

ESP-001- 2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION		Std. / Doc. Number	
				Annexure-7	
				Rev. No.	00

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Revisions:	Prepared by :	Checked by :	Approved by :	Date :
	Refer to record of revisions	Girish Prasad Palo	Siva Prasad Babu	27.03.2017

TD-201 Rev No. 00 Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE-7
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. QAP GUIDELINES & FORMAT (ANNEXURE-7, Rev 01) The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement. Note : 1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval. 2. No deviation to reference document is acceptable.			

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u> 1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. 2. Each page of QAP shall contain the following information. a) Vendor's name & address. b) Customer: BHEL, Hyderabad. c) Project. d) BHEL Product Standard Number/revision number as referred in P.O. e) BHEL Purchase Order Number & Date. f) Product as per P.O. description. g) QAP Number (unique and shall not repeat)/revision number/date. h) Page number and number of pages 3. QAP shall contain four parts / stages as follows. a) Raw materials and bought out items. b) In process Control / Inspection. c) Final assembly, Inspection & Testing. d) Painting, preservation & packing. 4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). 5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.) 6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic. 7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) 8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) 9. Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. 10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.		
	11. Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor)		
Ref. Doc			

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code1. 12. Under 'D' please put (☐ Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification. 13. Vendor's signature & stamp should be available on each page of QAP. 14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings. 15. The following operations/characteristics/check points may be included (AS APPROPRIATE) a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non-Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. 16. QAP Format enclosed. 17. Typical Manufacturing QAP(s) is /are attached.	
		Ref. Doc	

VENDOR'S NAME & ADDRESS:		MANUFACTURING QUALITY PLAN							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32.				BHEL P.O.NO.:			REV NO:		DATE:		
		PROJECT: PRODUCT:				P.O.DATE: BHEL SPEC:			REV:		PAGE 1 OF 1		
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
2.0	INPROCESS INSPECTION												
3.0	FINAL INSPECTION & TESTING												
4.0	PRESERVATION & PACKING												

VENDOR TO NOTE: THIS FORMAT IS IN MICROSOFT WORD. HEADER & FOOTER SHALL BE AVAILABLE IN EACH PAGE OF QP. QP SHALL BE IN LANDSCAPE & A4 SIZE ONLY. FONT SIZE SHALL BE MIN 10. VENDOR SHALL SIGN & STAMP IN EACH PAGE OF QP. LOI REF. & DATE ARE NOT ACCEPTABLE. P.O.NO. & DATE SHALL BE INDICATED. QP NO. SHOULD BE UNIQUE AND SHALL NOT REPEAT. ALL THE TESTS / CHECKS INDICATED IN THE BHEL SPEC. SHALL BE INDICATED IN THE QP.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: BOILER FEED PUMP BHEL TECH SPEC:			REV NO:		DATE:			
								PAGE 1 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.0	RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Casing, suction & discharge nozzle, stuffing box	Chemical & Mech. Properties	Major	Chemical & Mech. analysis	1 per heat/lot	Tech Spec/ Approved Datasheet/ Approved Drawing		MTC	√	2	2	1	
1.2		Heat treatment *	Major	Heat treatment	100%			HT chart	√	2	2	1	
1.3	Impeller, Diffuser and shaft	Chemical & Mech. Properties	Major	Chemical & Mech. analysis	1 per heat/lot			MTC	√	2	2	1	
1.4	Mechanical seal	Material compliance and leakage check	Major	TC review, Air test	100%			MTC / COC	√	2	2	1	
1.5	Bearing and bearing housing	Make and Model compliance	Major	Visual	100%			MTC / COC	√	2	2	1	
1.6	Lube oil system	MOC, routine tests of all valves, instruments, filters, coolers and pump & motor	Major	OEM test certificate verification	100%			MTC	√	2	2	1	
1.7		Piping hydro test	Major	Hydro test	100%			TC	√	2	2	1	
1.8		Performance test	Major	testing	100%			TC	√	2	2	1	

