



# 工程机械行业用钢

ENGINEERING MACHINE INDUSTRY STEEL

太钢产品分行业系列册 Products Serial Catalogs Of Tisco For Different Industries

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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.



#### ◆ 工程机械行业用钢概况

自2006年新热连轧生产线（2250机组）投产以来，不断依靠先进的生产装备和技术水平，致力于高强度工程机械用钢的产品开发，取得了丰硕的成果，目前已形成了低碳贝氏体钢、高强度焊接结构钢等系列产品，屈服强度覆盖345MPa~960MPa，并可以按照欧标、美标等国外标准进行检验交货。

我公司已经与中国一重、大连重工、北方重工、西门子等大型设备制造公司形成长期、稳定的合作，用于制造各类重型设备。同时，太钢的双相不锈钢还用于各类建筑机械结构件，并得到各方的一致认可。

#### ◆ 与行业客户的合作关系

目前我公司已和国内外诸多工程机械厂家进行了深入的沟通与合作，高强产品已得到徐工、三一重工、维蒙特、中国一重等众多知名企业的认可，并与之形成了广泛的合作。

下一步，我公司将紧紧依托先进的装备、完善的工艺，过硬的技术实力加大工程机械行业用钢的开发力度，逐步替代进口，打造民族品牌。同时一如既往地加强同工程机械行业用户的合作，不断满足用户个性化的需求。

#### ◆ Brief on engineering machine industry steel

From the start-up of new hot rolling mill (2250mm production line) in 2006, based on the advanced equipments and technology, we have been dedicated to the development of high-strength engineering machine steel and gained fruitful achievements successful development of series products such as low carbon bainite steel and high strength welding structure steel, wide yield strength ranging from 345MPa to 960MPa, improved delivery inspection complying with European standard or U.S.A. standard.

The long-term and stable cooperation between TISCO and large equipment manufacturers, including China First Heavy Industry, Dalian Heavy Industry, Northern Heavy Industry and Siemens, has been established. At the mean time, TISCO's duplex stainless steel is also used for structural parts of different construction machines and wins wide acceptance and praise.

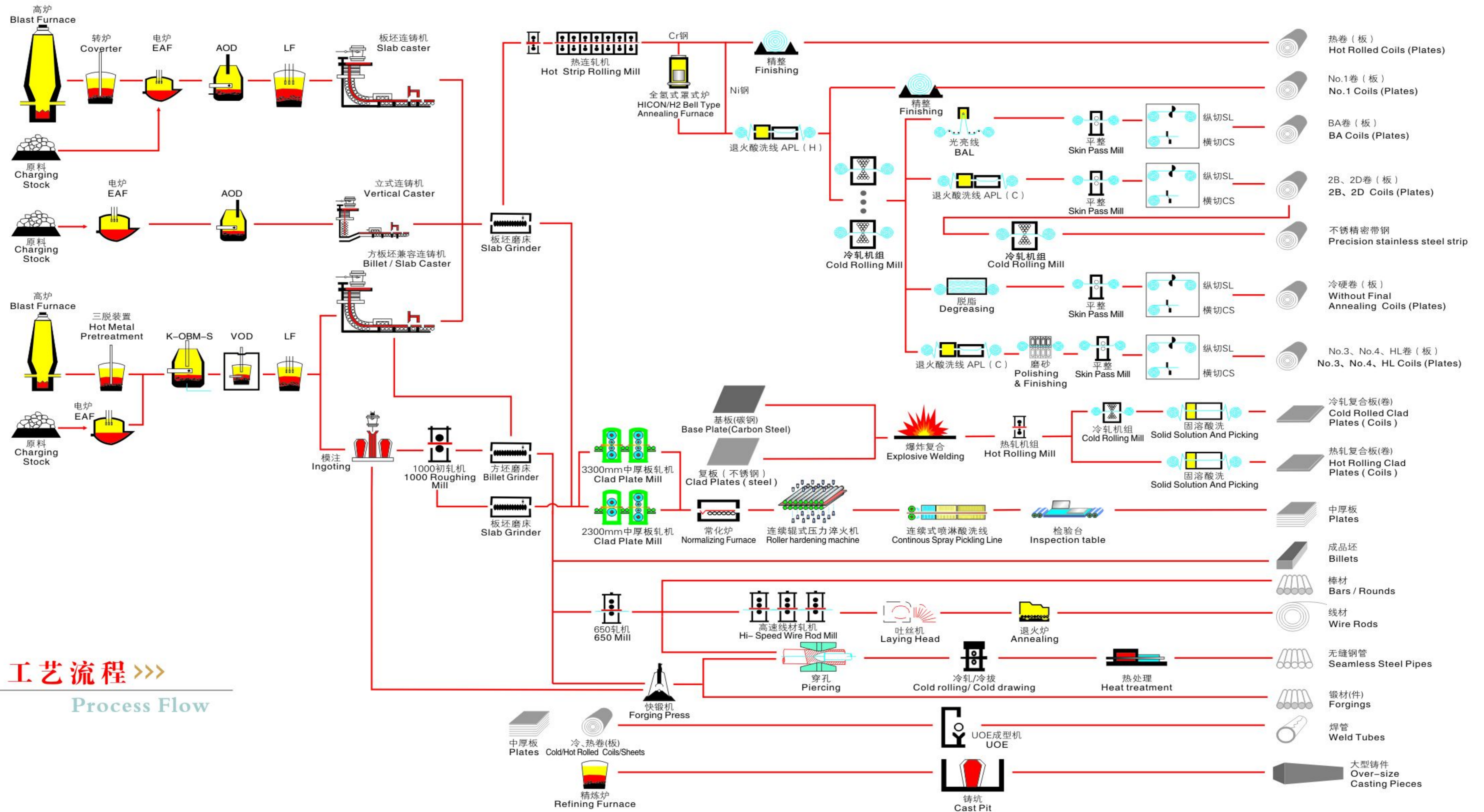
#### ◆ Cooperative relationship with industrial customers

At present, our company has been in deep communication and good cooperation with a lot of engineering machine manufactures at home and abroad, with our high strength product being accepted and widely applied by well-known enterprises, e.g. XCMG, Sany Group, Valmont, China First Heavy.

For the future, based on the state-of-the-art equipments, advanced process technology and professional technique strength, TISCO will put more effort on the development of engineering machine steel, aiming at creating a national brand and replacing the imported product. At the same time, TISCO will continue the cooperation with customers in engineering machine industry and meet customerized demands.







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.



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

认证、荣誉 >>>

Certification & Honors



- ◆ 《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.





常规产品 >>>

Conventional Products

钢种 Steel grade	牌号 Grade	规格 (mm) Specifications	标准 Standard	主要用途 Application
碳结 卷板 Coiled carbon constructional steel	Q195-Q275	1.5-80 × 860-3000	GB/T3274-2007 Q/TB3801-2007	用于建筑结构、桥梁、船舶、齿轮、工程机械与 农机等一般结构件。 Used for general structure parts of architecture, bridge, ship, gear, engineering machine and agriculture machine.
	SS400	1.5-25.4 × 860-2130		
	Q345	1.5-80 × 860-3000	GB/T912-1989 GB/T3274-2007	
轧制 模具 扁钢 Flat steel for rolling die	(R) H13	60-200 × 305-1000 × 2000-5000	Q/TX3018-2003 Q/TB3012-2003	热锻模、热挤压模、压铸模等热作模具。 Used for hot-working die, e.g. hot forged die, hot extrusion die, die-casting die, and etc.
	P20 (H) 718 (H)	40-250 × 300-1000 × 2000-5000	Q/TB3016-2004 Q/太新022-2007	制造大型、中型和精密塑料模具。 Used for big, medium and precision plastic dies.
锻制 模具钢 Forged die steel	(R) H13 5CrMnMo 5CrNiMo	φ80-400 × 1000 -5000	GB/T1299-2000 Q/TX3022-2003	热锻模、热挤压模、压铸模等热作模具。 Used for hot-working die, e.g. hot forged die, hot extrusion die, die-casting die, and etc.
	(R) Cr12Mo1V1 (R) X63CrMoV51	φ80-250 × 1000 -5000	Q/TB2034-2003 Q/TB6004-2003	轧辊、支撑辊、托辊等。 Roller, back-up roller, idle roller, and etc
模具钢 中厚板 Die steel plate	P20HL 718HL NAK80	20-80 × 1000-2000 × 3000-11000	Q/太新017-2009 Q/太新050-2009 Q/太新045-2009	制造大型、中型和精密塑料模具。 Used for big, medium and precision plastic dies.
碳结 合结钢 锻材 Forged carbon constructional steel and forged structural alloy steel	20-60 (Mn) 40Cr 42CrMo 40CrNiMoA等	φ80-400 × 1000 -12000	GB/T699-1999 GB/T3077-1999	制作较大截面的轴、齿轮、连杆等。 Shaft, gear and connecting rod with big cross-section.
300系 300 Series	304, 1.4301, 309L, 347L	厚度: 0.3-80mm, 宽度: 1000-3000mm, 卷料或开平板、 单张轧制均可 Thickness: 0.3-80mm, Width: 1000-3000mm, Coil, planished plate, or single-rolled plate	国标 美标 日标 欧标 State standards ANSI JIS European Standard	加氢反应器。 Hydrogenation reactor.
	304L, 1.4307, 022Cr19Ni10, 00Cr19Ni10, 301L			电气设备、制冷设备。 Electric equipment and refrigeration equipment.
	316, 1.4401			航空配件。 Aviation component.
	316L, 1.4404, 022Cr17Ni12Mo2, 00Cr17Ni12Mo2			化学品船、桥梁、储罐、造纸机械、工程机械、 污水处理设备。 Chemical ship, Bridge, Tank, Paper machinery, Engineering machine and Sewage Treatment Equipment.
双相 不锈钢板 Duplex stainless steel plate	S31803, 1.4462, 022Cr22Ni5Mo3N, S32205, 2205 S32304, 1.4362 022Cr23Ni4MoCuN, 2304			
不锈钢 无缝管 Seamless stainless steel pipe	13Cr 304 321 316L 双相等 13Cr 304 321 316L Duplex and etc.	外径: 6-630mm 壁厚: 1-30mm Outer diameter: 6-630mm Thickness: 1-30mm	GB3088-1999 GB/T 14975-2002 GB/T14976-2002 GB/T 21833-2008	机械配管, 气压缸, 不锈钢轴承等。 Mechanic piping, pneumatic cylinder, stainless steel bear, and etc.

