



**COCHIN PORT TRUST**

**COCHIN-682009, KERALA, INDIA**

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**TENDER DOCUMENT FOR ANNUAL CIVIL  
MAINTENANCE CONTRACT FOR THE YEAR 2019-2020.**

**TECHNICAL BID (e-Tendering Mode)**

**Website:www.tenderwizard.com/CoPT**

**CHIEF ENGINEER'S OFFICE**

**COCHIN PORT TRUST**

**COCHIN-682009**

**TENDER No.T6/T-1905/2019-C**

**PRICE: Rs.2100/-**

**COCHIN PORT TRUST**

**TENDER FOR ‘ANNUAL CIVIL MAINTENANCE CONTRACT FOR THE  
YEAR 2019-2020  
(Tender No.T6/T-1905/2019-C)**

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**SIGNATURE OF TENDERER**

## COCHIN PORT TRUST

CHIEF ENGINEER'S OFFICE,  
COCHIN – 682009

No.T6/T-1905/2019-C

Dated:-26/11/2019

### 1. TENDER NOTICE

- 1.1 Electronic tenders (e-tenders) in “**Two Cover System**” for “**Annual Civil Maintenance Contract for the year 2019-2020**” are invited by the Suptdg. Engineer(CM), Cochin Port Trust, Willingdon Island, Cochin- 9 and will be received **up to 14.30hrs. on 17/12/2019**. The tenders shall be submitted in accordance with the ‘Instruction to Tenderers’ and ‘General Description and Special Conditions of Contract’ etc. as detailed in the Tender Documents. The tenders will be opened by the Chief Engineer, Cochin Port Trust at this office on the same day at **15.00 hrs**.

**Estimated cost:1 Crore**

- 1.2 The Tender Document can be down loaded from the e-tendering portal [www.tenderwizard.com/COPT](http://www.tenderwizard.com/COPT) **from 10.00hrs. on 26/11/2019 to 14.30hrs on 17/12/2019** by making online requisition & submission of Demand Draft/ Banker’s Cheque for **Rs.2000/-+GST @5%(ie, Rs.2100/-)** drawn in favour of the FA & CAO, Cochin Port Trust, payable at Kochi, being the cost of single copy of the Tender Document. **Scanned copy of the DD/ Banker’s Cheque shall be attached with the e-tender.**
- 1.3 The Tender Documents are also available at Port’s website [www.cochinport.gov.in](http://www.cochinport.gov.in) or Government of India CPP portal for reference.
- 1.4 The bidders need to obtain the one time User ID & password for log-in to e-Tendering Portal [www.tenderwizard.com/COPT](http://www.tenderwizard.com/COPT) from the service provider M/s.KEONICS by paying registration amount of Rs.1124/- through online Payment using Credit/Debit Card/Net banking or DD in favour of “KSEDCL, Bangalore”.
- 1.5 The tender shall be submitted by an individual or by a registered Partnership firm or by a Limited Company. In the event of the tender being submitted by a registered partnership firm, it must be signed individually by each partner thereof. In the event of absence of any partner, it must be signed on his behalf by the person holding a proper power-of-attorney, authorizing him to do so and to bind the partner in all matters pertaining to the Contract including the arbitration clause, such power-of-attorney to be attached with the tender which must disclose that the firm is duly registered under Indian Partnership Act. If the tender is made by a Limited Company it shall be signed by a duly authorised person who shall produce with the tender satisfactory evidence of

the authorization. In the case of a Limited Company the tender should be accompanied by the Memorandum and Articles of Association of the Company. **Joint Venture is not allowed in the tender.**

- 1.6 **The tenders shall be submitted “on line” strictly in accordance with the Instructions to Tenderers and General Description and Special Conditions of Contract given in the Tender Document.** The bidders shall submit scanned copy of all the required documents such as DD / Bankers Cheque towards the cost of tender form and EMD; proof of experience, financial details, etc. along with e-tenders.
- 1.7 Original DD / Bankers Cheque towards the cost of tender and EMD, shall be submitted in a sealed cover to the **Suptdg. Engineer (CM), Cochin Port Trust, W/Island, Cochin-682009, KERALA**, before opening date & time of the tender. **Tenders without submitting the original documents as above, shall be liable for rejection.**
- 1.8 The intending bidder must have valid Class-II or III digital signature certificate to submit the bid. **For further details, please contact e-Tender Help Desk No. 080-40482000/ 9746118529/9605557738.**

**1.9 EARNEST MONEY TO BE DEPOSITED**

- 1.9.1 Each tender should be accompanied by an Earnest Money amounting to **Rs.1,00,000/-**. The Earnest Money can be deposited through Demand Draft or Banker’s Cheque or Pay Order from a Scheduled Bank in India, drawn in favour of Financial Adviser & Chief Accounts Officer, Cochin Port Trust. The original DD/Banker’s Cheque/ Pay Order shall be submitted to the Chief Engineer/ Dy.CE/SE, Cochin Port Trust, Cochin – 9, before opening time of the tender. Scanned copy of the DD/ Banker’s Cheque/ Pay Order shall be attached with the tender submitted “online”. The Earnest Money deposited will not carry any interest.

**1.10 Tender Submission/Opening:**

- 1.10.1 The time schedule for various activities in connection with this tender will be as follows.

Description of activity	Schedule time	Venue
a)Last date & time for submission of tenders	14.30 hrs on 17/12/2019	-----
b)Public opening of Tenders	15.00 hrs on 17/12/2019	Chief Engineer’s Office

- 1.10.2 Tender shall include Cover A containing hard copy of **“EMD & COST OF TEDNER FORM”**. All other technical details including Technical Bid & Price Bid shall be submitted only **online**.

1.10.3 The Officer opening the Cover A-containing the **“EMD & COST OF TENDER FORM” shall first open.** Technical Bid of only those tenderers shall be opened, whose documents furnished in the Cover A, are found to be in order. Others will not be opened; Only a mention to this effect shall be made in the tender opening register.

**1.10.5 Technical Bid & Price Bid shall be submitted only ‘Online’. The name and address of the tenderer shall be necessarily entered in the space provided in ‘Price Bid’.**

1.11 The right of acceptance of tender will rest with Port Trust Board who does not bind themselves to accept the lowest tender and reserves to themselves the authority to reject any or all of the tenders received without assigning any reason.

1.12 The Chief Engineer/ Dy. CE/ Suptdg. Engineer or his duly authorized assistant will open the tenders in the presence of intending tenderers who may be present at the time in person or through their authorized representative. In the event of a tender being rejected, the Earnest Money paid with such unaccepted tender shall be refunded to the tenderer by the Financial Adviser and Chief Accounts Officer direct.

1.13 i) The tenderer should keep open the validity of the tender normally for 60 days from the date fixed for its opening. However, it is also obligatory for the tenderer to keep the validity open for another 60 days for which request in writing/ telefax/e-mail by the Chief Engineer before the expiry of the original validity would be sufficient intimation. The receipt of the intimation of the Chief Engineer should be acknowledged.

ii) Should any tenderer withdraw his tender before these periods, or make any modification in the terms and conditions of the tender which are not acceptable to the department, the Earnest Money deposited by the tenderer shall be forfeited.

1.14 The tenderer shall visit the site of work in order to acquaint himself with the conditions of the site, the locality and its environment.

1.15 The tenderer shall be deemed to have full knowledge of all documents, site, etc. whether he has inspected them or not. The submission of a tender by tenderer implies that he has read this notice and General Conditions of Contract and has made himself aware of the scope and specifications and other factors bearing on the tender.

## **1.16 Securities:**

1.16.1 Security Deposit (SD) shall be 5% of the Contract value or value of the work done whichever is higher and it shall consist of the following two parts:

- a) **Performance Security** payable on award of the work.
- b) **Retention Money** to be recovered from Running Bills as detailed in Clause 48 of GCC.

The total amount thus deposited towards SD will be retained as security for the due and proper fulfillment of the Contract and will not carry any interest. Such deposit shall be forfeited on failure to perform or non-fulfillment by the Contractor of the terms and conditions of the Contract.

1.16.2 **Performance Security:** The Performance Security retained till end of Defects Liability Period shall be 2.50% of Contract Value or Cost of Work Done, whichever is higher. So, initially 2.50% of the Contract value shall be furnished as Performance Security.

1.16.3 The Performance Security shall be provided by the Contractor to the Employer not later than **14 days** from the date of receipt of work order and shall be furnished in one of the following forms:

- i) Banker's Cheque/Demand Draft/Pay Order of a Scheduled Bank.
- ii) An irrevocable Bank Guarantee(BG) enforceable and encashable at Cochin, drawn from any Scheduled Bank operating in India as per the prescribed proforma.

1.16.4 **The BG furnished towards the Performance Security shall be valid until a date 30 days from the day of expiry of the Defect Liability Period stipulated as per the terms of the Contract.**

1.16.5 Unless Performance Security is furnished within the period as specified above or such extension of that period as may be permitted by the Engineer in writing, the Earnest Money will be liable to forfeiture and the Contract to cancellation.

1.16.6 Performance Security will be released / refunded to the Contractor not later than 30 days from the date of completion of Defect Liability / Warranty Period of the work.

1.16.7 **Retention Money:** Retention Money @ 2.50% shall be retained from each payment due to the Contractor.

1.16.8 Retention Money shall be deducted at 2.50% of the gross amount of the bill from the first Running Account bill onwards till the recovered sum alongwith Performance Security amounts to 5% of the Contract value or the value of the work done whichever is higher at all times. Retention Money shall be refunded to the Contractor within 14 days from the date of payment of final bill.

1.16.9 The Performance Security retained till end of Defect Liability Period shall be 2.50% of Contract Value or Cost of Work Done, whichever is higher.

- 1.16.10 If the Cost of Work done exceeds the Contract Value, the total amount retained as Security Deposit considering the Performance Security initially submitted together with the Retention Money recovered from the running account bills, shall amount to 5% of the Cost of Work done.
- 1.16.11 In cases where cost of Work done exceeds the Contract Value While releasing the Retention Money after payment of Final Bill, only 2.50% cost of Work Done is released, instead of the entire Retention Money recovered from the bills. The balance amount shall be retained to make up for the shortage in the Performance Security , upon completion of the Defects Liability Period.
- 1.17 EMD shall be refunded to the Contractor on acceptance of Performance Security and entering into agreement.
- 1.18 In the event of the tenderer, after the issue of the communication of acceptance of offer by the Board, failing /refusing to execute the agreement as hereinafter provided, the tenderer shall be deemed to have abandoned the Contract and such an act shall amount to and be construed as the Contractor's calculated and willful breach of the Contract, the cost and consequence of which shall be to the sole account of the tenderer and upon such an event, the Board shall have full right to claim damages therefore either together with or in addition to the forfeiture of Earnest Money Deposit.
- 1.19 **Signing of Agreement:**
- 1.19.1 The successful tenderer will be required to execute within **21 days** from the date of receipt of work order, an agreement at his expense on proper value Kerala State Stamp Paper in the prescribed departmental form, consisting of:
- a) The Tender Notice, all the documents including additional conditions/specifications and drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading there to, and
  - b) General Conditions of Contract-2016 (GCC), for the due and proper fulfillment of the Contract.
- 1.19.2 The Contractor shall make 10 copies of the Agreement and submit to CoPT within 7 days following the date of signing of Agreement.
- 1.20 Till signing of agreement the tender together with the acceptance letter shall constitute a binding Contract between the Contractor and Cochin Port.
- 1.21 Failure to comply with conditions **1.13, 1.16 and 1.19** above will entail forfeiture of the Earnest Money.
- 1.22 Tenders received shall be considered for acceptance, only if it meet the Minimum Qualification Criteria stipulated below:

**Minimum Qualification criteria required for considering tenders:**

**(i) Experience:**

The tenderer should have successfully completed at least:

one similar work of value not less than Rs.80.00 lakhs

OR

two similar works, each of value not less than Rs.50.00 lakhs

OR

three similar works, each of value not less than Rs.40.00 lakhs,

during the preceding seven years ending 31<sup>st</sup> October 2019.

**Explanatory notes:**

- (a) Similar work(s) means “**Construction/ maintenance of town ships and OR construction/ maintenance of wharves and OR Construction/ maintenance of Port Structures**”.
- (b) The experience certificate of works executed in private sectors/organizations, shall be considered for qualification, only on submission of TDS certificate along with work order and completion certificate.
- (c) Copy of completion certificates of each work issued by the owner/ responsible officer of the owner under whom he has executed such contract shall be attached. The certificate shall contain details of work involved specifying the nature of work, the completion cost of the work, date of commencement & date of completion of the work.
- (d) The works reckoned for the above purpose are those executed by the tenderers as prime Contractor or proportionately as member of joint venture or sub Contractor. The subcontractor shall be an authorized and approved sub-Contractor by the Employer of the work(s) against which the tenderer has claimed his experience. The tenderer shall attach attested copy(s) of approval issued by the Employer(s) authorizing as a sub-Contractor; in proof of the claim of the tenderer as a sub-Contractor. The tenderer is also obliged to produce the original of the certified copy(s) on request by the department.
- (e) Following enhancement factors will be used for the costs of works executed for bringing the financial figures to a common base value in respect of the works completed in the past years.

Year before	Multiplying factor
One year	1.07



Two years	1.14
Three years	1.21
Four years	1.28
Five years	1.35
Six years	1.42

(ii) **Financial Turnover:**

Average Annual Turnover of the tenderer during the last three financial years ending 31<sup>st</sup> March 2019 shall not be less than Rs.30.00 Lakhs.

In proof of this Audited Annual Accounts Statements or IT returns duly acknowledged by the Income Tax department along with computation statement signed by the Auditor/ Chartered Accountant, for the last three years shall be produced by the tenderer.

1.23 Tenders which do not fulfill all or any of the above conditions or which contain any other condition of any sort including conditional rebates or are incomplete in any respect is liable for rejection. Such tenders shall be entered in the tender opening register but their rates shall neither be read out nor entered in the register. Only remark mentioning the reason of rejection in brief shall be appended against such entry.

1.24 Canvassing in connection with tender is strictly prohibited and tenders submitted by the Contractors who resort to canvassing will be liable to rejection.

1.25 The tenderer shall specify the PAN No. allotted to him so that Chief Engineer/ Executive Engineer can ascertain his liability to the Income Tax Department.

1.26 The tenderer shall furnish documentary evidence in support of Goods & Service Tax (GST) Registration.

1.27 Tender Documents can be seen at Chief Engineer's Office during working hours on all days except on Sundays, second and fourth Saturdays and Public Holidays.

1.28 **Taxes and Duties:**

1.28.1 Deductions towards statutory taxes as per the rules, prevailing in force at the time of payment of bills shall be made while releasing the bill amount.

1.28.2.GST for the work will be paid extra by the Port. The GST applicable as per law can be billed on the Port Trust, which will be paid to the Contractor by the Board along with the bills, for which the Contractor holds valid GST Registration number and the GST is being collected. The following are also to be considered while claiming payment towards GST:

- i. Invoice in specific format should be provided by the Contractor for every payment.
  - ii. GST Registration Number of Cochin Port Trust and the Contractor is to be clearly mentioned with all the bills.
  - iii. Invoice should be attached along with the running bills.
  - iv. The Contractor shall comply all the GST regulations, viz.; timely uploading of invoices and issue of debit/ credit notes.
- 1.28.3. Any stipulation by a tenderer that taxes and duties deductible from these bills should be borne by the Port Trust will result in the summary rejection of his /their tender.
- 1.29 Cess as per Building and other Construction Workers Welfare Cess Act (Act 28 of 1996) at the rate of one percent or at the rates prevailing in force at the time of payment of bills, of the cost of construction should be borne by the Contractor and the same will be deducted from Contractor's bills while making payment or when crediting amount to Contractor's account.
- 1.30 The undersigned reserves the right to reject/cancel/postpone any one or all tenders at any stage of the tender, which will be binding on all bidders.
- 1.31 This Tender Notice shall form part of the Contract.

