BHARAT HEAVY ELECTRICALS LIMITED
MM/PURCHASE
BHEL / TRICHY-620 014.

ANNEXURE-D Rev 01
ENQ.No.1402400011

Dt.13-08-2024

Enquiry Terms & Conditions for DIN EN 10088-3 1.4550 SS Rods

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 Comments
01	**Material specification:** Supply of **65 mm dia SS Rods** shall be made strictly as per specification ***DIN EN 10088-3 1.4550*** **NPCIL Technical *Specification PC-M-960 & PC-M-961 &* Special Condition Annexure A** as mentioned in the enquiry.	
02	**Specification, Size & Quantity:** a) All the **SS Rods** are to be supplied fully meeting the ***DIN EN 10088-3 1.4550*** **NPCIL Technical *Specification PC-M-960 & PC-M-961 &* Special Condition Annexure A.** If there is any deviation, the same should be mentioned clearly in the offer itself. b) **Quantity of the DIN EN 10088-3 1.4550 SS Rods shall be as per tendered quantity and it is not splittable.** **65 mm dia SS Rods** / **Specification: *DIN EN 10088-3 1.4550*** / ***NPCIL Specification: PC-M-960 & PC-M-961*** — **2000 kg** c) Inspection agency for Indigenous suppliers – BHEL & NPCIL. d) Inspection agency for import suppliers - BHEL & NPCIL or NPCIL appointed third party inspection (TPI) agency. e) Point wise confirmation for Special Condition Annexure 1 (Pre-Qualification Criteria) and manufacturing facility details are to be mandatorily filled & signed by the bidder and to be uploaded in NIC portal (https://eprocurebhel.co.in) along with Technical Bid (Part 1 bid). f) **Review, Witness and Hold Points** **Review** – All relevant records pertaining to the process/ activity should be produced to BHEL & NPCIL, as the case may be, for verification. **Witness** – Witness points are critical steps in manufacturing and examination/ inspection / testing, where the supplier is obliged to notify BHEL & NPCIL, as the case may be, sufficiently in advance of the start of the operation / test so that the same could be witnessed. The supplier may proceed with the work past a witness point, provided BHEL / BHEL & NPCIL, as the case may be, had waived the same or notified to the supplier of the inability to attend it at the scheduled date / even at a later date. However, surprise visit could be made to verify such activity and retest may be demanded in case of any discrepancy. Parallel processing, notwithstanding the waiver of inspection for the current stage of manufacturing/ testing, is not permitted normally, however with written permission of BHEL / BHEL & NPCIL further processing/ activity could be done. **Hold** – BHEL & NPCIL witness & clearance is mandatory before proceeding with further activity. Under no circumstances further activities should proceed without formal clearance from BHEL & NPCIL for the current stage."	

03	**Offer Submission:** 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. 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. c) Scanned copy of the filled Annexure-A, Tender documents etc., shall be uploaded in the EPS portal. 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, **https://eprocurebhel.co.in** **http://www.bhel.com/tender/** e) Acceptance of offer will be subject to existing customer approval. f) **Quoted Currency.** Supplier Shall indicate the quoted currency. If there is any discrepancy in the terms quoted in techno-commercial bid and price bid, the terms as per the techno commercial bid (part-1) shall hold good and the commercial term quoted in Price bid (Part-II) shall not be considered. g) The quoted / finalized rates shall be Firm till execution of the supplies. Offer with PVC clause will not be considered.	
04	**Reverse Auction** BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.	
05	**Authorization for participation in EPS portal through DSC: E-Tender. Participation requirements:** Either Principal or authorized agent shall register their Digital Signature Certificate (DSC) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION). Suppliers are advised to go through the FAQ available in the web portal (https://eprocurebhel.co.in). DSC shall be registered for the authorized person and all transaction done using that DSC against our tenders shall be taken as valid communication and shall be binding on principal/agent and is valid legally. **For foreign Principal** In case of Principal (being foreigner), they may apply for DSC through Indian embassy at their country and can register with us for participating in E-tenders. Details of the applicable procedure is available in the webpage http://www.cca.gov.in/cca/. **For Indian agent** In case of agents participating/registering their DSC (of authorized person), it will be at the sole authorization of principal to their agents to participate on their behalf and all transactions done using that DSC against our tenders shall be known as valid communication and shall binding on principal and is legally valid.	
06	**Validity:** The offers shall be kept open for acceptance for 120 days from the date of Part 1 bid opening. Once the tenders are submitted, rates cannot be changed on any grounds.	
07	**Delivery**: The offer shall clearly indicate delivery period in **fixed number of weeks/Months** for each lot from the date of approval of technical documents and manufacturing clearance.	
08	**Goods and Service Tax (GST)** **Indigenous suppliers:** • 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. • 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 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. • All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).	

	• Invoices will be processed only upon completion of statutory requirement and further subject to following: o Vendor declaring such invoice in Form GST ANX-1 o Receipt of Goods or Services and Tax invoice by BHEL • 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). • 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. • 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 • 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. • 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. • 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. • 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. • GST CREDIT: Suppliers are advised to get registered to GSTN portal. Tenderer under "GST credit" shall be preferred. **Import Suppliers:** Supplier shall mention the HSN code of each item quoted by them in the offer. The HSN shall be mentioned in the Invoice also for each item without fail. Since GST is implemented, the taxes & duties will prevail as per the government notification/ guidelines. Our Provisional GST registration no. is **33AAACB4146P2ZL**. However, it will be mandatory to confirm from BHEL for this mentioned GST no. Suppliers may quote their GST no with valid proof in the quotation. Also before quoting of tender it is suggested to consider all the factors in line with GST guidelines for input tax credit to arrive ranking of quoted suppliers.	
09	**<u>Indigenous vendors – Terms of delivery:</u>** • 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). • The soft copies of the Invoice, LR copy & Test certificates shall be forwarded to BHEL immediately after dispatch.	
10	**<u>IMPORT Vendors - Terms of Delivery:</u>** a) Import vendors to submit offers on CFR (Cost & Freight), Chennai port (LILO – Liner in Liner Out) basis. b) Port of loading should be indicated without fail. c) Port of discharge should be Chennai. d) The preferred shipment mode is "**Containerized Cargo** or **Break Bulk**" shall be specified clearly in the offer. **<u>FOR CFR INCO TERMS – CONTAINERIZED CARGO</u>** a.) For CFR terms, moved through CONTAINERS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis including extra charges, if any, like Container Imbalance Charges, Trade Imbalance charges or any other charges payable to the Liner. No other charges other than the quoted Freight rate will be paid by BHEL excepting applicable Terminal Handling Charges, Container cleaning Charges, DO charges to Shipping Liner at Discharge Port. 14 FREE DAYS FOR Container detention shall be provided.	

	b.) In case of shipment through Containers on CFR basis, the BL should bear the endorsement that "14 free days for Container Detention is applicable". **BREAKBULK CARGO:** a) For CFR terms, moved through BREAK BULK BASIS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis. b) The materials will be Custom cleared from Port itself. **INFORMATION TO IMPORT SUPPLIERS:** a) Indian Customs imposed a penalty on late filing of Bill of Entries (Air/Sea Shipments) by the importer. Bill of Entry is Required to be Filed Latest by the End of Day Preceding the Day (including Holidays) of Arrival of the Vessel for sea shipments and by the end of same day on arrival of air shipment. Penalty for not filing Bill of Entry within the specified time period is Rs.5000/- per day (for Initial 03 days) & Rs.10000/- per day (thereafter). b) The vendor should furnish the Non-Negotiable Documents (Air Way Bill/Bill of Lading, Commercial Invoice, Packing List, and Certificate of Origin) either by email or post/courier to BHEL well before the landing of cargo at final port of discharge. c) Vendor will be held responsible for the penalty arises against the late filing of Bill Of entry due to: Non availability of Non-Negotiable Documents (NNDs) before the cargo arrival Discrepancy in documents Short landing of Consignments (For shipments on CFR/CPT/CIF/CIP – Chennai Port) d) All the shipments for the contracts (POs) finalized on CFR -Chennai Port basis (i) Delivery Orders involving multiple agencies like liners/freight forwarders are not allowed. There must be a single agency office at the final discharge Port (Chennai) for issuing the Delivery Order to BHEL. (ii) The detention/demurrage charges arising due to the nomination of containers under single BL to different/ multiple CFS by the liner will be deducted from Vendor's bills only. (iii) The detention/demurrage charges arise due to the delay in collection of Delivery Orders from multiple agencies of liner/freight forwarder also whose offices are not at available Chennai, the same amount will be deducted from Vendor's bills only. (iv) Apart from the normal charges like Terminal Handling Charges, Container cleaning Charges, Delivery Order Charges at final port of discharge no other charges will be borne by BHEL. (v) The liner/freight forwarders should be properly communicated by the Vendor for not to claim such charges for issuing Delivery Order. If the liner/freight forwarder claims such charges in their invoices, the same amount will be deducted from the Vendor bills without any prior intimation in order to avoid the delay in Customs clearance. The likely additional/hidden costs or charges are: a. CIC - Container Imbalance Charges/Surcharges b. EIC - Equipment Imbalance Charge/Surcharges c. CAF - Container/Currency Adjustment Factor d. BAF - Bunker adjustment Factor e. RDS - Rupee Depreciation Surcharge f. CDS - Currency Depreciation Surcharge g. PCS - Port Congestion Surcharge h. LSS - Low Sulphur Surcharge i. Devanning Charges	
11	**Transport Conditions for Import:** The Original Documents (Bill of Lading, Invoice, Packing List, Certificate of Origin & Test Certificate) shall reach BHEL well in advance before the vessel arrival. The soft copies of the above shall be forwarded to BHEL immediately after shipment. a) 14 FREE DAYS for Container detention at final port of destination shall be provided and the same to be endorsed in the Bill of Lading. If there is no free day or less than 14 free days provided by the supplier, the actual cost incurred towards detention charges due to non-availability of above said free days will be recovered from the supplier Invoice. b) In the event of delayed submission of documents/ non-submission of documents by the supplier as per the mutually agreed terms, an amount up to 5% of the invoice value will be retained towards detention/ demurrage & other charges and the difference if any between actual charges and recovery will be settled separately through supplementary invoice.	

	c) In such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading". d) Otherwise, No-objection Certificate shall be issued to the Liner, authorizing BHEL to get the Delivery Order without producing the Original Bill of Lading. e) This is required to ensure avoidance of detention/ demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller.	
12	**<u>Acceptance of materials supplied:</u>** a) The supply shall strictly as per the specifications in the tender /purchase order. b) Delivery of the ordered items as per the delivery terms in the Purchase Order does not automatically constitute acceptance of the delivered items. c) 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. d) 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. e) 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.	
13	**<u>Payment terms:</u>** **<u>Indigenous:</u>** **Payment for MSE vendors will be as per MSMED Act, 2006.** For Micro & Small Enterprises vendors, BHEL Payment term is 100% direct EFT payment within 45 days from the date of Vehicle/Gate entry subject to acceptance of materials. **For Medium Enterprises**, BHEL Payment term is 100% direct EFT payment in 60 days from the date of Vehicle/Gate entry subject to acceptance of materials. **For Non MSME vendors**, BHEL Payment term is 100% direct EFT payment after 90 days from the date of Vehicle/Gate entry subject to acceptance of materials. **<u>Import:</u>** **BHEL Payment term is 100% payment on CAD basis after 90 days from the date of receipt of documents, specified in PO, at BHEL bank. Respective bank charges to respective account.** If supplier insists for LC, Usance LC with 120 days' credit will be opened one month prior to material readiness. Hence supplier shall intimate the material readiness accordingly along with MTC copies for opening of L.C. LC validity period will be 90 days and for any extension, applicable charges will be to supplier's account. Expiry of LC will deem any subsequent bill to be cleared against CAD. Any deviation in the above payment term will attract loading as mentioned below: Marginal cost lending rate (MCLR) of SBI (as applicable on the date of bid opening, Techno commercial bid opening in case of two part bids) + 6%, shall be considered for loading for the period of relaxation sought by bidders. **<u>New Suppliers:</u>** For new suppliers not registered with BHEL, Trichy for the product, Payment shall be made 90 days after receipt and acceptance of materials. In case of foreign supplier, first lot of mutually agreed quantity shall be supplied with payment as CAD basis after 90 days from the date of receipt & acceptance of material. If insisted for LC, after acceptance of first lot, only Usance LC with 120 days' credit will be opened one month prior to material readiness. **Offers with payment terms as Advance Payment & LC at Sight Shall be rejected.**	
14	**<u>Liquidated Damage (Indigenous & Imports):</u>** 1. Time is the essence of the contract. 2. The ordered items shall be delivered as per the delivery period mentioned in the Purchase Order.	

	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, Tiruchirappalli under any other condition of the contract/applicable legal provisions. 4. **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**. 5. 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). 6. Any change in applicable rates of Tax or any other statutory levies (Direct / Indirect) or any new introduction of any levy by means of statute and its corresponding liability for the deliveries beyond the agreed delivery date for reasons not attributable to BHEL will be to vendors account. BHEL will not reimburse the same and any subsequent claim in this respect will be summarily rejected. **Indigenous:** For "FOR Delivery terms", Vehicle / Gate entry date will be taken for LD calculation **Import:** For CFR terms, BL date will be considered for LD calculation.	
15	**<u>Breach of contract, Remedies and Termination:</u>** In case of breach of contract, wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners: I. from dues available in the form of Bills payable to defaulted supplier against the same contract. II. from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit. III. In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., will be applied as per provisions of the contract.	
16	**<u>Warrantee:</u>** Supplier to accept warrantee against non-compliance to specification requirements for "18 months from the date of supply or 12 months form the date of commissioning whichever Is earlier". 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.	
17	**<u>O&M Manual:</u>** Detailed O&M manuals shall be furnished. Three soft copies of O&M manuals in (CD ROM) compact disc to be submitted.	
18	**<u>Non-Disclosure Agreement(NDA)</u>** The bidders shall enter into the Non-disclosure agreement totally voluntarily, with full knowledge of its meaning and without duress. (Format attached).	
19	**<u>Patent Right</u>** 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.	
20	**PARTICULARS TO BE FURNISHED BY FOREIGN VENDORS FOR EVALUATION OF BIDS WITH CUSTOMS DUTY BENEFIT**	**VENDOR COMMENTS**
	A. Whether PTA/ CEPA or any other agreement/treaty between respective Governments/Countries exists and the same is applicable for your supplies w.r.t this Enquired Items/tender.	YES / NO
	B. If yes, mention the Concessional Customs Duty (Such Duty Benefits)	%
	C. Documentary proof for the applicable Concessional Customs Duty (eg. PTA/ CEPA or other agreement) shall be submitted along with the Part-1 bid.	SUBMITTED/ NOT SUBMITTED
	D. Relevant documents and details to avail the above concessional duty benefits by BHEL shall be submitted by the supplier along with dispatch documents	CONFIRMED/ NOT CONFIRMED

	E. In the event of seller failing to provide appropriate documents along with dispatch documents for purchasers to avail disclosed concessional duty benefits in India, financial loss, so incurred, will be to the seller's account.	CONFIRMED/ NOT CONFIRMED
	Note: Evaluation of the Price bids will be based on the above details only and unless mentioned/furnished by the vendor, Customs Duty benefit will not be applied for evaluation purposes.	
21	**Role of Agents** a. BHEL strongly discourages the engagement of Agents by foreign principals, to deal with BHEL, in BHEL's tenders. b. In case of foreign suppliers representing through their Indian/foreign agents, agency agreement should be submitted, else offer is liable for rejection. Agency agreement requirements attached as separate file and full compliance to it shall be ensured while submitting the same. c. BHEL, due to business reasons would ban, would have banned Indian agents from dealing with BHEL. Any foreign principal who engages such a banned agent, or an employee of the banned agency, or any other person connected with the banned agency, at any time during the tender proceedings, would be disqualified from the tender proceedings. The decision of BHEL in this regard shall be final and be binding on the OEM. Hence in their own interests, prospective tenderers may check with BHEL. The list of banned firms is available on BHEL website www.bhel.com. Vendors/ principals proposing to deal with BHEL by engaging and through an Indian Agent does so at their own risk. BHEL shall in no way be responsible for any consequences that may arise to the foreign principal on account of the antecedents / actions of their Indian agent.	
22	**Agency Commission:** a) If overseas principal has any tie-up with any third party/ agents, it should be declared while submitting offers. b) In respect of offers from overseas suppliers, agency commission, if any, payable to their agents in India, shall invariably be shown separately in the Performa invoice and this will be paid by BHEL in India, in Indian rupees, on satisfactory completion of the contract. c) Copies of current agency agreement / authorization letter in respect of agency commission shall be furnished along with offer. d) For calculation of rupee equivalent agency commission, exchange rate as prevailing on the date of order will be taken.	
23	**Evaluation Criteria:** 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: **Indigenous:** **Total Landed cost = FOR Rate in INR (A) + Applicable Taxes (B) + Loading for payment term & LD (C) – Applicable input tax credit (D) + Inspection loading** A. Indigenous vendors submit offers on Free on Road (FOR), Trichy in INR. B. GST and any other charges quoted by indigenous vendors will be added to the base price. C. Loading for payment terms & non-acceptance of Liquidated Damages (LD) will be added to the FOR value for arriving the landed rate. **D.** However, input credit is availed for GST (SGST, CGST/IGST), hence the same is excluded for arriving at the landed cost. **Import:** **Total Landed cost = CFR Rate in INR (A) + Applicable Duties & Taxes (B) + Incidental Charges (C) + Loading for payment term & LD (D) + Inspection Loading - Input Tax Credit (E)** **A.** Import vendors to submit offers on CFR (Cost & Freight), Chennai port (LILO – Liner In Liner Out) basis in foreign currency, which will be converted to INR by multiplying with the Exchange rate (SBI TT Selling rate) as on the technical bid opening date. **B.** Customs duty, Safe guard duty, antidumping duty and Goods and Services tax as applicable will be added to the INR price. **C.** Incidental charges as applicable will be added to the CFR Value. The incidental charge is inclusive of Insurance, port handling charges, & freight charges for movement from Chennai port to BHEL, Trichy. **D.** Loading for payment terms & Non-acceptance of Liquidated Damages (LD) will be added to the CFR value for arriving at the landed cost.	

