

ERW STEEL PIPE

# ELECTRICAL RESISTANCE WELDED STEEL PIPE

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 **湖南申德钢铁有限公司**  
H S C O HUNAN STANDARD STEEL CO.,LTD



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# A Introduction

## Company Profile

Hunan Standard Steel Co.,Ltd as the professional manufacturer of steel pipe and pipe fittings, is a Sino-Singapore joint venture enterprise which commenced its construction from 1989 and put into production on July 25 ,1990, The company is located in an industrial zone in Xinsha town,Changsha city ,Standard Steel will ,taking the scientific developments view as guideline in its overall reformation and develepment, stick to the development of quality -profitability road under the guidance of science and technology ,and persist in extraversive development with implementation of strategy of taking central china as standing ground and developing southwest,The group will makes the great efforts to reach a production scale of more than 10 million tons with an annual sales income of over 30 billion RMB into the rank of 500 top steel enterprises in the word.

Hunan Standard Steel Co.,Ltd has a capacity to produce full range and a wide variety of quality ERW steel pipe with High-frequency longitudinally welded pipe production line, which is mainly used for the production of welded steel pipe of  $\phi 8 \sim \phi 630\text{mm}$  and wall thickness of 0.5~ 25mm as well as the production of square, rectangular, and other custom seamless pipe profile, Carbon steel pipe, ERW steel Tube. The line can manufacture welded pipes with good quality machining and high precision assembling at high speed. The steel products are widely used in aviation, aerospace, national defense equipment, oil exploration, engineering machinery, automobiles, railway rolling stock, new energy and other industries and fields. Its exporting markets cover over 100 global main regions and countries with ten million tons Iron and steel capability.

So far, Hunan Standard Steel Co.,Ltd is the predecessor of branch of China's oil pipeline and gas pipeline science research institute, as the most authoritative pipeline engineering research institute, consists of eight backbone institute and line pipe bureau postdoctoral research stations, oil and gas pipe is "safe" the main body of the national engineering laboratory on units, is China technology center and plumbing contractor as well as steel products supplier branch of China welding association director branch pipe welding unit, and a large number of sophisticated equipment and high-end talent in pipeline engineering materials, pipe welding technology, piping, special tools and pipeline construction technology, pipeline corrosion protection technology, piping nondestructive testing technology, pipeline safety evaluation, pipe information standard eight fields a leading domestic level, undertake and fulfill the country and provincial key technology research projects more than 200 items, has a number of national patent results at home and abroad, and key pipeline engineering application widely.

# Quality



## Quality Assurance

Nowadays, Hunan Standard Steel Co.,Ltd has been granted a number of acceptance certificates issued by several international and domestic institutions. Such as:

Official API Monogram(API)

Quality Management System (ISO 9001)

Det Norske Veritas (DNV)

Bureau Veritas (BV)

Societe Generale de Surveillance S.A. (SGS)

Certificate Of Quality ( CIQ)







### Inspection Centre

Hunan Standard Steel Co.,Ltd have quality inspection center to provide testing services to the production process and finished products. The laboratory has 14 sets of test equipment, including Flattening test units, Hydraulic 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 properties. 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.



### Hardness Test

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



### 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.



### Hydraulic Tester

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 Microscope

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



### 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.



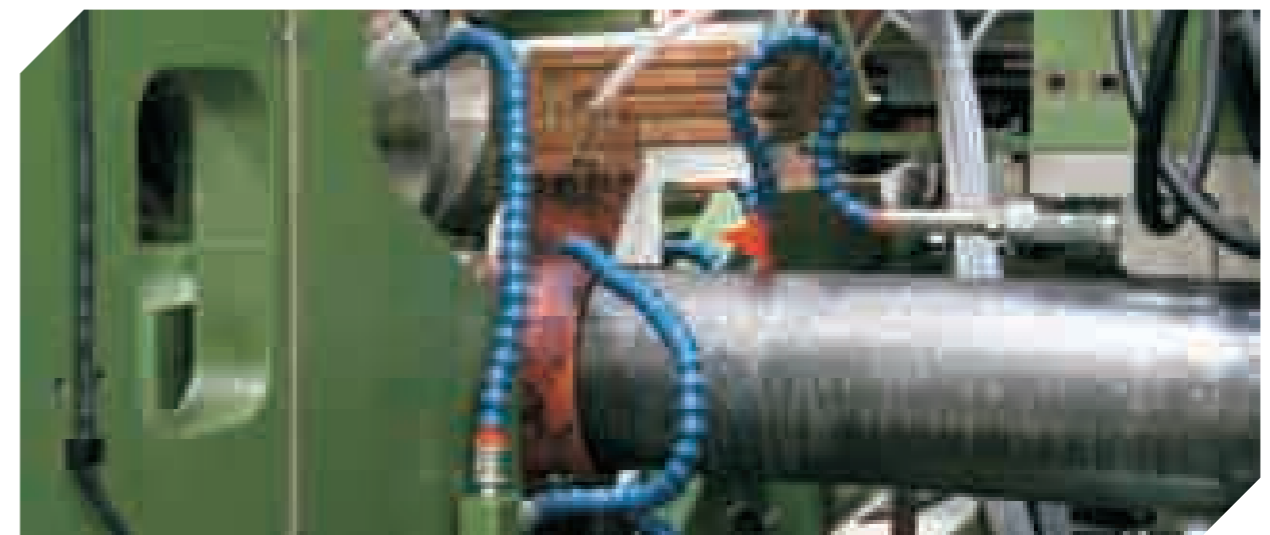
### Ultrasonic Flaw Detector

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.



### 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.



## Factory & Production Line

High-frequency longitudinally welded pipe production line is mainly used for the production of welded steel pipe of  $\phi 8 \sim \phi 610$  mm and wall thickness of 0.5~ 20mm as well as the production of square, rectangular, and other custom seamless pipe profile, Carbon steel pipe, ERW steel Tube. The line can manufacture welded pipes with good quality machining and high precision assembling at high speed.



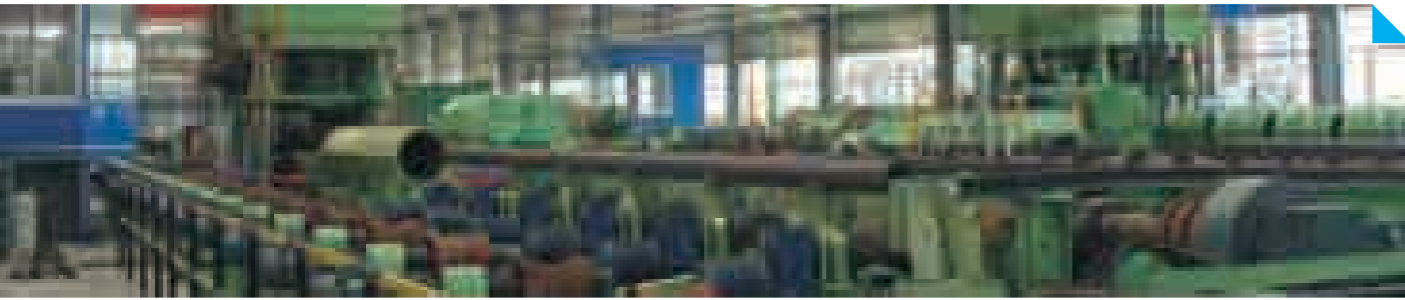
# B Production

## ERW Steel Pipe

ERW steel pipe is flattened then place it into roller to form a tube and passes through a welding electrode made of copper disk which is connected to a revolving transformer. When the electrodes contact each side, the temperature is increased to the welding point. Once the tubes leaves the electrodes, the inside flash is removed by after colling the tube with a hammer and the outer flash by a cutting tool. The surface finish could be either bare or coated. erw steel pipe is used in fencing, line pipes, oil country tubular, scaffolding, water and gas conveyance, structural, engineering purpose. There has been a tremendous increase in the production of ERW steel tubes due to growing demand in oil & gas industry, infrastructure and automobile usages.