◆ 相关图片  
Related Pictures



不锈钢罐车  
Stainless steel tank car



汽车改装  
Automobile refit



煤矿机械  
Coal mine machinery



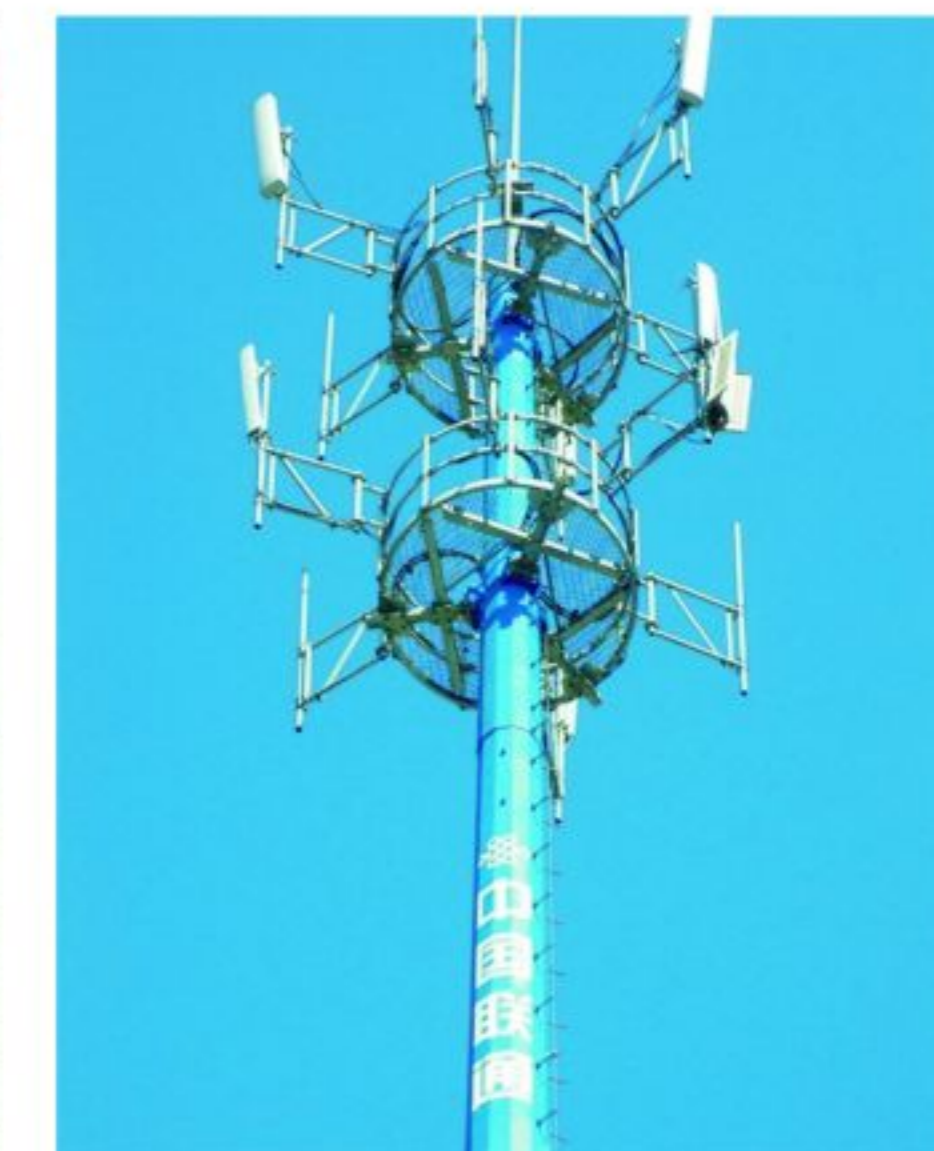
挖掘机  
Excavator



混凝土搅拌罐车  
Concrete stirring tank car



刮板输送机  
Scrape conveyer



通讯塔架  
Communication tower



加氢反应器  
Hydrogenation reactor



◆ 高强度结构钢、高韧性钢主要产品供货标准  
Delivery conditions of high strength structural steel product and high toughness steel product

钢种 Steel grade	牌号 Grade	标准 Standard	规格 (mm) Specifications		主要用途 Application
			厚度 Thickness	宽度 Width	
工程机械用钢 Engineering machine steel	TQ460MC~TQ550MC	Q/太新011-2008	4.0~20.0	1250~2130	工程机械、起重机煤矿液压支架等焊接结构用钢 Welding structure steel used for engineering machine, crane, coal ore hydraulic stand, and etc.
	TQ600MC~TQ960MC		4.0~12.0	1250~1800	
	T700	Q/TX3257-2007	6.0~16.0	1350~1800	银行ATM柜员机、汽车改装行业 ATM machine, automobile refit industry.
	TH800		3.0~6.0	1350~1550	
			6.0~16.0	1350~1800	
	S355MC~S600MC	EN10149-2	3.0~16.0	870~2130	供出口用焊接结构钢 Welding structure steel for exporting.
	S700MC	EN10149-2	3.0~5.0	1350~1600	工程机械、起重机 Engineering machine and mobile crane.
			5.0~16.0	1350~2000	
T520JJ	Q/TX3199-2006	4.0~6.0	870~2130	混凝土搅拌车 Concrete stirring truck.	
低碳贝氏体钢 Low-carbon bainite steel	DB685	Q/太新019-2008	3.0~14.0	1250~2000	工程机械制造 Engineering machine manufacturing.
	DB785	Q/太新019-2008	3.0~14.0	1250~2000	
钢结构 Steel structure	Q390C~Q690E	GB/T1591-1994 GB/T3274-2007	3.0~60.0	1000~3000	厂房、建筑等钢结构 Structure steel for plant building, and etc.
	SN400B	Q/TX3329-2007	9.0~22.0	1000~2130	抗地震管桩用钢 Anti-seismic pipe pile steel.
	SN490B	Q/太新041-2008	8.0~22.0		
电力通讯塔架用钢 Electric communication tower steel	ASTM A572 GR65	Q/太新080-2008	3.0~19.0	870~2130	电力桅杆、塔架 Electric power mast and tower.
耐磨钢 Anti-wear steel	TNM320~TNM400	Q/太新067-2008	20.0~50.0	1500~2700	刮板输送机、工程机械 Scrape conveyor and engineering machine.
	TNM450	Q/太新042-2009	20.0~60.0	1500~2700	

技术标准 >>>

Technical Specification

◆ 高强度工程机械用钢牌号及化学成份 (典型值)  
Steel grade and chemical composition (Typical value) of high strength engineering machine steel

牌号 Grade	化学成份 (%) Chemical composition												
	最大含量 Maximum content												最小含量 Minimum content
	C	Si	Mn	P	S	Nb	V	Ti	Cr	Ni	Mo	B	
TQ460MC (C/D/E)	0.10	0.30	1.60	0.020	0.010	0.07	0.09	0.12					0.015
TQ500MC (C/D/E)	0.10	0.30	1.70	0.020	0.010	0.07	0.09	0.12					0.015
TQ550MC (C/D/E)	0.10	0.30	1.80	0.020	0.010	0.07	0.09	0.12					0.015
TQ600MC (C/D/E)	0.10	0.30	1.80	0.020	0.010	0.07	0.09	0.12					0.015
TQ650MC (C/D/E)	0.12	0.30	1.80	0.020	0.010	0.07	0.09	0.12					0.015
TQ700MC (C/D/E)	0.12	0.30	1.90	0.020	0.010	0.07	0.09	0.12					0.015
TQ900MC (C/D/E)	0.17	0.50	2.00	0.020	0.010	0.07	0.09	0.12	0.09	1.0	0.6	0.005	0.015
TQ960MC (C/D/E)	0.17	0.50	2.10	0.020	0.010	0.07	0.09	0.12	0.09	1.0	0.6	0.005	0.015





