



# West Bengal State Electricity Distribution Company Limited

(A Govt. of West Bengal Enterprise)

Office of the Regional Manager

Birbhum Region

3<sup>rd</sup> Floor, Commercial Complex, Suri, Birbhum, Pin: 731101

e-mail: rm.birbhum@wbasedcl.in

## NOTICE INVITING e-TENDER

Memo No.: **RM/BRO/ETENDER/BOL33UG/26-27/1143**

Date-**06.08.2026**

NIT No.: **RM/BRO/ETENDER/BOL33UG/26-27/1**

Date-**06.08.2026**

**Name of the Tender:** Scheme for Conversion of existing overhead portion to underground system of the 33 KV Line (Ckt.-I) from Bolpur (Paruldanga) 132/33 KV Substation to Moldanga 33/11 KV Substation under Bolpur Division under Birbhum Region.

Tender is invited by the **Regional Manager, Birbhum Region, WBSEDCL, Super Market Complex, 3<sup>rd</sup> Floor, Suri, District: Birbhum, Pin-731101** in two part from the from the experienced, resourceful, Bonafide & working agencies of WBSEDCL/WBSETCL/WBPDCL/Central Govt./State Govt./Semi-Govt./Undertaking and who is technically & commercially qualified and have successfully completed similar type of works under WBSEDCL as under mentioned as per specified terms, conditions and specifications. [Submission of Bid through online]

| Sl. No. | Name of the Work                                                                                                                                                                                                              | Estimated Cost (Rs.)                                                                                       | Earnest Money (Rs.)                                                               | Cost of Tender Documents (Rs.) (Non-refundable) | Period of Completion | Name & address of the Concerned Office                                                                  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------|
| 1       | Scheme for Conversion of existing overhead portion to underground system of the 33 KV Line (Ckt.-I) from Bolpur (Paruldanga) 132/33 KV Substation to Moldanga 33/11 KV Substation under Bolpur Division under Birbhum Region. | 79,59,573.00 (Rupees Seventy Nine Lakhs Fifty Nine Thousand Five Hundred Seventy Three only) (Without GST) | 1,59,192.00 (Rupees One Lakh Fifty Nine Thousand One Hundred and Ninety Two only) | NIL                                             | 60 (Sixty) Days.     | Birbhum Regional Office, WBSEDCL, Super Market Complex, 3rd Floor, Suri, District: Birbhum, Pin-731101. |

### Terms & Conditions of the E-Tender:

- Both Technical Bid and Financial Bid should be submitted in technical and financial folder concurrently duly digitally signed by the Tenderer through the website <https://wbtenders.gov.in> as per schedule items of work.
- The FINANCIAL OFFER of the prospective bidder will be considered only if the TECHNICAL BID of the Bidder is found qualified by the WBSEDCL. The decision of the WBSEDCL will be final and absolute in this respect. The list of Qualified Bidders of Technical Bid will be displayed in the website. Technical & Financial Criteria has been mentioned in detail in SECTION-II.
- Technical Document and Financial Bid should be submitted online on or before as per following Date & Time Schedule:



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| Sl. No. | Particulars                                                              | Date & Time                 |
|---------|--------------------------------------------------------------------------|-----------------------------|
| 01      | Date of uploading of N.I.T. & other Documents (online) (Publishing Date) | 14.08.2026 at 11.00 hrs.    |
| 02      | Documents download/sell start date (Online)                              | 14.08.2026 from 11.00 hrs.  |
| 03      | Bid submission start date (On line)                                      | 14.08.2026 from 11.00 hrs.  |
| 04      | Pre Bid meeting Date                                                     | 18.08.2026 at 12.00 hrs.    |
| 05      | Documents download End Date(Online)                                      | 27.08.2026 up to 12:00 hrs. |
| 06      | Bid Submission closing date (Online)                                     | 27.08.2026 up to 12:00 hrs. |
| 07      | Last Date of submission of Earnest Money Deposit (Online)                | 27.08.2026 up to 12:00 hrs. |
| 08      | Technical Bid opening date (Online)                                      | 31.08.2026 at 11:00 hrs.    |
| 09      | Date of uploading list for Technically Qualified Bidder(Online)          | To be intimated later       |
| 10      | Financial Bid opening Date (Online)                                      | To be intimated later       |

- The WBSEDCL reserves the right to cancel the N.I.T. due to unavoidable circumstances and no claim in this respect will be entertained.
- Any further information may be had from the website: [www.wbsedcl.in](http://www.wbsedcl.in) and the Birbhum Regional Office.

Tender Inviting Authority (For WBSEDCL)

(P. Sarkar)  
Regional Manager  
Birbhum Region  
WBSEDCL



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## Section-II

### Invitation for Bids (IFB)

1. Intending bidders desirous of participating in the tender are to log on to the website <https://wbtenders.gov.in> for the tender. The tender can be searched by typing WBSEDCL in the search engine provided in the website. Further details of the Tender Notice may be had from the following office: **Office of The Regional Manager, Birbhum Region, WBSEDCL, Super Market Complex, 3<sup>rd</sup> Floor, Suri, District: Birbhum, Pin-731101.** Bidders willing to take part in the process of e-tendering are required to obtain Digital Signature Certificate (DSC) in the name of person who will sign the tender, from any authorized Certifying Authority (CA) under CCA, Govt of India (viz. nCode Solution, Safescrypt, e-Mudhra). DSC is given as a USB e-Token. After obtaining the Digital Signature Certificate (DSC) from the approved Certifying Authority they are required to register the fact of possessing the Digital Signature Certificates through the registration system available in the website.
2. Tender cost/Tender Fee is abolished as per O.O. No.- 1994 dated 19.05.2021 of the Director(HR), WBSEDCL. All participating bidders are therefore exempted from payment of Tender Fee.
3. **Scope of Work:** Conversion of existing overhead portion to underground system of the 33 KV Line (Ckt.-I) from Bolpur (Paruldanga) 132/33 KV Substation to Moldanga 33/11 KV Substation under Bolpur Division under Birbhum Region.
  - (a) Microtunnelling work with laying of HDPE pipe as per instruction of site Engineer and as per site condition including supply of HDPE pipe as per IS: 4984 : 2016 including preparation and submission of As built drawing with 200mm Dia HDPE pipe, PE 100, PN-10.- 3.171 KM.
  - (b) Laying and dressing of 01 No. Cable 45KV Gr., 3C X 400 Sqmm XLPE Cable In pacca trench/ excavated trench. – 7.009 KM (Both Open Cut and Micro tunneling).
4. **Earnest Money:** The amount of Earnest Money deposit of **1,59,192.00 (Rupees One Lakh Fifty Nine Thousand One Hundred and Ninety Two only)** for respective work shall be submitted through online mode through e-Tender portal (<https://wbtenders.gov.in>). All offline instruments like Bank draft, Pay Order etc. have been stopped for e-tender procurement. In case of unsuccessful/rejected bids, the EMD shall be refunded directly from the e-Tendering portal. However, for successful bids, the EMD will be refunded by WBSEDCL as per norms. Further details in respect of online payment as well as refund of EMD are provided within the EMD clause. This is in accordance to the O.O. No.- 1994 Dated: 19.05.2021 and O.O. No.- 1997 Dated: 14.06.2021 of the Director (HR), WBSEDCL. The bidder will have to mandatorily pay through Net-banking facility once Net banking mode is opted for payment.

Earnest money/bid guarantee shall have to be deposited @ 2% of the estimated cost of the tender subject to a maximum ceiling of **Rs. 5.0 Lakh.**

Exemption from deposition of earnest money/bid guarantee shall not be allowed under any circumstances.

#### 5. Refund/ Settlement of EMD Amount:

- a. For unsuccessful bidders, EMD amount submitted against the tender will be refunded automatically, through an automated process, by NIC portal on receipt of updated status of any bid.
- b. For successful bid(s), EMD will be refunded from WBSEDCL authority after completion of tendering process and following due procedures.



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- c. The bank account used for payment of EMD by the bidders shall be maintained operative until the completion of tendering process. All refunds will be made mandatorily to the Bank A/c from which the payment of EMD has been initiated.
- d. For any queries related to payments and refunds, bidders will have to communicate with ICICI Customer Support, viz, 033-40267512/ 13, since payment gateway facility used by E-tender portal is maintained by ICICI.

## 6. Eligibility criteria for participation in the tender:

### 6.1 Technical Requirement :

#### a) Eligibility Criteria of the bidder:

Experienced, resourceful, Bonafide & working agencies of WBSEDCL/WBSETCL/WBPDCL/Central Govt./State Govt./Semi-Govt./Undertaking and who is technically & commercially qualified and have successfully completed similar type of works under WBSEDCL as under mentioned as per specified terms, conditions and specifications.

#### b) Financial Eligibility criteria of the bidder :

Three similar works costing not less than the amount equal to 40% of the estimated cost in separate three contracts/Two similar works costing not less than the amount equal to 50% of the estimated cost in separate two contracts /One similar work costing not less than the amount equal to 80% of the estimated cost in single contract under the authority of State/Central Government, State /Central Government undertaking Organizations, Government Enterprises/Co-operative Society/ Electricity power Utility, Power Dept. in India, Statutory Bodies/Local Bodies constituted under the statute after **1st September' 2018**.

- c) Completion Certificate indicating Estimated Amount, value of work-done, date of completion of the work and detail communicational address along with contact number of the Client should be submitted by the Bidder. Completion Certificate from the concerned Executive Engineer/District Engineer/Divisional Engineer or equivalent rank and above will be treated as valid credential. [Non-statutory Documents]

### 6.2. Commercial Requirement:

- a) Average annual turnover during last three years shall not be less than 30% of the estimated cost.
- b) Working capital in the year of bid submission shall not be less than 30% of the estimated cost.
- c) In case documents certifying credit facility from a schedule Bank is submitted, the requirement given in (b) shall be judged by adding the available credit facility and working capital taken together.
- d) Annual Audited Financial Report for last 3 (three) years (**AY 2023-24, AY 2024-25 & AY 2025-26**) to be submitted for verification in respect of bidders for whom audit of accounts is mandatory. For those whose audit of accounts is not mandatory, they shall submit copy of IT returns along with related enclosures (Form 3CA and Form 3CB) for last five years.

### 6.3. Other Statutory requirement:

- a) All categories of prospective Bidders shall have to submit valid copies of up-to-date Professional Tax certificate with payment challan for current FY, P.F. Registration along with any payment challan within last three months., GST registration Certificate. E.S.I. Registration along with any payment challan within last three months, PAN Card and Income Tax Return for last three Financial Years (**AY 2023-24, AY 2024-25 & AY 2025-26**), Electrical Contractor's License and Electrical Supervisor's Certificate of Competency issued under Act, Trade License in respect of the prospective Bidder. Proprietorship Firm (Trade License). Partnership Firm (Partnership Deed, Trade License). Ltd



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Company (Incorporation certificate, Trade License). Co-operative Society (Society Registration copy, Trade License), to be documented through e-filing.

- b) Performance as contractor for execution of similar nature of work for last five years and details of works in hand.
- c) Declaration regarding no litigation against WBSEDCL (in format annexed).

6.4. Neither intending bidder nor any of the partners had been be barred to participate in any Tender by any Government Department/Semi-Govt./Govt. Undertakings/ Enterprise etc during the last 5 (five) years prior to the date of this NIT. Such debarring will be considered as disqualification towards eligibility. (A declaration in this respect has to be furnished by the prospective bidders).

6.5. The intending Bidders or any of their partner shall neither have abandoned any work nor any of their contract have been rescinded during the last 5 (five) years. Such abandonment or rescission will be considered as disqualification towards eligibility. (A declaration in this respect has to be furnished by the prospective bidders).

- 7. The intending Bidders are required to quote the rate online.
- 8. Constructional Labour Welfare Cess @ 1% (one percent) of cost of construction will be deducted from every Bill of the selected agency, Royalty & all other statutory levy/ Cess will have to be borne by the contractor & the rate quoted by the contractor item wise is inclusive of all such taxes and cess as stated above excluding Goods and Services Tax.
- 9. Bids shall remain valid for a period not less than 180 (One hundred Eighty) days after date of Bid opening of tender. Bid valid for a shorter period shall be rejected by the Tender Inviting Authority as non-responsive. If the tenderer withdraws the bid before the period of bid validity without giving any satisfactory explanation for such withdrawals, the earnest money as deposited will be forfeited forthwith without assigning any reason thereof.
- 10. No mobilization / secured advance will be allowed.
- 11. The Bidder, at his own responsibility and risk is encouraged to visit and examine the site of works and its surroundings and obtained all information that may be necessary for preparing Bid and entering into an agreement for the work/works as mentioned in the NIT, before submitting offer with full satisfaction. The costs for visiting the working site shall be at the bidder own expense.
- 12. The intending Bidders shall clearly understand that whatever may be the outcome of the present invitation of the Bid, no cost of Bidding shall be reimbursable by the Tender Inviting Authority. The Tender Inviting Authority reserves the right to accept or reject any/all offer without assigning any reason whatsoever and is not liable for any cost that might have incurred by the Bidder at the stage of Bidding.
- 13. Prospective applicants are advised to note carefully the minimum qualification criteria as mentioned in '**Instruction to bidders**' stated in Section –III before tendering the bids.
- 14. Work Order & Payment of work will be depended on availability of fund. Intending bidders may consider this criteria while submission of tender and quoting their rate through online.
- 15. Conditional/Incomplete tender will not be accepted under any circumstances.
- 16. The intending bidder(s) required to quote the rate item wise to tender online considering that no escalation and or price adjustment will be allowed by the department under any circumstances.



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17. At any stage during scrutiny, if it is found that the credential or any other papers which the Bidder uploaded during Bidding process, found incorrect/manufactured/fabricated, that bid will be considered a nonresponsive and outright rejected with forfeiture of Earnest Money and action will be taken as per stipulation of IT Rules in force.
18. All bids in the range of -20% to -50% of the estimated rate shall furnish an additional performance security in the format given in the prescribed format within 30 days from issuance of Purchase Order, which shall be equal to 10% of the ordered value for bid of the items.
19. All bids in the range of -50% to -80% of the estimated rate shall furnish an additional performance security in the format given in the prescribed format within 30 days from issuance of Purchase Order, which shall be equal to 20% of the ordered value for bid of the items.

The Security Deposit mentioned in (18) & (19) above shall remain valid upto the time of completion of supply of materials, with an additional claim period of further six months.

20. Before issuance of Letter of Acceptance/Work order, the tender accepting authority may verify the credential & other documents of the lowest bidder so uploaded online if found necessary. If it is found such document incorrect/manufactured/fabricated, Letter of Acceptance/Work order will not be issued in favor of the bidder under any circumstances and action will be taken accordingly.
21. The Tender Inviting Authority (WBSEDCL) does not bind itself to accept the lowest bidder and reserves the right to accept or reject, split any/all offer without assigning any reason whatsoever and is not liable for any cost that might have incurred by the Bidder at any stage of the Bidding. Tender inviting Authority (WBSEDCL) also reserves right to accept/cancel/withdraw the concerned NIT in full or part due to unavoidable circumstances and no claim in this respect shall be entertained.
22. In case of **Tie Bid** among the L1 bidders the following procedure shall be adopted:

Keeping the discovered L1 rate as ceiling, sealed bids may be invited from all L1 bidders and out of those lowest one may be selected.

If none of the L1 bidders is ready to offer further reduced rates:

## **22.1 For items divisible in nature**

22.1.1 The work may be distributed equally among the consenting L1 bidders.

22.1.2 If none of the L1 bidders is ready to accept the reduced quantity, the bidder with higher credential based on the following parameters, may be selected among L1 bidders in the following manner:

- a. In case of Supply of goods, last three years average turnover of the bidder shall be considered.
- b. In case of Execution of work/ Supply of service, value of single work/ service of similar nature completed during last three years shall be considered.

## **22.2 For items not divisible in nature**

If none of the L1 bidder is ready to offer further reduction of rates, the bidder with higher credential based on parameters, as mentioned in 22.1.2 above may be selected among L1 bidders.

-----End of IFB-----



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## SECTION – III INSTRUCTION TO BIDDERS (ITB)

### General guidance for e-Tendering

Instructions/Guidelines for tenders for electronic submission of the tenders online have been annexed for assisting the contractors to participate in e-Tendering.

#### **1. Registration of Contractor:**

Any contractor willing to take part in the process of e-Tendering will have to be enrolled & registered with the Government e-Procurement system, through logging on to <https://wbtenders.gov.in> (the web portal). The contractor is to click on the link for e-Tendering site as given on the web portal.

#### **2. Digital Signature certificate (DSC):**

Each contractor is required to obtain a class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders, from the approved service provider of the National Information's Centre (NIC) on payment of requisite amount. Details are available at the Web Site stated in Clause-2 of Guideline to Bidder DSC is given as a USB e-Token.

#### **3. Downloading of Tender documents:**

The contractor can search & download NIT & Tender Documents electronically from computer once he logs on to the website mentioned in Clause 2 using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.

#### **4. LANGUAGE OF BID:**

All documents relating to the bid shall be in the English language.

#### **5. Submission of Tenders:**

Tenders are to be submitted through online to the website in two folders at a time for each work, one in Technical Proposal & the other in Financial Proposal before the prescribed date & time using the Digital Signature Certificate (DSC) The documents are to be uploaded (virus scanned copy) duly Digitally Signed. The documents will get encrypted (transformed into non readable formats).

#### **5.1. Technical proposal:**

The Technical proposal should contain scanned copies of the following documents.

##### **5.1.1. Statutory Cover:**

It contains two covers (folders) (a) NIT (b) Draft & (c) Annexures / forms.

- (a) **NIT folder** containing downloaded and uploaded copies (Digitally Signed) of the following:
  - i. NIT.
  - ii. General conditions of contract and specification for works.
  - iii. Additional Terms & Conditions if any.



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## 5.1.2. Other Statutory Requirements / Technical Document Cover:

It contains the following:

- a) Valid Electrical Contractor's License.
- b) Valid Electrical Supervisory License (6B&7B).
- c) Valid Electrical trade license.
- d) I.T. Return for last three Assessment Years (**AY 2023-24, AY 2024-25 & AY 2025-26**) & PAN Card.
- e) Annual Audited Financial Report for last 3 (three) years (**AY 2023-24, AY 2024-25 & AY 2025-26**).  
For those whose audit of accounts is not mandatory, they shall submit copy of IT returns along with related enclosures (Form 3CA and Form 3CB) for last five years
- f) GST registration Certificate.
- g) Professional Tax Certificate with current challan.
- h) E.P.F. Registration certificate along with any payment challan within last three months.
- i) E.S.I. Registration certificate along with any payment challan within last three months.
- j) Performance as prime contractor for execution of similar nature of work for last five years and details of works in hand.
- k) Declaration of not being blacklisted/ debarred/ put on holiday list (*as per format **Form-XII***).
- l) Self-declaration by Proprietor of the Bidding Company for not being blacklisted/ debarred/ put on holiday list (*as per format **Form-XIII***).
- m) Declaration regarding no litigation against WBSEDCL (*as per format **Form-XI***).
- n) Requisite Credential Certificate for successfully completion of similar nature of work having value not less than Three similar works costing not less than the amount equal to 40% of the estimated cost in separate three contracts/Two similar works costing not less than the amount equal to 50% of the estimated cost in separate two contracts /One similar work costing not less than the amount equal to 80% of the estimated cost in single contract under the authority of Govt./Semi Govt./Govt. undertaking Organizations/Govt. Enterprises/Co-operative Society/Electricity power Utility Statutory Bodies/Local Bodies constituted under the statute after **1<sup>st</sup> September' 2018**.

## 5.2. Financial Proposal (in one cover/folder):

It contains Bill of Quantities (BOQ). The rate to be quoted in the BOQ on "**Item rate basis**" in the space marked for quoting rate (either excess, less or at par i.e, 0.00%). Quoted rate will be encrypted in the B.O.Q. under Financial Bid.

**Note: Failure of submission of any of the above mentioned documents will render the tender liable to be rejected for both statutory & other statutory cover.**

THE ABOVE STATED TECHNICAL DOCUMENTS SHOULD BE ARRANGED IN THE FOLLOWING MANNER

Click the check boxes beside the necessary documents in the My Document list and then click the tab "**Submit Other Statutory Documents**" to send the selected documents to Other Statutory folder. Next Click the tab "**Click to Encrypt and upload**" and then click the "**Technical**" Folder to upload the Technical Documents.

| Sl. No. | Category Name         | Sub-category Description | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------|-----------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01.     | Certificates          | Certificates             | <ul style="list-style-type: none"> <li>a) PAN Card.</li> <li>b) GST registration Certificate.</li> <li>c) I.T. Return for last three Assessment Years (<b>AY 2023-24, AY 2024-25 &amp; AY 2025-26</b>).</li> <li>d) Professional Tax Paid Certificate with current challan.</li> <li>e) E.P.F. Registration certificate along with any payment challan within last three months.</li> <li>f) E.S.I. Registration certificate along with any payment challan within last three months.</li> <li>g) Declaration of not being blacklisted/ debarred/ put on holiday list (<i>as per format Form-XII</i>).</li> <li>h) Self-declaration by Proprietor of the Bidding Company for not being blacklisted/ debarred/ put on holiday list (<i>as per format Form-XIII</i>).</li> <li>i) Declaration regarding no litigation against WBSEDCL (<i>as per format Form-XI</i>).</li> </ul> |
| 02.     | Company Detail(s)     | Company Detail(s)        | <ul style="list-style-type: none"> <li>a) Trade License in respect of the prospective Bidder, Proprietorship Firm (Trade License), Partnership Firm (Partnership Deed, Trade License) Ltd Company (Incorporation certificate, Trade License),</li> <li>b) Valid Electrical Contractor License.</li> <li>c) Valid Electrical supervisory license for UG cable laying work upto 33KV (6B&amp;7B)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 03.     | Financial Information | Financial Information    | <ul style="list-style-type: none"> <li>a) Copy of IT returns for last 3 assessment years (<b>AY 2023-24, AY 2024-25 &amp; AY 2025-26</b>).</li> <li>b) Annual Audited Financial Report for last 3 (three) years (<b>AY 2023-24, AY 2024-25 &amp; AY 2025-26</b>).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 04.     | Credentials           | Credential               | <p>A bidder shall be considered technically eligible, with experience of having successfully completed similar type of cable laying works subject to fulfillment of the following criteria.</p> <p>Experienced, resourceful, Bonafide &amp; working agencies of WBSEDCL/WBSETCL/WBPDCL/Central Govt./State Govt./Semi-Govt./Undertaking and who is technically &amp; commercially qualified and have successfully completed similar type of works under WBSEDCL as under mentioned as per specified terms, conditions and specifications &amp; have successfully completed not less than Three similar works costing not less than the amount equal to <b>40%</b> of the estimated cost in separate three</p>                                                                                                                                                                  |



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|  |  |  |                                                                                                                                                                                                                                                                                                |
|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | contracts/Two similar works costing not less than the amount equal to <b>50%</b> of the estimated cost in separate two contracts /One similar work costing not less than the amount equal to <b>80%</b> of the estimated cost in single contract after <b>1<sup>st</sup> September' 2018</b> . |
|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The bidder shall have to go through all the "Annexures" enclosed in this bid document and submit the filled in proforma of the appropriate/relevant annexure with the bid document, putting the signature with seal of the Company before uploading the tender.

## 5.3 Opening of Tender:

### 5.3.1 Opening of Technical proposal:

Technical proposals will be opened by the Regional Manager, Birbhum Region, WBSEDCL, Super Market Complex, 3rd Floor, Suri, District: Birbhum, Pin-731101 and his authorized representative electronically from the web site stated using their Digital Signature Certificate (DSC).

- Intending tenderers may remain present, if they so desire.
- Cover (folder) for Statutory Documents will be opened first and if found in order, cover (folder) for Other Statutory Documents will be opened. If there is any deficiency in the Statutory Documents the tender will summarily be rejected.
- Summary list of technically qualified tenderers will be uploaded online.
- Pursuant to scrutiny & decision of the Department, the list of eligible tenderers will be uploaded in the web portal.
- Uploading of summary list of technically qualified tenderers:
  - Pursuant to scrutiny & decision of the authorized representatives of WBSEDCL the summary list of eligible tenderer & the serial number of work for which their proposal will be considered will be uploaded in the web portals.
  - While evaluation the authorized representatives of WBSEDCL may summon any of the tenderer & seek clarification/information or tenderer may be asked for producing original hard copy/s of any of the documents already submitted & if these are not produced within the stipulated time frame, their proposals will be liable for rejection.

### 5.3.2. Financial proposal:

- The financial proposal should be one cover (folder) containing bill of quantities (BOQ) the contractor is to quote the rate (item basis) online in the space marked for quoting rate in the BOQ.
- Only downloaded copies of the above documents are to be uploaded virus scanned & Digitally Signed by the contractor.

## 5.4. Validity of Bids:

Price bid of the tender shall be opened after opening of "Techno-Commercial Bid & EMD". Bids shall remain valid for a period of 180 days from the next day of opening of the tender.

## 5.5 Earnest Money Deposit (EMD):

The bidder shall deposit the requisite earnest money online. The bid guarantee/EMD shall be forfeited:

- If during the period of validity specified by the bidder, the bidder withdraws/modifies its bid as a whole or part.



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5.5.2. If bidder deviates from any clarification/confirmation given by him subsequent to submission of his bid.

