411376/2021/BAP-QA_MECH

Bharat Heavy Electricals Limited
Ranipet-632406, India.
Quality Assurance (Mech)

FGD: BHUS: SLP: 236
Dt. 14-08-2021

Item Name	Indent No	Indent Dt.	PGMA	Technical Specification
SLURRY PUMPS	RFW11271	09.08.2021	FW701	ROS:9081, Rev:00, Dt:06.08.2021 and TECI:LT MOTOR:REV:05, Dt:28.07.2021
	RFW11272	09.08.2021	FW701	

Project: BHUSAWAL (1X660 MW).

"Customer/Mahagenco has informed that in case the item is covered under Sub-QR list.

1. Since Slurry Pump appears under Sub-QR item, Sub-QR approved vendor by Our Engg and Customer/ Mahagenco acceptable to Quality also.
2. Inspection and testing shall be done as per approved Quality plan, Quality plan to be approved by Customer/ Magenco after review of BHEL.
3. Painting shall be as per Customer approved Painting schedule.
4. Arrange MQP from sub QR Cleared vendor for taking up with Customer for their review and approval. Find herewith-attached typical MQP (QP NO.FGS: SLP:723/00, DT: 08.01.2021). This MQP involves minimum check only and actual Quantum of Check/Stage may differ based on Project/Customer requirement and their approved MQP.
5. All the Pumps shall be inspected at supplier works as per approved QP/Approved Drawing/Approved datasheet and Specification.
6. Packing of items shall be as per BHEL Engg Approved Packing Drawing/BHEL Specifications.
7. 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.
8. Annexure 'Q' and BOI's Details shall be part of enquiry File and shall be filled by Supplier with their duly sign and seal.
9. **Vendor Quality Plan shall contain following 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 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.

Prepared by.
Rakesh Kr Madhu (Dy.Mgr/QA)

Reviewed & Approved by.
K Renjith(Mgr/QA)

411376/2021/BAR-QA_MECH

Ranipet	MANUFACTURER'S NAME AND ADDRESS Customer Approved Source	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 1 of 5

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
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 TestingTC: 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

Ranipet	MANUFACTURER'S NAME AND ADDRESS Customer Approved Source	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 2 of 5

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1.	2.	3.	4.	5.	6.		7.	8.	9.		** 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 TestingTC: 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

Ranipet	MANUFACTURER'S NAME AND ADDRESS Customer Approved Source	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

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

411376/2021/BAR-QA-MECH

Ranipet	MANUFACTURER'S NAME AND ADDRESS Customer Approved Source	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 4 of 5

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

4113376/2021/BAR-QA-MECH

Ranipet	MANUFACTURER'S NAME AND ADDRESS Customer Approved Source	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 5 of 5

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

2. 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.
3. This QP is applicable for Mandatory Spare supply also.
4. Separate MQP to be submitted for Electric Motor.

Sl No	Types of Pumps	Quantity	
01.	Limestone slurry feed Pump	06	No of Pumps as Per Approved Datasheet / GA Drawing
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 TestingTC: 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		
	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 (Manuafcutering 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 invaribly cover w.r.t Inward inspection including on Raw materail 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/standrads 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 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	**Domastic / Inland Inspection** will be carried out by BHEL/BHEL apointed Third Party Inspection Agency (TPIA) / 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).	
3	**Inspection Agency for Foreign Bidders and also for Indian Bidder but importing from Forgign Sources**: (1) Any one of the fllowing 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. **<u>List of TPIA</u>** 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 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 strictely 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 adavnce 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/Endorsemment Sheet (As applicable) (iii) TCs identfied 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

Sl No.	Item/ Sub system Name	Quantity	Supplier Name	Place of Manufacturing

OEM (ORIGINAL EQUIPMENT MANUFACTURER) SEAL AND SIGN.	

W.r.t INDIGENOUS OEM VENDORS ONLY

Sl no	Description & Quality Requirements	Specific confirmation by the vendor (Confirmed/Not Confirmed)
01	OEM vendor shall meet all the requirements as in Annexure-I and also OEM Vendor shall endorse (Signature and Stamp in all the pages) in attached CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS(IE3) Up to 160KW used in Slurry Pumps for FGD application (DOC NO.: BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 001 Rev NO.: 00 dt 11.08.2020) and send us the same to follow / ensure all the requirements in the event of an order.	
02	OEM vendor shall ensure Credentials of design and Manufacturing capabilities w.r.t. LT Motors by their LT Motor manufacture.	
03	No material shall be dispatched without BHEL/ **Ultimate Customer – MAHAGENCO (Maharashtra State Power Generation Corporation Limited)** inspection or its Appointed Inspection Agency M/s QUEST - CHP/MDCC clearances.	

