up during rainy or foggy weather or when the base course is damp or wet, or during dust storm or when atmosphere temperature in shade is 10°C or less.

Preparation of base : The work shall consist of preparation and existing granular or black topped surface bituminous course. The work shall be performed on such widths and lengths as shown in applicable drawing or as directed by the Engineer. The existing surface shall be firm and clean, and treated with prime or tack coat as shown on the drawings as otherwise stated in the contract.

Materials :

For scarifying and re-laying granular surface : The materials used shall be coarse aggregate salvaged from scarification of the existing granular base course supplemented by fresh coarse aggregates and screenings so that aggregates and screening thus supplemented correspond to Clause 404 : Water macadam or Clause 406 Wet Mix Macadam, as the case may be.

For patching potholes and scaling cracks : Where the existing surface to be overlaid is bituminous. Any existing potholes and cracks shall be repaired and sealed in accordance with Clauses 3004.2 and 3004.3 or as directed by the Engineer.

For profile corrective course : A profile corrective course for correcting the existing pavement profile shall be laid to varying thickness as shown on the Drawings. Or as indicated in the Contract Documents. The profile corrective course shall be laid to tolerances and densities as specified for wearing course if a single layer or base course, if it is to be covered with a wearing course layer.

Profile corrective course and its application : The type of material for use as a profile corrective course shall be as shown on the drawing. If it is to be laid as part of the overlay/strengthening course, the profile corrective course material shall be of the same specification as that of the overlay/strengthening course. However, if provided as a separate layer, it may be of the same specification as the layer over which it is to be laid or intermediate between underlying layers, as shown on the Drawings.

Surface Levels

The levels of the sub grade different pavement courses as constructed, shall not vary from those calculated with reference to the longitudinal and cross profile of the road, shown on the drawings or as directed by the engineer beyond the tolerances mentioned in Table 900-1.

Bituminous materials shall not be applied to a wet surface or during a dust storm or when the weather foggy, rainy or windy or when the temperature in the shade is less than 10°C where the tack coat consists of emulsion, the surface shall be slightly damp, but not wet. Where the tack coat is of cutback bitumen, the surface shall be dry.

Construction Equipment :

The tack coat distributor shall be self propelled or towed bitumen pressure sprayer, quipped for spraying the material uniformly at a specified rate. Hand spraying of small areas, inaccessible to the distributor, or in narrow strips, shall be sprayed with a pressure and sprayer, or as directed by the Engineer. 503-4.2 of MORTH Specification

Preparation of base : The surface on which the tack coat is to be applied shall be clean and free from dust, dirt and extraneous materials, and be otherwise prepared in accordance with the requirements of Clauses 501.8 and 902 as appropriate immediately before the application of the tack coat, the surface shall be swept clean with a mechanical broom, and high pressure air jet, or by other means as directed by the Engineer.

Application of tack coat :

The application of tack coat shall be at the rate specified in the contract, and shall be applied uniformly, if rate of application of tack coat is not specified in the contract then it shall be at the rate specified in TABLE 500-2 OF MORTH Specification. The normal range spraying.

TABLE 500-2, RATE OF APPLICATION OF TACK COAT

The emulsion asphalt at the rate of 5 kg. per 10 sq. m. shall be used for tack coat temperature for a bituminous emulsion shall be 20°C to 70°C and for a cutback, 50°C to 80°C if RC-70/MC -70 is used. Where geosynthetic is proposed for use, the provisions of Clauses 703.3.2 and 703.3.4 of MORTH specification shall apply. The method of application of the tack coat will depend on the type of equipment to be used, size of nozzles, pressure at the spray bar, and speed of forward movement. The contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

Where the material to receive an overlay is a freshly laid bituminous layer, that has not been subjected to traffic or contaminated by dust, a tack coat is not mandatory where the overlay is completed within two days.

Curing of tack coat : The tack coat shall be left to cure until all the volatiles have evaporated before any subsequent construction is started. No panning or vehicles shall be allowed on the tack coat other than those essential for the construction.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Quality control of work : TOLERANCES IN SURFACE LEVELS

1. Sub grade	+20 mm. -25mm.
2. Sub-base	
(a) Flexible pavement	+10 mm. -20 mm.
(b) Concrete pavement. (Dry lean concrete of rolled concrete)	+6 mm. -10mm.
3. Base-course for flexible pavement.	+6 mm. -6 mm.
a) Bituminous course.	+6 mm. -6 mm.
b) Other than bituminous.	+6 mm. -6 mm.
(i) Machine laid.	+10 mm. -10 mm.
(ii) Manually laid,	+15 mm. -15 mm.
4. Wearing course for flexible pavement.	
(i) Machine laid.	+6 mm. -6 mm.
(ii) Manually laid,	+10 mm. -10 mm.
5. Cement concrete pavement.	+5 mm. -6 mm.

TACK COAT

Scope

This work shall consist of the application of a single coat of high viscosity liquid bituminous material to an existing bituminous road surface preparatory to be superimposition of a bituminous mix when specified in the Contract or instructed by the Engineer.

Materials

The binder used for tack coat shall be bitumen emulsion complying with ISS 8887 of a type and grade as specified in the Section 600 of MORTH specification contract or as directed by the Engineer. The use of cutback bitumen as per IS 217 shall be restricted only for sites at sub-zero temperatures or for emergency applications as directed by the Engineer.

Weather and Seasonal Limitations

For control of the quality of materials supplied and the works carried out the relevant provisions of Section 900 shall apply.

Specifications : The rate shall cover the provision of tack coat at 0.5 kg. per square meter with the provision that the variation in actual quantity of bitumen used will assessed and the payment adjusted accordingly.

Preparation and transport of mix :

Bituminous grout mix shall be prepared in abet mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality, with thoroughly coated aggregates.

The plant shall be drum mix type. The plant shall have coordinated set of essential units capable of producing uniform mix within the job mix formula such as laid down in Appendix-A.

- In case of drum mix plant, the cold feed system shall have variable speed conveyors/or other suitable devices for regulating the accurate proportion/Control Cabin.
- Bitumen Control Unit : Capable of measuring/metering and spraying required quantity of bitumen at specified temperature with automatic synchronization of bitumen and aggregate feed.
- Filter System : A fines feeder system suitable to receive bagged or bulk supply of filter materials and its incorporation to the mix in the correct quantity shall be necessary auxiliary.
- Dust control : A suitable built in Dust control equipment for the dryer to contain the exhaust of the dust in to atmosphere for environmental control whoever so specified by the Engineer.
- Suitable auxiliary Bitumen : Boiler of adequate capacity with self heating arrangement and temperature control device. The boiler should be fitted with temperature indicating instructs.

The temperature of binder at the time of mixing shall be in range of 150°C to 163°C and that of the aggregate in the range of 155°C to 163°C provided that the difference in temperature between the binder and aggregate at no time exceeds 14°C.

Mixing shall be through to ensure that a homogneneous mixture is obtained in which all particles of the aggregates are coated uniformly and then discharged temperature of mix shall be between 130°C to 160°C.

The mixture shall be transported from the mixing paint to the point of use in suitable tipper vehicles. The vehicles employed for transport shall be clean and be covered in transit of so directed by the Engineer. Any tipper causing excessive segregation of materials by its spring suspension or other contributing factors or that which shows undue shall be removed from the work unit such conditions are corrected.

Spreading : The mix transferred from the tipper at site to the paver shall be spread immediately by means of self propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix true to the specified lines, grads and cross sections. The paver finisher shall have the following essential features.

- Loading hoppers and suitable distributing mechanism.
- All drives having hydrostatic drive/control.
- The machine shall have a hydraulically extendable screed for appropriate width requirement.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- (d) The screed shall have tamping and vibrating arrangement for initial compacting to the layer as it is spread without rutting of otherwise marrying surface, it shall have adjustable amplitude and variable frequency.
- (e) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.
- (f) The paver shall be fitted with an electronic sensing device for automatic leveling and profile control within the specified tolerances.
- (g) The screed shall have the internal heating arrangement.
- (h) The paver shall be capable of laying either 2.5 to 4.0 m. width of 4.0 to 7.0 m. width as stipulated in the Contract.
- (i) The paver shall be so designed as to eliminate skidding/slippage of the tyres during operation.

However, in restricted location and in narrow widths where the available plant cannot be operated in the opinion of the Engineer, he may permit manual laying of the mix.

The temperature of the mix at the time of laying shall be in the range 120° C to 160°C. In multi layer construction, the longitudinal joint in one layer shall offset that the layer below by about 150 mm. However, the joint in the top-most layer shall be at the lane line of the pavement.

Longitudinal joints and edges shall be constructed true to the delineating line parallel to the center line of the road. All joints shall be cut vertical to the full thickness of the previously laid mix and surface painted with hot bitumen before placing fresh material. Longitudinal and transverse joints shall be offset by at least 250 mm. from those in the lower course and the joint on the top-most layer shall not be allowed to fall within the wheel path. All transverse joints shall be cut vertically to the full thickness of the previously laid mix with asphalt cutter/pavement breaker and surface painted with hot bitumen before placing fresh materials. Longitudinal joints shall be preferably hot joints. Cold longitudinal joints shall be properly heated with joint heater to attain a suitable temperature of about 80°C before laying of adjacent materials.

Compaction : After the spreading of mix, rolling shall be done by 80 to 100 KN. Vibratory roller. Rolling shall state as soon as possible after the material has been spread deploying 3 set of rollers as the rolling is to be completed in limited time frame. The roller shall move at a speed not more than 5 km/h. Rolling shall be done with care to avoid unduly roughening of pavement surface.

Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this the rolling shall commence at the edges and progress towards the center longitudinally except that on super elevated and unidirectional cambered portions, it shall progress from the lower to the upper edge parallel to the center line of the pavement.

The initial or break-down rolling shall be done with 80-100KN. Static weight smooth wheel roller (3wheels or tandem) as soon as it is possible to roll the mix without cracking the surface or having the mix pick up on the roller wheels. The second or intermediate rolling shall follow the break down rolling with vibratory roller of 80 to 100 KN. Static weight of pneumatic tired roller of 150 to 250 kn. Weight with minimum 7 wheels and minimum tyre pressure of 0.7 Mpa. As closely as possible to the paver and be done while material is still workable enough for removal of roller marks, with 60 to 80 Kn. Tandem roller. During the final rolling, vibratory system shall be switched off. The joints and edges shall be rolled with a 80 to 100 kn. Static roller.

When the roller has passed over the whole area once, any high spots or depressions which become apparent shall be corrected by removing or adding mix material. The rolling shall then be continued till the entire surface has been rolled to 95 percent of the average laboratory density (obtained from marshal specimens compacted as defined in Table (500-10), there is not crushing of aggregates and all roller marks have been eliminated. Each pass of the roller shall uniformly overlap not less than one-third of the track made in the preceding pass. The roller wheel shall be kept damp if necessary to avoid bituminous materials from sticking to the wheels and being packed up. In no case shall fuel, lubricating oil be used for this purpose, nor excessive water poured on the wheels. Rolling operations shall be completed in every respect before the temperature of the mix falls below 100°C.

Roller(s) shall not stand on newly laid materials while there is a risk that surface will be deformed thereby. The edges along and transverse of the bituminous grout laid and compacted earlier shall be cut to their full depth so as to expose fresh surface which shall be painted with a thin surface coat of appropriate binder before the new mix is placed against it.

Surface Finish and Quality Control of Work.

The surface finish of constructing shall conform to the requirements of Clause 902. Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900.

The built up spray grout shall be provided with next surfacing without any delay. If there is to be any delay, the course shall be covered by a seal coat to the requirement of Clause 613 before allowing any traffic over it. The seal coat in such cases shall be considered incidental to the work and shall not be paid for separately.

Arrangements for Traffic.

During the period of construction, arrangement of traffic shall be done to Clause 112 of MORTH specification.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Passage of Traffic along a part of the Existing Carriageway under Improvement.

For widening/strengthening existing carriageway where part width of the existing carriage way proposed to be used for passage of traffic, treated shoulders shall be provided on the side on which work is not in progress. The treatment to the shoulder shall consists of providing at least 150 mm. thick granular base course covered with bituminous surface dressing in a width of at least xxxx and surface shall be maintained throughout the period during which traffic uses the same to the satisfaction of the engineer. The continuous length in which such work shall be carried out, would be limited normally to 500 m. at a place. However, where work is allowed by the Engineer in longer stretches passing places at least 20m. long with additional paved width of 2.5 m shall be provided at every 0.5 km. interval.

In case of widening existing two lane to four lane, the additional two lanes would be constructed first and the traffic diverted to it and only there after the required treatment to the existing carriageway would be carried out. However, in case where on the request of the contractor, work on existing two lane carriageway is allowed by the Engineer with traffic using part of the existing carriageway, stipulations as in para above shall apply.

After obtaining permission of the Engineer, the treated shoulder shall be dismantled the debris disposed of and the area cleared as per the direction of the Engineer.

MEASUREMENTS FOR PAYMENT

The payment shall be made on the tonnage basis of the weight of mix of aggregates and bitumen. For the purpose, the contractor shall have to install a weight bridge of suitable capacity for the purpose of weighment of dumpers at suitable place at his cost as directed weight of empty and weight of loaded dumper will be recorded in bound and numbered register on plant site.

Department will be free to get some loaded dumpers test checked at other weight bridge. Weight bridge will be periodically got calibrated and verified from weight and measure authorities.

For the purpose of application of tack coat, if the theoretical area as per sanctioned estimate for basis of tone differs with the actual area of work done in the field, the reduction in or addition to payment shall have to be exceed respectively.

Weight of mix materials will be done in presence or responsible person, not less than the rank of supervisor of department and the measurement shall be recorded by the Deputy Executive or Assistant Engineer or Addl. Asst. Engineer. If so authorized, Record of each dumper will be maintained separately in bound and numbered register, which will be maintained by the departmental representative and signed by the contractor, proper gate pass system shall be established for the vehicle coming to the plant site and out going from the plant site. The location of the kilometer, hectometer and meter in which individual dumper are unloaded shall be recorded carefully.

Rate :

The contract unit rate for the work shall be payment in full for carrying out the required operations including full compaction for.

- (i) Making arrangements for traffic to Clause 112 of MORTH specification except or initial treatment to verge, shoulders and construction of diversion.
- (ii) preparation of base except for laying of profile corrective course
- (iii) but including filling of potholes.
- (iii) Providing all materials to be incorporated in the work including arrangement for stock yards, all royalties, fees, rents where necessary and all leads and lift.
- (iv) All labor, tools, equipment, plant including installation of hot mix plant, power supply units and all machineries, incidental to complete the work to the specifications.
- (v) Carrying out the work in part widths of the road where directed.
- (vi) Carrying out all tests for control of quality.

- ❖ **Providing, laying and rolling 37.50 / 50 mm. compacted thick B.M. in one layer using Aasphalt - Bitumen of grade VG 30 (60/70) for Tackcoat (usibg rapid setting asphalt) at the rate of 10 kg/ 10 sqmt on B.T. Surface and For Mixing at the rate of 3.5% (i.e. 35 Kg/ M.T.) with B.T. aggregate of Total mix, including heating & mixing in Drum mix plant and spreading the same by paver finisher and consolidation with Vibratory roller including necessary, fire wood, oil, Lubricants, labour charges etc. using contractor's own machineries and equipment, tools etc. complete in accordance with the requirement of specification**

1. DESCRIPTION

The work shall consist of construction in one layer each 37.5 / 50 mm thick LBM on previously prepared base to the requirements of these specification.

2. MATERIALS

2.1 Binder : The binder shall be straight run bitument of VG 30 (60/70) grade satisfying the requirement of IS 73. The actual grade of the BInder to be used shall be decided by the engineer in charge and it shall have to be brought by the contractor to the site of work at his own cost.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

2.2 Coarse aggregates : The coarse aggregate shall consist of crushed stone or crushed gravel. These shall be clean, durable, of cubical shape, free of disintegrated pieces, organic or other deleterious matter and adherent coatings. The aggregates shall preferably be hydrophobic and of low porosity and shall satisfy the physical requirements set forth in table given in above item (Para -2)

2.3 Fine aggregates : The fine aggregates shall consist of crusher run screenings, natural sand or a mixture of both. These shall be clean, hard, durable, uncoated, dry and free from injurious, soft or flaky pieces and organic deleterious substances.

2.4 Filler : The filler, where required, shall be an inert material the whole of which passes 600 micron sieve at least 90 percent passing 150 micron sieve and not less than 70 percent passing 75 micron sieve. The filler shall be cement, stone dust, hydrated lime, fly ash and other non plastic mineral matter approved by the Engineer in charge.

2.5 Aggregate gradation : The mineral aggregates, including mineral filler, shall be so graded or combined as to conform to gradings set forth in tables below :

Table : Aggregate gradation for LBM

Sieve Designation	% by weight passing the sieve		sieve designation	% by weight passing the sieve	
	37.5	75 mm		37.5	75 mm
40 mm	-	100	-	-	-
25 mm	100	75-100	5.6 mm	20-40	15-35
20.0 mm	70-100	60-95	2.80	5-20	5-20
10.0 mm	50-85	30-55	0.75 mm	0-5	0-5

2.6 Proportioning of materials : The binder content for premixing shall be 3.5 percent by weight of the total mix. The quantities of aggregates shall be sufficient to yield the specified thickness after compaction. The contractor shall get job-mix formula for the mix approved by the Engineer in charge before starting the work.

2.7 Variation in proportioning of material : The contractor shall have the responsibility of ensuring proper proportioning of materials in accordance with the approved job mix formula and producing a uniform mix. A variation in binder content of ± 0.3 percent by weight of total mix shall, however, be permissible in individual specimens taken for quality control tests vide MOST specification Section 900.

3. CONSTRUCTION OPERATIONS

3.1 Weather and seasonal limitation : Lean bound macadam shall not be laid during rainy weather or when the base course is damp or wet.

3.2 Preparation of base : The base on which LBM is to be prepared shall be shaped and conditioned to the specified, lines, grade and cross section in accordance with MOST Specification clause 601 as directed by the Engineer in charge. The surface shall be thoroughly swept and scraped clean and free of dust and foreign matter.

3.3 Tack coat : Application of binder : Binder shall be heated to the temperature appropriate to the grade of bitumen used and approved by the Engineer in charge and sprayed on the base at the rate specified hereafter. The rate of spread in term of 10 kg per 10 square metre area of surface. The binder shall be applied uniformly with the aid of sprayers. At specified temperature, so as to provide uniform rate binder shall be applied uniformly with the aid of sprayers. At specified temperature, so as to provide uniform rate and unbroken spread bitumen. The tack coat shall be applied just ahead of the oncoming bituminous construction.

3.4 Preparation of the mix : Hot mix plant of adequate capacity and capable of producing a proper and uniform quality shall be used for preparing the mix. The plant should be continuous type having a co-ordinated set of essential units such as dryer for heating the aggregates, device for feeding by weight or volume the required quantities of aggregates, a binder heating and control unit for metering out the correct quantity of heated binder together with a paddle mixer for intimately mixing of the binder and aggregates. For details regarding hot mix plant the Annexure 'A' may be referred.

The temperature of binder at the time of mixing shall be in the range of 150 C to 177 C and aggregates in the range of 150 C to 163 C provided also that at no time shall the difference in temperature of the aggregates and the binder exceed 14 C.

Mixing shall be throughout to ensure that a homogeneous mixture is obtained in which all the particles of the mineral aggregates are coated uniformly.

The Mix shall be transported from the mixing plant to the point of use in suitable vehicles. The vehicles employed for transport shall be clean and be covered over on the transit if so directed by the engineer in charge.

3.5 Spreading : The mix, transported from the hot mix plant to the site, shall be spread by means of self propelled mechanical paver with suitable screens capable of spreading, tamping and finishing the mix, true to specified grade, line and cross section. The temperature of mix at the time of laying shall be in the range of 121 C - 163 C.

Longitudinal joints and edges shall be constructed true to the delineating lines parallel to the centre line of the road. Longitudinal joints shall be offset by at least 150 mm from those in the binder course, all joints shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh material.

3.6 Rolling : Immediately after the spreading of mix, it shall be thoroughly compacted by rolling with a set of rollers moving at a speed not exceeding 5 km per hour. The initial or break down rolling shall be with 8-12 tonne three wheeled rollers and the surface finished by final rolling with 8-10 tonne tandem rollers, or suitable pneumatic rollers.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

The roller wheels shall be kept damp to prevent the mix adhering to them but in no case shall fuel lubricating oil be used for this purpose. Rolling shall commence longitudinally from the edge and progress toward the centre except that at super elevated portions, it shall progress from the lower to upper edges parallel to the centre line of the pavement. The roller should proceed on the fresh material with rear or fixed wheel leading so as to minimise the pushing of the mix and each pass of the roller shall uniformly overlap not less than one third on the track made in the preceding pass rolling shall continue until the entire surface has been rolled to compaction and all the roller marks eliminated.

4. OPENING TO TRAFFIC

Traffic may be allowed immediately after completion of the final rolling when the mix has cooled down to the surrounding temperature.

5. SURFACE FINISH AND QUALITY CONTROL OF WORK

The surface finish of construction shall conform to the requirements of most specification clause 901 Control on the quality of material and works shall be exercised by the engineer in charge in accordance with MOST specification clause 902.

6. ARRANGEMENT FOR TRAFFIC

The provision of MOST Specification clause 105 shall apply as regards the flow to traffic during construction.

7. MEASUREMENT FOR PAYMENT

The payment shall be made on the tonnage basis of the weight of mix of aggregates and bitumen. For this purpose the contractor shall have to install a weigh bridge of suitable capacity for the purpose of weighing of dumpers at suitable place at his cost as directed. Weight of empty dumper and weight of loaded dumper will be recorded in bound and numbered register on plant side.

Department will be free to get some loaded dumper test checked at other weigh bridge, Weigh bridge will be periodically got calibrated and verified from weight and measure authorities.

For the purpose of application of tack coat if the theoretical area as per sanctioned estimate for basis of tonne differs with the actual area of work done in the field, then the reduction in or addition to payment shall have to be effected to the contractor on proportionate basis depending upon the area reduced or exceed respectively.

Weight of mix materials will be done in presence of responsible person, not less than the rank of supervisor of Department Deputy Executive Engineer or Assistant Engineer or Addl. Assistant Engineer if so authorised. Record of each dumper will be maintained separately in bound and numbered register which will be maintained by the departmental representatives and signed by the contractor. Proper gate pass system shall be established for the vehicles coming to the plant site and out going from the plant site. The location of the kilometer, hectometer in which individual dumper are unloaded will be recorded carefully.

7.2 In Case of LBM, DBM and asphaltic concrete of thickness 50 mm and above, initial levels before commencement of the work and final levels after completion of the work will be taken as indicated below for working out the average thickness of pavement laid, also the actual tonnage of the mix shall then be worked out based on the designed density, for board cross check on the actual tonnage of total mix used in the works.

Surface levels before and after laying the pavement course shall be taken as below

- (a) For single lane : Levels at 15 cms. from both the edges and centre point. (Levels at 5 points)
 - (b) For double lane : Levels at 15 Cms & 75 cms : 175 cms 275 cms from both the edges and the centre point (Levels at 9 points)
 - (c) Widening single to double lane : Levels at 15 Cms. from both the edges and the centre carriage way (Up to 2 meters widening) point (Levels at 3 Points)
- However, in special cases if necessary, the cross profiles may be taken at closer length upto 3 meters.

8. RATE :

The contract unit rate for LBM shall be for payment in full for carrying out the required operations including full compensation for all components listed in MOST Specification Clause 503.8.

❖ **Providing, laying and rolling 12 / 20 mm. compacted thick Mix Seal Surface (M.S.S.) in one layer with B.T. aggregate as specified and using Bitumen of VG 30 (60/70) for mixing with 6 mm to 10 mm size aggregate at the rate of 5.10% (i.e. 51 Kg/ M.T.) of Total mix, including heating & mixing in Drum mix plant and spreading the same by paver finisher and consolidation with Vibratory roller including necessary, fire wood, oil, Lubricants, labour charges etc. using contractor's own machineries and equipment, tools etc. complete in accordance with the requirement of specification**

1. DESCRIPTION

The work shall consist of construction in one layer each 12 / 20 mm thick on previously prepared base to the requirements of these specification.

2. MATERIALS

2.1 **Binder :** The binder shall be straight run bitumen of VG 30 (60/70) grade satisfying the requirement of IS 73. The actual grade of the Binder to be used shall be decided by the engineer in charge and it shall have to be brought by the contractor to the site of work at his own cost.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

2.2 Coarse aggregates : The coarse aggregate shall consist of crushed stone or crushed gravel. These shall be clean, durable, of cubical shape, free of disintegrated pieces, organic or other deleterious matter and adherent coatings. The aggregates shall preferably be hydrophobic and of low porosity and shall satisfy the physical requirements set forth in table given in above item (Para -2)

2.3 Fine aggregates : The fine aggregates shall consist of crusher run screenings, natural sand or a mixture of both. These shall be clean, hard, durable, uncoated, dry and free from injurious, soft or flaky pieces and organic deleterious substances.

2.4 Filler : The filler, where required, shall be an inert material the whole of which passes 600 micron sieve at least 90 percent passing 150 micron sieve and not less than 70 percent passing 75 micron sieve. The filler shall be cement, stone dust, hydrated lime, fly ash and other non plastic mineral matter approved by the Engineer in charge.

2.5 Aggregate gradation : The mineral aggregates, including mineral filler, shall be so graded or combined as to conform to gradings set forth in tables below :

Aggregate Gradation for Mix Seal Surfacing.

IS Sieve Designation	Cumulative Percent by weight of total passing the sieve
13.2 mm	100
11.20 mm	100
5.60 mm	52 – 88
2.80 mm	14 – 38
90 micron	0-5

2.6 Proportioning of materials : The binder content for premixing shall be 5.10 percent by weight of the total mix. The quantities of aggregates shall be sufficient to yield the specified thickness after compaction. The contractor shall get job-mix formula for the mix approved by the Engineer in charge before starting the work.

2.7 Variation in proportioning of material : The contractor shall have the responsibility of ensuring proper proportioning of materials in accordance with the approved job mix formula and producing a uniform mix. A variation in binder content of ± 0.3 percent by weight of total mix shall, however, be permissible in individual specimens taken for quality control tests vide MOST specification Section 900.

3. CONSTRUCTION OPERATIONS

3.1 Weather and seasonal limitation : Lean bound macadam shall not be laid during rainy weather or when the base course is damp or wet.

3.2 Preparation of base : The base on which LBM is to be prepared shall be shaped and conditioned to the specified lines, grade and cross section in accordance with MOST Specification clause 601 as directed by the Engineer in charge. The surface shall be thoroughly swept and scraped clean and free of dust and foreign matter.

3.3 Tack coat : Application of binder : Binder shall be heated to the temperature appropriate to the grade of bitumen used and approved by the Engineer in charge and sprayed on the base at the rate specified hereafter. The rate of spread in terms of 10 kg per 10 square metre area of surface. The binder shall be applied uniformly with the aid of sprayers. At specified temperature, so as to provide uniform rate binder shall be applied uniformly with the aid of sprayers. At specified temperature, so as to provide uniform rate and unbroken spread bitumen. The tack coat shall be applied just ahead of the oncoming bituminous construction.

3.4 Preparation of the mix : Hot mix plant of adequate capacity and capable of producing a proper and uniform quality shall be used for preparing the mix. The plant should be continuous type having a co-ordinated set of essential units such as dryer for heating the aggregates, device for feeding by weight or volume the required quantities of aggregates, a binder heating and control unit for metering out the correct quantity of heated binder together with a paddle mixer for intimately mixing of the binder and aggregates. For details regarding hot mix plant the Annexure 'A' may be referred.

The temperature of binder at the time of mixing shall be in the range of 150 C to 177 C and aggregates in the range of 150 C to 163 C provided also that at no time shall the difference in temperature of the aggregates and the binder exceed 14 C.

Mixing shall be throughout to ensure that a homogeneous mixture is obtained in which all the particles of the mineral aggregates are coated uniformly.

The Mix shall be transported from the mixing plant to the point of use in suitable vehicles. The vehicles employed for transport shall be clean and be covered over on the transit if so directed by the engineer in charge.

3.5 Spreading : The mix, transported from the hot mix plant to the site, shall be spread by means of self propelled mechanical paver with suitable screens capable of spreading and finishing the mix, true to specified grade, line and cross section. The temperature of mix at the time of laying shall be in the range of 121 C to 163 C.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Longitudinal joints and edges shall be constructed true to the delineating lines parallel to the centre line of the road, Longitudinal joints shall be offset by at least 150 mm from those in the binder course, all joints shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh material.

3.6 Rolling : Immediately after the spreading of mix, it shall be thoroughly compacted by rolling with a set of rollers moving at a speed not exceeding 5 km per hour. The initial or break down rolling shall be with 8-12 tonne three wheeled rollers and the surface finished by final rolling with 8-10 tonne tandem rollers, or suitable pneumatic rollers.

The roller wheels shall be kept damp to prevent the mix adhering to them but in no case shall fuel lubricating oil be used for this purpose. Rolling shall commence longitudinally from the edge and progress toward the centre except that at super elevated portions, it shall progress from the lower to upper edges parallel to the centre line of the pavement. The roller should proceed on the fresh material with rear or fixed wheel leading so as to minimise the pushing of the mix and each pass of the roller shall uniformly overlap not less than one third on the track made in the preceding pass rolling shall continue until the entire surface has been rolled to compaction and all the roller marks eliminated.

4. OPENING TO TRAFFIC

Traffic may be allowed immediately after completion of the final rolling when the mix has cooled down to the surrounding temperature.

5. SURFACE FINISH AND QUALITY CONTROL OF WORK

The surface finish of construction shall conform to the requirements of most specification clause 901 Control on the quality of material and works shall be exercised by the engineer in charge in accordance with MOST specification clause 902.

6. ARRANGEMENT FOR TRAFFIC

The provision of MOST Specification clause 105 shall apply as regards the flow to traffic during construction.

7. MEASUREMENT FOR PAYMENT

The payment shall be made on the tonnage basis of the weight of mix of aggregates and bitumen. For this purpose the contractor shall have to install a weigh bridge of suitable capacity for the purpose of weighing of dumpers at suitable place at his cost as directed. Weight of empty dumper and weight of loaded dumper will be recorded in bound and numbered register on plant side.

Department will be free to get some loaded dumper test checked at other weigh bridge, Weigh bridge will be periodically got calibrated and verified from weight and measure authorities.

For the purpose of application of tack coat if the theoretical area as per sanctioned estimate for basis of tonne differs with the actual area of work done in the field, then the reduction in or addition to payment shall have to be effected to the contractor on proportionate basis depending upon the area reduced or exceed respectively.

Weight of mix materials will be done in presence of responsible person, not less than the rank of supervisor of Department Deputy Executive Engineer or Assistant Engineer or Addl. Assistant Engineer if so authorised. Record of each dumper will be maintained separately in bound and numbered register which will be maintained by the departmental representatives and signed by the contractor. Proper gate pass system shall be established for the vehicles coming to the plant site and out going from the plant site. The location of the kilometer, hectometer in which individual dumper are unloaded will be recorded carefully.

7.2 In Case of LBM , DBM and asphaltic concrete of thickness 50 mm and above, initial levels before commencement of the work and final levels after completion of the work will be taken as indicated below for working out the average thickness of pavement laid, also the actual tonnage of the mix shall then be worked out based on the designed density, for board cross check on the actual tonnage of total mix used in the works.

Surface levels before and after laying the pavement course shall be taken as below

- (a) For single lane : Levels at 15 cms. from both the edges and centre point. (Levels at 5 points)
- (b) For double lane : Levels at 15 Cms & 75 cms : 175 cms 275 cms from both the edges and the centre point (Levels at 9 points)
- (c) Widening single to double lane : Levels at 15 Cms. from both the edges and the centre carriage way (Up to 2 meters widening) point (Levels at 3 Points)

However, in special cases if necessary, the cross profiles may be taken at closer length upto 3 meters.

8. RATE :

The contract unit rate for LBM shall be for payment in full for carrying out the required operations including full compensation for all components listed in MOST Specification Clause 503.8.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ IF ITEMS TAKEN FOR BSG & BM WITHOUT P&L TACK COAT in tender
Follow specification as below for BSG & BM ONLY

❖ Providing and laying TACK COAT using asphalt of grade VG 30 (60/70) at the rate 5 Kg / 10 SqMt

Scope

This work shall consist of the application of a single coat of high viscosity liquid bituminous material to an existing bituminous road surface preparatory to be superimposition of a bituminous mix when specified in the Contract or instructed by the Engineer.

Materials

The binder used for tack coat shall be bitumen emulsion complying with ISS 8887 of a type and grade as specified in the Section 600 of MORTH specification contract or as directed by the Engineer. The use of cutback bitumen as per IS 217 shall be restricted only for sites at sub-zero temperatures or for emergency applications as directed by the Engineer.

Weather and Seasonal Limitations

For control of the quality of materials supplied and the works carried out the relevant provisions of Section 900 shall apply.

Specifications :

The rate shall cover the provision of tack coat at **0.5 kg. per Square meter (5 Kg/10 SqMt)** with the provision that the variation in actual quantity of bitumen used will assessed and the payment adjusted accordingly.

Construction Equipment :

The tack coat distributor shall be self propelled or towed bitumen pressure sprayer, quipped for spraying the material uniformly at a specified rate. Hand spraying of small areas, inaccessible to the distributor, or in narrow strips, shall be sprayed with a pressure and sprayer, or as directed by the Engineer. 503-4.2 of MORTH Specification Preparation of base : The surface on which the tack coat is to be applied shall be clean and free from dust, dirt and extraneous materials, and be otherwise prepared in accordance with the requirements of Clauses 501.8 and 902 as appropriate immediately before the application of the tack coat, the surface shall be swept clean with a mechanical broom, and high pressure air jet, or by other means as directed by the Engineer.

Application of tack coat :

The application of tack coat shall be at the rate specified in the contract, and shall be applied uniformly, if rate of application of tack coat is not specified in the contract then it shall be at the rate specified in TABLE 500-2 OF MORTH Specification. The normal range spraying.

TABLE 500-2, RATE OF APPLICATION OF TACK COAT

The emulsion asphalt at the rate of **5 kg. per 10 sq. m.** shall be used for tack coat temperature for a bituminous emulsion shall be 20°C to 70° C and for a cutback, 50°C to 80° C if RC-70/MC -70 is used. Where geosynthetic is proposed for use, the provisions of Clauses 703.3.2 and 703.3.4 of MORTH specification shall apply. The method of application of the tack coat will demand on the type of equipment to be used, size of nozzles, pressure at the spray bar, and speed of forward movement. The contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

Where the material to receive an overlay is a freshly laid bituminous layer, that has not been subjected to traffic or contaminated by dust, a tack coat is not mandatory where the overlay is completed within two days.

Curing of tack coat : The tack coat shall be left to cure until all the volatiles have evaporated before any subsequent construction is started. No panning or vehicles shall be allowed on the tack coat other than those essential for the construction.

❖ Providing and laying Bituminous Grout 37.50 / 50 / 75 mm thick compacted base WITHOUT TACK COAT using Asphalt of grade VG 30 (60/70) at the rate of 19.9 Kg/MT by weight of mix and using BT stone aggregate as per required gradation including cleaning the surface and heating asphalt premix materials in drum mix process in proper specification including transportation, Laying Laying with paver finisher and consolidation by vibratory roller. The work should be as per MOST specification including cost of labour, Materials, equipment and plant, fuel ,oil, etc complete

Scope :

The work shall consist of construction, in a single course, of compacted crushed aggregates premixed with a bituminous binder, to serve as base / binder course, laid immediately after mixing on a base prepared previously in accordance with the requirement of these specifications and in conformity with the lines, grades and cross-sections shown on the drawing or as directed by the Engineer. Built-up grout shall be used in a single course in a pavement structure.

Materials :

Bitumen : The Bitumen shall be paving bitumen of suitable penetration grade (30/40 to 80/100) as per IS 73. The actual grade of bitumen to be used shall be decided by the Engineer appropriate to the region, traffic, rainfall and other environmental conditions Guidelines on selection of the grade of bitumen are given in Appendix-4.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Aggregates :-

The aggregates shall consist of crushed stone of type black trap only. They shall be clean, strong, durable, of fairly cubical shape and free from desegregated pieces, organic or other deleterious matter and adherent coating the bitumen shall preferably be treated with anti-stripping agents of approved quality in suitable doses as Appendix-5. The aggregates shall satisfy the physical requirements set forth in Table.

PHYSICAL REQUIREMENTS OF AGGREGATES FOR BITUMINOUS GROUT.

No.	Test	Test Method	Requirement
01	Los Angles Abrasion Value.	IS : 2386(Part – 4)	40 % Maximum
02	Aggregate Impact Value.	IS : 2386(Part – 4)	30 % Maximum
03	Flakiness and Elongation indices (Total)**	IS : 2386(Part – 1)	30 % Maximum
04	Coating and stripping of bitumen aggregate mixtures.	AASHTO T 182	Minimum retained coating 95 %.
05	Soundness (j) Loss with sodium sulphate 5 cycles. (ii) Loss with Magnesium sulphate 5 cycles.	IS : 2386(Part – 5)	12 % Maximum
06	Water absorption.	IS : 2386(Part – 3)	2 % Maximum

- Aggregates may satisfy requirements for either of the two tests.
- To determine this combined proportion, the flaky stone from a representative sample should first be separated out. Flakiness index is weight of flaky stone metal divided by remaining(non flaky) stone metal elongation index is weight of elongated particles divided to total non flaky particles. The value of flakiness index and elongation index to found are added up.

Proportioning of materials :

The bitumen content for premixing shall be 1.99 percent by weight of the total mix except when otherwise directed by the engineer. The maximum compacted thickness of a layer shall be 100 mm. The quantities of aggregates to be used shall be sufficient to yield the specified thickness after compactions.

AGGREGATE GRADING FOR BITUMINOUS GROUT.

IS Sieve Designation	Percent by weight passing the sieve.
53.0 mm.	100
26.5 mm.	75-100
22.4 mm.	50-85
13.2 mm.	20-40
5.6 mm.	5-20
2.8 mm.	0-5

Variation in proportioning of material : The contractor shall have the responsibility for ensuring proper proportioning of materials and producing a uniform mix A variation in binder content +0.3 % by weight of total mix shall blow ever be permissible for individual specimens taken for quality control test vide Section 900.

Construction Operations :

Weather and seasonal limitations : The work of laying shall not be taken up during rainy or foggy weather or when the base course is damp or wet, or during dust storm or when atmosphere temperature in shade is 10 degree C or less.

Preparation of base : The work shall consist of preparation and existing granular or black topped surface bituminous course. The work shall be performed on such widths and lengths as shown in applicable drawing or as directed by the Engineer. The existing surface shall be firm ad clean, and treated with prime or tack coat as shown on the drawings as otherwise stated in the contract.

Materials :

For scarifying and re-laying granular surface : The materials used shall be coarse aggregate salvaged from scarification of the existing granular base course supplemented by fresh coarse aggregates and screenings so that aggregates and screening thus supplemented correspond to Clause 404 : Water macadam or Clause 406 Wet Mix Macadam, as the case may be.

For patching potholes and scaling cracks : Where the existing surface to be overlaid is bituminous. Any existing potholes and cracks shall be repaired and sealed in accordance with Clauses 3004.2 and 3004.3 or as directed by the Engineer.

For profile corrective course : A profile corrective course for correcting the existing pavement profile shall be laid to varying thickness as shown on the Drawings. Or as indicated in the Contract Documents. The profile corrective

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

course shall be laid to tolerances and densities as specified for wearing course if a single layer or base course, if it is to be covered with a wearing course layer.

Profile corrective course and its application : The type of material for use as a profile corrective course shall be as shown on the drawing. If it is to be laid as part of the overlay/strengthening course, the profile corrective course material shall be of the same specification as that of the overlay/strengthening course. However, if provided as a separate layer, it may be of the same specification as the layer over which it is to be laid or intermediate between underlying layers, as shown on the Drawings.

Surface Levels

The levels of the sub grade different pavement courses as constructed, shall not vary from those calculated with reference to the longitudinal and cross profile of the road, shown on the drawings or as directed by the engineer beyond the tolerances mentioned in Table 900-1. Bituminous materials shall not be applied to a wet surface or during a dust storm or when the weather foggy, rainy or windy or when the temperature in the shade is less than 10°C where the tack coat consists of emulsion, the surface shall be slightly damp, but not wet. Where the tack coat is of cutback bitumen, the surface shall be dry.

Quality control of work : TOLERANCES IN SURFACE LEVELS

1. Sub grade	+20 mm. -25mm.
2. Sub-base	
(a) Flexible pavement	+10 mm. -20 mm.
(b) Concrete pavement. (Dry lean concrete or rolled concrete)	+6 mm. -10mm.
3. Base-course for flexible pavement.	+6 mm. -6 mm.
a) Bituminous course.	+6 mm. -6 mm.
b) Other than bituminous.	+6 mm. -6 mm.
(iii) Machine laid.	+10 mm. -10 mm.
(iv) Manually laid,	+15 mm. -15 mm.
4. Wearing course for flexible pavement.	
a) Machine laid.	+6 mm. -6 mm.
b) Manually laid	+10 mm. -10 mm.
5. Cement concrete pavement.	+5 mm. -6 mm.

TACK COAT

Scope

This work shall consist of the application of a single coat of high viscosity liquid bituminous material to an existing bituminous road surface preparatory to be superimposition of a bituminous mix when specified in the Contract or instructed by the Engineer.

Materials

The binder used for tack coat shall be bitumen emulsion complying with ISS 8887 of a type and grade as specified in the Section 600 of MORTH specification contract or as directed by the Engineer. The use of cutback bitumen as per IS 217 shall be restricted only for sites at sub-zero temperatures or for emergency applications as directed by the Engineer.

Weather and Seasonal Limitations

For control of the quality of materials supplied and the works carried out the relevant provisions of Section 900 shall apply.

Specifications :

The rate shall cover the provision of tack coat at 0.5 kg. per square meter with the provision that the variation in actual quantity of bitumen used will assessed and the payment adjusted accordingly.

Construction Equipment :

The tack coat distributor shall be self propelled or towed bitumen pressure sprayer, quipped for spraying the material uniformly at a specified rate. Hand spraying of small areas, inaccessible to the distributor, or in narrow strips, shall be sprayed with a pressure and sprayer, or as directed by the Engineer. 503-4.2 of MORTH Specification Preparation of base : The surface on which the tack coat is to be applied shall be clean and free from dust, dirt and extraneous materials, and be otherwise prepared in accordance with the requirements of Clauses 501.8 and 902 as appropriate immediately before the application of the tack coat, the surface shall be swept clean with a mechanical broom, and high pressure air jet, or by other means as directed by the Engineer.

Application of tack coat :

The application of tack coat shall be at the rate specified in the contract, and shall be applied uniformly, if rate of application of tack coat is not specified in the contract then it shall be at the rate specified in TABLE 500-2 OF MORTH Specification. The normal range spraying.

TABLE 500-2, RATE OF APPLICATION OF TACK COAT

The emulsion asphalt at the rate of 5 kg. per 10 sq. m. shall be used for tack coat temperature for a bituminous emulsion shall be 20°C to 70° C and for a cutback, 50°C to 80° C if RC-70/MC -70 is used. Where geosynthetic is proposed for use, the provisions of Clauses 703.3.2 and 703.3.4 of MORTH specification shall apply. The method of

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

application of the tack coat will demand on the type of equipment to be used, size of nozzles, pressure at the spray bar, and speed of forward movement. The contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

Where the material to receive an overlay is a freshly laid bituminous layer, that has not been subjected to traffic or contaminated by dust, a tack coat is not mandatory where the overlay is completed within two days.

Curing of tack coat : The tack coat shall be left to cure until all the volatiles have evaporated before any subsequent construction is started. No panning or vehicles shall be allowed on the tack coat other than those essential for the construction.

Preparation and transport of mix :

Bituminous grout mix shall be prepared in a bet mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality, with thoroughly coated aggregates.

The plant shall be drum mix type. The plant shall have coordinated set of essential units capable of producing uniform mix within the job mix formula such as laid down in Appendix-A.

- (f) In case of drum mix plant, the cold feed system shall have variable speed conveyors/or other suitable devices for regulating the accurate proportion/Control Cabin.
- (g) Bitumen Control Unit : Capable of measuring/metering and spraying required quantity of bitumen at specified temperature with automatic synchronization of bitumen and aggregate feed.
- (h) Filter System : A fines feeder system suitable to receive bagged or bulk supply of filter materials and its incorporation to the mix in the correct quantity shall be necessary auxiliary.
- (i) Dust control : A suitable built in Dust control equipment for the dryer to contain the exhaust of the dust in to atmosphere for environmental control wherever so specified by the Engineer.
- (j) Suitable auxiliary Bitumen : Boiler of adequate capacity with self heating arrangement and temperature control device. The boiler should be fitted with temperature indicating instruments.

The temperature of binder at the time of mixing shall be in range of 150°C to 163°C and that of the aggregate in the range of 155°C to 163°C provided that the difference in temperature between the binder and aggregate at no time exceeds 14°C.

Mixing shall be through to ensure that a homogeneous mixture is obtained in which all particles of the aggregates are coated uniformly and then discharged temperature of mix shall be between 130°C to 160°C.

The mixture shall be transported from the mixing plant to the point of use in suitable tipper vehicles. The vehicles employed for transport shall be clean and be covered in transit of so directed by the Engineer. Any tipper causing excessive segregation of materials by its spring suspension or other contributing factors or that which shows undue shall be removed from the work unit such conditions are corrected.

Spreading :

The mix transferred from the tipper at site to the paver shall be spread immediately by means of self propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix true to the specified lines, grades and cross sections. The paver finisher shall have the following essential features.

- (j) Loading hoppers and suitable distributing mechanism.
- (k) All drives having hydrostatic drive/control.
- (l) The machine shall have a hydraulically extendable screed for appropriate width requirement.
- (m) The screed shall have tamping and vibrating arrangement for initial compacting to the layer as it is spread without rutting of otherwise marred surface, it shall have adjustable amplitude and variable frequency.
- (n) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.
- (o) The paver shall be fitted with an electronic sensing device for automatic leveling and profile control within the specified tolerances.
- (p) The screed shall have the internal heating arrangement.
- (q) The paver shall be capable of laying either 2.5 to 4.0 m. width OR 4.0 to 7.0 m. width as stipulated in the Contract.
- (r) The paver shall be so designed as to eliminate skidding/slippage of the tyres during operation.

However, in restricted location and in narrow widths where the available plant cannot be operated in the opinion of the Engineer, he may permit manual laying of the mix.

