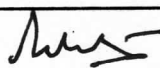


दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक		ST48015	
		PRODUCT STANDARD		मुख पृष्ठ PREFACE SHEET	
सामग्री सूची संख्या को अधिकृतित करता है SUPERSEDES INVENTORY NO	केवल आंतरिक प्रयोग हेतु प्रदायक को देने से पूर्व इस मुखपृष्ठ को निकाल दें । FOR INTERNAL USE ONLY REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS. Title :- Technical requirements for Local Instrument Racks (IR) समतुल्य मानक/सूची आदि COMPARABLE STANDARDS / CATALOGUES ETC. } : NO. सुझाए/सम्भावित प्रदायक एवं श्रेणी SUGGESTED / PROBABLE SUPPLIERS AND GRADES. } : 1) Instrumentation Ltd.-----Kota कोई अन्य जानकारी ANY OTHER INFORMATIONS } : NONE				
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में कोई भी सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में होना चाहिए ही न किया जाए ।					
सामग्री सूची संख्या INVENTORY NO P-6398	दिनांक/दिनांक SIGN & DATE 14/10/10	रवीकृति APPROVED :  K.B. Batra HOD-CIE			
REV.NO. 01	Dt. 29.10.2014	निर्माण PREPARED : CIE	जारी ISSUED : TSX	दिनांक DATE : 01.07.10	GR No 8.10

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक		ST 48015		
		PRODUCT STANDARD		पृष्ठ 13 का 2 Page 2 of 13		
सामग्री सूची संख्या को अधिकारित करता है	SUPERSEDES INVENTORY NO.	8. <u>Impulse Piping / Tubing</u> a. Instrument racks shall be complete with impulse tubing piping, valves from enclosure bulkhead connection to all instruments and necessary drain / blow down connections. The type, sizes, material and pressure class of pipes/tubes, fittings, valves etc. shall be suitable for the intended applications as per the Schemes / Tagging list of Instrument, provided by BHEL. b. Bulkhead connection shall be used when instrument piping/ tubing enters the enclosure through Bulkhead plate. Typically through Bulk heads, Impulse pipe entry shall be through top side of the rack for Steam and Liquid services. c. All Instrument Blow down lines, except those measuring vacuum shall be connected to a two-inch header, which is extended through one end of the rack and turned downward for directing the blow down into drain. d. In the drain /common header, provision of spare drain connections shall be made for adding additional instruments in future as shown in the rack drgs. These connections shall be plugged suitably to avoid any flash over near by the racks. e. Instrument piping and tubing shall be hydrostatically tested at one and one-half times the maximum system pressure for that instrument except for low pressure and vacuum measurement the test pressure will be 8 Kg / Cm2.				
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	दिनांक एवं हस्ताक्षर SIGN & DATE 5/11/17	दिनांक एवं हस्ताक्षर SIGN & DATE 24/7/10				
सामग्री सूची संख्या INVENTORY NO. P-6398	REV. 01	निर्माणकर्ता WORKED BY G.GUPTA	जांचकर्ता CHECKED BY V. KUMAR	01/07/10	01/07/10	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD		ST 48015	
				पृष्ठ 13 का 3 Page 3 of 13	
सामग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.	II. General Requirement applicable to Transmitter Racks : 1. Surface preparation And Painting a. All sheet metal / exterior steel surfaces shall rust free and scale free and all other residue during fabrication operation such as Oil, grease and salts etc. shall be removed by one or more solvent cleaning methods. Epoxy primer surface shall be applied to all exterior and interior surfaces. Epoxy paint shall be applied to all surfaces and the paint thickness shall be 100 to 150 microns. The finish colours for exterior and interior surfaces shall conform to the shades mentioned in scope of supply. b. All impulse lines starting from bulk head upto drain header including drain valves shall be finished with one coat of epoxy primer. 2. Grounding a. Racks shall be provided with ground points which shall have two (2) welded GI bolts and nuts at each end of frame. 3. Name plate / Label. Service details and Tag no. shall be engraved on a nameplate or label for each of the instrument. These Nameplates or Labels shall be of white non-hygroscopic material with engraved black lettering. This shall be fixed on to the Impulse Pipe closer to the instrument inside the Rack.			
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।					
दिनांक SIGN & DATE	दिनांक SIGN & DATE				
सामग्री सूची संख्या INVENTORY NO.	REV. 01	निर्माणकर्ता WORKED BY	G. GUPTA		01/07/10
P-6398		जांचकर्ता CHECKED BY	V. KUMAR		01/07/10