5.5.3. In case of successful bidder, if bidder fails.

5.5.3.1. To accept LOI/Order unconditionally and sign contract.

5.5.3.2. To furnish the Contract Performance Bond.

## 6. Responsibility of Bidders:

- a) WBSEDCL will not assume any responsibility regarding information gathered, interpretations or conclusions made by the bidder or regarding information, interruption or deductions the bidder may derive from the data furnished by the WBSEDCL. Verbal agreement or conversation with any officer, employee of WBSEDCL either before or after the execution of the contracts, shall not affect or modify any of the terms or obligations contained in the contract.
- b) It shall be the responsibility of the bidders to determine and to satisfy themselves by such means as they consider necessary or desirable as to all matters pertaining to this contract including in particular all factors that may affect the cost, duration and execution of the works. It must be understood and agreed that such factors have properly been investigated and considered while submitting the bid.
- c) Claim, whatsoever, including those for financial adjustment to the contract awarded under these specifications and documents will not be entertained by the purchaser. Neither any change in time schedule of contract nor any financial adjustments arising thereof shall be permitted by the purchaser, which are based on the back of such clear information of its effect on the cost of the contract to the bidder.
- d) The bidder is expected to examine carefully all instructions, conditions, forms, schedules terms, annexure, specifications and drawings in the bidding document. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Bids, which are determined to be not substantially responsive to the requirement of the bidding document, will be rejected.

## 7. Cost of Bidding:-

The Bidder, at his own responsibility and risk is encouraged to visit and examine the site of works and its surroundings and obtain all information that may be necessary for preparing bid and entering into an agreement for the work/works as mentioned in the NIT, before submitting offer with full satisfaction. The costs for visiting the working site shall be at the bidder's own expense. The intending bidders shall clearly understand that whatever may be the outcome of the present invitation of the bid, no cost of bidding shall be reimbursable by the Tender Inviting Authority.

## 8. Clarification of Bidding Documents:-

If the prospective Bidder finds discrepancies or omissions in the specifications and documents or is in doubt as to the true meaning of any part, he shall at once make a request, in writing, for an interpretation /clarification, to the Owner in triplicate at least one day before pre-bid discussion. The Owner then will issue interpretation/clarification as he may think fit in writing. After receipt of such interpretation and clarification, the Bidder may submit his Bid but within the time and date as specified in the Invitation for Bids. All such interpretations and clarifications shall form a part of the Bidding Documents and shall accompany the Bidder's proposal. The Owner will respond in writing to any request for such clarification of the Bidding Documents. Written copies of the Owner's response (including an explanation of the query but without identifying its source) will be sent to all other prospective bidders who received the Bidding Document.



# West Bengal State Electricity Distribution Company Limited

(A Govt. of West Bengal Enterprise)

**Office of the Regional Manager**

**Birbhum Region**

3<sup>rd</sup> Floor, Commercial Complex, Suri, Birbhum, Pin: 731101

e-mail: rm.birbhum@wbasedcl.in

## 9. Amendment of Bidding Documents:

- 9.1 Before the deadline for submission of bids, the Owner may modify the bidding documents by issuing addenda.
- 9.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable/fax/e-mail to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by cable/fax/e-mail to the Owner.
- 9.3 To give prospective bidder reasonable time in which to take an addendum into account in preparing their bids, the Owner shall extend as necessary the deadline for submission of bids.

## 10. Documents Constituting the Bid:-

The bid to be prepared and submitted by the bidders shall comprise the following documents:-

- a) Bid Security.
- b) Documentary evidence in support of Qualification Requirement.
- c) Price schedule with Techno-Commercial bid.
- d) Any other documents required to be submitted in accordance with the instructions to the bidders.
- e) Bid documents with corrigendum/amendments, if any.

## 11. Bid Prices:

- 11.1. The bidder shall quote their price in the appropriate format in percentage excess/at par/less the estimated price.
- 11.2. The quoted Price shall be firm. There will be no price adjustment. The Price shall be in INR.
- 11.3. The Price indicated in Price Schedule (BOQ) is deemed to include all levies/duties/taxes etc & all other incidentals payable as per statute. Goods & Service Tax (GST) is payable extra as per statute.

## 12. Duties and Taxes:

- 12.1. As regards the Income Tax, surcharge/cess on Income Tax and other corporate taxes, the bidder shall be responsible for such payment to the concerned authorities for his part. If such taxes are required statutorily to be deducted at source under the contract, the owner shall be entitled to deduct the same.
- 12.2. All other duties/levies payable for NIT (excluding Goods & Service Tax) shall be included by the bidder in his bid price and no claim in this behalf will be entertained by WBSEDCL. Goods & Service Tax (GST) shall be paid as per prevailing statute. The rates quoted by the bidders shall be considered for evaluation purpose. In case, the rates quoted by the bidder are higher than the prevailing rates, the prevailing rate shall be considered as the rates at the time of awarding the contract to the L1 bidder. The rates shall be specifically indicated on the Price Schedule.
- 12.3. Statutory Variation: Statutory variation, if any declared by the Govt. or any statutory authority would be considered for Goods & Service Tax (GST) only while executing the contract. If there is any increase/decrease in the rates of taxes for Goods & Service Tax (GST), that should be applicable/considered for payment purpose. However, if any, new Tax, Duties, Levies etc. are imposed/introduced subsequently by the Government, that shall be fully on your account and that will be borne by you and WBSEDCL will not bear any extra cost for it.
- 12.4. The Contractor should take Third Party Insurance cover and Workmen's Compensation Insurance cover of the adequate value.

## 13. Time Schedule:

- 13.1. The completion time would be 60 days from the date of handing over the site.



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**13.2.** The basic consideration and the essence of the contract shall be strict adherence to the time schedule for performing the specified works.

**13.3.** The Owner reserves the right to request for a change in the work schedule during post-bid discussion with successful bidder.

#### **14. Bid Validity:**

Bids shall remain valid for a period **180** days after the deadline date of opening of financial bid. Bidder shall have to extend the bid validity beyond the above stipulation, if required, on demand by WBSEDCL. In exceptional circumstances, prior to expiry of the original time limit, the WBSEDCL may request that the bidders may extend the period of validity for a specified additional period.

#### **15. Bid Security:**

**15.1.** The Bidder shall furnish, as part of its Bid, a Bid Security for an amount as specified in the tender notice.

**15.2. Earnest Money:** Earnest Money Deposit amounting to **Rs 1,59,192.00 (Rupees One Lakh Fifty Nine Thousand One Hundred and Ninety Two only)** shall be submitted through online mode through e-Tender portal (<https://wbttenders.gov.in>). All offline instruments like Bank draft, Pay Order etc. will be stopped for e-tender procurement. In case of unsuccessful/rejected bids, the EMD shall be refunded directly from the e-Tendering portal. However, for successful bids, the EMD will be refunded by WBSEDCL as per norms. Further details in respect of online payment as well as refund of EMD are provided within the EMD clause. This is in accordance to the O.O. No.- 1994 Dated: 19.05.2021 and O.O. No.- 1997 Dated: 14.06.2021 of the Director (HR), WBSEDCL. The bidder shall submit along with the offer necessary documents in support of credential (related to the tender) to WBSEDCL/Other Power Utilities/Other Govt. Departments in earlier occasions towards financial capabilities to the extent of the estimated financial capacity of the tenderer. Exemption from deposition of earnest money deposit (EMD) shall not be allowed under any circumstances. No interest shall be payable by WBSEDCL on the above EMD.

Earnest money/ bid guarantee shall have to be deposited @ 2% of the estimated cost subject to a maximum ceiling of **Rs. 5.0 Lakh**.

#### **15.3 Security Deposit:**

The Successful tenderer within 7 (seven) days of receipt of LOI / order, shall submit his unconditional acceptance in writing failing which the Department shall have the right to terminate the LOI / Order as per rule and earnest money, submitted along with the tender will be forfeited. On receiving tenderer's acceptance for the work and on receipt of a Performance Bank Guarantee amounting to 10% of the ordered value, the EMD submitted shall be eligible for refund. All security money shall be refunded after expiry of the period of maintenance which shall be 12 (Twelve) months normally, if not otherwise mentioned in the work order) after completion of the work. This period of maintenance shall be counted from the date of completion of job.

**15.4** In addition to the Security Deposit as mentioned above,

- i. Additional Performance Security equal to 10% of the ordered value for bid of the items having variation of -20% to -50% of the estimated rate should be furnished in the prescribed format, within a period of 30 days from the date of issuance of the Purchase Order.
- ii. All bids in the range of -50% to -80% of the estimated rate shall furnish an additional performance security in the format given in the prescribed format within 30 days from issuance of Purchase Order, which shall be equal to 20% of the ordered value for bid of the items.

The Security Deposit mentioned in (i) & (ii) above shall remain valid upto the time of completion of supply of materials, with an additional claim period of further six months.



# West Bengal State Electricity Distribution Company Limited

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**15.5.** Earnest Money of the unsuccessful bidders will be discharged/ returned as promptly as possible after placement of order with L1 bidder by the Owner.

**15.6.** The bid guarantee may be forfeited:

- a) If the Bidder withdraws the Bid during the period of Bid validity specified by the Bidder on the bid form; or
- b) In case of a successful Bidder if the bidder fails:
  - i) to accept the LOA/PO within 7 days alongwith submission of Performance Bank Guarantee or
  - ii) to sign the contract within 14 days from acceptance of LOA/PO.

**15.7** No interest shall be payable by the Owner on the above bid guarantee. (Declaration of Annexure)

**16. Deadline for Submission of the Bids:**

**16.1.** Bids must be received by the Owner at the address specified above not later than the specified hours and date as stated in NIT.

**16.2.** The owner may extend the deadline for submission of bids by issuing an amendment of NIT through display in web portal or suitable written communication, in which case all rights and obligations of the owner and the bidder set previously subject to the original deadline will then be subject to the new deadline.

**17. Late Bids:**

**17.1** No Bid will be received after the Dead Line for submission of Bids.

**17.2.** Modification and withdrawal of Bids:

**17.2.1.** Bidders may modify or withdraw their bids by giving notice in writing/ online before the deadline of prescribed bid submission.

**17.2.2.** No bid may be modified after the deadline for submission of Bids.

**17.2.3.** Opening of Bid: Opening of Bid shall be as per clause 5 as noted above.

**18. Examination of Bids and Determination of Responsiveness:**

The Owner will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed and whether the Bids are generally in order.

**19. Arithmetical errors will be rectified on the following basis:**

If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail. If the Bidder does not accept the correction of the errors as above, his bid will be rejected and the amount of Bid guarantee will be forfeited.

The Bidder should ensure that the prices furnished in various Price Schedules are consistent with each other. In the case of any inconsistency in the prices furnished in the specified price schedules as identified in Bid Form or for items not quoted, the Owner shall be entitled to consider the highest unit price of that item as quoted by any of the bidders in the package for the purpose of evaluation. For the purpose of award of the Contract the lowest of the lump sum prices in these schedules will be considered.

**20. EVALUATION AND COMPARISON OF BIDS:**

**20.1.** Bid Security will be examined; any deviation in conformity of the terms of NIT with the requirement, the bid will be liable for rejection without opening of any further documents of the bidder.

**20.2.** Techno-Commercial evaluation of the bidder as per terms of NIT will be examined; any deviation in conformity of the terms of NIT with the requirement, the bid will be liable for rejection.

**20.3.** On examination of the documents submitted under different folders in web portal, WBSEDCL will evaluate and compare the bids, determined to be substantially responsive at each step.



# West Bengal State Electricity Distribution Company Limited

(A Govt. of West Bengal Enterprise)

**Office of the Regional Manager**

**Birbhum Region**

3<sup>rd</sup> Floor, Commercial Complex, Suri, Birbhum, Pin: 731101

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- 20.4.** Financial Bid of the Techno-Commercially qualified bidders only will be considered for opening.
- 20.5.** Evaluated total bid amount of all the responsive & eligible/ Techno-Commercially qualified bidders shall be compared among themselves to determine the lowest evaluated Bid and, as a result of this comparison; the lowest Bid will be selected for award of the Contract.
- 20.6** The bids shall be evaluated on the basis of total amount for the entire scope of work.
- 20.7** Conditional rebate, if any, offered by any bidder shall not be considered in bid evaluation.
- 20.8** If any bidders fails to produce the original hard copies of the document like Completion Certificate and any other documents on demand of the department within a specified time frame or if any deviation is detected in the original copies from the uploaded soft copies, it may be treated as submission of false documents by the bidders and action as deemed fit shall be taken by the concerned authority as per rule.

**21. Award of Contract Criteria:**

- 21.1.** OWNER'S RIGHT TO ACCEPT ANY BID OR TO REJECT ANY OR ALL BIDS WITHOUT ASSIGNING ANY REASONS WHATSOEVER.
- 21.2.** Notwithstanding, the Owner reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Owner's action.
- 21.3.** The employer reserves right to vary the quantity of any work or delete any item of work at the time of Award of Contract and during the period of Contract.
- 21.4.** The mode of contracting with the successful bidder will be for providing all services i.e. inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, testing and commissioning including performance testing i.r.o. all the equipment supplied by WBSEDCL and any other services specified in the Contract.

**22. Notification of Award:** Prior to expiration of Bid validity the Employer shall notify to the successful bidder in writing the Letter of Award. The bidder shall provide unconditional acceptance of LOA within one week. Bidder will also submit Project Execution Plan, Contract Agreement, Indemnity Bond and Performance Security within two weeks from the date of LOA, which will constitute formation of the Contract.

- 22.1.** Failure of the successful bidder to comply with the requirement of acceptance of LOA, Signing of Contract Agreement, Submission of Project Execution Plan, Indemnity Bond and Performance Security as per the requirement shall constitute sufficient ground for the annulment of the Award and forfeiture of Bid security.
- 22.2.** Till the receipt and acceptance of Contract Agreement/Performance Bank Guarantee/Demand Draft of successful bidder, validity of all bids shall be kept valid to facilitate action as per clause 15 as above.

**N.B.: Letter of Award will be issued by the Controlling Officer of this work, i.e. The Regional Manager, Birbhum Region.**

**23. Corrupt or Fraudulent Practices:**

Owner expects that Bidders/Suppliers/Contractors observe the highest standard of ethics during the execution of such contracts. In pursuance of this policy, the Owner:

- a) Defines, for the purposes of this provision, the terms set forth below as follows:
- i) "Corrupt Practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution, and
  - ii) "Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Owner, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at



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**Office of the Regional Manager**

**Birbhum Region**

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artificial non-competitive levels and to deprive the Owner of the benefits of free and open competition.

- b) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.
- c) Will declare a firm ineligible, either indefinitely or for a stated period of time, if Owner any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing the Contract.

## **24. Insurance:**

The successful bidder on awarding of Contract shall arrange, secure and maintain all insurance as may be pertinent to the work and obligatory in terms of law in force to protect the interest of WBSEDCL against all perils. The form & the limit of such insurance together with underwriting in each case shall be the responsibility to maintain adequate insurance coverage at all times during the period of contract shall be contractors alone.

## **25. Correctness and Sufficiency of Rates Quoted in the Tender:**

The bidder shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for work and the rates and prices stated in the schedule of works. The rates and price quoted shall cover all obligation of the bidder under the contract and all materials, labour etc. necessary for proper completion and maintenance of the work.

## **26. Penalty for Suppression/Distortion of Facts:**

If any Bidder fails to produce the original hard copies of the documents (especially Completion Certificates and audited balance sheets), or any other documents on demand of the Tender Committee within a specified time frame or if any deviation is detected in the hard copies from the uploaded soft copies or if there is any suppression, the tender committee will take actions deem fit against such defaulting Bidder.

The Employer reserves the right to accept or reject any Bid and to cancel the Bidding processes and reject all Bids at any time the prior to the award of Contract without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the ground for Employer's action.

## **27. Award of Contract:**

The Bidders whose Bid would be accepted will be notified by the authorized official through acceptance letter/Letter of award. The notification of award will constitute the formation of the Contract. The Agreement as per enclosed format in G.C.C. will incorporate all agreements between the Tender Accepting Authority and the successful bidder. All the tender documents including N.I.T. & B.O.Q. will be the part of the contract documents.

The agreement as per enclosed format in G.C.C. will incorporate all agreements between the Tender Accepting Authority and the successful bidder. All the tender documents including NIT and BOQ will be part of the documents. After acceptance of Letter of Acceptance, the successful bidder shall have to submit requisite copies of contract documents stated in NIT of the concerned work within time limit to be set in the letter of acceptance.

-----End of ITB-----



# West Bengal State Electricity Distribution Company Limited

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**Office of the Regional Manager**

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## SECTION – IV GENERAL CONDITIONS OF CONTRACT

Any contractor willing to take part in the process of e-Tendering will have to be enrolled & registered with the Government e-Procurement system, through logging on to <http://wbtenders.gov.in> (the web portal). The contractor is required to click on the link for e-Tendering site as given in the web portal.

1. The intending bidder(s) required to quote the rate item wise in the BOQ.
  - a. The quoted price should be firm. There will be no price variation during the pendency of the contract period or thereafter. Bidders are in no way allowed to get any escalation of price against the contract.
  - b. Price indicated in the schedule of prices deemed to include all the levies/duties/cess & all other incidentals payable as per statute. Relevant Goods and Service Tax rules are applicable for the work. The estimated cost is exclusive of Goods and Services Tax. It will be paid to the appropriate authority/agency as per prevailing rates and rules in force.
2. WBSedcl, who do not bind itself to accept the lowest tender, reserves the right to accept or reject any bid and to annul the Bidding processes and reject all Bids at any time prior to the Award of Contract without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the ground for WBSedcl's (Tender Accepting Authority) action.
3. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors, who resort to canvassing will be liable to rejection.
4. Bids shall remain valid for a period not less than 180 (One hundred eighty) days after date of Bid opening of tender.
5. Earnest Money as per NIT should be paid in online mode. Any other mode of payment will not be accepted.
6. **Security Deposit/Performance Bank Guarantee:**

The Successful tenderer within 7 (seven) days of receipt of LOI / order, shall submit his unconditional acceptance in writing failing which the Department shall have the right to terminate the LOI / Order as per rule and earnest money, submitted along with the tender will be forfeited. On receiving tenderer's acceptance for the work and a Performance Bank Guarantee amounting to 10% of the ordered value, the EMD submitted shall be eligible for refund. All security money shall be refunded after expiry of the period of maintenance which shall be 12 (Twelve) months normally, if not otherwise mentioned in the work order) after completion of the work. This period of maintenance shall be counted from the date of completion of job.

In addition to the Security Deposit as mentioned above,

- i. Additional Performance Security equal to 10% of the ordered value for bid of the items having variation of -20% to -50% of the estimated rate should be furnished in the prescribed format, within a period of 30 days from the date of issuance of the Purchase Order.
- ii. All bids in the range of -50% to -80% of the estimated rate shall furnish an additional performance security in the format given in the prescribed format within 30 days from issuance of Purchase Order, which shall be equal to 20% of the ordered value for bid of the items.

The Security Deposit mentioned in (i) & (ii) above shall remain valid upto the time of completion of supply of materials, with an additional claim period of further six months.



# West Bengal State Electricity Distribution Company Limited

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**7. Refund of Security Deposit:** Refund of Security deposit shall be subject to Company's right to deduct/appropriate its dues against the contractor or under this contract or any other contract. The performance Guarantee Bond/Security Deposit shall be refunded after completion of defect liability period from the date of completion of the work.

**8. Refund of Earnest money:**

Earnest money shall be retained initially for all bidders. Refund of earnest money of the unsuccessful bidders shall be made immediately after placement of order. Earnest money for the L1 bidder shall be released after submission of Performance Guarantee Bond as applicable.

**9. Forfeited of Earnest Money:**

- a) If the bidder withdraws the Bid during the period of Bid validity specified by the Bidder on the bid form.
- b) In case of a successful Bidder if the bidder fails:
  - (i) to accept the LOA/PO within 7 days alongwith submission of Performance Bank Guarantee or
  - (ii) to sign the contract within 14 days from acceptance of LOA/PO.

**10. Definition of terms:**

In writing these General Conditions of Contract, Specification and Bill of Quantity/Bidding Schedule (Schedule of work), the following words shall have normally the meanings here-in-after indicated unless there is something in the subject matter of content inconsistent with such construction.

- The *Company/Purchaser/Owner/Department* shall mean the WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED (WBSEDCL), having its office at Birbhum Regional Office, WBSEDCL, Super Market Complex, 3rd Floor, Suri, District: Birbhum, Pin-731101.
- The *Engineer-in-Charge/Controlling Officer* shall mean the Engineer deployed by the company for the purpose of this contract.
- *Company's representative* shall mean any person or persons of WBSEDCL appointed by the Company and shall include the contractor's executor's administrators, successor and permitted assignees.
- The *Contractor* shall mean the Bidder who will be awarded with the contract by the Company and shall include the contractor's executor's administrators, successor and permitted assignees.
- The work *Site* shall mean the site of proposed work as detailed in the specification or any other place where the work is to be executed under the contract.
- The terms *Services* shall mean all works to be undertaken by the Contractor as laid down under the head 'Scope of Work' or elsewhere in the specification enclosed. When the words '*approved*', '*subject to approval*', '*as directed*', '*accepted*', '*permitted*' etc. are used, the approval, judgment, direction etc. are understood to be a function of company.
- *Writing* shall indicate any manuscript, type written, printed or other statement reproduced in any visible form.
- *Date of Contract* shall mean the date on which the notification of award of contract / letter of award / telex award has been issued.
- *Zero Date* will be reckoned from the date of handing over of site.

**11. Scope of work:**

The contract comprises of construction, completion and maintenance of the work as required including provision of all labour, material, construction plant, temporary work & everything whether of a temporary



# West Bengal State Electricity Distribution Company Limited

(A Govt. of West Bengal Enterprise)

**Office of the Regional Manager**

**Birbhum Region**

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or permanent nature required for such construction, completion & maintenance so far as the necessity of providing the same is specified or responsible to be inferred from the contract.

## 12. Manner of Execution of Contract:

The successful bidder has to submit acceptance of the PO/Order within 7 (seven) days from the date of issue of the Letter of Intent/Order. The successful bidder shall be required to execute an Agreement (as per format enclosed as **Annexure-2**) at his expenses on a non judicial stamp paper of Rs. 100/- with the company with all related documents for satisfactory execution of the work. Agreement shall be signed on a date and time to be mutually agreed upon at **Bolpur Division, WBSEDCL** and the same has to be signed by both parties within 14 (Fourteen) days from the date of the acceptance of the order. Power of attorney of the authorized representative of the contractor who will sign the contract on behalf of the contractor is to be submitted before signing of the agreement.

## 13. General Requirement: General requirements are stated below :

- 13.1. Pre-visit of work site:** Contractor to visit the site before submission of tender: The contractor shall inspect and examine the site and its surroundings and shall satisfy himself before submission of his tender as to nature of the site, the quantities and nature of work and the materials necessary for the completion of the works and the means to access to the site, the accommodation he may require and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence and effect his tender.
- 13.2. Cost of Bidding:** The Contractor shall bear all cost associated with the preparation and submission of their bid and WBSEDCL in no case shall be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
- 13.3. Correctness and sufficiency of rates quoted in the tender:** The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for works and the rates and prices quoted by them in the schedule of the items. The rates and prices quoted shall cover all obligation of the tenderer under the contract and all materials and things necessary for the proper completion and maintenance of the works.
- 13.4.** Contractor shall execute, complete and maintain the works as per direction of the **Controlling Officer/Engineer-in-Charge** of the works or his representatives. The testing should be done by agency to own arrangement before charging of UG cable line after completion of work.
- 13.5. Contractor to submit program:** Within 14 (Fourteen) days from the date of issue of PO/Execution order the Contractor shall submit a program showing the order, procedure and method in which he proposes to carry out the work.
- 13.6. Contractor's Staff at site:** The contractor shall provide at site authorized representative duly approved by the Controlling Officer (approval may be withdrawn for particular person, if necessary). The contractor and/or his authorized representative is to be constantly on the work and shall give whole time supervision of the same. Such authorized agent or representative shall receive (on behalf of the contractor) directions and instructions from the Controlling Officer/Engineer or his representative.
- 13.7. Removal of persons employed at site:** The Controlling Officer/Engineer shall be at liberty to ask the contractor to remove from the site any person, employed by the contractor in the execution of the

works, who in the opinion of the Controlling Officer/Engineer misconducts himself or is incompetent or negligent in the proper performance of his duties and such persons shall not be again employed upon the works without the permission of the Controlling Officer/Engineer.

- 13.8. Setting out:** The Contractor shall be responsible for true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignments of all parts of works. If at any time during the progress of the works any error shall appear or arise in the positions, levels, dimensions or alignments of any part of the work, the contractor on being asked to rectify by the Controlling Officer/Engineer, shall at his own expense rectify such error to the satisfaction of the Controlling Officer/Engineer.
- 13.9. Protection of works:** The Contractor shall in connection with the works provide and maintain at his own cost all lights guards, fencing and watching when and where necessary or required by the WBSEDCL or by any competent authority or statutory or other authority for the protection of the works or for the safety and convenience of the public or others.
- 13.10. Care of works:** From the commencement to the completion of the works, the contractor shall take full responsibility for the care thereof and of all temporary works and in case of any damage, loss, or injury to works or to any part thereof or to any temporary works due to any cause whatsoever shall at his own cost repair and make good the same, so that at completion the works shall be in good order and conditions and in conformity in every respect with the requirements of the contract. The contractor shall take every practicable precaution not to damage or to cause injury to adjoining or other properties or to any persons. However, even if any damage or injury occurs, the contractor shall be responsible in meeting the necessary claims and demands as may be required.
- 13.11. Workmen's compensation for accident or injury to any workmen:** The WBSEDCL shall not be liable for damage or compensation payable as per provision of law in respect of consequence of any accident or injury to any workmen or other person in the employment of the contractor. Contractor shall have to pay all claims, demands, proceedings costs, charges and expenses whatsoever in respect thereof or in relation thereto. Insurance policy covering provision for workmen's compensation for all the workmen to be engaged by the contractor is to be made by him.
- 13.12. Facilities for other contractors:** The contractor shall afford all reasonable facilities for any other contractor employed by WBSEDCL in the execution on or near the site of any work not included in the contract.
- 13.13. Clearing site on completion:** On completion of the works the contractor shall clear away and remove from the site all constructional plant, surplus materials rubbish, and temporary works of every kind and leave the whole of the site and works clean and in a good and tidy condition to the satisfaction of Engineer-in-charge.
- 14. Labour License:** Contractor will have to obtain Labour License in respect of the above work as per Contract Labour (Regulation & Abolition) Act, 1970 as early as possible.
- 15. Compliance of Labour Laws:**  
The Contractor shall comply all statutory Labour Laws to protect the labourers engaged by them. In this connection the contractor will be required to execute an Indemnity Bond (as per specimen enclosed as Annexure-1) after placement of Letter of Intent/Order.



