

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL		VENDOR'S NAME		ITEM		GENERATOR INTEGRAL PIPING & HYDROGEN COOLER PIPING		QP NO.	QA/BI/QP/021					
				DRG. NO.		AS PER PO								
				SPEC.-		TG60682								
				REV.-		02								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORDS	AGENCY		REMARKS			
1	2	3	4	5	6	7	8	9	D	M	B	N	10	11

1.0	MATERIAL	Co-relation & verification of Mill TCs for	Major	Verify	100%	Standard as per BOM	Standard as per BOM	Mill TCs	✓	P	V	-	
1.1	Seamless C.S. pipes as per A106 Gr. B & SS Seamless pipe	a)Chem. Composition	Major	Chem. Analysis	1/Heat	-DO-	-DO-	-DO-		P	V	-	
		b)Mech. Properties	Major	Mech. Test	1/Lot	-DO-	-DO-	-DO-		P	V	-	
		c)Flattening or bending test (as applicable as per ASTM)	Major	Mech. Test	1/Lot	-DO-	-DO-	-DO-		P	V	-	
		d)Hydraulic test	Major	Pressure Test	100%	-DO-	-DO-	-DO-		P	V	-	
		e)Heat Treatment (As applicable)	Major	Time/Temp	100%	-DO-	-DO-	-DO-		P	V	-	
		f) Surface finish	Major	Visual	100%	-DO-	-DO-	-DO-		P	V	-	
		g) Dimensions(OD, ID & wall Thickness)	Major	Measurement	10%	-DO-	-DO-	-DO-		P	V	-	
		h) NDT (UT/ECT)	Major	UT/ECT	100%	SA 106	-DO-	-DO-		P	V	-	
1.2	Pipe fitting	Co-relation & verification of MTCs For	Major	Verify	100%	Standard as per BOM	Standard as per BOM	MILL TCs	✓	P	V	-	
		a) Chem. Composition	Major	Chem. Analysis	1/Heat	-DO-	-DO-	TCs		P	V	-	
		b)Mech. Properties	Major	Mech. Test	1/Heat batch	-DO-	-DO-	-DO-		P	V	-	

MANUFACTURER/SUBCONTRACTOR	 20.07.2020		LEGEND: I RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM, INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		FOR CUSTOMER USE	APPROVED BY	
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		SPEC. -	TG60682								
		REV. -	02	Page 2 of 7							
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1.3	FLANGES	c)Dimensions , Finish	Major	Measurement	100%	ANSI B16.9	ANSI B16.9	-DO-	P	V	-	
		d)Wall thickness of bend by UT Gauge	Major	-DO-	100%	ASTM A234	ASTM A234	TC	P	V	-	
		e)Heat Treatment (as applicable)	Major	Time / Temp	10%	Standard as per BOM	Standard as per BOM	-DO-	P	V	-	
		g)Hardness of fitting	Major	Measurement	10% (random)	Standard as per BOM	Standard as per BOM	TC	P	V	-	
		h)Surface defects	Major	DPT/MP	100%	ASME SEC-V art-6	ASME Sec-VIII-div-1 APPENDIX-8	-DO-	P	V	-	
		Co-relation & verification of Mill TCs For	Major	verify	100%	Standard as per BOM	Standard as per BOM	TC	P	V	-	
		a) Chemical Composition	Major	Chem. test	1/Heat	-DO-	-DO-	-DO-	P	V	-	
		b)mechanical properties	Major	Mech. Test	1/HT Batch	-DO-	-DO-	-DO-	P	V	-	
		c)Heat Treatment	Major	Time/Temp	100%	-DO-	-DO-	-DO-	P	V	-	
		d)Dimension	Major	Measurement	10%	As per Drawing in BOM	As per Drawing in BOM	TCs	P	V	-	
		e)surface defects	Major	DPT	10%	E165/A275	ASME Sec-VIII Div-I Appendix 8	TC/IR				

MANUFACTURER/SUBCONTRACTOR		LEGEND:		FOR CUSTOMER USE	
 20/06/2020		I RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORMANCE 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED COLUMN 'N' SHALL BE 'CP' OF CUSTOMER		APPROVED BY	

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		SPEC.-	TG60682											
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		CHARACTERISTICS			CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANC E NORMS	FORMAT OF RECORDS	AGENCY		REMARKS	
SL. NO.	COMPONENT & OPERATIONS	3	4	5	6	7	8	9	D	M	B	N	10	11
1	2													

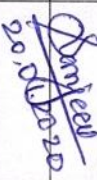
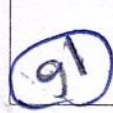
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		e)Proof load	-DO-	Load test	20% or Min. 2pc.									
		f)Dimension & Visual	-DO-	Measurment & Visual	100%									
1.9	Thermo well	Co-relation & verification of Mill TC Or Visual & Dimensional	-DO-	Analysis/ Mechanical Measurment	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-		
		Chemical Mechanical		Measurment Chem &Mech.										
1.10	Connection, Inlet Header, Outlet header	Dimension & Visual	-DO-	Measurment/ Verify RT/DPT	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-		
1.11	Clamp, Support, Pipe Clamp assembly	Weld Quality H.T (if applicable)			Random									
		Material TC's Heat Treatment Visual & Dimensional	-DO-	Verify Verify Verify	100% 100% 100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	IR	✓	P	V	-		
1.12	Base plate	Material TC's	-DO-	Verify Measurment & Visual	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-		
1.13	Tie rod, Threaded rod	a)Material TC b)Visual c)Dimensional d)Galvanizing	-DO-	Verify Measurment & Visual	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-		
1.14	Eye bolt, Welding eye	Supplier TC's	-DO-	Verify	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-	Inform vendor name	
1.15	Spring hanger, hanger assembly	Supplier TC's	-DO-	Verify	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-	Inform vendor name	

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				SPEC. -		TG60682					
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1.16	H2 vent Star	Material TC's Visual Dimensional	-DO-	Measurement & Visual	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-	
2.00	INSPECTION PROCESS												
2.1	Preparation	a) Marking & identification Check	Major	Visual	100%	As per Drawing	As per Drawing	IR		P	V	-	
		b) Cutting & Edge preparation	-DO-	-DO	100%	As per Drawing	As per Drawing	-		P	V	-	
		c) Dimensions	-DO-	-DO	10%	As per Drawing	As per Drawing	IR		P	V	-	
		d) Surface defects on edge preparation on Alloy steel pipes	-DO-	DPT	10%	ASME Sec. V Art-6	ASME Sec. V VIII Div-I Appendix 8	-	✓	P	V	-	
2.2	Bending	a) Dimensions	Major	Measurement	100%	As per Drawing	As per Drawing	IR	✓	P	V	-	
		b) Ovality	-DO-	Measurement	100%	As per Drawing	Max. 10%	-		P	V	-	
		c) Wrinkles	-DO-	Measurement	100%	As per Drawing	As per Drawing	-		P	V	-	
		d) Thinning	-DO-	Measurement	100%	By UT thickness meter	Max. 12.5%	-	✓	P	W*	-	
		e) Surface defects (On bend portion only)	-DO-	DPT	10%	ASME Sec. V Art-6	ASME Sec. VIII Div-I Appendix 8	-	✓	P	V	-	

MANUFACTURER/SUBCONTRACTOR	 20.08.2020	LEGEND: I RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	APPROVED BY	
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2.3	WPS & PQR	f) Bend radius / angle of bend	-DO-	Measurement	10%	As per Drawing	ANSI-B 31.1	-	✓	P	V	-	
		g) Out of Squareness	-DO-	Measurement	10%	As per drawing	ANSI-B 31.1	-		P	V	-	
2.4	Welding	Record for each weld combination & welder	-DO-	Verify	100%	ASME Sec. IX	ASME Sec. IX	-	✓	P	W	-	WPS, PQR shall be approved by BHEL
		a) Fit-up	-DO-	Visual	100%	HW0620599	HW0620599	-		P	-	-	
		b) Pre-heating	-DO-	TEMP.	As applicable	Relevant WPS	Relevant WPS	-		P	-	-	
		c) Root run	-DO-	Visual & DPT	10%	HW0850199	HW0850199	IR	✓	P	V	-	
		d) Inter pass cleaning	Minor	Visual	100%	-----	WPS	-		P	-	-	
		e) Dimensions & Visual examination of welds	Major	Measurement & Visual	10%	HW0620099	HW0620099	-	✓	P	V	-	
		f) Surface defects for fillet welds	Critical	DPT	10%	HW0620099	HW0620099	IR	✓	P	W	-	
		g) P.W.H.T. (if Applicable)	Major	TIME/TEMP	As per applicable	ANSI-B 31.1	ANSI-B 31.1	Report	✓	P	-	-	
3.00	FINAL INSPECTION	h) Internal Defects (for butt welds only)	Critical	RT /UT	As per applicable	HW0850199	HW0850199	I.R.	✓	P	W	-	
3.1	Complete Fabricated Piping	a) Visual examination	Major	Visual	100%	As Per Drawing	HW0620099	-	✓	P	V	-	
		b) Dimensions	-DO-	Measurement	100%	-DO-	As per Drawing	-	✓	P	W	-	*RANDOM (10%) WITNESS BY BHEL

MANUFACTURER/SUBCONTRACTOR		LEGEND:		FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR INTRACTOR <i>[Signature]</i> 20/04/2020		RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORMANCE 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED COLUMN 'N' SHALL BE 'CP' OF CUSTOMER		APPROVED BY _____	

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BHEL		DRG. NO.	AS PER PO											
		SPEC. REV.	TG60682											
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	FORMAT OF RECORDS	AGENCY		REMARKS			
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		c) Marking	-DO-	Visual	100%	-DO-	-DO-	-	✓	P	V	-		
		d) Cleaning (small bore pipes up to 3" NB by acid pickling)	-DO-	-DO-	100%	TG60682	ST34001 clause-8	-	✓	P	W	-		
		e) Preservation & Painting	-DO-	-DO-	100%	TG60682	TG60682	-	✓	P	V	-		
		f) End protection & packing	-DO-	-DO-	100%	TG60682	TG60682	-	✓	P	W	-		
		g) D.P site wedge edges	-DO-	DPT	Random	HW0850199	HW0850199		✓	P	W			

NOTES:-

- 1 All edge preparation shall be done by machining only.
- 2 For small bore piping, where the individual stamping & stencilling may not be possible metal tags or plastic tags may be used for identification.
- 3 i) Small items like small reducers, elbows, tees, stubs, flanges etc. and other machines components duly preserved shall be packed in wooden boxes.
- ii) Each item either individually or jointly will be segregated system wise for dispatch.
- 4 Inside protection by VPI tablets/powder shall be ensured before end capping.
- 5 The raw material used shall be procured from BHEL agreed vendors.
- 6 The pipe with requirement for UT shall be UT/Hydro tested at mill and shall indicate in certificates only.
- 7 All material of construction shall be as per approved Drawing / pipe schedule / BHEL plant Std.
- 8 Electrodes used shall be procured from BHEL agreed vendors.
- 9 Gaskets procured by the vendor shall be from BHEL approved sources only.

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 20.04.2020					



PPX-BOI DEPARTMENT
BHARAT HEAVY ELECTRICALS LIMITED
HEEP: HARDWAR-249 403 (Uttarakhand)
FAX: +91 1334 226084/226462
TEL: +91 1334 28 1660/1753
PRE-QUALIFICATION REQUIREMENT

Enquiry No.:
B/4133/2018/2835V/2

Annexure-A

Sl. No.	Pre-Qualification Requirements (Annexure-A)								Vendor's Response
1.	TG integral piping is used for connection of various equipment to Generator and its auxiliaries.								
2.	The material of construction of pipe & fittings (CS & SS) and dimensions shall be as per ASME B36.19/B16.9 or equivalent. Water Header (fabricated), Flanges, Neck, Hangers & Supports shall be in line with IS-2062.								
3.	Vendor should have experience of supplying pipe and fittings in thermal power- plant/ process industries.								
4.	Vendor to confirm that all the items specified at Point no.2.0 shall be quoted and offer with part supply shall not be considered.								
5.	Mandatory Requirement of utilities/testing facilities - a) <u>Mandatory In-House Facilities</u> - Vendors should have capability for Pickling & passivation (only for CS items), Dye penetrant Testing and Hydraulic testing. b) <u>Mandatory Outsourced or In-House Facilities</u> - Ultrasonic Testing, Radiography Testing, chemical analysis facility shall be either in house or outsourced. c) Particulars for testing facilities (at point a and b) along with details to be furnished. Photographs of pickling & passivation facility (tanks) will be provided. d) Vendor to submit third party approved WPS/PQR for welding requirement								
6.	The vendor should be a regular supplier/fabricator of such items mentioned at clause 1.0. Vendor should have executed Purchase Order (having date of delivery not earlier than 8 years at the time of bid submission) for CS & SS items. Total supply of each PO should be min. 5 tons and 1.5 tons for CS items & SS Items respectively. In support of above, vendor shall furnish details in following format along with their credential lists for the past 8 years.								
	Sl. N o.	Applic ation	Name & address of customer	Contact details of customer (email and phone number etc.)	Purchase order Referenc e no.	Purcha se order issue date	Total weight of quantity of piping item (kg.)	Brief technical details of Material of Constructio n	Details of test carried out
	1.	Therm al power-plant/ proces s industr ies Only							
	2.								
	3.								



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PRE-QUALIFICATION REQUIREMENT

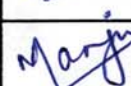
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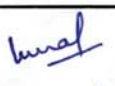
Annexure-A

4.									
7	In support of year of supply, vendor shall furnish copy of Purchase Order along with Bill of material executed in past along with test certificates (for the relevant PO's executed & indicated by vendor at point no. 6.0 above and qualifies the criteria at point 6.0 above).								
8.	Vendor to furnish the acceptance certificates or accepted test certificate from customer for complete supplies of for the relevant PO's executed & indicated by vendor at point no. 6.0 above and qualifies the criteria at point 6.0 above.								
9.	Vendor to submit each documents with marked-up Annexure no. clearly and also indicating "title" as mentioned in table at point 6.0 for co-relation of documents. In Case co-relation of documents is not mentioned by vendor & further non-receipt of details as per point no. 6.0, the vendor offer shall not be reviewed.								
10.	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false / incorrect, the offer shall be rejected.								
11.	Vendors to furnish point wise compliance of all the above mentioned points else offers will not be considered.								

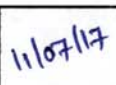
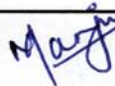
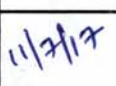
(Sign & Stamp of Bidder)

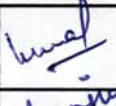
दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG 60682																																																			
				पृष्ठ 6 का 1 Page 1 Of 6																																																			
समयी सूची संख्या में अंकित किया जाता है	SUPERSEDES INVENTORY NO.	BASED ON OWN EXPERIENCE SPECIFICATION FOR FABRICATION AND SUPPLY OF GENERATOR INTEGRAL PIPING																																																					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	1.0 PROJECT INFORMATION The piping covered under this specification are to be used in association with mechanical auxiliaries for generator piping at power station for carrying oil, water and gas.																																																						
	2.0 SCOPE OF WORK The scope of work for piping vendor shall be to completely supply the total Piping to site, which includes materials, fabrication, testing, cleaning, painting, packing and dispatch, as mentioned in the order. All pipes shall be seamless and supplied in approximately 6.0 meter length. Tees, Bends, Reducers and flanges etc as per Bill of Material (BOM) shall be supplied loose.																																																						
	3.0 MATERIAL SPECIFICATION 3.1 The material to be used for fabrication of piping is specified in the BOM. 3.2 The vendor shall furnish the correlated mill test certificate for the material used. 3.3 Plates to be used for flanges > 25mm shall be checked for laminations by UT as per ASME-435. 3.4 Gaskets procured by the vendor shall be from BHEL Approved sources only.																																																						
	4.0 FABRICATION 4.1 All Pipes, Bend/Elbows, Tee, Reducer, Flange, Gasket, Fasteners etc shall be in accordance with the respective Bill of material. 4.2 All fitting shall be clean finished and reasonably free from scales. They shall be totally free from cracks, porosity, surface flaws, laminations, informal surface and other harmful defects.																																																						
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल लिमिटेड की सम्पत्ति है इसका प्रयोग एवं प्रकाशन अन्य से किसी भी तरह उपयोग जो कि कंपनी के हित में हानिकारक हो न किया जाय।	दिनांक एवं हस्ताक्षर SIGN & DATE	<table border="1"> <tr> <td>TSX</td> <td>Lalit Kumar</td> <td>Latit Kumar</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>PSC MEMBER</td> <td>R.K. Sharma</td> <td>R.K. Sharma</td> <td>अनुवादक TRANSLATED BY</td> <td></td> </tr> <tr> <td>QAX</td> <td>S.K. BHARDWAJ</td> <td>S.K. BHARDWAJ</td> <td>निर्माणकर्ता WORKED BY</td> <td>KUNAL MISHRA</td> </tr> <tr> <td></td> <td></td> <td></td> <td>जांचकर्ता CHECKED BY</td> <td>MANJU AZAD</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT.</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>R. L. VYAS</td> </tr> <tr> <td>EME</td> <td>Jagdish</td> <td>Jagdish</td> <td>स्वीकृति APPROVED :</td> <td>Gr. NO.</td> </tr> <tr> <td>EME</td> <td>R. L. VYAS</td> <td>R. L. VYAS</td> <td>RAKSH KUMAR (AGM - EME)</td> <td>2.11</td> </tr> <tr> <td>REV. NO.</td> <td>02</td> <td></td> <td>निर्माण PREPARED :</td> <td>जारी ISSUED :</td> </tr> <tr> <td>DATE</td> <td>23.08.2017</td> <td></td> <td>EME</td> <td>TSX</td> </tr> <tr> <td>Change Advice No.</td> <td>TGE-17-39</td> <td>21-08-17</td> <td></td> <td>दिनांक DATE : 29.03.2010</td> </tr> </table>				TSX	Lalit Kumar	Latit Kumar	नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	PSC MEMBER	R.K. Sharma	R.K. Sharma	अनुवादक TRANSLATED BY		QAX	S.K. BHARDWAJ	S.K. BHARDWAJ	निर्माणकर्ता WORKED BY	KUNAL MISHRA				जांचकर्ता CHECKED BY	MANJU AZAD	सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	R. L. VYAS	EME	Jagdish	Jagdish	स्वीकृति APPROVED :	Gr. NO.	EME	R. L. VYAS	R. L. VYAS	RAKSH KUMAR (AGM - EME)	2.11	REV. NO.	02		निर्माण PREPARED :	जारी ISSUED :	DATE	23.08.2017		EME	TSX	Change Advice No.	TGE-17-39	21-08-17		दिनांक DATE : 29.03.2010
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				पृष्ठ 6 का 2 Page 2 Of 6	
SUPERSEDES INVENTORY सामग्री सूची संख्या को अधिष्ठापित करता है	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	4.3 All elbows shall be of long radius type with R= 1.5 NB or as specified in the Bill of Material. 4.4 The final drg of H2 Cooler header shall be issued after placement of order. However tentative drg shall be furnished for the same along with enquiry BOM. 5.0 TESTING AND CERTIFICATION 5.1 HYDRAULIC TESTING Hydraulic test certificate of mother pipe shall be supplied by the fabricator. In the event of mill test certificate not being available, the pipelines shall be hydraulically tested by the vendor in his shop as per ANSI B31.1 before induction. 5.2 In case of standard fitting like elbows, tees, reducers etc hydraulic test certificate of mother pipe shall be furnished. 5.3 Material test certificates of individual item as per BOM shall be furnished. 5.4 DPT/MPI shall be carried out on all fittings for surface crack as per applicable ASME/ASTM. 6.0 CLEANING & PAINTING 6.1 STAINLESS STEEL PIPING All hot bent, forged, fabricated and straight section of piping shall be thoroughly cleaned, wire brushed and purged with an air blast to remove water, sand and scale from inner surface. The out side surface of all pipes shall also be free of cleaning slag. Vendor shall not leave any material on the inner or outer surface that will affect the serviceability of the pipe. 6.2 CARBON STEEL PIPING All CS pipes shall be treated by pickling with acid neutralised before dispatch. All pipes which are cleaned by acid pickling shall be conserved in accordance with the procedure detailed below. Any alternative method used by the supplier shall have to be got approved from BHEL for which the supplier shall furnish all the details along with the acceptance norms etc. with his offer.			
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INVENTORY NO. 26395		जांचकर्ता CHECKED BY	MANJU AZAD		11/7/17

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SUPERSEDES INVENTORY	7.0 PACKING & MARKING				
सामग्री सूची संख्या को अधिकृतित करता है	7.1 Item no. of BOM shall be clearly marked on each item with punch and paint. 7.2 All straight pipes of a particular system shall be packed in separate Box/Boxes. System name, BOM no. and item name shall be clearly mentioned on the Box. 7.3 All flanges, Tees, Reducers etc. of a particular system shall packed in separate box. System name, BOM no. and item name shall be clearly mentioned on the Box. 7.4 All fasteners of a particular system shall packed in separate box. System name, BOM no. and item name shall be clearly mentioned on the Box. 7.5 All Gaskets of a particular system shall be packed in separate box. System name shall be clearly mentioned on the Box. On each Gasket, Gasket size (as indicated in BOM), BOM sl. no. make & grade shall be clearly marked with suitable paint or marker for easy identification. 7.6 Vendor to ensure that the procurement of gaskets (or gasket material used for manufacturing) shall be done just before dispatch of the entire material so as to maintain the shelf life of the gasket for a min period of 2 years (from the date of dispatch). 7.7 All the parts shall be carefully packed for transport in such a manner that these are protected against all damage and the climatic conditions including saline atmosphere to which it may be subjected in transit and one year of storage. 7.8 Pipe ends, flange and other similar open ends shall be protected from both external damage (by provision of plastic caps) and ingress of dirt or moisture during transit and storage. All machined surface shall be protected by means of wooden protecting pieces bolted to such surfaces. 7.9 Small bore items are to be bundled or bagged and fitted with wired metal tags stamped with item number & BOM number, make & grade. 7.10 Water Proof paper & felt lining of the packages shall overlap seams at least up to 15mm and seams shall also be sealed.				
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दिनांक एवं हस्ताक्षर SIGN & DATE	P-6595				
सामग्री सूची संख्या INVENTORY NO.	REV. NO. 02	(SUPERSEDES)	निर्माणकर्ता WORKED BY	Jagdeesh Chauhan	23.08.17
			जांचकर्ता CHECKED BY	R. L. Vyas	23/8/17

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सामग्री सूची संख्या को अधिकृत करता है _____	SUPERSEDES INVENTORY _____	7.11 Vendor to ensure to take receipt from site for boxes for every dispatch against GR verification of items sent inside box. GR Verification should be done in presence of supplier's representative at site. Supplier is required to depute their representative to site (one visit per set) on demand from site for verification of items sent inside the box and ensure receipt of all items. Any shortage found during verification is to be replenished free of cost by supplier. However, payment will be released against dispatch documents as per present practice. 7.12 Each straight pipe and pipe fitting belonging to the different systems shall be color coded by making one color band on each free end of the component for identification of material at site as mentioned below: -																					
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सामग्री सूची संख्या INVENTORY NO 2-6395			जांचकर्ता CHECKED BY	MANJU AZAD 																			

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समयी सूची संख्या को अपडेट कर रहा है	SUPERSEDES INVENTORY	10.0 INSTRUCTION FOR BID PREPERATION 10.1 The supplier shall furnish a quality plan on BHEL's format detailing all the tests/ checks conducted by supplier at various stages including receipt of raw material, fabrication, packing and dispatch etc. BHEL shall identify hold points in this quality plan beyond which work shall not proceed without the approval of BHEL. The quality plan will form a pre-approval document. 10.2 The supplier shall furnish a list of deviations with respect to this purchase specification, if any, otherwise mention No DEVIATIONS. 10.3 The pipes and fittings shall be as per detailed B.O.M. 10.4 The material of the pipes and fittings shall be as per list of referred standards & drawings.			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		11.0 CROSS REFERRED STANDARDS ASME SA 106, ASME A182, ASME A 435, ASTM A234, ASTM A403, ASME B16.9, IS 2062, ANSI B31.1, HW 59870, HW0620599, HW0850199.			
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समयी सूची संख्या	INVENTORY NO.	REV. NO. 02	निर्माणकर्ता WORKED BY	KUNAL MISHRA	 11/07/17
			जांचकर्ता CHECKED BY	MANJU AZAD	 11/07/17

Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR GAS SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT.SPEC.	WT.(KG)
1		PIPE ASSEMBLY FROM TERM.94(GU) TO TERM.95 (H2 DIST.)						
	1.1	PIPE	D33.4X3.38		38	Mtr.	ASTM SA106 GR.B	95.00
2		PIPE ASSEMBLY FROM TERM.90(GU) TO TERM.16 (GEN.)						
	2.1	PIPE	D60.3X3.91		35	Mtr.	ASTM SA106 GR.B	190.40
	2.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A234 WPB,ASME B16.9	6.80
	2.3	FLANGE, 50NB (GU END)	31492501055	00	1	No.	IS:2062 E250 BR	2.50
	2.4	O-RING	41492501071	00	1	No.	HW59870	0.04
	2.5	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	2.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	2.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	2.8	FLANGE, 50NB (GEN END)	31492501005	00	1	No.	IS:2062 E250 BR	2.50
	2.9	O-RING	41492501071	00	1	No.	HW59870	0.04
	2.10	SCREW HEX	A-8.8 M16X65		4	No.	IS:1364PART-2,1367PART-3	0.53
	2.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	2.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
3		PIPE ASSEMBLY FROM TERM.97(CO2 DIST.) TO TERM.96(GU)						
	3.1	PIPE	D60.3X3.91		30	Mtr.	ASTM SA106 GR.B	163.20
	3.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A234 WPB,ASME B16.9	6.80
	3.3	FLANGE, 50NB (GU END)	31492501055	00	1	No.	IS:2062 E250 BR	2.50
	3.4	O-RING	41492501071	00	1	No.	HW59870	0.04
	3.5	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	3.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	3.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	3.8	FLANGE, 50NB (CO2 DIST. END)	31492501005	00	1	No.	IS:2062 E250 BR	2.50
	3.9	O-RING	41492501071	00	1	No.	HW59870	0.04
	3.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	3.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	3.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
4		PIPE ASSEMBLY FROM TERM.91(GU) TO TERM.15 (GEN.)						
	4.1	PIPE	D60.3X3.91		35	Mtr.	ASTM SA106 GR.B	190.40
	4.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A234 WPB,ASME B16.9	6.80
	4.3	FLANGE, 50NB (GU END)	31492501055	00	1	No.	IS:2062 E250 BR	2.50
	4.4	O-RING	41492501071	00	1	No.	HW59870	0.04
	4.5	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	4.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	4.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	4.8	FLANGE, 50NB (FOR GEN END)	31492501005	00	1	No.	IS:2062 E250 BR	2.50
	4.9	O-RING	41492501071	00	1	No.	HW59870	0.04
	4.10	SCREW HEX	A-8.8 M16X65		4	No.	IS:1364PART-2,1367PART-3	0.53
	4.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	4.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09

Kunal Mishra

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR GAS SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT.SPEC.	WT.(KG)
5		PIPE ASSEMBLY FROM TERM.19(GEN) TO TERM.110/112 (GAS DRIER INLET)						
	5.1	PIPE	D60.3X3.91		35	Mtr.	ASTM SA106 GR.B	190.40
	5.2	ELBOW LR 90°	D60.3X3.91		12	No.	ASTM A234 WPB,ASME B16.9	8.16
	5.3	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.59
	5.4	FLANGE, 50NB (FOR VLV, GAS DRIER,OIL TRAP,GEN END)	31492501005	00	11	No.	IS:2062 E250 BR	27.50
	5.5	O-RING	41492501071	00	11	No.	HW59870	0.39
	5.6	SCREW HEX	A-8.8 M16X65		44	No.	IS:1364PART-2,1367PART-3	5.81
	5.7	NUT HEX	A-8.8 M16		44	No.	IS:1364PART-3,1367PART-3	1.50
	5.8	WASHER MCD-ST17.0			88	No.	IS:2016-1967, IS:2062 E250 BR	0.97
	5.9	CONNECTION, 8NB	31500001190	06	1	No.	IS:2062 E250 BR	0.06
6		PIPE ASSEMBLY FROM TERM.111/113 (GAS DRIER OUTLET) TO TERM.20(GEN)						
	6.1	PIPE	D60.3X3.91		35	Mtr.	ASTM SA106 GR.B	190.40
	6.2	ELBOW LR 90°	D60.3X3.91		12	No.	ASTM A234 WPB,ASME B16.9	8.16
	6.3	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.59
	6.4	FLANGE,50NB (FOR VLV,GAS DRIER, GEN END)	31492501005	00	9	No.	IS:2062 E250 BR	22.50
	6.5	O-RING	41492501071	00	9	No.	HW59870	0.32
	6.6	SCREW HEX	A-8.8 M16X65		36	No.	IS:1364PART-2,1367PART-3	4.75
	6.7	NUT HEX	A-8.8 M16		36	No.	IS:1364PART-3,1367PART-3	1.22
	6.8	WASHER MCD-ST17.0			72	No.	IS:2016-1967, IS:2062 E250 BR	0.79
	6.9	CONNECTION, 8NB	31500001190	06	1	No.	IS:2062 E250 BR	0.06
7		PIPE ASSEMBLY FROM TERM.107(GU) TO 313A/313B(GAC)						
	7.1	PIPE	D13.7X2.24		20	Mtr.	ASTM SA106 GR.B	12.60
							TOTAL WT.	1157.75

TOTAL WEIGHT OF PIPING FOR GAS SYSTEM = 1158 KG KG

Kunal Mishra

Prepared by KUNAL MISHRA
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Approved by R.L.VYAS

Generator Pipings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
101	PIPE ASSEMBLY FROM TERM.445A (SOU) TO 5A, 5C (GEN)							
	101.6	GASKET VITON	102X60X3		12	No.	HW59870	0.42
	101.7	SCREW HEX	A-8.8 M16X65		48	No.	IS:1364PART-2,1367PART-3	6.34
	101.8	NUT HEX	A-8.8 M16		48	No.	IS:1364PART-3,1367PART-3	1.63
	101.9	WASHER MCD-ST17.0			96	No.	IS:2016-1967, IS:2062 E250 BR	1.06
	101.12	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	101.13	SCREW HEX	A-8.8 M16X40		8	No.	IS:1364PART-2,1367PART-3	0.74
	101.14	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	101.15	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
102	PIPE ASSEMBLY FROM TERM.445B (SOU) TO 5B, 5D (GEN)							
	102.6	GASKET VITON	102X60X3		9	No.	HW59870	0.32
	102.7	SCREW HEX	A-8.8 M16X65		36	No.	IS:1364PART-2,1367PART-3	4.75
	102.8	NUT HEX	A-8.8 M16		36	No.	IS:1364PART-3,1367PART-3	1.22
	102.9	WASHER MCD-ST17.0			72	No.	IS:2016-1967, IS:2062 E250 BR	0.79
	102.12	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	102.13	SCREW HEX	A-8.8 M16X40		8	No.	IS:1364PART-2,1367PART-3	0.74
	102.14	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	102.15	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
103	PIPE ASSEMBLY FROM TERM. 285A (SOU) TO TERM.6A, 6C (GEN)							
	103.5	GASKET VITON	68X34X3		9	No.	HW59870	0.27
	103.6	SCREW HEX	A-8.8 M12X50		36	No.	IS:1364PART-2,1367PART-3	2.27
	103.7	NUT HEX	A-8.8 M12		36	No.	IS:1364PART-3,1367PART-3	0.61
	103.8	WASHER MCD-ST 13			72	No.	IS:2016-1967, IS:2062 E250 BR	0.45
	103.10	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	103.11	SCREW HEX	A-8.8 M16X40		8	No.	IS:1364PART-2,1367PART-3	0.74
	103.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	103.13	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
104	PIPE ASSEMBLY FROM TERM. 285B (SOU) TO TERM.6B, 6D (GEN)							
	104.5	GASKET VITON	68X34X3		9	No.	HW59870	0.27
	104.6	SCREW HEX	A-8.8 M12X50		36	No.	IS:1364PART-2,1367PART-3	2.27
	104.7	NUT HEX	A-8.8 M12		36	No.	IS:1364PART-3,1367PART-3	0.61
	104.8	WASHER MCD-ST 13			72	No.	IS:2016-1967, IS:2062 E250 BR	0.45
	104.10	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	104.11	SCREW HEX	A-8.8 M16X40		8	No.	IS:1364PART-2,1367PART-3	0.74
	104.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	104.13	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
105	PIPE ASSEMBLY FROM TERM 80 (SOU) TO OUTLET OF SOST							
	105.4	GASKET VITON	122X76X3		10	No.	HW59870	0.45
	105.5	SCREW HEX	A-8.8 M16X65		40	No.	IS:1364PART-2,1367PART-3	5.28
	105.6	NUT HEX	A-8.8 M16		40	No.	IS:1364PART-3,1367PART-3	1.36
	105.7	WASHER MCD-ST17.0			80	No.	IS:2016-1967, IS:2062 E250 BR	0.88
107	PIPE ASSEMBLY FROM TERM.294 (SOST) TO 79 (SOU)							
	107.6	GASKET VITON	158X115X3		10	No.	HW59870	0.60
	107.7	SCREW HEX	A-8.8 M16X65		80	No.	IS:1364PART-2,1367PART-3	10.56
	107.8	NUT HEX	A-8.8 M16		80	No.	IS:1364PART-3,1367PART-3	2.72
	107.9	WASHER MCD-ST17.0			160	No.	IS:2016-1967, IS:2062 E250 BR	1.76
	107.11	GASKET VITON	158X122X3		2	No.	HW59870	0.10
	107.12	SCREW HEX	A-8.8 M20X70		16	No.	IS:1364PART-2,1367PART-3	3.57
	107.13	NUT HEX	A-8.8 M20		16	No.	IS:1364PART-3,1367PART-3	0.80
	107.14	WASHER MCD-ST21.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.54
108	PIPE ASSEMBLY FROM TERM 283(SOU) TO TEE OF PIPE 294 (SOST) TO 79(SOU)							
	108.4	GASKET VITON	122X76X3		2	No.	HW59870	0.09
	108.5	SCREW HEX	A-8.8 M16X65		8	No.	IS:1364PART-2,1367PART-3	1.06
	108.6	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	108.7	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18

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Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR SEAL OIL SYSTEM							
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	WT.(KG)
109		PIPE ASSEMBLY FROM TERM.7A/7B (GEN) TO 78 (SOU)					
	109.6	O-RING	41492501071	01	15	No.	0.53
	109.7	SCREW HEX	A-8.8 M16X65		8	No.	1.06
	109.8	NUT HEX	A-8.8 M16		120	No.	4.08
	109.9	WASHER MCD-ST17.0			240	No.	2.64
	109.14	O-RING	41492501071	01	2	No.	0.07
	109.15	SCREW HEX	A-8.8 M16X65		8	No.	1.06
	109.16	NUT HEX	A-8.8 M16		16	No.	0.54
	109.17	WASHER MCD-ST17.0			16	No.	0.18
111		PIPE ASSEMBLY FROM CONN.480 (SOST) TO TERM. 481 (SOU)					
	111.4	GASKET VITON	158X115X3		8	No.	0.48
	111.5	SCREW HEX	A-8.8 M16X65		8	No.	1.06
	111.6	NUT HEX	A-8.8 M16		64	No.	2.18
	111.7	WASHER MCD-ST17.0			128	No.	1.41
	111.9	GASKET VITON	158X122X3		2	No.	0.10
	111.10	SCREW HEX	A-8.8 M20X70		16	No.	3.57
	111.11	NUT HEX	A-8.8 M20		16	No.	0.80
	111.12	WASHER MCD-ST21.0			32	No.	0.54
112		PIPE ASSEMBLY OF ACW SUPPLY/RETURN FROM TERM 921/922 TO 927/928					
	112.1	PIPE CS	D114.3X3.05		20	Mtr.	321.60
	112.2	ELBOW LR 90°	D114.3X6.02		8	No.	31.60
	112.3	TEE	114.3X114.3X3.05		2	No.	10.00
	112.4	FLANGE, 100NB	31500001239	10	3	No.	10.86
	112.5	GASKET VITON	158X115X3		3	No.	0.18
	112.6	SCREW HEX	A-8.8 M16X65		24	No.	3.17
	112.7	NUT HEX	A-8.8 M16		24	No.	0.82
	112.8	WASHER MCD-ST17.0			48	No.	0.53
	112.9	FLANGE, 100NB (SEAL OIL CLR END)	31500001239	10	4	No.	14.48
	112.10	GASKET VITON	158X115X3		4	No.	0.24
	112.11	SCREW HEX	A-8.8 M16X65		32	No.	4.22
	112.12	NUT HEX	A-8.8 M16		32	No.	1.09
	112.13	WASHER MCD-ST17.0			64	No.	0.70
	112.14	FLANGE, 100NB (FOR VLV)	31493201065	08	8	No.	40.00
	112.15	GASKET VITON	158X122X3		8	No.	0.40
	112.16	SCREW HEX	A-8.8 M20X70		64	No.	14.27
	112.17	NUT HEX	A-8.8 M20		64	No.	3.20
	112.18	WASHER MCD-ST21.0			128	No.	2.18
	112.19	FLANGE, 100NB (FOR PEM TP)	31500001239	10	4	No.	14.48
	112.20	GASKET VITON	158X115X3		2	No.	0.12
	112.21	SCREW HEX	A-8.8 M16X65		16	No.	2.11
	112.22	NUT HEX	A-8.8 M16		16	No.	0.54
	112.23	WASHER MCD-ST21.0			32	No.	0.54
						TOTAL WT	556.53

TOTAL WEIGHT OF PIPING FOR SEAL OIL SYSTEM = 557 KG

REMARKS : ITEM NOS. TO BE READ IN CONJUNCTION WITH BOM TGE-3703.

Kunal Mishra

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

**Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028**

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR LIQUID DETECTOR RACK								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT.SPEC.	WT.(KG)
200		PIPE ASSEMBLY FROM TERM. 21A/B/C(GEN) TO 61A/B/C(LDR)						
	200.1	PIPE	D33.4X3.38		65	Mtr.	ASTM SA106 GR.B	162.50
	200.2	REDUCER CONC.	60.3X33.4X3.91X3.38		3	No.	ASTM A234 WPB,ASME B16.9	1.11
	200.3	FLANGE, 25NB	31500001239	04	30	No.	IS:2062 E250 BR	30.60
	200.4	GASKET VITON	68X34X3		30	No.	HW59870	0.90
	200.5	SCREW HEX	A-8.8 M12X50		120	No.	IS:1364PART-2,1367PART-3	7.56
	200.6	NUT HEX	A-8.8 M12		120	No.	IS:1364PART-3,1367PART-3	2.04
	200.7	WASHER MCD-ST 13			240	No.	IS:2016-1967, IS:2062 E250 BR	1.49
	200.8	FLANGE, 50NB (FOR 21A/B/C TP GEN END)	31500001239	07	3	No.	IS:2062 E250 BR	6.30
	200.9	GASKET VITON	102X60X3		3	No.	HW59870	0.11
	200.10	SCREW HEX	A-8.8 M16X65		12	No.	IS:1364PART-2,1367PART-3	1.58
	200.11	NUT HEX	A-8.8 M16		12	No.	IS:1364PART-3,1367PART-3	0.41
	200.12	WASHER MCD-ST17.0			24	No.	IS:2016-1967, IS:2062 E250 BR	0.26
	200.13	FLANGE, 25NB (FOR VLV)	31493201125	00	6	No.	IS:2062 E250 BR	6.78
	200.14	O-RING	41492501071	02	6	No.	HW59870	0.21
	200.15	SCREW HEX	A-8.8 M12X50		24	No.	IS:1364PART-2,1367PART-3	1.512
	200.16	NUT HEX	A-8.8 M12		24	No.	IS:1364PART-3,1367PART-3	0.408
	200.17	WASHER MCD-ST 13			48	No.	IS:2016-1967, IS:2062 E250 BR	0.2976
201		PIPE ASSEMBLY FROM TERM.22(GEN) TO 62(LDR)						
	201.1	PIPE	D33.4X3.38		25	Mtr.	ASTM SA106 GR.B	62.50
	201.2	REDUCER CONC.	60.3X33.4X3.91X3.38		1	No.	ASTM A234 WPB,ASME B16.9	0.37
	201.3	FLANGE, 25NB	31500001239	04	10	No.	IS:2062 E250 BR	10.20
	201.4	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	201.5	SCREW HEX	A-8.8 M12X50		20	No.	IS:1364PART-2,1367PART-3	1.26
	201.6	NUT HEX	A-8.8 M12		20	No.	IS:1364PART-3,1367PART-3	0.34
	201.7	WASHER MCD-ST 13			40	No.	IS:2016-1967, IS:2062 E250 BR	0.25
	201.8	FLANGE, 50NB (FOR 22 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	201.9	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	201.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	201.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	201.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
202		PIPE ASSEMBLY FROM TERM. 25(GEN) TO 64(LDR)						
	202.1	PIPE	D33.4X3.38		25	Mtr.	ASTM SA106 GR.B	62.50
	202.2	REDUCER CONC.	60.3X33.4X3.91X3.38		1	No.	ASTM A234 WPB,ASME B16.9	0.37
	202.3	FLANGE, 25NB	31500001239	04	10	No.	IS:2062 E250 BR	10.20
	202.4	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	202.5	SCREW HEX	A-8.8 M12X50		20	No.	IS:1364PART-2,1367PART-3	1.26
	202.6	NUT HEX	A-8.8 M12		20	No.	IS:1364PART-3,1367PART-3	0.34
	202.7	WASHER MCD-ST 13			40	No.	IS:2016-1967, IS:2062 E250 BR	0.25
203		PIPE ASSEMBLY FROM TERM. 23(GEN) TO 63(LDR)						
	203.1	PIPE	D33.4X3.38		25	Mtr.	ASTM SA106 GR.B	62.50
	203.2	REDUCER CONC.	60.3X33.4X3.91X3.38		1	No.	ASTM A234 WPB,ASME B16.9	0.37
	203.3	FLANGE, 25NB	31500001239	04	10	No.	IS:2062 E250 BR	10.20
	203.4	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	203.5	SCREW HEX	A-8.8 M12X50		20	No.	IS:1364PART-2,1367PART-3	1.26
	203.6	NUT HEX	A-8.8 M12		20	No.	IS:1364PART-3,1367PART-3	0.34
	203.7	WASHER MCD-ST 13			40	No.	IS:2016-1967, IS:2062 E250 BR	0.25
							TOTAL WT.	452.13

TOTAL WEIGHT OF PIPING FOR LDR = 452 KG

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Kunal Mishra

Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
301		PIPE ASSEMBLY FROM TERM.190 (PW TANK PIPE LINE) TO (PW PUMP INLET)						
	301.6	GASKET VITON	212X169X3		9	No.	HW59870	0.54
	301.7	SCREW HEX	A-8.8 M20X80		72	No.	IS:1364PART-2,1367PART-3	18.58
	301.8	NUT HEX	A-8.8 M20		72	No.	IS:1364PART-3,1367PART-3	3.60
	301.9	WASHER MCD-ST 21			144	No.	IS:2016-1967, IS:2062 E250 BR	2.45
	301.11	GASKET VITON	218X159X3		4	No.	HW59870	0.24
	301.12	SCREW HEX	A-8.8 M24X130		32	No.	IS:1364PART-2,1367PART-3	20.00
	301.13	NUT HEX	A-8.8 M24		32	No.	IS:1364PART-3,1367PART-3	2.24
	301.14	WASHER MCD-ST 25			64	No.	IS:2016-1967, IS:2062 E250 BR	1.92
	301.16	GASKET VITON	188X140X3		2	No.	HW59870	0.12
	301.17	SCREW HEX	A-8.8 M16X120		16	No.	IS:1364PART-2,1367PART-3	2.74
	301.18	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	301.19	WASHER MCD-ST 17			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	301.21	FLANGE, 125NB (190 GEN END)	31530201018	00	1	No.	IS:2062 E250 BR	6.90
	301.22	GASKET VITON	188X131X3		1	No.	HW59870	0.06
	301.23	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	301.24	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	301.25	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
302		PIPE ASSEMBLY FROM TERM.188 (PW TANK PIPE LINE) TO TERM. 195 (PW UNIT)						
	302.5	GASKET VITON	212X169X3		9	No.	HW59870	0.54
	302.6	SCREW HEX	A-8.8 M20X80		72	No.	IS:1364PART-2,1367PART-3	18.58
	302.7	NUT HEX	A-8.8 M20		72	No.	IS:1364PART-3,1367PART-3	3.60
	302.8	WASHER MCD-ST 21			144	No.	IS:2016-1967, IS:2062 E250 BR	2.45
	302.10	FLANGE, 150NB (PWU 195 END)	31531401089	01	1	No.	IS:2062 E250 BR	7.59
	302.11	GASKET VITON	218X159X3		1	No.	HW59870	0.06
	302.12	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	302.13	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	302.14	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
	302.16	FLANGE, 125NB (188 GEN END)	31530201018	00	1	No.	IS:2062 E250 BR	6.90
	302.17	GASKET VITON	188X131X3		1	No.	HW59870	0.06
	302.18	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	302.19	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	302.20	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48

Prepared by KUNAL MISHRA
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Approved by R.L.VYAS

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**Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028**

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
303		PIPE ASSEMBLY FROM OUTLET OF PW PUMP TO PW FILTER UNIT (206)						
	303.6	GASKET VITON	212X169X3		2	No.	HW59870	0.12
	303.7	SCREW HEX	A-8.8 M20X70		16	No.	IS:1364PART-2,1367PART-3	3.57
	303.8	NUT HEX	A-8.8 M20		16	No.	IS:1364PART-3,1367PART-3	0.80
	303.9	WASHER MCD-ST 21			32	No.	IS:2016-1967, IS:2062 E250 BR	0.54
	303.12	GASKET VITON	138X85X3		2	No.	HW59870	0.10
	303.13	SCREW HEX	A-8.8 M16X75		16	No.	IS:1364PART-2,1367PART-3	2.24
	303.14	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	303.15	WASHER MCD-ST 17			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	303.17	GASKET VITON	218X159X3		2	No.	HW59870	0.12
	303.18	SCREW HEX	A-8.8 M24X130		16	No.	IS:1364PART-2,1367PART-3	10.00
	303.19	NUT HEX	A-8.8 M24		16	No.	IS:1364PART-3,1367PART-3	1.12
	303.20	WASHER MCD-ST 25			32	No.	IS:2016-1967, IS:2062 E250 BR	0.96
	303.21	STUDS-MILD STEEL DOUBLE ENDED (FOR NRV)	C-20 M24X250		16	No.	HW7141199	13.60
	303.22	NUT HEX (FOR NRV)	M24-B6		16	No.	AA7151112	1.12
	303.23	WASHER MCD-ST25.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
	303.25	FLANGE 150NB (PW FILTER UNIT END)	31531401089	01	1	No.	IS-2062 E250BR	7.59
	303.26	GASKET VITON	218X159X3		1	No.	HW59870	0.06
	303.27	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	303.28	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	303.29	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
304		PIPE ASSEMBLY FROM PW UNIT (207) TO PW PUMP SUCTION LINE 198						
	304.3	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	304.4	SCREW HEX	A-8.8 M12X100		4	No.	IS:1364PART-2,1367PART-3	0.25
	304.5	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	304.6	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
	304.8	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	304.9	SCREW HEX	A-8.8 M12X50		4	No.	IS:1364PART-2,1367PART-3	0.25
	304.10	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	304.11	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
305		PIPE ASSEMBLY FROM PW UNIT (394) TO TERMINAL BUSHING INLET (132A/B/C)						
	305.6	GASKET VITON	88X48X3		10	No.	HW59870	0.30
	305.7	SCREW HEX	A-8.8 M16X55		40	No.	IS:1364PART-2,1367PART-3	4.64
	305.8	NUT HEX	A-8.8 M16		40	No.	IS:1364PART-3,1367PART-3	1.36
	305.9	WASHER MCD-ST 17			80	No.	IS:2016-1967, IS:2062 E250 BR	0.88

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Generator Pippings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
	305.11	GASKET VITON	68X34X3		3	No.	HW59870	0.09
	305.12	SCREW HEX	A-8.8 M12X50		12	No.	IS:1364PART-2,1367PART-3	0.76
	305.13	NUT HEX	A-8.8 M12		12	No.	IS:1364PART-3,1367PART-3	0.20
	305.14	WASHER MCD-ST 13			24	No.	IS:2016-1967, IS:2062 E250 BR	0.15
	305.16	FLANGE, 40NB (PWU 394 END)	31500001044	00	1	No.	IS:2062 E250 BR	1.19
	305.17	GASKET VITON	71X48X3		1	No.	HW59870	0.03
	305.18	SCREW HEX	A-8.8 M12X100		4	No.	IS:1364PART-2,1367PART-3	0.41
	305.19	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	305.20	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
306		PIPE ASEMBLY FROM PW BUSHING OUTLET(133A/B/C) TO CONNECTION AT (PIPE TERM 190 TO TERM 199).						
	306.10	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	306.11	SCREW HEX	A-8.8 M16X55		8	No.	IS:1364PART-2,1367PART-3	0.93
	306.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	306.13	WASHER MCD-ST 17			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
	306.15	GASKET VITON	68X34X3		7	No.	HW59870	0.21
	306.16	SCREW HEX	A-8.8 M12X50		28	No.	IS:1364PART-2,1367PART-3	1.76
	306.17	NUT HEX	A-8.8 M12		28	No.	IS:1364PART-3,1367PART-3	0.48
	306.18	WASHER MCD-ST 13			56	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	306.20	GASKET VITON	88X48X3		2	No.	HW59870	0.06
	306.21	SCREW HEX	A-8.8 M16X55		8	No.	IS:1364PART-2,1367PART-3	0.93
	306.22	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	306.23	WASHER MCD-ST 17			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
	306.29	GASKET VITON	45X22X3		18	No.	HW59870	0.54
	306.30	SCREW HEX	A-8.8 M12X55		72	No.	IS:1364PART-2,1367PART-3	5.18
	306.31	NUT HEX	A-8.8 M12		72	No.	IS:1364PART-3,1367PART-3	1.22
	306.32	WASHER MCD-ST 13			144	No.	IS:2016-1967, IS:2062 E250 BR	0.89
	306.34	GASKET VITON	68X34X3		6	No.	HW59870	0.18
	306.35	SCREW HEX	A-8.8 M12X50		24	No.	IS:1364PART-2,1367PART-3	1.51
	306.36	NUT HEX	A-8.8 M12		24	No.	IS:1364PART-3,1367PART-3	0.41
	306.37	WASHER MCD-ST 13			48	No.	IS:2016-1967, IS:2062 E250 BR	0.30
							TOTAL WT. (KG)	194.36

TOTAL WEIGHT OF PIPING FOR PW SYSTEM = 194 KG

REMARKS : ITEM NOS. TO BE READ IN CONJUNCTION WITH BOM TGE-3703.

