



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/4133/2018/4649V/1

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 - <u>Mandatory In-House Facilities</u> - Vendors should have capability for Pickling & passivation (only for CS items), Dye penetrant Testing and Hydraulic testing. <u>Mandatory Outsourced or In-House Facilities</u> - Ultrasonic Testing, Radiography Testing, chemical analysis facility shall be either in house or outsourced. - Particulars for testing facilities (at point a and b) along with details to be furnished. Photographs of pickling & passivation facility (tanks) will be provided. - 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. No.	Application	Name & address of customer	Contact details of customer (email and phone number etc.)	Purchase order Reference no.	Purchase order issue date	Total weight of quantity of piping item (kg.)	Brief technical details of Material of Construction	Details of test carried out
	1.	Thermal power-plant/ process industries Only							
	2.								
	3.								
	4.								



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Annexure-A

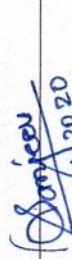
7.	In support of year of supply, vendor shall furnish copy of Purchase Order along with Bill of material executed in past along with test certificates (for the relevant PO's executed & indicated by vendor at point no. 6.0 above and qualifies the criteria at point 6.0 above).	
8.	Vendor to furnish the 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)

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

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

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DRG. NO.		AS PER PO		REV.	02		
SPEC. REV.		TG60682					
SL. NO.	1	COMPONENT & OPERATIONS	2	CHARACTERISTICS	3	CLASS	4
MATERIAL		Co-relation & verification of Mill TCs for		Major	Verify	100%	Standard as per BOM
Seamless C.S. pipes as per A106 Gr. B & SS Seamless pipe		a) Chem. Composition		Major	Chem. Analysis	1/Heat	-DO-
		b) Mech. Properties		Major	Mech. Test	1/Lot	-DO-
		c) Flattening or bending test (as applicable as per ASTM)		Major	Mech. Test	1/Lot	-DO-
		d) Hydraulic test		Major	Pressure Test	100%	-DO-
		e) Heat Treatment (As applicable)		Major	Time/Temp	100%	-DO-
		f) Surface finish		Major	Visual	100%	-DO-
		g) Dimensions (OD, ID & wall Thickness)		Major	Measurement	10%	-DO-
		h) NDT (UT/ECT)		Major	UT/ECT	100%	SA 106
1.2	Pipe fitting	Co-relation & verification of MTCs For		Major	Verify	100%	Standard as per BOM
		a) Chem. Composition		Major	Chem. Analysis	1/Heat	-DO-
		b) Mech. Properties		Major	Mech. Test	1/Heat batch	-DO-


 30.01.2020
 APPROVED BY
 Sanjeev Kumar Bhardwaj
 Senior Engineer
 वरिष्ठ अभियन्ता/Senior Engineer
 गुणता आश्वासन/Quality Assurance
 बी.एच.ई.एल. हरिद्वार/BHEL, Haridwar

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

1.3	FLANGES	c)Dimensions , Finish	Major	Measurement	100%	ANSI B16.9	ANSI B16.9	ANSI B16.9	-DO-	P	V	-	
		d)Wall thickness of bend by UT Gauge	Major	-DO-	100%	ASTM A234	ASTM A234	ASTM A234	TC	P	V	-	
		e)Heat Treatment (as applicable)	Major	Time / Temp	10%	Standard as per BOM	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	Standard as per BOM	TC	P	V	-	
		h)Surface defects	Major	DPT/MPI	100%	ASME SEC-V art-6	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	Standard as per BOM	TC	P	V	-	
		a) Chemical Composition	Major	Chem. test	1/Heat	-DO-	-DO-	-DO-	-DO-	P	V	-	
		b)mechanical properties	Major	Mech. Test	1/HT Batch	-DO-	-DO-	-DO-	-DO-	P	V	-	
		c)Heat Treatment	Major	Time/Temp	100%	-DO-	-DO-	-DO-	-DO-	P	V	-	
		d)Dimension	Major	Measurement	10%	As per Drawing in BOM	As per Drawing in BOM	As per Drawing in BOM	TCs	P	V	-	
		e)surface defects	Major	DPT	10%	E165/A275	E165/A275	ASME Sec.-VIII Div-I Appendix 8	TC/IR				

MANUFACTURER/SUBCONTRACTOR		LEGEND: ! 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 COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		FOR CUSTOMER USE		APPROVED BY
						50/6/1/2020

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

1.4	Fasteners	a) Verification of trade mark & prop. Class b) Dimension	Major	Verify	10%	Standard as per BOM	Standard as per BOM	TC	✓	P	V	-	
		c) Marking & Packing	-DO-	Measurement	10%	Standard as per BOM	Standard as per BOM	IR	✓	P	V	-	
1.5	Gaskets	a) Review of Test certificates b) Dimension	Major	Review	100%	TG60682	TG60682	IR	✓	P	W		
		c) Marking & Packing	Major	Measurement	100%	Standard as per BOM	Standard as per BOM	TC	✓	P	V		Gaskets procured by the vendor shall be from BHEL approved sources only.
1.6	Rods, Round, Flanges	a) Chemical composition, Mechanical b) Dimension, finish c) H.T. if applicable d) DPT/UT	Major	Visual	100%	TG60682	TG60682	TC	✓	P	W		
1.7	Angle, Beam, Channel, Tee Bar, Beam attachment, AS plate/Flat	a) Visual b) Dimensional c) Chemical d) Mechanical	-DO-	Chem. & Mech. Measurement Time/Temp.	100%	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V		
1.8	Forging, Turn buckle, Pipe clamp	a) Chemical & Mech. properties b) Heat treatment c) Hardness d) Surface defect	-DO-	Measurement & Visual Chem & Mech. Analysis/Mechanical Verify Hardness DPT	100% 1/Heat 1/Heat/ heat treatment batch 100% 20% 20% of each item	Drawing & Standard as per BOM	Drawing & Standard as per BOM	TC	✓	P	V	-	Inform vendor name

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		APPROVED BY  30.01.2020	

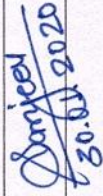
MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL							
BHEL	VENDOR'S NAME		ITEM	GENERATOR INTEGRAL PIPING & HYDROGEN COOLER PIPING		QP NO.	QA/BI/QP/321											
						REV.	02											
	DRG. NO.		AS PER PO															
	SPEC.-		TG60682															
	REV.-		02				Page 4 of 7											
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY		REMARKS						
1	2	3	4	5	6	7	8	9	D	M	B	N	11					

		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 Chemical Mechanical	-DO-	Analysis/ Mechanical Measurment Chem &Mech.	100%	Drawing & Standard as per BOM	TC	✓	P	V	-	
1.10	Connection, Inlet Header, Outlet header	Dimension & Visual Weld Quality H.T (if applicable)	-DO-	Measurment/Verify RT/DPT	100% Random	Drawing & Standard as per BOM	TC	✓	P	V	-	
1.11	Clamp, Support, Pipe Clamp assembly	Material TC's Heat Treatment Visual & Dimensional	-DO-	Verify Verify Verify	100% 100% 100%	Drawing & Standard as per BOM	IR	✓	P	V	-	
1.12	Base plate	Material TC's Visual & Dimensional	-DO-	Verify Measurment & Visual	100%	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	TC	✓	P	V	-	
1.14	Eye bolt, Welding eye	Supplier TC's	-DO-	Verify	100%	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	TC	✓	P	V	-	Inform vendor name

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MANUFACTURER/SUBCONTRACTOR				

MANUFACTURER'S NAME AND ADDRESS				STANDARD QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
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BHEL		DRG. NO.	AS PER PO		REV.	02									
		SPEC. -	TG6082												
		REV. -	02												
		CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS			
SL. NO.	COMPONENT & OPERATIONS	3	4	5	6	7	8	9	D	M	B	N	11		
1	2														

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. V VIII Div-I Appendix 8	-	✓	P	V	-	

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MANUFACTURER/SUBCONTRACTOR		 30.01.2020	

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BHEL		DRG. NO.	AS PER PO	REV.	02										
		SPEC.-	TG60682												
		REV.-	02												
		CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS				
SL. NO.	COMPONENT & OPERATIONS	3	4	5	6	7	8	9	D	M	B	N	11		

1		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	-	
2.3	WPS & PQR	Record for each weld combination & welder	-DO-	Verify	100%	ASME Sec. IX	ASME Sec. IX	-	✓	P	W	-	WPS, PQR shall be approved by BHEL
2.4	Welding	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	-	-	
		h) Internal Defects (for butt welds only)	Critical	RT /UT	As per applicable	HW0850199	HW0850199	I.R.	✓	P	W	-	
3.00	FINAL INSPECTION												
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		FOR CUSTOMER USE	
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BHEL	VENDOR'S NAME	ITEM	GENERATOR INTEGRAL PIPING & HYDROGEN COOLER PIPING		QP NO.	QA/BI/QP/021		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS	
					REV.	02							
		DRG. NO.	AS PER PO										
		SPEC.-	TG60682										
		REV.-	02										
					Page 7 of 7								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT		ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS		
1	2	3	4	5	6	7	8	9	D	M	B	N	
											10	11	

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		

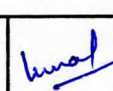
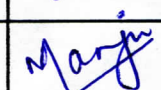
NOTES:-

- 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.

MANUFACTURER/SUBCONTRACTOR		LEGEND: ! 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  30.01.2020
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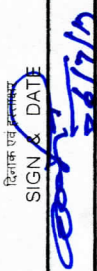
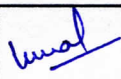
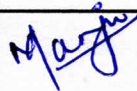
दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG 60682 मुख्य पृष्ठ PREFACE SHEET
सामग्री सूची संख्या INVENTORY NO.		SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकृत करता है	<u>SPECIFICATION FOR FABRICATION AND SUPPLY OF</u> <u>GENERATOR INTEGRAL PIPING</u> केवल आंतरिक प्रयोग हेतु प्रदायक को देने से पूर्व इस मुख्य पृष्ठ को निकाल दें। FOR INTERNAL USE ONLY REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS. समतुल्य मानक / सूची आदि COMPARABLE STANDARDS / CATALOGUES ETC. सुझाए / सम्भावित प्रदायक एवं श्रेणी SUGGESTED / PROBABLE SUPPLIERS AND GRADES. AS PER PMD – BI-153 - DEE DEVELOPMENT ENGINEERS LTD. - PAL ENGG CORPORATION - S&G ENGINEERS PVT. LTD. - UNITECH MACHINES LTD - BEND JOINTS - GUJARAT INFRAPIPES PVT. LTD. - PVT. LTD. - FLASH FORGE PVT. LTD. कोई अन्य जानकारी ANY OTHER INFORMATION		
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					
स्वत्वधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग जो कि सम्पत्ती के हित में हानिकारक हो न					
दिनांक एवं हस्ताक्षर SIGN & DATE					
सामग्री सूची संख्या INVENTORY NO.	P-6395		स्वीकृति APPROVED : RAKSH KUMAR (AGM - EME)	जारी ISSUED : TSX	दिनांक DATE : 29.03.2010
REV.NO.	02		निर्माण PREPARED : EME		Gr. No. 2.11
DATE	23.08.2017				

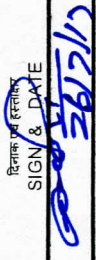
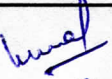
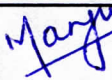
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COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	2.0 SCOPE OF WORK The scope of work for 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.																																																																										
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				पृष्ठ 6 का 2 Page 2 Of 6	
सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY	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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REV. NO. 02		निर्माणकर्ता WORKED BY	KUNAL MISHRA		11/07/17
		जांचकर्ता CHECKED BY	MANJU AZAD		11/7/17

नाम एवं हस्ताक्षर WALLEN		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)	TG 60682 पृष्ठ 6 का 3 Page 3 Of 6																																				
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				पृष्ठ 6 का 4 Page 4 Of 6	
सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY	7.0 PACKING & MARKING			
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		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.			
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग जो कि सम्पत्ती के हित में हानिकारक	दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 02 (SUPERSEDES)			
सामग्री सूची संख्या INVENTORY NO. P-6395	निर्माणकर्ता WORKED BY Jagdeesh Chauhan	जांचकर्ता CHECKED BY R. L. Vyas	जगदीश चौहान Jagdeesh Chauhan	23.08.17	23/8/17

नाम एवं हस्ताक्षर NAME AND SIGNATURE		उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG 60682 पृष्ठ 6 का 5 Page 5 Of 6																			
SUPERSEDES INVENTORY सामग्री सूची संख्या को अधिकृतित करता है	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: - <table border="1" style="width:100%; border-collapse: collapse; margin-top: 20px;"> <thead> <tr> <th style="width:10%;">S. No.</th> <th style="width:50%;">DESCRIPTION</th> <th style="width:40%;">COLOUR CODE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Seal oil system and Liquid Detector Rack System</td> <td>Light brown (ISC 410)</td> </tr> <tr> <td>2</td> <td>Primary water system</td> <td>Sea Green (ISC 217)</td> </tr> <tr> <td>3</td> <td>Gas system</td> <td>Canary yellow (ISC 309)</td> </tr> <tr> <td>4</td> <td>Waste gas and waste Fluid system</td> <td>Black (ISC 632)</td> </tr> <tr> <td>5</td> <td>H2 Cooler Piping system</td> <td>Sea Green (ISC 217)</td> </tr> </tbody> </table>					S. No.	DESCRIPTION	COLOUR CODE	1	Seal oil system and Liquid Detector Rack System	Light brown (ISC 410)	2	Primary water system	Sea Green (ISC 217)	3	Gas system	Canary yellow (ISC 309)	4	Waste gas and waste Fluid system	Black (ISC 632)	5	H2 Cooler Piping system	Sea Green (ISC 217)
S. No.						DESCRIPTION	COLOUR CODE																
1						Seal oil system and Liquid Detector Rack System	Light brown (ISC 410)																
2	Primary water system	Sea Green (ISC 217)																					
3	Gas system	Canary yellow (ISC 309)																					
4	Waste gas and waste Fluid system	Black (ISC 632)																					
5	H2 Cooler Piping system	Sea Green (ISC 217)																					
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग जो कि सम्पत्ती के हित में हानिकारक	8.0 FINAL INSPECTION BHEL inspection shall be carried out at vendor works before dispatch of material to Site. 9.0 GUARANTEE Vendor shall guarantee all material fabrication and workman ship of all piping furnished by vendor for a period of 24 months from the actual delivery or 18 months from the date of commissioning of the piping system whichever is earlier.																						
दिनांक एवं SIGN & DATE 																							
सामग्री सूची संख्या INVENTORY NO. P-6395	REV. NO. 02		निर्माणकर्ता WORKED BY KUNAL MISHRA 		11/07/17 11/07/17																		

नाम एवं हिस्सा नं. NAME & PART NO.			उत्पाद क्रय विनिर्देश (हीप : हरिद्वार) PRODUCT PURCHASE SPECIFICATION (HEEP: HARIDWAR)		TG 60682 पृष्ठ 6 का 6 Page 6 Of 6	
सामग्री सूची संख्या को अपडेट किया है Inventory No. is updated	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. 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.				
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 हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक						
दिनांक एवं हस्ताक्षर SIGN & DATE 						
सामग्री सूची संख्या INVENTORY NO. P.6395	REV. NO. 02		निर्माणकर्ता WORKED BY	KUNAL MISHRA		11/07/17
			जांचकर्ता CHECKED BY	MANJU AZAD		11/07/17



PIPING FOR GAS UNIT								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
1		FROM TERM. 95 (H2 DIST.) TO 94 (GU)						
	1.1	PIPE CS	D33.4X2.90		29	Mtr.	ASTM SA106 GR.B	63.22
2		FROM TERM. 90(GU) TO 16(GEN)						
	2.1	PIPE CS	D60.3X3.91		40	Mtr.	ASTM SA106 GR.B	217.60
	2.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A234 WPB,ASME B16.9	6.50
	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		FROM TERM. 97 (CO2 DIST.) TO TERM 96 (GU)						
	3.1	PIPE CS	D60.3X3.91		23	Mtr.	ASTM SA106 GR.B	125.12
	3.2	ELBOW LR 90°	D60.3X3.91		5	No.	ASTM A234 WPB,ASME B16.9	3.25
	3.3	FLANGE, 50NB (GU END)	31492501055	00	1	No.	IS:2062 E250 BR	2.50
	3.4	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	3.5	O-RING	41492501071	00	1	No.	HW59870	0.04
	3.6	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	3.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	3.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	3.9	FLANGE, 50NB (CO2 DIST. END)	31492501005	00	1	No.	IS:2062 E250 BR	2.50
	3.10	O-RING	41492501071	00	1	No.	HW59870	0.04
	3.11	SCREW HEX	A-8.8 M16X65		4	No.	IS:1364PART-2,1367PART-3	0.53
	3.12	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	3.13	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
4		FROM TERM. 91(GU) TO 15(GEN)						
	4.1	PIPE CS	D60.3X3.91		40	Mtr.	ASTM SA106 GR.B	217.60
	4.2	ELBOW LR 90°	D60.3X3.91		9	No.	ASTM A234 WPB,ASME B16.9	5.85
	4.3	FLANGE, 50NB (GU END)	31492501055	00	1	No.	IS:2062 E250 BR	2.50
	4.4	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	4.5	O-RING	41492501071	00	1	No.	HW59870	0.04
	4.6	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	4.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	4.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	4.9	FLANGE, 50NB (FOR GEN END)	31492501005	00	1	No.	IS:2062 E250 BR	2.50
	4.10	O-RING	41492501071	00	1	No.	HW59870	0.04
	4.11	SCREW HEX	A-8.8 M16X65		4	No.	IS:1364PART-2,1367PART-3	0.53
	4.12	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	4.13	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
5		FROM TERM. 19(GEN) TO 110/113 (GAS DRIER)						
	5.1	PIPE CS	D60.3X3.91		40	Mtr.	ASTM SA106 GR.B	217.60
	5.2	ELBOW LR 90°	D60.3X3.91		7	No.	ASTM A234 WPB,ASME B16.9	4.55
	5.3	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.49
	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	0.12

Kunal Mishra
KUNAL MISHRA
Dy. Mg. BHEL-HW2(ENG)



PIPING FOR GAS UNIT								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
6		FROM TERM. 111/112 (GAS DRIER) TO 20 (GEN)						
	6.1	PIPE CS	D60.3X3.91		40	Mtr.	ASTM SA106 GR.B	217.60
	6.2	ELBOW LR 90°	D60.3X3.91		5	No.	ASTM A234 WPB,ASME B16.9	3.25
	6.3	TEE	60.3x60.3x3.91		1	No.	ASTM A234 WPB,ASME B16.9	1.49
		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	0.12
7		FROM TERM. 107 (GU) TO 313A/B (GAC)						
	7.1	PIPE CS	D13.7X1.85		15	Mtr.	ASTM SA106 GR.B	8.10
	7.2	TEE	13.7X13.7X1.65		1	No.	ASTM A234 WPB,ASME B16.9	0.04
TOTAL WT.								1178.93

TOTAL WEIGHT OF PIPING FOR GAS SYSTEM = 1179 KG



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
101		PIPE ASSEMBLY FROM 76(SOU AIR SIDE) TO TERM. 72(SOVR)						
	101.5	GASKET VITON	122X76X3		5	No.	HW59870	0.225
	101.6	SCREW HEX	A-8.8 M16X55		40	No.	IS:1364PART-2,1367PART-3	4.64
	101.7	NUT HEX	A-8.8 M16		40	No.	IS:1364PART-3,1367PART-3	1.36
	101.8	WASHER MCD-ST17.0			80	No.	IS:2016-1967, IS:2062 E250 BR	0.88
	101.10	GASKET VITON	122X76X3		1	No.	HW59870	0.045
	101.11	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	101.12	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	101.13	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
102		PIPE ASSEMBLY FROM 80(SOUA) TO U-LOOP SOST						
	102.4	GASKET VITON	122X76X3		6	No.	HW59870	0.27
	102.5	SCREW HEX	A-8.8 M16X55		48	No.	IS:1364PART-2,1367PART-3	5.57
	102.6	NUT HEX	A-8.8 M16		48	No.	IS:1364PART-3,1367PART-3	1.63
	102.7	WASHER MCD-ST17.0			96	No.	IS:2016-1967, IS:2062 E250 BR	1.06
103		PIPE ASSEMBLY FROM 283 (SOUA) TO 467 (SOST)						
	103.4	GASKET VITON	122X76X3		6	No.	HW59870	0.27
	103.5	SCREW HEX	A-8.8 M16X55		48	No.	IS:1364PART-2,1367PART-3	5.568
	103.6	NUT HEX	A-8.8 M16		48	No.	IS:1364PART-3,1367PART-3	1.632
	103.7	WASHER MCD-ST17.0			96	No.	IS:2016-1967, IS:2062 E250 BR	1.056
	103.9	GASKET VITON	122X76X3		1	No.	HW59870	0.045
	103.10	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	103.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	103.13	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
104		PIPE ASSEMBLY FROM 419(SOUA) TO TERM 294(SOST)						
	104.4	GASKET VITON	158X115X3		5	No.	HW59870	0.30
	104.5	SCREW HEX	A-8.8 M16X60		80	No.	IS:1364PART-2,1367PART-3	9.92
	104.6	NUT HEX	A-8.8 M16		80	No.	IS:1364PART-3,1367PART-3	2.72
	104.7	WASHER MCD-ST17.0			160	No.	IS:2016-1967, IS:2062 E250 BR	1.76
	104.9	GASKET VITON	158X115X3		2	No.	HW59870	0.12
	104.10	SCREW HEX	A-8.8 M16X60		16	No.	IS:1364PART-2,1367PART-3	1.98
	104.11	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	104.12	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
105		PIPE ASSEMBLY FROM 70A(SOVR) TO TERM 6A/6C(GEN)						
	105.5	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	105.6	SCREW HEX	A-8.8 M12X50		4	No.	IS:1364PART-2,1367PART-3	0.252
	105.7	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	105.8	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496
	105.10	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	105.11	SCREW HEX	A-8.8 M12X50		20	No.	IS:1364PART-2,1367PART-3	1.26
	105.12	NUT HEX	A-8.8 M12		20	No.	IS:1364PART-3,1367PART-3	0.34
	105.13	WASHER MCD-ST 13			40	No.	IS:2016-1967, IS:2062 E250 BR	0.248
	105.15	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	105.16	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	105.17	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	105.18	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
106		BRANCH PIPE ASSEMBLY TO TERM 6C(GEN) (BRANCH OF PIPE AT SI NO. 105)						
	106.4	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	106.5	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	106.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	106.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
107		PIPE ASSEMBLY FROM 69A(SOVR) TO TERM 5A/5C(GEN)						
	107.6	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	107.7	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	107.8	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	107.9	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	107.11	GASKET VITON	102X60X3		5	No.	HW59870	0.64
	107.12	SCREW HEX	A-8.8 M16X55		20	No.	IS:1364PART-2,1367PART-3	2.32
	107.13	NUT HEX	A-8.8 M16		20	No.	IS:1364PART-3,1367PART-3	0.68
	107.14	WASHER MCD-ST17.0			40	No.	IS:2016-1967, IS:2062 E250 BR	0.44
	107.16	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	107.17	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	107.18	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	107.19	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
108		BRANCH PIPE ASSEMBLY FROM 5C(GEN) (BRANCH OF PIPE AT SI NO. 107)						
	108.5	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	108.6	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	108.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	108.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
109		PIPE ASSEMBLY FROM TERM.68A (SOVR) TO 4A/4C						
	109.6	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	109.7	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	109.8	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	109.9	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	109.11	GASKET VITON	102X60X3		5	No.	HW59870	0.64
	109.12	SCREW HEX	A-8.8 M16X55		20	No.	IS:1364PART-2,1367PART-3	2.32
	109.13	NUT HEX	A-8.8 M16		20	No.	IS:1364PART-3,1367PART-3	0.68
	109.14	WASHER MCD-ST17.0			40	No.	IS:2016-1967, IS:2062 E250 BR	0.44
	109.16	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	109.17	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	109.18	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	109.19	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
110		BRANCH PIPE ASSEMBLY TO TERM.68A(SOVR) (BRANCH OF PIPE AT SI NO. 109)						
	110.5	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	110.6	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	110.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	110.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
111		PIPE ASSEMBLY FROM TERM.69B (SOVR) TO 5D/5B						
	111.6	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	111.7	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	111.8	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	111.9	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	111.11	GASKET VITON	102X60X3		5	No.	HW59870	0.64
	111.12	SCREW HEX	A-8.8 M16X55		20	No.	IS:1364PART-2,1367PART-3	2.32
	111.13	NUT HEX	A-8.8 M16		20	No.	IS:1364PART-3,1367PART-3	0.68
	111.14	WASHER MCD-ST17.0			40	No.	IS:2016-1967, IS:2062 E250 BR	0.44
	111.16	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	111.17	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	111.18	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	111.19	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
112		BRANCH PIPE ASSEMBLY TO TERM.69B(SOVR) (BRANCH OF PIPE AT SI NO. 111)						
	112.5	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	112.6	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	112.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	112.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
113		PIPE ASSEMBLY FROM TERM. 68B (SOVR) TO 4B/4D						
	113.6	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	113.7	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	113.8	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	113.9	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	112.11	GASKET VITON	102X60X3		5	No.	HW59870	0.64
	113.12	SCREW HEX	A-8.8 M16X55		20	No.	IS:1364PART-2,1367PART-3	2.32
	113.13	NUT HEX	A-8.8 M16		20	No.	IS:1364PART-3,1367PART-3	0.68
	113.14	WASHER MCD-ST17.0			40	No.	IS:2016-1967, IS:2062 E250 BR	0.44
	113.16	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	113.17	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	113.18	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	113.19	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
114		BRANCH PIPE ASSEMBLY TO TERM.68B(SOVR) (BRANCH OF PIPE AT SI NO. 113)						
	114.5	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	114.6	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	114.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	114.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
119		PIPE ASSEMBLY FROM TERM 438(SOUH) TO 439(SOVR)						
	119.3	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	119.4	SCREW HEX	A-8.8 M12X50		4	No.	IS:1364PART-2,1367PART-3	0.252
	119.5	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	119.6	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496
	119.8	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	119.9	SCREW HEX	A-8.8 M12X50		40	No.	IS:1364PART-2,1367PART-3	2.52
	119.10	NUT HEX	A-8.8 M12		40	No.	IS:1364PART-3,1367PART-3	0.68
	119.11	WASHER MCD-ST 13			80	No.	IS:2016-1967, IS:2062 E250 BR	0.496
120		PIPE ASSEMBLY FROM TERM 78 (SOUH) TO 7A/7B (GEN)						
	120.6	O-RING	41492501071	01	64	No.	HW59870	2.24
	120.7	SCREW HEX	A-8.8 M16X65		64	No.	IS:1364PART-2,1367PART-3	8.45
	120.8	NUT HEX	A-8.8 M16		64	No.	IS:1364PART-3,1367PART-3	2.18
	120.9	WASHER MCD-ST17.0			132	No.	IS:2016-1967, IS:2062 E250 BR	1.45
	120.11	O-RING	41492501071	01	1	No.	HW59870	0.04
	120.12	SCREW HEX	A-8.8 M16X65		8	No.	IS:1364PART-2,1367PART-3	1.06
	120.13	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	120.14	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
121		BRANCH PIPE ASSEMBLY TO TERM.78(SOUH) (BRANCH OF PIPE AT SI NO. 120)						
	121.5	O-RING	41492501071	01	2	No.	HW59870	0.07
	121.6	SCREW HEX	A-8.8 M16X65		16	No.	IS:1364PART-2,1367PART-3	2.11
	121.7	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	121.8	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	121.10	O-RING	41492501071	01	1	No.	HW59870	0.04
	121.11	SCREW HEX	A-8.8 M16X65		8	No.	IS:1364PART-2,1367PART-3	1.06
	121.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	121.13	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
123		PIPE ASSEMBLY FROM TERM 79 (SOUH) TO 295 (SOST)						
	123.5	GASKET VITON	158X115X3		1	No.	HW59870	0.06
	123.6	SCREW HEX	A-8.8 M16X60		8	No.	IS:1364PART-2,1367PART-3	0.99
	123.7	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	123.8	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
	123.10	GASKET VITON	158X115X3		5	No.	HW59870	0.3
	123.11	SCREW HEX	A-8.8 M16X60		40	No.	IS:1364PART-2,1367PART-3	4.96
	123.12	NUT HEX	A-8.8 M16		40	No.	IS:1364PART-2,1367	1.36
	123.13	WASHER MCD-ST 13			80	No.	IS:2016-1967, IS:2062 E250 BR	0.496
124		PIPE ASSEMBLY FROM TERM 75(SOUH) TO 71(SOVR)						
	124.4	GASKET VITON	102X60X3		1	No.	HW59870	0.032
	124.5	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	124.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	124.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	124.9	GASKET VITON	102X60X3		6	No.	HW59870	0.768
	124.10	SCREW HEX	A-8.8 M16X55		24	No.	IS:1364PART-2,1367	2.78
	124.11	NUT HEX	A-8.8 M16		24	No.	IS:1364PART-2,1367	0.82
	124.12	WASHER MCD-ST17.0			48	No.	IS:2016-1967, IS:2062 E250 BR	0.53
125		PIPE ASSEMBLY FROM TERM 921(PEM) TO SEAL OIL CLR AIR SIDE SEAL OIL UNIT						
	125.5	GASKET VITON	158X115X3		2	No.	HW59870	0.12
	125.6	SCREW HEX	A-8.8 M16X60		16	No.	IS:1364PART-2,1367PART-3	1.98
	125.7	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	125.8	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	125.10	GASKET VITON	158X115X3		1	No.	HW59870	0.06
	125.11	SCREW HEX	A-8.8 M16X60		8	No.	IS:1364PART-2,1367PART-3	0.99
	125.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	125.13	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
	125.15	GASKET VITON	158X115X3		4	No.	HW59870	0.24
	125.16	SCREW HEX	A-8.8 M16X60		32	No.	IS:1364PART-2,1367PART-3	3.97
	125.17	NUT HEX	A-8.8 M16		32	No.	IS:1364PART-3,1367PART-3	1.09
	125.18	WASHER MCD-ST17.0			64	No.	IS:2016-1967, IS:2062 E250 BR	0.70



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
126		PIPE ASSEMBLY FROM TERM SEAL OIL CLR AIR SIDE SEAL OIL UNIT TO 922(PEM)						
	126.5	GASKET VITON	158X115X3		2	No.	HW59870	0.12
	126.6	SCREW HEX	A-8.8 M16X60		16	No.	IS:1364PART-2,1367PART-3	1.98
	126.7	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	126.8	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	126.10	GASKET VITON	158X115X3		1	No.	HW59870	0.06
	126.11	SCREW HEX	A-8.8 M16X60		8	No.	IS:1364PART-2,1367PART-3	0.99
	126.12	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	126.13	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
	126.15	GASKET VITON	158X115X3		4	No.	HW59870	0.24
	126.16	SCREW HEX	A-8.8 M16X60		32	No.	IS:1364PART-2,1367PART-3	3.97
	126.17	NUT HEX	A-8.8 M16		32	No.	IS:1364PART-3,1367PART-3	1.09
	126.18	WASHER MCD-ST17.0			64	No.	IS:2016-1967, IS:2062 E250 BR	0.70
127		PIPE ASSEMBLY FROM TERM 931(PEM) TO SEAL OIL CLR H2 SIDE SEAL OIL UNIT						
	127.5	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	127.6	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	127.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	127.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	127.10	GASKET VITON	102X60X3		4	No.	HW59870	0.512
	127.11	SCREW HEX	A-8.8 M16X55		16	No.	IS:1364PART-2,1367PART-3	1.86
	127.12	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	127.13	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	127.15	GASKET VITON	102X60X3		2	No.	HW59870	0.256
	127.16	SCREW HEX	A-8.8 M16X55		8	No.	IS:1364PART-2,1367PART-3	0.93
	127.17	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	127.18	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
128		PIPE ASSEMBLY FROM TERM SEAL OIL CLR H2 SIDE SEAL OIL UNIT TO TERM 932(PEM)						
	128.5	GASKET VITON	102X60X3		1	No.	HW59870	0.128
	128.6	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	128.7	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	128.8	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	128.10	GASKET VITON	102X60X3		4	No.	HW59870	0.512
	128.11	SCREW HEX	A-8.8 M16X55		16	No.	IS:1364PART-2,1367PART-3	1.86
	128.12	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	128.13	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	128.15	GASKET VITON	102X60X3		2	No.	HW59870	0.256
	128.16	SCREW HEX	A-8.8 M16X55		8	No.	IS:1364PART-2,1367PART-3	0.93
	128.17	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	128.18	WASHER MCD-ST17.0			16	No.	IS:2016-1967, IS:2062 E250 BR	0.18
129		PIPE ASSEMBLY FROM 70B(SOVR) TO TERM 6B/6D(GEN)						
	129.5	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	129.6	SCREW HEX	A-8.8 M12X50		4	No.	IS:1364PART-2,1367PART-3	0.252
	129.7	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.068
	129.8	WASHER MCD-ST 13			8	No.	IS:2016-1967, IS:2062 E250 BR	0.0496
	129.10	GASKET VITON	68X34X3		5	No.	HW59870	0.15
	129.11	SCREW HEX	A-8.8 M12X50		20	No.	IS:1364PART-2,1367PART-3	1.26
	129.12	NUT HEX	A-8.8 M12		20	No.	IS:1364PART-3,1367PART-3	0.34
	129.13	WASHER MCD-ST 13			40	No.	IS:2016-1967, IS:2062 E250 BR	0.248
	129.15	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	129.16	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	129.17	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	129.18	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
130		BRANCH PIPE ASSEMBLY TO TERM 6D(GEN) (BRANCH OF PIPE AT SI NO. 130)						
	130.4	GASKET VITON	88X48X3		1	No.	HW59870	0.03
	130.5	SCREW HEX	A-8.8 M16X40		4	No.	IS:1364PART-2,1367PART-3	0.37
	130.6	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	130.7	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
							TOTAL WT.	146.54

TOTAL WEIGHT OF PIPING FOR SEAL OIL SYSTEM = 147

KG



PIPING FOR LIQUID DETECTOR RACK								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
201		PIPE ASSEMBLY FROM TERM. 21A/B/C(GEN) TO 61A/B/C(LDR)						
	201.1	PIPE	D33.4X2.90		78	Mtr.	ASTM SA106 GR.B	170.04
	201.2	REDUCER CONC.	60.3X33.4X2.90		3	No.	ASTM A234 WPB,ASME B16.9	1.05
	201.3	FLANGE, 25NB	31500001239	04	30	No.	IS:2062 E250 BR	30.60
	201.4	GASKET VITON	68X34X3		15	No.	HW59870	0.45
	201.5	SCREW HEX	A-8.8 M12X50		60	No.	IS:1364PART-2,1367PART-3	3.78
	201.6	NUT HEX	A-8.8 M12		60	No.	IS:1364PART-3,1367PART-3	1.02
	201.7	WASHER MCD-ST 13			120	No.	IS:2016-1967, IS:2062 E250 BR	0.74
	201.8	FLANGE, 50NB (FOR 21B TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	201.9	GASKET VITON	102X60X3		4	No.	HW59870	0.14
	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			4	No.	IS:2016-1967, IS:2062 E250 BR	0.04
	201.13	FLANGE, 50NB (FOR 21A/C TP GEN END)	31500001239	07	2	No.	IS:2062 E250 BR	4.20
	201.14	GASKET VITON	102X60X3		8	No.	HW59870	0.28
	201.15	SCREW HEX	A-8.8 M12X40		8	No.	IS:1364PART-2,1367PART-3	0.50
	201.16	NUT HEX	A-8.8 M12		8	No.	IS:1364PART-3,1367PART-3	0.14
	201.17	WASHER MCD-ST 13			4	No.	IS:2016-1967, IS:2062 E250 BR	0.02
	201.18	FLANGE,25NB (FOR VLV)	31493201125	00	6	No.	IS:2062 E250 BR	6.78
	201.19	O-RING	41492501071	02	6	No.	HW59870	0.21
	201.20	SCREW HEX	A-8.8 M12X50		24	No.	IS:1364PART-2,1367PART-3	1.512
	201.21	NUT HEX	A-8.8 M12		24	No.	IS:1364PART-3,1367PART-3	0.408
	201.22	WASHER MCD-ST 13			48	No.	IS:2016-1967, IS:2062 E250 BR	0.2976
202		PIPE ASSEMBLY FROM TERM.22(GEN) TO 62(LDR)						
	202.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	202.2	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	202.3	FLANGE, 25NB	31500001239	04	6	No.	IS:2062 E250 BR	6.12
	202.4	GASKET VITON	68X34X3		3	No.	HW59870	0.09
	202.5	SCREW HEX	A-8.8 M12X50		12	No.	IS:1364PART-2,1367PART-3	0.76
	202.6	NUT HEX	A-8.8 M12		12	No.	IS:1364PART-3,1367PART-3	0.20
	202.7	WASHER MCD-ST 13			24	No.	IS:2016-1967, IS:2062 E250 BR	0.15
	202.8	FLANGE, 50NB (FOR 22 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	202.9	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	202.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	202.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	202.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
203		PIPE ASSEMBLY FROM TERM. 23/25(GEN) TO 63/64(LDR)						
	203.1	PIPE	D33.4X2.90		50	Mtr.	ASTM SA106 GR.B	109.00
	203.2	REDUCER CONC.	60.3X33.4X2.90		2	No.	ASTM A234 WPB,ASME B16.9	0.70
	203.3	FLANGE, 25NB	31500001239	04	12	No.	IS:2062 E250 BR	12.24
	203.4	GASKET VITON	68X34X3		6	No.	HW59870	0.18
	203.5	SCREW HEX	A-8.8 M12X50		24	No.	IS:1364PART-2,1367PART-3	1.51
	203.6	NUT HEX	A-8.8 M12		24	No.	IS:1364PART-3,1367PART-3	0.41
	203.7	WASHER MCD-ST 13			45	No.	IS:2016-1967, IS:2062 E250 BR	0.28
	203.8	FLANGE, 50NB (FOR 23 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	203.9	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	203.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	203.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	203.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	203.13	FLANGE, 50NB (FOR 25 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	203.14	GASKET VITON	102X60X3		1	No.	HW59870	0.04



PIPING FOR LIQUID DETECTOR RACK								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
	203.15	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	203.16	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	203.17	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09



PIPING FOR LIQUID DETECTOR RACK								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
204		PIPE ASSEMBLY FROM TERM. 27(GEN) TO 67(LDR)						
	204.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	204.2	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	204.3	FLANGE, 25NB	31500001239	04	6	No.	IS:2062 E250 BR	6.12
	204.4	GASKET VITON	68X34X3		3	No.	HW59870	0.09
	204.5	SCREW HEX	A-8.8 M12X50		12	No.	IS:1364PART-2,1367PART-3	0.76
	204.6	NUT HEX	A-8.8 M12		12	No.	IS:1364PART-3,1367PART-3	0.20
	204.7	WASHER MCD-ST 13			24	No.	IS:2016-1967, IS:2062 E250 BR	0.15
	204.8	FLANGE, 50NB (FOR 27 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	204.9	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	204.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	204.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	204.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
205		PIPE ASSEMBLY FROM TERM.26(GEN) TO 66(LDR)						
	205.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	205.2	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	205.3	FLANGE, 25NB	31500001239	04	6	No.	IS:2062 E250 BR	6.12
	205.4	GASKET VITON	68X34X3		3	No.	HW59870	0.09
	205.5	SCREW HEX	A-8.8 M12X50		12	No.	IS:1364PART-2,1367PART-3	0.76
	205.6	NUT HEX	A-8.8 M12		12	No.	IS:1364PART-3,1367PART-3	0.20
	205.7	WASHER MCD-ST 13			24	No.	IS:2016-1967, IS:2062 E250 BR	0.15
	205.8	FLANGE, 50NB (FOR 26 TP GEN END)	31500001239	07	1	No.	IS:2062 E250 BR	2.10
	205.9	GASKET VITON	102X60X3		1	No.	HW59870	0.04
	205.10	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	205.11	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	205.12	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
							TOTAL WT.	550.05

TOTAL WEIGHT OF PIPING FOR LDR = 550 KG



PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
301		PIPE ASSEMBLY FROM TERM.195 (PW UNIT) TO TERM. 196 (PW PIPELINE)						
	301.3	FLANGE, 150NB (PWU 195 END)	31531401089	01	1	No.	IS:2062 E250 BR	7.59
	301.5	GASKET VITON	218X159X3		1	No.	HW59870	0.06
	301.6	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	301.7	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	301.8	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
	301.10	GASKET VITON	212X169X3		1	No.	HW59870	0.06
	301.11	SCREW HEX	A-8.8 M20X80		8	No.	IS:1364PART-2,1367PART-3	2.06
	301.12	NUT HEX	A-8.8 M20		8	No.	IS:1364PART-3,1367PART-3	0.40
	301.13	WASHER MCD-ST 21			16	No.	IS:2016-1967, IS:2062 E250 BR	0.27
	301.15	GASKET VITON	212X169X3		5	No.	HW59870	0.30
	301.16	SCREW HEX	A-8.8 M20X80		80	No.	IS:1364PART-2,1367PART-3	20.64
	301.17	NUT HEX	A-8.8 M20		80	No.	IS:1364PART-3,1367PART-3	4.00
	301.18	WASHER MCD-ST 21			80	No.	IS:2016-1967, IS:2062 E250 BR	1.36
302		BRANCH PIPE ASSEMBLY FROM TERM.205 (PW TANK PIPE LINE) TO 206 (PW UNIT)						
	302.3	FLANGE, 150NB (PWU 206 END)	31531401089	01	1	No.	IS:2062 E250 BR	7.59
	302.5	GASKET VITON	218X159X3		1	No.	HW59870	0.06
	302.6	SCREW HEX	A-8.8 M24X130		8	No.	IS:1364PART-2,1367PART-3	5.00
	302.7	NUT HEX	A-8.8 M24		8	No.	IS:1364PART-3,1367PART-3	0.56
	302.8	WASHER MCD-ST 25			16	No.	IS:2016-1967, IS:2062 E250 BR	0.48
	302.10	GASKET VITON	212X169X3		1	No.	HW59870	0.06
	302.11	SCREW HEX	A-8.8 M20X80		8	No.	IS:1364PART-2,1367PART-3	2.06
	302.12	NUT HEX	A-8.8 M20		8	No.	IS:1364PART-3,1367PART-3	0.40
	302.13	WASHER MCD-ST 21			16	No.	IS:2016-1967, IS:2062 E250 BR	0.27
	302.15	GASKET VITON	212X169X3		5	No.	HW59870	0.30
	302.16	SCREW HEX	A-8.8 M20X80		80	No.	IS:1364PART-2,1367PART-3	20.64
	302.17	NUT HEX	A-8.8 M20		80	No.	IS:1364PART-3,1367PART-3	4.00
	302.18	WASHER MCD-ST 21			80	No.	IS:2016-1967, IS:2062 E250 BR	1.36
305		PIPE ASSEMBLY FROM TERM.579 (PW UNIT) TO 140 (PW TANK)						
	305.3	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	305.4	SCREW HEX	A-8.8 M16X50		4	No.	IS:1364PART-2,1367PART-3	0.46
	305.5	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	305.6	WASHER MCD-ST 17			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	305.8	GASKET VITON	68X34X3		4	No.	HW59870	0.12
	305.9	SCREW HEX	A-8.8 M16X50		24	No.	IS:1364PART-2,1367PART-3	2.78
	305.10	NUT HEX	A-8.8 M16		24	No.	IS:1364PART-3,1367PART-3	0.82
	305.11	WASHER MCD-ST 17			48	No.	IS:2016-1967, IS:2062 E250 BR	0.53
	305.13	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	305.14	SCREW HEX	A-8.8 M16X50		4	No.	IS:1364PART-2,1367PART-3	0.46
	305.15	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	305.16	WASHER MCD-ST 17			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
306		PIPE ASSEMBLY FROM TERM.149(PW TANK) TO 567 (PW UNIT)						
	306.3	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	306.4	SCREW HEX	A-8.8 M16X50		4	No.	IS:1364PART-2,1367PART-3	0.46
	306.5	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	306.6	WASHER MCD-ST 17			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	306.8	GASKET VITON	68X34X3		4	No.	HW59870	0.12
	306.9	SCREW HEX	A-8.8 M16X50		24	No.	IS:1364PART-2,1367PART-3	2.78
	306.10	NUT HEX	A-8.8 M16		24	No.	IS:1364PART-3,1367PART-3	0.82
	306.11	WASHER MCD-ST 17			48	No.	IS:2016-1967, IS:2062 E250 BR	0.53
	306.13	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	306.14	SCREW HEX	A-8.8 M16X50		4	No.	IS:1364PART-2,1367PART-3	0.46
	306.15	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	306.16	WASHER MCD-ST 17			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
307		PIPE ASSEMBLY FROM TERM.585(PW TANK) TO WASTE GAS						
	307.3	GASKET VITON	68X34X3		1	No.	HW59870	0.03
	307.4	SCREW HEX	A-8.8 M16X50		4	No.	IS:1364PART-2,1367PART-3	0.46
	307.5	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	307.6	WASHER MCD-ST 17			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	307.8	GASKET VITON	68X34X3		4	No.	HW59870	0.12
	307.9	SCREW HEX	A-8.8 M16X50		24	No.	IS:1364PART-2,1367PART-3	2.78
	307.10	NUT HEX	A-8.8 M16		24	No.	IS:1364PART-3,1367PART-3	0.82
	307.11	WASHER MCD-ST 17			48	No.	IS:2016-1967, IS:2062 E250 BR	0.53



PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
308		PIPE ASSEMBLY FROM PW COOLER INLET/OUTLET TO TERM 208/209						
	308.1	PIPE	D168.3X3.40		30	Mtr.	ASTM SA106 GR.B	414.90
	308.2	REDUCER CONC.	D168.3X141.3X3.4		4	No.	ASTM A234 WPB,ASME B16.9	4.40
	308.3	TEE	D168.3X168.3X3.4		2	No.	ASTM A234 WPB,ASME B16.9	8.00
	308.4	ELBOW LR 90°	D168.3x3.40		10	No.	ASTM A234 WPB,ASME B16.9	72.00
	308.5	CONNECTION FOR TE/TG	41500001118	00	6	No.	IS:2062 E250 BR	3
	308.6	CONNECTION, 15NB FOR PG/PT	31500001190	02	4	No.	IS:2062 E250 BR	0.4
	308.7	CONNECTION, 15NB	31500001190	02	4	No.	IS:2062 E250 BR	0.4
	308.8	FLANGE, 125NB (CLR TP END)	31500001239	18	4	No.	IS:2062 E250 BR	20.00
	308.9	GASKET VITON	188X140X3		4	No.	HW59870	0.24
	308.10	SCREW HEX	A-8.8 M24X80		32	No.	IS:1364PART-2,1367PART-3	11.78
	308.11	NUT HEX	A-8.8 M24		32	No.	IS:1364PART-3,1367PART-3	2.24
	308.12	WASHER MCD-ST 25			64	No.	IS:2016-1967, IS:2062 E250 BR	1.92
	308.13	FLANGE, 150NB (VALVE FLANGES)	31500001239	12	8	No.	IS:2062 E250 BR	48.00
	308.14	GASKET VITON	212X169X3		8	No.	HW59870	0.48
	308.15	SCREW HEX	A-8.8 M20X70		64	No.	IS:1364PART-2,1367PART-3	14.27
	308.16	NUT HEX	A-8.8 M20		64	No.	IS:1364PART-3,1367PART-3	3.20
	308.17	WASHER MCD-ST 21			128	No.	IS:2016-1967, IS:2062 E250 BR	2.18
	308.18	FLANGE, 150NB (PEM TERM)	31500001239	12	4	No.	IS:2062 E250 BR	24.00
	308.19	GASKET VITON	212X169X3		2	No.	HW59870	0.12
	308.20	SCREW HEX	A-8.8 M20X70		16	No.	IS:1364PART-2,1367PART-3	3.57
	308.21	NUT HEX	A-8.8 M20		16	No.	IS:1364PART-3,1367PART-3	0.80
	308.22	WASHER MCD-ST 21			32	No.	IS:2016-1967, IS:2062 E250 BR	0.54
309		PIPE ASSEMBLY FROM ION EXCHANGER TO PW UNIT INLET						
	309.3	GASKET VITON	68X34X3		4	No.	HW59870	0.12
	309.4	SCREW HEX	A-8.8 M16X50		48	No.	IS:1364PART-2,1367PART-3	5.57
	309.5	NUT HEX	A-8.8 M16		48	No.	IS:1364PART-3,1367PART-3	1.63
	309.6	WASHER MCD-ST 17			96	No.	IS:2016-1967, IS:2062 E250 BR	1.06
TOTAL WT. CS (KG)								747