Annexure-I

421674/2021/BAP-QA-MECH

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 1 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) Up to 160KW**	
01	**Type Test Requirements**	*A.* Vendor shall conduct all the type tests for LT Motors as listed in SL NO: 01 (D) below and accordingly submit the type test reports. These reports should be for the test conducted on the identical/similar LT Motors to those proposed to be supplied under this enquiry and test (s) should have been witnessed by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL /Ultimate client MAHAGENCO at respective LT Motor Manufacturer of OEM vendor.	
		B. 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 MAHAGENCO and submit the reports for review & approval.	
		C. Type Test reports review and approval by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL / Ultimate client MAHAGENCO and its consultant DCPL is must in line with MAHAGENCO and its consultant DCPL approved data sheet / BOM/GA Drawing etc.	

Annexure-I

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421674/2021/BAP-QA-MECH

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 2 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) Up to 160KW**	
01	**Type Test Requirement …….Contd**	D. The following Type test reports to be submitted covering the following for LT Motors as per relevant BIS (Bureau of Indian Standard) - BIS 325 /IS 12615/ IEC 60034 etc i. Insulation Resistance Test ii. Measuring of resistance of winding of stator and wound rotor (if applicable) iii. No load test at rated voltage to determine input current, power and speed. iv. Locked Rotor Readings of Voltage, Current and Power Input at a Suitable Reduced Voltage v. Reduced Voltage Running up Test at no-load (for squirrel cage motor up to 37 kW only) vi. Open circuit voltage ratio of wound rotor motor (in case slip ring motors) vii. Locked Rotor Test (for Motors Having Output Rating Up to 37 kW) viii. Full load test to determine efficiency power factor and slip ix. Temperature rise test. x. Momentary excess load test xi. High voltage test xii. Test for vibration severity of motor xiii. 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).** xiv. Over speed test **xv. Degree of Protection Tests (Minimum Ingress Protection - IP 55). Type test certificate shall be acceptable, if the test is conducted for IP-55 degree of protection on motors of similar frame size within last 10 years.** **xvi. Fault Withstand Test for main terminal box. Type test certificate shall be acceptable, if the test is conducted on exactly identical terminal box within last 3 years.** xvii. Type test reports for motors located in fuel oil area having flame proof enclosures as per BIS 2148/ IEC 60079-1	
		E. The TCs / Type Test reports shall also be given as PDF file with index sheet & page control through Email & Soft Copy (File size to less than 9MB).	

Annexure-I

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421674/2021/BAP-QA-MECH

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 3 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) Up to 160KW**	
02	**Quality Plan Requirement**	**1.** MQP is applicable for these LT Motors and accordingly Actual LT Motor Manufacturer and OEM shall submit the MQP for BHEL and ultimate customer MAHAGENCO and its consultant DCPL approval. **2.** If any of LT Motor manufacturer is having, ultimate customer MAHAGENCO and its consultant DCPL approved MQP (Manufacturing Quality Plan) / NTPC approved RQP (Reference Quality Plan) and having validity, the same is applicable for these LT Motor for inspection subject to obtaining ultimate customer MAHAGENCO and its consultant DCPL formal approval in the event of an order. **3.** If LT Motor Manufacture / OEM vendor does not have MQP/RQP, they should submit a fresh MQP to BHEL/MAHAGENCO (in BHEL format) for review & approval. (copy attached).	
03	**BHEL / ultimate Customer – MAHAGENO approved vendors**	LT Motors are to be procured only from Ultimate Customer - MAHAGENCO approved vendors and no deviation on this specific customer requirement is acceptable.	
04	**Inspection Methodology to be adopted at Actual LT Motor Manufacture works by OEM vendor**	**LT Motors (below 60 KW) – Inspection Categorization: II** All Routine Tests (including Test for noise level and Test for vibration as Routine Tests) and Type tests on LT Motors are to be ensured by OEM vendor & witnessed by BHEL/BHEL AIA (BHEL authorized inspection Agency) at LT Motor manufacturer works including review of Type Test Reports and Degree of Protection Test Reports (IP 55) as per approved MQP & approved data sheet/drg/spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 12615/IEC 60034 etc and all the Routine Test and Type Test Reports with Inspection report (IR) to be submitted for BHEL/Ultimate Customer – MAHAGENCO and its consultant DCPL for review and to obtain inspection and dispatch clearance .	

