



CITIC PACIFIC SPECIAL STEEL

JINGJIANG SPECIAL STEEL CO., LTD



PRODUCT MANUAL FOR SEAMLESS STEEL PIPE



CITIC PACIFIC SPECIAL STEEL

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Company Profile

Jing Jiang special steel Co.,LTD (hereinafter to as Jing Jiang steel) formerly known as Jiang Su Xi Gang Group Co.,LTD founded in 1958, and incorporated in CITIC Steel Group in July 2018. Jing Jiang steel located in the coastal city Jing Jiang near by Yangtze river, based on the advantage location, it' s very convenient for inland and water transportation.

Jing Jiang steel equipped 100 tons ultra-high power electric furnace, one production line of continue cast billets for steel making, one production line for hot rolled alloy steel round bars, two production lines for seamless pipes including : ϕ 258 PQF three-roller tandem unit and ϕ 100 ASSEL three-roller tandem unit, and one production line for seamless pipes further processing .

The annual capacity of JingJiang steel are 1,000,000 tons steel, 600,000 tons seamless pipes, 700,000 tons alloy steel round bars. The variety of seamless pipes including: casing and tubing pipes, line pipe, mechanical structure pipe, boiler pipe, gas cylinder pipe, hydraulic prop pipe, fluid pipe and special hermetic seal thread connection of independent research and development, Non-API standard series OCTG apply to special service; round bars covering bearing steel, gearing steel, tool and die steel, alloy structure steel, optimal carbon steel, spring steel, anchor chain steel, etc.



Equipments Guarantee Capability

Φ258PQF Continuous Hot Rolling Line

Production size range: $\Phi 73\text{mm} \sim \Phi 356\text{mm} \times 4.5\text{mm} \sim 45\text{mm}$

Designed annual capacity: 700,000 tons.

Production line advantages: the Premium Quality Finishing(PQF) continuous hot rolling machine was introduced from German SMS MEER, equipped with the advanced continuous rolling controlling and quality assurance technology, such as process supervisor system(PSS), continuous rolling Hydraulic Roller



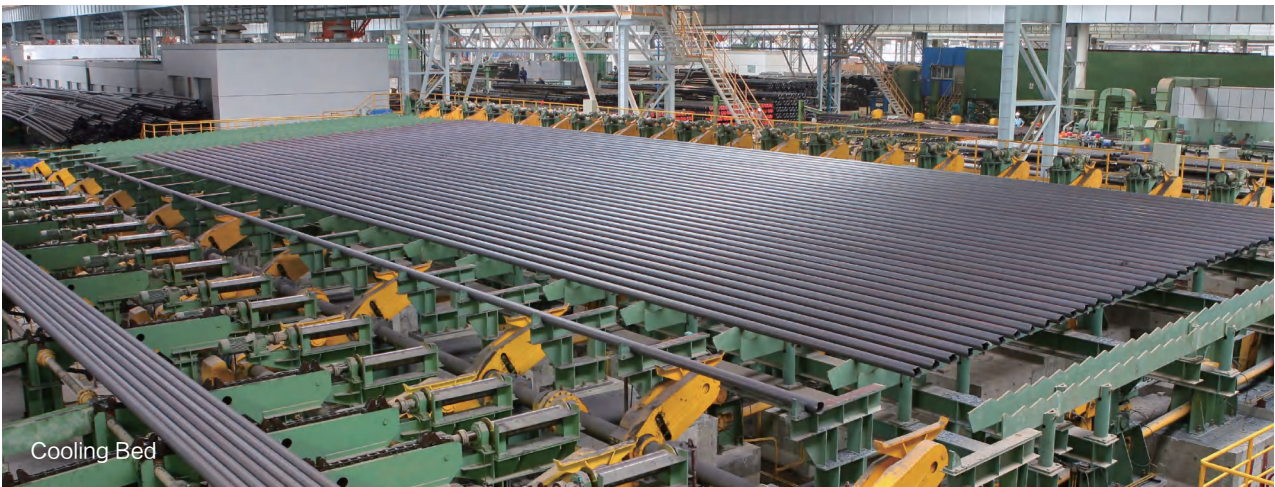


Gap Control System(HGS), CARTA technology for Sizing mill , Material Tracking System(MTS), Quality Assurance System(QAS), etc.

Product advantages:

- 1.The wall thickness tolerance can be controlled within $\pm 5\%$;
- 2.The ovality can be controlled within $\pm 0.5\%$;
- 3.The length can be up to 15m;
- 4.Be able to produce thin-walled tube with large diameter, D/S can be 45;
- 5.The best delivery time can be one day.

Main supporting equipments: two cone type rollers piercer, six stands PQF three rollers continuous rolling mill, fourteen stands sizing mill.





Φ100 ASSEL Hot Rolling Line

Production size range: $\Phi 48.3\text{mm} \sim \Phi 102\text{mm} \times 3.91\text{mm} \sim 16\text{mm}$

Designed annual capacity: 100,000 tons.

Product advantages:

1. It can produce small diameter and middle-thick-walled tube without inner hexagon;
2. Its raw material is hot-rolled billet with high reduction ratio and fine grain, hence it is more suitable to produce high alloy tubes for high pressure boiler pipes, machining use and so on.

Main supporting equipments: barrel type two-rollers piercer, ASSEL rolling mill, eighteen-stands Stretch-reducing mill, two-rollers precise straightener.





Heat Treatment Line

Production size range: $\Phi 48.3\text{mm} \sim \Phi 356\text{mm} \times 4\text{mm} \sim 45\text{mm} \times 6000 \sim 14600\text{mm}$

Designed annual capacity: 350,000 tons.