# West Bengal State Electricity Distribution Company Limited

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- 16. Night and Holiday Work:** None of the permanent work related to contract shall be carried out during night or Sunday or on other holiday without permission in writing of the Engineer-in-charge.
- 17. Variation, Omission, Addition & Alteration:** The Contractor shall not modify the work except under direction in writing by the Company. The quantities provided in the Schedule of work are provisional only, which may vary up to any extent or may be deleted altogether. The quoted rate of each item shall remain firm till completion of contract. The company reserves the right to alter, amend and omit or otherwise vary the quantities as may be necessary but such variation will be limited to  $\pm 25\%$  (plus or minus twenty five percent) of the contract price. Payment shall be made as per actual execution.
- 18. Supplementary Works:** Whenever supplementary works become unavoidable for completion of the work in all respect, the Contractor shall bring the matter to the notice of the Controlling Officer and submit their proposal. However, the controlling Officer shall have the right to advise the contractor to proceed with such item(s) of work. Rates for supplementary item shall be arrived at as given hereunder:
- 18.1.** The rates of all supplementary items shall be decided on pro-rata basis from the existing items in the contract. The rates of all supplementary items shall be also derived from earlier issued Purchase order of WBSEDCL if available.
- 18.2.** When Cl. No. 18.1 above shall not be applicable, the rate should be analyzed to the mutual acceptance of the present market rates of different elements involved in the item, against documentary evidence, with 5% overhead, contractor's profit as 10% (ten percent) and 1% (one percent) as Cess towards BOCWW Act, 1996. In that case contractual rate of quotation will not be applicable.
- Controlling Officer's decision regarding finalization of rate of non-scheduled item(s) shall be final and binding upon the Contractors.
- 19. Terms of Payment:**
- All items of work carried out by the contractor in accordance with the provision of the contract having a financial value shall be entered in Measurement Book (MB) as prescribed by the company as applicable, so that a complete record is obtained of all works performed under the contract and the value of work carried out can be ascertained and determined there from.
  - Measurement shall be taken jointly by the Supervising Officer or his authorised representative and by the contractor or his authorised representative. Every measurement thus taken shall be signed and dated by both the parties. In absence of Contractor or his representative, measurement taken by WBSEDCL Engineer or his representative shall be taken to be correct & final. The contractor shall arrange and provide all necessary facilities along with necessary manpower for inspection and measurement of work at his own cost.
  - Progressive R/A bills, against the prayer of the contractor, for an amount of minimum 20% (twenty percent) up to 80% (eighty) of the ordered value as deemed justified by the Controlling Officer shall be released against certification of the Controlling Officer after the deducting the amount as may be applicable as per contract & statutory rules of the country. The bill shall be released within 45 (forty five) days of its submission if all formalities as per terms of contract is maintained. The final 20% bill shall be released on completion of the work in all respect and fulfilment of all contractual obligations by the contractor.
  - If it is obligatory under the provision of Income Tax Act 1961 and Goods & Service Tax (GST) Act and subsequent amendments to deduct tax at source then the same will be deducted from the bills as applicable. The Contractor is required to follow the Building and other Construction Worker's Welfare Act, 1996. Registration of his establishment under section-7 of the Building and other Construction Worker's (Regulation and condition of Service) Act, 1996 is to be made after the contract is awarded. 1% cess towards BOCWW Act, 1996 will be deducted from its total amount of each bill. For these deductions certificate will be issued as per rules.

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- v) The company reserves the right to recover /enforce recovery of any overpayments detected after payment as a result of post payment or audit or technical examination or by other means. The amount of such over payment may be recovered from the subsequent bills, under the contract, failing that from contractors claim under any other contract with the company or from the contractors (Performance) security deposit or from the amount retained or the contractor shall pay the amount of overpayment on demand immediately.
- vi) **The Manager (F&A), Birbhum Region, WBSEDCL will be the paying authority of the work.**

## **20. Completion of Contract:**

All work under the contract must be completed by period of completion mentioned in NIT while portions of work as per program settled in consultation with the controlling officer shall be completed by the date stipulated in the said program. It is to be noted that time is the essence of the contract and any default on the part of the contractor to complete the work within the stipulated date / dates aforesaid or within the time as may be extended in writing by the Controlling Officer subject to payment of liquidated damages, the WBSEDCL shall have the right, without prejudice to any other clauses, to terminate contract forthwith and to take possession of the balance work / materials and have the same allotted to any other agency and the contractor shall be liable to compensate the loss that may be occasioned to the WBSEDCL on that account. Any letter in writing by the Controlling Officer shall be treated as conclusive on behalf of the WBSEDCL.

## **21. Defect Liability Period:**

The term 'Defect Liability Period' shall mean the **period of 13 months for erection items from the date of completion of the work**. If during the Defect Liability Period any defect should be found in the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects and at its cost, repair, replace or otherwise make good as the Contractor shall determine at its discretion, such defect as well as any damage to the Facilities caused by such defect.

If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor.

For faithful & due fulfillment of all obligations, this defect liability period shall be covered by the Security money already retained from the contractor. After completion of Defect liability period, and on completion of satisfaction rectification of defect, if any reported within the defect liability period, and on receipt of the application from the contractor, controlling officer of the work shall recommend for refund of the Security money.

At the end of the Defect Liability Period, the Contractor's liability ceases except for latent defects. The Contractor's liability for latent defects warranty shall be limited to period of three (3) years from the end of Defect Liability Period as applicable. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the Defect Liability Period, but later." However, Contractor shall have to submit an Indemnity Bond for Latent Defect liability period.



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## 22. Defective Materials:

If in the option of the Engineer-in-charge, any of the materials brought to the site for use are not of the quality or kind specified in the contract and/or are unfit for the works, he shall be at liberty to order the removal of the said materials and the contractor shall remove the same within 24 (twenty four) hours after notice has been given to him and if he fails to remove them within the time the Engineer may cause them to be removed anywhere at the risk of the Contractor and any cost incurred in so doing shall be deducted from the dues to the contractor under the contract.

## 23. Drawings:

The works shall be carried out as per the instructions and to the satisfaction of the Engineer in accordance with the signed drawings, the specifications and schedule of quantities and also as per any further drawings which may be supplied, all instructions which may be given by the Engineer-in-Charge from time to time.

## 24. Material and Workmanship:

All the works shall be executed with the materials to be supplied by WBSEDCL (except as mentioned in the BOQ) and with best workmanship and/or in the best manner to the satisfaction of the Engineer-in-charge.

## 25. Extension of Time:

An extension of time without imposition of liquidity damage, may be granted for delay in execution of work provided there is no fault whatsoever on the part of the contractor. Such extension may only be granted on the basis of application to be submitted by the contractor who has to establish that the extension of time required by him is not due to his fault.

## 26. Liquidated Damage:

If the Contractor shall fail to complete the works within the time prescribed herein or extended time for completion, then the Contractor shall pay to the WBSEDCL a sum amounting to 0.143% of the value of works as liquidated damages of such default for each day of delay between the time prescribed or extended time as the case may be and the date of completion of the works subject to a maximum of 10% (ten percent) of the total contract value.

The WBSEDCL may, without prejudice to any, other method of recovery deduct the amount of such damages from any money in their hand due or which may become due to the contractor. The payment for deduction of such damages shall not relieve the contractor from his obligation to complete the works or from any other his obligations and liabilities under the contract.

## 27. Default Risk:

In the event of the contractor's inability/non-response to accept and take up the work as per the order & contract agreement, the Owner reserves the right to terminate the contract with forfeiture of E.M.D. along with Contract Performance Guarantee and deploy any separate agency to complete residual portion of this contract. If the contract is terminated in the above manner, the Contractor shall have no claim for compensation against the Owner. the Owner shall have the right to engage any other Contractor to complete the work and any extra cost incurred by the Owner to the get the work completed in all respect will be realized from the pending bill(s) and/or E.M.D. and/or Retention Money and/or Security Deposit and/or any Bank Guarantee(s) of the original Contractor for this contract or any other contract under WBSEDCL.



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## 28. Company's Right to Terminate Contract:

- 28.1.** If the contractor fails to start the work within a month from the date of issue of Letter of Intent/ Work Order, the WBSEDCL shall have the right to cancel the Letter of Intent/Work Order with forfeiture of earnest money without giving any notice to the contractor.
- 28.2.** If the contractor neglects or fails to proceed with the work proportionate to the scheduled time of completion of the work or fails to complete the work within scheduled time for completion or within the extended time approved by the WBSEDCL, the WBSEDCL shall have right to terminate the Work Order / Letter of Intent after giving notice in writing to the contractor. If the contractor fails, after 14 (Fourteen) days of such notice, to proceed with the work in the matter notified, the WBSEDCL shall terminate the contract and call the contractor to take joint measurement along with the Engineer for the finished portion of work. If the contractor does not appear for a joint measurement, ex-party measurement by the WBSEDCL will be taken as final. In that case the WBSEDCL shall take possession of the work site and engage other agency to complete the work. Extra cost, if incurred to get the unfinished work done through other agency, will be realized from him, from his pending bills and security money. In the contract terminated as above, the contractor shall have no claim for compensation against the WBSEDCL for any loss or deterioration of any materials that he may have collected or engaged or entered into an account of the work.

## 29. Quality of Work / Material and Mode of Measurement:

As regards specification of materials, execution of work and the mode of measurement relevant stipulation of WBSEDCL in this respect will be applicable. The contractor shall arrange and provide all necessary facilities along with necessary manpower for inspection, testing and measurement of work at his own cost.

## 30. Materials:

**The materials, if any, to be supplied by the agency as per BOQ after taking necessary approval as per approved GTP and Technical Specifications of WBSEDCL.**

**The DI of materials will be issued by the Controlling Officer after necessary testing and sample inspection. The guarantee certificate and challan of all purchased materials must be submitted.**

The WBSEDCL will have right to test any material(s) at any moment, if found necessary. In that case the contractor will be liable to take appropriate actions, which include the cost of testing and other incidentals. Authenticated document for confirmation of quality of material, purchased by the contractor, shall have to be submitted on demand by the Engineer-in-charge.

**N.B.: Material specification & Scope of work have been described in SECTION-V & SECTION-VII.**

## 31. Insurance:

The bidder on awarding of contract shall arrange, secure and maintain all insurance as may be pertinent to the work and obligatory in terms of law in force to protect the interests of WBSEDCL against all perils. The form & the limit of such insurance together with underwriting in each case shall be acceptable to WBSEDCL. However, irrespective of such acceptance the responsibility to maintain adequate insurance coverage at all times during the period of contract shall be contractor's alone.

## 32. Safe custody of WBSEDCL materials and executed works:

The contractor shall be entirely responsible for all the materials issued for the works and the executed portion of the work till it is officially taken over by the WBSEDCL. **The working site till handed over to**



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**WBSEDCL to be clearly demarcated (Through temporary fencing / Danger Tape) and execution of works to be cautioned before pedestrians & vehicles by using Caution Boards.**

It is responsibility of the contractor to keep the policy alive throughout the desired period by timely and adequate payment of the premium. The insurance policy should cover towards materials. If the amount of contract is modified subsequently the Insurance coverage should also be modified accordingly.

**33. Deduction of Taxes and Cess for BOCWWC Act, 1996:**

It is obligatory under the provision of Income Tax Act 1961, Goods & Services Tax Act 2017 to deduct tax to at source then the same will be deducted from the bills as applicable.

The contractor is required to follow the Building and Other construction Work Welfare Act, 1996.

Registration of his establishment under section-7 of the building and the construction worker's (Regulation and Condition of Service) Act, 1996 is to be made after the contract is awarded. 1% (one percent) Cess towards BOCWC Act, 1996 will be deducted from its total amount of each bill. For these deductions certificate will be issued as per rules.

**34. Force Majeure:**

The contractor shall not be liable to pay any liquidated damage for delay/failure to perform the contract for reasons of force majeure such as act of God, act of the public enemy, acts of Governments, fire, flood, epidemics, quarantine restriction, strikes, freight embargos and provided that the contractor shall within 10 (ten) days from beginning of such delay notify the Company in writing of the cause of delay. The Company shall verify the fact and grant such extension as found to be justified without imposing liquidated damage.

The department shall not be responsible or liable to pay any compensation for any interruption in work at the site due to strike, lockout, riot, earthquake, flood, cyclone or civil commotion or any other force of accident due to any reason beyond control. The department shall not be held responsible to or liable to pay for any interruption in your work at the site arising out of resistance from the local public due to any resistance towards work.

**35. Sub-letting of Contract:**

The Contractor shall not, without the written consent of the Company, assign or sublet his contract or any part thereof, other than of raw materials, or for any part of the work provided that any such consent shall not relieve the contractor from any obligation, duty or responsibility of the contract. In the event of sub-letting of contract or any part thereof is permitted, the fact that such permission has been accorded shall not establish any contractual relationship between the approved Sub-vendor and WBSEDCL of any of his liabilities and obligations under the contract.

**36. Engineer's Decision:**

Controlling Officer's decision is final in all respect of all matters which are left to the decision of the Controlling Officer including the granting of with-holding or certificates.

If in the opinion of Contractor, a decision made by Controlling Officer is not in accordance with the meaning and intent of the contract, the Contractor may file with the Controlling Officer within 7 (seven) days after receipt of the decision. Failure to file an objection within the allotted time will be considered as acceptance of the Controlling Officer's decision and the decision shall become final and binding.

**37. Liability of Accidents and Damage:**

The Contractor shall be responsible for the loss, damage or depreciation of the Company's materials while in their custody and until the same was taken over by the company.

Until the completed work is taken over by the Company, the Contractor shall also be liable for and shall indemnify the Company in respect of all injury to person or damage to property resulting from negligence of the Contractor or his workman or sub-contractor or for defective workmanship etc.

**38. Language and Measurement:**



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All documents pertaining to the contract including specifications, schedule notices, correspondences, operating and maintenance instruction, drawing or any other writings be written shall be in English language. The metric system measurement shall be used exclusively in the contract.

## **39. Completion of Work:**

Completion of work means completion of the work in totality and acceptance/takeover of the same by the company. Partial or phase wise completion will have no bearing towards consideration of guarantee/defect liability period. Completion time will be considered after WBSEDCL supply of major materials, if applicable.

## **40. Idle Labour / Machinery:**

Whatever the reason may be no claim for idle labour and machinery, additional establishment cost, hire and labour charges of tools & plants would be entertained by the Company, under any circumstances.

## **41. Safety Rules:**

The bidder shall also provide necessary fencing and lights to protect the public from accident. Fire extinguishers shall be kept by the Contractor at the site of works where there is risk of fire hazard. Adequate washing facilities shall be provided near the place of work.

When the work is done near any place where there is risk of drowning, all necessary equipment's shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions shall be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

These safety provisions shall be brought to be notice of all concerned by displaying on a notice board at a prominent place at the work spot. The person responsible for the compliance of code shall be named by the bidder.

To ensure effective enforcement of the rules & regulations relating to safety precautions, the arrangement made by the bidder shall be open to inspection of the employer and WBSEDCL.

Notwithstanding the above clause there is nothing in those of exempt the bidder from the operation of any other Act or Rule in force in the Republic of India.

All storage, handling & use of flammable liquids shall be under the supervisions of qualified persons. First aid arrangements with the degree of hazard and numbers of workers employed shall be maintained in a readily accessible place throughout the whole of working hours.

## **42. Settlement of Disputes:**

All disputes concerning question of act arising under the contract shall be decided by the Owner/Company on receipt of written appeal by the Contractor. Any dispute or differences arising out in connection with this contract shall to the extent possible be settled amicably and where settlement cannot be reached then such disputes shall be subjected to settlement under the jurisdiction of Calcutta High Court.

## **43. Reporting of Accident:**

All accidents, major or minor, must be reported immediately to WBSEDCL and the contractor will provide first aid to the injured person immediately. The injured person shall report to the First Aid station along with the 'Injure on Work' form as per appropriate Proforma, duly filled in quintuplicate and submit to the Medical Officer of the First Aid Station.

**Serious Injuries:** In case of serious injuries, the following procedure shall be adopted by the contractor.

- To provide first aid at his own First Aid Station.
- To take the injured person to the hospital along with the 'Injured on Work' form duly filled in.
- To report the accident to WBSEDCL.

**Fatal Accident:** Fatal accident must be reported immediately to WBSEDCL as well as to Police.



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**Penalty:** Failure to observe the Safety Rules will make the contractor liable to penalty by way of suspension of work and termination of contract. Adequate arrangement for proper lighting & guarding shall be made at the work site.

**44. 1. Execution Order/P.O. Issuing Authority:** The Regional Manager, Birbhum Region, WBSEDCL.

**2. Controlling Officer:** The Regional Manager, Birbhum Region, WBSEDCL.

**3. Nodal Officer:** The Manager (HR&A), Birbhum Region, WBSEDCL.

**4. Supervising Officer:** The Divisional Manager, Bolpur Division, WBSEDCL.

**5. Payment Disbursing Officer:** The Manager (F&A), Birbhum Region, WBSEDCL.

**45. Miscellaneous:**

**45.1.** The entire work shall be inspected by WBSEDCL representative from time to time at site as necessary. The Contractor shall provide all facilities for such inspection free of cost. Notwithstanding any inspection of the site, WBSEDCL shall have the right to reject any work not conforming to the specification without being liable for any explanation or compensation. The authorized representative of WBSEDCL shall have the free access to the work site, contractor site office and store.

**45.2.** During the execution of the work, if any, problem arises which is not covered by the specifications, the contractor shall seek necessary clarification and instruction from WBSEDCL. Such instruction shall be binding on the contractor and shall be observed in full.

**45.3.** The Contractor shall make his own arrangement for the labour, construction equipment, tools and tackles and construction materials, construction water, office/labour accommodation, water supply, sanitation.

**45.4.** Electricity for construction purpose, if supplied by WBSEDCL, the charge shall be borne by the Contractor at the rate specified by WBSEDCL. The Contractor cannot claim any compensation for any failure in such supply caused due to any reason whatsoever in case of non-availability of electricity for construction purpose from WBSEDCL. The Contractor has to arrange the same at his own cost.

**45.5.** The Contractor shall strictly follow the construction safety rules, regulations and instructions issued from time to time. In absence of any particular reference the Contractor shall refer to the Indian Standard and also the State Government rules and regulations.

**45.6.** The contractor shall take all precautions during execution, especially while excavating underground works, such as cables, pipelines, drains etc. and provide all possible precautions to these works and in case they are damaged, rebuild / divert them at his own cost.

**45.7.** All guarantees and test certificates obtained by the contractor during the execution of the work shall be transferred to the WBSEDCL before issue of the final payment.

**45.8.** The Contractor shall provide all necessary storage at the site in specified areas for all materials such as timber, cement, lime and such other materials which are likely to deteriorate by the action of sun, wind, rain or other natural causes due to exposure in the open in such manner that all such material shall be duly protected from damage by weather or any other cause. All such stores shall be cleared after completion of work and the entire site shall be clean and free from debris. All material shall be stacked in such a manner as to facilitate rapid and easy checking of such materials.

**45.9.** All works are to be carried out with due regard to the convenience of the occupants of the premises or road users and with close coordination with other Contractors who may be working on that area. All arrangements / program of work must be adjusted accordingly. All precautions must be taken to guard against chances of injury or accident to the occupants, users & workers. The Contractor must see that all damages to any property, which in the opinion of the Controlling Officer are due to the work of Contractor, are promptly rectified as per direction and to his satisfaction. The construction of work must be done in such a way as not to dislocate or disturb any sewerage system and existing other structures.

**45.10.** It must be clearly understood that WBSEDCL is indemnified by the Contractor against payment of any compensation or award on account of any accident, injuries, and damages and if any such payment



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have to be made by WBSEDCL under order of appropriate authorities, the same shall be recovered from the Contractor.

- 45.11.** Any services if affected by the work must be restored by the Contractor on emergency basis at his own cost.
- 45.12.** After completion of work, the finishes shall be of high quality and approved standard.
- 45.13.** No omission or ambiguities in the drawing or in the specifications will relieve the contractor from responsibility for material or completeness of the work.

-----End of GCC-----



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## SECTION – V Technical Specifications of Contract (TSC)

### PROJECT MANAGEMENT SYSTEM, QUALITY ASSURANCE AND DOCUMENTATION

This section describes the project management system, quality assurance and documentation requirements for the project.

#### 1. Project Management System:

##### General :

The Contractor shall assign a Project Manager with the authority to make commitments and decisions that are binding on the Contractor. Employer will designate a Project Manager to coordinate all employer project related activities. All communications between employer and the Contractor shall be coordinated through the project managers. The Project Managers shall also be assisting employer in communicating project related information to others take holders.

Bidder shall submit the manpower deployment plan along with the bids, describing the key roles of each person. The role and responsibilities of contractor shall be as follows:

- a) To prepare, maintain and update project detailed Work Execution Plan for successful implementation of project like approval of GTP, approval of sub-contractor, approval of drawings, supply of materials, mobilization of men, material and equipment etc. at site for successful completion of works, Compile and upload physical as well as financial progresses, compile the progress of works at Employer level and to assist in forwarding it to all stakeholders.
- b) To actively participate with employer in resolving all issues relating to project implementation including ROW, Forest Clearances, Railway Crossings and Payments to contractors/vendors and policy matters.

##### Project Schedule:

As per the schedule the bidder shall submit a preliminary implementation plan along with the bid. The detailed project implementation schedule shall be submitted by the contractor after the award for employer's approval, which shall include at least the following activities:

- (a) Surveying of site.
- (b) Documents submission and approval schedule
- (c) Type Testing Schedule
- (d) Dispatch Schedule
- (e) Installation & commissioning schedule
- (f) Training schedule, if any.

The project schedule shall include the estimated period for completion of project and its linkage with other activities.

##### Progress Report:



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A progress report shall be prepared by the Contractor each month against the activities listed in the project schedule. The report shall be made available to employer on a monthly basis, e.g., the 10th of each month. The progress report shall include all the completed, ongoing and scheduled activities.

## **Transmittals:**

Every document, letter, progress report, change order, and any other written transmissions exchanged between the Contractor and employer shall be assigned a unique transmittal number. The Contractor shall maintain a correspondence index and assign transmittal numbers consecutively for all Contractor documents. Employer will maintain a similar correspondence numbering scheme identifying documents and correspondence that employer initiates.

## **2. Quality Assurance and Evaluation Mechanism**

The Contractor shall be solely responsible & accountable for assuring quality in works. Accordingly, the Contractor shall formulate a detailed comprehensive Quality Assurance (QA) plan for the works to be carried out with an objective to create quality infrastructure works. The QA and Inspection Plan shall be integral part of the contract agreement with turnkey contractor or equipment supplier and erection agency as the case may be in case of turnkey/or departmental execution of works. Documentation with regard to quality assurance and inspection plan shall be maintained by Contractor and kept in proper order for scrutiny during the course of project execution and for future reference. The Contractor has to ensure that the quality of materials/equipment supplied at site and execution of works carried out at field under deposit scheme is in accordance to Manufacturing Quality Plan /Guaranteed Technical Particulars (GTP) Approved Drawings/Data Sheets respectively.

The implementation of the scheme in the particular place shall be reviewed periodically during meeting of District vigilance and monitoring committee

The internal quality assurance mechanism followed by Employer and the turnkey Contractor shall be termed as Level-Zero of overall quality assurance plan of works.

### **Quality checks under Level-Zero of QAM:**

Turnkey Contractor shall strictly ensure QA checks during the day to day course of project execution.

## **3. SCOPE**

**3.1** The following provisions shall supplement all the detailed technical specifications and requirements brought out in the accompanying Technical Specifications. The Bidder's proposal shall be based on the use of equipment and materials complying fully with the requirements, specified herein.

The Bidder shall furnish clause-by-clause commentary (with detailed technical data as required) on the Technical Specifications demonstrating the goods' substantial responsiveness to the specifications or deviation and exceptions to the provisions of the Technical Specification unless and until advised contrary to this in the bidding document.

**3.2** The material/equipment to be supplied on final destination at site basis as covered in this volume shall be designed, manufactured and tested as per the requirements specified.

Final Destination shall mean the railheads or depots or stores established by the Contractor in the above-mentioned electrical circles/towns.

## **4. WEIGHTS AND MEASURES**



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All weights and measures shall be in System International (S.I.) units. All fasteners shall be of Metric size only.

## **5. GENERAL TECHNICAL CONDITIONS**

**5.1.** The materials/equipment covered here under this package shall be supplied complete in all respects, for completion of erection in all respect, including all components, fittings and accessories which are necessary or are usual for their efficient performance and satisfactory maintenance under the various operating and atmospheric conditions. Such parts shall be deemed to be within the scope of the contract, whether specifically included or not in the specification or in the Contract Schedules. The Contractor shall not be eligible for any extra charges for such fittings, etc.

The details of the materials/equipment required for the project have been elaborated in the respective volumes of technical specification. However, the quantities of the same are mentioned in Bill of Quantity (BOQ).

### **5.2. Equipment Performance Guarantee:**

**5.2.1.** The performance requirements of the items are detailed separately in this specification. These guarantees shall supplement the general performance guarantee provisions covered under General Terms and Conditions of Contract.