◆ 高强度工程机械用钢产品机械性能  
Mechanical properties of high strength engineering machine steel products

牌号 Grade	质量等级 Quality level	机械性能 Mechanical property			其它性能 Other properties				
		屈服强度 Yield strength	抗拉强度 Tensile strength	延伸率 Elongation ≥%	180°C弯曲试验 Bending test		冲击功 Impacting power AKV, J	布氏硬度 Brinell hardness HB	
					A≤6mm	A>6mm			
TQ460MC	C	≥460	590~750	18	d=1.5a	d=2a	0°C	≥40	
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ500MC	C	≥500	610~770	17	d=1.5a	d=2a	0°C	≥40	
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ550MC	C	≥550	670~830	16	d=1.5a	d=2a	0°C	≥40	
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ600MC	C	≥600	690~850	17	d=1.5a	d=2a	0°C	≥40	
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ650MC	C	≥650	700~880	15	d=1.5a	d=2a	0°C	≥40	250
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ700MC	C	≥700	780~930	15	d=1.5a	d=2a	0°C	≥40	260
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ900MC	C	≥900	940~1100	12	d=3a	d=4a	0°C	≥40	310
	D						-20°C	≥40	
	E						-40°C	≥27	
TQ960MC	C	≥960	980~1150	12	d=3a	d=4a	0°C	≥40	320
	D						-20°C	≥40	
	E						-40°C	≥27	

◆ 银行柜员机、汽车改装等行业用高强度钢牌号及化学成份 (典型值)  
Steel grade and chemical composition ( Typical value ) of high strength steel used for ATM and automobile refitting industry

牌号 Grade	化学成份 (%) Chemical composition									
	C	Si	Mn	P	S	Nb	V	Ti	Mo	Al
T700	≤0.12	≤0.50	≤2.0	≤0.020	≤0.010	≤0.09	≤0.20	≤0.15	≤0.50	≥0.015
TH800	≤0.12	≤0.40	≤2.1	≤0.020	≤0.010	≤0.09	≤0.20	≤0.15	≤0.50	≥0.015

◆ 银行柜员机、汽车改装等行业用高强度钢产品机械性能  
Steel grade and mechanical property of high strength steel used for ATM and automobile refitting industry

牌号 Grade	规格 (mm) Specifications	力学性能 Mechanical property				180° 横向 冷弯试验 transversal cold bending test
		Rel, MPa	Rm, MPa	A, %	纵向-20°C AKv (J) Longitudinal	
T700	≥6.0 ~ ≤10.0	≥625	≥700	≥17	≥47	d=2a 完好 Well
	>10.0 ~ ≤16.0	≥590	≥700	≥15		
TH800	≥3.0 ~ ≤8.0	≥700	750~950	≥12	≥40	d=2a 完好 Well
	>8.0 ~ ≤16.0	≥680	750~950	≥12		

◆ 出口高强钢牌号及化学成份 (典型值)  
Steel grade and chemical composition ( Typical value ) of high strength steel for export

牌号 Grade	化学成份 (%) Chemical composition										
	C	Si	Mn	P	S	Nb	V	Ti	Mo	Al	B
S355MC	≤0.12	≤0.50	≤1.50	≤0.025	≤0.020	≤0.09	≤0.20	≤0.15	-	≥0.015	-
S420MC	≤0.12	≤0.50	≤1.60	≤0.025	≤0.015	≤0.09	≤0.20	≤0.15	-	≥0.015	-
S460MC	≤0.12	≤0.50	≤1.60	≤0.025	≤0.015	≤0.09	≤0.20	≤0.15	-	≥0.009	-
S500MC	≤0.12	≤0.50	≤1.70	≤0.025	≤0.015	≤0.09	≤0.20	≤0.15	-	≥0.015	-
S550MC	≤0.12	≤0.50	≤1.80	≤0.025	≤0.015	≤0.09	≤0.20	≤0.15	-	≥0.015	-
S600MC	≤0.12	≤0.50	≤1.90	≤0.025	≤0.015	≤0.09	≤0.20	≤0.22	≤0.50	≥0.015	≤0.005
S700MC	≤0.12	≤0.50	≥2.10	≤0.020	≤0.015	≤0.09	≤0.20	≤0.22	≤0.50	≥0.015	≤0.005



◆ 出口高强钢产品机械性能  
Mechanical property of high strength steel for export

牌号 Grade	屈服强度 Yield strength	抗拉强度 Tensile strength	延伸率 ≥% Elongation		180°C弯曲试验 Bending test
			Lo=80mm	Lo=5.65	
S355MC	≥355	430~550	23	23	d=0.5a
S420MC	≥420	480~620	16	19	d=0.5a
S460MC	≥460	520~670	14	17	d=1a
S500MC	≥500	550~700	12	14	d=1a
S550MC	≥550	600~760	12	14	d=1.5a
S600MC	≥600	650~820	11	13	d=1.5a
S700MC	≥700	750~950	10	12	d=2a

◆ 混凝土搅拌罐用钢牌号及化学成份 (典型值)  
Steel grade and chemical composition (Typical value) of concrete stirring tank car steel

牌号 Grade	化学成份 (%) Chemical composition					
	C	Si	Mn	P	S	Cu
T520JJ	≤0.20	≤0.55	≤1.60	≤0.030	≤0.020	0.20~0.45

◆ 混凝土搅拌罐用钢机械性能  
Mechanical property of concrete stirring tank car steel

牌号 Grade	规格 (mm) Specifications	力学性能 Mechanical property			180° 横向 冷弯试验 transversal cold bending test
		Rel, MPa	Rm, MPa	A, %	
T520JJ	4.0~6.0	≥365	≥520	≥20	d=2a

◆ 低碳贝氏体钢牌号及化学成份 (典型值)  
Steel grade and chemical composition (Typical value) of low carbon bainite steel

牌号 Grade	化学成份 (%) Chemical composition									
	C	Si	Mn	P	S	Cu	Nb	Ni	Mo	B
DB685	≤0.08	≤0.50	1.2~1.6	≤0.020	≤0.01	≤0.35	≤0.10	≤0.3	≤0.35	≤0.0030
DB785	≤0.10	≤0.50	1.2~1.6	≤0.020	≤0.01	≤0.50	0.025~0.06	≤1.0	≤0.60	≤0.0030

◆ 低碳贝氏体钢机械性能  
Steel grade and mechanical property (Typical value) of low carbon bainite steel

牌号 Grade	规格 (mm) Specifications	Rel, MPa	Rm, MPa	A, %	冷弯180° d=2a b=35mm Cold bending	冲击功AKV Impacting power		
						试验温度 Test temperature 0°C	冲击值不小于J Impact value is not less than J	
							纵向 Longitudinal	横向 Transversal
DB685	≤6	≥570	670~860	≥15	完好 Well	-	-	-
	6.0~16.0					-40	47	-
DB785	3.0~6.0	≥700	750~950	≥12	完好 Well	不进行冲击试验 No impacting test		
	≥6.0~14.0					-40	27	20

◆ 电力桅杆、塔架用钢牌号及化学成份 (典型值)  
Steel grade and chemical composition (Typical value) of power mast and tower

牌号 Grade	化学成份 (%) Chemical composition						
	C	Si	Mn	P	S	Al	Nb
ASTM A572 GR65	≤0.23	≤0.04	≤1.65	≤0.020	≤0.020	≥0.015	≤0.090

注: 1、生产厂根据需要, 还可加入V、Ti、Mo等微量合金元素。  
Note: 1. Manufacturers may add some alloy trace elements, e.g. V, Ti, Mo, according to their demands.