Annexure-I

421674/2021/BAP-QA-MECH

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 4 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) Up to 160KW**	
04	**Inspection Methodology to be adopted at Actual LT Motor Manufacture works by OEM vendor...Contd**	**From 60KW and up to 160KW – Inspection Categorization: I** All Routine tests (including Test for noise level and Test for vibration as Routine Tests) & Type Tests on LT Motors are to be ensured by OEM Vendor and same shall be offered to BHEL/ BHEL AIA (BHEL authorized inspection Agency) / Ultimate Customer-MAHAGENCO for inspection & witnessing including review of Degree of Protection Test Reports as per approved MQP /RQP / approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 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 – MAHAGENCO and its consultant DCPL for review and to obtain inspection and dispatch clearance.	
		BHEL/ BHEL AIA (BHEL authorized inspection Agency) / Ultimate Customer-MAHAGENCO to witness / perform inspection at LT Motor Supplier works and submit all the inspection documents and routine & Type test reports including Degree of Protection Test Reports (IP 55) as per approved MQP & approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 /IEC 60034 etc.	
		No material shall be dispatched without BHEL / BHEL AIA and Ultimate Customer – MAHAGENCO 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 for these LT Motors as per BHEL/ Ultimate Customer -MAHAGENCO and its consultant DCPL approved data sheet/drg/spec (As applicable).	
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 – MAHAGENCO including for type test witnessing to be ensured / addressed to Mr R Kesavan., DGM (QC-Proc)., Mobile no: +91 9443006303., Email id: kesavan@bhel.in and Mr Kovarathanan., DM (QC-Proc)., Mobile no: +91 8903502628., Email id: kovak@bhel.in including for inspection related activities for immediate response / resolution.	

Annexure-I

421674/2021/BAP-QA-MECH

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 5 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) Up to 160KW**	
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) MQP/RQP (iii) TCs identified by BHEL/MAHAGENCO 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 MAHAGENCO (Maharashtra State Power Generation Corporation Ltd) CHP (Customer Hold Point) / MDCC (Material Dispatch 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 BHEL/BHEL AIA and also by Ultimate Customer – MAHAGENCO based on MQP/RQP approved and as in sl no:04** **Inspection Categorization: II** **Inspection by Main contractor (BHEL) / BHEL AIA based on Ultimate Customer – MAHAGENCO approved MQP/RQP & based on inspection as in sl no: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 – MAHAGENCO 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.	

Annexure-I

421674/2021/BAP-QA-MECH

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

(For INDIGENOUS OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8 /Bhusawal/ LTM/ Slurry Pumps: 001** **Rev NO.: 00** **PAGE : Page 6 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor

ITEM: LT Motors (Energy Efficient) Up to 160KW**

10 **Motor details**

**LT Motors should be of Energy Efficiency class as per Technical specification/drg/datasheet (as applicable).

Vendor shall furnish following Motor details for the Pumps applicable for this enquiry.

MAHAGENCO Bhusawal 1 x 660 MW – FGD Project :-

S. No	Pump	LT Motor		
		Rating (in kW)	Quantity (in nos)	Make
1	Limestone Slurry Feed Pump			
2	Gypsum Bleed Pump			
3	Primary Hydro-cyclone Feed Tank Pump			
4	Filtrate Water Tank Pump			
5	Secondary Hydro-cyclone Feed Tank Pump			
6	Waste Water Tank Pump			
7	Auxiliary Absorbent Tank Pump			
8	Emergency Transfer Pump			
9	Absorber Area Drain Sump Pump			
10	Gypsum Area Drain Sump Pump			
11	Limestone Area Drain Sump Pump			
12	Other LT motors involved in the system (if any)			

OEM 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 – MAHAGENCO (Maharashtra State Power Generation Corporation Limited) specific requirements.

421674/2021/BAPCOA_MECH

Manufacturer's Logo, if available	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	PROJECT: MAHAGENCO BHUSAWAL (1 X 660 MW) FGD PROJECT BHEL PO NO & DATE: MQP NO: REV NO: DATE: DD/MM/YYYY PAGE: 1 OF 1
Format No		PRODUCT: LT MOTORS (UPTO 16O KW) USED IN SLURRY PUMPS SUB-SYSTEM : FGD PACKAGE	

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

Record of Revisions

Rev No	Date	Clauses revised	Description of Revision

PREPARED BY	REVIEWED & APPROVED BY
MANUFACTURER	MAIN SUPPLIER (BHEL)
SIGNATURE & SEAL	

LEGEND: *** RECORDS** IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** **M:** MANUFACTURER, **C:** BHEL / BHEL AIA, **N:** CUSTOMER; **P:** PERFORM, **W**: WITNESS, **V:** VERIFICATION;
CLASS: **A** - CRITICAL**; B** - MAJOR; **C** – MINOR;
TC- MILL /MANUFACTURER'S TEST CERTIFICATE; **IR**- INSPECTION REPORT.