### **5.3. Engineering Data:**

**5.3.1.** The furnishing of engineering data by the Contractor shall be in accordance with the appropriate Schedule appended to this document. The review of these data by the Owner/Employer will cover only general conformance of the data to the specifications and drawings. This review by the Owner may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the Owner shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirement, specified under these Specifications and documents.

**5.3.2.** All engineering data submitted by the Contractor after final process including review and approval by the Owner shall form part of the Contract Document and the entire works performed under these Specifications shall be performed in strict conformity, unless otherwise expressly requested by the owner in writing.

### **5.4. Drawings:**

**5.4.1.** All Working Drawing should be submitted by the Contractor after survey work with complete bill of materials including proper locations for approval by the Owner in triplicate before starting of erection.

**5.4.2.** Each drawing submitted by the Contractor shall be clearly marked with the name of the Purchaser, the unit designation, the Specification title, the Specification number and the name of the Project. All titles, noting, markings and in writings on the drawing shall be in English. All the dimensions should be to the scale and in metric units.

**5.4.3.** The drawings submitted by the Contractor shall be reviewed by the Owner as far as practicable within four (4) weeks and shall be modified by the Contractor if any modifications and/or corrections are required by the Owner in compliance with the Specifications. The Contractor shall incorporate such modifications and



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or corrections and submit the final drawings for approval. Any delays arising out of failure by the Contractor to rectify the drawings in good time shall not alter the Contract completion date.

**5.4.4.** All drawings, except Civil drawings, submitted for approval to the Owner shall be in triplicate. One print of such drawings shall be returned to the Contractor by the Owner marked "approved"/"approved with corrections". The Contractor shall thereupon furnish before the Owner additional print as stipulated in Technical Specification (Electrical) after incorporating all corrections. All Civil drawings shall be submitted in the manner as specified in Technical Specification (Civil).

**5.4.5.** Further work by the contractor shall be strictly in accordance with these approved drawings and no deviation shall be permitted without the written approval of the Owner, if so required.

**5.4.6.** All manufacturing and fabrication work in connection with the equipment/material prior to the approval of the drawings shall be at the Contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Owner. Approval of Contractor's drawing or work by the Owner shall not relieve the Contractor of any of his responsibilities and liabilities under the Contract.

**5.4.7.** All rights of the design/drawing shall be strictly reserved with the Owner only and any designs/drawings/data sheets submitted by the contractor from time to time shall become the property of the owner, Under no circumstances, the Contractor shall be allowed to user/offer above designs/drawings/data sheets to any other authority without prior written permission of the Owner. Any deviation to above is not acceptable.

**5.4.8.** As-Built Drawings (with GPS markings, for different voltage grade) should be submitted by the Bidder before handing over the system with proper locations to the Owner in 6 (Six) sets. Not limited to the following, it should contain data/markings for various voltage grade i.e. for 33 KV level, RMUs with demarcation of HV joints in UG cable.

#### **5.4.9. Approval of Vendors**

Contractor may procure any Supply materials from live suppliers of WBSEDCL or any vendors (herein called as Sub-Vendor to the Contractor) approved by WBSEDCL, if the specifications of Supply materials match with approved TS by submission of following documents for WBSEDCL's approval.

- i) Sub-Vendor's credentials.
- ii) Performance Report regarding supply of such materials to other Govt. Power Utility, Private Power Distribution/Transmission/Generation Companies or any industries.
- iii) Type Test Report of the product conducted not before than 5 (five) years in a NABL accredited Govt. Laboratory along with relevant documents.
- iv) Manufacturing capability of the Vendor supported by copy of Purchase Order, copy of Dispatch Clearance from the Employer, copy of delivery note etc.

Failure to comply with these requirements will result in rejection of name of such vendor. Also if there is any litigation under sub-judice status between sub-vendor and its last 5 years client & the Owner (WBSEDCL), the Owner may reject the name of such vendor.

#### **5.4.10. Design Co-ordination:**

Wherever, the design is in the scope of Contractor, the Contractor shall be responsible for the selection and design of appropriate material/item to provide the best co-ordinated performance of the entire system. The basic design requirements are detailed out in this Specification. The design of various components, sub-assemblies and assemblies shall be so done that it facilitates easy field assembly and maintenance.

## **5.5. Manufacturing Schedule:**

The Contractor shall submit to the Owner his manufacturing, testing and delivery schedules of various items within thirty (30) days from the date of the Letter of Award in accordance with the delivery requirements stipulated. Schedules shall also include the materials and items purchased from outside Contractors, if any.

## **5.6. Reference Standards:**

- 5.6.1.** The codes and/or Standard referred to in Specifications shall govern, in all cases wherever such references are made. In case of a conflict between such codes and/or Standards and the specifications, latter shall govern. Such codes and/or Standards, referred to shall mean the latest revisions, amendments/changes adopted and published by the relevant agencies. Any anomalies, ambiguities of this specification if arises, Board's standard specifications will govern without any escalation in item price.
- 5.6.2.** Other internationally acceptable Standards which ensure equivalent or better performance than those specified shall also be accepted.

## **5.7. Design Improvements:**

- 5.7.1.** The Owner or the Contractor may propose changes in the Specification of the equipment or quality thereof and if the parties agree upon any such changes the Specification shall be modified accordingly without any escalation in item price.
- 5.7.2.** If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the Contractor proceeds with the change. Following such agreement, the provision thereof, shall be deemed to have been amended accordingly.

## **5.8. Quality Assurance:**

- 5.8.1.** To ensure that the equipment under the scope of this Contract whether manufactured within the Contractor's Works or at his Sub-Contractor's premises is in accordance with the specifications, the Contractor shall adopt suitable Quality Assurance Program to control such activities at all points necessary.

Such Program shall be outlined by the Contractor and shall be finally approved by the Owner.

Quality Assurance Program of the Contractor shall generally cover but not limited to the following:

- a) His organization structure for the management and implementation of the proposed Quality Assurance Program.
- b) Documentation control system.
- c) Qualification data for key personnel.
- d) The procedure for purchases of materials. Parts/components and selection of sub-Contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- e) System for shop manufacturing including process controls.
- f) Control of non-conforming items and system for corrective action.
- g) Control of calibration and testing of measuring and testing equipment.
- h) Inspection and test procedure for manufacturing.
- i) System for indication and appraisal of inspection status.
- j) System for Quality audits.
- k) System for authorizing release of manufactured product to the Purchasers.
- l) System for maintenance of records.
- m) System for handling storage and delivery and
- n) A Quality Plan detailing out the specific quality control procedure adopted for controlling the quality characteristic of the product.



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The Quality Plan shall be mutually discussed and approved by the Owner after incorporating necessary corrections by the Contractor as may be required.

## **5.8.2. Quality Assurance Documents:**

The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Owner's inspection of equipment/material.

**5.8.3.** The owner or his duly authorized representatives reserves the right to carry out Quality Audit and Quality surveillance of the systems and procedures of the Contractor's/his vendor's Quality Management and Control Activities.

## **5.9. Owner's Supervision:**

**5.9.1.** To eliminate delays and avoid disputes and litigation it is agreed between the parties to the Contract that all matters and questions shall be resolved in accordance with the provisions of this documents.

**5.9.2.** The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Owner, pursuant to the contract, will include but not be limited to the following:

- a) Interpretation of all the terms and conditions of these Documents and Specifications.
- b) Review and interpretation of all the Contractor's drawings, engineering data etc.
- c) Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the Contract.
- d) Inspect, accept or reject any equipment, material and work under the Contract, in accordance with the Specifications.
- e) Issue certificate of acceptance and / or progressive payment and final payment certificate.
- f) Review and suggest modification and improvement in completion schedules from time to time; and
- g) Supervise the Quality Assurance Program implementation at all stages of the Works.

## **5.10. Inspection, Testing & Inspection Certificate:**

**5.10.1.** The Owner, his duly authorized representative and/or outside inspection agency acting on behalf of the Owner shall have at the reasonable times access to the Contractor's premises or Works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the product during its manufacture and if part of the product is being manufactured or assembled at other premises or works, the Contractor shall obtain from the Owner and/or his duly authorized representative permission to inspect as if the equipment/materials were manufactured or assembled on the Contractor's own premises or works.

**5.10.2.** The Contractor shall give the Owner/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Owner/Inspector, unless witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days of the date of which the equipment is notified as being ready for test/inspection or on a mutually agreed date, failing which the Contractor will offer a 2<sup>nd</sup> inspection date with minimum 7 days notice, and on failure of the inspector to attend the same, the contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of tests in triplicate.

**5.10.3.** The Owner/Inspector shall, within fifteen (15) days from the date of inspection as defined herein give notice in writing to the Contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall make the modifications that may be necessary to meet the said objections.

**5.10.4.** When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Employer Inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Owner/Inspector, the certificate shall be issued within fifteen

(15) days of receipt of the Contractor's Test certificate by the Owner/Inspector. The completion of these tests or the issue of the certificate shall not bind the Owner to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.

- 5.10.5.** In all cases where the Contract provides for tests whether at the premises or works of, the Contractor, the Contractor except where otherwise specified shall provide free of charge such item as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Owner/Inspector or his authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Owner/Inspector or to his authorized representative to accomplish testing.
- 5.10.6.** The inspection by Owner and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Program forming a part of the Contract.
- 5.10.7.** If during inspection at the contractor's or sub-contractor's works, the offered material/equipment are not found in entire quantity or found in a part quantity or without any identification mark as is required in case of PCC pole, the offer would be termed as "FAKE OFFER". The owner in that case shall ask the contractor to deposit a sum of Rs. 50,000/-(fifty thousand) as a penal measure. However, the referred material/equipment shall be inspected further on receipt of re-offer as well as deposition of specified amount, as above, to the owner by the contractor.

## **6. TECHNICAL DESCRIPTION**

- 6.1.** The technical description of various materials/equipment has been specified in the respective technical specifications which are readily available in WBSEDCL's official web portal @ [www.wbsedcl.in](http://www.wbsedcl.in). Further technical descriptions if necessary after actual site visits, may be included in consultation with the Engineer-In-Charge in writing.

## **7. TESTS AND STANDARDS**

### **7.1. Tests**

The following type, acceptance and routine tests and tests during manufacture shall be carried-out on the material. For the purpose of this clause:

- 7.1.1.** All equipment offered/supplied should have been type tested as per the relevant standards and certificates of the same shall be submitted to the owner/ employer. In case any equipment is not type tested, the bidder shall carry out the type testing at his own cost and provide the necessary certificates to the owner for approval.
- 7.1.2.** Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.
- 7.1.3.** Routine Tests shall mean those tests, which are to be carried out on the material to check requirements, which are likely to vary during production.
- 7.1.4.** Tests during Manufacturing shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him
- 7.1.5.** The norms and procedure of sampling for these tests will be as per the Quality Assurance Program to be mutually agreed to by the Contractor and the Owner or as per relevant I.S.S.
- 7.1.6.** The standards and norms to which these tests will be carried out are listed against them. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified separately or as mutually agreed to between the Contractor and the Owner in the Quality Assurance Program.
- 7.1.7.** For all type and acceptance tests, the acceptance values shall be the values specified in the Specification or guaranteed by the Bidder, as applicable. The test and standards for various materials/equipment has been specified in the respective volume of technical specification.



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## 7.2. Testing Expenses

No testing expenses will be borne by WBSEDCL.

## 7.3. Additional/ Alternative Tests

**7.3.1.** The Owner reserves the right if required necessary arrangements have to be done by contractor out of his own expenses. Any other test(s) of reasonable nature carried out at contractor's premises, at site, or in any other place in addition to the specified type, acceptance and routine tests to satisfy himself that the materials/equipment comply with the Specifications.

**7.3.2.** The Owner also reserves the right to conduct all the tests mentioned in this specification at his own expense on the samples drawn from the site at Contractor's premises or at any other test center. In case of evidence of non compliance, it shall be binding on the part of contractor to prove the compliance of the items to the technical specifications by repeat tests, or correction of deficiencies, or replacement of defective item all without any extra cost to the Owner.

## 7.4 Sample Batch for Testing

**7.4.1** The contractor is required to carry out at the Acceptance tests as specified/as per I.S.S norms successfully in presence of Owner's representative.

## 8. Guaranteed Technical Particulars

**8.1.** The Guaranteed Technical Particulars of the various items shall be furnished by the Bidders in one original and two (2) copies in the prescribed schedules of the Specifications. The Bidder shall also furnish any other schedule information as in their opinion is needed to give full description and details to judge the item(s) offered by them.

**8.2.** The Data furnished in Guaranteed Technical Particulars should be the minimum or maximum value (as per the requirement of the specification) required. A Bidder may guarantee a value more stringent than the specification requirement. However, for testing purpose or from performance point of view, the material shall be considered performed successfully if it achieves the minimum / maximum value required as per the technical specification. No preference whatsoever shall be given to the bidder offering better/ more stringent values than those required as per specifications.

## 9. Climatic Conditions:

All Equipment/Material to be supplied against this specification shall suitable for satisfactory continuous operation under tropical conditions as specified in Technical Specification.

## 10. Approval from Electrical Inspectorate:

The contractor need not obtain approval from Electrical Inspectorate before commissioning and handing over. WBSEDCL shall arrange for the same.

## 11. Work Procedure:

### 11.1. Laying of 11 KV grade XLPE cable:

**11.1.1.** Based on survey drawing approved by WBSEDCL, estimation of the quantum of work involved in excavation, road cutting, filling, resurfacing of road, boring work for laying of pipe/conduit under Railway track crossing (as per Indian Railways Norms of crossing), crossing involving National or State Highways etc.



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- 11.1.2. Assessment of the requirement of all materials like cable joints, GI/HDPE pipe, sand, Kiln burnt bricks, connectors and other materials and submission of list of required materials to WBSEDCL Engineers for approval.
- 11.1.3. Transport of all materials required for execution of work to the designated locations & subsequent neat stacking at the store. The Contractor shall be responsible for the safe custody of all materials till handing over of the project.
- 11.1.4. The Contractor shall have to excavate trenches of sizes as per approved drawing. Any deviation, if necessary, will be intimated by Divisional Manager. Care must be taken so as not to damage any existing underground utility services. The Contractor shall be liable to pay or make good any losses caused to any property due to the Contractor's negligence. Trench less boring shall be adopted in some stretches of the cable run without disturbing the railway traffic or the vehicular traffic above.
- 11.1.5. Long stretches of cable trenches shall not be kept open at a time exceeding 7 days without prior permission of the Divisional Manager.
- 11.1.6. Prior approval of the Divisional Manager will be necessary in case of some pits required for bailing out water manually or by pump. Bending of the cables must be made as per permissible bending radius specified by the manufacturer. During excavation, if necessary, site shall have to be shored up with timbering and shuttering.
- 11.1.7. Supply and installation of GI/HDPE pipe, Kiln burnt bricks having proper shape and size for cable protection, sand filling, laying and dressing of 11KV grade XLPE cable in excavated cable trenches, making of straight through joint (suitable for above cable) including marking of jointing pit, putting RCC protective covers on top and beneath of joint, making of termination joint (both Indoor and Outdoor type wherever applicable), supply and installation of M.S. pipe for cable protection, supply and erection of Cement concrete /cast iron cable marker on concrete foundation blocks for straight run (at feasible intervals along the route), road crossing and joint locations. The Contractor should mend good any damages done during excavation.
- 11.1.8. Permanent Cable Record: The Contractor shall have to prepare and submit necessary Permanent Records w.r.t. the cable Installations as mentioned in specifications.
- 11.1.9. Preparation of route map with proper geo-orientation, drawn to scale indicating location of joints, Type and make of Joints, size of cable, distances etc and submission of the same to WBSEDCL.
- 11.1.10. Submission of Completion and Commissioning Report to WBSEDCL for approval.

## **11.2 33 KV line for underground Railway/Highway crossing:**

02 Nos. separate cables shall be laid in separate HDPE pipe enclosures in case of single circuit lines and 3 nos. cable to be laid in case of double circuit lines. One cable shall be kept idle as spare in ready to joint condition. Cable termination, cable identification, protective covering, laying of jumpering cable etc. shall all be completed in this head. This composite item shall contain following key items:

- a. 3Cx400 sq.mm. XLPE armoured cable.
- b. 200 mm dia. HDPE pipe.
- c. Outdoor heat shrinkable cable jointing kits for main cable and jumpering cable – 4 Sets for main cable.
- d. 4 Nos. GI 3-meters long pipe earthing.
- e. 6 SWG GI wires with GI nuts, bolts & washers.
- f. Cable markers.
- g. Bi-metallic clamps.

Detailed survey of location of railway crossing be performed by contractor to avoid multi-crossing at nearby location. Prior railway permission for execution of this work shall be obtained by Project Manager for which necessary technical support shall be provided by contractor. Line crossing shall be performed using underground cabling. Block on railway traffic shall be arranged by Project Manager. Contractor should ensure timely completion of work during block period by mobilizing requisite man, materials and machine at crossing locations.



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Horizontal drilling machine shall be used for horizontal bore below railway tracks.

## **12. 33 KV Line testing**

- i. Visual examination of statutory clearances.
- ii. Visual examination of earthing connections.
- iii. Measurement of earth resistance of individual earth pit.
- iv. Checking of sag chart.
- v. Visual examination of tensioning of wires, evenness of sag.
- vi. Visual examination of straightening of individual pole.
- vii. Visual examination of painting of support and fabricated items.
- viii. Insulation resistance of line conductor.
- ix. Visual examination of labeling, danger board, anti-climbing device, muffing.
- x. Visual examination of unguarded road/line crossings.
- xi. Visual examination of alignment of lines.
- xii. Visual examination of position correctness of pre-fabricated items.
- xiii. Visual examination of tightness and tidiness of stays.

## **13. Technical Specifications for Locally Purchased Items:**

### **13.1. Cable Jointing Kit/ Termination Accessories**

#### **13.1.1. Scope**

This specification covers design, manufacturing, testing, supply of ISI mark (IS-13573:2011) 33KV, 11KV and LTXLPE Cable accessories i.e. Joints/Termination (Straight Through, Indoor and outdoor End termination Kits) suitable for armoured, XLPE Insulated, Aluminum conductor cables.

The cable accessories shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to WBSEDCL, who will interpret meaning of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in these specifications and or the commercial order or not.

#### **13.1.2 Application**

The cable accessories shall be used on armoured 33 KV XLPE Aluminum conductors/cables installed under Ground Cabling works at Bolpur Division.

#### **13.1.3 Cable Jointing Accessories**

**13.1.3.1** The cable jointing accessories shall include the Indoor and Outdoor end terminating kits, straight through joints and also any special tools and tackles required for making these joints.

**13.1.3.2** The contractor shall minimize the use of straight joints.

**13.1.3.3** The straight through joints shall be heat shrinkable type complete with accessories. The joint shall preferably be built up from the same material as the main cable and shall have electrical and mechanical withstand capabilities same as or better than the main cable. The joints shall be suitable for tropical climatic conditions specified in this specification.

**13.1.3.4** The end termination shall be Indoor and outdoor heat shrinkable type complete with accessories. The outdoor termination should be suitable for heavily polluted atmospheric conditions with total creep



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age distance of 25 mm/ kV and protected creep age distance of not less than 50% of the total creep age distance.

**13.1.3.5** The detailed description on jointing procedure shall be furnished along with the bid.

**13.1.3.6** The details of the end termination/ straight through joints in service with the period in service shall be furnished.

## **13.1.4 Applicable Standards**

|                                                                                                                                  |                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| IS-13573(Part –I):2011                                                                                                           | -for working voltage from 1.1 KV upto and including 3.3 KV(E)-Test methods and requirements |
| IS-13573(Part-II):2011<br>Test requirements.                                                                                     | -for working voltage from 3.3KV (UE)upto and including33 KV(E)-                             |
| IS-13573(Part-III):2011<br>Test methods.                                                                                         | -for working voltage from 3.3KV (UE)upto and including 33KV(E)-                             |
| IS-13573:2011                                                                                                                    | -for LT Cable accessories, i.e., Joints & Terminations.                                     |
| IEC:60502-04/2005VDE0278                                                                                                         | -Standard for cable accessories.                                                            |
| IEEE48                                                                                                                           | -for terminations of cable.                                                                 |
| ESI-09-13standards                                                                                                               | -for components used in the Kit.                                                            |
| IS1255-1983                                                                                                                      | -End termination accessories.                                                               |
| The specification given in these documents upper sheds the relevant clauses of IS-13573:2011(Part-I/II/III) wherever applicable. |                                                                                             |

## **13.1.5 General Technical Requirement**

Material used for construction of a joint/termination shall perfectly match with the Di-electric, chemical and physical characteristics of the associated cable. The material and design concepts shall incorporate a high degree of operating compatibility between the cable and joints.

The Straight through joint kit or termination shall be complete with all accessories, jointing material, insulating stress control tube and sealing material, lugs, nuts, bolts etc. as well as an instruction booklet explaining the method of using the kit. In case of heat shrinkable type kit, the joint shall include a heat shrinkable dual wall tubing which shall be insulating from inside and semi conductive from outside. Detailed sectional views of the assemblies shall be submitted along with the offer.

The straight through joints should be absolutely impervious to the entry of water. The manufacturer shall use the proven technologies and design to ensure a construction which will prevent entry of water or any other liquid inside the straight through joint and cable. The cable termination kit shall be suitable for terminating the cable on Indoor and outdoor installation as per requirement.

The Straight-through joints shall be suitable for Buried/Over Head application.

The heat shrinkable component shall be light in weight and shall be made of specially formulated cross linked polymeric material with excellent tracking & erosion resistance characteristic. Environmentally sealed system for splicing dielectric shielded power cables. The design of joint and termination shall be such that on completion of work, the cable can be charged immediately. The joint/termination shall have range taking feature. The Connector/ferrule used shall be range taking; Moisture entry into conductor shall be protected by providing special mastic. The termination kit offered shall provide for total environmental sealing of the cable crutch and at the lug end. The details of the same shall be submitted along with the offer.

## **1. Heat Shrinkable Straight through Joints.**

The heat shrinkable straight through joints shall have following function abilities.

- a) For encapsulation, environmental sealing set of heat shrink outer insulating tubes with hot melt

- adhesive coating are required to be provided.
- b) To reduce stress over conductor, heat shrinkable stress control tube to be provided. The stress control tube has to be in electrical contact with the outer insulation screen of the cable. Impedance of the tube shall be constant up to an operating temperature and shall be within the range  $1 \times 10^8$  ohm-cm to  $8 \times 10^8$  ohm-cm and with Relative permittivity shall be minimum 15. Voids filling and stress relief over crimped connector and cut point of the insulation screen to be provided with void filling and moisture sealing high permittivity yellow mastic and lubricant. The nested ends of the heat shrinkable tubing shall be provided with environmental sealing red mastic. Continuity of copper metallic screen of cable to be provided by Tinned copper mesh with 50% overlap. Mechanical protection of joint to be provided by rollable Metallic Strip Canister of suitable size and length for 3 core and by tinned copper mesh for 1 core cable.
  - c) For joining of main conductor cores suitable size of ferrules/mechanical connectors with range taking feature should be provided. The cross-sectional area (CSA) of the ferrule/mechanical connector shall not be less than CSA of the conductor of the cable. Length of the ferrule/connector shall be sufficient to allow adequate number of crimps/shear head type bolts, to limit temperature rise at the joint. For providing insulation over the conductor area maximum three layers of heat shrinkable insulating tube are to be provided. The thickness of the heat shrinkable tube after installation should not be less than 1.2 times the insulation thickness of the cable. For outer semi conductor screening of the joint suitable heat shrinkable dual wall tubes which are co-extruded are to be provided.
  - d) Earth Continuity between armour to be provided by tinned copper braid of adequate cross section. This is required for proper earthing of the joint. Also, to support armour wire support ring is to be provided. The material of support ring to be steel (G.I.) for 3 core Cable and Aluminum for 1 core cable-Worm drive clip (jubilee/hose clips) for tightly securing the earthing braids required to be provided in suitable size & quantity.
  - e) For cleaning of cores, removing burrs on ferrules & rough insulation. Sufficient quantity of cleaning solvent & aluminum oxide cloth is required to be provided.
  - f) The cable termination (Indoor-outdoor) shall be of class-I type which consist of following point
    - (i) Stress control layer
    - (ii) Resistance against UV light environmental protection.
    - (iii) Moisture seal-for environmental sealing against ingress of moisture & aggressive gases for crutch portion sealing of cable strifurcating Heat shrinkable breakout is required.
  - g) To protect the cable breakout mono plast tape/non-adhesive PVC tape is required to be applied over earthing arrangement (worm drive clip installed over copper braid and
  - h) Armour for suitable length of the termination part.
  - i) For proper sealing of lugs at end of the terminations suitable size & length of Heat Shrinkable tube is to be provided. No tape is to be provided for sealing purpose. For earthing tinned copper braid of adequate cross section is to be provided. Also, to support armour wire GI support ring is to be provided. Worm drive clip (jubilee clips) for tightly securing the earthing braid is required to be provided in suitable size & quantity.
  - j) Suitable size of heat stress control tubes is to be provided to reduce stress at cut back of screed Void filling yellow mastic is to be provided at semi-conducting screen. Heat shrinkable anti tracking tubes are to be provided to cover bare XLPE insulation and to provide UV resistance & environmental sealing.
  - k) For cleaning of cores, removing burrs on ferrules & rough insulation, sufficient quantity of cleaning solvent & Aluminum Oxide cloth is required to be provided. Adhesive tapes to be provided in sufficient length for marking on cables.
  - l) Sufficient quantities of heat shrinkable rain sheds are to be provided to increase the creep age distance and to prevent water collection over termination end portion.
- ii) **Heat Shrinkable Indoor Type End Termination:** Terminations should be designed to withstand high humidity and surface contamination under electrical stress caused due to condensation and dust in indoor conditions.