57/14

	उत्पाद मानक PRODUCT STANDARD		ST 48015	
			पृष्ठ 13 का 4 Page 4 of 13	
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या को INVENTORY NO.	4. <u>Wiring Details</u> a. Interconnecting wiring shall be provided between all electrical devices mounted in the panels and between the devices and terminal blocks if the devices are to be connected to equipment outside the panels by cabling. All interior wiring shall be installed neatly and carefully and shall be terminated at suitable terminal blocks in the Junction box. Sufficient clearance shall be provided for all control and instrumentation leads. b. Each wire shall be identified at both ends with wire designations as per approved wiring diagram. Interlocking type ferrules shall be used for identification c. All wire termination shall be made with insulated sleeve and cage clamp type terminals. d. All signal wiring shall be done with 2 or 4 pair, 0.5 sq. mm annealed copper, pair twisted overall & shielded, voltage grade 650 V, unarmored FRLS PVC sheathed cable and 4 pair, 0.5 sq. mm for PS/DPS. For power supply application, 1100V cable shall be used. e. Wires shall be dressed and run in trays or troughs with clamp-on type covers. Wiring may be neatly bunched in-groups by non-metallic cleats or bands. Shield wires shall be terminated on separate terminal blocks. f. Internal wiring shall follow distinct color coding to segregate different voltage levels viz. 24V DC & 230V AC g. For DPT/ Pressure Transmitter, two wires and for Pressure Switch six wires shall be terminated in the Junction Boxes (JB) of each Rack.		
सामग्री सूची संख्या को INVENTORY NO.		5. <u>Fuse Blocks</u> a) Fuse blocks shall be modular type with Bakelite frame and reinforced retaining clips.		
दिनांक एवं हस्ताक्षर SIGN & DATE		6. <u>Terminal Blocks</u> (a) Terminal blocks shall be DIN rail mounted and shall have Cage clamp type connection which shall be maintained for all panels uniformly. b) The terminal blocks shall be suitable for connecting 0.5mm²/2.5 mm² conductor of suitable voltage grade as specified in clause 4(d). c) Terminal blocks shall be mounted vertically with adequate spacing between rows for routing the cable and to allow adequate free workspace for termination and removal of wires.		
दिनांक एवं हस्ताक्षर SIGN & DATE		निर्माणकर्ता WORKED BY		
दिनांक एवं हस्ताक्षर SIGN & DATE		जांचकर्ता CHECKED BY		
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	उत्पाद मानक PRODUCT STANDARD		ST 48015 पृष्ठ 13 का 5 Page 5 of 13	
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या INVENTORY NO.	d) Terminal blocks shall be provided with white marking strips/self adhesive marker cards. e) 10 nos. of spare unused terminals shall be provided on each terminal blocks for circuit modifications and for termination of all conductors in a multi conductor control cables. f) Terminal blocks for termination of electrical power supply shall be type WAGO / PHOENIX make of suitable size with marking strips. g) The last terminal in a rail-mounted assembly shall be closed with an end plate and end bracket.		
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		III. Documents to be Submitted by Vendor for Approval : 1. OGA for Instrument Racks. 2. Layout of Components in each of Instrument Rack. 3. Electrical diagrams for each Instrument Rack. 4. Component datasheets 5. Quality plan including Welding Procedure specification and Welder Procedure qualification Record. 6. The quality plan shall include Visual inspection, GA BOM/Layout features verification, Dimensions, Paint shade, thickness measurement, Alignment of sections, component ratings, Wiring, IR, HV, review of TC for instruments / Devices, Accessibility of TBs / Devices, Illumination, Tubing and Degree of protection (Review of type test certificate)		
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।		IV. Specific requirements 1. Where grouping is not provided for instruments, same shall be indicated during detailed engineering. 2. Two nos. of drain valves shall be provided where operating pressure is more than 40Kg/cm2. 3. Spare drain connections at drain / common header as per clause I:8(d), shall be plugged with removable metallic caps. This should be ensured before dispatch of Racks. 4. Drain/common header and other open ended points of valves/pipes etc. shall be plugged with removable rubber/plastic caps. This should be ensured before dispatch of Racks.		
दिनांक एवं हस्ताक्षर SIGN & DATE		V. Testing requirements Testing shall be carried out as per check list for Instrument valve, Impulse & tubes, Socket weld fittings and SS compression fittings.		
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या INVENTORY NO.	REV.01	निर्माणकर्ता WORKED BY	जांचकर्ता CHECKED BY
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या INVENTORY NO.	REV.01	G.GUPTA	V. KUMAR
दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या INVENTORY NO.	REV.01	01/07/10	01/07/10

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक 		ST 48015	
सामग्री सूची संख्या को अधिकृत करता है SUPERSEDES INVENTORY NO.		VI. <u>Packing and conservation:</u> All the items shall be conserved and packed to avoid damage during shipment and handling.		पृष्ठ 13 का 6 Page 6 of 13	
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		VII. <u>Compliance with National/International Standard :</u> No Indian standard exists, assistance taken from BHEL-EDN-Bangalore technical specification.			
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 ।		VIII. <u>Cross-referred Standards:</u> ASTM: A3328, IS:2147 & ANSI: B16.11.			
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57/11/14 P-6398		14.7.10		14.7.10	
REV. 01				निर्माणकर्ता WORKED BY	
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				जांचकर्ता CHECKED BY	
				V. KUMAR	
				01/07/10	
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दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद मानक PRODUCT STANDARD	ST 48015 पृष्ठ 13 का 7 Page 7 of 13						
सामग्री सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY NO.	CHECK LIST FOR INSTRUMENT VALVES								
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		M	C	N	D *					
		1	DIMENSIONS, TYPE	REFER NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS/DRG.	P	W	V		* FOR BARSTOCK ITEMS LABR. TC TO BE FURNISHED NO LEAKAGE TO BE OBSERVED FOR 4 & 5
		2	MATERIAL FOR BODY AND STEM	ONE SAMPLE/	AS PER ASTM STD.* (FOR FORGING)/DRG.	P	V	V		
		2.1	CHEMICAL	HEAT/						
		2.2	PHYSICAL	LOT						
		3	STELITING OF SEAT	↑	MANUFACTURE'S STD.	P	V	V		
		4	HYDRAULIC TESTING BODY AND SEAT	REFER NOTE-1 BELOW	1.5 TIMES RATED PRESSURE	P	W	V		
		5	AIR LEAKAGE TEST	↓	AT 7 Kg/cm ²	P	W	V		
		6	IDENTIFICATION & RATINGS TO BE PUNCHED MARKED	REFER NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS/DRG.	P	W	V		
LEGEND : * D: RECORDS, IDENTIFIED WITH ' right mark ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY N: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION										
NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW : 100% - BY MANUFACTURER 10% - BY CONTRACTOR NIL - BY M/S CUSTOMER 2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME. 3) UT REQUIRED IF RAW MATERIAL/ FORGING SECTION IS 50mm AND ABOVE 4) FORGINGS SHALL BE NORMALISED BEFORE MACHINING										
दिनांक एवं हस्ताक्षर SIGN & DATE	दिनांक एवं हस्ताक्षर SIGN & DATE	सामग्री सूची संख्या INVENTORY NO.	REV. 01	निर्माणकर्ता WORKED BY	G.GUPTA	01/07/10	जांचकर्ता CHECKED BY	V. KUMAR	01/07/10	

दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद मानक PRODUCT STANDARD	ST 48015 पृष्ठ 13 का 8 Page 8 of 13
सामग्री सूची संख्या को SUPERSEDES INVENTORY NO.		CHECK LIST FOR IMPULSE PIPES AND TUBES		
LEGEND : * D: RECORDS, IDENTIFIED WITH ' right mark ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY N: END USER "P" PERFORM "W" WITNESS "V" VERIFICATION				
NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW: 100% - BY MANUFACTURER NIL - BY M/S BHEL NIL - BY M/S END USER 2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE UNDER TEST,INSPECTING ENGINEER SHALL CHECK THE SAME. 3) ## APPLICABLE FOR TUBES ONLY 4) ** APPLICABLE FOR CS PIPES ONLY 5) WHEN,MATERIAL CORRELATION IS NOT POSSIBLE. MATERIAL SAMPLES ARE TO BE TESTED AT THIRD PARTY LAB & TEST CERTIFICATES ARE TO BE SUBMITTED FOR BHEL REVIEW CHP				
सामग्री सूची संख्या INVENTORY NO. P-6398	दिनांक एवं हस्ताक्षर SIGN & DATE 14.7.10	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 ।	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.	

SL NO	TESTS/CHECKS	QUANTUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS.	AGENCY**				REMARKS
				M	C	N	D *	
1	CHECK FOR DIMENSION, GRADE, SURFACE-DEFECTS	SEE NOTE: BELOW	APPROVED DATA SHEET AND CORRESPONDING ASTM STDS FOR GRADE OF MATERIAL	P	V	V	✓	↑ MANUFACTURER TO PROVIDE TEST CERT. AS PER RELEVANT ASTM STDS. MENTIONED IN SPECS ↓
2	CHEMICAL PROPERTIES AND PHY. PROPERTIES AS PER RELEVANT ASTM. (GRADE SHALL BE AS PER APPROVED DATA SHEET)	FOR LOT	↑	P	V	V	✓	
3	FLATTENING TEST.			P	V	V	✓	
4	FLARING TEST	##	-DO- ↓	P	V	V	✓	
5	BENDING TEST.	**		P	V	V	✓	
6	HYDRAULIC TEST OR EDDY CURRENT TEST			P	V	V	✓	
7	HARDNESS CHECK ✓	##		P	V	V	✓	

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

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P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

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P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

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P-6398	14.7.10		

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P-6398	14.7.10		

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P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
P-6398	14.7.10		

सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE	स्वत्वधिकार एवं गोपनीय	
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सामग्री सूची संख्या INVENTORY NO.	दिनांक एवं हस्ताक्षर SIGN & DATE
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दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 48015 पृष्ठ 13 का 9 Page 9 of 13						
सामग्री सूची संख्या INVENTORY NO. सामग्री सूची संख्या को अधिकृतित करता है	CHECK LIST FOR SOCKET WELD FITTING								
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.	SL NO.	TESTS/CHECKS	QUATUM OF CHECK	REFERENCE DOC. ACCEPTANCE NORMS	AGENCY**				REMARKS
	1	RAW MATERIAL IDENTIFICATION CHEMICAL COMPOSITION	ONE PER SECTION	APPROVED SPEC DATA SHEETS	P	V	V	✓	LABORATORY TEST REPORT FOR 10
	2	FORGING		AS PER ASTM STD	P	V	V	✓	
	2.1	CHEMICAL TEST	SEE COI						ONE PER CAST
	2.2	MECHANICAL TEST	REMARKS						PER HEAT FOR
	2.3	DIMENSINOL CHECK	100°						2.1&2.2
	2.4	NDT(BY U T)	FOR CL 9000 ONLY	AS PER ASTM A338					NO DEFECT TO BE OBSERVED IN 2.4
	3	MACHINING	100°		P	V	V	✓	
	4	HYDRAULIC PRESSURE TESTING OF FITTING (ALSO SEE NOTE-2 BELOW)	5°	AS PER RATINGS	P	V	V	✓	
	5	FINAL MACHINING OF TEEs	10°	AS PER ANSI B16.11	P	V	V		
	6	DIMENSIONAL CHEK OF ALL FITTINGS	10°	AS PER ANSI B16.11	P	V	V		
	LEGEND: *D: RECORDS IDENTIFIED WITH 'right marked 'SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION **M: MANUFACTURER / SUB CONTRACTOR . C: CONTRACTOR NOMINATED INSP AGENCY N : END USER "P" PERFORM "W" WITNESS "V" VERIFICATION								
	NOTE : 1) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INPECTING ENGINEER SHALL CHECK THE SAME. 2) HYDRAULIC PRESSURE TEST SHALL BE CARRIED ON UNDRILLED BRANCH-TEE 3) HYDRAULIC PRESSURE TEST ON FITTINGS QUANTUM CHECK TWO NOS OF EACH TYPE ON BY CONTRACTOR NO LEAKAGE TO BE OBSERVED 4) MARKING OF RATING ON FITTING BY PUNCHING SHALL BE CARRIED OUT BY MANUFACTURER 5) FORGINGS SHALL BE NORMALLISED BEFORE MACHINING RECORDS TO BE MAINTAINED								
	सामग्री सूची संख्या INVENTORY NO. दिनांक एवं हस्ताक्षर SIGN & DATE	REV. 01				निर्माणकर्ता WORKED BY G.GUPTA		01/07/10	
	सामग्री सूची संख्या INVENTORY NO. दिनांक एवं हस्ताक्षर SIGN & DATE					जांचकर्ता CHECKED BY V. KUMAR		01/07/10	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	ST 48015
		पृष्ठ 13 का 10 Page 10 of 13	
सामग्री सूची संख्या INVENTORY NO.	CHECK LIST FOR STAINLESS STEEL COMPRESSION FITTINGS		
सामग्री सूची संख्या को अधिकृत करता है 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.	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.		
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।	LEGEND : * D: RECORDS, IDENTIFIED WITH 'right marked ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION ** M: MANUFACTURER/SUB CONTRACTOR, C:CONTRACTOR/NOMINATED INSP.AGENCY N:CUSTOMER "P" PERFORM "W" WITNESS "V" VERIFICATION		
NOTE : 1) QUANTUM OF CHECK SHALL BE AS BELOW : 100% - BY MANUFACTURER NIL -BY M/S BHEL NIL -BY CUSTOMER 2) MANUFACTURER TO MAINTAIN CALIBRATED INSTRUMENT HAVING BETTER ACCURACY THAN THE ITEM UNDER TEST. INSPECTING ENGINEER SHALL CHECK THE SAME.			
दिनांक एवं हस्ताक्षर SIGN & DATE 14/7/10	5/7/10		
सामग्री सूची संख्या INVENTORY NO. P-6398	REV. 01	निर्माणकर्ता WORKED BY G.GUPTA	जांचकर्ता CHECKED BY V. KUMAR
			