W.r.t FOREIGN OEM VENDORS ONLY

Sl no	Description & Quality Requirements	Specific confirmation by the vendor (Confirmed/Not Confirmed)
01	OEM vendor shall meet all the requirements as in Annexure-II and also OEM Vendor shall endorse (Signature and Stamp in all the pages) in attached CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS(IE3) Up to 160KW used in Slurry Pumps for FGD application (DOC NO.: BAP/QR/R4U8/Bhusawal/LTM/ Slurry Pumps: 002 Rev NO.: 00 dt 11.08.2020) and send us the same to follow / ensure all the requirements in the event of an order.	
02	OEM vendor shall ensure Credentials of design and Manufacturing capabilities w.r.t. LT Motors by their LT Motor manufacture.	
03	No material shall be dispatched without BHEL/ **Ultimate Customer – MAHAGENCO (Maharashtra State Power Generation Corporation Limited)** inspection or its Appointed Inspection Agency M/s QUEST - CHP/MDCC clearances.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 002** **Rev NO.: 00** **PAGE : Page 1 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) - Up to 160kW**	
01	**Type Test Requirements**	*A.* Vendor shall conduct all the type tests for LT Motors as listed in SL NO: 01 (D) below and accordingly submit the type test reports. These reports should be for the test conducted on the identical/similar LT Motors to those proposed to be supplied under this enquiry and test (s) should have been witnessed by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL /Ultimate client MAHAGENCO at respective LT Motor Manufacturer of OEM vendor.	
		B. 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 MAHAGENCO and submit the reports for review & approval.	
		C. Type Test reports review and approval by BHEL AIA (BHEL Appointed Inspection Agency) / BHEL / Ultimate client MAHAGENCO and its consultant DCPL is must in line with MAHAGENCO and its consultant DCPL approved data sheet / BOM/GA Drawing etc.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 002** **Rev NO.: 00** **PAGE : Page 2 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) - Up to 160kW**	
01	**Type Test Requirement …..(Contd)**	D. The following Type test reports to be submitted covering the following for LT Motors as per relevant BIS (Bureau of Indian Standard) - BIS 325/IS 12615/ IEC 60034 etc i. Insulation Resistance Test ii. Measuring of resistance of winding of stator and wound rotor (if applicable) iii. No load test at rated voltage to determine input current, power and speed. iv. Locked Rotor Readings of Voltage, Current and Power Input at a Suitable Reduced Voltage v. Reduced Voltage Running up Test at no-load (for squirrel cage motor up to 37 kW only) vi. Open circuit voltage ratio of wound rotor motor (in case slip ring motors) vii. Locked Rotor Test (for Motors Having Output Rating Up to 37 kW) viii. Full load test to determine efficiency power factor and slip ix. Temperature rise test. x. Momentary excess load test xi. High voltage test xii. Test for vibration severity of motor xiii. 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).** xiv. Over speed test xv. **Degree of Protection Tests (Minimum Ingress Protection - IP 55). Type test certificate shall be acceptable, if the test is conducted for IP-55 degree of protection on motors of similar frame size within last 10 years**. **xvi. Fault Withstand Test for main terminal box. Type test certificate shall be acceptable, if the test is conducted on exactly identical terminal box within last 3 years.** xvii. Type test reports for motors located in fuel oil area having flame proof enclosures as per BIS 2148/ IEC 60079-1	
		E. The TCs/Test reports shall also be given as PDF file with index sheet & page control through Email & Soft Copy (File size to less than 9MB).	
02	**Quality Plan Requirement**	a. MQP (Manufacturing Quality Plan) is applicable for these LT Motors and accordingly Actual LT Motor Manufacture shall submit the MQP in BHEL format for review and approval by BHEL / Ultimate Customer – MAHAGENCO and its consultant DCPL.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 002** **Rev NO.: 00** **PAGE : Page 3 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) - Up to 160kW**	
02	**Quality Plan Requirement …contd**	b. If any of LT Motor manufacture is having, ultimate customer MAHAGENCO approved MQP (Manufacturing Quality Plan)/ NTPC approved RQP and having validity, the same is applicable for these LT Motor for inspection purposes subject to obtaining ultimate customer MAHAGENCO and its consultant DCPL formal approval in the event of an order.	
		c. If LT Motor Manufacture / OEM vendor does not have MQP, they should submit a fresh MQP to BHEL/MAHAGENCO (in BHEL format) for review & approval. (copy attached).	
		d. Typical Indicative MQP is attached for inf and & guidance purposes only and it is not final and binding on BHEL / Ultimate Customer MAHAGENCO.	
03	**Inspection Methodology to be adopted at Actual LT Motor Manufacture works by OEM vendor**	a. All LT Motors are to be inspected by BHEL AIA (BHEL authorized inspection Agency) at LT Motor manufacture works as per approved MQP & approved data sheet/drg/spec/ as per relevant BIS (Bureau of Indian Standard) - BIS 325 /IS 12615/ IEC 60034 etc by BHEL / Ultimate Customer-MAHAGENCO	
		b. All Type tests & Routine Tests are to be witnessed by BHEL AIA (BHEL authorized inspection Agency) at LT Motor manufacture works as per approved MQP & approved data sheet/drg/spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 12615/ IEC 60034 etc by BHEL / Ultimate Customer-MAHAGENCO	
		c. BHEL AIA (BHEL authorized inspection Agency) / Ultimate Customer-MAHAGENCO will also ensure LT Motor type tests reports review including Degree of Protection Test Reports & acceptance as per approved MQP & approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 /IS 12615/ IEC 60034 etc.	
		d. BHEL AIA (BHEL authorized inspection Agency)) / Ultimate Customer-MAHAGENCO to witness / perform inspection at LT Motor Supplier works and submit all the inspection documents and routine & Type test reports including Degree of Protection Test Reports (IP 55) as per approved MQP & approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 12615/ IEC 60034 etc.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