- iii) **Heat Shrinkable Outdoor Type End Termination:** The Terminations should be designed to withstand exposure to extreme climatic variations & surface contamination, UV rays from sunlight and electrical stress caused due to heavy pollution & dust in external conditions.

Heat Shrinkable Cable Termination Kits and required for the following Sizes of XLPE Cables:

| Sl. No. | No. of Cores | Voltage | Cable Size in sq. mm. |
|---------|--------------|---------|-----------------------|
| 1       | 3            | 33kV    | 400                   |
| 2       | 3            | 11kV    | 300                   |
| 3       | 3            | 11kV    | 185                   |
| 4       | 3.5          | 1.1kV   | 300                   |
| 5       | 3.5          | 1.1kV   | 120                   |
| 6       | 1            | 1.1kV   | 630                   |
| 7       | 4            | 1.1kV   | 25                    |
| 8       | 4            | 1.1kV   | 16                    |
| 9       | 2            | 1.1kV   | 25                    |
| 10      | 2            | 1.1kV   | 10                    |

### 13.1.6. Marking and Labeling

As per the IS 13573(Part-I&II):2011 all kits shall be marked and labeled suitably for identification.

- Manufacturer's name or logo and the name of components wherever feasible;
- Type of jointing materials, the application;
- Batch number(s), where relevant;
- Product reference;
- Defined storage conditions and expiry date, if any;
- If relevant, the manufacturing date;
- Health and safety marking and handling instructions, where relevant; and
- Reference to compliance with this standard.

### 13.1.7 Tests

#### 13.1.7.1. Type Tests

The Jointing Kit offered, shall be fully type tested at NABL Lab as per the relevant standards. The applicable standards are indicated in Clause No.3. The bidder shall furnish the type test reports along with the offer. Offer without Type test reports will not be considered. For any change in the design/type, already type tested and the design/type offered against this specification the WBSEDCL reserved the right to demand repetition of type tests without any extra cost in presence of WBSEDCL's representative.

Contractor shall submit type test reports for Terminating/jointing accessories as per IS 17573:1992/ IEC 60840:1999/IEC62067.

#### 13.1.7.2 Type Test Sequence

The type test shall be carried out as per the test sequence given in IS13573/2011(Part- I,II&III).

#### 13.1.7.3 ACCEPTANCE & ROUTINE TESTS:

All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the



# West Bengal State Electricity Distribution Company Limited

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**Office of the Regional Manager**

**Birbhum Region**

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supplier in presence of WBSEDCL's representative.

The WBSEDCL reserves the right to insist for witnessing the acceptance/routine testing of the bought out items.

## **13.1.8 Pre Despatch Inspection**

All acceptance tests and inspection shall be carried out at the place of manufacturer unless otherwise specially agreed upon the manufacturer and purchase at the time purchase. Manufacturer shall offer to the inspector representing the WBSEDCL, all the reasonable facilities, free of charge, for inspection and testing to satisfy him that the material is being supplied in accordance with this specification.

The Client's representative/Engineer attending the above test will carried out testing for suitable number of cable joints/terminations as per sampling procedure laid down in IS:13573(Part-I,II,III):2011(amended up to date) and issue test certificate approval to the manufacturer and give clearance for dispatch. The cable jointing/ termination kit shall be sealed after the inspection.

### **13.1.8.1 Inspection after Receipt at Stores**

For Random sample testing (RST) the sample Cable Termination/ jointing kit will be drawn from anyone of the store.

### **13.1.8.2 Demonstration & Training:**

The WBSEDCL reserves the right to ask for demonstration of the equipment offered at the WBSEDCL's place. The bidder shall arrange for demonstration of installation of jointing/termination kits free of cost for giving training to WBSEDCL's representative to get acquainted with the jointing method. The jointing/ termination kit along with required length of the kits to be used for demonstration purpose shall be specified the cable will be provided by the WBSEDCL.

## **13.1.9 Guarantee**

The Kits shall be suitable for storage without deteriorating at a temperature up to 50 degree Celsius under normal conditions of storage and shall have unlimited shelf storage life. The bidder shall guarantee the installed cable accessories for a minimum period of not less than 5 years from the date of installation. The stores/materials found defective within the above guarantee period, shall be replaced by the supplier free of cost within one month of receipt to f intimation. If the defective stores/materials are not replaced as per the above guarantee clause, the Company shall recover an equivalent amountplus15%supervisionchargesfrom any of the supplier's bills.

### **13.1.10 Quality control**

The WBSEDCL has a right to send team of experienced Engineers for assessing the capability of the firm for manufacturing and testing of Cable jointing kit as per this specification. The WBSEDCL representative should be given all assistance and cooperation for inspection and testing at the bidder's work.

### **13.1.11 Quality Assurance Plan**

The tendered shall invariably furnish QAP along with his offer, The QAP adopted by him in the process of manufacturing shall be consist of

- a) List of Plant and Machinery available at the manufacturer's premises.



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- 
- b) List of testing equipments available at the manufacturer's premises with their calibration schedule.
  - c) Organizational chart.

## **13.1.12 Packing**

The Cable jointing kits shall be suitably packed to avoid damage or disturbance during transit or handling. Each Cable jointing kits may be suitably packed in the first instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case of adequate strength with extra cushioning if considered necessary. The cases may then be properly sealed against accidental opening in transit.

The following information shall be furnished with the consignment:

- Name of consignee.
- Details of consignment.
- Destination.
- Total Weight of consignment.
- Sign showing upper/lower side of the crate.
- Sign showing fragility of the material.
- Handling and unpacking instructions.
- Bill of Materials indicating contents of each component and spare materials.
- Installation instructions including drawing or other information specific to the accessories.

## **13.1.13 Schedules**

The bidder shall fill in the following schedules which are part and parcel of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be liable for rejection. The discrepancies if any between the specification and the catalogs and / or literatures submitted as part of the offer by the bidders, the same shall not be considered and representations in this regard will not be entertained. The bidder shall furnish these particulars for each size/ rating.

## 13.2. HDPE Pipe:

IS 4984 : 2016

### Indian Standard POLYETHYLENE PIPES FOR WATER SUPPLY — SPECIFICATION (Fifth Revision)

#### 1 SCOPE

1.1 This standard lays down the requirements for polyethylene (PE) pipes (mains and service pipes) intended for the conveyance of water for human consumption including raw water prior to treatment and also water for general purpose.

1.2 This standard is applicable for the water supplies with a maximum operating pressure of 2.0 MPa.

1.3 An operating temperature of 27°C has been taken as the reference temperature.

1.4 The reference temperature of 20°C for 50 years of continuous stress is considered for the minimum required strength (MRS) of polyethylene base resin. To enable an operating water temperature of 27°C, the design stress has been accordingly corrected (see Table 1 and corresponding Notes). The standard also provides pressure reduction coefficients for water temperatures higher than 20°C and other than 27°C so as to calculate the maximum allowable operating pressure at those temperatures.

1.5 This standard does not purport to give guidelines for designing and dimensioning of pipe lines.

#### 2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated are valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below :

| IS No.      | Title                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------|
| 2362 : 1993 | Determination of water by Karl Fischer method — Test method (second revision)                   |
| 2530 : 1963 | Methods of test for polyethylene moulding materials and polyethylene compounds                  |
| 4905 : 1968 | Methods of random sampling                                                                      |
| 7328 : 1992 | High Density polyethylene materials for moulding and extrusion — Specification (first revision) |

| IS No.       | Title                                                                                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9845 : 1998  | Method of analysis for the determination of specific and/or overall migration of constituents of plastics materials and articles intended to come in contact with foodstuffs (first revision) |
| 10441 : 1982 | Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water                                                                                  |
| 10146 : 1982 | Polyethylene for its safe use in contact with foodstuff, pharmaceuticals and drinking water                                                                                                   |

#### 3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply:

**3.1 Nominal Size (DN)** — Numerical designation of the size of a component, other than a component designated by a thread size, which is a convenient round number approximately equal to the manufacturing dimension in millimetres (mm).

**3.2 Nominal Size (DN/OD)** — Nominal size, related to the outside diameter.

**3.3 Nominal Outside Diameter ( $d_n$ )** — Specified outside diameter, in millimetres, assigned to a nominal size DN/OD.

**3.4 Outside Diameter at any Point ( $d_e$ )** — Value of the measurement of the outside diameter through its cross-section at any point of the pipe rounded to the next greater 0.1 mm.

**3.5 Mean Outside Diameter ( $d_{em}$ )** — Value of the measurement of the outer circumference of the pipe or spigot end of a fitting in any cross-section divided by  $\pi$  ( $= 3.142$ ), rounded to the next greater 0.1 mm.

**3.6 Minimum Mean Outside Diameter ( $d_{em, Min}$ )** — Minimum value of the outside diameter as specified for a given nominal size.

**3.7 Maximum Mean Outside Diameter ( $d_{em, Max}$ )** — Maximum value of the outside diameter as specified for a given nominal size.

IS 4984 : 2016

**3.8 Out-of-roundness (Ovality)** — Ovality shall be measured as the difference between maximum outside diameter and minimum outside diameter measured at the same cross-section of the pipe, at 300 mm away from the cut end, for the pipe to be coiled.

**3.9 Nominal Wall Thickness ( $e_n$ )** — Numerical designation of the wall thickness of a pipe, which is a convenient round number approximately equal to the manufacturing dimension in millimetres.

**3.10 Standard Dimension Ratio (SDR)** — The SDR value is the ratio of the nominal outside diameter,  $d_n$ , of a pipe to its nominal wall thickness.

$$SDR = \frac{d_n}{e_n}$$

**3.11 Wall Thickness at any Point ( $e$ )** — Wall thickness at any point of the body of the pipe, around its circumference.

**3.11.1 Minimum Wall Thickness at any Point ( $e_{min}$ )** — Minimum value of the wall thickness at any point of the body of the pipe, around its circumference as specified.

**3.11.2 Maximum Wall Thickness at any Point ( $e_{max}$ )** — Maximum value of the wall thickness at any point of the body of the pipe, around its circumference as specified.

**3.12 Mean Wall Thickness ( $e_m$ )** — The arithmetic mean of a number of measurements regularly spaced around the circumference of the pipe in the same cross-section of the pipe, including the measured minimum and the measured maximum values of the wall thickness.

**3.13 Tolerance** — Permissible variation of the specified value of a quantity expressed as the difference between the permissible maximum and permissible minimum values.

**3.14 Minimum Required Strength (MRS)** — Minimum value in megapascals (MPa), for long-term hydrostatic strength (LTHS) of the polyethylene resin which represents the 97.5 percent confidence limits of the predicted hydrostatic strength at 20°C for 50 years. This is considered as the property of the material.

**3.15 Overall Service (Design) Coefficient ( $C$ )** — An overall design co-efficient with a value greater than 1, which takes into consideration service conditions as well as properties of the components of a piping system other than those represented in the lower confidence limit. For potable water supply pipes, the minimum value of  $C$  is 1.25.

**3.16 Design Stress ( $s$ )** — The maximum allowable stress, expressed in megapascals (MPa), for a given

application derived by dividing MRS by the co-efficient  $C$ . This is the allowable stress at 20°C.

**3.17 Nominal Pressure (PN)** — Numerical designation used for reference purposes related to the mechanical characteristics of the component of piping system.

NOTE — For plastic piping systems conveying water, it corresponds to the maximum continuous operating pressure, expressed in bar which can be sustained with water at 27°C, based on the minimum design coefficient,  $C$  (1 MPa = 10 bar).

The relationship between MRS, PN and SDR is given in Annex A.

**3.18 Maximum Allowable Operating Pressure (MAOP)** — The maximum allowable continuous pressure, expressed in MPa. It is given by the equations,

$$P(\text{MPa}) = \frac{2 \times \sigma}{[(SDR) - 1]} \times f_T$$

$$P(\text{MPa}) = \frac{2 \times \text{MRS}}{C [(SDR) - 1]} \times f_T$$

where

SDR = standard dimension ratio;

$\sigma$  = design stress, in MPa;

MRS = minimum required strength, in MPa;

$f_T$  = pressure reduction co-efficient; and

$C$  = overall service design co-efficient.

**3.19 Pressure Reduction Co-efficient ( $f_T$ )** — A co-efficient which takes into account the reduction in maximum allowable operating pressure due to increase in operating temperature.

**3.20 Melt Flow Rate (MFR)** — Value relating to the viscosity of the molten thermoplastic material at a specified temperature and rate of shear.

**3.21 Virgin Material** — Thermoplastics material in a form such as granules which has not been previously processed other than for compounding and to which no reprocessed or recycled materials have been added.

## 4 GRADE OF RESIN

Pipes shall be classified according to the grade of the raw material (resin) as given in Table 1. The resin supplier shall give the raw material grade.

## 5 MATERIAL

### 5.1 General

The material used for the manufacture of pipes should not constitute toxic hazard, should not support microbial growth and should not give rise to unpleasant taste or odour, cloudiness or discoloration of water. Pipe manufacturers shall obtain a certificate to this effect from the manufacturer of raw material.

IS 4984 : 2016

**Table 1 Classification of Materials**  
(Clause 4)

| Sl No. | Material Classification (Grade) | MRS (Minimum Required Strength) of PE Resin at 20°C for 50 Year Life MPa (3) | Design Stress at 20°C MPa (4) |
|--------|---------------------------------|------------------------------------------------------------------------------|-------------------------------|
| (1)    | (2)                             | (3)                                                                          | (4)                           |
| i)     | PE 63                           | 6.3                                                                          | 5                             |
| ii)    | PE 80                           | 8.0                                                                          | 6.3                           |
| iii)   | PE 100                          | 10.0                                                                         | 8                             |

**NOTES**

1 The maximum allowable operating pressure (MAOP) of a pipe is obtained by the equations given in 3.18.

2 Pressure reduction-coefficients for calculating maximum allowable operating pressure at temperatures higher than 20°C are given in Fig. 1.

3 As an operating water temperature of 27°C has been considered, a pressure reduction co-efficient,  $f_T$ , of 0.85 has been taken from Fig. 1 and used in the equation given at 3.18 for determining the maximum allowable operating pressure at 27°C (nominal pressure). This ensures that no further correction factor is required for over ground or underground water supply systems.

4 The wall thicknesses are calculated based on maximum allowable operating pressure at 27°C rounded up to nearest SDR series (PN values). The pressure class (pressure rating) is also rounded to standard series. Tolerances calculated from  $(0.1e_{min} + 0.1)$  mm rounded up to the next 0.1 mm. Considering operational production problems, maximum wall thickness of pipes are considered around 130 mm.

5 The pipes are recommended for maximum water temperature of +45°C.

6 The pipes may also be used up to the ambient temperature of -40°C without any correction factor as long as the water temperatures inside the pipe do not exceed the operating temperature of 27°C. Intermittent increase in the ambient or water temperatures because of weather changes would not have any deleterious effect on the pipe's long-term performance.

## 5.2 Polyethylene Resin

PE resin used for the manufacture of pipes shall conform to parameters mentioned in Table 2. In addition, the resin shall conform to requirement of 5.6.2 of IS 7328.

The material classification and conformity to Table 2 shall be provided by the raw material (resin) manufacturer with documentation duly certified by resin manufacturer.

## 5.3 Carbon Black Master Batch

Carbon black master batch shall be manufactured from a mixture of the following:

- Polyethylene, which may include co-polymers of ethylene and higher olefin, in which the higher olefin constituent does not exceed 10 percent (mass/mass) and density of 910-950 kg/m<sup>3</sup>.
- The constituents used should be from the positive list of constituents of PE, in contact with food stuff, pharmaceutical and drinking water as per IS 10141 and should not constitute a toxic hazard, shall not support microbial growth and shall not give rise to an unpleasant taste or odour, cloudiness or discoloration of the water.
- Loading of carbon black should not exceed 50 percent (m/m).
- Ash content <0.1 percent.
- Carbon black used in carbon black master batch shall comply with the following requirements

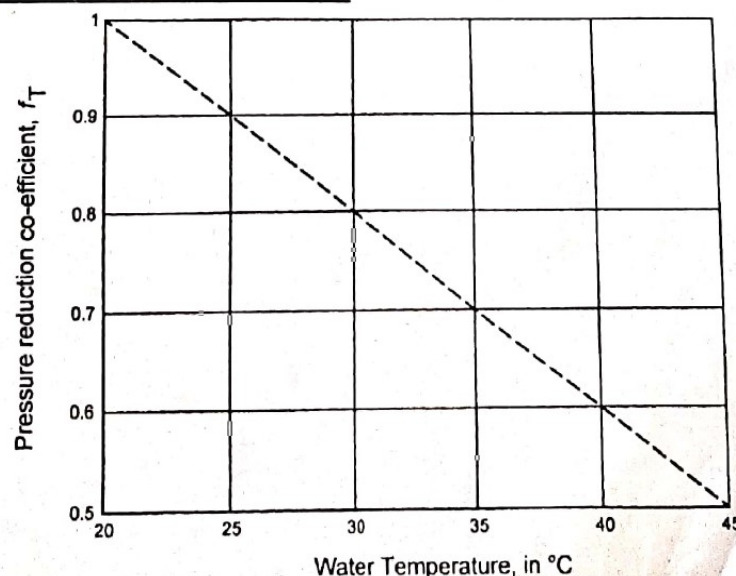


FIG. 1 PRESSURE REDUCTION CO-EFFICIENT FOR WATER TEMPERATURES ABOVE 20°C

IS 4984 : 2016

Table 2 Characteristics of PE Resin as Granules  
(Clauses 5.2 and 6.1.1)

| Sl No.<br>(1) | Characteristics<br>(2)                       | Units<br>(3)      | Requirements<br>(4)            | Test Parameters<br>(5)  | Test Method<br>(6) |
|---------------|----------------------------------------------|-------------------|--------------------------------|-------------------------|--------------------|
| i)            | Base density                                 | kg/m <sup>3</sup> | 930-960                        | 27°C                    | IS 7328            |
| ii)           | Melt flow rate                               | g/10 min          | 0.2 to 1.1<br>(both inclusive) | 190°C using a 5 kg mass | IS 2530            |
| iii)          | Thermal stability (oxidation induction time) | min               | ≥ 20                           | 200°C, isothermal       | Annex B            |
| iv)           | Volatile matter                              | mg/kg             | ≤ 350                          | Number of test pieces   | 01 Annex C         |
| v)            | Water content <sup>1)</sup>                  | mg/kg             | ≤ 300                          | Number of test pieces   | 01 Annex D         |

<sup>1)</sup> This requirement is only applicable if the measured volatile content is not in conformity with its specified requirement. In case of dispute, the requirement for water content shall apply. ( If the water content exceeds the limit, drying to be done prior to use).

- 1) Density: 1.5 to 2.0 g/ml.
- 2) Toluene extract not more than 0.1 percent (m/m).
- 3) Maximum volatile matter 0.9 percent (m/m) (see Annex C).
- 4) Carbon black particle size should be less than 0.025 µ.

NOTE — A test report or confirmative certificate may be obtained from the carbon black master batch manufacturer.

#### 5.4 Anti Oxidant

The percentage of anti-oxidant used shall not be more than 0.3 percent by mass of finished resin. The anti-oxidant used shall be physiologically harmless and shall be selected from the list given in IS 10141.

#### 5.5 Rework Material

Clean, reprocessible material generated from a manufacturer's own production and works testing of products according to this standard may be used if it is derived from the same raw material as used for the relevant production. Reprocessible material obtained from external sources and recycled material shall not be used.

### 6 PIPE DESCRIPTION

6.1 Pipes shall be designated according to the grade of material (see 6.1.1) followed by standard dimension ratio (SDR) (see 6.1.2), nominal outside diameter (see 6.1.3) and pressure rating (PN) (see 6.1.4). For example PE 80, SDR 26, DN 200, PN 0.5 indicates pipe pertaining to material grade PE 80 with wall thickness corresponding to SDR 26, nominal outside diameter 200 mm and pressure rating 0.5.

6.1.1 The grade of material shall be as given in Table 1.

6.1.2 The standard dimension ratio of pipes covered in this standard are:

SDR 41, SDR 33, SDR 26, SDR 21, SDR 17, SDR 13.6, SDR 11, SDR 9, SDR 7.4 and SDR 6.

6.1.3 The nominal outside diameter of pipes covered in this standard are:

16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500, 560, 630, 710, 800, 900, 1 000, 1 200, 1 400, 1 600, 1 800, 2 000 mm.

6.1.4 The pipes shall be classified by pressure rating (PN) corresponding to the maximum allowable operating pressure at 27°C, as follows:

| Pressure Rating of Pipe<br>(1) | Maximum Allowable Operating Pressure at 27°C<br>(2) |
|--------------------------------|-----------------------------------------------------|
| PN 2                           | 0.20 MPa                                            |
| PN 2.5                         | 0.25 MPa                                            |
| PN 3                           | 0.30 MPa                                            |
| PN 3.2                         | 0.32 MPa                                            |
| PN 4                           | 0.40 MPa                                            |
| PN 5                           | 0.50 MPa                                            |
| PN 6                           | 0.60 MPa                                            |
| PN 8                           | 0.80 MPa                                            |
| PN 10                          | 1.00 MPa                                            |
| PN 12.5                        | 1.25 MPa                                            |
| PN 16                          | 1.60 MPa                                            |
| PN 20                          | 2.00 MPa                                            |

#### 6.2 Colour

The colour of the pipe shall be black with blue identification stripes.

NOTE — Blue pipes have not been included due to non-availability of enough experience regarding manufacture/ use of these pipes and raw materials for the same in India. However blue pipes may also be supplied if so required by the purchaser. Purchaser shall specify requirement regarding raw material, weathering test, etc, in such cases.

#### 6.2.1 Identification Stripes

Each black pipe with identification stripes shall contain minimum of three longitudinal stripes of minimum

IS 4984 : 2016

width of 3 mm in blue colour, circumferentially distributed. These stripes shall be co-extruded during pipe manufacturing and shall not preferably be more than 0.2 mm in depth for wall thickness up to 10 mm and 0.5 mm beyond 10 mm. The material of the stripes shall be of the same type as used in the base compound for the pipe.

## 7 GEOMETRIC CHARACTERISTICS OF PIPE

### 7.1 Visual Appearance

The internal and external surface of the pipe shall be smooth, clean and free from grooving and other defects. The ends of the pipes shall be cleanly cut square with the axis of the pipe to within the tolerances given below and free from deformity. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible, provided that the wall thickness remains within the permissible limits.

| Nominal diameter<br>DN<br>mm<br>(1) | Maximum Out of Square<br>of Pipe End<br>mm<br>(2) |
|-------------------------------------|---------------------------------------------------|
| 16 to 75                            | 2                                                 |
| 90 to 125                           | 3                                                 |
| 140 to 180                          | 4                                                 |
| 200 to 280                          | 5                                                 |
| Above 280                           | 7                                                 |

### 7.2 Length

The length of straight pipe shall be 5 m to 20 m as agreed to between the manufacturer and purchaser. Short lengths of 3 m (minimum) up to the maximum of 10 percent of the total supply may be permitted.

### 7.3 Coiling

The pipes shall be coiled such that localized deformation, for example, buckling and kinking is prevented. The minimum internal diameter of the coil shall not be less than  $18 d_n$ . The length of the coiled pipes shall be as agreed between the manufacturer and purchaser.

### 7.4 Dimensions

The mean outside diameters,  $d_{em}$ , and the out-of-roundness (ovality) of the pipes for different nominal diameters covered in the standard shall be in accordance with Table 3. The minimum and maximum wall thickness of pipes shall be as given in Table 4.

#### 7.4.1 Methods of Measurement

7.4.1.1 Mean outside diameter of the pipe shall be the

Table 3 Mean Outside Diameters and Out-of-Roundness  
(Clause 7.4)

All dimensions in millimetres.

| Sl No.  | Nominal Size<br>DN/OD | Nominal Outside Diameter<br>$d_n$ | Mean Outside Diameter<br>$(d_{em, min})$ $(d_{em, max})$ | Maximum Out-of-Roundness (Ovality) |
|---------|-----------------------|-----------------------------------|----------------------------------------------------------|------------------------------------|
| (1)     | (2)                   | (3)                               | (4)                                                      | (5)                                |
| i)      | 16                    | 16                                | 16.0                                                     | 16.3                               |
| ii)     | 20                    | 20                                | 20.0                                                     | 20.3                               |
| iii)    | 25                    | 25                                | 25.0                                                     | 25.3                               |
| iv)     | 32                    | 32                                | 32.0                                                     | 32.3                               |
| v)      | 40                    | 40                                | 40.0                                                     | 40.4                               |
| vi)     | 50                    | 50                                | 50.0                                                     | 50.4                               |
| vii)    | 63                    | 63                                | 63.0                                                     | 63.4                               |
| viii)   | 75                    | 75                                | 75.0                                                     | 75.5                               |
| ix)     | 90                    | 90                                | 90.0                                                     | 90.6                               |
| x)      | 110                   | 110                               | 110.0                                                    | 110.7                              |
| xi)     | 125                   | 125                               | 125.0                                                    | 125.8                              |
| xii)    | 140                   | 140                               | 140.0                                                    | 140.9                              |
| xiii)   | 160                   | 160                               | 160.0                                                    | 161.0                              |
| xiv)    | 180                   | 180                               | 180.0                                                    | 181.1                              |
| xv)     | 200                   | 200                               | 200.0                                                    | 201.2                              |
| xvi)    | 225                   | 225                               | 225.0                                                    | 226.4                              |
| xvii)   | 250                   | 250                               | 250.0                                                    | 251.5                              |
| xviii)  | 280                   | 280                               | 280.0                                                    | 281.7                              |
| xix)    | 315                   | 315                               | 315.0                                                    | 316.9                              |
| xx)     | 355                   | 355                               | 355.0                                                    | 357.2                              |
| xxi)    | 400                   | 400                               | 400.0                                                    | 402.4                              |
| xxii)   | 450                   | 450                               | 450.0                                                    | 452.7                              |
| xxiii)  | 500                   | 500                               | 500.0                                                    | 503.0                              |
| xxiv)   | 560                   | 560                               | 560.0                                                    | 563.4                              |
| xxv)    | 630                   | 630                               | 630.0                                                    | 633.8                              |
| xxvi)   | 710                   | 710                               | 710.0                                                    | 716.4                              |
| xxvii)  | 800                   | 800                               | 800.0                                                    | 807.2                              |
| xxviii) | 900                   | 900                               | 900.0                                                    | 908.1                              |
| xxix)   | 1 000                 | 1 000                             | 1 000.0                                                  | 1 009.0                            |
| xxx)    | 1 200                 | 1 200                             | 1 200.0                                                  | 1 210.8                            |
| xxxi)   | 1 400                 | 1 400                             | 1 400.0                                                  | 1 412.6                            |
| xxxii)  | 1 600                 | 1 600                             | 1 600.0                                                  | 1 614.4                            |
| xxxiii) | 1 800                 | 1 800                             | 1 800.0                                                  | 1 816.2                            |
| xxxiv)  | 2 000                 | 2 000                             | 2 000.0                                                  | 2 018.0                            |

NOTE — For coiled pipes and for straight lengths with diameters  $\geq 710$  mm, the maximum out-of-roundness shall be as agreed to between the manufacturer and the purchaser.

average of two measurements taken using a vernier at right angles for pipes up to 50 mm diameter. For higher sizes, the diameter shall be measured using a flexible Pi tape or a circumferometer, having an accuracy of not less than 0.1 mm. The wall thickness shall be measured by a dial vernier or ball ended micrometer. The resulting dimension shall be expressed to the nearest 0.1 mm.