TOTAL WEIGHT OF PIPING FOR PW SYSTEM = 747 KG



PIPING FOR WGS								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
500		FROM TERM. 105(GU) TO ATM						
	500.1	PIPE	D168.3X3.40		55	Mtr.	ASTM SA106 GR.B	760.65
	500.2	ELBOW LR 90°	D168.3x3.40		5	No.	ASTM A234 WPB,ASME B16.9	36.00
	500.3	H2 VENT STAR	TGE-2774		1	No.	TGE-2774	80.74
501		FROM TERM. (CO2 DIST.) TO WGS						
	501.1	PIPE	D60.3X3.91		20	Mtr.	ASTM SA106 GR.B	108.8
	501.2	ELBOW LR 90°	D60.3X3.91		4	No.	ASTM A234 WPB,ASME B16.9	2.6
	501.3	TEE UNEQUAL	168.3X114.3X3.4		1	No.	ASTM A234 WPB,ASME B16.9	3.50
	501.4	REDUCER CONC.	114.3X60.3X3.05		1	No.	ASTM A234 WPB,ASME B16.9	0.86
	501.5	FLANGE, 50NB (CO2 DIST END)	31500001001	04	1	No.	IS:2062 E250 BR	2.5
	501.6	GASKET VITON	102X60X3		1	No.	HW59870	0.035
	501.7	SCREW HEX	A-8.8 M16X60		4	No.	IS:1364PART-2,1367PART-3	0.50
	501.8	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	501.9	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	501.10	FLANGE, 50NB	31500001001	04	6	No.	IS:2062 E250 BR	15
	501.11	GASKET VITON	102X60X3		2	No.	HW59870	0.035
	501.12	SCREW HEX	A-8.8 M16X60		8	No.	IS:1364PART-2,1367PART-3	0.99
	501.13	NUT HEX	A-8.8 M16		8	No.	IS:1364PART-3,1367PART-3	0.27
	501.14	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
502		FROM TERM. GAC 315 A/B TO WGS						
	502.1	PIPE	D33.4X2.90		50	Mtr.	ASTM SA106 GR.B	109
	502.2	TEE	33.4X33.4X2.77		2	No.	ASTM A234 WPB,ASME B16.9	0.4
	502.3	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	502.4	REDUCER CONC.	33.4X13.7X2.77X1.65		1	No.	ASTM A234 WPB,ASME B16.9	0.09
	502.5	ELBOW LR 90°	D60.3X3.91		5	No.	ASTM A234 WPB,ASME B16.9	3.25
503		FROM TERM. 296 (SOST VENT) TO VAP. EXHUASTER						
	503.1	PIPE	D73X3.05		20	Mtr.	ASTM SA106 GR.B	105.2
	503.2	ELBOW LR 90°	D73X3.05		8	No.	ASTM A234 WPB,ASME B16.9	8
	503.3	REDUCER CONC.	D73X60.3X3.05X2.77		1	No.	ASTM A234 WPB,ASME B16.9	0.66
	503.4	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	503.5	TEE UNEQUAL	88.9X73X3.05		1	No.	ASTM A234 WPB,ASME B16.9	1.69
	503.6	FLANGE, 65NB (FOR 296 SOST)	31500001239	08	1	No.	IS:2062 E250 BR	2.67
	503.7	GASKET VITON	122X76X3		1	No.	HW59870	0.045
	503.8	SCREW HEX	A-8.8 M16X55		4	No.	IS:1364PART-2,1367PART-3	0.46
	503.9	NUT HEX	A-8.8 M16		4	No.	IS:1364PART-3,1367PART-3	0.14
	503.10	WASHER MCD-ST17.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.09
	503.11	FLANGE, 65NB	31500001239	08	6	No.	IS:2062 E250 BR	16.02
	503.12	GASKET VITON	122X76X3		3	No.	HW59870	0.135
	503.13	SCREW HEX	A-8.8 M16X55		18	No.	IS:1364PART-2,1367PART-3	2.09
	503.14	NUT HEX	A-8.8 M16		18	No.	IS:1364PART-3,1367PART-3	0.61
	503.15	WASHER MCD-ST17.0			36	No.	IS:2016-1967, IS:2062 E250 BR	0.40
504		FROM TERM. H2 DIST. TO WGS						
	504.1	PIPE	D21.3X2.77		25	Mtr.	ASTM SA106 GR.B	31.75
505		FROM TERM. 9A/9B TO VAPOUR EXHAUSTER (COMMON HEADER 80NB) UPTO 100NB COMMON HEADER						
	505.1	PIPE	D88.9X3.05		50	Mtr.	ASTM SA106 GR.B	323
	505.2	ELBOW LR 90°	D88.9x3.05		20	No.	ASTM A234 WPB,ASME B16.9	30
	505.3	TEE	88.9X88.9X3.05		6	No.	ASTM A234 WPB,ASME B16.9	10.14
	505.4	FLANGE, 80NB	31500001239	09	28	No.	IS:2062 E250 BR	91.84
	505.5	GASKET VITON	138X89X3		14	No.	HW59870	0.70
	505.6	SCREW HEX	A-8.8 M16X70		112	No.	IS:1364PART-2,1367PART-3	15.68
	505.7	NUT HEX	A-8.8 M16		112	No.	IS:1364PART-3,1367PART-3	3.81
	505.8	WASHER MCD-ST17.0			112	No.	IS:2016-1967, IS:2062 E250 BR	1.23
	505.9	FLANGE, 80NB (VAP EXHST END)	41500001011	00	4	No.	IS:2062 E250 BR	15.632



PIPING FOR WGS								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
	505.10	GASKET VITON	90X108X3		4	No.	HW59870	0.035
	505.11	SCREW HEX	A-8.8 M8X70		32	No.	IS:1364PART-2,1367PART-3	5.76
	505.12	NUT HEX	A-8.8 M8		32	No.	IS:1364PART-3,1367PART-3	0.16
	505.13	WASHER MCD-ST9.0			64	No.	IS:2016-1967, IS:2062 E250 BR	0.40
	505.14	FLANGE, 80NB (9A/B GEN END)	31500001239	09	2	No.	IS:2062 E250 BR	6.56
	505.15	GASKET VITON	138X89X3		2	No.	HW59870	0.10
	505.16	SCREW HEX	A-8.8 M16X70		16	No.	IS:1364PART-2,1367PART-3	2.24
	505.17	NUT HEX	A-8.8 M16		16	No.	IS:1364PART-3,1367PART-3	0.54
	505.18	WASHER MCD-ST17.0			32	No.	IS:2016-1967, IS:2062 E250 BR	0.35
	505.19	FLANGE, 80NB (DIAPH.VALVE END CONN.)	31500001239	09	4	No.	IS:2062 E250 BR	13.12
	505.20	GASKET VITON	138X89X3		4	No.	HW59870	0.035
	505.21	SCREW HEX	A-8.8 M8X70		32	No.	IS:1364PART-2,1367PART-3	5.76
	505.22	NUT HEX	A-8.8 M8		32	No.	IS:1364PART-3,1367PART-3	0.16
	505.23	WASHER MCD-ST9.0			64	No.	IS:2016-1967, IS:2062 E250 BR	0.40
	505.24	SCREW HEX FOR NRV FLANGE	A-8.8 M16X100		48	No.	IS:1364PART-2,1367PART-3	8.21
	505.25	NUT HEX	A-8.8 M16		48	No.	IS:1364PART-3,1367PART-3	1.63
	505.26	WASHER MCD-ST17.0			96	No.	IS:2016-1967, IS:2062 E250 BR	1.06
	505.27	FLANGE, 80NB (BLIND)	AA7244703		2	No.	IS:2062 E250 BR	9.54
	505.28	CONNECTION, 15NB	31500001190	02	3	No.	IS:2062 E250 BR	0.3
506	FROM COMMON HEADER 100NB TO ATM							
	506.1	PIPE	D114.3X3.05		80	Mtr.	ASTM SA106 GR.B	669.6
	506.2	ELBOW LR 90°	D114.3X3.05		15	No.	ASTM A234 WPB,ASME B16.9	42
	506.3	TEE UNEQUAL	114.3X88.9X3.05		2	No.	ASTM A234 WPB,ASME B16.9	5.00
	506.4	FLANGE, SORF, 100NB	31500001239	10	32	No.	IS:2062 E250 BR	115.84
	506.5	GASKET VITON	158X115X3		16	No.	HW59870	0.96
	506.6	SCREW HEX	A-8.8 M16X60		128	No.	IS:1364PART-2,1367PART-3	15.87
	506.7	NUT HEX	A-8.8 M16		128	No.	IS:1364PART-3,1367PART-3	4.35
	506.8	WASHER MCD-ST17.0			128	No.	IS:2016-1967, IS:2062 E250 BR	1.41
	506.9	FLANGE, 100NB (BLIND)	AA7244703		1	No.	IS:2062 E250 BR	5.65
	506.10	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.115
507	PIPE FITTINGS IN COMMON HEADER 150NB							
	507.1	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.115
	507.2	FLANGE, 20NB (FOR SIGHT GLASS)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	507.3	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	507.4	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.29
	507.5	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	507.6	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
	507.7	FLANGE, 20NB (FOR VALVE)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	507.8	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	507.9	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.29
	507.10	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	507.11	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
508	PIPE FITTINGS IN COMMON HEADER 25NB							
	508.1	CONNECTION, 20NB	31500001190	03	2	No.	IS:2062 E250 BR	0.23
	508.2	FLANGE, 20NB (FOR SIGHT GLASS)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	508.3	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	508.4	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.29
	508.5	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	508.6	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
	508.7	FLANGE, 20NB (FOR VALVE)	31500001239	03	1	No.	IS:2062 E250 BR	0.73
	508.8	GASKET VITON	58X27X3		1	No.	HW59870	0.03
	508.9	SCREW HEX	A-8.8 M12X60		4	No.	IS:1364PART-2,1367PART-3	0.29
	508.10	NUT HEX	A-8.8 M12		4	No.	IS:1364PART-3,1367PART-3	0.07
	508.11	WASHER MCD-ST13.0			8	No.	IS:2016-1967, IS:2062 E250 BR	0.05
TOTAL WT.								2710.38

TOTAL WEIGHT OF PIPING FOR WASTE GAS SYSTEM =

2710

KG



PIPING FOR WASTE FLUID SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION	DRG.NO./SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
600		FROM WASTE GAS SYSTEM 40/ 42 TO COMMON HEADER OF 50 NB						
	600.1	PIPE	D26.7X2.87		20	Mtr.	ASTM SA106 GR.B	33.80
	600.2	CONNECTION, 20NB	31500001190	03	2	No.	IS:2062 E250 BR	0.23
601		FROM GIS 74 (LDR) TO COMMON HEADER OF 50 NB						
	601.1	PIPE	D33.4X2.90		20	Mtr.	ASTM SA106 GR.B	43.60
	601.2	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.12
602		FROM U-LOOP SEAL OIL SYS. 297 TO COMMON HEADER OF 50 NB						
	602.1	PIPE	D33.4X2.90		20	Mtr.	ASTM SA106 GR.B	43.60
	602.2	CONNECTION, 20NB	31500001190	03	1	No.	IS:2062 E250 BR	0.12
603		FROM 920 (SOUH) TO COMMON HEADER OF 50 NB						
	603.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	603.2	CONNECTION, 25NB	31500001190	08	2	No.	IS:2062 E250 BR	0.28
604		FROM 930 (SOUA) TO COMMON HEADER OF 50 NB						
	604.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	604.2	CONNECTION, 25NB	31500001190	08	2	No.	IS:2062 E250 BR	0.28
605		FROM 950 (SOUA) TO COMMON HEADER OF 50 NB						
	605.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	605.2	CONNECTION, 25NB	31500001190	08	2	No.	IS:2062 E250 BR	0.28
606		FROM 114 (GS) TO COMMON HEADER OF 50 NB						
	606.1	PIPE	D21.3X2.77		20	Mtr.	ASTM SA106 GR.B	25.40
	606.2	CONNECTION, 15NB	31500001190	02	2	No.	IS:2062 E250 BR	0.20
607		FROM 214 & 390 (PWS) TO COMMON HEADER OF 50 NB						
	607.1	PIPE	D33.4X2.90		25	Mtr.	ASTM SA106 GR.B	54.50
	607.2	CONNECTION, 25NB	31500001190	08	2	No.	IS:2062 E250 BR	0.28
608		FROM 585 (PWT) TO DRAIN OIL COLLECTOR						
	608.1	PIPE	D33.4X2.90		30	Mtr.	ASTM SA106 GR.B	65.40
	608.2	PIPE	D114.3X3.05		1	Mtr.	ASTM SA106 GR.B	8.37
	608.3	REDUCER CONC.	114.3X60.3X3.05		1	No.	ASTM A234 WPB,ASME B16.9	0.86
	608.4	REDUCER CONC.	60.3X33.4X2.90		1	No.	ASTM A234 WPB,ASME B16.9	0.35
	608.5	CONNECTION, 25NB	31500001190	08	2	No.	IS:2062 E250 BR	0.28
609		COMMON HEADER OF 50 NB TO DRAIN OIL COLLECTOR						
	609.1	PIPE	D60.3X3.91		20	Mtr.	ASTM SA106 GR.B	108.80
	609.2	ELBOW LR 90°	D60.3X3.91		5	No.	ASTM A234 WPB,ASME B16.9	3.25
610		FROM DRAIN OIL COLLECTOR TO WASTE DISPOSAL PIT						
	610.1	PIPE	D33.4X2.90		20	Mtr.	ASTM SA106 GR.B	43.60
TOTAL WT.								597.11

TOTAL WEIGHT OF PIPING FOR WASTE FLUID SYSTEM =

597 KG



SUPPORTS FOR GENERATOR PIPING								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG NO. / SIZE	VAR.	QTY.		MAT. SPEC.	WT.(KG)
600	600.1	STRIP	3.16X20		60	Mtr.	IS:5985	30.00
	600.2	FLAT	6X40		100	Mtr.	IS:2062 E250 BR	180.00
	600.3	FLAT	16X30		70	Mtr.	IS:2062 E250 BR	264.09
	600.4	ANGLE	50X50X5		100	Mtr.	IS:2062 E250 BR	380.00
	600.5	ANGLE	75X75X6		100	Mtr.	IS:2062 E250 BR	680.00
	600.6	CHANNEL ISMC 100			20	Mtr.	IS:2062 E250 BR	185.00
	600.7	CHANNEL ISMC 75			20	Mtr.	IS:2062 E250 BR	138.00
	600.8	PIPE CS	D60.3X3.91		10	Mtr.	ASTM SA106 GR.B	54.40
	600.9	TEE BAR ISNT-50			24	Mtr.	IS:2062 E250 BR	106.00
	600.10	TEE BAR ISNT-75			24	Mtr.	IS:2062 E250 BR	245.00
	600.11	PIPE CLAMP NB8	21500001023	01	200	No.	IS:2062 E250 BR	24.00
	600.12	PIPE CLAMP NB10	21500001023	02	120	No.	IS:2062 E250 BR	14.40
	600.13	PIPE CLAMP NB15	21500001023	03	80	No.	IS:2062 E250 BR	10.40
	600.14	PIPE CLAMP NB20	21500001023	04	50	No.	IS:2062 E250 BR	8.00
	600.15	PIPE CLAMP NB25	21500001023	05	120	No.	IS:2062 E250 BR	27.00
	600.16	PIPE CLAMP NB40	21500001023	07	40	No.	IS:2062 E250 BR	11.00
	600.17	PIPE CLAMP NB50	21500001024	08	250	No.	IS:2062 E250 BR	328.00
	600.18	PIPE CLAMP NB65	21500001026	06	50	No.	IS:2062 E250 BR	40.00
	600.19	PIPE CLAMP NB80	21500001026	07	40	No.	IS:2062 E250 BR	36.00
	600.20	PIPE CLAMP NB100	21500001026	08	40	No.	IS:2062 E250 BR	80.00
	600.21	PIPE CLAMP NB 150	31500001237	01	30	No.	IS:2062 E250 BR	72.00
	600.22	BEAM ATTACHMENT M12	41500001101	02	40	No.	IS:2062 E250 BR	1.25
	600.23	TURN BUCKLE M12	41500001103	02	50	No.	IS:2062 E250 BR	52.00
	600.24	TIE ROD M12	41500001130	00	50	No.	IS:2062 E250 BR	12.00
	600.25	THREADED ROD M12	41500001131	00	100	No.	IS:2062 E250 BR	72.00
	600.26	WELDING EYE	41500001132	00	80	No.	IS:2062 E250 BR	90.00
	600.27	EYE BOLT M12	41500001099	02	50	No.	IS:2062 E250 BR	8.00
	600.31	SUPPORT FOR PW TANK	11500001097			No.	IS:2062 E250 BR	
	600.31.1	PLATE	11500001097		1	No.	IS:2062 E250 BR	390
	600.31.2	PIPE CS	48.3X2.77, L=1M		35	Mtr.	ASTM SA106 GR.B	108.85
	600.31.3	CHANNEL ISMC	175X75		2	Mtr.	IS:2062 E250 BR	39.20
	600.31.4	CHANNEL ISMC	175X75		2	Mtr.	IS:2062 E250 BR	39.20
	600.31.5	CHANNEL ISMC	150X75		1.5	Mtr.	IS:2062 E250 BR	25.2
	600.31.6	CHANNEL ISMC	150X75		1.5	Mtr.	IS:2062 E250 BR	25.2
	600.31.7	CHANNEL ISMC	150X75		1.85	Mtr.	IS:2062 E250 BR	31.08
	600.31.8	CHANNEL ISMC	150X75		1.85	Mtr.	IS:2062 E250 BR	31.08
	600.31.9	CHANNEL ISMC	150X75		1.2	Mtr.	IS:2062 E250 BR	20.16
	600.31.10	CHANNEL ISMC	150X75		1.2	Mtr.	IS:2062 E250 BR	20.16
	600.31.11	PIPE CS	48.3X2.77, L=500MM		10	Mtr.	ASTM SA106 GR.B	31.10
	600.31.12	ANGLE	50X50X6 L=250MM		1	Mtr.	IS:2062 E250 BR	4.5
	600.31.13	ANGLE	50X50X6 L=3500MM		7	Mtr.	IS:2062 E250 BR	31.5
	600.31.14	FLAT	50X6		6.5	Mtr.	IS:2062 E250 BR	15.3075
							TOTAL WT. (KG)	3961.08

TOTAL WEIGHT OF PIPING FOR HANGERS & SUPPORTS = 3961

KG

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

9891

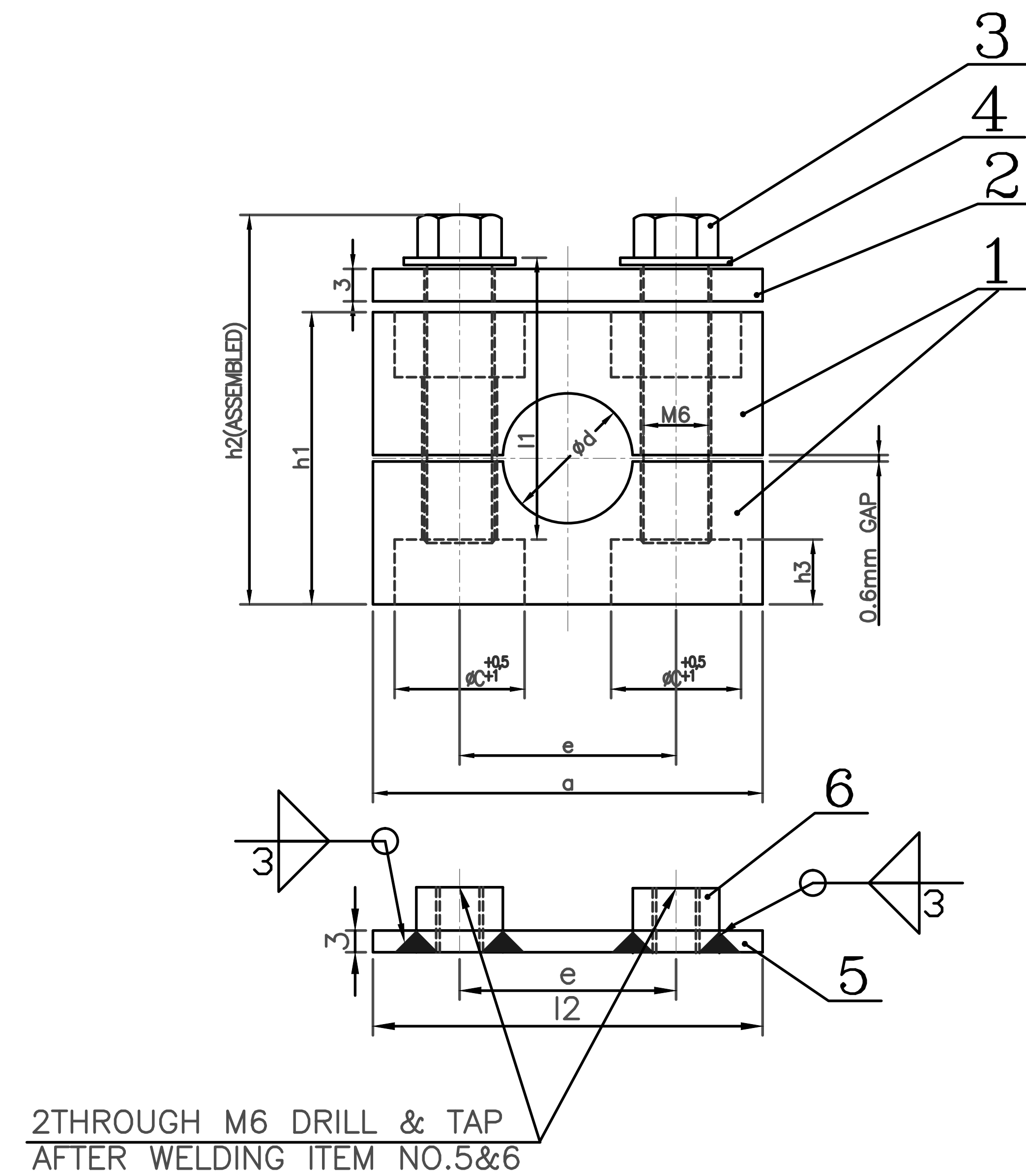
KG

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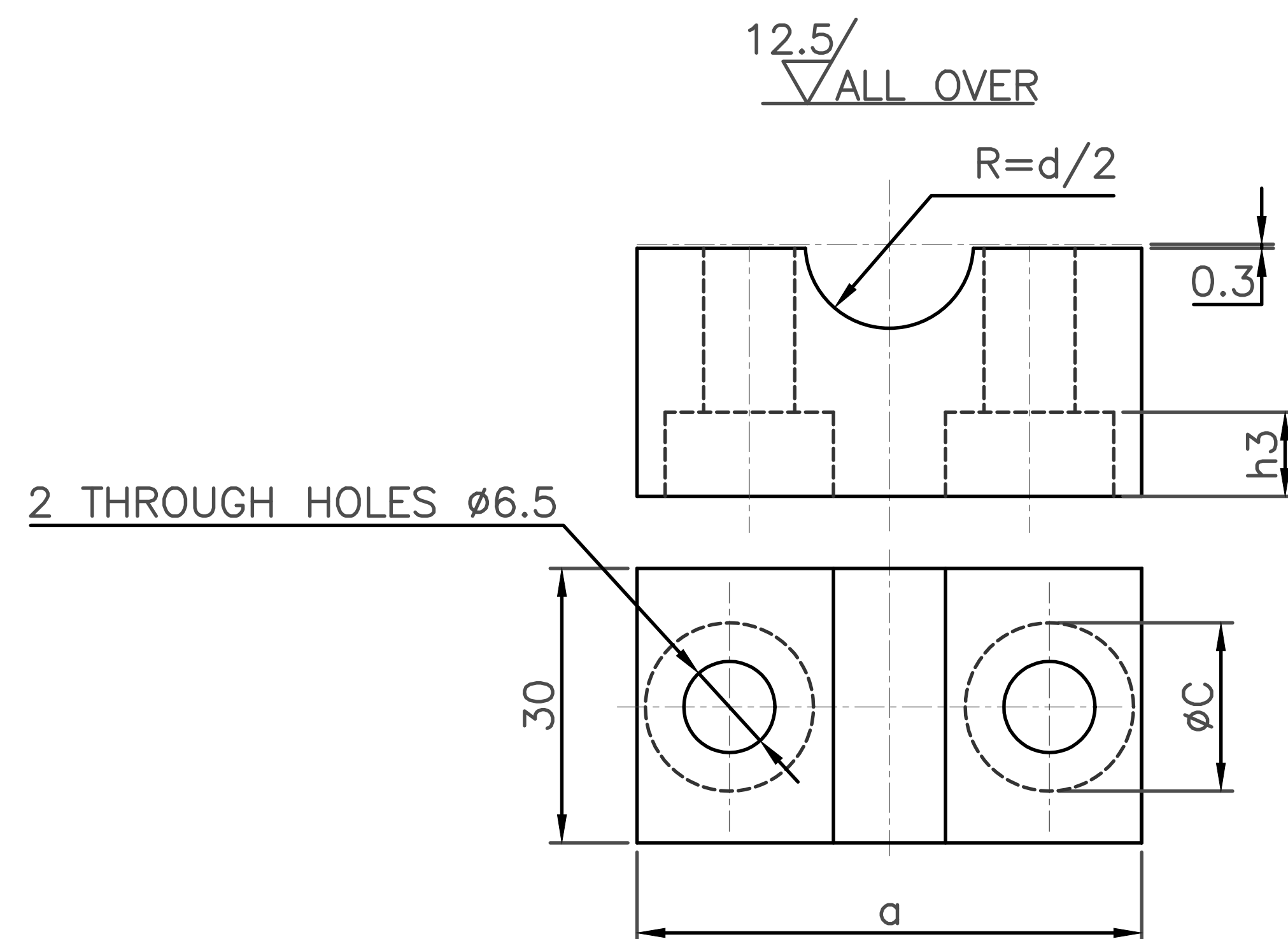
Et1-16322 INVENTORY NO.	22/8/92 SIGN & DATE	REF. DRG NO.
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22/8/92
SIGN & DATE

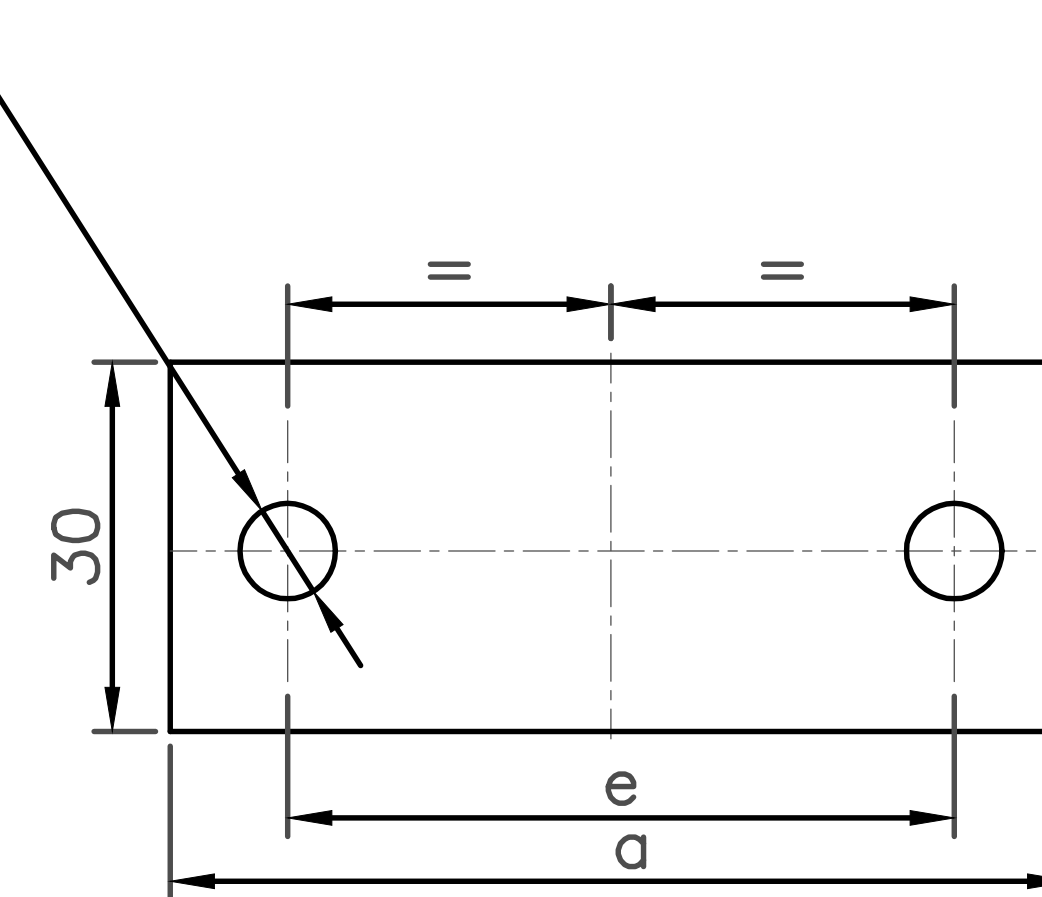
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INVENTORY NO.



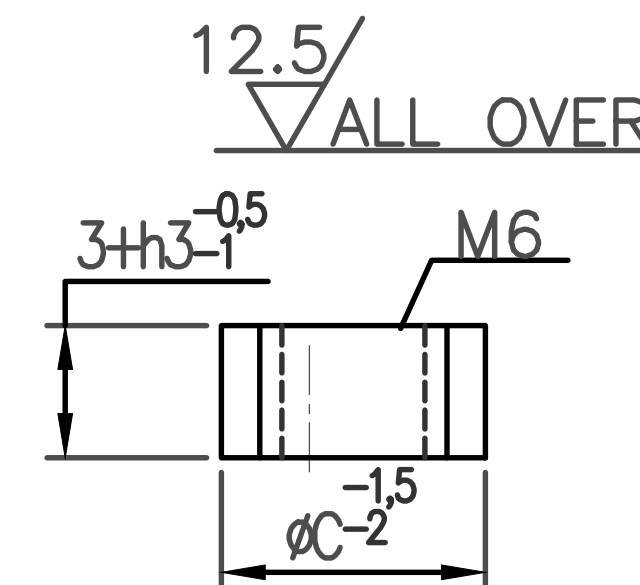
DETAILS OF ITEM NO.-1



DETAILS OF ITEM NO.-2



DETAILS OF ITEM NO.-6



VARIANT TABLE

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

TECHNICAL REQUIREMENTS

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	STL	VAR	MATERIAL CODE MATERIAL SPEC.	A	C	UNIT WEIGHT

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

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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
E
D
C
B
A

8 7 6 5 4 3

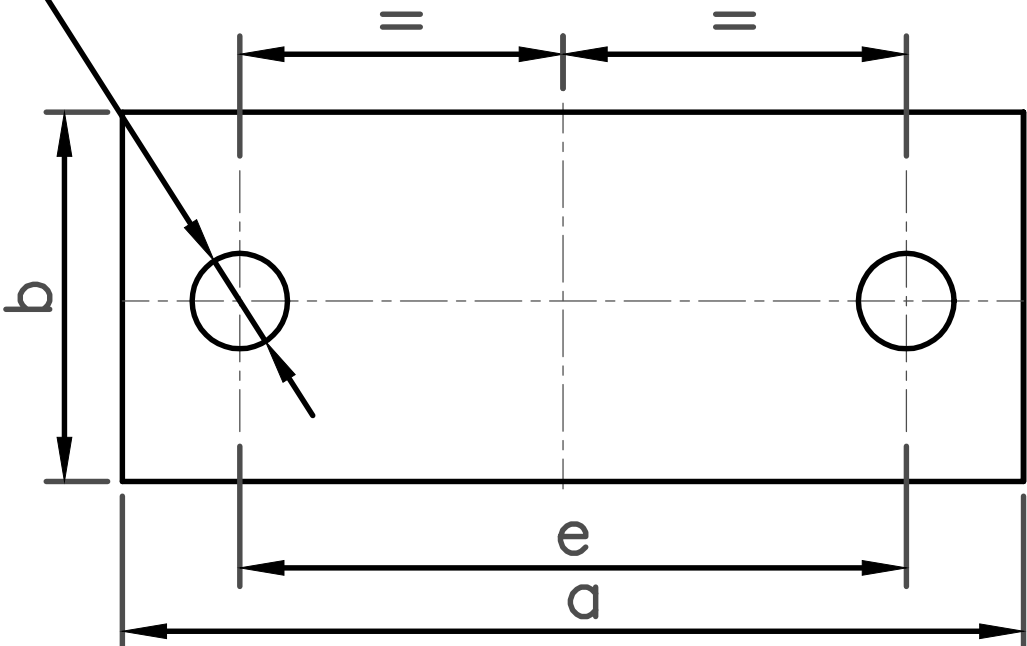
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

FORM: DG 44(B)

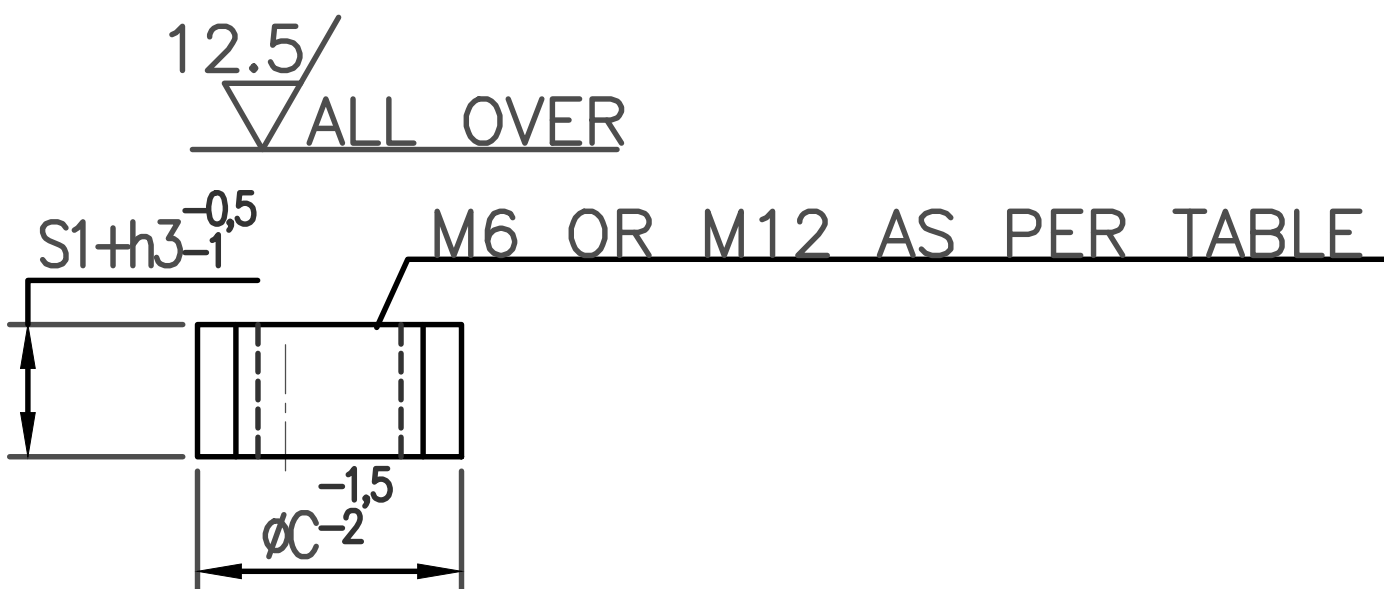
VARIANT TABLE

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	"

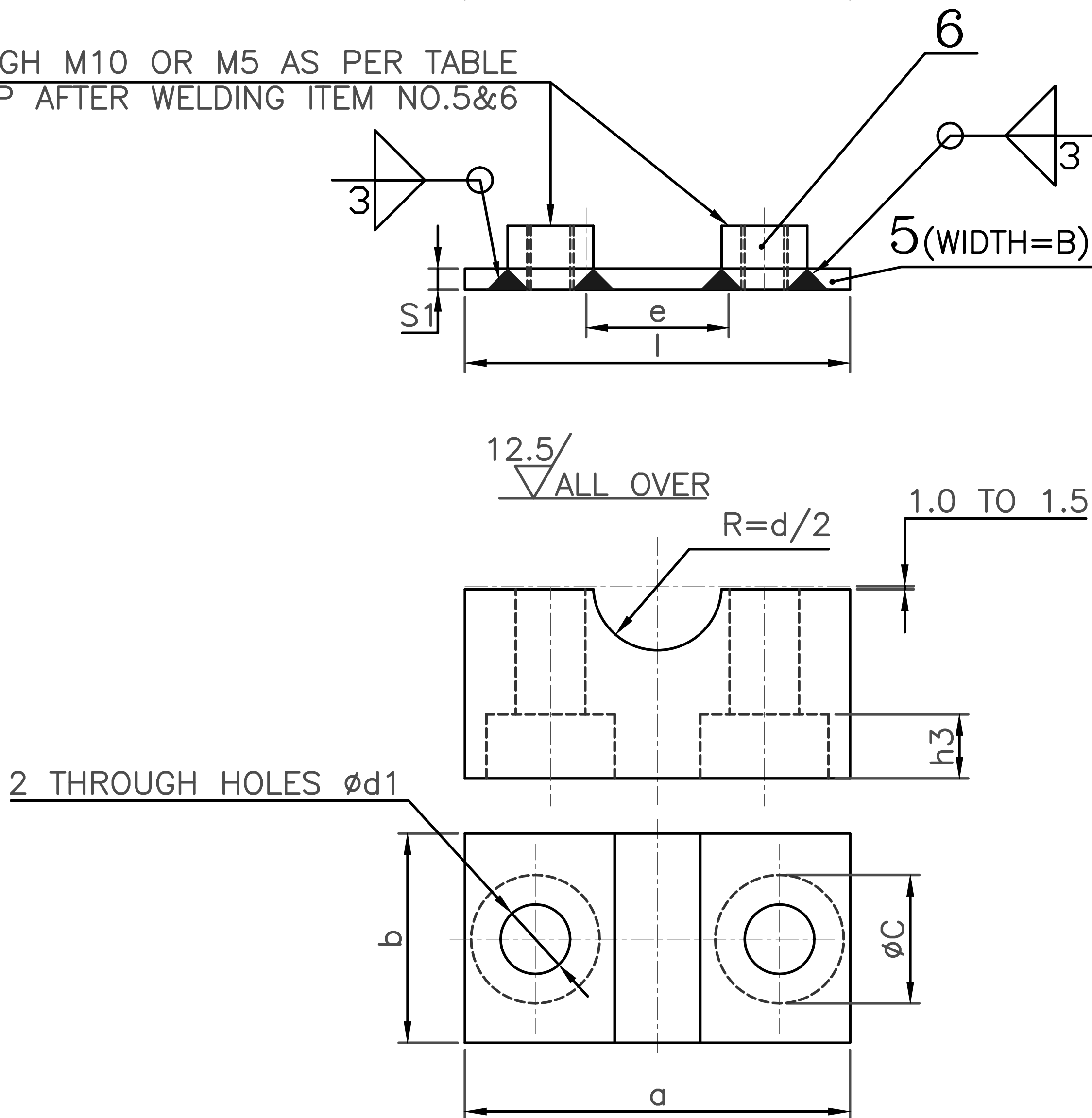
DETAILS OF ITEM NO.-2



DETAILS OF ITEM NO.-6



DETAILS OF ITEM NO.-1



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 MATERIAL SPEC.	A C	UNIT WEIGHT

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

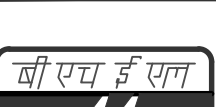
REV.	DATE	ALTERED
		CHECKED

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

REV.	DATE	ALTERED
01	04.06.18	KM
		CHECKED
		MA

REVISION MARKED

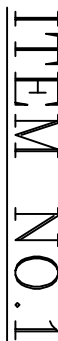
TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT

 BHARAT HEAVY ELECTRICALS LTD. HARDWAR				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		
DEPT. EME		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	73, 74 NO.OF ITEMS
CODE 4133		N.T.S	SEE TABLE	0-150-00-01125			75, 77
TITLE			13	DRAWING NO.			23, 24
PIPE CLAMP				2-150-00-01024			
			SHEET NO. 01		NO.OF SHEETS 01		

SIZE A2



VIEW-B



VIEW—C

01

12 THK STIFFENER PLATES TO BE PROVIDED
(ON THE OPPOSITE SIDE OF WEB AS SHOWN)

600.31:1

EL. +18.41M

EL.+17.0M

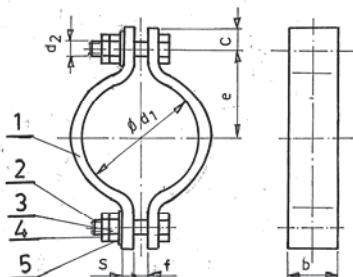
EL. +16.81M

1. ALL THE ITEMS OF THE PW TANK SUPPORTS ARE TO BE SUPPLIED IN DIS-ASSEMBLED CONDITION BY THE VENDOR TO SITE AS PER BOM LISTED IN THIS DRG

12

SIZE A1

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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 13/9/79		No. Of VAR	
REV		DATE		ALTERED CHECKED		No. Of ITEM	
ZONE		DEPT TGE		SCALE N.T.S		WEIGHT (KG)	
		CODE 4003				REF. TO ASSY. DRG. 0-150-00-01125	
TITLE PIPE CLAMP				CARD CODE		DRAWING No. 2-150-00-01026	
4						SHEET No. 01	
						NO. OF SHEETS 01	

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

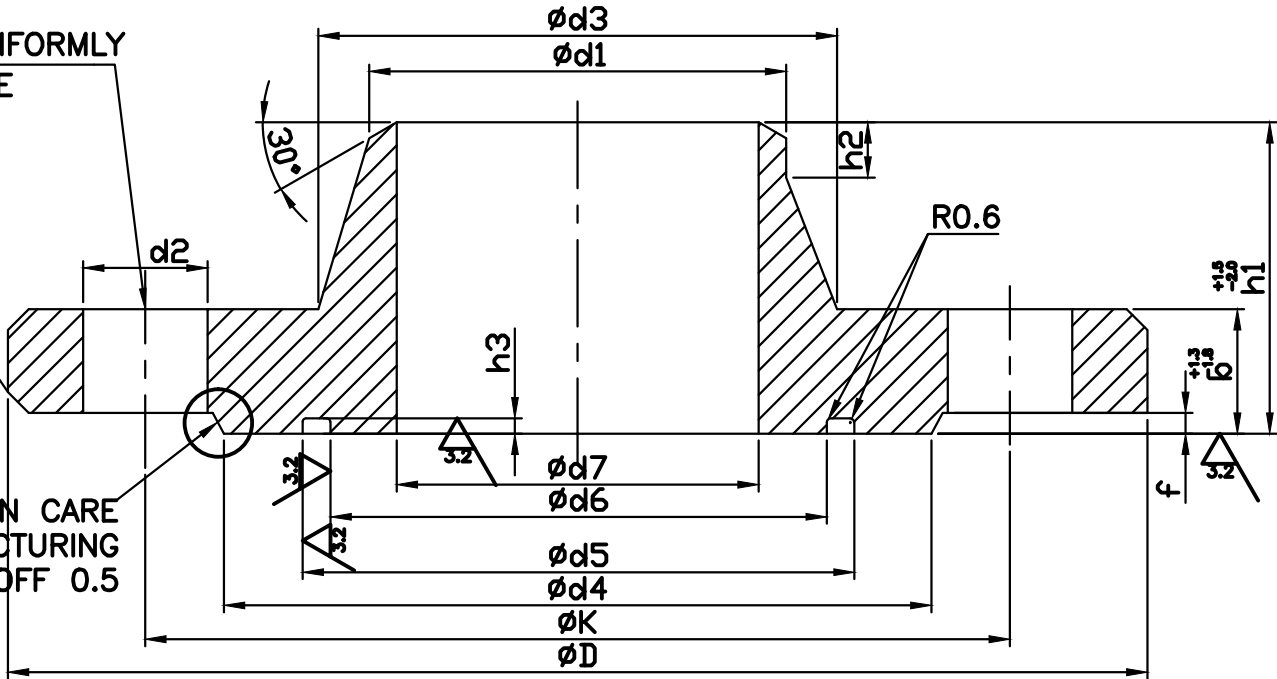
31492501005
DRAWING NO.

VAR NO.	d1	D	k	h1	d3	h2	d4	d2 ^{±2.0}	d5 ^{±2.0}	d6 ^{±2.0}	h3 ^{+0.05}	f ^{+0.2 -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.

REF. DRG NO.

SIGN & DATE

INVENTORY NO.

CBOM NO. 0-149-25-01000		STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE
EMT	S.CHANDRA	SD/-	15/1/82
WT	S.CHANDRA	SD/-	14/6/82

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	ALTERED
05	19.09.18	CHECKED

CHANGES DONE AS PER
CA NO. TGE-18-F0205.

