Bid Number/बोली क्रमांक (बिड संख्या):
GEM/2023/B/4376862
Dated/दिनांक : 22-12-2023

Bid Document/ बिड दस्तावेज़

Bid Details/बिड विवरण	
Bid End Date/Time/बिड बंद होने की तारीख/समय	02-01-2024 15:00:00
Bid Opening Date/Time/बिड खुलने की तारीख/समय	02-01-2024 15:30:00
Bid Offer Validity (From End Date)/बिड पेशकश वैधता (बंद होने की तारीख से)	75 (Days)
Ministry/State Name/मंत्रालय/राज्य का नाम	Ministry Of Heavy Industries And Public Enterprises
Department Name/विभाग का नाम	Department Of Heavy Industry
Organisation Name/संगठन का नाम	Bharat Heavy Electricals Limited (bhel)
Office Name/कार्यालय का नाम	10170006-ivp Goindwal
Total Quantity/कुल मात्रा	1000
Item Category/मद केटेगरी	Matl Code - 940760130000 Description - FOUNDATION BOLT 40 DIA 1120 LONG DRG - 2-FZ-010-00004 , Matl Code - 940760120000 Description - FOUNDATION BOLT 50 DIA 1200 LONG DRG - 2-FT-010-00128 , Matl Code - 942490524750 Description - FDN BOLT D50 X 2000 L DRG - 2-35-010-01247 , Matl Code - 940760110000 Description - FOUNDATION BOLT 63 DIA 1500 LONG DRG - 2-FT-010-00129 , Matl Code - 940670010000 Description - FM FDN BLT DIA 25-900 LONG DRG - 2-FM-011-00053 , Matl Code - 940760050000 Description - FM FDN BLT DIA 63-2000 LONG DRG - 2-FM-011-00054
BOQ Title/बीओक्यू शीर्षक	Procurement of Foundation Bolts with Delivery at BHEL Trichy
MSE Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से एमएसई छूट	No
Startup Exemption for Turnover/ टर्नओवर के लिए स्टार्टअप को छूट प्राप्त है	Yes
Document required from seller/विक्रेता से मांगे गए दस्तावेज़	Bidder Turnover,Certificate (Requested in ATC),Additional Doc 1 (Requested in ATC) *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled/बिड से रिवर्स नीलामी सक्रिय किया	Yes
RA Qualification Rule	H1-Highest Priced Bid Elimination
Type of Bid/बिड का प्रकार	Two Packet Bid

Bid Details/बिड विवरण	
Primary product category	Matl Code - 940760130000 Description - FOUNDATION BOLT 40 DIA 1120 LONG DRG - 2-FZ-010-00004
Time allowed for Technical Clarifications during technical evaluation/तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय	2 Days
Inspection Required (By Empanelled Inspection Authority / Agencies pre-registered with GeM)	No
Payment Timelines	Payments shall be made to the Seller within **90** days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills (This is in supersession of 10 days time as provided in clause 12 of GeM GTC)
Evaluation Method/मूल्यांकन पद्धति	Total value wise evaluation

EMD Detail/ईएमडी विवरण

Required/आवश्यकता	No

ePBG Detail/ईपीबीजी विवरण

Required/आवश्यकता	No

Splitting/विभाजन

Bid splitting not applied/बोली विभाजन लागू नहीं किया गया.

MSE Purchase Preference/एमएसई खरीद वरीयता

MSE Purchase Preference/एमएसई खरीद वरीयता	No

Details of the Competent Authority for MSE

Name of Competent Authority	Sumeet Bansal
Designation of Competent Authority	DGM
Office / Department / Division of Competent Authority	BHEL IVP Goindwal Punjab
CA Approval Number	Computer No: 436278 File No: IVP-MM0TEN(FAS)/17/2023-IVP-MM
Competent Authority Approval Date	22-12-2023
Brief Description of the Approval Granted by Competent Authority	No MSE Purchase preference, due to package wise evaluation.

Competent Authority Approval for not opting Micro and Small Enterprises Preference : View Document

MII Purchase Preference/एमआईआई खरीद वरीयता

MII Purchase Preference/एमआईआई खरीद वरीयता	Yes

1. If the bidder is a Startup, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria" subject to their meeting of quality and technical specifications. If the bidder is OEM of the offered products, it would be exempted from the "OEM Average Turnover" criteria also subject to meeting of quality and technical specifications. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer.
2. Preference to Make In India products (For bids < 200 Crore):Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a Class 1 local supplier is denoted in the bid document. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020. Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate. However, eligible micro and small enterprises will be allowed to participate .The buyers are advised to refer the OM No.F.1/4/2021-PPD dated 18.05.2023.
OM_No.1_4_2021_PPD_dated_18.05.2023 for compliance of Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.

3. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

4. Reverse Auction would be conducted amongst all the technically qualified bidders except the Highest quoting bidder. The technically qualified Highest Quoting bidder will not be allowed to participate in RA. However, H-1 will also be allowed to participate in RA in following cases:

i. If number of technically qualified bidders are only 2 or 3.
ii. If Buyer has chosen to split the bid amongst N sellers, and H1 bid is coming within N.
iii. In case Primary product of only one OEM is left in contention for participation in RA on elimination of H-1.
iv. If L-1 is non-MSE and H-1 is eligible MSE and H-1 price is coming within price band of 15% of Non-MSE L-1
v. If L-1 is non-MII and H-1 is eligible MII and H-1 price is coming within price band of 20% of Non-MII L-1

Excel Upload Required/एक्सेल में अपलोड किए जाने की आवश्यकता :

CONFIRMATION OF TENDER TERMS (to be uploaded in .pdf format while submitting Quotation) - 1703228067.xlsx

Matl Code - 940760130000 Description - FOUNDATION BOLT 40 DIA 1120 LONG DRG - 2-FZ-010-00004

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	520	120

Matl Code - 940760120000 Description - FOUNDATION BOLT 50 DIA 1200 LONG DRG - 2-FT-010-00128

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	300	120

Matl Code - 942490524750 Description - FDN BOLT D50 X 2000 L DRG - 2-35-010-01247

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	50	120

Matl Code - 940760110000 Description - FOUNDATION BOLT 63 DIA 1500 LONG DRG - 2-FT-010-00129

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	50	120

Matl Code - 940670010000 Description - FM FDN BLT DIA 25-900 LONG DRG - 2-FM-011-00053

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	30	120

Matl Code - 940760050000 Description - FM FDN BLT DIA 63-2000 LONG DRG - 2-FM-011-00054

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Thamaraiselvan Namachivayam	620014,Manager / Stores – 11 Fossil Boilers, BHEL High Pressure Boiler Plant	50	120

Buyer Added Bid Specific Terms and Conditions/क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें

1. **Buyer Added Bid Specific ATC**

   Buyer Added text based ATC clauses

   - **UNIT RATES TO BE QUOTED INCLUSIVE OF ALL TA XES AND ON FOR BHEL TRICHY BASIS**
   - **NOTE: Please Fill the attached MS -Excel File and upload in the .pdf format while uploading the quo tation on GeM Portal.**

     [MS- excel file link available at Page -3 of GeM bid docu ment under the Heading of "Excel Upload Required/ एक्से ल पे अपलोड किये जाने की आवश्यकता"]
   - **Refer GeM Buyer uploaded Documents for 'Buyer adde d bid specific ATC' as per link below.**

.

2. **Buyer Added Bid Specific ATC**

   Buyer uploaded ATC document Click here to view the file.

3. **Scope of Supply**

   Scope of supply (Bid price to include all cost components) : Only supply of Goods

4. **Generic**

   Without prejudice to Buyer's right to price adjustment by way of discount or any other right or remedy available to Buyer, Buyer may terminate the Contract or any part thereof by a written notice to the Seller, if:
   i) The Seller fails to comply with any material term of the Contract.
   ii) The Seller informs Buyer of its inability to deliver the Material(s) or any part thereof within the stipulated Delivery Period or such inability otherwise becomes apparent.
   iii) The Seller fails to deliver the Material(s) or any part thereof within the stipulated Delivery Period and/or to replace/rectify any rejected or defective Material(s) promptly.
   iv) The Seller becomes bankrupt or goes into liquidation.
   v) The Seller makes a general assignment for the benefit of creditors.
   vi) A receiver is appointed for any substantial property owned by the Seller.
   vii) The Seller has misrepresented to Buyer, acting on which misrepresentation Buyer has placed the Purchase Order on the Seller.

5. **Generic**

   1. The Seller shall not assign the Contract in whole or part without obtaining the prior written consent of buyer.
   2. The Seller shall not sub-contract the Contract in whole or part to any entity without obtaining the prior written consent of buyer.
   3. The Seller shall, notwithstanding the consent and assignment/sub-contract, remain jointly and severally liable and responsible to buyer together with the assignee/ sub-contractor, for and in respect of the due performance of the Contract and the Sellers obligations there under.

6. **Certificates**

   Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.

7. **Inspection**

   Nominated Inspection Agency: On behalf of the Buyer organization, any one of the following Inspection Agency would be conducting inspection of stores before acceptance:
   Pre-dispatch Inspection at Seller Premises (applicable only if pre-dispatch inspection clause has been selected in ATC):

   By BHEL or Third Party at vendor works as per QP

   Post Receipt Inspection at consignee site before acceptance of stores:
   By BHEL at BHEL works

8. **Inspection**

   Pre-dispatch inspection at Seller premises (Fee/Charges to be borne by the BUYER): Before dispatch, the goods will be inspected by Buyer / Consignee or their Authorized Representative or by Nominated External Inspection Agency (independently or jointly with Buyer or Consignee as decided by the Buyer) at Seller premises (or at designated place for inspection as declared / communicated by the seller) for their compliance to the contract specifications. Fee/Charges taken by the External inspection Agency and any external laboratories testing charges shall be borne by the Buyer. For in-house testing, the Sellers will provide necessary facilities free of cost. Seller shall notify the Buyer through e-mail about readiness of goods for pre-dispatch inspection and Buyer will notify the Seller about the Authorized

Representative/ Nominated External Inspection Agency and the date for testing. The goods would be dispatched to consignee only after clearance in pre-dispatch inspection. Consignee's right of rejection as per GTC in respect of the goods finally received at his location shall in no way be limited or waived by reason of the goods having previously been inspected, tested and passed by Buyer/ Consignee or its Nominated External Inspection Agency prior to the goods' shipment. While bidding, the sellers should take into account 7 days for inspection from the date of email offering the goods for inspection. Any delay in inspection beyond 7 days shall be on the part of the buyer and shall be regularised without Liquidated Damages.
When there is requirement of submission the advance sample, the seller shall inform the buyer promptly through emails about the date of submission of sample to the buyer nominated Inspection agency.

9. **Generic**

   OPTION CLAUSE: The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly.

Disclaimer/अस्वीकरण

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. Any clause(s) incorporated by the Buyer regarding following shall be treated as null and void and would not be considered as part of bid:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process.
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

This Bid is also governed by the General Terms and Conditions/ यह बिड सामान्य शर्तों के अंतर्गत भी शासित है

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which

shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws./जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो।बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।

---Thank You/धन्यवाद---

Confirmation to Tender Terms & Conditions

(To be filled by bidder & submit with offer as pdf file only)

Tender Enquiry No. & Date	**GEM/2023/B/437862 Dt. 22.12.2023**
Tender Description	**Procurement of Foundation Bolts**

Bidder must note following points:

1. This workbook is protected, except for cells where comments / confirmation is to be given by bidder.
2. Bidder is advised not to unprotect / tamper the sheet / alter the terms mentioned in the sheet.
3. Any alteration to terms mentioned by BHEL will be considered as tampering and bidder's offer shall be liable for rejection.
4. Bidders are advised to only fill the unprotected cells (shaded cells) by dropdown or writing the comments as applicable as their confirmation. **Bidders are adviced to submit duly filled & signed 'PDF' file as techno-commercial (Part-I) bid'**. Failure on the part of bidder in not returning this duly filled-up techno-commercial bid and / or submitting incomplete replies may lead to rejection of bidder's quotation.
5. All the commercial terms and conditions shall be indicated by vendor in this format only and nowhere else in his quotation. However, in case the space for vendor's reply is not sufficient against a particular question, the vendor shall furnish same by way of separate annexure / sheet attached to this questionnaire, indicating cross-reference of respective clauses.