	E. However, input credit is availed for GST (SGST, CGST/IGST), hence the same is excluded for arriving at the landed cost. 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". **Loading for Inspection (For both Import and Indigenous):** BHEL Personnel (1 Person) will be at vendor works for Reviewing / Witnessing of stage wise testing as indicated in Quality Plan from the date of approval of all technical documents till the dispatch of final lot of SS Rods. Expense to BHEL for the above mentioned time frame will be loaded to the quoted rate, based on the quoted delivery period.	
24	**General condition:** 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. b) Three sets of documents containing Test certificates, Copies of the approved quality documents and test procedures, DCR and Drawings, etc must be provided along with the supply of materials. Dispatch clearance for material shall be given after acceptance of TC's by BHEL & NPCIL. c) Supplier has to submit Quality documents and related test procedures for BHEL and NPCIL approval within two weeks from the placement of Purchase Order. d) Shipment of **SS Rods** shall be as per the dates mentioned in the enquiry. e) For Indigenous supply, chemical composition and mechanical test are to be carried out in NABL accredited laboratory only. f) No revision of prices shall be allowed after the tenders are opened. g) For the evaluation purposes, exchange rate (TT selling rate of SBI) as on schedule date of tender opening (Part I, i.e technical bid, in case of two part bid) shall be considered. h) BHEL will consider the ranking after the loading is applied wherever deviations are observed. i) 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. j) 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. k) Offer will be evaluated based on Landed cost to BHEL- Trichy on total package basis only. l) Vendor should physically weigh the materials before stuffing them into container and incorporate the same in BL and packing slip. m) Offers for partial quantities of a given item are not acceptable to BHEL. While tenderers can quote for some or all the tendered items, no supplier shall quote for partial quantity of any given enquiry item. Such partial offer would not be considered in the enquiry for that item. n) No payment will be made for the excess quantity. o) Offer should be submitted only as per the Unit of Measurement (UOM) specified in the enquiry. p) Documents not signed and stamped by the authorized signatory of the bidder shall not be accepted and considered for registration / evaluation of the bid etc.	

	q) Any additional documents submitted by supplier / bidder, during processing of registration application / tender or after placement of order, shall not be accepted unless it is submitted with forwarding letter and duly signed and stamped as mentioned above. r) All documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. s) 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. SEALED COVER BIDS / E-MAILS / FAX / MANUAL OFFERS WILL NOT BE ACCEPTED. For any clarification you can contact to *rmega@bhel.in*, Contact no. **0431 2575458.**	
25	**Fraud Prevention Policy** "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."	
26	**Suspension of Business Dealings with Suppliers/Contractors:** 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. 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 dealing, then, 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.	
27	**Integrity commitment, performance of the contract and punitive action thereof:** **Commitment by BHEL** BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity. **Commitment by Bidder/ Supplier/ Contractor** • 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. • 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. • 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.	
28	**Cartel Formation:** The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.	
29	**Tax Residency Certificate (Import Suppliers)** As per extant provisions of Income Tax Act,1962 in India, foreign suppliers have to submit the following documents to avail benefits under DTAA at time of each dispatches, failing which TDS will be applicable	

	considering Business Income in India. (Current TDS rate @ 40% as per the extant law provisions) plus applicable surcharge and cess is to be deducted u/s. 195 of I.T Tax Act. • Valid Tax Residency Certificate issued by Govt / Tax agency of country. • Form 10F duly filed signed. • No PE and No Business connection declaration in supplier's letter head. • Declaration of No Significant Economic Presence (SEP) in India as per Indian I.T Rule 11UD & indemnity to pay taxes at later stages on demand. Self-declaration that Non-resident is eligible to obtain benefits of relevant DTAA between India and Supplier's country. (sample copy as per Annexure-DT2)	
30	**<u>Resolution of Disputes:</u>** 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. **<u>Notes:</u>** 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. 3. 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 X to this Enquiry Conditions. 4. The Annexure 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 Conditions. 5. 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 . 6. The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties. 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. 7. The seat of arbitration shall be Trichy, Tamil Nadu, India. The cost of arbitration shall be borne as per the award of the Arbitrator. 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. 8. The contract shall be governed, construe and interpreted in accordance with the laws of India. 9. 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. **<u>In Case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:</u>** 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. 05/003/2019-FTS-10937 dtd. 14th December, 2022 and the decision of AMRCD on the said dispute will be binding on both the parties.	
31	**<u>In the event of Force Majeure:</u>** 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. 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. 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. 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.	
32	**<u>Execution of the order:</u>** 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. b. If the inspection fails, the vendor shall offer the material again as per ordered terms and specifications for further inspection. 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. 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. **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, including customs clearances at Indian Ports in the case of foreign suppliers.	
33	**<u>Set-off Clause</u>**: 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 furnished by the Contractor under this Contract or any other contract.	
34	**<u>Conflict of Interest Among Bidders/Agents:</u>** A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if: a. they have controlling partner (s) in common; or b. they receive or have received any direct or indirect subsidy/ financial stake from any of them; or c. they have the same legal representative/agent for purposes of this bid; or d. they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or e. Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly. Assemblies from one bidding manufacturer in more than one bid; or f. In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One	

	manufacturer can also authorise only one agent/dealer. There can be only one bid from the following: 1. The principal manufacturer directly or through one Indian agent on his behalf; and 2. Indian/foreign agent on behalf of only one principal; or g. A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; or h. In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business in the format provided as Annexure.	
35	**<u>Caution:</u>** a) 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. b) The language in 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.	
36	**<u>Special Provisions for Micro and Small Enterprises (MSE) bidders registered as per MSME act:</u>** (Subject to participating MSE vendors meeting the tender requirements of BHEL) a) 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 certificate. b) 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. c) If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on. Finally, if none of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor. d) 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%. e) Payment to MSE vendor will be as per the applicable provisions of the MSMED Act 2006. f) If L1 offer is from a Micro / Small enterprise, the 25% earmarking provision is not applicable. g) 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. h) MSE suppliers can avail the intended benefits only if they submit along with the offer, Valid EM-II certificate along with CA certificate or valid NSIC certificate or UAM certificate along with attested copy of a CA certificate (Format enclosed as below) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). 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. Documents should be notarized or attested by a Gazetted officer.	

	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.	
37	**<u>Preference to Make in India:</u>** 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. The 'Class-I local supplier'/ 'Class-II local supplier' shall be required to provide a declaration/certificate in this regard as per Govt. of India guidelines for Public Procurement.	
38	**<u>Restrictions for Procurement from a country sharing its land border with India</u>** Orders issued by Govt. of India with respect to Restriction under Rule 144 (xi) of GFR on procurement from bidders representing countries sharing land border with India will be applicable for this tender. In case of subsequent orders issued by Govt. of India regarding procurement from bidders representing countries sharing land border, the same shall be applicable even if issued after issue of this NIT.	
39	**<u>Enclosures:</u>** a) Enquiry b) Specification PC-M-960 & PC-M-961 c) Generic QP and Format d) Special Condition Annexure A & B (PQR) e) List of Approved penetrants f) NDA format	

RAMASAMY MEGANATHAN Digitally signed by RAMASAMY MEGANATHAN Date: 2024.08.13 16:16:46 +05'30' (On behalf of BHEL)	**<u>SIGNED BY MANUFACTURER / MILL</u>** Name of Mill: Designation / Department: Seal & Signature

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

SPECIFICATION NO.	:	PC – M – 960						
REVISION NO.	:	0	1					
DATE OF ISSUE (MONTH/YEAR)	:	June, 2013	Feb, 2014					
TOTAL NO. OF PAGES (Including Cover Sheet)	:	52	52					

TECHNICAL SPECIFICATION

FOR

QUENCHED & TEMPERED LOW ALLOY AND OTHER CARBON STEEL FORGINGS FOR 700 MWe PROJECTS

REF. USI NO. : 33111

	NAME	Designation	SIGNATURE	DATE
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File Name : PC – M – 960
CD No.:

REVISION CONTROL SHEET

DOCUMENT TYPE: TECHNICAL SPECIFICATION

NO. : PC – M – 960

TITLE: TECHNICAL SPECIFICATION FOR QUENEHED & TEMPERED LOW ALLOY AND OTHER CARBON STEEL FORGINGS FOR 700 MWe PROJECTS

REV. NO. & DATE	DESCRIPTION OF REVISION	PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
0 June, 2013	Original (Pages 52)	Sd/- R.K.Gupta Sd/- Braham Prakash	Sd/- P.B.Rshikesan Sd/- D.Ganesh Sd/- M.R.S.Saxena	Sd/- S.N.Kamath Sd/- M.K.Sharma	Sd/- U.C. Muktibodh
1 Feb 2014	General Revision , Revision at page 14 regarding acceptance standard of UT examination.	R.K.Gupta 04/2/14 Braham Prakash 04/02/14	P.B.Rshikesan 5/2/14 D.Ganesh M.R.S.Saxena 7/2/14	S.N.Kamath 10.02.14 M.K.Sharma 10/02/14	12-02-2014 U.C. Muktibodh

NPCIL PROPRIETARY

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1.0 SCOPE

This specification establishes minimum requirements for low alloy steel forgings (Pressure boundary Shells, Tube Sheet, Integral Cone & Shell Dished Ends, Nozzles, Plates etc.) used in the construction of Heat Exchangers and Pressure Vessels. The forgings are required to be made from fine grained, killed and vacuum degassed low alloy steel equivalent to DIN 20MnMoNi55 grade with modified chemical composition. The manufacturing process adopted shall ensure cleanliness of the highest order, isotropy of the mechanical, chemical and metallurgical properties, superior fracture toughness and weldability. This specification is appended with following Annexures.

Annexure 1: Low Alloy Steel Forgings -16 Mo3
Annexure 2: Steel Forgings –ASME SA 350 LF2
Annexure 3: 20 Mn Mo Ni 55 Forgings for Bleed Condenser.

This specification is applicable for 700MWe projects beyond RAPP 7&8.

2.0 CONTENTS

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

3.0 APPLICABLE CODES AND STANDARDS

The following codes and standards of the issue in effect on the date of issuing the tender document shall form part of this specification. In case of conflict between the codes/standards listed below and this specification, generally the specification will govern. The supplier must obtain necessary clarification from the purchaser in such a case.

i.	ASME Section II	-	Part A - Ferrous Materials
ii.	ASME Section III	-	Division 1 - Sub-Section NB
iii.	ASME Section V	-	Non Destructive examination
iv.	ASTM	-	Relevant Standards

4.0 PROCESS OF MANUFACTURE

4.1 Melting

The steel shall be made by basic electric process and shall be vacuum degassed to remove objectionable gases particularly Hydrogen. Vacuum system should be of sufficient capacity to effect a blank-off pressure which is sufficiently low for sufficiently long duration.

4.2 **Discard**

Sufficient discard shall be made from each ingot to secure freedom from piping and excessive segregation.

4.3 **Grain size**

Grain size shall be measured as per ASTM-E-112 and shall be 6 or finer. The grain size and microstructure shall be determined on a notched bar impact test specimen, obtained from simulated Heat Treated Test Coupons. The examination shall be on the Longitudinal – Normal Section. In case of determination on an untested side (e.g. Tubesheet, Nozzles), these examinations shall be carried out on the forging directly. The micrographs for assessing the microstructure shall be made at a magnification allowing unambiguous assessment (as a rule: X 200).

4.4 **Forging Process**

The components shall be hot forged as close as practicable to their final finished shape and size by a press or hammer of sufficient capacity to work the metal throughout its section. The forging ratios shall not be less than 3. Tube sheet and primary head forgings, where overlay cladding is done, shall be processed in such a way that the minimum segregation portion shall be identified and kept for cladding zone.

Material flow shall be such as to favorably resist the stresses encountered in service (Main Working Direction).

4.5 **Machining**

Prior to the heat treatment, forgings shall be contour machined as close to the finish dimensions as possible.

5.0 CHEMICAL COMPOSITION

The chemical composition for both product and ladle analysis shall be as follows. The specimens for product analysis will be taken from simulated heat treated test coupons described elsewhere in this specification.

Element	Weight percentage
C	0.17 - 0.23
Mn	1.20 - 1.50
Si	0.15 - 0.30
Mo	0.40 - 0.55(1)
Ni	0.50 -0.80
Cr	0.20 max.
Cu	0.12 max(1)
V	0.02 max.
Co	0.03 max.
A1 (tot)	0.010 – 0.040
Sn	0.01 max(1)
As	0.015 max
Sb	0.007 max.
P	0.010 max(1)
S	0.008 max(1)
N (tot)	0.013(1)
H_2	1 ppm max.
O_2	20 ppm max.

The above chemical composition slightly differs from DIN 20 Mn.Mo Ni 55 grade. Subject to the approval by the purchaser, minor deviations may be permitted provided all other requirements of the specification are met. In the likelihood of the above limits being exceeded, the guaranteed maximum values shall be indicated in the bid itself.

Note (1) – If these figures are exceeded and check analysis levels of upto P ≤ 0.015%, S ≤ 0.015%, Mo ≤ 0.63%, Cu ≤ 0.18%, Sn ≤ 0.016% and N (tot) ≤ 0.015% are accepted, the inspection agency shall determine until further notice whether heat affected zone simulation tests and, where applicable, tangential section examination are required. If intermediate annealing at 550° C is planned in the course of further processing the permissibility of this annealing temperature shall be demonstrated in the course of the aforementioned tests/examinations. Extent and implementation of testing shall be agreed upon with the Inspection Agency.

6.0 HEAT TREATMENT

6.1 The forgings shall be supplied in quenched and tempered condition. The forgings, after contour machining near to finish dimensions, shall be heated to a temperature which produces an austenitic structure and then quenched in a suitable liquid medium ensuring uniform cooling. The tempering temperature shall be between 650 to 680°C. The measured highest temperature during stress relief heat treatment shall not be higher than the measured lowest temperature during tempering.

The uniformity of temperature during any of the heat treatment shall be proved by continuous temperature recording instruments with the help of thermocouples attached to the component.

6.2 Simulated Heat Treatment (SHT)

The simulated heat treatment (SHT) is intended to simulate the heating cycles which the actual component may experience during the course of fabrication. Such heat treatment is given to some of the test coupons called Simulated Heat Treated Coupons (STC). Heating and cooling rates shall be as indicated in the figure below:

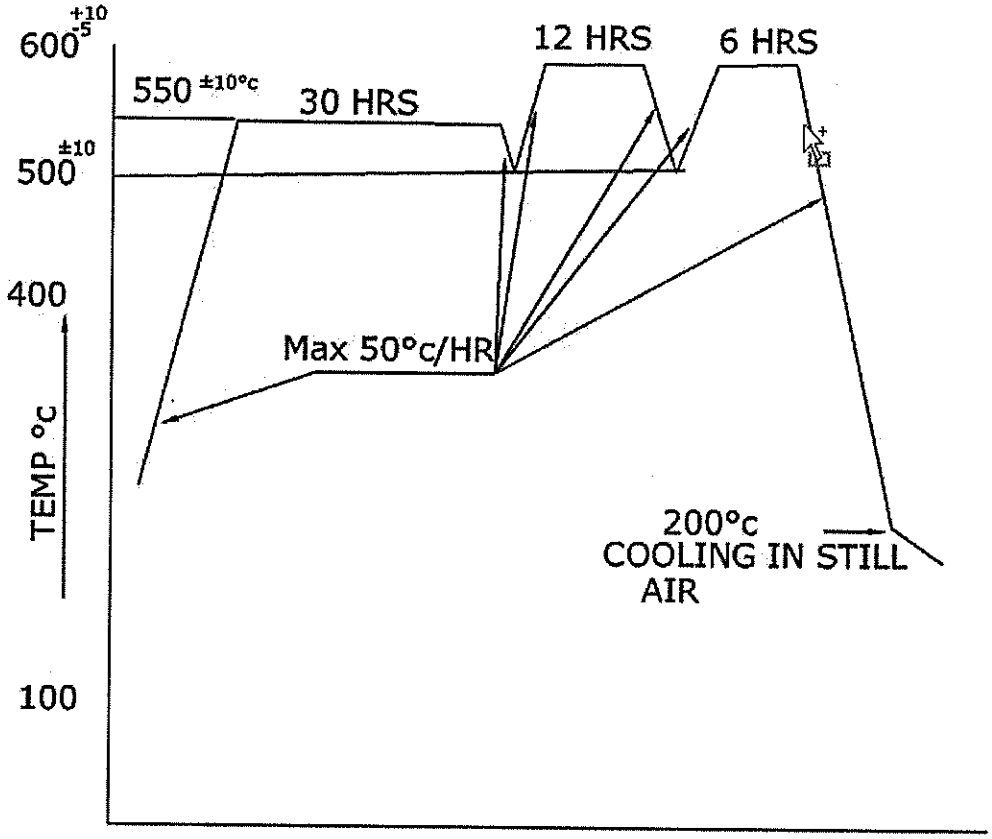


FIG.-1

7.0 MECHANICAL PROPERTIES

7.1 The mechanical tests shall be conducted as per ASTM A-20 and ASTM A-370 (DIN 50115, DIN 50125 and DIN EN 10002-1). Following minimum requirements shall be met with both in Quenched and Tempered and simulated heat treated condition for all products except manhole cover / handhole cover wherein minimum requirement shall be met in Quenched & Tempered condition.

