



## NOTICE INVITING TENDER

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Ref: OS/WC/2025-26/60/42

Date: 08.08.2025

Sub: Works contract for re-laying of roads (6.7 KM Approx.) at township of BHEL-HPVP, Visakhapatnam - Reg.

Tenders are invited under **two bid system**, Techno-Commercial Bid (Part-I) and Price Bid (Part-II) from the reputed and experienced contractors with sound technical and financial capability for the subject work.

SL. NO.	NAME OF THE WORK	CONTRACT PERIOD
01	Works contract for re-laying of roads (6.7 KM Approx.) at township of BHEL-HPVP, Visakhapatnam	04 Months

### 1. ELIGIBILITY CRITERIA:

- Average annual turnover of the contractor duly certified by a practitioner-chartered accountant during the last 3 years ending **31<sup>st</sup> March 2024** should be at least. **₹46 Lakh**.
- Tenderer should enclose Certificate of Incorporation / Firm registration, EPF, ESI, PAN, GSTIN New registration no., Income tax returns for last three years (AY-2022-23, 2023-24 & 2024-25) and Profit & Loss account and Balance Sheet certified by the Practicing Chartered Accountant for the last 3 years.
- The Contractor should have experience in similar works during the last **7 years** ending **31.07.2025** as given below: -
  - Three** similar completed works costing not less than the amount equal to **₹72.00 Lakh each including GST**
  - OR
  - Two** similar completed works costing not less than the amount equal to **₹90.00 Lakh each including GST**
  - OR
  - One** similar completed work costing not less than the amount equal to **₹144.00 Lakh including GST**

Work orders & Job Completion Certificates from the customer shall be enclosed in support of successful and satisfactory completion of the orders.

#### Note:

**Similar work means Construction of Roads, Laying / Relaying / Repairs & Maintenance of roads on contract basis for State / Central Govt. / Undertakings / Private Firms.**

- Work Completion Certificates (**must have Work order reference, contract period & actual executed value**) from the customer and Work order copy shall be enclosed in support of successful and satisfactory completion of the orders.
- The works executed in the own name of the tenderer will only be considered for eligibility criteria.
- Bank solvency certificate shall be submitted for value not less than ₹100 lakhs from any Nationalized bank. The date of solvency certificate issued by bank should not be more than 3 months from the date of submission of bid.**

**Note: While scrutiny it is found that If any bidder has made false declaration and/ or provided false information and/ or forged documents or has forged BHEL documents, certificates etc. for securing business, meeting PQR, such offers shall be rejected and action will be initiated as per BHEL extant Guide lines.**

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**2. SCOPE OF THE WORK:**

Work is to be carried out as per Technical Conditions of contract (Annexure-I), Special Conditions of Contract (Annexure-II), General Conditions of Contract (work / Service) (Annexure- III) and Schedule of Quantities & Rates (Annexure- VII).

**3. LOCATION OF WORK:**

- 3.1 The subject job is to be carried out at Township of BHARAT HEAVY ELECTRICAL LIMITED- HEAVY PLATES AND VESSELS PLANT, Visakhapatnam.
- 3.2 The intending tenderers are advised to visit the above place, note down the entry procedures, safety requirements, work permit system etc. and satisfy themselves of all conditions prevailing there before submission of their tenders.

**4. EARNEST MONEY DEPOSIT:**

- I. The tenderer shall submit EMD for **₹2,00,000/- (Rupees Two Lakh only)** in the following forms only:
  - a) Cash Deposit as permissible under the extant Income Tax Act (before tender opening).
  - b) Electronic Fund Transfer credited in BHEL account (before tender opening).
  - c) Banker's Cheque/ Pay Order/ Demand Draft, in favour of BHEL, Visakhapatnam (along with offer)
  - d) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL)
  - e) Insurance Surety Bonds

In addition to above, the EMD amount in excess of ₹Two lakh may also be accepted in the form of Bank Guarantee from scheduled bank. The Bank Guarantee in such cases shall be valid for at least six months

- II. EMD by the tenderer will be forfeited as per NIT conditions, if:
  - a) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
  - b) The contractor fails to deposit the required security deposit or commence the work within the period as per LOI/ Contract.
  - c) EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" and forfeited/ released based on the action as determined under these guidelines.
- III. EMD given by all unsuccessful tenderers shall be refunded normally within 15 days of award of work.
- IV. EMD shall not carry any interest.
- V. EMD of successful tenderer will be retained as part of Security Deposit.

**Note: Micro & Small Enterprises (MSEs) are eligible for exemption of EMD as given below:**

MSE suppliers can avail the intended benefits only if they submit **valid UDYAM Registration** for **Micro / Small** category along with the offer. Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefits shall be applicable for this enquiry if any deficiency in the above required documents is not submitted before price bid opening.

**5. CONTRACT PERIOD:**

Contract shall be valid for a period of **4 months** from date of work order or date of Intimation from Engineer In-charge whichever is later.

**6. VALIDITY OF OFFER:**

The offer shall be valid for a period of **3 months** from the last date for tender submission.

**7. SECURITY DEPOSIT (SD):**

Security Deposit shall be collected from the successful tenderer @5% Contract Value (Value of actual Quantity Ordered).

- A. Security deposit means the security provided by the contractor towards fulfilment of any obligations in terms of the provisions of the contract.
- B. The total amount of the security deposit will be **5% of the contract value**. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security deposit.

**C. Modes of Deposit:**

The balance amount to make up the required Security Deposit i.e. **5%** of the contract value may be accepted in the following forms:

- a) Cash (as permissible under the extant Income Tax Act)
- b) Local Cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
- c) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the company's act. The bank guarantee format should have the approval of BHEL.
- d) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the company's act (FDR should be in the name of the contractor, a/c BHEL)
- e) Insurance Surety Bonds

**(Note:** BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

**D. Collection of Security deposit:**

At least 50% of the required Security Deposit, including the EMD, should be collected before start of the work. Balance of the Security Deposit can be collected by deducting 10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected.

**In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder.**

If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor.

The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

**Note: In case of (a) small value contracts not exceeding Rs. 20 lakhs or (b) SAS jobs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/ recovery of initial 50% Security Deposit.**

**E. Refund of Security Deposit:**

- i. The security deposit shall be refunded after successful completion of the Workmanship Guarantee as per agreement and subject to deduction of any amount due to BHEL.
- ii. Security deposit shall not be refunded to the Contractor except in accordance with the terms of the Contract.
- iii. The successful tenderers shall furnish Security Deposit within 15 days from the date of Work Order / Letter of Intent. The Security Deposit shall be furnished by the successful tenderers before commencement of work by them.

iv. The security deposit shall not carry any interest.

**Note:** Acceptance of Security Deposit against Sl. No. (d) and (e) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

F. Security Deposit will be released after the completion of **Workmanship Guarantee period**.

## 8. **INCOME TAX:**

Income tax as per statutory requirement will be deducted on each payment made to the contractor and TDS certificate will be issued to this effect.

## 9. **TDS ON GST:**

TDS on GST amount as per statutory requirement as applicable will be deducted on each payment made to the contractor. Present TDS on GST is 2%.

## 10. **PAYMENT TERMS:**

### **Running Account Bills (RA Bills)**

- a) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).
- b) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.
- c) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.
- d) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non-availability of fronts 'OR' non-availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.
- e) In order to facilitate part payment, BHEL at its discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work, subject to following:
  - 1) Provided no 'part' payment is recommended till **25%** of total contract value is executed.
  - 2) Payment of RA bills to be made in not more than **four (04) instalments**.

Bill payments will be arranged within 45 days for MSE (Micro/Small), 60 days for Medium Enterprise, 90 days for non-MSMEs from the date of submission of correct/ complete bill with all relevant documents to Engineer- in-Charge.

Bills (RA/Final Bill) to be submitted to Engineer-in-charge along with following documents:

### **A. R.A Bill:**

Payment will be made for **95% of the RA Bill value** and **balance 5%** shall be the **retention amount** (retention amount shall be returned after **12 months** of works completion i.e. workmanship guarantee period).

- a) Tax Invoice
- b) Measurement sheets duly filled and signed by officials of BHEL and contractor
- c) Proof of GST payment as per Annexure - GST.
- d) RTGS form
- e) WAM 06 duly filled & signed

**B. Final Bill**

After successful completion of the work in all respects and handing over the same to BHEL, payment shall be made **excluding 5%** of the final bill value as the retention amount. **Retention amount deducted from the RA bills and Final Bill will be paid after successful completion of workmanship Guarantee period.**

- a) Invoice
- b) Job completion certificate issued by the Engineer-in-charge
- d) Measurement sheets duly filled and signed by officials of BHEL and contractor
- e) Proof of GST payment as per Annexure - GST.
- f) RTGS form
- g) WAM 07 duly filled & signed
- h) In case of release of security deposit, WAM-10 to be filled and submitted **after successful completion of workmanship Guarantee period.**

**11. PENALTY/ LIQUIDATED DAMAGES:**

In the event of any delay in completion of work or part thereof as per the contractual completion period due to the reasons attributable to contractor, BHEL - HPVP shall have the right to impose Liquidated Damage at the rate of **0.5%** of the contract value for every complete week of delay or part thereof subject to a maximum of **10%** of the contract value.

**12. WORKMANSHIP GUARANTEE:**

Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of **Twelve (12) months** from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty work detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works by itself, without prejudice to any other rights and recover the cost incurred for the same **along with 5% overheads** from the Security Deposit & Retention Amount

**13. PVC & ORC:** Not Applicable**14. PRICE SCHEDULE, TAXES & DUTIES:**

- a. Prices shall be quoted in the price schedule attached to the tender for the complete scope of work.
- b. **The quoted prices shall be exclusive of GST. However, GST as applicable shall be payable by vendor & the same will be reimbursed by BHEL.**
- c. In addition to existing taxes, any new taxes imposed by Central/ State Govt. shall be payable by the contractor and same shall be reimbursed on submission of relevant documents/proof of payment.
- d. In case, any new tax is imposed instead of existing tax, difference of the amount shall be reimbursed/ recovered on submission of documentary evidence.
- e. Any new tax is imposed by Central/ State Govt. or there is any variation in taxes after expiry of delivery / contract period, the same shall be borne by contractor only.
- f. All terms & conditions of the contract in respect of taxes & duties are subject to new taxation laws introduced time to time by Govt. and terms & conditions will deemed to be modified in accordance with the provisions of New Laws (i.e., GST).
- g. **The quoted prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.**

**15. REVERSE AUCTION:**

- A. BHEL shall be resorting to Reverse Auction (RA) (**Guidelines as available on <https://www.bhel.com/guidelines-reverse-auction-2024>**) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.”

This will be decided after techno-commercial evaluation. Bidders have to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider).

#### **B. PROCEDURE OF REVERSE AUCTIONING:**

- 1) Price bids of all techno-commercially qualified bidders shall be opened.
- 2) Reverse Auction: The 'bid decrement' will be decided by BHEL.
- 3) The lowest bidder in sealed envelope price bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.
- 4) Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become “L1” and this continues as an iterative process. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.
- 5) After the completion of the reverse auction, the Closing Price shall be available for further processing.
- 6) Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.

#### **C. REVERSE AUCTION PROCESS:**

- 1) Reverse Auction will be conducted if two or more bidders are techno-commercially qualified.
- 2) The techno-commercially qualified H1 will not be allowed to participate in RA. In case more than one H1 bidder quote the same rate, the Price Offer received last, as per the time log of the Portal, shall be removed first, on the principle of last in, first out by the system.
- 3) However, H1 will be allowed to participate in RA in the following cases:
  - a) If number of techno-commercially qualified bidders are only 2 or 3.
  - b) In case Primary product of only one OEM is left in contention for participation in RA on elimination of H1.
  - c) For cases where there are more than 3 techno-commercially qualified bidders, if lowest bidder in sealed price bid is non-MSE and H-1 is eligible MSE and H-1 price is coming within price band of 15% of Non-MSE lowest bidder.
  - d) For cases where there are more than 3 techno-commercially qualified bidders, if lowest bidder in sealed price bid is non-MII and H-1 is eligible MII and H-1 price is coming within price band of 20% of Non-MII lowest bidder.
- 4) Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed price bid along with applicable loading, if any, shall be considered for ranking.
- 5) Start price for RA shall be lowest of sealed envelope price bid.
- 6) If the start price is lower than the lowest sealed envelope price bid, on acceptance of such start price by any bidder this bid would be indicated as current L1 for further bidding. However, if no bidder accepts the start price, RA shall be treated as cancelled for the respective line item(s) and the tender shall be processed accordingly.
- 7) In case of no further bidding, RA will be deemed to have been successful with current L1 bidder. During RA, all bidders will see their rank and current L1 price on the screen. Once the RA is done, the ranking status would be based on the last quoted price of the bidder(s) irrespective of the quote received in RA or sealed envelope price bid.

**For detailed Guidelines visit our website:** <https://www.bhel.com/guidelines-reverse-auction-2024>



**16. COMPENSATION IN CASES OF DEATH / PERMANENT INCAPACITATION OF PERSON DUE TO UNINTENDED / UNFORESEEN OCCURRENCES DURING MANUFACTURING / OPERATION AND WORK AT BHEL FACTORIES / OFFICES:**

BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

- a) **Victim:** Any person who suffers permanent disability or dies in an accident as defined below.
- b) **Accident:** Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing / operation and works incidental thereto at BHEL factories / offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, servicing, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by company or during any works/during working at BHEL units/offices/townships and premises/project sites.
- c) Compensation in respect of each of the victims:
  - (i) In the event of death or permanent disability resulting from Loss of both limbs: ₹ 10,00,000/- (Rupees Ten Lakhs)
  - (ii) In the event of other Permanent disability: ₹7,00,000/- (Rupees Seven Lakhs)
- d) Permanent Displacement: A displacement that is classified as a permanent total disablement under the provision to Section 2(I) of the Employees Compensation Act, 1923".

**17. RISK PURCHASE:**

In case the contractor fails to execute the work due to any reason, BHEL reserves the right to get the same completed through some other party at the risk & cost of the contractor and any additional expenditure incurred due to the same and overhead charges shall be charged to the contractor. Risk & Cost will be implemented as per STANDARD OPERATING PROCEDURE FOR IMPLEMENTATION OF RISK & COST of BHEL.

**18. FACTORY RULES AND REGULATIONS:**

Party shall abide by all the rules and regulations in force from time to time as per factories act. It shall be party's responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

**19. SUB-LETTING:**

In general, sub-letting of jobs will not be permitted. But in special circumstances, this may be allowed. In such case, the party should obtain written approval from BHEL-HPVP, Visakhapatnam before sub-letting

**20. BREACH OF CONTRACT:**

In case of Breach of Contract, 10% of the contract value will be recovered from the contractor and necessary action will be initiated as per contract terms and conditions and BHEL extant Guide Lines.

**21. ENGINEER IN-CHARGE:**

Manager (WE-Civil) shall be the Engineer-in-charge for herein after referred to as such in the tender. Contact Details: Ph: 0891-288- 1390, email: [srinivasaraok@bhel.in](mailto:srinivasaraok@bhel.in)

**22. GENERAL:**

**22.1 Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry.**

Deviations to the tender conditions are not acceptable and BHEL-HPVP reserves the right to reject such offers which do not meet Technical / Commercial requirements without any / further correspondence.

Bids not accompanied with requisite documents / delayed bids, incomplete / conditional offers, bids not conforming to the terms & conditions specified in the tender documents are liable for rejection.

**22.2 BHEL reserves the right to modify or cancel or short close the tender at any stage at its discretion without assigning any reason thereof.**

22.3 The bidders shall study the Tender documents and all other relevant documents in detail for understanding the scope of work involved in various items before submission of offers.

For any clarifications required on this tender document, scope of work etc., the bidders shall depute their authorized representatives to HPVP, Visakhapatnam with prior intimation to get clarifications from concerned authorities.

22.4 Lowest offer need not be the rate acceptable to BHEL-HPVP and BHEL-HPVP reserves the right to go for negotiation with the L1 bidder/s.

22.5 The following documents (enclosed) shall form part of the contract including this Notice Inviting Tender:

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**PART - I: TECHNO COMMERCIAL BID**

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| a) Technical Conditions of Contract                  | : Annexure - I   |
| b) Special Conditions of Contract                    | : Annexure – II  |
| c) General Conditions of Contract (Works / Services) | : Annexure – III |
| d) Acceptance to the tender terms & conditions       | : Annexure – IV  |
| e) Contractor Information                            | : Annexure – V   |
| f) Check List  | : Annexure – VI  |

**PART - II: PRICE BID**

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| g) Price Bid (Schedule of items and Bill of Quantities) | : Annexure – VII |
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**23. TENDER SUBMISSION:**

**a) The Bid shall be submitted in two parts through BHEL e-procurement portal (<https://eprocurebhel.co.in>) on or before 18.08.2025, 14.00 Hrs along with the following documents:**

- (i) Signed tender documents with all Annexures
- (ii) Income tax returns for last 3 years, Profit & Loss account and Balance Sheet certified by the Practicing Chartered Accountant for the last 3 years
- (iii) Work Order and Job Completion Certificates in line with eligibility criteria
- (iv) Copy of GSTIN Registration Certificate.
- (v) Copy of PAN card.
- (vi) Udyam Registration Certificate / proof of EMD submission
- (vii) Copy of EPF & ESI registration
- (viii) Certificate of Incorporation / Firm registration
- (ix) Bank solvency certificate for value not less than ₹100 lakhs.
- (x) All other applicable documents as detailed in the tender

**Note: All pages of tender documents and the various supporting documents enclosed by the bidder should be signed on all pages with Company seal. Offers received in any other form will not be accepted.**

- b) Submission of offer by a tenderer implies that all the tender documents were read by the tenderer and the tenderer is aware of the scope and specifications of the work, site condition, local conditions and rates at which stores, tools and plant, free / chargeable materials etc., will be issued to him by BHEL - HPVP and other factors having bearing on the execution of the work.



**24. OPENING OF TENDERS:**

Techno-commercial Bids will be opened on **18.08.2025 at 15.00 Hrs** time in BHEL e-procurement Portal. Date of opening of financial bids shall be notified on BHEL e-procurement after short listing of eligible Bidders based on Techno - Commercial bid evaluation.

**25. For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO/WO against this NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable**

**26. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.**

**In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.**

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TECHNICAL CONDITIONS OF CONTRACT

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**1.0 TERMINOLOGY**

**Asphalt:** A natural or artificial mixture in which bitumen is associated with mineral matter. The word 'Asphalt' should always be qualified by indication of its origin or nature.

**Asphalt Mastic:** An intimate mixture of mineral fillers, well graded sand and / or stone chippings with a hard grade of bitumen, cooked and laid hot manually by means of wooden float. The mixture settles to a coherent, void less and impermeable solid or semi-solid mass under normal temperature condition.

**Bitumen:** A nanocrystalline solid or viscous material, having adhesive properties derived from petroleum either by natural or refinery processes and substantially soluble in carbon desulphated.

**Bitumen-Cutback:** Bitumen, the viscosity of which has been reduced by a volatile diluent when blended with kerosene or naphtha type diluent or fuel oil, is called, medium or rapid or slow curing cut backs respectively.

**Bitumen-Emulsion:** A liquid product in which a substantial amount of bitumen is suspended in a finely divided condition in an aqueous medium containing an emulsifier and stabiliser. The emulsion is termed 'Anionic' when the bitumen particles are negatively charged and the aqueous phase is alkaline. The emulsion is termed 'cationic' when the particles are positively charged and the aqueous phase is acidic.

**Bitumen Mastic:**

**Filler:** Inorganic mineral material all of which will pass through specified IS: sieve used in admixture with solid or semi-solid bituminous material.

**Road Tar:** A product obtained by treating at high temperature coal tar in such a manner that it conforms to a specification which defines its suitability for road construction.

**Tar:** A viscous material having adhesive properties and resulting from the distinctive distillation of certain type of organic material. The term Tar should be preceded by the name of the material from which it is produced e.g. coal, shale, peat, vegetable matter and its mode of production shall be indicated.

**Flash Point:** The lowest temperature at which the vapour of a substance can be ignited in air by a flame under specified conditions of test. The substance itself does not continue to burn.

**Tack Coat:** It shall consist of application of a single coat of low viscosity liquid bituminous material to an existing road surface preparatory to further bituminous construction.

**1.1 Materials****1.1.1 Aggregate Coarse**

Coarse aggregate as specified in the item shall be either crushed / broken stone, hard blue granite or one of the naturally occurring aggregates such as kankar or laterite of suitable quality as stated hereinafter and approved by the Engineer-in-charge.

The stone aggregate shall conform to the physical requirements set forth in Table 1.1. The type and size range of the aggregate shall be specified in the contract.

**TECHNICAL CONDITIONS OF CONTRACT**

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**TABLE 1.1****PHYSICAL REQUIREMENTS OF COARSE AGGREGATE**

Sl. No.	Type of Constn.	Test of W.B.M.	Test method	Requirements
1.	Sub-base	Los Angeles Abrasion value or Aggregate impact value	IS: 2386 (Pt.IV) IS: 2386 (Pt.IV) IS: 5640***	60% max. *50% max.
2.	Base	(a) Los Angeles Abrasion value of aggregate impact value (b)	IS 2386 (Pt. IV) IS 2336 (Pt. IV) IS 5640***  IS 2386 F (1)	50% max. “40% maxs.  ** 15% max.
3.	Surface Course	(a) Los Angeles Abrasion value or Aggregate impact value (b) Flakiness Index	IS 2386 (Pt. IV) IS 2386 (Pt. IV) IS 2386 F (1)	40% max. 30% max.

The coarse aggregate shall conform to one of the gradings given in Table 1.2 as specified. For crushable type of aggregates such as kankar and laterite, hard blue granite grading shall not be regarded as very important, but the materials should generally be within the specified range.

**TABLE 1.2****GRADING REQUIREMENTS OF COARSE AGGREGATE FOR W.B.M.**

Grading No.	Size Range	Sieve designation	% by weight passing the sieve
1.	90mm to 45mm (suitable for sub base courses of compacted layer of not less than 90mm thickness)	125mm 90mm 63mm 45mm 22.4mm	100 90 – 100 25 – 60 0 – 15 0 - 5
2.	63mm to 45mm	90mm 63mm 53mm 45mm 22.4mm	100 90 – 100 25 – 75 0 – 15 0 – 5
3	53mm to 22.4mm	63mm 53mm 45mm 22.4mm 11.2mm	100 95 – 100 65 – 90 0 – 10 0 - 5

**TECHNICAL CONDITIONS OF CONTRACT**

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- 1.1.1.1 Crushed or Broken Stone: When crushed or broken stone is specified as the coarse aggregate, it shall be hard, durable and free from excess of flat, elongated, soft, disintegrated particles, dirt and other objectionable matter. The total quantity of such deleterious material including clay lumps, soft fragment, foreign material etc., shall not exceed 5% of the weight of the aggregate.
- 1.1.1.2 Kankar: Kankar shall be tough, having a blue almost opalescent fracture. It shall not contain any clay in the cavities between nodules.
- 1.1.1.3 Laterite: Laterite shall be hard, compact, heavy and of dark colour. The light coloured sandy laterite as well as those containing much ochreous clay shall be rejected. The sum of the percentages of all deleterious material shall not exceed 5%. Tests for estimation of deleterious materials and organic impurities shall be done as per IS : 2386 (Pt.II).

**1.1.3 Binding Material**

Binding materials to prevent ravelling of water bound macadam construction shall consist of a fine grained material possessing plasticity index value of 4 to 9 when the water bound macadam is to be used as a wearing course, and 4 to 6 when W.B.M. is being adopted as a sub-base/base course with bituminous surfacing on top of it. The plasticity index shall be determined in accordance with IS:2720 (Pt.V). The quantity of binding material used in each layer shall be as per direction of the Engineer-in-charge, where screening consisting of crushable type material like morrum or gravel are used. Where earth cut for sub-grade formation is used as binder with the approval of Engineer-in-charge, no separate payment shall be made for collection of this binder material.

**1.1.4 Bitumen Straight run**

A range of grades, from a very soft to a very hard consistency, can be produced by varying the temperature and the rate of flow during distilling process. It shall conform to IS:73. Grades of bitumen for different uses is given in Table 1.3

**TABLE 1.3 BITUMEN GRADES**

Sl. No.	Grade		Temperature to which it shall be heated
I	FOR PAINTING (Surface Dressing)		
	1	Paving bitumen from Assam Petroleum A 90	177 deg. C to 190 deg. C
	2	Paving bitumen from other sources 80/100 – S90	177 deg. C to 190 deg. C
	3	Bitumen Emulsion min. 50% bitumen content: RS grade IS:8837	(Cold application)
	4	Cut backs RC-3 (rapid curing) IS:217	-do-
II	FOR PREMIX CARPETING		
	1	Paving Asphalt 30/40 s-35 OR 80/100 S-90	149 deg C to 177 deg. C
	2	Bitumen Emulsion min. 60% bitumen contents RS grade IS:8837	(Cold application)
	3	Cut back MC (medium curing) IS:4545	(Cold application)
III	FOR ASPHALTIC CONCRETE STRAIGHT RUN BITUMEN 60/70 (S-65) CONFIRMING TO IS : 73		150 deg. C to 177 deg. C

**Note:** For premix carpeting with paving asphalt, extra shall be paid if solvent is used.

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**1.1.5 Filler**

The filler, where specified, shall be an inert material, the whole of which passes through a 710 micron sieve, at least 90 percent passing through a 180 micron sieve and not less than 70 percent passing through a 90 micron sieve. The filler shall be cement, stone dust, hydrated lime, lime stone dust, fly ash or any other non-plastic mineral matter approved by the Engineer-in-charge.

