# BHARAT HEAVY ELECTRICALS LIMITED

ATP/PURCHASE

BHEL / TRICHY-620 014.

**ANNEXURE-I**
**1402200010**

**Enquiry Terms & Conditions for Supply of Grade SA333 Gr.6 Feeder Pipes**

**Note: This Annexure has to be mandatorily filled & signed by the manufacturer (or) mill and submitted along with Technical bid.**

***Any deviation to the below mentioned terms shall be stated specifically in the comments column for each term and also in case of acceptance to our terms, it will be construed that the whole term is understood and agreed in totality without any deviation. (If otherwise mentioned).***

| Sl No | BHEL Requirements | Supplier Confirmation /Comments |
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| 01. | **Restrictions for Procurement from a country sharing its land border with India**<br>For this procurement, Public procurement order dated 23.07.2020 regarding restrictions under rule 144 (xi) of general financial rules 2017 and clarification dt 08.02.2021 from DoE is applicable. In case of subsequent Orders issued, the same shall be applicable even if issued after issue of this NIT. | |
| 02. | **Preference to Make in India:**<br>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 respective 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. | |
| 03. | **Special Provisions for Micro and Small Enterprises (MSE) bidders registered as per MSME act:**<br>(Subject to participating MSE vendors meeting the tender requirements of BHEL)<br>➢ As per Gazette Notification no. S.O. 2119(E) dated 26.06.2020 issued by Ministry of MSME applicable/existing Micro and small suppliers are requested to get registered with Udyam Registration portal and share us the Udyam registration no. along with Udyam registration certificate.<br>➢ 25% of the tendered quantity is earmarked for MSE suppliers in this tender, subject to participating MSE Vendors should meet the tender requirements of BHEL. In case MSE vendor participating in the tender quotes within the price band of L1 + 15%, they will be allowed to supply the portion of the requirement subject to acceptance of L1 price by MSE vendor. In case of more than one such MSE vendor within the "L1+15% price band", the supply shall be shared proportionately.<br>➢ In the event of Non MSE supplier becoming L1 and MSE supplier quotes within the price band of L1+15% and it is not possible to split the tendered quantity on account of reasons like customer contract requirement/technical requirements, then 100% of the quantity will be offered to MSE suppliers subject to acceptance of L1 price by MSE supplier.<br>➢ Counter offering of L1 rate will not be made with any MSE vendor whose quoted rate is more than the price band of L1+15%.<br>➢ Payment to MSE vendor will be as per the applicable provisions of the MSMED Act 2006.<br>➢ If L1 offer is from a Micro / Small enterprise, the 25% earmarking provision is not applicable.<br>➢ Out of the 25% tendered quantity reserved for MSE suppliers, 6.25% shall be earmarked for procurement from MSE owned by SC/ST entrepreneurs. Apart from this 3% shall be earmarked for procurement from MSE owned by Women entrepreneurs.<br>➢ In case of any change in the MSE status of the bidder, it shall be the responsibility of the bidder to notify the change as a part of the bid document. If at a later date it comes to the knowledge of BHEL, that the change in the status has not been intimated by the bidder and the order is obtained under the premise of an MSE then BHEL would cancel the pending order against this tender and take necessary steps for suspension of the business dealing with the bidder as per the procurement policy of BHEL. | |

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| | ➢ MSE suppliers can avail the intended benefits only if they submit along with the offer, valid UDYAM certificate for the relevant financial year (latest audited). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. However, credentials of all MSE suppliers will be verified before considering the intended benefits for MSE suppliers at the time of tender evaluation. Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents. | |
| **04.** | **Specification, Size & Quantity:**<br><br>a) Specification, size and quantity shall be as given in enquiry.<br><br>b) Pre-qualification requirements are defined in **Special Condition Annexure A & B**<br><br>c) Offer shall fully comply with the technical specification PC-M-287 Rev 01.<br><br>d) If there is any deviation, the same should be mentioned clearly with the specific clause no. of the **Special Condition Annexure A** and the deviation against it in the **e- procurement** offer itself.<br><br>e) Offer will be evaluated on total package basis, | |
| **05** | **Offer Submission:**<br><br>a) This Tender is hosted in EPS portal & offer to be submitted through EPS portal only. You are requested to submit your 2 parts offer before due date & time of the enquiry through NIC (https://eprocurebhel.co.in) only.<br><br>b) Offer is to be submitted in TWO part bids system (Technical bid + Price bid) in the E-Procurement NIC PORTAL (https://eprocurebhel.co.in) ONLY.<br><br>c) Scanned copy of the filled documents shall be uploaded in the EPS portal.<br><br>d) At its option, BHEL may consider extending the due date/s for the tender openings. Sufficient notice would be given by BHEL for such extensions and it will be published as corrigendum in following websites,<br>**https://eprocurebhel.co.in**<br>**http://www.bhel.com/tender/**<br><br>e) Acceptance of offer will be subject to existing customer approval. | |
| **06.** | **Validity:** Offer/Price validity of **60 days is required** from the Price bid opening date. | |
| **07.** | **Delivery**: The offer shall clearly indicate delivery period in **fixed number of weeks/Months** from the date of approval of technical documents / Manufacturing clearance. | |
| **08.** | **Indigenous vendors – Terms of delivery:**<br><br>• Bidders should submit their offer on FOR Destination -BHEL Stores, Trichy basis. The quote should be inclusive of all charges, including testing, packing & forwarding, inspection, Insurance etc. (Ex-Works offers will not be considered).<br>• The soft copies of the Invoice, LR copy and/or E-way bill as the case may be &Test certificates shall be forwarded to BHEL immediately after dispatch. | |
| **09.** | **Goods and Service Tax (GST)**<br><br>**Indigenous suppliers:**<br>• Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GST registration No (GSTIN) which should be clearly mentioned in the offer. If the dealer is exempted from GST registration, a declaration with due supporting documents need to be furnished for considering the offer. Dealers under composition scheme should declare that he is a composition dealer supported by the screen shot taken from GST portal. The dealer has to submit necessary documents if there is any change in status under GST.<br>• Supplier shall mention their GSTIN in all their invoices (incl. credit Notes, Debit Notes) and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the | |

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| | Invoice No. which is linked/uploaded in GSTN network shall be clearly indicated), Billed to party (with GSTIN) & Shipped to party details, item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, Place of Supply etc.<br>• All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).<br>• Invoices will be processed only upon completion of statutory requirement and further subject to following:<br>o Vendor declaring such invoice in Form GST ANX-1<br>o Receipt of Goods or Services and Tax invoice by BHEL<br>• As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoices raised on BHEL may be uploaded immediately in GST portal on despatch of material /rendering of services. The supplier shall ensure availability of Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).<br>• In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.<br>• In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor<br>• In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.<br>• Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.<br>• Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contracts. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Tax Invoice will be issued by BHEL indicating the respective supply invoice number.<br>• GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.<br>• GST CREDIT: Suppliers are advised to get registered to GSTN portal. Tenderer under "GST credit" shall be preferred. | |
| **10** | **<u>Acceptance of materials supplied:</u>**<br>The supply shall be strictly as per the specifications in the tender / purchase order.<br>Delivery of the ordered items as per the delivery terms in the Purchase Order does not automatically constitute acceptance of the delivered items.<br>The acceptance or otherwise of the delivered items will be separately communicated to the supplier by BHEL either through B2B portal or through e mail within 120 days from the delivery of items or delivery of the required test certificates /other documents whichever is later.<br>In case of rejection of the delivered items, either part or full, the vendor shall replace the rejected items as per the specification in the Purchase order/tender at their cost within specified days/months of communication of rejection to the supplier.<br>In case of rejection of the delivered items, either part or full, if the supplier fails to replace the rejected items within the specified days/months of communication of the rejection, the same shall be treated as failure to execute the contract and actions as per the Guidelines for Suspension of Business Dealings with Suppliers /Contractors available in the webpage: http://www.bhel.com/vender_registration/vender.php. would be taken against such supplier. | |

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| 11 | **Payment terms:**<br>**Indigenous:**<br><br>For Micro & Small Enterprises vendors, BHEL Payment term is 100% direct EFT payment after 45 days from the date of receipt and acceptance of materials.<br><br>For Medium Enterprises vendors, BHEL Payment term is 100% direct EFT payment after 60 days from the date of receipt and acceptance of materials.<br><br>For Non MSME vendors, BHEL Payment term is 100% direct EFT payment after 90 days from the date of receipt and acceptance of materials<br><br>Offers with payment terms as Advance Payment & LC at Sight Shall be rejected | |
| 12 | **Liquidated Damage (Indigenous):**<br><br>1. Time is the essence of the contract.<br>2. The ordered items shall be delivered as per the delivery period mentioned in the Purchase Order.<br>3. In case the supplier supplies the ordered items beyond the delivery period specified, Liquidated Damages -LD - as detailed below shall be will be levied from the supplier without prejudice to any other relief /compensation available to BHEL, Tiruchirapalli under any other condition of the contract/applicable legal provisions.<br><br>1. LD shall be 0.5% of the undelivered portion per week or part thereof subject to a maximum of 10% of the total order value.<br>2. Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).<br>3. Indigenous: For "FOR Delivery terms", Lorry way bill date will be taken for LD calculation for cases where E way bill is not mandatory. Wherever E Way Bill is involved. the date of commencement of movement of vehicle as reflected in E way Bill [ the 'Valid from' date in the E way Bill] will be taken for LD calculation. | |
| 13 | **Warrantee:**<br>Supplier to accept warrantee against manufacturing defect and non -compliance with technical specifications in the enquiry for "18 months from dispatch or 12 months from commissioning, whichever is earlier".<br><br>Supplier shall replace defective material free of cost (inclusive of all Testing, Inspection, TPI, Service charges etc.) up to destination within two months from defect notification date. | |
| 14 | **Risk Purchase clause:**<br><br>a) In the event of any successful Tenderer's failure to fulfil any of the tender / Contract obligations including supply of whole or any part of the ordered items as per Contract / Agreement, BHEL has the right to terminate the contract and purchase from elsewhere ,at the risk and cost of the defaulted supplier, either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated in the contract or if the same were not available, the best and nearest available substitute thereof. The supplier shall be liable for the additional expenditure/difference in Cost, if any, including consequential losses which BHEL may sustain by reason of risk purchase in addition to the applicable LD as per the Purchase order/contract.<br><br>b) The decision of BHEL with regard to the additional expenditure / difference in cost and consequential losses incurred by BHEL shall be final and binding on the supplier.<br><br>c) The amount recoverable under risk purchase shall be recovered from the defaulted supplier in all or any of the following manners:<br>i) from dues available in the form of Bills payable to defaulted supplier, SD, BGs against the same contract.<br>ii) from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit<br>iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier. | |

