

Quality Assurance (Mechanical)

WS: UDAN: AC: 521
Dt. 02-08-2022

Project: UDANGUDI (2X660 MW)

Item Name	Indent No	Indent Dt.	PGMA	Technical Specification
Supply, E& C and Mandatory spares for Air conditioning package.	RWT21152	20.06.2022	WT305	ROS: 4280, Rev: 00.
	RWT21153	20.06.2022	WT997	
	RWT21154	20.06.2022	WT305	

1. All the items shall be inspected at Manufacturer works as per Customer approved QP, which will be submitted to Customer after review by BHEL on receipt from successful bidder.
2. MQP shall be submitted as per attached MQP Format and in line with Typical MQP (attached herewith) / Approved datasheet and Technical Specification.
3. Arrange Vendor acceptance on our Typical QP and MQP format with vendor sign and seal.
4. Physical Inspection shall be done by Customer and BHEL/BHEL AIA at Manufacturer works.
5. Packing of items shall be as per BHEL Engg Approved Packing Drawing/Packing Specifications.
6. BHEL Authorized representatives shall have the right to witness the necessary inspection and testing of goods mentioned in the PO. The supplier shall inform BHEL in advance about the readiness of the goods for inspection and testing. Inspection / Inspection wavier / approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO. Material Test Certificates shall be submitted to BHEL.
7. Annexure 'Q' shall be part of enquiry File and shall be filled by Supplier with their duly sign and seal.
8. Supplier should be manufacturer not a trader/Agent. *(If the OEM/Principal engaging the services of an agent to participate on their behalf, vendor will be acceptable with respect to Quality requirement provided acceptance on Point No 1,2, 3 and 6 shall be accepted to supplier)*
9. **Following Inspection Notes applicable during inspection:**
 - a. Latest version of standards & Specification shall be applied.
 - b. Materials shall be procured in compliance to Functional Technical specification.
 - c. Gauges and measuring instruments with valid calibration only shall be used.
 - d. Inspection / Inspection wavier / approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO.
 - e. BHEL /BHEL Authorized representatives shall have the right to witness the necessary inspection and testing of goods mentioned in the PO.
 - f. In case of Vendor Drawing & Datasheet, it needs approval by BHEL Engineering.
 - g. This QP shall be read along with relevant PO, BHEL Specification / Approved Drawing/Datasheet.

Note: Bidder to share the Manufacturing Process / Item Catalogue along with offer.

Sd\ - Rakesh Kr Madhu
Dy/Mgr-QA

Sd\ - K Renjith
Mgr/QA

973999/2022/BAP-QA

MECH

MANUFACTURER'S NAME & ADDRESS Manufacturer Logo		MANUFACTURING QUALITY PLAN Item/subsystem:				QP NO: Rev: Date: Page:		PROJECT: MAIN CONTRACTOR: M/s BHEL-RANIPET PO NO:					
SL NO 1	COMPONENT & OPERATION 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6		REFERENCE DOCUMENTS 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9 D	AGENCY 10			REMARKS 11
					M	B/C				M	B	C	

RAW MATERIAL INSPECTION													
1	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT		MTC	√	P	V	V	NO REPAIR WELDING IS PERMITTED ON CI AS CAST / PUNCHED HEAT NO SHALL BE PROVIDED FOR CORRELATION		
	MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1 SAMPLE / HEAT		MTC	√	P	V	V			
	SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%		IR	√	P	V	V			
2	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT		MTC	√	P	V	V			
	MECHANICAL PROPERTIES	MAJOR	TENSILE TEST & HARDNESS	1 SAMPLE / HEAT		MTC	√	P	V	V			
	HEAT TREATMENT (As applicable)	CRITICAL	REVIEW OF TIME- TEMP CHART	100%		HT CAHRT	√	P	V	V			
	SURFACE EXAMINATION	MAJOR	VISUAL INSPECTION	100%		IR		P	V	V			
3	CHEMICAL COMPOSITION	MAJOR	CHEMICAL ANALYSIS	1 SAMPLE / HEAT		MTC	√	P	V	V			
	MECHANICAL PROPERTIES	MAJOR	TENSILE TEST	1 SAMPLE / HEAT		MTC	√	P	V	V			

QP FORMAT

M – Manufacturer / Subcontractor, B - MAIN CONTRACTOR/ BHEL /BHEL Authorized Inspection Agency, C- Customer / Customer Authorized Inspection Agency, P - Perform, V - Verification of reports, W - Witness, TC - Test certificate, DR – Dimensional report. * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package.	Prepared by	Reviewed by	Approved by

973999/2022/BAP-QA MECH

Manufacturer Logo		MANUFACTURER'S NAME & ADDRESS		MANUFACTURING QUALITY PLAN			PROJECT: MAIN CONTRACTOR: M/s BHEL-RANIPET PO NO:						
				Item/subsystem:	QP NO: Rev: Date: Page:								
SL NO 1	COMPONENT & OPERATION 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6		REFERENCE DOCUMENTS 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9 D	AGENCY 10			REMARKS 11
					M	B/C				M	B	C	

		SOUNDNESS	CRITICAL	VISUAL INSPECTION	100%			UT Report	√	P	V	V	FOR BAR DIA. ≥ 50 MM ONLY
4								MTC	√	P	V	V	
								MTR	√	P	V	V	

QP FORMAT

IN PROCESS INSPECTION													
5		DIMENSIONAL	MAJOR	MEASURE				IR	√	P	V	V	
		HYDROSTATIC TEST OF CASTING	CRITICAL	PRESSURE TEST	100%			IR	√	P	W	V	SEE NOTE -1
6		DIMENSIONAL	MAJOR	MEASURE				IR	√	P	V	V	
		DYNAMIC BALANCING	CRITICAL	MEASURE	100%			IR	√	P	W	V	SEE NOTE-1
7		SOUNDNESS OF CASTING	MAJOR	NDT-DPT				DPT Report	√	P	V	V	
8		DIMENSIONAL	MAJOR	VISUAL				IR	√	P	V	V	
		SOUNDNESS	CRITICAL	ULTRASONIC TEST				UT Report	√	P	W	V	FOR SHAFT DIA ≥ 50 MM ONLY (EXCEPT THREADED PORTION) SEE NOTE-1
		DP TEST ON MACHINED AREA	MAJOR	DP TEST	100%			DPT Report	√	P	V	V	
FINAL INSPECTION													

M – Manufacturer / Subcontractor, B - MAIN CONTRACTOR/ BHEL /BHEL Authorized Inspection Agency, C- Customer / Customer Authorized Inspection Agency, P - Perform, V - Verification of reports, W - Witness, TC - Test certificate, DR – Dimensional report. * Record, identified with “tick” (√) under column ‘D’ shall be submitted to customer as a QA documentation package.	Prepared by	Reviewed by	Approved by

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MECH

MANUFACTURER'S NAME & ADDRESS Manufacturer Logo		MANUFACTURING QUALITY PLAN Item/subsystem:				QP NO: Rev: Date: Page:		PROJECT: MAIN CONTRACTOR: M/s BHEL-RANIPET PO NO:					
SL NO 1	COMPONENT & OPERATION 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6		REFERENCE DOCUMENTS 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9 D	AGENCY 10			REMARKS 11
					M	B/C				M	B	C	

9	PUMP ASSEMBLY								IR	√	P	V	V	
10	PERFORMANCE TEST WITH JOB								IR	√	P	W	W	
									IR		P	W	W	
									IR		P	W	W	
									IR		P	W	W	
11	NPSHR TEST								IR	√	P	W	W	
12	PAINTING PACKING AND PRESERVATIONS								IR	√	P	V	-	

QP FORMAT

INSPECTION NOTES:

- a. Latest version of standards & Specification shall be applied.
- b. Materials shall be procured in compliance to Functional Technical specification.
- c. Gauges and measuring instruments with valid calibration only shall be used.
- d. Inspection/Inspection waiver/approval by BHEL does not absolve Supplier's responsibility for conformity of the specification as per the terms of PO.
- e. BHEL /BHEL Authorized representatives shall have the right to witness the necessary inspection and testing of goods mentioned in the PO.
- f. In case of Vendor Drawing & Datasheet, it needs approval by BHEL Engineering.
- g. This QP shall be read along with relevant PO, BHEL Specification / Approved Drawing/ Datasheet.
- h. This QP is applicable for Mandatory supply also.
- i. All other minor items, which are not cover under this QP, shall be manufactured inspected as per OEM (Original equipment Manufacturer)/BHEL standard practice and relevant standard. Relevant TC/COC will be submitted for the same.

M – Manufacturer / Subcontractor, B - MAIN CONTRACTOR/ BHEL /BHEL Authorized Inspection Agency, C- Customer / Customer Authorized Inspection Agency, P - Perform, V - Verification of reports, W - Witness, TC - Test certificate, DR – Dimensional report. * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package.	Prepared by	Reviewed by	Approved by

Annexure Q

		Indent No:	Enquiry no:	
Sl.No	BHEL / Customer Requirements	## Specific confirmations by the manufacturer (Acceptable/Not acceptable)		
	Quality Plan Requirement: (If SQP is not given & Vendor QP applicable)			
	(i) MQP (Manufacturing Quality Plan) shall be submitted in attached format for BHEL/Customer review & approval. Our SQP/Typical MQP/ MQP Format is attached for guidance & use.			
	(ii) MQP shall invariably cover w.r.t Inward inspection including on Raw material Procurement, In process and Final inspection in elaborated way/details.			
	(iii) Bidder shall also to give specific confirmation that on need basis, their competent officials shall visit to BHEL / customer for finalization of Quality plan including test procedure/methodology during preaward / post award approval / detailed engineering in the event of an order.			
	(iv) No deviation on BHEL/Customer approved MQP/ SQP (In case BHEL SQP is provided) is acceptable.			
1	(v) Bidder shall agree to submit all cross referred documents other than codes/standards to BHEL/Customer/Consultant.			
	Important Notes shall be included in MQP : (a) Latest revision of Standard s & Specification shall apply. Only International Standards are applicable. (b) Materials shall be procured in compliance to Functional Technical Specification. (c) Inspection shall be in compliance with Approved Quality Control Procedure for the Product. (d) NDT shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME standard. (e) Gauges and measuring Instruments, with valid calibration only shall be used. (f) Cleaning and Painting of products shall be carried out as per Approved Painting Schedule. (g) Finished Products shall be packed to comply with Approved Packing Schedule. (h) Welding shall be carried out by Qualified Personnel with compliance to Approved NDT Procedures and Acceptance Norms, as per ASME standard.			
2	Domestic / Inland Inspection will be carried out by BHEL/BHEL appointed Third Party Inspection Agency (TPIA) / Customer/Customer Appointed Inspection Agency/Consultant. This is applicable for all Stage inspection and Final Inspection identified as "W" - Witness or "CHP" - Customer Hold Point as per customer approved Quality Plan/ Technical specification / Approved Drawing/ Approved Data sheet / Scheme / PID / PFD / SLD (Process Instrumentation Diagram / Process Flow Diagram / Single Line Diagram) etc. (as applicable).			
3	Inspection Agency for Foreign Bidders and also for Indian Bidder but importing from Foreign Sources: (1) Any one of the following Third Party Inspection Agency (TPIA) shall be appointed by the bidder and same shall be furnished by the bidder in techno commercial bid itself. (2) The details of TPIA with contact details like Name of the official, Phone no, Email id shall also to be submitted during pre/post award. However cost for such inspection agency shall be borne by the bidder only. Inspection charges for such inspection agency shall be indicated separately so that if BHEL/Customer is undertaking the inspection by on their own , then these charges are non claimable by the bidder. For NTPC Project ensure TPI Approved by NTPC. Refer our QC Procurement email in this regard. List of TPIA 1.M/s Bureau Veritas 2.M/s TUV-Nord 3.M/s TUV-SUD 4.M/s TUV Rheinland 5.M/s Lloyds Register 6.M/s SGS 7.M/s Germanischer Lloyds 8.M/s QUEST 9.M/s Certification Engineers International 10.M/s Intertek 11.M/s IR Class Systems and Solutions 12.M/s DNV 13. M/s Fichtner 14. M/s ABS Inspection Services			