**TABLE 1.4 AGGREGATE GRADATION INCLUDING FILLER**

Sieve designation	Percent by weight passing the sieve	
	For 25mm thickness	For 20mm thickness
20.0 mm	100	--
12.5mm	75 -100	100
10.0mm	60 - 85	75 - 100
4.75mm	35 - 55	35 - 55
2.36mm	20 - 35	20 - 35
600 micron	10 - 22	10 - 22
300 micron	6 - 16	6 - 16
150 micron	4 - 12	4 - 12
75 micron	2 - 8	2 – 8

**1.1.6 Fly ash:**

Fly ash shall conform to IS 3812 (Pt.III)

**1.1.7 Lime**

**1.1.7.1** Lime used shall conform to IS:712-1984 Building limes are classified as follows:

Class A	: Eminently hydraulic lime used for structural purposes.
Class B	: Semi hydraulic lime used for masonry mortars.
Class C	: Fat Lime used for finishing coat in plastering, white washing etc., and addition of Pozzolanic material for Masonry Mortar.
Class D	: Magnesium lime used for finishing coat in plastering, white washing etc.
Class E	: Kankar lime used for masonry mortars.

**1.1.7.2** Quick Lime: Quick Lime shall be supplied in the form of lumps and not in powder. Soon after delivery, lump lime shall be separate from powder and all underburnt / overburnt lumps and the powder removed. Quick lime shall not be used directly in the work and shall invariably be slaked and converted to lime putty before use.

**1.1.7.3** Hydrated Lime: Hydrated lime shall be in the form of a fine dry powder. It shall be supplied in suitable containers such as jute bags lined with water proofing membrane. The bags shall bear marking indicating the class of lime, net weight, date of manufacture and the brand name. It shall be used within 4 months of its date of manufacture.

**1.1.7.4** Storage: Lime shall be stored in weather proof sheds. Hydrated lime shall be stored in the same manner as cement. Lime which has been damaged by moisture or air-slaking shall not be used. All damaged and rejected lime shall be removed from the site of work forthwith.

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**1.1.7.5 Testing:** Chemical and physical requirements of building limes are as per Physical and chemical requirements specified in CPWD Specification Vol.I. Laboratory tests shall be carried out to check the quality of lime to be used.

**1.1.8 Moorum**

It shall be obtained from pits of weathered disintegrated rocks. It should preferably contain siliceous material and natural mixture of clay of calcareous origin. The size of moorum shall not be more than 20mm.

**1.1.9 Soil**

Soil having a plasticity index (PI) between 5 and 20 shall be suitable. At least one test for 200 cubic metre of soil for determining P.I. shall be conducted.

**1.1.10 Stones**

These shall be clean, hard, sound and durable stones, free from decay and weathering, they shall be in blocks and hammer dressed on all sides. The size of pitching stones shall be approximately 22.5 cm in depth and not less than 15cm in any other direction.

**1.1.11 Stone Chipping for Surface Dressing/Painting**

The stone chipping shall consist of fairly cubical fragment of clean, hard, tough and durable rock of uniform quality throughout. These shall be obtained by crushing stone river gravel (shingle) or other approved materials. Rounded gravel shall be used only if specifically permitted by the Engineer-in-charge. The chipping shall be free of elongated or flaky pieces, soft or disintegrated stone, salt, alkali, vegetable matter, dust and adherent coatings. They shall conform to the quality requirements of Table 1.5.

However, the total quantity of such deleterious material including clay lumps, soft fragments, foreign material shall not exceed 5% of the weight of the aggregate.

The aggregate shall be got tested to ensure the requirements specified in Table 1.5.

**TABLE 1.5**  
**PHYSICAL REQUIREMENTS OF AGGREGATES FOR SURFACE DRESSING /**  
**ASPHALTIC CONCRETE**

Sl. No.	Test	Test method	Requirements
1.	Los Angeles Abrasion Value	IS:2386 (Pt.IV)	40% max
2.	Aggregate Impact Value*	IS:2386 (Pt.IV)	30% max
3.	Flakiness Index	IS:2386 (Pt.I)	25% max
4.	Stripping Value	Vide method given in appendix	25% max
5.	Water Absorption	IS:2386 (Pt.III)	1% max

\* Aggregates may satisfy requirements of either of the two tests.

**1.2 Supplying and Stacking of Materials****1.2.1 Aggregates / Red Bajri**

**1.2.1.0** The item of work shall specify stone aggregate / Red bajri, as the case may be.

**1.2.1.1** Stacking : Ground where stacks are proposed to be made shall be cleared, levelled or dressed to a uniform slope and all lumps, depressions etc., shall be removed. The rate stacked metal shall be free from vegetation and other foreign matter. Coarse aggregates stack shall be made at places as directed by the Engineer-in-charge. All rejected stone metal shall be removed from the site.



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The aggregates shall be stacked in convenient units of one metre top width, 2.2m bottom width, .60cm height and of length in multiples of 3m for new roads. Where berm width is limited or for repair works it shall be stacked in units of 40cm top width 1.4m bottom width, 50cm height and length in multiples of 3m. Template of steel shall be used for making the stacks and shall always be kept at site for check measurements. The Engineer-in-charge may permit stacking in different sizes and height ranging between 45 to 75cm for new roads and 40 to 60cm for repair work, in case the site conditions so demand, in a particular reach of road as decided by the Engineer-in-charge, the quantity of stacked material shall be comparable to the theoretical quantity required for W.B.M. to be laid in the reach.

The stacks shall be uniformly distributed along the roads and shall be numbered serially. The number plate shall be planted on each stack, which shall remain in position until the stack is used in the work. A register showing daily consumption of stacks shall be maintained at site of work. The collection of stone metal shall be for completed length of one km (for each layer of W.B. Macadam) or as directed by the Engineer-in-charge in writing,

- 1.2.1.2 Measurements:** Length, breadth and height shall be measured correct to a cm. The total quantity so arrived shall be reduced by 7.5% to arrive at the net quantity for payment, in case of aggregates. NO such reduction shall be made in case of fine aggregate i.e. Red bajri & screening etc., as defined under Clause 1.1.2

**1.2.2 Binder**

- 1.2.2.1 Stacking:** Specified binder shall be brought to the site of work in the sealed original containers. Binder brought in damaged containers shall not be allowed. The material shall be stacked in fenced enclosures, as directed by the Engineer-in-charge, on one side of the roadway. The material shall be purchased from reputed firms or their authorised dealer. All the drums brought to site shall be serially numbered and used in the same order. The materials shall be brought in at a time in adequate quantities to suffice for the whole work or for at least a fortnight's work.

For major bituminous road works, supply of bitumen in bulk may be taken for economical reasons, or if the contingencies of the work so require. Sufficient storage arrangement shall be made at site for at least ten days requirement.

Materials shall be kept in the joint custody of the contractor and the representative of the Engineer-in-charge. The empty containers shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Engineer-in-charge. A few drums may be removed before completion of work for heating bitumen and mixing aggregate etc., with the permission to the Engineer-in-charge.

- 1.2.2.2 Measurement:** The materials shall be recorded as per standard weights of different type of container as intimated by manufacturers. The material shall be weighed where containers are found leaking.

**1.2.3 Moorum / Stone Chipping:**

- 1.2.3.0** The item of work shall specify moorum / stone chipping, as the case may be.

- 1.2.3.1 Stacking:** Ground where stacks are proposed to be made, shall be dressed to a uniform slope and all lumps, depressions etc., shall be removed. Sample of moorum shall be got approved from the Engineer-in-charge, before the material in bulk is brought to site.

Moorum shall be stacked in convenient units of one cubic metre in between aggregate stacks in each length of 100m as per requirement. The stacks shall be made with wooden boxes open at both ends and of 2 x 2 x 0.25m dimensions. These shall always be kept at site for stacking and check measurement.

The stacks shall be uniformly distributed along the road. The supply of moorum shall be completed for the entire work or for a complete length of one km as directed by the Engineer-in-charge in writing.

- 1.2.3.2 Measurements:** Length and breadth of boxes shall be measured correct to a cm. Volume shall be calculated in cubic metres, correct to two places of decimal.

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**1.3 Water Bound Macadam with Stone Aggregate (of size 90mm to 45mm)**

- 1.3.1** Quantities of Materials: Quantities of coarse aggregate, screening and binding material required to be stacked for 100mm approximate compacted thickness of W.B.M. sub-base course for 10 Sq.m. shall be Table 1.6.

**TABLE 1.6**

Coarse Aggregate			Stone screening	Binding Material	
Classification	Size range	Net Quantities	Grading / Classification and size	Quantity	
Grading I	90mm to 45mm	1.21 Cum to 1.28 Cum	Type A 13.22mm	0.27 Cum to 0.30 Cum	0.08 Cum to 0.10 Cum

**Note:-** Net quantity = Loose quantity measured in stacks minus 7.5%.

- 1.3.2** Preparation of Foundation: In the case of an existing unsurfaced road, where new material is to be laid, the surface shall be scarified and reshaped to the required grade, camber and shape as necessary. Weak places shall be strengthened, corrugations removed and depressions and pot holes made good with suitable materials, before spreading the aggregate for W.B.M.

Where the existing surface over which the sub base of W.B.M. is to be laid is black topped, to ensure effective internal drainage, furrows 50mm x 50mm (depth of furrows increased to reach bottom of bituminous layer where necessary) at one metre intervals shall be cut in the existing bituminous surface at 45 degree C to the central line of the carriage way before the W.B.M. is laid.

- 1.3.3** Provision of lateral confinement of aggregates: Before starting with W.B.M. construction, necessary arrangements shall be made for lateral confinement of aggregates. One method is to construct side shoulders in advance to a compacted layer of the W.B.M coarse. Inside edges may be trimmed vertical and the included area cleaned off all spilled materials thereby setting the stage for spreading the coarse aggregate.

The practice of laying W.B.M. after excavating a trench section in the finished formation must be completely avoided.

- 1.3.4** Spreading Aggregate: The coarse aggregate shall be spread uniformly and evenly upon the prepared base in required quantities with a twisting motion to avoid segregation. In no case shall these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed base be permitted. The aggregates shall be spread uniformly to proper profile by using templates placed across the road six metres apart. Where specified, approved mechanical devices may be used to spread the aggregates uniformly. The levels along the longitudinal direction up to which the metal shall be laid, shall be first obtained at site to the satisfaction of Engineer-in-charge, and these shall be adhered to.

The surface of the aggregate spread shall be carefully trued up and all high or low spots remedied by removing or adding aggregates as may be required.

The W.B.M. sub-base shall be normally constructed in layer of 100mm compacted thickness. No segregation of large or fine particles shall be allowed and the coarse aggregate as spread shall be of uniform gradation with no pockets of fine material.

The coarse aggregate shall normally not be spread in lengths exceeding three days average work ahead of the rolling and blending of the proceeding section.

- 1.3.5** Rolling: Immediately following at spreading of the coarse aggregate, it shall be compacted to the full width by rolling with either the three-wheel-power-roller of 8 to 10 tonnes capacity or an equivalent vibratory roller. Initially, light rolling is to be done, which shall be discontinued when the aggregate is partially compacted with sufficient void space in them to permit application of screenings.

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The rolling shall begin from the edges with the roller running forward and backward and adding the screenings simultaneously until the edges have been firmly compacted. The roller shall then progress gradually from the edges to the centre, parallel to the centre line of the road and overlapping uniformly each preceding rear wheel track by one half width and shall continue until the entire area of the course has been rolled by the rear wheel. Rolling shall continue until the road metal is thoroughly keyed with no creeping of metal ahead of the roller. Only slight sprinkling of water may be done during rolling, if required. On super elevated curves, the rolling shall proceed from the lower edge and progress gradually continuing towards the upper edge of the pavement.

Rolling shall not be done when the sub-grade is soft or yielding or when the rolling causes a wave like motion in the sub –base or sub-grade. When rolling develops irregularities that exceed 12mm when tested with a three metre straight edge, the irregular surface shall be loosened and then aggregate added to or removed from it as required and the area rolled until it gives a uniform surface conforming to the desired cross-section and grade. The surface shall also be checked transversely by template for camber and any irregularities corrected in the manner described above. In no case shall the use of screenings to make up depressions be permitted.

- 1.3.6 Application of Screenings:** After the coarse aggregate has been lightly rolled to the required true surface, screenings shall be applied gradually over the surface to completely fill the interstices. Dry rolling shall be continued while the screenings are being spread so that the jarring effect of the roller causes them to settle into the voids of the coarse aggregates. The screenings shall not be dumped in piles on the coarse aggregate but shall be spread uniformly in successive thin layers either by the spreading motion of the hand, shovels or a mechanical spreader.

The screenings shall be applied at a slow rate (in three or more applications) so as to ensure filling of all voids. Rolling and brooming shall continue with the spreading of the screenings. Either mechanical brooms or hand brooms or both may be used. In no case shall the screenings be applied, so fast and thick as to form cakes, ridges on the surface making the filling of voids difficult, or to prevent the direct bearing of the roller on the coarse aggregates. The spreading, rolling and brooming of screenings shall be performed on sections which can be completed within one day's operation and shall continue until no more screenings can be forced into the voids of the coarse aggregate. Damp and wet screenings shall not be used under any circumstances.

- 1.3.7 Sprinkling and Grouting:** After spreading the screening and rolling the surface shall be copiously sprinkled with water, swept and rolled. Hand brooms shall be used to sweep the wet screening into the voids and to distribute them evenly. The sprinkling, sweeping and rolling operations shall be continued and additional screenings applied where necessary until the coarse aggregate are well bonded and firmly set for the entire depth and until a grout has been formed of screenings and water that will fill all voids and form a wave of grout ahead of the wheels of the roller. The quantity of water to be used during the construction shall not be excessive so as to cause damage to the sub-base or sub-grade.

- 1.3.8 Application of Binding Material:** After the application of screenings and rolling, a suitable binding material shall be applied at a uniform and slow rate in two or more successive thin layers. After each application of binding material, the surface shall be copiously sprinkled with water and the resulting slurry swept in with hand brooms or mechanical brooms or both so as to fill the voids properly.

The surface shall then be rolled by a 8 – 10 tonne roller, water being applied to the wheels in order to wash down the binding material that may get stuck to the wheels. The spreading of binding material, sprinkling of water, sweeping with brooms and rolling shall continue until the slurry that is formed will, after filling the voids form a wave ahead of wheels of the moving roller.

- 1.3.9 Setting and Drying:** After final compaction of the course, the road shall be allowed to cure **overnight**. Next morning defective spots shall be filled with screenings or binding material. Lightly sprinkled with water, if necessary and rolled. No traffic shall be allowed till the macadam sets.

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**1.3.10 Surface Evenness:** The surface evenness of completed W,B,M, sub-base in the longitudinal and **transverse** directions shall be as specified in Table 1.7.

**Table 1.7**

Size of coarse aggregate	Longitudinal profile measured with a 3m straight edge			Cross Profile
	Maximum permissible	Max. No. of Undulations permitted in any 300m length exceeding		Max. permissible undulation when measured with a camber template
		12mm	10mm	
90-45mm	15mm	30	--	12mm

The longitudinal profile shall be checked using 3m long straight edge and graduated wedge at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with adjustable template at intervals of 10metres.

**1.3.11 Rectification of Defective Construction:** Where the surface irregularity of the W.B.M. sub-base course exceeds the tolerances specified in Table 1.7 or where the course is otherwise defective due to sub grade soil mixing with the aggregates, the layer to its full thickness shall be scarified over the attached area, reshaped with added material or removal and replaced with fresh materials as applicable, and recomputed. The area treated in the aforesaid manner shall not be less than 10 Sq.m. In no case shall depressions be filled up with screenings and binding materials.

**1.3.12 Measurement:** The length and breadth shall be taken to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre and at 30cm from the left and right edges at a cross section taken at 100 metre interval or less as decided by the Engineer-in-charge by making small pits. The consolidated cubical contents calculated in cubic metres correct to two places of decimal. The cubical contents for each 100 metre length should be compared with the volume of aggregate collected less 7.5% .

**1.4 Bases**

**1.4.0** The base course may consist of any one of the following (of size 63mm – 45mm or 53mm – 22.4 mm)

- Water Bound Macadam with Stone Aggregate: The stone aggregate of size 63mm to 45mm or 53mm to 22.4mm as specified shall be used. This is standard type of base course used in road work. In important roads such as national Highways and City Roads, this may form the lower part of the base course overlaid by a bitumen bound base.
- Water Bound Macadam Surfacing / Wearing Course with Stone Aggregate: Water Bound Macadam when laid as a surfacing / wearing course needs timely and constant maintenance. This will include patching pot holes, removal of ruts and blinding of surface with blinding material. This course is generally used only in roads of temporary nature.

**1.4.1 Water Bound Macadam (Base or Surfacing coarse)**

**1.4.1.1** Quantities of Materials: (Quantities of coarse aggregates and screenings required to be stacked for 75mm (approximate) compacted thickness of W.B.M. base courses for 10 Sq.m. shall be as specified in Table 1.8

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**Table 1.8**

Coarse Aggregate			Stone screening		
Classification	Size range	Net Quantity	Gradings/ classification & size	For W.B.M. base course	For W.B.M. surface course
Grading 2	63-45mm	0.91 cum to 0.96 cum	Type A 13.2mm	0.12 cum to 0.15 cum	0.10 cum to 0.12 cum
Do	63-45mm	0.91 cum to 0.96 cum	Type B 11.2mm	0.20 cum to 0.22 cum	0.16 cum to 0.18 cum
Grading 3	53-22.4mm	0.91 cum to 0.96 cum	Type B 11.2mm	0.18 cum to 0.21 cum	0.14 cum to 0.17 cum
<p>The quantity of binding material required for 75mm (approximate) compacted thickness will be 0.09 cum / 10 sqm in the case of W.B.M. base course and 0.13 cum / 10 sqm when the W.B.M. is to function as a surface course.</p> <p>* Net quantity means: The quantity of metal measured in stacks and reduced by 7.5%</p>					

**1.4.1.2** Preparation of foundation: Shall be specified in 1.3.2.

**1.4.1.3** Spreading coarse aggregate shall be as specified in 1.3.4 except that the W.B.M. base course shall be normally constructed in layers of not more than 75mm compacted thickness.

**1.4.1.4** Rolling: Application of Screening, Sprinkling and grouting and application of blending material shall be as specified under 1.3.5 to 1.3.8.

**1.4.1.5** Setting and Drying: After final compaction of the course, the road shall be allowed to cure overnight. The next morning, defective spots shall be filled with screenings or binding material, lightly sprinkled with water, if necessary and rolled. No traffic shall be allowed till the macadam sets.

**1.4.1.6 Surface Evenness:** The surface evenness of completed W.B.M. courses in the longitudinal and transverse directions shall be within the tolerance specified in Table 1.9.

**TABLE 1.9**

Size of coarse aggregate	Longitudinal profile measured with a 3 metre straight edge.			Cross profile
	Max. permissible undulations	Max. No. of undulations permitted in any 300 metre length exceeding		Max. permissible undulation when measured with a camber template
		12mm	10mm	
63-45 mm and 53-22.4 mm	12 mm	--	30	8 mm

The longitudinal profile shall be checked with a three metre long straight edge and graduated wedge at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with adjustable templates at intervals of 10 metres.

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**1.5 Surface Course****1.5.0** The main functions of surface course are :

- (a) To provide a dust free wearing course over base course such as water-bound macadam, or bitumen macadam.
- (b) To provide water-proof surface.
- (c) To protect water-bound macadam by preventing removal of binder between aggregate pieces.
- (d) To prevent disintegration of an old bitumen surface.
- (e) To provide a non-skid riding surface. This type of treatment is normally done for roads with medium density, rubber tyred traffic.

**The surface course may consist of any one of the following:**

- |  |           |
|--|-----------|
| (a) Surface dressing using hot bitumen                         | Two coats |
| (b) Surface dressing on new surface with hot bitumen           | One coat  |
| (c) Surface dressing on old surface with hot bitumen           | One coat  |
| (d) Surface dressing on new surface with bitumen emulsion      | One coat  |
| (e) Surface dressing on old surface with bitumen emulsion      | One coat  |
| (f) Premix carpet with hot bitumen                             |           |
| (g) Premix carpet with bitumen emulsion                        |           |
| (h) Bituminous Macadam using hot-mix plant and paver equipment |           |

**1.5.1 Surface Dressing using Hot Bitumen – Two Coats**

**1.5.1.0** This consists of the application of two coats of surface dressing each coat consisting of a layer of bituminous binder sprayed on a base prepared previously, followed by a cover of stone chippings properly rolled to form a wearing course. The existing water-bound macadam, kankar or gravel surface shall be rolled to form a wearing course. The existing water-bound macadam, kankar or gravel surface shall be cleaned thoroughly before application of bituminous binder. The work shall be carried out only when the atmospheric temperature in shade is 16 deg. C or above. No bituminous material shall normally be applied when the road surface or materials is damp, when the weather is foggy or rainy, or during dust storms.

**1.5.1.1** Materials: Binder shall be as specified and shall conform to Table 1.10 and stone chippings shall conform to grading as the Table 1.10. Unless otherwise specified or directed by the Engineer-in-charge the quantities of materials shall be as specified in Table 1.10. A proper record will be kept to ensure that the daily out-turn of work is co-related with the quantity of bitumen used.

**TABLE 1.10**

	Stone Chipping			Bitumen Quantity
	Nominal Size	Specification	Quantity	
First coat	13.2mm	100 percent passing through IS:22.4mm square mesh and retained on IS: 11.2mm square mesh	1.5 cum/ 100 sqm	1.8 kgm per sqm
Second coat	11.2mm	100 percent passing through 13.2mm square mesh and retained on 5.6mm square mesh	1.0 cum/ 100 sqm	1.1 kgm per sqm



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**1.5.1.2 First Coat:****(a) 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 materials.

For the purpose of repairs the area of pot holes shall be taken up to 0.75 sqm and depth up to 5cm. All pot holes, patches and ruts up to 2.5cm deep shall be repaired and brought to level with premix as specified in 1.5.7 and properly consolidated while those of depths greater than 2.5cm 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 30cm 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 up to a depth of about 10mm 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.

**(b) Applying Binder (hot bitumen)**

The binder shall be heated in a boiler to a temperature as specified under 1.1.4 for the grade used and maintained at the temperature, the use of a thermometer being essential.

The binder shall be applied evenly to the clean dry surface by means of a pressure sprayer at the rate specified. The binder shall be applied longitudinally along the length of the road and never across it. The edges of the binder surface shall be defined by wire or a rope stretched in position.

Heating in cut out drums and pouring from perforated tins, cans and such other methods shall not be permitted. Except in the case of petty works and repairs with the specific approval of the Engineer-in-charge.

Excessive deposits of binder caused by stopping or starting of the sprayer or through leakage or any other reason shall be suitably corrected before the stone chippings are spread.

**(c) Blinding or Spreading Stone Chippings**

Immediately after the binder is applied and while it is still hot, stone chippings free from dust and in a dry and clean state shall be spread evenly over the surface at the rate specified above. Spreading shall be done preferably by means of a mechanical gritter, otherwise manually with a twisting motion to avoid segregation which otherwise shall have to be removed by brushing the excess stone chippings over the surface into hungry spots to obtain a uniform surface, free from waviness, depressions and other irregularities. The surface shall be checked by means of a camber board laid across the road and a three metre straight edge laid parallel to the centre line of the road, and undulations if any shall be corrected by addition or removal of blindage till a surface free from undulation is obtained.

If a uniform surface is assured at this stage the completed surface should be normally free from undulations and unevenness.

**(d) Consolidation of Blindage**

Immediately following the application of the stone chipping and light brooming, the road surface shall be compacted by a power roller of 6 to 8 tonnes, starting at edges and working towards the centre (or to the outside edge in case of super elevated curve). Each pass of the roller shall uniformly overlap not less than one third of the track made in preceding pass. The roller shall be worked or started and stopped without jerks and shall not be stopped or reversed each time at the same location to cause displacement of stone and other irregularities, Consolidation shall be considered complete when the stone chippings are firmly embedded.

