



Manufacturers of
Stainless Steel Seamless,
Welded Pipes, Tubes & 'U' Tubes



Shubhlaxmi Metals And Tubes Pvt. Ltd.

AN ISO 9001:2000 PED, 97/23/EC, AD 2000 MERKBLATT WO CERTIFIED COMPANY

Welded Pipes & Tubes

Shubhlaxmi's Stainless steel welded Pipes & Tubes division consist of Tube Mills, Bead Removing machines, Cold Drawing Benches, 'U' Bending Machine, Roller hearth Heat Treatment Furnace, Tube finishing lines including pickling, tube strengtheners, end facing, cut-to-length facilities, and Various destructive and non-destructive tests to produce high quality product Confirming to International Standard.

These facilities are capable of manufacturing per annum 3000 Tones of Stainless Steel Welded Pipes & Tubes of various Austenitic Ferritic, & Duplex Steel.

Product Range

PRODUCT	SIZE	THICKNESS	SPECIFICATION
PIPES	1/8" NB TO 1" NB 1" NB TO 8" NB	Sch.5, 10,40, 80s Sch.5, 10, 40s	ASTM A-312, A-554, A-778 & Its equivalent ASME, DIN & EN Standard
TUBES	6.35mm TO 101.6 mm OD	0.50mm TO 4.0mm	ASTM A-249, A-268, A-269, A-270 A-554, A-688, A-778, DIN 17455 & 17457 [Class 1] & Its equivalent ASME, DIN & EN Standard

AUSTENITIC GRADES : 304/L/H/LN, 316/L/H/LN/Ti,317L, 321/H, 347/H,309,310,904L

FERRITIC & MARTENSITIC GRADES : 409/L,410, 430/Ti,436, 439

DUPLEX STAINLESS STEEL : UNS 31254, 31500, 31803, 32205

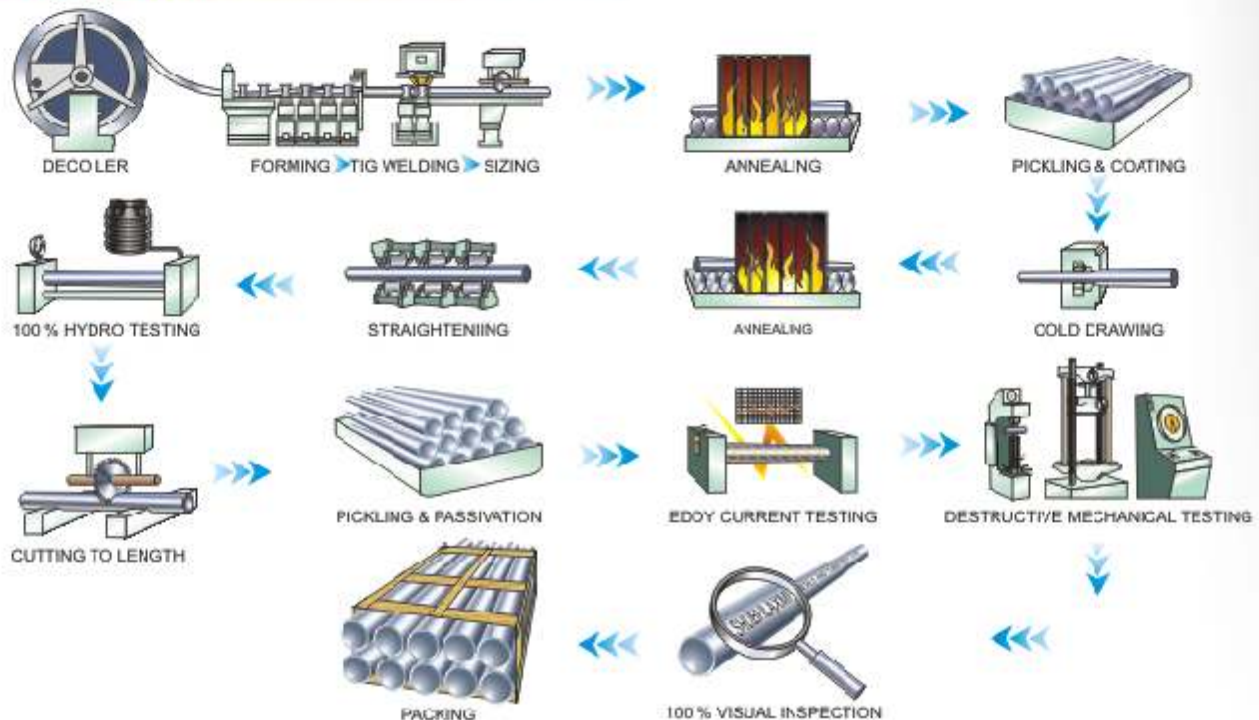
LENGTH : As per customer requirement, Maximum upto 22 Meter Long.

'U' TUBES: are supplied as per the customer Drawing.

FINISHING : Tubes can be supplied in mechanical polished with various grits like at 80, 120, 240, 320, 400, 600 grit and Mirror polished.



Process flow chart



Seamless Pipes & Tubes

Seamless Pipes Tubes & 'U' Tubes are manufactured from Mother hollow pipes with the processing on cold pilgering machine, cold drawn benches, Heat Treatment furnace, 'U' bending facilities, Tube finishing lines including pickling, tube straighteners, end facing, cut-to-length facilities, and Various destructive and non-destructive tests to produce high quality product Confirming to International Standard.