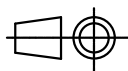
TYPE OF PRODUCT
OR
NAME OF CUSTOMER/ PROJECT

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



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

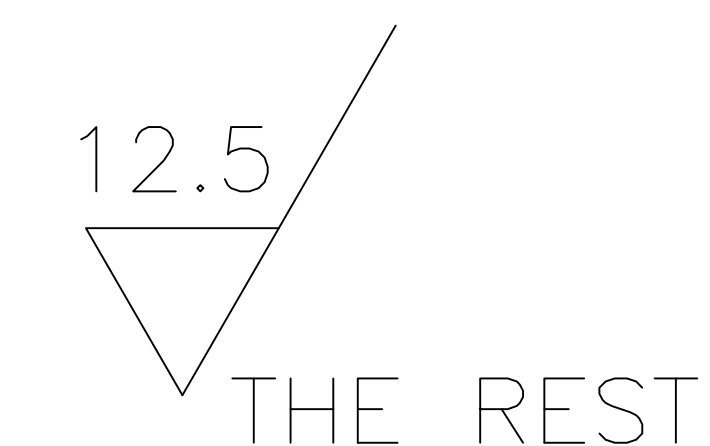
NO.OF SHEETS

1

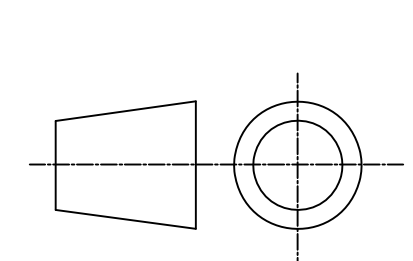
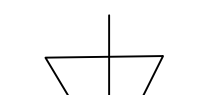
SIZE A3

EDGES TO BE TAKEN CARE
DURING MANUFACTURING
ROUND OFF 0.5

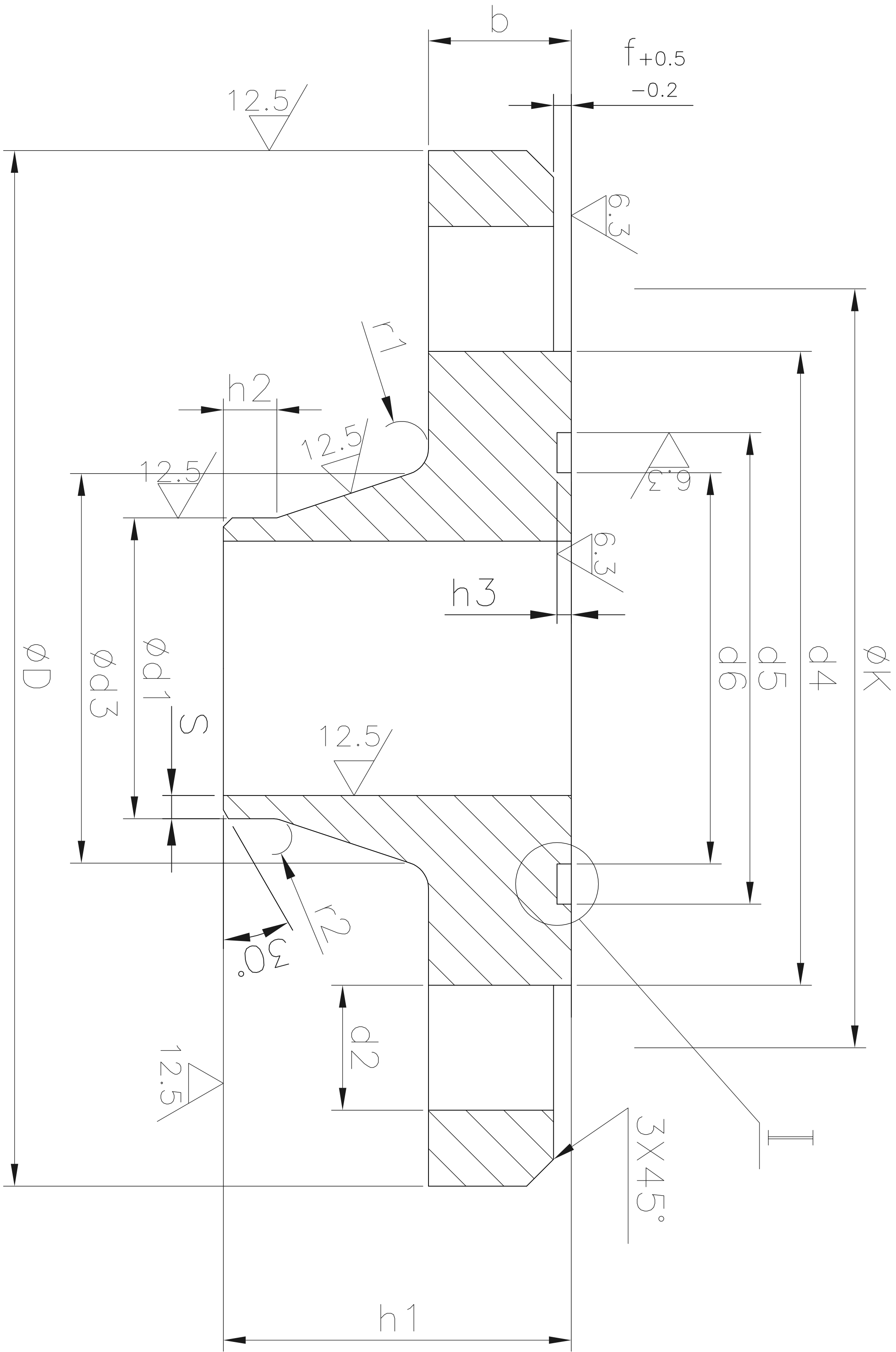
VAR NO.	d1	D	k	h1	d3	h2	d4	d2 ^{+2.0}	h3 ^{+0.05}	f ^{+0.2 -0.7}	b	d5
00	60.3	165	125	45	75	8	102	18	2.2	3	18	52.3
01	26.9	105	75	38	40	6	58	14	2.2	2	16	22.3
02	33.7	115	85	38	45	6	68	14	2.2	2	16	28.5
03	60.3	152.4	120.6	45	75	8	92.1	19	2.2	3	15.9	52.3



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:-						 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 CHECKED		REV.		DATE		ALTERED CHECKED		DEPT. TGE				SCALE NTS		WEIGHT(Kg)		REF. TO ASSY. DRG.		ITEM NO.		NO.OF ITEMS							
												CODE 4133						SEE TABLE						75, 76							
 17												TITLE						1		3		DRAWING NO.									
												FLANGE										7		23		24		31492501055			
																						SHEET NO.		1		NO.OF SHEETS		1			

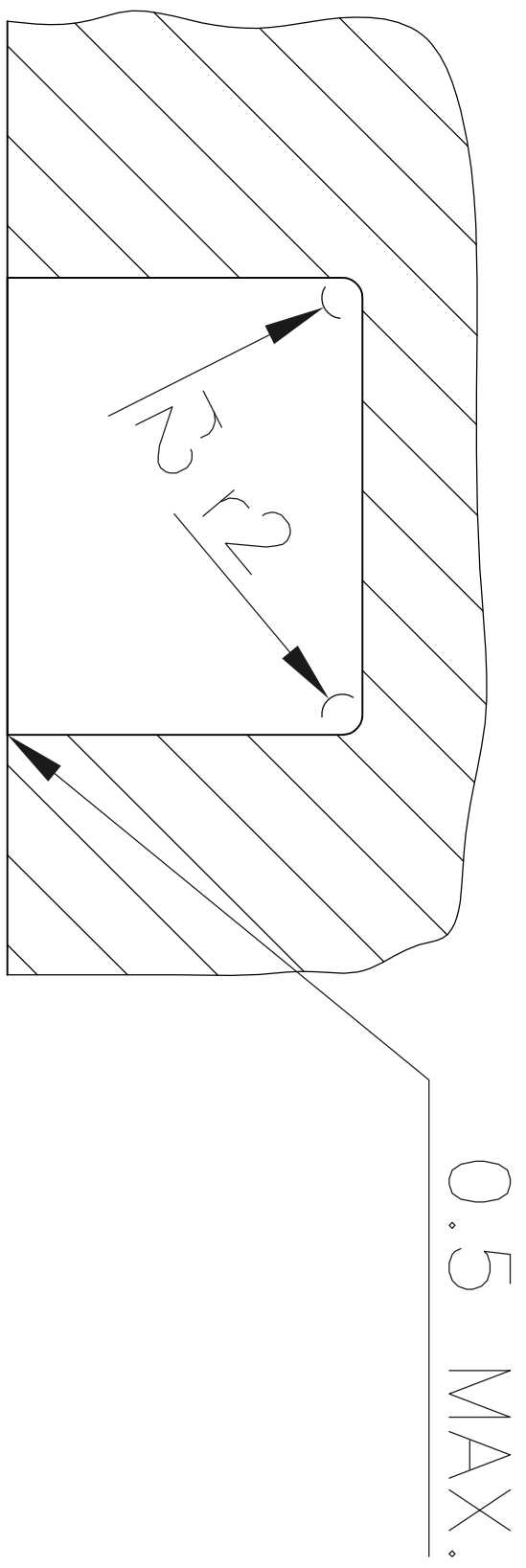
52110-32-641-3
DRAWING NO



VAR	NB	d1	D	b	K	h1	d3	s	r1	h2	d4	f+0.2 -0.7	N HOLE	d2	d5 ^{+0.2} -0.3	d6 ^{+0.4} -0.3	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	

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DETAIL-I

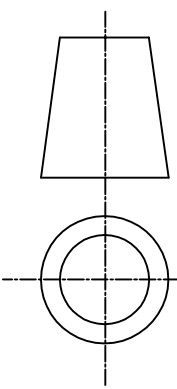


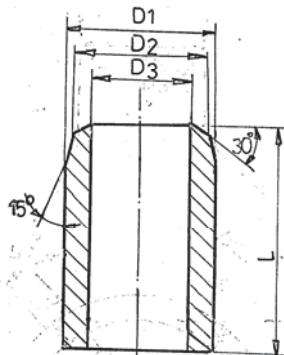
TECHNICAL REQUIREMENTS
IDENTIFICATION AS PER HW0400.397

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/-	31.11.87	
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				

7

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				TG-HH-210MW				
भारत भारती BHARAT HEAVY ELECTRICALS LTD. HARDWAR								
DEPT. TGE		SCALE	WEIGHT(Kg.)	DRN	NAME	SIGN	DATE	NO.OF VAR.
CODE 4233		N.T.S.		CHD	KB. MUKHERJEE	sd/-	07.03.87	
				APD	K.R.G./G.GUPTA	sd/-	06.07.87	
					A.C.C	sd/-	13.11.87	73, 74
					REF. TO ASSY. DRG.			ITEM NO. NO.OF ITEMS
TITLE				1	3			75, 77
FLANGE								

3-150-00-01190
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	AS PER BOM	-0560
03	50	15	010	25.3	21.3	16.7	09		0100
04	50	25	009	36.5	33.7	28.5	08		0142
03	50	20	008	30.5	26.9	21.7	07		0115
	50	8	007	17.5	13.5	8.3	06		0060
03	50	15	006	25.3	21.3	16.7	05		-0100
03	50	20	005	30.5	26.9	21.7	04		-0115
	50	20	004	30.5	26.9	21.7	03		0115
	50	15	003	25.3	21.3	16.7	02		0100
	100	50	002	60.3	52.3		01		0560
	50	10	001	21.2	17.2	13.6	00		0080
L	N B	SL No.		Ø D1	Ø D2	Ø D3			
59	64	65	75	25	27	29	58		
CARD TYPE-3			28	CARD TYPE-1			28	CARD TYPE-2	
29	31	34	45	55	58	65	71	72	
VAR	MATERIAL SPECN.	54	56	57	66				
29	31	34	45	55	58	65	71	72	

MATERIAL
AS PER
BOM

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-99-327GMS No./GR-SP. No.
01500001125AGREED DEPT NAME SIGN DATE
GTK SGOYAL 23/7/97TYPE 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
CHD	K.R.G.		13.1.92	VAR
APPD	G.M.K.		10.9.92	73, 74

DEPT
TGE
CODE
2033SCALE
N.T.SWEIGHT (KG)
SEE TABLEREF. TO ASSY. DRG.
0-150-00-01125ITEM
No.
75 77TITLE :
CONNECTIONCARD
CODEDRAWING No.
3-150-00-01190

SHEET No. 01 No. OF SHEETS 01

REV. DATE ALTERED KBM
04 10.1.97 CHECKED KRG
VAR. 08 ADDED
CH. AD. NO. TGE-97-04GRADE OF UNTOL. DIM:-
MCG. :- C/M/F/ AA 023 0208
WELDING :- 'T1' O 610.003
GAS CUTTING :- 'T3' AA 0621101REV. DATE ALTERED P.A.B.
03 11.9.96 CHECKED KRG
CH. AD. NO. TGE-96-325REV. DATE ALTERED KBM
02 30.5.96 CHECKED R.L.V.
CH. AD. NO. TGE-96-161REV. DATE ALTERED KBM
01 18.11.95 CHECKED KRG
CH. AD. NO. TGE-95-445

31500001237
DRAWING NO.

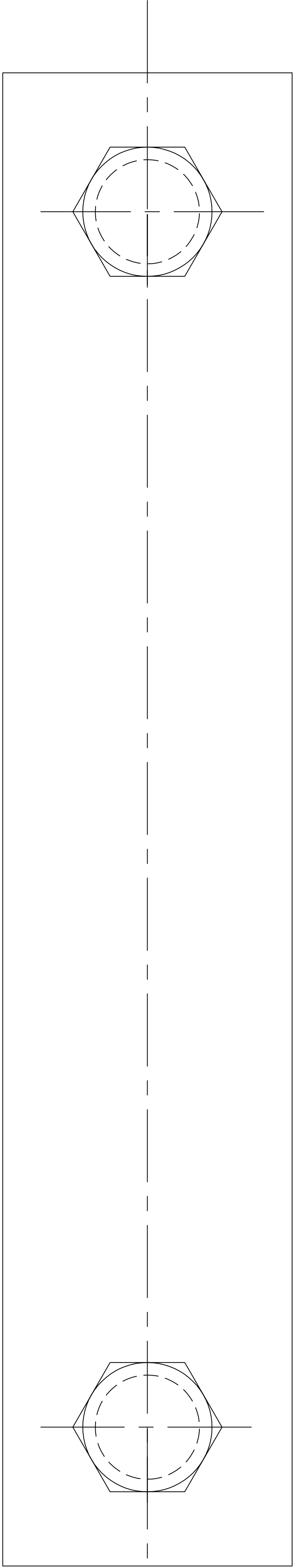
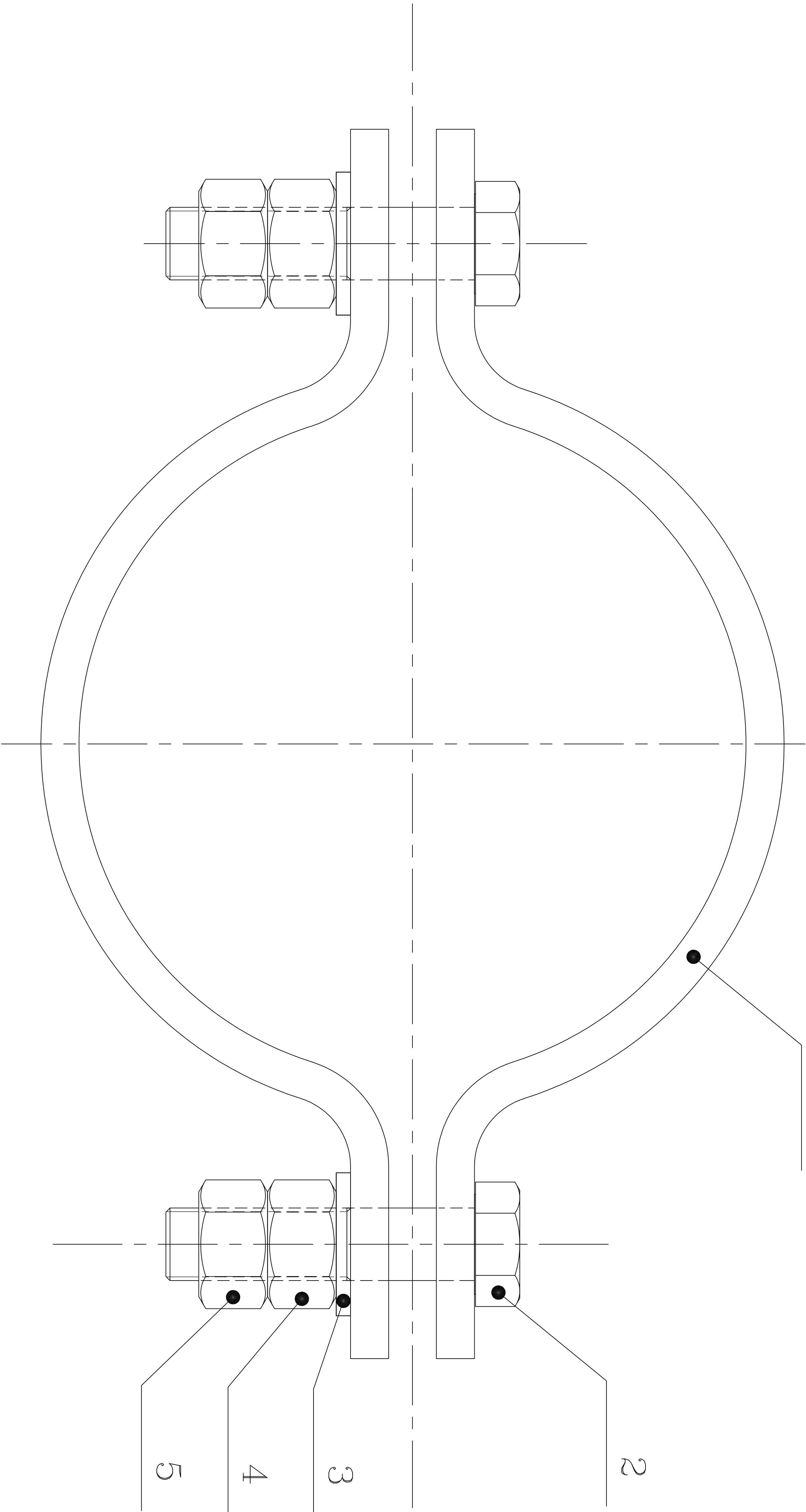
X

1

2

FASTENERS DETAILS -
BOLT HEX A8.8 M16X65 - 2 NOS.
NUT HEX A8 M16 - 4 NOS.
WASHER MCD ST 17.0 - 2 NOS.

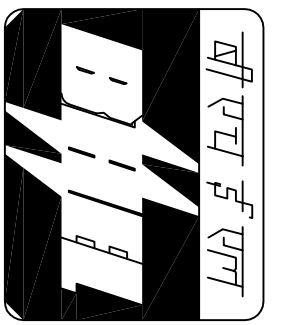
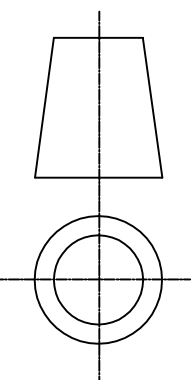
VAR	SIZE(NB)	WT.(KG)	PART DRG FOR ITEM NO.1
00	125	2.15	31500001238,VAR00
01	150	2.40	31500001238,VAR01



VIEW-X

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

GRADE OF UNTOL. DIM.:-		CBOM NO. 31500001237		STATUS OF DRG.	
M/CG-V/C/M/F-AA-0230208		AGREED DEPT. EMT	NAME AEMTAKG	SIGN AEMTAKG	DATE 30-10-2013
WELDING-A/B/C/D-AA621104					
GAS CUTTING-T3-AA0621101					
REV.	DATE	ALTERED	DATE	ALTERED	
		CHECKED		CHECKED	

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				THD F 115/67			
 BHARAT HEAVY ELECTRICALS LTD. HARDWAR				DEPT. TGE	SCALE	WEIGHT(Kg.)	
				CODE 4133		see table	
TITLE				1	3		
PIPE CLAMP ASSEMBLY							
				DRAWING NO.		31500001237	
				SHEET NO. 1		NO.OF SHEETS 1	

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REF. DRG NO.

SIGN & DATE

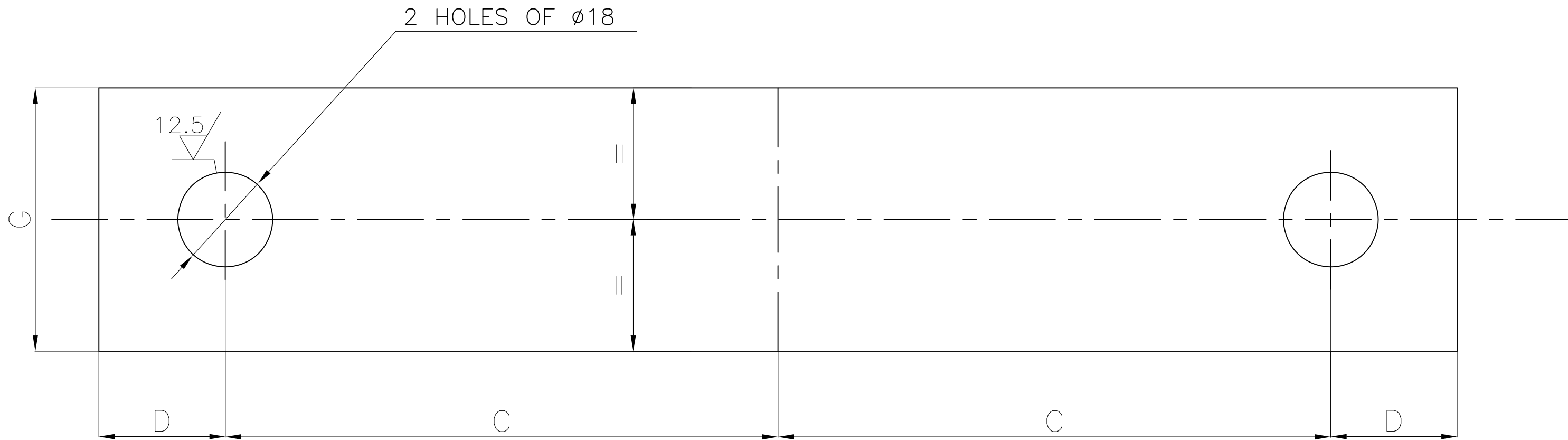
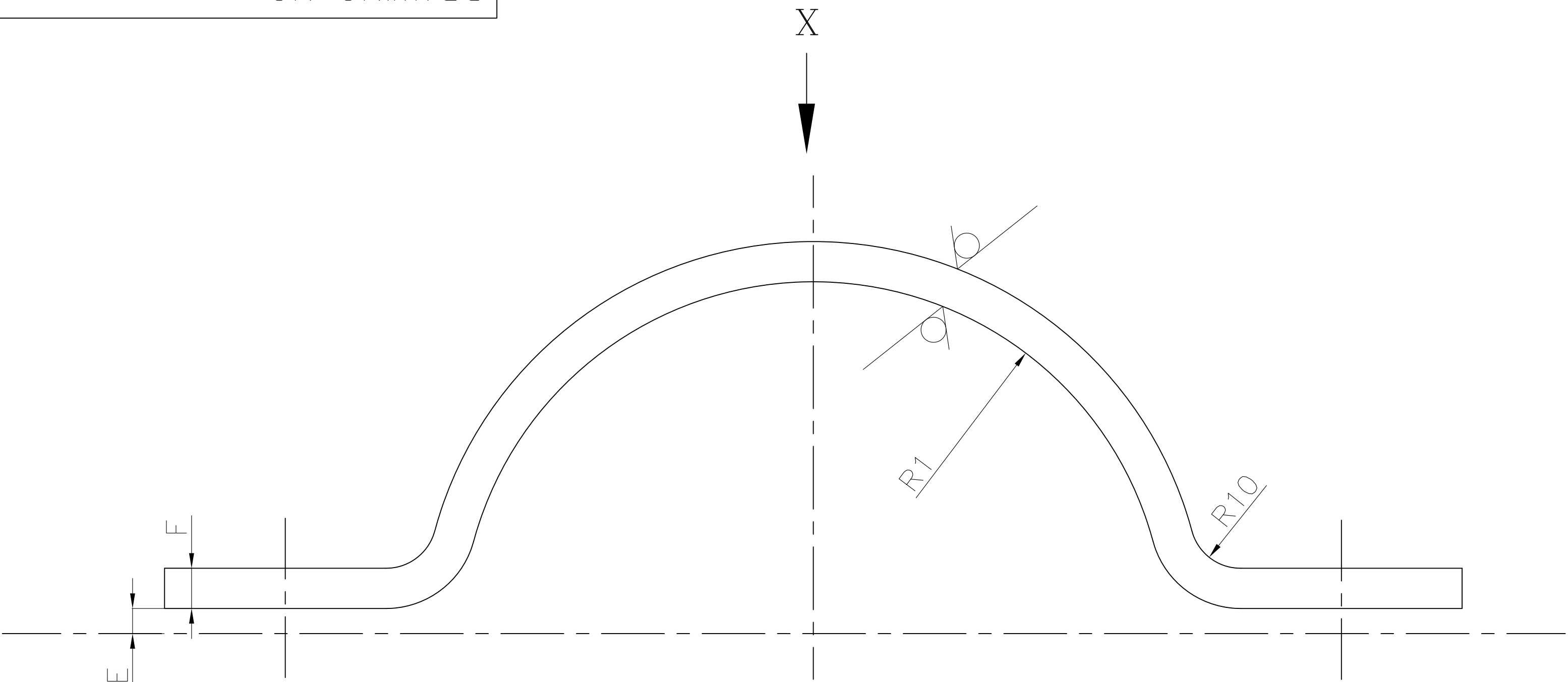
INVENTORY NO.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

882100001238
DRAWING NO.



VIEW-X

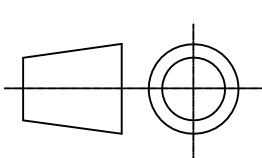
50
✓ ALONG CONTOUR

VAR	SIZE(NB)	WT.(Kg)	R1	C	D	E	F	G	STRETCHED LENGTH
00	125	2.15	70	105	24	5	8	50	318
01	150	2.40	85	120	24	5	8	50	365

TECHNICAL REQUIEMENTS

1. IDENTIFICATION ACCORDING TO HW 0400397.
2. ROUND-OFF SHARP EDGES.

GRADE OF UNTOL. DIM.:—			CBOM NO. 31500001237		STATUS OF DRG.	
M/CG— V/C/M/AA 0230208	WTX	AWTXRR	AWTXRR	15/11/2013		
WELDING=A/B/C/D=AA621104						
GAS CUTTING—'T3'AA0621101						
REV.	DATE	ALTERED	REV.	DATE	ALTERED	
		CHECKED			CHECKED	

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT					THDF 115/67				
बी एच ई एल BHEL BHARAT HEAVY ELECTRICALS LTD. HARDWAR						NAME	SIGN	DATE	NO.OF VAR.
					DRN	STGEKM	STGEKM	28/10/2013	
					CHD	STGEPG	STGEPG	28/10/2013	
					APD	ATGEAKM	ATGEAKM	27/12/2013	73 74
DEPT. TGE		SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS		
CODE 4133		1:1.5	0.30				75 77		
TITLE			1	3	DRAWING NO.				
PIPE CLAMP					315000001238				
			SHEET NO.1		NO.OF SHEETS 1				

SIZE A3

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REF. DRG NO.

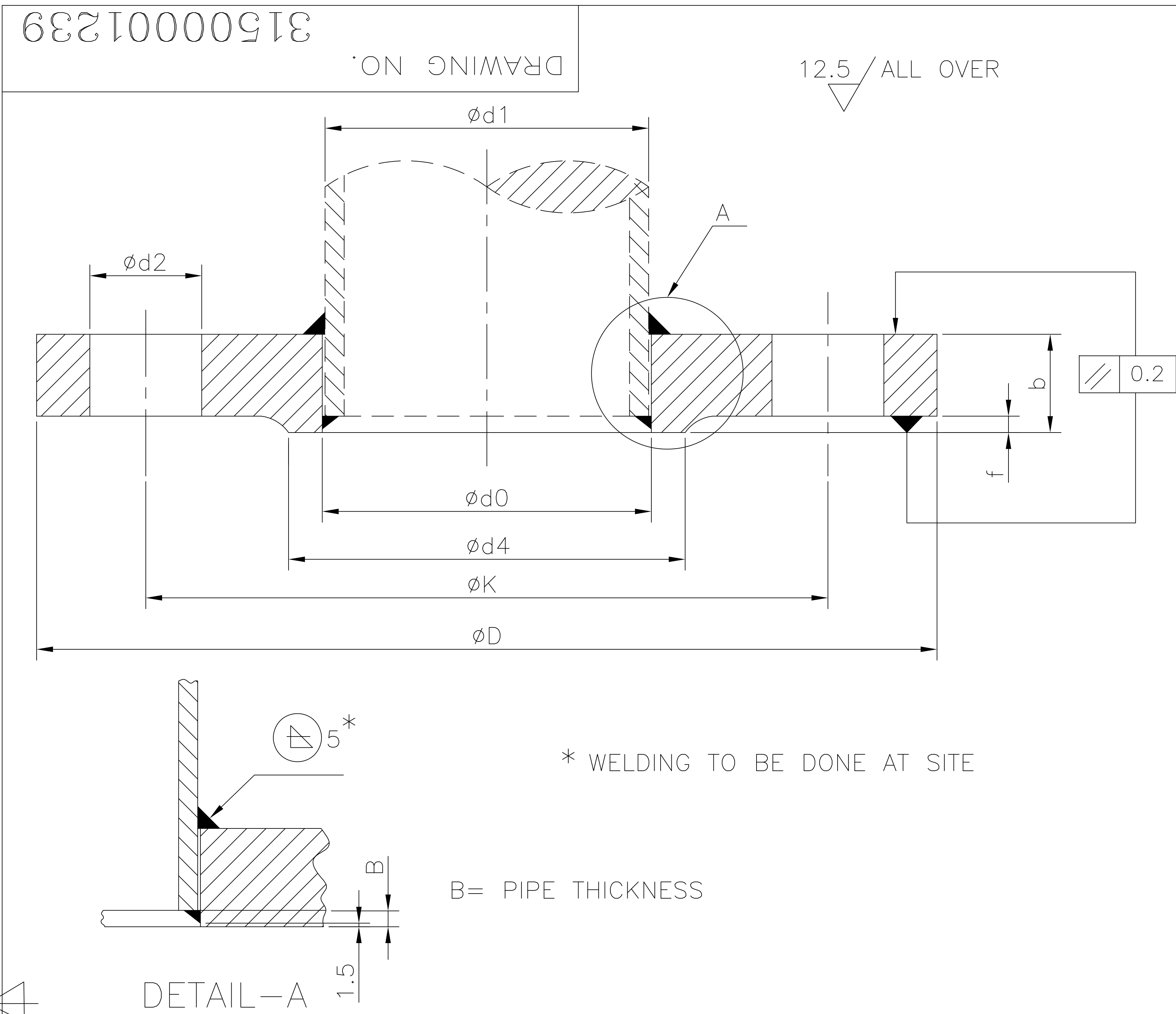
SIGN & DATE

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	+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		4	M24	16	26	470	24.3
18	125	139.7	140.7		+1.5	270	22		188	+0.0 -2.0	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

- 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 : CARBON STEEL AS PER IS-2062E250BR.
- 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	REV.	DATE	ALTERED KM
		CHECKED	01	15.12.17	CHECKED MA
			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

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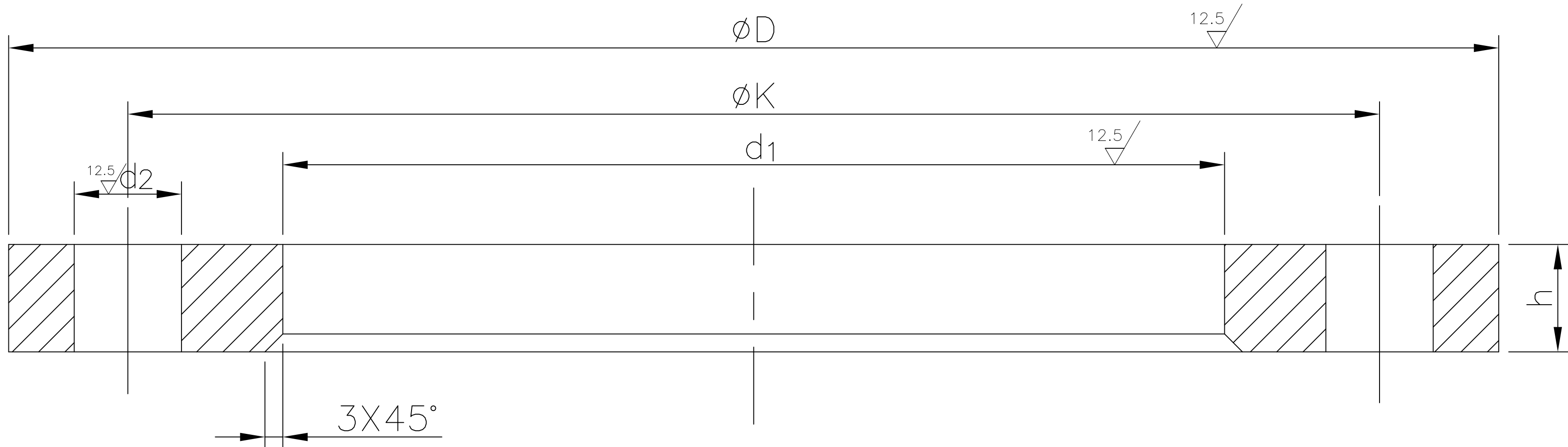
OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

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

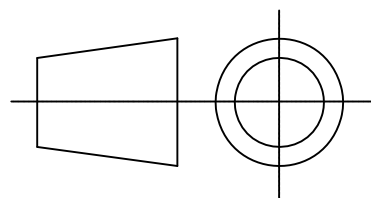
FOR COOLER

TECHNICAL REQUIREMENTS

1. EDGE PREPARATION AS PER HW0620.599.

SUPERSEEDS OLD DRAWING
UNDER THE SAME NUMBER

GRADE OF UNTOL. DIM.:— M/CG— V/C/M/F AA 0230208 WELDING—A/B/C/D—AA621104 GAS CUTTING—’T3’AA0621101			CBOM NO. 01531401007		STATUS OF DRG.	
			AGREED DEPT.	NAME	SIGN	DATE
			—	—	—	—
REV.	DATE	ALTERED CHECKED	REV. 06	DATE 22.02.18	ALTERED AKA2 CHECKED PG	sd/— 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 1:5	WEIGHT(Kg.) 4.64	REF. TO ASSY. DRG. 31531401071				ITEM NO. 06	NO.OF ITEMS
CODE 4133									75, 77
TITLE FLANGE PN40			1	3	DRAWING NO. 31531401089				
					SHEET NO. 1			NO.OF SHEETS 1	

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			

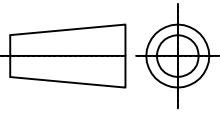


VARIANT TABLE

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.

SIGN & DATE	REF.DRG.No.																					
INVENTORY No.	 BHARAT HEAVY ELECTRICALS LTD HARDWAR												DRN	KM	NAME	SIGN	DATE	NO. OF VAR				
													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						

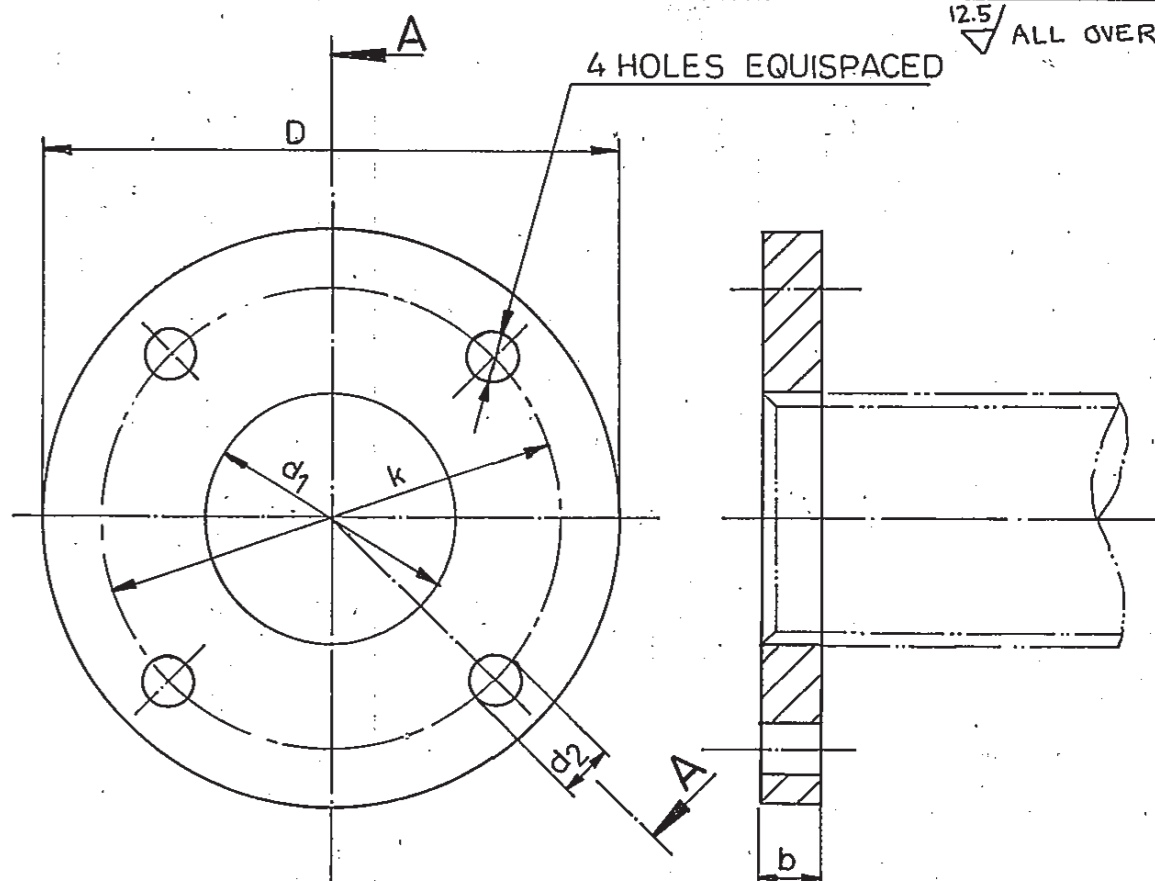
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REV	DATE	ALTERED	REV	DATE	ALTERED	GMS NO./GR. SP. NO.		STATUS OF DRG.	
		CHECKED			CHECKED	0-150-00-01090			
						AGREED DEPT.	NAME	SIGN	DATE
						GTY	S.C. GOYAL	<i>[Signature]</i>	29.10.86
						W.T.	S.K.C.	<i>[Signature]</i>	29.10.86



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		

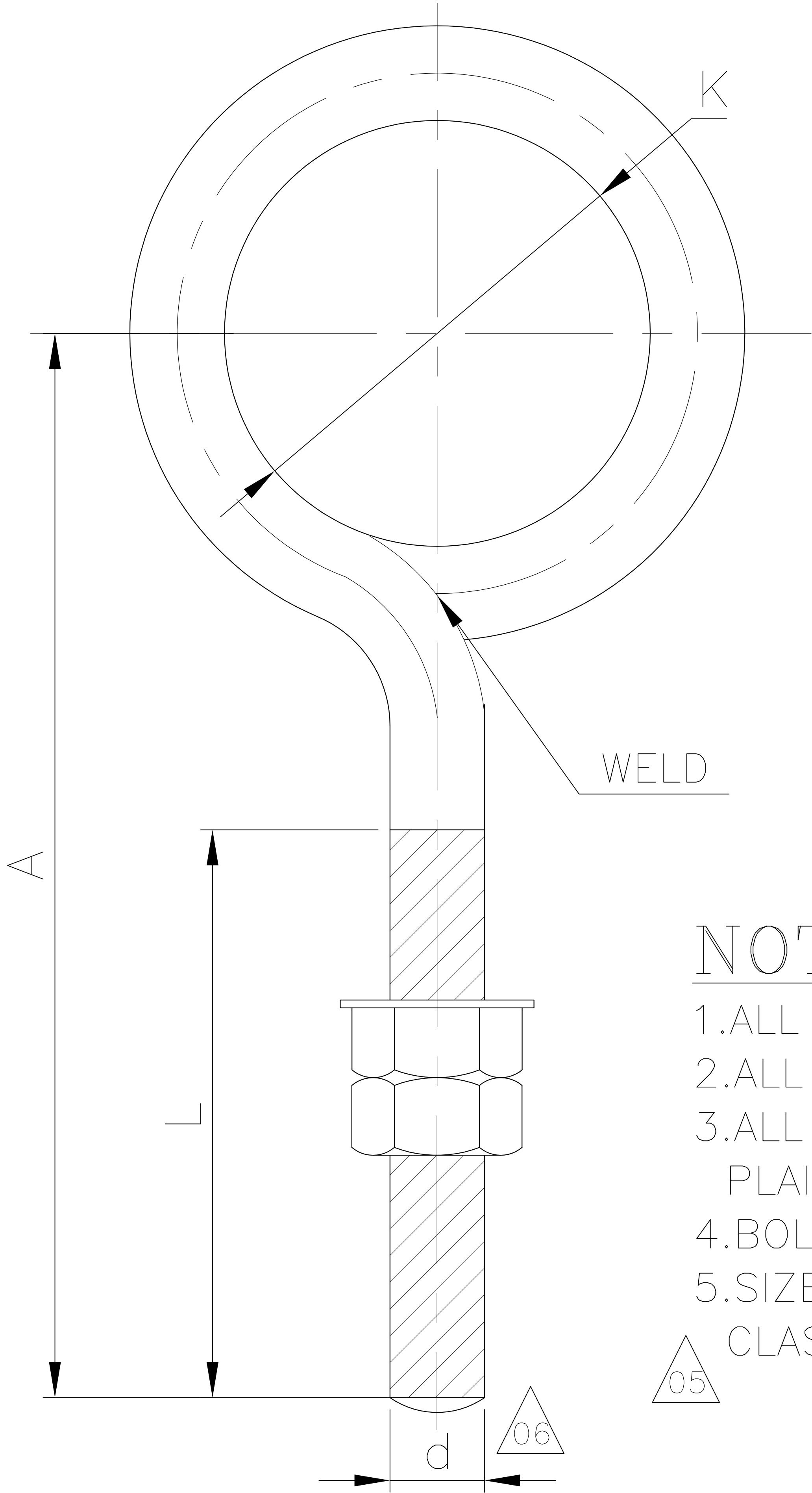
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FIRST ANGLE PROJECTION

(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			



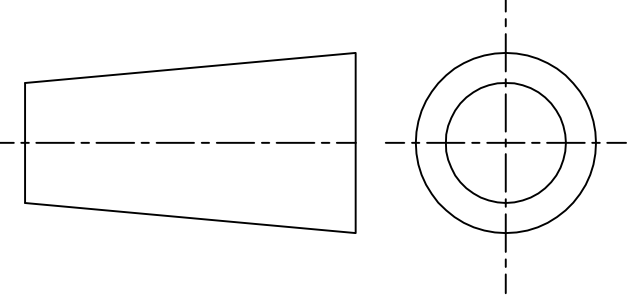
TESTING:—

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				4-150-00-01099							
RAPP 3,4 : KAIGA1,2						SHEET No. 1				No.OF SHEETS	1

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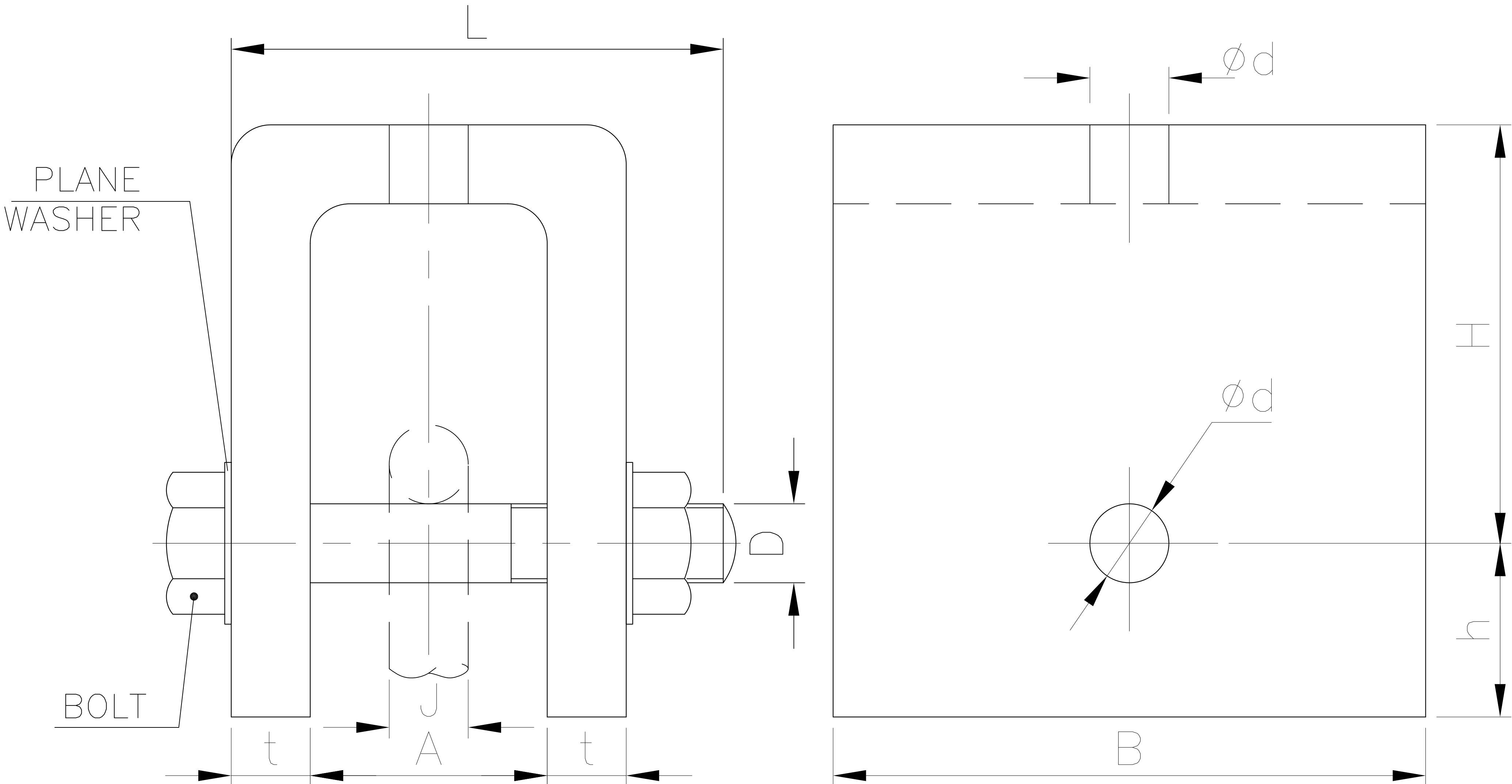
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FIRST ANGLE PROJECTION

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

REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No.			STATUS OF DRG
		CHECKED			CHECKED	0-150-00-01151			
						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.AA0230208WELDING A/B/C/D AA0621104GAS CUTTING-T3 AA0621101

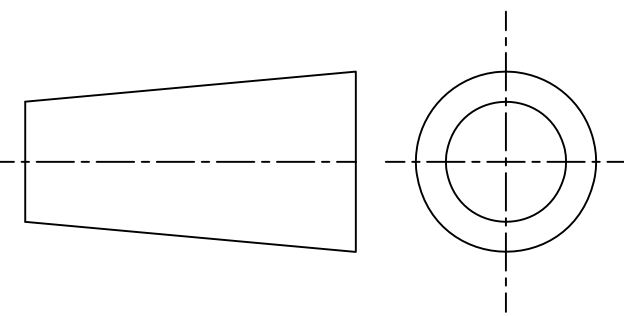


VAR.	ROD J SIZE	A	B	H	t	h	d	BOLT SIZE DXL
01	M-10	30	75	53	10	22	14	M12X75
02	M-12	30	75	53	10	22	18	M16X80
03	M-16	32	75	53	10	25	22	M20X85
04	M-20	40	75	53	10	30	24	M22X90

MATERIAL:- IS-2062 E250BR

NOTE:-

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

REF.DRG.No.		004	BEAM ATTACHMENT		04	W96415001469			1.80		
		003	BEAM ATTACHMENT		03	W96415000969			1.41		
		002	BEAM ATTACHMENT		02	W96415000950			1.25		
		001	BEAM ATTACHMENT		01	W96415000942			1.15		
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	AEDD	sd/-	09.04.91		
						CHD	K.R.GUPTA	sd/-	09.04.91		
						APD	G.GUPTA	sd/-	12.04.91		
INVENTORY No.	DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM	No OF ITEMS	
	CODE 4133		N.T.S	SEE TABLE		0-150-00-01151			No. -		
	TITLE BEAM ATTACHMENT					DRAWING No.					
	RAPP 3,4 : KAIGA1,2					4-150-00-01101					
					SHEET No. 1					No.OF SHEETS	1

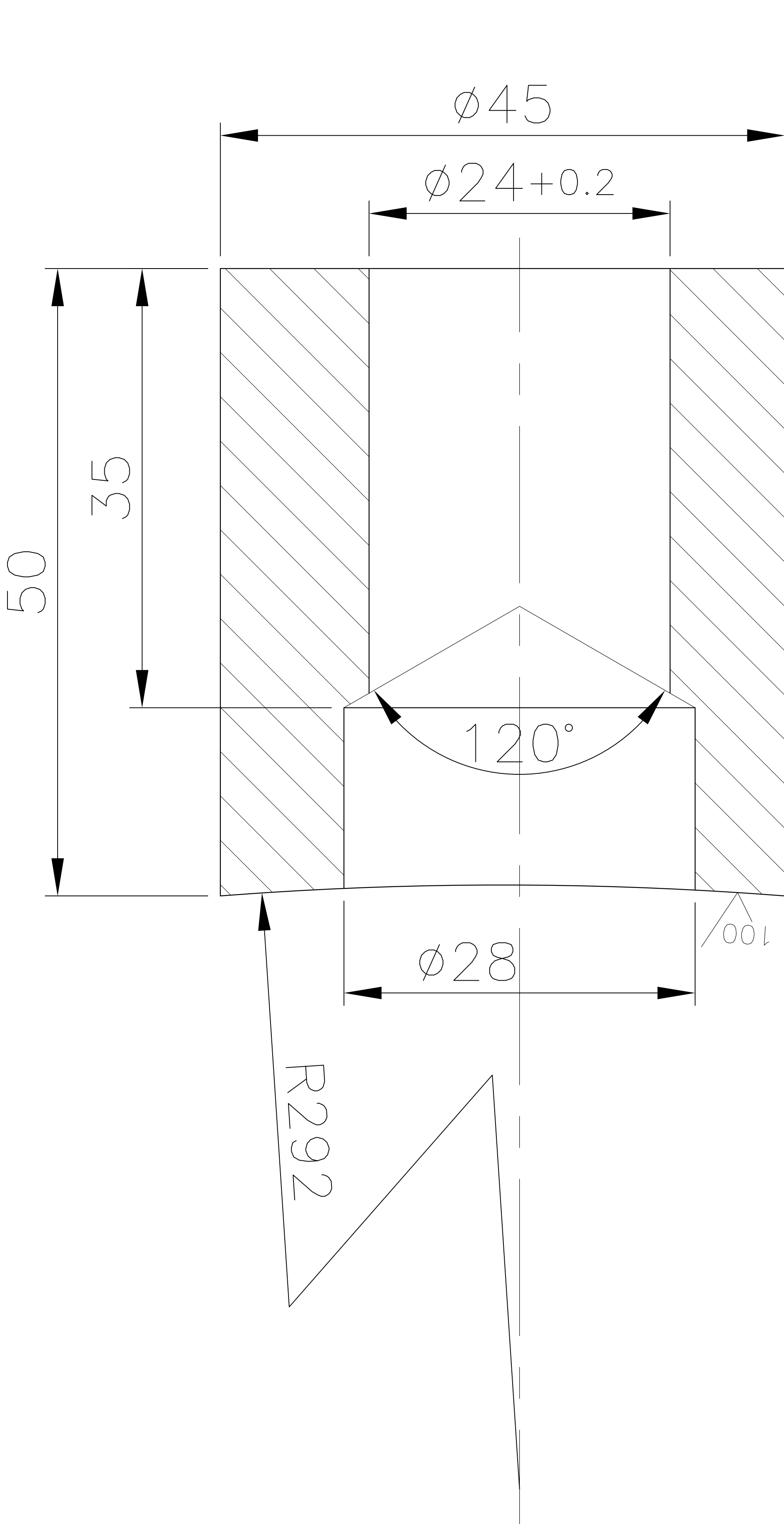
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FIRST ANGLE PROJECTION

(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	KBM NV			
			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-v/C/M/F.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.