**Chief Engineer**  
**Cochin Port Trust**  
**For and on behalf of the Board of Trustees of the Cochin Port Trust**

## 2. TENDER FOR WORKS

To

**The Board of Trustees,**

**Cochin Port Trust**

**Through**

**The Chief Engineer**

**Cochin Port Trust, Cochin -9**

I/We hereby tender for the execution of the work specified in the underwritten memorandum within the time specified in such memorandum at the rates specified in the schedule attached hereto and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in 'clause 16' of the General Conditions of Contract and with such materials as are provided for, by and in all other respects in accordance with such conditions so far as applicable.

### MEMORANDUM

- a) General description of work : **Annual Civil maintenance Contract for the year 2019-2020.**
- b) Estimated cost : **Rs. 1 Crore**
- c) Earnest Money : **Rs.1,00,000/-**
- d) Security Deposit : 5% of the value of the Contract awarded or value of the work done whichever is higher. (Performance Security @ 2.50% and Retention Money @ 2.50%)
- e) Percentage, if any, to be deducted from the bills : The Retention Money will be recovered from the first running bill onwards at the rate of 2.50% of the gross amount of each bill. Also refer Clause 1.16 in the Tender Notice.
- f) Time allowed for commencement of work from the date of receipt of work order : **7 days**
- g) Time allowed for the work from the date of commencement of work : **1 Year**
- h) Schedule, specifications, conditions, drawings etc. : As per "Contents" sheet attached.

Should this tender be accepted, I/We hereby agree to abide by and fulfill all the terms and provisions of the said conditions of Contract annexed here to so far as applicable or in default thereof forfeit and pay to the Board the sum of money mentioned in the said conditions and to execute an agreement with the Board in the prescribed form or in default thereof to forfeit the Earnest Money deposited by me/us. The sum of Rs..... has been deposited with Financial Adviser and Chief Accounts Officer of the Port Trust as Earnest Money: (a) the full value of which is to be absolutely forfeited to the Board in office without prejudice to any other rights or remedies of the said Board in office should I/We fail to commence the work specified in the Contract Data or should I/We not deposit the full amount of Performance Security specified in the Contract Data in accordance with clause 52 of the said conditions of Contract otherwise the said sum of Rs. .... shall be retained by the Board as on account of such security deposit as aforesaid; or (b) the full value of which shall be retained by the Board on account of the security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered, upto maximum of the percentage mentioned in Contract Data and those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 40.3 of the Conditions of Contract.

Dated the ..... day of ..... 2019

**Signature of the Tenderer**

Address :

Witness :

Address :

Occupation :

**ACCEPTANCE**

The above tender is hereby accepted by me for and on behalf of the Board.

Dated the .....day of .....2019.

Dated.....

**Chief Engineer**

**Cochin Port Trust**

### **3. CONTRACT DATA**

Items marked “N/A” do not apply in this Contract.

Sl. No.	Description	Reference Cl.No. of GCC												
1	<i>The following documents are also part of the Contract</i>													
	The Schedule of other Contractors ----- i)	(8.2) N.A												
	The Schedule of Key personnel	(9) N.A												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Qualification of Staff</th> <th style="text-align: center;">No.</th> <th style="text-align: center;">Min. Experience (Years)</th> <th style="text-align: center;">Rate of recovery in case of non-compliance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Graduate Engineer or</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">Rs.15,000/- p.m</td> </tr> <tr> <td style="text-align: center;">Diploma Engineer</td> <td style="text-align: center;">1</td> <td style="text-align: center;">5</td> <td style="text-align: center;">Rs.15,000/- p.m</td> </tr> </tbody> </table>	Qualification of Staff	No.	Min. Experience (Years)	Rate of recovery in case of non-compliance	Graduate Engineer or	1	2	Rs.15,000/- p.m	Diploma Engineer	1	5	Rs.15,000/- p.m	
Qualification of Staff	No.	Min. Experience (Years)	Rate of recovery in case of non-compliance											
Graduate Engineer or	1	2	Rs.15,000/- p.m											
Diploma Engineer	1	5	Rs.15,000/- p.m											
2	The Employer is	(1)												
	<b>The Board of Trustees, Cochin Port Trust, Cochin -9</b>													
	Name of Authorized Representative:													
	Name: <b>Dr. M. Beena, Chairperson, Cochin Port Trust, Cochin -9.</b>													
3	The Engineer is:													
	Name : <b>Shri. G. Vaidyanathan, Chief Engineer, Cochin Port Trust, Cochin-9.</b>													
	The Nominee/ Engineer-in-Charge is:													
	Name : <b>Smt. C.S.Rekha, Exe. Engineer(CM-I)</b>													
4	<b>Name of Contract: “Annual Civil maintenance Contract for the year 2019-2020. Tender No: T6/T-1905/2019-C</b>	(1)												
5	10 copies of Contract Agreement shall be furnished by													

Sl. No.	Description	Reference Cl.No. of GCC				
	the Contractor	[7.1]				
6	Tender Document and other data are available at : <b>Chief Engineer's Office,</b> <b>Cochin Port Trust, W/Island,</b> <b>Cochin – 682009, KERALA.</b>	(7.2)				
7	The Intended Completion Date for the whole of the Work is <b>4 months</b> with the following milestones:	(17.28)				
8	Milestone dates: <table border="1" data-bbox="342 779 1081 993"> <tr> <td data-bbox="342 779 716 894">Physical works to be completed</td> <td data-bbox="716 779 1081 894">Period from the date of receipt of LoA to proceed with the work</td> </tr> <tr> <td data-bbox="342 894 716 993">4 months</td> <td data-bbox="716 894 1081 993">7 days</td> </tr> </table>	Physical works to be completed	Period from the date of receipt of LoA to proceed with the work	4 months	7 days	
Physical works to be completed	Period from the date of receipt of LoA to proceed with the work					
4 months	7 days					
9	The following shall form part of the Contract Document: (1) Form of Agreement (2) Letter of Acceptance (3) Contractor's Bid (4) Contract Data (5) General Conditions of Contract ( GCC) (6) Instructions to Tenderers (7) General Description and Special Conditions of Contract (8) Detailed Specifications for Materials and Works (9) Drawings (if any) (10) Schedule of quantities and (11) Any other documents listed in the Contract Data as forming part of the Contract. (12) Correspondence exchanged after the opening of the Bid and before the issue of Letter of Acceptance by which the Condition of Contract are amended, varied or modified in any way by mutual consent	(2.3)				
10	The Contractor shall submit a Program for the Works within <b>7 (Seven) days</b> of date of the Letter of Acceptance.	(27)				
11	The site possession date: The site will be handed over within <b>7 (Seven) days</b> after	(21)				

Sl. No.	Description	Reference Cl.No. of GCC
	receipt of LoA and the site is free from encumbrances.	
12	The Start Date shall be within <b>7 (Seven) days</b> from the date of receipt of the Letter of Acceptance (LoA) by the Contractor.	(1)
13	The site is located at W/ Island	
14	The Defects Liability Period is : One year from the date of completion of work.	(35)
15	The minimum insurance cover for physical property, injury and death is <b>Rs.10 lakhs (Rupees Ten lakhs)</b> per occurrence with the number of occurrences unlimited. After each occurrence, Contractor will pay additional premium necessary to make insurance valid always.	(13)
16	The following events shall also be Compensation Events: -----	(44) N/A
17	The period between Programme updates shall be <b>30 days</b>	(27)
18	The amount to be with held for late submission of an updated Programme shall be Rs..... (Rupees.....)	(27) N/A
19	The language of the Contract documents is <b>English.</b>	(3)
20	The law, which applies to the Contract, is the law of Union of India.	(3)
21	The currency of the Contract is <b>Indian Rupees.</b>	(46)
22	The proportion of payments retained (Retention Money) shall be 5% from each bill subject to a maximum of 5% of the Contract price or value of the work done whichever is higher.	(48)
23	The maximum amount of Liquidated Damages for the whole of the works is 10% of the Contract Price.	[49]
24	The amounts of the advance payments : The advance payments as applicable to the Contract are: -----	[51] N/A
25	Repayment of advance payment for mobilization : -----	[51] N/A
26	Repayment of advance payment for Construction and Equipment: -----	[51] N/A
27	Repayment of Secured Advance: -----	N/A
28	The date by which “As Built Drawings” are required is within -- days of issue of certificate of completion of whole or section of the work, as the case may be.	(58) N/A

Sl. No.	Description	Reference Cl.No. of GCC
29	The amount to be withheld for failing to supply “As Built Drawings” and/or operating and maintenance manuals by the date required is Rs..... (Rupees -----)	(58) N/A
30	Schedule of Rates Applicable: CPWD DSR 2018 + 55% Cost Index X 0.8768 for deducting GST	
31	<p>Base Rate for materials to be considered for price variation :-----</p> <p>(i) Cement consumed for various items of work : Rs.....per tonne</p> <p>(ii) Reinforcement steel used under various items : Rs..... per tonne</p> <p>(iii) Structural Steel used under various items: Rs..... per tonne</p> <p>(iv) Bitumen under various items in: Rs..... per tonne</p> <p>(v) Bitumen Emulsion (MS&amp;RS) under various items in: Rs..... per tonne</p>	<p>(47)</p> <p>N/A</p>
32	<p>Permissible wastage on theoretical quantities of</p> <p>(a) Cement : 2%</p> <p>(b) Steel Reinforcement and structural steel sections for each diameter, section and category : 5.99%</p> <p>(c) Bitumen/Bitumen Emulsion : 2.5%</p>	(47)



## 4. INSTRUCTIONS TO TENDERERS

- 4.1 Electronic Tenders (e-tenders) on percentage basis under “Two Cover system” are invited for “**Annual Civil Maintenance Contract for the year 2019-2020.**” The tenderer shall submit the tender Cover-A (Hard Copy of EMD & Cost of Tender form). All the Technical Bid documents & Price Bid shall be submitted “**online**”.
- 4.2 The Tender Document will be available as three separate files in the e-tendering Portal:
- i. A. Technical Bid Documents (as per Sl. No 1 to 7 of the Contents sheet)
  - ii. B. Price Bid: Schedule of quantities of Work- Schedule-A and
  - iii. C. General Conditions of Contract-2016
- 4.3 The tenderer shall upload the documents indicated in 4.2 (i) & (iii) above and also the Schedule of Quantities(Percentage) [as per Cl.4.3(ii), duly filled in, “**online**”.

### 4.4 SUBMISSION OF TENDERS

- 4.5.1 The Cover A shall contain – hard copy of EMD as described in Clause 1.9.1 of Tender Notice & Cost of Tender form as mentioned in Clause 1.2 of Tender Notice shall be submitted before **15.00 Hrs on 17/12/2019.**

#### 4.5.2 Technical Bid (Online mode)

Technical Bid shall contain all technical and commercial details except Schedule of Quantities. It shall consist scanned/ soft copies of the following documents.

- a) A covering letter from the tenderer enlisting the enclosures/ attachments.
- b) Original Tender Document (Technical Bid) except Schedule of Quantities.
- c) Copy of the documents in proof of fulfillment of the Minimum Qualification Criteria.
- d) Copy of PAN Card, ESI/EPF & GST Registration documents.
- e) Copy of Authorisation documents of Signatory of the bid in case of Registered Partnership firm / Limited company
- f) Partnership deed or Memorandum and Article of Association of the company and registration certificate of the company as the case may be.
- g) Any other relevant document.

4.5.2.3 Scanned copies of all documents as per Clause 4.5.2, EMD and Cost of Tender Form shall be submitted as “Technical Bid”.

4.5.2.4 Departmental Tender Document (except Schedule of Quantities), along with scanned copies of Cost of Tender form, EMD and other documents as per Clause 4.5.2 shall be submitted ‘online’ before 14.30 hrs of opening date of the Tender. **In no case shall filled in Price Bid - Schedule of Quantities be submitted in hard copy, as it shall result in rejection of the tender.**

#### **4.5.3 Price Bid:**

4.5.3.1 Price Bid shall contain only the “Schedule of Quantities”, which shall be submitted only in e-tendering mode.

4.5.3.2 **Tenderer should ensure that his tendered percentage as per ‘Price Bid’ is not mentioned anywhere in any other documents, directly or indirectly. If any such mention is made, the tender will become invalid and shall become liable for rejection.**

4.5.3.3 Tenderer shall quote the percentage in figures with Above/Below the departmental rate in the last page of Price Bid, where space provided.

#### **4.6 PRE-QUALIFICATION CRITERIA**

4.6.1. Selection criteria for qualifying the tenderers for opening the Price Bids in Cover ‘B’ of the tender will be as below:

(i) **Experience :**

The tenderer should have successfully completed at least one similar work of value not less than Rs.80.00 lakhs

OR

two similar works, each of value not less than Rs.50.00 lakhs

OR

three similar works, each of value not less than Rs.40.00 lakhs,

during the preceding seven years ending 31<sup>st</sup> October 2019.

#### **Explanatory notes:**

a) Similar work(s) means **“Construction/ Maintenance of Townships and OR Construction/ maintenance of Wharves and OR Construction/ Maintenance of Port Structures”**.

b) Copy of completion certificates of each work issued by the owner/responsible officer of the owner under whom he has executed such

contract shall be attached. The certificate shall contain details of work involved specifying the nature of work, the completion cost of the work, date of commencement & date of completion of the work.

- c) The experience certificate of works executed in private sectors/ organisations, shall be considered for qualification, only on submission of TDS certificate along with work order and completion certificate.
- d) The works reckoned for the above purpose are those executed by the tenderers as prime Contractor or proportionately as member of joint venture or sub Contractor. The sub-Contractor shall be an authorized and approved sub-Contractor by the Employer of the work(s) against which the tenderer has claimed his experience. The tenderer shall attach attested copy(s) of approval issued by the Employer(s) authorizing as a sub-Contractor; in proof of the claim of the tenderer as a sub-Contractor. The tenderer is also obliged to produce the original of the certified copy(s) on request by the department.
- e) Following enhancement factors will be used for the costs of works executed for bringing the financial figures to a common base value in respect of the works completed in the past years.

Year before	Multiplying factor
One year	1.07
Two years	1.14
Three years	1.21
Four years	1.28
Five years	1.35
Six years	1.42

(ii) **Financial Turnover:**

Average Annual Turnover of the tenderer during the last three financial years ending 31<sup>st</sup> March 2019 shall not be less than Rs.30.00 Lakhs.

In proof of this Audited Annual Accounts Statements or IT returns duly acknowledged by the Income Tax department along with computation statement signed by the Auditor/ Chartered Accountant for the last three years shall be produced by the tenderer.

**4.7. OPENING AND EVALUATION OF TENDERS**

- 4.7.1 Cover 'A' containing the **EMD and cost of tender form** shall be opened at **15.00 hrs. on 25/11/2019**, the last date fixed for receiving the bid, in the SE's chamber in the presence of the tenderers or their representatives as may be present. Scanned copy of EMD & Cost of Tender form submitted online also opened at 15.00 Hrs on 25/11/2019. Technical Bid documents of only those tenderers shall be opened whose documents furnished in Cover A is found in order.

4.7.2 After opening the Technical Bid documents, it shall be thoroughly checked for completeness with respect to the details stipulated to be submitted as Technical Bid by the tenderer. The Price Bid of those tenderers satisfying the tender requirements shall only be opened. The Price Bid of those tenderers who are found responsive and satisfactory on evaluation of Technical Bid documents, will be opened after bringing all tenderers to the same footing and giving notice to the short listed tenderers, on a date to be decided and intimated later.