## Production Equipment

Hunan Standard Steel Co.,Ltd is well equipped and masters advanced workshop and technology. The HFW 426 weld pipe mill has introduced today's world-class petroleum steel pipes manufacturing technology and equipment, including the forming machine and milling saw from Japanese KUSAKABE Company, the solid state high frequency welder from Norwegian EFD Company, the servo motor from German SIEMENS Company, and other equipment is manufactured by famous factories at home. The products include: oil castings meeting the United States API 5CT Standard for the steel grade of H40, J55, K55, N80 and L80 as well as oil and natural gas pipelines satisfying the United States API 5L Standard for the steel grade of X80 and below and the ASTM A53 Standard, German DIN 17100 Standard, GB/T9711.1-1997.



### Pinching Machine

Pinching machines, including machines, rails, fixed clamping block, activities clamping block and cylinder; the machine table surface provided with the rail and the fixed clamping block the rail in close proximity to one end of the stationary clamping block; said movable clamping block is provided on the guide rail and can slide along the rail; the active clamp block connected to said cylinder rod; the cylinder fixed to the other end of the guide rail. A horizontal hydraulic clamping of the utility model provides machine, the workpiece can reduce injuries, improve the efficiency of the clamp.



### Precious Leveling Machine

The machine adopts pneumatic clamp connection dovetail clamping plate, clamp easy to move, reduce the bending deformation of the material, reducing processing dead zone, a large selection of high-precision servo motor torque, long life, high precision drive, precision ball screw high performance linear motion guide, to meet the various requirements of the stamping process, through the machine after leveling can be corrected material to bend up and down or flat.



### High-Frequency Induction Welder

High-frequency induction welding machine can be used for various kinds of diamond saw blade welding your factory, diamond tools, diamond drilling tools, carbide cutting tools and the like. The new high-frequency high-efficiency equipment 、 low cost electricity and failure costs.



### Edger Roll Machine

Vertical roller mill gearing is not due to axial load weight and high pressure grinding disc, so the gear reducer can be generic, which has the advantages of compact structure configuration, reliable, and can shorten the stop grinding time, reduce use and maintenance cost of the device.



### Uncoiling Machine

Unwinding of sheet metal leveling machine is special equipment for steel leveling lines, uneven boards can be composed according to the configuration uncoiling, leveling, cutting production lines and other sheet metal products production line.



### Plate Shear

Shears with a blade relative to the other reciprocating linear motion of the shear blade for sheet metal machine. Is in motion by the blade and the fixed lower blade, using reasonable blade clearance, applying a shearing force on the sheet metal of various thicknesses, the sheet material separated by the desired size of the fracture.



### Looper Accumulator

A horizontal strip accumulator for metal strip includes a looper car which is moveable along a travel path at at least one swivel gate which is moveable, when the looper car is moved, by the looper car between a starting position and an end position. For moving the swivel gate, the looper car acts on an actuating element which is connected with the swivel gate through a four-gear mechanism with two swivels.

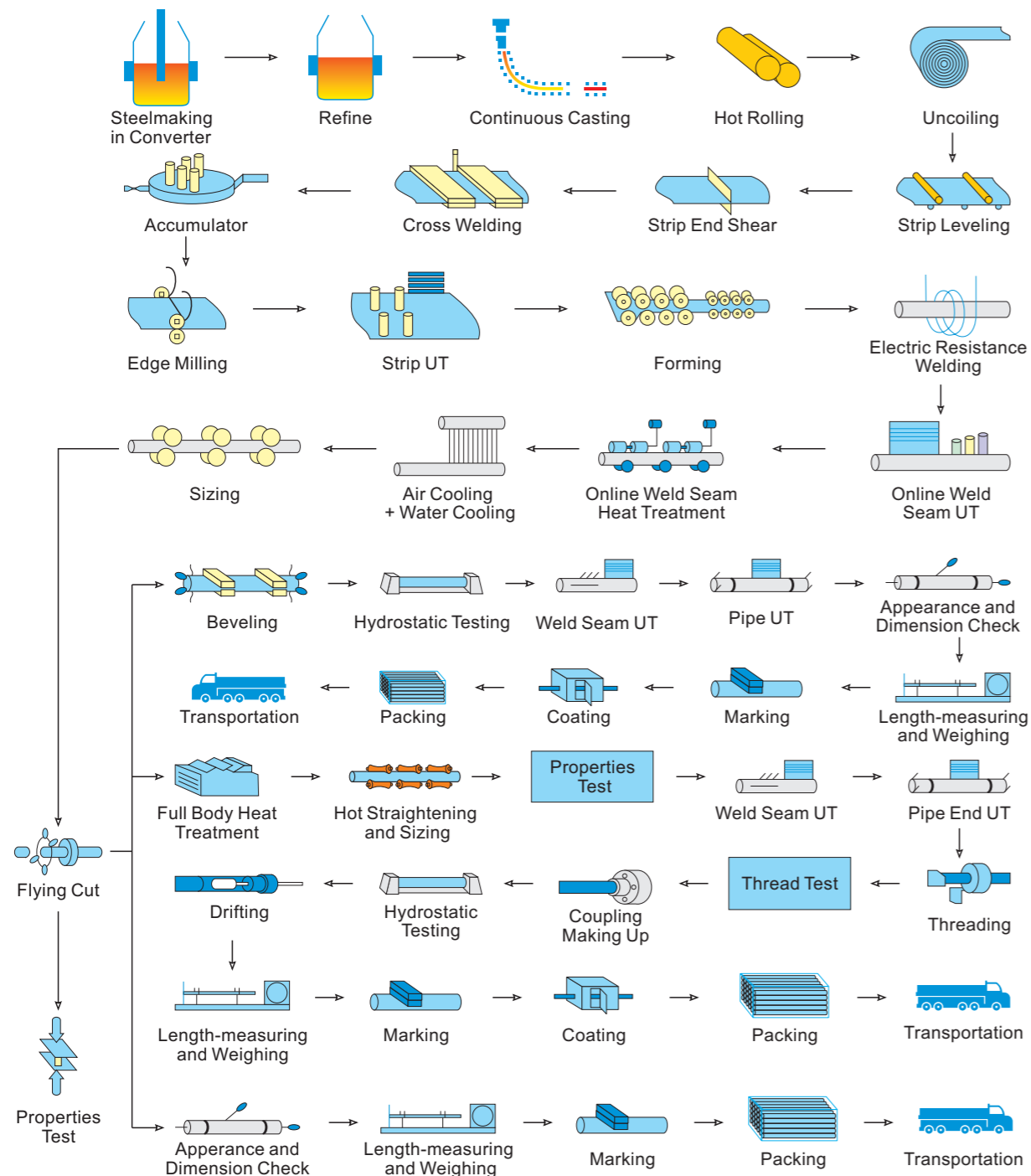


### Slitting Shears

Slitting shears is widely used for longitudinal shear thickness less than 20-30mm steel and thin strip. Because the blade is rotating disk, which can cut a moving continuous longitudinal steel or steel.



## Process

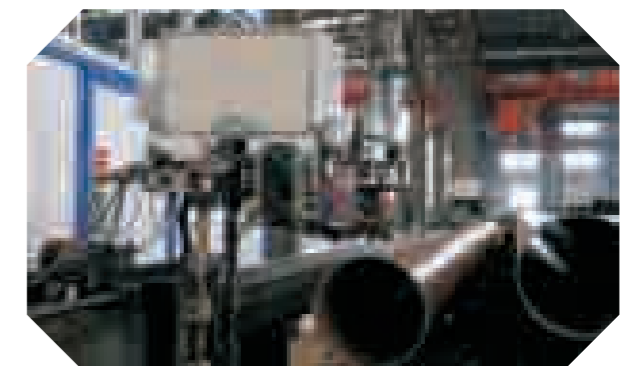


ERW pipe is formed from hot-rolled coil produced in steel mill. All the incoming coils are verified based on the test certificate received from steel mill for their chemistry and mechanical properties.

