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Steel pipe+

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湖南巨盛管业有限公司
HYROGRAND Steel Pipe Co.,Ltd.

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湖南巨盛管业有限公司
HYDROGRAND Steel Pipe Co.,Ltd.

COMPANY PROFILE

HYDROGRAND Steel Pipe Co.,ltd is a large steel complexes in China integrated with steel making and rolling process. A multiple producing system with steel products, such as steel plates, steel pipes, steel section and round bar has been built. The Capability of steel products in 10 million tons each year.

The company' s leading steel pipes industry includes medium & small- diameter hot-rolled seamless tubes, specially alloy rolled tubes, cold-rolled and cold-drawn seamless tubes, expanding large diameter seamless tube, medium-diameter ERW welded steel pipes, large-diameter longitudinal submerged-arc welded steel pipes, large spiral steel pipes and all kinds of pipe fittings,such as bend, elbow, reducer,tee, flanges,coupling, caps,,etc for the connection of the pipeline.

Now the Seamless tube has 3 hot rolling lines and 1 cold drawn line: Φ400mm Plug Mill,Φ180mm retaining rack MPM,Φ159mm PQF. It also has Φ340mm and Φ245mm OCTG threading line and two heat treatment line.So it can produce all kinds of hot rolling seamless with O.D. from Φ38-457mm and W.T. from 2.9-60mm,Cold-drawn seamless tube with O.D. from Φ10-89mm and W.T.from 1.2-19.05mm.

The 3 ERW welded steel pipes production lines can produce O.D. Φ 10-Φ610 mm with W.T.0.5-15mm welded steel pipes, including hollow section, such as square & rectangular steel tube, galvanized steel pipes, per-galvanized tube, EMT Tube.etc. And meanwhile the large longitudinal submerged-arc welded steel pipes lines can produce the O.D. Φ 457-Φ1420 mm with W.T.7-60mm with one seam and two seams for above Φ1500mm.

The largest spiral steel pipes production lines can cover 7 lines from Φ219mm to Φ3500mm : 1) O.D. from Φ219-530mm and W.T. from 3.0-15mm; 2) O.D. from Φ325-1320mm and W.T. from 3.0-16mm; 3) O.D. from Φ530-2200mm and W.T. from 5.0-20mm; 4) O.D. from Φ219-630mm and W.T. from 3.0-16mm;5) O.D. from Φ219-820mm and W.T. from 3.0-16mm; 6) O.D. from Φ325-1820mm and W.T. from 5.0-18mm; 7) O.D. from Φ530-3500mm and W.T. from 5.0-25mm; These steel pipes have been widely applied in energy industry, petrochemical industry, machining, maritime facilities, gas and oil projects,hydroelectric(power) station,water transmitting project and infrastructure construction.,etc.

Energy Steel Industrial CO.,ltd 's steel pipe industry integrates R&D, product development, machining and inspection, distribution. It implements whole process quality control including piercing, hot-rolled coils,heavy plates,blooming, pipe rolling and welding. The company' s steel pipe industry has comprehensive advantages super iron and steel complex. The mills is one of the most modernized steel pipes production bases in China nowadays.

Relying on competitive advantages such as advanced equipment, completed technical knowledge, strict management and high credit,especially strong resource integration capability, Energy Steel Industrial can supply high quality product and services to satisfy customers demands.We have been implementing an effective Quality Control and Assurance System.We have a long-term plan to keep, control and improve quality continually.

PRODUCTS

- SEAMLESS STEEL PIPE
- TUBING & CASING
- ERW STEEL PIPE
- LSAW STEEL PIPE
- SSAW STEEL PIPE
- STAINLESS STEEL
- PIPE FITTING
- STEEL FABRICATION

SEAMLESS STEEL PIPE

A new process for producing a seamless steel pipe comprises the following processing steps: firstly, producing a hollow pipe blank, at one end of which an annular cup bottom is arranged, through centrifugal casting; secondly, mechanically processing the inner surface and the outer surface of the hollow pipe blank; thirdly, heating the processed hollow pipe blank; fourthly, performing pipe jacking mill processing to the heated hollow pipe blank,and obtaining pipe fittings meeting the requirements of the wall thickness, the diameter and the length; and fifthly, after bar loosening and bar releasing, performing end cropping and finishing operation to the pipe fittings after the pipe jacking mill processing, and ob-taining qualified finished product pipe materials. The invention can produce a high-quality stainless steel and special steel pipe difficult to process, and overcomes the defects in the prior art, so as to form an energy-saving, high-quality and economic new process with theshort procedure for producing the seamless steel pipe compared with the traditional.

TYPES OF SEAMLESS STEEL PIPE

Types	Uses
Structure Purposes	General structure and mechanical
Liquid Services	Petroleum, gas and other fluids conveying
Low and Medium Pressure	Steam and boiler manufacturing
Hydraulic Pillar Service	Hydraulic support
Auto Semi-shaft Casing	Auto sem-shaft casing
Line Pipe	Oil and gas conveying
Tubing and Casing	Oil and gas conveying
Drill Pipes	Well drilling
Geological Drilling Pipes	Geological drilling
Petroleum Cracking Tubes	Furnace tubes, heat exchangers

STANDARD OF SEAMLESS STEEL PIPE

Standard	Types		Chemical Composition(%)													
	Steel Name	Steel Number	c	Si	Mn	P	S	Cr	Mo	Ni	Al	Cu	Nb	Ti	V	Cr+Cu +Mo+Ni
EN 10216-1	P195TR1	1.0107	≤0.13	≤0.35	≤0.70	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	-	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70
	P195TR2	1.0108	≤0.13	≤0.35	≤0.70	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	0.02	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70
	P235TR1	1.0254	≤0.16	≤0.35	≤1.20	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	-	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70
	P235TR2	1.0255	≤0.16	≤0.35	≤1.20	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	≥0.02	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70
	P265TR1	1.0258	≤0.20	≤0.40	≤1.40	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	-	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70
	P265TR2	1.0259	≤0.20	≤0.40	≤1.40	≤0.025	≤0.020	≤0.30	≤0.08	≤0.30	≥0.02	≤0.30	≤0.010	≤0.04	≤0.02	≤0.70

Standard	Grade		Yield Strength(Mpa)			Tensile Strength	Elongation(%)		Impact Properties(KV J)		
	Steel Name	Steel Number	Wt ≤ 16	16<WT ≤ 40	40<WT ≤ 60	(Mpa)	Longitudinal	transverse	Longitudinal		transverse
									0℃	-10℃	0℃
EN 10216-1	P195TR1	1.0107	≥195	≥185	≥175	320-440	≥27	≥25	-	-	-
	P195TR2	1.0108	≥195	≥185	≥175	320-440	≥27	≥25	≥40	≥28	≥27
	P235TR1	1.0254	≥235	≥225	≥215	360-550	≥25	≥23	-	-	-
	P235TR2	1.0255	≥235	≥225	≥215	360-550	≥25	≥23	≥40	≥28	≥27
	P265TR1	1.0258	≥265	≥255	≥245	410-570	≥21	≥19	-	-	-
	P265TR2	1.0259	≥265	≥255	≥245	410-570	≥21	≥19	≥40	≥28	≥27

Standard	Grade	Chemical Composition(%)								Mechanical Properties		
		c	Si	Mn	P	S	Mo	Cr	V	Cr+Cu +Mo+Ni	Cr+Cu +Mo+Ni	Cr+Cu +Mo+Ni
ASTM A106	A	≤0.30	≤0.10	0.29-1.06	≤0.035	≤0.035	≤0.15	≤0.40	≤0.08	≥415	≥240	≥30
A106	B	≤0.35	≤0.10	0.29-1.06	≤0.035	≤0.035	≤0.15	≤0.40	≤0.08	≥485	≥275	≥30

Standard	Grade	Chemical Composition(%)								Mechanical Properties		
		c	Si	Mn	P	S	Mo	Cr	V	Tensile STrength(Mpa)	Yield STrength(Mpa)	Elongation(%)
ASTM A179	A179	0.06-0.18	/	0.27-0.63	≤0.035	≤0.035	/	/	/	≥325	≥180	≥35

Standard	Grade	Chemical Composition(%)								Mechanical Properties		
		c	Si	Mn	P	S	Mo	Cr	V	Tensile STrength(Mpa)	Yield STrength(Mpa)	Elongation(%)
ASTM A192	A192	0.06-0.18	≤0.25	0.27-0.63	≤0.035	≤0.035	/	/	/	≥325	≥180	≥35

Standard	Grade	Chemical Composition(%)					Mechanical Properties		
		c	Si	Mn	P	S	Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation (%)
Dn1629	St37	≤ 0.17	-	-	≤ 0.04	≤ 0.04	350-480	≥ 235	≥ 25
	St44	≤ 0.21	-	-	≤ 0.04	≤ 0.04	420-550	≥ 275	≥ 21
	St52	≤ 0.22	≤ 0.55	≤ 1.60	≤ 0.04	≤ 0.035	500-650	≥ 355	≥ 21

Standard	Grade	Chemical Composition(%)					Mechanical Properties		
		c	Si	Mn	P	S	Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation (%)
DIN17175	St35.8	≤0.17	0.10-0.35	0.40-0.80	≤ 0.030	≤ 0.030	360-480	≥235	≥25
	St45.8	≤0.21	0.10-0.35	0.40-1.20	≤ 0.030	≤ 0.030	410-530	≥255	≥21

Standard	Grade	Chemical Composition(%)				Tensile STrength(min)	Yield Strength(min)
		c	Mn	P	S	Mpa	Mpa
API 5L PSL1	A	0.22	0.90	0.030	0.030	335	210
	B	0.28	1.20	0.030	0.030	415	245
	X42	0.28	1.30	0.030	0.030	415	290
	X46	0.28	1.40	0.030	0.030	435	320
	X52	0.28	1. 40	0.030	0.030	460	360
	X56	0.28	1.40	0.030	0.030	490	390
	X60	0.28	1.40	0.030	0.030	520	415
	X65	0.28	1.40	0.030	0.030	535	450
	X70	0.28	1.40	0.030	0.030	570	485

Standard	Grade	Chemical Composition(%)				Tensile STrength	Yield Strength
		c	Mn	P	S	Mpa	Mpa
API 5L PSL2	B	0.24	1.20	0.025	0.015	415-655	245-450
	X42	0.24	1.30	0.025	0.015	415-655	290-495
	X46	0.24	1.40	0.025	0.015	435-655	320-525
	X52	0.24	1. 40	0.025	0.015	460-760	360-530
	X56	0.24	1. 40	0.025	0.015	490-760	390-545
	X60	0.24	1. 40	0.025	0.015	520-760	415-565
	X65	0.24	1.40	0.025	0.015	535-760	450-600
	X70	0.24	1.40	0.025	0.015	570-760	485-635
	X80	0.24	1. 40	0.025	0.015	625-825	555-705

DIMENSION TOLERANCES OF SEAMLESS STEEL PIPE

Types	Types		Uses
Hot rolled	OD	<50	±0.50mm
		≥50	±1%
	WT	<4	±12. 5%
		≥4~20	+15%, - 12. 5%
		>20	±12. 5%
Cold drawn	OD	6~10	±0. 20mm
		10~30	±0. 40mm
		30~50	±0. 45
		>50	±1%
	WT	≤1	±0. 15mm
		>1~3	+15%, - 10%
		>3	+12.5%, - 10%

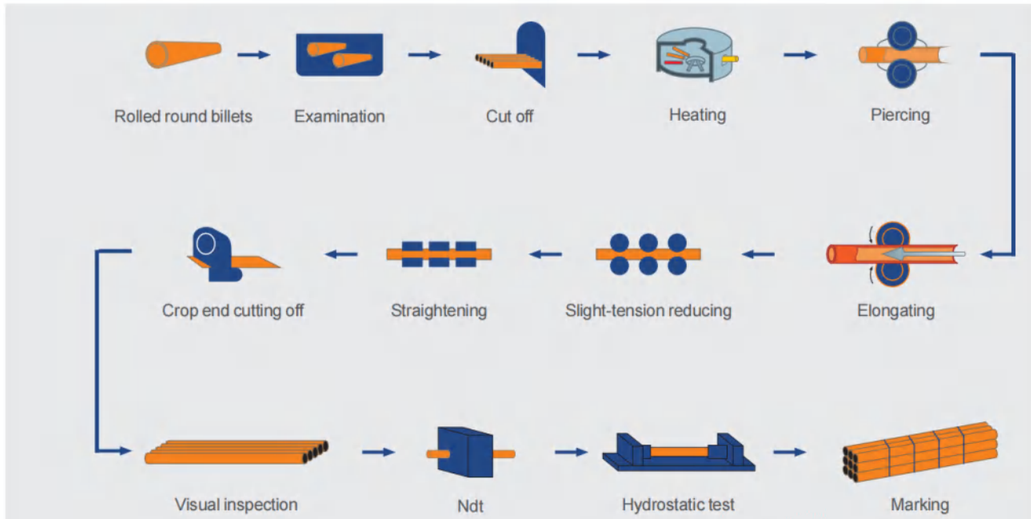
SPECIFICATIONS OF SEAMLESS STEEL PIPE

Types	Wall Thickness (mm)																												
mm	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
73																														
76.1																														
82.5																														
88.9																														
101.6																														
114.3																														
127																														
139.7																														
152.4																														
159																														
168.3																														
177.8																														
193.7																														
203																														
219.1																														
244.5																														
273																														
298.5																														
323.8																														
339.7																														
355.6																														
406.4																														
457.2																														
473.1																														
508																														
530																														
558.8																														
609.6																														
630																														

Hot Rolled

Round Pipe Billet → Heating → Punching → Three-Roller Skew Rolling → Annealing →Acid Pickling →Coating Oil (Copper Plating) → Multi-pass Cold Drawing or ColdRolling → Pipe Billet → Heat Treatment → Straightening → Hydrostatic Test or Inspection → Marking → Warehousing