The temperature of the mix at the time of laying shall be in the range 120° C to 160°C. In multi layer construction, the longitudinal joint in one layer shall offset that the layer below by about 150 mm. However, the joint in the top-most layer shall be at the lane line of the pavement.

Longitudinal joints and edges shall be constructed true to the delineating line parallel to the center line of the road. All joints shall be cut vertical to the full thickness of the previously laid mix and surface painted with hot bitumen before placing fresh material. Longitudinal and transverse joints shall be offset by at least 250 mm. from those in the lower course and the joint on the top-most layer shall not be allowed to fall within the wheel path. All transverse joints shall be cut vertically to the full thickness of the previously laid mix with asphalt cutter/pavement breaker and surface painted with hot bitumen before placing fresh materials. Longitudinal joints shall be preferably hot joints. Cold longitudinal joints shall be properly heated with joint heater to attain a suitable temperature of about 80°C before laying of adjacent materials.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Compaction :

After the spreading of mix, rolling shall be done by 80 to 100 KN. Vibratory roller. Rolling shall state as soon as possible after the material haws been spread deploying 3 set of rollers as the rolling is to be completed in limited time frame. The roller shall move at a speed not more than 5 km/h. Rolling shall be done with care to avoid unduly roughening of pavement surface.

Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this the rolling shall commence at the edges and progress towards the center longitudinally except that on super elevated and unidirectional cambered portions, it shall progress from the lower to the upper edge parallel to the center line of the pavement.

The initial or break-down rolling shall be done with 80-100KN. Static weight static weight smooth wheel roller (3wheels or tandem) as soon as it is possible to roll the mix without cracking the surface or having the mix pick up on the roller wheels. The second or intermediate rolling shall follow the break down rolling with vibratory roller of 80 to 100 KN. Static weight of pneumatic tyred roller of 150 to 250 kn. Weight with minimum 7 wheels and minimum tyre pressure of 0.7 Mpa. As closely as possible to the paver and be done while material is still workable enough for removal of roller marks, with 60 to 80 Kn. Tandem roller. During the final rolling, vibratory system shall be switched off. The joints and edges shall be rolled with a 80 to 100 kn. Static roller.

When the roller has passed over the whole area once, any high spots or depressions which become apparent shall be corrected by removing or adding mix material. The rolling shall then be continued till the entire surface has been rolled to 95 percent of the average laboratory density (obtained from marshal specimens compacted as defined in Table (500-10), there is not crushing of aggregates and all roller marks have been eliminated. Each pass of the roller shall uniformly overlap not less than one-third of the track made in the preceding pass. The roller wheel shall be kept damp if necessary to avoid bituminous materials from sticking to the wheels and being packed up. In no case shall fuel, lubricating oil be used for this purpose, nor excessive water poured on the wheels. Rolling operations shall be completed in every respect before the temperature of the mix falls below 100°C.

Roller(s) shall not stand on newly laid materials while there is a risk that surface will be deformed therby. The edges along and transverse of the bituminous grout laid and compacted earlier shall be cut to their full depth so as to expose fresh surface which shall be painted with a thin surface coat of appropriate binder before the new mix is placed against it.

Surface Finish and Quality Control of Work.

The surface finish of constructing shall conform to the requirements of Clause 902. Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900.

The built up spray grout shall be provided with next surfacing without any delay. If there is to be any delay, the curse shall be covered by a seal coat to the requirement of Clause 613 before allowing any traffic over it. The seal coat in such cases shall be considered incidental to the work and shall not be paid for separately.

Arrangements for Traffic.

During the period of construction, arrangement of traffic shall be done to Clause 112 of MORTH specification.

Passage of Traffic along a part of the Existing Carriageway under Improvement.

For widening/strengthening existing carriageway where part width of the existing carriage way proposed to be used for passage of traffic, treated shoulders shall be provided on the side on which work is not in progress. The treatment to the shoulder shall consists of providing at least 150 mm. thick granular base course covered with bituminous surface dressing in a width of at least xxxx and surface shall be maintained throughout the period during which traffic uses the same to the satisfaction of the engineer. The continuous length in which such work shall be carried out, would be limited normally to 500 m. at a place. However, where work is allowed by the Engineer in longer stretches passing places at least 20m. long with additional paved width of 2.5 m shall be provided at every 0.5 km. interval.

In case of widening existing two lane to four lane, the additional two lanes would be constructed first and the traffic diverted to it and only there after the required treatment to the existing carriageway would be carried out. However, in case where on the request of the contractor, work on existing two lane carriageway is allowed by the Engineer with traffic using part of the existing carriageway, stipulations as in para above shall apply.

After obtaining permission of the Engineer, the treated shoulder shall be dismantled the debris disposed of and the area cleared as per the direction of the Engineer.

MEASUREMENTS FOR PAYMENT

The payment shall be made on the tonnage basis of the weight of mix of aggregates and bitumen. For the purpose, the contractor shall have to install a weight bridge of suitable capacity for the purpose of weighment of dumpers at suitable place at his cost as directed weight of empty and weight of loaded dumper will be recorded in bound and numbered register on plant site.

Department will be free to get some loaded dumpers test checked at other weight bridge. Weight bridge will be periodically got calibrated and verified from weight and measure authorities.

For the purpose of application of tack coat, if the theoretical area as per sanctioned estimate for basis of tone differs with the actual area of work done in the field, the reduction in or addition to payment shall have to be exceed respectively.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Weight of mix materials will be done in presence or responsible person, not less than the rank of supervisor of department and the measurement shall be recorded by the Deputy Executive or Assistant Engineer or Addl. Asst. Engineer. If so authorized, Record of each dumper will be maintained separately in bound and numbered register, which will be maintained by the departmental representative and signed by the contractor, proper gate pass system shall be established for the vehicle coming to the plant site and out going from the plant site. The location of the kilometer, hectometer and meter in which individual dumper are unloaded shall be recorded carefully.

Rate :

The contract unit rate for the work shall be payment in full for carrying out the required operations including full compaction for.

- (i) Making arrangements for traffic to Clause 112 of MORTH specification except or initial treatment to verge, shoulders and construction of diversion.
- (iv) preparation of base except for laying of profile corrective course
- (v) but including filling of potholes.
- (vii) Providing all materials to be incorporated in the work including arrangement for stock yards, all royalties, fees, rents where necessary and all leads and lift.
- (viii) All labor, tools, equipment, plant including installation of hot mix plant, power supply units and all machineries, incidental to complete the work to the specifications.
- (ix) Carrying out the work in part widths of the road where directed.
- (x) Carrying out all tests for control of quality.

❖ Providing, laying and rolling 37.50 / 50 mm. compacted thick B.M. in one layer with B.T. aggregate as specified WITHOUT TACK COAT using Bitumen VG 30 (60/70) for mixing with aggregate at the rate of 3.5% (i.e. 35 Kg/ M.T.) of Total mix, including heating & mixing in Drum mix plant and spreading the same by paver finisher and consolidation with Vibratory roller including necessary, fire wood, oil, Lubricants, labour charges etc. using contractor's own machineries and equipment, tools etc. complete in accordance with the requirement of specification

1. DESCRIPTION

The work shall consist of construction in one layer each 37.5 / 50 mm thick BM on previously prepared base to the requirements of these specification.

2. MATERIALS

2.1 Binder : The binder shall be straight run bitument of VG 30 (60/70) grade satisfying the requirement of IS 73. The actual grade of the Binder to be used shall be decided by the engineer in charge and it shall have to be brought by the contractor to the site of work at his own cost.

2.2 Coarse aggregates : The coarse aggregate shall consist of crushed stone or crushed gravel. These shall be clean, durable, of cubical shape, free from disintegrated pieces, organic or other deleterious matter and adherent coatings. The aggregates shall preferably be hydrophobic and of low porosity and shall satisfy the physical requirements set forth in table given in above item (Para -2)

2.3 Fine aggregates : The fine aggregates shall consist of crusher run screenings, natural sand or a mixture of both. These shall be clean, hard, durable, uncoated, dry and free from injurious, soft or flaky pieces and organic deleterious substances.

2.4 Filler : The filler, where required, shall be an inert material the whole of which passes 600 micron sieve at least 90 percent passing 150 micron sieve and not less than 70 percent passing 75 micron sieve. The filler shall be cement, stone dust, hydrated lime, fly ash and other non plastic mineral matter approved by the Engineer in charge.

2.5 Aggregate gradation : The mineral aggregates, including mineral filler, shall be so graded or combined as to conform to gradings set forth in tables below :

Table : Aggregate gradation for BM

Sieve Designation	% by weight passing the sieve		sieve designation	% by weight passing the sieve	
	37.5	75 mm		37.5	75 mm
40 mm	-	100	-	-	-
25 mm	100	75-100	5.6 mm	20-40	15-35
20.0 mm	70-100	60-95	2.80	5-20	5-20
10.0 mm	50-85	30-55	0.75 mm	0-5	0-5

2.6 Proportioning of materials : The binder content for premixing shall be 3.5 percent by weight of the total mix. The quantities of aggregates shall be sufficient to yield the specified thickness after compaction. The contractor shall get job-mix formula for the mix approved by the Engineer in charge before starting the work.

2.7 Variation in proportioning of material : The contractor shall have the responsibility of ensuring proper proportioning of materials in accordance with the approved job mix formula and producing a uniform mix. A variation in binder content of ± 0.3 percent by weight of total mix shall, however, be permissible in individual specimens taken for quality control tests vide MOST specification Section 900.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

3. CONSTRUCTION OPERATIONS

3.1 Weather and seasonal limitation : Lean bound macadam shall not be laid during rainy weather or when the base course is damp or wet.

3.2 Preparation of base : The base on which LBM is to be prepared shaped and conditioned to the specified, lines , grade and cross section in accordance with MOST Specification clause 601 as directed by the Engineer in charge. The surface shall be thoroughly swept and scraped clean and free of dust and foreing matter.

3.3 TACK COAT

Scope

This work shall consist of the application of a single coat of high viscosity liquid bituminous material to an existing bituminous road surface preparatory to be superimposition of a bituminous mix when specified in the Contract or instructed by the Engineer.

Materials

The binder used for tack coat shall be bitumen emulsion complying with ISS 8887 of a type and grade as specified in the Section 600 of MORTH specification contract or as directed by the Engineer. The use of cutback bitumen as per IS 217 shall be restricted only for sites at sub-zero temperatures or for emergency applications as directed by the Engineer.

Weather and Seasonal Limitations

For control of the quality of materials supplied and the works carried out the relevant provisions of Section 900 shall apply.

Specifications : The rate shall cover the provision of tack coat at 0.5 kg. per square meter with the provision that the variation in actual quantity of bitumen used will assessed and the payment adjusted accordingly.

Construction Equipment :

The tack coat distributor shall be self propelled or towed bitumen pressure sprayer, quipped for spraying the material uniformly at a specified rate. Hand spraying of small areas, inaccessible to the distributor, or in narrow strips, shall be sprayed with a pressure and sprayer, or as directed by the Engineer. 503-4.2 of MORTH Specification Preparation of base : The surface on which the tack coat is to be applied shall be clean and free from dust, dirt and extraneous materials, and be otherwise prepared in accordance with the requirements of Clauses 501.8 and 902 as appropriate immediately before the application of the tack coat, the surface shall be swept clean with a mechanical broom, and high pressure air jet, or by other means as directed by the Engineer.

Application of tack coat :

The application of tack coat shall be at the rate specified in the contract, and shall be applied uniformly, if rate of application of tack coat is not specified in the contract then it shall be at the rate specified in TABLE 500-2 OF MORTH Specification. The normal range spraying.

TABLE 500-2, RATE OF APPLICATION OF TACK COAT

The emulsion asphalt at the rate of 5 kg. per 10 sq. m. shall be used for tack coat temperature for a bituminous emulsion shall be 20°C to 70° C and for a cutback, 50°C to 80° C if RC-70/MC -70 is used. Where geosynthetic is proposed for use, the provisions of Clauses 703.3.2 and 703.3.4 of MORTH specification shall apply. The method of application of the tack coat will demand on the type of equipment to be used, size of nozzles, pressure at the spray bar, and speed of forward movement. The contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

Where the material to receive an overlay is a freshly laid bituminous layer, that has not been subjected to traffic or contaminated by dust, a tack coat is not mandatory where the overlay is completed within two days.

Curing of tack coat : The tack coat shall be left to cure until all the volatiles have evaporated before any sub sequent construction is started. No pant or vehicles shall be allowed on the tack coat other than those essential for the construction.

3.4 Preparation of the mix : Hot mix plant of adequate capacity and capable of producing a proper and unifor quality shall be used for preparing the mix. The plant should be continuous type having a co-ordinated set of essential units such as dryer for heating the aggregates, deive for feeding by weight or volume the required quantities of aggregatesm a binder heating and control unit for metering out the correct quantity of heated binder together with a paddle mixer for intimately mixing of the binder and aggregates. For details regarding hot mix plant the Annexure 'A' may be referred.

The temperature of binder at the time of mixing shall be in the range of 150 C to 177 C and aggregates in the rang of 150 C to 163 C provided also that at no time shall the difference in temprerature of the aggregates and the binder exceed 14 C.

Mixing shall be throughout to ensure that a homogeneous mixture is obtained in which all the particles of the mineral aggregates are coated uniformly.

The Mix shall be transported form the mixing plant to the point of use in suitable vehicles, The vehicles employed for trasport shall be clean and be covered over ion the transit if so directed by the engineer in charge.

3.5 Sprading : The mix, transported from the hot mix plant to the site, shall be spread by means of self propelled mechanical paver with suitable screens capable of spreadign tamping and ifinishing the mix, true to specified grade, line and cross section. The temperature of mix at the time of laying shall be in the range of 121 C - 163 C.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Longitudinal joints and edges shall be constructed true to the delineating lines parallel to the centre line of the road, Longitudinal joints shall be offset by at least 150 mm from those in the binder course, all joints shall be cut vertical to the full thickness of the previously laid mix and the surface painted with hot bitumen before placing fresh material.

3.6 Rolling : Immediately after the spreading of mix, it shall be thoroughly compacted by rolling with a set of rollers moving at a speed not exceeding 5 km per hour. The initial or break down rolling shall be with 8-12 tonne three wheeled rollers and the surface finished by final rolling with 8-10 tonne tandem rollers, or suitable pneumatic rollers.

The roller wheels shall be kept damp to prevent the mix adhering to them but in no case shall fuel lubricating oil be used for this purpose. Rolling shall commence longitudinally from the edge and progress toward the centre except that at super elevated portions, it shall progress from the lower to upper edges parallel to the centre line of the pavement. The roller should proceed on the fresh material with rear or fixed wheel leading so as to minimise the pushing of the mix and each pass of the roller shall uniformly overlap not less than one third on the track made in the preceding pass rolling shall continue until the entire surface has been rolled to compaction and all the roller marks eliminated.

4. OPENING TO TRAFFIC

Traffic may be allowed immediately after completion of the final rolling when the mix has cooled down to the surrounding temperature.

5. SURFACE FINISH AND QUALITY CONTROL OF WORK

The surface finish of construction shall conform to the requirements of most specification clause 901 Control on the quality of material and works shall be exercised by the engineer in charge in accordance with MOST specification clause 902.

6. ARRANGEMENT FOR TRAFFIC

The provision of MOST Specification clause 105 shall apply as regards the flow to traffic during construction.

7. MEASUREMENT FOR PAYMENT

The payment shall be made on the tonnage basis of the weight of mix of aggregates and bitumen. For this purpose the contractor shall have to install a weigh bridge of suitable capacity for the purpose of weighing of dumpers at suitable place at his cost as directed. Weight of empty dumper and weight of loaded dumper will be recorded in bound and numbered register on plant side.

Department will be free to get some loaded dumper test checked at other weigh bridge, Weigh bridge will be periodically got calibrated and verified from weight and measure authorities.

For the purpose of application of tack coat if the theoretical area as per sanctioned estimate for basis of tonne differs with the actual area of work done in the field, then the reduction in or addition to payment shall have to be effected to the contractor on proportionate basis depending upon the area reduced or exceed respectively.

Weight of mix materials will be done in presence of responsible person, not less than the rank of supervisor of Department Deputy Executive Engineer or Assistant Engineer or Addl. Assistant Engineer if so authorised. Record of each dumper will be maintained separately in bound and numbered register which will be maintained by the departmental representatives and signed by the contractor. Proper gate pass system shall be established for the vehicles coming to the plant site and out going from the plant site. The location of the kilometer, hectometer in which individual dumper are unloaded will be recorded carefully.

In Case of LBM, DBM and asphaltic concrete of thickness 50 mm and above, initial levels before commencement of the work and final levels after completion of the work will be taken as indicated below for working out the average thickness of pavement laid, also the actual tonnage of the mix shall then be worked out based on the designed density, for board cross check on the actual tonnage of total mix used in the works.

Surface levels before and after laying the pavement course shall be taken as below

- (a) For single lane : Levels at 15 cms. from both the edges and centre point. (Levels at 5 points)
- (b) For double lane : Levels at 15 Cms & 75 cms : 175 cms 275 cms from both the edges and the centre point (Levels at 9 points)
- (c) Widening single to double lane : Levels at 15 Cms. from both the edges and the centre carriage way (Up to 2 meters widening) point (Levels at 3 Points)

However, in special cases if necessary, the cross profiles may be taken at closer length upto 3 meters.

8. RATE :

The contract unit rate for LBM shall be for payment in full for carrying out the required operations including full compensation for all components listed in MOST Specification Clause 503.8.

❖ Providing and Applying Asphalt Painting on B.T. surface with mechanical sprayer using Bitumen VG 30 (60/70) at the rate of 5.00 kg/10 sq mt and spreading stone dust on painting surface at the rate of 0.03 cum/10 sq mt and rolling with smooth wheeled and pneumatic roller and brushing etc. complete.

07 SAND ASPHALT BASE COURSE

507.1 Scope

This work shall consist of a base course composed of a mixture of sand, mineral filler where required and bituminous binder, placed and compacted upon a prepared and accepted subgrade in accordance with these Specifications and the lines, levels, grades, dimensions and cross sections shown on the Drawings or as directed by the Engineer.

Note: Sand Asphalt Base course is used in special situations like quality coarse aggregates not being available within economical leads and/or water needed for conventional base course not being readily available, as in desert areas.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

507.2 Materials

507.2.1 Bitumen :

The bitumen shall be paving bitumen of viscosity grade VG 30, as specified in the Contract, conforming to IS:73.

507.2.2 Sand :

The sand shall be clean, naturally occurring or blended material free from any deleterious substances, dry and well graded within the limits given in Table 500-16 and with other physical properties conforming to the requirements of this Table.

TABLE 500-16 SAND GRADING AND PHYSICAL REQUIREMENTS

Sieve Size (mm)	Cumulative percentage by weight of total aggregate passing
9.5	100
4.75	85-100
2.36	80-100
1.18	70-98
0.60	55-95
0.30	30-75
0.15	10-40
0.075	4-10
Plasticity Index (%)	6 max.
Sand equivalent (IS:2720, Part 37)	30 min.
Los Angeles Abrasion Value (IS:2386, part 4)	40 max.

Note : Maximum thickness for sand asphalt is 80 mm.

507.2.3 Filler :

When required, filler shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement as approved by the Engineer. The filler shall conform to Clause 505.2.4.

507.3 Mix Design

507.3.1 Requirements for the mixture :

Apart from conformity with the grading and quality requirements for individual ingredients, the mixture shall meet the requirements set out in Table 500-17.

507.3.2 Binder content :

The binder content shall be optimized to achieve the requirements of the mix set out in Table 500-17. The Marshall method for determining the optimum binder content shall be adopted as described in the Asphalt Institute Manual MS-2.

Table 500-17 Requirements for Sand Asphalt Base Course

Parameter	Requirement
Minimum stability(kN at 600 C)	2.0
Minimum flow (mm)	2
Compaction level (Number of blows)	2 x 75
Per cent air voids	3 – 5
Percent voids in mineral aggregate (VMA)	>16
Percent voids filled with bitumen (VFB)	65 – 75

507.3.3 Job mix formula :

The contractor shall develop the job mix formula proposed for use in the works and shall give the following details:

- (i) Source and location of all materials;
- (ii) Proportions of all materials expressed as follows where each is applicable;
 - a: Binder as percentage by weight of total mixture;
 - b: Sand/Mineral filler as percentage by weight of total aggregate. including mineral filler;
- (iii) A single definite percentage passing each sieve for the mixed aggregate;
- (iv) The results of tests enumerated in Table 500-17 as obtained by the Contractor;
- (v) Test results of physical characteristics of aggregates to be used;
- (vi) Mixing temperature and compacting temperature.

While working out the job mix formula, the Contractor shall ensure that it is based on a correct and truly representative sample of the materials that will actually be used in the work and that the mixture and its different ingredients satisfy the physical and strength requirements of these Specifications.

Approval of the job mix formula shall be based on independent testing by the Engineer for which joint samples of all ingredients of the mix shall be furnished by the Contractor as required by the former.

The approved job mix formula shall remain effective unless and until modified by the Engineer. Should a change in the source of materials be proposed, a new job mix formula shall be established by the Contractor and approved by the Engineer before actually using the materials.

507.3.4 Permissible variation from job mix formula :

The Contractor shall produce a uniform mix conforming to the approved job mix formula, subject to the permissible variations of the individual percentages of the various ingredients in the actual mix from the job mix formula to be used, within the limits as specified in Table 500-12, with the condition that the gradation after the variation remains within the

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

gradation envelop. These variations are intended to apply to individual specimens taken for quality control tests in accordance with Section 900.

507.4 Construction Operations

507.4.1 Weather and seasonal limitations : Clause 501.5.1 shall apply.

507.4.2 Preparation of base :

The surface on which Sand Asphalt Basecourse

Material is to be laid shall be prepared, shaped and graded in the profile required for the particular layer in accordance with Clause 501 and 902 as appropriate or as directed by the Engineer. The surface shall be thoroughly swept clean free from dust and foreign matter using a mechanical brush, and the dust blown off by compressed air. In confined locations where mechanical plant cannot get access, other methods shall be used as approved by the Engineer. A prime coat, where specified, shall be applied in accordance with Clause 502 or as directed by the Engineer.

507.4.3 Tack coat : A tack coat over the base shall be applied in accordance with Clause 503, or otherwise as directed by the Engineer.

507.4.4 Preparation and transportation of the mixture : The provisions of Clause 501.3 and 501.4 shall apply.

507.4.5 Spreading :

The provisions of Clauses 501.5.2 to 501.5.4 shall apply. Mixing must be accomplished at the lowest temperatures and in the shortest time that will produce a mixture with complete coating of the aggregate and at a suitable temperature to ensure proper compaction. Guidance for mixing and compaction temperature for the particular bitumen may be taken from Table 500-15 and shall correspond to a viscosity of 2 Poise

(0.2 Pa.s) and 3 poise (0.3 Pa.s) respectively, based on the original (unaged) bitumen properties.

507.4.6 Rolling :

Clause 501.6 shall apply. Generally the initial or breakdown rolling shall be done with 8-10 tonne deadweight smooth-wheeled rollers. The intermediate rolling shall be done with 8-10 tonne deadweight or vibratory rollers or with a pneumatic tyred roller of 12-15 tonne weight having a tyre pressure of at least 5.6 kg/sq.cm. The finish rolling shall be done with 8-10 tonne deadweight smooth wheeled tandem rollers. The exact pattern of rolling shall be established at the laying trials.

507.5 Opening to Traffic

It shall be ensured that the traffic is not allowed without the express approval of the Engineer in writing, on the surface until the paved mat has cooled below 600C in its entire depth.

507.6 Surface Finish and Quality Control of Work

The surface finish of the completed construction shall conform to the requirements of Clause 902.

For control of the quality of materials and the works carried out, the relevant provisions of Section 900 shall apply.

507.7 Arrangements for Traffic

During the period of construction, arrangements for traffic shall be made in accordance with the provisions of Clause 112.

507.8 Measurement for Payment

Sand Asphalt Base course materials shall be measured as finished work, for the area covered, in cubic metres, metric tonnes, or in square metres, at a specified thickness, as stated in the Contract.

The variation from the actual percentage of bitumen approved by the Engineer and used will be assessed and the rate adjusted, plus or minus, using the rate for bitumen in the Bill of Quantities.

❖ Hot Applied Thermoplastic Compound Road Marking with Reflectorising Glass Beads

803.4. Hot Applied Thermoplastic Road Marking

803.4.1. General :

- (i) The work under this section consists of marking traffic stripes using a thermoplastic compound meeting the requirements specified herein.
- (ii) The thermoplastic compound shall be screeded/extruded on to the pavement surface in a molten state by suitable machine capable of controlled preparation and laying with surface application of glass beads at a specific rate. Upon cooling to ambient pavement temperature, it shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation by traffic,
- (iii) The colour of the compound shall be white or yellow (IS colour No. 556) as specified in the drawings or as directed by the Engineer.
- (iv) Where the compound is to be applied to cement concrete pavement, a sealing primer as recommended by the manufacturer, shall be applied to the pavement in advance of placing of the stripes to ensure proper bonding of the compound. On new concrete surface any laitance and/or curing compound shall be removed before the markings are applied.

803.4.2. Thermoplastic Material

803.4.2.1. General : The thermoplastic material shall be homogeneously composed of aggregate, pigment, resins and glass reflectorizing beads.

803.4.2.2. Requirements :

- (i) Composition : The pigment, beads, and aggregate shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with requirements indicated in Table 800-3.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

TABLE 800-3. PROPORTIONS OF CONSTITUENTS OF MARKING MATERIAL (Percentage by weight)

Component	White	Yellow
Binder	18.0 min.	18.0 min.
Glass Beads	30-40	30-40
Titanium Dioxide Calcium Carbonate and Inert Fillers	10.0 min. 42.0 max.	— See
Yellow Pigments	—	Note

Note : Amount of yellow pigment, calcium carbonate and inert fillers shall be at the option of the manufacturer, provided all other requirements of this Specification are met

(ii) Properties: The properties of thermoplastic material, when tested in accordance with ASTM D36/BS -3 262-(Part 1), shall be as below:

(a) Luminance :

White : Daylight luminance at 45 degrees -65 per cent min. as per AASHTO M 249

Yellow: Daylight luminance at 45 degrees -45 per cent min. as per AASHTO M 249

(b) Drying time :

When applied at a temperature specified by the manufacturer and to the required thickness, the material shall set LO bear traffic in not more than 15 minutes.

(c) Skid resistance : not less than 45 as per BS 6044.

(d) Cracking resistance at low temperature :

The material shall show i-o cracks on application to concrete blocks

(e) Softening point : $102.5 \pm 9.5^{\circ}$ C as per ASTM D 36.

(f) How resistance : Not more than 25 per cent as per AASHTO M 249.

(g) Yellowness index (for white thermoplastic paint): not more than 0.12 as per AASHTO M 249

(iii) Storage life : The material shall meet the requirements of these Specifications for a period of one year. The thermoplastic material must also melt uniformly with no evidence of skins or unmelted panicles for the one year storage period. Any material not meeting the above requirements shall be replaced by the manufacturer/ supplier/Contractor.

(iv) Reflectorisation : Shall be achieved by incorporation of beads, the grading and other properties of the beads shall be as specified in Clause 803.4.3.

(v) Marking : Each container of the thermoplastic material shall be clearly and indelibly marked with the following information:

1. The name, trade mark or other means of identification of manufacturer
2. Batch number
3. Date of manufacture
4. Colour (white or yellow)
5. Maximum application temperature and maximum safe heating temperature.

(vi) Sampling and testing: The thermoplastic material shall be sampled and tested in accordance with the appropriate ASTM/BS method. The Contractor shall furnish to the Employer a copy of certified test reports from the manufacturers of the thermoplastic material showing results of all tests specified herein and shall certify that the material meets all requirements of this Specification

803.4.3. Reflectorising glass beads

803.4.3.1. General : This Specification covers two types of glass beads 10 be used for the production of reflectorised pavement markings.

Type 1 beads are those which are a constituent of the basic thermoplastic compound vide Table 800-3 and Type 2 beads are those which are to be sprayed on the surface vide Clause 803.6.3.

803.4.3.2. The glass beads shall be transparent, colourless and free from milkiness, dark particles and excessive air inclusions. These shall conform to the requirements spelt out in Clause 803.4.3.3,

803.4.3.3. Specific requirements

A. Gradation: The glass beads shall meet the gradation requirements for the two types as given in Table 800-4. TABLE 800-4.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

GRADATION REQUIREMENTS FOR GLASS BEADS

Sieve size	Per cent retained	
	Type 1	Type 2
1.18 mm	0 to 3	- - - -
850 Micron	5 to 20	0 to 5
600 Micron	- - - -	5 to 20
425 Micron	65 to 95	30 to 75
300 Micron	- - - -	30 to 75
180 Micron	0 to 10	10 to 30
Below 180 Micron		0 to 15

B. Roundness: The glass beads shall have a minimum of 70 per cent true spheres.

C. Refractive index: The glass beads shall have a minimum refractive index of 1.50.

D. Free flowing properties : The glass beads shall be free of hard lumps and clusters and shall dispense readily under any conditions suitable for paint striping. They shall pass the free flow-test.

803.4.3.4. Test methods: The specific requirements shall be tested with the following methods:

- Free-flow test- Spread 100 grams of beads evenly in a 100 mm diameter glass dish. Place the dish in a 250 mm inside diameter desiccator which is filled within 25 mm of the top of a desiccator plate with sulphuric acid water solution { specific gravity 1.10). Cover the desiccator and let it stand for 4 hours at 20 to 29 degree C. Remove sample from desiccator, transfer beads to a pan and inspect for lumps or clusters. Then pour beads into a clean, dry glass funnel having a 100 mm stem and 6 mm orifice. If necessary, initiate flow by lightly tapping the funnel. The glass spheres shall be essentially free of lumps and clusters and shall flow freely through the funnel.
- The requirements of gradation, roundness and refractive index of glass beads and the amount of glass beads in the compound shall be tested as per B3 6088 and BS 3262 (Part I).
- The Contractor shall furnish to the Employer a copy of certified test reports from the manufacturer of glass beads obtained from a reputed laboratory showing results of all tests specified herein and shall certify that the material meets all requirements of this Specification. However, if so required, these tests may be carried out as directed by the Engineer.

803.4.4. Application properties of thermoplastic material

803.4.4.1. The thermoplastic material shall readily get screeded/ extruded at temperatures specified by the manufacturers for respective method of application to produce a line of specified thickness which shall be continuous and uniform in shape having clear and sharp edges.

803.4.4.2. The material upon heating to application temperatures, shall not exude fumes, which are toxic, obnoxious or injurious to persons or property.

803.4.5. Preparation:

- The material shall be melted in accordance with the manufacturer's instructions in a heater filled with a mechanical stirrer to give a smooth consistency to the thermoplastic material to avoid local overheating. The temperature of the mass shall be within the range specified by the manufacturer, and shall on no account be allowed to exceed the maximum temperatures stated by the manufacturer. The molten material should be used as expeditiously as possible and for thermoplastic material which has natural binders or is otherwise sensitive to prolonged heating, the material shall not be maintained in a molten condition for more than 4 hours.
- After transfer to the laying equipment, the material shall be maintained within the temperature range specified by the manufacturer for achieving the desired consistency for laying.

803.4.6. Properties of finished road marking :

- The stripe shall not be slippery when wet.
- The marking shall not lift from the pavement in freezing weather.
- After application and proper drying, the stripe shall show no appreciable deformation or discolouration under traffic and under road temperatures up to 60°C.
- The marking shall not deteriorate by contact with sodium chloride, calcium chloride or oil drippings from traffic.
- The stripe or marking shall maintain its original dimensions and position. Cold ductility of the material shall be such as to permit normal movement with the road surface without chipping or cracking.
- The colour of yellow marking shall conform to IS Colour No. 356 as given in IS:164.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- ❖ **Construction of Granular Sub Base - GSB by providing well graded material, mixing at OMC, spreading in uniform layers with motor grader on prepared surface and compacting with smooth wheel roller to achieve the desired density, complete as per Technical Specification Clause 401**

GRANULAR SUB-BASE

401.1. Scope

This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these Specifications. The material shall be laid in one or more layers as sub-base or lower sub-base and upper sub-base (termed as sub-base hereinafter) as necessary according to lines, grades and cross-sections shown on the drawings or as directed by the Engineer.

401.2. Materials

401.2.1. The material to be used for the work shall be natural sand, moorum, gravel, crushed stone, or combination thereof depending upon the grading required. Materials like crushed slag, crushed concrete, brick metal and kankar may be allowed only with the specific approval of the Engineer. The material shall be free from organic or other deleterious constituents and conform to one of the three gradings given in Table

While the gradings in Table 400-1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75 mm, 53 mm and 26.5 mm, the corresponding gradings for the coarse-graded materials for each of the three maximum particle sizes are given at Table 400-2. The grading to be adopted for a project shall be as specified in the Contract.

401.2.2. Physical requirements: The material shall have a 10 per cent fines value of 50 kN or more (for sample in soaked condition)

when tested in compliance with BS:812 (Part 111). The water absorption value of the coarse aggregate shall be determined as per IS : 2386 (Part 3); if this value is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS : 383.

For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 per cent.

TABLE GRADING FOR CLOSE-GRADED GRANULAR SUB-BASE MATERIALS

IS Sieve Designation	Per cent by weight passing the IS sieve		
	Grading I	Grading II	Grading III
75.0 mm	100	—	—
53.0 mm	80-100	100	—
26.5 mm	55-90	70-100	100-
9.50 mm	35-65	50-80	65-95
4.75 mm	25-55	40-65	50-80
2.36 mm	20-40	30-50	40-65
0.425 mm	10-25	15-25	20-35
0.075 mm	3-10	3-10	3-10

TABLE 400-2. GRADING FOR COARSE GRADED GRANULAR SUB-BASE MATERIALS

IS Sieve Designation	Per cent by weight passing the IS Sieve		
	Grading I	Grading II	Grading III
75.0 mm	100	—	—
53.0 mm		100	
26.5 mm	55-75	50-80	100
9.50 mm			
4.75 mm	10-30	15-35	25-45
2.36 mm			
0.425 mm			
0.075 mm	<10	<10	<10
CBR Value (Minimum)	30	25	20

Note : The material passing 425 micron (0.425 mm) sieve for all the three gradings! when tested according to IS : 2720 (Part 5) shall have liquid limit and plasticity index not more than 25 and 6 per cent respectively.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

401.3. Strength of sub-base

It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished. When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remoulded at field dry density and moisture content and any other tests for the "quality" of materials, as may be necessary.

401.4. Construction Operations

401.4.1. Preparation of subgrade : Immediately prior to the laying of sub-base, the subgrade already finished to Clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80-100 kN smooth wheeled roller.

401.4.2. Spreading and compacting : The sub-base material of grading specified in the Contract shall be spread on the prepared subgrade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned in Clause 401.2.1, mixing shall be done mechanically by the mix-in-place method.

Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations, as in small-sized jobs. The equipment used for mix-in-place construction shall be a rotavator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out to establish its suitability for the work.

Moisture content of the loose material shall be checked in accordance with IS:2720 (Part 2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 per cent above to 2 per cent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotavators until the layer is uniformly wet.

Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight with plain drum or pad foot-drum or heavy pneumatic tyred roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/m^2 or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall and super-elevation and shall commence at the edges and progress towards the centre for portions having crossfall on both sides.

Each pass of the roller shall uniformly overlap not less than one-third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots or depressions, which become apparent, corrected by removing or adding fresh material.

The speed of the roller shall not exceed 5 km per hour. Rolling shall be continued all the density achieved is at least 98 per cent of the maximum dry density for the material determined as per IS:2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material.

All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

401.5. Surface Finish and Quality Control of Work

The surface finish of construction shall conform to the requirements of Clause 902. MORTH Specifications.

Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900. MORTH Specifications.

401.6. Arrangements for Traffic

During the period of construction, arrangement of traffic shall be maintained in accordance with Clause 112.

401.7. Measurements for Payment

Granular sub-base shall be measured as finished work in position in cubic metres. The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

401.8. Rate

The Contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including full compensation for :

- (i) making arrangements for traffic to Clause 112 except for initial treatment to verges, shoulders and construction of diversions;
- (ii) Furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- (iii) all labour, tools, equipment and incidentals to complete the work to the Specifications;
- (iv) carrying out the work in pan widths of road where directed; and
- (v) carrying out the required tests for quality control.
- (vi)

❖ **Providing and laying, spreading and compacting graded stone aggregate to Wet Mix Macadam (WMM) in single layer not greater than 150mm. Thick as per MORTH specification including mixing the material with water at OMC laying in uniform layers with mechanical means in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density.**

WET MIX MACADAM SUB -BASE/BASE

1 Scope

This work shall consist of laying and compacting clean, crushed, graded aggregate and granular material, premixed with water, to a dense mass on a prepared subgrade/sub -base/base or existing pavement as the case may be in accordance with the requirements of these Specifications. The material shall be laid in one or more layers as necessary to lines, grades and cross -sections shown on the approved drawings or as directed by the Engineer.

The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75 mm. When vibrating or other approved types of compacting equipment are used, the compacted depth of a single layer of the sub-base course may be increased to 200 mm upon approval of the Engineer.

2. Materials

2.1. Aggregates

2.1.1. Physical requirements: Coarse aggregates shall be crushed stone. If crushed gravel/shingle is used, not less than 90 per cent by weight of the gravel/shingle pieces retained on 4.75 mm sieve shall have at least two fractured faces. The aggregates shall conform to the physical requirements set forth in Table below,

Sub-Base, Bases (Not-Bituminous and Shoulders)

Table . PHYSICAL REQUIREMENTS OF COARSE AGGREGATES FOR WET MIX MACADAM FOR SUB-BASE/BASE COURSES

Test	Test Method	Requirements
* Los Angeles Abrasion value or	IS: 2386 (Part-4)	40 per cent (Max)
* Aggregate Impact value	IS: 2386 (Part-4) or IS: 5640	30 per cent (Max)
Combined Flakiness and Elongation Indices (Total)	IS: 2386 (Part-4)	30 per cent (Max)

Aggregate may satisfy requirements of either of the two tests.

If the water absorption value of the coarse aggregate is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS: 2386 (Part-5)

2.1.2. Grading requirements: The aggregate shall conform to the grading given in Table below

Table GRADING REQUIREMENTS OF AGGREGATES FOR WET MIX MACADAM

IS Sieve	Per cent by weight passing the IS sieve
Designation	100
53.00 mm	95-100
45.00 mm	---
26.50 mm	60-80
22.40 mm	40-60
11.20 mm	25-40
4.75 mm	15-30
2.36 mm	8-22
600.00 micron	0-8
75.00 micron	

Materials finer than 425 micron shall have Plasticity Index (PI) not exceeding 6.

The final gradation approved within these limits shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

3. Construction Operations

3.1. Preparation of base:

The surface of the subgrade/ sub- base/base to receive the water bound macadam course shall be prepared to the specified lines and crossfall (camber) and made free of dust and other extraneous material. Any ruts or soft yielding places shall be corrected in an approved manner and rolled until firm surface is obtained if necessary by sprinkling water. Any sub-base/base/surface irregularities, where predominant, shall be made good by providing appropriate type of profile corrective course (levelling course) to Clause 501 MORTH Specifications.

As far as possible, laying water bound macadam course over an existing thick bituminous layer may be avoided since it will cause problems of internal drainage of the pavement at the interface of two courses. It is desirable to completely pick out the existing thin bituminous wearing course where water bound macadam is proposed to be laid over it. However, where the intensity of rain is low and the interface drainage facility is efficient, water bound macadam can be laid over the existing thin bituminous surface by cutting 50 mm x 50 mm furrows- at an angle of 45 degrees to the centre line of the pavement at one metre intervals in the existing road. The directions and depth of furrows shall be such that they provide adequate bondage and also serve to drain water to the existing granular base course beneath the existing thin bituminous surface.

3.2.1. Provision of lateral confinement of aggregates:

While constructing wet mix macadam, arrangement shall be made for the lateral confinement of wet mix. This shall be done by laying materials in adjoining shoulders along with that of wet mix macadam layer and following the sequence of operations described in Clause 407.4.1. MORTH Specifications.

3.3. Preparation of mix :

Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pugmill or pan type mixer of concrete batching plant. For small quantity of wet mix work, the Engineer may permit the mixing to be done in concrete mixers.

Optimum moisture for mixing shall be determined in accordance with IS:2720 (Part -8) after replacing the aggregate fraction retained on 22A mm sieve with material of 4.75 mm to 22.4 mm size. While adding water, due allowance should be made for evaporation losses. However, at the time of compaction, water in the wet mix should not vary from the optimum value by more than agreed limits. The mixed material should be uniformly wet and no segregation should be permitted.

406.3.4. Spreading of mix :

Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared subgrade/sub- base/base in required quantities. In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed stretch be permitted. The mix may be spread either by a paver finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading the material uniformly all over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade. The paver finisher shall be self-propelled, having the following features :

- (i) Loading hoppers and suitable distribution mechanism
- (ii) The screed shall have lamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface profile.
- (iii) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.

The surface of the aggregate shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregate as may be required. The layer may be tested by depth blocks during construction. No segregation of larger and fine particles should be allowed. The aggregates as spread should be of uniform gradation with no pockets of fine materials.

406.3.5. Compaction: After the mix has been laid to the required thickness, grade and crossfall/camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100 mm, a smooth wheel roller of 80 to 100 kN weight may be used. For a compacted single layer upto 200 mm, the compaction shall be done with the help of vibratory roller of minimum static weight of 80 to 100 kN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h.

In portions having unidirectional cross fall/superelevation, rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the centre line of the road, uniformly over-lapping each preceding track by at least one third width until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 1 m away from any preceding stop.

In portions in camber, rolling should begin at the edge with the roller running forward and backward until the edges have been firmly compacted. The roller shall then progress gradually towards the centre parallel to the centre line of the road uniformly overlapping each of the preceding track by at least one-third width until the entire surface has been rolled.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Any displacement occurring as a result of reversing of the direction of a roller or from any other cause shall be corrected" at once as specified and/or removed and made good.

Along forms, kerbs, walls or other places not accessible to the roller, the mixture shall be thoroughly compacted with mechanical tampers or a plate compactor. Skin patching of an area without scarifying the surface to permit proper bonding of the added material shall not be permitted.

Rolling should not be done when the subgrade is soft or yielding or when it causes a wave-like motion in the sub-base/base course or subgrade. If irregularities develop during rolling which exceed 12 mm when tested with a 3 metre straight edge, the surface should be loosened and premixed material added or removed as required before rolling again so as to achieve a uniform surface conforming to the desired grade and crossfall. In no case should the use of unmixed material be permitted to make up the depressions. Rolling shall be continued till the density achieved is at least 98 per cent of the maximum dry density for the material as determined by the method outlined in IS: 2720 (Part -8)

After completion, the surface of any finished layer shall be well- closed, free from movement under compaction equipment or any compaction planes, ridges, cracks and loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of the layer and recompacted.

406.3.6. Setting and drying: After final compaction of wet mix mac- adam course, the road shall be allowed to dry for 24 hours.

406.4. Opening to Traffic

Preferably no vehicular traffic of any kind should be allowed on the finished wet mix macadam surface till it has dried and the wearing course laid.

406.5. Surface Finish and Quality Control of Work

406.5.1. Surface evenness : The surface finish of construction shall conform to the requirements of Clause 902, MORTH Specifications.

406.5.2. Quality control :

Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900 MORTH Specifications.

406.6. Rectification of Surface Irregularity

Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances or where the course is otherwise defective due to subgrade soil getting mixed with the aggregates, the full thickness of the layer shall be scarified over the affected area, re - shaped with added premixed material or removed and replaced with fresh premixed material as applicable and recompacted in accordance with Clause 406.3. The area treated in the aforesaid manner shall not be less than 5 m long and 2 m wide. In no case shall depressions be filled up with unmixed and ungraded material or fines,

406.7. Arrangement for Traffic

During the period of construction, arrangement of traffic shall be done as per Clause 112, MORTH Specifications.

406.8. Measurements for Payment

Wet mix macadam shall be measured as finished work in position in cubic metres.

406.9. Rates

The Contract unit rate for wet mix macadam shall be payment in full for carrying out the required operations including full compensation for all components listed in Clause 401.8. MORTH Specifications.

❖ P & L 25 / 30 / 40 / 50 / 60 mm thick MASTIC ASPHALT Wearing Course with paving grade bitumen meeting the requirements given in the MORTH specification table 500-29 prepared using Mastic Cooker and Laid to required level and slope after cleaning the surface, including providing anti-skid surface with bitumen precoated fine grained hard stone chipping of 13.2 mm nominal size at the rate of .005 cumt per 10 SqMt and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 1000 C, protruding 1 mm to 4 mm over Mastic Asphalt surface, all complete as per MORTH specification

518

MASTIC ASPHALT

Scope

This work shall consist of constructing a single layer of mastic asphalt wearing course for road pavements and bridge decks.

Mastic asphalt is an intimate homogenous mixture of selected well-graded aggregates, filler and bitumen in such proportions as to yield a plastic and void less mass, which when applied hot can be trowelled and floated to form a very dense impermeable surfacing.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Materials

Binder : Subject to the approval of the Engineer, the binder shall be a paving/ Industrial grade bitumen meeting the requirements given in Table 500-43.

Coarse aggregates : The coarse aggregates shall consist of crushed stone, crushed gravel/shingle or other stones. They shall be clean, hard, durable, of fairly cubical shape, uncoated and free from soft, organic or other deleterious substances. They shall satisfy the physical requirements given in Table 500-13.

Table 500-43 Requirements for Physical Properties of Binder

Property	Test Method	Requirements
Penetration at 25°C	IS:1203	15 ± 5*
Softening point, °C	IS:1205	65 ± 10
Loss on heating for 5h at 163°C, % by mass Max.	IS:1212	2.0
Solubility in trichloroethylene, % by mass Min.	IS:1216	95
Ash (mineral matter), % by mass Max.	IS:1217	1.0

* In cold climatic regions (temperature d"10°C), VG 40 grade bitumen may be used.

The percentage and grading of the coarse aggregates to be incorporated in the mastic asphalt depending upon the thickness of the finished course should be as specified in Table 500-44.

Fine aggregates : The fine aggregates shall be the fraction passing the 2.36 mm and retained on the 0.075 mm sieve consisting of crusher run screening, natural sand or a mixture of both. These shall be clean, hard, durable, uncoated, dry, and free from soft or flaky pieces and organic or other deleterious substances.

Filler : The filler shall be limestone powder passing the 0.075 mm sieve and shall have a calcium carbonate content of not less than 80 percent by weight when determined in accordance with IS:1514.

The grading of the fine aggregate inclusive of filler shall be as given in Table 500-45.