Prepared by KUNAL MISHRA
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Generator Piping for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR WASTE GAS SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
400		FROM TERM. 105(GU) TO ATM						
	400.1	PIPE	D168.3X7.11		70	Mtr.	ASTM SA106 GR.B	1978.2
	400.2	ELBOW LR 90°	D168.3X7.11		10	No.	ASTM A234 WPB,ASME B16.9	104
	400.3	H2 VENT STAR	TGE-2774		1	No.	TGE-2774	80.74
	400.4	PIPE	D26.7X2.87		10	Mtr.	ASTM SA106 GR.B	16.9
	400.5	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.115
	400.6	FLANGE, 20NB (FOR SIGHT GLASS)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	400.7	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	400.8	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.288
	400.9	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	400.10	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496
	400.11	FLANGE, 20NB (FOR VALVE)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	400.12	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	400.13	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.288
	400.14	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	400.15	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496
401		FROM TERM. CO2 DIST.(968) TO WGS CONNECTION						
	401.1	PIPE	D60.3X3.91		25	Mtr.	ASTM SA106 GR.B	136
	401.2	ELBOW LR 90°	D60.3X3.91		8	No.	ASTM A234 WPB,ASME B16.9	5.44
	401.3	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.59
	401.4	TEE UNEQUAL	D168.3x114.3x3.40		1	No.	ASTM A234 WPB,ASME B16.9	13.5
	401.5	REDUCER CONC.	114.3X60.3X6.02X3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.44
402		FROM TERM. H2 DIST.(106) TO WGS CONNECTION						
	402.1	PIPE	D60.3X3.91		10	Mtr.	ASTM SA106 GR.B	54.4
	402.2	ELBOW LR 90°	D60.3X3.91		4	No.	ASTM A234 WPB,ASME B16.9	2.72
	402.3	TEE UNEQUAL	D168.3x114.3x3.40		1	No.	ASTM A234 WPB,ASME B16.9	13.5
	402.4	REDUCER CONC.	114.3X60.3X6.02X3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.44
403		FROM TERM. GAC 315 A/B TO WGS CONNECTION(COMMON HEADER OF 50/100NB)						
	403.1	PIPE	D33.4X3.38		15	Mtr.	ASTM SA106 GR.B	37.5
	403.2	TEE	33.4X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.34
	403.3	PIPE	D60.3X3.91		10	Mtr.	ASTM SA106 GR.B	54.4
	403.4	ELBOW LR 90°	D60.3X3.91		4	No.	ASTM A234 WPB,ASME B16.9	2.72
	403.5	TEE UNEQUAL	60.3X33.4X3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.49
	403.6	REDUCER CONC.	60.3X33.4X3.91X3.38		1	No.	ASTM A234 WPB,ASME B16.9	0.37
404		FROM TERM. 87 (SOU) TO WGS CONNECTION(COMMON HEADER OF 50NB)						
	404.1	PIPE	D33.4X3.38		30	Mtr.	ASTM SA106 GR.B	75
405		COMMON HEADER 100NB TO ATM						
	405.1	PIPE	D114.3X6.02		45	Mtr.	ASTM SA106 GR.B	723.6
	405.2	ELBOW LR 90°	D114.3X6.02		8	No.	ASTM A234 WPB,ASME B16.9	31.6
	405.3	REDUCER CONC.	114.3X60.3X6.02X3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.44
	405.4	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.115
	405.5	FLANGE, 20NB (FOR SIGHT GLASS)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	405.6	GASKET VITON	58X27X3		2	No.	HW59870	0.06
	405.7	SCREW HEX	A-8.8 M12X60		8	No.	IS:1364PART-2,1367PART-3	0.576
	405.8	NUT HEX	A-8.8 M12		8	No.	IS:1364PART-3,1367PART-3	0.136
	405.9	WASHER MCD-ST13.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.0992
	405.10	FLANGE, 20NB (FOR VALVE)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	405.11	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	405.12	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.288
	405.13	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	405.14	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496

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Generator Piping for 660 MW sets
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MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR WASTE GAS SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
406		FROM TERM. 9A/9B TO VAPOUR EXHAUSTER (COMMON HEADER 80NB) UPTO 100NB COMMON OUTLET HEADER						
	406.1	PIPE	D88.9X5.49		50	Mtr.	ASTM SA106 GR.B	564.5
	406.2	ELBOW LR 90°	D88.9X5.49		20	No.	ASTM A234 WPB,ASME B16.9	41.6
	406.3	TEE	88.9X88.9X3.05		5	No.	ASTM A234 WPB,ASME B16.9	15
	406.4	FLANGE, SORF, 80NB	31500001239	09	20	No.	IS:2062 E250 BR	65.6
	406.5	GASKET VITON	138X89X3		10	No.	HW59870	0.5
	406.6	SCREW HEX	A-8.8 M16X70		80	No.	IS:1364PART-2,1367PART-3	11.2
	406.7	NUT HEX	A-8.8 M16		80	No.	IS:1364PART-3,1367PART-3	2.72
	406.8	WASHER MCD-ST17.0			160	No.	IS:2016-1967, IS:2062 E250 BR	1.76
	406.9	FLANGE, 80NB (VAP EXHST END)	41500001011	00	4	No.	IS:2062 E250 BR	15.632
	406.10	GASKET VITON	90X108X3		4	No.	HW59870	0.14
	406.11	SCREW HEX	A-8.8 M8X70		16	No.	IS:1364PART-2,1367PART-3	2.88
	406.12	NUT HEX	A-8.8 M8		16	No.	IS:1364PART-3,1367PART-3	0.08
	406.13	WASHER MCD-ST9.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.1984
	406.14	FLANGE, 80NB (9A/9B GEN END, VALVE)	31500001239	09	10	No.	IS:2062 E250 BR	32.8
	406.15	GASKET VITON	138X89X3		10	No.	HW59870	0.5
	406.16	SCREW HEX	A-8.8 M16X70		48	No.	IS:1364PART-2,1367PART-3	6.72
	406.16	SCREW HEX FOR NRV						
	406.16	FLANGE	A-8.8 M16X100		32	No.	IS:1364PART-2,1367PART-3	5.472
	406.17	NUT HEX	A-8.8 M16		80	No.	IS:1364PART-3,1367PART-3	2.72
	406.18	WASHER MCD-ST17.0			160	No.	IS:2016-1967, IS:2062 E250 BR	1.76
	406.19	FLANGE, 80NB (BLIND)	AA7244703		1	No.	IS:2062 E250 BR	4.77
	406.20	CONNECTION, 15NB	31500001190	02	3	No.	IS:2062 E250 BR	0.3
407		FROM COMMON HEADER 100NB TO ATM						
	407.1	PIPE	D114.3X6.02		80	Mtr.	ASME SA106 GR.B	1286.40
	407.2	ELBOW LR 90°	D114.3X6.02		20	No.	ASTM A234 WPB,ASME B16.9	79.00
	407.3	TEE	114.3X88.9X3.05		2	No.	ASTM A234 WPB,ASME B16.9	10.00
	407.4	FLANGE, SORF, 100NB	31500001239	10	32	No.	IS:2062 E250 BR	115.84
	407.5	GASKET VITON	158X115X3		16	No.	HW59870	0.96
	407.6	SCREW HEX	A-8.8 M16X65		128	No.	IS:1364PART-2,1367PART-3	16.90
	407.7	NUT HEX	A-8.8 M16		128	No.	IS:1364PART-3,1367PART-3	4.35
	407.8	WASHER MCD-ST17.0			128	No.	IS:2016-1967	1.41
	407.9	FLANGE, 100NB (BLIND)	AA7244703		1	No.	IS:2062 E250 BR	5.65
	407.10	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.115
408		FROM TERM. 296 (SOST VENT) TO VAP. EXHAUSTER						
	408.1	PIPE	D88.9X5.49		15	Mtr.	ASTM SA106 GR.B	169.35
	408.2	ELBOW LR 90°	D88.9X5.49		6	No.	ASTM A234 WPB,ASME B16.9	12.48
	408.3	FLANGE, SORF, 80NB	31500001239	09	4	No.	IS:2062 E250 BR	13.12
	408.4	GASKET VITON	138X89X3		2	No.	HW59870	0.10
	408.5	SCREW HEX	A-8.8 M16X70		16	No.	IS:1364PART-2,1367PART-3	2.24
	408.6	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	408.7	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	408.8	FLANGE, SORF, 80NB (SOST END)	31500001239	09	1	No.	IS:2062 E250 BR	3.28
	408.9	GASKET VITON	138X89X3		1	No.	HW59870	0.05
	408.10	SCREW HEX	A-8.8 M16X70		8	No.	IS:1364PART-2,1367PART-3	1.12
	408.11	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.272
	408.12	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.176

Kunal Mishra

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Generator PIPings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR WASTE GAS SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
409		FROM TERM 189 (PW TANK) TO WGS (VAP EXHAUSTER)						
	409.1	PIPE	D26.7X2.87		10	Mtr.	ASTM SA106 GR.B	16.9
	409.2	PIPE	D21.3X2.77		6	Mtr.	ASTM SA106 GR.B	7.62
	409.3	REDUCER CONC. (FOR VALVE)	26.7X21.3X2.87X2.77		2	No.	ASTM A234 WPB,ASME B16.9	0.16
	409.4	REDUCER CONC. (FOR VALVE)	26.7X17.1X2.87X2.31		2	No.	ASTM A234 WPB,ASME B16.9	0.14
	409.5	TEE	26.7X21.3X2.87		3	No.	ASTM A234 WPB,ASME B16.9	0.45
	409.6	REDUCER CONC. (FOR SIGHT GLASS)	33.4X21.3X3.38X2.77		2	No.	ASTM A234 WPB,ASME B16.9	0.28
	409.7	FLANGE, 25NB(FOR SIGHT GLASS)	31500001239	04	2	No.	IS:2062 E250 BR	2.04
	409.8	GASKET VITON	68X34X3		2	No.	HW59870	0.06
	409.9	SCREW HEX	A-8.8 M12X50		8	No.	IS:1364PART-2,1367PART-3	0.504
	409.10	NUT HEX	A-8.8 M12		8	No.	IS:1364PART-3,1367PART-3	0.136
	409.11	WASHER MCD-ST13.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.0992
410		FROM TERM 114/115 (GAS DRIER) TO WGS (VAP EXHAUSTER)						
	410.1	PIPE	D60.3X3.91		20	Mtr.	ASTM SA106 GR.B	108.8
	410.2	ELBOW LR 90°	D60.3X3.91		4	No.	ASTM A234 WPB,ASME B16.9	2.72
	410.3	REDUCER CONC.	88.9X60.3X5.49X3.91		1	No.	ASTM A234 WPB,ASME B16.9	0.91
	410.4	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.59
	410.5	FLANGE, 50NB (FOR GAS DRIER)	31500001239	07	2	No.	IS:2062 E250 BR	4.2
	410.6	GASKET VITON	102X60X3		2	No.	HW59870	0.07
	410.7	SCREW HEX	A-8.8 M16X65		8	No.	IS:1364PART-2,1367PART-3	1.056
	410.8	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.272
	410.9	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.176
TOTAL WT.								5992.40

TOTAL WEIGHT OF PIPING FOR WASTE GAS SYSTEM =

5992 KG

Kunal Mishra

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Generator Piping for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

PIPING FOR WASTE FLUID SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
500		FROM WASTE GAS SYSTEM TO COMMON HEADER OF 50 NB						
	500.1	PIPE	D26.7X2.87		20	Mtr.	ASTM SA106 GR.B	33.80
	500.2	CONNECTION, 20NB	31500001190	03	2	No.	ASTM SA106 GR.B	0.23
501		FROM GIS(LDR) TO COMMON HEADER OF 50 NB						
	501.1	PIPE	D17.1X2.31		20	Mtr.	ASTM SA106 GR.B	16.80
	501.2	CONNECTION, 10NB	31500001190	00	1	No.	ASTM SA106 GR.B	0.08
502		FROM SOS(U-LOOP DRAIN) & GS(OIL TRAP) TO COMMON HEADER OF 50 NB						
	502.1	PIPE	D21.3X2.77		40	Mtr.	ASTM SA106 GR.B	50.80
	502.2	CONNECTION, 15NB	31500001190	02	2	No.	ASTM SA106 GR.B	0.20
503		FROM SOU TO COMMON HEADER OF 50 NB						
	503.1	PIPE	D33.4X3.38		35	Mtr.	ASTM SA106 GR.B	87.50
	503.2	CONNECTION, 25NB	31500001190	08	1	No.	ASTM SA106 GR.B	0.14
504		COMMON HEADER OF 50 NB TO DRAIN OIL COLLECTOR						
	504.1	PIPE	D60.3X3.91		20	Mtr.	ASTM SA106 GR.B	108.80
	504.2	ELBOW 90° LR	D60.3X3.91		5	No.	ASTM A234 WPB, ASME B16.9	3.40
505		FROM DRAIN OIL COLLECTOR TO WASTE DISPOSAL PIT						
	505.1	PIPE	D33.4X3.38		20	Mtr.	ASTM SA106 GR.B	50.00
TOTAL WT.								351.75

TOTAL WEIGHT OF PIPING FOR WASTE FLUID SYSTEM =

352 KG

Kunal Mishra

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Generator Pipings for 660 MW sets
(CARBON STEEL)
MATERIAL CODE-W90415002028

TGE-3702
REV02
DATE-12.10.2019

SUPPORTS FOR GENERATOR PIPING								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG NO. / SIZE	VAR.	QTY.	QTY.	MAT. SPEC.	WT.(KG)
600	600.1	STRIP	3.16X20		60	Mtr.	IS:5986	30
	600.2	FLAT	6X40		100	Mtr.	IS:2062 E250 BR	180
	600.3	FLAT	16X30		70	Mtr.	IS:2062 E250 BR	264
	600.4	ANGLE	50X50X5		100	Mtr.	IS:2062 E250 BR	380
	600.5	ANGLE	75X75X6		100	Mtr.	IS:2062 E250 BR	680
	600.6	CHANNEL ISMC 100			20	Mtr.	IS:2062 E250 BR	185
	600.7	CHANNEL ISMC 75			20	Mtr.	IS:2062 E250 BR	138
	600.8	PIPE CS	D60.3X3.91		10	Mtr.	ASTM SA106 GR.B	54.4
	600.9	TEE BAR ISNT-50			24	Mtr.	IS:2062 E250 BR	106
	600.10	TEE BAR ISNT-75			24	Mtr.	IS:2062 E250 BR	245
	600.11	PIPE CLAMP NB8	2-150-00-01023	1	40	No.	IS:2062 E250 BR	4.8
	600.12	PIPE CLAMP NB10	2-150-00-01023	2	25	No.	IS:2062 E250 BR	3
	600.13	PIPE CLAMP NB15	2-150-00-01023	3	80	No.	IS:2062 E250 BR	10.4
	600.14	PIPE CLAMP NB20	2-150-00-01023	4	6	No.	IS:2062 E250 BR	0.96
	600.15	PIPE CLAMP NB25	2-150-00-01023	5	100	No.	IS:2062 E250 BR	22.5
	600.16	PIPE CLAMP NB40	2-150-00-01023	7	20	No.	IS:2062 E250 BR	5.5
	600.17	PIPE CLAMP NB50	2-150-00-01024	8	100	No.	IS:2062 E250 BR	131.2
	600.18	PIPE CLAMP NB65	2-150-00-01026	6	15	No.	IS:2062 E250 BR	12
	600.19	PIPE CLAMP NB80	2-150-00-01026	7	20	No.	IS:2062 E250 BR	18
	600.20	PIPE CLAMP NB100	2-150-00-01026	8	60	No.	IS:2062 E250 BR	120
	600.21	PIPE CLAMP NB 150	31500001237	01	55	No.	IS:2062 E250 BR	132
	600.22	BEAM ATTACHMENT M12	4-150-00-01101	2	40	No.	IS:2062 E250 BR	1.25
	600.23	TURN BUCKLE M12	4-150-00-01103	2	50	No.	IS:2062 E250 BR	52
	600.24	TIE ROD M12	4-150-00-01130	0	50	No.	IS:2062 E250 BR	12
	600.25	THREADED ROD M12	4-150-00-01131	0	100	No.	IS:2062 E250 BR	72
	600.26	WELDING EYE	4-150-00-01132	0	80	No.	IS:2062 E250 BR	90
	600.27	EYE BOLT M12	4-150-00-01099	2	50	No.	IS:2062 E250 BR	8
TOTAL WT. (KG)								2958

TOTAL WEIGHT OF PIPING FOR HANGERS & SUPPORTS =

2958 KG

COMBINED WEIGHT OF THE
SYSTEM(GS+SOS+LDR+PWS+WGS+WFS+H&S)=

11663 KG

TOTAL WEIGHT OF CARBON STEEL MATERIAL =

11663 KG

Kunal Mishra
KUNAL MISHRA
Dy. Mg. BH&E (EME)

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

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Generator Pipings for 660 MW Sets
(STAINLESS STEEL)
MATERIAL CODE - W90415001994

TGE-3703
REV02
DATE-12.10.2019

PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
101		PIPE ASSEMBLY FROM TERM.445A (SOU) TO 5A, 5C (GEN)						
	101.1	PIPE SS	D60.3X3.91		65	Mtr.	ASTM A312 TP321	353.60
	101.2	ELBOW LR 90°	D60.3X3.91		22	No.	ASTM A403 WP321,ASME B16.9	14.96
	101.3	TEE	60.3X60.3X3.91		1	No.	ASTM A403 WP321,ASME B16.9	1.59
	101.4	REDUCER CONC.	60.3X48.3X3.91X3.68		2	No.	ASTM A403 WP321,ASME B16.9	0.82
	101.5	FLANGE, 50NB	31500001240	07	24	No.	ASTM A182 F321	50.40
	101.10	PIPE SS	D48.3X3.68		3	Mtr.	ASTM A312 TP321	12.15
	101.11	FLANGE,40NB (FOR GEN END)	31500001240	06	2	No.	ASTM A182 F321	2.34
	101.16	CONNECTION, 15NB	31500001190	02	1	No.	ASTM A182 F321	0.10
102		PIPE ASSEMBLY FROM TERM.445B (SOU) TO 5B, 5D (GEN)						
	102.1	PIPE SS	D60.3X3.91		50	Mtr.	ASTM A312 TP321	272.00
	102.2	ELBOW LR 90°	D60.3X3.91		16	No.	ASTM A403 WP321,ASME B16.9	10.88
	102.3	TEE	60.3X60.3X3.91		1	No.	ASTM A403 WP321,ASME B16.9	1.59
	102.4	REDUCER CONC.	60.3X48.3X3.91X3.68		2	No.	ASTM A403 WP321,ASME B16.9	0.82
	102.5	FLANGE, 50NB	31500001240	07	18	No.	ASTM A182 F321	37.80
	102.10	PIPE SS	D48.3X3.68		3	Mtr.	ASTM A312 TP321	12.15
	102.11	FLANGE,40NB (FOR GEN END)	31500001240	06	2	No.	ASTM A182 F321	2.34
	102.16	CONNECTION, 15NB	31500001190	02	1	No.	ASTM A182 F321	0.10
103		PIPE ASSEMBLY FROM TERM. 285A (SOU) TO TERM.6A, 6C (GEN)						
	103.1	PIPE SS	D33.4X3.38		60	Mtr.	ASTM A312 TP321	150.00
	103.2	TEE	33.4X33.4X3.38		1	No.	ASTM A403 WP321,ASME B16.9	0.34
	103.3	REDUCER CONC.	D48.3X33.4X3.68X3.38		2	No.	ASTM A403 WP321,ASME B16.9	0.48
	103.4	FLANGE, 25NB	31500001240	04	18	No.	ASTM A182 F321	18.36
	103.9	FLANGE,40NB (FOR GEN END)	31500001240	06	2	No.	ASTM A182 F321	2.34
104		PIPE ASSEMBLY FROM TERM. 285B (SOU) TO TERM.6B, 6D (GEN)						
	104.1	PIPE SS	D33.4X3.38		50	Mtr.	ASTM A312 TP321	125.00
	104.2	TEE	33.4X33.4X3.38		1	No.	ASTM A403 WP321,ASME B16.9	0.34
	104.3	REDUCER CONC.	D48.3X33.4X3.68X3.38		2	No.	ASTM A403 WP321,ASME B16.9	0.48
	104.4	FLANGE, 25NB	31500001240	04	18	No.	ASTM A182 F321	18.36
	104.9	FLANGE,40NB (FOR GEN END)	31500001240	06	2	No.	ASTM A182 F321	2.34
105		PIPE ASSEMBLY FROM TERM 80 (SOU) TO OUTLET OF SOST						
	105.1	PIPE SS	D73X5.16		50	Mtr.	ASTM A312 TP321	431.50
	105.2	ELBOW LR 90°	D73X5.16		10	No.	ASTM A403 WP321,ASME B16.9	13.00
	105.3	FLANGE, 65NB	31500001240	08	20	No.	ASTM A182 F321	53.40
107		PIPE ASSEMBLY FROM TERM.294 (SOST) TO 79 (SOU)						
	107.1	PIPE SS	D114.3X6.02		55	Mtr.	ASTM A312 TP321	884.40
	107.2	ELBOW LR 90°	D114.3X6.02		12	No.	ASTM A403 WP321,ASME B16.9	47.40
	107.3	TEE	114.3X114.3X6.02		1	No.	ASTM A403 WP321,ASME B16.9	5.00
	107.4	REDUCER CONC.	114.3X73X6.02X5.16		1	No.	ASTM A403 WP321,ASME B16.9	1.52
	107.5	FLANGE, 100NB	31500001240	10	20	No.	ASTM A182 F321	72.40
	107.10	FLANGE,100NB (FOR VLV)	31493201065	08	2	No.	ASTM A182 F321	10.00
108		PIPE ASSEMBLY FROM TERM 283(SOU) TO TEE OF PIPE 294 (SOST) TO 79(SOU)						
	108.1	PIPE SS	D73X5.16		15	Mtr.	ASTM A312 TP321	129.45
	108.2	ELBOW LR 90°	D73X5.16		6	No.	ASTM A403 WP321,ASME B16.9	7.80
	108.3	FLANGE, 65NB	31500001240	08	4	No.	ASTM A182 F321	10.68

Kunal Mishra

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Checked by MANJU AZAD
Approved by R.L.VYAS

Generator Pipings for 660 MW Sets
(STAINLESS STEEL)
MATERIAL CODE - W90415001994

TGE-3703
REV02
DATE-12.10.2019

PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
109		PIPE ASSEMBLY FROM TERM.7A/7B (GEN) TO 78 (SOU)						
	109.1	PIPE SS	D114.3X6.02		80	Mtr.	ASTM A312 TP321	1286.40
	109.2	ELBOW LR 90°	D114.3X6.02		26	No.	ASTM A403 WP321,ASME B16.9	102.70
	109.3	TEE	114.3X114.3X6.02		1	No.	ASTM A403 WP321,ASME B16.9	5.00
	*109.4	FLANGE, 100NB	31500001027	02	15	No.	ASTM A182 F321	54.3
	*109.5	FLANGE, 100NB	31500001000	06	15	No.	ASTM A182 F321	88.2
	109.10	CONNECTION FOR RTD	4150000111	00	2	No.	ASTM A182 F321	1.00
	109.11	THERMOWELL	41531401027	00	2	No.	ASTM A182 F321	0.80
	109.12	CONNECTION, 15NB	31500001190	02	2	No.	ASTM A182 F321	0.20
	109.13	FLANGE, 100NB (FOR GEN END)	31500001027	02	2	No.	ASTM A182 F321	7.24
* REMARKS FOR PROJECT SITE - ITEM NO. 109.4 & 109.5 SHALL BE USED IN COMBINATION i.e. ONE FLAT FLANGE ALONG WITH GROOVED FLANGE WITH O-RING COVERED IN BOM TGE-3702 (ITEM NO. 109.14).								
110		PIPE ASSEMBLY FROM U LOOP TO TERM.81(DPR LINE)						
	110.1	PIPE SS	D21.3X2.77		45	Mtr.	ASTM A312 TP321	57.15
111		PIPE ASSEMBLY FROM CONN.480 (SOST)TO TERM. 481 (SOU)						
	111.1	PIPE SS	D114.3X6.02		45	Mtr.	ASTM A312 TP321	723.60
	111.2	ELBOW LR 90°	D114.3X6.02		10	No.	ASTM A403 WP321,ASME B16.9	39.50
	111.3	FLANGE, 100NB	31500001240	10	16	No.	ASTM A182 F321	57.92
	111.8	FLANGE,100NB (FOR VLV)	31493201065	08	2	No.	ASTM A182 F321	10.00
113		SPARE ITEMS FOR SEAL OIL SYSTEM PIPING						
	113.1	PIPE SS	D13.7X2.24		3	Mtr.	ASTM A312 TP321	1.89
	113.2	FLANGE, 100NB (SOST END TERM 448)	31490701004	00	1	No.	ASTM A182 F321	4.58
							TOTAL WT	5198.71

TOTAL WEIGHT OF PIPING FOR SEAL OIL SYSTEM = 5199 KG

REMARKS FOR SITE: ITEM NOS. TO BE READ IN CONJUNCTION WITH BOM TGE-3702.

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Generator Pippings for 660 MW Sets
(STAINLESS STEEL)
MATERIAL CODE - W90415001994

TGE-3703
REV02
DATE-12.10.2019

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PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
301		PIPE ASSEMBLY FROM TERM.190 (PW TANK PIPE LINE) TO (PW PUMP INLET)						
	301.1	PIPE SS	D168.3X7.11		48	Mtr.	ASTM A312 TP321	1356.48
	301.2	ELBOW LR 90°	D168.3X7.11		11	No.	ASTM A403 WP321,ASME B16.9	114.40
	301.3	TEE	D168.3X168.3X7.11		1	No.	ASTM A403 WP321,ASME B16.9	15.00
	301.4	REDUCER CONC.	D168.3X141.3X7.11X6.55		3	No.	ASTM A403 WP321,ASME B16.9	11.79
	301.5	FLANGE, 150NB	31500001240	12	18	No.	ASTM A182 F321	108.00
	301.10	FLANGE 150NB (VALVE END)	31500001240	20	4	No.	ASTM A182 F321	24.00
	301.15	FLANGE, 125NB (PW PUMP END)	31500001240	11	2	No.	ASTM A182 F321	9.98
	301.20	NECK, 125NB (190 GEN END)	31500601115	00	1	No.	ASTM A182 F321	2.40
	301.26	CONNECTION, 25NB	31500001190	08	1	No.	ASTM A182 F321	0.14
302		PIPE ASSEMBLY FROM TERM.188 (PW TANK PIPE LINE) TO TERM. 195 (PW UNIT)						
	302.1	PIPE SS	D168.3X7.11		45	Mtr.	ASTM A312 TP321	1271.70
	302.2	ELBOW LR 90°	D168.3X7.11		8	No.	ASTM A403 WP321,ASME B16.9	83.20
	302.3	REDUCER CONC.	D168.3X141.3X7.11X6.55		1	No.	ASTM A403 WP321,ASME B16.9	3.93
	302.4	FLANGE, 150NB	31500001240	12	18	No.	ASTM A182 F321	108.00
	302.9	NECK, 150NB (PWU 195 END)	31531401088	01	1	No.	ASTM A182 F321	3.26
	302.15	NECK, 125NB (188 GEN END)	31500601115	00	1	No.	ASTM A182 F321	2.40
303		PIPE ASSEMBLY FROM OUTLET OF PW PUMP TO PW FILTER UNIT (206)						
	303.1	PIPE SS	D168.3X7.11		12	Mtr.	ASTM A312 TP321	339.12
	303.2	ELBOW LR 90°	D168.3X7.11		5	No.	ASTM A403 WP321,ASME B16.9	52.00
	303.3	TEE	D168.3X168.3X7.11		1	No.	ASTM A403 WP321,ASME B16.9	15.00
	303.4	REDUCER CONC.	D168.3x88.9x7.11X5.49		2	No.	ASTM A403 WP321,ASME B16.9	7.26
	303.5	FLANGE, 150NB	31500001240	12	4	No.	ASTM A182 F321	24.00
	303.10	CONNECTION, 8NB	31500001190	06	2	No.	ASTM A182 F321	0.23
	303.11	FLANGE 80NB (PW PUMP END)	31500001240	09	2	No.	ASTM A182 F321	6.56
	303.16	FLANGE 150NB (VALVE END)	31500001240	20	2	No.	ASTM A182 F321	12.00
	303.24	NECK 150NB (PW FILTER UNIT END)	31531401088	01	1	No.	ASTM A182 F321	3.26
	303.30	PIPE SS (FOR PG PT)	D21.3X2.77		16	Mtr.	ASTM A312 TP321	20.32
	303.31	CONNECTION, 15NB	31500001190	02	2	No.	ASTM A182 F321	2.54
304		PIPE ASSEMBLY FROM PW UNIT (207) TO PW PUMP SUCTION LINE 198						
	304.1	PIPE SS	D33.4X3.38		10	Mtr.	ASTM A312 TP321	25.00
	304.2	NECK,25NB (PWU 198 END)	31531401021	01	1	No.	ASTM A182 F321	0.47
	304.7	FLANGE, 25NB	31500001240	04	2	No.	ASTM A182 F321	2.04

Kunal Mishra

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Generator Pippings for 660 MW Sets
(STAINLESS STEEL)
MATERIAL CODE - W90415001994

TGE-3703
REV02
DATE-12.10.2019

PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
305		PIPE ASSEMBLY FROM PW UNIT (394) TO TERMINAL BUSHING INLET (132A/B/C)						
	305.1	PIPE SS	D48.3X3.68		50	Mtr.	ASTM A312 TP321	202.50
	305.2	PIPE SS	D33.4X3.38		6	Mtr.	ASTM A312 TP321	15.00
	305.3	REDUCER CONC.	D48.3X33.4X3.68X3.38		1	No.	ASTM A403 WP321,ASME B16.9	0.24
	305.4	TEE	D48.3X33.4X3.68X3.38		2	No.	ASTM A403 WP321,ASME B16.9	1.84
	305.5	FLANGE, 40NB	31500001240	06	20	No.	ASTM A182 F321	23.40
	305.10	FLANGE, 25NB	31500001240	04	6	No.	ASTM A182 F321	6.12
		NECK, 40NB						
	305.15	(PWU 394 END)	31531401021	03	1	No.	ASTM A182 F321	0.74
306		PIPE ASSEMBLY FROM PW BUSHING OUTLET(133A/B/C) TO CONNECTION AT (PIPE TERM 190 TO TERM 199).						
	306.1	PIPE SS	D21.3X2.77		10	Mtr.	ASTM A312 TP321	12.70
	306.2	PIPE SS	D33.4X3.38		35	Mtr.	ASTM A312 TP321	87.50
	306.3	PIPE SS	D48.3X3.68		12	Mtr.	ASTM A312 TP321	48.60
	306.4	PIPE SS	D114.3X6.02		1	Mtr.	ASTM A312 TP321	16.08
	306.5	REDUCER CONC.	114.3X48.3X6.02X3.68		2	No.	ASTM A403 WP321,ASME B16.9	2.48
	306.6	REDUCER CONC.	D48.3X21.3X3.68X2.77		3	No.	ASTM A403 WP321,ASME B16.9	0.60
	306.7	REDUCER CONC.	D33.4X21.3X3.38X2.77		3	No.	ASTM A403 WP321,ASME B16.9	0.42
	306.8	TEE	48.3X48.3X3.68		2	No.	ASTM A403 WP321,ASME B16.9	2.40
	306.9	FLANGE, 40NB	31500001240	06	4	No.	ASTM A182 F321	4.68
	306.14	FLANGE, 25NB	31500001240	04	14	No.	ASTM A182 F321	14.28
		FLANGE, 40NB						
	306.19	(FOR VALVE)	31500001240	06	2	No.	ASTM A182 F321	2.34
	306.24	CONNECTION, 40NB	31531401139	05	1	No.	ASTM A182 F321	1.27
	306.25	CONNECTION	31531401020	03	2	No.	ASTM A182 F321	2.54
	306.26	THERMOWELL	41531401027	00	2	No.	ASTM A182 F321	0.80
		FLANGE, 15NB						
	306.27	(FOR FLOW METER)	31500001240	02	18	No.	ASTM A182 F321	22.86
		FLANGE, 25NB						
	306.33	(FOR SIGHT GLASS)	31500001240	04	6	No.	ASTM A182 F321	6.12
307		PIPE ASSEMBLY FROM TERM.136/582A/581A to PW SKID & PW PUMP DISCHARGE TO PW UNIT						
	307.1	PIPE SS	D21.3X2.77		170	Mtr.	ASTM A312 TP321	215.90
	307.2	TEE	D21.3X21.3X2.77		1	No.	ASTM A403 WP321,ASME B16.9	0.20
308		FROM N2 DIST(312) TO PW TANK						
	308.1	PIPE SS	D13.7X2.24		60	Mtr.	ASTM A312 TP321	37.80
	308.2	REDUCER CONC.	D26.7X13.7X2.87X2.24		1	No.	ASTM A403 WP321,ASME B16.9	0.07
309		PIPE ASSEMBLY FOR DRAIN PIPING FROM PU PUMP LINE TO PW UNIT DRAIN						
	309.1	PIPE SS	D13.7X2.24		10	Mtr.	ASTM A312 TP321	6.30
							TOTAL WT. (KG)	4360.26

TOTAL WEIGHT OF PIPING FOR PW SYSTEM (STAINLES STEEL) = 4360 KG
COMBINED WEIGHT OF THE SYSTEM (SOS+PWS) = 9559 KG
TOTAL WEIGHT OF STAINLES STEEL MATERIAL = 9559 KG

REMARKS FOR SITE: ITEM NOS. TO BE READ IN CONJUCTION WITH BOM TGE-3702.

Kunal Mishra
KUNAL MISHRA
By Mgr/BHEL-HWR(EME)

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

**Piping for Hydrogen Cooler-660 MW
(CARBON STEEL)
(MATERIAL CODE-W90415002036)**

TGE-3805
REV00
DATE-20.05.2019

H2 COOLER PIPING								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRAWING NO. / SIZE	VAR.	QTY.	QTY.	MAT. SPEC.	WT.(KG)
1	1.1	INLET HEADER	21500001125	00	1	No.	ASTM SA106 GR.B	536
2	2.1	OUTLET HEADER	21500001126	00	1	No.	ASTM SA106 GR.B	536
3	3.1	PIPE	D168.3X7.11		200	Mtr.	ASTM SA106 GR.B	5652
	3.2	PIPE	D33.4X3.38		40	Mtr.	ASTM SA106 GR.B	100
	3.3	PIPE	D21.3X2.77		100	Mtr.	ASTM SA106 GR.B	127
	3.5	PIPE	D13.7X2.24		20	Mtr.	ASTM SA106 GR.B	12.6
	3.6	ELBOW 90 °	D168.3X7.11		64	No.	ASTM A234 WPB,ASME B16.9	665.6
	3.7	ELBOW 45 °	D168.3X7.11		16	No.	ASTM A234 WPB,ASME B16.9	83.2
	3.8	CONNECTION	41500001118	00	16	No.	IS:2062 E250 BR	8
	3.9	CONNECTION	41500001182	00	16	No.	IS:2062 E250 BR	8
	3.10	CONNECTION, 8NB	31500001190	06	10	No.	IS:2062 E250 BR	0.6
	3.11	CONNECTION, 10NB	31500001190	00	15	No.	IS:2062 E250 BR	2.13
	3.12	THERMOWELL	41531401027	00	10	No.	IS:2062 E250 BR	4
	3.13	FLANGE NB150	31500001239	12	80	No.	IS:2062 E250 BR	480
	3.14	GASKET VITON	212X170X3TK		40	No.	HW59870	3.2
	3.15	SCREW HEX A-8.8	M20X80		320	No.	IS:1364PART-2,1367PART-3	82.56
	3.16	NUT HEX A-8.8	M20		320	No.	IS:1364PART-3,1367PART-3	16
	3.17	WASHER MCD-ST 21			640	No.	IS:2016-1967, IS:2062 E250 BR	10.88
	3.18	FLANGE NB150 (C.F. OF VALVES)	31500001239	12	16	No.	IS:2062 E250 BR	96
	3.19	GASKET VITON	212X170X3TK		16	No.	HW59870	1.28
	3.20	SCREW HEX A-8.8	M20X80		128	No.	IS:1364PART-2,1367PART-3	33.024
	3.21	NUT HEX A-8.8	M20		256	No.	IS:1364PART-3,1367PART-3	12.8
	3.22	WASHER MCD-ST 21			128	No.	IS:2016-1967, IS:2062 E250 BR	2.176
4	4.1	SUPPORT	21500001041	00	1	SET	IS:2062 E250 BR	322
	4.2	SUPPROT U3,U4	21500001042	00	1	No.	IS:2062 E250 BR	330
	4.3	HANGER ASSEMBLY F1,F2,F3,F4	11500001019		1	SET		192
	4.3.1	PARALLEL BEAM IPB 100	L=3000		1	No.	IS:2062 E250 BR	
	4.3.2	CHANNEL ISMC 150X75	L=1200		2	No.	IS:2062 E250 BR	
	4.3.3	PIPE CLAMP	21500001026	10	8	No.	IS:2062 E250 BR	
	4.3.4	BEAM ATTACHEMENT M20	4-150-00-01101	04	8	No.	IS:2062 E250 BR	
	4.3.5	EYE BOLT M20	4-150-00-01099	04	8	No.	IS:2062 E250 BR	
	4.3.6	THREADED ROD M20X1.5	4-150-00-01131	02	8	No.	IS:2062 E250 BR	
	4.3.7	TURN BUCKLE M20	4-150-00-01103	04	8	No.	IS:2062 E250 BR	
	4.3.8	TIE ROD M20X2000	41500001176	00	2	No.	IS:2062 E250 BR	
	4.3.9	SPRING HANGER	41500001198	00	2	No.	IS:2062 E250 BR	
	4.3.10	SPRING HANGER	41500001199	00	2	No.	IS:2062 E250 BR	
	4.4	HANGER ASSEMBLY F5	21500001043		1	No.		65
	4.4.1	PARALLEL BEAM IPB 100	L=1800		2	No.	IS:2062 E250 BR	
	4.4.2	BEAM ATTACHEMENT M20	4-150-00-01101	04	1	No.	IS:2062 E250 BR	
	4.4.3	EYE BOLT M20	4-150-00-01099	04	2	No.	IS:2062 E250 BR	
	4.4.4	PIPE CLAMP	21500001026	11	1	No.	IS:2062 E250 BR	
	4.4.5	THREADED ROD M20X1.5	4-150-00-01131	02	1	No.	IS:2062 E250 BR	
	4.4.6	TIE ROD M20X2000	41500001176	00	1	No.	IS:2062 E250 BR	
	4.4.7	SPRING HANGER	41500001199	00	1	No.	IS:2062 E250 BR	
	4.4.8	TURN BUCKLE M20	4-150-00-01103	04	2	No.	IS:2062 E250 BR	
	4.5	HANGER ASSEMBLY F6	21500001044		1	No.		63
	4.5.1	PARALLEL BEAM IPB 100	L=1800		1	No.	IS:2062 E250 BR	
	4.5.2	PLATE	41500001177	00	1	No.	IS:2062 E250 BR	
	4.5.3	BEAM ATTACHEMENT M20	4-150-00-01101	04	2	No.	IS:2062 E250 BR	
	4.5.4	EYE BOLT M20	4-150-00-01099	04	1	No.	IS:2062 E250 BR	
	4.5.5	THREADED ROD M20X1.5	4-150-00-01131	02	1	No.	IS:2062 E250 BR	
	4.5.6	TIE ROD M20X2000	41500001176	00	1	No.	IS:2062 E250 BR	
	4.5.7	SPRING HANGER	41500001199	00	1	No.	IS:2062 E250 BR	
	4.6	HANGER ASSEMBLY F7	21500001045		1	No.		60
	4.6.1	PARALLEL BEAM IPB 100	L=1800		1	No.	IS:2062 E250 BR	
	4.6.2	BEAM ATTACHEMENT M20	4-150-00-01101	04	1	No.	IS:2062 E250 BR	
	4.6.3	EYE BOLT M20	4-150-00-01099	04	2	No.	IS:2062 E250 BR	

Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

Piping for Hydrogen Cooler-660 MW
(CARBON STEEL)
(MATERIAL CODE-W90415002036)

TGE-3805
REV00
DATE-20.05.2019

H2 COOLER PIPING							
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRAWING NO. / SIZE	VAR.	QTY.	QTY.	MAT. SPEC.
	4.6.4	PIPE CLAMP	21500001026	11	1	No.	IS:2062 E250 BR
	4.6.5	THREADED ROD M20X2000	41500001178	00	1	No.	IS:2062 E250 BR
	4.6.6	SPRING HANGER	41500001199	00	1	No.	IS:2062 E250 BR
	4.7	HANGER ASSEMBLY F8	21500001046		1	No.	
	4.7.1	PARALLEL BEAM IPB 100	L=1800		1	No.	IS:2062 E250 BR
	4.7.2	PLATE	41500001177	00	1	No.	IS:2062 E250 BR
	4.7.3	BEAM ATTACHEMENT M20	4-150-00-01101	04	2	No.	IS:2062 E250 BR
	4.7.4	EYE BOLT M20	4-150-00-01099	04	1	No.	IS:2062 E250 BR
	4.7.5	THREADED ROD M20X2000	41500001178	00	1	No.	IS:2062 E250 BR
	4.7.6	SPRING HANGER	41500001199	00	1	No.	IS:2062 E250 BR
	4.8	PIPE CLAMP NB150	21500001026	10	30	No.	IS:2062 E250 BR
	4.9	FLAT	5X40		6	Mtr.	IS:2062 E250 BR
	4.10	ANGLE	75X75X6		10	Mtr.	IS:2062 E250 BR
	4.11	CHANNEL ISMC 75			6	Mtr.	IS:2062 E250 BR
TOTAL WT. (KG)							9757

TOTAL WEIGHT CARBON STEEL PIPING FOR H2 COOLER SYSTEM = 9757 KG

Kunal Mishra
KUNAL MISHRA
Dy. Mg. BH&L-HWR (ENE)

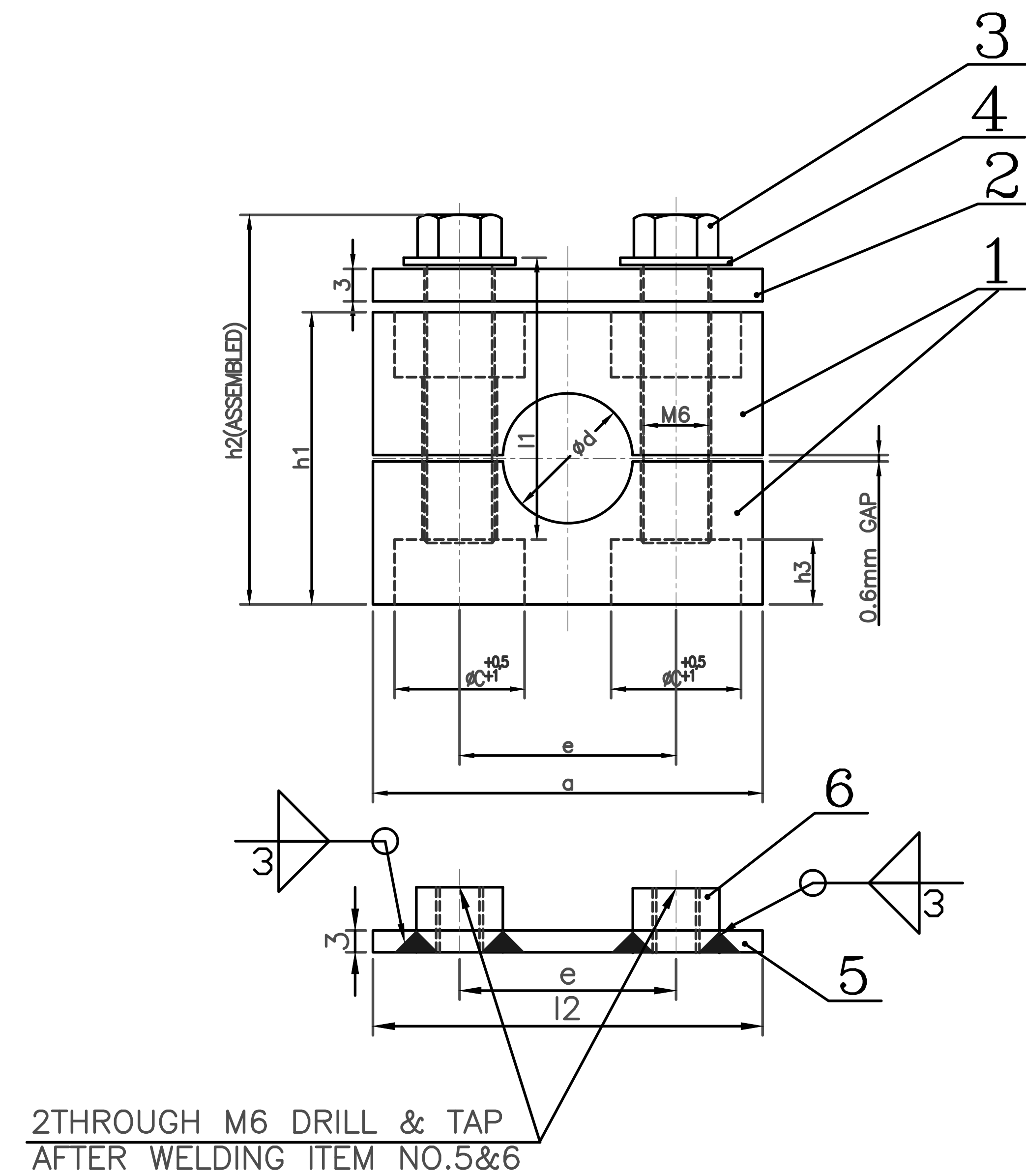
Prepared by KUNAL MISHRA
Checked by MANJU AZAD
Approved by R.L.VYAS

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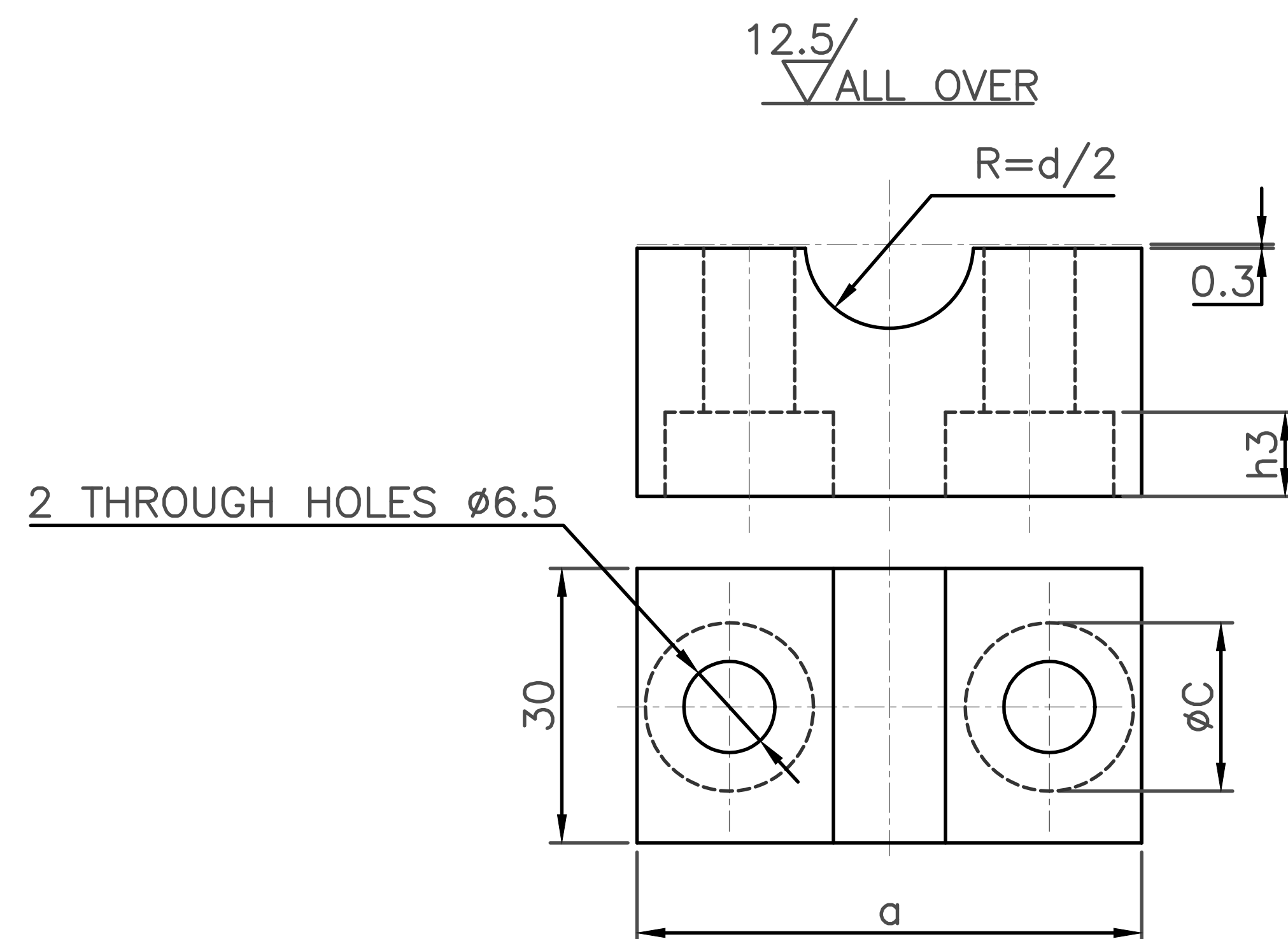
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22/8/92
SIGN & DATE

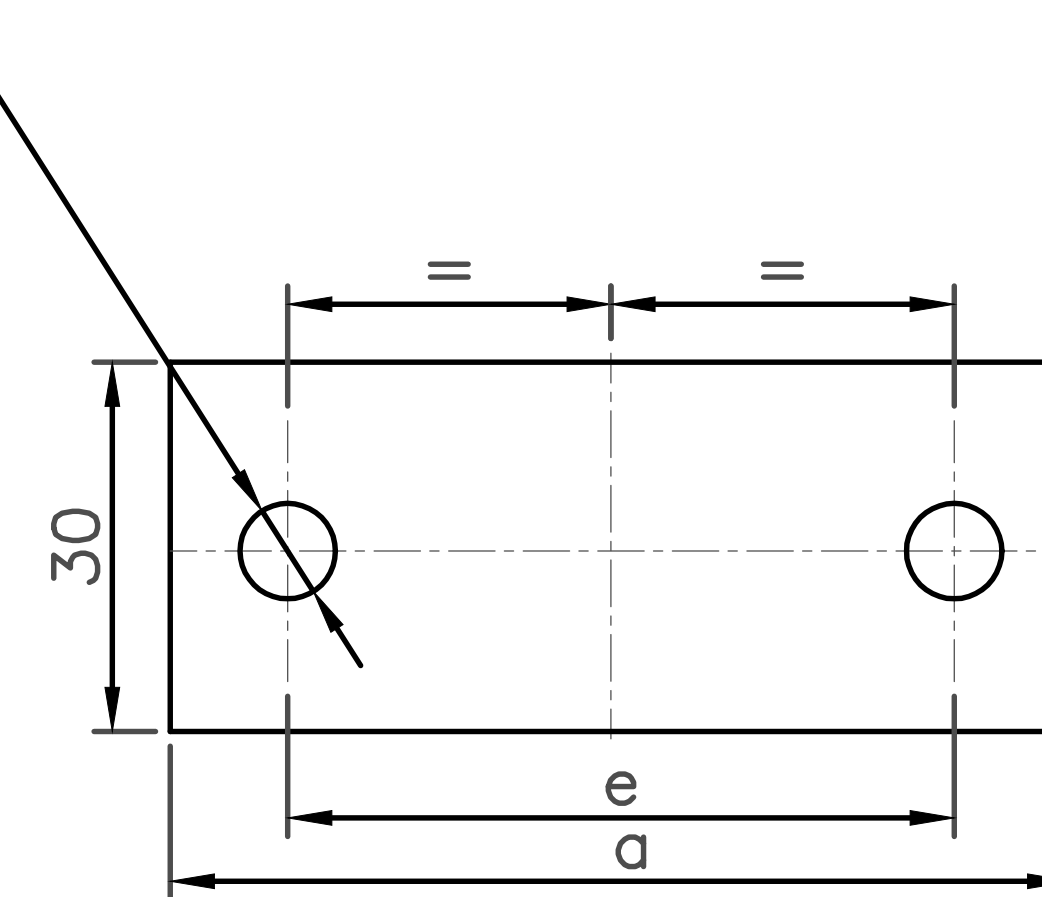
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INVENTORY NO.



