

宝钢股份特钢事业部

BAOSHAN IRON & STEEL CO.,LTD.  
Special Steel Business Unit

特殊合金钢管

Special Alloy Steel Tube



# Special Alloy Steel Tube

特殊合金钢管

Product Manual of Special Alloy Steel Tube  
特殊合金钢管产品手册





严格苛求的精神  
Stringent and exigent spirit

学习创新的道路  
Learning and innovation road

争创一流的目标  
Striving for first-class objective





**核心价值** Core Value

**诚信** Integrity

**协同** Cooperation







## 特殊合金钢管简介

### Introduction of Special Alloy Steel Tube



特殊合金钢管是宝钢股份特钢事业部的重点产品之一，特殊合金钢管产线拥有先进、完整的特殊钢冶炼、锻造、轧坯、无缝管制造和后道检验、检测能力。是中国第一支航空奥氏体无缝不锈钢管的诞生地，是中国航天、航空、石油化工、化肥、电站、仪表、机械等工业用无缝钢管的主要生产基地，是中国核电用管的专业生产企业。

Special alloy tube is one of the major products of Baosteel Special Steel Business Unit. This line has advanced and integrated special steel smelting, forging, rolling, seamless steel tube manufacturing and back end inspection and testing capacities. It is the birthplace of the first aerospace austenitic seamless stainless steel tube in China as well as the main production base of industrial seamless tubes applied to aerospace and aviation, petrochemical industry, fertilizer, power plant, appearance and mechanical industry. It is also specialized manufacturer of nuclear power tubes in China.

宝钢股份特钢事业部采用国内外新技术、新工艺、新装备，按国家标准、国际标准以及协议条件组织生产各类牌号的耐蚀不锈钢管、耐热不锈钢管、双相不锈钢管、沉淀硬化不锈钢管、高温合金钢管及镍基合金钢管、铁镍基合金钢管、钛及钛合金管。其中，部分产品的实物质量达到国外同类产品的先进水平。核反应堆蒸发器用合金钢管和00Cr18Ni5Mo3Si2双相耐腐蚀不锈钢管荣获国家科技进步一等奖。1Cr18Ni9Ti化工用不锈长钢管荣获国家银质奖。1995年公司获ISO-9002质量体系认证证书。1999年获劳氏船级社认证证书。2008年成功研发出超超临界锅炉用钢管S30432，油田开采用BG2830(N08028)、BG2250(N06985)高合金无缝钢管。

Baosteel Special Steel Business Unit produces all kinds of corrosion resistant stainless steel tube, heat resistant S.S.tube, duple S.S.tube, precipitation hardening S.S.tube, superalloy tube and nickel-based alloy tube, Fe-based alloy tube, Titanium and Titanium alloy tube with new technology, new process and new equipment, according to national standard, international standard and terms of agreement. Among these products, some of them have reached international advanced level. The alloy tube for evaporator of nuclear reactor and 00Cr18Ni5Mo3Si2 duplex corrosion resistant stainless steel tube have got national progress first prize of science and tube technique. 1Cr18Ni9Ti chemical stainless steel long tube has got national silver medal. In 1995, Special Steel Business Unit was certificated with ISO-9002; 1999 certificated by Lloyd's Register of Shipping. In 2008, we have successfully developed S30432 tube for USC boiler, BG2830 (N08028) and BG2250 (N06985) superalloy seamless tube for oil field exploitation.



特殊合金钢管产线先后引进了德国SMS公司25MN扩(穿)孔机和60MN热挤压机、英国应达公司制造感应加热炉、德国LOI公司设计制造的环形加热炉、德国KPW50VMR、SKW75VMR高速冷轧管机、RS371型八头砂带抛光机、五头砂带抛光机、英国DREVER网带式氢气保护连续热处理炉、精密矫直机、美国钢管内壁潜望镜等，配置有九条无损检测生产线，包括德国ROTA40全自动无损检测线，形成了热挤压钢管生产线、核电U型管生产线、特种合金管生产线。

Special alloy tube line has introduced advanced equipments like 25MN expanding (piercing) machine and 60MN hot extruding machine from Germany SMS Company, induction heating furnace from Britian Induct Company, round heating furnace designed by Germany LOI Company. German high speed cold tube mill (KPW50VMR, SKW75VMR), RS371 brasive band polisher, Hydrogen portective continuous heat treatment furnace(DREVER), precision straightening machine, American inner wall periscope, and together with 9N.D. lines including Germany ROTA 40 full automatic non-destructive detection line. It has formed hot-extruding steel tube production line, nuclear power U shape tube production line, high standard aerospace and aviation stainless steel, tube steel and special alloy continuous rolling line.



特钢事业部按ISO9001质量体系管理规范，制订发布了质量手册、质量管理程序和作业程序及各种工艺技术操作规程，2001年通过中国冶金和中国进出口质量认证中心ISO9001-2000质量管理体系认证(复审)、2006年通过军工生产体系质量认证、航空产品质量体系认证、外贸产品质量体系认证、ISO14001:2004体系认证、OHSAS8001:1999体系认证。2007年完成特种设备(压力管道)制造许可证换证。2010年，获得国家环境保护部颁发的《民用核安全机械设备制造许可证》，1级直管(国核安证字Z(09)12号)；1级U型管(国核安证字Z(10)16号)。

According to ISO9001 quality system management regulation, Baosteel Special Steel Business Unit enacted and released quality manual, quality management procedure and operation steps and all kinds of process and technical operation rules. In 2001, It has been certificated by China Metallurgy Quality System Certification Center. With ISO9001-2000 quality management system (reexamination). In 2006, It has also passed military industry production system quality certification, aviation products quality system certification, export products quality system certification, ISO14001:2004, OHSAS8001:1999, In 2007, It got the manufacture license replacement of special equipment (pressure pipe). In 2010, Aquired "civil nuclear security machinery and equipment manufacturing license" issued by State Environmental Protection Department, first level straight tube (National Nuclear Security certificate characters Z (09)No. 12.); first level U-tube (National Nuclear Security certificate characters Z (10 )No. 16).

