

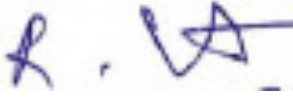


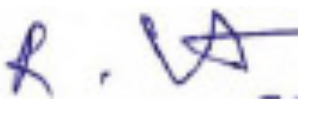




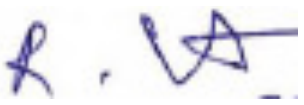
1029912/2022/BAP/QA/MECH

SL. NO		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS		
1.		2.	3.	4.	5.	6.	7.	8.	9.	D*	** 10.	11.	
1.0 RAW MATERIALS													
1.1	Volute Casing, Casing Cover	Chemical & Mechanical Properties	Major	Chemical & Mechanical Properties, Hardness check	1 Sample / Heat	NTPC Approved GA Drawing / Data Sheet/ Specification	MTC	√	P	V	V		
1.2	Impeller, Wear Plate.	Chemical & Mechanical Properties	Major	Chemical & Mechanical Properties, Hardness check	1 Sample / Heat	Drawing & Specification	MTC	√	P	V	V		
1.3	Volute Casing	Surface Defects	Major	DPT on machined surface	100%	ISO4987	ISO 4987, Level 2	DPT Report	√	P	V	V	
1.4	Cover Plate & Frame Plate	Soundness	Major	RT *	100 %	ASME Sec V, ASTM - E446 Level - 5	Test Report	√	P	V	V	*For Gypsum Bleed Pumps	
1.5	Shaft	Chemical Composition	Major	Chemical composition	1 Sample /Heat	Drawing/Specification	Test Report	√	P	V	V		
		Mechanical Properties		Mechanical Tests, Heat treatment if applicable		Drawing/Specification	Test Report	√	P	V	V	HT Chart Review.	
Manufacturer Sign & Seal		Legend: * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package. M: Manufacturer / Sub supplier, C: Main Contractor/BHEL/BHEL AIA. N: NTPC P: Perform: witness, V: review of records, MA: Major and MI: Minor, DPT: Dye Penetrant Test, UT: Ultrasonic Testing TC: Test Certificate, IR: inspection report, MTC: Material Test Certificate. COC: Certificate of conformance.					 Rakesh Kr Madhu (Dy Mgr / QA)		 K Renjith (Mgr / QA)		 R Arunachalam (DGM/QA)		
							Prepared by		Reviewed by		Approved by		

1029912/2022/BAP-QA-MECH

SL. NO		COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORD		AGENCY		REMARKS			
1.		2.		3.		4.		5.		6.		7.		8.		9.		D*		** 10.		11.	
				Hardness Test				Mechanical Hardness	100%	Drawing/Specification		Test Report	√	P	V	V							
				Internal Soundness				UT	100%	ASTM A 388	ASTM A 788	UT Report	√	P	V	V							
				Surface & Sub Surface Defects				MT-on m/c Surface	100%	ASTM E709	ASTM A 788	MT Report	√	P	V	V					MT-Magnetic Particle Test		
1.6	Impeller			Surface & Sub Surface Defects	Major			DPT	Accessible Areas	ISO4987	ISO 4987, Level 2	DPT Report	√	P	V	V							
2.0 IN PROCESS INSPECTION																							
2.1	Impeller/Volute Casing/ Wear Plate / Casing Cover/ Shaft After Machining			Surface Condition/ Defects/ Measurement	Major			Visual and Measurement	100%	Drawing		IR (Protocol)		P	-	-							
2.2	Couplings			Verification of TC	Major			Review of TC	100%	Technical Specification / Drawing		COC/TC	√	P	V	-							
2.3	Rotating Parts			Balancing	Major			Static & Dynamic Balancing	100%	ISO 1940	ISO 1940, grade 2.5 or lower	Balancing Report	√	P	V	V							
2.4	Volute Casing			Soundness	Major			Static	100 20%	See	No Leakage	Test	√	P	W						Test		
Manufacturer Sign & Seal		Legend: * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package. M : Manufacturer / Sub supplier, C : Main Contractor/BHEL/BHEL AIA. N : NTPC P : Perform: witness, V : review of records, MA : Major and MI : Minor, DPT : Dye Penetrant Test, UT : Ultrasonic Testing TC : Test Certificate, IR : inspection report, MTC : Material Test Certificate. COC : Certificate of conformance.																					
												Rakesh Kr Madhu (Dy Mgr / QA)		K Renjith (Mgr / QA)		R Arunachalam (DGM/QA)							
												Prepared by		Reviewed by		Approved by							

1029912/2022/BAP-QA-MECH

SL. NO		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY	REMARKS	
1.		2.	3.	4.	5.	M	C/N	7.	8.	9.	D*	M C N	11.	
					Pressure Testing of Casing	%	/10 % of each type	Remarks Column		Report			W	Pressure at 2x rated head or 1.5x shut of head whichever is higher for 30min.
3.0		FINAL INSPECTION												
3.1	Complete Pump Assembly	Completeness	Major	Visual & Dimensional	100 %	*		Approved GA Drawing	IR	√	P	W	W	
		Measurement- Flow vs Head(Complete operating range), Power, Efficiency	Major	Performance testing of pump	100 %	*		Approved Drawing /Data Sheet	Performance Test Report	√	P	W	W	*BHEL to witness 20% of each type of Pump and NTPC-one Pump per type.
		Vibration Velocity RMS [MM/S] Bearing Temperature Noise Level RMS[MM/S]		Measurement	100 %	*		Approved Drawing. Approved Data Sheet	Performance Test Report	√	P	W	W	
		NPSH Test	Major	Measurement	1 Pump / each type			Design Standard of Pump	NPSH Test	√	P	W	W	
Manufacturer Sign & Seal		Legend: * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package. M : Manufacturer / Sub supplier, C : Main Contractor/BHEL/BHEL AIA. N : NTPC P : Perform: witness, V : review of records, MA : Major and MI : Minor, DPT : Dye Penetrant Test, UT : Ultrasonic Testing TC : Test Certificate, IR : inspection report, MTC : Material Test Certificate. COC : Certificate of conformance.												
								Rakesh Kr Madhu (Dy Mgr / QA)		K Renjith (Mgr / QA)		R Arunachalam (DGM/QA)		
								Prepared by		Reviewed by		Approved by		