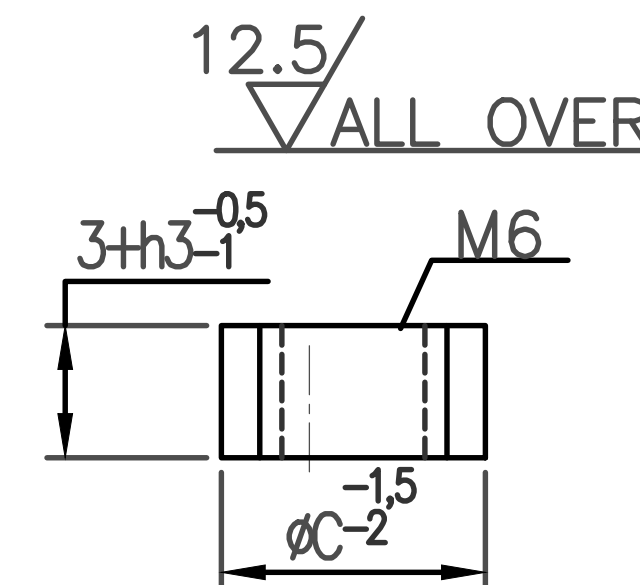
DETAILS OF ITEM NO.-1



DETAILS OF ITEM NO.-2



DETAILS OF ITEM NO.-6



VAR	d	NB	a	e	h1	h2	l1	l2	c	h3	Wt. Kg.	MATERIAL CODE
00	12	6	36	20	27	36	30	54	12	5	0.10	W96415001701
01	13.5	8	42	26	33	43	35	62	12	8	0.12	W96415001710
02	17.2	10	42	26	33	43	35	62	12	8	0.12	W96415001728
03	21.3	12	50	33	35	45	40	69	12	8	0.13	W96415001736
04	26.9	15	59	40	42	52	45	76	15	12	0.16	W96415001744
05	33.7	25	72	52	58	68	60	88	15	12	0.22	W96415001752
06	42.4	32	72	52	58	68	60	88	15	12	0.22	W96415001760
07	48.3	40	86	66	66	82	60	110	15	12	0.26	W96415001779

1. PIPE CLAMPS SHALL BE SUPPLIED IN ASSEMBLED CONDITION.
2. IDENTIFICATION SHALL BE DONE BY ATTACHING A TAG.
3. FOR MATERIAL CODE REFER VARIANT TABLE.
4. MATERIAL OF CLIP ITEM NO.1 SHALL BE POLYAMIDE.

006	NUT	SEE DETAIL			STEEL A8.8	01		--
005	SUPPORT PLATE L2X30	-			CS-IS2062E250BR	01		--
004	WASHER M6	-			CS-IS2062E250BR	01		--
003	BOLT HEX.M6XL1	SEE DETAIL			STEEL A8.8	01		--
002	COVER PLATE	SEE DETAIL			CS-IS2062E250BR	01		--
001	CLIP	SEE DETAIL			POLYAMIDE			--
ITEM NO.	DESCRIPTION	DRAWING	SIZE	VAR	MATERIAL CODE A			UNIT WEIGHT
					MATERIAL SPEC. C			

			CBOM NO. 0-150-00-01125		STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT								
GRADE OF UNTOL. DIM.:—			AGREED DEPT. W.T	NAME ROY	SIGN sd/—	DATE 3.2.92	सो एव है एम BHEL BHARAT HEAVY ELECTRICALS LTD. HARDWAR					NAME	SIGN	DATE	NO. OF VAR.
M/CG— 4 /C/ M / F AA 0230208											DRN	KAPOOR	sd/—	19.1.92	
WELDING— A / B /C/ D —AA0621104											CHD	K.R.G	sd/—	19.1.92	
GAS CUTTING—T3—AA0621101											APD	G.M.K	sd/—	10.8.92	73, 74
REV.	DATE	ALTERED CHECKED	REV.	DATE 04.08.18	ALTERED KM CHECKED MA		DEPT. EME		SCALE N.T.S	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO. OF ITEMS	
			REVISION MARKED			CODE 4133	SEE TABLE			0-150-00-01125			75, 77		
							TITLE PIPE CLAMP				DRAWING NO.		2-150-00-01023		23, 24
											SHEET NO. 01		NO. OF SHEETS 01		
5			4				3								

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KUN 633.03
REF. DRG NO.

22/8/92
SIGN & DATE

Et1-16321
INVENTORY NO.

2-150-00-01024
DRAWING NO.

F

F

F

D

D

C

C

B

B

A

A

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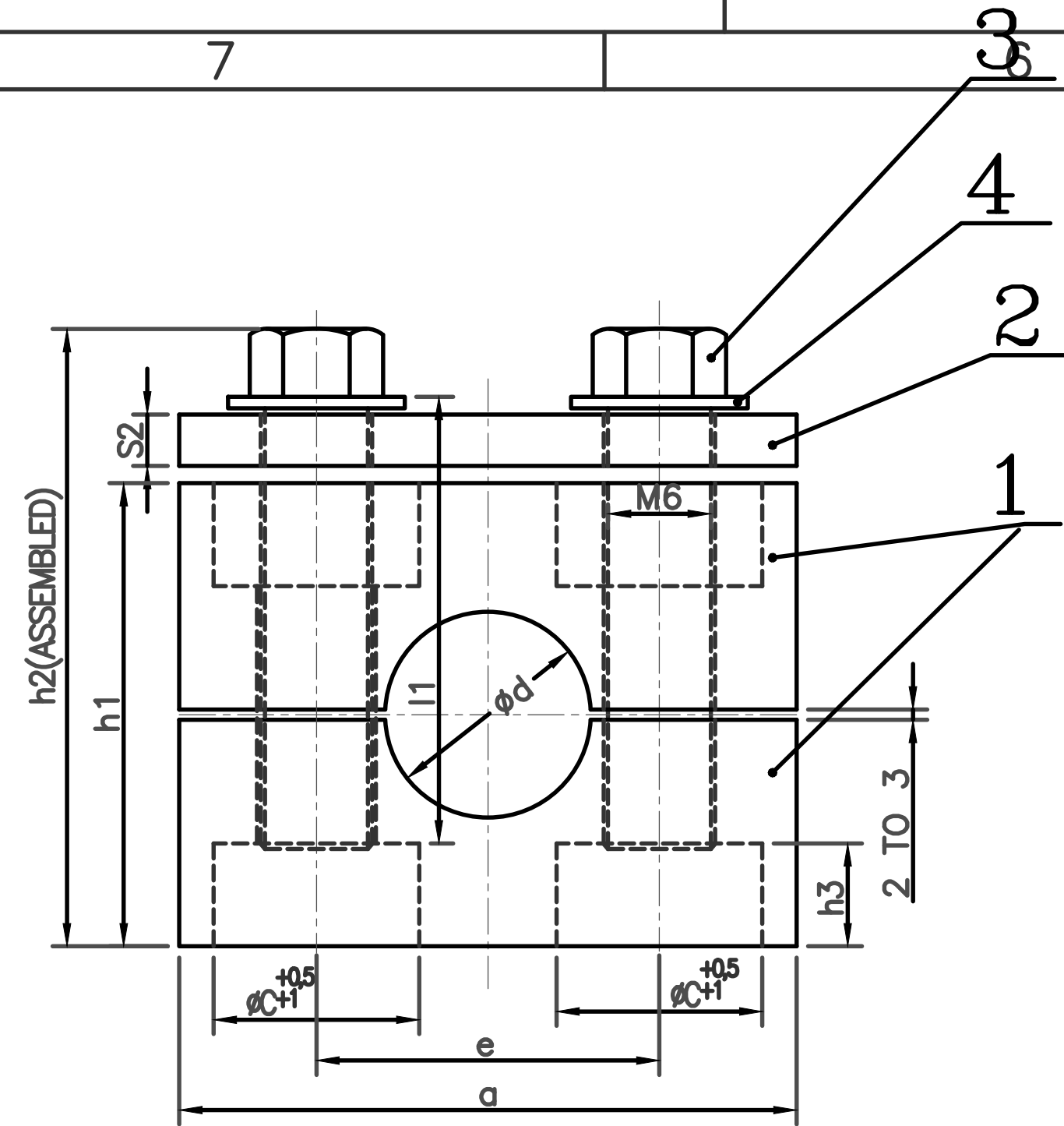
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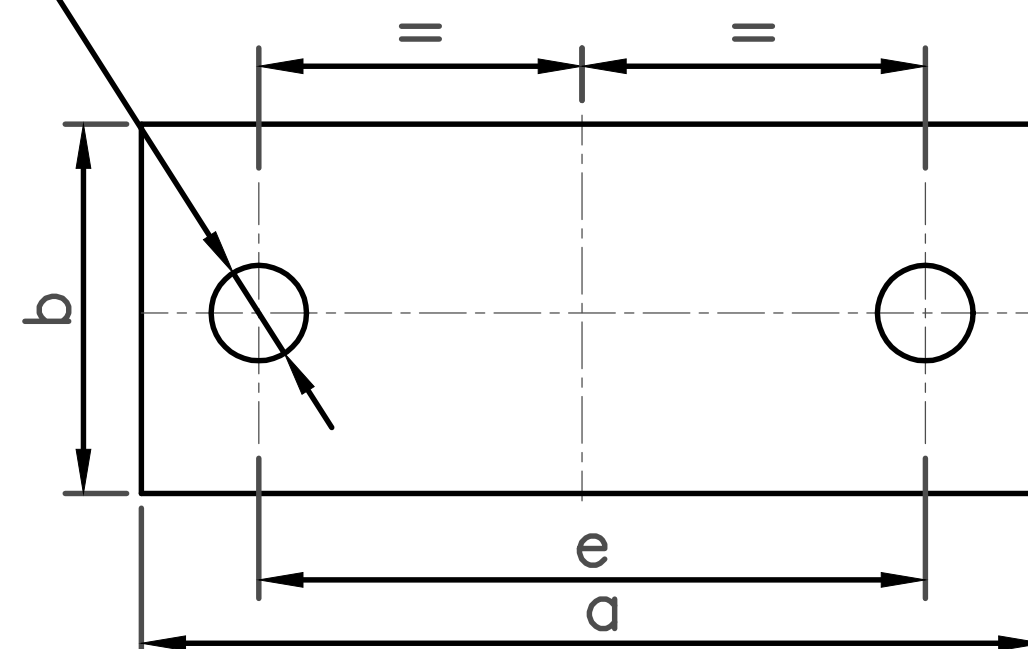
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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

FORM: DG 44(B)

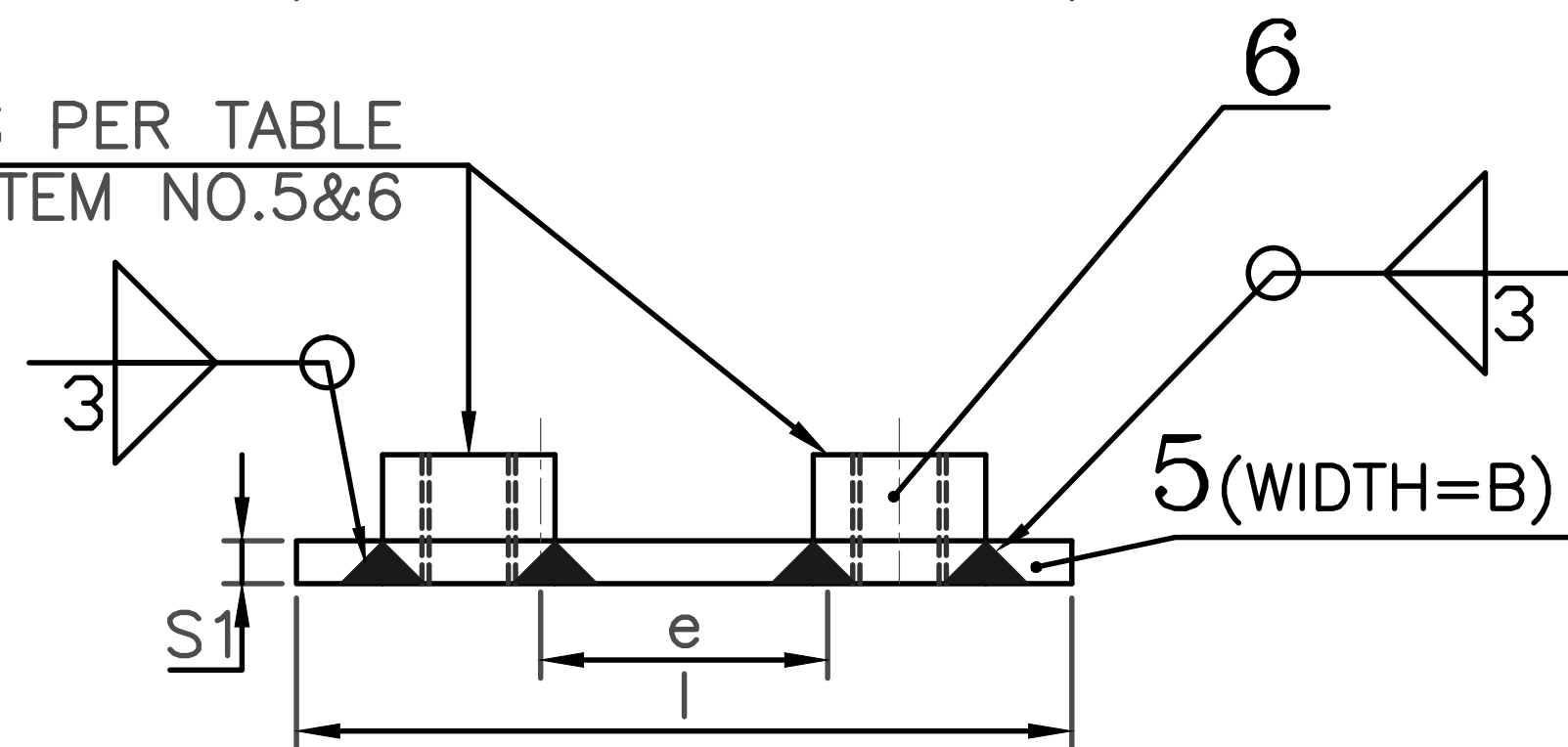


2 THROUGH HOLES $\phi d1$



DETAILS OF ITEM NO.-2

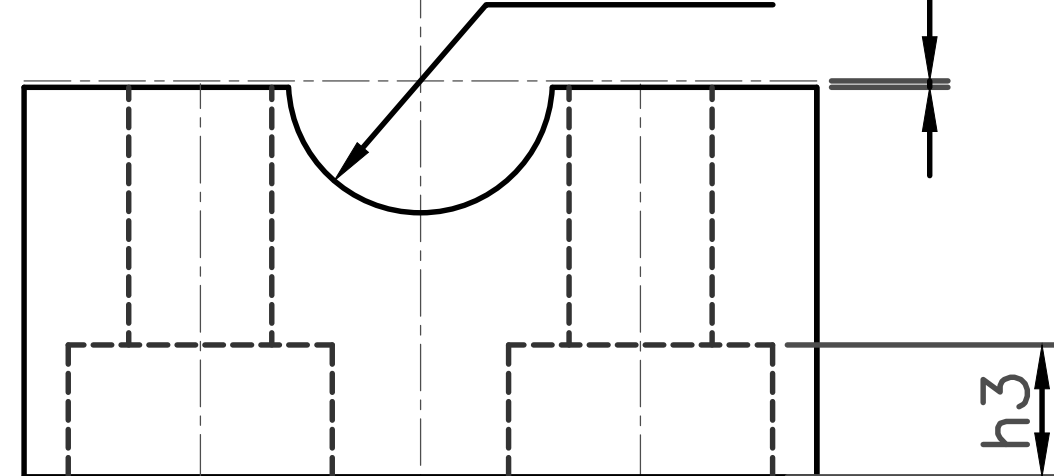
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AND TAP AFTER WELDING ITEM NO.5&6



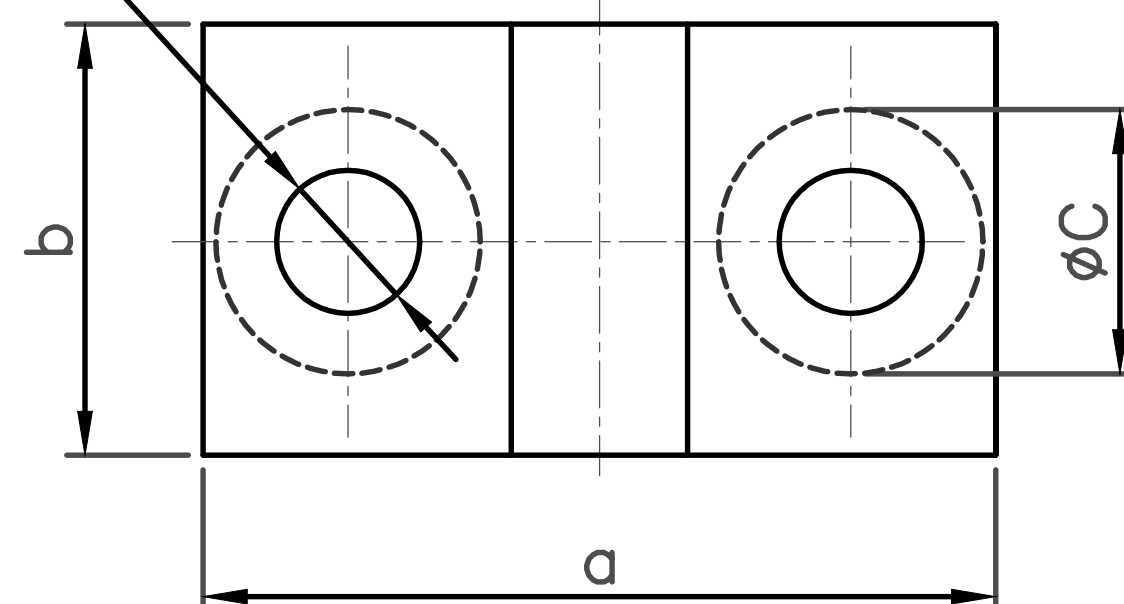
12.5/
▽ALL OVER

R=d/2

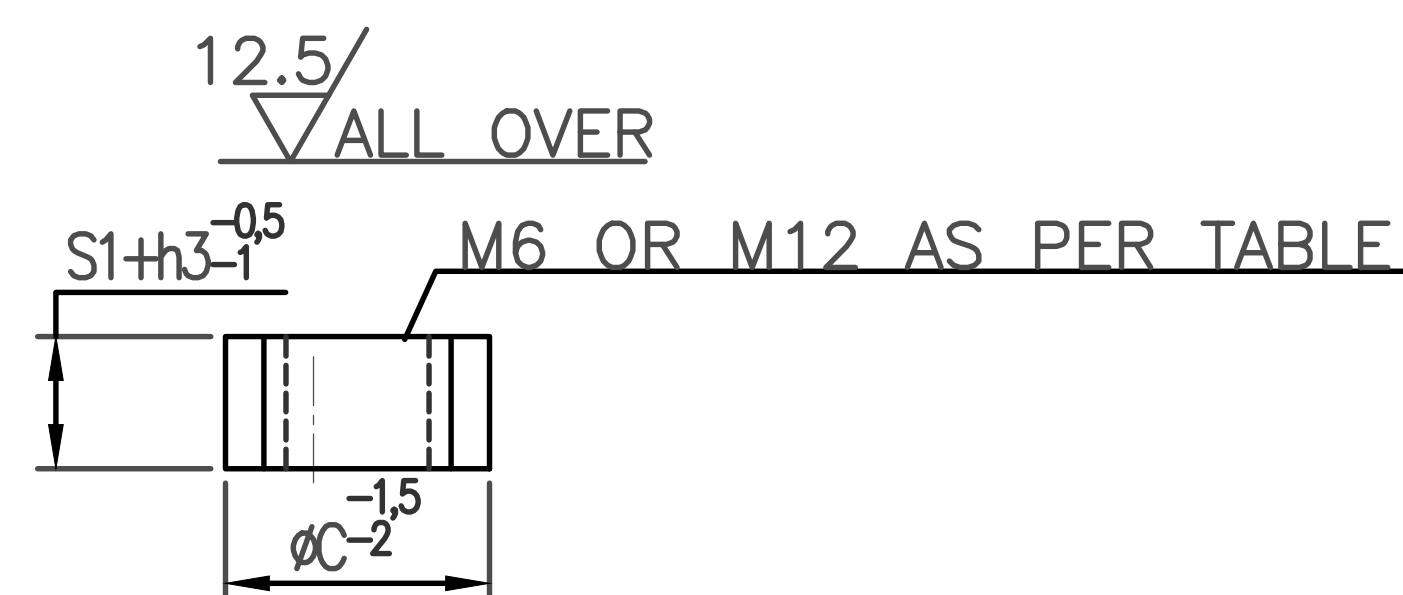
1.0 TO 1.5



2 THROUGH HOLES $\phi d1$



DETAILS OF ITEM NO.-1



DETAILS OF ITEM NO.-6

VARIANT TABLE

VAR	b	d	PIPE NB	a	e	h1	h2	d1	l	c	h3	Wt. Kg.	MATERIAL CODE	S1	S2	BOLT SIZE
00	30	12	6	55	33	32	48	10.5	73	18	12	0.34	W96415001617	8	8	M10X45
01	30	13.5	8	55	33	32	48	10.5	73	18	12	0.34	W96415001625	8	8	"
02	30	17.2	10	55	33	32	48	10.5	73	18	12	0.34	W96415001633	8	8	"
03	30	21.3	15	70	45	48	64	10.5	85	20	15	0.44	W96415001641	8	8	M10X60
04	30	26.9	20	70	45	48	64	10.5	85	20	15	0.44	W96415001655	8	8	"
05	30	33.7	25	84	60	60	76	10.5	100	20	15	0.54	W96415001663	8	8	M10X70
06	30	42.4	32	84	60	60	76	10.5	100	20	15	0.54	W96415001671	8	8	"
07	45	48.3	40	115	90.5	90	111	13	140	25	20	1.36	W96415001680	10	10	M12X100
08	45	60.3	50	115	90.5	90	111	13	140	25	20	1.31	W96415001698	10	10	"

TECHNICAL REQUIREMENTS

- PIPE CLAMPS SHALL BE SUPPLIED IN ASSEMBLED CONDITION.
- IDENTIFICATION SHALL BE DONE BY ATTACHING A TAG.
- FOR MATERIAL CODE REFER VARIANT TABLE.
- MATERIAL OF CLIP ITEM NO.1 SHALL BE POLYAMIDE.

006	NUT	SEE DETAIL			STEEL A8.8	▽01		---
005	SUPPORT PLATE	-			CS-IS2062E250BR	▽01		---
004	WASHER	-			CS-IS2062E250BR	▽01		---
003	BOLT HEX.M6XL1	SEE DETAIL			STEEL A8.8	▽01		---
002	COVER PLATE	SEE DETAIL			CS-IS2062E250BR	▽01		---
001	CLIP	SEE DETAIL			POLYAMIDE			---
ITEM NO.	DECEIPTION	DRAWING	1/2	VAR	MATERIAL CODE	A	UNIT WEIGHT	

GRADE OF UNTOL. DIM.:--
M/CG- ~~4~~/C/~~M~~/~~F~~ AA 0230208
WELDING-~~A~~/~~B~~/C/~~D~~-AA621104
GAS CUTTING-~~T3~~/AA0621101

REV. DATE ALTERED
CHECKED

CBOM NO.
0-150-00-01125
STATUS OF DRG.
AGREED DEPT. NAME SIGN DATE
WTK SC GOYAL sd/- 23.7.92

REV. DATE ALTERED KM
01 04.06.18 CHECKED MA
REVISION MARKED

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DEPT. EME
CODE 4133

SCALE
N.T.S

WEIGHT(Kg.)
SEE TABLE

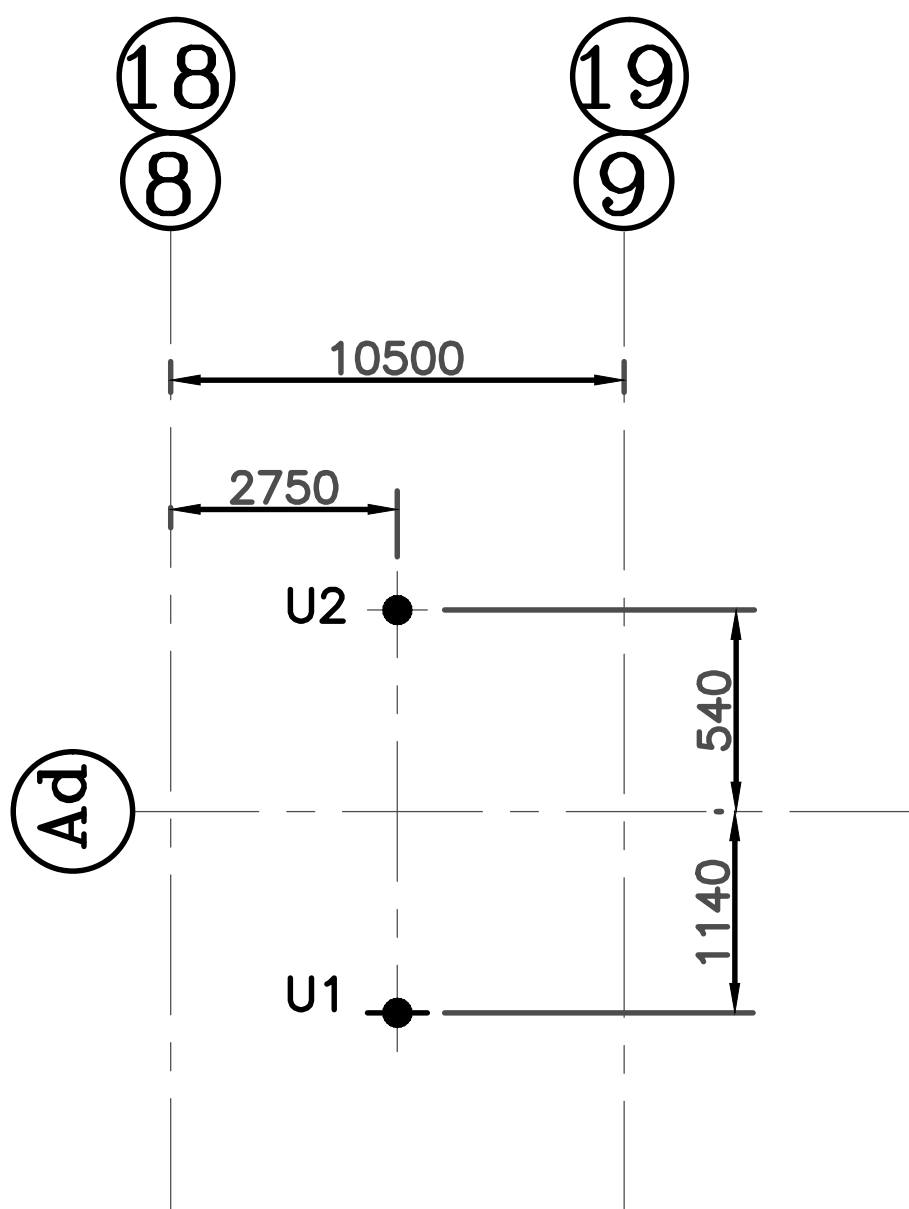
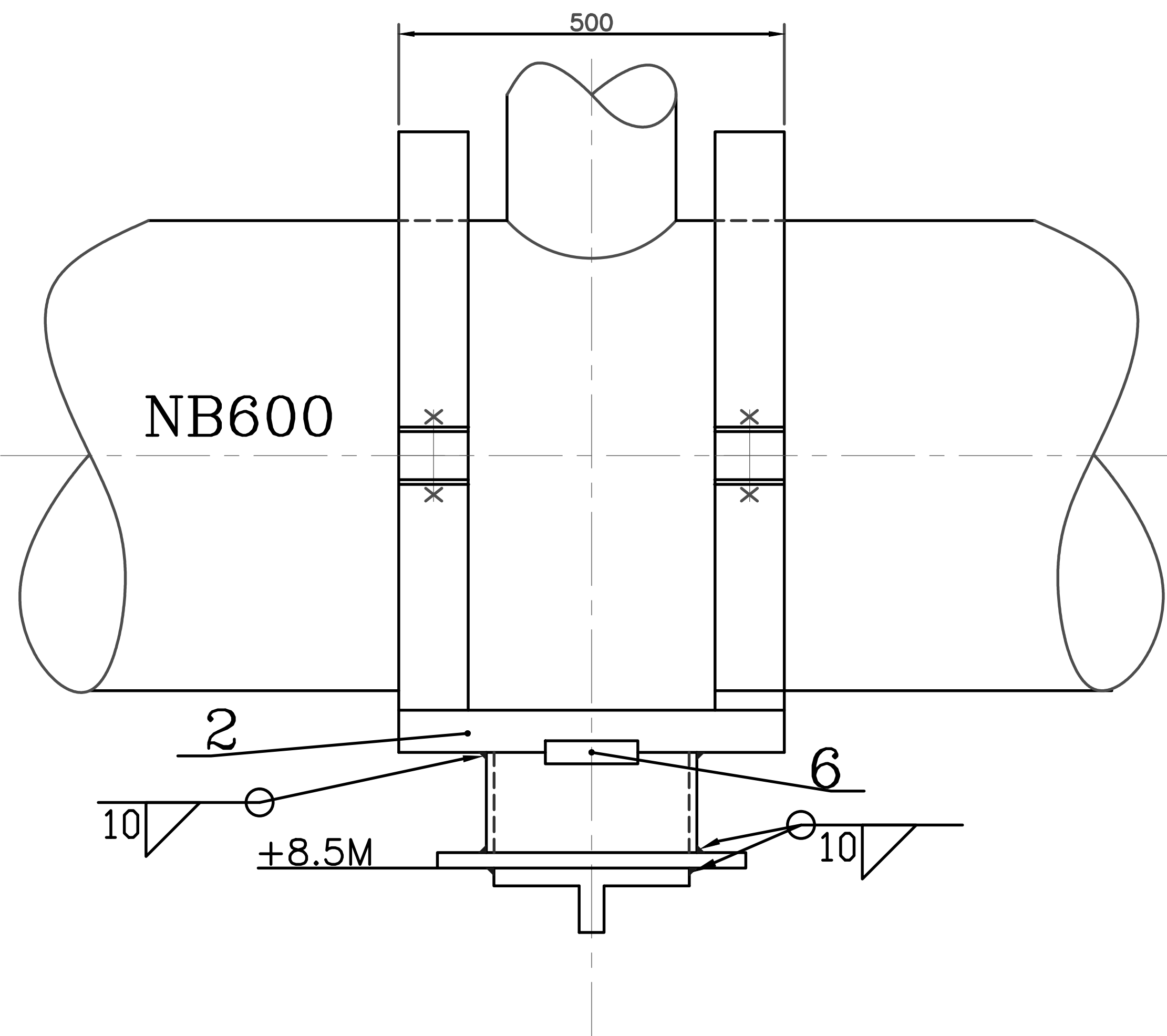
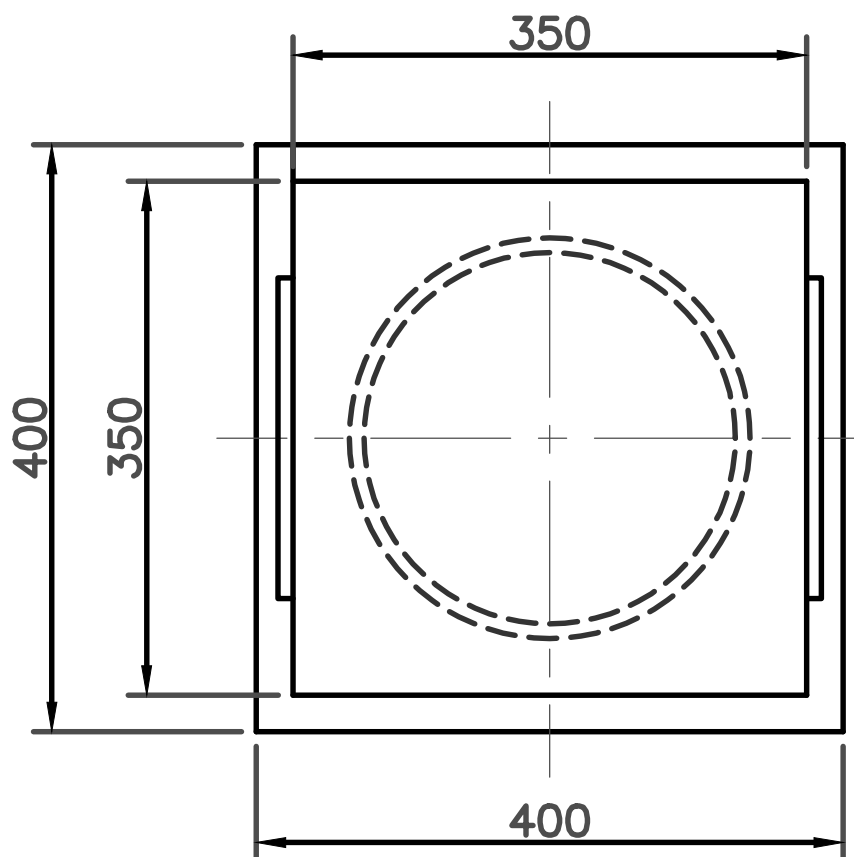
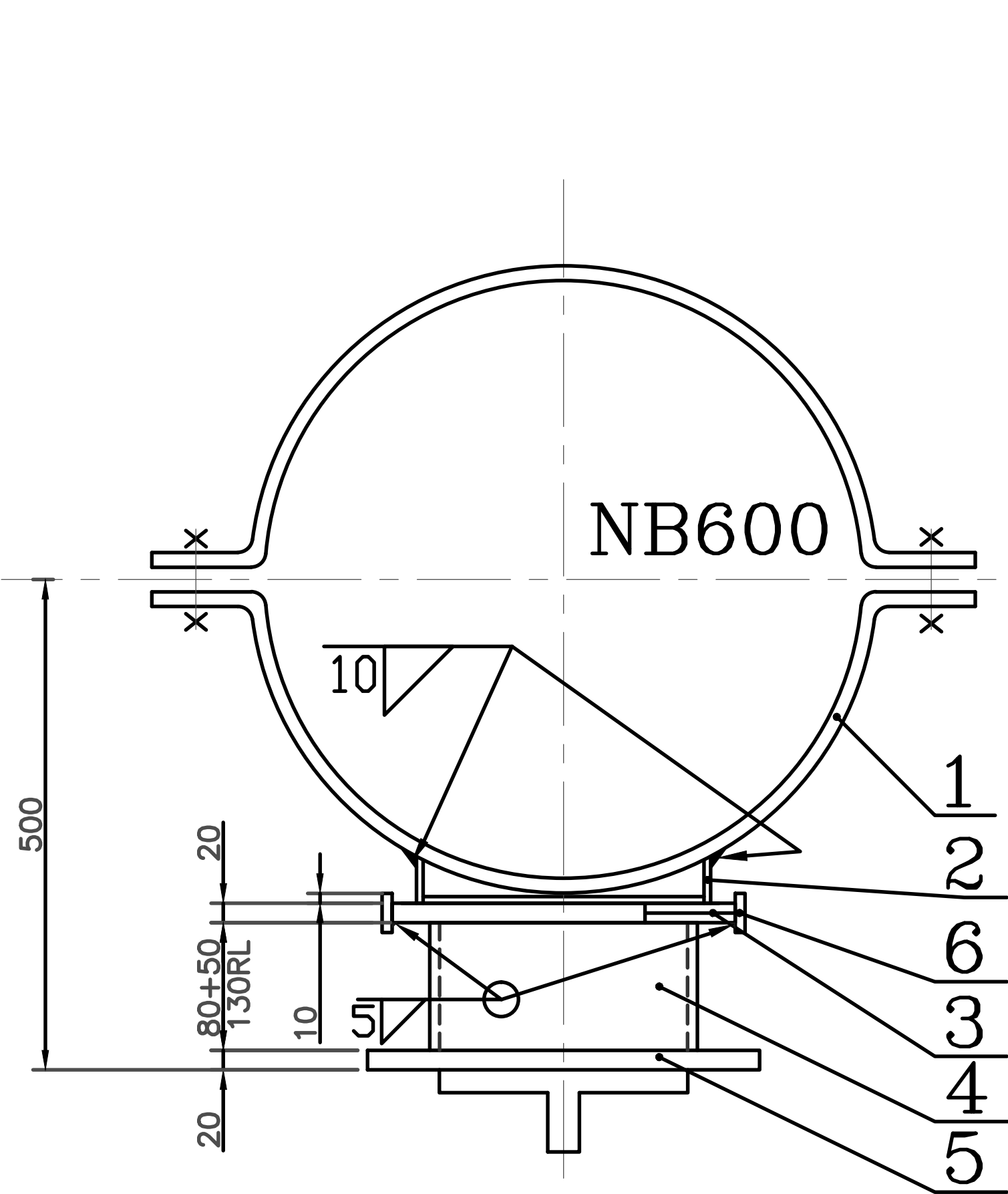
NAME SIGN DATE NO.OF VAR.
DRN KAPOOR sd/-
CHD K.R.G sd/- 19.1.92
APD G.M.K sd/- 10.8.92

REF. TO ASSY. DRG.
0-150-00-01125
ITEM NO. NO.OF ITEMS
73, 74
75, 77

TITLE
PIPE CLAMP
DRAWING NO.
2-150-00-01024
SHEET NO. 01 NO.OF SHEETS 01

SIZE A2

DRAWING NO. 2-150-00-01041



TECHNICAL REQUIREMENTS

1. ALL THE WELD JOINT TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER 0620.099 BS/BK.
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR.4.
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE TO BE SUPPLIED LOOSE ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
6. DESIGN OF THE SUPPORT IS FOR THE GUIDANCE OF SITE. MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.

001		006	FLAT40X10, L=1350	-		AA1010308580	IS2062E250BR	4	240
002		005	PLATE 400X400X20	-		AA1011808137	IS2062E250BR	25	120
001		004	PIPE Ø273X10,L=300	-		AA1041155409	IS2062E250BR	19	470
004		003	PLATE 350X350X20	-		AA1011808137	IS2062E250BR	19	200
001		002	CHANNEL ISMC 300X90,L=1000	-		AA1012708179	IS2062E250BR	36	300
004	VAR	001	PIPE CLAMP NB600	2-150-00-01026	13	W96415001914		26	000
VAR		PURCHASED	ITEM NO.	DECRPTION	DRAWING	VAR	MATERIAL CODE	A	UNIT WEIGHT
							MATERIAL SPEC.	C	

CBOM NO. 0-150-00-01212			STATUS OF DRG.
AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UNTOL. DIM.:—			
M/CG— V /C/ M / F AA 0230208			
WELDING— A / B /C/ D —AA621104			
GAS CUTTING—'T3'AA0621101			
REV.	DATE	ALTERED	
		CHECKED	
REV. 01		DATE 04.06.18	ALTERED KM CHECKED MA
REVISION		MARKED	

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				NATIONAL THERMAL POWER LTD VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE -II (2X500MW)-UNIT-7&8				
सर्वोत्तम ई सप्लाय  BHARAT HEAVY ELECTRICALS LTD. HARDWAR					NAME	SIGN	DATE	NO
				DRN	AEDD	sd/-		VA
				CHD	K.R.G	sd/-	19.1.97	
				APD	G.GUPTA	sd/-	05.2.97	73
DEPT. EME			SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO
CODE 4133			1:10	321.950	0-150-00-01212		051	(NO) 75
TITLE				1	3	DRAWING NO.		23
SUPPORT U1, U2						2-150-00-01041		
						SHEET NO. 01		NO.OF SHEETS 01

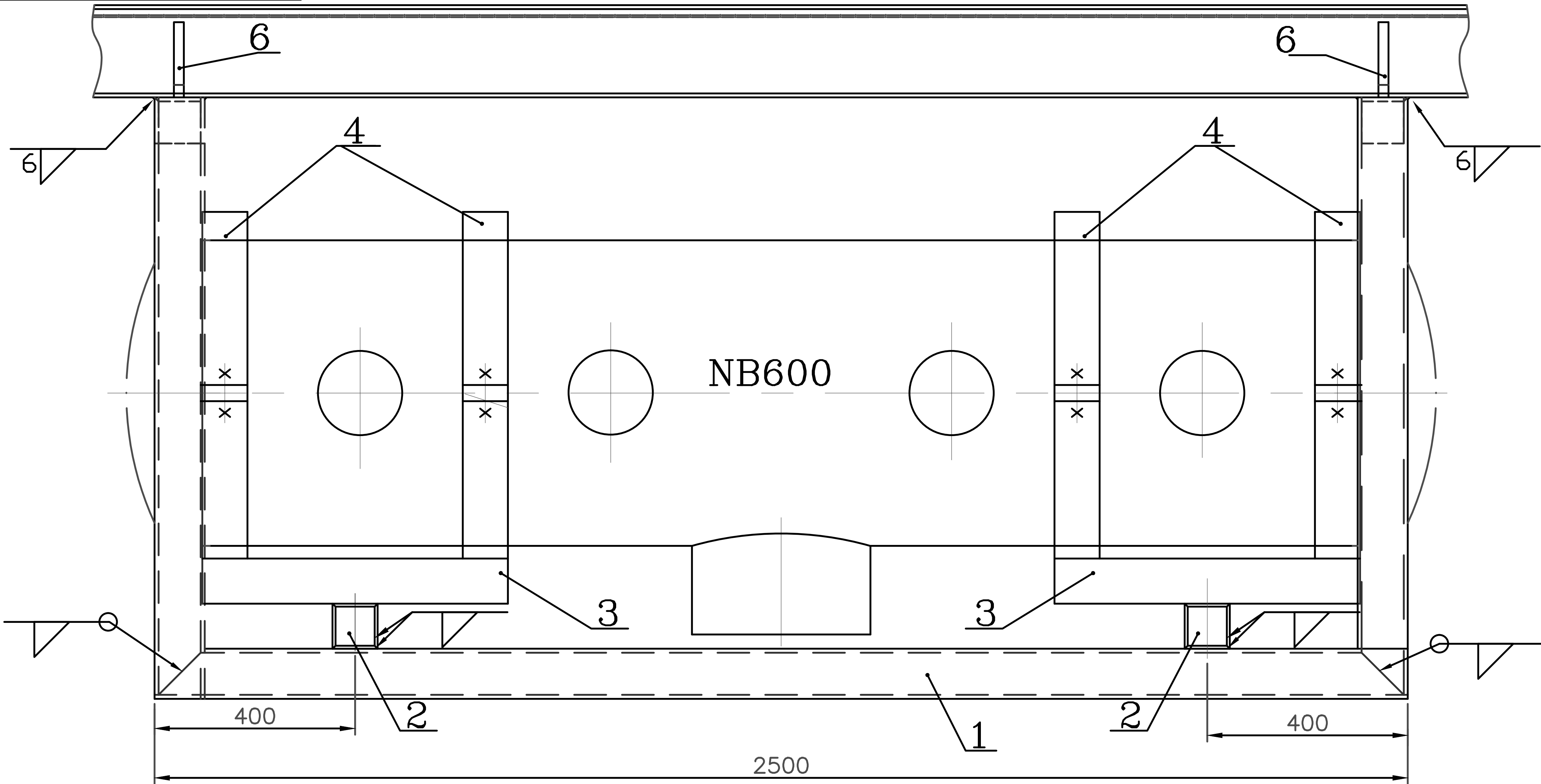
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REF. DRG NO.

SIGN & DATE
10/2/97

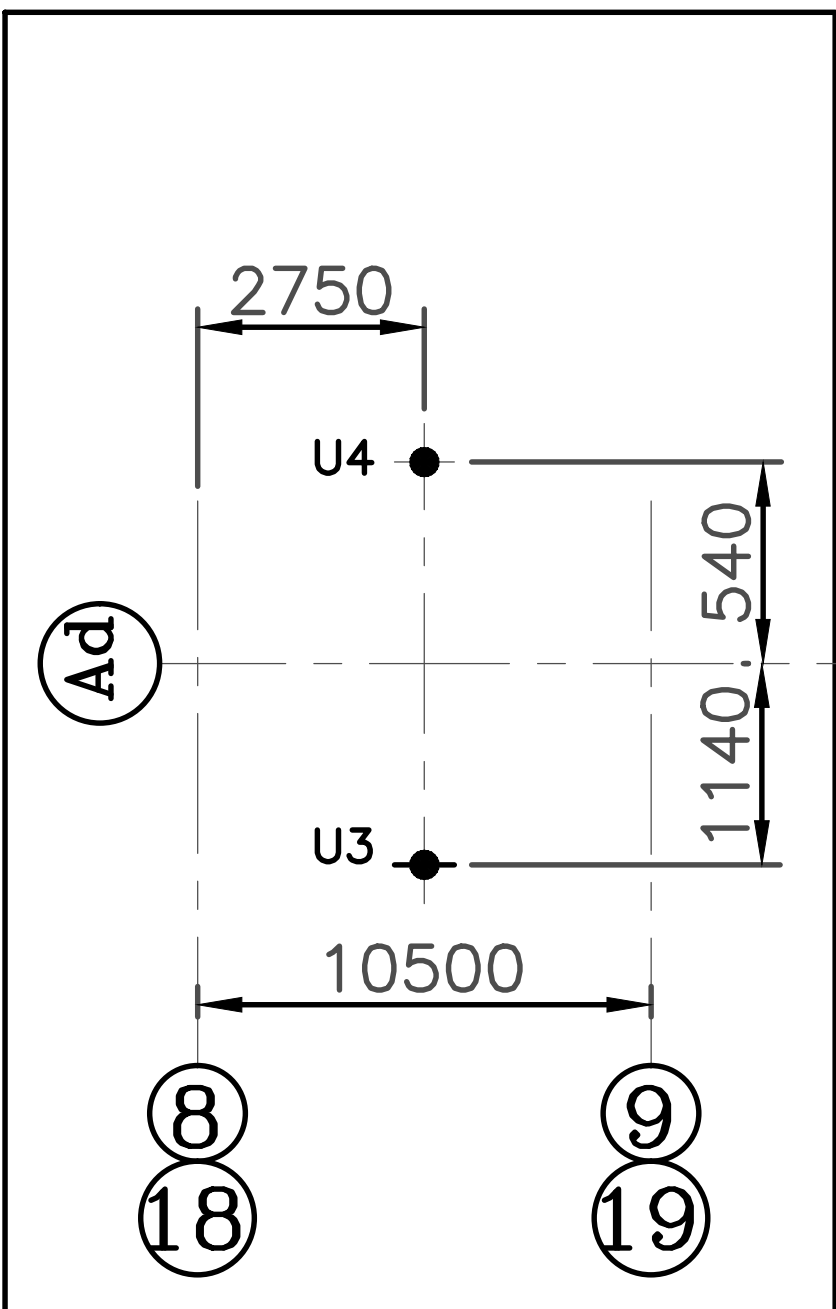
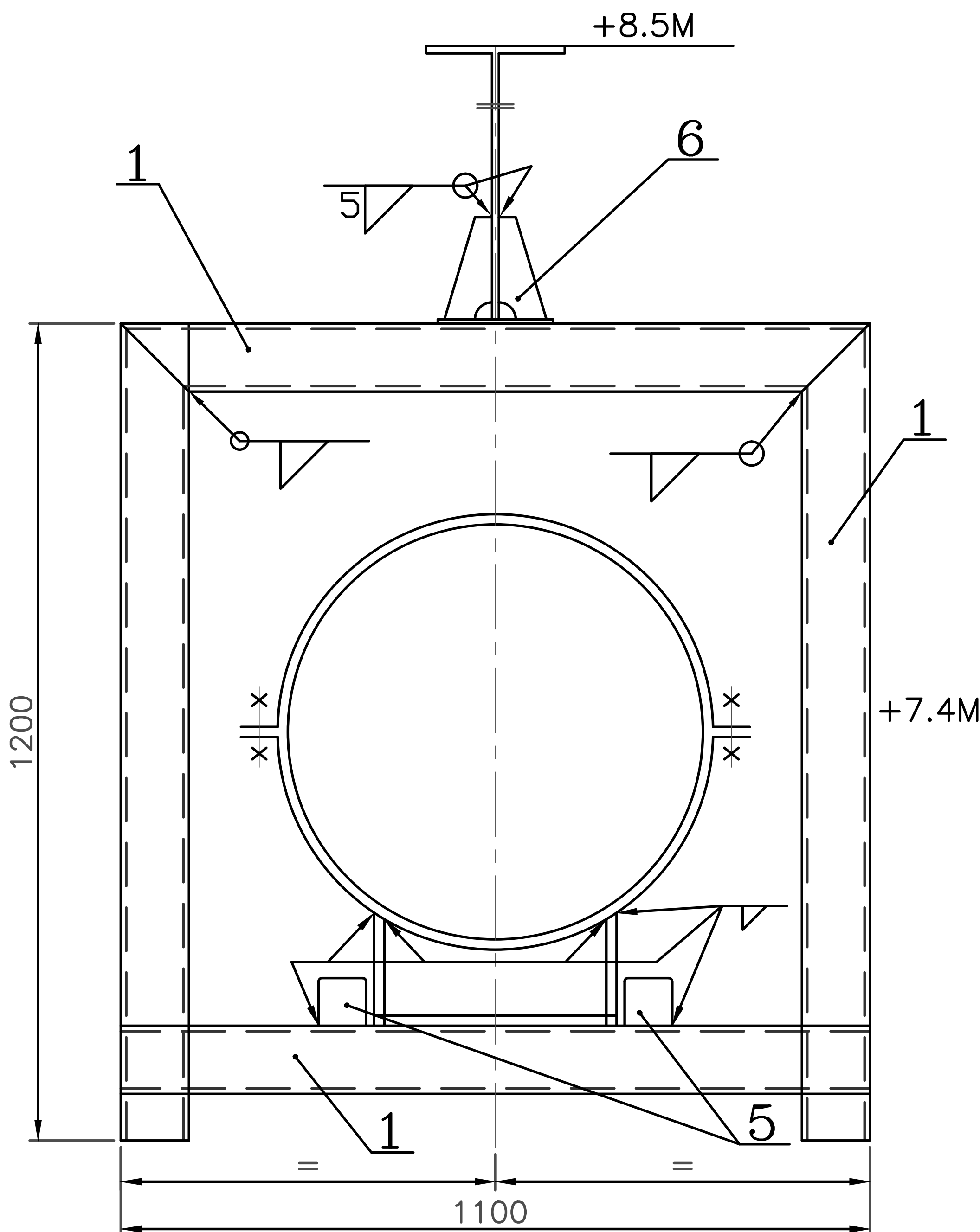
INVENTORY NO.
Et1-19256

DRAWING NO.
2-150-00-01042



TECHNICAL REQUIREMENTS

1. ALL THE BUTT JOINT TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER 0620.099 BS/BK.
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR.4.
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE TO BE SUPPLIED LOOSE ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
6. DESIGN OF THE SUPPORT IS FOR THE GUIDANCE OF SITE. MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.



004	BOR01500001205	006	RIB	4-150-00-01175		AA1011808137	1	100
	MS					IS2062E250BR		
004		005	PLATE 70X70X20	-		AA1011808137	0	770
						IS2062E250BR		
004	BOR01500001125	004	PIPE CLAMP NB600	2-150-00-01026		W96415001914	26	000
	MS				13	-		
001		003	CHANNEL ISMC 300X90,L=1000	-		AA1012708179	36	300
						IS2062E250BR		
004		002	PLATE 90X90X6	-		AA1011808030	0	380
						IS2062E250BR		
001		001	ANGLE 100X100X8 L=15000	-		AA1012508226	181	500
						IS2062E250BR		
VAR	PURCHASED	ITEM NO.	DESCRIPTION	DRAWING	IS	MATERIAL CODE	UNIT	WEIGHT
						MATERIAL SPEC.		

TYPE OF PRODUCT NATIONAL THERMAL POWER LTD VINDHYACHAL
OR SUPER THERMAL POWER PROJECT
NAME OF CUSTOMER/ PROJECT STAGE -II (2X500MW)-UNIT-7&8

DRN	NAME	SIGN	DATE	NO.OF VAR.
CHD	K.R.G	sd/-	19.1.97	
APD	G.GUPTA	sd/-	05.2.97	73, 74

DEPT. EME	SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
CODE 4133	1:10	330.800	0-150-00-01212	052	75, 77

TITLE	DRAWING NO.	SHEET NO. 01	NO.OF SHEETS 01
SUPPORT U3 U4	2-150-00-01042		

GRADE OF UNTOL. DIM.:--
M/CG- X/C/M/F AA 0230208
WELDING-X/B/C/D-AA621104
GAS CUTTING-T3'AA0621101

REV.	DATE	ALTERED
		CHECKED

CBOM NO.	STATUS OF DRG.
0-150-00-01212	
AGREED DEPT.	NAME SIGN DATE

REV.	DATE	ALTERED KM
01	04.06.18	CHECKED MA

REVISION MARKED

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10/2/97
SIGN & DATE

Et1-19254
INVENTORY NO.

