VALUE DELIVERY

ASPERA LIMITED
Room 803, Chevalier House, 45-51 Chatham
Road South, Tsim Sha Tsui, Kowloon, H.K.
T: +852 2789 6062|F: +852 2789 6062
Website: www.aspera-limited.com
Email: info@aspera-limited.com

ASPERA

WELCOME

Aspera Limited is a company that provides materials and accessories for steel pipe series used in civil engineering such as oil and natural gas. It is committed to using professional knowledge and experience to provide customers with a series of services and continuously deliver value

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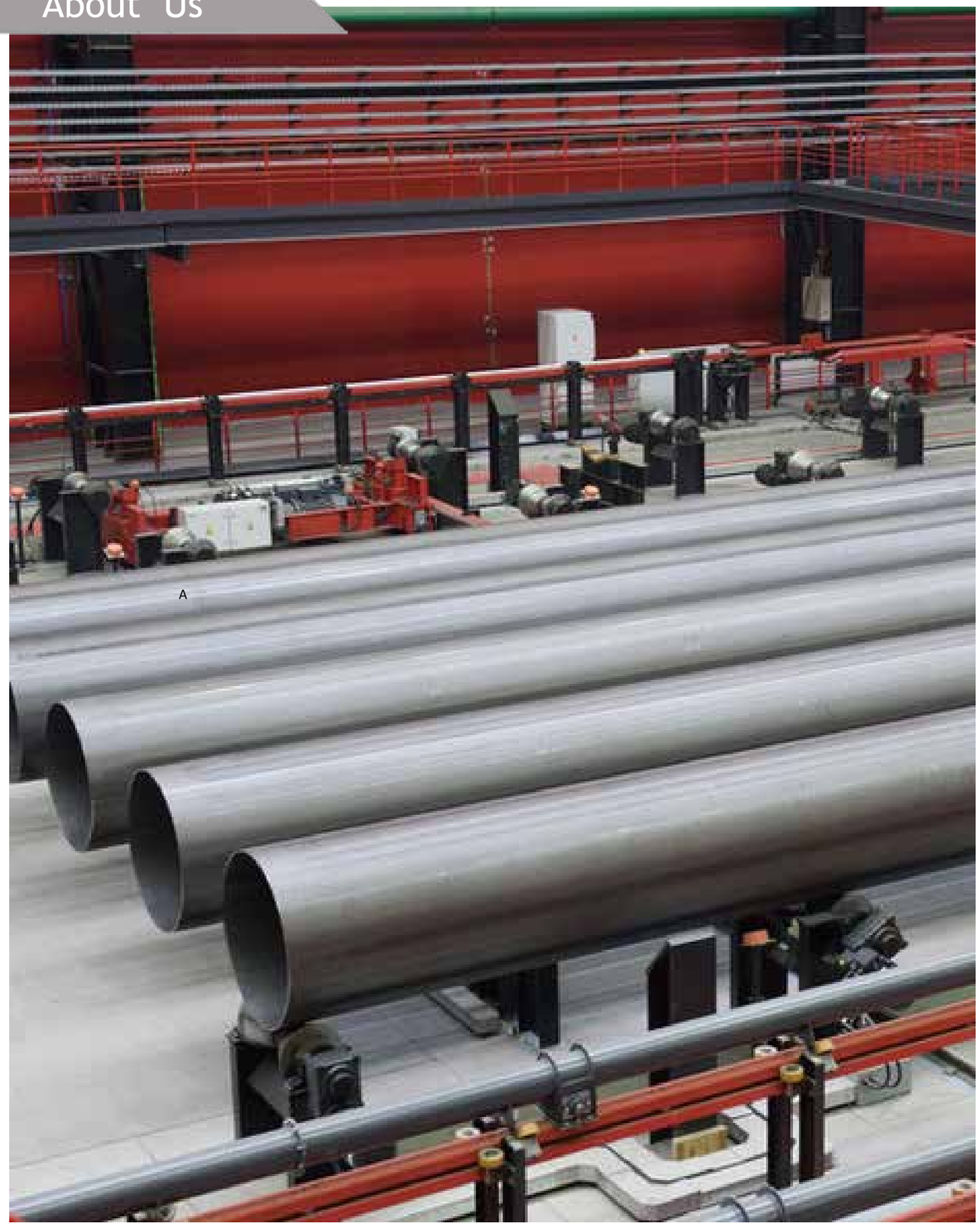
ASPERA

About Us



Learn Aspera

Aspera Limited provides specialized steel pipes & fittings and services to the oil & gas and civil engineering & construction industry. Utilizing our experience and expertise, we deliver supply chain management and procurement services to clients that enhance their pipes & fittings and other steel products capabilities. Aspera Limited has been supplied carbon steel products, stainless steel products, alloy steel pipe, square / rectangle hollow section and numerous types of pipe fittings including elbow, reducer, tee, flange .....

Who We Are

Aspera Limited as a special concatenation of client and vendor on the oil & gas industrial and civil engineering & construction, dedicated our knowledge and experience in reliable supply, sound solution and timely response based on client requirements.

What We Do

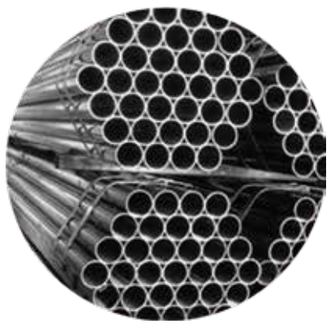
Aspera Limited is an effort to provide its customer base an uninterrupted supply of general Oil and Gas materials, Equipment and Spare Parts world-wide and make their operational activities smoother than ever. We at Aspera Limited take every care to serve our clients with our accumulated experience of managing supplies of material for various projects as well as day-to-day requirements that shall be very hard for other companies to match. Aspera Limited is structured to be close to the end-users and other industries which are achieved through well trained support staffs and our team members who are working relentlessly to put everything in place. Driven by a common vision and shared values, every individual of Aspera Limited is committed to the company's as well as our customers' success, and work towards enhancing its reputation of our company. We nurture a team of seasoned personnel who hold the Integrity of our organization by building cordial professional relationship with our clients, taking the ownership of the their work, standing strong with their team-members and keeping a keen eye on customer needs thus supporting the core values of Aspera Limited. We understand the importance of quality, timely delivery and always never allow to slip up anything that may dent our quality policy. Aspera Limited adopts the best practices in the industry that offers the highest value proposition to its Clients