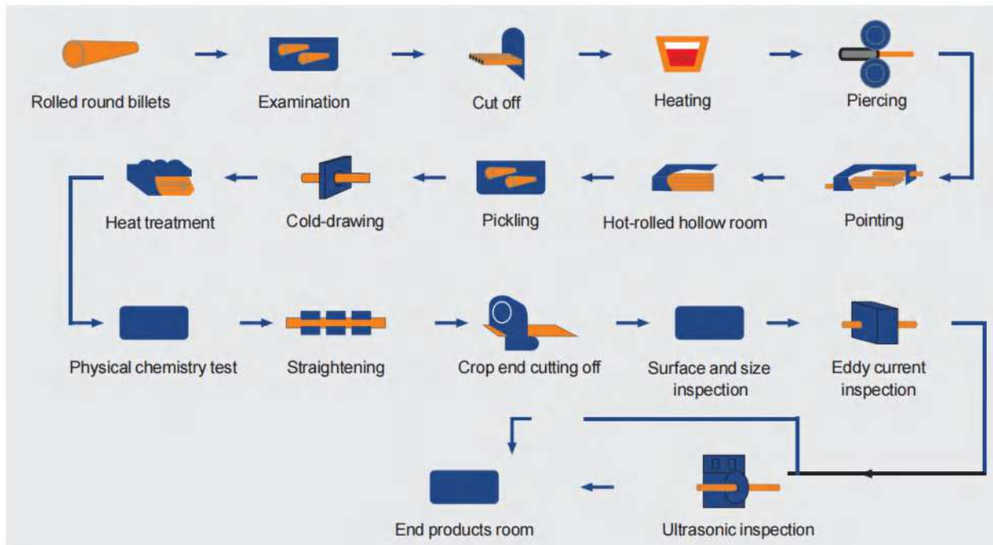
HOT ROLLED PROCESS OF SEAMLESS STEEL PIPE



Cold Drawn

Round Pipe Billet → Heating → Punching → Pipe Head Treatment → Annealing →Acid Pickling → Coating Oil (Copper Plating) → Multi-pass Cold Drawing or Cold Rolling → Pipe Billet → Heat Treatment → Straightening → Hydrostatic Test or Inspection → Marking → Warehousing

COLD DRAWN PROCESS OF SEAMLESS STEEL PIPE



TUBING& CASING

Standard:API 5CT
A pplication:Used in the oil well extracting the petroleum or the natural gas

MECHANICAL PROPERTIES

Group	Grade	Type	Total elongation under load %	Yield strength Mpa		Tensile strength min Mpa	C Type of end-finish	
				min	max		HRC	HBW
1	2	3	4	5	6	7	8	9
1	J55	-	0.5	379	552	517	-	-
	K55	-	0.5	379	552	655	-	-
	N80	1	0.5	552	758	689	-	-
	N80	Q	0.5	552	758	689	-	-
2	L80	1	0.5	552	655	655	23	241
	L80	9Cr	0.5	552	655	655	23	241
	L80	13Cr	0.5	552	655	655	23	241
	C90	1?2	0.5	621	724	689	25.4	255
	C95	-	0.5	655	758	724	-	-
	T95	1?2	0.5	655	758	724	25.4	255
3	P110	-	0.6	758	965	862	-	-
4	Q125	All	0.65	862	1034	931	-	-

API CASING LIST
SIZES,MASSES,WALL THICKNESS,GRADE AND APPLICABLE END FINISH

Labels[a]		Outside diameter D mm	Nominal linear mass T&C kg/m	Wall thickness T mm	Type of end-finish[d]								
1	2				H40	J55 K55	M65	L80 R95	N80 Type 1, Q	C90 T95	C110	P110	Q125
1	2	3	4	5	6	7	8	9	10	11	12	13	14
7-5/8	24.00	193,68	35,72	7,62	PS	-	-	-	-	-	-	-	-
7-5/8	26.40	193,68	39,29	8,33	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-
7-5/8	29.70	193,68	44,20	9,52	-	-	PLB	PLB	PLB	PLB	P	PLB	-
7-5/8	33.70	193,68	50,15	10,92	-	-	PLB	PLB	PLB	PLB	P	PLB	-
7-5/8	39.00	193,68	58,04	12,70	-	-	-	PLB	PLB	PLB	P	PLB	PLB
7-5/8	42.80	193,68	63,69	14,27	-	-	-	PLB	PLB	PLB	P	PLB	PLB
7-5/8	45.30	193,68	67,41	15,11	-	-	-	PLB	PLB	PLB	P	PLB	PLB
7-5/8	47.10	193,68	70,09	15,88	-	-	-	PLB	PLB	PLB	P	PLB	PLB
7-5/8	51.20	193,68	76,19	17,45	-	-	-	-	-	P	P	-	-
7-5/8	55.30	193,68	82,30	19,05	-	-	-	-	-	P	P	-	-
7-3/4	46.10	196,85	68,60	15,11	-	-	-	P	P	P	P	P	P
8-5/8	24.00	219,08	35,72	6,71	-	PS	PS	-	-	-	-	-	-
8-5/8	28.00	219,08	41,67	7,72	PS	-	PS	-	-	-	-	-	-
8-5/8	32.00	219,08	47,62	8,94	PS	PSLB	PSLB	-	-	-	-	-	-
8-5/8	36.00	219,08	53,57	10,16	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-
8-5/8	40.00	219,08	59,53	11,43	-	-	PLB	PLB	PLB	PLB	P	PLB	-
8-5/8	44.00	219,08	65,48	12,70	-	-	-	PLB	PLB	PLB	P	PLB	-
8-5/8	49.00	219,08	72,92	14,15	-	-	-	PLB	PLB	PLB	P	PLB	PLB
9-5/8	32.30	244,48	48,07	7,92	PS	-	-	-	-	-	-	-	-
9-5/8	36.00	244,48	53,57	8,94	PS	PSLB	PSLB	-	-	-	-	-	-
9-5/8	40.00	244,48	59,53	10,03	-	PSLB	PSLB	PLB	PLB	PLB	P	-	-
9-5/8	43.50	244,48	64,73	11,05	-	-	PLB	PLB	PLB	PLB	P	PLB	-
9-5/8	47.00	244,48	69,94	11,99	-	-	PLB	PLB	PLB	PLB	P	PLB	PLB
9-5/8	53.50	244,48	79,62	13,84	-	-	-	PLB	PLB	PLB	P	PLB	PLB
9-5/8	58.40	244,48	86,91	15,11	-	-	-	PLB	PLB	PLB	P	PLB	PLB
9-5/8	59.40	244,48	88,40	15,47	-	-	-	-	-	P	P	-	-
9-5/8	64.90	244,48	96,58	17,07	-	-	-	-	-	P	P	-	-
9-5/8	70.30	244,48	104,62	18,64	-	-	-	-	-	P	P	-	-
9-5/8	75.60	244,48	112,50	20,24	-	-	-	-	-	P	P	-	-
10-3/4	32.75	273,05	48,74	7,09	PS	-	-	-	-	-	-	-	-
10-3/4	40.50	273,05	60,27	8,89	PS	PSB	PSB	-	-	-	-	-	-
10-3/4	45.50	273,05	67,71	10,16	-	PSB	PSB	-	-	-	-	-	-

See notes at end of table.

Labels[a]		Outside diameter D mm	Nominal linear mass T&C kg/m	Wall thickness T mm	Type of end-finish[d]								
1	2				H40	J55 K55	M65	L80 R95	N80 Type 1, Q	C90 T95	C110	P110	Q125
1	2	3	4	5	6	7	8	9	10	11	12	13	14
10-3/4	51.00	273,05	75,90	11,43	-	PSB	PSB	PSB	PSB	PSB	P	PSB	-
10-3/4	55.50	273,05	82,59	12,57	-	-	PSB	PSB	PSB	PSB	P	PSB	-
10-3/4	60.70	273,05	90,33	13,84	-	-	-	-	-	PSB	P	PSB	PSB
10-3/4	65.70	273,05	97,77	15,11	-	-	-	-	-	PSB	P	PSB	PSB
10-3/4	73.20	273,05	108,93	17,07	-	-	-	-	-	P	P	-	-
10-3/4	79.20	273,05	117,86	18,64	-	-	-	-	-	P	P	-	-
10-3/4	85.30	273,05	126,94	20,24	-	-	-	-	-	P	P	-	-
11-3/4	42.00	298,45	62,50	8,46	PS	-	-	-	-	-	-	-	-
11-3/4	47.00	298,45	69,94	9,53	-	PSB	PSB	-	-	-	-	-	-
11-3/4	54.00	298,45	80,36	11,05	-	PSB	PSB	-	-	-	-	-	-
11-3/4	60.00	298,45	89,29	12,42	-	PSB	PSB	PSB	PSB	PSB	P	PSB	PSB
11-3/4	65.00	298,45	96,73	13,56	-	-	-	P	P	P	P	P	P
11-3/4	71.00	298,45	105,66	14,78	-	-	-	P	P	P	P	P	P
13-3/8	48.00	339,72	71,43	8,38	PS	-	-	-	-	-	-	-	-
13-3/8	54.50	339,72	81,10	9,65	-	PSB	PSB	-	-	-	-	-	-
13-3/8	61.00	339,72	90,78	10,92	-	PSB	PSB	-	-	-	-	-	-
13-3/8	68.00	339,72	101,19	12,19	-	PSB	PSB	PSB	PSB	PSB	P	PSB	PSB
13-3/8	72.00	339,72	107,15	13,06	-	-	-	PSB	PSB	PSB	P	PSB	-
16	65.00	406,40	96,73	9,53	PS	-	-	-	-	-	-	-	-
16	75.00	406,40	111,61	11,13	-	PSB	PSB	-	-	-	-	-	-
16	84.00	406,40	125,01	12,57	-	PSB	PSB	-	-	-	-	-	P
16	109.00	406,40	162,21	16,66	-	P	-	P	P	-	-	P	-
18-5/8	87.50	473,08	130,21	11,05	PS	PSB	PSB	-	-	-	-	-	-
20	94.00	508,00	139,89	11,13	PSL	PSLB	PSLB	-	-	-	-	-	-
20	106.50	508,00	158,49	12,70	-	PSLB	PSLB	-	-	-	-	-	-
20	133.00	508,00	197,93	16,13	-	PSLB	-	-	-	-	-	-	

P=Plain-end, S=Short round thread, L=Long round thread, B=Buttress thread.

a.Labels are for information and assistance in ordering.
b.Nominal linear masses (col. 4) are shown for information only.
c.The densities of martensitic chromium steels (L80 Types 9Cr and 13Cr) are different from carbon steels. The masses shown are therefore not accurate for martensitic chromium steels. A mass correction factor of 0,989 may be used.
d.Buttress casing is available with regular, special clearance couplings or special clearance couplings with special bevel.

湖南巨盛管业有限公司
HYDROGRAND Steel Pipe Co.,Ltd.

API 5CT TUBING

MECHANICAL PROPERTIES

Group	Grade	Type	Total elongation under load %	Yield strength Mpa		Tensile strength min Mpa	Hardness max	
				min	max		HRC	HRC
1	2	3	4	5	6	7	8	9
1	J55	-	0.5	379	552	517	-	-
	K55	-	0.5	379	552	655	-	-
	N8O	1	0.5	552	758	689	-	-
	N8O	Q	0.5	552	758	689	-	-
	L80	1	0.5	552	655	655	23	24 1
2	L80	9Cr	0.5	552	655	655	23	24 1
	L80	13Cr	0.5	552	655	655	23	24 1
	C90	1?2	0.5	621	724	689	25.4	255
	C95	-	0.5	655	758	724	-	-
	T95	1 ?2	0.5	655	758	724	25.4	255
3	P110	-	0.6	758	965	862	-	-
4	Q125	All	0.65	862	1034	931	-	-

CHEMICAL COMPOSITION

Grade	Chemical Composition(%)								
	C(max)	Mn(max)	Mo(max)	Cr(max)	Ni(max)	Cu(max)	P(max)	S(max)	Si(max)
J55	-	-	-	-	-	-	0.030	0.030	-
K55	-	-	-	-	-	-	0.030	0.030	-
N8O	-	-	-	-	-	-	0.030	0.030	-0.45
L80-1	0.43	1.90	-	-	0.25	0.35	0.030	0.030	-
C90-1	0.35	1.00	0.75	1.20	0.99	-	0.020	0.010	-
C90-2	0.50	1.90	N.L	-	0.99	-	0.030	0.010	0.45
C95	0.45	1.90	0.85	N.L	-	-	0.030	0.030	-
P110	0.35	1.20	-	1.50	0.99	-	0.020	0.010	-
T95-1	0.50	1.90	-	-	-	-	0.030	0.010	-
T95-2	-	-	-	-	-	-	0.030	0.030	-
M65	-	-	-	-	-	-	0.020	0.010	-
BG80S	-	-	-	-	-	-	0.020	0.010	-
BG80T	-	-	-	-	-	-	0.030	0.030	-
BG110T	-	-	-	-	-	-	0.030	0.030	-

MECHANICAL PROPERTIES

Grade	Yield Strength				Tensile Strength		Hardness		Allowab Hardnes
	Min		Max		Min		Max		
	Psi	Mpa	Psi	Mpa	Psi	Mpa	HRC	HBW	HRC
J55	55.000	379	80.000	552	75.000	517	-	-	-
K55	55.000	379	80.000	552	95.000	655	-	-	-
N80	80.000	552	110.000	758	100.000	689	-	-	-
L80-1	80.000	552	95.000	655	95.000	655	23	241	-
C90	90.000	621	105.000	724	100.000	689	25.4	255	3.0
C95	95.000	655	110.000	758	105.000	724	-	-	-
T95	95.000	655	110.000	758	125.000	724	25.4	255	3.0
P110	110.000	758	140.000	965	100.000	862	-	-	-
M65	65.000	448	85.000	586	85.000	586	22	235	-
BG80S	83.000	570	99.000	680	100.000	689	23	241	-
BG80T	80.000	552	110.000	758	100.000	689	-	-	-
BG110T	110.000	758	140.000	965	125.000	862	-	-	-