DRAWING NO. 2-150-00-01043

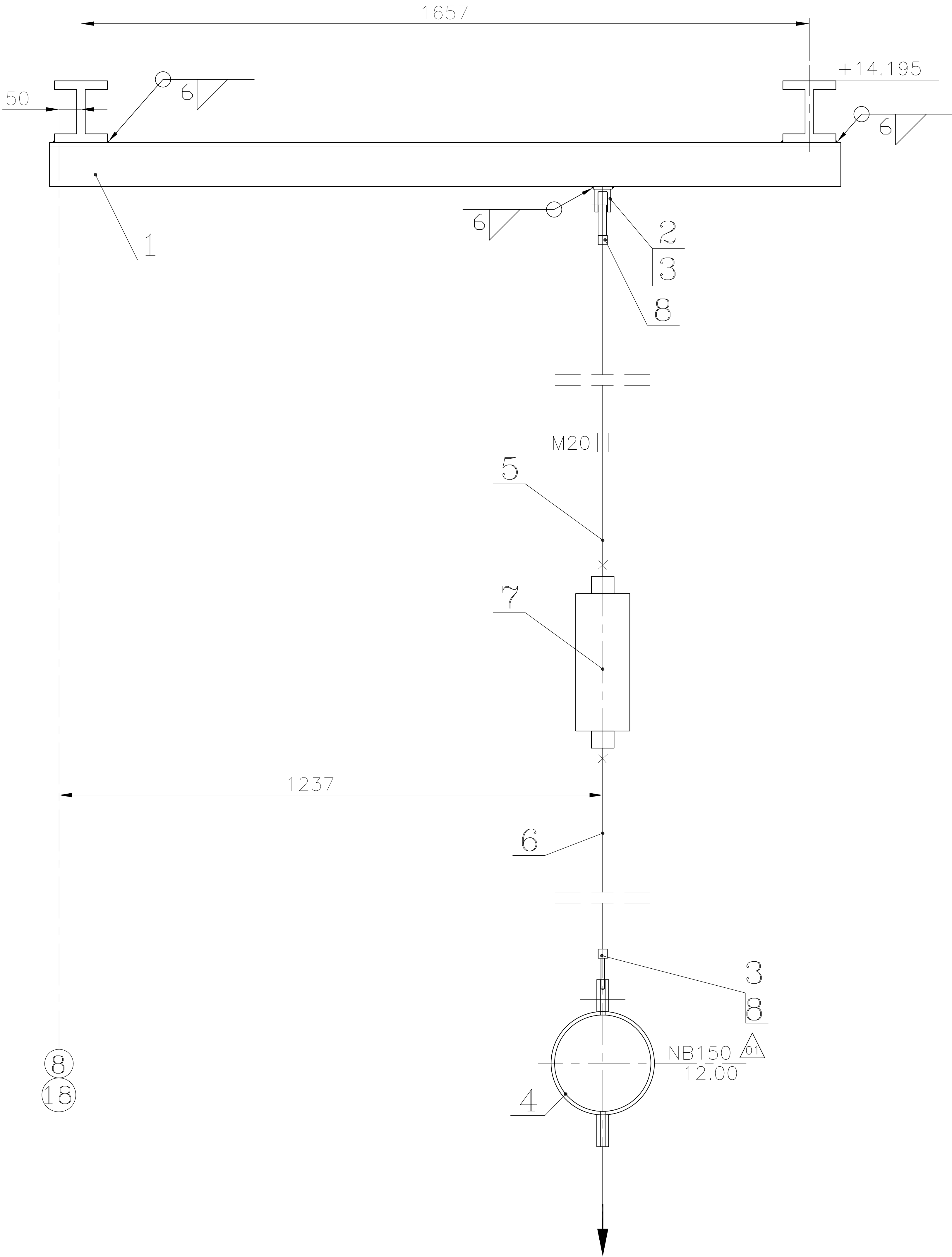
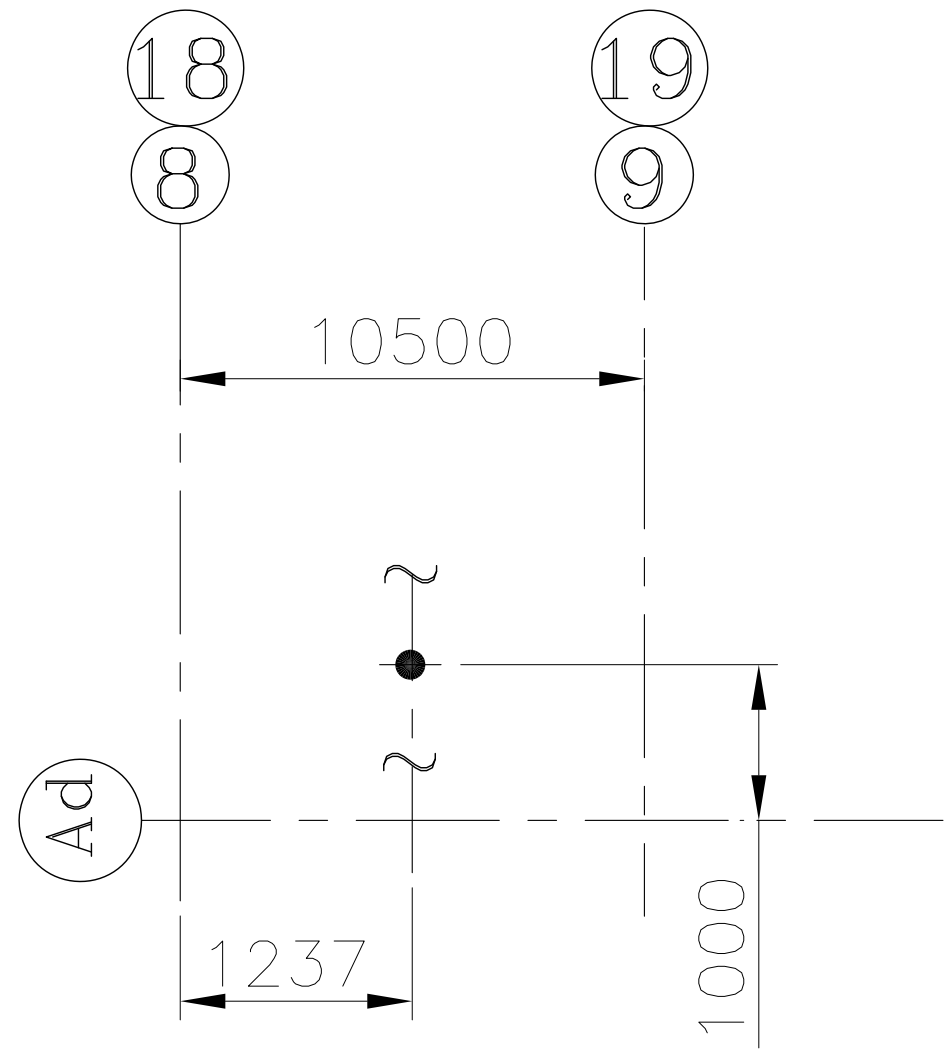
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REF. DRG NO.

10/2/97
SIGN & DATE

Et1-19255
INVENTORY NO.

A



TECHNICAL REQUIREMENTS

1. ALL THE BUTT JOINTS TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER 0620.099 BS/BK.
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR.4.
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE TO BE SUPPLIED LOOSE
6. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF SITE MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.

002	BOR.01500001205 GMS	008	TURN BUCKLE M20	4-150-00-01103	3	04	W96415001434			0.800
001		007	SPRING HANGER	4-150-00-01199	3		W96415002341			12.800
001	BOR.01500001205 GMS	006	TIE ROD M20X2000	4-150-00-01176	3		W96415002325			5.600
001	BOR.01500001125 GMS	005	THREADED ROD M20X1.5	4-150-00-01131	3	02	W96415001973			2.080
001	BOR.01500001125 GMS	004	PIPE CLAMP NB150	2-150-00-01026	3	10	W96415001892			2.400
002	BOR.01500001151 GMS	003	EYE BOLT M20	4-150-00-01099	3	04	W97415000099			0.300
001	BOR.01500001151 GMS	002	BEAM ATTACHMENT M20	4-150-00-01101	3	04	W96415001469			1.800
001		001	PARALLEL BEAM IPB100,L=1800	-	3		HW1013360897 AA10108			36.720
VAR	PURCHASED	ITEM NO.	DESCRIPTION	DRAWING	3	05	VAR	MATERIAL CODE MATERIAL SPEC.	A C	UNIT WEIGHT

CBOM NO. 0-150-00-01212			STATUS OF DRG.
AGREED DEPT.	NAME	SIGN	DATE

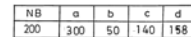
GRADE OF UNTOL. DIM.:-			
M/CG- X/C/M/F AA 0230208			
WELDING-A/B/C/D-AA621104			
GAS CUTTING-T3'AA0621101			
REV.	DATE	ALTERED CHECKED	
01	04.06.18	CHECKED MA	
REVISION MARKED			

TYPE OF PRODUCT NATIONAL THERMAL POWER LTD VINDHYACHAL
OR SUPER THERMAL POWER PROJECT
NAME OF CUSTOMER/ PROJECT STAGE -II (2X500MW)-UNIT-7&8

	NAME		SIGN	DATE	NO.OF VAR.
	AEDD		sd/-	19.1.97	
	K.R.G.		sd/-	19.1.97	
DRN	G.GUPTA		sd/-	05.2.97	73, 74

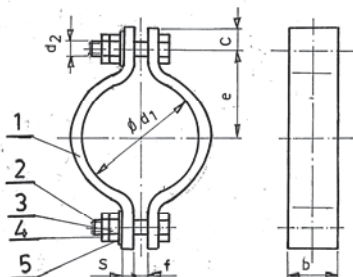
DEPT. EME		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
CODE 4133		1:10	64.160	0-150-00-01212	054	008 75, 77

TITLE			1	3	DRAWING NO. 2-150-00-01043	
HANGER ASSEMBLY F-5					22, 23, 24	
					SHEET NO. 01	NO.OF SHEETS 01



GRADE OF UNIFORM DIM. —		REV	DATE	NAME	SIGN	DATE	NAME OF	STAGE-II (2X 500 MM) UNITS-748			
M/CQ-C/M/F AA 0230208								NAME	SIGN	DATE	NO
WELDING <i>W.C.C.</i> OF AAO21104								ORIN AAOO	R.SIGN	DATE	NO
GAS CUTTING "13" AAO21104								CHD R.R.G.			
REVDATE: 14/05/2018		REVDATE	ALTERED P.A.	DEPT-16	SCALE	WEIGHT (KG)					
CHK:GSD		CHK:GSD	CHECKED: R.R.	CODE A033	N.T.S.						
ZONE		ZONE	CH AD-N-95	TITLE			DRAWING NO				
				HANGER ASSEMBLY			I-150-00-00119				
				F1, F2, F3, F4			SHEET NO. 01			NO OF SHEETS	

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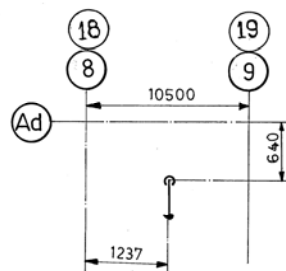
13	600	609.6	90	45	375	25	15	M 30 X 120	26-00	W9615001914
12	300	323.9	60	30	205	14	8	M 20 X 75	5.04	W9615001906
11	200	219.1	50	24	145	11	8	M 16 X 65	2.96	W 96415001892
10	150	168.3	50	24	120	11	8	M 16 X 65	2.40	W96415001884
09	125	139.7	50	24	105	11	8	M 16 X 65	2.15	W96415001876
08	100	114.3	50	24	90	11	8	M 16 X 65	1.95	W96415001868
07	80	88.9	40	18	70	9	6	M 12 X 50	0.88	W96415001850
06	65	76.1	40	18	60	9	6	M 12 X 50	0.79	W96415001841
05	50	60.3	40	18	55	9	6	M 12 X 50	0.71	W96415001833
04	40	48.3	30	15	45	7	5	M 10 X 40	0.31	W96415001825
03	32	42.4	30	15	41	7	5	M 10 X 40	0.28	W96415001817
02	25	33.7	30	15	36	7	5	M 10 X 40	0.25	W96415001809
01	20	26.9	30	15	33	7	5	M 10 X 40	0.23	W96415001795
00	15	21.3	30	15	30	7	5	M 10 X 40	0.21	W96415001787
VAR00	NB	d ₁	b	c	e	f	s	d ₂	WT. IN Kgs.	MATERIAL CODE

1. PIPE CLAMPS SHALL BE SUPPLIED IN ASSEMBLED CONDITION.
2. IDENTIFICATION SHALL BE DONE BY ATTACHING A TAG.
3. MATERIAL CODE REFER VARIAT TABLE.
4. FOR MATERIAL CODE REFER VARIANT TABLE.

0 0 2		0 0 5	WASHER	—		CS-IS2062E250BR			—	
0 0 2		0 0 4	LOCK NUT	—		STEEL A8.8			—	
0 0 2		0 0 3	NUT	—		STEEL A8.8			—	
0 0 2		0 0 2	BLOT HEX.	—		STEEL A8.8			—	
0 0 2		0 0 1	CLAMP	—		CS-IS2062E250BR			—	
VAR 00	REMARKS	ITEM No.	DESCRIPTION	S/D	DRAWING No.	MATERIAL CODE	UNIT	UNIT WEIGHT	GS	ZONE
59	64 65	75 25 27 29	28	58 59 60	77	31 32 33 34	45 55	58 65	71	72
CARD TYPE-3				CARD TYPE-1		CARD TYPE-2				

GMS No./Gr-SP-No. 0150 000125				STATUS OF DRG.		CARD TYPE-1				CARD TYPE-2					
AGREED DEPT		NAME		SIGN		DATE									
GTY		SCGYVAL		23/9/79											
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR						NAME Karpoor		SIGN <i>[Signature]</i>		DATE		No. Of VAR			
						CHD K.R.G		<i>[Signature]</i>		13/9/79		73.74			
						APPD G.M.K		<i>[Signature]</i>		10/9/79		73.74			
REV		DATE		ALTERED CHECKED		DEPT TGE		SCALE N.T.S		WEIGHT (KG)		REF. TO ASSY. DRG. 0-150-00-01125		ITEM No.	
ZONE						CODE 6003						73.74		No. Of ITEM	
TITLE: PIPE CLAMP						CARD CODE		DRAWING No. 2-150-00-01026		REV					
4										SHEET No. 01		NO. OF SHEETS 01			

DRAWING NO. 2-150-00-01042



1. ALL THE BUTT JOINTS TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER HW 0620 099 B5/BK
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR.4
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE SUPPLIED LOOSE ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
6. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF SITE MODIFICATIONS CAN BE DONE TO SUIT SIDE CONVENIENCE.

001		007	SPRING HANGER	3	41500001199		W96415002341		NO	12 800				
001	BORROWED 01500001205 GMS	006	TIE ROD M20X2000	3	4-150-00-01176		W96415002325		NO	5 600				
001	BORROWED 01500001125 GMS	005	THREADED ROD M20X1.5	3	4-150-00-01131		W96415001973		NO	2 080				
001	- DO -	004	EYE BOLT M20	3	4-150-00-01099		W97475000099		NO	0 300				
002	BORROWED 01500001151 GMS	003	BEAM ATTACHMENT M20	3	4-150-00-01101		W96415001469		NO	1 800				
001	BORROWED 01500001205 G.M.S.	002	PLATE		4-150-00-01177		AA1011808137 AA10108		NO	1 500				
001		001	PARALLEL BEAM 1PB100, L=1800		-		HW1013608917 AA10108		NO	36 700				
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	S/D	DRAWING NO.	29.31 VAR 32.33	MATERIAL CODE MATERIAL SPECN.	A C	UNIT	UNIT WEIGHT	G/G	ZONE		
59	64	65	75	25	29	58	59	60	77	58	65	66	71	72

CARD TYPE - 3 → 28				28 → CARD TYPE - 1				28 → CARD TYPE - 2			
GMS NO. / GR. SP. NO. 0-150-00-01212				STATUS OF PROJ.				TYPE OF PRODUCT NATIONAL THERMAL POWER CORPORATION LTD.			
AGREED DEPT				NAME				OR VINDHYACHAL SUPER THERMAL POWER PROJECT			
SIGN				DATE				NAME OF CUSTOMER / PROJECT STAGE-II (2 X 500 MW)-UNITS)-748			

GRADE OF UNTOL. DIM. :-
M / CG - ϕ / M / F AA 0230208
WELDING-A/B/C/D-AA 0621104
GAS CUTTING-'T3' AA 0621101

REV.	DATE	ALTERED
		CHECKED

ZONE	

REV.	DATE	ALTERED
		CHECKED

ZONE	
------	--

	BHARAT HEAVY ELECTRICALS LTD. HARDWAR			NAME	SIGN	DATE	NO OF VAL	
			DRN	AEDD				
			CHD	K.R. GUPTA	<i>12</i>	13-1-77		
			APD	G. GUPTA	<i>Shiv</i>	5-2-77		7310

DEPT. TGE		SCALE	WEIGHT (kg.)	REF. TO ASSY. DRG.	ITEM NO.	NO.
CODE 000		N.T.S.	62.580	0-150-00-01212	055	ITEM

TITLE		DRAWING NO.	
HANGER ASSEMBLY F-6		2-150-00-01044	
1	3	7	22 23
SHEET NO. 01		NO. OF SHEET 01	

SIZE A2

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INVENTORY NO	SIGN & DATE	REF.	DRG	NO.
E-1-1935	10/2/89			

DRAWING NO.

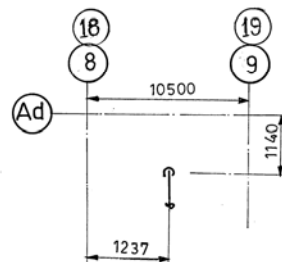
1. ALL THE BUTT JOINTS TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER HW 0620.099 BS/BK
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR 4.
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE SUPPLIED LOOSE ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
6. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF SITE. MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.

001		006	SPRING HANGER	3	41500001199		W96415002341	NC	12 800	C	
	BORROWED 015000001205 G.M.S.	005	THREADED ROD M 20X 2000	3	4-150-00-01178		W96415002333	NC	4 160		
001	BORROWED 015000001125 G.M.S.	004	PIPE CLAMP NB 200	3	2-150-00-01026		W96415001892	NC	2 960		
002	BORROWED 015000001151 G.M.S.	003	EYE BOLT M20	3	4-150-00-01099		W97415000099	NC	0 300		
001	BORROWED 015000001151 G.M.S.	002	BEAM ATTACHMENT M20	3	4-150-00-01101		W96415001469	NC	1 800		
001		001	PARALLEL BEAM IPB 100. L=1800		-		HW1013F089P7 AA1Q108	NC	36 720	B	
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	DWG NO.	DRAWING NO.	MATERIAL SPECN.	A UNIT WEIGHT	GSS	ZONE.		
59	64	65	75	25	27	29	31	58	65	71	72
CARD TYPE - 3 → 28			28 → CARD TYPE - 1			28 → CARD TYPE - 2					

GMS NO. / GR. SP. NO. 0-150-00-01212				STATUS OF DWG. 0	TYPE OF PRODUCT NATIONAL THERMAL POWER CORPORATION LTD. OR VINDHYACHAL SUPER THERMAL POWER PROJECT NAME OF CUSTOMER / PROJECT STAGE II (2 X500MW) - UNITS-748									
AGREED DEPT	NAME		SIGN	DATE	 BHARAT HEAVY ELECTRICALS LTD. HARDWAR				DRN	NAME		SIGN	DATE	NO. OF VAR.
									CHD	K.R. GUPTA			13/17	
								APD	G. GUPTA			5/297	73/74	
REV.	DATE	ALTERED			DEPT. TGE		SCALE	WEIGHT (kg.)	REF. TO ASSY. DRG.					
		CHECKED			CODE4033		NTS	59.040	0-150-00-01212					

SIZE A2

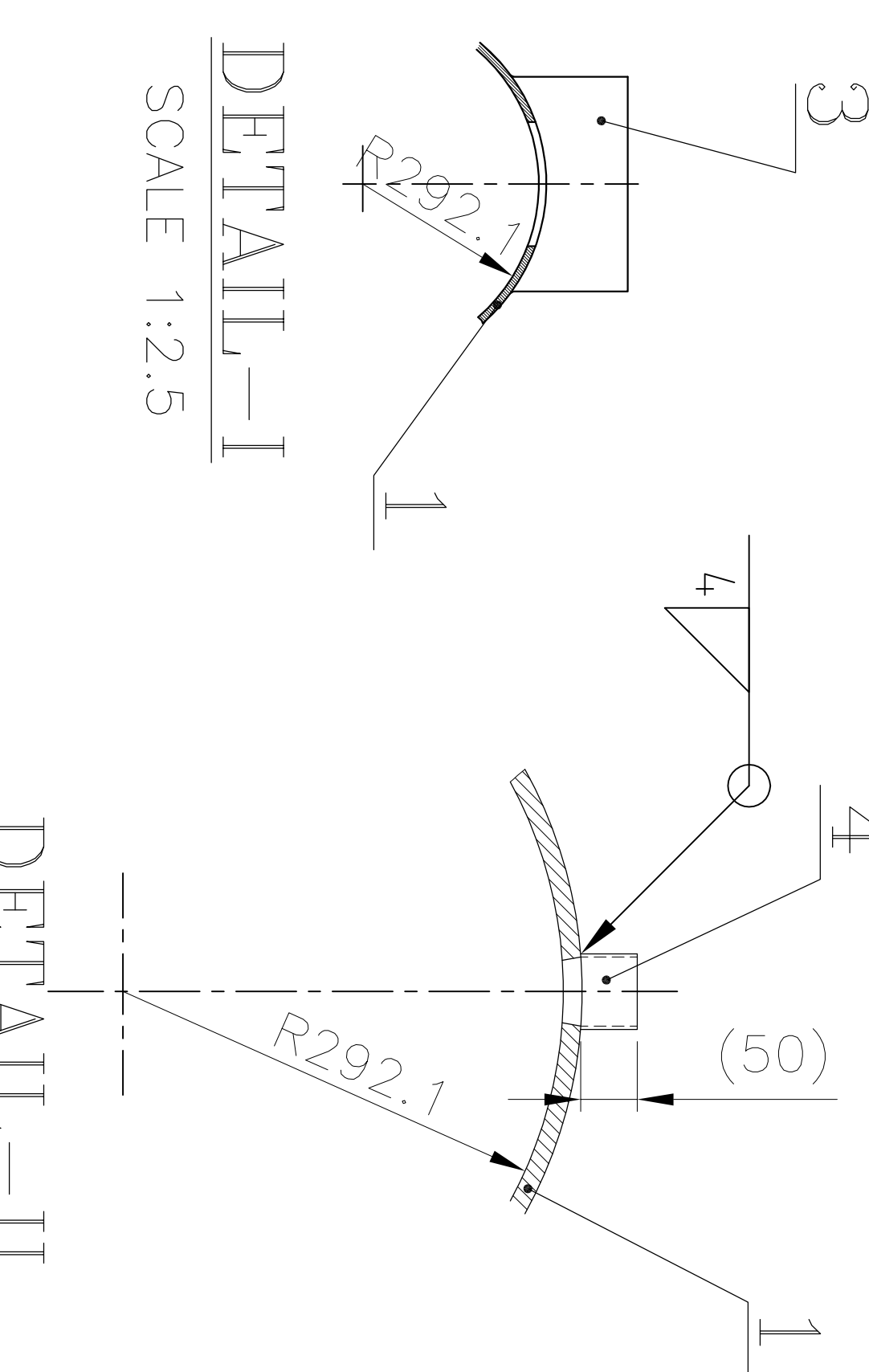
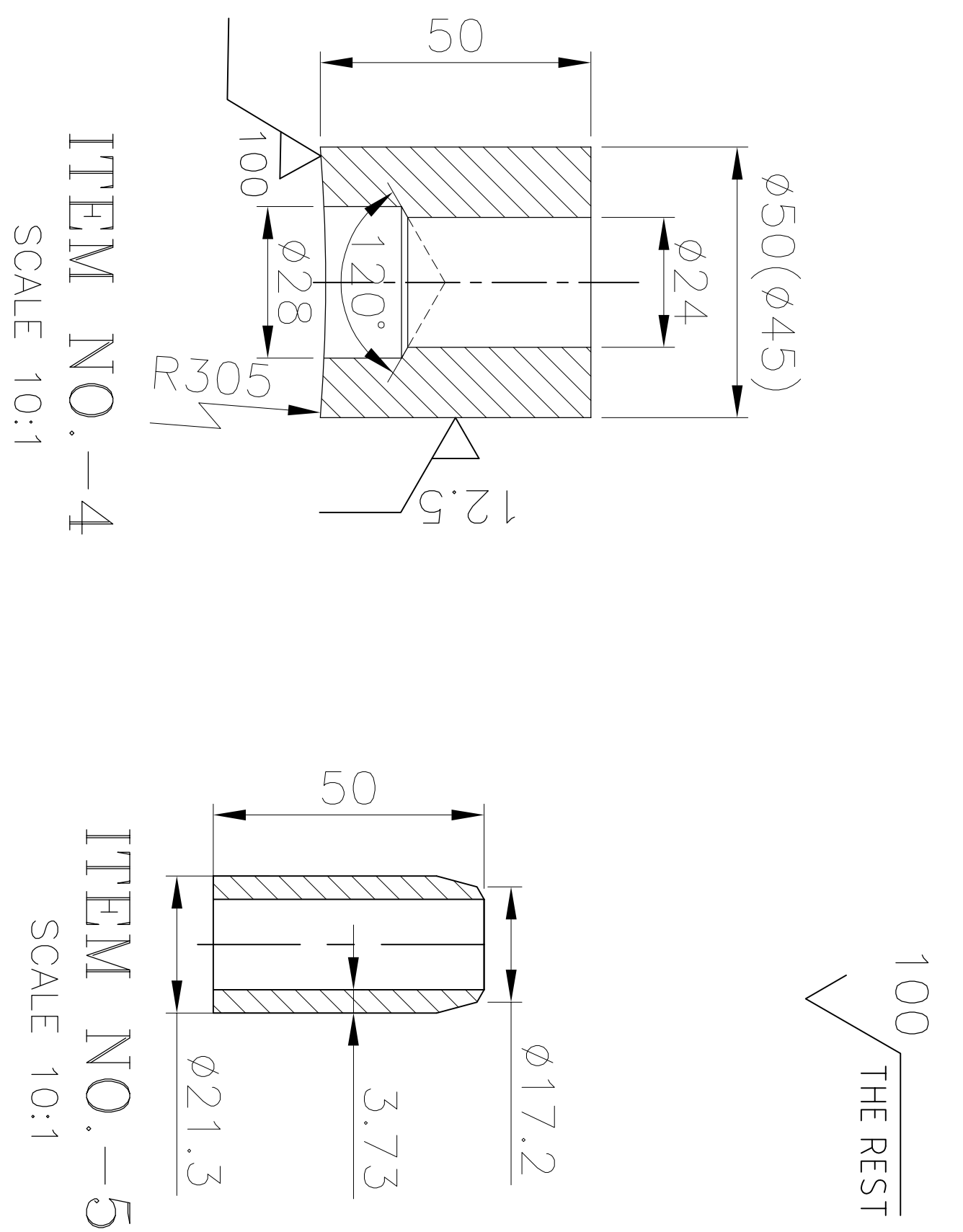
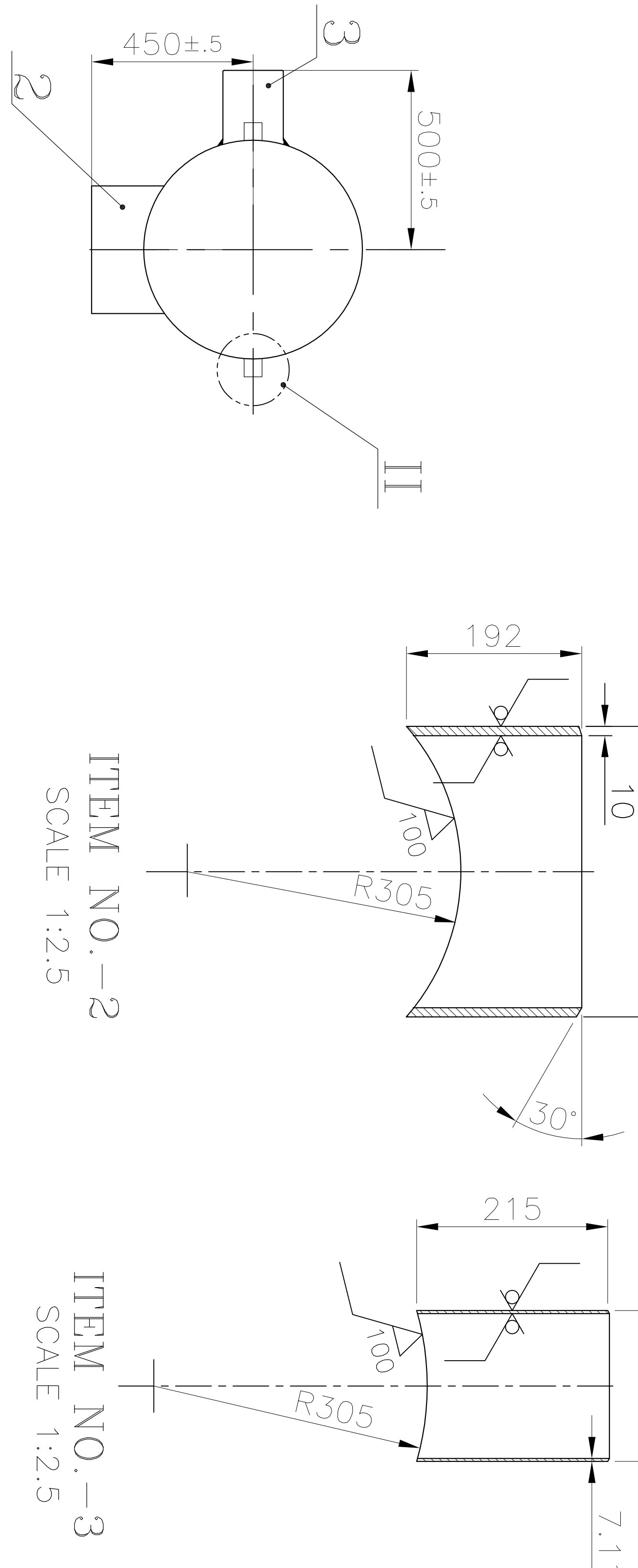
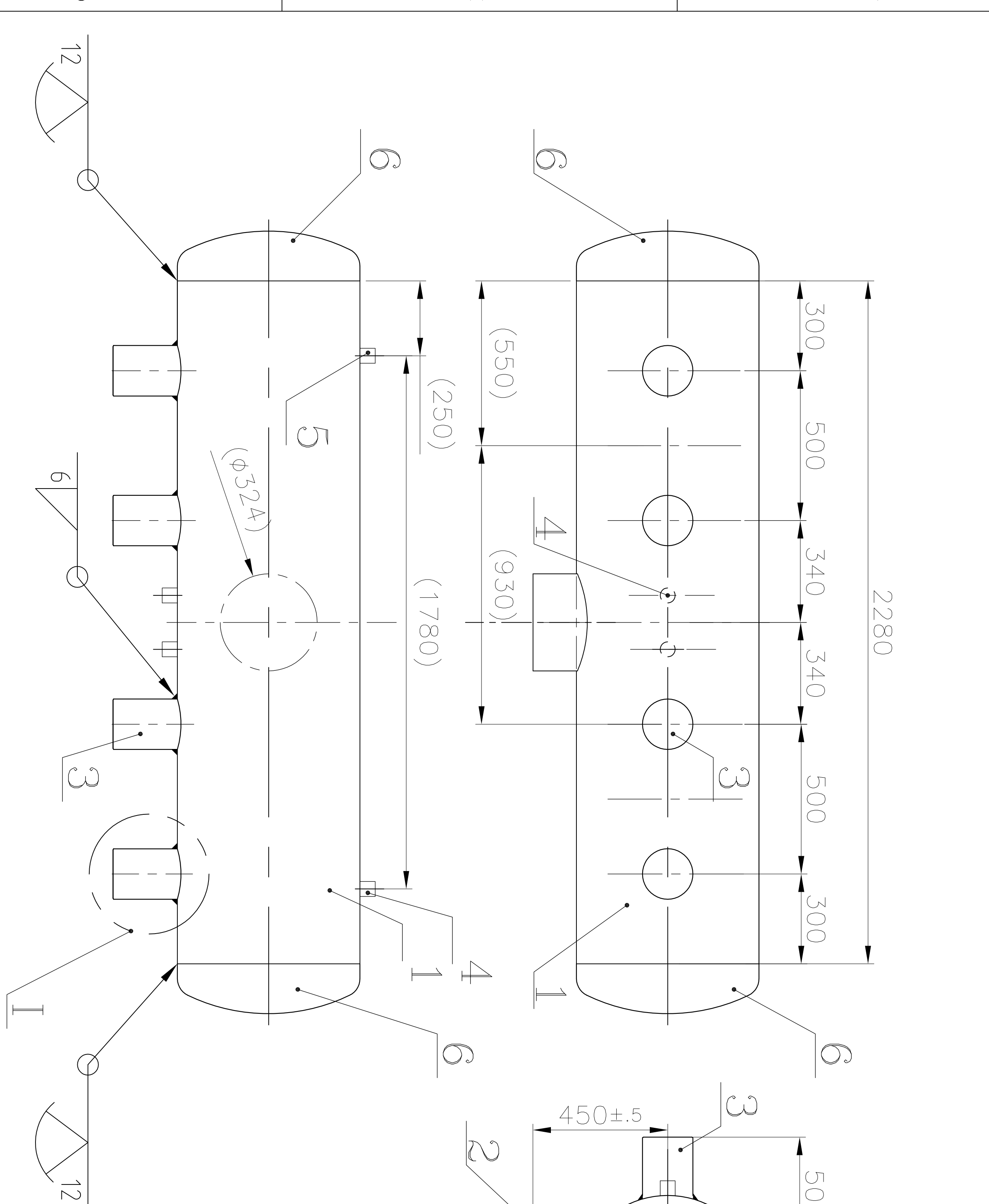
DRAWING NO.



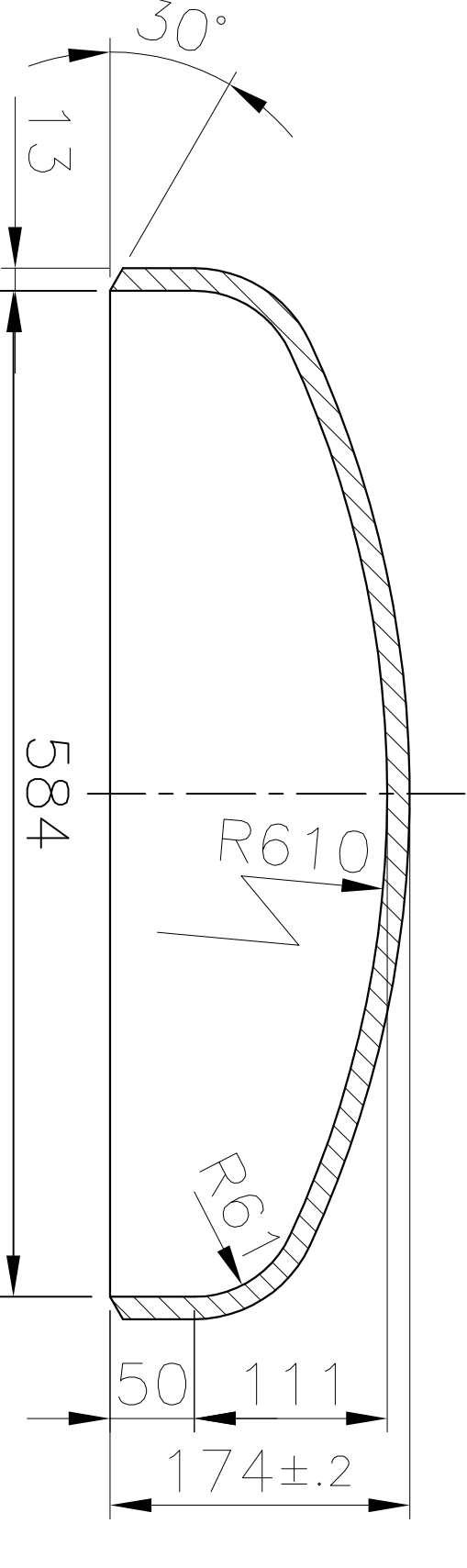
1. ALL THE BUTT JOINTS TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER HW 0620 099 BS/BK
3. TEST SCOPE AS PER HW 0850 199 EX GR.4
4. IDENTIFICATION AS PER HW 0400 397.
5. ITEMS AS PER BILL OF MATERIAL ARE SUPPLIED LOOSE ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
6. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF SITE. MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.

001		006	SPRING HANGER	3	41500001199		W96415002341	NO	12	800	
001	BORROWED 01500001205	005	THEREADED ROD M 20 x 200	3	4-150-00-0178		W96415002333	NO	4	160	
001	— DO —	004	EYE BOLT M20	3	4-150-00-01099		W97415000099	NO	0	300	
002	BORROWED 01500001151 GMS	003	BEAM ATTACHMENT M 20	3	4-150-00-01101	04	W96415001469	NO	1	800	
001		002	PLATE		4-150-00-01177	04	AA1011806137 A A10 10 8	NO	1	500	
001		001	PARALLEL BEAM IPB 100, L= 1800				H W 1Q1360P8917 AA1010 8	NO	36	720	
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	UNIT WEIGHT	MATERIAL CODE	A/C UNIT	CENTRAL WEIGHT	GROSS WT	ZONE
59	64 65	75	25 27	28	→ CARD TYPE - 1	58 59 60	77	29, 31 VAR. 32, 33 46	38	65	
CARD TYPE → 2					DRAWING NO. → 2						
GMS NO. / GR. SP. NO. 0-1500-00-01212			STATUS OF CHNG. U		TYPE OF PRODUCT NATIONAL THERMAL POWER CORPORATION LTD. OR VINDHYCHAL SUPER THERMAL POWER PROJECT NAME OF CUSTOMER / PROJECT STAGE II(2X500 MW)-UNITS-7 & 8						
AGREED DEPT	NAME	SIGN	DATE	 BHARAT HEAVY ELECTRICALS LTD. HARDWAR		NAME SIGN DATE NO OF VAP					
REV.	DATE	ALTERED CHECKED	DEPT.TGE	SCALE N.T.S.	WEIGHT(kg.)	REF. TO ASSY. DRG.					
ZONE			CODE 4033		59.080	0-150-00-01212					
TITLE					DRAWING NO.						
HANGER ASSEMBLY F8					2-150-00-01046						
					1 3 SHEET NO.		NO. OF SHEET				
							SIZE A2				

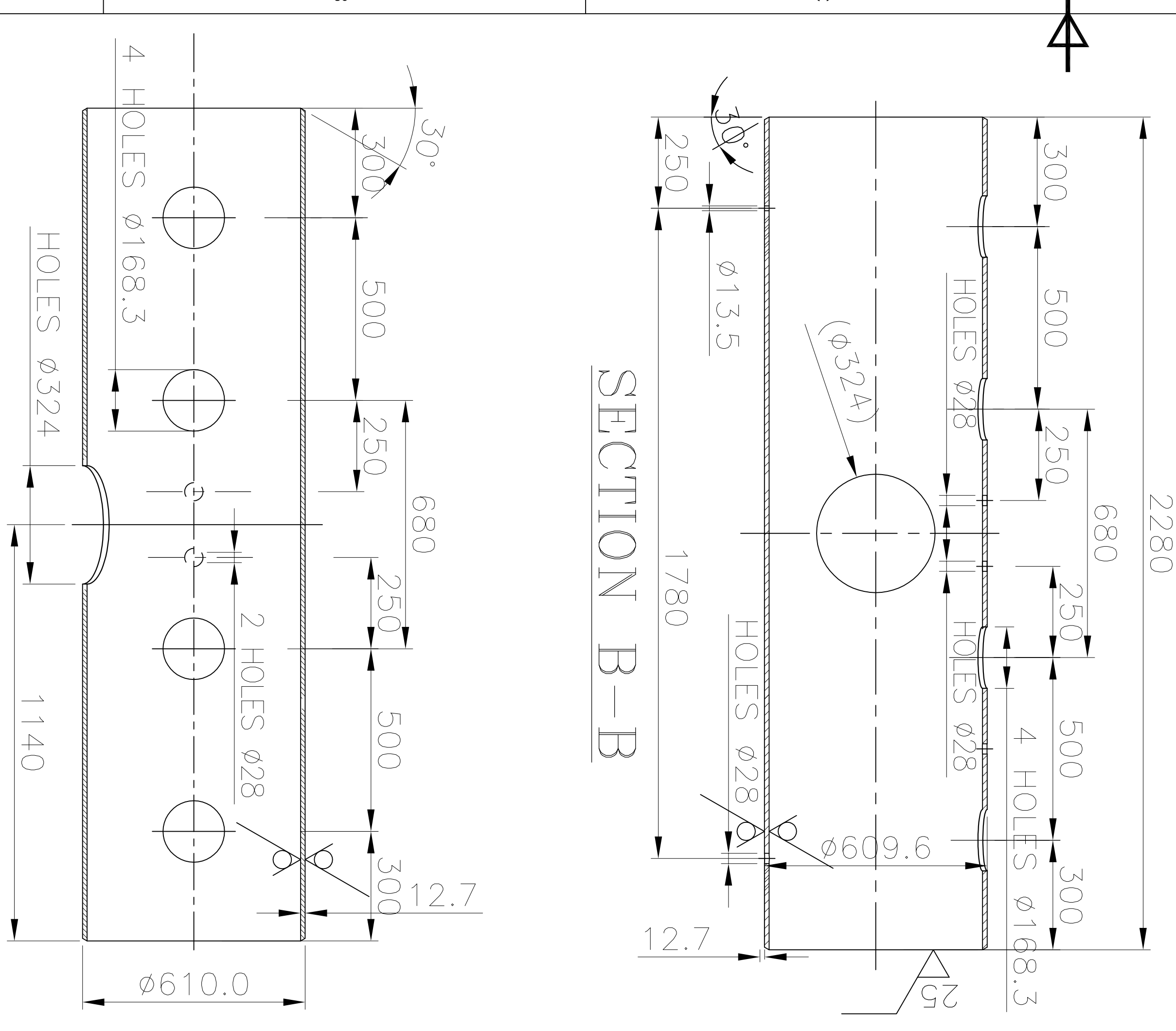
52110000512
GN GNINWYRD



ITEM NO.-6
SCALE 1:2.5



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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.



SECTION A-A

SECTION B-B

ITEM NO.-1

TABLE-1

ITEM NO.	ITEM DETAIL	UNIT WT.(KG)	QTY.	MOC
1	CYLINDER	390	1	ASME A106GrB
2	CONNECTION	14.2	1	ASME A106GrB
3	CONNECTION	6.08	4	ASME A106GrB
4	CONNECTION	0.5	3	ASTM A105
5	CONNECTION	0.08	1	ASME A106GrB
6	CAP	50	2	IS2062 E250BR

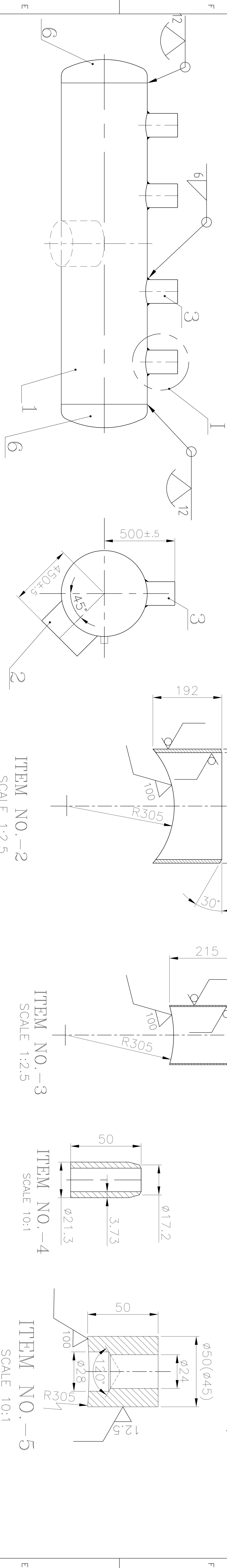
GRADE OF UNTOL. DIM.:- M/M/CG- V/C/M/F AA 0230208 WELDING-A/B/C/D-AA621104 GAS CUTTING-13'AA0621101	CBOM NO.		STATUS OF DRG.	
	AGREED DEPT.	NAME	SIGN	DATE

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				THDF 115/67			
BHARAT HEAVY ELECTRICALS LTD.				HARDWAR			
DEPT. EME	SCALE 1:20	WEIGHT(Kg)	536	DRN KUNAL MISHRA	Sd/-	DATE 22.04.19	NO.OF VAR.
CODE 41333				CHD MANJU AZAD	Sd/-	DATE 22.04.19	
				APD R.L.VYAS	Sd/-	DATE 22.04.19	73, 74
				REF. TO ASSY. DRG.		ITEM NO.OF NO. ITEMS	75, 77

INLET HEADER

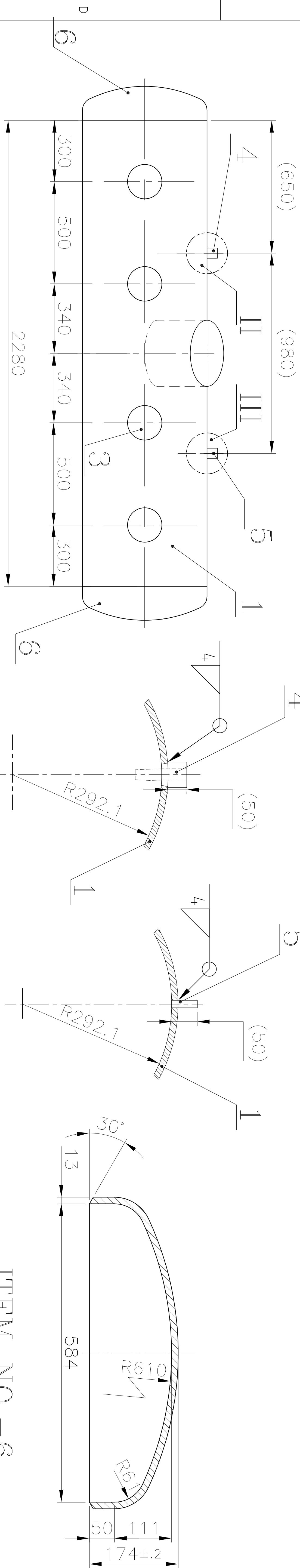
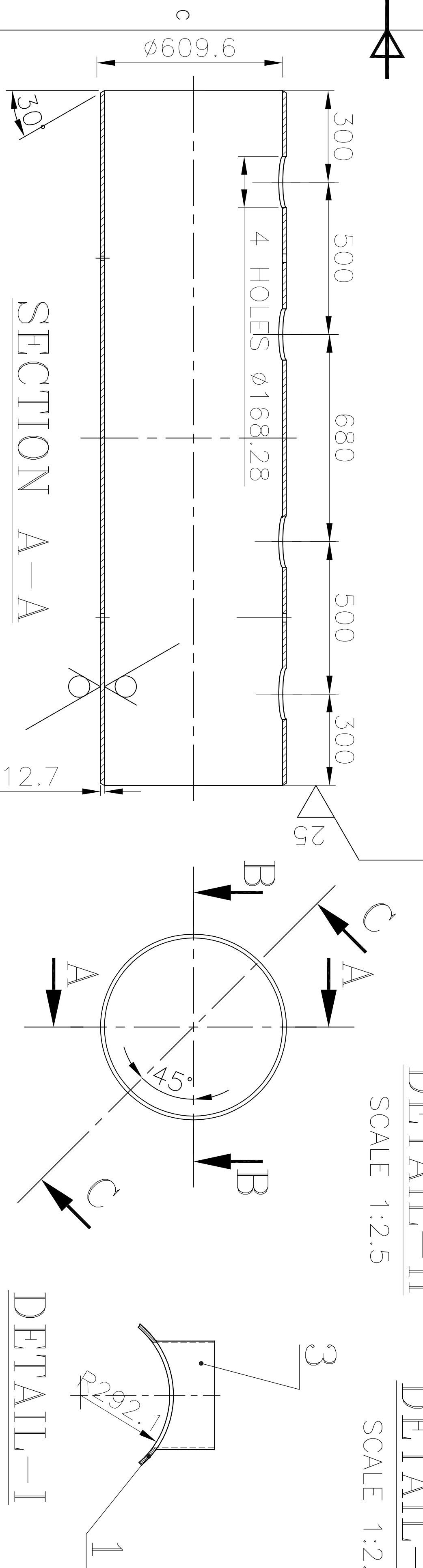
REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
04	30.07.18	CHECKED	M/A	03	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION				REVISION MARKED AS			
UPDATED AS PER LATEST PDMS MODEL							

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

92110000512
ON GN1WAYRDITEM NO.-2
SCALE 1:2.5ITEM NO.-3
SCALE 1:2.5ITEM NO.-4
SCALE 10:1ITEM NO.-5
SCALE 10:1

TECH. REQUIREMENTS:-

1. MATERIAL OF CONSTRUCTION IS AS PER TABLE-1
2. WELDING & EDGE PREPARATION AS PER HW 0620.599.
3. QUALITY OF WELD SEAM TO BE AS PER HW 0620.099. BS/BK.
4. DPT OF 100% WELD JOINTS & RT OF 10% BUTT JOINTS TO BE DONE AS PER HW0850199.
5. IDENTIFICATION AS PER HW0400397.
6. DIMENSION WITH IN BRACKET ARE FOR REFERENCE ONLY.
7. DURING ASSY. OF ITEM 2 PROPER MATCHING TO BE DONE BY GAS CUTTING & GRINDING THE PROFILE.
8. EXT COATING OF RED OXIDE PRIMER TO BE DONE AS PER HW 0912.015.
9. ITEM NO. 6 TO BE NORMALISED IF NOT FORMED IN NORMALISING RANGE.
10. ITEM NO. 6 TO BE MANUFACTURED AS PER ASME SECTION-VIII DIV-1 REQUIREMENTS.
11. FOR ITEM NO. 6, MAXIMUM PERMISSIBLE THINNING IS 25% OF CAP THICKNESS.
12. DPT TO BE DONE ON KNUCKLE PORTION AND SF AFTER HEAT TREATMENT (BOTH INSIDE & OUTSIDE).
13. PHYSICAL TESTS ON TEST COUPONS TO BE CARRIED OUT AS PER UCS-85 OF ASME SECTION-VIII DIV-1. IMPACT TEST NOT REQUIRED.
14. ITEM NO. 6 TO BE CONSTRUCTED IN SINGLE PIECE. CENTRAL HOLE IF REQUIRED FROM MANUFACTURING POINT OF VIEW SHOULD BE PLUGGED & FULLY RADIOGRAPHED.
15. HYDRO TEST TO BE PERFORMED AT 15 KG/CM2 FOR 30 MIN. AND NO LEAKAGE ALLOWED.