Generally five to six trips shall be made thorough compaction of the surface or as may be specified by the Engineer-in-Charge.

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Along kerbs, manholes and all places not accessible to the roller, compaction shall be secured by means of steel rammers or hand rollers.

**1.5.1.3 Second Coat:****(a) Cleaning the road surface**

The surface shall be examined and any loose material and foreign matter shall be removed by brooming or blowing off by fanning with gunny bags, care being taken not to loosen the blindage already set.

**(b) Applying binder (hot Bitumen)**

The second coat of binder shall be applied immediately after the blinding has been set and the surface has been cleaned. The binder shall be applied at the specified rate in the manner specified for the first coat (1.5.1.2 b)

**(c) Blinding of spreading stone chippings**

Immediately after the second application of binder, the stone chippings shall be spread at the specified rate in the manner described in 1.5.1.2 c.

**(d) Consolidation of blindage**

The specifications described in 1.5.1.2 (d) shall apply. Further the prepared finished surface shall be protected from traffic for 24 hours or such period as may be specified by the Engineer-in-charge.

**1.5.1.4 Surface Finishing:** The finished surface shall be uniform and conform to the lines, grades and typical cross-sections shown in the drawings.

**1.5.1.5** The finished surface shall be thrown open to traffic on the following day. Controlling traffic shall be done by suitable methods like barricading, posting of watchman etc.

**1.5.1.6 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 1.2.2 and 1.2.3 before they are actually used on the work. Premeasurements of materials taken for record purposes shall simply serve as a guide and shall not form the basis for payment.

**1.5.1.7 Rate:** The rate shall include the cost of materials and labour involved in all the operations described above, except for requires described under 1.5.1.2 (a)

**1.5.2 Surface Dressing on New Surface with Hot Bitumen One Coat**

**1.5.2.0** This type of treatment shall consist of cleaning the existing water bound macadam kankar or gravel surfaces, and applying one coat of hot bitumen on the prepared base, blinding it with stone chippings of 12.5mm nominal size and consolidation with a road roller. This type of treatment is normally done for a road with light density rubber tyred traffic and roads for temporary construction. This treatment is also done on existing water bound macadam before applying the final surface treatment. In the latter case, after applying a coat of painting the roads is thrown open to traffic till the road is consolidated. The final treatment is then given after making good the undulations etc., in the road surface.

**1.5.2.1** Preparation of Surface (Repairs and Cleaning) shall be specified under 1.5.1.2 (a).

**1.5.2.2** Applying binder, blinding, consolidation, surface finishing, measurements and rates shall be as specified under 1.5.1 except that binder shall be applied at the rate of 2.25 kg per sqm and stone chippings of size 13.2mm at 1.65 cum per 100 Sqm unless otherwise specified.

**1.5.3 Surface Dressing on Old Surface with Hot Bitumen One Coat**

**1.5.3.0** This treatment consists of cleaning old painted surfaces and applying a coat of hot bitumen on the prepared base, blinding with stone chippings and consolidation with road roller.

**1.5.3.1 Materials:** Binder shall be as specified and conform to 1.1.4, stone chipping shall conform to grading given in Table 1.10 for 11.2mm. Unless otherwise specified or directed by the Engineer-in charge stone chippings of 11.2mm nominal size shall be used @ 1.5 cum 100 sqm area and bitumen @ 1.95 kg per square metre area. A proper record shall be kept to ensure that the daily out turn of work is co-related with the quantity of bitumen used.

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- 1.5.3.2** Preparation of Surface (Repairs and cleaning) shall be as specified under 1.5.1.2(a).
- 1.5.3.3** Applying binder, Blinding, Consolidation, Surface Finishing, Measurement and Rate shall be as specified under 1.5.1 except that the binder and chippings shall be applied at the specified rate.
- 1.5.4 Surface Dressing on New Surface with Bitumen Emulsion – One Coat**
- 1.5.4.0** This treatment consists of cleaning the existing water bound macadam, kankar gravel or stabilised base and other black top surfaces, applying a coat of bitumen emulsion at atmospheric temperature, blinding it with stone chippings including consolidation with a road roller. This type of treatment is normally applied under damp conditions and for minor repair works during rainy season for roads with medium density, rubber tyred traffic such as service roads. This treatment is also done on existing water bound macadam before applying the final surface treatment. In the latter case, the road is consolidated. The final treatment is then given after making good the undulations depressions etc., in the road surface.
- 1.5.4.1** Materials: Binder shall be specified and shall conform to RS grade IS:8837. Stone chipping of 13.2mm size shall conform to Table 1.10. Unless otherwise specified or directed by the Engineer-in-charge. 13.2mm stone chippings shall be used @ 1.5 cum per 100 sqm area and bitumen @ 1.95 kg/sq.m. area. A proper record shall be kept to ensure that the daily out turn of work is correlated with the quantity of bitumen used.
- 1.5.4.2** Preparation of Surface: The specification described in 1.5.1.2 (a) shall apply except that the binder used for patch repairs etc. shall be bitumen emulsion.
- 1.5.4.3** Applying Binder: The specification described in 1.5.1.2(b) shall apply except that bitumen emulsion is not heated in boilers but it shall be spread at atmospheric temperature at the specified rate. In case the road surface is very dry the surface shall be very lightly sprinkled with water just before applying the binder.
- 1.5.4.4** Blinding including consolidation, Measurements and Rate shall be as specified under 1.5.1 except that the stone chippings shall be spread at the specified rate immediately after the bitumen emulsion on application breaks i.e. changes colour from brown to black.
- 1.5.5 Surface Dressing on Old Surface with Bitumen Emulsion – One Coat.**
- 1.5.5.0** This treatment consists of cleaning old painted surfaces and applying a coat of bitumen emulsion on the prepared base, blinding with stone chippings and consolidation with a road roller. This type of treatment is normally done under damp conditions.
- 1.5.5.1** Materials: Binder shall be as specified and shall conform to RS grade IS:8837.unless otherwise specified or directed by the Engineer-in-charge 11.2mm stone chippings shall be used @ 1.10cum per 100 sqm area and bitumen @ 1.22kg per sqm area. A proper record shall be kept to ensure that the daily out turn of work is correlated with the quantity of bitumen used.
- 1.5.5.2** Preparation of surface shall be as specified in 1.5.1 except that the binder used for patch repairs etc. shall be bitumen emulsion.
- 1.5.5.3** Applying binder, bitumen emulsion, blinding or Spreading to it including consolidation of blindage, measurement etc. shall be as specified under 1.5.1 except for preparation of surface and that the binder and stone chippings shall be used at the rates prescribed in 1.5.5.1.
- 1.5.6 Tack coat of hot straight run bitumen**
- 1.5.6.0** The rate of application of binder which shall be as specified and which shall conform to 1.1.5 shall depend on the surface on which the premix carpet is to be laid.
- (a) 0.75 kg/sqm on W.B.M surface.
- (b) 0.50 kg/sqm on existing black topped surface.
- 1.5.6.1** Materials:
- Bitumen: This shall be straight-run bitumen of penetration value 80/100 conforming to IS:73 Specifications.

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**1.5.6.2 Preparation of surface:**

**1.5.6.3** 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 blows, 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.

**1.5.6.4** 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 16 deg. C or below.

**1.5.6.5 Application of Tack Coat:**

**1.5.6.5.1** 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.

**1.5.6.5.2** 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.

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

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

**1.5.7.0** Premix carpet with hot bitumen: 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 2cm or 2.5cm 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 16 deg. C or below:

**1.5.7.1** Preparation of Surface: This shall be done as described in 1.5.1

**1.5.7.2** Materials: Quantities of Binder, stone chipping and grading of stone chipping shall be as per Table 1.11. Binder shall be as specified and shall conform to Table 1.11. Stone chippings shall conform to grading as per Table 1.11. Quantities of materials shall be as given in Table 1.11. A proper record shall be kept to ensure that the daily out turn of work is correlated with the quantity of bitumen.

**TABLE 1.11**

Consolidated thickness of premix carpet	Binder hot bitumen	Stone chippings (in cum/100 Sq.m).	
	Carpet	13.2mm size	11.2mm size
2.00 cm	52 kg/cum of 1.32mm size and 56 kg per cum of 11.2mm	1.8	0.90
2.50 cm	-do-	2.25	1.12

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- 1.5.7.3 Tack coat:** The rate of application of binder for tack coat shall be as specified. The rate will be depending upon the surface on which the premix carpet is to be laid i.e. water bound macadam surface or existing black topped surface. Tack coat shall be applied as described in 1.5.6.
- 1.5.7.4 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 boiler 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.

- 1.5.7.5 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 any 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 in no 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 the 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 specified by the Engineer-in-charge.

- 1.5.7.6 Surface Finishing:** The surface regularity both in longitudinal and transverse directions shall be within the tolerances specified in Table 1.12

**TABLE 1.12**

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

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**1.5.7.7 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.

**1.5.7.8 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 1.2.2 and 1.2.3 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.

**1.5.7.9 Rate :** The rate shall include the cost of materials and labour involved in all the operations described above for the particular item, except for the cost of "Repairs described under para 1.5.1.2(a)".

**1.5.8 Premix Carpet with Bitumen Emulsion**

**1.5.8.0** This type of work is not ordinarily recommended but may be done in case of urgent repairs under damp conditions.

**1.5.8.1. Materials:** Binder shall be as specified and shall conform to RS grade IS: 8837 grading of 11.2mm stone chipping shall be as per Table 1.12. Quantities of bitumen emulsion and stone chippings shall be as specified in Table 1.13. A proper record shall be kept to ensure that the daily out turn of works is correlated with the quantity of bitumen used.

**TABLE 1.13**

Consolidated thickness of premix carpet	Bitumen Emulsion	Stone Chippings
	For Carpet in cum of chippings	Cum per 100 sqm
2 cm	96	2.4 (11.2mm nominal size)
2.5cm	96	3.0 (11.2mm nominal size)

**1.5.8.2.** Preparation of surface and binder application shall be as specified under 17.5.4 except that the rate of application of bitumen for tack coat shall be 0.75 kg per sqm on water bound macadam surface and 0.5 kg per sqm on black topped surface.

**1.5.8.3.** Preparation, spreading, consolidating mix, surface finishing, measurements and rate shall be as specified under 1.5.7 except that the bitumen emulsion shall not be heated but it shall be poured over the aggregate at atmospheric temperature at the correct rate before spreading on the road surface, the rolling shall commence 24 hours after spreading the mixture. The surface shall be protected by a suitable device such as barricading and posting of watchmen for closing the traffic.

**1.5.9.0 Bituminous Macadam using hot mix Plant and Paver Equipment**

**1.5.9.1 General:** This shall consist of construction of a single or more courses of compacted crushed aggregates premixed with bitumen laid immediately after application of the tack coat. The thickness of single compacted course shall not exceed 75 mm.

**1.5.9.2 Materials :**

**1.5.9.2.1 Aggregates**

These shall be crushed or broken from hard stones obtained from approved quarry. These shall be clean, strong, durable of fairly cubical shape and free from disintegrated soft, friable, thin, elongated or laminated pieces. These shall also be free from dirt, organic, deleterious and any other foreign matter and adherent coatings. These shall conform to the physical requirements laid down in Table 1.5 under this item.



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(a) Grading: Aggregates shall conform to grading specified in Table 1.14

**TABLE 1.14**

Sieve Designation (IS: 460)	Percentage of wt. Passing the sieve	
	For 75 mm compacted thickness	For 50 mm compacted thickness
63mm	100	--
53mm	95 – 100	100
45mm	50 – 90	90 – 100
26.5mm	30 – 45	60 – 95
22.4mm	--	--
13.2mm	10 – 25	15 – 35
11.2mm	--	--
5.6mm	--	--
2.8MM	--	--
90 microns	0 – 5	0 – 5

**1.5.9.2.2** Bitumen : it shall be straight run bitumen of penetration value 80/100 conforming to IS : 73.**1.5.9.3** Mixing :**1.5.9.3.1** Weather & Seasonal limitations : Bitumen macadam shall not be laid during rainy weather or when the surface is damp or wet or when the temperature is less than 16 deg. C under shade.**1.5.9.4** Plant : A hot mix Plant of adequate capacity not less than 30 tonne per hr. Capacity and capable of producing a proper and uniform quality mix shall be used for preparing the mix. The plant may be either a batch type or a continuous one, having a co-ordinated set of essential units such as a drier for heating the aggregates, device for batching/ feeding by weight or volume the required quantities of aggregate, a binder heating and control unit for metering out the correct quantity of heated binder together with a mechanical mixer for thorough mixing of the binder and aggregates.**1.5.9.5** Temperature: The temperature of the binder at the time of mixing shall be in the range of 150 deg. C – 177 deg. C and of aggregates in the range of 155 deg. C – 163 deg. C. At no time, however, shall the difference in temperature between the aggregates and the binder exceed 14 deg. C. At no time shall bitumen of aggregates be over heated.**1.5.9.6** The hot graded aggregates and bitumen shall be measured separately and as accurately as practicable, to the proportion in which they are to be mixed. Mixing shall be done thoroughly so that a homogeneous mixture is obtained in which all the particles are uniformly coated.

If feasible, a suitable site as approved by the Engineer-in-charge near the works site for the mixer and for the storage of materials shall be provided free of rent to the contractor. No claim whatsoever on this account shall be entertained by the Department.

**1.5.9.7** Transporting Mixed Materials:**1.5.9.7.1** The mixed materials shall be transported from mixing plant to the point of use in clean vehicles. Every precaution shall be taken to avoid segregation of mixed materials and to ensure that they do not become contaminated with dust or foreign matter. In order to maintain satisfactory temperature of materials in transit, particularly in cold weather, and to prevent undue loss of heat, adequate precautions shall be taken by covering the materials to ensure that the materials are properly protected during transportation. The temperature of the mix in every transporting vehicle shall be checked immediately prior to discharge into the spreader. If the temperature of any batch is below the laying temperature specified in para 1.5.9.8.1 the mix shall be rejected and shall be removed from site immediately.

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**1.5.9.8 Laying:**

**1.5.9.8.1** The mix transported from the hot mix plant to the site shall be spread by means of a self propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mixture to specified width and profile without causing segregation, dragging, burning, irregularities or other surface defects. The paver shall be capable of being operated at spread consistent with the character of the mix and the thickness of the course being laid, so as to produce a surface having a uniform density and surface texture. Where not operated on side forms, the spreader shall employ equalizing runners, evener arms or other devices to adjust the profile and confine the edges of the course to true lines. The temperature of the mix at the time of laying shall be in the range of 110 deg. C to 135 deg. C

**1.5.9.8.2** Hand spreading is prohibited.

**1.5.9.9 Rolling:**

**1.5.9.9.1** After spreading of the mix consolidation shall be done by an approved power driven roller or rollers weighing not less than 8/10 tonnes each. Rolling shall start as soon as possible after the material has been spread. Rolling shall be done with care to keep from unduly roughening of the pavement surface. Rolling shall start longitudinally at the sides and proceed towards the centre of the pavement, over lapping on each successive trip by at least one half the width of a rear wheel. End stop channel boards may have to be used if the middle portion of the pavement is taken first. Alternate strips of the roller shall be slightly different lengths.

**1.5.9.9.2** The speed of the roller shall not exceed 5 km per hour and shall at all points be slow enough to avoid displacement of the mixture and, any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall at once be corrected by the use of rakes and addition of fresh mixture where required.

**1.5.9.9.3** 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 fresh material. Rolling shall then proceed continuously with at least 10 passes of the roller till no further compaction is possible. To prevent adhesion of the mixture to the wheels of the roller, the wheel shall be kept damp with water, but excess of water shall not be permitted. In no case shall fuel lubricating oil be used for this purpose.

**1.5.9.10 Joints:**

**1.5.9.10.1** Longitudinal joints and edge shall be constructed true to the delineating line parallel to the centre line of runway. The longitudinal lane joints shall be truly vertical in straight lines which are continuous for the full length of the pavement, or in smooth curves around bends. The exposed vertical edges of the longitudinal lane joints shall be carefully cut back and trimmed to firm material in the compacted lane, or for minimum of one and a half times the layer thickness, whichever is the greater. Arising from this operation shall be removed from the pavement and the underlying surface cleaned. The exposed joints shall then be cleaned and painted with hot bitumen immediately before the laying of lane continues. Nothing extra shall be paid on this account.

**1.5.9.10.2** Transverse Joints: They shall be formed at right angles to the longitudinal joints, and truly vertical. The exposed vertical edges of the transverse joint shall be cut back and trimmed to firm, material or for a distance of not less than 1.5 times the thickness of layer whichever is greater. Arising from this operation shall be removed from the pavement and the underlying surface cleaned. The exposed joints shall then be cleaned and painted with hot bitumen immediately before the laying of the lane continues. Nothing extra shall be paid on this account.

**1.5.9.11** Pavement Edges: Pavement shall be laid to correct width and alignment. To achieve straight and vertical edges, contractor shall either use adequate side shuttering or cut back the edges to correct width and alignment by removing extra mix spread. Nothing extra shall be paid on this account.

**1.5.10.0 DENSE GRADED BITUMINOUS MIXES (Dense Bituminous Macadam (DBM), Dense Bituminous Macadam (DBM), Semi-Dense Bituminous Concrete (SDBC) & Bituminous Concrete)**

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- 1) This specification deals with the basic outline for the design, construction and controls needed while laying dense graded bituminous mixes in base course, binder course and wearing course .  
.In case of discrepancy in the following specification, relevant IRC 111 latest edition shall have the precedence.
- 2) Dense graded bituminous mixes shall consist of mineral aggregate and appropriate bituminous binder, mixed in a hot mix plant and laid with a mechanized paver Dense graded bituminous mixes, such as, binder and wearing courses are usually laid on a previously prepared bituminous layer. Binder course is the intermediate layer between bituminous base course and bituminous wearing course. Three different specifications for dense graded bituminous mixes are available for use for highways Purpose, layer thickness and number of layers allowed for these specifications are given in Table I

**Table 1**

Types of Dense Graded Bituminous Mixes, their Use, Number of Layers and Layer Thickness

<b>Specification</b>	<b>Purpose</b>	<b>Number of Layers</b>	<b>Thickness of each Layer</b>
Dense Bituminous Macadam (DBM)	Base/ Binder course/overlay for Strengthening	Single or Multiple	50 mm - 100 mm
Semi-Dense Bituminous Concrete (SDBC)	Wear ino	Single	25 mm to 40 mm
Bituminous Concrete	Wearing Course	Single	25 mm/40 mm/ 50 mm

**3) MATERIALS****3.1 Bitumen**

- 3.1.1 The bitumen for dense graded bituminous mixes shall comply with Indian Standard Specification for viscosity-graded paving bitumen, IS: 73 or modified bitumen complying with the IS: 15462 Guidelines for selection of grade of viscosity-graded paving bitumen and modified bitumen are given in Tables 2 to 4

**Table 2**

Viscosity Graded (VG) Bitumens and their General Applications

<b>Viscosity Grade</b>	<b>General Applications</b>
VG-40 (40-60 penetration)	Use in highly stressed areas such as those in intersections, near toll booths, and truck parking lots in lieu of old 30/40 penetration grade
VG-RO (50-70 penetration)	Use for paving in most of India in lieu of old 60/70 penetration glade
VG-20 (60-80 penetration)	Use for paving in cold climatic. high altitude regions of North India
VG-IO (80-100 penetration)	Use in spraying applications and for paving in very cold climate in lieu of old 80/100 penetration grade

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3.1.2 The type and grade of bitumen to be used shall be specified in the Contract

3.1.3 Both the highest daily mean air temperature and the lowest daily mean air temperatures mentioned in Tables 3 and 4 can be obtained for the weather station nearest to the project site from the Indian Meteorological Organization (IMO). The IMO has data on daily mean high temperature for all 365 days in a year for all weather stations based on historical records of the last 30-40 or more years. This daily mean high temperature on a specific day is the same as daily "normal" high temperature for that day as usually reported in some newspapers. The highest of the R65 daily mean high air temperatures (which usually occurs on some day in May or June) is used in Tables 3 and 4. Likewise, the lowest daily mean air temperature (which usually occurs on some day in January) can also be obtained from the IMO.

**Table 3**

Selection Criteria for Viscosity-Graded (VG) Paving -Bitumen Based on Climatic Conditions

Highest Daily Mean Air Temperature °C

Lowest daily mean Air Temperature, °C	Less than 20 °C	20 °C to 30 °C	More than 30 °C
More than -10 °C	VG-10	VG-20	VG-30
-10 °C or lower	VG-10	VG-10	VG-20

**Table 4**

Selection Criteria for Grade of Modified Bitumen

Highest Daily Mean Air Temperature °C,

Lowest Daily Mean Air Temperature, °C	Less than 20 °C	20 to 30°C	More than 30°C
	Grade of Modified Bitumen		
More than -10 °C	PMB/NRMB 120 CRMB 50	PMB/NRMB 70 CRMB 55	PMB/NRMB 40 CRMB 60
-10 °C or lower	PMB/NRMB 120 CRMB 50	PMB/NRMB 120 CRMB 50	PMB/NRMB 70 CRMB 55

PMB - Polymer Modified Bitumen ,NRMB - Natural Rubble Modified Bitumen CRMB- Crumb Rubber Modified Bitumen

**Note :** When commercial vehicles exceeds 2000 per day per lane and the highest daily mean temperature exceeds 40°C. V G-40 or modified bitumen of equivalent stiffness are recommended for bituminous concrete and top layers of dense bituminous macadam.

### 3.2 Coarse Aggregate

3.2.1 The coarse aggregate shall consist of crushed rock, crushed gravel or other hard material retained on 2.36 mm sieve. It shall be clean, hard, durable and have cubical shape, free from dust and soft organic and other deleterious substances. The aggregate should preferably be of low porosity. The coarse aggregate shall satisfy the physical requirements specified in Table 5.

3.2.2 Where crushed gravel is proposed as aggregate, not less than 95% and 90% by weight of the crushed material retained on 4.75 mm sieve shall have at least two fractured faces for bituminous concrete and DBM/SDBC respectively.

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**3.3 Fine Aggregate**

3.3.1 Fine aggregate shall consist of crushed or naturally occurring mineral material, or a combination of two, passing 2.36 mm sieve and retained on 0.075 mm sieve. No natural sand will be allowed in the binder and wearing courses and no more than 50 percent natural sand will be allowed in the base courses. The fine aggregate shall be clean, hard, durable, dry and free from dust and soft organic and other deleterious substances. Fine aggregate shall have a sand equivalent value not less than 50 when tested in accordance with the requirement of IS: 2720 Part 37. The plasticity index of the fraction passing the 0.425 mm sieve shall not exceed 4 when tested in accordance with IS: 2720 Part 5.

**Table 5**  
Physical Properties of Coarse Aggregate

Property	Test	Requirement	Test method
Cleanliness	Grain size analysis	Max. 5% passing 0.075 mm	IS: 2386 Part 1
Particle Shape	Flakiness and Elongation Index combined	Max-35%	IS: 2386 Part 1
Strength *	Los Angeles Abrasion Value	BC-Max. 30% Others-Max 35%	IS: 286 Part IV
	Aggregate impact Value	BC-Max.24%	IS: 2386 Part IV
		Others -Max.27%	
Polishing **	Polished Stone Value	Min. 55	IS: 2386 Part IV
Durability	Soundness (Either Sodium or Magnesium Sulphate) – 5 cycles		
	Sodium Sulphate	Max.12%	IS: 2386 Part V
	Magnesium Sulphate	Max.18%	IS: 2386 Part V
Water Absorption	Water Absorption	Max 2%	IS: 2386 Part 111
Stripping	Coating and Stripping of Bitumen Aggregate Mixtures	Min. Retained Coating 95%	IS:6241
Water sensitivity	Retained Tensile strength***	Min 80%	ASHTO 283

Notes:

\* The aggregate may satisfy either of the two tests.

\*\* Only for wearing courses

\*\*\* If the minimum retained tensile strength falls below 80%, use of anti-stripping agent is recommended to meet the minimum requirements.

3.4.1 Filler shall consist of finely divided mineral matter such as rock dust or hydrated lime or cement approved by the Engineer. The use of hydrated lime is encouraged because of its very good anti-stripping and antioxidant properties. The filler shall be graded within the limits indicated in Table 6

**Table 6**  
Grading Requirement of Mineral Filler

IS Sieve (mm)	Cumulative % passing by weight of total aggregate
0.6	100
0.3	95-100
0.075	85-100

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3.4.2 The filler shall be inert material free from organic impurities and have plasticity index not greater than 4 Plasticity index requirement will not apply if filler is hydrated lime or cement Where the complete bituminous mixture fails to satisfy requirement of Moisture Susceptibility test (AASHTO T283 with freeze & thaw option), 2% by total weight of aggregate of hydrated lime shall be used and percentage of fine aggregate reduced accordingly. Please refer Annex A of IRC 111-2009 for the outline of AASHTO T283.