The forming stage of ERW pipe begins with a single-width strip. The width of strip is roughly equal to the perimeter of the pipe to be produced. The edges of coil are sheared to pre-specified widths in slitting line.

The process involves uncoiling & leveling of coils and processing the same. The lead end of each coil is squared by shearing operation for threading into the mill. Then this end is joined with coil end of outgoing coil to maintain continuity in production and reduce losses.

To maintain continuity of production, it is accumulated in an accumulator/loop pit. It is then gradually and continuously formed into a circular shape by shaped rolls as per the required diameter in forming stands arranged in tandem. In the welding stand, edges of formed strip are pre heated by High Frequency Electrical Induction heating process to the desired temperature, which are mechanically pressed together horizontally to form continuous weld seam. This welding process does not need any filler metal. Instead, the welding pressure causes some of the metal to be squeezed from the joint, forming a bead of metal on inside and outside of the tube. This bead or welding flash is trimmed during the process. The weld seam is examined and adjusted as per the weld parameters, including temperature and outside diameters.



## Introduction

### Line Pipe

**Standard:** API SPEC 5L, GB/T 9711-1, GB/T 9711-2, ISO 3183-1, ISO 3193-2  
**Application:** For conveying gas, water, and oil in both the oil and natural gas industries.

### Specifications

Wall Thickness 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																			

### Tolerances of Outside Diameter

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%
GB/T 9711-1 ISO 3183-1	219.1~273.1	+1.59mm, -0.4mm	±0.75%
	219.1~273.1	2.38mm, -0.79mm	±0.75%
	219.1~273.1	2.38mm, -0.79mm	±1%
GB/T 9711-2 ISO 3183-2	219.1~273.1	±0.5%	±0.75%
	323.9~355.6	±1.6mm	±0.75%
	406.4~610	±1.6mm	±3.0mm

### Tolerances of Wall Thickness

Out Diameter	Grade	Out Diameter	Wall Thickness	Tolerance
API 5L	/	219.1~457	4~20	+15%, -12.5%
	B	508~610	4~20	+17.5%, -12.5%
	X42-X80	508~610	4~20	+19.5%, -8%
GB/T 9711-1 ISO 3183-1	-	219.1~457	4~20	+15%, -12.5%
	L245	508~610	4~20	+17.5mm, -10%
	L290-L555	508~610	4~20	+19.5%, -8%
GB/T 9711-2 ISO 3183-2	-	219.1~610	4~20	+1.0mm, -0.5mm
	-	219.1~610	10.1~20	+10%, -5%

### Chemical Analysis and Mechanical Properties

Standard	Class	Grade	Chemical Components				Mechanical Properties	
			C	Mn	P	S	Tensile Strength (Mpa)	Yield Strength (Mpa)
API 5L	PSL1	B	0.26	1.20	0.030	0.030	≥414	≥241
		X42	0.26	1.30	0.030	0.030	≥414	≥290
		X46	0.26	1.40	0.030	0.030	≥434	≥317
		X52	0.26	1.40	0.030	0.030	≥455	≥359
		X56	0.26	1.40	0.030	0.030	≥490	≥386
		X60	0.26	1.40	0.030	0.030	≥517	≥414
		X65	0.26	1.45	0.030	0.030	≥531	≥448
		X70	0.26	1.65	0.030	0.030	≥565	≥483
	PSL2	B	0.22	1.20	0.025	0.015	414-578	241-448
		X42	0.22	1.30	0.025	0.015	414-578	290-496
		X46	0.22	1.40	0.025	0.015	434-758	317-524
		X52	0.22	1.40	0.025	0.015	455-758	359-531
		X56	0.22	1.40	0.025	0.015	490-758	386-544
		X60	0.22	1.40	0.025	0.015	517-758	414-565
GB/T 9711-1 ISO 3183-1	-	L245	0.26	1.15	0.030	0.030	≥415	≥245
	-	L290	0.28	1.25	0.030	0.030	≥415	≥290
	-	L320	0.30	1.25	0.030	0.030	≥435	≥320
	-	L360	0.30	1.25	0.030	0.030	≥460	≥360
	-	L390	0.26	1.35	0.030	0.030	≥490	≥390
	-	L415	0.26	1.35	0.030	0.030	≥520	≥415
	-	L450	0.26	1.40	0.030	0.030	≥535	≥450
	-	L485	0.23	1.60	0.030	0.030	≥570	≥485
	-	L555	0.18	1.80	0.030	0.030	≥625	≥555
	GB/T 9711-2 ISO 3183-2	-	L245MB	0.16	1.50	0.025	0.020	≥415
-		L290MB	0.16	1.50	0.025	0.020	≥415	290-440
-		L360MB	0.16	1.60	0.025	0.020	≥460	360-510
-		L415MB	0.16	1.60	0.025	0.020	≥520	415-565
-		L450MB	0.16	1.60	0.025	0.020	≥535	450-570
-		L485MB	0.16	1.70	0.025	0.020	≥570	485-605
-	L555MB	0.16	1.80	0.025	0.020	≥625	555-675	



Casing

Standard: API SPEC 5CT

Application: Casing serves as wall of well

Specifications

OD		WT		End Type			
inch	mm	inch	mm	Grade			
				J55 K55	M65	N80/L80-1	P110
8 5/8	219.08	0.304	7.72	-	PS	-	-
		0.352	8.94	PSLB	PSLB	-	-
		0.400	10.16	PSLB	PSLB	PLB	PLB
		0.450	11.43	-	PLB	PLB	PLB
		0.500	12.70	-	-	PLB	PLB
9 5/8	244.48	0.352	8.94	PSLB	PSLB	-	-
		0.395	10.03	PSLB	PSLB	PLB	PLB
		0.435	11.05	-	PLB	PLB	PLB
		0.472	11.99	-	PLB	PLB	PLB
		0.545	13.84	-	-	PLB	PLB
10 3/4	273.05	0.350	8.89	PSB	PSB	-	-
		0.400	10.16	PSB	PSB	-	-
		0.450	11.43	PSB	PSB	PSB	PSB
		0.500	12.57	-	PSB	PSB	PSB
		0.545	13.84	-	-	-	PSB
13 3/8	339.72	0.380	9.65	PSB	PSB	-	-
		0.430	10.92	PSB	PSB	-	-
		0.480	12.19	PSB	PSB	PSB	PSB
		0.514	13.06	-	-	PSB	PSB
16	406.40	0.438	11.13	PSB	-	-	-
		0.495	12.57	PSB	-	-	-
		0.656	16.66	P	-	-	-
18 5/8	473.08	0.435	11.05	PSB	-	-	-
20	508	0.438	11.13	PSLB	-	-	-
		0.500	12.70	PSLB	-	-	-
		0.635	16.13	PSLB	-	-	-



Dimensional Tolerances

Standard	Tolerance of O.D.	Tolerance of W.T.	Straightness of Pipe Body	Straightness of Pipe End	Tolerance for Weight
API 5CT	+1%, -0.5%	-12.5%	≤ 0.2%L	≤ 3.18mm	+6.5%, -3.5%