Product Range

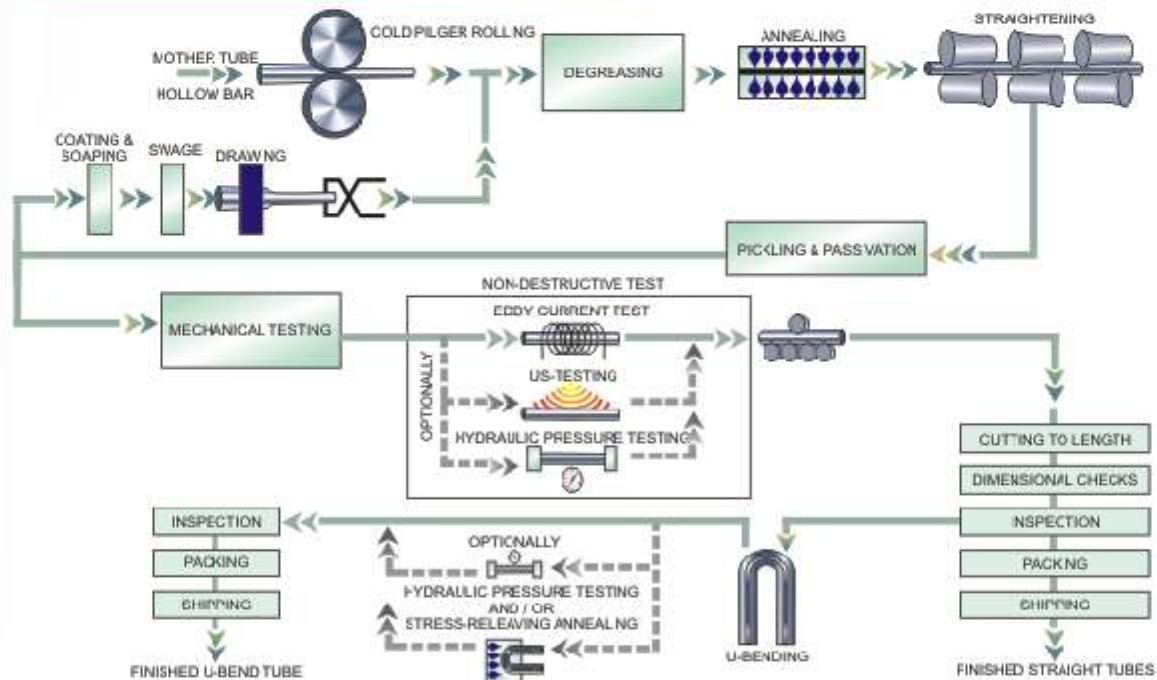
PRODUCT	SIZE	THICKNESS	SPECIFICATION
PIPES	1/8" NB TO 4" NB 4" NB TO 8" NB	Sch.5,10,40, 80s Sch.5,10,40s	ASTM A-312
TUBES	6.35mm OD TO 50.8mm OD	0.50mm TO 6.00mm	ASTM A-213, A-268, A-269, A-270, DIN 17456 & DIN 17458 (Class 1) & Its equivalent ASME, DIN & EN Standard

AUSTENITIC GRADES : 304/L/H/IN, 316/L/H/IN/Ti,321/H, 347/H,310

LENGTH : As per customer requirement, Maximum upto 22 Meter Long.

'U' TUBES are supplied as per the customer Drawing.

Process flow chart



Cold Pilger Mill

'U' Tubes

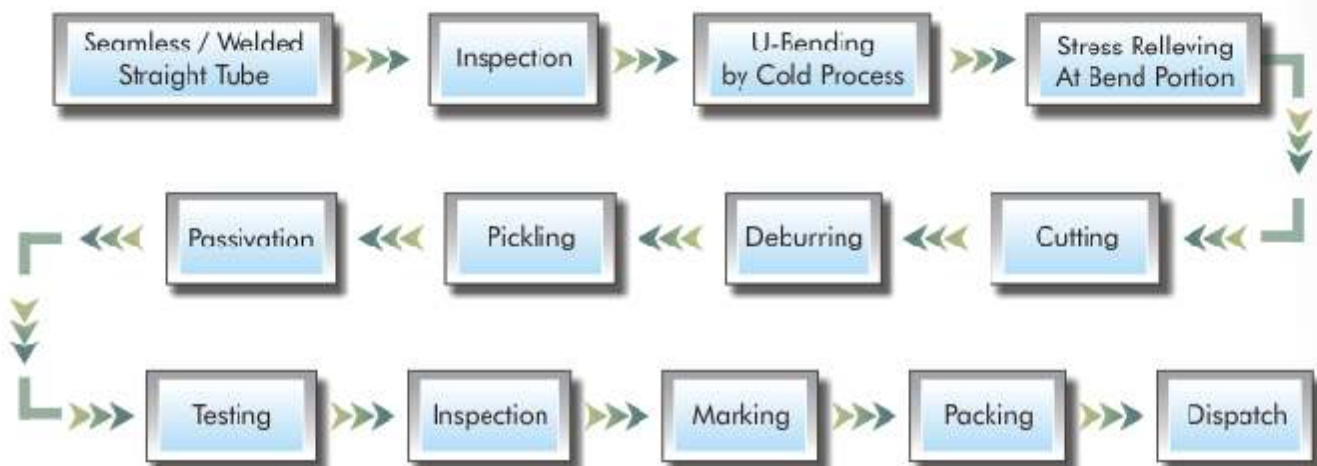
In addition to the production of Straight Stainless Steel Tubes, Shubhlaxmi Manufactures 'U' Tubes for use in Heat Exchanger, Condensors, Pre-Heaters & Various other equipments.

The manufacturing of 'U' Tubes takes place in a separate Shop, adjacent to the tube mill, on SHUBHLAXMI premises by utilizing bending equipment that is used exclusively for stainless tube bending as per drawing & specification given by customer. In the process bending portion & six inch leg is stress relieved by resistance heating & to avoid oxidation in ID argon gas is passed through the required flow rate.

All the procedure is strictly followed as per TEMA 'C' & ASTM A-688.



Manufacturing Process Flowchart for U-Tubes



Application



Heat Exchanger & Condensers



Chemical Equipment

Pharmaceuticals

Sugar Industries

Furniture

Fabrication (Vessel)

Oil & Gas Industries

Dairy & Food Industries

Automobile

Paper & Pulp Industries

Doors & Handles

Boilers

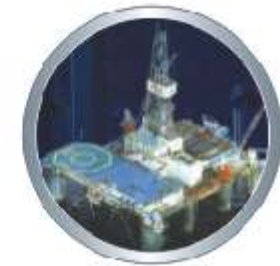
Sanitary & Plumbing

Instrumentation

Fertilizer Plants

Power Plants

Railway Coaches



Quality control & Product Reliability

Shubhlaxmi is regularly certified by TUV according to the standard ISO 9001:2000 on the overall management of the working process.

