

PROJECT-NTPC LARA & SINGRAULI
Pre-Qualification Criteria (Technical)

Package Name : FABRICATED FITTINGS PACKAGE
PR No : 1900160782, 1900160783, 1900160780 & 1900160781

Only **Fabricators/ Manufacturers** qualified as per the Pre-qualification criteria laid down below, are allowed to bid. **Authorised Dealers, Agents, Stockists and Traders are not allowed to bid.** However, offer consideration is subject to approval from end customer NTPC.

The bid evaluation shall be on Package wise L1 basis. The bidder must quote for all the items in a package. Partial quotation for a package shall not be considered.

The Bidder shall meet the Pre-Qualification Criteria (listed below) to get themselves qualified for the complete package.

Non-compliance to any of the criteria listed below will lead to disqualification of bidder for the subject item of the tender.

Qualification Criteria of the Bidder:

- 1.** Bidder must be an established fabricator of fittings, and should have successfully completed Manufacture, Surface Preparation, Painting, Testing & Supply of **Fabricated Fittings**.
- 2.** The Bidder should have successfully completed supply of **Fabricated fittings of cumulative quantity not less than 50 MT**, through a single Purchase Order or multiple Purchase Orders in last 5 years ending on the original due date of this tender.
- 3.** Detailed BOQ of Pipes supplied, satisfying the criteria laid down above, shall be provided in the format enclosed as Annexure-1, with details like Project & Customer, Description, Quantity & Weight of Items supplied, PO details etc. as a minimum for assessing pre-qualification. **PO Copies shall be enclosed for the references provided.**
- 4.** The bidder should not have been under suspension for business or blacklisted by any of the BHEL units or in the Blocked list of Customer.
- 5.** Consideration of the Bidder offer is subjected to end customer's approval.

Annexure-1

Supply References in the Last 5 Years ending on the Original due date of this tender

Details of items supplied by the Bidder:

[illegible]

ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
I	NTPC Lara STPP, Stage-II (2 x 800 MW)												
A	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1321X12 BE	PY9752332013	12	Nos	IS2062E250B	PY 52 332	1900160781/10	1234.20	14810.40	1, 2	Later	0.21971	
2	MITRE 60D 3P R1.5D IS2062E250B 1321X12 BE	PY9752332102	8	Nos	IS2062E250B	PY 52 332	1900160781/20	822.80	6582.40	1, 2	Later	0.09765	
3	MITRE 45D 3P R1.5D IS2062E250B 1219X12 BE	PY9752332129	2	Nos	IS2062E250B	PY 52 332	1900160781/30	520.08	1040.16	1, 2	Later	0.01543	
4	TEE (STRT) IS2062E250B 1321X12 BE	PY9752356010	2	Nos	IS2062E250B	PY 52 356	1900160781/40	972.60	1945.20	1, 2	Later	0.02886	
B	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - AG)												
1	MITRE 30D 2P R1.5D IS2062E250B 1321X12 BE	PY9752332145	4	Nos	IS2062E250B	PY 52 332	1900160781/50	411.40	1645.60	1, 3	Later	0.02616	
2	MITRE 90D 4P R1D IS2062E250B 1321X12 BE	PY9752332013	4	Nos	IS2062E250B	PY 52 332	1900160781/60	822.80	3291.20	1, 3	Later	0.05231	
C	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	4	Nos	IS2062E250B	PY 52 332	1900160781/70	491.58	1966.32	2	Later	0.02323	
2	MITRE 90D 4P R1.5D IS2062E250B 406.4X6 BE	PY9752332080	1	Nos	IS2062E250B	PY 52 332	1900160781/80	58.12	58.12	2	Later	0.00069	
3	MITRE 60D 3P R1.5D IS2062E250B 914X10 BE	PY9752332110	16	Nos	IS2062E250B	PY 52 332	1900160781/90	327.72	5243.52	2	Later	0.06194	
4	TEE (RED) IS2062E250B 914X10-610X6 BE	PY9752356087	3	Nos	IS2062E250B	PY 52 356	1900160781/100	313.75	941.25	2	Later	0.01112	
5	RDCR (ECC) IS2062E250B 914X10-406.4X6 BE	PY9752333079	1	Nos	IS2062E250B	PY 52 333	1900160781/110	97.81	97.81	2	Later	0.00116	
D	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	1	Nos	IS2062E250B	PY 52 332	1900160781/120	491.58	491.58	3	Later	0.00622	
2	MITRE 90D 4P R1.5D IS2062E250B 610X6 BE	PY9752332064	3	Nos	IS2062E250B	PY 52 332	1900160781/130	131.38	394.14	3	Later	0.00499	
3	MITRE 90D 4P R1.5D IS2062E250B 406.4X6 BE	PY9752332080	4	Nos	IS2062E250B	PY 52 332	1900160781/140	58.12	232.48	3	Later	0.00294	
E	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - UG)												
1	ELBOW 90D LR CS 12" SCH 20 BW	PY9752101330	12	Nos	A234GRWPB	PY 52 101	1900160780/10	35.70	428.40	2	Later	0.00557	
2	ELBOW 90D LR CS 6" STD BW	PY9752101100	1	Nos	A234GRWPB	PY 52 101	1900160780/20	10.15	10.15	2	Later	0.00013	
3	RDTEE CS 12" X 8" SCH 20 X 20 BW	PY9752147259	3	Nos	A234GRWPB	PY52 147	1900160781/150	36.35	109.05	2	Later	0.00142	
4	ERDCR CS 12" X 6" SCH 20 X 40 BW	PY9752104355	1	Nos	A234GRWPB	PY52 104	1900160781/160	15.05	15.05	2	Later	0.00020	
F	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - AG)												
1	ELBOW 90D LR CS 12" SCH 20 BW	PY9752101330	1	Nos	A234GRWPB	PY 52 101	1900160780/30	35.70	35.70	3	Later	0.00050	
2	ELBOW 90D LR CS 8" SCH 20 BW	PY9752101313	3	Nos	A234GRWPB	PY 52 101	1900160780/40	15.95	47.85	3	Later	0.00067	
3	ELBOW 90D LR CS 6" STD BW	PY9752101100	4	Nos	A234GRWPB	PY 52 101	1900160780/50	10.15	40.60	3	Later	0.00057	
II	NTPC Singrauli STPP, Stage-III (2 x 800 MW)												
A	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1118X10 BE	PY9752332030	1	Nos	IS2062E250B	PY 52 332	1900160783/340	607.34	607.34	1, 2	Later	0.00901	
B	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1118X10 BE	PY9752332030	15	Nos	IS2062E250B	PY 52 332	1900160783/330	607.34	9110.10	1, 3	Later	0.14481	
2	MITRE 45D 3P R1.5D IS2062E250B 1219X12 BE	PY9752332129	1	Nos	IS2062E250B	PY 52 332	1900160783/320	520.08	520.08	1, 3	Later	0.00827	
3	MITRE 45D 3P R1.5D IS2062E250B 1118X10 BE	PY9752332137	4	Nos	IS2062E250B	PY 52 332	1900160783/310	364.51	1458.04	1, 3	Later	0.02318	
C	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	6	Nos	IS2062E250B	PY 52 332	1900160783/300	491.58	2949.48	2	Later	0.03484	
2	MITRE 90D 4P R1.5D IS2062E250B 355.6X6 BE	PY9752332099	11	Nos	IS2062E250B	PY 52 332	1900160783/290	44.23	486.53	2	Later	0.00575	
D	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	4	Nos	IS2062E250B	PY 52 332	1900160783/280	491.58	1966.32	3	Later	0.02484	
2	MITRE 90D 4P R1.5D IS2062E250B 711X7 BE	PY9752332056	3	Nos	IS2062E250B	PY 52 332	1900160783/270	208.55	625.65	3	Later	0.00792	
3	MITRE 90D 4P R1.5D IS2062E250B 610X6 BE	PY9752332064	10	Nos	IS2062E250B	PY 52 332	1900160783/260	131.38	1313.80	3	Later	0.01663	

ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
4	MITRE 90D 4P R1.5D IS2062E250B 508X6 BE	PY9752332072	3	Nos	IS2062E250B	PY 52 332	1900160783/250	90.92	272.76	3	Later	0.00345	
5	MITRE 90D 4P R1.5D IS2062E250B 355.6X6 BE	PY9752332099	13	Nos	IS2062E250B	PY 52 332	1900160783/240	44.23	574.99	3	Later	0.00728	
6	MITRE 30D 2P R1.5D IS2062E250B 610X6 BE	PY9752332153	3	Nos	IS2062E250B	PY 52 332	1900160783/230	65.06	195.18	3	Later	0.00247	
7	MITRE 30D 2P R1.5D IS2062E250B 457X6 BE	PY9752332161	3	Nos	IS2062E250B	PY 52 332	1900160783/220	36.44	109.32	3	Later	0.00138	
8	TEE (STRT) IS2062E250B 1219X12 BE	PY9752356028	1	Nos	IS2062E250B	PY 52 356	1900160783/210	827.02	827.02	3	Later	0.01047	
9	TEE (STRT) IS2062E250B 1118X10 BE	PY9752356036	3	Nos	IS2062E250B	PY 52 356	1900160783/200	602.73	1808.19	3	Later	0.02289	
10	TEE (STRT) IS2062E250B 711X7 BE	PY9752356044	1	Nos	IS2062E250B	PY 52 356	1900160783/190	194.03	194.03	3	Later	0.00246	
11	TEE (RED) IS2062E250B 1219X12-711X7 BE	PY9752356052	3	Nos	IS2062E250B	PY 52 356	1900160783/180	653.63	1960.89	3	Later	0.02482	
12	TEE (RED) IS2062E250B 1219X12-508X6 BE	PY9752356060	3	Nos	IS2062E250B	PY 52 356	1900160783/170	645.53	1936.59	3	Later	0.02451	
13	TEE (RED) IS2062E250B 1118X10-610X6 BE	PY9752356079	4	Nos	IS2062E250B	PY 52 356	1900160783/160	457.75	1831.00	3	Later	0.02317	
14	TEE (RED) IS2062E250B 914X10-610X6 BE	PY9752356087	3	Nos	IS2062E250B	PY 52 356	1900160783/150	313.75	941.25	3	Later	0.01191	
15	TEE (RED) IS2062E250B 914X10-406.4X6 BE	PY9752356095	1	Nos	IS2062E250B	PY 52 356	1900160783/140	306.12	306.12	3	Later	0.00387	
16	TEE (RED) IS2062E250B 711X7-457X6 BE	PY9752356109	3	Nos	IS2062E250B	PY 52 356	1900160783/130	134.28	402.84	3	Later	0.00510	
17	RDCR (CON) IS2062E250B 1219X12-1118X10 BE	PY9752333010	1	Nos	IS2062E250B	PY 52 333	1900160783/120	223.55	223.55	3	Later	0.00283	
18	RDCR (CON) IS2062E250B 711X7-610X6 BE	PY9752333028	3	Nos	IS2062E250B	PY 52 333	1900160783/110	64.08	192.24	3	Later	0.00243	
19	RDCR (CON) IS2062E250B 610X6-508X6 BE	PY9752333036	3	Nos	IS2062E250B	PY 52 333	1900160783/100	41.57	124.71	3	Later	0.00158	
20	RDCR (CON) IS2062E250B 508X6-406.4X6 BE	PY9752333044	3	Nos	IS2062E250B	PY 52 333	1900160783/90	33.92	101.76	3	Later	0.00129	
21	RDCR (CON) IS2062E250B 457X6-355.6X6 BE	PY9752333052	3	Nos	IS2062E250B	PY 52 333	1900160783/80	22.57	67.71	3	Later	0.00086	
22	RDCR (CON) IS2062E250B 406.4X6-323.8X6 BE	PY9752333060	1	Nos	IS2062E250B	PY 52 333	1900160783/70	18.92	18.92	3	Later	0.00024	
23	RDCR (ECC) IS2062E250B 711X7-355.6X6 BE	PY9752333087	1	Nos	IS2062E250B	PY 52 333	1900160783/60	56.79	56.79	3	Later	0.00072	
24	RDCR (ECC) IS2062E250B 610X6-508X6 BE	PY9752333036	4	Nos	IS2062E250B	PY 52 333	1900160783/50	41.57	166.28	3	Later	0.00210	
E	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - UG)												
	NIL												
F	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - AG)												
1	ELBOW 90D A234WPB 12" SCH 20 BE	PY9752101330	4	Nos	A234GRWPB	PY 52 101	1900160782/10	35.70	142.80	3	Later	0.00199	
2	CAP CS 48" SCH XS BW	PY9752181325	1	Nos	A234GRWPB	PY 52 181	1900160783/40	165.63	165.63	3	Later	0.00231	
3	CAP CS 44" SCH STD BW	PY9752181333	1	Nos	A234GRWPB	PY 52 181	1900160783/30	107.65	107.65	3	Later	0.00150	
4	CAP CS 36" SCH STD BW	PY9752181341	1	Nos	A234GRWPB	PY 52 181	1900160783/20	73.43	73.43	3	Later	0.00102	
5	CAP CS 28" SCH 10 BW	PY9752181350	1	Nos	A234GRWPB	PY 52 181	1900160783/10	45.07	45.07	3	Later	0.00063	
												1.00000	

NOTES:

- 1) Bidder to Quote Single Lumpsum Price for all the Groups of Fittings.
- 2) Bidder to Quote for all items. Partial offers shall not be considered for evaluation.
- 3) Bidder to indicate "Quoted" against each item, in the column "Bidder's Confirmation" as a confirmation of their bid.
- 4) Bid Evaluation shall be on overall L1 basis.
- 5) The fittings are to be supplied in painted condition. Bidder to consider the Painting requirements of individual lines items, as per the indicated Painting Scheme, while quoting.
- 6) Bidder shall note that Painting shall be as per Painting scheme:
A) Lara : Doc No 1834:QPC:12 Rev 01
B) Singrauli : Doc No 1840:QPC:12 Rev 01
- 7) Bidder to note that different painting scheme is applicable for different line items. Paintings scheme S.No provided against each line item shall be referred for painting applicability.
- 8) Bidders to quote as per the Pre-Qualification Criteria given.
- 9) Final ordering quantity may vary upto +/- 25% of the finalised package value, which shall be informed while placing purchase order.

ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
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- 10)
- Unit Price for the individual line items shall be derived by multiplying the lumpsum price quoted/price finalized after RA, with the Price Weightage Factor and dividing the resultant by the Quantity.
- 11)
- Unit Price thus arrived, shall be binding on the bidder, post order placement, for the total duration of the Contract, for possible amendment upto +10% of the PO Value.
- 12)
- No Observations / Objections shall be entertained after the Techno-Commercial Bid is opened.
- 13)
- The Total Lump price quoted for each of the packages, shall be INCLUSIVE of GST, Freight, Packing & Forwarding and Testing Charges.
- 14)
- The Total Lump price quoted for each of the packages, shall be EXCLUSIVE of Third party inspection (TPI) & Insurance Charges.



CHECKLIST FORMAT
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-C TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Description	Yes / No
Bidder to confirm that ALL THE DOCUMENTS SPECIFIED in Clause No 5.0 of purchaser's Job Specification (Doc.No. PEMC-07786) are submitted along with the technical offer.		
Stamped & Signed copies of the following documents:		
1	PY52332, Technical Specification for Mitre Bends with IS 2062 Plate formed Pipes (or) IS 3589 Pipes & the relevant Reference documents.	
2	PY52333, Technical Specification for Fabricated Reducers using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.	
3	PY52356, Technical Specification for Fabricated Tees using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.	
4	PY52101, Technical Specification for Elbow 90D Long Radius Carbon Steel Butt Welding	
5	PY52104, Technical Specification for Reducer Eccentric Carbon Steel Butt Welding	
6	PY52147, Technical Specification for Reducing Tee Carbon Steel Butt Welding	
7	PY52181, Technical Specification for Cap Carbon Steel Butt Welding	
8	Annexure-A :: BOQ cum Unpriced Bid Format	
9	Annexure-B :: Surface Preparation & Painting Scheme, Approved make of Paints	
10	Annexure-C :: Checklist Format	
11	Annexure-D :: Format for Deviation Schedule	
12	Annexure-E :: Format for Pre-bid Queries	
13	Annexure-F :: Format for Manufacturing Quality Assurance Plan	

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:



DEVIATION SCHEDULE
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-D TO PEMC-7786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Reference			BHEL Specification's Requirement	Deviation sought by Bidder
	Doc No	Page No	Clause No		

A. INSTRUCTIONS TO BIDDERS

1. All of bidder's deviations to the BHEL specification shall be intimated to BHEL in a consolidated manner in this document only. Deviations listed elsewhere will be summarily rejected and shall be ignored.
2. BHEL will clarify in writing to the bidder regarding the acceptance / non acceptance of the deviations sought by bidder.
3. In case no deviations are raised by bidder, it will be assumed that the bidder has accepted and confirmed to all the requirements of BHEL's specification in totality without any deviation.
4. No deviations other than those that have been specifically mentioned in this document and have been accepted by BHEL during the post-bid stage, will be accepted or allowed during the offer execution stage.
5. Additional sheets, if necessary for bidder's deviations, may be enclosed.

B. BIDDER'S DECLARATION.

1. We confirm that all our deviations to BHEL's specifications and its annexures are listed in this document only.
2. We confirm that except for those deviations, covered in this document, it will be our responsibility to fully meet the intent and the requirements of the specifications and all its annexures within the quoted price, without any deviation.

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:



PRE-BID QUERY FORMAT
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-E TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Reference			BHEL Specification’s Requirement	Bidder’s Query / Observation	BHEL’s Clarification
	Doc No	Page No	Clause No			
(To be filled by the Bidder)						(To be filled by BHEL)

A. INSTRUCTIONS TO BIDDERS

1. All of bidder's queries / clarifications / observations to the BHEL specification shall be intimated to BHEL in a consolidated manner in this document only.
2. BHEL will clarify in writing to the bidder all such queries / clarifications / observations raised by the bidder.
3. Decision of BHEL on all such queries / clarifications / observations raised by bidder will be final and binding on bidder.
4. In case no pre-bid query is raised by bidder, it will be assumed that the bidder has accepted and confirmed to all the requirements of BHEL's specification in totally without any deviation.
5. None of the bidder's queries / clarifications / observations (except those that have been specifically mentioned in this document and have been accepted by BHEL during the pre-bid stage) will be accepted or allowed during post bid stage / offer execution stage.
6. Additional sheets, if necessary for bidder's queries / clarifications / observations, may be enclosed.

B. BIDDER'S DECLARATION.


1. We confirm that all our queries / clarifications / observations to the BHEL's Specifications and its annexures are listed in this document only.
2. We confirm that except for those queries / clarifications / observations covered in this document, it will be our responsibility to fully meet the intent and the requirements of the specifications and all its annexures within the quoted price, without any deviation.

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:

	Form No:	<div><div>बी एच ई एल</div><div></div><div>PE&SD</div></div>	BHARAT HEAVY ELECTRICALS LIMITED	PEMC-07786
			PROJECT ENGINEERING & SYSTEMS DIVISION	Rev. No. 00
			JOB SPECIFICATION	Page 1 of 3
			RAW WATER SYSTEM - PIPE FITTINGS PACKAGE	
			NTPC LARA & NTPC SINGRAULI	

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JOB SPECIFICATION

FOR

PIPE FITTINGS PKG WITH PAINTING



NTPC LARA SUPER THERMAL POWER PROJECT


STAGE-II (2 X 800 MW)

&

NTPC SINGRAULI SUPER THERMAL POWER PROJECT

STAGE-III (2 X 800 MW)

Refer Doc		LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		PROJECT ENGINEERING & SYSTEMS DIVISION	 M A MOQEET	 IMRAN AHMAD	 SRIKANTH G	15.11.24

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PEMC-07786
		JOB SPECIFICATION	Rev. No. 00
		RAW WATER SYSTEM - PIPE FITTINGS PACKAGE NTPC LARA & NTPC SINGRAULI	Page 2 of 3

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1.0 GENERAL

1.1 This job specification document specifies the requirements of Pipe Fittings (Plate formed Fabricated Fittings & ASTM Fittings) to be used in Raw Water System, applicable for NTPC Lara Super Thermal Power Project, Stage-2 (2 x 800 MW) & NTPC Singrauli Super Thermal Power Project, Stage-3 (2 x 800 MW).

1.2 Bidder shall read this document in conjunction with relevant Technical Specifications indicated against each of the materials, for the technical requirements, scope of supply & services, design criteria, requirements of quality, inspection & testing, documentation etc. Bidder shall also refer to all the enclosures listed at the end of this document.

1.3 Bidder shall comply with all the requirements specified in the documents referred above.

2.0 SCOPE OF SUPPLY / SERVICES

2.1 Pipe Fittings as listed in the BOQ Sheet / Price Bid Format (Annexure-A) shall be supplied as per the relevant Technical specifications indicated against each of the items.

3.0 PROJECT SPECIFIC DATA AND REQUIREMENTS

3.1 Manufacturers of Pipe Fittings and Piping Fabricators are allowed to bid.

3.2 Final ordering quantity may vary upto +/- 25% of the finalised package value, which shall be informed while placing purchase order.

3.3 Unit Price derived as explained in the Price Bid Format, shall be binding on the bidder, post order placement, for the total duration of the Contract, for possible amendment upto +10% of the PO Value.

3.4 Bidder shall note that the Pipe Fittings shall be supplied with Surface Preparation and Painting as per:


3.4.1 Painting scheme (Doc.No. 1834:QPC:12 Rev 01), for Lara Project.

3.4.2 Painting scheme (Doc.No. 1840:QPC:12 Rev 01), for Singrauli Project.

3.5 Bidder to note that different painting scheme is applicable for different line items. Painting scheme Sl No provided against each line item shall be referred for painting applicability.

4.0 CHECK LIST FORMAT

A check list format is attached with this job specification. Bidder shall submit, along with the technical offer, duly filled-in checklist as per this format only. **No other format is acceptable.** Offers submitted without the duly filled in checklist is liable for rejection.

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PEMC-07786
		JOB SPECIFICATION	Rev. No. 00
		RAW WATER SYSTEM - PIPE FITTINGS PACKAGE NTPC LARA & NTPC SINGRAULI	Page 3 of 3

5.0 LIST OF ENCLOSURES / ANNEXURES



Sl No	Doc Number	Description
1	PY52332, Rev.00	Technical Specification for Mitre Bends with IS 2062 Plate formed Pipes (or) IS 3589 Pipes & the relevant Reference documents.
2	PY52333, Rev.00	Technical Specification for Fabricated Reducers using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.
3	PY52356, Rev.00	Technical Specification for Fabricated Tees using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.
4	PY52101, Rev 01	Technical Specification for Elbow 90D Long Radius Carbon Steel Butt Welding
5	PY52104, Rev 01	Technical Specification for Reducer Eccentric Carbon Steel Butt Welding
6	PY52147, Rev 01	Technical Specification for Reducing Tee Carbon Steel Butt Welding
7	PY52181, Rev 03	Technical Specification for Cap Carbon Steel Butt Welding
8	Annexure-A	BOQ cum Unpriced Bid Format
9	Annexure-B	Surface Preparation & Painting Scheme, Approved make of Paints
10	Annexure-C	Checklist Format
11	Annexure-D	Format for Deviation Schedule
12	Annexure-E	Format for Pre-bid Queries
13	Annexure-F	Format for Manufacturing Quality Assurance Plan

6.0 IMPORTANT INSTRUCTIONS TO BIDDER

Bidder shall mandatorily submit the following documents along-with Technical offer, failing which bidder's offer is liable for rejection.

- 6.1 Stamped & Signed copies of BOQ cum Unpriced Bid Format
- 6.2 Filled-in Checklist.
- 6.3 Deviation Schedule ("NIL" to be mentioned, if no deviations)
- 6.4 Stamped & Signed copies of Technical Specifications and the Job Specification for Pipe Fittings Package (PEMC-07786).
- 6.5 Pre-bid queries, if any (within 4 days of receipt of enquiry from purchaser, failing which it is presumed that bidder does not have any pre-bid queries)
- 6.6 In case of ambiguity of any technical requirement among the above referred documents, a clarification/ query shall be raised by the bidder and get clarified from Purchaser during pre-bid stage itself.

7.0 RECORD OF REVISIONS

Rev No	Date	Revision Detail	Issued by	Approved by
00	15.11.2024	FIRST ISSUE	 IMRAN AHMAD	 SRIKANTH G

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Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 332
		TECHNICAL SPECIFICATION		Rev. No. 00
		Mitre Bends fabricated using IS 2062 Plate formed Pipe Sections (or) IS 3589 Pipes		Page 1 of 3

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1.0 GENERAL

- 1.1 This standard specifies requirements related to Design, Manufacture, Inspection, Testing and Supply of Fabricated Mitre Bends used for water applications.
- 1.2 The Fabricated Mitre bends supplied according to this specification shall conform to the requirements of latest versions of all applicable National & International standards and BHEL specifications indicated herein.

2.0 MANUFACTURING:

- 2.1 **Mitre bends** shall be fabricated using **Pipe sections cut from IS 3589 Grade FE410 Pipes (or) Plate Rolled and Longitudinally Welded Pipes using IS2062 Grade E250B plates. Use of Spirally Welded Pipes is not acceptable.**
- 2.2 The pipes used to fabricate the Reducers shall strictly meet all the requirements of BHEL specification **PY52355**.
- 2.3 **All welds** of the Mitre Bends **shall be 100% radiographed.**
- 2.4 Mitre Bends shall be supplied with **Edge Preparation** as per **Drng.No.4-80-468-84546 Rev.00**. Inside Bevel is required only if nominal inside diameter is higher than the measured inside diameter.
- 2.5 For Mitre Bends of **Size > NB1000, Spider arrangement and Lifting Lug arrangement** shall be provided as per **Drng.No. 3-80-468-33334 Rev.00**.
- 2.6 Mitre Bends **shall be finished and painted as per the applicable Painting Scheme** (as per project specific data sheet).


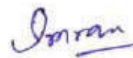

3.0 DIMENSIONS AND TOLERANCES:

- 3.1 Dimensions of the Mitre bends shall be as per the following reference table and the drawings referred to therein:

Sl	Mitre Bend Specification	Std Drawing Number
1	Mitre 90 Deg, 4 Piece / 3 Weld, Radius = 1.5 x OD	PY-DH-3-0000-8602-01
2	Mitre 60 Deg, 3 Piece / 2 Weld, Radius = 1.5 x OD	PY-DH-3-0000-8602-02
3	Mitre 45 Deg, 3 Piece / 2 Weld, Radius = 1.5 x OD	PY-DH-3-0000-8602-03
4	Mitre 30 Deg, 2 Piece / 1 Weld, Radius = 1.5 x OD	PY-DH-3-0000-8602-04
5	Mitre 22.5 Deg, 2 Piece / 1 Weld, Radius = 1.5 x OD	PY-DH-3-0000-8602-05
6	Mitre 90 Deg, 4 Piece / 3 Weld, Radius = 1 x OD	PY-DH-3-0000-8602-06

Legend: OD – Outside Dia of the Pipe;

Construction of Bend (4P / 3P / 2P) is broadly in line with BS 534.

Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		 M A MOQEET	 IMRAN AHMAD	 SRIKANTH G	15.11.24

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 332
		TECHNICAL SPECIFICATION	Rev. No. 00
		Mitre Bends fabricated using IS 2062 Plate formed Pipe Sections (or) IS 3589 Pipes	Page 2 of 3

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3.2 For bend sizes up to 48" NPS, the dimensional tolerances shall be as per ASME B16.9. For bend sizes higher than 48" NPS, the dimensional tolerances for 48" NPS elbow as per ASME B16.9, are applicable.

4.0 SIZE AND THICKNESS:

Size and thickness shall be as indicated against the Material Code indicated in the enquiry. However, the bevel ends edge preparation of mitre bend shall match the connecting pipe thickness, which will be indicated during drawing approval stage.

5.0 DESIGNATION:

A typical 4 piece 48" NPS (1219 OD) 90 Degree Mitre bend of thickness 12 mm, with radius equal to 1.5 times the OD, supplied according to this specification, shall be designated as:
MITRE 90 4P R1.5D IS2062E450B 1219x12 BE

A typical 3 piece 24" NPS (610 OD) 60 Degree Mitre bend of thickness 6 mm, with radius equal to 1 times the OD, supplied according to this specification, shall be designated as:
MITRE 60 3P R1D IS2062E450B 610x6 BE

6.0 INSPECTION & TESTING:

- 6.1 Inspection and testing shall be as per BHEL approved Manufacturing Quality Plan. Manufacturing Quality Plan for BHEL approval shall be submitted within 7 days.
- 6.2 Stenciling, Identification and End protection shall be as per the Quality Control Procedure Doc.No. QCP:07 Rev.02.
- 6.3 Surface Preparation and Painting shall be carried out as per the Quality Control Procedure, Doc.No. QCP:09 Rev.01.

7.0 PACKING AND MARKING:

Proper Packing and Marking shall be ensured during dispatch of materials as per the following documents:

- 7.1 Inspection Procedure for Packing, Doc.No. TIP:07:0
- 7.2 Packing Instructions for Piping Components Doc.No. PC:PKG:01, Rev.00
- 7.3 BHEL Technical Specification PY52355 Rev.00

The following details are to be marked on the Fittings for identification:

- | | |
|---------------------------|------------------------------------|
| 1) Supplier's emblem/code | 4) Fitting Number / Total Quantity |
| 2) Size & Specification | 5) Inspector's seal |
| 3) Material Code | 6) Work Order – DU Details |

Paint Stenciling	Details 1 to 6
Hard Punch	Details 1, 4, 5 & 6

For Sizes NB 1000 and above, the marking shall be done on internal surface in the uncoated area (i.e.) within 150mm from pipe ends. The hard punching shall be done at one end and paint stenciling at other end. In case of sizes less than NB 1000, the marking shall be done on outside surface.

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COMPUTER FILE NAME
33810102762-S00-R00.DWG

REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

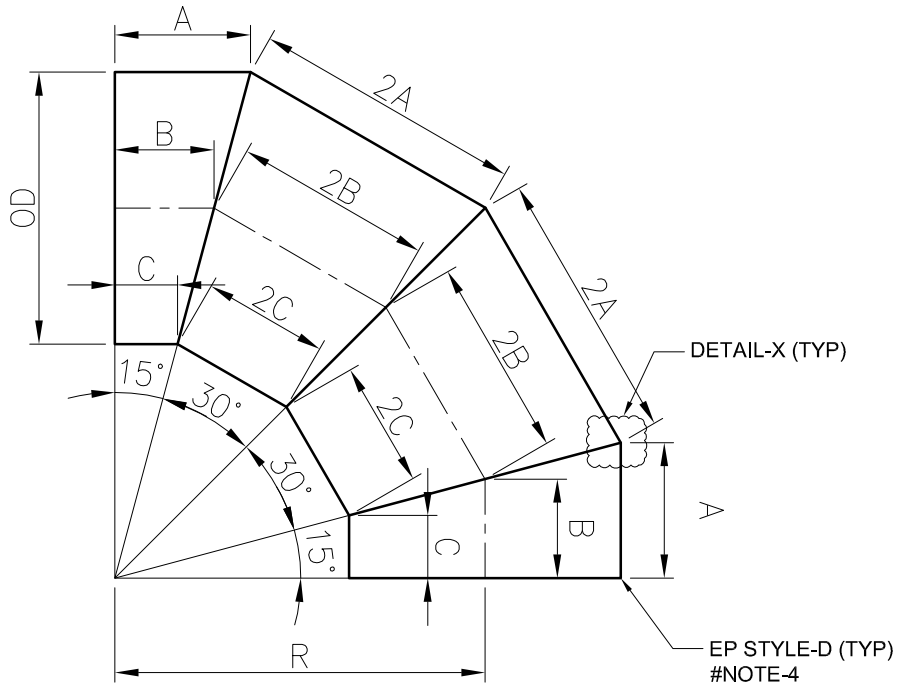
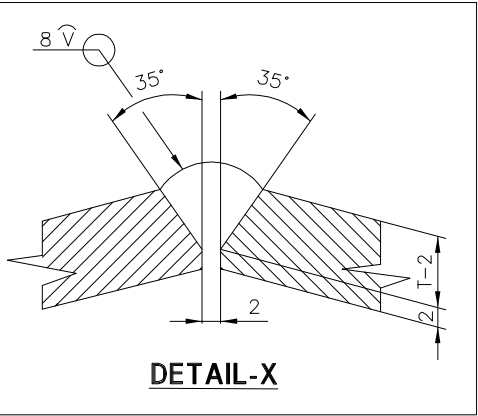
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

10-2098-0000-8602-01

DRG. NO.