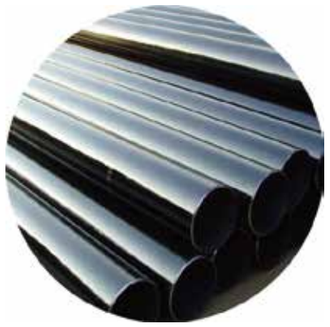
Welded Steel Pipe

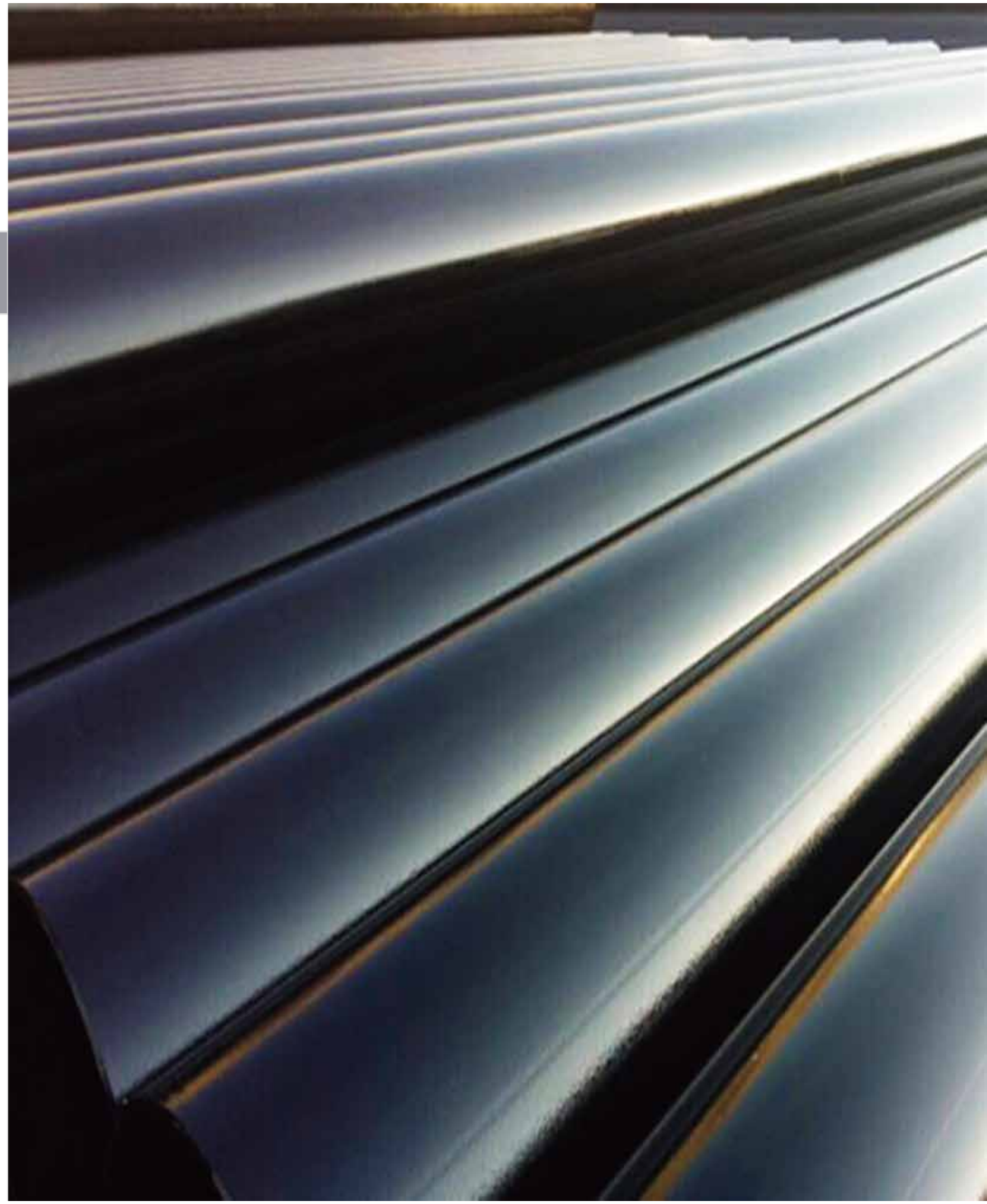
PIPE

Aspera-Limited

Welded steel pipe, also called welded pipe, is a steel pipe made by welding a steel plate or steel strip after crimping. The production process of welded steel pipe is simple, the production efficiency is high, there are many varieties and specifications, and the equipment cost is small, but the general strength is lower than that of seamless steel pipe. Welded steel pipe is divided into straight seam welded pipe and spiral welded pipe according to the form of weld. Classification by production method: process classification-arc welded pipe, resistance welded pipe, (high frequency, low frequency) gas welded pipe, furnace welded pipe. The production process of straight seam welded pipe is simple, the production efficiency is high, the cost is low, and the development is fast. The strength of spiral welded pipes is generally higher than that of straight seam welded pipes. Welded pipes with larger diameters can be produced from narrower billets. Welded pipes with different diameters can also be produced with billets of the same width. However, compared with straight seam pipes of the same length, the weld seam length is increased by 30-100%, and the production speed is lower. Generally, the smaller tube is welded by straight seam, and the larger pipe is welded by spiral.







In the last few years, ERW pipes are have become an efficient alternative to seamless pipes, both in terms of price and performance, due to the modern welding technologies adopted by ERW pipe manufacturers (example HFI and HFW, high-frequency welding). These advancements in welding technologies have reduced, over time, the technical superiority of seamless pipes vs ERW pipes, making them interchangeable at least in some applications (low/medium pressure and temperature). Of course, seamless pipes will always benefit from the intrinsic superior mechanical strength of steel billets vs. coils and plates.

ERW

ERW pipes are manufactured using steel coils: the coil is first uncoiled, then smoothed, cut and, finally formed into a pipe shape by joining its two extremities electrically.

Electric Resistance Welding

The biggest difference between ERW steel pipe and seamless steel pipe is that ERW has a weld, which is also the key to the quality of ERW steel pipe. Some people divide the seamlessization of ERW steel pipe into geometric seamless and physical seamless. Geometric seamless is to remove the internal and external burrs of ERW steel pipe. Physical seamlessness is to heat the weld area to AC3 (927°C) by using the intermediate frequency induction heating device through the local heat treatment process of the weld seam, and then perform an air cooling process with a length of 60m and a speed of 20m / min, and then water cooling if necessary.

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CLAUSE	STANDARD	STANDARD VALUE(MM)	
Pipe Except The End Diameter Tolerance	API 5L GB/T9711.1-1997	D≤60.3 60.3≤D≤168.3 168.3<D≤610 610<D≤1422	-0.8,+0.4 ±0.0075D ±0.0075D max±3.2 ±0.005D max4
	GB/T3091-2008	D≤48.3 48.3<D≤273.1 273.1<D≤508 D>508	±0.5 ±1%D ±0.75%D ±1%D or 10.0 whichever is less
Pipe End Diameter Tolerance	API 5L GB/T9711.1-1997	D≤168.3 1683<D≤610 610<D<1422	-4-+1.6 ±0.005D max±1.6 ±1.6
	GB/T3091-2008	D≤273.1 273.1<D≤508 D>508	+2.4 -0.8 +3.2 -0.8
Thickness Tolerance	API 5L GB/T9711.1-1997	t≤5.0 5<t<15 t≥15	±0.5 ±1.0t ±1.5
	GB/T3091-2008	±10%t	
Length	API 5L GB/T9711.1-1997	±500	
	GB/T3091-2008	+20 -0	
Straightness	API 5L GB/T9711.1-1997	≤0.2%L	
	GB/T3091-2008	≤0.2%L	
Out-Of Roundness	API 5L GB/T9711.1-1997	60.3≤D≤610, Pipe end 0.015D	
	GB/T3091-2008	D≤508 D>508 ≤0.8%D Maximum diameter and nimimum diameter of the poor should be within the tolerance range in diameter	

CLAUSE	STANDARD	STANDARD VALUE(MM)
Pipe End Shape	API 5L GB/T9711.1-1997	Chamfer30°+5°-0 obtuse angle 1.6±0.8 cut diagonal ≤1.59
	GB/T3091-2008	Chamfer30+5° obtuse angle16±0.8 cut diagonal≤3
Outer Burrs	API 5L GB/T9711.1-1997	Flush with the arc
	GB/T3091-2008	≤0.5
Internal Burrs	API 5L GB/T9711.1-1997	4.0<t≤8.0 Scraping groove deepth≤0.4 t>8.0 Scraping groove deepth≤0.05t
	GB/T3091-2008	4.0<t≤8.0 Scraping groove deepth≤0.4 t>8.0 Scraping groove deepth≤0.05t
Alternate Side	API 5L GB/T9711.1-1997	The radial offset of the strip/plate edges shall not cause the remaining wall thickness at the weld to be less than the minimum permissible wall thickness
	GB/T3091-2008	The radial offset of the strip/plate edges shall not cause the remaining wall thickness at the weld to be less than the minimum permissible wall thickness.
Surface Defects	API 5L GB/T9711.1-1997	Convex part of any scratches or indentation depth does not exceed the 12.5% thickness after grinding any wresting pit sag ≤6. 35 length does than half the diameter
	GB/T3091-2008	Internal and external surface should be smooth, the defects of unfolding cracks, layered, lap welding Arc, burning and other depth exceeding wall thickness minus arc
Repair	API 5L GB/T9711.1-1997	Minimum length of welding seam 50.8, one tube with an interval of at least 3m
	GB/T3091-2008	Minimum length of welding seam 50, the maximum salvation is not greater than 150, with a pipe does not exceed through 3 from the tube end welding is not allowed within 200mm
Nondestructive Test	GB/T3091-2008	According to ISO9764、ISO9765、ASTME213
Hydrostatic Test	API 5L GB/T9711.1-1997	P=2ST/D T as 60% of the yield strength values, pressing time: D: less than 457 not less than 5seconds d> 457, not less than 10seconds
	GB/T3091-2008	p=2ST/D T as 60%of the yield strength values pressing time not less than 5 seconds
Squashing	API 5L GB/T9711.1-1997 GB/T3091-2008	D>168. 3 when the distance between the two pltes (H)H=2/3D, weld shall be no cracks when the H1/3D weld outside shall be no cracks or fissures, continually compressed to fit relarive to the tube wall stratification or metal overheating not allowed

ERW steel pipes and tubes are used for various engineering purposes, in pipelines transmitting water, gas, and oil, fencing, scaffolding, etc.

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ERW PIPE

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ERW DIMENSION

Outer Diameter	1/8 inch to 24 inch
Wall Thickness	max26.5mm
Length	3.0m-18m

OD		WT																
Inch	mm	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354	0.394	0.433	0.492	0.551	0.630	0.689	0.748	0.787
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.5	14.0	16.0	17.5	19.0	20.0
1/2"	21.3	—	—															
3/4"	26.7	—	—															
1"	33.4	—	—	—														
2"	60.3	—	—	—	—													
3"	88.9		—	—	—	—												
4"	114.3		—	—	—	—												
5"	141.3		—	—	—	—	—											
6"	168.3		—	—	—	—	—	—										
8"	219.1		—	—	—	—	—	—	—	—	—	—	—					
10"	273.1					—	—	—	—	—	—	—	—					
12"	325.0					—	—	—	—	—	—	—	—	—	—			
14"	355.6					—	—	—	—	—	—	—	—	—	—			
16"	406.4						—	—	—	—	—	—	—	—	—	—		
18"	457.7						—	—	—	—	—	—	—	—	—	—	—	
20"	508.0							—	—	—	—	—	—	—	—	—	—	—
24"	610.0								—	—	—	—	—	—	—	—	—	—

ERW pipes are available in sizes between 1/2 and 26 inches, in carbon steel (ASTM A53 is the most common specification) and stainless steel (ASTM A312). In terms of dimensions, the ASME B36.10 and ASME B36.19 are the key reference specifications (API 5L for welded ERW line pipes).

