

Heavy Metal & Tubes Ltd

Quality Assurance Plan for Stainless Steel Seamless 'U' Tubes

Sr.No	Operation	Quality Characteristics Checked	Reference Standard	Instrument used	Testing Carried Out	Type of record keeping	Remark	Responsibility	
1	2	3	4	5	6	7	8	9	
1	Seamless Mother Hollows	[A] Dimensions	As per Applicable Standard	Micrometer[for OD & Thickness Checking] & Measuringtap	HMTL	Format	Random Checking of Dimensions	Q.C.Dept.	
		[B] Surface		Visual	HMTL		Random Checking of surface inspection	Q.C.Dept.	
		[C] Chemical Analysis	As per Applicable Standard & P.O.Requirements			HMTL	Format	Chemical analysis results compared with ladle analysis as per applicable standard(Random Checking)	Q.C.Dept.
		(D) Colour Coding	As per internal Procedure			HMTL		100% Colour Coding done as per international std. for differanc grade	Raw material dept.
2	Intermediate Heat treatment	(A) Temperature	As per Applicable Standard & P.O.Requirements	Automatic Temp. controller	HMTL	Format	As per Applicable Specification & P.O.Requirements.	Production & Q.C. Department	
		(B) Speed & Feed	Depends on tubes thk & size of tube			HMTL	Format	Speed & Feed checking for maintaining soaking time (Depends on OD & Thk of the tubes)	Production & Q.C. Department
3	Intermediate Straightening	A) Dimensions	As per Applicable Standard & P.O.Requirement	Micrometer & Measuringtap.	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department	
4	Inter mediate Pickling	HF% & HNO3%		Lab	HMTL	Format	Random Checking once in a day	Chemist	



5	Coating	Acidity	Internal Procedure	Lab	HMTL	Format	Random Checking once in a day	Chemist
6	Soap Bath	% Fatty Acid & PH Value	Internal Procedure	Lab	HMTL	Format	Random Checking once in a day	Chemist
7	Drawing	A) Dimensions	As per Applicable Standard & P.O.Requirement	OD & Thickness Micrometer	HMTL	Format	Random Dimensions & Length Checking as per applicable Standard & P.O.Requirement	Q.C.Dept & Production Dept
		B) Surface		Visual	HMTL		Ranodm Checking for straightning marks, dent & any other mechanical damages which are visible in sraightning condition.	Q.C.Dept & Production Dept
8	Heat treatment	(A) Temperature	As per Applicable Standard & P.O.Requirments	Automatic Temp. controller	HMTL	Format	As per Applicable Specification & P.O.Requirments.	Production & Q.C. Department
		(B) Speed & Feed	Depends on tubes thk & size of tube		HMTL	Format	Speed & Feed checking for maintaining soaking time (Depends on OD & Thk of the tubes)	Production & Q.C. Department
		© Hardness	As per Applicable Standard & P.O.Requirments	Rckwell Superfical Hardness Tester & Rockwell Hardness Tester	HMTL	Format	Random Checking	Production & Q.C. Department
9	Pickling	HF% & HNO3%		Lab	HMTL	Format	Random Checking once in a day	Chemist
10	Straightening	A) Dimensions	As per Applicable Standard & P.O.Requirement	Micrometer & Measuringtap.	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department



		B) Surface		Visual			Random checking for straightening marks, dents & any other mechanical damages which are visible in straightening condition	Production & Q.C. Department
11	End Cutting	Length checking	P.O.Requirement	Mesuringtap	HMTL	Format	Random checking	Production dept
12	Eddy Current [If Applicable]	Non Destructive testing	ASTM-A-450/ 426 & P.O	E- Eddy current testing machine	HMTL	Format	100%	Q.C.Dept
13	Ultrasonic test [if applicable]	Non Destructive testing	ASTM E-213 & P.O	Ultrasonic testing machine	HMTL	Format	100%	Q.C.Dept
14	Mechanical testing	A) Tensile test	As per Applicable standard & P.O	Tensile testing Machine	HMTL	Format	Tensile test carried out random as per standard	Q.C.Dept
		B)Hardness	As per Applicable Standard & P.O	Rckwell Supperfical Hardness Tester & Rockwell Hardness Tester	HMTL	Format	Random Checking as per applicable standard	Q.C.Dept.
		C) Flaring & Flattening	As per applicable Standard & P.O	Tensile testing Machine	HMTL	Format	Testing conducted as per standard	Q.C.Dept
		D) IGC & Micro [If Applicable]	As per Applicable Standerd & P.O.Requirement		HMTL & At out side approved lab as demand		As per Applicable Specification & P.O.Requirements.	Q.C.Dept
15	Chemical	Product Analysis	As per Applicable Standerd & P.O.Requirement	Spectro metre	HMTL	Format	As per Applicable Specification & P.O.Requirements.	Q.C.Dept
16	Mock Up Test	Thinning & Ovality	As per Applicable Standard & P.O.Requirements	Micro Metre & Thickness Ultrasonic metre	HMTL	Format	As per Applicable Specification & P.O.Requirements.	Q.C.Dept
17	U-Bending	Surface		Visual	HMTL		Random Checking of surface inspection	Production Dept



		B) Dimension & Radius	As per Applicable Standard & P.O.Requirements	Micrometer[for OD & Thickness Checking] & Measuringtap	HMTL		Random Checking As per applicable standard	Production Dept
18	End Cutting	Length checking	P.O.Requirement	Mesuringtap	HMTL	Format	Random checking	Production dept
19	Solution Annealing On 'U' Bendportation + 300 mm Leg Length	Temperature	As per Applicable Standard & P.O.Requirements	Automatic Temp. controller	HMTL	Format	As per Applicable Specification & P.O.Requirements.	Production & Q.C. Department
20	Hydrotesting	Test Pressure	As per Applicable Standerd & P.O.Requirement	Hydrotesting	HMTL	Format/Register	100% Checking by keeping of pressure for minimum of 5 seconds	Production & Q.C. Department
21	Final Cutting	A) Dimensions	As per Applicable Standard & P.O.Requirements	Micrometre & Mesuringtap	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department
22	Final Inspection	A) Dimensions	As per applicable Standard & P.O	Micrometere,Vernier , Measuringtap.	HMTL	Format/Register	100 % Checking	Q.C Dept
		B) Surface			HMTL	Format/Register	100% Visual Inspection	Q.C.Dept
		C) D.P.Test	As per applicable Standard & P.O		HMTL	Format	100 % Checking	Q.C Dept
23	Marking	For Identification			HMTL		Manufacturer trade mark,OD,Thk,Length,Spec.,Grade,Heat No and as Specified by purchaser.	Q.C.Dept
24	Packing	Soundnes of packing	As per P.O		HMTL	Formet	As Per P.O	Despatch