28/04/92 SIGN & DATE	REF.DRG.No.													
	T.R													
	1. IDENTIFICATION AS PER HW0400397.													
	2. RADIUS R-292 SHOULD BE MADE DURING ASSLY. MATCHING WITH THE JOB.													
28/04/92 SIGN & DATE	PURCHASED	001	CONNECTION		00	MATERIAL AS PER BOM				0.500				
	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			
	Et1-16068 INVENTORY No.	DEPT. EME			SCALE		WEIGHT(Kg)		REF.TO ASSY.DRG.				ITEM No.	No OF ITEMS
		CODE 4133			1:1		0.500		3-150-00-01185					
TITLE							DRAWING No.							
CONNECTION							4-150-00-01118							
							SHEET No. 1		No.OF SHEETS				1	

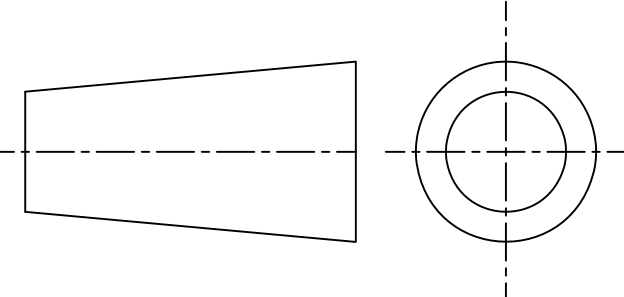
(ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

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

Technical drawing of a U-shaped component. The drawing includes the following dimensions and features:

- b**: Width of the top flange.
- h**: Total height of the component.
- e**: Height of the top flange.
- R = b/2**: Radius of the bottom semi-circular curve.
- 12.5**: Chamfer dimension on the inner corner.
- s**: Width of the top flange at the inner corner.
- d**: Diameter of the central hole.

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		01	CS-IS2062E250BR				
REMARKS	ITEM NO.	DESCRIPTION	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 OF ITEMS
CODE 4133		1:1	SEE TABLE		0-150-00-01125			No. -	
TITLE			WELDING EYE		DRAWING No.				
					4-150-00-01132				
					SHEET No. 1		No.OF SHEETS		1

Et1-16337
INVENTORY No.

SIGN & DATE

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CORPORATE STANDARD

AA7244703

Rev No.01

PAGE 1 of 3

BLANK FLANGES, CARBON STEEL, NOMINAL PRESSURE 1.6 N/mm²

1.0 SCOPE

This standard covers the designation, material, sizes, dimensions and other requirements of carbon steel blank flanges for nominal pressure 1.6 N/mm² (16 kg/cm²) and of nominal sizes 10 to 500 mm.

2.0 DESIGNATION

A carbon steel blank flange of nominal size 50 mm shall be designated as:

2.1 On Drawings :

- i) Material specification column : AA7244703
- ii) Description Column : BLANK FLANGE CS NP 1.6 NS 50

2.2 For placing indents on purchase:

Blank Flange, Carbon Steel, Nominal Pressure 1.6 N/mm², Nominal size 50; AA7244703

2.3 For issuing enquiries and on purchase orders:

A copy of this BHEL standard shall be enclosed.

3.0 COMPLIANCE WITH NATIONAL STANDARDS

3.1 Dimensions, Tolerances and other requirements: To IS:6392-1971

3.2 Material: To IS:2002, Gr 2

4.0 MANUFACTURING DETAILS

4.1 Machining of Flanges: Rims shall be turned or burrs removed. All bolt holes shall be drilled, equally spaced on the pitch circle diameter and spot faced.

4.2 Finish of joint surfaces:

4.2.1 Flanges up-to 300 mm nominal size inclusive shall have a continuous spiral groove produced by a 1.5 mm radius round-nosed tool at a feed of approximately 0.8 mm per revolution.

4.2.2 Flanges over 300 mm nominal size shall have continuous spiral groove produced by a 3 mm radius round-nosed tool at a feed of approximately 1.2 mm per revolution.

Revisions: As per Clause 25.04 of MOM of MRC-SMC+RP

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE - MRC(SMC+RP)

Rev No.01

Amd No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:15-12-2004

Dt:

Year:2013

HPEP, Hyderabad

Corp.R&D

Sept 1978

19/11/19

CS-0075-

CORPORATE STANDARD

**5.0 TEST CERTIFICATE**

Three copies of test certificate of the material shall be furnished by the supplier.

6.0 MARKING, PRESERVATION & PACKING

6.1 Marking : The following details shall be punched on the periphery of the rim of the flanges:

AA7244703

Nominal Pressure: 1.6 N/mm²

Nominal Size

Supplier's Identification

6.2 Preservation: Before despatch, the flanges shall be dried and cleaned, and the entire surface shall be well-covered with a good quality rust preventive material that will not become fluid and run off at 65°C

6.3 Packing: The flanges shall be bundled by bolting them together or securing them with wire of suitable strength passed through the bolt holes in such a manner that the flanges are paired and no flange facings remain exposed.

7.0 NOTE

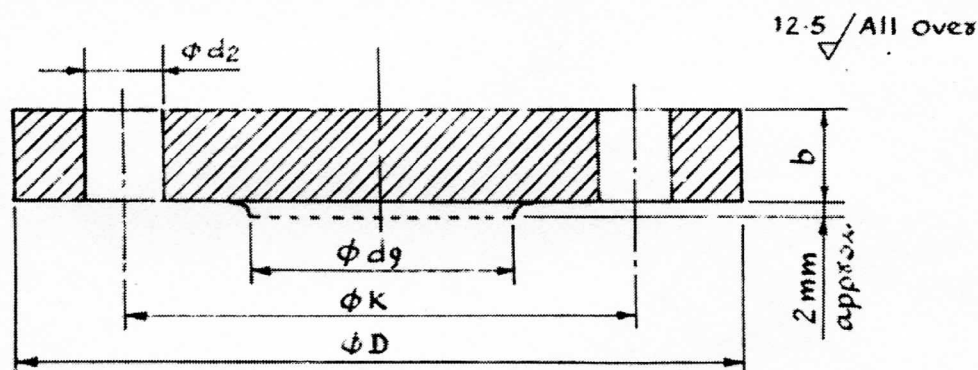
7.1 For details of the corresponding gaskets, refer BHEL standard AA7240313.

7.2 For nominal pressure/class designation with respect to service temperature, refer BHEL standard AA0233101.

7.3 For internal manufacture, refer BHEL specification AA10401, which is based on IS:2002, Gr:2

8.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS:2002 2) IS:6392 3) AA0233101 4) AA7240313 5) AA10401

**NOTE:**

- 1) The provision of spigot shown in dotted line in the figure is at the option of the manufacturer.
- 2) Weights given in the table are for general reference only and are not meant for commercial transactions.
- 3) Corporate sub-codes are shown against corporate rationalised sizes.
- 4) Sizes used by individual plants are covered in the annexure along with complete code numbers.

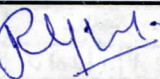
CS-0075
19/11/13

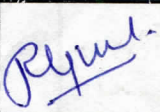
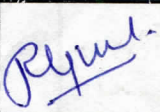
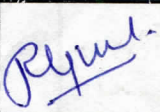
Nom Size	Flange Dimensions				Bolting Details					Wt / piece in kg	Sub Code
	D		b		d9	Bolt Size	Holes		K		
	Nom.	Tol.	Nom.	Tol.			No.	d2			
10	90	±1	14	+3 -0	-	M 12	4	14	60	0.63	
15	95		14		-	M 12	4	14	65	0.72	
20	105		16		-	M 12	4	14	75	1.01	
25	115		16		-	M 12	4	14	85	1.23	
32	140		16		-	M 16	4	18	100	1.80	
40	150		16		-	M 16	4	18	110	2.09	
50	165		18		-	M 16	4	18	125	2.88	
65	185		18		55	M 16	4	18	145	3.66	
80	200	±1.5	20	+3 -0	70	M 16	8	18	160	4.77	112
100	220		20		90	M 16	8	18	180	5.65	
125	250		22		115	M 16	8	18	210	8.42	
150	285		22		140	M 20	8	22	240	10.4	147
175	315	±2	24	+5 -0	165	M 20	8	22	270	14	
200	340		24		190	M 20	12	22	295	16.1	
250	405		26		237	M 24	12	26	355	24.9	
300	460		28		285	M 24	12	26	410	35.1	
350	520		30		332	M 24	16	26	470	47.8	
400	580		32		380	(M 27)	16	30	525	63.5	
500	715		36		475	M 30	20	33	650	102	

NOTE: The bolt size given in bracket is of second preference

CS-0075 - 19/11/13

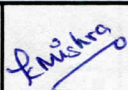
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.		संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW-59870 पृष्ठ 11 का 1 Page 1 of 11																																															
			FLOUROCARBON /VITON RUBBER SHEETS, 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%; text-align: center;">TSX</td> <td style="width:20%;">V.K. Singh</td> <td style="width:15%; text-align: center;">31/11/18</td> <td style="width:15%; text-align: center;">अनुवादक</td> <td style="width:20%;">TRANSLATED BY</td> <td style="width:15%;"></td> </tr> <tr> <td style="text-align: center;">QAX</td> <td>S.K. Chauhan</td> <td style="text-align: center;">31/11/18</td> <td style="text-align: center;">निर्माणकर्ता</td> <td>WORKED BY</td> <td>Amit</td> </tr> <tr> <td style="text-align: center;">सहमत विभाग</td> <td style="text-align: center;">नाम</td> <td style="text-align: center;">दिनांक एवं हस्ताक्षर</td> <td style="text-align: center;">जांचकर्ता</td> <td>CHECKED BY</td> <td>Rakesh Kumar</td> </tr> <tr> <td style="text-align: center;">AGREED DEPTT.</td> <td style="text-align: center;">NAME</td> <td style="text-align: center;">DATE & SIGNATURE</td> <td style="text-align: center;">पर्यवेक्षणकर्ता</td> <td>SUPERVISED BY</td> <td>R.C. Bajpai</td> </tr> <tr> <td style="text-align: center;">WORKED BY</td> <td>PRASHANT</td> <td style="text-align: center;">31/11/18</td> <td style="text-align: center;">स्वीकृति</td> <td colspan="2" rowspan="2"> APPROVED : AGM (EME) 27.11.10 </td> </tr> <tr> <td style="text-align: center;">CHECKED BY</td> <td>AMIT</td> <td style="text-align: center;">31/11/18</td> <td style="text-align: center;">संस्थान मानक समिति</td> <td>PLANT STANDARDS COMMITTEE</td> </tr> <tr> <td style="text-align: center;">Rev. No. 02</td> <td></td> <td></td> <td style="text-align: center;">निर्माण</td> <td>PREPARED : EME</td> <td rowspan="2"> जारी : मानक विभाग ISSUED : STANDARDS DIVISION </td> </tr> <tr> <td style="text-align: center;">31/8/18</td> <td></td> <td></td> <td style="text-align: center;">C/A NO.</td> <td>TSX (EME) 18-98</td> <td>31/8/18</td> </tr> </table>						TSX	V.K. Singh	31/11/18	अनुवादक	TRANSLATED BY		QAX	S.K. Chauhan	31/11/18	निर्माणकर्ता	WORKED BY	Amit	सहमत विभाग	नाम	दिनांक एवं हस्ताक्षर	जांचकर्ता	CHECKED BY	Rakesh Kumar	AGREED DEPTT.	NAME	DATE & SIGNATURE	पर्यवेक्षणकर्ता	SUPERVISED BY	R.C. Bajpai	WORKED BY	PRASHANT	31/11/18	स्वीकृति	APPROVED : AGM (EME) 27.11.10		CHECKED BY	AMIT	31/11/18	संस्थान मानक समिति	PLANT STANDARDS COMMITTEE	Rev. No. 02			निर्माण	PREPARED : EME	जारी : मानक विभाग ISSUED : STANDARDS DIVISION	31/8/18			C/A NO.	TSX (EME) 18-98	31/8/18
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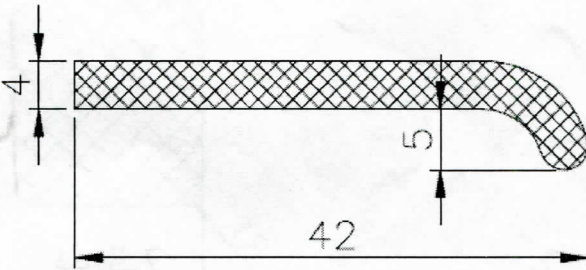
दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हार्डवेयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)		HW-59870 पृष्ठ 11 का 2 Page 2 of 11	
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकृत करता है	4.2.1 On Length & width: $\pm 3\%$ (Max.3mm) 4.2.2 On Thickness: +10% upto 4mm 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 जांचकर्ता CHECKED BY	Amit Rakesh Kr.	  27/11/10 27/11/10

दिनांक एवं हस्ताक्षर SIGN & DATE		संस्थान क्रय विनिर्देश (हीप - हार्डवयर) PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)	HW-59870 पृष्ठ 11 का 3 Page 3 of 11												
सामग्री सूची संख्या को अधिकृतित 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.															
हस्ताक्षर एवं दिनांक SIGN & DATE	सामग्री सूची संख्या INVENTOR YNO.	REV.NO. 02	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">निर्माणकर्ता WORKED BY</td> <td style="width:25%;">Amit</td> <td style="width:25%; text-align: center;">  </td> <td style="width:25%; text-align: center;">27/11/10</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>Rakesh Kr.</td> <td style="text-align: center;">  </td> <td style="text-align: center;">27/11/10</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	निर्माणकर्ता WORKED BY	Amit		27/11/10	जांचकर्ता CHECKED BY	Rakesh Kr.		27/11/10				
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जांचकर्ता CHECKED BY	Rakesh Kr.		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											
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											
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. <table border="0"> <tr> <td>Change in Hardness</td> <td>Not more than +5 IRHD</td> </tr> <tr> <td>Change in T.S.</td> <td>±2.5 N/mm²</td> </tr> <tr> <td>Elongation</td> <td>125 % Min.</td> </tr> </table> 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%						Change in Hardness	Not more than +5 IRHD	Change in T.S.	±2.5 N/mm ²	Elongation	125 % Min.
Change in Hardness	Not more than +5 IRHD										
Change in T.S.	±2.5 N/mm ²										
Elongation	125 % Min.										
स्वत्वधिकार 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 2/11/10											
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 : 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

प्रिण्ट एवं हस्ताक्षर SIGN & DATE		उत्पाद क्रय विनिर्देश PRODUCT PURCHASE SPECIFICATION		HW-59870	
				पृष्ठ 11 का 6 Page 6 of 11	
सामग्री सूची संख्या INVENTORY NO.	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 :-			
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 को कि कंपनी के हित में हानिकारक हो न किया जाए।	प्रिण्ट एवं हस्ताक्षर SIGN & DATE	- 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 :			
सामग्री सूची संख्या INVENTORY NO.	REV. NO.	(SUPERSEDES)	निर्माणकर्ता WORKED BY	PRASHANT	
P-3721	02		जांचकर्ता CHECKED BY	AMIT MITTAL	
					31/8/18 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)

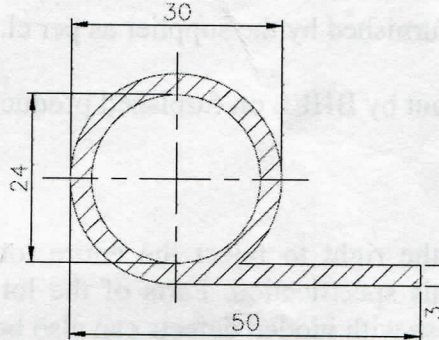
HW-59870

पृष्ठ 11 का 8

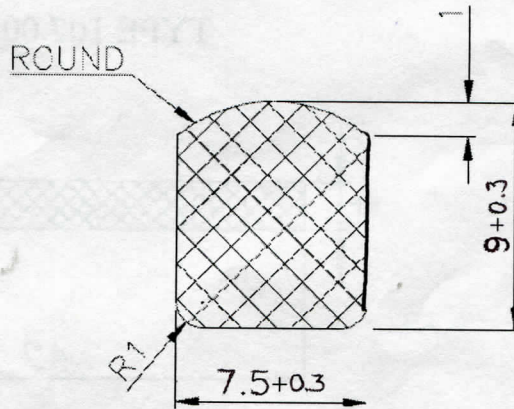
Page 8 of 11



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 होनिकाएक 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.

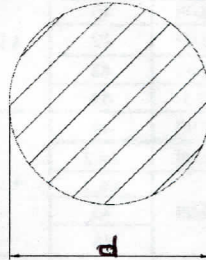
27/11/10

27/11/10

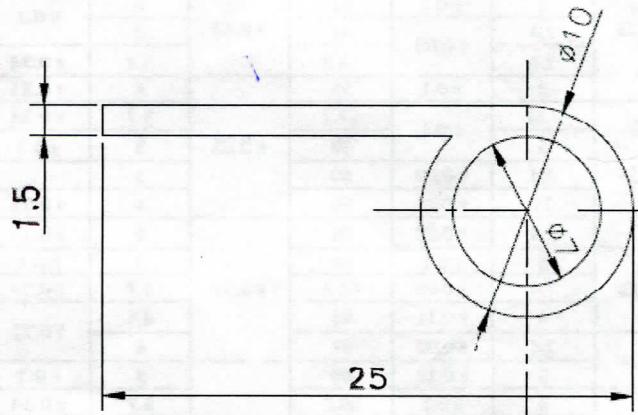
(हीप – हरिद्वार)

PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

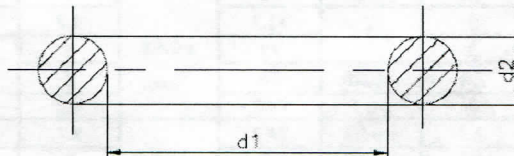
Profile NO. 501-026 d=10±0.3 Mat.Code =HW5983681010



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 हेवी 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)

HW-59870

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PLANT PURCHASE SPECIFICATION (HEEP - HARDWAR)

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TABLE-1

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

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।

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सामग्री सूची संख्या को अधिकतम करना है

SUPERSEDES INVENTORY NO.

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

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
अधिकारित 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				

2-11-2010

P-3721

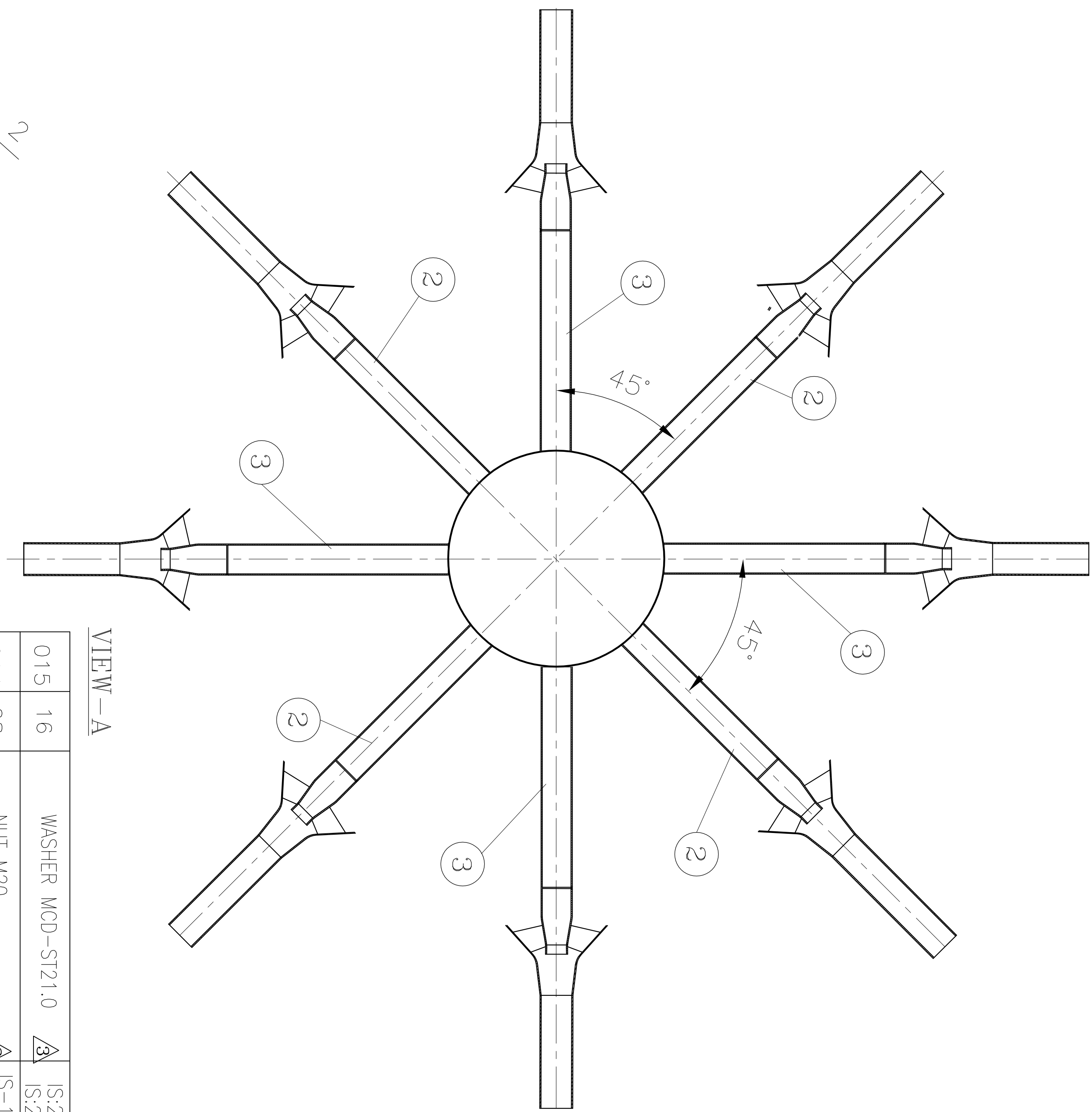
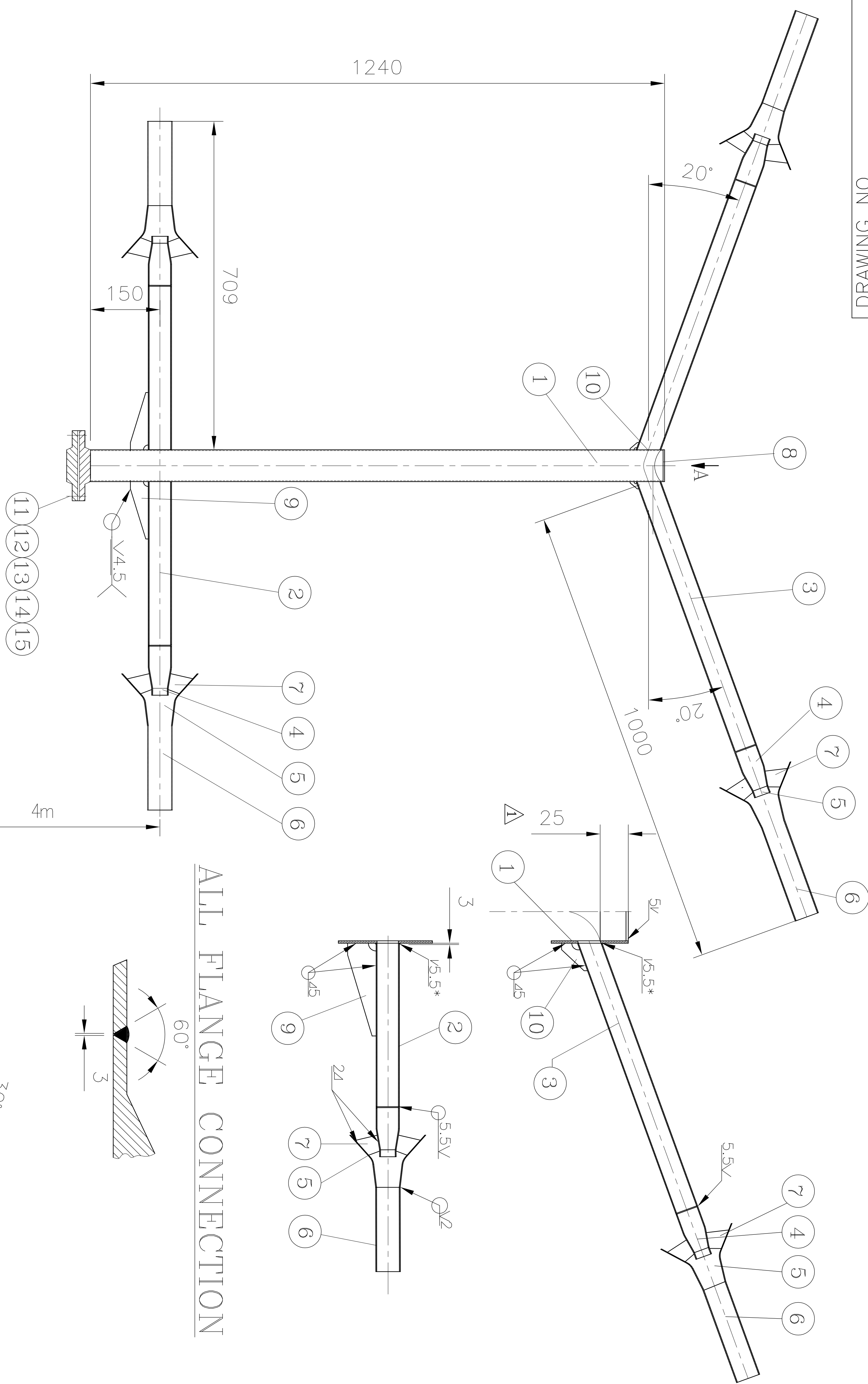
Amit

27/11/10

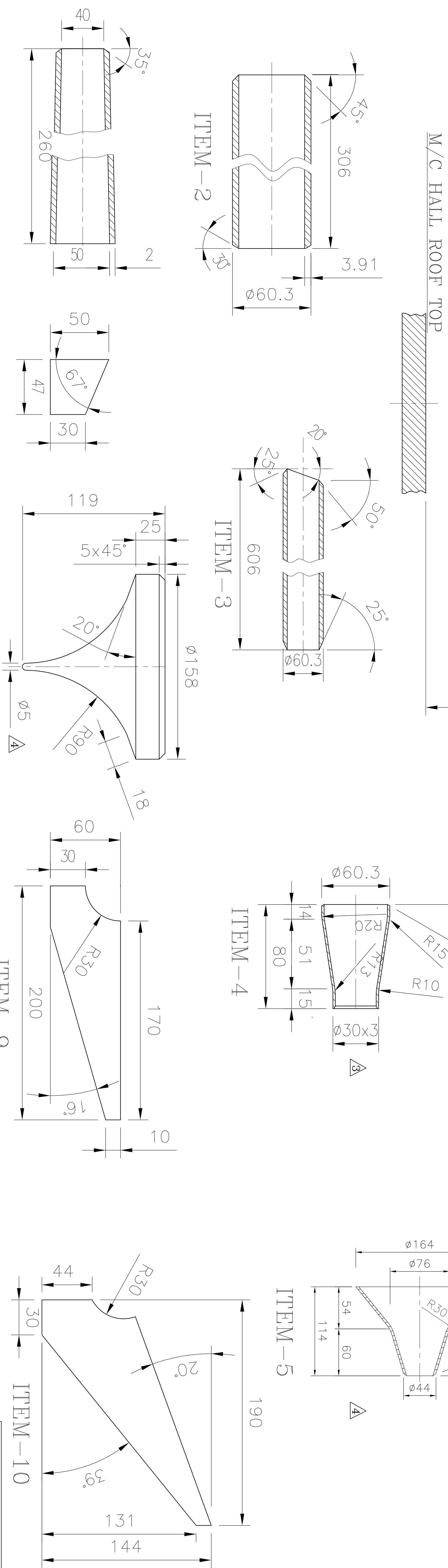
Rakesh Kr.

27/11/10

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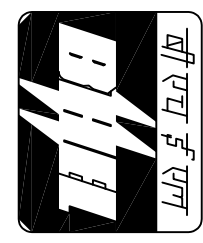


VIEW-A



ITEM NO.	QTY.	DESCRIPTION	MATERIAL SPEC	UNIT	WEIGHT
015	16	WASHER MCD-ST12.10	IS:2016-1967 IS:2062E250BR	NO	0.01
014	08	NUT M20	IS-1364 PART-3 IS-1367 PART-3	NO	0.02
013	08	BOLT M20X80	IS-1364 PART-2 IS-1367 PART-3	NO	0.02
012	01	GASKET 210X168X3TK	HWS9870 VITON	NO	0.01
011	02	FLANGE NB150	IS:2062E250BR DIMENSION AS PER AA/244303;	NO	6.00
010	04	SUPPORT (THK=8MM)	IS:2062 E250BR	NO	0.5
009	04	SUPPORT (THK=8MM)	IS:2062 E250BR	NO	0.5
008	01	FLOW GUIDE	IS:2062 E250BR	NO	1.00
007	024	SUPPORT (THK=4MM)	IS:2062 E250BR	NO	0.05
006	08	PIPE ASSY	ASTM A105	NO	1.5
005	08	VENT COWL	ASTM A105	NO	1.2
004	08	REDUCER 60.3X30X3	ASTM A105	NO	0.4
003	04	C.S PIPE ASSY 60.3X3.91	ASME SA106GRB	NO	3.29
002	04	C.S PIPE ASSY 60.3X3.91	ASME SA106GRB	NO	1.66
001	01	C.S PIPE 60.3X3.4 L=1240	ASME SA106GRB	NO	17.15

THDF 115/67



BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

NAME	SIGN	DATE	NO.OF
RAVINDRA	SD/-	16.01.10	VAR.
RLV	SD/-	16.01.10	
AKM	SD/-	16.01.10	73, 74

TOLERANCES ON DIMENSIONS SHALL BE AS PER COARSE "C" GRADE OF STANDARRD AA0230208

REV.	DATE	ALTERED	KM	REV.	DATE	ALTERED	KM	REV.	DATE	ALTERED	KM	REV.	DATE	ALTERED	KM
04	09.01.2020	CHECKED	MA	03	14.08.19	CHECKED	MA	02	02.08.19	CHECKED	MA	01	29.05.18	CHECKED	MA
DETAILS UPDATED FOR ITEM NO. 5 & 8.															
REVISION MARKED AS A															

INVENTORY NO. SIGN & DATE REF. DRG NO.

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DEPT.	EME	SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO.OF
CODE	4133	1:10	80.44		73, 74
TITLE					NO.OF
HYDROGEN VENT STAR					73, 74
DRAWING NO. TGE-2774					22, 23, 24
SHEET NO.					NO.OF SHEETS

SIZE A2



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
101		PIPE ASSEMBLY FROM 76(SOU AIR SIDE) TO TERM. 72(SOVR)						
	101.1	PIPE SS	D73x3.05		30	Mtr.	ASTM A312 TP321	157.8
	101.2	ELBOW LR 90°	D73X3.05		8	No.	ASTM A403 WP321,ASME B16.9	11.2
	101.3	REDUCER CONC	D88.9X73X3.05		1	No.	ASTM A403 WP321,ASME B16.9	1.5
	101.4	FLANGE, 65NB	31500001240	08	10	No.	ASTM A182 F321	26.7
	101.9	FLANGE,65NB (FOR 72 SOVR)	31500001240	08	1	No.	ASTM A182 F321	2.67
102		PIPE ASSEMBLY FROM 80(SOUA) TO U-LOOP SOST						
	102.1	PIPE SS	D73x3.05		30	Mtr.	ASTM A312 TP321	157.8
	102.2	ELBOW LR 90°	D73X3.05		10	No.	ASTM A403 WP321,ASME B16.9	14
	102.3	FLANGE, 65NB	31500001240	08	12	No.	ASTM A182 F321	32.04
103		PIPE ASSEMBLY FROM 283 (SOUA) TO 467 (SOST)						
	103.1	PIPE SS	D73x3.05		30	Mtr.	ASTM A312 TP321	157.8
	103.2	ELBOW LR 90°	D73X3.05		10	No.	ASTM A403 WP321,ASME B16.9	14
	103.3	FLANGE, 65NB	31500001240	08	12	No.	ASTM A182 F321	32.04
	103.8	FLANGE,65NB (FOR 467 SOST)	31500001240	08	1	No.	ASTM A182 F321	2.67
104		PIPE ASSEMBLY FROM 419(SOUA) TO TERM 294(SOST)						
	104.1	PIPE SS	D114.3X3.05		45	Mtr.	ASTM A312 TP321	376.65
	104.2	ELBOW LR 90°	D114.3X3.05		12	No.	ASTM A403 WP321,ASME B16.9	7.8
	104.3	FLANGE, 100NB	31500001240	10	10	No.	ASTM A182 F321	36.2
	104.8	FLANGE, 100NB (VALVE MKW01/AA285)	31500001240	10	2	No.	ASTM A182 F321	7.24
105		PIPE ASSEMBLY FROM 70A(SOVR) TO TERM 6A/6C(GEN)						
	105.1	PIPE SS	D33.4X2.77		20	Mtr.	ASTM A312 TP321	41.8
	105.2	REDUCER CONC	48.3x33.4x2.77		2	No.	ASTM A403 WP321,ASME B16.9	0.46
	105.3	TEE	33.4X33.4X2.77		1	No.	ASTM A403 WP321,ASME B16.9	0.2
	105.4	FLANGE,25NB (FOR 70A SOVR)	31500001240	04	1	No.	ASTM A182 F321	1.02
	105.9	FLANGE, 25NB	31500001240	04	10	No.	ASTM A182 F321	10.2
	105.14	FLANGE,40NB (FOR GEN END 6A)	31500001240	06	1	No.	ASTM A182 F321	1.17
106		BRANCH PIPE ASSEMBLY TO TERM 6C(GEN) (BRANCH OF PIPE AT SI NO. 105)						
	106.1	PIPE SS	D33.4X2.77		10	Mtr.	ASTM A312 TP321	20.9
	106.2	REDUCER CONC	48.3x33.4x2.77		1	No.	ASTM A403 WP321,ASME B16.9	0.35
	106.3	FLANGE,40NB (FOR GEN END 6C)	31500001240	06	1	No.	ASTM A182 F321	1.17
107		PIPE ASSEMBLY FROM 69A(SOVR) TO TERM 5A/5C(GEN)						
	107.1	PIPE SS	D60.3X3.91		20	Mtr.	ASTM A312 TP321	108.8
	107.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A403 WP321,ASME B16.9	30.00
	107.3	REDUCER CONC	60.3X48.3X2.77		1	No.	ASTM A403 WP321,ASME B16.9	1.5
	107.4	TEE	60.3X60.3X2.77		1	No.	ASTM A403 WP321,ASME B16.9	1.49
	107.5	FLANGE,50NB (FOR 69A SOVR)	31500001240	07	1	No.	ASTM A182 F321	2.1
	107.10	FLANGE, 50NB	31500001240	07	10	No.	ASTM A182 F321	21
	107.15	FLANGE,40NB (FOR GEN END 5A)	31500001240	06	1	No.	ASTM A182 F321	1.17
108		BRANCH PIPE ASSEMBLY FROM 5C(GEN) (BRANCH OF PIPE AT SI NO. 107)						
	108.1	PIPE SS	D60.3X3.91		14	Mtr.	ASTM A312 TP321	76.16
	108.2	ELBOW LR 90°	D60.3X3.91		2	No.	ASTM A403 WP321,ASME B16.9	6.00
	108.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321,ASME B16.9	0.5
	108.4	FLANGE,40NB (FOR GEN END 5C)	31500001240	06	1	No.	ASTM A182 F321	1.17
109		PIPE ASSEMBLY FROM TERM.68A (SOVR) TO 4A/4C						
	109.1	PIPE SS	D60.3X3.91		20	Mtr.	ASTM A312 TP321	108.8
	109.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A403 WP321,ASME B16.9	30.00
	109.3	REDUCER CONC	60.3X48.3X2.77		1	No.	ASTM A403 WP321,ASME B16.9	0.5
	109.4	TEE	60.3X60.3X2.77		1	No.	ASTM A403 WP321,ASME B16.9	1.49
	109.5	FLANGE,50NB (FOR 68A SOVR)	31500001240	07	1	No.	ASTM A182 F321	2.1

Kunal Mishra
KUNAL MISHRA
Sr. Mgr - BHEL-HDR(EME)

Prepared by KUNAL MISHRA

Checked by MANJU AZAD

Approved by R.L.VYAS



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
	109.10	FLANGE, 50NB	31500001240	07	10	No.	ASTM A182 F321	21
	109.15	FLANGE, 40NB (FOR GEN END 4A)	31500001240	06	1	No.	ASTM A182 F321	1.17
110		BRANCH PIPE ASSEMBLY TO TERM.68A(SOVR) (BRANCH OF PIPE AT SI NO. 109)						
	110.1	PIPE SS	D60.3X3.91		14	Mtr.	ASTM A312 TP321	76.16
	110.2	ELBOW LR 90°	D60.3X3.91		2	No.	ASTM A403 WP321, ASME B16.9	6.00
	110.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.5
	110.4	FLANGE, 40NB (FOR GEN END 4C)	31500001240	06	1	No.	ASTM A182 F321	1.17
111		PIPE ASSEMBLY FROM TERM.69B (SOVR) TO 5D/5B						
	111.1	PIPE SS	D60.3X3.91		21	Mtr.	ASTM A312 TP321	114.24
	111.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A403 WP321, ASME B16.9	30.00
	111.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.5
	111.4	TEE	60.3X60.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	1.49
	111.5	FLANGE, 50NB (FOR 69B SOVR)	31500001240	07	1	No.	ASTM A182 F321	2.1
	111.10	FLANGE, 50NB	31500001240	07	10	No.	ASTM A182 F321	21
	111.15	FLANGE, 40NB (FOR GEN END 5B)	31500001240	06	1	No.	ASTM A182 F321	1.17
112		BRANCH PIPE ASSEMBLY TO TERM.69B(SOVR) (BRANCH OF PIPE AT SI NO. 111)						
	112.1	PIPE SS	D60.3X3.91		6	Mtr.	ASTM A312 TP321	32.64
	112.2	ELBOW LR 90°	D60.3X3.91		2	No.	ASTM A403 WP321, ASME B16.9	6.00
	112.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.5
	112.4	FLANGE, 40NB (FOR GEN END 5D)	31500001240	06	1	No.	ASTM A182 F321	1.17
113		PIPE ASSEMBLY FROM TERM. 68B (SOVR) TO 4B/4D						
	113.1	PIPE SS	D60.3X3.91		21	Mtr.	ASTM A312 TP321	114.24
	113.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A403 WP321, ASME B16.9	30.00
	113.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.5
	113.4	TEE	60.3X60.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	1.49
	113.5	FLANGE, 50NB (FOR 68B SOVR)	31500001240	07	1	No.	ASTM A182 F321	2.1
	113.10	FLANGE, 50NB	31500001240	07	10	No.	ASTM A182 F321	21
	113.15	FLANGE, 40NB (FOR GEN END 4B)	31500001240	06	1	No.	ASTM A182 F321	1.17
114		BRANCH PIPE ASSEMBLY TO TERM.68B(SOVR) (BRANCH OF PIPE AT SI NO. 113)						
	114.1	PIPE SS	D60.3X3.91		6	Mtr.	ASTM A312 TP321	32.64
	114.2	ELBOW LR 90°	D60.3X3.91		2	No.	ASTM A403 WP321, ASME B16.9	6.00
	114.3	REDUCER CONC	60.3X48.3x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.5
	114.4	FLANGE, 40NB (FOR GEN END 4D)	31500001240	06	1	No.	ASTM A182 F321	1.17
115		PIPE ASSEMBLY FROM TERM 69D(SOVR) TO 12B(GEN)						
	115.1	PIPE SS	D21.3X2.77		21	Mtr.	ASTM A312 TP321	26.67
116		PIPE ASSEMBLY FROM TERM 68D(SOVR) TO 14B(GEN)						
	116.1	PIPE SS	D21.3X2.77		25	Mtr.	ASTM A312 TP321	31.75
117		PIPE ASSEMBLY FROM TERM 69C(SOVR) TO 12A(GEN)						
	117.1	PIPE SS	D21.3X2.77		30	Mtr.	ASTM A312 TP321	38.1
118		PIPE ASSEMBLY FROM TERM 68C(SOVR) TO 14A(GEN)						
	118.1	PIPE SS	D21.3X2.77		30	Mtr.	ASTM A312 TP321	38.1
119		PIPE ASSEMBLY FROM TERM 438(SOVR) TO 439(SOVR)						
	119.1	PIPE SS	D33.4X2.77		30	Mtr.	ASTM A312 TP321	62.7
	119.2	FLANGE, 25NB (FOR 439 SOVR)	31500001240	04	1	No.	ASTM A182 F321	1.02
	119.7	FLANGE, 25NB	31500001240	04	10	No.	ASTM A182 F321	10.2
120		PIPE ASSEMBLY FROM TERM 78 (SOVR) TO 7A/7B (GEN)						
	120.1	PIPE SS	D114.3X3.05		50	Mtr.	ASTM A312 TP321	418.5
	120.2	ELBOW LR 90°	D114.3X3.05		12	No.	ASTM A403 WP321, ASME B16.9	7.8
	120.3	TEE	114.3X114.3X3.05		1	No.	ASTM A403 WP321, ASME B16.9	2.5
	*120.4	FLANGE, 100NB	31500001027	02	8	No.	ASTM A182 F321	36.64
	*120.5	FLANGE, 100NB	31500001000	06	8	No.	ASTM A182 F321	47.04



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
	120.10	FLANGE, 100NB (TERM 7B GEN)	31500001240	10	1	No.	ASTM A182 F321	3.62
* REMARKS FOR PROJECT SITE - ITEM NO. 120.4 & 120.5 SHALL BE USED IN COMBINATION i.e. ONE FLAT FLANGE ALONG WITH GROOVED FLANGE WITH O-RING COVERED IN BOM TGE-3629 (ITEM NO. 120.6).								
121		BRANCH PIPE ASSEMBLY TO TERM.78(SOUH) (BRANCH OF PIPE AT SI NO. 120)						
	121.1	PIPE SS	D114.3X3.05		13	Mtr.	ASTM A312 TP321	108.81
	121.2	ELBOW LR 90°	D114.3X3.05		8	No.	ASTM A403 WP321, ASME B16.9	5.2
	*121.3	FLANGE, 100NB	31500001027	02	2	No.	IS-2062 GR.B	9.16
	*121.4	FLANGE, 100NB	31500001000	06	2	No.	ASTM A182 F321	11.76
	121.9	FLANGE, 100NB (TERM 7A GEN)	31500001240	10	1	No.	ASTM A182 F321	3.62
* REMARKS FOR PROJECT SITE - ITEM NO. 121.3 & 121.4 SHALL BE USED IN COMBINATION i.e. ONE FLAT FLANGE ALONG WITH GROOVED FLANGE WITH O-RING COVERED IN BOM TGE-3629 (ITEM NO. 121.5).								
122		PIPE ASSEMBLY FROM U LOOP TO TERM 450 (DPR LINE SOVR)						
	122.1	PIPE SS	D21.3X2.77		25	Mtr.	ASTM A312 TP321	31.75
123		PIPE ASSEMBLY FROM TERM 79 (SOUH) TO 295 (SOST)						
	123.1	PIPE SS	D114.3X3.05		30	Mtr.	ASTM A312 TP321	251.1
	123.2	REDUCER CONC	114.3X60.3X3.05X2.77		1	No.	ASTM A403 WP321, ASME B16.9	1
	123.3	REDUCER CONC	60.3X33.4X2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.23
	123.4	FLANGE, 100NB (FOR 295 SOST)	31500001240	10	1	No.	ASTM A182 F321	3.62
	123.9	FLANGE, 100NB	31500001240	10	10	No.	ASTM A182 F321	36.2
124		PIPE ASSEMBLY FROM TERM 75(SOUH) TO 71(SOVR)						
	124.1	PIPE SS	D60.3X3.91		30	Mtr.	ASTM A312 TP321	163.2
	124.2	ELBOW LR 90°	D60.3X3.91		10	No.	ASTM A403 WP321, ASME B16.9	30.00
	124.3	FLANGE, 50NB (FOR 71 SOVR)	31500001240	07	1	No.	ASTM A182 F321	2.1
	124.8	FLANGE, 50NB	31500001240	07	12	No.	ASTM A182 F321	25.2
125		PIPE ASSEMBLY FROM TERM 921(PEM) TO SEAL OIL CLR AIR SIDE SEAL OIL UNIT						
	125.1	PIPE SS	D114.3X3.05		5	Mtr.	ASTM A312 TP321	41.85
	125.2	ELBOW LR 90°	D114.3X3.05		3	No.	ASTM A403 WP321, ASME B16.9	1.95
	125.3	TEE	114.3X114.3X3.05		1	No.	ASTM A403 WP321, ASME B16.9	2.5
	125.4	FLANGE, 100NB (CLR. END TERM)	31500001240	10	2	No.	ASTM A182 F321	7.24
	125.9	FLANGE, 100NB (PEM TERM)	31500001240	10	2	No.	ASTM A182 F321	7.24
	125.14	FLANGE, 100NB (FOR VLV)	31500001240	10	4	No.	ASTM A182 F321	14.48
126		PIPE ASSEMBLY FROM TERM SEAL OIL CLR AIR SIDE SEAL OIL UNIT TO 922(PEM)						
	126.1	PIPE SS	D114.3X3.05		5	Mtr.	ASTM A312 TP321	41.85
	126.2	ELBOW LR 90°	D114.3X3.05		3	No.	ASTM A403 WP321, ASME B16.9	1.95
	126.3	TEE	114.3X114.3X3.05		1	No.	ASTM A403 WP321, ASME B16.9	2.5
	126.4	FLANGE, 100NB (CLR. END TERM)	31500001240	10	2	No.	ASTM A182 F321	7.24
	126.9	FLANGE, 100NB (PEM TERM)	31500001240	10	2	No.	ASTM A182 F321	7.24
	126.14	FLANGE, 100NB (FOR VLV)	31500001240	10	4	No.	ASTM A182 F321	14.48
127		PIPE ASSEMBLY FROM TERM 931(PEM) TO SEAL OIL CLR H2 SIDE SEAL OIL UNIT						
	127.1	PIPE SS	D60.3X3.91		5	Mtr.	ASTM A312 TP321	27.2
	127.2	ELBOW LR 90°	D60.3X3.91		3	No.	ASTM A403 WP321, ASME B16.9	9.00
	127.3	TEE	60.3X60.3X2.77		1	No.	ASTM A403 WP321, ASME B16.9	1.49
	127.4	FLANGE, 50NB (PEM TERM)	31500001240	07	2	No.	ASTM A182 F321	4.2
	127.9	FLANGE, 50NB (FOR VLV)	31500001240	07	4	No.	ASTM A182 F321	8.4
	127.14	FLANGE, 50NB (CLR. END TERM)	31500001240	07	2	No.	ASTM A182 F321	4.2
128		PIPE ASSEMBLY FROM TERM SEAL OIL CLR H2 SIDE SEAL OIL UNIT TO TERM 932(PEM)						
	128.1	PIPE SS	D60.3X3.91		5	Mtr.	ASTM A312 TP321	27.2
	128.2	ELBOW LR 90°	D60.3X3.91		3	No.	ASTM A403 WP321, ASME B16.9	9.00
	128.3	TEE	60.3X60.3X2.77		1	No.	ASTM A403 WP321, ASME B16.9	1.49



PIPING FOR SEAL OIL SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
	128.4	FLANGE, 50NB (PEM TERM)	31500001240	07	2	No.	ASTM A182 F321	4.2
	128.9	FLANGE, 50NB (FOR VLV)	31500001240	07	4	No.	ASTM A182 F321	8.4
	128.14	FLANGE, 50NB (CLR. END TERM)	31500001240	07	2	No.	ASTM A182 F321	4.2
129		PIPE ASSEMBLY FROM 70B(SOVR) TO TERM 6B/6D(GEN)						
	129.1	PIPE SS	D33.4X2.77		20	Mtr.	ASTM A312 TP321	41.8
	129.2	REDUCER CONC	48.3x33.4x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.35
	129.3	TEE	33.4X33.4X2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.2
	129.4	FLANGE, 25NB (FOR 70B SOVR)	31500001240	04	1	No.	ASTM A182 F321	1.02
	129.9	FLANGE, 25NB	31500001240	04	10	No.	ASTM A182 F321	10.2
	129.14	FLANGE, 40NB (FOR GEN END 6B)	31500001240	06	1	No.	ASTM A182 F321	1.17
130		BRANCH PIPE ASSEMBLY TO TERM 6D(GEN) (BRANCH OF PIPE AT SI NO. 130)						
	130.1	PIPE SS	D33.4X2.77		10	Mtr.	ASTM A312 TP321	20.9
	130.2	REDUCER CONC	48.3x33.4x2.77		1	No.	ASTM A403 WP321, ASME B16.9	0.35
	130.3	FLANGE, 40NB (FOR GEN END 6D)	31500001240	06	1	No.	ASTM A182 F321	1.17
TOTAL WT.								3780.03

TOTAL WEIGHT OF PIPING FOR SEAL OIL SYSTEM = 3780 KG

PIPING FOR PRIMARY WATER SYSTEM								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRG. NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC./ DIMENSION STD.	WT.(KG)
301		PIPE ASSEMBLY FROM TERM.195(PW UNIT) TO TERM. 196 (GEN.)						
	301.1	PIPE SS	D168.3X3.40		41	Mtr.	ASTM A312 TP321	567.03
	301.2	ELBOW LR 90°	D168.3X3.40		6	No.	ASTM A403 WP321,ASME B16.9	23.10
	301.4	NECK (TERM.195 PW UNIT)	31531401088	01	1	No.	ASTM A182 F321	5.20
	301.9	FLANGE, 150NB (TERM.196 PW PIPELINE)	31500001240	12	1	No.	ASTM A182 F321	6.00
	301.14	FLANGE, 150NB	31500001240	12	10	No.	ASTM A182 F321	60.00
302		BRANCH PIPE ASSEMBLY FROM TERM.205 (PW TANK PIPE LINE) TO 206 (PW UNIT)						
	302.1	PIPE SS	D168.3X3.40		60	Mtr.	ASTM A312 TP321	829.80
	302.2	ELBOW LR 90°	D168.3X3.40		10	No.	ASTM A403 WP321,ASME B16.9	38.50
	302.4	NECK, 150NB (TERM.206 PW UNIT)	31531401088	01	1	No.	ASTM A182 F321	5.20
	302.9	FLANGE, 150NB (TERM.205 PW PIPELINE)	31500001240	12	1	No.	ASTM A182 F321	6.00
	302.14	FLANGE, 150NB	31500001240	12	10	No.	ASTM A182 F321	60.00
303		PIPE ASSEMBLY FROM TERM.732 (GEN PPG) TO 731 (PW UNIT)						
	303.1	PIPE SS	D21.3X2.77		100	Mtr.	ASTM A312 TP321	127.00
304		PIPE ASSEMBLY FROM TERM.581A,582A TO 582B,582B						
	304.1	PIPE SS	D21.3X2.77		50	Mtr.	ASTM A312 TP321	63.50
305		PIPE ASSEMBLY FROM TERM.579 (PW UNIT) TO 140 (PW TANK)						
	305.1	PIPE SS	D33.4X2.77		50	Mtr.	ASTM A312 TP321	104.50
	305.2	FLANGE, 25NB (TERM.597 PW UNIT)	31500001240	04	1	No.	ASTM A182 F321	1.02
	305.7	FLANGE, 25NB	31500001240	04	8	No.	ASTM A182 F321	8.16
	305.12	FLANGE, 25NB (TERM.140 PW TANK)	31500001240	04	1	No.	ASTM A182 F321	1.02
306		PIPE ASSEMBLY FROM TERM.149(PW TANK) TO 567 (PW UNIT)						
	306.1	PIPE SS	D33.4X2.77		50	Mtr.	ASTM A312 TP321	104.50
	306.2	FLANGE, 25NB (TERM.576 PW UNIT)	31500001240	04	1	No.	ASTM A182 F321	1.02
	306.7	FLANGE, 25NB	31500001240	04	8	No.	ASTM A182 F321	8.16
	306.12	FLANGE, 25NB (TERM.149 PW TANK)	31500001240	04	1	No.	ASTM A182 F321	1.02
307		PIPE ASSEMBLY FROM TERM.585(PW TANK) TO WASTE GAS						
	307.1	PIPE SS	D33.4X2.77		50	Mtr.	ASTM A312 TP321	104.50
	307.2	FLANGE, 25NB (TERM.585PW UNIT)	31500001240	04	1	No.	ASTM A182 F321	1.02
	307.7	FLANGE, 25NB	31500001240	04	8	No.	ASTM A182 F321	8.16
308		PIPE ASSEMBLY FROM PW COOLER INLET TO TERM 208/209						
	308.5	THERMOWELL FOR TG	41531401027	00	6	No.	ASTM A182 F321	2.4
309		PIPE ASSEMBLY FROM ION EXCHANGER TO PW UNIT INLET						
	309.1	PIPE SS	D33.4X2.77		10	Mtr.	ASTM A312 TP321	20.90
	309.2	FLANGE, 25NB (VALVE FLANGE)	31500001240	04	6	No.	ASTM A182 F321	6.12
TOTAL WT. SS (KG)								2164

TOTAL WEIGHT OF PIPING FOR PW SYSTEM (STAINLES STEEL) = 2164

KG

COMBINED WEIGHT OF THE SYSTEM (SOS+PWS) = 5944

KG

TOTAL WEIGHT OF STAINLES STEEL MATERIAL = 5944

KG

Handwritten signature: Kunal Mishra
Handwritten text: KUNAL MISHRA
 Dy. Mg. / BHEL-HWR(EME)

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KUN673.41
REF. DRG NO.