10 30 10 1HS





MITRE BEND 90 DEGREE, 4 PIECE / 3 WELD, R=1.5D

NOTE:-

1. WELDED PORTIONS SHALL HAVE UNIFORMLY SMOOTH TOOL FINISH WITHOUT BURRS, WELD SPATTER, CRACKS ETC.
2. FULL PENETRATION OF WELDS TO BE ENSURED.
3. EDGE PREPARATION SHALL BE AS PER DRG.NO.4-80-468-84546 REV.00

4 PIECE / 3 WELD 90D MITRE BEND (R = 1.5D)

NB	NPS	OD	R	A	B	C	LEN	THK	WT
	(in)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
350	14	355.6	533	190	143	95	855	6	44.23
400	16	406.4	610	218	163	109	981	6	58.12
450	18	457	686	245	184	123	1104	6	73.67
500	20	508	762	272	204	136	1224	6	90.92
550	22	559	839	300	225	150	1350	6	110.47
600	24	610	915	327	245	163	1470	6	131.38
650	26	660	990	354	265	177	1593	6	154.16
700	28	711	1067	381	286	191	1716	7	208.55
750	30	762	1143	408	306	204	1836	7	239.30
800	32	813	1220	436	327	218	1962	8	311.60
850	34	864	1296	463	347	232	2085	8	352.12
900	36	914	1371	490	367	245	2205	10	491.58
950	38	965	1448	517	388	259	2328	10	548.28
1000	40	1016	1524	544	408	272	2448	10	607.34
1050	42	1067	1601	572	429	286	2574	10	670.97
1100	44	1118	1677	599	449	300	2697	10	736.95
1150	46	1168	1752	626	469	313	2817	10	804.48
1200	48	1219	1829	653	490	327	2940	12	1050.16
1300	52	1321	1982	708	531	354	3186	12	1234.20
1400	56	1422	2133	762	572	381	3429	12	1430.83
1500	60	1524	2286	817	613	408	3675	12	1644.41
1600	64	1626	2439	871	654	436	3921	12	1872.84
1700	68	1727	2591	926	694	463	4167	12	2114.89
1800	72	1829	2744	980	735	490	4410	12	2371.34
1900	76	1930	2895	1034	776	517	4653	12	2641.09
2000	80	2032	3048	1089	817	544	4899	12	2928.60

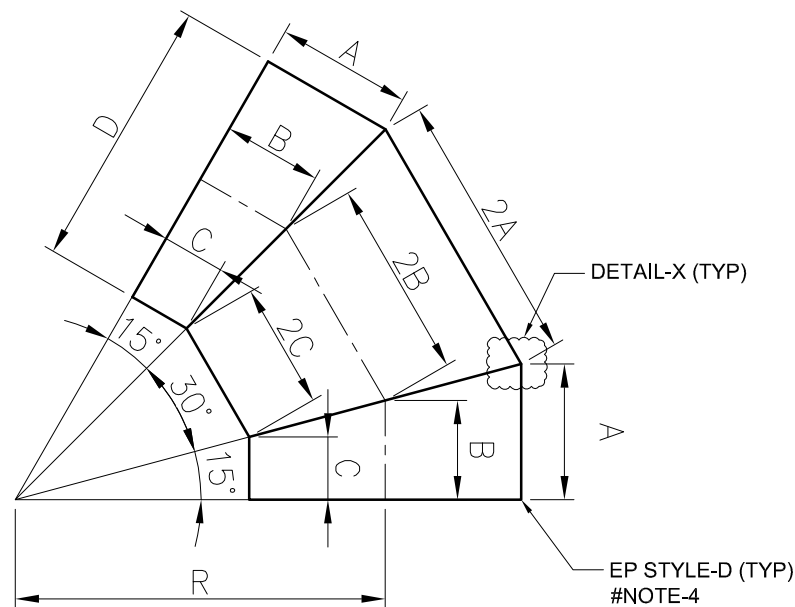
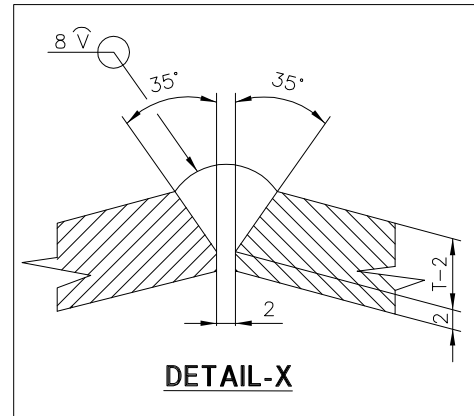
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 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		DRN.	NAME	SIGN.	DATE	NO.OF VAR.	
		CHD.	UDAY G	-sd-	15.11.24		
		APPD.	SRIKANTH	-sd-	15.11.24		
DEPT. PED CODE 415	UNTOL. DIMS. GR. /C/M/F/		SCALE NTS	WEIGHT (KG) -NA-	REF. TO ASSY. DRG. -NA-	ITEM NO. -NA-	NO.OF ITEMS -NA-
TITLE MITRE BEND 90 DEGREE, 4 PIECE / 3 WELD, R = 1.5D				CARD CODE NA	DRAWING NO. PY-DH-3-0000-8602-01		REV. 00
				SHT. No	01	NO. OF SHT.	01

INVENTORY NO	SIGN. AND DATE	REF. DRG. NO.	COMPUTER FILE NAME 33810102762-S00-R00.DWG
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GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO. F

SHT.01 OF 01



MITRE BEND 60 DEGREE, 3 PIECE / 2 WELD, R=1.5D



NOTE:-

1. WELDED PORTIONS SHALL HAVE UNIFORMLY SMOOTH TOOL FINISH WITHOUT BURRS, WELD SPATTER, CRACKS ETC.
2. FULL PENETRATION OF WELDS TO BE ENSURED.
3. EDGE PREPARATION SHALL BE AS PER DRG.NO.4-80-468-84546 REV.00

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE			ZONE		
1			2			3			4			5		

3 PIECE / 2 WELD 60D MITRE BEND (R = 1.5D)

NB	NPS	OD	R	A	B	C	LEN	THK	WT
	(in)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
350	14	355.6	533	190	143	95	570	6	29.49
400	16	406.4	610	218	163	109	654	6	38.75
450	18	457	686	245	184	123	736	6	49.12
500	20	508	762	272	204	136	816	6	60.61
550	22	559	839	300	225	150	900	6	73.64
600	24	610	915	327	245	163	980	6	87.59
650	26	660	990	354	265	177	1062	6	102.77
700	28	711	1067	381	286	191	1144	7	139.03
750	30	762	1143	408	306	204	1224	7	159.53
800	32	813	1220	436	327	218	1308	8	207.74
850	34	864	1296	463	347	232	1390	8	234.75
900	36	914	1371	490	367	245	1470	10	327.72
950	38	965	1448	517	388	259	1552	10	365.52
1000	40	1016	1524	544	408	272	1632	10	404.89
1050	42	1067	1601	572	429	286	1716	10	447.31
1100	44	1118	1677	599	449	300	1798	10	491.30
1150	46	1168	1752	626	469	313	1878	10	536.32
1200	48	1219	1829	653	490	327	1960	12	700.11
1300	52	1321	1982	708	531	354	2124	12	822.80
1400	56	1422	2133	762	572	381	2286	12	953.89
1500	60	1524	2286	817	613	408	2450	12	1096.27
1600	64	1626	2439	871	654	436	2614	12	1248.56
1700	68	1727	2591	926	694	463	2778	12	1409.93
1800	72	1829	2744	980	735	490	2940	12	1580.90
1900	76	1930	2895	1034	776	517	3102	12	1760.72
2000	80	2032	3048	1089	817	544	3266	12	1952.40

TYPE OF PRODUCT		STANDARD					
OR							
NAME OF CUSTOMER/PROJECT							
	BHARAT HEAVY ELECTRICALS LTD. HYDERABAD			NAME	SIGN.	DATE	NO.OF VAR.
			DRN.	IMRAN	-sd-	15.11.24	-NA-
			CHD.	UDAY G	-sd-	15.11.24	
			APPD.	SRIKANTH	-sd-	15.11.24	
DEPT. PED CODE 415	UNTOOL. DIMS. GR. /C/M/F/		SCALE NTS	WEIGHT (KG) -NA-	REF. TO ASSY. DRG. -NA-	ITEM NO. -NA-	NO.OF ITEMS -NA-
TITLE MITRE BEND 60 DEGREE, 3 PIECE / 2 WELD, R = 1.5D				CARD CODE NA	DRAWING NO. PY-DH-3-0000-8602-02		REV. 00
				SHT. No 01		NO. OF SHT. 01	

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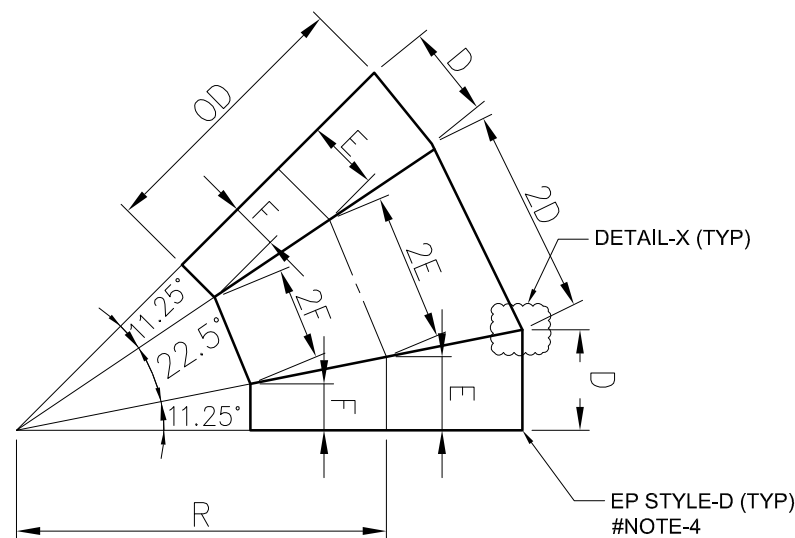
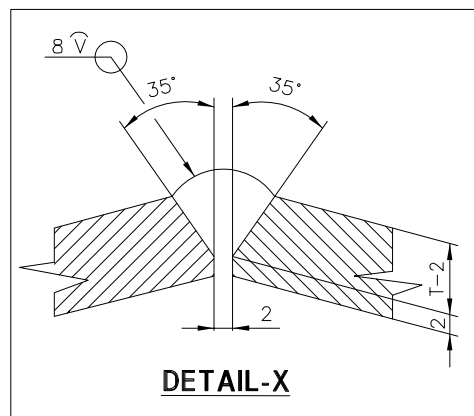
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INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO.	PY-DH-3-0000-8602-03
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SHT.01 OF 01



MITRE BEND 45 DEGREE, 3 PIECE / 2 WELD, R=1.5D



NOTE:-

1. WELDED PORTIONS SHALL HAVE UNIFORMLY SMOOTH TOOL FINISH WITHOUT BURRS, WELD SPATTER, CRACKS ETC.
2. FULL PENETRATION OF WELDS TO BE ENSURED.
3. EDGE PREPARATION SHALL BE AS PER DRG.NO.4-80-468-84546 REV.00

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE			ZONE			ZONE		

3 PIECE / 2 WELD 45D MITRE BEND (R = 1.5D)

NB	NPS	OD	R	D	E	F	LEN	THK	WT
	(in)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
350	14	355.6	533	141	106	71	424	6	21.93
400	16	406.4	610	162	121	81	486	6	28.79
450	18	457	686	182	136	91	546	6	36.44
500	20	508	762	202	152	101	606	6	45.01
550	22	559	839	222	167	111	666	6	54.50
600	24	610	915	243	182	121	728	6	65.06
650	26	660	990	263	197	131	788	6	76.26
700	28	711	1067	283	212	142	850	7	103.30
750	30	762	1143	303	227	152	910	7	118.61
800	32	813	1220	324	243	162	972	8	154.37
850	34	864	1296	344	258	172	1032	8	174.29
900	36	914	1371	364	273	182	1092	10	243.45
950	38	965	1448	384	288	192	1152	10	271.32
1000	40	1016	1524	404	303	202	1212	10	300.69
1050	42	1067	1601	425	318	212	1274	10	332.10
1100	44	1118	1677	445	334	222	1334	10	364.51
1150	46	1168	1752	465	348	232	1394	10	398.10
1200	48	1219	1829	485	364	243	1456	12	520.08
1300	52	1321	1982	526	394	263	1578	12	611.29
1400	56	1422	2133	566	424	283	1698	12	708.53
1500	60	1524	2286	606	455	303	1818	12	813.48
1600	64	1626	2439	647	485	323	1940	12	926.63
1700	68	1727	2591	687	515	344	2062	12	1046.53
1800	72	1829	2744	728	546	364	2184	12	1174.38
1900	76	1930	2895	768	576	384	2304	12	1307.77
2000	80	2032	3048	808	606	404	2424	12	1449.05

TYPE OF PRODUCT		OR		STANDARD								
NAME OF CUSTOMER/PROJECT								NAME	SIGN.	DATE	NO. OF VAR.	
		BHARAT HEAVY ELECTRICALS LTD.					DRN.	IMRAN	-sd-	15.11.24	-NA-	
		HYDERABAD					CHD.	UDAY G	-sd-	15.11.24		
							APPD.	SRIKANTH	-sd-	15.11.24		
DEPT. PED CODE 415		UNTOL. DIMS. GR. C/M/F/ 		SCALE NTS		WEIGHT (KG) -NA-		REF. TO ASSY. DRG. -NA-		ITEM NO. -NA-	NO. OF ITEMS -NA-	
TITLE MITRE BEND 45 DEGREE, 3 PIECE / 2 WELD, R = 1.5D						CARD CODE NA	DRAWING NO. PY-DH-3-0000-8602-03			REV. 00		
						SHT. No		01		NO. OF SHT.		01

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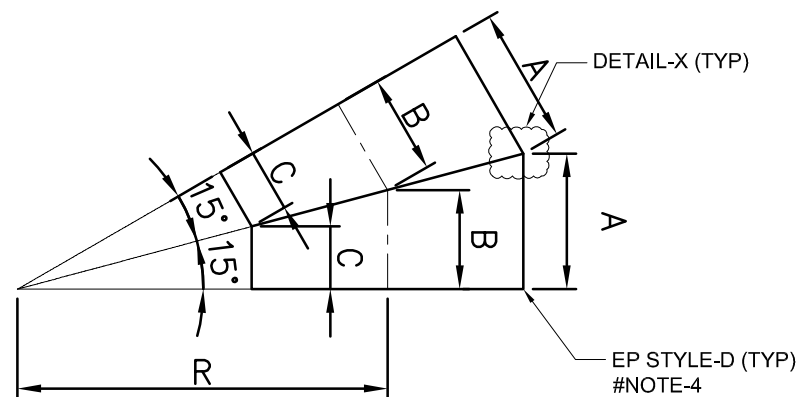
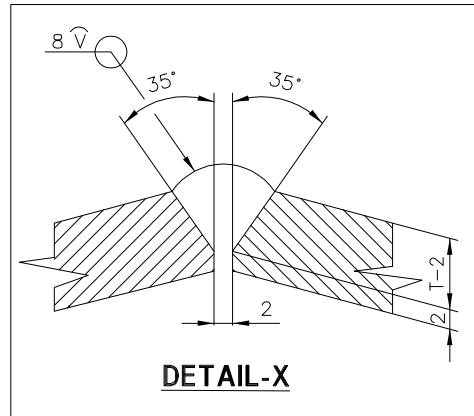
SIGN. AND DATE	REF. DRG. NO.
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INVENTORY NO

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

DRG. NO. F

SHT.01 OF 01



MITRE BEND 30 DEGREE, 2 PIECE / 1 WELD, R=1.5D



2 PIECE / 1 WELD 30D MITRE BEND (R = 1.5D)

NB	NPS	OD	R	A	B	C	LEN	THK	WT
	(in)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
350	14	355.6	533	190	143	95	285	6	14.74
400	16	406.4	610	218	163	109	327	6	19.37
450	18	457	686	245	184	123	368	6	24.56
500	20	508	762	272	204	136	408	6	30.31
550	22	559	839	300	225	150	450	6	36.82
600	24	610	915	327	245	163	490	6	43.79
650	26	660	990	354	265	177	531	6	51.39
700	28	711	1067	381	286	191	572	7	69.52
750	30	762	1143	408	306	204	612	7	79.77
800	32	813	1220	436	327	218	654	8	103.87
850	34	864	1296	463	347	232	695	8	117.37
900	36	914	1371	490	367	245	735	10	163.86
950	38	965	1448	517	388	259	776	10	182.76
1000	40	1016	1524	544	408	272	816	10	202.45
1050	42	1067	1601	572	429	286	858	10	223.66
1100	44	1118	1677	599	449	300	899	10	245.65
1150	46	1168	1752	626	469	313	939	10	268.16
1200	48	1219	1829	653	490	327	980	12	350.05
1300	52	1321	1982	708	531	354	1062	12	411.40
1400	56	1422	2133	762	572	381	1143	12	476.94
1500	60	1524	2286	817	613	408	1225	12	548.14
1600	64	1626	2439	871	654	436	1307	12	624.28
1700	68	1727	2591	926	694	463	1389	12	704.96
1800	72	1829	2744	980	735	490	1470	12	790.45
1900	76	1930	2895	1034	776	517	1551	12	880.36
2000	80	2032	3048	1089	817	544	1633	12	976.20

NOTE:-

1. WELDED PORTIONS SHALL HAVE UNIFORMLY SMOOTH TOOL FINISH WITHOUT BURRS, WELD SPATTER, CRACKS ETC.
2. FULL PENETRATION OF WELDS TO BE ENSURED.
3. EDGE PREPARATION SHALL BE AS PER DRG.NO.4-80-468-84546 REV.00

	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD			CHD/APPD
ZONE				ZONE			ZONE			ZONE			ZONE		
1				2			3			4			5		

TYPE OF PRODUCT		STANDARD					
OR							
NAME OF CUSTOMER/PROJECT							
	BHARAT HEAVY ELECTRICALS LTD. HYDERABAD			NAME	SIGN.	DATE	NO.OF VAR.
			DRN.	IMRAN	-sd-	15.11.24	-NA-
			CHD.	UDAY G	-sd-	15.11.24	
			APPD.	SRIKANTH	-sd-	15.11.24	
DEPT. PED CODE 415	UNTOL. DIMS. GR. /C/M/F/		SCALE NTS	WEIGHT (KG) -NA-	REF. TO ASSY. DRG. -NA-	ITEM NO. -NA-	NO.OF ITEMS -NA-
TITLE MITRE BEND 30 DEGREE, 2 PIECE / 1 WELD, R = 1.5D				CARD CODE NA	DRAWING NO. PY-DH-3-0000-8602-04		REV. 00
				SHT. No 01		NO. OF SHT. 01	

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COMPUTER FILE NAME
33810102762-S00-R00.DWG

SIGN. AND DATE
REF. DRG. NO.

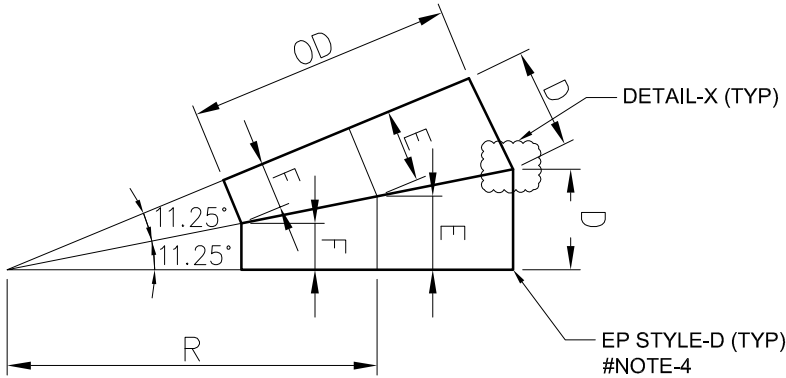
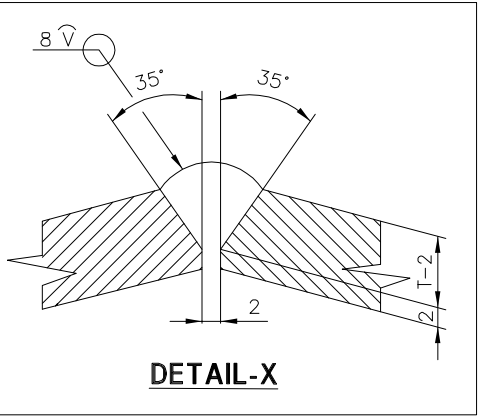
INVENTORY NO

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO.
PY-DH-3-0000-8602-05

SHT. 01 OF 01



MITRE BEND 22.5 DEGREE, 2 PIECE / 1 WELD, R=1.5D

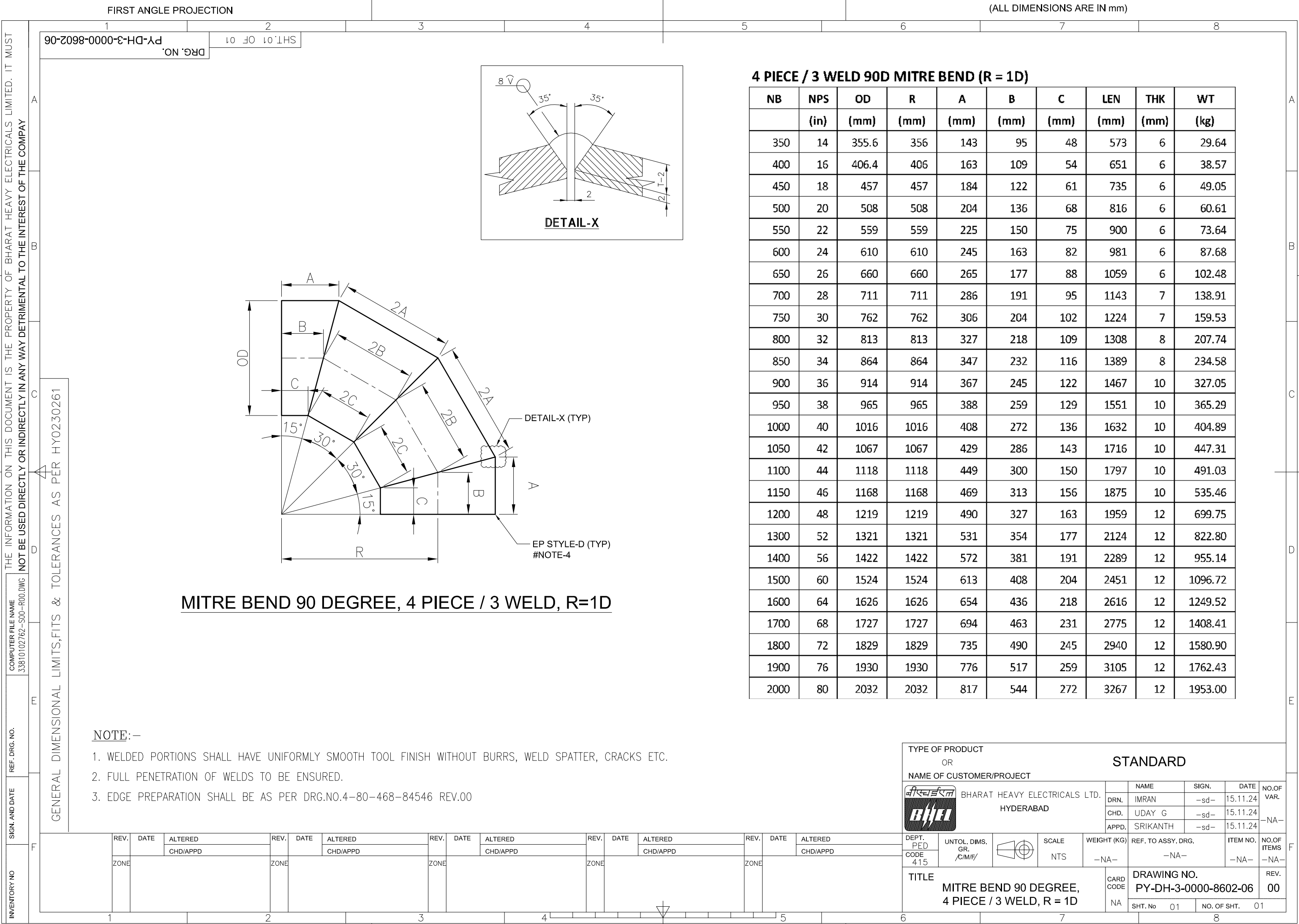
NOTE:-


1. WELDED PORTIONS SHALL HAVE UNIFORMLY SMOOTH TOOL FINISH WITHOUT BURRS, WELD SPATTER, CRACKS ETC.
2. FULL PENETRATION OF WELDS TO BE ENSURED.
3. EDGE PREPARATION SHALL BE AS PER DRG.NO.4-80-468-84546 REV.00

2 PIECE / 1 WELD 22.5D MITRE BEND (R = 1.5D)

NB	NPS	OD	R	D	E	F	LEN	THK	WT
	(in)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
350	14	355.6	533	141	106	71	212	6	10.97
400	16	406.4	610	162	121	81	243	6	14.40
450	18	457	686	182	136	91	273	6	18.22
500	20	508	762	202	152	101	303	6	22.51
550	22	559	839	222	167	111	333	6	27.25
600	24	610	915	243	182	121	364	6	32.53
650	26	660	990	263	197	131	394	6	38.13
700	28	711	1067	283	212	142	425	7	51.65
750	30	762	1143	303	227	152	455	7	59.30
800	32	813	1220	324	243	162	486	8	77.19
850	34	864	1296	344	258	172	516	8	87.14
900	36	914	1371	364	273	182	546	10	121.73
950	38	965	1448	384	288	192	576	10	135.66
1000	40	1016	1524	404	303	202	606	10	150.35
1050	42	1067	1601	425	318	212	637	10	166.05
1100	44	1118	1677	445	334	222	667	10	182.26
1150	46	1168	1752	465	348	232	697	10	199.05
1200	48	1219	1829	485	364	243	728	12	260.04
1300	52	1321	1982	526	394	263	789	12	305.65
1400	56	1422	2133	566	424	283	849	12	354.26
1500	60	1524	2286	606	455	303	909	12	406.74
1600	64	1626	2439	647	485	323	970	12	463.31
1700	68	1727	2591	687	515	344	1031	12	523.27
1800	72	1829	2744	728	546	364	1092	12	587.19
1900	76	1930	2895	768	576	384	1152	12	653.89
2000	80	2032	3048	808	606	404	1212	12	724.53

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT				
Bharat Heavy Electricals Ltd. HYDERABAD				
DRN.	NAME IMRAN	SIGN. -sd-	DATE 15.11.24	NO.OF VAR.
CHD.	UDAY G	-sd-	15.11.24	-NA-
APPD.	SRIKANTH	-sd-	15.11.24	-NA-
DEPT. PED CODE 415	UNTOL. DIMS. GR. /C/M/F/	SCALE NTS	WEIGHT (KG) -NA-	REF. TO ASSY. DRG. -NA-
TITLE MITRE BEND 22.5 DEGREE, 4 PIECE / 3 WELD, R = 1.5D			CARD CODE NA	DRAWING NO. PY-DH-3-0000-8602-05 SHT. No 01 NO. OF SHT. 01
				REV. 00



Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 333
		TECHNICAL SPECIFICATION	Rev. No. 00
		Fabricated Reducers using IS 2062 Plates / IS 3589 Pipes	Page 1 of 4

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1.0 GENERAL

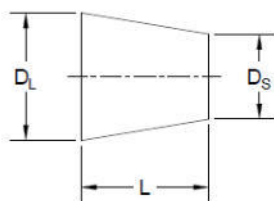
- 1.1 This standard specifies requirements related to Design, Manufacture, Inspection, Testing and Supply of Fabricated Reducers (Concentric & Eccentric) used for water applications.
- 1.2 The Fabricated Reducers supplied according to this specification shall conform to the requirements of latest versions of all applicable National & International standards and BHEL specifications indicated herein.

2.0 MANUFACTURING

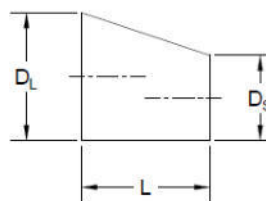
- 2.1 Reducers shall be fabricated from **IS2062 Grade E250B Plates** (or) using **Pipe sections cut from IS 3589 Grade FE410 Pipes / Plate Rolled and Longitudinally Welded Pipes using IS2062 Grade E250B plates.** *Use of Spirally Welded Pipes is not acceptable.*
- 2.2 The pipes used to fabricate the Reducers shall strictly meet all the requirements of BHEL specification **PY52355.**
- 2.3 **All welds** of the Fabricated Reducers **shall be 100% radiographed.**
- 2.4 Fabricated Reducers shall be supplied with **Edge Preparation** as per **Drg.No.4-80-468-84546 Rev.00.** Inside Bevel is required only if nominal inside diameter is higher than the measured inside diameter.
- 2.5 For Reducers with **Large end size > NB1000, Spider arrangement and Lifting Lug arrangement** shall be provided as **per Drg.No. 3-80-468-33334 Rev.00.**
- 2.6 Fabricated Reducers **shall be finished and painted as per the applicable Painting Scheme** (as per project specific data sheet).