BIDDER's DETAILS

Sr. No.	Elements		Remarks	
1	Name of the Firm / Company			
2	Registered Address	Address Line 1		
		District - Pincode		
		State		
3	Quotation reference no. & date			
4	Bidder Type (Indian / Foreign):			
5	Type of Owenership		Select from drop down list	
6	Company's Nature of Business		Select from drop down list	
7	Year of commencement of Business			
8	PAN No.			
9	GST No.			
10	Whether company is registered under MSMED Actr 2006 as Micro / Samll / Medium Enterprise category. *(If yes, please attach valid certificate as per latest MSME guidelines)*		Yes (Valid Certificate attached)	**If yes, mention UDYAM registration number Here**

TECHNICAL CONDITION DETAIL

Sr. No.	Elements	Response	Remarks
1	**Technical :** Procurement of Foundation Bolts as per tender documents (if selected 'Accepted with deviation', please mention the deviation clearly)	Select from drop down list	

Some red color fields are pending to be filled. Please respond and upload file when this field is converted to Green Color

COMMERCIAL CONDITIONS & DETAILS

Sr. No.	Elements		Response	Remarks (if any)
1	Delivery Destination : BHEL Trichy - Tamil Nadu (refer GeM Bid ATC Sr. no. 2.1 and 2.8)		Select from drop down list	
2	Quoted rates are INCLUSIVE OF TAXES and on FOR Destination Basis		Select from drop down list	
3	**Firm Price**: The quoted / finalised rates shall be firm till execution of the supplies.		Select from drop down list	
4	**Offer Validity:** 75 days from Part-I (techno-commercial) bid opening date.		Select from drop down list	
5	**Delivery Period:** FOUR MONTHS from date of Purchase Order/LOI release date		Select from drop down list	
6	L1 Evaluation of tender is on the basis of Total Package (refer GeM Bid ATC Sr. no. 2.1)		Select from drop down list	
7	Welding Qualification (refer GeM Bid ATC Sr. no. 2.1)	WPS,PQR,WQ to be reviewed/Witnessed (PQR-As per AWS D1.1).by QC BHEL IVP Goindwal. Supplier need to intimate to BHEL before starting of welding.	Select from drop down list	

Confirmation to Tender Terms & Conditions

(To be filled by bidder & submit with offer as pdf file only)

Tender Enquiry No. & Date	**GEM/2023/B/437862 Dt. 22.12.2023**
Tender Description	**Procurement of Foundation Bolts**

Bidder must note following points:

1. This workbook is protected, except for cells where comments / confirmation is to be given by bidder.
2. Bidder is advised not to unprotect / tamper the sheet / alter the terms mentioned in the sheet.
3. Any alteration to terms mentioned by BHEL will be considered as tampering and bidder's offer shall be liable for rejection.
4. Bidders are advised to only fill the unprotected cells (shaded cells) by dropdown or writing the comments as applicable as their confirmation. **Bidders are adviced to submit duly filled & signed 'PDF' file as techno-commercial (Part-I) bid'**. Failure on the part of bidder in not returning this duly filled-up techno-commercial bid and / or submitting incomplete replies may lead to rejection of bidder's quotation.
5. All the commercial terms and conditions shall be indicated by vendor in this format only and nowhere else in his quotation. However, in case the space for vendor's reply is not sufficient against a particular question, the vendor shall furnish same by way of separate annexure / sheet attached to this questionnaire, indicating cross-reference of respective clauses.

8	Self Declaration by Bidder : It is hereby declared that Bidder is engaged in Metal Fabrication Jobs (refer GeM Bid ATC Sr. no. 2.2.1)		Select from drop down list	
9	Self Declaration by Bidder : It is hereby declared that Bidder is having the in-house facilities of Metal Cutting and Welding (refer GeM Bid ATC Sr. no. 2.2.2)		Select from drop down list	
10	Bidder should have Minimum Average Annual Financial Turnover of Rs. 60 Lakhs, over three financial years viz. FY 2020-21, 2021-22 and 2022-23 (refer GeM Bid ATC Sr. no. 2.2.3)		Select from drop down list	
11	**Payment Terms:** Due date of payment will be calculated from the date of supply-completion of all the items. MSE- 45 days, Medium- 60 Days, Non-MSME- 90 Days (refer GeM Bid ATC Sr. no. 2.7)		Select from drop down list	
12	**Performance Security (PS):** For Total PO value placed through this tender is less than or equal to Rupees one lakh : Not Applicable. **For Total PO value placed through this tender is greater than Rupees one lakh : PS @5% of PO value to be submitted within 21 days from the date of PO.** All values are net of taxes. (refer GeM Bid ATC Sr. no. 2.3)		Select from drop down list	
13	Breach of contract, Remedies and Termination (refer GeM Bid ATC Sr. no. 2.4)		Select from drop down list	
14	**Warranty Period**: Supplier shall give a warrantee for a period of 18 months from the date of receipt. In case of non-acceptance of this term bid will be rejected. (refer GeM Bid ATC Sr. no. 2.5)		Select from drop down list	
15	**Payment Terms:** Due date of payment will be calculated from the date of supply-completion of all the items. MSE- 45 days, Medium- 60 Days, Non-MSME- 90 Days (refer GeM Bid ATC Sr. no. 2.7)		Select from drop down list	
16	**Unloading** of Material at BHEL Trichy Stores site is in the SUPPLIER **(refer GeM Bid ATC Sr. no. 2.8)**		Select from drop down list	
17	Confirmation during packing and Supply(refer GeM Bid ATC Sr. no. 2.9)	Packing of the material will be done as per tender terms	Select from drop down list	
		The project name, PGMA, DU Number, quantity, weight, Vendor code shall be legibly stenciled for identification and dispatch as may be advised	Select from drop down list	
		All threaded and other surfaces of foundation bolts shall be coated with Temporary Rust Preventive Fluid	Select from drop down list	
18	Make in India (MII) (as per latest MII Guidelines)	Local Content Declaration	Select from drop down list	
		Details of location at which local value addition will be made is as follows:	Select from drop down list	
19	I have thoroughly gone through the attached tender terms & conditions and understood the above techno-commercial requirements		Select from drop down list	

Confirmation to Tender Terms & Conditions

(To be filled by bidder & submit with offer as pdf file only)

Tender Enquiry No. & Date	**GEM/2023/B/437862 Dt. 22.12.2023**
Tender Description	**Procurement of Foundation Bolts**

Bidder must note following points:

1. This workbook is protected, except for cells where comments / confirmation is to be given by bidder.
2. Bidder is advised not to unprotect / tamper the sheet / alter the terms mentioned in the sheet.
3. Any alteration to terms mentioned by BHEL will be considered as tampering and bidder's offer shall be liable for rejection.
4. Bidders are advised to only fill the unprotected cells (shaded cells) by dropdown or writing the comments as applicable as their confirmation. **Bidders are adviced to submit duly filled & signed 'PDF' file as techno-commercial (Part-I) bid'**. Failure on the part of bidder in not returning this duly filled-up techno-commercial bid and / or submitting incomplete replies may lead to rejection of bidder's quotation.
5. All the commercial terms and conditions shall be indicated by vendor in this format only and nowhere else in his quotation. However, in case the space for vendor's reply is not sufficient against a particular question, the vendor shall furnish same by way of separate annexure / sheet attached to this questionnaire, indicating cross-reference of respective clauses.

20	If there is any deviation in reference to any of the tender term, kindly mention it **HERE** only. **Deviation specified elsewhere, will not be considered.**	Select from drop down list	

Procurement of Foundation Bolts

- **UNIT RATES TO BE QUOTED INCLUSIVE OF ALL TAXES AND ON FOR BHEL TRICHY BASIS**
- **NOTE: Please Fill the attached MS -Excel File and upload in the .pdf format while uploading the quotation on GeM Portal.**
  [MS- excel file link available at Page -3 of GeM bid document under the Heading of "Excel Upload Required/ एक्सेल पे अपलोड किये जाने की आवश्यकता"]

2.1 SCOPE OF SUPPLY

Material shall be supplied as per the applicable Technical Delivery Condition (TDC) / Drawing as mentioned in the Table – 1, at the respective Delivery Destinations. National & International material standards shall have to be arranged by bidders themselves.

Table 1 : List of Items along with Quantity, Drawing Number and Delivery Destination

Sr. No.	Material Code	Material Description	Tender Qty (in No.)	FDN Bolt Head Type	Drawing No.	Delivery Destination	L1 Comparison will be done as
1	940760130000	FOUNDATION BOLT 40 DIA. 1120 LONG	520	Plate type	2-FZ-010-00004	*BHEL Trichy, Tamil Nadu*	Total Package
2	940760120000	FOUNDATION BOLT 50 DIA. 1200 LONG	300	Plate type	2-FT-010-00128		
3	942490524750	FDN BOLT D50 X 2000 L	50	Rod Type	2-35-010-01247		
4	940760110000	FOUNDATION BOLT 63 DIA. 1500 LONG	50	Plate type	2-FT-010-00129		
5	940670010000	FM FDN BLT DIA 25-900 LONG	30	Plate Type	2-FM-011-00053		
6	940760050000	FM FDN BLT DIA 63-2000 LONG	50	Plate Type	2-FM-011-00054		

Fdn Blt stands for Foundation Bolt.

"1 number" of Quantity = 1 Complete Fabricated Foundation Bolt along with Hex Nut and Washer assembled, as detailed in the above referred Drawings.

Quality Control Procedure: -
QCP:002/05 Dt. 07.03.2018 is applicable.

Procurement of Foundation Bolts

Additional Technical Requirement: -

Table - 2

Radiography Testing	Not applicable
MPI/LPI	To be done as per QCP002_ rev 05
Applicable Quality document for fabricating Foundation Bolts.	QCP002_ rev 05
Type of weld, Type of electrode, Total length of weld	As per applicable drawing
Welding Qualification	WPS, PQR, WQ to be reviewed/Witnessed (PQR-As per AWS D1.1).by QC BHEL IVP Goindwal. Supplier need to intimate to BHEL before starting of welding.
Pre-Heating for Welding and Flame cutting	Preheating procedure need to be followed as per clause of 4.3.3 of QCP002_rev05, Preheating temperature is 150 ˚C for welding and flame cutting.
Post Weld Heat Treatment	Not applicable

WPS stands for Welding Procedure Specification; PQR stands for Procedure qualification Records; WQ stands for Welding Quality.

The **broad scope of work** includes:

Procurement of raw materials, bought out items and consumables like electrodes, rust preventive oil etc. is to be done as per material Specifications/ Drawings/Quality Plan (QP).

Materials and consumables are to be procured with relevant Test Certificate (TC) and these have to be submitted/ produced in original during inspection. Any test, both destructive and non-destructive, if required, will have to be carried out by the vendors at their own cost. All such reports in original will have to be submitted during inspection. Vendors also shall verify the materials & TC to comply with the QP.

Manufacturing and fabrication of components shall be according to the drawings/Quality Plan (QP).

All handling charges till completion of fabrication & despatch up to destination is in Vendor's Scope. All costs towards testing & inspection including BHEL/ BHEL nominated agency as per BHEL's QP/PO /Drawings is in scope of supplier. However, BHEL will bear the Third-Party Inspection (TPI) inspection charges.

2.2 PRE-QUALIFICATION CRITERIA (PQC)

1. Bidder should be engaged in Metal Fabrication Jobs. Offers from Traders/Dealers/Stockists/agents will be rejected. Submission of UDYAM Certificate or Declaration from bidder is required to fulfil this criterion.

2. Bidder should have the in-house facilities of Metal Cutting and Welding. Declaration from bidder is required to fulfil this criterion.