Minima pertaining to mechanical properties at room temperature and 350°C

Product form	Test Temp.	Mechanical Properties		20 MnMoNi 55[1)]	Unit
Primary head Spherical Ring Tube sheet Shell Secondary Head Nozzles	RT	Rm	l, tr, n	560-700	[N/mm^2]
		$R_p0.2$	l, tr, n	390	[N/mm^2]
		A_5	l, tr	19	[%]
		Z	l, tr	45 (EW)	[%]
		Z	n	35 (EW) / 45 (MW)	[%]
Primary head Spherical Ring Shell Secondary Head Nozzles Tube sheet	350°C	Rm	l, tr, n	505	[N/mm^2]
		$R_p0.2$	l, tr, n	343[3)]	[N/mm^2]
		A_5	l, tr	16[2)]	[%]

l = Longitudinal
tr = Transverse
n = Normal

EW = Smallest single value
MW = Average value of 3 specimens

A_5 = % Elongation on 5d (in 50 mm minimum gauge length)
Z = % Reduction in area
$R_p0.2$ = Yield Strength (0.2 % offset)
Rm = Tensile strength

1) Sampling location T/4 x T/2 (Resp. 80 x 80 mm for tube sheet)
2) 14% for Nozzles and Tube Sheet
3) 314 N/mm^2 for Tube Sheet

7.1.1 Testing scope of Manhole and Handhole covers in quenched & tempered condition shall be same as that of 'STC-B' of Shell forgings (Table – 2). Testing scope of Production Weld test Coupon (PWTC) in both quenched & tempered and simulated heat treated condition shall be same as that of STC-B of Shell forgings (Table – 2).

7.2 **Notch Toughness**

7.2.1 **Nil Ductility Transition Temperature (T-NDT)**

The nil-ductility transition temperature as determined by drop weight test in accordance with ASTM-E-208 shall not be higher than - 15°C.

In case T-NDT has already been established for this type of material, complete details of the test procedure and results will be reported which shall be subject to approval by the purchaser.

7.2.2 **Reference Nil Ductility Transition Temperature (R-TNDT)**

Three ISO-V transverse specimens will be tested at +18°C for certification of RTNDT. The minimum absorbed energy and lateral expansion shall not be less than 68 J and 0.9 mm respectively, for any of the specimens. The percent shear fracture shall be reported.

7.2.3 Longitudinal, transverse and normal ISO-V test specimens will exhibit the following minimum values at -15°C.

i) Average of 3 specimens 41 J
ii) Lowest single value 34 J

7.2.3 **Cv-Impact Curve**

Charpy V-notch impact strength versus temperature curves shall be established. Tests shall be conducted at least at six different temperatures including - 15°C and +18°C, to fully define upper and lower energy shelves. The upper energy shelf shall have 100% shear fracture and lower energy shelf a maximum of 10% shear fracture. The test reports shall include absorbed energy, percent shear fracture and lateral expansion, plotted against temperature. The upper shelf energy shall be more than 100 J. The absorbed energy and lateral expansion values at +18°C and - 15°C shall meet the requirements of 7.2.2 and 7.2.3.

7.3 **Hardness Test**

Hardness of each forging shall be measured after tempering, before any further processing, along the grid as defined in each product specification to demonstrate uniformity. The minimum and maximum hardness value of each forging shall be reported. The difference between these two values for a forging shall not exceed 40 BHN. Tests shall be carried out as per ASTM-E-10.

7.4 **Inclusion Rating**

Inclusion rating (Heavy and Thin Series) shall be determined as per ASTM-E 45 (Method A or D) and shall be better than –

A	B	C	D
2.0	2.0	1.0	1.5

8.0 **TESTS & EXAMINATIONS**

8.1 **Categories of Test Coupons**

Compliance of the material with the specification requirements is checked on various categories of test coupons described as under:

i) Raw Material Test Coupons (RTC)

Test coupons obtained from the quenched and tempered forgings or forging extensions.

ii) Simulated Heat Treated Test Coupons (STC)

Test coupons obtained from the quenched and tempered forgings and subjected to simulated heat treatment described in Section 6.2.

iii) Final Production Test Coupons (FTC)

These are in the same condition as RTC. RTC and STC shall be tested at the supplier's works whereas FTC will be dispatched with the ordered item for production tests at the Purchaser's works.

iv) Production Weld Test Coupon (PWTC)

PWTC wherever required shall be from the same heat. The PWTC shall undergo same amount of deformation and shall be supplied in same heat treatment condition (Q&T) as that of respective forgings.

8.2 **Test Coupon Location**

Top and bottom of the forgings shall be same as respective ends of the ingot. Sufficient material in the form of integrally forged ring or disc prolongations shall be provided for the purpose of testing. Cylindrical shells and nozzle forgings from which more than one nozzle is to be made, shall have prolongations at both ends. Dished ends, tube sheets and single nozzle forgings shall have prolongations on the bottom end. RTC samples shall be tested first.

STC, RTC and FTC shall be taken from the adjacent areas at any location of the cross section in the following manner:

i) Full circumferential test rings shall be parted off from the forging prolongations after the final heat treatment. Entire cross section shall be divided into three sectors (say A, B, & C), equally spaced at 120° apart.

ii) Each sector shall be suitably marked to accommodate STC, RTC and FTC, adjacent to each other. Identification of the coupons shall be ensured by suitable methods prior to their separation from the test ring and all through the various stages of testing.

iii) The location of test coupons in the top and bottom test rings shall be diametrically opposite to each other.

iv) Any balance material from the test rings, if in excess of the test requirement shall be kept reserved for any contingency which may arise during the course of testing.

Refer Figures 7 to 17 for location of test coupons.

v) Test coupon for forged plate for Manhole \ Handhole covers and PWTC shall be taken from one end of the forged plate.

8.3 **Test Specimen Location**

The test coupons shall be taken in such a way that the test specimens shall have their longitudinal axis atleast ¼ t (80 mm for tube sheet) from any surface and with the mid length of the specimens at least 1/2 t (80 mm for tube sheet) from any second surface, where't' is the maximum heat treated thickness of the forging.

8.4 **Specimen Directions**

The mechanical properties are to be established along the following three mutually perpendicular directions:

i) Longitudinal	-	Parallel to the main working direction
ii) Transverse	-	Transverse to the main working direction
iii) Normal	-	Parallel to the direction of thickness (Applicable for thickness in excess of 70 mm)

8.5 **Chemical Analysis**

Chemical analysis shall be carried out in accordance with ASTM-E 30 & ASTM—E 350. If the ingot is made from one heat, only one ladle analysis is required. However, in case of an ingot made from more than one heat, weighted average shall be reported.

For product analysis, samples from each STC shall be analyzed. Samples for chemical analysis shall be taken from a depth of 1/4t from any tempered wall surface and at least at a distance of 1/2t from the heat treated edge of the coupon. Broken mechanical test specimens may be used.

Apart from STC samples, the chemical composition shall also be determined as required by individual product specifications.

8.6 **Mechanical Tests**

The extent of tests required for each product has been included in tabular form under the product specifications.

For tension test, one specimen shall be tested from a sampling point at room temperature and at 350°C. For impact test, one set of 3 Charpy-V notch specimens shall be tested at a given temperature.

NDT temperature shall be determined using STC Pellini specimens from one location. The NDT temperature so determined shall also be confirmed by tests on two transverse specimens taken from STC & RTC coupons from other locations (See Tables 1, 2 & 3). However, in case of Nozzle forgings (Table 4 & 5) NDT temperature shall be confirmed by testing two transverse Pellini specimens from STC coupons as shown therein.

8.7 **Sulfur Prints (Baumann Prints)**

Sulfur prints shall be prepared for Tube sheet & Primary Head forgings at the location and area specified in Fig. 9 and Table -3 respectually. For other forgings Sulfur print is not required to be taken provided the bulk sulfur content as revealed by chemical analysis is less than or equal to 0.008% both in Ladle and Product analysis.

9.0 **NON DESCTRUCTIVE EXAMINATION**

9.1 **Ultrasonic Examination**

All forgings after the final heat treatment and machining shall be ultrasonically examined in accordance with SA-388, recommended practice for Ultrasonic Examination of Heavy Steel Forgings. Where ultrasonic examination is not feasible or only partially feasible due to the final component geometry after machining, examination shall be carried out for acceptance in the semi-machined condition. The forgings shall be examined for the total volume using both straight beam and angle beam search units, observing the scanning directions as indicated in Figure 2, 3, 4and 4A.

The reference level for the straight beam examination shall be 6 mm diameter flat bottom hole for t > 100 mm and 3 mm for t ≤100 mm. For angle beam examination a 3 mm wide x 12mm long x 0.03 t deep notch (3mm maximum depth) where t is nominal thickness of the material.

All Recordable indications (above 20% of reference level), apparently within acceptable limits shall be investigated to confirm that they are parallel to the forging faces and not in the transverse direction, i.e. not in the thickness direction. Defect indications under following conditions are not acceptable.

a) Indications exceeding 20% of the reference level in thickness direction.
b) Indications exceeding the reference level parallel to the forging faces.

In case of the tube sheet with integral hub, the hub and the portion in the tube sheet underneath the hub for a depth of at least one hub thickness shall be free from defect indications equal to or above 3% hub thickness. Similarly, in case of forgings with integral protrusions, the protrusion for a depth equal to the thickness of the protrusion shall be free from defect indication greater than or equal to the protrusion thickness.

When a cluster of small indications are obtained on the screen whose amplitudes cannot be resolved, then the gain shall be adjusted to give a back echo equal about 80% of full screen height on an adjacent defect free region. At this gain setting, the cluster of indications causing loss of back echo shall be a cause of rejection of the forging. Loss of back echo is assumed when the back reflection falls below 5% of full calibration screen height. Additionally, at such locations the sound attenuation shall be measured. The sound attenuation at 2MHz shall not be more than 4DB/Meter of single sound path.

Examination of forged bars must be performed from both thickness faces and from the cylindrical surface with normal beam probes. Additional scanning in the circumferential direction with 35° angle beam probes shall be carried out for bars larger than 120 mm in diameter. The acceptance standard shall be as follows:

D < 60 mm C.R.R. – 2 mm
D > 60 mm C.R.R. – 3 mm
D > 120 mm C.R.R. – 4 mm
(C.R.R. – Circular Reference Reflector)

9.2 **Magnetic Particle Examination**

Each forging after final machining shall be examined by magnetic particle method (MT) in accordance with ASME Section III, Para NB-2545. The acceptance standards shall be as per para NB-2545.3. The extent of examination shall be 100%. Demagnetization is required after test.

9.3 **Dimensional check**

Each forging shall be checked for dimensional compliance with the approved drawings. The actual dimensions shall be recorded in a sketch/drawing and submitted for final acceptance.

10.0 **REPAIRS**

Repair is generally not permitted. Slight surface defects may be smoothly ground and blended without impairing the minimum wall thickness. No other repair shall be carried out without prior approval of the purchaser or his authorized inspection agency. Plans for all repairs requiring heat treatment shall be submitted to the purchaser or his authorized inspection agency for review and approval, prior to taking up the job. Repairs involving welding are prohibited.

All non-conformities shall be recorded and reported to the Purchaser to determine their disposal.

11.0 **PROCEDURES, PLANS, REPORTS AND DOCUMENTATION**

The manufacturer shall prepare Quality assurance plan (QAP), manufacturing, testing, examination procedures, Fabrication drawings etc. and obtain Purchaser's approval prior to the commencement of manufacture. The manufacturer shall be responsible for preparation and issue of all certificates, reports and documents which shall be certified by the Purchaser or his authorized agency. Such certified final documents shall be supplied in bound volumes with proper identification. Final documentation containing all the above shall also be submitted in soft form (pdf format) with proper indexing.

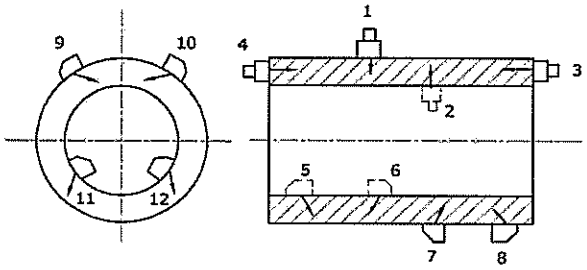
12.0 **QUALITY SURVEILLANCE**

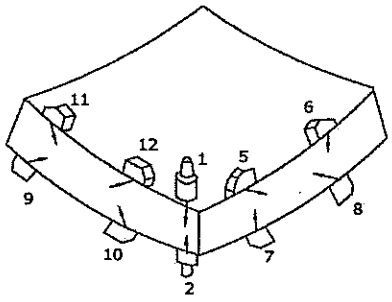
The forgings shall be subjected to quality surveillance by the Purchaser or his authorized agency during manufacture. The forgings shall not be shipped until the shipping release is given by the Purchaser/his authorized agency.

13.0 **MARKING, PACKING AND SHIPMENT**

Each forging shall be marked with Product Serial Number, Heat number, Material Specification and main working direction. In case of forgings accompanied with forged test plates, corresponding test plate identification shall also be marked on the main forging indicating correspondence with top/bottom of original ingot.

The forgings shall be protected against corrosion and damage in transit and shall be properly preserved and packed for sea-worthiness. The supplier shall submit the preservation and packing plan for Purchaser's approval. Before shipment, suitable rust preventive coating shall be applied on the forgings to ensure sea-worthiness and tropical storage for two years.





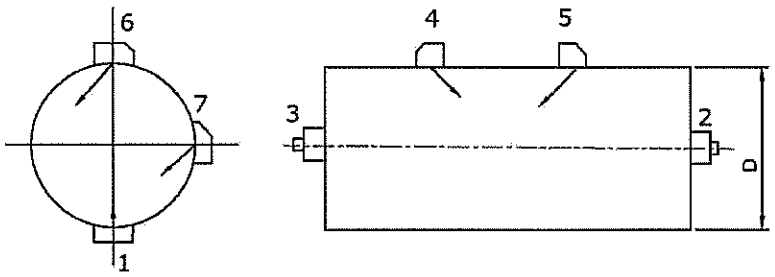
NOTES -

1. 1 TO 4 - NORMAL BEAM SCANNING
   5 TO 12 - ANGLE BEAM SCANNING
2. SCAN FROM INSIDE ONLY NECESSARY IF FURTHER INVESTIGATION OF INDICATION OBTAINED BY O.C. SCAN IS REQUIRED.

SHELLS, TUBULAR FORGINGS, DISHED ENDS & PETALS

FIG. -2

Fig. -2 UT Scanning direction for Shells, Tubular Forgings, Dished Ends & Petals



NOTES:-

1 1-3NORMAL BEAM SCAN

2 4-7 ANGLE BEAM SCAN

3 SCANNING-

3.I①FOR ALL BARS.

ADDITIONAL

3.2②&③FOR D>60° mm.

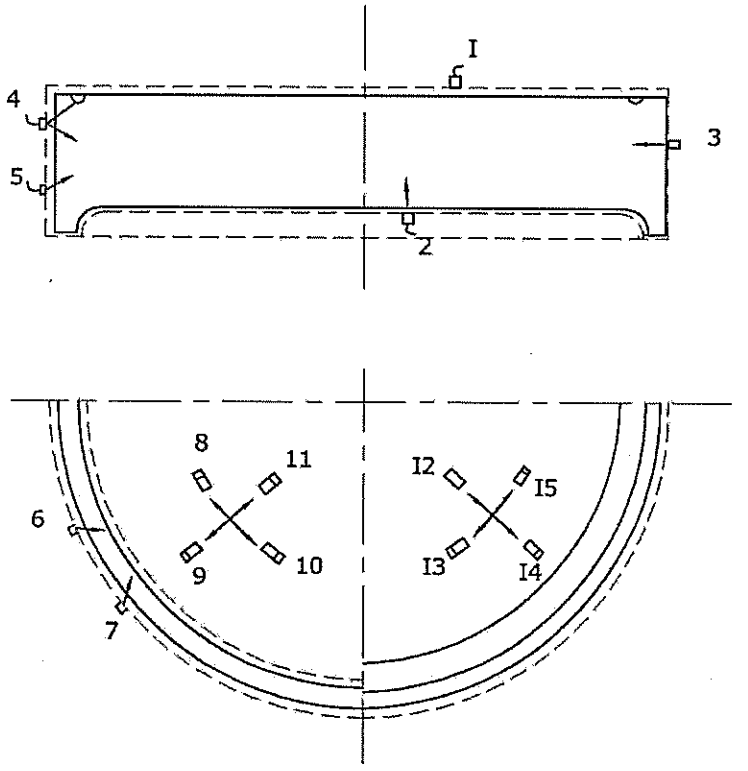
IF EVALUATION NOT POSSIBLE 4⟳5 WITH 45°

3.3⑥&⑦FOR D>I20 mm.WITH 35° PROBE.

FORGED BARS

FIG.-3

Fig -3 UT Scanning Direction for Forged Bars



NOTES:-

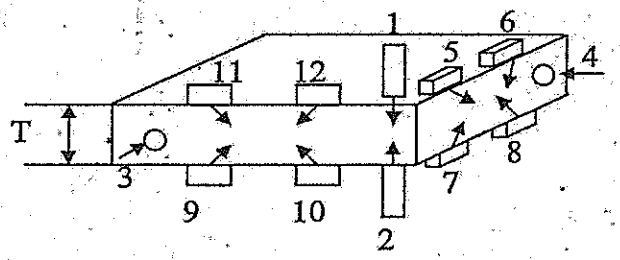
1 TO 3 - NORMAL BEAM SCAN

4 TO 15 - ANGLE BEAM SCAN

FIG. -4

UT Scanning Direction for Tube Sheet and Dished Ends

Scanning direction for Ultrasonic Test



Specimen direction: 1 to 4 NORMAL BEAM SCAN
5 to 12 ANGLE BEAM SCAN (45°)

Forged plate for Manhole \ Handhole covers and PWTC

Fig 4A

TABLE – 1
EXTENT OF TESTS – TUBE SHEET

N – Normal, T – Transverse, L - Longitudinal

Sr. No	Description	Direction	STC A	STC B	STC C	RTC D	Remarks
1	Tensile (RT)	N T L	1* 1 1	- 1 -	- 1 -	- 1 -	*If testing of first test specimen yields Z <45% two more specimen shall be tested from the same location.
2	Tensile (350°C)	N T L	1 1 1	- 1 -	- 1 -	- 1 -	
3	Impact at - 15°C	N T L	3 3 3	- 3 -	- 3 -	- 3 -	
4	Impact at +18°C	N T L	- 3 -	- 3 -	- 3 -	- 3 -	
5	Impact curve (- 15°C, 18°C and 4 other temperatures	N T L	- 12 -	- - -	- - -	- - -	
6	Drop weight test	T	8	2	2	2	Specimen P-2
7	Grain size and microstructure		1	1	1	-	Also required at 2 other locations as per Fig.9
8	Product analysis		1	1	1	-	Also required at 3 other locations as per Fig.9
9	Hardness and Sulphur Print test						Refer Fig.9
10	.U.T. & M.P.I						100%; Refer Para 9.1 & 9.2

Note : For the locations & extent of Sulfur Print test Refer Fig. 9.