3.5 Aggregate Grading and Bitumen Content:

3.5.1 The combined grading of the coarse aggregate, fine aggregate and filler, when tested in accordance with IS 2386 Part I , wet sieving method, shall conform to limits given in Table 7.

3 5 2 The combined aggregate grading shall not vary from the lower limit on one sieve to the higher limit on the adjacent sieve to avoid gap grading

**Table 7**  
**Aggregate Grading and Bitumen Content**

Specification	DBM		SDBC		BC	
Grading	1	2	1	2	1	2
Nominal maximum aggregate size *	37.5	26 5 mm	132mm		19 mm	13 2 mm
Layer thickness	75-100 mm	50-75	40 mm	25 mm	50 mm	25/40 mm
IS Sieve size (mm)	Cumulative Percent by weight of total aggregate passing					
45	100					
37.5	95-100	100				
26.5	63-93	90-100			100	
19		71-95	100		90-100	100
13.2	55-75	56-80	90-100	100	59-79	90-100
9.5			70-90	90-100	52-72	70-88
4.75	38-54	38-54	35-51	35-51	35-55	53-71
2.36	28-42	28-42	24—39	24—39	28—44	42-58
1.18			15-30	15-30	20-34	34—48
0.6					15-27	26-38
0.3	7-21	7-21	9—19	9—19	10-20	18-28
0.15					5-13	12-20
0.075	2-8	2-8	3-8	3-8	2-8	4—10
Bitumen content (Min)**	4%	4.5%	4.5%	5%	5.2%	5.4%

\* Nominal maximum aggregate size is the largest specified sieve size upon which any of the aggregate material is retained

\*\* Corresponds to specific gravity of the Aggregate being 2.7 . In case aggregate have specific gravity more than 2.7, bitumen content can be reduced proportionately Further for regions where highest daily mean air temperature is 30°C or lower and lowest daily mean air temperature is (-)10°C or lower, the bitumen content may be increased by as much as 0.5 percent.



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3.5.3 Bitumen content indicated in Table 7 is the minimum only The exact bitumen content required shall be determined following the Marshall Mix Design procedure contained in the Asphalt Institute Manual MS-2 (Sixth Edition)

3.5.4 The fines to bitumen (F/B) ratio by weight of total mix shall range from 0.6 to 1.2 for all mixes in Table 7.

**4)Design Mix****4.1 Mix Requirements**

4.1.1 Besides conforming to the requirement of grading and quality for individual ingredients the mix shall meet the requirement set out in Tables 8 depending upon the type of binder

**Table 8**  
**Requirement of the Dense Graded Bituminous Mix Using Viscosity-Graded (VG) Paving/Modified Bitumen**

Properties	Viscosity Grade Paving Bitumen	Modified Bitumen		Test Method
		Hot Climate	Cold Climate	
Compaction level (Number of blows)	75 blows on each face of the specimen			
Minimum stability (kN at 60°C)	9.0	12	10	AASHTO T245
Marshall flow (mm)	2 - 4	2.5 - 4	3.5 - 5	AASHTO T245
Marshall Quotient (stability/flow)	2 - 5	2.5 - 5		
% Air Voids	3-5			MS-2 and ASTM D2041
% Voids filled with bitumen (VFB)	65-75			MS-2
Tensile Strength Ratio	80% (Minimum)			AASHTO T283
Coating of Aggregate Particles with bitumen		95% (Minimum)		IS: 6241
% Voids in Mineral aggregate VMA				
Nominal Maximum Particle size (mm)	Min % VMA related to designed % air Voids ***			
	3	4	5	
9.5	14	15	16	
13.2	13	14	15	
19.0	12	13	14	
26.5	11	12	13	
37.5	10	11	12	

\*\*\* For intermediate value of designed percentage air voids interpolate the VMA

**4.2 Binder Content**

4.2.1 The binder content shall be selected to obtain 4 percent air voids in the mix design and shall meet all requirements given in Table The Marshall Method for designing the mix shall be adopted as described in the sixth edition of the Asphalt Institute Manual MS-2

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4.2.2 Where maximum size of the aggregate is more than 26.5 mm, modified Marshall method using 150 mm (6 inches) diameter specimen described in the Asphalt Institute Manual MS-2 (Sixth Edition) and ASTM D5581 shall be used. This test method requires modified equipment and procedure. When the modified Marshall test is used, the specified minimum stability values and the specified flow values given in Table 8 shall be multiplied by 2.25 and 1.5, respectively.

**4.3 Job Mix Formula**

4.3.1 The laboratory mix design gives the proportion of the mineral aggregate combination in terms of individual sieve sizes, for actual operational purpose in the field, blending of the two or more sizes of aggregates (each size having within its range of individual sieve size) would be necessary. This blending ratio is obtained on a weight basis giving percent weight of the coarse aggregate, fine aggregate and filler needed to give the ultimate gradation. This mineral aggregate combination together with the corresponding optimum bitumen content as determined in the laboratory, constitute the job mix formula for implementation during construction. The job mix formula proposed for the use in the work shall give the following details:

- 1 Source and location of all materials
- 2 Proportions of all materials
- 3 Binder type and percentage by weight of total mixture
- 4 Coarse aggregate/fine aggregates/mineral filler as percentage by weight of total aggregate including mineral filler
- 5 A single definite percentage passing each sieve for the mix aggregate
- 6 The individual grading of the individual aggregate fraction and the proportion of each in the combined grading
- 7 The test results of mix design such as maximum specific gravity of loose mix (G<sub>mm</sub>), compacted specimen densities, Marshall stability, flow, air voids, VMA, V<sub>FB</sub> and related graphs, and test results of AASHTO T 283 Moisture Susceptibility test
- 8 In case of batch mixer, the individual weight of each type of aggregate and binder per batch
- 9 Test results of aggregates
- 10 Mixing and compacting temperatures

4.3.2 Annual of the job mix formula shall be based on independent testing by the Engineer on the samples furnished by the contractor. It should be ensured that it is based on the truly representative samples of the material that will be used for the work. New job mix formula shall be got approved whenever there is change in the material used for the work.

**4.4 Plant Trial**

4.4.1 Plant trial shall be carried out to establish that the plant can produce uniform mix conforming to the job mix formula. The permissible variation of the various ingredients in the actual mix from the job mix formula shall be within the limits as given in **Table 9**. These variations are intended to apply to individual specimen taken for quality control test in accordance with Clause 6

**Table 9** Permissible Variation from the Job Mix Formula:

Description	Permissible Variation	
	DBM	SDBC/BC
Aggregate passing		
19 mm or larger	± 8 %	± 7 %
13.2 mm/9.5 mm	± 7 %	± 6 %
4.75 mm	± 6 %	± 5 %
2.36 mm, 1.18 mm, 0.6 mm	± 5 %	± 4 %
0.3 mm, 0.15 mm	± 4 %	± 3 %
0.075 mm	± 2 %	± 1.5 %
Binder Content	± 0.3 %	± 0.3 %
Mixing Temperature	± 10 °C	± 10 °C

**TECHNICAL CONDITIONS OF CONTRACT****::26::****4.5 Laying Trials**

- 4.5.1 Laying trials are carried out to establish that the proposed mix can be successfully laid and compacted. The laying trial shall be carried out in an area, which does not form a part of the work. The minimum area for laying trials shall be 100 sqm. This shall be similar to the project area on which the bituminous layer is to be laid. Methodology, equipment and mix shall also be similar to those proposed for the project.
- 4.5.2 The trials establish that the proposed laying plan, compaction plan, and methodology are capable of producing satisfactory results. The density of finished paving layer should not be less than the 92% of the average density (Sample size N=2) based on theoretical maximum specific gravity of the loose mix (G<sub>mm</sub>) obtained on the day of trial following ASTM D2041. See Annex B for the outline of ASTM D2041.

**5. CONSTRUCTION OPERATION****5.1 Preparation of Base**

- 5.1.1 Cleaning of the surface: The surface shall be cleaned of all loose extraneous matter by means of mechanical broom and high-pressure air jet from compressor or any other approved equipment/method.
- 5.1.2 Filling-up of potholes and sealing of cracks: Any potholes and/or cracks shall be repaired and sealed.
- 5.1.3 Geosynthetics or stress absorbing layers: Where required, layer of geosynthetics/ stress absorbing material shall be laid.
- 5.1.4 Profile correcting course: Depending upon requirement, profile-correcting course for correcting the existing pavement profile shall be laid either as a separate layer or as a composite layer with varying thickness. Where the maximum thickness of the profile corrective course is less than 40 mm, the profile corrective course shall be laid as an integral part of the overlaying layer. In other cases the profile corrective course shall be constructed as a separate layer. When it is laid as a separate layer, type of material for the use as the profile corrective course may differ.

**5.2 Tack Coat**

- 5.2.1 Tack coat: Tack Coat shall be as per IRC: 16 "Standard Specification and Code of Practice for Prime and Tack Coat".

**5.3 Mixing**

- 5.3.1 Dense graded bituminous mixes 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 aggregate. The essential features of the hot mix plant are given in Annex A of IRC: 27 "Specifications for Bitumen Macadam". Table 10 gives the mixing, laying, and rolling temperatures for dense graded mixtures. In case of modified bitumen, the temperature of mixing and compaction shall be higher than the mix with conventional bitumen as binder. The exact temperature depends upon the type and amount of modifier used and shall be adopted as per the recommendations of the manufacturer. In order to ensure uniform quality of mix the plant shall be calibrated from time to time.

**Table 10**

Mixing, Laying and Rolling Temperatures for Dense Mixtures (Degree Celsius)

Bitumen Viscosity Grade	Bitumen Temperature	Aggregate Temperature	Mixed Material Temperature	Laying Temperature	*Rolling Temperature
VG-40	160-170	160-175	160-170	150 Min.	100 Min.
VG-30	150-165	150-170	150-165	140 Min.	90 Min.
VG-20	145-165	145-170	145-165	135 Min.	85 Min.
VG-10	140-160	140-165	140-160	130 Min.	80 Min.

\*Rolling must be completed before the mat cools to these minimum temperatures

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**5.4 Transportation**

5.4.1 Bituminous material shall be transported in clean, insulated covered vehicles. An asphalt release agent, which does not adversely affect the bituminous mix, may be applied to the interior of the vehicle to prevent sticking and to facilitate discharge of the material.

5.4.2 Laying

5.4.3 Weather and seasonal limitations: Dense graded bituminous mixes shall not be laid:

- a) in presence of standing water on the surface
- b) when rain is imminent and during rains, fog or dust storm
- c) when the base/binder course is damp,
- d) when the air temperature on the surface on which it is to be laid is less than 10°C for mix with conventional bitumen as binder and is less than 15 °C for mix with modified bitumen as binder
- e) When the wind speed at any temperature exceeds the 40 km/h at 2 m height

5.4.4 Preparation of the base: Base shall be prepared by carrying out all or some of the operations as per Clause 5.1, depending upon the site conditions.

5.4.5 Spreading: Except in areas where paver cannot access, bituminous material shall be spread, levelled and tamped by self-propelled hydrostatic paver finisher preferably with sensor. As soon as possible after arrival at site the material shall be supplied continuously to the paver and laid without delay. The rate of delivery of material to the paver shall be regulated to enable the paver to operate continuously. The travel rate of paver and the method of operation shall be adjusted to ensure even and uniform flow of bituminous material across the screed, free from dragging, tearing and segregation.

Restricted areas (such as confined space, footways, irregular shape and varying thickness, approaches to expansion joints etc.) where paver cannot be used, the material shall be spread, raked and levelled with suitable hand tool by trained staff.

When laying dense graded bituminous mixes near expansion joint, the machine laying shall be stopped about 300 mm short of joint. The remainder of the pavement up to the joint and the corresponding area beyond it shall be laid manually. Table 10 gives the minimum laying temperatures. Bituminous material, with temperature greater than 145°C shall not be laid or deposited on bridge deck waterproofing system unless precautions against the heat damage have been taken.

**5.5 Compaction**

5.5.1 Compaction shall commence as soon as possible after laying and shall be completed before the temperature falls below the minimum rolling temperatures given in Table 10. Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this the rolling shall commence at the edge and progress towards the centre longitudinally except at sections with unidirectional camber, where it shall progress from lower edge to upper edge parallel to centreline of the pavement.

5.5.2 All deficiencies in the surface after laying shall be made good by the attendant behind the paver, before initial rolling is commenced. The initial or breakdown rolling shall be done with the 8 to 10 tonnes dead weight 01 vibratory steel wheel roller. The intermediate rolling shall be done with 8 to 10 tonnes dead weight 01 vibratory roller or with a pneumatic roller of 12 to 15 tonnes, with a tire pressure of at least 0.56 MPa. The finished rolling shall be done with 6 to 8 tonnes smooth wheel roller. Rolling shall continue till all the rolled marks are removed from the surface and the minimum specified field density is achieved.

5.5.3 The dense graded bituminous mixes shall be rolled in the longitudinal direction, with the roller as close as possible to the paver. The overlap on successive passes should be at least one third of the width of the rear 1011 or in the case of pneumatic wheeled rollers, at least the nominal width of 300 mm. The roller should move at a speed of no more than 5 km/hour. The roller shall

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not be permitted to stand on pavement, which has not been fully compacted All precautions shall be taken to prevent dropping of oil, grease, petrol 01 other foreign material on the pavement The wheel of the rollers shall be kept moist with the water 01 spray system provided with the machine to prevent the mixture from adhering to the wheels Minimum moisture to prevent adhesion between wheels and mixture shall be used and surplus water shall not be allowed to stand on the partially completed pavement

- 5.5.4 The density of the finished paving layer shall be determined by taking 150 mm diameter cores The density of finished paving layer shall not be less than the 92% of the average (sample size N=2) theoretical maximum specific gravity of the loose mix (Gmm) obtained on that day in accordance with ASTM D2041. Please refer Annex B of IRC 111 -2009 for the outline of ASTM D2041

**5.6 Joints**

- 5.6.1 Where joints are made, the material shall be fully compacted and the joint made flush in one of the following ways

- a) All joints shall be cut vertical to the full thickness of the previously laid mix All loosened material shall be discarded and the vertical face be coated with any viscosity grade bitumen, or cold applied emulsified bitumen While spreading the material along the joint the material spread shall overlap 25 mm to 50 mm on the previously laid mix beyond the vertical face of the joint The thickness of the loose overlap material should be approximately a quarter more than the final compacted thickness The overlapped mix should be dragged back to the hot lane so that the roller can press the small excess into the hot side of the joint to obtain a high joint density.
- b) By using two 01 more pavers in echelon, where this is practicable and in sufficient proximity for adjacent width to be fully compacted by continuous rolling

- 5.6.2 In multi-layer construction the longitudinal joint in one layer shall offset the joint in the underneath layer by about 150 mm

- 5.6.3 For transverse joints method a) above can apply Transverse joints in the successive and adjoining layers should have a minimum offset of 2 m.

**5.7 Arrangement for Traffic**

- 5.7.1 It shall be ensured that traffic is not allowed on the surface until the paved mat has cooled below a temperature of 60°C in its entire depth

**6. CONTROLS****6.1 Surface Finish**

- 6.1.1 The levels of the dense graded bituminous mixes shall not vary from those calculated with reference to longitudinal and cross profile of the roads as per the Contract beyond  $\pm 6$  mm provided that the negative tolerance shall not be permitted in conjunction with the positive tolerance for the base course if the thickness of the former is thereby reduced by more than 6 mm
- 6.1.2 For checking the compliance with the above requirement measurements of the surface level shall be taken on a grid of points spaced 6.25 m along the length and 0.5 m from the edges and at the centre of the pavement. The compliance shall be deemed to be met for the final road surface only if the tolerance given above is satisfied for any point on the surface
- 6.1.3 In case where surface levels fall outside the specified tolerance, the Contractor shall be liable to rectify these by replacing the full depth of layer In all cases of replacement the area treated shall not be less than 5 m in length and not less than 3.5 m in width

**6.2 Surface Evenness**

- 6.2.1 The measurement and checking of surface unevenness shall be done by a 3 m straight edge in accordance with the procedures in IRC:SP: 16

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- 6.2.2 The maximum permissible surface unevenness in longitudinal profile shall be 6 mm for SDBC and 5 mm for The maximum permissible unevenness in transverse profile shall be 4 mm for both SDBC and BC.
- 6.2.3 The maximum permissible frequency of surface unevenness in 300m length in longitudinal profile shall be as per Table 11

**Table 11**

Maximum Permissible Frequency of Unevenness

Maximum Number of Surface Unevenness

Type of Surface	Unevenness,	NH/SH	MDR and Lower Category
Semi-Dense Bituminous Concrete	4—6	20	40
Bituminous Concrete	3-5	15	30

- 6.2.4 Where the surface unevenness falls outside the tolerance, in either case i e. the surface is low or high, the full depth of the layer shall be and replaced with fresh material and compacted to the specification
- 6.2.5 In all cases of removal and replacement the area treated shall not be less than 5 m in length and 3.5 m width

**6.3 Surface Roughness**

- 6.3.1 Surface roughness shall be checked in accordance with procedures in IRC:SP: 16
- 6.3.2 The maximum permissible values of surface roughness measured with a bump integrator are given in Table 12 Newly constructed surface are expected to give roughness values corresponding to Good category While the Average and Poor categories indicate level of service and the intervention criteria.

**Table 12**

Maximum Permissible Values of Roughness (mm/km) for Surface with Dense Graded Bituminous Mixes

Type of surface	Condition of Road Surface (mm / km)		
	Good	Average	Poor
SDBC	< 2500	2500-3500	> 3500
BC	< 2000	2000-3000	> 3000

**6.4 Quality Control during execution**

- 6.4.1 The material supplied and the work shall conform to the specifications prescribed in the preceding Clauses to ensure the quality of the material and the work, control tests shall be conducted during the execution of the paving project. The tests and minimum frequency for each test is indicated in Table 13.

**6.5 Acceptance Criteria**

- 6.5.1 The acceptance criteria for test on density (N = 3 minimum) and Marshall stability (N = 2 minimum) shall be subjected to the condition that the mean value of N samples is not less than the specified value plus  $[1.65 - 1.65/(\text{No of samples})^{0.5}] \times \text{standard deviation}$
- 6.5.2 Table 9 will govern the permissible variation in the mix and temperature

**TECHNICAL CONDITIONS OF CONTRACT****::30::****Table 13** Control Tests for Dense Graded Bituminous Mixes and their Minimum Frequency

S.no	Test	Frequency
1	Quality of binder	Number of samples per lot and tests as per IS: 73 01 IRC:SP: 53
2	Aggregate impact value/Los Angeles Abrasion value	One test per 350 m <sup>3</sup> of aggregate for each source and whenever there is change in the quality of aggregate
3	Flakiness index	One test per 350 m <sup>3</sup> of aggregate for each source and whenever there is change in the quality of aggregate
4	Soundness test (Sodium and Magnesium Sulphate test)	1 test for each source and whenever there is change in the quality of aggregate
5	Water absorption of aggregate	1 test for each source and whenever there is change in the quality of aggregate
6	Sand equivalent test	1 test for each source and whenever there is change in the quality of aggregate
7	Plasticity Index	1 test for each source and whenever there is change in the quality of aggregate
8	Polished stone value	1 test for each source and whenever there is change in the quality of aggregate
9	Percent of fractured faces	One test per 350 m <sup>3</sup> of aggregate when crushed gravel is used.
10	Mix grading	One set for individual constituent and mixed aggregate from dryer for each 400 tonnes of mix subject to minimum of two tests per day per plant
11	Stability and voids analysis of mix including theoretical maximum specific gravity of loose mix	3 tests for stability, flow value, density and void contents for each 400 tonnes of mix subject to minimum of two tests per day per plant
12	Moisture Susceptibility of mix (AASHTO T 283)	1 test for each mix type whenever there is change in the quality or source of coarse or fine aggregate
13	Temperature of binder in boiler, aggregate in dryer and mix at the time of laying and compaction	At regular intervals
14	Binder Content	One set for each 400 tonnes of mix subject to minimum of two tests per day per plant
15.	Rate of spread of mix material	After every 5 <sup>th</sup> truck load
16	Density of compacted layer	One test per 700 m <sup>2</sup> area

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1. Water and Electricity required for construction shall be supplied at a single point at free of cost.
2. Any time during construction if it is found that the water is being wasted, penalty at the rate of **₹1000.00** per day will be levied for those days on which it is found.
3. The Department has the right to stop the water supply to contractor at any stage without giving any prior notice due to shortage of water. The contractor in such cases has to make his own arrangements for such periods at his own cost.
4. In case of ambiguity in schedule, specification or details the same shall be read / followed as per I.S / CPWD specifications for the respective items in consultation with Engineer-In-Charge and generally confirming to I.S. or CPWD specifications.
5. **WORKING HOURS AND WORKING CONDITIONS:**
  - No worker shall be required or allowed to work on Sunday unless he has or will have a holiday on anyone of the three days before or after the said day.
  - The Contractor shall inform BHEL Management in the prescribed form details of the contract
  - workers scheduled to work on Sunday, the day of rest and also indicate the substituted holiday in lieu thereof. This shall be intimated two days in advance before his workmen are booked for work on Sunday.
  - The contract labour working for more than nine hours in any day or for more than 48 hours in any week shall be paid wages at the rate of twice the ordinary rate of wages in accordance with the provisions of Sections 59 of the Factories Act 1948.
  - The Contractor shall provide all safety devices and personal protective equipment to his
    - workmen at his own cost and shall ensure that his workmen wear / use such devices or
    - equipment provided to them while doing the work and there should not be any relaxation on this.
  - The Contractor shall give four paid National Holidays to his workers, viz., 26th January, 1st May, 15th August and 2nd October.
  - The Contractor shall ensure that his workmen vacate the premises after the shift is over.
  - The Contractor shall give leave with wages to his workmen who have worked for a period of 240 days or more in the Factory premises during a calendar year. This leave shall be allowed during the subsequent calendar year at the rate of one day for every 20 days of work performed by the worker during the previous calendar year. The worker whose services commences on a day other than the first of January shall be entitled to leave with wages at the above rate (One day for every 20 days of work) only if he had worked for a minimum of 2 / 3 of the total number of days in the reminder of the calendar year. This leave will be admissible only during the subsequent calendar year.
  - No woman worker shall be required or allowed to work in the Factory except between the hours of 6.00 A.M. and 7.00 P.M.
  - The Contractor shall comply with the provisions relating to Welfare and Health facilities as provided in the Contract Labour (Regulation and Abolition) Act 1970 read with the Tamil Nadu Contract Labour Rules 1975.



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6. Since the work involves different agencies, contractor should co-ordinate with other agencies to plan the work and ensure the progress of work as directed.
7. The successful tenderer should maintain a site office cum stores within the premises at the site shown by the company and should maintain the minimum stock of all materials to attend the works in short notice. The contractor or his representative should be available at all times at site during office hours to receive instructions.
8. The contractor has to arrange his own tools and equipment such as road roller, mixers, vibrators and etc.,
9. The quantities provided in the schedule are only provisional and may vary according to exigencies of work and no claim can be entertained on this score.
10. **All required tools, tackles and materials as per scope (Cement, steel and other construction materials) are in contractor's scope. No materials/ tools are in BHEL scope.**
11. The contractor shall forward a bar-chart indicating proposal to complete the work within the stipulated period. BHEL, Visakhapatnam reserves the right to fix the priorities and revise the bar-chart. The bar-chart shall be submitted before entering into formal agreement for specific works.
12. The contractor should follow the rules and regulations annexed with for employment of labour by contractors in BHEL, Visakhapatnam.
13. Work Contract Tax on the bill value will be deducted at source at the rates specified by the Government from time to time as per the Act.
14. The tenderer should satisfy all the statutory obligations required under statutory of the Government from time to time.
15. If incomplete tenders in the form is furnished or where total value is not entered, such tenders will be summarily rejected. Management reserves the right to accept or reject any or all the tenders or part thereof without assigning any reason whatsoever. No correspondence will be entertained when once the tenders are decided.
16. All the tools, tackles and safety items (like Safety Shoes/Rubber Shoes, Goggles, Safety Jacket, Helmet, Gloves, Masks & Apron etc.) will be under the scope of the contractor

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**BHARAT HEAVY ELECTRICALS LIMITED**  
Heavy Plates & Vessels Plant, Visakhapatnam

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**CHAPTER -1****1. GENERAL INSTRUCTION TO TENDERERS****1.1. DESPATCH INSTRUCTION**

- i) The General Conditions of Contract form part of the Tender specifications. **For this tender, bidders shall use electronic Signature viz Digital Signature Certificate while uploading the tender documents on the e-procurement portal.** The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.
- ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., he shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non-compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.
- iii) Integrity pact (IP) shall be applicable for all tenders / contracts if indicated in NIT. This IP shall be issued as part of the Tender documents and shall be submitted by the bidder along with Techno-commercial bid duly filled, signed and stamped by the authorized signatory who signs the bid. . Entering into this pact shall be a preliminary qualification.

