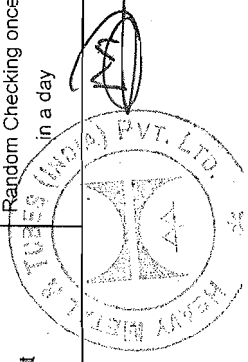


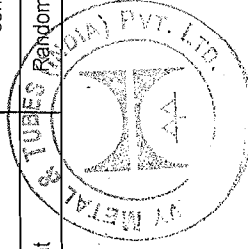
Heavy Metal & Tubes (India) Pvt Ltd

Quality Assurance Plan for Stainless Steel Seamless Tubes/Pipes

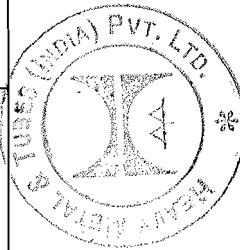
Sr.No	Operation	Quality Characteristics Checked	Reference Standard	Instrument used	Testing Carried Out	Type of record keeping	Remark	Responsibility
1	2	3	4	5	6	7	8	9
1	Seamless Mother Hollows	[A] Dimension	As per Applicable Standard	Micrometer[for OD & Thickness Checking]	HMTIPL	Format	Random Checking of Dimensions	Q.C.Dept.
		[B] Surface		Visual	HMTIPL		Random Checking of Surface Inspection	Q.C.Dept.
		[C] Chemical Analysis	As per Applicable Standard & P.O.Requirements		HMT PL	Format	Chemical analysis results compared with ladle analysis as per applicable standard(Random Checking)	Q.C.Dept.
		(D) Colour Coding	As per internal std		HMT PL		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	HMTIPL	Format	As per Applicable Specification & P.O.Requirements.	Production & Q.C. Department
		(B) Speed & Feed	Depends on tubes thk & size of tube		HMTIPL	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.	HMTIPL	Format	Random Checking as per applicable standard	Production & Q.C. Department
4	Intermediate Pickling	HF% & HNO3%		Lab	HMTIPL	Format	Random Checking once in a day	Chemist
5	Coating	Acidity		Lab	HMTIPL	Format	Random Checking once in a day	Chemist



6	Soap Bath	% Fatty Acid & PH Value		Lab	HMTIPL	Format	Random Checking once in a day	Chemist
7	Drawing	A) Dimensions B) Surface	As per Applicable Standard & P.O.Requirement	OD & Thickness Micrometer Visual	HMTIPL HMTIPL	Format	Random Dimensions & Length Checking as per applicable Standards & P.O.Requirement Random Checking for straightening marks, dent & any other mechanical damages which are visible in straightening	Q.C.Dept & Production Dept Q.C.Dept & Production Dept
8	Heat Treatment	(A) Temperature (B) Speed & Feed	As per Applicable Standard & P.O.Requirements	Automatic Temp. controller	HMTIPL	Format	As per Applicable Specification & P.O.Requirements. Speed & Feed checking for maintaining soaking time (Depends on OD & Thk of the tubes)	Production & Q.C. Department Production & Q.C. Department
9	Pickling	© Hardness HF% & HNO3%	As per Applicable Standard & P.O.Requirements	Rockwell Superficial Hardness Tester & Rockwell Hardness Lab	HMTIPL HMTIPL	Format	Random Checking Random Checking once in a day	Production & Q.C. Department Chemist
10	Straightening	A) Dimensions B) Surface	As per Applicable Standard & P.O.Requirements	Micrometer & Measuringtap Visual	HMTIPL HMTIPL	Format	Random Checking as per applicable standard Random checking for straightening mark, dent & any other mechanical damages which are visible in straightening condition	Production & Q.C. Department Production & Q.C. Department
11	End Cutting	Length cutting	P.O Requirement	Measuringtap	HMTIPL	Format	Random checking	Production dept



12	Hydro testing	Test Pressure	As per Applicable Standard & P.O. Requirement	Hydro testing	HMTIPL	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	HMTIPL	Format	100%	Q.C.Dept
14	Ultrasonic test [if applicable]	Non Destructive testing	ASTME-213 & P.O	Ultrasonic testing machine	HMTIPL	Format	100%	Q.C.Dept
15	Mechanical testing	A) Tensile test B) Hardness C) Flaring, Flange, Flattening	As per Applicable standard & P.O As per Applicable Standard & P.O As per applicable Standard & P.O	Tensile testing Machine Rockwell Superficial Hardness Tester & Rockwell Hardness Tensile testing Machine	HMTIPL HMTIPL HMTIPL	Format Format Format	Tensile test carried out random as per standard Random Checking as per applicable standard Testing conducted as per standard	Q.C.Dept Q.C.Dept Q.C.Dept
16	Chemical	Product Analysis	As per Applicable Standard & P.O Requirement	Spectro metre	HMTIPL	Format	As per Applicable Specification & P.O. Requirements. As per Applicable Specification & P.O. Requirements.	Q.C.Dept Q.C.Dept
17	Final Cutting	A) Dimensions	As per Applicable Standard & P.O. Requirements	Micrometre & Mesuringtap	HMTIPL	Format	Random Checking as per applicable standard	Production & Q.C. Department
18	Final Inspection	A) Dimensions B) Surface	As per applicable Standard & P.O	Micrometre, Vernier, Measuringtap.	HMTIPL HMTIPL	Format/Register Format/Register	100 % Checking 100% Visual Inspection	Q.C Dept Q.C.Dept
19	Marking	For Identification			HMTIPL		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		HMTIPL	Format	As Per P.O	Despatch



[Handwritten signature]