◆ 电力桅杆、塔架用钢机械性能  
Mechanical properties of power mast and tower

牌号 Grade	力学性能 Mechanical properties				180° 弯曲 d=弯心直径, a=试样厚度 (直径) 180° bending d=curve diameter a=sample thickness (diameter)
	Rel, MPa	Rm, MPa	A, % (Lo=50mm)	纵向V型冲击试验(-30)J Longitudinal V type impacting test	
ASTM A572 GR65	≥450	≥550	≥19	≥34	d=2a



◆ 抗地震管桩用钢牌号及化学成份 ( 典型值 )  
Steel grade and chemical composition ( Typical value ) of anti-seismic pipe pile steel

牌号 Grade	化学成份 (%) Chemical composition							
	C	Si	Mn	P	S	Ti	N	Cep
SN400B	≤0.20	≤0.35	0.6~1.4	≤0.030	≤0.015		≤0.006	≤0.36
SN490B	≤0.18	≤0.55	≤1.5	≤0.030	≤0.020	≤0.15	≤0.006	≤0.44

◆ 抗地震管桩用钢机械性能  
Mechanical properties of anti-seismic pipe pile steel

牌号 Grade	规格 (mm) Specifications	力学性能 Mechanical properties				180° 冷弯试验 Cold bending Test
		Rel, MPa	Rm, MPa	A, % (Lo=200mm bo=40mm)	屈强比 Tensile ratio	
SN400B	9≤t≤16	255~355	420~510	≥19	≤0.8	d=2a
	16<t≤22			≥23		
SN490B	8.0~22	≥315	490~637	A, % (Lo=50mm, bo=25mm)		d=1.5a
				≥23		

◆ 耐磨钢牌号及化学成份 ( 典型值 )  
Steel grade and chemical composition ( Typical value ) of anti-wear steel

牌号 Grade	化学成份 (%) Chemical composition								
	C	Si	Mn	P	S	Cr	Mo	B	Al
TNM320	0.16~0.22	≤0.70	1.00~1.60	≤0.018	≤0.010	0.50~0.80	0.20~0.35	0.001~0.004	0.02~0.06
TNM360									
TNM400									
TNM450	0.18~0.24	≤0.55	1.00~1.60	≤0.015	≤0.007	0.50~0.80	0.15~0.25	0.001~0.004	0.02~0.06

◆ 耐磨钢主要性能指标  
Main property indexes of anti-wear steel

牌号 Grade	力学性能 Mechanical properties				
	抗拉强度 Tensile strength Rm, MPa	布氏硬度 Brinell hardness HB	延伸率 Elongation A, %	-20℃横向 AKV (J) Transversal	冷弯, 90° d=3a Cold bending
TNM320	≥900	300~360	≥12	27	完好 Well
TNM360	≥1050	340~400	≥10		
TNM400	≥1150	380~440	≥10		
TNM450	≥1300	420~500	≥7		

◆ 不锈钢板材牌号及化学成份 ( 典型值 )  
Steel grade and chemical composition ( Typical value ) of stainless steel plate

牌号 Grade	化学成份 (%) Chemical composition								
	C	Si	Mn	P	S	Cr	Ni	Mo	N
304	0.08	0.75	2.00	0.045	0.03	18.0~20.0	8.00~10.50	-	0.10
304L	0.03	0.75	2.00	0.045	0.03	18.0~20.0	8.00~12.00	-	0.10
316L	0.03	0.75	2.00	0.045	0.03	16.0~18.5	10.0~14.0	2.0~3.0	0.10
S31803	0.03	1.00	2.00	0.03	0.02	21.0~23.0	4.50~6.50	2.5~3.5	0.08~0.20
S32205	0.03	1.00	2.00	0.03	0.02	22.0~23.0	4.50~6.50	3.0~3.5	0.14~0.20
S32304	0.03	1.00	2.50	0.04	0.03	21.5~24.5	3.00~5.50	0.05~0.6	0.05~0.20

注: 除表明是范围外, 所有数据均为最大值  
Note: all the data is maximum limit, unless specified.

◆ 不锈钢板材牌号及力学性能  
Steel grade and physical property of stainless steel plate

牌号 Grade	0.2% 验证应力 (N/mm2) 最小 Tested stress Minimum	1% 验证应力 (N/mm2) 最小 Tested stress Minimum	抗拉强度最小 (N/mm2) Tensile strength Minimum	伸长率% 最小 Elongation rate minimum	夏比V型缺口冲击试验 Charpy V-notch impact test		
					试验温度 Test temperature	纵向 Longitudinal	横向 Transverse
304	205	245	515	40	-196	41	27
304L	170	210	485	40	-196	41	27
316L	170	210	485	40	-196	41	27
S31803	450	-	620	25	-20	41	27
S32205	450	-	620	25	-20	41	27
S32304	400	-	600	25	-20	41	27

注: 309L、347L目前正在开发过程中。  
Note: the steel grade of 309L and 347L is under development now.



◆ 不锈钢无缝管化学成份 ( 典型值 )  
Chemical composition ( Typical value ) of seamless stainless steel pipe

牌号 Grade	C	Si	Mn	P	S	Ni	Cr	Mo
1Cr18Ni9	≤0.15	≤1.00	≤2.00	≤0.035	≤0.030	8.00 ~ 10.00	17.00 ~ 19.00	
0Cr18Ni9	≤0.07	≤1.00	≤2.00	≤0.035	≤0.030	8.00 ~ 11.00	17.00 ~ 19.00	
00Cr19Ni10	≤0.03	≤1.00	≤2.00	≤0.035	≤0.030	8.00 ~ 12.00	18.00 ~ 20.00	
0Cr17Ni12Mo2	≤0.08	≤1.00	≤2.00	≤0.035	≤0.030	10.00 ~ 14.00	16.00 ~ 18.00	2.00 ~ 3.00
00Cr17Ni14Mo2	≤0.03	≤1.00	≤2.00	≤0.035	≤0.030	12.00 ~ 15.00	16.00 ~ 18.00	2.00 ~ 3.00
0Cr18Ni10Ti	≤0.08	≤1.00	≤2.00	≤0.035	≤0.030	9.00 ~ 12.00	17.00 ~ 19.00	
1Cr18Ni9Ti	≤0.12	≤1.00	≤2.00	≤0.035	≤0.030	8.00 ~ 11.00	17.00 ~ 19.00	
0Cr18Ni11Nb	≤0.08	≤1.00	≤2.00	≤0.035	≤0.030	9.00 ~ 13.00	17.00 ~ 19.00	
0Cr13	≤0.08	≤1.00	≤1.00	≤0.035	≤0.030		11.50 ~ 13.50	
1Cr13	≤0.15	≤1.00	≤1.00	≤0.035	≤0.030		11.50 ~ 13.50	

◆ 不锈钢无缝管力学性能  
Mechanical property of seamless stainless steel pipe

牌号 Grade	Rm/MPa	R <sub>p0.2</sub> /MPa	伸长率A/% Elongation
	不小于 ≥		
0Cr18Ni9	520	205	35
1Cr18Ni9	520	205	35
00Cr19Ni10	480	175	35
0Cr18Ni10Ti	520	205	35
0Cr18Ni11Nb	520	205	35
0Cr17Ni12Mo2	520	205	35
00Cr17Ni14Mo2	480	175	35
1Cr18Ni9Ti	520	205	35
0Cr13	370	180	22
1Cr13	410	205	20

产品优势 >>>

Product Advantage

◆ 热卷规格和尺寸精度  
Specification and dimension tolerance of hot rolled coil

厚度精度 Thickness tolerance	± 30 μ m 实际 ± 30 μ m Actual figure
宽度精度 Width tolerance	0~6.5mm 设计能力 0~6.5mm Designed capacity
平直度 Flatness	<5mm/m
凸度精度 Convexity tolerance	± 20 μ m
开平板不平度 Unevenness of planished steel plate	≤5mm/m

◆ 耐磨钢TNM450不平度  
Unevenness of anti-wear steel TNM450

厚度范围 ( mm ) Thickness range (mm)	20.0~60.0
不平度要求 ( mm/2m ) Unevenness requirement (mm/2m)	≤7

太钢高强度、高韧性结构用钢突出宽、厚、特的产品优势，通过采用控轧控冷手段，将产品的晶粒尺寸降低到几个 μ m 的水平，在强度提高数十到数百兆帕 ( MPa ) 的同时，具有良好的塑、韧性；通过降低钢的碳当量提高焊接性能。采用炉外精炼技术，大幅降低钢中的杂质元素含量，特别是S含量达到小于0.003%的水平，提高钢的低温冲击韧性。

太钢700MPa级高强度钢从2007年开发以来，截止目前已累计开发量达到数万吨，产品广泛应用于银行柜员机、汽车改装、工程机械制造等行业。

TISCO's high strength and high toughness structural steel is featured with big width, big thickness and special grade. By controlling the rolling process and regulating cooling method, the grain size of our product can reach μ m level; with the strength being increased by dozens or hundreds MPa, the plasticity and toughness is maintain good; the welding property is also improved by decreasing the carbon equivalent of steel. Impurity contents are dramatically decreased, especially the S content is lower than 0.003%, and the low temperature impact toughness of steel is increased.

Since 2007 when TISCO 700MPa level high strength steel was developed, the output has been tens of thousands tons. This kind of steel is widely applied in ATM, automobile refitting, engineering machine manufacture, and etc.



