



石化行业用钢

STEEL PRODUCTS USED IN PETROCHEMICAL INDUSTRY

太钢产品分行业系列册

Products Serial Catalogs Of Tisco For Different Industries

地址: 中国 山西省太原市尖草坪 2 号
Add: No. 2 Jiancaoping, Taiyuan, Shanxi, P.R.China.
邮编 (Post Code): 030003
电话 (Tel): +86 (0) 351-3011431
传真 (Fax): +86 (0) 351-3130793
网址 (http): //www.tisco.com.cn
服务热线(Hotline): 400-653-1998
800-806-1998



太原钢铁(集团)有限公司
Taiyuan Iron & Steel (Group) Co., Ltd.



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太钢简介

BRIEF ON TISCO

太原钢铁（集团）有限公司（简称太钢）是中国特大型钢铁联合企业和全球产能最大、工艺技术装备水平最高、品种规格最全的不锈钢企业。经过70年发展，已具备1000万吨以上钢、铁、材的生产能力，其中不锈钢产能达300万吨。



太钢是中国第一炉不锈钢、第一炉硅钢、第一张硅钢片的诞生地。拥有铁矿石等钢铁冶炼原料的采掘与加工、钢铁冶炼、钢铁材料压力加工、冶金设备及备品备件制造等方面先进技术和装备，主要产品有不锈钢、冷轧硅钢片（卷）、热连轧卷板、车轴钢、合金模具钢、军工钢等。产品广泛应用于石油化工、交通运输、建筑装饰、家用电器、医疗食品等行业及神舟系列飞船、嫦娥一号、“东风”系列火箭等高端领域，进入三峡水利、西气东输、奥运场馆等国家重点工程。

太钢的发展目标是，加快建设全球最具竞争力的不锈钢企业，到2010年，以不锈钢为主的品种、质量、成本、研发、节能、环保、效率、服务等各项指标达到国际一流水平，建设具有国际竞争力的大企业集团。

Taiyuan Iron and Steel (Group) Co. Ltd. (TISCO) is a gigantic steel complex in China and a world leading stainless steel producer with largest capacity, full range of products and state of the art facility. With 70 years development, the capacity of pig iron, crude steel and rolled products increased over 10 million ton, including 3 million tons of stainless steel.

TISCO produced the first heat of stainless steel, first heat of silicon steel and first sheet of silicon steel. It is well equipped for mining and beneficiation (such as iron ores), ironmaking, steelmaking, rolling and manufacture of metallurgical equipment and spare parts. Main products include cold rolled stainless and silicon sheet/coil, hot rolled coil, axle steel, die steel and military steel. They are widely used in petrochemical industry, transportation, construction, decoration, home appliance, medical apparatus and food industry, they are also used for high-end application and national key projects as Shenzhou spaceship, Chang'e-1 Moon Detector, Dongfeng rocket series, Three Gorges project, West-East natural gas transmission project and Olympic games facility.

Our goal in development is to expedite building TISCO as the most competitive stainless steel producer in the world, holding the world leading position by 2010 in terms of range, quality, cost, R&D, energy saving, environment protection, efficiency and service, Our target is to create an international enterprises group of strong competitive edges out of Taigang.

◆ 石化行业用钢概况

太钢产品广泛应用于石油、石化行业，先后与中石油、中石化、中海油、蒂森克虏伯曼内斯曼公司签定战略合作协议，紧密与国际、国内石油石化企业合作，目前已成为石化行业用钢的主要生产企业。

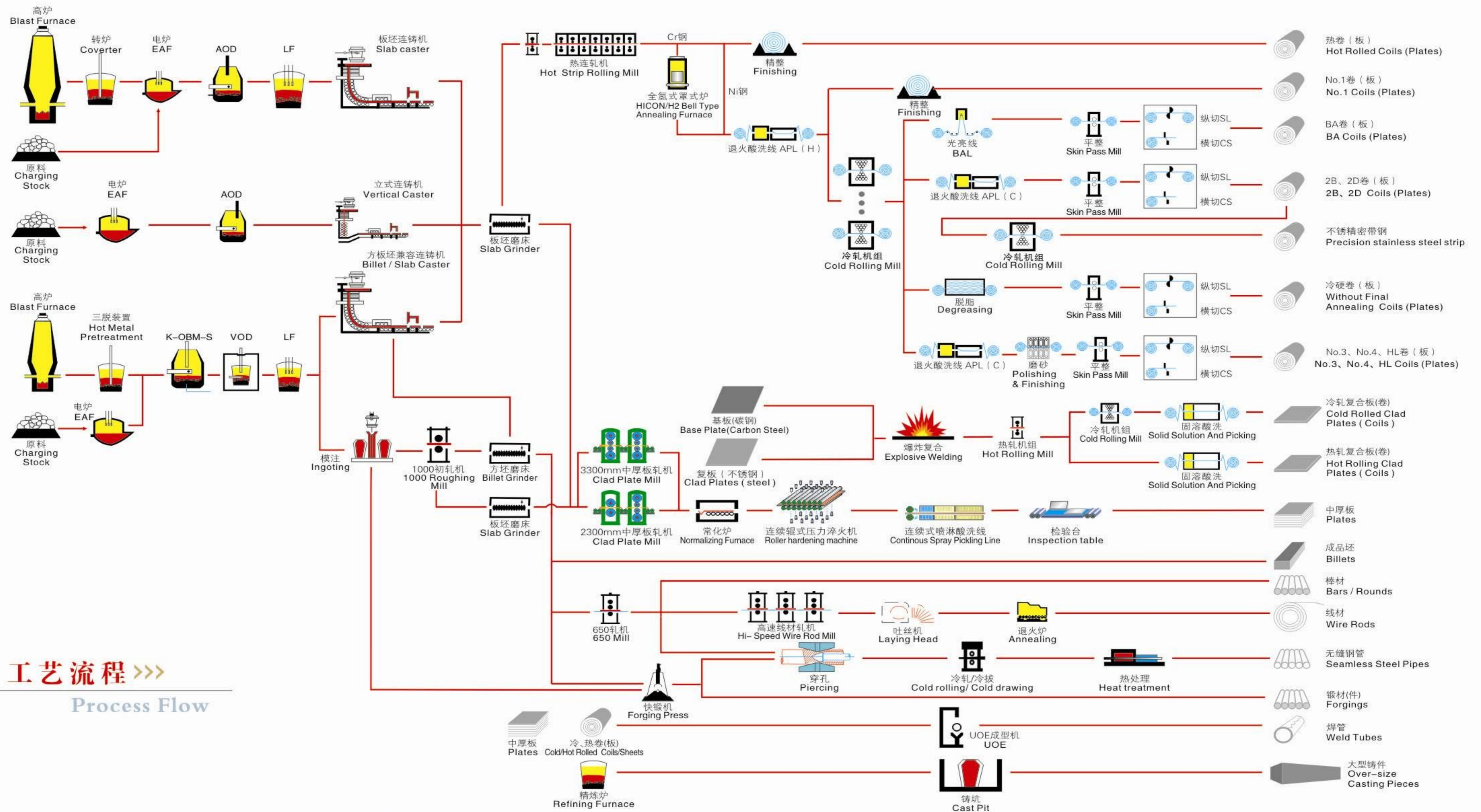
太钢紧紧围绕石化行业需求，不断开发优质、尖端产品。可按EN、AISI、DIN、JIS、GB标准生产的奥氏体、铁素体、马氏体、双相钢四大类所有牌号不锈钢，广泛应用于石油石化；在中国首家开发出高品质06Ni9大型LNG储罐用钢；向茂名石化、辽阳石化、齐鲁石化等提供了各类不锈钢复合板；不锈钢管坯为中石油、中石化、中海油指定使用产品，开发应用于石油裂化装置的TP347H及制煤流体管用2305双相钢；自主开发成功了N含量达2800ppm的超级双相不锈钢S2507中板和经济型双相不锈钢2101和2304等，填补了国内空白，顶替了进口。太钢双相不锈钢在石化、造船、海水淡化等行业的应用也取得了历史性突破，太钢生产的B-X80钢级管线钢，用于大型石油天然气管线工程项目。同时管线钢产品还出口到亚洲、欧洲、南美等国家和地区。

