

## QUALITY ASSURANCE PLAN

<b>Manufacturer Name &amp; Address</b>				<b>QAP No.</b> _____			
<b>Project:</b>		<b>Customer:</b> BHEL Corporate R&D		<b>Ref. Technical Specification No.:</b>		Sheet 1 of 2	
<b>Item:</b> Monoblock		<b>System:</b> Pump Module					

SL. No.	Component / Operations	Characteristics	Type of Check	Quantum of Check		Reference Document	Acceptance Norms	Format of Record	Agency		Remarks
				M	BHEL				M	BHEL	
1.0	<b>RAW MATERIAL</b>										
1.1	Bar	Chemical Properties	Chemical Analysis	1/ Batch	1/ Batch	AA6061 T6/T651 as per AMS-4027	Technical Spec.	Test Certificate	P	V	
		Hardness	Hardness Test	1/ Batch	1/ Batch	ASTM E10	ASTM E10	Test Certificate	P	V	
		Tensile Properties		1/ Batch	1/ Batch	ASTM E8	ASTM E8	Test Certificate	P	V	Test report should include: UTS, 0.2% Proof test & percentage elongation
		Sub surface defects	NDE (Ultrasonic Test)	1/ Batch	1/ Batch	ASTM B 594-90 class A	ASTM B 594-90 class A	NDT Report	P	V	NDT to be carried out by Level-II Qualified personnel only.
2.0	<b>IN-PROCESS</b>										
2.1	Machining	Dimensions	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Dimension Report	P	V	
2.2	Ports Thread	Dimensions	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Dimension Report	P	V	
2.3	Plugs Manufacturing	Dimensions	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Dimension Report	P	V	
2.4	Engraving	Dimensions	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Dimension Report	P	V	
2.5	Chromate Conversion (Monoblock)	Adhesion/ Thickness	Measurement	100%	100%	MIL-DTL-5541F CLASS 1A	MIL-DTL-5541F CLASS 1A	Test Certificate	P	V	
2.6	Welding	Weld Soundness	Welding Process Validation	Test Coupon	Test Coupon	ASME Section IX	ASME Section IX	As per ASME Section IX	P	V	WPS, PQR & WPQ records from reputed Inspection agencies like Lloyds, BVI, TUV, etc. to be submitted

<b>Manufacturer</b>			<b>Review &amp; Approval by BHEL Corporate R&amp;D</b>		
	Name	Signature & Date	<b>Document No.</b>		
Prepared by					
Checked by					

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				M	BHEL				M	BHEL	
											for verification, before start of welding on actual job.
2.7	Assembly of Plugs and Welding in Monoblock	Dimensions	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Inspection Report	P	V	
3.0	Monoblock Assembly	Leakage Test	Proof Pressure Test	100%	100%	Technical Spec. Cl. No. 6	Technical Spec. Cl. No. 6	Test Report	P	W	
4.0	Plating	Dry Film Thickness (DFT)	Measurement	100%	100%	MIL-C-20674 CLASS 2	THICKNESS 12-15 MICRONS	Test Report	P	W	
5.0	Helical Inserts	Positioning	Visual	100%	100%	BHEL Drawing	BHEL Drawing	Inspection report	P	W	
6.0	Documentation					As per approved MQP			P	V	

**Notes:**

1. All instruments used for Tests shall be calibrated at NABL accredited Laboratories.
2. Mechanical/ Chemical Tests shall be carried out at NABL accredited Laboratories.

**Legends:**

**M:** Manufacturer/ Supplier/ Sub-Supplier;

**P:** Perform; **V:** verification; **W:** Witness

<b>Manufacturer</b>			<b>Review &amp; Approval by BHEL Corporate R&amp;D</b>	
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