DETAIL-II
SCALE 1:2.5DETAIL-III
SCALE 1:2.5ITEM NO.-6
SCALE 1:2.5

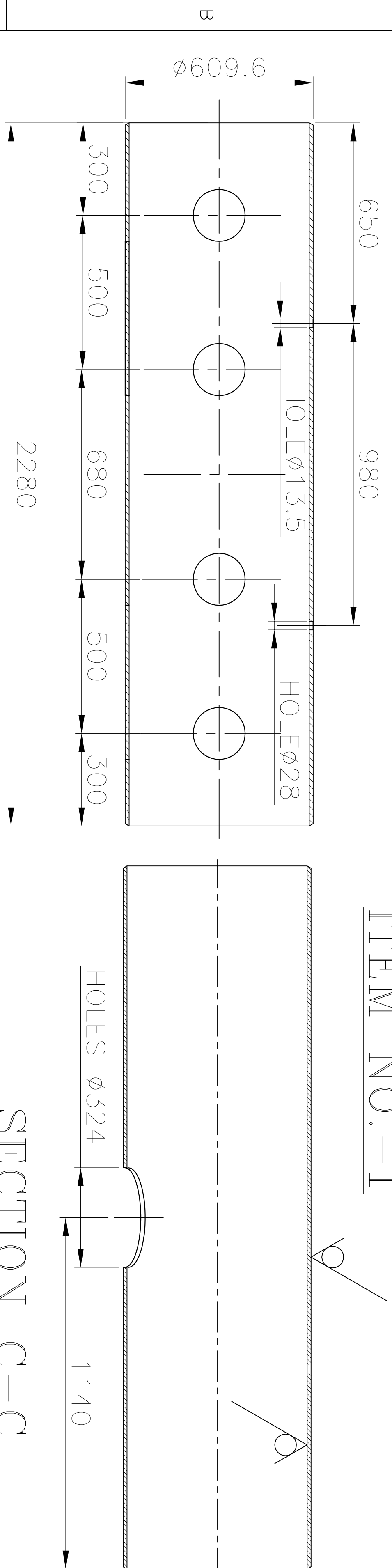
DETAIL-I

TABLE-1

SYMBOL & SIZE OF SEAM	4	6	12
SEAM LENGTH(M)	0.28	3.75	3.80
WT. OF DEPOSITED METAL(kg)	0.03	0.35	2.15
TYPE OF ELECTRODE	E 7018/ER 70SG		

ITEM NO.	ITEM DETAIL	UNIT WT.(KG)	QTY.	MOC
1	CYLINDER	390	1	ASME 106GrB
2	CONNECTION	14.2	1	ASME 106GrB
3	CONNECTION	6.08	4	ASME 106GrB
4	CONNECTION	0.08	1	ASME 106GrB
5	CONNECTION	0.5	1	ASTM A105
6	CAP	50	2	IS-2062 E250BR

ITEM NO.	ITEM DETAIL	UNIT WT.(KG)	QTY.	MOC
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2	CONNECTION	14.2	1	ASME 106GrB
3	CONNECTION	6.08	4	ASME 106GrB
4	CONNECTION	0.08	1	ASME 106GrB
5	CONNECTION	0.5	1	ASTM A105
6	CAP	50	2	IS-2062 E250BR

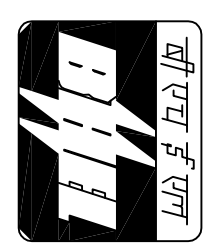


ITEM NO.-1

SECTION C-C

SECTION B-B

	CBOM NO.	STATUS OF DRG.			
		AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UNTOL. DIM. :-					
M/CG- V/C/M/F AA 0230208					
WELDING-A/B/C/D-AA621104					
GAS CUTTING-13'AA0621101					

BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

THDF 115/67

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
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NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
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NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
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NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
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UPDATED AS PER LATEST PDMS MODEL							

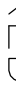
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O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
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UPDATED AS PER LATEST PDMS MODEL							

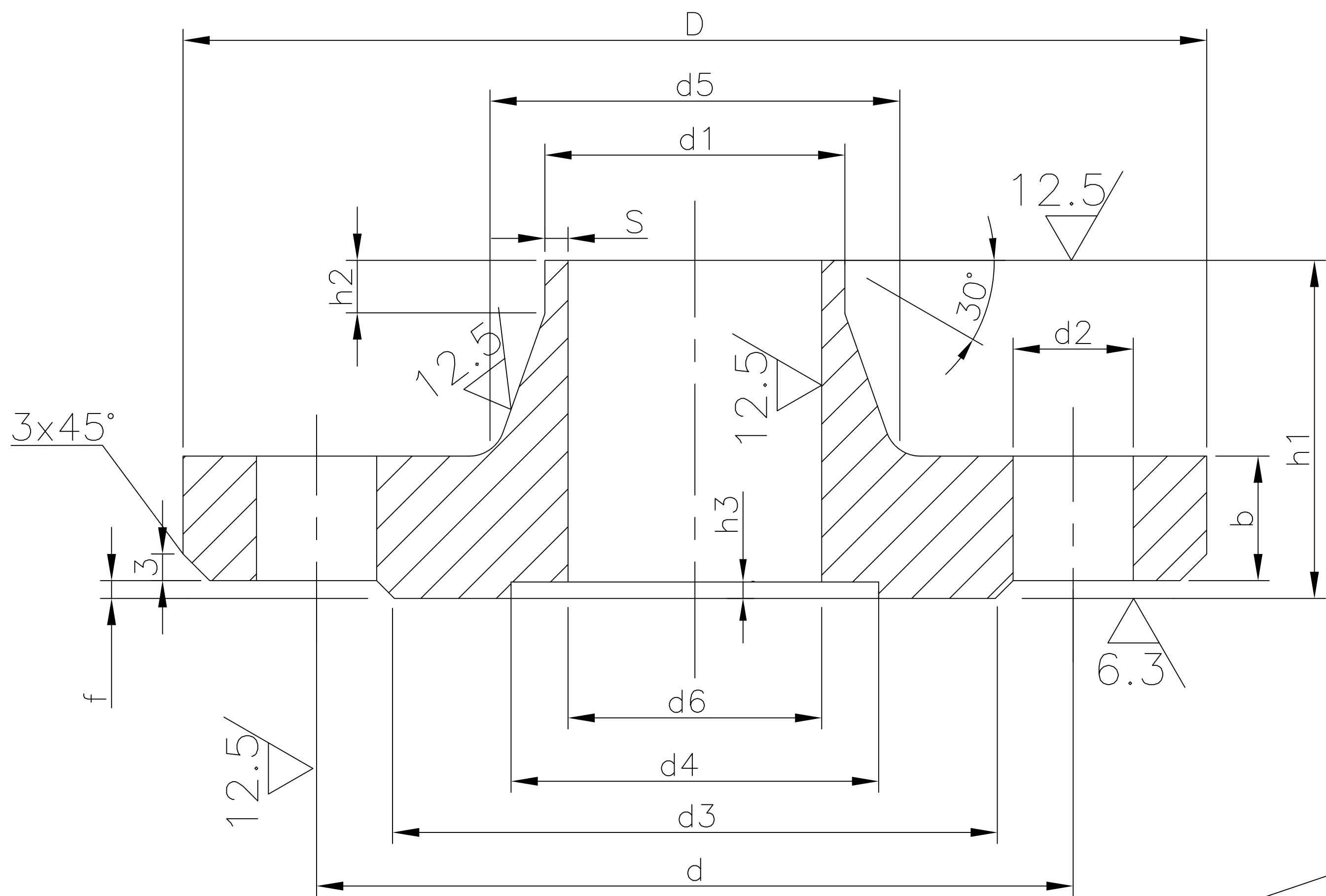
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NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M
O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A
NOZZLE ORIENTATION							
UPDATED AS PER LATEST PDMS MODEL							

A	REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M	REV.	DATE	ALTERED	K/M					
	O4	30.07.18	CHECKED	M/A	O3	11.06.18	CHECKED	M/A	O2	12.01.16	CHECKED	R/LV					
NOZZLE ORIENTATION UPDATED AS PER LATEST PDMS MODEL					REVISION MARKED AS 						O1		28.07.15	CHECKED	R/LV		
8					7			6			5			4		3	

DRAWING NO. 3-149-07-01004



VAR	NB	D	d1	d	d2	d3	d4	d5	d6	h2	h1	h3	f	b	N HOLE	s
00	100	220	114.3	180	18	158	122.5	131	107.1	12	52	3.2	3	20	8	3.6
01	65	185	76.1	145	18	122	79.5	90	68.1	10	45	2.4	3	18	4	4.0
02	40	150	48.3	110	18	88	55.5	64	43.1	7	42	2.4	3	16	4	2.6

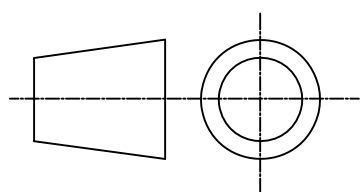
SERRATION ON FLANGE FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

THIS DRAWING SUPERSEDES THE OLD DRAWING UNDER THE SAME NUMBER

		003	V FLANGENb=40		3-149-07-01005	02	MATERIAL AS PER BOM	CNO	1	840	
		002	V FLANGENb=65		3-149-07-01005	01		CNO	3	020	
		001	V FLANGENb=100		3-149-07-01004	00		CNO	4	580	
VAR.00	REMARKS	KYE NO.	DESCRIPTION	59		29 31 VAR.	MATERIAL	55 57 C	UNIT WT.(kg.)		
59	64 65	75	25 27 29	58	60	NO 77	32 33 46	54 A	56 UNIT	58 66	72 S 71

KUN 673.42
REF. DRG NO.
SIGN & DATE
INVENTORY NO.

CBOM NO. 0-149-07-01000				STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE		
GRADE OF UNTOL. DIM.:-					
M/CG- X/C/M/F AA 0230208					
WELDING A/B/C/D AA621104					
GAS CUTTING-T3'AA0621101					
REV.	DATE	ALTERED CHECKED	REV.	DATE	ALTERED K.B.M. sd/- CHECKED K.N. sd/-
02	29.08.07				
DRAWING SUPERSEDES CHANGE ADVICE NO. TGE-07-F0179					

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				TG—HW—500—2				
BHARAT HEAVY ELECTRICALS LTD. HARDWAR					NAME	SIGN	DATE	NO.OF VAR.
				DRN	BDS/KBM	sd/—	18.11.81	
				CHD	S.N./G.G	sd/—	13.05.82	
				APD	D.R.C./N.P.C	sd/—	22.07.82	
DEPT. EME		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	73, 74 NO.OF ITEMS	
CODE 4133		N.T.S	SEE TABLE	3—149—07—01012		001	— 75, 77	
TITLE				1 3 001	DRAWING NO. 3—149—07—01004			
V FLANGE				SHEET NO.			NO.OF SHEETS	

V FLANGE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

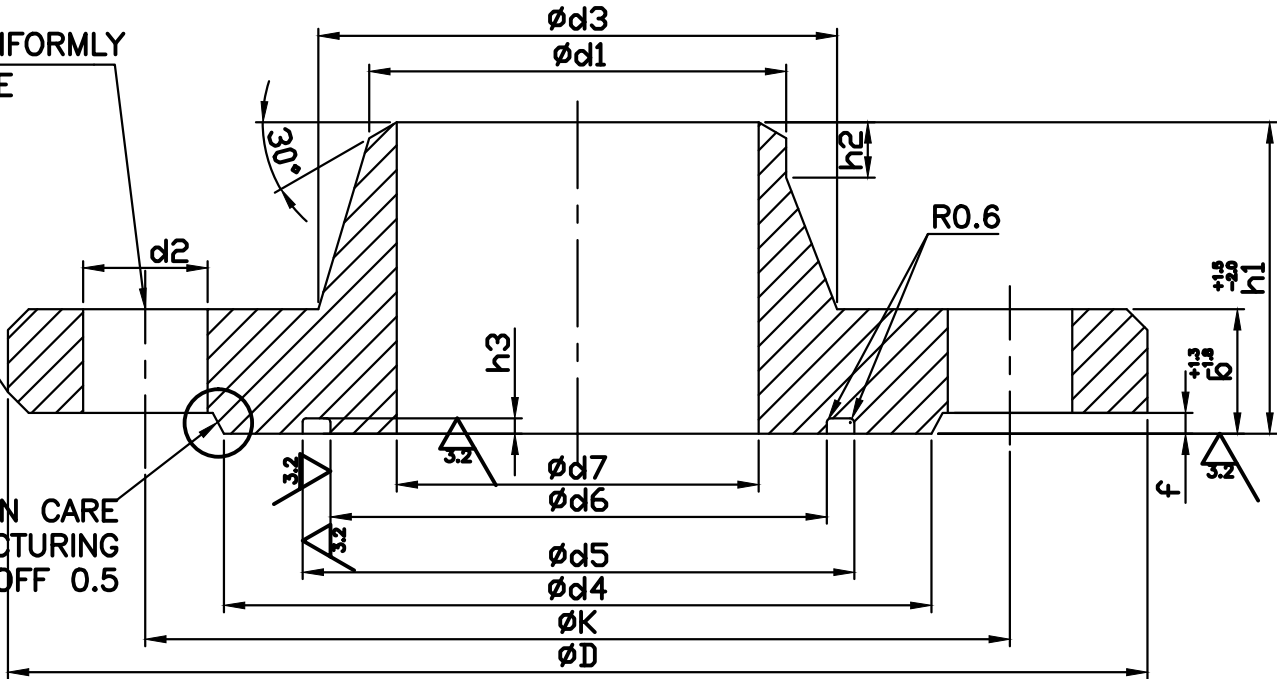
31492501005
DRAWING NO.

VAR NO.	d1	D	k	h1	d3	h2	d4	± 2.0 d2	± 2.0 d5	± 2.0 d6	$+0.05$ h3	$+0.2$ $f_{0.7}$	b	d7
00	60.3	165	125	45	75	8	102	18	79.5	71.5	2.2	3	18	52.3
01	26.9	105	75	38	40	6	58	14	39.5	31.5	2.2	2	16	22.3
02	33.7	115	85	38	45	6	68	14	45.5	37.5	2.2	2	16	28.5
03	60.3	152.4	120.6	45	75	8	92.1	19	79.5	71.5	2.2	3	15.9	52.3
04	48.3	150	110	42	64	7	88	18	60	52	2.2	3	16	43.1

12.5
THE REST

4 HOLES PLACED UNIFORMLY
ON CIRCUMFERENCE

EDGES TO BE TAKEN CARE
DURING MANUFACTURING
ROUND OFF 0.5



SUPERSEEDS OLD DRAWING
UNDER THE SAME NUMBER

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

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OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

INVENTORY NO.	SIGN & DATE	REF. DRG NO.

GRADE OF UNTOL. DIM.:-		CBOM NO.		STATUS OF DRG.	
M/CG V/C/M/F AA 0230208		0-149-25-01000			
WELDING-A/B/C/D-AA621104		AGREED DEPT.	NAME	SIGN	DATE
GAS CUTTING-T3-AA0621101		EMT	S.CHANDRA	SD/-	15/1/82
REV.		DATE	ALTERED	AKA2	Sd/-
05		19.09.18	CHECKED	KM	Sd/-
CHANGES DONE AS PER		CA NO. TGE-18-F0205.			

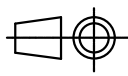
TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT

TG-HW-0500-2

BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

	NAME	SIGN	DATE	NO.OF VAR.
DRN	KB MUKHERJEE	SD/-	19.02.81	
CHD	G.GUPTA/D.R.C	SD/-	2.11.81	
APD	N.P.GUPTA	SD/-	24.6.82	73, 74

DEPT. TGE
CODE 42/33



SCALE
NTS

WEIGHT<Kg
SEE TABLE

REF. TO ASSY. DRG.
0-149-25-01000

ITEM NO.
75, 77

TITLE

FLANGE

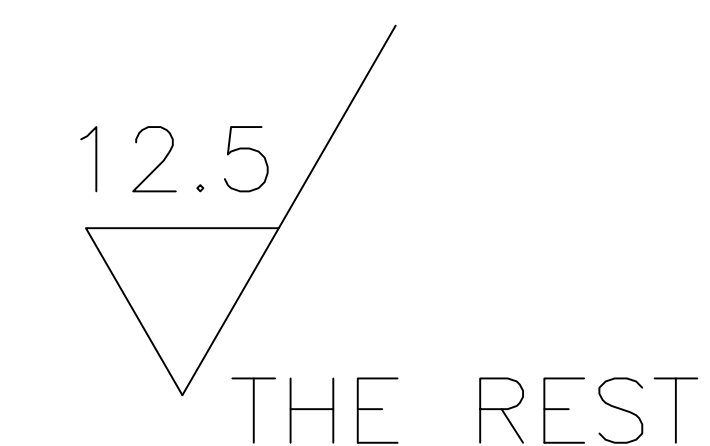
DRAWING NO.
31492501005

SHEET NO. 1 NO.OF SHEETS 1

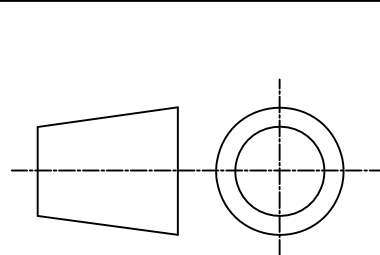
SIZE A3

EDGES TO BE TAKEN CARE
DURING MANUFACTURING
ROUND OFF 0.5

VAR NO.	d1	D	k	h1	d3	h2	d4	d2 ^{+2.0}	h3 ^{+0.05}	f ^{+0.2 -0.7}	b	d5
00	60.3	165	125	45	75	8	102	18	2.2	3	18	52.3
01	26.9	105	75	38	40	6	58	14	2.2	2	16	22.3
02	33.7	115	85	38	45	6	68	14	2.2	2	16	28.5
03	60.3	152.4	120.6	45	75	8	92.1	19	2.2	3	15.9	52.3



SERRATION ON FLANGE FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

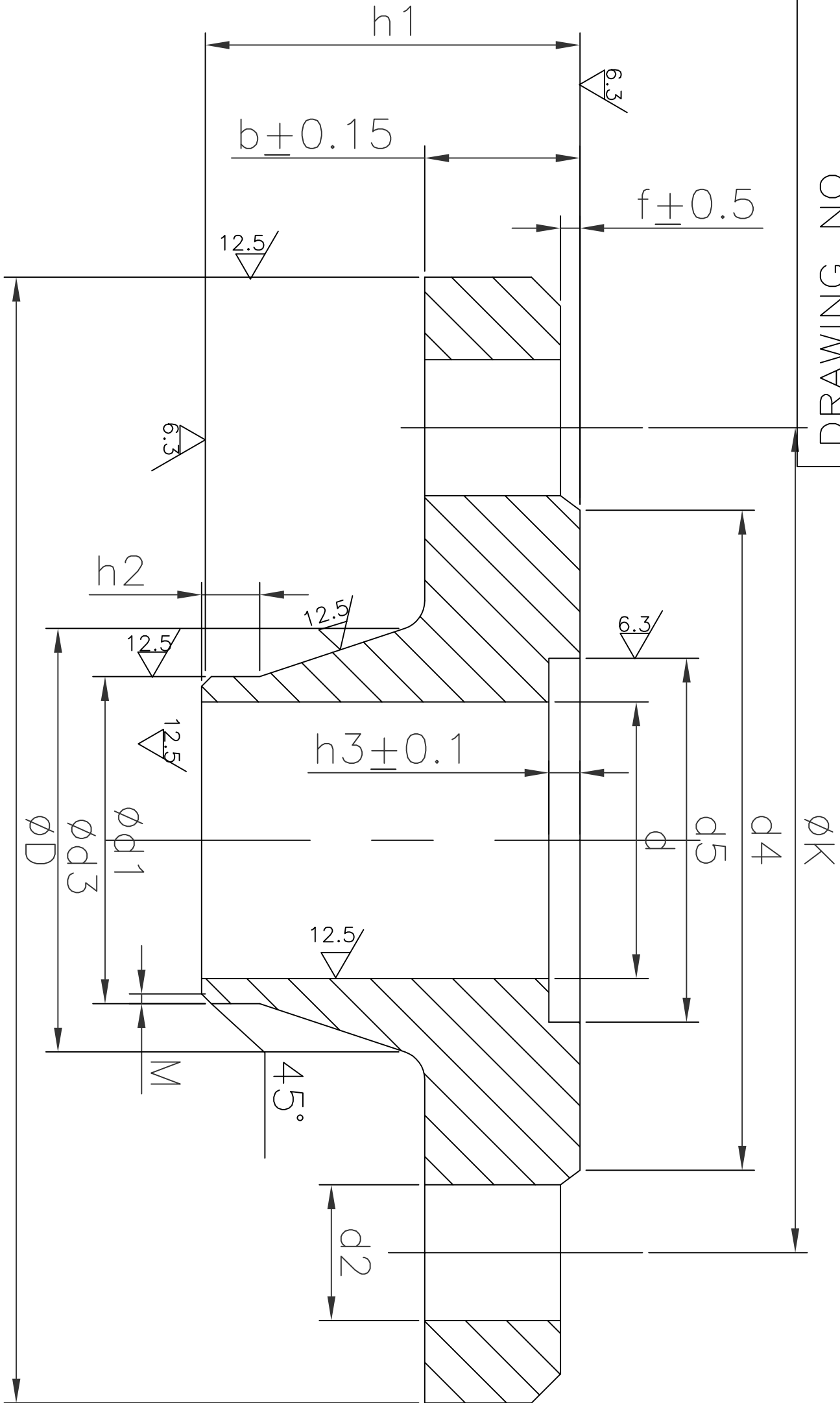
				CBOM NO.		STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT																							
				AGREED DEPT.		NAME		SIGN		DATE		THDF 115/67																			
GRADE OF UNTOL. DIM.:-				बी एच ई एल  BHARAT HEAVY ELECTRICALS LTD. HARDWAR												NAME		SIGN		DATE		NO.OF VAR									
M/CG- ✓/C/M/F AA 0230208														DRN		KUNAL		SD/-		14.12.17											
WELDING-A/B/C/D-AA621104														CHD		MANJU		SD/-		14.12.17											
GAS CUTTING-'T3'AA0621101														APD		RLV		SD/-		14.12.17		73, 74									
REV.		DATE		ALTERED		REV.		DATE		ALTERED		DEPT. TGE				SCALE		WEIGHT(Kg)		REF. TO ASSY. DRG.				ITEM NO.		NO.OF ITEMS					
				CHECKED						CHECKED		CODE 4133				NTS		SEE TABLE		_____						75, 77					
														TITLE						1		3		DRAWING NO.							
														FLANGE										31492501055							
																								SHEET NO. 1						NO.OF SHEETS 1	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

59010236413
ON SIGNWARD



SERRATION ON FLANGE FACE - FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

VAR	D	K	d	d1	d2	d3	d4	d5	h1	h2	h3	f	M	b	N	WEIGHT
															HOLE	(KG)
00	90	60	13.6	17.2	14	28	40	23.5	35	6	2.4	2	2	14	4	0.58
01	165	125	52.3	60.3	18	75	102	65.5	45	8	2.4	3	4	18	4	2.50
02	185	145	68.1	76.1	18	90	122	79.5	45	10	2.4	3	4	18	4	3.02
03	200	160	80.9	88.9	18	105	138	97.5	50	10	3.2	3	4	20	8	3.66
04	220	180	105.3	114.3	18	131	158	122.5	52	12	3.2	3	5	20	8	4.58
05	115	85	28.5	33.7	14	45	68	39.5	38	6	2.4	2	3	16	4	1.13
06	150	110	43.1	48.3	18	64	88	55.5	42	7	2.4	3	-	16	4	1.84
07	235	190	105.3	114.3	18	131	158	122.5	52	12	3.2	3	5	20	8	5.00
08	235	190	105.3	114.3	22	131	158	122.5	52	12	3.2	3	5	20	8	5.00
09	185	145	68.1	76.1	18	90	122	79.5	45	10	2.4	3	4	18	8	3.02
10	270	220	130.7	139.7	26	158	184	138.7	68	14	4	3	5	22	8	9.8
11	285	240	167.4	168.3	22	188	208	175.4	75	14	4	3	5	22	8	11.59

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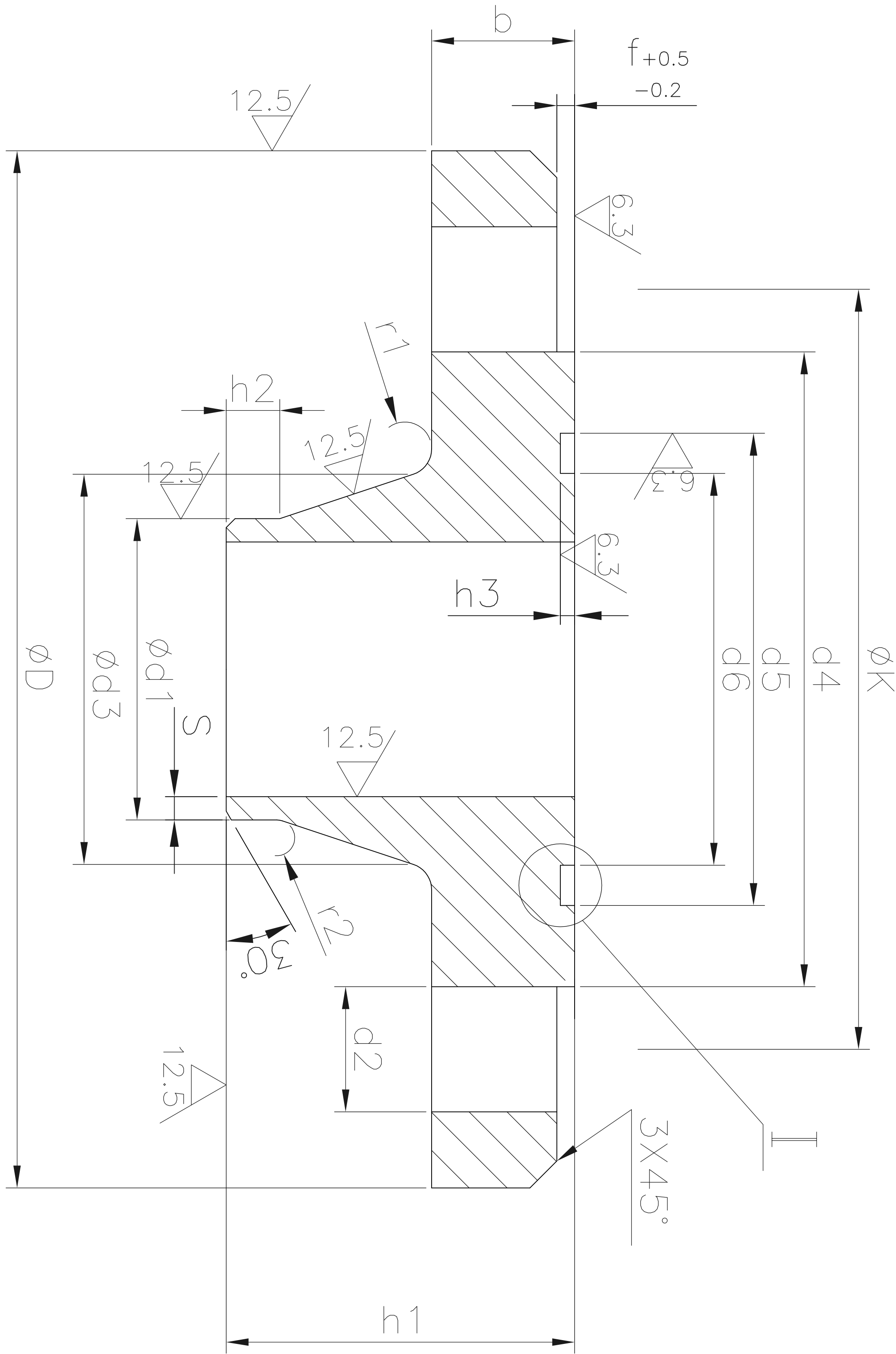
REF. DRG NO.	SIGN & DATE	INVENTORY NO.
--------------	-------------	---------------

CBOM NO. 01493201014		STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE
EMT	S. CHANDRA	SD/-	11/07/2007
WT	CHHABRA	SD/-	17/07/2007
GRADE OF UNTOL. DIM:--			
M/CG- M/C/M/F AA 0230208			
WELDING-X/B/Ø/Ø-AA621104			
GAS CUTTING-T3'AA0621101			
REV.	DATE	ALTERED	AKA2
04	13.11.18	CHECKED	PG
CHANGES DONE AS PER CHANGE ADVICE NUMBER TGE-18-F0247.			
REV.	DATE	ALTERED	AKA2
03	13.02.14	CHECKED	AJ
CHANGES DONE AS PER CHANGE ADVICE NUMBER TGE-14-F0039.			
REV.	DATE	ALTERED	AJ
02	21.05.12	CHECKED	PG
CH. AD. NO. TGE-12-F0174			

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT		TG-HW-0500-2	
BHARAT HEAVY ELECTRICALS LTD.		DRAWING NO. 31493201065	
HARDWAR		SHEET NO. 1	
DEPT. TGE	SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.
CODE 4133	NTS	-	01493201014
TITLE FLANGE		1	3
DRAWING NO. 31493201065		SHEET NO. 1	
NO. OF SHEETS 1		NO. OF SHEETS 1	

SIZE A3

52110-32-641-3
DRAWING NO.

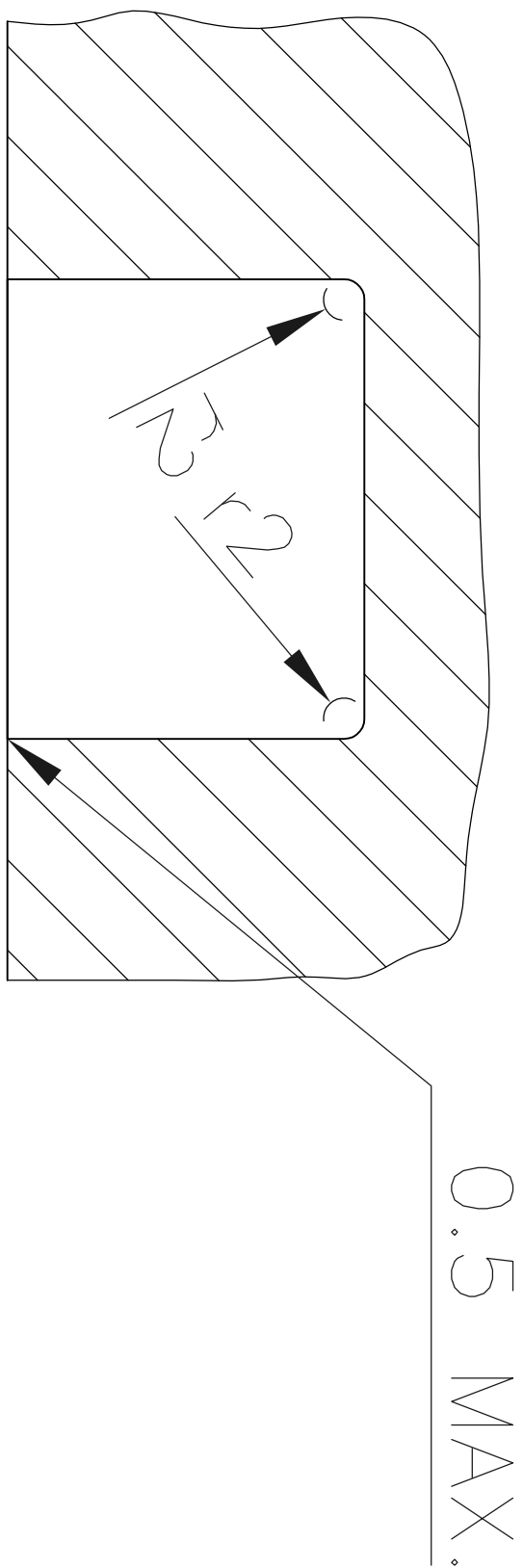


VAR	NB	d1	D	b	K	h1	d3	s	r1	h2	d4	f+0.2 -0.7	N HOLE	d2	d5 ^{+0.3}	d6 ^{+0.4}	h3	r2
00	25	33.7	115	16 ^{+1.3} -1.8	85	38	45	2.6	4	6	68	2	4	13.5	41.3	33.3	1.85 ^{+0.1}	0.6
01	40	48.3	150	16 ^{+1.3} -1.8	110	42	64	2.6	6	7	88	3	4	17.5	59.6	49.6	2.5 ^{+0.2}	1.2
02	50	60.3	165	18 ^{+1.3} -1.8	125	45	75	4	6	8	102	3	4	17.5	69.6	59.6	2.5 ^{+0.2}	1.2
03	65	76.1	185	18 ^{+1.3} -1.8	145	45	90	4	6	10	122	3	4	17.5	86.6	76.6	2.5 ^{+0.2}	1.2
04	80	88.9	200	20 ^{+1.3} -1.8	160	50	105	4	8	10	138	3	8	17.5	96.6	86.6	2.5 ^{+0.2}	1.2
05	20	26.9	105	16 ^{+1.3} -1.8	75	38	40	2.3	4	6	58	2	4	13.5	34.8	26.9	1.85 ^{+0.1}	0.6
06	25	33.7	115	16 ^{+1.3} -1.8	85	38	45	2.6	4	6	68	2	4	13.5	59.1	49.1	2.5 ^{+0.2}	0.6
07	50	60.3	165	18 ^{+1.3} -1.8	125	45	75	4	6	6	102	3	4	18	86.1	76.1	2.5 ^{+0.2}	0.6

12.5/
ALL OVER

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DETAIL-I



TECHNICAL REQUIREMENTS
IDENTIFICATION AS PER HW0400.397

Et1-12219 INVENTORY NO.	19/11/87 SIGN & DATE	KUN673.42(PART-2) REF. DRG NO.
----------------------------	-------------------------	-----------------------------------

CBOM NO. 0-149-32-01003				STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE		
GTX	S.C.GOYAL	sd/-	10.11.87		
WT				B.CHOUDHARY	sd/-
GRADE OF UNTOL. DIM.:-				31.11.87	
M/CG- V/C/M/F AA 0230208					
WELDING-A/B/C/D-AA621104					
GAS CUTTING-T3'AA0621101					
REV.	DATE	ALTERED	CHECKED	REV.	DATE

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				TG-HH-210MW					
BHARAT HEAVY ELECTRICALS LTD. HARDWAR									
				DRN	KB. MUKHERJEE	sd/-	07.03.87	NO.OF VAR.	
				CHD	K.R.G/G.GUPTA	sd/-	06.07.87		
				APD	A.C.C	sd/-	13.11.87	73, 74	
DEPT. TGE		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS		
CODE 4233		N.T.S.	SEE TABLE				75, 77		
TITLE		1		3		DRAWING NO.			
FLANGE		3-149-32-01125							
		7, 22, 23, 24							
		01							
SHEET NO.		NO.OF SHEETS							

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KUN673.41
REF. DRG NO.

25/11/86
SIGN & DATE

Et1-11527
INVENTORY NO.

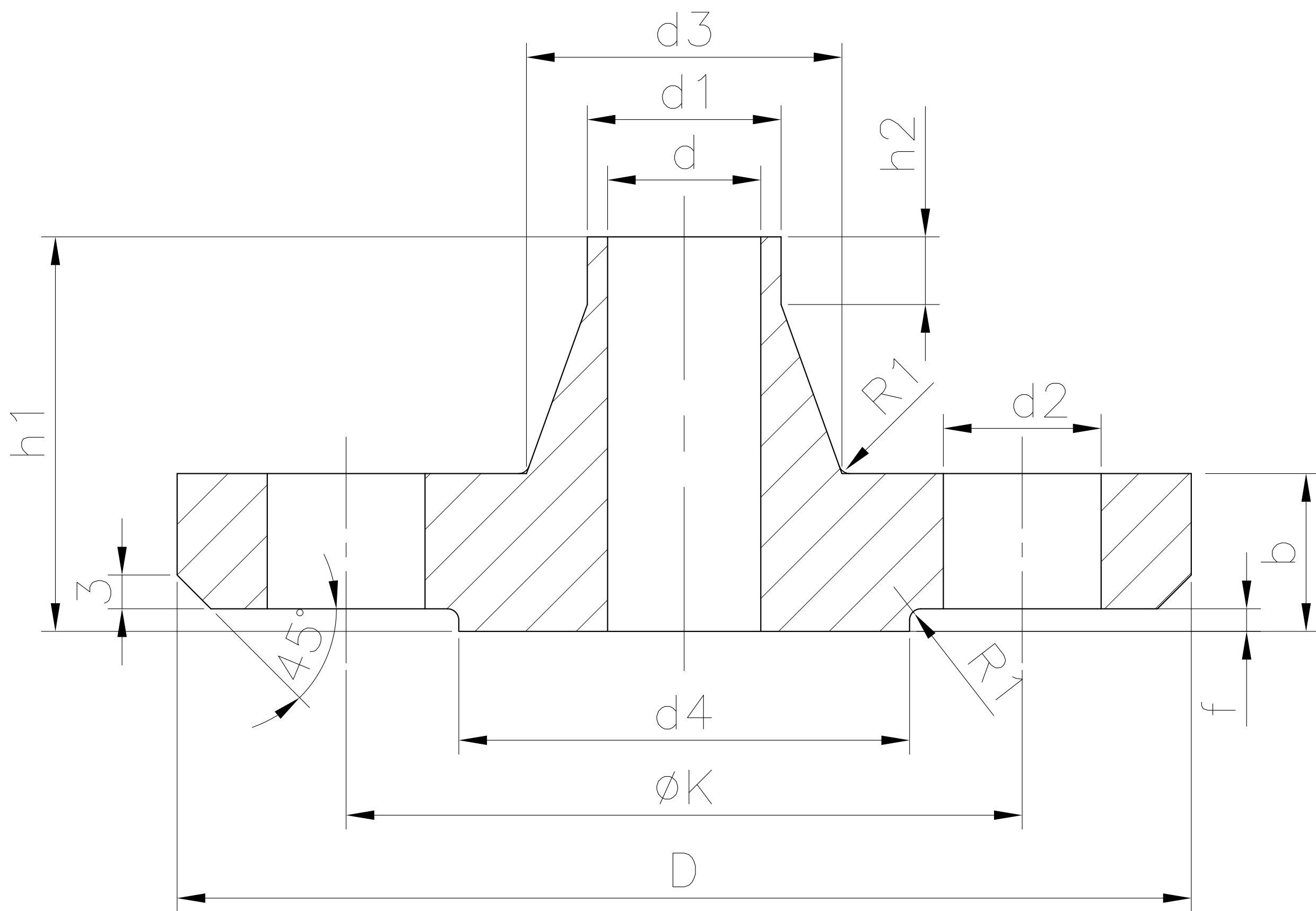
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

00010-00-0913
DRAWING NO.

12.5/
ALL OVER



SERRATION ON FLANGE FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

VAR	D	K	d	d1	d2	d3	d4	h1	h2	f	b	N HOLES
00	90	60	13.6	17.2	14	28	40	35	6	2	14	4
01	95	65	19.3	21.3	14	32	45	35	6	2	14	4
02	115	85	28.5	33.7	14	45	68	38	6	2	16	4
03	150	110	43.1	48.3	18	64	88	42	7	3	16	4
04	165	125	52.3	60.3	18	75	102	45	8	3	18	4
05	200	160	80.9	88.9	18	105	138	50	10	3	20	8
06	220	180	106.3	114.3	18	131	158	52	12	3	20	8
07	185	145	68.1	76.1	18	90	122	45	10	3	18	4
08	340	295	206.5	219.1	23	235	268	62	16	3	24	12

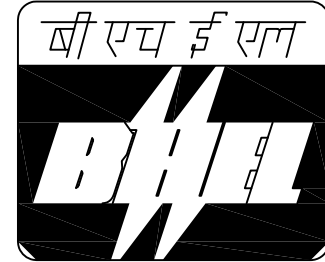
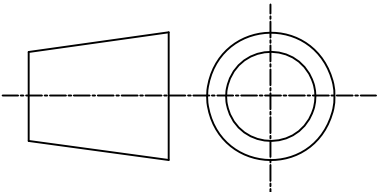
		009	FLANGE	3-150-00-01000		08	MATERIAL AS PER BOM			6.200
		008	FLANGE	3-150-00-01000		07				3.060
		007	FLANGE	3-150-00-01000		06				5.880
		006	FLANGE	3-150-00-01000		05				3.700
		005	FLANGE	3-150-00-01000		04				2.530
		004	FLANGE	3-150-00-01000		03				1.840
		003	FLANGE	3-150-00-01000		02				1.130
		002	FLANGE	3-150-00-01000		01				0.630
		001	FLANGE	3-150-00-01000		00				0.580
VAR	REMARKS	ITEM NO.	DECRPTION	DRAWING	STD	VAR	MATERIAL CODE	A	UNIT WEIGHT	
							MATERIAL SPEC.	C		

CBOM NO. 0-150-00-01090		STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE
GTX	S.C.GOYAL	sd/-	29.10.86
W.T	S.C.C	sd/-	29.11.86

GRADE OF UNTOL. DIM.:—		
M/CG- X/C/M/F AA 0230208		
WELDING-A/B/C/D-AA621104		
GAS CUTTING-'T3'AA0621101		

REV.	DATE	ALTERED CHECKED

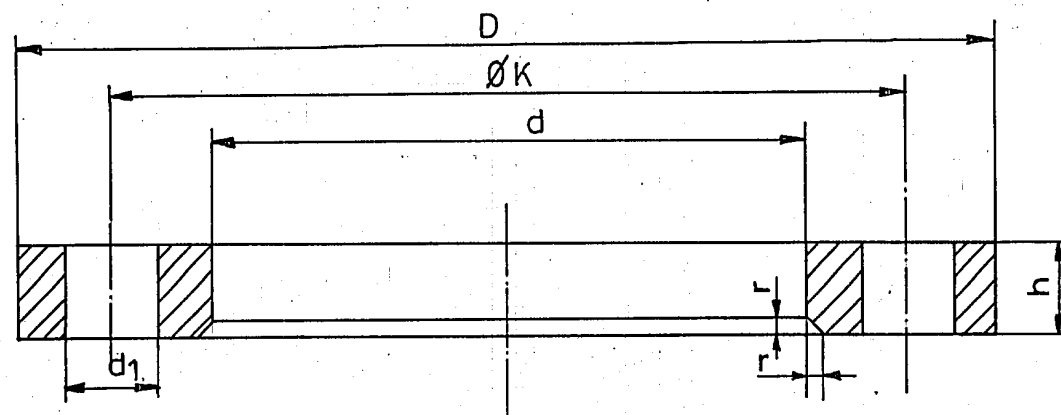
REV.	DATE	ALTERED CHECKED

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT		TG-HW-0500-2				
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR		DRN	NAME	SIGN	DATE	NO.OF VAR.
		CHD	K B MUKHER JEE	sd/-	17.7.86	
		APD	KRG/G.G	sd/-	17.7.86	
			A.C.C.	sd/-	17.11.86	73, 74
DEPT. EME		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
CODE 4133		N.T.S	SEE TABLE			75, 77
TITLE			1	3	DRAWING NO. 3-150-00-01000	
					22 23 24	
			SHEET NO. 1		NO.OF SHEETS 1	

SIZE A3

3-150-00-01044

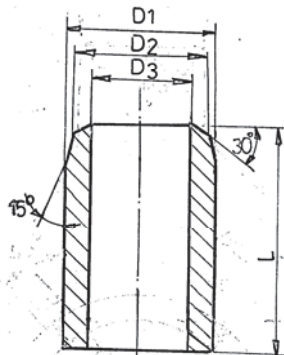
DRAWING NO.

12.5/
ALL OVER

VAR.	D	ØK	d	d ₁	r	NO. OF HOLES	h	Nb
00	115	85	48	14	3	4	18	25
01	150	110	66	18	3	4	18	40
02	235	190	135	22	3	8	22	100
03	270	220	164	26	4	8	26	125
04	165	125	78	18	3	4	20	50
05	95	65	34	14	3	4	16	15

		006	FLANGE	3-150-00-01044	05	AA1041801122		0.960
		005	FLANGE	3-150-00-01044	04	AA1041801149		2.580
		004	FLANGE	3-150-00-01044	03	AA1041801165		6.450
		003	FLANGE	3-150-00-01044	02	AA1041801157		4.770
		002	FLANGE	3-150-00-01044	01	AA1041801130		1.970
		001	FLANGE	3-150-00-01044	00	AA1041801130		1.190
VAR. 00	REMARKS	KEY NO.	DESCRIPTION	NO.	29 31	MATERIAL CODE	55 57	UNIT WT. (Kg.)
59	64 65	75 25 27 29	58	60	77	32 33 46	54	66 71
CARD TYPE-3			CARD TYPE-1			CARD TYPE-2		

GMS/GR. SP. NO. 0-150-00-01090		STATUS OF DRG.		TYPE OF PRODUCT IG-HW-0500-2		OR		NAME OF CUSTOMER/PROJECT		M F	
AGREED DEPT.	NAME	SIGN.	DATE	DRN.		NAME	SIGN.	DATE	NO. OF VAR.		
GTX	S.C. GOYAL	[Signature]	29/11/86	CHD.		G. GUPTA	[Signature]	27.86	73 74		
w.T. she				APPD.		A.C.C. WLA	[Signature]	17.11.86	75 77		
REV	DATE	ALTERED	DEPT. TGE	GRADE OF UNTO DIM	SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG	ITEM NO.	NO. OF ITEMS		
		CHECKED	CODE 4233	C/M/F	N.T.S.	SEE TABLE					
TITLE FLANGE				CARD CODE		DRAWING NO. 3-150-00-01044		REV.			
						SHEET NO. 1		NO. OF SHEETS:- 1			

06110-00-051-3
DRAWING NO.12.5/
ALL OVER
EXCEPT OTHER
WISE STATED

03	50	25	012	36.5	33.7	28.5	011	MATERIAL	-0142
03	100	50	011	60.3	52.3	10	09	AS PER BOM	-0560
03	50	15	010	25.3	21.3	16.7	08		0100
04	50	25	009	36.5	33.7	28.5	07		0142
03	50	20	008	30.5	26.9	21.7	06		0115
	50	8	007	17.5	13.5	8.3	05		0060
03	50	15	006	25.3	21.3	16.7	04		-0100
03	50	20	005	30.5	26.9	21.7	03		-0115
	50	20	004	30.5	26.9	21.7	02		0115
	50	15	003	25.3	21.3	16.7	01		0100
	100	50	002	60.3	52.3		00		0560
	50	10	001	21.2	17.2	13.6			0080
L	N B	SL No.		Ø D1	Ø D2	Ø D3			
59	64	65	75	25	27	29	58		
CARD TYPE-3				CARD TYPE-1			CARD TYPE-2		
29	31	34	45	55	58	65	71	72	
VAR	MATERIAL SPECN.	UNIT WEIGHT							
32	33	46	54	56	57	66	71	72	

NOTE:

WELDING TO BE DONE AT SITE

REV	DATE	ALTERED P.A.B.
05	4.9.99	CHECKED R.L.V.

CH. ADVICE No.
TGE-99-327

GMS No./GR-SP. No.
01500001125

STATUS OF DRG
23179

TYPE OF PRODUCT OR **NUCLEAR POWER CORPORATION (500 MW)**

NAME OF CUSTOMER/PROJECT **TARAPUR ATOMIC POWER PROJECT-4**

BHARAT HEAVY ELECTRICALS LTD.
HARDWARE

DRN.	NAME	SIGN.	DATE	No. OF VAR
CHD	K.R.G.		13.1.92	
APPD	G.M.K.		10.9.92	73, 74

DEPT	TGE
CODE	2033



SCALE
N.T.S

WEIGHT (KG)
SEE TABLE

REF. TO ASSY. DRG.
0-150-00-01125

ITEM No.	No. OF ITEMS
75	77

CONNECTION

CARD CODE
3

DRAWING No.	REV
3-150-00-01190	22, 23, 24

SHEET No.	No. OF SHEETS
01	01

REV	DATE	ALTERED KBM
04	10.1.97	CHECKED KRG
VAR. 08 ADDED		
CH. AD. NO. TGE-97-04		

GRADE OF UNTOL. DIM:-
MCG. :- C/M/F/ AA 023 0208
WELDING :- 'T1' O 610.003
GAS CUTTING :- 'T3' AA 0621101

REV	DATE	ALTERED KBM
03	11.9.96	CHECKED KRG

CH. AD. NO. TGE-96-325

REV	DATE	ALTERED KBM
02	30.5.96	CHECKED R.L.V.

CH. AD. NO. TGE-96-161

REV	DATE	ALTERED KBM
01	18.11.95	CHECKED KRG

CH. AD. NO. TGE-95-445

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REF. DRG NO.

SIGN & DATE

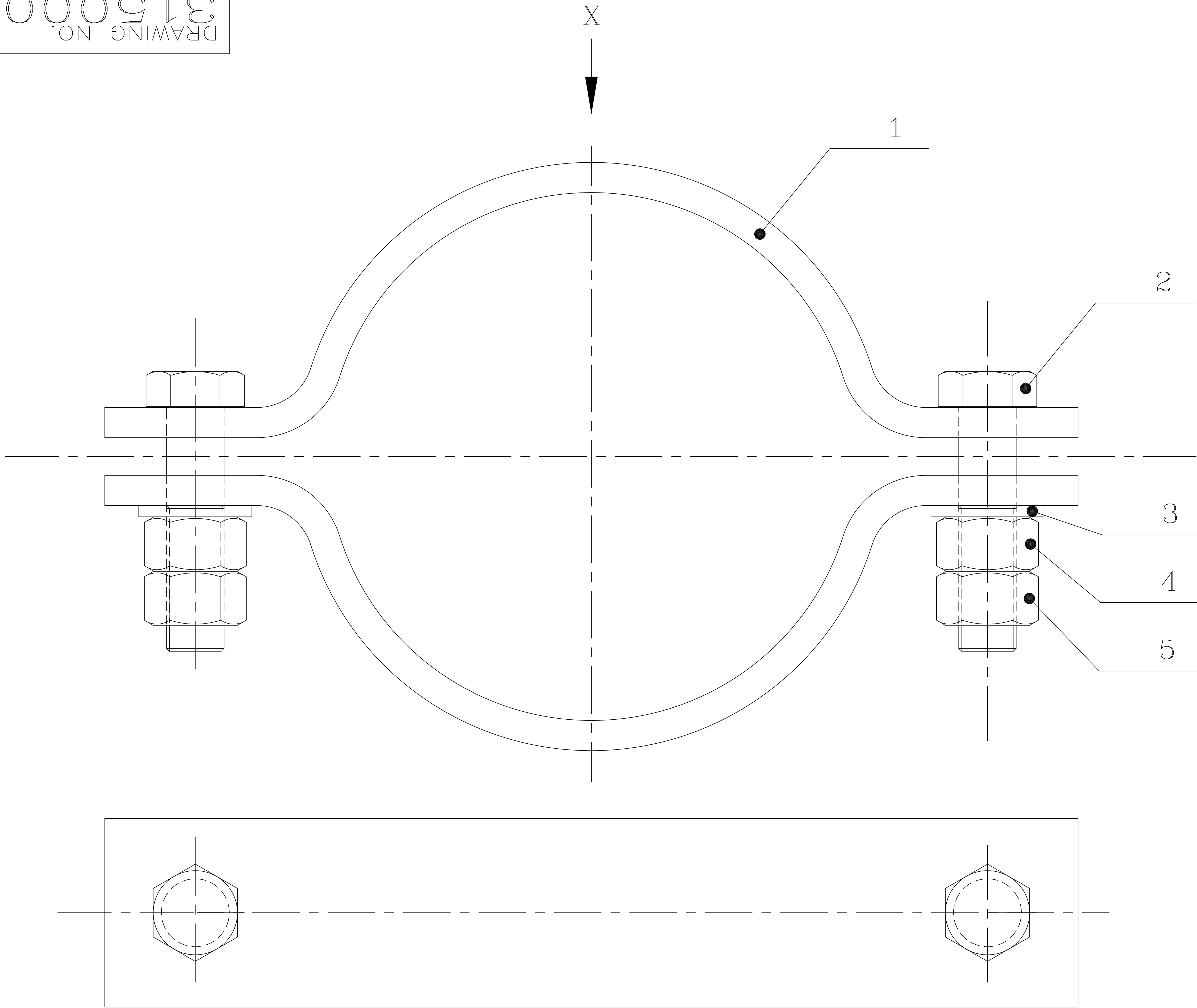
INVENTORY NO.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31500001237
DRAWING NO.