		01/07/10	01/07/10

सामग्री सूची संख्या INVENTORY NO. P-6398	हस्ताक्षर एवं दिनांक SIGN & DATE 14.7.10	स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	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	सामग्री सूची संख्या को अधिकृत करता है SUPERSEDES INVENTORY NO.	उत्पाद मानक PRODUCT STANDARD	<table> <tr> <th colspan="3">CHARGING ELEMENTS</th></tr> <tr> <th>IN-TYPE</th><th>WIDTH</th><th>HEIGHT</th></tr> <tr> <td>TYPE-A</td><td>1000</td><td>650</td></tr> <tr> <td>TYPE-B</td><td>1000</td><td>850</td></tr> </table> NOTES:- 1. PAINT :- EXTERIOR & INTERIOR - HAL 9002 (EPOXY BASED) SEMI-GLOSSY FINISH, AIR DRYING TYPE & THICKNESS MORE THAN 100 MICRONS. 2. JUNCTION BOX SIZE 1100mm DO FOR IN TYPE-A AND 900mm DO FOR IN TYPE-B <table> <tr> <th>S.NO.</th><th>DESCRIPTION</th><th>QTY</th><th>REMARKS</th></tr> <tr> <td>20</td><td>CABLE TRAY</td><td>8</td><td></td></tr> <tr> <td>22</td><td>MOUNTING ANGLE 40x40x3mm</td><td>8</td><td></td></tr> <tr> <td>21</td><td>MS STRIP 80x3, LENGTH, 800, 200</td><td>4/2</td><td></td></tr> <tr> <td>23</td><td>BRACKET FOR PANEL METER</td><td>1</td><td></td></tr> <tr> <td>19</td><td>SOLE HEAD PLATE 80x80 TRUCK</td><td>1</td><td></td></tr> <tr> <td>18</td><td>CONNECTION PLATE 5 TRUCK</td><td>2</td><td></td></tr> <tr> <td>17</td><td>STANDARD PAD 60x60mm</td><td>4/2</td><td></td></tr> <tr> <td>16</td><td>CHANNEL</td><td>1</td><td></td></tr> <tr> <td>15</td><td>CLEAR AT HEAD OF THE CHANNEL</td><td>1</td><td></td></tr> <tr> <td>14</td><td>COVER PLATE (MADE FROM BRIST)</td><td>2</td><td></td></tr> <tr> <td>13</td><td></td><td></td><td></td></tr> <tr> <td>12</td><td>CL. HEAD SCREW M10x18 WITH NUT</td><td>4/2</td><td></td></tr> <tr> <td>11</td><td>BRUSH FOR PANEL METER</td><td>8</td><td></td></tr> <tr> <td>10</td><td>TOOL LIGHT WITH THERMIST</td><td>1/2</td><td></td></tr> <tr> <td>9</td><td>CONDUIT</td><td>2</td><td></td></tr> <tr> <td>8</td><td>CLEAR AT HEAD OF THE CHANNEL</td><td>1</td><td></td></tr> <tr> <td>7</td><td>CLEAR AT FRONT (MADE FROM BRIST)</td><td>2</td><td></td></tr> <tr> <td>6</td><td>CONDUIT MOUNTING PLATE MADE FROM BRIST 1 TRUCK</td><td>1</td><td></td></tr> <tr> <td>5</td><td>CLEAR AT REAR (MADE FROM BRIST)</td><td>4</td><td></td></tr> <tr> <td>4</td><td>PLATE FROM BRIST 40x40x10 TRUCK</td><td>2</td><td></td></tr> <tr> <td>3</td><td>JUNCTION BOX, 80x80 TRUCK CIRC. BRIST</td><td>1</td><td></td></tr> <tr> <td>2</td><td>CARPET FOR TRANSMITTER BOLT, 80x80 TRUCK</td><td>1</td><td></td></tr> <tr> <td>1</td><td>CHANNEL 100x100mm, Length 1000mm</td><td>2</td><td></td></tr> </table>	CHARGING ELEMENTS			IN-TYPE	WIDTH	HEIGHT	TYPE-A	1000	650	TYPE-B	1000	850	S.NO.	DESCRIPTION	QTY	REMARKS	20	CABLE TRAY	8		22	MOUNTING ANGLE 40x40x3mm	8		21	MS STRIP 80x3, LENGTH, 800, 200	4/2		23	BRACKET FOR PANEL METER	1		19	SOLE HEAD PLATE 80x80 TRUCK	1		18	CONNECTION PLATE 5 TRUCK	2		17	STANDARD PAD 60x60mm	4/2		16	CHANNEL	1		15	CLEAR AT HEAD OF THE CHANNEL	1		14	COVER PLATE (MADE FROM BRIST)	2		13				12	CL. HEAD SCREW M10x18 WITH NUT	4/2		11	BRUSH FOR PANEL METER	8		10	TOOL LIGHT WITH THERMIST	1/2		9	CONDUIT	2		8	CLEAR AT HEAD OF THE CHANNEL	1		7	CLEAR AT FRONT (MADE FROM BRIST)	2		6	CONDUIT MOUNTING PLATE MADE FROM BRIST 1 TRUCK	1		5	CLEAR AT REAR (MADE FROM BRIST)	4		4	PLATE FROM BRIST 40x40x10 TRUCK	2		3	JUNCTION BOX, 80x80 TRUCK CIRC. BRIST	1		2	CARPET FOR TRANSMITTER BOLT, 80x80 TRUCK	1		1	CHANNEL 100x100mm, Length 1000mm	2		Fig-2- Typical Fabrication drg for Instrument Rack (Type A & B)
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स्वत्वधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रलेख एवं आगलख 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.