特殊合金钢管 Special Alloy Steel tube	热挤压产线 Hot extruding line
	特殊合金管产线 Special alloy tube line
	核电U型管产线 Nuclear power U shape tube line

产线 Line	产能 production capability	主要产品 main product	规格组距 class interval (mm)
热挤压 Hot extruding	23000t/年	不锈钢、镍基合金 S.S、Nickel base alloy	外径 External diameter 48-325 壁厚 wall thickness 4-40
特殊合金管 Special alloy tube	5000t/年	不锈钢、镍基合金 S.S、Nickel base alloy	外径 External diameter 1-219 壁厚 wall thickness 0.1-25
核电U型管 Nuclear power U shape tube	1000t/年	690	外径 External diameter 14-45 壁厚 wall thickness 1-4

# Contents 目录

产品流程 07  
Process Flow

生产装备 10  
Production Equipment



07



产品标准 15  
Products Standard

质量保证 30  
Quality Guarantee

15

36

用户服务  
Customer Service







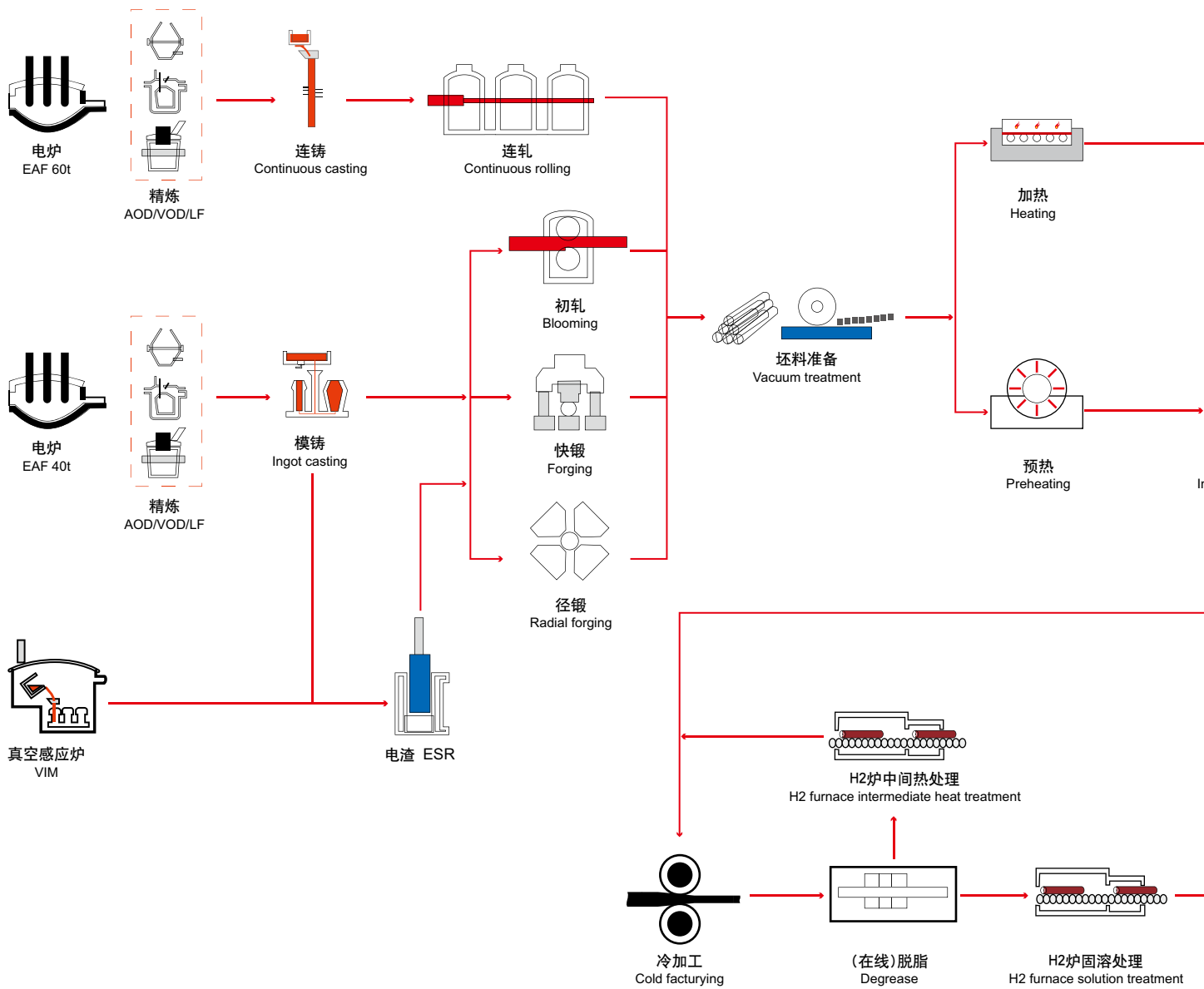
# 产品流程

Process Flow

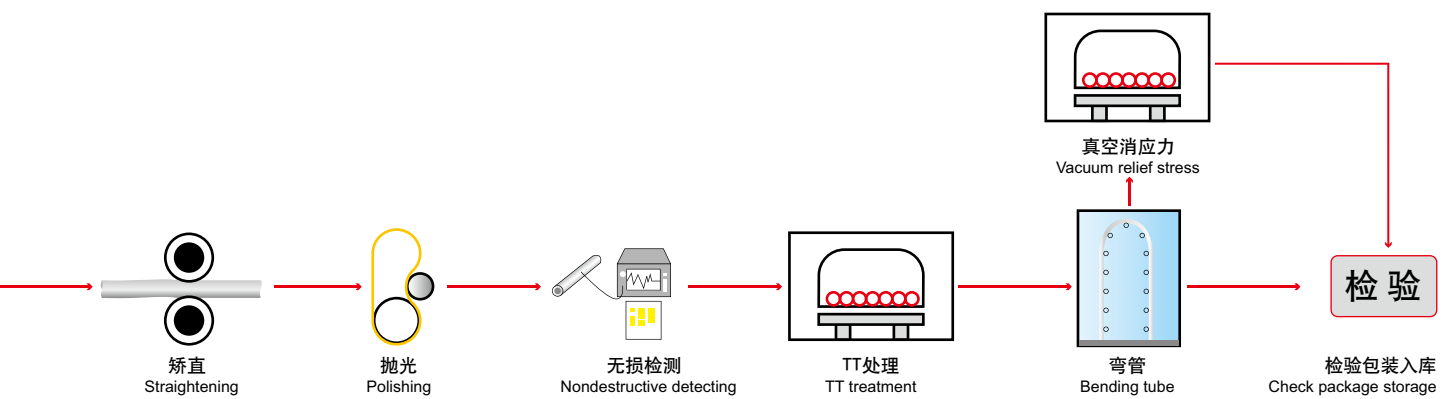
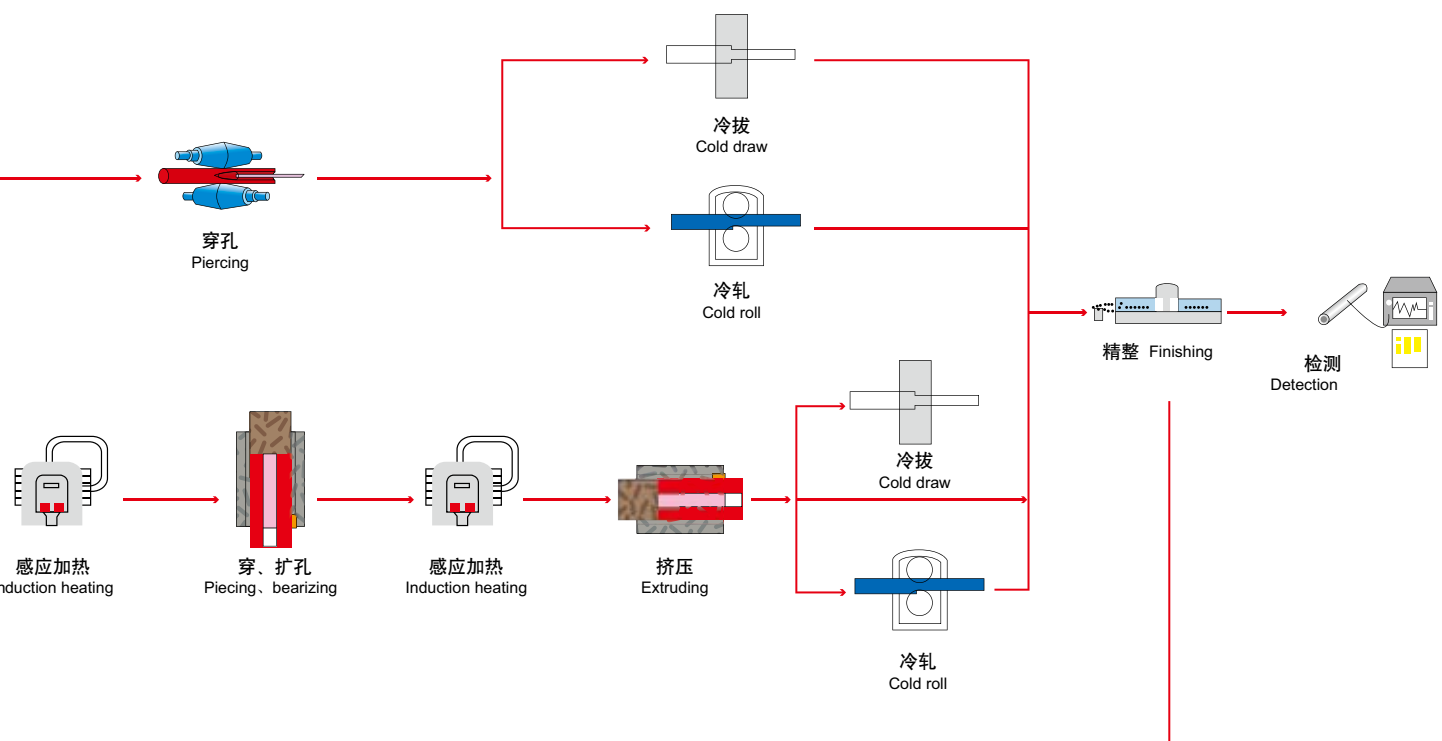




## 产品流程 Process Flow

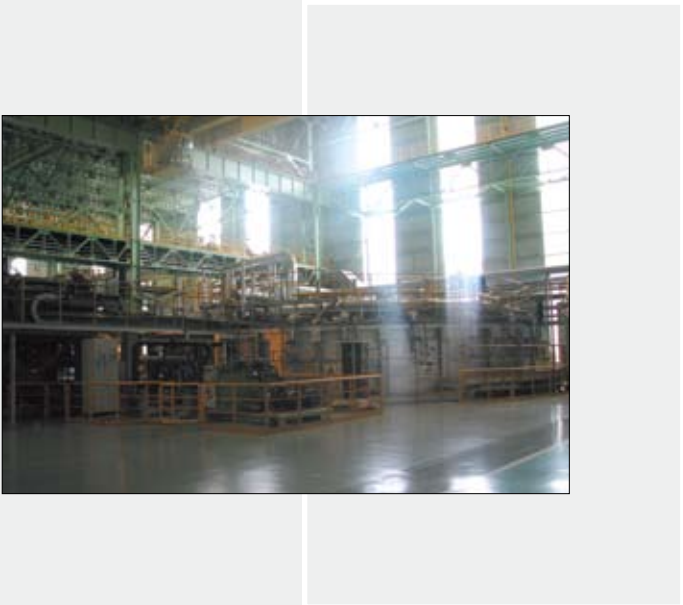








Production Equipment





## 冶炼、锻造装备及特点

### Smelting & Forging Equipments & Features



电弧炉  