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| 15 | **Set-off Clause**: BHEL shall have the right to recover any money, which in the sole opinion of BHEL is due from the Contractor, from any money due to the Contractor under this Contract or any other contract or from the Security Deposit & bank Guarantee's, if any, furnished by the Contractor under this Contract or any other contract. | |
| 16 | **Non-Disclosure Agreement(NDA):**<br><br>The bidders shall enter into the Non-disclosure agreement totally voluntarily, with full knowledge of its meaning and without duress. (Format attached). | |
| 17 | **Intellectual Property Right**<br><br>The supplier shall, at all times, indemnify and keep indemnified the purchaser, free of cost, against all claims which may arise in respect of goods & services to be provided by the supplier under the contract for infringement of any intellectual property rights or any other right protected by patent, registration of designs or trademarks. In the event of any such claim in respect of alleged breach of patent, registered designs, trademarks etc. being made against the purchaser, the purchaser shall notify the supplier of the same and the supplier shall, at his own expenses take care of the same for settlement without any liability to the purchaser. | |
| 18 | **Evaluation Criteria:**<br><br>The Evaluation Currency for this tender shall be "INR". The offers of vendors will be evaluated on total landed cost to BHEL, Trichy. The evaluation process is as detailed below:<br><br>**Indigenous:**<br><br>**Total Landed cost = FOR Rate in INR (A) + Applicable Taxes (B) + Loading for payment term & LD (C) – Applicable input tax credit (D)**<br>**A.** Indigenous vendors submit offers on Free on Road (FOR), Trichy in INR.<br>**B.** GST and any other charges quoted by indigenous vendors will be added to the base price.<br>**C.** Loading for payment terms & non-acceptance of Liquidated Damages (LD) will be added to the FOR value for arriving the landed rate.<br>**D.** However, input credit is availed for GST (SGST, CGST/IGST), hence the same is excluded for arriving at the landed cost.<br><br>Note: "In the course of evaluation, if more than one bidder happens to occupy L1 status, effective L1 will be decided by soliciting discounts from the respective L1 bidders. In case more than one bidder happens to occupy the L1 status even after soliciting discounts, the L1 bidder shall be decided by a toss/draw of lots, in the presence of the respective L1 bidders or their representatives. Ranking will be done accordingly. BHEL decision in such situations shall be final and binding". | |
| 19 | **General condition:**<br><br>a) Bids including all enclosures and supporting documents like catalogues, pamphlets, etc., shall be submitted / uploaded in ENGLISH language only. If the documents submitted have other than English language, translation of the same shall be provided for evaluation.<br>b) Test Certificates shall be provided along with dispatch of pipes. Two sets of originals of all such TCs are to be provided to BHEL, Trichy.<br>c) Inspection Agency: BHEL & NPCIL.<br>d) While dispatching the tubes & pipes, in addition to bundling with metal straps, we require slinging arrangement with nylon belt (not rope) for easy handling at loading and unloading points.<br>e) No revision of prices will be entertained after the tenders are opened.<br>f) BHEL will consider the ranking after the loading is applied wherever deviations are observed.<br>g) BHEL reserves the right to negotiate L1 rate or re-float the tender opened if L1 price is not the lowest acceptable price to them inter-alia other reasons.<br>h) In the event of our customer order covering this tender being cancelled / placed on hold / otherwise modified, BHEL would be constrained to accordingly cancel / hold / modify the tender / your purchase order at any stage of execution.<br>i) Offer will be evaluated based on Landed cost to BHEL- Trichy on total package basis only.<br>j) Offers for partial quantities of a given item are not acceptable to BHEL. | |

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| | k) No payment will be made for the excess quantity / length.<br>l) Offer should be submitted only as per the Unit of Measurement (UOM) specified in the enquiry.<br>m) All documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder.<br>n) This Tender is hosted in EPS portal & offer to be submitted through EPS portal only. You are requested to submit your 2 parts offer before due date & time of the enquiry through **NIC** (https://eprocurebhel.co.in) only.<br>SEALED COVER BIDS / E-MAILS / FAX / MANUAL OFFERS WILL NOT BE ACCEPTED. | |
| **20** | **Fraud Prevention Policy**<br><br>"The bidder along with its associate/collaborators/sub-contractors /consultants/service providers shall strictly adhere to BHEL Fraud prevention policy displayed on BHEL website htpp://www.bhel.com and shall immediately bring to the notice of BHEL Management about fraud or suspected fraud as soon as it comes to their notice." | |
| **21** | **Suspension of Business Dealings with Suppliers/Contractors:**<br><br>The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms /principal/agents, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.<br><br>**Integrity commitment, performance of the contract and punitive action thereof:**<br><br>**Commitment by BHEL**<br>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.<br><br>**Commitment by Bidder/ Supplier/ Contractor**<br>• 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.<br>• 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.<br>• 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.<br><br>If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in any act, including but not limited to, mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or tampers the tendering process or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, or does anything which is actionable under the Guidelines for Suspension of Business dealings, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions. Guidelines for suspension of business dealings is available in the webpage: http://www.bhel.com/vender_registration/vender.php. | |
| **22** | **Cartel Formation:**<br><br>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. | |

**23** **Integrity Pact (IP):**

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

| IEM | Email |
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| Shri Otem Dai, IAS (Retd.) | iem1@bhel.in |
| Shri Bhiswamitra Pandey, IRAS (Retd.) | iem2@bhel.in |
| Shri Mukesh Mittal, IRS (Retd) | iem3@bhel.in |

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.
Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below: Details of contact person(s):

Name: R. Meganathan / Manager.
Dept: ATP/Purchase
Address: 4th Floor, 24 Building
HPBP, BHEL, Trichy- 620014
Email: rmega@bhel.in
Phone: 0431-257-5458

Name: R.Krishnakumar / Manager
Dept: ATP/Purchase
Address: 4th Floor, 24 Building
HPBP, BHEL, Trichy-620014
Email: krishnakumar.r@bhel.in
Phone: 0431-257-4203

**24** **Resolution of Disputes:**

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the contract/tender which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.
2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Annexure 1 to this Enquiry Terms and conditions for supply of seamless Tubes.

The Annexure 1 together with its appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in these Enquiry Terms and conditions for supply of seamless Tubes. .

Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract ; or , in any manner touching upon the Contract, then, either Party may , by a notice in writing to other Party refer such dispute or difference to sole arbitration of an arbitrator appointed as per the Arbitration and Conciliation Act, 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force .

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties.

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| | Subject as aforesaid, the provision of Arbitration & Conciliation Act 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceeding under this clause.<br><br>The seat of arbitration shall be Trichy, Tamil Nadu, India<br><br>The cost of arbitration shall be borne as per the award of the Arbitrator.<br><br>Subject to arbitration in terms of clause above, the Courts at Trichy, Tamil Nadu, India shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.<br><br>Notwithstanding the existence or any dispute or difference and/or reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of its obligation under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.<br><br>**In Case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:**<br><br>In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/Port Trusts *inter se* and also between CPSEs and Government Departments/Organizations (Excluding disputes concerning Railways, Income Tax, Customs & Excise Departments, such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No. 4(1)/2013 –DPE (GM)/FTS-1835 dated 22-05-2018. |
| **25** | **In the event of Force Majeure:**<br><br>a. Notwithstanding the provisions contained in other clauses, the supplier shall not be liable for imposition of any such sanction so long the delay and/or failure of the supplier in fulfilling its obligations under the contract is the result of an event of Force Majeure. For purposes of this clause, Force Majeure means an event beyond the control of the supplier and not involving the supplier's fault or negligence and which is not foreseeable and not brought about at the instance of the party claiming to be affected by such event and which has caused the non – performance or delay in performance. Such events may include, but are not restricted to, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes excluding by its employees, lockouts excluding by its management, freight embargoes and Acts of GOD.<br>b. If a Force Majeure situation arises, the supplier shall promptly notify the Purchaser/Consignee in writing of such conditions and the cause thereof within twenty-one days of occurrence of such event. Unless otherwise directed by the Purchaser/Consignee in writing, the supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.<br><br>c. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding sixty days, either party may at its option terminate the contract without any financial repercussion on either side.<br><br>**d.** In case due to a Force Majeure event the Purchaser/Consignee is unable to fulfil its contractual commitment and responsibility, the Purchaser/Consignee will notify the supplier accordingly and subsequent actions taken on similar lines described in above sub-paragraphs. |
| **26** | **Execution of the order:**<br><br>a. BHEL will have the option to pre-inspect the materials at Supplier's works by BHEL's own inspector or by third party agency appointed by BHEL or BHEL‟s end customer/s.<br>b. If the inspection fails, the vendor shall offer the material again as per ordered terms and specifications for further inspection.<br>c. The mere act of the pre-dispatch inspection (PDI) does not absolve the Supplier from giving the specifications as agreed upon in the Purchase Order.<br>d. In the case of overseas suppliers Inspection call for carrying out the inspection shall be given 30 days before the scheduled contract delivery date. The Inspection date/s given by the Supplier shall be on firm basis. For local Suppliers the Notice period of Inspection shall be 10 working days.<br>**e.** In the event of any short supply, it shall be the responsibility of the supplier to deliver such short supplied/ missing items on Free-of-Cost basis at BHEL stores. |
| **27** | **Caution:**<br><br>• The suppliers are severely cautioned to note that the price bid document accepts the price in figures only. It does not allow the supplier to write the value by words. Therefore, all care shall be exercised by the supplier while filling in the figures. Once the price bid is opened no option is available for the supplier to retract the offer under any grounds. If a supplier, for any reason whatsoever approaches BHEL with a request for change in the price, it would be treated as going back on the offer submitted. In such cases, action would be initiated by BHEL for suspending further business dealings with such suppliers as per policy of BHEL which prevails at that point of time. |