#### NOTES

1 The outside diameter shall be measured at a distance of at least 300 mm from the end of the pipe.

2 In the case of discrepancy, the dimension of pipes shall be measured after conditioning at room temperature ( $27^\circ\text{C} \pm 2^\circ\text{C}$ ) for 4 h.

#### 7.4.1.2 Ovality

Ovality shall be measured at 300 mm away from cut end, using a scale having suitable graduations. For

Table 4 Standard Dimension Ratio (SDR) and Corresponding Wall Thicknesses (e) of Pipes  
(Clauses 7.4 and E-4.3)

IS 4984 : 2016

| Nominal OD<br>$d_n$ , mm | SDR 41                 |                          | SDR 33                   |                      | SDR 26               |                      | SDR 21               |                      | SDR 17               |                      | SDR 13.6             |                      | SDR 11               |                      | SDR 9                |                      | SDR 7.4              |                      | SDR 6                |                      |
|--------------------------|------------------------|--------------------------|--------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                          | PN 2<br>PN 2.5<br>PN 3 | PN 2.5<br>PN 3.2<br>PN 4 | PN 2.5<br>PN 3.2<br>PN 4 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 | PN 4<br>PN 5<br>PN 6 |
| 16                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 20                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 25                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 32                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 40                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 50                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 63                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 75                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 90                       |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 110                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 125                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 140                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 160                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 180                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 200                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 225                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 250                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 280                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 315                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 355                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 400                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 450                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 500                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 560                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 630                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 710                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 800                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 900                      |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 1000                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 1200                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 1400                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 1600                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 1800                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
| 2000                     |                        |                          |                          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |

## NOTES

1 Tolerances calculated from  $(0.1 e_{\text{Min}} + 0.1)$  mm rounded up to the next 0.1 mm.

1 Tolerances calculated from  $(0.1 e_{\text{Min}} + 0.1)$  mm rounded up to the next 0.1 mm.

2 All pressure ratings are calculated at 27°C and rounded up to nearest pressure class.

IS 4984 : 2016

coiled pipes and pipes having SDRs  $\geq 21$ , re-rounding shall be permissible before the measurement of ovality. The ovality shall be measured during extrusion and prior to coiling.

## 8 PERFORMANCE REQUIREMENTS

### 8.1 Hydraulic Characteristics

#### 8.1.1 Internal Pressure Creep Rupture Test of Pipe

When subjected to internal pressure creep rupture test in accordance with procedure given in Annex E and test parameters as specified in Table 5, the pipes under test shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

**Table 5 Hydraulic Characteristic Requirements of Pipes**  
(Clauses 8.1.1 and E-4.3)

| Sl No. | Test Temp °C | Test Duration h | Induced Hoop Stress MPa |           |            |
|--------|--------------|-----------------|-------------------------|-----------|------------|
|        |              |                 | PE 63 (4)               | PE 80 (5) | PE 100 (6) |
| (1)    | (2)          | (3)             |                         |           |            |
| i)     | 27           | 100             | 6.9                     | 8.6       | 10.7       |
| ii)    | 80           | 48              | 3.8                     | 4.9       | 5.7        |
| iii)   | 80           | 165             | 3.5                     | 4.5       | 5.4        |
| iv)    | 80           | 1000            | 3.2                     | 4.0       | 5.0        |

#### 8.1.2 Internal Pressure Creep Rupture Test of Pipe Joints

The pipe joints shall also be tested for the hydraulic characteristic requirement by subjecting the butt fusion joint or electro fusion joint of a pipe to internal pressure creep rupture test at 80°C for 48 h as per Table 5 and in accordance with the method given in Annex E. The pipe joints under test shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

### 8.2 Longitudinal Reversion Test

When tested in accordance with the method given in Annex F, the value of the longitudinal reversion shall not be greater than 3 percent.

### 8.3 Carbon Black Content and Dispersion

When tested from a composite sample of minimum three pipes, in accordance with IS 2530, the carbon black content shall be within  $2.5 \pm 0.5$  percent, and the dispersion of carbon black shall be satisfactory.

### 8.4 Melt Flow Rate

When tested from a composite sample of minimum

three pipes as per IS 2530 at 190° C with nominal load of 5 kgf, MFR shall not deviate from the MFR of the resin by more than 30 percent.

### 8.5 Oxidation Induction Time

The minimum oxidation induction time of the pipe when tested in accordance with the method given in Annex B shall be not less than 20 min.

### 8.6 Overall Migration

When tested from a composite sample of minimum 3 pipes as per IS 9845, the overall migration of constituents shall be within the limits stipulated in IS 10146.

### 8.7 Density

When tested from a composite sample of minimum of 3 pipes as per IS 7328, the base density of the pipe shall be between 930 to 960 kg/m<sup>3</sup>.

### 8.8 Tensile Strength for Butt-fusion

When tested according to Annex G, the test specimens prepared by punching /machining from pipe butt fusion sample preferably 110 mm Dia/SDR 11 shall show ductile failure. If the sample shows brittle fail the test may be considered as a failure.

NOTE — If 110 mm/SDR 11 pipes are not being manufactured, test shall be carried out on the nearest, preferably higher size/ SDR ratio being manufactured.

### 8.9 Elongation at Break

When tested according to Annex H, the test specimens punched/machined from pipe samples, shall meet requirement as per Table 6.

### 8.10 Slow Crack Growth Rate

When subjected to test parameters as given below and tested in accordance with the procedure given in Annex E, the notched test specimens prepared from pipe size of preferably 110 mm and SDR 11 in accordance with Annex J shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

| Test Temperature °C | Test Duration h | Internal Test Pressure, MPa |       |        |
|---------------------|-----------------|-----------------------------|-------|--------|
|                     |                 | PE 63                       | PE 80 | PE 100 |
| 80 $\pm$ 1          | 500 h           | 0.64                        | 0.8   | 0.92   |

NOTE — If 110 mm / SDR 11 pipes are not being manufactured, test shall be carried out on the nearest, preferably higher size/ SDR ratio being manufactured.

IS 4984 : 2016

Table 6 Elongation at Break Requirements of Pipes  
(Clause 8.9)

| Sl No. | Characteristics                                 | Requirements       | Test Parameters                |                                                                              | Test Method, Ref to |
|--------|-------------------------------------------------|--------------------|--------------------------------|------------------------------------------------------------------------------|---------------------|
|        |                                                 |                    | Parameter (4)                  | Value (5)                                                                    |                     |
| (1)    | (2)                                             | (3)                |                                |                                                                              | (6)                 |
| i)     | Elongation at break for $e \leq 3$ mm           | $\geq 350$ percent | Test piece shape<br>Test speed | Type 2<br>100 mm/min<br>Type 1 <sup>1)</sup>                                 | Annex II            |
| ii)    | Elongation at break for $3$ mm $< e \leq 12$ mm | $\geq 350$ percent | Test piece shape<br>Test speed | 50 mm/min<br>Type 1 <sup>1)</sup>                                            | Annex II            |
| iii)   | Elongation at break for $e > 12$ mm             | $\geq 350$ percent | Test piece shape<br>Test speed | 25 mm/min<br>Type 1 <sup>1)</sup><br>Or<br>Type 3 <sup>1)</sup><br>10 mm/min | Annex II            |

<sup>1)</sup> Where practical, machined type 2 test pieces may be used for pipe wall thickness  $\leq 25$  mm. The test may be terminated when the requirement is met, without continuing until the rupture of the test piece.

## 9 SAMPLING, FREQUENCY OF TESTS AND CRITERIA FOR CONFORMITY

### 9.1 Type Tests

9.1.1 Type tests are intended to prove the suitability and performance of a new composition, a new technique or a new size of a pipe. Such tests, therefore, need be applied only when a change is made in polymer composition or method of manufacture, or when a new size of pipe is to be introduced. Even if no change is envisaged, type test shall be done at least once in two years on each pressure rating and grade of pipe of the highest size manufactured during the period.

9.1.2 Three samples of the same grade, same size and same SDR selected at random shall be tested for compliance with the requirements of the type tests as given in Table 7.

9.1.3 If all the samples pass the requirements of the type test, the type of the pipe under consideration shall be considered eligible for type approval.

9.1.4 In case of any of the samples fails in the type test, the testing authority, at its discretion, may call for fresh samples not exceeding the original number and subject them to the type test again. If in repeat test, no single failure occurs, the type of pipe under consideration shall be considered eligible for type approval. If any of the samples fails in the repeat tests, the type of pipe shall not be approved. The manufacturer or the supplier may be asked to improve the design and resubmit the product for type approval.

9.1.5 At the end of the validity period (normally one year for internal pressure creep rupture test at 27°C for 100 h and two years for all other type tests) or earlier

as may be necessary, the testing authority may call for fresh samples for type-test for the purpose of type approval.

Table 7 Type Tests  
(Clause 9.1.2)

| Sl No. | Description of Test                                                                         | Sample Size | Requirement Clause |
|--------|---------------------------------------------------------------------------------------------|-------------|--------------------|
| (1)    | (2)                                                                                         | (3)         | (4)                |
| i)     | Tensile strength for butt-fusion                                                            | 3           | 8.8                |
| ii)    | Overall migration                                                                           | 3           | 8.6                |
| iii)   | Internal pressure creep rupture test (hydrostatic resistance test) at 27°C for 100 h        | 3           | 8.1.1              |
| iv)    | Internal pressure creep rupture test (hydrostatic resistance test) at 80°C for 165 h        | 3           | 8.1.1              |
| v)     | Internal pressure creep rupture test (hydrostatic resistance test) at 80°C for 1 000 h test | 3           | 8.1.1              |
| vi)    | Slow crack growth rate test                                                                 | 3           | 8.10               |

### 9.2 Acceptance Test

9.2.1 Acceptance tests are carried out on sample selected from a lot for the purpose of acceptance of the lot.

#### 9.2.2 Lot

All pipes of the same grade, same size, same SDR and also manufactured essentially under similar conditions of manufacture shall constitute a lot. For ascertaining conformity of the lot to the requirements of this standard, samples for acceptance tests (see Table 8) shall be selected and prepared after conditioning at 27±2°C and tested for compliance as per Table 8.

**Table 8 Acceptance Tests**  
(Clause 9.2.2)

| Sl No.<br>(1) | Description of Test<br>(2)                                                                     | Sample Size<br>(3) | Requirement Clause<br>(4) |
|---------------|------------------------------------------------------------------------------------------------|--------------------|---------------------------|
| i)            | Visual appearance and dimensions                                                               | Table 9            | 7.1 and 7.4               |
| ii)           | Melt flow rate                                                                                 | Table 10           | 8.4                       |
| iii)          | Density                                                                                        | Table 10           | 8.7                       |
| iv)           | Reversion test                                                                                 | Table 10           | 8.2                       |
| v)            | Elongation at break                                                                            | Table 10           | 8.9                       |
| vi)           | Carbon black content                                                                           | Table 10           | 8.3                       |
| vii)          | Carbon black dispersion                                                                        | Table 10           | 8.3                       |
| viii)         | Oxidation Induction                                                                            | Table 10           | 8.5                       |
| ix)           | Internal pressure creep rupture test (hydrostatic resistance test) for joints at 80°C for 48 h | Table 10           | 8.1.1                     |
| x)            | Internal pressure creep rupture test (hydrostatic resistance test) for joints at 80°C for 48 h | Table 10           | 8.1.2                     |

## 9.2.3 Conformity to Dimensional and Visual Characteristics

9.2.3.1 The number of test samples shall be in accordance with Table 9.

9.2.3.2 These pipes shall be selected at random from the lot and in order to ensure the randomness of selection, a random number table shall be used. For guidance and use of random number tables, IS 4905 may be referred. For the above purpose, each length of the coil of a given size, grade and SDR shall be considered as one pipe. In the absence of a random number table, the following procedure may be adopted.

Starting from any pipe in the lot, count them as 1, 2, 3, 4, etc. up to  $r$  and so on where  $r$  is the integral part of  $N/n$ ,  $N$  being the number of pipes in the lot and  $n$  is the number of pipes in the samples. Every  $r$ th pipe so counted shall be drawn so as to constitute the required sample size.

9.2.3.3 The number of pipes given for the first sample in col 3 of Table 9 shall be examined for visual and dimensional requirements as given in 7.1 and 7.4 respectively. A pipe failing to satisfy any of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements, if the number of defectives found in the first sample are less than or equal to the corresponding acceptance number given in col 5 of Table 9. The lot shall be deemed not to have met these requirements if the number of defectives found in the first sample is greater than or equal to the corresponding rejection numbers given in col 6 of Table 9. If, however, the number of defectives found in the first sample lies between the corresponding acceptance and rejection numbers given in col 5 and 6 of Table 9, the second sample of the size given in col 3 of Table 9 shall be taken and examined for these requirements. The lot shall be considered to have satisfied these requirements, if the number of defectives found in the cumulative sample is less than or equal to the corresponding acceptance number given in col 5 of Table 9 otherwise not. In case, the sample size equals, or exceeds, lot size, 100 percent inspection shall be done for these tests and all the samples from the lot which pass these tests shall be tested for other acceptance tests.

## 9.2.4 Conformity to Acceptance Tests Other Than Dimensional and Visual Characteristics

The lot having satisfied dimensional and visual requirements shall be tested for other acceptance tests as given in Table 7. The number of test samples selected from the lot for subjecting to these tests shall be in accordance with Table 10. For the above purpose, each length of the coil of a given size, grade and SDR shall be considered as one pipe. The lot shall be considered to have met the requirements of these tests, if none of samples tested fails.

**Table 9 Scale of Sampling for Dimensional Requirements**  
(Clauses 9.2.3.1 and 9.2.3.3)

| Sl No.<br>(1) | No. of Pipes in the Lot<br>(2) | Sample No.<br>(3) | Sample Size<br>(4) | Cumulative Sample Size<br>(5) | Acceptance No.<br>(6) | Rejection No.<br>(7) |
|---------------|--------------------------------|-------------------|--------------------|-------------------------------|-----------------------|----------------------|
| i)            | Up to 150                      | First             | 13                 | 13                            | 0                     | 2                    |
|               |                                | Second            | 13                 | 26                            | 1                     | 2                    |
| ii)           | 151 to 280                     | First             | 20                 | 20                            | 0                     | 3                    |
|               |                                | Second            | 20                 | 40                            | 3                     | 4                    |
| iii)          | 281 to 500                     | First             | 32                 | 32                            | 1                     | 4                    |
|               |                                | Second            | 32                 | 64                            | 4                     | 5                    |
| iv)           | 501 to 1 200                   | First             | 50                 | 50                            | 2                     | 5                    |
|               |                                | Second            | 50                 | 100                           | 6                     | 7                    |
| v)            | 1 201 to 3 200                 | First             | 80                 | 80                            | 3                     | 7                    |
|               |                                | Second            | 80                 | 160                           | 8                     | 9                    |
| vi)           | 3 201 to 10 000                | First             | 125                | 125                           | 5                     | 9                    |
|               |                                | Second            | 125                | 250                           | 12                    | 13                   |
| vii)          | 10 001 to 35 000               | First             | 200                | 200                           | 7                     | 11                   |
|               |                                | Second            | 200                | 400                           | 18                    | 19                   |

IS 4984 : 2016

**Table 10 A Scale of Sampling for Acceptance Tests  
Other Than Dimensional Requirements**

(Clauses 9.2.2 and 9.2.4)

| Sl<br>No.                             | No. of Pipes in the Lot | Sample Size |
|---------------------------------------|-------------------------|-------------|
| (1)                                   | (2)                     | (3)         |
| <b>a) For Pipe Sizes Up to 500 mm</b> |                         |             |
| i) Up to 150                          |                         | 3           |
| ii) 151 to 1 200                      |                         | 5           |
| iii) 1 201 to 35 000                  |                         | 8           |
| <b>b) For Pipe Sizes Above 500 mm</b> |                         |             |
| iv) Up to 500                         |                         | 3           |
| v) 501 to 1 200                       |                         | 5           |
| vi) 1 201 to 35 000                   |                         | 5           |

## 10 MARKING

**10.1** Each straight length/coil of pipe shall be clearly and indelibly marked in white/yellow colour using ink/paint or inkjet print or hot embossed on white base, at every 1 m throughout the length of pipe/coil with the information given in 10.1.1.

**10.1.1** The marking on the pipe shall carry the following minimum information:

- Manufacturer's name/trade-mark;
- Material designation (see 6.1);
- Pressure rating;
- Standard dimension ratio (SDR);
- Outside diameter; and
- Lot No./Batch No., containing information of date of manufacture.

## 10.2 BIS Certification Marking

Each pipe/coil may also be marked with the Standard Mark.

**10.2.1** The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which a license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## AMENDMENT NO. 2 APRIL 2022

TO

### IS 4984 : 2016 POLYETHYLENE PIPES FOR WATER SUPPLY — SPECIFICATION

( Fifth Revision )

[Foreword, para 3, Sl No. (a), fourth sentence] — Substitute the following for the existing sentence:

‘Therefore, the Committee has decided to retain the present practice of manufacturing PE pipes with master batch technology for black pipes, in addition to manufacture by use of pre-compounded material.’

[Foreword, para 3, Sl No. (g)] — Substitute the following for the existing:

‘g) Carbon black content and its dispersion have not been specified for the raw material as PE resin in its virgin form has been permitted. In case of pre-compounded material, where used, a requirement for obtaining test certificate from the material supplier has been included.’

(Page 1, clause 2) — Substitute the following for the existing entries for IS 4905 : 1968 and IS 7328 : 1992:

| IS No.                           | Title                                                                                         |
|----------------------------------|-----------------------------------------------------------------------------------------------|
| 4905 : 2015/<br>ISO 24153 : 2009 | Random sampling and randomization procedures ( <i>first revision</i> )                        |
| 7328 : 2020                      | Specification for polyethylene material for moulding and extrusion ( <i>second revision</i> ) |

(Page 1, clause 2) — Delete the entry for IS 10141 : 1982.

(Page 1, clause 2) — Insert the following new entry at the end:

| IS No.       | Title                                                                                                                                              |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 16738 : 2018 | Positive list of constituents for polypropylene, polyethylene and their copolymers for its safe use in contact with foodstuffs and pharmaceuticals |

(Page 2, clause 3.21) — Insert the following new clause after the clause:

**‘3.22 Rework Material** — Material prepared from rejected unused pipes, including trimmings from the production of pipes, that will be reprocessed in a manufacturer’s plant by a process such as extrusion and for which the complete formulation is known.

(Page 2, clause 5.1) — Insert the following at the end:

‘The various constituents used to make the material for extrusion shall meet the requirements specified in 5.2 to 5.5.’

(Page 3, clause 5.2) — Substitute the following for the existing clause:

#### **‘5.2 Polyethylene Resin**

**5.2.1** PE resin used for the manufacture of pipes shall conform to parameters mentioned in Table 2. In addition, the resin shall conform to the requirements of IS 10146 and 5.5 of IS 7328.

The material classification and conformity to Table 2, 5.5 of IS 7328 and IS 10146 shall be provided by raw material (resin) manufacturer with documentation duly certified by the resin manufacturer.

## Amendment No. 2 to IS 4984 : 2016

**5.2.1.1** In case of pre-compounded black material, the PE resin shall meet the requirements in **5.2.1**. The other constituents used should be from the positive list of constituents of PE in contact with foodstuff and pharmaceuticals as per IS 16738 and should not constitute a toxic hazard, shall not support microbial growth and shall not give rise to an unpleasant taste or odour, cloudiness or discolouration of the water. The certificate for conformity in such a case shall additionally include the results of compound density, carbon black content, toluene extract, maximum volatile matter, carbon black particle size, ash content and carbon black dispersion to establish conformity to the requirements specified in SI No. (i) of Table 2, **8.3**, SI No. (2), (3) and (4) of **5.3(e)**, **5.3(d)** and **8.3**, respectively.

[Page 3, clause **5.3(b)**, line 4] — Substitute ‘IS 16738’ for ‘IS 10141’.

[Page 4, Table 2, SI No. (i), col 4] — Substitute ‘940-960 (The tested value of density shall not differ from density declared/nominated by the resin manufacturer by more than 3 kg/m<sup>3</sup>.)’ for ‘930-960’.

[Page 4, Table 2, SI No. (ii), col 4] — Substitute ‘0.15 to 1.1 (both inclusive)<sup>2)</sup> (The tested value of melt flow rate (MFR) shall be within  $\pm 20$  percent of the MFR declared/nominated by the resin manufacturer if the latter is 1 or above, and within  $\pm 30$  percent if the latter is less than 1)’ for ‘0.2 to 1.1 (both inclusive)’.

(Page 4, Table 2, footnote <sup>1)</sup>) — Insert the following new footnote at the end of table:

<sup>2)</sup> In case of materials with  $0.15 < \text{MFR} < 0.20$ , attention is drawn to the fusion compatibility which has to be established by the raw material supplier. The lowest MFR value resulting from the maximum lower deviation of the nominated value should be not less than 0.15. For  $0.15 \leq \text{MFR} < 0.20$  compounds, fusion compatibility of larger diameter thicker-walled pipes should be investigated to confirm compatibility. If electrofusion jointing is to be adopted, appropriate testing should be carried out to verify the fusion capability of such pipes.

(Page 4, clause **5.4**, line 4) — Substitute ‘IS 16738’ for ‘IS 10141’.

(Page 4, clause **5.5**) — Substitute the following for the existing clause:

### ‘5.5 Rework Material

The addition of not more than 5 percent of the manufacturer’s own rework material conforming to this standard is permissible. No other rework material shall be used.’

(Page 4, clause **6.1.3**, line 6) — Substitute ‘2 000, 2 250, 2 500 mm’ for ‘2 000 mm’.

(Page 4, clause **6.1.4**, Informal Table) — Delete the entry for PN 3 from the table.

(Page 4, clause **6.2.1**, line 5) — Delete the term ‘preferably’.

[Page 5, Table 3, SI No. (xxxiv)] — Insert the following new entries at the end:

| SI No. | Nominal Size<br>DN/OD | Nominal Outside<br>Diameter, $d_n$ | Mean Outside Diameter |                | Maximum Out-of-<br>Roundness (Ovality) |
|--------|-----------------------|------------------------------------|-----------------------|----------------|----------------------------------------|
|        |                       |                                    | $(d_{m, Min})$        | $(d_{m, Max})$ |                                        |
| (1)    | (2)                   | (3)                                | (4)                   | (5)            | (6)                                    |
| xxxv)  | 2 250                 | 2 250                              | 2 250.0               | 2 270.3        | -                                      |
| xxxvi) | 2 500                 | 2 500                              | 2 500.0               | 2 522.5        | -                                      |

(Page 5, clause **7.4.1.1**, Note 2) — Substitute ‘dispute’ for ‘discrepancy’.

(Page 5, clause **7.4.1.2**) — Substitute the following for the existing clause:

‘Ovality shall be measured at 300 mm away from cut end, using a scale having suitable graduations/sliding vernier calliper permitting reading to the nearest 0.05 mm. For coiled pipes and straight pipes having SDRs  $\geq 21$ , re-rounding shall be permissible before the measurement of ovality.

Ovality shall also be measured by the manufacturer during extrusion and prior to coiling and a record of the results obtained shall be maintained for inspection by the purchaser, wherever required.’