- NOTES:-**
1. CONTINUOUS WELDING REQD. ALL WHERE WELDING IS APPLICABLE.
 2. BOX TO BE MANUFACTURED AS PER IP-55 DEGREE OF PROTECTION IS:2147.
 3. CABLE ENTRY FROM TOP AND BOTTOM.
 4. STRIPPING IN JUNCTION BOX SHALL BE DONE BY SHOWN IN THE DRG.
 5. WITH IN TOLERANCE OF $\pm 10\%$ OF INDICATED DIMENSIONS.
 6. FOR TYPE A JB HEIGHT 1100 & TYPE B JB HEIGHT 800mm.
 7. PAINT:- EXT & INT.- EPOXY BASED RAL 9002
 8. JB'S DOOR (OUT SIDE) PAINT SHALL BE EPOXY BASED RAL-5012 AIR DRYING.
 9. TOGGLE SWITCH PROVIDED FOR JB.
 10. JUNCTION BOX SHALL BE MADE OF 2mm CRCA SHEET.

S.NO.	DESCRIPTION	QTY	REMARKS
21	BUSH	3	
20	RUBBER GASKET	A/B	
19	CH.SCR. M4x12 WITH NUT & WASHER	4	
18	CH.SCR. M4x16 (PS-47)	20	
17	RUBBER GASKET 3x16	A/B	
16	STRIP FOR CABLE ROUTING 80x3	2	TYPE-A=700 TYPE-B=400
15	END PLATE FOR TERMINAL BLOCK	2	
14	TERMINAL BLOCK	A/B	
13	SIDE CLAMP	2	
12	MOUNTING CHANNEL	1	
11	KNOB	1	
10		2	
9	HINGE ASSEMBLY	3	
8	KNURLED SCREW	3	
7	BUSH FOR TERMINAL	4	
6	BUSH FOR BARTING	2	
5	POWER RECP. PLATE FOR JB	1	
4	BRACKET FOR MOUNTING PLATE	4	
3	TOP & BOTTOM PLATE	1	
2	DOOR LEAF	1	
1	CASE FOR JUNCTION BOX	1	