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| | • The tender documents downloaded by the Bidders shall at no point of time be changed, altered or modified in any manner by the Tenderer. If such changes are made by any tenderer, it shall be considered as tampering with BHEL's terms and the offer shall be summarily rejected, whenever it is noticed by BHEL. Such Bidders would be disqualified from the Bidding Process and their offers would be forfeited / Bank Guarantees invoked. They would also not be allowed to participate in future tenders of BHEL. |
| **28** | **Enclosures:**<br><br>**a)** Special condition Annexure A & B<br>b) NPCIL technical specifications PC-M-287 Rev01.<br>c) SQP-RH Pipes.<br>d) Non-Disclosure agreement.<br>e) Pre-signed Integrity Pact |

| | |
|---|---|
| MEGANATHAN R<br>(On Behalf of BHEL)<br>Digitally signed by MEGANATHAN R<br>Date: 2022.08.01 12:43:37 +05'30' | **SIGNED BY MANUFACTURER / MILL**<br><br>Name of Mill:<br>Designation / Department:<br>Seal & Signature |

## SPECIAL CONDITION ANNEXURE – A

## For procurement of Feeder Pipes for Fleet RH Project

## PR No.: 132101942

1. The indented items are required for NPCIL order for Fleet Mode Reactor Headers.
2. Two-part bid, open tender to be floated.
3. **End Use and End User Certificates will not be provided by BHEL.**
4. Supply of Seamless steel pipes conforming to SA 333 Gr.6 shall be as per NPCIL Specification: PC-M-287 Rev 01 ("Technical Specification for Seamless Carbon Steel Pipes and Butt Welding Seamless Fittings for Feeders") and Suggestive Quality Assurance Plan. Supplier shall conform to all these documents.
5. Supplier shall supply NDE reference blocks used for raw material testing along with pipes as a part of contract.
6. Supplier shall give clause by clause confirmation for all clauses (except 3.2, 4.1.3, 5.3.1(b), 5.3.2, 5.4.3, 6.2(b), 6.2(e-ii), 8.0(4), 8.0(6-ii), & Appendix-B) mentioned in NPCIL Technical Specification PC-M-287 Rev 01. Deviations (if any) shall be mentioned in the offer itself.
7. For offer acceptance, suppliers should have the capability and experience to produce the seamless carbon steel or alloy steel tubes / pipes. Supplier should have supplied the seamless carbon steel or alloy steel tubes / pipes for nuclear application / Nuclear Power Corporation of India Limited / any other nuclear power station.
8. As a documentary proof of supplier's experience in manufacturing the seamless carbon steel or alloy steel tubes / pipes, supplier shall submit the unpriced P.O., Signed Test Certificates (Signed by Customer/TPI) and Shipping release document/ supply invoice copy/bill of lading/delivery challan with specifications and details of customer as a documentary proof of Supplier's experience along with the offer.
9. UT shall be performed in suppliers works mandatorily for all the sizes except nominal size of 20 NB (PR SL.No.40).
10. UT on nominal size of 20 NB pipes will be carried out by BHEL. Acceptance of 20 NB pipes is subject to qualification of UT in accordance with relevant NDE clauses of PC-M-287 & NPCIL approved UT Procedure.
11. Cold bending test as per PC-M-287 Clause 4.1.2d)5) & Clause 5.2c) will be carried out at BHEL Trichy. Supplier shall identify the samples for cold bending test in line with PC-M-287 Clause 5.2c) (Identification of samples will be in presence of the inspection agencies) and send to BHEL Trichy for testing. Material acceptance shall be given to supplier subject to outcome of the cold bending test in accordance with PC-M-287 Clause 5.2c). The arrangements & cost of sending the samples to BHEL Trichy shall be borne by the supplier.
12. The Supplier shall submit the offer for all the items since all the items indicated in the PR is proposed to be procured from the same Supplier as a package.
13. Supplier shall submit their QA Manual/Quality Manual in line with ISO 9001 (Latest version) for review and acceptance by BHEL
14. Quantity given in the indent may increase or decrease and will depend on the requirements of BHEL & NPCIL. Quantity being procured will be finalized before price bid opening.

30/07/2022

30.07.2022

15. Due to stringent quality requirements, offers from traders/dealers/distributors/stockiest shall not be entertained and will not be considered for evaluation.
16. Offers received will be evaluated by BHEL and NPCIL. Final acceptance of the offers will be based on NPCIL recommendation.
17. Supplier has to submit Quality Documents– Quality Assurance Plan (QAP) (in line with Suggestive Quality Assurance Plan), Heat Treatment Plan, Manufacturing Process Plan (MPP) and associated procedures, Material Sampling and Testing Plan (MSTP) and related test procedures, NDE documents (NDE procedures & Technique Sheets) for approval from BHEL & NPCIL after awarding the contract.
18. The actual production of material is permitted only after approval of all documents required for manufacturing / inspection / testing activities by BHEL and NPCIL.
19. Inspection agency for imports are BHEL & NPCIL or NPCIL appointed third party inspection (TPI) agency. Inspection agency for indigenous supply are BHEL and NPCIL.
20. Chemical and mechanical tests shall be carried out in In-house labs or Labs meeting the requirements as per National/ International standards like ISO 9001 or ISO/IEC 17025 etc. or Government approved labs.
21. Supplier shall submit test certificates of indented items after completion of manufacturing for review by BHEL & NPCIL. Dispatch clearance will be given after acceptance of the test certificates by BHEL & NPCIL.
22. Documentation: Three sets of documents containing (i.) Test Certificates and respective test reports (ii.) copies of the approved quality documents, records and test procedures, (iii.) NCRs/DCRs (if any) and (iv.) Drawing etc. to be provided along with the supply of the indented items. The supplier shall be responsible for preparation and issue of all certificates, reports and documents which shall be certified by "BHEL" & "NPCIL/TPI". Such certified final documents shall form part of history dockets and shall be supplied in bound volumes (3 copies) with proper identification. Final documentation shall also be submitted in soft form (pdf format) with proper indexing.
23. Supplier shall submit his technical and commercial bid conforming to the above points as given in this annexure.

Sridharan 30/07/2022

Engineering

K. SRIDHARAN
Sr. Dy. General Manager
Engg., MP, SC & OP&C / ATP
BHEL, TRICHY - 620 014

30.07.2022

Material Planning

ASHWIN KUMAR MAROLI
Manager - MP & SC
Advanced Technology Products
BHEL, TRICHY - 620 014.

## SPECIAL CONDITION ANNEXURE - B

Requirements of Financial Soundness:

1. Import suppliers shall submit latest report from any reputed third party business rating agency like Dun &Bradstreet, Credit reform etc.

2. Indigenous supplier shall submit audited copies of annual reports (Balance Sheet), Profit & Loss statement for the last three years (or from the date of incorporation whichever is less) and GST Certificate.

   This Special Condition Annexure-B (Financial Soundness) along with Special Condition Annexure-A (Technical Qualification requirements) together will form the Pre-Qualification requirements for this PR.

