



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0016

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GATE VALVE**

REV NO: 01

DATE: 19-SEP-2022

PAGE 1 OF 6

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	Body, bonnet, yoke	Surface defects and dimension	Major	Visual and measurement	100%	BHEL Specification / Approved Drawing / Data sheet		-	-	2	2	-	
1.2		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.3		Heat Treatment (as applicable)	Major	HT chat review	100%			HT chat	✓	2	2	1	
1.4		Hardness value	Major	Hardness Test	100%			TC	✓	2	2	1	Note 9
1.5		NDE	Major	RT/UT#	As per BHEL spec.			NDE Reports	✓	2	2	1	# RT for castings, UT for forgings. Note 7
1.6		IGC test for austenitic SS parts	Major	IGC Test	One per Heat			TC	✓	2	2	1	Note 8
1.7	Trim parts – wedge, seat, seat rings	Surface defects and dimension	Major	Visual and measurement	100%			-	-	2	2	-	
1.8		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.9		Heat Treatment (as applicable)	Major	HT chat review	100%			HT chat	✓	2	2	1	
1.10		NDE	Major	MPI/LPI #	100%			TC	✓	2	2	1	# LPI for SS materials
1.11		Hardness value	Major	Hardness Test	100%			TC	✓	2	2	1	Note 9

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0016

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GATE VALVE**


REV NO: 01

DATE: 19-SEP-2022

PAGE 2 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.12		IGC test for austenitic SS parts	Major	IGC Test	One per Heat	BHEL Specification / Approved Drawing / Data sheet		TC	✓	2	2	1	
1.13	Stem	Surface defects	Major	Visual inspection	100%			-	-	2	2	-	
1.14		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat		MTC	✓	2	2	1		
1.15		NDE	Major	UT for shaft dia.>40mm	100%		NDE Reports	✓	2	2	1	Note 7	
1.16		Gaskets (as applicable)	Chemical & Mech. properties	Major	Chem. & Mech. Analysis		One per Heat	MTC	✓	2	2	1	
1.17	Surface defects, Dimensions, Type, Compressibility test etc.		Major	Visual, Measurement, testing	100%		TC	✓	2	2	1		
1.18	Fasteners (Bolt, Nut, Stud, Eye Bolt etc.)	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Heat		MTC	✓	2	2	1		
1.19		Surface defects, Dimensions, Heat Treatment, Type, Hardness etc.	Major	Visual & Measure. Hardness Test	100%		TC	✓	2	2	1		
1.20	Accessories Like Gear / Hand Wheel / Actuator	Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat		MTC	✓	2	2	1		
1.21		Surface defects Make, Model & Operation	Major	Visual & Functional	100%		TC	✓	2	2	1		

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0016					
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032		PRODUCT: GATE VALVE						REV NO: 01		DATE: 19-SEP-2022			
PAGE 3 OF 6													
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.22	Gland Packing	Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
2.0 INPROCESS INSPECTION													
2.1	Bonnet/bonnet/wedge/ seat ring/trim	Surface finish of Machining	Major	Visual	100%	BHEL Specification / Approved Drawing / Data sheet		-	2	2	-		
2.2		LPI for seating Surfaces, spindle, Butt Welding Ends # of Valves	Major	NDE	100%		NDE Report, TC	✓	2	2	1	# butt welding ends – as applicable	
2.3		Dimensions	Major	Measurements	100%		IIR	✓	2	2	1		
3.0 FINAL INSPECTION & TESTING													
3.1	Valve Assembly	Visual Inspection, Dimensional check	Critical	Visual & measurement	100%	MSS SP55/ BHEL Specification / Approved Drawing / Data sheet	IIR	✓	2	1	-	10% of offered quantity per size / rating / type shall be witnessed by 1	
3.2		Hydro test for - a) body and bonnet b) seat c) back seat d) Air leak test	Critical	Pr. Testing	100%	API 598 / BHEL Specification / Approved Drawing / Data sheet	TC	✓	2	1	-		
3.3		Functional test - three times from fully closed to fully opened position and the reverse under no flow conditions	Critical	Testing	100%	BHEL Specification / Approved Drawing / Data sheet	TC	✓	2	1	-		

