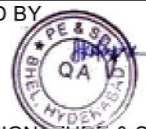
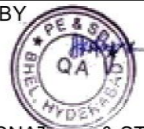


 PROJECT ENGINEERING & SYSTEM DIVISION		STANDARD MANUFACTURING QUALITY PLAN							QP. NO.: PESD/QA/PIPEFITTINGS/01/18-19				
		PRODUCT: PIPE FITTINGS				BHEL SPEC: AS PER P.O			REV NO: 01		DATE: 31-05-19		
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SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS

1.0 RAW MATERIALS & BOUGHT OUT ITEMS													
1.1	Raw Material (Bar/Pipes/Plates Ingots/Billets etc.)	Mechanical & Chemical Properties, UT/hydro test as applicable.	Major	Verification of RMTC	100%	BHEL Spec / Approved Drawing	MTC	✓	2	-	1	Corelation with MTC to be maintained by manufacture r.	
2.0 INPROCESS INSPECTION													
2.1	WELDING#	WPS, PQR, WQR#	Major	Doc. Verification	100%	BHEL Spec / Appd. Dwg. / ASME Sec IX / Sec VIII	WPS, PQR, WQR	✓	2	2	1	# for Welded Fittings	
2.2		Heat Treatment	Major	TC Review	100%		TC, HT Chart	✓	2	2	1		
2.3		Mechanical Analysis (UTS, YS, EL)	Major	Mech. Analysis	One per Lot/Batch /Heat		MTC / TC	✓	2	2	1		
2.4		Visual (Rating, Markings Edge preparation Finish etc.), Dimensions	Major	Visual, Measurem ent	100%		ITR	✓	2	2	1		
2.5		MPI/LP*	Major	NDE	100%		ITR	✓	2	2	1		

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	 BHEL QA SIGNATURE & STAMP	 BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP

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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
2.6		Radiography Test [#]	Critical	RT	100%			NDE Report	✓	2	2	1	# for Welded Constructions fittings.
3.0	FINAL INSPECTION & TESTING												
3.1	PIPE FITTINGS	Visual (Rating, Markings Edge preparation Finish etc.), Dimensions	Major	Visual, Measurement	100%	BHEL Spec / Approved Drawing/ASTM E 572/ASTM E 262/IS 4736		IR	✓	2	1	-	10% shall be witnessed by 1.
3.2		Hardness Check	Major	Hardness test	One per Lot/Batch /Heat			IR	✓	2	1	-	
3.3		MPI / LPT [#]	Major	MPI / LPT	10%			IR	✓	2	1		# Refer Note-4
3.4		IBR Certificate [#]	Critical	Doc. Review	100%			IBR Cert.	✓	2	-	1	# if applicable
3.5		IGC test	Major	IGC test	Highest thickness & highest carbon/HT lot			Lab report	✓	2		1	Refer Note-8
3.6		PMI [#]	Major	PMI test	As per Spec			IR / TC	✓	2	1	-	# if applicable

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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
3.7		Galvanization# (Uniformity, mass of zinc coating Thickness of Coating)	Major	Measurem ent	As per IS 4736	IS 4736		TC/ITR	✓	2	-	1	# if applicable
4.0 PRESERVATION & PACKING													
4.1		Painting (Shade, DFT,Marking)#	Major	Visual	Random	BHEL Spec / Approved Drawing		TC	✓	2	1		# if applicable
4.2		Packing#	Major	Visual	100%			Packing Slip	✓	2	-	1	#Seaworthy packing for export orders

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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 Standard MQP should be read along with specification (Latest revision as per PO), approved drawings & approved datasheet (as applicable).
2. Drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements, which shall be notified, have to be fulfilled by the vendor at the time of execution of order.
4. MPI/LPT Should be carried on Knuckle of Reducers, Outer bend portion of Elbows and Neck portion of Tees.
 - a) CS & AS Material – MPI
 - b) SS Material – LPT.
 - c) DP test on bevel ends and sidewall area of tees manufactured from cold forming method.
5. Seaworthy packing shall be **witnessed** BHEL/BHEL nominated inspection agency for overseas project.
6. End Customer/Consultant inspection if any shall be intimated during quality plan approval.
7. **NACE requirement:** For items coming under **NACE category**, all tests, reports, MTC and certificates shall be submitted as per **NACE MR0103** requirements.
8. IGC test for austenitic stainless steel shall be conducted in a NABL approved lab as follows: IGC practice "E" with acceptance criteria of "No crack observed from 20X magnification and microstructure to be observed at 250X magnification to ensure absence of any crack/fissure. Photograph of microstructure shall be submitted for records. Two samples shall be drawn from each solution annealing lot, one correspond to highest carbon and other corresponding to highest thickness.

Abbreviations:-

MTC	–	Material Test certificate	TC	–	Test Certificate
IR	-	Inspection Report	ITR	-	Internal Test Report
UTS	-	Ultimate Tensile Strength	YS	-	Yield Strength
EL.	-	Elongation	PMI	-	Positive Material Identification
MPI	–	Magnetic Particle Inspection	LPT	–	Liquid Penetrant Test
IBR	–	Indian Boiler Regulations	NDE	-	Non Destructive Examination
RT	-	Radiography Test	UT	-	Ultrasonic Test

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