MANUFACTURING QUALITY PLAN

ITEM: SLURRY PUMP

PROJECT: AS PER PO

SYSTEM: FGD APPLICATION

BHEL WO : AS PER INTERNAL W/O

QP NO.

FGS:SLP:723, REV:00

DATE: 08.01.2021

MAIN CONTRACTOR

M/S BHEL, RANIPET

PAGE NO:

Page 3 of 5



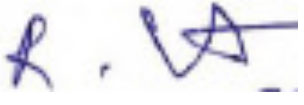
Ranipet

Customer Approved Source

1029912/2022/BAP/QA-MECH

SL. NO		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS	
1.		2.	3.	4.	5.	6.	7.	8.	9.	D*	** 10.	
						/ design			Report			
3.2	Complete Pump Assembly	Leak test	Major	Leakage testing	100%	Mfg. Drawing, Approved Data Sheet	No Leakage	Report	√	P	W	W
3.3		Strip Down Test (Not Required If Performance Test is Fine.)	Major	Visual	100%	Mfg. Drawing, Approved Data Sheet	Report	√	P	W	W	Only Required in case of Abnormal Sound
3.4	Painting	Dry Film Thickness/Paint shade	Major	Visual & Measurement	100%	NTPC Approved Painting Schedule	IR(Protocol)	√	P	V	V	
3.5	Packing	Preservation	Major	Visual & Measurement	100%	Technical Spec/ BHEL approved Packing Procedure/Drawing	COC	√	P	V	-	
4.0 DOCUMENTATION												
4.1	Check of Quality Assurance Documentation	Compliance to MQP	Major	Check of Compliments	100%	Manufacturing Quality Plan	Protocol	√	V	V	V	

NOTE: 1. (\$) – 10 % of each type for NTPC (Customer).

Manufacturer Sign & Seal	Legend: * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package. M: Manufacturer / Sub supplier, C: Main Contractor/BHEL/BHEL AIA. N: NTPC P: Perform: witness, V: review of records, MA: Major and MI: Minor, DPT: Dye Penetrant Test, UT: Ultrasonic Testing TC: Test Certificate, IR: inspection report, MTC: Material Test Certificate. COC: Certificate of conformance.			
		Rakesh Kr Madhu (Dy Mgr / QA)	K Renjith (Mgr / QA)	R Arunachalam (DGM/QA)
		Prepared by	Reviewed by	Approved by

1029912/2022/BAP-QA-MECH




SL. NO		COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORD		AGENCY		REMARKS			
1.		2.		3.		4.		5.		6.		7.		8.		9.		D*		** 10.		11.	

- All other 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.
- This QP is applicable for Mandatory Spare supply also.
- Separate MQP to be submitted for Electric Motor.

SI No	Types of Pumps	Quantity	No of Pumps as Per Approved Datasheet / GA Drawing
01.	Limestone slurry feed Pump	06	
02.	Gypsum bleed Pump	06	
03.	Primary hydro cyclone feed tank Pump	02	
04.	Filtrate water tank Pump	02	
05.	Secondary hydrocyclone feed tank	02	
06.	Waste water tank Pump	04	
07.	Auxiliary absorbent tank Pump	02	
08.	Emergency transfer Pump	03	
09.	Absorber area drain sump Pump	06	
10.	Gypsum area drain sump Pump	02	
11.	Limestone area drain sump Pump	02	

Record of revision

Rev no	Date	Description
00	08.01.2021	Original Issue – First submission.

Manufacturer Sign & Seal	Legend: * Record, identified with "tick" (√) under column 'D' shall be submitted to customer as a QA documentation package. M : Manufacturer / Sub supplier, C : Main Contractor/BHEL/BHEL AIA. N : NTPC P : Perform: witness, V : review of records, MA : Major and MI : Minor, DPT : Dye Penetrant Test, UT : Ultrasonic Testing TC : Test Certificate, IR : inspection report, MTC : Material Test Certificate. COC : Certificate of conformance.			
		Rakesh Kr Madhu (Dy Mgr / QA)	K Renjith (Mgr / QA)	R Arunachalam (DGM/QA)
		Prepared by	Reviewed by	Approved by

Annexure Q		
Sl.No	Indent No:	Enquiry no:
Sl.No	BHEL / Customer Requirements	##Specific confirmations by the manufacture(Acceptable/Not acceptable)
1	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.	
	(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 Standards & 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 Section V. (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 Section V.	
2	Domestic / Inland Inspection will be carried out by BHEL/BHEL appointed Third Party Inspection Agency (TPIA) / Customer/Customer Apointed 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 non claimable by the bidder. 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	