Production line advantages: Walking beam furnace with its hearth longitudinal division and horizontal partition, the furnace temperature is automatically controlled in every section, with good temperature uniformity, hence the property is uniform and stable. Using water as the cooling medium after quenching, the type of cooling is shower outside and spray inside. The shower water flow rate and spray water pressure are adjustable within a large range. So it can meet the requirement of the cooling intensity for different materials and different specifications.

After process of high pressure water dephosphorizing and hot sizing, the surface quality and dimensional accuracy of pipes after heat treatment are both in good condition.

Main supporting equipments: Walking beam quenching furnace, walking beam tempering furnace, German GE, FOERSTER UT&EMI composite non-destructive testing machine, BRONX six rollers straightener.





Pipe End Upsetting Line

Production size range: $\Phi 48.3\text{mm} \sim 114.3\text{mm}$

Designed annual capacity: 20,000 tons.

Production line advantages: 4 times heating, 2 times upsetting, good temperature uniformity in heating process, available for both internal and external upsetting.

Product advantages :

1. It can meet the upsetting requirements of various premium connections;
2. Roundness of transition section is good.

Main supporting equipments: 500/250T hydraulic upsetting machine, medium-frequency induction heating furnace.





OCTG Thread Processing Line

Production size range: $\Phi 48.30\text{mm}$ – 339.72mm

Designed annual capacity: 200,000 tons(including PSL1,PSL2, PSL3)

Production line advantages:Three-dimensional continuous control CNC machine tool with FUNUC Oi-TD system, it can meet the processing requirements of API series threads and Non-API series premium connections VST-1, VST-2, VST-Z1, VST-Z2 etc.

Main supporting equipments: CNC machine tool, screw-on machine, sand blasting machine.





Non-destructive Testing Equipments

Size range of testing: $\Phi 48.3\text{mm}$ – 356mm

Every production line is equipped with non-destructive testing machine, including 3 sets Tuboscope EMI machine、1 set Foerster EMI machine、1 set Tuboscope UT machine and 1 set GE UT machine.

It has high sensitivity,efficiency and accuracy,and the annual testing capacity is 900,000 tons steel pipe.

It can meet the requirements of L2, L3, L4 longitudinal and transversal defect detection for both internal and external surface,wall thickness test,lamination defect detection,OD and ID test for OCTG,line pipe,drill pipe,gas cylinder pipe,high pressure boiler tube, high-pressure fertilizer pipe, oil cracking pipe etc., from $\Phi 48.3\text{mm}$ to $\Phi 356\text{mm}$ with different specifications including API 5CT, API 5L, API 5DP, GB 18248, GB 5310, GB 6479, GB 9948 etc.





Hydrotest Equipments

Size range of testing: $\Phi 48.3\text{mm}$ – 356mm

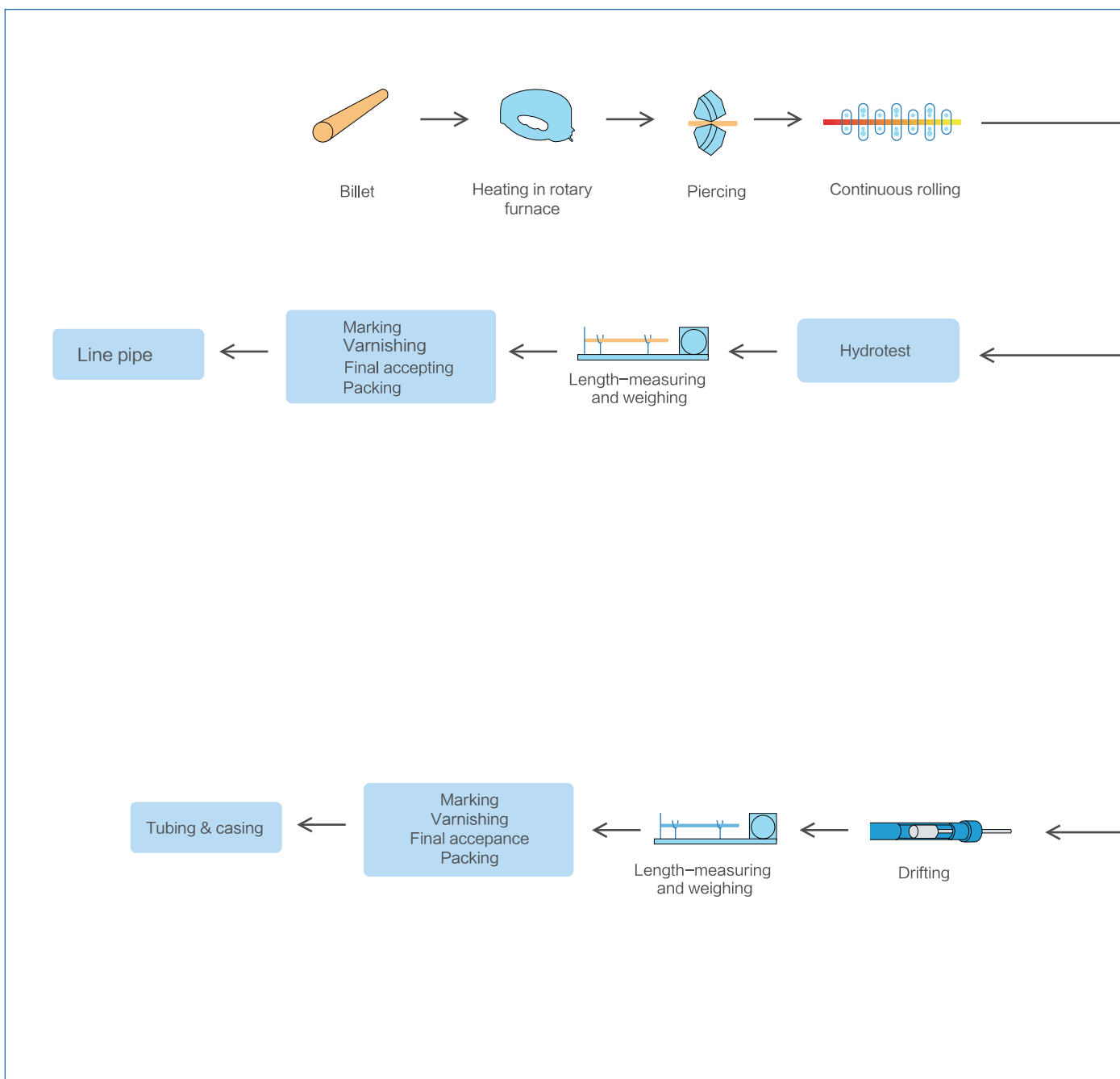
Equipment advantages: Mill is equipped with four hydrotest equipments available for pipes with coupling to do hydrotest, the pressure can reach 120 MPa, hydrotest curve can be tracked to each piece.