25/11/86
SIGN & DATE

Et1-11527
INVENTORY NO.

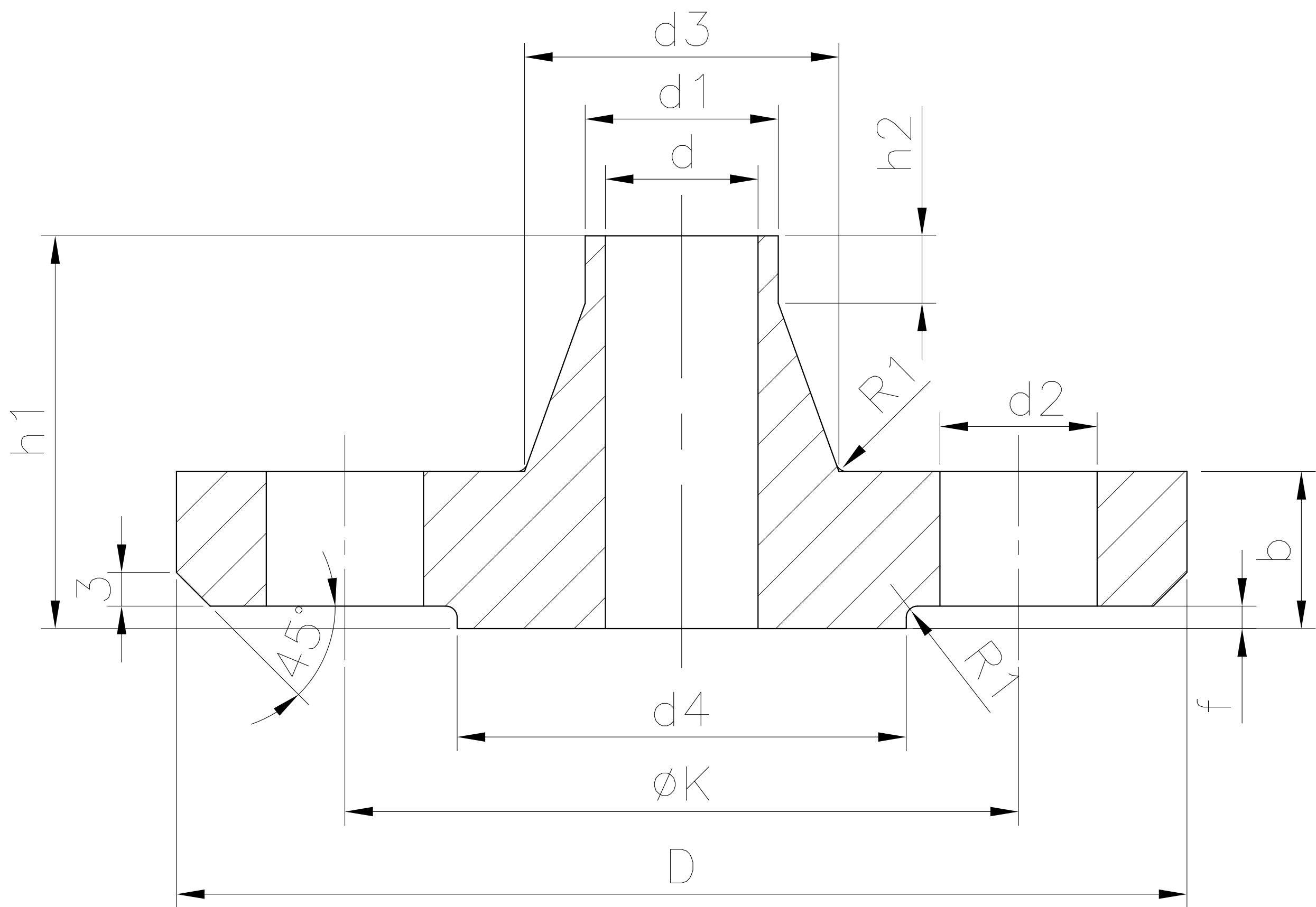
FIRST ANGLE PROJECTION

(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.		STATUS OF DRG.	
0-150-00-01090			
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	K B MUKHER JEE	sd/-	17.7.86	
				CHD	KRG/G.G	sd/-	17.7.86	
				APD	A.C.C.	sd/-	17.11.86	
DEPT. EME		SCALE N.T.S	WEIGHT(Kg.) SEE TABLE	REF. TO ASSY. DRG.		ITEM NO.	NO.OF ITEMS	
CODE 4133								
TITLE				1	3	DRAWING NO. 3-150-00-01000		
						22	23	
						24		
				SHEET NO. 1		NO.OF SHEETS 1		

SIZE A3

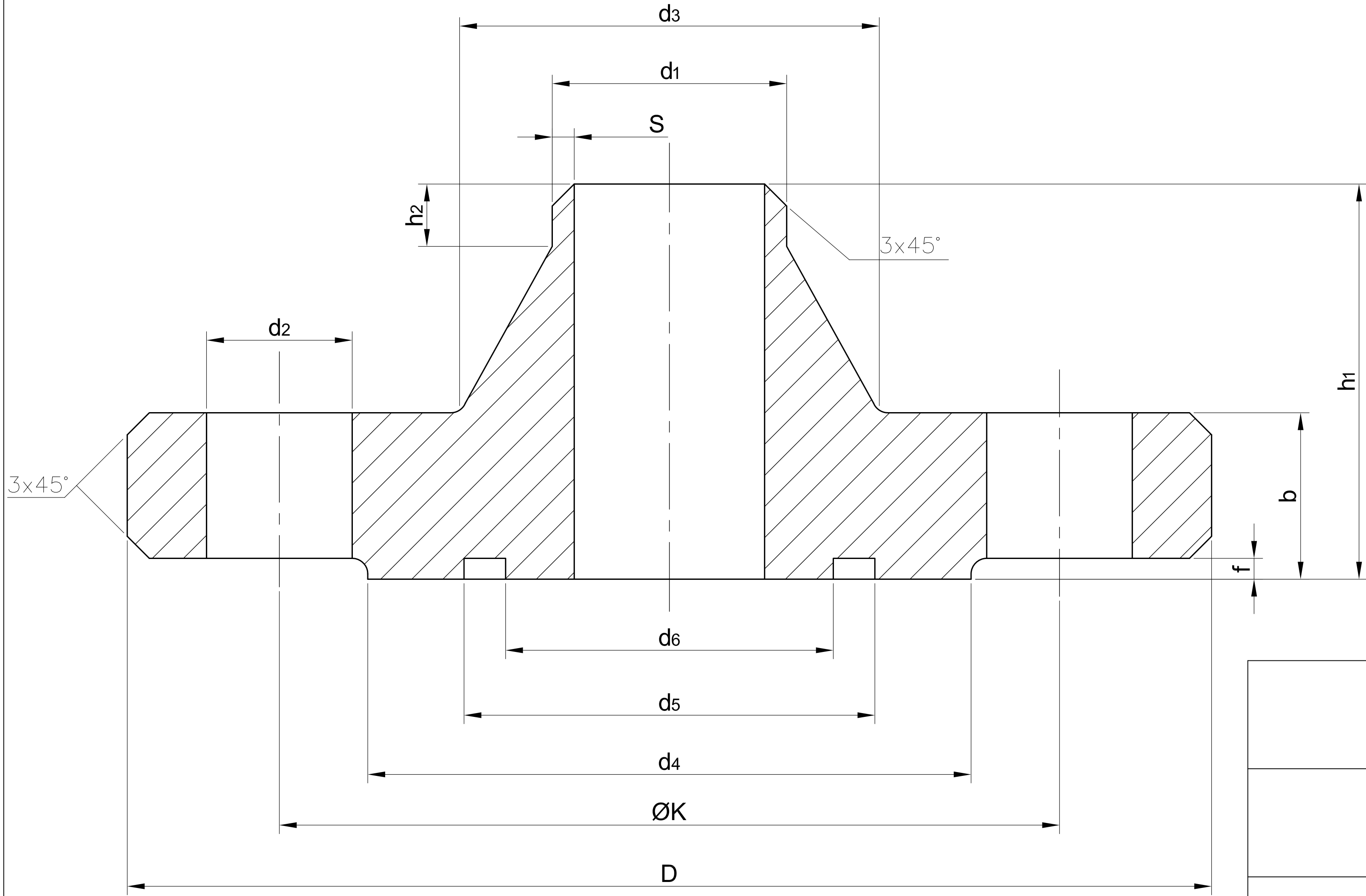
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FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

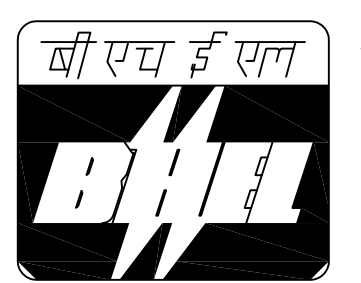
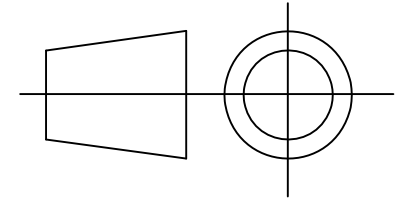
3-150-00-01027
DRAWING NO.

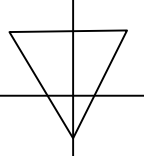


VAR.	D	d ₁	d ₂	d ₃	d ₄	d ₅	d ₆	h ₁	h ₂	ØK	b	S	f	N HOLE
00	105	26.9	14	40	58	39.5	31.5	38	6	75	16	2.3	2	4
01	200	88.9	18	105	138	99.5	91.5	50	10	160	20	3.2	3	8
02	220	114.3	18	131	158	136.5	123.5	52	12	180	20	3.6	3	8
03	90	17.2	14	28	40	30.5	22.5	35	6	60	14	1.8	2	4
04	95	21.3	14	32	45	35.5	27.5	35	6	65	14	2	2	4
05	115	33.7	18	45	68	45.5	37.5	38	6	85	16	2.6	2	4
06	150	48.3	18	64	88	64.5	56.5	42	7	110	16	2.6	3	4
07	165	60.3	18	75	102	79.5	71.5	45	8	125	18	2.9	3	4

VAR.	b ₁	
	DEPTH	TOL.
00	2.2	+0.1
01	2.2	+0.1
02	2.8	+0.1
03	2.2	+0.1
04	2.2	+0.1
05	2.2	+0.1
06	2.2	+0.1
07	2.2	+0.1

		008	FLANGE	3-150-00-01027	07	AA1041801211			2	530
		007	FLANGE	3-150-00-01027	06	AA1041801203			1	860
		006	FLANGE	3-150-00-01027	05	AA1041801203			1	140
		005	FLANGE	3-150-00-01027	04	AA1041801190			1	000
		004	FLANGE	3-150-00-01027	03	AA1041801190			0	580
		003	FLANGE	3-150-00-01027	02	AA1041801238			4	580
		002	FLANGE	3-150-00-01027	01	AA1041801238			3	660
		001	FLANGE	3-150-00-01027	00	AA1041801203			1	000
VAR. 00	REMARKS	ITEM NO.	DESCRIPTION	STD	DRAWING NO.	29 31	MATERIAL CODE	A	UNIT WEIGHT	65
59	64 65	75 25 27 29	58 69 60	77	32 33 46	54 55 56 57 66	71 72			
CARD TYPE-3			CARD TYPE-1			CARD TYPE-2				

CBOM NO. 0-150-00-01090				STATUS OF DRG.				TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT																	
AGREED DEPT.		NAME		SIGN		DATE		TG-HW-0500-2																	
GRADE OF UNTOL. DIM.:—										DRN		NAME		SIGN		DATE		NO.OF VAR.							
M/CG- X/C/M/F AA 0230208										CHD		A.AGARWAL		SD/		10.07.12									
WELDING-A/B/C/D-AA621104										APD		A.JAIN		SD/		10.07.12									
GAS CUTTING-'T3'AA0621101												AK.MALHOTRA		SD/		10.07.12		73 74							
REV.		DATE		ALTERED CHECKED		REV.		DATE		ALTERED CHECKED		AOK ANUBHAV		DEPT. EME		SCALE N.T.S.		WEIGHT(Kg.) SEE TABLE		REF. TO ASSY. DRG.		ITEM NO.		NO.OF ITEMS	
						02		11.07.12						CODE 4133											
CHANGES DONE AS PER CHANGE AD. NO. TGE-12-F0266								DRAWING NO. 3-150-00-01027																	
								SHEET NO. 01 NO.OF SHEETS 01																	

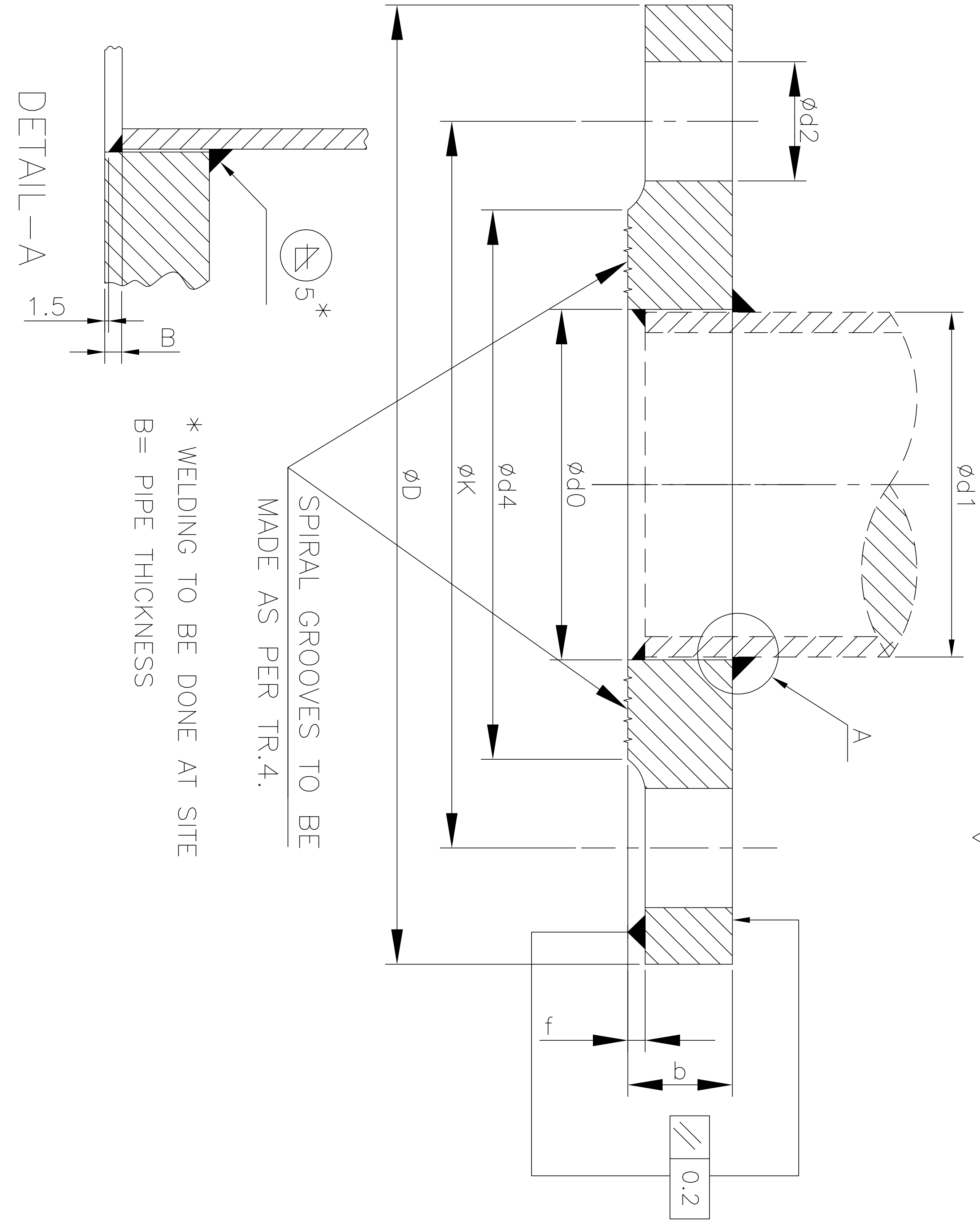


SIZE A3

0721000051C

ON GINWARD

12.5/ALL OVER



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 : STAINLESS STEEL AS PER ASTM A182 F321.
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. SURFACE FINISH OF FLANGE FACING – FLANGES SHALL HAVE A CONTINUOUS SPIRAL GROOVE PRODUCED BY A 1.5 MM RADIUS ROUND–NOSED TOOL AT A FEED OF APPROXIMATELY 0.8 MM PER REVOLUTION.

VARIANT		NOM. SIZE (NB)	CONNECTING 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.	NOM.	TOL.		d4	f		NO	d2	
01	10	17.2	17.7	90		14		40		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	+0.5	16		78	+0.0	2	M16	4	18	100	1.47			
06	40	48.3	48.8	150	+0.0	16		88	-1.0	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	+3	122		3	M16	4	18	145	2.67			
09	80	88.9	89.9	200		20	-0	138		3	M16	8	18	160	3.28			
10	100	114.3	115.3	220		20		158		3	M16	8	18	180	3.62			
11	125	139.7	140.7	250	±1.5	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	+1.0	24		268	+0.0	3	M20	12	22	295	8.31			
15	250	273	275	405	±2.0	26		320	-2.0	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	4	M24	16	26	470	24.3			
18	125	139.7	140.7	270		22		188	-3.0	3	M24	8	26	220	5.0			
19	100	114.3	115.3	235	±1.5	24		162	+0.0	3	M20	8	22	190	3.8			
20	150	168.3	169.3	300		26		218	-2.0	3	M24	8	26	250	6			

PURCHASED

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REF. DRG NO.	SIGN & DATE	INVENTORY NO.
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CBOM NO.			STATUS OF DRG.	
AGREED DEPT.	NAME	SIGN	DATE	
GRADE OF UNTOL. DIM.:-				
M/CG- X/Ø/M/F AA 0230208				
WELDING- A/B/C/D-AA621104-				
GAS CUTTING-'T3'AA0621101				
REV.	DATE	ALTERED KM	REV.	DATE
02	14.12.19	CHECKED MA	01	15.12.17
1. VARIANT 20 IS ADDED.				

1. VARIANT 19 IS ADDED.				
2. TR NO. 4 IS ADDED.				

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT				THEIR 115/67			
BHARAT HEAVY ELECTRICALS LTD. HARDWAR				DRAWING NO. 31500001240			
DEPT.	TGE	SCALE	WEIGHT(Kg.)	NAME	SIGN	DATE	NO.OF VAR.
CODE	41333	NTS	SEE TABLE	ALOK AGARWAL	SD/-	25.03.14	
				KUNAL MSHRA	SD/-	25.03.14	
				RAKESH KUMAR	SD/-	25.03.14	
				REF. TO ASSY. DRG.			
				ITEM NO. 75, 77			
				NO.OF ITEMS			
				SHEET NO. 1			
				NO.OF SHEETS 1			

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REF. DRG NO.

SIGN & DATE

INVENTORY NO.

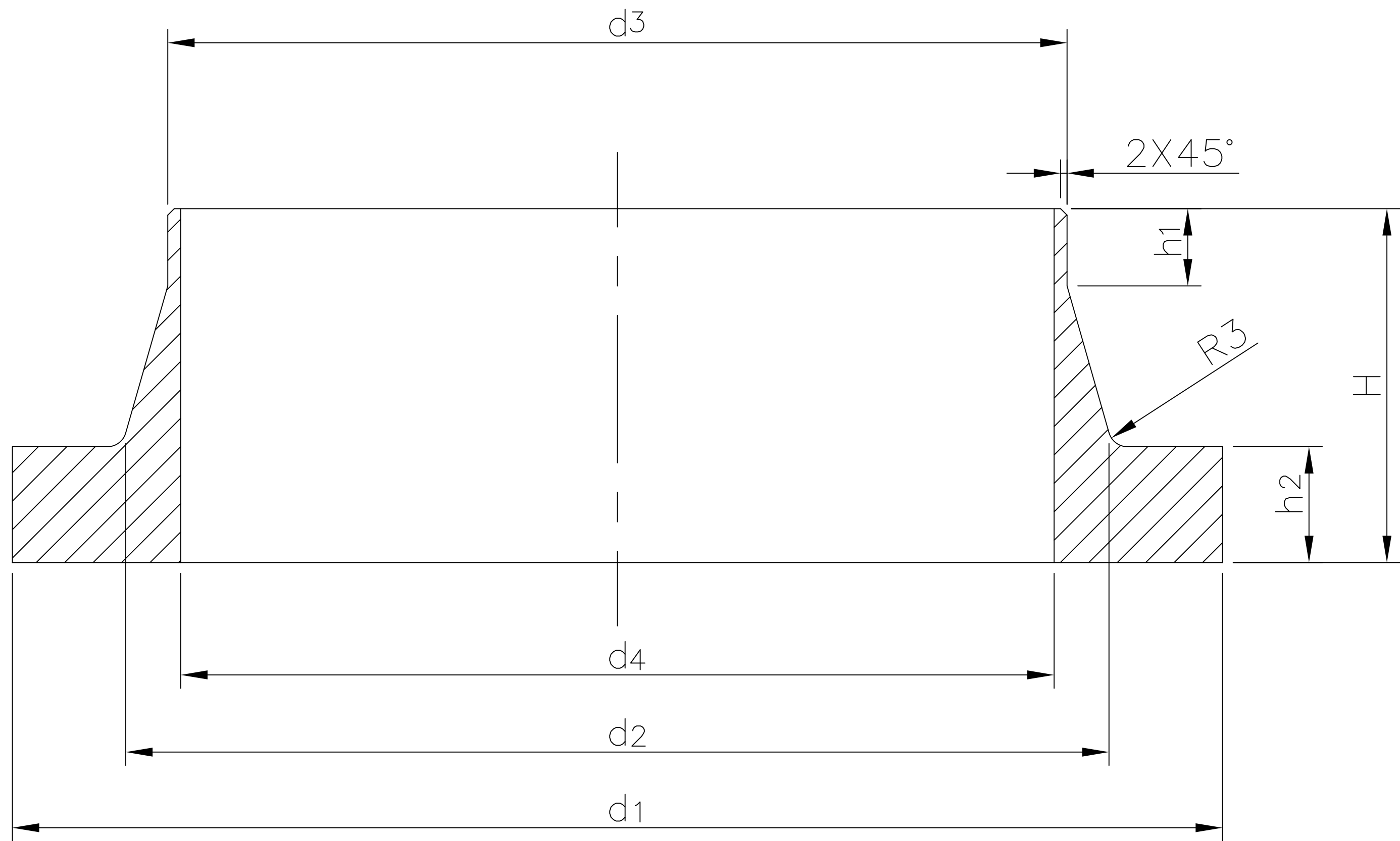
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)

31531401088
DRAWING NO.

12.5/
ALL OVER

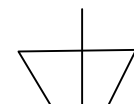


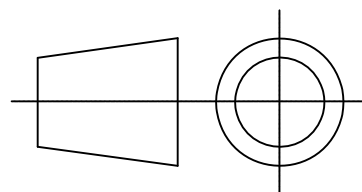
REF.ASSLY	ITEM	VAR.	NB	d1	d2	d3	d4	h1	h2	H	WT.
31531401076	01	00	125	188	158	139.7	131.7	12	22	68	3.95
31531401071	01	01	150	218	188	168.3	159.3	12	22	75	5.20

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— X /C/ M / F AA 0230208								
WELDING—A/B/C/D—AA621104—								
GAS CUTTING—'T3'AA0621101								
REV.	DATE	ALTERED AKA2 SD/—		REV.	DATE	ALTERED PKM SD/—		
03	17.05.16	CHECKED AJ SD/—		02	01.08.14	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	73 74		
				CHD	STGEKN	STGEKN	12/05/2007			
				APD	ATGEKRG	ATGEKRG	24/07/2007	75 77		
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				1	3	DRAWING NO.				
NECK PN25						31531401088			22 23 24	
				SHEET NO.1			NO.OF SHEETS 1			

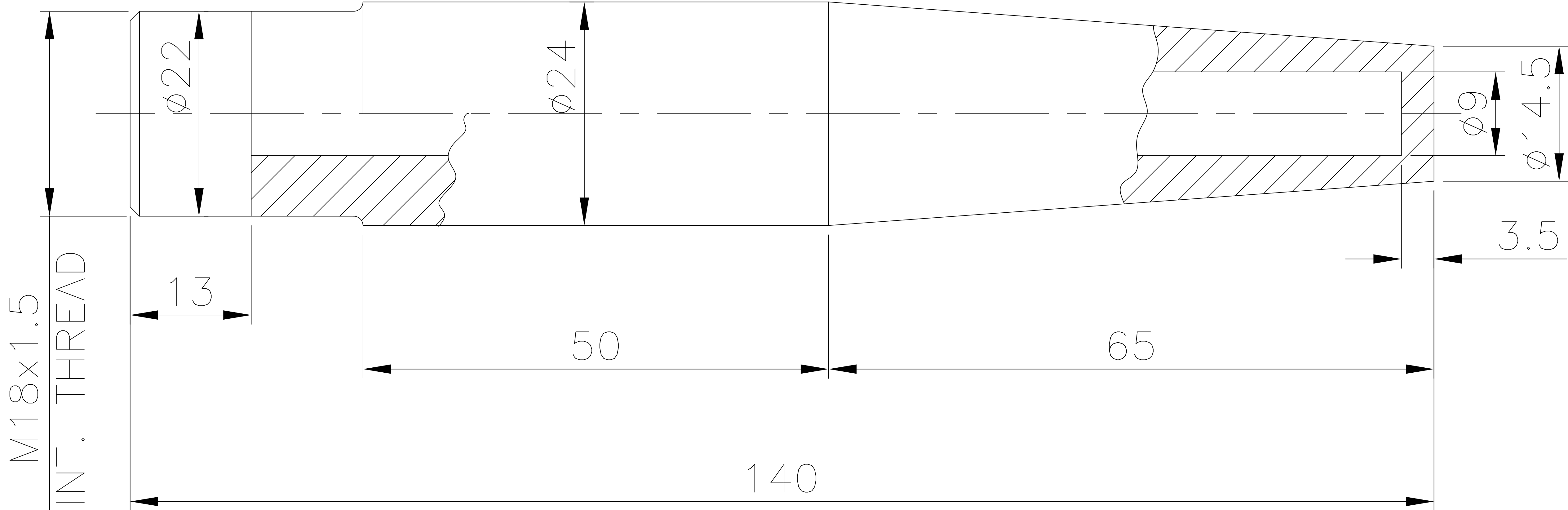
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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

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

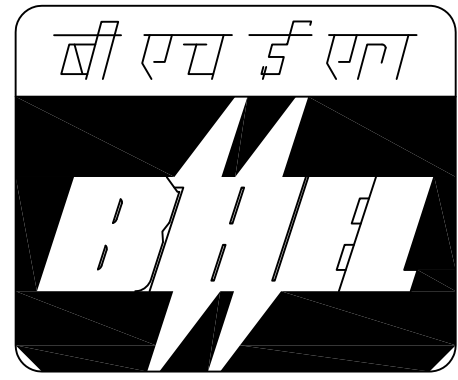
MATERIAL: AS PER BOM

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

MATERIAL CODE: W96415300814

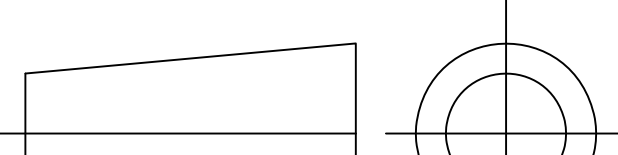
SUPERSEDES OLD DRAWING UNDER
THE SAME NUMBER

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

H2 COOLER PIPING								
ITEM NO.	PART NO.	DESCRIPTION OF SUB-ASSEMBLY	DRAWING NO. / SIZE	VAR.	QTY.	UNIT	MAT. SPEC.	WT.(KG)
1	1.1	INLET HEADER	21500001127	00	1	No.	ASTM SA106 GR.B	536
2	2.1	OUTLET HEADER	21500001129	00	1	No.	ASTM SA106 GR.B	536
3	3.1	PIPE	D168.3X3.4		200	Mtr.	ASTM SA106 GR.B	2766
	3.2	PIPE	D33.4X2.90		85	Mtr.	ASTM SA106 GR.B	185.3
	3.3	PIPE	D21.3X2.77		100	Mtr.	ASTM SA106 GR.B	127
	3.4	PIPE	D17.1X2.31		50	Mtr.	ASTM SA106 GR.B	42
	3.5	PIPE	D13.7X1.85		20	Mtr.	ASTM SA106 GR.B	10.8
	3.6	ELBOW LR 45 °	D168.3X3.4		16	No.	ASTM A234 WPB B16.9	57.6
	3.7	ELBOW LR 90°	D168.3X3.4		80	No.	ASTM A234 WPB B16.9	576
	3.8	CONNECTION	41500001118	00	16	No.	IS:2062 E250 BR	8
	3.9	THERMOWELL	41531401027	00	16	No.	ASTM A182 F321	6.4
	3.10	CONNECTION, 15NB FOR PG/PT	31500001190	02	8	No.	IS:2062 E250 BR	0.8
	3.11	CONNECTION 10 NB	41500001182	00	6	No.	IS:2062 E250 BR	3
	3.12	CONNECTION 8 NB	31500001190	06	8	No.	IS:2062 E250 BR	0.92
	3.13	FLANGE NB150	31500001239	12	80	No.	IS:2062 E250 BR	480
	3.14	GASKET VITON	212X169X3TK		40	No.	HW59870	2.4
	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	0.96
	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		128	No.	IS:1364PART-3,1367PART-3	6.4
	3.22	WASHER MCD-ST 21			256	No.	IS:2016-1967, IS:2062 E250 BR	4.352
4	4.1	SUPPORT	21500001041		1	SET	IS:2062 E250 BR	322
	4.2	SUPPORT U3,U4	21500001042		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	41500001101	04	8	No.	IS:2062 E250 BR	
	4.3.5	EYE BOLT M20	41500001099	04	8	No.	IS:2062 E250 BR	
	4.3.6	THREADED ROD M20X1.5	41500001131	02	8	No.	IS:2062 E250 BR	
	4.3.7	TURN BUCKLE M20	41500001103	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	SET		65
	4.4.1	PARALLEL BEAM IPB 100	L=1800		2	No.	IS:2062 E250 BR	
	4.4.2	BEAM ATTACHEMENT M20	41500001101	04	1	No.	IS:2062 E250 BR	
	4.4.3	EYE BOLT M20	41500001099	04	2	No.	IS:2062 E250 BR	
	4.4.4	PIPE CLAMP	21500001026	10	1	No.	IS:2062 E250 BR	
	4.4.5	THREADED ROD M20X1.5	41500001131	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	41500001103	04	2	No.	IS:2062 E250 BR	
	4.5	HANGER ASSEMBLY F6	21500001044		1	SET		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	41500001101	04	2	No.	IS:2062 E250 BR	
	4.5.4	EYE BOLT M20	41500001099	04	1	No.	IS:2062 E250 BR	
	4.5.5	THREADED ROD M20X1.5	41500001131	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	

Kunal Mishra
KUNAL MISHRA
Dy. Mgr. BHEL-HW2 (EME)

4.6	HANGER ASSEMBLY F7	21500001045		1	SET		60
4.6.1	PARALLEL BEAM IPB 100	L=1800		1	No.	IS:2062 E250 BR	
4.6.2	BEAM ATTACHEMENT M20	41500001101	04	1	No.	IS:2062 E250 BR	
4.6.3	EYE BOLT M20	41500001099	04	2	No.	IS:2062 E250 BR	
4.6.4	PIPE CLAMP	21500001026	10	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	SET		60
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	41500001101	04	2	No.	IS:2062 E250 BR	
4.7.4	EYE BOLT M20	41500001099	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	72
4.9	FLAT	5X40		6	Mtr.	IS:2062 E250 BR	9.42
4.10	ANGLE	75X75X6		10	Mtr.	IS:2062 E250 BR	68
4.11	CHANNEL ISMC 75			6	Mtr.	IS:2062 E250 BR	42.84
TOTAL WT. (KG)							6873

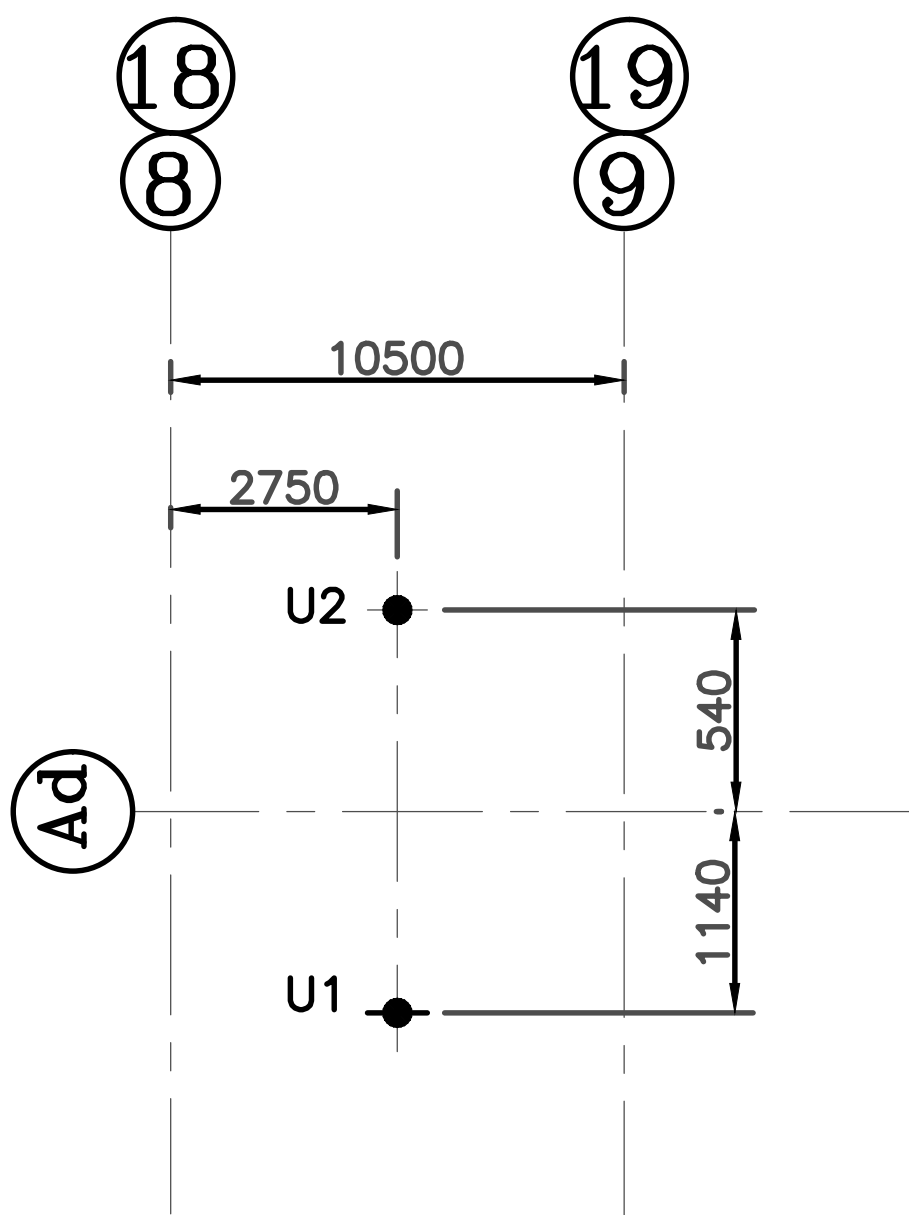
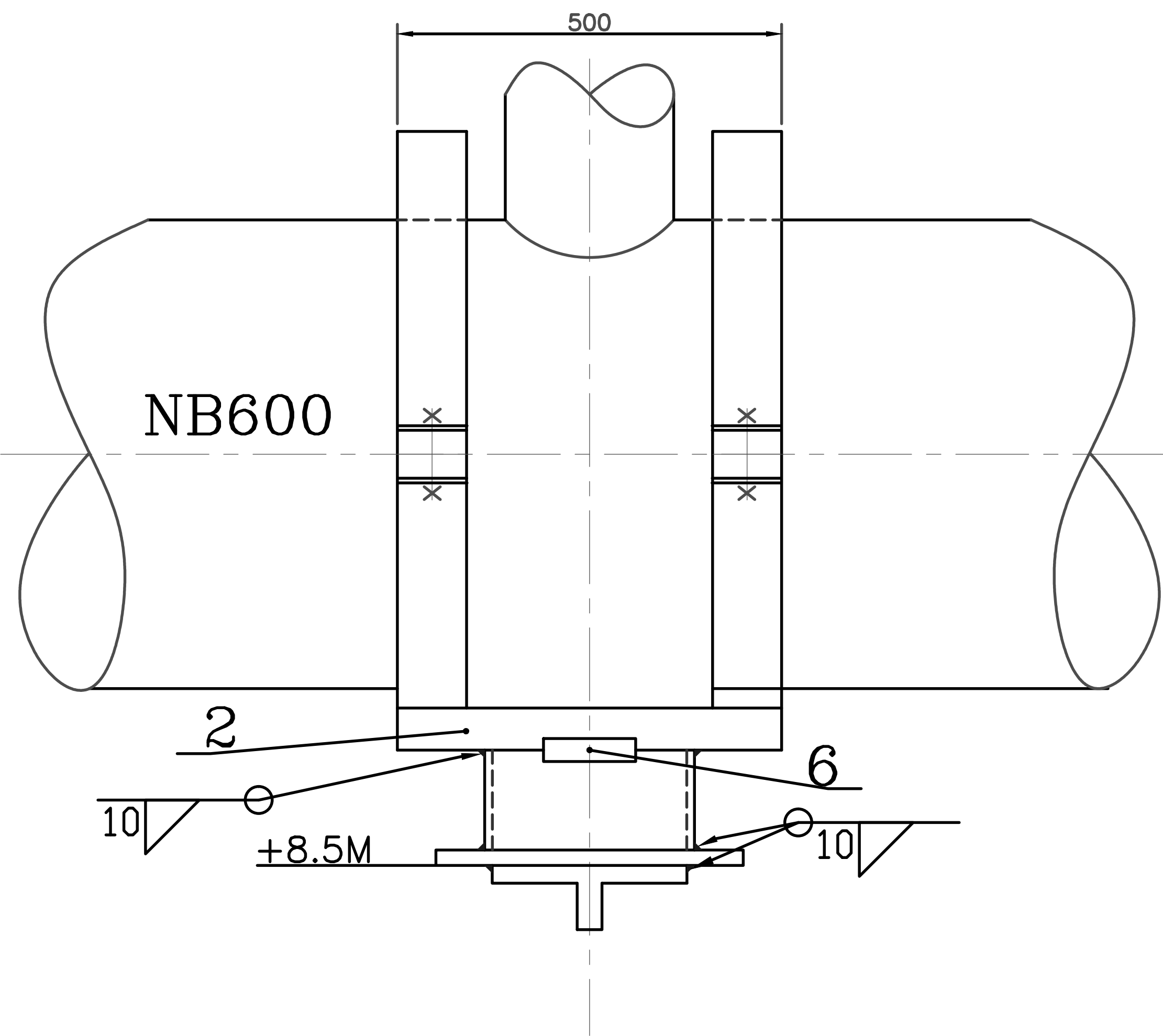
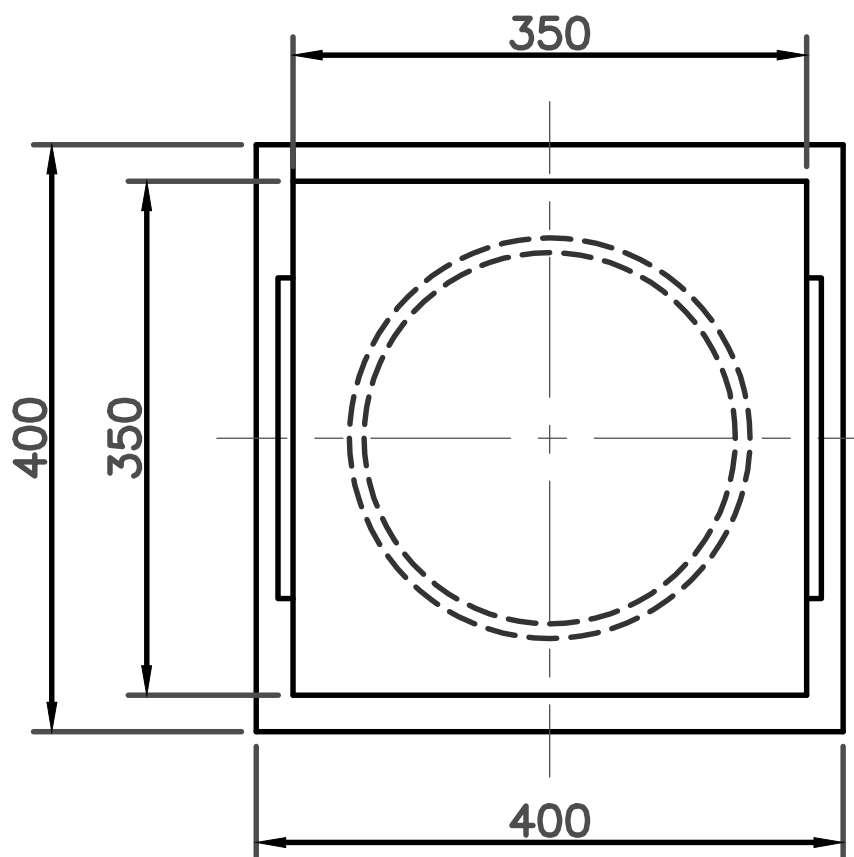
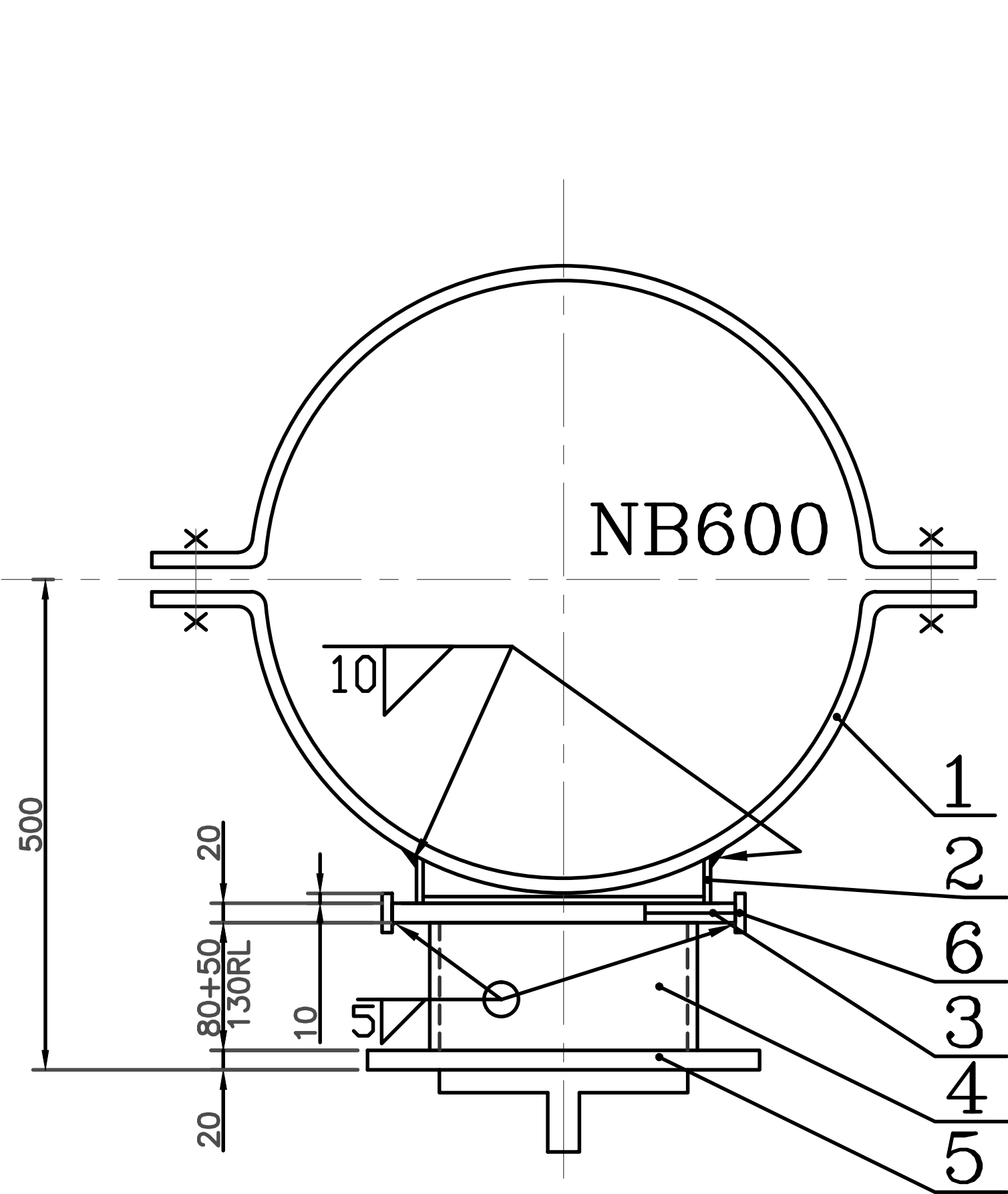
TOTAL WEIGHT OF PIPING FOR H2 COOLER SYSTEM =

