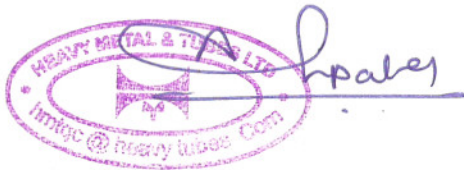


Heavy Metal & Tubes Ltd

Quality Assurance Plan for Seamless Alloy Steel & Carbon steel Tubes/Pipes

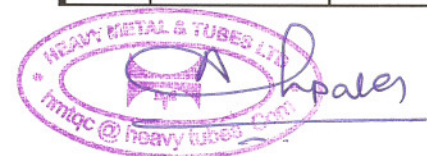
Sr.No	Operation	Quality Characteristics Checked	Reference Standard	Instrument used	Testing Carried Out	Type of record keeping	Remark	Responsibility
1	2	3	4	5	6	7	8	9
1	Seamless Mother Hollows	[A] Dimension	As per Applicable Standard	Micrometer[for OD & Thickness Checking] & Measuring tap	HMTL	Format	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 Coaing	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 & 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 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.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 Standard & P.O.Requirements	Micrometer & Measuringtap.	HMTL	Format	Random Checking as per applicable standard	Production & Q.C. Department



		B) Surface		Visual	HMTL		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.Requirments	Mesuringtap	HMYL	Format	Random checking	Production dept
12	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
13	Eddy Current [If Applicable]	Non Destructive testing	ASTM-A-450/E-309 & P.O	Eddy current testing machine	HMTL	Format	100%	Q.C.Dept
14	Ultrasonic test [if applicable]	Non Destructive testing	ASTME-213 & P.O	Ultrasonic testing machine	HMTL	Format	100%	Q.C.Dept
15	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 Superfical Hardness Tester & Rockwell Hardness Tester	HMTL	Format	Random Checking as per applicable standard	Q.C.Dept.
		C) Flaring,Flange, Flattening & Bend test	As per applicable Standard & P.O	Tensile testing Machine	HMTL	Format	Testing conducted as per standard	Q.C.Dept
		D) Impact test	As per Applicable Standerd & P.O.Requirement		At out side approved lab		As per Applicable Specification & P.O.Requirements.	Q.C.Dept
16	Chemical	Product Analysis	As per Applicable Standerd & P.O.Requirement	Spectro metre	HMTL	Format	As per Applicable Specification & P.O.Requirements.	Q.C.Dept
17	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
18	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
19	Marking	For Identification			HMTL		Manufacturer trade mark, OD, Thk, Length, Spec., Grade, Heat No and as Specified by purchaser.	Q.C. Dept
20	Packing	Soundness of packing	As per p.o		HMTL	Formet	As per p.o	Despatch