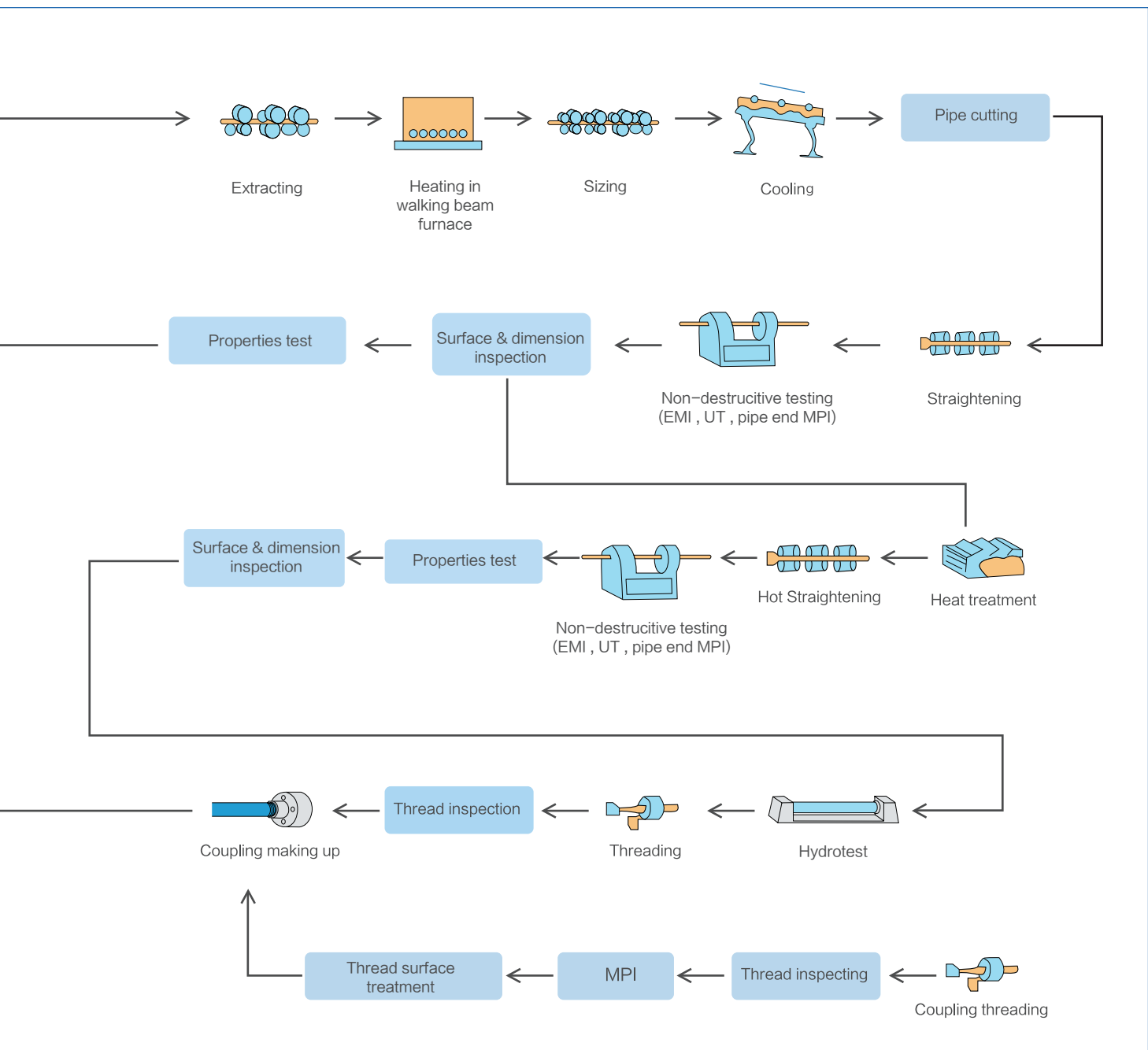




Production Process

The process flows of steel pipe





SUPPLY CAPABILITY OF PRODUCTS

Brief Instruction

Main steel pipe products of Valin-xigang cover OCTG, line pipe, mechanical structure pipe, boiler tube gas, cylinder pipe, hydropost pipe, fluid pipe, and self-developed premium connection, non-API OCTG for special service(including H2S corrosion-resistant tubing and casing, collapse-resistant casing, casing with high strength and high toughness for deep well, casing for thermal production well.

SIZE RANGE CHART

[illegible]



OCTG

Reference standards and technical specification: API SPEC 5CT、ISO 11960、GB/T 19830 and technical specification

Application: tubing is used for extracting oil or gas from oil or gas well, casing is used for wall of oil or gas well.