Steel Grade:

EN10217: S185, S235, S235JR, S275, S275JR, S355JRH, S355J2H

ASTM A 53: Gr. A, Gr B, Gr C, Gr.D

API 5L: A, B, X42, X46, X52, X56, X60, X65, X70

MANUFACTURING PROCESS

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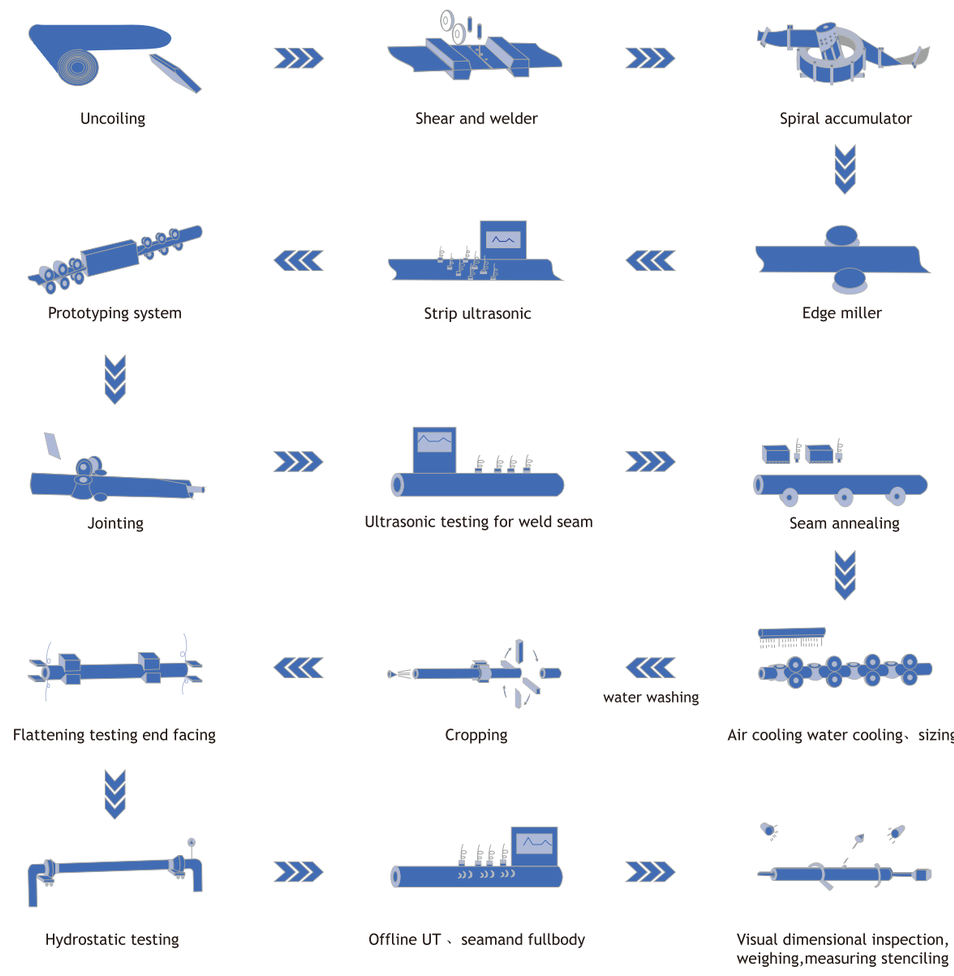

ERW pipes are manufactured starting from steel coils, that are at first uncoiled, cut, processed, welded and tested as shown in the picture below.The most common welding technique used for oil and gas pipes is the so-called “high-frequency induction technology” (ERW-HFI), consisting in the application of an induction current on the outer surface of the pipe able to generate a robust seam weld and join the two sides of the steel coil very tightly.

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LSAW

An LSAW pipe (“submerged arc welding”) is manufactured by cutting, bending and welding steel plates (JCOE process)

LSAW pipes compete with seamless and ERW pipes in the size range between 16 and 24 inches but are “must-go” option for pipelines above 24 inches (as 24 inches is the maximum size for commercial seamless pipes).

LSAW steel pipe is produced by using a single medium-thick plate as a raw material, pressing (rolling) the steel plate into a tube blank in a mold or forming machine, and using double-sided submerged arc welding and expanding the diameter. The finished product has a wide specification range, good toughness, plasticity, uniformity and compactness of the weld, and has the advantages of large pipe diameter, pipe wall thickness, high pressure resistance, high temperature resistance and corrosion resistance. When constructing high-strength, high-quality long-distance oil and gas pipelines, most of the steel pipes required are large-diameter thick-walled straight-seam submerged arc welded pipes. According to the API standard, in large oil and gas pipelines, when passing through Class 1 and Class 2 areas such as alpine areas, the seabed, and densely populated areas in cities, straight seam submerged arc welded pipes are the only designated pipe type.

Longitudinally Submerged Arc Welding

Arc welding (including submerged arc surfacing and electroslag surfacing, etc.) is a method in which an arc burns under a flux layer for welding. Its inherent advantages of stable welding quality, high welding productivity, no arc and little smoke, make it the main welding method in the manufacture of important steel structures such as pressure vessels, pipe section manufacturing, box beams and columns. Although many new efficient and high-quality new welding methods have appeared, the application field of submerged arc welding is still unaffected. From the perspective of the weight of the deposited metal of various welding methods, submerged arc welding accounts for about 10%, and has not changed much over the years.

When the welding wire is determined (usually depends on the steel type to be welded), the supporting flux becomes the key material, which directly affects the mechanical properties of the weld metal (especially plasticity and low temperature toughness), crack resistance, and the incidence of welding defects and welding productivity. The weight ratio of welding wire to flux is welding wire: flux = 1.1 ~ 1.6, depending on the type of welding joint, the type of flux used, and welding specification parameters. Compared with smelting flux, the amount of sintered flux is more economical, about 20% less.

Main features of LSAW steel pipe:

Main features of LSAW steel pipe:

1) The steel pipe has a longitudinal weld, and the inner and outer welds are welded by a submerged arc weld.

2) After the overall mechanical expansion process, the internal stress of the steel pipe is small and evenly distributed, which can effectively prevent stress corrosion cracking, high dimensional accuracy, and easy on-site welding construction.

3) The process of precision welding after pre-welding is adopted, the welding process is stable, and the quality of the weld is high.

4) Welding seam is easy to realize nondestructive flaw detection during production and field nondestructive flaw detection during use.

5) The range of product specifications is large, which can produce steel pipes with small diameter and large wall thickness as well as large diameter and large wall thickness.

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MAIN QUALITY INDEX TABLE OF SPIRALLY WELDED STEEL PIPE			
	API Spec5L	GBT9711.1-1997	SYT5037-2000
The Scope Of Application Of	With oil and gas pipe	With oil and gas pipe	Gas, water, gas, air, steam heating Pipes and other fluid with ordinary steel
Steel	A、Bx42~x70	L175-1483	Q195、Q215、Q235
Tube Diameter	D<508±0.75% D508≤D≤9140.25%D+0.75%D D>914-3.20+6.35	D<508±0.75% D≥508±1.00%D	D<508±0.75% D≥508±1.00%D
Outside Diameter Of Pipe End	D≤610,±0005D, max ±1.6mm 610< to ≤1422,±1.6mm	D≤610,±0005D,max ±1.6mm 610< to ≤1422,±1.6mm	D&lt:508±0.78%D or ±2.5 from the minimum D&lt:508±0.50%D or ±4.5 from the minimum
Deviayion Wall Thickness >5.0 To ≤15	±0.1t	±0.1t	±12.5%t
Deviayion Wall Thickness >15	1.5mm	1.5mm	10%t
Ellipticity	Steel pipe in the distance range of 101.6 May not be the largest outside diameter Large diameter than the nominal 1%D Minimum diameter shall not be smaller than the nominal diameter of 1%D	Steel pipe in the distance range of 101.6 May not be the largest outside diameter Large diameter than the nominal 1%D Minimum diameter shall not be smaller than the nominal diameter of 1%D	±1% D within 100 range of tube end
Satraigtness Of Curvature	Pipe length should not exceed 0.2%	Pipe length should not exceed 0.2%	Pipe length should not exceed 0.2%
Tube- Side Groove	Siope argument30°-35° Blunt edge1.59±0.79	Siope argument30°-35° Blunt edge1.59±0.79	Siope argument30°-35° Blunt edge1.59±0.79
Oblique Cot	<1.59	<1.59	D<813≤1.6 D≥903≤3.0

MAIN QUALITY INDEX TABLE OF SPIRALLY WELDED STEEL PIPE			
	API Spec5L	GBT9711.1-1997	SYT5037-2000
Wrong Side T≤12.7	≤1.59	≤1.59	0.35t and not more than 3.0
Wrong Side T>12.7	0.125l and 3. 18 the minimum value of the check	0.125l and 3. 18 the minimum value of the check	0.25t
Weld Than High	t≤13…<3.5:T>13…<3.5 t≤13…3.5;t>13…<4.5		t≤13<30 t>13<4.8
Chemical Analysis	Melting check each batch of sample 2	Melting check each batch of sample 2	Check each batch Melting of a sample
Tenile Specimens	Materials: Check each batch melting a sample Spiral Weld: take each test a sample batch Weld head: not more than 50 from a sample	Materials: Check each batch melting a sample Spiral Weld: take each test a sample batch Weld head: not more than 50 from a sample	Take a test batch of each welded joint
Bending Test-Oriented	Each test is approved for a bend specimen and an anti-bending samples, not more than the right seam for a 50 bend specimen and is an anti-bending specimen	Each test is approved for Each test is approved for a bend specimen and an anti-bending samples, not more than the right seam for a 50 bend specimen and is an anti-bending specimen	Not
Fracture Toughness Test	With the requirements of the whole,the complex melting than the impact of approved check every 3 D 508,the drop hammer impact from each batch melting 2	With the requirements of the whole,the complex melting than the impact of approved check every 3 D 508,the drop hammer impact from each batch melting 2	Not
Non-Destructive Testing	100%x or 100% ultrasonic inspection testing, plus the right seam. pipe end 203MMX-ray inspection	100%x or 100% ultrasonic inspection testing, plus the right seam. pipe end 203MMX-ray inspection	Repair welding seam, weld head, ring gap to be welded into the X-ray or ultrasound examination: 20%of samples of spiral weld pipes for combustible gases spiral welded pipes should be 100%seamless inspection.