3. Bidder should have Minimum Average Annual Financial Turnover of *Rs. 60 Lakhs*, over three financial years viz. FY 2020-21, 2021-22 and 2022-23. To certify the same, bidder need to submit balance sheets of above stated three years. Balance sheets should be audited, as applicable. If the balance sheets are not audited, bidder need to submit CA certificate for the turnover. **Audited balance sheets/CA certificate with valid UDIN (Unique Document Identification Number) will only be considered in order of fulfill this criterion.**

   Start-ups shall be exempted from the above pre-qualification criteria Sr. no. 3, without any relaxation in quality standards or technical parameters as per D.O. No. 5(4)/2016-BE-I dated 15.02.2017. For claiming

Start-Up exemption, vendors have to submit DPIIT (Dept. of Promotion of Industry and Internal Trade)/DIPP (Department for Industrial Policy and Promotion) recognition certificates.)

BHEL may carry out evaluation of bidder's capability. BHEL reserves the right to accept/reject any offer based on evaluation of bidder's capability. BHEL may decide to visit the bidder(s) works. Any fact found deviating from bids during evaluation shall make the bidder liable to be dis-qualified.

2.3 PERFORMANCE SECURITY

Applicability:

1. Performance Security will not be applicable in case the cumulative value of all purchase orders placed under the tender on the vendor is less than or equal to Rupees one lakh.
2. **In case total PO value on vendor in one tender enquiry is greater than Rs. 1 Lakh**: Successful bidder (L1 or counter-offer accepted) has to submit Performance Security (PS) @5% of PO value within 21 days from the date of award of PO. PS shall be valid for a period of one year. This PS will be released to the vendor without interest after two months beyond the completion of all supplies under the PO.

Before the release of this PS, vendor has to submit another PS @1% of PO value or Rs. 3000.00 whichever is higher after two months beyond the completion of all supplies under the PO. This PS shall be valid for a period of 18 months. This additional PS will be released to the vendor without interest after expiry of validity upon fulfilment of contractual obligations as per terms of contract.

All mentioned values are net of taxes.

Vendor has to submit written request to BHEL for refund of PS well in advance before the due date.

In case of non-submission of PS for 5% of contract value, it will amount to breach of contract.

Mode of deposit:

Performance security may be furnished in the following forms:

1. Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
2. Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
3. Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
4. Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
5. Insurance Surety Bond.
6. By way of retention from dues available in the form of Bills payable to the supplier against same / other contracts in the same unit.

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

Forfeiture of Performance Security: The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier.

2.4 BREACH OF CONTRACT, REMEDIES AND TERMINATION:

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 the value of the security instruments available is less than 10% of the contract value, the balance amount be recovered in all or any of the following manners:

1. from dues available in the form of Bills payable to defaulted supplier against the same contract.
2. from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit.
3. 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., shall be applied as per provisions of the contract.

2.5 WARRANTEE

Goods shall comply with the specifications for material, workmanship and performance. Unless otherwise specified, vendor shall give a warrantee against design & manufacturing defects for a period of 18 months from the date of receipt. In case of non-acceptance of this term, bid shall be liable for rejection.

2.6 DELIVERY SCHEDULE

Delivery shall be within FOUR MONTHS from date of Purchase Order/ Letter of Intent.
Material is to preferably to be delivered in ONE lot.

However, vendor may dispatch the material in multiple lots. Due date of payment will be calculated from the date of supply-completion of all the items.

2.7 PAYMENT TERMS

Payments shall be made to the Seller within the mentioned days (as per below table) of issue of consignee receipt cum-acceptance certificate (CRAC) and on-line submission of bills.

Type of Bidder	**Payment Terms (Number of days)**
Micro & Small Enterprises (MSEs)	45 Days
Medium Enterprises	60 Days
Non MSME	90 Days

To be considered as Micro, Small or Medium enterprise, bidder must be manufacturer of offer product and relevant valid certificate as per latest MSME guidelines is to be submitted along with bid.

If no valid certificate as per latest MSME guidelines is submitted along with bid, then bidder will be considered as Non-MSME.

In addition to the above-mentioned Payment terms, due date of payment will be calculated from the date of supply-completion of all the items.

2.8 DELIVERY DESTINATION and SCOPE OF UNLOADING

Delivery Destination is BHEL Trichy, the material is to be supplied at following address:

Manager / Stores
Fossil Boilers, BHEL
Boiler Plant Project P.O.
Tiruchirapalli - 620 014.
Tamilnadu, India.

Unloading of Material at BHEL Trichy Stores is in the Scope of SUPPLIER.

2.9 PACKING OF MATERIAL

The project name, PGMA, DU Number, quantity, weight, Vendor code shall be legibly stencilled for identification and dispatch as may be advised. Vendor code shall be punched using letter punch and bordered suitably for identification. Threaded portions shall be protected with rust preventive oil and covered by tar impregnated Gunny cloth.

Note: "All threaded and other surfaces of foundation bolts shall be coated with Temporary Rust Preventive Fluid"

For diameter 20 to 32 mm, upto 100 Nos shall be stacked as below figure-1. 4 Number of double side threaded anchor with connecting flats could help tie, easy handling and stacking. The foundation bolt weight should be restricted to Max. 1.5 MT.

For Diameter above 32 mm, wire rope sling shall be used and wraparound the bolts as shown in figure -2. The Number of foundation bolts shall be restricted to maximum weight of 1 to 1.5 MT for handling purpose.

Handling anchor bolts, flats and wire rope sling shall be designed to carry bundle loads and it is in supplier scope.

Figure 1 For Dia 20 to 32 mm

Figure 2: Wire Rope Sling

Below table may be referred for packing of different foundation Bolt: -

Foundation bolt	Qty per Crate/Frame, Nos
DIA 20	100
DIA 25	100
DIA 32	100
DIA 40	50
DIA 50	40
DIA 63	25
DIA 80	16

2.10 INSPECTION

Bidders will submit TPI (Third party inspection) / BHEL Inspection report to BHEL IVP after inspection. Then based on Inspection report, BHEL will give dispatch clearance and then only the material shall be supplied to the respective consignee address.

BHEL will provide dispatch clearance within 7 Calendar days of receipt of complete quality cleared documents.

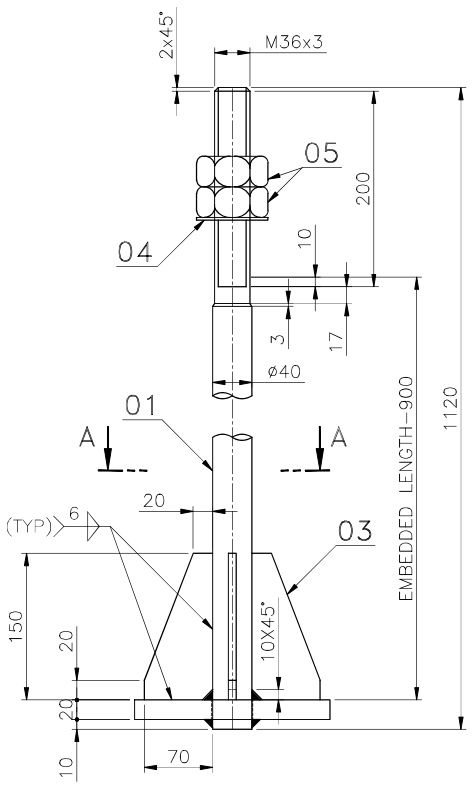
2.11 QUANTITY VARIATION

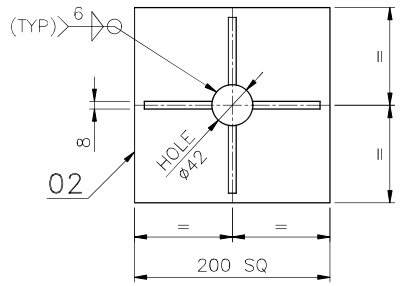
+/-10% Variation in the quantity is applicable.

CORPORATE DRG ID:TP-DG-2-FZ-010-00004/00

DRAWING NO: 2-FZ-010-00004

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299





SECTION–AA

NOTES:–

01. FOUNDATION BOLT SHOULD NOT BE PAINTED.
02. THREAD ENDS OF BOLT TO BE COATED WITH RUST PREVENTIVE LUBRICANT AND COVERED BY TAR IMPREGNATED GUNNY CLOTH.
03. FOUNDATION BOLT THREAD PITCH IS TO BE FOLLOWED IN LINE WITH THE NUT.
04. BOLT AND NUT ARE TO BE SHOP ASSEMBLED.
05. MANUFACTURING REQUIREMENT SHALL BE AS PER APPLICABLE Q.C.P.
06. MATERIAL AND OTHER REQUIREMENTS ARE GIVEN PER ASSEMBLY ONLY.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P	UNIT / DI	UNIT WEIGHT / QUANTITY	GS	ZONE
	05	HEX NUT M36				4130430036			0.396		
									2		
	04	PUNCHED WASHER A36				4140800036			0.087		
									1		
	03	PLATE 8				15011027			0.455		
		70x150				IS2062Fe410A			4		
	02	PLATE 20				15011150			6.063		
		200x200				IS2062Fe410A			1		
	01	ROD DIA.40				15004007			11.043		
		1120				IS2062Fe410A			1		

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014
355–054

	NAME	SIGNATURE	DATE
DRN	K.SURESH KUMAR		29.06.2021
CHD	R.DEEPAK KARTHIKEYAN		29.06.2021
APPD	S.YUVARAJ		29.06.2021

DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
PE/FB			N.T.S.	19.805	---
CODE 122					

TITLE: FOUNDATION BOLT 40 DIA. 1120 LONG

DRAWING NO : 2-FZ-010-00004

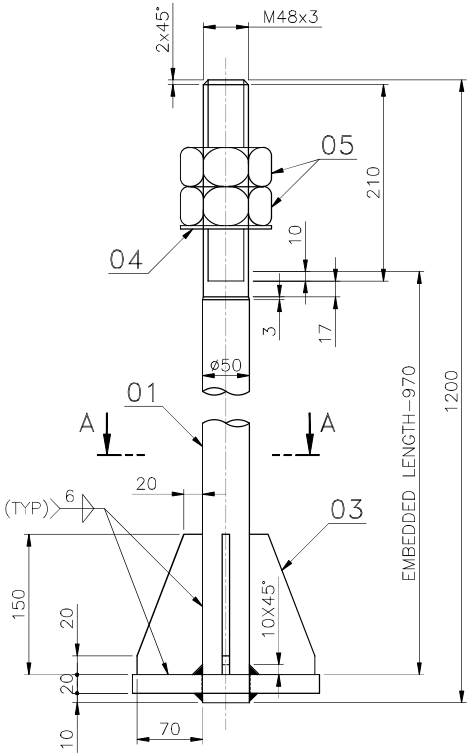
REV 00

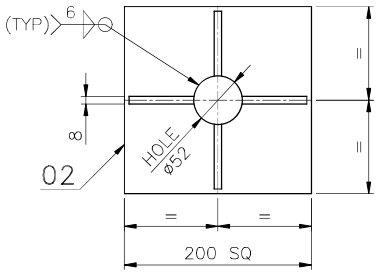
CORPORATE DRG ID:TP-DG-2-FZ-010-00004/00

CORPORATE DRG ID:TP-DG-2-FT-010-00128/00

DRAWING NO: 2-FT-010-00128

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299





SECTION-AA

NOTES:-

01. FOUNDATION BOLT SHOULD NOT BE PAINTED.
02. THREAD ENDS OF BOLT TO BE COATED WITH RUST PREVENTIVE LUBRICANT AND COVERED BY TAR IMPREGNATED GUNNY CLOTH.
03. FOUNDATION BOLT THREAD PITCH IS TO BE FOLLOWED IN LINE WITH THE NUT.
04. BOLT AND NUT ARE TO BE SHOP ASSEMBLED.
05. MANUFACTURING REQUIREMENT SHALL BE AS PER APPLICABLE Q.C.P.
06. MATERIAL AND OTHER REQUIREMENTS ARE GIVEN PER ASSEMBLY ONLY.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P / DI	UNIT / UNIT WEIGHT / QUANTITY	GS	ZONE
	05	HEX NUT M48				4130430048		0.928		
								2		
	04	PUNCHED WASHER A52				4140800048		0.284		
								1		
	03	PLATE 8				15011027		0.455		
		70x150				IS2062Fe410A		4		
	02	PLATE 20				15011150		5.947		
		200x200				IS2062Fe410A		1		
	01	ROD DIA.50				15004023		18.492		
		1200				IS2062Fe410A		1		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD., it must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014