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Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) - Up to 160kW**	
03	**Inspection Methodology to be adopted at Actual LT Motor Manufacture works by OEM vendor…contd**	**LT Motors (below 60 KW) – Inspection Categorization: II** All Routine Tests (including Test for noise level and Test for vibration as Routine Tests) and Type tests on LT Motors are to be ensured by OEM vendor & witnessed by BHEL/BHEL AIA (BHEL authorized inspection Agency) at LT Motor manufacturer works including review of Type Test Reports and Degree of Protection Test Reports (IP 55) as per approved MQP & approved data sheet/drg/spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 12615/ IEC 60034 etc and all the Routine Test and Type Test Reports with Inspection report (IR) to be submitted for BHEL/Ultimate Customer – MAHAGENCO and its consultant DCPL for review and to obtain inspection and dispatch clearance.	
		From 60KW and up to 160KW – Inspection Categorization: I All Routine(including Test for noise level and Test for vibration as Routine Tests) & Type Tests on LT Motors are to be ensured by OEM Vendor and same shall be offered to BHEL/ BHEL AIA (BHEL authorized inspection Agency) and Ultimate Customer-MAHAGENCO for inspection & witnessing including review of Degree of Protection Test Reports as per approved MQP /RQP/ approved data sheet / drg / spec / as per relevant BIS (Bureau of Indian Standard) - BIS 325 / IS 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 – MAHAGENCO and its consultant DCPL for review and to obtain inspection and dispatch clearance.	
		All the checks / tests /review of documents / inspection & witnessing at LT Motor Manufacture by OEM /BHEL / BHEL AIA (BHEL authorized inspection Agency) / Ultimate Customer-MAHAGENCO are under OEM scope and any cost implication arising out of due to conducting checks / tests including for witnessing of any of the tests at Actual LT Motor Manufacture Works (or) at third party etc by BHEL / BHEL AIA / Ultimate Customer – MAHAGENCO are in the scope of OEM Supplier only. As such No extra cost if any will be admissible and paid in the event of an order and also during execution of the contract.	
		No material shall be dispatched without BHEL / BHEL AIA and Ultimate Customer – MAHAGENCO Inspection and dispatch clearance.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 002** **Rev NO.: 00** **PAGE : Page 5 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor
		ITEM: LT Motors (Energy Efficient) - Up to 160kW**	
04	**Painting Requirements**	Painting requirement like paint shade and painting thickness including no of coats if any are to be ensured by the OEM vendor for these LT Motors as per BHEL/ Ultimate Customer –MAHAGENCO and its consultant DCPL approved data sheet/drg/spec (As applicable)	
05	**Packing**	Packing shall be as per Specification / Drg. / Data sheet including sea worthy packing if any to avoid any transit & handling damages	
06	**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 – MAHAGENCO including for type test witnessing to be ensured / addressed to Mr R Kesavan., DGM (QC-Proc)., Mobile no: +91 9443006303., Email id: kesavan@bhel.in and Mr Kovarathanan., DM (QC-Proc)., Mobile no: +91 8903502628., Email id: kovak@bhel.in including for inspection related activities for immediate response / resolution.	
07	**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) MQP/RQP (iii) TCs identified by BHEL/MAHAGENCO 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 MAHAGENCO (Maharashtra State Power Generation Corporation Ltd) CHP (Customer Hold Point) / MDCC (Material Dispatch Clearance Certificate) (vii) Type test reports conducted/submitted with approval with approved data sheet and BOM with actual make used with Customer approved drgs.	