TABLE – 2
EXTENT OF TESTS – SHELL & RING FORGINGS

N – Normal, T – Transverse, L – Longitudinal

Sr. No	Description	Direction	Bottom of Ingot				STC Top of Ingot			Remarks
			STC			RTC				
			A	B	C		D	E	F	
1	Tensile at RT	N T L	1 1 1	- 1 -	- 1 -	- 1 -	1 1 -	- 1 -	- 1 -	See Note-1
2	Tensile at 350°C	N T L	1 1 1	- 1 -	- 1 -	- 1 -	- 1 -	- 1 -	- 1 -	
3	Impact at - 15°C	N T L	3 3 3	- 3 -	- 3 -	- 3 -	- 3 -	- 3 -	- 3 -	
4	Impact at +18°C	T	3	3	3	3	-	-	-	
5	Impact curve (-15°C, 18°C and 4 other temperatures)	T	12	-	-	-	-	-	-	
6	Drop weight test	T	8	2	2	2	-	-	-	Specimen P-2
7	Grain size and microstructure		1	1	1	-	1	1	1	Examination on notched bar specimen in long-normal section
8	Product analysis		1	1	1	-	1	1	1	See note-2.
9	Hardness and Sulphur Print									See note-3.
10	U.T. & M.P.I									100%; Refer Para 9.1 & 9.2

Notes:

1. If testing of the first specimen at RT yields Z <45%, then two more test specimens from the same sampling location shall be tested.

2. Chemical composition shall be determined from one sampling location each from top and bottom. At other location C, Mn, P&S shall be verified.

3. Hardness along a maximum square grid of 1000 mm x 1000 mm on the cylindrical outside surface and end faces. In case Sulfur print is required to be carried out as specified in clause 8.7 of this Specification, than it shall be carried out on top and bottom faces at 120° apart and 200 mm long.

TABLE – 3
EXTENT OF TESTS – PRIMARY HEAD & DISHED END FORGINGS

N – Normal
T – Transverse
L - Longitudinal

Sr. No	Description	Direction	STC A	STC B	STC C	RTC	Remarks
1	Tensile at RT	N T L	1 [1)] 1 1	- 1 -	- 1 -	- 1 -	See Note-1
2	Tensile at 350°C	N T L	1 1 1	- 1 -	- 1 -	- 1 -	
3	Impact at - 15°C	N T L	3 3 3	- 3 -	- 3 -	- 3 -	
4	Impact at +18°C	T	3	3	3	3	
5	Impact curve (- 15°C, 18°C and 4 other temperatures)	T	12	-	-	-	
6	Drop weight test	T	8	2	2	2	Specimen P-2
7	Grain size and microstructure		1	1	1	-	See Note-3
8	Product analysis		1	1	1	-	
9	Hardness and Sulphur Print						See Note-2
10	U.T. & M.P.I						100%; Refer Para 9.1 & 9.2

Notes:

1. If testing of the first specimen at RT yields Z <45%, then two more test specimens from the same location shall be tested.
2. Hardness values along a square grid of maximum 1000 mm x 1000 mm on the inside and outside. Sulfur print on the face at 120° apart and 120 mm long (only for Primary Head See Clause 8.7).
3. Examination on notched bar specimen in Longitudinal – Normal direction and in the centre (insitu).

TABLE – 4
EXTENT OF TESTS – NOZZLES OF I.D. UPTO 250 MM

N – Normal
T – Transverse
L - Longitudinal

Sr. No	Description	Direction	Bottom of Ingot		Topof Ingot STC-B	Remarks
			STC-A	RTC		
1	Tensile at RT	T	1	1	1	See Note-2
2	Tensile at 350°C	T	1	1	1	See Note-2
3	Impact - 15°C	T	3	3	3	
4	Impact at +18°C	T	3	3	3	
5	Drop weight test	T	2	-	-	Pellini - P-2 Specimen
7	Grain size and microstructure		1	-	1	Examination on notched bar specimen in longitudinal - normal direction. Also see Note-3
7	Product analysis		1	-	1	
8	Hardness					Fig.17
9	U.T. & M.P.I					100%; Refer Para 9.1 & 9.2

Notes:

1. If only one nozzle is made from a forging then test coupon shall be taken only from bottom of forging. For more than one nozzle from a forging, additional test coupon shall be taken from the top end.
2. Specimens for nozzles upto ID 160 mm need to be taken only in longitudinal direction.
3. In case only one nozzle is made from a forging, the grain size and microstructure shall be examined at one location on the main product opposite to the sample location.

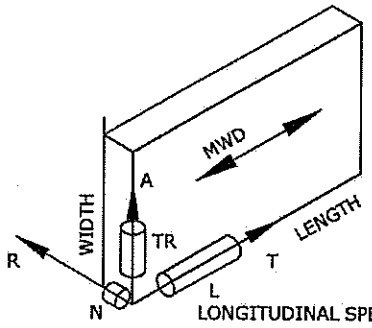
TABLE – 5
EXTENT OF TESTS – NOZZLES OD I.D. OVER 250 MM

N – Normal
T – Transverse
L - Longitudinal

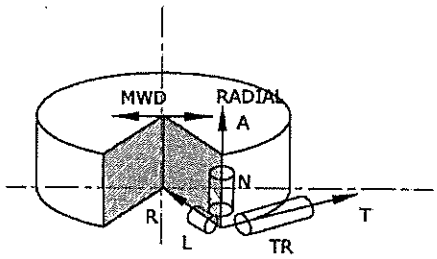
Sr. No	Description	Direction	Bottom of Ingot			Top of Ingot		Remarks
			STC-A	STC-B	RTC	STC-C	STC-D	
1	Tensile at RT	N T L	1 1 1	- 1 -	- 1 -	- 1 -	- 1 -	See Note-1
2	Tensile at 350°C	N T L	1 1 1	- 1 -	- 1 -	- 1 -	- 1 -	
3	Impact - 15°C	N T L	3 3 3	- 3 -	- 3 -	- 3 -	- 3 -	
4	Impact at +18°C	T	3	3	3	-	-	
5	Impact curve -15°C, 18°C and 4 other temperatures	T	12	-	-	-	-	
6	Drop weight test	T	2	-	-	-	-	Pellini - P-2 Specimen
7	Grain size and microstructure		1	1	-	1	1	See Note-2
8	Product analysis		1	1	-	1		See Note-2
9	Hardness							Fig.17
910	U.T. & M.P.I							100%; Refer Para 9.1 & 9.2

Notes:

1. If testing of first specimen at RT yields Z <45%, then two more test specimens from the same location shall be tested.
2. Examination on notched bar specimen in Longitudinal – Normal direction.

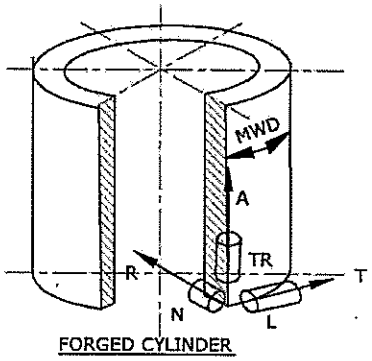


LONGITUDINAL SPECIMEN

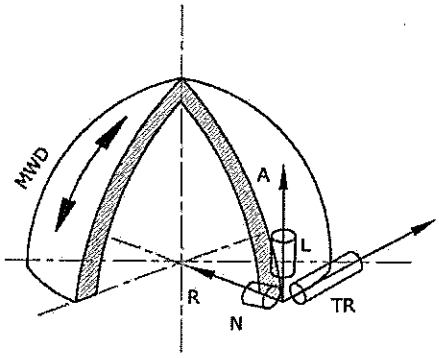


DISC FORGINGS
(TUBE SHEET)

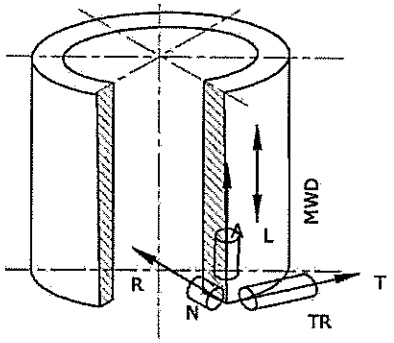
PLATE



FORGED CYLINDER



FORGED DISHED ENDS



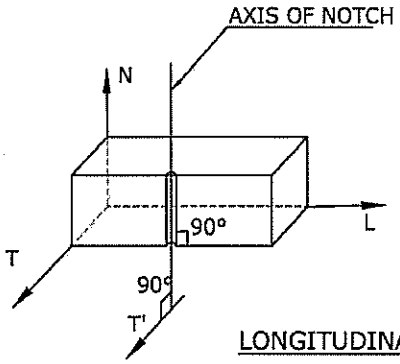
FORGED CYLINDER
METAL WORKING DIRECTION AXIAL (NOZZLES)

T = TANGENTIAL	L = LONGITUDINAL
A = AXIAL	Tr = TRANSVERSE
R = RADIAL	N = NORMAL

MWD = MAIN WORKING AIRECTION
(TO BE INDICATED BY THE SUPPLIER FOR HIS PRODUCTS)

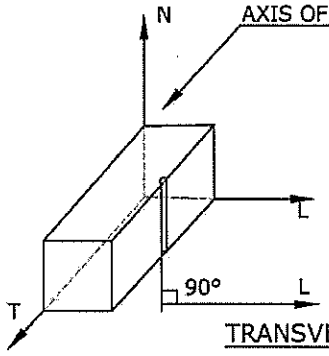
TEST SPECIMEN ORIENTATION

Fig. -5



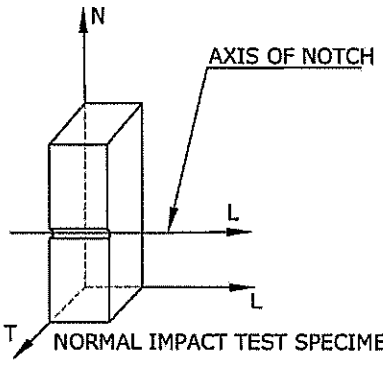
SPECIMEN ORIENTED ALONG
LONGITUDINAL AXIS
AXIS OF NOTCH PERPENDICULAR TO
LONGITUDINAL & TRANSVERSE DIRECTIC

LONGITUDINAL INPACT TEST SPECIMEN



TEST SPECIMEN ALONG TRANSVERSE
DIRECTICN.
AXIS OF NOTCH PERPENDICULAR TO
LONGITUDINAL & TRANSVERSE DIRECTIC

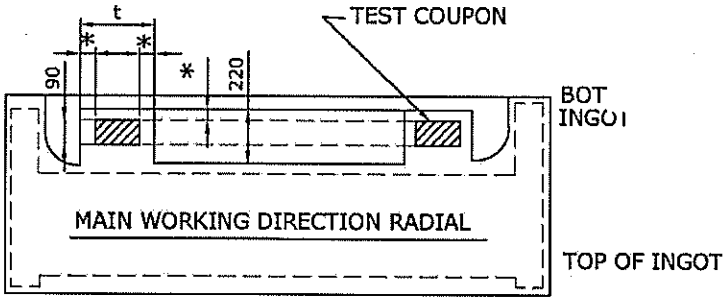
TRANSVERSE INPACT TEST SPECIMEN



TEST SPECIMEN ALONG NORMAL
DIRECTICN.
AXIS OF NOTCH PARALLEL TO
LONGITUDINAL DIRECTICN.
NOTCH NEARER TO H.T. SURFACE

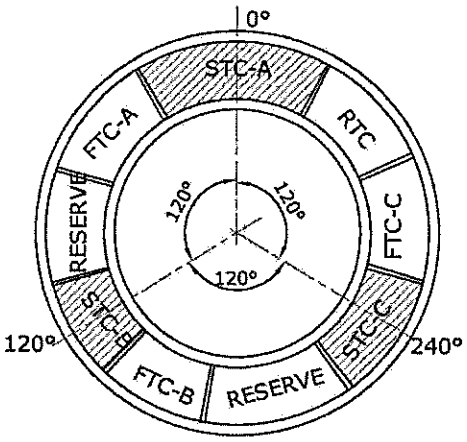
NORMAL IMPACT TEST SPECIMEN

TEST SPECIMEN FOR
ImpactTests
Fig.-6



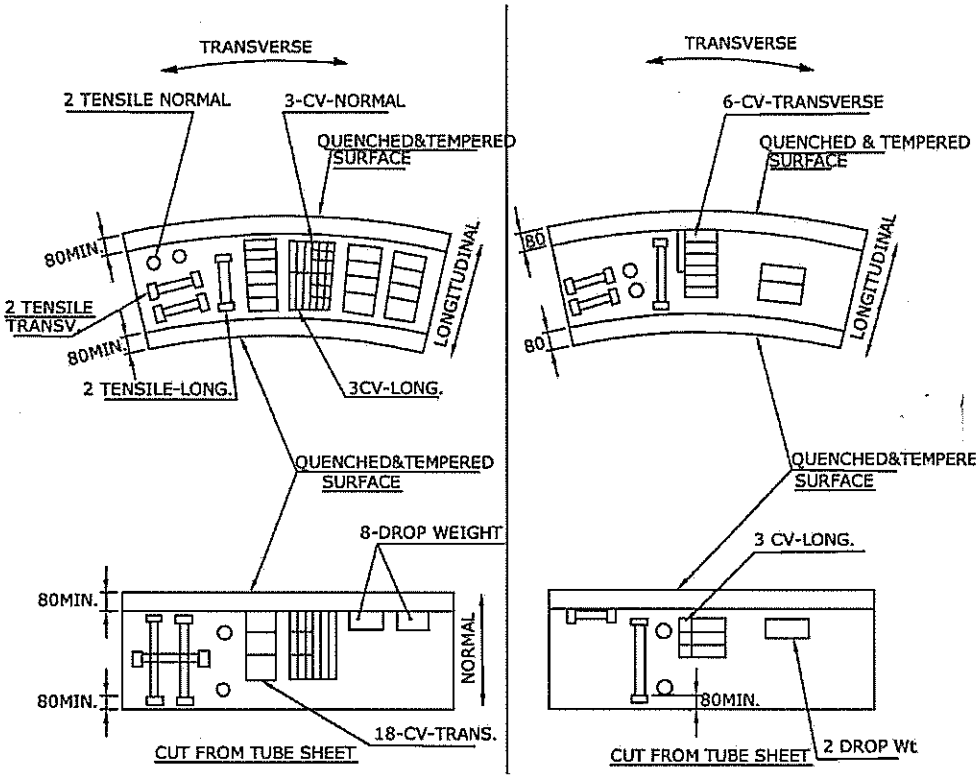
* ≥ 80 mm.

DIMENSION 't' MAY BE SUITABLY SELECTED BY THE SUPPLIER.



TEST COUPONS LOCATION - TUBE SHEET

FIG-7



MATERIAL SAMPLING AND TESTING PLAN FOR STC-A

MATERIAL SAMPLING AND TESTING PLAN FOR STC-B,STC-C & RTC-1

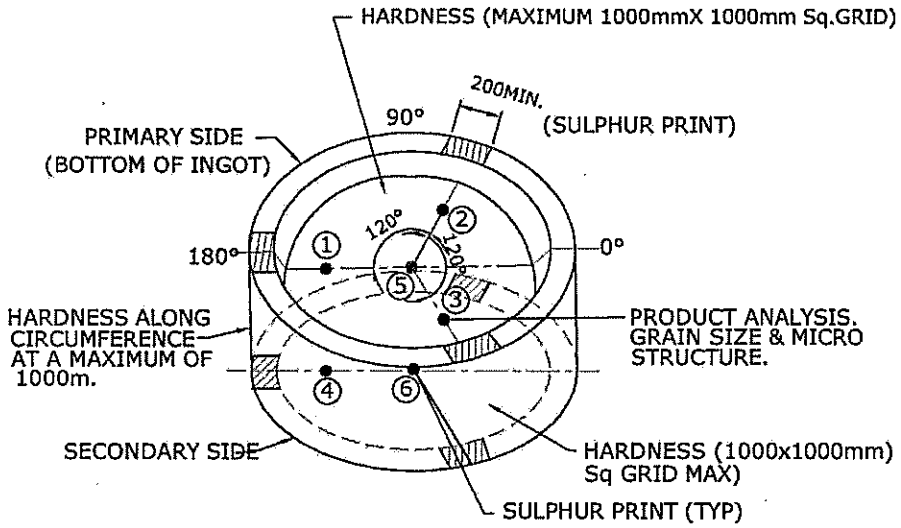
SL NO.	TEST COUPONS	STC-A			FOR EACH STC-B,STC-C & RTC-D LOCATIONS		
	TYPE OF TEST	N	L	T	N	L	T
1	TENSILE R.T.	1	1	1	-	-	1
2	TENSILE 350°C	1	1	1	-	-	1
3	IMPACT	3	3	18	-	-	6
4	DROP WEIGHT	-	-	8	2	2	2

EXTENT OF TESTS- TUBE SHEET

LEGEND:-

N - NORMAL
L - LONGITUDINAL
T - TRANSVERSE

MATERIAL SAMPLING & TESTING PLAN-TUBE SHEET
Fig.- 8



HARDNESS CHECK - [AFTER REMOVAL OF TEST COUPONS] a) ON BOTH END FACES ON A GRID PATTERN OF MAXIMUM 1000 X 1000mm.
b) ALONG CIRCUMFERENCE AT MAX. OF 1000mm APART.