◆ Brief on petrochemical industry steel

TISCO's products are widely used in petroleum and petrochemical industry. TISCO has concluded strategic cooperation agreements with CNPC (China National Petroleum Corporation), Sinopec Group (China Petrochemical Corporation), CNOOC (China National Offshore Oil Corporation), Thyssen Krupp Steel and Mannesmann AG respectively. Close cooperation with the enterprises in China and abroad has made TISCO become a main steel supplier for petrochemical industry.

TISCO persists in developing high quality products to meet the requirements of the petrochemical industry. In TISCO, the stainless steel including the austenitic, ferritic, martensitic and duplex stainless steel is produced in accordance with the standards such as EN, AISI, DIN, JIS and GB; the high quality steel grade 06Ni9 for heavy LNG tank has been developed; A variety of stainless steel clad plates were produced for Maoming Petrochemical, Liaoyang Petrochemical and Qilu Petrochemical; the stainless steel tube billets are destined for CNPC, Sinopec Group and CNOOC; the steel grade TP347H for petroleum cracking apparatus and the duplex steel 2305 for coal making fluid tubes have been developed; the super duplex stainless steel S2507 with N up to 2800ppm and the standard duplex stainless steel 2101 and 2304 have been developed successfully; the duplex stainless steel has also made a historical breakthrough in the application to the industries such as petrochemical, shipbuilding and desalination etc; the pipeline steel B-X80 is used in the oil and gas pipeline project, and the pipeline steel products are exported to Asia, Europe and South America etc.





工艺流程 >>>
Process Flow



研发能力 >>>

Research and Development

国家级实验室
National level laboratory



2007年在国家认定的438家企业技术中心中，太钢技术中心排名第4位。
Tisco technology center ranks 4th among enterprise-based 438 technology centers accredited by the state in 2007.



企业荣誉 >>>

Honors & Awards

- ◆ 《高质量不锈钢板材技术开发》获国家科技进步二等奖；
- ◆ 《AOD炉炉龄、工艺技术开发》等三项成果获山西省科技进步一、二等奖；
- ◆ 《太钢含氮不锈钢研制》等九项成果获冶金科学技术进步一、二、三等奖；
- ◆ 《双相不锈钢复合板》等六种产品分别获得国家重点新产品奖、山西省优秀新产品奖；
- ◆ 不锈钢2B板被科技部认定为国家高新技术产品；
- ◆ 《AOD炉用氮气进行氮合金化工艺》《VOD冶炼不锈钢高碳区脱氮方法》等专利80余项；
- ◆ 不锈钢中板通过了TUV认证，并获得了冶金实物质量金杯奖；
- ◆ 双相不锈钢通过了中国船级社CCS认证。
- ◆ "Technical development of high quality stainless steel flat product" won second prize of state technical progresses.
- ◆ "AOD campaign, production technology development" and other two won the first and second prizes of Shanxi technical progresses.
- ◆ "Production technology and new grade development of Nitrogen-containing stainless steel by TISCO" won second prize of state technical progresses.
- ◆ Duplex stainless steel clad plate and so on six products were honored as among statewide new products and Shanxi great new products, respectively.
- ◆ Stainless steel 2B grade was approved by the Ministry of Science & Technology as the state hi-tech products.
- ◆ More than 80 patents such as "Nitrogen alloying process by nitrogen gas in AOD" and "Denitrification process in the phase of high carbon of stainless steel smelting in VOD).
- ◆ Stainless steel plate passed TUV examination and was rewarded Golden Cup of physical quality of metallurgical product.
- ◆ Duplex stainless steel passed CCS, China Classification Society, examination.



