



## **INTRODUCTION OF STAINLESS STEEL PRODUCTION**

Shanxi TISCO Stainless Steel Co. Ltd.

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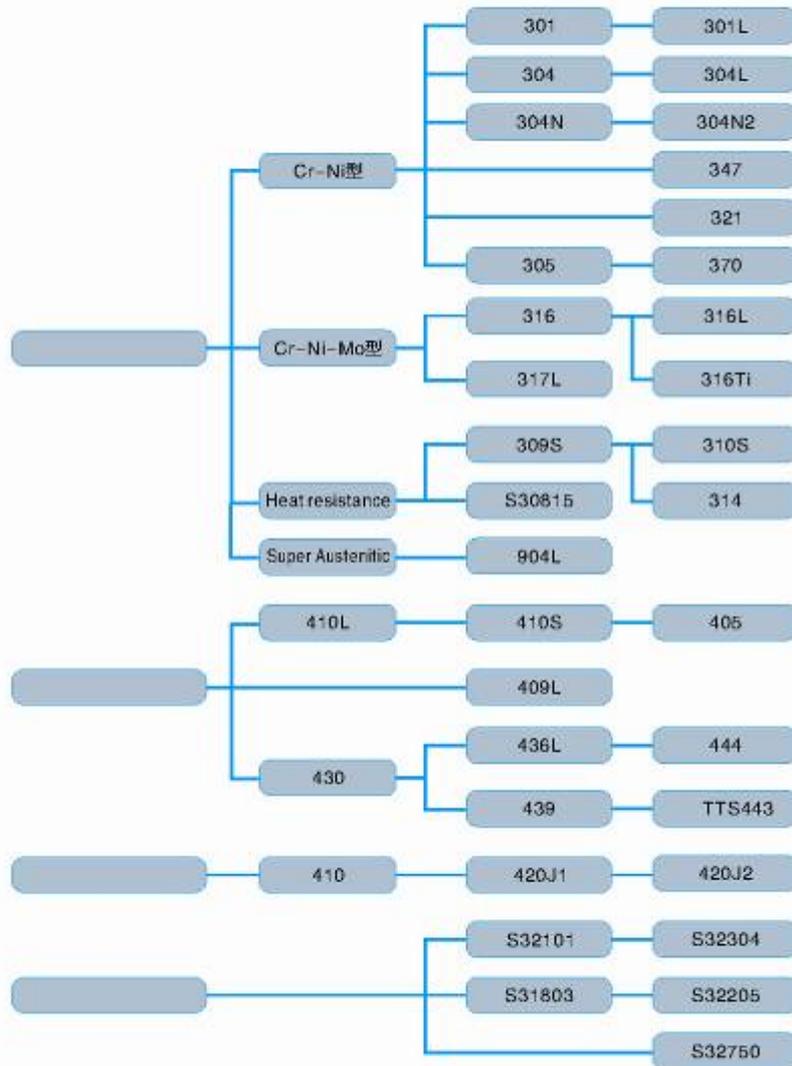
Shanxi TISCO Stainless Steel Co. Ltd. (Taigang) is one of the largest iron and steel complex and the largest stainless steel producer in China. After the development of 70 years, its annual production capability of steel, iron and steel products has reached more than 10 million tons. TISCO is the birthplace of the 1st heat stainless and silicon steel, and the 1st silicon sheet in China.

In 2006, the sale revenue realized was 53.4 billion yuan, the steel output was 6.26 million tons, among it, 1.11 million tons of stainless steel. TISCO became one of the top eight stainless steel producers in the world. TG brand stainless steel products won the titles of "No.1 Brand in China Stainless Steel" and "Famous Brand Products in China". TISCO won the "Award of National Quality" and the "Award of National Advanced Enterprise to Promote Six-Sigma Management".

In Sept. 2006, the new stainless steel production line was put into operation, which, with capacity of 3 million tons of stainless steel per year, makes TISCO the largest and the most competitive stainless steel producer in the world with the most advanced facilities, full range of steel grades and specifications.