SULPHUR PRINT TEST - AFTER FINAL MACHINIG.

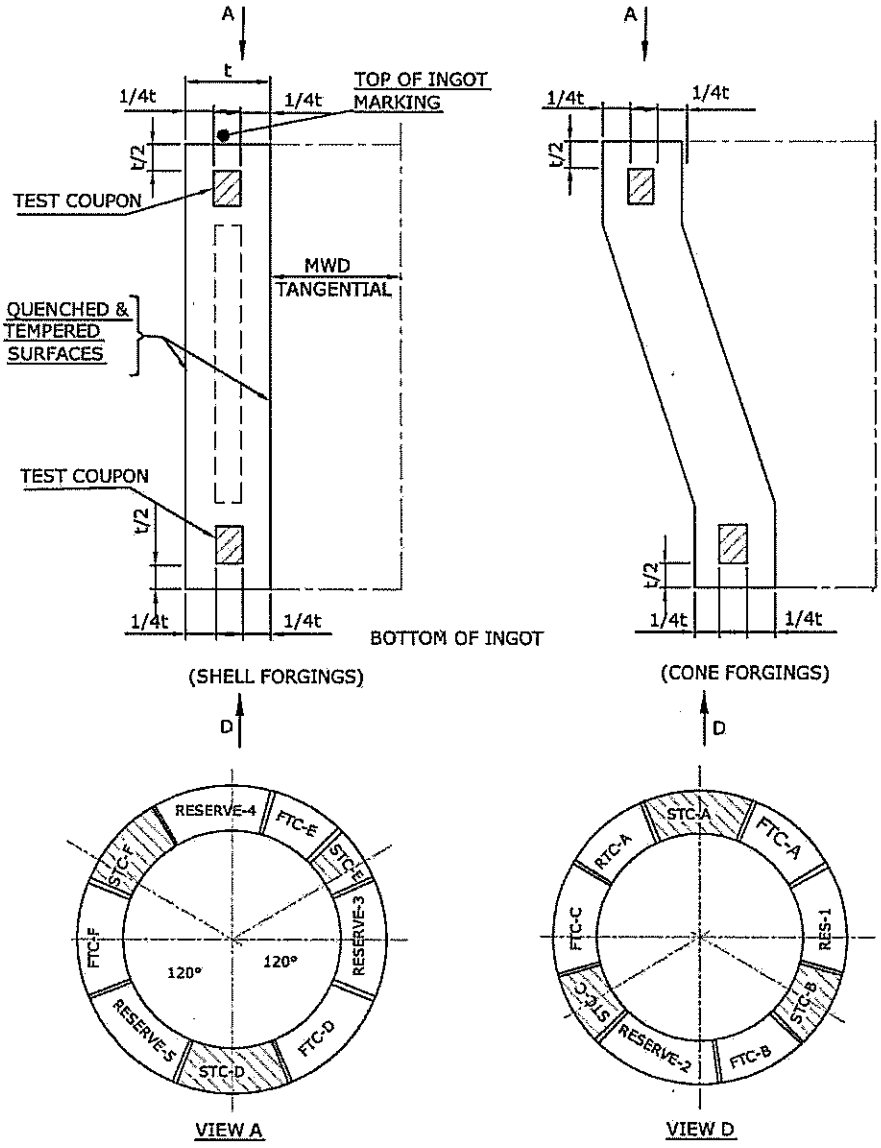
PRODUCT ANALYSIS -①,②,③ ACCEPTANCE TEST COUPONS FROM TEST RING
- 4 , 5 ,⑥ ADDITIONAL SAMPLES.

GRAIN SIZE & MICROSTRUCTURE - a) ON ONE NOTCHED BAR TEST SPECIMEN FROM EACH SAMPLING LOCATION (STC-A, STC-B, STC-C)

b) IN THE CENTER OF THE PRIMARY & SECONDERY SIDE THE MICROSTRUCTURE AND SEGREGATION SHALL BE EXAMINED.

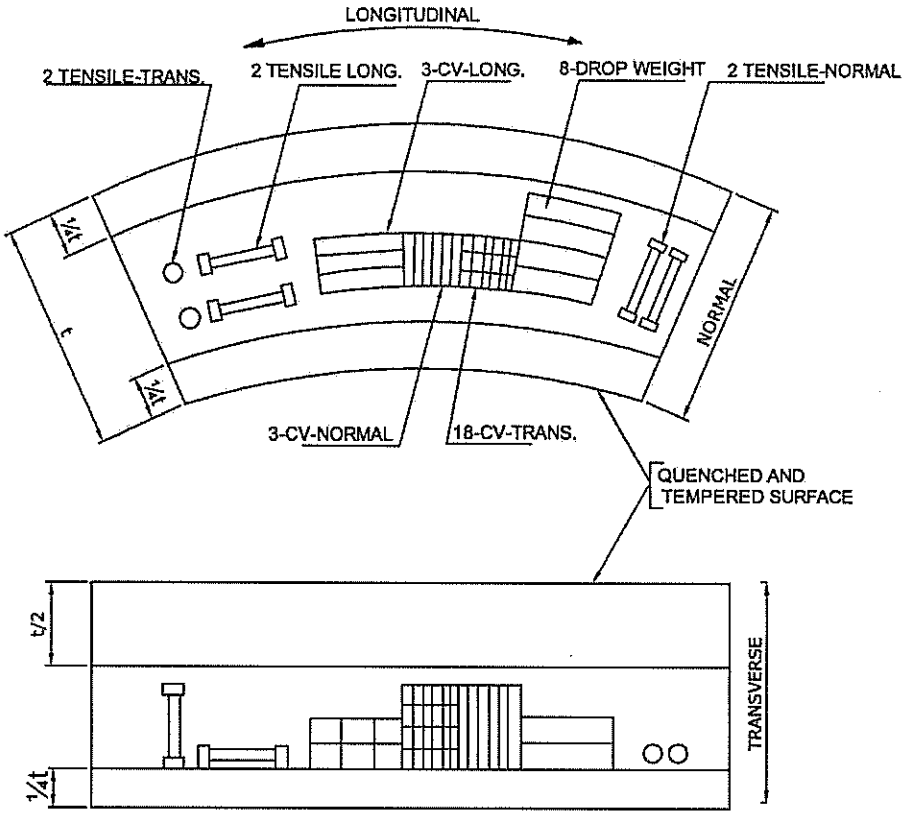
PRODUCT ANALYSIS & METALLURGICAL EXAMINATION (TUBE SHEET)

FIG-9



TEST COUPONS LOCATON-RING FORGINGS

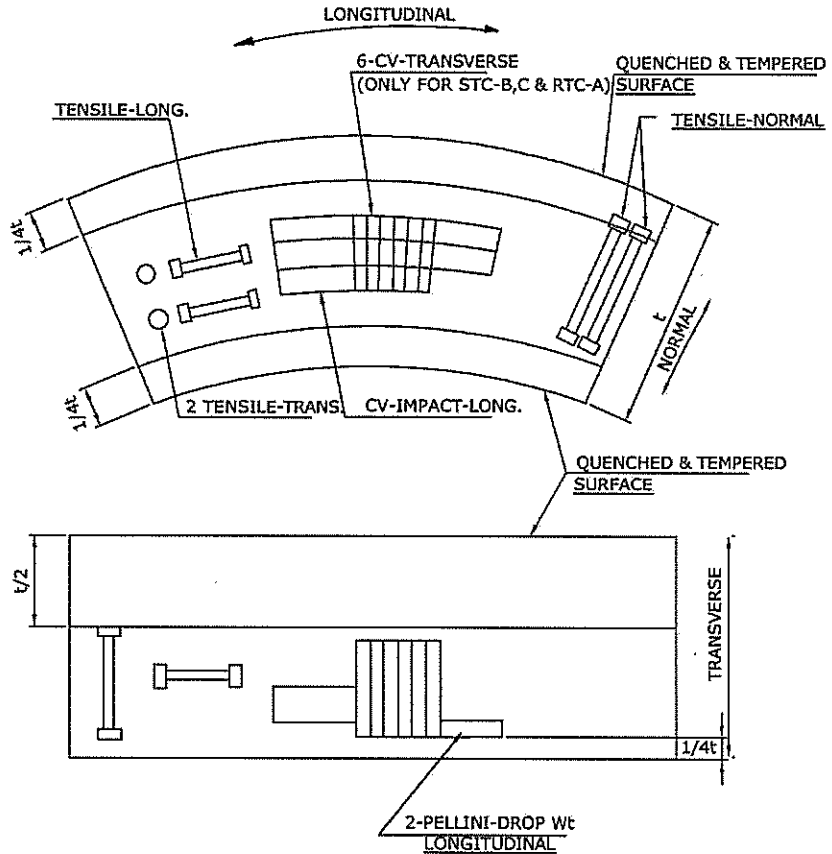
FIG-10



S. NO.	TYPE OF TEST	NO.OF TEST SPECIMEN		
		L	N	T
1	TENSILE AT RT	1	1	1
2	TENSILE AT 350°C	1	1	1
3	IMPACT TEST	3	3	18
4	DROP WEIGHT TEST	-	-	8

MATERIAL SAMPLING & TESTING PLAN FOR STC-A RING FORGINGS

FIG-11



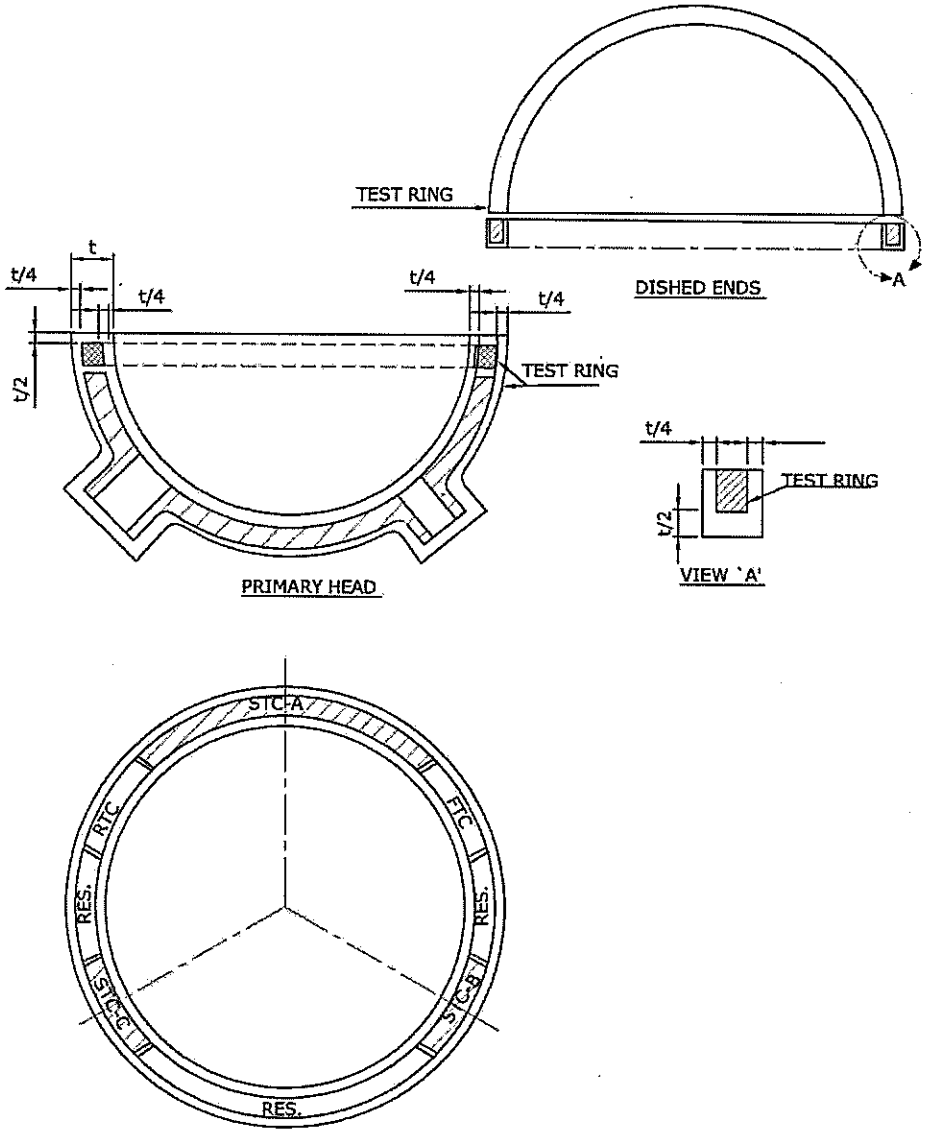
SL No	TYPE OF TEST	NO.OF SPEC FOR EACH OF STC-B & C			NO.OF SPEC FOR EACH OF STC-D,E&F			RTC-A No.OF SPEC		
		L	N	T	L	N	T	L	N	T
1	TENSILE AT RT	-	-	1	-	1	1*	-	-	1
2	TENSILE AT 350°C	-	-	1	-	-	1	-	-	1
3	IMPACT TEST	-	-	6	-	-	3	-	-	6
4	DROP WEIGHT TEST	-	-	2	-	-	-	-	-	2

* ONLY FOR STC-D

NOTE- ALSO SEE TABLE -2 FOR E XTENT OF TESTS.

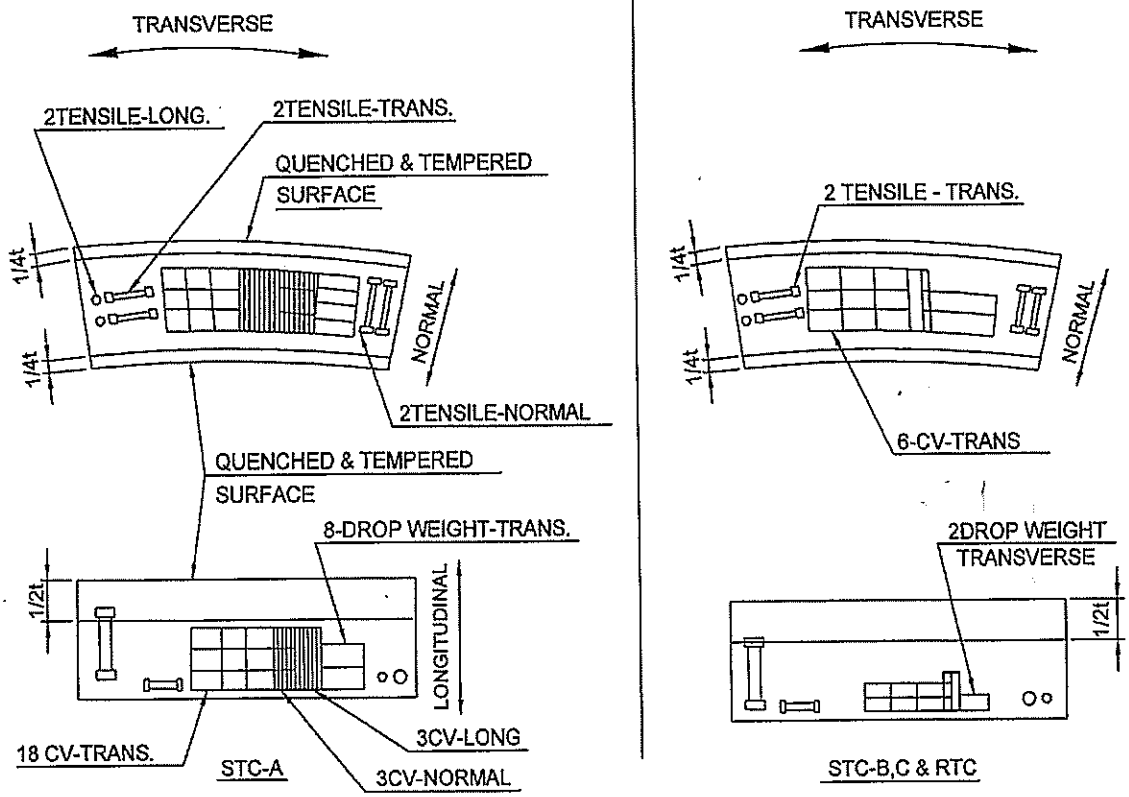
MATERIAL SAMPLING TESTING PLAN-STC-B,C,D,E&F AND RTC-A-RING FORGINGS

FIG-12



TEST COUPONS-LOCATION-DISHED END FORGINGS

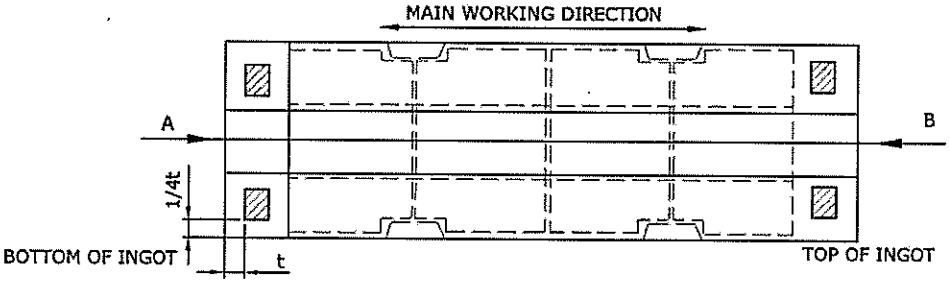
FIG-13

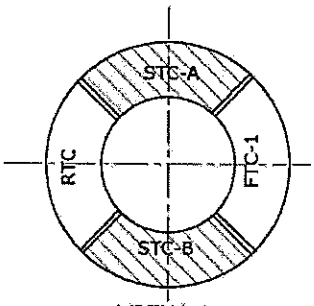


SL. NO.	TYPE OF TEST	NO.OF TEST SPECIMEN					
		STC-A			FOR EACH OF STC-B,STC-C & RTC		
		L	N	T	L	N	T
1	TENSILE RT	1	1	1	-	-	1
2	TENSILE 350°C	1	1	1	-	-	1
3	IMPACT	3	3	18	-	-	6
4	DROP WEIGHT	-	-	8	2	2	2