******

ASHWIN KUMAR MAROLI

Digitally signed by ASHWIN KUMAR MAROLI
Date: 2022.04.13 11:31:19 +05'30'

PC-M-287

**NUCLEAR POWER CORPORATION OF INDIA LTD**
**(A Government of India Enterprise)**

PROJECT : 700 MWe

SPECIFICATION NO. : PC-M-287

| REVISION NO. | 0 | 1 | | |
|---|---|---|---|---|
| DATE OF REVISION (Months / Year) | July, 2008 | Sept. 2009 | | |
| TOTAL NO OF PAGES (Including cover sheet) | 18+2 | 18+2 | | |

# Technical Specification For Seamless Carbon Steel Pipes and Butt Welding Seamless Fittings For Feeders

USI No. : 33116
Ref : PB-M-48, R-3, Feb., 2001

| | | | | |
|---|---|---|---|---|
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| APPROVED BY | : | G.K. Sharma | | 30.09.09 |

Name Signature Date

R1 Issued : Sept. 2009
Issued By : NPCIL

## REVISION CONTROL SHEET

**DOCUMENT TYPE: SPECIFICATION**

**NO. : PC-M-287 Rev.No. 1**

**TITLE : Technical Specification for Seamless Carbon Steel Pipes and Butt Welding Seamless Fittings for Feeders**

| REV. NO. & DATE | DESCRIPTION OF REVISION | PREPARED BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|---|---|---|---|---|---|
| 0 (July' 2008) | Original (pages 18+2) | R.Midha / JKS | T.S.Shetty | T.K.Kandar / G.M.Arora | G.K.Sharma |
| 1 (Sept.' 2009) | 100 mm NB feeder pipe, feeder stubs and feeder fittings added in para. 4.1.2 (f) and 4.1.3 (e) | 30.9.09 S.Ahmad 30.9.09 | 30-9-09 | T.K.Kandar 30.9.09 Rajendra Kawde 30.09.09 | G.K.Sharma 30.09.09 |

## .1.0 SCOPE

This Specification establishes the technical requirements for the material, manufacture, examination, inspection, testing documentation, identification and packaging of seamless carbon steel pipes and butt welding seamless carbon steel fittings for "FEEDERS'.

## 2.0 CONTENTS

The requirements of this specification are presented under the following headings:



## 3.0 SPECIFICATIONS, CODES/STANDARDS AND DRAWINGS

All Specifications, codes/standards and drawings listed below of the issue in effect on the date of the pertinent tendering documents, apply as specified herein. In the event of any conflict between the provisions of this specification and the documents listed below, this specification with the concurrence of Purchaser shall govern.

3.1 Specifications, Codes/Standards

| | | |
|---|---|---|
| ASME | :- | Boiler and Pressure Vessel Code |
| | :- | Section II – Part A – Ferrous Material Specifications |
| | :- | Section III – Division-1 Sub-Section NB – Class-I Components |
| | :- | Section V – Non-destructive Examination |
| ANSI | :- | Standards of American National Standards Institutes |

| | | |
|---|---|---|
| ANSI – B 16.9 | :- | Factory made Wrought Steel Butt Welding Fittings |
| ANSI – B 16.25 | :- | Butt Welding of Ends |
| ANSI – B 16.28 | :- | Wrought Steel Butt Welding Short Radius Elbows and Returns |
| ANSI – B 46.1 | :- | Surface Texture |
| MSS – SP – 25 | :- | Standard Marking System for Valves, Fittings, Flanges and Unions |
| ASTM | :- | Appropriate standards of American Society for Testing and Materials |
| SA – 333 | :- | Specification for Seamless and Welded Steel Pipe for Low Temperature Service |
| SA - 370 | :- | Test Methods and definitions For Mechanical Testing Of Steel products |
| SA – 420 | :- | Specification for Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Low Temperature Service |
| SA – 530 | :- | Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe |
| SE – 709 | :- | Standard Guide for Magnetic Particle Examination |
| SE – 165 | :- | Standard Method for Liquid Penetrant Inspection |
| SE – 213 | :- | Standard Method for Ultrasonic Inspection of Metal Pipe and Tubing |
| ASTM-E-94 | :- | Recommended Practice for Radiographic Testing |
| ASTM – E – 112 | :- | Method for Estimating the Average Grain Size of Metals |
| ASTM-E-381 | :- | Method of Macro Etch Testing Products, Inspection and Rating Comprising Steel Bars, Billets, Blooms and Forgings. |

3.2 **Drawings**

| | | |
|---|---|---|
| NPCIL/01006/2235/SK | :- | Butt welding edge preparation for feeder fittings (for Flat type consumable inserts) |

## 4.0 MATERIAL AND MANUFACTURING REQUIREMENTS

### 4.1 Material Requirements

#### 4.1.1 General

All pipes and butt welding fittings shall be new and of high quality carbon steel material and manufacture. All the general requirements, specified herein, regarding material, manufacture, examination, inspection and testing shall be applicable to all pipes and butt welding fittings and shall also be applicable to the starting stock used for the manufacture of butt welding fittings. All pipes and butt welding fittings shall be of 'SEAMLESS' manufacture. They shall have the best workmanship like finish and be made by the best manufacturing practice.

a) The steel shall be clean, homogeneous and intrinsically tough and shall be produced by recognized "fine Grain melting practice" and shall be fully "killed". The manufacturer shall indicate in the bid the Austenitic grain size guaranteed in the micro structure for their offered products and shall report the grain size actually achieved in the material certificates in the event of an order. Grain size should be 5 or finer.

b) The steel subjected to vacuum treatment and/or refinement is preferred. The manufacturer shall indicate in the bid the particular type of vacuum treatment and/or refinement method used for Purchasers consideration/evaluation.

c) The chemical composition shall be in accordance with the particular SA-Material specifications specified herein with the following restrictions on chromium, sulphur, phosphorus and other elements:

| | | |
|---|---|---|
| Chromium | : | 0.20% min. and 0.25% max. |
| Sulphur | : | 0.025% max. |
| Phosphorus | : | 0.025% max. |
| Aluminimum | : | 0.04% max |
| Vanadium | : | 0.01% max. |
| Copper | : | 0.30% max. |
| Cobalt | : | 0.02% max. |
| Nickel | : | 0.40% max. |
| Molybdenum | : | 0.10% max. |

d) All material product forms shall be supplied in the "Normalized" condition, unless otherwise specified herein and shall be delivered in "pickled" condition. All heat treatment and pickling procedures shall be subjected to purchaser's approval.

Note: - All pipe and pipe fittings shall be pickled to remove loose scale before use for fabrication. (Either at supplier's shop or at site by the contractor)

e) In addition to the particular SA – Material specification requirements, the following special or supplementary requirements shall be applicable to pipes and butt welding fittings, where appropriate for the material product forms and as specified herein. However, if any of the following requirements are already called for in the SA – Material specification, then such requirements need not be repeated, provided the scope of testing of the stricter of the two is followed :-

| Sl. No | Special/ Supplementary Requirement | Material Product Form | Remarks |
|---|---|---|---|
| 1. | Metal Macro Structure / Etching test | Pipes and pipe fittings | Vide 4.1.2(d) and 4.1.3(d) |
| 2. | Grain size evaluation | Pipes and pipe fittings | Vide 4.1.2(d) and 4.1.3(d) |
| 3. | Product Analysis (Modified) | Pipes and pipe fittings | Vide 4.1.2(d) and 4.1.3(d) |
| 4. | Hardness Test | Pipe fittings | Vide 4.1.3(d) |
| 5. | Cold bending (close coiling) test | Pipes | Vide 4.1.2(d) and 5.2 (c) |
| 6. | Flattening test | Pipes | Vide 4.1.2 (d) |
| 7. | Controlled Bore and Wall Thickness | Pipes and pipe fittings | Vide 4.1.2 (f) and 4.1.3 (e) |
| 8. | Hydrostatic Test | Pipes and pipe fittings | Vide 4.1.2 (d) and 4.1.3 (d) |
| 9. | Magnetic Particle Examination | Pipe fittings | Vide 4.1.3 (d) |
| 10. | Liquid Penetrant Examination | Pipe fittings | Only when magnetic particle examination is not feasible. Permitted only with prior approval of Purchaser. |
| 11. | Ultrasonic Examination | Pipes and pipe fittings | Vide 4.3.2 and 5.3 |
| 12. | No Repair by Welding | All pipes and pipe fittings | |
| 13. | No bar stock machined products | All pipe fittings | |

4.1.2 **Pipes**

a) All pipes shall be in accordance with SA-333 Grade 6 (modified). They shall also meet the requirements of ASME Section III – NB for Class I components and this specification

b) Pipes shall be cold drawn, followed by appropriate heat treatment for controlling and achieving the required micro-structure and mechanical properties. The pipes shall be finally bright annealed. All pipes supplied to this specification shall be suitable for cold bending (close coiling) to a minimum mean radius of the lesser of 250 mm or four times the pipe O.D. The manufacturing route and condition of each lot of pipe shall be recorded. Refer Appendix-A for Standard QAP.

c) Pipes shall be offered in double random lengths, unless otherwise specified in tendering documents. Pipes shall be supplied with square cut ends. Average length of supplied pipes shall be 11 meter with minimum length of 7 meter.

d) For all pipes, the special/supplementary tests as defined below shall be conducted with satisfactory results.

1) Metal structure/etching test
2) Grain size evaluation (5 or Finer shall be obtained)
3) Product analysis (Modified)

} These tests shall be conducted on one sample, for each test, taken from each pipe size per lot.

4) Flattening test (as per SA-530)

} This test shall be conducted on each pipe at both ends.

5) Cold bending (close Coiling) test, [vide 5.2 (c)].
This test shall be conducted on two samples taken from pipes of each size per lot.

6) Hydrostatic test
7) Ultrasonic examination

} The test/examination shall be conducted on each pipe.

e) No repair by welding shall be permitted on the pipes.

f) The pipe / header stubs supplied to this specification shall be of special dimensions with controlled bore diameter and wall thickness.