	NAME	SIGNATURE	DATE
DRN	K.SURESH KUMAR		29.06.2021
CHD	RJEEPAK KARTHIKEYAN		29.06.2021
APPD	S.YUVARAJ		29.06.2021

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

DEPT: PE/FB | CODE: 122 | ALL DIMENSIONS ARE IN MM | PROJECTION | SCALE: N.T.S. | WEIGHT (Kg): 28.861 | REF TO ASSY / OLD DWG: ---

TITLE: FOUNDATION BOLT 50 DIA. 1200 LONG

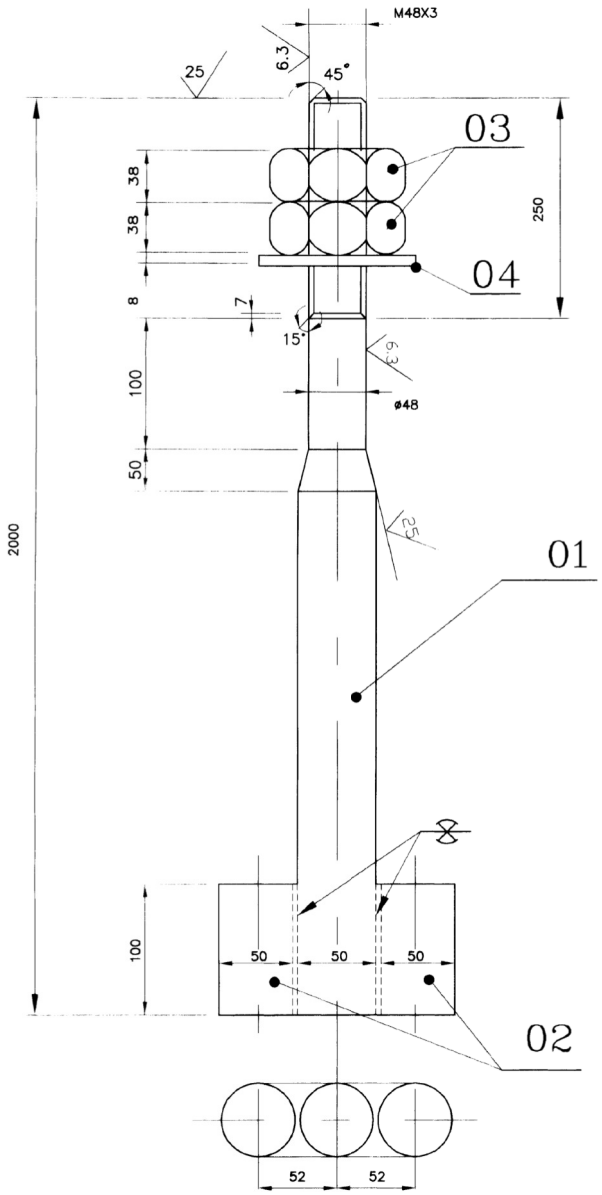
DRAWING NO : 2-FT-010-00128 | REV: 00

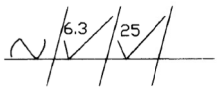
CORPORATE DRG ID:TP-DG-2-FT-010-00128/00

DRAWING NO. 2-35-010-01247

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299

SIZE AND TYPE OF WELD	TYPE OF ELECTRODE	TOTAL LENGTH OF WELD IN MTRS.
12 ⊠	E 7018	0.400





NOTES :

1. FOUNDATION BOLT SHOULD NOT BE PAINTED.
2. THREAD ENDS OF BOLT TO BE COATED WITH RUST PROOF OIL AND PROTECTED AGAINST CORROSION.
3. MANUFACTURING REQUIREMENTS SHALL BE AS PER APPLICABLE Q.C.P
4. MATERIALS AND OTHER REQUIREMENTS ARE GIVEN PER ASSEMBLY ON.Y.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P / DI	UNIT / QUANTITY	UNIT WEIGHT	GS	ZONE
	04	WASHER PUNCHD.A48				41408-00048			0.284		
									1		
	03	NUT HEX GR C M48X3				41304-00048			0.928		
									2		
	02	ROD DIA 50 ; 100				15-004-023			1.540		
						IS2062Fe410A			2		
	01	ROD DIA 50 ; 2000				15-004-023			30.800		
						IS2062Fe410A			1		

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620014

355-054

	NAME	SIGNATURE	DATE
DRN	AMALA.M	M.Amala	23.04.98
CHD	M.B.K.RAJA	M.B.K.Raja	26/04/98
APPD	R.M.A		

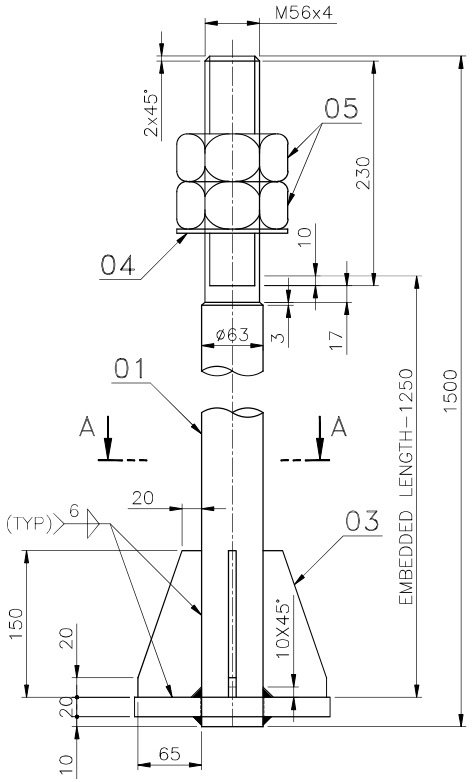
DEPT ST | CODE 122 | ALL DIMENSIONS ARE IN MM | PROJECTION | SCALE NTS | WEIGHT (Kg) | REF TO ASSY / OLD DWG

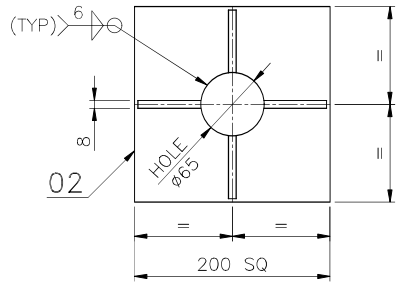
TITLE
FOUNDATION BOLT 50 DIA. 2000 LONG

DRAWING NO : 2-35-010-01247 | REV

DRAWING NO: 2-FT-010-00129

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299





SECTION-AA

NOTES:-

01. FOUNDATION BOLT SHOULD NOT BE PAINTED.
02. THREAD ENDS OF BOLT TO BE COATED WITH RUST PREVENTIVE LUBRICANT AND COVERED BY TAR IMPREGNATED GUNNY CLOTH.
03. FOUNDATION BOLT THREAD PITCH IS TO BE FOLLOWED IN LINE WITH THE NUT.
04. BOLT AND NUT ARE TO BE SHOP ASSEMBLED.
05. MANUFACTURING REQUIREMENT SHALL BE AS PER APPLICABLE Q.C.P.
06. MATERIAL AND OTHER REQUIREMENTS ARE GIVEN PER ASSEMBLY ONLY.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P	UNIT / DI	UNIT WEIGHT / QUANTITY	GS	ZONE
	05	HEX NUT M56				4130400056			1.355		
									2		
	04	PUNCHED WASHER A61				4140800056			0.405		
									1		
	03	PLATE 8				15011027			0.429		
		65x150				IS2062Fe410A			4		
	02	PLATE 20				15011150			5.800		
		200x200				IS2062Fe410A			1		
	01	ROD DIA.63				15004107			36.705		
		1500				IS2062Fe410A			1		

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014
355-054

	NAME	SIGNATURE	DATE
DRN	K.SURESH KUMAR		29.06.2021
CHD	R.DEEPAK KARTHKEYAN		29.06.2021
APPD	S.YUVARAJ		29.06.2021

DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
PE/FB			N.T.S.	48.560	---
CODE 122					

TITLE: FOUNDATION BOLT 63 DIA. 1500 LONG

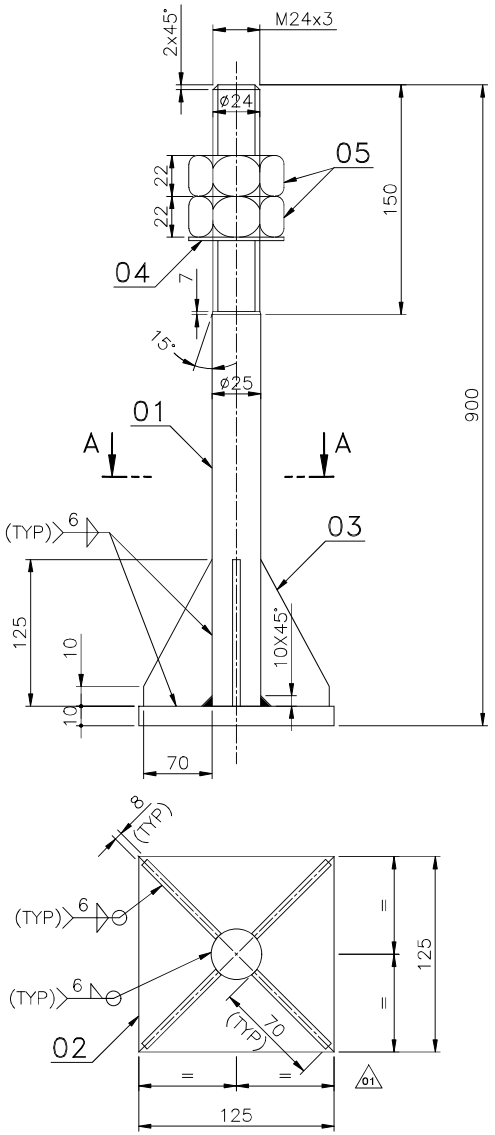
DRAWING NO : 2-FT-010-00129

REV 00

CORPORATE DRG ID:TP-DG-2-FM-011-00053/02

DRAWING NO: 2-FM-011-00053

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299



SECTION–AA

SIZE AND TYPE OF WELD	TYPE OF ELECTRODE	TOTAL LENGTH OF WELD IN MTRS.
6 FILLET	E7018	1.7

NOTES:–

01. FOUNDATION BOLT SHOULD NOT BE PAINTED.
02. THREAD ENDS OF BOLT TO BE COATED WITH RUST PREVENTIVE LUBRICANT AND COVERED BY TAR IMPREGNATED GUNNY CLOTH.
03. FOUNDATION BOLT THREAD PITCH IS TO BE FOLLOWED IN LINE WITH THE NUT.
04. BOLT AND NUT ARE TO BE SHOP ASSEMBLED.
05. MANUFACTURING REQUIREMENT SHALL BE AS PER APPLICABLE Q.C.P.
06. MATERIAL AND OTHER REQUIREMENTS ARE GIVEN PER ASSEMBLY ONLY.
07. SA–105–ROD CAN BE SUBSTITUTED WITH IS2062 ROD AND VICE–VERSA.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER							ZONE
								No			
								No			
								No			
								No			
								No			
	05	HEX NUT M24			ITEM NO	413040002400	A/C/P	No	0.110	GS	
					VAR NO	CL4–IS1363P3			2		
	04	PUNCHED WASHER M24			ITEM NO	414080002400	A/C/P	No	0.030	GS	
					VAR NO	IS2016–A			1		
	03	PLATE 8 70x125			ITEM NO	15011027	A/C/P	No	0.297	GS	
					VAR NO	IS2062Fe410A			4		
	02	PLATE 10 125x125			ITEM NO	152110980000	A/C/P	No	1.226	GS	
					VAR NO	IS2062Fe410A			1		
	01	ROD DIA.25 890			ITEM NO	150040270000	A/C/P	No	3.429	GS	
					VAR NO	IS2062Fe410A			1		