We have various product certificate which allow us to offer high quality for the most specific needs, like being Qualified suppliers of PED 97/23/EC, AD 2000 MERKBLATT WO by "TUV Nord"

Our real strength lies in quality control, We have an exhaustive quality assurance facility to test each & every product that leaves the factory the company has the latest manufacturing & testing equipment of world class Standard & Equally qualified and experienced personnel to manage the inspection at various level.

Chemical Testing:

As per the ASTM requirement chemical analysis is carried out. In NABL approved laboratory.

Mechanical Testing:

Tensile testing, Hardness, Flaring, Flanging, Flatening, Reverse bend test, according to the ASTM Standard are regularly carried out.

Hydro Test:

100% hydro testing on a hydraulic test bench is carried out using a high-pressure pump on all pipes & tubes, as per the ASTM A 450 & 530.

Air Under Water Test/Pneumatic Test:

Even though this is a supplementary requirement, the company has made a point to test all the tubes coming out of a factory to be tested under compressed air to determine any leakage ensuring ultimately that there is no incomplete weld penetrations.

Eddy-Current Testing:

It is conducted to detect any sub surface defect etc. This test is carried out by using Techno four flaw marking detective system on the entire length of the tubes as per the E426 with hole or notch standard.

Micro Structure Examination / Analyser Software :

Shubhlaxmi has the facility to measure ferrite content, Microscope helps to check the grain structure of Pipes & Tubes after annealing process. The above microscope is attached with analyzer software, which automatically indicates grain structure without manual intervention. Microstructure examination is carried out as per ASTM E-112

Hardness Tester:

Hardness tester is used to check the surface hardness of material with the help of Rockwell Brinell scale on 30T scale. Above test is carried out as per ASTM A-370

Corrosion Testing:

To find out the susceptibility of the material to intergranular corrosion attack or to measure rate of corrosion, IGC test as per A-262 practice A B C or E in our fully equipped in house laboratory.

Chemical Laboratory

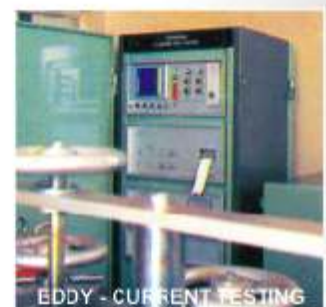
Shubhlaxmi has in-house fully equipped laboratory to check, chloride content in water, Daily pickling, passivation, coating & soaping bath analysis.

Radiography Testing:

The company can provide radiography testing facilities with an X- Ray unit.

Ultrasonic Testing:

Shubhlaxmi can arrange an off-line ultrasonic Testing facility having four-probe water emulsion system with a microprocessor unit to detect special process flow. In addition to above, the system can mark the defect by spraying.



ASTM Standard

Condensed ASTM Specification for Stainless Steel Tubes & Pipes

Specification	Allowable Outside Diameter Variations in mm			Allowable Wall Thickness Variations		Exact Length Tolerances in mm		Testing
	Nominal Diameter	Over	Under	Over %	Under %	Over	Under	
ASTM A-213 Seamless Boiler, Superheater and Heat Exchanger Tubes	Under 25.4 25.4-38.1 Incl. 38.1-50.8 excl. 50.8-63.5 excl. 63.5-76.2 excl. 76.2-101.6 incl	0.10 0.15 0.20 0.25 0.30 0.38	0.10 0.15 0.20 0.25 0.30 0.33	+20 +20 +22 +22 +22 +22	-0 -0 -0 -0 -0 -0	3.17 3.17 3.17 3.76 4.76 4.76	0 0 0 0 0 0	Tension Test Flattening Test Flare Test Hardness Test 100% Hydrostatic Test Refer to ASTM A-450
ASTM A-249 Welded Boiler Superheater, Heat Exchanger and Condenser Tubes	Diameter Under 25.4 25.4-38.1 Incl. 38.1-50.8 excl. 50.8-63.5 excl. 63.5-76.2 excl. 76.2-101.6 incl	0.10 0.15 0.20 0.25 0.30 0.36	0.10 0.15 0.20 0.25 0.30 0.36	+10 +10 +10 +10 +10 +10	-10 -10 -10 -10 -10 -10	3.17 3.17 3.17 4.76 4.76 4.76	0 0 0 0 0 0	Tension Test Flattening Test Flare Test/Flange Test *Reverse Bend Test Hardness Test 100% Hydrostatic Test * Reverse Flattening Test Refer to ASTM A-450 **Wherever Applicable
ASTM A-269 Seamless & Welded Tubing for General Service	Upto 12.7 12.7- 38.1 excl 38.1-88.9 excl. 88.9-139.7 exc. 139.7-203.2 excl.	0.13 0.13 0.25 0.38 0.76	0.13 0.13 0.25 0.38 0.76	+15 +10 +10 +10 +10	-15 -10 -10 -10 -10	3.2 3.2 4.8 4.8 4.8	0 0 0 0 0	Flare Test Flange Test (Welded Only) Hardness Test Flattening Test, Reverse Flattening 100% Hydrostatic
ASTM A-312 Seamless & Welded Pipe	13.70-48.3 incl 48.3-114.3 incl. 114.3-220 incl.	0.40 0.79 1.30	0.79 0.79 0.79	Minimum Wall 12.5% under nominal wall Specified & maximum 20 %		6.4 6.4 6.4	0 0 0	Tension Test Flattening Test 100% Hydrostatic Test Refer to ASTM A-530
ASTM A-358 Welded Pipe for High Temperature Service.	For all size 5" NB & Above	+0.5%	-0.5%	*	-0.3 mm	Customers Specification		Transvers Tension test Transverse guided bend test. Hydrostatic test, radiographic penetmt (optional.)
ASTM A-554 Mechanical Steel Tubing	Upto 5" 127 mm	0.1 to 0.5	0.1 to 0.5	+10	-10%	1.6 to 4.88	0	As per Customer Requirement
ASTM A-688 For Welded Feed Water heater 'U' Tubes	Under 25.4	0.1016	0.1016	+20 +10	-0 (For min. Wall thk.) -10 (For Avg. Wall thk.)	3 to 13	0	Tension, Hardness, Corrosion, Reverse bend, Flange, Flattening, Hydrostatic Test, Pneumatic Test, Non Destructive Test

Eddy current non destructive test & intergranular corrosion test can be offered on request.