Table 500-44 Grade and Thickness of Mastic Asphalt Paving and Grading of Coarse Aggregates

Application	Thickness range (mm)	Nominal size of course aggregate (mm)	Course aggregate content, % by mass of total mix
Roads and carriageways	25–50	13	40±10
Heavily stressed areas i.e. Junctions and toll plazas	40–50	13	45±10
Nominal size of coarse aggregate IS Sieve (mm)	13 mm		
	Cumulative % passing by weight		
19	100		
13.2	88–96		
2.36	0-5		

Table 500-45 Grading of Fine Aggregate (Inclusive of Filler)

IS Sieve	Percentage by weight of aggregate
Passing 2.36 mm but retained on 0.600 mm	0 – 25
Passing 0.600 mm but retained on 0.212 mm	10 – 30
Passing 0.212 mm but retained on 0.075 mm	10 – 30
Passing 0.075 mm	30 – 55

Mix Design

Hardness number : The mastic asphalt shall have a hardness number at the time of manufacture of 60 to 80 at 25°C prior to the addition of coarse aggregate and 10 to 20 at 25°C at the time of laying after the addition of coarse aggregate. The hardness number shall be determined in accordance with the method specified in IS:1195-1978.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Binder content : The binder content shall be so fixed as to achieve the requirements of the mix specified in Clause 518.3.1 and shall be in the range of 14 to 17 percent by weight of total mix as indicated in Table 500-46.

Table 500-46 Composition of Mastic Asphalt Blocks without Coarse Aggregate

IS Sieve	Percentage by weight of mastic asphalt	
	Minimum	Maximum
Passing 2.36 mm but retained on 0.600 mm	0	22
Passing 0.600 mm but retained on 0.212 mm	4	30
Passing 0.212 mm but retained on 0.075 mm	8	18
Passing 0.075 mm	25	45
Bitumen Content % by mass	14	17

Job mix formula : The Contractor shall submit to the Engineer for approval at least one month before the start of the work the job mix formula proposed to be used by him for the work, indicating the source and location of all materials, proportions of all materials such as binder and aggregates, single definite percentage passing each sieve for the mixed aggregate and results of the tests recommended in the various Tables and Clauses of this Specification.

Construction Operations

Weather and seasonal limitations : The provisions of Clause 501.5.1 shall apply, except that laying shall not be carried out when the air temperature at the surface on which the Mastic Asphalt is to be laid is below 10°C.

Preparation of the base : The base on which mastic asphalt is to be laid shall be prepared, shaped and conditioned to the profile required, in accordance with Clause 501 or 902 as appropriate or as directed by the Engineer. In the case of a cement concrete base, the surface shall be thoroughly power brushed clean and free of dust and other deleterious matter. Under no circumstances shall mastic asphalt be spread on a base containing a binder which might soften under high application temperatures. If such material exists, the same shall be cut out and repaired before the mastic asphalt is laid.

Tack coat : A tack coat in accordance with Clause 503 shall be applied on the base or as directed by the Engineer.

Preparation of mastic asphalt : Preparation of mastic asphalt consists of two stages. The first stage shall be mixing of filler and fine aggregates and then heating the mixture to a temperature of 170°C to 210°C. Required quantity of bitumen shall be heated to 170°C to 180°C and added to the heated aggregated. They shall be mixed and cooked in an approved type of mechanically agitated mastic cooker for some time till the materials are thoroughly mixed. Initially the filler alone is to be heated in the cooker for an hour and then half the quantity of binder is added. After heating and mixing for some time, the fine aggregates and the balance of binder are to be added and further cooked for about one hour. The second stage is incorporation of coarse aggregates and cooking the mixtures for a total period of 3 hours. During cooking and mixing care shall be taken to ensure that the contents in the cooker are at no time heated to a temperature exceeding 210°C.

Where the material is not required for immediate use it shall be cast into blocks consisting of filler, fine aggregates and binder, but without the addition of coarse aggregate, weighing about 25 kg each. Before use, these blocks shall be reheated to a temperature of not less than 175°C and not more than 210°C, thoroughly incorporated with the requisite quantity of coarse aggregates and mixed continuously. Mixing shall be continued until laying operations are completed so as to maintain the coarse aggregates in suspension. At no stage during the process of mixing shall the temperature exceed 210°C.

The mastic asphalt blocks (without coarse aggregate) shall show on analysis a composition within the limits as given in Table 500-46

The mix shall be transported to the laying site in a towed mixer transporter having arrangements for stirring and keeping the mix hot during transportation.

Spreading : The mastic asphalt shall be laid, normally in one coat, at a temperature between 175°C and 210°C and spread uniformly by hand using wooden floats or by machine on the prepared and regulated surface. The thickness of the mastic asphalt and the percentage of added coarse aggregate shall be in accordance with Table 500-44 or as specified by the Engineer. Where necessary, battens of the requisite dimensions should be employed. Any blow holes that appear in the surface shall be punctured while the material is hot, and the surface made good by further floating.

Laying surface over old existing bridge deck : Before laying bitumen over old existing bridge deck, the existing cross fall/camber, expansion joint members and water drainage spouts shall be carefully examined for their proper functioning in the bridge deck structure and any deficiency found shall be removed. Loose elements in the expansion joint shall be firmly secured. The cracks in the concrete surface, if any, shall be repaired and filled up properly or replaced by new concrete of specified grade before laying the bitumen mastic over bridge deck.

Laying over new bridge deck : New concrete bridge deck which is not in camber/cross fall shall first be provided with required camber and cross fall by suitable concrete or bituminous treatment. In case of laying over concrete surface, following measures shall be taken :

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- 1) For proper bond with new concrete deck, surface shall be roughened by means of stiff broom or wire brush and it shall be free from ridges and troughs.
- 2) A thin bituminous tack coat (with bitumen of grade 60/70) shall be applied on the concrete deck before pouring mastic. The quantity of bitumen for tack coat shall not exceed 5-6 kg per 10 sq.m.
- 3) On surface in longitudinal slope, after applying tack coat, chicken- mesh reinforcement of 1.5 mm dia steel wire with hexagonal or rectangular openings of 20-25 mm shall be placed and held properly in position on the concrete surface before pouring mastic.

Joints : All construction joints shall be properly and truly made. These joints shall be made by warming existing mastic asphalt by the application of an excess quantity of the hot mastic asphalt mix which afterwards shall be trimmed to leave it flush with the surfaces on either side.

Surface finish : The mastic asphalt surface can have poor skid resistance after floating. In order to provide resistance to skidding, the mastic asphalt after spreading, while still hot and in a plastic condition, shall be covered with a layer of stone aggregate. This aggregate shall be 13.2 mm size (passing the 19.0 mm sieve and retained on the 6.7 mm sieve) or 9.5 mm size (passing the 13.2 mm sieve and retained on the 6.7 mm sieve) subject to the approval of the Engineer. Hard stone chips, complying with the quality requirements of Table 500-18, shall be precoated with bitumen at the rate of 2 ± 0.4 percent of VG 30 grade. The addition of 2 percent of filler complying with Table 500-8 may be required to enable this quantity of binder to be held without draining. The chips shall then be applied at the rate of 0.005 cu.m per 10 sq.m and rolled or otherwise pressed into the surface of the mastic layer when the temperature of the mastic asphalt is not less than 100°C.

518.5 Opening of Traffic

Traffic may be allowed after completion of the work when the mastic asphalt temperature at the mid-depth of the completed layer has cooled to the daytime maximum ambient temperature.

518.6 Surface Finish and Quality Control of Work

The surface finish of the completed construction shall conform to the requirements of Clause 902.

For control of the quality of materials and the works carried out, the relevant provisions of Section 900 shall apply.

The surface of the mastic asphalt, tested with a straight edge 3 cm long, placed parallel to the centre line of the carriageway, shall have no depression greater than 7mm. The same shall also apply to the transverse profile when tested with a camber template.

518.7 Arrangements for Traffic

During the period of construction, arrangements for traffic shall be made in accordance with the provisions of Clause 112.

518.8 Measurement for Payment

Mastic asphalt shall be measured as finished work in square metres at a specified thickness, or by weight in tonnes as stated in the Contract.

518.9 Rate

The contract unit rate for mastic asphalt shall be payment in full for carrying out the required operations including full compensation for all components listed under Clause 501.8.2.2.

Cat Eye (D.M.C.) : Made out of Epoxy down molding compound pressurized molded in size 10x10x1.75 cm., provided with high intensity reflector on both side in desired colour A.S.A.

General

Reflective pavement marker (R & P) or road stud is device which is bound to or anchored within the road surface for lane marking and delineation for night-time visibility. If reflected light in directions close to the direction from which it came.

1.1 Definitions

1.2.1 Description of Terms Specific to this standard

1.2.1.1 Coefficient of luminous intensity (C I L) or specific intensity = the ratio of luminous intensity of the retro reflector in the direction of observation to luminance at the retro-reflector on a plane perpendicular to the direction of the incident light expressed in terms of Milca deal as per incident lax (med / Ix).

1.2.1.2 Horizontal entrance angle the angle in the horizontal plane between the direction of incident light and the normal to the leading edge of the marker.

1.2.1.3 Observation angle – the angle in the reflector between the illumination axis and the observation axis.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- 1.2.1.4. Retro – reflection in which the radiation is returned in direction close to the direction from which it came, this property being maintained over wide variations of the direction of incident radiation.
- 1.2.1.5. Head – that part of a road stud which is above the road surface when the road stud is fixed in position in the road.
- 1.2.1.6. Upper surface – that part of the external surface of road stud which is visible when the road stud is fixed in position in the road.
- 1.2.1.7 Anchorage – that part of the external surface of road stud which is visible when the road stud is fixed in position in the road.

1.3 Material

- 1.3.1. Plastic body of RPM road stud shall be molded from ASA (Acrylic sterner Acryl nitric) or HIPS (Impacts polystyrene) or ABS or any other material approved by the Engineer-in-charge. The marker shall support a load of 13536 kg tested in accordance with ASTM D4280.
- 1.3.2 Reflective panels shall consist of number of lenses containing single or dual prismatic cubes capable of providing total internal reflection of the light of the light entering the lens face. Lenses shall be molded of methyl methacrylate conforming to ASTM D 788 or equivalent.

1.4 Design

- 1.4.1 The slope of retro-reflecting surface shall preferably be 35 ± 5 degree to base.
- 1.4.2 The area of each retro-reflecting surface shall not be less than 13.0 sq.cm.

1.5 Optical Performance

1.5.1 Unidirectional and bi-directional studs.

- 1.5.1.1 Each reflector or combination of reflectors on each face of the stud shall have a C.I.L. not less than that given in Table 1 or 2 as appropriate.

Table 1 Minimum C.I.L. Values for Category ‘A’ studs.

Entrance angle observation angle		C.I.L. in made 1 x		
		White	Amber	Red
0°U 5° L & R	0.3°	220	110	44
0°U 10° L & R	0.5°	120	60	24

Table Minimum C.I.L. Values for Category ‘B’ studs.

Entrance angle observation angle		C.I.L. in made 1 x		
		White	Amber	Red
0°U 6° L & R	0.3°	20	10	4
0°U 10° L & R	0.5°	15	7.5	3

Note : The entrance angle of 0°U corresponds to the normal aspect of the reflectors when the reflecting road studs is installed in horizontal road surface.

- 1.5.1.2 A stud that incorporates one or more corner cube reflectors shall be considered to be included in category ‘A’ A stud that incorporates one or more biconvex reflectors shall be considered to be included in category ‘B’.

1.5.2 Omni – directional studs.

Each omni-directional stud shall have a minimum C.I.L. of not less than 2 med / 1x.

1.5.3 Tests

- 1.5.3.1. Coefficient of luminance intensity can be measured by produced described in ASTM 809 “Practice for Measuring Photometric Characteristics” or as recommended in BS: 873 – Part 4:1973.
- 1.5.3.2 Under test conditions, a stud shall not be considered to fail the photometric requirements if the measured C.I.L. at any one position of measurement is less than the values specified in Table 1 or 2 provided that.
- (i) The value is not less than 80% of the specified minimum, and

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(ii) The average of the left and tight measurements for the specific angle is greater than the specified minimum.

1.6 Fixing of Reflective Markers.

1.6.1.1. The enveloping profile of the head of the stud shall be smooth and the studs shall not present any sharp edges to traffic.

1.6.1.2. The reflecting portions of the studs shall be free from crevice or ledges where dirt might accumulate.

1.6.1.3. All road studs shall be legibly marked with the name, trade mark or other means of identification of the manufacture.

1.6.1.4. Marker height shall not exceed 20mm.

1.6.1.5. Marker width shall not exceed 130mm.

1.6.1.6. The base of the marker shall be flat within 1.3 mm. If the bottom of the marker is configured. The outermost faces of the configurations shall not deviate more than 1.3 mm from a flat surface.

1.6.2. Placement.

1.6.2.1. The reflective marker shall be faced to the road surface using the adhesives and the produced recommended by the manufacture. No nails shall be used to affix the marker as nails are hazardous for the road.

1.6.2.2. Regardless of the type adhesive used. The markers shall not be fixed if the pavements are not surface dry and no new asphalt concrete surfacing has been opened to traffic for a period of not less than 14 hours.

1.6.2.3. The portions of the highway surface, to which the marker is to be bonded by the adhesive, shall be free of dirt, curing compound, grease, oil, moisture, looser or unsound layers, paint and any other material which would adversely affect the adhesive.

1.6.2.4. Use a wire brush, if necessary to loosen and remove dirt. Then brush or blow clean.

1.6.2.5. The adhesive shall be placed uniformly on the cleaned pavement surface or on the bottom of the marker in a quantity sufficient to result in complete coverage of the area of contact of the marker with no voids present and with a slight excess the marker has been lightly pressed in place.

1.6.2.6. For epoxy installations, excess adhesive around the edge of the marker, excess adhesive on the pavement and adhesive on the exposed surface of the markers shall be immediately removed. Soft rags moistened with mineral spirits or kerosene may be used, if necessary to remove adhesive from exposed faces of pavement markers.

1.7. Warranty and durability.

The contractor shall obtain from the manufacture a two year warranty for satisfactory field performance including stipulated retro-reflectance of the reflecting panel and submit the same to the Engineer. In addition, a two year warranty for satisfactory infield performance of the finished road marker shall also be given by the contractor who carried out the work of fixing of reflective road markers. In case the markers are displaced, damaged, get worn out or lose their reflectivity compared to stipulated standards, the contractor would be required to replace all such marker within 15 days of the intimation from the Engineer at his own cost and with no extra remuneration to be paid for such works.

1.8 Measurement for Payment.

The measurement of reflective road markers shall be in numbers of different type of markers supplied and fixed.

1.9 Rate

The contract unit rate for reflective road markers shall be payment in full compensation for furnishing all labour material, tools, equipment including incidental costs necessary for carrying out the work at site conforming to the specifications complete as per approved drawings or as directed by the Engineer.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ સીમેન્ટ કોન્ક્રીટ - ૧ : ૨ : ૪ ના પ્રમાણથી સી.સી. કામ

આ કામમાં ૧૫ થી ૨૦ એમ.એમ. સાઈઝની હાર્ડ બ્લેક સ્ટોન મેટલની મશીન ક્લશ કપચી લાવી વાપરવાની છે. ઉમરાળા, તળાજા, ઘંધુકા, પૈકીની પાસ કરવામાં આવે તેવી ધૂળ વગરની ચોખ્ખી, જીણી, ચાળેલી, કસ્તર વિનાની, શ્રીકાર આકારની લાવી વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. તમામ રેતી, ઘોઈને વાપરવાની છે. તમામ કામ મશીન મીકસીંગ વડે જરૂરી તેમજ યોગ્ય સેન્ટરીંગ, શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (વાયબ્રેટીંગ મશીન વડે) તથા ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે કમ્પલીટ કામ કરી આપવાનું છે. આ કામમાં એક ભાગ સીમેન્ટ, ૨ ભાગ રેતી, ૪ ભાગ કપચી, એ પ્રમાણે કોન્ક્રીટ માટે માલ બનાવવાનો છે. કપચી, રેતી, સીમેન્ટ પાયલા ભરી માપવાનું છે. ઉપરોક્ત તમામ વિગતે કામનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. આ તમામ કામ લાઈન દોરીએ, લેવલે, ઓળંભે આપવામાં આવે તે ડીઝાઈન મુજબ કરી આપવાનું છે.

❖ સીમેન્ટ કોન્ક્રીટ - ૧ : ૩ : ૬ ના પ્રમાણથી સી.સી. કામ

આ કામમાં ૧૫ થી ૨૦ એમ.એમ. સાઈઝની હાર્ડ બ્લેક સ્ટોન મેટલની મશીન ક્લશ કપચી લાવી વાપરવાની છે. ઉમરાળા, તળાજા, ઘંધુકા, પૈકીની પાસ કરવામાં આવે તેવી ધૂળ વગરની ચોખ્ખી, જીણી, ચાળેલી, કસ્તર વિનાની, શ્રીકાર આકારની લાવી વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. તમામ રેતી, ઘોઈને વાપરવાની છે. તમામ કામ મશીન મીકસીંગ વડે જરૂરી તેમજ યોગ્ય સેન્ટરીંગ, શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (વાયબ્રેટીંગ મશીન વડે) તથા ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે કમ્પલીટ કામ કરી આપવાનું છે. આ કામમાં એક ભાગ સીમેન્ટ, ૩ ભાગ રેતી, ૬ ભાગ કપચી, એ પ્રમાણે કોન્ક્રીટ માટે માલ બનાવવાનો છે. કપચી, રેતી, સીમેન્ટ પાયલા ભરી માપવાનું છે. ઉપરોક્ત તમામ વિગતે કામનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. આ તમામ કામ લાઈન દોરીએ, લેવલે, ઓળંભે આપવામાં આવે તે ડીઝાઈન મુજબ કરી આપવાનું છે.

❖ ઈટ યજ્ઞતરકામ પ્લીન્થ/સુપરસ્ટ્રક્ચર માટે સિમો ૧:૬

આ કામમાં વાપરવાની તમામ ઈટો ચીમની ભઠ્ઠાની, બેસ્ટ મેન્યુફેક્ચરની મ્યુ. કોર્પો. તરફથી પાસ કરવામાં આવે તેવી ફર્સ્ટ ક્વોલિટીની લાવવાની છે. તમામ ઈટો આખી, સારીપાકેલી, ફાટફટ વગરની એક સરખી સાઈઝની કોલસી કે તેવો બીજો કોઈ પદાર્થ ચોટેલો ન હોય તેવી એક સરખી સ્ટાન્ડર્ડ સાઈઝની લાવવાની છે. સાઈટ ઉપર ઈટો લાવ્યા પછી પણ પાસ કરાવ્યા બાદ વાપરવા દેવામાં આવશે. તમામ ઈટો યજ્ઞતર કામમાં વાપરતાં પુર્વે જરૂરી પૂરતાં પ્રમાણમાં પાણી વડે પલાળવાની છે. આર્ય, કોર્નીસ્ટ, પીલર્સ, આર્કીટ્રેપ, પેરાપેટ વિગેરે કામનો સમાવેશ ઈટના યજ્ઞતરમાં થાય છે. તેનો કોઈપણ ભાવ જુદો આપવામાં આવશે નહીં. ઈટનું યજ્ઞતર કામ દર એક થરે દોરી બાંધીને લાઈન દોરીમાં, લેવલમાં ઓળંભે, સાડ, સફાઈદાર કરવાનું છે. યજ્ઞતર કામમાં સાંધ (૧/૨" થી) ૧.૨૫ સે.મી. તમામ કામ કાળજીથી કરવાનું છે. મ્યુ. કોર્પો. પાસ કરે તેવી સારી જાતની ચોખ્ખી ચાળેલી રેતી (તળાજા, ઉમરાળા, ઘંધુકા પૈકીની) વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ વાપરવાની છે. ઈટનું યજ્ઞતર ૧:૬ નાં પ્રમાણમાં સી.મો.થી કરવાનું છે. તમામ યજ્ઞતર કામને જરૂરી પૂરતા પ્રમાણમાં ક્યોરીંગ કરવાનું છે અને દસ દિવસ સુધી પાણીથી ભીનું રાખવાનું છે. આ કામના પ્લાન, એલીવેશન, તથા સેક્સન મુજબનું તથા ઉચાઈ મુજબનું યજ્ઞતર કામ કરવાનું છે. તેનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. ઉપરોક્ત તમામ વિગતે આ કામ જરૂરી ક્યોરીંગ, સ્કેફોલ્ડીંગ રેકીંગ ઓફ જોઈન્ટસ સાથે કંપલીટ કામ કરી આપવાનું છે.

❖ એમ.એસ.ફેબ્રિકેશન- ફેબ્રિકેટડ ગ્રીલ, ગેઈટ, રેલીંગ, પાઈપ રેલીંગ વિ. બનાવી સ્થળે ફીટીંગ તથા

ઓઈલ પેઈન્ટીંગ સાથેનું કમ્પલીટ કામ

આ કામ માટે આપવામાં આવે અને સુચવવામાં આવે તે માપ સાઈઝ તથા ડીઝાઈન અનુસારનું આઈ.એસ. સ્પેશીયલ સ્ટીલમાં જણાવ્યા મુજબનું સાડ, કાટ વગરનું પાસ કરવામાં આવે તેવું માર્શલ સ્ટીલ લાવી આપવામાં આવે તે ડીઝાઈન મુજબ ફેબ્રિકેશન વર્ક તૈયાર કરી જરૂરી તમામ પ્રકારના લોખંડના ફીટીંગ્સ ફીક્સીંગ સાથે અને સ્થળ ઉપર જરૂરી વેલ્ડીંગ કામ સાથે સ્થળે સુચવવામાં આવે તે મુજબ જરૂરી યોગ્ય તોડફોડ સાથે દિવાલમાં ૧:૨ ના સી.મો. વડે છાંદા છુંદી અગર તો જમીનમાં દર બે મીટરે ૩૦×૩૦×૩૦ સે.મી. ઉડાઈમાં ખાડા કરી ૧:૨:૪ આર.સી.સી. માં ફીટ કરી આપવાનું છે. જરૂરી જણાયે આવું ફેબ્રિકેશન વર્ક લાકડા કામમાં પણ જરૂરી સ્ક્રુ વગેરેથી ફીટ કરવાનું છે. જરૂર જણાયે કહેવામાં આવે તો આવું ફેબ્રિકેશન વર્ક દિવાલો કે આર.સી.સી. કામમાં જરૂરી ડ્રીલીંગ મશીન વડે જરૂરી હોલ પાડી લાકડાની ડટીઓમાં સ્ક્રુ વડે ફીટ કરવાનું છે. તમામ કામને પાસ કરવામાં આવે તેવા પ્રાયમર લાવી તેનો એક હાથ મારવાનો છે. અને પાસ કરવામાં આવે તેવો સારી કંપનીનો ઓઈલ પેઈન્ટ લાવી તેના તમામ કામને બે હાથ મારી આપવાના છે. આ ઉપરોક્ત વિગતે કામના ભાવ દર એક કિ.ગ્રા. પર સમજવાના છે. તૈયાર કામનું માપ લેવામાં આવશે. જરૂર જણાયે મટીરીયલનું વજન કોન્ટ્રાક્ટરે સ્વખર્ચે સૂચવ્યા મુજબનાં ઈલેક્ટ્રોનીક વજનકાંટા પર કરાવવાનું રહેશે તથા વજનની ઓરીજનલ કાંટાચીઠી અત્રે જમા કરાવવાની રહેશે.

❖ Re-Fitting of Man Hole Frame Cover

- The work under this section consists Dismantelling of old Frame & Cover and Concrete of Manhole
- The work under this section consists Brick Masonry in C:M 1:6 to Raise the level of manhole up to surface of new proposed road (Aprox 3 layer of brick on old manhole) The Specification of Brick Masonary will be applied
- The work under this section consists Cement Concrete of proportion in 1:1.5:3 (Aprox 10 Cm thickness) including require Steel with fixing the existing manhole frame. The Specification of Cement Concrete will be applied
- The work under this section consists Plaster 15 mm thick in C:M 1:3 Inside of manhole AND Vata in C:M 1:3 Outside of manhole The Specification of Cement Plaster will be applied

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ ડબલ કોટ સેન્ડ ફેસ પ્લાસ્ટર

મ્યુ. કોર્પો. પાસ કરે તેવી સારી ચાળેલી રેતી લાવી ૧૦ મીટર ઉંચાઈ હાઈટ લેવલ સુધીની જે તે સપાટી પાણીથી તરે કર્યા બાદ જરૂરી ઠયાઓ કરી એક સરખું દોરીએ, ઓળખે લાઈન લેવલે ખાડા ખડીયા વગર ૧:૩ સિ.મો. નાં પ્રમાણમાં ૧૫ એમ.એમ. જાડો પ્રથમ કોટ નું પ્લાસ્ટર કરવાનું છે. ત્યારબાદ બીજા દિવસે આ પ્રથમ કોટ પર મ્યુ. કોર્પો. પાસ કરે તેવો સુરેન્દ્રનગરનો પાણો લાવી આપી ૧:૨ નાં પ્રમાણમાં બીજો હાથ લગાવી આપવાનો છે. આ બીજા હાથ પર "રબર સ્પોન્જસ" વડે ડબલ કોટ એન્ડ ફેઈસ પ્લાસ્ટર કરી આપવાનું છે. તૈયાર કામ પર દસ દિવસ સુધી પાણી છાંટી કચોરીંગ કરવાનું છે. તૈયાર કામનું માપ લેવામાં આવશે. ભાવ દર એક ચો.મી. મુજબ સમજવાનો છે.

❖ 80 mm thick Precast paving block with comp. strength 35 N/sq mm

❖ પ્રિકાસ્ટ ૮૦ મીમી જાડા ૩૫ ન્યુટન/ચો મીમી સ્ટ્રેન્થ ધરાવતા પેવિંગ બ્લોક સપ્લાઈ કરી ફીટીંગનું કામ.

આ કામ જરૂર મુજબનું ખોદાણ કામ કરી, રેતી સપ્લાય કરી, પાથરીને પ્રિકાસ્ટ પેવિંગ બ્લોક સપ્લાય કરી ફીટ કરવાનું કામ. ૮૦ મીમી જાડાઈ ધરાવતા – ૩૫ N / sq. mm compressive strength (૩૫ ન્યુટન / ચો મીમી સ્ટ્રેન્થ ધરાવતા) ના તેમજ ઓફીસ ધ્વારા પાસ કરવામાં આવે તેવી ડીઝાઈન તથા કલર મુજબના પ્રિકાસ્ટ સીમેન્ટ કોન્ક્રીટ બ્લોક કામના સ્થળે સપ્લાય કરી, ફીટીંગના સ્થળે જરૂરી લેવલીંગ કરી, જરૂરી કોમ્પેક્શન કરાવી, ૧" થી ૧-૧/૨" જાડાઈમાં રેતી પાથરી, તેના પર સ્ટોન ડસ્ટ પાથરી બેઈઝ તૈયાર કરી, પેવિંગ બ્લોક ફીટ કરવાના રહેશે. તેમજ પેવિંગ બ્લોકના છોડે સીમેન્ટ કોન્ક્રીટ ૧:૨:૪ ના પ્રમાણમાં વાટા કરી, પેવિંગ બ્લોકના વચ્ચેનાં જોઈન્ટસ માં સ્ટોન પાવડર કે પણા થી ફીલીંગ કરી, કચોરીંગ વોટરીંગ સાથે કમ્પલીટ કામ કરી આપવાનું રહેશે. પેવિંગ બ્લોક સાઈટ પર લાવ્યા બાદ કે ફીટિંગ કરાયા બાદ ગમે ત્યારે ૩૦૦ ચો.મી. દીઠ તથા મીનીમમ એક વખત અત્રેની હાજરીમાં બ્લોકનાં નમુનાઓ લઈ ટેસ્ટીંગ માટે જરૂરી તમામ વ્યવસ્થા કરી ગેરી / સરકારી કોલેજ અથવા સુચવવામાં આવે તે લેબોરેટરીમાં કોન્ટ્રાક્ટરે સ્વખર્ચે ટેસ્ટીંગ કરાવી ટેસ્ટીંગ રીપોર્ટસ રજૂ કરવાનો રહેશે. ટેસ્ટીંગ બાદજ નિયત સ્ટ્રેન્થ ધરાવતાં પેવિંગ બ્લોકનું જ ફીટીંગ કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તેવા બ્લોક ફીટીંગ થઈ ગયા હોય તો પણ સાઈટ પરથી દૂર કરાવવાનાં રહેશે. ૧૦ સેમી સુધીનું ખોદાણ આ આઈટમમાં ગણવામાં આવશે જે માટે ખોદાણનું કામ /રકમ અલગથી નહિ અપાય. આ કામનો ભાવ ૧ ચો.મી. મુજબ આપવામાં આવશે.

❖ 65 mm thick Precast paving block with comp. strength 25 N/sq mm

❖ પ્રિકાસ્ટ ૬૫ મીમી જાડા ૨૫ ન્યુટન / ચો મીમી સ્ટ્રેન્થ ધરાવતા પેવિંગ બ્લોક સપ્લાઈ કરી ફીટીંગનું કામ.

આ કામ જરૂર મુજબનું ખોદાણ કામ કરી, રેતી સપ્લાય કરી, પાથરીને પ્રિકાસ્ટ પેવિંગ બ્લોક સપ્લાય કરી ફીટ કરવાનું કામ. ૬૫ મીમી જાડાઈ ધરાવતા – ૨૫ N / sq.mm compressive strength (૨૫ ન્યુટન / ચો મીમી સ્ટ્રેન્થ ધરાવતા) ના તેમજ ઓફીસ ધ્વારા પાસ કરવામાં આવે તેવી ડીઝાઈન તથા કલર મુજબના પ્રિકાસ્ટ સીમેન્ટ કોન્ક્રીટ બ્લોક કામના સ્થળે સપ્લાય કરી, ફીટીંગના સ્થળે જરૂરી લેવલીંગ કરી, જરૂરી કોમ્પેક્શન કરાવી, ૧" થી ૧-૧/૨" જાડાઈમાં રેતી પાથરી, તેના પર સ્ટોન ડસ્ટ પાથરી બેઈઝ તૈયાર કરી, પેવિંગ બ્લોક ફીટ કરવાના રહેશે. તેમજ પેવિંગ બ્લોકના છોડે સીમેન્ટ કોન્ક્રીટ ૧:૨:૪ ના પ્રમાણમાં વાટા કરી, પેવિંગ બ્લોકના વચ્ચેનાં જોઈન્ટસ માં સ્ટોન પાવડર કે પણા થી ફીલીંગ કરી, કચોરીંગ વોટરીંગ સાથે કમ્પલીટ કામ કરી આપવાનું રહેશે. પેવિંગ બ્લોક સાઈટ પર લાવ્યા બાદ કે ફીટિંગ કરાયા બાદ ગમે ત્યારે ૩૦૦ ચો.મી. દીઠ તથા મીનીમમ એક વખત અત્રેની હાજરીમાં બ્લોકનાં નમુનાઓ લઈ ટેસ્ટીંગ માટે જરૂરી તમામ વ્યવસ્થા કરી ગેરી / સરકારી કોલેજ અથવા સુચવવામાં આવે તે લેબોરેટરીમાં કોન્ટ્રાક્ટરે સ્વખર્ચે ટેસ્ટીંગ કરાવી ટેસ્ટીંગ રીપોર્ટસ રજૂ કરવાનો રહેશે. ટેસ્ટીંગ બાદજ નિયત સ્ટ્રેન્થ ધરાવતાં પેવિંગ બ્લોકનું જ ફીટીંગ કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તેવા બ્લોક ફીટીંગ થઈ ગયા હોય તો પણ સાઈટ પરથી દૂર કરાવવાનાં રહેશે. ૧૦ સેમી સુધીનું ખોદાણ આ આઈટમમાં ગણવામાં આવશે જે માટે ખોદાણનું કામ /રકમ અલગથી નહિ અપાય. આ કામનો ભાવ ૧ ચો.મી. મુજબ આપવામાં આવશે.

❖ પ્રિકાસ્ટ રબર મોલ્ડેડ ૮૦ મીમી જાડા ૫૦ ન્યુટન/ચો મીમી સ્ટ્રેન્થ ધરાવતા પેવિંગ બ્લોક સપ્લાઈ કરી ફીટ કરવાનું કામ

❖ Rubber Moulded 80 mm thick Precast paving block with comp. strength 50 N/sq mm

આ કામ જરૂર મુજબનું ખોદાણ કામ કરી, ફીટીંગના સ્થળે જરૂરી લેવલીંગ કરી, જરૂરી કોમ્પેક્શન કરાવી, ૧" થી ૧-૧/૨" જાડાઈમાં રેતી અથવા ગ્રીટ પાથરી, તેના પર સ્ટોન ડસ્ટ પાથરી બેઈઝ તૈયાર કરી, રબર મોલ્ડેડ ૮૦ મીમી જાડાઈ ધરાવતા – ૫૦ ન્યુટન / ચો મીમી સ્ટ્રેન્થ ધરાવતા (50 N / sq.mm compressive strength) તેમજ ઓફીસ ધ્વારા પાસ કરવામાં આવે તેવી ડીઝાઈન તથા કલર મુજબના પ્રિકાસ્ટ સીમેન્ટ કોન્ક્રીટ પેવિંગ બ્લોક કામના સ્થળે સપ્લાય કરી, પેવિંગ બ્લોક ફીટ કરવાના રહેશે. તેમજ પેવિંગ બ્લોકના છોડે સીમેન્ટ કોન્ક્રીટ ૧:૨:૪ ના પ્રમાણમાં વાટા કરી, પેવિંગ બ્લોકના વચ્ચેનાં જોઈન્ટસ માં સ્ટોન પાવડર કે પણા થી ફીલીંગ કરી, કચોરીંગ વોટરીંગ સાથે કમ્પલીટ કામ કરી આપવાનું રહેશે. પેવિંગ બ્લોક સાઈટ પર લાવ્યા બાદ કે ફીટિંગ કરાયા બાદ ગમે ત્યારે ૩૦૦ ચો.મી. દીઠ તથા મીનીમમ એક વખત અત્રેની હાજરીમાં બ્લોકનાં નમુનાઓ લઈ ટેસ્ટીંગ માટે જરૂરી તમામ વ્યવસ્થા કરી ગેરી / સરકારી કોલેજ અથવા સુચવવામાં આવે તે લેબોરેટરીમાં કોન્ટ્રાક્ટરે સ્વખર્ચે ટેસ્ટીંગ કરાવી ટેસ્ટીંગ રીપોર્ટસ રજૂ કરવાનો રહેશે. ટેસ્ટીંગ બાદજ નિયત સ્ટ્રેન્થ ધરાવતાં પેવિંગ બ્લોકનું જ ફીટીંગ કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તેવા બ્લોક ફીટીંગ થઈ ગયા હોય તો પણ સાઈટ પરથી દૂર કરાવવાનાં રહેશે. ૧૦ સેમી સુધીનું ખોદાણ આ આઈટમમાં ગણવામાં આવશે જે માટે ખોદાણનું કામ /રકમ અલગથી નહિ અપાય. આ કામનો ભાવ ૧ ચો.મી. મુજબ આપવામાં આવશે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

❖ પ્રિકાસ્ટ રબર મોલ્ડેડ ૬૦ થી ૬૫ મીમી જાડા ૪૦ ન્યુટન/ચો મીમી સ્ટ્રેન્થ ધરાવતા પેવિંગ બ્લોક સપ્લાઈ કરી ફીટ કરવાનું કામ

❖ Rubber Moulded 60 to 65 mm thick Precast paving block with comp. strength 40 N/sq mm

આ કામ જરૂર મુજબનું ખોદાણ કામ કરી, ફીટીંગના સ્થળે જરૂરી લેવલીંગ કરી, જરૂરી કોમ્પેક્શન કરાવી, ૧" થી ૧-૧/૨" જાડાઈમાં રેતી અથવા ગ્રીટ પાથરી, તેના પર સ્ટોન ડસ્ટ પાથરી બેઈઝ તૈયાર કરી, રબર મોલ્ડેડ ૬૦ થી ૬૫ મીમી જાડાઈ ધરાવતા - ૪૦ ન્યુટન / ચો મીમી સ્ટ્રેન્થ ધરાવતા (40 N / sq.mm compressive strength) તેમજ ઓફીસ ધ્વારા પાસ કરવામાં આવે તેવી ડીઝાઈન તથા કલર મુજબના પ્રિકાસ્ટ સીમેન્ટ કોન્ક્રીટ પેવિંગ બ્લોક કામના સ્થળે સપ્લાય કરી, પેવિંગ બ્લોક ફીટ કરવાના રહેશે. તેમજ પેવિંગ બ્લોકના છેડે સીમેન્ટ કોન્ક્રીટ ૧:૨:૪ ના પ્રમાણમાં વાટા કરી, પેવિંગ બ્લોકના વચ્ચેનાં જોઈન્ટ્સ માં સ્ટોન પાવડર કે પણા થી ફીલીંગ કરી, ક્યોરીંગ વોટરીંગ સાથે કમ્પલીટ કામ કરી આપવાનું રહેશે. પેવિંગ બ્લોક સાઈટ પર લાવ્યા બાદ કે ફીટિંગ કરાયા બાદ ગમે ત્યારે ૩૦૦ ચો.મી. દીઠ તથા મીનીમમ એક વખત અત્રેની હાજરીમાં બ્લોકનાં નમુનાઓ લઈ ટેસ્ટીંગ માટે જરૂરી તમામ વ્યવસ્થા કરી ગેરી / સરકારી કોલેજ અથવા સુચવવામાં આવે તે લેબોરેટરીમાં કોન્ટ્રાક્ટરે સ્વખર્ચે ટેસ્ટીંગ કરાવી ટેસ્ટીંગ રીપોર્ટ્સ રજૂ કરવાનો રહેશે. ટેસ્ટીંગ બાદજ નિયત સ્ટ્રેન્થ ધરાવતાં પેવિંગ બ્લોકનું જ ફીટીંગ કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તેવા બ્લોક ફીટીંગ થઈ ગયા હોય તો પણ સાઈટ પરથી દૂર કરાવવાનાં રહેશે. ૧૦ સેમી સુધીનું ખોદાણ આ આઈટમમાં ગણવામાં આવશે જે માટે ખોદાણનું કામ /રકમ અલગથી નહિ અપાય. આ કામનો ભાવ ૧ ચો.મી. મુજબ આપવામાં આવશે.

❖ Supply And Fitting of Precast Road Divider of M-25 Grade Concrete - Having size of 300 mm Long x 300 mm Height x 150 mm Wide Using 6 mm steel 6 Straight & 3 Ring per Divider Block Including Transporting, Stacking, Placing & Fitting in Line & Level As Directed, Vata between blocks and vata at base with road, Curing, Oil Painting 1 coat primer & 2 coat Oil paint

❖ પ્રિકાસ્ટ રોડ ડિવાઈડર ૩૦×૧૫×૩૦ સે.મી. માપ ના ૬ મીમી ની ત્રણ રીંગ તથા ૬ નંગ સીધા સળીયા વાપરી આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે એમ ૨૫ ગ્રેડ (M-25) સિમેન્ટ કોન્ક્રીટ વાપરી બનાવેલા સીંગલ પેલ ડિવાઈડર સપ્લાઈ કરી ૨૦ મી.મી. જાડાઈમાં ૧:૬ સી.મો.માં બેડીંગ માં લાઈન લેવલે ફીટ કરી ડિવાઈડરો વચ્ચેના જોઈન્ટને સીમેન્ટ સ્લરીવડે વાટા કરી, રોડ તરફની ડિવાઈડરની સાઈડમાં ૧:૩ સી.મો. વડે ૧૦×૧૦ સેમીનો ગોળીયો/ લોઢીયો વાટો કરી, એક સાઈડ રોડ તરફ ઓઈલ પેઈન્ટિંગ કરવા સાથે સપ્લાઈ, ફીટીંગ, વાટાકામ તથા ક્યોરીંગ સાથેનું કામ.

આ કામમાં ૬ એમ. એમ.એમ.એસ.બારનું લોખંડની ત્રણ રીંગ તથા ૬ નંગ સીધા સળીયા વાપરી, આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે એમ ૨૫ ગ્રેડ (M-25) સિમેન્ટ કોન્ક્રીટ વાપરી, મીક્સ માલ ડીઝાઈન મુજબનાં ફર્મામાં ઢાળી ૩૦×૧૫×૩૦ સે.મી. માપ ના પ્રિકાસ્ટ ડિવાઈડર તૈયાર કરી, કહેવામાં આવે તે સ્થળે ભાંગ-તૂટ વગરના સપ્લાય કરી, ડિવાઈડર ને જમીનમાં ફીટીંગ કરતા પહેલા ખોદેલ માટી દુર કરી એક સરખું લેવલે કરી ૨૦ મી.મી. જાડાઈમાં ૧:૬ સી.મો.માં બેડીંગ કરી ડિવાઈડર લાઈન લેવલે ફીટ કરી ડિવાઈડરો વચ્ચેના જોઈન્ટને સીમેન્ટ સ્લરીવડે વાટા કરી, તથા રોડ તરફની ડિવાઈડરની સાઈડમાં ૧:૩ સી.મો. વડે ૧૦×૧૦ સેમીનો ગોળીયો/ લોઢીયો વાટો કરવા સાથે જરૂરી ક્યોરીંગ સાથે એક સાઈડ રોડ તરફ ઓઈલ પેઈન્ટિંગ પ્રાયમરનો એક હાથ તથા ઓઈલ પેઈન્ટનાં બે હાથ મારી આપવા સાથે સુચના મુજબ ના સ્થળે ફીટીંગ કરી આપવાનું કમ્પલીટ કામ. કરેલ કામનું માપ નંગ મુજબ ગણવામાં આવશે.

❖ ઓઈલ પેઈન્ટિંગ નું કામ

મ્યુ. કોર્પો. ધ્વારા પાસ કરવામાં આવે તે કંપનીનાં તથા કલર શેડસનો ઓઈલ પેઈન્ટ લાવી જે તે સપાટી ઘસી, સાફ કરી, સપાટી સ્મુથ કરી લોખંડ કામ, લાકડ કામ, દિવાલ, કોન્ક્રીટસરફેસ પર પ્રથમ પ્રાઈમરનો હાથ લગાવી તેનાં પર ઓઈલ પેઈન્ટનાં બે હાથ લગાવી આપવાનું કમ્પલીટ કામ છે. તૈયાર કામનું માપ લેવામાં આવશે. ભાવ દર એક ચો.મી. પર સમજવાનો છે.

❖ Providing form work of ordinary timber planking so as to give a rough finish including centring. Shuttering strutting and propping etc. Height of propping and centring below supporting floor to ceiling not ex-exceeding 4M. And removal of the same for in including reinforced concrete and plain concrete work

1501. DESCRIPTION

Formwork shall include all temporary or permanent forms required for forming the concrete of the shape, dimensions and surface finish as shown on the drawing or as directed by the Engineer, together with all props, staging, centering, scaffolding and temporary construction required for their support. The design, erection and removal of formwork shall conform to IRC:87 "Guidelines for Design and Erection of Falsework for Road Bridges" and these specifications.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

1502. MATERIALS

All materials shall comply with the requirements of IRC87. Materials and components used for formwork shall be examined for damage or excessive deterioration before use / re-use and shall be used only if found suitable after necessary repairs. In case of timber formwork, the inspection shall not only cover physical damages but also signs of attacks by decay, rot or insect attack or the development of splits.

Forms shall be constructed with metal or timber. The metal used for forms shall be of such thickness that the forms remain true to shape. All bolts should be countersunk. The use of approved internal steel ties or steel or plastic spacers shall be permitted. Structural steel tubes used as support for forms shall have a minimum wall thickness of 4 mm. Other materials conforming to the requirements of IRC:87 may also be used if approved by the Engineer.

1503. DESIGN OF FORMWORK

1503.1. The Contractor shall furnish the design and drawing of complete formwork (i.e. the forms as well as their supports) for approval of the Engineer before any erection is taken up. If proprietary system of formwork is used, the Contractor shall furnish detailed information as per *Appendix. 150011* to the Engineer for approval.

Notwithstanding any approval or review of drawing and design by the Engineer, the Contractor shall be entirely responsible for the adequacy and safety for formwork.

1503.2. The design of the formwork shall conform to provisions of IRC:87. It shall ensure that the forms can be conveniently removed without disturbing the concrete. The design shall facilitate proper and safe access to all parts of formwork for inspection.

1503.3. In the case of prestressed concrete superstructure, careful consideration shall be given to redistribution of loads on props due to prestressing.

1504. WORKMANSHIP

1504.1. The formwork shall be robust and strong and the joints shall be leak-proof.

Balli shall not be used as staging. Staging must have cross bracings and diagonal bracings in both directions. Staging shall be provided with an appropriately designed base plate resting on firm strata.

1504.2. The number of joints in the formwork shall be kept to a minimum by using large size panels. The design shall provide for proper "soldiers" to facilitate alignment. All joints shall be leak proof and must be properly sealed. Use of PVC JOINT sealing tapes, foam rubber or PVC T-section is essential to prevent leakage of grout.

1504.3. As far as practicable, clamps shall be used to hold the forms together. Where use of nails is unavoidable minimum number of nails shall be used and these shall be left projecting so that they can be withdrawn easily. Use of double headed nails shall be preferred.

1504.4. Use of ties shall be restricted, as far as practicable. Wherever ties are used they shall be used with HOPE sheathing so that the ties can easily be removed. No parts prone to corrosion shall be left projecting or near the surface. The sheathing shall be grouted with cement mortar of the same strength as that of the structure.

1504.5. Unless otherwise specified, or directed, chamfers or fillets of sizes 25 mm x 25 mm shall be provided at all angles of the formwork to avoid sharp corners. The chamfers, bevelled edges and mouldings shall be made in the formwork itself. Opening for fixtures and other fittings shall be provided in the shuttering as directed by the Engineer.

1504.6. Shuttering for walls, sloping members and thin sections of considerable height shall be provided with temporary openings to permit inspection and cleaning out before placing of concrete.

1504.7. The formwork shall be constructed with precamber to the soffit to allow for deflection of the formwork. Pre-camber to allow for deflection of formwork shall be in addition to that indicated for the permanent structure in the drawings.

1504.8. Where centering trusses or launching trusses are adopted for casting of superstructure, the joints of the centering trusses, whether welded, riveted or bolted should be thoroughly checked periodically. Also, various members of the centering trusses should be periodically examined for proper alignment and unintended deformation before proceeding with the concreting. They shall also be periodically checked for any deterioration in quality due to steel corrosion.