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0016

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GATE VALVE**


REV NO: 01

DATE: 19-SEP-2022

PAGE 4 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.4		PMI Test for SS and AS parts	Critical	Testing	100%			IR	✓	2	1	-	All accessible SS & AS parts
3.5		Galvanization # (Uniformity, Thickness of Coating etc.)	Major	Visual & Measurement	100%			TC / ITR	✓	2	1	-	# for Galvanized Valve
3.6		Name Plate Check / Tag No./direction of flow	Critical	Visual & Doc Verification	100%			IR	✓	2	1	-	
3.7		Fire Safe Test #	Critical	Type test	100%			TC	✓	2	-	1	# If applicable
3.8		IBR certification #	Critical	Verification	100%			IBR Norms	IBR certificate	✓	2	-	1
3.9	Spares for valves	BOM & TC	Major	Visual & TC review	100%	BHEL Specification / Approved Drawing / Data sheet	TC	✓	2	1	-		
4.0	PRESERVATION & PACKING												
4.1	Valves and components	Surface Preparation (Blast Cleaning)	Major	Visual & Match Card	100%	BHEL Specification / Approved Drawing / Data sheet		Log Book	✓	2	2	1	
4.2		Painting (Shade, DFT etc.) Marking	Major	Visual & DFT Measurement	Random			IR	✓	2	1		
4.3		Preservation and End Protection	Major	Visual	100%			ITR	✓	2	2	-	


LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0016					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: GATE VALVE			REV NO: 01		DATE: 19-SEP-2022		PAGE 5 OF 6	
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	
4.4		Packing #	Major	Visual	Random			Packing list	✓	2	2/1	-	# seaworthy packing for export order will be witnessed by 1

Notes: -

1. This QAP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specification/drawing/data sheet shall prevail over quality plan. For contradiction if any between Quality plan and drawings, whichever is stringent is to be followed.
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.
5. Material test certificate shall include tensile, impact, hardness, bend, IGC, hot tensile, grain size, chemical analysis etc. as required by applicable material code /approved drawing /data sheet.
6. One product analysis of each heat shall be carried out and reported. Chemical analysis shall be as per applicable specification with carbon content not exceeding 0.23% and Carbon Equivalent (Ce) shall not exceed 0.43.
7. Radiography Test (min 2 shots in diff. directions) for Castings as per ASTM E94 & E142 and Ultrasonic Test for Forgings as per ASTM A388. RT & UT- Quantum of check is as per spec AA0851403, Cl. No 5.4.1 and 5.4.2 of Table 3.
8. IGC test as per ASTM A262 Practice B/E and Microscopic Structure Examination at 250X Magnification for SS Valves.
9. Hardness values as per the technical delivery conditions for valves spec. AA0851403, Cl. No 2.6 of Table I.
10. Hydro test shall be done in un-painted condition as per approved procedure/relevant code.
11. Marking inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 10.
12. Preservation inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 11 & 12
13. NACE requirement: For valves coming under NACE category, all tests, reports, MTC and certificates shall be submitted as per NACE requirements (MR0103/MR1075).
14. Valve material should be resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in sour environment.
15. All lab reports shall be from NABL accredited lab.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0016					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: GATE VALVE			REV NO: 01		DATE: 19-SEP-2022			
		PAGE 6 OF 6											
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	

Abbreviations: -

MTC – Material Test Certificate
 IIR – Internal Inspection Report
 DFT – Dry Film Thickness

TC – Test Certificate,
 IBR – Indian Boiler Regulations
 NDE – Non Destructive Examination

Revision History:-

Rev No.	Date	Revision Status
00	09-09-22	Initial Issue
01	19-09-22	Revised in line with engg. comments