Electric arc furnace

AOD, VOD/VD, LF)

**Equipments:**

40/60t (EAF, AOD, VOD/VD, LF)

**装备:**

1t、6t、12t真空感应炉

**主要产品:**

镍基合金、耐蚀合金、

**Equipments:**

1t,6t,12t VIM

**Main products:**

nickel based alloy, corrosion resistant alloy, and precise alloy



VIM



电渣炉  
ESR

**装备:**

ESR (1-20吨)

**主要产品:**

高温合金、耐蚀合金、特殊不锈

**装备特点:**

熔速自动控制 氩气保护

**Equipments:**

ESR(1-20t)

**Main products:**

super alloy, corrosion resistant alloy, special stainless steel

**Feature:**

automatic control of melting ration, argon protection,



径锻机  
Radial forging machine

吨径锻机

**主要产品:**

不锈钢、特殊不锈钢、镍基合金、钛合金、高强钢

**Equipments:**

1300 tons radial forging machine

**Main products:**

stainless steel, special stainless steel, nickel base alloy, titanium, high-tensile steel



快锻机  
High speed forging machine

**装备:**

40/45MN快锻机

**主要产品:**

不锈钢、特殊不锈钢、镍基合金、钛合金、高强钢

**Equipments:**

High speed forging machine

**Main products:**

stainless steel, special stainless steel, nickel base alloy, titanium, high-tensile steel