扫描电镜
Scanning Electron Microscope



热模拟试验机
Thermal Simulating Tester



透射电镜
Transition Electron Microscope



全自动电子拉伸试验机
Automatic electronic tensile tester



质量保证体系 >>>

Quality Assurance System



常规产品 >>>

Conventional Products

◆ 在石化行业可生产的不锈钢常规产品
Conventional stainless steel for petrochemical industries

钢种 Steel grade	牌号 Grade	规格 (mm) Specifications	单重 (t) Weight	标准 Standard	主要用途 Application
不锈钢 中厚板 Medium and thick stainless steel plates	304L, 321, 316L	6-80 × 1500-3000 × 4000-12000	≤7.5	GB, ASME, EN, JIS	炼油、化工反应釜、 换热器、吸收塔、 脱硫反应器、 解析塔设备 Oil refining, chemical reaction kettle, heat exchanger, absorption column, desulphurization reactor, desorption column
	347H, 304H, 321H	6-80 × 1500-3000 × 6000-10000	≤7.5	GB, ASME, EN, JIS	
	S31803, S32750, S32205	6-80 × 1500-3000 × 6000-10000	≤7.5	GB, EN, JIS	
不锈钢 热轧卷 Hot rolled stainless steel coils	304L, 316L, 321	2-20 × 1500-3000 × C	≤20	GB, ASME, EN, JIS	
	316L, S31803, S32205	2-20 × 1500-3000 × C	≤20	GB, ASME, EN, JIS	
不锈钢 冷轧卷 Cold rolled stainless steel coils	304L	0.4-8 × 1000-2000 × C	20	GB, ASME, EN, JIS	
	316L	0.4-8 × 1000-2000 × C	20	GB, ASME, EN, JIS	
不锈钢 管坯 Stainless steel tube billets	TP304	Φ65 ~ 240	0.5 ~ 3	Q/TB3071-2007	石油炼化装置用管 Tubes for petroleum cracking apparatus
	TP321	Φ65 ~ 240	0.5 ~ 3	Q/TB3071-2007	
	TP321H	Φ65 ~ 240	0.5 ~ 3	Q/TB3071-2007	
	TP316L	Φ65 ~ 240	0.5 ~ 3	Q/TB3071-2007	
不锈钢 复合板 Stainless steel clad plates	06Cr13+Q345R	3+18\20\24	2.4 ~ 2.8	JB4733-96	石油炼化延迟焦化 装置 Oil refining delayed coking unit
	06Cr13AL+ Q345R	3+18\20\26	2.2 ~ 3.0	JB4733-96	石油炼化项目焦炭塔 Oil refining coke column
	022Cr17Ni12Mo2+ Q345R	3+18\20\26	2.2 ~ 3.0	JB4733-96	
	06Cr18Ni11Ti+ Q345R\Q245R	3+18\20\26	2.2 ~ 3.0	JB4733-96	
不锈钢 管 Stainless steel tubes	321	无缝管 (Seamless tubes): D: Φ6 ~ 630 S:1-40 焊管 (Welded tube): D: Φ12.7 ~ 4800 S:1-50	理论计算 公式 (Theoretical calculation formula)= π S(D-S) ρ /1000	ASME SA-312 无缝管 (Seamless tubes): GB/T 14976-2002 焊管 (Welded tube): GB/T 12771-2008	石油化工用裂化管 和炉管、热交换管 Cracking tubes, furnace tubes and heat exchanging tubes used in petrochemical industry
	316L				
	347H				
	310S				
	P91				

◆ 碳钢在石化行业可生产的常规产品

钢种 Steel grade	牌号 Grade	规格 (mm) Specifications		单重 (t) Weight		标准 Standard	主要用途 Application
		厚度 Thickness	宽度 Width	1549机组	2250机组		
热连轧 卷板 Hot rolled coils	X42-X60	4-21.6	900-2130	14-20	26-30	GB/T14164-2005 或协议标准 GB/T14164-2005 or agreed standards	石油、天然气、 煤层气、矿浆输送管线 Pipeline for transportation of oil, natural gas, coal seam gas and pulp
	X65	4-20	900-2130	—			
		20-24	900-1500				
	X70	4-19	900-2130				
		19-23	900-1500				
	X80	4-16	900-2130				
16-19		900-1700					
J55	4-15	900-2130	14-20	26-30	Q/TX3220-2006	油井管表套 Oil well pipe casing	
热轧 中板 Hot rolled plates	06Ni9 (9%Ni)	5-35	1000-3000			EN10028-4 ASTMA553/A553M Q/太新001-2007	制造焊接低温储罐和 压力容器要求低温 性能的镍系合金钢板 Nickel alloy steel plates used to make and weld low-temperature tank and pressure vessel

产品成分、性能 >>>

Composition and Property of Product

◆ 化学成分 (典型值)

Chemical composition (Typical value)

1、不锈钢板材 Stainless steel flat products

牌号 Grade	C	Si	Mn	P	S	Cr	Ni	Cu	Al	Ti	Mo	N	Nb
06Cr19Ni10	0.051	0.450	1.130	0.032	0.006	18.30	8.19	-	-	-	0.12	0.0510	-
06Cr18Ni11Ti	0.028	0.720	0.940	0.027	0.001	17.49	9.10	0.24	0.017	0.25	0.09	0.0144	-
022Cr17Ni12Mo2	0.013	0.540	1.080	0.028	0.001	16.75	10.27	-	-	-	2.05	0.0290	-
06Cr17Ni12Mo2	0.048	0.591	1.100	0.025	0.006	16.614	12.01	-	-	-	2.05	0.0235	-
S31803	0.025	1.55	1.20	0.028	0.003	18.50	4.85	-	-	-	0.065	2.60	-
S32750	0.026	0.55	0.78	0.030	0.005	25.1	7.40	-	-	-	0.28	3.60	-
304H	0.06	1.00	2.00	0.045	0.030	10.65	18.85	-	-	-	-	-	-
347H	0.06	1.00	2.00	0.045	0.030	10.65	18.85	-	-	-	-	-	8C-1.10
321H	0.06	0.75	2.00	0.030	0.030	10.65	18.55	-	-	4C-0.60	-	-	-