## Steel Grade Series of Products



## Comparison of Grades Designation Home and Abroad

Designation in China standard	Designation in European standards	Designation in American standards	Main composition
1Cr17Ni7	1.4310	301	17Cr-7Ni
00Cr17Ni7	1.4318	301L	LC-17Cr-7Ni
0Cr18Ni9	1.4301	304	18Cr-8Ni
00Cr19Ni10	1.4306	304L	LC-18Cr-9Ni
0Cr18Ni10Ti	1.4541	321	18Cr-9Ni-Ti
0Cr19Ni9N	—	304N	18Cr-8Ni-N
0Cr19Ni10NbN	—	—	18Cr-9Ni-Nb-N
0Cr18Ni11Nb	1.4550	347	18Cr-11Ni-Nb
1Cr18Ni12	1.4303	305	18Cr-12Ni
1Cr16Ni14	—	370	16Cr-14Ni
0Cr17Ni12Mo2	1.4401	316	17Cr-12Ni-2Mo
00Cr17Ni12Mo2	1.4404	316L	LC-17Cr-12Ni-2Mo
00Cr19Ni13Mo3	1.4438	317L	LC-19Cr-13Ni-3Mo
0Cr18Ni12Mo2Ti	1.4571	316Ti	18Cr-12Ni-2Mo-Ti
1Cr23Ni13	1.4833	309S	23Cr-13Ni
0Cr25Ni20	1.4845	310S	25Cr-20Ni
0Cr25Ni20Si2	—	314	25Cr-20Ni-2Si
0Cr21Ni11Si2N	1.4835	S30815	21Cr-11Ni-2Si-N
0Cr20Ni25Mo4.5Ca	1.4539	994L	20Cr-25Ni-4.5Mo-Ca
00Cr12	1.4512	410L	LC-12Cr
00Cr12Ti	—	409L	LC-12Cr-Ti
0Cr13	1.4000	410S	13Cr
0Cr13Al	1.4002	405	13Cr-Al
1Cr17	1.4016	430	17Cr
00Cr17Mo	—	436L	LC-17Cr-Mo
00Cr15Mo2	1.4521	444	LC-18Cr-2Mo
00Cr18Ti	—	439	LC-18Cr-Ti
TTS443	—	—	21Cr-Ti
1Cr13	—	410	0.1C-13Cr
2Cr13	1.4021	420J1	0.2C-13Cr
3Cr13	1.4028	420J2	0.3C-13Cr
TDS2101	1.4162	S32101	LC-21Cr-Ni-N
00Cr23Ni4N	1.4362	S32304	LC-23Cr-4Ni-N
00Cr22Ni5Mo3N	1.4462	S32205	LC-22Cr-5Ni-3Mo-N
00Cr25Ni7Mo4N	1.4410	S32750	LC-25Cr-7Ni-4Mo-N

## Cold Rolled Plates ( Coils )



### ◆ Main Features

#### ● Stable quality

By the means of advanced technology and equipment from the melting to the cold rolling and international standardization management methods, our cold rolled products are of clean steel, good surface finishes, high size accuracy, good coil shape, profile and flatness, corrosion resistance, and formability

#### ● Wide range of steel grades and specifications

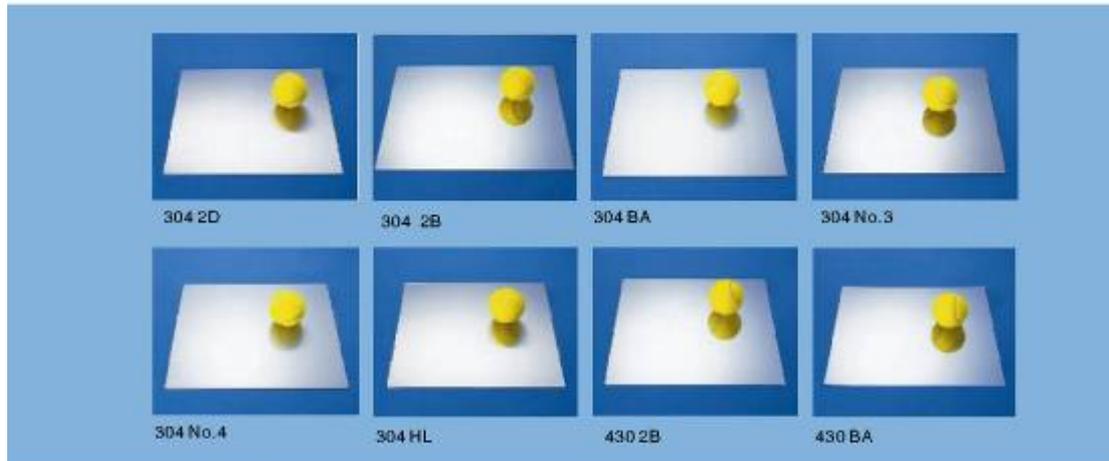
All the steel grades of austenitic, ferritic, martensitic and duplex steels can be produced according to EN, AISI, DIN and JIS. The products have been widely used in the fields of petrochemical, transportation, aviation and space flight, decoration, electric power, mechanical and electric home appliance, kitchenware, and tableware.