DIMENSION:

SIZE		TUBING	CASING	PUP JOINT
		2-3/8" ~ 4-1/2"	4-1/2" ~ 13-3/8"	2-3/8" ~ 13-3/8"
LENGTH (m)	R1	6.10 ~ 7.32	4.88 ~ 7.62	0.6 ~ 6.0
	R2	8.53 ~ 9.75	7.62 ~ 10.36	
	R3	11.58 ~ 12.80	10.36 ~ 14.63	

Thread Types:

STANDARD	TYPE	CONECTION THREAD
API	TUBING	NU、EU
	CASING	SC、LC、BC
NON-API	OCTG	CJT-1、CJT-2、CJT-Z1、CJT-Z2

Mechanical Properties:

GRADE		TYPE	TOTAL ELONGATION UNDER LOAD	Yield strength MPa		Tensile strength MPa	Hardness ^a		SPECIFIED WALL THICKNESS mm	Allowable hardness variation
			%	Min	Max	Min	HRC	HBW		HRC
API series	H40	—	0.5	276	552	414	—	—	—	—
	J55	—	0.5	379	552	517	—	—	—	—
	K55	—	0.5	379	552	655	—	—	—	—
	N80	1	0.5	552	758	689	—	—	—	—
		Q	0.5	552	758	689	—	—	—	—
	R95	—	0.5	655	758	724	—	—	—	—
	M65	—	0.5	448	586	586	22	235	—	—
		1	0.5	552	655	655	23	241	—	—
	L80	9Cr	0.5	552	655	655	23	241	—	—
		13Cr	0.5	552	655	655	23	241	—	—
		C90	1	0.5	621	724	689	25.4	255	≤ 12.70
	12.71 ~ 19.04									4.0
	19.05 ~ 25.39									5.0
	≥ 25.40									6.0
	T95	1	0.5	655	758	724	25.4	255	≤ 12.70	3.0
									12.71 ~ 19.04	4.0
									19.05 ~ 25.39	5.0
									≥ 25.40	6.0
	C110	—	0.7	758	828	793	30	286	≤ 12.70	3.0
									12.71 ~ 19.04	4.0
									19.05 ~ 25.39	5.0
									≥ 25.40	6.0
	P110	—	0.6	758	965	862	—	—	—	—
	Q125	1	0.65	862	1034	931	b	—	≤ 12.70	3.0
									12.71 ~ 19.04	4.0
									≥ 19.05	5.0

Remarks:

a) In case of dispute, laboratory Rockwell C hardness testing shall be used as the referee method.

b) No hardness limits are specified, but the maximum variation is restricted as a manufacturing control in accordance with 7.8 and 7.9



Continued:

Grade		Total elongation under load	Yield strength MPa		Tensile strength MPa	Hardness ^a		Specified wall thickness mm	Allowable hardness variation	Full size impact test (J)		
			Min	Max		HRC	HBW			Temperature (°C)	Transversal	Longitudinal
		%			Min				HRC		Min	Min
Anti-corrosion	HS80S(S)	0.5	552	655	655	23	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS90S(S)	0.5	621	724	689	25.4	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS95S(S)	0.5	655	758	724	25.4	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS100S(S)	0.5	689	792	758	27	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS110S(S)	0.6	758	862	827	30	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS80-3Cr	0.5	552	655	655	23	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS90-3Cr	0.5	621	724	689	25.4	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS95-3Cr	0.5	655	758	724	25.4	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
	HS110-3Cr	0.6	758	862	827	30	—	≤12.70	3.0	0	60	80
								12.71 ~ 19.04	4.0			
								≥19.05	5.0			
Thermal production well	HS100H	0.5	730	895	800	—	—	—	—	0	60	80
	HS110H	0.6	800	965	862	—	—	—	—	0	60	80
Anti-collapse	HS80T(T)	0.5	552	655	655	—	—	—	—	0	40	45
	HS90T(T)	0.5	621	724	689	—	—	—	—	0	40	45
	HS95T(T)	0.5	655	758	724	—	—	—	—	0	40	45
	HS110T(T)	0.6	850	965	862	—	—	—	—	0	45	50
	HS125T(T)	0.65	920	1034	931	—	—	—	—	0	50	70
High-strength high-toughness	HSV140	0.7	965	1171	1034	—	—	—	—	0	100	120
	HSV150	0.7	1034	1240	1103	—	—	—	—	0	100	120
Low temperature	HS80L	0.5	552	689	655	—	—	—	—	-60	80	—
	HS90L	0.5	621	758	724	—	—	—	—	-60	70	—
	HS110L	0.6	758	965	862	—	—	—	—	-60	50	—

Remark:

a In case of dispute, laboratory Rockwell C hardness testing shall be used as the referee method.



Line Pipe

Reference standards and technical specification: API SPEC 5L、ISO 3183、GB/T 9711、 and reference technical specification

Application: transfer gas, water, and oil in oil and gas industry area.

Chemical (%) :

