



TENDER SPECIFICATION

BHEL : PSSR : ENR – SEZ : 2026–27 : PUR:107

FOR

**Limited Tender for Procurement of 32NB Medium Class
Galvanized Steel Pipes for Hand Rails at BHEL / 2x660 MW
Ennore SEZ STPP, Voyalur PO, Minjur, Ponneri Taluk,
Tamil Nadu – 601203.**

VOLUME-I BOOK- I

TECHNOCOMMERCIAL BID - Consists of Book- I & Book- II

Book- I Consists of

- Notice Inviting Tender
- Volume-IA: Technical Conditions of Contract

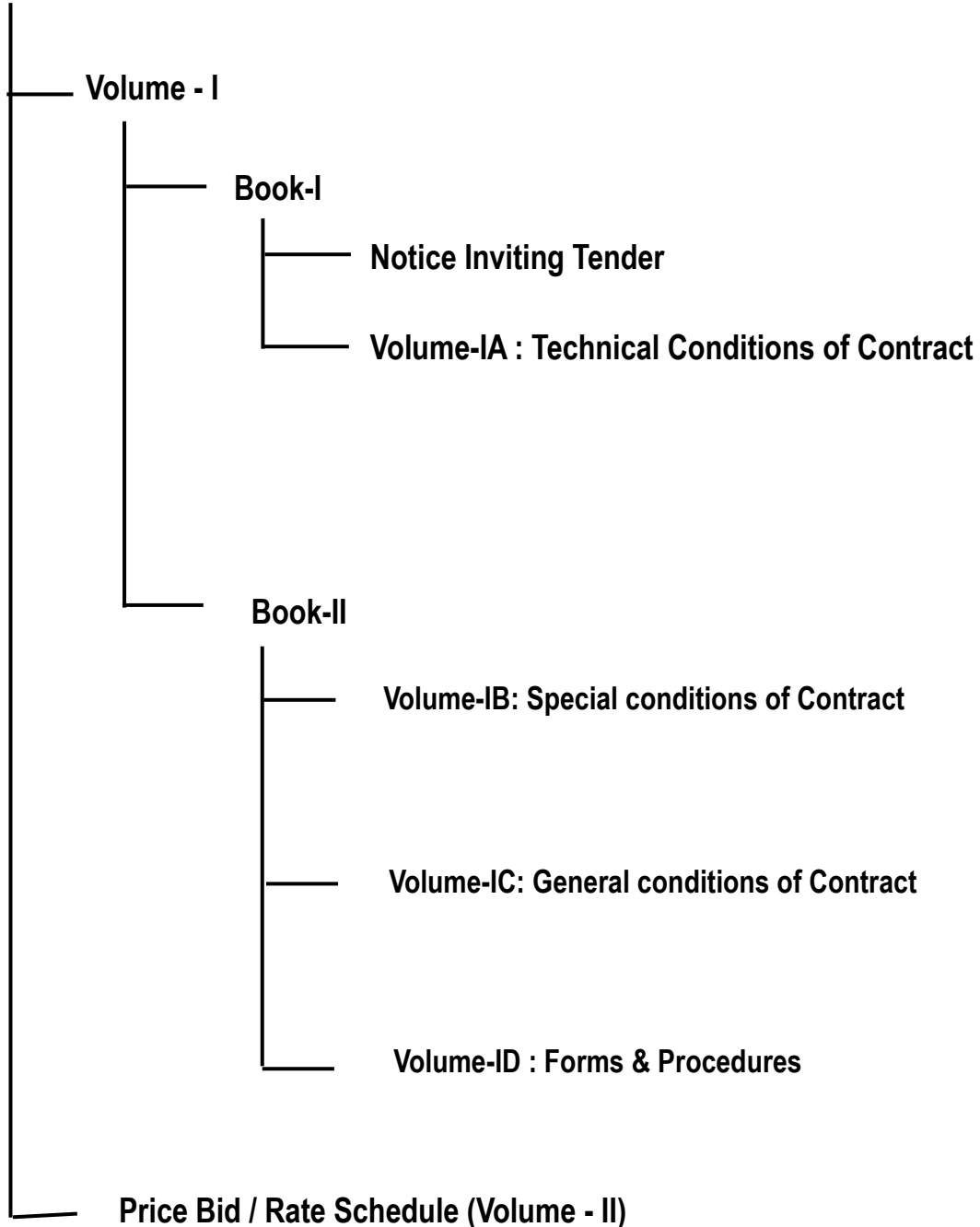
Book-II consists of

- Volume-IB : Special conditions of Contract,
- Volume-IC : General conditions of Contract
- Volume-ID : Forms & Procedures



TENDER SPECIFICATION CONSISTS OF

Tender Specification





Notice Inviting Tender : Procurement of 32NB Medium class Galvanized Steel Pipes for Hand Rails at BHEL / 2x660 MW Ennore SEZ STPP, Voyalur PO, Minjur, Ponneri Taluk, Tamil Nadu – 601203

NIT Ref No: BHEL:PSSR: ENR-SEZ:2026-27: PUR:107

Date: 22/04/2026

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited



Notice Inviting Tender : Procurement of 32NB Medium class Galvanized Steel Pipes for Hand Rails at BHEL / 2x660 MW Ennore SEZ STPP, Voyalur PO, Minjur, Ponneri Taluk, Tamil Nadu – 601203

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NOTICE INVITING TENDER

BHEL PSSR ENNORE SEZ SITE invites tender in Two Part - bid system (i.e. Technical Bid & Price bid - **thro' email**) for Procurement of 32NB Medium class Galvanized Steel Pipes for Hand Rails at BHEL / 2x660 MW Ennore SEZ STPP, Voyalur PO, Minjur, Ponneri Taluk, Tamil Nadu – 601203.

The Bidder shall submit the Price Bid (password protected) along with all signed and scanned documents should be sent to tender.ennore@bhel.in. Price bid must be sent with password protected mode in PDF and the **password shall be asked from bidder at the time of price bid opening.**

This is a **Limited Tender** and only the bidders already qualified by BHEL PSSR shall be eligible to participate.

1. Salient Features of NIT:

SL NO	ISSUE	DESCRIPTION	
i	TENDER NUMBER	BHEL: PSSR: ENR-SEZ:2026-27: PUR:107	
ii	Broad Scope of job	Procurement of 32NB Medium class Galvanized Steel Pipes for Hand Rails at BHEL / 2x660 MW Ennore SEZ STPP, Voyalur PO, Minjur, Ponneri Taluk, Tamil Nadu – 601203.	
iii	DETAILS OF TENDER DOCUMENT		
a	Volume-IA	Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.	Applicable
b	Volume-II	Price Bid (Rate Schedule).	Applicable
iv	BID / OFFER SUBMISSION START TIME	Start Date: 22/04/2026, Time : 12:00 Hrs	
v	DUE DATE & TIME OF OFFER SUBMISSION	Date : 29/04/2026 , Time : 11:00 Hrs Noon Place : The bidder should submit their offer through email at tender.ennore@bhel.in only. Bidders are requested to send their offer well in advance in order to avoid last minute congestion. Hard copy bids shall not be accepted.	
vi	OPENING OF PART-1 TECHNO-COMMERCIAL BID	Date : 29/04/2026 , Time : 17:00 Hrs Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidders who wish to be present to witness the tender opening may depute their authorised representative on the due date to BHEL Site Office, 2X660 MW Ennore SEZ STPP.	



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		(3) Bidders have to mail their Password to tender.ennore@bhel.in for opening the password protected pdf format Price Bid at least 15 mins before the scheduled date and time of Price Bid opening. Bidders to note that, in case of wrong password / no password received, the bid will not be considered for further evaluation. No further correspondence will be entertained in this regard.	
vii	EMD AMOUNT	NOT APPLICABLE	Not Applicable
viii	LAST DATE FOR SEEKING CLARIFICATION	Date: 28/04/2026 upto 14:00 Hrs Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: A V Gireesh Babu Designation: Sr Engineer Deptt: MM, SCT & Purchase Address: BHEL/Ennore SEZ STPP site Phone: 9442516865 Email : gireesh@bhel.in 2) Name: S Jeevan Prakash Designation: DGM Deptt: MM, SCT & Purchase Address: BHEL/Ennore SEZ STPP site Phone: 9442004609 Email : jeevanp@bhel.in	Applicable
ix	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc. to Tender Specifications will be informed through email (either from jeevanp@bhel.in or gireesh@bhel.in) only. Bidders to keep themselves updated with all such information. This also form part of tender hence the same shall be enclosed with their offer.	Applicable
x	Bids shall be addressed to	G.M. & P.D. / ENNORE SEZ, SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP, VOYALUR PO MINJUR PONNERI TALUK TAMIL NADU – 601 203	Applicable

- The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed, scanned and send through email at tender.ennore@bhel.in , as part of offer. **Rates / Price including discounts / rebates, if any, mentioned anywhere/ in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**
- Unless specifically stated otherwise, bidder shall deposit EMD and Security Deposit as per the procedure mentioned as below: -
Detailed Instruction Brochure for depositing EMD/SD through SBI e-collect is detailed given below:



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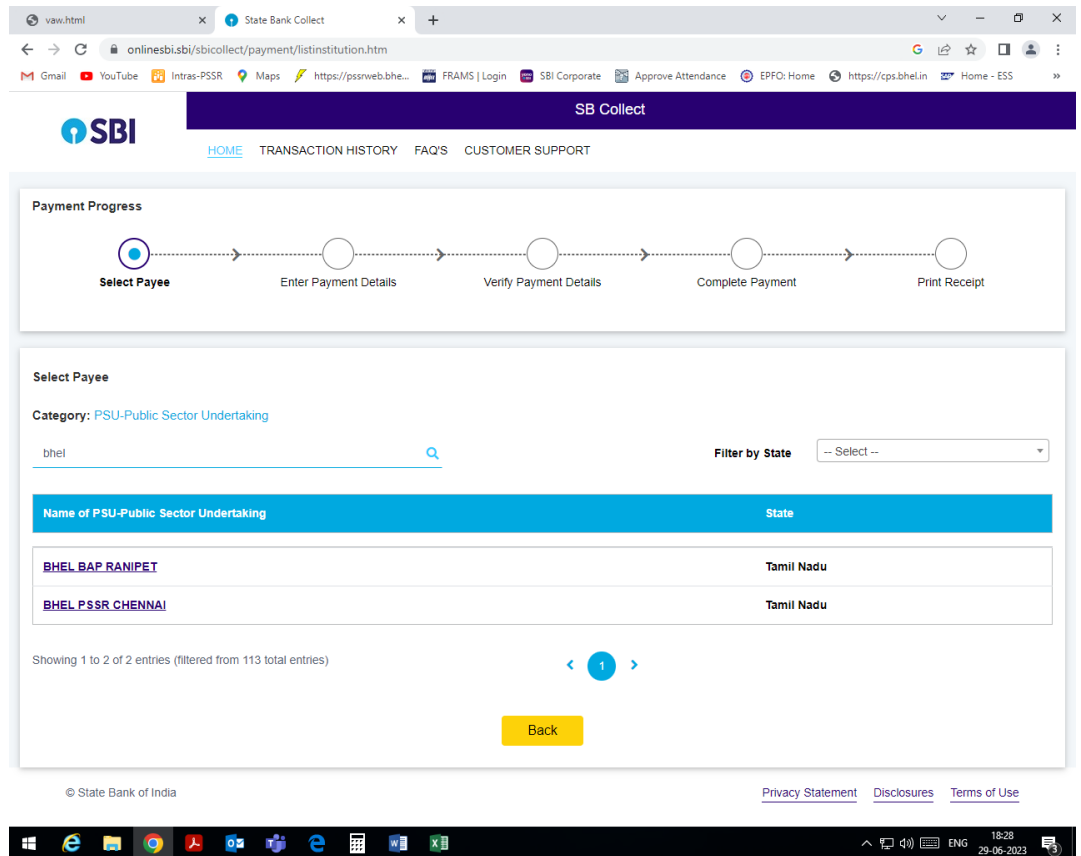
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Step 1: Vendors may visit SBI collect website, the URL of which is <https://www.onlinesbi.sbi/sbicollect> where they get the home page with various categories of institutions.

Step 2: Select PSU - Public Sector Undertakings – leading to a page with list of PSUs

Step 3: Type BHEL and search, they get to see all BHEL divisions wherein they shall select BHEL PSSR Chennai. The screen shot of the same is given below.



Step 4: Select EMD receipts. Having selected the Payee in the Payment Progress, it will lead to the payment details – a drop down list of values. From that list, vendors shall select EMD receipts. Upon clicking the entry EMD receipts, a form will open asking for the remitters details and the details of the tender.

Step 5: Confirm details and pay

Fill in all the details correctly, verify the details, and complete the payment as it is leading to the payment gateway.

Step 6: Take a printout on completing the payment and enclose the copy of the same along with the bid submission. Store the copy of receipt for future reference.

4. **Procedure of Submission of Tenders/ Bids:** This is an E-tender floated online through Email (either from gireesh@bhel.in or jeevanp@bhel.in). The bidder should respond by submitting their offer online through email at tender.ennore@bhel.in only. Offers are invited in two-parts only.



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- a) **Part – I – Techno-Commercial Bid:** All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in email, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format)

SL. No.	Description	Applicability for Tender
<u>i</u>	Proof of remittance of Earnest Money Deposit (EMD).	Not Applicable
<u>ii</u>	Signed & Stamped Copy of Notice Inviting Tender (NIT) & Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.	Applicable
<u>iii</u>	No Deviation Certificate (Signed & Sealed on <u>company's letter head</u>) Note: 1. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be attached along with document under sl no (i) & (ii) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. 2. BHEL reserves the right to accept / reject the deviations without assigning any reasons, and BHEL decision is final and binding. a. In case of acceptance of the deviations, appropriate loading shall be done by BHEL b. In case of unacceptable deviations, BHEL reserves the right to reject the tender.	Applicable
<u>iv</u>	Undertaking on company's letter head related to insolvency/ liquidation/ bankruptcy.	Applicable
<u>v</u>	Undertaking - Declaration confirming knowledge about Site conditions	Applicable
<u>vi</u>	Acceptance of UNPRICED Rate Schedule. (without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED'.	Applicable
<u>vii</u>	All Amendments / Correspondences / Corrigenda / Clarifications / Changes / Errata etc. pertinent to this NIT.	Applicable
<u>viii</u>	Duly filled-in annexures, formats etc. as required under this Tender Specification/ NIT.	Applicable
<u>ix</u>	Any other details preferred by bidder with proper indexing.	Applicable
<u>x</u>	Caution to Bidders: - The duly signed & stamped scanned copies of all above mentioned documents are to be sent at tender.ennore@bhel.in as Techno-commercial Bid.	

- b) **Part – II – Price Bid (Rate Schedule) - Volume – II consisting of the following shall be provided as mentioned below**



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- i) Prices are to be quoted in the attached Price Bid Format **Price Bid (Rate Schedule) – Volume - II**, duly filled, signed and password protected mode in PDF format only.
- ii) The price should be quoted for the accounting unit indicated in the tender document.
- iii) Note: It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- iv) A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- v) A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

NOTE : File (pdf) / Email size should be less than 25 MB.

DO NOT'S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable in place of email, the same shall not be considered. **Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.**

5. Deviation with respect to tender clauses and additional clauses / suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.
6. BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).
7. Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc., before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.
8. For any clarification on the tender document, the bidder may seek the same in writing or through e-mail as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
9. In the event of any conflict between requirement of any clause of this specification / documents / drawings / data sheets etc., or requirements of different codes / standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error / missing pages / other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting / submission of offer, else BHEL's interpretation shall prevail.



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10. Unless specifically mentioned otherwise, bidder's quoted price shall be deemed to be in compliance with tender including PBD.
11. Validity of the offer shall be for **Six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.
12. **Reverse Auction (RA):** BHEL shall be resorting to Reverse Auction (RA) (Guidelines for Reverse Auction – 2024 available elsewhere in this tender) for this tender. RA shall be conducted among all the techno-commercially qualified bidders.
Price Bids of all the techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.
13. On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.
14. The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.
15. **Consortium Bidding is not applicable for this tender.**
16. The bidder may have to produce original document for verification if so decided by BHEL.
17. Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page**".
18. Integrity commitment, performance of the contract and punitive action thereof:

18.1 Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

18.2 Commitment by Bidder/ Supplier/ Contractor:

- i. The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
- ii. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
- iii. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the prices or acts or omits in any manner



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which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extent guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

19.0 Micro and Small Enterprises (MSE) :

Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.032012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L 1 + 15% of margin of purchase preference [price band defined in relevant policy, such Seller(s) shall be given opportunity to match 1--1 price and contract will be awarded for 25% of total quantity.

- a) If LI bidder is MSE bidder, entire quantity will be given to such MSE bidder only.
 - b) In case of more than one such MSE, within the price band of L1 +15%, the supply shall be shared proportionately, provided the available quantum can be split.
 - c) Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.

Type under MSE	SC/ST owned	Women owned	Others (excluding SC/ ST & Women owned)
Micro			
Small			

Note: - If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category. MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21 (8)/201 1-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (I-JAM) & Acknowledgement or EM-II Certificate along with attested copy of a CA certificate (format enclosed as Annexure - 3) where deemed validity of EM-II certificate of five years has expired applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.



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Documents should be notarized or attested by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits

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

21.0 PREFERENCE TO MAKE IN INDIA:

For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local supplier/ Non- Local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent Orders issued by the Nodal Ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

22.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.

23.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

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

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

25.0 One Bid per Bidder

A Bidder shall submit only one bid in a particular bidding process. In case of a holding company having more than one subsidiary having common business ownership/ management, only one business entity amongst the holding company and its subsidiaries should quote for a particular tender. Similar restrictions shall apply to closely related sister companies. Bidder's sister/ Associated/ Allied concern(s) participating or applying against the same tender, shall lead to disqualification of Bidders. Sister/ Associated/ Allied concern means a company, society, partnership firm or proprietorship firm having one or more common persons as Director/ Partner/ Member/ Owner. A Bidder who submits more than one bid will cause all the proposals submitted in the particular bid to be disqualified.



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In relation to the above, a person will include firm(s) of Proprietorship / Partnership Firm /Limited Liability Partnership / Private Limited / Limited company / Society registered under Society's Act / Statutory Bodies / any other legal entity, as the case maybe, & will be deemed to have submitted multiple bids in a particular bid if a person bids in any of the two formats given below:

- i. individual or proprietorship format and/or
- ii. a partnership or association of persons format and/or
- iii. a company format

Whereby,

- A company shall for this purpose include any artificial person whether constituted under the Indian laws or of any other country.
- A person shall be deemed to have bid in a partnership format or in association of persons format if he is a partner of the firm which has submitted the bid or is a member of any association of persons which has submitted a bid.
- A person shall be deemed to have bid in a company format if the person holds:
 - i. more than 10% (ten percent) of the voting share capital of the company which has submitted a bid, or

ii. is a director and / or Key Managerial Personnel of the company which has submitted a bid, or

holds more than 10% (ten percent) of voting share capital in and/or is a director and / or Key Managerial Personnel of a holding company of that company which has submitted the bid.

By making a bid pursuant to the Tender Documents, the bidder / tenderer shall be deemed to have declared that the bidder / tenderer has not made any other bid or multiple bids as understood or deemed in terms of this clause.

All the bids of a bidder who has submitted multiple bids, as per the clause, shall be rejected. Bidder shall submit Declaration as per format provided in Annexure-11.

26.0 Conflict of interest

A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. **The bidder found to have a conflict of interest shall be disqualified.** A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- a) They have controlling partner (s) in common; **OR**
- b) They receive or have received any direct or indirect subsidy/ financial stake from any of them; **OR**
- c) They have the same legal representative/agent for purposes of this bid; **OR**
- d) They have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **OR**
- e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/Assemblies from one bidding manufacturer in more than one bid; **OR**



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f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf; and
2. Indian/foreign agent on behalf of only one principal;

Or

g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; **OR**

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business.