**1.2. SUBMISSION OF TENDERS**

- 1.2.1. The tenderers must submit their tenders to Officer inviting tender as per instructions in the NIT.
- 1.2.2. Tenders shall be submitted through E-Procurement portal as per instruction in NIT. Tenderers to upload offers well in advance in order to avoid last minute congestion in e-procurement website. However, after submission of the tender, the tenderer can re-submit revised tender but before due date and time of submission of tender as notified.
- 1.2.3. Tenders shall be opened by Officer of BHEL at the time and date as specified in the NIT. For this tender, bidders may attend through online mode, if provisions are available in e-procurement portal.
- 1.2.4. Tenderers whose bids are found techno commercially qualified shall be notified through e-procurement system about the date and time of opening of the Price Bids. BHEL's decision in this regard shall be final and binding.
- 1.2.5. The information given in the tender documents is for general guidance and shall not be construed as contractually binding on BHEL/ Owner. All relevant site data/ information as may be necessary for bidding shall have to be obtained/ collected by the Tenderer.
- 1.2.6. The Tenderers are advised to physically visit the site to acquaint and satisfy themselves about the weather conditions, working culture in the area, socio-political environment, safety & security aspects, law & order situation, law of the land, transportation routes, various distances, surroundings of plant/ project premises together with all statutory, obligatory, mandatory requirements of various authorities and obtain for themselves all necessary information as to the risks, contingencies and all other circumstances, which may influence or affect the discharge of various obligations under the Contract during contract period including extended period (if any).

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1.2.7. The submission of bid will tantamount to due diligence having been done and it shall be deemed that:

- a) the Tenderer has obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Works
- b) the Tenderer accepts total responsibility for having foreseen all difficulties and costs of successfully completing the Works
- c) the Tenderer accepts that, the Contract Price shall not be adjusted to take account of any unforeseeable or unforeseen difficulties or costs and the Tenderer shall not raise any claims/ disputes against BHEL and/ or Owner at later date in any manner whatsoever.

1.2.8. The Tenderer shall mandatorily be required to submit “Site Visit Confirmation Declaration” along with the Technical Bid.

### 1.3. **LANGUAGE**

1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. Tenderers are requested to refer the clauses of NIT/ Vol-II “Price Bid” for more details. For the purpose of the tenders, the metric system of units shall be used.

1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

### 1.4 **PRICE DISCREPANCY:**

1.4.1 **Price Bid opening:** During opening of price bids, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

1.4.2 **Reverse Auction:** In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. (Guidelines as available on [www.bhel.com](http://www.bhel.com) on “supplier registration page”).

### 1.5 **QUALIFICATION OF TENDERERS**

- i) Only tenderers who have previous experience in the work of the nature and description detailed in the Notice Inviting Tender and/or tender specification are expected to quote for this work duly detailing their experience along with offer.
- ii) Offers from tenderers who do not have proven and established experience in the field shall not be considered.
- iii) The offers of the bidders who are on the debarred list shall be rejected. Further, offer of the bidders, who engage the services of the debarred firms or associated with the debarred firm, for present bid, shall also be rejected. The list of debarred firms is available on BHEL web site [www.bhel.com](http://www.bhel.com). (Refer clause 28.0 of NIT).
- iv) Offers from tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt. of India shall not be considered.

### 1.6. **EVALUATION OF BIDS**

- i) Technical Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer.
- ii) In case the same qualifying experience is claimed by more than one agency, then:
  - a. The agency who has executed the work as per documentary evidence submitted shall only be qualified. Scope of qualifying work should be totally with the agency who has executed and in case it is only labour and consumables without T&P, then the credentials of execution is assigned to the first agency and not to the agency who has executed only as labour supply contractor. Further, BHEL reserves the right to ask for any other proof for the said job.

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- b. However, if the same is on account of subletting, part of scope by one agency to another agency in a project of BHEL, experience of both the agencies may be considered for the sublet portion of the work provided subletting has been done with the approval of BHEL.
  - iii) In case the qualifying experience is claimed by bidder is based on 'Work Order' and 'Experience Certificates' from any organization other than BHEL (main agency), then it shall be the responsibility of the bidder to submit (in addition to the experience certificate from main agency) relevant certificate regarding qualifying experience from the end Customer or the Turnkey-Contractor (if any) who has awarded the work to main agency, as a proof for having executed subject qualifying work. BHEL reserves the right to ask for any other proof for the said job.
  - iv) Assessing Bidder's Capacity for executing the current tender shall be as per Notice Inviting Tender.
  - v) Price Bids of shortlisted bidders shall only be opened through the electronic price bid opening with/without Reverse Auction, at the discretion of BHEL. Unless specified otherwise in the tender, the L1 bidder amongst all the shortlisted bidders shall be considered for award. However, the L1 bidder shall have no claim on the award & BHEL reserves the right to award the tender at its sole discretion.
  - vi) Price Bids of unqualified bidders shall not be opened. Reasons for rejection shall be intimated in due course either through system generated e-mail or through letter/e-mail after award to successful bidder.
  - vii) Bidders are advised to also refer to clause no 2.9.4 regarding evaluation of their performance in ongoing projects.
- 1.7. DATA TO BE ENCLOSED**
- Full information shall be given by the tenderer in respect of the following. Non submission of this information may lead to rejection of the offer.
- i) **INCOME TAX PERMANENT ACCOUNT NUMBER**  
Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/Firm/Individual Partners etc. shall be furnished along with tender.
  - ii) **ORGANIZATION CHART**  
The organization chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.
  - iii) An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor.
  - iv) **IN CASE OF INDIVIDUAL TENDERER:**  
His / her full name, address, PAN and place & nature of business.
  - v) **IN CASE OF PARTNERSHIP FIRM:**  
The names of all the partners and their addresses, copy of the partnership deed/instrument of partnership duly certified by the Notary Public shall be enclosed.
  - vi) **IN CASE OF COMPANIES:**
    - a) Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished).
    - b) Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.
- 1.8 AUTHORIZATION AND ATTESTATION**
- Tenders shall be signed by a person duly authorized/empowered to do so, for which a Power of Attorney is to be submitted along with the tender offer. For company, a Power of Attorney (as per format in Volume-I D) shall be submitted.

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## 1.9 EARNEST MONEY DEPOSIT

1.9.1 Every tender must be accompanied by the prescribed amount of Earnest Money Deposit (EMD) in the manner described herein.

- i) EMD shall be furnished before tender opening / along with the offer in full as per the amount indicated in the NIT.
- ii) **The EMD up to an amount of Rs. 2 Lakh** is to be paid only in the following forms:
  - a) Cash deposit as permissible under the extant Income Tax Act (before tender opening).
  - b) Electronic Fund Transfer credited in BHEL account (before tender opening).
  - c) Banker's cheque / Pay order / Demand draft, in favour of 'Bharat Heavy Electricals Limited' and payable at Regional HQ issuing the tender (along with offer).
  - d) Fixed Deposit Receipt (FDR) issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL) duly marking lien in favour for BHEL (along with offer). The Fixed Deposit in such cases shall be valid for at least six months from the due date of tender submission.
  - e) Insurance Surety Bonds
  - f) **In case EMD amount is more than Rs. Two Lakhs**, Tenderer has the option to submit the amount in excess of Rs. Two lakhs in the forms described above in clause no. 1.9.1. ii) (a) to (e) or in the form of Bank Guarantee from Scheduled Bank (along with the Offer). The Bank Guarantee in such cases shall be valid for at least six months from the due date of tender submission. The Bank Guarantee format for EMD shall be in the prescribed formats.
- iii) No other form of EMD remittance shall be acceptable to BHEL.
- iv) Proof of EMD: Bidder shall upload the scanned copy of EMD along with bid submission through BHEL e-procurement Portal. However, for the purpose of realization, the bidder shall send the demand draft/ banker's cheque/ pay order/ Bank Guarantee/ FDR/ Insurance Surety Bonds, in original, to the designated officer through post/courier or by hand within reasonable time.

1.9.2 EMD by the Tenderer will be forfeited as per NIT conditions, if:

- i) After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL. OR
- ii) The successful Contractor, on whom the work has been awarded, fails to deposit the required Security deposit or commence the work within the period as per LOI/ LOA/ Contract or refuse to accept the LIO/LOA/Contract.  
EMD by the tenderer shall be withheld in case any action on the tenderer is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors" of BHEL and forfeited/ released based on the action as determined under these guidelines.

1.9.3 EMD shall not carry any interest.

1.9.4 EMD given by all unsuccessful tenderers shall be refunded normally within fifteen days of award of work.

1.9.5 Cash portion of EMD of successful tenderer will be retained as part of Security Deposit. EMD submitted in the form of Bank Guarantee/ FDR shall be retained by BHEL until the receipt of the Security Deposit.

## 1.10 SECURITY DEPOSIT

1.10.1 Upon acceptance of Tender, the successful bidder shall be required to deposit the 5% of the contract value as Security Deposit towards fulfilment of any obligations in terms of the provisions of the contract.

1.10.2 The Security Deposit shall be furnished before start of the work by the contractor.

1.10.3 The required Security Deposit may be accepted in the following forms.

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- i) Cash (as permissible under the extant Income Tax Act).
- ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
- iii) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
- iv) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format for Security Deposit shall be in the prescribed formats.
- v) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL). Specific lien in favour of BHEL on the FDR shall be marked and letter from the Bank having created such lien in the format shall be submitted along with FDR.
- vi) Insurance Surety Bonds.

**Note:**

- i. BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.
- ii. In case of delay in submission of Security Deposit, enhanced security deposit which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder before submission of first bill

1.10.4 The Security Deposit shall not carry any interest.

1.10.5 In case the value of work exceeds the awarded / accepted value, the Security Deposit shall be correspondingly enhanced as given below:

- i) The enhanced part of the Security Deposit shall be immediately deposited by the Contractor or adjusted against payments due to the Contractor.
- ii) Contract value for the purpose of operating the increased value of Security Deposit due to Quantity Variation, shall be exclusive of Price Variation Clause, Over Run Compensation and Extra works done on man-day rates.
- iii) The recoveries made from running bills can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of competent authority of BHEL.

1.10.6. The validity of Bank Guarantees towards Security Deposit shall be valid till actual completion of work + Guarantee Period + 3 months,.

1.10.7 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims, damages and remedies in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL by giving prior notice to the contractor.

### **1.11 RETURN OF SECURITY DEPOSIT**

Security Deposit shall be released to the contractor upon fulfilment of contractual obligations as per terms of the contract including completion of Guarantee Period after deducting all expenses / other amounts due to BHEL under the contract.

### **1.12 BANK GUARANTEES**

Where ever Bank Guarantees are to be furnished/submitted by the contractor, the following shall be complied with



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- i) Bank Guarantees shall be from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. Bank Guarantees issued by Co-Operative Banks/ Financial Institutions shall not be accepted.
- ii) The Bank Guarantees shall be as per prescribed formats.
- iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period as per the advice of BHEL Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.
- iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Construction Manager and submitted to the Regional HQ issuing the LOI/LOA.
- v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.
- vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.
- vii) The Original Bank Guarantee shall be submitted to Subcontracting Department of CPC (Central Procurement Cell) - PSHQ of BHEL unless specified otherwise in TCC.

**1.13 VALIDITY OF OFFER**

The rates in the Tender shall be kept open for acceptance for a minimum period of **SIX MONTHS** from latest due date of offer submission (including extension, if any). In case BHEL (Bharat Heavy Electricals Ltd) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

**1.14 EXECUTION OF CONTRACT AGREEMENT**

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Award by Bharat Heavy Electricals Limited.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Award, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by BHEL.

**1.15 REJECTION OF TENDER AND OTHER CONDITIONS**

- 1.15.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender nor any tender and reserves to itself full rights for the following without assigning any reasons whatsoever: -
  - a) To reject any or all of the tenders.
  - b) To split up the work amongst two or more tenderers as per NIT.
  - c) To award the work in part if specified in NIT.
  - d) In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.
- 1.15.2 Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc. are liable to be rejected.
- 1.15.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL or tenderer under suspension (debarred) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt of India. BHEL reserves the right to not consider a bidder for further processing of tender in case it is observed that they are overloaded and may not be in a position to execute this job as per

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the required schedule in line with clause no. 9.0 of the 'NIT'. The decision of BHEL will be final in this regard.

- 1.15.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character. In case BHEL resolves to cancel the tender under this clause, BHEL will issue a notice in this regard containing reasons as to the cancellation of tender. The contractor shall be required to furnish his response to such notice within a period of 14 days from the date of receipt of such notice through any means (BHEL reserves the right to decrease the period up to 05 days). BHEL after due consideration of the representation made by contractor shall communicate its final decision within a reasonable period.

In case contractor fails to submit any response to the notice issued by BHEL within the period stipulated in the notice, BHEL at its discretion may proceed to cancel the contract.

Contractor shall not be eligible for any compensation whatsoever for the cancellation of contract under this clause

- 1.15.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. BHEL may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.
- 1.15.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.
- 1.15.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.
- 1.15.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer.

**1.16 INTIMATION OF CHANGE OF NAME/ RECONSTRUCTION OF THE ORGANIZATION:**

In the event of the organization (Proprietorship/Partnership/Company) undergoing any change of name or reconstitution, prior intimation of the same shall be given to BHEL. Upon such changes coming into effect, the same is to be intimated to BHEL immediately with supporting documents as applicable.

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**CHAPTER-2****2.1 DEFINITION:**

The following terms shall have the meaning hereby assigned to them except where the context otherwise requires.

- i) BHEL shall mean Bharat Heavy Electricals Limited, a company registered under Indian Companies Act 1956, having its Registered Office at BHEL HOUSE, SIRI FORT, NEW DELHI – 110 049, and its office at HPVP, Visakhapatnam-530012 (inviting tenders) or its Authorized Officers.
- ii) “**EXECUTIVE DIRECTOR**” or “**GENERAL MANAGER (In- charge)**” or “**GENERAL MANAGER**” shall mean the Officer in Administrative charge of the respective UNIT/Power Sector Region.
- iii) “**COMPETENT AUTHORITY**” shall mean BHEL Officers who are empowered to act on behalf of BHEL
- iv) “**ENGINEER**” or “**ENGINEER IN CHARGE**” shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as “Engineer” on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes ‘**CONSTRUCTION MANAGER**’ or ‘**SITE IN CHARGE**’ as well as Officers at Site or at the Headquarters of the respective Power Sector Regions. For the purpose of joint measurement, verification, certification and/ or approval of the work and/ or documents under the contract the word “Engineer” or “Engineer In charge” shall be deemed to include the Engineers of the Customer and/ or his Consultant also.
- v) “**SITE**” shall mean the places or place at which the plants/ equipment are to be erected and services are to be performed as per the specification of this Tender.
- vi) “**CLIENT OF BHEL**” or “**CUSTOMER**” shall mean the project authorities with whom BHEL has entered into a contract for supply of equipment or provision of services.
- vii) “**CONTRACTOR**” shall mean the successful Bidder/Tenderer who is awarded the Contract and shall include the Contractor’s successors, heirs, executors, administrators and permitted assigns.
- viii) “**CONTRACT**” or “**CONTRACT DOCUMENT**” shall mean and includes the Agreement or Work Order, the accepted appendices of Rates, Schedules, Quantities if any, Offer submitted by contractor including acceptance to General Conditions of Contract, Special.

Conditions of Contract, Instructions to the Tenderers, Drawings, Technical Specifications, the Special Specifications if any, the Tender documents, subsequent amendments /corrigendum to Tender mutually agreed upon and the Letter of Intent/ Award/ Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement or amendment thereof.

- ix) “**GENERAL CONDITIONS OF CONTRACT**” shall mean the ‘**Instructions to Tenderers**’ and ‘**General Conditions of Contract**’ pertaining to the work for which above tenders have been called for.
- x) “**TENDER SPECIFICATION**” or “**TENDER**” or “**TENDER DOCUMENTS**” shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexures, Corrigendum, Amendments, Forms, Procedures, Site information etc. and drawings/documents pertaining to the work for which the tenderers are required to submit their offers. Individual specification number will be assigned to each Tender Specification.
- xi) “**LETTER OF INTENT/ AWARD**” shall mean the intimation by a Letter/Fax/email to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date.
- xii) “**COMPLETION TIME**” shall mean the period by ‘date/month’ specified in the ‘Letter of Intent/Award’ or date mutually agreed upon for handing over of the intended scope of work, the erected

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equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.

- xiii) **“PLANT”** shall mean and connote the entire assembly of the plant and equipment covered by the contract.
- xiv) **“EQUIPMENT”** shall mean equipment, machineries, materials, structural, electricals and other components of the plant covered by the contract.
- xv) **“TESTS”** shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
- xvi) **“APPROVED”, “DIRECTED” or “INSTRUCTED”** shall mean approved, directed or instructed by BHEL.
- xvii) **“WORK or CONTRACT WORK”** shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipment to the entire satisfaction of BHEL.
- xviii) **“SINGULAR AND PLURALS ETC”** words carrying singular number shall also include plural and vice versa, where the context so requires. Words imparting the masculine Gender shall be taken to include the feminine Gender and words imparting persons shall include any Company or Associations or Body of Individuals, whether incorporated or not.
- xix) **“HEADING”** – The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.
- xx) **“MONTH”** shall mean calendar month unless otherwise specified in the Tender.
- xxi) **‘Day’ or ‘Days’** unless herein otherwise expressly defined shall mean calendar day or days of twenty-four (24) hours each. A Week shall mean continuous period of seven (7) days.
- xxii) **“COMMISSIONING”** shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been completed and Equipment with associated system is ready for taking into service.
- xxiii) **“WRITING”** shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.
- xxiv) **“TEMPORARY WORK”** shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
- xxv) **‘CONTRACT PRICE’ or ‘CONTRACT VALUE’** shall mean the sum mentioned in the LOI/ LOA/ Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained.
- xxvi) **‘EXECUTED CONTRACT VALUE’** shall mean actual value of works executed by the contractor and certified by BHEL. This value shall not include PVC, ORC, Extra Works and Taxes.
- xxvii) **“COMMENCEMENT DATE” or “START DATE”** shall mean the commencement/start of work at Site as per terms defined in the Tender.
- xxviii) **“SHORT CLOSING” or “FORE CLOSING”** of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor.
- xxix) **“TERMINATION”** of Contract shall mean the pre-mature closing of contract due to reasons as mentioned in the contract.
- xxx) **“DE MOBILIZATION”** shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor.

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xxxi) “**RE MOBILIZATION**” shall mean the resumption of work with all resources required for the work after demobilization.

xxxii) “**OVERRUN CHARGES (ORC)**” shall mean and include all the costs incurred by the Contractor during the extended period of the contract, including but not limited to any cost arising out of idle labour, administrative cost, T & P and machinery.

## 2.2 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Laws of India. Subject to clause 2.21.1.1 of this contract, the Civil Court having original Civil Jurisdiction at .....( e.g. **Delhi for PSNR/ Kolkata for PSER/ Nagpur for PSWR/ Chennai for PSSR**, shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.

## 2.3 ISSUE OF NOTICE

### 2.3.1 Service of notice to the Contractor

Any notice to be given to the Contractor under the terms of the contract shall be served by sending the same by **Email/ Registered Post/Speed Post to or leaving the same at** the Contractor’s last known address of the principal place of business (or in the event of the contractor being a company, to or at its Registered Office). In case of change of address, the notice shall be served at changed address as notified in writing by the Contractor to BHEL. Such dispatch or display ~~posting or leaving~~ of the notice as the case may be shall be deemed to be good service of such notice and the time mentioned to the condition for doing any act after notice shall be reckoned from the date so mentioned in such notice.

### 2.3.2 Service of notice to on BHEL

Any notice to be given to BHEL In-charge of the Region under the terms of the Contract shall be served by sending the same by Registered/AD or Speed post to BHEL address or changed address as notified in writing by BHEL to the Contractor.

## 2.4 USE OF LAND

No land belonging to BHEL or their Customer under temporary possession of BHEL shall be occupied by the contractor without written permission of BHEL.

## 2.5 COMMENCEMENT OF WORK

2.5.1 The contractor shall commence the work as per the time indicated in the Letter of Intent/Award from BHEL and shall proceed with the same with due expedition without delay.

2.5.2 If the contractor fails to start the work within stipulated time as per LOI/ LOA or as intimated by BHEL, then BHEL at its sole discretion shall have the right to cancel the contract. The Earnest Money and/or Security Deposit furnished by the contractor to under this tender will stand forfeited without any further reference to him and without prejudice to BHEL’s other rights and remedies under this contract and the applicable laws in this regard.

2.5.3 All the work shall be carried out under the direction and to the satisfaction of BHEL.

## 2.6 MEASUREMENT OF WORK AND MODE OF PAYMENT:

2.6.1 All payments due to the contractors shall be made by e mode only, unless otherwise found operationally difficult for reasons to be recorded in writing and approved by contract executing department.

2.6.2 For progress running bill payments: - The Contractor shall present detailed measurement sheets in triplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per contract. The basis of arriving at the quantities, weights shall be relevant documents and drawings released by BHEL. These measurement sheets shall be prepared jointly with BHEL Engineers and signed by both the parties.

2.6.3 These measurement sheets will be checked by BHEL Engineer and quantities and percentage eligible for payment under various groups shall be decided by BHEL Engineer. The abstract of

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quantities and percentage so arrived at based on the terms of payment shall be entered in Measurement Book and signed by both the parties.

**2.6.4** Based on the above quantities, contractor shall prepare the bills, along with statutory documents, in prescribed format and work out the financial value. These will be entered in Measurement Book and signed by both the parties. Payment shall be made by BHEL after effecting the recoveries due from the contractor.

**2.6.5** All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained to the contrary.

**2.6.6** Measurement shall be restricted to that portion of work for which it is required to ascertain the financial liability of BHEL under this contract.

**2.6.7** The measurement shall be taken jointly by persons authorized on the part of BHEL and by the Contractor.

**2.6.8** The Contractor shall bear the expenditure involved if any, in making the measurements and testing of materials to be used/ used in the work. The contractor shall, without extra charges, provide all the assistance with appliances and other things necessary for measurement.

**2.6.9** If at any time due to any reason whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re measurements shall be borne by the contractor unless such re measurements are warranted solely for reasons not attributable to contractor.

**2.6.10** Passing of bills covered by such measurements does not amount to acceptance of the completion of the work measured. Any left out work has to be completed, if pointed out at a later date by BHEL.

Final measurement bill shall be prepared in the final bill format prescribed for the purpose based on the certificate issued by BHEL Engineer that entire works as stipulated in tender specification has been completed in all respects to the entire satisfaction of BHEL. The Contractor shall submit the final bill in line with WAM 7 format as per tender documents with an additional recording of the dispute, if any and shall sign with the following declaration:

*I/ We hereby certify that I/We have performed the work as per the terms and conditions of Contract Agreement/Work Order No.....dated.....for which payment is claimed as above and that I/We have no further claim under this agreement/work order\* except for the following (nature of claim with details & amount claimed, if any. NIL may be mentioned if there are no further claims). –*

a).....

b).....

c) .....

It is agreed that the authorized signatory of Contractor shall necessarily record his claims/ dispute in Form WAM 7 only and any claim(s)/ dispute in any other form/ letter shall not be taken cognizance of by BHEL and admissible before any forum. BHEL shall make the payment of undisputed amount within the stipulated time without any unreasonable delay.

All the tools and tackles loaned to him should be returned in satisfactory condition to BHEL. The abstract of final quantities and financial values shall also be entered in the Measurement Books and signed by both parties to the contract. The Final Bill shall be prepared and paid within a reasonable time after completion of work.

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## 2.7 RIGHTS OF BHEL

BHEL reserves the following rights in respect of this contract during the original contract period or its extensions if any, as per the provisions of the contract, without entitling the contractor for any compensation.

**2.7.1** To withdraw any portion of work and/or to restrict/alter quantum of work as indicated in the contract during the progress of work and get it done through other agencies to fulfil BHEL's commitment to its customer or the date of completion is advance due to other emergent reasons/ BHEL's obligation to its customer.

Where the contractor fails to deploy adequate manpower to meet the contractual target, BHEL reserves the right to deploy manpower to meet such shortfall, through any other agency for expediting activities in the interest of the project. Supplied manpower shall be put on job by the contractor. Fulfilling of all obligations towards payments and other statutory compliances related to such manpower shall be the contractor's responsibility. In case of contractor's failure to fulfil his obligations in respect of such manpower, BHEL shall be entitled to take action as provided herein.