Permissible Deviations of Outside Diameter and wall thickness

Scope		Outside diameter		Wall thickness	
Tube Manufacturing Process	Outside diameter d_o mm	ISO tolerance class	Permissible deviation	ISO tolerance class	Permissible deviation
cold-fabricated	$d_o \leq 219.1$	D 2	$\pm 1.0\% \text{ min. } - 0.5 \text{ mm}$	T 3	$\pm 10\% \text{ min. } \pm 0.2 \text{ mm}$
			In special cases :		In special cases :
		D 3 D 4	$\pm 0.75\% \text{ min. } \pm 0.3 \text{ mm}$ $\pm 0.5\% \text{ min. } - 0.1 \text{ mm}$	T 4	$\pm 7.5\% \text{ min. } \pm 0.15 \text{ mm}$
hot-fabricated	$44.5 \leq d_o \leq 219.1$	U 1	$\pm 1.5\% \text{ min. } - 0.75 \text{ mm}$	I 1	$\pm 15\% \text{ min. } \pm 0.6 \text{ mm}$
		D 2	In special cases : $\pm 1.0\% \text{ min. } - 0.5 \text{ mm}$	T 2	In special cases : $\pm 12.5\% \text{ min. } \pm 0.4 \text{ mm}$
	$219.1 < d_o < 610$		$\pm 1.5\% \text{ min. } - 0.75 \text{ mm}^1$		$\pm 22.5\%$ $- 15\% \text{ }^2$
				T 1 T 2	$\pm 15\% \text{ min. } \pm 0.6 \text{ mm}^1$ $\pm 12.5\% \text{ min. } \pm 0.15 \text{ mm}^1$

1) Applies to tubes with wall thickness $\leq 0.05d_o$ 2) Applies to tube with thickness: $0.05d_o < s \leq 0.09d_o$ 3) Applies to tubes with thickness $> 0.09d_o$

4) The tubes can be ordered with sized ends. In this case a permissible deviation of the outside diameter of $\pm 0.6\%$ applies to the tube ends over a length of approx. 100 mm.

Chemical Compositions (%)

CHEMICAL COMPOSITIONS (%)

Type	C	Mn	P	S	Si	Cr	Ni	Others
201	C.15	5.50 - 7.5	0.060	0.030	1.00	16.0 - 18.0	3.5 - 5.5	N 0.25
202	C.15	7.5 - 10.0	0.060	0.030	1.00	17.0 - 19.0	4.0 - 6.0	N 0.25
301	C.15	2.00	0.045	0.030	1.00	16.0 - 18.0	6.0 - 8.0	N 0.25
302	C.15	2.00	0.045	0.030	0.75	17.0 - 19.0	8.0 - 10.0	N 0.10
304	C.08	2.00	0.045	0.030	0.75	18.0 - 20.0	8.0 - 10.5	N 0.25
304L	C.03	2.00	0.045	0.030	0.75	18.0 - 20.0	8.0 - 12.0	N 0.25
305	C.12	2.00	0.045	0.030	0.75			
309S	C.08	2.00	0.045	0.030	0.75	22.0 - 24.0	12.0 - 15.0	
310S	C.08	2.00	0.045	0.030	1.50	24.0 - 26.0	19.0 - 22.0	
316	C.08	2.00	0.045	0.030	0.75	16.0 - 18.0	10.0 - 14.0	Mo 2.0-3.0, N 0.10
316L	C.03	2.00	0.045	0.030	0.75	16.0 - 18.0	10.0 - 14.0	Mo 2.0-3.0, -0.10
316Ti	C.08	2.00	0.045	0.030	0.75	16.0 - 18.0	10.0 - 14.0	N 0.10 Ti 5 (C+N) Min, 0.70 Max
317	C.08	2.00	0.045	0.030	0.75	18.00 - 20.00	11.0 - 15.0	Mo 3.0-4.0, N 0.10
317L	C.03	2.00	0.045	0.030	0.75	18.00 - 20.00	11.0 - 15.0	Mo 3.0-4.0, N 0.10
321	C.08	2.00	0.045	0.030	0.75	17.00 - 19.00	9.0 - 12.0	Ti 5 (C+N) Min, 0.70 Max
347	C.08	2.00	0.045	0.030	0.75	17.00 - 19.00	9.0 - 13.0	Cb 10 x C Mn, 1.0 Max
904L	C.02	2.00	0.045	0.030	1.00	19.00 - 23.00	23.0 - 28.0	Mo 4.0-5.0, Cu 1.0-2.0
409L	C.03	1.00	0.030	0.040	1.00	10.50 - 11.75	0.50	Ti 6 (c) Min - 0.75 Max, Cb 0.17 Max
410	C.15	1.00	0.040	0.030	1.00	11.50 - 13.50	0.75	
410S	C.08	1.00	0.030	0.040	1.00	11.50 - 13.50	0.60	
420	0.15 (Min)	1.00	0.045	0.030	1.00	10.50 - 15.50	1.0 - 2.5	Mo 0.20-1.20
430	C.12	1.00	0.030	0.040	1.00	16.00 - 18.00	0.75	

STAINLESS STEEL - COMPARISON OF GRADE SPECIFICATIONS

Grade	UNS	Old British		W. No	Name	Swedish SS	JIS
		BS	En				
201	S20100	301S21	-	1.4310	X10CrNi18-8	2331	SUS 201
202							SUS 202
301	S30100	301S21	-	1.4310	X10CrNi18-8	2331	SUS 301
302	S30200	302S25	58A	1.4319	-	-	SUS 302
304	S30400	304S31	58E	1.4301	X5CrNi18-10	2332	SUS 304
304L	S30403	304S31	-	1.4306	X2CrNi18-11	2352	SUS 304L
305	S30500	305S19	-	1.4312	-	-	SUS 305
309S	S30908	309S24	-	1.4833	X12CrNi23-13	-	SUS 309S
310S	S31008	310S16	-	1.4845	X3CrNi25-21	2361	SUS 310S
316	S31600	316S31	58H,56J	1.4401	X5CrMo17-12-2	2347	SUS 316
316L	S31603	316S31	-	1.4404	X2CrNiMo17-12-2	2348	SUS 316L
316Ti	S31635	320S31	-	1.4571	X10CrNiMoTi18-10	2350	SUS 316Ti
317		316S16					
317L	S31703	317S12	-	1.4438	X2CrNiMo18-16	2367	SUS 317L
321	S32100	321S31	58B,58C	1.4541	X6CrNiTi18-10	2337	SUS 321
347	S34700	347S31	58G	1.4550	X6CrNiNb18-10	2338	SUS 347
904L	N08904	904S13	-	1.4539	X1NiCrMoCuNi25-20-5	2562	
409L				1.4512	X2CrTi17		
410	S41000	410S21	56A	1.4006	X12C-13	2302	SUS 410
410S				1.4000	X6Cr13		
420	S42000	420S37	56C	1.4021	X20C-13	2303	SUS 420,11
430	S43000	430S17	60	1.4016	X8Cr17	2320	SUS 430