1029912/2022/BAP-QA_MECH

Sl.No	BHEL / Customer Requirements	##Specific confirmations by the manufacture(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 clearanace for further processing. This inspection call shall be given well in advance (atleast 2 weeks before for Indeginious and 45 days forforeign) 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 Bidder appointed Inspection agency(As in Sl no.3.) Inspection shall be done as per approved Quality plan/ Technical specification/ Approved Drawing/ Approved Data sheet .	
6	Inspection at Forign Source/Supplier: (a) As in sl no: 3. shall be ensured without fail (b) No materail / items shall be despatched without getting the written communication from BHEL / Customer inspection carried out by Bidder apointed Third Party Inspection Agency (As per Sl no.3) / Customer/Customer Apointed Inspection Agency/Consulatnat. 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 Instrumentaion 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 to BHEL well in advanve before proceding 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 + Mechnaical + 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 tarnsit / handling / transhipment 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 accreadted 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 w.r.t 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 evidances in the offer itself.	
12	## Necessorily 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.	
13	If the OEM/Principal engaging the services of an agent to participate on their behalf, Then mention OEM /vendor Name & address as well as agent details with their sign and seal.	
VENDOR SIGN AND STAMP:		Vendor Name & Address:

Details of BOI's/ Sub Systems with respect to Main Items

SI No.	Item/ Sub system Name	Quantity	Supplier Name	Place of Manufacturing
OEM (ORIGINAL EQUIPMENT MANUFACTURER) SEAL AND SIGN.				

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		

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:

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (IE3) Up to 200KW

PROJECT: Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2) PACKAGE: FGD PACKAGE MAIN CONTRACTOR: BHEL - RANIPET SUB CONTRACTOR (OEM) & ADDRESS: (To be filled by OEM VENDOR)		CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2)	DOC.NO: BAP/QR/G301 To - G 304) / Yadadri FGD: LTM /Water Pumps: 001 Rev NO.: 00 PAGE : Page 1 of 3 DATE: 05.09.2022	##Enquiry No: ## OEM Supplier Name & Address: ##Offer reference: ##Date: Contact Official Name: Mobile no: Email id:
Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - TSGENCO (Telangana State Power Generation Corporation Limited),, Quality Requirements	##Specific confirmations by the vendor	

ITEM: LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW

01	Type Test Requirements	A. Vendor shall submit the type test reports of all the type tests as listed in SL NO: 01 (D) below and carried out within 10 years from the data of Issue of Notification : 21.12.2019. These reports should be for the test conducted on the identical/similar LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc s to those proposed to be supplied under this enquiry and test (s) either should have been conducted at an independent laboratory (or) should have been witnessed by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL (or) Ultimate client TSGENCO at respective LT Motor Manufacture of OEM vendor.	
		B. However, if vendor is not able to submit the similar / identical type test report as per above condition (or) in the case of type test reports are not found to be meeting the specification requirement, the vendor shall conduct all the tests at no additional cost to BHEL either at third party lab (or) own lab in the presence of BHEL AIA (BHEL Appointed Inspection Agency) / BHEL /Ultimate client TSGENCO and submit the reports for review & approval.	
		C. Type Test reports review and approval by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL / Ultimate client TSGENCO is must in line with TSGENCO approved data sheet / BOM/GA Drawing etc.	
		D. The following Type test reports to be submitted covering the following for above 50KW LT Motor as per relevant BIS (Bureau of Indian Standard) - BIS 12615 / IEC 60034 or any other international standard like DIN, BS, IEC etc	
		i. Measuring of resistance of winding of stator and wound rotor (if applicable) ii. No load test at rated voltage to determine input current, power and speed. iii. Open circuit voltage ratio of wound rotor motor (in case slip ring motors) iv. Full load test to determine efficiency power factor and slip v. Temperature rise test. vi. Momentary excess load test vii. High voltage test viii. Test for vibration severity of motor ix. Test of noise levels of motor (Noise level for all the motors shall be limited to 85dB(A) except for BFP motor for which the maximum limit shall be 90dB(A).) x. Over speed test xi. Degree of Protection Tests (Minimum Ingress Protection - IP 55). xii. Type test reports for motors located in fuel oil area having flame proof enclosures as per BIS 2148/ IEC 60079-1	

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (IE3) Up to 200KW

PROJECT: Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2) PACKAGE: FGD PACKAGE MAIN CONTRACTOR: BHEL - RANIPET SUB CONTRACTOR (OEM) & ADDRESS: (To be filled by OEM VENDOR)		CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2)	DOC.NO: BAP/QR/G301 To - G 304) / Yadadri FGD: LTM /Water Pumps: 001 Rev NO.: 00 PAGE : Page 2 of 3 DATE: 05.09.2022	##Enquiry No: ## OEM Supplier Name & Address: ##Offer reference: ##Date: Contact Official Name: Mobile no: Email id:
Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - TSGENCO (Telangana State Power Generation Corporation Limited),, Quality Requirements	##Specific confirmations by the vendor	