3.0 DIMENSIONS AND TOLERANCES:


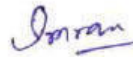

- 3.1 For Reducers with **Large end size \leq NB 1200**, Dimensions shall be as per ASME B16.9.
- 3.2 For Reducers with **Large end size > NB 1200**, Dimensions shall be as per the following table (As per AWWA C208):




REDUCER (CONCENTRIC)



REDUCER (ECCENTRIC)

Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		 M A MOQEET	 IMRAN AHMAD	 SRIKANTH G	15.11.24

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 333	
		TECHNICAL SPECIFICATION		Rev. No. 00
		Fabricated Reducers using IS 2062 Plates / IS 3589 Pipes		Page 2 of 4

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FABRICATED REDUCER (CONCENTRIC / ECCENTRIC)

NB(L)	NPS(L)	OD(L)	NB(S)	NPS(S)	OD(S)	L
	(in)	(mm)		(in)	(mm)	(mm)
1300	52	1321	1200	48	1219	406
1300	52	1321	1150	46	1168	610
1300	52	1321	1100	44	1118	813
1300	52	1321	1050	42	1067	1016
1400	56	1422	1300	52	1321	406
1400	56	1422	1200	48	1219	813
1400	56	1422	1150	46	1168	1016
1400	56	1422	1100	44	1118	1219
1500	60	1524	1400	56	1422	406
1500	60	1524	1300	52	1321	813
1500	60	1524	1200	48	1219	1219
1500	60	1524	1150	46	1168	1422
1600	64	1626	1500	60	1524	406
1700	68	1727	1600	64	1626	406
1800	72	1829	1700	68	1727	406
1900	76	1930	1800	72	1829	406
2000	80	2032	1900	76	1930	406

3.3 For Fabricated Reducers with Large end size up to 48" NPS, the dimensional tolerances shall be as per ASME B16.9. For Reducers with Large end size higher than 48" NPS, the dimensional tolerances for 48" NPS Reducer as per ASME B16.9 are applicable.

4.0 SIZE AND THICKNESS:

Size and thickness shall be as indicated against the Material Code indicated in the enquiry. However, the bevel ends edge preparation of Reducers shall match the connecting pipe thickness, which will be indicated during drawing approval stage.

5.0 DESIGNATION:

Fabricated Concentric Reducer - 48" NPS (1219 OD) of thickness 12 mm x 36" NPS (914 OD) of thickness 10mm, supplied according to this specification, shall be designated as:

RDCR (CON) IS2062E250B 1219x12-914X10 BE

Fabricated Eccentric Reducer - 52" NPS (1321 OD) of thickness 12 mm x 48" NPS (1219 OD) of thickness 12mm, supplied according to this specification, shall be designated as:

RDCR (ECC) IS2062E250B 1321X12-1219x12 BE

**6.0 INSPECTION & TESTING:**

- 6.1 Inspection and testing shall be as per BHEL approved Manufacturing Quality Plan. Manufacturing Quality Plan for BHEL approval shall be submitted within 7 days.
- 6.2 Stenciling, Identification and End protection shall be as per the Quality Control Procedure, **Doc.No. QCP:07 Rev.02**.
- 6.3 Surface Preparation and Painting shall be carried out as per the Quality Control Procedure, **Doc.No. QCP:09 Rev.01**.

7.0 PACKING AND MARKING:

Proper Packing and Marking shall be ensured during dispatch of materials as per the following documents:

- 7.1 Inspection Procedure for Packing, **Doc.No. TIP:07:0**
- 7.2 Packing Instructions for Piping Components **Doc.No. PC:PKG:01, Rev.00**
- 7.3 BHEL Technical Specification **PY52355 Rev.00**

The following details are to be marked on the Fittings for identification:

- | | |
|---------------------------|------------------------------------|
| 1) Supplier's emblem/code | 4) Fitting Number / Total Quantity |
| 2) Size & Specification | 5) Inspector's seal |
| 3) Material Code | 6) Work Order – DU Details |

Paint Stenciling	Details 1 to 6
Hard Punch	Details 1, 4, 5 & 6

For Sizes NB 1000 and above, the marking shall be done on internal surface in the uncoated area (i.e.) within 150mm from pipe ends. The hard punching shall be done at one end and paint stenciling at other end. In case of sizes less than NB 1000, the marking shall be done on outside surface.

Work Order and DU details, which are to be hard punched and stenciled on the Fabricated Reducers, will be provided prior to dispatch of materials.

8.0 DOCUMENTATION**8.1 Along with the offer:**


One copy each of the following documents shall be submitted along with offer:
G.A. Drawings / leaflets / catalogues for the offered item with binding dimensions, material specification details, tolerances, weights, painting details etc.

8.2 After placement of order:

Four copies each of the following documents shall be submitted for approval
G.A. Drawings for the offered item with binding dimensions, tolerances, material specification details, tests to be conducted, weight etc.

Schedule for document submissions:

S.no	Description	Schedule
1	GA drawing submission by vendor	7 days from the date of P.O.
2	BHEL approval of GA drawing	14 days from drawing submission *



	Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 333
			TECHNICAL SPECIFICATION	Rev. No. 00
			Fabricated Reducers using IS 2062 Plates / IS 3589 Pipes	Page 4 of 4


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* The GA drawing submitted by vendor shall be strictly in compliance to all applicable standards and specification. The approval of GA drawing in no way absolves the supplier from meeting this specification requirement. Any manufacturing activity shall be started only after getting necessary drawing approval from BHEL.

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RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Issued by	Approved by
00	15.11.2024	FIRST ISSUE	 IMRAN AHMAD	 SRIKANTH G

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 356	
		TECHNICAL SPECIFICATION		Rev. No. 00	
		Fabricated Tees using IS 2062 Plates / IS 3589 Pipes		Page 1 of 4	

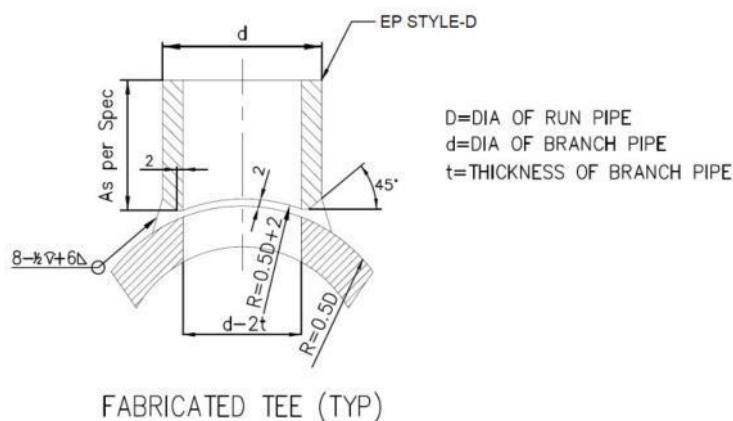
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1.0 GENERAL

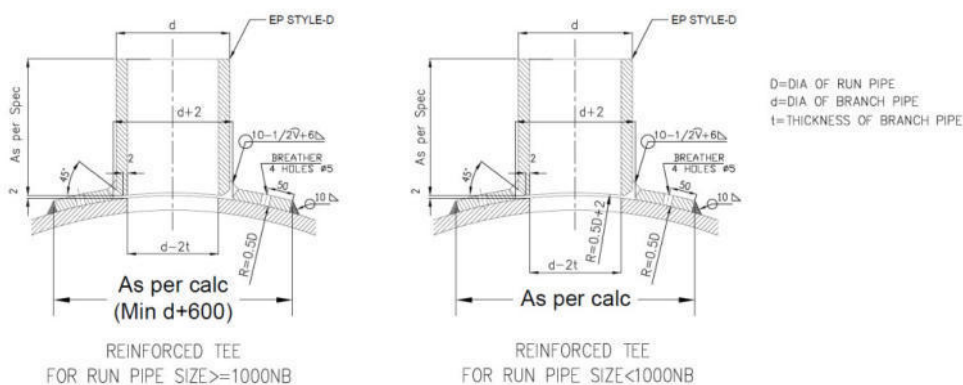
- 1.1 This standard specifies requirements related to Design, Manufacture, Inspection, Testing and Supply of Fabricated Tees (Straight & Reducing) used for water applications.
- 1.2 The Fabricated Tees supplied according to this specification shall conform to the requirements of latest versions of all applicable National & International standards and BHEL specifications indicated herein.




2.0 MANUFACTURING

- 2.1 Tees shall be fabricated from **IS2062 Grade E250B Plates** (or) using **Pipe sections cut from IS 3589 Grade FE410 Pipes / Plate Rolled and Longitudinally Welded Pipes using IS2062 Grade E250B plates.** *Use of Spirally Welded Pipes is not acceptable.*



- 2.2 The pipes used to fabricate the Tees shall strictly meet all the requirements of BHEL specification **PY52355**.
- 2.3 **For Run Size \geq NB 1000**, a Compensating / Reinforcement Pad shall be provided by default irrespective of requirement as per ASME B31.1.
For Run Size $<$ NB 1000, a Compensating / Reinforcement Pad shall be provided, if required as per the provisions of ASME B31.1.



Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		 M A MOQEET	 IMRAN AHMAD	 SRIKANTH G	15.11.24

- 2.4 Full penetration of welds to be ensured. Welded portions shall have uniformly smooth tool finish without Burrs, Weld Spatter, Cracks Etc. **All welds** of the Fabricated Tees shall be **100% radiographed**.
- 2.5 Fabricated Tees shall be supplied with **Edge Preparation** as per **Drg.No.4-80-468-84546 Rev.00**. Inside Bevel is required only if nominal inside diameter is higher than the measured inside diameter.
- 2.6 For Fabricated Tees with **Size > NB1000**, **Spider arrangement** and **Lifting Lug arrangement** shall be provided as per **Drg.No. 3-80-468-33334 Rev.00**.
- 2.7 Fabricated Tees **shall be finished and painted as per the applicable Painting Scheme** (as per project specific data sheet).

3.0 DIMENSIONS AND TOLERANCES:

- 3.1 For Tees with **Run Size ≤ NB 1200**, Dimensions shall be as per ASME B16.9.
- 3.2 For Tees with **Run Size > NB 1200**, Dimensions shall be as per the following table (As per AWWA C208):

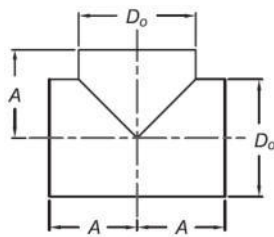


Figure 1A Tee

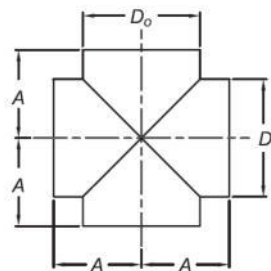


Figure 1B Cross

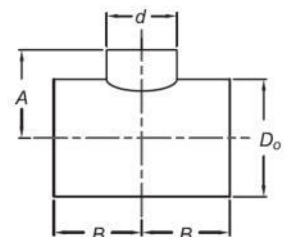



Figure 1C Reducing Tee

FABRICATED TEE (STRAIGHT)

NB	NPS	OD (Do)	A
	(in)	(mm)	(mm)
1300	52	1321	991
1400	56	1422	1067
1500	60	1524	1118
1600	64	1626	1194
1700	68	1727	1245
1800	72	1829	1321
1900	76	1930	1372
2000	80	2032	1448

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 356	
		TECHNICAL SPECIFICATION		Rev. No. 00
		Fabricated Tees using IS 2062 Plates / IS 3589 Pipes		Page 3 of 4

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FABRICATED TEE (REDUCING)

NB1	NPS1	OD1 (Do)	NB2	NPS2	OD2 (d)	A	B
	(in)	(mm)		(in)	(mm)	(mm)	(mm)
1300	52	1321	1200	48	1219	991	914
1400	56	1422	1300	52	1321	1067	991
1500	60	1524	1400	56	1422	1118	1067
1600	64	1626	1500	60	1524	1194	1118
1700	68	1727	1600	64	1626	1245	1194
1800	72	1829	1700	68	1727	1321	1245
1900	76	1930	1800	72	1829	1372	1321
2000	80	2032	1900	76	1930	1448	1372

- 3.3 For Fabricated Tees sizes up to 48" NPS, the dimensional tolerances shall be as per ASME B16.9. For sizes higher than 48" NPS, the dimensional tolerances for 48" NPS elbow as per ASME B16.9 are applicable.

4.0 SIZE AND THICKNESS:

Size and thickness shall be as indicated against the Material Code indicated in the enquiry. However, the bevel ends edge preparation of Tees shall match the connecting pipe thickness, which will be indicated during drawing approval stage.

5.0 DESIGNATION:

A typical Fabricated Straight Tee of 48" NPS (1219 OD) of thickness 12 mm, supplied according to this specification, shall be designated as:

TEE (STRT) IS2062E250B 1219x12 BE

A typical Fabricated Reducing Tee - 48" NPS (1219 OD) of thickness 12 mm x 36" NPS (914 OD) of thickness 10mm, supplied according to this specification, shall be designated as:

TEE (RED) IS2062E250B 1219x12-914X10 BE

6.0 INSPECTION & TESTING:

- 6.1 Inspection and testing shall be as per BHEL approved Manufacturing Quality Plan. Manufacturing Quality Plan for BHEL approval shall be submitted within 7 days.
- 6.2 Stenciling, Identification and End protection shall be as per the Quality Control Procedure **Doc.No. QCP:07 Rev.02**.
- 6.3 Surface Preparation and Painting shall be carried out as per the Quality Control Procedure, **Doc.No. QCP:09 Rev.01**.

7.0 PACKING AND MARKING:

Proper Packing and Marking shall be ensured during dispatch of materials as per the following documents:

- 7.1 Inspection Procedure for Packing, **Doc.No. TIP:07:0**
- 7.2 Packing Instructions for Piping Components **Doc.No. PC:PKG:01, Rev.00**
- 7.3 BHEL Technical Specification **PY52355 Rev.00**


The following details are to be marked on the Fittings for identification:

- | | |
|---------------------------|------------------------------------|
| 1) Supplier's emblem/code | 4) Fitting Number / Total Quantity |
| 2) Size & Specification | 5) Inspector's seal |
| 3) Material Code | 6) Work Order – DU Details |

Paint Stenciling	Details 1 to 6
Hard Punch	Details 1, 4, 5 & 6

For Sizes NB 1000 and above, the marking shall be done on internal surface in the uncoated area (i.e.) within 150mm from pipe ends. The hard punching shall be done at one end and paint stenciling at other end. In case of sizes less than NB 1000, the marking shall be done on outside surface.

Work Order and DU details, which are to be hard punched and stenciled on the Fabricated Tees, will be provided prior to dispatch of materials.

8.0 DOCUMENTATION
8.1 Along with the offer:

One copy each of the following documents shall be submitted along with offer:
G.A. Drawings / leaflets / catalogues for the offered item with binding dimensions, material specification details, tolerances, weights, painting details etc.

8.2 After placement of order:

Four copies each of the following documents shall be submitted for approval
G.A. Drawings for the offered item with binding dimensions, tolerances, material specification details, tests to be conducted, weight etc.

Schedule for document submissions:

S.no	Description	Schedule
1	GA drawing submission by vendor	7 days from the date of P.O.
2	BHEL approval of GA drawing	14 days from drawing submission *

* The GA drawing submitted by vendor shall be strictly in compliance to all applicable standards and specification. The approval of GA drawing in no way absolves the supplier from meeting this specification requirement. Any manufacturing activity shall be started only after getting necessary drawing approval from BHEL.

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RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Issued by	Approved by
00	15.11.2024	FIRST ISSUE	 IMRAN AHMAD	 SRIKANTH G

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 355
		TECHNICAL SPECIFICATION		Rev. No. 00
		IS 3589 Pipes / Rolled & Welded Pipes using IS2062 plates or IS 10748 coils, conforming to IS 3589, with Painting		Page 1 of 2

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1.0 GENERAL


The Pipes shall be manufactured and supplied conforming to the following:

- 1.1 For Pipe OD from 168.3 mm to 2540 mm, Pipes shall be manufactured and supplied as per **Technical Delivery Conditions for IS 3589 Pipes / Rolled & Welded Pipes using IS2062 plates or IS 10748 coils, conforming to IS 3589**, Doc.No.TDG:07, Rev.08.
- 1.2 For Pipe OD above 2540 mm, Pipes shall be manufactured and supplied as per **Technical Delivery Conditions for Rolled & Welded Pipes made of IS2062 Plates / IS 10748 Coils**, Doc.No.TDG:121, Rev.01.
- 1.3 Pipes shall be supplied with **Edge Preparation** as per **Drg.No.4-80-468-84546 Rev.00**. Inside Bevel is required only if nominal inside diameter is higher than the measured inside diameter.
- 1.4 For Pipes with OD > NB1000, **Spider arrangement** shall be provided at the pipe ends after Edge preparation as per **Drg.No. 4-80-999-93078 Rev.01**.
- 1.5 For Pipes with OD > NB1000, **Lifting Lug arrangement** shall be provided as per **Drg.No. 3-80-468-33334 Rev.00**.
- 1.6 **Items shall be finished and painted as per the applicable Painting Scheme (as per project specific data sheet).**

2.0 SUPPLY LENGTH & QUANTITY TOLERANCE:

- 2.1 Unless otherwise specified, **pipes shall be supplied in single specific random length of 10 to 12.5 meters**. Same specific length shall be maintained for the total order quantity, for each item.
- 2.2 Item wise specific length of supply shall be indicated in the Manufacturing Quality Plan being submitted to BHEL for approval.
- 2.3 Last cut bit length can be suitably adjusted by maintaining the required specific length.
- 2.4 Acceptable tolerance on a single pipe length is -0, +50 mm.
- 2.5 Tolerance on total length of pipe for each variant is +2.00 M if the length greater than 350 M. Else, tolerance on total length of pipe is +0.50 M.
- 2.6 Tolerance indicated is only for manufacturing purpose and not for payment.

Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		IMRAN AHMAD	V UDAY KUMAR	SRIKANTH G	07.11.24

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 355	
		TECHNICAL SPECIFICATION		Rev. No. 00
		IS 3589 Pipes / Rolled & Welded Pipes using IS2062 plates or IS 10748 coils, conforming to IS 3589, with Painting		Page 2 of 2

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3.0 DESIGNATION:

A SAW steel pipe of OD 1219 mm, wall thickness of 12 mm, of grade Fe410 with bevel ends, shall be designated as:

PIPE SAW 1219 X 12 IS3589FE410 BE.

4.0 INSPECTION & TESTING:

4.1 Inspection and testing shall be as per BHEL approved Manufacturing Quality Plan. Manufacturing Quality Plan for BHEL approval (in line with TDG:07 Rev 08 / TDG:121 Rev 01) shall be submitted within 7 days.

4.2 Stenciling, Identification and End protection shall be as per the Quality Control Procedure **Doc.No. QCP:07 Rev.02.**

4.3 Surface Preparation and Painting shall be carried out as per the Quality Control Procedure, **Doc.No. QCP:09 Rev.01.**

4.4 Hydraulic Test Procedure for Pressure Parts, **Doc.No. TIP:05 Rev.01.**

5.0 PACKING AND MARKING:

Proper Packing and Marking shall be ensured during dispatch of materials as per the following documents:

5.1 **Inspection Procedure for Packing**, Doc.No. TIP:07:0

5.2 **Packing Instructions** for Piping Components Doc.No. PC:PKG:01, Rev.00

5.3 **Technical Delivery Conditions** TDG:07, Rev.08 / TDG:121 Rev.01

Marking shall be as per Clause No 9.1 & 9.2 of TDG:07 Rev.08/ TDG:121 Rev.01.

Work Order and DU details to be hard punched and stenciled, will be provided prior to dispatch of materials.

RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Issued by	Approved by
00	07.11.2024	FIRST ISSUE	V UDAY KUMAR	SRIKANTH G



Bharat Heavy Electricals Limited, Piping Centre, Chennai

**Technical Delivery Conditions for IS 3589 Pipes /
Rolled & Welded Pipes using IS2062 plates or IS 10748
coils, confirming to IS 3589.**

Doc: TDG : 07
Rev : 08
Dt : 05.12.2019
Page 1 of 3

Records of Revn:07 :- Applicable Pipe Size indicated in para 1.3; *Para 2.0, 8.3 & 9.1 revised.
Para 4.4, 5.0 & 10.0 added further clauses re-numbered;*

Records of Revn:08 :- Modified based on Internal Discussion regarding BIS license
requirement dt 28.11.2019.

1.0 SCOPE

- 1.1 This Technical Delivery Conditions specify the requirements in addition to IS:3589 for electrically welded (ERW \ SAW) steel pipes.
- 1.2 The pipes are intended for water, air services (under Non-IBR Piping system only).
- 1.3 The pipes shall conform to the size, grade and quantity as specified in the purchase order.

Applicability: Pipe outside Diameter from 168.30mm to 2540.00mm.

2.0 RAW MATERIAL

Raw material (IS 2062 plates / IS 10748 coils) used for pipe shall meet the requirements as per IS: 3589 Grade Fe 410 MPa including Chemical (Ladle analysis) & Mechanical test requirements.

3.0 DIMENSIONAL TOLERANCES




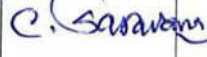
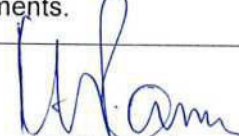
- 3.1 The tolerances limits are:
- a) OD:- Upto NB 1600 mm: ± 4 mm; Above NB 1600 mm: ± 6 mm
 - b) Thickness:- Upto 14mm : +1.3mm / -0.8mm; Above 14 mm : +1.4mm / - 0.8mm.
 - c) Ovality (Difference between major and minor inside diameter): 0.5% maximum
 - d) Squareness of ends: The ends of pipe section shall not vary by more than 3mm at any point from a true plane perpendicular to the axis of the pipe and passing through the center of the pipe at the end.
 - e) Length and quantity tolerance as per P.O.
- 3.2 Other tolerances shall be as per IS: 3589

4.0 MANUFACTURING

- 4.1 The pipe shall be of longitudinally welded or spirally welded as indicated in the Tender/P.O.
- 4.2 The ends shall be edge prepared as indicated in the Tender/P.O.
- 4.3 Circumferential seams shall be minimum 1500 mm apart from each other and from ends.
- 4.4 For longitudinal SAW pipes the offset between any two subsequent longitudinal joints **shall be more than 90deg.**
- 4.5 All pipes shall be completely finished and free from surface, sub surface defects such as pits, cracks, weld spatters & laminations etc..

5.0 CHEMICAL & MECHANICAL TEST

- 5.1 **Product Analysis:-** Shall be done for One sample per heat per size as per IS3589. Chemical values shall meet the IS3589 table - 2 & 3 requirements.
- 5.2 **Mechanical Tests:-**
- (a) **Tensile test for ERW / SAW Pipes:** Shall be done for One sample per heat per size as per IS3589. Values shall meet the IS3589 table - 4 requirements.

 J Nanthini Dy.Mgr/QA	 D Sandra Priya Dy.Mgr/QA	 K. Rajitha AGM/MM	 C Saravanan SDGM/Engg	 K V Ramani AGM/Engg & Quality
Prepared By	Reviewed By			Approved By

**Technical Delivery Conditions for IS 3589 Pipes /
Rolled & Welded Pipes using IS2062 plates or IS 10748
coils, confirming to IS 3589.**

(b) **Flattening test for ERW Pipes:** Shall be done for One sample per heat per size as per IS3589 and shall confirm to para 9.2.1 of IS3589.

(c) **Guided Bend test for SAW Pipes:** Shall be done for One sample per heat per size as per IS3589 and shall confirm to para 9.3.2 & 9.3.3 of IS3589.

6.0 NDE

6.1 For Pipe dia less than 1000mm:- 100 % Hydro test on each pipe + Radiography test for 100mm weld length at both the ends for 10% of the pipes.

6.2 For Pipe dia 1000 mm & above:- The NDT for each pipe shall be done by any one of the following options. The vendor shall indicate their choice in the offer.

a) 100 % Hydro test + Radiography test for 100mm weld length on both the ends of each pipe.

b) 100 % Ultrasonic test + 10 % Radiography test on weld length (including all T-joints and 100mm weld length at both the ends) for each pipe.

c) 100 % Radiography test on complete weld length of each pipe.

6.3 The Ultrasonic test / Radiography test shall be carried out as per ASME Sec-V and shall be accepted as per ASME B31.1 Cl:136.4.6 / Cl:136.4.5.

7.0 INSPECTION

7.1 All pipes shall be inspected by the vendor prior to BHEL / Customers' Inspection. BHEL or BHEL authorized inspector / Customer will select the pipes at random and carryout the inspection. The necessary Material Despatch Clearance Certificate is to be obtained by the vendor prior to the despatch of material.

8.0 PAINTING AND PACKING

8.1 The pipes if dispatched to BHEL Stores shall be coated with resin type translucent rust preventive on the outside unless otherwise specified in the Tender/P.O. Pipes of diameter above NB 450 mm, shall be coated inside also.

8.2 The pipes if dispatched to project site directly shall be coated outside & inside as indicated in Tender/P.O.

8.3 **Internal Coating:-** In case of any special coating like PU, Glass Flake, 100% Solid Epoxy etc., the vendor shall use BHEL approved make/coating materials. And also vendor shall submit Inspection & Testing Plan (ITP) and Procedure for internal coating for BHEL approval.

8.4 Coating shall not be applied for cutback length (as specified in Tender/ PO) from each end to facilitate site joints.



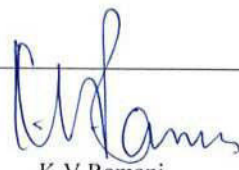
8.5 Spiders are to be provided on both ends of the pipes as per the drawing indicated in the Tender / Purchase Order.

9.0 MARKING

9.1 The following details are to be marked on the pipes for identification.

1) Supplier's emblem/code 2) Size & Specification 3) Material code

4) Pipe number 5) Inspector's seal 6) Work Order-DU details

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Prepared By	Reviewed By			Approved By



Bharat Heavy Electricals Limited, Piping Centre, Chennai

**Technical Delivery Conditions for IS 3589 Pipes /
Rolled & Welded Pipes using IS2062 plates or IS 10748
coils, confirming to IS 3589.**

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Page 3 of 3

	Pipes dispatched to BHEL Stores	Pipes dispatched to BHEL Project Site
Paint Stencilling	Details 1 to 6	Details 1 to 6
Hard Punch	Details 1, 2, & 5	Details 1, 4, 5 & 6

- 9.2 For the pipe dia 1000mm and above marking shall be done on internal surface in the uncoated area (i.e) within 150mm from pipe ends. The hard punching shall be done at one end and paint stencilling at other end. In case of pipes of dia less than 1000mm the marking shall be done on outside surface.



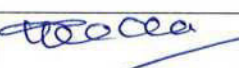


- 10.0 **QUALITY PLAN:-** Vendor shall submit QAP for BHEL approval before commencement of production.

11.0 **CERTIFICATES**

- 11.1 Three original test certificates typed in English shall be submitted along with the inspection report.

- 11.2 The test certificate shall furnish the following details.

- BHEL P.O Number & Amendment Number(if any)
- BHEL P.O. Serial Number
- Test Certificate number.
- Specification, grade, size, quantity
- Heat number of plate (or pipe number with traceability to heat number)
- Chemical composition and Mechanical properties
- Hydrostatic test, UT, RT reports as applicable.
- Dimensional report
- Painting details

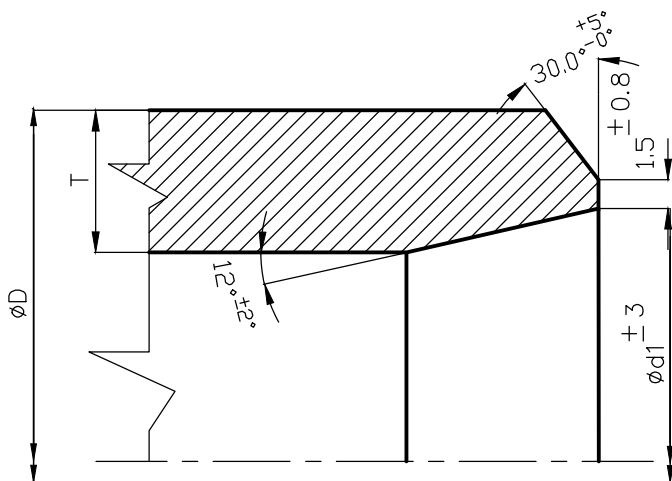
 J Nanthini Dy.Mgr/QA	 D Sandra Priya Dy.Mgr/QA	 K. Rajitha AGM/MM	 C Saravanan SDGM/Engg	 K V Ramani AGM/Engg & Quality
Prepared By	Reviewed By			Approved By

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REV	DATE	ALTERED
		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES

NOTE: INSIDE BEVEL IS REQUIRED, ONLY IF D1 VALUE IS HIGHER THAN INSIDE DIAMETER.