R-1

| Nominal size | Special ID for Feeder Pipe/ Header Stub (mm) | Wall Thickness of Feeder Pipe | Special Thickness for Feeder Stubs (mm) on reactor headers |
|---|---|---|---|
| 100 mm NB | 87.00 ± 0.50 | $10.0^{+0.60/-0.00}$ | $13.50^{+1.0/-0.0}$ |
| 80 mm NB | 73.65 ± 0.45 | $8.50^{+0.60/-0.00}$ | $11.0^{+1.0/-0.0}$ |
| 65 mm NB | 59.00 ± 0.40 | $7.40^{+0.60/-0.00}$ | $10.0^{+1.0/-0.0}$ |
| 50 mm NB | 49.25 ± 0.30 | $6.75^{+0.60/-0.00}$ | $9.0^{+1.0/-0.0}$ |

4.1.3 **Butt Welding Pipe Fittings**

a) All butt welding fittings shall be in accordance with SA-420 Gr.WPL-6 (modified). They shall also meet the requirements of ASME Section III – NB for Class-I components and this Specification. The fittings shall be rated equivalent in strength (pressure rating) to pipes of same size and wall thickness. This shall be established and certified as described in NB-3649 and NB-3612.

b) Butt welding fittings shall be forged or formed to the finished shape and size by hot working. The hot working shall be done in such a way as to cause metal flow in directions most favorable for resisting the stresses encountered in service and as to achieve completely wrought structure. Forging for pipe fittings shall be done in number of stages. Fittings manufactured by hot working and/or cold forming processes shall be appropriately heat treated for controlling and achieving the required micro structure and mechanical properties. Fittings shall be finally annealed or normalized. The manufacturing route and condition of each lot of fittings shall be recorded. Refer Appendix-B for Standard QAP.

c) Fittings shall not be manufactured by machining only from bar stock.

d) For all fittings, the special / supplementary tests as defined below shall be conducted with satisfactory results.

| | | |
|---|---|---|
| 1) | Metal structure/etching test | These tests shall be conducted on one sample, for each test, taken from each size of fittings per lot. |
| 2) | Grain size evaluation (5 or finer shall be obtained) | |
| 3) | Product analysis | |
| 4) | Hardness test<br>Fittings shall have maximum hardness of 197 HB. | |
| 5) | Hydrostatic test | The test shall be conducted on 2 samples for each size of fittings per lot. Hydro pressure shall be 174 $Kg/cm^2(g)$ |
| 6) | Ultrasonic examination | To be carried out on all fittings. [Refer Note 5.3.1(b)] |
| 7) | Magnetic particle examination | |
| 8) | Dimension Check | See Note given below. |
| 9) | Thickness gauging by ultrasonic | |
| 10) | Proof test | The test shall be conducted on one fitting from each nominal size. Pressure shall be 770 $Kg/cm^2(g)$ |

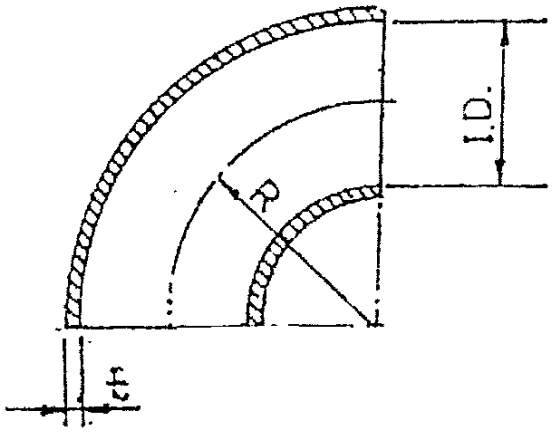
Note: - Ultrasonic Thickness Gauging: - In addition to thickness measurement by conventional methods, ultrasonic thickness gauging shall be carried out (in grid pattern) on pipe fittings from each lot on random basis. For elbows the extent of examination shall be minimum 10 % and for other fittings it shall be minimum 2%. If results are found to be unacceptable, the thickness gauging shall be extended on 100% of fittings.

e) The fittings supplied to this specification shall comply with the requirements of ANSI-B-16.28 / B-16.9 for the corresponding nominal size fittings excepting that their bores and wall thickness shall meet the special requirements as given below:

R-1

| Nominal size | Special ID for elbows at ends & concentric reducer(mm) | Special ID for elbow along the length (mm) | Special Wall Thickness, t | | Bend Radius * R | |
|---|---|---|---|---|---|---|
| | | | Concentric Reducers (mm) | Elbows (mm) | LR (mm) | SR (mm) |
| 100 mm NB | 87.00 ± 0.50 | 87.00 ± 0.50 | $10.00^{+0.60/-0.00}$ | $10.00^{+0.60/-0.00}$ | 152.4 | -- |
| 80 mm NB | 73.65 ± 0.45 | 73.65 ± 0.45 | $8.50^{+0.60/-0.00}$ | $8.50^{+0.60/-0.00}$ | 114.3 | -- |
| 65 mm NB | 59.00 ± 0.40 | 59.00 ± 1.0 | $7.40^{+0.60/-0.00}$ | $9.50^{+0.6/-0.00}$ | 95.25 | 63.50 |
| 50 mm NB | 49.25 ± 0.30 | 49.25 ± 0.8 | $6.75^{+0.60/-0.00}$ | $8.70^{+0.5/-0.00}$ | 76.20 | 50.80 |

* Refer Sketch below:




f) The fittings shall have circular, uniform and smooth bores. This shall be demonstrated by means of longitudinal and transverse sectioning on a representative fitting of each size and wall thickness, produced by the same production process/method for the bulk order fittings. The butt weld edge preparations shall be as per drawing no: NPCIL/01006/2235/SK suitable for Flat type consumable inserts.

g) Ovality, concentricity, other tolerances (except ID and wall thickness) shall be as given in ANSI B16.28 and B16.9 for pipe fittings.

h) No repair by welding shall be permitted on the fittings.

i) Ball passage test shall be carried out on all the elbows. The size of the ball shall be worked out by the manufacturer considering the dimensional requirement and after establishing the procedure obtain NPCIL approval.

## 4.2 Surface Finish and End Preparation

4.2.1 The surfaces of pipes and pipe fittings shall be smooth and even, and shall be prepared as required for the examination, inspection and tests called for in para-5.0 – Examination, Inspection and testing.

4.2.2 Butt welding ends of pipe fittings shall be prepared in accordance with Drawing No. NPCIL/01006/2235/SK for Butt Welding Edge Preparation for feeder fittings for Flat type consumable inserts. Other requirements for edge preparation shall be as per ANSI B 16.25.

## 4.3 Repair of Pipes and Fittings

4.3.1 All the surface of pipes and fittings shall be smooth and all surface, defects revealed by visual or non-destructive examinations shall be removed as required by ASME Section III NB – 2538 excepting that repair by welding shall not be permitted.

4.3.2 Pipes and pipe fittings containing sub surface defects which are greater than 5% of the wall thickness, as revealed by the volumetric examination such as ultrasonic / radiographic examination, are not acceptable and shall be rejected.

4.3.3 Repairs by thermal process shall not be performed and all local repairs shall be by mechanical means only, viz. grinding and machining and shall be smoothly blended into the surrounding surface. Removal of any defects, surface or sub surface, shall not reduce the remaining local defect free wall thickness under the repair areas to less than the specified minimum wall thickness in Para 4.1.2(f) & 4.1.3 (e). All repaired areas shall be re-examined by magnetic particle and the volumetric examination by which the defect was detected, to ensure complete removal of the defect. Acceptance of repaired geometrics shall be at the discretion of the Purchaser.

4.3.4 However, repair by local grinding / machining shall not be permitted in such portions of any fitting, if it impairs the integrity or reinforcement of such fittings (e.g. high stress/stress concentration areas).

## 5.0 EXAMINATION, INSPECTION AND TESTING

### 5.1 General

The manufacturer shall be responsible to provide and perform all the in-process and final examination, inspection and testing specified herein. The examination, inspection and testing shall be programmed and conducted in a manner satisfactory to the Purchaser and hence the examination, inspection and testing programme and procedures shall be subjected to the prior approval of the purchaser.

The Purchaser or his authorized, agency shall have access to the Manufacturer's or their sub-contractors premises at all reasonable times and to the extent necessary to assess compliance with the provisions of the said programme and this specification. Examination, inspection and test reports shall be submitted by the Manufacturer to the Purchaser.

### 5.2 Material Inspection and Tests

a) All the materials shall be inspected / tested with satisfactory results and accepted in full compliance with the applicable SA – Material specification and in addition with this specification. The material shall be tested in its final finished and heat treated condition at delivery.

b) The pipes and pipe fittings shall be impact tested and shall comply with the impact test requirements of the applicable SA – Material Specification.

c) Cold Bend Tests for Pipes

Two pipe sample lengths selected from each size per lot shall be cold bent through 135° around a cylindrical or contoured mandrel to produce pipe bends of mean radius equal to lesser of 250 mm or 4 (four) times the pipe O.D. Suitable flexible bore mandrels or approved filler material shall be used to maintain the section circularity of the pipe bends. After bending, the external surfaces of each test bend shall be inspected and shall be found free from cracks, laminations and other defects. Further the external surfaces of each test bend shall be examined by liquid penetrant method and shall be free from any indications. Similarly internal surfaces of the bend shall be inspected after sectioning and liquid penetrant examination carried out. After the successful completion of these inspection and examination, the bend specimens shall be forwarded to the Purchaser for his review and reference purposes.

If the test bends reveal any cracks, laminations or other defects on inspection or any unacceptable indications on liquid penetrant examination, the lot of pipes from which these test bends were made shall be rejected.

d) Documents in the form of Certified Material Inspection / Test reports and Mill Certificates that the required tests have been carried out at the sources shall be furnished by the Manufacturer to the Purchaser.

