



核电行业用钢

STEEL USED IN NUCLEAR POWER INDUSTRY

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销量最大、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余年发展，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。2009年生产不锈钢248万吨，产量世界第一！



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”系列火箭及核电站等高端领域，进入三峡水利、西气东输、奥运场馆及世博场馆等国家重点工程。2009年在国家认定的575所企业技术中心中，太钢技术中心排名第二，位钢铁行业首位。太钢拥有以不锈钢为核心的745项具有自主知识产权的核心技术，其中100多项达到国际先进水平。

太钢的发展战略是，加快建设全球最具竞争力的不锈钢企业，实现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，进而建设具有国际竞争力的大企业集团。

Taiyuan Iron and Steel (Group) Co. Ltd. (TISCO) is one of the steel giants in China and, the largest stainless producer in the world in term of output and sales equipped with the most advanced facilities covering pretty wide product range. After over 70 years development TISCO has the capacity of 10 million tons of steel, which includes 3 million tons of stainless. The year of 2009 saw TISCO become No.1 stainless producer in the world with production of 2.48 million tons of stainless.

In TISCO came out the first heat of stainless steel and first heat of silicon steel as well as the first sheet of silicon in the history of China steel industry. TISCO is well equipped for mining and iron ore refining, iron and steel making, rolling and forging, metallurgical equipment and spare parts manufacturing. TISCO's products cover stainless steel of cold and hot rolling, cold rolled silicon, hot rolled coil, axle steel, die steel and steel for military purpose etc. TISCO's products are widely used in petrochemical industry, transportation, construction decoration, home appliance, medical and food industry. TISCO's products can be also found in the national key projects such as Shenzhou spaceship, Chang'e-1 Moon Detector, Dongfeng rocket series and nuclear power, Three Gorges, West-East natural gas transmission, and Olympic game facility as well as Shanghai world expos. In 2009 TISCO technology centre ranked No.2 among the 575 state acknowledged enterprise technology institutions, and No.1 among the steel industry. TISCO owns 745 core patents in the field of stainless and over 100 patents are taken as the world class.

TISCO is aiming to become the most competitive stainless producer in the world, and achieve the first class stainless product in terms of product range, quality, cost, R&D, energy saving, environment protection, efficiency and service. For this goal TISCO is trying the first world class level and build itself into the world competitive large group company.

◆ 核电行业用钢概况

太钢按照ASME和RCC-M标准生产的核电用钢已成功应用于国内目前正在建的核电项目和巴基斯坦恰希玛（Chashma）核电站；并成功开发出俄罗斯核电用钢和国际热核聚变实验堆ITER项目用钢。太钢已成为国内唯一具有堆芯构件用钢板供货资质的企业。

太钢产品广泛应用于核岛主设备的堆内构件、控制棒驱动机构、蒸汽发生器、稳压器、蓄势器、压力容器，以及常规岛汽轮机、发电机、汽水分离再热器、除氧器等设备的制造，土建安装工程的“水池覆面板”、板管支架等。品种涵盖冷板、热轧中厚板、钢管、棒材、锻件等。

太钢与上海第一机床厂有限公司、中广核工程公司、东方锅炉有限公司、山东核电设备公司、中核二二、二三、二四建设公司等企业联合研发核级钢板，并成功供货。实现多个项目材料替代进口，填补国内空白。太钢高牌号冷硅是国内目前百万千瓦核电机组唯一实现批量供货的厂家。