Size Range

Stainless Steel Tube: Dimension and Weights

Tube size Outside Diameter mm	Thickness in mm												
	0.8	1	1.2	1.5	1.6	2	2.3	2.5	2.6	3	3.2	3.6	4
6	0.104	0.125	-	-	-	-	-	-	-	-	-	-	-
8	0.144	0.175	-	-	-	-	-	-	-	-	-	-	-
10	0.184	0.225	0.264	0.319	-	-	-	-	-	-	-	-	-
12	0.224	0.275	0.325	0.394	-	-	-	-	-	-	-	-	-
13	0.244	0.300	0.355	0.432	-	-	-	-	-	-	-	-	-
14	0.264	0.325	0.385	0.470	-	-	-	-	-	-	-	-	-
15	0.284	0.351	0.415	0.507	-	-	-	-	-	-	-	-	-
16	0.304	0.375	0.445	0.545	0.577	0.701	-	-	-	-	-	-	-
17	0.325	0.401	0.475	0.582	0.617	0.751	-	-	-	-	-	-	-
18	0.345	0.425	0.505	0.620	0.657	0.801	-	-	-	-	-	-	-
19	0.365	0.451	0.535	0.657	0.697	0.851	-	-	-	-	-	-	-
19.05	0.366	0.452	0.536	0.659	0.699	0.854	-	-	-	-	-	-	-
21.3	0.411	0.503	0.604	0.744	0.789	0.967	1.094	1.177	1.217	-	-	-	-
22	0.425	0.525	0.625	0.770	0.817	1.002	-	-	-	-	-	-	-
23	0.445	0.551	0.655	0.808	0.857	1.052	-	-	-	-	-	-	-
25	0.485	0.601	0.715	0.883	0.937	1.152	1.307	1.409	1.458	-	-	-	-
25.4	0.493	0.611	0.727	0.898	0.954	1.172	1.330	1.434	1.484	-	-	-	-
26.9	0.523	0.649	0.772	0.954	1.014	1.247	1.417	1.527	1.582	1.795	-	-	-
28	0.545	0.675	0.805	0.995	1.058	1.302	1.480	1.596	1.654	-	-	-	-
30	0.585	0.725	0.865	1.070	1.138	1.402	1.595	1.722	1.784	2.028	-	-	-
31.8	0.621	0.771	0.919	1.138	1.210	1.492	1.699	1.834	1.901	2.163	-	-	-
32	0.625	0.775	0.925	1.146	1.218	1.502	1.710	1.847	1.914	2.178	-	-	-
33	0.645	0.801	0.956	1.183	1.258	1.552	1.768	1.909	1.979	2.254	2.338	-	-
33.7	0.660	0.819	0.977	1.209	1.286	1.588	1.808	1.953	2.025	2.306	2.444	-	-
34	0.665	0.825	0.986	1.221	1.298	1.603	1.826	1.972	2.044	2.329	2.468	-	-
35	0.685	0.851	1.016	1.258	1.338	1.653	1.883	2.035	2.109	2.404	2.548	-	-
38	0.745	0.925	1.106	1.371	1.458	1.803	2.056	2.222	2.305	2.629	2.738	-	-
40	0.785	0.977	1.166	1.446	1.538	1.903	2.171	2.348	2.435	2.779	2.949	-	-
41	0.805	1.002	1.196	1.484	1.579	1.953	2.229	2.410	2.500	2.855	3.029	-	-
42	0.825	1.027	1.226	1.521	1.619	2.003	2.286	2.473	2.565	2.930	3.109	-	-
44.5	0.875	1.089	1.301	1.615	1.719	2.128	2.430	2.629	2.728	3.117	3.309	3.687	-
45	0.885	1.102	1.316	1.634	1.739	2.153	2.459	2.661	2.760	3.155	3.349	3.732	-
48.3	0.952	1.184	1.415	1.758	1.871	2.319	2.649	2.867	2.975	3.403	3.614	4.029	-
50	0.980	1.227	1.466	1.822	1.939	2.404	2.747	2.974	3.086	3.531	3.750	4.183	-
50.8	1.002	1.247	1.490	1.852	1.971	2.444	2.793	3.024	3.138	3.591	3.814	4.255	-
54	-	1.327	1.587	1.972	2.099	2.604	2.978	3.224	3.346	3.831	4.071	4.543	-
57	-	1.402	1.677	2.085	2.220	2.754	3.150	3.412	3.542	4.056	4.311	4.814	-
60.3	-	1.485	1.776	2.209	2.352	2.920	3.340	3.618	3.757	4.304	4.575	5.111	-
63.5	-	-	1.872	2.329	2.480	3.080	3.525	3.819	3.965	4.545	4.832	5.400	-
70	-	-	2.067	2.573	2.740	3.405	3.899	4.226	4.388	5.033	5.353	5.986	-
73	-	-	2.157	2.686	2.861	3.556	4.072	4.413	4.583	5.258	5.593	6.256	-
76.1	-	-	2.251	2.802	2.985	3.711	4.250	4.607	4.785	5.491	5.841	6.535	7.222
85	-	-	2.518	3.136	3.341	4.157	4.763	5.165	5.365	6.160	6.554	7.338	8.113
88.9	-	-	2.635	3.283	3.498	4.352	4.987	5.409	5.618	6.453	6.857	7.689	8.504
101.6	-	-	3.016	3.760	4.006	4.988	5.719	6.204	6.445	7.407	7.835	8.834	9.776