● Products with different width and thickness are available, thickness range 0.15—8.0mm, width range 30mm—2000mm. Among them, the wide products can greatly increase the utilization ratio of the materials during the processing. They are especially suitable for the production of large vessels. The manufacturing cost and maintenance cost are reduced, the reliability and safety improved due to less welding seams. Compared with plates produced by traditional process, the utilization ratio of the thick products can be greatly improved. They can meet the flexible requirements of the customers and provide customers with much more room for the design and application.

#### ● Different surface finishes

Advanced cold rolling mill and annealing line, grinding line and BAL. Products with surface finishes of 2D、2 B、2BB、BA、No3、No4、HL can be produced.

## Cold Rolled Plates ( Coils )



### ◆ Surface Finish

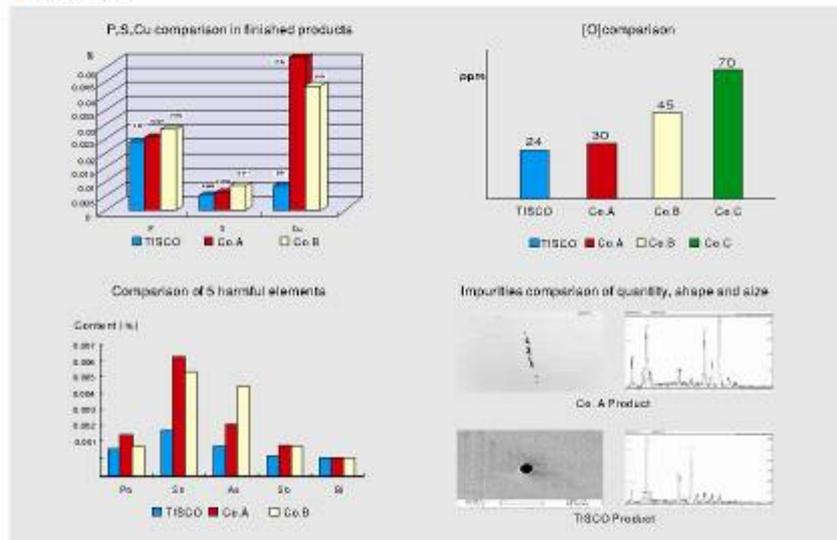
Finish	Description	Application
2B	Proper finish is obtained through heat treatment, pickling and similar treatment, and final treatment with the skin pass mill after cold rolling.	All different industries, hardwares.
2D	Certain roughness is obtained through heat treatment, pickling and similar treatment and final skin pass treatment with dull rolls after cold rolling.	Used in the fields for surface coating and deep drawing
BA	After cold rolling, processed by BAL.	Used as raw materials for decoration, and processing of high reflective surface
3#	Polished with the specified grit size 100—120 grinding materials in the GB2477.	Decoration etc.
4#	Polished with the specified grit size 150—180 grinding materials in the GB2477.	Decoration etc.
HL	Polished with proper sized grinding materials to produce continuous grinding lines on surface.	Decoration etc.
2BB	2BB is a surface finish close to BA. It is not processed by BAL, but by a special process.	The application is same as BA products.

Note: Products can be film coated.

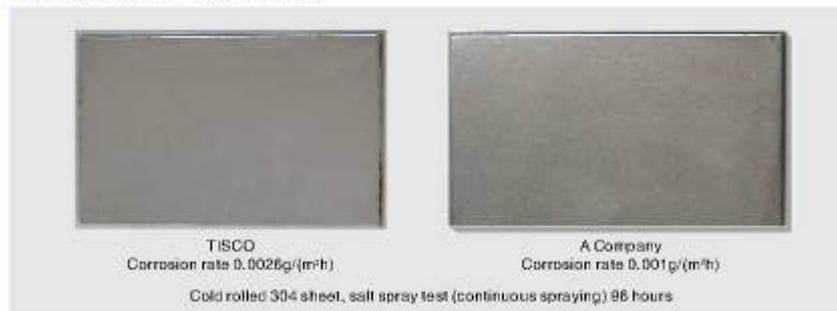
## Cold Rolled Plates ( Coils )