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Sl.No	BHEL / Customer Requirements	## Specific confirmations by the manufacturer (Acceptable/Not acceptable)
4	Stage Inspection during manufacturing Process : Stage Inspection during manufacturing shall be carried out as per approved quality plan and all necessary documents shall be provided for review, verification and clearance for further processing. This inspection call shall be given well in advance (at least 2 weeks before) to TPI/Bidder's own inspection agency to avoid delay in the manufacturing processes.	
5	Inspection before despatch for domestic supplier : Inspection before despatch at supplier's works shall be carried out by BHEL appointed Inspection agency (as in Sl no. 2). Inspection shall be done as per approved Quality plan/ Technical specification/ Approved Drawing/ Approved Data sheet .	
6	Inspection at Foreign Source/Supplier: (a) As in sl no: 3. shall be ensured without fail (b) No material / items shall be despatched without getting the written communication from BHEL / Customer inspection carried out by Bidder appointed Third Party Inspection Agency (As per Sl no.3) / Customer/Customer Appointed Inspection Agency/Consultant. This is applicable for all Stage inspection and Final Inspection identified as "W" - Witness or "CHP" - Customer Hold Point as per customer approved Quality Plan/ Technical specification / Approved Drawing/ Approved Data sheet / Scheme / PID / PFD / SLD (Process Instrumentation Diagram / Process Flow Diagram / Single Line Diagram) etc. (As applicable). Inspection before despatch for Foreign supplier : Inspection before despatch at supplier's works shall be carried out by bidder appointed inspection agencies having international presence at vendors and or vendor's sub vendor works. Inspection shall be done as per approved Quality plan/ Technical specification/ Approved Drawing/ Approved Data sheet by TPIA mentioned in Sl no: 03 at supplier's cost.	
7	Painting shall be done strictly as per BHEL/Customer approved painting schedule / scheme only. Paint Thickness / Paint shade shall be ensured as per BHEL / Customer approved painting schedule / specification / data sheet etc. No deviation is acceptable unless otherwise accepted by BHEL/Customer in writing. Any conflict if any among BHEL / Customer approved painting schedule / Spec / data sheet etc. shall be brought to the notice of BHEL well in advance before proceeding including the BOI being procured for assy / skid like motors etc.	
8	Specific conformation for document package in the event of an order (2 Hard copies & soft copy in PDF file) is to be given containing the following with proper linkages (i) Index Sheet (ii) MQP/RQP/Endorsement Sheet (As applicable) (iii) TCs identified by BHEL/ Customer for record for "CHP" / "W" and Verification portion ("V") as given in approved QP. (iv) Final inspection report + TC including Chemical + Mechanical + HT + NDT etc. (v) Third party Inspection report + TC (vi) Customer CHP/ MDCC (vii) Type test / Performance Test reports conducted (viii) Type test / Performance Test approval/ clearance obtained from BHEL/Customer (ix) BOM with As Build Drgs with actual make / rating used with BHEL/customer approved drawings.	
9	Packing / Seaworthy Packing shall be as per BHEL Packing schedule / approved drg / sketch. This shall be ensured to take care transit / handling / transshipment in Road / Sea / Air. Photographs are to be submitted for BHEL review before despatching the material as per contract conditions.	
10	Outsourcing of test facilities: Bidder shall ensure all the testing facilities in house. However If any of the test facilities are not available with successful bidder, then bidder shall ensure the same at NABL accredited third party lab / Govt / Govt Lab for major testing such as NDT, Electrical & Mechanical testing.	
11	Important Note: No deviation on the above requirement 01 to 10 is acceptable with respect to Quality Requirement and those offers not meeting these specific customer requirement is liable for rejection and hence the bidder shall submit all the required documentary evidences in the offer itself.	
12	## Necessarily to be filled up by the bidder at the time of offer itself otherwise the offer may not be considered w.r.t Quality Requirement being customer specific requirement.	

VENDOR SIGN AND STAMP:

Vendor Name & Address:

List of items in this Systems (.....) required OP approval

SI No.	Item/ Sub system Name	Quantity	SI No.	Item/ Sub system Name	Quantity
01			08		
02			09		
03			10		
04			11		
05			12		
06			13		
07			14		
<u>List of Minor items in this Systems (.....) required COC of OEM</u>					
01			08		
02			09		
03			10		
04			11		
05			12		
06			13		
07			14		
OEM (ORIGINAL EQUIPMENT MANUFACTURER) SEAL AND SIGN WITH DATE.					

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®

MANUFACTURER NAME AND ADDRESS

MANUFACTURING QUALITY PLAN

TYPICAL

Item: AXIAL FLOW FAN & RE UNITS OF VENTILATION SYSTEM.



SL. NO.	COMPONENTS & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORDS	D	P	W	V	REMARKS	
1	2	3	4	5	6	7	8	9	10				11	
1.0	MATERIAL													
1.1	Casing - MS Sheets & Plates	Visual, Chemicals & Physical	Major	Visual/ Physical & Chemical Test	Sample/Heat	Appr. Drg./Appr. Data Sheet	Appr. Drg./Appr. Data Sheet	Arrival Note & Test Certificate	√	3	-	1/2	 These test certificates shall be reviewed by BHEL during witness	
1.2	Motor Support Bracket	Visual, Chemicals & Physical	Major	Visual/ Physical & Chemical Test	Sample/Heat	Appr. Drg./Appr. Data Sheet	Appr. Drg./Appr. Data Sheet	Arrival Note & Test Certificate	√	3	-	1/2		
1.3	Impeller Blade (Al. Alloy) & Hub	Visual, Chemicals & Physical	Major	Visual/ Physical & Chemical Test	1 in each heat	As per IS:617	Appr. Drg./Appr. Data Sheet	Arrival Note & Test Certificate	√	3	-	1/2		
1.4	Impeller Hub Drum	- do -	- do -	- do -	- do -	- do -	- do -	- do -		3	-	1/2		
1.5	Impeller Hub Bush	Visual, Chemicals & Physical	- do -	- do -	Sample/Heat	Appr. Drg./Appr. Data Sheet	Appr. Data Sheet/IS 513	- do -		3	-	1/2		
			LEGENDS : D : Records indicated with "Tick" shall be essentially included by supplier in QA Documentation 1. Main contractor (BHEL) 2. TANGEDCO / TCE 3. Manufacturer P : Perform , W : Witness, V : Verification				FOR CUSTOMER USE							
MANUFACTURER/ SUB CONTRACTOR			MAIN CONTRACTOR				REVIEWED BY							
Seal & Sign			Seal & Sign						NAME & SIGN OF APPROVING AUTHORITY					

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MANUFACTURING QUALITY PLAN

TYPICAL

Item: AXIAL FLOW FAN & RE UNITS OF VENTILATION SYSTEM.

SL. NO.	COMPONENTS & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORDS	D	P	W	V	REMARKS	
1	2	3	4	5	6	7	8	9	10				11	
2	IN PROCESS INSPECTION													
2.1	Casing Fabrication	Visual & Dimensional check	Major	-- 	100%	Appd. Drg./Data Sheet	No relevant indications	Insp. Report	√	3	-	1/2		
		DPT on welding	Major	NDT 	20%	ASTME 165	No relevant indication	Inspection Report						
2.2	Impeller - Balancing	Balancing Level	Critical	Dynamic Balancing	100%	ISO 1940 Gr 6.3	ISO 1940 Gr 6.3	IR	√	3	-	1/2		
3	FINAL ACCEPTANCE													
3.1	Motors (from Appd. Vendors)	Routine Test	Major	Review Mfr's TC	100%	Appd. Drg./Data Sheet	Appd. Drg./Data Sheet	Manufactuer TC		3	-	1/2	Refer note 1 Separate MQP shall be furnished for motor above 30KW	
		Type, Rating, Make & Size		Visual										
3.2	Overall dimension of Assembly	Visual & measurement	Major	Measurement	one of each type & size	Appr. Drg.	Appr. Drg.	Insp. Report	√	3	1	2	BHEL shall witness one fan per size /type	
			LEGENDS : D : Records indicated with "Tick" shall be essentially included by supplier in QA Documentation 1. Main contractor (BHEL) 2. TANGEDCO / TCE 3. Manufacturer P : Perform , W : Witness, V : Verification				FOR CUSTOMER USE							
							REVIEWED BY							
MANUFACTURER/ SUB CONTRACTOR		MAIN CONTRACTOR												
Seal & Sign		Seal & Sign						NAME & SIGN OF APPROVING AUTHORITY						

TYPICAL

Item: AXIAL FLOW FAN & RE UNITS OF VENTILATION SYSTEM.

SL. NO.	COMPONENTS & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORDS	D	P	W	V	REMARKS
1	2	3	4	5	6	7	8	9	10				11
3.3	Running test - duration for 1 hour (By job motor)	Visual & measurement	Critical	Measurement a) Speed b) Vibration c) Current drawn d) Noise	one of each type & size	Appd. Data Sheet/ Drg.	As per appr. Drg. & Data sheet Noise-85 dBA at 1 mtr distance in free field condition. Vibration 80 Microns	Run Test Report	√	3	1	2	BHEL shall witness one fan per size /type
3.4	PERFORMANCE TEST WITH JOB MOTOR	Visual & measurement	Critical	Measurement a) Flow b) Pressure c) Efficiency d) Power Consumption	One of each type & size	IS - 3588/Appd. Data Sheet	Approved drawing & data sheet Vibration 80 Microns, Noise 85 dBA at 1 mtr. Distance in free field condition. Temp. rise max 40° C above ambient	PT Report	√	3	1	2	BHEL shall witness one fan per size /type
3.5	Painting	Visual & measurement	Major	Visual & DFT	100%	Appd. Drg/Data Sheet	Appvd. Drawing/ Data Sheet			3	-	1/2	
4.0	Review of Q.A. Documentation					Appr. Q.P.	Appr. Q.P.	IR		-	-	1/2	

Note: Separate MQP for Motor as applicable.

MANUFACTURER/ SUB CONTRACTOR	MAIN CONTRACTOR	LEGENDS :	FOR CUSTOMER USE
		D : Records indicated with "Tick" shall be essentially included by supplier in QA Documentation	
		1. Main contractor (BHEL) 2. TANGEDCO / TCE 3. Manufacturer	
Seal & Sign	Seal & Sign	P : Perform , W : Witness, V : Verification	REVIEWED BY
			NAME & SIGN OF APPROVING AUTHORITY

973999/2022/BAP-QA MECH

Item: Centrifugal Pump of Ventilation System.

QUALITY ASSURANCE PLAN

TYPICAL

S.No	Component / Operation	Characteristics Check	Category	Type / Method of Check	Extend of Check	Reference Document	Acceptance Norm	Format of Record	Agency			Remarks
									M	C	O	
1	2	3	4	5	6	7	8	9	10			11
1.0	RAW MATERIAL											
1.1	Casing, Impeller, Wear Plate / Wear ring	Surface defect	Major	Visual	100%	App.Drg / Data Sheet	App.Drg / Data Sheet	Inspn. Report & TC	P	V	V	
		Mechanical Properties		Physical Test	1 / Heat				P	V	V	
		chemical Properties		Chemical Analysis	1 / Heat				P	V	V	
1.2	Shaft, Sleeve	Mechanical Properties	Major	Physical Test	1 / Heat / HT Batch	App.Drg / Data Sheet	App.Drg / Data Sheet	TC	P	V	V	
		chemical Properties		Chemical Analysis	1 / Heat			TC	P	V	V	
		Sub-Surface defects > 50mm (For Shaft)		UT	100%			ASTM A – 388	ASME SEC VIII DIV-2	UT Report	P	V
2.0	IN-PROCESS											
2.1	Machining of Shaft, Sleeve, Impeller, Casing, etc.,	Dimensional Conformity	Major	Measurement	100%	Approved Drawing / Mfr. Drawing	Approved Drawing / Mfr. Drawing	COC	P	V	V	
2.2	Casing	Soundness	Critical	Hydrotest	100%	IS 5120	No Leakage	Inspn. Report	P	V	V	
2.3	Impeller	Residual Unbalance	Critical	Dynamic Balancing	100%	ISO 1940	ISO 1940 Gr. 6.3	Inspn. Report	P	V	V	
3.0	FINAL INSPECTION											
3.1	Complete Pump	Overall Dimensions	Major	Measurement	100%	Approved Drawing / Data Sheet		Inspn. Report	P	W	V	
3.2	Performance Test with Calibrated Test Lab Motor	Q Vs Head Q Vs Efficiency, Q Vs Power Noise, Vibration & Brg. Temperature rise	Critical	Performance, Measurement	1 / type / size Per visit	Approved Drawing / Data Sheet / IS 5120 / HIS		Inspn. Report	P	W	V	BHEL witness for 1 no pump of each Type & Size per visit
3.3	Pump strip test (In case of doubt due to abnormal sound)	Wear & Rubbing	Major	Visual & Strip Test	100%	App.Drg / Data Sheet	App.Drg / Data Sheet / HIS	Inspn. Report	P	W	V	
3.4	Painting	Paint Shade & DFT	Major	Visual, Measurement	Random	Mfr. Standard	Mfr. Standard	Inspn. Report	P	W	V	

Note: Separate MQP for Motor as applicable.