1504.9. The formwork shall be so made as to produce a finished concrete true to shape, line and levels and dimensions as shown on the drawings, subject to the tolerances specified in respective sections of these specifications, or as directed by the Engineer.

1504.10. Where metal forms are used, all bolts and rivets shall be countersunk and well ground to provide a smooth, plane surface. Where timber is used it shall be well seasoned, free from loose knots, projecting nails, splits or other defects that may mar the surface of concrete.

1504.11. Forms shall be made sufficiently rigid by the use of ties and bracings to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration during and after placing the concrete. Screw jacks or hard wood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete.

1504.12. The formwork shall take due account of the calculated amount of positive or negative camber so as to ensure the correct final shape of the structures, having regard to the deformation of false work, scaffolding or propping and the instantaneous or deferred deformation due to various causes affecting prestressed structures.

1504.13. Suitable camber shall be provided to horizontal members of structure, specially in long spans to counteract the effects of deflection. The formwork shall be so fixed as to provide for such camber.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

1504.14. The formwork shall be coated with an approved release agent that will effectively prevent sticking and will not stain the concrete surface. Lubricating (machine oils) shall be prohibited for use as coating.

1505. FORMED SURFACE AND FINISH

The formwork shall be lined with material approved by the Engineer so as to provide a smooth finish of uniform texture and appearance. This material shall leave no stain on the concrete and so fixed to its backing as not to impart any blemishes. It shall be of the same type and obtained from only one source throughout for the construction of any one structure. The contractor shall make good any imperfections in the resulting finish as required by the Engineer. Internal ties and embedded metal parts shall be carefully detailed and their use shall be subject to the approval of the Engineer.

1506. PRECAUTIONS

- (i) Special measures in the design of formwork shall be taken to ensure that it does not hinder the shrinkage of concrete. The soffit of the formwork shall be so designed as to ensure that the formwork does not restrain the shortening and/or hogging of beams during prestressing. The forms may be removed at the earliest opportunity subject to the minimum time for removal of forms with props retained in position.
- (ii) Where necessary, formwork shall be so arranged that the soffit form, properly supported on props only can be retained in position for such period as may be required by maturing conditions.
- (iii) Any cut-outs or openings provided in any structural member to facilitate erection of formwork shall be closed with the same grade of concrete as the adjoining structure immediately after removal of formwork ensuring watertight joints.
- (iv) Provision shall be made for safe access on, to and about the formwork at the levels as required.
- (v) Close watch shall be maintained to check for settlement of formwork during concreting. Any settlement of formwork during concreting shall be promptly rectified.
- (vi) Water used for curing should not be allowed to stagnate near the base plates supporting the staging and should be properly drained.

1507. PREPARATION OF FORMWORK BEFORE CONCRETING

The inside surfaces of forms shall, except in the case of permanent form work or where otherwise agreed to by the Engineer be coated with a release agent supplied by approved manufacturer or of an approved material to prevent adhesion of concrete to the formwork. Release agents shall be applied strictly in accordance with the manufacturer's instructions and shall not be allowed to come into contact with any reinforcement or prestressing tendons and anchorages. Different release agents shall not be used in formwork for exposed concrete.

Before re-use of forms, the following actions shall be taken :

- (i) The contact surfaces of the forms shall be cleaned carefully and dried before applying a release agent.
- (ii) It should be ensured that the release agent is appropriate to the surface to be coated. The same type and make of release agent shall be used throughout on similar formwork materials and different types should not be mixed.
- (iii) The form surfaces shall be evenly and thinly coated with release agent. The vertical surface shall be treated before horizontal surface and any excess wiped out.
- (iv) The release agent shall not come in contact with reinforcement or the hardened concrete.
- (v) All forms shall be thoroughly cleaned immediately before concreting.

The Contractor shall give the Engineer due notice before placing any concrete in the forms to permit him to inspect and approve the formwork, but such inspection shall not relieve the contractor of his responsibility for safety of formwork, men, machinery, materials and finish or tolerances of concrete.

1508. REMOVAL OF FORMWORK

The scheme for removal of formwork (i.e. de-shuttering and de-centering) shall be planned in advance and furnished to the Engineer for scrutiny and approval. No formwork or any part thereof shall be removed without prior approval of the Engineer.

The formwork shall be so removed as not to cause any damage to concrete. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually to avoid any shock or vibration.

Where not specifically approved, the time of removal of formwork (when ordinary Portland Cement is used without any admixtures at an ambient temperatures exceeding 10 degrees Celsius) shall be as under :

- | | | |
|--|---|--|
| a) Walls, piers, abutments, | : | 12 to 48 hours as may be decided by the Engineer of structural members |
| b) Soffits of Slabs
(with props left under) | : | 3 days |
| c) Props (left under slabs) | : | 14 days |
| Soffit of Girders
(with props left under) | : | 7 days |
| e) Props (left under girders) | : | 21 days |

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Where there are re-entrant-angles in the concrete sections, the formwork should be removed at these sections as soon as possible after the concrete has set, in order to avoid cracking due to shrinkage of concrete.

1509. RE-USE OF FORMWORK

When formwork is dismantled, its individual components shall be examined for damage and damaged pieces shall be removed for re-tification. Such examination shall always be carried out before being used again. Before re-use all components shall be cleaned of deposits of soil, concrete or other unwanted materials. Threaded parts shall be oiled after cleaning.

All bent steel props shall be straightened before re-use. The maximum deviation from straightness is 1/600 of the length. The maximum permissible axial loads in used props shall be suitably reduced depending upon their condition. The condition of the timber components, plywood and steel shuttering plates shall be examined closely for distortion and defects before re-use.

❖ **Providing laying controlled cement concrete M-25 FOR RCC ROAD using minimum cement content @ 450 kg/Cmt and including curing complete excluding the cost of form work and reinforcement**

❖ **કન્ટ્રોલ્ડ આર.સી.સી. M-25 Grade રસ્તા માટે સીમેન્ટ કોન્ક્રીટ ટ્રીમિક્સ પદ્ધતિથી સીમેન્ટ કોન્ક્રીટ કરવાનું કમ્પલીટ કામ.**

Providing laying **Controlled Reinforced cement concrete M 25 For RCC ROAD by Trimix Method using minimum cement content @ 450 kg/Cmt** including curing complete excluding the cost of form work and reinforcement for reinforced concrete work in concrete road Coarse and fine aggregate confirming to IS:383 maximum size of coarse aggregate not exceeding 25 mm, using mechanical weigh batcher, mixed as per approved mix design, laid, placed & distributed with sufficient man power using M.S. Side Rail of road thickness with necessary nut bolt plates, fixing as per width, compacted with Poker vibrator V.D. system (Trimix) & Surface Plate Vibrator, Troweling to be carried out with the same machine running on troweling blades, finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler separation membrane, sealant primer, joint sealant debonding strip, dowel bar, tie rod, **Surface Hardner must be sprayed on final concrete surface to harden the top surface, admixtures as approved, curing compound, finishing to lines and grades**

આ કામમાં મેકસીમમ ૨૫ એમ.એમ. સાઈઝની હાર્ડ બ્લેક સ્ટોન મેટલની મશીન ક્રશ્ડ કપચી લાવી વાપરવાની છે. ઉમરાળા, તળાજા, ધંધુકા, પૈકીની પાસ કરવામાં આવે તેવી ધૂળ વગરની ચોખ્ખી, જીણી, ચાળેલી, કસ્ટર વિનાની, શ્રીકાર આકારની લાવી વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. તમામ રેતી, ઘોઈને વાપરવાની છે. તમામ કામ મશીન મીકસીંગ, વાયબ્રેટીંગ (વાયબ્રેટીંગ મશીન વડે), ૨૧ દિવસ ક્યોરીંગ વગેરે સાથે કમ્પલીટ કામ કરી આપવાનું છે. આ કામમાં **ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીક્ચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી M-25 Grade ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો/ ઘ.મી. વાપરીને મીકેનીકલ વે-બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે. ઉપરોક્ત આ તમામ કામ લાઈન દોરીએ, લેવલે, ઓળંભે આપવામાં આવે તે ડીઝાઈન મુજબ કરી આપવાનું છે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ માટેનાં ક્યુબ કાસ્ટીંગ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. નિયત સ્ટ્રેન્થ સિવાયનું કામ ગ્રાહ્ય રખાશે નહિ. તમામ વિગતે કામનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે. અન્યથા જે તે માપનાં કામનું બિલ આ આઈટમનાં ભાવનાં મેકસીમમ ૫૦ % મુજબ ભાવ ગણીને અપાશે.**

Specification of Compaction by Trimix method

1. Working Method

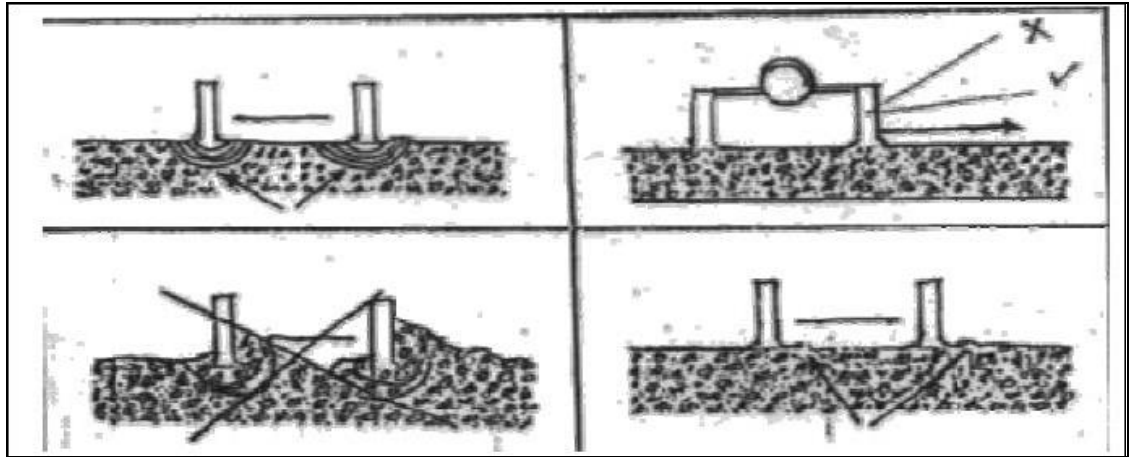
1. Concrete Placing

Concrete can be placed & distributed with sufficient man power required. It is important to distributed the concrete evenly & as near the final level as possible.

2. Poker vibration:

As a first step, concrete is vibrated with an immersion vibrator in order to remove entrapped air & voids & make the concrete homogeneous, please ensure that area close to channels & stop ands carefully vibrated. Do not distribute the concrete with the poker vibration along with the surface vibration.

ભાવનગર મહાનગરપાલિકા, ભાવનગર રોડઝ વિભાગ

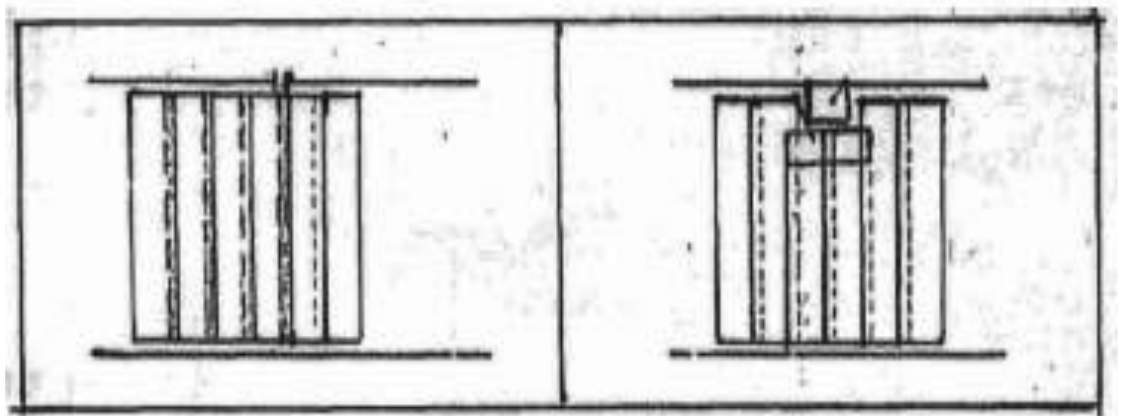


3. Surface vibration:

Surface vibration should always start as soon as there is enough concrete in front of surface vibrator. Two passes with the surface vibrator are required. During the first pass, concrete must be distributed evenly in front of surface vibrator. There should be a roll of concrete of about 10-20 mm in front of leading beam along the entire length of the vibrator when the concrete has been placed and vibrated to a length of 5mm, the second pass is carried but. The machine should be pulled at a speed of maximum 1 mtr./min and without interruption avoid linings on the surface. Keep the surface of the channel. Clean from concrete.

4. Vacuum Processing:

Place the filter pads as soon as the sufficient concrete surface is vibrated. Please note that the vacuum dewatering process must start within 30 minits from the time of starting concrete pouring, Filter pads are placed in such away that there is at least 100 mm fresh concrete visible around the fitter pads on all four sides. Filter should be overlapped with each other by at least 250 mm. (all filter pads are marked with black line .to ensure proper overlapping.)



The recesses or other obstacles within the area to be vacuum processed must be covered & sealed using polyethylene sheet before the filter pads are placed. If the obstacles are flush with the surface level or above, filter pad must be folded.

The rolled up top cover is placed centrally on the filter pads. It is rolled out in such a way that it covers all filter pads & exposed concrete on the sides of the filter pads. Please note that this exposed concrete will ensure perfect sealing for the cover from laying top. Connect the central pipe of top cover to the suction hose, which is connected to the vacuum pump.

When the pump is started vacuum will be created between the top cover & filter pads. Excess water will be taken in to the vacuum pump's tank & discharged. Normal suction cycle is 1 -1.5 min. per 10 mm. of concrete thickness. Guidelines for selecting dewatering time @ normal condition are shown in the following table.

Thickness		Dewatering Time {Min}
MM	Inch	
50	2	7
100	4	15
125	6	20
150	8	30
200	10	40
250	12	45

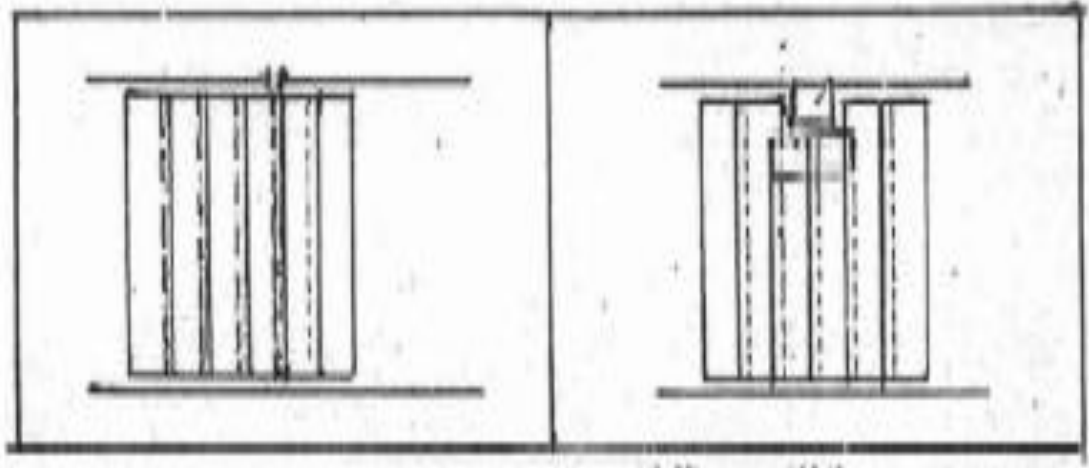
ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Please note that dewatering time largely depends upon ambient conditions viz. Temperature, humidity, etc. During the course of dewatering, the concrete surface gradually hardens & can be felt from the top of the top cover. The extent of hardness achieved by the concrete decides when to stop dewatering process.

When the vacuum processing is over, the cover is rolled up, to 100 mm so that the filter pads are visible. This will remove the water, that may have remained on the concrete surface, filter pads & in the suction hose. After about 30 seconds, the top cover is rolled completely & vacuum pump is switched off. Simultaneously, the suction hose & the top cover pipe are disconnected. Do not run the pump while the ball valve is open as likely that small aggregate are sucked into the pump due to vacuum. The entire process is repeated on the next concrete pane.

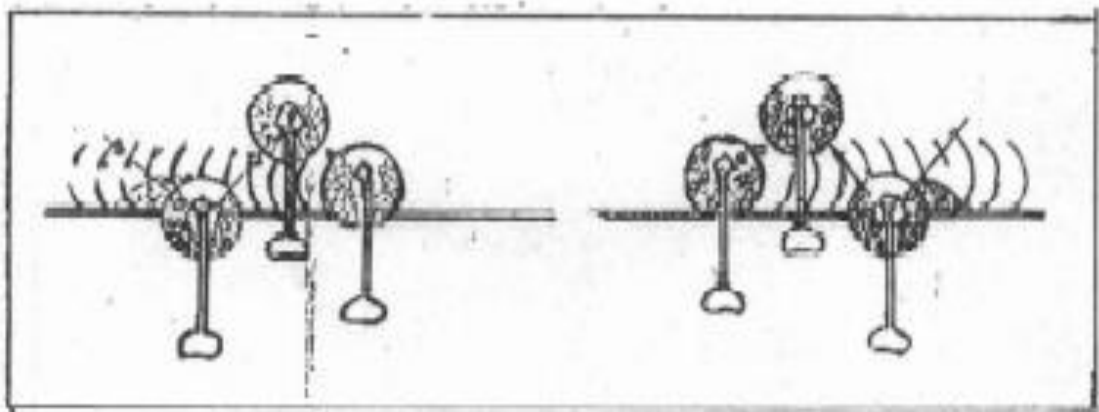
After first patch in any / given panel is dewatered, care should be taken while placing filter pad on the concrete surface next to the dewatered concrete. First filter pad should start from the edges of last filter pad of the previously dewatered concrete. The remaining filter pads than shall be placed as explained above.



While repeating dewatering process subsequently, in order that top cover should get proper sealing against the side already vacuum processed, it should be rolled out at least 300 mm over the vacuum dewatered area. Before spreading the top cover on the dewatered area, it is essential to give on pass of skim floater (with disc) along the edges of the dewatered concrete. The concrete surface will become wet as some will be come on the top surface. This will provide the necessary sealing. Subsequently roll out the top cover completely. Check that there are no wrinkles on the top ewer.

5. Floating :

The first finishing operation is floating where floating disc is used. that can not be reached by skim floater floated by hand. Care should be taken while floating near channels & edges. The skim floater is run over the channel up to disc center in order to avoid unevenness at the joint. All four sides of dewatered panel must be floated first central area is to be floated later. Any corrections, if required are to be carried out at this stage with the concrete at the time of raking only. Never use any cement paste, mixtures of cement & sand or fresh concrete for patchwork. Such materials will be pill off, will leave patches after the concrete floor is brought to use.



Normally two passes with disc with the skim floater operating at higher speed are sufficient for the skid free surfaces. This pass of skim floater should be given perpendicular to the previous pass.

Please note that the floating operation brings up certain amount of water to the surface. This moisture helps in carrying out finishing operation.

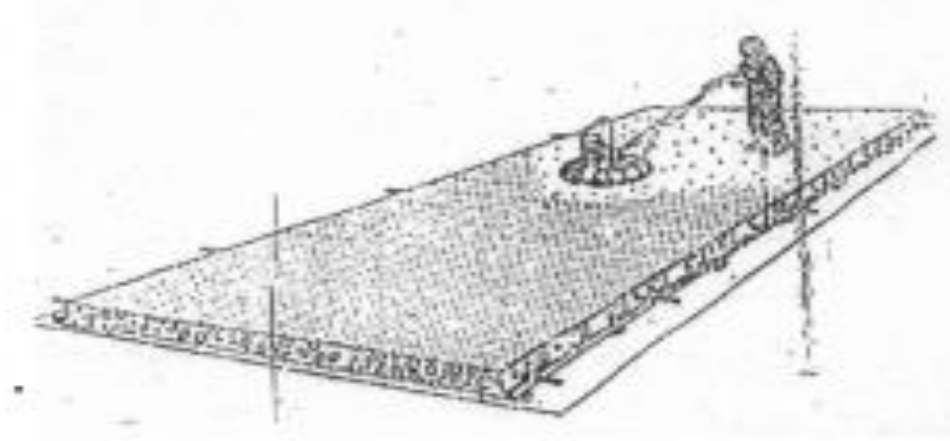
ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

6 Troweling:-

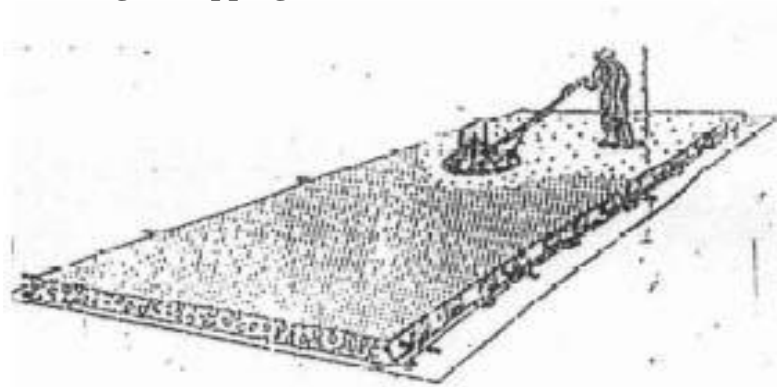
Troweling is carried out with the same machine running on troweling blades. Normally, two pass of troweling blades are required for the smooth surface finish. However, the number of passes can be decided depending upon the surface finish required. The first troweling operation can start after the about 30 minutes after the final floating operation & surface is sufficiently dry. This pass is to be made using low speed & minimum blade angle. Please also use the lower speed when troweling near the channels, from the edges, obstacles etc. Blade angle & the speed can be increased for subsequent passes to achieved smoother surface finish.

Intermixing of topping First Pass



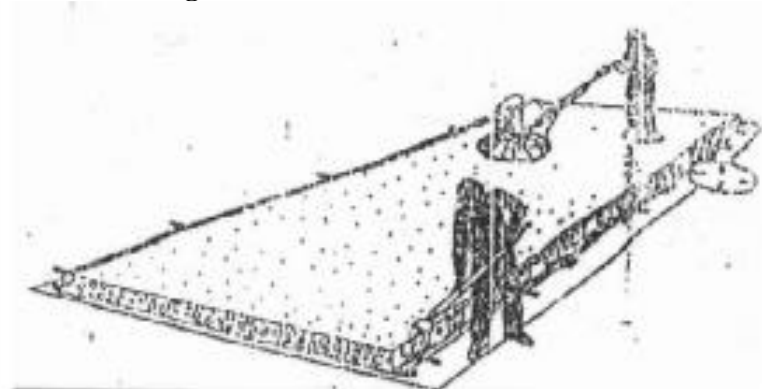
You can start the work when topping has darkened because the moisture under the concrete. The topping material is worked with care into concrete surface with a skim floated equipped with disc.

Intermixing of Topping Second Pass



Cheek the surface flatness with straight edge and work the topping material into concrete s the first time.

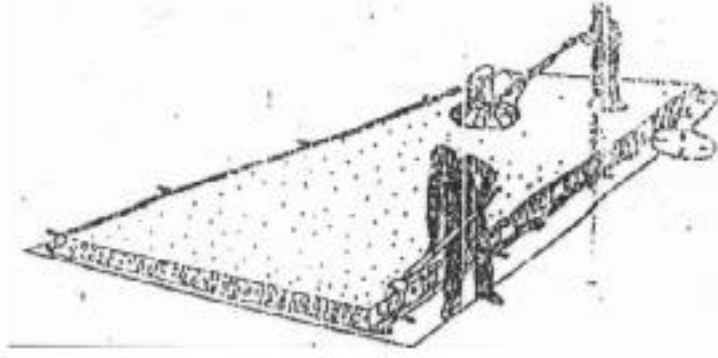
Power Troweling First Pass



ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Power Troweling Final Pass



At the time of final power troweling, Surface Hardner must be spraied on final concrete surface to harden the top surface. surplus concrete must be off from the rails and stop ends.,There must not be any damage at the rails when the floor is finished.

After the finished the surface, the groove shall be made using concrete cutter with appropriate spacing as directed by Engineer in Charge. The groove shall be filled up by bitumen. The edges of panels shall not be damaged during the process of making grooves

7. Curing

Concrete has to be protected from rapid drying which may result in cracking. Curing can be done by ponding, covering with plastic sheet or gunny bags. In any method, the surface should be always kept wet with water. Curing call also be done by application of curing compound. Curing must be done for at least 7 days.

- ❖ **Providing laying controlled cement concrete M-40 FOR RCC ROAD using minimum cement content @ 525 kg/Cmt and including curing complete excluding the cost of form work and reinforcement**
- ❖ **કન્ટ્રોલ્ડ આર.સી.સી. M-40 Grade રસ્તા માટે સીમેન્ટ કોન્ક્રીટ ટ્રીમિક્સ પધ્ધતિથી સીમેન્ટ કોન્ક્રીટ કરવાનું કમ્પલીટ કામ.**

Providing laying Controlled Reinforced cement concrete **M 40 For RCC ROAD by Trimix Method** using **minimum cement content @ 525 kg/Cmt** including curing complete excluding the cost of form work and reinforcement for reinforced concrete work in concrete road Coarse and fine aggregate confirming to IS:383 maximum size of coarse aggregate not exceeding 25 mm, using mechanical weigh batcher, mixed as per approved mix design, laid, placed & distributed with sufficient man power using M.S. Side Rail of road thickness with necessary nut bolt plates, fixing as per width, compacted with Poker vibrator V.D. system (Trimix) & Surface Plate Vibrator, Troweling to be carried out with the same machine running on troweling blades, finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler separation membrane, sealant primer, joint sealant debonding strip, dowel bar, tie rod, Surface Hardner must be spraied on final concrete surface to harden the top surface, admixtures as approved, curing compound, finishing to lines and grades

આ કામમાં મેકસીમમ ૨૫ એમ.એમ. સાઈઝની હાર્ડ બ્લેક સ્ટોન મેટલની મશીન ક્રશ્ડ કપચી લાવી વાપરવાની છે. ઉમરાળા, તળાજા, ધંધુકા, પેકીની પાસ કરવામાં આવે તેવી ધૂળ વગરની ચોખ્ખી, જીણી, ચાળેલી, કસ્તર વિનાની, શ્રીકાર આકારની લાવી વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. તમામ રેતી, ઘોઈને વાપરવાની છે. તમામ કામ મશીન મીકસીંગ, વાયબ્રેટીંગ (વાયબ્રેટીંગ મશીન વડે), ૨૧ દિવસ ક્યોરીંગ વગેરે સાથે કમ્પલીટ કામ કરી આપવાનું છે. આ કામમાં **ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીક્ચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી M-40 Grade ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે મીનીમમ સિમેન્ટ કન્ટેન્ટ પરપ કિલો/ ઘ.મી. વાપરીને મીકેનીકલ વે-બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે. ઉપરોક્ત આ તમામ કામ લાઈન દોરીએ, લેવલે, ઓળંભે આપવામાં આવે તે ડીઝાઈન મુજબ કરી આપવાનું છે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ માટેનાં ક્યુબ કાસ્ટીંગ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. નિયત સ્ટ્રેન્થ સિવાયનું કામ ગ્રાહ્ય રખાશે નહિ. તમામ વિગતે કામનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે. અન્યથા જે તે માપનાં કામનું બિલ આ આઈટમનાં ભાવનાં મેકસીમમ ૫૦ % મુજબ ભાવ ગણીને અપાશે.**

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Specification of Compaction by Trimix method

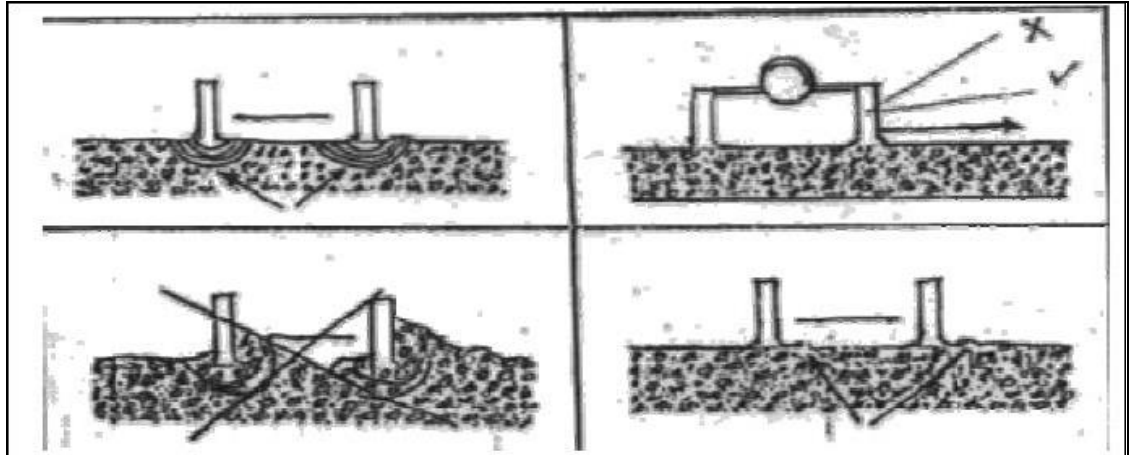
1. Working Method

1. Concrete Placing

Concrete can be placed & distributed with sufficient man power required. It is important to distributed the concrete evenly & as near the final level as possible.

2. Poker vibration:

As a first step, concrete is vibrated with an immersion vibrator in order to remove entrapped air & voids & make the concrete homogeneous, please ensure that area close to channels & stop and carefully vibrated. Do not distribute the concrete with the poker vibration along with the surface vibration.

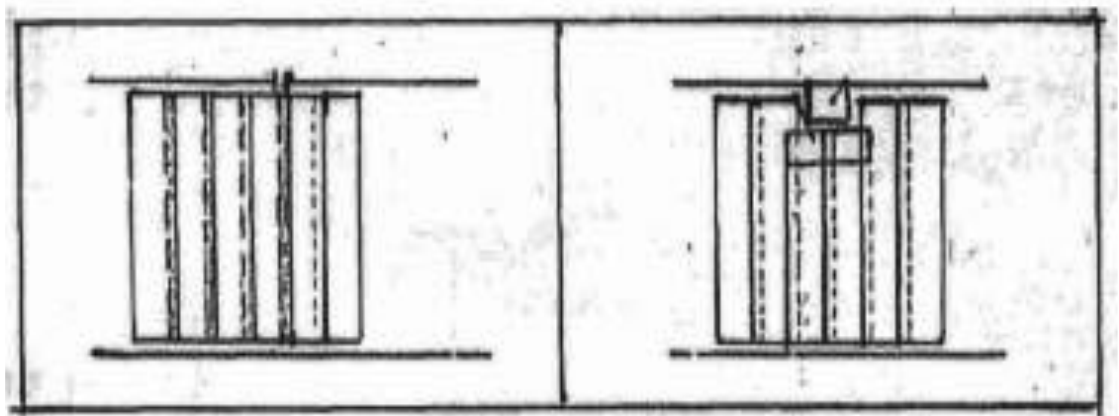


3. Surface vibration:

Surface vibration should always start as soon as there is enough concrete in front of surface vibrator. Two passes with the surface vibrator are required. During the first pass, concrete must be distributed evenly in front of surface vibrator. There should be a roll of concrete of about 10-20 mm in front of leading beam along the entire length of the vibrator when the concrete has been placed and vibrated to a length of 5mm, the second pass is carried but. The machine should be pulled at a speed of maximum 1 mtr./min and without interruption avoid linings on the surface. Keep the surface of the channel. Clean from concrete.

4. Vacuum Processing:

Place the filter pads as soon as the sufficient concrete surface is vibrated. Please note that the vacuum dewatering process must start within 30 minits from the time of starting concrete pouring, Filter pads are placed in such away that there is at least 100 mm fresh concrete visible around the fitter pads on all four sides. Filter should be overlapped with each other by at least 250 mm. (all filter pads are marked with black line .to ensure proper overlapping.)



The recesses or other obstacles within the area to be vacuum processed must be covered & sealed using polyethylene sheet before the filter pads are placed. If the obstacles are flush with the surface level or above, filter pad must be folded.

The rolled up top cover is placed centrally on the filter pads. It is rolled out in such a way that it covers all filter pads & exposed concrete on the sides of the filter pads. Please note that this exposed concrete will ensure perfect sealing for the cover from laying top. Connect the central pipe of top cover to the suction hose, which is connected to the vacuum pump.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

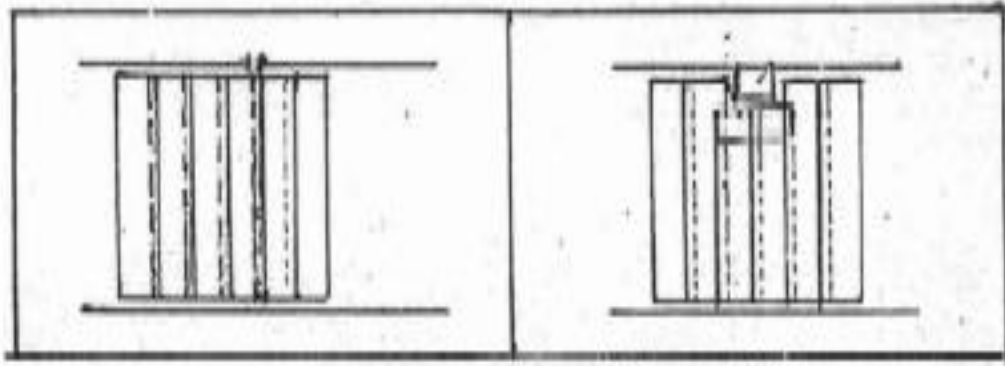
When the pump is started vacuum will be created between the top cover & filter pads. Excess water will be taken in to the vacuum pump's tank & discharged. Normal suction cycle is 1 -1.5 min. per 10 mm. of concrete thickness. Guidelines for selecting dewatering time @ normal condition are shown in the following table.

Thickness		Dewatering Time {Min}
MM	Inch	
50	2	7
100	4	15
125	6	20
150	8	30
200	10	40
250	12	45

Please note that dewatering time largely depends upon ambient conditions viz. Temperature, humidity, etc. During the course of dewatering, the concrete surface gradually hardens & can be felt from the top of the top cover. The extent of hardness achieved by the concrete decides when to stop dewatering process.

When the vacuum processing is over, the cover is rolled up, to 100 mm so that the filter pads are visible. This will remove the water, that may have remained on the concrete surface, filter pads & in the suction hose. After about 30 seconds, the top cover is rolled completely & vacuum pump is switched off. Simultaneously, the suction hose & the top cover pipe are disconnected. Do not run the pump while the ball valve is open as likely that small aggregate are sucked into the pump due to vacuum. The entire process is repeated on the next concrete pane

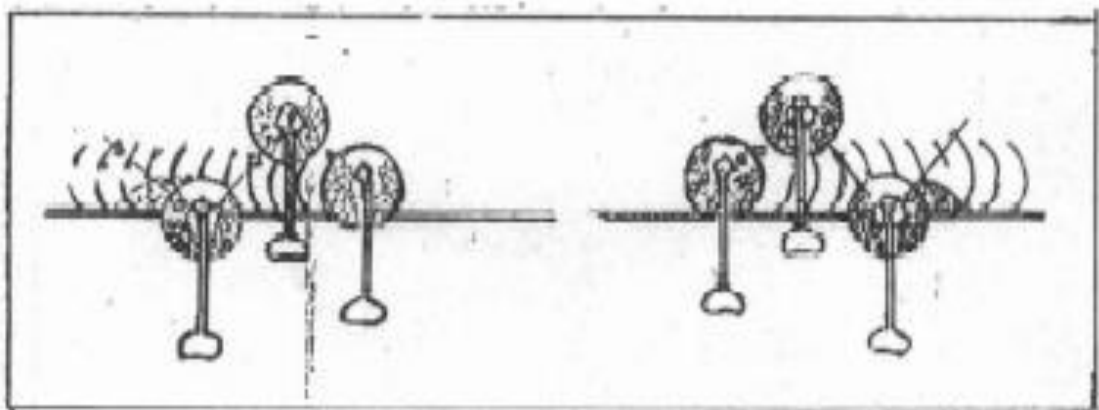
After first patch in any / given panel is dewatered, care should be taken while placing filter pad on the concrete surface next to the dewatered concrete. First filter pad should start from the edges of last filter pad of the previously dewatered concrete. The remaining filter pads than shall be placed as explained above.



While repeating dewatering process subsequently, in order that top cover should get proper sealing against the side already vacuum processed, it should be rolled out at least 300 mm over the vacuum dewatered area. Before spreading the top cover on the dewatered area, it is essential to give on pass of skim floater (with disc) along the edges of the dewatered concrete. The concrete surface will become wet as some will be come on the top surface. This will provide the necessary sealing. Subsequently roll out the top cover completely. Check that there are no wrinkles on the top ewer.

5. Floating :

The first finishing operation is floating where floating disc is used. that can not be reached by skim floater floated by hand. Care should be taken while floating near channels & edges. The skim floater is run over the channel up to disc center in order to avoid unevenness at the joint. All four sides of dewatered panel must be floated first central area is to be floated later. Any corrections, if required are to be carried out at this stage with the concrete at the time of raking only. Never use any cement paste, mixtures of cement & sand or fresh concrete for patchwork. Such materials will be pill off, will leave patches after the concrete floor is brought to use.



ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

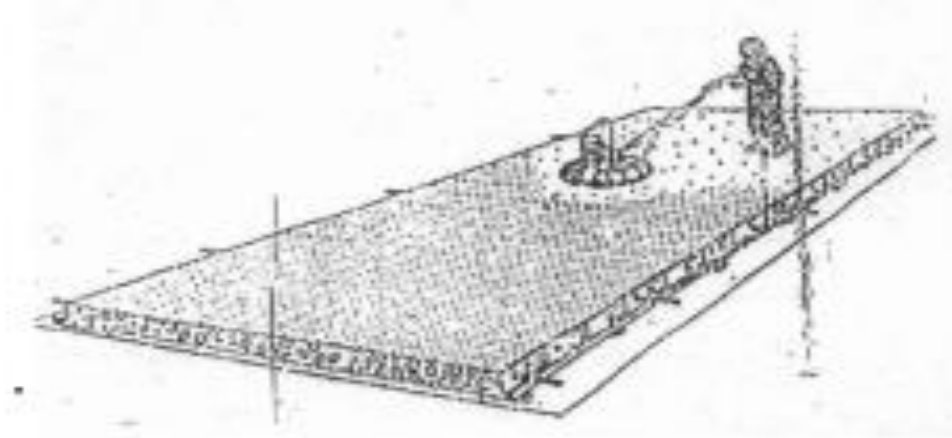
Normally two passes with disc with the skim floater operating at higher speed are sufficient for the skid free surfaces. This pass of skim floater should be given perpendicular to the previous pass.

Please note that the floating operation brings up certain amount of water to the surface. This moisture helps in carrying out finishing operation

6 Troweling:-

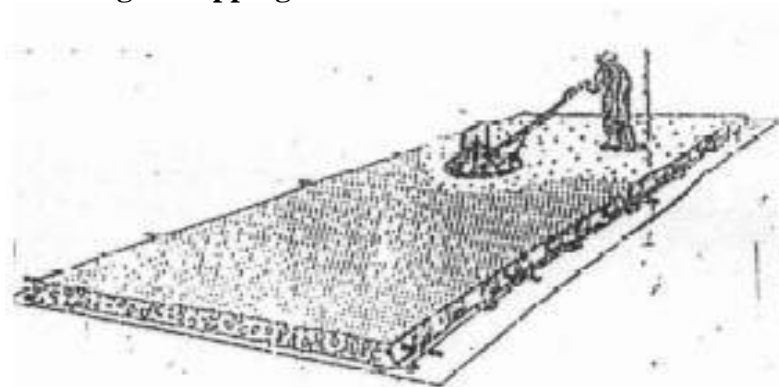
Troweling is carried out with the same machine running on troweling blades. Normally, two pass of troweling blades are required for the smooth surface finish. However, the number of passes can be decided depending upon the surface finish required. The first troweling operation can start after the about 30 minutes after the final floating operation & surface is sufficiently dry. This pass is to be made using low speed & minimum blade angle. Please also use the lower speed when troweling near the channels, from the edges, obstacles etc. Blade angle & the speed can be increased for subsequent passes to achieved smoother surface finish.

Intermixing of topping First Pass



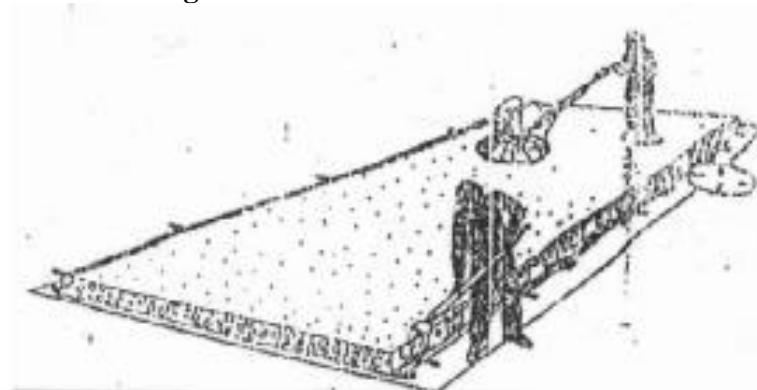
You can start the work when topping has darkened because the moisture under the concrete. The topping material is worked with care into concrete surface with a skim floated equipped with disc.

Intermixing of Topping Second Pass



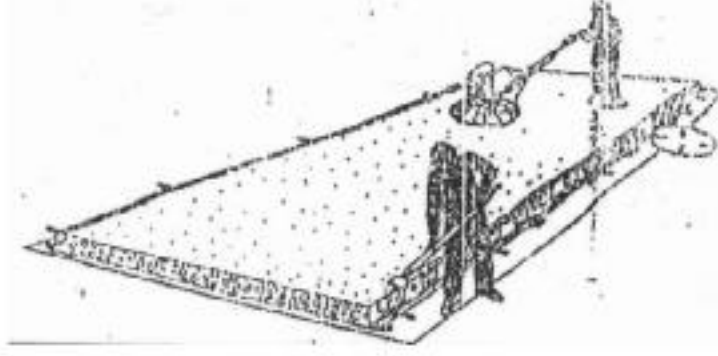
Check the surface flatness with straight edge and work the topping material into concrete s the first time.

Power Troweling First Pass



ભાવનગર મહાનગરપાલિકા, ભાવનગર રોડઝ વિભાગ

Power Troweling Final Pass



At the time of final power troweling, Surface Hardner must be spraied on final concrete surface to harden the top surface, surplus concrete must be off from the rails and stop ends.,There must not be any damage at the rails when the floor is finished.

After the finished the surface, the groove shall be made using concrete cutter with appropriate spacing as directed by Engineer in Charge. The groove shall be filled up by bitumen. The edges of panels shall not be damaged during the process of making grooves.

7. Curing

Concrete has to be protected from rapid drying which may result in cracking. Curing can be done by ponding, covering with plastic sheet or gunny bags. In any method, the surface should be always kept wet with water. Curing call also be done by application of curing compound. Curing must be done for at least 7 days.

❖ **Providing laying controlled cement concrete M-30 FOR RCC ROAD using minimum cement content @ 475 kg/Cmt and including curing complete excluding the cost of form work and reinforcement**

❖ **કન્ટ્રોલ્ડ આર.સી.સી. M-30 Grade રસ્તા માટે સીમેન્ટ કોન્ક્રીટ ટ્રીમિક્સ પધ્ધતિથી સીમેન્ટ કોન્ક્રીટ કરવાનું કમ્પલીટ કામ.**

Providing laying Controled Reinforced cement concrete **M 30 For RCC ROAD by Trimix Method** using **minimum cement content @ 475 kg/Cmt** including curing complete excluding the cost of form work and reinforcement for reinforced concrete work in concrete road Coarse and fine aggregate confirming to IS:383 maximum size of coarse aggregate not exceeding 25 mm, using mechanical weigh batcher, mixed as per approved mix design, laid, placed & distributed with sufficient man power using M.S. Side Rail of road thickness with necessary nut bolt plates, fixing as per width, compacted with Poker vibrator V.D. system (Trimix) & Surface Plate Vibrator, Troweling to be carried out with the same machine running on troweling blades, finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler separation membrane, sealant primer, joint sealant debonding strip, dowel bar, tie rod, Surface Hardner must be spraied on final concrete surface to harden the top surface, admixtures as approved, curing compound, finishing to lines and grades

આ કામમાં મેકસીમમ ૨૫ એમ.એમ. સાઈઝની હાર્ડ બ્લેક સ્ટોન મેટલની મશીન ક્રશ્ડ કપચી લાવી વાપરવાની છે. ઉમરાળા, તળાજા, ઘંઘુકા, પૈકીની પાસ કરવામાં આવે તેવી ધૂળ વગરની ચોખ્ખી, જીણી, ચાળેલી, કસ્ટર વિનાની, શ્રીકાર આકારની લાવી વાપરવાની છે. આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. તમામ રેતી, ઘોઈને વાપરવાની છે. તમામ કામ મશીન મીકસીંગ, વાયબ્રેટીંગ (વાયબ્રેટીંગ મશીન વડે), ૨૧ દિવસ ક્યોરીંગ વગેરે સાથે કમ્પલીટ કામ કરી આપવાનું છે. આ કામમાં **ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીકચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી M-30 Grade ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૭૫ કિલો/ ઘ.મી. વાપરીને મીકેનીકલ વે-બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે. ઉપરોક્ત આ તમામ કામ લાઈન દોરીએ, લેવલે, ઓળખે આપવામાં આવે તે ડિઝાઈન મુજબ કરી આપવાનું છે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ માટેનાં ક્યુબ કાસ્ટીંગ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. નિયત સ્ટ્રેન્થ સિવાયનું કામ ગ્રાહ્ય રખાશે નહિ. તમામ વિગતે કામનો ભાવ દર એક ઘનમીટર પર સમજવાનો છે. તૈયાર કામનું માપ લેવામાં આવશે. I.S. - 456-2000 મુજબ ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે. અન્યથા જે તે માપનાં કામનું બિલ આ આઈટમનાં ભાવનાં મેકસીમમ ૫૦ % મુજબ ભાવ ગણીને અપાશે.**

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Specification of Compaction by Trimix method

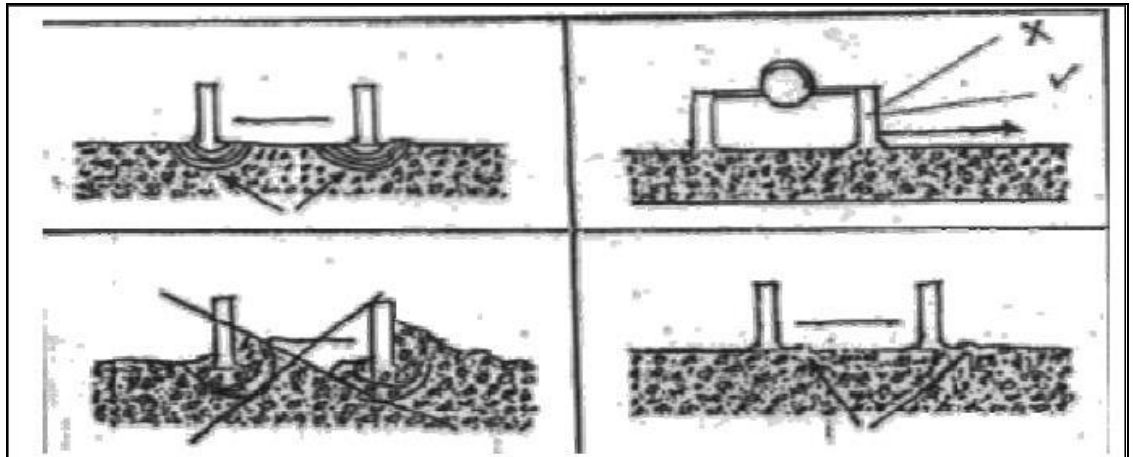
1. Working Method

1. Concrete Placing

Concrete can be placed & distributed with sufficient man power required. It is important to distributed the concrete evenly & as near the final level as possible.