LSAW steel pipe LSAW steel pipe (LASW steel tube) or Longitudinal Submerged-arc Welded steel pipes are used for the transmitting of water, natural gas, or petroleum.

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LSAW PIPE

Aspera-Limited

LSAW DIMENSION

OD		WT																								
Inch	mm	0.236	0.276	0.315	0.354	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142	1.181
		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
16	406	—	—	—	—	—	—	—	—	—																
18	457	—	—	—	—	—	—	—	—	—	—															
20	508	—	—	—	—	—	—	—	—	—	—	—														
22	559	—	—	—	—	—	—	—	—	—	—	—	—													
24	610	—	—	—	—	—	—	—	—	—	—	—	—	—												
26	660	—	—	—	—	—	—	—	—	—	—	—	—	—	—											
28	711	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—										
30	762		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—									
32	813		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—								
34	864		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—							
36	914			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—							
38	965			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
40	1016			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
42	1067			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
44	1118				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
46	1168				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
48	1219				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
52	1321				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
56	1422					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
60	1524					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
64	1626					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
68	1727					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
72	1829					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Steel Grade:

EN10217: S235, S235JR, S275, S275JR, S355JRH, S355J2H

ASTM A 53: Gr. A, Gr B, Gr C, Gr.D

API 5L: A, B, X42, X46, X52, X56, X60, X65, X70

GB/T9711: L175, L210, L245, L290, L320, L360, L290, L320, L360, L390, L415, L450, L485, L555

GB/T3091: Q195, Q235, Q275, Q295, Q345

MANUFACTURING PROCESS

Aspera-Limited

Tab welding、plate feeding、board probe

Edge miller

Edge crimping

Prototyping system

Ultrasonic testing for weld seam

Tab removal slag

Cage-type roll forming、
outside and inside welding、cleaning

Internal wall dedusting

Conting tack weldin

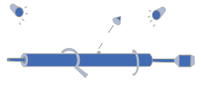
Seam and pipe and
X-ray inspecton

Mechanical expansion

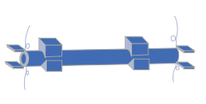
Flame flat
tube end weld grinding

Hydrostatic testing

Ultrasonic inspection



Visual dimensional inspection,
weighing,measuring stenciling



Flattening testing end facing

info@aspera-limited.com

SSAW

SSAW spiral submerged arc welded pipe manufacturing standard implementation submerged arc welding (including submerged arc surfacing and electroslag surfacing, etc.) is an important welding method, with its inherent stable welding quality and high welding productivity, there is no arc and little smoke, etc., making it a pressure vessel, The main welding method in the manufacture of pipe sections, box beams and other important steel structures.

Straight Spiral Submerged Arc Welding

In recent years, although many new efficient and high-quality new welding methods have appeared, the application field of submerged arc welding is still unaffected. From the perspective of the weight of the deposited metal of various welding methods, submerged arc welding accounts for about 10%, and has not changed much over the years.

When the welding wire is determined (usually depends on the steel type to be welded), the supporting flux becomes the key material, which directly affects the mechanical properties of the weld metal (especially plasticity and low temperature toughness), crack resistance, and the incidence of welding defects and welding productivity. The weight ratio of welding wire to flux is welding wire: flux = 1.1 ~ 1.6, depending on the type of welding joint, the type of flux used, and welding specification parameters. Compared with smelting flux, the amount of sintered flux is more economical, about 20% less.

The spiral submerged arc welded pipe (SSAW) is a steel coiled pipe whose forward direction has a forming angle (adjustable) with the center line of the forming pipe, and is welded while forming, and its weld seam is formed into a spiral line. The advantage is that the same specification of strip steel can be produced. The steel pipes of various diameters and specifications have a relatively large range of raw materials, the welds can avoid the main stress, and the stress is better.

info@aspera-limited.com

SSAW PIPE

Aspera-Limited

SSAW DIMENSION

OD		WT													
Inch	mm	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354	0.394	0.433	0.492	0.551	0.630	0.689
		6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	18.0	20.0	22.0
8"	219.1	—	—	—											
10"	273.1	—	—	—											
12"	323.9	—	—	—	—	—									
14"	355.6	—	—	—	—	—									
16"	406.4	—	—	—	—	—	—	—							
18"	457.0	—	—	—	—	—	—	—							
20"	508.0	—	—	—	—	—	—	—	—	—					
22"	559.0	—	—	—	—	—	—	—	—	—					
24"	610.0	—	—	—	—	—	—	—	—	—					
26"	660.0	—	—	—	—	—	—	—	—	—					
28"	711.0	—	—	—	—	—	—	—	—	—	—	—			
30"	762.0	—	—	—	—	—	—	—	—	—	—	—			
32"	813.0	—	—	—	—	—	—	—	—	—	—	—			
34"	864.0		—	—	—	—	—	—	—	—	—	—			
36"	914.0			—	—	—	—	—	—	—	—	—			
38"	965.0			—	—	—	—	—	—	—	—	—			
40"	1016.0			—	—	—	—	—	—	—	—	—	—		
42"	1067.0			—	—	—	—	—	—	—	—	—	—		
44"	1118.0			—	—	—	—	—	—	—	—	—	—		
46"	1168.0			—	—	—	—	—	—	—	—	—	—		
48"	1219.0			—	—	—	—	—	—	—	—	—	—		
52"	1321.0				—	—	—	—	—	—	—	—	—		
56"	1422.0					—	—	—	—	—	—	—	—	—	—
60"	1524.0					—	—	—	—	—	—	—	—	—	—
64"	1626.0					—	—	—	—	—	—	—	—	—	—
68"	1727.0					—	—	—	—	—	—	—	—	—	—
72"	1829.0						—			—	—	—	—	—	—
76"	1930.0									—	—	—	—	—	—
80"	2032.0									—	—	—	—	—	—
100"	2540.0											—	—	—	—
112"	2845.0											—	—	—	—

MANUFACTURING PROCESS

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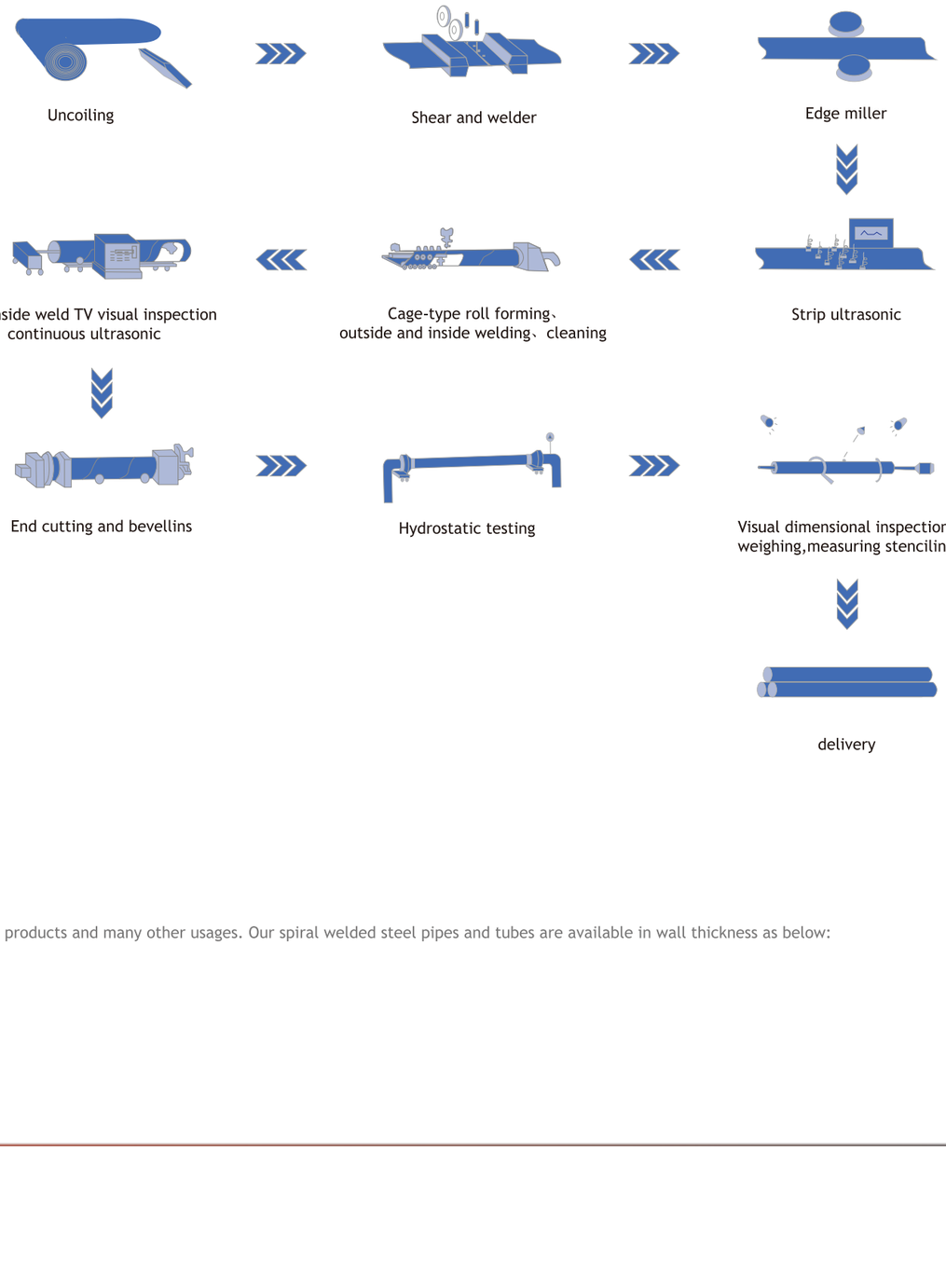