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Sr No	Item Description	CHECK			Acceptance Norms.	Format of record	Inspection By			Remarks	
		Characteristics	Method	Extent			M	C	I		
1	Compressor Assembly										
1a	Compressor Assembly	Pressure Test	Certificate Review	100%	Manufacturer Specification	Manufacturer's Test certificate	R/P	R	R		
1b	Motor for compressor	Separate MQP for Motor as applicable.									
2-A	Heat Exchanger Assembly (Evaporator for all chillers & Condenser for water cooled chiller models)										
2a	Pneu. Test: Ref. Side	Leakage/ Pr. drop	Visual	100%	No any leakage and/ or pressure drop	Inspection Report	P	R	R		
	Hydro Test: Water side	Leakage/ Pr. drop	Visual	100%		Inspection Report	P	R	R		
2-B	Condenser Coils (For air cooled chiller models)										
2a	Pressure testing	Leakage/ Pr. drop	Visual	100%	Drawing, Material specification.	Inspection Report	P	R	R		
3	Panel Inspection										
3a	Panel inspection	Visual, dimensions	Visual, Measurement	100%	drgs / specification	Inspection Report	P	R	R		
		Component Layout					P	R	R		
		Wiring check					P	R	R		
4	Chiller Unit Assembly.										
4a	Pneumatic Pressure Test (Refrigerant side)	Leakage/ Pr. drop	Visual	100%	No any leakage and/ or pressure drop	Inspection Report	P	R	R		
4b	Performance testing Refer Note (**)	Performance	Run test.	As per remark	- specification	Log sheet	P	W	W	Performance run Test of 1 chiller shall be carried out at full load however test certificate for remaining chillers shall be furnished for verification	
4c	Final Inspection	Finish Painting	Visual & DFT	100%	- specification	Inspection Report	P	R	R		
		Insulation	Visual	100%							
		Name plate, labels	Visual	100%							



973999/2022/BAP-QA_MECH

Manufacturing Quality Assurance Plan


MANUFACTURER NAME & ADDRESS		CLIENT	CONTRACTOR		ITEM	REV No./ DATE	GAP NO.			
TYPICAL										
Item: AIR HANDLING UNIT										
SL.NO.	DESCRIPTION	NATURE OF INSPECTION	CHECK POINTS		INSTRUMENTS USED	REFERENCE DOCUMENT	QUANTUM OF CHECK	AGENCY		
			POINTS	DETAILS				M	C	N
1. INCOMING INSPECTION										
1.1	G.I. / S.S. / PRE COATED	DIMENSIONAL	THICKNESS & DIMENSIONS	SHOULD BE UNIFORM THROUGHOUT THE SHEET.	MICROMETER	MANUFACTURER TC	SAMPLING & REVIEW OF MFG. TC.	P	R	R
		VISUAL	PLATING/COATING	PLATING SHOULD NOT PEEL OFF DURING BENDING			SAMPLING			
			NO DAMAGE & DENTS	TO BE FREE FROM SURFACE DEFECTS			SAMPLING			
1.2	ALUMINIUM SECTIONS	DIMENSIONAL	FITMENT DIMENSIONS	OBSERVATION SHOULD BE WITHIN THE LIMITS AS PER THE DRG.	VERNIER	MANUFACTURER TC	SAMPLING & REVIEW OF MFG. TC.			
		FITMENT	WITH MATCHING PART	FUNCTIONAL & ASTHETICS			SAMPLING			
		VISUAL	NO DAMAGE & DENTS	TO BE FREE FROM SURFACE DEFECTS			SAMPLING			
1.3	FILTER	DIMENSIONAL	LENGTH, WIDTH & THICKNESS	CHECK FOR DIMENSIONS , TYPE & GRADE	VERNIER /MEASURING TAPE	MANUFACTURER TC	SAMPLING	P	R	R
		VISUAL	NO DAMAGE , TYPE & AIRFLOW	NO DAMAGE IN MEDIA	----		SAMPLING			
1.4	FAN	FAN DIA. & TYPE	AS PER APPROVED DRAWING & TDS	TYPE, CLASS & ORIENTATION		MANUFACTURER TC	SAMPLING & REW.	P	R	R
		VISUAL	NO DAMAGE & DENTS	NO DAMAGE, DENTS & WHITE MARKS SHOULD BE OBSERVED.			100%			
1.5	MOTOR	Separate MQP for Motor as applicable.								

973999/2022/BAP-QA-MECH		CHECK POINTS			INSTRUMENTS USED	REFERENCE DOCUMENT	QUANTUM OF CHECK	AGENCY		
SL.NO.	DESCRIPTION	TYPE OF INSPECTION	POINTS	DETAILS				M	C	N
2. INPROCESS INSPECTION										
2.1	OUTER CASING OF ALL SECTION AS MENTIONED ABOVE	DIMENSIONAL	LENGTH, WIDTH & HT	AS PER INTERNAL REPORT	MEASURING TAPE	EDGE TECH MANUFACTURING DRAWING	SAMPLING			
		VISUAL	NO DAMAGE & DENTS				SAMPLING	P	R	R
2.2	COIL	NO. OF ROWS & DIMENSIONAL	FITMENT DIMENSIONS	VISUAL & MEASUREMENT	MEASURING TAPE	APPROVED DRAWING / DATA SHEET & TC	100%			
		LEAKAGE TEST	NO LEAKAGE	PNEUMATIC TEST	PRESSURE GAGUES	300 PSI For CHW-Coil & 600 PSI for DX-Coil / COIL LEAKAGE TEST REPORT	100% By MFG.	P	R	R
3. FINAL UNIT INSPECTION										
3.1	ASSEMBLED / SKD	OVERALL DIMENSIONAL / VISUAL	AS PER INSPECTION REPORT	AS PER INSPECTION REPORT	MEASURING TAPE	EDGE TECH DRAWING / SPECIFICATION	ONLY ONE UNIT	P	W	R
3.2	FREE AIR RUN TEST	DRY RUN TEST	AIR VOLUME		ANEMOMETER	EDGE TECH DRAWING / SPECIFICATION	ONLY ONE UNIT	P	W	R
Note: * Since it is free Air Run test,observed values will not matched with designed Parameters.Actual Condition performed after site commisionning. ** All Documents will be Offered for Verification only for offered Unit.										
LEGENDS :										
M : Manufacturer, N : Customer/Third Party, C: Contractor/ Third										
P : Perform, W : Witness, R : Review										
TC: Test Certificate										
This is Computer Generated Documents,hence no Signature required.										
PREPARED BY			Q.C. INCHARGE			APPROVED BY				

PROJECT: UDANGUDI STPP STAGE I (2 X 660 MW) (W.O No: R4T0) MAIN CONTRACTOR: BHEL – RANIPET SUB CONTRACTOR & ADDRESS: (To be filled by VENDOR)		CONTRACT QUALITY REQUIREMENTS (CQR) for <u>AIR CONDITIONING PACKAGE & ACCESSORIES-ELECTRICAL, C&I ITEMS</u> UDANGUDI STPP STAGE I (2 X 660 MW) (BHEL WO No: R4T0)	DOC.NO: BAP/QR/R4T0/Air Conditioning: 001 Rev NO.: 00 PAGE : Page 1 of 1 DATE: 09.07.2022	##Enquiry No: ## Supplier Name & Address: ##Offer reference: ##Date: Contact Official Name: Mobile no: Email id:
Sl. NO.	DESCRIPTION	BHEL/TANGEDCO Requirements		##Specific confirmations by the vendor
ITEM: AIR CONDITIONING PACKAGE & ACCESSORIES-ELECTRICAL, C&I ITEMS				
01	Quality plan Requirement	Vendor shall confirm to meet the requirement of indicative QPs (copy attached) for LT Motors, Switches (Flow, Temperature, Level Switches etc.), Analytical Instruments, Annunciators, Transmitters, Temperature Element, Flow meter, Solenoid Valve, Gauges (Pressure, Differential Pressure, Temperature, Level Gauges etc.), Flow Indicator, Orifice Plate, Local Control Panel, RTD. Junction Box, Electric operated Hoist, Chain Pulley Block etc. and arrange to submit the QP for items in the event of Purchase Order.		
02	Inspection Methodology	Ultimate Customer TANGEDCO –Inspection Categorization-I and List of all items and QPs will be submitted to Ultimate Customer TANGEDCO for approval/regularization and inspection by Ultimate Customer TANGEDCO/BHEL/BHEL AIA Inspection as per Customer approved Quality Plans. No material shall be dispatched without Ultimate Customer TANGEDCO/BHEL/BHEL AIA inspection with required CHP/MDCC clearances from BHEL/ Ultimate Customer TANGEDCO.		
04	For inspection call	To raise inspection call for BHEL/BHEL AIA inspection including for type test witnessing, vendor is requested to contact Mr R Kesavan, DGM (QC-Proc), Mobile no: +91 9443006303., Email id: Kesavan@bhel.in and Mr Zeeshan Ali, Dy. Manager (QC-Proc), Mobile no: +91 9443149691., Email id: zeeshan@bhel.in for inspection related activities for immediate response / resolution.		
05	Packing	Required Packing & preservation shall also to be ensured as per requirements stipulated in Engg spec / drg / data sheet/PO condition to avoid any damage during transit., handling damages & storage at site.		
06	Painting	Paint color and coating thickness to be ensured as per requirements stipulated in Engg spec / drg / data sheet.		
07	Document package	Specific confirmation for Document Package in the event of an order (2 hard copies + 2 soft copies) is to be given containing the following with proper linkages (.) (i) Index Sheet (ii) SQP (iii) TCs identified by BHEL for record for “CHP” and Verification portion as given in SQP. (iv) Final Inspection Report + all applicable Test Certificates (v) TANGEDCOBHEL/BHEL authorized Inspection Agency report + TC (vi) Type test reports conducted/submitted with approval with approved data sheet and BOM with actual make used with Customer approved drgs. (vii) TANGEDCO CHP/MDCC.		


##Supplier signature with seal

Necessarily to be filled up by the vendor at the time of offer itself otherwise their offer may not be considered w.r.t Quality Requirements being customer specific requirements.

		QUALITY PLAN	CUSTOMER :			PROJECT 2 X 660 MW UDANGUDI STPP STAGE-I			Section-D			
			BIDDER/ VENDOR :			TITLE						
SHEET 1 OF 2		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-006, REV-01			ITEM : AC ELECT. MOTORS BELOW 30KW (LV)				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	MANUF'S SPEC	MANUF'S SPEC	-DO-	2	-	-	
		2.DIMENSIONS	MA	-DO-	-DO-	MFG. DRG./MFG. SPEC.	MFG. DRG./MFG. SPEC.	-DO-	2	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/COLOUR CODE	MA	VISUAL	100%	MFG.SPEC./RELEVANT IS	MFG.SPEC. RELEVANT IS	-DO-	2	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	MANUFR'S SPEC/BHEL SPEC./RELEVANT STANDARD	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	IS-325/BHEL SPEC./DATA SHEET	SAME AS COL.7	TEST REPORT	2	1	-	NOTE -1 & NOTE-3
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPN. REPORT	2	1	-	NOTE -1 & NOTE-3
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									

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		QUALITY PLAN SHEET 2 OF 2		CUSTOMER :			PROJECT 2 X 660 MW UDANGUDI STPP STAGE-I			Section-D		
				BIDDER/ :			TITLE QUALITY PLAN					
				VENDOR :			NUMBER PED-506-00-Q-006, REV-01					
		SYSTEM :			ITEM AC ELECT. MOTORS BELOW 30KW (LV)							
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
		3.NAMEPLATE DETAILS NOTES: 1 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON 2 WHERE EVER CUSTOMER IS INVOLVED IN INSPECTION, (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER. 3 FOR EXHAUST/VENTILATION FAN MOTORS OF RATING UPTO 1.5KW , ONLY ROUTINE TEST CERTIFICATES SHALL BE FURNISHED FOR SCRUTINY. <u>Legends for Inspection agency</u> 1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER) P. PERFORM W. WITNESS V. VERIFY	MA	VISUAL	100%	SPECIFICATION/ DATA SHEET	SPECIFICATION/ DATA SHEET	INSPN. REPORT	2	1	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

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ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM


2 X 660 MW UDANGUDI STPP STAGE-I

		QUALITY PLAN			CUSTOMER :			PROJECT					
					BIDDER/ VENDOR			TITLE					
		SHEET 1 OF 9			SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007. REV-03					
			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)										
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.0	RAW MATERIAL & BOUGHT OUT CONTROL												
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK	3	-	-		
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	-DO-	3	-	-		
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	-DO-	-DO-	-DO-	INSPEC. REPORT	3	-	2		
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, UN-EVENNESS ETC.	-DO-	3	-	-		
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	MANFR'S DRG./SPEC BOOK	RELEVENT IS/SPEC.	SUPPLIERS TC & LOG	3	-	2	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR	
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK	3	-	2		
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	MANFR'S DRG./SPEC	RELEVENT IS/	SUPPLIER'S TC	3	-	2	HEAT NO. SHALL BE VERIFIED	
		3.DIMENSIONS	MA	MEASUREMENT	100%	MANUFR'S DRG.	MANUFR'S DRG.	LOG BOOK	3	-	2		
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	LOG BOOK	3	-	2		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE									BIDDER'S/VENDORS COMPANY SEAL	

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**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN SHEET 2 OF 9			CUSTOMER :		PROJECT					
					BIDDER/ VENDOR		TITLE					
SYSTEM		QUALITY PLAN			NUMBER PED-506-00-Q-007, REV-03			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	MFG. DRG. SPEC.	RELEVANT IS	SUPPLIER'S TC	3	-	2	
		3. DIMENSIONS	MA	MEASUREMENT	100%	-DO-	MANUFR'S DRG.	LOG BOOK	3	-	2	
		4. INTERNAL FLAWS	CR	UT	-DO-	ASTM-A388	MANUFR'S SPEC. BHEL SPEC.	-DO-	3	2	1	
1.6	SPACE HEATERS, CONNECTORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	-DO-	MANUFR'S DRG. SPEC.	MANUFR'S DRG. SPEC.	-DO-	3	-	2	
		2. PHYSICAL COND.	MA	-DO-	-DO-	-	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	-DO-	3	-	2	
		3. DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG./ SPEC.	MANUFR'S DRG. / SPEC.	-DO-	3	-	2	
		4. PERFORMANCE/ CALIBRATION	MA	TEST	100%	-DO-	-DO-	INSP. REPORT	3	-	2	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

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**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN SHEET 3 OF 9			CUSTOMER :		PROJECT					
					BIDDER/ VENDOR		TITLE					
SYSTEM		QUALITY PLAN			NUMBER PED-506-00-Q-007, REV-03			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC.	MA	VISUAL	100%	-	NO VISUAL DEFECTS	INSPT. REPORT	3	-	2	
		2. OTHER CHARACTERISTICS	MA	TEST	SAMPLE	MANUF'S SPEC.	MANUF'S SPEC.	LOG BOOK AND OR SUPPLIER'S TC	3	-	2	
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND.	MA	VISUAL	100%	-	NO VISUAL DEFECTS (FREE FROM BURS)	LOG BOOK	3	-	-	
		2.DIMENSIONS INCLUDING BURS HEIGHT	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG. .	MANUFR'S DRG.	-DO-	3	-	2	
		3. ACCEPTANCE TESTS	MA	ELECT. & MECH TESTS	-DO-	MANUF'S SPEC./ RELEVANT IS	RELEVANT IS	SUPPLIER'S TC	3	-	2	
1.9	CONDUCTORS	1. SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	LOG BOOK	3*	-	2*	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HIS WORKS AND MAINTAIN RECORD FOR VERIFICATION BY BHEL/CUSTOMER.
		2.ELECT. PROP, & MECH. PROP	MA	ELECT. & MECH.TEST	SAMPLES	RELEVANT IS/ BS OR OTHER STANDARDS	RELEVANT IS/ BS OR OTHER STANDARDS	SUPPLIERS TC & VENDOR'S INSPN. REPORTS	3	-	2	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

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**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN			CUSTOMER :			PROJECT				
					BIDDER/ VENDOR			TITLE				
		SHEET 4 OF 9			SYSTEM			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.10	BEARINGS	3.DIMENSIONS	MA	MEASUREMENT	-DO-	-DO-	-DO-	Log Book	3	-	2	
		1.MAKE & TYPE	MA	VISUAL	100%	MANFR'S DRG./ APPROVED DATASHEET	MANFR'S DRG./ APPROVED DATASHEET	-DO-	3	-	2	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	BHEL DATA SHEET	BHEL DATA SHEET BEARING MANUF'S CATALOGUES	-DO-	3	-	2	
1.11	SLIP RING (WHEREVER APPLICABLE)	3.SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	2	
		1.SURFACE COND.	MA	VISUAL	100%	-	-DO-	-DO-	3	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	-DO-	MANUF'S SPEC./ BHEL SPEC.	MANUF'S SPEC./ BHEL SPEC.	-DO-	3	-	2	
1.12	OIL SEALS & GASKETS	4.HV/IR	MA	-DO-	100%	-DO-	-DO-	-DO-	3	-	2	
		1.MATERIAL OF GASKET	MA	VISUAL	100%	MANUF'S DRG/SPECS	MANUF'S DRG./ SPECS.	-DO-	3	-	-	
		2.SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE									BIDDER'S/VENDORS COMPANY SEAL

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**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN SHEET 5 OF 9			CUSTOMER :		PROJECT					
					BIDDER/ VENDOR		TITLE					
SYSTEM		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)							
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
2.0	IN PROCESS											
2.1	STATOR FRAME WELDING (IN CASE OF FABRICATED STATOR)	1.WORKMANSHIP & CLEANNESS	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	3/2	2	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	2	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
		3.SHAFT SURFACE FLOWS	MA	PT	-DO-	RELEVANT SPEC./ ASTM-E165	MANUF'S SPEC./ BHEL SPEC./	-DO-	2	-	1	
2.3	PAINTING	1.SURFACE PREPARATION	MA	VISUAL	100%	MANFR'S SPEC/BHEL SPEC./ RELEVANT STAND	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-DO-	-DO-	-DO-	2	-	-	
		3.SHADE	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-	
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	-DO-	-DO-	-DO-	Log Book	2	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

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**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
									10			
1	2	3	4	5	6	7	8	9	10			11
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	MANUFR'S SPEC.	MANUFR'S SPEC.	Log Book	2	-	-	(FOR MOTORS OF 2MW AND ABOVE) * ON 10% RANDOM SAMPLE
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-DO-	-DO-	Log Book	2	-	-	
		3.CORE LOSS & HOTSPOT	MA	ELECT.TEST	-DO-	-DO-	-DO-	Log Book	2	1*	1	
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	MANUFR'S SPEC./BHEL SPEC.	MANUFR'S SPEC./BHEL SPEC.	Log Book	2	-	-	FOR MV MOTOR
		2.CLEANLINESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-	
		3.IR-HV-IR	CR	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2	-	1	
		4.RESISTANCE	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	
		5.INTERTURN INSULATION	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-	
		6.SURGE WITH STAND AND TAN. DELTA TEST	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	
2.6	IMPREGNATION	1.VISCOSCITY	MA	PHY. TEST	AT STARTING	-DO-	-DO-	Log Book	2	-	-	THREE DIPS TO BE GIVEN
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-DO-	-DO-	Log Book	2	-	-	
		3.NO. OF DIPS	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			



QUALITY PLAN

SHEET 6 OF 9

CUSTOMER :

PROJECT TITLE


BIDDER/ VENDOR :

QUALITY PLAN NUMBER PED-506-00-Q-007. REV-03

SYSTEM :

ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)

**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN SHEET 7 OF 9		CUSTOMER :			PROJECT TITLE					
				BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
2.7	COMPLETE STATOR ASSEMBLY	4.DURATION 1.COMPACTNESS & CLEANLINESS	MA MA	-DO- VISUAL	-DO- 100%	-DO- -DO-	-DO- -DO-	Log Book Log Book	2 2	- -	1 -	
2.8	BRAZING/COMPRESSION JOINT	1.COMPLETENESS 2.SOUNDNESS	CR CR	-DO- MALLETT TEST & UT	-DO- -DO-	-DO- -DO-	-DO- -DO-	Log Book Log Book	2 2	- -	- 1	
2.9	COMPLETE ROTOR ASSEMBLY	3.HV 1.RESIDUAL UNBALANCE	MA CR	ELECT. TEST DYN. BALANCE	-DO- -DO-	-DO- MFG SPEC./ ISO 1940	-DO- MFG. DWG.	Log Book Log Book	2 2	- -	1 1	VERIFICATION FOR MV MOTOR ONLY
2.10	ASSEMBLY	2.SOUNDNESS OF DIE CASTING 1.ALIGNMENT 2.WORKMANSHIP 3.AXIAL PLAY 4.DIMENSIONS 5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE 6. RTD, BTD & SPACE HEATER MOUNTING.	CR MA MA MA MA MA MA	ELECT. (GROWLER TEST) MEAS. VISUAL MEAS. -DO- VISUAL	-DO- -DO- -DO- -DO- 100%	-DO- -DO- -DO- MFG.DRG./ MFG SPEC. MFG SPEC. RELEVANT IS	-DO- -DO- -DO- MFG. DRG/ RELEVANT IS	Log Book Log Book Log Book Log Book Log Book	2 2 2 2 2	- - - - -	- - 1 - -	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE									BIDDER'S/VENDORS COMPANY SEAL

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289 01582

ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM

2 X 660 MW UDANGUDI STPP STAGE-I



QUALITY PLAN

BIDDER/ VENDOR :
SYSTEM


TITLE

QUALITY PLAN
NUMBER PED-506-00-Q-007, REV-03
ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)

SHEET 8 OF 9

SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS AS PER BHEL SPEC.	MA	ELECT.TEST	1/TYPE/SIZE	BHEL SPEC./ DATA SHEET	BHEL SPEC./ DATA SHEET	TEST REPORT	2	1*	1	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	-DO-	100%	IS-12075 & IS-12065	IS-12075 & IS-12065	-DO-	2	1\$	1	\$NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPC. REPORT	2	1	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	RELEVANT IS	BHEL SPEC. AND DATA SHEET	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$NOTE - 2
		8. NAMEPLATE DETAILS	MA	VISUAL	100%	BHEL SPEC./ DATA SHEET	BHEL SPEC./ DATA SHEET	INSPC. REPORT	2	1\$	1	\$NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	IS-3682 IS-8239 IS-8240	IS-3682 IS-8239 IS-8240	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	BHEL SPEC. & DATA SHEET	BHEL SPEC. & DATA SHEET	TC	2	1\$	1	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY \$NOTE - 2
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE					BIDDER'S/VENDORS COMPANY SEAL				

**ELECTRICAL EQUIPMENT SPECIFICATION
FOR AC SYSTEM
2 X 660 MW UDANGUDI STPP STAGE-I**

		QUALITY PLAN			CUSTOMER :			PROJECT TITLE				
		SHEET 9 OF 9			BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03				
					SYSTEM			ITEM: AC ELECT. MOTORS 30 KW & ABOVE (LV & MV)				
1	2	3	4	5	6	7	8	9	10			11
									P	W	V	
<p>NOTES:</p> <p>1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED.</p> <p>2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON.</p> <p>3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THESE TEST MAY NOT BE REPEATED.</p> <p>4 WHEREVER CUSTOMER IS INVOLVED IN INSPECTION, AGENCY (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER.</p> <p><u>Legends for Inspection agency</u></p> <p>1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER)</p> <p>P. PERFORM W. WITNESS V. VERIFY</p>												
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

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282 Q1588



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR FLOW SWITCH

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR	100%	APPROVED SPEC./ DATA SHEETS	P	W	V		
	TYPE							
	RANGE							
	MODEL / TAG No.							
	END CONNECTION							
	DIMENSIONS							
	SIZE							
2	ACCURACY & REPEATABILITY (WET CALIBRATION)	100%		P	W	V		
3	HV / IR	100%		P	W	V		
4	CONTACT RATING / No. OF CONTACTS	RANDOM	P	W	V			
5	MATERIAL TC FOR BODY, WET PARTS, SENSING ELEMENT	ONE / LOT	P	W	V			
6	ACCESSORIES AS APPLICABLE	100%	P	W	V			
7	DEGREE OF PROTECTION	ONE / LOT	P	W	V			
8	OVER PRESSURE TEST	100%	P	W	V			

Legend :

** M = Manufacturer / Sub-contractor, C = Contractor / Nominated Inspecting Agency, B = BHEL,
P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out routine test for 100%
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR TEMPERATURE SWITCH