#### **4.8 GENERAL INSTRUCTIONS TO TENDERERS**

4.8.1 The submission of a tender by tenderer implies that he has read whole Tender Documents including the General Conditions of Contract ( GCC) -2016.

4.8.2 The tenderer is expected to examine the Tender Documents including all conditions, specifications, forms etc. and also conditions in the G.C.C. Failure to furnish the information required in the Tender Document / G.C.C or submission of a tender not conforming to the requirements in every respect, is likely to result in the rejection of the tender.

4.8.3 Incomplete tenders or tenders not in the prescribed format shall be liable for rejection.

4.8.4 Cochin Port will not take responsibility for any delay in receipt or non-receipt of the bidding document.

4.8.5 The tenderers shall inspect the site of work with prior appointment with the Engineer's Nominee for the work to get himself acquainted with the site conditions and to assess and satisfy himself of the difficulties and constraints which may be involved in executing the work in the location. It will be deemed that prior to the submission of tender, the tenderer has visited the site and has satisfied himself as to the nature and location of the work, general and local conditions, particularly those pertaining to transportation, handling and availability and storage of materials, availability of labour, working conditions etc. and that the tenderer has estimated his cost accordingly and the Port Trust will be in no way responsible for the lack of such knowledge and also consequences thereof to the tenderer.

4.8.6 All costs, charges, and expenses that may be incurred for the submission of the tender shall be borne by the tenderer and the Board accepts no liability whatsoever thereof. Tenderer shall rely on his own judgement, skill and expertise in all matters connected with the tender and submission thereof.

4.8.7 The tenderer shall make their own arrangements for obtaining all licenses, permits etc, if any that may be required in connection with procurement of any accessories etc. to be used on the works. The Board shall give only recommendatory assistance for the same with no obligation thereafter. Obtaining necessary licence and permits shall be the responsibility of the Contractor. Contractor will not be entitled to any claim on the Board on the ground that the Board did not afford the recommendatory assistance.

- 4.8.8 In case the department desires to inspect the equipments/ machinery for conformation of its availability and capacity etc., necessary arrangements shall be made by the contractor for such inspection at his own cost.
- 4.8.9 The rates for each items shall be all inclusive value of the finished work as per drawings and specifications, covering all labour charges, cost of materials, plants, equipment etc., transportation cost and all duties, taxes and other levies but excluding GST as applicable at the time of tendering and shall be multiples of ten paise.
- 4.8.10 The tenderer shall quote for the work on percentage basis. The departmental rate for each item of work is given in the Schedule of Quantities. The tenderer shall fill the percentage above or below the Departmental rate, in the column provided for the purpose in the Schedule.
- 4.8.11 In case of discrepancy between the specifications and the drawings, the following order of preference shall be observed for execution of works.
- a) Drawings.
  - b) Conditions and specification of tender.
  - c) B.I.S. Specifications / MORT & H's specifications.
  - d) Sound Engineering Practice.
- 4.8.12 If there are varying or conflicting provisions made in any document forming part of the Contract, the Chief Engineer, Cochin Port Trust, Cochin-682009 shall be the deciding authority with regard to the intention of the document which will be binding on the tenderer / Contractor.
- 4.8.13 Any error in description, any omissions there from shall not vitiate the Contract or release the Contractors from the execution of whole or any part of the works comprised therein according to drawing and specifications or from any of his obligations under the Contract.
- 4.8.14 The Chief Engineer, Cochin Port Trust shall have the right to omit or suspend certain items of work or revise or amend the Tender Documents at any time prior to the due date of submission of the tender. Such revisions or amendments or extensions if any, shall be communicated to all the bidders who have downloaded the Tender Documents, in the form of an addendum by telefax /e-mail / writing. In order to afford the Bidders with reasonable time to take addendum into account, or for any other reason, the Port Trust may, at its discretion, extend the due date for submission of tender.
- 4.8.15 All payments due to the Contractor under this Contract will be made in Indian Rupees only.
- 4.8.16 Tenders received after the date specified for submission shall not be opened.

4.8.17 The Bank Guarantees (BGs) to be furnished by the Contractors in connection with the tender shall be sent to by the Chief Engineer, Cochin Port Trust directly by the issuing bank under registered post with AD. The Contractor shall take the responsibility of sending BGs directly to the Port Trust by the issuing bank.

**SIGNATURE OF TENDERER.**

## **5. GENERAL DESCRIPTION AND SPECIAL CONDITIONS OF CONTRACT**

### **5.1 SCOPE OF WORK**

5.1.1 The scope of this contract covers the following:

Part-A Labour oriented miscellaneous civil works- Rs.15 lakhs.

Part-B Material & labour involved miscellaneous nature work-Rs.55 lakhs.

Part-C Road repair works- Rs.20 lakhs.

Part-D Supply of building construction materials-Rs.5 lakhs.

Part-E Supply of skilled/ unskilled labours-Rs.5 lakh.

5.1.2 The contract is for Civil Maintenance works / supply to be carried out in all areas under the jurisdiction of Cochin Port.

5.1.3 It shall include works/ supply at all the areas under the jurisdiction of Cochin Port Trust, Ernakulam Wharf & CFS area on W/Island including Indira Nagar Housing Colony near Palluruthy, Fishing Harbour Project area, South End Reclamation area, Port Quarters at Fort Cochin, Fort Cochin Wharf, Bolghatty, Puthuvypeen, Vallarpadam and OTB at Ernakulam.

5.1.4 The rate of items of work/ supply plus or minus percentage quoted shall be inclusive of all leads and lifts of every nature and no extra claim will be entertained on this account.

5.2 **Work orders of repair works will be issued from time to time as required by the Engineer-in-Charge or his authorised subordinate at the accepted tender percentage over/ below the Port's rates.**

5.3 The work shall be meticulously planned in consultation with the departmental supervisory staff and nearby users, so that minimum inconvenience is caused to the functions of the wharf.

### **5.4 MATERIALS / FACILITIES TO BE PROVIDED BY DEPARTMENT**

#### **5.4.1 CONTRACTOR'S WORK AREA**

Space will be made available to the Contractor free of rent for storing materials and equipments etc., adjacent to the work site for the duration of the Contract. After the work is over, Contractor shall at his cost, reinstate the area by clearing the temporary works, debris etc. as decided by the Engineer's Nominee.

#### **5.5 CONTRACTOR'S RESPONSIBILITY**

5.5.1 The tenderer shall visit the area before tendering. It will be deemed that the tenderer has visited the site and studied the site conditions before submitting the tender. The tenderer should get himself acquainted with the nature and extent of the work. No claim whatsoever will be entertained on the plea of ignorance of difficulties involved in execution of work or carriage of materials etc.

5.5.2 All materials, plants and equipments, required for the work shall be provided

- by the Contractor at his own cost, and shall conform to relevant I.S. Specification unless otherwise specified.
- 5.5.3 Samples of all materials, to be incorporated in the work shall be got approved by the Engineer's Nominee before procurement.
- 5.5.4 The Contractor shall thoroughly study the specifications and errors / omissions/modifications if any shall be brought to the notice of the Engineer – in-Charge well in advance so that a final decision in the matter could be given in time.
- 5.5.5 All labour, skilled or unskilled shall be provided by the Contractor. Settling any dispute with the labour will be Contractor's responsibility. Insurance as per Indian Workmen's Compensation Act for the Contractors' workmen and Public Liability Policy shall be provided by the Contractor at his own cost.
- 5.5.6 The Contractor shall be solely responsible for any damage or injury to the persons or things caused or suffered during the execution of the work and shall be made good or compensated at his own cost.
- 5.5.7 The Contractor shall take all care and precautionary measures for avoiding any kind of damage/accidents in the work site due to any of his reasons. The Contractor shall indemnify the Port against any compensation whatsoever payable to the workmen for accident or loss arising out of and in the course of their employment under this Contract.
- 5.5.8 The work shall be arranged by the Contractor without causing any damage to Port structures. Any damage or accident caused by the Contractor's operation shall be compensated / made good at Contractor's risk and cost to the satisfaction of the Engineer's Nominee of the works, failing which department will do the rectification work and the cost incurred will be recovered from his bill or from security deposit.
- 5.5.9 **The Contractor shall not construct any structure, even of temporary nature, for any purpose at site, except with the written permission of the Engineer's Nominee of the work and any construction so put up shall be removed by the Contractor whenever the Engineer's Nominee calls upon the Contractor to do so.**
- 5.5.10 **The Contractor shall remove all temporary works, clear and make good the site, at his cost to the satisfaction of the Engineer's Nominee before the site is returned to the Port Trust. All materials shall be disposed to any place as pointed out by the Engineer's Nominee of the work and site shall be cleared in every respect at no extra cost after completion of work.**
- 5.5.11 The Contractor shall remove all materials brought to work site / stacked at the work site or anywhere else within the Port area and clear the site at his cost to the full satisfaction of the Engineer's Nominee before the site is returned to the Port Trust. All such materials including debris, tools & plants etc. shall be disposed off to any place as pointed out by the Engineer's Nominee or be taken away from the location and shall be cleared in every respect and to reinstate to its original condition at no extra cost to the Port Trust immediately after completion of the work. In case, any such material is found left in the work site or anywhere in the Port area, rent for the storage space occupied by the Contractor, either for stacking the materials /debris or for areas used for such



purpose but not cleared thereafter, will be recovered as per the prevailing Scale of Rate of Cochin Port Trust, for the rent applicable for open storage space for commercial purpose, for the period for which the area had been occupied by the Contractor. In addition to the above, in case the Port requires the area immediately for its use, Port will repossess the land after restoring it to its original condition, material will be confiscated and disposed off at the risk and cost of the Contractor, after issuing two notices giving 15 days' time each for removing the material. All expenses incurred in this shall be recovered by disposing off the material if any confiscated. If any balance amount still remains to be realized that will be recovered from the Contractor by appropriate means.

- 5.5.12 The Contractor shall observe all safety regulations during the execution of the work. Safety measures, precautions, warning signals etc. shall be taken/provided at the Contractor's cost, as directed by the Engineer-in-Charge of the work. The Contractor shall provide all necessary personnel protection equipments such as helmet, lifeguard, goggles, boots, safety belts etc. to the workmen at his own cost and it shall be the Contractor's responsibility to ensure that they use it while on the work site.
- 5.5.13 The Contractor shall ensure that no labourers with criminal background are engaged for the work.
- 5.5.14 The contractor shall take all precautions for not to damage any cables, pipelines etc. passing through the area of work.
- 5.5.15 **The Contractor shall comply with all the provisions of the Indian Workmen's Compensations Act, Public Liability Policy, Provident Fund Regulations, Employees Provident Fund and ESI Act etc. amended from time to time and rules framed there under and other laws affecting the Contract labour that may be brought in to force from time to time.**
- 5.5.16 **The contractor shall be registered under EPF and ESI Act and the employees employed under them shall be covered in the EPF and ESI scheme, as applicable under the act.**  
**If the number of employees proposed to be engaged in the work is less than the threshold limit under ESI/ EPF act, an undertaking to this effect shall be included in the tender submission.**
- 5.5.17 The Contractor shall provide, at every work place, at which 20 or more women workers are ordinarily employed, crèches of reasonable size and with adequate facility for the use of their children under the age of six years at his risk and cost.

## 5.6 MATERIALS

- 5.6.1 Materials supplied by the contractor shall be of good quality conforming to relevant Indian Standard Specifications. Work should be done strictly in accordance with the Indian Standard Specifications and CPWD specifications.
- 5.6.2 All items of work covered under CPWD – DSR-2014 other than those specified under Schedule of items of this tender, if required, shall be executed by the contractor at the percentage quoted above or below than rates for schedule irrespective of parts.

- 5.6.3 For items of works for which specification are not provided in this tender document, the same shall be executed based on CPWD specification Volume- I & II.
- 5.6.4 Contractor has to make his own arrangements for the supply of all materials required for the work under respective items.
- 5.6.5 Measurement of quantities of work done will be made in accordance with relevant I.S.S. unless otherwise specified.
- 5.7 Only potable water shall be used for carrying out the work entrusted under this contract. Water connection for the labour employed by the contractor and for the use on the works can be had from a convenient point where supply is available. If the contractor wants specific water connection to suit his convenience of the work near the work site, he will be allowed to take connection from the existing water supply line at his own cost. The water connection taken for the work will not be metered. 1% of the cost of the work will be charged towards the cost of the water consumed for the work and labour irrespective of whether the contractor uses the water or not. Where the work is to be done in the place where Port's water supply lines are not available, the contractor has to make his own arrangements for the water required for the work and labour. If the contractor intends to set up a yard for the purpose of executing the work under the contract and water required at this place, the contractor shall provide water from outside at his own cost. Sea or well water can be used for consolidation works. The contractor should arrange the same at no extra cost to the department. The recovery at 1% on the value of the work towards the cost of the water will not be applied in this case.
- 5.8 Royalty or siege, moorage charges as fixed from time to time duties, GST, tolls etc. on all materials quarried or otherwise purchased shall be borne by contractor and are expected to be included in his rates quoted. The percentage quoted shall be firm and shall not be subject to exchange variations, labour conditions, fluctuations in railway freight, any taxation policy of the State or Central Government etc and no claim on this account will be entertained.
- 5.9 Land required for the erection of workshed office etc. shall be given free of rent. Any temporary shed erected shall be removed immediately after the completion of work and the site cleared off to the original condition to the entire satisfaction of the Engineer-in-charge or his authorised subordinate, failing which they shall be caused to be removed by the Department and charges if any, incurred including centage charges shall be recovered from the sales of materials or from the contractor's bill or any other amount due to him. If the Department required the site occupied by the contractor for departmental use he should shift to an alternative site and no compensation will be paid. The temporary shed shall be constructed with non-inflammable materials like A.C sheet, G.I sheet etc.
- 5.10 All claims of the Port against the Contractor whether arising out of this contract or any other transaction or claim what so ever will be recovered from the amount due to the Contractor on account of this contract.
- 5.11 A work order book is to be maintained by the Contractor at the site of works/any orders or instructions issued by the Engineer-in-charge or his

- authorised subordinate shall be entered in the book and shall be deemed to have been legally issued. The Contractor shall sign each entry in token of having seen the orders/ instructions. The work order book shall be returned to the Engineer-in-charge in good condition after the completion of work.
- 5.12 The Contractor shall erect an office room at his own cost at a suitable location as decided by the Engineer-in-charge. The Contractor's representative shall be available at this room for receiving instructions from the Department on during all days during the working hours of the Port. The Contractor should have avail Port's telephone connection from the Port Telephone Exchange with call facility limited under Port's Telephone Exchange area only, with his own cost and arrangements like telephone sets, installation etc. at this office room.
- 5.13 Maintenance work and other sanctioned work costing less than Rs.2,00,000/- may be entrusted for execution under this contract at the discretion of the Engineer-in-Charge.
- 5.14 **This contract shall remain in force for a period of one year from the date of issue of work order.** Any work order placed till the last date of the contract period should be executed by the same contractor, at his tendered rates within a reasonable time fixed for the same and no extra claim will be entertained on this account.
- 5.15 For consolidating cement concrete mechanical vibrator or other suitable machinery may be used unless otherwise permitted by the Engineer-in-charge.
- 5.16 All fittings for doors, windows, sanitary fittings etc. shall be got approved by the Engineer-in-charge before fixing, failing which the contractor may be asked to remove the same and refix with such other material as may be directed by the Engineer-in-charge.
- 5.17 The surplus materials, debris etc. to be transported shall be stacked up to the proper shape and slope to the approved template for measuring before transporting and levelled at unloading place as required at Contractor's own cost.
- 5.18 Each work shall be completed in the stipulated time fixed by the Engineer-in-Charge or his authorised subordinate at the time of issuing the work order. The discretions of the Engineer-in-charge or his authorised subordinate regarding the time limit is final. If the work is not carried out in the stipulated time, action according to general conditions of contract will be taken for the particular work order.
- 5.19 The rate of random rubble masonry work should include cost of dressing the stone as required and no extra will be paid for using dressed stones in masonry pillars, pilasters etc.
- 5.20 The measurement for rolling shutters will be taken only for clear opening. No extra payment will be made for the accessories like drum etc.
- 5.21 The Contractor should note that the rate for items, which do not find place in his contract, will be decided by the Engineer-in-charge based on the rates for similar items or by adding up the rates for relevant items in the contract. No claim on this account will be entertained by the Department.
- 5.22 The contractor should note that either the tor steel or mild steel or combination of both shall be based on the work as desired by the Engineer-in-charge and no