(Page 6, Table 4) — Substitute the following for the existing table:

**Table 4 Standard Dimension Ratio (SDR) and Corresponding Wall Thicknesses (e) of Pipes**

(Clauses 7.2 and E-4.3)

| SDR →                      | SDR 41                       | SDR 33          | SDR 26          | SDR 21          | SDR 17          | SDR 13.6        | SDR 11          | SDR 9           | SDR 7.4         | SDR 6           |      |      |      |      |      |      |      |      |      |      |
|----------------------------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------|------|------|------|------|------|------|------|------|------|
| Grade                      | Nominal Pressure (PN)<br>Bar |                 |                 |                 |                 |                 |                 |                 |                 |                 |      |      |      |      |      |      |      |      |      |      |
| PE 63                      | PN 2                         | PN 2.5          | PN 3.2          | PN 4            | PN 5            | PN 6            | PN 8            | -               | -               | -               |      |      |      |      |      |      |      |      |      |      |
|                            | PN 2.5                       | PN 3.2          | PN 4            | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           |      |      |      |      |      |      |      |      |      |      |
|                            | PN 3.2                       | PN 4            | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           | -               |      |      |      |      |      |      |      |      |      |      |
| PE 80                      | PN 3.2                       | PN 4            | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           | -               |      |      |      |      |      |      |      |      |      |      |
| PE 100                     | PN 4                         | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           | PN 20           | -               |      |      |      |      |      |      |      |      |      |      |
| Nominal<br>OD, $d_n$<br>mm | Wall Thicknesses             |                 |                 |                 |                 |                 |                 |                 |                 |                 |      |      |      |      |      |      |      |      |      |      |
|                            | $e_{Min}$<br>mm              | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Min}$<br>mm | $e_{Max}$<br>mm |      |      |      |      |      |      |      |      |      |      |
|                            | (2)                          | (3)             | (4)             | (5)             | (6)             | (7)             | (8)             | (9)             | (10)            | (11)            | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) |
|                            | 16                           | -               | -               | -               | -               | -               | -               | -               | -               | -               | -    | -    | -    | -    | 2.0  | 2.3  | 2.2  | 2.6  | 2.7  | 3.1  |
|                            | 20                           | -               | -               | -               | -               | -               | -               | -               | -               | -               | -    | -    | 2.0  | 2.3  | 2.3  | 2.7  | 2.8  | 3.2  | 3.4  | 3.9  |
|                            | 25                           | -               | -               | -               | -               | -               | -               | -               | -               | -               | 2.0  | 2.3  | 2.3  | 2.7  | 2.8  | 3.2  | 3.4  | 3.9  | 4.2  | 4.8  |
|                            | 32                           | -               | -               | -               | -               | -               | -               | -               | 2.0             | 2.3             | 2.4  | 2.8  | 3.0  | 3.4  | 3.6  | 4.1  | 4.4  | 5.0  | 5.4  | 6.1  |
|                            | 40                           | -               | -               | -               | -               | -               | 2.0             | 2.3             | 2.4             | 2.8             | 3.0  | 3.4  | 3.7  | 4.2  | 4.5  | 5.1  | 5.5  | 6.2  | 6.7  | 7.5  |
|                            | 50                           | -               | -               | -               | -               | 2.0             | 2.3             | 2.4             | 2.8             | 3.0             | 3.4  | 3.7  | 4.2  | 4.6  | 5.2  | 6.3  | 6.8  | 7.6  | 8.4  | 9.4  |
|                            | 63                           | -               | -               | -               | -               | 2.5             | 2.9             | 3.0             | 3.4             | 3.8             | 4.3  | 4.7  | 5.3  | 5.8  | 6.5  | 7.0  | 7.8  | 8.6  | 9.6  | 11.7 |
|                            | 75                           | 2.0             | 2.3             | 2.7             | 2.9             | 3.3             | 3.6             | 4.1             | 4.5             | 5.1             | 5.6  | 6.3  | 6.9  | 7.7  | 8.4  | 9.4  | 10.2 | 11.4 | 12.5 | 13.9 |
|                            | 90                           | 2.2             | 2.6             | 3.2             | 3.5             | 4.0             | 4.3             | 4.9             | 5.3             | 6.0             | 6.7  | 7.5  | 8.2  | 9.2  | 10.0 | 11.1 | 12.2 | 13.6 | 15.0 | 16.6 |
|                            | 110                          | 2.7             | 3.1             | 3.4             | 3.9             | 4.3             | 4.9             | 5.3             | 6.0             | 6.5             | 7.3  | 8.1  | 9.1  | 10.0 | 11.1 | 12.3 | 13.7 | 14.9 | 16.5 | 18.4 |
|                            | 125                          | 3.1             | 3.6             | 3.8             | 4.3             | 4.9             | 5.5             | 6.0             | 6.7             | 7.4             | 8.3  | 9.2  | 10.3 | 11.4 | 12.7 | 13.9 | 15.4 | 16.9 | 18.7 | 20.9 |
|                            | 140                          | 3.5             | 4.0             | 4.3             | 4.9             | 5.4             | 6.1             | 6.7             | 7.5             | 8.3             | 9.3  | 10.3 | 11.5 | 12.8 | 14.2 | 15.6 | 17.3 | 19.0 | 21.0 | 23.4 |
|                            | 160                          | 4.0             | 4.5             | 4.9             | 5.5             | 6.2             | 7.0             | 7.7             | 8.6             | 9.5             | 10.6 | 11.8 | 13.1 | 14.6 | 16.2 | 17.8 | 19.7 | 21.7 | 24.0 | 26.7 |
|                            | 180                          | 4.4             | 5.0             | 5.5             | 6.2             | 7.0             | 7.8             | 8.6             | 9.6             | 10.6            | 11.8 | 13.3 | 14.8 | 16.4 | 18.2 | 20.0 | 22.1 | 24.4 | 27.0 | 30.0 |
|                            | 200                          | 4.9             | 5.5             | 6.1             | 6.9             | 7.7             | 8.6             | 9.6             | 10.7            | 11.8            | 13.1 | 14.8 | 16.4 | 18.2 | 20.2 | 22.3 | 24.7 | 27.1 | 30.0 | 33.4 |
|                            | 225                          | 5.5             | 6.2             | 6.9             | 7.7             | 8.7             | 9.7             | 10.8            | 12.0            | 13.3            | 14.8 | 16.6 | 18.4 | 20.5 | 22.7 | 25.0 | 27.6 | 30.5 | 33.7 | 37.5 |
|                            | 250                          | 6.1             | 6.9             | 7.6             | 8.5             | 9.7             | 10.8            | 12.0            | 13.3            | 14.8            | 16.4 | 18.4 | 20.4 | 22.8 | 25.2 | 27.8 | 30.7 | 33.8 | 37.3 | 41.7 |
|                            | 280                          | 6.9             | 7.7             | 8.5             | 9.5             | 10.8            | 12.0            | 13.4            | 14.9            | 16.5            | 18.3 | 20.6 | 22.8 | 25.5 | 28.2 | 31.2 | 34.5 | 37.9 | 41.8 | 46.7 |
| 315                        | 7.7                          | 8.6             | 9.6             | 10.7            | 12.2            | 13.6            | 15.0            | 16.6            | 18.6            | 20.6            | 23.2 | 25.7 | 28.7 | 31.7 | 35.0 | 38.6 | 42.6 | 47.0 | 52.5 |      |
| 355                        | 8.7                          | 9.7             | 10.8            | 12.0            | 13.7            | 15.2            | 17.0            | 18.8            | 20.9            | 23.1            | 26.2 | 29.0 | 32.3 | 35.7 | 39.5 | 43.6 | 48.0 | 52.9 | 59.2 |      |

Amendment No. 2 to IS 4984 : 2016

Table 4 (Concluded)

| SDR →                      | SDR 41                       | SDR 33          | SDR 26          | SDR 21          | SDR 17          | SDR 13.6        | SDR 11          | SDR 9           | SDR 7.4         | SDR 6           |       |       |       |       |       |       |       |       |       |       |
|----------------------------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grade                      | Nominal Pressure (PN)<br>Bar |                 |                 |                 |                 |                 |                 |                 |                 |                 |       |       |       |       |       |       |       |       |       |       |
| PE 63                      | PN 2                         | PN 2.5          | PN 3.2          | PN 4            | PN 5            | PN 6            | PN 8            | -               | -               | -               |       |       |       |       |       |       |       |       |       |       |
| PE 80                      | PN 2.5                       | PN 3.2          | PN 4            | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           |       |       |       |       |       |       |       |       |       |       |
| PE 100                     | PN 3.2                       | PN 4            | PN 5            | PN 6            | PN 8            | PN 10           | PN 12.5         | PN 16           | PN 20           | -               |       |       |       |       |       |       |       |       |       |       |
|                            | Wall Thicknesses             |                 |                 |                 |                 |                 |                 |                 |                 |                 |       |       |       |       |       |       |       |       |       |       |
| Nominal<br>OD, $d_n$<br>mm | $e_{Min}$<br>mm              | $e_{Max}$<br>mm | $e_{Min}$<br>mm | $e_{Max}$<br>mm | $e_{Min}$<br>mm | $e_{Max}$<br>mm | $e_{Min}$<br>mm | $e_{Max}$<br>mm | $e_{Min}$<br>mm | $e_{Max}$<br>mm |       |       |       |       |       |       |       |       |       |       |
| (1)                        | (2)                          | (3)             | (4)             | (5)             | (6)             | (7)             | (8)             | (9)             | (10)            | (11)            | (12)  | (13)  | (14)  | (15)  | (16)  | (17)  | (18)  | (19)  | (20)  | (21)  |
| 400                        | 9.8                          | 10.9            | 12.2            | 13.6            | 15.4            | 17.1            | 19.1            | 21.2            | 23.6            | 26.1            | 29.5  | 32.6  | 36.4  | 40.2  | 44.5  | 49.1  | 54.1  | 59.7  | 66.7  | 73.5  |
| 450                        | 11.0                         | 12.2            | 13.7            | 15.2            | 17.4            | 19.3            | 21.5            | 23.8            | 26.5            | 29.3            | 33.1  | 36.6  | 41.0  | 45.2  | 50.0  | 55.1  | 60.9  | 67.1  | 75.0  | 82.6  |
| 500                        | 12.2                         | 13.6            | 15.2            | 16.9            | 19.3            | 21.4            | 23.9            | 26.4            | 29.5            | 32.6            | 36.8  | 40.6  | 45.5  | 50.2  | 55.6  | 61.3  | 67.6  | 74.5  | 83.4  | 91.9  |
| 560                        | 13.7                         | 15.2            | 17.0            | 18.8            | 21.6            | 23.9            | 26.7            | 29.5            | 33.0            | 36.4            | 41.2  | 45.5  | 51.0  | 56.2  | 62.3  | 68.7  | 75.7  | 83.4  | 93.4  | 102.9 |
| 630                        | 15.4                         | 17.1            | 19.1            | 21.2            | 24.3            | 26.9            | 30.0            | 33.1            | 37.1            | 41.0            | 46.4  | 51.2  | 57.3  | 63.2  | 70.0  | 77.1  | 85.2  | 93.9  | 105.0 | 115.6 |
| 710                        | 17.4                         | 19.3            | 21.6            | 23.9            | 27.4            | 30.3            | 33.9            | 37.4            | 41.8            | 46.1            | 52.3  | 57.7  | 64.6  | 71.2  | 78.9  | 86.9  | 96.0  | 105.7 | 118.4 | 130.4 |
| 800                        | 19.6                         | 21.7            | 24.3            | 26.9            | 30.8            | 34.0            | 38.1            | 42.1            | 47.1            | 52.0            | 58.9  | 64.9  | 72.8  | 80.2  | 88.9  | 97.9  | 108.2 | 119.2 |       |       |
| 900                        | 22.0                         | 24.3            | 27.3            | 30.2            | 34.7            | 38.3            | 42.9            | 47.3            | 53.0            | 58.4            | 66.2  | 73.0  | 81.9  | 90.2  | 100.0 | 110.1 | 121.7 | 134.0 |       |       |
| 1000                       | 24.4                         | 27.0            | 30.4            | 33.6            | 38.5            | 42.5            | 47.7            | 52.6            | 58.9            | 64.9            | 73.6  | 81.1  | 91.0  | 100.2 | 111.2 | 122.5 |       |       |       |       |
| 1200                       | 29.3                         | 32.4            | 36.4            | 40.2            | 46.2            | 51.0            | 57.2            | 63.1            | 70.6            | 77.8            | 88.3  | 97.3  | 109.1 | 120.2 |       |       |       |       |       |       |
| 1400                       | 34.2                         | 37.8            | 42.5            | 46.9            | 53.9            | 59.4            | 66.7            | 73.5            | 82.4            | 90.8            | 103.0 | 113.4 |       |       |       |       |       |       |       |       |
| 1600                       | 39.1                         | 43.2            | 48.5            | 53.5            | 61.6            | 67.9            | 76.2            | 84.0            | 94.2            | 103.6           | 117.7 | 129.6 |       |       |       |       |       |       |       |       |
| 1800                       | 44.0                         | 48.5            | 54.6            | 60.2            | 69.3            | 76.4            | 85.8            | 94.5            | 105.9           | 116.6           |       |       |       |       |       |       |       |       |       |       |
| 2000                       | 48.8                         | 53.8            | 60.7            | 66.9            | 77.0            | 84.8            | 95.3            | 105.0           | 117.7           | 129.6           |       |       |       |       |       |       |       |       |       |       |
| 2250                       | 54.9                         | 60.5            | 68.2            | 75.2            | 86.6            | 95.4            | 107.2           | 118.1           |                 |                 |       |       |       |       |       |       |       |       |       |       |
| 2500                       | 61.0                         | 67.2            | 75.8            | 83.5            | 96.2            | 106.0           | 119.1           | 131.2           |                 |                 |       |       |       |       |       |       |       |       |       |       |

NOTES

1 1 Bar = 0.1 MPa = 1 N/mm<sup>2</sup>.

2 Tolerances on wall thicknesses are calculated from  $(0.1 e_{Min} + 0.1)$  mm rounded up to the next 0.1 mm.

3 For practical reasons, a minimum wall thickness of 2.0 mm is recommended.

4 All pressure ratings are calculated at 27 °C and rounded up to nearest pressure class.

5 Considering operational problems, maximum wall thickness of pipes is considered around 130 mm.

NOTES

- 1 Bar = 0.1 MPa = 1 N/mm<sup>2</sup>.
- 2 Tolerances on wall thicknesses are calculated from  $(0.1 e_{Min} + 0.1)$  mm rounded up to the next 0.1 mm.
- 3 For practical reasons, a minimum wall thickness of 2.0 mm is recommended.
- 4 All pressure ratings are calculated at 27 °C and rounded up to nearest pressure class.
- 5 Considering operational problems, maximum wall thickness of pipes is considered around 130 mm.

(Page 7, clause 8.3) — Substitute the following for the existing clause:

### ‘8.3 Carbon Black Content and Dispersion

When tested from a composite sample of minimum three pipes, in accordance with IS 2530, the carbon black content shall be within  $2.5 \pm 0.5$  percent. When tested from a composite sample of minimum three pipes, the carbon black dispersion shall meet the requirement of 5.4.6 of IS 7328.’

(Page 7, clause 8.7) — Substitute the following for the existing clause:

### ‘8.7 Density

When tested from a composite sample of minimum three pipes as per IS 7328, the base (corrected) density of pipes shall be between  $940 \text{ kg/m}^3$  and  $960 \text{ kg/m}^3$  and the same shall not differ from the density of the resin as specified by the resin manufacturer by more than  $3 \text{ kg/m}^3$ .

(Page 7, clause 8.8, line 3) — Substitute ‘110 mm diameter and SDR 11’ for ‘110 mm Dia/SDR 11’.

(Page 7, clause 8.8, Note) — Substitute the following for the existing note:

‘NOTE — If 110 mm and SDR 11 pipes are not being manufactured, test shall be carried out on the nearest, preferably higher size of SDR 11 pipe being manufactured. If pipe sizes only below 90 mm are manufactured, the test is not required, however, in such cases, a test certificate from the raw material (resin) supplier for establishing conformity to the above requirement for 110 mm and SDR 11 pipe shall be provided.’

(Page 7, clause 8.9) — Substitute the following for the existing clause:

### ‘8.9 Tensile Properties

When tested in accordance with Annex H with test parameters as per Table 6, the yield strength and elongation at break shall be as follows:

- Yield strength : 15 MPa, *Min*
- Elongation at break : 350 percent, *Min*

(Page 7, clause 8.10, line 4) — Delete the word ‘preferably’.

(Page 7, clause 8.10) — Substitute the following for the existing clause:

‘8.10 When subjected to test parameters as given below and tested in accordance with the procedure given in Annex E, the notched test specimens prepared from 110 mm SDR 11 pipe in accordance with Annex J shall show no signs of localized swelling, leakage or weeping and shall not burst during the prescribed test period.

| Test<br>Temperature<br>°C | Test Duration<br>h | Internal Test Pressure, Min<br>(or Induced Hoop Stress, Min) |           |            |
|---------------------------|--------------------|--------------------------------------------------------------|-----------|------------|
|                           |                    | MPa                                                          |           |            |
|                           |                    | PE 63                                                        | PE 80     | PE 100     |
| (1)                       | (2)                | (3)                                                          | (4)       | (5)        |
| 80 ± 1                    | 500                | 0.64 (3.2)                                                   | 0.8 (4.0) | 0.92 (4.6) |

8.10.1 If 110 mm SDR 11 pipes are not being manufactured, the test shall be carried out on the nearest higher size SDR 11 pipe being manufactured with test parameters as given in 8.10.

#### NOTES

1 The test is applicable to pipes of wall thickness greater than 5 mm.

2 If pipe sizes only below 63 mm are manufactured, the test is not required, however, in such cases, the test certificate from the raw material (resin) supplier for establishing conformity to the above requirement for 110 mm and SDR 11 pipe will suffice.

## Amendment No. 2 to IS 4984 : 2016

3 In case SDR 11 pipes are not manufactured, the internal test pressure values shall be calculated using the formula given in 3.18 (considering pressure reduction coefficient,  $f_r$  as 1) for an induced hoop stress of 3.2 MPa, 4.0 MPa and 4.6 MPa for PE 63, PE 80 and PE 100 pipes, respectively.

(Page 8, clause 9.1.1, third sentence) — Substitute the following for the existing sentence:

‘Even if no change is envisaged, type test shall be done at least once during the validity period as mentioned in 9.1.5.’

[(Page 8, clause 9.1.5 (see also Amendment No. 1)] — Substitute the following for the existing:

‘9.1.5 At the end of the validity period [normally one year for internal pressure creep rupture test at 27 °C for 100 h and internal pressure creep rupture test (hydrostatic resistance test) for joints at 80 °C for 48 h, five years for internal pressure creep rupture test (hydrostatic resistance test) at 80 °C for 1 000 h, and two years for all other type tests] or earlier, as may be necessary, the testing authority may call for fresh samples for type test for the purpose of type approval.’

[Page 8, Table 7, Sl No. (v), col 2] — Substitute ‘1 000 h’ for ‘1 000 h test’.

[Page 10, clauses 10.1.1 and 10.1.1.1 (see also Amendment No. 1)] — Substitute the following for the existing clauses:

‘10.1.1 The marking on the pipe shall carry the following minimum information:

- Manufacturer’s name/trade mark;
- Pipe designation as per 6.1; and
- Lot number/Batch number containing information of date of manufacture.

10.1.1.1 The lot number/batch number shall include the details of production in the following manner:

| Year | Month | Day | Machine No. | Shift |
|------|-------|-----|-------------|-------|
| XXXX | XX    | XX  | XXX         | X     |

(Page 10, clauses 10.2) — Substitute the following for the existing clause:

### ‘10.2 BIS Certification Marking

PE pipe for water supply conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and each PE pipe for water supply may be marked with the Standard Mark.’

(Page 11, clause B-2) — Substitute the following for the existing clause:

‘A sample from the pipe shall be taken by use of a core drill directed radially through the pipe wall. In case of PE granules, the sample shall be taken in a manner to avoid voids. The diameter of the sample in both the above cases shall be just less than the inner diameter of the sample pan of the thermal analyzer, and care should be taken not to overheat the sample during the coring/cutting operation. Using a scalpel, cut the test pieces that weigh  $15 \pm 0.5$  mg in the form of discs from the inner and outer surfaces of the cored sample. These samples are to be tested with the original surface facing upward.

NOTE — If the purchaser wants to check the characteristics of the base material, the sample should be obtained by cutting a middle-section disc by removing the outer and inner surfaces.’

(Page 11, clause B-3, para 1, line 4) — Insert ‘,’ between ‘made’ and ‘the’.

(Page 12, clause B-3, para 2, line 2) — Insert ‘and’ between ‘pan’ and ‘an’.

(Page 12, clause B-3, para 2 and para 3) — Substitute ‘thermogram’ for ‘thermograph’.

(Page 16, clause G-1, para 2, first sentence) — Insert the following sentence at the end:

‘A ductile failure will be the one which is a gradual failure with significant plastic deformation before rupture. A brittle failure will be the one with abrupt/sudden failure.’

[Page 20, Table 14, Sl No. (iv), col 4] — Substitute ‘ $6 \pm 0.4$ ’ for ‘ $6+0-0.4$ ’.

(Page 19, Annex H, Title) — Substitute the following for the existing title:

## ‘DETERMINATION OF YIELD STRESS AND ELONGATION AT BREAK’.

[Page 22, clause H-5(a), second sentence] — Substitute the following for the existing sentence:

‘Calculate the minimum initial cross-sectional area,  $A$ .’

[Page 22, clause H-5(d)] — Insert the following at the end:

‘Also, record the load at yield point (steady load),  $F$ , which is the point from where the elongation of the test piece continues without any increase in the load.’

[Page 22, clause H-6 (see also Amendment No. 1)] — Substitute the following for the existing clause:

### ‘H-6 EXPRESSION OF RESULTS

#### H-6.1 Elongation at Break

Calculate, for each test piece, the elongation at break, using the following formula:

$$E = \frac{L_1 - L_0}{L_0} \times 100$$

Where,

$E$  = elongation at break, expressed as a percentage;

$L_0$  = initial gauge length of the test piece, expressed in mm; and

$L_1$  = gauge length at rupture/break, expressed in mm.

The average value (arithmetic mean) of the elongation at break of the three test pieces shall be obtained and reported.

#### H-6.2 Yield Stress

Calculate for each test piece, the yield stress on the basis of the minimum initial cross-sectional area of the test piece, using the following formula:

$$\sigma_y = \frac{F}{A}$$

where,

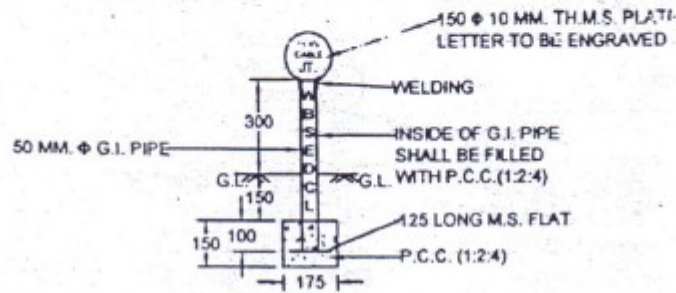
$\sigma_y$  = tensile stress at yield, in MPa;

$F$  = force at yield, in N; and

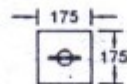
$A$  = minimum initial cross-sectional area of the test piece, in mm<sup>2</sup>.

NOTE — The yield stress should, in fact, be calculated using the cross-sectional area of the test piece at yield, but for reasons of convenience, the initial cross-sectional area is used.

The average value (arithmetic mean) of the tensile strength of the three test pieces shall be obtained and reported. The result should be expressed to three significant figures.’



**ELEVATION**

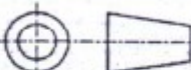


**PLAN**

**NOTES:**

1. ALL DIMENSIONS ARE IN MM.
2. ONLY FIGURE DIMENSION SHOULD BE FOLLOWED
3. THIS DRAWING SUPERSEDES DRAWING NO. -  
PLN(D)/CABLE/ 04 AND PLN(D)/CABLE/ 05

IN CASE OF ANY CONFUSION PLEASE CONSULT DIST. P. & E. DEPT.

|           |                                                                                             |                                     |                                                                                       |
|-----------|---------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|
| REVISIONS |  WBSEDCL | DISTRIBUTION HQ.                    |                                                                                       |
|           |                                                                                             | PLANNING AND ENGINEERING DEPARTMENT |                                                                                       |
|           | DETAILS OF MARKER FOR 11KV CABLE JOINT                                                      |                                     |                                                                                       |
|           | DRAWN BY :                                                                                  | Bm 01.05.2015<br>S.A.E.(C)          |  |
|           | DESIGNED BY:                                                                                | A. K. S. 05.15.<br>D.E.(C)          |                                                                                       |
|           | CHECKED BY:                                                                                 | J. Majumdar 05.05.15<br>S.E.(C)     | DRAWING NO.<br>PLN(D)/SS/107                                                          |
|           | RECOMMENDED BY:                                                                             | Blankinbora 05.05.15<br>A.S.E.(C)   | SCALE:<br>AS STATED                                                                   |
|           | APPROVED BY:                                                                                | S.S. 15<br>A.C.E. (Dist P & E)      | DATE:<br>05.05.2015                                                                   |
|           |                                                                                             |                                     | SHEET NO.<br>1 OF 1                                                                   |
|           |                                                                                             |                                     | REV. NO.<br>0                                                                         |

Annexure-"S"

## Detail Scope of work for Micro- Tunnelling with HDPE pipe for Underground cable laying

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | The Micro-Tunnelling work with HDPE Pipe of requisite sizes (160 mm. or 200mm.dia. as per IS: 4984-1995) by Horizontal Direct drilling( H.D.D) methord may be done for laying of different sizes of underground cables along the route for main crossing point of NH/ SH/ Metal road, Railway, River/ Canal, Other pipelines/ installations of different utilities as per direction of Engineer-In Charge. (Cost of all materials, labour, hiring charges of tools, plants, machineries etc., transportations, incidentals are to to be borne by the contractor) |
| 2  | Ground penetrating Radar survey along the proposed Micro-Tunnelling route for identification of underground services is to be adopted during Micro-tunnelling work                                                                                                                                                                                                                                                                                                                                                                                               |
| 3  | Requisite safe drilling inspection pits and test pits, where ever necessary, are to be executed during Micro-tunnelling work                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4  | Guided boring/ drilling Technology is to be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 5  | In horizontal and vertical boring system should be capable up to 10 m below ground level                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6  | Depth of boring should be as to clear any underground utilities/ obstructions. Minimum depth of boring for road crossing should be 1.65m from the crust level of road. The micro -Tunneling should be at least 2 m below the design bed level of the Channel/ Canal                                                                                                                                                                                                                                                                                              |
| 7  | Radio or any other detection system should be used for avoiding damage to existing underground utilities like electric cables, water pipe lines, sewerage line, Telcom copper cables, Optical fibres, Gas pipe lines etc.                                                                                                                                                                                                                                                                                                                                        |
| 8  | The record of depth of laying HDPE pipe through Micro-Tunnelling below the canal / road/ Railway/ other utilities should be maintained at an interval of 5m.                                                                                                                                                                                                                                                                                                                                                                                                     |
| 9  | Necessary data from the appropriate different authorities for crossing point are to be obtained for Micro-Tunnelling work with the assistance of WBSedcl                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10 | Proposed Micro-Tunnelling diagram with land mark along with depth profile are to be submitted for obtaining approval from the respective utilities before execution. After execution of Micro-Tunnelling work route profile are to be submitted for record.                                                                                                                                                                                                                                                                                                      |



-----End of TSC-----



# **West Bengal State Electricity Distribution Company Limited**

(A Govt. of West Bengal Enterprise)

**Office of the Regional Manager**

Birbhum Region

3<sup>rd</sup> Floor, Commercial Complex, Suri, Birbhum, Pin: 731101

e-mail: rm.birbhum@wbsedcl.in

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## **SECTION-VI** **ANNEXURES**



# West Bengal State Electricity Distribution Company Limited

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## ANNEXURE-I

PROFORMA FOR UNDERTAKING TO BE SUBMITTED BY THE BIDDER (For genuineness of the information furnished on-line and authenticity of the documents produced before Tender Committee for verification in support of his eligibility)

I, \_\_\_\_\_, Partner/Legal Attorney/Accredited representative of M/S \_\_\_\_\_, solemnly declare that:

1. We are submitting Tender for the Work \_\_\_\_\_ against Tender Notice No. \_\_\_\_\_ Dated \_\_\_\_\_
2. None of the Partners of our firm is relative of employee of W.B.S.E.D.C.L.
3. All information furnished by us in respect of fulfillment of eligibility criteria and qualification information of this Tender is complete, correct and true.
4. All documents/credentials submitted along with this Tender are genuine, authentic, true and valid.
5. If any information and document submitted is found to be false/incorrect any time, department may cancel my Tender and action as deemed fit may be taken against us, including termination of the contract, forfeiture of all dues including Earnest Money and banning/delisting of our firm and all partners of the firm etc.