Mechanical Properties

Standard	Grade	Yield Strength (Mpa)	Tensile Strength (Mpa)	Hardness(HRC)	Impact Energy(J)(min)	Impact Temperature(°C)
API 5CT	J55	379-552	≥ 517	-	T-10-20(SR16)	21
	K55	379-552	≥ 655	-	L-10-27(SR16)	
	M65	448-586	≥ 586	≤ 22	T-10-20, L-10-41 C19-20, C76-77(SR16)	0
	L80	552-655	≥ 655	≤ 23		
	N80	552-758	≥ 689	-		
	P110	758-965	≥ 862	-		

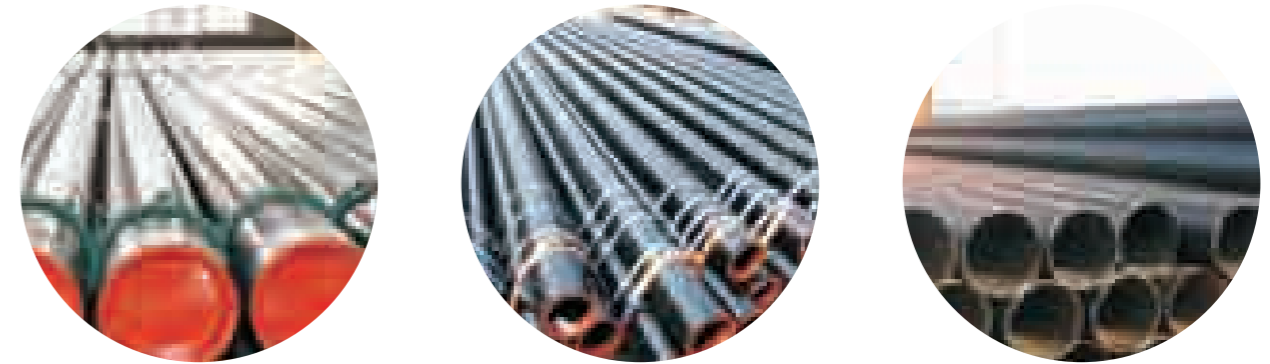
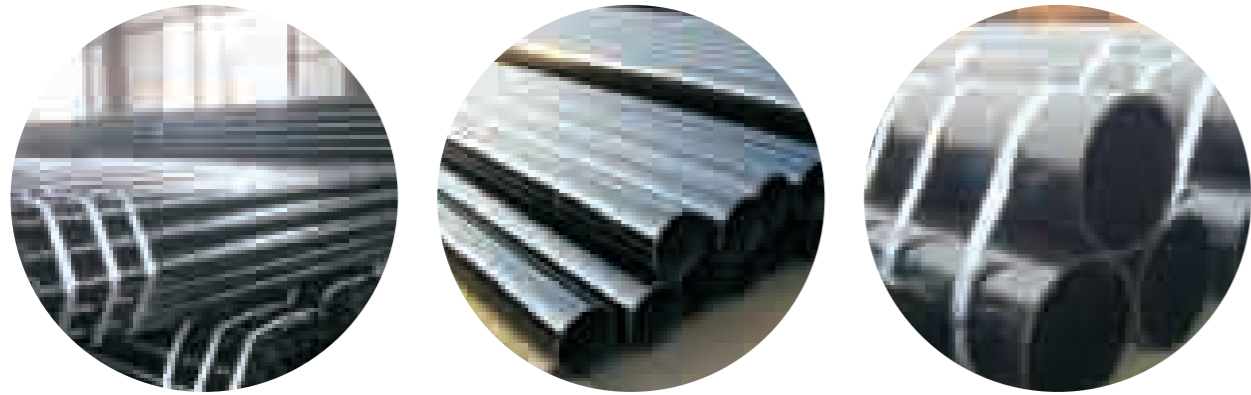
Chemical Composition(%)

Standard	Grade	C	Mn	P	S	Ni	Cu	Si
API 5CT	J55	-	-	≥ 0.030	≥ 0.030	-	-	-
	K55	-	-	≥ 0.030	≥ 0.030	-	-	-
	M65	-	-	≥ 0.030	≥ 0.030	-	-	-
	L80	≥ 0.43	≥ 1.90	≥ 0.030	≥ 0.030	≥ 0.25	≥ 0.35	≥ 0.45
	N80	-	-	≥ 0.030	≥ 0.030	-	-	-
P110	-	-	≥ 0.030	≥ 0.030	-	-	-	

## Structure Tube

**Standard:** ASTM A53, GB/T 13793, GB/T 6725, JIS G 3466

**Application:** suitable for mechanical and pressure applications and low pressure liquid delivery and other purpose



### Round Pipe Specifications

Wall Thickness		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	325.0	14	355.6	16	406.4	18	457.7	20	508.0	24	610	24 4/5	630.0	
0.157	4.0																			
0.197	5.0																			
0.236	6.0																			
0.276	7.0																			
0.315	8.0																			
0.354	9.0																			
0.394	10.0																			
0.433	11.0																			
0.492	12.5																			
0.551	14.0																			
0.630	16.0																			
0.689	17.5																			
0.748	19.0																			
0.787	20.0																			

### Dimensional Tolerances

Standard	Tolerance for O.D.		Tolerance of W.T.	
	O.D.(mm)	Tolerance	W.T.(mm)	Tolerance
ASTMA53	219-610	±1%D	-	-12.5%
GB/T 3091	219-508	+2.4mm, -0.8mm	-	±12.5%
	508.1-610	+3.0mm, -0.8mm	-	-
GB/T 6725	219.1-610	±1%D	4-10	±10%
			10.1-20	±8%
GB/T 13793	219-323.9	±0.8%D	4.2-5.5	±8%
			324.0-610	±10%

### Mechanical Properties

Standard	Grade	Yield Strength(min) (Mpa)	Tensile Strength (min) (Mpa)	Elongation(%)
ASTMA53	A	205	330	-
	B	240	415	-
GB/T 700	Q215	215	335	20
	Q235	235	375	20
GB/T 1591	Q295	295	390	18
	Q345	345	510	18
GB/T 699	10	205	335	31
	20	245	410	25
JIS G 3466	STKR400	245	400	23
	STKR490	325	490	23

### Chemical Composition(%)

Standard	Grade	C(max)	Mn	Si	P	S	V	Ni	Cu	Cr	Mo	
		Max										
ASTMA53	A	0.25	0.95	-	0.05	0.045	0.08	0.4	0.4	0.4	0.15	
	B	0.30	1.20	-	0.05	0.045	0.08	0.4	0.4	0.4	0.15	
GB/T 699	10	0.07-0.13	0.35-0.65	0.17-0.37	0.035	0.035	-	0.30	0.25	0.15	-	
	20	0.17-0.23	0.35-0.65	0.17-0.37	0.035	0.035	-	0.30	0.25	0.25	-	
GB/T 700	Q235A	0.14-0.22	0.3-0.35	0.30	0.045	0.05						
	Q235B	0.12-0.2	0.3-0.7			0.045						
	Q235C	0.18	0.35-0.8			0.04						0.04
	Q235D	0.17				0.035						0.035
GB/T 1591	Q345A	0.20	1-1.6	0.55	0.045	0.045	0.02-0.15					
	Q345B	0.20			0.040	0.040						
	Q345C	0.20			0.035	0.035						
	Q345D	0.18			0.030	0.030						
	Q345E	0.18			0.025	0.025						
JIS G 3466	STKR400	0.25	-	-	0.040	0.040	-	-	-	-	-	
	STKR490	0.18	0.55	1.50	0.040	0.040	-	-	-	-	-	

# C Logistics



## Introduction

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



### 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 risk of damaged pipe-ends. This is caused by extra handling procedures in ports and shifting of the pipes onboard vessels.

### Pipe Handling

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, design of bottom support, and contamination. In this paragraph the impact of these influences on the pipe coating is examined.