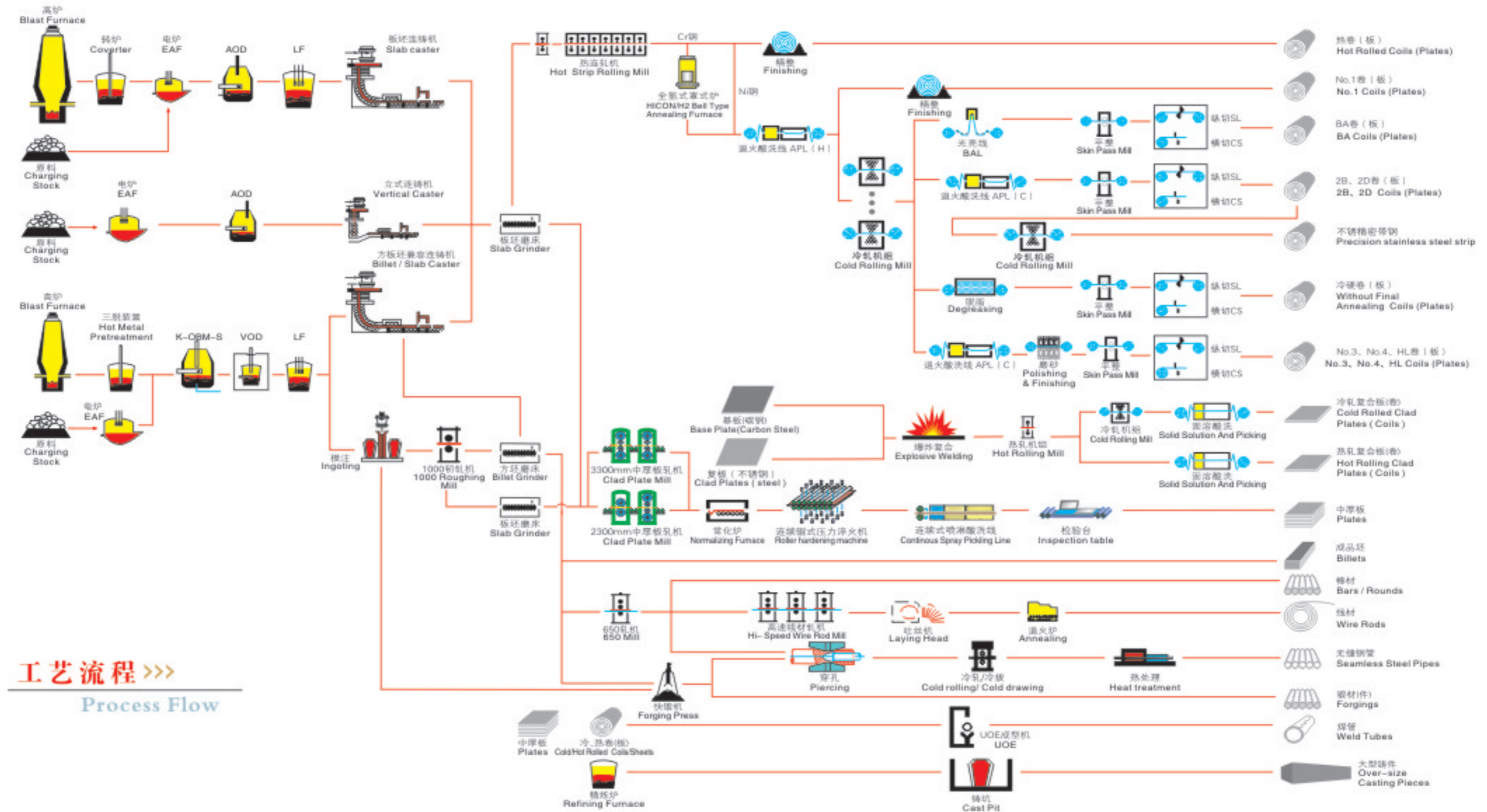
◆ Brief in nuclear power industry steel

The nuclear power steel, produced by TISCO in accordance with ASME and RCC-M Standards, has been successfully used in the nuclear power projects under construction and Chashma Nuclear Power Plant. TISCO also developed the steel for Russian nuclear power plant and International Thermonuclear Experimental Reactor (ITER) Project. TISCO has been the only qualified supplier for the plate used for reactor internals in CHINA.

TISCO products have been widely used in manufacturing of nuclear island main equipments such as reactor internals, control rod actuator, steam generator, voltage regulator, pressure accumulator and pressure vessels, and of conventional island equipments such as steam turbine, power generator, re-heater with steam and water separated, and deoxygenation equipment, as well as in civil and erection projects such as face-sheet for water tank and supports with plate and pipe. TISCO products series include cold rolled plate, hot rolled medium plate, steel tube, rod and forgings etc.