6873

KG

Manjunath
dy. Mgr.
(EME)

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.	DESCRIPTION	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				
वी एच ई एल  BHARAT HEAVY ELECTRICALS LTD. HARDWAR				DRN	NAME	SIGN	DATE	NO.
				CHD	K.R.G	sd/-	19.1.97	VA
				APD	G.GUPTA	sd/-	05.2.97	73
								75
DEPT. EME			SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.		ITEM NO.	NO. ITEM
CODE 4133			1:10	321.950	0-150-00-01212		051	75
TITLE				1	3	DRAWING NO.		22
SUPPORT U1, U2						2-150-00-01041		
				7		SHEET NO. 01		23
						NO.OF SHEETS		01

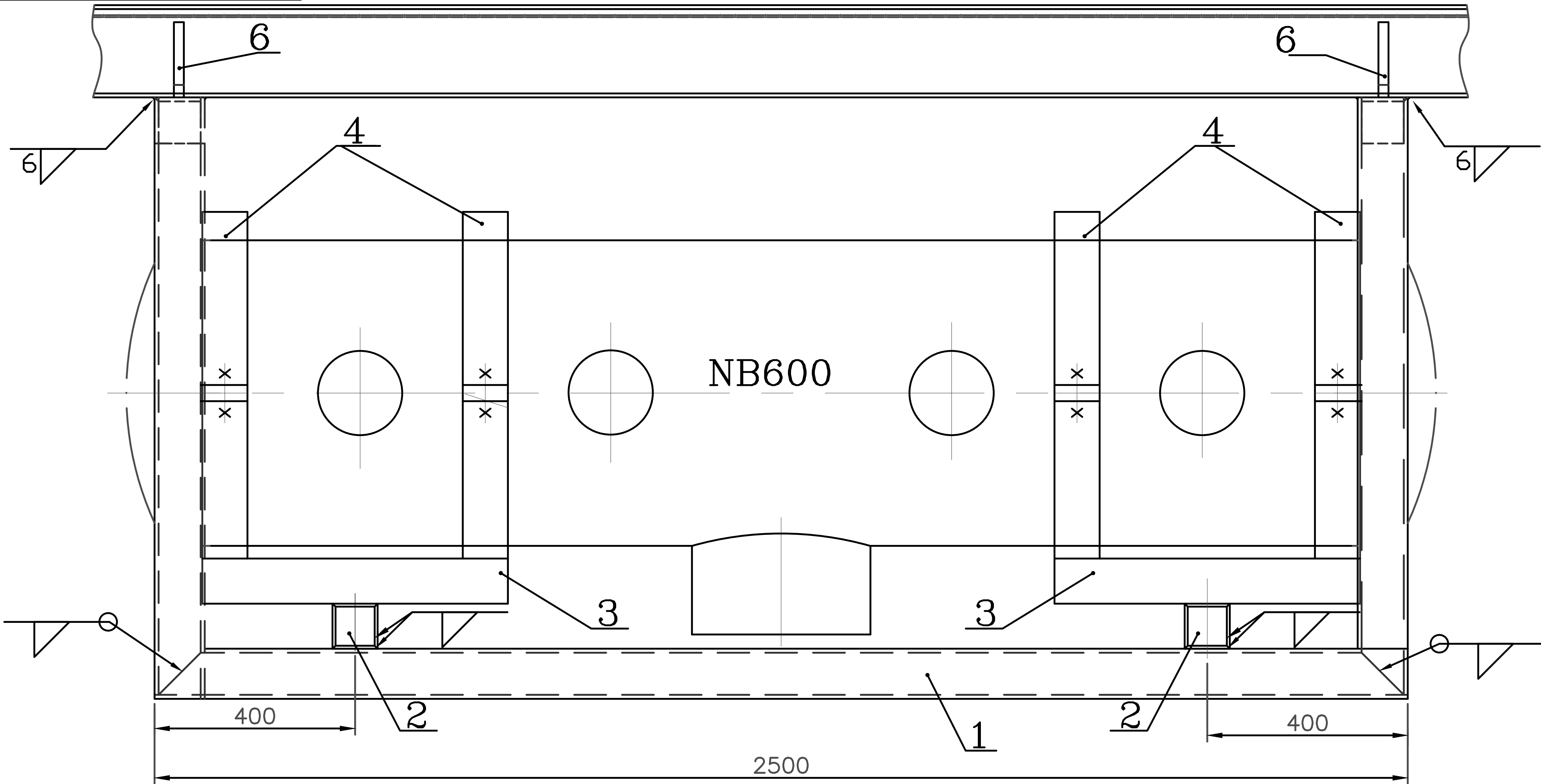
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REF. DRG NO.

SIGN & DATE
10/2/97

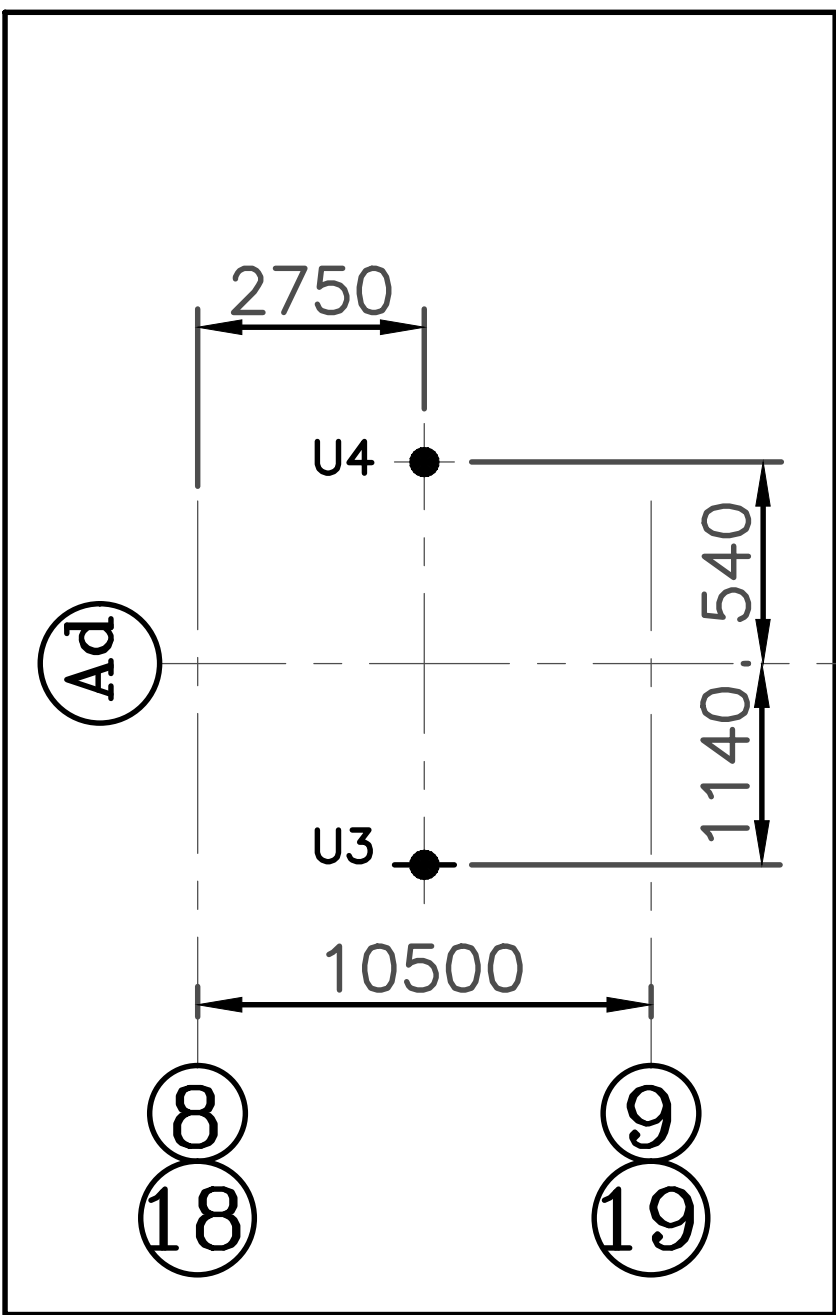
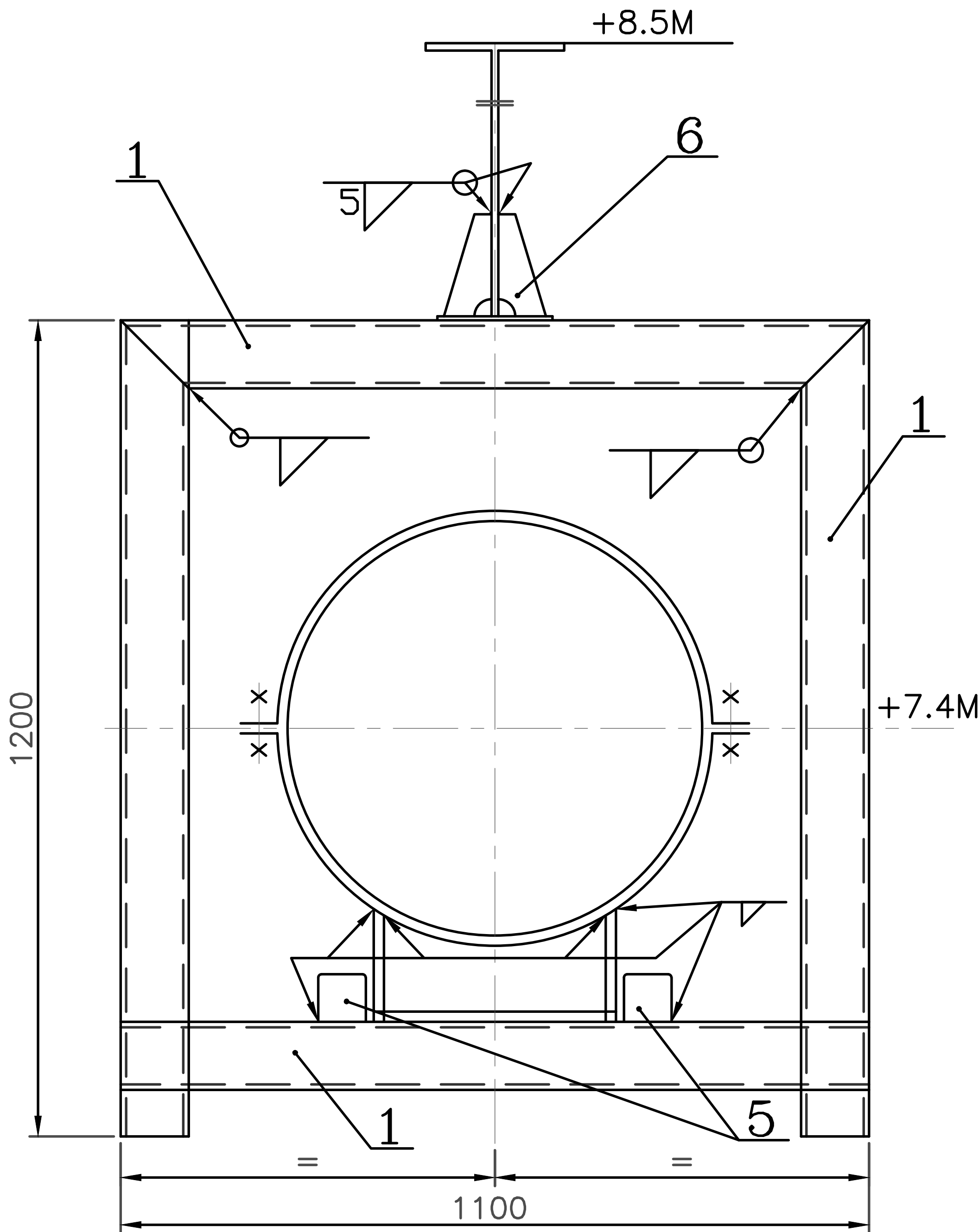
INVENTORY NO.
Et1-19256

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							
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	VAR	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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REF. DRG NO.
10/2/97
SIGN & DATE

Et1-19254
INVENTORY NO.

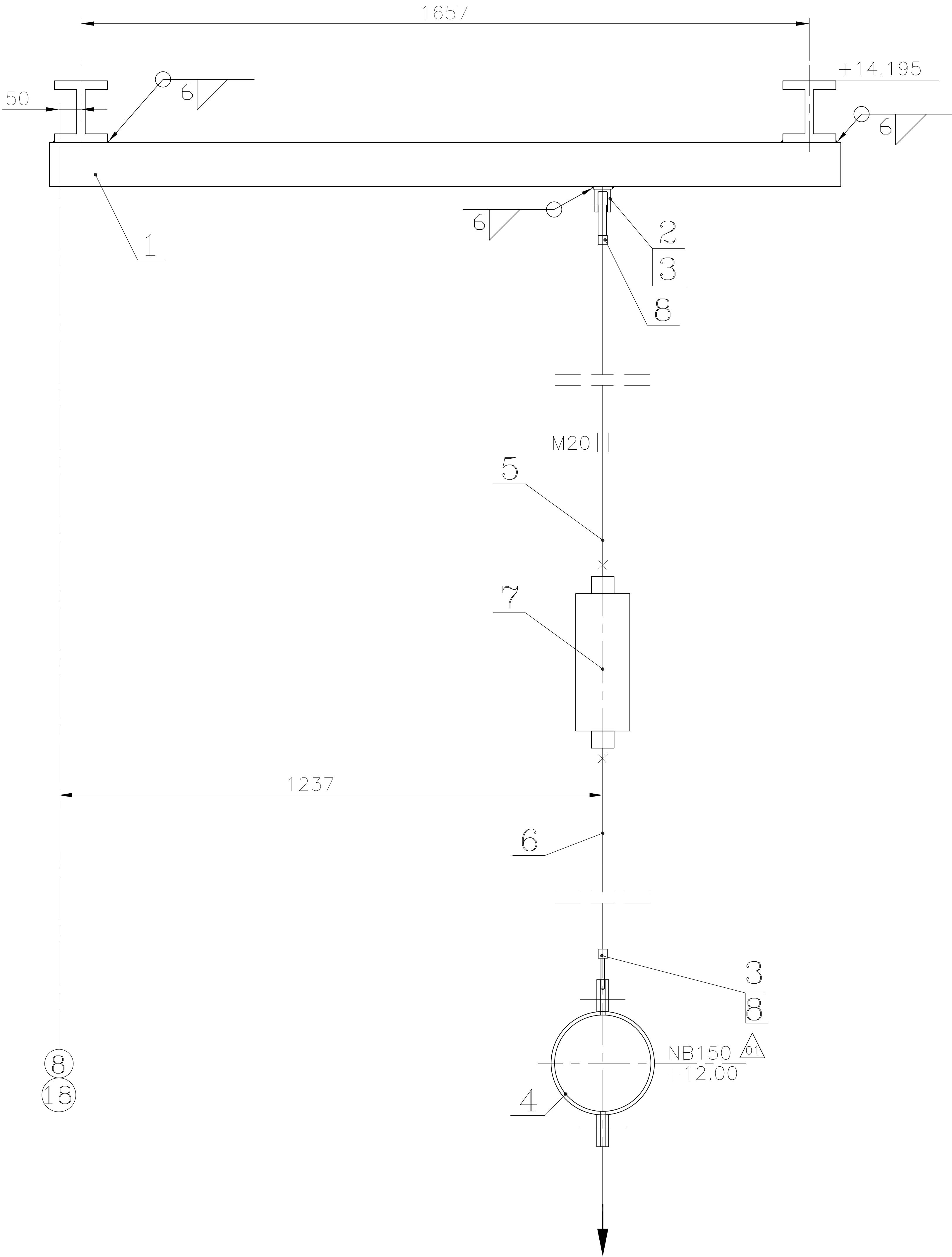
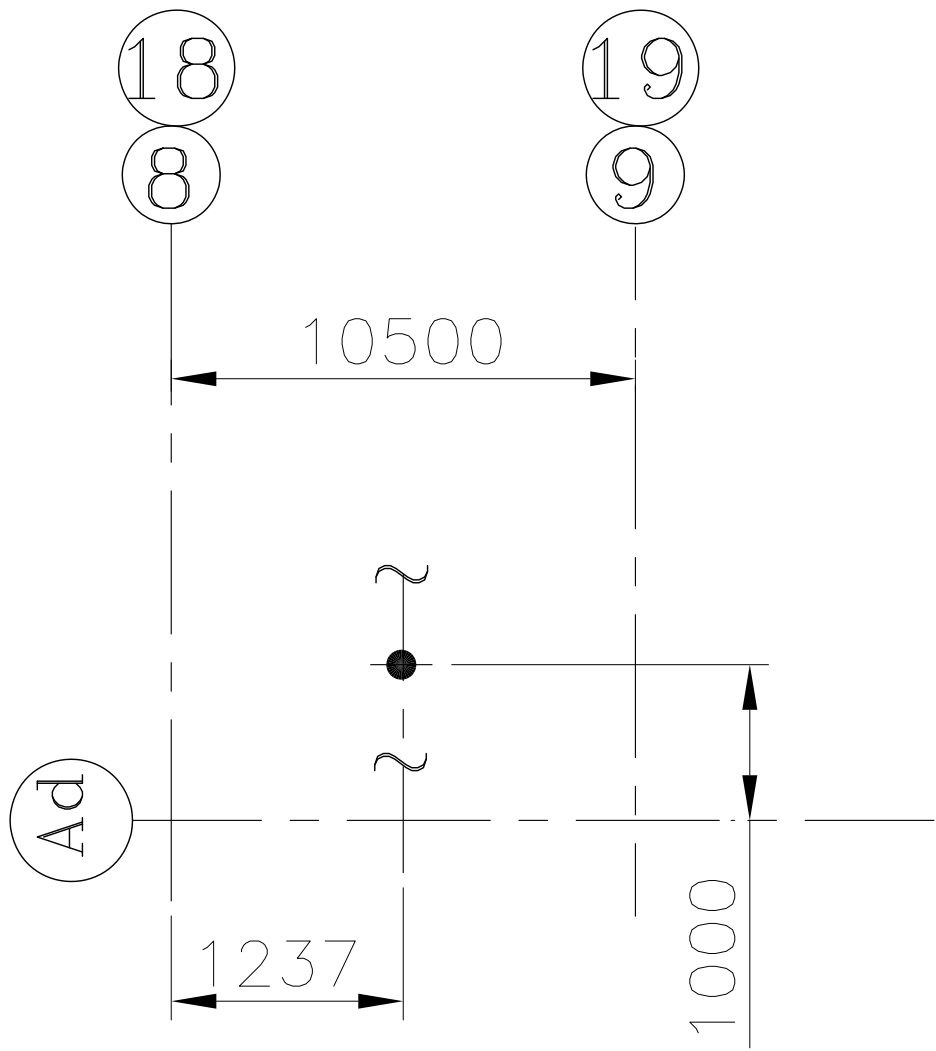
DRAWING NO. 2-150-00-01043

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REF. DRG NO.

10/2/97
SIGN & DATE

Et1-19255
INVENTORY NO.



TECHNICAL REQUIREMENTS

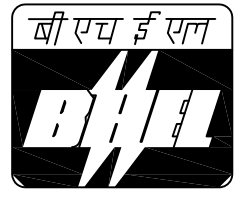
1. ALL THE BUTT JOINTS TO BE AS PER HW 0620.599.
2. QUALITY OF WELD SEAM TO BE AS PER 0620.099 BS/BK.
3. TEST SCOPE AS PER HW 0850.199 EXAMINATION GR.4.
4. IDENTIFICATION AS PER HW 0400.397.
5. ITEMS AS PER BILL OF MATERIAL ARE TO BE SUPPLIED LOOSE
6. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF 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.	DECRPTION	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	ALTERED KM CHECKED MA
01	04.06.18		
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



BHARAT HEAVY ELECTRICALS LTD.
HARDWAR

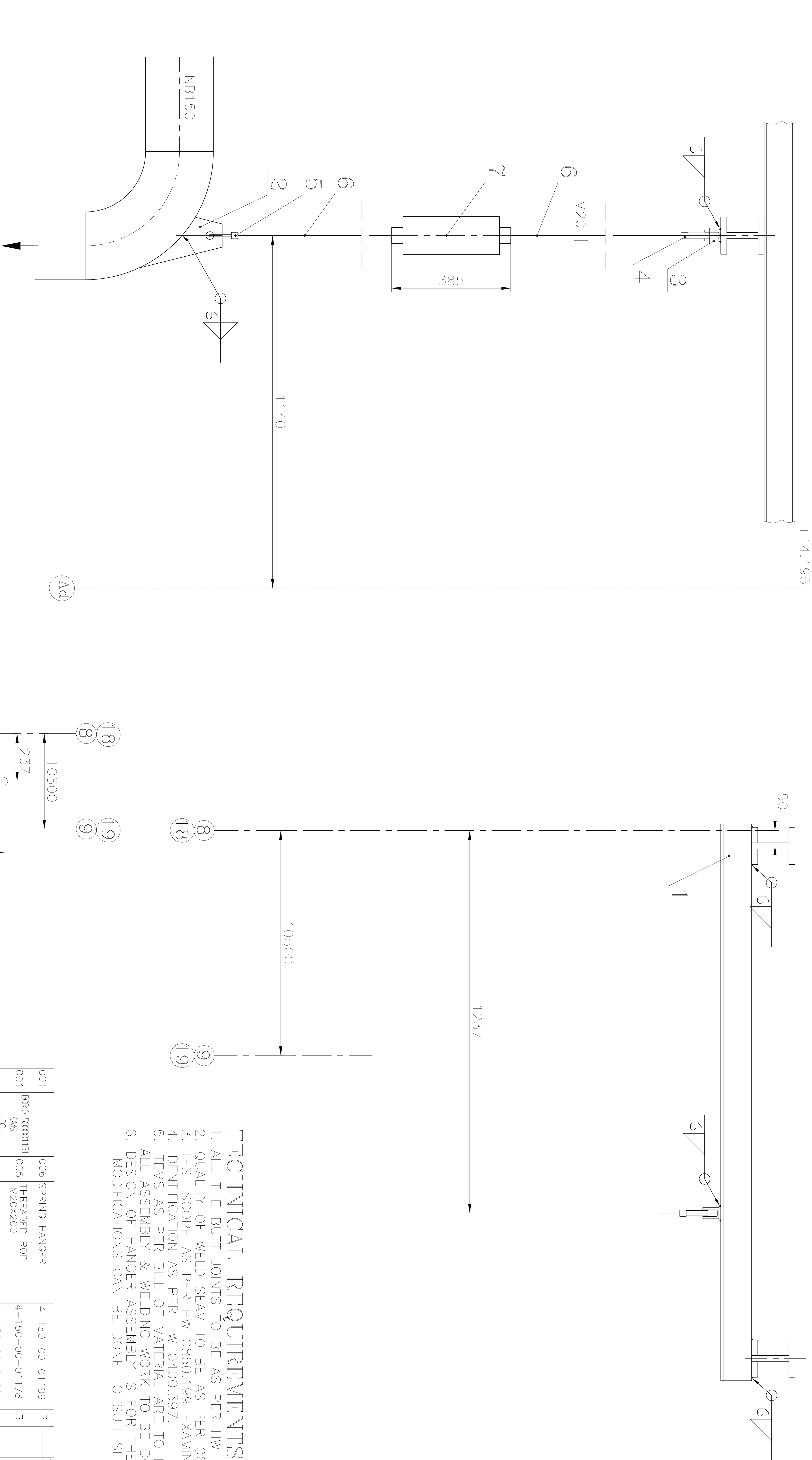
NAME	SIGN	DATE	NO.OF VAR.
AEDD	sd/-	19.1.97	
K.R.G	sd/-	19.1.97	
G.GUPTA	sd/-	05.2.97	73, 74

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

TITLE HANGER ASSEMBLY F-5	DRAWING NO. 2-150-00-01043	SHEET NO. 01	NO.OF SHEETS 01
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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

97010-00-051-2
DRAWING ON GINIMAW



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. ALL ASSEMBLY & WELDING WORK TO BE DONE AT SITE.
7. DESIGN OF HANGER ASSEMBLY IS FOR THE GUIDANCE OF SITE MODIFICATIONS CAN BE DONE TO SUIT SITE CONVENIENCE.

001		006	SPRING HANGER	4-150-00-01199	3			W96415002490		121.800
001	B060150001151	005	THREADED ROD	4-150-00-01178	3			W96415002333		4.160
001	-00-	005	M20X200					IS2062E250BR		
001	004	004	EYE BOLT M20	4-150-00-01099	3			W97415000099		0.300
002	B060150001151	003	BEAM ATTACHMENT M20	4-150-00-01101	3			W96415001469		1.800
001	005	003	BEAM ATTACHMENT M20	4-150-00-01101	3			IS2062E250BR		
001	002	002	PLATE	4-150-00-01177				AA1011808137		1.500
001	001	002	PARALLEL BEAM					HW1013360897		36.720
001	001	001	IPB100,L=1800					IS2062E250BR		
VAR	PURCHASED	ITEM NO.	DESCRIPTION	DRAWING				MATERIAL CODE A		UNIT WEIGHT

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

DEPT. EME	SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO. OF ITEMS
CODE 4133	1:10	59.080	0-150-00-01212	052.005

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
-----	---------	------	---------	-------

NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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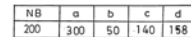
NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	19.1.97	VAR.
CHD	K.R.G	sd/-	19.1.97	

APD	G.CUPTA	sd/-	05.2.97	73.74
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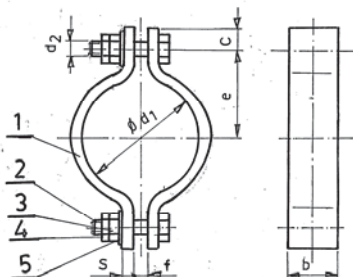
NAME	SIGN	DATE	NO. OF
AEDD	sd/-	19.1.97	VAR.
K.R.G	sd/-	19.1.97	

DRN	AEDD	sd/-	
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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" AAO21101								CHD R.R.G.			F23
REVDATE: 14/05/2018		REVDATE	ALTERED P.A.		DEPT-16	SCALE	WEIGHT (KG)				
CHK:GCD		CHK:GCD	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	M16 X 65	2.96	W96415001892
10	150	168.3	50	24	120	11	8	M16 X 65	2.40	W96415001884
09	125	139.7	50	24	105	11	8	M16 X 65	2.15	W96415001876
08	100	114.3	50	24	90	11	8	M16 X 65	1.95	W96415001868
07	80	88.9	40	18	70	9	6	M12 X 50	0.88	W96415001850
06	65	76.1	40	18	60	9	6	M12 X 50	0.79	W96415001841
05	50	60.3	40	18	55	9	6	M12 X 50	0.71	W96415001833
04	40	48.3	30	15	45	7	5	M10 X 40	0.31	W96415001825
03	32	42.4	30	15	41	7	5	M10 X 40	0.28	W96415001817
02	25	33.7	30	15	36	7	5	M10 X 40	0.25	W96415001809
01	20	26.9	30	15	33	7	5	M10 X 40	0.23	W96415001795
00	15	21.3	30	15	30	7	5	M10 X 40	0.21	W96415001787
VAR00	NB	d ₁	b	c	e	f	s	d ₂	WT. IN Kgs.	MATERIAL CODE

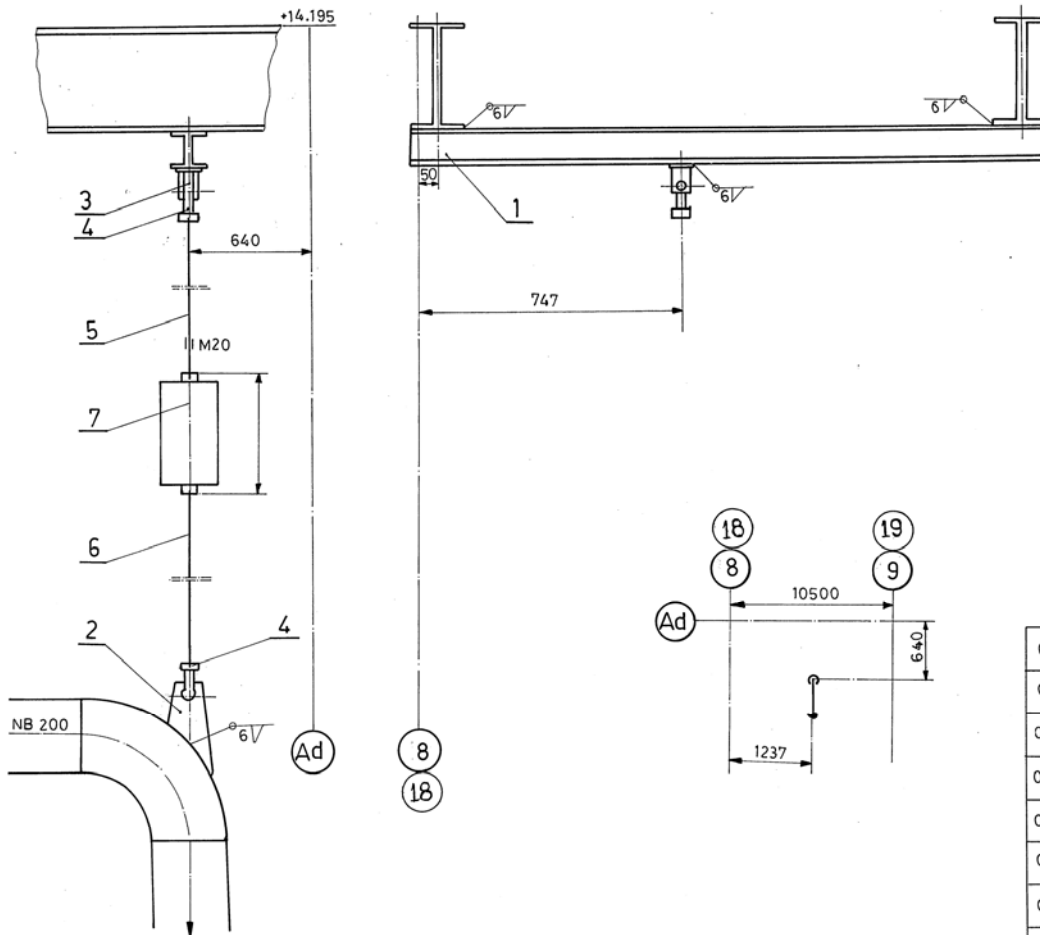
1. PIPE CLAMPS SHALL BE SUPPLIED IN ASSEMBLED CONDITION.
2. IDENTIFICATION SHALL BE DONE BY ATTACHING A TAG.
3. MATERIAL CODE REFER VARIAT TABLE.
4. FOR MATERIAL CODE REFER VARIANT TABLE.

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 54	65 66	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 13/9/79		No. Of VAR	
REV		DATE		ALTERED CHECKED		No. Of ITEM	
ZONE		DEPT TGE		SCALE N.T.S		WEIGHT (KG)	
		CODE 6003		REF. TO ASSY. DRG. 0-150-00-01125		ITEM No.	
TITLE PIPE CLAMP				CARD CODE 2-150-00-01026		REV	
4				SHEET NO 01		NO. OF SHEETS 01	

27010-00-051-2
DRAWING NO.COPYRIGHT AND CONFIDENTIAL
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USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

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



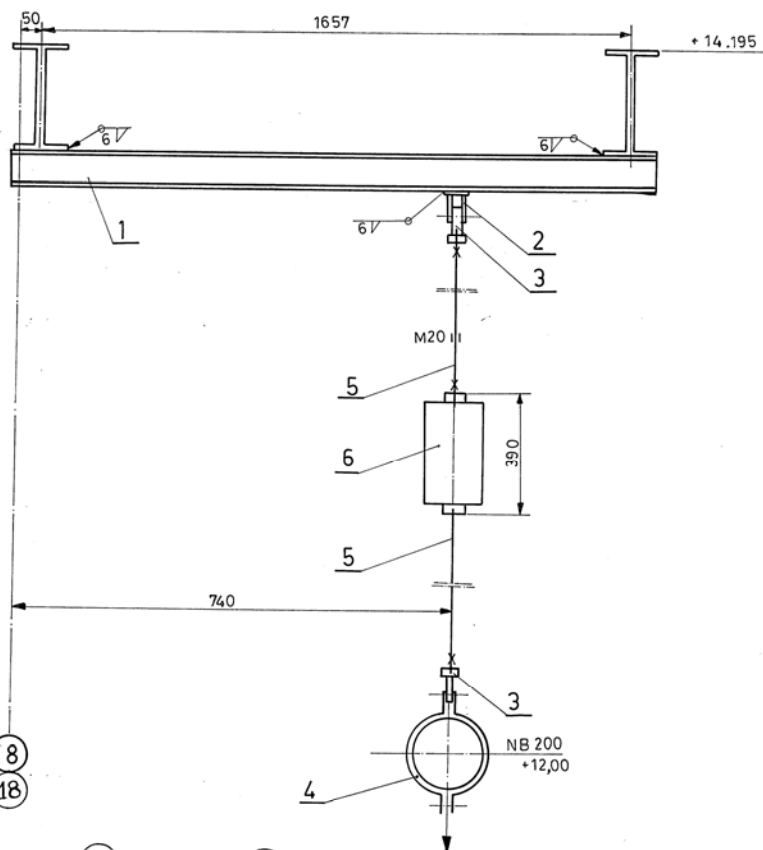
TECHNICAL REQUIREMENTS :-

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 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 GMS	002	PLATE		4-150-00-01177	AA1011808137 AA10108	NO	1	500	
001		001	PARALLEL BEAM IPB 100, L-1800			HW1013608917 AA10108	NO	36	700	
VAR.00	REMARKS	ITEM NO.	DESCRIPTION	STATUS	DRAWING NO.	MATERIAL CODE	UNIT WEIGHT	NO. OF	CONC.	
59	64	65	75	25	27	29	31	33	35	
58	59	60	77	79	81	83	85	87	89	
CARD TYPE - 3 → 28			28 → CARD TYPE - 1			28 → CARD TYPE - 2				
GMS NO. / GR. SP. NO. 0-150-00-01212			STATUS OF DRG.			TYPE OF PRODUCT NATIONAL THERMAL POWER CORPORATION LTD. OR VINDHYACHAL SUPER THERMAL POWER PROJECT NAME OF CUSTOMER / PROJECT STAGE - II (2 X 500 MW) - UNIT 5 - 748				
AGREED DEPT			NAME			SIGN			DATE	
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57010-00-091-2

DRAWING NO



TECHNICAL REQUIREMENTS :-

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	12800	
001	BORROWED 01500001205 GMS	005	THREADED ROD M20X2000	3	4-150-00-01178	W96415002333	NC	4160	
001	BORROWED 01500001125 GMS	004	PIPE CLAMP NB 200	3	2-150-00-01026	W96415001892	NO	2960	
002	BORROWED 01500001151 GMS	003	EYE BOLT M20	3	4-150-00-01099	W97415000099	NO	0300	
001	BORROWED 01500001151 GMS	002	BEAM ATTACHMENT M20	3	4-150-00-01101	W96415001469	NO	1800	
001		001	PARALLEL BEAM IPB 100, L-1800			HW1013608917	NO	36720	
VAR.00	REMARKS	ITEM	DESCRIPTION	QTY	DRAWING NO.	MATERIAL CODE	UNIT WEIGHT	NO.	ZONE
59	64 65	75 25 27	29	58 59 60	77	VAR. 32 33 46	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

TYPE OF PRODUCT NATIONAL THERMAL POWER CORPORATION LTD.
OR
VINDHYACHAL SUPER THERMAL POWER PROJECT

NAME OF CUSTOMER / PROJECT STAGE II (2 X 500 MW) - UNITS-748

GRADE OF UNTOL. DIM. :-

M / CG - 6 / M / F AA 0230208

WELDING-A/B/C/D-AA 0621104

GAS CUTTING-'T3' AA 0621101

REV. DATE ALTERED

ZONE CHECKED

REV. DATE ALTERED

ZONE CHECKED

DEPT. TGE

CODE 4033

SCALE

NTS

WEIGHT (kg.)

59.040

REF. TO ASSY. DRG.

0-150-00-01212

TITLE

HANGER ASSEMBLY F-7

DRAWING NO.

2-150-00-01045

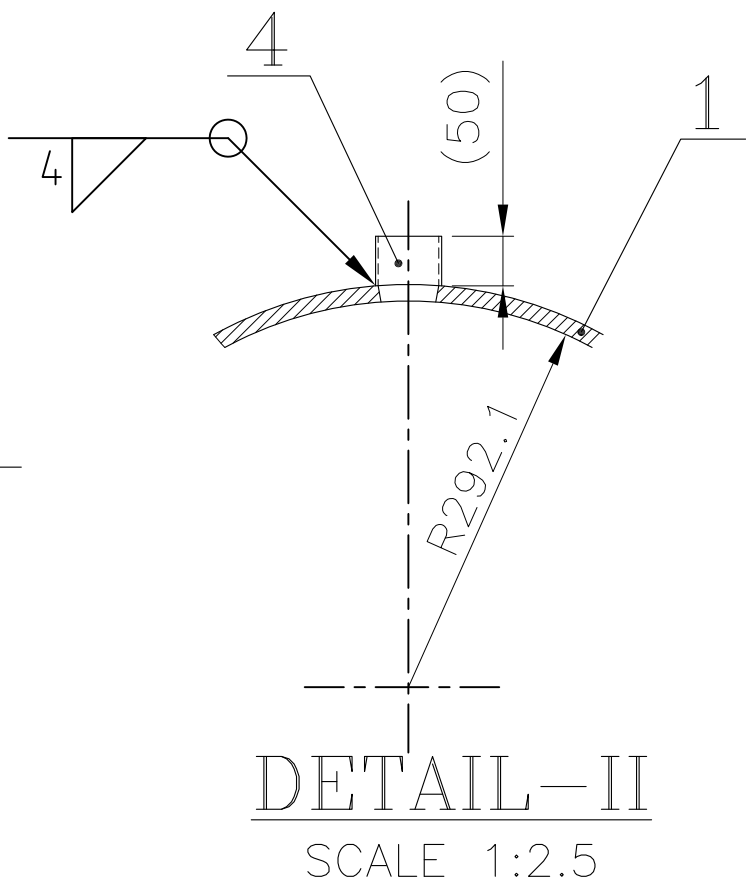
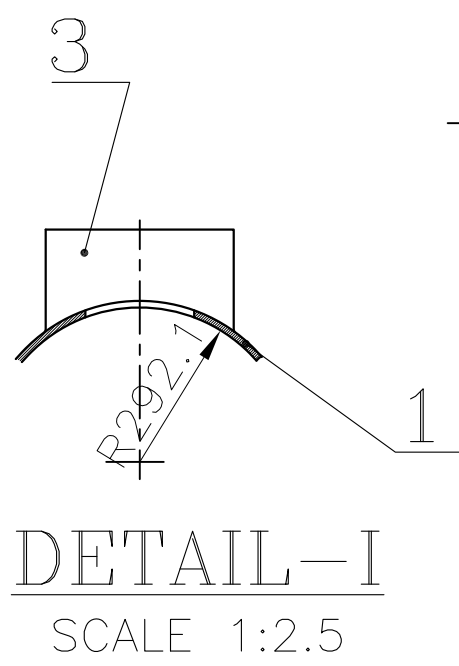
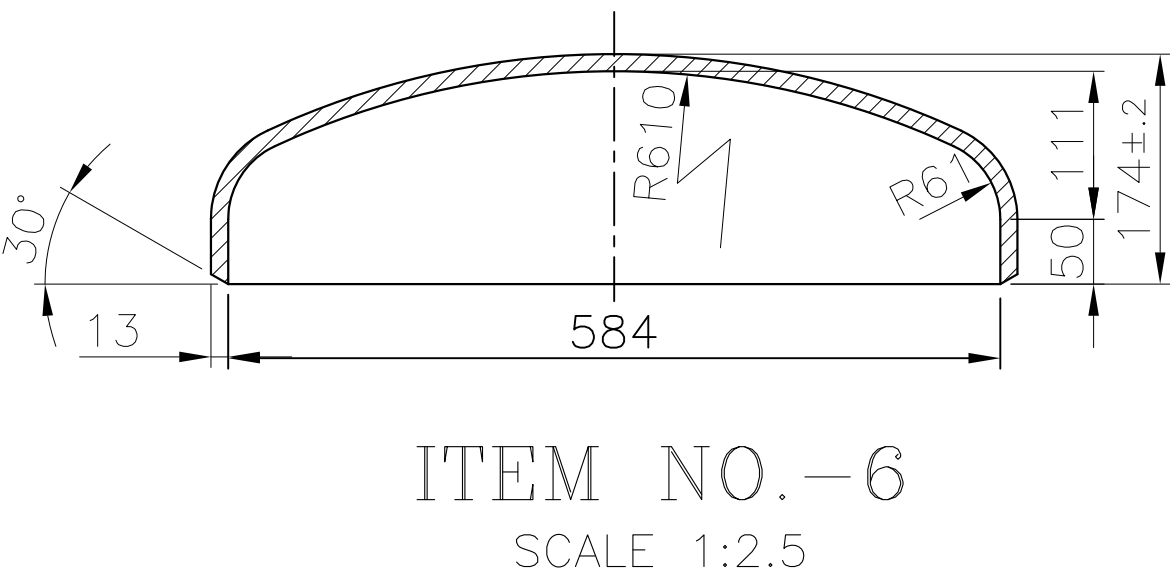
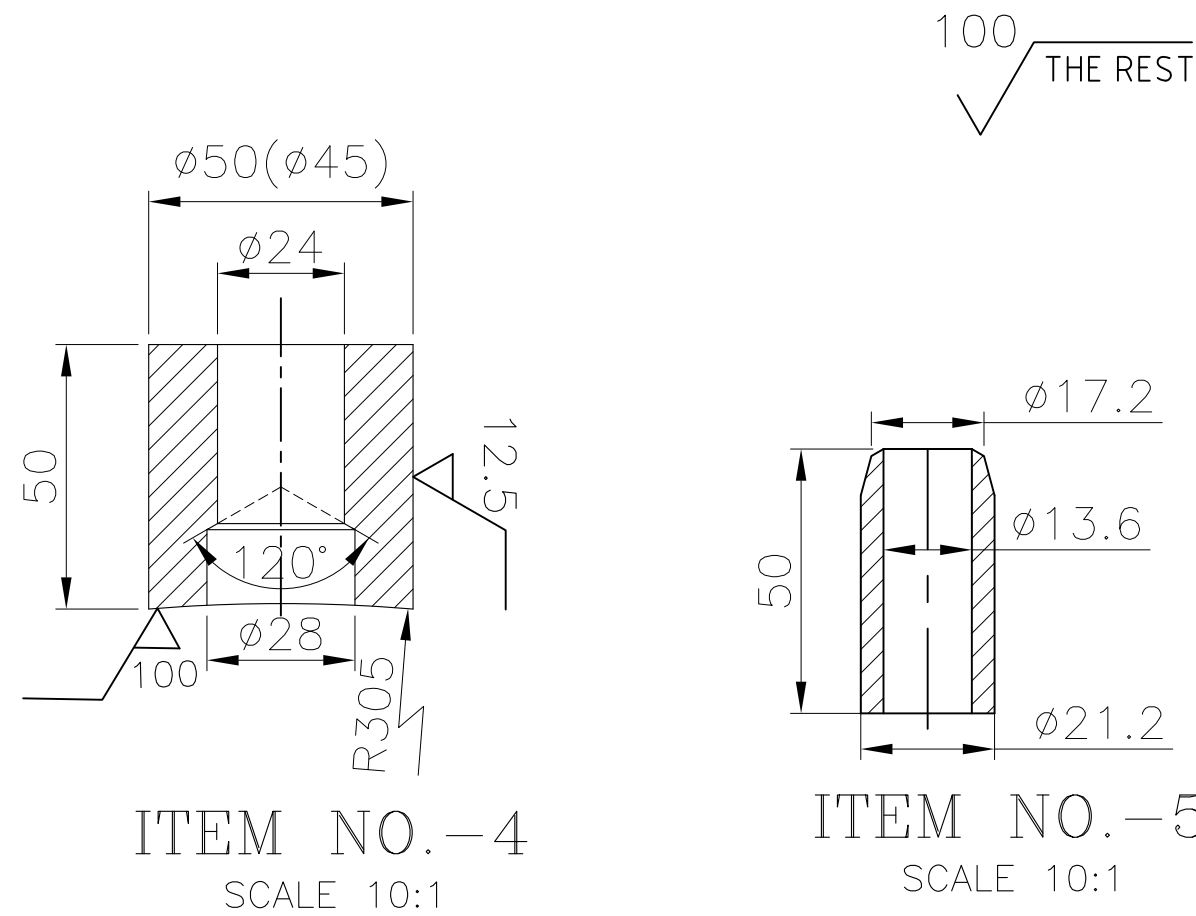
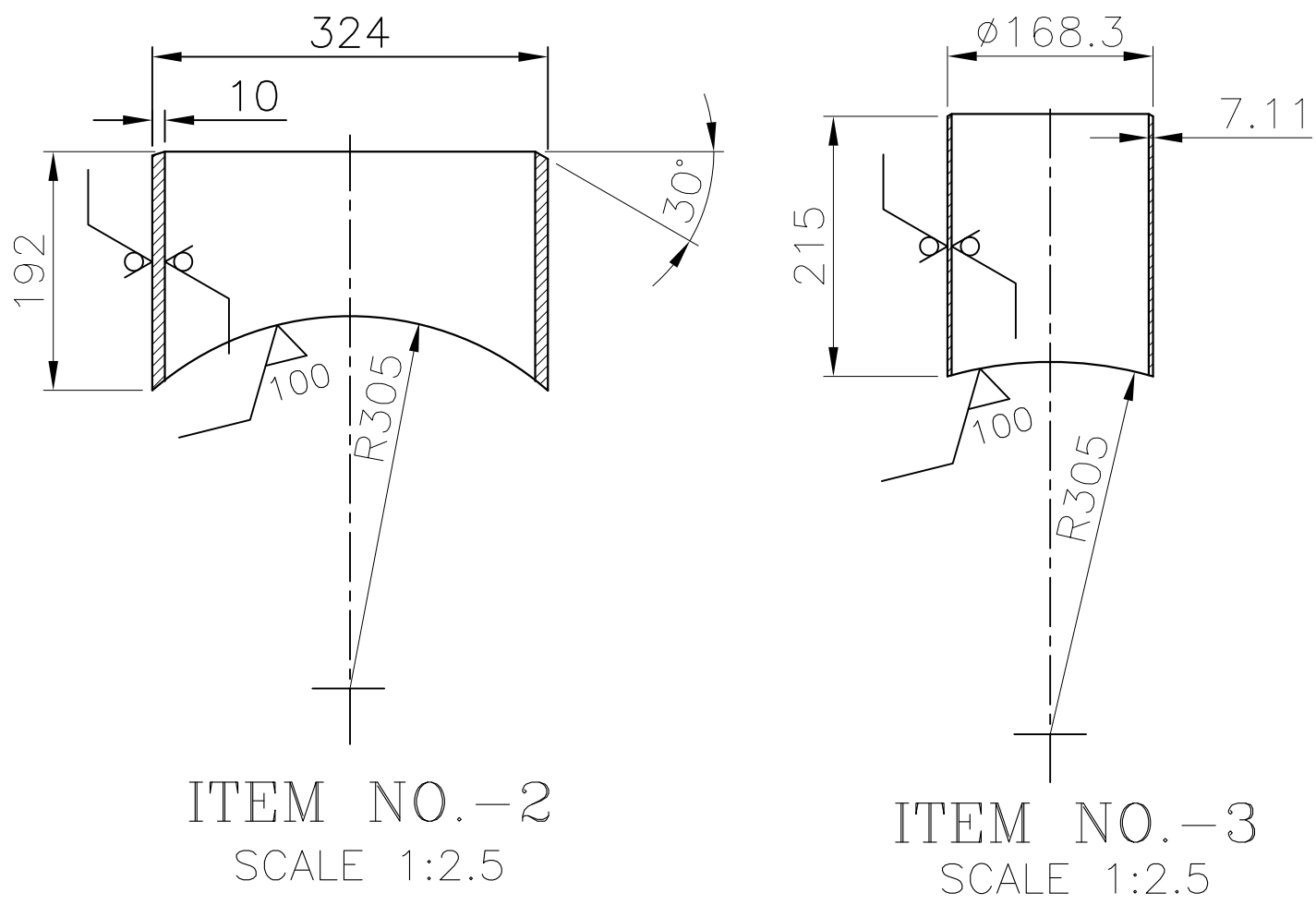
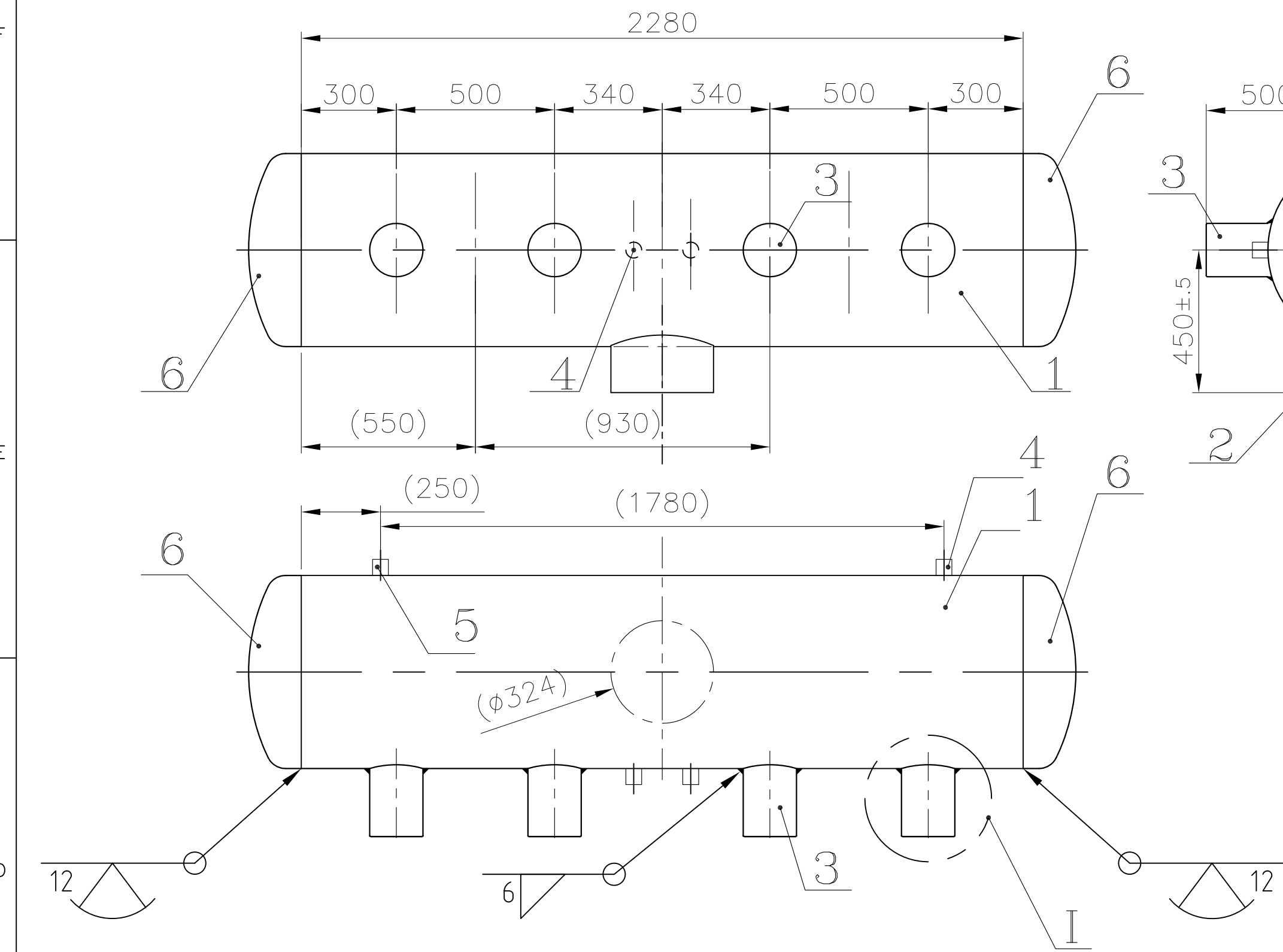
SHEET NO. 01