# D Import & Export





## Overseas Agents


Steel pipe from Hunan Standard Steel Co.,Ltd is not only in domestic, but also exported to all over the world, so far, we have 12 agents distributed in different regions of the world.

- Asia:  Singapore



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- Africa:  South Africa  Nigeria


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- Europe:  Italy  Romania


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- Australia:  Australia  New Zealand



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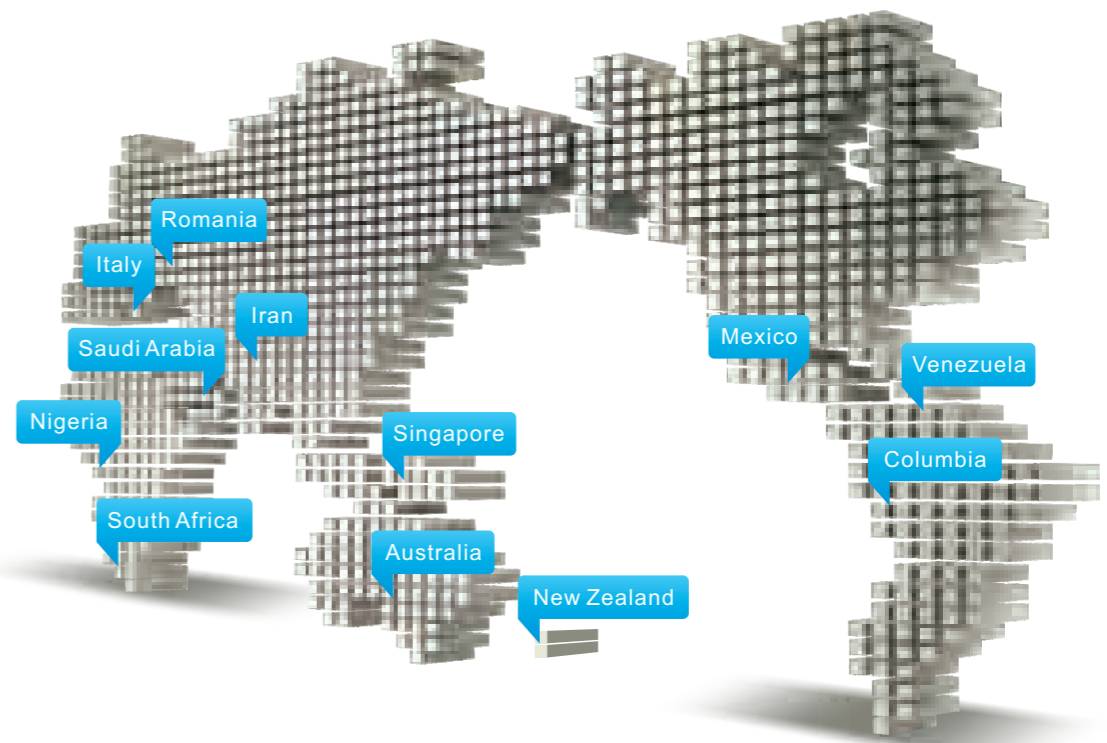
- Middle East:  Saudi Arabia  Iran

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- North America:  Mexico

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- South America:  Venezuela  Columbia



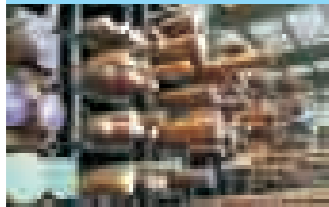
Material Resources





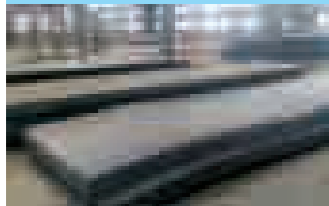
Raw Materials

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



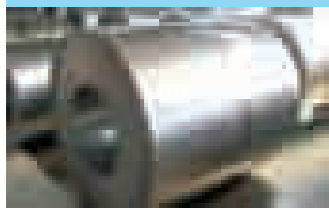
Heavy plates are mainly used in shipbuilding, offshore platform, boiler, pressure vessel, pipeline, high building, bridge and heavy duty trucks, etc.

HR steel sheet



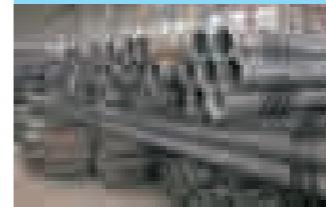
With the excellent properties such as high strength, good toughness, easy machinability and good weldability, Baosteel's hot-rolled steel products are widely used in ship, automobile, bridge, building, machinery and pressure vessel and other industrial applications.

CR steel sheet



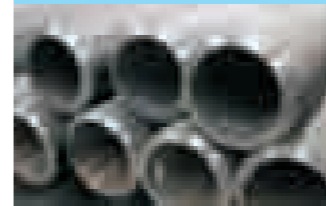
CR steel sheets have good processability, with good flatness and excellent surface, are available with different thickness and width combinations; are mainly used to manufacture the high value-added products in automotive and appliance, beverage packaging, electronic, electrical moor and building etc.

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  $PN \leq 32.0\text{MPa}$ , temperature  $-30-425\text{ }^\circ\text{C}$  water, steam, air, hydrogen, ammonia, nitrogen and petroleum products, and other media.

Alloy steel



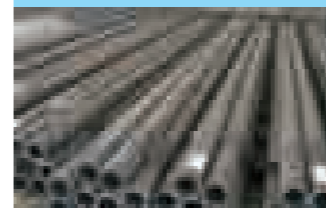
Alloy steel is often subdivided into two groups: high alloy steels and low alloy steels. The difference between the two is defined somewhat arbitrarily. However, most agree that any steel that is alloyed with more than eight percent of its weight being other elements beside iron and carbon, is high alloy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

# E Projects

## Oil & Gas



- ◎ Refineries
- ◎ Petrochemical Plants
- ◎ Offshore Facilities
- ◎ Pipelines

## Power / Alternative Energy



- ◎ Thermal and Hydroelectric Power
- ◎ Waste-to-Energy Plants
- ◎ Transmission Lines
- ◎ Substations

## Water Supply / Sewage



- ◎ Dams
- ◎ Transmission Pipelines
- ◎ Irrigation Canals
- ◎ Pumping Stations

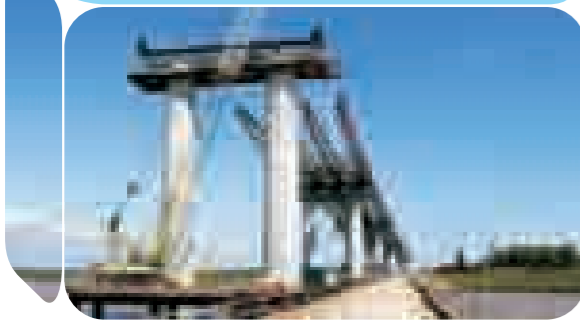
## Industrial Process



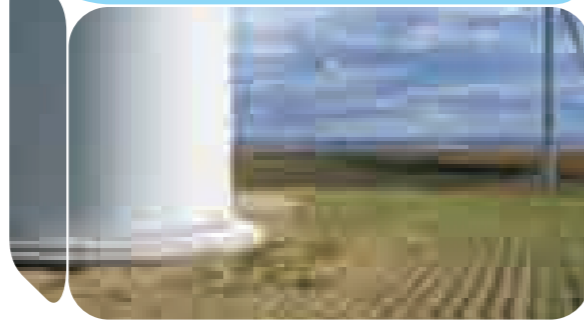
- ◎ Steel Mills
- ◎ Pharmaceutical Plants
- ◎ Chemical Plants
- ◎ Mining



