

Plant MRPL Mangalore	Client MRPL	Contract Code WSS for PFCC Flue Gas	Document ID 6723-IEX-G00-EC-0001-A204	Contract No. 66-6723
	Indicative Inspection and Test Plan(IITP) for Welded, Seamless & Forged Fittings			
				Rev

The tests indicated are general minimum requirements of tkIS India. All Tests, as applicable, have to be performed as specified in the Order, Order Attachments, Codes, tkIS India Specifications, Licensor's Specifications and Standards. In case of discrepancies between the Indicative Inspection Test Plan and the workshop documents Approved / Reviewed by LSTK Contractor, the latter shall apply. The Manufacturer shall be responsible for the required Tests to be performed and for the Inspector to be invited in due time to witness the Tests. The Manufacturer shall try to perform as many individual Tests as possible on same day, provided that the fabrication process permits such a procedure

Sr. No.	Inspection / Test Stage	Checks	Type of Inspection	Frequency of Check	Reference Document	Acceptance Norm	Format of Record	Inspection By			
								Vendor	LSTK Contractor	TPIA	PMC / Owner

	QAP Approval							Endorse	P	A	A
A	Receiving Inspection										
1	Raw material inspection for Forgings	Steel making process, Chemical Properties	Review of Chemical properties, Steel making process	One sample per Heat	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	MTC	P	R	R	--
2	Raw material inspection for Plates & Pipes	Steel making process, Mechanical & Chemical Properties, NDT-UT, hydrotest/ECT compliance to material code requirements	Review of Mechanical & Chemical Properties, Steel making process	One sample per Heat / Coil	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	MTC	P	R	R	--
B	In-Process Inspection										
1	Welding (For Welded fittings)	Welding Procedure / Technique / Quality	Review of WPS / PQR / Welder Qualification	100%	As per ASME Section IX	As per ASME IX	WPS / PQR / WPQ	P	R	R	--
1A	Ferrite test	Ferrite no test for all austenitic stainless steels	Ferritescope check	100%	Applicable Material & Order Specifications	A Ferrite No. (FN) not less than 3% and not more than 10%	Ferrite no report	P	H	H	--

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2	Heat Treatment	Heat treatment of Fittings	Review of HT Chart	100%	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	Heat Treatment Chart	P	R	R	--
3	Radiography (Applicable for Welded Fittings)	Weld Defects	Review of Radiography Film	100%	As per ASME Section V	ASME Sec VIII Div 1	Radiography Reports	P	R (Review of Radiography Film & RT report)	R Review of RT Film report)	

C	Product Testing										
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1	Test piece Identification by LSTK Contractor /TPIA as per code/spec, per heat per heat treatment lot per size	1. Chemical Analysis (2) Max allowable Carbon Equivalent	Review of Chemical properties	As per Code / Order Specification	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification.	Lab test certificate	P	R	R	--
		2. YS, UTS,EL,R.A	ASTM A370								
		3. Hardness test	ASTM A370								
		4. Impact Test (if Applicable)	ASTM A370								

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		5. IGC E with micro test (as Applicable)	ASTM A262									
D	Final inspection	1. Surface Condition	Visual	100%	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification.	Inspection report	P	100%H	100% H	--	
		2. Marking as per Material & Order specification and Tag No.	Visual	100%				P	100%H	100% H	--	
		3. Dimension	Measurement & check	100% by Mfr				P	10%H	10%H	--	
		4. End Finish Bevel / SW Ends / Thread ends	Dye Penetrant Test	100%				P	10%H	10%H	--	
		5. Hardness	Portable Hardness Tester (Avoid Poldi Testing)	20%				P	10%H	10%H	--	
		6. Galvanizing for Galvanized items -Hot dip Galvanizing	Applicable Specification/Order Specification	100% for Coating Thickness. Other tests as applicable				P	10%H Coating thickness	10%H Coating thickness	--	

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E	PMI as specified in Technical Requirements.	Alloying Elements for material and welds	As per Specification	100%	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	PMI Report	P	10%- H	10%- H	--
F	100% Final Stamping by LSTK Contractor & TPIA	Surface Protection, pickling and passivation, marking & Colour Coding	Visual	100%	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	MTC	P	H	H	--
G	Inspection documentation & Issue of Inspection Release Note	Material Test Certificate	Review of Documents	100%	As per Applicable Material & Order Specifications	Conformance to Codes & Order Specification	IRN, MTC With back up reports	P	H	H	R
H	Final documentation & Issue of Despatch Clearance	Manufacturer Test certificate & Release note	Review of Documents	100%	As per Order & Order Specification	Conformance to Order & Order Specification	--	P	H	-	H

- Notes -**
- LSTK contractor to prepare final QAP based on this IITP, Applicable specifications, standards and codes and submit to PMC for final approval
 - In addition to the requirements of IITP, all requirements of Purchase order, material specification, Order specification and Order Technical requirements (Document ID: EDB-0006) for raw material and final product shall be fulfilled. In addition, Material in Hydrogen Service shall comply with the requirements of Annexure F of document EDB-0006. Material in Sour service shall comply with the requirements of NACE MR0103 & MR0175 & EDB-0006.
 - Where ever % of inspection is mentioned it is per Tag, Per Size, per visit. For PMI, per TAG, Per Size, per Heat, per visit

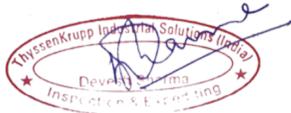
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4. Any other tests if specified in order, order specifications, order attachments etc shall be tested and test witnessed by LSTK Contractor &TPIA
5. Statutory requirement and inspection by Statutory Authority, if applicable, the same shall be met. IBR requirements for EDB-0006 shall be met
6. LSTK Contractor may increase percentage of inspection upto 100% if any rejection or non-conformity is observed during sampling inspection or based on past experience with vendor.
7. Statutory requirement and inspection by Statutory Authority, if applicable, the same shall be met. IBR requirements for EDB-0006 shall be met. Original IBR Forms shall be submitted.
8. The specified NDT is after final heat treatment.
9. Hydro test Water quality shall be as potable for CS and LAS. For SS material Chloride shall be 20 ppm max
10. All CS and SS fittings shall be offered for inspection in the blasted condition and all SS fittings shall be offered in the pickled and passivated condition.

Legends: W - Witness, R - Review, H – Hold do not proceed unless cleared by the inspector, P-Perform, A-Approval



Devesh Sharma	Abhi Thomas / TV Sundar	Syam N.S.
Prepared by: LE	Checked by: SSP / DQAR	Approved by: HDP