27.0 Order of Precedence:

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

- a. Amendments / Clarifications / Corrigenda / Errata etc. issued in respect of the tender documents by BHEL
- b. Notice Inviting Tender (NIT)
- c. Price Bid
- d. Technical Conditions of Contract (TCC)—Volume-IA

28.0 Modification / Deletions in Standard Clause of General Conditions of Contract (GCC) and Special Conditions of Contract (SCC)

Not Applicable

29.0 Suvidha Portal:

For goods / works / services on Indian Suppliers / Contractors: Irrespective of the value of the invoice amount, the supplier/ contractor should necessarily upload the invoice details on BHEL SUVIDHA portal at <https://suvidha.bhel.in/suvidha/>, prior to despatch/raising invoice. All documents as per contract checklist, along with additional documents (if any), must be uploaded on the portal. It is mandatory that tax invoices with a net amount (including taxes) exceeding Rs five lakhs uploaded on the portal are digitally signed using a Class 3 Digital Signature Certificate (DSC) issued by a licensed Certifying Authority. Submission of invoice document in hard copy is allowed for invoices with a net amount (including taxes) equal to and upto Rs five lakhs in case the requirement for digitally signed invoice is not explicitly mentioned in the contract checklist. The Invoice will not be accepted in absence of the above.

30.0 Grievance Redressal Mechanism

To promote transparency and ensure fair treatment of all bidders, a structured Grievance Redressal Mechanism is in place to address any concerns or issues arising during the tendering process or in subsequent business dealings with the company.



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Suppliers/Contractors are requested to follow the below escalation process for grievance resolution:

- 1. First Level:** Any grievance should initially be addressed to the designated Dealing Officer, whose contact details are provided in the Notice Inviting Tender (NIT)/Contract.
- 2. Second Level:** If the issue remains unresolved, it may be escalated by lodging a formal grievance through the SUVIDHA Portal: <https://suvidha.bhel.in/suvidha/>. Responses will be provided in accordance with the defined escalation matrix.”

31.0 TAXES AND OTHER DUTIES

31.1 Goods and service Tax (GST) & Cess

- 31.1.1 The **successful** bidder shall furnish proof of GST registration with GSTN Portal in the State in which the Project is being executed, covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work. If the Successful Bidder submits Invoice from a GST No. from outside the state where the project is being executed, then the Bidder shall furnish a declaration for the same in their Letter head, for the single supply of services/short term supply of services.
- 31.1.2 Contractor's price/rates shall be exclusive of GST & Cess (if applicable) (herein after termed as GST). Contractor shall submit to BHEL the GST compliant tax invoice/debit note/revised tax invoice on the basis of which BHEL will claim the input tax credit in its return. Since this is a works contract, the applicable rate shall be @ 18% GST, as applicable presently.
- 31.1.3 Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules wherein the 'Bill to' details will be as below:
- BHEL GSTN - 33AAACB4146P2ZL
GM & PROJECT DIRECTOR / ENNORE SEZ
BHARAT HEAVY ELECTRICALS LIMITED,
2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203**
- 31.1.4 GST charged in the tax invoice/debit note/revised tax invoice by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return.
- 31.1.5 In case BHEL has to incur any liability (like interest / penalty etc.) due to denial/reversal / delay of input tax credit in respect of the invoice submitted by the contractor, for the reasons attributable to the contractor, the same shall be recovered from the contractor.
- 31.1.6 Further, in case BHEL is deprived of the Input tax credit due to any reason attributable to contractor, the same shall not be paid or Recovered if already paid to the contractor.
- 31.1.7 Tax invoice/debit Note/revised tax invoice shall contain all such particulars as prescribed in GST law and comply to the timelines for issue of the same. Invoices shall be submitted on time to the concerned BHEL Engineer In-Charge.



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- 31.1.8 TDS under GST (if/ as & when applicable) shall be deducted at prevailing rates on gross invoice value from the running bills.
- 31.1.9 E-way bills / Transit passes / Road Permits, if required for materials / T&P etc., bought into the project site is to be arranged by the Contractor only.
- 31.1.10 BHEL shall not reimburse any amounts towards any interest / penalty etc., incurred by contractor. Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL.
- 31.1.11 Bidder Shall submit E-Invoice as per the GST Rules, if E-Invoicing has been enabled against their GSTIN No. Otherwise a Declaration may be submitted along with Invoice certifying that E-Invoicing is not enabled against their GSTIN No.
- 31.1.12 Bidder shall note that if the service which they are going to provide to BHEL is covered under RCM, then BHEL shall discharge the liability on RCM basis and no GST Payment will be released to the Bidder in any circumstances.

31.2 All taxes and duty other than GST & Cess

- 31.2.1 The contractor shall pay all (except the specific exclusion viz. GST & Cess) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

31.3 Statutory Variations

- 31.3.1 Statutory variations are applicable under the GST Acts, against production of proof. The changes implemented by the Central / State Government during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision are to be suitably paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.

31.4 New Taxes/Levies

- 31.4.1 In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

31.5 Direct Tax

- 31.5.1 BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act.

32.0 TCS (Tax collected at Source) under Income Tax Act.

If the vendor is mandated to collect the TCS from BHEL (for sale of Goods) as per the newly inserted sub section(1H) under Section 206C of the Income Tax Act, then the below conditions need to be adhered to:

- 32.1. Vendors should mention their TAN and PAN number in the Invoice submitted to BHEL.



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- 32.2. Where the tender conditions do not specify any pec on financial parameters, then the reimbursement of IT TCS to the Vendor can be made only on submission of below undertaking on yearly basis. "If we have made a total sale, gross receipts or turnover from our business carried exceeds ten crore rupees during the financial year_ (should be immediate preceding financial year)" And on submission of TCS paid challan and TCS certificate for the TCS payments made in the last quarter.
- 32.3. Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice.
- 32.4. PAN No of BHEL is AAACB4146P, same need to be considered by vendor while filing their TCS returns.
- 32.5. Vendor shall issue a TCS Certificate for the amount collected at source within the due dates as per the IT Act.
- 32.6. In event of failure to comply with the provisions of the Act or proper certificate was not issued or if tax collected, not remitted to the Government or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the Vendor towards non- compliance of statutory provisions from the money's due to them with applicable interest.

33.0 General Instruction for Bidder:

- a) Offer must be submitted strictly in line with Technical specification.
- b) Incomplete offer shall not be acceptable.
- c) Duly filled & signed with seal on all documents to be submitted along with offer.
- d) BHEL Site office, Ennore STPP, Voyalur PO Minjur, Ponneri Taluk reserve the right to get the services from more than one vendor.
- e) Please quote price in figures & words both. In case the prices quoted in words and figures are different, the value indicated in words will be considered for evaluation and establishing L1 status. Offers with deviations from terms and conditions of the tender may not be considered. Bidders shall also furnish 'No Deviation Certificate' (Format attached).
- f) BHEL reserves the right to accept or reject any of the bid/all bids with or without deviation, or cancel/withdraw the invitation for bid without assigning any reason whatsoever and in such case no bidder shall have any claim arising out of such action by BHEL.
- g) In case you are not quoting, please send your regret letter positively for our reference.
- h) Tender received after the specified time of their "SUBMISSION" will be treated as late tender and shall not be considered under any circumstances.
- i) Supplier shall quote for all the items in the enclosed price bid format.
- j) The Vendor should have registration under GST Act and should submit the registration certificate along with Quotation.
- k) Tenderers are requested to sign and put seal on all pages of tender documents and submit else their offer shall be liable for rejection.
- l) Bidders are required to ensure that all columns of the bid are duly filled in. If any incorrect rates or unusually low rates are quoted, offer is liable for rejection and no correspondence will be entertained in this regard.

For and on behalf of BHARAT HEAVY ELECTRICALS LTD

DGM / MM, SCT, Purchase & FEX
BHEL / 2 x 660 MW ENNORE SEZ STPP



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Enclosure:

1. Annexure-1: Check List.
2. Annexure-2: Offer Forwarding Letter
3. Annexure-3: Declaration by Authorized Signatory
4. Annexure-4: No Deviation Certificate
5. Annexure-5: Undertaking Regarding Insolvency/ Liquidation/ Bankruptcy Proceedings
6. Annexure-6: Declaration regarding Minimum Local Content In Line With Revised Public Procurement (Preference To Make In India), Order 2017 Dated 04th June, 2020) And Subsequent Order(s)
7. Annexure-7: Bank Account Details for E-Payment



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ANNEXURE - 1

CHECK LIST

**NOTE: - Tenderers are required to either fill in or submit separately the following details.
No column should be left blank.**

1	Name of the Tenderer		
	Address of the Tenderer		
2	Details about type of the Firm / Company		
3a	Details of Contact person for this Tender: Name: Mr. / Ms. Designation: Telephone No: Mobile No: E-mail ID: Fax No:		
3b	Details of alternate Contact person for this Tender: Name: Mr. / Ms. Designation: Telephone No: Mobile No: E-mail ID: Fax No:		
4	Validity of Offer	To be valid for six months from due date	
		Applicability (By BHEL)	Bidder's reply
5	Submission of Copy of PAN Card	Applicable	Yes / No
6	Submission of Copy of GST Certificate	Applicable	Yes / No
7	Whether all pages of the Tender documents including annexures, appendices etc., are read understood and signed	Applicable	Yes / No
8	Whether all pages of the offer documents are signed by the person authorized to sign this offer	Applicable	Yes / No
9	Submission of Offer Forwarding Letter (as per Annexure – 2)	Applicable	Yes / No
10	Submission of Declaration by Authorized Signatory (as per Annexure – 3)	Applicable	Yes / No
11	Submission of No Deviation Certificate (as per Annexure – 4)	Applicable	Yes / No



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12	Submission of Declaration confirming knowledge about Site Conditions (as per Annexure – 5)	Applicable	Yes / No
13	Submission of Undertaking regarding Insolvency/ Liquidation/ Bankruptcy Proceedings (as per Annexure - 6)	Applicable	Yes / No
14	Submission of Bank Account Details for E-Payment (as per Annexure – 7)	Applicable	Yes / No

NOTE:

1. Strike Off 'YES' OR 'NO', as applicable.
2. Formats for Annexure 1 to 7 mentioned at Sl. No.9 to 14 above, are enclosed with NIT
3. Tender not accompanied by the prescribed above applicable documents are liable to be summarily rejected.