VAR	SIZE(NB)	WT.(Kg)	PART DRG FOR ITEM NO.1
00	125	2.15	31500001238,VAR00
01	150	2.40	31500001238,VAR01

VIEW-X

GRADE OF UNTOL. DIM.:—			CBOM NO. 31500001237		STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT						THDF 115/67										
M/CG— V/C/M/F AA 0230208—			AGREED DEPT.		NAME		SIGN		DATE		DRN		NAME		SIGN		DATE		NO.OF VAR.				
WELDING—A/B/C/D—AA621104—			EMT		AEMTAKG		AEMTAKG		30-10-2013				CHD		STGEPG		STGEPG		26-10-2013				
GAS CUTTING—'T3'AA0621101—													APD		ATGEAKM		ATGEAKM		27-12-2013				
REV.		DATE		ALTERED CHECKED		REV.		DATE		ALTERED CHECKED		DEPT. TGE		SCALE		WEIGHT(Kg.)		REF. TO ASSY. DRG.		ITEM NO.		NO.OF ITEMS	
												CODE 4133		05-01		8251400001009		21		75, 77			
												TITLE PIPE CLAMP ASSEMBLY						DRAWING NO. 31500001237					
																		SHEET NO.1		NO.OF SHEETS 1			

SIZE A3

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REF. DRG NO.

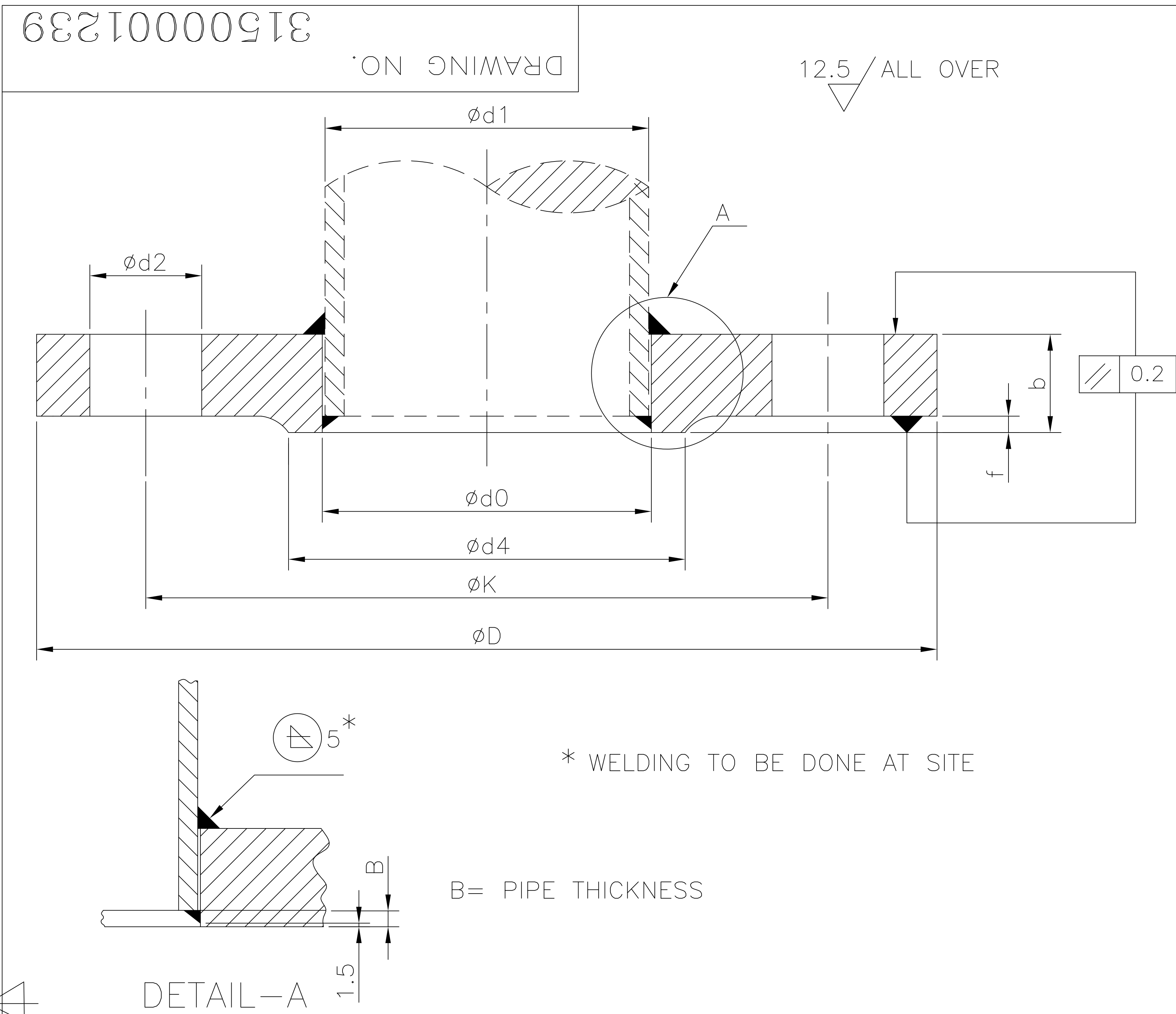
SIGN & DATE

INVENTORY NO.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)



VARIANT	NOM. SIZE (NB)	CONNEC- TING PIPE O.D.	FLANGE DIMENSIONS									BOLTING DETAILS					Wt/ PIECE IN kg
			d0		D		b		RAISED FACE			BOLT SIZE	HOLES		K		
			NOM.	TOL.	NOM.	TOL.	NOM.	TOL.	d4		f						
									NOM.	TOL.							
01	10	17.2	17.7	+0.5 +0.0	90	±1	14	+3 -0	40	+0.0 -1.0	2	M12	4	14	60	0.53	
02	15	21.3	21.8		95		14		45		2	M12	4	14	65	0.59	
03	20	26.9	27.4		105		16		58		2	M12	4	14	75	0.73	
04	25	33.7	34.2		115		16		68		2	M12	4	14	85	1.02	
05	32	42.4	42.9		140		16		78		2	M16	4	18	100	1.47	
06	40	48.3	48.8		150		16		88		3	M16	4	18	110	1.77	
07	50	60.3	60.8		165		18		102		3	M16	4	18	125	2.18	
08	65	76.1	76.6		185		18		122		3	M16	4	18	145	2.67	
09	80	88.9	89.9		200		20		138		3	M16	8	18	160	3.28	
10	100	114.3	115.3	+1.0 +0.0	220	±1.5	20	158	+0.0 -2.0	3	M16	8	18	180	3.62		
11	125	139.7	140.7		250		22	188		3	M16	8	18	210	4.99		
12	150	168.3	169.3		285		22	212		3	M20	8	22	240	6		
13	175	193.7	194.7		315	24	242	3		M20	8	22	270	7.82			
14	200	219.1	221.1		340	24	268	3		M20	12	22	295	8.31			
15	250	273	275		405	26	320	3		M24	12	26	355	11.9			
16	300	323.9	325.9		460	28	378	4		M24	12	26	410	14.7			
17	350	355.6	357.6		520	32	438	4	M24	16	26	470	24.3				
18	125	139.7	140.7		+1.5	270	22	188	3	M24	8	26	220	5.0			
19	100	114.3	115.3			235	24	162	3	M20	8	22	190	3.8			

TECHNICAL REQUIREMENTS

1. RIMS SHALL BE TURNED OR BURRS SHALL BE REMOVED ALONG WITH MACHINING OF CENTER HOLE. ALL BOLT HOLES SHALL BE DRILLED, EQUALLY SPACED ON THE PITCH CIRCLE DIAMETER AND SPOT FACED.
2. MATERIAL : CARBON STEEL AS PER IS-2062E250BR.
3. PRESERVATION : BEFORE DESPATCH, THE FLANGES SHALL BE DRIED AND CLEANED, AND THE ENTIRE SURFACE SHALL BE WELL COVERED WITH GOOD QUALITY RUST PREVENTIVE MATERIAL THAT WILL NOT BECOME FLUID AND RUN OFF AT 65 °C.
4. SERRATION ON FLANGE FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

CBOM NO.				STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE		
GRADE OF UNTOL. DIM.:—					
M/CG- X/Ø/M/Ø AA 0230208					
WELDING A/B/C/D AA621104-					
GAS CUTTING-'T3'AA0621101					
REV.	DATE	ALTERED CHECKED	REV.	DATE	ALTERED KM CHECKED MA
			01	15.12.17	
			1. VARIANT 19 IS ADDED. 2. TR NO. 4 IS ADDED.		

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT

THDF 115/67

DRN

CHD

APD

BHARAT HEAVY ELECTRICALS LTD.

HARDWAR

NAME

SIGN

DATE

ALOK AGARWAL

SD/-

25.03.14

KUNAL MISHRA

SD/-

25.03.14

RAKESH KUMAR

SD/-

25.03.14

NO.OF VAR.

73, 74

75, 77

DEPT. TGE

CODE 4133

TITLE

FLANGE PN16
(CARBON STEEL)

SCALE

NTS

WEIGHT(Kg.)

SEE TABLE

REF. TO ASSY. DRG.

ITEM NO.

DRAWING NO.

315000001239

SHEET NO.

1

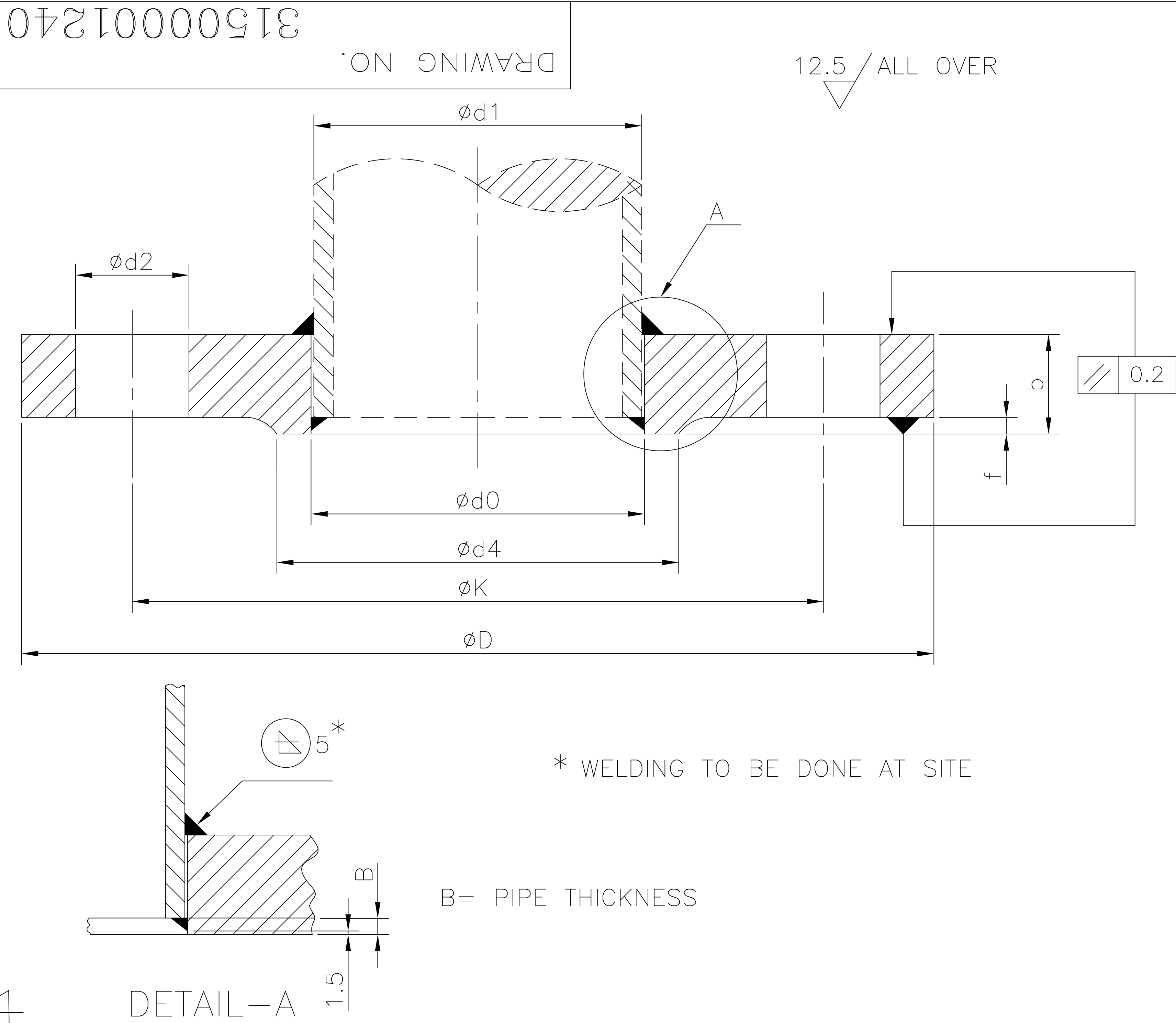
NO.OF SHEETS

1

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)



VARIANT	NOM. SIZE (NB)	CONNEC- TING PIPE O.D.	FLANGE DIMENSIONS								BOLTING DETAILS						Wt/ PIECE IN kg
			d0		D		b		RAISED FACE			BOLT SIZE	HOLES		K		
			NOM.	TOL.	NOM.	TOL.	NOM.	TOL.	d4		f						
									NOM.	TOL.			NO	d2			
01	10	17.2	17.7	+0.5 +0.0	90	±1	14	+3 -0	40	+0.0 -1.0	2	M12	4	14	60	0.53	
02	15	21.3	21.8		95		14		45		2	M12	4	14	65	0.59	
03	20	26.9	27.4		105		16		58		2	M12	4	14	75	0.73	
04	25	33.7	34.2		115		16		68		2	M12	4	14	85	1.02	
05	32	42.4	42.9		140		16		78		2	M16	4	18	100	1.47	
06	40	48.3	48.8		150		16		88		3	M16	4	18	110	1.77	
07	50	60.3	60.8		165		18		102		3	M16	4	18	125	2.18	
08	65	76.1	76.6		185		18		122		3	M16	4	18	145	2.67	
09	80	88.9	89.9	200	20	138	3	M16	8	18	160	3.28					
10	100	114.3	115.3	+1.0 +0.0	220	±1.5	20	+3 -0	158	+0.0 -2.0	3	M16	8	18	180	3.62	
11	125	139.7	140.7		250		22		188		3	M16	8	18	210	4.99	
12	150	168.3	169.3		285		22		212		3	M20	8	22	240	6	
13	175	193.7	194.7		315	24	242		3		M20	8	22	270	7.82		
14	200	219.1	221.1		340	±2.0	24		268		3	M20	12	22	295	8.31	
15	250	273	275		405	26	320		3		M24	12	26	355	11.9		
16	300	323.9	325.9		460	28	378		4		M24	12	26	410	14.7		
17	350	355.6	357.6		520	32	438		+0.0 -3.0		4	M24	16	26	470	24.3	
18	125	139.7	140.7		270	±1.5	22		188		+0.0 -2.0	3	M24	8	26	220	5.0
19	100	114.3	115.3	235	±1.5	24	162	+0.0 -2.0	3	M20	8	22	190	3.8			

TECHNICAL REQUIREMENTS

- RIMS SHALL BE TURNED OR BURRS SHALL BE REMOVED ALONG WITH MACHINING OF CENTER HOLE. ALL BOLT HOLES SHALL BE DRILLED, EQUALLY SPACED ON THE PITCH CIRCLE DIAMETER AND SPOT FACED.
- MATERIAL : STAINLESS STEEL AS PER ASTM A182 F321.
- PRESERVATION : BEFORE DESPATCH, THE FLANGES SHALL BE DRIED AND CLEANED, AND THE ENTIRE SURFACE SHALL BE WELL COVERED WITH GOOD QUALITY RUST PREVENTIVE MATERIAL THAT WILL NOT BECOME FLUID AND RUN OFF AT 65 °C.
- SERRATION ON FLANGE FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

CBOM NO.				STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE		
GRADE OF UNTOL. DIM.:—					
M/CG- X/Ø/M/Ø AA 0230208					
WELDING A/B/C/D AA621104-					
GAS CUTTING-’T3’AA0621101					
REV.	DATE	ALTERED CHECKED	REV.	DATE	ALTERED KM CHECKED MA
			01	15.12.17	
			1. VARIANT 19 IS ADDED. 2. TR NO. 4 IS ADDED.		

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT

THDF 115/67

DRN

CHD

APD

BHARAT HEAVY ELECTRICALS LTD.

HARDWAR

NAME

SIGN

DATE

ALOK AGARWAL

SD/-

25.03.14

KUNAL MISHRA

SD/-

25.03.14

RAKESH KUMAR

SD/-

25.03.14

DEPT. TGE

CODE 4133

TITLE

SCALE

NTS

FLANGE (STAINLESS STEEL)

WEIGHT(Kg.)

SEE TABLE

1 3

REF. TO ASSY. DRG.

ITEM NO.

NO.OF ITEMS

73 74

75 77

DRAWING NO.

31500001240

7 22 23 24

SHEET NO.

1

NO.OF SHEETS

1

SIZE A3

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REF. DRG NO.

SIGN & DATE

INVENTORY NO.

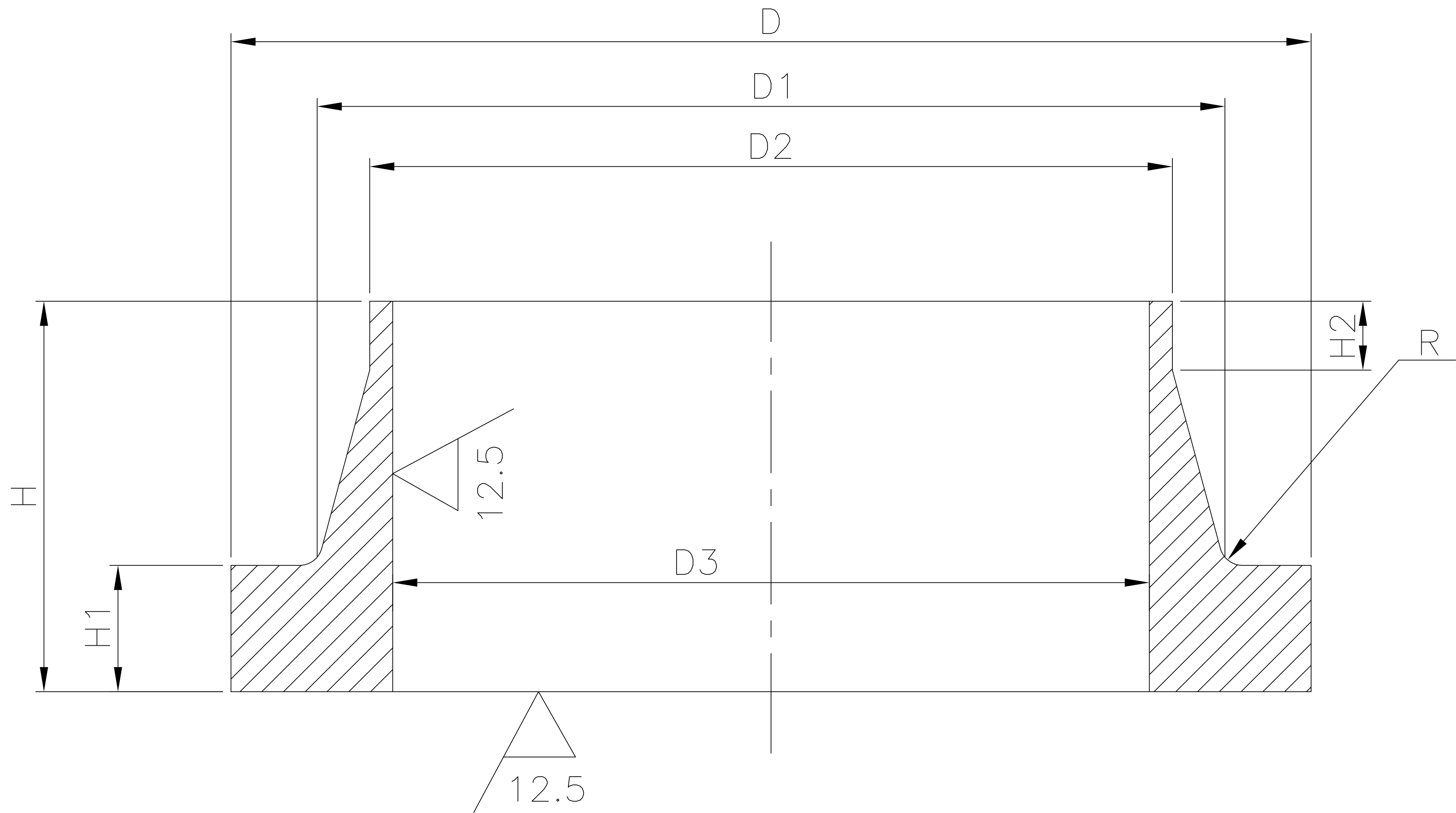
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31500601115
DRAWING NO.

25/
THE REST

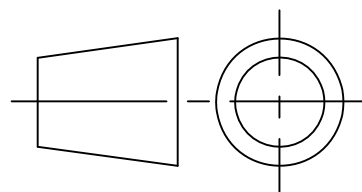


VAR	DN	DIMENSIONS								REF. TO ASSEMBLY	
		D	D1	D2	H	H1	H2	R	D3	ITEM NO.	DRAWING NO.
00	125	188	158	139.7	68	22	12	4	131.7	001	3-150-06-01094

TECHNICAL REQUIREMENTS

- MARK IDENTIFICATION ACCORDING TO HW 0400.397
- EDGE PREPARATION AND WELDING TO BE DONE AS PER HW 0620.599
- SERRATION ON NECK FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

CBOM NO.			STATUS OF DRG.	
01500601006				
AGREED DEPT.	NAME	SIGN	DATE	
GRADE OF UNTOL. DIM.:—				
M/CG- V/C/M/F AA 0230208				
WELDING-A/B/C/D-AA621104				
GAS CUTTING-'T3'AA0621101				
REV.	DATE	ALTERED CHECKED	REV.	DATE

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT					THDF 115/67				
बी एच ई एल  BHARAT HEAVY ELECTRICALS LTD. HARDWAR						NAME	SIGN	DATE	NO.OF VAR.
					DRN	STGEKBM	STGEKBM	06/03/2010	
					CHD	STGENV	STGENV	06/03/2010	
					APD				
DEPT. TGE			SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS	
CODE 4133			1:1	2.4	SEE TABLE		SEE TABLE		
TITLE				1	3	DRAWING NO.		NO.OF SHEETS	
NECK PN25						31500601115			
				SHEET NO.1		NO.OF SHEETS 1			

SIZE A3

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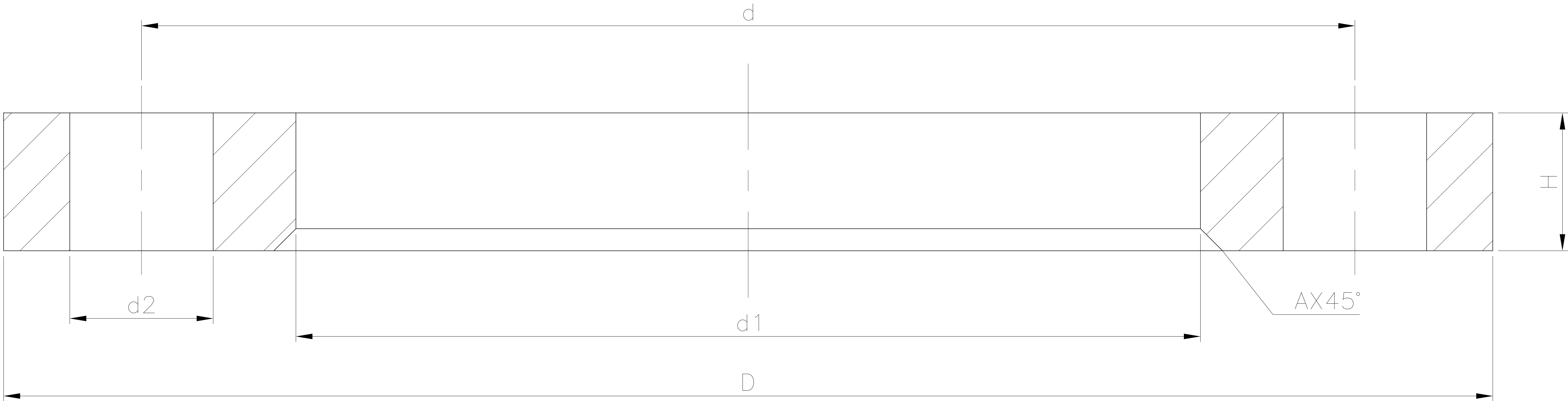
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

DRAWING NO. 31530201018

6.3 ALL OVER



VAR	DIN	DIMENSIONS						NO.OF HOLES	REF.TO ASSY.	
		D	d	d1	d2	H	A		ITEM NO.	DRAWING NO
00	125	270	220	164	26	25	4	8	005	11530201002

TECHNICAL REQUIREMENTS

- MARK IDENTIFICATION ACCORDING TO HW 0400.397.
- THERE SHOULD BE NO TOOL MARK OR PITTING (PARTICULARLY I.D) ON THESE FLANGES. ALSO AT ALL CORNERS A CHAMFER OF 1X45° TO BE SHOWN.

INVENTORY NO.	SIGN & DATE	REF. DRG NO.	CBOM NO. 01530201000				STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT												
			AGREED DEPT.	NAME	SIGN	DATE	GRADE OF UNTOL. DIM.:— M/CG— X/C/M/F AA 0230208 WELDING— A/B/C/D AA621104— GAS CUTTING—'T3'AA0621101			बी एच ई एल BH BHARAT HEAVY ELECTRICALS LTD. HARDWAR	DRN	NAME	SIGN	DATE	NO.OF VAR.						
			WT	CHHABRA	Sd/—	4/4					CHD	MAH/PCC	sd/—	20.12.80							
			REV.	DATE	ALTERED	REV.	DATE	ALTERED JC	sd/—		APD	KNW/N.P.G	sd/—	15.4.81							
CHANGE DONE AS PER CHANGE ADVICE NO. TGE-16-F0344.			CHECKED	DAJ	sd/—	05	14.10.16	CHECKED	sd/—	DEPT. 4133		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO. SEE TABLE	NO.OF ITEMS				
			SEE TABLE			CODE EME		1:1				—	SEE TABLE								
			DRAWING NO. 31530201018			TITLE FLANGE PN25		1 3		DRAWING NO. 31530201018		7 22 23 24		75 77							
SHEET NO. 01			NO.OF SHEETS 01			SIZE A3															

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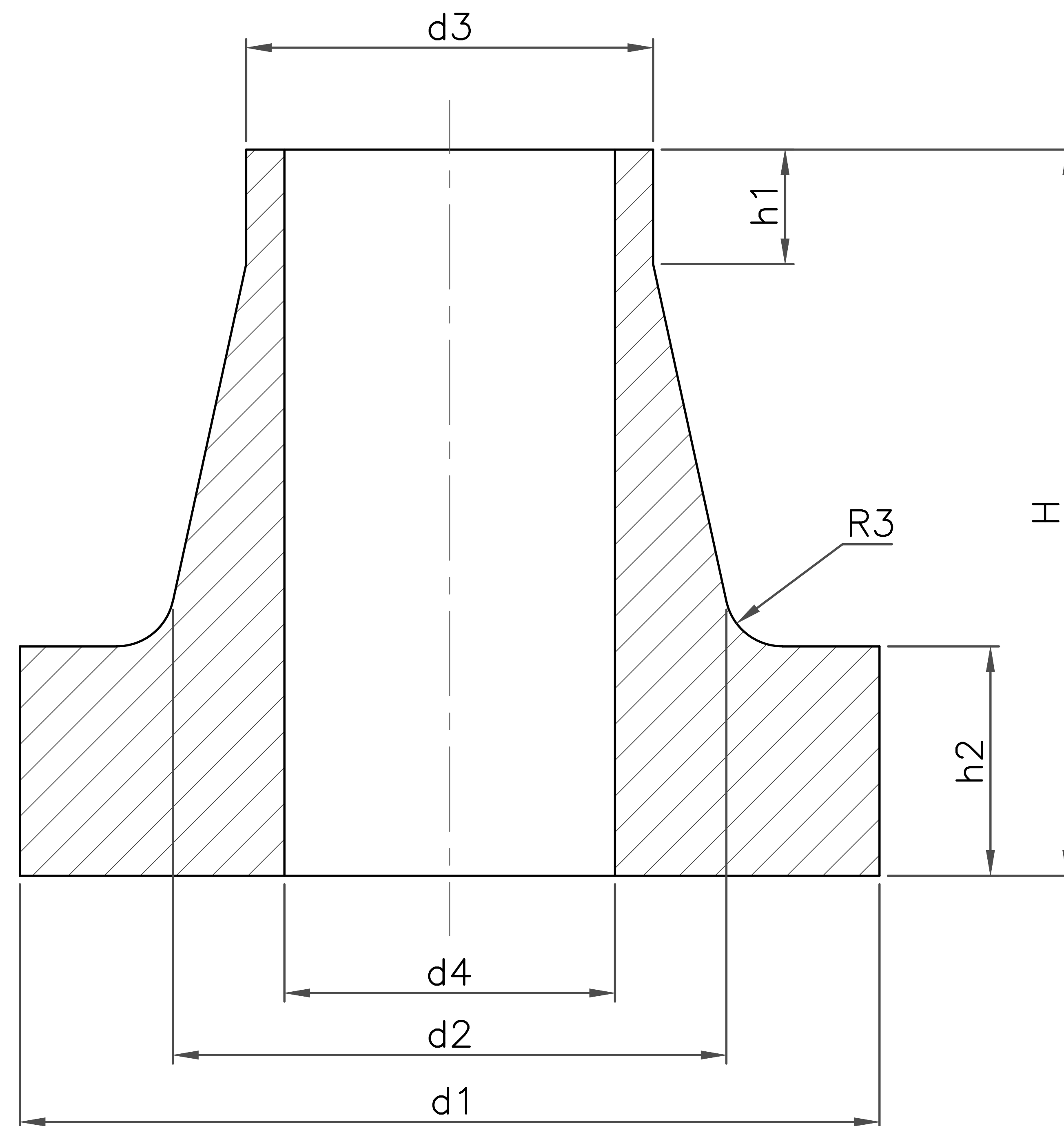
KUN 673.33

SIGN & DATE

INVENTORY NO.

DRAWING NO. 3-153-14-01021

12.5/
▽ ALL OVER

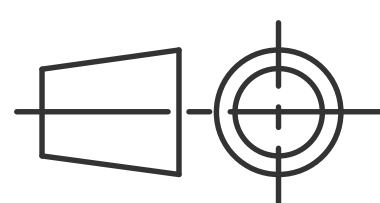


VAR.	NB	d1	d2	d3	d4	h1	h2	H
00	15	45	30	21.3	17.3	6	12	38
01	25	68	43	33.7	28.5	6	14	40
02	65	122	90	76.1	70.3	10	16	52
03	40	88	62	48.3	43.1	7	14	45
04	50	102	78	60.3	54.5	8	16	48
05	80	138	110	88.9	82.5	12	18	58

TECH. REQUIREMENTS

1. EDGE PREPARATION AS PER PS 0620.599
2. MATERIAL OF THE NECK SHALL BE STAINLESS STEEL AS PER BHEL CORPORATE STD. NO. AA10725
3. MATERIAL TEST CERTIFICATES SHALL BE SUPPLIED.
4. SERRATION ON NECK FACE — FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION

SUPERSEDES OLD DRAWING UNDER
THE SAME NUMBER.

				CBOM NO. 0-153-14-01001		STATUS OF DRG. U	TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				TG-HW-0500-2									
GRADE OF UNTOL. DIM.:—				AGREED DEPT.	NAME	SIGN	DATE													
M/CG- V/C/M/F AA 0230208				EMT	S.C. GOYAL	sd/-	22.2.83													
WELDING-A/B/C/D-AA0621104										BHARAT HEAVY ELECTRICALS LTD.			NAME	SIGN	DATE	NO.OF VAR.				
GAS CUTTING-'T3'AA0621101										DRN	KB MUKHERJEE	sd/-								
REV. DATE ALTERED AKA2 sd/-								CHD	S.N/G.G	sd/-	15.02.83									
06 17.05.16 CHECKED AJ sd/-				APD	D.R.C/N.P.G	sd/-	12.05.83									73, 74				
REV.	DATE	ALTERED AKA2	sd/-	REV.	DATE	ALTERED K.B.M.	sd/-	DEPT. EME		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS					
06	17.05.16	CHECKED AJ	sd/-	05	27.08.09	CHECKED R.L.V.	sd/-	CODE 4233		N.T.S.	—	0-153-14-01001		053	—					
CHANGE ADVICE NO. TGE-16-F0177.				SUPERSEDES OLD DRAWING UNDER THE THE SAME NUMBER CHANGE ADVICE NO. TGE-09-F0228				TITLE				1	3	DRAWING NO.						
								NECK PN40						3-153-14-01021						
												7						22	23	24
												SHEET NO. 1		NO.OF SHEETS 1						

SIZE A3

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REF. DRG NO.

SIGN & DATE

INVENTORY NO.

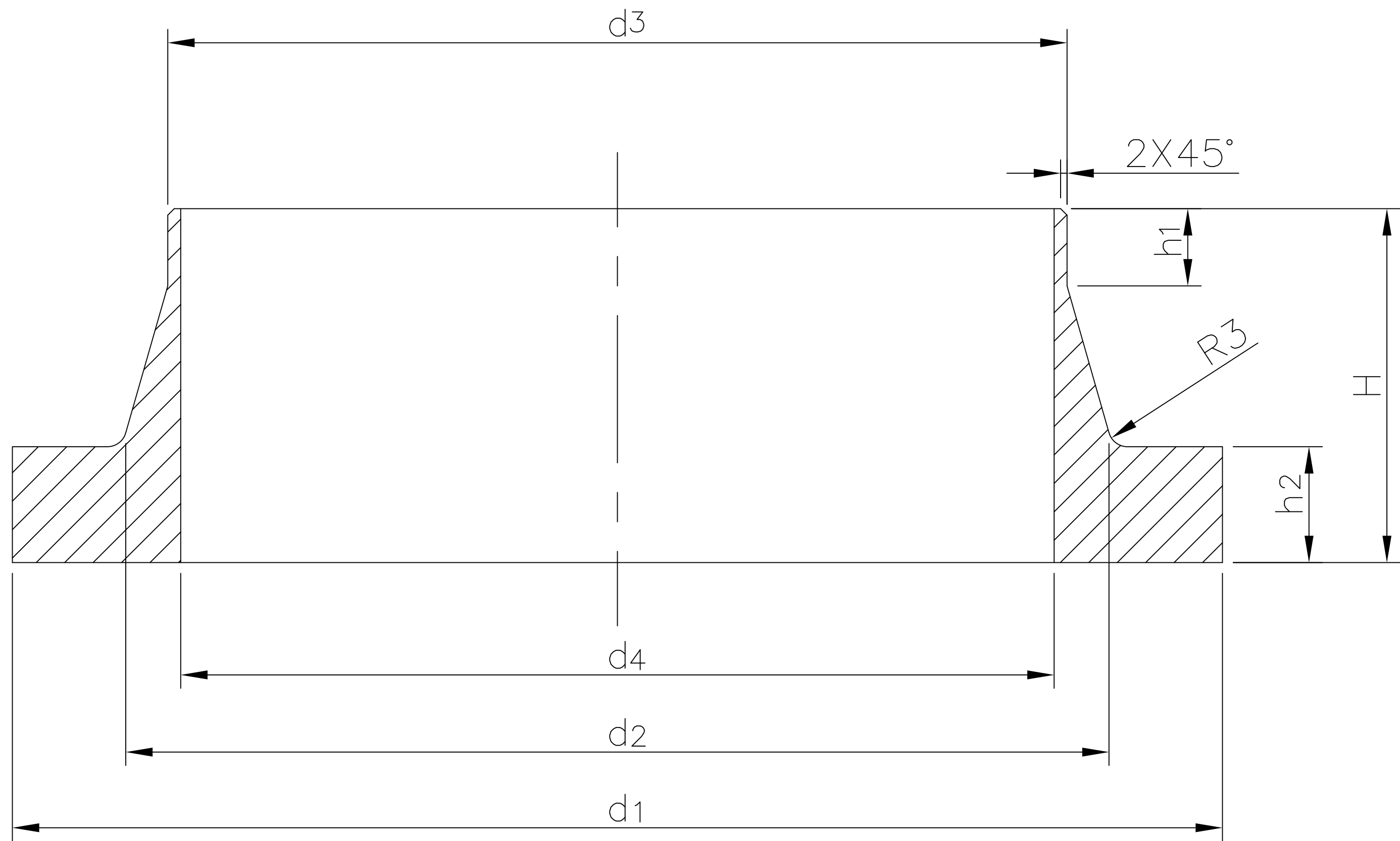
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31531401088
DRAWING NO.

12.5/
ALL OVER

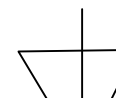


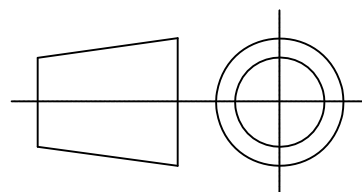
REF.ASSLY	ITEM	VAR.	NB	d1	d2	d3	d4	h1	h2	H	WT.
31531401076	01	00	125	188	158	139.7	131.7	12	22	68	3.95
31531401071	01	01	150	218	188	168.3	159.3	12	22	75	5.20

TECHNICAL REQUIREMENTS

- EDGE PREPARATION AS PER HW0620.599.
- MATERIAL OF THE NECK SHALL BE STAINLESS STEEL AS PER BHEL CORPORATE STD NO.AA10725.
- MATERIAL TEST CERTIFICATES SHALL BE SUPPLIED.
- SERRATION ON NECK FACE – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND-NOSED TOOL AT A FEED OF APPROXIMATELY 0.8MM PER REVOLUTION.

PURCHASED

				CBOM NO. 01531401007			STATUS OF DRG.	
				AGREED DEPT.	NAME		SIGN	DATE
GRADE OF UNTOL. DIM.:—				EMT	AEMTNCG		AEMTNCG	18/05/2007
M/CG— W /C/ M / F AA 0230208								
WELDING—A/B/C/D—AA621104—								
GAS CUTTING—'T3'AA0621101								
REV. 03	DATE 17.05.16	ALTERED AKA2 SD/—		REV. 02	DATE 01.08.14	ALTERED PKM SD/—		
		CHECKED AJ SD/—				CHECKED PG SD/—		
CHANGES ARE DONE AS PER C/A NO.— TGE—16—F0176				CHANGES ARE DONE AS PER C/A NO.— TGE—14—F0234				
								

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT					THDF 125/67					
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR						NAME	SIGN	DATE	NO.OF VAR.	
					DRN	STGEPNM	STGEPNM	27/04/2007		
					CHD	STGEKN	STGEKN	12/05/2007		
					APD	ATGEKRG	ATGEKRG	24/07/2007	73	74
DEPT. TGE		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.				ITEM NO.	NO.OF ITEMS	
CODE 4133		1:5	3.26	31531401071				01	75	77
TITLE NECK PN25			1	3	DRAWING NO.					
					31531401088					
					SHEET NO.1		NO.OF SHEETS 1			

SIZE A3

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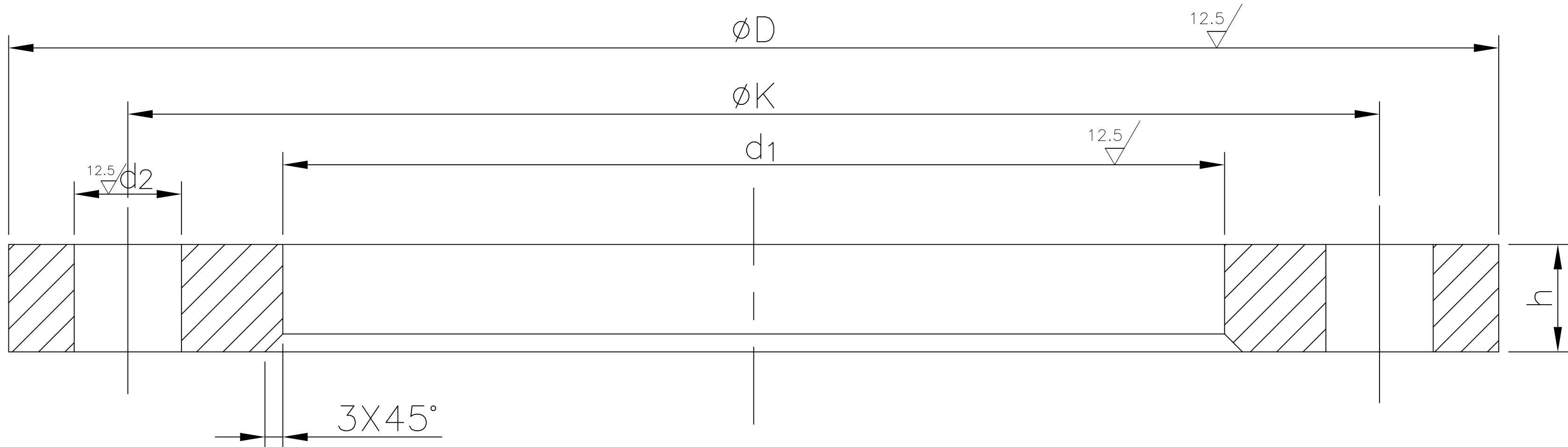
OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31531401089
DRAWING NO.



VAR.	NB	D	d1	d2	K	NO.OF HOLES	h	WT.
00	125	270	164	22	220	8	24	6.45
01	150	300	194	26	250	8	24	7.59
02	125	250	164	18	210	8	24	6.45
03	125	270	164	26	220	8	24	7.00

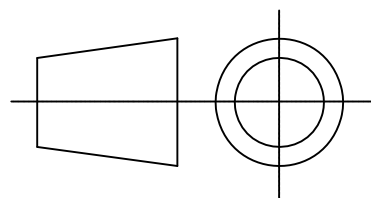
FOR COOLER

TECHNICAL REQUIREMENTS

1. EDGE PREPARATION AS PER HW0620.599.

SUPERSEEDS OLD DRAWING
UNDER THE SAME NUMBER

				CBOM NO. 01531401007			STATUS OF DRG.	
				AGREED DEPT.	NAME		SIGN	DATE
GRADE OF UNTOL. DIM.:—				—	—		—	—
M/CG— V/C/M/F AA 0230208								
WELDING—A/B/C/D—AA621104								
GAS CUTTING—'T3'AA0621101								
REV.	DATE	ALTERED		REV.	DATE	ALTERED AKA2		sd/—
		CHECKED		06	22.02.18	CHECKED PG		sd/—
				CHANGES DONE AS PER CHANGE NO. TGE—18—F0034.				

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				THDF 125/67				
बी एच ई एल  BHARAT HEAVY ELECTRICALS LTD. HARDWAR					NAME	SIGN	DATE	NO.OF VAR.
				DRN	STGEKBM	STGEPNM	27/04/2007	
				CHD	STGERLV	STGEKN	12/05/2007	
				APD	ATGEKRG	ATGEKRG	24/07/2007	73 74
DEPT. TGE		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.			ITEM NO.	NO.OF ITEMS
CODE 4133		1:5	4.64	31531401071			06	
TITLE				1	3	DRAWING NO. 31531401089		75 77
FLANGE PN40				7 22 23 24				
				SHEET NO.1		NO.OF SHEETS 1		

SIZE A3

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REF. DRG NO.

SIGN & DATE

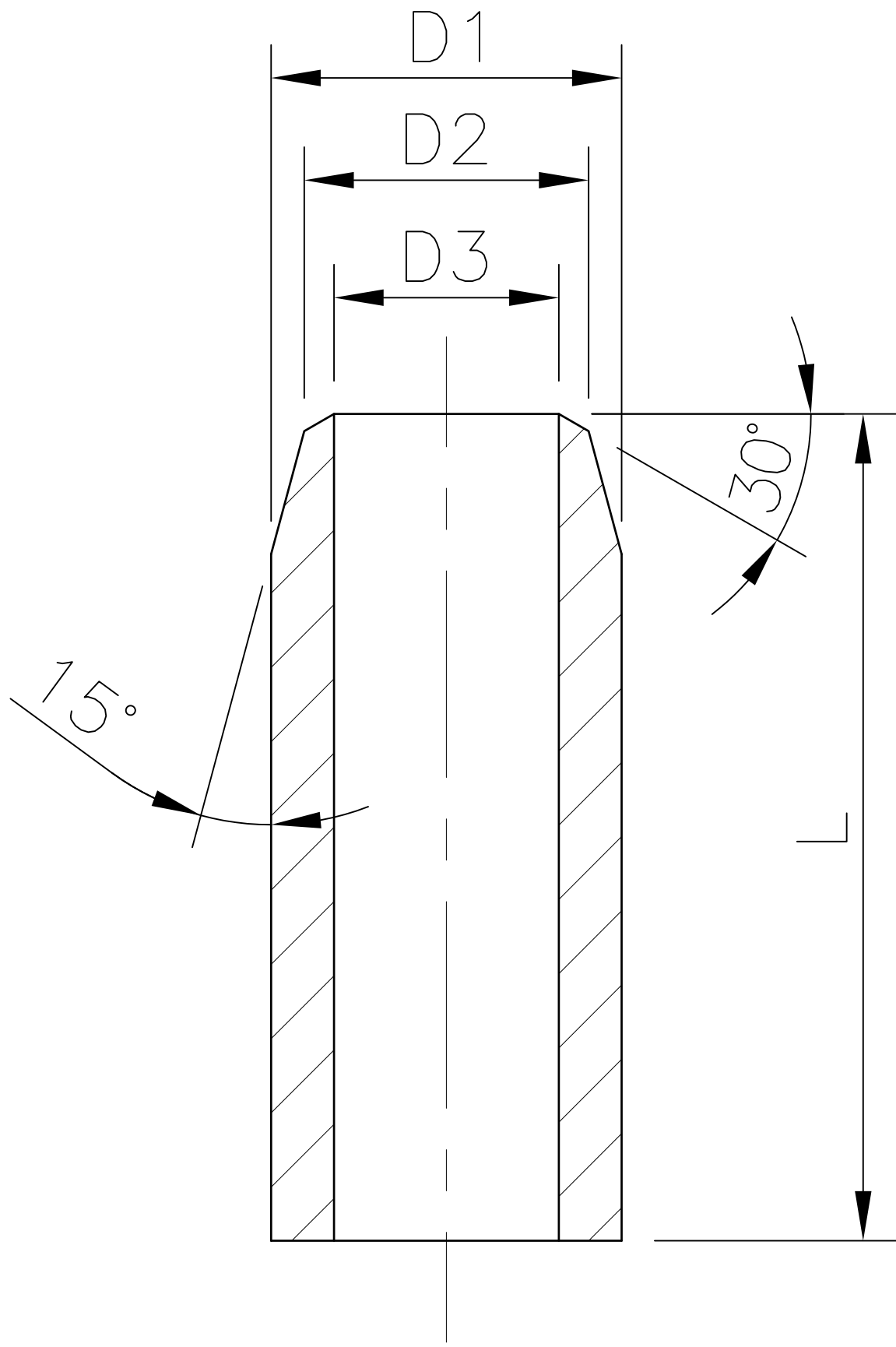
INVENTORY NO.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31531401139
DRAWING NO



12.5 ALL OVER

06	100	50	68.1	60.3	52.3	0.560
05	100	40	55.6	48.3	40.94	0.40
04	50	25	36.5	33.7	28.5	0.142
03	50	20	30.5	26.9	21.7	0.115
02	50	15	25.3	21.3	16.7	0.100
01	50	10	21.2	17.2	13.6	0.080
00	50	8	17.5	13.5	8.3	0.060
VAR.	L	NB	øD1	øD2	øD3	WEIGHT (KG)

NOTE:

MATERIAL : STAINLESS STEEL AS PER ASTM A182F321.