产品介绍 >>>

Product Introduction

1、太钢生产的8 mm 700MPa带钢的铁素体晶粒组织与A公司3mm厚 S700MC 的铁素体晶粒组织对比。

1. Ferro grain size structural comparison between 8 mm 700MPa strip of TISCO and 3 mm S700MC of Company A.

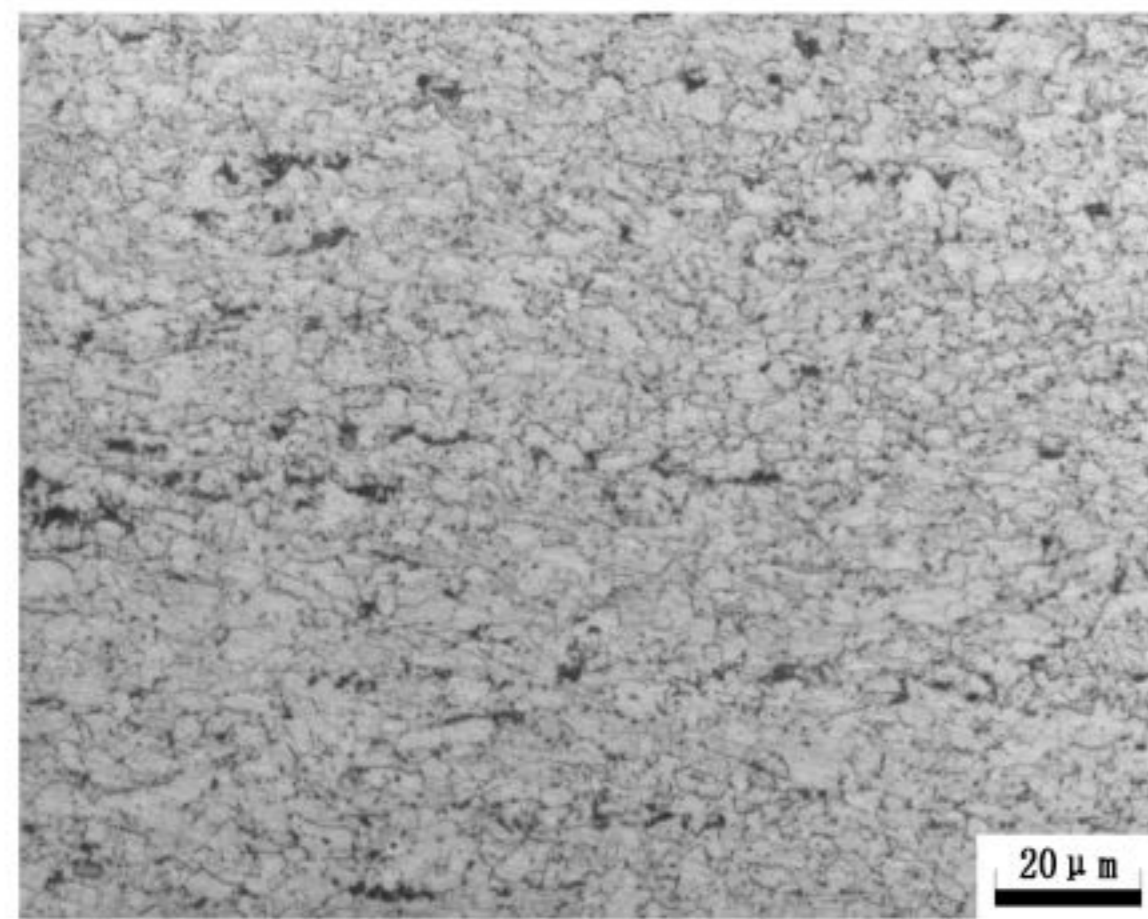


图1 8 mm 700MPa带钢显微图  
8 mm 700MPa strip microstructure picture

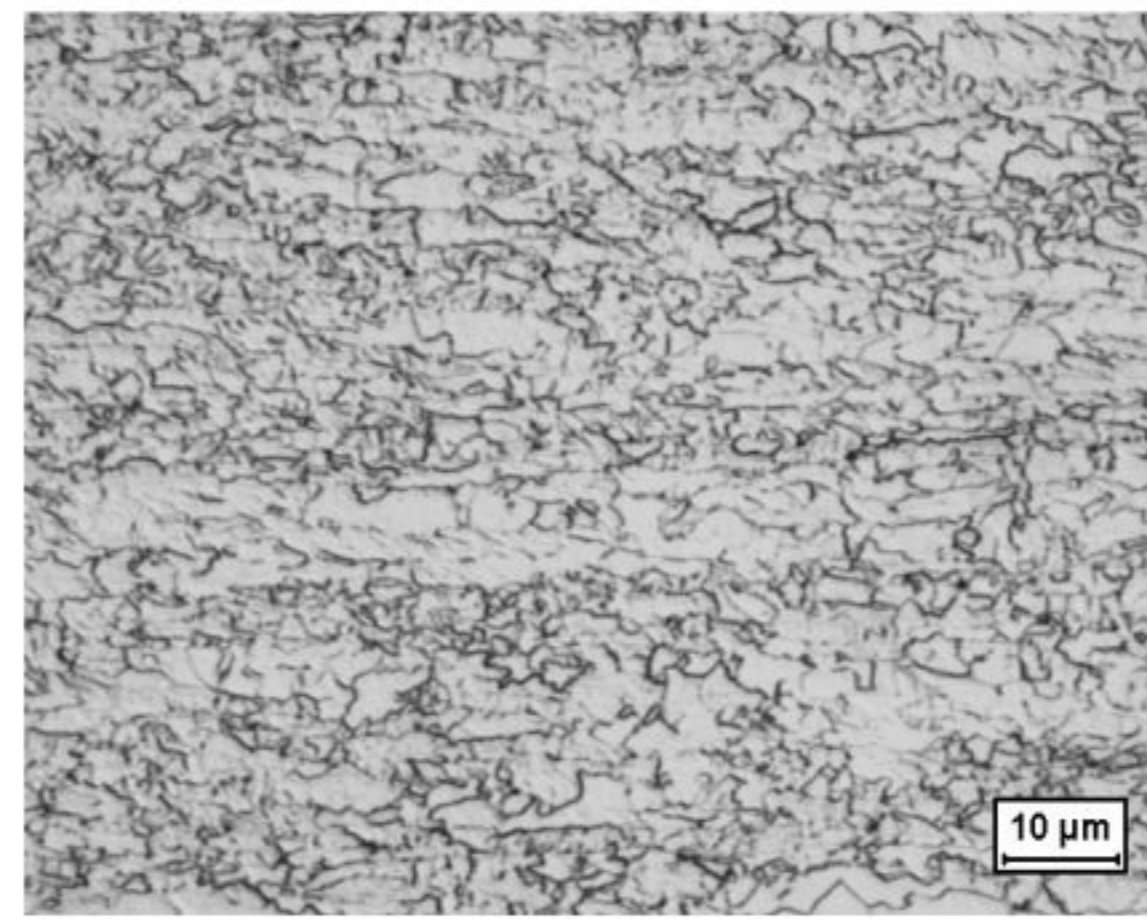


图2 A 公司S700MC显微图象  
TISCO's S700MC microstructure picture

从上图对比中，可以看出，太钢S700MC产品的晶粒细小，而且更均匀。

From above figure, it can be found that, the grain size of S700MC produced by TISCO is finer and evener.

2、成份设计的优势

2. Advantage in composition design

屈服强度700 MPa级热轧高强度带钢的化学成份对比

Chemical composition comparison of the hot rolled high strength strip with yield strength of 700 MPa level

牌号 Grade	C Max	Si Max	Mn Max	P Max	S Max	Nb Max	V Max	Ti Max	B Max	Al Min
A公司 S700MC	0.12	0.10	2.10	0.025	0.010	0.09	0.20	0.15	0.005	0.015
太钢 700MPa	0.09	0.15	1.80	0.020	0.010	≤0.22				0.015

产品性能对比  
Product property comparison

牌号 Grade	规格 (mm) Specifications	力学性能 Mechanical properties			
		ReI,MPa	Rm, MPa	A, %	冷弯 Cold bending
700MPa	3.0	740	790	18	合格 Qualified
进口 Import	3.0	760	810	17	合格 Qualified

从化学分析，力学性能试验，和显微组织及析出物的观察分析结果证明，太钢生产的700MPa热轧带钢达到用户技术要求，和国外同类钢种比较,在显微组织和性能方面表现出一定的优势。试验钢的强度-塑性有较好的配比，伸长率 A5 达到 21.0-21.5%，同时均匀伸长率Ag为9.0-9.5%，有利于成形性的提高。

By chemical analysis, physical property test, as well as the observation of micro-structure and precipitation, it is proved that TISCO's 700MPa hot rolled strip meets customer's demands in terms of technique, and compared with equivalent overseas products, it even has shown some predominance in terms of microstructure and properties. The strength and plasticity of tested steel have a good balance, with elongation A5 of 21.0-21.5%, uniform elongation Ag of 9.0-9.5%, which is good for the improvement of formability.





## 用户使用指南 >>>

### User Instruction

牌号 Grade	焊材型号 Type of welding material			使用说明 User manual
	中国GB焊丝 Chinese GB welding wire	中国GB焊条 Chinese GB welding rod	美国材料AWS American material AWS	
304L	H00Cr21Ni10	E308L	308L	焊材的C、S、P、Si、Nb应尽可能低。 The contents of C, S, P, Si, and Nb in welding material should be as low as possible.
316L	H00Cr19Ni12Mo2	H00Cr19Ni12Mo2	316	焊缝金属为316L的焊后状态,有时耐腐蚀性欠佳,可通过1050-1100℃固溶处理来改善。 In case that welding seam metal is post-welded 316L, the anti-corrosion performance, which would be bad, can be improved through solution treatment under 1050-1100℃.