## 热挤压钢管设备 Hot-extrusion steel pipe equipment



环形炉  
Circular furnace

装备：  
环形炉

主要产品：  
不锈钢系列、镍基合金、钛合金等

装备参数：  
坯料外径： $\phi 176\sim 416\text{mm}$   
坯料长度：400~1300mm

**Equipment:**  
Circular furnace

**Main product:**  
Stainless steel series, nickel base alloy, titanium alloy, etc

**Equipment parameter:**  
Outside diameter:  $\phi 176\sim 416\text{mm}$   
Billet length: 400~1300mm



感应炉  
Induction furnace

装备：  
感应炉

主要产品：  
不锈钢系列、镍基合金、钛合金等

装备参数：  
坯料外径： $\phi 176\sim 416\text{mm}$   
坯料长度：400~1300mm

**Equipments:**  
Induction furnace

**Main products:**  
Stainless steel series, nickel base alloy, titanium alloy, etc

**Equipemnt parameter:**  
Outside diameter:  $\phi 176\sim 416\text{mm}$   
Billet length: 400~1300mm



穿(扩)孔机  
Piercing(Expanding) press

装备：  
穿(扩)孔机

主要产品：  
不锈钢系列、镍基合金、钛合金等

装备参数：  
穿(扩)孔力25M

**Equipment:**  
Piercing(expanding) press

**Main products:**  
Stainless steel series, nickel base alloy, titanium alloy etc.,

**Equipment parameter:**  
piercing force 25MN



挤压机  
Extruding press

装备：  
挤压机

主要产品：  
挤压不锈钢系列、镍基合金、钛合金等及异形材

装备参数：  
挤压力60MN  
成品外径： $\phi 48\sim 325\text{mm}$   
成品长度：5~25m

**Equipment:**  
Extruding press

**Main products:**  
Extrude stainless steel series, nickel base alloy, titanium alloy, etc, heteromorphism materials.

**Equipment parameter:**  
Extrusion force 60MN  
Outside diameter:  $\phi 48\sim 325\text{mm}$   
Billet length: 5~25m



## 特殊合金钢管设备 Special alloy tube equipment



LG 系列冷轧管机  
LG series cold pilger mill

**装备:**  
LG系列冷轧管机

**装备参数:**  
成品外径 $\phi 14\sim 219\text{mm}$ , 壁厚 $0.8\sim 25\text{mm}$

**Equipments:**  
LG series cold pilger mill

**Equipment parameter:**  
Outside diameter of the finished steel tube is  $\phi 14\sim 219\text{mm}$ , Wall thickness is  $0.8\sim 25\text{mm}$



固溶炉  
Solution Heat Treatment

**装备:**  
固溶炉

**装备参数:**  
固溶处理外径: $\phi 20\sim 250\text{mm}$

**Equipments:**  
Solution Heat Treatment Furnace

**Equipment parameter:**  
Pipe solution treatment outside diameter: $\phi 20\sim 250\text{mm}$



矫直机系列  
Straightening machines series

:  
机系列  
**参数:**  
规格 $\phi 1\sim 325\text{mm}$

**Equipments:**  
Straightening machines series

**Equipemnt parameter:**  
Straightening standard  $\phi 1\sim 325\text{mm}$



抛光机  
Polishing machine

**装备:**  
抛光机

**装备参数:**  
抛光规格:  $\phi 10\sim 250\text{mm}$

**Equipments:**  
Polishing machine

**Equipment parameter:**  
Polishing diameter: $\phi 10\sim 250\text{mm}$



无损检测  
NDT

**装备:**  
无损检测

**检测内容:**  
超声、纵伤、横伤, 分层检测, 测厚, 管端盲检, 涡流检测

**Equipments:**  
NDT

**detection content:**  
Ultrasonic inspection, vertical injury, horizontal injury, thickness measuring, pipe end blind technique, Eddy current testing.



## 核电U型管设备

### Nuclear power U-shape pipe equipment



机  
KPW50LC high speed tube press

**装备:**

KPW50LC 高速轧管机

**装备参数:**

成品外径:  $\phi 14 \sim 45\text{mm}$ , 壁厚:  $0.8 \sim 4\text{mm}$

**Equipments:**

KPW50LC high speed tube press

**Equipment parameter:**

Outside diameter :  $\phi 14 \sim 45\text{mm}$

Wall thickness :  $0.8 \sim 4\text{mm}$



联合探伤机组  
Unite fault detection unit

**装备:**

联合探伤机组

**检测内容:**

超声波检测(纵、横伤)、涡流检测、外径、壁厚及长度测量

**Equipment:**

Unite fault detection unit

**Detection content:**

ultrasonic Detection (vertical, horizontal injury), eddy current testing, outside diameter, wall thickness and length measurement



真空炉  
Vacuum Furnace

**装备:**

真空炉

**装备参数:**

外径:  $\phi 12 \sim 25.4\text{mm}$

长度: 最长29m

**Equipment:**

Vacuum Furnace

**Equipment parameter:**

Outside diameter :  $\phi 12 \sim 25.4\text{mm}$

length: max 29m



氢气保护炉  
Hydrogen protection furnace

**装备:**

氢气保护炉

**装备参数:**

处理钢管外径:  $\phi 12 \sim 38\text{mm}$

**Equipment:**

Hydrogen protection furnace

**Equipemnt parameter:**

Outside diameter:  $\phi 12 \sim 38\text{mm}$



精密弯管机  
Precision tube bender

**装备:**

精密弯管机

**装备参数:**

弯曲半径:  $R60 \sim 1900\text{mm}$

**Equipments:**

Precision tube bender

**Equipment parameter:**

Bending radius:  $R60 \sim 1900\text{mm}$





## 产品标准

Products Standard





## 航空航天用管 Pipe for aero-space area

### 碳结、合结无缝钢管 Carbon, alloy structure seamless pipe

- **用途:** 本产品包括航空导管用 20A 薄壁无缝钢管, 航空空心铆钉用 18A 薄壁无缝钢管, 航空用结构钢薄壁钢管和航空结构用厚壁无缝钢管。
- **Usage:** This product includes 20A thin wall seamless pipe used for aviation pipe, 18A thin wall seamless pipe used for aviation hollow rivet, structural iron thin wall pipe used in aviation area and thick wall seamless pipe used in aviation structure.
- **订货标准 Order norm:** YB/T681-1997、YB/T679-1997、GJB2609-96、GJB2608A-2008。
- **产品规格组距 Product standard group interval:**

GJB2609-96(原 original YB680-71) 钢管规格 pipe specification:  $\phi 4\sim 108\times 0.5\sim 7\times 1000\sim 7000\text{mm}$ 。

GJB2608-96(原 original YB676-73) 钢管规格按 GB/T8162 的规定执行 (壁厚大于 2.5mm) pipe specification should in accordance with GB/T 8162 provision。

YB/T681-1997 和 YB/T679-1997 钢管规格见下表。

外径×壁厚 outside diameter×wall thickness (mm) YB/T681-1997 (原 original YB681-71)							
4×0.4	6×1	15×1	26×1	38×1	9×1.5	38×1.5	12×2.5
10×0.5	7×1	16×1	27×1	42×1	11×1.5	43×1.5	32×2.5
16×0.5	8×1	18×1	30×1	6.25×1.25	12×1.5	9×1.8	
20×0.5	10×1	20×1	32×1	6×1.4	20×1.5	8×2	
25×0.5	11×1	22×1	34×1	8×1.4	22×1.5	12×2	
10×0.8	12×1	24×1	35×1	7×1.5	23×1.5	16×2	
5×1	14×1	25×1	37×1	8×1.5	35×1.5	10×2.5	
外径×壁厚 outside diameter×wall thickness (mm) YB/T679-1997 (原 original YB681-71)							
3×0.5	6×0.5	5×0.75	5×1	8×1	7×1.5	20×1.5	10×2.5
4×0.5	7×0.5	10×0.75	6×1	10×1	14×1.5	6×1.75	12×2.5
5×0.5	8×0.5	4×1	7×1	12×1	16×1.5	8×2.5	
注: 根据用户需要可生产上表以外规格的钢管。 Note: According to the requirement of the customers, we can produce the pipe which standard is not mentioned above.							