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECK FOR	100%	APPROVED SPEC./ DATA SHEETS	P	W	V	
	TYPE						
	MODEL/TAG NO.						
	RANGE/SCALE						
	END CONNECTION						
2	DIMENSIONS CHECK	100%		P	W	V	
3	ACCURACY	100%		P	W	V	
4	SWITCHING DIFFERENTIAL	100%		P	W	V	
5	CONTACT RATING / No. OF CONTACTS	RANDOM		P	W	V	
6	MATERIAL TC FOR BULB, CAPILLARY, ARMOUR	ONE / LOT		P	V	V	
7	HV / IR	RANDOM		P	W	V	
8	DEGREE OF PROTECTION	TYPE TEST		P	V	V	
9	THERMOWELLS						
	DIMENSIONS, PROCESS CONN	100%	P	W	V		
	MATERIAL TC	ONE / LOT	P	V	V		
	HYD TEST	100%	P	W	V		
	IBR CERTIFICATE, IF APPLICABLE		P	V	V		
10	REPEATABILITY	100%	P	V	V		
11	HYSTERISIS	100%	P	V	V		
12	ACCESSORIES AS APPLICABLE	SEE NOTE-1 BELOW	P	W	V		

Legend :

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P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.
- Manufacturer to carry out routine test for 100%



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR PRESSURE SWITCH

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	V	V		
	1.1 MODEL NO/TAG NO							
	1.2 RANGE							
	1.3 END CONN							
	1.4 NO. OF CONTACT							
2	CALIBRATION				P	V	V	
	2.1 REPEATABILITY							
	2.2 SET POINT ADJUSTMENT							
	2.3 DIFFERENTIAL							
3	OVER PR & LEAK TEST				P	V	V	
4	ELECT. INSULATION/HV TEST	ONE		P	V	V		
5	REVIEW OF TC FOR MATERIALS OF	FOR LOT		V	V	V		
	5.1 SENSOR							
	5.2 MOVEMENT							
	5.3 PROCESS CONNECTION							
	5.4 HOUSING							
6	REVIEW OF TC FOR DEGREE OF PROTECTION	TYPE TEST		V	V	V		
7	REVIEW OF TC OF MICROSWITCH	FOR LOT		V	V	V		

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to carry out ROUTINE TEST on 100 %.
- Contractor to provide compliance certificate for tests/checks verified by contractor and the same alongwith test certificates to be verified by BHEL



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR FLOAT OPERATED LEVEL SWITCH

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	V	V	
	MODEL NO/TAG NO						
	TYPE						
	END CONNECTION						
	ON/OFF DIFFL			P	W	V	
2	ON/OFF DIFFL			P	W	V	
3	REPEATABILITY			P	W	V	
4	IR TEST			P	W	V	
5	HV TEST			P	V	V	
6	PR. TEST ON CHAMBER	SEE NOTE-5		P	V	V	
7	MATL. TC FOR CHAMBER & FLOAT	FOR LOT	---	V	V	V	
8	CONTACT CONFIG. & RATING FOR MICROSWITCH	FOR LOT	---	V	V	V	
9	TC FOR DEGREE OF PROTECTION	TYPE TEST	---	V	V	V	
10	MANUFACTURER TO ENSURE WELDING PROCEDURE, WELDERS & NDT AS PER ASME FOR PR >40 KG/CM2		---	P	V	V	
11	CHECK FOR TEMP. SUITABILITY FOR MICROSWITCH AND LEAD WIRE	SEE NOTE-1 BELOW	---	V	V	V	
	12			ACCESSORIES AS APPLICABLE		APPROVED SPEC./ DATA SHEETS	

Legend :

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- When material correlation is not available, MFR's compliance to be provided
- IBR certificates shall be provided wherever required.
- Contractor to provide compliance certificate for tests/checks verified by contractor and the same alongwith test certificates to be verified by BHEL



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR ANALYTICAL INSTRUMENTS

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	V	V	
	VISUAL						
	MAKE, MODEL No.						
	POWER SUPPLY						
	TYPE						
2	DIMENSIONS CHECK			P	V	V	
3	FUNCTIONAL CHECK			P	V	V	
4	LEAKAGE TEST			P	V	V	
5	HV / IR TEST			P	V	V	
6	LINEARITY			P	V	V	
7	RESPONSE TIME			P	V	V	
8	ENCLOSURE CLASS			P	V	V	
9	ACCESSORIES, AS APPLICABLE			P	V	V	
10	ACCURACY / CALIBRATION			P	V	V	
11	ALARM CONTACT TEST	P	V	V			
12	ANALOG OUTPUT CHECK	P	V	V			
13	BURN-IN TEST OF ELECTRONIC PARTS	1/LOT	P	V	V		
14	IN-BUILT INDICATOR, ZERO, SPAN, RANGE SCALE SELECTION ETC	SEE NOTE-1 BELOW	P	V	V		

Legend :

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR ANNUNCIATORS

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V	
	TYPE/ MODEL						
	DIMENSIONS OF HARDWARE						
	MODULARITY						
	SEQUENCE						
	FACIA DETAILS						
2	FUNCTIONAL TEST	100%		P	W	V	
3	IMMUNE TO STEP VARIATIONS IN THE POWER SUPPLY	SEE NOTE-1 BELOW		P	W	V	
4	DEGREE OF PROTECTION FOR ENCLOSURE	TYPE TEST		P	W	V	
5	I/R CHECK	SEE NOTE-1 BELOW		P	W	V	
6	RESPONSE			P	W	V	

Legend :

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P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR TRANSMITTER

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECKS FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V	
	VISUAL.						
	MODEL/TAG No						
2	PROCESS CONNECTION			P	W	V	
3	ACCURACY			P	W	V	
4	REPEATABILITY			P	W	V	
5	HYSTERESIS	P		W	V		
6	EFFECT OF TEMP VARIATION ON ACCURACY	P		W	V		
7	SPAN / ZERO ADJUSTMENT	ONE / TYPE		P	W	V	
8	EFFECT OF SUPPLY VOLTAGE VARIATION			P	W	V	
9	EFFECT OF LOADING (500 OHM METERS)			P	W	V	
10	HIGH PRESSURE TEST	SEE NOTE-1 BELOW		P	W	V	
11	BURN-IN TEST	ONE / TYPE		P	W	V	
12	DEGREE OF PROTECTION		P	W	V		
13	ACCESSORIES AS APPLICABLE	SEE NOTE-1 BELOW	V	V	V		

Legend :

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- When material correlation are not available manufacturer's compliance to be provided.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR TEMPERATURE ELEMENT

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks		
				M	C	B			
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V			
	TYPE								
	MODEL No./TAG No.								
	PROCESS CONNECTION								
2	STABILITY					P	W	V	
3	INSULATION RESISTANCE					P	W	V	
4	ENCLOSURE CLASS					P	W	V	
5	RESPONSE TIME					P	W	V	
7	ACCURACY					P	W	V	
8	HYDROSTATIC TEST					P	W	V	
9	ELECTRICAL CHARACTERISTIC OF SENSOR (CONTINUITY OF T/C WIRES & INSULATION RESISTANCE OF RTD LEADS w.r.t. BODY)					P	W	V	
10	TEMP CURVES / CHARTS					P	V	V	
11	AMBIENT TEMP. EFFECT CHECK			P	W	V			
12	HV TEST			P	W	V			

Legend :

** M = Manufacturer / Sub-contractor, C = Contractor / Nominated Inspecting Agency, B = BHEL,
P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.
- IBR certificate to be provided, if applicable



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR MAGNETIC TYPE FLOW METER

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks
				M	C	B	
1	CHECK FOR MODEL TAG No VISUAL	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V	
2	DIMENSIONS,			P	W	V	
3	PROCESS CONNECTION			P	W	V	
4	RANGE / SCALE			P	W	V	
5	ACCURACY			P	W	V	
6	MATERIAL TC FOR METERING TUBE, ORIFICE PLATE, FLANGES AND FASTNER			P	V	V	
7	CALIBRATION REPORT	ONE / SIZE		P	V	V	
8	ACCESSORIES AS APPLICABLE	SEE NOTE-1 BELOW		V	V	V	
9	TC FOR DEGREE OF PROTECTION	TYPE TEST		V	V	V	

Legend :

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P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- Contractor to provide compliance certificate for tests/checks verified by contractor and the same alongwith test certificates to be verified by BHEL



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR SOLENOID VALVES

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks		
				M	C	B			
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V			
	TYPE								
	MAKE								
	MODEL No.								
2	MATERIAL (BODY. PLUNGER/TRIM)					P	W	V	
3	PORT SIZE					P	W	V	
4	CABLE CONNECTION SIZE					P	W	V	
5	ENCLOSURE CLASS					P	W	V	TYPE TEST CERTIFICATE TO BE FURNISHED BY VENDOR
6	No. OF COILS & INSULATION CLASS					P	W	V	TEST CERTIFICATE TO BE FURNISHED FOR INSULATION CLASS BY VENDOR
7	POWER SUPPLY CHECK			P	W	V			
8	IR / HV TEST			P	W	V			
9	FUCTIONAL TEST			P	W	V			

Legend :

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Contractor to provide compliance certificate for tests/checks verifid by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR TEMPERATURE GAUGE

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V		
	DIAL SIZE							
	MODEL NO./TAG NO./TYPE							
	RANGE/SCALE							
	END CONNECTION							
2	CALIBRATION	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V		
	ACCURACY							
	REPEATABILITY							
	HYSTERESIS							
3	OVER TEMP. TEST			P	W	V		
4	AMBIENT TEMP. COMPENSATION CHECK	1 OF TYPE			P	V	V	
5	REVIEW OF TC FOR MATERIALS OF	FOR LOT	APPROVED SPEC./ DATA SHEETS	V	V	V		
	SENSOR							
	MOVEMENT							
	PROCESS CONNECTION							
	THERMOWELL							
6	REVIEW OF TC FOR DEGREE OF PROTECTION	TYPE TEST			V	V	V	
7	THERMOWELL	SEE NOTE-1 BELOW	AS PER APPD DWG		V	V		
	MATERIAL TC & DIMN. CHECK							
	HYD. TEST							
	OVER RANGE TEST							

Legend :

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Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- IBR certificate to be provided if called for in specn.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR PRESSURE & DP GAUGE

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V		
	SENSOR TYPE							
	DIAL SIZE							
	MODEL NO/TAG NO							
	RANGE/SCALE							
	SWITCH CONTACT RATING & NOS.							
	END CONNECTION							
2	CALIBRATION	ONE	APPROVED SPEC./ DATA SHEETS	P	W	V		
	ACCURACY							
	REPEATABILITY							
	SET POINT ADJUSTMENT							
3	OVER PRESSURE & LEAK TEST			P	W	V		
4	OPERATION OF PRESSURE. RELIEF DEVICE	ONE			P	W	V	
5	REVIEW OF TC FOR	FOR LOT	APPROVED SPEC./ DATA SHEETS	V	V	V		
	MATERIALS OF SENSOR							
	MOVEMENT							
	PROCESS CONNECTION							
6	REVIEW OF TC FOR DEGREE OF PROTECTION	TYPE TEST			V	V	V	
7	ACCESSORIES AS APPLICABLE	SEE NOTE-1 BELOW			V	V	V	

Legend :

** M = Manufacturer / Sub-contractor, C = Contractor / Nominated Inspecting Agency, B = BHEL, P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- When material correlation is not available, MFR's compliance to be provided
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR LEVEL GAUGE

Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS / DRWGS	P	W	V		
	TYPE							
	MODEL/ TAG NO.							
	DAIL SIZE							
	RANGE/SCALE							
END CONNECTION								
2	DIMENSIONS, PROCESS CONNECTION	ONE / LOT		P	W	V		
3	ACCURACY			P	W	V		
4	MATERIAL TC FOR			P	V	V		
	BODY ISO.							
	VALVE							
	GAUGE GLASS							
5	HYD. TEST	SEE NOTE-1 BELOW	P	W	V			
6	ACCESSORIES AS APPLICABLE		P	W	V			

Legend :

** M = Manufacturer / Sub-contractor, C = Contractor / Nominated Inspecting Agency, B = BHEL, P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- Contractor to provide compliance certificate for tests/checks verified by contractor and submit the same alongwith test certificates to be verified by BHEL.