DATE:

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)



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Date: 22/04/2026
Annexure-2

OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER

(To be typed and submitted in the Letter Head of the Company / Firm of Bidder)

Offer Reference No:

Date :

To,

**GENERAL MANAGER & PROJECT DIRECTOR,
SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203**

Dear Sir,

Sub : Submission of Offer against tender Specification No. _____

I / We hereby offer to carry out the work detailed in the Tender Specification issued by Bharat Heavy Electricals Limited, Power Sector Southern Region, Ennore SEZ, in accordance with the terms and conditions thereof.

I/We have carefully perused the following listed documents connected with the above work and agree to abide by the same.

1. Amendments/Clarifications/Corrigenda/Errata/etc issued in respect of the Tender documents by BHEL.
2. Notice Inviting Tender (NIT)
3. Price Bid
4. Technical Conditions of Contract
5. Special Conditions of Contract
6. General Conditions of Contract
7. Forms and Procedures

Should our Offer be accepted by BHEL for Award, I/we further agree to furnish 'Security Deposit for the work as provided for in the Tender Conditions with the stipulated time as may be indicated by BHEL.

I / We further agree to execute all the works referred to in the said Tender documents upon the terms and conditions contained or referred to therein and as detailed in the appendices annexed thereto.

I/We have deposited/depositing herewith the requisite Earnest Money Deposit (EMD) as per details furnished in the Check List.

Authorised Representative of Bidder

Signature : _____

Name : _____

Address : _____

Place: _____

Date: _____



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Date: 22/04/2026
Annexure-3

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

GENERAL MANAGER & PROJECT DIRECTOR,
SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203

Dear Sir,

Sub : **Declaration by Authorised Signatory**

Ref : 1) NIT/Tender Specification No:,
2) All other pertinent issues till date

I/We, hereby certify that all the information and data furnished by me with regard to the above Tender Specification are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations and all other pertinent issues till date, and agree to comply with the requirements and Intent of the specification.

I further certify that I am authorised to represent on behalf of my Company/Firm for the above mentioned tender and a valid Power of Attorney to this effect is also enclosed.

Yours faithfully,

(Signature, Date & Seal of Authorized Signatory of the Bidder)

Date:



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Date: 22/04/2026

Annexure-4

NO DEVIATION CERTIFICATE

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

**GENERAL MANAGER & PROJECT DIRECTOR,
SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203**

Dear Sir,

Sub : **No Deviation Certificate**

Ref : 1) NIT/Tender Specification No:,
2) All other pertinent issues till date

We hereby confirm that we have not changed/ modified/materially altered any of the tender documents as downloaded from the website/ issued by BHEL and in case of such observance at any stage, it shall be treated as null and void.

We also hereby confirm that we have neither set any Terms and Conditions and nor have we taken any deviation from the Tender conditions together with other references applicable for the above referred NIT/Tender Specification.

We further confirm our unqualified acceptance to all Terms and Conditions, unqualified compliance to Tender Conditions, Integrity Pact (if applicable) and acceptance to Reverse Auctioning process.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)



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Date: 22/04/2026

Annexure-5

DECLARATION CONFIRMING KNOWLEDGE ABOUT SITE CONDITIONS

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,
GENERAL MANAGER & PROJECT DIRECTOR,
SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203

Dear Sir,

Sub : **Declaration confirming knowledge about Site conditions**

Ref : 1) NIT/Tender Specification No:,
2) All other pertinent issues till date

I/We, _____ hereby declare and confirm that we have visited the Project Site as referred in BHEL Tender Specifications and acquired full knowledge and information about the Site conditions including Wage structure, Industrial Climate, the Law & Order and other conditions prevalent at and around the Site. We further confirm that the above information is true and correct and we shall not raise any claim of any nature due to lack of knowledge of Site conditions.

I/We, hereby offer to carry out work as detailed in above mentioned Tender Specification, in accordance with Terms & Conditions thereof.

Yours faithfully,

(Signature, Date & Seal of Authorized Representative of the Bidder)

Date : _____

Place: _____



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Date: 22/04/2026

Annexure-6

UNDERTAKING

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

GENERAL MANAGER & PROJECT DIRECTOR,
SITE OFFICE: BHEL, PSSR, 2X660 MW ENNORE SEZ STPP,
VOYALUR PO MINJUR PONNERI TALUK
TAMIL NADU – 601 203

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No:

I/We,

_____ declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/ authorities, which will render us ineligible for participation in this tender.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:

Date:



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Annexure-7

BANK ACCOUNT DETAILS FOR E-PAYMENT

(To be given on Letter head of the Company /Firm of Bidder, and **ENDORSED (SIGNED & STAMPED) BY THE BANK** to enable BHEL release payments through Electronic Fund Transfer (EFT/RTGS)

1. Beneficiary Name :
 2. Beneficiary Account No. :
 3. Bank Name & Branch :
 4. City/Place :
 5. 9 digit M ICR Code of Bank Branch :
 6. IFSC Code of Bank Branch :
 7. Beneficiary E-mail ID :
- (for payment confirmation)

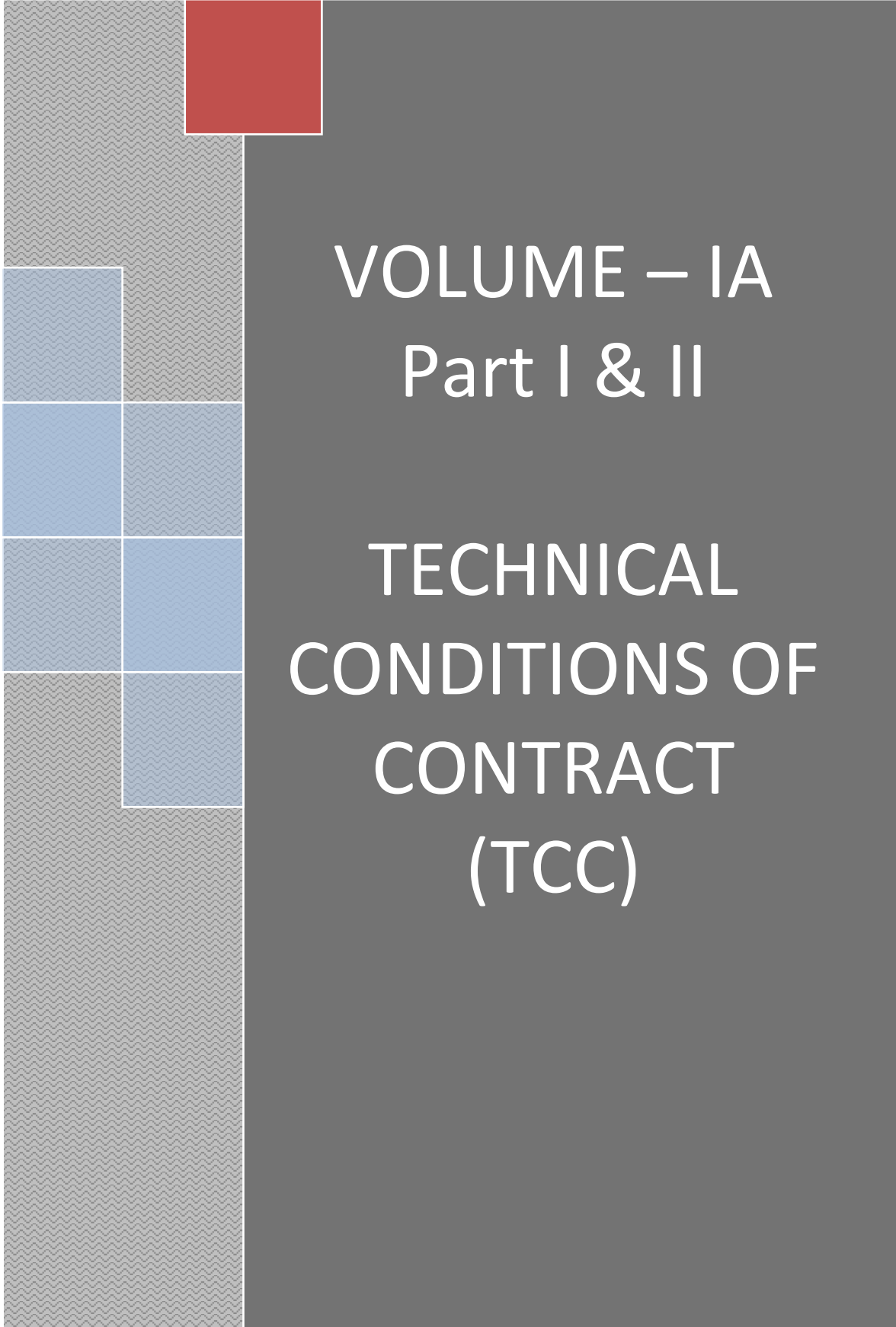
NOTE: In case Bank endorsed certificate regarding above has already been submitted earlier, Kindly submit photocopy of the same



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TECHNICAL CONDITIONS OF CONTRACT

SUPPLY OF 32NB GALVANISED MS PIPES FOR HANDRAIL

1. 32 NB Medium class steel tubes confirming to **IS 1161:2014** shall only be used for galvanization.
2. Galvanisation of steel tubes shall confirm to **IS 4736:1986**
3. The length of tubes supplied shall fall between 5 to 7 meter, and standard length shall be maintained for the complete lot of supply.
4. Delivery period shall be 45 days from the date of Purchase order.
5. Vendor has to declare the OEM of steel pipes in the technical bid.