Nuclear grade plate was successfully developed and supplied by TISCO together with The First Machine Tool Plant in Shanghai, and China Nuclear Power Engineering Co.Ltd., DongFang Boiler Group Co., Ltd. and Shandong Nuclear Power Generating Equipment Co.Ltd., as well as China Nuclear Industry 22(nd), 23(rd) and 24(th) Construction Corporation etc. Steel for several projects has constituted imported materials, and filled the domestic gaps. TISCO has been the only batched supplier for high grade cold silicon steel for Mega kilowatt nuclear power units in CHINA.





研发能力 >>>

Research and Development

国家级实验室
National level laboratory



2009年在国家认定的575家企业技术中心中，太钢技术中心排名第2位。
Tisco technology center ranks 2th among enterprise-based 575 technology centers accredited by the state in 2009.



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

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.



质量保证体系 >>>

Quality Assurance System



◆ 核质保大纲

Quality guarantee outline on TISCO's nuclear power steel

太钢已经完成ISO9000、ISO/TS16949标准体系的建立并有效运行，取得了由国家认证机构颁发的ISO9001质量体系认证证书。为满足核电用钢的特殊用途，满足国家核安全法规要求，制定并建立太钢核电用钢质量保证大纲。本大纲规定了太钢制造核电项目用钢质量目标、部门质量职责，主要质量保证内容及措施、质量计划管理办法、不符合项管理办法、体系文件管理、组织机构和人员分工、接口管理与授权人员、工艺试验与评定控制程序、特种工艺人员管理程序、产品试验（功能性试验）控制程序等内容。

TISCO has finished establishment of standard system ISO9000, ISO/TS16949, and running it efficiently, and also gain the authentication certificate of quality system ISO9001 awarded by state authentication organization. In order to fulfill the special purpose of the nuclear power steel and the requirement of the state safety regulation, we work out and establish quality guarantee outline on TISCO's nuclear power steel. The outline has the following contents: the quality target for TISCO's nuclear power steel, department responsibility on quality, content and measures on quality guarantee, quality plan management, treatment on disagreeing items, management of standard-system document, organization and staff duty, interface management and authorization, controlling progress on process test and evaluation, managing progress of special processing staff., and controlling progress on test of products (functional test) etc.

常规产品 >>>

Conventional Products

| 钢种 Steel grade | 牌号 Grade | 产品规格 (mm) Specifications | 单重 Weight (t) | 执行标准 Standard | 用途 Application |
|------------------------|----------------|-----------------------------|------------------|------------------|---|
| 不锈钢 Stainless steel | Z2CN18-10 | 0.6-120 x 1000-2500 x 6000 | 5.0 | RCCM-3307 | 核岛主设备及压力容器 Nuclear island main equipments and pressure vessels |
| | Z2CN19-10 (控氮) | 6-120 x 1000-3500 x 13000 | 19.1 | RCCM-3310 | 安注箱、堆内构件 Accumulator and reactor internals |
| | Z2CND17-12 | 6-60 x 1500-2500 x 6000 | 3.8 | RCCM-3307 | 稳压器 Voltage regulator |
| | Z2CND18-12 | 6-60 x 1500-2500 x 6000 | 5.5 | RCCM-3307 | 核岛管道、配件 Nuclear island piping and fittings |
| | S32101 | 6.35-60 x 1500-3060 x 13800 | 5.5 | ASME A240/A240M | 核岛工程用结构模块 Structural modules for nuclear island project |
| 碳钢 Carbon steel | P265GH | 4-90 x 1400-2000 x L | 1-6 | Q/太新030-2008 | 核电常规岛的支撑件、管道(焊管)等 Nuclear grade carbon steel plate for nuclear power project |
| | P295GH | 4-90 x 1400-2000 x L | 1-6 | Q/太新030-2008 | 核电常规岛的支撑件、管道(焊管)等 Nuclear grade carbon steel plate for nuclear power project |
| 硅钢 Silicon steel | M310-50A | 0.5 x 619 x C | - | BS EN10106; 1996 | 百万千瓦核电的发电机组 Mega kilowatt nuclear power units |

◆ 化学成分 (典型值)