ITEM: LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW

		E. The TCs / Type Test reports shall also be given as PDF file with index sheet & page control thro Email & Soft Copy (File size to less than 9MB).	
02	Quality Plan Requirement	OEM/LT Motor Manufacture shall confirm to Ultimate Customer TSGENCO approved MQP QP:R827:ELE:003 Rev 01 received along with letter ref no: CE/TPC/SE-3/EME-11/YTPS (5 X 800 MW)/QAP/D.No.12/19 dt 02.02.2019. (or) OEM/LT Motor Manufacturer to submit their QP for BHEL and Ultimate Customer TSGENCO review and approval.	
03	BHEL / Ultimate Customer – TSGENCO approved vendors	LT Motors are to be procured only from Ultimate Customer - TSGENCO approved vendors and no deviation on this specific requirement is acceptable. If Ultimate customer is not agreeing for any of LT Motor make, then it is the responsibility of OEM vendor to get approval from BHEL/Ultimate customer during execution of the contract.	
04	Inspection Methodology to be adopted at Actual LT Motor Manufacture works by OEM vendor	<u>LT Motors (Up to 200KW) – Inspection Categorization: II</u> All Routine Tests & Type tests including Degree of Protection Test Reports shall be ensured by OEM/LT Motor Manufacture as per Ultimate Customer TSGENCO approved MQP.	
		All Routine & Type Tests are to be ensured by OEM Vendor and same shall be offered to BHEL/ BHEL AIA (BHEL authorized inspection Agency) / Ultimate Customer-TSGENCO for inspection & witnessing including review of Degree of Protection Test Reports as per above approved MQP / approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 12615 / IEC 60034 etc and all the Routine Test Reports , Type test Reports including Degree of protection test report with Inspection report (IR) to be submitted for BHEL/Ultimate Customer – TSGENCO for review and to obtain inspection and dispatch clearance .	
		No material shall be dispatched without BHEL / BHEL AIA and Ultimate Customer – TSGENCO Inspection and dispatch clearance.	
05	Painting Requirements	Painting requirement like paint shade and painting thickness including no of coats if any are to be ensured by the OEM vendor and LT Motor manufacture for these LT Motors as per BHEL/ Ultimate Customer - TSGENCO approved data sheet / drg / spec (As applicable).	


CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (IE3) Up to 200KW

PROJECT: Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2) PACKAGE: FGD PACKAGE MAIN CONTRACTOR: BHEL - RANIPET SUB CONTRACTOR (OEM) & ADDRESS: (To be filled by OEM VENDOR)		CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW Yadadri 5 X 800 MW TPS- FGD (BHEL W.O no: R4R8, R4R9, R4S0, R4S1, R4S2)	DOC.NO: BAP/QR/G301 To - G 304) / Yadadri FGD: LTM /Water Pumps: 001 Rev NO.: 00 PAGE : Page 3 of 3 DATE: 05.09.2022	##Enquiry No: ## OEM Supplier Name & Address: ##Offer reference: ##Date: Contact Official Name: Mobile no: Email id:
Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - TSGENCO (Telangana State Power Generation Corporation Limited),, Quality Requirements	##Specific confirmations by the vendor	

ITEM: LT MOTORS (Energy Efficient Motor as per IS 12615 (or) as per International Standards like IEC, DIN, BS etc) Up to 200KW

06	Packing	Packing shall be as per Specification / Drg. / Data sheet including sea worthy packing if any to avoid any transit & handling damages .	
07	For Inspection call	Inspection call by OEM Vendor for LT Motor inspection at Actual LT Motor Manufacture works to be raised for BHEL/BHEL AIA inspection / Ultimate Customer – TSGENCO including for type test witnessing if any to be ensured / addressed to Mr MS Aditya Chakravathy., Manager (QC-Proc)., Mobile no: +919489202788., Email id: msachakravarthy@bhel.in and Mr Zeeshan Ali., Dy. Manager (QC-Proc)., Mobile no: +91 9443149691., Email id: zeeshan@bhel.in including for inspection related activities for immediate response / resolution.	
08	Document Package / Dossier	Specific confirmation for Document Package in the event of an order (3 hard copies + soft copies in Pdf file) is to be given containing the following with proper linkages (.) (i) Index Sheet (ii) Ultimate Customer TSGENC Approved MQP (iii) TCs identified by BHEL/TSGENCO for record for “CHP” (Customer Hold Point) Verification & Witness “W” portion as given in MQP / RQP / MQP (as applicable). (iv) Final Inspection Report + TC (v) BHEL AIA (BHEL Appointed Inspection Agency) / BHEL report + TC (vi) Ultimate customer TSGENCO CHP (Customer Hold Point) / MDCC (Material Despatch Clearance Certificate) (vii) Type test reports conducted/submitted with approval with approved data sheet and BOM with actual make used with Customer approved drgs.	
09	Important notes	Inspection Categorization: I Inspection by Main contractor (BHEL) / BHEL AIA/Ultimate Customer TSGENCO based on Ultimate Customer – TSGENCO approved MQP & based on inspection as in sl no:02 & 04. Any cost implication for conducting checks / tests including for witnessing of any of the tests at Actual LT Motor Manufacture Works by BHEL / BHEL AIA / Ultimate Customer – TSGENCO is in the scope of OEM Supplier only and no extra cost if any will be admissible in the event of an order and also during execution of the contract.	

Supplier signature with seal ## Necessarily to be filled up & submitted by the OEM vendor at the time of offer itself otherwise the offer may not be considered w.r.t Quality Requirements against LT Motors being BHEL/ ultimate customer – TSGENCO (Telangana State Power Generation Corporation Limited) specific requirements.