NO. OF SHEET 01

SIZE A2

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DRAWING NO. 21500001127



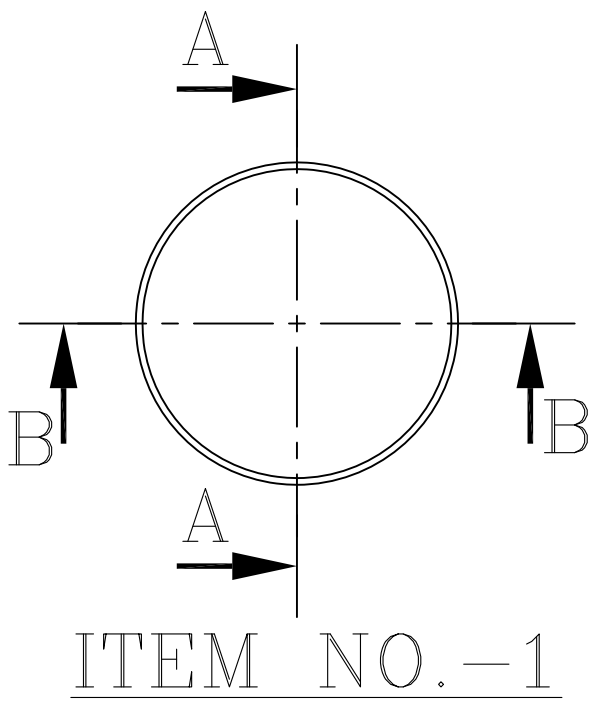
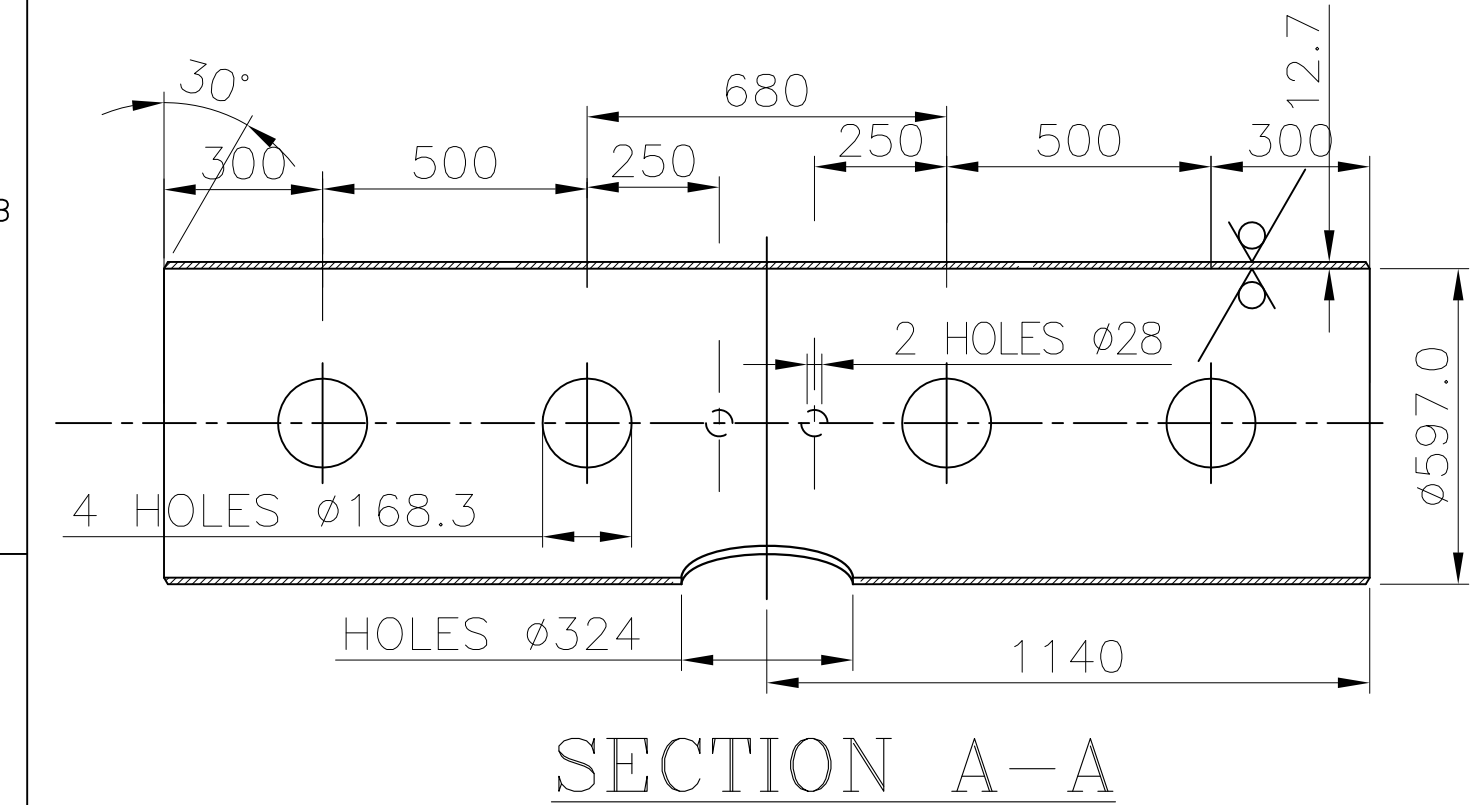
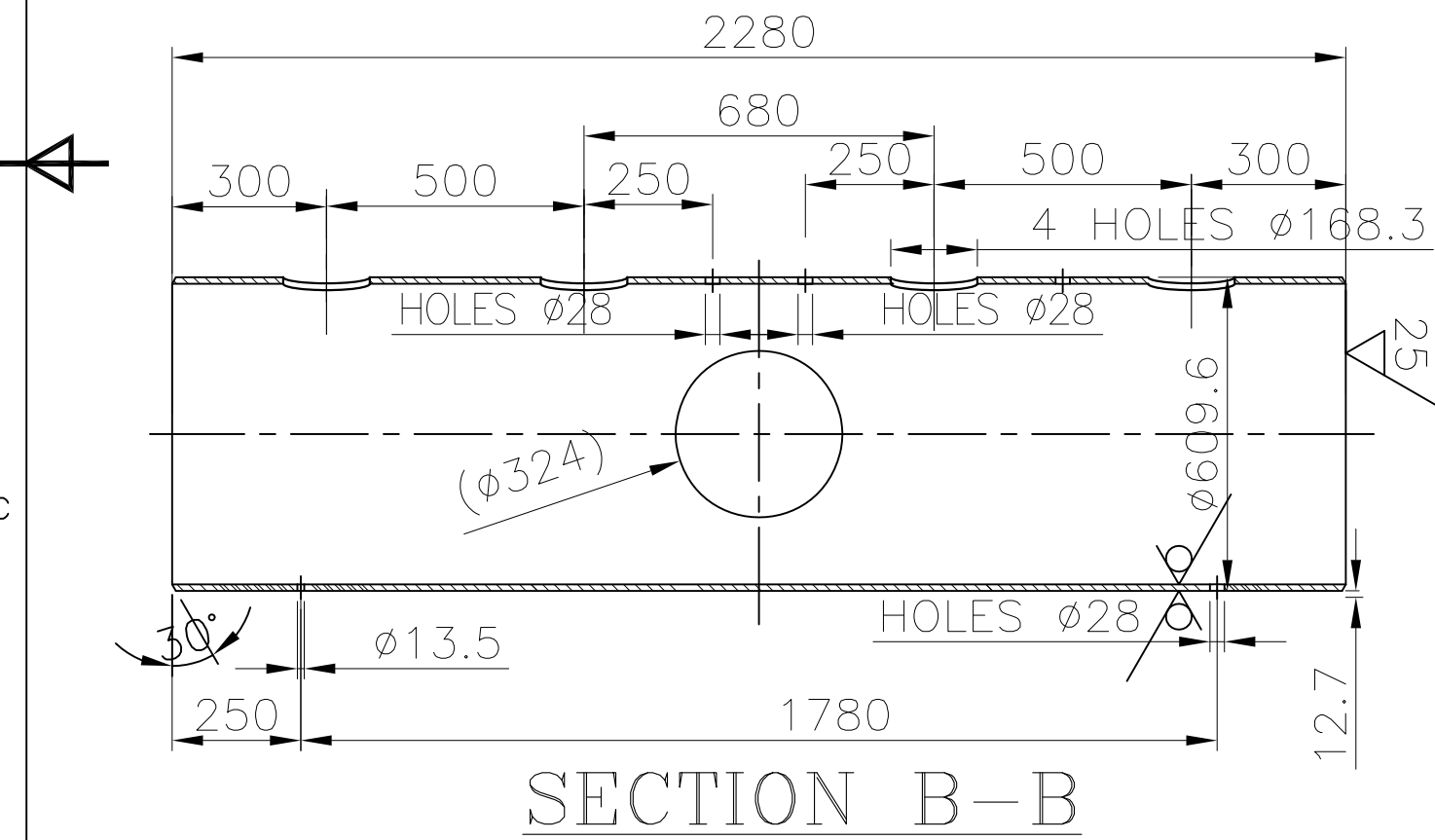
TECH. REQUIREMENTS:-

1. MATERIAL OF CONSTRUCTION IS AS PER ASME A106 GrB.
2. ALL THE BUTT JOINT TO BE AS PER HW 0620.599.
3. QUALITY OF WELD SEAM TO BE AS PER HW 0620.099. BS/BK.
4. 100% OF WELD JOINTS IS 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 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-I. 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.

DRG IS TENTATIVE AND FINAL
DRG SHALL BE ISSUED AFTER
ISSUANCE PO.

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.
1	CYLINDER	390	1
2	CONNECTION	14.2	1
3	CONNECTION	6.08	4
4	CONNECTION	0.5	3
5	CONNECTION	0.08	1
6	CAP	50	2



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

CBOM NO.			
AGREED	NAME	SIGN	DATE

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT		THDF 115/67			
BHARAT HEAVY ELECTRICALS LTD. HARDWAR		DRN	KUNAL MISHRA	sd/-	27.07.15
		CHD	KUNAL MISHRA	sd/-	27.07.15
		APD	R.L.VYAS	sd/-	27.07.15
DEPT. EME	SCALE 1:20	WEIGHT(Kg.)	536	REF. TO ASSY. DRG.	ITEM NO. OF ITEMS
CODE 4133					
TITLE		INLET HEADER		DRAWING NO. 21500001127	
				SHEET NO. 01	

621100001129
DRAWING NO.

7

6

5

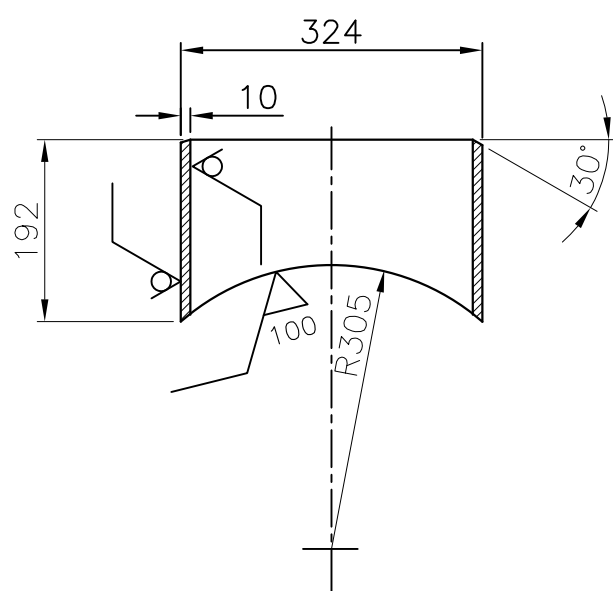
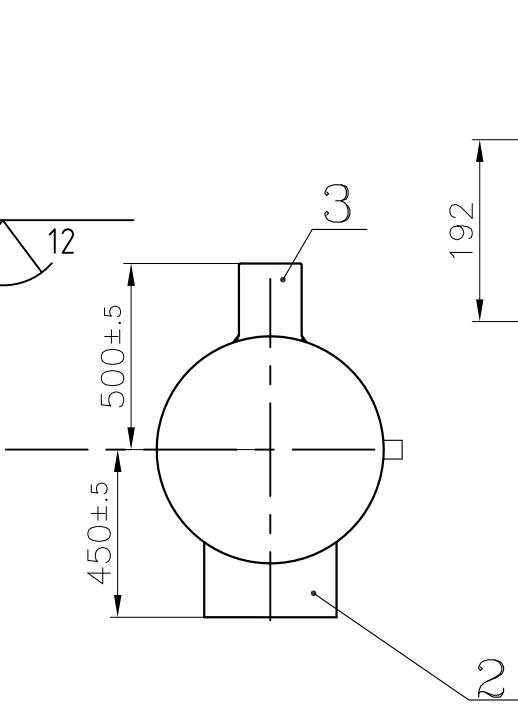
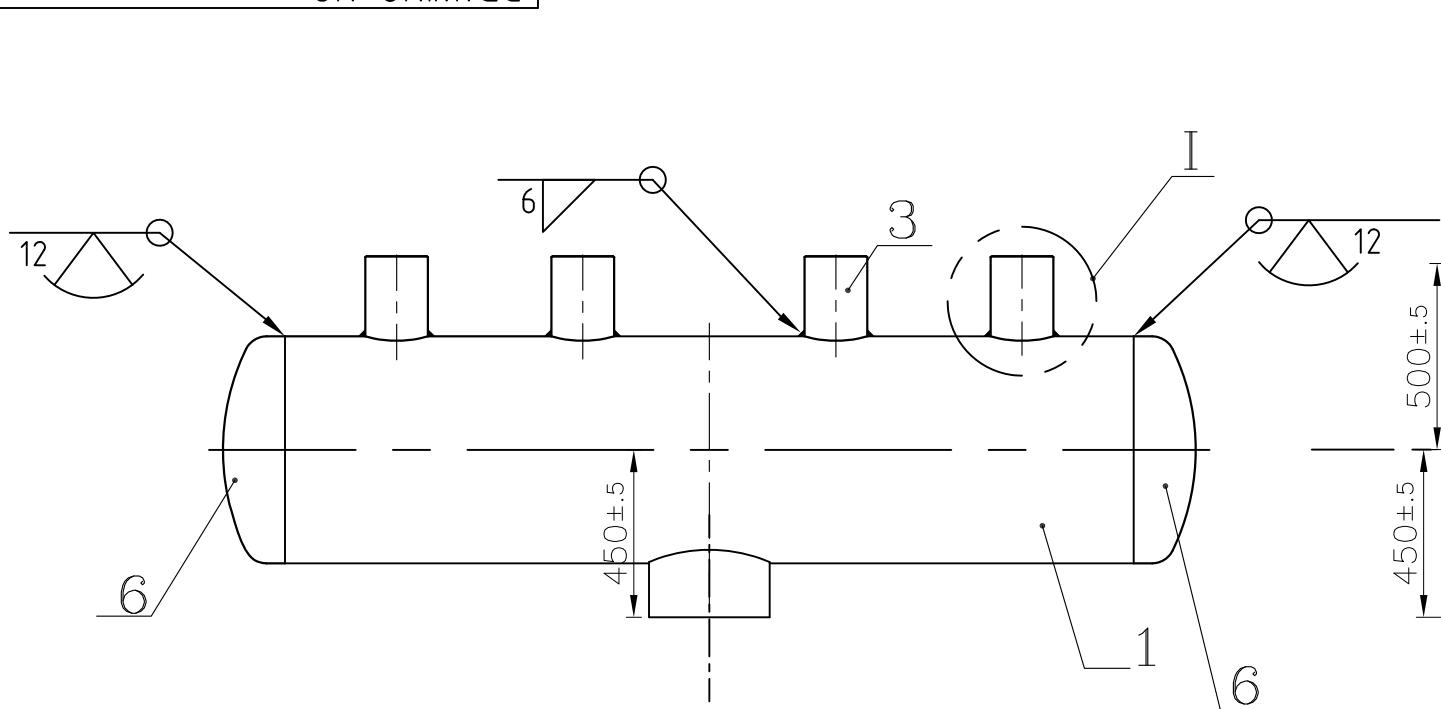
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3

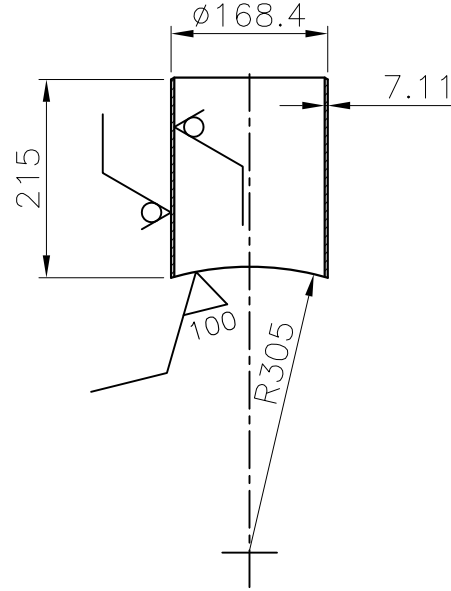
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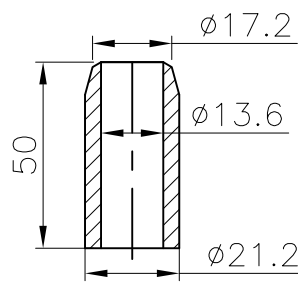
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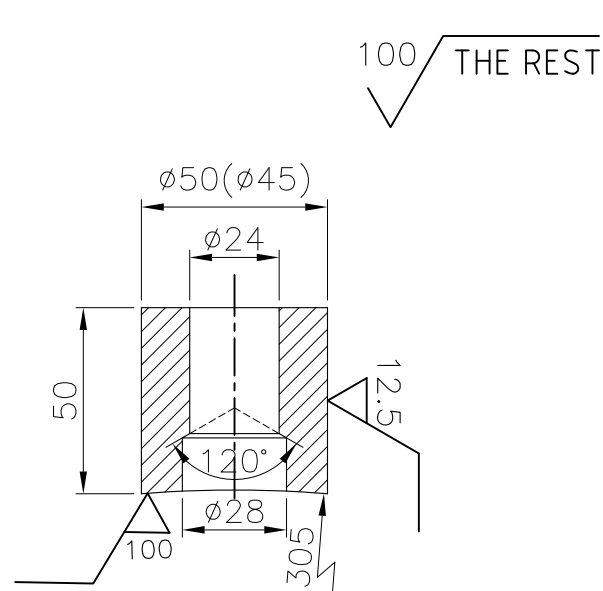
ITEM NO.-2
SCALE 1:2.5



ITEM NO.-3
SCALE 1:2.5

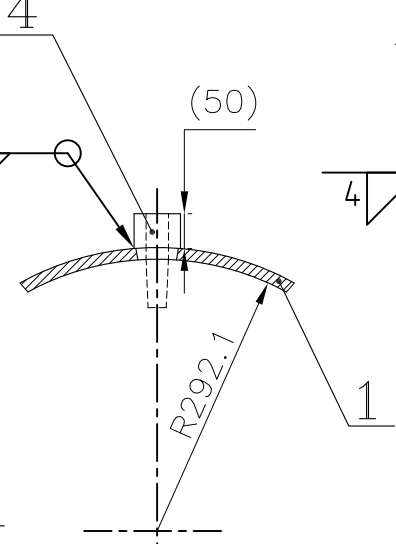
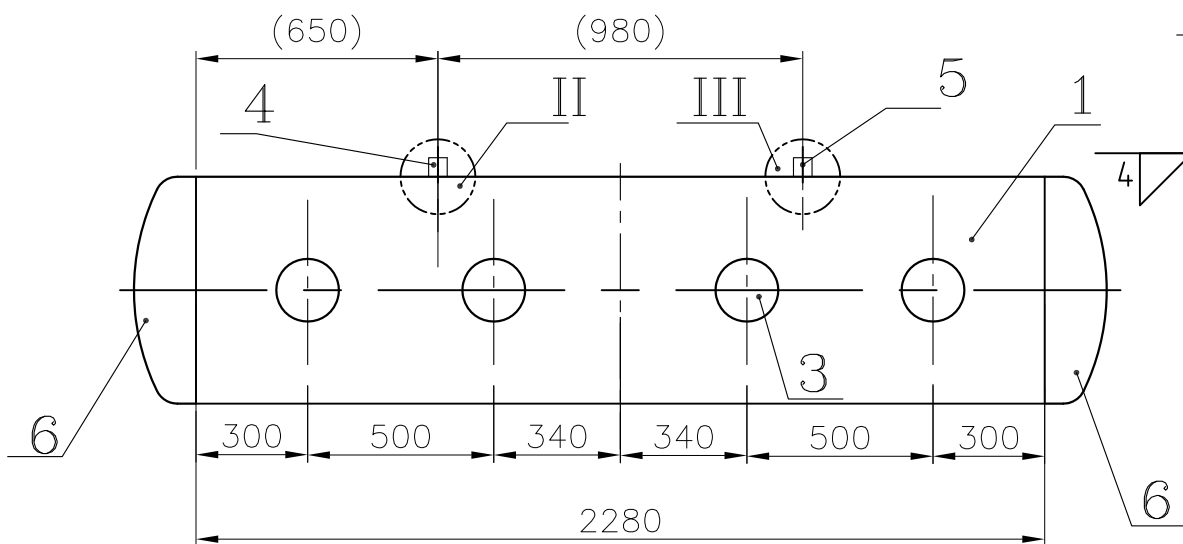


ITEM NO.-4
SCALE 10:1

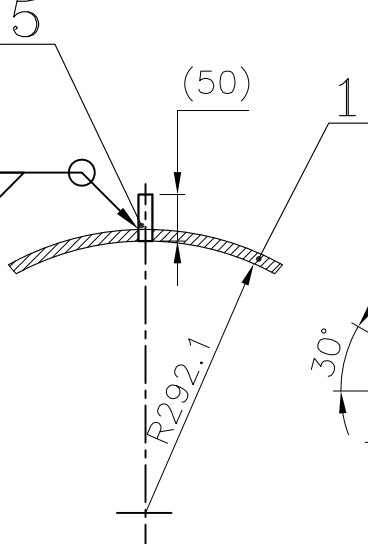


ITEM NO.-5
SCALE 10:1

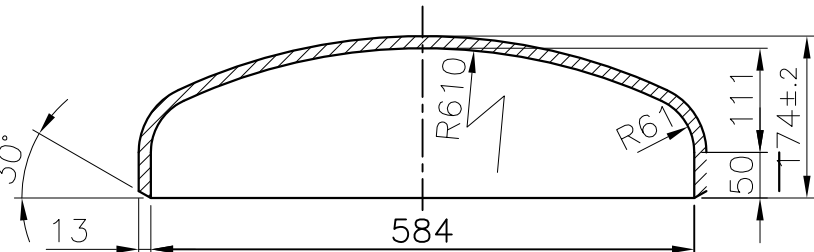
100 THE REST



DETAIL-II
SCALE 1:2.5



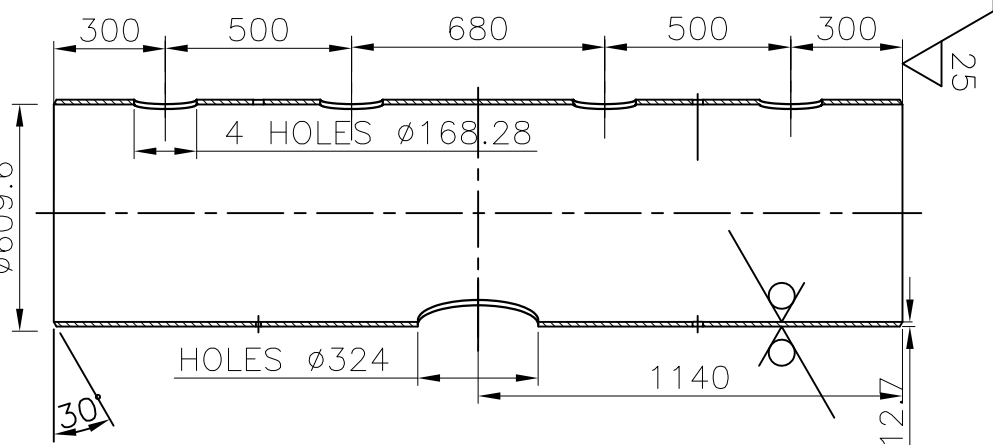
DETAIL-III
SCALE 1:2.5



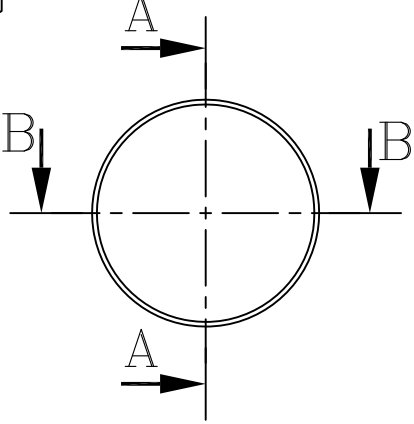
ITEM NO.-6
SCALE 1:2.5

TECH. REQUIREMENTS:-

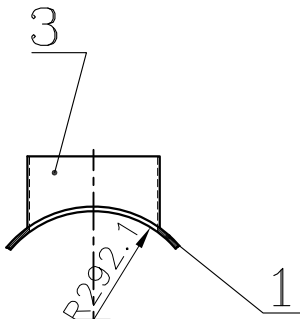
1. MATERIAL OF CONSTRUCTION IS AS PER ASME A106 GrB.
2. ALL THE BUTT JOINT TO BE AS PER HW 0620.599.
3. QUALITY OF WELD SEAM TO BE AS PER HW 0620.099. BS/BK.
4. 100% OF WELD JOINTS IS TO BE DONE AS PER HW0850199.
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6. DIMENSION WITH IN BRACKET ARE FOR REFERENCE ONLY.
7. DURING ASSY. OF ITEM 2 & 4 PROPER MATCHING TO BE DONE BY GAS CUTTING & GRINDING THE PROFILE.
8. EXT COATING OF RED OXIDE PRIMER 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.
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14. ITEM NO. 6 TO BE CONSTRUCTED IN SINGLE PIECE. CENTRAL HOLE IF REQUIRED FROM MANUFACTURING POINT OF VIEW SHOULD BE PLUGGED & FULLY RADIOGRAPHED.



SECTION A-A



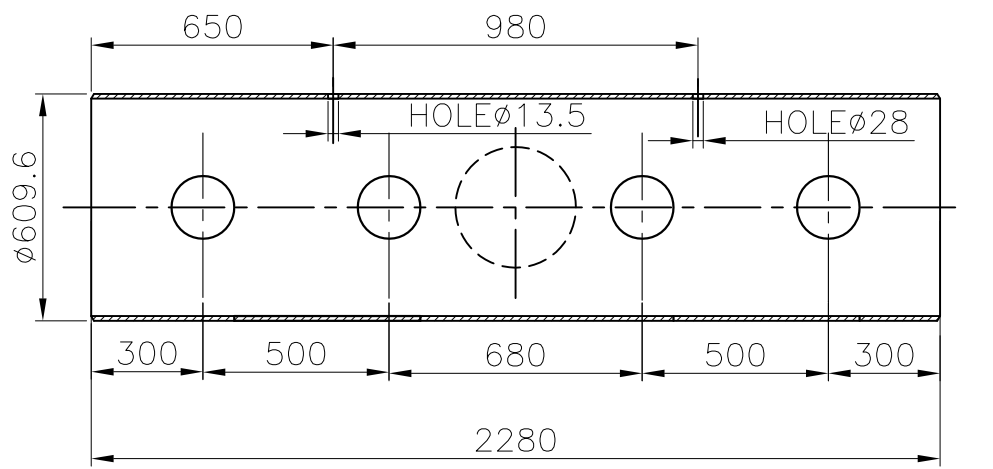
ITEM NO.-1



DETAIL-I

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.
1	CYLINDER	390	1
2	CONNECTION	14.2	1
3	CONNECTION	6.08	4
4	CONNECTION	0.08	1
5	CONNECTION	0.5	1
6	CAP	50	2



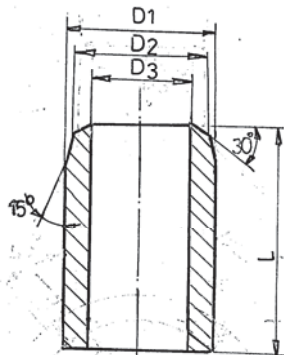
SECTION B-B

DRG IS TENTATIVE AND FINAL
DRG SHALL BE ISSUED AFTER
ISSUANCE PO.

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

CBOM NO.			STATUS OF DRG.
AGREED DEPT.	NAME	SIGN	DATE
REV.	DATE	ALTERED	CHECKED

TYPE OF PRODUCT OR NAME OF CUSTOMER/ PROJECT		THDF 125/67				
BHARAT HEAVY ELECTRICALS LTD. HARDWAR		DRN	NAME	SIGN	DATE	NO.OF VAR.
		CHD	KUNAL MISHRA	sd/-	16.01.16	
		APD	R.L.VYAS	sd/-	16.01.16	73, 74
DEPT. EME	SCALE	WEIGHT(Kg.)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS	
CODE 4133	1:20	536.0			75, 77	
TITLE		DRAWING NO.		R00		
OUTLET HEADER		21500001129		22/23, 24		
		SHEET NO. 01		NO.OF SHEETS 01		

3-150-00-01190
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	01	AS PER BOM	-0560
03	50	15	010	25.3	21.3	16.7	09		0100
04	50	25	009	36.5	33.7	28.5	08		0142
03	50	20	008	30.5	26.9	21.7	07		0115
	50	8	007	17.5	13.5	8.3	06		0060
03	50	15	006	25.3	21.3	16.7	05		-0100
03	50	20	005	30.5	26.9	21.7	04		-0115
	50	20	004	30.5	26.9	21.7	03		0115
	50	15	003	25.3	21.3	16.7	02		0100
	100	50	002	60.3	52.3	01	01		0560
	50	10	001	21.2	17.2	13.6	00		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	

MATERIAL
AS PER
BOM

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-99-327GMS No./GR-SP. No.
01500001125AGREED DEPT. NAME SIGN DATE
GTK SGOYAL 23/7/97TYPE 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
2033SCALE
N.T.SWEIGHT (KG)
SEE TABLEREF. TO ASSY. DRG.
0-150-00-01125ITEM
No.
75 77TITLE :
CONNECTIONCARD
CODEDRAWING No.
3-150-00-01190

SHEET No. 01 No. OF SHEETS 01

REV. DATE ALTERED KBM
04 10.1.97 CHECKED KRG
VAR. 08 ADDED
CH. AD. NO. TGE-97-04GRADE OF UNTOL. DIM:-
MCG. :- C/M/F/ AA 023 0208
WELDING :- 'T1' O 610.003
GAS CUTTING :- 'T3' AA 0621101REV. DATE ALTERED P.A.B.
03 11.9.96 CHECKED KRG
CH. AD. NO. TGE-96-325REV. DATE ALTERED KBM
02 30.5.96 CHECKED R.L.V.
CH. AD. NO. TGE-96-161REV. DATE ALTERED KBM
01 18.11.95 CHECKED KRG
CH. AD. NO. TGE-95-445

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REF. DRG NO.

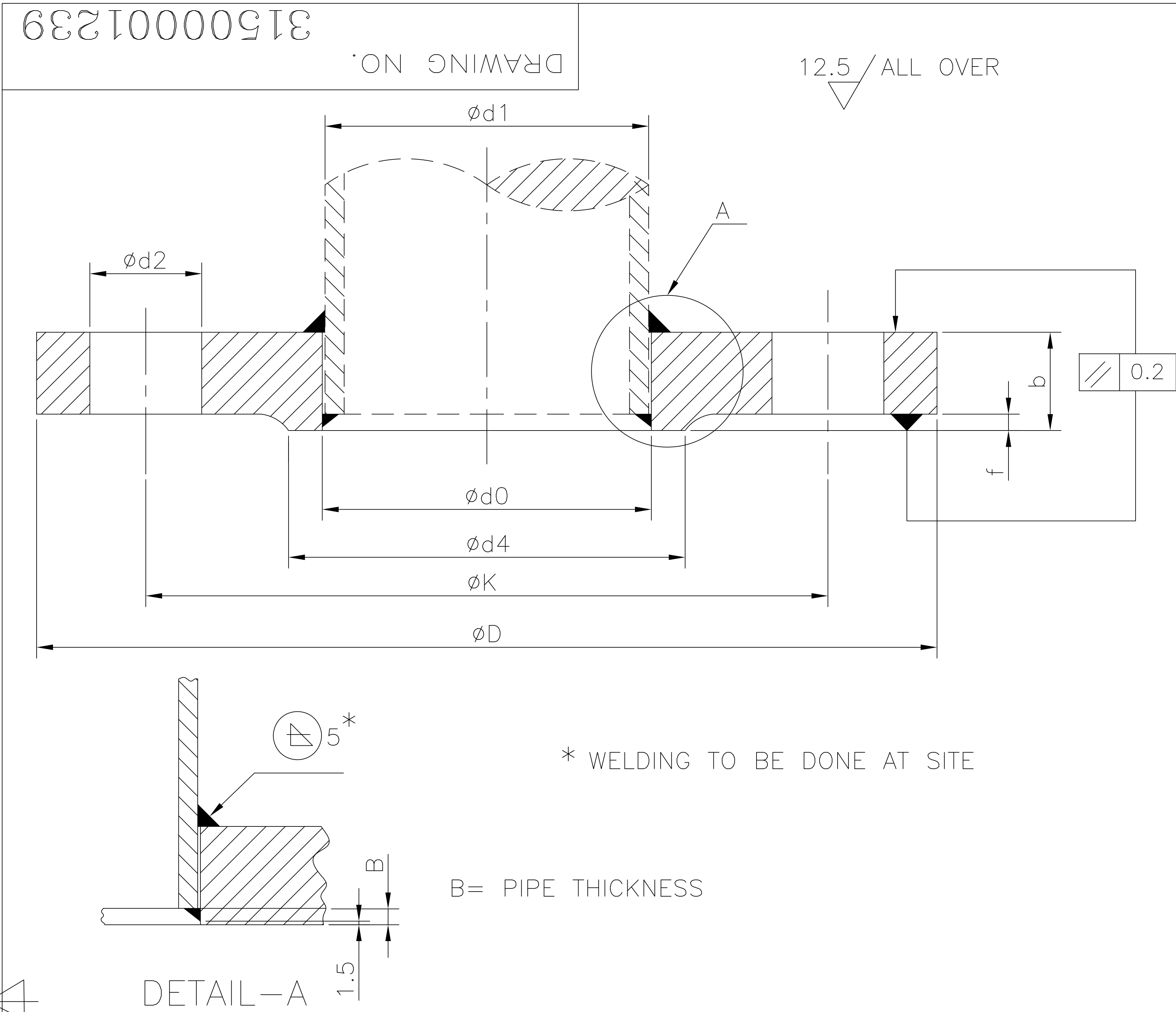
SIGN & DATE

INVENTORY NO.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

FORM: DG-38(B)



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						45		2	M12	4	14	65	0.59				
03	20	26.9	27.4						58		2	M12	4	14	75	0.73				
04	25	33.7	34.2						68		2	M12	4	14	85	1.02				
05	32	42.4	42.9						78		2	M16	4	18	100	1.47				
06	40	48.3	48.8						88		3	M16	4	18	110	1.77				
07	50	60.3	60.8						102		3	M16	4	18	125	2.18				
08	65	76.1	76.6						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						188		3	M16	8	18	210	4.99				
12	150	168.3	169.3						212		3	M20	8	22	240	6				
13	175	193.7	194.7						242		3	M20	8	22	270	7.82				
14	200	219.1	221.1						268		3	M20	12	22	295	8.31				
15	250	273	275						320		3	M24	12	26	355	11.9				
16	300	323.9	325.9						378		4	M24	12	26	410	14.7				
17	350	355.6	357.6						438		4	M24	16	26	470	24.3				
18	125	139.7	140.7						±1.5		22		188	+0.0 -2.0	3	M24	8	26	220	5.0
19	100	114.3	115.3										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	REV.	DATE	ALTERED KM
		CHECKED	01	15.12.17	CHECKED MA
			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

SCALE

NTS

WEIGHT(Kg.)

SEE TABLE

REF. TO ASSY. DRG.

ITEM NO.

NO.OF VAR.

73, 74

75, 77

TITLE

FLANGE PN16
(CARBON STEEL)

1

3

DRAWING NO.

315000001239

71

72

73

74

75

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100

SHEET NO.