STYLE-D

PIPE SIZE	$\phi d1$
$\phi D \times T$	$D-2T$



BHARAT HEAVY ELECTRICALS LIMITED

PIPING CENTRE
CHENNAI 600 017

DRN	NAME TRINADHA RAO	SIGN	DATE 16.03.22	NO. OF VAR
CHD	TRINADHA RAO		16.03.22	
APPD	SARAVANAN.C		16.03.22	

DEPT CODE	GRADE OF UNTOL. DIM C / M / F		SCALE N.T.S	WEIGHT (KG). 	REF. TO ASSY./OLD DRG.	ITEM NO.	NO. OF ITEMS
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TITLE EDGE PREPARATION DETAIL	CARD CODE U 01	DRAWING NO. 4-80-468-84546	REV 00
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Size A4

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3-80-468-33334

DRAWING No

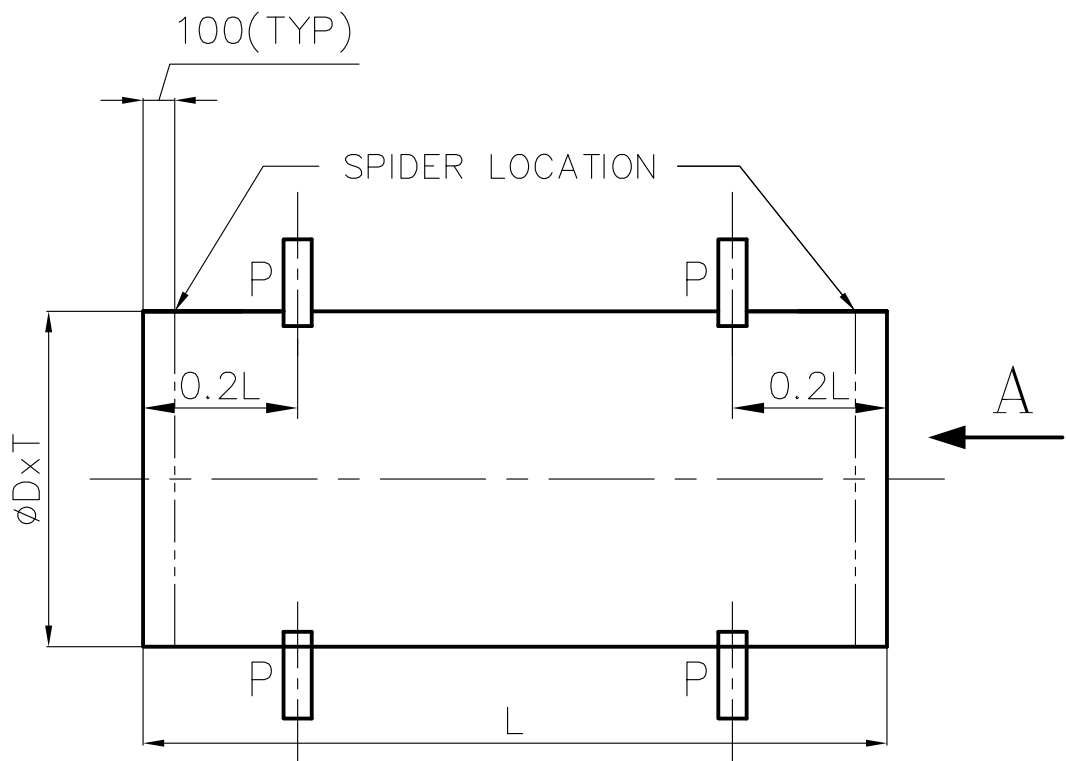
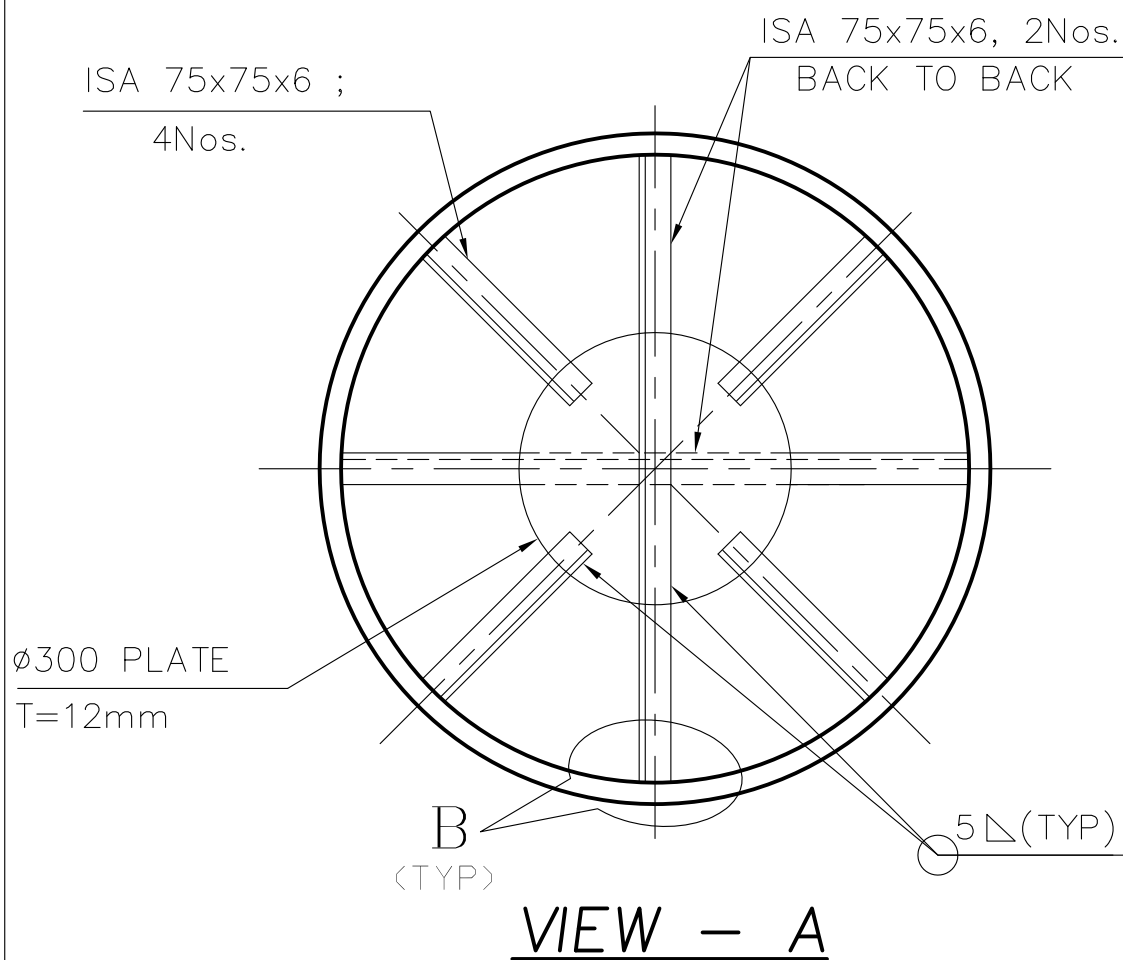
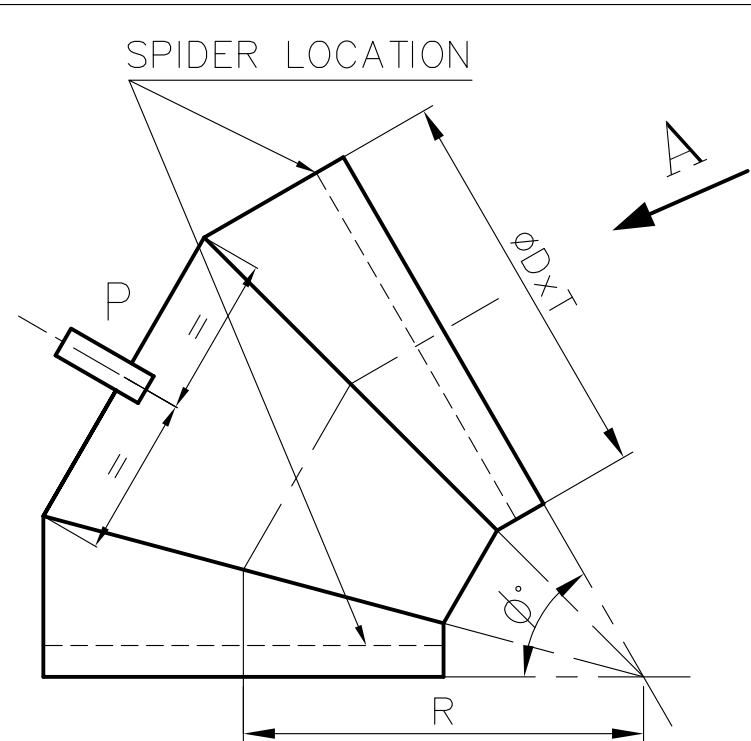


PLATE FORMED PIPE

SPIDER 2 LOCATIONS
LIFTING LUG 2 LOCATIONS

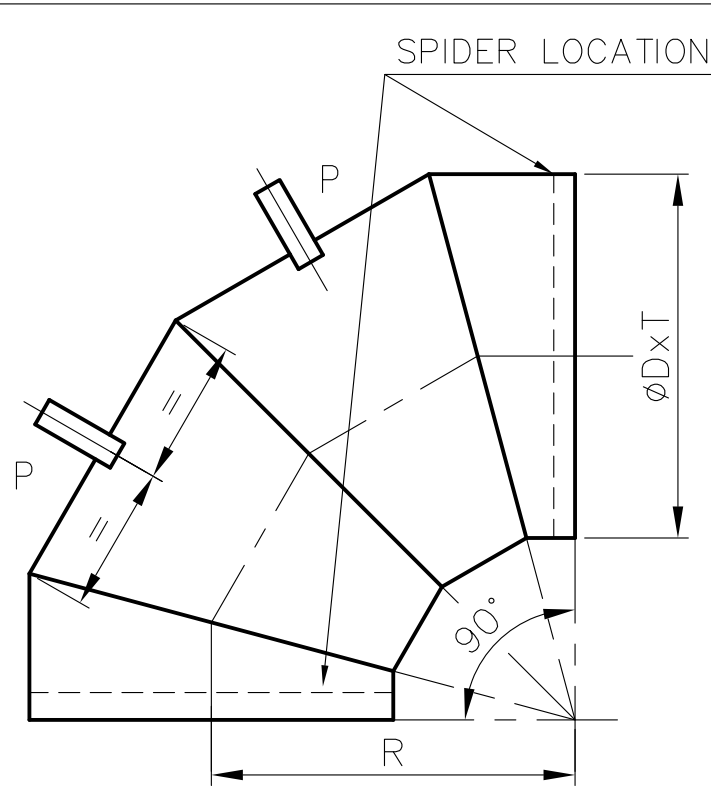


VIEW - A



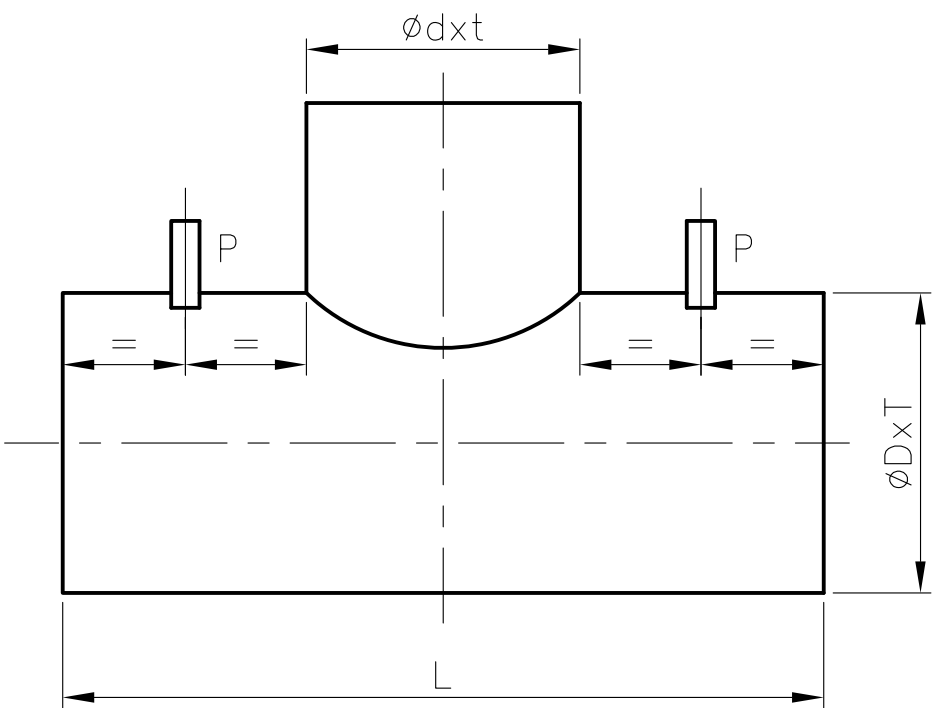
45°/60° MITRE BEND

SPIDER 2 LOCATIONS
LIFTING LUG 1 LOCATION

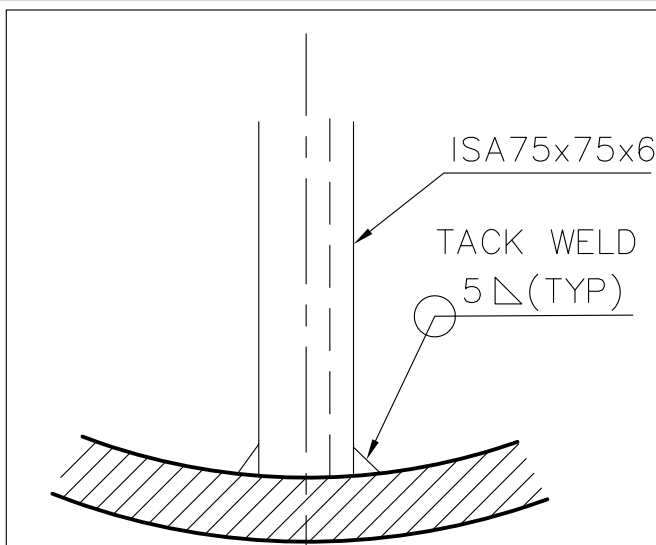


90° MITRE BEND

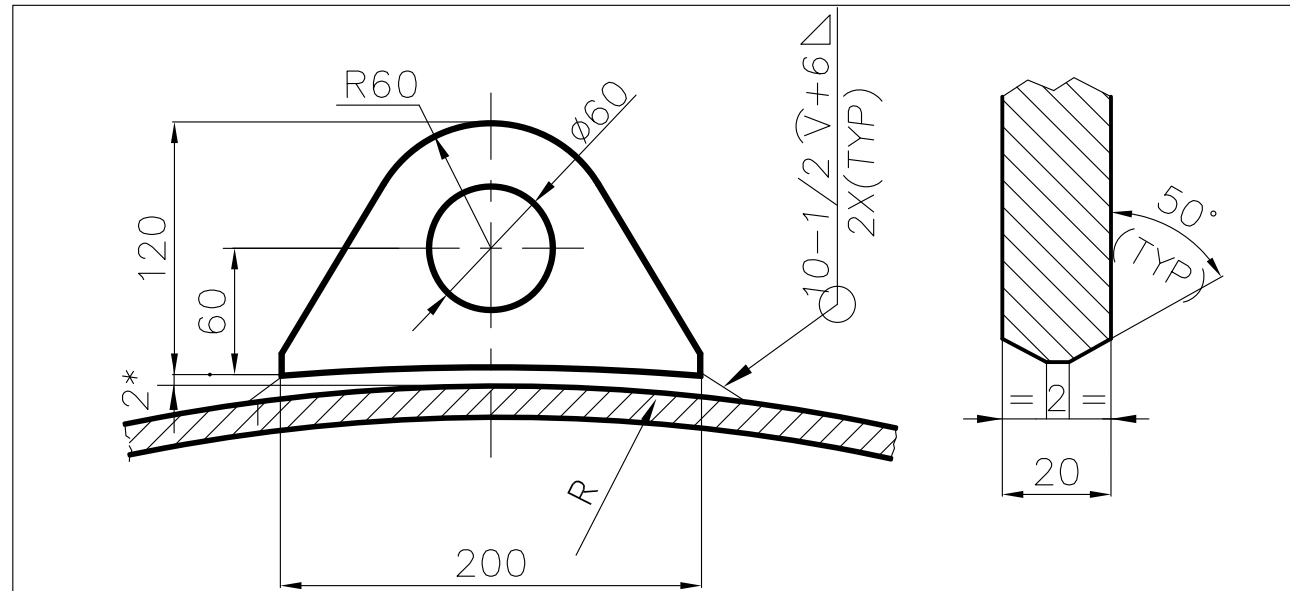
SPIDER 2 LOCATIONS
LIFTING LUG 2 LOCATIONS



UN EQUAL TEE/EQUAL TEE



DETAIL - B



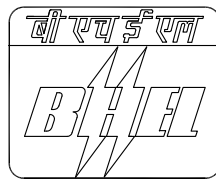
DETAIL - P

* LIFTING LUG SHALL BE CUT TO SUIT THE OUTER SURFACE OF THE MAIN PIPE SUCH THAT A UNIFORM GAP OF 2MM IS MAINTAINED THROUGHOUT

NOTES: -

1. SPIDER ARRANGEMENT IS MEANT FOR TRANSPORTATION AND STORAGE PURPOSE ONLY. TO BE CUT AND REMOVED AT SITE AT THE TIME OF ERECTION.
2. SPIDER/LIFTING LUG SHALL BE PAINTED WITH YELLOW COLOUR.
3. MATERIAL SPECIFICATION FOR PLATE IS IS2062.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT



BHARAT HEAVY ELECTRICALS LTD.,
PIPING CENTRE,
CHENNAI 600 017

DRN	NAME ARUN	SIGN	DATE 05.10.16	NO OF ITEMS
CHD	TRINADHA RAO		05.10.16	
APPD	R.SESHAGIRI		05.10.16	

DEPT.	GRADE OF UN TOL. DIM	SCALE NTS	WEIGHT (Kg).	REF TO ASSY / OLD DRG	ITEM No.
CODE	C/M/F				
TITLE	SPIDER AND LIFTING LUG ARRANGEMENT			CARD CODE U 01	REV
				DRAWING No. 3-80-468-33334	00



BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE, MADRAS-600 017

Title: **Quality Control Procedure for Surface Preparation and Painting.**

Specification No: QCP:09:1

Project : All

Material : All

Equipment : All

Concurred

Quality Control

OP&C

Engineering

[Signatures]
NV. Kengir
R. Rajan
R. Rajan
A. Senthil Kumar
A. Senthil Kumar

Date/Initial/Dept.

04.03-74

26.12.94

Orig. Issue

Rev. 1

Rev. 2

Rev. 3

Rev. 4

Rev. 5

Rev. 6

Revised by

M. PUGAZHENDI

[Signature]

[Signature]

Approved by

[Signature]

[Signature]

Distribution :

Piping Centre

Quality Assurance Department

Page

1

of

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Page 2 of 10

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QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

| QCP:09:1

Dt 26.12.94

1.0 SCOPE

- 1.1 This procedure covers the requirements of surface preparation, primer and finish painting for piping components .
- 1.2 Any special requirements , as indicated in the respective drawings, or QP shall get precedence over this QCP.
- 1.3 This document is based on PR:QE:104/04 issued by Quality Assurance, BHEL Trichy.

2.0 REFERENCE DOCUMENTS

IS 5	IS 2339
IS 104	IS 2932
IS 2074	

3.0 GENERAL REQUIREMENTS

- 3.1 This procedure specifies the painting requirements to provide adequate surface protection of components upto a period of one year under good storage conditions at site.
- 3.2 Periodic re-preservation is required if components are kept under prolonged storage.
- 3.3 The following guidelines are provided for estimation purpose only.
- 3.3.1 The approximate surface area (sq.m) to weight (tonne) ratio is as follows:

Components	Area (Sq.m) / Wt (Tonne)
a. Structural	30
b. Vessels	1.5
c. Piping	5

- 3.3.2 The spreading capacity for a normal painting is varying from 5 sq.m / litre to 8 sq.m / litre.
- 3.3.3 The dosage of volatile corrosion inhibitor (VCI) pellets / silica gel in sachet shall be 100gms / cu.m.
- 3.4 The surface preparation, primer coat and finish coat for various piping components are detailed in Annexure-I.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

3.5 The approved brands and approved manufacturers of paint, rust preventive fluid, weldable primer and VCI tablet are detailed in Annexure-II.

4.0 SURFACE PREPARATION

4.1 Surfaces of components shall be thoroughly cleaned before the application of primer paint as per the schemes indicated in Annexure-I and shall be free from dust, rust, weld slag, spatters etc.

4.2 The following are the surface preparation schemes indicated in this document.

Scheme No.

Description

SP 1	Solvent cleaning
SP 2	Application of rust converter (Ruskil or equivalent grades)
SP 3	Shot blasting
SP 4	Power tool cleaning (Mechanical wire brushing)
SP 5	Seven tank phosphating

4.3 Shot blasting shall be used as surface preparation method for thermally worked pipes prior to application of primer. For other pipes, power tool cleaning shall be adopted.

5.0 APPLICATION OF SURFACE PROTECTANT

5.1 Surfaces prepared as per the surface preparation scheme indicated in 4.2 shall be applied with primer paint immediately after the preparation.

5.2 The following are the painting schemes indicated in this document.

Painting Scheme

Description

PS 1	One coat of zinc chrome primer (Alkyd base) by brush/spray to IS 104.
PS 2	Zinc chrome primer (Alkyd base) by dip coat as per BHEL specification.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

| QCP:09:1

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PS 3	One coat of synthetic enamel long oil alkyd to IS 2932.
PS 4	One coat of red oxide zinc chrome primer (Alkyd base) to IS 2074.
PS 5	One coat of aluminum paint to IS 2339.
PS 6	One coat of rust preventive fluid by spray, dip or brush.
PS 7	One coat of weldable primer - Deox-aluminate or equivalent.
PS 8	One coat of high build Epoxy. Shade - aluminum.
PS 9	One coat of aliphatic acrylic polyurethane, Shade - French blue.
PS 10	One coat of zinc dust primer, containing minimum 80% of solid zinc dust by brush / spray.
PS 11	One coat of micaceous iron oxide based paint by brush / spray.

- 5.3 Paint shall be used as supplied by the supplier without any addition of thinner.
- 5.4 Paint shall be thoroughly mixed before application.
- 5.5 If any painting scheme calls for special mixing of paints, it shall be according to the instruction of Paint Manufacturer.
- 5.6 Adequate drying time is to be allowed for each coat.
- 5.7 No painting is required in case of Stainless Steel, aluminum and galvanised components, unless otherwise specified in contracts.
- 5.8 For all machined components, rust preventive fluids of approved make shall be used.

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

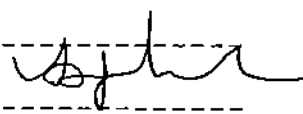
| QCP:09:1

Dt 26.12.94

- 5.9 All weld edge preparation for site welding shall be applied with one coat of weldable primer - Deoxaluminat or equivalent.
- 5.10 For internal protection of tubes and pipes, VCI pellets of required dosage as given in Cl. 3.3.3 shall be used after ensuring sponge cleaning.
- 5.11 VCI pellets shall not be used for Stainless steel components and composite assemblies. Instead silica gel sachet is shall be used which shall be removed at site.
- 5.12 Wherever required, paints and rust preventive protection can be removed using commercial solvents.
- 5.12.1 For rust preventive : Acetone, Carbon tetra chloride (CTC) or Tri-chloro ethylene.
- 5.12.2 For all paints : Alkaline paint strippers
Solvent based paint strippers
available in the market.

6.0 INSPECTION

- 6.1 Surface preparation, primer coating, finish coating shall be checked at appropriate stages by executing agency before proceeding to next operation.
- 6.2 Necessary records shall be maintained by executing agency after inspection at every stage.



QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

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ANNEXURE-I

S.no.	Description	Surface	Primer	Finish Coat					
		Prepar- ation Scheme No	Scheme No	Coats	DFT	System	Coat	DFT	* Color Shade
1.	Hanger Rods	SP 4/ SP 2	PS 4	One	25	PS 3	One	20	Smoke Grey
2.	Pipe clamps - Carbon Steel	SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey
3.	Pipe clamps - Alloy Steel	SP 4	PS 4	One	25	PS 3	Two	20	White
4.	Rigid Struts	SP 3/ SP 4	PS 10	One	40	PS 11	One	40	French Blue. (shade 166 of IS 5).
5.	Fixing Compo- nents, Skin casings	SP 2	PS 4	One	25	-	-	-	-
6.	Oil systems, fuel piping, scanner / exhaust fans, filters	SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey
7.	External Piping, Tanks & Vessels	SP 3/ SP 4	PS 4	One	25	PS 3	One	20	Smoke Grey

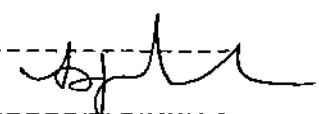
QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

8.	All Conv. valves body & yoke	SP 1/ SP 2	PS 3 PS 5	One One	25 25	-	-	- French Blue for CS Valves Aluminium paint for AS valves
	Arrow	-	PS 3	One	25	-	-	Post Off- ice red
	Hand wheels	SP1/ SP2	PS 5	One	25	-	-	Aluminium paint
	HPLP Valves & QCNRV Body/yoke/cover	SP1/ SP2	PS 3	One	25	-	-	Air craft grey
	Safety & safety relief valves	SP1/ SP2	PS 5	One	25	-	-	Aluminium Paint
	Forged Valves	SP1/ SP5	PS 6	One	25	-	-	-
	Stainless steel Valves	No painting required unless required by customer						

Note: * Prior to painting tubes and pipes shall be dosed with
VCI pellets and ends shall be sealed with plastic/metal
end caps / end covers.



QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

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ANNEXURE - II

I PRIMER AND FINISH PAINTS

1. Abilash Coating, Madras
2. Anuradha Paints, Madras
3. Asian Paints
4. Balu Paints, Tanjore-4
5. Berger Paints India Ltd., Madras
6. Goodlass and Nerolac Paints
7. Jenson & Nicholson Ltd., Calcutta
8. Maruthy Paints, Trichy-10
9. Nova Paints, Trichy-13
10. Rockfort Paints & Chemicals, Trichy
11. Shalimar Paints Ltd., Madras
12. Sigma Paints, Madras-1
13. Solar Paints, Pudukkotal
14. Sudha Enterprises, Trichy
15. Sundram Paints & Chemicals Pvt. Ltd., Thanjavur
16. Titan Paints & Chemicals Pvt. Ltd., Coimbatore
17. Usha Paints, Pudukkotal
18. Western Indian Paint & Colour Co., Madras

II HEAT RESISTANT PAINTS

1. Asian Paints, Madras
2. Berger Paints India Ltd., Madras
3. Bombay Paints, Bombay
4. CDC Carboline, Madras
5. Goodlass and Nerolac Paints, Madras
6. Jenson & Nicholson Ltd, Calcutta
7. Western Indian Paint & Colour Co., Madras

III WELDABLE PRIMERS

	Vendor Name	Brand Name
1.	Asian Paints, Madras	Silver Streak Mango (Aluminium paint)
2.	Western India Paint & Colour Co. Ltd, Madras	Coloxy paint

QUALITY CONTROL PROCEDURE FOR SURFACE
PREPARATION AND PAINTING

QCP:09:1

Dt 26.12.94

IV TEMPERORY RUST PREVENTIVE FLUIDS

	Vendor Name	Brand Name
1.	Bonita Chemicals, Agra	BONITA RPF (Wax Brand)
2.	Guardian Anti corrosives (P) Ltd., Madras	CHAMPION
3.	Plastic Peel Chemicals, Bombay	TRPF - 320
4.	Sundaram Paints, Tanjore	TRPF
5.	Western Indian Paint & Colour Co., Madras	WICOR - P

V VCI TABLETS

Vendor Names

1. M/s Aquarius Chemicals, Bombay
2. M/s Suprabha Protective Products (P) Ltd, Trichy
3. M/s Trans Dynamic, Pune
4. M/s Venkateswara Enterprises, Trichy



BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE, MADRAS-600 017

Title : Inspection Procedure for Packing

Specification No : TIP:O7:O

Project : All

Material : All

Equipment : -

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	Date 10/09/93						
	Orig. Issue	Rev. 1	Rev. 2	Rev. 3	Rev. 4	Rev. 5	Rev. 6
Revised by	<i>m. myy</i>						
Approved by	<i>L. Nayak</i>						

Distribution :

Piping Centre

Quality Assurance Department

Page 1 of 7

MASTER COPY

INSPECTION PROCEDURE FOR PACKING

TIP:07:0

Dt 10.09.93

1.0 SCOPE

This procedure describes the requirement of Packing and Inspection of packing of raw material and finished products.

2.0 GENERAL REQUIREMENTS FOR ALL PRODUCTS

- 2.1 All packing shall fulfil the following requirements and these requirements shall be checked during inspection.
- 2.2 All bundles shall have identification tags with details such as Material Code, Size, W.O., D.U., Quantity.
- 2.3 Specific instruction given in drawings, Purchase orders, QP, QCP etc. shall be carried out.
- 2.4 All crates /boxes, used shall be covered, fastened tightly and shall have coating or lining inside so as to avoid water seepage into the packing.
- 2.5 PVC coated gunny bags shall be used for packing and bags shall be firmly closed.
- 2.6 All forwarding instruction shall be strictly adhered to.
- 2.7 Tanks and vessels / pipes with attachments shall be positioned in the packing in such way that nozzle and other attachments like stubs, flanges etc. are not loaded.
- 2.8 Except for the structural material and other certain products mentioned in this document, all other products shall not be sent as loose piece. They shall be packed.

3.0 SPECIFIC REQUIREMENTS FOR PRODUCTS

- 3.1 The specific requirements product wise is given below. These requirements shall be adhered to.

INSPECTION PROCEDURE FOR PACKING**TIP:07:0****Dt 10.09.93**

3.2 Straight pipes / tubes:

3.2.1 Straight pipes and tube ends shall be covered by end caps as follows:

Type of End cover	Pipe / tube diameter
Plastic end cap	Dia \leq 76mm
Metallic cap	76mm > dia \leq 610mm
Metallic ring	610mm > dia

3.2.2 VCI pellets shall be used for tubes / pipes for diameter upto and including 610mm. Dosage shall be 100gms / cu.m.

3.2.3 VCI pellets shall not be used for SS pipes.

3.2.4 The pipes / tubes upto dia 76mm can be bundled in such a way that weight of the bundle shall not exceed 1000kgs.

3.2.5 The bundle shall be strapped with steel bands at 1 metre interval.

3.2.6 The pipes of dia above 76mm can be despatched loose.

3.3 Pipe Bends including Mitre Bends:

3.3.1 End covering and use of VCI pellets shall be as per 3.2.2. norms and shall be packed in wooden boxes for Nb upto 150mm.

3.3.2 Bends of above Nb 150 can be despatched as loose piece.

3.4 Pipe with attachments:

The packing shall be as per 3.3 and the attachments shall be covered with plastic or metal caps as per 3.2.1.

3.5 Rubber lined pipes and fittings:

Wooden blanks of minimum thickness of 12mm shall be provided at the flange ends. The wooden blanking shall be secured to the flange by 4 bolts and nuts at 90° apart.

INSPECTION PROCEDURE FOR PACKING

TIP:07:0

Dt 10.09.93

3.6 Fittings other than IS:1239:

3.6.1 Fittings of nominal diameter upto Nb 150 and below shall be packed in wooden boxes. The boxes used for this purpose, shall have coating or lining inside so as to avoid any water seepage from outside.

3.6.2 Fittings above Nb 150 can be despatched as loose piece with proper end cover and VCI pellet. See para 3.2.2.

3.7 Tanks and Vessels:

The pipe ends shall be covered with plastic or metal caps as per 3.2.1.

Wooden blanks of minimum thickness of 12mm shall be provided at the flange ends. The wooden blanking shall be secured to the flange by 4 bolts and nuts at 90° apart.

The tank / vessel shall be supported by channel in the packing to avoid transit damage.

3.8 Clamp Assembly:

Components shall be assembled as per drawing. Grease shall be applied on threaded portion and plastic sleeve / VCI coated tape shall be used to protect the threads. All fasteners shall be tightened with spanners to avoid loss during transit. Clamp assemblies upto Nb 100 shall be packed in wooden boxes. Higher sizes can be sent as loose items.

3.9 Clamps and Tube Clips:

3.9.1 Tube Clips

Bundling shall be done in multiples of ten (for long clamps) / twenty (for short clamps) with G.I. wire. Packing shall be in the Standard (shipping) Wooden Box.

3.9.2 Clamps

Clamps shall be bundled with G.I. strap / wire in size wise and shall be packed in wooden box.

3.10 Insulation clamps & fixing components:

Clamps in multiples of 50 shall be bundled with G.I. wire and shall be packed in Standard (shipping) Wooden Box.

3.11 Tie Rods:

Proper rust preventive coating as per relevant painting schedule / QCP / QP shall be applied. Plastic sleeve / VCI coated tapes shall be used to protect the threaded ends. Tie rods shall be bundled size wise as per the table below:

Size -----	No. of piece in bundle -----
M12, M16	30 Max.
M20, M24	25 Max.
M30	Max. quantity restricted by the handling facility.

3.12 Fasteners:**3.12.1 Hex Nuts**

Packing shall be in PVC coated polythene bags in multiples of "N" nos. The PVC coated gunny bags with weight not exceeding 10kgs shall be packed in wooden boxes.

The quantity of "N" hexagonal nuts for different sizes shall be as per the table below:

Size of Hex. Nut -----	No. "N" of nuts / Polythene bag -----
Dia \leq 20mm	100
20mm > dia \leq 36mm	50
36mm > dia \leq 56mm	10
56mm > dia	5

INSPECTION PROCEDURE FOR PACKING**TIP:07:0****Dt 10.09.93**

3.12.2 Studs and Bolts

All studs and bolts shall be coated with rust preventive. Thread size above M20 shall be protected with plastic sleeve / VCI coated tape. All studs and bolts shall be put in PVC coated gunny bags size wise and DU wise. The PVC coated gunny bag shall be properly closed and packed in wooden boxes.

3.12.3 Washers

Rust preventive coating shall be applied. Packing shall be in PVC coated gunny bags in multiples of 50 nos with weight not exceeding 10kg packed in the wooden box.

3.12.4 Split Pins

Packing shall be in a good quality polythene bag such that each bag shall not weigh more than 0.5kg.