Standard	Rank	Grade	C	Si	Mn	P	S	V	Nb	Ti	CE ^a	Pcm ^b	Remark
			Max										
API SPEC 5L ISO 3183 GB/T 9711	PSL1	L 175 or A25	0.21	—	0.60	0.030	0.030	—	—	—	—	—	e,o
		L 210 or A	0.22	—	0.90	0.030	0.030	—	—	—	—	—	e,o
		L 245 or B	0.28	—	1.20	0.030	0.030	—	—	—	—	—	c,d,e,o
		L 290 or X42	0.28	—	1.30	0.030	0.030	—	—	—	—	—	d,e,o
		L 320 or X46	0.28	—	1.40	0.030	0.030	—	—	—	—	—	d,e,o
		L 360 or X52	0.28	—	1.40	0.030	0.030	—	—	—	—	—	d,e,o
		L 390 or X56	0.28	—	1.40	0.030	0.030	—	—	—	—	—	d,e,o
		L 415 or X60	0.28	—	1.40°	0.030	0.030	—	—	—	—	—	d,e,o
		L 450 or X65	0.28	—	1.40	0.030	0.030	—	—	—	—	—	d,e,o
		L 485 or X70	0.28	—	1.40	0.030	0.030	—	—	—	—	—	d,e,o
	PSL2	L 245N/BN	0.24	0.40	1.20	0.025	0.015	—	—	0.04	0.43	0.25	c,f,o
		L 245Q/BQ	0.18	0.45	1.40	0.025	0.015	0.05	0.05	0.04	0.43	0.25	f,o
		L 290N/X42N	0.24	0.40	1.20	0.025	0.015	0.06	0.05	0.04	0.43	0.25	f,o
		L 290Q/X42Q	0.18	0.45	1.40	0.025	0.015	0.05	0.05	0.04	0.43	0.25	f,o
		L 320N/X46N	0.24	0.40	1.40	0.025	0.015	0.07	0.05	0.04	0.43	0.25	d,f,o
		L 320Q/X46Q	0.18	0.45	1.40	0.025	0.015	0.05	0.05	0.04	0.43	0.25	f,o
		L 360N/X52N	0.24	0.45	1.40	0.025	0.015	0.10	0.05	0.04	0.43	0.25	d,f,o
		L 360Q/X52Q	0.18	0.45	1.50	0.025	0.015	0.05	0.05	0.04	0.43	0.25	f,o
		L 390N/X56N	0.24	0.45	1.40	0.025	0.015	0.10	0.05	0.04	0.43	0.25	d,f,o
		L 390Q/X56Q	0.18	0.45	1.50	0.025	0.015	0.07	0.05	0.04	0.43	0.25	d,f,o
		L 415N/X60N	0.24	0.45	1.40	0.025	0.015	0.10	0.05	0.04	As per agreement		d,g,o
		L 415Q/X60Q	0.18	0.45	1.70	0.025	0.015	—	—	—	0.43	0.25	d,g,o
		L 450Q/X65Q	0.18	0.45	1.70	0.025	0.015	—	—	—	0.43	0.25	d,g,o
		L 485Q/X70Q	0.18	0.45	1.70	0.025	0.015	—	—	—	0.43	0.25	d,g,o
		L 555Q/X80Q	0.18	0.45	1.70	0.025	0.015	—	—	—	As per agreement		d,h,i



Continued:

standard	rank	grade	C	Si	Mn	P	S	V	Nb	Ti	CE ^a	Pcm ^b	note
			Max										
	Sour service	L245NS/BNS	0.14	0.40	1.35	0.020	0.008	—	—	0.04	0.36	0.22	c,d,j,k
		L245QS/BQS	0.14	0.40	1.35	0.020	0.008	0.04	0.04	0.04	0.34	0.22	j,k
		L290NS/X42NS	0.14	0.40	1.35	0.020	0.008	0.05	0.05	0.04	0.36	0.22	j,k
		L290QS/X42QS	0.14	0.40	1.35	0.020	0.008	0.04	0.04	0.04	0.34	0.22	j,k
		L320NS/X46NS	0.14	0.40	1.40	0.020	0.008	0.07	0.05	0.04	0.38	0.23	d,j,k
		L320QS/X46QS	0.15	0.45	1.40	0.020	0.008	0.05	0.05	0.04	0.36	0.23	j,k
		L360NS/X52NS	0.16	0.45	1.65	0.020	0.008	0.10	0.05	0.04	0.43	0.25	d,j,k
		L360QS/X52QS	0.16	0.45	1.65	0.020	0.008	0.07	0.05	0.04	0.39	0.23	d,j,k
		L390QS/X56QS	0.16	0.45	1.65	0.020	0.008	0.07	0.05	0.04	0.40	0.24	d,j,k
		L415QS/X60QS	0.16	0.45	1.65	0.020	0.008	0.08	0.05	0.04	0.41	0.25	d,j,k
		L450QS/X65QS	0.16	0.45	1.65	0.020	0.008	0.09	0.05	0.06	0.42	0.25	d,j,k
		L485QS/X70QS	0.16	0.45	1.65	0.020	0.008	0.09	0.05	0.06	0.42	0.25	d,j,k
	Offshore service	L245NO/BNO	0.14	0.40	1.35	0.020	0.010	—	—	0.04	0.36	0.22	c,d,l,m
		L245QO/BQO	0.14	0.40	1.35	0.020	0.010	0.04	0.04	0.04	0.34	0.22	l,m
		L290NO/X42NO	0.14	0.40	1.35	0.020	0.010	0.05	0.05	0.04	0.36	0.22	l,m
		L290QO/X42QO	0.14	0.40	1.35	0.020	0.010	0.04	0.04	0.04	0.34	0.22	l,m
		L320NO/X46NO	0.14	0.40	1.40	0.020	0.010	0.07	0.05	0.04	0.38	0.23	d,l,m
		L320QO/X46QO	0.15	0.45	1.40	0.020	0.010	0.05	0.05	0.04	0.36	0.23	l,m
		L360NO/X52NO	0.16	0.45	1.65	0.020	0.010	0.10	0.05	0.04	0.43	0.25	d,l
		L360QO/X52QO	0.16	0.45	1.65	0.020	0.010	0.07	0.05	0.04	0.39	0.23	d,l,n
		L390QO/X56QO	0.16	0.45	1.65	0.020	0.010	0.07	0.05	0.04	0.40	0.24	d,l,n
		L415QO/X60QO	0.16	0.45	1.65	0.020	0.010	0.08	0.05	0.04	0.41	0.25	d,l,n
		L450QO/X65QO	0.16	0.45	1.65	0.020	0.010	0.09	0.05	0.06	0.42	0.25	d,l,n
		L485QO/X70QO	0.17	0.45	1.65	0.020	0.010	0.10	0.05	0.06	0.42	0.25	d,l,n
		L555QO/X80QO	0.17	0.45	1.85	0.020	0.010	0.10	0.06	0.06	As per agreement		d,l,n