Chemical composition (Typical value)

| 牌号 Grade | C≤ | Si≤ | Mn≤ | P≤ | S≤ | Cr | Ni | Mo | Cu≤ | Nb≤ | Ti≤ | V≤ | N≤ |
|-----------------|-----------|------|---------|-------|-------|---------|-----------|-----------|---------|------|------|------|----------|
| Z2CN18-10 | 0.03 | 1.00 | 2.00 | 0.03 | 0.015 | 17-20 | 9-12 | - | 1.00 | - | - | - | - |
| Z2CN19-10 (控氮) | 0.035 | 1.00 | 2.00 | 0.03 | 0.015 | 18.5-20 | 9-10 | - | 1.00 | - | - | - | 0.08 |
| Z2CND17-12 | 0.03 | 1.00 | 2.00 | 0.03 | 0.015 | 16-19 | 10-14 | 2-2.5 | 1.00 | - | - | - | - |
| Z2CND18-12 (控氮) | 0.035 | 1.00 | 2.00 | 0.03 | 0.015 | 17-18.2 | 11.5-12.5 | 2.25-2.75 | 1.00 | - | - | - | 0.08 |
| S32101 | 0.04 | 1.0 | 4-6 | 0.04 | 0.03 | 21-22 | 1.35-1.7 | 0.1-0.8 | 0.1-0.8 | - | - | - | 0.2-0.25 |
| P265GH | 0.02 | 0.40 | 0.5-1.4 | 0.025 | 0.015 | 0.30 | 0.30 | 0.08 | 0.30 | 0.02 | 0.03 | 0.02 | - |
| P295GH | 0.08-0.20 | 0.40 | 0.9-1.5 | 0.025 | 0.015 | 0.30 | 0.30 | 0.08 | 0.30 | 0.02 | 0.03 | 0.02 | - |

产品性能 >>>

Introduction of Product

◆ 力学性能
Mechanical properties

1、不锈钢 Stainless steel

| 牌号 Grade | 室 温 Room temperature | | | | | 350℃ | |
|-----------------|-------------------------|----------------------|-----------------------|-----------------------|---------|------------------------|------------------------|
| | R _m ,MPa≥ | R _e ,MPa≥ | A,%, ≥ | | Akvj, ≥ | R _{0.1} ,MPa≥ | R _{0.2} ,MPa≥ |
| | | | 厚度 > 3mm Thickness | 厚度 ≤ 3mm Thickness | | | |
| Z2CN18-10 | 175 | 490 | 45 | 40 | - | 105 | 350 |
| Z2CN19-10 (控氮) | 210 | 520 | 45 | 40 | - | 125 | 394 |
| Z2CND17-12 | 175 | 490 | 45 | 40 | - | 105 | 382 |
| Z2CND18-12 (控氮) | 220 | 520 | 45 | 40 | - | 130 | 445 |
| S32101 | 450 | 650 | 30 | 30 | - | - | - |

2、碳钢 Carbon steel

| 牌号 Grade | 钢板厚度 Plate thickness (mm) | 拉伸性能 Tensile property | | | 180° 弯曲 bending b = 35mm |
|-------------|---------------------------------|--------------------------|---------|---------|--------------------------------|
| | | ReH,MPa | Rm, MPa | A, % | |
| P265GH | t ≤ 16 | ≥ 265 | 410-530 | ≥ 23 | d=1a完好 |
| | 16 < t ≤ 40 | ≥ 255 | | | |
| | 40 < t ≤ 60 | ≥ 245 | | | |
| | 60 < t ≤ 100 | ≥ 215 | ≥ 22 | | |
| | 100 < t ≤ 150 | ≥ 200 | | 400-530 | |
| P295GH | t ≤ 16 | ≥ 295 | 460-580 | ≥ 22 | d=1a完好 |
| | 16 < t ≤ 40 | ≥ 290 | | | |
| | 40 < t ≤ 60 | ≥ 285 | | | |
| | 60 < t ≤ 100 | ≥ 260 | ≥ 21 | | |
| | 100 < t ≤ 150 | ≥ 235 | | 440-570 | |

冲击韧性 (AKv) 要求 Impact energy requirements (AKv)

| 牌号 Grade | 试验温度 Test temperature | 表面试样 Surface sample | 内部试样 Internal sample |
|-------------|--------------------------|------------------------|-------------------------|
| P265GH | -20℃ | ≥ 27J | ≥ 19J |
| P295GH | -20℃ | ≥ 21J | ≥ 16J |