SSAW/SAWH STEEL PIPES SSAW steel pipes or spiral submerged-arc welded steel pipes are used for the transmission of water, gas, or petroleum products and many other usages. Our spiral welded steel pipes and tubes are available in wall thickness as below:

Steel Grade:

S235, S235JR, S275, S275JR, S355JRH, S355J2H

ASTM A 53: Gr. A, Gr B, Gr C, Gr.D

API 5L: A, B, X42, X46, X52, X56, X60, X65, X70

GB/T9711: L175, L210, L245, L290, L320, L360, L290, L320, L360, L390, L415, L450, L485, L555

Seamless steel tube is a long steel bar with a hollow cross-section and no joints around it. Seamless tube
Features of seamless pipe:
First, the thicker the wall thickness of the product, the more economical and practical it is. The thinner the wall thickness, the greater the processing cost. Second, the process of the product determines its limited performance. Generally Seamless steel tubes have low accuracy: uneven wall thickness, low brightness on the inside and outside of the tube, and high cost for length determination, and there are also pitting and black spots on the inside and outside of the surface; Therefore, it embodies its superiority in high-pressure, high-strength, mechanical structural materials.
Types of seamless steel pipes:
The rolling method is divided into hot rolled, hot extruded and cold drawn (rolled) steel tubes.

SEAMLESS

Seamless pipes are produced starting from steel billets, that are heated and perforated to create the tubular section. The word “seamless” means the absence of seam welds.

Seamless steel pipes are used for different applications within the oil & gas industry:

upstream operations (OCTG pipes) midstream (transmission and distribution of fluids, as oil, gas, steam, acids, slurries) downstream (process piping to refine oil and gas in derivative products) general plumbing applications for utility services.

The most common types of pipes used in the oil&gas industry are (ASTM pipe specifications):

ASTM A53, A106, A333, and API 5L (types of carbon steel pipes for high and low-temperature carbon steel)

ASTM A335 Grades P5 to P91 (chrome-moly alloy steel pipes for high temperature and pressure, for refinery and power plants applications)

ASTM A312 Series 300 and 400 (stainless steel pipes in grades 304, 316, 321, 347)

ASTM A790/A928 (duplex and super duplex pipes with double ferritic and austenitic structure)

Various nickel alloys material specifications (Inconel, Hastelloy, Cupronickel, Monel, Nickel 200)

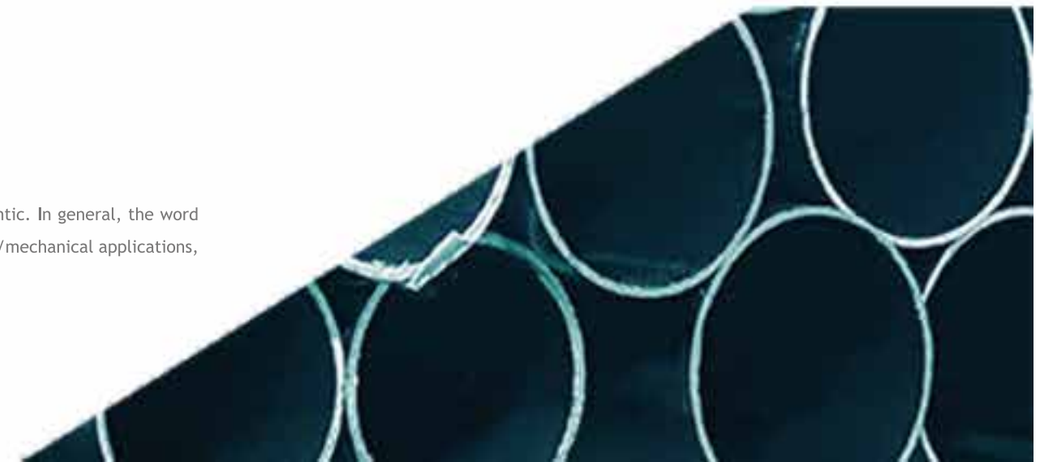
Specifications for non-ferrous pipes (aluminum, copper, brass, cupro-nickel)

Some specifications cover seamless pipes only (example ASTM A106), others apply both to seamless and welded pipes (example ASTM A53)

Carbon steel pipes (A53, A333, A106 and API 5L) have the largest market share, as they can be used for most high and low-temperature applications; The main application of stainless steel pipes is for corrosive services (and higher grades are used as the temperature and the pressure increase, or when the conveyed fluid is more and more aggressive).

In the upstream oil & gas industry, API 5CT is the key specification covering OCTG pipes (oil country tubular goods). instrumentation systems, and the construction of pressure equipment like boilers, heat exchangers, and superheaters.

Seamless steel pipes shall not be confused with seamless tubes. Indeed, there are a few important differences between pipes and tubes, which are not only semantic. In general, the word “pipe” applies to any tubular used to convey fluids, whereas the word “tube” applies to tubular sections (of various shapes, round, oval, squared) used for structural/mechanical applications, instrumentation systems, and the construction of pressure equipment like boilers, heat exchangers, and superheaters.



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SEAMLESS PIPE

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SEAMLESS PIPE DIMENSION

(168 PQF Mill)															
OD		WT													
Inch	mm	0.098	0.157	0.177	0.236	0.252	0.295	0.374	0.866	1.102	1.181	1.575	2.000	2.244	2.362
		2.5	4	4.5	6	6.4	7.5	9.5	22	28	30	40	50.8	57	60
1 1/4	32	—	—	—	—	—	—	—	—						
3	88.9	—	—	—	—	—	—	—	—						
4	114	—	—	—	—	—	—	—	—						
6 2/3	170	—	—	—	—	—	—	—	—						
(219 ASSEL Mill)															
3	88.9							—	—	—	—	—	—		
4	114							—	—	—	—	—	—		
6 2/3	170							—	—	—	—	—	—		
8 5/8	219							—	—	—	—	—	—		
(250 MPM Mill)															
4	114			—	—	—	—	—	—	—	—	—			
6 2/3	170			—	—	—	—	—	—	—	—	—			
8 5/8	219			—	—	—	—	—	—	—	—	—			
9	245			—	—	—	—	—	—	—	—	—			
9 5/6	250			—	—	—	—	—	—	—	—	—			
11 7/9	299			—	—	—	—	—	—	—	—	—			
12 4/5	325			—	—	—	—	—	—	—	—	—			
(258 PQF Mill)															
4	114	—	—	—	—	—	—	—	—	—					
6 2/3	170	—	—	—	—	—	—	—	—	—					
8 5/8	219	—	—	—	—	—	—	—	—	—					
9	245	—	—	—	—	—	—	—	—	—					
(460 PQF Mill)															
9	245					—	—	—	—	—	—	—	—	—	
9 5/6	250					—	—	—	—	—	—	—	—	—	
11 7/9	299					—	—	—	—	—	—	—	—	—	
12 4/5	325					—	—	—	—	—	—	—	—	—	
13 2/5	340					—	—	—	—	—	—	—	—	—	
18	457					—	—	—	—	—	—	—	—	—	
(508 PQF Mill)															
11 7/9	299						—	—	—	—	—	—	—	—	—
12 4/5	325						—	—	—	—	—	—	—	—	—
13 2/5	340						—	—	—	—	—	—	—	—	—
18	457						—	—	—	—	—	—	—	—	—
20	508						—	—	—	—	—	—	—	—	—