## 2.7.2 BREACH OF CONTRACT, REMEDIES AND TERMINATION:

**2.7.2.1** The following shall amount to breach of contract:

- I. Non-supply of material/ non-completion of work by the Supplier/Vendor within scheduled delivery/ completion period as per contract or as extended from time to time.
- II. The Supplier/Vendor fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery/ completion period to justify that supplies shall be inordinately delayed beyond contractual delivery/ completion period.
- III. The Supplier/Vendor delivers equipment/ material not of the contracted quality.
- IV. The Supplier/Vendor fails to replace the defective equipment/ material/ component as per guarantee clause.
- V. Withdrawal from or abandonment of the work by the Supplier/Vendor before completion as per contract.
- VI. Assignment, transfer, subletting of Contract by the Supplier/Vendor without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
- VII. Non-compliance to any contractual condition or any other default attributable to Supplier/Vendor.
- VIII. Any other reason(s) attributable to Vendor towards failure of performance of contract. In case of breach of contract, BHEL shall have the right to terminate the Purchase Order/ Contract either in whole or in part thereof without any compensation to the Supplier/Vendor.  
Any of the declarations furnished by the contractor at the time of bidding and/ or entering into the contract for supply are found untruthful and such declarations were of a nature that could have resulted in non-award of contract to the contractor or could expose BHEL and/ or Owner to adverse consequences, financial or otherwise.
- IX. Supplier/Vendor is convicted of any offence involving corrupt business practices, antinational activities or any such offence that compromises the business ethics of BHEL, in violation of the Integrity Pact entered into with BHEL has the potential to harm the overall business of BHEL/ Owner.

**Note**-Once BHEL considers that a breach of contract has occurred on the part of Supplier/Vendor, BHEL shall notify the Supplier/Vendor by way of notice in this regard. Contractor shall be given an opportunity to rectify the reasons causing the breach of contract within a period of 14 days.

In case the contractor fails to remedy the breach, as mentioned in the notice, to the satisfaction of BHEL, BHEL shall have the right to take recourse to any of the remedial actions available to it under the relevant provisions of contract.

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**LD against delay in executed work in case of Termination of Contract:**

LD against delay in executed work shall be calculated in line with LD clause no. 2.7.9 of GCC, for the delay attributable to contractor. For limiting the maximum value of LD, contract value shall be taken as Executed Value of work till termination of contract.

Method for calculation of “LD against delay in executed work in case of termination of contract” is given below.

- i) Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor = T1
- ii) Let the value of executed work till the time of termination of contract = X
- iii) Let the Total Executable Value of work for which inputs/fronts were made available to contractor and were planned for execution till termination of contract = Y
- iv) Delay in executed work attributable to contractor i.e.  $T2 = [1 - (X/Y)] \times T1$
- v) LD shall be calculated in line with LD clause (clause 2.7.9) of the Contract for the delay attributable to contractor taking “X” as Contract Value and “T2” as period of delay attributable to contractor.

**2.7.2.2 REMEDIES IN CASE OF BREACH OF CONTRACT.**

- i) Wherein the period as stipulated in the notice issued under clause 14.1 has expired and Contractor has failed to remedy the breach, BHEL will have the right to terminate the contract on the ground of "Breach of Contract" without any further notice to contractor.
- ii) Upon termination of contract, BHEL shall be entitled to recover an amount equivalent to 10% of the Contract Value for the damages on account of breach of contract committed by the Contractor. This amount shall be recovered by way of encashing the security instruments like performance bank guarantee etc available with BHEL against the said contract. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, from the money due to the Contractor etc. with BHEL) or the other legal remedies shall be pursued.
- iii) wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners:
- iv) In case the amount recovered under sub clause (a) above is not sufficient to fulfil the amount recoverable then; a demand notice to deposit the balance amount within 30 days shall be issued to Contractor.
- v) If Contractor fails to deposit the balance amount within the period as prescribed in demand notice, following action shall be taken for recovery of the balance amount:
  - a from dues available in the form of Bills payable to defaulted Contractor against the same contract.
  - b If it is not possible to recover the dues available from the same contract or dues are insufficient to meet the recoverable amount, balance amount shall be recovered from any money(s) payable to Contractor under any contract with other Units of BHEL including recovery from security deposits or any other deposit available in the form of security instruments of any kind against Security deposit or EMD.



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- c In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted Contractor.
- vi) It is an agreed term of contract that this amount shall be a genuine pre-estimate of damages that BHEL would incur in completion of balance contractual obligation of the contract through any other agency and BHEL will not be required to furnish any other evidence to the Contractor for the purpose of estimation of damages.
- vii) In addition to the above, imposition of liquidated damages, debarment, termination, descoping, short-closure, etc., shall be applied as per provisions of the contract.

**Note:** The defaulting contractor shall not be eligible for participation in any of the future enquiries floated by BHEL to complete the balance work. The defaulting contractor shall mean and include:

- (a) In case defaulted contractor is the Sole Proprietorship Firm, any Sole Proprietorship Firm owned by same Sole Proprietor.
- (b) In case defaulted contractor is The Partnership Firm, any firm comprising of same partners/ some of the same partners (but not including any new partner); or sole proprietorship firm owned by any partner(s) as a sole proprietor.

In case Contractor fails to deploy the resources as per requirement informed by BHEL in writing to expedite the work, BHEL can deploy own/hired/otherwise arranged resources and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC.

**2.7.4** To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contract with their customer are terminated for any reason, whatsoever.

**2.7.5** Whenever any Claim or Claims for payment of any sum of money(s) arises under this or any other contract against the contractor, BHEL shall be entitled to withhold and also have a lien to retain such sum of money(s) in whole or in part from any money(s) payable to contractor and/or security deposits furnished or deducted in cash from the bills of contractor, (if any) under this contract. In the event of the securities or the amounts payable to Contractor, being insufficient to cover BHEL claims, then BHEL shall be entitled to withhold and have a lien to the extent of such claims from any sum or sums found payable or which at any time thereafter may become payable to the contractor under this or any other contract with BHEL.

- a) Claim or Claims for payment of any sum of money(s) arising from the Contractor under this or any other contract against the contractor, shall mean, the sum of money(s) actually incurred by BHEL in fulfilling the contractual responsibilities of contractor under the contract, to which he has failed to fulfil plus applicable overheads (@ 5%) along with interest as applicable under the Contract on total amount (i.e. money actually incurred plus overheads)
- b) It is an agreed term of the contract that, the sum or sums of money so withheld or retained under the lien by BHEL will be kept withheld or retained as such by BHEL till the claims arising out of this or any other contract are finally adjudicated wither through Arbitration or a Court of competent jurisdiction as the case may be in accordance with the terms of contract. Intimation given by the BHEL Engineer regarding withholding of such money(s) shall be considered as sufficient and relevant date for all purposes. No Interest shall be payable on such sum(s) of money which becomes due or as the case may be adjudged to be due from BHEL to Contractor, whether under contract or otherwise.
- c) Where the contractor is a partnership firm, BHEL shall be entitled to withhold and also have a lien to retain towards such claims in whole or in part, from any other money(s) payable to any partner, whether in his individual capacity or otherwise.

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- d) If any money(s) shall, as a result of any claim or application made under the relevant provisions of any Labour Welfare Act and/ or Rules, including but not limited to Contract Labour Regulation & Abolition Act, Minimum Wages Act, Payment of Gratuity Act, BOCW (RE&CS ) Act, Provident Fund Act, Employee State Insurance Act, be directed to be paid by the BHEL, such money shall be deemed to be moneys payable to the BHEL by the Contractor.
- e) Where the Contractor fails to repay to BHEL such moneys along with applicable overheads (@ 5%) and interest, as aforesaid within seven days of being demanded, BHEL shall be entitled to recover the same from Contractor's bills/ Security Deposit or any other money(s) payable to Contractor under this Contract or any other Contract with BHEL.

**2.7.6** While every endeavour will be made by BHEL to this end, yet BHEL cannot guarantee uninterrupted work due to conditions beyond its control. The Contractor will not be normally entitled for any compensation/extra payment on this account unless otherwise specified elsewhere in the contract.

**2.7.7** BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:

- i) suspension of work(s) at a Project either by BHEL or Customer,  
or
- ii) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months

In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to terminate the contract and effect remedies under Clause 2.7.2.2. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor.

**2.7.8** In the unforeseen event of inordinate delay in receipt of materials, drawings, fronts etc. due to which inordinate discontinuity of work is anticipated, BHEL on its own or contractor's request at its discretion may consider to short close the contract in any of the following cases:

- a) The balance works (including but not limited to Trial Operation, PG Test etc.) are minor vis a vis the scope of work envisaged as per the contract.
- b) There has been no significant work in past 6 months OR no significant work is expected in next 6 months (example in Hydro projects or in projects where work has stopped due to reasons beyond the control of BHEL).
- c) The balance works cannot be done within a reasonable period of time as they are dependent on unit shut down or on other facilities of customer or any other such reasons not attributable to the contractor.

At the point of requesting for short closure, contractor shall establish that he has completed all works possible of completion and he is not able to proceed with the balance works due to constraints beyond his control. In such a case, the estimated value of the unexecuted portion of work (or estimated value of services to be provided for carrying out milestone/stage payments like Trial Operation/PG Test etc.) as decided by BHEL, shall however be reduced from the final contract value.

**Note:** The Contractor shall not be eligible for any compensation on account of Quantity Variation arising out of short-closure of contract as per clause no. 2.7.8 (b) above.

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### **2.7.9 LIQUIDATED DAMAGES**

Liquidated Damages, wherever referred under this Tender/Agreement, shall mean and refer to the damages, not in the nature of penalty, which the contractor agrees to pay in the event of delay in delivery of stores, installation, commissioning, breach of contract etc. as the case may be.

Liquidated Damages leviable upon the contractor is a sum which is agreed by the parties as a reasonable and genuine pre-estimate of damages which will be suffered by BHEL on account of delay/breach on the part of the contractor.

Liquidated Damages shall be calculated in the manner stipulated hereinafter:

In case the work is not completed within the stipulated time period, BHEL at its discretion may grant provisional time extension to contractor for the sole purpose of completion of balance works keeping its right reserved under the contract and law.

Grant of any provisional time extension shall by no means be considered as waiver of BHEL rights under the contract or law.

After the completion of work, duly certified by Engineer in charge, a comprehensive delay analysis shall be carried out to ascertain the attribution of delays in the provisional time extensions granted to contractor. The delay analysis shall record:

- a) Delays solely attributable to contractor
- b) Delays attributable to BHEL
- c) Delays on account of Force Majeure (as specified elsewhere in the contract)

The total period under the final time extension shall be equal to the period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/ levied for the portion of time

extensions solely attributable to contractor and recoverable from the dues payable to the contractor.

For the periods, wherein the delay as per the comprehensive delay analysis carried out is solely attributable to contractor, BHEL shall have the right to impose Liquidated Damage at the rate of 0.5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value.

Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Man-day rate basis, Supplementary/ Additional Items and PVC. Before levying LD, the contractor shall be duly intimated the amount and reasons thereof for imposition of LD.

### **2.8 RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS ETC.**

The following are the responsibilities of the contractor in respect of observance of local laws, employment of personnel, payment of taxes etc. The subcontractor shall fully indemnify BHEL against any claims of whatsoever nature arising due to the failure of the contractor in discharging any of his responsibilities hereunder:

- 2.8.1** As far as possible, Unskilled Workers shall be engaged from the local areas in which the work is being executed.
- 2.8.2** The contractor at all times during the continuance of this contract shall, in all his dealings with local labour for the time being employed on or in connection with the work, have due regard to all local festivals and religious and other customs.
- 2.8.3** The contractor shall comply with all applicable State and Central Laws, Statutory Rules, Regulations, Notifications etc. such as Payment of Wages Act, Minimum Wages Act, Workmen Compensation Act, Employer's Liability Act, Industrial Disputes Act, Employers Provident Fund and Miscellaneous Provisions Act, 1952, Employees State Insurance Scheme, Contract Labour (Regulation and Abolition) Act, 1970, Payment of Bonus & Gratuity Act, Building and Other

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Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, The Building and Other Construction Workers' Welfare Cess Act 1996 and other Acts, Rules, and Regulations for labour/workers as applicable and as may be enacted by the State Government and Central Govt. during the tenure of the Contract and having force or jurisdiction at Site. The Contractor shall also comply with provisions of and give all such notices to the local Governing Body, Police and other relevant Authorities as may be required by the Law. The Contractor shall without any fail maintain all the registers/records in proper formats as per all the Acts, Rules and Regulations mentioned in this clause 2.8.3.

- 2.8.4** The Contractor shall obtain independent License under the Contract Labour (Regulations and Abolition) Act, 1970 for engaging contract labour as required from the concerned Authorities based on the certificate (Form- V or as applicable) issued by the Principal Employer/Customer.
- 2.8.5** The contractor shall pay and bear all taxes, fees, license charges, Cess, duties, deposits, tolls, royalties, commission or other charges which may be leviable on account of his operations in executing the contract.
- 2.8.6** While BHEL would pay the inspection fees and Registration fees of Boiler/Electrical Inspectorate, all other arrangements for site visits periodically by the Inspectorate to site, Inspection certificate etc. will have to be made by contractor. However, BHEL will not make any payment to the Inspectorate in connection with contractor's Welders/Electricians qualification tests etc.
- 2.8.7** Contractor shall be responsible for provision of Health and Sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act), Safety precautions etc. as may be required for safe and satisfactory execution of contract.
- 2.8.8** The contractor shall be responsible for proper accommodation including adequate medical facilities for personnel employed by him.
- 2.8.9** The contractor shall be responsible for the proper behaviour and observance of all regulations by the staff employed by him.
- 2.8.10** The contractor shall ensure that no damage is caused to any person/property of other parties working at site/company" premises. If any such damage is caused, it is responsibility of the contractor to make good the losses or compensate for the same.
- 2.8.11** All the properties/equipment/components of BHEL/their Client/Customer loaned with or without deposit to the contractor in connection with the contract shall remain properties of BHEL/their Client/Customer.
- 2.8.12** The contractor shall use such properties for the purpose of execution of this contract. All such properties/equipment/components shall be deemed to be in good condition when received by the contractor unless he notifies within 48 hours to the contrary. The contractor shall return them in good condition as and when required by BHEL/their Client. In case of non-return, loss, damage, repairs etc. the cost thereof as may be fixed by BHEL Engineer will be recovered from the contractor.
- 2.8.13** In case the contractor is required to undertake any work outside the scope of this contract, the rates payable shall be those mutually agreed upon if the item rates are not mentioned in existing contract.
- 2.8.14** Any delay in completion of works/or non-achievement of periodical targets/or non execution of contract due to the reasons attributable to the contractor, the same may have to be compensated by the contractor either by increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.
- 2.8.15** The contractor shall arrange, coordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
- 2.8.16** All safety rules and codes applied by the Customer /BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the

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equipment/material and works to be performed by him and shall maintain all light, fencing guards, slings etc. or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view to prevent pilferage, accidents, fire hazards. Due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of Clerical staff, watch and ward, store keepers to take care of equipment/materials and construction tools and tackles shall be posted at site by the contractor till the completion of work under this contract.

The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per prescribed standards and practices.

Contractor has to ensure the implementation of Health, Safety and Environment (HSE) requirements as per directions given by BHEL/Customer. The contractor has to assist in HSE audit by BHEL/Customer and submit compliance Report. The contractor has to generate and submit record/reports as per HSE plan/activities as per instruction of BHEL/Customer.

- 2.8.17** The contractor shall be directly responsible for payment of wages to his workmen/labours before the expiry of seven days from the last day of wage period and to ensure disbursement of wages in the presence of the representative from BHEL. A pay roll sheet giving all the payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL site for the purpose of maintaining the records for compliance, Contractor shall create awareness amongst their workforce by helping & encouraging in opening bank accounts and to encourage them to adopt digital mode of transactions. While releasing wages/ salary to their workers/ supervisors/ staff, Contractor shall comply with the GOI's guidelines for maximizing such transactions through Non-Cash / digital means.
- 2.8.18** In case of any class of work for which there is no such specification as laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.
- 2.8.19** Also, no idle charges will be admissible in the event of any stoppage caused in the work resulting in contractor's labour and Tools & Plants being rendered idle due to any reason at any time.
- 2.8.20** The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL or their Customer whichever is earlier.
- 2.8.21** The contractor shall not stop the work or abandon the site for whatsoever reason of dispute, excepting force majeure conditions. All such problems/disputes shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly.
- 2.8.22** The contractor shall keep the area of work clean and shall remove the debris etc. while executing day-to-day work. Upon completion of work, the contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The contractor will also demolish all the hutments, sheds, offices etc. constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the Engineer and the expenses recovered from the contractor.
- 2.8.23** The contractor shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/ or as per the instructions of the Engineer.
- 2.8.24** The Contractor to note that some of BHEL's T&Ps/MMDs may not be insured. The Contractor will take necessary precautions and due care to protect the same while in his custody from any damage/ loss till the same is handed over back to BHEL. In case the damage / loss is caused

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due to carelessness/ negligence on the part of the contractor, the Contractor is liable to get them repair/ replaced immediately and in case of his failure to do so within a reasonable time, BHEL shall lto recover the loss from the contractor.

**2.8.25** For all works having contract value of Rs. 5,00,000/- or above, BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life/ permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

- a) Victim: Any person who suffers permanent disablement or dies in an accident as defined below.
- b) Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works/ during working at BHEL Units/ Offices/ townships and premises/ Project Sites.
- c) Compensation in respect of each of the victims:
  - i. In the event of death or permanent disability resulting from Loss of both limbs: ₹10,00,000/- (Rupees Ten Lakh).
  - ii. In the event of other permanent disability: ₹.7,00,000/- (Rupees Seven Lakh)
- d) Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to section 2 (I) of the Employee's Compensation Act, 1923.

**2.8.26** Contractor shall be fully responsible for the safety of their T&Ps and other material mobilized at site. In any case, BHEL shall not be liable for any damage/loss/misuse of any item(s) belong to the contractor.

**2.8.27** Contractor will ensure that the work/job is executed through his/her employees on and under no circumstances, the contractor shall subcontract the job without prior written permission from BHEL.

**2.8.28** The liability for any compensation on account of injury sustained by an employee of the contractor will be exclusively that of the contractor.

## **2.9 EXECUTION PLAN, PROGRESS MONITORING, MONTHLY REVIEW AND PERFORMANCE EVALUATION**

**2.9.1** A tentative plan/ programme for completion of the contractual scope of work as per the time schedule given in the contract shall be made jointly by BHEL and Contractor, before commencement of work. The above programme shall be supported by month wise deployment of resources viz Manpower, T&P, Consumables, etc. Progress will be reviewed periodically (Daily/Weekly/Monthly) vis-à-vis this jointly agreed programme.

Subsequently, every month, quarterly rolling plan will be made by BHEL based on budgeted targets.

Monthly plan in F-14 format shall be drawn from this Quarterly plan. Monthly plan shall necessarily include activities required for achieving targets/ milestones unless inputs/ fronts are not available. While planning and arriving on asking rate all available inputs shall be taken into consideration.

Vendor will be required to execute the monthly plan in that month in addition to make full efforts to minimize the cumulative shortfall attributable to him up to the month.

BHEL may require monthly work plan up to one and half times of average monthly value and demand matching manpower.

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Where, Average Monthly Value = Total Contract Value (as per latest revision) / Period of Contract (in months) Provided, this requirement is reflected in the rolling quarterly plan two months in advance.

If the Contractor refuses to sign the F-14 format, those F-14 formats requiring Contractor's signature shall be deemed to have been signed and accepted by the Contractor, if communicated to the Contractor through email or any other mode as stated in clause 2.3.1.

The Contractor shall submit periodical progress reports (Daily/Weekly/Monthly) and other reports/information including manpower, consumables, T&P mobilization etc. as desired by BHEL.

**2.9.2** Monthly progress review between BHEL and Contractor shall be based on the agreed programme as above, availability of inputs/fronts etc., and constraints if any, as per prescribed formats (i.e. Form F-14). Manpower, T&P and consumable reports as per prescribed formats shall be submitted by contractor every month. Release of RA Bills shall be contingent upon certification by BHEL Site Engineer of the availability of the above prescribed formats duly filled in and signed.

**2.9.3** The burden of proof that the causes leading to any shortfall is not due to any reasons attributable to the contractor is on the contractor himself. The monthly progress review shall record shortfalls attributable to (i) Contractor, (ii) Force Majeure Conditions, and (iii) BHEL

**2.9.4** Performance of the Contractor shall be assessed as per prescribed formats and shall form the basis for 'Assessment of Capacity of Bidder' for Tenders where the Contractor is a bidder. BHEL reserves the right to revise the evaluation formats during the course of execution of the works.

## **2.10 TIME OF COMPLETION**

**2.10.1** The time for completion shall be as mentioned in the LOA/Contract. The time for completion shall be reckoned from the date of commencement of work at Site as certified/notified in writing by BHEL Engineers.

**2.10.2** Time being the essence of the contract, the entire work shall be completed by the contractor within the time schedule or within such extended periods of time as may be allowed by BHEL under clause 2.11.

## **2.11 EXTENSION OF TIME FOR COMPLETION**

**2.11.1** If the completion of work as detailed in the scope of work gets delayed beyond the contract period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the Contract. If the completion of work gets delayed for reasons not attributable to the contractor, the contract period may be suitably extended at the sole discretion of BHEL.

**2.11.2** Based on the F-14 formats, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.

**2.11.3** However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take under Clause 2.7.2 of GCC i.e. Breach of Contract, Remedies and Termination.

**2.11.4** Planning, progress monitoring, monthly review and performance monitoring shall be carried out as per clause 2.9 of GCC.

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**2.12 OVERRUN COMPENSATION –**

**2.12.1 ORC during original contract period:** No ORC shall be applicable during the original contract period.

**2.12.2 ORC during extended period for the reasons solely attributable to contractor:** No ORC shall be applicable during the extended period granted for the reasons solely attributable to contractor and work executed during this period shall be paid as per original contract rates.

**2.12.3 ORC during extended period for the reasons not attributable to contractor:** ORC shall be payable as per following procedure:

**2.12.3.1** For initial period of twelve months of extended period, ORC rate applicable over executed value shall be 5%. For every subsequent period of twelve months, ORC rate shall be further increased by 5% over the previous rate. For example, ORC rates applicable for initial period of 12 months and subsequent period of 12 months are given below.

Sl. No.	Extended Period for the reasons attributable to BHEL	ORC rate applicable over executed value
1	First 12 months	5%
2	13 <sup>th</sup> -24 <sup>th</sup> month and so on	10.25% $\{[(1.05 \times 1.05)-1] \times 100\}$

This process of increasing ORC rate for each subsequent period of 12 months shall continue till applicability of ORC.

**2.12.3.2** On completion of original contract period as well as on completion of each subsequent period of twelve months i.e. at the time of change in applicable ORC rate, Delay Analysis shall be carried out and percentage shortfall attributable to both BHEL & Contractor shall be calculated.

**2.12.3.3** For the purpose of calculation of ORC, executed value of work in the month shall be divided in Part-1 and Part-2 in proportion of percentage shortfall attributable to BHEL and contractor respectively, based on the last delay analysis as worked out in 2.12.3.2.

ORC shall be payable only on Part-1 and no ORC shall be payable on Part-2.

Value of Part-1 shall be further limited to the value of actual inputs provided by BHEL i.e.

“Plan - Shortfall attributable to BHEL” for the month, as per Form-14 for calculation of ORC.

**2.12.3.4** Payment of ORC amount shall be further regulated as follows:

- (i) 50% of the ORC is allocated for deployment of matching resources (with weightages) agreed as per the joint programme drawn vide 2.11.4. ORC Payment against resources shall be calculated in proportion to percentage of resources actually deployed w.r.t. planned resources, as per Form-14.
- (ii) 50% of ORC is allocated for achieving of planned progress agreed as per the joint programme drawn vide 2.11.4. ORC Payment shall be reduced in proportion to percentage shortfall attributable to contractor w.r.t. “Plan - Shortfall attributable to BHEL” for the month, as per Form-14.

**2.12.3.5** The maximum amount of ORC payable for the month shall be limited to Rs. 10,00,000/- (Rupees Ten Lakhs).

**2.12.3.6** In case, there is no shortfall attributable to contractor for the month and also contractor has deployed the resources as agreed in Form-14 but ORC amount payable for the month worked out as per procedure mentioned in clause 2.12.3.3, 2.12.3.4 and 2.12.3.5, is less than Rs.1,00,000/-, then ORC amount payable for the month shall be Rs.1,00,000/- otherwise ORC amount payable for the month shall be as per procedure mentioned in Clauses clause 2.12.3.3, 2.12.3.4 and 2.12.3.5.