标准 Standard	牌号 Grade	C	Si	Mn	P	S	Cr	Ni	Mo	N
日标 Japanese Standard	SUS317	≤0.08	≤1.00	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	
	SUS317L	≤0.03	≤1.00	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	
美标 American Standard	317	≤0.08	≤0.75	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	≤0.10
	317L	≤0.03	≤0.75	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	≤0.10
国标 National Standard	0Cr19Ni13Mo3	≤0.08	≤0.75	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	≤0.10
	00Cr19Ni13Mo3	≤0.03	≤0.75	≤2.00	≤0.045	≤0.030	18.0/20.0	11.0/15.0	3.0/4.0	≤0.10



2、不锈钢型材 Stainless steel sections

钢种 Steel grade	牌号 Grade	C	Si	Mn	P	S	Ni	Cr	Mo	其他 Others
不锈钢 管坯 Stainless steel tube billets	TP304	≤0.08	≤0.75	≤2.00	≤0.030	≤0.020	9.00~11	18.00~20	-	-
	06Cr18Ni11Ti	≤0.08	≤1	≤2.00	≤0.030	≤0.020	9.00~12	17.00~19	-	Ti: 5×C%~0.70
	TP321H	0.04~0.08	≤0.75	≤2.00	≤0.020	≤0.008	10.00~13	18.00~20	-	Ti:4C%~0.60 N:≤0.03
	TP316L	≤0.035	≤0.75	≤2.00	≤0.030	≤0.020	11.0~15	16.0~18	2.0~3	-
	TP347H	≤0.04~0.10	≤0.75	≤2.00	≤0.030	≤0.020	9.00~13	17.00~20	-	Nb+Ta≥18×C%~1.00

3、热连轧卷板 Hot rolled coils

(%)

牌号 Grade	C (Max)	Si (Max)	Mn (Max)	P (Max)	S (Max)	Al (Max)	其他 Others
B (L245)	0.15	0.35	1.20	0.025	0.015	0.06	-
X42 (L290)	0.15	0.35	1.30	0.025	0.015	0.06	Nb、Ti
X46 (L320)	0.15	0.35	1.40	0.025	0.015	0.06	Nb、Ti
X52 (L360)	0.15	0.35	1.40	0.025	0.015	0.06	Nb、Ti
X56 (L390)	0.15	0.40	1.40	0.025	0.015	0.06	Nb、Ti
X60 (L415)	0.15	0.40	1.40	0.025	0.015	0.06	Nb、Ti、V
X65 (L450)	0.15	0.40	1.45	0.025	0.015	0.06	Nb、Ti、V
X70 (L485)	0.15	0.40	1.65	0.025	0.015	0.06	Nb、Ti、V、Mo等
X80 (L555)	0.15	0.40	1.85	0.025	0.015	0.06	Nb、Ti、V、Mo等
J55	0.15~0.20	0.15~0.25	1.00~1.20	≤0.020	≤0.010		

4、合金中厚板 Medium and thick alloy steel plates

钢种 Steel grade	标准 Standard	C	Si	Mn	P	S	Mo	v	Ni
合金中厚板 06Ni9 (9%Ni) Medium and thick alloy steel plates	EN10028-4	≤0.10	≤0.35	0.30~0.80	≤0.015	≤0.005	≤0.10	≤0.01	8.50~10.00
	ASTMA553/A553M I型	≤0.13	0.15~0.40	≤0.90	≤0.035	≤0.035	-	-	8.50~9.50
	Q/太新001-2007	≤0.10	≤0.35	0.30~0.80	≤0.008	≤0.005	≤0.10	≤0.01	8.50~10.00

5、碳钢油井用钢 Carbon steel for oil well

牌号 Grade	C	Si	Mn	Cr	Mo	P	S	Cu
4145	0.42~0.48	0.15~0.30	0.75~1.20	0.90~1.20	0.20~0.25	≤0.030	≤0.030	≤0.20
30CrMo	0.26~0.34	0.17~0.37	0.40~0.70	0.80~1.1	0.15~0.25	≤0.030	≤0.030	≤0.20

◆ 力学性能
Mechanical properties

1、不锈钢板材 Stainless steel flat products

牌号 Grade	规格 (mm) Specifications	屈服强度 (MPa) Yield strength	抗拉强度 (MPa) Tensile strength	伸长 (%) Elongation
06Cr19Ni10	δ=10	295	585	49.5
06Cr18Ni11Ti	δ=12	-	595	56.5
022Cr17Ni12Mo2	δ=20	260	575	59.0
06Cr17Ni12Mo2	δ=12	-	542	55.5
S31803	δ=10	480	710	28
S32750	δ=12	530	730	27
304H	δ=20	205	515	40
347H	δ=12	205	515	40

标准 Standard	牌号 Grade	σ _s (MPa)	σ _b (MPa)	δ5 (%)	硬度值 Hardness		
					HB	HRB	HV
日标 Japanese Standard	SUS317	≥205	≥520	≥40	≤187	≤90	≤200
	SUS317L	≥175	≥480	≥40	≤187	≤90	≤200
美标 American Standard	317	≥205	≥515	≥35	≤217	≤95	
	317L	≥205	≥515	≥40	≤217	≤95	
国标 National Standard	0Cr19Ni13Mo3	≥205	≥520	≥40	≤187	≤90	≤200
	00Cr19Ni13Mo3	≥177	≥480	≥40	≤187	≤90	≤200
新日标 New Japanese Standard	06Cr19Ni13Mo3	205	515	35	217	95	220
	022Cr19Ni13Mo3	205	515	40	217	95	220