牌号 Grade	焊材型号 Type of welding material	热输入KJ/mm Heat input	层间温度 Weld Inter-pass Temperature	使用说明 User manual
S31803	Cr22-Ni9-Mo3型 超低碳 Cr22-Ni9-Mo3 Type Super Low Carbon	0.5-2.5	< 250℃	双相钢的焊接比较复杂,无论是对于焊缝还是焊接热影响区,都希望焊后在高温区的冷却速度不要过快,以便于铁素体向奥氏体转变,而同时又希望焊后在低温阶段冷却速度尽可能快,防止有害的金属间化合物析出。 The welding of duplex is relatively complicated. Both for welding seam and welding heat-affected zone, the cooling of high-temperature zones after welding should not be too fast in consideration of the transformation of ferrite to austenite, at the same time, the cooling of low-temperature stage after welding is expected to be as quick as possible to avoid the adverse precipitation of inter-metallic compound.

## 主要特点 >>>

### Main Features

太钢工程机械用钢产品具有高强度、高韧性和优良的焊接性能,广泛应用于制造各类工程机械,可在很大程度上满足产品的高强化、轻量化和经济化得要求。同时满足银行柜员机、汽车改装、通讯塔架、煤矿机械等行业的应用,如各类起重机、煤矿机械、载重汽车、混凝土设备、推土机等,产品实物达到国际先进水平。

利用我公司强大的科研实力,开发一批具有国际水平,自主知识产权的模具钢新材料,如TCB13、TCB12,大力发展非调质预硬模具钢,向精品化、制品化方向发展,满足国内外大型精密、长寿命模具的要求,成为模具钢国产化的领导者。

太钢新开发的400系列产品,品种齐全,可以在一定的条件下有效地替代部分300系材料,由于400系不含Ni,可以大大降低原材料的成本,尤其443材料,在一定的条件下,只要使用正确,完全可以替代304材料。

TISCO's engineering machine steel, featured with high strength, high toughness and good welding performance, is widely used in manufacturing different engineering machine and meets the demands of products in aspects of high-strength, light-weight and economization. At the mean time, the steel is also qualified for making ATM, automobile refitting, communication tower, and coal ore machine, e.g. various crane, coal machine, truck, concrete equipment and bulldozer, with manufactured products reaching international advanced level.

A passel of international-level new die-steel materials with independent knowledge property right, e.g. TCB13 and TCB12, as well as non-tempered pre-hardening die-steel are developed, meeting the demands of big-scale long-life precision die at home and abroad, being the leadership in die-steel localization.

The 400 series products newly developed by TISCO, with complete variety, can effectively replace 300 series under certain conditions. As there is no Ni content in 400 series, the raw material cost is dramatically decreased. 443, for example, can be a substitute for 304 under certain conditions, as long as it is correctly used.



牌号 Grade	Cr	Ni	Ti	Nb	Cu
443	21	-	0.3	0.2	0.4
304	18.2	8.2	-	-	-

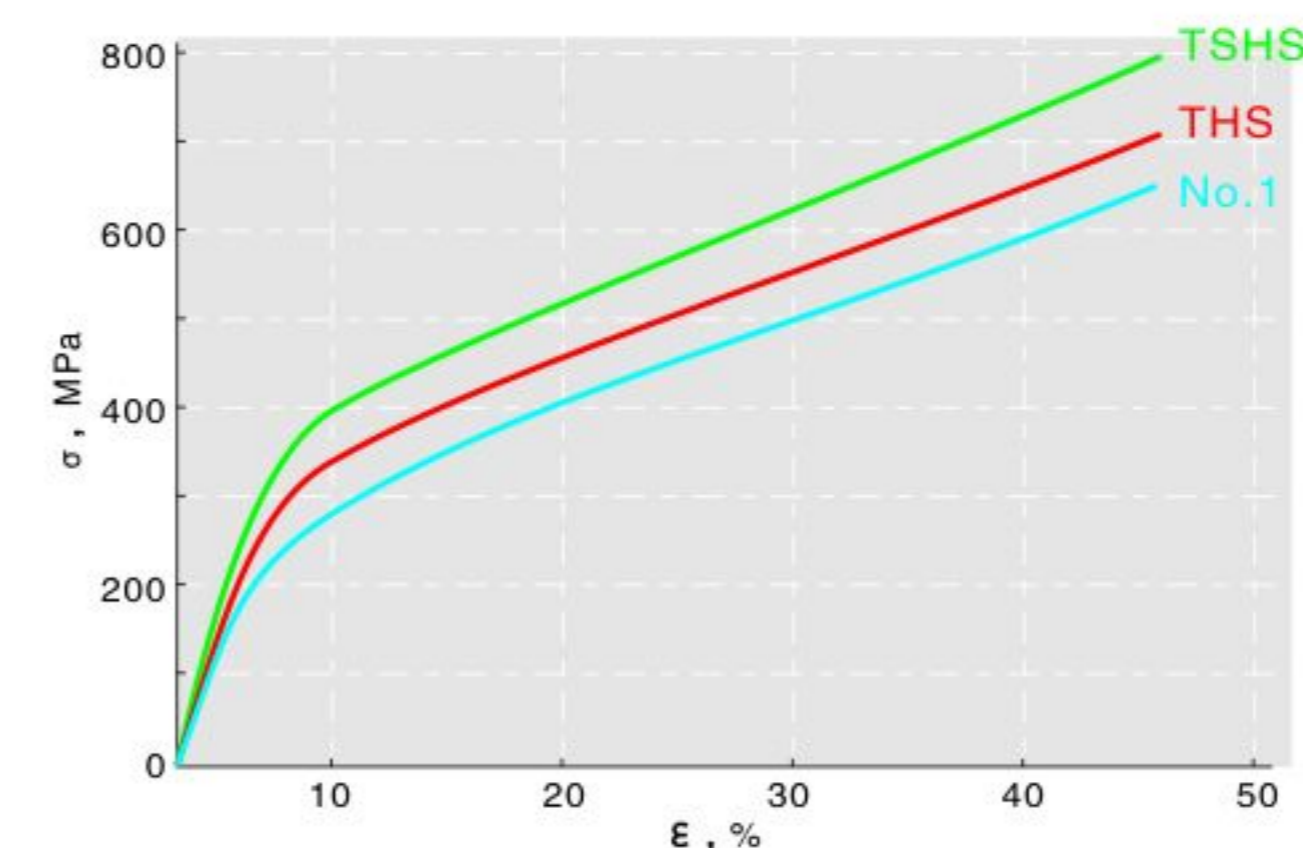
牌号 Grade	屈服强度 (MPa) Yield strength	抗拉强度 (MPa) Tensile strength	延伸率 (%) Elongation	r 值 r value	硬度 (HV) Hardness	圆锥杯突 (mm) Conical cup
443	305	483	31	1.3	161	38.6
304	260	645	60	1.0	185	37.7

牌号 Grade	密度 Density (g/cm <sup>3</sup> )	电阻 Resistance (10-6Ω·cm)	磁性 Magnetic	比热25℃ Specific heat (J/kg·℃)	热传导100℃ Heat conductivity (W/m·℃)	热膨胀系数 Heat expansion rate 20-100℃ (10 <sup>-6</sup> /℃)	杨氏模量 Young's modulus (GPa)
443	7.74	58	有 Have	440	22.5	10.5	204
304	7.93	70	无 Non	500	16.2	17.3	193