- claim what so ever on this account will be entertained by the Department.
- 5.23 All laps, bends, hooks, chairs etc. in the reinforcement will be measured and paid for.
  - 5.24 All the steel materials and cement shall be stored sufficiently above ground level by providing proper dunnage below.
  - 5.25 Great care shall be taken by the Contractor to prevent displacement or bending of the members of reinforcement. Any displacement shall be adjusted and fixed in position before commencement of concreting at no extra cost to the Department.
  - 5.26 All conversions from metric units to British units and vice versa will be as per I.S.No.786 latest edition.
  - 5.27 The Contractor shall keep the site clean, free from all rubbish offensive matter and other materials not approved by the Engineer-in-charge.
  - 5.28 The percentage above/ below the rates quoted by the Contractor should be inclusive of all labour and materials etc. unless otherwise specified.
  - 5.29 All rules and regulations governing the Cochin Port Trust shall be applicable.
  - 5.30 The site for the work will be handed over to the Contractor as soon as the work order is given. In the case the entire site is not handed over the Contractor, he should programme his work in such a way as not to hamper the progress in any way. No claim for the delay in handing over of the site will be entertained.
  - 5.31 For all R.C.C. works, the decking shall be of steel or other suitable centering materials approved by the Engineer-in-charge.
  - 5.32 All reinforcement shall be cleaned off all loose scales, rusts etc. before in cooperating in the work. Binding wire required for the work shall be procured by the Contractor at his own cost.
  - 5.33 Required number of wooden gutties and pipes will be supplied by the Department and the Contractor has to fix them in places shown for electrical wiring etc.
  - 5.34 Necessary holes are to be left in masonry for G.I. pipes etc. for water supply, sanitary and electrical connections.
  - 5.35 Clear cover of R.C.C. work as specified in drawing supplied to the Contractor or as directed by the Engineer-in-charge shall be clearly maintained by using dense cement mortar 1:1/2 mix spacer blocks and no separate payment will be made for spacer blocks.
  - 5.36 Where welding is needed, electric arc welding or gas welding conforming to I.S.406 of 1964 can be permitted at the discretion of the Engineer-in-charge and shall be done by the Contractor with no extra cost to department.
  - 5.37 Concrete for R.C.C. works necessarily be machine mixed and consolidated with mechanical devices such as vibrator etc. unless specifically allowed otherwise by the Engineer-in-charge.
  - 5.38 No claim for the increase in rates of materials during the currency of contract will be entertained by the Department.
  - 5.39 The Contractor has to obtain necessary passes for himself, his staff and vehicles (to transport the materials) to enter into the security area, for executing the works.
  - 5.40 The General Conditions of Contract and the drawing and schedule of quantities

are to be read in conjunction with these special conditions and specifications and the matter referred to, shown or described in any of the former are not necessarily repeated in the latter.

All materials and workmanship shall conform to appropriate Indian Standard Specifications published by the Indian Standard Institute where they have been formulated or to the specifications even the CPWD Specifications and specification attached here to.

- 5.41 The rates quoted for all concrete work must also include provision of holes etc. required for being handled by equipments, machineries etc. and for fixing fixtures like bolts etc.
- 5.42 For all reinforced concrete works included in the contract detailed drawings, showing the reinforcement and other details will be made available to the Contractor at the time of construction and the work will have to be done according to these drawings.
- 5.43 Bolts, nuts, washers and rivets etc, required for complete erection of form work centering etc. will have to be supplied by the Contractor at his own cost unless other wise specified.
- 5.44 Great care shall be taken by the Contractor to prevent displacement or bending of the members of the reinforcement adjusted and fixed in position before the commencement of concrete. Contractor should clean the reinforcements by wire broom etc. and remove all the rusts and dirt before tying in position.
- 5.45 Cover as specified in the drawing shall be clearly maintained by using cement mortar blocks unless otherwise directed.
- 5.46 Concrete shall not be laid unless the steel grills kept in position are approved.
- 5.47 The cement supplied by the Contractor shall be stored in a dry place over dunnage and properly covered at his own cost and he will be held entirely responsible for any loss or damage.
- 5.48 Only clean, fresh water as approved by the Engineer-in-Charge shall be used in washing metal, mixing and curing concrete. Sufficient storage facilities for the water shall be arranged by the Contractor for the continuous supply of water to the works at his own cost.
- 5.49 The coarse aggregate shall be of hard blue granite quality and the fine aggregate shall be of good clean sharp river sand.
- 5.50 Sufficient stocks of aggregates shall be kept at the site to ensure continuity of the work. Different types and sizes of aggregate shall be stored separately and in such a way as to eliminate any contamination by dirt or earth or other impurities.
- 5.51 Concrete mixes specified in schedule are nominal mixes and the quantity of the cement used in each grade of concrete should not be less than those given below:

<u>No</u>	<u>GRADE OF MIX</u>	<u>QUANTITY OF CEMENT PER CUBIC METRE</u>
<b>1:1 ½: 3</b>	<b>(1cement: 1 ½ sand: 3, 20 mm granite metal</b>	<b>400 kg.</b>

<b>1:3:6</b>	<b>(1cement: 3 sand: 6, 40 mm granite metal)</b>	<b>220 kg.</b>
<b>1:2:4</b>	<b>(1cement: 2 sand: 4, 20 mm granite metal)</b>	<b>320 kg.</b>
<b>1:4:8</b>	<b>(1cement: 4 sand: 8, 40 mm granite metal)</b>	<b>170 kg.</b>
<b>(1:3:6) with 20 mm size graded metal</b>		<b>220 kg.</b>
<b>Mix higher than 1:1 ½:3 if required, proportion shall be designed for the same as per IS 456 &amp; IS 10261</b>		

- 5.52 The concrete shall be mixed in the standard mechanical mixers of sufficient capacity. The mixing, transporting, placing in position and vibrating and curing shall conform to I.S.No.456 of 1964.
- 5.53 Unless otherwise approved to all concrete works must be vibrated with suitable vibrator and only experienced and skilled workmen shall be allowed to handle the vibrating machinery. Care must be taken to avoid segregation by excessive vibration.
- 5.54 No concreting will be allowed during period of rain unless permitted by the Engineer-in-charge.
- 5.55 Construction joints in concrete shall be in position approved by the Engineer-in-charge. At the construction joints, where the first poured concrete has set hard and skin or laitance shall be removed and the surface roughened by hacking with hammer, and through wire brushing. It shall then be thoroughly washed and when the surface is still moist, it will be covered with a layer of 1:1 cement mortar of not less than 3mm thick which must be vigorously stippled into the surface by means of suitable stiff brush, the depositing of fresh concrete following on closely. Care should be taken as not to damage the laid concrete.
- 5.56 Care must be taken not to disturb the concrete by direct or indirect loading, striking of forms or other wise until it has hardened sufficiently. Normally bottom shuttering shall not be stripped earlier than 14 days and the side shuttering not earlier than one day unless other wise approved by the Engineer-in-charge.
- 5.57 The form work shall conform to the shape, line and dimension as shown in the plans and be so constructed as to remain sufficiently tight to prevent loss of liquid from the concrete. All form work and supports shall be designed by the Contractor and must be approved by the Engineer-in-charge. All rubbish particularly chipping shaving saw dust loose metal or concrete shall be removed from the interior of form work before the concrete is placed and the formwork in contact with the concrete shall be cleaned and an approved form oil applied thoroughly. Care should be taken that the form oil is out of contact with the reinforcement. Concreting shall be start only after the formwork is checked and approved.
- 5.58 **CURING**
- 5.57.1 Unless otherwise specified all concrete and masonry & plastering should be kept wet and properly cured with fresh water for not less than 14 days and 7

days respectively after its construction at the Contractor's cost. If curing is not done properly the Department will be at liberty to engage labour for curing and the expenditure incurred will be recovered from the Contractor's bills. The decision of the Engineer-in-charge will be final on this.

5.59 **SURFACE TREATMENT**

All concrete surface must be reasonably smooth and true and impressions, fins, etc. that may occur from the formwork shall be removed and treated with cement mortar 1:1 ½ mix. A final cement wash is to be given in the exposed surface without extra payment whenever so ordered to be done by the Engineer-in-charge.

5.60 **WORKING TIME**

The normal working time of the Port Trust is from 8 a.m. to 4.00 p.m. on all weekdays. If the Contractor wishes to carry out the work beyond normal working hours and or on holidays, he should get specific approval from the Engineer's Nominee for the same. Necessary supervision will be arranged by the department and the expenditure to be incurred in this connection will be borne by the department.

5.61 **RATES FOR VARIOUS ITEMS**

The rate specified for each item shall be all inclusive value of the finished work, income tax and other taxes prevailing but excluding GST.

5.62 **ALTERATIONS / ADDITIONS / OMISSIONS**

The quantities given in the bill of quantities (Schedule of items) are only approximate and payment will be made as per actual quantity of work done and rate specified.

5.63 **MEASUREMENT**

The quantities shall, unless otherwise stated, be measured in accordance with I.S.1200.

5.64 For levying compensation as per Clause-49 of General Conditions of Contract (GCC), the Employer is not required to have documentary evidence to quantify or prove the losses suffered by the Employer due to delay in completion of work by the Contractor, as per conditions.

5.65 Clause-25 of GCC- 'Settlement of Disputes and Arbitration' is not applicable in this Contract.

5.66 Clause-26 of GCC- 'Computerised Measurement Book' is modified to the extent as detailed below.

5.67 **Measurements of Work Done:**

Executive Engineer (hereinafter called the Engineer's Nominee) shall, except as otherwise provided, ascertain and determine by measurement the value in accordance with the Contract of work done.

All measurement of all items having financial value shall be entered in Measurement Book and/or level field book so that a complete record is obtained of all works performed under the Contract.

All measurements and levels shall be taken jointly by the Engineer's Nominee or his authorised representative and by the Contractor or his authorised representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer's Nominee and the Contractor or their representatives in token of their acceptance. If the Contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.

If for any reason the Contractor or his authorised representative is not available and the work of recording measurements is suspended by the Engineer's Nominee or his representative, the Engineer's Nominee and the Department shall not entertain any claim from Contractor for any loss or damages on this account. If the Contractor or his authorised representative does not remain present at the time of such measurements after the Contractor or his authorised representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer's Nominee or his representative shall be deemed to be accepted by the Contractor.

The Contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.

The Contractor shall give not less than seven days' notice to the Engineer's Nominee or his authorised representative in charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer's Nominee or his authorised representative in charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer's Nominee's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.



Engineer's Nominee or his authorised representative may cause either themselves or through another officer of the department to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this Contract that recording of measurements of any item of work in the measurement book and/or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the Contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

5.68 **Clause 45 and Clause 80 of GCC shall be modified as below;**

**Clause 45-Rates for items to be inclusive of Taxes** The rate quoted by the Contractor shall be inclusive of the cost of provision of plant and equipment, materials, labour, execution, supervision, maintenance, overheads and profits and every incidental and contingent cost and charges whatsoever excluding Goods and Service Tax (GST). GST as may be applicable from time to time shall be shown separately in the invoice. The Employer will perform such duties in regard to the deduction of such taxes at sources as per applicable law. Any new Taxes, levies, duties imposed after signing the Contract shall be reimbursed by the Employer on production of documentary evidence. The invoice to be submitted by the Contractor should include the GST Registration Number of the Contractor as well as the Employer.

**Clause 80-Taxes and Duties Income Tax** The Contractor and his staff shall be responsible for payment of all personal income taxes to the concerned authorities as per the law in force from time to time. Deduction of Income Tax shall be made by the Employer from each certificate of payment to the Contractor at the rate of 2% plus surcharge or such other rates as may be specified by the Central Government from time to time, on the gross amount of the Contractor's bill for payment. The Contractor shall comply all the GST Regulations viz. timely uploading of bills, issue of debit/ credit notes etc.

5.69 Sub clause **43.2** under **Clause 43: Payments,.....** in GCC 2016 stands amended as given below:

43.2 Payment of bills for Civil Works shall be regulated as detailed hereunder:

43.2.1 Any Interim/Final bill which is incomplete in any respect shall be returned to the Contractor within 5 days of date of submission of bill to the Engineer or his Nominee.

43.2.2 Interim bills shall be paid within 21 days of date of submission of bills in full shape, by the Contractor, as detailed below.

43.2.3 Clarifications/corrections if any required on an Interim bill submitted, shall be sought from the Contractor within 4 days of submission of the bill and also, all such clarifications/corrections required shall be sought at one go except in exceptional circumstances. The Contractor shall submit the clarifications including carrying out corrections in the bill, if required, within 4 days thereafter. The clarified / corrected bill shall be verified and forwarded to Finance Department within the next 4 days. Clarifications if any required by the Finance Department shall be sought within 3 days and the Engineer/Nominee shall clear it on top priority within the next 3 days and, finally, the bill shall be paid to the Contractor within 3 days thereafter, i.e., within a total 21 days of date of submission of bills in full shape, as indicated above.

43.2.4 However, on request by the Contractor, 75% of the bill amount shall be paid within 7 days of submission of the bill. Balance amount of the verified bill shall be paid within 21 days of the submission of the bill, on completion of all contractual requirements as brought out at sub clause 43.2.3. above.

43.2.5 Final bill shall be paid within 3 months of issue of Taking Over Certificate by the Engineer / Nominee, as detailed below.

43.2.6 The Contractor shall submit the Final bill to the Engineer / Nominee within 20 days of issue of Taking Over Certificate by the Engineer / Nominee. The bill shall be checked and all clarifications/corrections required on the bill submitted, shall be sought from the Contractor within 15 days thereafter. The Contractor shall submit the clarifications including carrying out corrections in the bill, if required, within the next 10 days. The clarified / corrected bill shall be verified and forwarded to Finance Department within the next 15 days. Thereafter, clarifications if any required by the Finance Department shall be sought within 10 days and the Engineer/Nominee shall clear it on top priority within the next 10 days and, finally, the bill shall be paid to the Contractor within 10 days thereafter, i.e., within a total 3 months of issue of Taking Over Certificate by the Engineer / Nominee, as indicated above.

43.2.7 However, on request by the Contractor, 50% of the final bill amount shall be paid within 7 days of submission of the bill, which will be adjusted against the final bill payment, on completion of all contractual requirements as brought out at sub clause 43.2.6. above.