CBOM NO.						STATUS OF DRG.		TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT						THDF (115/67)											
AGREED DEPT.						NAME		SIGN		DATE															
GRADE OF UNTOL. DIM.:—																									
M/CG— ✓/C/M/F AA 0230208																									
WELDING A/B/C/D AA621104—																									
GAS CUTTING —T3'AA0621101—																									
REV.		DATE		ALTERED CHECKED		REV.		DATE		ALTERED CHECKED		DEPT. EME		SCALE 1:1		WEIGHT(Kg.) SEE TABLE		REF. TO ASSY. DRG. —		ITEM NO. —		NO.OF ITEMS —			
												CODE 4133						TITLE CONNECTION		DRAWING NO. 31531401139		SHEET NO.01		NO.OF SHEETS 01	

SIZE A3

REV	DATE	ALTERED	KM	REV	DATE	ALTERED	KM	CBOM No.			STATUS OF DRG
02	29.12.17	CHECKED	MA	01	17.05.17	CHECKED	MA	—			
VARIANT TABLE ADDED.				DIMENSION CORRECTED.				AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UNTOL.DIM.M/CG-✓/C/M/F.AA0230208						WELDING A/B/C/D AA0621104		GAS CUTTING-T3 AA0621104			



VARIANT TABLE

VARIANT	D1 (MM)	D2 (MM)
00	74.0	3.0
01	123	4.0
02	34	3.0

TECHNICAL REQUIREMENT

1. THE 'O' RING MATERIAL SHOULD CONFORM TO SPEC. HW59870.



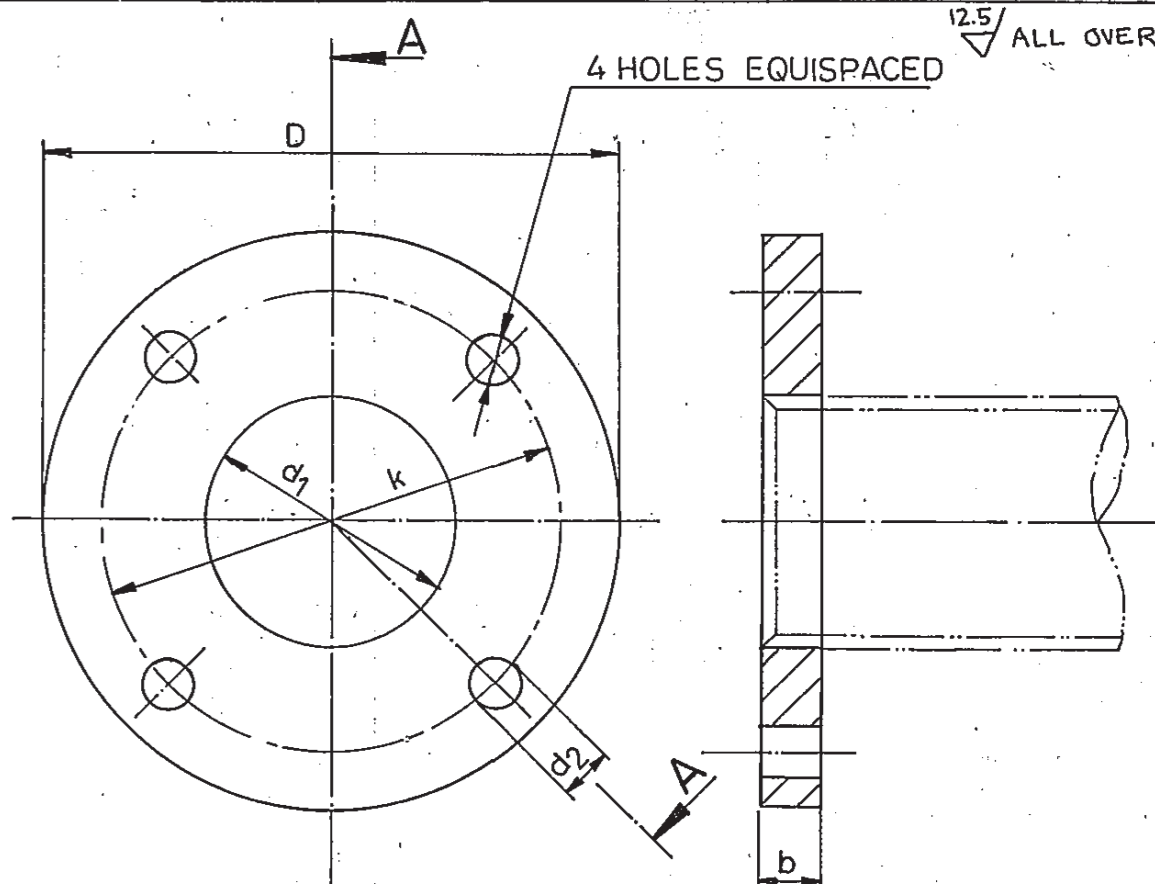
BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	KM	—SD—	30/04/2014	
CHD	KM	—SD—	30/04/2014	
APD	RLV	—SD—	30/04/2014	

DEPT.TGE		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	No OF ITEMS
CODE 4133		1:1	0.01	_____		—
TITLE				DRAWING No.		
O—RING				41492501071		
				SHEET No.1	No.OF SHEETS 1	

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REV	DATE	ALTERED	REV	DATE	ALTERED	GMS NO./GR. SP. NO.		STATUS OF DRG.	
		CHECKED			CHECKED	0-150-00-01090			
						AGREED DEPT.	NAME	SIGN	DATE
						GTY	S.C. GOYAL	<i>[Signature]</i>	29.10.86
						W.T.	S.K.C.	<i>[Signature]</i>	29.10.86



SECTION A-A

VAR	D	d ₁	k	b	d ₂
00	144	90	118	20	9.5
01	200	90	160	20	18



	002	FLANGE		01	CS-IS2062E250BR		3908
	001	FLANGE		00	CS-IS2062E250BR		1548
REMARKS	KEY NO.	DESCRIPTION	STD	29 31	MATERIAL CODE	45 A	UNIT WEIGHT
65	75 25 27	29	58 59	32 33 46	VAR. MATERIAL SPECN	54 55 56 57 66	71

CARD TYPE-3

28

28

CARD TYPE-1

28

CARD TYPE-2



BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

DRN.	NAME	SIGN	DATE	NO. OF VAR.
CHD.	KB MUKHERJEE	<i>[Signature]</i>	17.7.86	
APPD.	G. GUPTA	<i>[Signature]</i>	17.7.86	
	A.C.C.	<i>[Signature]</i>	17.11.86	73 74

DEPT. TGE	GRADE OF UNTO: DIM.	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS
CODE 4233	C/M/F	N.T.S.	SEE TABLE	3-150-00-01037	4 5	-
TITLE			1 CARD CODE	DRAWING NO.		
FLANGE			3	4-150-00-01011		
			7	SHEET NO. 1		
			22	NO. OF SHEETS. 1		

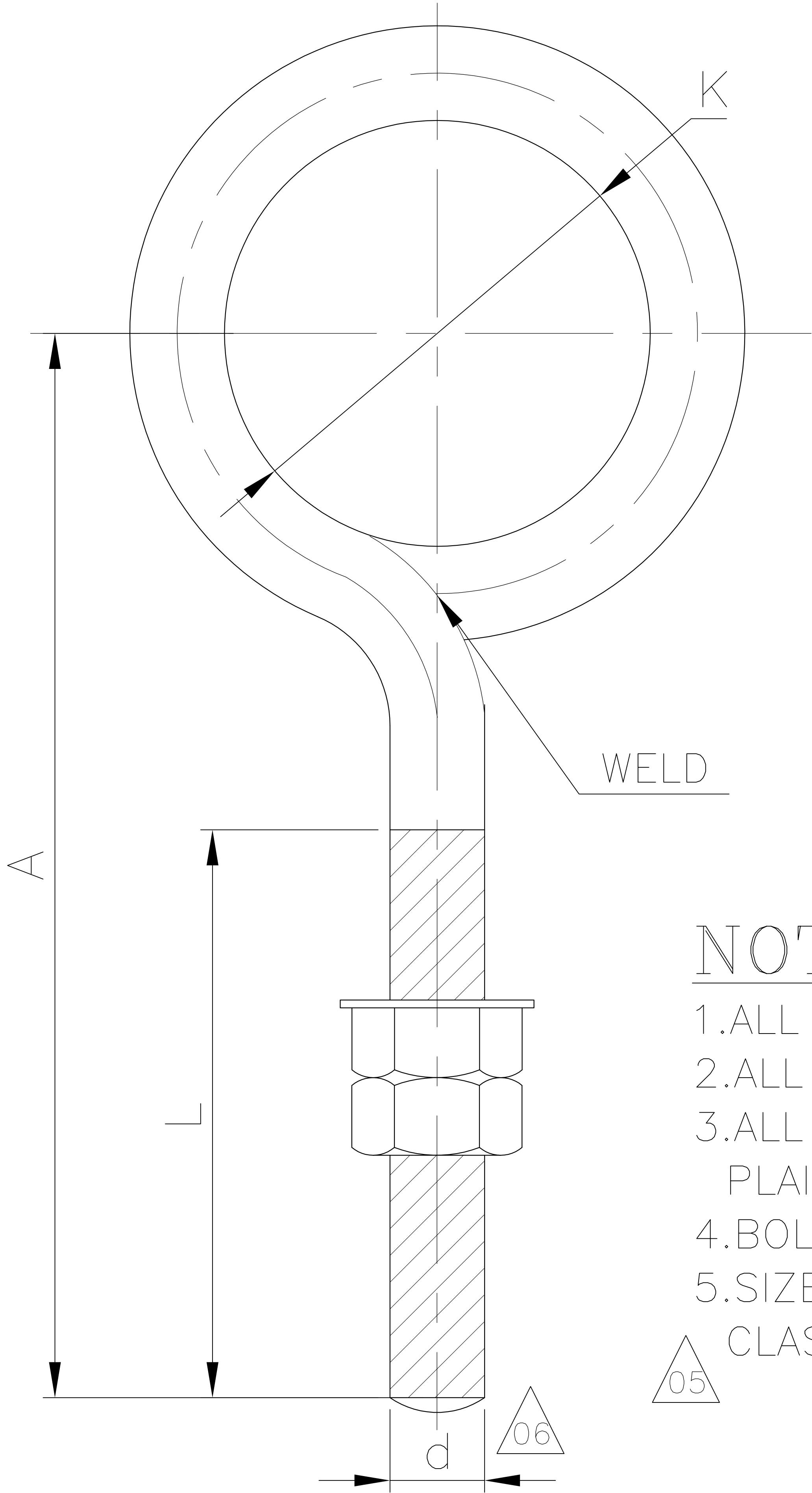
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	KM	REV	DATE	ALTERED	KM	CBOM No.			STATUS OF DRG
06	08.11.19	CHECKED	MA	05	04.06.18	CHECKED	MA	0-150-00-01151			
REVISION MARKED				REVISION MARKED				AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UN				TOL.DIM.M/CG-V/C/M/F.AA0230208				WELDING A/B/C/D AA0621104			
								GAS CUTTING-T3 AA0621101			



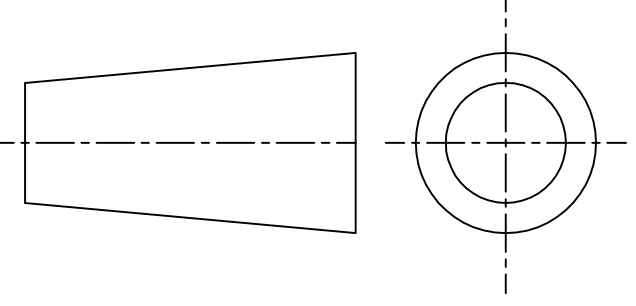
TESTING:—

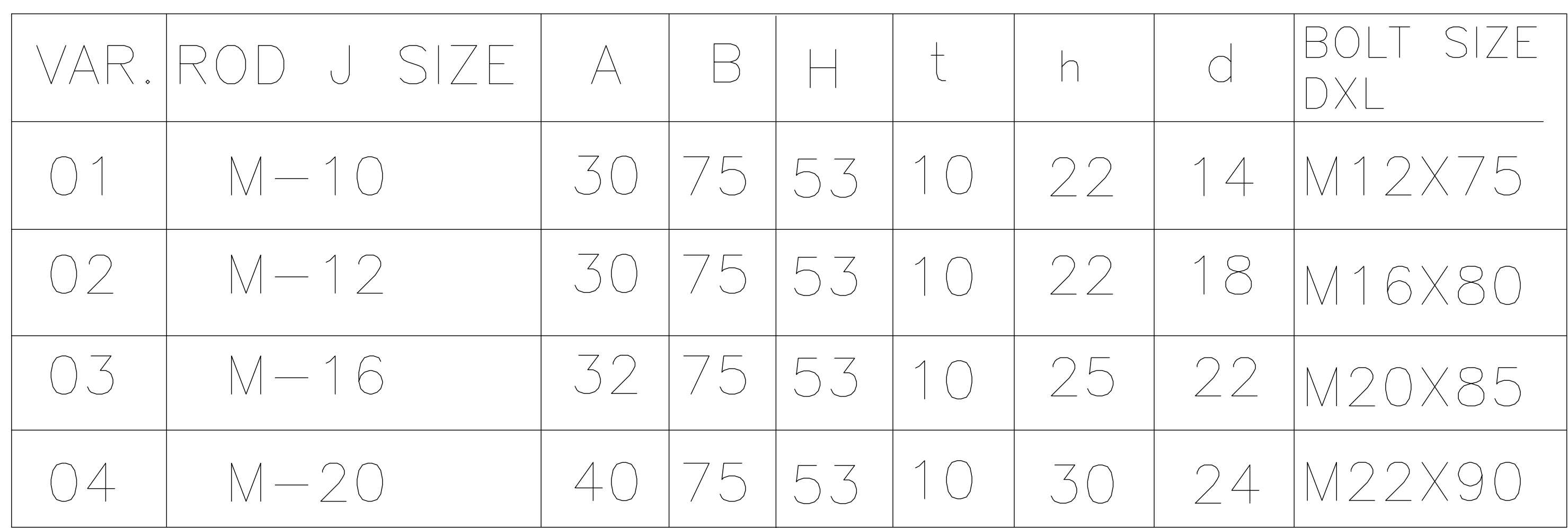
VAR.	A	L	K	d	F
01	100	60	18	M10	5
02	120	65	22	M12	8
03	130	65	26	M16	12.5
04	145	75	31	M20	20

F—AXIAL PROOF FORCE (KN)

NOTE:—

- 1.ALL DIMENSIONS ARE IN mm.
- 2.ALL STEEL MATERIAL SHALL BE AS PER IS:2062E250BR.
- 3.ALL BOLTS SHALL HAVE NUTS, LOCK NUTS & PLAIN WASHER AS SHOWN.
- 4.BOLT & NUT SHALL CONFORM TO IS : 1363.
- 5.SIZE TOLERANCE AS PER AA0230208 CLASS—COARSE.

REF.DRG.No.		004	EYE BOLT		04	W97415000013			0.30	
		003	EYE BOLT		03	W97415000056			0.20	
		002	EYE BOLT		02	W97415000048			0.15	
		001	EYE BOLT		01	W97415000030			0.10	
SIGN & DATE	REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE	A	UNIT WEIGHT		
						MATERIAL SPEC.	C			
	 BHARAT HEAVY ELECTRICALS LTD HARDWAR						NAME	SIGN	DATE	NO. OF VAR
						DRN	BEDD	sd/-	15.6.93	
						CHD	K.R.GUPTA	sd/-	19.6.93	
						APD	G.GUPTA	sd/-	19.6.93	
INVENTORY No.	DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM	No. OF ITEMS
	CODE 4133		1:1	SEE TABLE		0-150-00-01151			No. —	
	TITLE						DRAWING No.			
EYE BOLT RAPP 3,4 : KAIGA1,2				4-150-00-01099						
						SHEET No. 1		No.OF SHEETS		1



MATERIAL:- IS-2062 E250BR

1.BEAM ATTACHMENT SHALL BE SUPPLIED COMPLETE WITH BOLT, NUT
& PLANE WASHERS (2NOS)



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	AEDD	sd/-	09.04.91	
CHD	K.R.GUPTA	sd/-	09.04.91	
APD	G.GUPTA	sd/-	12.04.91	

DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM	No OF
CODE 4133		N.T.S	SEE TABLE	0-150-00-01151	No.	ITEMS
TITLE BEAM ATTACHMENT				DRAWING No.		
RAPP 3,4 : KAIGA1,2				4-150-00-01101		
				SHEET No. 1	No.OF SHEETS	1

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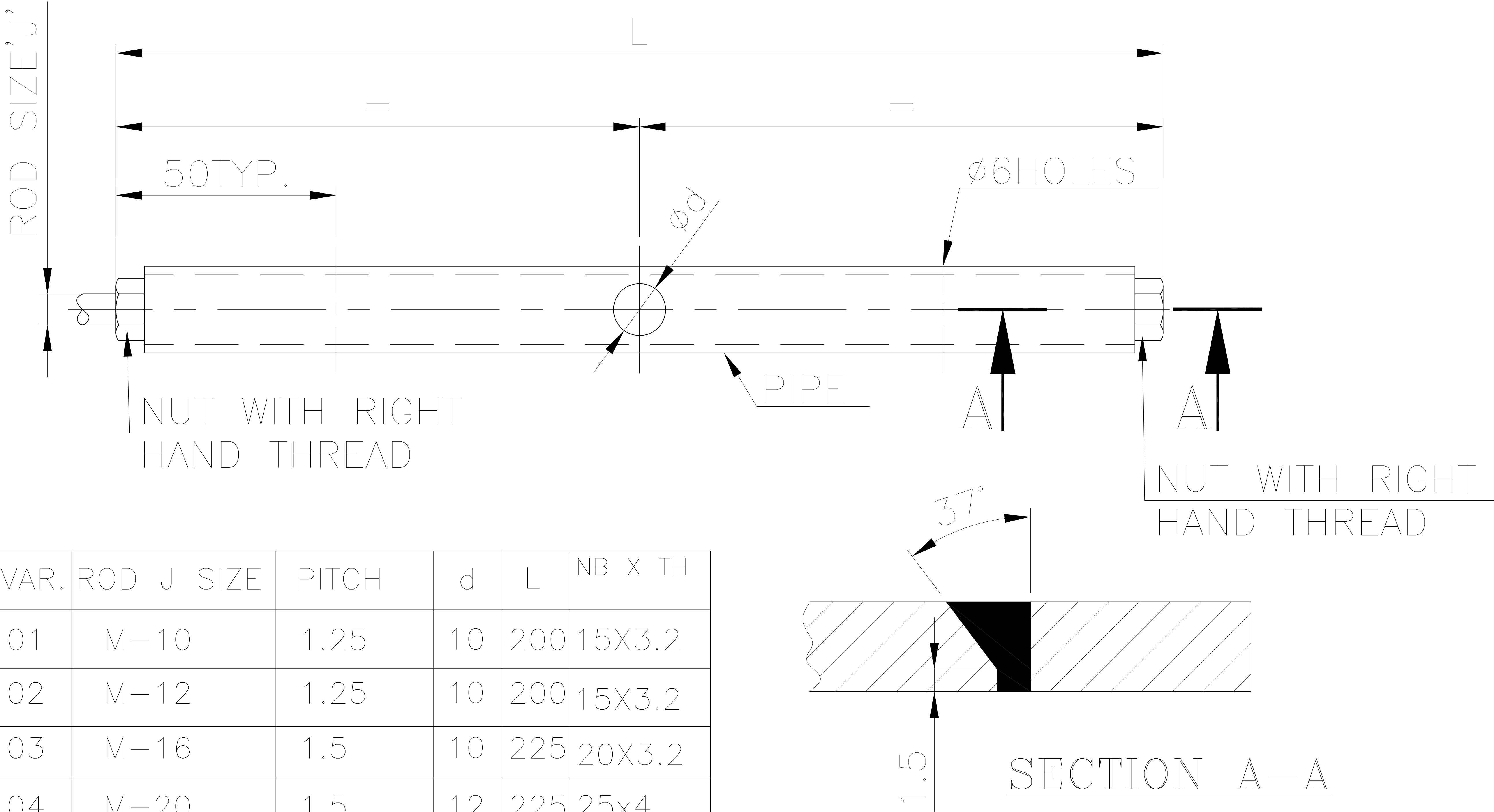
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED	PAB	CBOM No.			STATUS OF DRG	
		CHECKED	01	17.11.99	CHECKED	KRG	0-150-00-01151				
							AGREED DEPT.	NAME	SIGN		DATE

GRADE OF UN			TOL.DIM.V/C/M/F.AA0230208			WELDING A/B/C/D AA0621104			GAS CUTTING T3 AA0621104		
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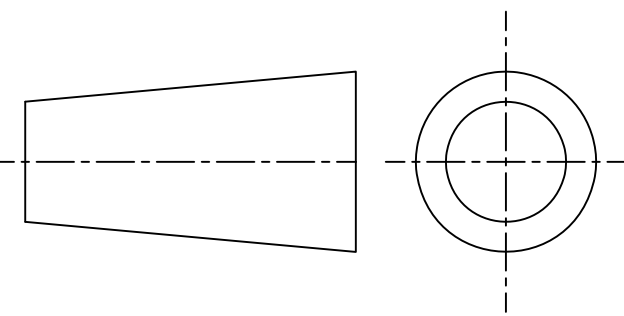


VAR.	ROD J SIZE	PITCH	d	L	NB X TH
01	M-10	1.25	10	200	15X3.2
02	M-12	1.25	10	200	15X3.2
03	M-16	1.5	10	225	20X3.2
04	M-20	1.5	12	225	25x4

MATERIAL:- PIPE C.S AS PER IS:1239 PART 1
NUT C.S TO IS 1364 CLASS 8.8

NOTE:-

- 1.TO BE GALVANISED AS PER IS:1367 (PART XIII), THICKNESS OF COATING 15μ.
2. WELD TO BE D.P. TESTED AS PER ASME SECTION VIII

24.04.91 SIGN & DATE	REF.DRG.No.		004	TURN BUCKLE		04	W96415001434			0.80	
			003	TURN BUCKLE		03	W96415000934			0.60	
			002	TURN BUCKLE		02	W96415000926			0.50	
			001	TURN BUCKLE		01	W96415000918			0.50	
Et1-15373 INVENTORY No.	REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE		A	UNIT WEIGHT		
						MATERIAL SPEC.		C			
 BHARAT HEAVY ELECTRICALS LTD HARDWAR							NAME	SIGN	DATE	NO. OF VAR	
DRN	AEDD	sd/-	09.04.91								
CHD	K.R.GUPTA	sd/-	09.04.91								
APD	G.M.K	sd/-	12.04.91								
DEPT. EME			SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM No.	No OF ITEMS	
CODE 4133			N.T.S	SEE TABLE		0-150-00-01151					
TITLE				TURN BUCKLE				DRAWING No.			
				RAPP 3,4 : KAIGA1,2				4-150-00-01103			
								SHEET No. 1		No.OF SHEETS	1

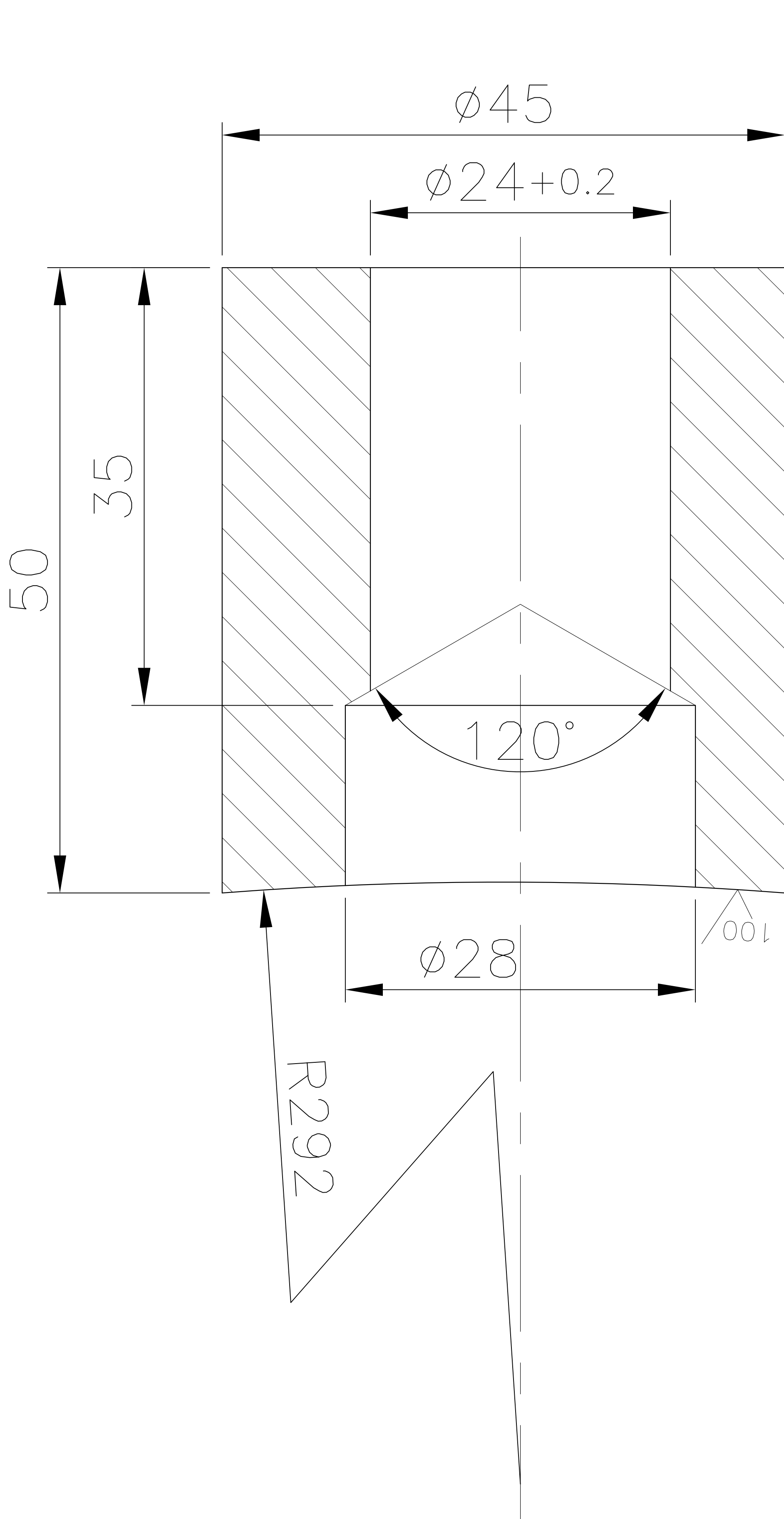
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No.			STATUS OF DRG
		CHECKED	02	13.12.08	CHECKED	9-150-00-01002			
			CH.AD.NO.TGE-08-F0330			AGREED DEPT.	NAME	SIGN	DATE
						W.T	ROY	sd/-	3.2.92
GRADE OF UN					TOL.DIM.M/CG-X/C/X/Ø.AA0230208		WELDING A/B/C/D AA0621104		GAS CUTTING-T3 AA0621101



12.5/
▽ THE REST

T.R

1. IDENTIFICATION AS PER HW0400397.
2. RADIUS R-292 SHOULD BE MADE DURING ASSLY. MATCHING WITH THE JOB.

PURCHASED	001	CONNECTION			MATERIAL AS PER BOM			0.500	
				00					
REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE	A		UNIT WEIGHT	
					MATERIAL SPEC.	C			
बी एच ई एल BHARAT HEAVY ELECTRICALS LTD HARDWAR					NAME	SIGN	DATE	NO. OF VAR	
				DRN	KAPOOR	sd/-	12.08.91		
				CHD	K.R.GUPTA	sd/-	12.08.91		
				APD	G.M.K	sd/-	16.04.92		
DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM	No OF ITEMS
CODE 4133		1:1	0.500		3-150-00-01185			No. 006	
TITLE					DRAWING No.				
CONNECTION					4-150-00-01118				
					SHEET No. 1		No.OF SHEETS		1

RIGHT HAND THREAD

LEFT HAND THREAD

12.5 / ALL OVER

d1

d2

l2

l3

l1

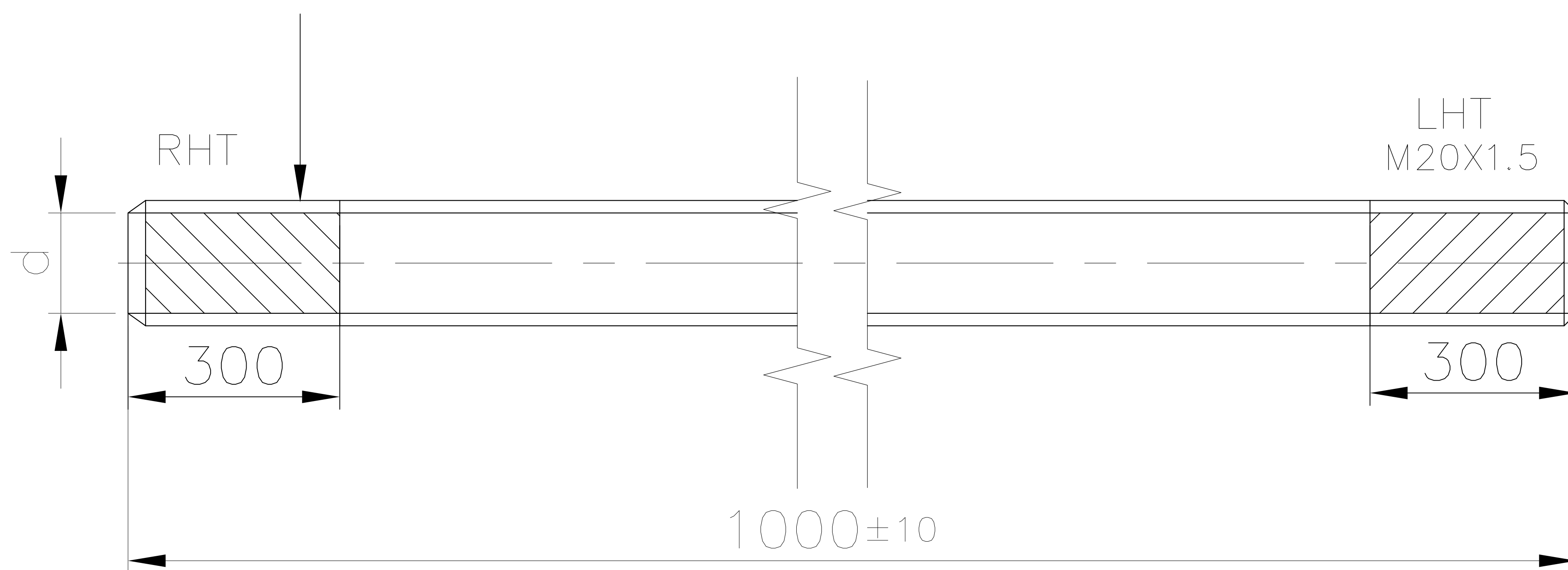
VAR	d1	d2	PITCH	l1	l2	l3	wt.in Kg	MATERIAL CODE
00	M12	M12	1.25	250	80	130	0.200	W96415001922
01	M16	M16	1.5	250	80	130	0.300	W96415001930
02	M20	M20	1.5	250	80	130	0.500	W96415001949

1.TIE ROD TO BE GALVANISED WITH MIN. THICKNESS 15 MICRONS.

SUPER SEEDS OLD DRAWING
UNDER SAME NUMBER

[illegible]

THIS END IS OF M16X1.5 WHILE ASSEMBLY WITH
HANGER WITH DRG NO.41500001198 AND OF
M20X1.5 WHILE ASSEMBLY WITH HANGER WITH
DRG NO. 41500001199.
FOR ASSEMBLY DRG. PLEASE REFER DRG NO.
11500001019, 21500001043, 21500001044,
21500001045, 21500001046



VAR.	SIZE d	WEIGHT (KG)	MATERIAL CODE
00	M12X1.25	0.725	W96415001957
01	M16X1.5	1.330	W96415001965
02	M20X1.5	2.080	W96415001973

1. THREADED ROD TO BE GALVANISED AS PER IS: 1367 (PART XIII), THICKNESS OF COATING 15μ

BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	KAPOOR	sd/-	13.04.92	
CHD	K.R.GUPTA	sd/-	13.04.92	
APD	G.M.K	sd/-	10.04.92	

DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM	No Of
CODE 4133		N.T.S	SEE TABLE	0-150-00-01125	No.	ITEMS
TITLE				DRAWING No.		
THREADED ROD				4-150-00-01131		
				SHEET No. 1	No.OF SHEETS	1

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KUN 664.51
REF.DRG.No.

SIGN & DATE

Et1-16337
INVENTORY No.

FIRST ANGLE PROJECTION

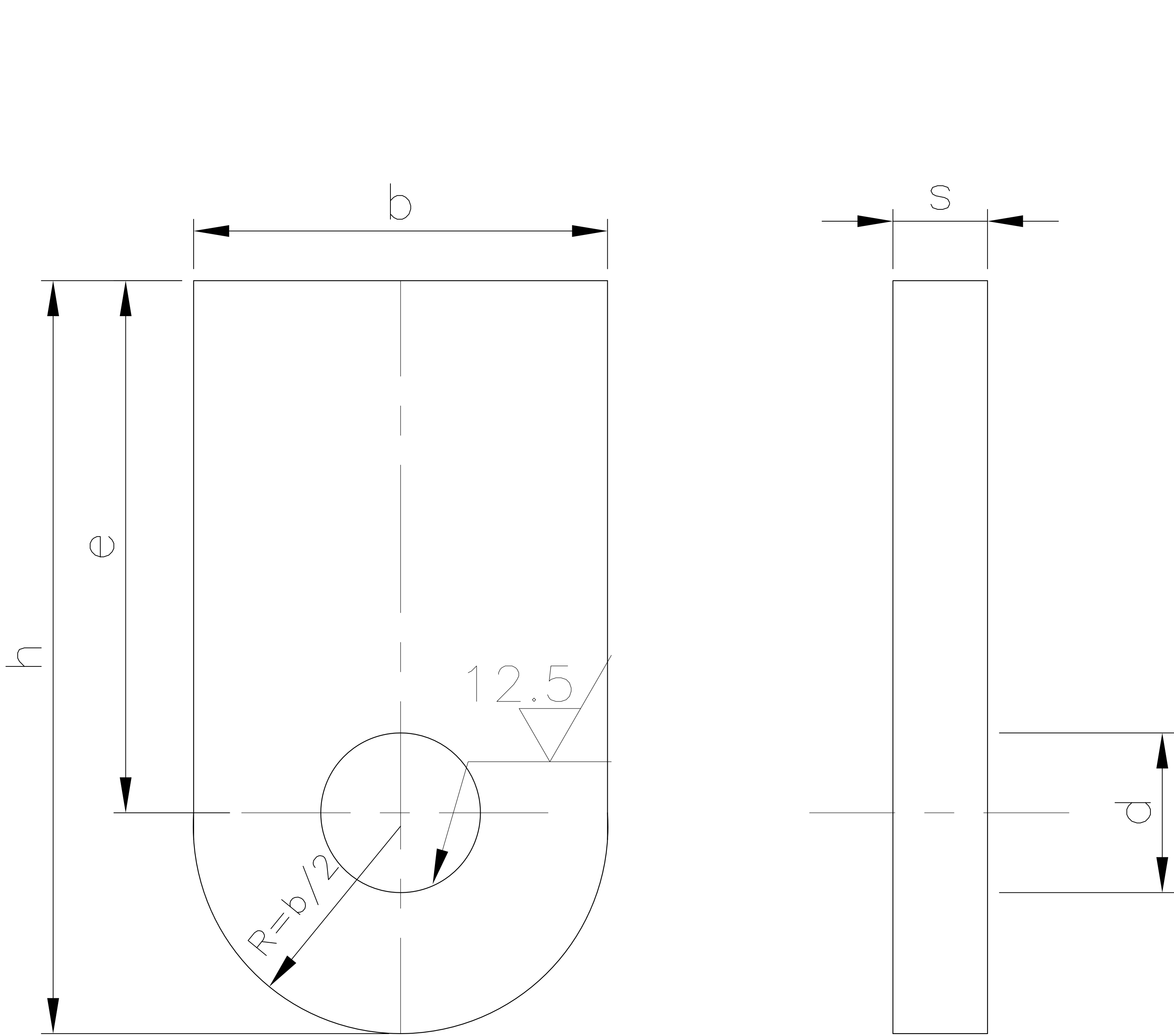
(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REVDATE	ALTERED	REVDATE	ALTERED	PNM	SD/-	CBOM No.			STATUS OF DRG
	CHECKED	01	1.03.07	CHECKED	KN	SD/-	0-150-00-01125		
				CHANGE ADVICE NO. TGE-07-F0043		AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UNTOL.DIM.M/CG- V /C/ M /F.AA0230208				WELDING A/B/C/D AA0621104			GAS CUTTING-T3 AA0621101		

GRADE OF UNTOL.DIM.M/CG-V/C/M/F.AA0230208

WELDING A/B/C/D AA0621104

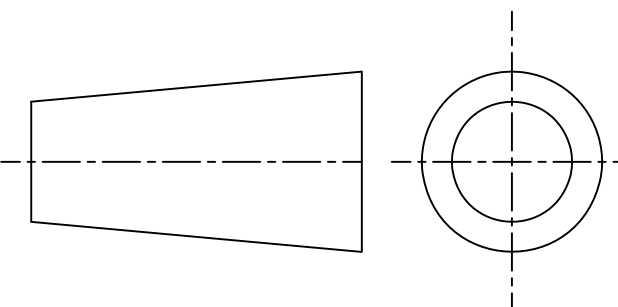
GAS CUTTING-T3 AA0621101



50
THE REST

VARIANT TABLE

VAR.	SIZE	d	b	h	e	s	WT.IN Kg.	MATERIAL CODE
00	12	13.5	35	67	45	8	0.11	W96415001981
01	16	17.5	45	78	50	10	0.19	W96415001990
02	20	21.5	60	92	55	12	0.35	W96415002007

	001	WELDING EYE			CS-IS2062E250BR				
				01					
REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE	A	UNIT WEIGHT		
					MATERIAL SPEC.	C			
 BHARAT HEAVY ELECTRICALS LTD HARDWAR					NAME	SIGN	DATE	NO. OF VAR	
				DRN	KAPOOR	sd/-			
				CHD	K.R.GUPTA	sd/-	13.01.92		
				APD	G.M.K	sd/-	10.08.92		
DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM No.	No OF ITEMS
CODE 4133		1:1	SEE TABLE		0-150-00-01125				
TITLE						DRAWING No.			
WELDING EYE						4-150-00-01132			
						SHEET No. 1		No.OF SHEETS 1	

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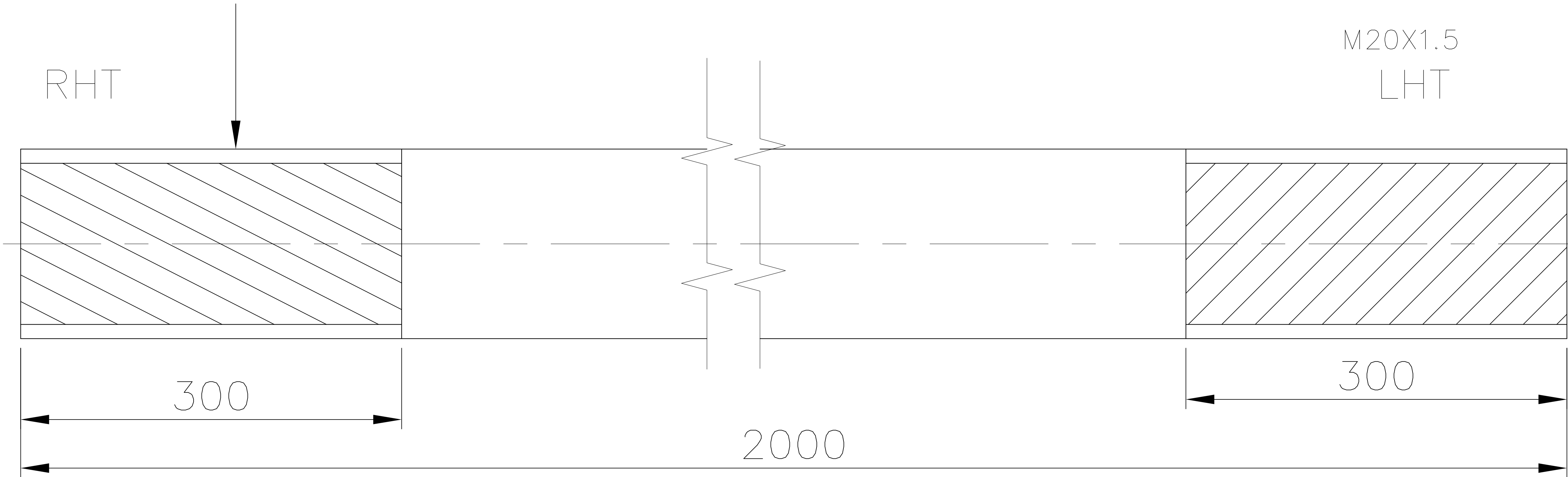
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REVDATE	ALTERED	K M	REVDATE	ALTERED	P A B	CBOM No.			STATUS OF DRG
02	06.04.18	CHECKED M A	01	17.11.91	CHECKED K R G	0-150-00-01205			
REVISION MARKED			CH.AD.NO.TGE-99-415			AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UNTOL.DIM.M/CG- x/c /M/ f .AA0230208					WELDING A/B/C/D AA0621104		GAS CUTTING-T3 AA0621101		

GRADE OF UNTOL.DIM.M/CG-X/C/M/F.AA0230208 WELDING A/B/C/D AA0621104 GAS CUTTING-T3 AA0621104

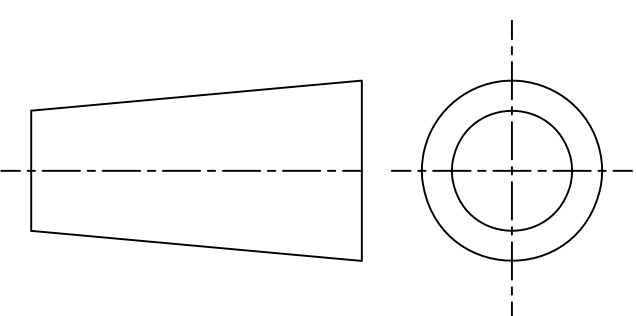
THIS END IS OF M16X1.5 WHILE ASSEMBLY WITH HANGER WITH DRG NO.41500001198 AND OF M20X1.5 WHILE ASSEMBLY WITH HANGER WITH DRG NO. 41500001199.
FOR ASSEMBLY DRG. PLEASE REFER DRG NO. 11500001019, 21500001043, 21500001044, 21500001045, 21500001046



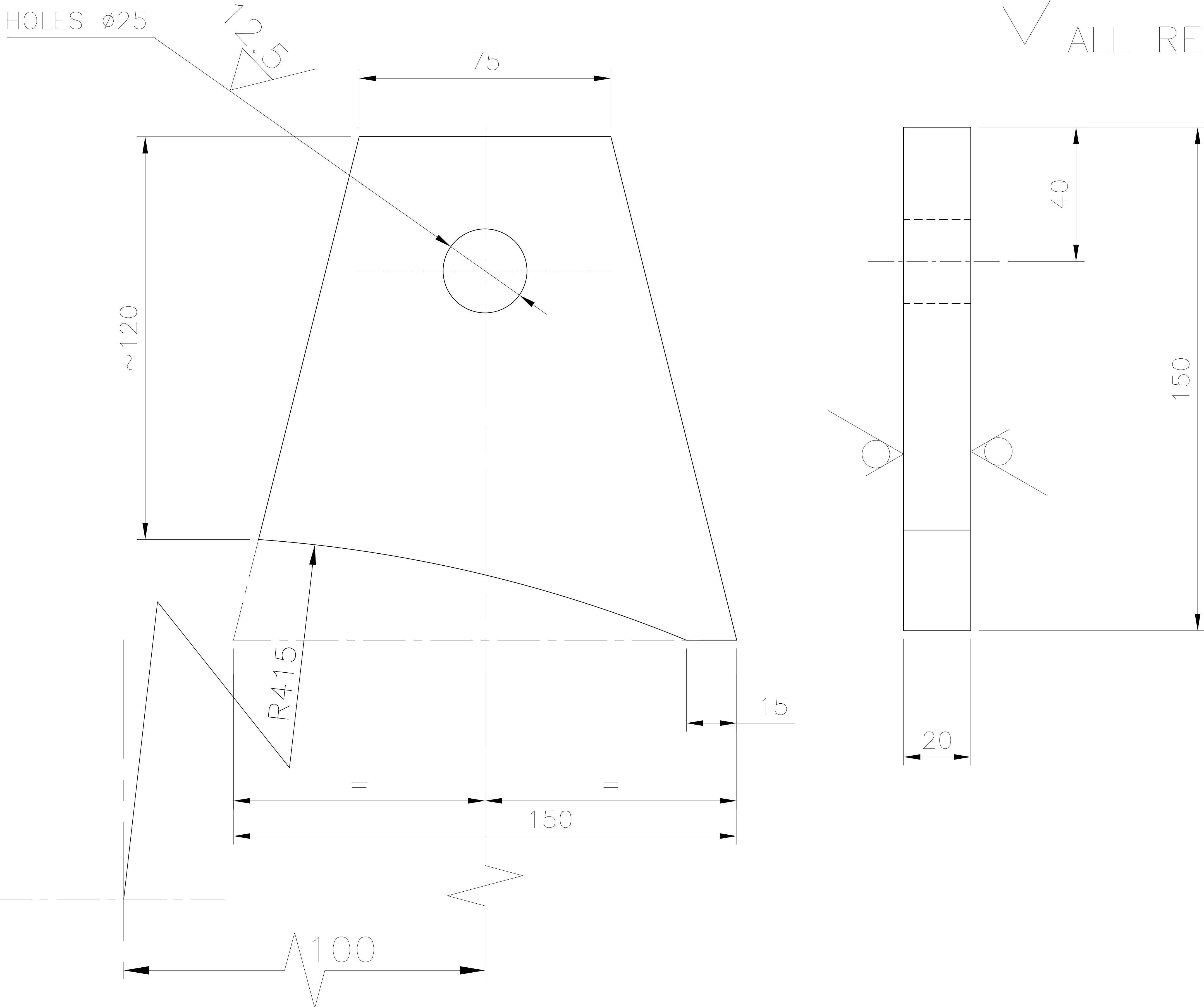
TECH. REQ.

1. IDENTIFICATION AS PER HW 0400.397.
2. TO BE GALVANISED AS PER IS :1367 (PART XIII), THICKNESS OF COATING 15μ

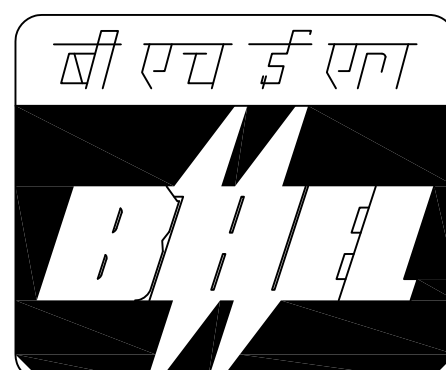
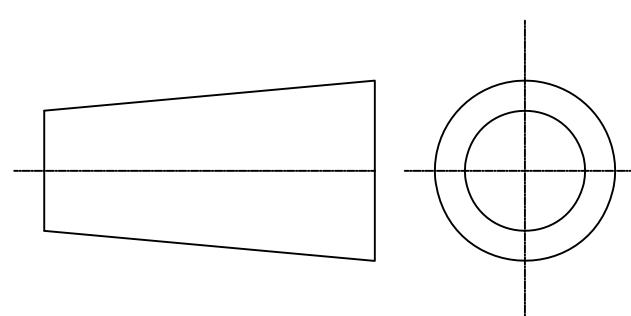
PURCHASED

PURCHASED	001	ROD (M20X2000)			W96415002325	01		5.600	
				01	CS:IS2062E250BR				
REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE	A		UNIT WEIGHT	
					MATERIAL SPEC.	C			
बी एच ई एल BHEL BHARAT HEAVY ELECTRICALS LTD HARDWAR						NAME	SIGN	DATE	NO. OF VAR
					DRN	EDC	sd/-	24.08.95	
					CHD	K.R.G/G.G	sd/-	14.09.95	
					APD	G.GUPTA	sd/-	18.10.95	
DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG. 0-150-00-01205			ITEM No. 05208	No OF ITEMS
CODE 4133		N.T.S							
TITLE					DRAWING No.				
TIE ROD (M20X2000)					4-150-00-01176				
TG-HW-0500-2					SHEET No. 1		No.OF SHEETS		

GRADE OF UNTOL.DIM.M/CG-V/C/M/F.AA0230208 | ~~WELDING A/B/C/D AA0621104~~ | GAS CUTTING-T3 AA0621101



1. IDENTIFICATION AS PER HW 0400.397

	001	PLATE			AA1011808137		1.500		
					CS-IS2062E250BR				
REMARKS	ITEM NO.	DESCRIPTION		VAR	MATERIAL CODE	A	UNIT WEIGHT		
					MATERIAL SPEC.	C			
BHARAT HEAVY ELECTRICALS LTD HARDWAR					NAME	SIGN	DATE	NO. OF VAR	
				DRN	EDC	sd/-	24.8.95		
				CHD	K.R.GUPTA/G.G	sd/-	14.9.95		
				APD	G.GUPTA	sd/-	18.10.95		
DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.			ITEM	No OF ITEMS	
CODE 4133		1:5	1.500	0-150-00-01205			No 055-02		
TITLE				PLATE		DRAWING No.			4-150-00-01177
						SHEET No. 1		No.OF SHEETS	

Technical drawing of a threaded rod with a break symbol in the middle. The drawing shows a horizontal rod with a dashed centerline. A break symbol (two zig-zag lines) is located in the middle. To the left of the break, the diameter is labeled 'M20'. Below the rod, a dimension line indicates a length of '2000±10'. Below the dimension line, the text 'THREAD TYPE — RHT M20X1.5' is written.

TECH. REQ.

- PURCHASED



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

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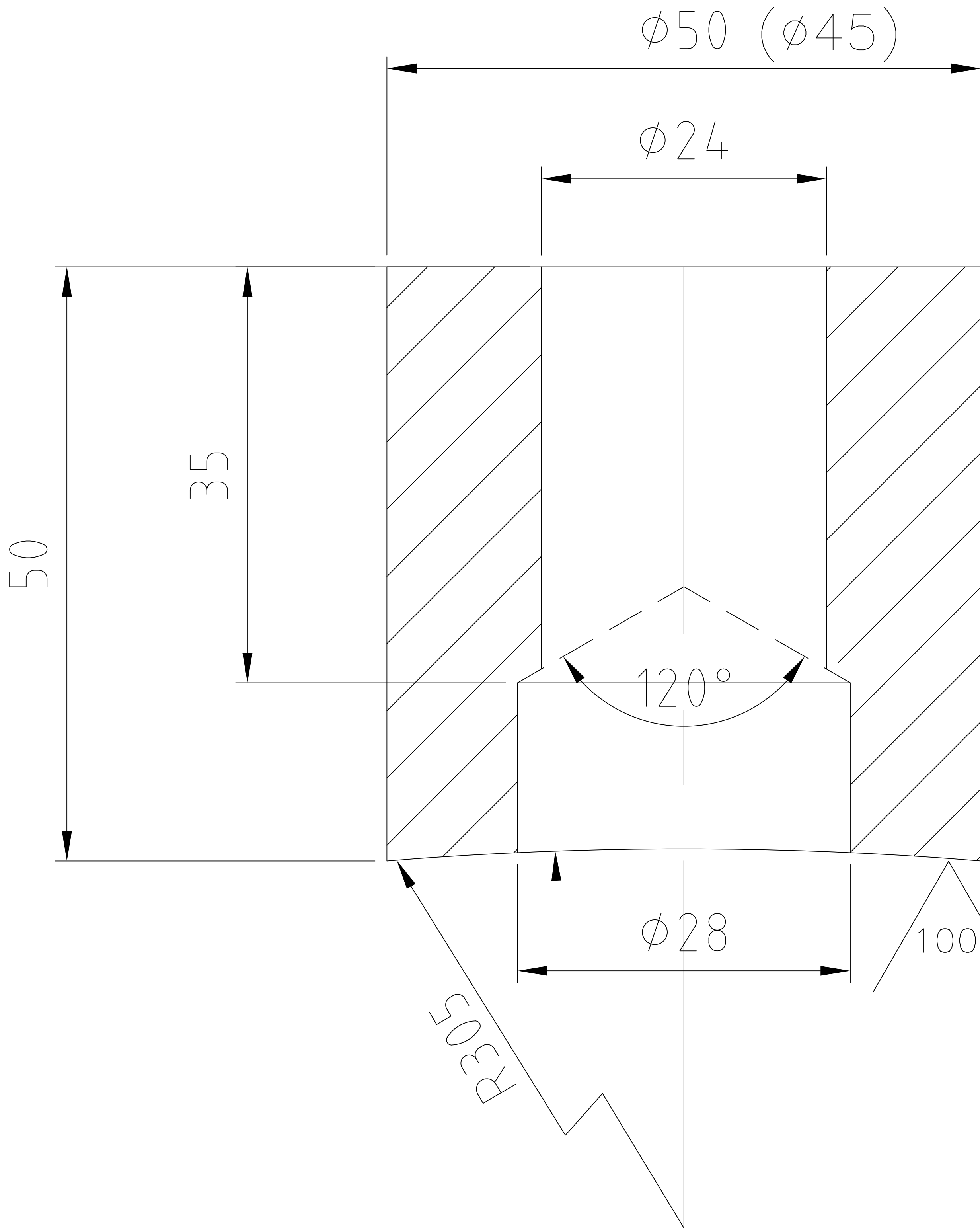
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED	PNM	SD/-	CBOM No. 01500001212		STATUS OF DRG	
		CHECKED			CHECKED						
			02	19.05.07		KN	SD/-				
			CHANGE AD.NO.TGE-07-F0107					AGREED DEPT.	NAME	SIGN	DATE
								WT	RSC	SD/-	28.01.97
GRADE OF UNTOL.DIM.M/CG- V /C/ M /F.AA0230208				WELDING A/B/C/D AA0621104				GAS CUTTING-T3 AA0621101			

12.5
ALL OVER

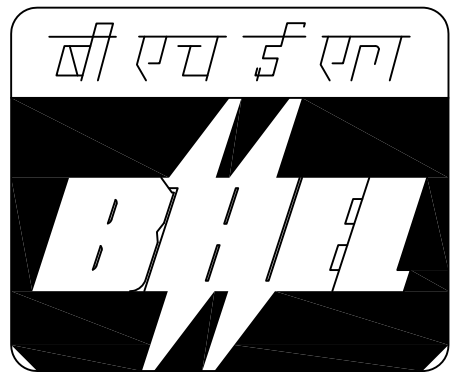


TECH.REQI.

- 1. IDENTIFICATION ACCORDING TO HW 0400.397
- 2. DIM. IN BRACKET ARE AFTER MACHINING.

REF.DRG.No.

SIGN & DATE



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	P.N.MOURYA	Sd/-	28.04.07	
CHD	K.N	Sd/-	28.04.07	
APD	A.K.M	Sd/-	19.05.07	

INVENTORY No.

DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM	No OF
CODE 4133		1:1	0.500	21500001039	No.	ITEMS
TITLE CONNECTION			DRAWING No.			
			415000001182			
			SHEET No.	No.OF SHEETS		

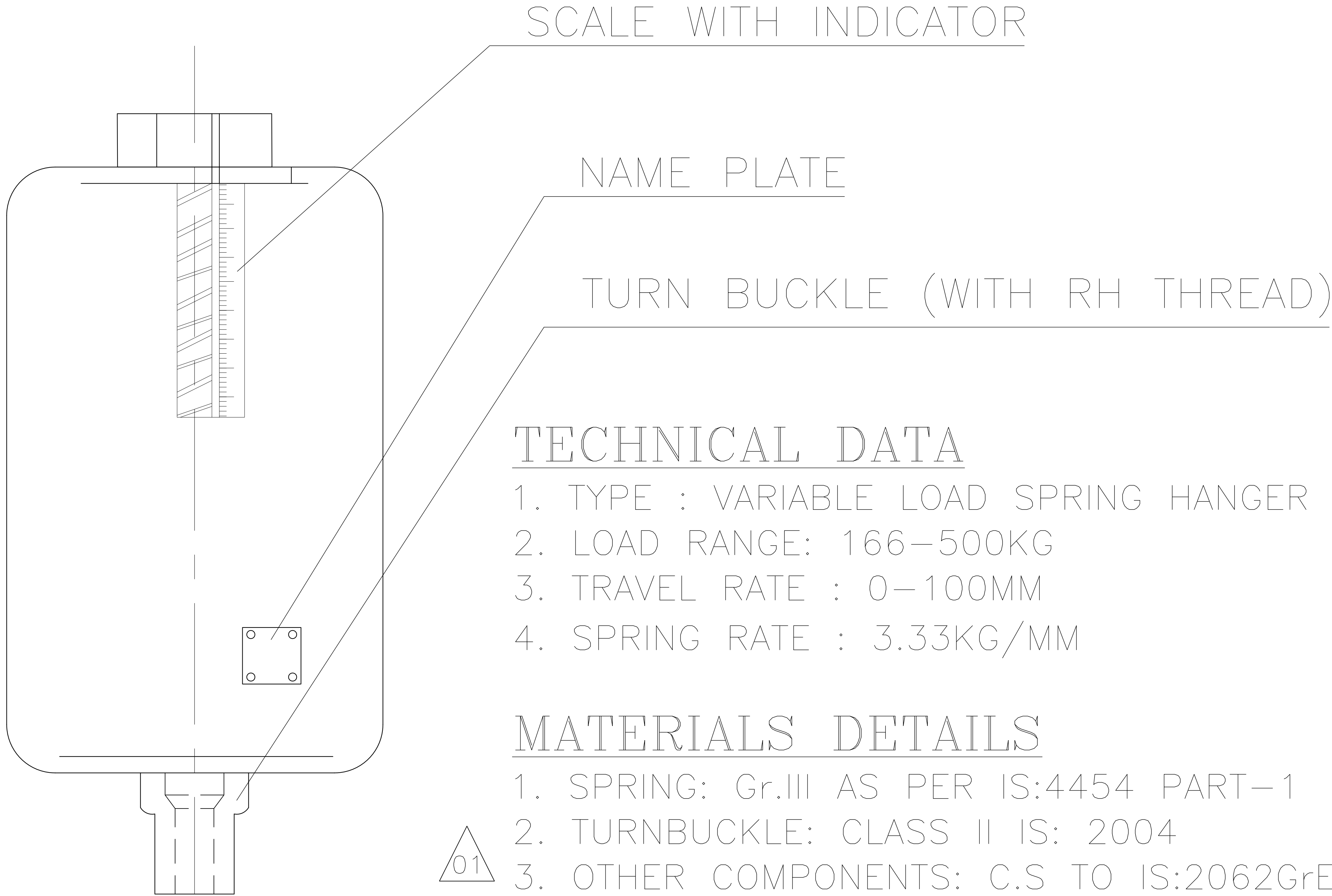
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No.			STATUS OF DRG	
		CHECKED	01	06.04.18	CHECKED	—				
			REVISION MARKED			AGREED DEPT.	NAME	SIGN	DATE	
GRADE OF UN				TOL.DIM.M/CG— V /C/M/F.AA0230208			WELDING A/B/C/D AA0621104		GAS CUTTING—T3 AA0621101	



TECHNICAL DATA

- 1. TYPE : VARIABLE LOAD SPRING HANGER
- 2. LOAD RANGE: 166–500KG
- 3. TRAVEL RATE : 0–100MM
- 4. SPRING RATE : 3.33KG/MM

MATERIALS DETAILS

- 1. SPRING: Gr.III AS PER IS:4454 PART–1
- 2. TURNBUCKLE: CLASS II IS: 2004
- 3. OTHER COMPONENTS: C.S TO IS:2062GrE250BR

TESTING REQUIREMENTS

- 1. STATIC LOAD TESTING OF SPRING AS PER IS:7906 PART–II
- 2. SPRING RATE CHECKING
- 3. MATERIAL TEST (CHEMICAL COMP.) OF SPRING
- 4. MATERIAL TEST FOR TURNBUCKLE
- 5. TEST CERTIFICATES FOR 1,2,3,4 TO BE FURNISHED

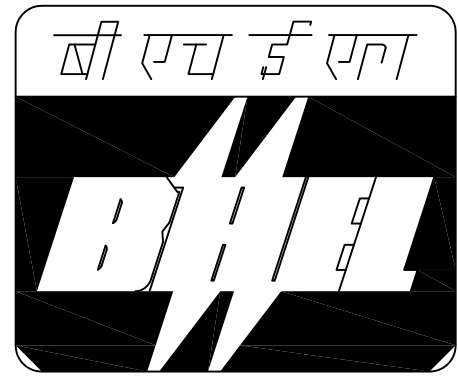
PAINTING REQUIREMENTS

- 1. ALL PARTS EXCEPT SPRING SHALL BE COATED WITH RED OXIDE PRIMER
- 2. THE COMPLETE SPRING HANGER TO BE COATED WITH 2COATS OF DARK ADMIRALTY GREY PAINT
- 3. SPRING SURFACE TO BE MANGANESE PHOSPHATED AND OIL DIPPED

NOTE:—

THE DIMENSION 300 CORRESPONDS TO ZERO COMPRESSION OF THE SPRING.
THIS DIMENSION SHALL GET EXTENDED ACCORDING TO THE LOAD ON THE SPRING CAGE

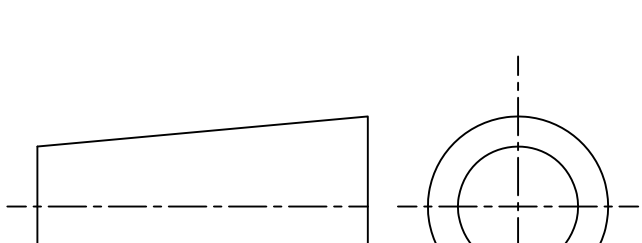
PURCHASED W96415002481



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	KB MUKHERJEE	sd/—	16.11.99	
CHD	K.R.GUPTA	sd/—	16.11.99	
APD	G.GUPTA	sd/—	16.11.99	

INVENTORY No.

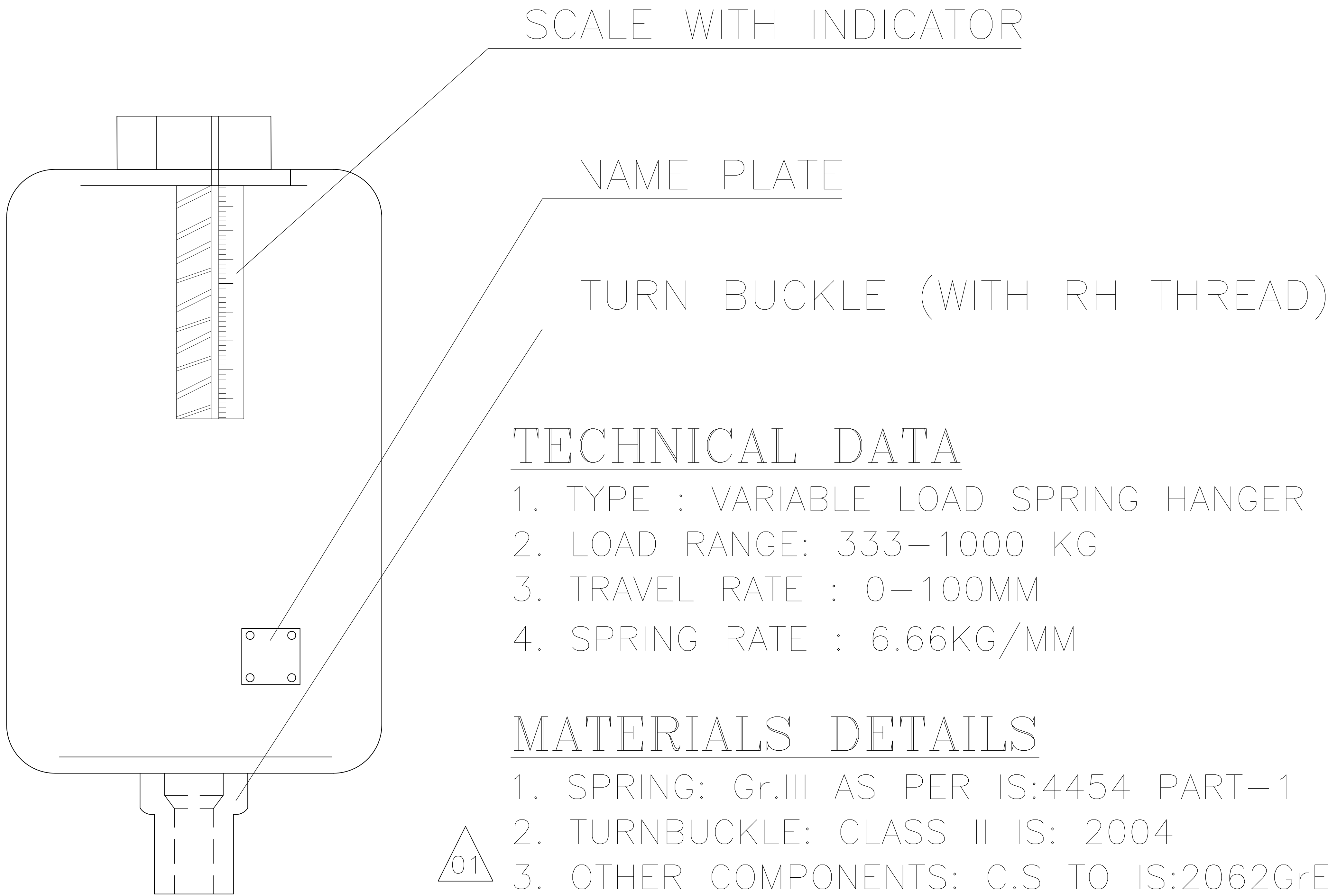
DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	No OF ITEMS
CODE 4133		N.T.S	6.5		—	
TITLE				DRAWING No.		
SPRING HANGER				4—150—00—01198		
500MW				SHEET No. 1		
				No.OF SHEETS 1		

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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

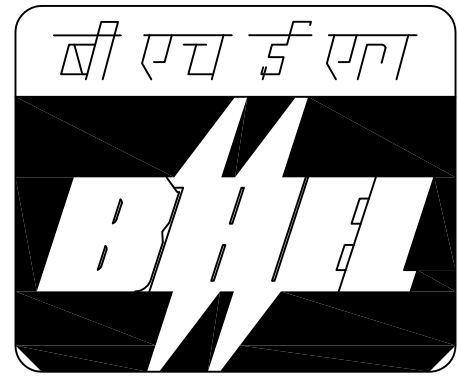
REV	DATE	ALTERED		REV	DATE	ALTERED		CBOM No.			STATUS OF DRG
		CHECKED		01	06.04.18	CHECKED		—			
				REVISION MARKED				AGREED DEPT.	NAME	SIGN	DATE
GRADE OF UN					TOL.DIM.M/CG—V/C/M/F.AA0230208			WELDING A/B/C/D AA0621104			GAS CUTTING—T3 AA0621101



NOTE:—
THE DIMENSION 300 CORRESPONDS TO ZERO COMPRESSION OF THE SPRING.
THIS DIMENSION SHALL GET EXTENDED ACCORDING TO THE LOAD ON THE SPRING CAGE

- TESTING REQUIREMENTS**
- 1. STATIC LOAD TESTING OF SPRING AS PER IS:7906 PART–II
 - 2. SPRING RATE CHECKING
 - 3. MATERIAL TEST (CHEMICAL COMP.) OF SPRING
 - 4. MATERIAL TEST FOR TURNBUCKLE
 - 5. TEST CERTIFICATES FOR 1,2,3,4 TO BE FURNISHED
- PAINTING REQUIREMENTS**
- 1. ALL PARTS EXCEPT SPRING SHALL BE COATED WITH RED OXIDE PRIMER
 - 2. THE COMPLETE SPRING HANGER TO BE COATED WITH 2COATS OF DARK ADMIRALTY GREY PAINT
 - 3. SPRING SURFACE TO BE MANGANESE PHOSPHATED AND OIL DIPPED

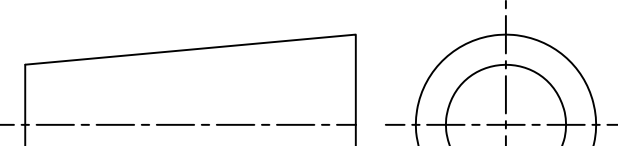
PURCHASED W96415002490



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	KB MUKHERJEE	sd/—	16.11.99	
CHD	K.R.GUPTA	sd/—	16.11.99	
APD	G.GUPTA	sd/—	16.11.99	

INVENTORY No.

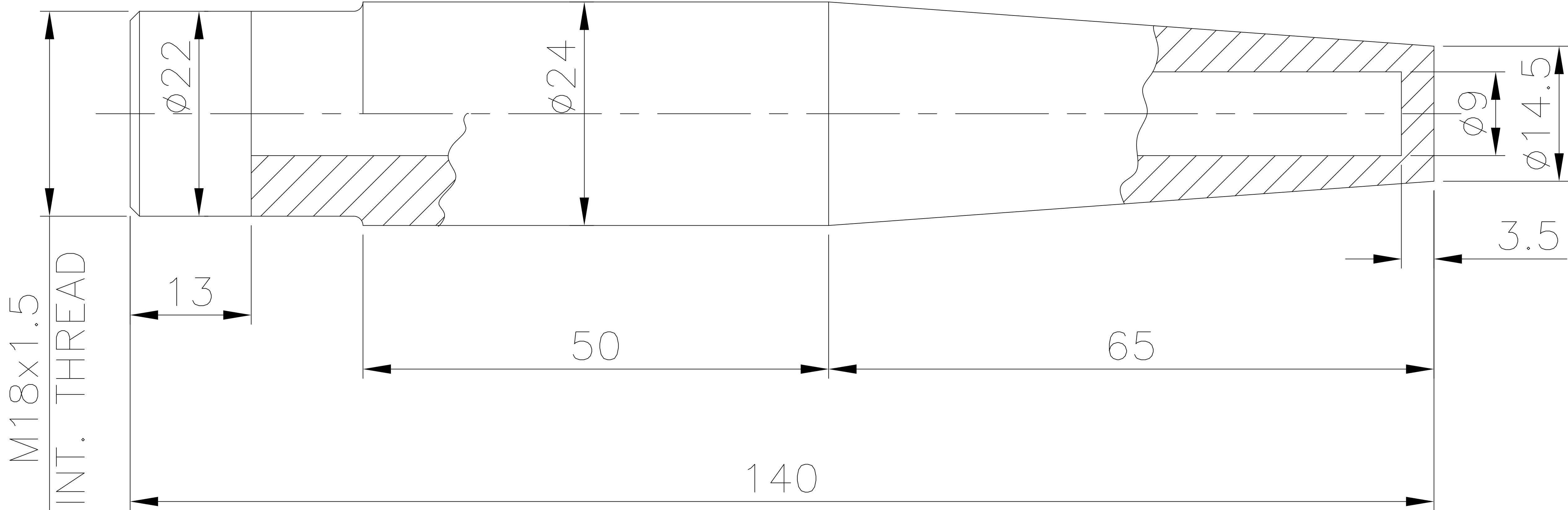
DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	No OF ITEMS
CODE 4133		N.T.S	13.5		—	
TITLE				DRAWING No.		
SPRING HANGER				4—150—00—01199		
				SHEET No. 1		No.OF SHEETS 1

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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	AKA2	sd/-	REV	DATE	ALTERED	K.B.M.	sd/-	CBOM No.			STATUS OF DRG
06	17.03.15	CHECKED	GC	sd/-	05	24.11.10	CHECKED	N.V.	sd/-	0-153-14-01001			
CHANGE ADVICE DONE AS PER CHANGE ADVICE NO. TGE-15-F0080.					CHANGE ADVICE DONE AS PER CHANGE ADVICE NO. TGE-10-F0304					AGREED DEPT.	NAME	SIGN	DATE
										EMT	SC GOYAL	sd/-	06.04.83
GRADE OF UNTO L.DIM.M/CG-V/C/M/F.AA0230208						WELDING A/B/C/D AA0621104				GAS CUTTING-T3 AA0621101			



NOTE;

1. HYDRAULIC TEST AND MATERIAL TEST CERTIFICATES SHALL BE SUPPLIED
2. VENDOR TO ENGRAVE MATERIAL CODE & DRAWING NO. WITH REV. NO. ON THE THERMOWELL

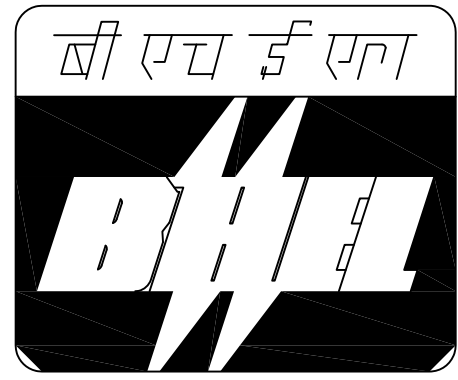
MATERIAL: AS PER BOM

TEST PRESSURE: 15 Kg/cm2, DURATION: 2 MIN.

MATERIAL CODE: W96415300814

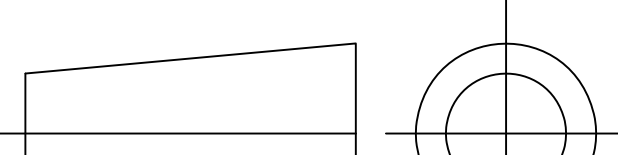
SUPERSEDES OLD DRAWING UNDER THE SAME NUMBER

PURCHASED



BHARAT HEAVY ELECTRICALS LTD
HARDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	B.D. SINGH	sd/-	09.04.81	
CHD	G. GUPTA	sd/-	15.02.83	
APD	D.R.C./N.P.G.	sd/-	12.05.83	

INVENTORY No.	DEPT. TGE		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	No OF ITEMS
	CODE 4233		1:1	0.400	2-153-14-01012	008	001
	TITLE THERMOWELL				DRAWING No. 4-153-14-01027		
					SHEET No.1		No.OF SHEETS 1



CORPORATE STANDARD

AA7151112

Rev. No. 05

PAGE 1 of 3

NUTS HEXAGON, PRODUCT Gr.B, COARSE PITCH, STEEL, PROPERTY CLASS 6 (M20-M36)

1.0 DESIGNATION

A Product Gr.B hexagon, steel nut, thread M24, coarse pitch and conforming to property class 6 shall be designated as:

1.1 On drawings

- i) Material specification column : AA7151112
- ii) Description column : NUT HEX B M24 – 6

1.2 On indents

Nut Hex B M24 – 6; AA7151112

1.3 For issuing enquiries and on purchase orders

While issuing enquiries and purchase orders, delete BHEL standard number from above description and add the information given under clause 2.0

2.0 COMPLIANCE WITH STANDARDS

2.1 Dimensions, Tolerances and General Requirements

As per IS: 1364, Part 3–2002, Reaffirmed 2007

2.2 Mechanical properties

To conform to property class 6, as specified in Table-5&6 of IS: 1367, Part 6

2.3 Threads

- Pitch - Coarse to IS: 4218, Part 2
- Tolerance quality - Medium
- Tolerance class - 6H

2.4 Identification Marking

As stated in clause 9 of IS: 1367, Part 6

2.5 Finish

As specified in BHEL order.

Revisions:
As per clause 32.2 of MOM of MRC-F

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC (F)

Rev. No. 05	Amd. No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue
Dt: 06-09-2014	Dt:	Year:	HPEP, Hyderabad	Corp. R&D	01-01-1977

3.0 NOTE

- 3.1 For nut, hexagon, brass product Gr.A, coarse pitch, (M1.6-M16) refer BHEL standard AA7151113
- 3.2 For screw threads, general (Metric) refer to BHEL standard AA0231800
- 3.3 For tolerance grade, position and class refer to BHEL standard AA0230201
- 3.4 Nuts to this standard would be unplated, divisions wishing to have plated screws would have to get them plated.
- 3.5 Weights given in this standard are for general reference only and are not meant for commercial transactions.
- 3.6 When fasteners are to be tested with in BHEL, the sampling and acceptance plan shall be as per IS: 1367, Part 17

4.0 REFERRED STANDARDS (Latest Publications including Amendments)

- 1) IS: 1367, Part 6 & 17
- 2) IS: 4218, Part 2
- 3) AA7151113
- 4) AA0231800
- 5) AA0230201

EXPLANATORY NOTE

The following changes have been made in the revision:

- Clause 2.1, Reaffirmed 2007 added to IS: 1364 Part 3
- Clause 2.2, Reference year removed for IS: 1367 Part 6
- Clause 2.3, Reference year removed for IS: 4218 Part 2
- Clause 4.0 changed

Fig 1

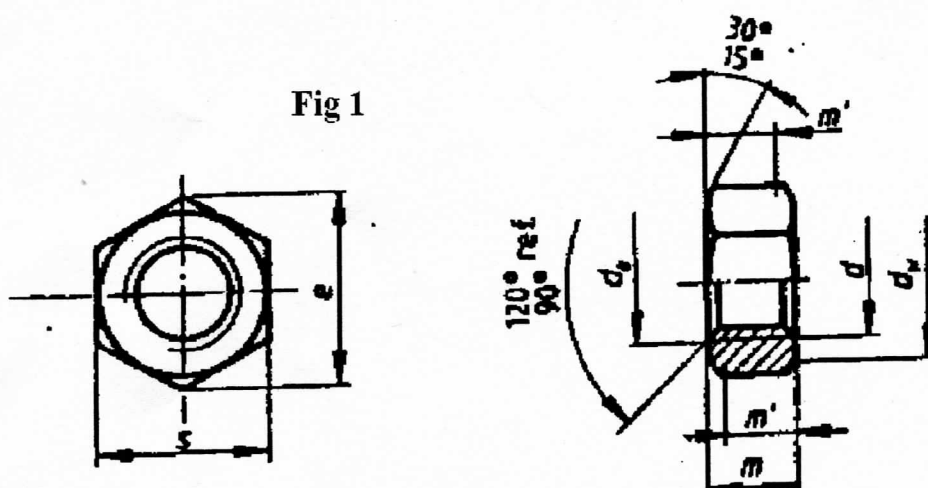


Table-1

All dimensions are in mm

Size	Flats		Coreners	Thickness		Wrench Height	Dia	Dia		Sub Code
d	s		e	m		m'	d _w	d _a		
Nom.	Max.	Min.	Min.	Max.	Min.	Min.	Min.	Min.	Max.	Weight
M20	30	29.16	32.95	18.0	16.9	13.5	27.7	20	21.6	017 64.59
M24	36	35	39.55	21.5	20.2	16.2	33.3	24	25.9	025 110.40
M30	46	45	50.85	25.6	24.3	19.4	42.8	30	32.4	033 237.40
M36	55	53.8	60.79	31.0	29.4	23.5	51.1	36	38.9	041 396.80

NOTE:

- 1) Corporate sub code numbers are shown above.
- 2) Weights have been shown in kg/1000 Nos.

24/09/14

CS-804

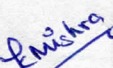
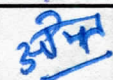
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.		संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW-59870 पृष्ठ 11 का 1 Page 1 of 11																																																
			FLOUROCARBON /VITON RUBBER SHEETS, GASKETS CORDS, PROFILES, MOULDINGS ETC			Supersedes old standard no. TG-60101, TG-60108, TG60154, TG60158, TG-60413 partially, TG-60414, TG-60415																																															
1. GENERAL : This specification governs the quality of fluorocarbon/viton rubber sheets, gaskets, cords, profiles & mouldings of different grades.. 2. APPLICATION : Used as gaskets, mouldings & seals in DC & AC machines, water turbines, shunt reactors and generators. 3. COMPLIANCE WITH NATIONAL STANDARD : There is no Indian standard covering this specification. 4. DIMENSIONS AND TOLERANCES 4.1 SIZES - Length x Width x Thickness of sheet shall be stated on the order. - Gaskets, mouldings, cords, profiles shall be supplied as per our drawings. - Preferred thickness of sheets & gaskets shall be 2,3,4,5,6,8,10,12 & 16 mm. 4.2 TOLERANCES Variation in individual piece not to increase more than 50% of given tolerance. Unless otherwise stated on the order/drawing tolerance on length, width and thickness shall be as follows:-																																																					
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए 1.1.10 <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">TSX</td> <td style="width:20%;">V.K. Singh</td> <td style="width:15%;">31/11/18</td> <td style="width:15%;">अनुवादक TRANSLATED BY</td> <td style="width:15%;">-</td> <td style="width:20%;"></td> </tr> <tr> <td>QAX</td> <td>S.K. Chauhan</td> <td>31/11/18</td> <td>निर्माणकर्ता WORKED BY</td> <td>Amit</td> <td>27/11/18</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT.</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td>जांचकर्ता CHECKED BY</td> <td>Rakesh Kumar</td> <td>27/11/18</td> </tr> <tr> <td>WORKED BY</td> <td>PRASHANT</td> <td>31/11/18</td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>R.C. Bajpai</td> <td>27.11.18</td> </tr> <tr> <td>CHECKED BY</td> <td>AMIT</td> <td>31/11/18</td> <td colspan="3"> स्वीकृति : APPROVED : AGM (EME) 27.11.18 संस्थान मानक समिति PLANT STANDARDS COMMITTEE </td> </tr> <tr> <td>Rev. No. 02</td> <td></td> <td></td> <td colspan="3"> निमाण : मानक विभाग PREPARED : EME ISSUED : STANDARDS DIVISION </td> </tr> <tr> <td>31/8/18</td> <td></td> <td></td> <td colspan="3"> दिनांक : DATE : 10.11.80 </td> </tr> <tr> <td>C/A NO.</td> <td>TSX(EME)18-98</td> <td>31/8/18</td> <td colspan="3"></td> </tr> </table>						TSX	V.K. Singh	31/11/18	अनुवादक TRANSLATED BY	-		QAX	S.K. Chauhan	31/11/18	निर्माणकर्ता WORKED BY	Amit	27/11/18	सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	जांचकर्ता CHECKED BY	Rakesh Kumar	27/11/18	WORKED BY	PRASHANT	31/11/18	पर्यवेक्षणकर्ता SUPERVISED BY	R.C. Bajpai	27.11.18	CHECKED BY	AMIT	31/11/18	स्वीकृति : APPROVED : AGM (EME) 27.11.18 संस्थान मानक समिति PLANT STANDARDS COMMITTEE			Rev. No. 02			निमाण : मानक विभाग PREPARED : EME ISSUED : STANDARDS DIVISION			31/8/18			दिनांक : DATE : 10.11.80			C/A NO.	TSX(EME)18-98	31/8/18			
TSX	V.K. Singh	31/11/18	अनुवादक TRANSLATED BY	-																																																	
QAX	S.K. Chauhan	31/11/18	निर्माणकर्ता WORKED BY	Amit	27/11/18																																																
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	जांचकर्ता CHECKED BY	Rakesh Kumar	27/11/18																																																
WORKED BY	PRASHANT	31/11/18	पर्यवेक्षणकर्ता SUPERVISED BY	R.C. Bajpai	27.11.18																																																
CHECKED BY	AMIT	31/11/18	स्वीकृति : APPROVED : AGM (EME) 27.11.18 संस्थान मानक समिति PLANT STANDARDS COMMITTEE																																																		
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31/8/18			दिनांक : DATE : 10.11.80																																																		
C/A NO.	TSX(EME)18-98	31/8/18																																																			

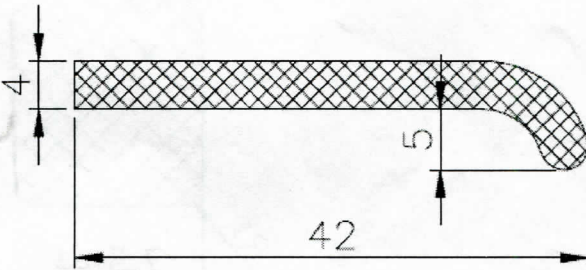
दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW-59870 पृष्ठ 11 का 2 Page 2 of 11		
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकृत करता है	4.2.1 On Length & width: $\pm 3\%$ (Max.3mm) 4.2.2 On Thickness: +10% upto 4mm thickness +0.40 from 05 to 08 mm +0.60 from 09 to 12 mm. +0.80 from 13 to 16 mm. 4.2.3 On Cord dia: +0.20mm upto dia. 06 mm. +0.25mm from dia. 07 to 12mm. +0.30mm from dia. 13 to 20mm. +0.35mm from dia. 21 to 30mm. +0.40mm from dia. 31 to 40mm.					
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	5. FINISH & FREEDOM FROM DEFECTS : Material shall have a smooth finish when seen with a magnifying glass (1X10). All ingredients of the mix shall be free from grit and extraneous matter. The selection and processing of the ingredients shall be such that the vulcanizate is free from surface imperfections, blisters, porosity, voids, inclusions, flow marks, inadequate joint of moulding blank, cracks, twists and other defects which could impair the satisfactory performance.					
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	6. CHEMICAL COMPOSITION : Sheets, gaskets, mouldings shall be made out of fluorocarbon rubber. 7. IDENTIFICATION : The material when identified by infrared spectrometer or by infrared spectrometer or by other convenient method shall be of fluoro-elastomer rubber. It is inert to 80% H₂SO₄ or concentrated HNO₃. Burns brightly in flame but extinguishes immediately on removal from flame. 8. TEST SAMPLES : The test certificates in respect of tests at sl. No. 9 & 10 shall be supplied alongwith test samples. The samples shall have the same composition and shall be made by the same process as the original product. Supplier shall not change the composition/ process after type approval. In case of any change, the same shall be revalidated from BHEL.					
हस्ताक्षर एवं दिनांक SIGN & DATE 2-11-2010	8.1 SAMPLE FOR ROUTINE TESTING Solid cylinder dia. 29$\pm$0.5 x 12.5$\pm$0.5 ----- 3 nos.					
सामग्री सूची संख्या INVENTORY NO. P-3721	REV.NO. 02		निर्माणकर्ता WORKED BY	Amit		27/11/10
			जांचकर्ता CHECKED BY	Rakesh Kr.		27/11/10

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हार्डवार) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW-59870 पृष्ठ 11 का 3 Page 3 of 11
सामग्री सूची संख्या को अधिकृत करता है SUPERSEDES INVENTORY NO.	Extra component in case 'O' ring Or if otherwise mentioned in P.O. ----- 1 No.		
The samples for routine testing shall be supplied alongwith the consignment. The compression test & any other test to the extent possible shall be carried out on the original supplies to ascertain the reliability of the supplies material. In case of gaskets & moulded articles the testing may be done on 5% pieces selected at random. In case of cords the required length for testing may be taken from each roll supplied.			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	8.2 <u>SAMLES FOR TYPE TESTING :</u> Sheet 150x150x3mm ----- 3 nos. Solid cylinder dia . 29±0.5 x 12.5±0.5 ----- 9 nos.		
A complete set of test samples for type testing shall be supplied for testing/evaluation at BHEL for vendor approval as well as once in a year for revalidation of vendor approval. A complete set of test of test samples for type test shall also be supplied alongwith consignment in case it is specially asked for in P.O./enquiry.			
9 <u>ROUTINE TESTS :</u>			
9.1. <u>DIMENSIONS AND TOLERANCES:</u> To be checked as per clause no. 4.			
9.2 <u>FINISH & FREEDOM FROM DEFECTS :</u> To be checked as per clause no. 5.			
9.3 <u>HARDNESS (B.S. 903: PART A 26: METHOD N) :</u> Unless otherwise stated on drawing/purchase order, hardness shall be 80±5 IRHD.			
9.4. <u>COMPRESSION SET AT 200°C FOR 22 HRS. (IS:3400, PART X) :</u> 14% max.			
9.5. <u>IDENTIFICATION :</u> As per clause no.7.			
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।	हस्ताक्षर एवं दिनांक SIGN & DATE 27/11/10	सामग्री सूची संख्या INVENTOR YNO. P-3721	REV.NO. 02
		निर्माणकर्ता WORKED BY Amit	जांचकर्ता CHECKED BY Rakesh Kr.
		27/11/10	27/11/10

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW-59870	
				पृष्ठ 11 का 4 Page 4 of 11	
SUPERSEDES INVENTORY NO.					
सामग्री सूची संख्या को अधिकृतित करता है					
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10. TYPE TESTs :					
10.1 TENSILE STRENGTH (IS:3400. PART I. DUMB BELL) :					
10 N/mm ² Min.					
10.2 ELONGATION AT BREAK (IS:3400. PART I. DUMB BELL) :					
150%Min.					
10.3 COMPRESSION SET AT 200° C FOR 22 HRS. (IS : 3400. PART X) :					
14% Max.					
10.4 COMPRESSION SET AT 200° C FOR 70 HRS. (IS : 3400. PART X) :					
25% Max.					
10.5 ADHESION TO & CORROSION OF METALS (BS: 2751. APPENDIX-A) :					
There shall be no corrosion or pitting of the metals and the material shall not adhere to the metal surface or show any sign of liquid exudation.					
10.6 ACCELERATED AGING. (IS : 3400. PART IV) :					
10.6.1 AGEING IN AIR :					
The specimen shall be aged in air for 168 hours at 200±5° C. Following shall be the changes over the values obtained at clause 09.3, 10.1, 10.2.					
Change in Hardness Not more than +5 IRHD Change in T.S. ±2.5 N/mm ² Elongation 125 % Min.					
10.6.2 AGEING IN OIL :					
The specimen shall be aged in insulating oil, confirming to IS : 335, for 168 hrs. at 100 °C. After oil is wiped by blotting paper, the specimen shall show the following properties.					
10.6.2.1 OIL ABSORPTION :					
The original weight of the specimen shall not increase by more than 1.5%					
सामग्री सूची संख्या INVENTORY NO.	REV.NO. 02	निर्माणकर्ता WORKED BY		Amit	27/11/10
		जांचकर्ता CHECKED BY		Rakesh Kr.	27/11/10
P-3721					

दिनांक एवं हस्ताक्षर SIGN & DATE			संस्थान क्रय विनिर्देश (हीप : हरिद्वार) PLANT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		HW-59870 पृष्ठ 11 का 5 Page 5 of 11	
सामग्री सूची संख्या INVENTORY NO.		SUPERSEDES INVENTORY NO.	10.6.2.2 CHANGE IN VOLUME: $\pm 5\%$ Max. 10.7 RESISTANCE TO SOLVENTS, LUBRICANTS ETC: The material shall have long wearing characteristics, resistance to oil, fuels, grease, lubricants, and solvents etc., coupled with excellent resistance to atmospheric oxidation. 11 STORAGE: The finished rubber items shall be stored at ambient temperature not exceeding 30°C & not below 15°C. Condensation, moist conditions should be avoided and humidity generally should not exceed 80%. Exposure to direct sunlight, strong artificial light, and ultra-violet light should be avoided. Contact with liquid or semi-solid material should be avoided. Under the recommended storage conditions, the maximum shelf life is 12 years. 12 TRACEABILITY OF MATERIAL: The supplier shall print the name of his organization, monogram, month & year of manufacture on each and every item. In case of chord, the same shall be done on every meter length. The printing so done should not damage the surface of rubber component and no way affect its quality. 13 TEST CERTIFICATES: Unless otherwise stated, three copies of test certificates shall be supplied along with each consignment giving the following information: - Fluorocarbon/Viton Rubber to BHEL Purchase specification No. : - BHEL Purchase Order No. : - Drawing No. & Item No. if any : - Supplier's Name : - Batch No. and Month & Year of manufacture : - Size & Quantity supplied :			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company						
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत भारती एलेक्ट्रिकल लिमिटेड की सम्पत्ति है इसका प्रयोग एवं आश्रय के बिना या किसी भी तृतीय पक्ष को किसी भी रूप में प्रयोग के बिना न होना चाहिए।						
दिनांक एवं हस्ताक्षर SIGN & DATE						
सामग्री सूची संख्या INVENTORY	REV. NO. 02	(SUPERSEDES)	निर्माणकर्ता WORKED BY	PRASHANT		31/8/18
			जांचकर्ता CHECKED BY	AMIT MITTAL		4/9/18

दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद क्रय विनिर्देश PRODUCT PURCHASE SPECIFICATION		HW-59870 पृष्ठ 11 का 6 Page 6 of 11	
SUPERSEDES INVENTORY		- Test result of routine tests as per clause no.09 : - Reference & copy of test Report as per clause no. 10. : (not older than 2 years on the date of supply)				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		14 INSPECTION AT SUPPLIERS WORK : All facilities shall be provided by the supplier for carrying out the inspection at supplier's works. BHEL shall have the right to check at manufacturing stage of the product ordered. 15 PACKING & MARKING : The material shall be preserved with French-chalk powder, packed to prevent damage from contamination and handling during transit and storage. The moulded articles should be packed individually in a sealed transparent plastic cover packing which should be further kept in a carton having max. gross wt. of 10 Kgs. The "O" rings may be packed in a similar way as above. The cords should be rolled over wooden/plastic drums of dia. 250mm with max. gross wt. of 10 Kgs and the drum should be sealed air tight. The drum flange size should be such that the cord when rolled does not project over the flange. The minimum length of the cord required in a single piece shall be mentioned in the PO. Each package shall be legibly marked with following information :- - Fluorocarbon/Viton Rubber to BHEL Purchase specification No. : - BHEL Purchase Order No. : - Drawing No. & Item No. if any : - Supplier's Name : - Batch No. and Month & Year of manufacture : - Size & Quantity supplied :				
स्वत्वधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं प्रसारण अन्य से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाय।						
दिनांक एवं हस्ताक्षर SIGN & DATE						
सामग्री सूची संख्या INVENTORY NO.	P-3721	REV. NO. 02	(SUPERSEDES)	निर्माणकर्ता WORKED BY	PRASHANT	 31/8/18
				जांचकर्ता CHECKED BY	AMIT MITTAL	 4/9/18

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW-59870 पृष्ठ 11 का 7 Page 7 of 11	
सामग्री सूची संख्या को अधिकृतित करता है SUPERSEDES INVENTORY NO.	16 ACCEPTANCE CRITERIA : The items shall be accepted by BHEL on the basis of the following:- -Compliance certificate furnished by the supplier. -Test certificate furnished by the supplier as per cl. No. 13 -Testing carried out by BHEL on furnished products or otherwise.				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	17 REJECTION : BHEL reserves the right to reject the entire lot of material, if found not confirming to stipulations of this specification. Parts of the lot not subjected to testing but found to be defective and those with hidden defects can also be rejected later on.				
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।	PROFILE VITON TYPE 107.001 				
दिनांक एवं हस्ताक्षर SIGN & DATE 2-11/2010					
सामग्री सूची संख्या INVENTORY NO. P-3721	REV.NO. 02		निर्माणकर्ता WORKED BY Amit	जांचकर्ता CHECKED BY Rakesh Kr.	27/11/10 27/11/10

संस्थान क्रय विनिर्देश

(हीप - हरिद्वार)

PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

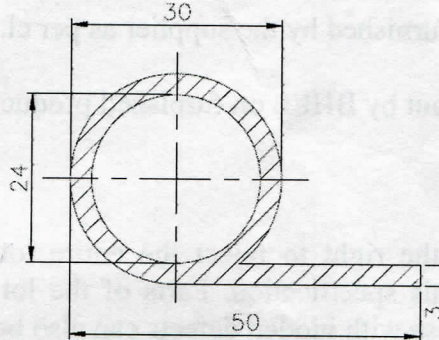
HW-59870

पृष्ठ 11 का 8

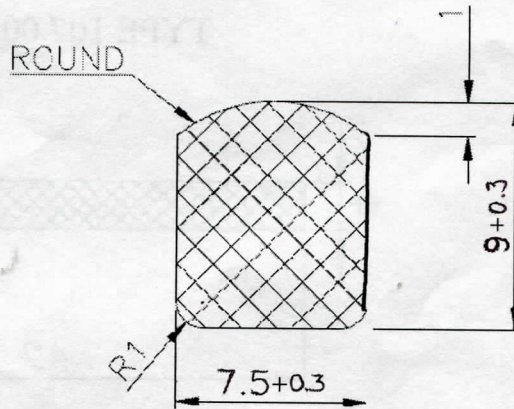
Page 8 of 11



TYPE 502.003 FLUOR-KAUKSCHOK



SKETCH PROFILE RUBBER VITON HW5984588013



दिनांक एवं हस्ताक्षर
SIGN & DATE

SUPERSEDES
INVENTORY NO.

सामग्री सूची संख्या को
अधिकृतित करता है

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स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO.

REV.NO.
02

निर्माणकर्ता
WORKED BY

Amit

जांचकर्ता
CHECKED BY

Rakesh Kr.

27/11/10

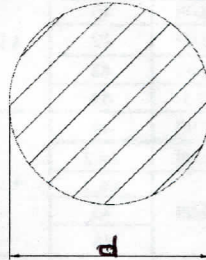
27/11/10



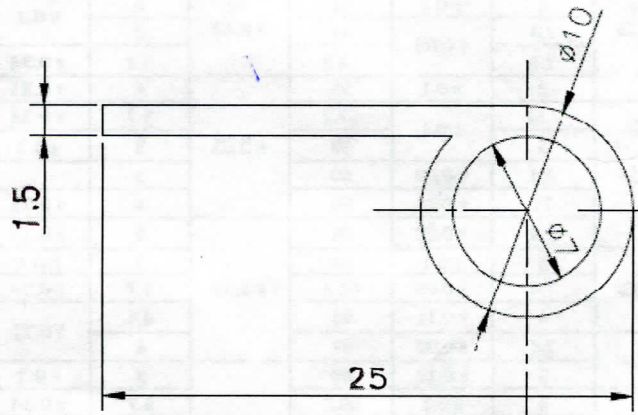
(हीप – हरिद्वार)

PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

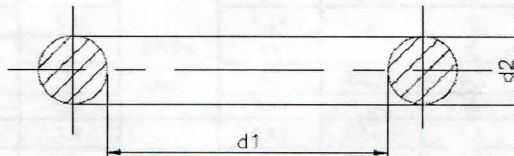
Profile NO. 501-026 d=10±0.3 Mat.Code =HW5983681010



PROFILE NO. 502.004



O-RING



DIMENSIONAL DETAILS AS PER TABLE-1

NOTE :LENGTH OF ALL PROFILES AS PER PURCHASE ORDER

स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेतु इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी को हित में हानिकारक हो न किया जाए ।

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SUPERSEDES
INVENTORY NO.

सामग्री सूची संख्या बढ़ो
अधिकमित करता है

दिनांक एवं हस्ताक्षर
SIGN & DATE

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORYNO.

REV.NO.
02

निर्माणकर्ता
WORKED BY

Amit

जांचकर्ता
CHECKED BY

Rakesh Kr.

27/11/10

27/11/13



संस्थान क्रय विनिर्देश

(हीप - हार्डवार)

PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

HW-59870

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SUPERSEDES
INVENTORY NO.

सामग्री सूची संख्या को
अधिकृतित करना है

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स्वत्वाधिकार एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं
अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO.

REV.NO.
02

निर्माणकर्ता
WORKED BY

Amit

जांचकर्ता
CHECKED BY

Rakesh Kr.

27/11/10

27/11/10

TABLE-1

d1	d2	d1	d2	d1	d2
ALL.TOL	ALL.TOL	ALL.TOL	ALL.TOL	ALL.TOL	ALL.TOL
4	1.5 ±0.07	40	3 ±0.1	89	3 ±0.1
5	2.5 ±0.08	40	3.5 ±0.11	89.2	5.7 ±0.14
6	1.5 ±0.07	42	3 ±0.1	90	3 ±0.1
6	2 ±0.08	43	3 ±0.1	90	4 ±0.11
6	3 ±0.1	43	4 ±0.11	90	5 ±0.12
7.3	2.4 ±0.09	44	3 ±0.1	91	8 ±0.16
8	2 ±0.08	44.2	3 ±0.1	92	8.5 ±0.18
8.3	2.4 ±0.09	44.2	5.7 ±0.14	94	3 ±0.1
9	2.5 ±0.09	45	3 ±0.1	94.2	5.7 ±0.14
9.5	2.4 ±0.09	45	3.5 ±0.11	97	5 ±0.12
10	2.5 ±0.09	46	3 ±0.1	99.2	5.7 ±0.14
10.3	2.4 ±0.09	47	3.5 ±0.11	100	4 ±0.11
11	2.5 ±0.09	47	3 ±0.1	102	4 ±0.11
11.3	2.4 ±0.07	48	6 ±0.14	104.2	5.7 ±0.14
12	1.5 ±0.07	49	3 ±0.1	108	3 ±0.1
12	3 ±0.1	50	3 ±0.1	109.2	5.7 ±0.14
12.3	2.4 ±0.09	50	4 ±0.11	112	3 ±0.1
14	3 ±0.1	52	3 ±0.1	112	4 ±0.11
14.3	2.4 ±0.09	54	3 ±0.1	115	4 ±0.11
15	2.5 ±0.1	54.2	5.7 ±0.14	118	4 ±0.1
15	3 ±0.1	55	4 ±0.11	120	3 ±0.1
15.54	2.62 ±0.1	57.2	5.7 ±0.14	120	4 ±0.11
16	3 ±0.1	59	3 ±0.1	122	4 ±0.11
16.3	2.4 ±0.09	60	3 ±0.11	123	4 ±0.1
17	11 ±0.24	60	4 ±0.11	124	3 ±0.1
17.3	2.4 ±0.08	60	8 ±0.16	124.2	5.7 ±0.14
18	3 ±0.1	64	3 ±0.1	125	4 ±0.11
18.3	2.4 ±0.09	64.2	5.7 ±0.14	128	6 ±0.14
18	4 ±0.11	65	3.5 ±0.11	129	4 ±0.11
19.3	2.4 ±0.09	67	4 ±0.11	132	3 ±0.1
20	5 ±0.12	69	3 ±0.1	132	4 ±0.11
20.2	3 ±0.1	69.2	5.7 ±0.14	135	4 ±0.1
20.3	2.4 ±0.09	70	3 ±0.1	138	3 ±0.1
21.2	2.5 ±0.09	70	5 ±0.12	140	3 ±0.11
21.3	2.4 ±0.07	71	3 ±0.11	142	4 ±0.11
22	1.5 ±0.07	71	4 ±0.11	145	4 ±0.11
22	3 ±0.1	71.2	5.7 ±0.14	146	8 ±0.16
22.2	3 ±0.1	73	3 ±0.1	150	4 ±0.11
22.3	2.4 ±0.09	74	3 ±0.1	153	6 ±0.14
25	3 ±0.1	74.2	5.2 ±0.14	154	3 ±0.1
25.3	2.4 ±0.09	74.2	5.7 ±0.14	155	4 ±0.11
25.3	2.4 ±0.09	75	4 ±0.11	159	6 ±0.14
28	3 ±0.1	78	3 ±0.11	160	3 ±0.1
30	3 ±0.1	78	5 ±0.12	160	4 ±0.11
32	3 ±0.1	79	3 ±0.1	164	4 ±0.11
33	3.5 ±0.11	79.2	5.7 ±0.14	165	4 ±0.11
34	3 ±0.1	80	3 ±0.1	166	6 ±0.14
34	4 ±0.11	80	4 ±0.11	170	4 ±0.11
35	3 ±0.1	81	6 ±0.14	171	11 ±0.24
35.2	3 ±0.1	84.2	6.7 ±0.14	175	5 ±0.12

दिनांक एवं हस्ताक्षर
SIGN & DATE



संस्थान क्रय विनिर्देश

(हीप - हरिद्वार)

PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

HW-59870

पृष्ठ 11 का 11

Page 11 of 11

SUPERSEDES
INVENTORY NO.

सामग्री सूची संख्या को
अधिकतम करना है

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स्वत्वधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रलेख एवं अप्रलेख रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE

सामग्री सूची संख्या
INVENTORY NO.

REV.NO.
02

निर्माणकर्ता
WORKED BY

Amit

जांचकर्ता
CHECKED BY

Rakesh Kr.

d1	ALL.TOL.	d2	ALL.TOL.	d1	ALL.TOL.	d2	ALL.TOL.	d1	ALL.TOL.	d2	ALL.TOL.
180	± 1.25	6	± 0.14	355	± 2.5	5	± 0.12	760		12	± 0.24
184.2		5.7	± 0.14	360		4	± 0.11	770	± 6.3	4	± 0.11
185	± 1.6	4	± 0.11	367		3.5	± 0.11	785		8	± 0.16
185		5	± 0.12	370		10	± 0.18	800		12	± 0.24
190		4	± 0.11	375	± 2.5	10		820	± 9	12	
193		6	± 0.14	380		4	± 0.11	837		4	± 0.11
195	± 1.6	4	± 0.11	380		10	± 0.18	870		12	± 0.24
200		3	± 0.1	385		12	± 0.24	920	± 9	12	
200		4	± 0.11	395	± 2.5	5	± 0.12	902		4	± 0.11
203		3	± 0.1	400		4	± 0.11	955		10	± 0.18
204		4	± 0.11	415	± 3.15	5	± 0.12	968		10	± 0.18
205	± 1.6	5	± 0.12	420		5		970		12	± 0.24
212		4	± 0.11	424		5	± 0.12	980	± 9	10	± 0.18
215		8	± 0.16	425		4	± 0.11	992		8	± 0.16
220		3	± 0.1	435	± 3.15	12	± 0.24	1002		4	± 0.11
220		5	± 0.12	438		4	± 0.11	1015		8	± 0.16
221	± 1.6	6	± 0.14	445		5	± 0.12	1022		6	± 0.14
228		4	± 0.11	450		5	± 0.12	1025	± 9	12	± 0.24
235		5	± 0.12	455		5		1070		12	
238		5	± 0.12	473		7.5	± 0.15	1100		12	
242		6	± 0.14	475	± 3.15	5	± 0.12	1185		8	± 0.16
243	± 1.6	4	± 0.11	485		5		1240	± 11	12	± 0.24
244		7	± 0.16	495	± 3.15	4	± 0.11	1246		8	± 0.16
245		5	± 0.12	500		5	± 0.12				
247		6	± 0.14	510		6	± 0.14				
250		4	± 0.11	530	± 4	4	± 0.11				
250	± 1.6	7	± 0.16	530		5	± 0.12				
250		8	± 0.16	530		12	± 0.24				
255	± 2	4	± 0.11	540		3	± 0.1				
260		5	± 0.12	540	± 4	4	± 0.11				
265		3	± 0.1	540		5	± 0.12				
265	± 2	5	± 0.12	550		8	± 0.15				
265		8	± 0.16	560		5	± 0.12				
275		5	± 0.12	580		10	± 0.18				
280		4	± 0.11	580	± 4	12	± 0.24				
280	± 2	5	± 0.12	585		4	± 0.11				
280		8	± 0.16	590		5	± 0.12				
280		10	± 0.18	598		8	± 0.15				
285		4	± 0.11	600		4	± 0.11				
285		6	± 0.14	600	± 4	10	± 0.18				
290	± 2	5	± 0.12	612		8	± 0.15				
290		8	± 0.15	621	± 4	8	± 0.15				
297		4	± 0.11	640		8					
300		4	± 0.11	655		4	± 0.11				
300		5	± 0.12	660	± 5.3	12	± 0.24				
315	± 2.5	4	± 0.11	680		12					
315		5	± 0.12	700		10	± 0.18				
330		4	± 0.11	730		4	± 0.11				
330		10	± 0.18	730		10	± 0.18				
345		5	± 0.12	745	± 5.3	7	± 0.15				
350	± 2.5	4	± 0.11	750		6	± 0.14				
355		4		750		10	± 0.18				

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