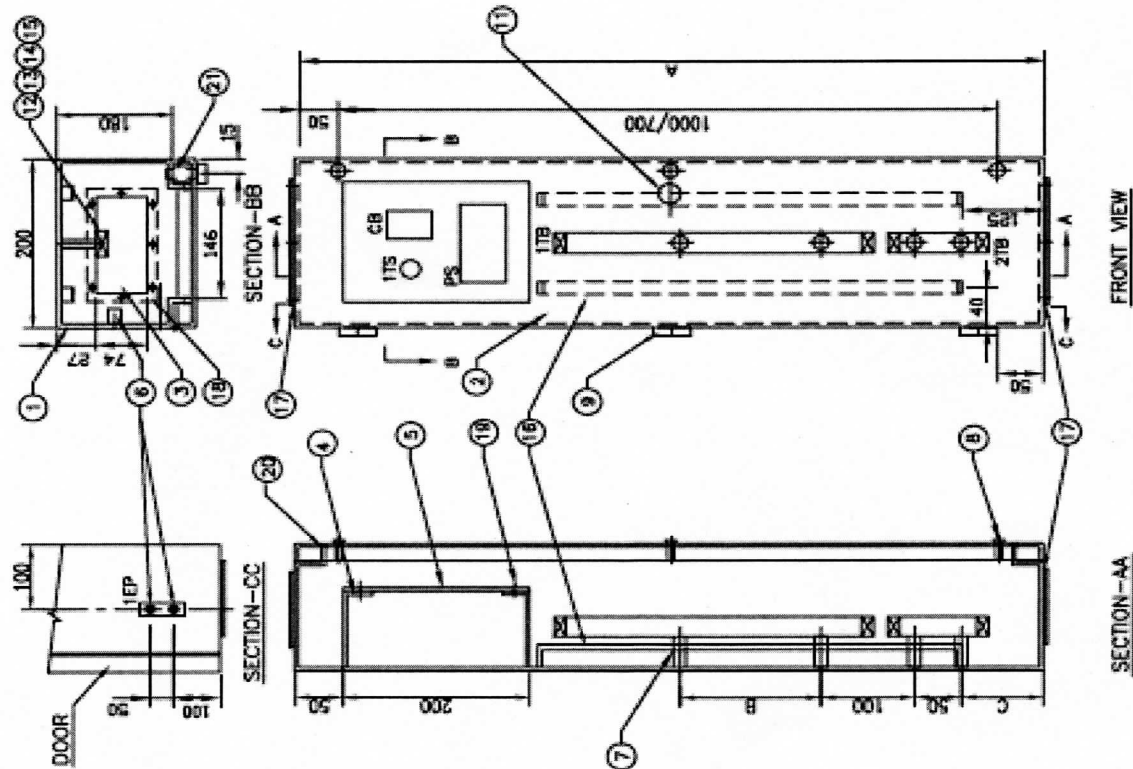


Fig.-3- Typical JB drg. for Instrument Rack (Type A & B)

VARIANTS	CHANGING ELEMENT			REMARKS
	A	B	C	
FOR TYPE-A	1100	300	175	
FOR TYPE-B	800	200	125	

REV. 01

निर्माणकर्ता
WORKED BY

G.GUPTA

01/07/10

जांचकर्ता
CHECKED BY

V. KUMAR

01/07/10

Purchase Specification For Local Instrument Racks (IR)

TYPE OF PRODUCT : TG-C&I								
NAME OF CUSTOMER / PROJECT: ENNORE (2X660MW)								
BHARAT HEAVY ELECTRICALS LTD.  HEEP-Haridwar					NAME	SIGN	DATE	NO.OF VAR.
				DRN.	SHEETAL SINGH	Sd/-	18.01.17	
				CHD.	VINOD KUMAR	Sd/-	18.01.17	
				APPD.	B.S.RANA	Sd/-	18.01.17	
DEPT. CODE.	CIE 4180		SCALE	WEIGHT(KG)	REF.TO ASSY.DRG.	ITEM NO.	NO. OF ITEMS	
TITLE: Purchase Specification for Local Instrument Racks (IRs)				CARD CODE	DOC. No. CIE-IR-D8		REV. 01	
					SHT.NO 01		NO. OF SHT. 05	

CONTENTS

SL. NO.	DESCRIPTION	REFERENCE NO /SHEET NO.
01	SCOPE OF SUPPLY	Page nos.: 3
02	INSTRUMENT SCHEDULE	4-180-00D8-006 Rev-01
03	VENDOR LIST FOR COMPONENTS	Page nos.: 4 to 5
04	MANDATORY SPARE CALCULATION	As Per Drawing no- 418130D8001
05	COMMISSIONING SPARE CALCULATION	As per Drawing No-418130D7001
06	DRAWINGS FOR IR	IR nos.- 1 TO 10
07	TECHNICAL REQUIREMENTS	ST48015 Rev 01

Scope of supply

The Scope of supply is as per Technical requirements attached with this specification. Vendor shall quote for each line item of the Table A, B & C. The unit rate shall be valid until the completion of the contracts. For this purpose vendors shall maintain MS Excel file indicating total Bill of materials and calculation of commissioning and mandatory spares.

TABLE: A

Sl. No	Description	Ref.Drg/ Doc	VA R No.	IR no.	IR Type	Qty	Unit	Material code
1	RACK FOR M.S. PRESS. INSTRUMENTS	11335363010	00	IR01	A	1	No.	W90318130300
2	RACK FOR M.S. PRESS. INSTRUMENTS	11335363010	01	IR02	A	1	No.	W90318130319
3	RACK FOR CONDENSER PRESS. INSTRUMENTS	21335460010	00	IR03	A	1	No.	W90318130165
4	RACK FOR CONDENSER PRESS. INSTRUMENTS	21335460010	01	IR04	A	1	No.	W90318130173
5	RACK FOR EXTN. & G.S. INSTRUMENTS	21335560010	00	IR05	B	1	No.	W90318130181
6	RACK FOR EXTN. & G.S. INSTRUMENTS	21335560010	01	IR06	B	1	No.	W90318130190
7	RACK FOR HRH/MS PRESS. INSTRUMENTS	21335660010	00	IR07	A	1	No.	W90318130203
8	RACK FOR HRH/MS PRESS. INSTRUMENTS	21335660010	01	IR08	B	1	No.	W90318130211
9	RACK FOR WATER INJECTION INSTRUMENTS	21336060510	00	IR09	A	1	No.	W90318130220
10	RACK FOR WATER INJECTION INSTRUMENTS	21336060510	01	IR10	A	1	No.	W90318130238
11	Commissioning spares for IR	418130D7001	-	-	-	1	SET	W99318130040
12	Mandatory Spare	418130D8001	-	-	-	1	SET	W99318130015

Note:

- The finish colours for exterior and interior surfaces of shall conform to the following shades:
 - Exterior:(FRONT,REAR & TOP) –RAL7032
 - Interior: Glossy White
- Quantity mentioned above (for Item no.s 1 to 10) is for per unit.
- Type test for Protection Class to be conducted for Junction Box in Instrument Rack of each type (As per Cl. 9.a of ST48015, Sh.2) & test report to be submitted for approval.
- Instrument grouping will be as per Instrument Rack drawings above (Table-A).
- The KKS tags of Junction Box as per Table A above shall be fixed with the Junction Box of the respective Instrument Rack.
- The drawings of Instrument Racks type A & B and Junction Box given at Sheet 11,12 & 13 of ST48015 are to be followed until specified otherwise during detailed Engineering in case of P.O.