Remarks:

a、 $CE=C+Mn/6+(Cr+Mo+V)+(Ni+Cu)/15$ b、 $Pcm=C+Si/30+(Mn+Cu+Cr)/20+Ni/60+Mo/15+V/10+5B$ c、 $Nb+V \leq 0.06\%$ d、 $Nb+V+Ti \leq 0.15\%$ e、 $Cu \leq 0.50\%$, $Ni \leq 0.50\%$, $Cr \leq 0.50\%$, $Mo \leq 0.15\%$ f、 $Cu \leq 0.50\%$, $Ni \leq 0.30\%$, $Cr \leq 0.30\%$, $Mo \leq 0.15\%$ g、 $Cu \leq 0.50\%$, $Ni \leq 0.50\%$, $Cr \leq 0.50\%$, $Mo \leq 0.50\%$ h、 $Cu \leq 0.50\%$, $Ni \leq 1.00\%$, $Cr \leq 0.50\%$, $Mo \leq 0.50\%$ i、 $B \leq 0.004\%$ j、 $Alt_{total} \leq 0.060\%$; $N \leq 0.012\%$; $Al/N \geq 2:1$ (not applicable to titanium-killed steel or titanium-treated steel); $Cu \leq 0.35\%$ (if have agreement, $Cu \leq 0.10\%$); $Ni \leq 0.30\%$; $Cr \leq 0.30\%$; $Mo \leq 0.15\%$; $B \leq 0.0005\%$ 。k、For SMLS, $Ca \leq 0.006\%$ l、 $Alt_{total} \leq 0.060\%$; $N \leq 0.012\%$; $Al/N \geq 2:1$ (not applicable to titanium-killed steel or titanium-treated steel)m、 $Cu \leq 0.35\%$; $Ni \leq 0.30\%$; $Cr \leq 0.30\%$; $Mo \leq 0.10\%$; $B \leq 0.0005\%$ 。n、 $Cu \leq 0.50\%$; $Ni \leq 0.50\%$; $Cr \leq 0.50\%$; $Mo \leq 0.50\%$; $B \leq 0.0005\%$ 。o、 $B \leq 0.001\%$



Mechanical:

Standard	Rank	Grade	Tensile strength (MPa)		Yield strength (MPa)		Elongation (%)	Yield ratio (Rt0.5/Rm)	0°C Transversal Full size CVN energy (J)	Hardness	
			Min	Max	Min	Max	Min	Max		HV10	HRC
API SPEC 5L ISO 3183 GB/T 9711	PSL1	L175 or A25	310	—	175	—	a	—	—	—	—
		L210 or A	335	—	210	—	a	—	—	—	—
		L245 or B	415	—	245	—	a	—	—	—	—
		L290 or X42	415	—	290	—	a	—	—	—	—
		L320 or X46	435	—	320	—	a	—	—	—	—
		L360 or X52	460	—	360	—	a	—	—	—	—
		L390 or X56	490	—	390	—	a	—	—	—	—
		L415 or X60	520	—	415	—	a	—	—	—	—
		L450 or X65	535	—	450	—	a	—	—	—	—
		L485 or X70	570	—	485	—	a	—	—	—	—
	PSL2	L245N/BN	415	655	245	450	a	0.93	27	—	—
		L245Q/BQ	415	655	245	450	a	0.93	27	—	—
		L290N/X42N	415	655	290	495	a	0.93	27	—	—
		L290Q/X42Q	415	655	290	495	a	0.93	27	—	—
		L320N/X46N	435	655	320	525	a	0.93	27	—	—
		L320Q/X46Q	435	655	320	525	a	0.93	27	—	—
		L360N/X52N	460	760	360	530	a	0.93	27	—	—
		L360Q/X52Q	460	760	360	530	a	0.93	27	—	—
		L390N/X56N	490	760	390	545	a	0.93	27	—	—
		L390Q/X56Q	490	760	390	545	a	0.93	27	—	—
		L415N/X60N	520	760	415	565	a	0.93	27	—	—
		L415Q/X60Q	520	760	415	565	a	0.93	27	—	—
		L450Q/X65Q	535	760	450	600	a	0.93	27	—	—
		L485Q/X70Q	570	760	485	635	a	0.93	27	—	—
		L555Q/X80Q	625	825	555	705	a	0.93	40	—	—



Continued:

Standard	Rank	Grade	Tensile strength (MPa)		Yield strength (MPa)		Elongation (%)	Yield ratio (Rt0.5/Rm)	0℃Transversal Full size CVN energy (J)	Hardness	
			Min	Max	Min	Max	Min	Max		HV10	HRC
	Sour service	L245NS/BNS	415	655	245	450	a	0.93	27	250	22
		L245QS/BQS	415	655	245	450	a	0.93	27	250	22
		L290NS/X42NS	415	655	290	495	a	0.93	27	250	22
		L290QS/X42QS	415	655	290	495	a	0.93	27	250	22
		L320NS/X46NS	435	655	320	525	a	0.93	27	250	22
		L320QS/X46QS	435	655	320	525	a	0.93	27	250	22
		L360NS/X52NS	460	760	360	530	a	0.93	27	250	22
		L360QS/X52QS	460	760	360	530	a	0.93	27	250	22
		L390QS/X56QS	490	760	390	545	a	0.93	27	250	22
		L415QS/X60QS	520	760	415	565	a	0.93	27	250	22
		L450QS/X65QS	535	760	450	600	a	0.93	27	250	22
		L485QS/X70QS	570	760	485	635	a	0.93	27	250	22
	Offshore service	L245NO/BNO	415	655	245	450	a	0.93	27	270	25
		L245QO/BQO	415	655	245	450	a	0.93	27	270	25
		L290NO/X42NO	415	655	290	495	a	0.93	27	270	25
		L290QO/X42QO	415	655	290	495	a	0.93	27	270	25
		L320NO/X46NO	435	655	320	520	a	0.93	27	270	25
		L320QO/X46QO	435	655	320	520	a	0.93	27	270	25
		L360NO/X52NO	460	760	360	525	a	0.93	27	270	25
		L360QO/X52QO	460	760	360	525	a	0.93	27	270	25
		L390QO/X56QO	490	760	390	540	a	0.93	27	270	25
		L415QO/X60QO	520	760	415	565	a	0.93	27	270	25
		L450QO/X65QO	535	760	450	570	a	0.93	27	270	25
		L485QO/X70QO	570	760	485	605	a	0.93	27	300	30
		L555QO/X80QO	625	825	555	675	a	0.93	40	300	30
Remark: a. MIN FORMULAR: A=1940*A ^{0.2} /U ^{0.9}											



