

TD-201 Rev No. 00 Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE 3 Rev No. 00 Page 1 of 3
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 -3) 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.		

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE X
			Rev No. 00
			Page 2 of 3
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> - QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. - Each page of QAP shall contain the following information. - Vendor's name & address. - Customer: BHEL, Hyderabad. - Project. - BHEL Product Standard Number/revision number as referred in P.O. - BHEL Purchase Order Number & Date. - Product as per P.O. description. - QAP Number (unique and shall not repeat)/revision number/date. - Page number and number of pages - QAP shall contain four parts / stages as follows. - Raw materials and bought out items. - In process Control / Inspection. - Final assembly, Inspection & Testing. - Painting, preservation & packing. - Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). - Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.) - Under 'Class', indicate minor, major or critical depending on the importance of characteristic. - Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) - Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) - 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. - Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc. - 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	

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE X
			Rev No. 00
			Page 3 of 3
Ref. Doc	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. 18. Inspection Categorization Plan for Items in this package to be submitted by bidder.		
	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.		

MFGR.'s LOGO	MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING QUALITY PLAN		PROJECT:
		ITEM:	QP NO.: REV.NO.:	PACKAGE:
		SUB-SYSTEM:	DATE: PAGE: OF....	CONTRACT NO.:
				MAIN-SUPPLIER:

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

		LEGEND: * RECORDS, IDENTIFIED WITH “TICK” () SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUM “N” AS ‘ W”	 FOR NTPC USE	DOC. NO.: REV..... CAT.....		
MANUFACTURER/ SUB-SUPPLIER	MAIN- SUPPLIER					
SIGNATURE					REVIEWED BY	APPROVED BY

		TYPICAL MANUFACTURING QUALITY PLAN					QP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032					PRODUCT: GAS ENGINE PROJECT:					
							REV NO:		DATE:			
PAGE 1 OF 9												
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	

1.0	RAW MATERIALS / ENGINE COMPONENTS											
1.1	Piston crown, Connecting rod, Crankshaft, Camshaft	Chem. & mech. properties	Major	Chem. & mech. Testing	1 per lot/heat	Tech Spec/ Approved Datasheet/ Approved Drawing	MTC	√	2	2	1,3	
1.2		Crack test	Major	NDE	100%		MTC	√	2	2	1,3	
1.3		Dimensions	Major	Measure ment	100%		MTC	√	2	2	1,3	
1.4	Cylinder block, Cylinder head, Cylinder liner	Chem. & mech. properties	Major	Chem. & mech. Testing	1 per lot/heat		MTC	√	2	2	1,3	
1.5		Pressure test	Major	Hydro test	100%		MTC	√	2	2	1,3	
1.6		Dimensions	Major	Measure ment	100%		MTC	√	2	2	1,3	
1.7	Crankshaft	Dynamic balancing	Critical	balancing	100%		Test certificates	√	2	2	1,3	
2.0	BOUGHT OUT ITEMS											
2.1	Lubrication system	Make, Model No. and MTC review of each components	MA	Visual	100%	Tech Spec/ Approved Datasheet/ Approved Drawing	OEM certificate	√	2	2	1,3	

LEGEND:												
P: PERFORM W: WITNESS V: VERIFICATION	1: BHEL / BHEL's TPIA 2: VENDOR / SUB VENDOR 3: END CUSTOMER / END CUSTOMER's Representative		* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES / REPORTS SHALL BE SUBMITTED TO BHEL FOR RECORDS.									

		TYPICAL MANUFACTURING QUALITY PLAN					QP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032			PRODUCT: GAS ENGINE PROJECT:		REV NO:		DATE:			
							PAGE 2 OF 9					
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		Performance test	MA	Test	100%	Tech Spec/ Approved Datasheet/ Approved Drawing	Test certificates	√	2	1	3	
2.3	Ignition system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.4		Functional test	MA	Test	100%		Test certificates	√	2	1	3	
2.5	Air intake and exhaust system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.6		Assembly and BOM verification	MA	Visual	100%		Test certificates	√	2	1	3	
2.7	Starting air system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.8		Performance test	MA	Test	100%		Test certificates	√	2	1	3	
2.9	Engine cooling system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.10		Functional/No load test	MA	Test	100%		Test certificates	√	2	1	3	
2.11	Fuel gas system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	

LEGEND:		
P: PERFORM W: WITNESS V: VERIFICATION	1: BHEL / BHEL's TPIA 2: VENDOR / SUB VENDOR 3: END CUSTOMER / END CUSTOMER's Representative	* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES / REPORTS SHALL BE SUBMITTED TO BHEL FOR RECORDS.