## 5.3 Non-destructive Examination of Pipes and Fittings

### 5.3.1 Examination of Pipes and Pipe – Stock

a) Pipes of all sizes shall be examined for both "Longitudinal and Transverse" discontinuities by Ultrasonic examination by scanning with beam directed successively in two opposite circumferential directions and two opposite longitudinal directions. The examination shall be carried out in accordance with ASME Section III NB-2550.

b) In case of such pipe fittings which cannot be satisfactorily examined by ultrasonic method, their starting pipe stock material shall be ultrasonically examined as in (a) above. This aspect shall be checked, established prior to taking up manufacturing of pipe fittings and needs approval of purchasers. In addition to ultrasonic inspection, 5% (Min.5 Nos.) fittings of lot of each size shall be radiographed to detect any flaws.

### 5.3.2 Examination of Pipe Fittings

a) Each pipe fitting shall be ultrasonically examined completely to cover its entire volume.

b) If it is not possible to cover the entire volume in the finished form the starting stock or semi-finished material, shaped nearest to the final form shall be ultrasonically examined completely and subsequently the finished product shall be ultrasonically examined to the maximum extent possible. Further, if the purchaser deems it necessary the Manufacturer shall examine by radiographic method, to Purchaser's satisfaction, such portion of the finished product which cannot be either ultrasonically examined meaningfully or examined to the required ultrasonic examination acceptance standards.

The bidder shall describe in detail the stages and extent of volumetric examination in his quotation for Purchaser's evaluation.

c) Each pipe fitting shall be examined by magnetic particle method. This examination shall cover completely all the external surfaces and accessible internal surfaces. The examination shall be repeated with magnetization applied successively in two mutually perpendicular directions over the surfaces. When magnetic particle examination cannot be meaningfully carried out over an entire or part of a fitting liquid penetrant examination may be carried out in such cases with prior approval of the Purchaser.

d) The Ultrasonic, Radiographic Magnetic Particle and Liquid Penetrant Examinations shall be in accordance with ASME Section III – NB-2550. The ultrasonic examination acceptance standards for the starting stock or semi-finished material shall be same as called for the corresponding finished product thickness.

e) Ultrasonic thickness gauging for elbows to be done as per approved procedure.

## 5.4 Additional Examination, Inspection and Testing Requirements

5.4.1 All examination, inspection and testing procedures shall be submitted to Purchaser for approval and only after the approval of such procedures work shall commence.

5.4.2 All chemicals and fluids such as cleaning agents, penetrants, developers and water used for hydrostatic testing and paints used for marking shall preferably be free from halogen and sulphur. However, in no case more than 25 ppm of halogen and sulphur shall be permitted. For hydro testing, the potable quality water is acceptable. Examination materials, chemicals, fluids, or any other material used for examination, inspection and tests shall be removed from the product to achieve a clean-dry surface.

5.4.3 Fittings shall be demagnetized immediately after magnetic particle examination.

5.4.4 In addition to the above examination, inspection and tests, the finish of all surfaces of all pipes and fittings shall be inspected visually as required by the basic SA – Material Specifications. This shall include the use of boroscope, dental mirrors or any other devices where necessary.

# 6.0 DOCUMENTATION AND IDENTIFICATION

## 6.1 Documentation

All manufacturing Procedures, Examination/Inspection/Testing programme and procedures, after approval by Purchaser as called for in this Specification, shall form part of documentation. Various Examination, Inspection and Testing data/results obtained their evaluation and disposition etc, shall be properly documented and certified by the Manufacturer. The final documentation, before issue, shall be countersigned by the Purchaser or his Authorized Agency. At least 6 (six) sets of such final documentation shall be supplied to the Purchaser.

## 6.2 Identification

a) Pipes shall be marked in accordance with SA – 530 and the applicable SA-Material Specification. Marking shall be done on both the ends of pipes.

b) All fittings shall be marked in accordance with MSS-SP-25 and the applicable SA – Material Specification.

c) In addition, all pipes and fittings shall be identified with this specification no. (PC-M-287) and the lot reference number.

d) Marking shall be by vibro-tool or electro-etching only.

e) To indicate that the materials have undergone non-destructive examinations an additional material identification shall be painted on each piece as described below:

i) Pipes : A continuous longitudinal white strip

ii) Fittings : A continuous white strip on the major dimensions but not extending over the machined end preparation.

## 7.0 PRESERVATION AND PACKAGING FOR SHIPMENT

7.1 The Manufacturer shall not ship the materials without obtaining the clearance for shipment by the Purchaser or his Authorized Agency.

7.2 The supplier shall be responsible for preparing, preserving and packing the materials supplied to this specification, to protect them against corrosion and damage of any kind during shipment to the destination and also during storage at site. Protective measures shall be adequate to prevent corrosion in transit and in storage at the destination for a period of about 48 months in a tropical climate.

7.3 All material shall be cleaned and coated with removable preservative to prevent corrosion. Pipe fittings shall be packaged to protect their weld edge preparations. Pipe ends shall be sealed by water proof plastic end caps. All material shall be packed in weather proof wooden boxes in such a way that materials will not undergo any damage or rusting during shipment, handling and site storage. The packaging shall be subjected to the inspection and approval of Purchaser or his Authorized Representative.

7.4 All pipes shall be in bundles with each pipe ends closed, machine strapped at 3 places and box packed

## 8.0 TECHNICAL INFORMATION REQUIRED TO BE SUBMITTED WITH BIDS

1) Catalogue, technical literature indicating product range, manufacturing and testing facilities available at bidder works.

2) Confirmation to the effect that the specifications have been clearly understood by the bidder.

3) Confirmation to the extent that the material shall be supplied completely in accordance with technical specifications. In case of any deviations from technical specifications, the fact should be clearly brought out giving cross reference to the Para no., section no. of this specification.

4) Complete manufacturing sequence with details of the process at each stage. Indicate clearly the method for manufacturing ID controlled pipe fittings.

5) Raw material proposed to be used for manufacturing of each type item. i.e. material specification, size, thickness of raw material to be used for manufacturing pipes and pipe fittings.

6) Indicate specifically :

   i) Type of vacuum treatment or refinement method used.
   ii) Meeting additional chemistry control requirements
   iii) Forging ratio for making pipe fittings.
   iv) Availability of pickling facility.

7) Vendor shall indicate the activities to be carried out in house and furnish the details of sub vendors for manufacturing / inspection activities.

## APPENDIX – A: STANDARD QUALITY ASSURANCE PLAN FOR PIPES

| Sl. No | OPERATION | NPC'S INSPECTION | | | SAMPLE | INSPECTION |
|---|---|---|---|---|---|---|
| | | A | B | C | | |
| 1. | Heat Analysis | √ | | | One sample per heat | Checking of test certificates- Heat no. grade, Fine grain melting practice and fully killed. See restrictions of Para 4.1.1 ( c) |
| 2. | Heat Treatment | √ | √ | | All pipes must be heat treated | H.T. by normalizing. Checking of time temperature chart. |
| 3. | Product Analysis | √ | | | As per material spec ( min. One sample from each size per each lot) | Checking of test certificates see restrictions of Para 4.1.1(c) |
| 4. | Tensile Test | √ | | √ | On 5% of the pipes from lot ( min. two per lot) | Witness the test operation |
| 5. | Impact test | √ | | √ | As per material spec. | Witness the test operation |
| 6. | Grain Size | √ | | √ | One sample from each size per lot | Checking |
| 7. | Flattening Test | √ | | √ | Test shall be made from both ends of each pipe. | Witness the test operation |
| 8. | Cold bending test & Liquid penetrant test | √ | | √ | Two samples taken from pipes of each size per lot | Witness the test operation |
| 9. | Metal Macro Structure / Etching test | √ | | | One sample from each size per lot | Also check that no seam and no repair by welding |
| 10. | Ultrasonic Examination | √ | √ | √ | Refer Para 5.3.1 | Witness the test operation. |
| 11. | LP Examination | √ | √ | √ | On re-worked areas only | Witness the test operation. |
| 12. | Hydrostatic Test | √ | √ | √ | Each pipe shall be tested at 174 $kg/cm^2$ (g) | Witness for pressure integrity and leak tightness |
| 13. | Dimension check | √ | | √ | Each pipe | Check for double random length, controlled bore, ends, wall thickness, straightness |
| 14. | Visual Inspection test | | √ | | 10% random checking – surface quality, cleaning | Inside/outside of pipes to ensure absence of mill scale, degreased condition and dryness. |
| 15. | Marking, color coding | √ | | | Each pipe shall be marked | Checking as per Para 6.2 |
| 16. | Document / test certificate verification | √ | | | All certificates must be checked. | Checking |
| 17. | Preservation and Packing | √ | | | All pipes must be suitably packed | Checking as per Para 7.0 |
| 18. | Issue of Third Party Inspection Certificate and Shipping Release Note. | √ | | √ | | |