REV	DATE	ALTERED :	MPN
02	12.06.23	CHD & APPD :	RAJIV
ZONE 01	1)NOTES NO: 07 ADDED 2)WELDING TABLE ADDED		
REV	DATE	ALTERED :	GOVINDASMY
01	12.06.23	CHD & APPD :	SETHU/KRG
ZONE 01	ITEM No:2&3 SIZE CHANGED		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014
355–054

	NAME	SIGNATURE	DATE
DRN	R.GOVINDASAMY		08.04.2022
CHD	M.PADMANABAN		08.04.2022
APPD	K.RAJIVGANDHI		08.04.2022

DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
PE/FB			N.T.S.	6.093	---
CODE 122					

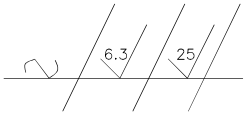
TITLE: FOUNDATION BOLT 25 DIA. 900mm LONG

DRAWING NO : 2–FM–011–00053 REV 02

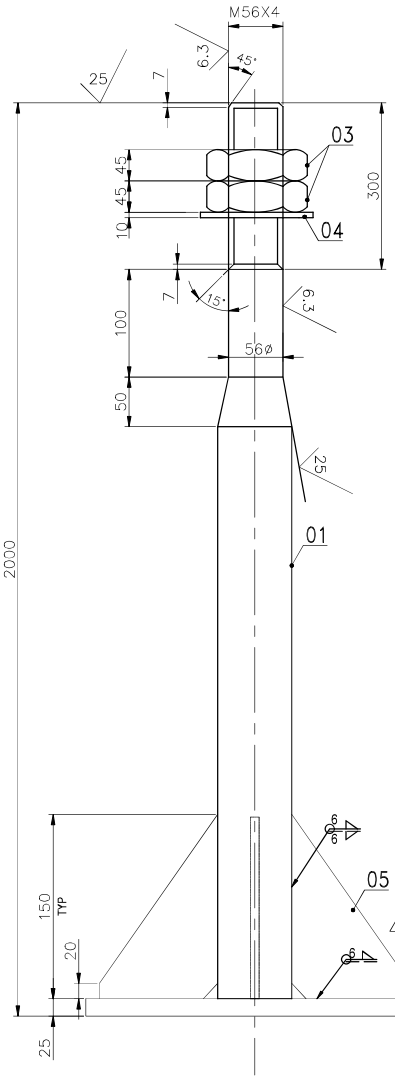
CORPORATE DRG ID:TP-DG-2-FM-011-00054/04

DRAWING NO: 2-FM-011-00054

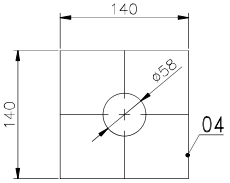
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299

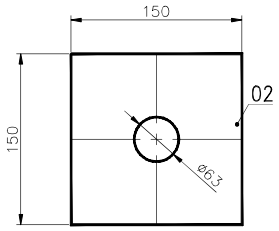


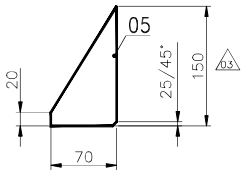
SIZE AND TYPE OF WELD	TYPE OF ELECTRODE	TOTAL LENGTH OF WELD IN MTRS
6 △	E 7018	1.800

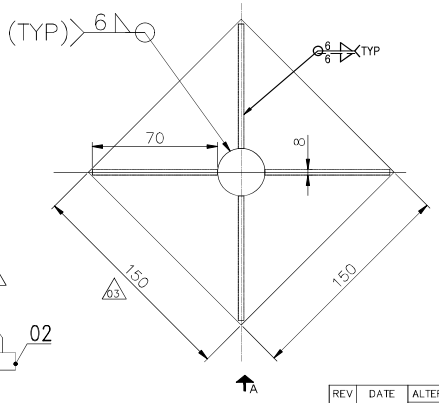


VIEW-A









NOTES :–

01) FOUNDATION BOLT SHOULD NOT BE PAINTED.
02) THREAD ENDS OF BOLT TO BE COATED WITH RUST PROOF OIL AND PROTECTED AGAINST CORROSION .
03) MANUFACTURING REQUIRMENTS SHALL BE AS PER RELAVENT Q.C.P .
04) MATERIALS AND OTHERS REQUIRMENTS ARE GIVEN PER ASSEMBLY ONLY.
05) SA–105–ROD CAN BE SUBSTITUTED WITH IS2062 ROD AND VICE–VERSA.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO / VAR NO	MATERIAL CODE / MATERIAL SPECN	A/C/P / UNT	UNIT WEIGHT / QUANTITY	GS	ZONE
	05	PLATE 8 150 X 70				15011027 IS2062E250A		0.374 4		
	04	WASHER PLATE; PLATE 140X140X10				15211098 IS2062fe410A	No	1.539 1		
	03	NUT HEX GR.B M56X4				413044005600 IS3138	No	1.355 2		
	02	PLATE 25 150X150				150110810000 IS2062E250A	No	4.416 1		
	01	ROD DIA 63; 1975				153391430000 SA–105	No	48.329 1		

REV	DATE	ALTERED : MPN
04	12.06.23	CHD & APPD: RAJIV
ZONE	1)ITEM No: 03 SPEC ADDED 2)WELDING TABLE ADDED	

REV	DATE	ALTERED : GOVINDASAMY.R
02	17.06.22	CHD & APPD: SETHU & RAJIV
ZONE	ITEM No:5 MATERIAL CODE CORRECTED	

REV	DATE	ALTERED : SETHUPATHI S
03	12.06.23	CHD & APPD: RAJIVGANDHI K
ZONE	ITEM No: 02 & 05 SIZE CORRECTED	

REV	DATE	ALTERED : GOVINDASAMY
01	29.04.22	CHD & APPD: SETHU & RAJIV
ZONE	ANCHOR DETAIL CORRECTED.	

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014

	NAME	DATE
DRN	R.GOVINDASAMY	07.04.2022
CHD	M.PADMANABAN	07.04.2022
APPD	K.RAJIVGANDHI	07.04.2022

355–054

DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG
ST			N.T.S	58.49	
CODE 122					

TITLE: FOUNDATION BOLT 63 DIA –2000 LONG

DRAWING NO : 2–FM–011–00054 REV 04

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620 014
QUALITY ASSURANCE DEPARTMENT

AMENDMENT TO QUALITY WORK INSTRUCTIONS (QWI)

QWI NO: QCP:002 REV: 05

AMENDMENT SL NO: A1 DATE: 15.09.2018

DESCRIPTION: **QUALITY CONTROL PROCEDURE FOR NON- PRESSURE PARTS**

Clause No.	Existing…	Amended as…	Remarks / Basis for Amendment
4.1.7	Heat treatment shall be done after shearing for P3 materials for t>12.5mm and for P4 and P5 materials of all thickness with a holding time of 15 minutes minimum	Heat treatment shall be done after shearing for P3,P4 materials t>12.5mm and for P5materials t>10mm.	Standard practice of BHEL is retained.
NOTE	The above-mentioned changes will be incorporated in the QWI during the next revision of the document.		

Prepared by: M.Jeyaram	Approved by: J V V Aruna Kumar
Signature & Dt: 15.09.18	Signature & Dt: 15.09.18

BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALI 620 014

QUALITY ASSURANCE DEPARTMENT

QUALITY CONTROL PROCEDURE FOR NON- PRESSURE PARTS — **QCP: 002 / 05**

Prepared by *M.Jeyaram* 07/3/18 Quality Assurance	
REVIEWED BY	SIGNATURE
ENGINEERING *(M. Shanmugam)*	07/03/2018
OUT SOURCING *(M. Arunmozhi Devan)*	7/3/18
QUALITY CONTROL *(A.Rajasekar)*	7/3/18
QUALITY ASSURANCE *(J V V Aruna kumar)*	7/3/2018

Revision No.	Date	Approved by	Signature
05	07/03/18	AGM / QA&BE	7/3/18
04	08/12/11	DGM/QA	---
03	10/06/10	SM/QA	
02	24/04/04	SDGM/QA	
01	01/01/95	SM/QA	
00	01/04/93	SM/QA	

Proprietary Data – For Internal Use only

RECORD OF REVISIONS

Rev No...	Clause No	Details of revision
00	--	This document consolidates all the general requirements and technical disciplines covered in the various previous
01	--	All amendments issued has been regularized and editorial correction made for better clarity. Scope of machining added in this document.
02		Editorial correction made for better clarity. Scope of machining added in this document.
03		Shaded clauses & Type of joints for base plates incorporated. PWHT temperature for P4 material revised.
04		P91 &92 Bar process requirements added.
05	1.0	Scope modified
	3.0	New materials added.
	3.6.3	TC added.
	4.1.7	Minimum holding time specified.
	4.1.8	P3 and P5 material requirements added.
	4.1.8.1	Alternate method of grinding for gas cut edges included
	4.3.1.3	Newly added
	4.3.2.2	Root gap for SAW defined.
	4.3.3.3	Preheat area defined.
	4.3.13	1:2.5 taper specified
	4.5.3	Hot correction temperatures given for alloy steels
	4.6.7	Table added
	4.6.8.1	Thickness for soaking time defined
	4.6.8.2	Effective thickness for combination of groove and fillet defined as per AWS D1.1 2015
	4.6.11	Width of heat band defined
	4.6.11.1	Width of insulation band defined
	8.1	Machined/bolted surface painting defined
		Fig-1 added
		Annexure A and B added for better clarity

1.0 SCOPE

1.1 This procedure details out the process control and quality requirements for manufacture of Non Pressure Parts in addition to the requirements specified in SQPs and SIPs of the respective products/projects.

2.0 REFERENCE DOCUMENTS

2.1 AWS D.1.1, D1.6, IS 7215 and GE:M&P 5.11.2.3(b), 5.11.2.1(e) & 5.11.2.2(e) as guidelines.

3.0 MATERIALS

3.1 CLASSIFICATION OF MATERIALS (commonly used):

P No. Group	Specifications
P1 - Group 1 -	Carbon steel :IS 2062/E250A & E250B0,BR& C, SA 515 Gr 60.SA106 GrB,A36, A53 GrB,
P1 - Group 2 -	H.Strength CS :SA105, SA 515 Gr 70, SA 299, SA 516 Gr 70,
P3 - Group 1	SA 588
P3- Group 2	SA 204 Gr B
P4 -	SA 387 Gr 11 & Gr 12, SA 182 Gr F 11 & F 12.
P5 A– Gr 1(LAS),	SA 387 Gr 22 Cl.1&CL.2, SA 182 Gr F 22
P5 B- Gr1(LAS)	SA387 Gr5 CL.1 &SA387 Gr.9 Cl.2
P15E Gr1	SA182 F91,F92,SA387 Gr91,Gr92, SA 335 P91,P92 SA213 T91,T92 ,SA234 WP91,WP92 & SA 336 F91,F92
P6 -	SA 240-410,429
P8 - Stainless steel	SA 240 - 304 ,309,310, 316, 321, 347 & 253MA
IS	IS 2062/E350A,B0,BR& C, E450BR, Fe410, IS3589,IS1079 , IS513 TYPE D, IS 1239, IS 1161 YST 240.
EN	BS EN10025-2, EN10025-3

Any other materials as specified in the drawings.

3.2 Raw materials used shall conform to the relevant specification as given in drawings and applicable TDC/PO. Any substitution of materials shall be done only with prior approval of engineering through applicable documents. Where subcontractors procure the raw materials, the same shall have valid test certificates.

3.3 Raw materials shall be free from visual defects like cracks, seams, laps, laminations,heavy pitting etc. When defects are noticed in visual inspection the same shall be confirmed using appropriate NDE techniques and repaired using applicable approved process .