Gas Cylinder Pipe

Reference standard and technical specification: GB 18248、Q/3200 HLXT 01-2013 (company standard of Valin-Xigang) 、 reference standard

Application: using for gas cylinder manufacture
chemical (%) :

Serial No	Grade	Chemical (mass fraction) /%											
		C	Si	Mn	P	S	P+S	Cr	Mo	V	Ni	Cu	Al
1	37Mn ^a	0.36~0.40	0.17~0.30	1.55~1.70	≤0.015	≤0.010	≤0.025	≤0.20	≤0.10	≤0.05	≤0.20	≤0.15	—
2	37Mn/1 ^a	0.36~0.40	0.17~0.30	1.55~1.70	≤0.015	≤0.010	≤0.025	≤0.20	≤0.10	≤0.05	≤0.20	≤0.15	0.020~0.045
3	37Mn/2 ^a	0.34~0.38	0.17~0.30	1.50~1.70	≤0.015	≤0.010	≤0.025	≤0.20	≤0.10	≤0.05	≤0.20	≤0.15	0.020~0.045
4	34Mn2V	0.32~0.36	0.17~0.35	1.50~1.70	≤0.015	≤0.010	≤0.025	≤0.20	≤0.10	0.08~0.12	≤0.20	≤0.15	—
5	30CrMo ^a	0.28~0.32	0.17~0.35	0.45~0.65	≤0.015	≤0.010	≤0.025	0.90~1.10	0.18~0.25	≤0.02	≤0.20	≤0.15	0.020~0.045
6	35CrMo ^a	0.33~0.39	0.17~0.35	0.45~0.65	≤0.015	≤0.010	≤0.025	0.90~1.10	0.18~0.25	≤0.05	≤0.20	≤0.15	—
7	34CrMo4 ^{a, b}	0.30~0.35	0.17~0.35	0.65~0.80	≤0.015	≤0.010	≤0.025	0.90~1.10	0.18~0.25	≤0.05	≤0.20	≤0.15	0.020~0.045
8	30CrMnSiA	0.29~0.34	1.00~1.20	0.90~1.10	≤0.015	≤0.010	≤0.025	0.90~1.10	≤0.10	≤0.05	≤0.20	≤0.15	—

Remarks:
a As≤0.020%, Sn≤0.020%, As+Sn+Sb+Pb+Bi≤0.035%, V+Nb+Ti+B+Zr≤0.15% (For 30CrMo:V+Nb+Ti+B+Zr≤0.10%) .
b This grade is based on 34CrMo4 of EN 10297-1: 2003, adjust P、S、Ni、Cu.

Mechanical property:

Serial	Grade	Heat treatment		Longitudinal mechanical property ^a			
		Heat temperature (°C)	Cooling method	Tensile strength Rm/MPa	Yield strength Rel ^b /MPa	Elongation A/%	Impact
1	37Mn	820~860 Quenching 550~650 Tempering	water	≥750	≥630	≥16	≥27 (-50℃)
2	37Mn/1	850~890 Quenching 580~620 Tempering	water	≥750	≥630	≥16	≥30 (-50℃)
3	37Mn/2	850~890 Quenching 580~620 Tempering	water	≥750	≥630	≥16	≥30 (-50℃)
4	34Mn2V	850~890 Normalizing	Air cooling	≥745	≥530	≥16	≥27 (-20℃)
5	30CrMo	860~900 Quenching 490~590 Tempering	water	≥930	≥785	≥12	≥27 (-50℃)
6	35CrMo	830~870 Quenching 500~600 Tempering	water	≥980	≥835	≥12	≥27 (-50℃)
7	34CrMo4	850~880 Quenching 500~600 Tempering	water	≥950	≥850	≥14	≥30 (-50℃)
8	30CrMnSiA	860~900 Quenching 470~570 Tempering	water	≥1080	≥885	≥10	≥27 (Room temperature)

Remarks:
a Except impact, test temperature is room temperature.
b When yield is invisible, taking R_{p0.2}.



Boiler Tube

Standard		Steel grade	Application
Chinese national standards	GB 3087	10、20	Use for manufacturing water cooled wall of Boiler, economizer, reheater, superheater and steam pipe.
	GB 5310	20G、20MnG、25MnG、15MoG、20MoG、12CrMoG、15CrMoG、12Cr2MoG、12Cr1MoVG	
	GB 6479	10、20、Q345B、Q345C、Q345D、Q345E、12CrMo、15CrMo	
	GB 9948	10、20、12CrMo、15CrMo、12Cr1Mo、12Cr1MoV、12Cr2Mo	
ASME standard ASTM standard	ASTM A106、ASME SA106	A、B、C	
	ASTM A192、ASME SA192	A192 SA192	
	ASTM A209 ASME SA209	T1、T1a、T1b	
	ASTM A210 ASME SA210	A-1、C	
	ASTM A213 ASME SA213	T2、T11、T12、T22	
	STM A335 ASME SA335	P1、P2、P11、P12、P22	
EU standard	EN 10216-2	P195GH、P235GH、P265GH、16Mo3、10CrMo5-5、13CrMo4-5、10CrMo9-10	
Deutsch industrial normal	DIN 17175	St35.8、St45.8、15Mo3、13CrMo4-4、10CrMo9-10	
Japanese industrial standards	JIS G3456	STPT 370、STPT 410、STPT 480	
	JIS G3461	STB 340、STB 410、STB 510	
	JIS G3454	STPG 370、STPG 410	
	JIS G3462	STBA 12、STBA 13、STBA 20、STBA 22、STBA 23、STBA 24	