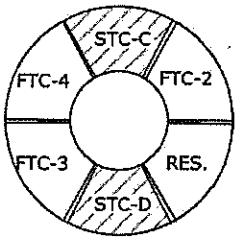
MATERIALI SAMPLING & TEST PLAN - DISHED END FORGINGS

FIG - 14





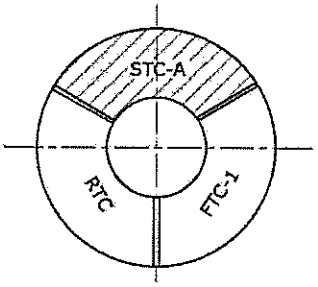
VIEW-A



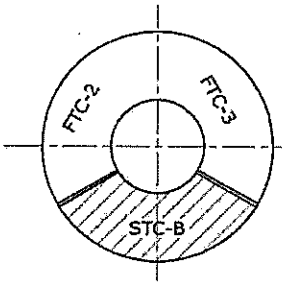
VIEW-B

(No.OF F.T.C.'S WILL BE EQUAL TO THE No.OF NOZZLES & OF SIZE EQUAL TO ATLEAST THAT OF S.T.C.-B)

SAMPLING PLAN FOR NOZZLES I.D. ABOVE 250



VIEW-A



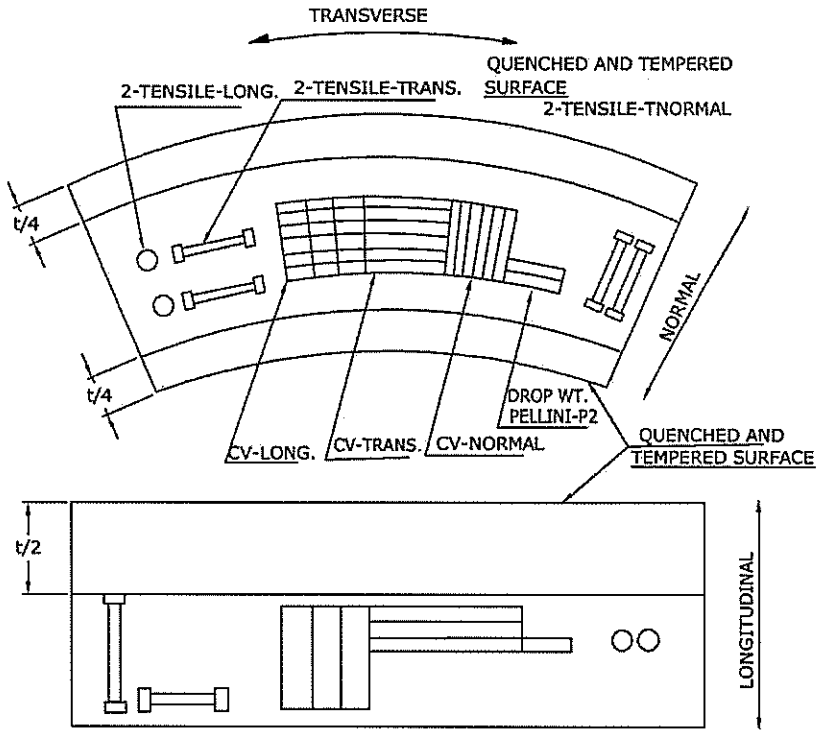
VIEW-B

NOTE:–
IF ONLY ONE NOZZLE IS MADE FROM A FORGING TEST COUPONS SHALL BE DRAWN ONLY FROM THE BOTTOM.

SAMPLING PLAN FOR NOZZLES I.D. UPTO 250

TEST COUPONS-LOCATION-NOZZLE FORGINGS

FIG-15

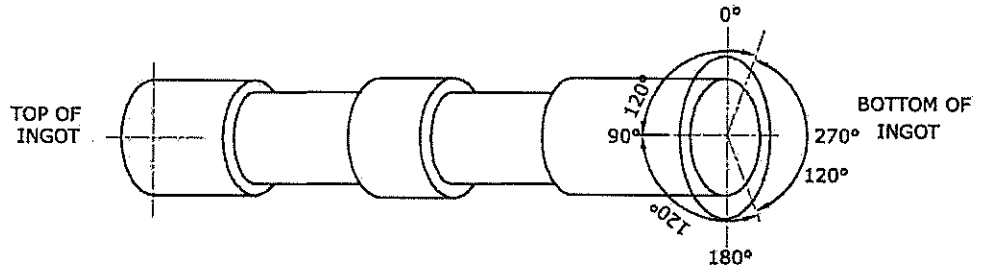


SL. No.	TYPE OF TEST	NO.OF TEST SPECIMEN															
		NOZZLE ID >250									ID UPTO 160 mm			160<ID<250			
		STC-A			STC-B&D (EACH)			RTC			STC-A & B&RTC(EACH)			STC-A&B&RTC(EACH)			
		L	N	T	L	N	T	L	N	T	L	N	T		L	N	T	
1	TENSILE RT	1	1	1	-	-	1	-	-	1	1	-	-		-	-	1	
2	TENSILE 350°C	1	1	1	-	-	1	-	-	1	1	-	-		-	-	1	
3	IMPACT -15`c	3	3	3	-	-	3	-	-	3	3	-	-		-	-	3	
3	IMPACT + 18°c	-	-	3	-	-	3●	-	-	3	3	-	-		-	-	3	
5	ADDITIONAL FOR IMPACT CURVE	-	-	12	-	-	-	-	-	-	-	-	-		-	-	-	
6	DROP WEIGHT	-	-	2	-	-	-	-	-	-	-	-	2		-	-	2	

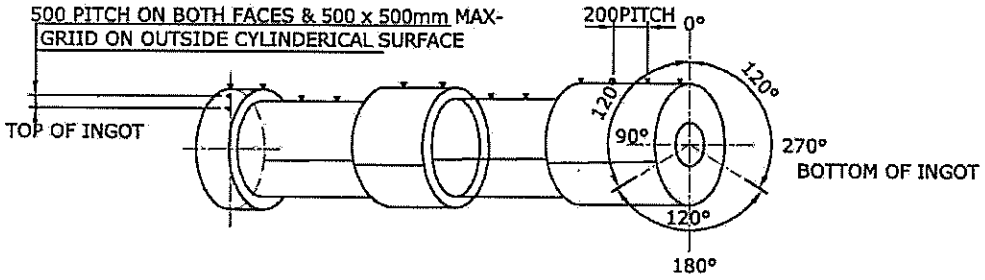
NOTE :- 1.× ONLY ON STC-A
2.● ONLY FOR STC-B
3. ALSO REFER TABLE-5

MATERIAL SAMPLING & TEST PLAN- NOZZLES.

FIG-16



SULPHUR PRINT AFTER Q&T



HARDNESS TEST AFTER REMOVAL OF TEST COUPONS

NOTE:

• —— HARDNESS TEST

METALLURGICAL TEST PLAN-NOZZLES

FIG–17

ANNEXURE-1

LOW ALLOY STEEL FORGINGS – 16 Mo 3

1.0 SCOPE

This annexure covers the technical requirements for the supply of low alloy steel forgings conforming to DIN EN 10222-2 material number 1.5415.

2.0 PROCESS OF MANUFACTURE

2.1 Steel Melting
The steel shall be melted in an open hearth / electric furnace. The steel shall be fully killed and preferably vacuum degassed.

2.2 Discard
Sufficient discard shall be made from the ingot to secure freedom from piping and segregation.

2.3 Forging Process
The components shall be hot forged as close as practicable to their final shape by a press or hammer of sufficient capacity to work the metal throughout its section.

2.4 Repairs
Refer para 10.0 of PC-M-960.

3.0 CHEMICAL COMPOSITION

Both ladle and product analysis shall meet the following requirements:

Element	Weight percentage
C	0.12 - 0.20
Si	0.15 - 0.35
Mn	0.50 - 0.70

P max	0.035
S max	0.035
Cr	0.30 max
Mo	0.25 - 0.35
Cu max	0.30
N2 max	0.009

4.0 HEAT TREATMENT

The forgings shall be supplied in the normalized condition.

5.0 MECHANICAL PROPERTIES

5.1 Mechanical tests shall be conducted in accordance with ASME SA-370 and ASTM E-21. Following minimum requirements shall be met within final normalized condition. Wherever possible transverse specimen will be used failing which longitudinal specimens can be used for tests.

	RT	350°C
Tensile strength (N/sq.mm)	440 – 580	To be reported
Yield strength (N/sq.mm)	270	190
% elongation on 5d (in 50 mm gauge length)	21	To be reported
Reduction in area	35	-

5.2 Notch Toughness

Three ISO-V test specimens will be tested at 20°C. The longitudinal and transverse specimen shall exhibit the following minimum values.

i) Average of three specimens 55 J
ii) Lowest single value 39 J

5.3 Hardness Test

Hardness shall be measured on each forging after final heat treatment along the length as well as over the thickness of the forging at sufficient number of points to demonstrate uniformity.

6.0 TEST COUPONS AND SPECIMEN LOCATION

Two separate test coupons (RTC & FTC) shall be identified and taken out from the forged bars. RTC (Raw Material Test Coupons) shall be used for preliminary tests before taking up final forging. FTC (Final Test Coupon) shall undergo same amount of working heat treatment as the final forging.

The specimens for testing shall be at least 1/4't' from a heat treated surface and ½ 't' from the end where 't' is the heat treated thickness.

6.1 Tensile Test Specimen

Two tensile test specimens shall be taken from each Coupon (RTC – 2 nos. & FTC – 2 nos.) for tests at room temperature and at 350°C.

6.2 Impact Test Specimen

One set of Cv impact test specimen shall be taken from each (RTC & FTC) for tests at 20°C. Lateral expansion and percent shear fracture shall be reported.

7.0 NON-DESTRUCTIVE EXAMINATION

The ultrasonic examination, magnetic particle tests and dimensional checks shall be carried out on each forging as per para 9.1, 9.2 and 9.3 of PC-M-960.

8.0 QUALITY SURVEILLANCE, DOCUMENTATION, MARKING, PRACKING AND SHIPMENT

Refer para 11, 12 and 13 of PC-M-960.

ANNEXURE-2

LOW ALLOY STEEL FORGINGS – ASTM-A-350 LF2

1.0 SCOPE

This annexure covers the technical requirements for supply of low alloy steel forgings conforming to ASME-SA-350Grade LF2.

2.0 MANUFACTURE.

2.1 The steel shall be clean, homogeneous, intrinsically tough produced by any recognized fine grain melting practice and shall be fully killed. The steel shall be produced by vacuum treatment. Details of the vacuum treatment and secondary metallurgical processes used shall be indicated in the bid.

2.2. The forgings shall be supplied in accordance with SA-350 grade LF2 with following additional requirements.

2.2.1 Chemical Composition

Sulfur, Phosphorus and other impurity elements shall be restricted as given below:

S	0.025% max
P	0.025% max
A1	0.04%
V	0.01%
Cr	0.25%
Cu	0.30%
Ni	0.40%
Sn	0.011%
As	0.025%
Sb	0.007%
N2	0.013%

2.2.2 Heat Treatment

The forgings shall be supplied in normalized condition.

2.2.3 Grain Size & Microstructure

The grain size and microstructure shall be determined on Longitudinal-Normal section of the forging. The mcirographs for determining the microstructure shall be made with a minimum magnification of 200X. The grain size shall be measured as per ASTM-E-112 and shall be 6 or finer.

3.0 MECHANICAL PROPERTIES

3.1 Mechanical tests shall be conducted in accordance with ASME-SA-370 and ASTM-E-21. Following minimum requirements shall be met within final normalized condition and are applicable to all test specimen orientation viz. Longitudinal, Transverse and Normal.

	RT	**350°C**
Tensile strength (N/sq.mm)	483 - 655	To be reported
Yield strength (N/sq.mm) (0.2% offset)	250	190
% elongation in 50 mm	22	To be reported
Reduction in area	30	To be reported

3.2 Notch Toughness

In addition to the impact properties specified at -45.6°Cas called for in SA-350 LF2, ISO-V impact transverse test specimens will be tested at + 18°C for certification of RTNDT. The absorbed energy and lateral expansion shall not be less than 69 J and 0.9 mm respectively for any of the specimens. The percent shear fracture shall be reported. Two drop weight tests carried out at - 15°C shall not indicate any break.

3.3 Hardness Test

Hardness of each forging shall be measured after the heat treatment before any further processing along the grid as defined in product specifications to demonstrate uniformity. Tests shall be carried out as per ASTM-E-10. The difference between the maximum and minimum hardness values shall not exceed 20 BHN.

3.4 Inclusion Rating

Refer para 7.4 of PC-M-960.

4.0 TESTS & EXAMINATION

For test coupon location and extent of tests refer para 8.2, 8.3, 8.4, 8.5, 8.6, 8.7 and product specification tables of PC-M-960.

5.0 NON-DESTRUCTIVE EXAMINATION

Refer para 9.1, 9.2 and 9.3 of PC-M-960.

6.0 QUALITY SURVEILLANCE, DOCUMENTATION, MARKING, PRACKING AND SHIPMENT

Refer para 11, 12 and 13 of PC-M-960.

ANNEXURE-3
BLEED CONDENSER FORGING

N – Normal, T – Transverse, L - Longitudinal

1. **EXTENT OF TESTS FOR**
   a) Primary Head with Integral Nozzles
   b) Tube Sheet
   c) Shell Flange
   d) Hemispherical Head
   e) Ellipsoidal Head

1.1 No. of Test Coupons : 3 Nos. (STC-A, STC-B & RTC)

1.2 Location of Test Coupons : STC A&B Diametrically opposite to each other.

1.3 Condition of Test Coupons : Simulated Heat Treatment for STC (See Clause 6.2 of PC-M-960)

1.4 Extent of Tests

Description	Direction	STC -A	STC –B	RTC
Tensile (RT)	N T L	1 1 1	-- 1 --	-- 1 --
Tensile (350°C)	T	1	1	1
Impact at - 15°C	T	3	3	3
Impact at +18°C	T	3	3	3
Drop weight test	T	2	--	2
Grain size and * microstructure		1	1	--
Product analysis		1	--	--
Hardness		At 500 x 500 mm grid		
U.T. & M.P.I		100% Refer 9.1 & 9.2 0f PC-M-960		

* Examination on notched bar specimen in Longitudinal – Normal direction.

BLEED CONDENSER FORGINGS

N – Normal, T – Transverse, L - Longitudinal

2. **EXTENT OF TESTS FOR**
   a) Integral Forging of Cone & Shell
   b) Shell Forging

2.1 No. of Test Coupons: 5 Nos.(STC-A, STC-B & RTC - Bottom of Ingot, STC-C & STC-D –Top of Ingot)

2.2 Location of Test Coupons: Diametrically opposite to each other on one face and displaced by 90°to the opposite face.RTC at 90° to STC

2.3 Condition of Test Coupons: Simulated Heat Treatment for STC (See Clause 6.2 of PC-M-960)
Q&T for RTC

2.3 Extent of Tests

Description	Direction	Bottom of Ingot			Top of Ingot	
		STC –A	STC -B	RTC	STC -C	STC -D
Tensile (RT)	N T L	1 1 1	-- 1 --	-- 1 --	1 1 --	-- 1 --
Tensile (350°C)	T	1	1	1	1	1
Impact at - 15°C	T	3	3	3	3	3
Impact at +18°C	T	3	3	3	3	3
Impact curve (-15°C, 18°C and 4 other temperatures	T	12	--	--	--	--
Drop weight test	T	2	-	-	-	2
Grain size and * microstructure		1	1	--	1	1
Product analysis		1	1		1	
Hardness	At 500 x 500 mm grid					
U.T. & M.P.I	100% as per para 9.1 & 9.2 of PC-M-960					

* Examination on notched bar specimen in Longitudinal – Normal direction.

BLEED CONDENSER FORGINGS

3. EXTENT OF TESTS FOR

a) Nozzle Forgings
b) Heater Nozzle

3.1	No. of Test Coupons	3 per forged bar (STC-A,STC-B & RTC) (Refer Fig. 15 of PC-M-960)
3.2	Location of Test Coupons	On opposite faces - Diametrically opposite
3.3	Condition of Test Coupons	Simulated Heat Treated
3.4	Extent of Tests	

Description	Direction 1)	Bottom of Ingot		Top of Ingot
		STC –A	RTC	STC -B
Tensile (RT)	T	1	1	1
Tensile (350°C)	T	1	1	1
Impact at - 15°C	T	3	3	3
Impact at +18°C	T	3	3	3
Drop weight test	T	2	--	--
Grain size and microstructure 2)		1		1
Product analysis		1		1
Hardness	At 200 x 200 mm grid			
U.T. & M.P.I	100% Refer 9.1 & 9.2 0f PC-M-960			

Notes :

1) For nozzles of size 160 NB and less, the specimens are to be taken from longitudinal direction.
2) Examination on notched bar specimen in Longitudinal – Normal direction.
   Production weld test coupons (PWTC) wherever required shall be supplied as per clause no. 8.1 (iv) of PC-M-960.