 50 Golden Jubilee 2004-2014		TYPICAL MANUFACTURING QUALITY PLAN					QP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032			PRODUCT: GAS ENGINE PROJECT:		REV NO:		DATE:			
							PAGE 3 OF 9					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
									P	W	V	
2.12		Functional/No load test	MA	Test	100%	Tech Spec/ Approved Datasheet/ Approved Drawing	Test certificates	√	2	1	3	
2.13	Fuel gas supply system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.14		Performance test	MA	Test	100%		Test certificates	√	2	1	3	
2.15	Base frame	MTC of plates and structures, Welding quality, dimensions	MA	Visual and measure ment	100%		IR	√	2	2	1,3	
2.16		Finishing of painting	MA	Visual and DFT	100%		TC	√	2	2	1,3	
2.17	Bearings, Seals, Coupling, Turning Gear system, Governing system	Make, Model No. and MTC review of each components	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.18	Control Panel	Make, rating, MTC review, Continuity/loop test on wired panel, HV IR test	MA	Visual	100%		OEM certificate	√	2	2	1,3	
2.19	Battery and battery charger	Make, AH, Acceptance tests and type tests	MA	Visual	100%		OEM certificate	√	2	2	1,3	

LEGEND:		
P: PERFORM W: WITNESS V: VERIFICATION	1: BHEL / BHEL's TPIA 2: VENDOR / SUB VENDOR 3: END CUSTOMER / END CUSTOMER's Representative	* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES / REPORTS SHALL BE SUBMITTED TO BHEL FOR RECORDS.

TYPICAL MANUFACTURING QUALITY PLAN							QP. NO.:						
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032							PRODUCT: GAS ENGINE PROJECT:			REV NO:		DATE:	
							PAGE 4 OF 9						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS	
									P	W	V		
3.0	FINAL INSPECTION & TESTING												
3.1	engine	Performance/Load test with job alternator	Critical	Testing	100%	Tech Spec/ Approved Datasheet/ Approved Drawing/ Approved FAT	TC	√	2	1,3	--		
3.2		Net Heat Rate test with Job alternator	Major	Testing	100%		IR	√	2	1,3	--		
		Noise and vibrations	Major	Measurement	Random		IR	√	2	1,3	--		
		Overhaul inspection	Major	Visual	Random		IR	√	2	1,3	--		
3.3		Complete unit test	Major	Testing	100%		IR	√	2	1,3	--		
3.4		Tools and tackles and Spares (if any)	Major	BOM check	100%		IR	√	2	1	--		
4.0	PRESERVATION & PACKING												
4.1	engine and its components	Stamping and Painting	Major	Visual, Shade & DFT	Random	Tech Spec/ Approved Datasheet/ Approved Drawing	IR	√	2	2	--		
4.2		Packing #	Major	Visual	100%		Packing List	√	2	2	1		# Seaworthy packing for this orders

NOTES:

1. This MQP should be read along with specification (latest revision as per PO), approved drawings & approved datasheet, approved BOM (as applicable).
2. Approved drawing/datasheet & specification shall prevail over quality plan in case contradiction if any.

LEGEND:		
P: PERFORM W: WITNESS V: VERIFICATION	1: BHEL / BHEL's TPIA 2: VENDOR / SUB VENDOR 3: END CUSTOMER / END CUSTOMER's Representative	* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES / REPORTS SHALL BE SUBMITTED TO BHEL FOR RECORDS.

		TYPICAL MANUFACTURING QUALITY PLAN					QP. NO.:					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL-HYD 502032			PRODUCT: GAS ENGINE PROJECT:		REV NO:		DATE:			
							PAGE 5 OF 9					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
								D	P	W	V	

3. Material test certificate shall include tensile, impact, hardness, bend, IGC, hot tensile, grain size, chemical analysis etc. as required by applicable material code /approved drwg./data sheet.
4. WPS/PQR/WPQ to be submitted for review wherever required. All welding shall be done by qualified welders. Duly endorsed documents will be submitted to BHEL/TPIA's review.
5. Hydro test shall be done in un-painted condition as per approved procedure/relevant code.
6. Any other tests/ checks indicated in specification, P.O., or drawing/data sheet & any additional checks envisaged by BHEL/Customer as part of correspondence to ensure workmanship, finish, aesthetics, etc. shall also be conducted and witnessed/verified by BHEL /TPIA /Customer as per project requirement.
7. All documents issued by statutory authorities such as CCOE /IBR, CMRI, ATEX etc., shall be submitted during inspection.
8. Only type test certificate of same design and same Material of Construction of equipment to be submitted, wherever required.
9. All the relevant test reports /certificates shall be submitted during inspection. The reviewed and certified documents by BHEL/TPIA/Customer shall be submitted to BHEL as documentation package.
10. All sub-ordered items, bought out items, electrical & instrumentation Items shall be procured from approved / agreed vendor list with BHEL/BHEL's Customer.

Abbreviations: –

MTC –	Material Test certificate	COC –	Certificate of Compliance	DFT –	Dry Film Thickness
TC –	Test Certificate	NDE –	Non Destructive Examination	IR –	Inspection Report
DFT –	Dry Film Thickness	IBR –	Indian Boiler Regulations	IS –	Indian Standards

LEGEND:		
P: PERFORM W: WITNESS V: VERIFICATION	1: BHEL / BHEL's TPIA 2: VENDOR / SUB VENDOR 3: END CUSTOMER / END CUSTOMER's Representative	* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES / REPORTS SHALL BE SUBMITTED TO BHEL FOR RECORDS.