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**2.12.3.7** In case execution is on **HOLD** (Other than Force Majeure), ORC shall be payable as per following:

i). Contractor has not been permitted by BHEL to de-mobilize

ORC amount of Rs. 1,00,000/- per month shall be applicable during the period of HOLD

a) provided resources as planned are deployed (not demobilised) during the period of hold.

b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1. ii). Contractor has been permitted to demobilize and to remobilize after lifting of HOLD

a) No ORC shall be payable to contractor for the period of HOLD.

b) Subsequent to lifting of HOLD, Period of HOLD shall not be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

**2.12.3.8** In case **Force Majeure** is invoked:

i). No ORC shall be applicable during the period of Force Majeure.

ii). Subsequent to revocation of Force Majeure, period of Force Majeure shall be excluded in calculation of period for deciding applicable ORC rate as per clause 2.12.3.1.

**2.12.4** Applicability of ORC: ORC shall not be applicable for following activities.

i). Area cleaning, removal of temporary structures and return of scrap.

ii). Punch list points / pending points liquidation pending due to reasons attributable to contractor

iii). Submission of "As built Drawing"

iv). Material Reconciliation

v). Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./ Statutory Authorities etc.

**2.12.5** Total Over Run Compensation shall be limited to 10% of the cumulatively executed contract value till the month (excluding Taxes and Duties if payable extra). For this purpose, executed contract value excludes PVC, ORC and Extra/Supplementary Works.

## **2.13 SECURED RECOVERABLE ADVANCES:**

**2.13.1 INTEREST FREE MOBILIZATION ADVANCE:** Competent Authority of BHEL may approve proposals for payment of Interest Free Secured Mobilization Advance (limited to a maximum of 5% of the Contract Value) only in Installation Works in Power Plants under exceptional circumstances.

Interest Free Mobilization Advance shall be disbursed in specifically mentioned stages of major resource mobilization in the beginning of the contract, as specified in the TCC, in three or more instalments with the value of any instalment not more than 2.5% of the Contract Value. The next instalment will be due only on completion of the activities linked to the previous instalment.

Each such instalment is to be secured through BG of 100% of the instalment amount. Recovery of Interest Free Secured Advance shall be made @ 10% of Running Bill Amount. As and when the total recovered amount exceeds any of the BG value submitted against the advance, that BG shall be returned. In any case, Interest Free Advance shall be fully recovered by the time the contract reaches 50% of the original contract period either from Running Bills or by the Contractor directly depositing the amount. If the Contractor fails to deposit the total amount by the stipulated date, the recovery shall be made by encashing BGs/ Securities available with BHEL for the balance amount.

## **2.13.2 INTEREST BEARING ADVANCE:**

**2.13.2.1 INTEREST BEARING MOBILIZATION ADVANCE:** Competent authority may also approve need based Interest Bearing Mobilization advance after a certification from the Contractor for having achieved a financial progress of 10% of the original contract price. However, the total

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mobilization advance (including Interest Free Mobilization Advance) shall not exceed 10% of the Contract Value. Bank Guarantee towards 'Interest Bearing Recoverable Advance' shall be 110% of the advance so as to enable recovery of not only principle amount but also the interest portion, if so required.

**2.13.2.2 INTEREST BEARING SECURED ADDITIONAL INTERIM ADVANCE:** In exceptional circumstances, with due justification, Competent Authority of BHEL may approve proposals for payment of additional interim interest-bearing advance against Bank Guarantee, for resource augmentation towards expediting work for project implementation. Contractor shall establish the utilization of advance drawn in the form of Utilization Certificate before the release of next instalment.

Bank Guarantee shall be 110% of the advance so as to enable recovery of not only principle amount but also the interest portion, if so required. Unadjusted amount of advances (including Interest Free Mobilization Advance) paid shall not exceed 10% of the total contract value at any point of time.

**NOTES for INTEREST BEARING ADVANCE:**

- (a) Recovery of Interest Bearing Advances shall be made from the Running Bills progressively. Recovery rate per month for Interest Bearing Advances shall be the sum of:
  - i) Not less than 10% of Running Bill amount
  - ii) Simple interest up to the date of RA Bill on the outstanding Principle amount/amounts
- (b) In any case, Interest Bearing Advance shall be fully recovered by the time the contractor's billing reaches 90% of contract value either from Running Bills or by the Contractor directly depositing the amount. If the Contractor fails to deposit the total amount by the stipulated date, the recovery shall be made by encashing BGs/ Securities available with BHEL for the balance amount along with interest.
- (c) Payment and recovery of any of the above advance(s) shall be at the sole discretion of BHEL and shall not be a subject matter of arbitration.
- (d) The rate of interest applicable for the above advances shall be the repo rate prevailing on the date of release of advance plus 4%, and such rate will remain fixed till the total advance amount is recovered.
- (e) Contractor to submit Bank Guarantee as per prescribed formats for each of the advance and shall be valid for at least one year or the recovery duration whichever is earlier. In case the recovery of dues does not get completed within the aforesaid BG period, the contractor shall renew the BG or submit fresh BG for the outstanding amount, valid for at least one year or the remaining recovery duration whichever is earlier. For each advance, the Contractor will be allowed to submit more than one BG so that the BGs can be returned progressively based on recovered amount. In case, the Contractor prefers to submit single BG against an advance, the amount of BG may be progressively reduced by the amount repaid by the Contractor. (f) BHEL is entitled to make recovery of the entire outstanding amount in case the contractor fails to comply with the BG requirement.

**2.13.3 SECURED ADVANCE AGAINST MATERIAL BROUGHT TO SITE:**

Secured advance on the security of materials (which are not combustible, fragile or perishable in nature) brought to the site but not yet incorporated in the works will be made up to 75% of Invoice value, or the 75% of the corresponding value of the materials determined on the basis of BOQ rates, whichever is less, subject to the condition that their quantities are not excessive and shall be used within a period of 90 days and subject to the stipulations, as mentioned below:

- (i) Contractor shall obtain prior permission of Engineer-in-charge before procurement of materials against which advance is being sought. Engineer-in-charge shall ensure formal approval of Construction Manager before communicating the permission to Contractor.

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- (ii) Secured advance shall not be allowed/ payable for materials procured by Contractor before the date of such permission.
- (iii) Secured Advance shall be allowed only once against a single invoice. Multiple Secured Advance against single invoice is not allowed.
- (iv) Secured advance against materials shall be paid only against non-perishable items. Engineer-in-charge to ensure that such items are adequately covered under insurance cover (to be taken by the Contractor if not covered under BHEL Insurance Policy).
- (v) At any point of time, the unadjusted secured payments against material brought to site shall not be more than 5% of the Contract Value.
- (vi) The advance will be repaid from each succeeding Running bill(s) to the extent materials for which advance has been previously paid have been incorporated into the works. In any case, such advance payment shall be fully recovered maximum from 3-4 subsequent RA bills whether the material is consumed in the work or not. In absence of sufficient value of RA bills for making the required recovery, the Contractor shall deposit the balance amount. If the Contractor fails to deposit the total amount by the stipulated date, the recovery shall be made by encashing the Securities available with BHEL for the balance amount.
- (vii) Contractor has to give a formal deed of hypothecation, drawn up on non-judicial stamp paper under which the BHEL secures a lien on the materials and is safeguarded against losses, due to the contractor postponing the execution of the work or due to the shortage or misuse of materials and against the expenses incurred on their watch and safe custody.

**2.14 QUANTITY VARIATION****2.14.1 Variation in Final Executed Contract Value**

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the final executed contract value is within the limits of Minus (-) 15% of awarded contract value. Also, no compensation becomes payable in case the contract gets partially executed/ short closed/ terminated/ work withdrawn under Rights of BHEL mentioned in Clause 2.7 of GCC. In case of work terminated/ short closed under clause 2.7.4 of GCC, compensation may be considered only if BHEL receives compensation from customer.

Compensation due to variation of final executed contract value in excess of the limits defined in clause above, shall be as follows:

- i) In the event the finally executed contract value reduces below the lower limit of awarded Contract Value due to quantity variation specified above, the Contractor will be eligible for compensation @ 15% of the difference between the lower limit of the awarded contract value and the actual executed contract value.
- ii) In the event the finally executed contract value increases above the awarded Contract Value due to quantity variation, the Contractor is not eligible for any compensation.

**2.14.2 Variation in Individual Quantities of BOQ Item(s)**

The quantities given in the contract are tentative and may change to any extent (both in plus side and minus side). No compensation becomes payable in case the variation of the quantity of individual BOQ item(s) is within the limits of Plus (+) 100% of the quantity in the original price schedule in this regard.

In case executed quantity for a particular BOQ item(s) exceeds two times the quantity in the original price schedule (100% increase), then the revision in rates for such BOQ item(s) for the quantity in excess of two times the quantity in the original price schedule including any subsequent increase in quantity, may be considered based on request from the Contractor, however, BHEL decision in this regard shall be final. Revised rates for subject BOQ item(s) shall

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be worked out on the basis of prevailing market rates mutually agreed between BHEL and Contractor. PVC/ ORC will not be applicable for these revised rates.

BHEL, however, retains the right to arrange the excess quantity through any other source for expediting activities in the interest of the Project.

Note:

- (a) Revision in rates under clause 2.14.2 will remain admissible in those cases also, where, the Contractor is eligible for compensation under clause 2.14.1 i).
- (b) The value of work executed at revised rates due to variation in Individual Quantities of BOQ Item(s) shall be included while calculating the finally executed contract value in clause no. 2.14.1 above.

**2.15 EXTRA WORKS**

**2.15.1** All rectifications/modifications, revamping and reworks required for any reasons not due to the fault of the contractor, or needed due to any change in deviation from drawings and design of equipment, operation/maintenance requirements, mismatching or due to damages in transit, storage and erection/commissioning and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, will be considered as extra works.

**2.15.2** Extra works arising on account of the contractor's fault, irrespective of time consumed in rectification of the damage/loss, will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose will also have to be arranged by the contractor at his cost.

**2.15.3** All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents i.e. daily log sheets. Signing of log sheets by BHEL engineer does not necessarily mean the acceptance of such works as extra works.

**2.15.4** BHEL retains the right to award or not to award any of the major repair/ rework/ modification/ rectification / fabrication works to the contractor, at their discretion without assigning any reason for the same.

**2.15.5** After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

**MAN-HOUR RATE FOR ELIGIBLE EXTRA WORKS:** Single composite average labour man-hour rate, including overtime if any, supervision, use of tools and tackles and other site expenses and incidentals, consumables for carrying out any major rework/repairs/ rectification/ modification/ fabrication as certified by site as may arise during the course of erection, testing, commissioning or extra works arising out of transit ,storage and erection damages, payment, if found due will be at Rs139/- per man hour.

**2.15.6** The above composite labour man hour rate towards extra works shall remain firm and not subject to any variation during execution of the work. PVC will not be applicable for extra works. Rate revision, Over Run Charges/compensation etc. will not be applicable on extra works.

**2.15.7 Extra Works for Civil Packages** shall be regulated as follows –

- i) Rates for Extra Works arising due to (1) non availability of BOQ (Rate Schedule), OR (2) change in Specifications of materials/works (3) rectification/modification/dismantling & re-erecting etc. due to no fault of Contractor, shall be in the order of the following:

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- a) Item rates are to be derived from similar nature of items in the BOQ (Rate Schedule) with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities.
- b) As per latest edition of CPWD-DSR with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities OR Notification issued by the office of CPWD for 'Cost Index' in that Region where the project is being executed with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities, whichever is less.
- c) Item rates are to be worked out on the basis of market rates prevailing on the date of execution mutually agreed between BHEL and Contractor.
- ii) PVC and ORC will not be applicable for (i) above.

## **2.16 SUPPLEMENTARY ITEMS**

### **2.16.1 For NON-Civil Works**

Supplementary items are items/works required for completion of entire work but not specified in the scope of work. Subject to certification of such items/works as supplementary items by BHEL Engineer, rates shall be derived on the basis of any one of the following on mutual agreement:

- i) Based on percentage breakup/rates indicated for similar/nearby items.
- ii) In case (i) above does not exist, then BHEL/site may derive the percentage breakup/rates to suit the type of work.

### **2.16.2 For Civil Works**

- i) Rates for Supplementary Works/Additional Works arising out due to additions/alterations in the original scope of works as per contract subject to certification of BHEL Engineer shall be worked out as under:
  - a) Item rates which are available in existing BOQ (Rate Schedule) shall be operated with applicable escalation derived from All India Consumer Price Index for Whole Sale Commodities  
Items of works which are not available in existing BOQ shall be operated as an 'Extra Works' and rate shall be derived as per clause no 2.15.7
  - ii) Execution of Supplementary Works/Additional Works through the Contractor shall be at the sole discretion of BHEL, and shall be considered as part of executed contract value for the purpose of Quantity Variation as per clause 2.14
  - iii) BHEL Engineer's decision regarding fixing the rate as above is final and binding on the contractor.
  - iv) PVC and ORC will not be applicable for (i) above.

## **2.17 PRICE VARIATION COMPENSATION –**

- 2.17.1 In order to take care of variation in cost of execution of work on either side, due to variation in the index of LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS, Price Variation Formula as described herein shall be applicable.
- 2.17.2 85% component of Contract Value shall be considered for PVC calculations and remaining 15% shall be treated as fixed component. The basis for calculation of price variation in each category, their component, Base Index, shall be as under:

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SL NO.	CATEGORY	INDEX/ AVERAGE MINIMUM WAGE	PERCENTAGE COMPONENT ('K')				
			CIVIL PACKAGES (See Note A/B/C)			MECHANICAL PACKAGES	Electrical , C&I Material Management/ Handling and other labour oriented Packages
			A	B	C		
i)	LABOUR (ALL CATEGORIES)	(a) 'MONTHLY ALL-INDIA AVERAGE CONSUMER PRICE INDEX NUMBERS FOR INDUSTRIAL WORKERS' published by Labour Bureau, Ministry of Labour and Employment, Government of India. (50% weightage out of component 'K') (Website: labourbureau.nic.in)  (b) Arithmetical average of minimum wages of Unskilled, Semi-skilled, Skilled and Highly skilled workers as applicable at project site location (50% weightage out of component 'K')	40	25	30	65	80
ii)	HIGH SPEED DIESEL OIL	Name of Commodity: HSD Commodity Code: 1202000005 (See Note E)	5	3	5	5	5
iii)	WELDING ROD	Name of Commodity: MANUFACTURE OF BASIC METALS Commodity Code: 1314000000 (See Note E)				15	
iv)	CEMENT	Name of Commodity: ORDINARY PORTLAND CEMENT Commodity Code: 1313050003 (See Note E)		20	30		

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v)	STEEL (Structural and Reinforcement Steel)	Name of Commodity: MILD STEEL: LONG PRODUCTS Commodity Code: 1314040000 (See Note E)		25			
vi)	All OTHER MATERIALS (Other than Cement & Steel)	Name of Commodity: ALL COMMODITIES Commodity Code:1000000000 (See Note E)	40	12	20		

**Note:****A) Cement & Steel: Free Issue (BHEL Scope)****B) Cement & Steel: In Contractor Scope****C) Cement in Contractor Scope, and Steel is Free Issue (BHEL Scope)****D) For Composite packages (i.e. Civil + Mechanical + Electrical and/or C&I or Civil + Mechanical or Mechanical + Electrical and/or C&I), the COMPONENT ('K') for various categories shall be as per respective packages as above.****E) As per the 'MONTHLY WHOLE SALE PRICE INDEX' for the respective Commodity and Type, published by Office of Economic Adviser, Ministry of Commerce and Industry, Government of India. (Website: [eaindustry.nic.in](http://eaindustry.nic.in)). Revisions in the index or commodity will be re-adjusted accordingly.**

2.17.3 # Not Applicable

2.17.4 Payment/recovery due to variation in index shall be determined on the basis of the following notional formula in respect of the identified COMPONENT ('K') viz LABOUR, HIGH SPEED DIESEL OIL, WELDING ROD, CEMENT, STEEL, MATERIALS.

$$P = K \times R \times \frac{(X_N - X_o)}{X_o}$$

Where,

P = Amount to be paid/recovered due to variation in the Index for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

K = Percentage COMPONENT ('K') applicable for Labour, High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials

R = Value of work done for the billing month (Excluding Taxes and Duties if payable extra)

X<sub>N</sub> = Revised Index for Labour, Revised Average Minimum Wages for Labour, Revised Index for High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials for the billing month under consideration

X<sub>o</sub> = Index for Labour, Average Minimum Wages for Labour, Index for High Speed Diesel Oil, Welding Rod, Cement, Steel and Materials as on the Base date

2.17.5 PVC shall not be payable for the ORC amount, Supplementary/Additional Items, Extra works. However, PVC will be payable for items executed under quantity variation of BOQ items under originally awarded contract.

2.17.6 Base date shall be calendar month of the 'last date of submission of Tender'.

2.17.7 The contractor shall furnish necessary monthly bulletins in support of the requisite indices from the relevant websites along with his Bills.

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2.17.8 The contractor will be required to raise the bills for price variation payments on a monthly basis along with the running bills irrespective of the fact whether any increase/decrease in the index for relevant categories has taken place or not. In case there is delay in publication of bulletins (final figure), the provisional values as published can be considered for payments and arrears shall be paid/recovered on getting the final values.

2.17.9 PVC shall be applicable for the entire original contract period plus the extended period, i.e. for the complete execution period, as follows:

**For PVC computation of the  $n^{\text{th}}$  month:**

Let the cumulative delay attributable to the Contractor is  $D_n$  in the  $n^{\text{th}}$  month as per Form-14.

Considering  $R_n$  as the billing value for the  $n^{\text{th}}$  month, PVC for the  $n^{\text{th}}$  month shall be calculated as follows:

- a) PVC for the portion of  $R_n$  for an amount of  $D_{(n-1)}$  shall be payable as per indices for the  $(n-1)^{\text{th}}$  month.
- b) PVC for the balance portion of  $R_n$  shall be payable as per indices for the  $n^{\text{th}}$  month

In case  $D_{(n-1)}$  is greater than  $R_n$ , then entire  $R_n$  shall be payable as per indices for the  $(n-1)^{\text{th}}$  month and the balance portion of  $D_{(n-1)}$  shall be adjusted from  $R_{(n+1)}$  of the  $(n+1)^{\text{th}}$  month and will be payable as per indices for the  $(n-1)^{\text{th}}$  month. The above process shall be continued for subsequent month(s) also till full  $D_{(n-1)}$  is consumed.

- i) For milestones mentioned in the contract, PVC shall be applicable as per average of the indices from the month of base date till the month of execution of milestone. ii) PVC shall not be applicable for time extension provided for the delays solely attributable to the contractor. No PVC is payable during the period of Provisional Time Extension till grant of final time extension. Applicability of PVC will be decided at the time of grant of final time extension.
- ii) The total amount of PVC shall not exceed 15% of the cumulatively executed contract value. Executed contract value for this purpose is exclusive of PVC, ORC, Supplementary/Additional Items and Extra works except items due to quantity variation.

**Note:** Work Planning in F-14 format to be meticulously done as per Clause 2.9 of this GCC.

## **2.18 INSURANCE**

2.18.1 BHEL/their customer shall arrange for insuring the materials/properties of BHEL/customer covering the risks during transit, storage, erection and commissioning.

2.18.2 It is the sole responsibility of the contractor to insure his materials, equipment, workmen etc. against accidents and injury while at work and to pay compensation, if any, to workmen as per Workmen's compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client /BHEL in the area of project which are in force from time to time will have to be followed by the contractor.

2.18.3 If due to negligence and or non-observation of safety and other precautions by the contractors, any accident/injury occurs to the property / manpower belong to third party, the contractor shall have to pay necessary compensation and other expense, if so decided by the appropriate authorities.

2.18.4 The contractor will take necessary precautions and due care to protect the material, while in his custody from any damage/ loss due to theft or otherwise till the same is taken over by BHEL or customer. For lodging / processing of insurance claim, the contractor will submit necessary documents. BHEL will recover the loss including the deductible franchise from the contractor, in case the damage / loss is due to carelessness / negligence on the part of the contractor. In case of any theft of material under contractor's custody, matter shall be reported to Police by the



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contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL for taking up with insurance. However, this will not relieve the contractor of his contractual obligation for the material in his custody.

**2.19 STRIKES & LOCKOUT**

2.19.1 The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, it may be considered as 'Breach of Contract' under Clause 2.7 and the remedies under Clause 2.7.2.2 may be executed, at the discretion of BHEL.

2.19.2 For all purposes whatsoever, the employees of the contractor shall not be deemed to be in the employment of BHEL.

**2.20 FORCE MAJEURE**

2.20.1 "Force Majeure" shall mean circumstance which is:

- a) beyond control of either of the parties to contract,
- b) either of the parties could not reasonably have provided against the event before entering into the contract,
- c) having arisen, either of the parties could not reasonably have avoided or overcome, and
- d) is not substantially attributable to either of the parties And Prevents the performance of the contract,

Such circumstances include but shall not be limited to:

- i) War, hostilities, invasion, act of foreign enemies.
- ii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war.
- iii) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors.
- iv) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors.
- v) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio- activity.
- vi) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc.
- vii) Epidemic, pandemic etc.

2.20.2 The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party: a) any strike, work-to-rule action, go-slow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship.

2.20.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event.

2.20.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event.

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2.20.5 Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not

- a) Constitute a default or breach of the Contract.
- b) Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.

2.20.6 BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Supplier/Vendor cannot consider deemed short-closure after 1 year of imposition of Force Majeure.

## 2.21 SETTLEMENT OF DISPUTE:

If any dispute or difference of any kind whatsoever shall arise between BHEL and the Supplier/Vendor, arising out of the contract for the performance of the work whether during the progress of contract termination, abandonment or breach of the contract, it shall in the first place referred to Designated Engineer for amicable resolution by the parties. Designated Engineer ( to be nominated by BHEL for settlement of disputes arising out of the contract ) who within 60 days after being requested shall give written notice of his decision to the contractor. Save as hereinafter provided, such decision in respect of every matter so referred shall forthwith be given effect to by the Supplier/Vendor who shall proceed with the work with all due diligence, whether he or BHEL desires to resolve the dispute as hereinafter provided or not.

If after the Designated Engineer has given written notice of this decision to the party and no intention to pursue the dispute has been communicated to him by the affected party within 30 days from the receipt of such notice, the said decision shall become final and binding on the parties. In the event the Supplier/Vendor being dissatisfied with any such decision or if amicable settlement cannot be reached then all such disputed issues shall be resolved through conciliation in terms of the BHEL Conciliation Scheme 2018 as per Clause 2.21.1.

### 2.21.1 Conciliation:

Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the “Dispute”) shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure as per BHEL Conciliation Scheme 2018. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in - “Procedure for conduct of conciliation proceedings” (as available in [www.bhel.com](http://www.bhel.com))).

**Note:** Ministry of Finance has issued OM reference No. 1/2/24 dated 03.06.2024 regarding “Guidelines for Arbitration and Mediation in Contracts of Domestic Public Procurement. In the said OM it has been recommended that Government departments/ Entities/agencies are to encourage mediation under the Mediation Act. 2023 . The said Act has not yet been notified by the Government. Therefore, the clause “Settlement of Disputes” shall be modified accordingly as and when the Mediation Act 2023 gets notified.

### 2.21.2 ARBITRATION:

2.21.2.1 Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided in Clause 21.1 herein above or otherwise) in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or. in any manner touching upon the Contract (hereinafter referred to as the ‘Dispute’), then, either Party may, refer the disputes to Arbitral Institution ( to be identified by the contract issuing agency (eg. “IIAC” (India International Arbitration Centre) for Delhi/NCR offices) and such dispute to be

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adjudicated by Sole Arbitrator appointed in accordance with the Rules of said Arbitral Institution.

- 2.21.2.2 A party willing to commence arbitration proceeding shall invoke Arbitration Clause by giving notice to the other party in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice') before referring the matter to arbitral institution. The Notice shall be addressed to the Head of the Region, Power Sector/ Unit, BHEL, executing the Contract and shall contain the particulars of all claims to be referred to arbitration with sufficient detail and shall also indicate the monetary amount of such claim including interest, if any.
- 2.21.2.3 After expiry of 30 days from the date of receipt of aforesaid notice, the party invoking the Arbitration shall submit that dispute to the Arbitral Institutions..... ( to be identified by the contract issuing agency) and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd Judge having considerable experience in commercial matters to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged.
- 2.21.2.4 The fee and expenses shall be borne by the parties as per the Arbitral Institutional rules.
- 2.21.2.5 The Arbitration proceedings shall be in English language and the seat and venue of Arbitration shall be ( to be identified by the contract issuing agency) .....( i. e. New Delhi for Delhi/NCR based Units).
- 2.21.2.6 Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matters relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at..... (i.e. New Delhi for Delhi/NCR based Units).
- 2.21.2.7 Notwithstanding any reference to the Designated Engineer or Conciliation or Arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree. Settlement of Dispute clause cannot be invoked by the Contractor, if the Contract has been mutually closed or 'No Demand Certificate' has been furnished by the Contractor or any Settlement Agreement has been signed between the Employer and the Contractor.
- 2.21.2.8 It is agreed that Mechanism of resolution of disputes through arbitration shall be available only in the cases where the value of the dispute is less than Rs. 10 Crores.
- 2.21.2.9 In case the disputed amount (Claim, Counter claim including interest is Rs. 10 crores and above, the parties shall be within their rights to take recourse to remedies other than Arbitration, as may be available to them under the applicable laws after prior intimation to the other party. Subject to the aforesaid conditions, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof as amended from time to time, shall apply to the arbitration proceedings under this clause.
- 2.21.2.10 In case, multiple arbitrations are invoked (whether sub-judice or arbitral award passed) by any party to under this contract, then the cumulative value of claims (including interest claimed or awarded) in all such arbitrations shall be taken in account while arriving at the total claim in dispute for the subject contract for the purpose of clause 21.2.9. Disputes having cumulative value of less than 10 crores shall be resolved through arbitration and any additional dispute shall be adjudicated by the court of competent jurisdiction.