COMPONENT VENDOR LIST

SL NO.	ITEM DESCRIPTION	RECOMMENDED VENDORS
1	Socket Weld Fitting	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		FLOWTECH, KOLKATA
		V.K.INDUSTRIES,BANGALORE
		VIKAS INDUSTRIAL PRODUCTS, NEW DELHI
		HP VALVES AND FITTINGS, CHENNAI
		PANAM ENGINEERS MUMBAI
2	Compression Fitting	AURA INC, NEW DELHI
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PARKER HANNIFIN, USA
		PRECISION ENGG INDUSTRIES, MUMBAI
		HP VALVES AND FITTINGS, CHENNAI
		SWAGELOCK, USA
		ASTEC VALVES & FITTINGS PVT LTD, THANE
		FLUIDCONTROLS,MUMBAI
		PANAM ENGINEERS, MUMBAI
3	Instrument Valves	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		BHARAT HEAVY ELECTRICALS LTD, TRICHY
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		INSTRUMENTATION LIMITED, PALGHAT
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		SHALIMAR VALVES, MUMBAI
		HYDAIR ENGG WORKS, LONAVAL
4	Valve Manifolds	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		EXCEL HYDRO-PNEUMATICS PVT LTD, MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		FLOWTECH, KOLKATA
		HP VALVES AND FITTINGS, CHENNAI
		ASTEC VALVES & FITTINGS PVT LTD,THANE
		HYDAIR ENGG WORKS, LONAVAL

Sl No	Item Description	RECOMMENDED VENDORS
5	SEAMLESS TUBE / PIPES	CHOKSI TUBE COMPANY Ltd
		RATNAMANI METALS & TUBES LTD, AHMADABAD
		TROUVAY AND CAUVIN, GULF
		BHEL TRICHY
		TPS TECHNITUBE , GERMANY
		MAHALAKSHMI SEAMLESS, MAHARASHTRA
		MANNESMAN AG GERMANY
		HEAVY METAL TUBES AHMADABAD
		JINDAL SAW PIPES
		SUMITOMO CORPORATION JAPAN
6	INSTRUMENTATION CABLES	DELTON CABLES
		RELIANCE CABLES
		CORDS CABLE
		UNIVERAL CABLES , SATNA
		DELTON CABLES , FARIDABAD
		PARAMOUNT CABLES , ALWAR
		UNIVERAL CABLES , SATNA
		RELIANCE ENGRS. ,BANGALORE
		CORDS CABLES , RAJASTHAN
		NICCO CABLE , KOLKATA
7*	JUNCTION BOX (MILD STEEL)	K.S. INSTRUMENTS , BANGALORE
		BALIGA LIGHTNING , CHENNAI
		KHODAY CONTROL SYSTEMS , BANGALORE
		MANISHA ENTERPRISES , PUNE
		ELECTRO MECHANICAL (INDIA) , KOLKATA

NOTE: *VENDOR LIST OF JUNCTION BOX (JB) APPLICABLE ONLY IF JB IS A BOUGHT OUT ITEM.

Purchase Specification For Local Instrument Racks (IR)

TYPE OF PRODUCT : TG-C&I								
NAME OF CUSTOMER / PROJECT: TUTICORIN (1X525MW)								
BHARAT HEAVY ELECTRICALS LTD.  HEEL-Haridwar				DRN.	NAME	SIGN	DATE	NO.OF VAR.
				CHD.	ASHUTOSH SRIVASTAVA	Sd/-	02.09.16	
				APPD.	SHEETAL SINGH	Sd/-	02.09.16	
DEPT.	CIE		SCALE	WEIGHT(KG)	REF.TO ASSY.DRG.		ITEM NO.	NO. OF ITEMS
CODE.	4180							
TITLE: Purchase specification for Local Instrument Racks (IRs)				CARD CODE	DOC. No. CIE-IR-E6			REV. 00
					SHT.NO 01		NO. OF SHT. 05	

CONTENTS

SL. NO.	DESCRIPTION	REFERENCE NO /SHEET NO.
01	SCOPE OF SUPPLY	Page nos.: 3
02	INSTRUMENT SCHEDULE	4-180-00D5-006
03	VENDOR LIST FOR COMPONENTS	Page nos.: 4 to 5
04	COMMISSIONING SPARES	As Per Drawing no. 418130D5001
05	DRAWINGS FOR IR	IR nos.- 1 TO 13
06	TECHNICAL REQUIREMENTS	ST48015

Scope of supply

The Scope of supply is as per Technical requirements attached with this specification. Vendor shall quote for each line item of the Table A&B. The unit rate shall be valid until the completion of the contracts. For this purpose vendors shall maintain MS Excel file indicating total Bill of materials and calculation of commissioning spares.