	TELANGANA POWER GENERATION CORPORATION LIMITED (A Govt. Of Telangana Undertaking) Vidyut Soudha, Hyderabad - 500082. Phone: 040 - 23499261 Fax: 040 - 23499263.	
	From: The Chief Engineer Thermal Projects Construction, TSGENCO, 3 rd Floor, A-Block, VidyutSoudha, Khiarathabad Hyderabad-500 082. cetpctgenco@gmail.com	To: M/s BHEL/BAP, Ranipet,Vellore (Dist), Tamil Nadu-632 406 Ph: 9848265808. E-mail: mmahesh@bhel.in

Kind Attention: Sri M Mahesh,Dy. Manager(Commercial)

Lr.No.CE/TPC/SE-3/EME-11/YTPS(5X800MW)/QAP/D.No.12/19,Dt:02.02.19

Sir,

Sub: TSGENCO – YTPS (5X800MW) – Approval of QAP for LT Motor of ESP & FAN application submitted by M/s BHEL/BAP, Ranipet - Reg.

Ref: 1) M/s BHEL Letter ref: BAP:COMML:LT Motor of ESP & Fan:Rev-00, Date:29.11.2018
 2) TSGENCO Email dt 05.12.2018
 3) M/s BHEL Letter ref: BAP:COMML:LT Motor QP:Rev:01, Date: 05.01.2019
 4) M/s TCE Email dt: 22.01.2019

Please refer to the mail cited (3) wherein the revised QAP for LT Motor of ESP & FAN application was submitted for approval.

Sl. No.	BHEL Reference No.	Title	Rev.
1	QP:R827:ELE:003	QAP for LT Motor of ESP & Fan application	01

The above Quality Plan furnished by M/s BHEL/BAP, Ranipet is herewith reviewed and approved. Approved copy of the above Quality Plan is enclosed herewith for taking further necessary action at your end.

However, approval of the above Quality Plan does not absolve the responsibility of supplying the above equipment to the specifications and relevant standards and to ensure satisfactory performance of the above equipment as per the terms of the contract.

It is requested to upload the approved QAP in PEDM Portal.

Encl: As Above.

Yours faithfully




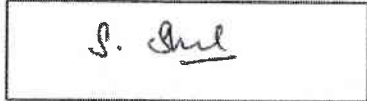
CHIEF ENGINEER/TPC

Copy communicated to:


- 1) Chief Engineer/Construction/YTPS Site/Damaracherla/Nalgonda Dist.
- 2) DE/Tech to Director/Projects/TSGENCO/Vidyut Soudha/Hyderabad.
- 3) Sri Y.A.Srinivas Rao, BHEL/PMG Camp Office, Vidyut Soudha, Hyderabad.
- 4) M/s Tata Consulting Engineers Limited, 73/1, Sheriff Centre, St. Marks road, Bangalore-560 001.
- 5) M/s TCE /Room No.323 /Site Office/Vidyut Soudha/Hyderabad

1031040/2022/BAP-QA_MECH


 Ranipet	QUALITY PLAN FOR LT MOTOR Of ESP & FAN Application for YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Customer No: R827, R828, R829, R830, R831, R4L4)	
	REF. NO.	REVISION NO.
QP:R827:ELE:003	01	11 12 2018

TITLE	:	Quality Plan for LT Motor of ESP & FAN application
PROJECT	:	YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE
		SIGNATURE
PREPARED BY	:	CH.ANILSINGH DY.ENGINEER/QA
		
REVIEWED	:	S.SHEELA DY.MANAGER/QA
		
APPROVED BY	:	K.C GANDHI PARIMALAM DGM/QA
		
ISSUED & CONTROLLED BY :	QUALITY ASSURANCE BHEL, RANIPET - 632 406.	
DOCUMENT STATUS	<input type="checkbox"/> INFORMATION COPY <input type="checkbox"/> CONTROL COPY	
	<input checked="" type="checkbox"/> It is a control copy only if the mark against the control copy is in other than black colour. Otherwise it will be an uncontrolled copy. Check for current revision.	
ISSUED TO:	CONTROL COPY NO :	



Chief Engineer
Thermal Projects Construction
TSGENCO, Vidhut Soudha,
Khairatabad, Hyd-500 082.

 Ranipet	QUALITY PLAN FOR LT MOTOR Of ESP & FAN Application for YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Customer No: R827, R828, R829, R830, R831, R4L4)	
REF. NO.	REVISION NO.	EFFECTIVE DATE
QP:R827:ELE:003	01	11 12 2018

<u>RECORD OF REVISION</u>		
REV. NO	EFFECTIVE DATE	REMARKS
00	27 11 2018	Original Issue
01	11 12 2018	Revised based on the customer comments received vide email dated 05 12 2018.



Chief Engineer
Thermal Projects Constructio:
TSGENCO, Vidyut Soudha,
Khairatabad, Hyd-500 092.

1031040/2022/BAP-QA_MECH

 BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET - 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)			QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 3 of 12				
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.1	Enamelled round copper conductor (Dual coated)M M	1.Overall diameter 2.Bare conductor diameter 3.Increase in diameter 4. Peel test (above 1mm dia.) 5.Mandrel winding test 6. Jerk test (upto 1mm dia.) 7.Resistance to abrasion 8.BDV Test 9.Electrical resistance 10.heat shock 11.Elongation	Major Major Major Major Major Major Major Major Major Major	Mechanical Mechanical Mechanical Mechanical Mechanical Mechanical Mechanical Electrical Electrical Electrical Mechanical	1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot 1 sample/lot	IS 13730 1993 Part 13 BHEL Spec & Apprd Datasheet --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do--	IEC 60317-0-1 2008 BHEL Spec & Apprd Datasheet --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do-- --do--	Plant format Plant format Plant format Plant format Plant format Plant format Plant format Plant format Plant format Plant format Plant format	P P P P P P P P P P P P	V V V V V V V V V V V V		



Chief Engineer
 Thermal Projects Construct
 TSGENCO, Vidyut South
 Khairatabad, Hyd-500 082.