2. Poker vibration:

As a first step, concrete is vibrated with an immersion vibrator in order to remove entrapped air & voids & make the concrete homogeneous, please ensure that area close to channels & stop and carefully vibrated. Do not distribute the concrete with the poker vibration along with the surface vibration.

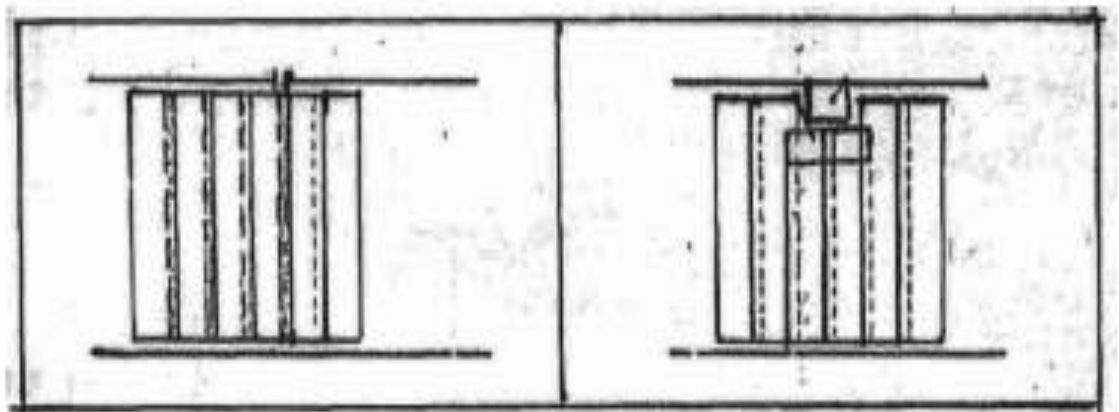


3. Surface vibration:

Surface vibration should always start as soon as there is enough concrete in front of surface vibrator. Two passes with the surface vibrator are required. During the first pass, concrete must be distributed evenly in front of surface vibrator. There should be a roll of concrete of about 10-20 mm in front of leading beam along the entire length of the vibrator when the concrete has been placed and vibrated to a length of 5mm, the second pass is carried but. The machine should be pulled at a speed of maximum 1 mtr./min and without interruption avoid linings on the surface. Keep the surface of the channel. Clean from concrete.

4. Vacuum Processing:

Place the filter pads as soon as the sufficient concrete surface is vibrated. Please note that the vacuum dewatering process must start within 30 minits from the time of starting concrete pouring, Filter pads are placed in such away that there is at least 100 mm fresh concrete visible around the filter pads on all four sides. Filter should be overlapped with each other by at least 250 mm. (all filter pads are marked with black line .to ensure proper overlapping.)



The recesses or other obstacles within the area to be vacuum processed must be covered & sealed using polyethylene sheet before the filter pads are placed. If the obstacles are flush with the surface level or above, filter pad must be folded.

The rolled up top cover is placed centrally on the filter pads. It is rolled out in such a way that it covers all filter pads & exposed concrete on the sides of the filter pads. Please note that this exposed concrete will ensure perfect sealing for the cover from laying top. Connect the central pipe of top cover to the suction hose, which is connected to the vacuum pump.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

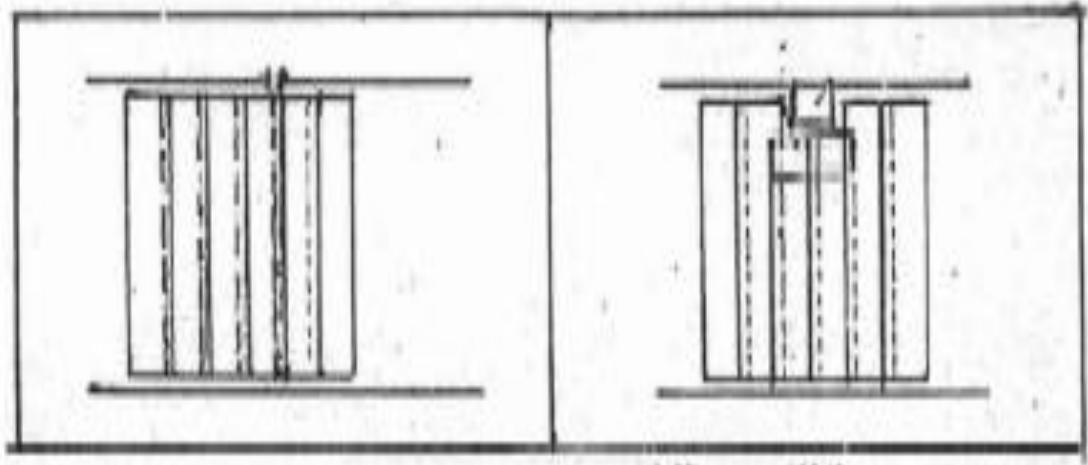
When the pump is started vacuum will be created between the top cover & filter pads. Excess water will be taken in to the vacuum pump's tank & discharged. Normal suction cycle is 1 -1.5 min. per 10 mm. of concrete thickness. Guidelines for selecting dewatering time @ normal condition are shown in the following table.

Thickness		Dewatering Time {Min}
MM	Inch	
50	2	7
100	4	15
125	6	20
150	8	30
200	10	40
250	12	45

Please note that dewatering time largely depends upon ambient conditions viz. Temperature, humidity, etc. During the course of dewatering, the concrete surface gradually hardens & can be felt from the top of the top cover. The extent of hardness achieved by the concrete decides when to stop dewatering process.

When the vacuum processing is over, the cover is rolled up, to 100 mm so that the filter pads are visible. This will remove the water, that may have remained on the concrete surface, filter pads & in the suction hose. After about 30 seconds, the top cover is rolled completely & vacuum pump is switched off. Simultaneously, the suction hose & the top cover pipe are disconnected. Do not run the pump while the ball valve is open as likely that small aggregate are sucked into the pump due to vacuum. The entire process is repeated on the next concrete pane

After first patch in any / given panel is dewatered, care should be taken while placing filter pad on the concrete surface next to the dewatered concrete. First filter pad should start from the edges of last filter pad of the previously dewatered concrete. The remaining filter pads than shall be placed as explained above.



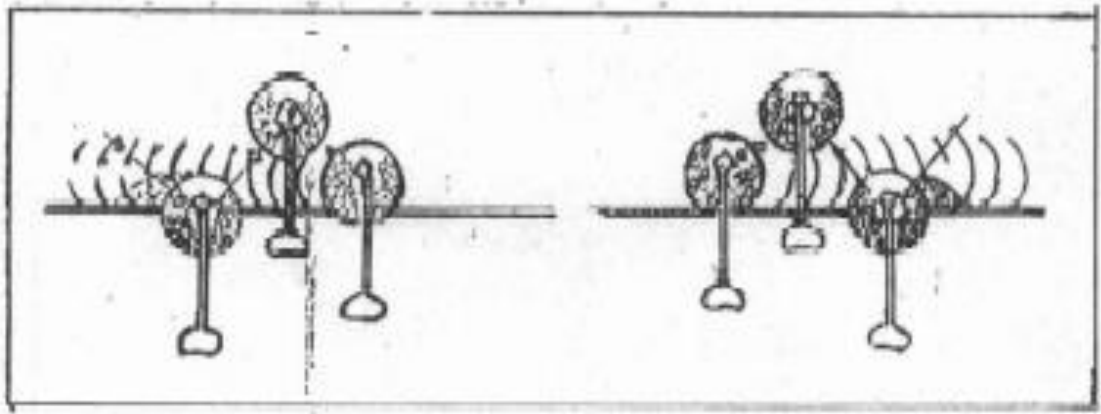
While repeating dewatering process subsequently, in order that top cover should get proper scaling against the side already vacuum processed, it should be rolled out at least 300 mm over the vacuum dewatered area. Before spreading the top cover on the dewatered area, it is essential to give on pass of skim floater (with disc) along the edges of the dewatered concrete. The concrete surface will become wet as some will be come on the top surface. This will provide the necessary sealing. Subsequently roll out the top cover completely. Check that there are no wrinkles on the top ewer.

5. Floating : .

The first finishing operation is floating where floating disc is used. that can not be reached by skim floater floated by hand. Care should be taken while floating near channels & edges. The skim floater is run over the channel up to disc center in order to avoid unevenness at the joint. All four sides of dewatered panel must be floated first central area is to be floated later. Any corrections, if required are to be carried out at this stage with the concrete at the time of raking only. Never use any cement paste, mixtures of cement & sand or fresh concrete for patchwork. Such materials will be pill off, will leave patches after the concrete floor is brought to use.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ



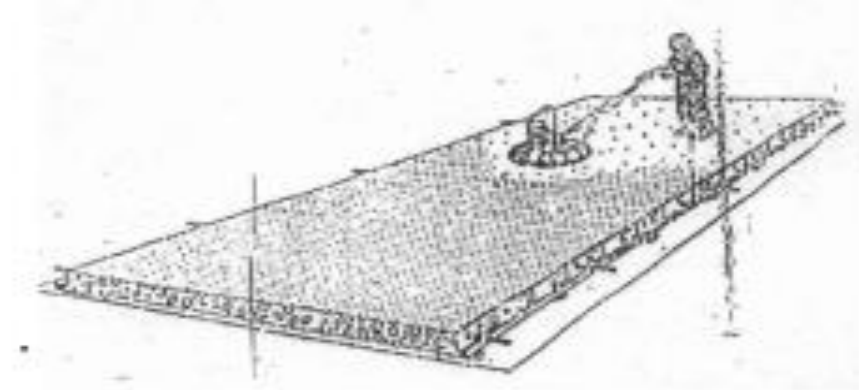
Normally two passes with disc with the skim floater operating at higher speed are sufficient for the skid free surfaces. This pass of skim floater should be given perpendicular to the previous pass.

Please note that the floating operation brings up certain amount of water to the surface. This moisture helps in carrying out finishing operation

6 Troweling:-

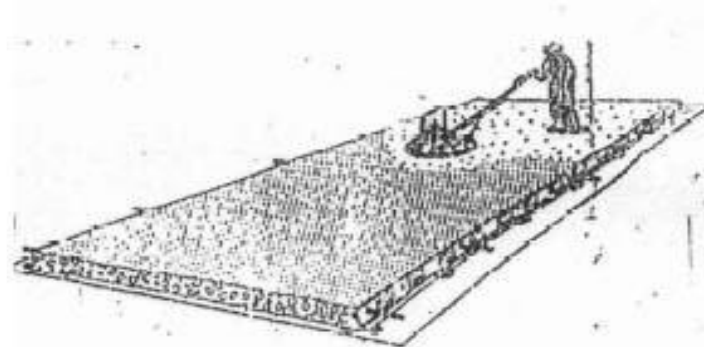
Troweling is carried out with the same machine running on troweling blades. Normally, two pass of troweling blades are required for the smooth surface finish. However, the number of passes can be decided depending upon the surface finish required. The first troweling operation can start after the about 30 minutes after the final floating operation & surface is sufficiently dry. This pass is to be made using low speed & minimum blade angle. Please also use the lower speed when troweling near the channels, from the edges, obstacles etc. Blade angle & the speed can be increased for subsequent passes to achieve smoother surface finish.

Intermixing of topping First Pass



You can start the work when topping has darkened because the moisture under the concrete. The topping material is worked with care into concrete surface with a skim floated equipped with disc.

Intermixing of Topping Second Pass

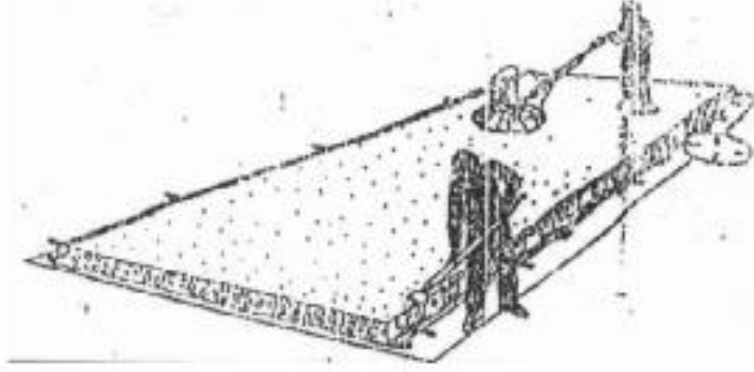


Check the surface flatness with straight edge and work the topping material into concrete as the first time.

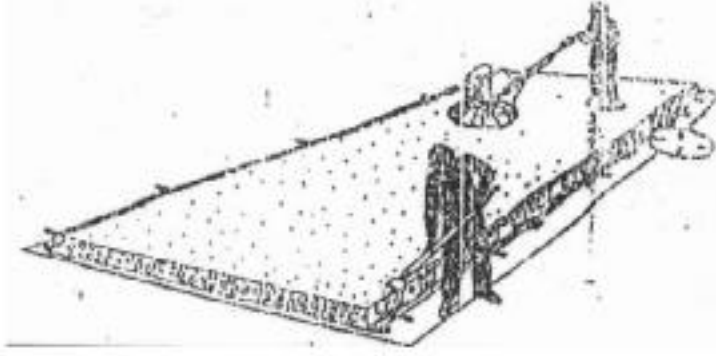
ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Power Troweling First Pass



Power Troweling Final Pass



At the time of final power troweling, Surface Hardener must be sprayed on final concrete surface to harden the top surface, surplus concrete must be off from the rails and stop ends., There must not be any damage at the rails when the floor is finished.

After the finished the surface, the groove shall be made using concrete cutter with appropriate spacing as directed by Engineer in Charge. The groove shall be filled up by bitumen. The edges of panels shall not be damaged during the process of making grooves.

7. Curing

Concrete has to be protected from rapid drying which may result in cracking. Curing can be done by ponding, covering with plastic sheet or gunny bags. In any method, the surface should be always kept wet with water. Curing call also be done by application of curing compound. Curing must be done for at least 7 days.

❖ **Providing T M T. bar reinforcement for R.C.C. work including bending binding and placing in position complete up to floor two level.**

❖ **ટી. એમ. ટી. રી-ઇન્ફોર્સમેન્ટ કામ. આર.સી.સી. ફાઉન્ડેશન ફુટીંગઝ, બેઈઝ, પાઈલ, રાફ્ટ સ્લેબ, સીલ, લિન્ટેલ, છજજા, દાદાર, લોફ્ટ, કોર્પીંગ, બીમ, કોલમ, સ્લેબ વગેરે માટે.**

આ કામમાં આવતું તમામ લોખંડ આઈ.એસ. ૧૭૮૬ મુજબનું સ્ટાન્ડર્ડ કંપની નું ટી.એમ.ટી. થર્મલ મીકેનિકલ ટ્રીટેડ (ટી.એમ.ટી. બાર્સ) સ્ટીલ બાર્સ સાફ, કાટ વગરનું પાસ કરવામાં આવે તે તેવું તથા આપવામાં આવે તે માપ સાઈઝનું સ્ટીલ લાવવાનું છે અને કહેવમાં તથા આપવામાં આવે તે તમામ (જરૂરી તમામ પ્રકારનાં ડીઝાઈન મુજબ હુકવાળી આપવા સાથે) ડીઝાઈન મુજબ વાળી કાપી, જરૂરી ૧૮ ગેઈઝનાં વાયર લાવી વાપરી ડબલ આંટા વડે, બાંધી સેન્ટરીંગ ઉપર ગોઠવી તૈયાર કરી આપવાનું છે. આ તૈયાર થયેલ કામ બતાવ્યા બાદ પાસ કરાવ્યા પછી મંજૂરી મેળવીને સીમેન્ટ કોન્ક્રીટ ભરવાનું છે. તૈયાર લોખંડનો ભાવ દર એક કી.ગ્રામ પર સમજવાનો છે. બાઈન્ડીંગ વાયર અને વેસ્ટેજનું વજન જુદુ ગણવામાં આવશે નહીં એટલે કે તેનું માપ લેવાનું નથી.

❖ **Providing contraction/ longitudinal joint groove 5mm wide and deep as thickness of pavement in concrete providing by sawing machine and sealing the joint with approved sealant etc. compound as per drawing and manufacturer's specifications.**

602.11. Preparation and Sealing of Joint Grooves

602.11.1. General

All transverse joints in surface slabs shall be sealed using sealants described in Clause 602.2.8. Joints shall not be sealed before 14 days after construction.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

602.11.2. Preparation of joint grooves for sealing

602.11.2.1. Joint grooves usually are not constructed to provide the minimum width specified in the drawings when saw cut joints are adopted. They shall be widened subsequently by sawing before sealing. Depth/width gauges shall be used to control the dimension of the groove.

602.11.2.2. If rough arrises develop when grooves are made, they shall be ground to provide a chamfer approximately 5 mm wide. If the groove is at an angle upto 10 degree from the perpendicular to the surface, the overhanging edge of the sealing groove shall be sawn or ground perpendicular. If spalling occurs or the angle of the former is greater than 10 degrees, the joint sealing groove shall be sawn wider and perpendicular to the surface to encompass the defects upto a maximum width, including any chamfer, of 35 mm for transverse joints and 20 mm for longitudinal joints. If the spalling cannot be so eliminated then the arrises shall be repaired by an approved thin bonded arris repair using cementitious materials.

602.11.2.3. All grooves shall be cleaned of any dirt or loose material by air blasting with filtered, oil-free compressed air. If need arises the Engineer may instruct cleaning by pressurised water jets. Depending upon the requirement of the sealant manufacturer, the sides of the grooves may have to be sand blasted to increase the bondage between sealant and concrete.

602.11.2.4. The groove shall be cleaned and dried at the time of priming and sealing.

602.11.2.5. Before sealing the temporary seal provided for blocking the ingress of dirt, soil etc., shall be removed. A highly compressible heat resistant paper-backed debonding strip as per drawing shall be inserted in the groove to serve the purpose of breaking the bond between sealant and the bottom of the groove and to plug the joint groove so that the sealant may not leak through the cracks. The width of debonding strip shall be more than the joint groove width so that it is held tightly in the groove. In the case of longitudinal joints, heat resistant tapes may be inserted to block the leakage through bottom of the joint.

602.11.3. Sealing with sealants

602.11.3.1. When sealants are applied, an appropriate primer shall also be used if recommended by the manufacturer and it shall be applied in accordance with their recommendation. The sealant shall be applied within the minimum and maximum drying times of the primer recommended by the manufacturer. Priming and sealing with applied sealants shall not be carried out when the naturally occurring temperature in the joint groove to be sealed is below 7° C.

602.11.3.2. If hot applied sealant is used it shall be heated and applied from a thermostatically controlled, indirectly heated preferably with oil jacketed melter and pourer having recirculating pump and extruder. For large road projects, sealant shall be applied with extruder having flexible hose and nozzle. The sealant shall not be heated to a temperature higher than the safe heating temperature and not for a period longer than the safe heating period, as specified by the manufacturer. The dispenser shall be cleaned out at the end of each day in accordance with the manufacturer's recommendations and reheated material shall not be used.

602.11.3.3. Cold applied sealants with chemical formulation like polysulphide may be used. These shall be mixed and applied within the lime limit specified by the manufacturer. If primers are recommended they shall be applied neatly with an appropriate brush. The Movement Accommodation Factor (MAP) shall be more than 10 per cent.

602.11.3.4. The sealants applied at contraction phase of the slabs would result in bulging of the sealant over and above the slab. Therefore, the Contractor in consultation with the Engineer, shall establish the right temperature and time for applying the sealant. Thermometer shall be hung on a pole in the site for facilitating control during the sealing operation.

602.11.3.5. Sealant shall be applied, slightly to a lower level than the slab with a tolerance of 5 ± 2 mm.

602.11.3.6. During sealing operation, it shall be seen that no air bubbles are introduced in the sealant either by vapours or by the sealing process.

602.11.4. Testing of applied sealants: Manufacturer's certificate shall be produced by the Contractor for establishing that the sealant is not more than six months old and stating that the sealant complies with the relevant standard as in Clause 602.2.8. The samples shall meet the requirement of AASHTO M 282 for hot applied sealant or BS 5212: (Part-2) for cold applied sealant.

❖ રોડ ડિવાઈડર એમ. ૨૫ ગ્રેડ સીમેન્ટ ક્રોકીટથી કાસ્ટ-ઈન-સીતુ (ઓનસાઈટ) ડિવાઈડર પાળી બનાવવાનું જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથે પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામ

હયાત ડામરરોડમાં સુચના મુજબ જરૂરી ખોદાણકામ કરી મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો પ્રતિ ઘનમીટર વાપરી એમ. ૨૫ (M-25) ગ્રેડ આર.સી.સી. જરૂરી સેન્ટરીંગ શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (નીડલ વાયબ્રેટર મશીન વડે), ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે સુચના મુજબની સાઈઝ માં રોડ ડિવાઈડર બનાવવાનું કામ. આ કામનો ભાવ ૧ ઘી.મી. મુજબ આપવાનો રહેશે. આ કામમાં સીમેન્ટ : ઓર્ડીનરી પોર્ટલેન્ડ સીમેન્ટ કા.પા.ઈ. શ્રી પાસ કરે તેવી વાપરવાની રહેશે. મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો પ્રતિ ઘનમીટર વાપરવાની રહેશે. સીમેન્ટને ભેજ ન લાગે તે પ્રમાણે જમીનથી ઉપર લાકડાનું પ્લેટ ફોર્મ બનાવી તેના ઉપર રાખી, કાળજીથી રાખવની તથા વાપરવામાં રહેશે. ખરાબ સીમેન્ટ કે ભેજ અથવા હવા લાગેલ સીમેન્ટ વાપરવાની નથી.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

રેતી : તમામ રેતી શેત્રુંજી(તળાજા) અથવા ઉમરાળાની જ્યાંથી સારી મળી શકે અને તે પાસ કરવામાં આવે ત્યાંથી લાવવાની છે. તમામ રેતી જીણી, ચાળેલી, ઘુળ, કસ્તર વિનાની સારી લાવવાની છે. તમામ રેતી ચોખ્ખા પાણીથી ઘુળ કે ડોળ ન રહે તે પ્રમાણે સારી રીતે ધોઈ ને ઉપયોગમાં લેવાની રહેશે.

પાણી : આ કામમાં વાપરવાનું તમામ પણી ચોખ્ખુ મીઠું તેમજ ઘુળ કે ડોળ વિનાનું ઉપયોગમાં લેવાનું રહેશે.

મીકસીંગ : આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે M-25 (એમ. ૨૫) ગ્રેડ સીમેન્ટ કોન્ક્રીટ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો પ્રતિ ઘનમીટર વાપરી તે મુજબ મીક્સ ડીઝાઈનનાં પ્રમાણ મુજબ મીક્સર મશીન વડે બનાવવાનું છે. મશીનની સગવડ પણ કોન્ટ્રાક્ટરે કરવાની રહેશે. તેનો કોઈપણ જુદો ખર્ચ આપવાનો રહેશે નહીં.

સેન્ટરીંગ:—આર.સી.સી. નાં તમામ કામ માટેનું સેન્ટરીંગ પુરતા ટેકાઓ વોલવેલ્ટ પ્લેટ, વિ. વાપરીને જરાપણ મચક ન ખાય તેવી રીતે તમામ ટેકાઓને નીચે કાટખુણે ડબલનોંધ મારીને ઘેરીમાં લેવલ કરવાનું છે. તમામ પ્લેટ વિ.સારીરીતે સાફ કરી તેને ઓઈલ લગાડીને કામ કરવાનું છે. સેન્ટરીંગ કામમાં જ્યાં જ્યાં લોખંડના હુક મુકવાનું કહેવામાં આવે ત્યાં મુકાવી આપવાનાં છે. સેન્ટરીંગ લોખંડની પ્લેટ હશે અને તેમાં હુક મુકવાનાં થશે તો તેમાં પણ કાણા પાડીને હુક વિ. મુકી આપવા પડશે. અને કામમાં કોઈપણ ડીઝાઈનવાળું તેમજ ઓરનામેન્ટલ ડીઝાઈન આપવામાં આવે તેવી ડીઝાઈન મુજબનું સેન્ટરીંગ કરી આપવું પડશે. તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં. કોઈપણ કામનું સેન્ટરીંગ કામ ખોલતા પહેલા શ્રી સીટી એનજીનીયર સાહેબની મંજૂરી મેળવવાની રહેશે. તમામ સેન્ટરીંગ કાળજીથી કોઈપણ ભાગતુટ ન થાય તે રીતે ખોલવાનું રહેશે. સેન્ટરીંગ કામ ખોલતા, કામમાં કોઈપણ જગ્યાએ દાઝીયા જણાય તો ત્યાં ૧:૩ નાં સીમેન્ટ મોર્ટારથી ફીનીસીંગ કરી આપવાનું રહેશે. સેન્ટરીંગ કામ આઠ દિવસમાં ખોલવાનું રહેશે. ઉપર પ્રમાણેના દિવસો વિત્યા છતાં પણ ખોલતા પહેલા શ્રી સીટી એનજીનીયરશ્રી સાહેબની મંજૂરી લેવાની રહેશે. આ તમામ આર.સી.સી. કામને ૧૫ દિવસ સતત ભીના રહે તે પ્રમાણે પાણી છાંટવાનું છે. ક્યોરીંગ કરવામાં કોન્ટ્રાક્ટર જરા પણ ઢીલ કરશે કે બેદરકાર રહેશે તો તેમને નોટીસથી ખબર આપ્યા સીવાય તેમના ખર્ચે ખાતા તરફથી માણસો લગાડવામાં આવશે અને તેનો ખર્ચ કોન્ટ્રાક્ટર પાસેથી વસુલવામાં આવશે.

આર. સી. સી. કામ જે સાઈઝમાં ભરવાનું કહેવામાં આવે તેટલી સાઈઝમાં કોન્ક્રીટ ભરવાનું રહેશે. સીમેન્ટ કોન્ક્રીટ ભરવા માટે સારા, હોશીયાર, કડીયા, કારીગર કામમાં રોકીને કામ કરવાનું છે. તમામ કોન્ક્રીટ ભરવાનું કામ સારી રીતે નીડલ વાયબ્રેટર મશીન વડે ખાંચીને, ઠાંસીને, જરૂરીયાત મુજબ પુરતા માણસો રોકીને કામ કરવાનું છે. તમામ કામ સાડુ, સફાઈદાર, લેવલમાં, આળભે, દોરીમાં, કાટખુણે બરાબર થાય તે રીતે કાળજીથી કરવાનું છે. સીમેન્ટ કોન્ક્રીટના કામમાં તમામ કોન્ક્રીટ મીક્સર મશીનમાં મીક્સ કરવાનું છે. સદરહુ કામમાં કોઈપણ જગ્યાએ "સરફેઈસ વાઈબ્રેટર" વાપરવાનું કહેવામાં આવે, તો સરફેઈસ વાઈબ્રેટર વાપરીને કામ કરી આપવાનું છે. વાઈબ્રેટરની સગવડ કોન્ટ્રાક્ટરે કરવાની રહેશે. અને તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં.

કોઈપણ દિવસે કરવાનાં થતાં કોન્ક્રીટ પૈકી પ્રથમ ૫ ઘ.મી.એ ૨-બે સેટ તથા બાદમાં દર ૧૦ ઘ.મી. દીઠ ૧ સેટ અથવા I.S. - 456-2000 મુજબ ટેસ્ટીંગ ક્યુબ અત્રેની હાજરીમાં કાસ્ટ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એનજીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તે કોન્ક્રીટ સાઈટ પરથી દૂર કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે.

આ રીતે તમામ માલ-મજૂરી સાથેનો, જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથેનો પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામનો ભાવ ૧ ઘ.મી. મુજબ આપવામાં આવશે.

- ❖ **Providing laying controlled cement concrete M-20 using minimum cement content @ 400 kg/Cmt Including the cost of form work But Excluding the cost of reinforcement**
- ❖ **કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટ – M – 20 Grade જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથે પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામ**

સુચના મુજબ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૦૦ કિલો પ્રતિ ઘનમીટર વાપરી એમ. ૨૦ (M-20) ગ્રેડ આર.સી.સી. જરૂરી સેન્ટરીંગ શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (નીડલ વાયબ્રેટર મશીન વડે), ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે સૂચના મુજબની સાઈઝ કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટમાં કરવાનું કામ. આ કામમાં ગેરી અથવા સરકારી એનજીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડીઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીકચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી M-20 Grade ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૦૦ કિલો/ ઘ.મી. વાપરીને મીકેનીકલ વે-બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે.

સીમેન્ટ : આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. સીમેન્ટ કા.પા.ઈ. શ્રી પાસ કરે તેવી વાપરવાની રહેશે. મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૦૦ કિલો પ્રતિ ઘનમીટર વાપરવાની રહેશે. સીમેન્ટને ભેજ ન લાગે તે પ્રમાણે જમીનથી ઉપર લાકડાનું પ્લેટ ફોર્મ બનાવી તેના ઉપર રાખી, કાળજીથી રાખવની તથા વાપરવામાં રહેશે. ખરાબ સીમેન્ટ કે ભેજ અથવા હવા લાગેલ સીમેન્ટ વાપરવાની નથી.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

રેતી : તમામ રેતી શેનુંજી(તળાજા) અથવા ઉમરાળાની જ્યાંથી સારી મળી શકે અને તે પાસ કરવામાં આવે ત્યાંથી લાવવાની છે. તમામ રેતી જીણી, ચાળેલી, ઘુળ, કસ્તર વિનાની સારી લાવવાની છે. તમામ રેતી ચોખ્ખા પાણીથી ઘુળ કે ડોળ ન રહે તે પ્રમાણે સારી રીતે ઘોઈ ને ઉપયોગમાં લેવાની રહેશે.

પાણી : આ કામમાં વાપરવાનું તમામ પણી ચોખ્ખુ મીઠું તેમજ ઘુળ કે ડોળ વિનાનું ઉપયોગમાં લેવાનું રહેશે.

મીકસીંગ : આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે **M-20 (એમ. ૨૦) ગ્રેડ સીમેન્ટ કોન્ક્રીટ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૦૦ કિલો** પ્રતિ ઘનમીટર વાપરી તે મુજબ મીક્સ ડીઝાઈનનાં પ્રમાણ મુજબ મીક્સર મશીન વડે બનાવવાનું છે. મશીનની સગવડ પણ કોન્ટ્રાક્ટરે કરવાની રહેશે. તેનો કોઈપણ જુદો ખર્ચ આપવાનો રહેશે નહીં.

સેન્ટરીંગ:—આર.સી.સી. નાં તમામ કામ માટેનું સેન્ટરીંગ પુરતા ટેકાઓ વોલપ્લેટ પ્લેટ, વિ. વાપરીને જરાપણ મચક ન ખાય તેવી રીતે તમામ ટેકાઓને નીચે કાટખુણે ડબલનોંધ મારીને ઘેરીમાં લેવલ કરવાનું છે. તમામ પ્લેટ વિ.સારીરીતે સાફ કરી તેને ઓઈલ લગાડીને કામ કરવાનું છે. સેન્ટરીંગ કામમાં જ્યાં જ્યાં લોખંડના હુક મુકવાનું કહેવામાં આવે ત્યાં મુકાવી આપવાનાં છે. સેન્ટરીંગ લોખંડની પ્લેટ હશે અને તેમાં હુક મુકવાનાં થશે તો તેમાં પણ કાણા પાડીને હુક વિ. મુકી આપવા પડશે. અને કામમાં કોઈપણ ડીઝાઈનવાળું તેમજ ઓરનામેન્ટલ ડીઝાઈન આપવામાં આવે તેવી ડીઝાઈન મુજબનું સેન્ટરીંગ કરી આપવું પડશે. તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં. કોઈપણ કામનું સેન્ટરીંગ કામ ખોલતા પહેલા શ્રી સીટી એનજીનીયર સાહેબની મંજૂરી મેળવવાની રહેશે. તમામ સેન્ટરીંગ કાળજીથી કોઈપણ ભાગતુટ ન થાય તે રીતે ખોલવાનું રહેશે. સેન્ટરીંગ કામ ખોલતા, કામમાં કોઈપણ જગ્યાએ દાઝીયા જણાય તો ત્યાં ૧:૩ નાં સીમેન્ટ મોર્ટારથી ફીનીશીંગ કરી આપવાનું રહેશે. સેન્ટરીંગ કામ આઠ દિવસમાં ખોલવાનું રહેશે. ઉપર પ્રમાણેના દિવસો વિત્યા છતાં પણ ખોલતા પહેલા શ્રી સીટી એનજીનીયરશ્રી સાહેબની મંજૂરી લેવાની રહેશે. આ તમામ આર.સી.સી. કામને ૧૫ દિવસ સતત ભીના રહે તે પ્રમાણે પાણી છાંટવાનું છે. ક્યોરીંગ કરવામાં કોન્ટ્રાક્ટર જરા પણ ઢીલ કરશે કે બેદરકાર રહેશે તો તેમને નોટીસથી ખબર આપ્યા સીવાય તેમના ખર્ચે ખાતા તરફથી માણસો લગાડવામાં આવશે અને તેનો ખર્ચ કોન્ટ્રાક્ટર પાસેથી વસુલવામાં આવશે.

આર. સી. સી. કામ જે સાઈઝમાં ભરવાનું કહેવામાં આવે તેટલી સાઈઝમાં કોન્ક્રીટ ભરવાનું રહેશે. સીમેન્ટ કોન્ક્રીટ ભરવા માટે સારા, હોશીયાર, કડીયા, કારીગર કામમાં રોકીને કામ કરવાનું છે. તમામ કોન્ક્રીટ ભરવાનું કામ સારી રીતે નીડલ વાયબ્રેટર મશીન વડે ખાંચીને, ઠાંસીને, જરૂરીયાત મુજબ પુરતા માણસો રોકીને કામ કરવાનું છે. તમામ કામ સાફ, સફાઈદાર, લેવલમાં, આળભે, દોરીમાં, કાટખુણે બરાબર થાય તે રીતે કાળજીથી કરવાનું છે. સીમેન્ટ કોન્ક્રીટના કામમાં તમામ કોન્ક્રીટ મીક્સર મશીનમાં મીક્સ કરવાનું છે. સદરહુ કામમાં કોઈપણ જગ્યાએ "સરફેઈસ વાઈબ્રેટર" વાપરવાનું કહેવામાં આવે, તો સરફેઈસ વાઈબ્રેટર વાપરીને કામ કરી આપવાનું છે. વાઈબ્રેટરની સગવડ કોન્ટ્રાક્ટરે કરવાની રહેશે. અને તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં.

કોઈપણ દિવસે કરવાનાં થતાં કોન્ક્રીટ પૈકી પ્રથમ ૫ ઘ.મી.એ ૨—બે સેટ તથા બાદમાં દર ૧૦ ઘ.મી. દીઠ ૧ સેટ અથવા I.S. - 456-2000 મુજબ ટેસ્ટીંગ ક્યુબ અત્રેની હાજરીમાં કાસ્ટ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તે કોન્ક્રીટ સાઈટ પરથી દૂર કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે.

આ રીતે તમામ માલ—મજૂરી સાથેનો, જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથેનો પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામનો ભાવ ૧ ઘ.મી. મુજબ આપવામાં આવશે.

- ❖ **Providing laying controlled cement concrete M-25 using minimum cement content @ 450 kg/Cmt Including the cost of form work But Excluding the cost of reinforcement**
- ❖ **કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટ — M — 25 Grade જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથે પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામ**

❖

સુચના મુજબ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો પ્રતિ ઘનમીટર વાપરી એમ. ૨૫ (M-25) ગ્રેડ આર.સી.સી. જરૂરી સેન્ટરીંગ શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (નીડલ વાયબ્રેટર મશીન વડે), ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે સૂચના મુજબની સાઈઝ કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટમાં કરવાનું કામ. આ કામમાં ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીકચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી **M-25 Grade** ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે **મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો/ ઘ.મી.** વાપરીને મીકેનીકલ વે—બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે.

સીમેન્ટ : આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. સીમેન્ટ કા.પા.ઈ. શ્રી પાસ કરે તેવી વાપરવાની રહેશે. **મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો પ્રતિ ઘનમીટર** વાપરવાની રહેશે. સીમેન્ટને ભેજ ન લાગે તે પ્રમાણે જમીનથી ઉપર લાકડાનું પ્લેટ ફોર્મ બનાવી તેના ઉપર રાખી, કાળજીથી રાખવાની તથા વાપરવામાં રહેશે. ખરાબ સીમેન્ટ કે ભેજ અથવા હવા લાગેલ સીમેન્ટ વાપરવાની નથી.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

રેતી : તમામ રેતી શેત્રુંજી(તળાજા) અથવા ઉમરાળાની જ્યાંથી સારી મળી શકે અને તે પાસ કરવામાં આવે ત્યાંથી લાવવાની છે. તમામ રેતી જીણી, ચાળેલી, ઘુળ, કસ્તર વિનાની સારી લાવવાની છે. તમામ રેતી ચોખ્ખા પાણીથી ઘુળ કે ડોળ ન રહે તે પ્રમાણે સારી રીતે ઘોઈ ને ઉપયોગમાં લેવાની રહેશે.

પાણી : આ કામમાં વાપરવાનું તમામ પણી ચોખ્ખુ મીઠું તેમજ ઘુળ કે ડોળ વિનાનું ઉપયોગમાં લેવાનું રહેશે.

મીકસીંગ : આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે **M-25 (એમ. ૨૫) ગ્રેડ** સીમેન્ટ કોન્ક્રીટ મીનીમમ **સિમેન્ટ કન્ટેન્ટ ૪૫૦ કિલો** પ્રતિ ઘનમીટર વાપરી તે મુજબ મીક્સ ડિઝાઈનનાં પ્રમાણ મુજબ મીક્ષર મશીન વડે બનાવવાનું છે. મશીનની સગવડ પણ કોન્ટ્રાક્ટરે કરવાની રહેશે. તેનો કોઈપણ જુદો ખર્ચ આપવાનો રહેશે નહીં.

સેન્ટરીંગ:—આર.સી.સી. નાં તમામ કામ માટેનું સેન્ટરીંગ પુરતા ટેકાઓ વોલપ્લેટ પ્લેટ, વિ. વાપરીને જરાપણ મચક ન ખાય તેવી રીતે તમામ ટેકાઓને નીચે કાટખુણે ડબલનોંધ મારીને ઘેરીમાં લેવલ કરવાનું છે. તમામ પ્લેટ વિ.સારીરીતે સાફ કરી તેને ઓઈલ લગાડીને કામ કરવાનું છે. સેન્ટરીંગ કામમાં જ્યાં જ્યાં લોખંડના હુક મુકવાનું કહેવામાં આવે ત્યાં મુકાવી આપવાનાં છે. સેન્ટરીંગ લોખંડની પ્લેટ હશે અને તેમાં હુક મુકવાનાં થશે તો તેમાં પણ કાણા પાડીને હુક વિ. મુકી આપવા પડશે. અને કામમાં કોઈપણ ડિઝાઈનવાળું તેમજ ઓરનામેન્ટલ ડિઝાઈન આપવામાં આવે તેવી ડિઝાઈન મુજબનું સેન્ટરીંગ કરી આપવું પડશે. તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં. કોઈપણ કામનું સેન્ટરીંગ કામ ખોલતા પહેલા શ્રી સીટી એનજીનીયર સાહેબની મંજૂરી મેળવવાની રહેશે. તમામ સેન્ટરીંગ કાળજીથી કોઈપણ ભાગતુટ ન થાય તે રીતે ખોલવાનું રહેશે. સેન્ટરીંગ કામ ખોલતા, કામમાં કોઈપણ જગ્યાએ દાઝીયા જણાય તો ત્યાં ૧:૩ નાં સીમેન્ટ મોર્ટારથી ફીનીસીંગ કરી આપવાનું રહેશે. સેન્ટરીંગ કામ આઠ દિવસમાં ખોલવાનું રહેશે. ઉપર પ્રમાણેના દિવસો વિત્યા છતાં પણ ખોલતા પહેલા શ્રી સીટી એનજીનીયરશ્રી સાહેબની મંજૂરી લેવાની રહેશે. આ તમામ આર.સી.સી. કામને ૧૫ દિવસ સતત ભીના રહે તે પ્રમાણે પાણી છાંટવાનું છે. ક્યોરીંગ કરવામાં કોન્ટ્રાક્ટર જરા પણ ઢીલ કરશે કે બેદરકાર રહેશે તો તેમને નોટીસથી ખબર આપ્યા સીવાય તેમના ખર્ચ ખાતા તરફથી માણસો લગાડવામાં આવશે અને તેનો ખર્ચ કોન્ટ્રાક્ટર પાસેથી વસુલવામાં આવશે.

આર. સી. સી. કામ જે સાઈઝમાં ભરવાનું કહેવામાં આવે તેટલી સાઈઝમાં કોન્ક્રીટ ભરવાનું રહેશે. સીમેન્ટ કોન્ક્રીટ ભરવા માટે સારા, હોશીયાર, કડીયા, કારીગર કામમાં રોકીને કામ કરવાનું છે. તમામ કોન્ક્રીટ ભરવાનું કામ સારી રીતે નીડલ વાયબ્રેટર મશીન વડે ખાંચીને, ઠાંસીને, જરૂરીયાત મુજબ પુરતા માણસો રોકીને કામ કરવાનું છે. તમામ કામ સાડ, સફાઈદાર, લેવલમાં, આળંભે, દોરીમાં, કાટખુણે બરાબર થાય તે રીતે કાળજીથી કરવાનું છે. સીમેન્ટ કોન્ક્રીટના કામમાં તમામ કોન્ક્રીટ મીક્ષર મશીનમાં મીક્સ કરવાનું છે. સદરહુ કામમાં કોઈપણ જગ્યાએ "સરફેઈસ વાઈબ્રેટર" વાપરવાનું કહેવામાં આવે, તો સરફેઈસ વાઈબ્રેટર વાપરીને કામ કરી આપવાનું છે. વાઈબ્રેટરની સગવડ કોન્ટ્રાક્ટરે કરવાની રહેશે. અને તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં.

કોઈપણ દિવસે કરવાનાં થતાં કોન્ક્રીટ પૈકી પ્રથમ ૫ ઘ.મી.એ ૨—બે સેટ તથા બાદમાં દર ૧૦ ઘ.મી. દીઠ ૧ સેટ અથવા I.S. - 456-2000 મુજબ ટેસ્ટીંગ ક્યુબ અત્રેની હાજરીમાં કાસ્ટ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તે કોન્ક્રીટ સાઈટ પરથી દૂર કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે.

આ રીતે તમામ માલ—મજૂરી સાથેનો, જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથેનો પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામનો ભાવ ૧ ઘ.મી. મુજબ આપવામાં આવશે.

- ❖ **Providing laying controlled cement concrete M-30 using minimum cement content @ 475 kg/Cmt Including the cost of form work But Excluding the cost of reinforcement**
- ❖ **કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટ — M — 30 Grade જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથે પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામ**

❖

સુચના મુજબ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૭૫ કિલો પ્રતિ ઘનમીટર વાપરી એમ. ૩૦ (M-30) ગ્રેડ આર.સી.સી. જરૂરી સેન્ટરીંગ શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (નીડલ વાયબ્રેટર મશીન વડે), ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે સૂચના મુજબની સાઈઝ કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટમાં કરવાનું કામ. આ કામમાં ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીકચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી **M-30 Grade** ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે **મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૭૫ કિલો/ ઘ.મી.** વાપરીને મીકેનીકલ વે—બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે.

સીમેન્ટ : આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. સીમેન્ટ કા.પા.ઈ. શ્રી પાસ કરે તેવી વાપરવાની રહેશે. **મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૭૫ કિલો પ્રતિ ઘનમીટર** વાપરવાની રહેશે. સીમેન્ટને ભેજ ન લાગે તે પ્રમાણે જમીનથી ઉપર લાકડાનું પ્લેટ ફોર્મ બનાવી તેના ઉપર રાખી, કાળજીથી રાખવની તથા વાપરવામાં રહેશે. ખરાબ સીમેન્ટ કે ભેજ અથવા હવા લાગેલ સીમેન્ટ વાપરવાની નથી.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

રેતી : તમામ રેતી શેત્રુંજી(તળાજા) અથવા ઉમરાળાની જયાંથી સારી મળી શકે અને તે પાસ કરવામાં આવે ત્યાંથી લાવવાની છે. તમામ રેતી જીણી, ચાળેલી, ઘુળ, કસ્તર વિનાની સારી લાવવાની છે. તમામ રેતી ચોખ્ખા પાણીથી ઘુળ કે ડોળ ન રહે તે પ્રમાણે સારી રીતે ઘોઈ ને ઉપયોગમાં લેવાની રહેશે.

પાણી : આ કામમાં વાપરવાનું તમામ પણી ચોખ્ખુ મીઠું તેમજ ઘુળ કે ડોળ વિનાનું ઉપયોગમાં લેવાનું રહેશે.