**SIGNATURE OF TENDERER**

## **6.SPECIFICATIONS FOR MATERIALS TO BE USED ON THE WORKS**

### **6.1 GENERAL**

- 6.1.1 Except where otherwise specified or authorised by the Chief Engineer or the Engineer- in- charge materials supplied and works executed by the contractor must conform to the latest edition of the Indian Standard Specification and the code of practice published by the Indian Standard Institution. Samples of the materials to be supplied by the contractor shall be shown to the Chief Engineer or his representative sufficiently in advance for the approval for its quality for use on work.
- 6.1.2 All materials supplied shall be stored appropriately to prevent deteriorations or damage from any cause what so ever and to the entire satisfaction of the Chief Engineer or the Engineer- in- charge.
- 6.1.3 The materials required for the work shall be brought to the site and stacked at the places shown by the Engineer-in-Charge and the same shall be got approved for use in work sufficiently advance so that the progress of the work is not affected by the supply of materials.**
- 6.1.4 Payment for the materials supplied, shall be given only after they are used on the work.**
- 6.1.5 Tolls are payable by the Contractor as per rules for vehicles using the Port's road for supplying the materials**

### **6.2 AGGREGATES FOR CONCRETE**

- 6.2.1 Aggregates (fine and coarse) for concrete shall comply with the requirements of I.S. 383 – ‘Specifications for coarse and fine aggregate from natural sources for concrete. Aggregate shall be obtained from sources approved by the Engineer-in-Charge. Aggregates, which are not perfectly clean, shall be washed in clean water to the entire satisfaction of the Engineer-in-Charge.
- 6.2.2 The fine aggregate shall be clean, hard, durable, uncoated, dry and free from injurious, soft or flaky pieces and organic or other deleterious substances.
- 6.2.3 Each type of aggregate shall be stored separately for the approval of Engineer-in-Charge. Wet aggregate delivered at the site shall be kept in storage for at least 24 hours to ensure adequate drainage before being used for concreting.
- 6.2.4 Contractor shall maintain at site at all times such quantities of each type of aggregate as are considered by the Engineer-in-Charge to be sufficient to ensure continuity of work.

### **6.3 CEMENT**

- 6.3.1 Quality of cement used for the work shall be 43 grade ordinary Portland cement conforming to IS: 8112 or 53 grade ordinary Portland cement conforming to IS: 12269 or Pozzolona cement conforming to IS: 1489 unless otherwise approved by the Engineer-in-Charge.

- 6.3.2 The cement required for the work will have to be procured by the contractor and shall comply with the relevant IS. As far as possible, cement shall be procured from government agencies. The cement shall, if required by the Chief Engineer / Engineer-in-Charge, be tested and analyzed by an independent analyst at the Contractor's cost and result produced to the Engineer-in-Charge.
- 6.3.3 Supply of cement shall be taken in 50kg bags bearing manufacture's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant B.I.S codes. In case, test results indicate that the cement arranged by the Contractor does not conform to the relevant B.I.S codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so.
- 6.3.4 A cement godown/store of adequate capacity as directed by the Engineer-in-Charge shall be constructed by the contractors at the site of the work for which no extra payment shall be made. Double lock provision shall be made to the door of the cement godown. The key of one lock shall remain with the Engineer-in-Charge or his authorized representative and the key of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge.
- 6.3.5 The cement brought to the site and cement remaining unused after completion of work shall not be removed from the site without written permission from /of the Engineer-in-Charge.
- 6.3.6 The cement shall be stored in a weather proof building with facilities for inspection.
- 6.3.7 The contractor shall maintain a cement register showing dates of receipt and issue, quantities used daily and balance which shall be accessible to the Engineer-in-Charge.

#### **6.4 STEEL REINFORCEMENT**

- 6.4.1 The reinforcement steel used for the work shall be HYSD bars conforming to IS: 1786 (Grade Fe 415) and the same will have to be procured by the contractor.
- 6.4.2 As far as possible, the reinforcement steel required for the work shall be procured from Steel Authority of India or Rashtriya Ispat Nigam Ltd. in case steel is not available from the above sources, the contractor shall obtain specific approval from the Engineer-in-Charge well in advance for purchase of steel from other sources.
- 6.4.3 The contractor shall have to obtain and furnish test certificates to the Engineer-in-Charge in respect of all supplies of steel brought by him to the site of work. Samples shall also be taken and got tested by the Engineer-in-Charge as per provisions in this regard in relevant BIS codes. In case the test

results indicate that the steel arranged by the Contractor does not conform to BIS codes, the same shall stand rejected and shall be removed from the site of work by the Contractor at his cost within a week's time of written orders from the Engineer-in-Charge to do so.

- 6.4.4 The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- 6.4.5 Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-Charge.

## **6.5 WATER**

- 6.5.1 Clean fresh water free from oils, acids, alkalies, salt, sugar, organic materials or other harmful materials shall be used for washing aggregates, mixing and curing of concrete. The water used shall comply with clause 5.4 of IS: 456-2000. Potable water is generally considered good for mixing concrete.
- 6.5.2 Samples of water arranged by the contractor shall be taken by the Engineer in Charge and got tested in accordance with the provisions of relevant BIS codes. In case test results indicate that the water arranged by the contractor does not conform to the relevant BIS codes, the same shall not be used for any works. The cost of tests shall be borne by the contractor.

## **6.6 BRICKS**

- 6.6.1 Bricks used in the masonry may be Common Burnt Clay Bricks shall conform to IS:1077 and shall be hand moulded or machine moulded. They shall be free from nodules of free lime, visible cracks, flaws warpage and organic matter, have a frog 100 mm in length 40 mm in width and 10 mm to 20 mm deep on one of its flat sides. Bricks made by extrusion process and. Each brick shall be marked (in the frog where provided) with the manufacturer's identification mark or initials.
- 6.6.2 Bricks shall have a minimum compressive strength to 50kg/sq.cm and shall not absorb water more than 20% of its dry weight, when soaked in cold water for 24 hours. The tolerance limit shall be 8 % for absorption.
- 6.6.3 In the case where locally available bricks do not meet standard, contractor shall carryout all the tests specified above on the bricks and submit the test report to the Engineer-in-charge, who will take a final decision on the use of the bricks, which shall be binding.

## **6.7 GLAZED TILES**

- 6.7.1 The tiles shall be of approved make and shall generally conform to IS 15622. They shall be flat, and true to shape and free from blisters crazing, chips, welts, crawling or other imperfections detracting from their appearance. The tiles shall be tested as per IS 13630. Classification and Characteristics of pressed ceramic tiles shall be as per IS 13712. The tiles shall be square or rectangular of nominal size. Table 1,3,5, and 7 of IS 15622 give the modular

preferred sizes and table 2,4,6 and 8 give the most common non modular sizes. Thickness shall be specified by the manufacturer. It includes the profiles on the visible face and on the rear side. Manufacturer/ supplier and party shall choose the work size of tiles in order to allow a nominal joint width upto 2mm for unrectified floor tiles and upto 1mm for rectified floor tiles. The joint in case of spacer lug tile shall be as per spacer. The tiles shall conform to table10 of IS 15622 with water absorption 3 to 6% (Group BII). The top surface of the tiles shall be glazed. Glaze shall be either glossy or matt as specified. The underside of the tiles shall not have glaze on more than 5% of the area in order that the tile may adhere properly to the base. The edges of the tiles shall be preferably free from glaze. However, any glaze if unavoidable, shall be permissible on only upto 50 per cent of the surface area of the edges.

- 6.7.2 Glazed tiles shall be first quality Johnson make or equal make and shall generally conform to I.S. Specification. They shall be flat, true to shape and free from cracks, craxing spots, clipped edges and corners. The glazing shall be uniform shade. The tiles shall be of size not less than 300mm x 200mm. It shall have thickness not less than 4mm.

## **6.8 WOOD**

- 6.8.1 The timber shall be free from decay, fungal growth, boxed heart, pitch pockets or streaks on the exposed edges, splits and cracks. The timber shall be graded as first grade and second grade on the basis of the permissible defects in the timber as given in Appendix 'A' of Chapter 9.0 of CPWD Specification. For both the grades, knots should be avoided over a specified limit.
- 6.8.2 Timber used shall be of good quality well seasoned wood. It shall have uniformly coloured and reasonably straight grains and shall be free from dead knots, cracks and shakes, sapwood and defects of any kind. The species of wood shall be as specified in the schedule of items /drawing.

## **6.9 ALUMINIUM SECTIONS**

- 6.9.1 Aluminium sections used for fixed/openable windows, ventilators, partitions, frame work & doors etc. shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer-in-Charge for technical, structural, functional and visual considerations. The aluminium extruded sections shall conform to IS 733 and IS 1285 for chemical composition and mechanical properties. The stainless steel screws shall be of grade AISI 304. The permissible dimensional tolerances of the extruded sections shall be as per IS 6477 and shall be such as not to impair the proper and smooth functioning/operation and appearance of door and windows. Aluminium glazed doors, windows etc. shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminium work, with the approval of Engineer-in-Charge. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete

fabrication and installation drawings for each type of glazing doors, windows, ventilators and partition etc. for the approval of the Engineer-in-Charge. If the sections are varied, the contractor shall obtain prior approval of Engineer-in-Charge and nothing extra shall be paid on this account.

#### 6.9.2 Anodising

6.9.2.1 Standard aluminium extrusion sections are manufactured in various sizes and shapes in wide range of solid and hollow profiles with different functional shapes for architectural, structural glazing, curtain walls, doors, window & ventilators and various other purposes. The anodizing of these products is required to be done before the fabrication work by anodizing/electro coating plants which ensures uniform coating in uniform colour and shades. The extrusions are anodized up to 30 micron in different colours. The anodized extrusions are tested regularly under strict quality control adhering to Indian Standard.

6.9.2.2 Aluminum sections used shall be of extruded tube and hollow sections of aluminum alloy of INDAL or approved equivalent. Anodizing shall be of 15 microns.

#### **6.10 PARTICLE BOARD**

##### 6.11.1 Pre-laminated Particle Board

A particle board laminated on both surfaces by synthetic resin impregnated base papers under heat and pressure. Pre-laminated particle boards shall conforming to IS 3087 Types-II,

6.11.2 Particle board used shall be 12mm thick melanine faced flat pressed three layers. Stamped IS: 3087 Type II on the edges and surface lamination conforming IS: 12823.

#### **6.11 CERAMIC FLOOR TILES**

6.12.1 Ceramic floor tiles of first quality Johnson/ Khajaria/ Nitco make or equivalent and shall be conforming to IS specification. They shall be flat, true to shape, free from cracks, craxing spots, clipped edges and corners. The glazing shall be uniform shade. The tiles shall be of size and thickness as specified.

**SIGNATURE OF TENDERER**



## **7.SPECIFICATIONS AND CONDITIONS OF ROAD WORK**

### **7.1 SPECIFICATIONS**

#### **7.1.1 GENERAL**

Except where otherwise specified or authorized by the Engineer-in-Charge, all items of works executed by the contractor shall conform to the latest edition of the Bureau of Indian Standard Specifications and code of practices published by the B.I.S. Where no such specifications or code of practice exists the latest B.S.S. codes of practice or any other equivalent / standard code of practice shall also be considered for adoption. The tenderer while indicating any such specifications shall enclose the full set of the publication so referred and not in extracts. Photostats / Xerox copies in duplicate shall be forwarded which shall not be returned to the contractor. In absence of any specification, the department deserves the right to adopt trade specifications and/or sound engineering practices for the specialized work as may be decided by the Engineer-in-Charge which shall be final, conclusive and binding on the contractor.

#### **7.1.2 GRANITE METAL**

The aggregate shall be broken stone chippings. They shall be clean, hard, tough, durable of fairly cubical in shape and free from soft or disintegrated places, organic and other deleterious matter and adherent coatings and should contain no appreciable amount of dust. The 20mm chipping shall pass through 25mm square mesh and retain in 12mm square mesh grading. The 10mm chipping shall pass through 12mm square mesh and retain on 6mm square mesh.

#### **7.1.3 SAND**

Sand supplied shall be of good river sand/crusher run screening of standard grading for fine aggregate.

#### **7.1.4 CRUSHER RUN SCREENING**

**Crusher run screening shall pass 100% through 2.36 mm sieve and 10 to 20 % by weight pass through 75 micron sieve. The same shall be clean, hard, durable, uncoated, dry and free from injurious soft or flaky piece and organic or other deleterious substances.**

7.1.5 The materials required for the work shall be brought to the site and stacked at the places as shown by the Engineer-in-charge and the same shall be got approved and measured for use in work sufficiently in advance so that the progress of the work is not affected by the supply of materials. The stacks shall be according to standard templates. The templates shall be supplied by the Contractor at his expenses and made to dimensions as ordered by the Engineer-in-charge. The sand stack shall be measured only after 48 hours of stacking.

7.1.6 Tolls are payable by the Contractor as per Rules for the craft using the Port's Wharves and for vehicles using the Port's road for supplying the materials.

7.1.7 The tendered rate shall include all charges and duties except GST.

**7.2 QUANTITIES OF MATERIALS TO BE USED FOR VARIOUS WORKS**

The quantities of materials to be used for various items of works shall be as given below.

a)	For 200mm thick rubble soling		
	For 10m <sup>2</sup>		
	Rubble (20-40 dm <sup>3</sup> )	:	1.80m <sup>3</sup>
	Crusher run screening	:	0.60m <sup>3</sup>
b)	For Bitumen premix 80mm		
	For 1m <sup>3</sup>		
	40mm graded granite metal	:	1m <sup>3</sup>
	Bitumen VG 30	:	0.048 Tonne
d)	For Bitumen premix 50mm		
	For 1m <sup>3</sup>		
	20mm graded granite metal	:	1m <sup>3</sup>
	Bitumen VG 30	:	0.048 Tonne
e)	BUSG Bottom layer		
	For 1m <sup>3</sup>		
	40mm graded granite metal	:	1m <sup>3</sup>
	Bitumen VG30	:	0.03 Tonne
d)	BUSG Top layer		
	For 1m <sup>3</sup>		
	40mm graded granite metal	:	1m <sup>3</sup>
	20mm graded granite metal	:	0.26m <sup>3</sup>
	Bitumen VG30	:	0.03 Tonne
e)	Close graded Premix 25mm thick		
	For 10m <sup>2</sup>		
	12mm graded granite metal	:	0.225m <sup>3</sup>
	6mm graded granite metal	:	0.113m <sup>3</sup>
	Crusher run screening	:	0.063
	Bitumen VG30	:	0.024 Tonne
f)	For tack coat using Bitumen VG30 Grade		
i	on WBM surface		
	Quantity for one sq.metre		
	Bitumen VG 30	:	0.75 kg.
ii	On Bituminous surface		
	Quantity for one sq.metre		
	Bitumen VG 30	:	0.50 kg.
g)	For tack coat using Bitumen Emulsion		
i	on WBM/ WMM surface		
	Quantity for one sq.metre		

	Bitumen Emulsion	:	0.40 kg.
ii	On Bituminous surface		
	Quantity for one sq.metre		
	Bitumen Emulsion	:	0.25 kg.
h)	2.50cm Premix Carpet		
	Quantity for 100 m2		
	12.5mm to 13.6mm metal	:	2.25 m <sup>3</sup>
	10mm to 11.2mm metal	:	1.12 m <sup>3</sup>
	Bitumen VG 30 Gade	:	180.00 kg
i)	Seal coat		
	Quantity for 100 m2		
	6mm metal	:	0.90 m <sup>3</sup>
	Bitumen VG 30 Gade	:	98.00 kg
j)	<b>Bituminous Concrete- For 1m3</b>		
	Bitumen VG 30 grade Minimum bitumen content		5% by weight of total mix
	Aggregates and filler		As per mix design
k)	Bituminous Macadam		
	Qty for 1m3		
	Bitumen VG-30		73 kg
	25mm to 10mm metal		0.57m3
	10mm to 5mm		0.57m3
	5mm below		0.28m3
	Total		1.42m3

### 7.3 **SPECIFICATION FOR WORKS**

#### 7.3.1 **DETAILED SPECIFICATION FOR GRANITE ROUGH STONE SOLING**

7.3.1.1. The materials required for the work shall be brought to the site and stacked at the places shown by the Engineer-in-charge and the same shall be got approved for the use in work sufficiently in advance so that the progress of work is not affected by the supply of materials.