3、硅钢 Silicon steel

| 牌号 Grade | 规格 (mm) Specifications | 抗拉强度MPa Tensile strength | 屈服强度MPa Yield strength | 延伸率% Elongation | 硬度HV Hardness |
|-------------|---------------------------|-----------------------------|---------------------------|--------------------|------------------|
| M310-50A | 0.5 | 543 | 429 | 29 | 184 |

◆ 特性及应用
Property and application

| 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 |
|----------------|---|--|--|
| Z2CN19-10 (控氮) | 既保持0Cr18Ni9的强度水平又具有00Cr19Ni10的耐晶间腐蚀性能, 通过增加适量的氮, 可以提高钢的强度, 改善钢的耐晶间腐蚀性能, 并可提高钢具有与超低碳奥氏体钢相同抗敏化能力。 It can keep strength level of 0Cr18Ni9, and also has intergranular corrosion resistance of 00Cr19Ni10. By appropriate addition of nitrogen, steel strength is increased, intergranular corrosion resistance of steel is improved, and it has capacity of anti-sensitization same as ultra-low-carbon austenitic steel. | 核岛反应堆堆内构件 Nuclear island reactor internals | 广东阳江核电站 Guangdong Yangjiang Nuclear Power Plant |
| S32101 | 强度高, 抗海水腐蚀性性能好。 High strength and good sea-water corrosion resistance. | AP1000核岛的结构模块 Structural modules for AP1000 nuclear island | 山东海阳 浙江三门核电站 Shandong Haiyang Nuclear Power Plant and Zhejiang Sanmen Nuclear Power Plant |
| Z2CN18-10 | 对钴、硼元素含量的要求及其严格, 这两种元素对工作中子数量的数量有吸收作用, 从而影响核电站运行的效率。 Requirement for contents of Cobalt and Boron is very critical. These two elements can absorb quantity of neutron inside the environment so that efficiency of nuclear power plant is affected. | 核岛反应堆水池覆面板 Face-sheet for nuclear island water tank | 秦山二扩核电站项目 Qinshan Nuclear Power Plant Expansion Project phase II |
| M310-50A | 1、加厚涂层 (杜邦E1151E)。 2、执行欧标及阿尔斯通采购规范。 1. Thick coating (Du Pont E1151E) 2. According to European Standards and Alstom purchasing specifications. | 百万千瓦核电机组 Mega kilowatt nuclear power units | 福建宁德项目 大连沿河项目 Fujian Ningde Project Dalian Hongyuanhe Project |
| P265GH, P295GH | 良好的耐高温氧化、焊接和冷、热加工性能; 产品横向、纵向拉伸性能各向异性小; 具有蠕变极限与持久强度数值相近的特点; 高韧性、高强度性能的特点, 钢质纯净, 残余元素低, 性能稳定性好。 Good high temperature resistance oxidation, good welding performance and hot & cold working performance; excellent transverse and longitudinal tensile strength; non-inclusions and without flaw, featured with similar creep limits and permanent strength values; high toughness and high strength; high purity steel quality, less residual element, good property stability. | 常规岛的支持件、管道、及管夹等 General heat resistant structure members, supports, etc | 岭澳二期、阳江、宁德、福清等大型核电站工程 Large scale Nuclear Power Plant project such as Ling'ao project phase II, Yangjiang, Ningde, Fuqing, ect. |

产品介绍 >>>

Product Introduction

◆ 1998年9月-2006年，太钢陆续供货泰山核电站、中俄联合进行的中国实验快堆工程、巴基斯坦恰希玛二期等核电项目不锈钢材料，主要钢种有1Cr18Ni9Ti、304L、0Cr18Ni10Ti、304。

◆ 2007年，太钢按照RCC-M核电体系和技术规范，陆续为泰山二期扩建工程、岭澳二期、红沿河等核电项目制造提供了Z2CN18-10、Z2CND17-12、Z2CND18-12N、P265GH等牌号核2、3级钢板。同时，按照国标、美标、欧标制造了满足RCC-M质保要求的非核级00Cr19Ni10、410S、1.4003等不锈钢中板、冷板。