મીકસીંગ : આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે **M-30 (એમ. ૩૦) ગ્રેડ સીમેન્ટ કોન્ક્રીટ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૪૭૫ કિલો** પ્રતિ ઘનમીટર વાપરી તે મુજબ મીક્સ ડિઝાઈનનાં પ્રમાણ મુજબ મીક્સર મશીન વડે બનાવવાનું છે. મશીનની સગવડ પણ કોન્ટ્રાક્ટરે કરવાની રહેશે. તેનો કોઈપણ જુદો ખર્ચ આપવાનો રહેશે નહીં.

સેન્ટરીંગ:—આર.સી.સી. નાં તમામ કામ માટેનું સેન્ટરીંગ પુરતા ટેકાઓ વોલપ્લેટ પ્લેટ, વિ. વાપરીને જરાપણ મચક ન ખાય તેવી રીતે તમામ ટેકાઓને નીચે કાટખુણે ડબલનોંધ મારીને ઘેરીમાં લેવલ કરવાનું છે. તમામ પ્લેટ વિ.સારીરીતે સાફ કરી તેને ઓઈલ લગાડીને કામ કરવાનું છે. સેન્ટરીંગ કામમાં જયાં જયાં લોખંડના હુક મુકવાનું કહેવામાં આવે ત્યાં મુકાવી આપવાનાં છે. સેન્ટરીંગ લોખંડની પ્લેટ હશે અને તેમાં હુક મુકવાનાં થશે તો તેમાં પણ કાણા પાડીને હુક વિ. મુકી આપવા પડશે. અને કામમાં કોઈપણ ડિઝાઈનવાળું તેમજ ઓરનામેન્ટલ ડિઝાઈન આપવામાં આવે તેવી ડિઝાઈન મુજબનું સેન્ટરીંગ કરી આપવું પડશે. તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં. કોઈપણ કામનું સેન્ટરીંગ કામ ખોલતા પહેલા શ્રી સીટી એનજીનીયર સાહેબની મંજૂરી મેળવવાની રહેશે. તમામ સેન્ટરીંગ કાળજીથી કોઈપણ ભાગતુટ ન થાય તે રીતે ખોલવાનું રહેશે. સેન્ટરીંગ કામ ખોલતા, કામમાં કોઈપણ જગ્યાએ દાઝીયા જણાય તો ત્યાં ૧:૩ નાં સીમેન્ટ મોર્ટારથી ફીનીશીંગ કરી આપવાનું રહેશે. સેન્ટરીંગ કામ આઠ દિવસમાં ખોલવાનું રહેશે. ઉપર પ્રમાણેના દિવસો વિત્યા છતાં પણ ખોલતા પહેલા શ્રી સીટી એનજીનીયરશ્રી સાહેબની મંજૂરી લેવાની રહેશે. આ તમામ આર.સી.સી. કામને ૧૫ દિવસ સતત ભીના રહે તે પ્રમાણે પાણી છાંટવાનું છે. ક્યોરીંગ કરવામાં કોન્ટ્રાક્ટર જરા પણ ઢીલ કરશે કે બેદરકાર રહેશે તો તેમને નોટીસથી ખબર આપ્યા સીવાય તેમના ખર્ચ ખાતા તરફથી માણસો લગાડવામાં આવશે અને તેનો ખર્ચ કોન્ટ્રાક્ટર પાસેથી વસુલવામાં આવશે.

આર. સી. સી. કામ જે સાઈઝમાં ભરવાનું કહેવામાં આવે તેટલી સાઈઝમાં કોન્ક્રીટ ભરવાનું રહેશે. સીમેન્ટ કોન્ક્રીટ ભરવા માટે સારા, હોશીયાર, કડીયા, કારીગર કામમાં રોકીને કામ કરવાનું છે. તમામ કોન્ક્રીટ ભરવાનું કામ સારી રીતે નીડલ વાયબ્રેટર મશીન વડે ખાંચીને, ઠાંસીને, જરૂરીયાત મુજબ પુરતા માણસો રોકીને કામ કરવાનું છે. તમામ કામ સારૂ, સફાઈદાર, લેવલમાં, આળભે, દોરીમાં, કાટખુણે બરાબર થાય તે રીતે કાળજીથી કરવાનું છે. સીમેન્ટ કોન્ક્રીટના કામમાં તમામ કોન્ક્રીટ મીક્સર મશીનમાં મીક્સ કરવાનું છે. સદરહુ કામમાં કોઈપણ જગ્યાએ "સરફેઈસ વાઈબ્રેટર" વાપરવાનું કહેવામાં આવે, તો સરફેઈસ વાઈબ્રેટર વાપરીને કામ કરી આપવાનું છે. વાઈબ્રેટરની સગવડ કોન્ટ્રાક્ટરે કરવાની રહેશે. અને તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં.

કોઈપણ દિવસે કરવાનાં થતાં કોન્ક્રીટ પૈકી પ્રથમ ૫ ઘ.મી.એ ૨-બે સેટ તથા બાદમાં દર ૧૦ ઘ.મી. દીઠ ૧ સેટ અથવા I.S. - 456-2000 મુજબ ટેસ્ટીંગ ક્યુબ અત્રેની હાજરીમાં કાસ્ટ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એનજીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તે કોન્ક્રીટ સાઈટ પરથી દૂર કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે.

આ રીતે તમામ માલ-મજૂરી સાથેનો, જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથેનો પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામનો ભાવ ૧ ઘ.મી. મુજબ આપવામાં આવશે.

- ❖ **Providing laying controlled cement concrete M-40 using minimum cement content @ 525 kg/Cmt Including the cost of form work But Excluding the cost of reinforcement**
- ❖ **કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટ - M - 40 Grade જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથે પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામ**

❖ સુચના મુજબ મીનીમમ સિમેન્ટ કન્ટેન્ટ ૫૨૫ કિલો પ્રતિ ઘનમીટર વાપરી **એમ. ૪૦ (M-40) ગ્રેડ આર.સી.સી.** જરૂરી સેન્ટરીંગ શટરીંગ, સ્કેફોલ્ડીંગ, વાયબ્રેટીંગ (નીડલ વાયબ્રેટર મશીન વડે), ૧૫ દિવસ ક્યોરીંગ વગેરે સાથે સૂચના મુજબની સાઈઝ કન્ટ્રોલ્ડ આર.સી.સી. સીમેન્ટ કોન્ક્રીટમાં કરવાનું કામ. આ કામમાં **ગેરી અથવા સરકારી એનજીનીયરીંગ કોલેજ માં કરાવવામાં આવેલ મીક્સ ડિઝાઈન પ્રમાણે સિમેન્ટ, રેતી, કપચી તથા એડમીકચર/કેમીકલ વાપરી વોટર સિમેન્ટ રેશીયો જાળવી M-40 Grade ના કન્ટ્રોલ્ડ કોન્ક્રીટ માટે મીનીમમ સિમેન્ટ કન્ટેન્ટ ૫૨૫ કિલો/ ઘ.મી. વાપરીને મીકેનીકલ વે-બેચર નો ઉપયોગ કરીને માલ બનાવવાનો છે.**

સીમેન્ટ : આઈ.એસ. ૫૩ ગ્રેડ ઓ.પી.સી. સિમેન્ટ પાસ કરવામાં આવે તે લાવી વાપરવાની છે. સીમેન્ટ કા.પા.ઈ. શ્રી પાસ કરે તેવી વાપરવાની રહેશે. **મીનીમમ સિમેન્ટ કન્ટેન્ટ ૫૨૫ કિલો પ્રતિ ઘનમીટર** વાપરવાની રહેશે. સીમેન્ટને ભેજ ન લાગે તે પ્રમાણે જમીનથી ઉપર લાકડાનું પ્લેટ ફોર્મ બનાવી તેના ઉપર રાખી, કાળજીથી રાખવાની તથા વાપરવામાં રહેશે. ખરાબ સીમેન્ટ કે ભેજ અથવા હવા લાગેલ સીમેન્ટ વાપરવાની નથી.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

રેતી : તમામ રેતી શેત્રુંજી(તળાજા) અથવા ઉમરાળાની જ્યાંથી સારી મળી શકે અને તે પાસ કરવામાં આવે ત્યાંથી લાવવાની છે. તમામ રેતી જીણી, ચાળેલી, ઘુળ, કસ્તર વિનાની સારી લાવવાની છે. તમામ રેતી ચોખ્ખા પાણીથી ઘુળ કે ડોળ ન રહે તે પ્રમાણે સારી રીતે ઘોઈ ને ઉપયોગમાં લેવાની રહેશે.

પાણી : આ કામમાં વાપરવાનું તમામ પણી ચોખ્ખુ મીઠું તેમજ ઘુળ કે ડોળ વિનાનું ઉપયોગમાં લેવાનું રહેશે.

મીકસીંગ : આઈ.એસ. સ્ટાન્ડર્ડ પ્રમાણેની કમ્પ્રેસીવ સ્ટ્રેન્થ મળે તે રીતે **M-40 (એમ. ૪૦) ગ્રેડ** સીમેન્ટ કોન્ક્રીટ મીનીમમ સિમેન્ટ કન્ટેન્ટ પરપ કિલો પ્રતિ ઘનમીટર વાપરી તે મુજબ મીક્સ ડીઝાઈનનાં પ્રમાણ મુજબ મીક્ષર મશીન વડે બનાવવાનું છે. મશીનની સગવડ પણ કોન્ટ્રાક્ટરે કરવાની રહેશે. તેનો કોઈપણ જુદો ખર્ચ આપવાનો રહેશે નહીં.

સેન્ટરીંગ:—આર.સી.સી. નાં તમામ કામ માટેનું સેન્ટરીંગ પુરતા ટેકાઓ વોલપ્લેટ પ્લેટ, વિ. વાપરીને જરાપણ મચક ન ખાય તેવી રીતે તમામ ટેકાઓને નીચે કાટખુણે ડબલનોંધ મારીને ઘેરીમાં લેવલ કરવાનું છે. તમામ પ્લેટ વિ.સારીરીતે સાફ કરી તેને ઓઈલ લગાડીને કામ કરવાનું છે. સેન્ટરીંગ કામમાં જ્યાં જ્યાં લોખંડના હુક મુકવાનું કહેવામાં આવે ત્યાં મુકાવી આપવાનાં છે. સેન્ટરીંગ લોખંડની પ્લેટ હશે અને તેમાં હુક મુકવાનાં થશે તો તેમાં પણ કાણા પાડીને હુક વિ. મુકી આપવા પડશે. અને કામમાં કોઈપણ ડીઝાઈનવાળું તેમજ ઓરનામેન્ટલ ડીઝાઈન આપવામાં આવે તેવી ડીઝાઈન મુજબનું સેન્ટરીંગ કરી આપવું પડશે. તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં. કોઈપણ કામનું સેન્ટરીંગ કામ ખોલતા પહેલા શ્રી સીટી એનજીનીયર સાહેબની મંજૂરી મેળવવાની રહેશે. તમામ સેન્ટરીંગ કાળજીથી કોઈપણ ભાગતુટ ન થાય તે રીતે ખોલવાનું રહેશે. સેન્ટરીંગ કામ ખોલતા, કામમાં કોઈપણ જગ્યાએ દાઝીયા જણાય તો ત્યાં ૧:૩ નાં સીમેન્ટ મોર્ટારથી ફીનીસીંગ કરી આપવાનું રહેશે. સેન્ટરીંગ કામ આઠ દિવસમાં ખોલવાનું રહેશે. ઉપર પ્રમાણેના દિવસો વિત્યા છતાં પણ ખોલતા પહેલા શ્રી સીટી એનજીનીયરશ્રી સાહેબની મંજૂરી લેવાની રહેશે. આ તમામ આર.સી.સી. કામને ૧૫ દિવસ સતત ભીના રહે તે પ્રમાણે પાણી છાંટવાનું છે. ક્યોરીંગ કરવામાં કોન્ટ્રાક્ટર જરા પણ ઢીલ કરશે કે બેદરકાર રહેશે તો તેમને નોટીસથી ખબર આપ્યા સીવાય તેમના ખર્ચે ખાતા તરફથી માણસો લગાડવામાં આવશે અને તેનો ખર્ચ કોન્ટ્રાક્ટર પાસેથી વસુલવામાં આવશે.

આર. સી. સી. કામ જે સાઈઝમાં ભરવાનું કહેવામાં આવે તેટલી સાઈઝમાં કોન્ક્રીટ ભરવાનું રહેશે. સીમેન્ટ કોન્ક્રીટ ભરવા માટે સારા, હોશીયાર, કડીયા, કારીગર કામમાં રોકીને કામ કરવાનું છે. તમામ કોન્ક્રીટ ભરવાનું કામ સારી રીતે નીડલ વાયબ્રેટર મશીન વડે ખાંચીને, ઠાંસીને, જરૂરીયાત મુજબ પુરતા માણસો રોકીને કામ કરવાનું છે. તમામ કામ સાડુ, સફાઈદાર, લેવલમાં, આળભે, દોરીમાં, કાટખુણે બરાબર થાય તે રીતે કાળજીથી કરવાનું છે. સીમેન્ટ કોન્ક્રીટના કામમાં તમામ કોન્ક્રીટ મીક્ષર મશીનમાં મીક્સ કરવાનું છે. સદરહુ કામમાં કોઈપણ જગ્યાએ "સરફેઈસ વાઈબ્રેટર" વાપરવાનું કહેવામાં આવે, તો સરફેઈસ વાઈબ્રેટર વાપરીને કામ કરી આપવાનું છે. વાઈબ્રેટરની સગવડ કોન્ટ્રાક્ટરે કરવાની રહેશે. અને તેનો કોઈપણ જુદો ભાવ આપવામાં આવશે નહીં.

કોઈપણ દિવસે કરવાનાં થતાં કોન્ક્રીટ પૈકી પ્રથમ ૫ ઘ.મી.એ ૨—બે સેટ તથા બાદમાં દર ૧૦ ઘ.મી. દીઠ ૧ સેટ અથવા I.S. - 456-2000 મુજબ ટેસ્ટીંગ ક્યુબ અત્રેની હાજરીમાં કાસ્ટ કરી મ્યુની. કોર્પો ની સુચના મુજબ ગેરી અથવા સરકારી એન્જીનીયરીંગ કોલેજ માં ટેસ્ટીંગ કરાવવાનાં રહેશે. જે માટે ની તમામ જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની રહેશે તથા તે માટે તથા ટેસ્ટીંગ નો તમામ ખર્ચ કોન્ટ્રાક્ટરના શીરે રહેશે. ટેસ્ટીંગ કરાવતાં નિયત સ્ટ્રેન્થ નહિ મળે તો તે કોન્ક્રીટ સાઈટ પરથી દૂર કરાવવાનું રહેશે. ટેસ્ટીંગ કરાવતાં તેનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે.

આ રીતે તમામ માલ—મજૂરી સાથેનો, જરૂરી સેન્ટરીંગ, શટરીંગ / ફોર્મવર્ક, વાઈબ્રેટીંગ, ફીનીશીંગ, ડિવોટરીંગ, ક્યોરીંગ સાથેનો પરંતુ (લોખંડ) સિવાય કમ્પલીટ કામનો ભાવ ૧ ઘ.મી. મુજબ આપવામાં આવશે.

❖ **Supplying and fixing reinforced concrete heavy duty NP-2 or NP-3 (As per Tender Sheet) Non Pressure pipes of I.S. Class NP-3 or NP-2 with collars for culverts of Directed Internal Diameter including setting and joining the pipes in CM 1:2 watering and laying to levels of slops (R&B SOR 2013-14 Item No. As Per NBO 26.105 - Sr No 89/ Page no 91)**

(i) 300 mm dia. (ii) 450 mm dia (iii) 600 mm dia (iv) 750 mm dia (v) 900 mm dia (vi) 1050 mm dia (vii) 1200 mm dia. (viii) 150 mm dia (ix) 200 mm dia

1. The work shall consist to furnishing and installing reinforced cement concrete pipe of the type dia metre and length required at the location shown on the drawings or as ordered by the Engineer in charge.

2. Reinforced concrete pipe shall be NP3 / NP2 type conforming to the requirements of IS : 458 and shall be of dia as specified in the item each consignment of cement concrete pipes shall be inspected. If neccessary and approved by the engineer in charge, either at the place of manufacture or at the site before their incorporation in the works.

NP3, NP2, NP1 pipes are used for RCC pipes where testing of pipes will not be feasible the contractors will have to produce a certificate from the manufacturers on company's letter head the given hereinafter form.

Production of such certificate will not however relieve the contractor from this responsibility of supplying pipes of required standard and will have to bear the loss or damage caused to the work in account of defects found subsequently during the execution It will also be necessary to purchase these pipes from manufacturere having standard equipments for carrying out various test as per IS : 458 at his factory.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

FORM OF CERTIFICATE FOR NP3, NP2, NP1 PIPES

We..... manufacture of RCC pipes prудude RCC pipes as per the requirement of IS : 458 and also carry out the required test at our place. We have acquired equipments for carrying out test and are prepared to carryout test at our factory sites.

We have experience of manufacturing of pies of years The pipes supplied by us to M/s Satisfy the requirement of IS " 458.

Date

Place Manufacturer;s sign.

3. No pipe shall be placed in position until the foundations have been approved by the eingneer in charge, Where two or more pipes are to be laid adjacent to each other they shall be separated by a distace equal to at least half the diameter of the pipe subject to minimum of 450mm. The laying of pipes on the prepared foundation shall start from the outlet and proceed toward the inlet and be completed to teh specified lines and grades. The pipes shall be fitted and matched so that when laid in works they form a culvert with a smooth uniform invert. Any pipe found defective or damaged during laying shall be removed at there cost of contractor.
4. The pipes shall be jointed either by collar joint or by flush joint in the former case the collers shall be of RCC 150 to 200 mm wide and having the same strength as the pipes to be jointed . Caulking space shall be slightly wet mix of cement and sand in the ratio of 1:2 rammed with caulking irons. Before caulking the collar shall be so placed that its centre coincides with that of pipe and an even annular space is left between the collar and the pipes. Flush joint may be shaped to form a self centering joing with a joinin space 13 cm wide, The joining space shall be filled with cement mortar, 1 cement 2. sand, mixed sufficiently dry to remain in position when forced with a trowel or rammer, Care shall be taken to fill all voids and excess mortar shall be removed. All joints shall be made with care so that their interior surface is smooth and consistent with the interior surface of the pipes. Agter finishing, the joint shall be kept covered and damp for at least four day.
5. RCC pipe shall be measured along thir centre between thir inlet and outlet ends in linear meties.
6. The rate for the pipes shall include the cost of pipe including loading unloading handing storing laying in position and joining complete.

305 EMABANKMENT CONSTRUCTION

❖ **Earth work for embankment including breaking clods dressing with all lead and lift and including watering, rolling, and consolidation of subgrade in layers at O.MC. to required dry density including filling the depressing which occur during the proces using power roller 8.T. to 10 T.**

❖ CONSTRUCTION OF SUBGRADE AND EARTHEN SHOULDER

❖ **Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads transporting to site, spreading, grading to required slope and compacted to meet requirement of MORTH Specification - table No. 300-2)**

305.1 General

305.1.1 Description : These Specifications shall apply to the construction of embankments including sub-grades, earthen shoulders and miscellaneous backfills with approved material obtained from approved source, including material from roadway and drain excavation, borrow pits or other sources. All embankments sub-grades, earthen shoulders and miscellaneous backfills shall be constructed in accordance with the requirements of these Specifications and in conformity with the lines, grades, and cross-sections shown on the drawings or as directed by the Engineer.

305.2 Materials and General Requirements

305.2.1 Physical requirements

305.2.1.1 The materials used in embankments, subgrades, earthen shoulders and miscellaneous backfills shall be soil, moorum, gravel, pond ash, a mixture of these or any other material approved by the Engineer. Such materials shall be free of logs, stumps, roots, rubbish or any other ingredient likely to deteriorate or affect the stability of the embankment/sub-grade. The use of pond ash as fill material shall be mandatory in road/ flyover embankment construction in the areas where pond ash is

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

available in adequate quantities within economical viable lead in accordance with the guidelines of IRC:SP:58-2001 unless it is not considered viable by the Chief Engineer/Engineer in Chief or any other Engineering Officer of equivalent rank.

The following types of material shall be considered unsuitable for embankment:

- a) Materials from swamps, marshes and bogs;
- b) Peat, log, stump and perishable material; any soil that classifies as OL, OI, OH or Pt in accordance with IS:1498;
- c) Materials susceptible to spontaneous combustion;
- d) Materials in a frozen condition;
- e) Clay having liquid limit exceeding 50 and plasticity index exceeding 25; and
- f) Materials with salts resulting in leaching in the embankment.

305.2.1.2 Expansive clay exhibiting marked swell and shrinkage properties (“free swelling index” exceeding 50 percent when tested as per IS:2720 – Part 40) shall not be used as a fill material. Where an expansive clay having “free swelling index” value less than 50 percent is used as a fill material, subgrade and top 500 mm portion of the embankment just below sub-grade shall be non-expansive in nature.

305.2.1.3 Any fill material with a soluble sulphate content exceeding 1.9 grams of sulphate (expressed as SO_3) per litre when tested in accordance with BS:1377 Test 10, but using a 2:1 water-soil ratio shall not be deposited within 500 mm distance (or any other distance described in the Contract), of permanent works constructed out of concrete, cement bound materials or other cementitious material..

Materials with a total sulphate content (expressed as SO_3) exceeding 0.5 percent by mass, when tested in accordance with BS:1377 Test 9 shall not be deposited within 500 mm, or other distances described in the Contract, of metallic items forming part of the Permanent Works.

305.2.1.4 The size of the coarse material in the mixture of earth shall ordinarily not exceed 75 mm when placed in the embankment and 50 mm when placed in the sub-grade. However, the Engineer may at his discretion permit the use of material coarser than this also if he is satisfied that the same will not present any difficulty as regards the placement of fill material and its compaction to the requirements of these Specifications. The maximum particle size in such cases, however, shall not be more than two-thirds of the compacted layer thickness.

305.2.1.5 Ordinarily, only the materials satisfying the density requirements given in Table 300-2 shall be employed for the construction of the embankment and the sub-grade.

Table 300-2 Density Requirements of Embankment and Sub-grade Materials

S.No.	Type of Work	Maximum laboratory dry unit weight when tested as per IS:2720 (Part 8)
1.	Embankments up to 3 m height, not subjected to extensive flooding	Not less than 16 kN/cu.m
2.	Embankments exceeding 3 m height or embankments of any height subject to long periods of inundation	Not less than 17 kN/ cu.m
3.	Subgrade and earthen shoulders/verges/backfill	Not less than 18 kN/cu.m

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- Notes:*
- 1) This Table is not applicable for lightweight fill material, e.g., cinder, pond ash, etc.
 - 2) The Engineer may relax these requirements at his discretion taking into account the availability of materials for construction and other relevant factors.
 - 3) The material to be used in subgrade should also satisfy design CBR at the dry unit weight applicable as per Table 300-3.

305.2.2 General requirements

305.2.2.1 The materials for embankment shall be obtained from approved sources with preference given to acceptable materials becoming available from nearby roadway excavation under the same Contract.

The work shall be so planned and executed that the best available materials are saved for the subgrade and the embankment portion just below the subgrade.

305.2.2.2 Borrow materials : No borrow area shall be made available by the Employer. The arrangement for the source of supply of the material for embankment and sub-grade complying with the guidelines as well as compliance to environmental requirements in respect of excavation and borrow areas as stipulated, from time to time by the Ministry of Environment and Forests, Government of India and the local bodies, as applicable shall be the sole responsibility of the Contractor.

Area where pond ash is available for construction of embankment, borrowing of the earth shall be avoided to the extent possible. Embankment constructed out of pond ash shall be properly designed to ensure stability against uplifting etc. A suitable thick cover may preferably be provided at intervening layers of pond ash for this purpose. A thick soil cover shall bind the edge of the embankment to protect it against erosion. Minimum thickness of such soil cover shall be 500 mm.

Borrow pits along the road shall be discouraged. If permitted by the Engineer, these shall not be dug continuously. Ridges of not less than 8 m width should be left at intervals not exceeding 300 m. Small drains shall be cut through the ridges to facilitate drainage. The depth of the pits shall be so regulated that their bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of the bank, the maximum depth in any case being limited to 1.5 m. Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10 m.

Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plant is operating at the place of deposition.

Where the excavation reveals a combination of acceptable and unacceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the unacceptable materials. The acceptable materials shall be stockpiled separately.

The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures.

The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme approved by the Engineer. It shall be ensured that the subgrade material when compacted to the density requirements as in Table 300-3 shall yield the design CBR value of the sub-grade.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Table 300-3 Compaction Requirements for Embankment and Sub-grade

Type of work/material	Relative compaction as percentage of max. laboratory dry density as per IS:2720 (Part 8)	Minimum CBR %
1. Subgrade and earthen shoulders	Not less than 98%	5
2. Embankment	Not less than 97%	5
3. Expansive Clays a) Subgrade and 500 mm portion just below the sub-grade b) Remaining portion of embankment	Not allowed Not less than 90%	-4

In case the sub-grade CBR is less than the specified in the Table 300-3, the subgrade shall be stabilised with lime, cement or any other stabilizer accredited by IRC or by mechanical stabilization so as to raise the (Field) CBR is not less than 15 percent.

The Contractor shall at least 7 working days before commencement of compaction submit the following to the Engineer for approval:

- i) The values of maximum dry density and optimum moisture content obtained in accordance with IS:2720 (Part 8), appropriate for each of the fill materials he intends to use.
- ii) A graph of density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined.

Once the above information has been approved by the Engineer, it shall form the basis for compaction.

305.3 Construction Operations

305.3.1 Setting out : After the site has been cleared to Clause 201, the work shall be set out to Clause 301.3.1 The limits of embankment/sub-grade shall be marked by fixing batter pegs on both sides at regular intervals as guides before commencing the

earthwork. The embankment/sub-grade shall be built sufficiently wider than the design dimension so that surplus material may be trimmed, ensuring that the remaining material is to the desired density and in position specified and conforms to the specified side slopes.

305.3.2 Dewatering : If the foundation of the embankment is in an area with stagnant water, and in the opinion of the Engineer it is feasible to remove it, the same shall be removed by bailing out or pumping, as directed by the Engineer and the area of the embankment foundation shall be kept dry. Care shall be taken to discharge the drained water so as not to cause damage to the works, crops or any other property. Due to any negligence on the part of the Contractor, if any such damage is caused, it shall be the sole responsibility of the Contractor to repair/restore it to original condition or compensate the damage at his own cost.

If the embankment is to be constructed under water, Clause 305.4.6 shall apply.

305.3.3 Stripping and storing topsoil : In localities where most of the available embankment materials are not conducive to plant growth, or when so directed by the Engineer, the topsoil from all areas of cutting and from all areas to be covered by embankment foundation shall be stripped to specified depths not less than 150 mm and stored in stockpiles of height not exceeding 2 m for

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

covering embankment slopes, cut slopes and other disturbed areas where re-vegetation is desired. Topsoil shall not be unnecessarily trafficked either before stripping or when in a stockpile. Stockpiles shall not be surcharged or otherwise loaded and multiple handling shall be kept to a minimum.

305.3.4 Compacting ground supporting embankment/sub-grade: Where necessary, the original ground shall be leveled to facilitate placement of first layer of embankment, scarified, mixed with water and then compacted by rolling in accordance with Clauses 305.3.5 and 305.3.6 so as to achieve minimum dry density as given in Table 300-3.

In case where the difference between the sub-grade level (top of the sub-grade on which pavement rests) and ground level is less than 0.5 m and the ground does not have 98 percent relative compaction with respect to the dry density (as given in Table 300-3), the ground shall be loosened upto a level 0.5 m below the sub-grade level, watered and compacted in layers in accordance with Clauses 305.3.5 and 305.3.6 to achieve dry density not less than 98 percent relative compaction as given in Table 300-3.

Where so directed by the Engineer, any unsuitable material occurring in the embankment foundation (500 mm portion just below the sub-grade) shall be removed, suitably disposed and replaced by approved materials laid in layers to the required degree of compaction.

Any foundation treatment specified for embankments especially high embankments, resting on suspect foundations as revealed by borehole logs shall be carried out in a manner and to the depth as desired by the Engineer. Where the ground on which an embankment is to be built has any of such material types (a) to (f) in Clause 305.2.1.1 at least 500 mm of such material must be removed and replaced by acceptable fill material before embankment construction commences.

305.3.5 Spreading Material in layers and Bringing to Appropriate Moisture content

305.3.5.1 The Embankment and sub-grade material shall be spread in layers of uniform thickness not exceeding 200 mm compacted thickness over the entire width of embankment by mechanical means, finished by a motor grader and compacted as per Clause 305.3.6. The motor grader blade shall have hydraulic control suitable for initial adjustment and maintain the same so as to achieve the specific slope and grade. Successive layers shall not be placed until the layer under construction has been thoroughly compacted to the specified requirements as in Table 300-3 and got approved by the Engineer. Each compacted layer shall be finished parallel to the final cross-section of the embankment.

305.3.5.2 Moisture content of the material shall be checked at the site of placement prior to commencement of compaction; if found to be out of agreed limits, the same shall be made good. Where water is required to be added in such constructions, water shall be sprinkled from a water tanker fitted with sprinkler capable of applying water uniformly with a controllable rate of flow to variable widths of surface but without any flooding. The water shall be added uniformly and thoroughly mixed in soil by blading, discing or harrowing until a uniform moisture content is obtained throughout the depth of the layer.

If the material delivered to the roadbed is too wet, it shall be dried, by aeration and exposure to the sun, till the moisture content is acceptable for compaction. Should circumstances arise, where owing to wet weather, the moisture content cannot be reduced to the required amount by the above procedure, compaction work shall be suspended.

Moisture content of each layer of soil shall be checked in accordance with IS:2720 (Part 2), and unless otherwise mentioned, shall be so adjusted, making due allowance for evaporation losses, that at the time of compaction it is in the range of 1 percent above to 2 percent below the optimum moisture content determined in accordance with IS:2720 (Part 8) as the case may be. Expansive clays shall, however, be compacted at moisture content corresponding to the specified dry density, but on the wet side of the optimum moisture content obtained from the laboratory compaction curve.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

After adding the required amount of water, the soil shall be processed by means of graders, harrows, rotary mixers or as otherwise approved by the Engineer until the layer is uniformly wet.

Clods or hard lumps of earth shall be broken to have a maximum size of 75 mm when being placed in the embankment and a maximum size of 50 mm when being placed in the sub-grade.

305.3.5.3 Embankment and other areas of fill shall, unless otherwise required in the Contract or permitted by the Engineer, be constructed evenly over their full width and their fullest possible extent and the Contractor shall control and direct construction plant traffic shall be made good by the Contractor with material and other vehicular traffic uniformly over them. Damage by construction plant and other having the same characteristics and strength as the material had before it was damaged.

Embankments and other areas of unsupported fills shall not be constructed with steeper side slopes, or to greater widths than those shown in the Contract, except to permit adequate compaction at the edges before trimming back, or to obtain the final profile following any settlement of the fill and the underlying material,

Whenever fill is to be deposited against the face of a natural slope, or sloping earthworks face including embankments, cuttings, other fills and excavations steeper than 1 vertical to 4 horizontal, such faces shall be benched as per Clause 305.4.1 immediately before placing the subsequent fill.

All permanent faces of side slopes of embankments and other areas of fill shall, subsequent to any trimming operations, be reworked and sealed to the satisfaction of the Engineer by tracking a tracked vehicle, considered suitable by the Engineer, on the slope or any other method approved by the Engineer.

305.3.6 Compaction : Only the compaction equipment approved by the Engineer shall be employed to compact the different material types encountered during construction. Static three wheel roller, self propelled single drum vibratory roller, vibratory tandem roller, pneumatic tyred, pad foot rollers, etc., of suitable size and capacity as approved by the Engineer shall be used for the different types and grades of materials required to be compacted either individually or in suitable combinations.

The compaction shall be done with the help of self-propelled single drum vibratory roller or pad foot vibratory roller of 80 to 100 kN static weight or heavy pneumatic tyre roller of adequate capacity capable of achieving required compaction with nine wheels and 200 to 300 kN weight with minimum tyre pressure of 0.7 MPa. The Contractor shall demonstrate the efficacy of the equipment he intends to use by carrying out compaction trials. The procedure to be adopted for these site trials shall first be submitted to the Engineer for approval.

Earthmoving plant shall not be accepted as compaction equipment nor shall the use of a lighter category of plant to provide any preliminary compaction to assist the use of heavier plant be taken into account.

Each layer of the material shall be thoroughly compacted to the densities specified in Table 300-3. Subsequent layers shall be placed only after the finished layer has been tested according to Clause 903.2.2 and accepted by the Engineer. The Engineer may permit measurement of field dry density by a nuclear moisture/density gauge used in accordance with agreed procedure and the gauge is calibrated to provide results identical to that obtained from tests in accordance with IS:2720 (Part 28). A record of the same shall be maintained by the Contractor.

When density measurements reveal any soft areas in the embankment/sub-grade/earthen shoulders, further compaction shall be carried out as directed by the Engineer. If inspite of that the specified compaction is not achieved, the material in the soft areas shall be removed and replaced by approved material, compacted using appropriate mechanical means such as light weight vibratory roller, double drum walk behind roller, vibratory plate compactor, trench compactor or vibratory tamper to the density requirements and satisfaction of the Engineer.

305.3.7 Drainage : The surface of the embankment/sub-grade at all times during construction shall be maintained at such a crossfall (not flatter than that required for effective drainage of an earthen surface) as will shed water and prevent ponding.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

305.3.8 Repairing of damages caused by rain/spillage of water : The soil in the affected portion shall be removed in such areas as directed by the Engineer before next layer is laid and refilled in layers and compacted using appropriate mechanical means such as small vibratory roller, plate compactor or power rammer to achieve the required density in accordance with Clause 305.3.6. If the cut is not sufficiently wide for use of required mechanical means for compaction, the same shall be widened suitably to permit their use for proper compaction. Tests shall be carried out as directed by the Engineer to ascertain the density requirements of the repaired area. The work of repairing the damages including widening of the cut, if any, shall be carried out by the Contractor at his own cost, including the arranging of machinery/equipment for the purpose.

305.3.9 Finishing operations : Finishing operations shall include the work of shaping and dressing the shoulders/verge/roadbed and side slopes to conform to the alignment, levels, cross-sections and dimensions shown on the drawings or as directed by the Engineer subject to the surface tolerance described in Clause 902. Both the upper and lower ends of the side slopes shall be rounded off to improve appearance and to merge the embankment with the adjacent terrain.

The topsoil, removed and conserved earlier (Clause 301.3.2 and 305.3.3) shall be spread over the fill slopes as per directions of the Engineer to facilitate the growth of vegetation. Slopes shall be roughened and moistened slightly prior to the application of the topsoil in order to provide satisfactory bond. The depth of the topsoil shall be sufficient to sustain plant growth, the usual thickness being from 75 mm to 150 mm. Where directed, the slopes shall be turfed with sods in accordance with Clause 307. If seeding and mulching of slopes is prescribed, this shall be done to the requirements of Clause 308.

When earthwork operations have been substantially completed, the road area shall be cleared of all debris, and ugly scars in the construction area responsible for objectionable appearance eliminated.

305.4 Construction of Embankment and Subgrade under Special Conditions

305.4.1 Earthwork for Widening Existing road Embankment

When an existing embankment and/or sub-grade is to be widened and its slopes are steeper than 1 vertical on 4 horizontal, continuous horizontal benches, each at least 300 mm wide, shall be cut into the old slope for ensuring adequate bond with the fresh embankment/sub-grade material to be added. The material obtained from cutting of benches could be utilized in the widening of the embankment / subgrade. However, when the existing slope against which the fresh material is to be placed is flatter than 1 vertical on 4 horizontal, the slope surface may only be ploughed or scarified instead of resorting to benching.

Where the width of the widened portions is insufficient to permit the use of conventional rollers, compaction shall be carried out with the help of light weight vibratory roller, double drum walk behind roller, vibratory plate compactor or vibratory tamper or any other appropriate equipment approved by the Engineer. End dumping of material from trucks for widening operations shall be avoided except in difficult circumstances when the extra width is too narrow to permit the movement of any other types of hauling equipment.

305.4.2 Earthwork for embankment and sub-grade to be placed against sloping ground : Where an embankment/subgrade is to be placed against sloping ground, the latter shall be appropriately benched or ploughed/scarified as required in Clause

305.4.1 before placing the embankment/sub-grade material. Extra earthwork involved in benching or due to ploughing/scarifying etc. shall be considered incidental to the work.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

For wet conditions, benches with slightly inward fall and subsoil drains at the lowest point shall be provided as per the drawings, before the fill is placed against sloping ground.

Where the Contract requires construction of transverse subsurface drain at the cut-fill interface, work on the same shall be carried out to Clause 309 in proper sequence with the embankment and sub-grade work as approved by the Engineer.

305.4.3 Earthwork over existing road surface : Where the embankment is to be placed over an existing road surface, the work shall be carried out as indicated below:

- i) If the existing road surface is of granular type and lies within 1 m of the new sub-grade level. The existing granular base/sub-base, as the case, may be, shall be scarified to a depth of 50 mm or as directed so as to provide ample bond between the old and new material ensuring that at least 500 mm portion below the top of new sub-grade level is compacted to the desired density;
- ii) If the existing road surface is of bituminous type and lies within 1 m of the new sub-grade level, the bituminous layer shall be removed completely, so as to avoid presence of impermeable layer beneath the new thin earthen layer and also provide ample bond between the old and new material ensuring that at least 500 mm portion below the top of new subgrade level is compacted to the desired density;
- iii) If the existing road surface is of cement concrete type and lies within 1 m of the new sub-grade level, the same shall be removed completely;
- iv) If the level difference between the existing road surface and the new formation level is more than 1 m, the existing surface shall be permitted to stay in place without any modification.

305.4.4 Embankment and subgrade around structures : To avoid interference with the construction of abutments, wing walls or return walls of culvert/bridge structures, the Contractor shall, at points to be determined by the Engineer suspend work on embankment forming approaches to such structures, until such time as the construction of the latter is sufficiently advanced to permit the completion of approaches without the risk of damage to the structure.

Unless directed otherwise, the filling around culverts, bridges and other structures upto a distance of twice the height of the road from the back of the abutment shall be carried out independent of the work on the main embankment. The fill material shall not be placed against any abutment or wing wall, unless permission has been given by the Engineer but in any case not until the concrete or masonry has been in position for 14 days. The embankment and sub-grade shall be brought up simultaneously in equal layers on each side of the structure to avoid displacement and unequal pressure. The sequence of work in this regard shall be got approved from the Engineer.

The material used for backfill shall not be an organic soil or highly plastic clay having plasticity index and liquid limit more than 20 and 40 respectively when tested according to IS:2720 (Part 5). Filling behind abutments and wing walls for all structures shall conform to the general guidelines given in Appendix-6 of IRC:78 (Standard Specifications and Code of Practice for Road Bridges-Section VII) in respect of the type of material, the extent of backfill, its laying and compaction etc. The fill material shall be deposited in horizontal layers in loose thickness and compacted thoroughly to the requirements of Table 300-3.

Where the provision of any filter medium is specified behind the abutment, the same shall be laid in layers simultaneously with the laying of fill material. The material used for filter shall conform to the requirements for filter medium spelt out in Clause 2502/309.3.2 (B) unless otherwise specified in the Contract.

Where it may be impracticable to use conventional rollers, the compaction shall be carried out by appropriate mechanical means such as small vibratory roller, plate compactor or power rammer. Care shall be taken to see that the compaction equipment does not hit or come too close to any structural member so as to cause any damage to them or excessive pressure against the structure.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

305.4.5 Construction of embankment over ground incapable of supporting construction equipment :

Where embankment is to be constructed across ground which will not support the weight of repeated heavy loads of construction equipment, the first layer of the fill may be constructed by placing successive loads of material in a uniformly distributed layer of a minimum thickness required to support the construction equipment as permitted by the Engineer. The Contractor, if so desired by him, may also use suitable geosynthetic material to increase the bearing capacity of the foundation. This exception to normal procedure will not be permitted where, in the opinion of the Engineer, the embankments could be constructed in the approved manner over such ground by the use of lighter or modified equipment after proper ditching and drainage have been provided. Where this exception is permitted, the selection of the material and the construction procedure to obtain an acceptable layer shall be the responsibility of the Contractor. The cost of providing suitable traffic conditions for construction equipment over any area of the Contract will be the responsibility of the Contractor and no extra payment will be made to him. The remainder of the embankment shall be constructed as specified in Clause 305.3.

305.4.6 Embankment construction under water : Where filling or backfilling is to be placed under water, only acceptable granular material or rock shall be used unless otherwise approved by the Engineer. Acceptable granular material shall be of GW, SW, GP, SP as per IS:1498 and consist of graded, hard durable particles with maximum particle size not exceeding 75 mm. The material should be non-plastic having uniformity coefficient of not less than 10. The material placed in open water shall be deposited by end tipping without compaction.

Coarse sand blanket layer in accordance with the provision of IRC:34 shall be made for construction of embankment in water logged and marshy areas.

305.4.7 Earthwork for high embankment :

In the case of high embankments (more than 6 m), the Contractor shall normally use pond ash in conformity with Clause 305.2.1.1

or the material from the specified borrow area. In case, he desires to use different material for his own convenience, he shall have to carry out necessary soil investigations and redesign the high embankment at his own cost. The Contractor shall then furnish the soil test data and design of high embankment for approval of the Engineer, who reserves the right to accept or reject it.

If necessary, stage construction of fills and any controlled rates of filling shall be carried out in accordance with the Contract including installation of instruments and its monitoring.

Where required, the Contractor shall surcharge embankments or other areas of fill with approved material for the periods specified in the Contract. If settlement of surcharged fill results in any surcharging material, which is unacceptable for use in the fill being surcharged, lying below formation level, the Contractor shall remove the unacceptable material and dispose it as per direction of the Engineer. He shall then bring the resultant level up to formation level with acceptable material.

305.4.8. Settlement period : Where settlement period is specified in the Contract, the embankment shall remain in place for the required settlement period before excavating for abutment, wingwall, retaining wall, footings, etc., or driving foundation piles. The duration of the required settlement period at each location shall be as provided for in the Contract or as directed by the Engineer.

305.5 Plying of Traffic

Construction and other vehicular traffic shall not use the prepared surface of the embankment and/or sub-grade without the prior permission of the Engineer. Any damage arising out of such use shall, however, be made good by the Contractor at his own cost as directed by the Engineer.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

305.6 Surface Finish and Quality Control of Work

The surface finish of construction of sub-grade shall conform to the requirements of Clause 902. Control on the quality of materials and works shall be exercised in accordance with Clause 903.

305.7 Sub-grade Strength

305.7.1 It shall be ensured prior to actual execution that the borrow area material to be used in the sub-grade satisfies the requirements of design CBR.

305.7.2 Sub-grade shall be compacted and finished to the design strength consistent with other physical requirements. The actual laboratory CBR values of constructed subgrade shall be determined on undisturbed samples cut out from the compacted sub-grade in CBR mould fitted with cutting shoe or on remoulded samples, compacted to the field density at the field moisture content.

305.8 Measurements for Payment

Each embankment/sub-grade construction shall be measured separately by taking cross sections at intervals given in sub-section 113.3 after completion of clearing and grubbing (not the virgin ground level) and after completion of embankment/sub-grade and computing the volumes of earthwork in cubic metres by the method of average end areas.

The measurement of fill material from borrow areas shall be the difference between the net quantities of compacted fill and the net quantities of suitable material brought from roadway and drainage excavation. For this purpose, it shall be assumed that one cu.m of suitable material brought to site from road and drainage excavation forms one cu.m of compacted fill and all bulking or shrinkage shall be ignored.

The embankment constructed out of pond ash with soil cover at intervening layer and at edge shall be measured in cu.m including soil cover volume. Construction of embankment under water shall be measured in cu.m.

Construction of high embankment with specified material and in specified manner shall be measured in cu.m.

Stripping including storing and reapplication of top soil shall be measured in cu.m.

Work involving loosening and recompacting of ground supporting embankment/subgrade shall be measured in cu.m.

Removal of unsuitable material at embankment/sub-grade foundation and replacement with suitable material shall be measured in cu.m.

Scarifying existing granular/bituminous road surface shall be measured in square metres.

Dismantling and removal of existing cement concrete pavement shall be measured vide Clause 202.6.

Filter medium and backfill material behind abutments, wing walls and other retaining structures shall be measured as finished work in position in cu.m.

305.9 Rates

305.9.1 The Contract unit rates for the items of embankment and sub-grade construction shall be payment in full for carrying out the required operations including full compensation for :

- i) Cost of arrangement of land as a source of supply of material of required quantity for construction unless provided otherwise in the Contract;
- ii) Setting out;
- iii) Compacting ground supporting embankment/sub-grade except where removal and replacement of suitable material or loosening and recompacting is involved;
- iv) Scarifying or cutting continuous horizontal benches 300 mm wide on side slopes of existing embankment and sub-grade as applicable;

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- v) Cost of watering or drying of material in borrow areas and/or embankment and sub-grade during construction as required;
- vi) Spreading in layers, bringing to appropriate moisture and compacting to Specification requirements;
- vii) Shaping and dressing top and slopes of the embankment and sub-grade including rounding of corners;
- viii) Restricted working at sites of structures;
- ix) Working on narrow width of embankment and sub-grade;
- x) Excavation in all soils from borrow pits/designated borrow areas including clearing and grubbing and transporting the material to embankment and sub-grade site with all lifts and leads unless otherwise provided for in the Contract;
- xi) All labour, materials, tools, equipment and incidentals necessary to complete the work to the Specifications;
- xii) Dewatering; and
- xiii) Keeping the embankment/completed formation free of water as per Clause 311.

305.9.2 Clause 301.9.5 shall apply as regards Contract unit rates for items of stripping and storing top soil and of reapplication of topsoil.

305.9.3 Clause 301.9.2 shall apply as regards Contract unit rate for the item of loosening and recompacting the embankment/sub-grade foundation.

305.9.4 Clause 309.1.1 and 305.8 shall apply as regards Contract rates for items of removal of unsuitable material and replacement with suitable material respectively.

305.9.5 The Contract unit rate for scarifying existing granular/bituminous road surface shall be payment in full for carrying out the required operations including full compensation for all labour, materials, tools, equipment and incidentals, necessary to complete the work. This will also comprise of handling, giving credit towards salvage value and disposal of the dismantled materials with all leads and lifts or as otherwise specified.

305.9.6 Clause 202.7 shall apply as regards Contract unit rate for dismantling and removal of existing cement concrete pavement.

305.9.7 The Contract unit rate for providing and laying filter material behind abutments shall be payment in full for carrying out the required operations including all materials, labour, tools, equipment and incidentals to complete the work to Specifications.

