

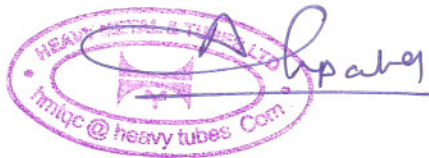
Heavy Metal & Tubes Ltd

Quality Control Plan for Carbon Steel/Alloy Steel Seamless 'U' Tubes

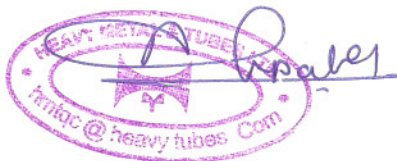
Sr.No	Operation	Quality Characteristics Checked	Referance Standred	Instrument used	Testing Carried Out	Type of record keeping	Remark	Responsibility
1	2	3	4	5	6	7	8	9
1	Seamless Mother Hollows	[A] Dimension	As per Applicable Standard	Micrometer[for OD & Thickness Checking] & Measuringtap	HMTL	Format	Random 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.Requirments		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.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
3	Intermediate Straightening	A) Dimensions	As per Applicable Standard & P.O.Requirement	Micrometer & Measuring Tap.	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department
4	InterMediate Pickling	HCL% & Fe%		Lab	HMTL	Format	Random Checking once in a day	Chemist



5	Coating	Acidity of Phosphating Bath Fe%		Lab	HMTL	Format	Random Checking once in a day	Chemist
6	Soap Bath	% Fatty Acid		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 Dimension & 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 Standards & 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
		© Hardness	As per Applicable Standard & P.O.Requirements	Rckwell Supperfical Hardness Tester & Rockwell Hardness Tester	HMTL	Format	Random Checking	Production & Q.C. Department
9	Pickling	HCL% & Fe%		Lab	HMTL	Format	Random Checking once in a day	Chemist
10	Straightening	A) Dimensions	As per Applicable Standards & P.O.Requirement	Micrometer & Measuringtap.	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department



		B) Surface		Visual	HMTL		Random checking for straightening mark, dent & 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/E-309 & P.O	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, Flange, Flattening	As per applicable Standard & P.O	Tensile testing Machine	HMTL	Format	Testing conducted as per standard	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	Micromerer & 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	Stress Reliving On 'U' Bend portation + 300 mm Leg Length	Temperature	As per Applicable Standard & P.O.Requirments	Automatic Temp. controller	HMTL	Format	As per Applicable Specification & P.O.Requirments.	Production & Q.C. Department
20	Hydro testing	Test Pressure	As per Applicable Standerd & P.O.Requirement	Hydro testing	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.Requirments	Micrometre & Mesuringtape	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	Q.C.Dept
24	Packing	Soundnes of packing	As per P.O		HMTL	Formet	As Per P.O	Despatch