- i) Tolls are payable by the Contractor as per Rules for the craft using the Port's Wharves and for vehicles using the Port's road for supplying the materials.
- ii) The tendered rate shall include sales tax/VAT and all other taxes.

#### 7.3.1.2. Granite rough stone for 200mm soling

It shall be hard, durable and generally free from flat, elongated, soft and disintegrated particles. Each stone shall not be more than 28 dm<sup>3</sup> or less than 7dm<sup>3</sup> in volume.

#### 7.3.1.3. MEASUREMENT AND PAYMENT FOR RUBBLE SUPPLY BY WEIGHING.

- a. Measurement and payment for rubble supplied shall be made on the basis of weight of the rubble supplied.
- b. Quantity of rubble in each lorry load shall be found out by weighing each lorry in both loaded and empty condition in the presence of the Engineer-in-charge or his authorised representative.
- c. The approved weigh bridges on W /Island shall alone be used for the purpose of weighing loaded or empty lorries.
- d. Weighing charges of loaded or empty lorries and other charges like tolls etc. shall be borne by the Contractor at his own cost and risk.
- e. The Contractor shall arrange conveyance for departmental personals for witnessing the lorry weighments. No extra payment of this account shall be entertained by the Department. The quoted rate shall include all of the above charges.
- f. Immediately after weighments, the weights shall be recorded in the register maintained in the format approved by the Engineer-in-charge and each entry in the register shall be attested by the initials of the Engineer-in-charge or his authorised representative and the Contractor or his authorised representative.
- g. Weighing slips issued by the weigh bridge office in original together with a photocopy of the same for weighment of each lorry in loaded and empty condition containing the particulars like lorry number, date and time of weighment etc. duly signed by the Contractor or his authorised representative shall be submitted to the Engineer-in-charge on completion of each day's supply for arranging accounting for payment. Department is not in any way responsible for the delay in payment on negligence of the Contractor to submit the above document in the time or loss of the same at his end.
- h. The volume of one tonne rubble of 100 mm size is taken as 0.566 m<sup>3</sup>

7.3.1.4 The stacks for various types of granite metal, sand and laterite gravel shall be according to standard templates. The template shall be supplied by the Contractor at his expenses and made to the dimensions as ordered by the Engineer-in-charge. The sand stack shall be measured only after 48 hours of stacking.

#### 7.3.1.5 SPECIFICATIONS FOR PROVIDING 200 MM THICK GRANITE ROUGH STONE SOLING

- a. All vegetation growth shall be removed and the ground levelled to prepare the sub-grade to required level and camber as directed by the Engineer-in-charge. Any ruts or soft yielding places that have appeared during the

preparation of sub- grade shall be corrected and rolled with a 3 tonne capacity hand roller.

- b. Conveying rubble already supplied and stacked to the prepared sub-grade, hand packing the stones to a uniform depth of 200 mm / 100mm as closely as possible by edging to the required camber of the road surface, dressing the projections are necessary with a hammer to obtain a close fit using 185 dm<sup>3</sup> per square metre of 200 mm soling and 92.50 dm<sup>3</sup> per square metre of 100 mm soling.
- c. The hand packed rough stone shall then be blinded with sand. The sand required for blinding should be brought from out side Willingdon Island and no extra payment will be made towards the cost of sand used for blinding.
- d. After blinding with sand, water shall be pumped profusely and rolled with a 8-10 tonne power roller two times or till a hard smooth finished surface is obtained. The rolling shall begin from the edges with roller running forward and backward until the edges have been compacted. The roller shall then progress gradually from edges towards center uniformly lapping each proceeding rear when tract from one half width.

e. **Measurement**

Measurement for the finished work including the preparation of the sub-grade shall be made for the area on which the work is done. The rate quoted shall include cost of all labour, materials etc. required for the work.

**7.3.2 DETAILED SPECIFICATION FOR BUILT- UP- SPRAY GROUT (BUSG) BASE COURSE**

**7.3.2.1 AGGREGATES FOR BUILT-UP-SPRAY-GROUT(BUSG) BASE COURSE**

- i. Aggregates for Built-up-spray-grout base course shall consist of crushed, granite stone. It shall be clean, strong, durable, of fairly cubical shape and free of disintegrated pieces, organic or other deleterious matter and adherent coatings. The aggregates shall preferably be hydrophobic and of low porosity. The coarse and key aggregates for built-up spray-grout shall conform to the grading given below:

Sieve Designation	Percentage by weight passing the sieve	
	Coarse aggregate	Key aggregate
50 mm	100	
25 mm	35 – 70	
20 mm	----	100

12.50 mm	0 – 15	35 – 70
4.75 mm	----	0 – 15
2.36 mm	0 - 5	0 – 5

### 7.3.2.2 Built-up-spray grout (BUSG) base course

- a. Built-up-spray grout base course is of two layers (Bottom layer and Top layer), composite construction of compacted crushed coarse aggregates with application of bituminous binder after each layer and key aggregates on the top of the top layer, in conformity with the lines, grades and cross sections as directed by the Engineer-in-Charge. This base course is proposed for raising the existing road level. In case it is found necessary to increase the road level only by thickness equal to the top layer it shall be done by applying only the top layer. Further the required raising of road shall be done by providing multiple bottom layers of BUSG finally covered by the top layer. Built-up-spray grout shall not be constructed during rainy weather, when the base is damp or wet or when the atmospheric temperature in shade is 16<sup>0</sup>C.or below.
- b. Bottom layer of BUSG shall be formed as here under. The coarse aggregates in a dry and clean form shall be spread uniformly and evenly at the rate of 0.5 m<sup>3</sup> per 10 m<sup>2</sup>area. The surface of the layer shall be carefully checked with templates and all high and low spots remedied by removing or adding aggregate as may be required. Immediately after spreading aggregates, the entire surface shall be rolled with a 8-10 tonne smooth wheeled roller. The binder shall be heated to the temperature approved by the Engineer-in-Charge and sprayed on aggregate layer prepared as above at the rate of 15 kg./10m<sup>2</sup> in a uniform manner with the help of mechanical sprayers. The first bottom layer of BUSG shall be applied immediately after the application of tack coat.
- c. The top layer BUSG shall be formed as hereunder. Immediately after the first application of binder for the bottom layer, the top layer of coarse aggregate shall be spread uniformly and evenly at the rate of 0.50 m<sup>3</sup> per 10 m<sup>2</sup> area. The surface of the layer shall be carefully checked with templates and all high and low spots remedied by removing or adding aggregates as may be required. Immediately after spreading aggregates, the entire surface shall be rolled with a 8-10 tonne smooth wheeled roller. The binder shall be heated to the temperature appropriate to the grade of bitumen as approved by the Engineer-in-Charge and sprayed on aggregate layer prepared as above at the rate of 15 kg./10m<sup>2</sup> in a uniform manner with the help of mechanical sprayer. Immediately after the application of the binder, key aggregates in a clean and dry state shall be spread uniformly at the rate of 0.13 m<sup>3</sup>/10m<sup>2</sup>, so as to cover the surface completely. The entire surface shall then be rolled with a 8-10 tonne smooth wheeled roller. While rolling is in progress, additional key aggregates, where required, shall be spread by hand. Rolling shall continue until the entire coarse is thoroughly completed and the key aggregates are firmly in position.
- d. Measurement for bottom layer and top layer of BUSG shall be made under separate heads and paid for accordingly. Measurement for bottom layer and

top layer shall be made on the basis of volume of coarse aggregate used on the work. The rate quoted shall include cost of all materials, labour, hire charges for plants equipments etc.

### **7.3.3 APPLYING TACK COAT INCLUDING PREPARATION OF BASE**

- a. The existing surface shall be made free from dust and caked mud. All ruts in potholes shall be picked and all loose and disintegrated materials shall be removed using compressed air. Over the surface thus prepared bitumen mexphalt 60/70 or 80/100 grade heated to temperature appropriate to the grade of bitumen shall be sprayed at the rate of 5-kg/10 m<sup>2</sup>/ 2.5-kg/10 m<sup>2</sup> using sprayers. For uniform distribution of bitumen the surface shall be brushed evenly. Tack coat shall be applied just ahead of the on coming bituminous construction. Measurement of the finished work under this head shall be made on the basis of the area of the work and rate quoted shall include the cost of labour, materials, plants, equipments etc. required for the surface preparation and tack coat.

### **7.3.4 PROVIDING CLOSE GRADED PREMIX SURFACING 25 MM THICK**

- a. The coarse and fine aggregates to be used for the work shall be mixed with bitumen in the mixing plant in required temperature and transported to the work spot in suitable method as approved by the Engineer in charge. The mix shall be laid and leveled and consolidated to a thickness of 25 mm by rolling using power roller of 8 T to 10T capacity. The rolling shall start immediately after laying the premix. A smooth wheeled roller of 8-10 T capacity shall be used for rolling. Rolling shall commence at the edges and progress towards the center longitudinally except in the case of super elevated and unidirectional cambered sections where rolling shall be carried out from the lower edge towards the higher edge parallel to the center line of the road. After one pass of the roller over the whole area, depressions or uncovered spots should be corrected by adding premix material. Rolling shall be continued until the entire surface is rolled to maximum compaction and all the roller marks eliminated. While rolling wheels of the roller shall be get moist to prevent the mix from adhering to wheels.

### **7.3.5 TACK COAT OF HOT STRAIGHT RUN BITUMEN**

- a. The rate of application of binder which shall be as specified and which shall conform to 16.1.5 of CPWD specification shall depend on the surface on which the premix carpet is to be laid.
  - (i) 0.75 kg/sqm on W.B.M. surface.
  - (ii) 0.50 kg/sqm on existing black topped surface.

ii. **Materials**  
*Bitumen* : This shall be straight-run bitumen of penetration value 80/100 conforming to IS 73 specifications.

iii. **Preparation of Surface**

iv. **Cleaning**

Prior to the application of bitumen, all vegetation, loose sealing compound, caked mud, animal dung, dust, dirt and foreign material shall be removed from the entire surface of the pavement and from existing dummy, construction and expansion joints (wherever existing) by means of mechanical sweepers and blowers, otherwise with steel wire brushes, small picks, brooms or other implements as approved by the Engineer-in-Charge. The material so removed shall be disposed off as directed by the Engineer-in-Charge.

v. **Weather and Seasonal Limitations**

The tack coat shall not be applied nor any bitumen work done during rainy weather or when the surface is damp or wet or when the atmospheric temperature in the shade is not more than 16o C.

vi. **Application of Tack Coat**

*Heating* : Bitumen shall be heated in a boiler to a temperature of 165 deg. C to 175 deg. C and maintained at that temperature. Temperature shall be checked at regular intervals with the help of a thermometer.

*Application of Bitumen* : Hot bitumen shall be applied evenly to the clean, dry surface by means of a pressure sprayer at specified rate. Even and uniform distribution of bitumen shall be ensured. Bitumen shall be applied longitudinally along the length of the pavement and never across it. Excessive deposits of bitumen caused by stopping or starting of the sprayer or through leakage or any other reason shall be suitably rectified.

vii. **Measurements**

Length and breadth shall be measured correct to a cm, along the surface of pavement. Area shall be worked out in sqm correct to two places of decimal.

viii. **Rate**

Rate shall include the cost of all materials and labour involved in all the operations described above.

### 7.3.6 TACK COAT WITH BITUMEN EMULSION

- a. Specification of item C.6 to be followed except Bitumen emulsion (Rapid Setting) of specified grade and consistency to be used at room temperature instead of hot straight run bitumen at following rate.



1. on w.b.m @ 0.4kg/sqm.

2. on bituminous surface @ 0.25 kg/sqm.

### **7.3.7 PREMIX CARPET WITH HOT BITUMEN**

- a. This type of treatment is normally applied on roads where the motor traffic is of medium intensity, but bullock cart traffic is fairly heavy. This treatment is suitable for district roads and for internal and service road in colonies. The consolidated thickness of this type of treatment shall be 2 cm or 2.5 cm as specified. This treatment consists of applying a tack coat on the prepared base followed immediately by spreading aggregates precoated with specified binder to camber and consolidated. Premix carpet shall not be laid during rainy weather or when the base course is damp or wet or, when the atmospheric temperature in the shade is not more than 16oC.

#### **b. Preparation of Surface**

Repairs : Pot holes or patches and ruts in the water bound macadam base or surface course which is to be surface treated, shall be repaired by removal of all loose and defective material by cutting in rectangular patches and replacement with suitable material. For the purpose of repairs the area of pot holes shall be taken upto 0.75 sqm and depth upto 5 cm. All pot holes, patches and ruts upto 2.5 cm deep shall be repaired and brought to level with premix and properly consolidated while those of depths greater than 2.5 cm shall be repaired with similar specifications as adopted originally.

Cleaning : Prior to the application of the binder, all dust, dirt, caked mud, animal dung, loose and foreign material etc. shall be removed 30 cm on either side, beyond the full width to be treated, by means of mechanical sweepers and blowers, if available or otherwise with wire brushes, small picks, brooms etc. The material so removed shall be disposed off as directed by the Engineer-in-Charge. For a water bound macadam surface, the interstices between the road metal shall be exposed upto a depth of about 10 mm by means of wire brushes. The surface shall then be brushed with soft brooms to remove all loose aggregate. Finally the traces of fine dust which get accumulated while brushing shall be thoroughly removed from the surface by blowing with gunny bags.

The prepared surface shall be closed to traffic and maintained fully clean till the binder is applied.

#### **c. Materials**

Grading of stone chipping shall be as per Table 16.17. Binder shall be as specified and shall conform to Table 16.7. Quantities of materials shall be as

given in Table 16.18. A proper record shall be kept to ensure that the daily out turn of work is correlated with the quantity of bitumen used as per proforma given in Appendix 'A' of CPWD Specification.

**Table 16.18**

Consolidated thickness of premix carpet	Binder Hot Bitumen	Stone chippings in Cubic Metre/ 100 Square metre	
		13.2mm	11.2mm
2.50cm	52 Kg/m <sup>3</sup> of 13.20mm size & 56 Kg/m <sup>3</sup> of 11.20mm	2.25	1.12

**d. Tack Coat**

i. The rate of application of binder which shall be as specified and which shall conform to 16.1.5 of CPWD specification shall depend on the surface on which the premix carpet is to be laid.

(i) 0.75 kg/sqm on W.B.M. surface.

(ii) 0.50 kg/sqm on existing black topped surface.

**ii. Materials**

**Bitumen** : This shall be straight-run bitumen of penetration value 80/100 conforming to IS 73 specifications.

**iii. Preparation of Surface**

**iv. Cleaning**

Prior to the application of bitumen, all vegetation, loose sealing compound, caked mud, animal dung, dust, dirt and foreign material shall be removed from the entire surface of the pavement and from existing dummy, construction and expansion joints (wherever existing) by means of mechanical sweepers and blowers, otherwise with steel wire brushes, small picks, brooms or other implements as approved by the Engineer-in-Charge. The material so removed shall be disposed off as directed by the Engineer-in-Charge.

**v. Weather and Seasonal Limitations**

The tack coat shall not be applied nor any bitumen work done during rainy weather or when the surface is damp or wet or when the atmospheric temperature in the shade is not more than 16o C.