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0024

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GLOBE VALVE**

REV NO: 00

DATE: 09-SEP-2022

PAGE 1 OF 6

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	Body, bonnet, yoke	Surface defects and dimension	Major	Visual and measurement	100%	BHEL Specification / Approved Drawing / Data sheet		-	-	2	2	-	
1.2		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat		MTC	✓	2	2	1		
1.3		Heat Treatment (as applicable)	Major	HT chat review	100%		HT chat	✓	2	2	1		
1.4		Hardness value	Major	Hardness Test	100%		TC	✓	2	2	1	Note 9	
1.5		NDE	Major	RT or UT	As per BHEL spec.		NDE Reports	✓	2	2	1	# RT for castings, UT for forgings. Note 7	
1.6		IGC test for austenitic SS parts	Major	IGC Test	One per Heat		TC	✓	2	2	1	Note 8	
1.7	Trim parts – plug, seat, seat rings	Surface defects and dimension	Major	Visual and measurement	100%			-	-	2	2	-	
1.8		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat		MTC	✓	2	2	1		
1.9		Heat Treatment (as applicable)	Major	HT chat review	100%		HT chat	✓	2	2	1		
1.10		NDE	Major	MPI/LPI #	100%		TC	✓	2	2	1	# LPI for SS materials	
1.11		Hardness value	Major	Hardness Test	100%		TC	✓	2	2	1	Note 9	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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

REVIEWED BY

APPROVED BY

BHEL QA SIGN & STAMP

BHEL ENGINEERING SIGN & STAMP

BHEL HOS - QA SIGN & STAMP



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0024

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GLOBE VALVE**


REV NO: 00

DATE: 09-SEP-2022

PAGE 2 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.12		IGC test for austenitic SS parts	Major	IGC Test	One per Heat	BHEL Specification / Approved Drawing / Data sheet		TC	✓	2	2	1	
1.13	Stem	Surface defects	Major	Visual inspection	100%			-	-	2	2	-	
1.14		Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.15		NDE	Major	UT for shaft dia.>40mm	100%			NDE Reports	✓	2	2	1	Note 7
1.16		Gaskets (as applicable)	Chemical & Mech. properties	Major	Chem. & Mech. Analysis		One per Heat		MTC	✓	2	2	1
1.17	Surface defects, Dimensions, Type, Compressibility test etc.		Major	Visual, Measurement, testing	100%			TC	✓	2	2	1	
1.18	Fasteners (Bolt, Nut, Stud, Eye Bolt etc.)	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.19		Surface defects, Dimensions, Heat Treatment, Type, Hardness etc.	Major	Visual & Measure. Hardness Test	100%			TC	✓	2	2	1	
1.20	Accessories Like Gear / Hand Wheel / Actuator	Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.21		Surface defects Make, Model & Operation	Major	Visual & Functional	100%			TC	✓	2	2	1	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0024					
PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032				PRODUCT: GLOBE VALVE		REV NO: 00		DATE: 09-SEP-2022					
PAGE 3 OF 6													
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
1.22	Gland Packing	Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
2.0 INPROCESS INSPECTION													
2.1	Bonnet/bonnet/ plug/ seat ring/trim	Surface finish of Machining	Major	Visual	100%	BHEL Specification / Approved Drawing / Data sheet			-	2	2	-	
2.2		LPI for seating Surfaces, spindle, Butt Welding Ends # of Valves	Major	NDE	100%		NDE Report, TC	✓	2	2	1	# butt welding ends – as applicable	
2.3		Dimensions	Major	Measurements	100%		IIR	✓	2	2	1		
3.0 FINAL INSPECTION & TESTING													
3.1	Valve Assembly	Visual Inspection, Dimensional check	Critical	Visual & measurement	100%	MSS SP55/ BHEL Specification / Approved Drawing / Data sheet	IIR	✓	2	1	-	10% of offered quantity per size / rating / type shall be witnessed by 1	
3.2		Hydro test for - a) body and bonnet b) seat c) back seat d) Air leak test	Critical	Pr. Testing	100%	API 598 / BHEL Specification / Approved Drawing / Data sheet	TC	✓	2	1	-		
3.3		Functional test - three times from fully closed to fully opened position and the reverse under no flow conditions	Critical	Testing	100%	BHEL Specification / Approved Drawing / Data sheet	TC	✓	2	1	-		