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.			QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)			QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 4 of 12		
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS	
									M	B	C		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	


1.2	INSULATION MATERIAL:	1.Thickness & width	Major	Mechanical	1 sample/lot	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Plant format	P	V		
		2.Tensile strength	Major	Mechanical	1 sample/lot	--do--	--do--	Plant format	P	V		
		3. BDV at elevated temp.in air.	Major	Electrical	1 sample/lot	--do--	--do--	Plant format	P	V		
		4.Tear resistance	Major	Mechanical	1 sample/lot	--do--	--do--	Plant format	P	V		
		5.conformation of glass fabric	Major	Physical	1 sample/lot	--do--	--do--	Plant format	P	V		
		6.Compatibility with impregnation varnish	Major	Chemical	1 sample/lot	--do--	--do--	Plant format	P	V		
		7.Thermal ageing	Major	Thermal	1 sample/lot	--do--	--do--	Plant format	P	V		
		8.IR	Major	Electrical	1 sample/lot	--do--	--do--	Insp.report / Supplier Te	P	V		
		9.Elongation	Major	Mechanical	1 sample/lot	--do--	--do--	Insp.report / Supplier Te	P	V		
1.3	Impregnation varnish	1.BDV test	Major	Electrical	1 sample/lot	--do--	--do--	Plant format	P	V		
		2.Density	Major	Physical	1 sample/lot	--do--	--do--	Plant format	P	V		
		3.Viscosity	Major	Physical	1 sample/lot	--do--	--do--	Plant format	P	V		
		4.Non volatile matter	Major	Chemical	1 sample/lot	--do--	--do--	Plant format	P	V		
		5.Drying time	Major	Thermal	1 sample/lot	--do--	--do--	Plant format	P	V		
		6.Resoftening	Major	Thermal	1 sample/lot	--do--	--do--	Plant format	P	V		
		7. Compatibility with thinner% min.	Major	Physical	1 sample/lot	--do--	--do--	Plant format	P	V		



Chief Engineer


 Thermal Projects Construction
 TSGENCO, Vidyut Soudha,
 Khairatabad, Hyd-500 082.

1031040/2022/BAP-QA_MECH

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 5 of 12			
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.4	Motor Shaft Material	8.Reaction of varnish with copper	Major	Chemical	1 sample/lot	--do--	--do--	Plant format	P	V		
		9.Stability of varnish in an open vessel	Major	Chemical	1 sample/lot	--do--	--do--	Plant format	P	V		
		10.Self life	Major	Visual	1 sample/lot	--do--	--do--	Plant format	P	V		
		1.Chemical composition	Major	Chemical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		2.Yield strength	Major	Mechanical	1 sample/lot	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Supplier TC	P	V		
		3.Tensile strength	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		4.Elongation	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		5.Hardness	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		6.Dimensions	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		7.Grain size inclusion rating	Major	Mechanical	1 Sample/lot	--do--	--do--	Supplier TC	P	V		
1.5	Stamping Steel	8.Heat treatment cycle	Major	Thermal	100%	--do--	--do--	Supplier TC	P	V		
		9.Ultrasonic test	Major	NDT	100%	--do--	--do--	Supplier TC	P	V		
		10.Heat treatment cycle	Major	Thermal	100%	--do--	--do--	Supplier TC	P	V		
		1.Specific core loss	Major	Electrical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		2.Magnetisation	Major	Electrical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		3.Insulation resistance	Major	Electrical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		4.Stacking factor	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		

R. Srinivasan
Chief Engineer


Thermal Projects Constr
TSGENCO, Vidyut Sou
Maintained, Ltd. 500.

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 6 of 12			
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.6	Aluminum Ingots	5.Ductility	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		6.Thickness of coating	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		7.Visual check(Waviness)	Major	Visual	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		8.Temperature Withstand capacity	Major	Measure	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		1.Chemical Composition	Major	Chemical	1 sample/lot	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Supplier TC	P	V		
1.7	Casting: Body& End shields	1.Grade of casting	Major	Chemical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		2.Surface defects	Major	Visual	100%	--do--	--do--	Inspection record	P	V		
		3.Hardness	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		4.Tensile strength	Major	Mechanical	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		5.Dimensions	Major	Mechanical	1 sample/lot	--do--	--do--	Inspection record	P	V		
1.8	FAN(Cast Iron)	1.Dimensions	Major	Mechanical	1 sample/lot	--do--	--do--	Inspection record	P	V		
		2.Protective paint	Major	Visual	100%	--do--	--do--	Inspection record	P	V		
1.9	Terminal Box & Covers	1.Dimensions	Major	Mechanical	1 sample/lot	--do--	--do--	Insp. Report	P	V		

[Signature]
 Chief Engineer

Thermal Projects Construction
 TSGENCO, Vidyut Soudha,
 Khairatabad, Hyd-500 082.