305.9.8 Clause 305.4.6 shall apply as regards Contract unit rate for construction of embankment under water.

305.9.9 Clause 305.4.7 shall apply as regards Contract unit rate for construction of high embankment. It shall include cost of instrumentation, its monitoring and settlement period, where specified in the Contract or directed by the Engineer.

505 DENSE GRADED BITUMINOUS MACADAM

505.1 Scope

This clause specified the construction of Dense Bituminous Macadam, (DBM), for use mainly, but not exclusively, in base/binder and profile corrective courses. The work shall consist of construction in a single or multiple layers of DBM on a previously prepared base or sub-base. The thickness of a single layer shall be 50 mm to 100 mm.

505.2 Materials

505.2.1 Bitumen : The bitumen for dense bituminous macadam shall comply with the Indian Standard Specification for viscosity graded bitumen, IS:73 modified bitumen complying with IS:15462 or as otherwise specified in the Contract. Guidelines for selection of viscosity graded bitumen and modified bitumen are given in Table 500-5 and Table 500-6 respectively.

The type and grade of modified bitumen to be used shall be specified in the Contract. The use of modified bitumen is recommended for very heavy traffic roads in very hot climate.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Both the highest daily mean air temperature and the lowest daily mean air temperatures mentioned in Tables 500-5 and 500-6 can be obtained for the weather station nearest to the project site from the Indian Meteorological Organization (IMO). The IMO has data on daily mean high temperature for all 365 days in a year for all weather stations based on historical records of the last 30-40 or more years. This daily mean high temperature on a specific day is the same as daily “normal” high temperature for that day as usually reported in some newspapers. The highest of the 365 daily mean high air temperatures (which usually occurs on some day in May or June) is used in Tables 500-5 and 500-6. Likewise, the lowest daily mean air temperature (which usually occurs on some day in January) can also be obtained from the IMO. Since these are mean temperatures based on the average of 30-40 years data, these temperatures are significantly lower than the absolute maximum temperatures, which may have occurred in a specific year.

**Table 500-5 Selection Criteria for Viscosity-graded (VG) Paving Bitumens
Based on Climatic Conditions**

Lowest Daily Mean Air Temperature, °C	Highest Daily Mean Air Temperature, °C		
	Less than 20°C	20 to 30°C	More than 30°C
More than -10°C	VG-10	VG-20	VG-30
-10°C or lower	VG-10	VG-10	VG-20

Table 500-6 Selection Criteria for Grade of Modified Bitumen

Lowest Daily Mean Air Temperature, °C	Highest Daily Mean Air Temperature, °C		
	Less than 20°C	20 to 30°C	More than 30°C
	Grade of Modified Bitumen		
More than -10°C	PMB/NRMB 120 CRMB 50	PMB/NRMB 70 CRMB 55	PMB/NRMB 40 CRMB 60
-10°C or lower	PMB/NRMB 40 CRMB 50	PMB/NRMB 120 CRMB 55	PMB/NRMB 70 CRMB 50

PMB = Polymer modified bitumen

NRMB= Natural rubber modified bitumen

CRMB= Crumb rubber modified bitumen

505.2.2 Coarse aggregates : The coarse aggregates shall consist of crushed rock, crushed gravel or other hard material retained on 2.36 mm sieve. They shall be clean, hard, durable, of cubical shape, free from dust and soft or friable matter, organic or other deleterious substances. Where the Contractor’s selected source of aggregates have poor affinity for bitumen, as a condition for the approval of that source, the bitumen shall be treated with an approved anti-stripping agent, as per the manufacturer’s recommendations, without additional payment to the Contractor. Before approval of the source, the aggregates shall be tested for stripping. The aggregates shall satisfy the requirements specified in Table 500-7.

Where crushed gravel is proposed for use as aggregate, not less than 90 percent by weight of the crushed material retained on the 4.75 mm sieve shall have at least two fractured faces.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Table 500-7 Physical Requirements for Coarse Aggregate for Dense Graded Bituminous Macadam

Property	Test		Specification
Cleanliness (dust)	Grain size analysis	Max 5% passing 0.075 mm sieve	IS 2386 Part I
Particle shape	Flakiness Index longation Index	Max 15% Max 20%	IS 2386 Part I
Strength	Los Angeles Abrasion Value Aggregate Impact Value	Max 35% Max 27%	IS 2386 Part IV
Durability	Soundness either : Sodium Sulphate or Magnesium Sulphate	Max 12% Max 18%	IS 2386 Part V
Water Absorption	Water Absorption	Max 2%	IS 2386 Part III
Stripping	Coating and Stripping of Bitumen Aggregate Mixtures	Minimum retained coating 95%	IS 6241
Water Sensitivity	Retained Tensile Strength*	Min 80%	ASHTO 283

* If the minimum retained tensile test strength falls below 80 percent, use of anti stripping agent is recommended to meet the requirement.

505.2.3 Fine aggregates : Fine aggregates shall consist of crushed or naturally occurring mineral material, or a combination of the two, passing the 2.36 mm sieve and retained on the 75 micron sieve. Natural sand shall not be allowed in binder courses. However, natural sand upto 50 percent of the fine aggregate may be allowed in base courses. They shall be clean, hard, durable, dry and free from dust, and soft or friable matter, organic or other deleterious matter. The fine aggregate shall have a sand equivalent value of not less than 50 when tested in accordance with the requirement of IS:2720 (Part 37). The plasticity index of the fraction passing the 0.425 mm sieve shall not exceed 4, when tested in accordance with IS: 2720 (Part 5).

505.2.4 Filter : Filter shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement approved by the Engineer. The use of hydrated lime should be encouraged because of its very good anti-stripping and antioxidant properties. The filler shall be graded within the limits indicated in Table 500-8.

Table 500-8 Grading Requirements for Mineral Filler

IS sieve (mm)	Cumulative per cent passing by weight of total aggregate
0.6	100
0.3	95 – 100
0.075	85 – 100

The filler shall be free from organic impurities and have a Plasticity Index not greater than 4. The Plasticity Index requirement shall not apply if filler is cement or lime. Where the aggregates fail to meet the requirements of the water sensitivity test in Table 500-7, then 2 per cent by total weight of aggregate, of hydrated lime shall be used and percentage of fine aggregate reduced accordingly.

505.2.5 Aggregate grading and binder content : When tested in accordance with IS:2386 Part 1 (wet sieving method), the combined grading of the coarse and fine aggregates and added filler for the particular mixture shall fall within the limits given in Table 500-9 for dense bituminous macadam grading 1 or 2 as specified in the Contract. To avoid gap grading, the combined aggregate gradation shall not vary from the lower limit on one sieve to higher limit on the adjacent sieve. The quantity of bitumen, and appropriate thickness, are also indicated for each mixture type.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

505.3 Mix Design Bitumen content indicated in the Table 500-9 is the minimum. The exact bitumen content required shall be determined following the Marshall mix design procedure contained in Asphalt Institute Manual MS-2.

The fines to bitumen F/B ratio by weight of total mix shall range from 0.6 to 1.2.

505.3.1 Requirements for the mix : Apart from conformity with the grading and quality requirements for individual ingredients, the mixture shall meet the requirements set out in Table 500-10.

Table 500-9 Composition of Dense Graded Bituminous Macadam Pavement Layers

Grading	1	2
Nominal aggregate size*	37.5 mm	26.5 mm
Layer thickness	75 – 100 mm	50 – 75 mm
IS Sieve ¹ (mm)	Cumulative % by weight of total aggregate passing	
45	100	
37.5	95 – 100	100
26.5	63-93	90-100
19	-	71-95
13.2	55-75	56-80
9.5	-	-
4.75	38-54	38-54
2.36	28-42	38-54
1.18	-	-
0.6	-	-
0.3	7 – 21	7-21
0.15	-	-
0.075	2 – 8	7-21
Bitumen content % by mass of total mix **	Min 4.0	Min 4.5

Notes: * The nominal maximum particle size is the largest specified sieve size upon which any of the aggregate is retained.

** Corresponds to specific gravity of aggregates being 2.7. In case aggregate have specific gravity more than 2.7, the bitumen content can be reduced proportionately. Further the region where highest daily mean air temperature is 30°C or lower and lowest daily air temperature is – 10°C or lower, the bitumen content may be increased by 0.5 percent

Table 500-10 Requirements for Dense Graded Bituminous Macadam

Properties	Viscosity Graded Bitumen	Modified bitumen	Test Method	Hot climate	Cold climate
Compaction level	75 blows on each face of the specimen				
Minimum stability (kN at 60°C)	9.0	12.0	10.0	AASHTO T245	
Marshall flow (mm)	2 – 4	2.5 – 4	3.5 – 5	AASHTO T245	
Marshall Quotient	2 – 5	2.5 - 5		MS -2 and ASTM D2041	
% air voids	3 – 5				
% voids filled with bitumen		65 – 75			
Coating of aggregate particle		95% minimum		IS 6241	
Tensile Strength ratio		80% Minimum		AASHTO T 283	
% voids in Mineral aggregate VMA	Minimum per cent voids in mineral aggregate (VMA) are set out in Table 500-11.				

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Table 500-11 Minimum Per Cent Voids In Mineral Aggregate (Vma)

Nominal Maximum Particle Size ₁ (mm)	Minimum VMA, Per cent Related to Design Air voids, Percent ₂		
	3.0	4.0	5.0
26.5 37.5	11.0 10.0	12.0 11.0	13.0 12.0

Notes: 1) The normal maximum particle size is one size larger than the first sieve to retain more than 10 percent.

2) Interpolate minimum voids in the mineral aggregate (VMA) for design air voids values between those listed.

505.3.2 Binder content : The binder content shall be optimized to achieve the requirements of the mix set out in Table 500-10. The Marshall method for determining the optimum binder content shall be adopted as described in the asphalt institute Manual MS-2.

Where maximum size of the aggregate is more than 26.5 mm, the modified Marshall method using 150 mm diameter specimen described in MS-2 and ASTM D 5581 shall be used. This method requires modified equipment and procedures. When the modified Marshall test is used, the specified minimum stability values in Table 500-10 shall be multiplied by 2.25, and the minimum flow shall be 3 mm.

505.3.3 Job mix formula : The Contractor shall submit to the Engineer for approval at least 20 days before the start the work, the job mix formula proposed for use in the works, together with the following details:

- i) Source and location of all materials;
 - ii) Proportions of all materials expressed as follows where each is applicable:
 - a) Binder type, and percentage by weight of total mix;
 - b) Coarse aggregate/Fine aggregate/Mineral filler as percentage by weight of total aggregate including mineral filler;
 - iii) A single definite percentage passing each sieve for the mixed aggregate;
 - iv) The individual gradings of the individual aggregate fraction, and the proportion of each in the combined grading;
 - v) The results of mix design such as maximum specific gravity of loose mix (Gmm), compacted specimen densities, Marshall stability, flow, air voids, VMA, VFB and related graphs and test results of AASHTO T 283 Moisture susceptibility test;
-
- i) Where the mixer is a batch mixer, the individual weights of each type of aggregate, and binder per batch;
 - ii) Test results of physical characteristics of aggregates to be used;
 - iii) Mixing temperature and compacting temperature.

While establishing the job mix formula, the Contractor shall ensure that it is based on a correct and truly representative sample of the materials that will actually be used in the work and that the mixture and its different ingredients satisfy the physical and strength requirements of these Specifications.

Approval of the job mix formula shall be based on independent testing by the Engineer for which samples of all ingredients of the mix shall be furnished by the Contractor as required by the Engineer.

The approved job mix formula shall remain effective unless and until a revised Job Mix Formula is approved. Should a change in the source of materials be proposed, a new job mix formula shall be forwarded by the Contractor to the Engineer for approval before the placing of the material.

505.3.4 Plant trials – permissible variation in job mix formula : Once the laboratory job mix formula is approved, the Contractor shall carry out plant trials to establish that the plant can produce a uniform mix conforming to the approved job mix formula. The permissible variations of the

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

individual percentages of the various ingredients in the actual mix from the job mix formula to be used shall be within the limits as specified in Table 500-12 and shall remain within the gradation band. These variations are intended to apply to individual specimens taken for quality control tests in accordance with Section 900.

Table 500-12 Permissible Variations from the Job Mix Formula

Description	Base/binder Course
Aggregate passing 19 mm sieve or larger	+ 8%
Aggregate passing 13.2 mm, 9.5 mm	+ 7%
Aggregate passing 4.75 mm	+ 6%
Aggregate passing 2.36 mm, 1.18 mm, 0.6 mm	+ 5%
Aggregate passing 0.3 mm, 0.15 mm	+ 4%
Aggregate passing 0.075 mm	+ 2%
Binder content	+ 0.3%
Mixing temperature	+ 10°C

505.3.5 Laying trials : Once the plant trials have been successfully completed and approved, the Contractor shall carry out laying trials, to demonstrate that the proposed mix can be successfully laid, and compacted all in accordance with Clause 501. The laying trial shall be carried out on a suitable area which is not to form part of the works, unless specifically approved in writing by the Engineer. The area of the laying trials shall be a minimum of 100 sq.m of construction similar to that of the project road, and it shall be in all respects, particularly compaction, the same as the project construction, on which the bituminous material is to be laid.

The Contractor shall previously inform the Engineer of the proposed method for laying and compacting the material. The plant trials shall then establish if the proposed laying plant, compaction plant, and methodology is capable of producing satisfactory results. The density of the finished paving layer shall be determined by taking cores, no sooner than 24 hours after laying, or by other approved method. The compacted layers of Dense Graded Bituminous Macadam (DBM) shall have a minimum field density equal to or more than 92% of the average theoretical maximum specific gravity (Gmm) obtained on the day of compaction in accordance with ASTM D2041

Once the laying trials have been approved, the same plant and methodology shall be applied to the laying of the material on the project, and no variation of either shall be acceptable, unless approved in writing by the Engineer, who may at his discretion require further laying trials.

505.4 Construction Operations

505.4.1 Weather and seasonal limitations : The provisions of Clause 501.5.1 shall apply.

505.4.2 Preparation of base : The base on which Dense Graded Bituminous Material is to be laid shall be prepared in accordance with Clause 501 and 902 as appropriate, or as directed by the Engineer. The surface shall be thoroughly swept clean by a mechanical broom, and the dust removed by compressed air. In locations where mechanical broom cannot get access, other approved methods shall be used as directed by the Engineer.

505.4.3 Geosynthetics : Where Geosynthetics are specified in the Contract, this shall be in accordance with the requirements stated in Clause 703.

505.4.4 Stress absorbing layer : Where a stress absorbing layer is specified in the Contract, this shall be applied in accordance with the requirements of Clause 517.

505.4.5 Prime coat : Where the material on which the dense bituminous macadam is to be laid is other than a bitumen bound layer, a prime coat shall be applied, as specified, in accordance with the provisions of Clause 502, or as directed by the Engineer.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

505.4.6 Tack coat : Where the material on which the dense bituminous macadam is to be laid is either bitumen bound layer or primed granular layer, tack coat shall be applied, as specified, in accordance with the provisions of Clause 503, or as directed by the Engineer.

505.4.7 Mixing and transportation of the mix : The provisions as specified in Clauses 501.3 and 501.4 shall apply. Table 500-15 gives the mixing, laying and rolling temperature for dense mixes using viscosity graded bitumen. In case of modified bitumen, the temperature of mixing and compaction shall be higher than the mix with viscosity graded bitumen. The exact temperature depends upon the type and amount of modifier used and shall be adopted as per the recommendations of the manufacturer. In order to have uniform quality, the plant shall be calibrated from time to time.

505.4.8 Spreading : The provisions of Clauses 501.5.3 and 501.5.4 shall apply.

505.4.9 Rolling : The general provisions of Clauses 501.6 and 501.7 shall apply, as modified by the approved laying trials. The compaction process shall be carried out by the same plant, and using the same method, as approved in the laying trials, which may be varied only with the express approval of the Engineer in writing.

505.5 Opening to Traffic

It shall be ensured that the traffic is not allowed without the express approval of the Engineer in writing, on the surface until the paved mat has cooled below 60⁰ C in its entire depth.

505.6 Surface Finish and Quality Control of Work

The surface finish of the completed construction shall conform to the requirements of Clause 902. All materials and workmanship shall comply with the provisions set out in Section 900 of these Specifications.

505.7 Arrangements for Traffic

During the period of construction, arrangements for traffic shall be made in accordance with the provisions of Clause 112.

505.8 Measurement for Payment

Dense Graded Bituminous Materials shall be measured as finished work either in cubic metres, tonnes or by the square metre at a specified thickness as detailed in the Contract drawings, or documents, or as otherwise directed by the Engineer.

505.9 Rate

The contract unit rate for Dense Graded Bituminous Macadam shall be payment in full for carrying out all the required operations as specified and shall include, but not necessarily limited to all components listed in Clause 501.8.8.2. The rate shall include the provision of bitumen, at 4 percent and 4.5 percent by weight of the total mixture for grading 1 and grading 2 respectively.

The variation in actual percentage of bitumen used will be assessed and the payment adjusted plus or minus accordingly.

508 BITUMINOUS CONCRETE

Scope

This work shall consist of construction of Bituminous Concrete, for use in wearing and profile corrective courses. This work shall consist of construction in a single layer of bituminous concrete on a previously prepared bituminous bound surface. A single layer shall be 25mm/40 mm/50 mm thick.

Materials

Bitumen : The bitumen shall conform to Clause 505.2.1.

Coarse aggregates : The coarse aggregates shall be generally as specified in Clause 505.2.2, except that the aggregates shall satisfy the physical requirements of Table 500-18 and where crushed gravel is proposed for use as aggregate, not less than 95 percent by weight of the crushed material retained on the 4.75 mm sieve shall have at least two fractured faces.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

Table 500-18 Physical Requirements for Coarse Aggregate for Bituminous Concrete
Table 500-18 and where crushed gravel is proposed for use as aggregate, not less than 95 percent by weight of the crushed material retained on the 4.75 mm sieve shall have at least two fractured faces.

Property	Test		Specification
Cleanliness (dust)	Grain size analysis	Max 5% passing 0.075 mm sieve	IS:2386 Part I
Particle shape	Flakiness Index Elongation index	Max 15% Max 20%	IS:2386 Part I
Strength	Los Angeles Abrasion Value Aggregate Impact Value	Max 30% Max 24%	IS:2386 Part IV
Durability	Soundness either : Sodium Sulphate or Magnesium Sulphate	Max 12% Max 18%	IS:2386 Part V
Polishing	Polished stone value	Min 55	IS:2386 Part IV
Water Absorption	Water Absorption	Max 2%	IS:2386 Part III
Stripping	Coating and Stripping of Bitumen Aggregate Mix	Minimum retained coating 95%	IS:6241
Water Sensitivity	Retained Tensile Strength*	Min 80%	AASHTO 283

* If the minimum retained tensile test strength falls below 80 percent, use of anti stripping agent is recommended to meet the requirement.

508.2.3 Fine aggregates: The fine aggregates shall be all as specified in Clause 505.2.3.

508.2.4 Filler: Filler shall be as specified in Clause 505.2.4.

508.2.5 Aggregate grading and binder content: When tested in accordance with IS:2386 Part 1 (Wet grading method), the combined grading of the coarse and fine aggregates and added filler shall fall within the limits shown in Table 500-19 for grading 1 or 2, as specified in the Contract.

Table 500-19 Composition of Bituminous Concrete Pavement Layers

Grading	1	2
Nominal aggregate size*	19mm	13.2mm
Layer thickness	50 mm	25/40 mm
IS Sieve ¹ (mm)	Cumulative % by weight of total aggregate passing	
45		
37.5		
26.5	100	
19	79-100	100
13.2	59-79	79-100
9.5	52-72	70-88
4.75	35-55	53-71
2.36	28-44	42-58
1.18	20-34	34-48
0.6	15-27	26-38
0.3	10-20	18-28
0.15	5-13	12-20
0.075	2-8	4-10
Bitumen content % by mass of total mix	5.2	5.4

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- Notes:* *
- The nominal maximum particle size is the largest specified sieve size up on which any of the aggregate is retained.
 - ** Corresponds to specific gravity of aggregate being 2.7. In case aggregate have specific gravity more than 2.7, the bitumen content can be reduced proportionately. Further the region where highest daily mean air temperature is 30oC or lower and lowest daily air temperature is – 10oC or lower, the bitumen content may be increased by 0.5 percent

508.3 Mix Design

508.3.1 Requirements for the mix: Clause 505.3.1 shall apply.

508.3.2 Binder content : Clause 505.3.2 shall apply.

508.3.3 Job mix formula: Clause 505.3.3 shall apply.

508.3.4 Plant trials – permissible variation in job mix formula: The requirements for plant trials shall be as specified in Clause 505.3.4, and permissible limits for variation as given in Table 500-20.

Table 500-20 Permissible Variations from the Job Mix Formula

Description	Bituminous concrete
Aggregate passing 19 mm sieve or larger	+ 7%
Aggregate passing 13.2 mm, 9.5 mm	+ 6%
Aggregate passing 4.75 mm	+ 5%
Aggregate passing 2.36 mm, 1.18 mm, 0.6 mm	+ 4%
Aggregate passing 0.3 mm, 0.15 mm	+ 3%
Aggregate passing 0.075 mm	+ 1.5%
Binder content	+ 0.3%
Mixing temperature	+ 10°C

508.3.5 Laying trials : The requirements for laying trials shall be as specified in Clause 505.3.5. The compacted layers of bituminous concrete (BC) shall have a minimum field density equal to or more than 92 percent of the average theoretical maximum specific gravity (Gmm) obtained on the day of compaction in accordance with ASTM D2041.

508.4 Construction Operations

508.4.1 Weather and seasonal limitations : The provisions of Clause 501.5.1 shall apply.

508.4.2 Preparation of base : The surface on which the bituminous concrete is to be laid shall be prepared in accordance with Clauses 501 and 902 as appropriate, or as directed by the Engineer. The surface shall be thoroughly swept clean by mechanical broom and dust removed by compressed air. In locations where a mechanical broom cannot get access, other approved methods shall be used as directed by the Engineer.

508.4.3 Geosynthetics: Where Geosynthetics are specified in the Contract, this shall be in accordance with the requirements stated in Clause 703.

508.4.4 Stress absorbing layer : Where a stress absorbing layer is specified in the Contract, this shall be applied in accordance with the requirements of Clause 517.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

508.4.5 Tack coat : The provisions as specified in Clause 505.4.5 shall apply.

508.4.6 Mixing and transportation of the mix : The provisions as specified in Clauses 501.3, 501.4 and 505.4.7 shall apply.

508.4.7 Spreading : The general provisions of Clauses 501.6 and 501.7 shall apply, as modified by the approved laying trials.

508.4.8 Rolling : The general provisions of Clauses 501.6 and 501.7 shall apply, as modified by the approved laying trials.

508.5 Opening to Traffic : Provisions in Clause 505.5 shall apply.

508.6 Surface Finish and Quality Control

The surface finish of the completed construction shall conform to the requirements of Clause 902. All materials and workmanship shall comply with the provisions set out in Section 900 of these Specifications.

508.7 Arrangements for Traffic

During the period of construction, arrangements for traffic shall be made in accordance with the provisions of Clause 112.

508.8 Measurement for Payment

The measurement shall be as specified in Clause 505.8.

508.9 Rate

The contract unit rate shall be all as specified in Clause 505.9, except that the rate shall include the provision of bitumen at 5.2 percent and 5.4 percent for grading 1 and grading 2, by weight of total mix respectively. The variation in actual percentage of bitumen used will be assessed and the payment adjusted plus and minus accordingly.

❖ **Rajula Supply And Fitting including 8 to 10 Cm thick Rajula Stone of 60 x 45 Cm Size, Excavatgion, 6 to 8 Cm thick 1:2 Lime Concrete, 5 to 7 Cm thick 1:2 Lime Beding, 5 Cm deep Vata With Cement and 80/100 Bitumen, Curing, All Labour And Transporting, etc. complete**

❖

❖ **રાજુલા પથ્થર ૮ થી ૧૦ સે.મી. સપ્લાઈ તથા ચોટકકામ :—**

આ કામમાં પ્રથમ ખોદાણ કરી, તે સ્થળ ઉપર રાજુલા પથ્થર ૬૦×૪૫ સે.મી. સાઈઝનાં ઓછામાં ઓછા ૮ થી ૧૦ સે.મી. જાડાઈના સપ્લાય કરી ૧:૨ માં ચુના ક્રોકીટનો માલ ૬ થી ૮ સે.મી. એવરેજ જાડાઈમાં પાથરી, ધમાલ મારી, દાજીયા ન રહે તે રીતે ચુનો પાથરી, પાણી છાંટી કંમ્પલીટ કરવાનું છે.(આ કામમાં ચુના—રેતીનું પ્રમાણ ૧:૨ નું રાખવાનું છે.) ત્યારબાદ લાઈન લેવલમાં લઈ ૫ થી ૭ સે.મી.ની. જાડાઈમાં ચુનાનું બેડીંગ પાથરી લેવલમાં પથ્થર બેસાડવાના રહેશે. ત્યારબાદ ૮ દિવસ ક્યોરીંગ કર્યા બાદ ૫ સે.મી. ઉડાઈના વાટા ખોતયાં બાદ તેમાં સીમેન્ટનો રસ છાંટી ૬ એમ.એમ.સાઈઝની ગ્રીટ તથા ૮૦/૧૦૦ ગ્રેડનો એસ્ફાલ્ટ સપ્લાય કરી ઓઠાં ન રહે તે રીતે વાટા ભરી ડામરનાં વાટા પોલીસ કરી કંમ્પલીટ કરવાનું રહેશે. આ રીતે કંમ્પલીટ થયેલ તમામ કામને માલસામાન મજૂરી સહીત દર ૧ ચો.મી. મુજબનો ભાવ આપવામાં આવશે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

- ❖ *Bitumen Batch Binder Using 56 Kg Bitumen per 1 CuMt B.T. Machin Crushed Metal including Tack Coat at the rate of 7.30 Kg Bitumen per 10 SqMt, all Material, labour, Rolling Laying, Heating and Transporting*

- ❖ **બેચ બાઈન્ડરનું કામ**

આ કામમાં શરૂ કરતાં પહેલા જે જગ્યાએ બેચ બાઈન્ડર વાપરવાની હોય, તે જગ્યા બરાબર સાફ કરી મ્યુનિ.એન્જી.ની હાજરીમાં ૧૦ ચો.મી.માં ૭.૩ કીલો ૮૦/૧૦૦ ગ્રેડનો ડામર છાંટવાનો છે. આ બેચ બાઈન્ડરની કામમાં ૨૦ થી ૨૫ મી.મી.સાઈઝની કપચી વાપરી ૧ ઘ.મી. કપચીમાં ૫૬ કીલો ૮૦/૧૦૦ ગ્રેડનો ડામર જોખીને નાંખી તાવડી અથવા હોટ મીક્સ મશીનરીથી ગરમ ગરમ કરી મીક્સ ૦.૧૧ ઘ.મી.ની ૧ બેચ એવી રીતે જરૂરત મુજબની બેચનો માલ બનાવી જરૂરત મુજબ ખાડામાં નાંખી રેઈકથી સરખી રીતે લેવલમાં કરી, તેના ઉપર ત્યારબાદ કોન્ટ્રાક્ટરે સ્વખર્ચે રોડ રોલર લાવી તેનાથી રોલીંગ કરવાનું છે. આ રીતે કંમ્પલીટ કામનું માપ ૧ લારી (બેચ) ૦.૧૧ ઘ.મી. માલ ગણી, માલ સામાન મંજૂરી સહીત ૧ ઘ.મી. મુજબ ભાવ આપવામાં આવશે.

- ❖ *Consolidated Premixed Asphalt carpet by MANUAL CARPET 60 mm thickness*

- ❖ **૬૦ મી.મી.જાડી કોન્સોલીડેટ પ્રી મીક્સ એસ્ફાલ્ટ કારપેટનું કામ કમ્પ.**

60 mm thick Consolidated Premixed Asphalt carpet by MANUAL CARPET Method using Asphalt VG 10 (80/100) at the rate of 56 kg per 1 CuMt of Machine Crushed Metal for 40 mm thick base coat and 81 kg Bitumen per 1 CuMt of Machine crushed Grit for making 20 mm thick sill coat including 73 kg bitumen per 100 SqMt for Tack coat. Item including Cleaning, Rolling, Heating, transporting and all material and labour

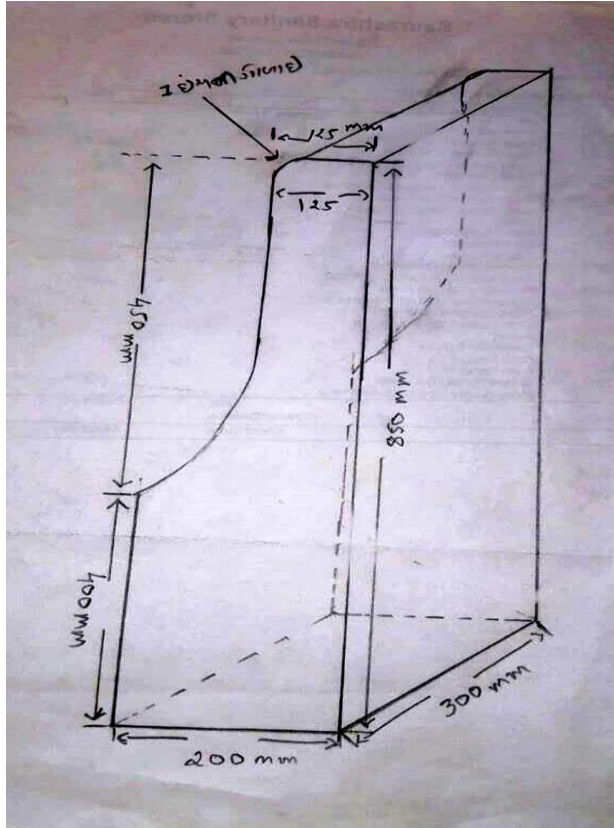
આ કામ શરૂ કરતાં પહેલા રસ્તાની સરફેઈસ બાબર રીતે સાફ કરવાની છે. ત્યારબાદ ૧૦૦ ચો.મી.માં ૭૩ કીલો ડામર છાંટવાનો છે. બેઈઝકોટ માટે ૨૦ થી ૪૦ મી.મી. સાઈઝની કપચી વાપરવાની છે. ૧ ઘ.મી. કપચીમાં ૫૬ કીલો એસ્ફાલ્ટ વાપરી તાવડી અથવા હોટમીક્સ મશીનથી બરાબર ગરમ કરી મીક્સ કરવાનો છે. ગરમ માલ ૪૦ મી.મી. જાડાઈમાં અંદાજે ૩ મી. લંબાઈની પટ્ટી રોડ સરફેઈસ ઉપર મુકી તુરત જ રસ્તા ઉપર એક્સરખા ખાડા ખડીયા ન રહે તે રીતે પાથરવાનો છે. જે બરાબર પથરાયા બાદ તુરત જ કોન્ટ્રાક્ટરે સ્વખર્ચે રોડ રોલર લાવી તેનાથી રોલીંગ કરવાનું છે. રોલીંગ થઈ ગયા બાદ સીલકોટ માટે ૬ મી.મી. સાઈઝની ગ્રીટ ૧ ઘ.મી.માં ૮૧ કીલો ડામર વાપરી મીક્સ માલ તૈયાર કરવાનો છે અને તે તૈયાર થયેલ સીલકોટનો ગરમ માલ ૨૦ મી.મી. જાડાઈમાં બરાબર રીતે પાથરવાનો છે. ત્યારબાદ રોલીંગ કરવાનું છે. અને રોલીંગ બાદ દાજીયા રહે તો ફરી સીલકોટનો માલ નાંખી કરી આપવાનો છે. ત્યારબાદ ઉપરોક્ત તમામ કામ ઉપર જે તે દિવસે ડસ્ટ(પાવડર)છાંટી આપવા સાથે તમામ માલ મટીરીયલ મજૂરી સાથેનું કંમ્પલીટ કામ. ઉપરોક્ત તૈયાર થયેલ કંમ્પલીટ કામનો માલ મજૂરી સાથે ૧ ચો.મી. મુજબ ભાવ આપવામાં આવશે.

- ❖ **રબ્બલ પથ્થર ખોડીયાર-શિહોરના સપ્લાય કરી ગોઠવી આપવાનું કામ**

આ કામમાં ખોડીયાર અથવા શિહોરના લાલ પાકા પથ્થર કહેવામાં આવે તે સ્થળે સપ્લાય કરી (મ્યુનિ.એન્જી.પાસ કરે તેવા) સ્થળ પર આપવામાં આવે તે સૂચના મુજબ પાથરી આપવાના રહેશે. સદરહુ કામનો રોયલ્ટી, ઓક્ટ્રોય, સેલ્સટેક્ષ વગેરે સાથે ટ્રક લોડથી રોડઝ વિભાગના મોતીબાગ ટાઉન હોલ પાછળ સ્ટોરમાં /સૂચના મુજબ સાઈટ પર પહોંચતા કરવા સાથે તમામ માલ-મજૂરી સાથેના ભાવ પ્રતિ ૧ મેટ્રીક ટન મુજબ આપવામાં આવશે. મટીરીયલનું વજન કોન્ટ્રાક્ટરે સ્વખર્ચે સૂચવ્યા મુજબનાં ઈલેક્ટ્રોનીક વજનકાંટા પર કરાવવાનું રહેશે તથા વજનની ઓરીજનલ કાંટાચીઠી અત્રે જમા કરાવવાની રહેશે. જો બરાબ મટીરીયલ સપ્લાય કરેલ હશે, તો કોન્ટ્રાક્ટરે પોતાનાં ખર્ચે પરત લઈ જવાનો રહેશે.

**ભાવનગર મહાનગરપાલિકા, ભાવનગર
રોડઝ વિભાગ**

-



- ❖ જો આ કામે ઉપર દર્શાવેલ સ્પેસીફિકેશનમાં ટેન્ડરમાં લેવાયેલ આઈટમો માટેના કોઈ સ્પેસીફિકેશનનો સમાવેશ થયેલ ન હોય તો MORTH માં આપેલ સ્પેસીફિકેશન તથા લાગુ પડતા I.S. Standards ને અનુસરવાનું રહેશે.

Contractor's Signature

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

શરતો

રોડઝ વિભાગમાં છેલ્લા ૫ વર્ષમાં કોઈ પણ કોન્ટ્રાક્ટર / એજન્સીની ડિપોઝીટ ફોરફીટ કરવામાં આવેલ હોય તેવી એજન્સી / કોન્ટ્રાક્ટર આ કામમાં ભાગ લઈ શકશે નહીં.

(૧) ટેન્ડર ખોલવાની તારીખથી અથવા તો જો નેગોશીએશન કરવામાં આવશે તો નેગોશીએશનની તારીખથી ૯૦ દિવસ ની સમય મર્યાદા માં કોઈપણ કામ માટે વર્ક-ઓર્ડર આપવામાં આવશે તો સપ્લાયર/કોન્ટ્રાક્ટરે ભરેલ ભાવે કે આખરે સહમતીથી નિયત રહેલ ભાવોથી મહાનગરપાલિકાના ટેન્ડરના/સ્ટન્ડર્ડ સ્પેશીફિકેશન મુજબ આ કામ કરી આપવાનું રહેશે.

(૨) સદરહું કામ અંગે મહાનગર પાલિકા દ્વારા L.O.A (લેટર ઓફ એકસેપ્ટન્સ) / વર્ક ઓર્ડર પૈકી જે પહેલા આપવામાં આવશે તેમા જણાવેલ તારીખ થી આ કામ ની કુલ સમય મર્યાદા માસ ની રહેશે. ધોરણસરનું એગ્રીમેન્ટ નીયત સમયમાં કરવામાં નહિ આવે તો કામ શરૂ કરવાની પરવાનગી આપવામાં નહિ આવે. (તેમ છતાં) આ કામની સમય મર્યાદા L.O.A (લેટર ઓફ એકસેપ્ટન્સ) ના જાવકની તારીખથી આઠમા દિવસથી શરૂ થયેલ ગણાશે. ફક્ત બીયટમેન / ડામર રોડ ના કામો માટે ચોમાસાની સિઝન નો સમયગાળો R & B ના પરિપત્ર મુજબ આ સમય મર્યાદા માં ગણાશે નહિ. આ મુજબ ઠરાવેલ કામ કરી આપવાનું છે.

(૩) કોઈપણ વ્યાજબી કારણોને લઈને આપેલ સમય મર્યાદામાં વધારો કરાવવાની જરૂરીયાત જણાતી હોય તો આપેલ સમય મર્યાદા પુર્ણ થવાના ૧૫ દિવસ અગાઉ કોન્ટ્રાક્ટર શ્રી એ અત્રેના વિભાગે લેખીતમાં રજૂઆત / માંગણી કરવાની રહેશે. અન્યથા સમય મર્યાદા વધારવા ની માંગણી ધ્યાને લેવામાં નહિ આવે. યોગ્ય કારણોસર ટાઈમલીમીટમાં વધારો કરી આપવામાં આવે તો પણ કોઈ પ્રકારે ભાવ વધારો આપવા માં નહિ આવે.

(૪) કામ કરવાના કલાકો અને દિવસના સવારના ૯.૦૦ થી ૧૮.૦૦ કલાક સુધી પ્રમાણે કામ ચાલુ રાખવનું છે. તેમજ જાહેર રજા ના દિવસો માં વર્ક કરવાનું નથી. સદરહું બાબતે સમય મર્યાદા માં કોઈ વધારો અપાશે નહિ. જો નિયત સમય સિવાય કે રજાના દિવસોમાં કોઈપણ કામ ચાલુ રાખવાનું થાય તો તે માટે પ્રથમ સંબંધીત સત્તા / વિભાગ ની મંજૂરી મેળવવા ની રહેશે.

(૫) તમામ કામ ઉપર લખેલી મુદત પ્રમાણે અગર તે અગાઉ પસંદગી ને પાત્ર ઠરે તેવી રીતે બરોબર પુરું કરવું. આપેલી મુદત ઉપરાંત વધારે દિવસ થાય તો પેનલટી પેટે જેટલા દિવસ વધારે થાય તેટલા દરેક દિવસના કોન્ટ્રાક્ટ વેલયુ / મંજૂર રકમ (જો કામમાં એકસેસ થાય તો એકસેસ સહિતની કુલ મંજૂર રકમ) ના ૦.૧૦ ટકા મુજબ ની રકમ કપાત કરાવા પાત્ર ઠરશે જે મહત્તમ ૧૦ ટકા રહેશે.જો જે તે કામે મંજૂર રકમ કરતાં સેવિંગ રહે તો ફાઈનલ બિલની રકમ મુજબની પેનલટી જમા રખવાની રહેશે. પરંતુ બીજુ વધારે કામ કરાવવું પડે તેવા કામ માટે અરજી કર્યેથી શ્રી કમિશ્નર સાહેબ મુળ કામ અને મુદત ઉપર સુરત રાખી યોગ્ય મુદત વધારી

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

શકશે. યોગ્ય કારણોસર ટાઈમલીમીટમાં વધારો કરવાનો થતો હશે તો પણ ટાઈમલીમીટનો વધારો મંજૂર ન થાય ત્યાં સુધી પેનલ્ટીની રકમ પેનલ્ટી હેડે જ જમા લેવાશે.

(૬) જે તે કામ નો ડીફેક્ટ લાચેબીલીટી પીરીયડ આ ટેન્ડરની તમામ કરવાપાત્ર આઈટમો સાથે કામ પુર્ણ થયાની તારીખ થી ૩૬ - છત્રીસ માસ નો રહેશે. કોઈપણ પ્રકારની નુકશાની, સેટલમેન્ટ, લીકેજ તથા અન્ય પ્રકારની ખામી આ ડીફેક્ટ લાચેબીલીટી પીરીયડ ના સમયગાળા દરમિયાન જોવામાં આવશે તો ભાવનગર મહાનગરપાલિકાની મૌખિક અથવા ટેલિફોનિક અથવા લેખિત કોઈપણ સુચના મળ્યે થી દીન ૭ (સાત) માં કોન્ટ્રાક્ટરે પોતાના ખર્ચે વ્યવસ્થિત રીપેર કરી સારુ કરી આપવાનું રહેશે. જો ભાવનગર મહાનગરપાલિકાની સુચનાઓ મુજબની આઈટમો મુજબ કોન્ટ્રાક્ટર નુકશાનીઓ સુધારવામાં નિષ્ફળ જશે તો ભાવનગર મહાનગરપાલિકા - સદર કામ કોન્ટ્રાક્ટરના ખર્ચે અને જોખમે અન્ય પાસે રીપેર કરાવી શકશે, અને થયેલા ખર્ચની રકમ વસુલ કરવા માં આવશે.

(૭) એગ્રીમેન્ટ સાથે રજુ પ ટકા મુજબની સિક્યોરીટી ડીપોઝીટ કોન્ટ્રાક્ટર હસ્તકનું આખરી કામ પુર્ણ થયા બાદથી ડીફેક્ટ લાચેબીલીટી પીરીયડ પુર્ણ થયા બાદ તથા ડીફેક્ટ લાચેબીલીટી પીરીયડના સમયગાળા દરમિયાન ધ્યાનમાં આવેલ કોઈપણ પ્રકાર ની નુકશાની, સેટલમેન્ટ, લીકેજ તથા અન્ય પ્રકાર ની ખામી વ્યવસ્થિત રીપેર કરી સારુ કરી આપ્યા બાદ માંગણી કર્યે થી પરત કરવા માં આવશે.

(૮) કોન્ટ્રાક્ટરે સરકાર શ્રી ના નીતી નિયમ મુજબના જરૂરી લાઈસન્સ ની નકલો કોઈપણ પ્રકરના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓનલાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૯) કોન્ટ્રાક્ટરે જરૂરી તમામ પ્રકારના સરકારી વેરા સરકારશ્રીમાં જમા કરાવ્યા અંગેની વિગતો / નકલો કોઈપણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવા ના રહેશે. ઓનલાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૧૦) સરકારશ્રીના નિયમ મુજબ રૂા. એક કરોડ થી વધુ રકમના કામ માટે કોન્ટ્રાક્ટરે સ્વખર્ચે ક્વોલીટાઈડ કુલટાઈમ એન્જીનીયર જે-તે દરેક કામ માટે નિયુક્ત કરવાનો રહેશે. ક્વોલીટાઈડ કુલટાઈમ એન્જીનીયરનું નામ, ક્વોલીટીફિકેશન, માર્કશીટ ની નકલ, કલર ફોટોગ્રાફ, નિયુક્તી નો હુકમ વિગેરે કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપી માં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવા નું રહેશે.

(૧૧) કામનો વર્કઓર્ડર કે **LOA** જે પ્રથમ આપવામાં આવે ત્યારબાદ થી ૧૫ માં એન્જીનીયરે કામ ઉપર હાજર થયા અંગેનો રિપોર્ટ આપવાનો રહેશે. જો આ પ્રકારે નિયુક્તી નહિ કરવામાં આવે તેમજ કામની સાઈટ પર એન્જીનીયર હાજર નહિ થાય કે હાજર નહિ રહે તો પ્રતિ માસ રૂ/૧૫,૦૦૦/- લેખે ચુકવવાપાત્ર બિલમાં થી કપાત કરવામાં આવશે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(૧૨) કામ શરૂ કરતા પહેલા વિભાગને જાણ કરવાની રહેશે. તમામ કામ / આઈટમ / કોન્ક્રીટીંગ અત્રેના અ.મ.ઈ. / ટાઈમકીપરની હાજરીમાં , જરૂરી ચેકિંગ કરાવ્યા બાદ જ, તેમની સુચના મુજબ કરવાનું રહેશે.

(૧૩) કામ દરમિયાન કોઈપણ સર્વિસ લાઈનો (જેમ કે પાણી, ડ્રેનેજ, કે ટેલીફોન જેવી તમામ સર્વિસ લાઈનો) કે મ્યુની.ની પ્રોપર્ટી માં તુટકુટ થાય તો તેનું રીપેરિંગ કોન્ટ્રાક્ટરશ્રી એ તેમના સ્વખર્ચે તાત્કાલીક અરજન્ટમાં કરી આપવાનું રહેશે. આ માટે કોઈ અલગ ચાર્જ / રકમ ચુકવવામાં આવશે નહીં. એજન્સી આ દુરસ્તીમાં નીષ્ફળ ગયેથી મહાનગરપાલિકા એજન્સીના ખર્ચે અને જોખમે આ રીપેરિંગ કામ કરાવી શકશે, અને તેની રકમ આ કામેના બીલમાંથી બાદ કરવામાં આવશે.

(૧૪) ચાલુ કામે વખતો વખત સરકારશ્રીના માર્ગ અને મકાન વિભાગના નિયમો તથા IS Code અનુસાર સિમેન્ટ મોર્ટાર, સિમેન્ટ કોન્ક્રીટ, લોખંડ, ચણતરકામ, બિટુમેન, એગ્રીગેટ, રેતી, પેવિંગ બ્લોક વિગેરે તથા સુચવવામાં આવે તે તમામના અત્રેની હાજરીમાં નમુનાઓ લઈ, ટેસ્ટીંગ માટે જરૂરી ફોરવર્ડીંગ તથા ડેટાશીટ વિભાગેથી મેળવી, ટેસ્ટીંગ માટે જરૂરી તમામ વ્યવસ્થા કરી, ગેરી/સરકારી કોલેજ અથવા સુચવવામાં આવે તે લેબોરેટરીમાં કોન્ટ્રાક્ટરે સ્વખર્ચે ટેસ્ટીંગ કરાવી ટેસ્ટીંગ રીપોર્ટસ રજૂ કરવાનો રહેશે.

(૧૫) ટેસ્ટીંગનાં રિઝલ્ટ આવ્યા બાદ બિલ તૈયાર કરાશે. અન્યથા રીપ્લેસ કે રીમુવ કરી શકાય તેવી જે તે આઈટમના જે - તે માપ/સ્ટેજનાં કામનું બિલ જે-તે આઈટમનાં ભાવનાં મેક્સીમમ ૫૦ % મુજબ ભાવ ગણીને અપાશે. ટેસ્ટીંગનાં રિઝલ્ટ નિષ્ફળ ગયેથી/નિયત સ્ટાન્ડર્ડસ સિવાયનું કામ ગ્રાહ્ય રખાશે નહિ તથા તે સાઈટ પરથી હટાવી લેવાનું રહેશે.

(૧૬) સુચના મુજબના સ્ટેજ વાઈઝ ફોટોગ્રાફ પાડી હાર્ડ કોપી એક સેટ તથા સોફ્ટ કોપીમાં આપવાના રહેશે.