**Signature of the Tenderer**

Dated \_\_\_\_\_



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## ANNEXURE-II

Format of Letter of Bid

LETTER HEAD OF BIDDER (AS ENROLLED ONLINE ON e-tendering PORTAL OF NIC)

To,  
The Tender Committee

Sub: Letter of Bid for the work

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Ref: 1. NIT No. \_\_\_\_\_ dated \_\_\_\_\_

2. Tender Id No. \_\_\_\_\_

Dear Sir,

We offer to execute the work as per our offered bill of quantity in accordance with the conditions of the NIT document as available in the website. The details of the EMD being submitted by us has been furnished on-line.

This Bid and your subsequent Letter of Acceptance/Work Order shall constitute a binding contract between us.

We hereby confirm our acceptance of all the terms and conditions of the NIT document unconditionally.

**Signature of the Tenderer**

Dated \_\_\_\_\_



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## ANNEXURE-III

Dated: \_\_\_\_\_

### DECLARATION BY THE TENDERER

I/We have inspected the site of work and have made myself/ourselves fully acquainted with local conditions in and around the site of work. I /We have carefully gone through the Notice Inviting Tender and other tender documents mentioned therein. I/We have also carefully gone through the 'Bill of Quantities'.

My/Our tender is offered taking due consideration of all factors regarding the local site conditions stated in this Detailed Notice Inviting Tender to complete the proposed construction in all respects.

I/We promise to abide by all the stipulations of the contract documents and carry out and complete the work to the satisfaction of the department.

I/We also agree to procure tools and plants, at my/our cost required for the work.

\_\_\_\_\_  
Signature of Tenderer

\_\_\_\_\_  
Postal address of the Tenderer



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ANNEXTURE-A

## SPECIMEN COPY OF INDEMNITY BOND

(TO BE EXECUTED ON Rs 100/- Non judicial Stamp Paper)

BY THE PRESENT INDEMNITY BOND EXCUTED by me/us on this Day of..... I/We having Registered Office / residing at. (hereinafter called "OBLIGOR/OBLIGATOR" which expression shall mean and included my/our Successors legal representatives, assigns) do hereby binds myself / ourselves and also our Company/firm ..... after having the power to bind so with the promise and undertaking in favor of the West Bengal State Electricity Distribution Company Limited. a government Company within the meaning of sec.2(45) of the Companies act 2013 having registered office at BidyutBhavan, Block-DJ,Sector-II, Salt Lake City, Kolkata-700091( hereinafter called as OBLIGEE, which expression shall mean and include it's legal representative administrators assigns. WHEREAS OBLIGOR/OBLIGATOR has/have been awarded to execute the job/works under letter no. Dated .issued by the OBLIGEE/OBLIGATOR after having observing necessary formalities the details of which is described in the schedule given hereunder as per letter mentioned herein-above and whereas the said job/works will be/likely to be done in places covered under Employees' State Insurance Act(ESI) and / or the Employees Compensation Act (W.e. Act) and/or other laws relating to the Labour Management and Welfare. AND WHEREAS according to the condition of the contract the OBLIGOR / OBLIGATOR is under obligation to execute this Indemnity Bond before the commencement of actual execution and OBLIGOR/OBLIGATOR is aware that unless this Indemnity Bond is executed in accordance with the condition of contract before the actual execution in accordance with law the OBLIGEE shall have the power to deem that actual work has been started within the meaning of the contract before the execution of this Indemnity Bond NOW THIS INDENTUREWITNESS THAT I/We the OBLIGOR/OBLIGATOR do hereby undertake.

1. THAT the OBLIGEE shall not be held responsible for any type of accident which may take place during the course of work undertaken by the OBLIGOR/OBLIGATOR.
2. THAT the OBLIGOR/OBLIGATOR will take adopt all safety norms in respect of each and every workmenlabour personnel according to the rules or to the satisfaction of the OBLIGEE in all cases.
3. THAT the OBLIGOR/OBLIGATOR undertakes to engage only those labour worker or any other personnel whether skilled or unskilled or any other person whether in technical managerial or non-managerial or any other capacity in the area covered under Employees' State Insurance Act who has have insurance coverage within the meaning of Employees State Insurance Act and further undertakes NOT to engage any person in the area covered under the Employees State Insurance Act, who does/do has/have insurance coverage within the meaning of Employees State Insurance Act.
4. THAT the OBLIGEE further undertakes to engage only those labour worker, or any other personnel, whether skilled or unskilled, whether in technical, managerial or non-managerial or any other capacity in the area NOT covered under Employees' State Insurance Act who has insurance for the sum assured equivalent to the amount of Compensation under the Employees' Compensation Act in case of accidental death or inquiry and such insurance has been effected by the OBLIGEE.
5. THAT the OBLIGOR/OBLIGATOR undertakes/undertake to indemnify and keep harmless the OBLIGEE from all claims action proceedings and of risk damage danger to any person whether belonging to/or not belonging to OBLIGOR/OBLIGATOR.
6. THAT the OBLIGOR/OBLIGATOR shall keep harmless the OBLIGEE from all claims compensation damages any proceedings in respect of any of its employee/workmen under the Employees Compensation Act. Act or any other laws for the time being in force.
7. THAT if during the course of execution of work as stated in the letter mentioned hereinabove issued by the OBLIGEE, it is found that the OBLIGOR/OBLIGATOR has not complied with/ guidelines formalities within the meaning of Employees' State Insurance Act or Employees Compensation Act or any other laws relating to the Labour Welfare for the time being in force, and also has not observed the safety norms in accordance with the



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law to the satisfaction of the OBLIGEE the OBLIGEE shall have the right to stop the execution of work/job and the period of such stoppage shall continue till adequate safety and other compliance mentioned hereinabove under the labour welfare legislation have been observed and such period of stoppage shall not be taken into account for the calculation of the total period of completion of work for which the OBLIGOR/OBLIGATOR is responsible to complete the work/job and it will be deemed that discontinuance was due to default of OBLIGOR/OBLIGATOR.

8. THAT ,if at any time due to exigency, the OBLIGOR/OBLIGATOR i.e. the West Bengal State Electricity Distribution Company Limited as the Principal Employer, becomes liable to pay any such compensation mentioned hereinabove, whether on failure of the oblige or for any other reason , the OBLIGOR/OBLIGATOR shall have the right to recover the said amount from any amount receivable by OBLIGEE or any bank guarantee deposited or anything payable whether in connection with this contract or other contract by the OBLIGOR/OBLIGATOR to the OBLIGEE.

9. THAT the OBLIGOR/OBLIGATOR is/are aware and accept that for the persistent or repeated violation of any condition mentioned in this Indemnity Bond, the OBLIGEE shall have right to terminate the contract of work issued by the OBLIGEE to OBLIGOR/ OBLIGATOR.

.....  
Deponent

Witness:

1.....

2.....



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ANNEXTURE-B

## PROFORMA OF AGREEMENT

(TO BE EXECUTED ON Rs 100/- Non judicial Stamp Paper)

ARTICLES OF AGREEMENT made this .....Date of .....in the year.....between West Bengal State Electricity Distribution Company Limited having its Head Office at VidyutBhavan, Block DJ. Sector-II, Kolkata-700091 hereinafter referred to as the WBSEDCL (which expression shall unless excluded by or repugnant to the context be deemed to include its successors and assigns) of the ONE PART AND .....hereinafter referred to as 'CONTRACTOR' (which expression shall unless excluded by or repugnant to the context be deemed to include his heirs, executors, administrators, representatives and assigns) of the OTHER PART.

WHERE AS WBSEDCL invited tenders vide Tender Notice No..... Date..... (annexed hereto) for (Name of the work).....

AND WHERE AS in pursuance of such invitation for tenders the contractor submitted a tender vide no. .... dt..... which was opened on .....

The tender offer shall be in the custody of the WBSEDCL at present.

AND WHERE AS AFTER consideration of the tender submitted by the contractor with clarification(s), if any, WBSEDCL accepted the said tender submitted by the contractor and placed order no..... dt..... (annexed hereto)

NOW THEREFORE, the WBSEDCL and the Contractor agree as follows:

The contractor agrees to undertake the work of ..... as per Order No ..... dt..... referred to above.

The WBSEDCL agrees to pay the contractor as per the Order No.....dt..... referred to above.

Both the contractor and the WBSEDCL agree that for the purpose of jurisdiction of court in regard to any dispute arising out of this agreement, this agreement shall be deemed to have been executed within the jurisdiction of the original side of the High Court, Kolkata.

In witness whereof the parties have hereunder affixed their signature, on the day, the month and year written as above.

.....  
Contractor

Witness:

1.....

2.....

.....  
WBSEDCL

Witness:

1.....

2.....



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ANNEXTURE-C

## PROFORMA OF BANK GUARANTEE FOR BID GUARANTEE/SECURITY (The non-Judicial stamp paper of Rs.100.00 should be in the name of issuing bank)

Ref:.....

Bank Guarantee No.....

Date.....

To

The Regional Manager,

Birbhum Region Office

Super Market Complex, 3rd Floor,

Suri, District: Birbhum, Pin-731101

Dear Sirs,

In accordance with Invitation to bid under your Bid No..... M/s ..... having its Registered/Head Office at .....(hereinafter called the 'Bidder') wish to participate in the said Bid of ..... and you, as a special favour have agreed to accept a confirmed, irrevocable, without recourse and unconditional Bank Guarantee for an amount of ..... valid up to..... on behalf of Bidder in lieu of the Bid deposit required to be made by the bidder, as a Condition precedent for participation in the said Bid.

We, the ..... Bank (Name) at..... (Address) having our Head Office at.....guarantee and undertake to pay immediately on demand by West Bengal State Electricity Distribution Co. Ltd. the Amount of ..... (in words & figures) without any reservation, protest, demur and recourse. Any such demand made by said 'Owner' shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.

This Guarantee shall be irrevocable and shall remain valid up to and including .....\*

If any further extension of this guarantee is required, the same shall be extended to such required period (not exceeding one year) on receiving instruction from M/s ..... on whose behalf this guarantee is issued.

In witness where of the Bank, through its authorized office, has set its hand and stamp on this ..... day of .....2019.....at.....

### WITNESS

.....  
(Signature)

.....  
(Signature)

.....  
(Name)

.....  
(Name)

.....  
(Official Address)

.....  
(Official Address)

\*This date shall be 30 (thirty) days after the last date for which the bid is valid.



# West Bengal State Electricity Distribution Company Limited

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e-mail: rm.birbhum@wbsedcl.in

ANNEXTURE – D

## PROFORMA FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT FACILITIES (TO BE GIVEN BY BANKER OF BIDDER)

### BANK CERTIFICATE

This is to certify that M/S ..... (FULL NAME AND ADDRESS) who are submitting their Bid to .....against their tender specification vide Ref. No. .... and date .....is our customer for the past ..... years.

Their financial transactions with our bank have been satisfactory. They enjoy the following fund based and non-fund based limits including guarantees, L/S and other credit facilities with us against which the extent of utilization as on date is also indicated below:

| Sl. No. | TYPE OF FACILITY | SANCTIONED LIMIT AS<br>ON DATE..... | UTILIZATION AS ON<br>DATE ..... |
|---------|------------------|-------------------------------------|---------------------------------|
|         |                  |                                     |                                 |
|         |                  |                                     |                                 |

This letter is issued at the request of  
M/S .....

Sd/-

Name of Bank .....

Name of authorized Signatory .....

Designation .....

Phone No .....

Address .....



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ANNEXTURE-E

## PROFORMA OF BANK GUARANTEE FOR CONTRACT PERFORMANCE

(The non-Judicial stamp paper of Rs.100.00 should be in the name of issuing bank)

Ref:.....

Bank Guarantee No.....

Date.....

To,  
The Regional Manager,  
Birbhum Region Office  
Super Market Complex, 3rd Floor,  
Suri, District: Birbhum, Pin-731101

Dear Sir,

In consideration of West Bengal State Electricity Distribution Company Limited (herein after referred to as the "Owner" which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/S ..... with registered/Head office at..... (hereinafter referred to as "Contractor" which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns), a Contract issued by Owner's Letter of Award No..... Dated..... for.....(scope of work) and the same having been acknowledged by the Contractor, resulting in a Contract bearing No.....Dated.....Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equivalent to Rs..... being (10%)(Ten Percent) of the said value of the Contract to the Owner.

We ..... (Name & Address) having its Head Office at ..... (hereinafter referred to as the "Bank", which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Owner, on demand any or all monies payable by the Contractor to the extent of Rs.....as aforesaid at any time upto.....\* (day/month/year) without any demur, reservation, contest, recourse or protest and/or without any reference to this Contractor.

Any such demand made by the Owner on the bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall continue to be enforceable till the Owner discharges this guarantee.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under the guarantee from time to time to extend the time for performance or the Contractor. The Owner shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or any right which they might have against the contractor and to exercise the same at any time in any manner and either to enforce or to forbear to enforce any covenants, contained or implied in the Contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The Bank shall not be relieved of its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act of omission or commission on the part of the Owner or any other indulgences shown by the Owner or by any other matter or things whatsoever which under law would, but for this provision have the effect of relieving the Bank.



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The bank also agrees that the Owner at its option shall be entitled to enforce this guarantee against the Bank as principal debtor, in the first instance without proceedings against the Contractor and not withstanding any security or other guarantee the Owner may have in relation to the Contractor's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to Rs.....and it shall remain in force up to and including.....\*\*(day/month/year) and shall be extended from time to time for such period may be desired M/S ..... on whose behalf this guarantee has been given unless a demand or claim is lodged on us within and including ..... \*(day/month/year) we shall be discharged from all liabilities thereafter.

Dated this..... day of.....2017.....at .....

## WITNESS

.....  
(Signature )

.....  
(Signature )

.....  
(Name )

.....  
( Name )

.....  
(Official Address )

.....  
(Official Address )

Attorney as Power of Attorney No..... Date.....

**\*\* Till 3 (Three) months after the validity of the Bank Guarantee.**

**\* Up to 3(Three) months after the expiry of warranty/guarantee period.**

Notes :-

1. The Stamp Paper of appropriate value shall be purchased in the name of issuing Bank.

2. The sum shall be 10% (Ten Percent) of the Contract Price.

The Performance Bank Guarantee /Security Deposit Bank Guarantee shall be valid as per terms of contract. A period of 3(Three) months should be added as claimed period from the last date of validity of the Bank Guarantee.



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ANNEXTURE-F

## PROFORMA OF EXTENSION OF BANK GUARANTEE

(The non-Judicial stamp paper of Rs.100.00 should be in the name of issuing bank)

Ref:.....

Date:.....

To,  
The Regional Manager,  
Birbhum Region Office  
Super Market Complex, 3rd Floor,  
Suri, District: Birbhum, Pin-731101

Dear Sir,

Sub: Extension of bank Guarantee No..... for Rs..... favoring yourself, expiring on..... account of M/S..... in respect of Contract No..... Dated..... (hereinafter called original Bank Guarantee)

At the request of M/S ....., We ..... Bank, branch office at..... and having its Head Office at ..... do hereby extend our liability under the above mentioned Bank Guarantee No..... Dated..... for a further period of ..... (years/months) from ..... to expire on..... except as provided above, all other terms and conditions of the original bank guarantee No..... dated..... Shall remain unaltered and binding.

Please treat this as an integral part of the original bank guarantee to which it would be attached.

Yours faithfully,

For.....  
Manager/Agent/Accountant.....  
Power of Attorney No.....  
Dated.....

SEAL OF BANK

*NOTE: The non-judicial stamp paper of appropriate value shall be purchased in the name of the bank who has issued the Bank Guarantee.*



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ANNEXTURE-G

## COMMERCIAL DEVIATIONS

(For Two Part Tender)

Bidder's Name & Address :

To

.....

.....

.....

Dear Sirs,

Sub : Commercial Deviations for .....

The following are the Commercial Deviations and variations from and exceptions to the specifications and documents for the subject package. These deviations and variations are exhaustive. Except these deviations, the entire work shall be performed as per your specifications and documents.

| Volume /Clause | Reference /Page No. | As specified in the specification | Commercial deviation and variations to the |
|----------------|---------------------|-----------------------------------|--------------------------------------------|
|                |                     |                                   |                                            |
|                |                     |                                   |                                            |

Date :

Place :

(Signature).....

(Printed Name) .....

(Designation)... ..

(Common Seal) .....

**Note:** Continuation sheets of like size and format may be used as per Bidder's requirements and annexed to this schedule.



# West Bengal State Electricity Distribution Company Limited

(A Govt. of West Bengal Enterprise)

**Office of the Regional Manager**

Birbhum Region

3<sup>rd</sup> Floor, Commercial Complex, Suri, Birbhum, Pin: 731101

e-mail: rm.birbhum@wbsedcl.in

ANNEXTURE-H

## TECHNICAL DEVIATIONS

(For Two Part Tender)

**Tender Notice No. ....**

Bidder's Name & Address :

To

.....

.....

.....

Dear Sirs,

Sub : Technical Deviations for .....

The following are the Technical Deviations and Variations from and Exceptions to the specifications and documents for the subject package. These deviations and variations are exhaustive. Except these deviations, the entire work shall be performed as per your specifications and documents.

| Vol./Clause | Ref./Page No. | As specified in<br>the specification | Technical<br>deviation and<br>variations to the<br>specification |
|-------------|---------------|--------------------------------------|------------------------------------------------------------------|
|             |               |                                      |                                                                  |
|             |               |                                      |                                                                  |
|             |               |                                      |                                                                  |
|             |               |                                      |                                                                  |
|             |               |                                      |                                                                  |

Date :

Place :

(Signature) .....

(Printed Name) .....

(Designation) .....

(Common Seal) .....

### **Note**

1. Continuation sheets of like size and format may be used as per Bidder's requirements and annexed to this schedule.
2. The deviations and variations, if any, shall be brought out separately for each of the equipment and are to be submitted in five copies.



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Annexure-I

## Form-XII

(On the Bidder's Letterhead)

### Declaration of not being blacklisted/Debarred/Put on Holiday list

Certified that our Company, M/s

..... is not  
blacklisted/ debarred/ suspended or put on holiday list by any

Statutory/Regulatory/Government Authorities/ State Electricity Utility/ PSU in India.

It is certified that the information furnished above is true to the best of my knowledge and belief.

Bidders Name:

Signature of the Tenderer:

Designation:

Seal of the Company:

Date:



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Annexure-J

## **FORM-XIII**

**(On the Bidder's Letterhead)**

### **Self-declaration by Proprietor of the Bidding Company for not being blacklisted/Debarred/Put On Holiday list**

I hereby confirm and declare that, none of the other CONCERNS OF WHICH I AM A Proprietor /Managing Partner are blacklisted/ debarred/ suspended or put on holiday list by any Statutory/ Regulatory/ Government Authorities/ State Electricity Utility/ PSU in India. It is certified that the information furnished above is true to the best of my knowledge and belief.

Signature of the Proprietor:

Name:

Designation:

Seal of the Company:

Date:



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Annexure-K

## **FORM-XI**

**(On the Bidder's Letterhead)**

### **Declaration regarding no litigation against WBSEDCL**

We hereby declare that, no legal litigation/arbitration is pending/ongoing against WBSEDCL in any court/Forum against/by the bidder or its sister concern/Director/Partner/Proprietor. If it is found at any stage of tendering, our offer will be rejected and I/We don't have any objection on the same.

Bidders Name:

Signature of the Tenderer:

Designation:

Seal of the Company:

Date:

## Section VII

### Schedule of Work (B.O.Q.)

| Sr. No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Unit     | Quantity |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
| 1       | Survey of cable route as per guidance of site Engineer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MTR      | 6823     |
| 2       | Erection of double pole Str complete with all fittings w/o any insulator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NOS      | 2        |
| 3       | Fixing of Pin Insulator 33KV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | NOS      | 6        |
| 4       | H.T. STAYING COMPLETE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SET      | 6        |
| 5       | EARTHING COMPLETE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | NOS      | 4        |
| 6       | FIXING OF CAUTION BOARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NOS      | 1        |
| 7       | Microtunnelling work with laying of HDPE pipe as per instruction of site Engineer and as per site condition including supply of HDPE pipe as per IS: 4984 : 2016 including preparation and submission of As built drawing with 200mm Dia HDPE pipe, PE 100, PN-10.                                                                                                                                                                                                                                                                                                                                   | MTR      | 3171     |
| 8       | Excavation of soil for formation of trial hole having minimum size 1.1 x 0.5 x 1.2 M in total cable route as per specification and direction of the site Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                    | CUM      | 40       |
| 9       | Excavation Of soil by cutting metal road/Cement concrete/Brick Soling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CUM      | 1001     |
| 10      | Excavation of soil for formation of cable trenches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | CUM      | 1190     |
| 11      | Supply of kiln burnt brick                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NOS      | 76692    |
| 12      | Laying of bricks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | NOS      | 76692    |
| 13      | Laying and dressing of 01 No. Cable 45KV Gr., 3C X 400 Sqmm XLPE Cable In pacca trench/ excavated trench.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | MTR      | 7009     |
| 14      | Arrangement for termination joint. Jointing kit for end termination joint will be supplied by WBSEDCL and the work of jointing will be done by WBSEDCL's own personnel or other agency. But necessary arrangements for properly covering top and all sides of jointing pits with tarpaulin/ Polythene sheet has to be made at the time of jointing. Also required manpower is to be provided to help the cable jointer for straightening the cable at the joint location and re arrangement of cable loops until completion of jointing and necessary lighting arrangement is to be done if required | NOS      | 37       |
| 15      | Supply and erection of RCC cable markers on concrete foundation blocks for straight run as per specification and direction of the site Engineer.(Ref.Drg.no.PLN(D)/SS/128 Dt.23.06.2018)                                                                                                                                                                                                                                                                                                                                                                                                             | NOS      | 20       |
| 16      | Supply & fixing of GI pipe as per ISI of the 200MM dia for cable protection as per instruction of site engineer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MTR      | 48       |
| 17      | Raising of 45 KV grade, 1 nos 3 x 400 sq. mm. XLPE cable upto 40 metres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Nos (LS) | 12       |
| 18      | Earthing of cable armour by G.I. earth electrode of G.I Pipe 50 mm diameter and 3000 mm length with perforations of 12 mm dia holes@150 mm from each other at right angles along with type top cap & clamp.The clamp shall be 250 mm long, manufactured with 65 x 6 mm G.I flat and the electrode shall be inserted vertically in the bore hole of 300 mm dia in earth and G.I. Flat ( All materials to be supplied by the contractor)                                                                                                                                                               | NOS      | 6        |
| 19      | Making protective duct for Cable Joint complit as per WBSEDCLs Approved Drawing(Ref.Drg.no.PLN(D)/SS/127 Dt.23.06.2018)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NOS      | 25       |
| 20      | Fabrication & erection of Iron material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | KG (LS)  | 220      |
| 21      | Dismantling of ACSR 100Sqmm 3 Wire from line & Return to store                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | KM       | 2.904    |
| 22      | Dismantling of 9 mtr poles & return to store                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | NOS      | 24       |
| 23      | Dismantling of Rail poles(12.81mtrs) & return to store                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NOS      | 49       |
| 24      | Supply & Fixing of 33kv 400 sqmm O/D Cable Jointing Kit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NOS      | 12       |
| 25      | Supply & Fixing of 33kv 400 sqmm ST. THR Cable Jointing Kit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | NOS      | 25       |