STANDARD CHECK LIST FOR C&I INSTRUMENTS (for Maux Pkgs)

CHECK LIST FOR SIGHT FLOW INDICATOR


Sl. No.	Test / Checks	Quantum of check	Reference Doc. / Acceptance Norms	Agency **			Remarks	
				M	C	B		
1	CHECK FOR MODEL TAG No. VISUAL	SEE NOTE-1 BELOW	APPROVED SPEC./ DATA SHEETS	P	W	V		
2	DIMENSIONS,			P	W	V		
3	PROCESS CONNECTION			P	W	V		
4	RANGE / SCALE			P	W	V		
5	ACCURACY			P	W	V		
6	MATERIAL TC FOR METERING TUBE, ORIFICE PLATE, FLANGES AND FASTNER			P	V	V		
7	CALIBRATION REPORT			ONE / SIZE	P	V	V	
8	ACCESSORIES AS APPLICABLE			SEE NOTE-1 BELOW	V	V	V	
9	TC FOR DEGREE OF PROTECTION			TYPE TEST	V	V	V	

Legend :

** M = Manufacturer / Sub-contractor, C = Contractor / Nominated Inspecting Agency, B = BHEL,
P = Perform, W = Witness, V = Verification

Note :

- Quantum of check shall be as below :
100 % - By Manufacturer
- Manufacturer to maintain calibrated instrument having better accuracy than the item under test. Inspecting engineer shall check the same.
- Manufacturer to carry out ROUTINE TEST on 100 %.
- Contractor to provide compliance certificate for tests/checks verified by contractor and the same alongwith test certificates to be verified by BHEL

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
 STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL										STD QUALITY PLAN NO.: PE-QP-999-145-I056 VOLUME IIB SECTION D REV. NO. 01 DATE: 22-02-2008 SHEET 1 OF 7		
1.0	INCOMING Sheet Steel (CRCA & HR)	1. Chemical Composition 2. Bend Test 3. Surface finish 4. Waviness 5. Thickness 6. Mill marking	MA CR MA MA MA MA	Chemical analysis Mech. test Visual Visual Measurement Visual	Sample Sample 100% 100% 100% 100%	IS:1079 IS:513 IS:1079 IS:513 Factory Standard / Sample Factory Standard BHEL Spec. Factory Standard	IS:1079 IS:513 IS:1079 IS:513 Factory Standard / Sample No Waviness BHEL Spec. Factory Standard	Test Certificate Log Book Log Book Log Book Log Book Log Book	3 2 2 2 2 2	--- --- --- --- --- ---	2 --- --- --- --- 1	
2.0	Flats / Angles / Channels	1. Dimensions 2. Surface Defects 3. Straightness 4. Mill marking	MA MA MA MA	Measurement Visual Measurement Visual	Sample 100% 100% 100%	IS:2062 Factory Standard / Sample Factory Std. IS:2062	IS:2062 Factory Standard / Sample Factory Std. IS:2062	Log Book Log Book Log Book Log Book	2 2 2 2	--- --- --- ---	--- --- --- 1	
3.0	Cables / Wires	1. Visual / Surface defects 2. IR and HV	MA MA	Visual Electrical	100% 100%	BHEL Spec. and IS:1554 or IS:694 BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694 BHEL Spec. and IS:1554 or IS:694	Log Book Log Book	2 2	--- ---	--- ---	
LEGEND: * CR - Critical characteristics MA - Major characteristics MI - Minor characteristics \$ P - Agency Performing the Test. W - Agency Witnessing the Test. V - Agency Verifying the Test. 1 - BHEL 2 - Vendor 3 - Sub-vendor												

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
		3. Conductor a) Resistance b) Size c) Sheet colour	MA MA MA	Electrical Measurement Visual	100% 100% 100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	2	---	---	
		4. Type / Routine Test Certificates	MA	Verification	100%	BHEL Spec. and IS:1554 or IS:694	BHEL Spec. and IS:1554 or IS:694	Log Book	3	---	2	
4.0	Electrical Components like Annunciator Transformers Lamps Switches PBs Contactors Relays Timers Space Heaters Thermostat Indicating meters etc.	1. Verification at make and Type 2. Verification of Test Certificates 3. Operation / Functional check 4. I.R. 5. H.V. 6. Calibration 7. Pick up / Drop off Voltage	CR CR CR MA MA MA MA	Visual Scrutiny of Type / Routine T.Cs. Electrical Electrical Electrical Electrical Electrical	Sample 100% Sample+ 100% 100% 100% 100% 100%	BHEL Spec. and BOM Relevant IS Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue	BHEL Spec. and BOM Relevant IS Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue Relevant Indian Std & Catalogue	Log Book Log Book Log Book Log Book Log Book Log Book Log Book	2 2 2 2 2 2 2	--- --- --- --- --- --- ---	--- --- --- --- --- 1 ---	+ for relay & contactors only @ for all components except relays & contactors.
LEGEND: * CR - Critical characteristics MA - Major characteristics MI - Minor characteristics § P - Agency Performing the Test. W - Agency Witnessing the Test. V - Agency Verifying the Test. 1 - BHEL 2 - Vendor 3 - Sub-vendor												



**STANDARD QUALITY PLAN
FOR
LOCAL CONTROL PANEL**


STD QUALITY PLAN NO.: PE-QP-999-145-I056

VOLUME IIB


SECTION D

REV. NO. 01 DATE: 22-02-2008

SHEET 2 OF 7

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
 PEM :: C&I		STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL						STD QUALITY PLAN NO.: PE-QP-999-145-I056				
		VOLUME		IIB								
		SECTION		D								
		REV. NO.		01			DATE:		22-02-2008			
		SHEET		3			OF		7			
5.0	Misc. Components like Gaskets, Terminal Blocks etc.	1. Verification of Type / Make	MA	Visual	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
		2. Surface defects	MA	Visual	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
		3. IR / HV on Terminal Blocks	MA	Electrical	Sample	BHEL Spec. & Mfrs. Catalogue	BHEL Spec. & Mfrs. Catalogue	Log Book	2	---	---	
6.0	IN PROCESS Blanking / Bending / Forming	1. Dimensions	MI	Measurement	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
		2. Surface defects after bending	MA	Visual	100%	Factory Standard	Factory Standard	Log Book	2	---	---	
7.0	Nibbling / Punching	1. Cutout Sizes	MI	Measurement	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
		2. Deburring	MA	Visual	100%	Approved Mfr. drgs.	Approved Mfr. drgs.	Log Book	2	---	---	
8.0	ASSEMBLY Frame Assembly & Sheet fixing	1. Dimensions	MA	Measurement	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		2. Alignment	MA	Measurement	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		3. Welding Quality	MA	Visual	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
		4. Surface defects	MA	Visual	100%	Approved drg. / Mfr. Standards	Approved drg. / Mfr. Standards	Log Book	2	---	2	
LEGEND: * CR - Critical characteristics \$ P - Agency Performing the Test. 1 - BHEL MA - Major characteristics W - Agency Witnessing the Test. 2 - Vendor MI - Minor characteristics V - Agency Verifying the Test. 3 - Sub-vendor												

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks	
									P	W	V		
		STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL					STD QUALITY PLAN NO.: PE-QP-999-145-I056						
							VOLUME		IIB				
							SECTION		D				
							REV. NO.		01		DATE: 22-02-2008		
							SHEET		4		OF 7		
9.0	Pre-treatment and Painting	<p>1. Pretreatment Process</p> <p>2. Process parameters like bath temp. concentration etc.</p> <p>3. Dipping / Removal Time</p> <p>4. Surface quality after every dip</p> <p>5. Primer after phosphating</p> <p>6. Putty Application & Rubbing after primer</p> <p>7. Paint first coat</p> <p>8. Putty Application and Rubbing after first coat of paint</p> <p>9. Paint second coat</p>	<p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p> <p>MA</p>	<p>Visual</p> <p>Measurement</p> <p>Measurement</p> <p>Visual</p> <p>Visual, Thickness</p> <p>Visual</p> <p>Visual, Thickness</p> <p>Visual</p> <p>Visual, Thickness, Scratch test Colour adhesion</p>	<p>100%</p> <p>Periodic</p> <p>100%</p> <p>100%</p> <p>100%</p> <p>100%</p> <p>100%</p> <p>100%</p>	<p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p>	<p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p> <p>Factory Standard & IS: 6005</p>	<p>Log Book</p> <p>Log Book</p> <p>Log Book</p> <p>Log Book</p> <p>Log Book</p> <p>Log Book</p> <p>Log Book</p> <p>Log Book</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	<p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p> <p>---</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>		
<p>LEGEND: * CR - Critical characteristics MA - Major characteristics MI - Minor characteristics</p> <p>\$ P - Agency Performing the Test. W - Agency Witnessing the Test. V - Agency Verifying the Test.</p> <p>1 - BHEL 2 - Vendor 3 - Sub-vendor</p>													

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
 STANDARD QUALITY PLAN FOR LOCAL CONTROL PANEL									STD QUALITY PLAN NO.: PE-QP-999-145-I056 VOLUME IIB SECTION D REV. NO. 01 DATE: 22-02-2008 SHEET 5 OF 7			
10.	Panel Wiring	1. Wiring Layout	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		2. Wiring Termination (Crimped Lugs)	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		3. Ferrule numbers	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	---	
		4. Colour of wiring	MA	Visual	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	1	
		5. Size of Conductor	MA	Measurement	100%	Approved drgs. & Specs.	Approved drgs. & Specs.	Log Book	2	---	1	
11.	Component Mounting	1. Correct components	MA	Visual	100%	Approved drgs., Specs. & BOM	Approved drgs., Specs. & BOM	Log Book	2	---	---	
		2. Fixing	MA	Visual	100%	Approved drgs., Specs. & BOM	Approved drgs., Specs. & BOM	Log Book	2	---	---	
12.	FINAL Final Inspection	1. Workmanship	MA	Visual	100%	Factory Standard	Factory Standard	Inspection Report	2	1	1	} At Random by BHEL, based on 100 % internal test reports by Mfr.
		2. Component layout (neatness, accessibility & safety) Mounting / Proper fixing of all components	MA	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		3. Components identification Marking / Name plates	MA	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics

^{\$} P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^s			Remarks
									P	W	V	
		5. Dimensions	MA	Measurement	100%	BHEL approved drg. / Spec., BOM	BHEL approved drg. / Spec., BOM	Inspection Report	2	1	1	At Random by BHEL, based on 100 % internal test reports by Mfr.
		6. Door functioning	MA	Functional	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		7. Paint Shade	CR	Visual	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		8. Paint Thickness	CR	Measurement	100%	BHEL approved drg. / Spec.	BHEL approved drg. / Spec.	Inspection Report	2	1	1	
		9. Workmanship of Gaskets	MA	Visual	100%	Factory Standard	Factory Standard	Inspection Report	2	1	1	
		10. Wiring Layout	MA	Visual	100%	BHEL approved drg.	BHEL approved drg.	Inspection Report	2	1	1	
		11. Wire Termination	MA	Pulling manually	Sample	----	Firm termination	Inspection Report	2	1	1	
		12. Continuity	MA	Electrical	100%	----	Continuity OK	Inspection Report	2	1	1	

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics

^s P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor


Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^s			Remarks
									P	W	V	
13.	TYPE TEST	Degree of Protection	CR	Mech. Protection	Sample	BHEL approved spec., drg relevant IS-13947 Part-1, IS-2148.	BHEL approved spec., drg relevant IS-13947 Part-1, IS-2148.	Type Test Certificate	3	---	1	
14	ROUTINE TEST	IR before & after HV Test	CR	Electrical	100%	BHEL approved spec., drg., BOM & relevant IS.	BHEL approved spec., drg., BOM & relevant IS.	Test Report	2	1	1	
15	FUNCTIONAL TEST	1. Control Logic Operation	CR	Electrical	100%	BHEL approved spec. / drg.	BHEL approved spec. / drg.	Inspection Report	2	1	1	
		2. Instrument Calibratio	CR	Electrical	10%	BHEL approved spec. / drg.	BHEL approved spec. / drg.	Inspection Report	2	1	1	
		3. Temperature rise (as applicable)	CR	Electrical	100%	BHEL approved spec/drg. & relevant IS.	BHEL approved spec/drg & relevant IS.	Inspection Report	2	1	1	