3.4 All materials are procured with permitted dimensional tolerances of the material specifications and / or TDC. Wherever required, the raw materials shall be corrected prior to fabrication to achieve the required product tolerances.

3.5 Customer supplied materials are to be verified as per SP 0626.

3.6 The requirements of material traceability shall be as indicated in the respective drawings.

3.6.1 Product Attest “P” items indicated as in drawings are traceable to the test certificates and identified with material Specification, grade and melt number by stamping.

3.6.2 CERTIFIED items indicated as "C" in drawings are traceable to material Specification / grade only and identified by stamping / engraving / stenciling / painting.

3.6.3 Raw materials not covered by the above shall be identified by its W.O.No / Material code / Specification / grade by painting / stenciling / engraving. The Test certificates for raw materials shall be maintained by OVM vendors.

3.6.4 All subdeliveries shall be identified by its material code by painting or through name plates / tags.

3.7 When materials (including stock) are to be upgraded for special contract requirements QC shall ensure that the respective specification,CQR and contract TDC (as applicable) are complied.

4.0 FABRICATION

4.1 MARKING, CUTTING AND PREPARATION

4.1.1 Raw material shall be marked and cut to size by shearing, machining, saw cutting, flame or plasma (for SS materials) cutting. Flame cut edges shall be cleaned to remove slag. Uneven edges shall be dressed by grinding. Gas cutting notches shall be filled up by grinding the notches smoothly for welding using compatible electrodes and ground before taking up for further fabrication.

4.1.2 Wherever raw materials supplied / available are not sufficient for the sizes required, the same can be built up using the splicing either by groove weld/fillet weld sufficient to hold the parts in place instructions given in the respective SQPs/ Drawings/DCN (Incl. Production Notes)

4.1.3 Layout for size and shape shall be marked before cutting (for other than CNC applications) The tolerance for marking shall be maintained within + 2mm unless otherwise specified. The diagonal difference shall be within 3 mm.

4.1.4 The markings shall be punched at convenient intervals and bordered with white paint.

4.1.5 Stainless Steel (SS) materials shall be cut using plasma cutting or shearing only. Any further dressing/ grinding of cut surfaces should be done with separate and clean abrasive wheels.

4.1.5.1 The cut edges should be smoothly ground.

4.1.5.2 Notches above 3 mm or 20 % 'T' shall be thoroughly cleaned and welded by using a qualified WPS and examined visually and by LPI . The repaired surfaces are to be cleaned to bright metal surface.

4.1.6 Clip / Cleat angles of carbon steel above 12 mm thick used for beam connections which are sheared to length shall require heat treatment. Shearing /Flame/gas cutting is prohibited on Gr 91 and Grade 92 materials. Use only bandsaw for cutting of Gr91&92 materials. However for plates use plasma/waterjet/ bandsaw only

4.1.7 Heat treatment shall be done after shearing for P3 materials for t>12.5mm and for P4 and P5 materials of all thickness with a holding time of 15 minutes minimum.

4.1.8 The requirements of preheat for gas cutting are as follows:

Carbon steel	$t \leq 50$mm:	: Nil
Carbon steel	$t > 50$mm :	: 100 ° C.min.
Alloy steel (P3&P4)	$t \leq 25$mm :	: Nil
Alloy steel (P3&P4)	$t > 25$mm :	: 150 ° C

Alloy steel (P5)

Sl no	P5 Material- thickness	Preheat temperature
1	t<13mm	120 ºC.
2	For t=13 upto 25mm	150 ºC.
3	t>25mm	200 ºC.

Stainless steel Not applicable

4.1.8.1 Stress relieving for gas cut edges shall be as follows. Alternatively, the cut surface can be ground / machined upto 3 mm to remove HAZ and checked by LPI/MPI.

Material	Thickness	Heat treatment cycle
P1	> 50 mm	600 º - 650 º C for 15 minutes
P3	> 16 mm	620-650 º C for 15 minutes.
P4	> 16 mm	650 º – 700 º C for 15 minutes.Furnace cool
P5	All	680 º - 730 º C for 15 minutes. Furnace cool
SS (plasma)	Any	Not required

For materials other than P5, P15E Gr 1(Grade 91) and Grade 92 this heat treatment may be clubbed with the final heat treatment of the product.

4.1.9 The prepared plates shall be visually inspected and repaired if required as per SIP:NP:06.

4.1.10 The raw materials after cutting shall be identified with relevant WO No., DU No., Part No. and Material Spec / Grade (transferred).

4.2 FORMING

4.2.1 Before forming , proper cutting plan (Drawing dimensions with process allowances) shall be prepared and cleared by the concerned agency. Forming shall be done using proper tooling free from damages. Method of forming and work centre shall be identified in OPS / relevant QWI refered in PO.

4.2.2 Built up (Forming) operations for Beams and columns shall be done done by suitable Fixtures,Machines ,WPS & other accessaries required for forming. All the Forming operations of sheets / plates shall be done by rolling / pressing. For shell formed components Circularity of rolled shells shall be checked using templates (of length > ¼ of ID).

4.2.3 Suitable nonmetallic padding shall be provided while forming of stainless steels to avoid contamination.

4.2.4 All formed /Built up components shall be checked for orientation, angle, and other dimensions as per drg. All formed parts shall have smooth finish and shall be free from bends, folds and sudden transitions.

4.2.5 Minimum thickness after forming shall be ensured whenever specified in drg.

4.2.6 **Forming of U-ROD(Gr91&92)**

4.2.6.1 Identify, mark and cut the rod using bandsaw to a length of equivalent to the arc length indicated in the drawing with two arm length(upto butt joint) +20mm.

4.2.6.2 Mark the centre of the rod with a heat resistant chalk to be visible after heating. For temperature and other details refer the SQP:NP:15(Latest)

4.2.6.3 Remove the "U"rod and air cool to room temperature.

4.2.6.4 Visually inspect the bend surface and check dimensions and ensure no surface imperfections.

4.2.6.5 Normalizing and tempering of "U"Rods to be done within 72 hours after pressing/bending operation.(Ref.SQP:NP:15(latest)

4.2.6.6 Shot blast the "U"Rod to remove scaling and check the dimension. Conduct LPI/Wet MPI and ensure no surface indications.

4.2.6.7 Mark and cut the limbs of "U" rods such that the straight portion shall be as per drawing from the tangent point.

4.2.6.8 Edge prepare the "U"rod s for butt joint preparation as shown in the drawing by machining No gouging and grinding is allowed.

4.2.6.9 For Detailed operation of cold and hot forming of Gr 91 &Gr 92 materials refer SQP:NP:15(latest)

4.2.7 **Threading of "U"Rods**

4.2.7.1 Mark and cut the rods equivalent to the straight portions as shown in the drawings.

4.2.7.2 Threading to be done on one end of the rod to thread size as mentioned in the drawing/ SQP:NP15(latest).

4.2.7.3 Edge prepare the other end of the rods by machining for butt welding as shown in the drawing.

4.2.7.4 Tolerances for formed components when not specified in drg. Shall be as follows

a) St.Length / Dia, Width & Height : + 1 mm/M, 5 mm Max
b) Verticality : 1 mm / M, 5 mm Max
c) Squareness : 1 mm / M of length / Dia
d) Straightness : 1 mm / M, 5 mm Max
e) Radius : + 5 mm
f) Bend Angle : + 2º
g) Ovality : 1%
h) E.P Angle : + 5º / - 2.5º
i) Diagonal diff : 3 mm

4.3 WELDING

4.3.1 WELDING CONSUMABLES

4.3.1.1 Welding consumables conforming to the qualified welding procedures shall be used. However the following guide lines are provided.

4.3.1.2 Unless specified otherwise in the WPS, basic coated electrodes E7018 shall be used for SMAW of all structural components involving materials of IS2062 E250 grade.

4.3.1.3 All the electrodes are to be procured using Welding consumable procurement instruction (WCPI) issued by WTC.

4.3.1.4 For duct welds, rutile electrodes (E6013) shall be used.

4.3.1.5 All low hydrogen electrodes shall be dried in the baking oven at 250-300 deg.C for 2 hours and the electrodes shall be held at 100-150 °C until they are used.Electrodes shall not be re-baked more than once and use of elctrodes in wet condtion is prohibited.

4.3.1.6 All rutile electrodes (EXX 13) shall be dried at 100-150 °C deg. C for 1 hour min. and held at 100-150 °C deg.C till use.

4.3.1.7 Fluxes for SAW shall be dried at 250 °C for 1 hour min. before use. Height of flux bed while drying in pan or oven, shall not be more than 100mm.

4.3.1.8 Unless otherwise specified, SS consumable shall be baked as per Electrode manufacturer's recommendations and stored at 100 º - 150 º C until use.

4.3.1.9 The type of welds employed in the structural fabrications (Girders,Columns,Beams & Base plates etc) are identified in the annexure –A along with sketch for better clarity and under standing. For further details the fabricator can ref the engg.drg. no.3-35-110-00995/00

4.3.2 FIT UP

4.3.2.1 Proper fit up shall be ensured before welding as per Drawing. Tack welding or mechanical clampings shall be used to maintain the fit up requirements before and during welding.Bridge pieces used during fit up shall be of ferritic for ferritic materials and stainless for stainless steel materials. However for P15E Gr.1.(F91 & F92) prepare a fixture for fit-up of butt joint of „U" rod with Straight rods

4.3.2.2 Dimensions of the cross sections of groove welded joint shall be within the following tolerances w.r.t . drawing requirements:

	Root not back gouged	Root back gouged
1. Root face of joint(land)	± 2 mm	Not limited
2. Root opening of joint (with out backing)	± 2 mm	+ 2 mm - 3 mm
Root opening of joint* with backing)	+ 6 mm - 2 mm	Not Applicable
3. Groove angle of of joint	+ 10º - 5º	+ 10º - 5º

*(NOTE): Root opening wider than permitted by above tolerances but not greater than twice the thickness of the thinner part or 20mm,whichever is less may be corrected by edge buildup to acceptable dimensions prior to welding. Such build up edge shall be MPI / LPI checked. For SAW process, the maximum root opening variation (minimum to maximum opening as fit-up) may not exceed 3 mm.

4.3.2.3 For C. S. fillet welds, the parts shall be as close as practicable and gap shall be limited to 5 mm (If gap exceeds 2 mm, the leg of fillet shall be increased by the amount of gap but in no case shall exceed 4.8 mm). For thickness 75 mm and above gap up to 8 mm can be permitted provided suitable backing is used.

4.3.2.4 For S. S. fillet welds, the parts shall be as close as practicable. Gaps 2 mm and above upto 5mm are acceptable if the fillet size is increased by an amount equal to the gap.

4.3.2.4 Parts to be joined by butt welds shall be properly aligned. An offset not exceeding 10% of the thickness of the thinner part joined can be permitted, but in no case more than 3 mm, is permitted.

4.3.2.5 The types of weld joints indicated in the fabrication of structural components are identified with symbols in ANNEXUR -A & B .For further details refer the Engg standard drawing no.3-35-110-00995 (Latest)

4.3.3 PRE HEATING

4.3.3.1 Pre heating requirements for welding shall be as per Clause 4.6.7 and controls shall be exercised as detailed below. No preheating is required for stainless steels.

4.3.3.2 Preheating shall be maintained during the entire process of welding.

4.3.3.3 Preheating is to be done using gas burner or induction / resistance heating. The temperature must be uniform and verified using thermal chalks or thermocouples prior to start of welding as well as during welding for a width of 1.5 times the base metal thickness or 75 mm whichever is more,around the point of welding (not less than 25mm incase of tack welding in all directions.

4.3.3.4 Where interpass temperature control is required during welding, the temperature must be ensured using thermal chalks / thermocouples with recorder . Inter pass nitrogen / air cooling can be adopted to maintain inter pass temperature in case of stainless steels.

4.3.3.5 Wherever post heating is specified after welding, the preheating shall be continued till attaining the post heat temperature and maintained for the required time and cooled slowly by wrapping suitable insulating blankets like asbestos.

4.3.4 Welding shall be performed using qualified procedures and qualified personnel. Edge preparation and welding details shall be as per drawing.