SPECIAL CONDITIONS OF CONTRACT

SUPPLY OF 32NB GALVANISED MS PIPES FOR HANDRAIL

1. The supply tolerance shall be +/- 10% (Rates indicated are FOR- Basic + Freight) Supply Quantity tolerance plus side: +10% allowed and Minus side is admissible only if the item wise balance quantity is less than one truck load.
2. Scope of unloading - Unloading of the materials is in the scope of BHEL. However, Demurrages on account of delay in unloading due to improper packing, non- availability of proper dunnage, not adhering to the tender conditions and other reasons attributable to supplier shall be on supplier's accounts only. Prior despatch clearance shall be obtained from site.
3. Manufacturing of MS pipes shall confirm to **IS 1161:2014**, Steel tubes for structural purposes.
4. Galvanizing shall be strictly as per **IS 4736:1986** (Reaffirmed 1998).
5. Delivery period shall be 45 days from the date of PO.
6. Quoted rate shall include transportation to site. Responsibility of delivering material to the project site lies with the vendor. Necessary transit insurance, other statutory compliance, certifications, permits etc. are in the scope of vendor.
7. Manufacturer's Material Test Certificates has to be furnished along with Invoice & LR/RR.
8. Original TCs shall be made available for material inspection at site.
9. Material Warrantee – Free replacement of whole material in case of notification of defect/ Failure during testing the material at site with respect to the relevant IS Standards, within the periods of one year from TC/Invoice date, whichever is later.
10. Defective/ Failed material replacement – Supplier shall replace the defective/Failed material free of cost (inclusive of freight, material cost, taxes etc.) up to destination within one month from notification of defect/ Test failure.
11. Ordering quantity Tolerance - + / - 25% each item wise of tendered quantity.



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12. BHEL reserves the right at its own discretion, to cancel the Order or to place the order for part/ full quantity.

PAYMENT TERMS:

Type of Bidders	Payment Terms (No of Days)
Micro & Small Enterprises (MSEs)	45 Days
Medium Enterprises	60 Days
Non MSME	90 Days

DOCUMENTS TO BE SUBMITTED BY VENDOR

Documents to be submitted by Supplier along with Material:

- GST compliant Invoice – original+1 copy
- Inspection/ Test Certificate
- Guarantee/ Warrantee Certificate
- Shelf Life: Minimum 12 months

For Claiming Payments

- GST compliant Invoice – original+1 copy
- Inspection/ Test Certificate
- BHEL/ Store Acknowledged LR/SRV
- MDCC



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VOLUME - II

PRICE BID - RATE SCHEDULE

Sl. No.	Description of Material	Quantity Required	Unit Rate including packing, forwarding, Freight Charges (₹)	Total Rate including packing forwarding & Freight Charges (₹)	GST Rate (%)	GST Amount (₹)	Total Cost including Freight & GST
		(A)	(B)	(C) = (A) x (B)	(D)	(E)	(C) + (E)
1	Procurement of 32NB Medium class Galvanized Steel Pipes for Hand Rails	140 MT					
TOTAL COST INCLUDING FREIGHT & GST (Rs)							₹ _____/- Rs. _____ _____

NOTES:

1. All the above quoted rates shall be firm throughout the contract period.
2. The rate shall be entered in figure as well as in words.
3. Evaluation shall be done on overall lowest offer basis.

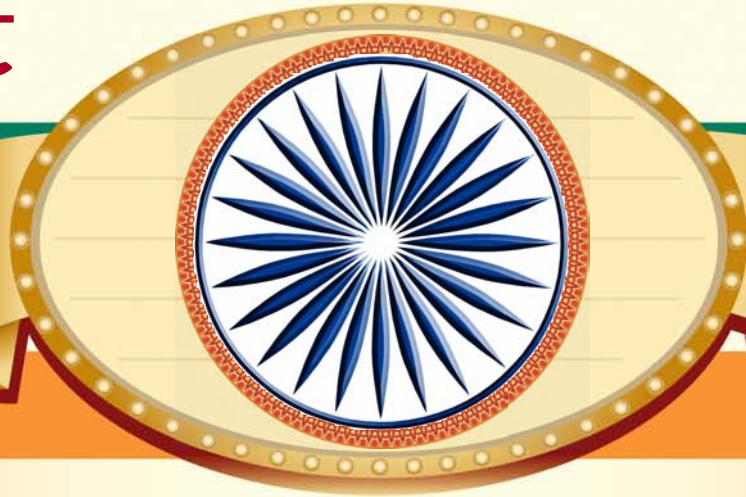
DATE:
PLACE:

SIGNATURE:
NAME OF SIGNATORY:
NAME OF BIDDER:
(SEAL OF THE BIDDER):

पंजीकृत कार्यालय : बीएचईएल हाउस, सिरी फोर्ट, नई दिल्ली - 110049 | फोन : 011-66337598 | ईमेल : contactus@bhel.in
Registered Office: BHEL HOUSE, Siri Fort, New Delhi - 110049 | Phone: 011-66337598 | E-mail: contactus@bhel.in
www.bhel.com
 BHELOfficial
 BHEL_India
 BHEL_India
 bhel.india
 company/bhel

इंटरनेट

मानक



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

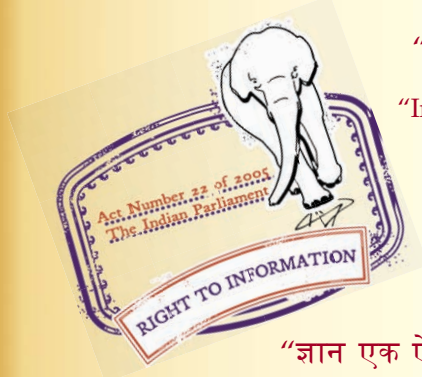
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 1161 (1998): Steel Tubes for Structural Purposes [MTD
19: Steel Tubes, Pipes and Fittings]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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भारतीय मानक
इस्पात नलिकाएँ संरचनात्मक उपयोगों के लिये — विशिष्टि
(चौथा पुनरीक्षण)

Indian Standard
STEEL TUBES FOR STRUCTURAL PURPOSES —
SPECIFICATION
(*Fourth Revision*)

First Reprint NOVEMBER 1998

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1958 and its first, second and third revisions were issued in 1963, 1968 and 1979 respectively. While reviewing the standard, the Committee has felt it necessary to revise this Indian Standard with the following modifications:

- a) Thickness and mass is aligned with IS 1239 (Part 1) : 1990.
- b) All amendments have been incorporated.

In the formulation of this standard, due consideration has been given to the trade practices followed in the country in this field. Due consideration has also been given to international co-ordination among the standards prevailing in different countries. Assistance has been derived from the following publications:

ISO/R 336 : 1976 Plain end steel tubes, welded or seamless; general table of dimensions and masses per unit length. International Organization for Standardization.

BS 6323 : 1982 Steel tubes for mechanical and general engineering purposes. British Standards Institution.

This standard contains clauses 8.1 and 12.1 which call for agreement between the purchaser and the manufacturer.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STEEL TUBES FOR STRUCTURAL PURPOSES — SPECIFICATION (Fourth Revision)

1 SCOPE

This standard covers the requirements for hot finished welded (HFW), hot finished seamless (HFS), and electric resistance welded (ERW) or high frequency induction welded (HRIW) plain carbon steel tubes for structural purposes.

2 REFERENCES

The Indian Standards listed below are the necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
228 : 1983	Method of chemical analysis of steel (in various parts)
1239 (Part 1) : 1990	Mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (<i>fifth revision</i>)
1387 : 1993	General requirements for the supply of metallurgical material (<i>second revision</i>)
1608 : 1995	Mechanical testing of metals — Tensile testing
2328 : 1983	Method for flattening test on metallic tubes (<i>first revision</i>)
2329 : 1985	Method for bend test on metallic tubes (in full section) (<i>first revision</i>)
4711 : 1974	Methods for sampling of steel pipes, tubes and fittings (<i>first revision</i>)
4736 : 1986	Hot-dip zinc coatings on mild steel tubes (<i>first revision</i>)
4740 : 1979	Code of practice for packaging of steel tubes (<i>first revision</i>)
10748 : 1995	Hot-rolled steel strip for welded tubes and pipes (<i>first revision</i>)

3 DESIGNATION

3.1 Steel tubes covered by this standard shall be designated by their nominal bore and shall be classified

as 'Light', 'Medium' and 'Heavy' depending on the wall thickness (*see* Table 1). They shall be further graded as YSt 210, YSt 240 and YSt 310 depending on the yield stress of the material (*see* Table 2). The designation of the steel tubes shall, therefore, include the nominal bore of the tube, classification on wall thickness and grade of the material.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of the steel tubes for structural purposes shall conform to IS 1387.

5 MATERIAL

5.1 The tubes shall be manufactured from steel as given in Table 3 and shall be supplied in the conditions as shown therein.