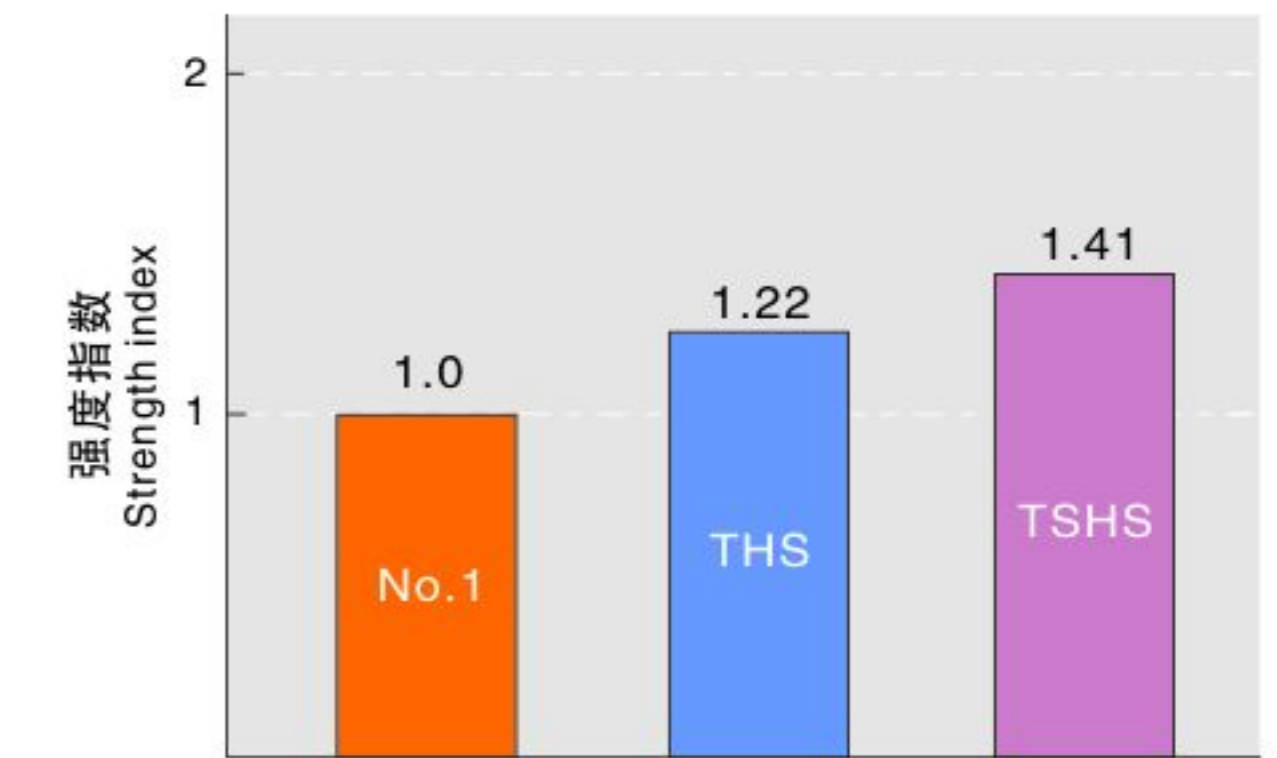
太钢拥有全球最先进的不锈钢生产设备，有着丰富的不锈钢生产经验，可以利用设备优势生产各种高强度材料，太钢的THS、TSHS材料具有高强度的特性，可以有效地替代部分热轧材料，减薄厚度，节约成本。

TISCO, with globally most advanced stainless steel facilities and experienced stainless steel production practices, is able to produce various high-strength material, e.g. THS and TSHS, which can effectively replace some hot rolled material with thinner thickness and lower cost.

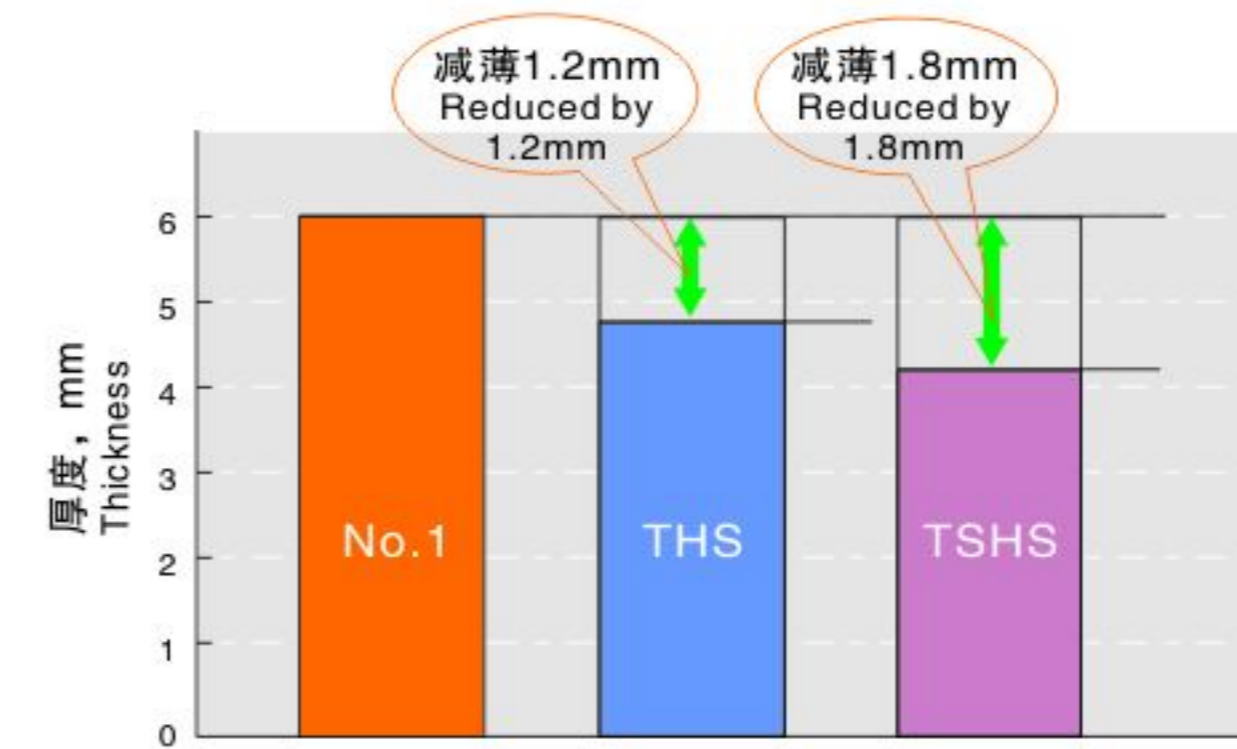
◆ 材料强度及节约率 Material Strength and Material Saved



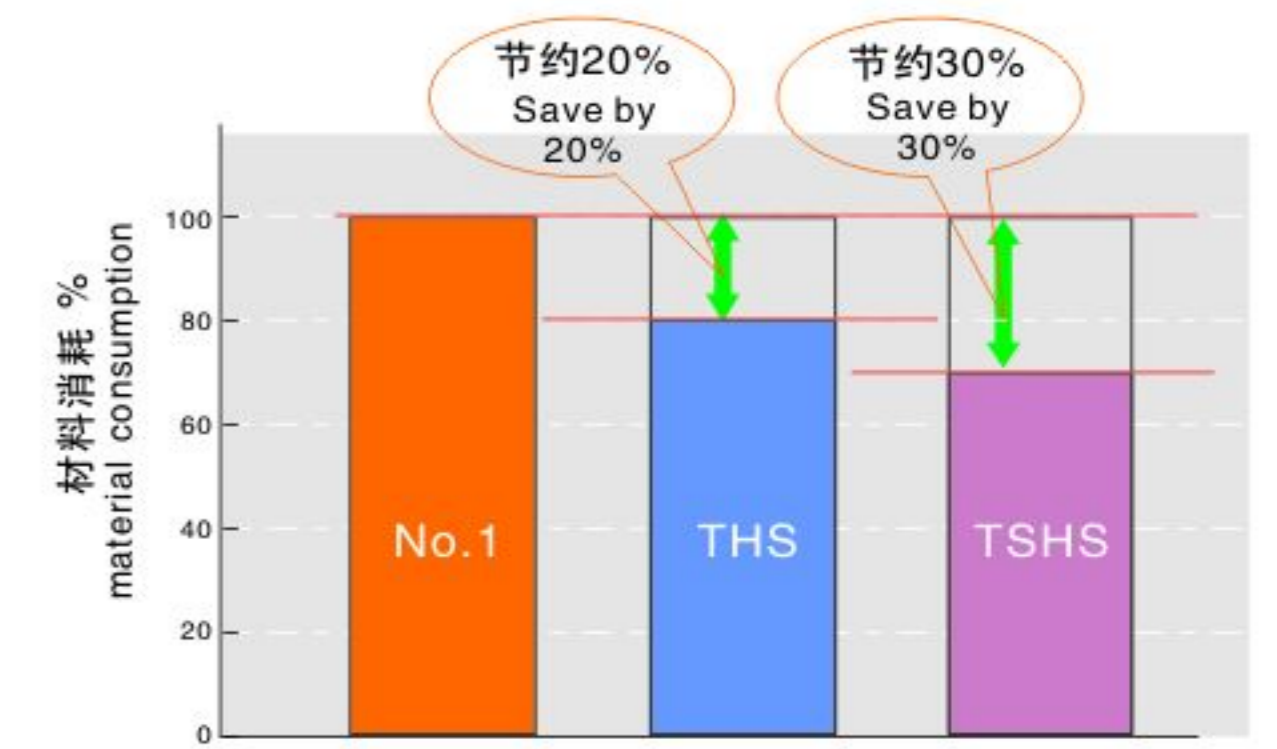
304不锈钢No.1、THS、TSHS应力-应变曲线  
304 stress-strain curve by No.1、THS、TSHS



304不锈钢No.1、THS、TSHS强度比较  
304 strength comparison by No.1、THS、TSHS



等强度设计材料厚度减薄量比较  
(以6mm304钢板为例)  
Thickness reduction comparison for material of identical strength (taking 6mm304 plate for an example)