### ◆ Quality

#### ○ Steel Purity

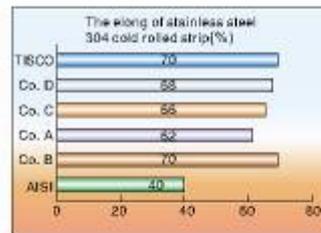
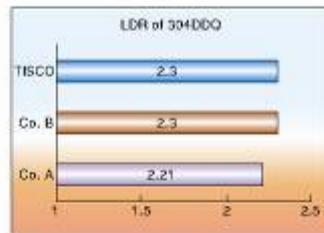
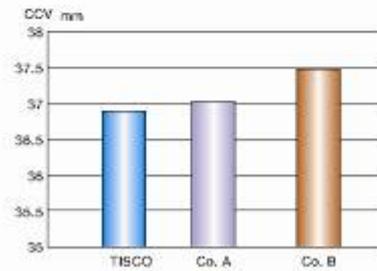
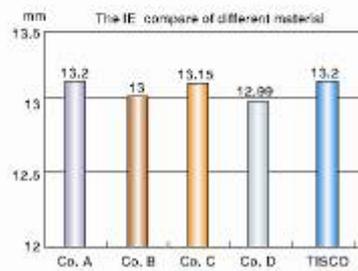


#### ○ Comparison of corrosion resistance



## Cold Rolled Plates ( Coils )

### Formability



### Surface quality

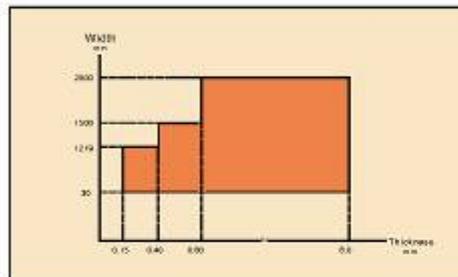


304 stainless steel

## Cold Rolled Plates ( Coils )

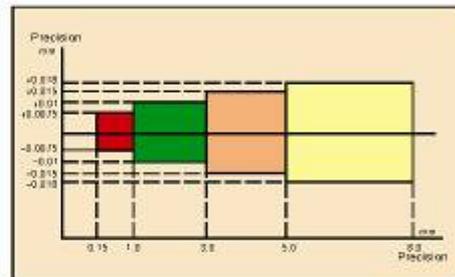
### ◆ Product Specifications and Accuracy

○ Main specifications



Products specification of cold rolled coil

○ Products thickness tolerance and precision control



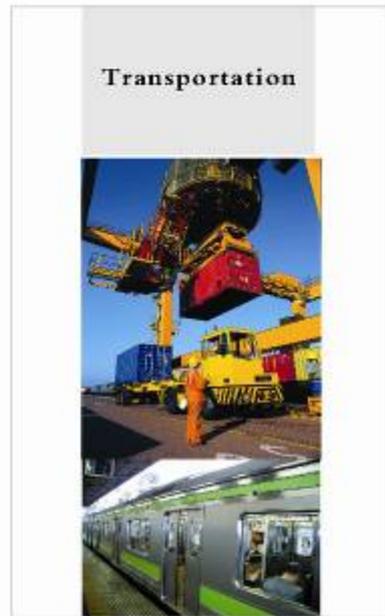
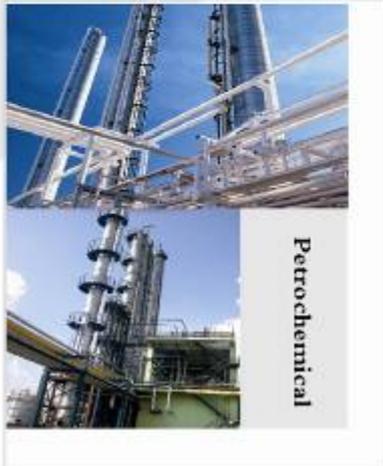
### ◆ Typical Applications



Decoration



## Cold Rolled Plates ( Coils )



## **Cold Rolled Plates ( Coils )**



**Home appliance**



**Tableware and kitchenware**



**Other**

## Hot Rolled Coils (Plates)

### ◆ Main Features

- TISCO's 2100 mm wide APL(H) adopts the technology of on-line rolling mill, pickling and annealing facilities, and tension elongation. It can produce No.1, 2E, THS, TSMS products (CMP) with different strengths, which occupies the leading position in the world.
- The THS, TSMS series products produced by the most advanced technology and equipment and special technology of cold process are of high strength, good properties, accuracy in sizes, wide range of specification, good surface quality. Compared with common no.1 stainless steel materials, 30% of materials can be saved, which has brought revolutionary change for the application of the stainless steel materials and will have profound and lasting influence on the consumption of stainless steel.
- The products have been widely used in large vessel body, railway vehicle, container, heat exchanger and manufacturing of industrial pipes.