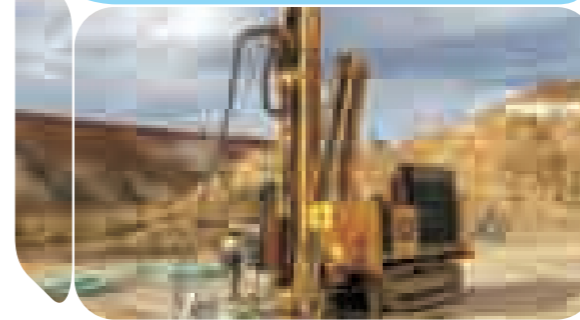
Bridge construction



Environmental project



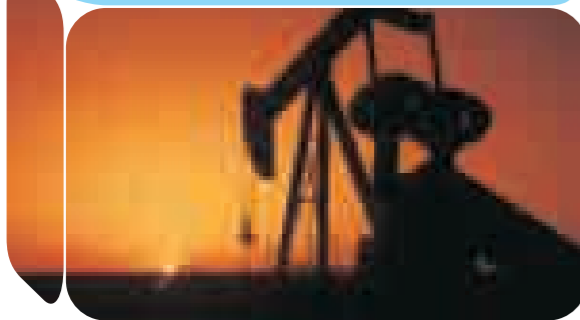
Mineral exploration



Offshore engineering



Gas exploration



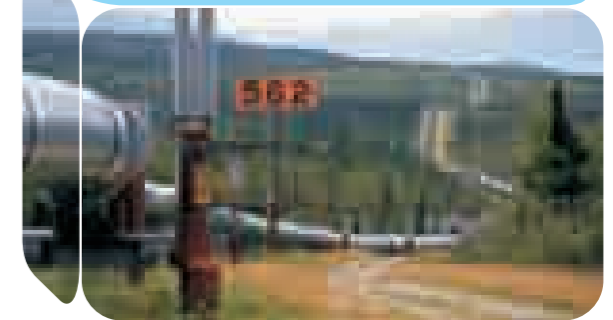
Hydraylic system



Oil refinery



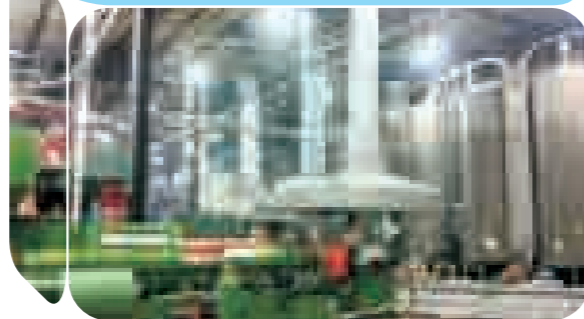
Pipeline for NICO



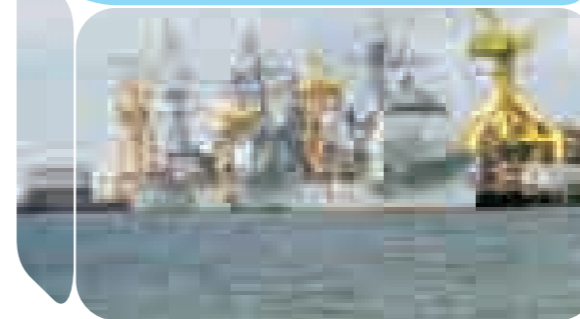
Hydroelectricity



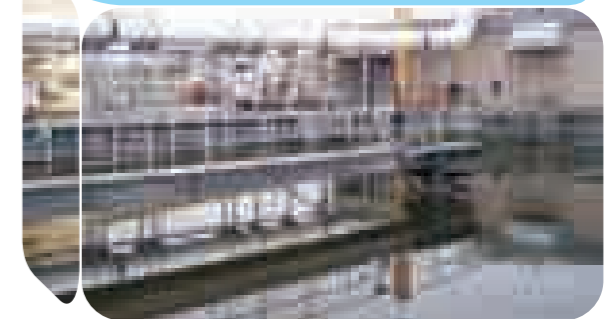
Industrial exhaust



Shipbuilding



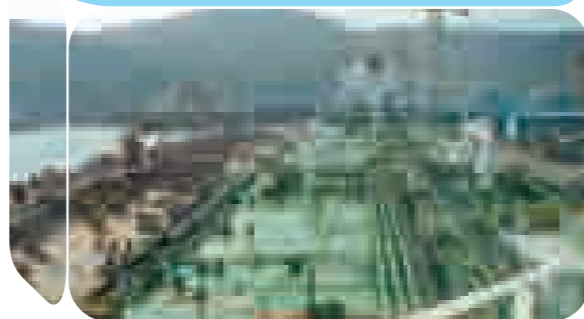
Sweage treatment



Liquefeild gas



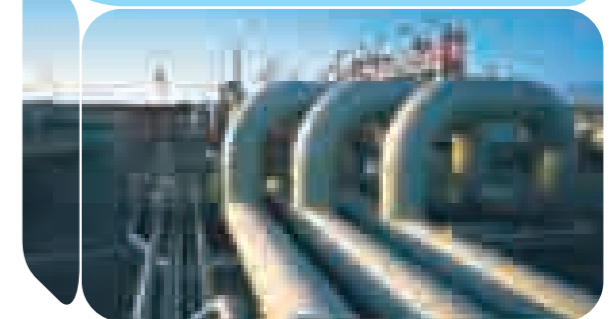
Marine engineering



Thermal power plants



West- east gas pipeline



### Achievement List Of Main Projects

YEAR	COUNTRY	PROUCT NAME	STANDARD / GRADE	SPECIFICATION	QUANTITY
2014	Colombia	ERW	API 5L GR.B	168.3*7.25	1200MT
2014	Singapore	ERW	ASTMA53 GR.B	457.2*12.5	1563MT
2014	Saudi Arabia	ERW	ASTMA53 GR.B	10**10.75 18**9.53	11770METERS
2014	Iraq	ERW	API 5L GR.B	133*5.75 406.4*5.5	1845MT
2014	Spain	ERW	API 5L, X42	210*8.75 610*5.75	18000METERS
2014	Georgia	ERW	API 5L GR.B	325*SCH80	3500MT
2014	Peru	ERW	API 5L, X42	660*12.5	1330MT
2014	Saudi Arabia	ERW (VARNISH)	ASTMA53 GR.B	60.3, 73, 88.9*5.54-7.62	583MT
2014	Singapore	ERW	API 5L, GR.B	610*5.75	918MT
2014	Botswana	ERW	API 5L, X56 PSL1	101.6*4.75	15000METERS
2013	Panama	ERW	API 5L, X56	108*SCH80	1569MT
2013	Cyprus	ERW	API 5L, X65	508*12.5	1300MT
2013	Saudi Arabia	ERW (VARNISH)	ASTMA53 GR.B	60.3, 73, 168.3*5.54-7.11	704MT
2013	Italy	ERW	ASTMA53 GR.B	114-273*5.49-9.27	4016METERS
2013	Singapore	ERW / SMLS	API 5L, GR.B	ERW:4"-14" SMLS:6-12"	1854MT 644MT
2013	Saudi Arabia	ERW (VARNISH)	ASTMA53 GR.B	73, 88.9*7.01, 7.62	978MT
2012	Chile	ERW	API 5L GR.B	406.4*5.5	1986MT
2012	Ukraine	ERW	ASTMA53 GR.B	4"SCH40 6"SCH80	132MT
2012	Kenya	ERW	ASTMA53 GR.B	508*12.5	1625MT
2012	Saudi Arabia	ERW	API 5L ,GR.B	18**9.53	1800MT
2012	Mexico	ERW	API 5L, GR.B	6**6.0mm	10160METERS
2012	Brazil	ERW	API 5L X52 PSL1	141.3*7.75mm	12500METERS