2、热连轧卷板 Hot rolled coils

牌号 Grade	厚度mm Thickness	屈服强度 Yield strength (MPa)	抗拉强度 Tensile strength (MPa)	伸长率 Elongation (%)	180° 冷弯 Cold bending	V型冲击 V type impacting		
						试验温度℃ Test temperature	冲击功≥J Impacting power	
B (L245)	5~25.4	245 ~ 445	415 ~ 755	≥21	d=2a	-20	40	
X42 (L290)	5~25.4	290 ~ 495	415 ~ 755	≥21			42	
X46 (L320)	5~25.4	320 ~ 525	435 ~ 755	≥20				
X52 (L360)	5~25.4	360 ~ 530	460 ~ 755	≥19				
X56 (L390)	5~22.0	390 ~ 545	490 ~ 755	≥18				
X60 (L415)	5~22.0	415 ~ 565	520 ~ 755	≥17				
X65 (L450)	5~20.0	450 ~ 600	535 ~ 755	≥17				47
X70 (L485)	5~20.0	485 ~ 620	570 ~ 755	≥16				63
X80 (L555)	5~19.0	555 ~ 690	625 ~ 825	≥15				96
J55	4 ~ 15.0	420 ~ 520	≥517	≥21	d=2a	-10	40	

3、合金中厚板 Medium and thick alloy steel plates

牌号 Grade	标准 Standard	屈服强度 (MPa) Yield strength	抗拉强度 (MPa) Tensile strength	伸长 (%) Elongation	冲击功Ak _v (J) Impacting power
06Ni9 (9%Ni)	EN10028-4	≥585	680 ~ 820	18	80 (横向) Transverse
	ASTMA553/A553M I型	≥585	690 ~ 825	20	27 (横向) Transverse
	Q/太新001-2007	≥585	680 ~ 820	18	80 (横向) Transverse

◆ 特性及应用

Property and application

1、不锈钢板材 Stainless steel flat products

牌号 Grade	主要特性及特点 Main properties and features	应用领域 Applications	主要业绩 Main achievements
304L	成份稳定均匀,良好的焊接和冷、热加工性能 Stable components, perfect welding and hot and cool machining performance	用于食品设备、一般化工设备等 Used to food equipment, normal chemical equipment, etc.	石化装置大型PTA(精对苯二甲酸)干燥设备 Big type of PTA (Pure Terephthalic Acid) dry equipment of petrification equipments
316L	成份稳定均匀、耐蚀性高 Stable and equal components, high resisting corrosion	用于抵抗硫酸、磷酸、甲酸、乙酸的设备 Used to the equipments resisting sulfuric acid, Phosphoric acid, formic acid and acetic acid	石化装置大型PTA(精对苯二甲酸)干燥设备 Big type of PTA (Pure Terephthalic Acid) dry equipment of petrification equipments
321	成份稳定均匀、耐蚀性高 Stable and equal components, high resisting corrosion	可用于制造耐酸容器和设备的衬里和管道等 Used to make acidproof vessel and the liner of equipment and pipes, etc.	石化装置反应塔容器设备 Petrification setting reaction tower vessel
S31803	耐蚀性高、高韧性、高强度 High resisting corrosion, high toughness, high strength	真空制盐、烟气脱硫 Vacuum refined salt, fgd (flue gas desulfurization)	炼油厂的冷凝管道 Condensing pipe of Oil refining factory
S32750	耐蚀性高、高韧性、高强度 High resisting corrosion, high toughness, high strength	甲醇合成塔、天然气管道 Carbinol synthetic tower, natural gas pip	石化装置大型PTA(精对苯二甲酸)干燥设备 Big type of PTA (Pure Terephthalic Acid) dry equipment of petrification equipments
304H	耐高温氧化 Resisting high temperature oxidation	一般化工设备 Normal chemical equipment	氢化脱硫装置 Hydrogen desulfurize settings
347H	耐高温氧化、耐晶间腐蚀 Resisting high temperature oxidation, resisting intercrystalline corrosion	用于抵抗硫酸、磷酸、甲酸、乙酸的设备 Used for the equipments resisting sulfuric acid, Phosphoric acid, formic acid and acetic acid	减压蒸馏装置 Pressure reducing distilling apparatus
321H	耐高温氧化 Resisting high temperature oxidation	可用于制造耐酸容器和设备的衬里和管道等 Used for making acidproof vessel and the liner of equipment and pipes, etc.	石化装置反应塔容器设备 Petrification setting reaction tower vessel

2、不锈钢管 Stainless steel pipe

牌号 Grade	主要特性及特点 Main properties and features	应用领域 Applications
321	在敏化温度范围(425~815℃)内服役时既有良好的耐晶间腐蚀能力。具有优异的高温性能。 Having better resisting intercrystalline corrosion and perfect high temperature performance in the sensitizing temperature range (425~815℃) .	石油化工用裂化管和炉管,耐酸容器和耐酸设备。 Cracking pipe and furnace tube used in petrochemical industry, resisting acid vessel and equipment.
316L	耐晶间腐蚀性能较好。 Perfect resisting intercrystalline corrosion.	海水、化学、造纸、沿海设备、特别使用于机械及化工工业设备。 Seawater, chemistry, paper making, inshore equipment, especially the equipment used to mechanics and chemical industry.
347H	具有良好的耐腐蚀性能、焊接性能和热强性能。 Having perfect resisting corrosion, welding performance and high temperature strength.	石油化工的热交换器和管件。 Heat exchanger and pipe fittings in petrochemical industry.
310S	耐晶间腐蚀性能较好,耐氯化物应力腐蚀性能优秀,有较好的抗高温氧化性能。 Fine resisting intercrystalline corrosion, perfect resisting chloride stress corrosion, better resisting high temperature oxidation performance.	热交换器管件。 Heat exchanger and pipe fittings.