主要钢种(牌号)的化学成分和性能 Chemical composition and performance of main steel grade (trademark)

标准 standard	钢号 grade	化学成分 chemical composition (Wt%)						力学性能 mechanical property	
		C	Si	Mn	Cr	Ni	Cu	Rm (MPa)	A (%)
YB/T681-1997	20A	0.17-0.24	0.17-0.37	0.35-0.65	≤0.30	≤0.30	≤0.25	≥390	≥20
YB/T679-1997	18A	0.15-0.22	0.17-0.37	0.35-0.65	≤0.30	≤0.30	≤0.25	≤470	≥20
GJB2609-96	20A	0.17-0.24	0.17-0.37	0.35-0.65	≤0.30	≤0.30	≤0.25	≥390	≥20
	30CrMnSiA	0.28-0.34	0.90-1.20	0.80-1.10	0.80-1.10	≤0.40	≤0.25	退火 annealed: ≥490 正火加回火 QT: 685-885	退火 annealed: ≥18 正火加回火 QT: ≥18
GJB2608A-2008	30CrMnSiA	0.28-0.34	0.90-1.20	0.80-1.10	0.80-1.10	≤0.30	-	≥1080	≥10

全国最大的碳结、合结航空钢管生产基地。

The biggest national carbon, alloy structure aviation pipe production base.

产品获国家国防科工委和冶金部颁发的奖励证书。

Product Gains the certificate rewarded by State Commission of Science and Technology for National Defense Industry and Ministry of Metallurgical Industry.

碳结、合结航空钢管国军标起草负责单位。

Carbon, alloy structure aviation pipe GJB responsible department.







## 航空航天用管 Pipe for aero-space area

### 不锈钢无缝钢管 Stainless seamless pipe

- 用途: 本产品适用于制造各类歼击机、强击机、轰炸机、运输机、直升机、教练机的燃油、润滑油和液压系统导管。
- **Usage:** this product applied for manufacturing fuel, lubricant and hydraulic system pipe for all kinds of fighter plane, attack aircraft, bomber, transporter, helicopter and training plane.
- 订货标准 **Order norm:** GJB2296A (原 original YB678-71)。
- 可供规格 **Offer specification:** 外径 outside diameter 4.0~50mm, 壁厚 wall thickness 0.5~2mm, 长度 length 1000~7000mm。

### 生产规格 Production specification

外径×壁厚 outside diameter×wall thickness (mm)							
4×0.5	8×0.65	25×0.8	6.5×1	20×1	34×1	16×1.25	28×1.5
5×0.5	10×0.7	6×0.85	8×1	22×1	35×1	18×1.25	30×1.5
6×0.5	10×0.75	8×0.85	9×1	24×1	36×1	50×1.25	33×1.5
8×0.5	12×0.75	9.5×0.85	10×1	25×1	38×1	8×1.5	35×1.5
10×0.5	16×0.75	13×0.85	12×1	26×1	44×1	9×1.5	38×1.5
12×0.5	20×0.75	12×0.9	13×1	27×1	8×1.1	10×1.5	43×1.5
14×0.5	6×0.8	19×0.9	14×1	28×1	12×1.1	12×1.5	7.5×1.75
25×0.5	8×0.8	7.7×0.95	15×1	29×1	15×1.1	13×1.5	10×2
6×0.6	16×0.8	5×1	16×1	30×1	14×1.2	16×1.5	12×2
9×0.6	22×0.8	6×1	18×1	32×1	8×1.25	27×1.5	20×2

注: 根据用户需要可生产上表以外规格的钢管。

**Note:** According to the requirement of the customers, we can produce the pipe which standard is not mentioned above.

### 主要钢种(牌号)的化学成分和性能 Chemical composition and performance of main steel grade (trademark)

牌号 trademark	化学成分 chemical composition							力学性能 mechanical property		
	C	Si	Mn	P	S	Ni	Cr	Ti	Rm	A
	Wt%							MPa	%	
1Cr18Ni9Ti	≤0.12	≤0.80	≤2.00	≤0.035	≤0.025	8.00-11.00	17.00-19.00	5(C%-0.02)-0.80	≥550	≥40
0Cr18Ni10Ti	≤0.08	≤1.00	≤2.00	≤0.035	≤0.025	9.00-12.00	17.00-19.00	≥5C%	≥520	≥40
0Cr18Ni9	≤0.07	≤1.00	≤2.00	≤0.035	≤0.025	8.00-11.00	17.00-19.00	-	≥520	≥35

全国最大的不锈钢航空钢管生产基地。The biggest national stainless aviation pipe production base

产品获国家国防科工委和冶金部颁发的奖励证书。

Product Gains the certificate rewarded by State Commission of Science and Technology for National Defense Industry and Ministry of Metallurgical Industry.

不锈钢航空管国军标起草负责单位。Stainless aviation pipe GJB responsible department

## 高温合金无缝管 High-temperature alloy seamless pipe

- 用途：本产品有优良的高温抗氧化性，高的热强性。用于燃气导管，加力燃烧室尾喷管，航天用摇摆软管、仪表用管等。
- **Usage:** This product has excellent inoxidability in high temperature and high heat resistance, which is used for fuel gas pipe, jet nozzle of tailpipe chamber, waver tube used in aerospace and pipe used in meter etc.
- 订货标准**Order norm:** GB/T15062、GJB2297、GJB5060。
- 可供规格**Offer specification:** 外径outside diameter 4~76mm, 壁厚wall thickness 0.2~7mm。