API TUBING LIST
SIZES, MASSES, WALL THICKNESS, GRADE AND APPLICABLE END-FINISH

Labels				Outside diameter D mm	Nominal linear masses [a,b]			Wall thick-ness	Type of end finish I I						
1	2				Nonupset T&C kg/m	Ext. upset T&C kg/m	Integ-joint kg/m		H40	J55	L80 R95	N80 Type 1,Q	P90	T95	P110
	NU T&C	EU T&C	IJ												
1.900	2.40	-	2.40	48,26	-	-	3.57	3,18	PI	PI	-	-	-	-	-
1.900	2.75	2.90	2.76	48,26	4,09	4.32	4.11	3,68	PNUI	PNUI	PNUI	PNUI	PNUI	PNUI	-
1.900	3.65	3.73	-	48,26	5,43	5.55	-	5,08	PU	PU	PU	PU	PU	PU	PU
1.900	4.42	-	-	48,26	6,58	-	-	6,35	-	-	P	-	P	P	-
1.900	5.15	-	-	48,26	7,66	-	-	7 ,62	-	-	P	-	P	P	-
2.063	3.24	-	3.25	52,40	-	-	4.84	3,96	PI	PI	PI	PI	PI	PI	-
2.063	4.50	-	-	52,40	-	-	-	5,72	P	P	P	P	P	P	p
2-3/8	4.00	-	-	60,32	5,95	-	-	4,24	PN	PN	PN	PN	PN	PN	-
2-3/8	4.60	4.70	-	60,32	6,85	6.99	-	4,83	PNU	PNU	PNU	PNU	PNU	PNU	PNU
2-3/8	5.80	5.95	-	60,32	8,63	8.85	-	6,45	-	-	PNU	PNU	PNU	PNU	PNU
2-3/8	6.60	-	-	60,32	9,82	-	-	7 ,49	-	-	P	-	P	P	-
2-3/8	7.35	7.45	-	60,32	10 ,94	11.09	-	8,53	-	-	PU	-	PU	PU	-
2-7/8	6.40	6.50	-	73,02	9,52	9.67	-	5,51	PUN	PUN	PNU	PNU	PNU	PNU	PNU
2-7/8	7.80	7.90	-	73,02	11,61	11.76	-	7,01	-	-	PNU	PNU	PNU	PNU	PNU
2-7/8	8.60	8.70	-	73,02	12,80	12.95	-	7 ,82	-	-	PNU	PNU	PNU	PNU	PNU
2-7/8	9.35	9.45	-	73,02	13,91	14.06	-	8,64	-	-	PU	-	PU	PU	-
2-7/8	10.50	-	-	73,02	15,63	-	-	9,96	-	-	P	-	P	P	-
2-7/8	11.50	-	-	73,02	17,11	-	-	11,18	-	-	P	-	P	P	-
3-1/2	7.70	-	-	88,90	11,46.	-	-	5,49	PN	PN	PN	PN	PN	PN	-
3-1/2	9.20	9.30	-	88,90	13,69	13.84	-	6,45	PNU	PNU	PNU	PNU	PNU	PNU	PNU
3-1/2	10.20	-	-	88,90	15,18	-	-	7,34	PN	PN	PN	PN	PN	PN	-
3-1/2	12.70	12.95	-	88,90	18,90	19.27	-	9,52	-	-	PNU	PNU	PNU	PNU	PNU
3-1/2	14.30	-	-	88,90	21,28	-	-	10,92	-	-	P	-	P	P	-
3-1/2	15.50	-	-	88,90	23,07	-	-	12,09	-	-	P	-	P	P	-
3-1/2	17.00	-	-	88,90	25 ,30	-	-	13,46	-	-	P	-	P	P	-
4	9.50	-	-	101 ,60	14,14	-	-	5,74	PN	PN	PN	PN	PN	PN	-
4	10.70	11.00	-	101,60	-	16.37	-	6,65	PU	PU	PU	PU	PU	PU	-
4	13.20	-	-	101,60	19,64	-	-	8,38	-	-	P	-	P	P	-
4	16.10	-	-	101,60	23,96	-	-	10,54	-	-	P	-	P	P	-
4	18.90	-	-	101,60	28,13	-	-	12,70	-	-	P	-	P	P	-
4	22.20	-	-	101 ,60	33,04	-	-	15,49	-	-	P	-	P	P	-
4-1/2	12.60	12.75	-	114,30	18,75	18.97	-	6,88	PNU	PNU	PNU	PNU	PNU	PNU	-
4-1/2	15.20	-	-	114,30	22,62	-	-	8,56	-	-	P	-	P	P	-
4-1/2	17.00	-	-	114.30	25,30	-	-	9,65	-	-	P	-	P	P	-
4-1/2	18.90	-	-	114,30	28,13	-	-	10,92	-	-	P	-	P	P	-
4-1/2	21.50	-	-	114, ,30	32,00	-	-	12,70	-	-	P	-	P	P	-
4-1/2	23.70	-	-	114,30	35,27	-	-	14,22	-	-	P	-	P	P	-
4-1/2	26.10	-	-	114,30	38 ,84	-	-	16,00	-	-	P	-	P	P	-

P = Plain-end, N = Non-upset threaded and coupled, U = External upset threaded and coupled, I = Integral joint.

a Nominal linear masses (col. 6, 7, 8) are shown for information only.
b The densities of martensitic chromium steels (L80 types 9Cr and 13Cr) are different from carbon steels. The masses shown are therefore not accurate for martensitic chromium steels. A mass correction factor of 0,989 may be used.

DIMENSIONS AND TOLERANCES

Item		Tolerance	
		OD≤101.60mm10.79mm	
Out Diameter	Pipe Body	OD≥114.30mm	11.58-12.80m
			-0.5%OD
	Coupling	±1 % OD	
Wall Thickness		-12.5%T	
	Single Lengths	+6.5%	
Weight		-3.5%	
	Carload Lots	-1.75%	

LENGTHS

Item	R1 (Range)	R2 (Range)	R3(Range)
Tubing	6.10-7.32m	8.53-9.75m	11.58-12.80m
Casing	4.88-7.62m	7.62-10.36m	10.36-14.36m

DRILL PIPE

Standard:API 5D

Application: For well drilling

DIMENSIONS AND TOLERANCES

Item		Tolerance	
		OD≤101.60mm10.79mm	
Out Diameter	Pipe Body	OD≥114.30mm	1.0%OD
			-0.5%OD
	Coupling	±1 % OD	
Wall Thickness		-12.5%T	
Weight	Single Lengths	+6.5%	
		-3.5%	
	Carload Lots	-1.75%	

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

Grade	Chemical Components		Mechanical Properties	
	P	S	Yield Strength(Mpa)	Tensile Strength(Mpa)
E-75	≤0.020	≤0.015	517-724	≥689
X-95	≤0.020	≤0.015	655-862	≥724
G-105	≤0.020	≤0.015	724-931	≥793
S-135	≤0.020	≤0.015	931-1138	≥1000

PETROLEUM CRACKING TUBE

Application:GB9948-1988

Application:For manufacturing of furnace tubes, heat exchangers and pipelines in refineries

TOLERANCE ON DIMENSIONS

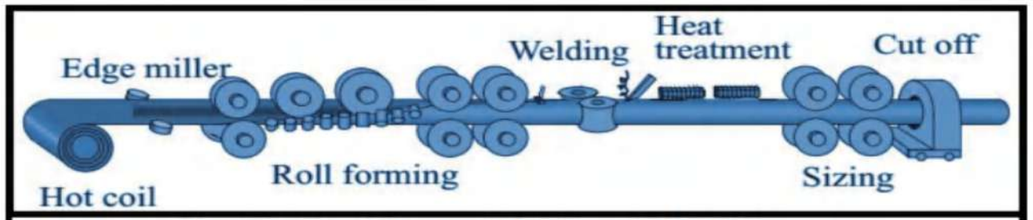
Pipe types	Pipe Szie (mm)		Tolerances
Hot rolled	OD	≤ 159	±1.0%
	WT	>159	±1.20%
Cold drawn	OD	≤ 20	±12.5%
		>20	±10.0%
		≤ 30	±0.20mm
		30-50	±0.30mm
	WT	>50	±0.8%
		≤ 3	+12% - 10%
		>3	±10%

CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

Grade	Chemical composition								Mechanical Properties		
	C	Mn	Si	Cr	Mo	Ni	S	P	Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation (%)
10	0.07-0.14	0.35-0.65	0.17-0.37	≤ 0.15	–	≤ 0.25	≤ 0.035	≤ 0.035	330-490	≥ 205	≥ 24
20	0.17-0.24	0.35-0.65	0.17-0.37	≤ 0.25	–	≤ 0.25	≤ 0.035	≤ 0.035	410-550	≥ 245	≥ 21
12CrMo	0.08-0.15	0.40-0.70	0.17-0.37	0.40-0.70	0.40-0.55	≤ 0.30	≤ 0.035	≤ 0.035	410-560	≥ 205	≥ 21
15CrMo	0.12-0.18	0.40-0.70	0.17-0.37	0.80-1.10	0.40-0.55	≤ 0.30	≤ 0.035	≤ 0.035	440-640	≥ 235	≥ 21
1Cr2Mo	≤ 0.15	0.30-0.60	0.50-1.00	2.15-2.85	0.40-0.65	-	≤ 0.035	≤ 0.035	≥390	≥ 175	≥ 22
1Cr5Mo	≤ 0.15	≤ 0.60	≤ 0.60	4.00-6.00	0.45-0.60	≤ 0.60	≤ 0.035	≤ 0.035	≥390	≥ 195	≥ 22

ERW STEEL PIPE

In Electric Resistance Welding (ERW) process, pipe is manufactured by cold-forming a flat sheet of steel into a cylindrical shape. Then current is passed between the two edges of the steel cylinder to heat the steel to a point at which the edges are forced together to form a bond without the use of welding filler material.



Electric Resistance Welding (ERW) Process

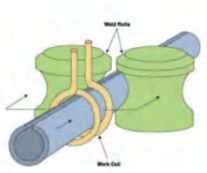
Several Electric Resistance Welding (ERW) processes are available for pipe production. The two main types of ERW are:

- High Frequency Welding
- Rotary Contact Wheel Welding

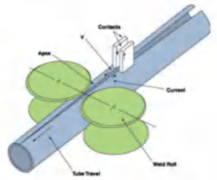
Initially ERW manufacturing process used low frequency A.C. current to heat the edges. This low frequency process was used from the 1920’ s until 1970. In 1970, the low frequency process was superseded by a high frequency ERW process which produced a higher quality weld. Over time, the welds of low frequency ERW pipe was found to be susceptible to selective seam corrosion, hook cracks, and inadequate bonding of the seams, so low frequency ERW is no longer used to manufacture pipe. The high frequency ERW process is still being used in pipe manufacturing.There are two types of High Frequency ERW processes.

High Frequency Induction Welding
High Frequency Contact Welding

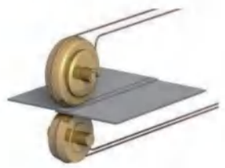
In High Frequency Induction Welding, the weld current is transmitted to the material through a work coil in front of the weld point. The work coil does not contact the pipe. The electrical current is induced into the pipe material through magnetic fields that surround the pipe. High frequency induction welding eliminates contact marks and reduces the setup required when changing pipe size.



High Frequency Induction Welding



High Frequency Contact Welding

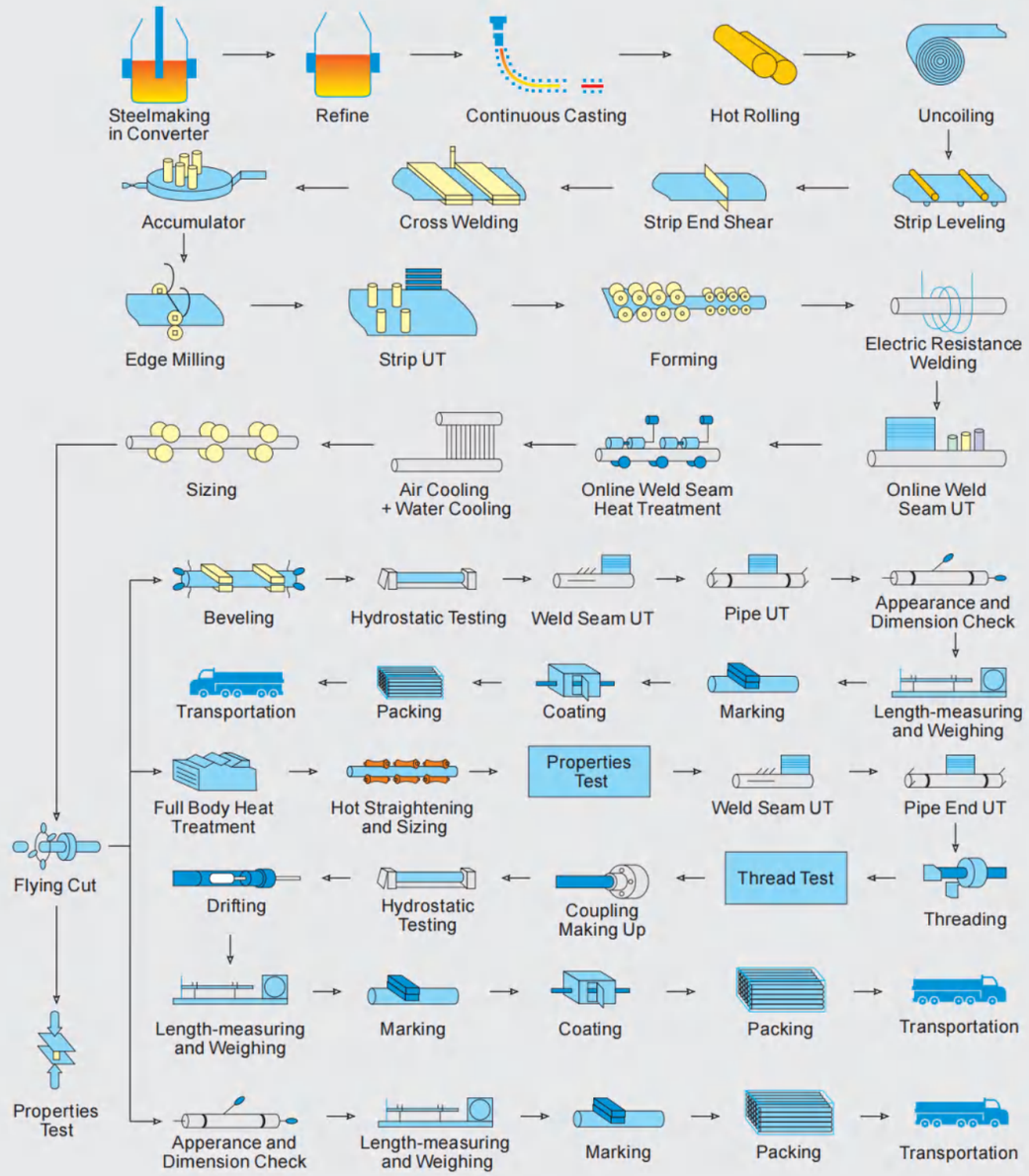


Rotary Contact Welding

In Rotary Contact Wheel Welding, the electrical current is transmitted through a contact wheel at the weld point. The contact wheel also applies some of the forge pressure necessary for the welding process. The three main types of rotary contact wheel welders are AC, DC, and square wave. In all three power supplies, electrical current is transferred by brush assemblies that engage slip rings attached to a rotating shaft that supports the contact wheels. These contact wheels transfer the current to the strip edges.