(૧૭) હોટમીક્ષ પ્લાન્ટ તથા પેવર ફીનીશર થી પેવર રોડ/ડામર રોડ ના કામમાં બીટયુમેન - ડામર નો બેઝિક ભાવ (**Basic Rate of bitumen as per tender Boq**) ગણતરીમાં લેવાયેલ છે. તથા આવા કામમાં બીટયુમેન - ડામર નો ભાવ તફાવત (સ્ટાર રેઈટ) ની રકમ અલગ થી ચુકવવાની કે વસુલ લેવાની રહેશે. આ સિવાય (અથવા વિશેષ ઉલ્લેખ કરેલ હોય તે સીવાયની) બીજી કોઈ આઈટમમાં ભાવ તફાવત (સ્ટાર રેઈટ) ની રકમ અલગથી ચુકવવાની કે વસુલ લેવાની નહિ રહે.

(૧૮) મેન્યુઅલ કાર્પેટ મેથડથી ડામર રોડ કે સરફેસ ડ્રેસીંગ (મેટલ ગ્રાઉટીંગ) ના કામમાં અને આવા કામમાં આવતા આસ્ફાલ્ટ પેઈન્ટીંગના કામ માટે બીટયુમેન - ડામર નો ભાવ તફાવત (સ્ટાર રેઈટ) ની રકમ અલગથી ચુકવવાની કે વસુલ લેવાની નહિ રહે. બીટયુમેન-ડામર નો બેઝિક ભાવ (**Basic Rate of bitumen as per tender Boq**) ગણતરીમાં લેવામાં આવેલ છે.

(૧૯) સદરહુ કામ ટેન્ડર પ્રમાણે તથા હવે પછી વધારે વિગતવાર કામ બતાવવામાં આવે તે પ્રમાણે પસંદગી મુજબ બરાબર મજબુત અને સારી કારીગરી માં લાઈન લેવલમાં કરવાનું રહેશે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(૨૦) ટેન્ડરમાં જણાવેલી આઈટમ સિવાય બીજી આઈટમ કરવી પડે તો આનાકાની વગર કરી આપવું મારે કબુલ છે. અને તેના ભાવ શ્રી કમિશ્નર સાહેબ ઠરાવે તે લેવા મારે કબુલ મંજૂર છે.

(૨૧) સદરહુ કામના આઈટમોમાં ફેરફાર અથવા કોઈ જથ્થામાં વધારો ઘટાડો કરવો પડે તો તેમ કરવાને કાર્યપાલક ઈજનેર સાહેબ મુખત્યાર છે અને તે પ્રમાણે કોન્ટ્રાક્ટરે કંઈ વાંધો લેવાશે નહિ. અગર એવો ફેરફાર અગર વધારો ઘટાડો ધોરણસર મંજૂર થાય ત્યારે તે પ્રમાણે થયેલ કામ નું માપ ભરેલા ભાવ મુજબ મજરે આપવામાં આવશે. અગર જરૂર જણાશે તો તેમનો ભાવ પ્રવર્તમાન એસ.ઓ.આર. મુજબ અને એસ.ઓ.આર. માં સમાવેશ ન હોય તો બજાર ભાવ મુજબ મુકરર કરવા મા આવશે અને તે ઠરવ છેવટ નો ગણાશે.

(૨૨) અગત્યના કામનો કોઈપણ ભાગ ટેન્ડરમાં રહી ગયેલ હોય તો પણ તે કોન્ટ્રાક્ટમાં કરેલ છે. તેમ સમજી બીજા કામની માફક તે મજબુત રીતે સારી કારીગરીથી કરી આપવું અને તેવાનો ભાવ ઠરવેલા ભાવ પ્રમાણે આપવામાં આવશે.

(૨૩) સદરહુ કામમાં વાપરવાનો સામાન ખરાબ માલુમ પડશે તો તે નાપાસ કરવાને શ્રી કાર્યપાલક ઈજનેર મુખત્યાર છે. તેવો સામાન કામના સ્થળ ઉપરથી દુર કરવાની રૂબરૂ સુચના અથવા ૨૪ કલાકની નોટીસ મળ્યેથી કોન્ટ્રાક્ટર તે દુર કરશે અને દુર નહીં કરે તો કોન્ટ્રાક્ટરને ખર્ચે દુર કરાવી શકશે અને તેનો ખર્ચ તથા જવાબદારી કોન્ટ્રાક્ટરના શીરે રહેશે અને તે કોન્ટ્રાક્ટરના બીલમાંથી કાપી લેવા હકકદાર રહેશે.

(૨૪) સદરહુ કામ માં સાઈટ એન્જીનીયરશ્રી ને જે કંઈ ખરાબ અગર નબળું માલુમ પડશે તે તુરત નાપાસ કરવામાં આવશે. તેમજ શ્રી કાર્યપાલક ઈજનેર ત્યાં ન હોય તો તે કામ ખાતે નિમાયેલ અ.મ.ઈ. કે.ટા.કી. તે કામ અટકાવી શ્રી કમિશ્નર સાહેબનો તે બાબત હુકમ મેળવશે. કોન્ટ્રાક્ટરે સારો માલ સામાન વાપરવા વગેરે બાબતો માટે તે કામ ઉપર નિમાયેલા અ.મ.ઈ. કે. ટાઈમ કીપર ના હુકમ પ્રમાણે કામ કરવાનું રહેશે.

(૨૫) સદરહુ કામ મુદતસર પુરું થાય તેવી ઝડપથી અને શ્રી કાર્યપાલક ઈજનેરની પસંદગી મુજબ ચાલતું જણાશે નહિ તો તે કોન્ટ્રાક્ટર નું કામ બંધ પાડી દેશે અને રદ ગણાશે અને ત્યારબાદ બીજા માણસ અથવા માણસોથી એ કામ પુરું કરાવવાને અને જોઈ તો સામાન મેળવવાને શ્રી કમિશ્નર સાહેબ તુરત કુલમુખત્યાર છે અને અને તેમ કરવામાં જે ખર્ચ થયેલ હશે તે કોન્ટ્રાક્ટરની તેની જામીનગીરીમાંથી અથવા તેના પૈસા જમા હોય તેમાંથી શ્રી કમિશ્નર સાહેબ વસુલ કરશે. (અમલ કરતા અન્ય કલમ નો બાધ આવશે નહીં)

(૨૬) સદરહુ કામ પુરું થતાં સુધીને માટે જઈતા તમામ સાધનો ઓજાર, રાય વિગેરે સામાન્ય કોન્ટ્રાક્ટરે પોતાના તરફથી પુરો પાડવો. ઉપરાંત દરેક જાતના સામાન કે રાય શ્રી કાર્યપાલક ઈજનેર ની પરવાનગી વગર કામના સ્થળ ઉપર થી ઉઠાવી લઈ જવા નહીં.

(૨૭) કોન્ટ્રાક્ટરે સદરહુ કામ કરવા ઉપર માણસો અથવા માણસ રાખેલા હશે તેમના કોઈની ગેરમાહિતી અગર ગેરચાલ માલુમ પડશે તો તેઓને રજા આપવાને શ્રીકાર્યપાલક ઈજનેર કુલ

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

મુખત્યાર છે. ત્યારબાદ સદરહુ માણસ અથવા માણસો ને શ્રીકમિશ્નર સાહેબની પરવાનગી સિવાય પાછા કામ ઉપર રાખી શકશે નહીં.

(૨૮) સદરહુ કામમાં કોઈ ભાગને અથવા સામાનને ગફલતે લઈને અગર હરકોઈ કારણ થી નુકશાન થાય તો કોન્ટ્રેક્ટર ને શીરે છે અને તે દુરસ્ત કરવા વિગેરે માટે નો ખર્ચ થાય તે પોતાના તરફથી કરશે.

(૨૯) આ કામ નો કોન્ટ્રેક્ટર દેવાળું કાઢશે અગર શ્રી કમિશ્નરસાહેબ/શ્રી કાર્યપાલક ઈજનેર ની પસંદગી પ્રમાણે કામ પુરુ કરવાને ના કહે અથવા વિલંબ કરે તો પંદર દિવસ ની લેખીત નોટીસ આપી તે કોન્ટ્રેક્ટર ને (અન્ય કલમ નો અમલ કરી) રદ કરવા માટે મ્યુ.કોર્પો. મુખત્યાર છે.

(૩૦) કોઈ બાબત ઉપર કંઈ તકરાર પડે તો તે બાબત ઉપર શ્રી કમિશ્નર સાહેબ જે ઠરવ કરે તે છેવટનો ગણાશે.

(૩૧) કરેલ કામના વચગાળાના બીલની રકમ ત્રીસ દિવસે એકવાર કામની રકમના ઓછામાં ઓછા ૧૫ ટકા તથા વધુમાં વધુ ખરેખર થયેલ કામ મુજબની રહેશે. ૧૫ ટકા થી ઓછી રકમનું વચગાળાનું બિલ ત્રીસ દિવસ પહેલ થઈ શકશે નહિ.

(૩૨) કોન્ટ્રેક્ટરે સદરહુ કામ ઉપર રાખેલ મજુરો વિગેરે ને બરાબર રીતે નાણાની ચુકવણી કર્યા બાબત શ્રી કમિશ્નર સાહેબને ખાતરી કરાવી આપવી પડશે. તેમ નહીં થયા નું જાહેર થશે તો કોન્ટ્રેક્ટર ને નાણા મળવામાં અટકાયત કરવામાં આવશે.

(૩૩) કોન્ટ્રેક્ટર પોતાના બીલના નાણા લેવાનું મુખત્યારનામું શ્રી કમિશ્નર સાહેબ ની મંજુરીથી આપશે તો પણ જોખમદરી તો કોન્ટ્રેક્ટર ને શીરે જ રહેશે અને આપેલું મુખત્યારનામું પાછળ થી શ્રી કમિશ્નર સાહેબની મંજુરી સિવાય રદ કરાવી કે ફેરવી શકશે નહીં.

(૩૪) કોન્ટ્રેક્ટરે કોન્ટ્રેક્ટ રાખ્યા બાદ સામાનનાં અગર મજુરી ના જે કંઈ ભાવો વધઘટ થાય તેને અંગે કોન્ટ્રેક્ટર ની કોઈ જાતની ભાવ વધારી આપવાની માંગણી રદ બાતલ રહેશે.

(૩૫) કામની સાઈટ ઉપર જે કાંઈ અકસ્માત કે અનીચ્છીય બનાવ બને તે અંગે ની બધી જવાબદારી કોન્ટ્રાક્ટરની રહે છે.

(૩૬) કામ અને મટીરીયલ્સનું સ્પેશીફિકેશન, જો બીજી કોઈ રીતે દર્શાવવામાં ન આવ્યું હોય તો તે કામ ની આઈટમ અને મટીરીયલ્સ ના પ્રવર્તમાન રીલેવન્ટ આઈ.એસ.સ્પેશીફિકેશન અનુસાર નું ગણવાનું છે.

(૩૭) બાંધકામ સાઈટ પર કામ કરતા સમયે કોઈપણ ના જાન-માલ ને હાનિ થાય તો તેની સંપૂર્ણ જવાબદારી કોન્ટ્રાક્ટરની રહેશે. આમ ન બને તે માટે કોન્ટ્રાક્ટરે સ્વખર્ચે જરૂરી યોગ્ય પુર્વ પગલાઓ લઈ તમામ જરૂરી યોગ્ય પુરતી વ્યવસ્થા કરવાની રહેશે.

(૩૮) કોન્ટ્રાક્ટરના અનુસંધાનમાં કે તે સિવાયના અથવા કામ કરવાની બાબતમાં ઉપસ્થિત થતા તમામ પ્રકાર ના વાંધાઓ, કોઈ પણ પ્રકાર ના મતભેદો કે તકરારો, તે તમામ ને સાંભળવા અને તેનું સમાધાન મ્યુનિ કમિશ્નર ભાવનગર ધ્વારા કરવામાં આવશે. મ્યુનિ કમિશ્નર ભાવનગર,કેવળ

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

એક માત્ર લવાદ રહેશે અને તેના ધ્વારા લેવામાં આવેલ નિર્ણય બનેં પક્ષ કોન્ટ્રાક્ટર અને ભાવનગર મહાનગરપાલિકા ને બંધનકર્તા રહેશે. સમય તે આ કોન્ટ્રાક્ટનું મુળ હાર્દ છે.

(૩૯) આપવામાં આવે તે સ્ટ્રક્ચરલ ડિઝાઈન,માપ સાઈઝ, નકશાઓ, પ્લાન ,એલીવેશન, સેક્શન તથા સ્પેસીફિકેશન મુજબ તમામ કામ કરી આપવાનું છે.

(૪૦) આ કામ માટે નિયત થતાં કોન્ટ્રાક્ટર / એજન્સી , આ કામ માટે ભાવનગર મહાનગરપાલિકા ને સીધા જ જવાબદાર છે અને ભાવનગર મહાનગરપાલિકા તરફથી સંપૂર્ણ બાંધકામની ગુણવત્તા , જથ્થો , નકશા માં ફેરફાર, સ્પેસીફિકેશન અને બાંધકામ કરવા માટેની સાનુકૂળતા , પાણી નો છંટકાવ (ક્યોરીંગ) અને રોજ રોજના કામના સુપરવિઝન બાબત, વખતના ઓડર્સ મેળવશે.

(૪૧) કોન્ટ્રાક્ટરના મજૂર અને કર્મચારીઓ માટે રહેઠાણની જરૂરી વ્યવસ્થા કોન્ટ્રાક્ટરે સ્વખર્ચે અને જોખમે કરવા ની રહેશે.

(૪૨) આ કામ માટે કોન્ટ્રાક્ટરે સ્વખર્ચે અને જોખમે જરૂરી તમામ પ્રકારના પુરતા પ્રમાણમાં સાધનો , સરંજામ , અને સ્કેફોલ્ડીંગ તથા બાંધકામ મશીનરી ની વ્યવસ્થા કરવાની છે. તથા સમય મર્યાદામાં કામ પુરુ કરવા માટે તમામ મશીનરીને સારી કન્ડીશન માં મેઈન્ટેન કરવાની છે. તમામ મટીરીયલ્સ, સાધનો, સ્કેફોલ્ડ્સ, અને સામગ્રી બાંધકામ સાઈટ સ્થળે લાવ્યા પછી ભાવનગર મહાનગરપાલિકાની મંજૂરી સિવાય હટાવવાની નથી.

(૪૩) જરૂરી હોય તેવી સાઈટ/કિસ્સા/સંજોગો માં ટેમ્પરરી ડાયવર્ઝન ની વ્યવસ્થા કોન્ટ્રાક્ટરે સ્વખર્ચે કરવાની રહેશે. શક્ય હશે ત્યાં સુધી આર.સી.સી પાઈપ મ્યુ.કોર્પો ધ્વારા આપવામાં આવશે.

(૪૪) સેલ્સ ટેક્ષ , ઈન્કમ ટેક્ષ , રોયલ્ટી,વેટ,પ્રોફેશનલ ટેક્ષ ,જી.એસ.ટી.અથવા અન્ય લાગુ પડતા ટેકસીઝ , ઈ.એસ.આઈ.સી. પ્રિમીયમ કે ઈ.પી.એફ. વિગેરે જો કોઈ લાગુ પડતા હોય તો ,તે તમામ કોન્ટ્રાક્ટ ધ્વારા ભરપાઈ કરવાના રહેશે. તેની પ્રમાણિત નકલો ફરજિયાતપણે ઓન લાઈન ટેન્ડર હોય તો ઓન લાઈન પણ અપલોડ કરવાની રહેશે તથા કોઈ પણ પ્રકાર ના ટેન્ડર માટે હાર્ડકોપી માં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે.

(૪૫) કોન્ટ્રાક્ટર બાંધકામના લેવલ તથા બાંધકામની ગુણવત્તા અંગેની વ્યવસ્થા ગોઠવશે. તેમજ કોન્ટ્રાક્ટર તેની ચોક્કસાઈ માટે સંપૂર્ણ જવાબદાર ગણાશે. કોન્ટ્રાક્ટર ધ્વારા કામ ની લાઈન લેવલ તથા કામ શરુ કરવાના પ્રાથમિક તબક્કા માટે જરુરી તમામ સાધનો તથા સ્ટાફની વ્યવસ્થા કરશે તથા આ માટે કોઈ અલગ નાંણા ભાવનગર મહાનગરપાલિકા ધ્વારા ચુકવવામાં આવશે નહિ. સાઈટ કલયરિંગ માટે પણ કોઈ અલગ નાણા ભાવનગર મહાનગરપાલિકા ધ્વારા ચુકવવા માં આવશે નહિં.

(૪૬) બાંધકામ માટે વાપરવાનું થતું તમામ પ્રકારનું મટીરીયલ સારી ગુણવત્તા વાળું તથા પ્રસ્તુત પ્રવૃત્તમાન આઈ.એસ. સ્ટાન્ડર્ડઝ અનુસારનું અને ભાવનગર મહાનગરપાલિકા ધ્વારા પાસ કરાયેલું હોય તેવું જ ઉપયોગમાં લેવાનું છે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(૪૭) થયેલા કામ અનુસારની કોઈ આઈટમ માટે રનીગ બીલ ધ્વારા રકમ ચુકવણી થવાથી તે કામ અને આઈટમ માન્ય રખાયેલ છે તેવું માની લેવાનું તથા કામ ની ગુણવત્તા સુધારવા ની કોન્ટ્રાક્ટર ની જવાબદારી માંથી કોઈ પણ રીતે મુક્તી આપતું નથી.

(૪૮) કોઈપણ કામ જેનો ઉપરોક્ત સ્પેસીફિકેશન માં સમાવેશ થયેલ ન હોય તે કામ રીલીવન્ટ આઈ.એસ. સ્ટાન્ટર્ટ અનુસાર કરવાનું છે – અગર તો કમિશ્નર ફરમાવે તે પ્રમાણે કરવાનું છે.

(૪૯) કામ પુર્ણ થયે સાઈટ તદ્દન કલીયર કરી આપવની છે. જેની લેખીત માં હકીકત જાહેર માં કરવા ની રહેશે.

(૫૦) કામ પર સુચના લેવા માટે અત્રેથી જાણ કર્યેથી કોન્ટ્રાક્ટરે પોતે જાતે હાજર રહેવું પડશે. તેમજ જવાબદાર ટેકનિકલી કવોલીફાઈડ માણસે કાયમ હાજર રહેવું પડશે. અને તેવો માણસ ફરમાન અનુસાર કામ પર થી રજા આપવામાં આવશે. કોન્ટ્રાક્ટર તરફ થી રોકવામાં આવેલ આ માણસને આપવામાં આવેલ સુચના કોન્ટ્રાક્ટરને આપ્યા બરાબર ગણાશે.

(૫૧) સંબંધીત સત્તાના લેખીત હુકમ અને પહેલેથી ભાવ નકકી કરવ્યા સિવાય કોઈપણ પ્રકાર નું “ એક્સ્ટ્રા કામ” કરવાનું નથી.

(૫૨) કામ ઉપરની સુચનાઓ ,સ્પેસીફિકેશન સાથે અસંમત હશે તો પણ તે સુચનાઓ કામ સંતોષકારક રીતે પુરૂ કરવા માટે આપવામાં આવેલ ગણાશે. જો કોઈ કામ સ્પેસીફિકેશનના ભાવથી બહાર હોવાનું જણાય તો તુરતજ તે માટે તેમણે સંબંધીત સત્તાને લેખીત ખબર આપી દેવાની છે. તે માટે ભાવ ઠરાવી લેવાનો છે. નહી તો પાછળથી એક્સ્ટ્રા કામ માટેનો દાવો બીલકુલ ચાલશે નહી.

(૫૩) કામનો પ્રોગ્રેસ દરમિયાન નકશામાં ફેરફાર કરવો કે કામમાં વધારો ઘટડો કરવા, એક્સ્ટ્રા આઈટમ કરવા સંબંધીત સત્તા મુખત્યાર છે. અને અપ દુ ૩૦ % સુધી કામમાં ટેન્ડર આઈટમોમાં વધારા ઘટાડ, એક્સ્ટ્રા આઈટમ થયા તે પ્રમાણે કામ કરી આપવા કોન્ટ્રાક્ટર બંધાયેલા છે . જે માટે કોઈ વાંધા/ અરજી ચાલશે નહી.

(૫૪) કામની લાઈન દોરી, લેવલ માટે તમામ સગવડતાઓ (મેખ, ખીલા, ચુકો, દોરી, ઓળંભ, મેજર ટેપ, કાટખુણા, ચુનો વિગેરે) કોન્ટ્રાક્ટરે આપવાની છે. દરેક મટીરીયલ્સ સારી રીતે રહે તે માટે તથા મટીરીયલ્સ ના સ્ટોરેજ કામ માટે જોઈતા તમામ “શેડ” કોન્ટ્રાક્ટરે સ્વખર્ચે યોગ્ય રીતે બાંધી આપવાના છે.

(૫૫) ખરાબ કામ કે નબળુ મટીરીયલ્સ કાઢી નાખી ઉપાડી લઈ જવા તેમજ તેની દુરસ્તી કરી આપવા માટે ડીફેક્ટ લાયેબીલીટી પીરીયડ પુરો થતાં સુધી કોન્ટ્રાક્ટર જવાબદાર રહેશે.

(૫૬) સદરહું કામ માટે જે પ્રકાર નું મજૂરી કામ કરવાનું હોય તે પ્રકાર ના કામ માટે સારા માં સારા કારીગરો / રોજમદારો રાખી કામ કરવાનું છે. નબળા કારીગરોને કામ ઉપરથી તુરતજ રજા આપવા માં આવશે.

(૫૭) તમામ કયોરીંગ કરવા પાત્ર કામ/આઈટમ મટીરીયલને જરૂર જણાયે/સુચના અપાયે થી બરાબર વીસ દીવસ સુધી પાણીનો છંટકાવ કરવાનો છે. તે માટે પુરતા પ્રમાણમાં પાણી મળી રહે

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

તે રીતે યોગ્ય પાણીની વ્યવસ્થા પોતાના સ્વખર્ચે અને જોખમે કરવાની છે. અને પાઈપ કીબી, પંપ વિગેરે આ કામ માટે ખાસ મજૂરો રોકી ને પાણીનો છાંટવા પુરતો બંદોબસ્ત કોન્ટ્રાક્ટરે પોતાના સ્વખર્ચે અને જોખમે કરવાનો છે. તેમા જરા પણ ક્યાશ હશે તો કોન્ટ્રાક્ટરના ખર્ચે અને જોખમે વિભાગ ધ્વારા બંદોબસ્ત કરવી લેવામાં આવશે જે માટે નોટીસ પણ આપવામાં આવશે નહીં.

(૫૮) ચાલુ કામે જ્યારે જ્યારે કામના ઈન્સ્પેક્શન માટે માપ લેવા અગર બીજી કોઈ તપાસ માટે તમામ સ્થળે પહોંચી શક્ય તે માટે પુરતા સાધનો જેવા કે નીસરણી, પાટીયા વિગેરે તમામ ની પુરતી વ્યવસ્થા કોન્ટ્રાક્ટરે કરવાની છે. અને જરૂર પડે નીસરણી ફેરવવા અગર બીજી મુકવા વિગેરે સુચના પ્રમાણે બંદોબસ્ત કરવાનો છે. તેમ નહીં કરવામાં આવે તો તેવો બંદોબસ્ત કોન્ટ્રાક્ટરના ખર્ચે કરાવી લેવામાં આવશે.

(૫૯) કોન્ટ્રાક્ટર/ટેન્ડર ભરનારે લગત કામની બાંધકામની સાઈટની સ્થળ સ્થિતિની મુલાકાત લઈ જરૂરી અભ્યાસ કરી લેવો.

(૬૦) કોન્ટ્રાક્ટર/ટેન્ડર ભરનારે તેઓની અનુકુળતા અનુસાર સાઈટ (સ્થળે) જરૂરી અન્ય સ્થળોએ જરૂરી વિજળી અને યોગ્ય પાણીની વિતરણ વ્યવસ્થા સ્વખર્ચે અને જોખમે પોતાની રીતે ગોઠવવાની રહેશે. આ બંને સુવિધાના થતો વપરાશના ચાર્જીસ કોન્ટ્રાક્ટર/ટેન્ડર ભરનારે ભરપાઈ કરી આપવાના રહેશે.

(૬૧) કોન્ટ્રાક્ટરમાં આવરી લેવામાં આવેલું તમામ કામ, કોન્ટ્રાક્ટર/ટેન્ડર ભરનારે સ્વયં બાંધવાનું/અમલ કરવાનો છે. ભાવનગર મહાનગરપાલિકાની લેખિત સંમતી મેળવ્યા સિવાય, કોન્ટ્રાક્ટર/ટેન્ડર ભરનારે આ કોન્ટ્રાક્ટ અથવા તે પૈકીનો કોઈ ભાગ, સીધો અથવા આડકતરી રીતે અન્યના નામે ટ્રાન્સફર કે પેટા ફાળવણી કરવાની નથી કે પેટા કોન્ટ્રાક્ટરની પાસે થી કરાવાશે નહીં કે પાવર ઓફ એટર્ની ધ્વારા અન્યને ફાળવી શકશે નહીં.

(૬૨) મહાનગરપાલિકા જરૂર જણાયે કોઈપણ કારણ બતાવ્યા સિવાય આ ટેન્ડર અથવા તેની કોઈ પણ આઈટમના એક કરતાં વધુ ભાગ કરીને અન્ય કોન્ટ્રાક્ટર અથવા એજન્સીને કામ આપી શકશે.

(૬૩) ભાવનગર મહાનગરપાલિકાની સક્ષમ સત્તાને કોઈપણ કારણ બતાવ્યા સિવાય કોઈ પણ ટેન્ડર સ્વિકારવા અથવા રદ કરવા અંગે નો અધિકાર અબાધિત રહેશે. અને લોએસ્ટ ભાવનું ટેન્ડર સ્વિકારવા માટે પણ બંધનકર્તા નથી. કોઈપણ કારણસર કે કોન્ટ્રાક્ટરની ભુલને કારણે ટેન્ડર રદ કરશે કે અસ્વીકાર કરાશે કે ડિસ્કવોલીફાઈ કરાશે તો પણ ટેન્ડર ફી પરત આપવા માં નહિ આવે.

(૬૪) કોઈ પણ પ્રકાર નુ એડવાન્સ પેમેન્ટ કરવામાં આવશે નહીં.

(૬૫) એસ્ટીમેટેડ (ટેન્ડર) ની કોઈ પણ આઈટમ ની કવોન્ટીટીના કોઈપણ વેરીએશન કે કોઈ આઈટમ કેન્સલ/ રદ કરવામાં આવે તો પણ સબબ કોઈ પણ પ્રકાર નો ભાવ વધારો આપવામાં આવશે નહીં કે તેવી આઈટમ અન્વયે કોઈ મટીરીયલ પર્યેઝ કરાયેલ હશે તો પણ કોઈ પણ પ્રકારનું પેમેન્ટ આપવામાં આવશે નહિ.

(૬૬) કોઈ પણ પ્રકારના માલ સામાન, મટીરીયલ્સ વગેરેનો કોઈ પણ પ્રકારનો ભાવ વધારો આપવામાં આવશે નહિ.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

(૬૭) કોઈપણ પ્રકારની વ્યાજની રકમની માંગણી કરી શકાશે નહીં.

(૬૮) કામ શરૂ કરતા પુર્વે કામની વિગતો દર્શાવતુ બોર્ડ કામ પુર્ણ થતા સુધી કોન્ટ્રાક્ટરે સ્વખર્ચે લગાડી રાખવાનુ રહેશે અન્યથા કોઈ પણ સમયે બોર્ડ લાગેલુ માલુમ નહીં પડશે ત્યારે રૂપિયા ૫,૦૦૦/- ની પેનલ્ટી લાગુ પડશે.

(૬૯) સામાન્ય રીતે આઈટમોના માપો લેવાની રીતે પ્રસ્તૂત આઈ.એસ.કોડ અનુસરની રહેશે.

(૭૦) સરકારશ્રીનાં વખતોવખત નાં બહાર પાડવામાં આવેલ મજૂર કામદારો નાં કાયદાઓ નું ચુસ્તપણે કોન્ટ્રાક્ટરશ્રી એ અમલ કરવાનું રહે છે.

(૭૧) બાળ મજૂર (પી.એન્ડ આર.) કાયદો-૧૯૮૬ ના પેટા નિયમ -૩ અનુસાર બાંધકામની કામગીરીમાં બાળ મજૂર રાખવા ની સખત મનાઈ છે. જો ઠેકેદાર આ નિયમનું ઉલ્લંઘન કરશે તો , જ્યારે આવી બાબત ધ્યાન પર આવશે ત્યારે તેમણે તેના પરિણામો ભોગવવા પડશે અને તેમાની સામે પ્રવર્તમાન નિયમોનુસાર જરૂરી કાયદાકીય પગલા લેવા માં આવશે તેમજ તેમણે કામે રાખેલ પ્રતિ બાળ મજૂર દીઠ જે નિયમો અમલ માં હશે તે પ્રમાણે ની રકમ વસુલ કરવામાં આવશે.

(૭૨) કોન્ટ્રાક્ટર મજૂરોને આપવા પાત્ર લઘુતમ બુનિયાદી સગવડો જે તે મજૂર કાયદા મુજબ કોન્ટ્રાક્ટરે મજૂરોને નિયમિત આપવાના રહેશે.

(૭૩) કોન્ટ્રાક્ટરે પોતાના તરફથી મજૂરોને અપાતું વેતન જે તે મજૂર કાયદાની જોગવાઈ મુજબ નક્કી થયેલ દરે અને સમયે નિયમિત આપવા નું રહેશે.

(૭૪) કોન્ટ્રાક્ટર હસ્તકના કર્મચારી/મજૂરો વિગેરેના એમ્પ્લોઈઝ પ્રોવિડંડ ફંડ (ઈ.પી.એફ.) ને લગત વખતો વખતના કાયદાઓનું પાલન કરવાનું રહેશે તથા તે માટેના જરૂરી આધારો/ નકલો કોઈપણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજૂ કરવાના રહેશે. ઓનલાઈન ટેન્ડર હોય તો ઓન લાઈન પણ અપલોડ કરવાનું રહેશે. જો આ ડોક્યુમેન્ટ રજુ નહિ કરવામાં આવે તો ટેન્ડર જે-તે એજન્સીને ડિસ્કવોલીફાઈ કરી તેના ટેન્ડર ઓપન કરવામાં નહિ આવે.

(૭૫) કરેલ કામના દરેક બીલમાંથી વખતો વખતના સરકારી નિયમસરના ટેકસ કાપવામાં આવશે તથા લાગુ પડતા કાયદાઓ મુજબ ચુકવવા પાત્ર વેતન/ઈ.પી.એફ./પેનલ્ટી.ટેકસ ની કપાત/ચુકવણી બાદ જ બિલ ની કાર્યવાહી થશે.

(૭૬) કોન્ટ્રાક્ટર સિકયોરીટી ડીપોઝીટ કોન્ટ્રાક્ટ વેલયુ/મંજૂર રકમ ના ૫ ટકા મુજબ તથા ડીફેક્ટ લાયેબીલીટી પીરીયડ પુરો થતા સુધી (ડીફેક્ટ લાયેબીલીટી પીરીયડ+કામ ની સમય મર્યાદા સુધી) ના સમયગાળાની રોકડ/ એફ.ડી.આર./શીડ્યુઅલ બેંક ની બેંક ગેરેન્ટી સ્વરૂપે એગ્રીમેન્ટ કરતા સમયે જમા કરવા ની રહેશે. જો કામ માં એકસેસ થશે તો થયેલ/થનાર એકસેસ રકમ માટે પણ ૫ ટકા મુજબ સિકયોરીટી ડિપોઝીટ જમા કરવાની રહેશે. તદઉપરાંત ૩૦ લાખ ઉપરનાં કામ માટે કોન્ટ્રાક્ટરે (એગ્રીમેન્ટ સમયે જમા કરેલ ૫ ટકા સિકયોરીટી ડિપોઝીટ ઉપરાંત) કોન્ટ્રાક્ટ વેલયુ/મંજૂર રકમના ૨.૫ ટકા મુજબ લેટેસ્ટ નર્મદા બોન્ડ અથવા એન.એસ.એસ.અથવા કામની સમયમર્યાદાથી એકમાસ વધુ સમયની શેડ્યુઅલ બેંકની બેંક ગેરેન્ટી એગ્રીમેન્ટ સમયે કામ શરૂ

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

કરતા પુર્વે રજુ કરવાના રહેશે. તથા દરેક રનીંગ બિલમાંથી રૂ.૫૦ ટકા લેખેની રકમ કપાત કરવામાં આવશે. સદરહુ બન્ને ડિપોઝીટ ફાઈનલ બિલ બાદ જ પરત મળશે. આ અંગેની જરૂરી માહિતી મ્યુ. કોર્પો. ના રોડઝ વિભાગેથી રૂબરૂ મેળવવાની રહેશે. (તેમજ ડીપોઝીટ અંગે સરકારશ્રી ના પ્રવર્તમાન નિયમો નો અમલ કરવાનો રહેશે.)

(૭૭) ટેન્ડર ભરનાર એજન્સીએ ટેન્ડર સાથે આપેલ નમુના મુજબનું ડિટઈલીંગ ફોર્મ ભરી કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૭૮) ટેન્ડર જો ભાગીદારી પેઢી હોયતો ભાગીદાર દસ્તાવેજની નકલ કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો ઓન લાઈન પણ અપલોડ કરવાનું રહેશે.

(૭૯) ટેન્ડરર જો કંપની કાયદા હેઠળ અથવા સહકારી મંડળીના કાયદા હેઠળ નોંધાયેલી હોય તો તે બાબતના દસ્તાવેજ પુરાવા તેમજ બંધારણની નકલ તથા પાવર ઓફ એટર્નીની પ્રમાણિત નકલ કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૮૦) ટેન્ડરર પેઢીના છેલ્લા ૩ વર્ષમાં જ્યારે - જ્યારે ભરવાના થતા હોય ત્યારે સેલ્સ ટેક્સ/વેટ/જી.એસ.ટી./ પ્રોફેશનલ ટેક્સ/ઈન્કમ ટેક્સ/સર્વિસ ટેક્સ ભર્યાની વર્ષવાર વિગત (રીટર્નની પ્રમાણિત નકલો તથા ચાર્ટર્ડ એકાઉન્ટન્ટની ઓડીટ રિપોર્ટની નકલો) કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૮૧) તમામ નકલો પોતાના ધ્વારા પ્રમાણિત કરી સહી-સિકકા સાથેની (સેલ્ફ એટેસ્ટેડ) કે ગેઝેટેડ ઓફિસરે સહી-સિકકા સાથે પ્રમાણિત કરેલી નકલો રજુ કરી કરવાની રહેશે. દસ્તાવેજોની મુળ નકલ ટેન્ડર ખોલતી વખતે ચકાસણીના હેતુસર માંગણી કરવામાં આવે તો રજુ કરવાની રહેશે.

(૮૨) કોઈપણ જાતના શરતી ટેન્ડરર સ્વીકારવામાં આવશે નહીં. અને આવા ટેન્ડર રદ થવાને પાત્ર ગણાશે.

(૮૩) ટેન્ડર ખોલ્યા બાદ કોઈ ટેન્ડર તેમના ભાવો પાછા ખેંચી લઈ શકશે નહિ. જો ટેન્ડરર તેમ કરશે તો તેમની ટેન્ડર અર્નેસ્ટમની ડિપોઝીટ જપ્ત કરવામાં આવશે અને આવા ટેન્ડરર ને ભવિષ્યમાં ઈજારા માટે ગેરલાયક ગણી શકશે.

(૮૪) સરકારી કચેરી/વિભાગ દ્વારા બ્લેક લીસ્ટ તથા નાણાકીય સંસ્થા ધ્વારા ડિફોલ્ટર કે પોલિસ તથા કોર્ટ રેકર્ડ પર કેસ નથી તે મતલબ નું ટેન્ડરની જાહેરાતની તારીખ બાદનું સાથે સામેલ નમુના મુજબનું બાહેધરી પત્રક કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાત પણે રજુ કરવાના રહેશે. ઓન લાઈન ટેન્ડર હોય તો

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

ઓનલાઈન પણ અપલોડ કરવાનું રહેશે. એક કરોડ થી વધુ રકમના ટેન્ડર માટે ૧૦૦ રૂપીયા ના સ્ટેમ્પ પેપર ઉપર ટાઈપ કરાવી નોટરાઈઝડ કરાવીને તથા એક કરોડથી ઓછી રકમના ટેન્ડર માટે ૨૦ રૂપીયા ના સ્ટેમ્પ પેપર ઉપર (નોટરાઈઝડ કરાવ્યા વગર) રજુ કરવાના રહેશે.

(૮૫) ટેન્ડરની ચકાસણી સમયે, જરૂરી કલેરીફિકેશન તથા નેગોસીએશન રૂબરૂ હાજર રહી કરી આપવાનું છે.

(૮૬) કોન્ટ્રાક્ટર/સપ્લાયર/ટેન્ડરે ટેન્ડરમાં આપેલ શરતો , સૂચનાઓ ની પ્રિન્ટ કાઢીને તેમાં સહિ સિકકા કરી કોઈ પણ પ્રકારના (હાર્ડકોપી કે ઓનલાઈન) ટેન્ડર માટે હાર્ડકોપીમાં અત્રેના વિભાગે ફરજિયાતપણે રજુ કરવાના રહેશે. ઓનલાઈન ટેન્ડર હોય તો ઓનલાઈન પણ અપલોડ કરવાનું રહેશે.

(૮૭) ટેન્ડર દસ્તાવેજ (કોમર્શીયલ બીડ વગર)ના દરેક પાના ઉપર ટેન્ડરે સહિ કરવાની રહેશે અને આ સહિ ટેન્ડરર કઈ હેસિયતથી કરે છે તે સ્પષ્ટ દર્શાવવાનું રહેશે.

(૮૮) ટેન્ડરમાં ભરેલ ભાવે/માન્ય રાખેલ ભાવોથી આ કામ કરવા મને વર્કઓર્ડર આપવામાં આવશે તો હું આ કામ કરવા બંધાઉ છુ. અને જો કોઈ સંજોગો માં હું આ કામ ન કરુ તો મહાનગરપાલિકામાં આ કામ માટેની ભરપાઈ કરેલ તમામ ડિપોઝીટની રકમ ફોરફીટ કરવા મહાનગરપાલિકા હકકદાર રહેશે અને મ્યુ. કોર્પો. અમો ને બ્લેક લીસ્ટ કરવા હકકદાર રહેશે.

(૮૯) રિફઈનરીના મુળ બિલ મુજબ ઉત્પાદિત ડામરની ખરીદીના વાસ્તવિક દરો અને ઉપર દર્શાવેલ સ્ટારરેટ વચ્ચેનો તફાવત ખરેખર આ કામમાં વપરાતા ડામરના જથ્થા માટે ચુકવવાપાત્ર વસુલપાત્ર રહેશે. જો વિભાગને આભારી વિલંબના કારણોસર સમયમર્યાદા વધારવામાં આવે તો આ તફાવત મુળ અને વધારાની સમય મર્યાદા દરમિયાન થયેલ કામમાં ઉપયોગમાં લેવાયેલા ડામર માટે ચુકવવાપાત્ર/વસુલપાત્ર રહેશે. જ્યારે કોન્ટ્રાક્ટરને આભારી વિલંબના કારણોસર વધારાની સમયમર્યાદામાં ચલાવવામાં આવેલા કામ માટે આ તફાવત ચુકવવાપાત્ર રહેશે નહીં પરંતુ વસૂલાતપાત્ર રહેશે.

(૯૦) BITUMEN USED IN WORK MUST BE FROM IOCL / BPCL REFINERY.

કોન્ટ્રાક્ટર / સપ્લાયર તરીકે સદરહુ કામના ટેન્ડરની / ઉપરોક્ત તમામ શરતો ,સૂચનાઓ , વિગતો તથા સ્પેસીફિકેશન અમો એ બરોબર વાંચી, વંચાવી, સમજી, વિચારીને ટેન્ડર માં ભાવો ભરેલ છે. ઉપરોક્ત તમામ શરતો અમોએ શુદ્ધિ - બુદ્ધિ પૂર્વક વાંચેલ - વંચાવેલ - વિચારેલ - સમજેલ છે જે મને / અમને કોઈ પણ ધાક ધમકી કે દબાણ વગર કબુલ મંજુર છે. જો કોઈ સંજોગોમાં હું આ કામ ન કરુ તો મહાનગરપાલિકામાં આ કામ માટેની ભરપાઈ કરેલ તમામ પ્રકાર ની ડિપોઝીટ ની રકમ ફોરફીટ કરવા મહાનગરપાલિકા હકકદાર રહેશે અને મ્યુ. કોર્પો અમો ને એ બ્લેક લીસ્ટ કરવા હકકદાર રહેશે. આમ અમો કોન્ટ્રાક્ટર /સપ્લાયર તરીકે તમામ શરતો તથા સ્પેસીફિકેશન મુજબ અમોએ ભરેલ કે માન્ય રાખેલ ભાવો થી કામ કરવા બંધાઈએ છીએ અને સહિ કરી આપીએ છીએ.

ભાવનગર મહાનગરપાલિકા, ભાવનગર

રોડઝ વિભાગ

ઉપરોક્ત તમામ શરતો તથા સ્પેશીફિકેશન અમોએ વાંચી,વંચાવી,સમજી,વિચારી ને ટેન્ડરમાં ભાવો ભરેલ છે જે મને / અમને કબુલ મંજુર છે અને તે મુજબ અમો કામ કરવા બંધાઈએ છીએ.

કા.પા.ઈ

ઓફિસર ઓન સ્પે (ટેકનીકલ) ડયુટી.

કોન્ટ્રાક્ટર ની સહી

રોડઝ વિભાગ

ભાવનગર મહાનગરપાલિકા

સ્થળ - ભાવનગર

ભાવનગર મહાનગરપાલિકા

તા:- / /

અન્ય સુચનાઓ

- 1) સહિ સિકકા કરેલ તથા ભાવો ભર્યા વગરની ટેન્ડરની હાઈકોપી તથા જરૂરી દસ્તાવેજો ટેન્ડર સાથે અપલોડ કરેલ / એટેચ / સપોર્ટીંગ ડોક્યુમેન્ટની કોપીઓ પણ (પ્રાઈઝ બીડ સિવાય) ફીઝીકલ ડોક્યુમેન્ટ રૂપે સાથે મોકલવાના રહેશે. અપલોડ કરેલ ડોક્યુમેન્ટ મુજબ ફીઝીકલ ડોક્યુમેન્ટ સબમીટ નહિ કરેલ હોય તો જે તે એજન્સીના ટેન્ડર માન્ય ગણવામાં નહિ આવે.
- 2) બેંક સોલ્વન્સી ટેન્ડર ઓપનીંગ ડેઈટ સુધી વેલીડ હોવી જોઈશે અન્યથા જે-તે એજન્સીને ડિસ્કવોલીફાઈ કરી પ્રાઈઝ બીડ ટેન્ડર ઓપન કરવામાં નહિ આવે.
- 3) લાગુ પડતા લાયસન્સ / રજીસ્ટ્રેશન ટેન્ડર ઓપનીંગ ડેઈટ સુધી વેલીડ હોવા જોઈશે અન્યથા જે-તે એજન્સીને ડિસ્કવોલીફાઈ કરી પ્રાઈઝ બીડ ટેન્ડર ઓપન કરવામાં નહિ આવે.
- 4) નિયત સમય મર્યાદા બાદ આવેલ ટેન્ડર રદ ગણવામાં આવશે તથા ઓપન કરવામાં નહિ આવે.
- 5) ટેન્ડર સાથે ટેન્ડર ફી ની રકમ ડીમાન્ડ ડાફ્ટ થી ભરવાની રહેશે રોકડેથી કે ચેકથી સ્વીકારવામાં આવશે નહીં. ડીમાન્ડ ડાફ્ટ ટેન્ડર પ્રસિધ્ધ થયા બાદની તારીખે તૈયાર કરાવેલ જ હોવો જોઈશે અન્યથા જે તે એજન્સીના પ્રાઈઝ બીડ ટેન્ડર ખોલવામાં નહિ આવે.
- 6) ઈ.એમ.ડી રાષ્ટ્રીયકૃત બેન્કની ૧૩૫ દિવસ ની મુદત ની એફ.ડી.આર. અથવા ડી.ડી. સ્વરૂપે જ રજૂ કરવાની રહેશે. (એફ.ડી.આર.માં ફરજીયાત રેવન્યુ સ્ટેમ્પ મારી પોતાની સહી કરીને રજૂ કરવી અન્યથા જે તે એજન્સીના પ્રાઈઝ બીડ ટેન્ડર ખોલવામાં નહિ આવે.)
- 7) ટેન્ડર ડોક્યુમેન્ટના કવર પર કામનું નામ, ટેન્ડર આઈ.ડી., ટેન્ડર નોટિસ/આઈ.એફ.બી.નંબર., ડોક્યુમેન્ટ પહોંચતા કરવાની આખરી તારીખ, કોન્ટ્રાક્ટરનું નામ - સરનામું - ફોન નંબર ફરજીયાત લખવાના રહેશે અન્યથા કવર સ્વીકારવામાં નહિ આવે યાતો ટેન્ડરો ઓપન કરવામાં નહિ આવે.

ભાવનગર મહાનગરપાલિકા, ભાવનગર રોડઝ વિભાગ

- 8) ટેન્ડર સાથે જોડેલ ટેન્ડર ફી ડ્રાફ્ટ તથા ઈ.એમ.ડી. ડ્રાફ્ટ/એફ.ડી. પાછળ કામનું નામ તથા એજન્સીનાં નામ ટેલિફોન નંબર ફરજીયાત લખવાના રહેશે અન્યથા ઈ.એમ.ડી. ડ્રાફ્ટ/એફ.ડી. મીસપ્લેસ થવા કે પરત મેળવવામાં વિલંબ અંગે મ્યુ. કોર્પોની જવાબદારી રહેશે નહિ.
- 9) કોઈપણ કારણસર કે કોન્ટ્રાક્ટરની ભૂલને કારણે ટેન્ડર રદ કરાશે કે અસ્વીકાર કરાશે કે ડિસ્કવોલીફાઈ કરાશે તો પણ ટેન્ડર ફી પરત આપવામાં નહિ આવે.

એજન્સીનું નામ :-		
કોન્ટ્રાક્ટરનું નામ :-		
સહી :-	તારીખ:-	
સહિ કરનાર — માલિક/ ભાગીદાર/ ઓથોરાઈઝડ પર્સન પૈકી કઈ હેસિયતથી સહી કરેલ છે		કોન્ટ્રાક્ટર / એજન્સીનો સિકકો