## Hot Rolled Coils (Plates)

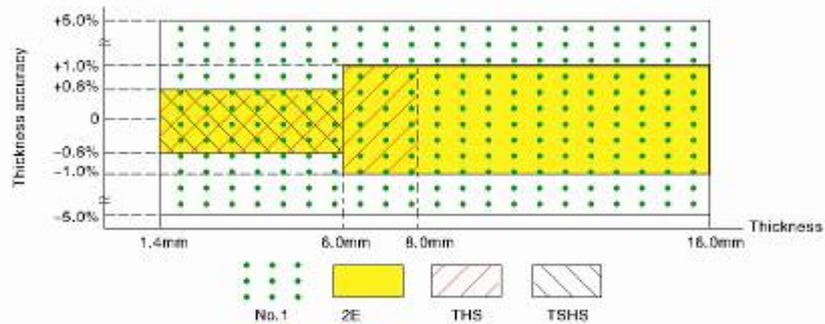
### ◆ Products Variety and its Definition

Type	Definition	Description ( an example of 304 )
No.1	Hot rolled, annealed and pickled coil	No.1 product goes without cold stretching deformation, with yield strength approximately 240MPa.
2E	Direct-rolled, annealed and pickled coil	2E hot strip through processes of slight cold rolling and descaling, will be of good quality surface.
THS	Direct-rolled, annealed and pickled coil under high-tension elongation	THS refers to the annealed strip subject to cold reduction $\geq 2.5\%$ with yield strength approximately 300MPa.
TSHS	Direct-rolled, annealed and pickled coil under super high-tension elongation	TSHS refers to the annealed strip subject to cold reduction $\geq 5.5\%$ with yield strength approximately 350MPa.

Note: THS-TISCO High Strength hot pickled strip,  
TSHS-TISCO Super High Strength hot pickled strip

### ◆ Specifications Dimensional

#### ○ Dimensional Precision

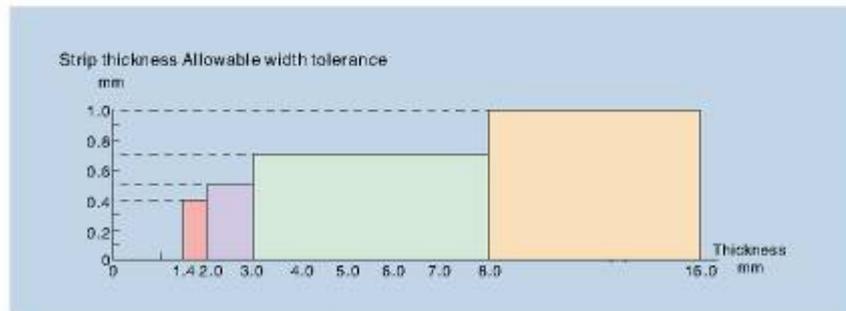


No.1, 2E, THS, TSHS Thickness accuracy

## Hot Rolled Coils (plates)

### ◆ Dimensional Precision

#### ○ Allowable width tolerance



#### ○ Steel plate

Width ( mm )	Allowable width tolerance ( mm )
1500 - 2100	0 - +1.0

Length ( m )	Allowable length tolerance ( mm/m )
4.0 - 12.0	0 - +0.2

Allowable diagonal difference	Stacking accuracy ( mm )
Less than 0.2% of plate width	Lengthwise: 0 - 3.0 Widthwise: 0 - 2.0

## Hot Rolled Coils (Plates)

### ◆ Advantages of Products

- Corrosion resistance properties

304 Stainless steel spray salt solution tested ( 72h )

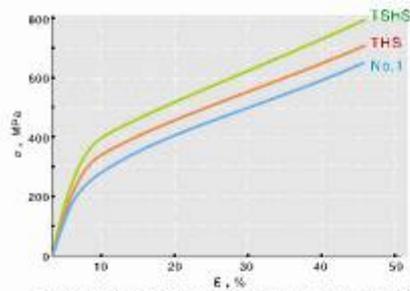


No.1 product

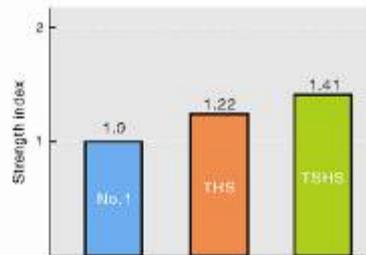


TSHS product

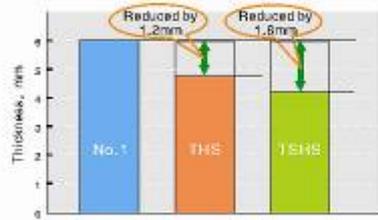
- Material Strength and Material Saved



304 stress-strain curve by No.1, THS, TSHS



304 strength comparison by No.1, THS, TSHS



Thickness reduction comparison for material of identical strength ( taking 6mm304 plate for an example )