**vi. Application of Tack Coat**

**Heating :** Bitumen shall be heated in a boiler to a temperature of 165 deg. C to 175 deg. C and maintained at that temperature. Temperature shall be checked at regular intervals with the help of a thermometer.

**Application of Bitumen :** Hot bitumen shall be applied evenly to the clean, dry surface by means of a pressure sprayer at specified rate. Even and uniform distribution of bitumen shall be ensured. Bitumen shall be applied longitudinally along the length of the pavement and never across it. Excessive deposits of bitumen caused by stopping or starting of the sprayer or through leakage or any other reason shall be suitably rectified.

**e. Preparation of Premix**

The aggregate shall be dry and suitably heated to temperature as directed by Engineer-in-Charge before these are placed in the mixer to facilitate mixing with the binder. Mixers of approved type shall be employed for mixing the aggregates with the bituminous binder. The binder shall be heated to the temperature appropriate to the grade of bitumen approved by the Engineer-in-Charge, in boilers of suitable design avoiding local overheating and ensuring a continuous supply. The aggregates shall be dry and suitably heated to a temperature as directed by Engineer-in-Charge before these are placed in the mixer. After about 15 seconds of dry mixing, the heated binder shall be distributed over the aggregates at the rate specified. The mixing of binder with chippings shall be continued until the chippings are thoroughly coated with the binder. The mix shall be immediately transported from the mixer to the point of use in suitable vehicles or wheel barrows. The vehicles employed for transport shall be cleaned and be covered over in transit if so directed.

**f. Spreading and Rolling**

The premixed material shall be spread on the road surface with rakes to the required thickness and camber or distributed evenly with the help of a drag spreader, without undue loss of time. The camber shall be checked by means of camber boards and inequalities evened out. As soon as sufficient length of bituminous material has been laid, rolling shall commence with 6 to 9 tonne power rollers, preferably of smooth wheel tandem type, or other approved plant. Rolling shall begin at the edges and progress towards the centre longitudinally. Except on the super elevated portions rolling shall progress from the lower to upper edge, parallel to the centre line of the pavement. The consolidated thickness shall not at any place be less than the specified thickness by more than 25%. However, the average thickness shall not be less

than that specified in the item. 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 premixed materials. Rolling shall then be continued until the entire surface has been rolled to compaction and all the roller marks eliminated. In each pass of the roller, preceding track shall be overlapped uniformly by at least 1/3 width. The roller wheels shall be kept damp to prevent the premix from adhering to the wheels and being picked up. In no case shall fuel/lubricating oil be used for this purpose. Rollers shall not stand on newly laid material as it may get deformed thereby. The edges along and transverse of the carpet, 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. Further, the prepared finished surface shall be protected from traffic for 24 hours or such period as may be directed by the Engineer-in-Charge.

**g. Surface Finishing**

The surface regularity both in longitudinal and transverse directions shall be within the tolerances specified in Table 16.19.

**Table 16.19.**

<i>Longitudinal profile Max. permissible undulation when measured with 3 M straight edge</i>	<i>Cross profile Max. permissible variation from specified profile when measured with a camber template</i>
10 mm	6 mm

The longitudinal profile shall be checked during rolling with a three metres long straight edge and graduated wedge at the middle of each traffic lane along the road. Similarly the transverse profile shall be checked with adjustable templates at intervals of 10 metres.

**h. Rectification**

Where the surface irregularity fall outside the specified tolerances the contractor shall be liable to rectify it to the satisfaction of Engineer-in-Charge by adding fresh material and recompacting to specifications where the surface is low. Where the surface is high the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications.

**vii. Measurements**

The length and width of the finished work shall be measured correct to a cm along the finished surface of the road. The area shall be calculated in square

metre, correct to two places of decimal. For record purposes, the measurement for binder and stone chippings shall be taken as specified in 16.4.2.2 and 16.4.3.2 of CPWD specification before they are actually used on the work. Premeasurements of the materials taken for record purposes shall simply serve as a guide and shall not form the basis for payment.

**viii. Rate**

The rate shall include the cost of materials and labour involved in all the operations described above for the particular item.

**7.3.8 WET MIX MACADAM BASE (WMM)**

**a. MATERIALS FOR WET MIX MACADAM**

Aggregates: Coarse aggregate shall be crushed stone.

The aggregates shall conform to the physical requirements set forth in Table 400.10 of MORT&H's Specification for Road and Bridge works.

Grading requirements: The aggregates shall conform to the grading given in Table 6.2 below:

**TABLE 6.2**

**( Table 400.11 of MORT&H 'specification)**

Grading Requirements of aggregates for Wet Mix Macadam

IS Sieve Designation	Percent by weight passing the IS sieve
53.00mm	100
45.00mm	95-100
26.50mm	-
22.40mm	60-80
11.20mm	40-60
4.75mm	25-40
2.36mm	15-30
0.600mm	8-22
0.075mm	0-8

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.

- b. The work consists of providing, laying and compacting clean, crushed, graded aggregate and granular material, premixed with water, to a dense mass for 150mm thick in two layers over granite rough stone soling or on a prepared sub- grade to lines and grades as per drawings and directions of the Engineer-in-Charge.

**c. Construction operations**

**(i) Preparation of base**

The surface of the sub-base to receive the Wet Mix Macadam course shall be prepared to the specified lines and 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 irregularities, where predominant, shall be made good by providing appropriate type of profile corrective course (leveling course) as per Clause 501 of MORT&H's Specification for Road and Bridge works or as directed by the Engineer-in-Charge.

**(ii) 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 of MORT&H's Specification for Road and Bridge works or as directed by the Engineer-in-Charge.

**(iii) Preparation of mix**

(a) Wet Mix Macadam shall be prepared using appropriate methods which shall ensure production of mix of proper and uniform quality as directed by the Engineer in charge.

(b) Optimum moisture for mixing shall be determined in accordance with IS: 2720 (Part-8) after replacing the aggregate fraction retained on 22.4mm sieve with material of 4.75mm to 22.4mm 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.

**(iv) Spreading of mix**

(a) Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared sub 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.

(b) The first layer of mix shall be spread by suitable means so as to get a uniform and level surface as directed by the Engineer-In-Charge. The second layer of mix shall 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 –in-charge shall be used.

(c) 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 shall be tested by depth blocks during construction. No segregation of larger and fine particles should be allowed. The aggregate as spread should be of uniform gradation with no pockets of fine materials.

**(v) Compaction**

- (a) After the mix has been laid to the required thickness, grade and camber, the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100mm, 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/hr.
- (b) In the portions having unidirectional super elevation, 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 1m away from any preceding stop.
- (c) 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 center 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.
- (d) 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.
- (e) 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 materials shall not be permitted.
- (f) Rolling should not be done when the sub grade is soft or yielding or when it causes a wave-like motion in the sub grade. If irregularities develop during rolling which exceed 12mm when tested with a 3 metre straight edge, the surface 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 camber. In no case should the use of unmixed material be permitted to make up the depressions.
- (g) 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)
- (h) 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 be made good to the full thickness of the layer and re-compacted.

**(vi) Setting and drying**

After final compaction of wet mix macadam course, the surface shall be allowed to dry for 24 hours.

**d. Surface evenness**

The surface finish of construction shall conform to the requirements of Clause 902 of MORT&H's Specification for Road and Bridge works or as directed by the Engineer-in-Charge.

**e. Quality control**

For control on the quality of materials and works carried out, relevant provisions of Section 900 of MORT&H's Specification for Road and Bridge works shall apply or as directed by the Engineer-in-Charge.

**f. Measurement for payment**

Wet Mix Macadam course shall be measured as finished work in cubic metres.

**g. Rate**

The contract unit rate for WMM shall be payment in full for carrying out the required operations including full compensation for making arrangements for traffic, furnishing all materials to be incorporated in the work including all royalties, fees, rents wherever necessary and all leads and lifts, all labour, tool, equipment and incidentals to complete the work to specifications, carrying out the required tests for quality control etc.

**7.3.9 PROVIDING BITUMIN PREMIX FOR POT HOLE FILLING**

**a. CONSTRUCTION OPERATIONS**

**Laying shall be suspended while free standing water is present on the surface to be covered, or during rain, fog and dust storms. After rain, the bituminous surface, prime or tack coat, shall be blown off with a high pressure air jet to remove excess moisture, or the surface let to dry before laying shall start. Laying of bituminous mixtures shall not be carried out when the air temperature at the surface on which it is to be laid is below 10°C or when the wind speed at any temperature exceeds 40 km per hour at 2m height unless specially approved by the Engineer-in-Charge.**

**b. BITUMEN PREMIX**

**Over the surface prepared as per clause 'a' above, bitumen premix shall be laid and compacted to the required compaction as per clause 'c' mentioned here under.**

**c. PREPARATION AND TRANSPORTATION OF THE MIX**

**i. MIXING**

Bitumen premix shall be prepared in a hot mix plant of adequate capacity and capable of producing a mix of proper and uniform quality with thoroughly coated aggregates. The temperature of bitumen at the time of mixing shall be in the range of 150°C -165 °C and of aggregate in the range of 125°C -150 °C.

**ii. TRANSPORTING**

Bituminous mix shall be transported in clean insulated vehicles, and unless otherwise agreed by the Engineer-in-charge, & shall be covered while in transit or awaiting tipping. Subject to the approval of the Engineer-in-charge a thin coating of diesel or lubricating oil may be applied to the interior of the vehicle to prevent sticking and to facilitate discharge of the material.



**iii. SPREADING & ROLLING**

Immediately after applying tack coat as above, bituminous mix shall be spread in layers of average thickness of 80mm/50mm over the surface where ever necessary for filling up the pot holes, easening the undulations on the existing surface and making up the surface to the required level and camber. Immediately after spreading the mix, rolling shall be done with 8 to 10 tonne power road roller as directed by the Engineer-in-charge of the work. The roller shall be kept damp to prevent the mix from adhering to the wheels and being picked up.

**iv. MEASUREMENT FOR PAYMENT**

Measurements for the finished work under this head shall be made on the basis of volume of coarse aggregate used for the work and shall include the cost of bitumen, labour, plants and equipments .

**7.4 MATERIALS FOR BITUMINOUS CONCRETE**

**Coarse aggregates**

The coarse aggregates shall consist of crushed rock, crushed granite or other hard material retained on the 2.36 mm sieve. They shall be clean, hard, durable, of cubical shape, dry, free from dust and soft or friable matter, organic or other deleterious matter. The aggregate shall satisfy the physical requirements set forth in Table 500-16 of MORT & H’s specification for Road and Bridge works.

**Fine aggregates**

Fine aggregates shall consist of crushed or naturally occurring material, or a combination of the two, passing 2.36 mm sieve and retained on 75 micron sieve. They shall be clean, hard, durable, dry and free from dust, soft or friable matter, organic or other deleterious matter.

**Filler**

Filler shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement approved by the Engineer-in-Charge. The filler shall be graded within the limits indicated in **Table 500-9** of MORT&H’s Specification for Road & Bridge works below.

**TABLE 6.3**

**(TABLE 500-9 of MORT &H’s specification)**

IS Sieve (mm)	Cumulative percent passing by weight
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.

**Combined grading**

The combined grading of the coarse and fine aggregate and added filler shall fall within the limits shown in Table 500-17 of MORT&H’s Specification for Road & Bridge work below.

**Table 500-17**

Nominal aggregate size	13.2 mm
IS Sieve (mm)	Cumulative % by weight of total aggregate passing
19	100
13.2	90-100
9.5	70-88
4.75	53-71
2.36	42-58
1.18	34-48
0.6	26-38
0.3	18-28
0.15	12-20
0.075	4-10
Bitumen content % by mass of total mix	Min.5.4
Bitumen grade	VG 30 grade

**BITUMINOUS CONCRETE WEARING COURSE**

The work consists of (i) providing 25mm thick Bituminous Concrete Wearing Course on the already prepared surface.

**Mix design**

The mix for bituminous concrete shall be design mix. The mix shall meet the following requirements set out in Table 500-11 of MORT & H’s Specification for Road and Bridge works below.

**Table-2 (Table 500 -11) Requirements for Bituminous Concrete**

Compaction level	75 Blows on each face of the specimen
Minimum stability (KN at 60°C )	9
Marshal flow(mm)	2-4
Marshal Quotient ( stability/ flow)	2-5
Percent air voids	3-5
Percent voids filled with bitumen (VFB)	65-75
Coating of aggregate particle	95% Minimum
Tensile strength ratio	80% Minimum
% Voids in Mineral Aggregate( VMA)	Minimum Percent Voids in mineral aggregate(VMA) are set out in Table 500-13

**Job Mix Formula**

The contractor shall inform the Engineer-in-Charge in writing, at least 7 days before the start of the work, of 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 each is applicable
  - a. Binder type, and percentage by weight of total mixture.
  - b. Coarse aggregates/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 grading of the individual aggregate fractions, and the proportion of each in the combined grade.
- v. The results of tests enumerated in Table 500-11 as obtained by the Contractors.
- vi. Where the mixer is a batch mixer, the individual weights of each type of aggregate, and the binder per batch.
- vii. Test results of physical characteristics of aggregates to be used.

viii. 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-in-Charge for which samples of all ingredients of the mix shall be furnished by the Contractor as required by the Engineer-in-Charge.

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 to the Engineer-in-Charge for approval before the placing of the material.

#### **Plant Trials- Permissible Variation in Job Mix Formula**

Once the laboratory job mix formula is approved, the Contractor shall carry out plant trials at the mixer to establish that the plant can be set up to produce a uniform mix conforming to the approved job mix formula. The permissible variations of the 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 500-18 of MORT& H's Specification for Road and Bridge works below.

These variations are intended to apply to individual specimens taken for the quality control test in accordance with Section 900 of MORT&H's specification for Road and Bridge works.

**Table -3**

**(Table 500-18 of MORT& H's Specification)**

<b>Description</b>	<b>Wearing course (Bituminous concrete)</b>
Aggregate passing 90mm sieve or larger	$\pm 7\%$
Aggregate passing 13.2mm, 9.5mm	$\pm 6\%$
Aggregate passing 4.75mm	$\pm 5\%$
Aggregate passing 2.36mm, 1.18mm, 0.6mm	$\pm 4\%$

Aggregate passing 0.3mm,0.15mm	±3%
Aggregate passing 0.075mm	±1.5%
Binder content	±0.3%
Mixing Temperature	±10°C

Once the plant trials have demonstrated the capability of the plant, and the trials are approved, the laying operation may commence.

### **Laying Trials**

Once the plant trials have been successfully completed and approved, the Contractor shall carryout laying trials, to demonstrate that the proposed mix can be successfully laid, and compacted all in accordance with the specifications hereinafter. The laying trial shall be carried out on a suitable area, approved by the Engineer-in-Charge. The area of the laying trials shall be a minimum of 100 Sq.m of construction, and it shall be similar to that of the proposed road of it shall be in all respects, particularly compaction, the same as the proposed construction on which the bituminous material is to be laid.

The Contractor shall previously inform the Engineer-in-Charge 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.

Once the laying trials have been approved, the same plant and methodology shall be applied to the laying of the material on the work, and no variation of either shall be acceptable, unless approved in writing by the Engineer-in-Charge, who may at his discretion require further laying trials.

### **Construction operations**

Laying shall be suspended while free standing water is present on the surface to be covered, or during rain, fog and dust storms. After rain, the bituminous surface, prime or tack coat, shall be blown off with a high pressure air jet to remove excess moisture, or the surface let to dry before laying shall start. Laying of bituminous mixtures shall not be carried out when the air temperature at the surface on which it is to be laid is below 10°C or when the

wind speed at any temperature exceeds 40km per hour at 2m height unless specially approved by the Engineer-in-Charge.