(720 Rotary Expansion Mill)		SEAMLESS PIPE DIMENSION															
OD		WT															
Inch	mm	0.039	0.098	0.157	0.177	0.236	0.252	0.295	0.374	0.866	1.102	1.181	1.575	2.000	2.244	2.362	3.150
		1	2.5	4	4.5	6	6.4	7.5	9.5	22	28	30	40	50.8	57	60	80
12 4/5	325		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13 2/5	340			—	—	—	—	—	—	—	—	—	—	—	—	—	—
18	457			—	—	—	—	—	—	—	—	—	—	—	—	—	—
20	508			—	—	—	—	—	—	—	—	—	—	—	—	—	—
(Hot Expansion Unit)																	
1	25					—	—	—	—	—	—	—	—	—	—	—	—
1 1/4	32					—	—	—	—	—	—	—	—	—	—	—	—
3	88.9					—	—	—	—	—	—	—	—	—	—	—	—
4	114					—	—	—	—	—	—	—	—	—	—	—	—
6 2/3	170					—	—	—	—	—	—	—	—	—	—	—	—
8 5/8	219					—	—	—	—	—	—	—	—	—	—	—	—
9	245					—	—	—	—	—	—	—	—	—	—	—	—
9 5/6	250					—	—	—	—	—	—	—	—	—	—	—	—
11 7/9	299					—	—	—	—	—	—	—	—	—	—	—	—
12 4/5	325					—	—	—	—	—	—	—	—	—	—	—	—
13 2/5	340					—	—	—	—	—	—	—	—	—	—	—	—
18	457					—	—	—	—	—	—	—	—	—	—	—	—
20	508					—	—	—	—	—	—	—	—	—	—	—	—
28	720					—	—	—	—	—	—	—	—	—	—	—	—
(Cold-rolling and Cold-drawing Unit)																	
1	25	—	—	—	—	—	—	—	—	—	—	—					
1 1/4	32	—	—	—	—	—	—	—	—	—	—	—					
3	88.9	—	—	—	—	—	—	—	—	—	—	—					
4	114	—	—	—	—	—	—	—	—	—	—	—					
6 2/3	170	—	—	—	—	—	—	—	—	—	—	—					
8 5/8	219	—	—	—	—	—	—	—	—	—	—	—					
9	245	—	—	—	—	—	—	—	—	—	—	—					
9 5/6	250	—	—	—	—	—	—	—	—	—	—	—					

The ASME B36.10 and B36.19 specifications cover the dimensions and weights of seamless pipes for the petrochemical industry (the specs apply to welded pipes too):

Mild steel seamless pipes from 1/8 to 6 inch. are manufactured with the so-called “plug mill process” or the “extrusion process” (used for smaller diameters), whereas the “mandrel mill process” is used for larger diameters.

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MANUFACTURING PROCESS(Hot rolled)

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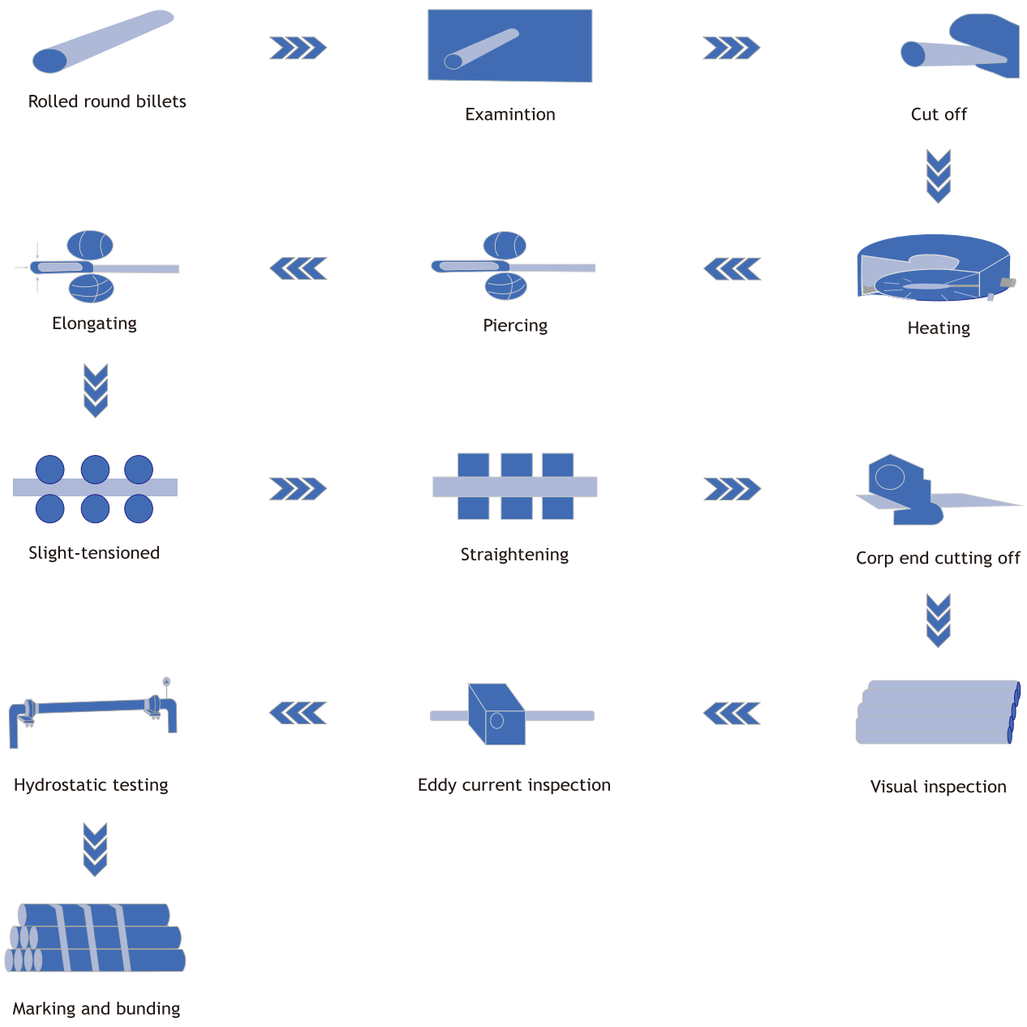
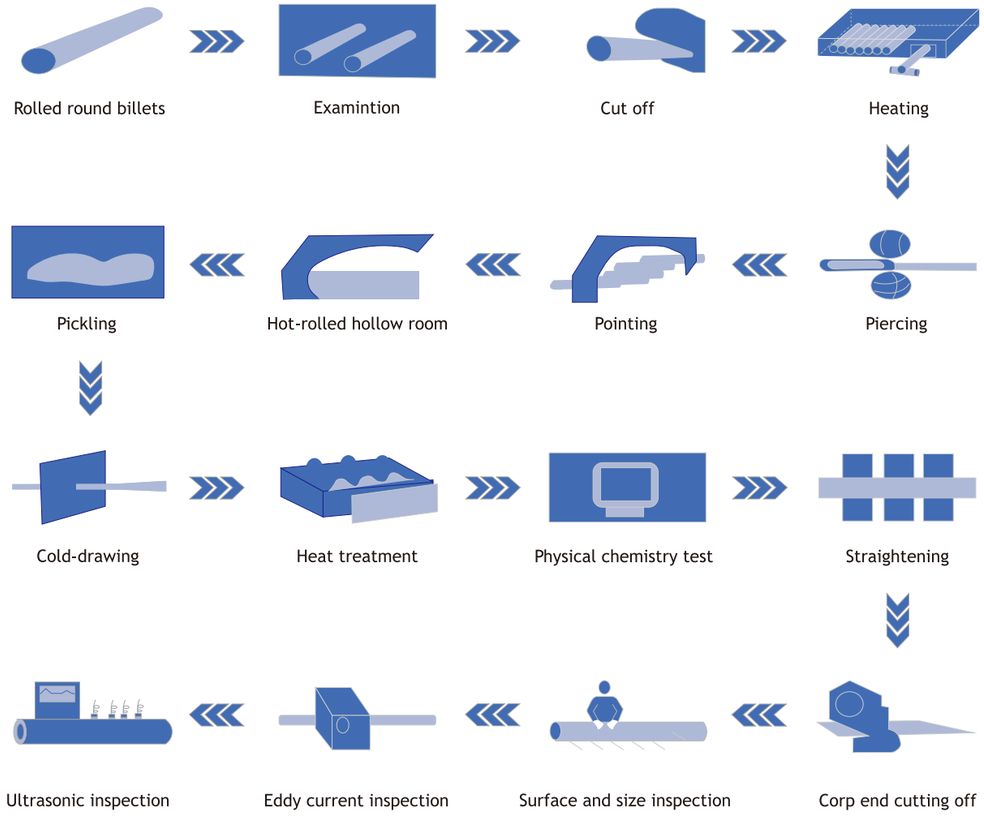


MANUFACTURING PROCESS(Cold drawing)

Aspera-Limited



The ASME B36.10 specification covers carbon and low-alloy seamless pipes sizes (dimensions and weights) between 1/8 and 24 inches

The ASME B36.19 specification, instead, covers the dimensions and weights of stainless steel, duplex, nickel-alloy seamless and welded pipes

Commercial seamless pipes are designated with a nominal pipe size (representing the approximate fluid conveyance capacity of the pipe) and with a “schedule”, which refers to the thickness of the pipe (the most common are schedule 40, STD, XS, XXS for carbon/alloy pipes, and 10S, 40S and 80S for stainless and nickel alloy pipes).