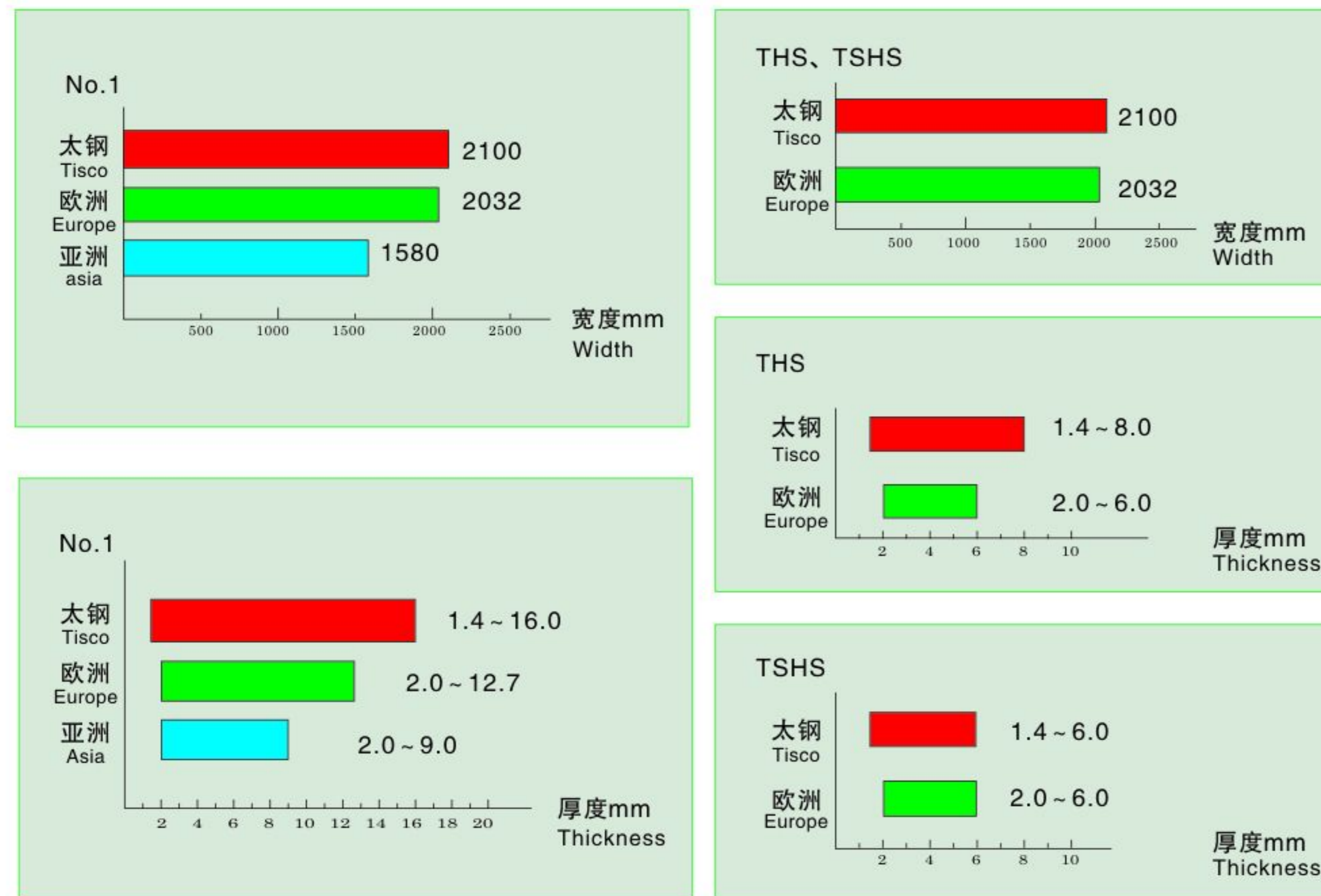
等强度设计材料消耗比较  
Consumption comparison for material of identical strength

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。

THS and TSHS product will have the increased material strength significantly as a result of special cold working process applied thereon, and can be reduced in thickness by 20-30% at an identical strength level as that for conventionally hot-rolled product. As such they are the ideal material for steel structure parts.



◆ 极限规格 Extreme Specifications



◆ 超宽规格产品可大大提高材料利用率，特别适合于大型容器等设备制造，减少焊缝，降低制造和维修费用，提高安全可靠。

◆ 超厚规格产品与常规工艺生产的单张中板相比，表面质量、尺寸精度及材料利用率大幅度提高，可满足用户的柔性化需求，为用户的设计和和应用提供了更广泛的选择空间。

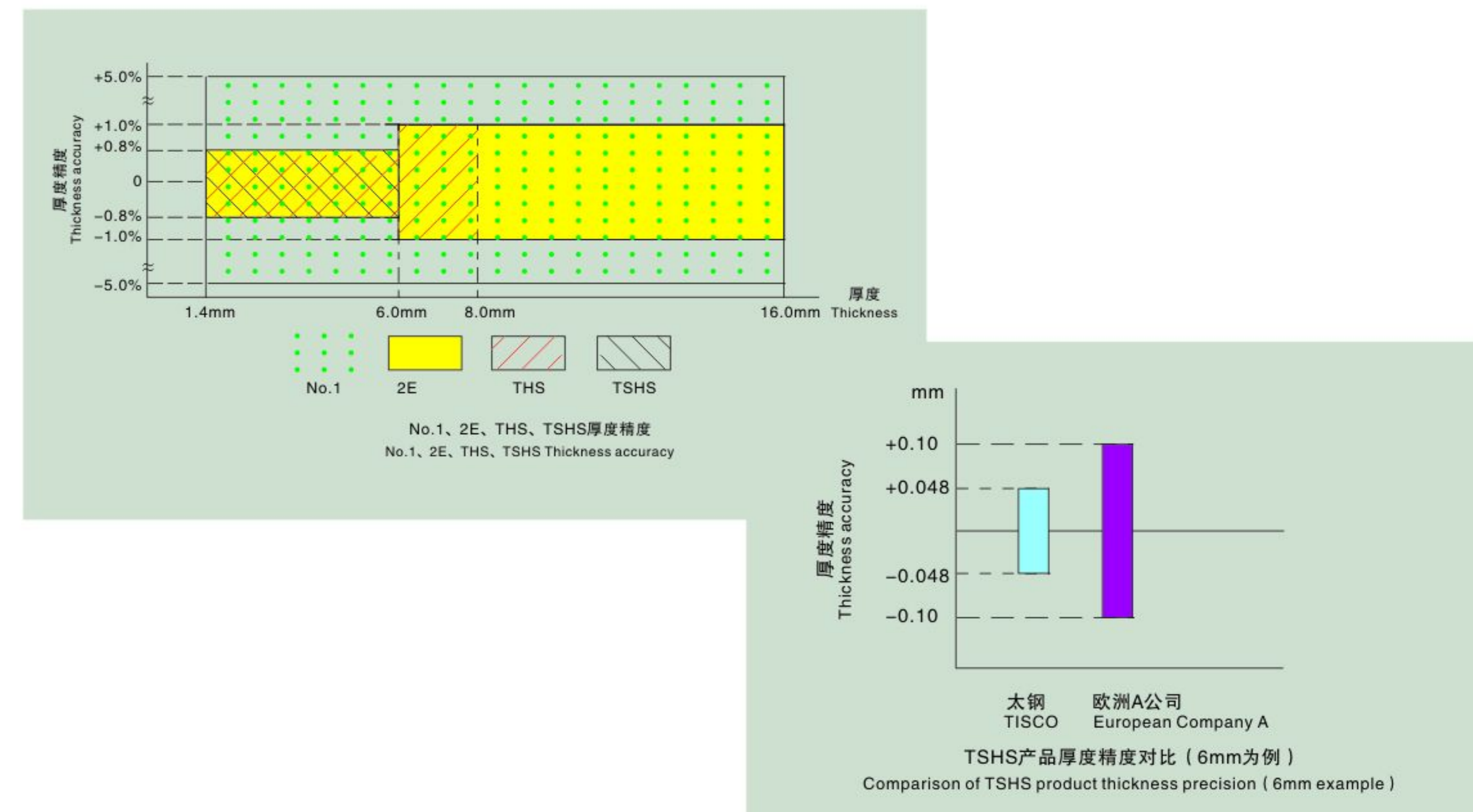
◆ 超薄规格产品在工业用管等诸多领域可替代常规的冷轧产品，降低制造成本。

◆ Ultra-wide product widens the possibility of material being used, particularly when it is used for huge tanks and containers, for the fact that less welding seams are needed and therefore manufacturing and servicing costs reduced while safety improved.

◆ In comparison with single plate produced in conventional technology, the ultra-thick product is greatly improved in terms of surface finish, dimensional precision and material utilization, which is ready to meet various needs and offers a wider choice of design and application to customers.

◆ Ultra-thin product can be an easy substitute for conventionally produced cold product in application to industrial tube and other fields, so as to reduce costs.

◆ 尺寸精度 Dimensional Precision



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 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.





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	0351-3014468 0351-3010422 0351-3011762 800-806-1998 +86 (0)351-3017169 +86 (0)351-3017525	wangjl@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.

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

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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
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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