1031040/2022/BAP-QA_MECH

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET - 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 7 of 12			
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE- RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
2.0	Bearings(SKF or FAG)	1.Type & Make	Major	Visual	100%	--do--	--do--	Inspection record	P	V		
		2.Dimensions-ID,OD & width	Major	Mechanical	1 sample/lot	--do--	--do--	Inspection record	P	V		
2.1	Earthing bolts & Nuts with washer Paints	Dimensions	Major	Measurement	100%	--do--	--do--	Inspection report	P	V		
		1.Viscosity at 32C	Major	Mechanical	1 sample/lot	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Insp. record	P	V		
		2.Drying time	Major	Visual	1 sample/lot	--do--	--do--	Supplier TC	P	V		
		3. Dry film property	Major	Visual	1 sample/lot	--do--	--do--	Supplier TC	P	V		
2.2	Gasket	1.Dimensions	Major	Meas.	As per IS / Plant std.	--do--	--do--	Insp. report / Supplier Tc	P	V		
		2.Neoprene test	Major	Physical	As per IS / Plant std.	--do--	--do--	Insp. Report / Supplier Tc	P	V		
		3.Hardness	Major	Mechanical	As per IS / Plant std.	--do--	--do--	Insp. report / Supplier Tc	P	V		
		4.Ageing test	Major	Physical	As per IS / Plant std.	--do--	--do--	Insp. Report / Supplier Tc	P	V		
		5.Tensile	Major	Measurement	As per IS / Plant std.	--do--	--do--	Insp. Report / Supplier Tc	P	V		
		6.Elongation	Major	Measurement	As per IS / Plant std.	--do--	--do--	Insp. Report / Supplier Tc	P	V		
2.3	Terminal Block	1.Dimensions	Major	Measurement	Plant std.	--do--	--do--	Insp. Report /	P	V		
		2.Proof voltage test	Major	Electrical	Plant std.	--do--	--do--	Insp. Report /	P	V		



Chief Engineer

 Thermal Projects Construct
 TSGENCO, Vidyut Soudha,
 Khairatabad. Hyd-500 012


 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.			QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 8 of 12		
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.


II												
INPROCESS INSPECTION:												
2.4	Machined Cast iron body	1.Blow holes/cracks	Major	Visual	100%	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Insp. Record	P	V		
		2.Surface finish	Major	Visual	100%	--do--	--do--	Insp. Record	P	V		
		3.Bore ID and other Dimensions	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		
2.5	Machined End shields	1.Blow holes/cracks	Major	Visual	100%	--do--	--do--	Insp. Record	P	V		
		2.Dimensions	Major	Mechanical	100%	--do--	--do--	Insp. Report	P	V		
2.6	Balancing(Rotor & Fan)	1.Permissiable unbalance	Major	Visual	1 sample	--do--	--do--	Insp. Report	P	V	V	
2.7	Stator core	1.Core length dia	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		
		2. Core locking	Major	Visual	100%	--do--	--do--	Insp. Record	P	V		
		3. Rigidity of core.	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		
2.8	Die cast Rotor	1.Core length	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		
		2.Blow holes	Major	Visual	100%	--do--	--do--	Insp. Record	P	V		
2.9	Impregnation	1.Dip & bake cycles as per OA requirement	Major	Process parameter	100%	--do--	--do--	Insp. Record	P	V		
3.0	Rotor machining	1.Rotor OD	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		
		2.Balancing	Major	Mechanical	100%	--do--	--do--	Insp. Record	P	V		




Chief Engineer

 Thermal Projects Constructio
 TSGENCO, Vidyal Smadhi
 Khairatabad, Hyd-600 Co.

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET - 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 9 of 12			
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
3.1	Space Heater(if applicable)	1.Insulation resistance 2.H.V. Test 3.Resistance 4.Wattage test	Major Major Major Major	Electrical Electrical Electrical Electrical	100% 100% 100% 100%	--do-- --do- --do-- --do--	--do-- --do- --do-- --do--	Insp. Record Insp. Record Insp. Record Insp. Record	P P P P	V V V V		
3.2	Final Assembly	1.Completeness 2.Runout in case of flanged motors 3.Mounting dimension	Major Major Major	Visual Mechanical Mechanical	100% 100% 100%	--do-- --do-- --do--	--do-- --do-- --do--	Insp. Record Insp. Record Insp. Record	P P P	V V V		
III	FINAL INSPECTION AND TESTING:											
3.3	Routine Test	1.Resistance Measurement on winding & space heater 2. Insulation Resistance before/after H.V. Test on winding & space heater 3. H.V. Test on winding & space heater 4.Phase sequence & direction of rotation 5.No load run test 6.Reduced voltage running test 7.Locked rotor test	Major Major Major Major Major Major Major	Electrical Electrical Electrical Electrical Electrical Electrical Electrical	100% 100% 100% 100% 100% 100% 100%	BHEL Spec & Apprd Datasheet --do-- --do-- --do-- --do-- --do-- --do--	BHEL Spec & Apprd Datasheet --do-- --do-- --do-- --do-- --do-- --do--	Insp. Record Insp. Record Insp. Record Insp. Record Insp. Record Insp. Record Insp. Record	P P P P P P P	W W W W W W W	W W W W W W W	



 Chief Engineer
 Thermal Projects Construc
 TSGENCO, Vidyut Soud
 Khairatabad, Hyd-500 982.