◆ 2008年，工程订单供货大连红沿河、福建宁德、广东阳江等项目（钢种为Z2CN18-10、Z2CND18-12N、P265GH、P295GH），设备订单供货东方汽轮机、广州重型机器厂、沈阳鼓风机厂、浙江久立等厂家。

◆ 2009年1月，太钢首次承担广东阳江核电项目1#、2#机组核岛反应堆堆内构件用核级不锈钢板的制造任务；3月，美国西屋公司AP1000技术的海阳、三门核电站的结构模块用不锈钢向太钢订货，该项目将全部使用太钢最新研发的双相钢S32101；同时供货的核电项目有泰山一扩方家山、广东台山、福建福清等，以及最近供东锅的安注箱核级不锈钢板。

◆ 2009年5月太钢核电用冷硅材料（采用欧洲牌号M310-50A，执行欧标BS EN10106；1996）340吨应用于即将投产的百万千瓦核电机组（宁德项目），09年6月又签订320吨高牌号冷硅M310-50A合同，应用于百万千瓦核电机组（红沿河项目），仅用1年时间。太钢高牌号冷硅成功进入东电百万千瓦核电领域，填补了国内空白。

◆ From September 1998 to 2006, TISCO supplied stainless steel products successively to many nuclear power project such as Qinshan Nuclear Power Plant, Sino-Russia joint China Experimental Fast Reactor(CEFR) Project, Pakistan Chashma phase II and so on. The key steel grades are 1Cr18Ni9Ti, 304L, 0Cr18Ni10Ti and 304.

◆ In 2007, according to RCC-M nuclear power system and technical specification, TISCO provided nuclear grade 2 and 3 steel plates, such as Z2CN18-10, Z2CND17-12, Z2CND18-12N, P265GH to Qinshan expansion project phase II, LingAo project phase II, Hongyanhe project and such nuclear power plants. At the same time, according to Chinese Standards, American Standards and European Standards, TISCO developed non-nuclear grade stainless steel medium plate and cold plate such as 00Cr19Ni10, 410S, and 1.4003, which had meet the quality assurance requirements of RCC-M.

◆ In 2008, TISCO supplied products for engineering orders from Dalian Hongyanhe, Fujian Ningde, Guangdong Yangjiang projects(steel grades were Z2CN18-10, Z2CND18-12N, P265GH, P295GH), as well as equipment orders from DongFang Steam Turbine Works, Guangzhou Heavy Machines Plant, Shenyang Air Blower Factory, Zhejiang Jiuli Corporation and so on.

◆ In January 2009, TISCO undertook the production of nuclear grade steel plate used for nuclear island reactor internals for Guangdong Yangjiang Nuclear Power Plant project 1 # and 2 # units for the first time. In March, TISCO got the order of stainless steel used for structural module from Haiyang and Sanmen nuclear power plant with US Westinghouse Company AP1000 technology, and this project will entirely use Duplex steel S32101 which is the latest development of TISCO. At the same time, the nuclear power projects which supplied by TISCO as well are Qinshan Expansion Project Fangjiashan phase I, Guangdong Taishan, Fujian Fuqing etc. Recently, nuclear grade stainless steel plate for accumulator will also be supplied to DongFang Boiler Group Co., Ltd.

◆ In May 2009, 340 tons cold silicon products for nuclear power plant (European Number M310-50A is adopted in accordance with European Standards BS EN10106) were applied to mega kilowatt nuclear power units (Ningde Project) which will be put into production soon. In June 2009, TISCO signed a contract of 320 tons high grade cold silicon steel M310-50A, which was applied to mega kilowatt nuclear power units (Hongyanhe Project) within only one year. TISCO high grade cold silicon products successfully entering the mega kilowatt nuclear power field filled up the domestic blank.