3.13 IS:1239 Black Fitting:

Edge prepared portion and inner portion of the fittings shall be coated with rust preventive. Outside shall be painted as per the relevant TDC.

Packing shall be in VCI coated polythene bag or PVC coated gunny bags with VCI pellet / powder, in multiples of 10 nos, each bag not weighing more than 10kgs. Size NB 150 and below shall be packed in wooden box.

3.14 IS:1239 G.I. Fitting:

Rust preventive shall be applied to threaded portions and packed in plain gunny bag / PVC coated bags with breather holes in multiples of 10 nos. such that each bag not weighing more than 10kgs. Proper end cap shall be provided. Nb 150mm and below shall be packed in wooden boxes.

3.15 CLH Bracket:

The CLH bracket shall be painted and shall be supplied as loose.

3.16 CLH Pins:

Galvanised pins shall be bundled in PVC coated bags with breather holes such that each bundle weighs less than 10kgs.

3.17 Hanger Components:

Hanger components such as weld on / bolt on clevis, eye nuts, turn buckle, bracket with hole, rod couplings shall be painted and the machined portion shall be treated with rust preventive. (GI and yellow chromotised components need not be treated with rust preventive). Packing for items other than galvanised and yellow chromatised, shall be in VCI coated polythene bags or PVC coated gunny bags with VCI pellets / powder, with maximum weight not more than 10kgs, and shall be kept in wooden boxes.

3.18 Rod type clamps:


Rust preventive coating shall be applied for threaded portion. Threads shall be covered with plastic sleeve / bitamax tape. Rods in multiples of 10 shall be bundled with G.I. wire such that weight shall not exceed 10kgs. Final packing shall be in wooden boxes.

3.19 CAF jointing / Rubber gaskets:

The jointing and rubber gaskets shall be rolled and tied before packing it in the wooden crates / boxes.

3.20 Boughtout items:

The suppliers shall use the packing procedures approved by BHEL.


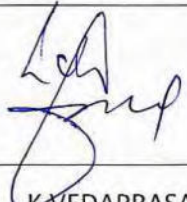
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Packaging Instructions for Piping Components	Doc. No PC: PKG:01	
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PACKAGING INSTRUCTIONS FOR PIPING COMPONENTS

PC: PKG: 01

Revision summary


Rev No	Revision Details	Issued on
00	Fresh issue	28-05-2014

Prepared by	Reviewed & Approved by
	
S.ARUN KUMAR	K.VEDAPRASAD

Bharat Heavy Electricals Ltd., Piping Centre, Chennai – 600 017		
Packaging Instructions for Piping Components	Doc. No PC: PKG:01	
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1. Scope
2. Packaging
3. Criteria for Selection of Packaging
4. Types of packaging
5. Sling protections
6. Marking and Labelling
7. Packing list
8. General Instructions for packaging
9. Reference drawings
10. Cautionary symbols
11. Packing reference table
12. Check list

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1. SCOPE

This procedure elicits the general requirements to be complied with for packaging of piping components. The packaging is intended to preserve and protect the contents.

The handling, storage, cleaning, packaging, and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration.

2. PACKAGING

This procedure contains requirements for packaging of items for protection against corrosion, contamination, physical damage, or any effect that would lower the quality or cause the components to deteriorate during the time they are shipped and stored at sites.

Items shall be inspected for cleanliness immediately before packaging. Dirt, oil, residue, metal chips or other forms of contamination shall be removed.


Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit and, for equipment suitable for outside storage, for prolonged storage at the site prior to installation.

Water proof barrier material – high density polythene shall be used as a resistant to grease and water; it shall protect items from airborne and windblown soils.

Desiccants like silica gel to be used inside pipe components. Silica gel shall conform to IS 3401. The gel is to be packed in sachets placed at different positions inside the components for absorbing moisture. The quantity of silica gel shall be adequate for storage period of one year.

Components to be placed in such a way that metal to metal contact is avoided.

For mechanical components, (1) all openings shall be covered or plugged with substantial (1/2 inch minimum thick) one piece plywood or metal closures, securely fastened and suitable for prolonged exposure prior to final installation; (2) all tapped openings in equipment shall be plugged with plastic plugs to protect internal threads; and (3) all welding end connections shall be provided with adequate weld bevel protectors to protect from corrosion and physical damage.

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Austenitic stainless steel and nickel-based alloy materials shall be handled in such a manner that they are not in direct contact with carbon steel materials or with materials containing halogen, sulphur, zinc and lead.

Each components/item of stainless steel materials should be wrapped with high density polythene.

All equipment shall be packed, securely anchored (skid mounted when required) and weather protected for the shipment method adopted.

Temporary bracing or supports, marked and tagged for removal after equipment installation, shall be provided to prevent damage during shipment and shall be painted bright, fluorescent yellow.

3. Criteria for Selection of Packaging:

Packages are to be made according to categories listed in Table-6 (see page – 24), depending on the type of materials and size.

4. TYPES OF PACKAGING:

4.1 CRATES

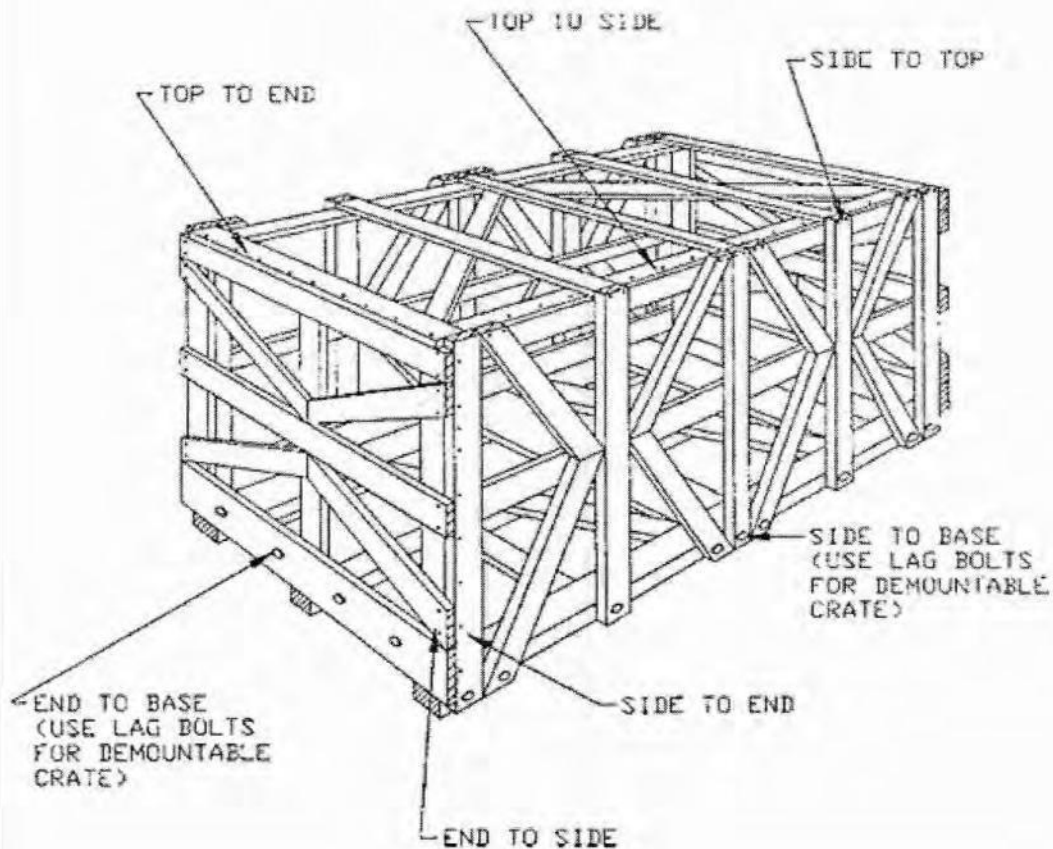
- These are to be made of seasoned wood and are intended for packaging heavy materials Viz., straight pipes and pipes with attachments.
- The crates are to be lined with hi-density polythene, to prevent entry of moisture.
- The dimensions of the crates are to be restricted to 20 x5x5 feet.
- Pipes up to OD 350mm are to be crated.
- Pipes are to be stacked inside the crate so that the weight of the pipe does not rest on branch stubs or carrier plates.
- Contents of the crate should not come in contact with each other or with the crating, and should be adequately cushioned to preserve the painting.
- The gross weight of the crate should not exceed 2 Tons.
- For further instructions refer ASTM D6039 Standard Specification for Open and Covered wood Crates.

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WOODEN CRATE



Max Net Load (KGS)	Length (mm)	Width (mm)	Height (mm)
2000	6096	1524	1524

All the dimensions shown in the above table are maximum inside dimensions.

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4.3 SADDLES

- Saddles are defined as profiled supports made of wood, and are used to cradle and support Tanks, pipe bends and pressure vessels.
- Ensure that the end chamfering of the bends are duly protected for the transit.
- Tanks are to be completely drained and dried.
- Adequate amount of the specified desiccant is to be placed inside the tank/ vessel.
- Ensure that all openings are covered and /or plugged.

4.4 CASES

- Other components such as fittings and Mitres are to be packed inside wooden cases.
- The insides of the cases are to be lined with hi-density polythene.
- Air vents to be provided in the cases for ventilation.
- Components to be placed in such a way that metal to metal contact is avoided.
- Small components like Fasteners, gaskets are to be packed in high density polythene covers and placed inside the wooden cases.
- Holes to be provided in the case floor to act as drains.

4.5 BUNDLES

- Bundles are transportable units where a large number of straight pipes of the same diameter and even lengths are arranged securely and are fit to be lifted by cranes and also stacked.
- Pipe ends should be covered fully with plastic end caps.
- Pipes can be bundled only when they can bear the stack compression load without additional support.
- Clamps made of wood or steel clamps with wooden inserts are to be used.
- Clamps must be locked firmly so that the pipes cannot slide out of bundle.
- Bundle must be held together by at least three sets of clamps as indicated in the diagram.

**Packaging Instructions for Piping
Components**

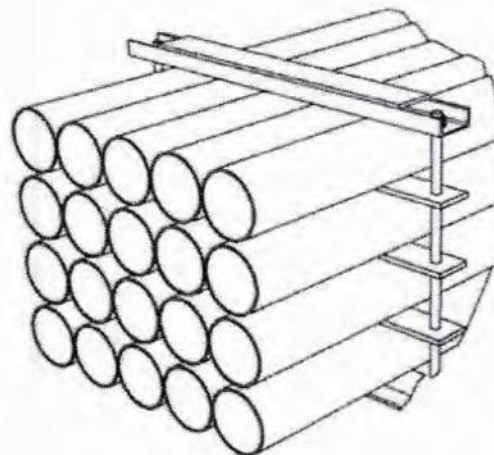
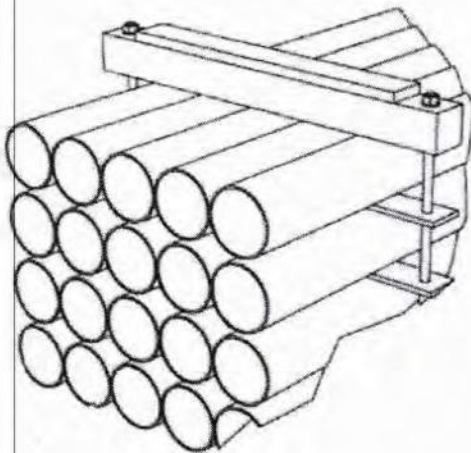
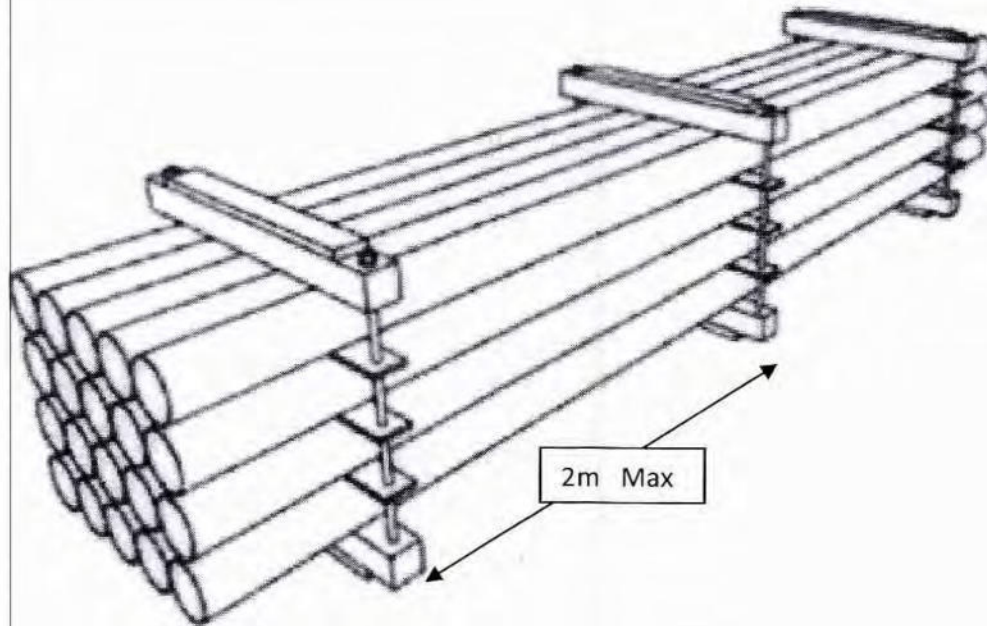
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5. SLING PROTECTIONS

The lifting points of the case or crate or bundle must be equipped with sling protections suitable to the respective package gross weight.


6. MARKING AND LABELLING

Components and their containers shall be identified by marking. Shipping marks shall be on all sides of package. The shipping marks shall be at least 3 inches high where space permits. Markings are to be in black paint or ink depending on shade of the package surface.

Cautionary symbols to be stencilled in red waterproof paint or ink.

7. PACKING LIST

One complete packing list inside a watertight envelope must be affixed outside of each package and be covered by sheet metal. One more copy of the packing slip wrapped in polyethylene bag is to be kept inside the box at the pertinent place.

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8. General Instructions for packaging

- The quantity of Slides / Runners is selected depending upon the weight and over-all dimension of the Load, to be carried. Table-1 and 2 details out the number of Slides, length and cross sections of the Slides to be provided with their carrying capacity.
- The construction of bottom frame is as shown in the Figure-2.
- The construction of the top frame is, as shown in the figure -3.
- Thickness of the boards, used for sheathing for the top, sides and end panels, shall be 25 mm.
- The top of the Box consist of Beam supported on top traverse bar and sheathing, as shown in the figure- 3.
- The dimension of items 1, 2 f figure -3 shall be as table -3.
- Diagonal braces shall be used in packing cases with height, exceeding 600 mm as shown in the figure- 4.
- The angle between the lower (or) upper horizontal supports and diagonal braces, shall be in the range of 20° to 60° and if possible, this angle preferably be kept at 45°.
- If the height of the box exceeds more than 1400 mm the diagonal braces, shall cross each other and when this dimension exceeds 1800mm additional horizontal supports shall be provided as shown in figure-5 and figure- 6.
- Size of upper and lower horizontal supports and vertical supports, shall be as per Table 4 refer figure 7, 8, 9 & 10 for the arrangement.
- The cross section of end traverses bar (item -1) and thickness of bottom boards (item-2), shall be used as per table - 5.
- All boxes measuring more than 600 mm height shall be constructed by assembling end, side and top shook's on a bottom, forming a complete enclosed Box (refer figure-11).
- Angle iron cleats shall be used for strengthening the joints, as indicated in figure -12.
- Boxes will be strengthened by steel bands to withstand transit damages.

Packaging Instructions for Piping Components

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9. Reference drawings

1. SLIDE
2. LONGITUDINAL UNDER SLIDE BOARD.
3. BOTTOM BOARD
4. CARRIER TRAVERSE BAR
5. INTERMEDIATE VERTICAL SUPPORT
6. HORIZONTAL BRACING
7. DRAINAGE HOLES
8. BATTEN
9. SLING PLATE
10. NUT BOLT WASHER
11. END TRAVERSE BAR
12. WATER PROOF LINING OF BITUMANISED PAPER
13. VERTICAL SUPPORTS
14. END SHEETING BOARD
15. SIDE SHEATING BOARD
16. TOP SHEATING BOARD
17. LONGITUDINAL SUPPORT
18. TOP HORIZONTAL BEAM
19. TOP SHEATING BOARD
20. TOP CORNER STRIPS (FOR STRENGTHENING)
21. OUT SIDE DOCUMENTS CONTAINER.

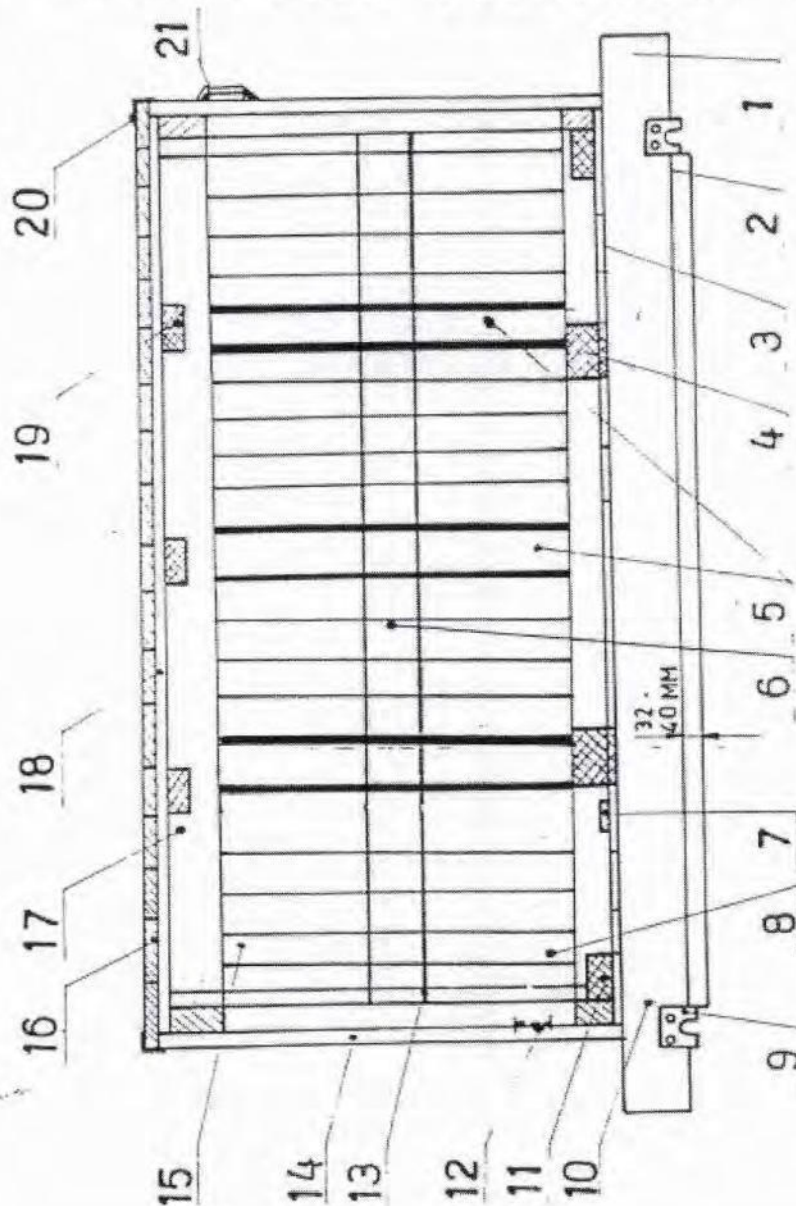


FIG. 1

NOMENCLATURE OF PARTS OF PACKING

**Packaging Instructions for Piping
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BOTTOM FRAME ARRANGEMENTS FOR TYPES
633, 654, 966, 1296, 1122, 1144, 1399, 1577

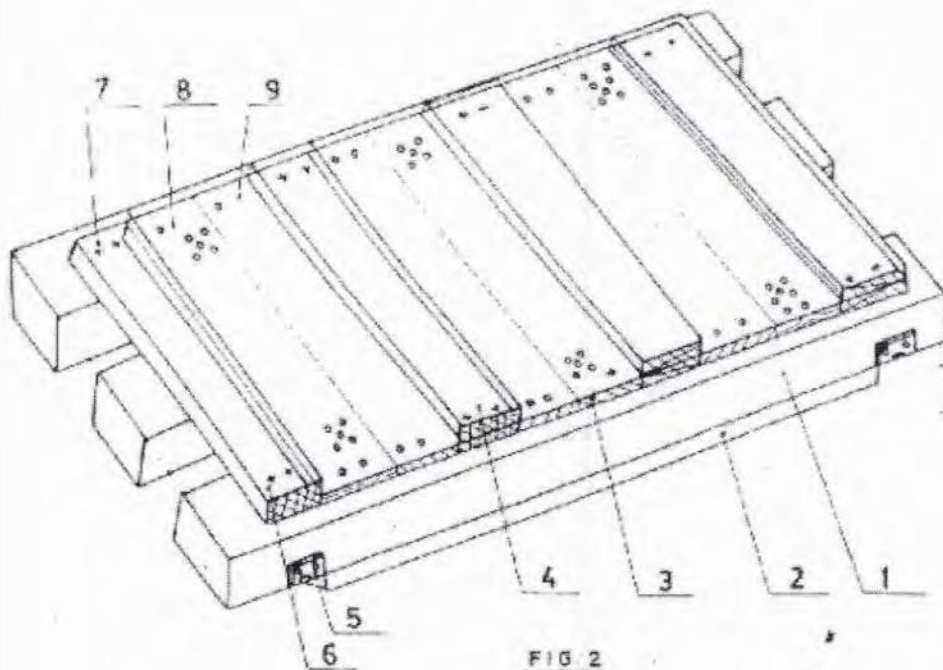



FIG 2

- 1. SLIDE
- 2. UNDER SLIDE BOARD
- 3. BOTTOM BOARD
- 4. CARRIER TRAVERSE BAR
- 5. SLING PLATE
- 6. TRAVERSE BAR
- 7. BOLT, NUT & WASHER
- 8. DRAINAGE HOLES
- 9. NAILS

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TOP FRAME ARRANGEMENT FOR TYPES

633, 654, 966, 1296, 1122, 1144, 1399 & 1577

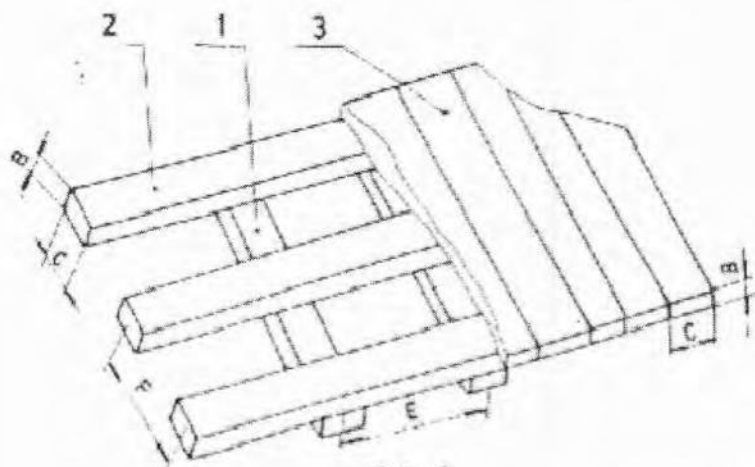


FIG-3

- 1 - Traverse Bars
- 2 - Horizontal Scans
- 3 - Top Board

PROVISION OF DIAGONAL BRACING ARRANGEMENT

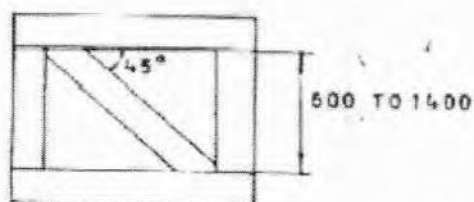


FIG-4

**Packaging Instructions for Piping
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**ARRANGEMENT OF DIAGONAL BRACING &
HORIZONTAL SUPPORT**

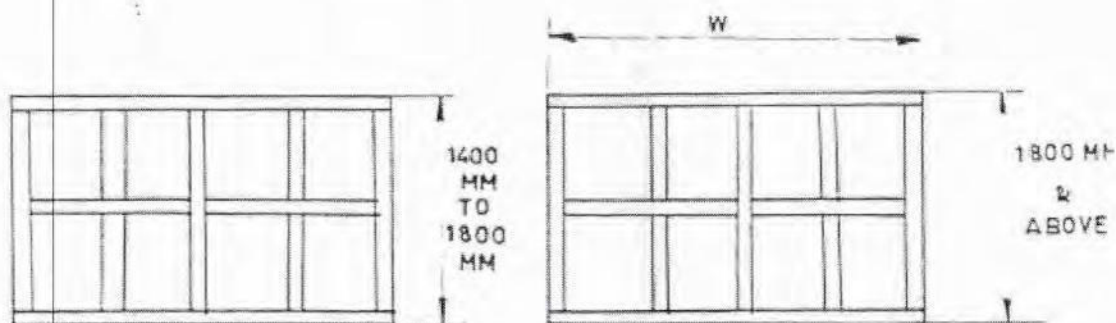


FIG. 5

FIG. 6

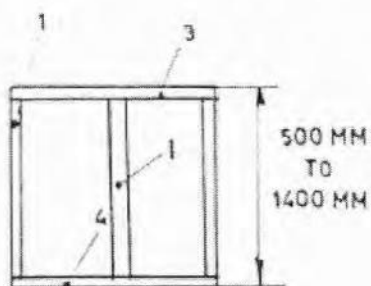


FIG : 7

1. VERTICAL SUPPORT

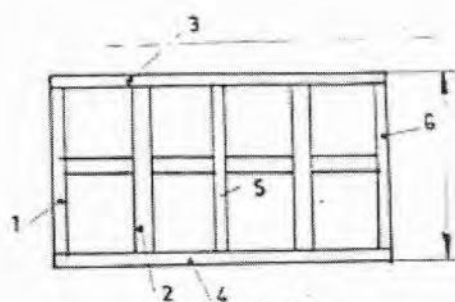


FIG: 8


1,2,5,6 - VERTICAL SUPPORT

3. UPPER HORIZONTAL SUPPORT

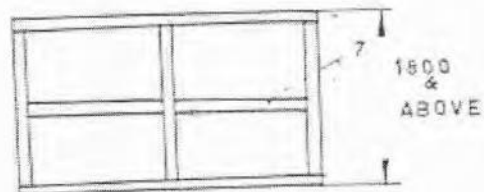
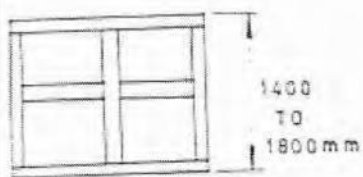
4. LOWER HORIZONTAL SUPPORT

3 - UPPER HORIZONTAL SUPPORT


4 - LOWER HORIZONTAL SUPPORT

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ARRANGEMENT OF DIAGONAL BRACING AND HORIZONTAL SUPPORT



7-MIDDLE HORIZONTAL SUPPORT

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ARRANGEMENT OF PACKING CASE

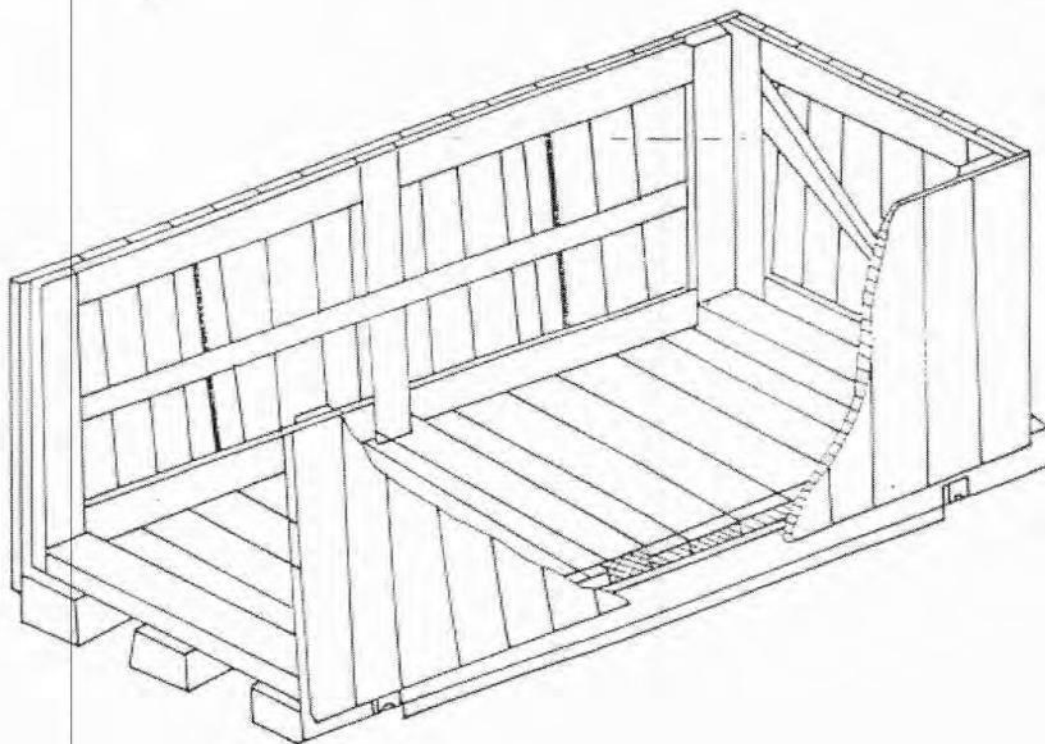



FIG : 11

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ARRANGEMENT OF ANGLE IRON CLEATS

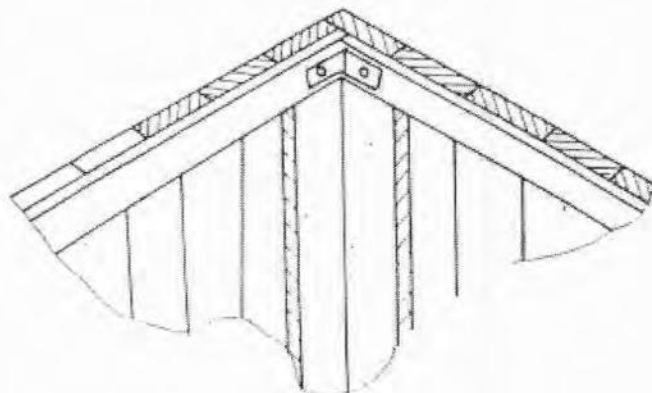


FIG :12

ARRANGEMENT OF C-CLAMPS AROUND CASES

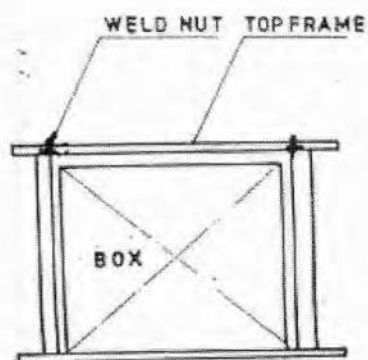
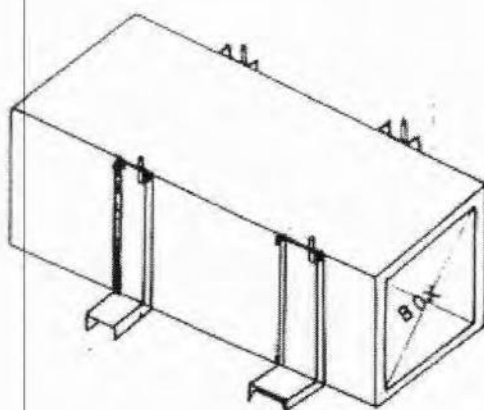


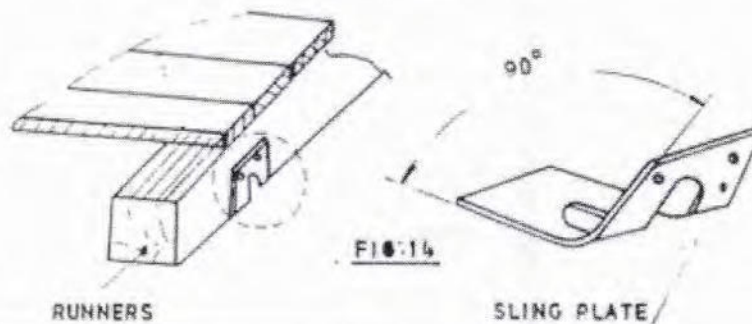
FIG:13

Packaging Instructions for Piping Components

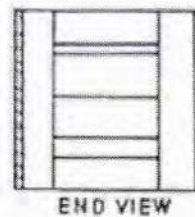
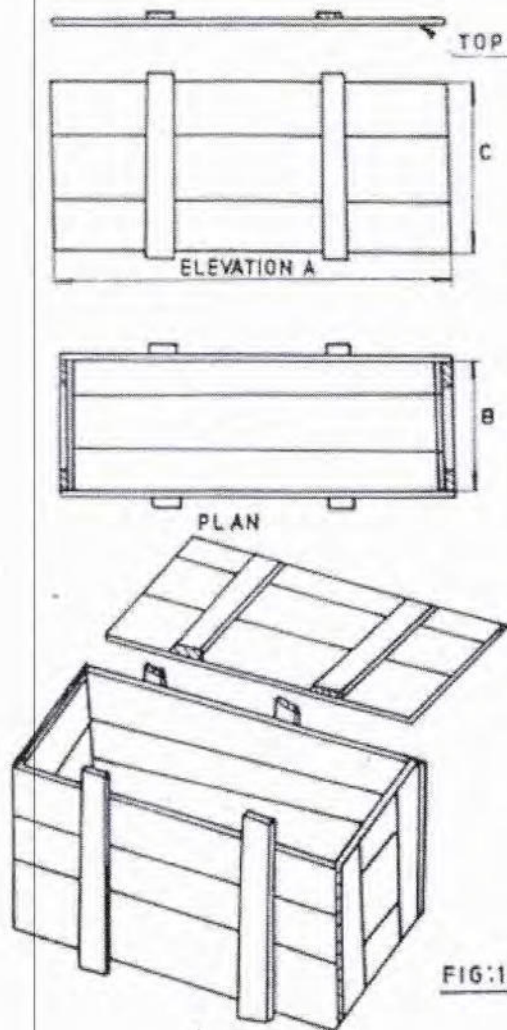
Doc. No
PC: PKG:01
Rev No: 00
Date : 28 /05/ 2014

No of Sheets : 24

ARRANGEMENT OF SLING - PLATE ON CASES



ARRANGEMENT OF SMALL CASES




TYPE 654, 633

DMS TYP	A	B	C
654	600	500	400
633	600	300	300

IN MM ONLY

1. BOTTOM BOARD
 2. CROSS TRAVERS BOARD
- A. UNIFORMLY DISTRIBUTED
B. CONCENTRATED LOAD

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The sizes of boxes given below are indicative. Actual sizes may vary according to size and positioning of component inside.