Annexure-II

CONTRACT QUALITY REQUIREMENTS (CQR) for LT MOTORS (Energy Efficient**) Up to 160kW

421677/2021/BAP-QA_MECH

(For FOREIGN (OUTSIDE INDIA) OEM VENDOR ONLY)

PROJECT: **MAHAGENCO 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)** **MAHAGENCO CONTRACT NO:** DG/BSL U-6/2011/T-1/BTG+BoP EPC Contract/Amendment to LOA/No.1974 dtd 31.12.2018 **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**) - Up to 160kW used in** **Slurry Pumps for FGD application** **MAHAGENCO Bhusawal 1 x 660 MW** **(BHEL W.O no: R4U8)**	**DOC.NO:** **BAP/QR/R4U8/Bhusawal/ LTM/ Slurry Pumps: 002** **Rev NO.: 00** **PAGE : Page 6 of 6** **DATE: 11.08.2020**	**##Enquiry No:** **## OEM Supplier Name & Address:** **##Offer reference:** **##Date:** **Contact Official Name:** **Mobile no:** **Email id:**

Sl. NO.	DESCRIPTION	BHEL and Ultimate Customer - MAHAGENCO (Maharashtra State Power Generation Corporation Ltd)., Quality Requirements	##Specific confirmations by the vendor

ITEM: LT Motors (Energy Efficient) - Up to 160kW**

08	**Important notes**	**Inspection Categorization: I** **Inspection by BHEL/BHEL AIA and also by Ultimate Customer – MAHAGENCO based on MQP/RQP approved and as in sl no:03** **Inspection Categorization: II** **Inspection by Main contractor (BHEL) / BHEL AIA based on Ultimate Customer – MAHAGENCO approved MQP/RQP & based on inspection as in sl no:03**	
		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 – MAHAGENCO 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.	

09 **Motor details**

**LT Motors should be of Energy Efficiency class as per Technical specification/drg/datasheet (as applicable).
Vendor shall furnish following Motor details for the Pumps applicable for this enquiry.

MAHAGENCO Bhusawal 1 x 660 MW – FGD Project :-

S. No	Pump	LT Motor		
		Rating (in kW)	Quantity (in nos)	Make and Country of origin
1	Limestone Slurry Feed Pump			
2	Gypsum Bleed Pump			
3	Primary Hydro-cyclone Feed Tank Pump			
4	Filtrate Water Tank Pump			
5	Secondary Hydro-cyclone Feed Tank Pump			
6	Waste Water Tank Pump			
7	Auxiliary Absorbent Tank Pump			
8	Emergency Transfer Pump			
9	Absorber Area Drain Sump Pump			
10	Gypsum Area Drain Sump Pump			
11	Limestone Area Drain Sump Pump			
12	Other LT motors involved in the system (if any)			

OEM 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 – MAHAGENCO (Maharashtra State Power Generation Corporation Limited) specific requirements.

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Manufacturer's Logo, if available	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	PROJECT: MAHAGENCO BHUSAWAL (1 X 660 MW) FGD PROJECT
Format No		PRODUCT: LT MOTORS (UPTO 16O KW) USED IN SLURRY PUMPS	BHEL PO NO & DATE:
		SUB-SYSTEM : FGD PACKAGE	MQP NO: REV NO:
			DATE: DD/MM/YYYY PAGE: 1 OF 1

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

Record of Revisions

Rev No	Date	Clauses revised	Description of Revision

PREPARED BY	REVIEWED & APPROVED BY
MANUFACTURER	MAIN SUPPLIER (BHEL)
SIGNATURE & SEAL	

LEGEND: *** RECORDS** IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** **M:** MANUFACTURER, **C:** BHEL / BHEL AIA, **N:** CUSTOMER; **P:** PERFORM, **W**: WITNESS, **V:** VERIFICATION;
CLASS: **A** - CRITICAL**; B** - MAJOR; **C** – MINOR;
TC- MILL /MANUFACTURER'S TEST CERTIFICATE; **IR**- INSPECTION REPORT.