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

SPECIFICATION NO. : PC – M – 961

REVISION NO. :	0	1						
DATE OF ISSUE (MONTH/YEAR) :	June, 2013	Feb 2014						
TOTAL NO. OF PAGES (Including Cover Sheet) :	9	9						

TECHNICAL SPECIFICATION

FOR

STAINLESS STEEL PLATES, FLATS, FORGINGS, BARS, TUBES, ETC. FOR GENERAL APPLICATION

REF. USI NO. : 33111

	NAME	Designation	SIGNATURE	DATE
PREPARED BY	R.K.Gupta	ACE	Sd/-	21/6/2013
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CHECKED BY	P.B.Rshikesan	ACE	Sd/-	25/6/2013
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	M.K.Sharma	CE	Sd/-	03/7/2013
APPROVED BY	U.C.Muktibodh	ED (Engg.)	Sd/-	01/10/2013

(For Revisions see Revision Control Sheet)

File Name :
Floppy No.:

REVISION CONTROL SHEET

DOCUMENT TYPE: TECHNICAL SPECIFICATION

NO. : PC – M – 961

TITLE: TECHNICAL SPECIFICATION FOR STAINLESS STEEL PLATES, FLATS, FORGINGS, BARS, TUBES, ETC. FOR GENERAL APPLICATION

REV. NO. & DATE	DESCRIPTION OF REVISION	PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
0 June, 2013	Original (Pages : 9)	Sd/- R.K.Gupta Sd/- Braham Prakash	Sd/- P.B.Rshikesan Sd/- D.Ganesh Sd/- M.R.S.Saxena	Sd/- S.N.Kamath Sd/- M.K.Sharma	Sd/- U.C. Muktibodh
1 Feb, 2014	Rev 1 (Pages : 9) General Revision & Cobalt content on primary side material added.	03/02/14 R.K.Gupta 03/02/14 Braham Prakash	5/2/14 P.B.Rshikesan 7/2/14 D.Ganesh 7/2/14 M.R.S.Saxena	03.02.14 S.N.Kamath 19/02/14 M.K.Sharma	21.2.2014 U.C. Muktibodh

NPCIL PROPRIETARY

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1.0 SCOPE

This specification establishes the technical requirements for the material, manufacture, inspection, examination, testing and supply of stainless steel plates, flats, forgings, bars, tubes, etc. for general application. The requirements stated herein are additional technical requirements over DIN EN 10028-7 (Plates/Flats) DIN EN 10088-3 (Rods/ Bars), DIN EN 10216-5 (Tubes) for the supply of material number 1.4550/1.4571.

This specification is applicable for 700MWe projects beyond RAPP-7, 8.

2.0 CONTENTS

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

3.0 STEEL MELTING

The steel shall be melted in an electric furnaces, vacuum degassed and fully killed

4.0 SUPPLY CONDITION

The supply condition of each material/product form shall be specified in the Tender document / Purchase order. However, following supply conditions for each of the product form is envisaged.

a) Plates upto 4 mm: 2D, Cold rolled, solution annealed, pickled & passivated.

b) Plates above 4mm: 1D, Hot rolled, Solution annealed, pickled & passivated.

c) Flats: Cold rolled, Solution annealed, pickled and passivated and 2G condition ie. Ground finished on both the sides. Flats shall be ground smooth and the surface finish shall be Ra less than or equal to 0.8 microns. Surface finish measurement shall be reported with a roughness measurement diagram.

d) Rods : Either, Cold formed, solution annealed, descaled, pickled and mechanically smoothened with surface condition conforming to symbol 2G, OR Hot formed, solution annealed, descaled, pickled and prepared by machining with surface condition confirming to symbol 1G.

e) Tubes (Material no 1.4571): Cold finished, solution annealed and pickled with metallically bright surface condition conforming to symbol CFG as per test category 2.Surface roughness shall be 3.2 microns (CLA) for both internal & external surfaces. Tubes (Material No. 1.4550) : Hot finished, solution annealed, descaled, pickled, with metallically clean surface condition conforming to symbol HFD as per Test category 2.

5.0 CHEMICAL COMPOSITION

Both ladle and product analysis shall be carried out & meet the requirement of relevant material specifications mentioned in clause 1.0 above. Residual copper content shall not be more than 0.3 %, as per product analysis. The cobalt content in the SS materials being used on primary side of Steam Generator shall not exceed 0.03%.

6.0 MECHANICAL PROPERTIES

Mechanical tests at ambient temperature and high temperature tensile test at 350°C shall be carried out from each heat treated batch and shall conform to the requirements of relevant material specification. Apart from this any other mandatory tests required as per the relevant material specification shall also be carried out. For bars over100 mm in diameter, the impact and tensile specimens shall be taken in transverse direction.

7.0 CORROSION TEST

The materials shall pass Intergranular corrosion resistance test conducted as per ASTM A 262 Practice E with preceding heat treatment at 650 °C / 30 minutes.

8.0 NON-DESTRUCTIVE EXAMINATION

8.1 Ultrasonic Examination :

Plates with thickness 6mm and above, Tubes, Rods shall be ultrasonically examined to cover 100% of the volume in accordance with the respective product specifications.

Plates with thickness 6mm and above shall be subjected to straight beam & angle beam examination in transverse direction on both the surfaces to cover 100% of the volume.

The forgings shall be examined in accordance with Para 9.1 of PC-M-960

8.2 Liquid Penetrant Examination :

All forgings in finished shape & both the surfaces of plates of thickness 20mm & above shall be examined by liquid penetrant method in accordance with ASTM-E-165 with following additional requirements.

a) Penetrants, developers and cleaning agents containing more than 25 ppm each of Sulfur and Halogens shall not be used.
b) Application of penetrant and developer from aerosol type of spray cans is preferred.
c) The temperature of the area examined shall not be lower than 10 °C.

d) All traces of penetrant and developer shall be removed after completion of the examination.

8.2.1 Acceptance Standard :

Indications of any shape and size are unacceptable.

8.3 Hydrostatic Test :

Each tube shall be subjected to Hydrostatic test as per the requirement of DIN EN-10216-5

9.0 DIMENSIONAL CHECK AND VISUAL EXAMINATION

Each material shall be visually examined and checked for dimensional requirements as per Purchase Order.

10.0 MIX-UP TEST

Every material shall be tested to detect any inadvertent mix-up.

11.0 REPAIRS

Repair is generally not permitted. Slight surface defects may be smoothly ground and blended without impairing the minimum wall thickness. No other repairs shall be carried out without prior approval of the Purchaser.

12.0 QUALITY SURVEILLANCE

All material shall be subjected to quality surveillance by the Purchaser or his authorized agency during manufacturer. The material shall not be supplied until the shipping release is given by the Purchaser or his authorized agency.

13.0 TEST REPORTS / CERTIFICATES

Five (5) copies of all test reports / certificates shall be sent to the purchaser immediately after completion of tests / inspection, prior to the shipment of the material. One set of test reports / certificates shall be dispatched along with the material. Following reports shall be submitted:

(a) Chemical Analysis (Ladle and Product).
(b) Heat treatment details (heat treatment charts) shall be sent after completion of the contract.
(c) Results of mechanical properties.
(d) Intergranular corrosion test report.
(e) Visual and dimensional test reports.
(f) Surface roughness measurement diagram for flats as required.
(g) Result of micrograph and grain size.
(h) Hardness values.
(i) Ultrasonic examination and liquid penetrant examination reports.
(j) Hydrostatic test report.

Final documentation containing all the above shall also be submitted in soft form (pdf format) with proper indexing

14.0 MARKING AND IDENTIFICATION

Each product shall be marked with the following information:

(a) Heat number.
(b) Direction of rolling (for plates).
(c) Material designation.
(d) Supply condition.
(e) Manufacturer's name.
(f) Inspection agency / Purchaser's seal.
(g) Purchase order number.

15.0 PACKING AND SHIPMENT :

The materials shall be packed suitably with adequate bracing and blocking to withstand transshipment and tropical storage for two years. The packages shall be released for shipment only after inspection and issue of "shipping release" by the Purchaser or his authorized agency. Each box shall contain the test certificates in respect of the material contained. Details of items packed including material specification, Purchase order number and destination shall be clearly marked on packages.

SPECIAL CONDITION ANNEXURE – A

PR No. : 132871371

1. The indented items are required for NPCIL / Fleet & GHAVP, 700MWe SG Project.
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 Stainless Steel Rod conforming to specification DIN EN 10088-3 1.4550 as per PC-M-961 Rev.01 and Quality Plan for SS Rods (GQP-SSRODS-01). Supplier to confirm.
5. Supplier shall confirm for all stages in Quality plan. Deviations shall be mentioned in the offer itself.
6. Supplier shall meet the below said requirement
    a. Residual Copper content shall not be more than 0.3% as per product analysis.
    b. The Cobalt content in SS material shall not exceed 0.03%
    c. Reference reflectors/acceptance for Ultrasonic Testing shall be based on final component nominal thickness of 37 mm as per PC-M-961 Rev.01 & PC-M-960.
7. **For offer acceptance,** Suppliers should have the capability and experience to produce the Indented SS Rods as per quality standards. Also, Supplier should have supplied the Austenitic Stainless Steel Rod for the 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 Austenitic Stainless Steel Rod, supplier shall submit the unpriced P.O., Signed Test Certificates (Signed or accepted by Customer/TPI) and Shipping release document/ supply invoice copy/bill of lading/delivery challan with specifications and details of customer along with the offer.
9. Offers received will be evaluated by BHEL and NPCIL. Final acceptance of the offers will be based on NPCIL recommendation.
10. Due to stringent quality requirements, offers from traders/dealers/stockist/distributors shall not be considered for evaluation.
11. Supplier has to submit the following Quality documents for review and approval from BHEL and NPCIL.
    - Quality Assurance Plan(QAP) in line with attached sample QAP format.
    - Manufacturing Process Plan(MPP) & Heat Treatment Plan (HT Plan)
    - Material Sampling and Testing Plan(MSTP)
    - NDE Procedures and Technique sheets & Report Formats

15/11/22

Engineering

E. ARUN KUMAR
Deputy Manager
Engg & RPD / ATP
BHEL, TRICHY - 620 014

15/11/22

Quality Assurance

(M. SHYAM SUNDAR)
(QA/ATP)

15.11.2022

Materials Planning

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

SPECIAL CONDITION ANNEXURE – A

PR No. : 132871371

12. The actual production of material is permitted only after approval of all documents required for manufacturing / inspection / testing activities by BHEL and NPCIL.
13. Supplier shall submit their QA Manual/Quality Manual in line with ISO 9001 (Latest version) for review and acceptance by BHEL
14. Inspection agency for imports are BHEL & "NPCIL or NPCIL appointed third party inspection (TPI) agency". Inspection agency for indigenous supply are BHEL and NPCIL.
15. Chemical and mechanical tests shall be carried out in ln-house labs or Labs meeting the requirements as per National/International standards like ISO 9001/ ISO/IEC 17025 etc. or Government approved labs.
16. Supplier shall submit Test Certificates of finished materials for our review. Dispatch clearance will be given after acceptance of Test Certificates by BHEL & NPCIL.
17. Supplier to submit his technical and commercial bid conforming to the above points as given in this annexure.
18. Documentation: Three sets of documents containing (i.) Test Certificates and respective test reports (ii.) copies of the approved quality documents and test procedure, (iii.) design change requisitions (if any) and (iv.) Drawing etc. to be provided along with the supply of items.

15.11.22

Engineering

E. ARUN KUMAR
Deputy Manager
Engg & RPD / ATP
BHEL, TRICHY - 620 014

15/11/22

Quality Assurance

(M. SHYAM SUNDAR)
(QA/ATP)

15-11-2022

Materials 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'

Supplier's LOGO	Supplier's Name and Address	Quality Plan for SS Rods (DIN EN 10088-3 , 1.4550		P.O No: To be filled
		Item : SS Rods Sub-system: Steam Generator	QP No.: To be filled by Supplier Rev.No.: To be filled by Supplier Date: To be filled by Supplier	GQP-SS RODS-01

Sl. No	Component & Operations	Characteristics	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record		Agency			Remarks
									M	B	N	
1.	2.	3.	4.	5.	6.	7.	8.	D*	9. **			10.
1.0	**Raw Material :**											
1.1	Steel Melting : :Melting in electric furnace :Vacuum Degassing	Temperature	Record Verification	100%	PC-M-961/01 MPP: To be submitted	TC	√		P	R	R	Steel shall be fully killed.
1.2	Ladle Analysis	Chemistry	Chemical analysis	1/Melt	PC-M-961/01 MPP: To be submitted	TC	√		P	R	R	Note-3 ---
1.3	Semi Product ingot casting	Free from defects	Visual/Record verification	100%	MPP: To be submitted	--	--		P	--	--	---
2.0	**In process Controls :**											
2.1	Cold /Hot Forming : Method of forming to be mentioned.	Forming Operation	Record verification	100%	PC-M-961/01 MPP: To be submitted	TC	√		P	R	--	---
2.2	Marking after Forming	Identifications	Verification and Visual	100%	PC-M-961 Rev 01	RD	--		P	R	R	---
2.3	Heat Treatment (Solution Annealing)	R.O.H , Soaking Temp & Time, R.O.C	Review of HT Chart	100%	PC-M-961 Rev 01 HT Plan: To be submitted	TC	√		P	R	R	Chart shall be signed at the start and End of Heat treatment and submitted along with TC

Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved
SUPPLIER'S NAME: To be filled		BHEL	NPCIL

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** **M:** SUPPLIER **B:** BHEL, **N:** NPCIL/TPI
P: PERFORM R: REVIEW **W:** WITNESS AND H: HOLD
TC:TEST CERTIFICATE **RD:**RECORD

न्यूक्लियर पावर कार्पोरेशन ऑफ इंडिया लिमिटेड
NUCLEAR POWER CORPORATION OF INDIA LTD.
☐ अनुमोदित / APPROVED
☐ टिप्पणी के अनुसार अनुमोदित / APPROVED AS NOTED
☐ संशोधन करें और पुनः प्रस्तुत करें
PROCEED WITH / HOLD FABRICATION
☐ अंतिम ट्रांसपेरेंसी एवं प्रतियां भेजें
SEND FINAL TRANSPARENCIES & PRINTS
☐ संशोधन कर पुनः अनुमोदन के लिए पुनः प्रस्तुत करें
REVISE AND RESUBMIT FOR APPROVAL
जाँचकर्ता CHECKED BY 28/8/18 (AKS)
समीक्षकर्ता REVIEWED BY 10/9/18
अनुमोदन कर्ता APPROVED BY 21/9/18 (CR Kumar) NPCIL
विक्रेय आपूर्तिकर्ता को विनिर्देशनों के अनुसार आपूर्ति करने से मुक्त नहीं करता ।
The Approval of ... to be done does not relieve the supplier of responsibility of supply according to specifications.

Master
AN

Supplier's LOGO	Supplier's Name and Address	Quality Plan for SS Rods (DIN EN 10088-3 , 1.4550,		P.O No: To be filled GQP-SS RODS-01
		Item : SS Rods Sub-system: Steam Generator	QP No.: To be filled by Supplier Rev.No.: To be filled by Supplier Date: To be filled by Supplier	

2.4	Descaling	Surface Inspection , Free from Visual Defects	Visual	100%	PC-M-961/01 Free from Visual Defects	RD	√	P	---	---	Surface Should be smooth and free of scales
2.5	Mechanical smoothening(for Cold formed) : Method to be mentioned Or Machining(for Hot Formed)	Dimensions , Visual	Measurement Visual	100%	PC-M-961 Rev 01 Drg/P.O: To be filled	--	--	P	--	--	--
2.6	Identification of Test coupon and Cutting	Location and orientation	Visual & Measurement	100%	PC-M-961/01 MPP & MSTP: To be submitted	RD	√	P	R	R	---
2.7	Pickling and Passivation of Rods	Completeness	Visual & passivity check	100%	PC-M-961/01 MPP: To be submitted	TC	√	P	R	R	---
2.8	Dimensional Check	Dimensions	Measurement	100%	PC-M-961 Rev 01 Drg/P.O: To be filled	TC	√	P	W	W	---
2.9	Visual Inspection	Visual	Visual	100%	Surface Condition: "2G-Cold formed" & "1G for Hot Formed"	TC	√	P	R	R	---
2.10	Liquid Penetrant Inspection	Surface breaking defects	LPI	100%	PC-M-961 Rev 01 ASTM E 165 LPI Procedure: To be submitted	TC	√	P	R	R	Surface shall be cleaned after LPI
2.11	Ultrasonic Inspection (USI)	Internal soundness	Ultrasonic Test	100%	PC-M-961 Rev 01 , PC-M-960 (Para 9.1) UT Procedure: To be submitted	TC	√	P	W	W	Surface shall be cleaned after USI
2.12	Specimens preparation	Dimensions	Measurement	100%	MSTP: To be submitted PC:M:961 Rev 01	RD	--	P	W	W	---
2.13	**Mechanical and Metallurgical Tests :**										

		(NITHIN.O.R)		**LEGEND:** * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** **M:** SUPPLIER **B:** BHEL, **N:** NPCIL/TPI **P:** PERFORM R: REVIEW **W:** WITNESS AND **H:** HOLD **TC:**TEST CERTIFICATE **RD**:RECORD
Prepared	**Reviewed & Approved**	**Reviewed & Approved**	**Reviewed & Approved**	
SUPPLIER'S NAME: To be filled		**BHEL**	**NPCIL**	

1/Heat/ HT Batch

Supplier's LOGO	Supplier's Name and Address	Quality Plan for SS Rods (DIN EN 10088-3 , 1.4550) Item : SS Rods Sub-system: Steam Generator	QP No.: To be filled by Supplier Rev.No.: To be filled by Supplier Date: To be filled by Supplier	P.O No: To be filled GQP-SS RODS-01