## APPENDIX – B: STANDARD QUALITY ASSURANCE PLAN FOR PIPE FITTINGS

| Sl. No | OPERATION | NPC'S INSPECTION | | | SAMPLE | INSPECTION |
|---|---|---|---|---|---|---|
| | | A | B | C | | |
| 1. | Inspection of pipes | √ | | √ | All pipes | Co-relation with mill T.C., heat no. and grade, surface quality, dimensional check |
| 2. | Heat Analysis | √ | | √ | One sample per heat | Checking of test certificates. See restrictions of Para 4.1.1 (c) |
| 3. | Ultrasonic test on starting stock / pipe | √ | √ | √ | Only when UTE on final product is not feasible (As per Para 5.3.1(b) | Prior approval required. Witness the test operation |
| 4. | Forming | √ | | √ | One sample from each lot of fittings per size and wall thickness | Longitudinal and transverse sectioning |
| 5. | Heat Treatment | √ | √ | | All pipe fittings must be heat treated | Checking of time temperature chart and temp. monitoring |
| 6. | Product Analysis | √ | | | As per material spec. ( min. one sample from each size per each lot) | Checking of test certificates see restrictions of Para 4.1.1(c) |
| 7. | Tensile Test | √ | | √ | One sample from each size of fitting per each lot ( min. as per material spec.) | Witness the test operation |
| 8. | Grain Size | √ | | √ | One sample per size per lot | Checking of Test Certificates |
| 9. | Impact test | √ | | √ | As per material spec. | Witness the test operation |
| 10. | Hardness Test | √ | | √ | One sample from each size of fitting per each lot | Witness the test operation |
| 11. | Proof test | √ | | √ | One sample from each nominal size of fitting | Witness the test operation |
| 12. | Etching test | √ | | | One sample from each size per lot | Checking of seamless. |
| 13. | Micro Structure test | √ | | | One sample from each size per lot | Checking |
| 14. | Radiographic examination | √ | √ | √ | Required on 5 % qty ( minimum 5 nos. fittings of each size), when UTE is carried out on starting pipe stock material | See Para 5.3.1 (b). Checking radiographs |
| 15. | Ultrasonic test | √ | √ | √ | As per Para 5.3.2 | Witness the test operation |
| 16. | Magnetic Particle Examination ( LPE if permitted) | √ | √ | √ | Each fitting shall be tested | Witness the test operation |
| 17. | Dimension Test | √ | | √ | Each fitting | |
| 18. | Ultrasonic Thickness gauging | √ | √ | √ | Fitting thickness gauging in grid pattern. Para 4.1.3 (d) | Witness the test operation |
| 19. | Hydrostatic Test at 174 $kg/cm^2(g)$ | √ | √ | √ | On two samples from each size of fittings per each lot | Witness for pressure integrity and leak tightness |
| 20. | Proof test | √ | | √ | One fitting from each nominal size. | Pressure shall be 770 $Kg/cm^2(g)$ |
| 21. | Ball passing test for elbows | √ | | √ | 100% elbows | Witness the test operation for circularity, ovality |
| 22. | Visual Inspection test | | √ | | 10% random checking – surface quality, cleaning | Inside/outside of fittings to ensure absence of mill scale, degreased condition and dryness. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 23. | Marking and color coding | √ | | | Each fitting shall be marked | Checking |
| 24. | Document / test certificate verification | √ | | | All certificates must be checked. | Checking |
| 25. | Preservation and Packing | √ | | | All fittings must be suitably packed | Checking |
| 26. | Issue of Third Party Inspection Certificate and Shipping Release Note. | √ | | | | |

Legends:- A = Checking of Test Report
B = Checking of material or equipment
C = Witnessing of Operation (customer hold point)

**Notes:-**

1. The lot number, heat number, coil number, mill test certificate number and its quantity shall be identified at raw material stage for ladle analysis, check test analysis and for product analysis. Random samples for various testing as required by QAP and code / material specification shall be drawn by QA representative and stamped.
2. Original test certificate of raw materials shall be required for review at the time of First Stage Inspection.
3. Manufacturer should use starting stock of pipe of sufficiently higher thickness for making pipe fittings to meet thickness reduction during process of bending, forming, scale removal, grinding (for removal of surface defects if found during visual / MPE / UTE) marking, etc. Manufacturer shall satisfy this aspect to the purchaser's representative before taking up the work.
4. The material test laboratory shall be approved by NPCIL.
5. The heat treatment furnaces shall be in good condition and shall have temperature recorder and checked for calibration by NPCIL QA / Third party QA and the related certificate shall be submitted. The validity of calibration shall not be more than 6 months. The agency for heat treatment shall be approved by NPCIL.
6. The loading and unloading of items in the furnace may be witnessed by NPCIL QA / Third party representative. Heat treatment chart shall be submitted for review.
7. All items shall be identified to avoid mixing and proper identification during inspection and examination.
8. Vendor shall carry out 100 % dimensional check on all pipe fittings.
9. All items shall be visually examined for any imperfections and defects.
10. All NDE examinations (UTE, MPE, LPE, Eddy current testing, radiography, etc.) shall be carried out as per NPCIL approved procedures. The selection of appropriate technique(s) / method(s) shall be approved by NPCIL. Work shall be taken up after approval of procedures.
11. NPCIL QA representative / Third party shall witness 100 % UT examination, 100 % magnetic particle examination and 100 % liquid penetrant examination
12. On removal of surface defects after MPE / LPE (particularly on class-I components) thickness checking shall be carried out by ultrasonic gauging. The UT instrument shall have reference master thickness gauge of required contour and capable of measuring the least count accuracy as required.
13. Suitable Go - NO GO gauges and fixtures may be used for dimensional inspection. Threads shall be examined by plug and ring gauges. These gauges shall have proper certification for accuracy.
14. Material traceability report (indicating material, size, item description, lot no., heat no., NDE report nos., check test certificate, vendor's final certificate no., etc.) shall be submitted.

15. Color coding, bin card and proper tagging along with entry in proper registers shall be maintained to identify the location of material at any point during manufacturing and to avoid mixing of materials.
16. All items shall be stamped by vendor's name / monogram apart from item description, size, serial no., class, material code, rating, grade, etc. and meeting MSS-SP-25 and NPCIL specification. The fittings confirming to NPCIL specification shall be color coded as mentioned in specification.
17. The history docket containing all test certificates, inspection reports, approved procedures, QAPs along with shipping release shall be submitted in properly bound document, duly signed by NPCIL QA / Third party Inspection agency, along with soft copy on CD.
18. In case, manufacturer intends to use " On line " UTE or eddy current examination or hydro test facility, the required system details shall be submitted for approval for on line witnessing and extent of witnessing.
19. Calibrated instruments shall be used for inspection, examination and testing.
20. Non destructive examinations shall be carried out by personnel qualified to level-1 of ASNT/ISNT and evaluated by ASNT/ ISNT level-II.
21. The portion at the end of pipe which is not examined by Ultrasonic Examination is to be discarded.
22. The visual examination and dimensional check shall cover outer diameter, wall thickness, workmanship, root face, end beveling, end squareness, outer and inner surface finish, out of roundness, straightness, dents on inside / outside surfaces, length, weight, marking, color coding, stamping, stenciling, processing / rolling marks on internal surface, etc.
23. After repair by grinding on parent material up to minimum wall thickness, the repaired area should be blended smoothly to the surrounding surface.
24. Check and ensure consistency and repeatability of detection in ultrasonic examination.
25. The drawing for all non-standard pipe fittings (like branched outlet fittings, lateral tees, etc for which the dimensions are not given in ANSI standards) shall be submitted for NPCIL approval.
26. QA representative shall stamp the inspected items.
27. Vendor shall submit guarantee certificate.

# NUCLEAR POWER CORPORATION OF INDIA LTD

( A Government of India Enterprise)

**Project :** 700 Mwe FLEET MODE REACTOR HEADER ASSEMBLY
**TENDER NO.** CMM/FTP/00-33-1-1199

| | | | | | |
|---|---|---|---|---|---|
| **Revision No** | 0 | | | | |
| **Date of Revision ( Month and Year )** | April 2019 | | | | |
| **Total Number of pages ( Including cover sheet )** | 8 | | | | |

# QAP for Seamless Carbon steel Pipes SA-333 GRADE -6

| | | |
|---|---|---|
| **Prepared By** | SONU KUMAR, EE (SG & RH) | 16/04/2019 |
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| **Approved By** | M.R.S. SAXENA, AD (SG & HTE) | 16/4/19 |
| | Name & designation | Sign & Date |

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| | QS REFERENCE NO. | PROJECT | | | | | | | MAIN CONTRACTOR:- | | | | |
| SR.No | COMPONENT /OPERATION | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | AGENCY | | | | REMARKS |
| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| 1 | Billet | Heat analysis &Chemical Composition | MA | Checking of TC, Heat No, Grade, fine grain, melting practice, fully killed, vacuum degassed | One sample per heat per size | Material specification – SA-333- Gr 6 modified , PC-M-287 R-1 | Material specification – SA-333-Gr 6 modified, PC-M-287 R-1 | Test Report | 3 | | | 1,2 | |
| 2 | Heat Treatment of Pipes | Monitoring of Temperature and Time | MA | Job loading & at the end of soaking witness , Review of H.T Register& chart | 100 % | PC-M-287 R-1 & Material specification – SA-333 Gr 6, NPCIL Approved procedure | PC-M-287 R-1 & Material specification – SA-333 Gr 6, NPCIL Approved procedure | HT Charts | 3 | | | 2,1 | Refer Note no-1 |
| 3 | Product Analysis | Chemical Composition | MA | Chemical Elements | One sample from each pipe size | PC-M-287 R-1 & Material specification – SA-333 Gr 6 | PC-M-287 R-1 & Material specification – SA-333 Gr 6 | Test Report | 3 | 2,1 | | | |