3、不锈钢复合板 Stainless steel composite board

钢种 Grade	主要特性及特点 Main properties and features	应用领域 Applications	主要业绩 Main achievements
06Cr13+Q345R	有较好的韧性和耐腐蚀性 Perfect toughness and resisting corrosion	涡轮机叶片及石化设备 Turbine blade and petrochemical equipment	北京燕山石化炼油改造项目 延迟焦化装置 Delayed coking equipment of Beijing Yanshan petrochemical oil refining reform project
06Cr13AL+Q345R			
022Cr17Ni12Mo2+Q345R	有良好的耐热、抗裂、耐腐蚀性能 Nice performance of heat, resisting cracking and corrosion	尿素合成纤维石化设备制造 Urea synthetic fibre petrochemical equipment manufacture	独山子1000万吨/年新建炼油装置 New oil refining equipment of DuShanZi and the output is 10,000,000 tons annual year
06Cr18Ni11Ti+Q345R\Q245R	具有良好的力学性能和抗晶间腐蚀性能 Perfect mechanical properties and resisting intercrystalline corrosion	适合制造化肥、石油化工设备制造 Adapting to produce chemical fertilizer and making the equipment for petrochemical industry	天津大港油田改造项目 Reform project of Tianjin Dagang oil field

4、热连轧卷板 Hot rolled coils

牌号 Grade	主要特性及特点 Main properties and features	应用领域 Applications	主要业绩 Main achievements
X70-X80	高强度、高韧性，高压输送 High strength, high toughness, high pressure transportation	天然气管线 Natural gas pipes	西气东输二线、陕京三线、中亚管线 The second line of west-east natural gas transmission project, Three line between Shanxi and Beijing, pipeline of Central Asia
B-X65	成分均匀，性能稳定 Proportional components, stable performance	原油、成品油、天然气管线 Crude oil, product oil, natural gas pipe line	兰-郑-长管线 second Lan-Zheng-Chang pipeline
J55	成分均匀，性能稳定 Proportional components, stable performance	油井套管 Sleeves of oil well	大庆、冀东油田 Daqing and Jidong oil field

5、合金中厚板 Medium and thick alloy steel plates

牌号 Grade	主要特性及特点 Main properties and features	应用领域 Applications	主要业绩 Main achievements
06Ni9 (9%Ni)	钢质纯净，气体含量低，组织均匀，性能优良，特别是具有良好的低温冲击韧性，-196℃低温韧性优于国外产品。 Steel quality is pure, less air, proportional structure, perfect performance, especially having nice impacting toughness in low temperature, it's much better than the overseas products at -196℃.	适用于制造焊接低温储罐和压力容器用要求低温性能的镍系合金钢板。 It is suitable to make welding low temperature storage tank and pressure vessel, the Ni alloy steel plate that have low temperature performance will be used.	用于制造大型LNG储罐等低温设备。 Also can be used to make some low temperature equipment, e.g. large LNG storage tank.

产品介绍 >>>

Product Introduction

◆ 自主开发成功了N含量达2800ppm的超级双相不锈钢2507中板和经济型双相不锈钢2101和2304等，填补了国内空白，顶替了进口。成功开发超级双相不锈钢S32750中板，成为国内首家生产超级双相不锈钢的企业。产品用于石油化工、炼油、真空制盐、烟气脱硫等腐蚀环境更为苛刻的领域。

◆ 油厂的冷凝管道用钢开发：S31803宽幅卷切板，应用在广西100万吨炼油项目，用于制造炼油厂的冷凝管道；0Cr18Ni9不锈钢热轧中厚板，应用在天津大沽化工厂的扩建项目上，用于制造化工品的反应釜、换热器。

◆ 不锈钢管坯开发用于石油裂化装置的TP347H产品、煤制油流体管用2305双相钢产品，并获得客户使用认可。

◆ 不锈钢复合板广泛应用于青岛大炼油项目、燕山石化、广西石化炼油项目改造等。

◆ We have successful developed the super diphas stainless steel 2507 medium plate which the content of Nitrogen is 2800ppm and economical diphas stainless steel 2101, 2304, etc. This fill up the domestic blank and replace the import part. We also successful develop the super diphas stainless steel 2750 medium plate and become the first enterprise that can produce the super diphas stainless steel. The products apply to some area which have high requires to environment, e.g. Petrochemical industry, oil refining, vacuum making salt.

◆ The development of condensate pipe steel products: The wide winding cutting plate applied to the 1, 000, 000tons oil refining project in Guangxi province to make condensate pipes in oil refining factory; Stainless hot rolling medium plate applied to the extension project of Tianjin Dagu chemical factory to make the reaction vessel and heat exchanger of chemicals.

◆ The development of stainless steel tube blank applied to TP347H products of petroleum cracking unit, 2305 diphas steel products of coal liquefaction to liquid flow tube. And get the trust of the customer.

◆ Stainless steel clad plates are widely applied to the project of Qingdao oil refining, Yanshan petrochemical company, Guangxi Shilin oil refining reform, etc.

◆ 钢板组织均匀，性能优良，特别是具有良好低温冲击韧性的9%Ni钢用于制造大型LNG储罐等低温设备。

◆ 截止目前，已向中石油提供X80管线钢48万吨，西气东输二线第一根螺旋焊管就是使用太钢产X80，为国家能源建设作出了贡献，为填补国内高等级X80管线钢空白作出了贡献。

◆ The steel plate having proportional structure, perfect performance, especially the 9% Ni steel having nice low temperature impacting toughness which can be used to make some low temperature equipment, e.g. large LNG storage tank.

◆ Till now we have already supply 480,000tons X80 pipeline steel. The first spiral welding pipe of West-East natural gas transmission project also come from TISCO. We have do some contribution to national energy construction and also to the blank of domestic high grade X80 pipeline steel.



西气东输二线
Two pipelines from the west to the east



炼油蒸馏装置
Refining and distilling equipment



化工厂
Chemical plant



制盐主体设备——蒸发罐
Salt making main equipment——evaporating pot



大型LNG储罐
Large LNG tanks

用户使用指南 >>>

User Instruction

1、304L、316L奥氏体不锈钢

(1) 冷作硬化特性

奥氏体不锈钢由于具有高的屈服强度、故成型时所需的能量比低碳钢要大两倍；所有的300系不锈钢都有加工硬化，而且可以作大的伸展。

1. 304L, 316L austenitic stainless steel

(1) Characteristic of cold hardening

Due to high yield strength of austenitic stainless steel, energy it needed is more than two times of mild steel needed when forming; all 300 series stainless steel can work hardening and has big extension.