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics

^s P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
		STANDARD QUALITY PLAN FOR FLOW ORIFICE PLATE ASSEMBLY					QUALITY PLAN NO.: PE-QP-999-145-1024 VOLUME IIB SECTION D REV. NO. 05 DATE: 30.05.13 SHEET 1 OF 2					
1.0	MATERIAL											
1.1	Orifice Plate	1. Physical, Chemical properties	MA	Physical, Chemical Tests	One / Plate OR One/ Heat	AP / DS / SP	AP / DS / SP	Lab Report	3/2	---	2,1	IBR certification (if applicable) to be verified by BHEL
		2. Dimensions	MA	Measurement	100%	AP	AP	IR	3/2		1	
1.2	Flanges											
	A. Forgings	Chemical, Mech Properties, UT & Heat Treatment	MA	Chem & Mech UT test	Sample	Material Spec as per ASTM A 388 for UT	ANSI B 16.34	MTC, UT cert, HT cert	3/2	---	1	
	B. Machining	Dimensions	MA	Measurement	100 %	AP / DS	AP / DS	IR	3/2	----	1	
2.0	IN PROCESS Machine											
		1. Dimension	MA	Measurement	100%	AP	AP	IR	3/2	2	2	
		2. Surface finish	MA	Visual	100%	-----	Mirror Finish	-----	3/2	2	---	
		3. Surface flaw on machined surface	MA	Penetrant test	100%	ASTM 165 / IS:3658	No surface flaw	IR / TC	3/2	2	1	
3.0	ASSEMBLY and FINAL INSPECTION											
		1. Overall dimensions	MA	Measurement	100%	AP	AP	IR	3/2	2,1	----	
		2. Marking, Tag no. Direction of flow	MA	Visual	100%	AP / DS	AP / DS	IR	3/2	2	1	
		3. Calibration	MA	Performance Test	One per type	-----	SP	TC	3/2		1	
		4. Painting	MA	Visual	100%	SP / MS	SP / MS	IR / MR	3/2	----	1	
LEGEND: * CR - Critical characteristics IR - Inspection Reports DS - Data Sheet MR- Manufacturer records ^{\$} P - Agency Performing the Test. 1 - BHEL MA - Major characteristics TC - Test Certificates SP - Tech. Spec. MS- Manufacturer standards W - Agency Witnessing the Test. 2 - Vendor MI - Minor characteristics AP - Approved Drawings/doc V - Agency Verifying the Test. 3 - Sub-vendor												

 PEM :: C&I		STANDARD QUALITY PLAN FOR FLOW ORIFICE PLATE ASSEMBLY						QUALITY PLAN NO.: PE-QP-999-145-1024				
								VOLUME IIB				
								SECTION D				
								REV. NO. 05 DATE: 30.05.13				
		SHEET 2 OF 2										
Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks
									P	W	V	
4.0	PACKING	Soundness of Packing against transit damage	MA	Visual	100%	SP / MS	SP / MS	----	3/2	----	----	Refer Note 4

NOTE:

1. All test reports & dimension reports shall be verified by BHEL wherever verification is by BHEL at the time of Final Inspection.
2. Minimum 2 coats of primer paint to be applied before dispatch.
3. CALIBRATION Test to be carried out at IIT-DELHI / FCRI or BHEL approved laboratory.
4. Sea Worthy packing, if applicable.

LEGEND: * CR - Critical characteristics IR - Inspection Reports DS – Data Sheet MR- Manufacturer records ^{\$} P - Agency Performing the Test. 1 - BHEL
 MA - Major characteristics TC - Test Certificates SP – Tech. Spec. MS- Manufacturer standards W - Agency Witnessing the Test. 2 - Vendor
 MI - Minor characteristics AP – Approved Drawings/doc V - Agency Verifying the Test. 3 - Sub-vendor

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency [§]			Remarks
									P	W	V	
1.0	Raw Material / Component											
1.1	Resistance sheath	Material composition	CR	Chemical testing	One Sample from each lot	Approved drg. / data sheet	Relevant material std.	Test Certificate	3,2	---	2,1 ▲	▲ Relevant compliance certificate to be verified.
1.2	Protective Sheath	Material composition	MA	Chemical testing		Approved drg. / data sheet	Relevant material std.	Test Certificate	3,2	---	2,1 ▲	
1.3	Terminal Head	Material composition	MA	Chemical testing		Approved drg. / data sheet	Relevant material std.	Test Certificate	3,2	---	2,1 ▲	
1.4	Thermowell⊕	1. Chemical properties	CR	Chemical composition	One Sample from each lot	Approved drg. / data sheet	Relevant material std.	Test Certificate	3,2	---	2,1	
		2. Dimensions (wall thickness concentricity of bore, OD & length)	MA	Measurement	100%	Approved drg., BHEL Spec.	Approved drg., BHEL Spec.	Inspection report	2	1♦	1	♦ BHEL to witness 25% Samples
		3. Threading	MA	Thread matching	100%	Approved drg., BHEL Spec.	Approved drg., BHEL Spec.	Inspection Report	2	2,1♦	1	
		4. Leak Test (Hyd. test at 1.5 times design press)	CR	Visual	100%	Approved drg., BHEL Spec.	Approved drg., BHEL Spec.	Inspection Report	3,2	1**	2/1	⊕IBR certificate wherever specified to be verified. **10% of total quantity with minimum of 2 random piece/type & size

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics; Mfd std - Manufacturers' standard

[§] P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor



**STANDARD QUALITY PLAN
FOR
RESISTANCE TEMPERATURE DETECTOR WITH THERMOWELL**

QUALITY PLAN NO.: PE-QP-999-145-1025


VOLUME IIB

SECTION D

REV. NO. 01

DATE: 21.03.2012

SHEET 1 OF 2

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^{\$}			Remarks			
									P	W	V				
		STANDARD QUALITY PLAN FOR RESISTANCE TEMPERATURE DETECTOR WITH THERMOWELL					QUALITY PLAN NO.: PE-QP-999-145-1025 VOLUME IIB SECTION D REV. NO. 01 DATE: 21.03.2012 SHEET 2 OF 2								
2.0	Final Inspection														
2.1	RTD Assembly	1. Workmanship 2. Marking 3. Dimensions	MA MA MA	Visual Visual Measurement	100% 100% 100%	Approved drg. / data sheet	Approved drg. / data sheet	Inspection Report	2	----	1▲				
													2	----	1▲
													2	----	1▲
2.2	Routine Tests	1. Calibration (Resis Vs. Temp.) 2. Insulation Resistance 3. Thermal Response time	CR MA CR	Measurement Electrical Measurement	100% 100% One Sample from each type	IS:2848 IS:2848 IS:2848	IS:2848 IS:2848 IS:2848	Test Report Test Report Test Certificate	2 2 2	2 1 1	1 --- ---				
2.3	Type Test	Enclosure protection test	CR	Verification	Each type	Approved drg. / data sheet	Approved drg. / data sheet	Test Certificate	3/2	----	1*		*Type Test Certificate (not more than 5 year old) to be verified Visual		
3.0	Packing	Soundness of packing	MA	Visual	100%	Mfd std.	Mfd std.	Inspection Report	3/2	2	---		Visual		

LEGEND: * CR - Critical characteristics \$ P - Agency Performing the Test. 1 - BHEL
 MA - Major characteristics W - Agency Witnessing the Test. 2 - Vendor
 MI - Minor characteristics; Mfd std - Manufacturers' standard V - Agency Verifying the Test. 3 - Sub-vendor



STANDARD QUALITY PLAN FOR TEMPERATURE GAUGE AND THERMOWELL

QUALITY PLAN NO.: PE-QP-999-145-1027	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	16-05-2007
SHEET	1 OF 4

Page 460 of 564

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
1.0	Raw Material / Component											
1.1	Capillary Bulb and Thermowell	1. Chemical composition	CR	Chemical analysis	one sample/lot	BHEL spec. / approved data sheet	Relevant raw material std.	Test report	3/2	---	2,1	Relevant compliance certificate to be verified by BHEL
		2. Marking,	MA	Visual	100%	BHEL spec. / Mfr. Standard	BHEL spec. / Mfr. Standard	Log Book	2	---	---	
		3. Dimensions	MA	Measurement	100%	BHEL spec. / approved doc	BHEL spec. / approved doc	Log Book	2	---	---	
1.2	Casing and Bezel	1. Material	MA	Chemical analysis	Sample	BHEL spec.	BHEL spec.	Test report	3/2	---	2,1	Relevant compliance certificate to be verified by BHEL
		2. Defects	MA	Visual	100%	Mfr. Standard	Mfr. Standard	Log Book	2	---	---	
		3. Dimension	MA	Measurement	Sample	BHEL spec. / approved doc.	BHEL spec. / approved doc.	Log Book	2	---	---	
		4. Threading	MA	Thread matching	100%	-----do-----	-----do-----	Log Book	2	---	---	
1.3	Dial	1. Size, range, scale length, least-count, spacing and graduation.	MA	Measurement and Visual	Sample	BHEL spec.	BHEL spec.	Log Book	2	---	---	
		2. Colour	MA	Visual	100%	BHEL spec.	BHEL spec.	Log Book	2	---	---	
		3. Resistance to dry heat and hot water	MA	Oven & Bath	Sample	Mfr. Standard	Mfr. Standard	Test report	3/2	---	---	

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LEGEND: * CR - Critical characteristics MA - Major characteristics MI - Minor characteristics	\$ P - Agency Performing the Test. W - Agency Witnessing the Test. V - Agency Verifying the Test.	1 - BHEL 2 - Vendor 3 - Sub-vendor
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**STANDARD QUALITY PLAN
FOR
TEMPERATURE GAUGE AND THERMOWELL**

QUALITY PLAN NO.: PE-QP-999-145-I027	
VOLUME	IIB
SECTION	D
REV. NO.	01
DATE:	16-05-2007
SHEET	2 OF 4

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Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
1.4	Complete sensing element	1. Correct assembly and workmanship.	MA	Visual	100%	Mfr. Standard drawing	Mfr. Standard drawing	Log Book	2	---	---	
		2. Dimensions	MA	Measurement	100%	Mfr. Standard drawing	Mfr. Standard drawing	Log Book	2	---	---	
		3. Welding & other defects	MA	Visual	100%	Mfr. Standard	Mfr. Standard	Log Book	2	---	---	
1.5	Thermowell ⊕	1. Dimensions of wall thickness, concentricity of bore OD & Length.	MA	Measurement	100%	BHEL spec. / approved data sheet / Drg.	BHEL spec. / approved data sheet / Drg.	Log Book	2	1	1	BHEL to witness 10 % random samples.
		2. Leak Test	CR	Hyd. test at 1.5 times of design pressure.	100%	BHEL spec. / approved data sheet / Drg.	BHEL spec. / approved data sheet / Drg.	Inspection report	3/2	2,1	1	⊕ IBR cert. wherever specified to be verified.
		3. Threading	MA	Thread matching	100%	BHEL spec. / approved data sheet / Drg.	BHEL spec. / approved data sheet / Drg.	Inspection report	2	2,1	1	BHEL to witness 10% samples.
2.0	Final Inspection											
2.1	Assembly	1. Correct assembly, workmanship and finish	MA	Visual	100%	BHEL spec. / approved data sheet	BHEL spec. / approved data sheet	Inspection report	2	1	---	

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LEGEND: *	CR - Critical characteristics	\$	P - Agency Performing the Test.	1 - BHEL
	MA - Major characteristics		W - Agency Witnessing the Test.	2 - Vendor
	MI - Minor characteristics		V - Agency Verifying the Test.	3 - Sub-vendor



PEM :: C&I

**STANDARD QUALITY PLAN
FOR
TEMPERATURE GAUGE AND THERMOWELL**

QUALITY PLAN NO.: PE-QP-999-145-I027

VOLUME IIB

SECTION D

REV. NO. 01 DATE: 16-05-2007

SHEET 3 OF 4

Page 462 of 504

Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
		2. Mounting and connection	MA	Visual ad measurement	100%	-----do-----	-----do-----	Inspection report	2	1	---	
		3. Dial Scale	MA	Visual	100%	-----do-----	-----do-----	Log Book	2	1	---	
		1. Cleanliness	MA	Visual	100%	-----do-----	Free from scratches, dirt etc.	Log Book	2	---	2	
		5. Marking (S.No., Tag No.)	MA	Visual	100%	BHEL spec. / approved data sheet	BHEL spec. / approved data sheet	Log Book	2	1	---	
2.2	Routine Test	1. Accuracy	MA	Measurement	100%	BHEL spec. / Approved data Sheet.	BHEL spec. / Approved data Sheet.	Test Report	2	1	1	BHEL to witness 10% random Samples.
		2. Overload	CR	Measurement	10%	125% of FSD for range upto 400 Deg. C. 110% of FSD for range between 400 to 500 Deg. C. 100% of FSD for range above 500 Deg. C.	No Damage	Test Report	2	1	---	