4.3.5 For items to be manufactured at subcontractor's works (including away centre fabrication) , for requirements of procedure and personnel qualification SIP:NP: 07 (Latest) shall be followed.

4.3.6 When double bevel welding is adopted, back gouging and grinding is to be done. Back gouged groove shall be checked with PT / MT before welding from second side. However for P15E Gr.1.(F91 & F92) Only back grinding to be done after interstage PWHT.

4.3.7 Proper sequence of welding shall be adopted to minimise distortion. The distortion of the finished jobs, if any may be corrected by mechanical means / hot correction.

4.3.7.1 For welding of SS extreme care is to be taken in weld sequencing to minimize the weld distortion and shrinkage. For complex weldments a weld sequence instructions may be prepared by contractor prior to work commencement. Weld joints likely to have high shrinkage should be welded (with minimum restraints) before welding other joints providing allowance for shrinkage.For furher details ref.SQP:NP:20

4.3.7.2 While cutting long web plates suitable camber may be provided /required to compensate for the distorion during cutting and welding.

4.3.8 All butt welds of divider plate and guide vanes in ducts shall be flush ground inside.

4.3.9 The use of jigs and fixtures is recommended where ever practicable. Suitable allowances shall be provided for weld shrinkage. Proper sequence of welding shall be followed to control the distortion during welding.

4.3.10 All temporary attachments shall be welded with the required preheat. After their removal welded spots shall be ground flush and LPI checked.

4.3.11 Groove welds shall preferably be made with minimum reinforcement unless and otherwise specified in drawing / SQP. In case of butt welds, reinforcement shall not exceed 3.2 mm. and shall have gradual transition to the plane of the base material surface.

4.3.12 The surface of the welds shall be free from coarse ripples, overlaps, undercuts and abrupt ridges to avoid stress raisers.

4.3.13 Where parts of different thicknesses are welded or surface offset is more, the transition shall be made gradual by grinding / machining with 1: 2.5 taper unless specified in the drawing.

4.3.14 Stray arcs shall be avoided to the extent possible. Arc spots if noticed shall be ground and checked by LPI / MPI. Thickness requirements shall be ensured after grinding.

4.3.15 Pre heating of Gr 91 &Gr 92 shall be 220 °C .For other process parameters refer the applicable WPS

4.4 WELD REPAIRS

4.4.1 Removal of defective weld / portions of the base material may be done by machining, grinding, chipping, gas cutting, oxygen gouging or carbon arc gouging. Defective portions of the weld shall be removed without substantial removal of sound base metal.

4.4.2 For under sized welds additional weld metal shall be deposited using an electrode preferably smaller than that used for making original weld limited to 4mm in diameter. The surfaces shall be cleaned thoroughly before deposition.

4.4.3 Defective welds/base metal shall be repaired by removing or/and rewelding as follows:

4.4.3.1 Overlap / excess weld metal shall be removed by grinding.

4.4.3.2 For excess concavity, crater, undersize & undercuts, deposit additional weld metal after cleaning the weld surface.

4.4.3.3 For Cracks in weld or base metal, ascertain the extent of crack by suitable NDE /acid etching, remove the crack to sound metal upto each end of the crack by arresting the ends for further propagation and reweld.

4.4.3.4 For weld porosity, slag inclusions & lack of fusion remove defective portions & reweld.

4.5 HOT CORRECTION

4.5.1 Members which require hot correction are to be supported at suitable locations and mark the locations for heating.

4.5.2 Heat the locations marked by using neutral flame. Torches used for heating shall be moved continuously & uniformly over selected area to avoid localised over heating.

4.5.3 For Carbon steels the maximum temperature shall not exceed 650 º C and shall be ensured using thermal chalks / thermocouples.

The temperatures for alloy steels shall not cross for P3 -649 º C,P4 – 704º C , P5 – 732º C during hot corrections.

4.5.3.1 For Austenitice stainless steels the maximum temperature shall not exceed 430 º C and shall be made known to inspection authorities . Otherwise , after hot correction solution annealing at 1050 – 1100 deg C is to be done.

4.5.3.2 For Ferritic/Martensitic/Duplex stainless steels the maximum temperature shall not exceed 315º C and shall be made known to inspection authorities . The temperature shall be ensured using thermal chalks / thermocouples.

4.5.4 Additional dead weights may be placed over the positive side of the bend depending upon the requirement to accelerate hot correction.

4.5.5 Allow for natural cooling. Accelerated cooling shall not be adopted. Remove the dead weights used after cooling.

4.5.6 Wherever the correction for distortion affects the weld joints, applicable NDE shall be repeated after the correction.

4.6 POST WELD HEAT TREATMENT (PWHT)

4.6.1 The process controls (temperature control and recording) for heat treatment shall cover the activities before, during and after heat treatment.

4.6.2 The weldment shall be cleaned to free of grease, oil etc. prior to heat treatment.

4.6.3 PWHT shall be done in a furnace or by local heating a band (including the entire weld and adjacent area of the base metal) .

4.6.4 The thermocouples and recording instruments shall be calibrated as per applicable standards and records maintained. The furnace shall have been qualified and calibrated.

4.6.5 All materials to be heat treated in furnace shall be loaded in such a way that they shall not be subjected to direct flame impingement. Jobs shall be preferably loaded on raised plat forms so that no material projects into the plane of burners. Alternatively flame deflectors may be provided in front of the burners to avoid direct flame impingement. Ensure loading of test coupons wherever applicable. The furnace temperature shall not exceed 315 º C at the time of loading material / weldment.

4.6.6 Number of thermocouples and their location shall be decided covering maximum and minimum thickness and covering all the zones. The temperature variation within 5 meters shall not exceed 140 º C during heating period (above 315 º C).

4.6.7 The **temperature requirements** for Pre heating, Post Weld Heat Treatment(PWHT) & temperatures for welding are given as below.(Unless otherwise specified in WPS.)

Material	Pre heating	PWHT	Remarks
Butt/groove welds:			
P1	For t> 38mm , 150 ° C	For t> 50 mm, 600-650 ° C	
P3	All thickness, 150 ° C	All welds when t >16 mm, 620-650 ° C.	For all butt welds in tension members, PWHT to be done.
P4	All thickness, 150 ° C	All welds when t >16 mm, 650-680 ° C.	For all butt welds in tension members, PWHT to be done.
P5	150 ° C (Note2)	680-710 ° C	All welds
P8	120 ° C, 300 type 205 ° C, 400 type	- -	
Fillet welds :			
P1	For t> 38mm , 150 ° C	-	
P3	All thickness, 150 ° C	if throat thickness>13mm, 620-650 ° C.	
P4	All thickness, 150 ° C	if throat thickness>13mm, 650-680 ° C.	
P5	150 ° C (Note2)	All thickness, 680-710 ° C	
P8	120 ° C,300 type 205 ° C ,400 type	-	

Note 1 All welds on P5 material shall be post heated at 250 ° C for 2 hrs or 150 ° C for 4 Hrs, immediately following welding.

4.6.7.1 The soaking time shall be as follows:

a. For P1 materials the soaking time shall be 1 hr/inch of thickness(t) (2.5 mts / mm) upto 2" and 2 hrs + 15 minutes for each additional inch for t > 2".

b. For P3, P4 & P5 materials the soaking time shall be 1 hr/inch of thickness (2.5 mts/ mm) upto 5" and 5 hrs + 15 minutes for each additional inch for t > 5".

c. For combination cycles mentioned above, calculate the minimum soaking time for individual components as 2.5 minutes/mm of the thickness of weld/material whichever is applicable. Soaking time selected for the cycle shall not exceed the limits given below:

Material	Thickness (mm)	Max. soaking time (minutes)
P1 (A,B,C), P4,P5A, P1 (A,B) + P4 P1C + P4, P1 + P3 P4 + P5A P15E Gr1	Up to 25 mm	125
	26 - 50 mm	200
	51 - 80 mm	250
	81 - 150mm	375

4.6.7.2 Unless otherwise specified, in case of mixed loads of materials not covered under simulation HT, the following heat treatment temperatures shall be followed. In such cases, guidelines for soaking can be taken from Clause 4.6.9.

For components having butt joint between P1 & P4, or P3 & P4, the cycle shall be 630 – 670ºC.

Where a component has a butt joint between P4 & P5A, the cycle shall be 680 - 720º C.

Where a component has a butt joint between P1 & P3, the cycle shall be 620-660 ºC

For P1+P5A material combination, follow the WPS requirements

The following jobs shall not be combined in the same cycle during PWHT.

i.separate jobs of P1 and P4 ii. separate jobs of P4 and P5.

4.6.8 The following rules shall apply to establish the thickness to be used in determining the soaking time for PWHT.

4.6.8.1 For Butt welds, the thickness shall be weld metal thickness. For bar stock, the thickness shall be the diameter. The holding time is based on the weld metal thickness even though some material in the weldment is thicker than the weld.

4.6.8.2 For fillet welds, the thickness shall be the throat thickness. The effective throat of a combination PJP bevel groove weld and a fillet weld shall be the shortest distance from the joint root to the weld face of the diagrammatic weld minus 1/8 in [3 mm] for any groove detail requiring such deduction as shown in Fig-1

4.6.8.3 For partial penetration branch welds, the thickness shall be the depth of the groove prior to welding.

4.6.8.4 For repairs, thickness shall be the depth of the groove as prepared for repair welding.

4.6.8.5 For combination of different welds in a component, maximum thickness of weld shall govern.

4.6.9 Requirements of Rate of Heating (ROH) above loading temperature 315 º C and Rate of Cooling (ROC) are as given below. During heating and cooling, variation in temperature between thermocouples shall be 85 º C maximum, unless otherwise specified.

Thickness	ROH / ROC (Max) Above / upto 315 º C
Up to 25mm	220 º C / hour
26 - 50 mm	110 º C / hour
50 – 75 mm	75º C / hour
Above 75 mm	55 º C
For S.S Matl	200 º C / hour min (Forced air cooling)

4.6.10 In case of interruption during Heat treatment the following action has to be taken depending on the stage of occurrence:

Type of Heat treatment	Stage of interruption	Action
Annealing & stress relieving	Heating	Heat treat subsequently as specified
	Soaking	Heat treat subsequently for balance soaking with minimum 15 minutes.
	Cooling	If the ROC during interruption period meets the specified rate, cool subsequently at required rate upto 400º C. Otherwise, reheat to the soaking temperature, hold for 15 minutes and then cool at the specified rate
Normalising(N) Tempering (T) &, Soln. annealing (S)	Heating	Heat treat subsequently as specified
	Soaking	Heat treat subsequently for full soaking(N,S) / Balance soaking (T)
	Cooling	Not applicable

4.6.11 Local heat treatment can be carried out by Resistance heating or Induction heating. For local heat treatment of weld joints, width of the heated band on either side of the weld must be at least 3 times the width of the widest part of the weld groove but not less than twice the thickness of the thicker part welded.

4.6.11.1 The width of the insulation band on either side shall be at least twice the width of the heating band.

4.6.11.2 A minimum of three thermocouples shall be placed such that at least one is on the weldment /HAZ and the other two on the base material on either side of the weldment.

4.6.11.3 The winding arrangement shall be established to attain the required temperature. The initial rate of heating shall be minimum such that it stabilises at the required rate of heating before reaching 400 deg C.

4.6.12 After heat treatment, the charts shall be correlated with the job and cleared by QC. The chart shall contain cycle no, Date, W.O and DU details. Temperature, ROH, ROC and soaking time shall be calculated, entered in the chart and signed off by QC.

4.6.13 Wherever applicable the test coupons shall be tested and reports obtained to complete the clearance of heat treatment operation.

5.0 NON-DESTRUCTIVE TESTING

5.1 The requirement of NDE, extent and type of examination shall be as per respective product SQP and / or CQP .Wherever product SQP is not existing the following requirements shall apply.