1

NO.OF SHEETS

1

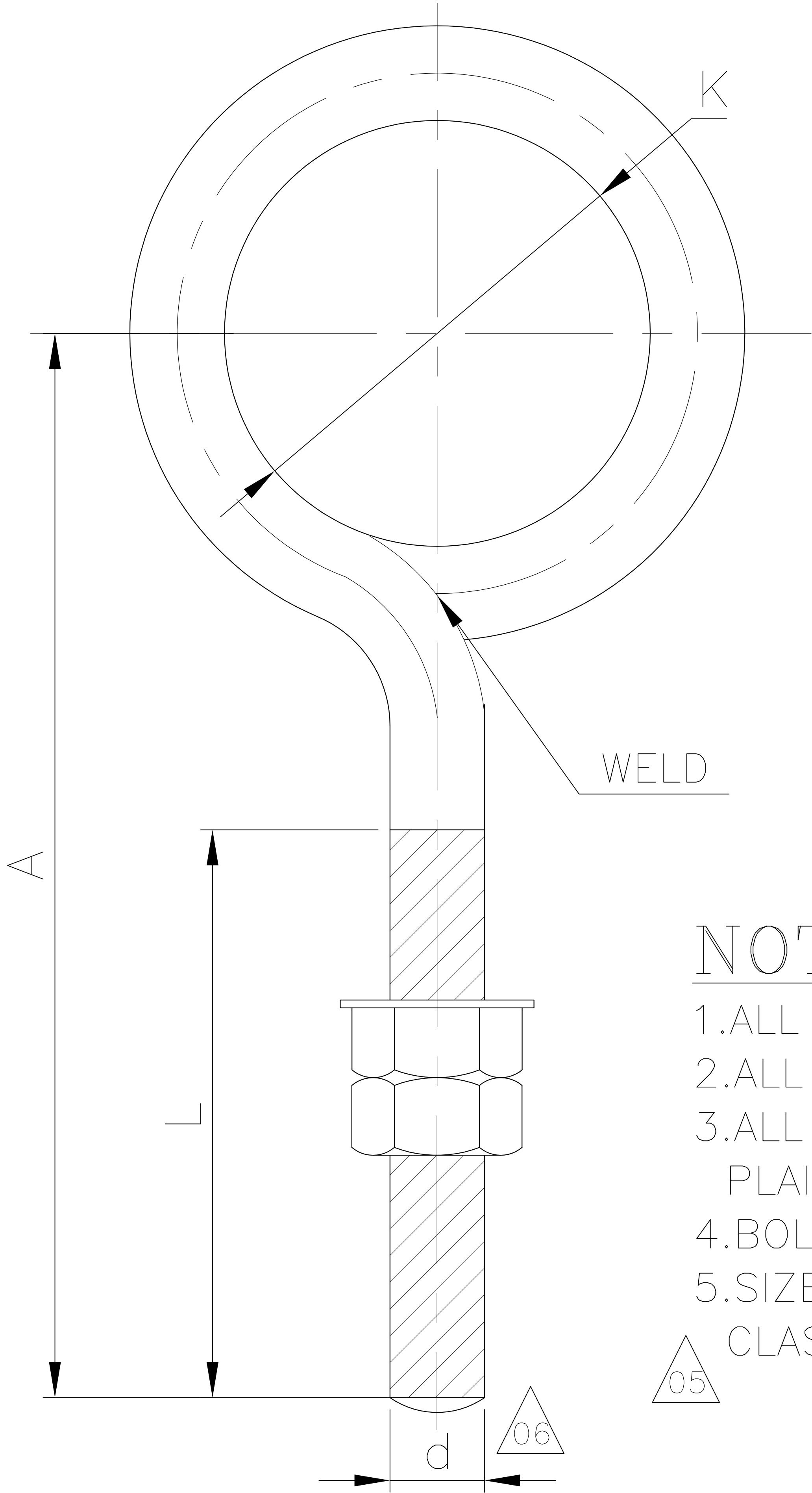
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FIRST ANGLE PROJECTION

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

REV 06	DATE 08.11.19	ALTERED CHECKED	KM MA	REV 05	DATE 04.06.18	ALTERED CHECKED	KM MA	CBOM No. 0-150-00-01151			STATUS OF DRG	
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		



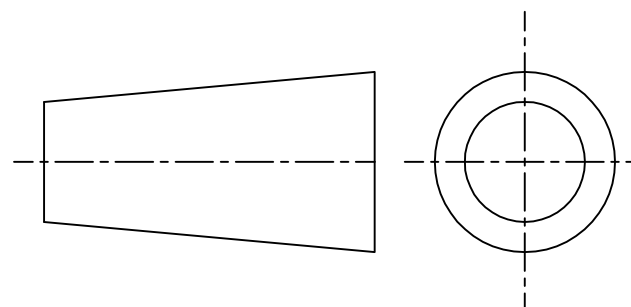
TESTING:-

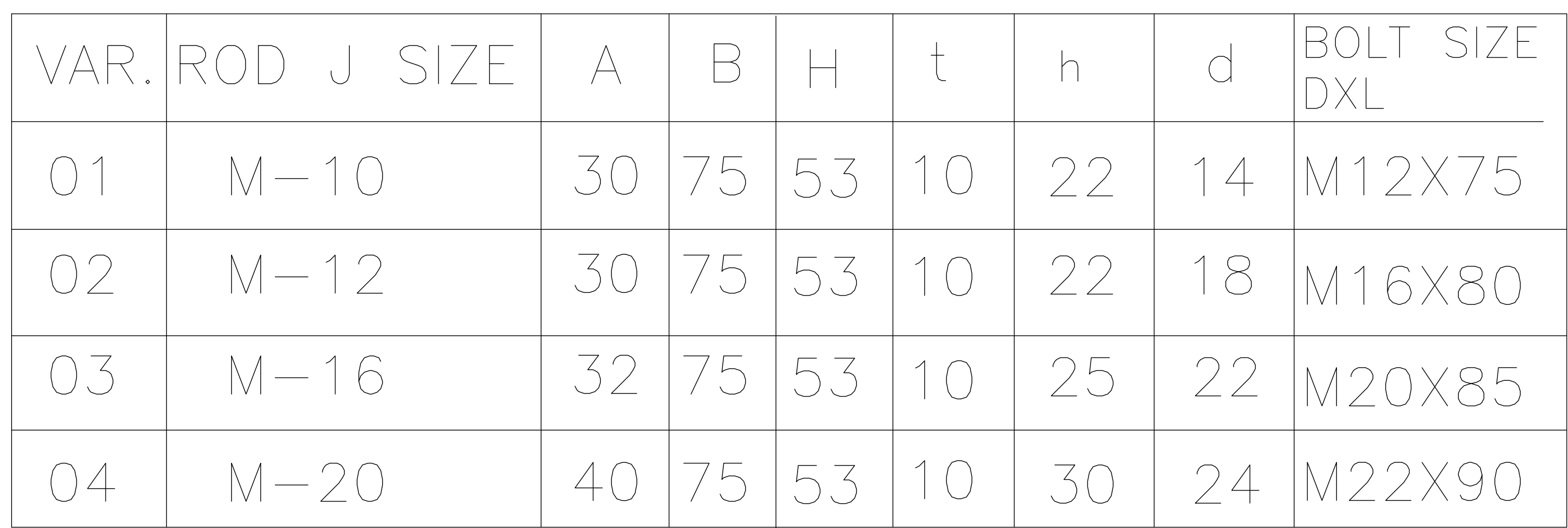
VAR.	A	L	K	d	F
01	100	60	18	M10	5
02	120	65	22	M12	8
03	130	65	26	M16	12.5
04	145	75	31	M20	20

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.	No OF ITEMS
	CODE 4133		1:1	SEE TABLE		0-150-00-01151				
		TITLE EYE BOLT RAPP 3,4 : KAIGA1,2					DRAWING No. 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

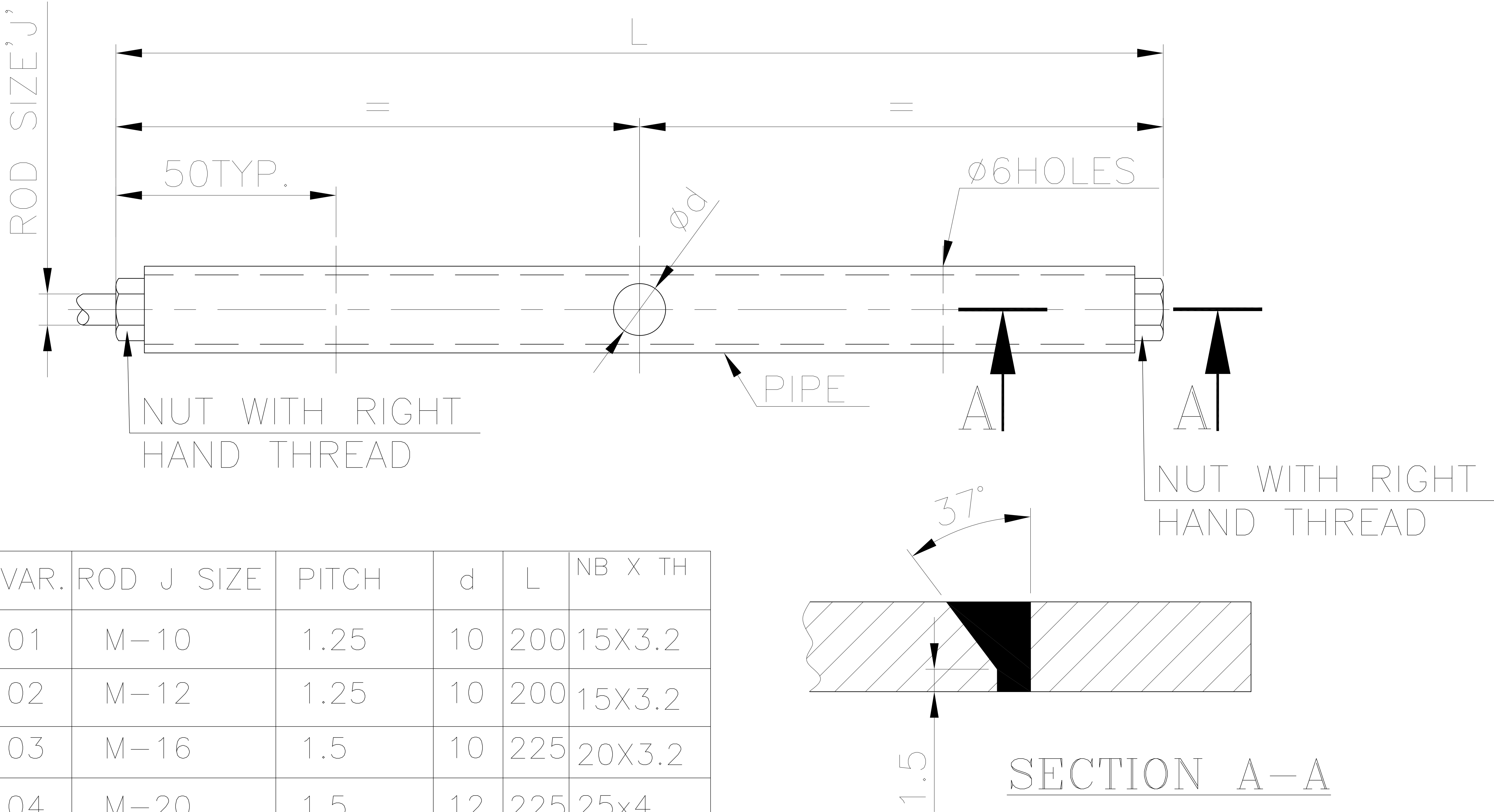
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FIRST ANGLE PROJECTION

(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 UNTOL.DIM.V/C/M/F.AA0230208				WELDING A/B/C/D AA0621104			GAS CUTTING T3 AA0621104			



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:-

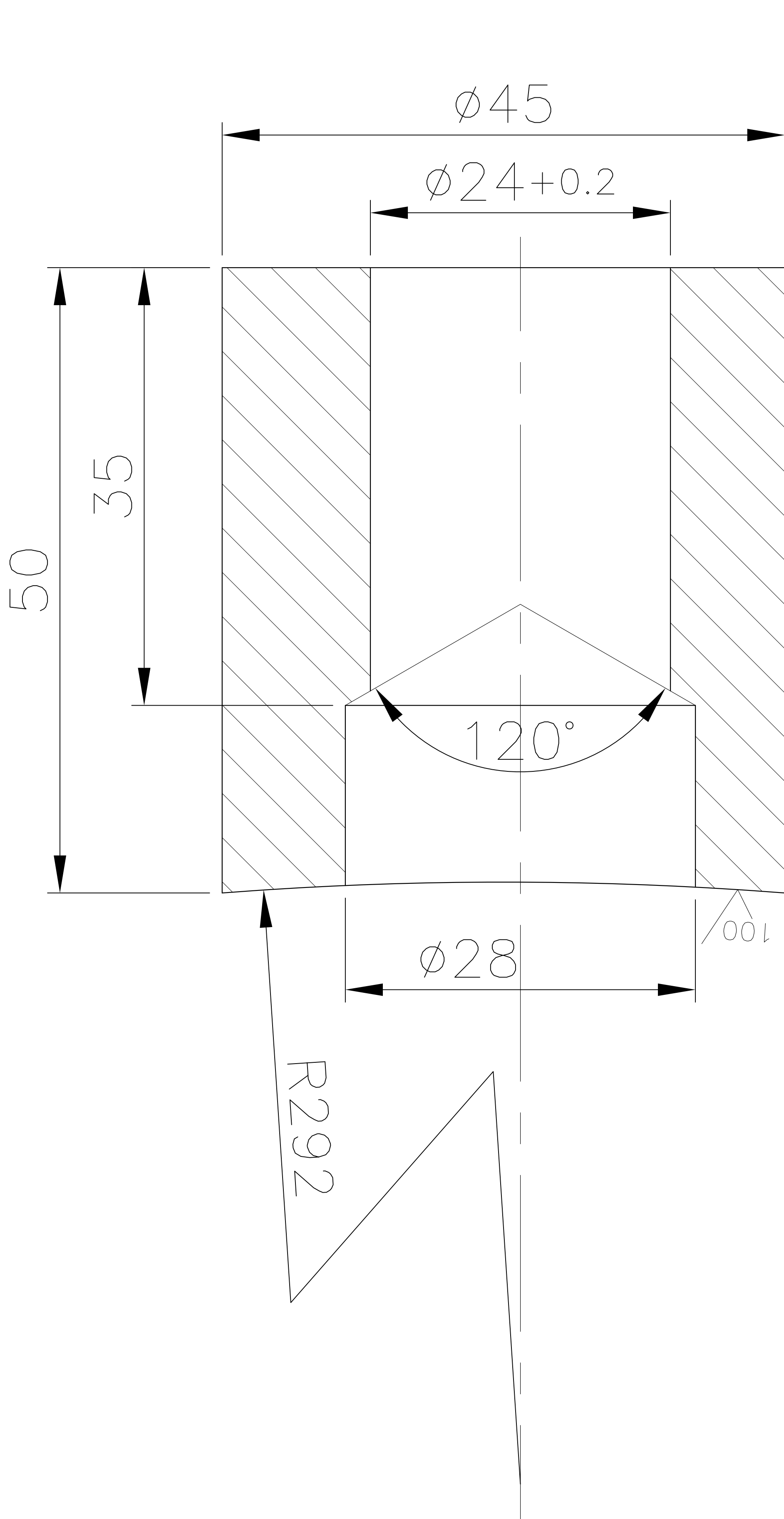
- 1.TO BE GALVANISED AS PER IS:1367 (PART XIII), THICKNESS OF COATING 15μ.
2. WELD TO BE D.P. TESTED AS PER ASME SECTION VIII

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					
			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							
										NAME		SIGN	DATE	NO. OF VAR	
						BHARAT HEAVY ELECTRICALS LTD HARDWAR				DRN	AEDD	sd/-	09.04.91		
										CHD	K.R.GUPTA	sd/-	09.04.91		
				APD	G.M.K					sd/-	12.04.91				
Et1-15373 INVENTORY No.	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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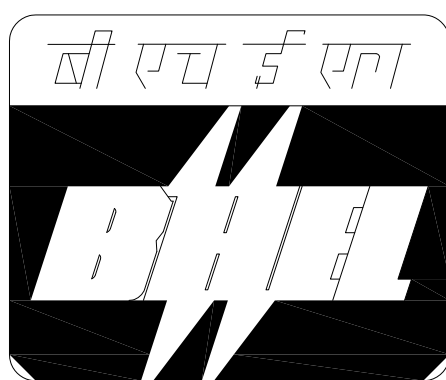
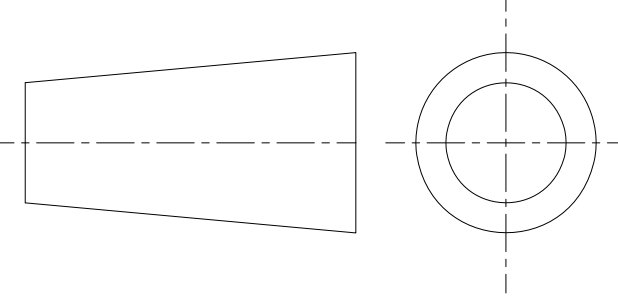
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REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No.			STATUS OF DRG	
		CHECKED	02	13.12.08	CHECKED	KBM NV				
			CH.AD.NO.TGE-08-F0330			AGREED DEPT.	NAME	SIGN	DATE	
						W.T	ROY	sd/-	3.2.92	
GRADE OF UN					TOL.DIM.M/CG-X/C/X/Ø.AA0230208		WELDING A/B/C/D AA0621104		GAS CUTTING-T3 AA0621101	



T.R

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

28/04/92 SIGN & DATE	REF.DRG.No.												
	T.R												
	1. IDENTIFICATION AS PER HW0400397. 2. RADIUS R-292 SHOULD BE MADE DURING ASSLY. MATCHING WITH THE JOB.												
	PURCHASED	001	CONNECTION		00	MATERIAL AS PER BOM				0.500			
	REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE		A		UNIT WEIGHT			
	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							
Et1-16068 INVENTORY No.	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			CONNECTION		DRAWING No.							
						4-150-00-01118							
					SHEET No. 1				No.OF SHEETS				1

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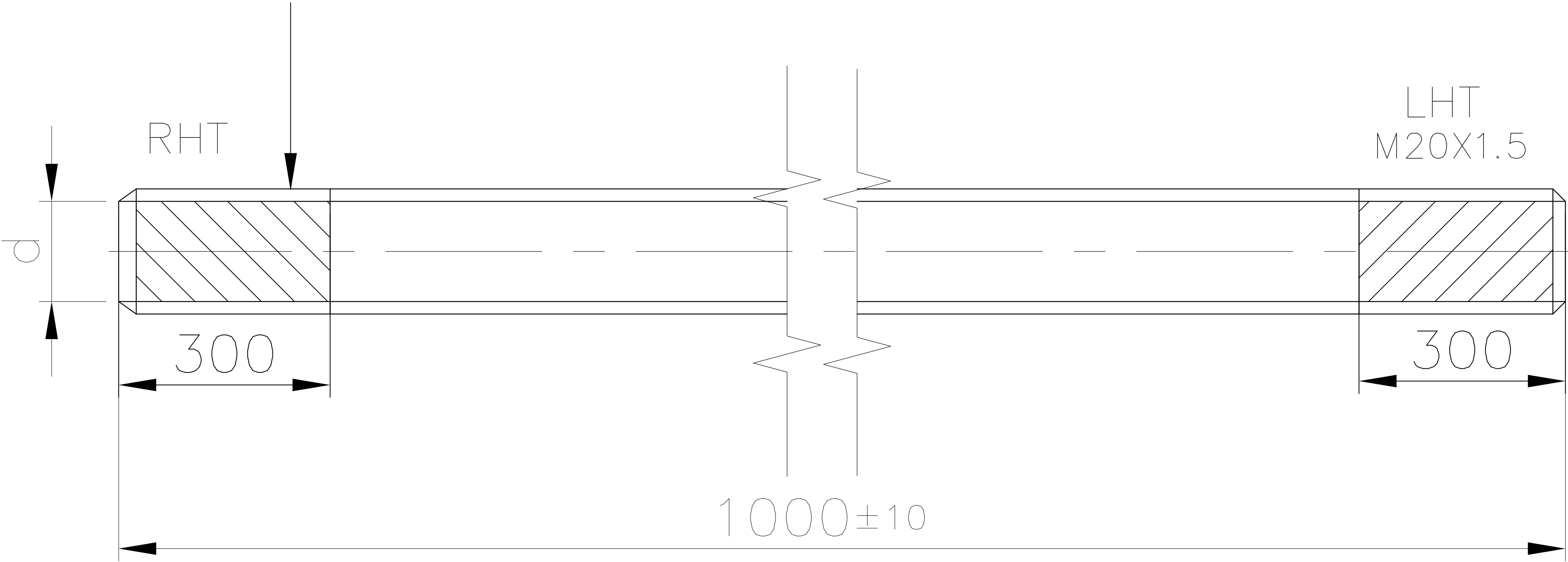
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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED	REV	DATE	ALTERED	PAB	CBOM No.			STATUS OF DRG
		CHECKED	03	20.11.01	CHECKED	RLV	0-150-00-01125			
			CH.AD.NO.TGE-01-529				AGREED DEPT.	NAME	SIGN	DATE
							GTX	SCGOYAL	sd/-	23/7/92
GRADE OF UNTOL.DIM.V/C/M/F.AA0230208				WELDING A/B/C/D-AA0621104			GAS CUTTING-T3 AA0621101			

12.5 / THE REST

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

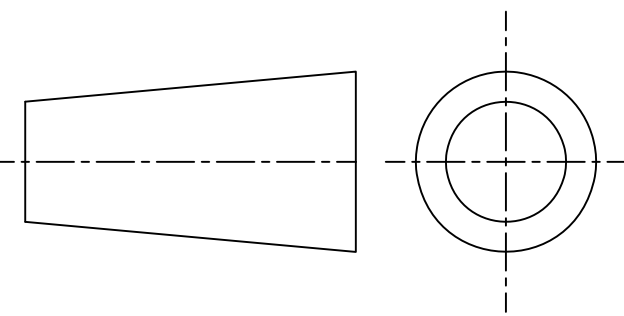


VARIANT TABLE

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

TECH. REQ.

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

DIN 975 REF.DRG.No.	TECH. REQ.											
	1. THREADED ROD TO BE GALVANISED AS PER IS: 1367 (PART XIII), THICKNESS OF COATING 15μ											
SIGN & DATE		001	THREADED ROD		01	CS-IS2062E250BR			SEE	TABLE		
	REMARKS	ITEM NO.	DECRPTION	STD	VAR	MATERIAL CODE		A	UNIT WEIGHT			
						MATERIAL SPEC.		C				
						NAME		SIGN			DATE	NO. OF VAR
						DRN	KAPOOR	sd/-			13.04.92	
CHD	K.R.GUPTA	sd/-	13.04.92									
 BHARAT HEAVY ELECTRICALS LTD HARDWAR					APD	G.M.K	sd/-	10.04.92				
Et1-16334 INVENTORY No.	DEPT. EME		SCALE	WEIGHT(Kg)		REF.TO ASSY.DRG.			ITEM No.	No OF ITEMS		
	CODE 4133		N.T.S	SEE TABLE		0-150-00-01125						
	TITLE					DRAWING No.						
THREADED ROD					4-150-00-01131							
					SHEET No. 1		No.OF SHEETS			1		

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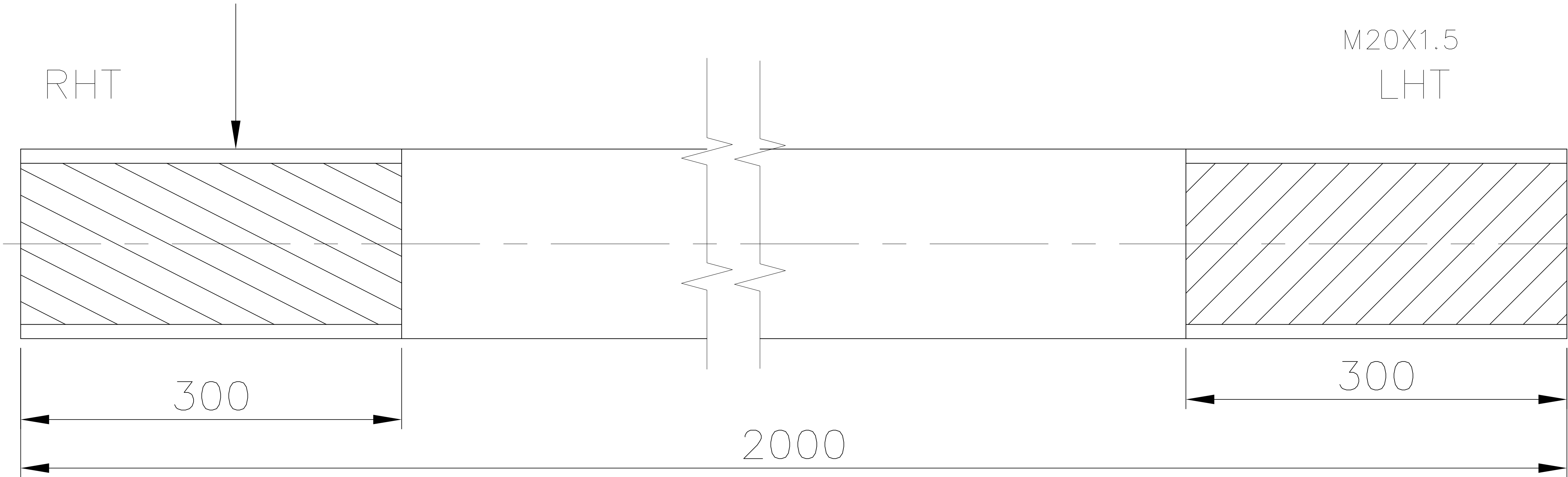
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FIRST ANGLE PROJECTION

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

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

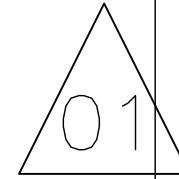
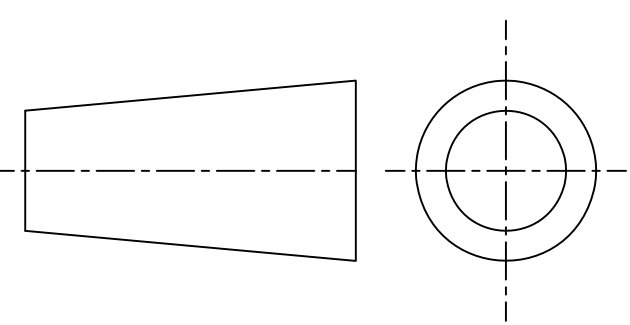
THIS END IS OF M16X1.5 WHILE ASSEMBLY WITH HANGER WITH DRG NO.41500001198 AND OF M20X1.5 WHILE ASSEMBLY WITH HANGER WITH DRG NO. 41500001199.
FOR ASSEMBLY DRG. PLEASE REFER DRG NO. 11500001019, 21500001043, 21500001044, 21500001045, 21500001046



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			5.600	
				01	CS:IS2062E250BR				
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	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.			ITEM	No OF ITEMS
CODE 4133		N.T.S	5.600		0-150-00-01205			No. 05208	
TITLE					DRAWING No.				
TIE ROD (M20X2000)					4-150-00-01176				
TG-HW-0500-2					SHEET No. 1		No.OF SHEETS		

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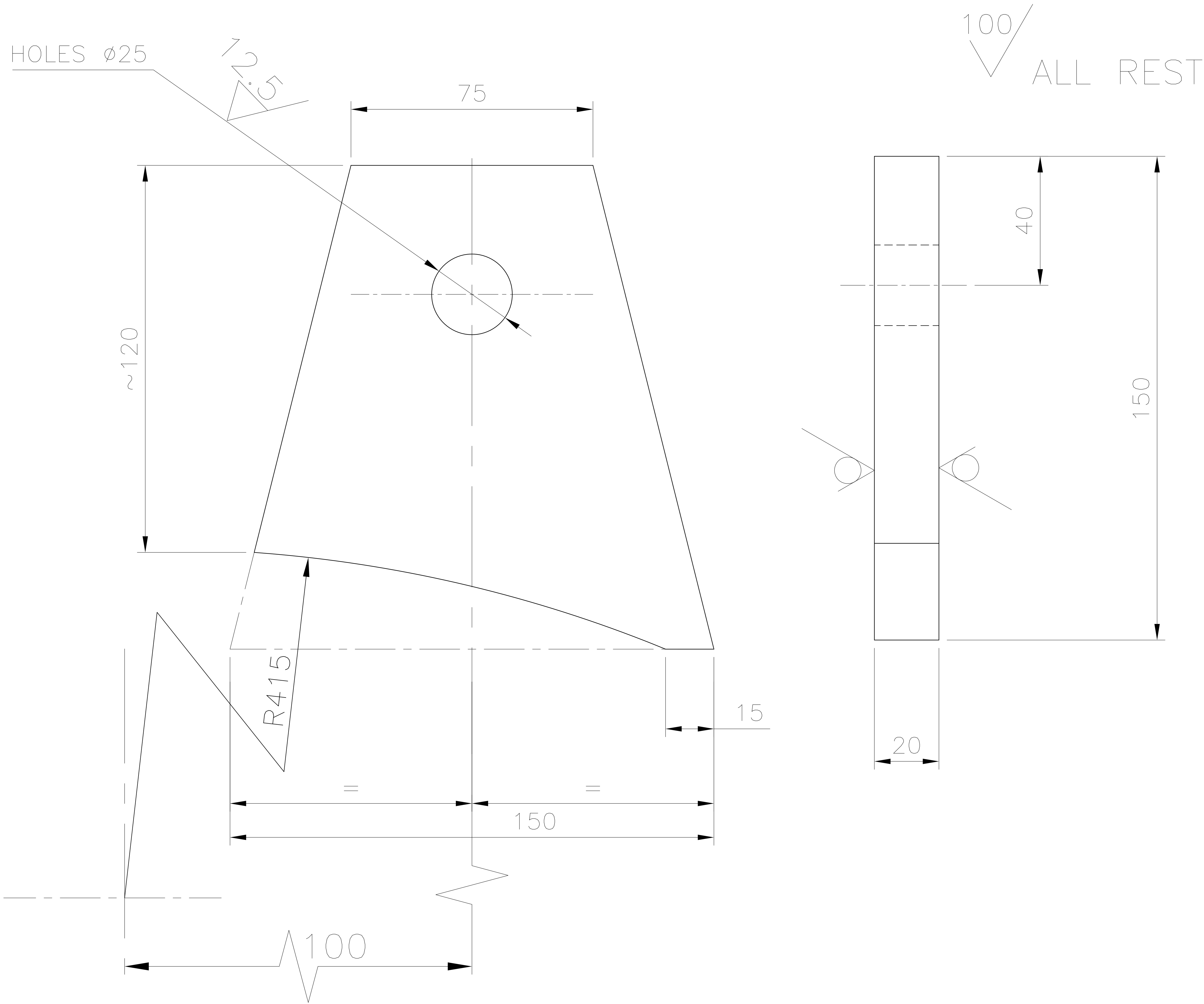
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FIRST ANGLE PROJECTION

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

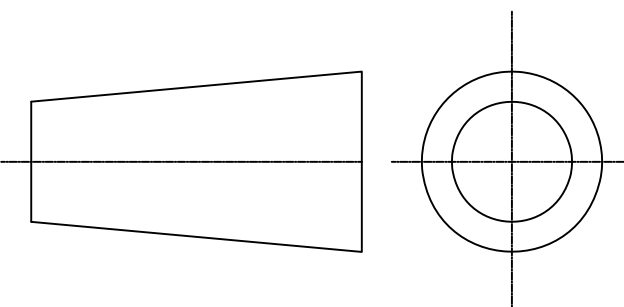
REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No. 0-150-00-01205			STATUS OF DRG
		CHECKED			CHECKED	AGREED DEPT.	NAME	SIGN	
						W.T.	SETH	sd/-	26.09.95

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



TECH. REQT.

1. IDENTIFCATION AS PER HW 0400.397

	001	PLATE			AA1011808137		1.500	
					CS-IS2062E250BR			
REMARKS	ITEM NO.	DECRPTION		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	1

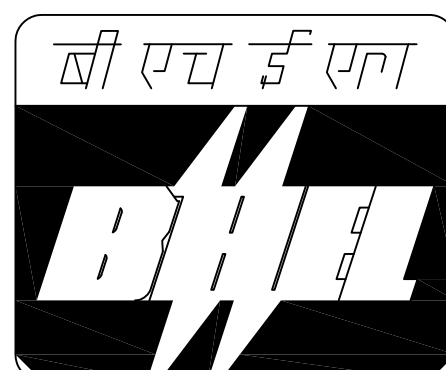
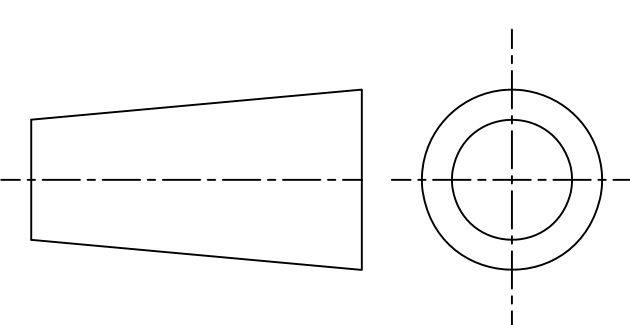
Technical drawing of a threaded rod with a break symbol in the middle. The drawing shows a horizontal rod with a dashed centerline. A break symbol (two zigzag lines) is placed in the middle of the rod. To the left of the rod, the text "M20" is written vertically. Below the rod, a dimension line with arrows at both ends is labeled "2000±10". Below the dimension line, the text "THREAD TYPE — RHT M20X1.5" is written.

THREAD TYPE — RHT M20X1.5

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)			W96415002333			4.160
				01	CS:IS2062E250BR			
REMARKS	ITEM NO.	DESCRIPTION	STD	VAR	MATERIAL CODE	A	UNIT WEIGHT	
					MATERIAL SPEC.	C		
BHARAT HEAVY ELECTRICALS LTD HARDWAR					NAME	SIGN	DATE	NO. OF VAR
				DRN	EDC	sd/-	22.08.95	
				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.			ITEM	No OF ITEMS
CODE 4133		1:1	4.160	0-150-00-01205			No. 056 05	
TITLE THREADED ROD (M20X2000)				DRAWING No. 4-150-00-01178				
TG-HW-0500-2				SHEET No. 1 No.OF SHEETS 1				

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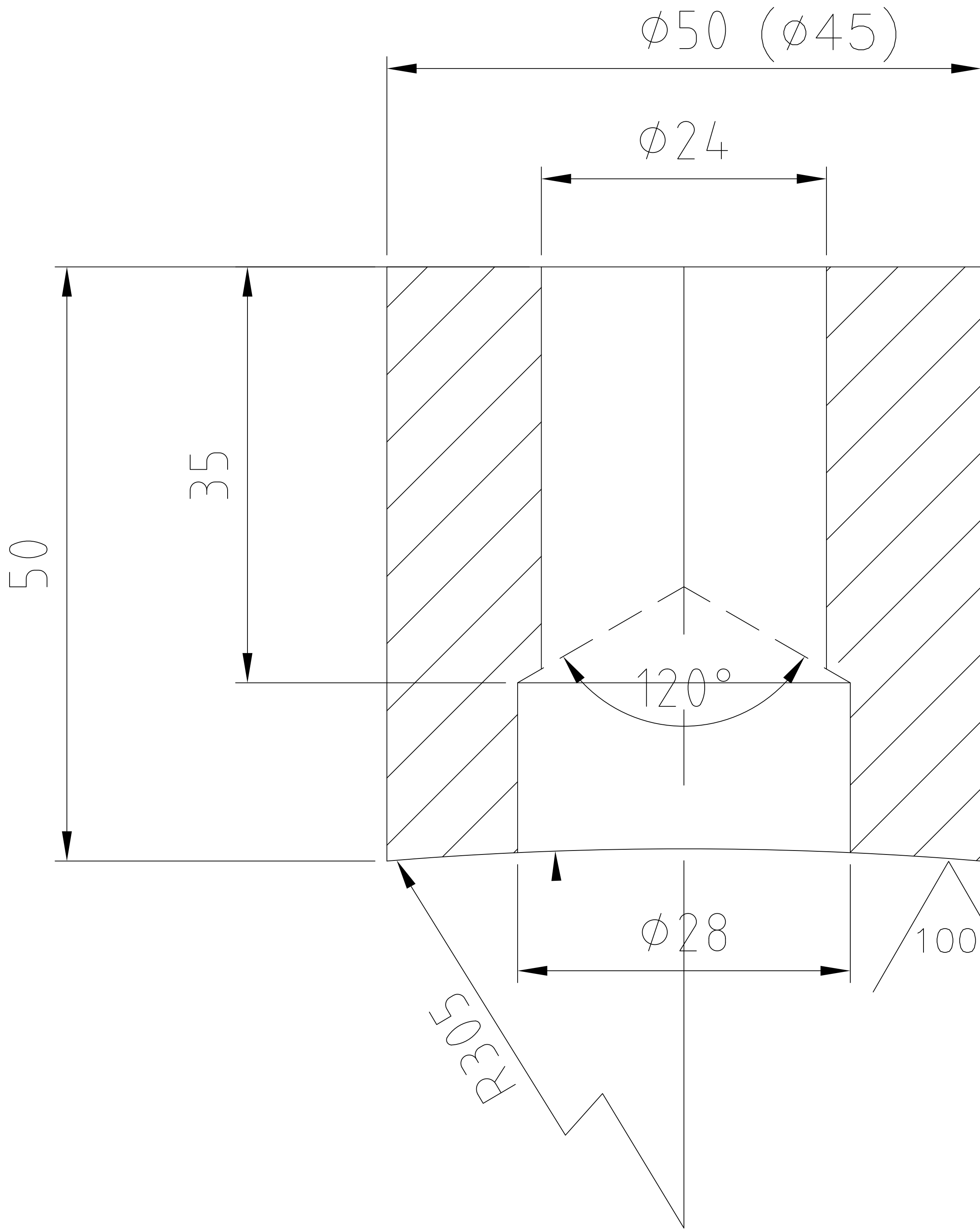
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FIRST ANGLE PROJECTION

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

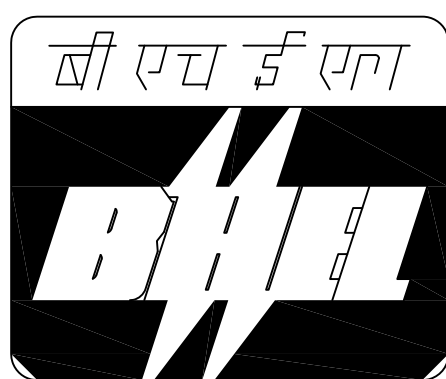
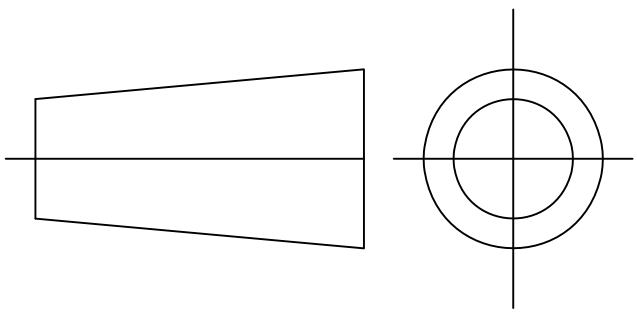
REV	DATE	ALTERED	REV	DATE	ALTERED	PNM	SD/-	CBOM No. 01500001212		STATUS OF DRG	
		CHECKED			CHECKED						
			02	19.05.07		KN	SD/-				
			CHANGE AD.NO.TGE-07-F0107					AGREED DEPT.	NAME	SIGN	DATE
								WT	RSC	SD/-	28.01.97
GRADE OF UNTOL.DIM.M/CG- V /C/ M /F.AA0230208				WELDING A/B/C/D AA0621104				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.	TECH.REQI. 1. IDENTIFICATION ACCORDING TO HW 0400.397 2. DIM. IN BRACKET ARE AFTER MACHINING.										
	SIGN & DATE	बी एच ई एल  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 ITEMS	
	CODE	4133		1:1							0.500
	TITLE					DRAWING No.					
CONNECTION					415000001182						
					SHEET No			No.OF SHEETS			

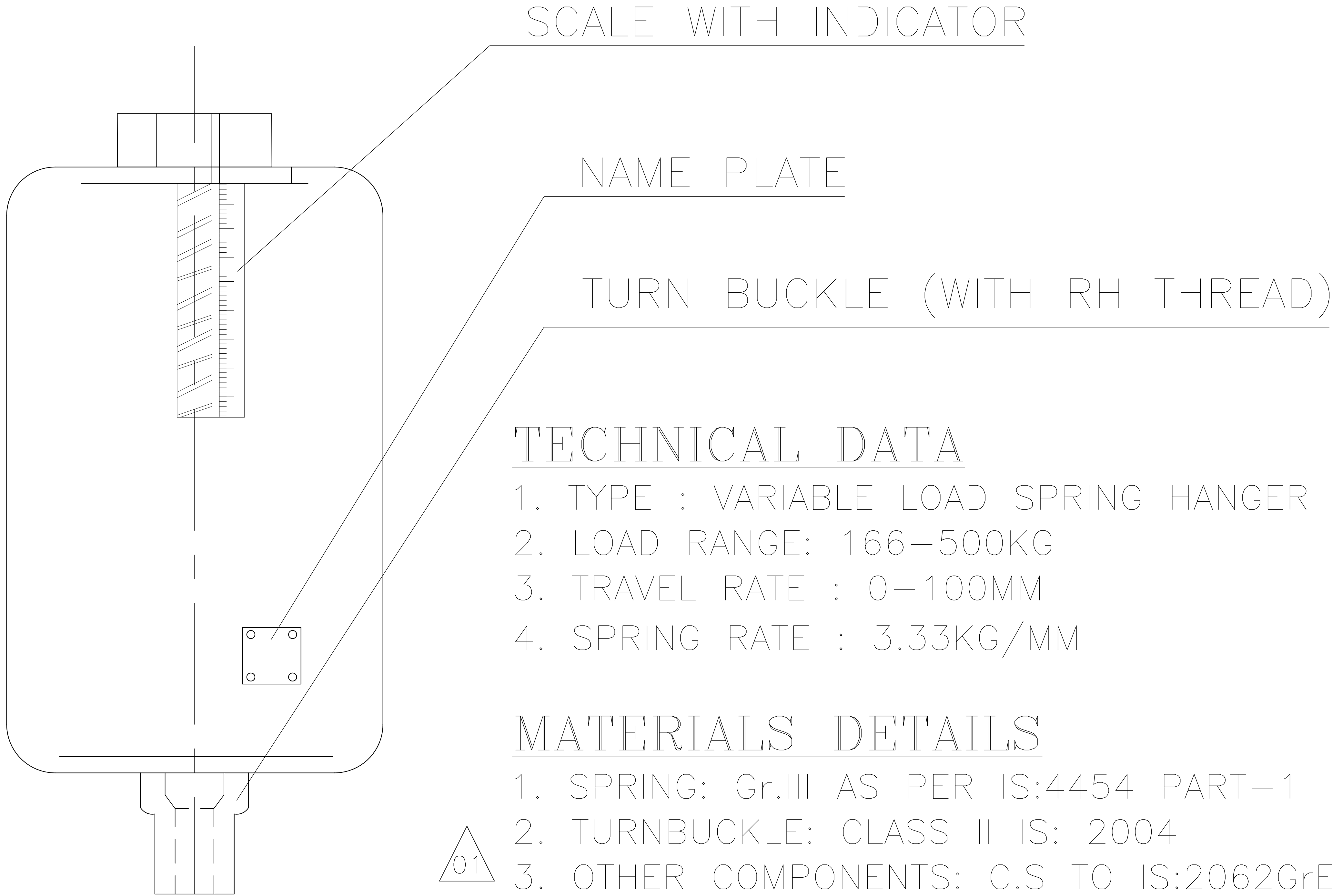
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FIRST ANGLE PROJECTION

(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

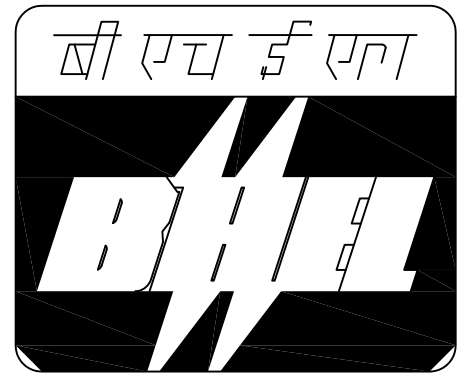
PAINTING REQUIREMENTS

- 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	

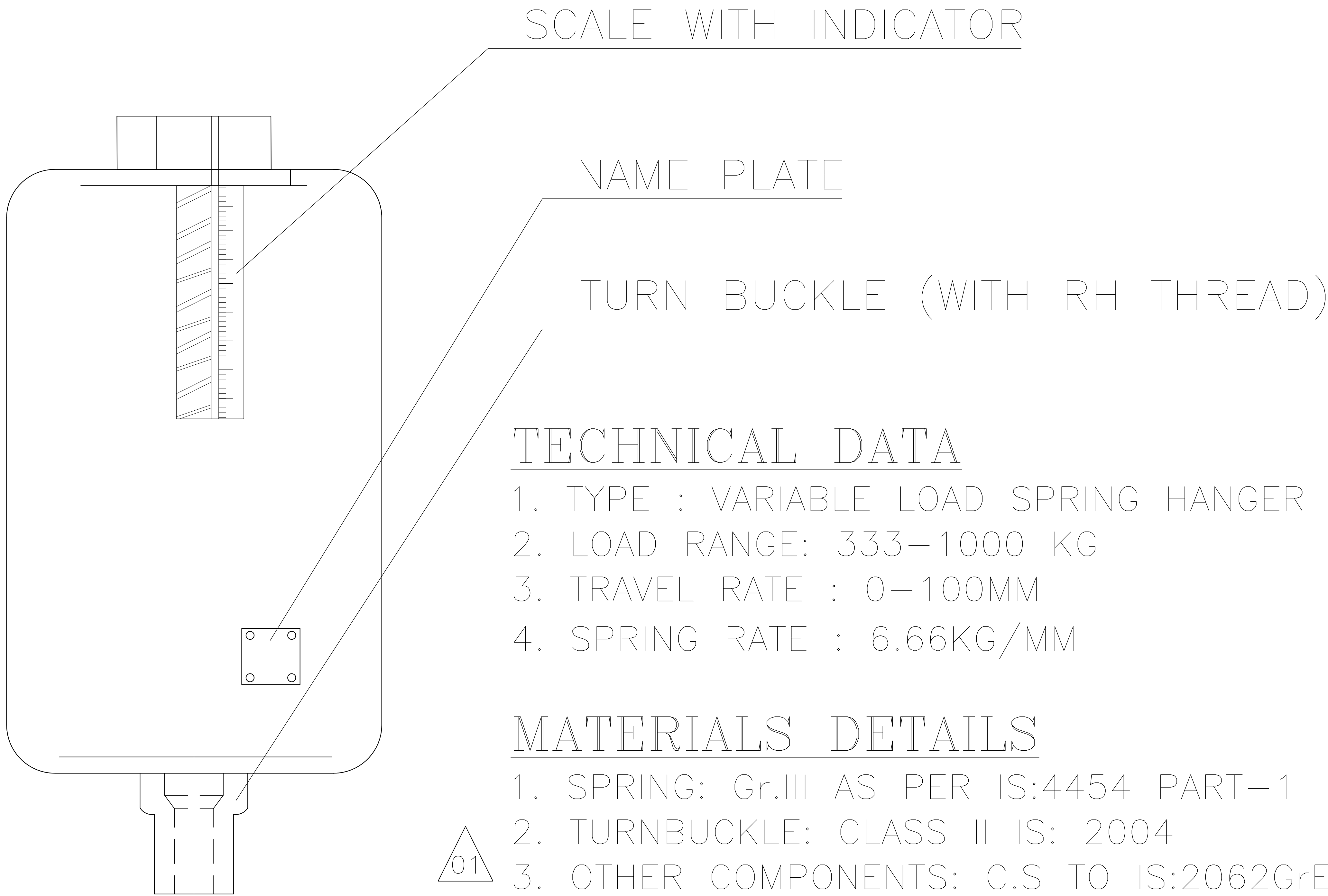
INVENTORY No.

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

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REV	DATE	ALTERED	REV	DATE	ALTERED	CBOM No.			STATUS
		CHECKED	01	06.04.18	CHECKED	—			OF DRG
			REVISION MARKED			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		



TECHNICAL DATA

- 1. TYPE : VARIABLE LOAD SPRING HANGER
- 2. LOAD RANGE: 333-1000 KG
- 3. TRAVEL RATE : 0-100MM
- 4. SPRING RATE : 6.66KG/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

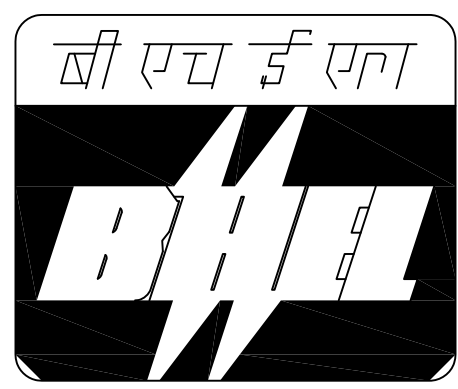
- 1. ALL PARTS EXCEPT SPRING SHALL BE COATED WITH RED OXIDE PRIMER
- 2. THE COMPLETE SPRING HANGER TO BE COATED WITH 2COATS OF DARK ADMIRALTY GREY PAINT
- 3. SPRING SURFACE TO BE MANGANESE PHOSPHATED AND OIL DIPPED

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 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.

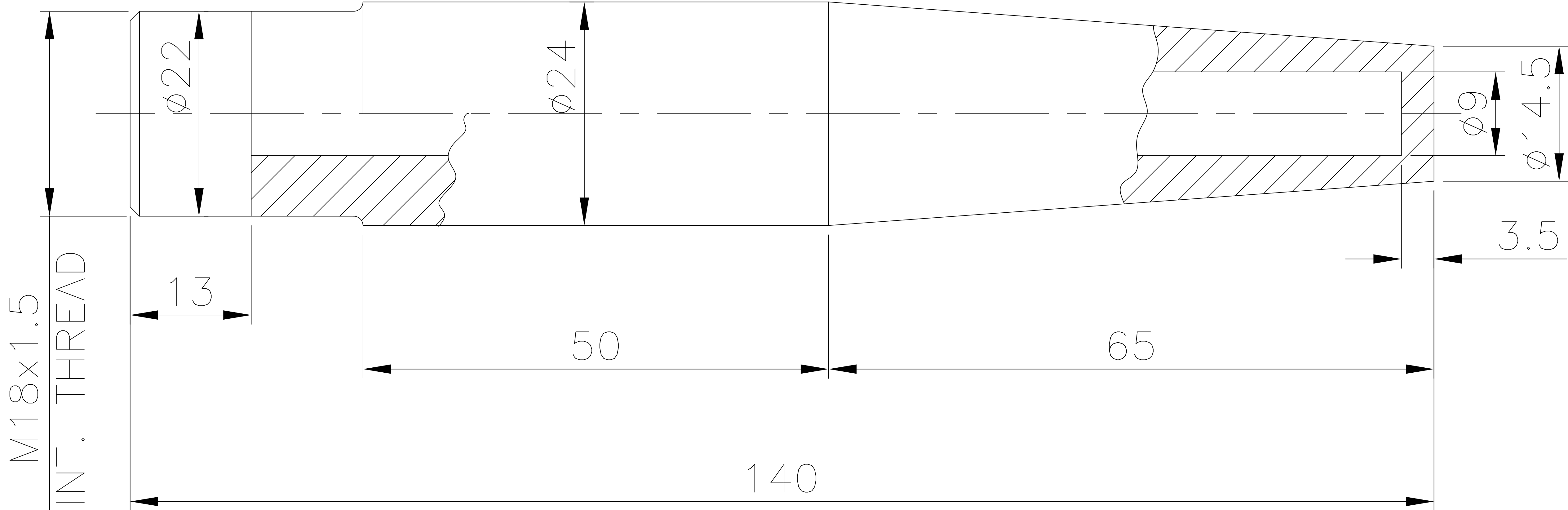
DEPT. EME		SCALE	WEIGHT(Kg)	REF.TO ASSY.DRG.	ITEM No.	No OF ITEMS
CODE 4133		N.T.S	13.5		—	
TITLE				DRAWING No.		
SPRING HANGER				4—150—00—01199		
				SHEET No. 1	No.OF SHEETS	1

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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 UNTOOL.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

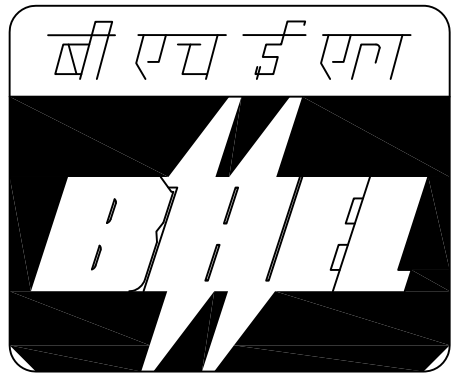
MATERIAL: AS PER BOM

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	