LEGEND: * CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

\$

P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

1 - BHEL
2 - Vendor
3 - Sub-vendor

QP for Electric Operated Hoist

MANUFACTURERS NAME & ADDRESS		STANDARD QUALITY PLAN				PROJECT				
AS PER APPROVED VENDOR LIST		ITEM:	ELECTRIC WIRE ROPE	QIP NO	REV	CONTRACT No	PACKAGE			
CHARACTERISTICS		CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS		
S/No	COMPONENT & OPERATIONS						D*	M	C	N
1	RAW MATERIALS	4	5	6	7	8	9	**	10	11
1.1	a) STRUCTURAL MATERIAL b) RAW MATERIAL FOR HOIST AND GEAR BOX HOUSING, TROLLEY PLATE (AS APPLICABLE)	MA	CHEMICAL COMPOSITION AND TENSILE STRENGTH	1 / lot	APPD. DRG./ DATA SHEET	APPD. DRG./ DATA SHEET	✓		V	V
1.2	GEARS, SHAFT/AXLES, WHEELS	MA	CHEMICAL COMPOSITION, HARDNESS (DURING IN-PROCESS), NDT	100%	APPD. DRG./ DATA SHEET	APPD. DRG./ DATA SHEET / IS:3938	✓		P	V
1.3	WIRE ROPE	CR	Dimensional CHECK	100%	APPD. DRG./ DATA SHEET	APPD. DRG./ DATA SHEET	✓		P	V
1.4	HOOKS	MA	PHYS / MECH , CHEM. PROPS.	1 / LOT	APPD. DRG./ DATA SHEET / IS:3938 / IS:15560	APPD. DRG./ DATA SHEET / IS:3938 / IS:15560	✓		P	V
2.0	IN-PROCESS	CR	NDT	100%	APPD. DRG./ DATA SHEET / IS:3938 / IS:15560	APPD. DRG./ DATA SHEET / IS:3938 / IS:15560	✓		P	V
2.1*	WELDING PROCEDURE SPECIFICATION	MA	CORRECTNESS	100%	IS:7307 / ASME SEC IX	IS:7307 / ASME SEC IX	✓		P	V
2.2*	PROCEDURE & WELDER QUALIFICATION	MA	WELDING PARAMETERS	100%	IS:7310 / ASME SEC IX	IS:7310 / ASME SEC IX	✓		P	W
		LEGENDS								
		* RECORDS IDENTIFIED WITH TICK(✓) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION								
		** M. MANUFACTURER/SUBCONTRACTOR								
		C. CONTRACTOR NOMINATED INSPECTION AGENCY(BHEL) H. CUSTOMER								
MANUFACTURER/ SUB CONTRACTOR		INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION AS APPROPRIATE. 'CHP' CUSTOMER SHALL IDENTIFY IN COLUMN 'M'								
SIGNATURE		REVIEWED BY: _____ NAME & SIGN OF APPROVING AUTHORITY & SEAL								

SLNo	COMPONENT & OPERATIONS	MANUFACTURERS NAME & ADDRESS				STANDARD QUALITY PLAN				PROJECT			
		AS PER APPROVED VENDOR LIST	ITEM:	ELECTRIC WIRE ROPE	OP NO	REV	DATE	PACKAGE	CONTRACT No	CONTRACTOR	CONTRACTOR	CONTRACTOR	CONTRACTOR
CHARACTERISTICS	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS	D*	M	C	N	
1	CABLES	3	4	5	6	7	8	9	10	11			
8	FINAL INSPECTION	TYPE AND ROUTINE TESTS	MA	100% AS PER TECH. SPEC. IS:1554/IS:9968. PART - I/ IS:694 / RELEVANT IS FOR RELS.CABLES.	AS PER TECH. SPEC. IS:1554/IS:9968. PART - I/ IS:694 / RELEVANT IS FOR RELS.CABLES.	MNFRS' TEST CERT.	OP						
3.0	COMPLETELY ASSEMBLED HOIST	1. COMPLETENESS, CORRECTNESS, OVERALL DIMENSIONS	MA	VISUAL, MEAS	100% APPD. DRG.	APPD. DRG.		MNFRS' TEST CERT.	P	W	V		
3.2	ASSEMBLED HOIST PERFORMANCE	1. LOWERING SPEED, PERFORMANCE OF CONTROLLERS SWITCHES AND OTHER CONTROL DEVICES CORRELATIONS OF CIRCUITS AND INTERLOCKS AND SEQUENCES OF OPERATION	CR	LOAD TEST at SWL	100% IS:6547 / IS:3938	MNFRS' TEST CERT.		MNFRS' TEST CERT.	P	W	V		
3.3	OVER LOAD TEST	1. TO RELEVANT IS	MI	CORRECTNESS OF MFG. TEST CERT.	TECH SPEC.	MNFRS' TEST CERT.		MNFRS' TEST CERT.	P	W	V		
4	PAINTING	1. TO RELEVANT IS	MI	CORRECTNESS OF MFG. TEST CERT.	TECH SPEC.	MNFRS' TEST CERT.		MNFRS' TEST CERT.	P	W	V		
1	PRIMER & FINISHING AND SHADE	1. TO RELEVANT IS	MI	CORRECTNESS OF MFG. TEST CERT.	TECH SPEC.	MNFRS' TEST CERT.		MNFRS' TEST CERT.	P	W	V		
NOTE:													
* 1.0 Clause from 2.1 to 2.4 shall be applicable for load bearing welded joints.													
2.0 Back Wall Echo shall be adjusted to 100% of Full Screen Height in sound (Defect Free) Area. Defect Echo Height more than 20% of Screen Height shall be treated as unacceptable. Back Wall Echo shall not be less than 80% of Screen Height in any case.													
LEGENDS													
* RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION													
** M: MANUFACTURER/SUBCONTRACTOR													
C: CONTRACTOR NOMINATED INSPECTION AGENCY(BHEL) H: CUSTOMER													
INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION AS APPROPRIATE 'CHP' CUSTOMER SHALL IDENTIFY IN COLUMN 'N'													
MANUFACTURER/ SUB CONTRACTOR	REVIEWED BY												
SIGNATURE	NAME & SIGN OF APPROVING AUTHORITY & SEAL												

	MANUFACTURING QUALITY PLAN	PROJECT: PACKAGE: VOL IIB, SEC C
	ITEM : Chain Pulley Block	
	QP No.: PE-TS-XXX-XXX-A001	
	REV.:0, Date.:, PAGE: 2 OF 4	

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			11.

		INTERNAL DEFECTS	MA	UT	10%	ASTM A-388 (REFER NOTE 1)	APPROVED DRAWING	IR	✓	P		shall be given.
1.4.	LOAD CHAIN WHEELS	-CHEMICAL COMPOSITION MECHANICAL PROPERTIES	MA	CHEMICAL MECHANICAL PROPERTIES	ONE SAMPLE PER LOT	APPD. DRG.	APPD. DRG.	MTC	✓	P		
1.5	BEARINGS	MAKE, TYPE, CATALOGUE NO.	MA	VISUAL	RANDOM	APP DRG / MFR'S CATALOGUE	APP DRG / MFR'S CATALOGUE	IR	✓	P	✓	
1.6	HAND CHAIN WHEEL	CHEMICAL MECHANICAL PROPERTIES	MA	CHEMICAL MECHANICAL PROPERTIES	ONE SAMPLE PER LOT	AS PER DRAWING	AS PER DRAWING	MTC	✓	P	✓	
1.7	HAND CHAIN	GRADE/ DIMENSION	MA	GRADE DIMENSION	100 %	AS PER DRAWING	AS PER DRAWING	MTC	✓	P	✓	
1.8	TROLLEY GEARS, PINION, WHEELS, AXLE	CHEMICAL & MECHANICAL	MA	LAB ANALYSIS,	100%	AS PER DRAWING	AS PER DRAWING	IR/T C	✓	P	✓	
2	IN PROCESS											
2.1	RATCHET PAWL / RATCHET WHEEL	-HARDNESS	MA	HARDNESS	100%	IS:3832 / APPD DRG.	IS:3832 / APPD. DRG.	IR	✓	P	✓	

FOR CUSTOMER USE		
MANUFACTURER / SUB-CONTRACTOR	SIGNATURE	
SUB-CONTRACTOR	SIGNATURE	
REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL	

LEGEND:

** M : MANUFACTURER / SUB-CONTRACTOR
 C : BHEL / NOMINATED INSPECTION AGENCY.
 N : CUSTOMER
 INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION

	MANUFACTURER'S NAME & ADDRESS:	MANUFACTURING QUALITY PLAN	PROJECT: PACKAGE: VOL IIB, SEC C
		ITEM: Chain Pulley Block QP No.: PE-TS-XXX-XXX-A001 REV.: 0, Date.: , PAGE: 4 OF 4	

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			11.

3.3	NAME PLATE	VERIFICATION	MA	VISUAL	100%			IR		P	V	--	
3.4	PACKING	-VERIFICATION	MI	VISUAL	100%		SPECS.	IR		P	--	-	
3.5	REVIEW OF QA DOCUMENTATION	VERIFICATION	MA	VISUAL	100%		APPD. CP		✓		V	V	

CR – CRITICAL, MA – MAJOR , MI – MINOR

NOTE 1: BACK WALL ECHO SHALL BE ADJUSTED TO 100% OF FULL SCREEN HEIGHT IN SOUND (DEFECT FREE) AREA. DEFECT ECHO HEIGHT MORE THAN 20% OF SCREEN HEIGHT SHALL BE TREATED AS UNACCEPTABLE. BACK WALL ECHO SHALL NOT BE LESS THAN 80% OF SCREEN HEIGHT IN ANY CASE.

NOTE 2: RECORDS IDENTIFIED WITH TICK SHALL BE ESSENTIALLY INCLUDED IN QA DOCUMENTATION.

	LEGEND:	FOR CUSTOMER USE	
	** M : MANUFACTURER / SUB-CONTRACTOR C : BHEL / NOMINATED INSPECTION AGENCY. N : CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION		
MANUFACTURER/ CONTRACTOR			
SUB-CONTRACTOR SIGNATURE		REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL



Ref :INSP:CHK:001/ REV 00
DT:10/08/2020

Inspection document Check List

Inspection documents to be submitted after inspection of the items for getting dispatch clearance. Vendor shall provide documents to the BHEL/BHEL TPIA inspector during inspection and TPIA shall sign all the documents.

The document dossier shall contain following.

SL no.	Documents
1	Unpriced PO COPY.
2	Latest approved specification, datasheet, drawing, P&ID, test procedures, approved painting schedule, Packing etc.
3	Approved QAP.
4	CQIR Report (Disposal code should be Accepted all the offered QTY)
5	<p>As per approved QAP all the inspection documents to be submitted.</p> <p>Indexing of the reports as per QAP and each page wise numbered and correlated to QAP. If more than one test in each page, against each test the clause number of QAP to be mentioned.</p> <p>Inspection clause shall be mentioned against each test.</p> <p>1. Raw Material Test Certificates (NABL approved Lab TC/Manufacturer TC like Mechanical properties, Chemical Properties, UT etc. as per approved QAP.</p>

K. Kovarthan

கி. கோவர்தனன்
கி. கோவர்தனன் / K. KOVARTHANAN
பரிசீலனை இயக்குநர் / Sr. Engineer
கualitasas Divisi / Quality Department
பி.என்.எம். / BHEL R&P RANIPET-3

	<p>2. In process Inspection Reports like Hydro test, Dimension Report, MPI,UT ,Balancing etc. as per approved QAP.</p> <p>3. Final Inspection Reports like Shop Assembly with testing reports, Hydro test/Leak / Pressure test reports, Type test Reports, WPS/PQR/WPQ Reports, PT/RT/UT/MT Reports etc. as per approved QAP.</p> <p>4. Final Inspection like packing and surface preparation & Painting/Metal finishing reports. (Sea worthy packing / Special Packing requirement).</p>
6	Relevant pages of standard shall be attached with report.
7	Calibration reports of the instruments used to be signed by TPI after verification.
8	Above said documents are should be in single .pdf file with not more than 10MB (if more than 10MB can be split into multiple files)
9	Hard copy of the same to be submitted along with material dispatch.

Kovarthanan

K KOVARTHANAN

கா. கோவர்த்தனன்
 क. कोवर्धनन / K. KOVARTHANAN
 वरिष्ठ इंजीनियर / Sr. Engineer
 गुणवत्ता विभाग / Quality Department
 बीएचईएल राणीपेट, राणीपेट, BHEL, BAP, RANIPET
DM/QC PROC
BHEL RANIPET