5.2 Visual inspection shall be performed as per SIP:NP:06 latest

5.3 RADIOGRAPHY.

a. All Butt welds of Carbon steel for thickness t > 32mm
b. All butt welds of alloy steels for thickness t >12mm for P5 and t > 16mm for P4&P3.
c. All butt welds in monorails.
d. SS butt welds of t > 16mm unless otherwise specified.

5.3.1 All radiographic films shall possess Firm code, RT agency, Cust. No, Part No, RT reference Number. and weld location reference number. The job shall be numbered with Radiograph number.

5.4 MPI / LPI BEFORE PWHT

a. All flame cut edges of Carbon steel for t $\geq$ 38 mm and alloy steels for t > 12mm.
b. All butt welds joining plate members in which one of the plate member is over 25 mm thick for Carbon steel and over 12 mm thick for alloy steel.
c. All fillet welds between tension flange and web.
d. All fillet welds joining plate members in which both the plate members are over 25 mm thick for Carbon steel and over 12 mm thick for alloy steel.
e. For all butt welds of CS & AS weld groove after back chipping prior to welding from second side.
f. All main fillet welds for SS require LPI
g. MPI/LPI for all fillet welds & HAZ of SA387 Gr.22 materials after HT.

5.5 All NDE shall be carried out by qualified personnel as per BHEL NDT procedures. Where subcontractors use their own procedures for NDE the same shall have the approval of BHEL NDTL.

6.0 MACHINING

6.1 GENERAL

6.1.1 Ensure of raw material identification throughout the machining process. Traceability to the contract shall be ensured by stamping or marking / painting or by tags(WO No.and DU / Part no.)

6.1.2 Where the material identification is likely to be removed during cutting or machining , the transfer of material identification shall be ensured.

6.1.3 In case of components / part processed items received from Subcontracting / other shops, ensure the completeness and clearance by QC / Customer Inspector through Inspection Reports / OPS.

6.1.4 Proper care shall be taken during handling of materials at all stages of manufacture. Items stored in the shop floor shall be properly identified and preserved to prevent mixup and damages / rusting / warpages.

6.1.5 All Machined surfaces shall be properly protected and stored. Wherever long storage is envisaged, they shall be preserved with grease / rust preventive oils and protected suitably with polythene / gunny bag or plastic peel off coatings.

6.2 MARKING

6.2.1 The marking on machined components shall be in such a location which will not be detrimental to the surface finish requirements of the component.

6.2.2 Purpose of marking is to:

1. Ensure availability of machining allowance.
2. Identify locations for machining.
3. Provide reference for setting and inspection.

6.3 PROCESS CONTROLS

6.3.1 The following shall be ensured for selection of work centers, tools, jigs and fixtures:

a The work centre for machining shall be identified in OPS / loading sheet based on the process capability of the machine or Machine accuracy established to suit the tolerances.

b Test hardwares (Jigs, Fixtures and Templates) used as a means of inspection / process control shall have been qualified through first off trials and shall be regulated through valid number. The same shall be reflected in the OPS / loading sheet .

c Softwares used in case of CNC / NC machines shall have been validated through trials or inspection of similar components produced and accepted.

d All cutting tools shall have been ensured for its correctness before use. In case of regrinding of tools they shall be verified after regrinding.

6.3.2 The following shall be ensured before setting the job on the machine, during processing and after completion of machining:

a Ensure the verticality and flatness of the job after clamping by using the reference markings or dialing the surfaces. Ensure the adequacy of clamping.

b Ensure proper clamping of the correct tool in to the tool holders.

c After machining the machined surfaces shall be cleaned and all corners shall be deburred. After removing from the machine they shall be properly stored.

d Before starting reaming ensure proper material allowance for finish operation.

e During drilling, reaming and tapping the removal of chips shall be done periodically to prevent clogging of chips. For deep drilling ensure that run out and drill travel are verified in free condition and ensure proper clamping of the tools.

6.4 INSPECTION

6.4.1 Ensure completeness of all final machining operations. Dimensional inspection shall be done with relevant drawings. Ensure use of calibrated instruments / gauges.

6.4.2 Unless otherwise specified in the drawing or SQP, the following tolerances can be used for untoleranced dimensions.

1. Linear Tolerance (:millimeters) - Medium

PERMISSIBLE DEVIATIONS FOR BASIC SIZE RANGE						
Up to 6	From 6 TO 30	from 30-120	From 120-400	From 400-1000	From 1000-2000	Above 2000
± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2.0

2. Angular Tolerance

a. Assembly characteristics ± 0.5º
b. Other characteristics ± 1º

7.0 FINAL INSPECTION

7.1 All dimension shall be inspected as per relevant drawings. Tolerances for fabricated items when not specified in drawings shall be as per clause 4.0.

8.0 CLEANING AND PAINTING

8.1 All the temporary cleats, bridge pieces shall be removed carefully so as to avoid damage to parent material. Temporary tack welds shall be ground smooth. Complete assembly shall be cleaned to remove mill scales, spatter, slag, rust, oil or grease.Surfaces shall be prepared and painted as per SIP:PP:22 (latest). Site EPs shall be applied with weldeable primer. All site EP shall be protected suitably from mechanical damage. The machined/bolted surfaces shall be applied with rust preventive oil coating and painting shall not be done on these surfaces. All the machined and bolted surfaces should be suitably masked to avoid handling damages.

8.2 All temporary stiffeners / attachments used for transportation and handling that are removed after site assembly shall be painted with yellow paint.

8.3 Match marking and flow direction for applicable components shall be as per the respective product SQP./Drawing

8.4 The following details shall be clearly marked with relavant details by paint, bordered and covered by one coat of transparent varnish

Project Name :
Work order number :
Component / Assly. Designation :
DU Number :
Weight :
Sub-contractor Name / Code :

8.5 Tension flanges in girders are to be identified by hard punching indicating `TENSION FLANGE'.

8.6 Apply grease on the threaded portion of "U" rod and protect the threaded portion from damage with suitable plastic end caps.

8.7 For subcontracted items the firm code shall be punched and bordered with white paint.

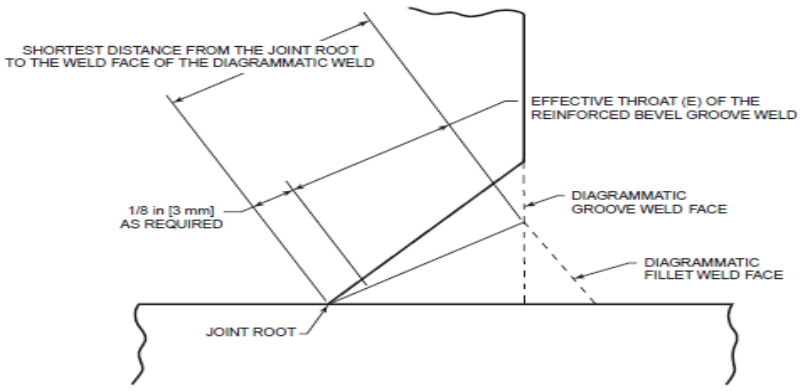
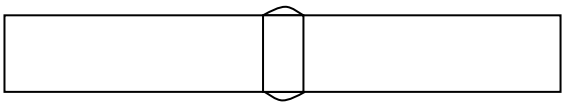


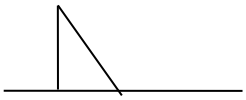
Fig-1

ANNEXURE - A

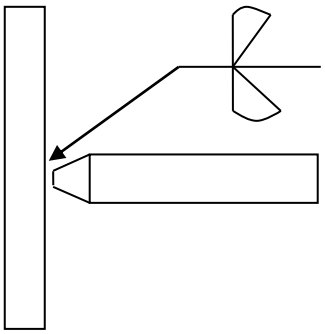
SQUARE BUTT WLED



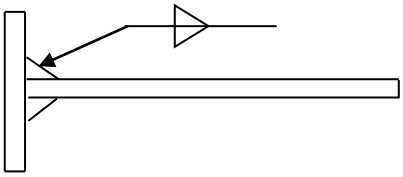
BEVEL WELD



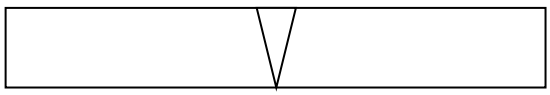
K WELD



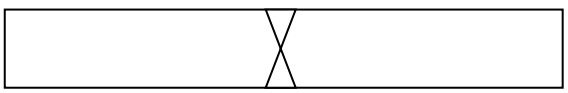
FILLET WLED



SINGLE V JOINT



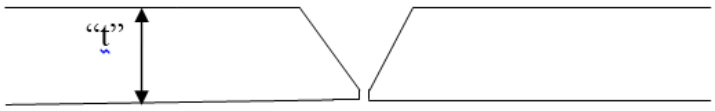
DOUBLE V JOINT



ANNEXURE-B

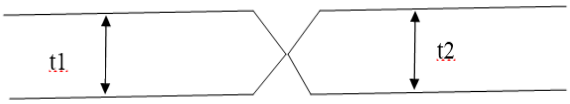
Examples illustrated with sketch for P1 materials.

Sketch-1 (Full penetration weld joint)



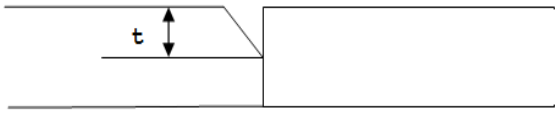
Where "t"is base metal thickness.If"t"is > 50mm PWHT to be done.RT is applicable and to be carried out as per Cl 5.3 and CQP.

Sketch:2 (Full penetration weld joint double V)



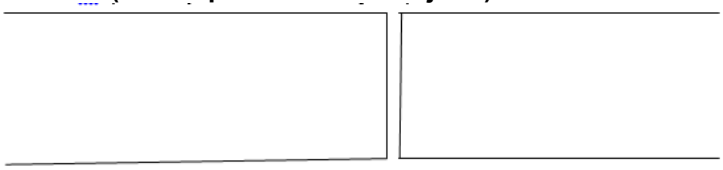
If "t1/t2" >50mm,PWHT to be done. RT is applicable and to be carried out as per Cl 5.3 and CQP.

Sketch:3 (Partial penetration weld joint bevel)



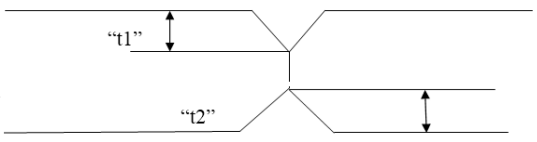
Where "t" is weld metal thickness.If weld depth is >50mm PWHT to be done,RT is not applicable,MPI to be done.

Sketch:4 (Partial penetration weld joint)



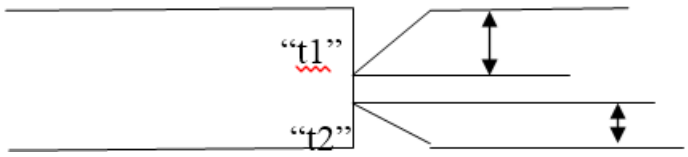
PWHT & RT is not applicable in this case, since only seal welding is required and the weld thickness does not exceed 50 mm. MPI to be done.

Sketch:5 (Partial penetration weld joint double V)



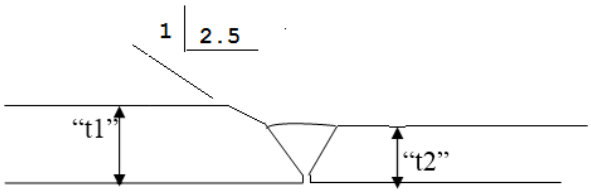
Where"t" is equal to t1+t2. If "t" is > 50mm PWHT to be done. RT is not applicable.MPI to be done

Sketch:6 (K connection Partial penetration weld joint)



Where "t" is equal to t1+t2.If "t" is > 50mm PWHT to be carried out. RT is not applicable. MPI to be done.

Sketch: 7 (Bi thickness joint)



If t2 is >50mm PWHT to be carried out and if t2>32mm RT is to be carried out as per Cl 5.3 and CQP. Chamfering in t1 shall be taken with taper 1:2.5 (Unless specified in drawing)