BHEL BAP/ RANIPET / TAMIL NADU INDIA	OEM SUPPLIER To be filled by OEM Supplier LT MOTOR Manufacture To be filled by OEM Supplier	MANUFACTURING QUALITY PLAN FOR LT MOTOR (Up to TO 160KW) - FGD Application	MQP:E:LTM:BHUSAWAL :FGD SLURRY :001 REV:NO:00 DATE: 12.08.2020 Page :

S1.No.	COMPONET/ASSEMBLY/OPERATION/TESTS	CHARACTE-RISTIC	CLASS	TYPE OF CHECK	QUANUTM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY			REMARKS
									D	M	BHEL/ BHEL AIA	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
INCOMING INSPCETIONS:												
1.1	Enamelled round copper conductor(Dual coated)MM	1.Overall diameter	Major	Mechanical	1 sample/lot	IS 13730 1993 Part 13 / IEC 60317-0-1-2008 (As applicable)	IEC 60317-0-1 2008	Plant format		P	V	
		2.Bare conductor diameter	Major	Mechanical	1 sample/lot	BHEL / MAHAGENCO Spec & Apprd Datasheet	BHEL / MAHAGENCO Spec & Apprd Datasheet	Plant format		P	V	
		3.BDV test	Major	Electrical	1 sample/lot	--do--	--do--	Plant format		P	V	
		4.Elongation	Major	Mechanical	1 sample/lot	--do--	--do--	Plant format		P	V	
		5.Continuity（insulation）	Major	Electrical	1 sample/lot	--do--	--do--	Insp report/ Supplier TC		P	V	
		6.Tan Delta (If applicable)	Major	Electrical	1 sample/lot	--do--	--do--	Insp report/ Supplier TC		P	V	EC gr purity：-99.6%
1.2	Aluminum Ingots	1.Chemical composition	Major	Chemical	1 sample/lot	--do--	--do--	Supplier Tc		P	V	
1.3	FAN	1.Diameter（ID&OD）	Major	Mechanical	1 sample/lot	--do--	--do--	Inspection Report		P	V	
1.4	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	
1.5	Terminal Block	1.Dimensions	Major	Mechanical	Plant std.	--do--	--do--	Inspection Report		P	V	
		2.Proof voltage test	Major	Electrical	Plant std.	--do--	--do--	Inspection Report		P	V	

BHEL BAP/ RANIPET / TAMIL NADU INDIA	OEM SUPPLIER To be filled by OEM Supplier LT MOTOR Manufacture To be filled by OEM Supplier	MANUFACTURING QUALITY PLAN FOR LT MOTOR (Up to TO 160KW) - FGD Application	MQP:E:LTM:BHUSAWAL :FGD SLURRY :001 REV:NO:00 DATE: 12.08.2020 Page :

S1.No.	COMPONET/ASSEMBLY/OPERATION/TESTS	CHARACTE-RISTIC	CLASS	TYPE OF CHECK	QUANUTM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC		AGENCY		REMARKS
									D	M	BHEL/ BHEL AIA	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
INPROCESS INSPCETIONS:												
2.1	Stator core	1.Core length dia	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	
		2.Core locking	Major	Visual	100%	--do--	--do--	Inspection Record		P	V	
		3.Rigidity of core	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	
2.2	Die cast rotor	1.Core length	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	
		2.Blow holes	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	
2.3	Wound stator （if applicable）	1.Resistance	Major	Electrical	100%	--do--	--do--	Inspection Record		P	V	
		2.H.V.Test	Major	Electrical	100%	--do--	--do--	Inspection Record		P	V	
		3.Insulation resisitance	Major	Electrical	100%	--do--	--do--	Inspection Record		P	V	
2.4	Final Assembiy	1.Completeness	Major	Visual	100%	--do--	--do--	Inspection Record		P	V	
		2.Runout in case of flanged motors	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	
		3.Mounting dimensions	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	V	

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BHEL BAP/ RANIPET / TAMIL NADU INDIA	OEM SUPPLIER To be filled by OEM Supplier LT MOTOR Manufacture To be filled by OEM Supplier	MANUFACTURING QUALITY PLAN FOR LT MOTOR (Up to TO 160KW) - FGD Application	MQP:E:LTM:BHUSAWAL :FGD SLURRY :001 REV:NO:00 DATE: 12.08.2020 Page :