PROCESS

Rotary contact welding is useful for applications that cannot accommodate an impeder inside the pipe or tube. Examples of this are small-diameter refrigeration grade tube and tube that is painted on the ID immediately after the welding process.



ERW STEEL PIPE



SPECIFICATIONS OF ERW STEEL PIPE

Wall Thickess / Out Diameter		Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
Inch	mm	8 5/8	219.1	10 3/4	273.1	12 3/4	323.9	14	355.6	16	406	18	457	20	508	22	559	24	610
0.157	4																		
0.173	4.4																		
0.205	5.2																		
0.22	5.6																		
0.25	6.4																		
0.28	7.1																		
0.312	7.9																		
0.344	8.7																		
0.375	9.5																		
0.406	10.3																		
0.5	12.7																		
0.562	14.3																		
0.625	15.9																		
0.688	17.5																		
0.75	19.1																		

TOLERANCE OF DIMENSION

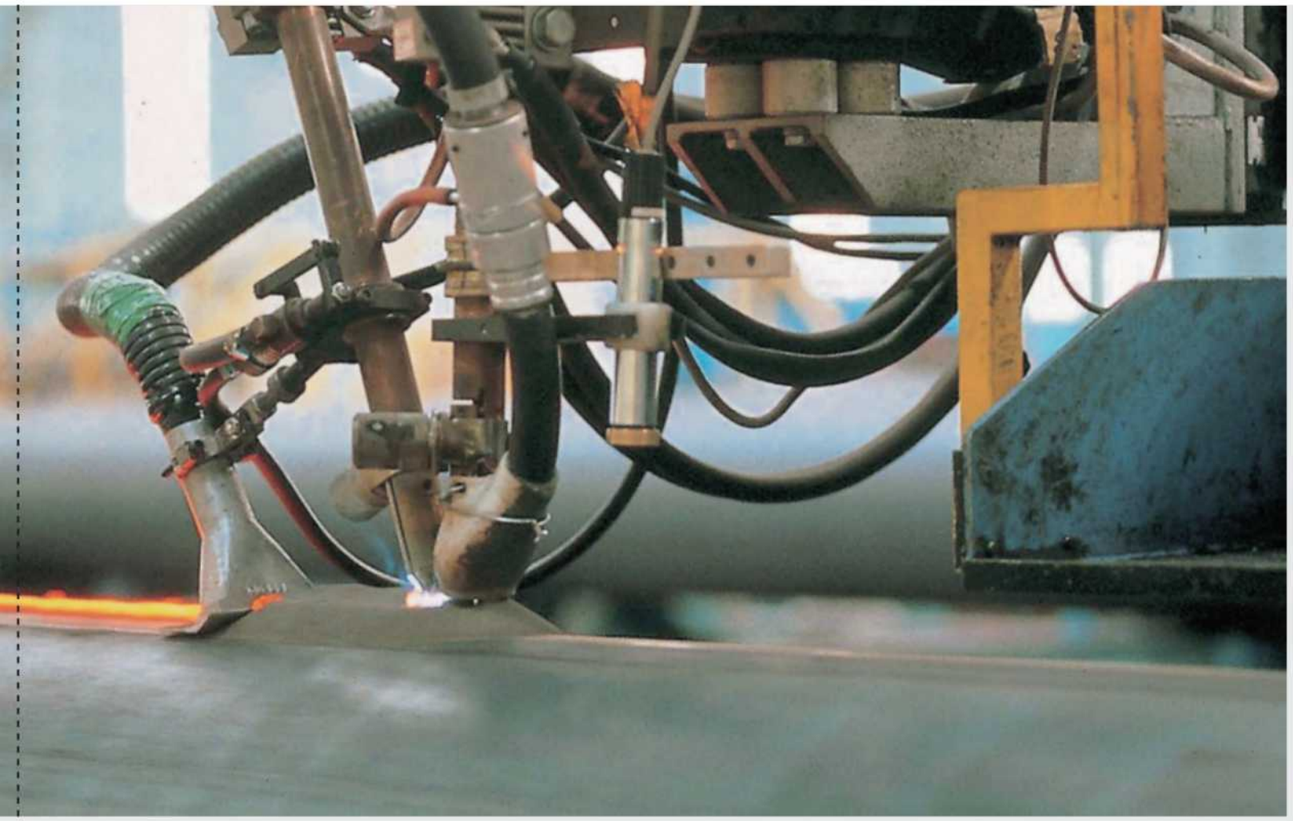
Standard	Out Diameter	Tolerance of Pipe End	Tolerance of Pipe Body
API 5L	219.1~273.1	+1.6mm, -0. 4mm	±0.75%
	274.0~320	+2.4mm, -0. 8mm	±0.75%
	323.9~457	+2.4mm, -0. 8mm	±0.75%
	508	+2.4mm, -0. 8mm	±0.75%
	559~610	+2.4mm, -0. 8mm	±0.75%


TOLERANCE OF WALL THICKNESS

Standard	Grade	Out Diameter	atll Thickne
API 5L	/	219.1~457	+15%, -12.5%
	B	508~610	+17.5%, -12.5%
	X42-X80	508~610	+19.5%, -8%

CHEMICAL ANALYSIS AND MECHANICAL PROPERTIES

Standard	Class	Grade	Chemical Analysis(%)				Mechanical Prop	
			C	Mn	P	S	Tensile Strength (Mpa)	Yield Strength (Mpa)
API 5L	PSL1	B	0.26	1.20	0.030	0.030	≥415	≥245
		X42	0.26	1.30	0.030	0.030	≥415	≥290
		X46	0.26	1.40	0.030	0.030	≥435	≥320
		X52	0.26	1.40	0.030	0.030	≥460	≥360
		X56	0.26	1.40	0.030	0.030	≥490	≥390
		X60	0.26	1.40	0.030	0.030	≥520	≥415
		X65	0.26	1.45	0.030	0.030	≥535	≥450
		X70	0.26	1.65	0.030	0.030	≥570	≥485
	PSL2	B	0.22	1.20	0.025	0.015	415-655	245-450
		X42	0.22	1.30	0.025	0.015	415-655	290-495
		X46	0.22	1.40	0.025	0.015	435-655	320-525
		X52	0.22	1.40	0.025	0.015	460-760	360-530
		X56	0.22	1.40	0.025	0.015	490-760	390-545
		X60	0.22	1.40	0.025	0.015	520-760	415-565
		X65	0.22	1.45	0.025	0.015	535-760	450-600
		X70	0.22	1.65	0.025	0.015	570-760	485-635
		X80	0.22	1.85	0.025	0.015	625-825	555-705



LSAW STEEL PIPE

In Longitudinal Submerged Arc Welding (LSAW) Process, longitudinal edges of steel plates are first beveled using carbide milling equipment. Beveled plates are then formed into a U shape using a U-press and subsequently into an O shape using an O-press. Longitudinal edges of the plates are then tack welded followed by internal and external welds. Pipes manufactured by this process are subjected to expanding operation in order to relieve internal stresses and obtain a perfect dimensional tolerance. After the pipes are conveyed to cold expansion, hydrostatic testing and NDT inspection, the pipes will be subject to final inspection.

The LSAW pipe diameter range is larger than ERW, normally from 16 inch (406mm) to 60 inch (1500mm). Good performances on high pressure resistance, and low-temperature corrosion resistance.

MANUFACTURING PROCESS

LSAW STEELPIPE

SPECIFICATIONS OF LSAW STEEL PIPE

Out Diameter		Wall Thickness(mm)															
Inch	mm	6.4	7.1	7.9	9.53	12.7	14.3	15.9	19.1	22.2	25.4	28.6	31.8	34.9	38.1	41.3	44.5
16	406.4																
18	457																
20	508																
22	559																
24	610																
26	660																
28	7 11																
30	762																
32	813																
34	864																
36	914																
38	965																
40	1016																
42	1067																
44	111 8																
46	1168																
48	1219																
52	1321																
56	1422																

TOLERANCE OF OUTSIDE DIAMETER AND WALL THICKNESS

Standard	Standard					
	SY/T5040-2000	Y/T5037-2000	SY/T9711.1-197	ASTM A252	AWWA C200-9	API 5L PSL1
Tube end OD deviation	± 0.5%D	± 0.5%D	-0.79mm～+2.38m	<± 0.1%T	<± 0.1%T	± 1.6mm
Wall thickness	± 10.0%T	D<508mm, ±12.5%T D>508mm, ±10.0%T	- 8%T～+19.5%T	<- 12.5%T	-8%T～+19.5%T	5.0mm<T<15.0mm, ± T≥15.0mm, ±1.5m

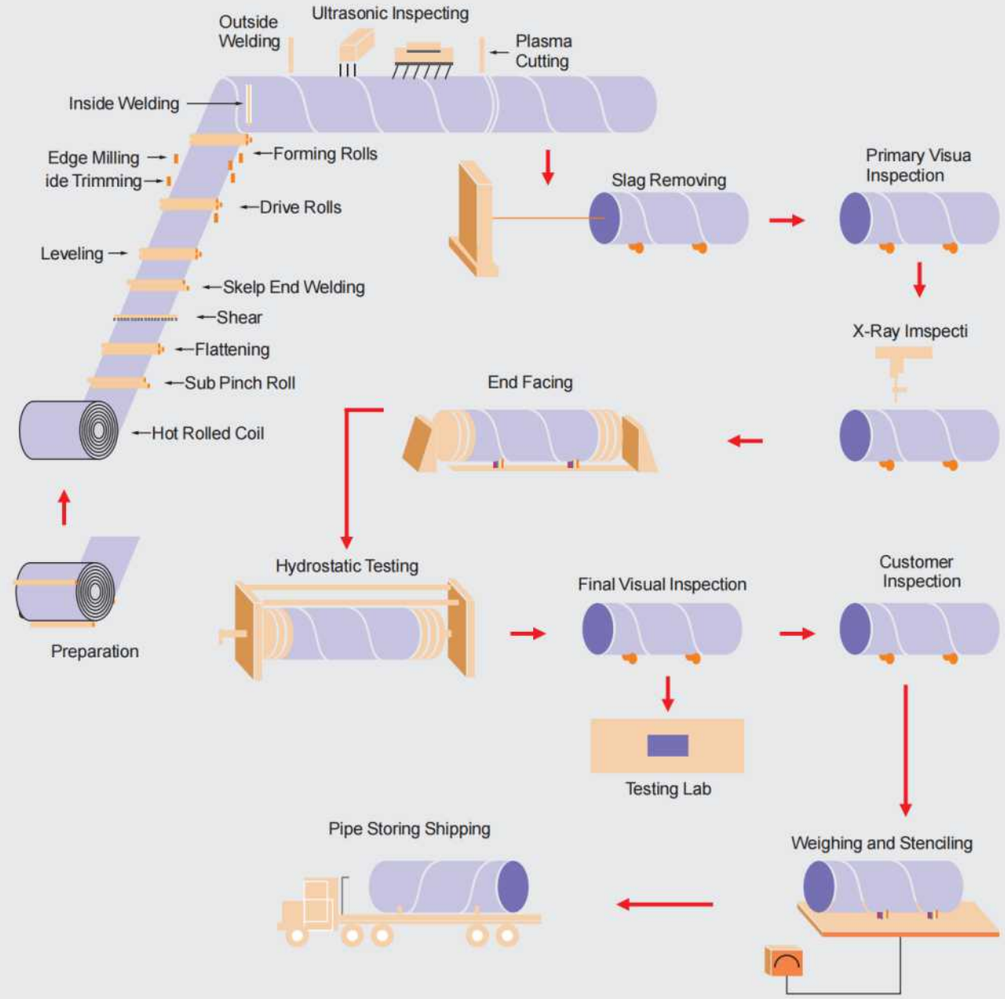
TOLERANCE OF OUTSIDE DIAMETER AND WALL THICKNESS