YEAR	COUNTRY	PROUCT NAME	STANDARD / GRADE	SPECIFICATION	QUANTITY
2011	Romania	ERW (3PE)	API 5L, X52	355.6*7.1/7.9	12000METERS
2011	Singapore	ERW	API 5L GR.B	73-406.4*5.16-9.52	1890METERS
2011	Saudi Arabia	ERW (VARNISH)	ASTMA53 GR.B	60.3,73,273*5.54,7.01,7.08	770MT
2011	Algeria	ERW (3PE)	API 5L GR.B	219*3.5	3500METERS
2010	Singapore	ERW / SMLS	API 5L, GR.B	ERW:6"-24" SMLS:18-24"	958MT 180MT
2010	Angola	ERW	API 5L GR.B (PSL2)	60.3*3.0	1660MT
2010	Serbia	ERW (3LPE)	API 5L,GR.B/X42 (PSL2)	88.9MM,273mm	2500MT
2010	Belgium	ERW	API 5L. X60, X65	76.1*4.0	1537MT
2010	Australia	ERW	API 5L ,GR.B	3**5.0 60.3*3.0	12563METERS
2010	Switzerland	ERW	EN10208-2 L290	406.4*9.53	5000METERS
2010	Sudan	ERW (3LDPE)	API 5L, X42	914*12.7 / 355*9.52	96840METERS
2010	Bangladesh	ERW	API 5L GR.B	323.8*6.4 / 406.4*7.9	1120MT
2009	Australia	ERW	API 5L ,GR.B	609*12	1128METERS
2009	Israel	EFW	ASTMA672 CLASS22	660,711,762	3560METERS
2008	Yemen	ERW (VARNISH)	ASTMA53 GR.B	8" 10"	400MT
2008	Spain	ERW	API 5L. X52,X60(PSL2)	273,323,355*7.8-8.7mm	1067MT
2007	Spain	ERW	API 5L. GR.B	323*6.35	950MT
2006	Norway	ERW	API 5L, X42(PSL2)	168.3*5.6	674MT
2006	SYRIA	ERW	API 5L X52	24" 36"	2150MT
2006	Iran	ERW	API 5L X52	API 5L X52, 20** 8.7mm	119400METERS
2006	Saudi Arabia	ERW	API 5L. GR.B	273*6.3 / 219*6.3	1272METERS
2005	LAOS	ERW	API 5L GR.B / X65 (PSL2)	14" / 24**SCH80	880MT

# F Clients



< SHELL OIL COMPANY



< SINOPEC GROUP



< PEMEX



< TOTAL S.A



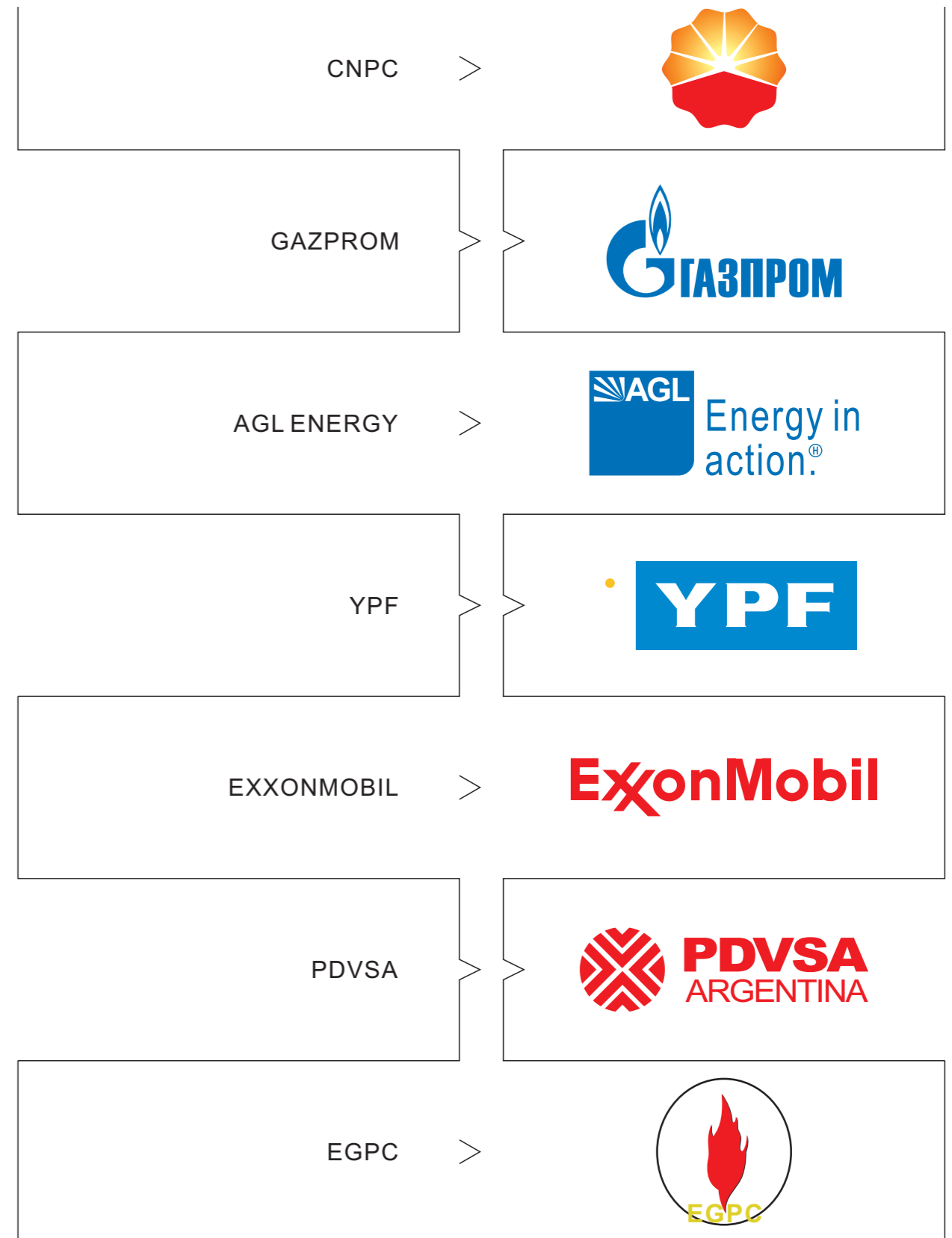
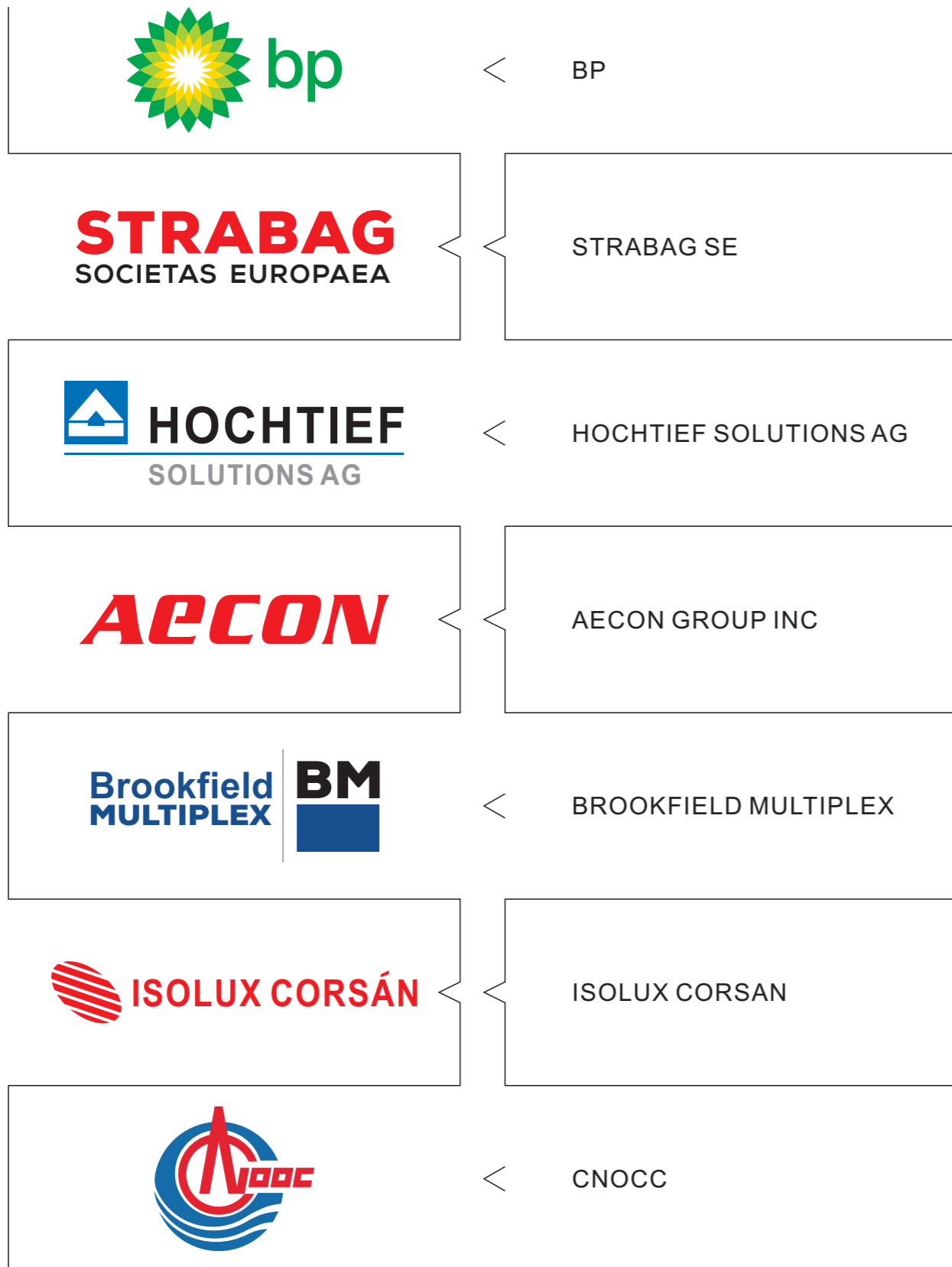
< PETROBRAS