6 DIMENSIONS AND WEIGHTS

6.1 The standard sizes and weights of tubes for structural purposes shall be as given in Table 1.

6.1.1 Some geometrical properties of the steel tubes are also given in Table 1 for information.

6.1.2 Tubes of thickness lower than light tubes, specified in Table 1 shall not be permissible.

6.2 Tolerances

The following tolerances shall apply:

- a) *Outside Diameter:*
 - 1) Up to and including 48.3 mm + 0.4 mm
 - 0.8 mm
 - 2) Over 48.3 mm ± 1.0 percent
- b) *Thickness (for all sizes):*
 - 1) Welded tubes + Not limited
 - 10 percent
 - 2) Seamless tubes + Not limited
 - 12.5 percent
- c) *Weight:*
 - 1) Single tube light + 10 percent
 - 8 percent

Table 1 Sizes and Properties of Steel Tubes for Structural Purposes

(Clauses 3.1, 6.1, 6.1.1 and 6.1.2)

Nominal Bore	Outside Diameter	Class	Thickness	Weight	Area of Cross Section	Internal Volume	Surface		Moment of Inertia	Modulus of Section	Radius of Gyration	Square of Radius of Gyration
							External	Internal				
mm (1)	mm (2)	(3)	mm (4)	kg/m (5)	cm ² (6)	cm ³ /m (7)	cm ³ /m (8)	cm ³ /m (9)	cm ⁴ (10)	cm ³ (11)	cm (12)	cm ² (13)
15	21.3	Light	2.0	0.947	1.21	235		543	0.57	0.54	0.69	0.47
		Medium	2.6	1.21	1.53	203	669	506	0.69	0.64	0.66	0.44
		Heavy	3.2	1.44	1.82	174		468	0.75	0.70	0.55	0.42
20	26.9	Light	2.3	1.38	1.78	390		700	1.36	1.01	0.87	0.76
		Medium	2.6	1.56	1.98	370	845	681	1.48	1.10	0.86	0.74
		Heavy	3.2	1.87	2.38	330		644	1.70	1.26	0.84	0.71
25	33.7	Light	2.6	1.98	2.54	638		895	3.09	1.83	1.10	1.21
		Medium	3.2	2.41	3.06	585	1 059	857	3.61	2.14	1.08	1.17
		Heavy	4.0	2.93	3.73	518		807	4.19	2.48	1.05	1.11
32	42.4	Light	2.6	2.54	3.25	1 086		1 168	6.47	3.05	1.41	1.98
		Medium	3.2	3.10	3.94	1 017	1 332	1 130	7.62	3.59	1.39	1.93
		Heavy	4.0	3.79	4.82	929		1 080	8.99	4.24	1.36	1.86
40	48.3	Light	2.9	3.23	4.13	1 418		1 335	10.70	4.43	1.61	2.59
		Medium	3.2	3.56	4.53	1 378	1 517	1 316	11.59	4.80	1.59	2.54
		Heavy	4.0	4.37	5.56	1 275		1 265	13.77	5.70	1.57	2.47
50	60.3	Light	2.9	4.08	5.23	2 332		1 711	21.59	7.16	2.03	4.13
		Medium	3.6	5.03	6.41	2 213		1 667	25.88	8.58	2.00	4.02
		Heavy	4.5	6.19	7.88	2 066		1 611	30.90	10.2	1.98	3.92
65	76.1	Light	3.2	5.71	7.32	3 814		2 189	48.79	12.82	2.58	6.66
		Medium	3.6	6.42	8.20	3 727	2 391	2 163	54.02	14.20	2.57	6.60
		Heavy	4.5	7.93	10.1	3 534		2 107	65.12	17.1	2.54	6.43
80	88.9	Light	3.2	6.72	8.61	5 343		2 591	79.23	17.82	3.03	9.19
		Medium	4.0	8.36	10.7	5 138	2 793	2 540	96.36	21.68	3.00	9.00
		Heavy	4.8	9.90	12.7	4 936		2 490	112.52	25.31	2.98	8.88
90	101.6	Light	3.6	8.70	11.1	6 995		2 964	133.27	26.23	3.47	12.03
		Medium	4.0	9.63	12.3	6 877	3 192	2 939	146.32	28.80	3.45	11.91
		Heavy	4.8	11.5	14.6	6 644		2 889	171.44	33.75	3.43	11.76

100	114.3	Light	3.6	9.75	12.5	9 004		3 363	192.03	33.60	3.92	15.36
		Medium	4.5	12.2	15.5	8 704	3 591	3 306	234.3	41.0	3.89	15.10
		Heavy	5.4	14.5	18.5	8 409		3 250	274.5	48.0	3.85	14.86
110	127.0	Light	4.5	13.6	17.3	10 930		3 705	325.3	51.2	4.33	18.78
		Medium	4.8	14.5	18.4	10 819	3 990	3 686	344.58	54.27	4.32	18.69
		Heavy	5.4	16.2	20.6	10 599		3 649	382.0	60.2	4.30	18.52
125	139.7	Light	4.5	15.0	19.1	13 410		4 104	437.2	62.6	4.78	22.87
		Medium	4.8	15.9	20.3	13 287	4 389	4 085	463.44	66.35	4.77	22.76
		Heavy	5.4	17.9	22.8	13 043		4 047	514.5	73.7	4.75	22.58
135	152.4	Light	4.5	16.4	20.9	16 142		4 503	572.2	75.1	5.23	27.37
		Medium	4.8	17.5	22.2	16 008	4 788	4 484	606.92	79.65	5.22	27.25
		Heavy	5.4	19.6	25.0	15 740		4 446	674.5	88.5	5.20	27.05
150	165.1	Light	4.5	17.8	22.7	19 128		4 902	732.6	88.7	5.68	32.27
		Medium	4.8	18.9	24.2	18 981	5 187	4 883	777.32	94.16	5.67	32.14
		Heavy	5.4	21.3	27.1	18 690		4 845	864.7	105.0	5.65	31.92
150	168.3	Light	4.5	18.2	23.1	19 921		5 002	777.2	92.4	5.79	33.56
		Medium	4.8	19.4	24.7	19 771	5 287	4 983	824.78	98.01	5.78	33.42
		Heavy 1	5.4	21.7	27.6	19 473		4 946	917.7	109.0	5.76	33.21
		Heavy 2	6.3	25.2	32.0	19 030		4 889	1 053	125.0	5.73	32.85
175	193.7	Light	4.8	22.4	28.5	26 606		5 781	1 271.71	131.31	6.68	44.63
		Medium	5.4	25.1	32.0	26 260	6 085	5 743	1 417	146	6.66	44.36
		Heavy	5.9	27.3	34.8	25 974		5 712	1 535.2	158.65	6.64	41.11
200	219.1	Light	4.8	25.4	32.3	34 454		6 578	1 856.51	169.47	7.58	57.45
		Medium	5.6	29.5	37.5	33 930	6 883	6 528	2 141	195	7.55	57.02
		Heavy	5.9	31.0	39.5	33 734		6 509	2 247	205	7.54	56.86
225	244.5	Heavy	5.9	34.7	44.2	42 507	7 681	7 307	3 149	258	8.44	71.21
250	273.0	Heavy	5.9	38.9	49.5	53 557	8 578	8 202	4 412	323	9.45	89.30
300	323.9	Heavy	6.3	49.3	62.8	76 073	10 177	9 775	7 992	493	11.2	125.44
350	355.6	Heavy	8.0	68.6	87.3	90 533	11 173	10 663	13 111	737	12.3	151.29

Medium } Heavy }	± 10 percent
2) 10 tonne lots light	± 5 percent
Medium } Heavy }	± 7.5 percent

NOTE — For 10 tonne lots, the weighment may be done in convenient smaller lots and added up at the option of the manufacturer.

7 WORKMANSHIP

7.1 The tubes shall be cleanly finished and reasonably free from scale. They shall be free from cracks, surface flaws, laminations and other defects. The ends shall be cut cleanly and square with the axis of tube, unless otherwise specified.

Surface imperfections such as handling marks, light die or roll marks, or shallow pits shall not be considered as defects provided the imperfections are removable within minimum wall thickness permitted. Removal of such surface imperfections is not required. Welded tubing shall be free of protruding metal on the outside surface of the weld seam.

8 GALVANIZING

8.1 If the tubes are required in galvanized condition the zinc coating on the tubes shall be conforming to the requirements and tested as per methods, specified in IS 4736.

9 STRAIGHTNESS

9.1 Unless otherwise agreed to between the purchaser and the manufacturer, tubes shall not deviate from straightness by more than 1 mm in any 600 mm length.

10 LENGTHS

10.1 The tubes shall normally be supplied in random lengths at 4 to 7 m. If ordered in exact lengths, the tolerances shall be subject to prior agreement between the manufacturer and the purchaser.

11 MECHANICAL TESTS

11.1 The following tests shall be carried out on the selected tube, strip or plate. For mechanical tests, tubes shall be sampled in accordance with IS 4711.

11.2 Tensile Test

The tensile strength, the yield stress and the percentage elongation shall be determined in accordance with the methods specified in IS 1608 and shall be not less than

the values specified for the relevant grades of tubes given in Table 2.

11.2.1 The tensile test shall be made on:

- a length cut from the end of the selected tube (the ends of the length being plugged for grips, where necessary); or
- a longitudinal strip cut from the tube, not including the weld, if any, and tested in the curved condition, the choice resting with the manufacturer.

Table 2 Tensile Properties of Steel Tubes for Structural Purposes

(Clauses 3.1 and 11.2)

Grade	Tensile Strength (Min) MPa	Yield Stress (Min) MPa	Elongation on Gauge Length $5.65 \sqrt{S_0}$, Min Percent
YSt 210	330	210	20
YSt 240	410	240	17
YSt 310	450	310	14

NOTES

1 1 MPa = 1N/mm² = 0.102 kgf/mm².

2 Elongation percent for tubes up to and including 25 mm nominal bore for all grades shall be 12 minimum.

Table 3 Steel and Supply Conditions

(Clause 5.1)

Sl No.	Manufacturing Process	Steel	Supply Conditions
i)	HFV	IS 10748	Only YSt 210 or YSt 240
ii)	HFS	Bars/ingots with suitable chemical composition as per IS 10748 to achieve mechanical properties for respective grades	YSt 210, YSt 240 or YSt 310
iii)	ERW/HRIW	IS 10748	YSt 210, YSt 240 or YSt 310 as welded, heat treated or cold drawn and normalized

NOTE — If required the copper bearing steel may be used to impart weather resistant properties in the steel. Copper content shall be between 0.20 to 0.35 percent subject to mutual agreement between the supplier and the purchaser.

11.3 Ductility Test

11.3.1 Cold Bend Test (Up to and Including 50 mm NB)

When tested in accordance with IS 2329 an unfilled length of tube shall be capable of being bent cold by tube bending machine around a grooved former (with radius at bottom of the groove equal to $6 \times O. D.$ of the tube) through 180° (with weld at 90° to the plane of bending) without showing any crack at the weld or the metal.