Standard	Grade	Chemical Composition(max)%					Mechanical Properties(min)	
		C	Mn	Si	S	P	Yield Strength(Mpa)	Tensile Strength(Mpa)
GB/T 700-2006	A	0.22	1.4	0.35	0.050	0.045	235	370
	B	0.2	1.4	0.35	0.045	0.045	235	370
	C	0.17	1.4	0.35	0.040	0.040	235	370
	D	0.17	1.4	0.35	0.035	0.035	235	370
GB/T 1591-2009	A	0.2	1.7	0.5	0.035	0.035	345	470
	B	0.2	1.7	0.5	0.030	0.030	345	470
	C	0.2	1.7	0.5	0.030	0.030	345	470
BS En10025	S235JR	0.17	1.4	-	0.035	0.035	235	360
	S275JR	0.21	1.5	-	0.035	0.035	275	410
	S355JR	0.24	1.6	-	0.035	0.035	355	470
DIN 17100	ST37-2	0.2	-	-	0.050	0.050	225	340
	ST44-2	0.21	-	-	0.050	0.050	265	410
	ST52-3	0.2	1.6	0.55	0.040	0.040	345	490
JIS G3101	SS400	-	-	-	0.050	0.050	235	400
	SS490	-	-	-	0.050	0.050	275	490
API 5L PSL1	A	0.22	0.9	-	0.03	0.03	210	335
	B	0.26	1.2	-	0.03	0.03	245	415
	X42	0.26	1.3	-	0.03	0.03	290	415
	X46	0.26	1.4	-	0.03	0.03	320	435
	X52	0.26	1.4	-	0.03	0.03	360	460
	X56	0.26	1.1	-	0.03	0.03	390	490
	X60	0.26	1.4	-	0.03	0.03	415	520
	X65	0.26	1 45	-	0.03	0.03	450	535
	X70	0.26	1.65	-	0.03	0.03	585	570

SSAW STEEL PIPE

In Spiral Submerged Arc Welding (SSAW) Process, also known as HSAW pipe, welding line shape like a helix. It is using thesame welding technology of Submerged Arc Welding with LSAW pipe. Only major difference being SSAW pipe is spiral welded whereas the LSAW is longitudinally welded. Manufacturing process is rolling the steel strip, to make the rolling direction have an angle with the direction of the pipe center, forming and welding, so the welding seam is in a spiral line.The SSAW pipe diameter range is from 8 inch (219 mm) to 137.8 inch (3500 mm).The advantage part is we can get the different diameter of SSAW pipes with the same size of the steel strip, there is a wide application for the raw material steel strip, and welding seam should avoid the primary stress, good performances to bear the stress. The disadvantage is the bad physical dimension, welding seam length is longer than the pipe length, easy to cause the defects of cracks, air hole, cinder inclusion, partial welding, welding force in pulling status.

PROCESS



SSAW STEEL PIPE

SSAW STEEL PIPE

SPECIFICATIONS OF SSAW STEEL PIPE

Out Diameter	Wall Thickness (mm)																				
mm	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
219.1																						
273																						
323.9																						
325																						
355.6																						
377																						
406.4																						
426																						
457																						
478																						
508																						
529																						
630																						
711																						
720																						
813																						
820																						
920																						
1020																						
1220																						
1420																						
1620																						
1820																						
2020																						
2220																						
2500																						
2540																						
3500																						

STANDARD

Classfication	Standard	Main Products
Steel Pipe for Fluid Service	GB/T 14291	Welded pipe for mine fluid sevice
	GB/T 3091	Welded pipe for low pressure fluid service
	SY/T 5037	Spirally submerged arc welded steel pipe for pipelines for low pressure fluid service
	ASTM A53	Black and hot-hipped galvanized welded and seamless steel pipe
	BS EN10217-2	Welded steel tybes for pressure purposes - delivery technical conditions - part2: Electric welded non- alloy and alloy steel tubes with specified elevated temperature properties
	BS EN10217-5	Welded steel tybes for pressure purposes - delivery technical conditions - part5: submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties
Steel Pipe for Ordinary Structure	GB/T 13793	Longitudinally electric resistance welded steel pipe
	SY/T 5040	Spirally submerged arc welded steel pipe piles
	ASTM A252	Welded and seamless steel pipe piles
	BS EN10219-1	Cold formed welded structural hollow sections of non-alloy and fine grain steels - part1: Technical delivert conditions
	BS EN10219-2	Cold formed welded structural hollow sections of non-alloy and fine grain steels - part2: tolerances dimmsions and sectional properties
Line Pipe	GB/T 9711.1	Steel pipe for pipeline transportation system of petroleum and natural gas industries(Class A steel pipe)
	GB/T 9711.2	Steel pipe for pipeline transportation system of petroleum and natural gas industries(Class A steel pipe)
	API 5L PSL 1/2	Line pipe
Casing	API 5CT/ ISO 11960 PSL1	Steel pipe for use as casing or tubing for wells of petroleum and natural gas industries

STAINLESS STEEL

Stainless steel is a family of iron-based alloys that contain a minimum of approximately 11% chromium,a composition that prevents the iron from rusting) as well as providing heat resistant properties. Different types of stainless steel include the elements carbon (from 0.03% to greater than 1.00%), nitrogen, aluminum, silicon, sulfur, titanium, nickel, copper, selenium, niobium, and molybdenum).Specific types of stainless steel are often designated by a three digit number, e.g., 304 stainless.

The resistance to ferric oxide formation results from the presence of the chromium in the alloy – specifically, from the propensity of the exposed chromium atoms to form an "invisible and adherent chromium-rich oxide film" that displays the further characteristic of being able to self-heal (reform the film in the presence of atmospheric oxygen, after its being disturbed). A variety of modifications to content can thereafter improve corrosion resistance even further, including:
increasing the chromium content to levels above 11%;
addition of 8% or higher amounts of nickel; and addition of molybdenum (which also improves resistance to "pitting corrosion").

Addition of nitrogen also improves resistance to pitting corrosion, and increases mechanical strength.Thus, there are numerous grades of stainless steel with varying chromium and molybdenum contents to suit the environment the alloy must endure.

Resistance to corrosion and staining, low maintenance, and familiar luster make stainless steel an ideal material for many applications where both the strength of steel and corrosion resistance are required.[citation needed] Moreover, stainless steel can be rolled into sheets, plates, bars, wire and tubing. [citation needed] These can be used in cookware, cutlery, surgical instruments, major appliances, construction material in large buildings, industrial equipment (e.g., in paper mills, chemical plants, water treatment), and storage tanks and tankers for chemicals and food products.The corrosion resistance, the ease with which the material can be steam-cleaned and sterilized, and absence of the need for surface coatings have prompted the use of stainless steel in kitchens and food processing plants.

STANDARD

GB	ASTM/ASME	JIS	DIN	EN
GB/T14975-2002	A213/A213M	G3446 G3447	DIN2462	EN10216-5
GB/T14976-2002	A249/A249M	G3448 G3459	DIN2463	EN10217-7
GB13296-2007	A312/A312M	G3463 G3468	DIN17457	
GB/T12771-2008	A269 A358		DIN17458	
GB/T12770-2000	A511 A688			
GB/T19228.2	A778 A789			
HG20537.2-92	A790			
HG20537.3-92	B163 B167			
HG20537.4-92	B338 B407			
SH3501-2002	B423 B444			
	B622 B668			
	B677 B829			

MATERIAL GRADE

AUSTENITIC	DUPLEX	NICKEL ALLOY	TI	FERRITE
304/L/H	S31500	600,625	Grade1	409L
310S/H	S32101	800,825	Grade2	439
316/L/H	S32003	400	Grade3	
317/L	S32304	N06985		
321/H	S31803	N10276		
347/H	S32205			
S30432	S32750			
S31042	S32760			
904L				
6Mo(S31254)				

PHYSICAL PROPERTIES OF STAINLESS STEEL

Designations		Density (kg/dmm³)	Modulus of elasticity (GPa)	Mean coefficient of thermal expansion (10⁻⁶·K⁻¹)		Thermal conductivity (W/m·K)	Specific heat (J/kg·K)	Electrical resistivity (Ω.mm²/m)
EN [№]	AISI/ASTM	at 20 C	at 20 C	20-200 C	20-400 C	at 20 C	at 20 C	at 20 C
Austenitic stainless steels								
1.4301	304	7.9	200	16.5	17.5	15	500	0.73
1.4401	316	8.0	200	16.5	17.5	15	500	0.75
Duplex stainless steels								
1. 4462	2205	7.8	200	13.5	14.0 (g)	15	500	0.80
1.4362	2304	7.8	200	13.5	14.0 (n)	15	500	0.80
1.4501		7.8	200	13.5	(n.r.)	15	500	0.80
Ferritic stainless steels								
1.4512	409	7.7	220	11.0	12.0	25	460	0.60
1.4016	430	7.7	220	10.0	10.5	25	460	0.60
Martensitic stainless steels								
1.4021	420	7.7	215	11.0	12.0	30	460	0.60
1.4418		7.7	200	10.8	10.6	15	430	0.60
Precipitation-hardened stainless steels								
1.4542	630	7.8	200	10.8	11.6	16	500	0.71

PIPE FITTING

FLANGE

Standard	
ASTM A105	For Carbon Steel Forgings for Piping Applications
ASTM A181	For Carbon Steel Forgings for general-purpose piping ; GR.60,GR70
ASTM A350	For Carbon and low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components; Blind flanges Steel material: LF1, LF2, CL1/CL2, LF3 CL1/CL2, LF5, LF6, LF9,
ASTM A694/ ASTM A694M-2016	For Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves, and Parts for High-Pressure Transmission Service; Blind flanges Steel material: A694 F42 F52 F60 F65, A516 Gr60, 65, 70
EN1092-1	Flanges and their joints- Circular flanges for pipes, valves,fittings and accessories, PN designated and for a single series of flanges specifies requirements for circular steel flanges in PN designations PN2.5 to PN400 and nominal sizes from DN10 to DN4000. Steel material:P250GH, P245GH, P280GH, 16Mo3, 13CrMo4-5,11CrMo9-10
ANSI / ASME B16.5-2017	Covers pressure-temperature ratings, materials, dimensions, tolerances, marking, testing, and methods of designating openings for pipe flanges and flanges fittings. Pressure: CLASS150, CLASS300, CLASS400, CLASS600, CLASS900, CLASS1500, CLASS2500
ASME B16.47	Large Diameter Steel Flanges;Series A flanges and Series B flanges
ASTM A961 / ASTM A961M-19	For Common requirements for steel flanges, forged fittings, valves, and parts for piping applications
DIN 2527	Blind flange nominal pressure PN6 to PN100
ANSI / AWWA C207-13	For Waterworks Service, Size 4 inch Through 144Inch (100mm through 3,600mm); describes ring- type slip-on flanges and blind flange
JIS B2220	Steel Pipe Flanges nominal sizes 10A to 1500 A for nominal pressures 5K,10K, 10K light type, 16K, 20K, 30K, 40K and 63K which are used to join parts for piping, such as steel pipes and valves used for ordinary piping, pressure piping, high pressure piping, high temperature piping, alloy steel piping and stainless steel piping for steam, air, gas, water, oil, etc.JIS G3201 (SF390A) , JIS G3202, JIS G5101 (SC 410, SC 480), JIS G5151, JIS G 3203 (SFVA F1, SFVA F11A), JIS G5151 (SCPH 11, SCPH 22), JIS G 4304 (SUS 304, SUS 304L, SUS 316L, SUS 316), JIS G 3214 (SS F316
ASTM A182/ A182M -18	For Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service F304/304L, F316/316L, F321, F309H, F310, F317, F317L, F347, F347H, F348, F348H, F904L.,etc, F1, F5 F9, F11, F91.

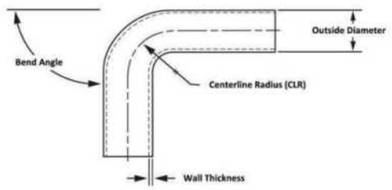
Flange type	Material	Size	Working pressure	flange Face	Coating	Usage
Blind Flange	Carbon Steel ASTM / ASME A 105 ASTM / ASME A 350 LF 2 Alloy Steel ASTM / ASME A 182 GR F 5, F 9, F 11, F 12, F 22, F 91 Stainless Steel: ASTM / ASME SA 182 F 304, 304L, 304H, 309H, 310H, 316, 316H, 316L, 316 LN, 317, 317L, 321, 321H, 347, 347 H. Duplex Steel: ASTM / ASME SA 182 F 44, F 45, F51, F 53, F 55, F 60, F 61.	NPS 1/2inch - NPS 144inch	150#--600 0# (PN6-PN4 0)	raised face, flat face, or RTJ face	Black painting flanges, hot-dip zinc galvanized coating flanges, electroplated zinc coating flanges	Oil Field, Offshore, Water System, Shipbuilding, Natural Gas, Electric Power, Pipe Projects, etc
WELD NECK FLANGES						
SLIP-ON FLANGES						
LAP JOINT PIPE FLANGES	Nickel Alloy ASTM / ASME SB 564 UNS 2200 (NICKEL 200), UNS 4400 (MONEL 400), UNS 8825 INCONEL (825), UNS 6600 (INCONEL 600), UNS 6601 (INCONEL 601), UNS 6625 (INCONEL 625), UNS 10276 (HASTELLOY C 276) ASTM / ASME SB 160 UNS 2201 (NICKEL 201) ASTM / ASME SB 472 UNS 8020 (ALLOY 20 / 20 CB 3) Copper Alloy ASTM / ASME SB 61 UNS NO. C 92200 & ASTM / ASME SB 62 UNS NO. C 83600. ASTM / ASME SB 151 UNS NO. 70600, 71500, C 70600 (CU -NI- 90/10), C 71500 (CU -NI- 70/30) ASTM / ASME SB 152 UNS NO C 10100, C 10200, C 10300, C 10800, C 12000, C 12200.					
THREADED PIPE FLANGES						
SOCKET WELD PIPE FLANGES						
Square Flanges						