(2) 成型方法的相对适应性

(2) Relative adaptability of forming method

牌号 Grade	冲切 Die cutting	冲孔 Punching	冷弯冲压 Cold bending and stamping	深冲压 Deep drawing	旋压成型 Spin forming	轧制成型 Rolling forming	压印 Coining	滚花 Knurling
304	B	B	A	A	B	A	B	B
304L	B	B	A	A	B	A	B	B
316L	B	B	A	A	B	A	B	B

注：A：最好 B：好 Note: A: best B: good

2、S31803、S32750双相钢加工与制造

2. Processing and manufacturing of S31803, S32750 dual phase steel

加工方式 Processing method	注意事项 Precaution
冷加工 Cold working	可采用像奥氏体不锈钢的方法进行。由于屈服强度高，需较强的初始力，达到该极限后，变形像奥氏体不锈钢一样容易，但不适宜深冲。冷加工后建议进行热处理软化。 Same method can be adopted as austenitic stainless steel. Due to high yield strength, it needs stronger initial force, after reach this limit, its deformation is as easy as austenitic stainless steel; but it is not suitable for deep drawing. Heat treatment softening is suggested after cold working.
热加工 Hot working	热加工成型温度在950-1100℃，随后应进行热处理软化。 The temperature of thermal forming is 950-1100℃ in hot working, then it should carry out heat treatment softening.
热处理 Heat treatment	淬火软化处理温度在950-1050℃，水中快冷，避免σ相析出。 The temperature of negative hardening is 950-1050℃, rapid cooling in water can avoid to precipitate σ phase.
焊接 Welding	E 2209 is recommended as welding material. Welding method: SMAW & GTAW are recommended; GMAW & SAW are restricted for use; plasma arc welding temperature between different layer shall be avoided to be less than 150℃. Multi-layers and multi-pass welding is used to ensure austenite content in welding HAZ larger than 30%.

3、不锈钢复合板焊接要点：

(1) 焊接要点：

- ◆ 复层焊接为保证焊接质量，要用小直径焊条多道焊，对焊层的堆焊高度要控制最小。
- ◆ 复层焊接时必须彻底清除过渡层溶渣及其他表面附着物，层间温度控制在60℃以下。
- ◆ 要注意引弧和熄弧的质量，收弧应将弧坑填满，多层焊时的层间接头应错开。
- ◆ 焊基层第1层时，需特别注意不得将低合金金属沉积到复层上。
- ◆ 过渡层熔敷金属必须盖满钢层1.5–2.5mm，并盖过不锈钢与碳钢交界面0.5–1.5mm。
- ◆ 过渡层第1遍焊接要采用小参数、反极性、直道多道焊，降低对复层的稀释。

3. Welding key point of clad plate of stainless steel

(1) Welding key point

◆ To ensure welding quality, small diameter electrode and multi passes welding should be used in alloy cladding welding, the height of weld layers in build up welding should be controlled to the smallest.

◆ It must thoroughly remove molten slag from transition layer and other surface attachments in alloy cladding welding, interlayer-temperature should controlled to less than 60°C.

◆ Pay attention to the quality of striking arc and extinguishing arc, crater should be filled in ending stage; welding joint should be staggered in multi-layers welding.

◆ It requires special attention that low alloy metal mustn't be settled down to the alloy cladding when welding the first layer of base metal.

◆ Transition layer deposited metal must cover metal by 1.5–2.5mm, and cover the interface of stainless steel and carbon steel by 0.5–1.5mm.

◆ The first welding of transition layer should use small parameter, reversed polarity, straight and multi passes welding to reduce the alloy cladding dilution.

(2) 焊层选择参照表

(2) Reference list of welding layer

复材厚度 (mm) Thickness of alloy cladding material	过渡层道数 Pass of transition layer	复层道数 Pass of alloy cladding	备注 Note
1	1		指盖面次数 Cover pass
2	1	1	
3	1	1	
3~6	1	2~3	

(3) 焊条选用参照表

(3) Reference list of welding rod

复层材料 Material of alloy cladding	过渡层 Transition layer	复层 Alloy cladding
06Cr13、06Cr13AL	A062	A062
06Cr18Ni11Ti	A302	A132
022Cr17Ni12Mo2	A042	A022
06Cr13+15CrMoR	A302	A132

创新发展 >>>

Introduction of Product

◆ 太钢在石化领域用钢上，立足高端，开发创新，积极研发和推进材料高强度、轻量化和替代进口国产化。

◆ THS和TSHS产品由于经特殊冷加工工艺处理，材料强度大幅度提高，且与常规热轧材相比，在等强度条件下可减薄厚度20%–30%，成为制作结构件的理想选材。

◆ 为了追求更精、更高的品质，进一步拓展不锈钢市场，延伸不锈钢产业链，太钢投资109224万元建设不锈钢精密带钢。

◆ 太钢精密带钢立足于高强度、高精度、超薄的不锈钢产品及各种高合金产品，可为国内外尖端领域提供各种材料。

◆ TISCO has been based on foothold high-end, innovates unceasingly, actively researches, develops and propels high strength and light material to substitute importation.

◆ After special cold processing, material strength of THS and TSHS product gets great improvement, comparing to the normal hot-rolled material, its thickness is thinner 20%–30% when the strength condition is same, it is the ideal material for structure manufacture.

◆ To attain the higher accuracy and higher quality, to exploit stainless steel market further, to extend industrial chain of stainless steel, TISCO has invested 1092.24 million RMB for stainless precise strip steel.

◆ Stainless precise strip steel of TISCO is one of high strength, high precise, ultrathin stainless steel products and various of high-alloy products, TISCO can provide various of materials for home and abroad leading-edge fields.