### **Preparation of base**

The base on which Bituminous concrete material is to be laid shall be prepared as directed by the Engineer-in-Charge. The surface shall be thoroughly swept clean by a mechanical broom, and the dust removed by compressed air. In locations where mechanical broom cannot access, other approved methods shall be used as directed by the Engineer-in-Charge.

### **Applying Tack Coat**

In case the Bitumen Premix surface over which the Bituminous concrete is to be laid is fresh and has not been subjected to traffic or contaminated by dust, a tack coat is not mandatory where the overlay is completed within two days. Otherwise, tack coat shall be provided as directed by the Engineer-in-Charge as per Clause 4 above.

### **Mixing and transportation of the mix**

The provisions as specified in Clause 5.4.1 and 5.4.2 shall apply.

### **Spreading**

The provisions as specified in Clause 5.4.3 shall apply.

### **Rolling**

- (i) Rolling for compaction shall be carried out in accordance with the provisions of clause 5.4.4 and clause 5.4.5.
- (ii) Rolling shall be continued until the specified density is achieved, until there is no further movement under the roller. The required frequency of testing is defined in Clause 903 of MORT & H's Specification for Road and Bridge works.

### **Surface finish and quality control.**

The surface finish of completed construction shall conform to the requirements of Clause 902 of MORT&H's Specification for Road and Bridge works or as directed by the Engineer-in-Charge. For control on the quality of materials and works carried out, relevant provisions of Section 900 of MORT&H's Specification for Road and Bridge works shall apply.

### **Measurement for payment**

- (i) Bituminous concrete shall be measured as finished work in cubic metres on the basis of volume of ingredients premeasured at plant site.

- (ii) For one cubic metre of compacted volume of bituminous concrete, quantity of each type of aggregate and filler and bitumen used for the work shall be as per the proportion of ingredients determined in the mix design.

### **Rate**

The contract unit rate for premixed bituminous courses shall be payment in full for carrying out the required operations including full compensation for, but not necessarily limited to:

- (i) Making arrangements for traffic control.
- (ii) Preparation of the surface to receive the material.
- (iii) Providing all materials to be incorporated in the work including arrangement for stock yards, all royalties, fees, rents wherever necessary and all leads and lifts;
- (iv) Mixing, transporting, laying and compacting the mix as specified.
- (v) All labour, tools, equipment, plant including installation of hot mix plant, power supply units and all machinery, incidental to complete the work to these specifications.
- (vi) Carrying out the work in part widths of the road if so directed by the Engineer-in-Charge.
- (vii) Carrying out all tests for control of quality; and
- (viii) The rate shall cover the provision of bitumen at the rate specified in the contract.
- (ix) The rates are to include for all necessary testing, mix design, transporting and testing of samples, and cores. If there is no laboratory at work site, the Contractor must arrange to carry out all necessary testing at an outside Laboratory, approved by the Engineer-in-Charge, and all costs incurred are deemed to be included in the rate quoted.
- (x) The cost of all plant and laying trials as specified to prove the mixing and laying methods is deemed to be included in the Contractor's quoted rate.

## **8. BITUMINOUS MACADAM**

The work consists of providing 50mm thick of compacted crushed aggregate premixed with a bituminous binder on a previously prepared sub base.

### **Construction operations**

Laying shall be suspended while free standing water is present on the surface to be covered, or during rain, fog and dust storms. After rain, the bituminous surface, prime or tack coat, shall be blown off with a high pressure air jet to remove excess moisture, or the surface let to dry before laying shall start. Laying of bituminous mixtures shall not be carried out when the air temperature at the surface on which it is to be laid is below 10°C or when the

wind speed at any temperature exceeds 40 km per hour at 2m height unless specially approved by the Engineer-in-Charge.

**Preparation of base**

The base on which Bituminous Macadam is to be laid shall be prepared, shaped and compacted to the required profile in accordance with clause 501.8 and 902.3 of MORT&H’s Specification for Road and Bridge works or as directed by the Engineer-in-Charge. The surface shall be thoroughly swept clean by a mechanical broom, and the dust removed by compressed air. In locations where mechanical broom cannot access, other approved methods shall be used as directed by the Engineer-in-Charge. A prime coat shall be applied in accordance with Clause 7.5 above.

**Applying Tack Coat**

Tack coat shall then be applied as per Clause.7.5 above over the surface thus prepared.

**Mixing and transportation of the mixture**

**Mixing**

Pre-mixed bituminous materials, including bituminous macadam and bituminous concrete shall be prepared in a hot mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregates. Appropriate mixing temperatures can be found in Table 500-5 of MORT & H’s Specification for Road and Bridge works; the difference in temperature between the binder and the aggregate should at no time exceed 14<sup>0</sup> C. In order to ensure uniform quality of the mix and better coating of aggregates, the hot mix plant shall be calibrated from time to time.

**Table 7 -1 Manufacturing and rolling temperatures**

(Table 500-5 of MORT & H’s Specification)

Bitumen Penetration	Bitumen Mixing (°C)	Aggregate Mixing (°C)	Mixed Material (°C)	Rolling (°C)	Laying (°C)
65	150-165	150-170	165 Maximum	90 Minimum	125 Minimum



Instead of installing a hot mix plant for the work at work site, the contractor shall be permitted to use an existing plant conforming to the above specifications, in the nearby locality subject to the following conditions.

- a) All materials required for the bituminous works shall be stored at the hot mix plant premises sufficiently in advance and stacked, measured and got approved by the Engineer-in-Charge before use in the work. Conveyance for the inspection / supervision of the material / works by the department staff at the plant site shall be arranged by the contractor without any extra cost to the department.
- b) Storage tank of adequate capacity for storing bitumen required for the work shall be arranged by the contractor at his risk and cost so that the progress of the work is not affected for want of bitumen.
- c) The contractor shall maintain a record of daily consumption and balance quantities of all materials measured for use in the work and also bitumen supplied from the department, at the plant site which shall be jointly signed by the representative of the Engineer-in-Charge and the contractor before starting each day's work and its closing on the day.
- d) The contractor shall take all precautionary measures to ensure the required temperature of the mix at the time of placing the same at work site.

### **Transporting**

Bituminous materials shall be transported in clean insulated vehicles, and unless otherwise agreed by the Engineer-in-charge shall be covered while in transit or awaiting tipping. Subject to the approval of the Engineer-in-charge a thin coating of diesel or lubricating oil may be applied to the interior of the vehicle to prevent sticking and to facilitate discharge of the material.

### **Spreading**

(i) Except in areas where a mechanical paver cannot access, bituminous materials shall be spread, levelled and tamped by an approved self-propelled paving machine. As soon as possible after arrival at site, the materials shall be supplied continuously to the paver and land without delay.

(ii) The rate of delivery of material to the paver shall be regulated to enable the paver to operate continuously. The travel rate of the paver and its method of operations, shall be adjusted to ensure an even and uniform flow of bituminous material across the screed, free from dragging, tearing and segregation of the material. In areas with restricted space where a mechanical paver cannot be used, the material shall be spread, raked and levelled with suitable hand tools

by experienced staff and compacted to the satisfaction of the Engineer-in-Charge..

(iii) The minimum thickness of material laid in each paver pass shall be in accordance with the minimum values given in the relevant parts in MORT&H's Specification for Road and Bridge works.

### **Rolling**

The compaction shall carry out in accordance with the provisions of clause 7.6.4.5 and 7.6.4.6 below shall apply, as modified by the approved laying trials. Rolling shall be continued until the specified density is achieved, until there is no further movement under the roller. The required frequency of testing is defined in Clause 903 of MORT & H's Specification for Road and Bridge works.

### **Compaction**

(i) Bituminous materials shall be laid and compacted in layers which enable the specified thickness, surface level, regularity requirements and compaction to be achieved.

(ii) Compaction of bituminous materials shall commence as soon as possible after laying. Compaction shall be substantially completed before the temperature falls below the minimum rolling temperatures stated in relevant part of the MORT&H's Specification for Road and Bridge works. Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this, rolling shall commence at the edges and progress towards the centre longitudinally except that on super elevated and unidirectional cambered portions, it shall progress from the lower to the upper edge parallel to the centre line of the pavement. Rolling shall continue until all roller marks have been removed from the surface. All deficiencies in the surface after laying shall be made good by the attendants behind the paver, before initial rolling is commenced. The initial rolling shall be done with 80-100 KN dead weight smooth-wheeled rollers. The finish rolling shall be done with 80-100 KN vibrating tandem rollers.

(iii) Where compaction is to be determined by density of cores the requirements to prove the performance of rollers shall apply in order to demonstrate that the specified density can be achieved. In such cases the Contractor shall nominate the plant, and the method by which he intends to achieve the specified level of compaction and finish at temperatures above the minimum specified rolling temperature. Laying trials shall then demonstrate the acceptability of the plant and method used.

(iv) Bituminous materials shall be rolled in a longitudinal direction, with the driven rolls nearest the paver. The roller shall first compact material adjacent to joints and then work from the lower to upper side of the layer, overlapping on successive passes by at least one-third of the width of the rear roll.

(v) In portions super elevated and uni-directional camber, after the edge has been rolled, the roller shall progress from the lower to the upper edge.

(vi) Rollers should move at a speed of not more than 5 km per hour. The roller shall not be permitted to stand on pavement which has not been fully compacted, and necessary precautions shall be taken to prevent dropping of oil, grease, petrol or other foreign matter on the pavement either when the rollers are operating or standing. The wheels of rollers shall be kept moist with water, and the spray system provided with the machine shall be in good working order, to prevent the mixture from adhering to the wheels. Only sufficient moisture to prevent adhesion between the wheels of rollers and the mixture should be used. Surplus water shall not be allowed to stand on the partially compacted pavement.

### **Joints**

(i) Where longitudinal joints are made in pre-mixed bituminous materials, the materials shall be fully compacted and the joint made flush.

(ii) All joints shall be offset at least 300mm from parallel joints in the layer beneath or as directed, and in a layout approved by the Engineer-in-Charge. Joints in the wearing course shall coincide with either the lane edge or the lane marking, whichever is appropriate. Longitudinal joints shall not be situated in wheel track zones.

### **Measurement for payment**

(i) Bituminous Macadam shall be measured as finished work in cubic metres on the basis of volume of ingredients premeasured at plant site.

(ii) For one cubic metre of compacted volume of Bituminous Macadam, quantity of each type of aggregate and bitumen used for the work shall be as per clause 7.8 below.

SIGNATURE OF THE TENDERER

## 8.DETAILED SPECIFICATIONS OF DISPOSAL OF GARBAGES

### 8.1 General

The work consists of collection of garbage, debris and other waste materials deposited in various places on Cochin Port Area and transporting, dumping and levelling the same in the dumping ground at A2 area at south end of W/Island.

- 8.2 The lorry/tipper, labours (skilled or unskilled), tools and equipments etc. required for carrying out the work shall be provided by the contractor at his own cost.
- 8.3 The work shall be carried out without causing any interruption to the vehicular traffic and also without causing any hindrance to the Port's operations.
- 8.4 The payment will be made on the basis of number of lorry load/ tipper load. The lorry/tipper used for this work shall have minimum body volume of 6m<sup>3</sup>. The lorry/ tipper shall be filled with the materials to the maximum extent possible to the satisfaction of the officer in charge of the work.
- 8.5 The work shall be carried out as per the directions and to the satisfaction of the Engineer-in-Charge.
- 8.6 The work may not be operated on a regular basis and it has to be arranged occasionally as and when special need arises and the contractor is informed accordingly.

SIGNATURE OF THE TENDERER

## 9. SPECIFICATION FOR LABOUR SUPPLY

1. Skilled labourers supplied shall be well trained & having good health to carryout works.
2. Unskilled labourers supplied shall have good health for carrying out all type of unskilled works.
3. The labourers supplied shall have valid Identity Cards issued by the Govt. of India viz; Electoral ID card or Aadhar card.
4. The labourers supplied shall be engaged for various civil construction/ maintenance works under various sub divisions at Cochin Port Trust.
5. A register for the labourers posted shall be maintained by the contractor specifying the nature of work done by each labourer on each day. The register shall be signed by the respective Sub-Divisional Officers after completion of each days work and shall be counter signed by the Engineer-in-Charge after completing of the whole work.
7. The rate stipulated in the Schedule is for supply of labour for one day of 8 hours.

SIGNATURE OF THE TENDERER

## 10.SCHEDULE OF FITTINGS FOR DOORS, WINDOWS AND VENTILATORS

All fittings should be of 1<sup>st</sup> class quality and got approved by the Engineer - in - charge. The numbers in each and its use will be decided by the Engineer - in - charge according to the location and number of leaves, the doors, windows and ventilators have.

### BRASS FITTINGS

#### DOORS: -

- a) Butt hinges: 125x75 mm heavy type brass butt hinges of approved quality with 40 mm nettle-folds brass screws to suit.
- b) 30 cms. heavy type brass tower bolts of approved quality with 25 mm nettle-folds brass screws to suit at top.
- c) 15 cms. heavy type brass tower bolts of approved quality with 25 mm nettle-folds brass screws to suit at bottom.
- d) Brass tubes 50 mm long for fixing in the floor to suit the tower bolts.
- e) 22.5 cms. heavy type brass tower bolt of approved quality with 25 mm nettle folds brass screws to suit.

#### WINDOWS: -

- a) 100 mm x 60 mm heavy type brass butt hinges of approved quality with 40 mm nettle-folds brass screws to suit.
- b) 15 cms. heavy type brass tower bolts of approved quality with 25 mm nettle-folds brass screws to suit at top and bottom.
- c) Brass tubes 30 mm long to suit the tower bolts.
- d) 22.5 cms. brass hooks and eyes with fixing plate of approved quality with 25 mm nettle-folds brass screws to suit.

#### VENTILATORS: -

- a) 62 mmx 6mmx 6mm brass sash centers fixed with 40 mm nettle-folds brass screws to suit
- b) Brass rings 25mm size fixed with 2 nos . nettle- folds brass screws to suit with necessary brass or chromium plated pulling chain . The length and sizes of chain will be decided at site by the Engineer-in-charge.

## IRON FITTINGS

### DOORS

- a) Butt hinges: - 125mm x 75mm heavy type iron butt hinges of approved quality with 40 mm nettle- folds brass screws to suit.
- b) 30 mm heavy type tower bolts of approved quality with 25 mm nettle -folds brass screws to suit at top.
- c) 15 cms heavy type iron tower bolts of approved quality with 25mm nettle-folds brass screws at bottom
- d) G.I tubes for fixing in the floor 50 mm long to suit the tower bolts.
- e) 22.5 mm heavy type tower bolts of approved quality with 25 mm nettle -folds brass screws to suit.

### WINDOWS: -

- a) 100 mm x 60 mm heavy type brass butt hinges of approved quality with 40 mm nettle-folds brass screws to suit.
- b) 15 cms heavy type brass tower bolts of approved quality with 25 mm nettle-folds brass screws to suit at top and bottom.
- c) G.I tubes 50 mm long to suit the tower bolt.
- d) 22.5 cms iron hooks and eyes with fixing plate of approved quality with 25 mm nettle-folds brass screws to suit.

### VENTILATORS: -

- a) 62 mmx 6mmx 6mm brass sash centers fixed with 25 mm nettle-folds brass screws to suit
- b) Iron rings 25mm size fixed with 2 nos. nettle- folds brass screws to suit with necessary length of G.I chain.

NOTE: All screws will be of only brass nettle- folds wherever not mentioned for works under the contract.

SIGNATURE OF THE TENDERER