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.			QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)			QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 10 of 12		
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS	
									M	B	C		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	

3.4	Type Test	7.1 Two successive Starts from cold Condition	Major	Electrical	100%	--do--	--do--	Insp. Record	P	W	W	Identical design type test report shall be submitted to BHEL/TPI agency during inspection for review and acceptance. The validity of type test report shall be 5 years from date of release of purchase order. Otherwise vendor has to conduct these test in presence of BHEL/TPI.
		7.2 Three equally spread starts pre hour.	Major	Electrical	100%	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	Insp. Record	P	W	W	
		7.3 Two hot restart from hot condition.	Major	Electrical	100%	--do--	--do--	Test Record	P	W	W	
		8.Vibration test	Major	Mechanical	100%	--do--	--do--	Test report	P	W	W	
		9.Name plate verification	Major	Visual	100%	--do--	--do--	Test report	P	W	W	
		10.Paint shade, thickness& adhesion	Major	Vis/Meas	100%	--do--	Apprd Drawing	Insp. Record	P	W	W	
		11.Moutings & Overall dimensions	Major	Vis/Meas.	100%	--do--	--do--	Insp. Record	P	W	W	
		1. Measuring of resistance of winding of stator and wound rotor (if applicable)	Major	Electrical	1 motor in a batch	--do--	--do--	Insp. Record	P	V	V	
		2. No load test at rated voltage to determine input current , power and speed.	Major	Electrical	1 motor in a batch	--do--	--do--	Insp. Record	P	V	V	
		3. Open circuit voltage ratio of wound rotor motor (in case slip ring motors	Major	Electrical	1 motor in a batch	--do--	--do--	TC	P	V	V	


 Chief Engineer


1031040/2022/BAP-QA_MECH

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET - 632 406.		QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 11 of 12			
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.

		4. Locked rotor reading of voltage, current and power input at a suitable Reduced voltage	Major	Electrical	1 motor in a batch	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	TC	P	V	V	
		5. Full load test to determine efficiency power factor and slip	Major	Electrical	1 motor in a batch	--do--	--do--	TC	P	V	V	To determine Efficiency, power factor & slip
		6. Temperature rise test.	Major	Electrical	1 motor in a batch	--do--	--do--	TC	P	V	V	
		7. Momentary overload test	Major	Electrical	1 motor in a batch	--do--	--do--	TC	P	V	V	
		8. Insulation resistance test	Major	Electrical	1 motor in a batch	--do--	--do--	TC	P	V	V	
		9. High voltage test	Major	Mechanical	1 motor in a batch	--do--	--do--	TC	P	V	V	
		10. Test for vibration severity of motor	Major	Mechanical	1 motor in a batch	--do--	--do--	TC	P	V	V	
		11. Test of noise levels of motor	Major	Visual	1 motor in a batch	--do--	--do--	TC	P	V	V	
		12. Over speed test	Major	Mechanical	1 motor in each frame size	BHEL Spec & Apprd Datasheet	BHEL Spec & Apprd Datasheet	TC	P	V	V	

[Signature]
 Chief Engineer

Thermal Projects Constructi.
 TSGENCO, Vidyut Soudha,
 Khairatabad, Hyd-500 002.

 Ranipet		BHARAT HEAVY ELECTRICALS LTD BOILER AUXILIARIES PLANT, RANIPET – 632 406.			QUALITY ASSURANCE PLAN FOR LT Motor of ESP & FAN application			PROJECT: YADADRI TPS 5 X 800MW, TSGENCO, EPC PACKAGE (Cust No: R827, R828, R829, R830, R831, R4L4)		QP:R827:ELE:003 REV. NO: 01 DATE: 11 12 2018 Page 12 of 12		
Sl. No.	COMPONENT / ASSEMBLY / OPERATION/TESTS	CHARACTE - RISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									M	B	C	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.

3.5	Preservation and Packing	13. Degree of Protection Tests	Major	Visual	100%	--do--	--do--	TC	P	V	V	
		1.Completness	Major	Review	100%	--do--	--do--	TC	P	V	V	
		2.Mounting & over all Dimensions	Major	Visual	100%	--do--	--do--	Insp. Record	P	V	V	
		3. Painting(label)	Major	Visual	100%	--do--	--do--	Insp. Record	P	V	V	
		4. Motors located on rubber mats.	Major	Visual	100%	--do--	--do--	Insp. Record	P	V	V	
		5. Motors covered with polythene sheets.	Major	Visual	100%	-do--	-do--	Insp. Record	P	V	V	
		6. Packing	Major	Visual	100%	-do--	-do--	Insp. Record	P	V	V	

Note:

1) Vendor shall submit raw material test certificates and internal test report for Enameled copper conductor, INSULATION MATERIALS, Impregnation varnish, Motor Shaft Material, Stamping Steel, Aluminum Ingots, yoke (Casting Body & End shields), Terminal Box & Covers, Bearings (SKF or FAG), Gasket, Terminal Block during inspection to BHEL/BHEL AIA for review and acceptance.


2) Vendor shall also submit INPROCESS INSPECTION report for Machined Cast iron body, Machined End shields, Balancing (Rotor & Fan), Hydraulic Pressure Testing, Stator core, Die cast Rotor, Impregnation, Rotor machining, Space Heater (if applicable) and Final Assembly during inspection to BHEL/BHEL AIA for review and acceptance.

3) Identical design type test report shall be submitted to BHEL/BHEL TPI agency/Customer/Customer Consultant during inspection for review and acceptance. The validity of type test report shall be 5 years from date of release of purchase order. Otherwise vendor has to conduct these test in presence of BHEL/BHEL TPI agency/Customer/Customer Consultant.

4) Type test clearance from BHEL/BHEL TPI agency/Customer/Customer Consultant to be obtained during Inspection at vendor works

Legends: TC = Test Certificates : Drg = Drawing : IR = Insulation Resistance : BOM = Bill of Material HV = High Voltage P= Perform/ V=verification/ Review of TC/Test Report W = Witness

M: Manufacturer B=Contractor/BHEL /TPI agency C=Customer/Customer Consultant.


Chief Engineer
Thermal Projects Constructio
TSGENCO, Vidyut Soudha
Khairatabad, Hyd-500 033