S1.No.	COMPONET/ASSEMBLY/OPERATION/TESTS	CHARACTE-RISTIC	CLASS	TYPE OF CHECK	QUANUTM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC		AGENCY		REMARKS
									D	M	BHEL/ BHEL AIA	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
FINAL INSPCETION AND TESTING:												
3.1	**Routine Test**	1.Resistance Measurement on winding & space heater	Major	Electrical	100%	BHEL / MAHAGENCO Spec, GA Drawing & Apprd Datasheet and IS/IEC 60034 (As applicable)	BHEL / MAHAGENCO Spec, GA Drawing & Apprd Datasheet and IS/IEC 60034 (As applicable)	Inspection Record		P	W	
		2.HV Test	Major	Electrical	100%	--do--	--do--	Inspection Record		P	W	
		3.Phase sequence & direction of rotation	Major	Electrical	100%	--do--	--do--	Inspection Record		P	W	
		4.No load run test	Major	Electrical	100%	--do--	--do--	Inspection Record		P	W	
		5.Vibration test	Major	Mechanical	100%	--do--	--do--	Inspection Record		P	W	
		6.Noise level measurement	Major	Measurement	100%	--do--	--do--	Inspection Record		P	W	
		6.Name plate recheck	Major	Visual	100%	--do--	--do--	Inspection Record		P	W	
		7.Paint shade thickness & adhesion	Major	Visual & Measurement	100%	--do--	--do--	Inspection Record		P	W	
		8.Moutings & Overall dimensions	Major	Mechanical	100%	--do--	-do-	Inspection Record		P	W	

BHEL BAP/ RANIPET / TAMIL NADU INDIA	OEM SUPPLIER To be filled by OEM Supplier LT MOTOR Manufacture To be filled by OEM Supplier	MANUFACTURING QUALITY PLAN FOR LT MOTOR (Up to TO 160KW) - FGD Application	MQP:E:LTM:BHUSAWAL :FGD SLURRY :001 REV:NO:00 DATE: 12.08.2020 Page :

S1.No.	COMPONET/ASSEMBLY/OPERATION/TESTS	CHARACTE-RISTIC	CLASS	TYPE OF CHECK	QUANUTM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE STANDARD	FORMAT OF REC	AGENCY D	AGENCY M	AGENCY BHEL/ BHEL AIA	REMARKS
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.		12.
3.2	**TYPE TESTS ###**											
3.3	Preservation and Packing	1.Completeness	Major	Review	100%	--do--	--do--	Inspection Record		P	V	
		2.Motors covered with polythene sheets	Major	Visual	100%	--do--	--do--	Inspection Record		P	V	
		3.Packing	Major	Visual	100%	--do--	--do--	Inspection Record		P	V	

TYPE TEST REQUIREMENTS FOR LT MOTOR INCLUDING DEGREE OF PROTECTION TEST REPORT (IP 55)

BHEL/BHEL AIA (Authorised Inspection Agency) shall witness type tests and review the type test reports during including degree of Protection Test report (IP 55) for acceptance in line with BHEL/ Ultimate Customer - MAHAGENCO approved Data sheet/Drg/Spec for LT Motors. OEM / LT Motor Manufacture shall conduct all these type tests in presence of BHEL/BHEL AIA /Ultimate Customer MAHAGENCO without any cost implication to BHEL/Ultimate Customer - MAHAGENCO within reasonable time.

1.Insulation Resistance Test

2. Measurement of Resistence of Stator

3. No Load test at Rated Voltage

4.Locked Rotor Readings of Voltage, Current and Power Input at a Suitable Reduced Voltage

5.Reduced Voltage Running up Test at no-load (for squirrel cage motor up to 37 kW only)

6.Open circuit voltage ratio of wound rotor motor (in case slip ring motors)

7.Locked Rotor Test (for Motors Having Output Rating Up to 37 kW)

8.Full load test to determine efficiency power factor and slip

9.Temperature Rise Test

10.Momentary Excees Torque Torque Test

11.High Voltage Test

12.Test for Vibration Severity

13.Test for Noise Level Measurement

14. Over Speed Test

15.Fault withstand test for Main Terminal Box-Type test cerificate shal be acceptable,if test is conducted on exactly identical terminal box within last three years

16. Degree of Protection TC (IP 55)-Type test certificate shall be acceptable, if the test is conducted for IP-55 degree of protection on motors of similar frame size within last 10 years

LEGEND: **OEM = Orgional Equipement Supplier M = LT Motor Manufacture -**
BHEL AIA = BHEL AUTHORISED INSPECTION AGENCY
GA Drawing : General Arrangment Drawing
MAHAGENCO - MAHARASHTRA STATE POWER GENERATION CORPORATION LIMITED (Ultimate Customer)
OEM SUPPLIER : (To be Filled up by OEM Supplier)
LT MOTOR Manufacture : (To be Filled up by OEM Supplier)