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP



TYPICAL MANUFACTURING QUALITY PLAN

MQP. NO.: PESD/QA/MP/0024

PROJECT ENGINEERING & SYSTEMS DIVISION
BHEL, RC PURAM, HYD-502032

PRODUCT: **GLOBE VALVE**


REV NO: 00

DATE: 09-SEP-2022

PAGE 4 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.4		PMI Test for SS and AS parts	Critical	Testing	100%			IR	✓	2	1	-	All accessible SS & AS parts
3.5		Galvanization # (Uniformity, Thickness of Coating etc.)	Major	Visual & Measurement	100%			TC / ITR	✓	2	1	-	# for Galvanized Valve
3.6		Name Plate Check / Tag No./ direction of flow	Critical	Visual & Doc Verification	100%			IR	✓	2	1	-	
3.7		Fire Safe Test #	Critical	Type test	100%			TC	✓	2	-	1	# If applicable
3.8		IBR certification #	Critical	Verification	100%			IBR Norms		IBR certificate	✓	2	-
3.9	Spares for valves	BOM & TC	Major	Visual & TC review	100%	BHEL Specification / Approved Drawing / Data sheet		TC	✓	2	1	-	
4.0	PRESERVATION & PACKING												
4.1	Valves and components	Surface Preparation (Blast Cleaning)	Major	Visual & Match Card	100%	BHEL Specification / Approved Drawing / Data sheet		Log Book	✓	2	2	1	
4.2		Painting (Shade, DFT etc.) Marking	Major	Visual & DFT Measurement	Random			IR	✓	2	1		
4.3		Preservation and End Protection	Major	Visual	100%			ITR	✓	2	2	-	


LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0024					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: GLOBE VALVE			REV NO: 00		DATE: 09-SEP-2022			
PAGE 5 OF 6													
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
4.4		Packing #	Major	Visual	Random			Packing list	✓	2	2/1	-	# seaworthy packing for export order will be witnessed by 1

Notes: -

1. This QAP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specification/drawing/data sheet shall prevail over quality plan. For contradiction if any between Quality plan and drawings, whichever is stringent is to be followed.
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.
5. Material test certificate shall include tensile, impact, hardness, bend, IGC, hot tensile, grain size, chemical analysis etc. as required by applicable material code /approved drawing /data sheet.
6. One product analysis of each heat shall be carried out and reported. Chemical analysis shall be as per applicable specification with carbon content not exceeding 0.23% and Carbon Equivalent (Ce) shall not exceed 0.43.
7. Radiography Test (min 2 shots in diff. directions) for Castings as per ASTM E94 & E142 and Ultrasonic Test for Forgings as per ASTM A388. RT & UT- Quantum of check is as per spec AA0851403, Cl. No 5.4.1 and 5.4.2 of Table 3.
8. IGC test as per ASTM A262 Practice B/E and Microscopic Structure Examination at 250X Magnification for SS Valves.
9. Hardness values as per the technical delivery conditions for valves spec. AA0851403, Cl. No 2.6 of Table I.
10. Hydro test shall be done in un-painted condition as per approved procedure/relevant code.
11. Marking inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 10.
12. Preservation inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 11 & 12
13. NACE requirement: For valves coming under NACE category, all tests, reports, MTC and certificates shall be submitted as per NACE requirements (MR0103/MR1075).
14. Valve material should be resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in sour environment.
15. All lab reports shall be from NABL accredited lab.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0024					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: GLOBE VALVE			REV NO: 00		DATE: 09-SEP-2022			
		PAGE 6 OF 6											
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	P	W	V	

Abbreviations: -


MTC – Material Test Certificate
 IIR – Internal Inspection Report
 DFT – Dry Film Thickness

TC – Test Certificate,
 IBR – Indian Boiler Regulations
 NDE – Non Destructive Examination


Revision History:-

Rev No.	Date	Revision Status
00	09-09-22	Initial Issue
01	19-09-22	Revised in line with engg comments


LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN					MQP. NO.: PESD/QA/MP/0026						
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: CHECK VALVE		REV NO: 1	DATE: 14-SEP-22					
PAGE 1 OF 3													
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	Body/Cover	Surface defects and dimension	Major	Visual and measurement	100%	BHEL Specification / Approved Drawing / Approved Datasheet	-	-	2	2	-		
1.2		Chemical & Mech. properties	Major	Chemical analysis & mech. testing	100%		MTC	✓	2	2	1		
1.3		Heat treatment#	Major	Heat treatment	100%		HT chart	✓	2	2	1	# if applicable	
1.4		Hardness value	Major	Hardness test	As per BHEL spec		MTC	✓	2	2	1		
1.5		NDE	Critical	RT / UT #	As per BHEL Spec		NDE Report	✓	2	2	1	# RT for castings, UT for forgings	
1.6		IGC test for austenitic SS parts	Major	IGC testing	One per Melt / Heat		MTC	✓	2	2	1		
1.7	Trim parts - flap, hinge pin, spring, seat rings (as applicable)	Surface defects and dimension	Major	Visual and measurement	100%		-	-	2	2	-		
1.8		Chemical & Mech. properties	Major	Chemical analysis & mech. testing	100%		MTC	✓	2	2	1		
1.9		Heat treatment#	Major	Heat treatment	100%		MTC	✓	2	2	1	# if applicable	
1.10		Hardness value	Major	Hardness test	As per BHEL spec		MTC	✓	2	2	1		
1.11		NDE	Major	MPI/LPI #	100%		TC	✓	2	2	1	# LPI for SS materials	
1.12		IGC test for austenitic SS parts	Major	IGC testing	One per Melt / Heat		MTC	✓	2	2	1		


LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN						MQP. NO.: PESD/QA/MP/0026					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032				PRODUCT: CHECK VALVE		REV NO: 1	DATE: 14-SEP-22				
		PAGE 2 OF 3											
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY			REMARKS
										P	W	V	
1.13	Gaskets (as applicable)	Chemical & Mech. properties	Major	Chem. & Mech. Analysis	One per Heat	BHEL Specification / Approved Drawing / Approved Datasheet		MTC	✓	2	2	1	
1.14		Surface defects, Dimensions, Type, Compressibility test etc.	Major	Visual, Measurement, testing	100%			TC	✓	2	2	1	
1.15	Fasteners (Bolt, Nut, Stud, Eye Bolt etc.)	Chemical & Mechanical Properties	Major	Chem. & Mech. Analysis	One per Heat			MTC	✓	2	2	1	
1.16		Surface defects, Dimensions, Heat Treatment, Type, Hardness etc.	Major	Visual & Measure. Hardness Test	100%			TC	✓	2	2	1	
2.0 INPROCESS INSPECTION													
2.1	Body, Cover, Flap after machining	Surfaces finish, Dimension	Major	Visual and Measurement	100%	BHEL Specification / Approved Drawing / Approved Datasheet		-	-	2	2	-	
2.2		LPT/MPI on Seating Surfaces # and machined surfaces	Major	LPT / MPI	100%			NDE reports	✓	2	2	1	# as applicable
2.3		Shell strength	Critical	Hydro test	100%			TC	✓	2	2	1	
3.0 FINAL INSPECTION & TESTING													
3.1	Valve Assembly	Visual Inspection, Dimensional check	Major	Visual & measurement	100%	BHEL Specification / Approved Drawing / Approved Datasheet		IR	✓	2	1	-	10% quantity / size or rating will be witnessed
3.2		Hydro test for - a) body and bonnet b) seat	Critical	Pr. Testing	100%			TC	✓	2	1	-	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