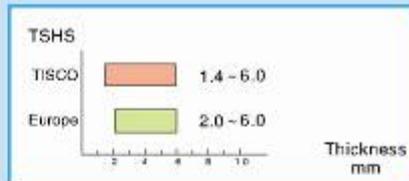
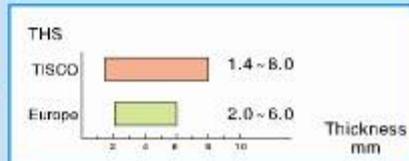
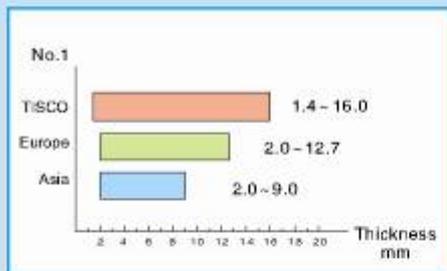
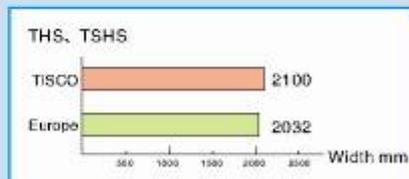
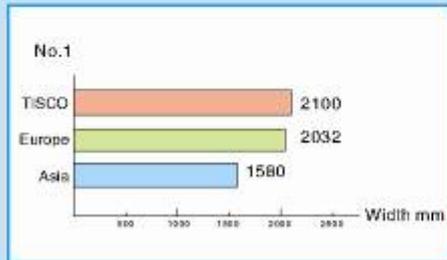


Consumption comparison for material of identical strength

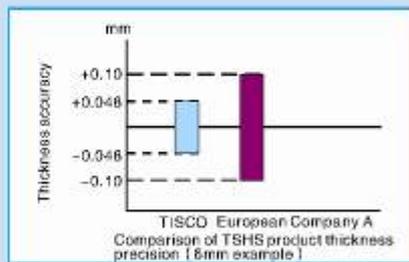
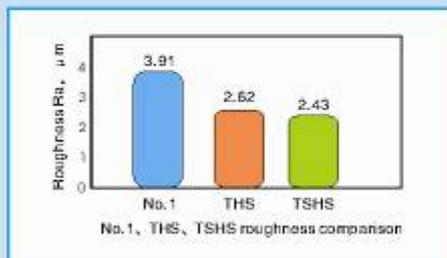
THS and TSHS product will have the increased material strength significantly as a result of special cold working process applied thereon, and can be reduced in thickness by 20-30% at an identical strength level as that for conventionally hot-rolled product. As such they are the ideal material for steel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

## Hot Rolled Coils (Plates)

### Extreme Specifications



### Surface Finish



## Hot Rolled Coils (Plates)

### ◆ Applications



Vehicles & Vessels



Tanks & Containers



## Hot Rolled Plates

### ◆ Main Features

- Clean steel: the steel is produced by EAF+ AOD with returned scraps as the raw materials or by EAF+K-OBM-S+VOD with hot metal as the main raw materials.
- Good properties: After treated with the internationally advanced normalizing and quenching lines, the steel is of uniform structure, best corrosion resistant properties. The plates are of good mechanical properties, the property difference of lengthwise and widthwise is small, good corrosion resistant properties and suitable for all kinds of welding processes.
- Good surface quality: The scratch on the plate surface is reduced due to the continuous pickling process. The luster of pickled surface is uniform.
- Size tolerance: Plasma cutting, cutting accuracy high.
- Profile and flatness: After hot rolling, many passed of leveling is applied, the flatness is high.
- They have been widely used in the key fields of petrochemical, nuclear power, water works and so on.