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
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| SEAL & SIGNATURE WITH DATE | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT.<br># '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

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| | | ITEM | | QAP FOR REACTOR HEADER–SEAMLESS CARBON STEEL PIPES SA - 333 GRADE -6(MODIFIED) | | | | | P.O.NO- Date- | | | | |
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| | | | | | per lot per heat | | | | | | | | |
| 4 | Tensile Test ( Longitudinal) | Tensile Strength and % Elongation (UTS,Y.S. and % Elongation) | MA | Strength and % Elongation | On 5 % of the pipes from each lot or min two per heat per lot | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Test Report | 3 | 2,1 | | | |
| 5 | Impact Test | Impact test at -45 degree C | MA | Toughness | One set (3 Nos.) / Heat/lot | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Test Report | 3 | 2,1 | | | Refer Note no-2 |
| 6 | Grain Size | Grain and Microstructure | MA | Grain and Microstructure | One sample from each pipe size per lot per heat | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Test Report | 3 | 1,2 | | | |

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
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| SEAL & SIGNATURE WITH DATE | | SEAL & SIGNATURE WITH DATE | |

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| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| 7 | Flattening Test | Flattening | MA | Flattening Test | Each pipe at both end | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,SA-530 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,SA-530 | Test Report | 3 | 1,2 | | | |
| 8 | Metal Macro structure /Etching Test | Structure& Check for seamless | MA | Structure | One sample from each pipe size per heat per lot | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Test Report | 3 | 1,2 | | | |
| 9 | Cold bending, LP test and sectioning | Cold bending test & LPE | MA | Cold bend test | Two sample from each size per heat per lot | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Test report | 2 | | | 1,2 | |
| 10 | Ultrasonic Examination | UTE | CR | Surface &Volumetric Examination | 100% | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | UE Report | 3 | 2,1 | | | . |

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
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| | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT.<br># '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | | |
| SEAL & SIGNATURE WITH DATE | | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

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| | SUB- VENDOR P.O. NO. : | QAP NO | | | | | | | NAME OF THE PACKAGE : REACTOR HEADER ASSEMBLIES FOR FLEET MODE REACTOR HEADER | | | | |
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| SR.No | COMPONENT /OPERATION | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | AGENCY | | | | REMARKS |
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| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| | | | | | | ,ASME section III-NB-2550& NPCIL approved procedure | ,ASME section III-NB-2550& NPCIL approved procedure | | | | | | |
| 11 | Hydrostatic Test | Hydrostatic test @ 174 Kg/cm2 g | CR | Pressure Integrity and leak tightness. | 100% | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,ASME section III-NB-2550& NPCIL approved procedure | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,ASME section III-NB-2550& NPCIL approved procedure | Hydro test report | 3 | 2,1 | | | |
| 12 | Pickling & Passivation | Surface prevention | MA | Visual | 100 % | PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL approved procedure | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 ,NPCIL approved procedure | Test reports | 3 | 2,1 | | | |

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
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| | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT. | | |
| SEAL & SIGNATURE WITH DATE | # '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

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| | SUB- VENDOR P.O. NO. : | QAP NO | | NAME OF THE PACKAGE : REACTOR HEADER ASSEMBLIES FOR FLEET MODE REACTOR HEADER | |
| | QS REFERENCE NO. | PROJECT | | MAIN CONTRACTOR:- | |

| SR.No | COMPONENT /OPERATION | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | AGENCY | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| 13 | Visual &Dimension Check | Dimension & Surface quality and cleaning | MA | Length, controlled bore, end wall thickness, straightness, For 2 % pipes thickness checked by UT thickness gauge at 1 mtr interval on 4 location throughout the circumference of the pipe | 100% | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | IR | 3 | 2,1 | | | |
| 14 | Marking, color coding at both ends location of the Pipe | Visual, Marking | MA | On each pipe at various locations | 100 % | Material specification – SA-333 & SA-530 | Material specification – SA-333 & SA-530 | IR | 3 | 1,2 | | | Refer note-5&6.2 of NPCIL PC-M-287 |

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
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| | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT.<br># '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | | |
| SEAL & SIGNATURE WITH DATE | | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

| | SUB VENOR NAME- | SUGGESTIVE QUALITY ASSURANCE PLAN | | | | | | | NO. OF PAGES | | Page 6 of 7 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ITEM | | QAP FOR REACTOR HEADER–SEAMLESS CARBON STEEL PIPES SA - 333 GRADE -6(MODIFIED) | | | | | P.O.NO- Date- | | | | |
| | SUB- VENDOR P.O. NO. : | QAP NO | | | | | | | NAME OF THE PACKAGE : REACTOR HEADER ASSEMBLIES FOR FLEET MODE REACTOR HEADER | | | | |
| | QS REFERENCE NO. | PROJECT | | | | | | | MAIN CONTRACTOR:- | | | | |

| SR.No | COMPONENT /OPERATION | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | AGENCY | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |
| 15 | Document /test certificate verification | documentation | MA | verification | 100 % | PC-M-287 R-1 & Material specification – SA-333 –Gr 6, | PC-M-287 R-1 & Material specification – SA-333 –Gr 6, | IR | 3 | | 1,2 | | Refer note-6 |
| 16 | Preservation and packing | Surface preservation & Packing quality | MA | Verification | 100 % | PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL Approved procedure | PC-M-287 R-1 & Material specification – SA-333 –Gr 6, NPCIL Approved procedure | IR | 3 | 1,2 | | | Refer note-5 |
| 17 | Issue Shipping Release | documentation | CR | verification | 100 % | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | PC-M-287 R-1 & Material specification – SA-333 –Gr 6 | Shipping Release | 3 | | | 1,2 | Refer note-8 |

**NOTES:**

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
|---|---|---|---|
| | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT. | | |
| SEAL & SIGNATURE WITH DATE | # '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

| | SUB VENOR NAME- | SUGGESTIVE QUALITY ASSURANCE PLAN | | | | | | | NO. OF PAGES | | | | Page 7 of 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ITEM | | QAP FOR REACTOR HEADER–SEAMLESS CARBON STEEL PIPES SA - 333 GRADE -6(MODIFIED) | | | | | P.O.NO- Date- | | | | |
| | SUB- VENDOR P.O. NO. : | QAP NO | | | | | | | NAME OF THE PACKAGE : REACTOR HEADER ASSEMBLIES FOR FLEET MODE REACTOR HEADER | | | | |
| | QS REFERENCE NO. | PROJECT | | | | | | | MAIN CONTRACTOR:- | | | | |
| SR.No | COMPONENT /OPERATION | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | AGENCY | | | | REMARKS |
| | | | | | | | | | #P | W | R | H | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | | 11 |

1) The heat treatment furnaces shall be in good condition and shall have temperature recorder and checked for calibration by Vendor-Q.A and NPCIL Q.A or its authorized inspection agency. The related certificates shall be submitted. Validity of calibration shall not more than 6 months and that of thermocouples &controllers for 3 months.
2) For hydro testing DM water is preferable, however potable water is acceptable. Water used for hydrostatic testing shall preferably be free from halogen and Sulphur. In no case halogen and Sulphur more than 25 ppm of shall be permitted.
3) These pipes should be oil dipped in both ID & OD and capped on both ends before Marking as per PCM-287-R1.
4) The manufacturer shall not ship the pipes without obtaining the clearance for shipment by NPCIL-Q.S OR its authorized inspection agency.
5) No repair by welding shall be permitted on the pipes.
6) All NDT shall be witnessed by appropriate qualified personnel of LEVEL-2 qualified as per referencing code.
7) Surface defects like dents, mechanical marks, hit marks; handling marks removal shall be done as per clause 4.3 of PC-M-287.
8) Lot-Lot means quantities of one size having one heat number, HT together in a continuous furnace.

| SUB-VENDOR- | LEGEND :- | MAIN PACKAGE CONTRACTOR | NPCIL SIGNATURE |
|---|---|---|---|
| | 1.NPCIL<br>2.PACKAGE/MAIN CONTRACTOR:<br>3.MANUFACTURER/SUB-CONTRACTOR/SUB-VENDOR:-<br>4.NOMINATED INSPECTION AGENCY/APPROVED LAB<br>H: HOLD POINT,"P"PERFORM,"W"WITNESS AND "R"REVIEW, MA-MAJOR, CR-CRITICAL,MI-MINOR, TC-TEST CERTIFICATE, IR-INSPECTION REPORT. | | |
| SEAL & SIGNATURE WITH DATE | # '3' IS TO BE READ '2' UNLESS UNTIL SUBCONTRACTOR IS APPROVED FROM NPCIL | SEAL & SIGNATURE WITH DATE | SIGN & DATE |

# ***TENDER DETAILS***

| | |
|---|---|
| *DESCRIPTION* | ***Supply of SA333Gr6 Pipes as per NPCIlL Technical Specification PC-M-287 Rev 01.*** |

| Item Sl. No. | Description | Unit | Quantity |
|---|---|---|---|
| 10 | **PIPE ID 87 ± 0.5 x thk 13.5 +1 / -0 x lg 6000** | M | 2040 |
| 20 | **PIPE ID 59 ± 0.4 x thk 10 +1 / -0 x lg 6000** | M | 1050 |
| 30 | **PIPE ID 49.25 ± 0.3 x thk 9 +1 / -0 x lg 6000** | M | 780 |
| 40 | **PIPE ID 15.6 ± 0.2 x thk 5.5 +1 / -0 x lg 6000** | M | 552 |