ELBOW

Standard	45°ELBOW, 90°ELBOW, 180°ELBOW		
	Carbon steel elbow	Stainless steel elbow	Alloy steel elbow
	Short Radius Elbow		Long Radius Elbow
standard Material	ANSI /ASME B16.9, B16.28, MSS-SP-43 ASTM 234 WPB and WPC ASTM A420 WPL6 MSS-SP-75 WPHY 42, 46, 52, 56, 60, 65 and 70	ASTM A403 F 304, 304L, 304H, 309H, 310H, 316, 316H, 316L, 316 LN, 317, 317L, 321, 321H, 347, 347 H.	ASTMA234: WP1, WP5, WP11, WP12, WP22,WP23 and WP91 grades. Class level in CL1, CL2, CL3.ASTM ASTM A403: F1, F5, F9, F11 Class 1, F12 Class 1, F22 Class 1 ETC
Size Range	Outer Diameter Range: 1/2" to 48" Thickness Range: SCH 10, sch 20, SCH 40, SCH STD, SCH 80, SCH XS, SCH 160, SCH XXS etc.		
Surface Coating	Black Painted, Varnished, Epoxy Coated, FBE coating, 3PE coating, 3PP coating, Galvanized		
manufacturing types	Steel elbow manufacturing types in forged, threaded, butt weld, and seamless		

REDUCER

Standard	Concentric reducer,Eccentric reducer		
	Carbon steel Reducer	Stainless steel Reducer	Alloy steel Reducer
standard Material	ASTM A234 ,ASME B16.9, DIN2615, JIS B2312, ASME B16.11 A234 WPB, A420 WPL6, MSS-SP-75 WPHY 42, 46, 52, 56, 60, 65 and 70.	ASTM A403 WP 304, 304L, A403, 316, 316L, 317, 317L, 321, 310 and 904L, etc.	ASTMA234: WP1, WP5, WP9 WP11, WP12, WP22,WP25 and WP91 grades. Class level in CL1, CL2, CL3.ASTM ASTM A403: F1, F5, F9, F11 Class 1, F12 Class 1, F22 Class 1 ETC
Size Range	Size Range: 1/2"x1/2"x1/4"-48"x48"x8" Wall thickness: Sch10, Sch40, Sch80, SCH120,SCH160 SCHXS, SCHXXS Pressure Rations: 150 #, 300#, 600#, 900#, 1200#, 3000#, 6000#, 9000# Connection type of reducer: socket weld reducer , butt weld reducer		
Surface Coating	Black Painted, Varnished, Epoxy Coated, FBE coating, 3PE coating, 3PP coating, Galvanized		
Connection type	socket weld reducer , butt weld reducer		



TEE

TYPE	Equal Tee and Reducing Tee		
	Carbon steel Tee	Stainless steel Tee	Alloy steel Tee
standard Material	ASTM A234: WPB, WPC; MSS SP-75 WPHY-42, WPHY-46, WPHY-52, WPHY-56, 60, 65 and 70. ASME/ANSI B16.9 ASME/ANSI B16.11	ASTM A403 WP 304, 304L, A403, 316, 316L, 317, 317L, 321, 310 and 904L, etc.	ASTMA234: WP1, WP5, WP9 WP11, WP12, WP22,WP25 and WP91 grades. Class level in CL1, CL2, CL3.ASTM ASTM A403: F1, F5, F9, F11 Class 1, F12 Class 1, F22 Class 1 ETC
Connection type	socket weld reducer , butt weld reducer		
Size Range	Equal Tee and Reducing Tee (Tee Reducer) Size Range: 1/2", 1", 2", 3", 4", 6", 8", 10", 12", 16", 20" to 48". Thickness: SCH 10, SCH 40, SCH 80 Socket Weld Tee (and Threaded Tee) Dimensions: 1/2", 1", 1/2", 2" and up to 4" Pressure Ratings: 2000#, 3000#, 6000#, 9000#		
Surface Coating	Black Painted, Varnished, Epoxy Coated, FBE coating, 3PE coating, 3PP coating, Galvanized		

STEEL PIPE BEND

TYPE	Equal Tee and Reducing Tee		
	Carbon steel Bend	Stainless steel Bend	Alloy steel Bend
standard Material	ASTM A234: WPB, WPC; MSS SP-75 WPHY-42, WPHY-46, WPHY-52, WPHY-56, 60, 65 and 70. ASME/ANSI B16.9 ASME/ANSI B16.11	ASTM A403 WP 304, 304L, A403, 316, 316L, 317, 317L, 321, 310 and 904L, etc.	ASTMA234: WP1, WP5, WP9 WP11, WP12, WP22,WP25 and WP91 grades. Class level in CL1, CL2, CL3.ASTM ASTM A403: F1, F5, F9, F11 Class 1, F12 Class 1, F22 Class 1 ETC
Size Range	Outer Diameters: 1/2" to 48". DN15 to DN1200 Radius range: R=2D, 2.5D, 3D, 5D, 6D, 7D Degree range: 45 degree, 60 degree, 90 degree and customized. Wall thickness: SCH 10, SCH 40, SCH80		
Radius range	R=2D, 2.5D, 3D, 5D, 6D, 7D		
Surface Coating	Black Painted, Varnished, Epoxy Coated, FBE coating, 3PE coating, 3PP coating, Galvanized		

STEEL PIPE CAP

Standard: ASTM A234, MSS SP-75, ASTM A403
Manufacturing Standard: ASME B16.9, DIN2615, JIS B2312
Size Range: 1/2", 1", 2", 3", 4", 6", 8", 10", 12", 16", 20" to 48". (DN15-DN1200)
Thickness: SCH 10, SCH 40, SCH 80
Surface Coatings: Black Painted, Varnished, Epoxy Coated, Galvanized

Socket Weld Cap (and Threaded Cap)
Standard: ASTM A105, ASTM A182
Manufacturing Standard: ASME B16.11
Dimensions: 1/2", 1", 1/2", 2" and up to 4"
Pressure Ratings: 2000#, 3000#, 6000#, 9000#

STEEL PIPE COUPLING

Material Types
Normally there are carbon steel coupling and stainless steel coupling.

Carbon Steel Pipe Coupling
For carbon steel pipe coupling the material standard is ASTM A105, manufacturing standard ASME B16.11.
(There are also casing and tubing coupling material in carbon steel, referred API 5CT J55/K55, N80, P110 etc).

Stainless Steel Pipe Coupling
For stainless steel coupling material standard is ASTM A182, grades in F304/L or 316/L
Material in carbon steel under standard ASTM A105 or Stainless steel ASTM A182 Grade F304/L and F316/L:

Dimensions Range (ASME B16.11): 1/4", 1/2", 3/4", 1", 1 1/2", 2", 3" and up to 4 inch.
Coupling Types: Full Coupling, Half Coupling
Pressure Ratings: 3000#, 6000#, 9000#
Connection Types: Socket Weld, Threaded Coupling(NPT & BSP)
Material in carbon steel under standard API 5CT Casing and Tubing Coupling:
Sizes: Up to 20 inch.
Connection Threads: BTC, EUE, NUE, Premium

SPIRAL WOUND GASKET

Filler:

Its thickness ranges from 0.5mm to 0.6mm. It contains flexible graphite 99.85%, Flexible Graphite is 98%, and Micalit, Ceramic, PTFE & EPTFE.

Centering Ring:

The Spiral Wound Gasket must be assembled and furnished into the centering ring. Its thickness shall range from 2.97 mm to 3.33 mm (0.117 in. to 0.131 in). This must be grooved on the inside of a diameter in order to retain the gasket. It does not come into direct contact of the contained fluid. This is made of carbon steel pointed or plated to avoid corrosion.

Inner Ring:

It helps in avoiding excessive compression occurring due to high-seating stress. The Inner Ring also decreases the turbulence in a flange area. It must be furnished with the Spiral Wound Gasket consisting of PTFE or Polytetrafluoroethylene filler material.

WELDOLET, SOCKOLET, THREADOLET

For Weldolet

Standard: ASTM A234, MSS SP-75, ASTM A403

Run Pipe OD: 1/2", 1", 2", 3", 4", 6", 8", 10", 12", 16", 20" to 48".

Branch Pipe OD: 1/2", 3/4", 1", 1 1/2", 2"

Thickness: SCH STD, SCH XS, SCH 160, SCH XXS.

For Sockolet (and Threadolet)

Standard: ASTM A105, ASTM A182, ASTM A403

Main Pipe OD: up to 48"

Branch Pipe OD: 1/2", 3/4", 1", 1 1/2", 2"

Pressure Ratings: 3000#, 6000#

STUB END

Size range: 1/2" to 36"

Grade: ASME/ASTM SA A234

Type: Long and short lap joint stub ends

Wall Thickness: Schedule 5s, 10s, 20s, Sch10, Sch20, Sch30, STD, Sch40 and etc.

Manufacturing standard of stub end: ASME/ANSI B16.9, ASME B16.28, MSS-SP-43

Material: Duplex / Carbon steel / Alloy steel / Cupro Nickel Low temperature steel

Stainless steel: 316/316L stainless steel, 304/304L stainless steel and chrome-moly

STEEL FABRICATION

It was approached by a clientfrom the clean air industry to fabricate 950,000 lbs. of steel stacks. Eight large stacks were fabricated using a variety of processes including rolling, bending, forming and MIG welding. The stacks were fabricated using a combination of material such as, A36 steel and 304 and 409 stainless steel. Each stack measured 140 ′ long with a diameter of 16 ′ . We held tightest tolerances of ±" 1/8 throughout the entire fabrication process. After being painted, tested and inspected, the steel stack was delivered to New Jersey.clean air industry to fabricate 950,000 lbs. of steel stacks. Eight large stacks were fabricated using a variety of processes including rolling, bending, forming and MIG welding. The stacks were fabricated using a combination of material such as, A36 steel and 304 and 409 stainless steel. Each stack measured 140 ′ long with a diameter of 16 ′ . We held tightest tolerances of ±" 1/8 throughout the entire fabrication process. After being painted, tested and inspected, the steel stack was delivered to South Amerïca.

STEEL FABRICATION

Steel Fabrication is a metal structure which is made of structural steel* components connect with each other to carry loads and provide full rigidity. Because of the high strength grade of steel, this structure is reliable and requires less raw materials than other types of structure like concrete structure and timber structure.

In modern construction, steel structures is used for almost every type of structure including heavy industrial building, high-rise building, equipment support system, infrastructure, bridge, tower, airport terminal, heavy industrial plant, pipe rack, etc.

WELDING OF STEEL FABRICATION

We manufacture and install all types of metal constructions for building. Metal constructions are certified and intended for various industrial and civil engineering sectors.

According to individual individual orders, various steel products are manufactured.

The high quality of the performed work is ensured by the installed quality system (LST EN ISO 9001:2008) and the environmental protection system(LST EN ISO 14001: 2005). Welding works are carried out in accordance with LST EN ISO 3834-3:2006 standard, and steel structures are manufactured in accordance with the requirements of EN1090-1: 2009 + A1: 2011.A declaration of conformity and other documents certifying quality are issued for the production of the enterprise.

ACID FURNACE FABRICATION

It was approached by a chemical industry customer to fabricate a 125,000 lbs. acid furnace. We first draftⅡed complete shop fabrication drawings for the furnace using AutoCAD software. We then used a variety of fabrication methods to complete the A516 grade 70 and A-36 grade steel furnace, including: drilling, rolling, laser cutting, plasma cutting, bending and piping. All other necessary hardware was cost-effecⅡtively procured from reliable outside sources. Before testing and inspecting the acid furnace, it was givena coat of inorganic zinc paint.

CE BOILER STACK REPLACEMENT

It was responsible to create a drawing based printed CAD drawings to design and fabricate a replacement stack out of A588 material for the refinery.

Start Date June 18, 2018	Completion Date August 18, 2018	Location:China
Materials	A588 Corten Steel	
Fabrication Methods	Plate and Angle Rolling, Seam Welding with Buggo Track Welding System	
Finishing Details	No Finish, A588 is designed to rust.	
Size	6'6" Diameter X 78' Length	
Weight	55,000 lbs	

CONVERTER

A customer approached us about doing this job out of carbon steel with the pipe bundle being made out of a special seamless tubing. The timeline was critical as the customer had a two day plant outage scheduled and they needed this unit installed during that time. We were given 5 weeks to complete the project but the special tubing had a 2 week lead time meaning we had just over a week to complete the job once the material arrived. We threw tons of guys on it and worked some crazy hours to make

Start Date :Mar,14, 2018	Completion Date: Apr,19, 2018	Location:CHINA
Materials	seamless tubing, pipe & pipe fittings, angle iron & bar.	
Fabrication Methods	There was a lot of rolling & forming of cylinders & cones. We used stainless steel flux cored welding wire to weld the entire unit.	
Finishing Details	The entire unit was to be wrapped in insulation and the insulation was wrapped in an external sheet metal shell.	
Size	40' long	
Weight	7500 lbs	
Speical Notes	The timeline & long lead time seamless tube.	

OCEAN PLATFORM

It was responsible to create a drawing based printed CAD drawings to design and fabricate the ocean platform with material of x60 From round ends to rectuangle ends ,forming ,completed CWI weld inspection. Shop “fit-up” , assembled completely in shop then disassembled for delivery.

MIXING TANK FABRICATION

A customer from the water treatment industry approached Energy Steel Industrial to fabricate a mixing tank assembly. The 50,000 lbs. tank assembly was made up of many different parts and systems including rapid mix, reactor and clarifier tanks, a 16′ -8″ long platform, and a 15′ high draft tube.To fabricate these components and many other smaller parts, we used a wide variety of methods including, CNC milling, MIG welding, drilling, laser cutting, bending and tapping. All other necessary hardware was cost-effectively procured from reliable outside sources.The mixing tank assembly, which was made from a combination of 6063-T6 aluminum, 316 stainless steel, A-36 carbon steel and schedule 80 pipe, was thoroughly inspected and delivered to Spain.