◆ 自主开发成功了超级双相不锈钢S32750中板、超级13Cr马氏体不锈钢、超级SUP13Cr-95和SUP13Cr-110等马氏体不锈钢管坯、高强度厚规格316、316L冷轧板、大口径不锈钢管、碳钢复合板等，目前，这些产品已成功应用于石油化工、炼油、真空制盐、烟气脱硫等腐蚀环境更为苛刻的领域，填补了国内空白，顶替了昂贵的进口材料。

◆ 目前太钢正采用世界上最先进的不锈钢无缝管制造工艺，拥有最大吨位的卧式热挤压机、最先进的冷轧管机、最为完善的热处理装备和国际一流的无损检测设备，可生产奥氏体、马氏体、铁素体、双相钢等不锈钢全部钢种及镍基合金等高合金的钢管，根据不同交货状态要求可提供挤压管、光亮管、抛光管、U型管等优质管材，可生产30米超长管材，钢管单支最大交货重量可达5吨。

◆ 太钢将根据本行业管线用材需求，正在研发X52-X70抗酸管线钢；抗大变形用X70管线钢；X100钢级管线钢；“连续油管”新型油井用钢H485。

◆ TISCO has developed independently super duplex steel S32750 plate, super 13Cr martensite stainless steel, super martensite stainless steel tube blank, such as SUP13Cr-95 and SUP13Cr-110, high strength thick gauge 316, 316L cold-rolled thick plate, big diameter stainless pipe, stainless steel cladding plate etc. These products have been used in the corrosive and harsh fields of petrochemical, oil refining, vacuum salt production, flue gas desulfurization, etc. These products fill in the gap in the native market, substitute expensive import material.

◆ At present, TISCO is using the most advanced stainless steel seamless pipe technology in the world, possesses the greatest tonnage of horizontal type extruding machine, the most advanced cold pilger mill, the most perfect heat treatment equipment and the international first-class non-destructive testing equipment, TISCO can produce all stainless steel grade, such as austenite, martensite, ferrite and duplex steel etc. Also TISCO can produce high-alloy steel pipe, such as nickel base alloy, and so on. TISCO can provide high quality tubes, such as extruded tube, cold drawn bright tube, polished tube and 'U' shape tube according to the different delivery requirements. TISCO can provide 30 meters long tubes, the maximum delivery weight of single tube can reach 5 tons.

◆ According to the requirements of petrochemical industry, TISCO is researching and developing international acid resistant pipeline project, X52-X70 acid resistant pipeline steel; high deformation resistance steel X70 pipeline steel; X100 pipeline steel; H485 steel used for new type of oil well 'coiled tubing'.

服务承诺 >>>

Service Promise

- 为客户提供个性化成份、性能、包装、卷重、质保书的设计。
 - 为客户在选材和加工工艺方面提供技术支持。
 - 交货准确及时。
 - 对客户异议，在24小时内答复。
-
- Provide for consumers with the personalized designs on composition, properties, package, coil weight and the quality certificate.
 - Technical support to customers in material selection and fabrication.
 - Accurate and prompt delivery.
 - Response to customer's claim within 24 hours.



太钢加工配送营销网络布局图
Marketing network of TISCO service centers



合作伙伴 >>>

Cooperative Partner



主要业务部门联系方式 >>>

Contacting Manners of the Main Business Sections

股份公司主要业务部门 Main business department of Co.,Ltd	业务功能 Functions	联系电话 Telephone	E-mail
营销部 Marketing Department	合同管理、订货、异议、 投诉受理及出口贸易 Contract and order management Complaint and claim handing Exports business	0351-3012518 0351-3011432 800-806-1998 +86 (0)351-3017169 +86 (0)351-3017525	Wangbt@tisco.com.cn Tgyhfwk@tisco.com.cn Tggm@tisco.com.cn
技术中心 Technology center	技术咨询与服务 Technical consultation service	0351-3012213	Tgjszxbxg@tisco.com.cn

国际分公司联系方式 Contacting manners of international trading Co.,Ltd.

太钢国贸(美国)有限公司 Taigang International Trading (USA) Co., Ltd.	美国 USA	电话 (Tel) 001-4124340607	传真 (Fax) 001-4124340608
太钢国贸(香港)有限公司 Taigang International Trading (Hongkong) Co., Ltd.	香港 Hongkong	电话 (Tel) +0852-28271686	传真 (Fax) +0852-28271300
太钢欧洲有限公司 Taigang Europe Co., Ltd.	德国 Germany	电话 (Tel) +49(0)2154-81690	传真 (Fax) +049-2154-816911

国内分公司联系方式 Contacting manners of domestic trading Co.,Ltd

公司名称 Branch Name	地址 Address	通讯方式 Telephone & Fax
太钢华北区销售公司 TISCO sales company in North China	天津 Tianjin 北京 Beijing 太原 Taiyuan 郑州 Zhengzhou	电话 (Tel) 022-24308105 邮编 (Post code) 300012 电话 (Tel) 010-64441368 邮编 (Post code) 100029 电话 (Tel) 0351-3096390 邮编 (Post code) 030003
太钢东北区销售公司 TISCO sales company in Northeast of China	沈阳 Shenyang 哈尔滨 Haerbin	电话 (Tel) 024-24232050 邮编 (Post code) 110016
太钢华东区销售公司 TISCO sales company in East China	无锡 Wuxi 上海 Shanghai 杭州 Hangzhou	电话 (Tel) 0510-82407713 邮编 (Post code) 214011
太钢山东区销售公司 TISCO sales company in Shandong	青岛 Qingdao 济南 Jinan	电话 (Tel) 0532-81101847 邮编 (Post code) 266000
太钢华中区销售公司 TISCO sales company in Central China	武汉 Wuhan 长沙 Changsha	电话 (Tel) 027-85615300 邮编 (Post code) 430015
太钢华南区销售公司 TISCO sales company in South China	佛山 Foshan 揭阳 Jieyang	电话 (Tel) 0757-83315711 邮编 (Post code) 528041
太钢西南区销售公司 TISCO sales company in Southwest of China	成都 Chengdu 重庆 Chongqing	电话 (Tel) 028-87604342 邮编 (Post code) 610036
太钢西北区销售公司 TISCO sales company in Northwest of China	西安 Xi'an	电话 (Tel) 029-86231507 邮编 (Post code) 710016