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**2.21.3 In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:**

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSEs Disputes) as mentioned in DPE OM No. 05/0003/2019-FTS10937 dated 14-12-2022 as amended from time to time.

**2.21.4 NO INTEREST PAYABLE TO CONTRACTOR**

Notwithstanding anything to the contrary contained in any other document comprising in the Contract, no interest shall be payable by BHEL to Contractor on any moneys or balances including but not limited to the Security Deposit, EMD, Retention Money, RA Bills or the Final Bill, or any amount withheld and/or appropriated by BHEL. etc., which becomes or as the case may be, is adjudged to be due from BHEL to Contractor whether under the Contract or otherwise.

**2.22 RETENTION AMOUNT**

2.22.1 Retention Amount shall be 5% of contract value and shall be furnished before the first RA Bill becomes due for payment. In case of increase in contract value, additional 5% of differential amount shall be submitted by Contractor before payment of next RA Bill due.

The Retention amount of 5% of the contract value may be accepted in the following forms: -

- i. Cash (as permissible under the extant Income Tax Act).
- ii. Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
- iii. Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated / pledged, as applicable, in favour of BHEL).
- iv. Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act and in line with clause 1.12 of GCC. The Bank Guarantee format for Retention Amount shall be in the prescribed formats. The validity of BG shall be initially for the contract period & shall be extended up to acceptance of final bill if the final bill is not settled during the contract period.
- v. Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
- vi. Insurance Surety Bonds.

**Alternatively**, on successful bidder's request, the Retention Amount can also be recovered at the rate of 10% of the gross amount, progressively, from each of the running bills of the contractor till the total amount of the required retention amount is collected.

In case, contractor opts cash deduction from RA bills in the beginning & subsequently submit 5% of the Contract Value as Retention amount in any form as mentioned above, then refund of deducted retention amount may be permitted to contractor.

**Note:**

BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

2.22.2 **Refund of Retention Amount shall be as follows:**

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100% of Retention Amount/ BG shall be released along with Final Bill after deduction all expenses/ other amounts due to BHEL under the contract/ other contracts entered into with them (contractor) by BHEL provided that.

#### **2.22.3 In case of short closure of contract**

- a) due to the premature termination of BHEL contract with customer for any reason whatsoever;
- b) upon the request of contractor for any reason, prior to completion and acceptance of Trial Run by the end customer

The retention money equivalent to the 5% of contract value executed by the contractor shall not be refundable and the contractor shall be discharged of his liabilities as provided in the clause 2.22.1

### **2.23 PAYMENTS**

Payments to Contractors are made in any one of the following forms: -

#### **2.23.1 Running Account Bills (RA Bills)**

- i) These are for interim payments when the contracts are in progress. The bills for such interim payments are to be prepared by Contractor in prescribed formats (RA Bill forms).
- ii) Payments shall be made according to the extent of work done as per measurements taken up to the end of the calendar month and in line with the terms of payments described in the Tender documents.
- iii) Recoveries on account of electricity, water, statutory deductions etc. are made as per terms of contract.
- iv) Full rates for the work done shall be allowed only if the quantum of work has been done as per the specifications stipulated in the contract. If the work is not executed as per the stipulated specifications, BHEL may ask the contractor to redo the work according to the required specifications, without any extra cost. However, where this is not considered necessary 'OR' where the part work is done due to factors like non-availability of material to be supplied by BHEL 'OR' non availability of fronts 'OR' non availability of drawings, fraction payment against full rate, as is considered reasonable, may be allowed with due regard for the work remaining to be done. BHEL decision in this regard will be final and binding on the contractor.
- v) In order to facilitate part payment, BHEL at its discretion may further split the contracted rates/percentages to suit site conditions, cash flow requirements according to the progress of work, subject to following:
  - a) Provided no 'part' payment is recommended till 25% of work in the item rate is executed.
  - b) Payment of item rate to be made in not more than three instalments, last stage payment to be not lower than 20% of the item rate.

#### **2.23.2 Final Bill**

Final Bill' is used for final payment on closing of Running Account for works or for single payment after completion of works. 'Final Bill' shall be submitted as per prescribed format after completion of works as per scope and upon material reconciliation, along with the following:

- i) 'No Claim Certificate' by Contractor as per Clause 2.6.11 of the GCC.
- ii) Clearance certificates where ever applicable viz. Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department etc.
- iii) Indemnity Bond as per prescribed format.

BHEL shall settle the final bills after deducting all liabilities of Contractor to BHEL.

### **2.24 PERFORMANCE GUARANTEE FOR WORKMANSHIP:**

- 2.24.1 Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of Twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects

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due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works by itself, without prejudice to any other rights and recover the cost incurred for the same along with 5% overheads from the Security Deposit.

2.24.2 BHEL shall release the Security Deposit subject to the following

- i) Contractor has submitted 'Final Bill'
- ii) Guarantee period as per contract has expired
- iii) Contractor has furnished 'No Claim Certificate' as per clause 2.6.11 of GCC
- iv) BHEL Site Engineer/Construction Manager has furnished the 'No Demand Certificate' in specified format
- v) Contractor has carried out the works required to be carried out by him during the period of Guarantee and all expenses incurred by BHEL on carrying out such works is included for adjustment from the Security Deposit refundable.

**2.25 CLOSING OF CONTRACTS**

The Contract shall be considered completed and closed upon completion of contractual obligations and settlement of Final Bill or completion of Guarantee period whichever is later. Upon closing of Contract, BHEL shall issue a performance/ experience certificate as per standard format, based on specific request of Contractor as per extant BHEL guidelines through the online portal available at <https://siddhi.bhel.in> only.

**2.26 SUSPENSION OF BUSINESS DEALINGS**

BHEL reserves the right to take action against Contractors who either fail to perform or Tenderers/Contractor who indulge in malpractices, by suspending business dealings with them in line with BHEL guidelines issued from time to time.

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms / principal / agents, shall be rejected. The list of banned firms is available on BHEL web site [www.bhel.com](http://www.bhel.com).

If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in any act, including but not limited to, mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or tampers the tendering process or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, or does anything which is actionable under the Guidelines for Suspension of Business dealings, action may be taken against such bidder / supplier / contractor as per extant guidelines of the company available on [www.bhel.com](http://www.bhel.com) and / or under applicable legal provisions.

Guidelines for suspension of business dealings is available in the webpage:

[http://www.bhel.com/vender\\_registration/vender.php](http://www.bhel.com/vender_registration/vender.php)

**2.27 LIMITATION ON LIABILITY:**

Notwithstanding anything to the contrary in this Contract or LOA or Work Order or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Contract or the Work Order. The Contractor shall not in any case be liable for loss of profit or special, punitive, exemplary, indirect or consequential losses whatsoever. This shall not be applicable on the recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.

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## 2.28 NON-DISCLOSURE AGREEMENT (NDA):

The bidders shall enter into the Non-disclosure agreement totally voluntarily, with full knowledge of its meaning and without duress. (Format attached).

## 2.29 CARTEL FORMATION

The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines

## 2.30 FRAUD PREVENTION POLICY

Bidder along with its associate /collaborators /sub-contractors /sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

## 2.31 ORDER OF PRECEDENCE:

In the event of any ambiguity or conflict between the contract Documents, the order of precedence shall be in the order below:

- a. Contract agreement with its Amendments/
- b. Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL
- c. Notice Inviting Tender (NIT)
- d. Price Bid
- e. Technical Conditions of Contract (TCC)—Volume-1A
- f. Special Conditions of Contract (SCC) —Volume-1B
- g. General Conditions of Contract (GCC) —Volume-1C
- h. Forms and Procedures —Volume-1D

## 2.32 OTHER ISSUES

2.32.1 Value of Non judicial Stamp Paper for Bank Guarantees and for Contract Agreement shall be not less than Rs 100/- unless otherwise required under relevant statutes.

2.32.2 In case of any conflict between the General Conditions of Contract and Special Conditions of Contract, provisions contained in the Special Conditions of Contract shall prevail.

2.32.3 Unless otherwise specified in NIT, offers from consortium/ JVs shall not be considered.

\*\*\*\*\*

**Ref: OS/WC/2025-26/60/42**

**Date: 08.08.2025**

Sub: Works contract for re-laying of roads(6.7 KM Approx.) at township of BHEL-HPVP,  
Visakhapatnam - Reg.

**ACCEPTANCE TO TENDER TERMS & CONDITIONS**

I / We hereby confirm that the Tender documents, all Annexures etc. have been studied in detail and we have fully understood the scope of work.

I / We accept to all the **Terms and Conditions** of the Tender Enquiry and the prices quoted are in accordance with the same.

I / We accept to offer valid for a period of **3 month** from the last date for tender submission.

I / We give our acceptance to participate in **Reverse Auction**

**Tender documents duly signed on all the pages by the Owner / authorized representative of the bidder are attached herewith.**

**SIGNATURE OF THE TENDERER WITH SEAL**



**CONTRACTOR INFORMATION**

Sl. No.	Particulars	To be Filled by Bidder														
01.	Name of the Contractor															
02.	Nature of Firm / Concern (Proprietor/ Partnership/ Pvt. Limited/ Public Ltd.) Note: In case of partnership concern, please enclose photo copies of the partnership deed															
03.	Full address															
04.	Name of the Proprietor/Partner															
05.	Name of the Person(s) and designation authorized for signing the contract/dealing with BHEL															
06.	Telephone No. of the firm															
07.	Mobile No.															
08.	E-mail ID															
09.	PAN Number															
10.	GSTIN Registration No.															
11.	Udyam Reg No.															
12.	MSE Status – Please put tick ( ✓ ) mark in the box whichever is applicable	<table border="1"> <tr> <td>Micro</td><td>Small</td><td>General</td><td>OBC</td><td>SC</td><td>ST</td><td>Woman</td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	Micro	Small	General	OBC	SC	ST	Woman							
Micro	Small	General	OBC	SC	ST	Woman										

**CHECK LIST**

<b>Sl. No.</b>	<b>Particulars</b>	<b>Document Enclosed (Yes / No)</b>	<b>Document No</b>
01.	Name of the Contractor		
02.	Tender Document Signed & Stamped		
03.	Certificate of Incorporation/Firm registration		
04.	PF Registration Certificate		
05.	ESI Registration Certificate		
06.	PAN Number		
07.	GSTIN Registration Certificate		
08.	UDYAM Registration Copy		
09.	Income Tax Returns for last 3 years		
10.	P & L account and Balance Sheet certified by the Practicing Chartered Accountant for the last 3 years		
11.	Work orders & Job Completion Certificates of similar works in line with eligibility criteria.		
12.	Bank Solvency Certificate		

**SIGNATURE OF THE TENDERER WITH SEAL**

**BHARAT HEAVY ELECTRICALS LIMITED  
HEAVY PLATES & VESSELS PLANT  
VISAKHAPATNAM – 530 012**

**PART – II  
(PRICE BID)**

**NAME OF WORK:** Works contract for re-laying of roads(6.7 KM Approx.) at township of BHEL-HPVP, Visakhapatnam

**Tender Enquiry No:** OS/WC/2025-26/60/42, Date: 08.08.2025.

**BILL OF QUANTITIES (BOQ)**

Sl. No.	Description of Item	Unit	Qty	Rate in ₹	Amount in ₹
1	Providing and applying tack coat using bitumen emulsion conforming to IS:8887, using emulsion pressure distributor including preparing the surface & cleaning with mechanical broom. On bituminous surface @ 0.25kg/sqm	Sqm	34,800.00	10.47	3,64,356.00
2	<b>2.5 cm premix carpet</b> (compact thickness) surfacing with 2.25 cum and 1.12 cum of stone chippings of 13.2 mm and 11.2 mm size respectively per 100 sqm and 52 kg and 56 kg of hot bitumen per cum of stone chippings of 13.2 mm and 11.2 mm size respectively, including a tack coat with hot straight run bitumen, including consolidation with road roller of 6to 9 tonne capacity etc. complete (tack coat to be paid for separately). With paving Asphalt grade VG - 10 heated and then mixed with solvent at the rate of 70 grams per kg of asphalt	sqm	34,800.00	209.56	72,92,688.00
3	Providing and laying <b>seal coat</b> of premixed fine aggregate (passing 2.36 mm and retained on 180-micron sieve) with bitumen using 128kg of bitumen of grade VG - 10 bitumen per cum of fine aggregate and 0.60 cum of fine aggregate per 100 sqm of road surface, including rolling and finishing with road roller all complete	Sqm	34,800.00	66.03	22,97,844.00
4	scarifying / Removal old metalised damaged Road surface to a thickness up to 75mm including cleaning the dust & other loose particles by means of mechanical brooms , high pressure air jet compressor and consolidation of the aggregate received from scarifying with power road roller of 8-10 tonne capacity etc. Quoted rate inclusive of disposal of debris to our the township premises etc. complete all as directed by the Engineering - in- charge.	Sqm	282.00	29.17	8,225.94

Tender Enquiry No: OS/WC/2025-26/60/42, Date: 08.08.2025.

Sl. No.	Description of Item	Unit	Qty	Rate	Amount
5	Providing and applying tack coat using hot straight run bitumen of grade VG - 10, including heating the bitumen, spraying the bitumen with mechanically operated spray unit fitted on bitumen boiler, cleaning and preparing the existing road surface as per specifications: WBM @ 0.50 Kg / sqm	Sqm	1,881.00	35.98	67,678.38
6	Providing and laying, spreading and compacting graded stone aggregates to Wet Mix Macadam of 250mm thick specification including premixing the materials with water at OMC in mechanical mix plant carriage of mixed material by tipper to site laying in uniform layers with pavers in Sub Base/ Base course on well prepared surface and compacting with vibratory roller to achieve the desired density including cost of material, labour charges, rentals for machinery, fuel and all other incidental charges etc., complete as per clause 406 of MORTH Rev-5	CUM	47.00	1,146.48	53,884.56
7	<b>Repairing of pot holes</b> including cutting Rectangle shape Providing and laying bituminous macadam using crushed stone aggregates of specified grading premixed with bituminous binder, transported to site by tippers, laid over a previously prepared surface with paver finisher equipped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers as per specifications to achieve the desired compaction and density, complete as per specifications and directions of Engineer-in-Charge of compaction and surface accuracy <b>50 to 100 mm average compacted thickness with bitumen of grade VG-30 @ 5% (percentage by weight of total mix) and lime filler @ 2% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity.</b>	Cum	430.00	8,300.00	35,69,000.00
8	Demolishing/ chipping cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge <b>Nominal concrete</b>	Cu.m	2.82	950.28	2,679.79

Tender Enquiry No: OS/WC/2025-26/60/42, Date: 08.08.2025.

Sl. No.	Description of Item	Unit	Qty	Rate	Amount
9	providing and applying 2.5mm thick road marking strips (retro-reflective) of specified shade/colour using hot thermoplastic materials by fully semi-automatic thermoplastic plant applicator machine filled with profile shoe glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on the Road surface including cost of materials, labour, T&P, cleaning the road surface of all dirt seals , oil, grease and foreign materials etc. complete as per direction of Engineering -in- charge and accordance with applicable specifications.	Sqm	141.00	471.84	66,529.44
10	Supply, spreading and levelling of Gravel on berms located on both sides of road, not exceeding 20cm in depth including consolidating each deposited layer by ramming and water etc. complete as per direction of Engineering -in- charge .	Cum	300.00	662.56	1,98,768.00
11	Supply of crusher Dust	Tons	800.00	425.18	3,40,144.00
12	Supply of JCB for any misc. works including the driver and fuels	Hrs	50.00	633.79	31,689.50
13	Dismantling manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge: bituminous road	Sqm	150.00	319.56	47,934.00
14	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge All kinds of soil	cum	150.00	132.37	19,855.50
15	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift up to 1.5 m. included (100mm to 300mm) pipes fixing. Pipes will be supply BHEL-HPVP	cum	150.00	146.17	21,925.50
16	Brick work with common burnt clay F.P.S. (Non- modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:4 (1 cement: 4 coarse sand)	cum	18.00	5,496.86	98,943.48

Tender Enquiry No: OS/WC/2025-26/60/42, Date: 08.08.2025.

Sl. No.	Description of Item	Unit	Qty	Rate	Amount
17	Providing and Laying P:C:C: 1:4:8 (1 Cement: 4 coarse sand (zone-III) derived from natural sources: 8 graded stone aggregate 40 mm nominal size derived from natural sources)	cum	31.00	5,080.28	1,57,488.68
18	Providing and Laying 15 mm thk plastering C:M 1:4 on Brick work	Sqm	102.00	297.88	30,383.76
19	GALVANIZED IRON CHAIN LINK FENCING WIRE-MESH WITH BOTH END KNUCKLING SIZE: 50 X 50 MM, THICKNESS: 4 MM, HEIGHT: 2 MTRS, WIDTH: 1000 RMS TOTAL: 2000 SQ. MTRS OF GALVANIZED IRON CHAIN LINK FENCING WIRE-MESH WITH BOTH END KNUCKLING IS REQUIRED	m	1,000.00	447.48	4,47,480.00
20	Supply and Laying parking Tiles /footpath Tiles Size 300X300x 25mm thick (Brand: ABC GRC Tiles) laid on 20mm thick cement mortar 1:4 (1 cement: 4 coarse sand), set in 1:4 CM & Tile adhesive of Rate to include for laying tiles to the pattern as directed by jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., included all materials complete. as per direction Engineer-in-charge. (Include Chipping work)	Sqm	400.00	387.87	1,55,148.00
21	TOTAL VALUE in ₹				1,52,72,646.53
22	Discount /Increase offered on Total Value in %				
23	Total Value after Discount/Increase in ₹				
24	GST @18%				
25	Total Value including GST in ₹				
*Note: the above applicable activities are to be carried out in line with Technical conditions and Special conditions of contract at Annexure-I & II					

Total Amount including GST in Words:

**NOTE:**

- 1) Tenderers are requested to visit the site before submitting their tenders and go through the site conditions, nature and quantum of the job to be done and in general shall themselves obtain all necessary information as to risks, safety precautions, contingencies and other circumstances. A tenderer shall be deemed to have full knowledge of the site, whether he inspects it or not, no claim shall be allowed.
- 2) GST as applicable shall be paid by contractor and same shall be reimbursed on submission of proof of payment.
- 3) The quoted prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.
- 4) L1 shall be evaluated based on the total quoted price at Sl. No:23.
- 5) Lowest offer need not be the rate acceptable to BHEL-HPVP and BHEL-HPVP reserves the right to go for negotiation with the L1 bidder.
- 6) The quantity indicated in the BOQ is indicative only and may increase/ decrease but total value of contract will not exceed the awarded value, unless otherwise order is amended. However, payment shall be made for the actual quantities executed only.
- 7) Road humps are to be laid down wherever necessary and as instructed by Engineer-in-charge.

Signature of the Tenderer with Company Seal

**ACCEPTANCE FOR ELECTRONIC FUND TRANSFER / RTGS / NEFT TRANSFER**

01	NAME & ADDRESS OF THE SUPPLIER / SUBCONTRACTOR	
02	VENDOR CODE ASSIGNED BY BHEL-HPVP LTD	

**DETAILS OF BANK ACCOUNT**

03	NAME & ADDRESS OF THE BANK	
04	NAME OF THE BRANCH	
05	BRANCH CODE	
06	MICR CODE	
07	ACCOUNT NUMBER	
08	TYPE OF ACCOUNT	
09	BENEFICIARY'S NAME	
10	IFSC CODE OF THE BRANCH	
11	EMAIL ID	
12	TELEPHONE / MOBILE NUMBER	

**CERTIFICATE**

I / We here by agree to receive the payments due from M/s Bharat Heavy Electricals Ltd., by the National Electronic Fund Transfer / or RTGS Transfer mode by credit to my / our above-mentioned Bank account. I / We also agree that payments made to the above-mentioned account are a valid discharge of the liability of M/s Bharat Heavy Electricals Ltd. I / We also agree to bear the applicable Bank charges for the above mode of transfer. A copy of the cheque leaf/ cancelled cheque leaf of the above account is sent herewith.

(Authorized Signatories with Name & Seal)

**BANKER'S CERTIFICATION**

We confirm that we are enabled for receiving RTGS and NEFT credits and we further confirm that the account number of \_\_\_\_\_ (name of account holder), the signature of authorized signatory and the MICR and IFSC codes of our branch mentioned above are correct.

Place:

Bank Manager / Officer

Date:

Signature with Bank stamp and Name seal

**FORWARDED TO ACCOUNTS DEPARTMENT / CASH SECTION**

We confirm the above details are verified with the records available with us

Signature of BHEL Official with name & seal  
Operating the contract / Services

**GST COMPLIANCE FOR INDIGENOUS SUPPLIERS / CONTRACTORS**

1. In Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GSTIN which should be clearly mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
2. Supplier shall mention their GSTIN in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per P0, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.
3. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
4. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
5. All documents like Test Certificate, LR copy, Guarantee/Warranty certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment where ever applicable. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
6. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the suppliers, within the calendar month notified by BHEL.
7. For any such delay in availing of tax credit for reasons attributable to supplier (as mentioned above), interest (calculated @ SBI Base Rate + 6%) along with penalty if any will be deducted for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
8. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.
9. This is to inform that GST portion of invoice, shall be released only upon Vendor declaring such invoice in his GSTR-1 and receipt of goods and Tax invoice by BHEL and Confirmation of payment of GST thereon by vendor on GSTN portal. Alternatively, BG of appropriate value may be obtained from vendor which shall be valid At least one month after the confirmation of date of payment of GST by vendor on GSTN portal and receipt of Tax invoice and receipt of goods, whichever is later. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
10. That in case vendor delays Declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.

**Note:** The above will be followed strictly for Processing vendor payments to ensure GST Compliance.





**BHARAT HEAVY ELECTRICALS LIMITED**  
**UNIT- HEAVY PLATES & VESSELS PLANT**  
**VISAKHAPATNAM – 530 012**  
(A Govt. of India Enterprise)

**MANDATE FORM**

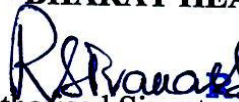
**OPTION TO RECEIVE E-PAYMENT THROUGH NEFT & RTGS.**

1. NAME : **BHARAT HEAVY ELECTRICALS LTD ( HPVP)**
2. ADDRESS : **NATHAYYPAALE,**  
**VISAKHAPATNAM**
3. PARTICULARS OF BANK ACCOUNT
  - a) BANK NAME : **STATE BANK OF INDIA**
  - b) BRANCH NAME : **BHPV BRANCH**
  - c) BRANCH ADDRESS : **BHPV POST, VISAKHAPATNAM**
  - d) IFSC CODE : **SBIN0001675**
  - e) ACCOUNT NUMBER ; **33276118389**
  - f) E-MAIL ID FOR RECEIVING SYSTEM GENERATED PAYMENT ADVICE :  
[rsprakash@bhel.in](mailto:rsprakash@bhel.in)

I hereby declare that the above account details are of our Receipts Bank Account and this is issued in lieu of cancelled cheque as we are not availing cheque facility for our Receipts Bank Account.

I hereby further declare that particulars furnished above are correct.

**FOR BHARAT HEAVY ELECTRICALS LIMITED**


  
( Authorised Signatory ) **SURYA PRAKASH**  
**Manager (Finance)**  
**HPVP Unit, BHEL**  
**VISAKHAPATNAM-530 012**

**Bank Certification**

This is to certify that the particulars furnished at Point (3), above are correct and complete as per our records.

09/01/24



  
**Murall Krishna Sunkari**  
**PF No. 5533805 SS.No. S-30284**  
**Dy. Manager**  
Seal & Signature of **Authorised Bank Official**

HPVP Unit, VISAKHAPATNAM – 530 012, A.P.,INDIA. Tel.No: +91(0891) 2881280. Fax :+91(0891)2881700.

Registered Office : BHEL House, Siri Fort,NEW DELHI – 110049, India.

Website : <http://www.bhel.com>, Tel.Nos: (91)(11)66337000(Multiple lines),Fax: (91)(11)26493021(Gen.)