ANNEXURE – A
WOODEN BOXES

TYPE	L X B X H (MM)	CARRYING CAPACITY IN KGS
633	600x300x300	200
654	600x500x400	500
966	900x600x600	1000
1296	1200x900x600	2000
1122	100x200x200	300
1144	110x400x400	300
1399	1300x900x900	2500
1577	1500 X 700 X 700	1500

TABLE - 1

No. of slides	Length of slides	Weight in (kgs)	Types of loading
2	600 – 1800 mm	0 – 1000	Two slides for central loading near the ends or uniformly distributes load.
3	1801 – 2500 mm	1001 – 5000	Three slides with load concentrates near the end or uniformly distributed load.


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TABLE - 2

LOAD	Length of slides						
	600	800	1000	1200	1300	1500	2000
	CROSS SECTION						
	B x C			<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 5px;"></div> <div style="margin-right: 5px;">b</div> <div style="border: 1px solid black; width: 100px; height: 20px; margin-right: 5px;"></div> <div>c</div> </div>			
500	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100
800	30 x 100	30 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
1000	30 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
1500	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
2000	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100
2500	100 x 100	100 x 100	100 x 100	100 x 100	100 x 100	120 x 150	120 x 150
3000	100 x 100	120 x 150	120 x 150	120 x 150	120 x 150		

TABLE – 3

Distance between top horizontal scans dim 'f'	Distance between the axis of the traverse bar dimension 'E' in fig -3				
	500	600	700	800	900
	Size b x c				
700 – 1000 mm	30 x 100	30 x 100	30 x 100	30 x 100	30 x 100


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TABLE-4

End and side panels	Width of the panels	Distance Between Longitudinal Support DIM 'D'						
		600	800	1000	1200	1400	1600	1800
		Cross section (b x c) Item 1 to 7						
Fig - 7	600 to 1200	30 x 100	30 x 100	30 x 100	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 8	1201 to 1600	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 9	1601 to 2000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130
Fig - 10	2001 to 3000	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	30 x 130	40 x 150
	3001 to 4000	30 x 130	30 x 130	40 x 150	40 x 150	40 x 150	40 x 150	40 x 150


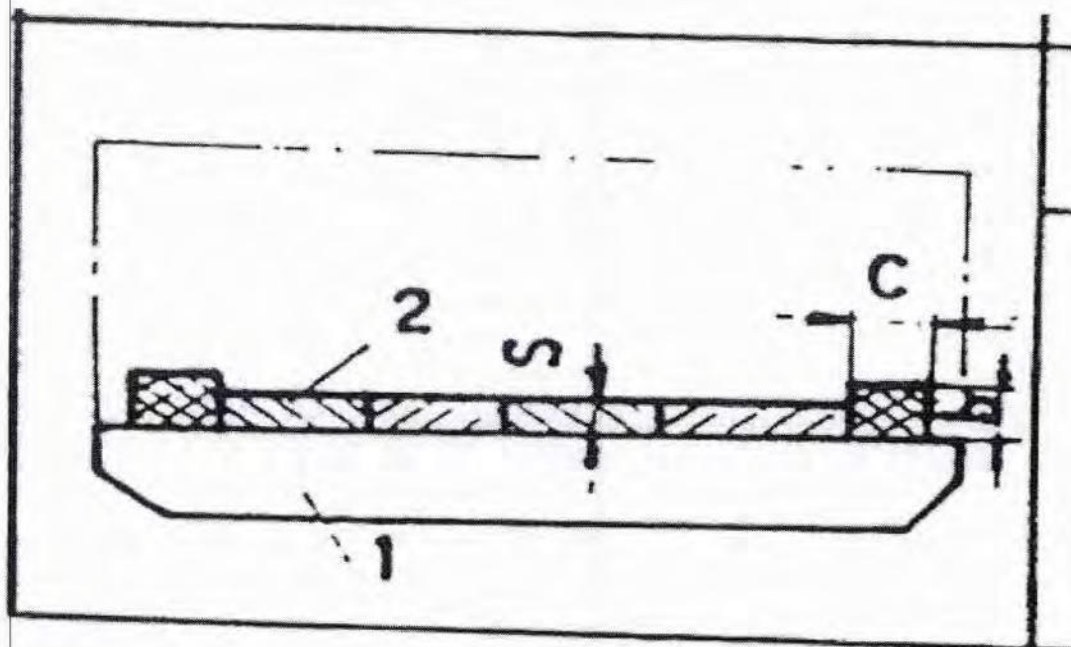

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TABLE-5

BOTTOM TRAVERSE:



Cross section of end traverse bar item 1 fig. X and thickness of bottom board (item – 2)			
Load in kg	Width of the box	Cross section	S
Up to 3000	Above 1000 mm	100 x 100	25

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10. Cautionary symbols



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND
RADIOACTIVE SOURCES



USE NO HOOKS

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.



KEEP DRY

NOTE: Not all cases have waterproof internal liners; plywood used in the construction may not have a waterproof gluing.



THIS WAY UP

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.



CENTRE OF GRAVITY

NOTE: This should be stencilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).



KEEP AWAY FROM HEAT

... kg max.




STACKING LIMITATION

NOTE: The maximum load in kilograms should be marked above the arrow.




International 'slings here' symbol

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11. Packing Reference Table

TABLE-6

No	Packing Method ->		Wooden Crates	Bundles	Saddle supports	HD Polythene Sheet Wrapping	Wooden boxes (Cases)	Spider	Remarks
	Description								
1	Straight Pipes		✓	✓					Crates for random length
2	Pipes with attachments		✓						
3	Pipes with Fittings		✓						
4	Tanks				✓				
5	Mitre bends				✓		✓		Saddle or cases to be used
6	Fasteners						✓		
7	Hanger components						✓		
8	Clamps						✓		
9	Fittings >nb200/ Flanges						✓		Fittings <200 shall be packed in boxes
10	Plates(Cut to size)						✓		
11	SS Pipes			✓		✓			Wrap SS pipes before bundling
12	SS fittings / Flanges		✓				✓		Fittings <200 shall be packed in boxes
15	SS Fasteners						✓		
16	CW piping(>900mm)							✓	To maintain circularity of pipes
17	CW fittings(>900mm)							✓	
18	CW fittings(<900mm)								
19	Structurals(<200mm)			✓					

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12. CHECK LIST

S No	VENDOR TO PROVIDE DETAILS	
1	<p>On despatch of components/items , vendor has to provide the following information for each package of despatched items:</p> <ol style="list-style-type: none"> 1. Contents of package (Packing list) 2. Corrosion Prevention: Rust-preventive coating /protective painting/Silica gel/ other corrosion inhibitors (please mention) 3. Lifting Instructions: Crane using slings/Fork lift/any other means (please mention) 4. Dimensions (LxBxH) mm: 5. Gross Weight (Kgs): 6. Net Weight (kgs): 	
S No	VENDOR TO CONFIRM	
1	Where ever items are despatched as a bundle, they should be clamped together with bolted timber block clamps or bolted steel section clamps with timber block inserts. Adequate number of clamps should be provided along the length of the bundle with sufficient projection of the clamps beyond the width and height of the bundle.	
2	Only such materials which can withstand corrosion and environmental conditions are allowed to be packed in wooden crates or bundles.	
3	In case of wooden packing, planks of 20-25 mm thick and 100-150mm wide needs to be suitably placed at close intervals for giving rigidity to packing appropriately.	
4	Wood used for packing should be seasoned & shall be free of termites.	
5	Damages, if any, resulting due to improper/inadequate packing will be to vendors account. It will be the responsibility of the vendor to identify suitable and adequate packing for his supplies to protect it from damage and/or deterioration during storage, stacking, transport and handling.	
6	All packing should be suitable for loading/unloading by cranes/forklifts & suitable for transport by road. Suitable marking should be made on the packing indicating the lifting positions.	

SECTION IX - ENQ 4211900006/21.11.2019
TENTATIVE PROJECTS SITES

S.No	Project	Transport Area/Address
1	YADRADRI 5 X 800 MW	Telangana
2	UPPUR - 2X800 MW	Tamilnadu
3	PATRATU 3X800 MW	Jharkand
4	PANKI UPRVUNL 1X660MW	Uttar Pradesh
5	UDANGUDI 2 X 660 MW	Tamilnadu
6	BHUSAWAL 1X660	Maharashtra.
7	MAITREE PCP	Export Project
8	DADRI FGD	Uttar Pradesh
9	NORTH KARANPURA PPG FOR FGD	Jharkhand
10	TCL MITHAPUR 1X14.9 MW	Gujarat
11	BARH STG II (2X660 MW) FGD	Bihar
12	MOUDA STPP STG-I PPG FOR FGD	Maharashtra
13	NTPC, TELENGANA 1&2 2X800MW	Telangana
14	BARH STG I (3X660 MW) FGD	Bihar
15	TSGENCO BHADRADRI 4X270MW FGD	Telangana
16	TSGENCO-KOTHAGUDAM FGD PKG	Telangana

Note: These are only tentative projects site, if new orders are obtained then that will also be included.



BHARAT HEAVY ELECTRICALS LIMITED

PIPING CENTRE, MADRAS-600 017

Title : Quality Control Procedure for surface preparations, painting and stencilling, identification, end protection of piping components

Specification No : QCP:07:2

Project : All

Material : All

Equipment : All

Concurred

Engineering

QC

OP&C

[Handwritten signatures for Engineering, QC, and OP&C]

Date/Initial/Dept.
05-01-94

16-07-94 28-12-94

Orig. Issue

Rev. 1

Rev. 2

Rev. 3

Rev. 4

Rev. 5

Rev. 6

Revised by

Approved by

Distribution :

Piping Centre

Quality Assurance Department

Page

1

of

10

MASTER COPY

Dt28.12.94

Rev.No	Revised Clause	Description
1	1.1	Corrected
1	2.0	Corrected
1	3.1	Corrected (QCP:09 added)
1	4.2.1	Corrected
1	4.2.2	Corrected (Flow direction)
1	Annexure 1A&1B	Corrected
2	4.2.3	Clear Varnish added
2	6.1.C	Corrected
2	Annexure 1A	Corrected

P. Kent Schum

QUALITY CONTROL PROCEDURE FOR SURFACE | QCP:07:2
PREPARATIONS, PAINTING AND STENCILLING ,
IDENTIFICATION, END PROTECTION OF PIPING COMPONENTS | Dt28.12.94

1.0 SCOPE

1.1 This procedure specifies the requirement of surface preparation, painting and stencilling, Identification and end capping of all items including those covered under painting and stencilling contracts.

2.0 SURFACE PREPARATION

The surface preparation & cleaning shall be carried out as as per QCP:09.

3.0 PAINTING

3.1 The painting of all Piping components shall be as per QCP:09 . It shall be ensured that paints shall be used before the expiry date.

4.0 IDENTIFICATION

4.1 Identification of Raw Materials:

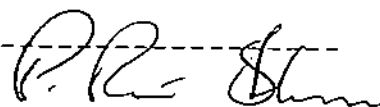
4.1.1 Immediately on receipt of materials from Stores, the contractors shall identify and segregate all the materials based on the gate pass and SMIV copies.

4.2 Identification of finished components:

4.2.1 The following details shall be punched on each item within 200mm from the free end.

- a. Firm Code
- b. Work Order No.
- c. DU No.
- d. Quantity (No. off)
- f. Boiler Inspectors /BHEL seal if applicable.
- g. Material specification and Melt No.

For pipes and tubes, fittings, and rods of diameter less than 76.1mm and / or thickness less than 6mm, punch code as per Annexure I (b) alone to be hard stamped. Identification on stainless steel tubes shall be by engraving /stencilling.



4.2.2 The following details shall be stencilled on each item:

- a. Name of the project
- b. Work Order No.
- c. DU No.
- d. Quantity (No. off)
- e. Weight in Kg
- f. Firm code
- g. Melt No.
- h. Material specification
- i. Arrowmark indicating the flow direction.

4.2.3 The details stencilled shall be protected by applying a coat of clear varnish over the stencilled area.

4.2.4 The details hard stamped shall be highlighted by applying a coat of aluminium paint over the punched area.

4.2.5 The material identification colour code as per the enclosed Annexure IA shall be applied on ends.

5.0 END PROTECTION

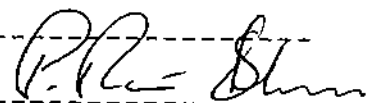
5.1 All tubes and fittings of diameters \leq 76.1mm shall be provided with plastic end caps.

5.2 All pipes and fittings of diameter above 76.1mm shall be provided with metallic caps, as detailed in Annexure II enclosed.

6.0 DOCUMENTS FOR INSPECTION

6.1 The availability of following documents shall be ensured by the firm, before taking up the job.

- a. Purchase order with details of work order, DU, Qty, Weight, specification and full description of the items including size.
- b. GMS, if P.O. does not specify the full description.
- c. Test Certificate / Group Test Certificate as applicable
- d. Applicable drawing.

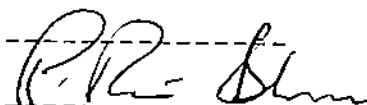


QUALITY CONTROL PROCEDURE FOR SURFACE PREPARATIONS, PAINTING AND STENCILLING , QCP:07:2
IDENTIFICATION, END PROTECTION OF PIPING COMPONENTS! Dt28.12.94

ANNEXURE - IA

COLOUR CODES FOR (SEAMLESS) STEEL PIPES/TUBES/BENDS:

<u>Specification</u>	<u>Colour Code</u>
01. ASME-SA / ASTM-A - 106 Gr.A	Aluminium
02. ASME-SA / ASTM-A - 106 Gr.B	Red
03. ASTM-SA / ASTM-A - 106 Gr.C	Blue
04. ASME-SA / ASTM-A 335 P11	Blue & Red
05. ASTM-SA / ASTM-A 335 P12	Yellow & Silver
06. ASME-SA / ASTM-A 335 P22	Red & Green
07. ASME-SA / ASTM 312 TP 304L	Blue & Brown
08. ASME-SA / ASTM 312 TP 304H	Blue & Yellow
09. BS 3604 (HFS / CDS) 622/31	Red & Green
10. BS 3604 (HFS / CDS) 660	White & Silver
11. 13 Cr MO44 of DIN 17175	Yellow & Silver
12. DIN 2391 St 35.4	Green & Black
13. ST 35 & DIN 1629	White
14. X20 Cr MOV 121	Black
15. ASME-SA / ASTM-A 179	Blue & Green
16. ASTM-SA / ASTM-A 192	White
17. ASTM-SA / ASTM-A 209 Gr. T1	Red & Silver
18. ASME-SA / ASTM-A 210 Gr. A1	Yellow
19. ASME-SA / ASTM-A 210 Gr. C	Blue
20. ASME-SA / ASTM-A 213 Gr. T11	Black & Red
21. ASTM-SA / ASTM-A 213 Gr. T12	Yellow & Silver
22. ASME-SA / ASTM-A 213 Gr. T22	Red & Green
23. ASME-SA / ASTM-A 213 Gr. TP304H	Blue & Yellow



QUALITY CONTROL PROCEDURE FOR SURFACE PREPARATIONS, PAINTING AND STENCILLING , IDENTIFICATION, END PROTECTION OF PIPING COMPONENTS | QCP:07:2
 ----- Dt28.12.94

24.	ASME-SA / ASTM-A 213 Gr.TP321H	Blue & White
25.	ASME-SA / ASTM-A 213 Gr.TP347H	Yellow & Black
26.	ASME-SA / ASTM-A 268 Gr.TP410	Yellow & Brown
27.	ASME-SA / ASTM-A 268 Gr.TP443	Green & White

COLOUR CODES FOR (WELDED) STEEL PIPES/TUBES/BENDS:

01.	API 5L Gr. B (ERW)	Pink
02.	ASME-SA / ASTM-A 312 TP304L	Blue & Brown
03.	ASME-SA / ASTM-A 672 B60 CL22	Red & White
04.	ASME-SA / ASTM-A 672 B65 CL22	Red & Blue
05.	ASME-SA / ASTM-A 672 B65 CL42	White & Brown
06.	ASME-SA / ASTM-A 691 B12 CL42	Yellow & Silver
07.	ASME-SA / ASTM 691 B22 CL41	Red & Green
08.	ASME-SA / ASTM 672 B70 CL22	Red & Aluminium
09.	IS 3589	Silver & Brown

COLOUR CODES FOR (SEAMLESS & WELDED) STEEL FITTINGS:

01.	ASME-SA / ASTM-A 234 Gr. WPB	Red
02.	ASME-SA / ASTM-A 234 Gr. WPBW	Red
03.	Special forged fittings of ASME-SA / ASTM-A 105	Red
04.	ASME-SA / ASTM-A 243 Gr. WPC	Blue
05.	ASME-SA / ASTM-A 234 Gr. WP 11	Black & Red
06.	ASME-SA / ASTM-A 234 Gr. WP 12	Yellow & Silver
07.	ASME-SA / ASTM-A 234 Gr. WP 22	Red & Green

[Handwritten Signature]

QUALITY CONTROL PROCEDURE FOR SURFACE PREPARATIONS, PAINTING AND STENCILLING , IDENTIFICATION, END PROTECTION OF PIPING COMPONENTS

QCP:07:2

Dt28.12.94

08. Special forged fittings of ASME-SA / ASTM-A 234 WP 12 Yellow & Silver
09. Special forged fittings of ASME-SA / ASTM-A 234 WP 22 Red & Green

ANNEXURE 1b

Sl. No.	Colour Code	ASME / ASTM		DIN		BS	
		Specifi- cation	Punch code	Specifi- cation	Punch code	Specifi- cation	Punch code
1.	White	SA/A 192	192	ST 35.8	35.8	BS 3059 Steel 33	33
2.	Brown	-	-	-	-	BS 3059 STEEL 45	45
3.	Yellow	A 210 GR A1	GRA1	ST 45.8	45.8	-	-
4.	Red	A 106 GR B	AGRB	-	-	-	-
5.	Blue	A 106 GR C	AGRC	-	-	-	-
6.	Red & Silver	A 209 GR T1	T1	15 Mo 3	15 Mo	-	-
7.	Black & Red	A 335 P11	P11	-	-	-	-
8.	Yellow & Silver	A 213 T11 A 335 P12	T11 P12	13CrMo 44	13Cr	BS 3059 Steel 620	620
9.	Red & Green	A 213 T22 A 335 P22	T22 P22	10CrMo 910	10Cr	BS 3059 Steel 622	622
10.	White & Silver	-	-	14MoV 63	14Mo	BS 3604 HF 660 CD 660	660
11.	White & Red	-	-	X10Cr AL13	X10	-	-
12.	White & Black	A 213 T9	T9	X12Cr Mo91	X12	-	-

P. K. Sharma

QUALITY CONTROL PROCEDURE FOR SURFACE PREPARATIONS, PAINTING AND STENCILLING , IDENTIFICATION, END PROTECTION OF PIPING COMPONENTS | QCP:07:2 Dt28.12.94

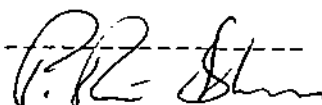
ANNEXURE - I b

Stainless Steel:

Sl. No.	Colour Code	ASTM		DIN		BS	
		Specifi- cation	Punch code	Specifi- cation	Punch code	Specifi- cation	Punch code
1.	White & Blue	A 213 TP 321/ TP 321H	321 321H	X10CrNi 189	T1 189	BS 3605 CDS 822/T1	822 T1
2.	Yellow & Black	A 213/ TP 347	347	X10CrNi Nb 189	Nb 189	-	-

Welded Steel Pipes/Tubes:

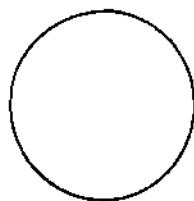
Sl No.	Colour code	Specification	Punch code
1.	Pink	API 5L GR B	LGRB



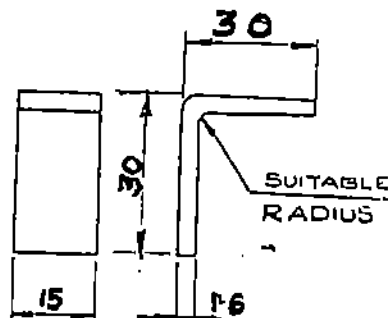
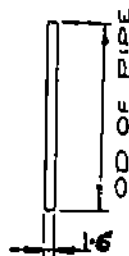
ANNEXURE II

a] $\leq \phi 76.1 \text{ mm}$ PLASTIC END CAPS

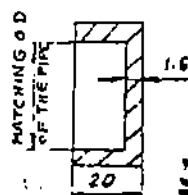
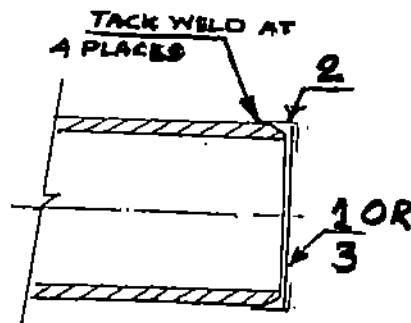
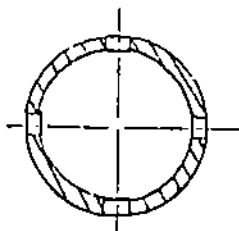
b] $> \phi 76.1 \text{ mm} \leq \phi 159 \text{ mm}$



1 DISC



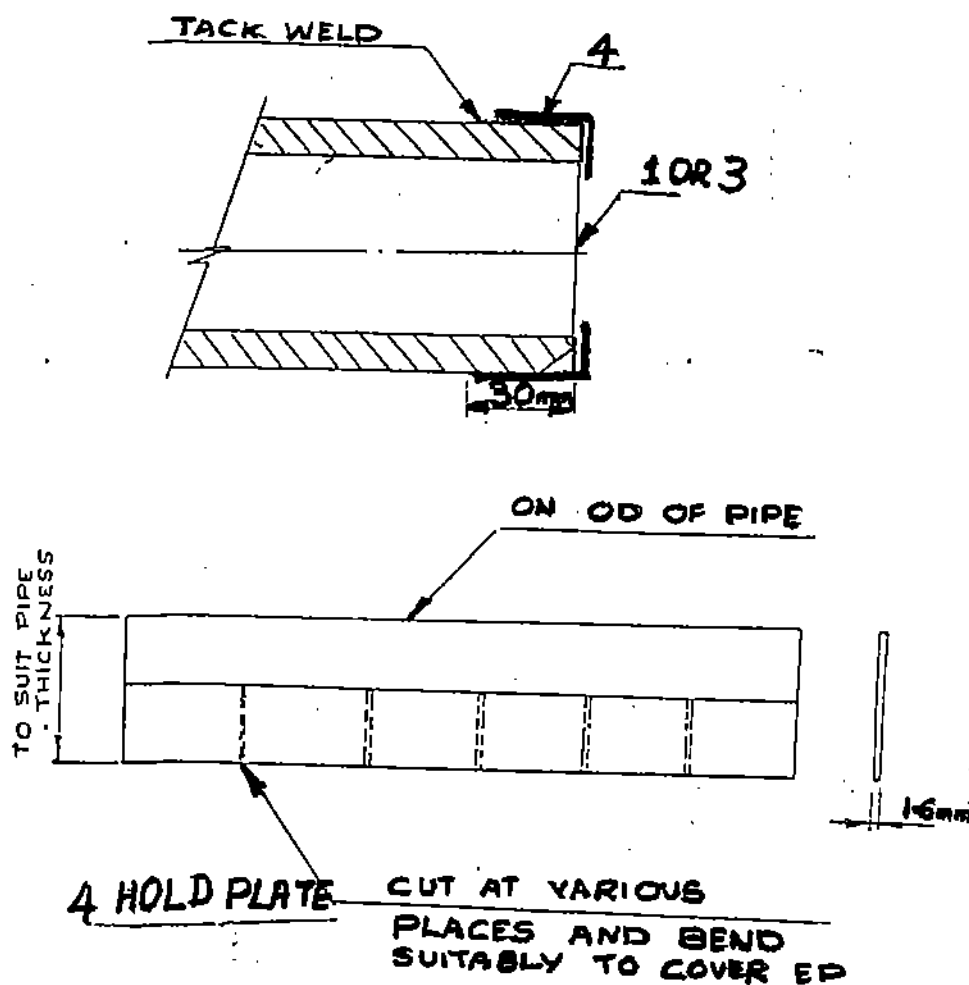
2. ELL



3 COVER

ANNEXURE II

c] $> \phi 159$ mm AND ALL FITTINGS



ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
I	NTPC Lara STPP, Stage-II (2 x 800 MW)												
A	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1321X12 BE	PY9752332013	12	Nos	IS2062E250B	PY 52 332	1900160781/10	1234.20	14810.40	1, 2	Later	0.21971	
2	MITRE 60D 3P R1.5D IS2062E250B 1321X12 BE	PY9752332102	8	Nos	IS2062E250B	PY 52 332	1900160781/20	822.80	6582.40	1, 2	Later	0.09765	
3	MITRE 45D 3P R1.5D IS2062E250B 1219X12 BE	PY9752332129	2	Nos	IS2062E250B	PY 52 332	1900160781/30	520.08	1040.16	1, 2	Later	0.01543	
4	TEE (STRT) IS2062E250B 1321X12 BE	PY9752356010	2	Nos	IS2062E250B	PY 52 356	1900160781/40	972.60	1945.20	1, 2	Later	0.02886	
B	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - AG)												
1	MITRE 30D 2P R1.5D IS2062E250B 1321X12 BE	PY9752332145	4	Nos	IS2062E250B	PY 52 332	1900160781/50	411.40	1645.60	1, 3	Later	0.02616	
2	MITRE 90D 4P R1D IS2062E250B 1321X12 BE	PY9752332013	4	Nos	IS2062E250B	PY 52 332	1900160781/60	822.80	3291.20	1, 3	Later	0.05231	
C	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	4	Nos	IS2062E250B	PY 52 332	1900160781/70	491.58	1966.32	2	Later	0.02323	
2	MITRE 90D 4P R1.5D IS2062E250B 406.4X6 BE	PY9752332080	1	Nos	IS2062E250B	PY 52 332	1900160781/80	58.12	58.12	2	Later	0.00069	
3	MITRE 60D 3P R1.5D IS2062E250B 914X10 BE	PY9752332110	16	Nos	IS2062E250B	PY 52 332	1900160781/90	327.72	5243.52	2	Later	0.06194	
4	TEE (RED) IS2062E250B 914X10-610X6 BE	PY9752356087	3	Nos	IS2062E250B	PY 52 356	1900160781/100	313.75	941.25	2	Later	0.01112	
5	RDCR (ECC) IS2062E250B 914X10-406.4X6 BE	PY9752333079	1	Nos	IS2062E250B	PY 52 333	1900160781/110	97.81	97.81	2	Later	0.00116	
D	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	1	Nos	IS2062E250B	PY 52 332	1900160781/120	491.58	491.58	3	Later	0.00622	
2	MITRE 90D 4P R1.5D IS2062E250B 610X6 BE	PY9752332064	3	Nos	IS2062E250B	PY 52 332	1900160781/130	131.38	394.14	3	Later	0.00499	
3	MITRE 90D 4P R1.5D IS2062E250B 406.4X6 BE	PY9752332080	4	Nos	IS2062E250B	PY 52 332	1900160781/140	58.12	232.48	3	Later	0.00294	
E	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - UG)												
1	ELBOW 90D LR CS 12" SCH 20 BW	PY9752101330	12	Nos	A234GRWPB	PY 52 101	1900160780/10	35.70	428.40	2	Later	0.00557	
2	ELBOW 90D LR CS 6" STD BW	PY9752101100	1	Nos	A234GRWPB	PY 52 101	1900160780/20	10.15	10.15	2	Later	0.00013	
3	RDTEE CS 12" X 8" SCH 20 X 20 BW	PY9752147259	3	Nos	A234GRWPB	PY52 147	1900160781/150	36.35	109.05	2	Later	0.00142	
4	ERDCR CS 12" X 6" SCH 20 X 40 BW	PY9752104355	1	Nos	A234GRWPB	PY52 104	1900160781/160	15.05	15.05	2	Later	0.00020	
F	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - AG)												
1	ELBOW 90D LR CS 12" SCH 20 BW	PY9752101330	1	Nos	A234GRWPB	PY 52 101	1900160780/30	35.70	35.70	3	Later	0.00050	
2	ELBOW 90D LR CS 8" SCH 20 BW	PY9752101313	3	Nos	A234GRWPB	PY 52 101	1900160780/40	15.95	47.85	3	Later	0.00067	
3	ELBOW 90D LR CS 6" STD BW	PY9752101100	4	Nos	A234GRWPB	PY 52 101	1900160780/50	10.15	40.60	3	Later	0.00057	
II	NTPC Singrauli STPP, Stage-III (2 x 800 MW)												
A	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1118X10 BE	PY9752332030	1	Nos	IS2062E250B	PY 52 332	1900160783/340	607.34	607.34	1, 2	Later	0.00901	
B	PLATE FORMED FABRICATED FITTINGS (PAINTING - INTERNAL & EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 1118X10 BE	PY9752332030	15	Nos	IS2062E250B	PY 52 332	1900160783/330	607.34	9110.10	1, 3	Later	0.14481	
2	MITRE 45D 3P R1.5D IS2062E250B 1219X12 BE	PY9752332129	1	Nos	IS2062E250B	PY 52 332	1900160783/320	520.08	520.08	1, 3	Later	0.00827	
3	MITRE 45D 3P R1.5D IS2062E250B 1118X10 BE	PY9752332137	4	Nos	IS2062E250B	PY 52 332	1900160783/310	364.51	1458.04	1, 3	Later	0.02318	
C	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - UG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	6	Nos	IS2062E250B	PY 52 332	1900160783/300	491.58	2949.48	2	Later	0.03484	
2	MITRE 90D 4P R1.5D IS2062E250B 355.6X6 BE	PY9752332099	11	Nos	IS2062E250B	PY 52 332	1900160783/290	44.23	486.53	2	Later	0.00575	
D	PLATE FORMED FABRICATED FITTINGS (PAINTING - EXTERNAL - AG)												
1	MITRE 90D 4P R1.5D IS2062E250B 914X10 BE	PY9752332048	4	Nos	IS2062E250B	PY 52 332	1900160783/280	491.58	1966.32	3	Later	0.02484	
2	MITRE 90D 4P R1.5D IS2062E250B 711X7 BE	PY9752332056	3	Nos	IS2062E250B	PY 52 332	1900160783/270	208.55	625.65	3	Later	0.00792	
3	MITRE 90D 4P R1.5D IS2062E250B 610X6 BE	PY9752332064	10	Nos	IS2062E250B	PY 52 332	1900160783/260	131.38	1313.80	3	Later	0.01663	

ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
4	MITRE 90D 4P R1.5D IS2062E250B 508X6 BE	PY9752332072	3	Nos	IS2062E250B	PY 52 332	1900160783/250	90.92	272.76	3	Later	0.00345	
5	MITRE 90D 4P R1.5D IS2062E250B 355.6X6 BE	PY9752332099	13	Nos	IS2062E250B	PY 52 332	1900160783/240	44.23	574.99	3	Later	0.00728	
6	MITRE 30D 2P R1.5D IS2062E250B 610X6 BE	PY9752332153	3	Nos	IS2062E250B	PY 52 332	1900160783/230	65.06	195.18	3	Later	0.00247	
7	MITRE 30D 2P R1.5D IS2062E250B 457X6 BE	PY9752332161	3	Nos	IS2062E250B	PY 52 332	1900160783/220	36.44	109.32	3	Later	0.00138	
8	TEE (STRT) IS2062E250B 1219X12 BE	PY9752356028	1	Nos	IS2062E250B	PY 52 356	1900160783/210	827.02	827.02	3	Later	0.01047	
9	TEE (STRT) IS2062E250B 1118X10 BE	PY9752356036	3	Nos	IS2062E250B	PY 52 356	1900160783/200	602.73	1808.19	3	Later	0.02289	
10	TEE (STRT) IS2062E250B 711X7 BE	PY9752356044	1	Nos	IS2062E250B	PY 52 356	1900160783/190	194.03	194.03	3	Later	0.00246	
11	TEE (RED) IS2062E250B 1219X12-711X7 BE	PY9752356052	3	Nos	IS2062E250B	PY 52 356	1900160783/180	653.63	1960.89	3	Later	0.02482	
12	TEE (RED) IS2062E250B 1219X12-508X6 BE	PY9752356060	3	Nos	IS2062E250B	PY 52 356	1900160783/170	645.53	1936.59	3	Later	0.02451	
13	TEE (RED) IS2062E250B 1118X10-610X6 BE	PY9752356079	4	Nos	IS2062E250B	PY 52 356	1900160783/160	457.75	1831.00	3	Later	0.02317	
14	TEE (RED) IS2062E250B 914X10-610X6 BE	PY9752356087	3	Nos	IS2062E250B	PY 52 356	1900160783/150	313.75	941.25	3	Later	0.01191	
15	TEE (RED) IS2062E250B 914X10-406.4X6 BE	PY9752356095	1	Nos	IS2062E250B	PY 52 356	1900160783/140	306.12	306.12	3	Later	0.00387	
16	TEE (RED) IS2062E250B 711X7-457X6 BE	PY9752356109	3	Nos	IS2062E250B	PY 52 356	1900160783/130	134.28	402.84	3	Later	0.00510	
17	RDCR (CON) IS2062E250B 1219X12-1118X10 BE	PY9752333010	1	Nos	IS2062E250B	PY 52 333	1900160783/120	223.55	223.55	3	Later	0.00283	
18	RDCR (CON) IS2062E250B 711X7-610X6 BE	PY9752333028	3	Nos	IS2062E250B	PY 52 333	1900160783/110	64.08	192.24	3	Later	0.00243	
19	RDCR (CON) IS2062E250B 610X6-508X6 BE	PY9752333036	3	Nos	IS2062E250B	PY 52 333	1900160783/100	41.57	124.71	3	Later	0.00158	
20	RDCR (CON) IS2062E250B 508X6-406.4X6 BE	PY9752333044	3	Nos	IS2062E250B	PY 52 333	1900160783/90	33.92	101.76	3	Later	0.00129	
21	RDCR (CON) IS2062E250B 457X6-355.6X6 BE	PY9752333052	3	Nos	IS2062E250B	PY 52 333	1900160783/80	22.57	67.71	3	Later	0.00086	
22	RDCR (CON) IS2062E250B 406.4X6-323.8X6 BE	PY9752333060	1	Nos	IS2062E250B	PY 52 333	1900160783/70	18.92	18.92	3	Later	0.00024	
23	RDCR (ECC) IS2062E250B 711X7-355.6X6 BE	PY9752333087	1	Nos	IS2062E250B	PY 52 333	1900160783/60	56.79	56.79	3	Later	0.00072	
24	RDCR (ECC) IS2062E250B 610X6-508X6 BE	PY9752333036	4	Nos	IS2062E250B	PY 52 333	1900160783/50	41.57	166.28	3	Later	0.00210	
E	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - UG)												
	NIL												
F	ASTM FITTINGS AS PER ASME B16.9 (PAINTING - EXTERNAL - AG)												
1	ELBOW 90D A234WPB 12" SCH 20 BE	PY9752101330	4	Nos	A234GRWPB	PY 52 101	1900160782/10	35.70	142.80	3	Later	0.00199	
2	CAP CS 48" SCH XS BW	PY9752181325	1	Nos	A234GRWPB	PY 52 181	1900160783/40	165.63	165.63	3	Later	0.00231	
3	CAP CS 44" SCH STD BW	PY9752181333	1	Nos	A234GRWPB	PY 52 181	1900160783/30	107.65	107.65	3	Later	0.00150	
4	CAP CS 36" SCH STD BW	PY9752181341	1	Nos	A234GRWPB	PY 52 181	1900160783/20	73.43	73.43	3	Later	0.00102	
5	CAP CS 28" SCH 10 BW	PY9752181350	1	Nos	A234GRWPB	PY 52 181	1900160783/10	45.07	45.07	3	Later	0.00063	
												1.00000	

NOTES:

- 1) Bidder to Quote Single Lumpsum Price for all the Groups of Fittings.
- 2) Bidder to Quote for all items. Partial offers shall not be considered for evaluation.
- 3) Bidder to indicate "Quoted" against each item, in the column "Bidder's Confirmation" as a confirmation of their bid.
- 4) Bid Evaluation shall be on overall L1 basis.
- 5) The fittings are to be supplied in painted condition. Bidder to consider the Painting requirements of individual lines items, as per the indicated Painting Scheme, while quoting.
- 6) Bidder shall note that Painting shall be as per Painting scheme:
A) Lara : Doc No 1834:QPC:12 Rev 01
B) Singrauli : Doc No 1840:QPC:12 Rev 01
- 7) Bidder to note that different painting scheme is applicable for different line items. Paintings scheme S.No provided against each line item shall be referred for painting applicability.
- 8) Bidders to quote as per the Pre-Qualification Criteria given.
- 9) Final ordering quantity may vary upto +/- 25% of the finalised package value, which shall be informed while placing purchase order.

ANNEXURE-A :: BOQ CUM UNPRICED BID FORMAT

NTPC Lara Super Thermal Power Plant, Stage-II (2 x 800 MW)

PGMA :: 80-477

Plate formed Fabricated Fittings & ASME Fittings for Raw Water System

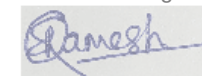
Item No	Material Description	Material Code	Quantity	UOM	Material Specification	BHEL Technical Specification	PR Number	Unit Weight (Kg)	Total Weight (Kg)	Painting Scheme	DU No.	Price Weightage Factor	Bidder's Confirmation
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- 10)
- Unit Price for the individual line items shall be derived by multiplying the lumpsum price quoted/price finalized after RA, with the Price Weightage Factor and dividing the resultant by the Quantity.
- 11)
- Unit Price thus arrived, shall be binding on the bidder, post order placement, for the total duration of the Contract, for possible amendment upto +10% of the PO Value.
- 12)
- No Observations / Objections shall be entertained after the Techno-Commercial Bid is opened.
- 13)
- The Total Lump price quoted for each of the packages, shall be INCLUSIVE of GST, Freight, Packing & Forwarding and Testing Charges.
- 14)
- The Total Lump price quoted for each of the packages, shall be EXCLUSIVE of Third party inspection (TPI) & Insurance Charges.







**SURFACE PREPARATION AND PAINTING SCHEME
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM**

**ANNEXURE-F TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI**



 BHARAT HEAVY ELECTRICALS LIMITED PIPING QUALITY ASSURANCE & CONTROL DEPT, TRICHY			PAINTING SCHEME FOR LP PIPING (ACW / ECW / Plant water, Air Piping, etc...,) PROJECT : NTPC LARA SUPER THERMAL POWER PLANT - STAGE II (2X800MW) BHEL CUSTOMER Nos : 1834, 1835								QPNo: 1834:QPC:12 REV.NO: 01 Dt : 19.07.2024	
Sl. NO	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat			Finish coat			Total DFT Microns (Min.)	REMARKS
			Primer	No of coats	Paint	No of coats	Shade	Paint	No of coats	Shade		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	(a) Internal Surface - ACW Pipe (for pipe - dia - 1000 mm and above)	Blast Cleaning SSPC SP-10 SA 2½ (Refer Note 1)	Epoxy based Zinc rich Primer (Refer Note 2)	1 (50 Microns Min. per coat)	----	----	----	Coal tar epoxy (Refer Note 2)	2 (75 Microns Min. per coat)	----	200 Microns (Refer Note 3)	(Refer Note 3)
	(b) Holiday test (Refer Note 3)	Holiday testing by low voltage (75 Volts Min.) wet sponge Holiday detector or by High voltage (Votage per micron of DFT is as recommended by Paint Manufacturer subjected to minimum of 5V / Micron). Holiday test Equipment to be calibrated before testing.										
2	External Surface of ACW --Buried Piping / Encased in concrete (Temporary Protection for transportation from works to site). **Further protection to be done by BHEL Erection Group as per Contract requirement.	SSPC-SP3 / Power Tool Cleaning	Red Oxide Zinc Phosphate (Alkyd base to IS 12744)	1 (30 Microns per coat)	----	----	----	----	----	----	30 Microns	
3	External Surface a) Over ground piping of ACW.(For all diameters) b) External Surface of ECW, Plant water (For all diameters)	SSPC-SP3 / Power Tool Cleaning	Red Oxide - Zinc Phosphate (Alkyd base to IS: 12744)	2 (25 Microns per coat)	----	----	----	Synthetic enamel Long oil Alkyd to IS: 2932	3 ** (35 microns per coat)	Smoke Grey (Shade No. 692 of IS: 5)	120 at shop + 35 at site	** (2 coat at shop + 1 coat at site)
4	Galvanised and Stainless steel Piping	No painting										
Notes: 1. Blast cleaning to near white metal to obtain roughness as per epoxy paint data sheet. 2. Application of Epoxy based Zinc rich Primer, Coal Tar Epoxy shall be done as per manufacturer's data sheet / recommendation, meeting the thickness requirements as per this document. 3. Testing requirements like DFT, holiday test shall be as per BHEL approved QP with Witness by BHEL / BHEL nominated inspection agency. 4. Colour shade shall be as per NTPC colour coding scheme.												
				For NTPC use MDL No : 9587-001-102-PVM-B-001B								Page 1/1
PREPARED BY :		APPROVED BY:										
K. SARANYA MGR/QA		S JEGAN SR.MGR/Q										

 BHARAT HEAVY ELECTRICALS LIMITED PIPING QUALITY ASSURANCE & CONTROL DEPT, TRICHY			PAINTING SCHEME FOR LP PIPING (ACW / ECW / Plant water, Air Piping, etc...,) PROJECT : NTPC SINGRAULI SUPER THERMAL POWER PROJECT- STAGE III (2X800 MW) BHEL CUSTOMER Nos : 1840,1841								QPNo: 1840;QPC:12 REV.NO: 01 Dt : 10.09.2024	
Sl. NO	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat			Finish coat			Total DFT Microns (Min.)	REMARKS
			Primer	No of coats	Paint	No of coats	Shade	Paint	No of coats	Shade		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	(a) Internal Surface - ACW Pipe (for pipe - dia - 1000 mm and above)	Blast Cleaning SSPC SP-10 SA 2½ (Refer Note 1)	Epoxy based Zinc rich Primer (Refer Note 2)	1 (50 Microns Min. per coat)	-----	-----	-----	Coal tar epoxy (Refer Note 2)	2 (75 Microns Min. per coat)	-----	200 Microns (Refer Note 3)	(Refer Note 3)
	(b) Holiday test (Refer Note 3)	Holiday testing by low voltage (75 Volts Min.) wet sponge Holiday detector or by High voltage (Voltage per micron of DFT is as recommended by Paint Manufacturer subjected to minimum of 5V / Micron). Holiday test Equipment to be calibrated before testing.										
2	External Surface of ACW --Buried Piping / Encased in concrete (Temporary Protection for transportation from works to site). **Further protection to be done by BHEL Erection Group as per Contract requirement.	SSPC-SP3 / Power Tool Cleaning	Red Oxide Zinc Phosphate (Alkyd base to IS 12744)	1 (30 Microns per coat)	-----	-----	-----	-----	-----	-----	30 Microns	
3	External Surface a) Over ground piping of ACW (For all diameters) b) External Surface of ECW, Plant water (For all diameters)	SSPC-SP3 / Power Tool Cleaning	Red Oxide - Zinc Phosphate (Alkyd base to IS: 12744)	2 (25 Microns per coat)	-----	-----	-----	Synthetic enamel Long oil Alkyd to IS: 2932	3 ** (35 microns per coat)	Smoke Grey (Shade No. 692 of IS: 5)	120 at shop + 35 at site	** (2 coat at shop + 1 coat at site)
4	Galvanised and Stainless steel Piping	No painting										
Notes: 1 Blast cleaning to near white metal to obtain roughness as per epoxy paint data sheet. 2 Application of Epoxy based Zinc rich Primer, Coal Tar Epoxy shall be done as per manufacturer's data sheet / recommendation, meeting the thickness requirements as per this document. 3 Testing requirements like DFT, holiday test shall be as per BHEL approved QP with Witness by BHEL / BHEL nominated inspection agency. 4 Colour shade shall be as per NTPC colour coding scheme. 5 Surface preparation, priming and painting of all non-insulated above ground piping except galvanized steel piping & stainless steel piping shall be as mentioned in the above painting scheme 6 For External Surface of ACW --Buried Piping / Encased in concrete, painting scheme for Temporary Protection for transportation from works to site is mentioned in S. No: 2. **Further protection to be done by BHEL Erection Group for Coating and wrapping/ Anti corrosive Protection Coal tar tape on the External Surface of ACW --Buried Piping / Encased in concrete as per Contract requirement.												
						For NTPC use MDL No : 1150-001-102-PVM-B-001B						Page 1/1
PREPARED BY :		REVIEWED BY:		APPROVED BY:								
M MANOJ PANDI MGR/QA		K. SARANYA MGR/QA		S JEGAN SR.MGR/Q								

Section V: Approved Supplier List for Paints

Vendor No	Vendor Name	Mat Group	Material Group Description	CITY	EMAIL	Specification	TDC	CITY1	PHONE2
17627	KORROCOAT POLYMERS PVT LTD	PGDIP	DIP COAT PAINT	MH	korrocoatpolymers@yahoo.co.in	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	PUNE.	0 98900 00370
18403	HARLEQUIN PAINTS PVT LTD	PGDIP	DIP COAT PAINT	MH	harlequinchem@yahoo.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	KHOPOLI.	0 98201 49080
10174	NOVAA PAINTS	PGDIP	DIP COAT PAINT	TN	novapaints89@gmail.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	TIRUCHIRAPALLI-13	0 96009 07011
10268	SUNDARAM PAINTS PVT LTD	PGDIP	DIP COAT PAINT	TN	sundarampaint1@rediffmail.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	THANJAVUR	
19552	GRAUER & WEIL (INDIA) LTD.,	PGDIP	DIP COAT PAINT	KA	bp1chennai@rediffmail.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	CHENNAI	
19620	CHEMECOAT PAINTS,	PGDIP	DIP COAT PAINT	TN	chemekkn@bsnl.in	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	TRICHY	0 98424 45649
19764	SYNORGANIC PAINTS PVT LTD	PGDIP	DIP COAT PAINT	AP	synovsp@gmail.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	VISAKHAPATNAM,	9701702411
10308	WESTERN INDIA PAINT& COLOUR CO. (P)	PGDIP	DIP COAT PAINT	TN	westernpaints@gmail.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	CHENNAI	0 98840 88887
18491	TITAN PAINTS & CHEMICALS LTD	PGDIP	DIP COAT PAINT	TN	businessdevelopment@titanpaints.in	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	COIMBATORE.	9003555628
10635	PASU MEENA PAINTS INDUSTRIES	PGDIP	DIP COAT PAINT	TN	pasummeena@yahoo.com	120011121900,120011120002,120050530000	PR:CHEM09-03/REV02D230810	TIRUPPUVANAM	0 9443065268
10308	WESTERN INDIA PAINT& COLOUR CO. (P)	PGPH1	PSS:HR.AL.Paint Gr-I	TN	westernpaints@gmail.com	IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI	0 98840 88887
18491	TITAN PAINTS & CHEMICALS LTD	PGPH1	PSS:HR.AL.Paint Gr-I	TN	businessdevelopment@titanpaints.in	IS:13183 GRADE-I	AS PER BHEL TDC	COIMBATORE.	9003555628
10031	BERGER PAINTS INDIA LTD.,	PGPH1	PSS:HR.AL.Paint Gr-I	TN	bpil_ch2@sify.com	IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI	9282329896
10051	CARBOLINE INDIA PRIVATE LTD	PGPH1	PSS:HR.AL.Paint Gr-I	TN	anand@carbolineindia.com	IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI.	0 76674 71777
18747	SHREE SURYA COATINGS	PGPH1	PSS:HR.AL.Paint Gr-I	MH	info@shreesuryacoatings.com	IS:13183 GRADE-I	AS PER BHEL TDC	NASIK	0 97652 40987
10323	STAR PAINT & OIL INDUSTRIES	PGPH1	PSS:HR.AL.Paint Gr-I	MH		IS:13183 GRADE-I	AS PER BHEL TDC	MUMBAI	
18403	HARLEQUIN PAINTS PVT LTD	PGPH1	PSS:HR.AL.Paint Gr-I	MH	harlequinchem@yahoo.com	IS:13183 GRADE-I	AS PER BHEL TDC	KHOPOLI.	0 98201 49080
10174	NOVAA PAINTS	PGPH1	PSS:HR.AL.Paint Gr-I	TN	novapaints89@gmail.com	IS:13183 GRADE-I	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPH1	PSS:HR.AL.Paint Gr-I	TN		IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI	
18248	POWER LIGHT PAINTS	PGPH1	PSS:HR.AL.Paint Gr-I	TN	powerlightpaints@yahoo.in	IS:13183 GRADE-I	AS PER BHEL TDC	TRICHY.	0 98424 03768
19764	SYNORGANIC PAINTS PVT LTD	PGPH1	PSS:HR.AL.Paint Gr-I	AP	synovsp@gmail.com	IS:13183 GRADE-I	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
10930	ADVANCE PAINTS PVT LTD.,	PGPH1	PSS:HR.AL.Paint Gr-I	TN	aplch@vsnl.net	IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI	
16739	JOTUN INDIA PVT LTD	PGPH1	PSS:HR.AL.Paint Gr-I	TN	moinudin.i@jotun.com	IS:13183 GRADE-I	AS PER BHEL TDC	CHENNAI.	0 87544 80089
17627	KORROCOAT POLYMERS PVT LTD	PGPH1	PSS:HR.AL.Paint Gr-I	MH	korrocoatpolymers@yahoo.co.in	IS:13183 GRADE-I	AS PER BHEL TDC	PUNE.	0 98900 00370
18403	HARLEQUIN PAINTS PVT LTD	PGPH2	H.R.ALUMINIUM PAINTS	MH	harlequinchem@yahoo.com	IS:13183 GRADE-II	AS PER BHEL TDC	KHOPOLI.	0 98201 49080
18248	POWER LIGHT PAINTS	PGPH2	H.R.ALUMINIUM PAINTS	TN	powerlightpaints@yahoo.in	IS:13183 GRADE-II	AS PER BHEL TDC	TRICHY.	0 98424 03768
10930	ADVANCE PAINTS PVT LTD.,	PGPH2	H.R.ALUMINIUM PAINTS	TN	aplch@vsnl.net	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI	
16739	JOTUN INDIA PVT LTD	PGPH2	H.R.ALUMINIUM PAINTS	TN	moinudin.i@jotun.com	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI.	0 87544 80089
17627	KORROCOAT POLYMERS PVT LTD	PGPH2	H.R.ALUMINIUM PAINTS	MH	korrocoatpolymers@yahoo.co.in	IS:13183 GRADE-II	AS PER BHEL TDC	PUNE.	0 98900 00370
18491	TITAN PAINTS & CHEMICALS LTD	PGPH2	H.R.ALUMINIUM PAINTS	TN	businessdevelopment@titanpaints.in	IS:13183 GRADE-II	AS PER BHEL TDC	COIMBATORE.	9003555628
10308	WESTERN INDIA PAINT& COLOUR CO. (P)	PGPH2	H.R.ALUMINIUM PAINTS	TN	westernpaints@gmail.com	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI	0 98840 88887
10323	STAR PAINT & OIL INDUSTRIES	PGPH2	H.R.ALUMINIUM PAINTS	MH		IS:13183 GRADE-II	AS PER BHEL TDC	MUMBAI	
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPH2	H.R.ALUMINIUM PAINTS	TN		IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI	

Section V: Approved Supplier List for Paints

Vendor No	Vendor Name	Mat Group	Material Group Description	CITY	EMAIL	Specification	TDC	CITY1	PHONE2
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPH2	H.R.ALUMINIUM PAINTS	TN	smohammad.mohideen@asianpaintspg.com	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI	
18747	SHREE SURYA COATINGS	PGPH2	H.R.ALUMINIUM PAINTS	MH	info@shreesuryacoatings.com	IS:13183 GRADE-II	AS PER BHEL TDC	NASIK	0 97652 40987
10031	BERGER PAINTS INDIA LTD.,	PGPH2	H.R.ALUMINIUM PAINTS	TN	bpil_ch2@sify.com	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI	9282329896
10174	NOVAA PAINTS	PGPH2	H.R.ALUMINIUM PAINTS	TN	novapaints89@gmail.com	IS:13183 GRADE-II	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
10051	CARBOLINE INDIA PRIVATE LTD	PGPH2	H.R.ALUMINIUM PAINTS	TN	anand@carbolineindia.com	IS:13183 GRADE-II	AS PER BHEL TDC	CHENNAI.	0 76674 71777
19620	CHEMECOAT PAINTS,	PGPH2	H.R.ALUMINIUM PAINTS	TN	chemekkn@bsnl.in	IS:13183 GRADE-II	AS PER BHEL TDC	TRICHY	0 98424 45649
19764	SYNORGANIC PAINTS PVT LTD	PGPH2	H.R.ALUMINIUM PAINTS	AP	synovsp@gmail.com	IS:13183 GRADE-II	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
10242	SHALIMAR PAINTS LTD.	PGPH3	H.R.ALUMINIUM PAINTS	TN		IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI	
19764	SYNORGANIC PAINTS PVT LTD	PGPH3	H.R.ALUMINIUM PAINTS	AP	synovsp@gmail.com	IS:13183 GRADE-III	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
17627	KORROCOAT POLYMERS PVT LTD	PGPH3	H.R.ALUMINIUM PAINTS	MH	korrocoatpolymers@yahoo.co.in	IS:13183 GRADE-III	AS PER BHEL TDC	PUNE.	0 98900 00370
17784	SEVEN SEAS PAINTS PVT. LIMITED	PGPH3	H.R.ALUMINIUM PAINTS	UP	gagan@smgroup.net.in	IS:13183 GRADE-III	AS PER BHEL TDC	NOIDA	09811775278
10174	NOVAA PAINTS	PGPH3	H.R.ALUMINIUM PAINTS	TN	novapaints89@gmail.com	IS:13183 GRADE-III	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
18248	POWER LIGHT PAINTS	PGPH3	H.R.ALUMINIUM PAINTS	TN	powerlightpaints@yahoo.in	IS:13183 GRADE-III	AS PER BHEL TDC	TRICHY.	0 98424 03768
18747	SHREE SURYA COATINGS	PGPH3	H.R.ALUMINIUM PAINTS	MH	info@shreesuryacoatings.com	IS:13183 GRADE-III	AS PER BHEL TDC	NASIK	0 97652 40987
18403	HARLEQUIN PAINTS PVT LTD	PGPH3	H.R.ALUMINIUM PAINTS	MH	harlequinchem@yahoo.com	IS:13183 GRADE-III	AS PER BHEL TDC	KHOPOLI.	0 98201 49080
18491	TITAN PAINTS & CHEMICALS LTD	PGPH3	H.R.ALUMINIUM PAINTS	TN	businessdevelopment@titanpaints.in	IS:13183 GRADE-III	AS PER BHEL TDC	COIMBATORE.	9003555628
10308	WESTERN INDIA PAINT & COLOUR CO. (P)	PGPH3	H.R.ALUMINIUM PAINTS	TN	westernpaints@gmail.com	IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI DIST.	0 98840 88887
18453	RAMDEV RESINS PVT LTD	PGPH3	H.R.ALUMINIUM PAINTS	GJ	info@ramdevcoatings.com	IS:13183 GRADE-III	AS PER BHEL TDC	GANDHINAGAR.	0 93750 80920
10031	BERGER PAINTS INDIA LTD.,	PGPH3	H.R.ALUMINIUM PAINTS	TN	bpil_ch2@sify.com	IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI	9282329896
19552	GRAUER & WEIL (INDIA) LTD.,	PGPH3	H.R.ALUMINIUM PAINTS	KA	bplchennai@rediffmail.com	IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI	
10051	CARBOLINE INDIA PRIVATE LTD	PGPH3	H.R.ALUMINIUM PAINTS	TN	anand@carbolineindia.com	IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI.	0 76674 71777
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPH3	H.R.ALUMINIUM PAINTS	TN	smohammad.mohideen@asianpaintspg.com	IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI	
10323	STAR PAINT & OIL INDUSTRIES	PGPH3	H.R.ALUMINIUM PAINTS	MH		IS:13183 GRADE-III	AS PER BHEL TDC	MUMBAI	
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPH3	H.R.ALUMINIUM PAINTS	TN		IS:13183 GRADE-III	AS PER BHEL TDC	CHENNAI	
19552	GRAUER & WEIL (INDIA) LTD.,	PGPTC	PSS:PAINTS & THINNER	KA	bplchennai@rediffmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	
10930	ADVANCE PAINTS PVT LTD.,	PGPTC	PSS:PAINTS & THINNER	TN	aplch@vsnl.net	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPTC	PSS:PAINTS & THINNER	TN	smohammad.mohideen@asianpaintspg.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	