### 化学成分 (Wt%) Chemical composition

牌号 trademark	C	Cr	Ni	Mo	Al	Ti	Fe	Mn	Si	P	S	其它 other
GH1140	0.06-0.12	20.0-23.0	35.0-40.0	2.00-2.50	0.20-0.60	0.70-1.20	余 basic	≤0.70	≤0.80	≤0.025	≤0.015	W:1.40-1.80 Ce≤0.050
GH3030	≤0.12	19.0-22.0	余 basic	—	≤0.15	0.15-0.35	≤1.5	≤0.70	≤0.80	≤0.030	≤0.020	—
GH3039	≤0.08	19.0-22.0	余 basic	1.80-2.30	0.35-0.75	0.35-0.75	≤0.3	≤0.40	≤0.80	≤0.020	≤0.012	Nb:0.90-1.30
GH3600	≤0.10	14.0-17.0	余 basic	—	≤0.35	≤0.50	6.0-10.0	≤1.00	≤0.50	≤0.020	≤0.005	Nb≤1.00
GH4169	≤0.08	17.0-21.0	50.0-55.0	2.8-3.3	0.2-0.6	0.65-1.15	余 basic	≤0.035	—	≤0.015	≤0.015	B≤0.006 Nb:4.75-5.50

### 主要钢种(牌号)的力学性能 mechanical property of main steel grade (trademark)

GH3030, GH1140	Rm≥590 MPa	A≥35%
GH3039	Rm≥635MPa	A≥35%
GH3600	Rm≥550 MPa, Rp0.2≥240 MPa	A≥30%
GH4169	Rm≤1070 MPa, Rp0.2≤655 MPa	A≥30%



## 核电用无缝管 Seamless pipe in nuclear power

- **用途:** 用于各种核反应堆的蒸汽发生器、燃料组件、堆内构件、驱动机构、换热器等一、二、三级用管和输送管道。
- **Usage:** Applied for pipe and transfer piping of all kinds of vapour generator, fuel subassembly, in-pile part and actuating mechanism etc. in nuclear reactor.
- **订货标准 Order norm:** GB13296、GB/T14976、RCCM M4105、ASME SB163、协议等 protocol etc,
- **可供规格 Offer specification:** 外径 outside diameter 8~325mm, 壁厚 wall thickness 0.5~40mm

主要钢种(牌号)的化学成分 Chemical composition of main steel grade (trademark)

牌号 trademark	标准 standard	化学成分 chemical composition											
		Ni	Cr	Fe	Mn	C	Si	S	P	Al	Ti	Cu	其它 others
0Cr18Ni9	GB13296 GB/T14976	8.0 - 11.0	17.0 - 19.0	余 bal	≤2.0	≤0.07	≤1.00	≤0.030	≤0.035	-	-	-	-
00Cr19Ni10	GB13296 GB/T14976	8.0 - 12.0	18.0 - 20.0	余 bal	≤2.0	≤0.030	≤1.00	≤0.030	≤0.035	-	-	-	-
0Cr17Ni12Mo2	GB13296 GB/T14976	11.0 - 14.0	16.0 - 18.5	余 bal	≤2.0	≤0.08	≤1.00	≤0.030	≤0.035	-	-	-	-
00Cr17Ni14Mo2	GB13296 GB/T14976	12.0 - 15.0	16.0 - 18.0	余 bal	≤2.0	≤0.03	≤1.00	≤0.030	≤0.035	-	-	-	-
00Cr25Ni35AlTi	协议 protocol	34.0 - 37.0	24.0 - 26.5	余 bal	0.5 - 1.5	≤0.030	0.30 - 0.70	≤0.015	≤0.015	0.15 - 0.45	0.15 - 0.60	≤0.50	Co ≤ 0.05 N ≤ 0.03
UNS N08800	ASME SB-163	30.0 - 35.0	19.0 - 23.0	≥ 39.5	≤ 1.5	≤ 0.10	≤ 1.00	≤ 0.015	-	0.15 - 0.60	0.15 - 0.60	≤ 0.75	-
UNS N06600	ASME SB-163	≥ 72.0	14.0 - 17.0	6.0 - 10.0	≤ 1.0	≤ 0.15	≤ 0.50	≤ 0.015	-	-	-	≤ 0.5	-
690 (NC30Fe)	RCCM M 4105	≥ 58.0	28.0 - 31.0	8.0 - 11.0	≤ 0.5	0.01 - 0.03	≤ 0.50	≤ 0.010	≤ 0.015	≤ 0.50	≤ 0.50	≤ 0.50	Co ≤ 0.018 Nb ≤ 0.10 B ≤ 0.003 N ≤ 0.05
690 (UNS N06690)	ASMESB163	≥ 58.0	27.0 - 31.0	7.0 - 11.0	≤ 0.5	≤ 0.05	≤ 0.50	≤ 0.015	-	-	-	≤ 0.5	-





## 电站锅炉用无缝钢管 Seamless tube for station boiler

- 用途：适用于制造220MW、250MW、300MW、600MW、1000MW等大型电站锅炉用的过热器、再热器等用管
- **Usage:** Applied to manufacture the pipe for overheater, reheater and so on of 220MW、250MW、300MW、600MW, 1000MW etc. large scale station boiler
- 订货标准**Order norm:** GB5310、GB13296、ASME SA-213、ASTMA213、JIS3463等国内外标准etc. domestic and overseas standard.
- 可供规格**Offer specification:** 外径outside diameter 32~89mm, 壁厚wall thickness 3.5~15mm

主要钢种(牌号)的化学成分和性能 Chemical composition and performance of main steel grade (trademark)

牌号 trademark (标准) (standard)	化学成分 chemical composition								力学性能 mechanical property		
	C	Mn	Si	Cr	Ni	S	P	其它 others	Rm	Rp0.2	A
	Wt%								MPa	MPa	%
1Cr19Ni9 (GB5310)	0.04 - 0.10	≤2.0	≤1.0	18.0 - 20.0	8.0 - 11.0	≤0.030	≤0.035	-	≥ 520	≥ 206	≥ 35
SUS304HTB (JISG3463)	0.04 - 0.10	≤2.0	≤0.75	18.0 - 20.0	8.0 - 11.0	≤0.030	≤0.040	-	≥ 520	≥ 206	≥ 35
TP304H (ASME SA-213)	0.04 - 0.10	≤2.0	≤0.75	18.0 - 20.0	8.0 - 11.0	≤0.030	≤0.040	-	≥ 520	≥ 205	≥ 35
1Cr18Ni11Ti (GB13296)	0.04 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.030	Ti: ≥4C%~0.60%	≥ 520	≥ 205	≥ 35
SUS321HTB (JISG3463)	0.04 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.040	Ti: ≥4C%~0.60%	≥ 520	≥ 206	≥ 35
TP321H (ASME SA-213)	0.04 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.040	Ti: ≥4C%~0.60%	≥ 515	≥ 205	≥ 35
1Cr19Ni11 Nb (GB5310)	0.04 - 0.10	≤2.0	≤1.0	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.030	Nb+Ta ≥ 8C%~1.00%	≥ 520	≥ 205	≥ 35
SUS347HTB (JISG3463)	0.04 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.030	Nb ≥8C%~1.00%	≥ 520	≥ 206	≥ 35
TP347H (ASME SA-213)	0.04 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.040	Nb+Ta ≥ 8C%~1.00%	≥ 515	≥ 205	≥ 35
TP347HFG (ASME SA-213)	0.06 - 0.10	≤2.0	≤0.75	17.0 - 20.0	9.0 - 13.0	≤0.030	≤0.040	Nb+Ta ≥ 8C%~1.00%	≥ 550	≥ 205	≥ 35
S30432 (ASME SA-213)	0.07 - 0.13	≤1.0	≤0.30	17.0 - 19.0	7.5 - 10.5	≤0.010	≤0.030	-	≥ 590	≥ 235	≥ 35
S31042 (ASME SA-213)	0.04 - 0.10	≤2.0	≤1.00	24.0 - 26.0	19.0 - 22.0	≤0.030	≤0.045	-	≥ 655	≥ 295	≥ 30