Size Range



Stainless Steel Pipe: Dimension and Weights

Nominal Pipe Size		Outside Diameter		SCH - 5 (WV) Thick		SCH - 10S (WV) Thick		SCH - 10 (WV) Thick		SCH - 20 (WV) Thick		SCH - 30 (WV) Thick		SCH - 40S (WV) Thick		SCH - 80 (WV) Thick	
(mm)	(inch)	(inch)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
15	½	0.840	21.34	0.80	1.65	1.00	2.11	-	-	-	-	-	-	1.27	2.77	1.67	3.73
20	¾	1.050	26.67	1.02	1.65	1.28	2.11	-	-	-	-	-	-	1.68	2.87	2.20	3.91
25	1	1.315	33.40	1.30	1.65	2.09	2.77	-	-	-	-	-	-	2.50	3.38	3.27	4.55
32	1 ¼	1.660	42.16	1.65	1.65	2.69	2.77	-	-	-	-	-	-	3.38	3.56	4.46	4.85
40	1 ½	1.900	48.26	1.90	1.65	3.10	2.77	-	-	-	-	-	-	4.04	3.68	5.41	5.08
50	2	2.375	60.33	2.39	1.65	3.92	2.77	-	-	-	-	-	-	5.44	3.91	7.48	5.54
65	2 ½	2.875	73.03	3.71	2.11	5.27	3.05	-	-	-	-	-	-	8.65	5.16	11.40	7.01
80	3	3.500	88.90	4.51	2.11	6.45	3.05	-	-	-	-	-	-	11.27	5.49	15.30	7.62
90	3 ½	4.000	101.60	5.25	2.11	7.40	3.05	-	-	-	-	-	-	13.55	5.74	18.60	8.08
100	4	4.500	114.30	5.92	2.11	8.35	3.05	-	-	-	-	-	-	16.06	6.02	22.30	8.56
125	5	5.563	141.30	9.60	2.77	11.56	3.40	-	-	-	-	-	-	21.75	6.55	31.00	9.53
150	6	6.625	168.28	11.47	2.77	14.04	3.40	-	-	-	-	-	-	28.23	7.11	42.50	10.97
200	8	8.625	219.08	14.99	2.77	20.26	3.76	33.81	-	36.87	-	-	-	42.48	8.18	64.60	12.70
250	10	10.750	273.05	22.97	3.40	28.20	4.19	42.38	6.35	51.10	7.80	-	-	61.20	9.27	96.10	15.08
300	12	12.750	323.85	33.53	4.20	36.53	4.57	50.45	6.35	65.29	8.38	-	-	74.92	9.53	132.10	17.45
360	14	14.000	356.63	-	-	41.41	4.78	64.77	6.35	68.01	7.92	81.46	9.53	81.46	9.53	164.50	19.05
400	16	16.000	406.40	-	-	47.41	4.78	62.74	6.35	77.95	7.92	93.41	9.53	93.41	9.53	203.53	21.41
450	18	18.000	457.20	-	-	53.41	4.78	70.71	6.35	87.88	7.92	122.62	11.13	105.37	9.53	-	-
500	20	20.000	508.00	-	-	68.75	5.54	78.68	6.35	117.33	9.53	155.37	12.70	117.33	9.53	-	-
550	22	22.000	558.80	-	-	-	-	86.64	6.35	129.29	9.53	171.30	12.70	129.29	9.53	-	-
600	24	24.000	609.60	-	-	-	-	94.61	6.35	141.25	9.53	209.83	14.27	141.25	9.53	-	-



Rectangular tube dimensions Theoretical weight in kg/mtr

Dimensions		1.0 mm	1.2 mm	1.5 mm	2.0 mm	2.5 mm	3.0 mm	3.5 mm	4.0 mm
mm	mm	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter
20	10	0.453	0.539	0.661	-	-	-	-	-
25	15	0.610	0.724	0.890	-	-	-	-	-
30	10	0.610	0.724	0.890	-	-	-	-	-
30	20	0.771	0.917	1.129	1.475	-	-	-	-
40	20	0.931	1.108	1.371	1.795	-	-	-	-
50	20	1.081	1.302	1.612	2.115	-	-	-	-
50	25	1.170	1.398	1.734	2.275	-	-	-	-
50	30	-	1.494	1.852	2.434	3.003	3.502	-	-
60	30	-	1.687	2.090	2.756	3.405	4.040	-	-
60	40	-	1.878	2.332	3.078	3.806	4.533	-	-
80	40	-	-	2.815	3.724	4.612	5.494	6.359	7.257



Square tube dimensions Theoretical weight in kg/mtr

Dimensions		1.0 mm	1.2 mm	1.5 mm	2.0 mm	2.5 mm	3.0 mm	3.5 mm	4.0 mm	4.0 mm
mm	mm	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter	Kg / meter
10	10	0.294	-	-	-	-	-	-	-	-
15	15	0.453	0.538	0.661	-	-	-	-	-	-
20	20	0.610	0.724	0.890	1.159	-	-	-	-	-
25	25	0.772	0.917	1.129	1.475	-	-	-	-	-
30	30	0.932	1.108	1.371	1.795	2.203	2.643	-	-	-
35	35	1.081	1.302	1.612	2.115	2.604	3.124	-	-	-
40	40	1.251	1.495	1.852	2.434	3.003	3.562	-	-	-
50	50	-	1.882	2.332	3.078	3.806	4.533	5.248	5.997	-
60	60	-	-	2.815	3.724	4.612	5.494	6.359	7.267	-
80	80	-	-	3.798	5.040	6.268	7.484	-	-	-
100	100	-	-	-	6.400	7.969	9.525	11.069	12.600	15.824
120	120	-	-	-	7.660	9.554	11.415	13.274	15.120	18.774