FACILTY

- STEEL PIPE
- PIPE FITTING

PRODUCTION FACILITY

SEAMLESS STEEL PIPE PRODUCTION WORKSHOP

HYDROGRAND Steel Pipe Co.,ltd.Ltd owns 3 sets of hot-rolled seamless steel pipe production line and 2 sets of cold drawn seamless steel pipe production line with annual production capacity of 200,000 tons, the size range is from 60mm to 630mm.

HOT ROLLED STEEL PIPE PRODUCTION WORKSHOP

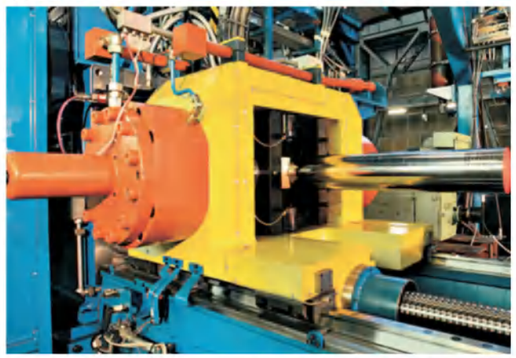
HOT ROLLED PRODUCTION

COLD DRAWN STEEL PIPE PRODUCTION WORKSHOP

The continuous mandrel rolling process and the push bench process in the size range from approx. 21 to 178 mm outside diameter. The multi-stand plug mill (MPM) with controlled (constrained) floating mandrel bar and the plug mill process in the size range from approx. 140 to 406 mm outside diameter. The cross roll piercing and pilger rolling process in the size range from approx. 250 to 660 mm outside diameter.

COLD DRAWN PRODUCTION



WELDED STEEL PIPE PRODUCTION WORKSHOP

PRODUCTION FACILITY

It rolls the strip or plate then welds the tube to steel pipes by HF welding or submerged arc welding. Welded pipe making machine is composed of uncoiler, leveling machine, butt welder, loop, straightening machine and high frequency equipment. Our innovative production line and each single unit of the production line are not only economical but also practical. The complete production line adopts ZTF technology when producing round pipe, the customer shall reduce 60% expense on tooling and improve production Cold Drawn Production efficiency and gain maximum economic benefit.






PIPE FITTING PRODUCTION WORKSHOP

Four-Columns Elbow cold forming Hydraulic Press

CNC Lathe

Double-Layer FBE Coating Line

Double-Layer FBE Coating Line

Frame-Type Tee Cold-Extrusion Forming Hydraulic Press Submerged Arc Welder

1220 Hot Induction Bending Line

1640 Hot Induction Bending Line

COATING

The Company has advanced four production lines of internal FBE lining and external three layers PE (the diameter range from 32mm-6000mm, and length from 5m to 18m); four internal shot blasting machines and four external shot blasting machines; six internal and external FBE and PE coating production lines and so on.

The main products is :

Two polyethylene (2PE) steel pipe, three polyethylene (3PE) steel pipe,epoxy power (FBE) steel pipe, double layers polypropylene (2PP), three layers polypropylene (3PP), 3 Layer Asphalt Coating, spigot-socket joint large diameter steel-plastic composite pipe, PU coating steel pipe, CWC steel pipe , steel pipe with cement mortar on inner wall and epoxy coal tar on outer wall, fire fighting steel pipes, mining dual-resistance steel pipe, epoxy ceramic steel pipe, HOPE gas pipe, HDPE jacket thermal insulation steel pipe, HDPE casing pipe, and various anti-corrosive and insulating accessory fittings.

The mains standard is:

DIN30670, DIN30671, DIN30678, AWWA C210, AWWA C213A-02, CAN / CSA-Z245, NF A49-710, AS/ NZS 3862:2002, IPS-G-TP-335, ISO21809-1:2011, GB /T 23257-229, SY/T 0315-2005, CJ/T120-2008; SY/T 0447-2014.,etc.

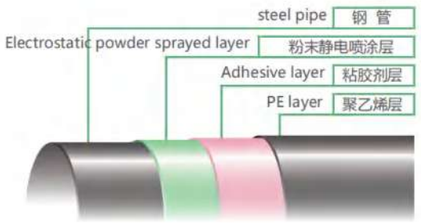
The company has 6 vacuum sizing HDPE external protecting tube production lines, can produce from Φ75-Φ1680 HDPE external protecting pipe , 3 large diameter Φ1680 protection pipe production lines, has two spaying PU and wrapping PE layer thermal insulation steel pipe production lines, which executes the latest standard GB/T 34611-2017; has three production lines of primary-shaping thermal insulation steel pipe; has six lines of prefabricated Erectly buried insulation steel pipe; has three lines of steel jacket steam steel pipe; The PE extrusion machine is equipped with corona equipment,which can corona treatment for polyethylene jacket pipe.

The annual production capacity of thermal insulation steel pipe and fittings is more than 600 km.The products of the Company are widely used in such important fields as oil transmission, gas transmission, water transmission, thermal power generation, fire protection system, salt chemical,and coal chemical. It Is a professional manufacturer. The company's production capacity Is fifty million square meters per year.

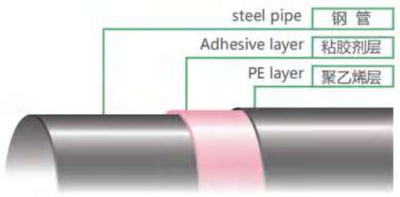
INSULATION WORKSHOP

① PE extruding machine with vacuum sizing function
② Extruder production line
③ Foaming Platform without Bracket
④ Foaming platform
⑤ Thickness gauging

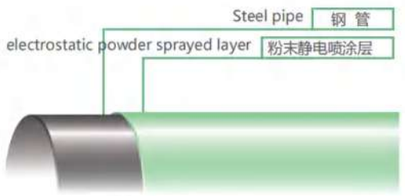
STRUCTURES OF 3LPE、2LPE AND FBE LAYER STEEL PIPE



三层结构防腐管
Triple-layer anti-corrosion pipe



双层结构防腐管
Double-layer anti-corrosion pipe



单层结构防腐管
Single-layer anti-corrosion pipe

防腐层厚度 Thickness of anti-corrosion layer

钢管公称直径 Nominal diameter of steel pipe DN (MM)	环氧涂料图层 Epoxy coating a/μm	粘胶剂层 Adhesive layer (mm)/μm	防腐层最小厚度（mm） Min thickness of anti-corrosion layer (mm) 普通型 General type	加强型Type
DN≤100	≥120	≥170	1.8	2.5
1002DN≤250			2.0	2.7
250<DN<500			22	29
500≤DN<800			25	3.2
DN≥800			3.0	3.7
a不适用于二层结构聚乙烯防腐层				

熔结环氧涂层的性能指标 Performance indexes of fusion bonded epoxy coating

序号 NO.	项目 Item	性能指标 performance ndex	试验方法 testing method
1	附着力级	≤2	附录C
2	阴级剥离(65℃,48h).mm Cathodic disbonding(65℃,48h).mm	≤8	附录D
3	阴级剥离Cathodic disbonding (65℃,48h),mm	≤15	附录D
4	抗弯曲Bending resistance (-20℃,2.5°)	无裂纹	附录E
实验室喷涂试件的涂层厚度应为300μm-400μm			

二层结构胶粘剂的性能指标 Performance indexes of the adhesive for double- layer structure

序号 NO.	项目 item	性能指标 performance index	试验方法 testing method
1	软化点℃Softening point ℃	90	见GB/T 4507
2	蒸发损失Evaparation loss （160℃）%	≤1.0	见GB/T 11967
3	剪切强度（PE/刚） Shearing strength（PE/steel）Mpa	≥1.0	见GB 7124
4	剥离强度（PE/刚）N/cm Peel strength（PE/steel）N/CM	≥35	见G8 2792
（20±5℃）			

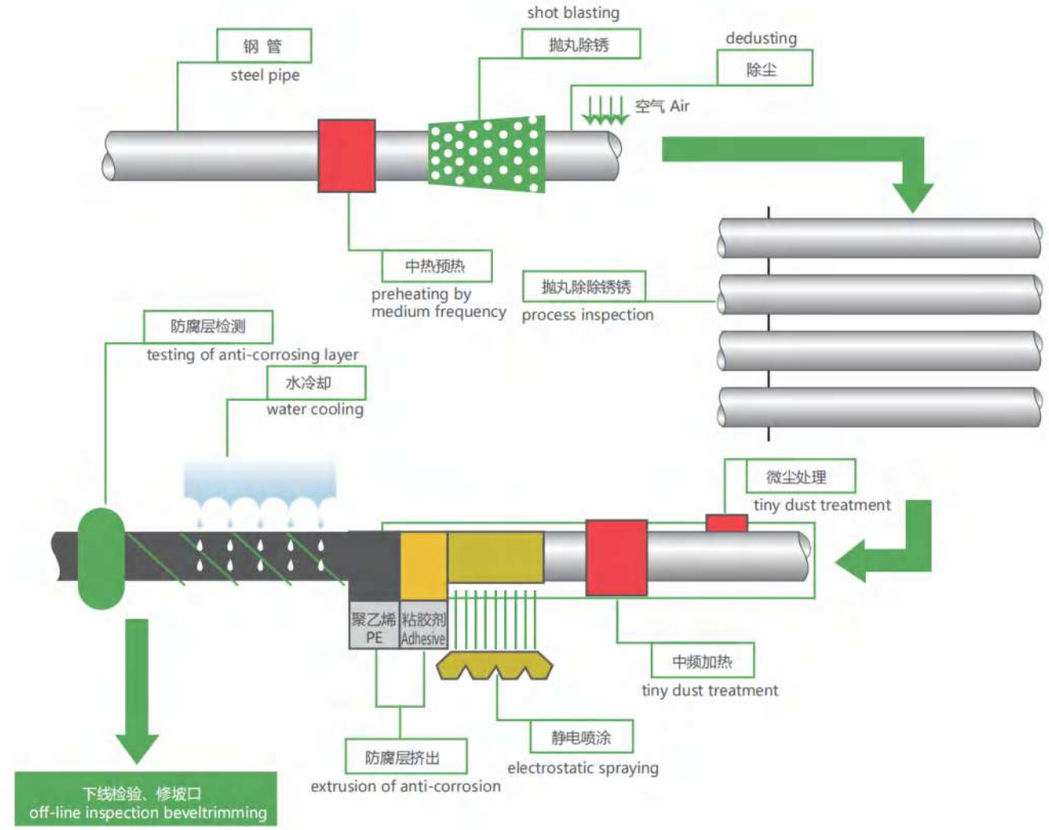
三层结构胶粘剂的性能指标 Performance indexes of the adhesive for triple - layer structure

序号 NO.	项目 item	性能指标 performance index	试验方法 testing method
1	密度，g/cm Density,g/cm	0.920-0.950	见GB 4472
2	熔体流动速率g/10min(190°C=2 ,16kg) Flowing rate ,g/10min(190C=216kg)	≥0.7	见GB 3682
3	维卡软化点，℃ Vicat softening point,C	≥90	见GB 1633
4	脆化温度°C Embrittlement temperature,°C	≤-50	见G8 5470

聚乙烯层的性能指标 Performance indexes of PVC layer

序号 NO.	项目 item		性能指标 performance index	试验方法 testing method
1	拉伸强度 tensile strength	轴向/MPa	≥20	见GB/T 1040
		周向/MPa	≥20	见GB/T 1040
		偏差/a%	≤15	
2	断裂伸长率Breaking eiangation,%		≥600	见GB/T 1040
3	压痕硬度Indentation hardness,mm 23℃±2℃ 50℃±2℃或70℃±2℃		≤0.2 ≤0.3	附录G
4	耐环境应力开裂 environmental stress caused crack resistance(F50)/h		≥1000	GB/T 1842
a.偏差为轴向和周向拉伸强度的差值与两者中较低者之比 b.常温型，试验条件为50℃;高温型,试验条件为70℃				

PRODUCTION PROCESS FLOW FOR TRIPLE-PE-LAYER PIPE



防腐层的性能指标 Performance indexes of anti- corrosion coating

序号 NO.	项目 item	性能指标 performance index 二层Double-layer	三层Triple-layer	试验方法 testing method
1	剥离强度(Peel strength) /(N/cm) (20°C+ 10°C) (50°C±5C)	≥70 ≥35	≥100(内聚破坏) ≥70(内聚破坏)	附录J
2	阴极剥离(Cathodic disbonding)(65%C ,48h)/mm	≤15	≤6	附录D
3	阴极剥离(最高使用温度，30 d) /mm CDT (Max. service temperure,30d)/mm	≤25	≤15	附录D
4	环氧粉末固化度:固化百分率/% 环氧粉末固化度:玻璃化温度变化值 | ΔTg | /°C FBE powder curing degree/Tg value	--	≥95 ≤5	附录B
5	冲击强度(Impact strength)/(J / mm)	≥8		附录K
6	抗弯曲(Bending resistance)(-30°C,2.5°)	聚乙烯无开裂(No split of PVC)		附录E

QUALITY CONTROL

HYDROGRAND Steel Pipe Co,LTD is committed to comply with the requirement of the established Quality Management System(QMS) in accordance with the requirement of API Specification Q1 and ISO 9001:2008 Standard and strive for continually improve QMS effectiveness and customer satisfaction through competitiveness and efficiency in manufacturing of steel pipe and steel related services.