正在研制开发700°C超超临界火电站用UNS N06617和UNS N07740等新型镍基合金高压锅炉管

注：根据用户需要可生产上表以外的牌号。

**Note:** According to the requirement of the customers, we can produce the pipe which standard is not mentioned above.



## 石油化工用无缝钢管 Seamless pipe in petrochemical industry area

### 普通奥氏体不锈钢无缝管 Common austenitic stainless steel seamless pipe

- 用途：适用于锅炉、热交换器、冷凝器、石油裂化管以及流体输送用普通奥氏体不锈钢无缝管
- **Usage:** applied to common austenitic stainless steel seamless pipes which are used in boiler, heat exchanger, condenser, cracking tube and fluid transportation .
- 订货标准**Order norm:** GB/T14976、GB13296、GB9948、ASME SA213、ASTM A213、JIS G3463、EN 10216等etc,
- 可供规格**Offer specification:** 外径outside diameter 6~325mm, 壁厚wall thickness 0.5~40mm



牌号 trademark	化学成分 chemical composition								力学性能 mechanical property		
	C	Si	Mn	P	S	Ni	Cr	其他 others	Rm	Rp0.2	A
									MPa	MPa	%
0Cr18Ni9	≤0.07	≤1.0	≤2.0	≤0.035	≤0.030	8.0 - 11.0	17.0 - 19.0		≥520	≥205	≥35
1Cr18Ni9	0.04 - 0.10	≤1.0	≤2.0	≤0.035	≤0.030	8.0 - 11.0	18.0 - 20.0		≥520	≥205	≥35
1Cr18Ni9Ti	≤0.12	≤1.0	≤2.0	≤0.035	≤0.030	8.0 - 11.0	17.0 - 19.0		≥550	≥205	≥40
00Cr19Ni10	≤0.03	≤1.0	≤2.0	≤0.035	≤0.030	8.0 - 12.0	18.0 - 20.0	Ti:5(C%-0.02)~0.80	≥480	≥175	≥35
0Cr23Ni13	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	12.0 - 15.0	22.0 - 24.0		≥520	≥205	≥35
2Cr23Ni13	≤0.20	≤1.0	≤2.0	≤0.035	≤0.030	12.0 - 15.0	22.0 - 24.0		≥520	≥205	≥35
0Cr25Ni20	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	19.0 - 22.0	24.0 - 26.0	Ti:5C%~0.70	≥520	≥205	≥35
2Cr25Ni20	≤0.25	≤1.0	≤2.0	≤0.035	≤0.030	19.0 - 22.0	24.0 - 25.0		≥520	≥205	≥35
0Cr18Ni10Ti	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	9.0 - 12.0	17.0 - 19.0	Ti:≥5C%	≥520	≥205	≥35
1Cr18Ni11Ti	0.04 - 0.10	≤0.75	≤2.0	≤0.035	≤0.030	9.0 - 13.0	17.0 - 20.0	Ti:4C%~0.60	≥520	≥205	≥35
0Cr18Ni11Nb	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	9.0 - 13.0	17.0 - 19.0	Nb:≥10C%	≥520	≥205	≥35
1Cr19Ni11Nb	0.04 - 0.10	≤1.0	≤2.0	≤0.035	≤0.030	9.0 - 13.0	17.0 - 20.0	Nb+Ta:≥8C%~1.00	≥520	≥205	≥35
0Cr17Ni12Mo2	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	10.0 - 14.0	16.0 - 18.5		≥520	≥205	≥35
1Cr17Ni12Mo2	0.04 - 0.10	≤0.75	≤2.0	≤0.035	≤0.030	11.0 - 14.0	16.0 - 18.0	Mo:2.0~3.0	≥520	≥205	≥35
00Cr17Ni14Mo2	≤0.03	≤1.0	≤2.0	≤0.035	≤0.030	12.0 - 15.0	16.0 - 18.0	Mo:2.0~3.0	≥480	≥175	≥35
0Cr19Ni13Mo3	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 15.0	18.0 - 20.0	Mo:2.0~3.0	≥520	≥205	≥35
00Cr19Ni13Mo3	≤0.03	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 15.0	18.0 - 20.0	Mo:3.0~4.0	≥480	≥175	≥35
0Cr18Ni12Mo2Ti	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 14.0	18.0 - 20.0	Ti:5(C%-0.70) Mo:3.0~4.0	≥530	≥205	≥35
1Cr18Ni12Mo2Ti	≤0.12	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 14.0	16.0 - 19.0	Ti:5(C%-0.02)~0.80 Mo:1.8~2.5	≥530	≥205	≥35
0Cr18Ni12Mo3Ti	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 14.0	16.0 - 19.0	Ti:5C%~0.70 Mo:1.8~2.5	≥530	≥205	≥35
1Cr18Ni12Mo3Ti	≤0.12	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 14.0	16.0 - 19.0	Ti:5(C%-0.02)~0.80 Mo:2.5~3.5	≥530	≥205	≥35
0Cr18Ni12Mo2Cu2	≤0.08	≤1.0	≤2.0	≤0.035	≤0.030	11.0 - 14.0	17.0 - 19.0	Cu:1.0~2.5 Mo:2.5~3.5	≥520	≥205	≥35