Quality Assurance Plan

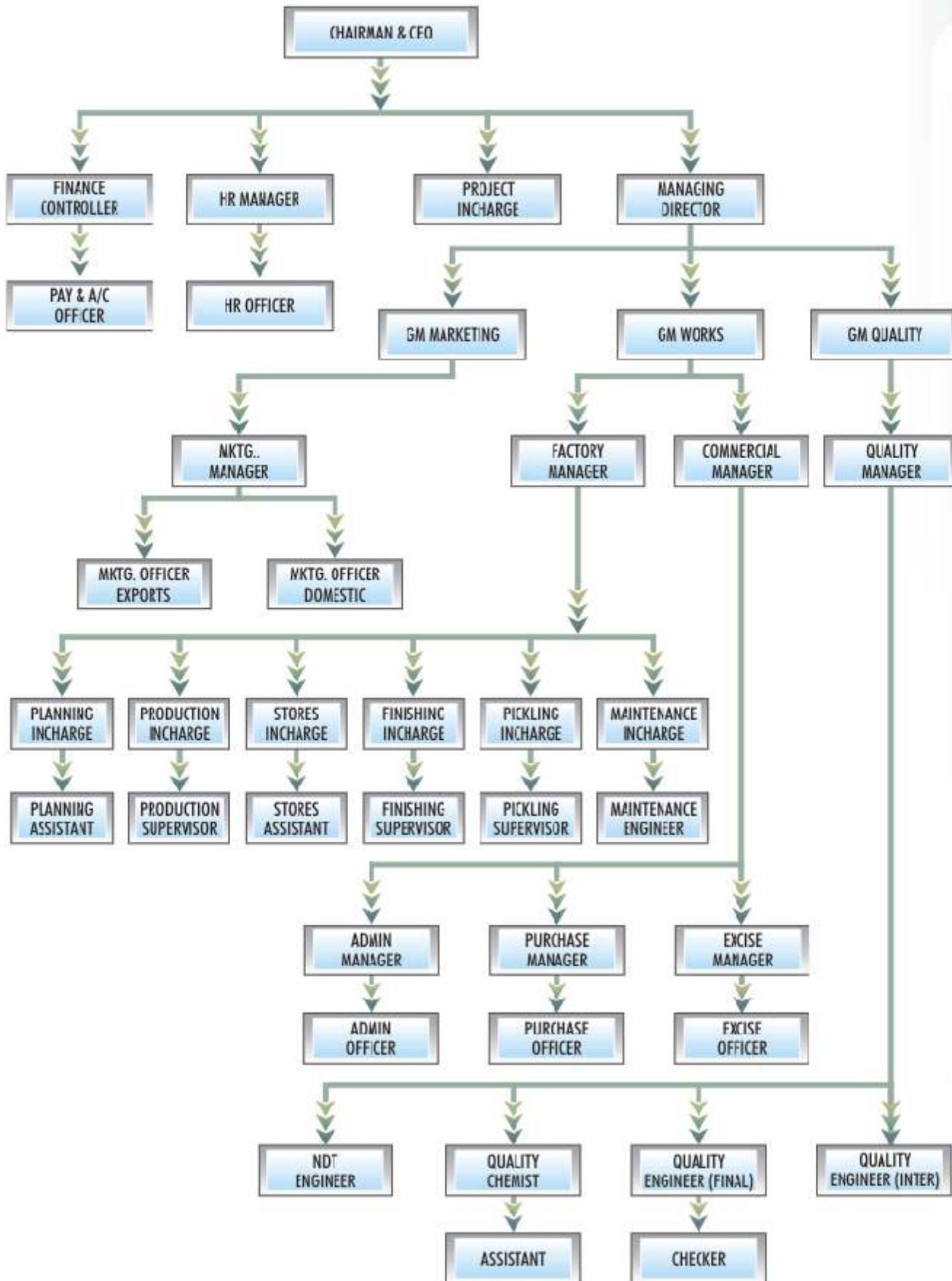
A) Incoming Raw Materials :

SR. NO.	PROCESS DESCRIPTION	REF DOCUMENTS / STANDARDS	CHARACTERISTICS TO BE CHECKED	SAMPLE SIZE / QUORUM OF INSPECTION	INSTRUMENT & EQUIPMENT USED FOR TESTING	ACCEPTANCE CRITERIA
1.	Raw Material (S.S. Coils Mother - Hollow Pipes)	Purchase Order / Specifications	1) Dimensions 2) Chemical Analysis & T.C. Verification 3) Packing Condition 4) Weight 5) Surface Defects if any	1 Sample Per heat	Vernier, Micrometer volumetric, Gravimetric, UTM 40-T Testing Machine, Brinnels / Rockwell hardness Tester	Confirm to specification-100%

B) Stagewise Inspection :

2.	Tube forming & welding	As per W.O./ Specifications	1) Dimension 2) Inspection of weld, seam 3) Weld test, Flare, Flange, Reverse Bending & Flattening	Testing as per Standard Specification & Recording the results one test of every 35 to 40 Meters.	UTM 40-T, Microscope Visual Insp. Vernier, Micrometer Measure Tape.	Dimension is acceptance as per order and Confirm to standard Specification
3.	Cold Pilger & Draw Bench	As per W.O./ Specification	1) Dimension Check Diameter (Ovality) X Length X Thickness 2) Visual Inspection	Testing as per Standard Specification & Recording the results one test of every 35 to 40 Mts.	UTM 40-T, Microscope Visual Insp. Vernier, Micrometer Measure Tape	Dimensions acceptance as per order and Confirm to standard Specification
4.	Oxalate Coating and Seaping Bath	As per Work instruction	Concentration Temperature	One Test/ Bath day, Temperature Control	Fully Equipped chemical laboratory	Confirm to requirement
5.	Solution Annealing	Temperature as per ASTM Standard	1. Temperature 2. Hardness 3. Water Quenching	1. Sample per lot / sample per heat or as per stranded	Digital graphic Temperature Scanner Recorder, Digital Temperature Indicator & Control Metallurgical Microscope Rockwel / Binell Hardness Tester	Confirm to ASTM Standard / Work instruction of furnace
6.	Straightening	Straightening as per specification	Check straightening of Pipe / Tube	First pipes of each size lot & Recording the results one test of every 30 to 40 pipes.	Roller Straightening Machine, Straightness edge by keeping on table, Filler Gauge Micrometer, Visual Observation.	Straightening as per specifications / standard sample
7.	Cutting	As per W.O./ Specification	Right Angle to length	Two pipes of each size lot & one test of every 30 to 40 pipes	Abrasive cut of Machine, Measure Tape	Confirm to requirement
8.	End Facing / Squaring	As per requirement Squaring / Beveling	Free free Squaring / Beveling with proper 'V' shape	100% Visual inspection	Abrasive cut of Machine, Measure Tape & Mechanical Right Angle	Confirm to requirement
9.	Hydrostatic Testing / Air Under Water Test	As per ASTM Standard As Per W.O.	*Leakages	100%	Hydraulic Pressure Tester, Air Under Water Test	No Leakage
10.	Pickling & Passivation	As Per W.O./Standard	Scale Free and Proper cleaning	100% Visual inspection	Light Pass Test, Acetone soaked Cotton Plug, Visual inspection	Confirm to requirement
11.	Eddy Current Test	Specified in Standard	Surface defect / Lamination crack & dent	100%	Eddy current Testing Machine	As Per standard
12.	Final Inspection Physical / Chemical Testing	As per applicable standard	Visual, Dimension, Physical Testing Chemical Testing IGC Test & Product Analysis	100% Visual, Dimension Physical & Chemical Testing as per standard	Beaker, Allihn Condensor Chemicals, Hot plate, Micrometer, Vernier, Universal testing Machine UTM-40T Molly detector & sampling at random spectro	Confirm to requirements
13.	Marking (as per customer requirement / Standard Marking)	As per requirement	Spell check, Details verification	100% Confirm on first two samples and continue	Injet Machine / Electro ETCH Cu-relation of Heat No. Size Grade etc. with Test Certificate.	Confirm to requirements
14.	Packing & Delivery	As per customer requirements	Packing quality Tightness of packing Sea Worthy packing Fumigation certificate	100% confirm to requirement and release for delivery	Wooden Box, Crate, Polythene, Hessian.	Packing confirm to customer requirements