Carbon steel: ASTM / ASME A234 WPB, WPC

Alloy: ASTM / ASME A234 WP 1-WP 12-WP 11-WP 22-WP 5-WP 91-WP911, 15Mo3 15CrMoV, 35CrMoV

Stainless steel: ASTM / ASME A403 WP 304-304L-304H-304LN-304N

ASTM / ASME A403 WP 316-316L-316H-316LN-316N-316Ti

ASTM / ASME A403 WP 321-321H ASTM / ASME A403 WP 347-347H

Low temperature steel: ASTM / ASME A402 WPL3-WPL 6

High-performance steel: ASTM / ASME A860 WPHY 42-46-52-60-65-70

1.Cast steel, alloy steel, stainless steel, copper, aluminum alloy, plastic, argon leaching, PVC, PPR, RFPP(reinforced polypropylene), etc.

2. According to the production method, it can be divided into pushing, pressing, forging, casting and so on.

3. According to manufacturing standards, it can be divided into national standard, electric standard, ship standard, chemical standard, water standard, American standard, German standard, Japanese standard, Russian standard, etc.

4. According to its curvature radius: it can be divided into long radius elbow and short radius elbow. The long radius elbow refers to the outside diameter of the tube whose radius of curvature is equal to 1.5 times, that is R = 1.5D; the short radius elbow refers to its radius of curvature equal to the outside diameter of the tube, namely R = 1.0D. (D is the diameter of the elbow, R is the radius of curvature). 5. If divided by pressure level: there are about 17 kinds, which are the same as the American pipe standards, including: Sch5s, Sch10s, Sch10, Sch20, Sch30, Sch40s, STD, Sch40, Sch60, Sch80s, XS; SCH100, Sch120, Sch140, Sch160, XXS; the two most commonly used are STD and XS..

Steel pipe fittings are all pressure fittings. According to the different processing technology, it is divided into four categories, namely butt-welded pipe fittings (with welded and non-welded), socket welding and threaded pipe fittings, flange pipe fittings.

PIPE FITTING

There are mainly two systems for the upper pipe flange standard, namely the European pipe flange system represented by German DIN (including the former Soviet Union) and the American pipe flange system represented by the US ANSI pipe flange. In addition, there are Japanese JIS pipe flanges, but they are generally only used for public works in petrochemical plants, and have little influence internationally. The pipe flanges of various countries are introduced below:

1. European system pipe flanges represented by Germany and the former Soviet Union

2. American system pipe flange standard, represented by ANSI B16.5 and ANSI B 16.47

3. British and French pipe flange standards, two countries have two casing flange standards.

In summary, the internationally accepted pipe flange standards can be summarized as two different, non-interchangeable pipe flange systems: a European pipe flange system represented by Germany; the other is represented by the United States American pipe flange system.

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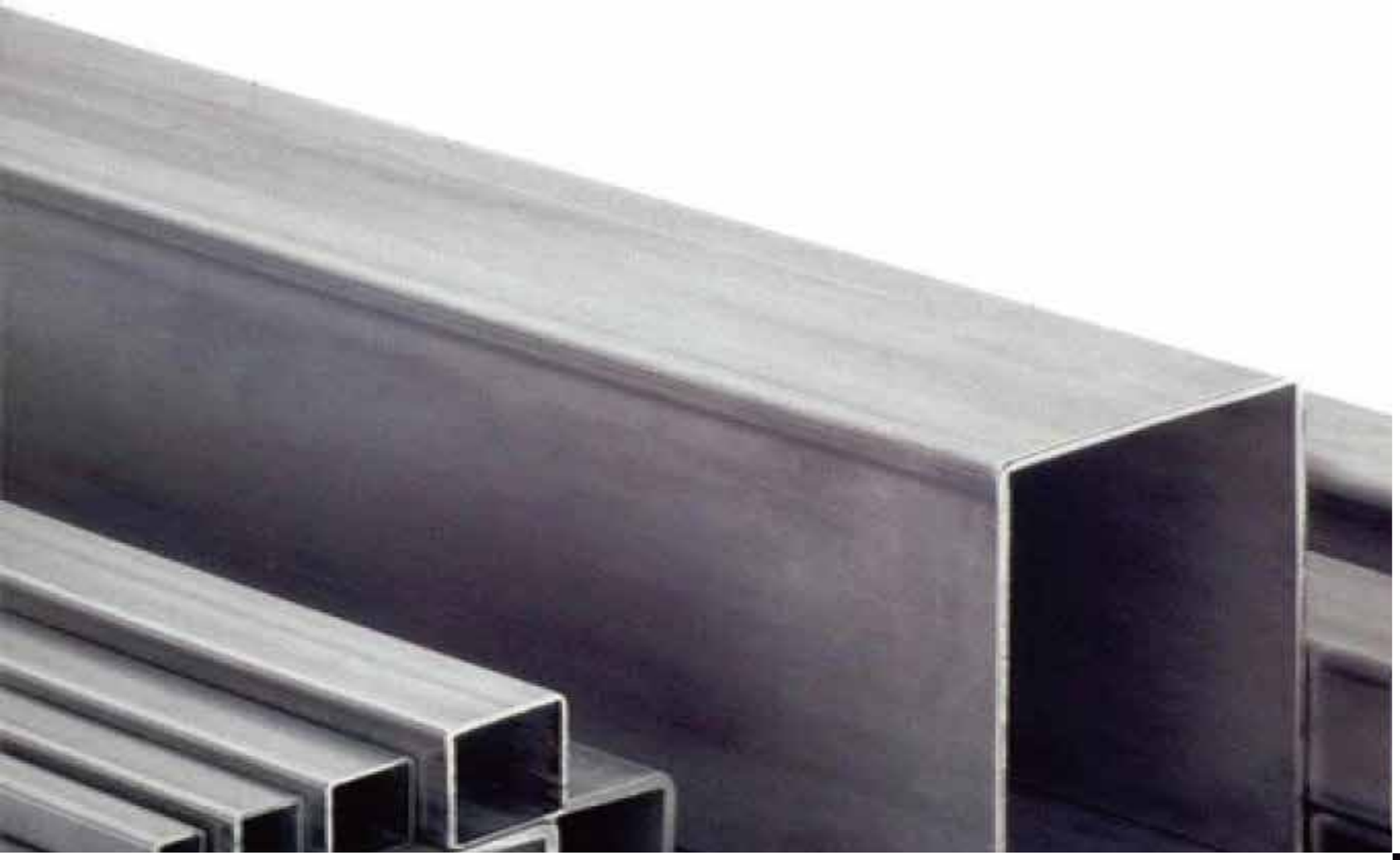
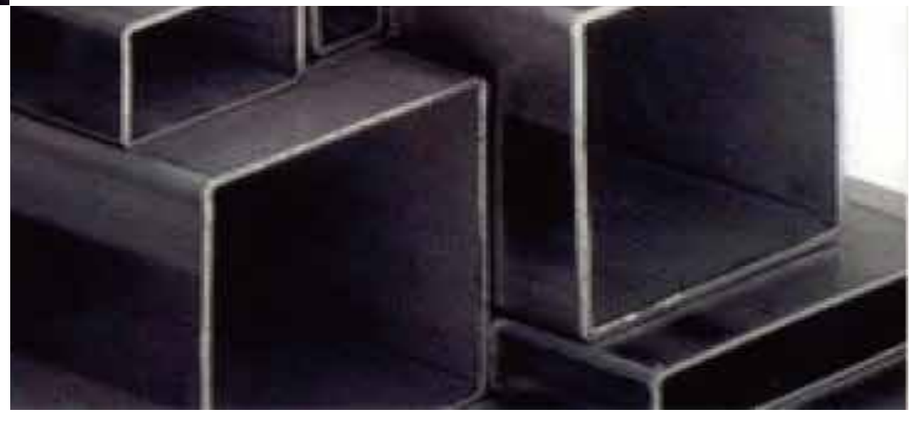


Rectangular tube

Process requirements

1. Straight rectangular pipes must be made on the dedicated inlet assembly line to ensure the accuracy of the production of the air pipe and the air tightness of the air pipe.
2. The blanking of the rectangular air duct fittings should be fully automated using computer software on the imported special machine, and the automatic plasma cutting process should be completed on the imported sheet metal special plasma cutting machine.
3. The bite connection of the rectangular air duct should adopt the imported automatic articulator for the articulation process.
4. The connection between the rectangular air duct body and the plug flange should use a rivetless connection process, and use imported equipment for the rivetless connection process.
5. The connecting flange of rectangular air pipe should adopt the connecting plate flange and plug flange connection technology. When the long side of the air pipe is less than or equal to 2000mm, the common plate flange connection should be used. The long side of the air pipe is greater than 2000mm When the sum is less than or equal to 2500mm, the plug flange connection mode should be used, and the rectangular air duct should be mechanically pressed with reinforcing ribs, and the spacing between the reinforcing ribs is about 300mm.