TABLE: A

Sl.N o.	Description	Ref.Drg/ Doc	VAR No.	IR no.	IR Type	Qty	Material code
1	RACK FOR M.S.PRESSURE INSTRUMENTS	11335353010	00	IR01	A	1	W90318130025
2	RACK FOR CONDENSER. INSTRUMENTS	11335453010	00	IR02	A	1	W90318130033
3	RACK FOR EXTN. LINES & GLAND SEAL INSTRUMENTS	11335553010	00	IR03	B	1	W90318130041
4	RACK FOR EXTN. LINES & GLAND SEAL INSTRUMENTS	11335553010	01	IR04	B	1	W90318130050
5	RACK FOR HRH / M.S. PRESSURE INSTRUMENTS	11335653010	00	IR05	A	1	W90318130068
6	RACK FOR CONTROL OIL PRESSURE INSTRUMENTS	11335753010	00	IR06	A	1	W90318130076
7	RACK FOR CONTROL OIL PRESSURE INSTRUMENTS	11335753010	01	IR07	A	1	W90318130084
8	RACK FOR CONTROL OIL PRESSURE INSTRUMENTS	11335753010	02	IR08	A	1	W90318130092
9	RACK FOR LUBE OIL PRESSURE INSTRUMENTS	11335953010	00	IR09	A	1	W90318130106
10	RACK FOR LUBE OIL PRESSURE INSTRUMENTS	11335953010	01	IR10	A	1	W90318130114
11	RACK FOR LUBE OIL PRESSURE INSTRUMENTS	11335953010	02	IR11	A	1	W90318130122
12	RACK FOR FRF INSTRUMENTS	11335253010	00	IR12	A	1	W90318130017
13	RACK FOR WATER INJECTION INSTRUMENTS	11336065510	00	IR13	A	1	W90318130386
14	Commissioning spares for IR	418130D5001	-	-	-	1 SET	W99318130058

Note:

- The finish colours for exterior and interior surfaces of shall conform to the following shades:
EXTERNAL (FRONT , REAR & TOP)- 2 Coats of SIEMENS Grey RAL 7032 with 2 Coats of Synthetic Enamel paint
INTERNAL-Brilliant White
Final colour will be decided during detailed engineering.
- Quantity mentioned above is for per unit.
- Type test for Protection Class to be conducted for Junction Box in Instrument Rack of each type (As per Cl. 9.a of ST48015, Sh.2) & test report to be submitted for approval.
- Instrument grouping will be as per Instrument Rack drawings above (Table-A).
- A blank tag plate for KKS tags of Junction Box for each Instrument Rack as per Table A above shall be fixed with the Junction Box of the respective Instrument Rack.
- The drawings of Instrument Racks type A & B and Junction Box given at Sheet 11,12 & 13 of ST48015 are to be followed until specified otherwise during detailed Engineering in case of P.O.

COMPONENT VENDOR LIST

SL NO.	ITEM DESCRIPTION	RECOMMENDED VENDORS
1	Socket Weld Fitting	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		FLOWTECH, KOLKATA
		V.K.INDUSTRIES,BANGALORE
		VIKAS INDUSTRIAL PRODUCTS, NEW DELHI
		HP VALVES AND FITTINGS, CHENNAI
		PANAM ENGINEERS MUMBAI
2	Compression Fitting	AURA INC, NEW DELHI
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PARKER HANNIFIN, USA
		PRECISION ENGG INDUSTRIES, MUMBAI
		HP VALVES AND FITTINGS, CHENNAI
		SWAGELOCK, USA
		ASTEC VALVES & FITTINGS PVT LTD, THANE
		FLUIDCONTROLS,MUMBAI
		PANAM ENGINEERS, MUMBAI
3	Instrument Valves	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		BHARAT HEAVY ELECTRICALS LTD, TRICHY
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		INSTRUMENTATION LIMITED, PALGHAT
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		SHALIMAR VALVES, MUMBAI
		HYDAIR ENGG WORKS, LONAVAL
4	Valve Manifolds	AURA INC, NEW DELHI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		EXCEL HYDRO-PNEUMATICS PVT LTD, MUMBAI
		METPRESS ENGINEERING WORKS, KOLKATA
		PRECISION ENGG INDUSTRIES, MUMBAI
		FLOWTECH, KOLKATA
		HP VALVES AND FITTINGS, CHENNAI
		ASTEC VALVES & FITTINGS PVT LTD,THANE
		HYDAIR ENGG WORKS, LONAVAL

Sl No	Item Description	RECOMMENDED VENDORS
5	SEAMLESS TUBE / PIPES	CHOKSI TUBE COMPANY Ltd
		RATNAMANI METALS & TUBES LTD, AHMADABAD
		TROUVAY AND CAUVIN, GULF
		BHEL TRICHY
		TPS TECHNITUBE , GERMANY
		MAHALAKSHMI SEAMLESS, MAHARASHTRA
		MANNESMAN AG GERMANY
		HEAVY METAL TUBES AHMADABAD
		JINDAL SAW PIPES
		SUMITOMO CORPORATION JAPAN
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		UNIVERAL CABLES , SATNA
		DELTON CABLES , FARIDABAD
		PARAMOUNT CABLES , ALWAR
		UNIVERAL CABLES , SATNA
		RELIANCE ENGRS. ,BANGALORE
		CORDS CABLES , RAJASTHAN
		NICCO CABLE , KOLKATA
7*	JUNCTION BOX (MILD STEEL)	K.S. INSTRUMENTS , BANGALORE
		BALIGA LIGHTNING , CHENNAI
		KHODAY CONTROL SYSTEMS , BANGALORE
		MANISHA ENTERPRISES , PUNE
		ELECTRO MECHANICAL (INDIA) , KOLKATA

NOTE: *VENDOR LIST OF JUNCTION BOX (JB) APPLICABLE ONLY IF JB IS A BOUGHT OUT ITEM.