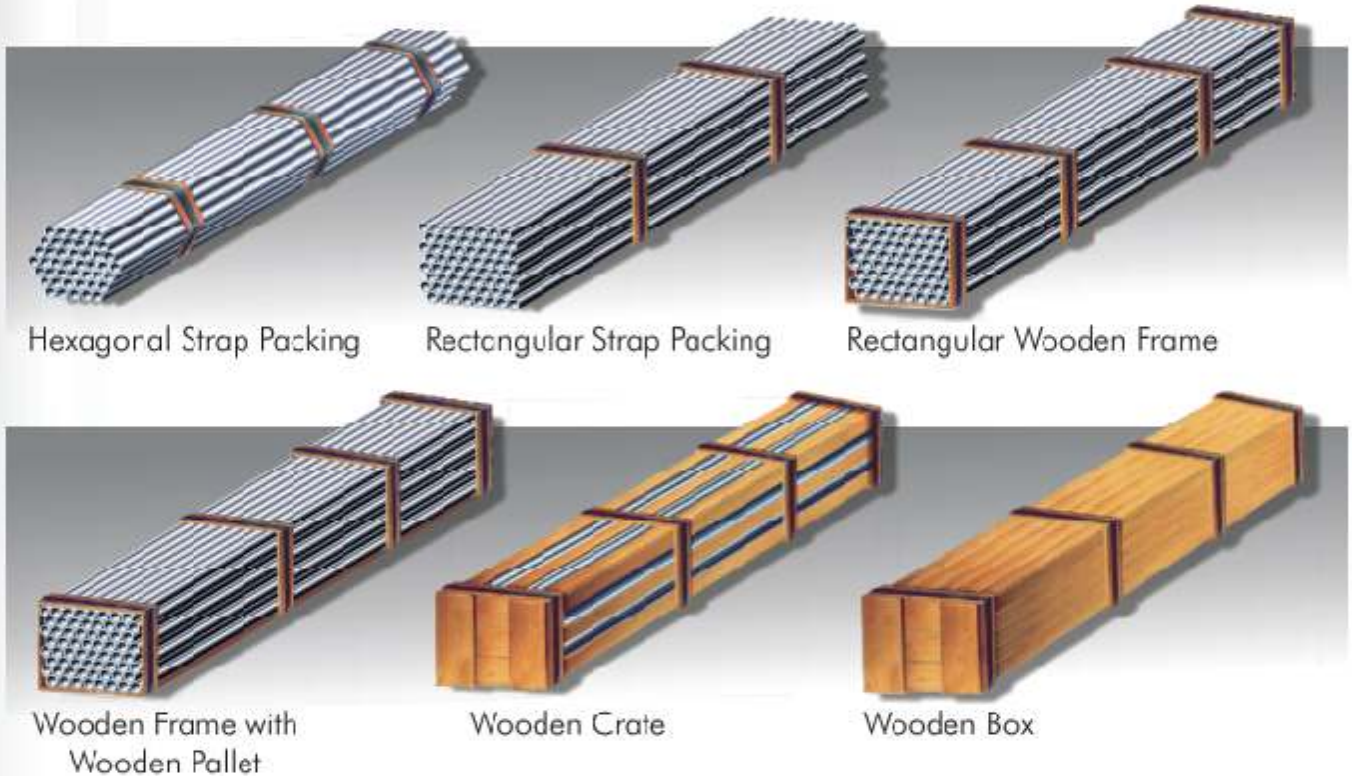
Organisation Chart



Packing

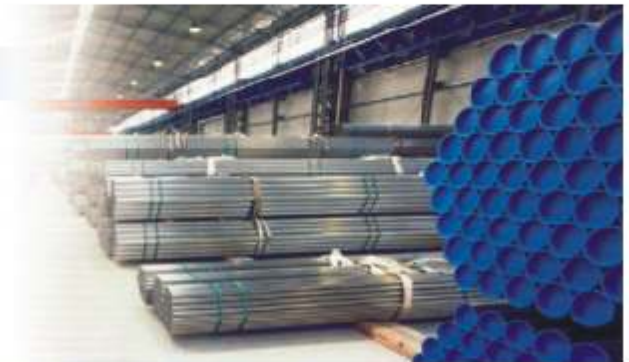
Our products have to arrive safely, quickly and without damages at their destination in any part of the World. Adequate packing is also an essential part of quality assurance. In case of contaminations or damages the best material selection and fabrication are useless, if goods are not properly protected.

Within the scope of extensive quality assurance, Shubhlaxmi has developed customized packing methods to suit the size of the products and the transport conditions.



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Shubhlaxmi can offer you material with inspection of any third party.

Third party Inspection offers quality and thorough Inspection for buyers.

The Inspection Agency can be nominated by client or we can arrange the third party inspection by various world class reputed agency like below.....



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