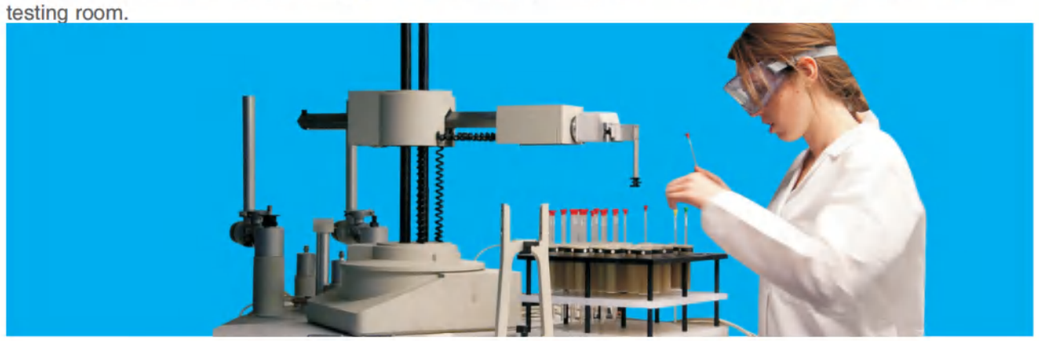
- Cultivate good corporate governance and corporate social responsibility.
- Comply with relevant regulatory requirements and industrial practices.
- Employ and encourage safe working environment to reduce work accidents.
- Actively upgrade human resources through continuous training and development programs.
- Promote environment by preservation by minimizing hazardous industrial waste and
- effective energy conservation.

To make sure that every pipe leawng our plant conforms to the high standard we guarantee to our customers,our quality control departanent will follow seven steps to confirm the quality of our product.

- To detect any area of lamination on the material and dimensional flaws, a manual ultrasonic inspection will be performed on the hot rolled coils before use.
- To determine the chemical composition and mechanical properties of the skelp, mill tests are run by our quality control inspectors before they are fed to the machine.
- An ultrasonic examination is run on the formed and welded strip to check for any laminations around the parent metal,defects in the welded seam or heat affected areas.
- A primary visual and dimensional inspection focusing on the weld bead and the surface condition of the base metal is carried out after cleaning.
- To further ensure the quality of the weld, a fluoroscopic X-Ray test is carried out to look for possible weak spots. This test is captured on film and can be provided on request.
- A hydrostatic testing machine will subject the pipe to further analysis identification.
- Finally, a radiographic X-Ray inspection will take place on both ends of the pipe before a final mill examination.

PROCESS

HYDROGRAND Steel Pipe Co,LTD have quality inspection center to provide testing services to the production process and finished products.The laboratory has 14sets of test equipment, including Flatting test units, Hy-draulic test unit and the Ultrasonic flaw detection units used in the production workshop at the scene. It could detect 31 kinds of projects, including the metal material and coating material physical and chemical proper-ties. A total of 8 kinds of standard to be used and standard software. Inspection and Quarantine has become a technology center in Liaoning Anshan Branch of metallic materials under the testing room.



CHEMICAL ANALYSIS

Main purpose of chemical analysis to determine whether the batch product accord with standard of the grade of steel products, and to the analysis of the results should be taken as the basis of the judgement of the batch product.Chemical composition analysis instrument is mainly used direct reading spectrometer, carbon sulfur analyzer to finish a lot of online product production testing tasks.

HARDNESS TEST

The main purpose of the hardness test is to determine the applicability of the steel pipe, or steel pipefor a specific purpose by hardening or softening effect, Methods is including brinell, rockwell and vickers hardness index to measure the hardness.

CHEMICAL ANALYSIS

Checking the quality of pipe connection leak test, check the vacuum pipe system maintain the performance of the vacuum test and based on the fire safety considerations for the leakage test, etc.

METALLURGICAL MICRISCOPE

Test metal organization, such as rolling, forging and heat treatment processing leads to changes in micro-structure, grain size inspection or the distribution of non- metallic inclusion and other groups, such as size and material damage judgment, etc.

ULTRASONIC FLAW DETECTOR

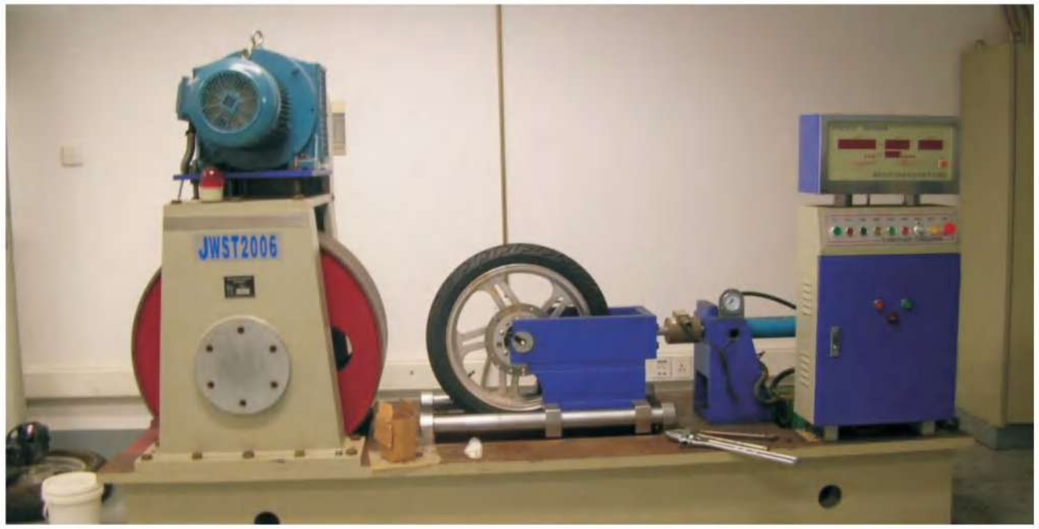
Ultrasonic flaw detection has high detection sensitivity, to crack in the steel pipe straight defects such as sensitive, also can detect non-metallic inclusions such as volume type of defect.

IMPACT TEST MACHINE

Low temperature and impact test of low temperature tank, with impact testing machine is a kind of form a complete set of low temperature environment for the sample to a special test equipment, widely used in petroleum chemical industry, metallurgy, boiler, pressure vessel, steel, steel, metal, casting, pumps, valves, fasteners, vehicle, machinery manufacturing, aerospace and scientific research industry sectors such as physical and chemical test in low temperature.

BENDING MACHINE

This machine test special plug lead and folding strength of wire.The sample test is fixed on the fixture, and add a certain load, test fixture swinging, examine the break rate after a certain number of times, or until all bolt can't electricity to check its total number of swing.The function of automatic counting, bending specimen is no electricity to break, and can automatically stop the operation.



LOGISTICS

▪ OPERATION

When steel pipe is completed and operational, it is the result of cooperation between a number ofparties in the supply chain. These parties perform steps which are sequential and overlap-pinginvolved in the design, manufacturing, blasting, coating, handling, storage, stransport and construction of steel pipe.

1 .Advising on importing and exporting including freight provid-ers, ports of loading and discharge,consular fees, special docu-mentation, insurance costs and freight handling.
2. Preparing and filing required export documentation such as the bill of lading and routing appropriatedocuments to the seller, the buyer or a paying bank.
3. Advising on the most appropriate mode of cargo transport and making arrangements to pack and load the cargo.
4. Reserving the necessary cargo space on a vessel, train or truck.
5. Making arrangements with overseas customs brokers to ensure that the goods and documents comply with customs regulations;

PIPE PROTECTION

Pipe-end protection is advisable in case the pipe-ends are bevelled at the pipe manufacturer. In the case of overseas transport, there is an especially increased riskof damaged pipe-ends. This is caused by extra handling procedures in ports and shifting of the pipes onboard vessels.

PIPE HANDING

Pipes are handled multiple times in the supply chain, for example in ports and storage yards. By handling we mean lifting of pipes and loading to or unloading from trailers, train wagons or vessels. Most damages to pipe ends, surfaces and coatings occur during handling procedures due to a combination of inadequate equipment and poor personnel awareness.

PIPE TRANSPORT

Pipes need to be transported between parties involved in the supply chain. This is done by truck, train and/or vessel.

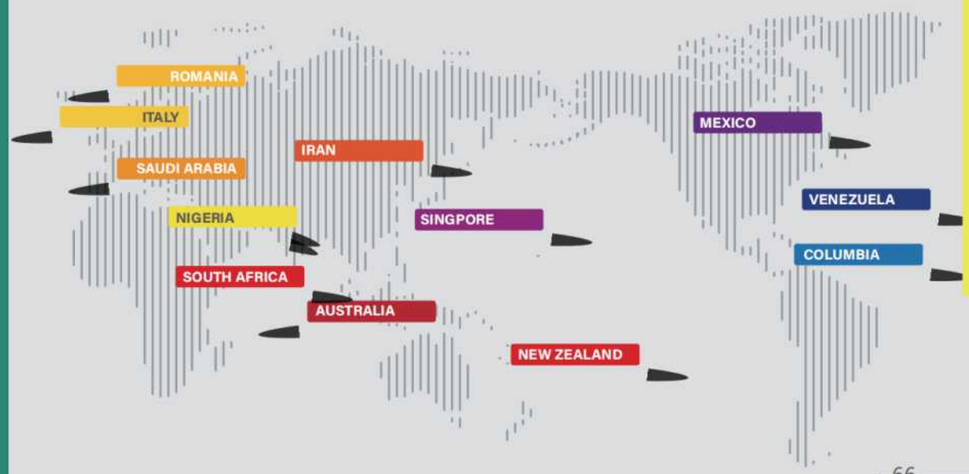
PIPE STORAGE

Pipes are stored a number of times before they reach their destination. During storage the pipe coating is among other things subject to high pressure , ultra violet (UV) degradation, des ign of bottom support, and contamination. In this paragraph the impact of these influences on the pipe coating is examined.

IMPORT&EXPORT

- OVERSEA AGENTS
- RAW MATERIAL
- PROJECT REFERENCE

Asia:	Singapore	
Africa:	South Africa	Nigeria
Europe:	Italy	Romania
Australia:	Australia	New Zealand
Middle East:	Saudi Arabia	Iran
North America:	Mexico	
South America:	Venezuela	Columbia



OVERSEA AGENTS

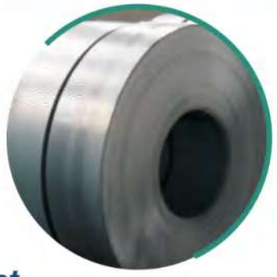
RAW MATERIALS

Bar

With the features of high level purity, precise chemical composition control, high reduction ratio, high dimensional accuracy and excellent surface quality, the products are mainly used to manufacture the axle shaft, gas cylinder and plastic mould, etc.

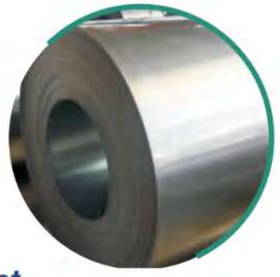
Heavy plate

Heavy plates are mainly used in shipbuilding, offshore platform, boiler, pressure vessel, pipeline, high building, bridge and heavy duty trucks, etc.



HR steel sheet

With the excellent properties such as high strength, good toughness, easy machinabi l ity and good weldabi l ity, Baosteel"s hot-rolled steel products are widely used in ship, automobile, bridge, building, machinery and pressure vessel and other industrial applications.



CR steel sheet

CR steel sheets have good processability, with good flatness and excellent surface, are available with different thickness and width combinations; are mainly used to manufacture the high value-added products in automotive and appliance, beverage packaging, electronic, electrcial moor and building etc.

Carbon steel

Carbon steel is steel where the main interstitial alloying constituent is carbon in the range of 0.12-2.0%. Suitable for nominal pressure PN ≤ 32.0MPa, temperature -30-425 ℃ water, steam, air, hydrogen, ammonia, nitrogen and petroleum products, and other media.

Alloy steel

Alloy steel is often subdivided into two groups: high alloy steels and low alloy steels. The difference between the two is defined somewhat arbitrarily. However, most agree that any steel that s alloyed with more than eight percent of its weight being other elements beside iron and carbon, is high alloy steel.

Stainless steel

Stainless steel does not readily corrode, rust or stain with water as ordinary steel does, but despite the name it is not fully stain-proof, most notably under low oxygen, high salinity, or poor circulation environments. It is also called corrosion- resistant steel or CRES when the alloy type and grade are not detailed, particularly in the aviation industry.

Black steel

Black steel is a term given to steel pipe with a black oxide scale on the surface. This black oxide scale is formed when the pipe is forged and is typically sealed with a protective oil to prevent corrosion. Because of this oxide scale and protective film, black steel pipe requires little maintenance and is used for a wide variety of applications, including in water, steam, air and gas services.

PROJECT REFERENCE

Bridge construction

Marine engineering

Mineral exploration

Offshore engineering

Environmental project

Gas exploration

Hydraylic system

Oil refinery

Pipeline for NICO

Shipbuilding

Hydroelectricity

Industrial exhaus

Liquefeild gas

Sweage treatment

Thermal power plants

West- east gas pipeline

CONTACT

▪ ORGANIZATION FRAMEWORK

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- QUALITY CONTROL CENTER
  - Technical Centre
  - Inspect Centre
  - Maintenance Centre
- MARKETING DEPT
  - Purchase Dept
  - Sales Dept
    - Domestic Sales
    - Oversea Sales
  - Project Dept
  - Marketing Dept
- PRODUCTION DEPT
  - Planning Dept
  - Finished Product Dept
  - Production Workshop
    - Seamless Steel Pipe Workplace
    - SSAW Steel Pipe Workplace
    - LSAW Steel Pipe Workplace
    - ERW Steel Pipe Workplace
    - Coating Workplace
- FINANCIAL DEPT
  - Financial Dept
  - Financing Dept
  - Invest Dept
- HR DEPT
  - Administration Dept
  - HR Dept
- SERVICE DEPT
  - Customer Service Dept
  - Complaints Dept
  - Legal Affairs Dept
- LOGISTICS DEPT
  - Shipping Dept
  - Warehouse Dept
    - Stock Dept
    - Price Dept
  - Transport Dept