11.3.2 Flattening Test (Tubes Above 50 mm NB)

Rings, not less than 40 mm in length cut from the ends of selected tubes with edges rounded shall be flattened between parallel plates with the weld, if any, at 90° (point of maximum bending) in accordance with IS 2328. No opening shall occur by fracture in the weld until the distance between the plates is less than the value specified for each grade in col 4 of Table 4 and no cracks or breaks in the metal elsewhere than in the weld shall occur until the distance between the plates is less than the value specified for each grade in col 5 of Table 4.

11.4 Retest

Should any one of the test pieces first selected fail to pass any of the tests specified, two further samples shall be selected for testing in respect of each failure from the same lot. Should the test pieces from both these additional samples pass, the material represented by the test samples shall be deemed to comply with the requirement of that particular test. Should the test pieces from either of these additional samples fail, the material represented by the test samples shall be deemed as not complying with the standard or the manufacturer may select to test individually the remaining lengths in the lot for the test failed to comply in the preceding tests.

11.5 Sampling

11.5.1 Sampling of Tubes

For the purpose of drawing samples all mild steel tubes bearing same designation and manufactured under a single process shall be grouped together to constitute a lot. Each lot shall be sampled separately and assessed for conformity to this specification.

11.5.2 Sampling and Criterion for Conformity

Unless otherwise agreed to between the manufacturer and the purchaser the procedure for sampling of tubes for various tests and criteria for conformity shall be as given in IS 4711.

12 MARKING

12.1 Each tube shall be suitably marked with the manufacturer's name or trade-mark, and class of the tube.

12.1.1 The tubes may also be marked with the Standard Mark.

12.1.2 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 the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

13 OILING AND PAINTING

13.1 All tubes shall, unless otherwise specified, be varnished, painted or oiled externally.

14 BUNDLING AND PACKING

14.1 Where tubes are to be bundled for transport, they shall unless otherwise specified, be packed in accordance with IS 4740.

Table 4 Flattening Requirement in Metal

(Clause 11.3.2)

Sl No.	Manufacturing Process Metal	Steel Grade	Weld (Distance Between the Plates)	Parent (Distance Between the Plates)
i)	HFW/HFS/ERW/HFIW	YSt 210	75 percent of O.D. ¹⁾	60 percent of O.D.
ii)	HFW/HFS/ERW/HFIW	YSt 240	85 percent of O.D.	75 percent of O.D.
iii)	FHS/ERW/HFIW	YSt 310	85 percent of O.D.	75 percent of O.D.

¹⁾ O.D. = Outside diameter.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

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**AMENDMENT NO. 1 MARCH 2000
TO
IS 1161 : 1998 STEEL TUBES FOR STRUCTURAL
PURPOSES — SPECIFICATION**

(Fourth Revision)

(Page 5, clause 12.1, line 2) — Insert 'grade of the steel' after the words 'trade-mark'.

(MTD 19)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 APRIL 2006
TO
IS 1161 : 1998 STEEL TUBES FOR STRUCTURAL
PURPOSES — SPECIFICATION

(Fourth Revision)

(Page 1, clause 1, line 4) — Substitute 'HFIW' in parenthesis for 'HRIW' in parenthesis.

(Page 1, clause 5.1) — Substitute the following for the existing clause:

'Steel tubes shall be manufactured through one of the following processes as given in Table 3 and shall be supplied in conditions as shown therein:

- a) Hot finished seamless (HFS)
- b) Cold finished seamless (CDS)
- c) Hot-finished welded (HFW); and
- d) Electric resistance welded or high frequency induction welded (ERW or HFIW)

NOTE — Tubes made by manual welding are not covered by this standard.'

(Page 1, clause 6.1) — Substitute 'mass' for 'weights'.

(Page 2, Table 1, col heading 5) — Substitute 'Mass' for 'Weight'.

[Page 4, Table 3, Sl No. (ii)] — Substitute 'HFS/CDS' for 'HFS'.

[Page 4, Table 3, Sl No. (iii)] — Substitute 'ERW/HFIW' for 'ERW/HRIW'.

(Page 5, Table 4, under col 2) — Substitute the following for the existing:

Manufacturing Process

- i) HFW/HFS/CDS/ERW/HFIW
- ii) HFW/HFS/CDS/ERW/HFIW
- iii) HFS/CDS/ERW/HFIW

(MTD 19)

AMENDMENT NO. 3 MAY 2008
TO
IS 1161 : 1998 STEEL TUBES FOR STRUCTURAL
PURPOSES — SPECIFICATION

(Fourth Revision)

(Page 3, Table 1, col 3, against Nominal Bore 150 mm, Outside Diameter 165.1 mm) — Substitute 'Heavy 1' for 'Heavy'.

(Page 3, Table 1, col 3, against Nominal Bore 200 mm, Outside Diameter 219.1 mm) — Substitute 'Heavy 1' for 'Heavy'.

(Page 3, Table 1, col 3, against Nominal Bore 250 mm, Outside Diameter 273.0 mm) — Substitute 'Heavy 1' for 'Heavy'.

(Page 3, Table 1, col 3, against Nominal Bore 300 mm, Outside Diameter 323.9 mm) — Substitute 'Heavy 1' for 'Heavy'.

(Page 3, Table 1, col 3, against Nominal Bore 350 mm, Outside Diameter 355.6 mm) — Substitute 'Heavy 1' for 'Heavy'.

(Page 3, Table 1) — Add the following at the appropriate place:

Nominal Bore mm	Outside Diameter mm	Class	Thick-ness mm	Weight kg/m	Area of Cross Section cm ²	Internal Volume cm ³ /m	Surface Area		Moment of Inertia cm ⁴	Modulus of Section cm ³	Radius of Gyration cm	Square of Radius of Gyration cm ²
							External cm ² /m	Internal cm ² /m				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
150	165.1	Heavy 2	5.9	23.2	29.5	18 465.0	5 189	4 818	937	113.4	5.63	31.72
		Heavy 3	6.3	24.7	31.4	18 272.8		4 793	993	120.3	5.62	31.57
		Heavy 4	8.0	31.0	39.5	17 467.1		4 686	1 222	148.0	5.56	30.93
200	219.1	Heavy 2	8.0	41.6	53.1	32 410.4	6 886	6 383	2 960	270	7.47	55.78
		Heavy 3	10.0	51.6	65.7	31 146.4		6 257	3 598	328	7.40	54.78
		Heavy 4	12.0	61.3	78.1	29 907.4		6 132	4 200	383	7.33	53.79
250	273.0	Heavy 2	8.0	52.3	66.6	51 895.6	8 580	8 077	5 852	429	9.37	87.86
		Heavy 3	10.0	64.9	82.6	50 292.8		7 951	7 154	524	9.31	86.59
		Heavy 4	12.0	77.2	98.4	48 715.1		7 826	8 396	615	9.24	85.33
300	323.9	Heavy 2	8.0	62.3	79.4	74 487.6	10 180	9 677	9 910	612	11.2	124.82
		Heavy 3	10.0	77.4	98.6	72 564.8		9 551	12 160	751	11.1	123.29
		Heavy 4	12.0	92.3	118.0	70 667.2		9 425	14 320	884	11.0	121.78
350	355.6	Heavy 2	10.0	85.2	109	88 492.9	11 176	10 547	16 220	912	12.2	149.42
		Heavy 3	12.0	102.0	130	86 396.0		10 422	19 140	1 076	12.2	147.76

AMENDMENT NO. 4 JUNE 2011
TO
IS 1161 : 1998 STEEL TUBES FOR STRUCTURAL PURPOSES —
SPECIFICATION

(Fourth Revision)

(Page 1, clause 6.1.2) – Add the following new clause after 6.1.2:

‘6.1.3 Tubes of thickness higher than light tubes specified in Table 1 may be mutually agreed between the purchaser and the manufacturer.’

(Page 3, Table 1, col 3, against Nominal Bore 175, Outside Diameter 193.7 mm) — Substitute ‘Heavy 1’ for ‘Heavy’.

[Page 3, Table 1 (see also Amendment No.3)] — Add the following at the appropriate place:

Nominal Bore	Outside Diameter	Class	Thickness	Weight	Area of Cross Section	Internal Volume	Surface Area		Moment of Inertia	Modulus of Section	Radius of Gyration	Squire of Radius of Gyration
							External	Internal				
mm	mm		mm	kg/m	cm ²	cm ³ /m	cm ² /m	cm ² /m	cm ⁴	cm ⁴	cm	cm ²
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
150	168.3	Heavy 3	8.0	31.6	40.3	18 224.9	5 290	4 787	1 297	154.0	5.67	32.20
		Heavy 4	10.0	39.0	49.7	17 280.1		4 661	1 564	186.0	5.61	31.45
175	193.7	Heavy 2	6.3	29.1	33.1	25 770.0	6 088	5 692	1 630	218.0	6.63	43.96
		Heavy 3	8.0	36.6	41.6	24 812.0		5 585	2 016	270.0	6.57	43.16
		Heavy 4	10.0	45.3	51.6	23 707.0		5 459	2 442	328.0	6.50	42.25
175	193.7	Heavy 5	12.0	53.8	61.3	22 628.0	6 088	5 334	2 839	383.0	6.44	41.47

AMENDMENT NO. 5 SEPTEMBER 2012
TO
IS 1161 : 1998 STEEL TUBES FOR STRUCTURAL
PURPOSES — SPECIFICATION

(Fourth Revision)

(Second cover page, FOREWORD) — Substitute ‘ISO 4200 : 1991 Plain end steel tubes, welded and seamless – General tables of dimension and masses per unit length’ for ‘ISO/R 336 : 1976 Plain end steel tubes, welded and seamless – General table of dimensions and masses per unit length. International Organization for Standardization’.