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		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: BOILER FEED PUMP BHEL TECH SPEC:			REV NO:		DATE:			
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SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	
1.9	ARC valve, Hydraulic coupling and Gear box	MOC and routine tests	Major	OEM test certificate verification	100%			MTC	√	2	2	1	
1.10	Accessories * (strainers, coupling and guards, JB, instruments etc.)	Chemical & Mech. Properties	Major	Chemical & Mech. Analysis	1 per heat/lot			MTC	√	2	2	1	
1.11		MOC, Leakage test, Calibration reports and Type test certificates	Major	Testing and type test certificate review	100%			TC, Type test certificates and Calibration reports	√	2	2	1	* accessories as per scope of supply
1.12	Gaskets, Wear rings, base plate and Fasteners	Chemical & Mech. Properties, Hardness	Minor	Chemical & Mech. Analysis, Hardness test	1 per heat/lot			MTC	√	2	2	1	
2.0	INPROCESS INSPECTION												
2.1	Fabrication of casing and other components	WPS, PQR and WQR	Major	Document verification	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		WPS, PQR and WQR	--	2	2	1	

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बी एच ई एल BHEL		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PROJECT: PACKAGE: BOILER FEED PUMP BHEL TECH SPEC:			REV NO:		DATE:			
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SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
2.2	Fillet welds on pressure containing components *	NDE	Major	MPI or LPI (when MPI is not feasible)	100%			NDE reports	√	2	2	1	* if any
2.3	Nozzle weld and butt weld joints on pressure containing components *	NDE	Major	RT or UT (when RT is not feasible)	100%			NDE reports	√	2	2	1	* if any
2.4	Casing, suction & discharge nozzle, stuffing box	Surface finish & NDE	Major	Visual & DPT/MPI	100%			IR and NDE reports	√	2	2	1	
2.5		Leakage	Critical	Hydro test	100%			TC	√	2	1	--	
2.6	Impeller, Diffuser and Shaft > 50 mm diameter	NDE	Major	For impeller/ diffuser DPT/MPI and for Shaft UT	100%			NDE reports	√	2	2	1	
2.7	Rotor with coupling hub	Dynamic balancing	Critical	Balancing	100%			TC	√	2	2	1	
2.8	Auxiliary piping	Leakage check	Major	Hydro test	100%			TC	√	2	1	--	

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SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
3.0	FINAL INSPECTION & TESTING												
3.1	Pump Assembly with job motor	Performance test	Critical	Testing	100%	Tech Spec/ Approved Datasheet/ Approved Drawing		TC	√	2	1	--	
3.2		Vibration level at five points , Noise level, Bearing temperature rise and leakage from mechanical seal	Critical	Testing	100%			TC	√	2	1	--	
3.3		NPSH (if applicable)	Major	Testing	100%			TC	√	2	1	--	
3.4		Mechanical run test	Critical	Testing	100%			TC	√	2	1	--	
3.5		Strip Examination	Critical	Dismantling	100%			IR	√	2	1	--	
3.6		Overall Dimensions	Major	Measurement	100%			IR	√	2	1	--	
3.7		String test	Major	Testing	100%			IR	√	2	1	--	
3.8		Spares (if any)	Major	BOM check	100%			IR	√	2	1	--	
4.0	PRESERVATION & PACKING												
4.1	Pump and its components	Direction of rotation, Stamping and Painting	Major	Visual, Shade & DFT	Random	Tech Spec/ Approved Datasheet/ Approved Drawing		IR	√	2	1	--	
4.2		Packing #	Major	Visual	100%			Packing List	√	2	2	1	

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SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	

Notes:-

1. This TMQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specifications/drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

Abbreviations:-

MTC – Material Test certificate
 IBR – Indian Boiler Regulations
 DFT – Dry Film Thickness
 TC – Test Certificate
 PMI – Positive Material Identification
 G.I – Galvanized Iron

WPS – Welding Procedure Specification
 PQR – Procedure Qualification Record
 WPQ – Welder Performance Qualification
 NDE – Non Destructive Examination
 OD – Outer Diameter
 ID – Internal Diameter

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