		TYPICAL MANUFACTURING QUALITY PLAN					MQP. NO.: PESD/QA/MP/0026						
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: CHECK VALVE		REV NO: 1	DATE: 14-SEP-22					
									PAGE 3 OF 3				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY			REMARKS
										P	W	V	
3.3		Smooth Operation	Critical	Functional	100%			TC	✓	2	1	-	by 1
3.4		PMI Test for SS and AS parts	Critical	PMI testing	All accessible parts			TC	✓	2	1	-	All accessible parts
3.5		Name Plate Check	Critical	Visual	100%			TC	✓	2	1	-	
3.6		IBR certification #	Critical	Verification	100%			Form III C	✓	2	2	1	# If applicable
3.7		BOM Check	Major	Visual	100%			IR	✓	2	1	-	
3.8	Spares for valves	BOM & TC	Major	Visual & TC review	100%			TC	✓	2	1	-	
4.0	PRESERVATION & PACKING												
4.1	Valve components and spares	Surface Preparation	Major	Visual	100%	BHEL Specification / Approved Drawing / Approved Datasheet		Log Book	✓	2	2	1	
4.2		Painting (Shade, DFT), Markings, direction of flow	Major	Visual, Measurement	Random			IR	✓	2	1	-	
4.3		Preservation	Major	Visual	100%			ITR	✓	2	2	1	
4.4		Packing #	Major	Visual	100%			Packing List	✓	2	2/1	-	# seaworthy packing for export order will be witnessed by 1

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP

	TYPICAL MANUFACTURING QUALITY PLAN								MQP. NO.: PESD/QA/MP/0026				
	PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032					PRODUCT: CHECK VALVE			REV NO: 1	DATE: 14-SEP-22			
	PAGE 4 OF 3												
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY			REMARKS
										P	W	V	

Notes: -

1. This QAP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specification/drawing/data sheet shall prevail over quality plan. For contradiction if any between Quality plan and drawings, whichever is stringent is to be followed.
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.
5. Material test certificate shall include tensile, impact, hardness, bend, IGC, hot tensile, grain size, chemical analysis etc. as required by applicable material code /approved drawing /data sheet.
6. One product analysis of each heat shall be carried out and reported. Chemical analysis shall be as per applicable specification with carbon content not exceeding 0.23% and Carbon Equivalent (Ce) shall not exceed 0.43.
7. Radiography Test (min 2 shots in diff. directions) for Castings as per ASTM E94 & E142 and Ultrasonic Test for Forgings as per ASTM A388. RT & UT- Quantum of check is as per spec AA0851403, Cl. No 5.4.1 and 5.4.2 of Table 3.
8. IGC test as per ASTM A262 Practice B/E and Microscopic Structure Examination at 250X Magnification for SS Valves.
9. Hardness values as per the technical delivery conditions for valves spec. AA0851403, Cl. No 2.6 of Table I.
10. Hydro test shall be done in un-painted condition as per approved procedure/relevant code.
11. Marking inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 10.
12. Preservation inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 11 & 12
13. NACE requirement: For valves coming under NACE category, all tests, reports, MTC and certificates shall be submitted as per NACE requirements (MR0103/MR1075).
14. Valve material should be resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in sour environment.
15. All lab reports shall be from NABL accredited lab.

Abbreviations: -

MTC –	Material Test certificate,	TC –	Test Certificate,
IR –	Inspection Report	NDE –	Non Destructive Examination
IBR –	Indian Boiler Regulations	DFT –	Dry Film Thickness

Revision History:-

Rev No.	Date	Revision Status
00	05-09-22	Initial Issue
01	14-09-22	Revised in line with Engg. comments

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY, 2 FOR VENDOR / SUB VENDOR & 3 FOR END USER 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	REVIEWED BY	APPROVED BY
	BHEL QA SIGN & STAMP	BHEL ENGINEERING SIGN & STAMP	BHEL HOS - QA SIGN & STAMP



QAP GUIDELINES & FORMAT

(ANNEXURE)


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.

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.

Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE 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>		
Ref. Doc	<ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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) 		

	Form No.	 HYDERABAD	<p style="text-align: center;">PRODUCT STANDARD</p> <p style="text-align: center;">PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD</p>	ANNEXURE Rev No. 00 Page 3 of 3
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> 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. </p>		<p>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.</p> <p>12. Under 'D' please put (<input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature & stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ol style="list-style-type: none"> 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. <p>16. QAP Format enclosed.</p>		
	Ref. Doc			