### ◆ Product Specification

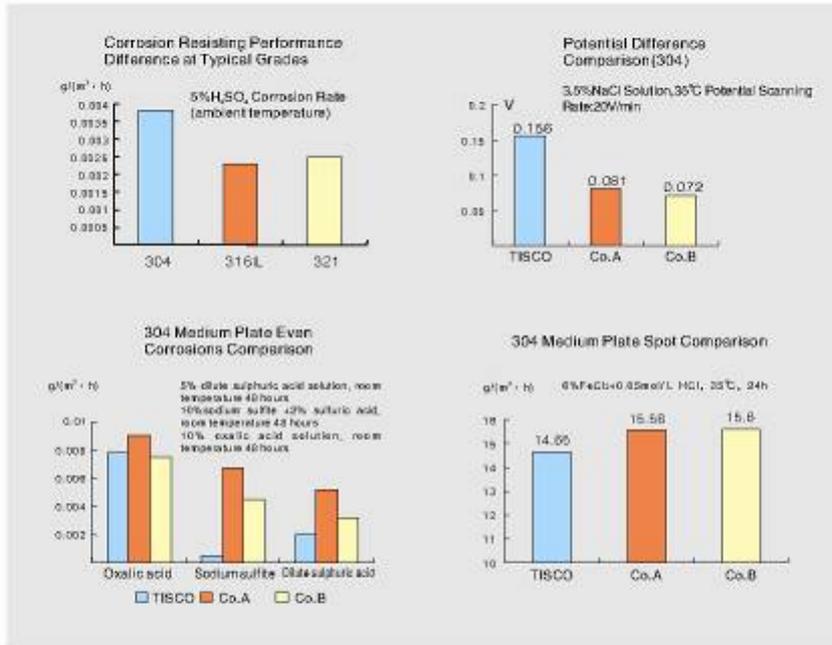
Product	Thickness ( mm )	Width ( mm )	Length ( mm )
PMP	6.0 ~ 100.0	1500 ~ 3000	2000 ~ 12000

Note: Double length delivery is possible if requested.



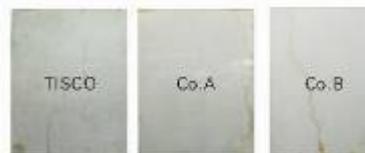
## Hot Rolled Plates

### ◆ Corrosion-resisting Performance



#### 304 Medium Plate Salt Mist Comparison

5% NaCl, continuously sprays for 96 hours. TISCO products show better performance than that of Co.B, with no rust mark, Co.A product displays visible rust mark.



## Hot Rolled Plates

### ◆ Typical Application

Hydroelectric



## Hot Rolled Plates

### ◆ Typical Application



Vehicles & vessels



## Stainless Wire Rods



### ◆ Main Features

- TISCO is one of the largest stainless wire rod producers in China. It can produce three kinds of martensitic, ferritic and austenitic wire rods with 40 steel grades.
- The products are of clean steel, dense structure, stable properties, with good cold heading and drawing properties. They have been widely used in standard parts, springs, filter gauze, welding wire, electrode, tableware. Some of them have exported to foreign countries.

### ◆ The Physical Quality

- Dimensional precision



## Stainless Wire Rods

### ◆ The Physical Quality

- Excellent cold heading performance

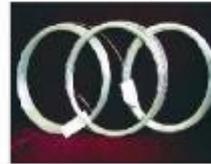


TISCO product: 1/5 can be cold-headed



Company A: 1/3 can be cold-headed

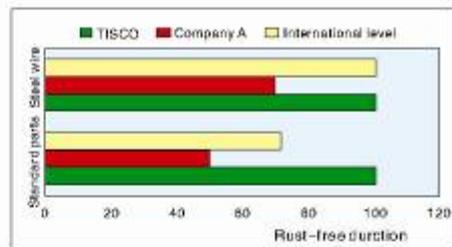
- Super drawability



- Kinds of standard parts available



- SUS304HC good corrosion resistance performance



### ◆ Typical Application



Standard parts



Welding wire



Cutlery

## Clad Materials



### ◆ Main Features

- TG stainless steel clad plates are produced by the advanced technology of all weather explosion clad and rolling.
- The two different metals of the clad materials are saw-tooth atomic bonded. The interface bonding ratio is 100%, the strength of clad interface is high.
- The TG clad plates can be produced by many kinds of steel grades, the combination of the plates can be made according to the requirements of the customers.
- The products are widely applied in the fields of petrochemical, water works, salt production, light industry, pressurized vessels decoration and so on.

### ◆ Main Products

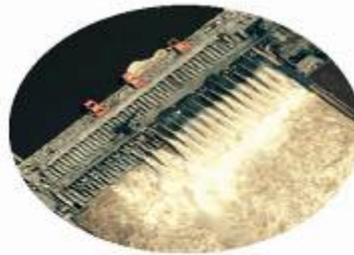
Carbon steel Substrate material	Stainless steel Clad materials
Q235, Q345 etc.	405, 304, 304L, 316L, 2205 etc.
Clad plates of steel/aluminum, steel/titanium, aluminum/Copperc can be produced.	

### ◆ Specifications

Specifications	Thickness mm	Width mm	Length mm
Carbon steel Substrate material	6.0-140	1100-3000	2000-9000
Stainless steel Clad materials	2-14		

## Clad Materials

### ◆ Typical Application



## Stainless Steel Pipes

### ◆ Main Features

TG stainless steel pipes are produced by quality stainless steel materials. The pipe products are of high quality, small deformation and uniform wall thickness.