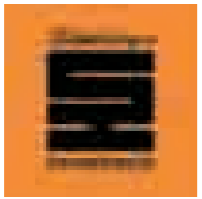




< AMOCO CORPORATION









< TERPEL



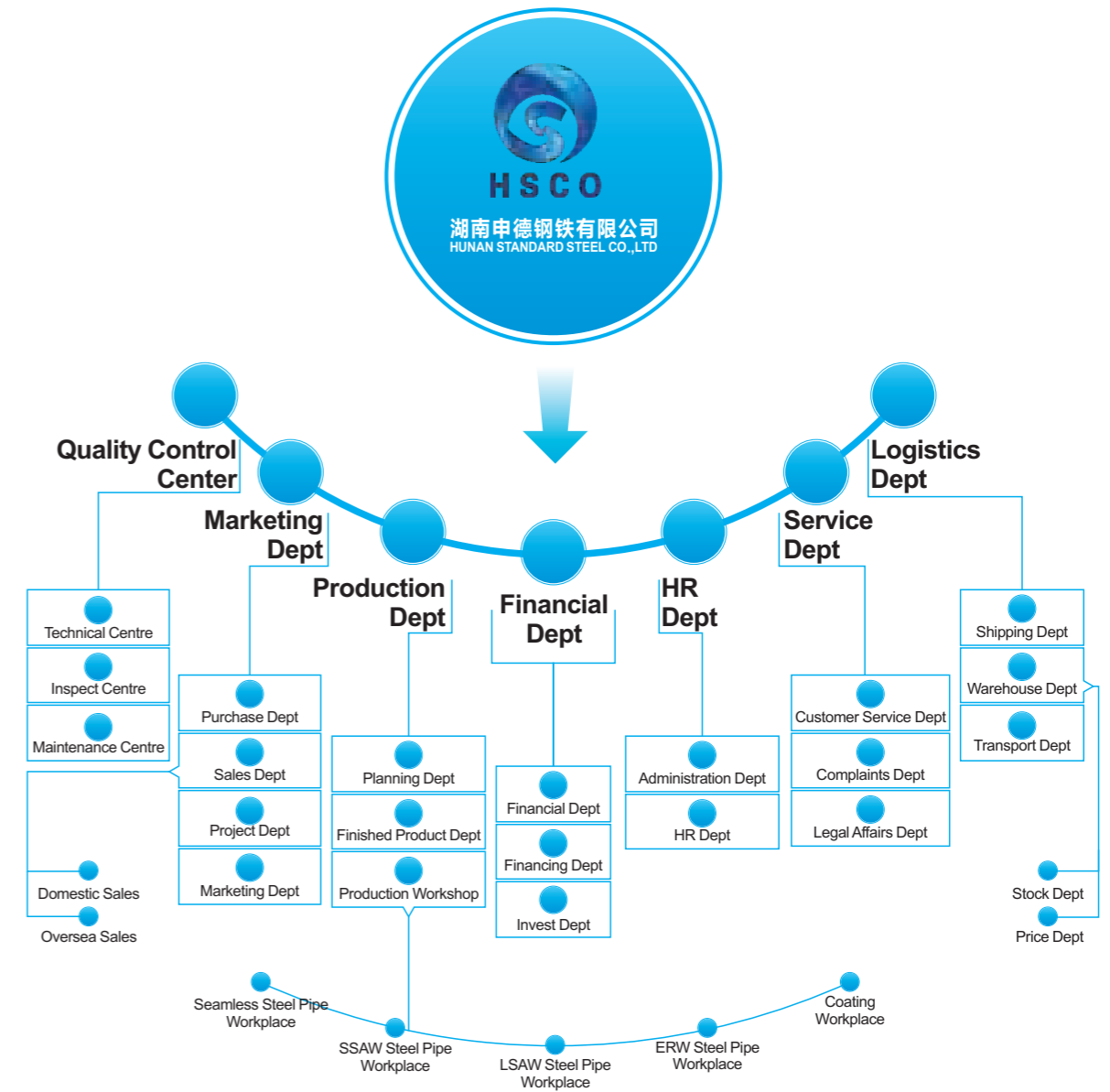


 <p>Qatar Petroleum</p>	<p>&lt; QATAR PETROLEUM(QP)</p>
	<p>STATOIL</p>
	<p>&lt; SONATRACH</p>
	<p>ECOPETROL</p>
	<p>&lt; SALINE WATER CONVERSION</p>
	<p>NATIONAL IRANIAN OIL</p>
	<p>&lt; APA GROUP</p>

<p>ORIGIN ENERGY LIMITED</p>	
<p>SONANGOL GROUP</p>	
<p>NEE ZEALAND OIL &amp; GAS</p>	
<p>WOODSIDE PETROLEUM</p>	
<p>SASOL</p>	
<p>SUDAPET</p>	
<p>PETROECUADOR</p>	

# G Contact

## Organization Framework



**Sales Network**



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**Services Teamwork**

Teamwork	Service Field
Industrial Pipe Department	Mining enterprises,Public works
Construction Engineering Department	Civil construction,Bridge, road construction
Coastal Engineering Department	Marine & Offshore,Shipping building
Comprehensive Project Department	Steel industrial
Oil & Gas Department	Oil Pipeline, Refining,Gas Platforms, Petroleumchemical
Main Project Department	Pipeline,Construction

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