Machining Pipe

Standard	Steel grade	Application
GB/T 8162	10、20、35、45、20Mn、25Mn、20Mn2、45Mn2、27SiMn、Q345A、Q345B、Q345C、Q345D、Q345E	using for manufacturing pipeline, container, equipment, fitting and steel structure.
EN 10297-1	E355、E470	
EN 10210-1	S235JRH、S275J0H、S275J2H、S355J0H、S355J2H、S355k2H	
DIN 1629	St37.0、St44.0、St52.0	
ASTM A519	1026、1045、4140	

Other Steel Tube

Name	Standard	Grade	Application	Size
Drill pipe	API SPEC 5DP	E、X、G、S	Use for drilling well	60.32mm ~ 168.28mm
Seamless steel pipe used for fluid transportation	GB/T 8163、ASTM A53、ASTM A106	10、20、Q345A、Q345B、Q345C、Q345D、Q345E、A、B、C	Use for transferring oil, gas and other fluid	60 mm ~ 340 mm
Seamless steel pipe used for shipbuilding	GB/T 5312、Classification society specification	320、360、410、460、490	Use for manufacturing Marine boiler, superheater, and pressure pipeline.	60 mm ~ 340 mm
Seamless steel pipe used for hydraulic prop	GB/T 17396	20、35、40、27SiMn	Use for support and prop of hydraulic clinder	60 mm ~ 340 mm
Seamless steel pipe used for automobile semi-axle housing	YB/T 5035	45、45Mn2	Used for automobile axle, axle housing	60 mm ~ 340 mm
Seamless steel pipe used for drilling	GB/T 9808	ZT380、ZT490、ZT520、ZT540、ZT590、ZT640、ZT740	Used for drilling geological corestone, water well and projects, etc.	60 mm ~ 340 mm



Quality Assurance Capacity

Test Capacity

The company owns first-class test laboratory, which has passed CNAS laboratory capacity audit, with qualification to issue test report to different sectors of the society.

The laboratory is responsible for quality control of raw material and finished products, the building area is around 5000 square meters, equipped with more than 120 sets high-precision testing machines, for example direct-reading spectrometer, gas analyzer, infrared carbon and sulfur analyzer, X-ray fluorescence spectrometer, universal testing machine, impact testing machine, hardness tester, scanning electron microscope, metallographic microscope; 76 sets measuring standard devices, 18 sets different kinds of detection facility including eddy current, magnetic leakage flux and ultrasonic.



Microcomputer-controlled pendulum bob impact testing machine



Bruker director-reading spectrometer



Oxygen, nitrogen and hydrogen analyzer



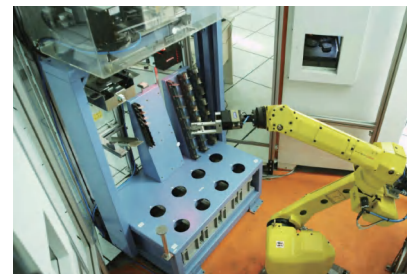
Carbon and sulfur analyzer



Impact testing machine



Microcomputer-controlled electro-hydraulic servo universal testing machine



High speed analysis station



Digital display Rockwell hardness tester



Metallographic microscope



Quality Management System

The company sets up perfect management system, has passed certification of ISO9001, ISO14001 and OHSAS18001.

Tubing, casing and line pipes have passed API certification, and successfully got API 5CT, API 5L certificate of all product specification levels. The mill has got ABS, BV and DNV certificates for marine seamless pipes, PED, AD2000 and CPD certificates for seamless boiler tubes and pressure vessel, production license and manufacture license for special equipments issued by AQSIQ for bearing steel, billet and pipes.

The company is qualified supplier of Sinopec, CNPC and CNOOC, and has set up long-term and stable strategic cooperative partnership with several overseas well-known enterprises like SAPCO(Saudi Arabia), CAMEG(Algeria), VICO, MEDCO, DALEEL, SABIC, HUNTING and so on. Products are exported to south-east Asia, Oceania, Middle east, south Asia, south America, north America, Europe, Africa, central Asia, east Asia and so on, formed a sales network covering the world.



ISO9001 Quality management system certificate



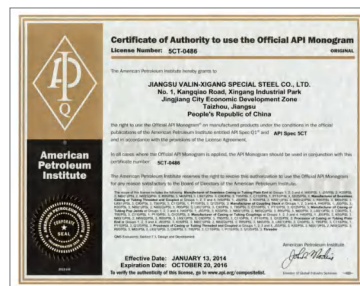
ISO14001 Environmental management system certificate



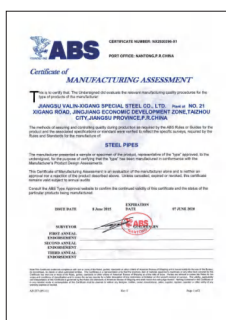
OHSAS18001 Occupational health and safety management system certificate



API 5L certificate



API 5CT certificate



ABS certificate (American Bureau of Shipping)



BV certificate (Bureau Veritas)



GOST-R certificate (Russia)



TUV(AD) certificate



TUV certificate



TUV(CPD) certificate



Excellent quality product certificate in metallurgical industry for casing



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