Austenitic, ferritic, duplex, clad and other special properties and application seamless and welded pipes can be produced.

The products are widely applied in the fields of petrochemical, water power, medicine, paper, food, mechanical, environment protection, light industry, decoration, urban waste water treatment and water supply and discharge, the pipes of heat exchanger and so on.



## Stainless Steel Pipes

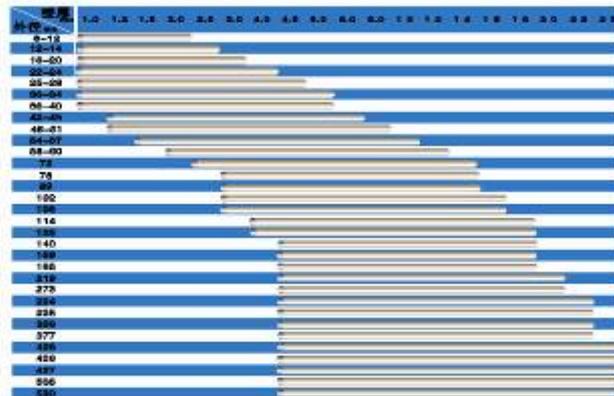
### ◆ Specification

Pipes with normal, thin, ultra-thin, thick, ultra-thick wall thickness can be provided. Min. wall thickness 0.5 mm, max. wall thickness 30.0mm, min diameter 6.0mm; max diameter 480.0mm; ratio of diameter and wall thickness; 6-70.

#### ○ Specification of welded pipe



#### ○ Specification of seamless pipe



## Stainless Steel Pipes



### ◆ Typical Applications



## Service

We can provide 3.1 and 3.2 certificates according to EN 10204 .

- Providing consumers with the customized design in composition, properties, package, coil weight and quality certificate.
- Delivery in time .
- Providing technical support to customers in selecting materials, processing, welding technology and applicability etc.
- Consumer's complains will be answered within 24 hours .



## Communications

Main business department	Functions	Telephone	E-mail
Marketing Department	Contract and order management Complaint and claim handling	0351-3010673 0351-3010679 800-806-1998	tgxsc@tisco.com.cn Tgyhfwk@tisco.com.cn
Technology Center	Technical consultation service	0351-3012213 0351-3017320	Tgjszxbq@tisco.com.cn
Steel Trade Department	Exports business	+86 (0)351-3017169 +86 (0)351-3017525	Tggm@tisco.com.cn

### Contacting manners of international trading Co.,Ltd.

Taigang International Trading (USA) Co., Ltd.	USA	(Tel) 001-4124340907	(Fax) 001-4124340908
Taigang International Trading (Hongkong) Co., Ltd.	Hongkong	(Tel) +0852-28271886	(Fax) +0852-28271300
Taigang Europe Co., Ltd.	Germany	(Tel) +49(0)2154-81680	(Fax) +49-2154-818811

### Contacting manners of domestic trading Co.,Ltd.

Branch Name	Address	Telephone & Fax
Wuxi TISCO Sales Co. Ltd.	Wuxi	(Tel) 0510-82407713 (Post code) 214011 (Fax) 0510-82441197
Foshan TISCO Stainless Steel Sales Co. Ltd.	Foshan	(Tel) 0757-83315711 (Post code) 528041 (Fax) 0757-83315718
Beijing TISCO Economic and Trade Center	Beijing	(Tel) 010-64441366 (Post code) 100029 (Fax) 010-64441369
Liaoning TISCO Sales Co. Ltd.	Shenyang	(Tel) 024-24232050 (Post code) 110016 (Fax) 024-24231216
Xian TISCO Sales Co. Ltd.	Xi'an	(Tel) 029-86231507 (Post code) 710016 (Fax) 029-86231508
Zhongnan Economic and Trade Center of TISCO	Wuhan	(Tel) 027-85615300 (Post code) 430015 (Fax) 027-85615311
Spot Sales company Ltd. of TISCO	Taiyuan	(Tel) 0351-3096390 (Post code) 030003 (Fax) 0351-3090668
Tianjin TISCO Sales Co. Ltd.	Tianjin	(Tel) 022-24308105 (Post code) 300012 (Fax) 022-24308103
Chengdu TISCO Sales Co. Ltd.	Chengdu	(Tel) 028-87604342 (Post code) 610038 (Fax) 028-87612940
Qingdao TISCO Sales Co. Ltd.	Qingdao	(Tel) 0532-81101647 (Post code) 266000 (Fax) 0532-87734798