宁德核电站
Ningde nuclear power station



福清核电站
Fuqing nuclear power station



核电用结构钢
Structural steel in nuclear power station



阳江核电站
Yangjiang nuclear power station



岭澳二期核电站
Ling'ao Phase II nuclear power station



结构模块
Structural module



核反应水池
Nuclear reaction water tank



辽宁红沿河
Liaoning Hongyanhe Project



广东台山项目
Guangdong Taishan Project

主要特点 >>>

Main Features

- ◆ 良好的耐高温氧化、良好的焊接和冷、热加工性能;
 - ◆ 产品横向、纵向拉伸性能优良;
 - ◆ 无夹杂、无裂纹、具有蠕变极限与持久强度数值相近的特点;
 - ◆ 高韧性、高强度性能的特点;
 - ◆ 钢质纯净, 硼、钴含量低, 核稳定性高, 感生放射性低, 中子吸收截面小;
 - ◆ 机械性能优良, 横纵向性能差异小, 适合各种焊接工艺;
 - ◆ 及时更换冲片磨具, 以免引起毛刺过大;
 - ◆ 二次涂漆时, 选择硅钢片要纵向送入, 保证运行稳定, 涂漆均匀。
- ◆ Good high temperature resistance oxidation, good welding, cold and hot working performance;
 - ◆ Good transverse and longitudinal tensile strength;
 - ◆ Non-inclusions and without flaw, featured with similar creep limits and permanent strength values;
 - ◆ High toughness and high strength;
 - ◆ Good steel purity, low content of boron and cobalt, high nuclear stability, low induced radioactivity, and small neutron absorption cross section;
 - ◆ Good mechanical property, small difference between transverse and longitudinal, suitable for various welding process;
 - ◆ Timely replace stamped steel grinding tools to avoid oversize burrs;
 - ◆ For second painting, silicon-steel sheet must be longitudinal infeed to ensure stable operation and uniform painting.



堆芯板
The reactor core plate



堆内构件筒体
In-pile cylinder



核电用高中压缸内结构
Hi-, mid- and low-pressure chamber
Interior structure of nuclear power plant

研发目标 >>>

Research and Development Target

世界目前核能发电的平均比例为16%，而我国为1.3%；到2020年将达到20%，而我国为4%，由此可见我国核能发电的比例与世界平均水平差距明显，若要达到发达国家的水平，则发展前景非常广阔，且持续发展的动力强劲。

我国发展的核电主力堆型：大型先进压水堆核电站，主要技术为美国西屋公司的AP1000技术和法国的CPR、EPR技术。根据技术的不同，国内主要材料的牌号是法国RCC-M核电标准、ASME核电标准。

太钢从07年开始按照法国RCC-M核电体系、美国的ASME核电体系的要求开始开发核电不锈钢板、碳钢板、以及高牌号冷硅产品。产品的研发能力均可满足国内核电体系的要求，并在多个项目上实现替代进口，填补国内空白。主要材料牌号有：Z2CN18-10、Z2CND17-12、Z2CND18-12N、Z2CN19-10（控氮）、S32101、P265GH、P295GH、M310-50A等。

太钢将根据国家核电发展规划，在进一步扩大现有牌号的基础上，研制开发核电用不锈钢管、不锈钢精带等高端产品，替代进口，大力提升我国核电用钢国产化水平。

At present, the average percentage for global nuclear energy power generation is 16%, and china occupies 1.3%; in 2020 the global one will be 20% while china 4%. From this, it can be seen that the percentage for nuclear energy power generation in china has obvious gap with the global average level. Development prospect is very wide and sustainable development impetus is driving if we want to reach the level of developed countries.

The main development for nuclear power reactor type in china is large-scale advanced pressurized water reactor nuclear power plant. Main technology is AP1000 from USA Westinghouse and CPR& EPR from French. According to different technologies, the designation for national main material is French RCC-M and ASME nuclear power standards.

TISCO began to develop nuclear power stainless steel plate, carbon steel plate and high grade cold silicon products in accordance with French RCC-M and ASME nuclear power standards in 2007. The research and development ability can meet the requirements of national nuclear power system. Furthermore, many projects have used domestic materials, which instituted imports and filled the domestic blank. Key steel grades are Z2CN18-10, Z2CND17-12, Z2CND18-12N, Z2CN19-10(controlled nitrogen), S32101, P265GH, P295GH, M310-50A etc.

According to national nuclear power development planning, TISCO will develop some more high-end products such as nuclear power stainless steel tube and precision strip which can institute imports and greatly improve localization ability for nuclear power steel.

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 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 |
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