Rectangular tube is a light-weight thin-walled steel tube with a hollow square cross section, also known as a steel refrigeration bent profile. It is made of hot-rolled or cold-rolled strip or coil as the base material, formed by cold bending and then shaped by high-frequency welding. In addition to the thickening of the wall thickness of the hot-rolled extra-thick square tube, the corner size and the straightness of the edge both reach or exceed the level of cold-formed square tube by resistance welding.



ASPERA

Rectangular tube

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REFERENCE STANDARDS				
	ASTM A500	JSG3466	ASII63	EN102102:2006
Outside Dimensions	≤63.5 ±0.51 63.5-88.9 ±0.64 88.9-139.7±0.76±0.76 >139. 7 ±1%	100 or less ± 1.5 Above 100 ± 1.5%	±1.0% min ±0.5mm	±1%, min ±0.5m
Convexity Or Concavity	65 or less ± 0.5 65-90 ± 0.6 90-140 ± 0.8 Above 140 ± 1.0%	Below 100 below 0.5 100 or more Chief Sergeant 0.5%	0.8% max or 0.5m (choose the maximum)	1%
Squareness Of Side	±2	±1.5	±1	±1
Bending Degree	0.20%	0.3% of total length	0.15% of total length	0.2% of total length, local range Within 3mm / m
Radius Of Corners	Rs = 3.0t or less	Rs = 3.0t or less	Below 50 Rs = 1.5-3.0t Rs above 50 = 1.8-3.0t Rs = 3.0t or less	Each corner is max. 3 times the wall thickness
Twist	40 or less ≤1.3m / m 40-65 ≤1.6m / m 65-100 ≤1.9mm / m 100-150 ≤2.2mm / m 150-200 ≤2.5mm / m 200 or more ≤2.8mm / m	No obvious distortion	2+0.5mm/m	2m. For every 1m increase in length, increase 0.5mm / m
Wall Thickness	±10%	Welding below 3mm ± 0.3mm 3mm or more ± 10% Seamless below 4mm ± 0.6mm Above 6mm ± 15%	±10%	Welding 10% + 0% Seamless -10% + 12.5%
Length	≤6.7m -6.4mm +12.7m >6. 7m -6 4mm +19mm	-0m + according to agreement	≤14m -0mm +6mm	2m-6m -0mm +10mm >6 -0mm +10mm

REFERENCE STANDARDS			
	QB/XJY01 Enterprise Standards	GB/T6728-2002	GB/T3094-2002
Outside Dimensions	Below 100 ±0.4(±0.2) 100 or more ±0.6%(±0.3%)	Below 50 ±0.5 300±2.4 100±0.8 300±2.8 150±1.2 400±3.2 200±1.6 500±4.0 250±2.0 600±4.0	Below 30±0.3 ±0.2 (Normal) (Advanced) 30-50 ±0.4 ±0.3 50-70 ±0.8% ±0.7% 75 or more ±1.0% ±0.8%
Convexity Or Concavity	Below 100±0.5 Below (±0.3) 100 or more ±0.4% Below (0.3)	Below 60 ±0.4 60 or more 0.6%	Below 30 ±0.2 ±0.1 30-50 ±0.3 ±0.15% 50-70 ±0.8% ±0.5% 75 or more ±0.9% ±0.6%
Squareness Of Side	±1.0“ (±1.5“)	±1.5“	±1.5“
Bending Degree	Special accuracy 0.2mm within 1m	Not more than 2mm per meter The total length is not greater than 0.2%	≤4.0mm per meter, total length ≤0.4% ≤2.0mm per meter, total length ≤0.2%
Radius Of Corners	Rs=1.0-3.0t	Carbon steel Rs = 1.0-3.5t Low alloy steel Rs = 1.5-4.0t	t ≤6 Rs ≤ 2.0t 6<t ≤10 Rs ≤ 2.5t t>10 Rs ≤ 3.0t
Twist	1mm within 1m Special accuracy 0.2mm within 1m	Distortion V = 2 + LX0.5 / 1000	Below 30 ≤1.5mm/m 30-50 ≤2.0mm/m 50-70 ≤2.5mm/m 75 or more ≤3.0mm/m
Wall Thickness	Use the corresponding standard tolerances of the material, or according to the agreement	Below 10.0mm ±10% 10.0mm or more ±8%	Below 1mm ±0.18 (Normal) ±0.12 (Advanced) 1-3mm +15% -10% +15% -10% 3mm or more +12.5% -11% ±10%
Length	-0mm +10mm	Normal level 4m—12m—0mm + 70mm Precision level 4m—6m—0mm + 5mm > 6m—12m—0mm + 10mm	-0mm +15mm

Rectangular tube is a name for square tube and rectangular tube, that is, steel tubes with equal and unequal sides. It is made of rolled steel after process treatment. Generally, the strip steel is unpacked, flattened, crimped, welded to form a round tube, and then rolled into a square tube from the round tube and then cut to the required length.

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RECTANGULAR TUBE

Aspera-Limited

SQUARE DIMENSION

OD	WT																	
Specification/Inch	2	3	4	5	6	8	9	10	12	14	16	18	20	22	25	28	30	32	35
20X20	—	—	—																
30X30	—	—	—	—	—														
40X40	—	—	—	—	—														
50X50	—	—	—	—	—														
60X60	—	—	—	—	—														
70X70	—	—	—	—	—														
80X80	—	—	—	—	—	—	—	—											
90X90	—	—	—	—	—	—	—	—											
100X100	—	—	—	—	—	—	—	—	—	—	—								
110X110		—	—	—	—	—	—	—	—	—	—								
115X115		—	—	—	—	—	—	—	—	—	—								
120X120		—	—	—	—	—	—	—	—	—	—								
135X135		—	—	—	—	—	—	—	—	—	—								
140X140		—	—	—	—	—	—	—	—	—	—	—							
150X150		—	—	—	—	—	—	—	—	—	—	—	—						
160X160		—	—	—	—	—	—	—	—	—	—	—	—						
180X180		—	—	—	—	—	—	—	—	—	—	—	—	—					
200X200				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
220X220				—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
240X240					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
250X250					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
260X260					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
280X280					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
300X300					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
350X350						—	—	—	—	—	—	—	—	—	—	—	—	—	—
400X400						—	—	—	—	—	—	—	—	—	—	—	—	—	—
500X500									—	—	—	—	—	—	—	—	—	—	—
600X600									—	—	—	—	—	—	—	—	—	—	—

RECTANGULAR DIMENSION

OD	WT																
Specification/Inch	5	6	8	9	10	12	14	16	18	20	22	25	28	30	32	35
100x300	—	—	—	—	—	—	—	—	—	—	—					
170x300	—	—	—	—	—	—	—	—	—	—	—					
200x200	—	—	—	—	—	—	—	—	—	—	—	—				
250x300		—	—	—	—	—	—	—	—	—	—	—				
254x304		—	—	—	—	—	—	—	—	—	—	—				
200x320	—	—	—	—	—	—	—	—	—	—	—	—				
100x350	—	—	—	—	—	—	—	—	—	—	—					
150x350	—	—	—	—	—	—	—	—	—	—	—	—				
250x350		—	—	—	—	—	—	—	—	—	—	—	—	—		
300x350		—	—	—	—	—	—	—	—	—	—	—	—	—		
200x360	—	—	—	—	—	—	—	—	—	—	—	—				
240x360		—	—	—	—	—	—	—	—	—	—	—	—	—		
310x360			—	—	—	—	—	—	—	—	—	—	—	—		
350x360			—	—	—	—	—	—	—	—	—	—	—	—		
200x360		—	—	—	—	—	—	—	—	—	—	—				
150x400		—	—	—	—	—	—	—	—	—	—	—				
200x400		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
300x400			—	—	—	—	—	—	—	—	—	—	—	—	—	—
350x420			—	—	—	—	—	—	—	—	—	—	—	—	—	—
150x450		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
250x450			—	—	—	—	—	—	—	—	—	—	—	—	—	—
300x500			—	—	—	—	—	—	—	—	—	—	—	—	—	—
200x600			—	—	—	—	—	—	—	—	—	—	—	—	—	—
200x700			—	—	—	—	—	—	—	—	—	—	—	—	—	—
400x700			—	—	—	—	—	—	—	—	—	—	—	—	—	—
500x700					—	—	—	—	—	—	—	—	—	—	—	—
400x800					—	—	—	—	—	—	—	—	—	—	—	—
600x800					—	—	—	—	—	—	—	—	—	—	—	—

1. The allowable deviation of the wall thickness of the rectangular tube is not to exceed 10% of the nominal wall thickness when the wall thickness is less than 10mm, and 8% of the wall thickness when the wall thickness is greater than 10mm. Except for wall thickness.
2. The usual delivery length of the rectangular tube is 4000mm-12000mm, mostly 6000mm and 12000mm. The rectangular tube is allowed to deliver short-scale and non-fixed-size products of not less than 2000mm, and can also be delivered in the form of an interface tube, but the demand side should cut off the interface tube when using it. The weight of the short-length and non-fixed-length products does not exceed 5% of the total delivery volume. For the rectangular tube with a theoretical weight greater than 20kg / m, it should not exceed 10% of the total delivery volume.
3. The bending of the rectangular tube should not be greater than 2mm per meter, and the total bending should not be greater than 0.2% of the total length.

info@aspera-limited.com

Application

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