Section V: Approved Supplier List for Paints

Vendor No	Vendor Name	Mat Group	Material Group Description	CITY	EMAIL	Specification	TDC	CITY1	PHONE2
10308	WESTERN INDIA PAINT & COLOUR CO. (P)	PGPTC	PSS:PAINTS & THINNER	TN	westernpaints@gmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	0 98840 88887
18747	SHREE SURYA COATINGS	PGPTC	PSS:PAINTS & THINNER	MH	info@shreesuryacoatings.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	NASIK	0 97652 40987
18248	POWER LIGHT PAINTS	PGPTC	PSS:PAINTS & THINNER	TN	powerlightpaints@yahoo.in	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	TRICHY.	0 98424 03768
10268	SUNDARAM PAINTS PVT LTD	PGPTC	PSS:PAINTS & THINNER	TN	sundarampaint1@rediffmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	THANJAVUR	
10174	NOVAA PAINTS	PGPTC	PSS:PAINTS & THINNER	TN	novapaints89@gmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPTC	PSS:PAINTS & THINNER	TN		IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	
19620	CHEMECOAT PAINTS,	PGPTC	PSS:PAINTS & THINNER	TN	chemekkn@bsnl.in	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	TRICHY	0 98424 45649
10635	PASU MEENA PAINTS INDUSTRIES	PGPTC	PSS:PAINTS & THINNER	TN	pasummeena@yahoo.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	TIRUPPUVANAM	0 9443065268
17784	SEVEN SEAS PAINTS PVT. LIMITED	PGPTC	PSS:PAINTS & THINNER	UP	gagan@smgroup.net.in	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	NOIDA	09811775278
19568	DOOALL CORPRO INDIA	PGPTC	PSS:PAINTS & THINNER	MH	dadiabharath@gmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	MUMBAI	0 9819491313
17627	KORROCOAT POLYMERS PVT LTD	PGPTC	PSS:PAINTS & THINNER	MH	korrocoatpolymers@yahoo.co.in	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	PUNE.	0 98900 00370
16739	JOTUN INDIA PVT LTD	PGPTC	PSS:PAINTS & THINNER	TN	moinudin.i@jotun.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI.	0 87544 80089
19764	SYNORGANIC PAINTS PVT LTD	PGPTC	PSS:PAINTS & THINNER	AP	synovsp@gmail.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
10031	BERGER PAINTS INDIA LTD.,	PGPTC	PSS:PAINTS & THINNER	TN	bpil_ch2@sify.com	IS:2074,2932,104,2339 & BHEL SPEC PR:CHEM:0	AS PER BHEL TDC	CHENNAI	9282329896
10174	NOVAA PAINTS	PGPTE	EPOXY BASED PAINTS &	TN	novapaints89@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
19568	DOOALL CORPRO INDIA	PGPTE	EPOXY BASED PAINTS &	MH	dadiabharath@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	MUMBAI	0 9819491313
18747	SHREE SURYA COATINGS	PGPTE	EPOXY BASED PAINTS &	MH	info@shreesuryacoatings.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	NASIK	0 97652 40987
19764	SYNORGANIC PAINTS PVT LTD	PGPTE	EPOXY BASED PAINTS &	AP	synovsp@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
10051	CARBOLINE INDIA PRIVATE LTD	PGPTE	EPOXY BASED PAINTS &	TN	anand@carbolineindia.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI.	0 76674 71777
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPTE	EPOXY BASED PAINTS &	TN	smohammad.mohideen@asianpaintspg.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
18491	TITAN PAINTS & CHEMICALS LTD	PGPTE	EPOXY BASED PAINTS &	TN	businessdevelopment@titanpaints.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	COIMBATORE.	9003555628
10308	WESTERN INDIA PAINT & COLOUR CO. (P)	PGPTE	EPOXY BASED PAINTS &	TN	westernpaints@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	0 98840 88887
10031	BERGER PAINTS INDIA LTD.,	PGPTE	EPOXY BASED PAINTS &	TN	bpil_ch2@sify.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	9282329896
16739	JOTUN INDIA PVT LTD	PGPTE	EPOXY BASED PAINTS &	TN	moinudin.i@jotun.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI.	0 87544 80089
17627	KORROCOAT POLYMERS PVT LTD	PGPTE	EPOXY BASED PAINTS &	MH	korrocoatpolymers@yahoo.co.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	PUNE.	0 98900 00370
19620	CHEMECOAT PAINTS,	PGPTE	EPOXY BASED PAINTS &	TN	chemekkn@bsnl.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	TRICHY	0 98424 45649
10930	ADVANCE PAINTS PVT LTD.,	PGPTE	EPOXY BASED PAINTS &	TN	aplch@vsnl.net	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	

Section V: Approved Supplier List for Paints

Vendor No	Vendor Name	Mat Group	Material Group Description	CITY	EMAIL	Specification	TDC	CITY1	PHONE2
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPTE	EPOXY BASED PAINTS &	TN		AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
13494	GRAND POLYCOATS CO. PVT. LTD,	PGPTE	EPOXY BASED PAINTS &	GJ	marketing@grandpolycoats.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VADODARA	
18248	POWER LIGHT PAINTS	PGPTE	EPOXY BASED PAINTS &	TN	powerlightpaints@yahoo.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	TRICHY.	0 98424 03768
19552	GRAUER & WEIL (INDIA) LTD.,	PGPTE	EPOXY BASED PAINTS &	KA	bplchennai@rediffmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
10007	AKZO NOBEL INDIA LTD.	PGPTF	EPOXY FINISH PAINTS	KA	pvr.narasimharao@akzonobel.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	BANGALORE	0 98804 22270
10031	BERGER PAINTS INDIA LTD.,	PGPTF	EPOXY FINISH PAINTS	TN	bpil_ch2@sify.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	9282329896
16739	JOTUN INDIA PVT LTD	PGPTF	EPOXY FINISH PAINTS	TN	moinudin.i@jotun.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI.	0 87544 80089
10930	ADVANCE PAINTS PVT LTD.,	PGPTF	EPOXY FINISH PAINTS	TN	aplch@vsnl.net	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
19764	SYNORGANIC PAINTS PVT LTD	PGPTF	EPOXY FINISH PAINTS	AP	synovsp@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
17627	KORROCOAT POLYMERS PVT LTD	PGPTF	EPOXY FINISH PAINTS	MH	korrocoatpolymers@yahoo.co.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	PUNE.	0 98900 00370
10308	WESTERN INDIA PAINT& COLOUR CO. (P)	PGPTF	EPOXY FINISH PAINTS	TN	westernpaints@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	0 98840 88887
19568	DOOALL CORPRO INDIA	PGPTF	EPOXY FINISH PAINTS	MH	dadiabharath@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	MUMBAI	0 9819491313
19620	CHEMECOAT PAINTS,	PGPTF	EPOXY FINISH PAINTS	TN	chemekkn@bsnl.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	TRICHY	0 98424 45649
10174	NOVAA PAINTS	PGPTF	EPOXY FINISH PAINTS	TN	novapaints89@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
18491	TITAN PAINTS & CHEMICALS LTD	PGPTF	EPOXY FINISH PAINTS	TN	businessdevelopment@titanpaints.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	COIMBATORE.	9003555628
18248	POWER LIGHT PAINTS	PGPTF	EPOXY FINISH PAINTS	TN	powerlightpaints@yahoo.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	TRICHY.	0 98424 03768
10051	CARBOLINE INDIA PRIVATE LTD	PGPTF	EPOXY FINISH PAINTS	TN	anand@carbolineindia.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI.	0 76674 71777
19552	GRAUER & WEIL (INDIA) LTD.,	PGPTF	EPOXY FINISH PAINTS	KA	bplchennai@rediffmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPTF	EPOXY FINISH PAINTS	TN	smohammad.mohideen@asianpaintspg.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
13494	GRAND POLYCOATS CO. PVT. LTD,	PGPTF	EPOXY FINISH PAINTS	GJ	marketing@grandpolycoats.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VADODARA	
18747	SHREE SURYA COATINGS	PGPTF	EPOXY FINISH PAINTS	MH	info@shreesuryacoatings.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	NASIK	0 97652 40987
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPTF	EPOXY FINISH PAINTS	TN		AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
19568	DOOALL CORPRO INDIA	PGPTP	SPECIAL PRIMER PAINT	MH	dadiabharath@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	MUMBAI	0 9819491313
18491	TITAN PAINTS & CHEMICALS LTD	PGPTP	SPECIAL PRIMER PAINT	TN	businessdevelopment@titanpaints.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	COIMBATORE.	9003555628
18248	POWER LIGHT PAINTS	PGPTP	SPECIAL PRIMER PAINT	TN	powerlightpaints@yahoo.in	AS PER CUSTOMER REQ	AS PER BHEL TDC	TRICHY.	0 98424 03768
10051	CARBOLINE INDIA PRIVATE LTD	PGPTP	SPECIAL PRIMER PAINT	TN	anand@carbolineindia.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI.	0 76674 71777
10174	NOVAA PAINTS	PGPTP	SPECIAL PRIMER PAINT	TN	novapaints89@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	TIRUCHIRAPALLI-13	0 96009 07011
10442	ASIAN PAINTS PPG PRIVATE LTD.	PGPTP	SPECIAL PRIMER PAINT	TN	smohammad.mohideen@asianpaintspg.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
13494	GRAND POLYCOATS CO. PVT. LTD,	PGPTP	SPECIAL PRIMER PAINT	GJ	marketing@grandpolycoats.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VADODARA	
10031	BERGER PAINTS INDIA LTD.,	PGPTP	SPECIAL PRIMER PAINT	TN	bpil_ch2@sify.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	9282329896
19764	SYNORGANIC PAINTS PVT LTD	PGPTP	SPECIAL PRIMER PAINT	AP	synovsp@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	VISAKHAPATNAM,	9701702411
18747	SHREE SURYA COATINGS	PGPTP	SPECIAL PRIMER PAINT	MH	info@shreesuryacoatings.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	NASIK	0 97652 40987
19552	GRAUER & WEIL (INDIA) LTD.,	PGPTP	SPECIAL PRIMER PAINT	KA	bplchennai@rediffmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	
10308	WESTERN INDIA PAINT& COLOUR CO. (P)	PGPTP	SPECIAL PRIMER PAINT	TN	westernpaints@gmail.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	0 98840 88887

Section V: Approved Supplier List for Paints

Vendor No	Vendor Name	Mat Group	Material Group Description	CITY	EMAIL	Specification	TDC	CITY1	PHONE2
16739	JOTUN INDIA PVT LTD	PGPTP	SPECIAL PRIMER PAINT	TN	moinudin.i@jotun.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	0 87544 80089
10007	AKZO NOBEL INDIA LTD.	PGPTP	SPECIAL PRIMER PAINT	KA	pvr.narasimharao@akzonobel.com	AS PER CUSTOMER REQ	AS PER BHEL TDC	BANGALORE	0 98804 22270
10095	KANSAI NEROLAC PAINTS LIMITED,	PGPTP	SPECIAL PRIMER PAINT	TN		AS PER CUSTOMER REQ	AS PER BHEL TDC	CHENNAI	



CHECKLIST FORMAT
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-C TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Description	Yes / No
Bidder to confirm that ALL THE DOCUMENTS SPECIFIED in Clause No 5.0 of purchaser's Job Specification (Doc.No. PEMC-07786) are submitted along with the technical offer.		
Stamped & Signed copies of the following documents:		
1	PY52332, Technical Specification for Mitre Bends with IS 2062 Plate formed Pipes (or) IS 3589 Pipes & the relevant Reference documents.	
2	PY52333, Technical Specification for Fabricated Reducers using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.	
3	PY52356, Technical Specification for Fabricated Tees using IS 2062 Plates (or) IS 3589 Pipes & the relevant Reference documents.	
4	PY52101, Technical Specification for Elbow 90D Long Radius Carbon Steel Butt Welding	
5	PY52104, Technical Specification for Reducer Eccentric Carbon Steel Butt Welding	
6	PY52147, Technical Specification for Reducing Tee Carbon Steel Butt Welding	
7	PY52181, Technical Specification for Cap Carbon Steel Butt Welding	
8	Annexure-A :: BOQ cum Unpriced Bid Format	
9	Annexure-B :: Surface Preparation & Painting Scheme, Approved make of Paints	
10	Annexure-C :: Checklist Format	
11	Annexure-D :: Format for Deviation Schedule	
12	Annexure-E :: Format for Pre-bid Queries	
13	Annexure-F :: Format for Manufacturing Quality Assurance Plan	

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:



DEVIATION SCHEDULE
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-D TO PEMC-7786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Reference			BHEL Specification's Requirement	Deviation sought by Bidder
	Doc No	Page No	Clause No		

A. INSTRUCTIONS TO BIDDERS

1. All of bidder's deviations to the BHEL specification shall be intimated to BHEL in a consolidated manner in this document only. Deviations listed elsewhere will be summarily rejected and shall be ignored.
2. BHEL will clarify in writing to the bidder regarding the acceptance / non acceptance of the deviations sought by bidder.
3. In case no deviations are raised by bidder, it will be assumed that the bidder has accepted and confirmed to all the requirements of BHEL's specification in totality without any deviation.
4. No deviations other than those that have been specifically mentioned in this document and have been accepted by BHEL during the post-bid stage, will be accepted or allowed during the offer execution stage.
5. Additional sheets, if necessary for bidder's deviations, may be enclosed.

B. BIDDER'S DECLARATION.

1. We confirm that all our deviations to BHEL's specifications and its annexures are listed in this document only.
2. We confirm that except for those deviations, covered in this document, it will be our responsibility to fully meet the intent and the requirements of the specifications and all its annexures within the quoted price, without any deviation.

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:



PRE-BID QUERY FORMAT
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-E TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

BHEL's Enquiry No & Date : Bidder to Specify
Bidder's Name : Bidder to Specify
Bidder's Offer No & Date : Bidder to Specify
Bidder's Ref No & Date : Bidder to Specify

SI No	Reference			BHEL Specification's Requirement	Bidder's Query / Observation	BHEL's Clarification
	Doc No	Page No	Clause No			
(To be filled by the Bidder)						(To be filled by BHEL)

A. INSTRUCTIONS TO BIDDERS

1. All of bidder's queries / clarifications / observations to the BHEL specification shall be intimated to BHEL in a consolidated manner in this document only.
2. BHEL will clarify in writing to the bidder all such queries / clarifications / observations raised by the bidder.
3. Decision of BHEL on all such queries / clarifications / observations raised by bidder will be final and binding on bidder.
4. In case no pre-bid query is raised by bidder, it will be assumed that the bidder has accepted and confirmed to all the requirements of BHEL's specification in totally without any deviation.
5. None of the bidder's queries / clarifications / observations (except those that have been specifically mentioned in this document and have been accepted by BHEL during the pre-bid stage) will be accepted or allowed during post bid stage / offer execution stage.
6. Additional sheets, if necessary for bidder's queries / clarifications / observations, may be enclosed.

B. BIDDER'S DECLARATION.

1. We confirm that all our queries / clarifications / observations to the BHEL's Specifications and its annexures are listed in this document only.
2. We confirm that except for those queries / clarifications / observations covered in this document, it will be our responsibility to fully meet the intent and the requirements of the specifications and all its annexures within the quoted price, without any deviation.

Bidder's Authorised Signature:

Date:

Bidder's Name:

Bidder's Seal:



Bharat Heavy Electricals Limited, Piping Centre, Chennai

**Technical Delivery Conditions for Rolled & Welded
Pipes made of IS 2062 Plates / IS 10748 Coils**

Doc: TDG : 121

Rev : 01

Dt : 21.06.2019

Page 1 of 3

Records of Revn:01 :- Applicable Pipe Size indicated in para 1.3; Para 5.0, 8.3, 8.4 & 9.0 revised.
Para 10.0 added further clauses re-numbered;

1.0 SCOPE

- 1.1 This Technical Delivery Conditions specify the requirements for electrically welded (ERW \ SAW) steel pipes.
1.2 The pipes are intended for water services (under Non-IBR Piping system only).
1.3 **Applicability: Pipe outside Diameter above 2540.00mm.**

2.0 MATERIAL

- 2.1 The plates / coils used for pipe shall meet the requirements as per IS:2062 / IS:10748 including Chemical & Mechanical test requirements.
2.2 **Grade of Plate / Coil shall be selected to meet the minimum tensile strength 410Mpa.**

3.0 DIMENSIONAL TOLERANCES

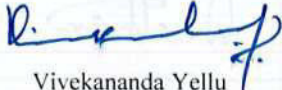

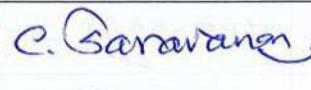

- 3.1 The tolerances limits are:
a) Outside Diameter:- $\pm 6\text{mm}$
b) Thickness:- Upto 14mm : $+1.3\text{mm} / -0.8\text{mm}$; Above 14 mm : $+1.4\text{mm} / - 0.8\text{mm}$.
c) Ovality (Difference between major and minor inside diameter): 0.5% maximum
d) Squareness of ends: The ends of pipe section shall not vary by more than 3mm at any point from a true plane perpendicular to the axis of the pipe and passing through the center of the pipe at the end.
e) Length, quantity and other tolerances as per P.O.


4.0 MANUFACTURING

- 4.1 The pipe shall be of longitudinally welded or spirally welded as indicated in the P.O.
4.2 The ends shall be edge prepared as indicated in the drawing / purchase order.
4.3 Circumferential seams shall be minimum 1500 mm apart from each other and from ends.
4.4 The offset between any two subsequent longitudinal joints **shall be more than 90deg.**
4.5 All pipes shall be completely finished and free from surface, sub surface defects such as pits, cracks, weld spatters & laminations etc..

5.0 CHEMICAL & MECHANICAL TESTS: Shall meet the plate/coil requirements.

- 5.1 **Product Analysis:** - Shall be done for One sample per heat per size.
Chemical values shall meet the IS3589 table - 2 & 3 requirements.
5.2 **Mechanical Tests:-**
(a) **Tensile test for ERW / SAW Pipes:** Shall be done for One sample per heat per size.
Values shall meet the IS3589 table - 4 requirements.
(b) **Flattening test for ERW Pipes:** Shall be done for One sample per heat per size & shall confirm to para 9.2.1 of IS3589.
(c) **Guided Bend test for SAW Pipes:** Shall be done for One sample per heat per size & shall confirm to para 9.3.2 & 9.3.3 of IS3589.

 Vivekananda Yellu Dy.Mgr/QA	 K. Rajitha AGM/MM	 C Saravanan SDGM/Engg	 C Vaithianathan AGM/Quality
Prepared By	Reviewed By		Approved By

	Bharat Heavy Electricals Limited, Piping Centre, Chennai Technical Delivery Conditions for Rolled & Welded Pipes made of IS 2062 Plates / IS 10748 Coils	Doc: TDG : 121 Rev : 01 Dt : 21.06.2019 Page 2 of 3
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6.0 NDE

- 6.1 For Pipe dia less than 1000mm:- 100 % Hydro test on each pipe + Radiography test for 100mm weld length at both the ends for 10% of the pipes.
- 6.2 For Pipe dia 1000 mm & above :-The NDT for each pipe shall be done by any one of the following options. The vendor shall indicate their choice in the offer.
- 100 % Hydro test along with Radiography test for 100mm weld length on both the ends of each pipe.
 - 100 % Ultrasonic test + 10 % Radiography test on weld length (including all T- joints and 100mm weld length at both the ends) for each pipe.
 - 100 % Radiography test on weld length of each pipe.
- 6.3 The Ultrasonic test / Radiography test shall be carried out as per ASME Sec-V and shall be accepted as per ASME B31.1 Cl:136.4.6 / Cl:136.4.5.

7.0 INSPECTION

- 7.1 All pipes shall be inspected by the vendor prior to BHEL / Customers' Inspection. BHEL or BHEL authorized inspector / Customer will select the pipes at random and carryout the inspection. The necessary Material Despatch Clearance Certificate is to be obtained by the vendor prior to the despatch of material.

8.0 PAINTING AND PACKING

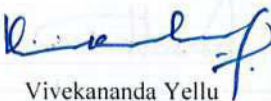
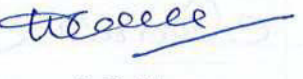
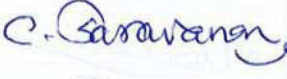

- 8.1 The pipes if dispatched to BHEL Stores shall be coated with resin type translucent rust preventive on the outside unless otherwise specified in the Tender / Purchase Order.
- 8.2 The pipes if dispatched to project site directly shall be coated outside & inside as indicated in Tender / Purchase Order.
- 8.3 **Internal Coating:-** In case of any special coating like PU, Glass Flake, 100% Solid Epoxy etc.. the vendor shall use BHEL approved make/coating materials. And also vendor shall submit Inspection & Testing Plan (ITP) and Procedure for internal coating for BHEL approval.
- 8.4 Internal coating shall not be applied for 150mm length from each end to facilitate site joints.
- 8.5 Spiders are to be provided on both ends of the pipes as per the drawing indicated in the enquiry / Purchase Order.


9.0 MARKING

- 9.1 The following details are to be marked on the pipes for identification.

- Supplier's emblem/code
- Size & Specification
- Material code
- Pipe number
- Inspector's seal
- Work Order-DU details

	Pipes dispatched to BHEL Stores	Pipes dispatched to BHEL Project Site
Paint Stencilling	Details 1 to 6	Details 1 to 6
Hard Punch	Details 1, 2, & 5	Details 1, 4, 5 & 6

 Vivekananda Yellu Dy.Mgr/QA	 K. Rajitha AGM/MM	 C Saravanan SDGM/Engg	 C Vaithianathan AGM/Quality
Prepared By	Reviewed By		Approved By

	Bharat Heavy Electricals Limited, Piping Centre, Chennai Technical Delivery Conditions for Rolled & Welded Pipes made of IS 2062 Plates / IS 10748 Coils	Doc: TDG : 121 Rev : 01 Dt : 21.06.2019 Page 3 of 3
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9.2 Marking shall be done on internal surface in the uncoated area (i.e) within 150mm from pipe ends. The hard punching shall be done at one end and paint stencilling at other end.

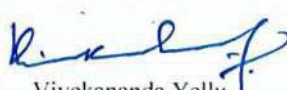

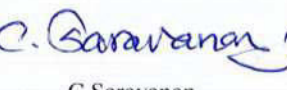
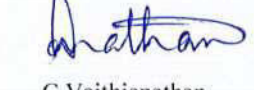
10.0 QUALITY PLAN:- Vendor shall submit QAP for BHEL approval before commencement of production.

11.0 CERTIFICATES

11.1 Three original test certificates typed in English shall be submitted along with the inspection report.

11.2 The test certificate shall furnish the following details.


- a. BHEL P.O Number & Amendment Number(if any)
- b. BHEL P.O. Serial Number
- c. Test Certificate number.
- d. Specification, grade, size, quantity
- e. Heat number of plate (or pipe number with traceability to heat number)
- f. Chemical composition and Mechanical properties
- g. Hydrostatic test, UT, RT reports as applicable.
- h. Dimensional report
- i. Painting details

 Vivekananda Yellu Dy.Mgr/QA	 K. Rajitha AGM/MM	 C Saravanan SDGM/Engg	 C Vaithianathan AGM/Quality
Prepared By	Reviewed By		Approved By



FORMAT FOR MAUFACTURING QUALITY ASSURANCE PLAN
PIPE FITTINGS PACKAGE – RAW WATER SYSTEM

ANNEXURE-F TO PEMC-07786
PROJECT NAME: NTPC LARA AND NTPC SINGRAULI

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 104	
			TECHNICAL SPECIFICATION	
		REDUCER, ECCENTRIC, CARBON STEEL, BUTT WELDING		Rev. No. 01 Page 1 of 2

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1.0 GENERAL

- 1.1 The Butt Welding Eccentric Reducers supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Eccentric Reducers of sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Eccentric Reducers of Larger End size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Eccentric Reducers of Larger End size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Sizes of Large and Small ends of the Reducer (NPS in inches) and their corresponding Wall thicknesses (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

An Eccentric Reducer of Size 12" STD x 10" STD Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" STD x STD BW.




An Eccentric Reducer of Size 12" schedule 20 x 10" schedule 30 Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" SCH 20 x SCH 30 BW.


An Eccentric Reducer of Size 12" Thickness 10mm x 10" Thickness 8mm Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" THK 10 X THK 8 BW

6.0 TECHNICAL DELIVERY CONDITIONS:




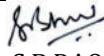
- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

+++


Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 104
		TECHNICAL SPECIFICATION	Rev. No. 01
		REDUCER, ECCENTRIC, CARBON STEEL, BUTT WELDING	Page 2 of 2

RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
01	02.05.2017	UPDATED S.NO.5: DESIGNATION	 G KALYAN	 SRIKANTH G
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO

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Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 147
		TECHNICAL SPECIFICATION		Rev. No. 01
		TEE, REDUCING, CARBON STEEL, BUTT WELDING		Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Reducing Tee supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Reducing Tee of sizes NPS½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Reducing Tee of Larger End size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Reducing Tee of Larger End size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Sizes of Large (Run) and Small (Outlet) ends of the Reducing Tee (NPS in inches) and their corresponding Wall thicknesses (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A Reducing Tee of Size 12" STD x 10" STD Carbon Steel, shall be designated as:




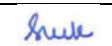
RDTEE CS 12" x 10" STD x STD BW.




6.0 TECHNICAL DELIVERY CONDITIONS:


- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

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RECORD OF REVISIONS:

Rev	Date	Revision Detail	Revised by	Approved by
00	24.12.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G.KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	24.12.15

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 181
		TECHNICAL SPECIFICATION		Rev. No. 03
		CAP CARBON STEEL(SA234 WPB)BW		Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Cap supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Butt Welding Cap of Sizes NPS 0.5" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Caps of size NPS ½" to NPS 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Caps of size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Cap Size (NPS in inches) and Wall thickness (Schedule) shall be as per BHEL Enquiry/ Order.

5.0 DESIGNATION:









A 10" Sch 40 Carbon Steel CAP, shall be designated as:
CAP-10"-SCH 40-BW-CS (SA 234 WPB)




6.0 TECHNICAL DELIVERY CONDITIONS:


- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

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RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
00	12.04.16	FIRST ISSUE	 SVN R	 SRIKANTH G
01	12.04.17	Added 0.5" to 2" size	 IMRAN	 SRIKANTH G
02	06.08.19	Clause 2.0 updated to include Galvanizing Specification.	 IMRAN	 SRIKANTH G
03	15.11.24	Revised to include Sizes up to 48"	 IMRAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
	PROJECT ENGINEERING & SYSTEMS DIVISION	 FARUQUE	 SVN R	 SRIKANTH G	12.04.16

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 101
		TECHNICAL SPECIFICATION		Rev. No. 01
		ELBOW 90D, LONG RADIUS, CARBON STEEL, BUTT WELDING		Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Elbows 90D supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Butt Welding Elbows of Sizes NPS½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Elbows of size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Elbows of size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Elbow Size (NPS in inches) and Wall thickness (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A 10" Sch 40 Carbon Steel 90D Elbow, shall be designated as:


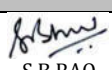

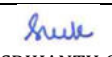
ELBOW 90D CS (A234WPB) 10" SCH 40 BW.




6.0 TECHNICAL DELIVERY CONDITIONS:


- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

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RECORD OF REVISIONS:


Rev No	Date	Revision Detail	Revised by	Approved by
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G. KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15

		TYPICAL MANUFACTURING QUALITY PLAN						QP. NO.: PESD/LARA/3589					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032			PRODUCT : RAW WATER PIPE FITTINGS BHEL SPEC: PEMC 07786			REV NO: 00		DATE: .12.11.2024			
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SL NO	COMPONENTS/ ACTIVITY	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Raw Material (IS 2062 Plate /IS 3589 Pipe/A106 Pipe)	Identification Dimension	Major	Visual, Measure ment	100%	Applicable Material Specification BHEL Spec		Mill TC		2	-	-	
1.2		Chemical Composition & Mechanical properties,Hydrotest for pipes and UT for plates.	Major	Verificatio n of MTC	One per Heat				√	2	-	1	
1.3	Welding Consumables	Chemical Composition & Mechanical properties	Major	Verificatio n of Manufactu rer TC	100%	Applicable Specification as per WPS		TC	√	2	-	-	
2.0	INPROCESS INSPECTION												
2.1	Pre welding operations	Rolling, Post Bending Edge preparation, Root gap alignment, Edge alignment	Major	Visual, Template, Measure ment	100%	Approved Drawing/BHEL Specification		IR		2	-	-	
2.2	Review of WPS & WPQ	Qualification of Welding procedure / Welder Specification	Major	Doc. Review	100%	ASME Sec IX		WPS,PQR, WPQ		2		1	
2.3	Fit-up	Fit-up	Major	Dimensio n & root gap	100%	Approved Drawing/BHEL Specification		IR	√	2	-	1	

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	BHEL QA	BHEL ENGG	BHEL QA	CUSTOMER'S

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2.4	NDE for Weld	Weld fusion	Major	Root back Chip and LPI for OD 1000 mm and above	100%	No linear indication		IR	√	2		1	
2.5		Weld Profile & Surface defects	Major	Visual	100%	ASME Sec V/ASME B 31.1 CI . 136.4.2		IR	√	2	1	-	
2.6		Radiography	Critical	RT	100%	ASME Sec VIASME B 31.1 CI 1 36.4.5.		RT report	√	2	-	1	RT film review.
2.7		Sub surface defect	Major	MPI	100%	ASME Sec-V Article-7	ASME sec VIII, Div 1, Appendix-6	MPI Report	√	2	1	1	10% RW by 1
2.8		Heat Treatment	Major	Chart review	100%	As per specification/Relavant standard		PWHT chart	√	2	-	1	
3.0	FINAL INSPECTION & TESTING												
3.1	Fittings	Measurement (including ovality, End Squareness)	Major	Visual & Measure ment	100%	As per IS 3589 (latest version) & Drawing		Dimension Report	√	2	1	1	10% RW Refer Note 4&5
		Surface Preparation & painting	Major	Testing	100%	As per specification/Relavant standard		IR	√	2	1	1	10% RW by 1
3.2		Stenciling ,Identification & End Protection	Major	Visual & Measure ment	100%	Project Specific Approved Painting Scheme		Painting Report	√	2	1	1	10% RW by 1
3.3		Hard Stamping & Stenciling after painting.	Major	Visual & Verificatio n	100%	Specification/Drawing		Inspection Report	√	2	1	-	Refer Note 6
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3.4		Documentation & Certification	Critical	Verification	100%	Arrangement of All relevant Documents QAP Clause wise .		Inspection Report	√	2	-	1	
3.5	Packing	Packing	Major	Visual	100%	Packaging Instruction for piping components		Packing report	√	2		1	Photographs of packing shall be submitted.

Notes:-


1. This Standard MQP should be read along with specification (Latest revision as per PO), approved drawings & approved datasheet (as applicable).
2. Stringent of the three shall prevail if there is any contradiction over Drawing/datasheet and quality plan.
3. Any project/customer specific requirements, which shall be notified, have to be fulfilled by the vendor at the time of execution of order
4. MPI/LPT Should be carried on Knuckle of Reducers, Outer bend portion of Elbows and Neck portion of Tees.
a) CS & AS Material – MPI b) SS Material – LPT c) DP test on bevel ends d) DP test on sidewall area of tees manufactured from cold forming method.
5. End Customer/Consultant inspection if any shall be intimated during quality plan approval.
6. **Any other tests/ checks indicated in specification, P.O., or drawing/data sheet & any additional checks envisaged by BHEL/Customer as part of correspondence to ensure workmanship, finish, aesthetics, etc. shall also be conducted and witnessed/verified by BHEL /TPIA /Customer as per project requirement**
7. For Technical delivery condition refer BHEL corporate standard AA0851402
8. **Hard Stamping:** Out Side of pipe at the both ends ; Specification, Pipe No., Heat No., Mfr's Identification & Project Name, BHEL PO No., DU No., Quantity & Weight
Stenciling: Out Side of fittings at both ends ; Specification, Pipe No., Heat No., Mfr's Identification, Material Code, Size & Project Name, WO No., DU No., Quantity & Weight.
9. Use of correct raw material i.e. primer, paint of NTPC acceptable make & grade.
Ensure application of correct primer, paint (check make, grade, date of manufacturing, date of expiry)
Finished Surface - Visual Examination, Measurement of Surface Roughness, Profile, Dust contamination
Visual Examination & Wet film thickness measurement after primer coat, paint coats
10. Lifting lugs & Spiders are to be provided on both ends of the pipes as per the drawing indicated in the Tender/ Purchase Order.
11. This MQP shall be read along with specification, approved drawings & approved datasheet. (Latest revisions to be considered as per PO).

Abbreviations:-

MTC – Material Test certificate

WPS - Welding Procedure Specification

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PQR	-	Procedure Qualification Record			HC	-	History Card						
DFT	-	Dry Film Thickness			WPQ	-	Welder Performance Qualification						
TC	-	Test Certificate			NDE	-	Non Destructive Examination						
IS	-	Indian Standards			UTS	-	Ultimate Tensile Strength						
Appd.					YS	-	Yield Strength						
Dwg.	-	Approved Drawing			EL.	-	Elongation						
OD	-	Outer Diameter											

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