2.14	Product analysis	Chemistry	Chemical analysis	1 / Batch	PC-M-961 Rev 01 MSTP: To be submitted EN10088-3	TC	√	P	W	W	Note-2 & 3
2.15	Tensile at RT	Tensile Strength, Yield Strength (0.2% offset), % Elongation	Destructive Test	1/Batch	PC-M-961 Rev 01 MSTP: To be submitted EN10088-3	TC	√	P	W H	W H	--
2.16	Tensile at 350° C	Tensile Strength, Yield Strength (0.2% offset)	Destructive Test	1/Batch	PC-M-961 Rev 01 MSTP: To be submitted EN10088-3	TC	√	P	W H	W H	--
2.17	Impact Test at Room Temperature	Energy absorbed % Shear fracture Lateral Expansion	Destructive Test	1/Batch	PC-M-961 Rev 01 MSTP: To be submitted EN10088-3	TC	√	P	W	W H	
2.18	Corrosion Test (in solution annealed condition)	Inter Granular Corrosion	IGC Test	1/Batch	PC-M-961 Rev 01 ASTM A 262 Practice-E MSTP: To be submitted	TC	√	P	W	W	Without sensitization
2.19	Corrosion Test (after sensitization)	Inter Granular Corrosion	IGC Test	1/Batch	PC-M-961 Rev 01 ASTM A 262 Practice-E MSTP: To be submitted	TC	√	P	W	W	Sensitization-650° x 30 Minutes.
2.20	Micrograph & grain size	Micro structure, Grain Size	Micro test , Grain size check	1/Batch	PC-M-961 Rev 01 ASTM E112 MSTP: To be submitted Grain Size to be reported EN10088-3	TC	√	P	~~R~~ W	R H	---
2.21	Hardness	Hardness	Brinell / Rockwell Hardness	1/Batch	PC-M-961 Rev 01 EN10088-3	TC	√	P	~~R~~ W	R	---

		12/08/18 (NITHIN O.R)		**LEGEND:** * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** **M:** SUPPLIER **B:** BHEL, **N:** NPCIL/TPI **P:** PERFORM R: REVIEW **W:** WITNESS AND **H:** HOLD TC:TEST CERTIFICATE **RD**:RECORD
Prepared	**Reviewed & Approved**	**Reviewed & Approved**	**Reviewed & Approved**	
SUPPLIER'S NAME: To be filled		**BHEL**	**NPCIL**	

Supplier's LOGO	Supplier's Name and Address	Quality Plan for SS Rods (DIN EN 10088-3 , 1.4550,									
		Item : SS Rods Sub-system: Steam Generator		QP No.: To be filled by Supplier Rev.No.: To be filled by Supplier Date: To be filled by Supplier		P.O No: To be filled GQP-SS RODS-01					
3.0	**Final Inspection**										
3.1	Visual Inspection of Rods	Free from visual defects	Verification and Visual	100%	PC-M-961 Rev 01	TC	√	P	R	R	---
3.2	Marking	Sl No, Heat Number, Material designation, Supply condition, Inspectors Seal, Manufactures name , P.O Number.	Verification and Visual	100%	PC-M-961 Rev 01	TC	√	P	R	R	---
3.3	Mix up Test	Positive Material Identification	PMI Test	100%	PC-M-961 Rev 01	TC	√	P	W	R	---
3.4	Certification and Documentation Control	Order compliance	Certificate compilation	100%	PC-M-961 Rev 01	TC	√	P	R	R	---
3.5	Documents (Test Certificates) shall be sent to BHEL/Trichy prior to dispatch. Dispatch clearance will be given after Acceptance of Test Certificates by BHEL&NPCIL)					RD	--	P	H	H	---
3.6	Packing & Shipment	Packing	Visual	100%	PC-M-961 Rev 01	---	--	P	R	R	---

Note:

1. MSTP (Material Sampling Plan) , MPP(Manufacturing Process plan), Heat Treatment Plan, Ultrasonic & Liquid Penetrant Test Procedures etc. shall be submitted by Supplier and the same will be subjected to both BHEL&NPCIL approval.
2. Residual Copper content shall not be more than 0.3% as per product analysis.
3. The cobalt content in the SS materials being used on Steam Generator shall not exceed 0.03%

12/08/18
(NITHIN.O.R)

14/8/18

S. LAKSHMI
Deputy General Manager
Quality Assurance
BHEL, Trichy - 620 014.

				LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** **M:** SUPPLIER **B:** BHEL, **N:** NPCIL/TPI **P:** PERFORM R: REVIEW **W:** WITNESS AND H: HOLD **TC:**TEST CERTIFICATE **RD**:RECORD
Prepared	**Reviewed & Approved**	**Reviewed & Approved**	**Reviewed & Approved**	
SUPPLIER'S NAME: To be filled		**BHEL**	**NPCIL**	

SAMPLE FORMAT OF QAP

P.O. NO: (MAIN CONTRACTOR/SUB-VENDOR AS APPLICABLE) DATE:	**QUALITY ASSURANCE PLAN** ITEM: SAFETY CLASS: QS GRADE:	QAP NO: NPCIL/PROJECT/USI/ITEM/SL. NO. REV. NO. DATE:
PROJECT	NAME OF PACKAGE: PO NO : (NPCIL)	NPCIL QA REF. NO.:

NAME OF PACKAGE CONTRACTOR / MAIN VENDOR AND ADDRESS	NAME OF VENDOR / SUB-VENDOR AND ADDRESS

SR.NO.	DATA SHEET/VSS NO./DRG NO.	BRIEF DESCRIPTION OF ITEM	DESIGN CODE/ SPEC. NO.

FOR MAIN CONTRACTOR's VENDOR			AFFIX STAMP OF VENDOR / SUB-VENDOR
	PREPARED BY	CHECKED/ REVIEWED BY	APPROVED BY
SIGNATURE			
NAME			
DATE			

FOR PACKAGE / MAIN CONTRACTOR			AFFIX STAMP OF PACKAGE CONTRACTOR
	CHECKED BY	REVIEWED BY	APPROVED BY
SIGNATURE			
NAME			
DATE			

FOR NPCIL			
	CHECKED BY	REVIEWED BY	APPROVED BY
SIGNATURE			
NAME			
DATE			

QAP REVISION CONTROL SHEET

SL No	Description of Revision	No of Pages	Revision No. with date
1	New issue	No of pages + Nos of control sheet	0 Date

Sample format of QAP

NPCIL	SUB VENDOR/SUB CONTRACTOR/ MANUFACTURERS NAME & ADDRESS	QUALITY ASSURANCE PLAN	PROJECT:
		ITEM:	NAME OF THE PACKAGE & MAIN CONTRACTOR :
		QAP No. REV. No.& DATE	
		NO. OF PAGES	

SR. NO.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS	NAME & SIGNATURE WITH DATE (REF NOTE NO-13)			
									P	W	R	H		1	2	3	4
1	2	3	4	5	6	7	8	9	10				11	12			

MANUFACTURER/ SUB-VENDOR

SEAL &SIGNATURE WITH DATE

LEGEND:

A) AGENCY:

1: NPCIL
2 : PAKAGE /MAIN CONTRACTOR
3: MANUFACTURER / SUB-CONTRACTOR /SUB VENDOR.
4: NOMINATED INSPECTION AGENCY /APPROVED LAB.

B) ACTIVITY:

H: HOLD POINT, "P" PERFORMED BY, "W" WITNESSED BY AND "R" REVIEW BY AS APPROPRIATE
MA – MAJOR, CR - CRITICAL

SEAL & SIGNATURE OF MAIN / PACKAGE CONTRACTOR

GENERAL NOTES

1. Heat treatment shall be carried out in calibrated furnaces only.
2. Calibrated instruments shall be used during inspection, examination and testing.
3. NPCIL approved chemicals shall only be used for liquid penetrant examination.
4. Non-destructive examinations & evaluation shall be carried out by personnel qualified to minimum Level-II of ISNT or ASNT
5. After completion of each stage, all concerned persons shall sign the QAP against each stage inspection. The original QAP shall be kept with vendor till the final stage is completed and signed by all concerned. This document shall also be one of the basis for issuing the Shipping Release. The final signed QAP shall be part of History Docket.

न्यूक्लियर पावर कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
NUCLEAR POWER CORPORATION OF INDIA LTD.
(A Government of India Enterprise)
गुणवत्ता आश्वासन निदेशालय
Directorate of Quality Assurance
नाभिकीय ऊर्जा भवन, अणुशक्तिनगर, मुंबई-400 094
Nabhikiya Urja Bhavan, Anushaktinagar, Mumbai - 400 094.
Corporate Identification No. U40104MH1987GOI149458

थॉमस मैथ्यू Thomas Mathew
अधिशासी निदेशक (गु.आ.) Executive Director (QA)

Phone: 022- 25995030/25558487
Fax.No.: 022-25565354
e-mail:tmathew@npcil.co.in

सं. No. एनपीसीआईएलNPCIL/02500/क्यूएडीQAD/ईडीED(क्यूएQA)/एमM/2022/111 June 28, 2022

विषय : वेधी पदार्थों के अनुमोदित ब्रांड की सूची।
Sub: List of approved brands of penetrant materials

28-06-2022 की स्थिति में एनपीसीआईएल के उपयोग हेतु वेधी पदार्थों के अनुमोदित ब्रांड की सूची इसक साथ सलग्न है। यह अनुमादन हमारा प्राक्रया सख्या QAD/NDT-PROC-PT-05,R-03 (तरल वेधी परीक्षण के लिए उपयोग में आने वाले रसायन परिवार के अनुमोदन हेतु प्रक्रिया) के अुनसार आवश्यकताओं के अनुरूप प्रदान किया जाता है।

The list of approved brands of penetrant materials for use on NPCIL jobs as on 28-06-2022 is enclosed. The approvals are granted in conformance to the requirements as per our procedure no. QAD/NDT-PROC-PT-05,R-03 (Procedure for approval of Family of Chemicals used for Liquid Penetrant Examination).

थॉमस मैथ्यू 28.06.2022
(थॉमस मैथ्यू Thomas Mathew)

LIST OF APPROVED PENETRANT TESTING MATERIALS

(As on 28-06-2022)

Sr No.	Manufacturers	Brand name	Description	Valid up to
1.	ORIENTAL CHEMICAL WORKS (P) LTD.KOLKATA	Orion 119 P	Red Dye Penetrant	**FEB-2026**
2.	ORIENTAL CHEMICAL WORKS (P) LTD.KOLKATA	Orion 119 PR	Penetrant Remover	**FEB-2026**
3.	ORIENTAL CHEMICAL WORKS (P) LTD.KOLKATA	Orion 119 D	Developer (Non-Aqueous)	**FEB-2026**
4	MAGNAFLUX ITW INDIA PVT.LTD.SECUNDERABAD	SKL-SP 1	Red Coloured Solvent Removable Penetrant	**July2024**
5.	MAGNAFLUX ITW INDIA PVT.LTD.SECUNDERABAD	SKC-1	Solvent Cleaner	**July2024**
6.	MAGNAFLUX ITW INDIA PVT.LTD.SECUNDERABAD	SKD-S2	Solvent Base Developer	**July2024**
7.	MAGNAFLUX ITW INDIA PVT.LTD.SECUNDERABAD	SKL-WP2	Red Coloured Water Washable Penetrant	**July2024**
8	MAGNAFLUX ITW INDIA PVT.LTD.SECUNDERABAD	SKL-SP2	Red Coloured Solvent Removable Penetrant.	**July2024**
9.	PRADEEP METAL TREATMENT CHEMICALS PVT. LTD., THANE	Flaw Guide Penetrant (NP Grade)	Red Coloured Solvent Removable Penetrant.	**Oct2024**
10	PRADEEP METAL TREATMENT CHEMICALS PVT. LTD., THANE	Flaw Guide Cleaner (NP Grade)	Solvent Cleaner	**Oct2024**
11	PRADEEP METAL TREATMENT CHEMICALS PVT. LTD., THANE	Flaw Guide Developer (NP Grade)	Solvent Base Developer	**Oct2024**
12	PRADEEP METAL TREATMENT CHEMICALS PVT. LTD., THANE	Flaw Guide Red Dye Penetrant-W	Water Washable Dye Penetrant	**Oct2024**
13	3AK Chemie India Pvt.Ltd. (Formerly known as MR Chemie India Pvt. Ltd.) Hyderabad	MR(R) 62	Solvent Removable Penetrant–Red	**Dec2026**
14	3AK Chemie India Pvt.Ltd .(Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	MR(R) 68 NF	Solvent Removable and Water Washable Penetrant–Red	**Dec2026**
15	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.)., Hyderabad	MR(R) 67	Solvent Removable and Water Washable Penetrant–Red	**Dec2026**
16	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	MR(R) 672 F	Solvent Removable and Water Washable Penetrant–Fluorescent	**Dec2026**
17	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.)., Hyderabad	MR(R) 85	Solvent Remover suitable for MR(R) 68NF, MR(R) 67, MR(R) 672F and MR(R) 62.	**Dec2026**
18	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	MR(R) 70	Non-Aqueous Developer suitable for MR(R) 68 NF, MR(R) 67 and MR(R) 672F	**Dec2026**

Sr. No.	Manufacturers	Brand name	Description	Valid up to
19	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	MR(R) 70 I	Non-Aqueous Developer suitable for MR(R) 62.	Dec2026
20	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	SP-10,SC-20, SD30	Solvent Removable Penetrant, Solvent Remover, Non - Aqueous Developer	April2027
21	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	WP-15, SC20, SD30	Water Washable Penetrant, Solvent Remover, Non - Aqueous Developer	April2027
22	3AK Chemie India Pvt. Ltd. (Formerly known as MR Chemie India Pvt. Ltd.), Hyderabad	MR311-R, MR85,MR70I	Water Washable & Solvent Removable Penetrant, Solvent Remover, Non - Aqueous Developer	April2027
23	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PP-15/PP-15B	Red Coloured Solvent Removable Penetrant	AUG2026
24	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PP-19/PP-19B	Red Coloured Water Washable Penetrant	AUG2026
25	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PC-21/PC-21B	Solvent Cleaner	AUG2026
26	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PD-31/PD-31B	Solvent Base Developer	AUG2026
27	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PP-110/ PP110B	Red Coloured Solvent Removable Penetrant	AUG2026
28	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PC 120/ PC-120B	Solvent Cleaner	AUG2026
29	P-MET HIGH TECH CO. PVT. LTD., VADODARA	PD 130 /PD-130B	Solvent Base Developer	AUG2026
30	P-MET HIGH TECH CO. PVT. LTD., VADODARA	FPS46/FPS46B	Solvent Removable Fluorescent Penetrant	AUG2026
31	P-MET HIGH TECH CO. PVT. LTD., VADODARA	FPS49/FPS49B	Water Washable Fluorescent Penetrant	AUG2026
32	FERROCHEM NDT SYSTEM PVT. LTD. PUNE	FC-911, FC-811 FC-711	Solvent Removable (Visible)	JAN2027
33	FERROCHEM NDT SYSTEM PVT. LTD. PUNE	FC-931, FC-811	Water Washable (Visible)	JAN2027
34	FERROCHEM NDT SYSTEM PVT. LTD. PUNE	FC-941, FC-821	Water washable (Fluorescent)	JAN2027
35	FERROCHEM NDT SYSTEM PVT. LTD. PUNE	FC-921, FC-821, FC-721	Solvent removable (Fluorescent)	JAN2027
36	DYEGLO PVT. LTD, PUNE	RP-81	Red Coloured Solvent Removable Penetrant	DEC2023
37	DYEGLO PVT. LTD, PUNE	RP-90	Red Coloured Water Washable Penetrant	DEC2023
38	DYEGLO PVT. LTD, PUNE	CL-01	Solvent Cleaner	DEC2023
39	DYEGLO PVT. LTD, PUNE	RD-01	Solvent Base Developer suitable for RP-81 & RP-90	DEC2023
40	DYEGLO PVT. LTD, PUNE	FP-01	Fluorescent Solvent Removable Penetrant	DEC2023
41	DYEGLO PVT. LTD, PUNE	WD-01	Solvent Base Developer suitable for FP-01.	DEC2023

Note:-

1. Halogen content in Penetrant, Cleaner and Developer is 25ppm (max) and Sulphur content is 500ppm (max). However when using penetrant materials for Austenitic Stainless Steel, Titanium, Nickel base or other high temperature alloys, Halogen and Sulphur content shall not exceed 25ppm. Manufacture has to mention for each batch, the Sulphur and Halogen content in the label of each container for selection of Penetrant materials for the stated application.
2. Developer is to be used in Aerosol Cane to get the best results.

28/6/2022

(Anoop Singh)
Head QA (Baroda & Dehej)

Through: Shri Sundar Singh, AD (QA, M-1 &4)

→ Shri A.K. Deshmukh, AD (QA Group-2) 28.6.2022

→ **Executive Director (QA)** 28.06.2022

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.

- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy 's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Dated at _____, this ____ day of _____, 20__.

Name

Company

Signature

In line with Government Public Procurement Order No. P-45021/2/2017-BE-II dt. 15.06.2017 & P-45021/2/2017-PP (BE-II) dated 28.05.2018, we hereby certify that we

……

(supplier name) are local supplier meeting requirement of minimum local content (50%) defined in as above orders for the material against Enquiry No.

……

Details of location at which local value addition will be made is as follows:

……

……

……

We also understand, false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

Seal and Signature of Supplier

Annexure C

VENDOR DETAILS

SL NO	DESCRIPTION	To be filled by bidder
1	VENDOR NAME	
2	QUOTATION REFERENCE	
3	QUOTATION DATE	
4	TELE, MOBILE NO	
5	FIRM MAIL ID	
6	CONTACT PERSON	
7	OFFICE ADDRESS	
8	ORDER TO BE PLACED ON	
9	COUNTRY OF ORIGIN	
10	QUOTED CURRENCY	
11	PORT OF LOADING	
12	PORT OF DISCHARGE	

Vendor Seal & Sign