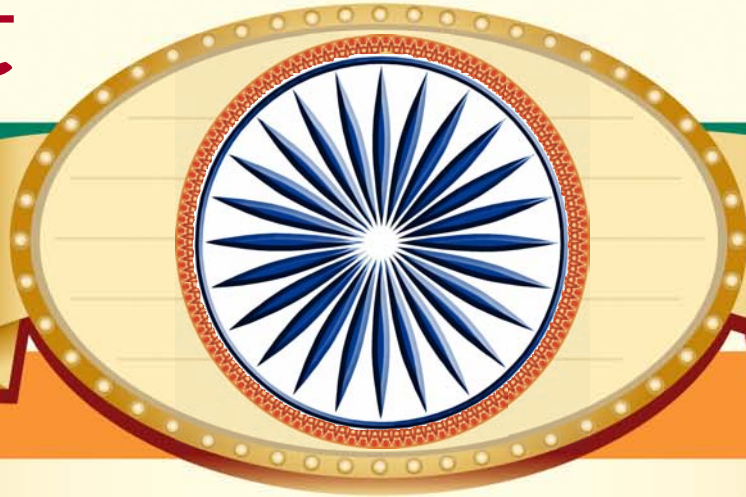
(Page 4, clause 6.2, Note, line 1) — Substitute ‘10 tonne (Min)’ for ‘10 tonne’.

(MTD 19)

Reprography Unit, BIS, New Delhi, India

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मानक



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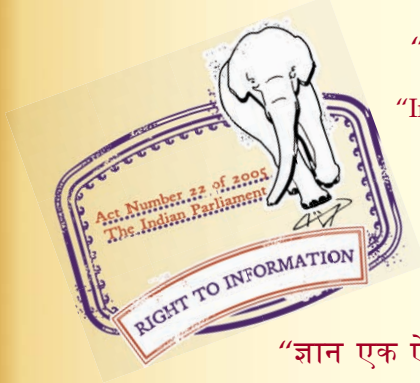
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IS 4736 (1986): Hot-dip Zinc Coatings on Mild Steel Tubes
[MTD 7: Light Metals and their Alloys]



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IS : 4736 - 1986
(Reaffirmed 1998)

Indian Standard
SPECIFICATION FOR
HOT-DIP ZINC COATINGS ON
MILD STEEL TUBES
(*First Revision*)

Third Reprint AUGUST 2001

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AMENDMENT NO. 1 MAY 1989
TO
IS : 4736 - 1986 SPECIFICATION FOR HOT-DIP
ZINC COATINGS ON MILD STEEL TUBES

(First Revision)

(Page 4, Note under clause 5.1) — Substitute the following for the existing note:

NOTE — Mass of zinc coating shall not be less than 400 g/m² as determined from the average result of two specimens taken from opposite ends of tube selected for testing. The lower of the two values shall not be less than 360 g/m².

(SMDC 28)

Reprography Unit, BIS, New Delhi, India

**AMENDMENT NO. 2 JANUARY 2001
TO
IS 4736 : 1986 SPECIFICATION FOR HOT-DIP ZINC
COATINGS ON MILD STEEL TUBES**

(First Revision)

(Page 4, clause 3.1) — Substitute the following for the existing:

'3.1 Quality of Zinc — Zinc used for galvanizing shall conform to any of the grades specified in IS 209 : 1992 Zinc ingot (*fourth revision*) or IS 13229 : 1991 Zinc for galvanizing.'

(MTD 20)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 MAY 2002
TO
IS 4736 : 1986 SPECIFICATION FOR HOT-DIP ZINC
COATINGS ON MILD STEEL TUBES

(*First Revision*)

(*Amendment No 1*) — Withdrawn

(*Page 4, clause 5.1*) — Substitute the following for the existing

'5.1 Mass of Zinc Coating — For tubes with thickness up to 6 mm, the minimum mass of zinc coating, when determined on a 100 mm long test piece (*see 6.2*) in accordance with IS 6745 1972‡ shall be 360 g/m^2

NOTE — Mass of zinc coating shall not be less than 360 g/m^2 when tested on two specimens taken from opposite ends of the tube selected for testing

(*Page 5, clause 5.4*) — Substitute the following for the existing

'5.4 Uniformity of Galvanized Coating — The galvanized coating when determined on a 100 mm long test piece (*see 6.2*) in accordance with IS 2633 1986* shall withstand 5 one minute dips '

(MTD 24)

**AMENDMENT NO. 4 NOVEMBER 2007
TO
IS 4736 : 1986 SPECIFICATION FOR HOT-DIP ZINC
COATINGS ON MILD STEEL TUBES**

(First Revision)

(Page 3, clause 1.1) — Delete 'covered in IS 1239 : (Part 1)-1979† and IS : 1161-1979‡'.

[Page 4, clause 5.1, first line (see also Amendment No. 3)] — Substitute 'tubes of any thickness' for 'tubes with thickness up to 6 mm'.

(MTD 24)

Reprography Unit, BIS, New Delhi, India

Indian Standard
**SPECIFICATION FOR
HOT-DIP ZINC COATINGS ON
MILD STEEL TUBES**
(First Revision)

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(Continued on page 2)

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IS : 4736 - 1986

(Continued from page 1)

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(Continued on page 6)

Indian Standard
**SPECIFICATION FOR
 HOT-DIP ZINC COATINGS ON
 MILD STEEL TUBES**
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 28 August 1986, after the draft finalized by the Hot Dip Sprayed and Diffusion Coatings Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 The hot-dip galvanizing process is very widely used for obtaining protection against corrosion of a large variety of ferrous products. This standard has been formulated with a view to achieving efficient and economic protection of steel tube by a hot-dip galvanized coating of adequate and uniform thickness.

0.3 This standard was first published in 1968. In this revision, the requirement of the quality of zinc for the purpose of galvanizing has been modified and also the purity of zinc in the galvanizing bath has been specified to ensure the better quality of zinc coatings. Reference has also been made for the guidance of manufacturer and purchaser for rejection/acceptance of the galvanizing defects, in 5.2.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for zinc coating applied by hot-dip galvanizing on mild steel tubes covered in IS : 1239 (Part 1)-1979† and IS : 1161-1979‡.

*Rules for rounding off numerical values (*revised*).

†Mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (*fourth revision*).

‡Steel tubes for structural purposes (*third revision*).

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of material shall conform to IS : 1387-1967*.

3. GENERAL REQUIREMENTS

3.1 **Quality of Zinc** — Zinc containing at least 98.5 percent by mass should be used for the purpose of galvanizing, or the molten metal in galvanizing bath shall contain not less than 98.5 percent by mass of zinc.

3.2 **Galvanizing** — The steel tubes may, as far as practicable, be galvanized in accordance with IS : 2629-1985†.

4. MANUFACTURE

4.1 **Basis Metal for Tubes** — Unless specified at the time of ordering, tubes shall be manufactured from mild steel and shall satisfy the conditions laid down in the relevant standards for tubes. Some alloy steels and carbon steels other than mild steel may present special difficulties in galvanizing. In such cases, the standard shall be applicable only after agreement between the galvanizer and the purchaser.

5. COATING REQUIREMENTS

5.1 **Mass of Zinc Coating** — For tubes with thickness up to 6 mm, the minimum mass of zinc coating, when determined on a 100 mm long test piece (*see* 6.2) in accordance with IS : 6745-1972‡, shall be 400 g/m².

NOTE — The mass of zinc coating shall be not less than 400 g/m² as determined from the average result of two specimens taken from opposite ends of tube selected for testing.

5.1.1 The mass of coating expressed in grams per square metre shall be calculated by dividing the total mass of zinc (inside plus outside) by the total area (inside plus outside) of the coated surface.

5.2 **Freedom from Defects** — The zinc coating shall be reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits and blisters. Guidance for rejection/acceptance of these defects have been prescribed in Appendix A of IS : 2629-1985†.

5.2.1 Small black spots may be repaired as prescribed in Appendix A of IS : 2629-1985†.

5.2.2 Unless a passivation treatment is specified, some white rust may be found on the tubes. Guidance for rejection/acceptance has been prescribed in Appendix A of IS : 2629-1985†.

*General requirements for the supply of metallurgical materials (*first revision*).

†Recommended practice for hot-dip galvanizing of iron and steel (*first revision*).

‡Methods for determination of mass of zinc coating on zinc coated iron and steel articles.

5.3 Free Bore Test — If required by the purchaser, a rod 230 mm long and of appropriate diameter as given below shall be passed through relevant nominal bores of the sample tubes to ensure a free bore:

<i>Nominal Bore of Tube After Galvanizing</i>	<i>Diameter of Rod to be Used</i>
mm	mm
8	4
10	6
15	11
20	16
25	21

5.4 Uniformity of Galvanized Coating — The galvanized coating when determined on a 100 mm long test piece (*see* 6.2) in accordance with IS : 2633-1986*, shall withstand 4 one-minute dips.

5.5 Adhesion Test — Galvanized tubes up to and including 50 mm nominal bore, when bent cold through 90° round grooved former having radius at the bottom of the groove equal to 8 times its outside diameter, shall not develop any crack in the coating.

5.5.1 The adherence of zinc coating on tubes above 50 mm nominal bore, shall be determined by the pivoted hammer test given in IS : 2629-1985†.

6. SAMPLING AND PREPARATION OF TEST SPECIMEN

6.1 The sampling shall be as given below:

<i>Nominal Bore</i>	<i>Sample Size</i>
Up to 25 mm	1 tube/1 000 tubes or part thereof
Above 25 mm	1 tube/500 tubes or part thereof

6.2 Test specimens shall be cut approximately 100 mm in length from opposite ends of the lengths of tube selected for testing. Before cutting the test specimen, 50 mm from both ends of the sample shall be discarded.

7. RETEST

7.1 Should any of the test pieces fail to pass the requirements of this standard (*see* 5), two further samples, from the same batch, shall be selected for testing. Should the test pieces from both these additional samples pass, the batch represented by the test samples shall be deemed to comply with the standard. Should the test pieces from either of these additional samples fail, the batch represented by the test samples shall be deemed not to comply with this standard.

*Method for testing uniformity of coating on zinc coated articles (*second revision*).

†Recommended practice for hot-dip galvanizing of iron and steel (*first revision*).

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(Continued from page 2)

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