## 石油化工用无缝钢管 Seamless pipe in petrochemical industry area

### 高钼奥氏体不锈钢管 High-Mo austenitic stainless steel tube

- **用途:** 具有良好的抗点蚀、缝隙腐蚀、应力腐蚀性能。应用于石油化工行业醋酸丁酯、醋酸、甲酸、对苯二酸、聚氯乙烯等介质环境；无机化工的硫酸、硫酸铁、纯碱、磷酸等介质环境；原油精炼中的原油脱盐、常减压蒸馏介质环境；采矿、冶金工业中铜电解、铝阳极处理、酸洗槽等介质环境；用于制造环境保护中各种煅烧炉和电厂烟道器、洗涤器，以及海水、半咸水和污染水的冷却器等。
- **Usage:** Good resistance to corrosive pitting, crevice corrosion and stress corrosion cracking. This product applied for butyl acetate, acetic acid, formate acid, terephthalate acid and polyvinyl chloride environment of petrochemical engineering; sulfuric acid, iron sulfate, pure caustic soda, phosphoric acid environment of inorganic chemical industry; crude oil desalting, atmospheric and vacuum distillation environment of crude oil refine; mineral extraction, copper electrolytic refine, aluminium node treatment and descaling bath environment; calcinator and funnel flue device of electricity generating station, cooler of saline water, brackish water and polluter water.
- **订货标准:** ASME SB-677、ISO 15156-3、ASTM A959、协议
- **Order norm:** ASME SB-677, ISO 15156-3, ASTM A959 etc.
- **可供规格:** 外径 16-219mm, 壁厚 1-20mm
- **主要钢种牌号的化学成分和性能** Chemical composition and performance of main steel grade (trademark)

牌号 grade	UNS 钢号	常用名称	化学成分 (Wt%) chemical composition										力学性能		
			C	Cr	Ni	Mn	Si	P	S	Mo	N	Cu	Rm MPa	Rp0.2 MPa	A %
00Cr20Ni18Mo6N	S31254	254Smo	≤0.020	19.5-20.5	17.5-18.5	≤1.00	≤0.8	≤0.030	≤0.010	6.0-6.5	0.18-0.22	0.50-1.00	≥650	≥300	≥35
00Cr22Ni24Mo6N	N08367	AL6XN	≤0.030	20.0-22.0	23.5-25.5	≤2.00	≤1.00	≤0.040	≤0.04	6.0-7.0	0.18-0.25	≤0.75	≥690	≥365	≥30
00Cr21Ni25Mo4.5Cu	N08904	904L	≤0.020	19.0-23.0	23.0-28.0	≤2.00	≤1.00	≤0.045	≤0.035	4.0-5.0		1.00-2.00	≥490	≥220	≥35

## 特种不锈钢无缝管 Special seamless stainless tube

### 尿素用不锈钢管 Urea stainless tube

- **用途:** 适用于制造尿素生产装置的汽提塔、自汽提一分塔、高压一段分离器、CO<sub>2</sub>压缩机三段冷却塔、高压管路等设备。
- **Usage:** applied in manufacturing the devices as air stripping towwe, high pressure seperator, CO<sub>2</sub> compressor cooling tower and high pressure piping,etc.
- **订货标准:** GB13296、ASME SA-213、ASTM A213、JIS G3463等国内外标准，企标
- **Standard:** GB13296、ASME SA-213、ASTM A213、JISG3463, and enprise standards, plant protocol, etc.
- **可供规格Size:** 外径outside diameter 16~219mm，壁厚wall thickness 1~20mm。

### 主要钢种(牌号)的化学成分和性能 Chemical composition and performance of main grade(trademark)

牌号 trademark	化学成分 chemical composition									力学性能 echanical property		
	C	Mn	Si	Cr	Ni	Mo	N	S	P	Rm	Rp0.2	A
	Wt%									MPa	MPa	%
316Lmod	≤0.03	≤2.0	≤1.0	17.0 - 18.5	13.0 - 15.0	2.2 - 3.0	≤0.22	≤0.030	≤0.030	≥ 520	≥ 206	≥ 35
2RE69 (00Cr25Ni22Mo2N)	≤0.02	≤1.5	≤0.4	24.0 - 26.0	21.0 - 23.0	2.0 - 3.0	0.10 - 0.14	≤0.015	≤0.020	≥ 539	≥ 225	≥ 30
0Cr17Mn13Mo2N (A4)	≤0.08	12.0- 15.0	≤0.7	16.5 - 18.5	-	1.8 - 2.2	0.20 - 0.30	≤0.020	≤0.045	≥ 736	≥ 441	≥ 30

注：根据用户需要可生产上表以外的牌号。

**Note:**According to the requirement of the customers , we can produce the pipe which standard is not mentioned above.

1991年起国家冶金部主持立项开发尿素工业高压系统设备及工艺管线级不锈钢管材研究，我厂是主要参加单位之一。

Since 1991, ministry of metallugical industry of PRC set up the research project on urea industrial seamless tube material of high pressure system and process line, and SPECIAL STEEL was one of the partipants.

1997年5月，国家冶金部召开了“尿素高压设备和工艺管线用尿素级不锈钢技术开发鉴定会”我厂研制的00Cr25Ni22Mo2N钢管通过鉴定。

In May of 1997, ministry of metallugical industry held the evaluation meeting on urea industrial seamless tube material of highpressure system and process line, steel grade 00Cr25Ni22Mo2N developed by SPECIAL STEEL was certified.

1998年《尿素工业高压系统设备及工艺管线用尿素级不锈钢管材的开发》获上海市科技进步二等奖。

“Development of urea industrial seamless tube material of high pressure system and process line” won the second prize of Shanghai Technology Innovation Award.



## 石油化工用无缝钢管 Seamless pipe in petrochemical industry area

### 特种不锈钢无缝管 Special seamless stainless tube

#### 双相不锈钢管 Duplex stainless tube

- **用途:** 适用于原油脱盐装置中的热交换器和管道; 甲醇生产制作管式反应器的催化剂管束; 氯乙烯生产制作预冷凝器; 纸浆和造纸工业硫酸蒸煮液预热器管束; 陆上和海上油气工业的输送管道和集气管; 海上石油平台的热交换器、水处理和供水系统、消防系统、喷水系统、稳水系统; 化工系统加工和运输各种化学品的压力容器、管道、罐和热交换器。
- **Usage:** heat exchanger and tube on oil desalt device, catalyst tubebank of tubular reactor for methanol manufacturing, precondenser for VCM, convey pipe and header of land/ocean oil/gas industry; heat exchanger, water treatment and supply system, fire extinguishing system, spraying system and water stabilizing system of onsea petrol platform; pressure vessel, chands, tanks, and heat exchanger used in chemicals process and transportation in chemical industry.
- **综合性能 general characteristic:**  
 具有高的强度与韧性, 综合机械性能好。High intensity and tenacity, excellent mechanical performance.  
 良好的抗点蚀及缝隙腐蚀能力。Good resistance to corrosive pitting and crevice corrosion.  
 良好的抗应力腐蚀破裂能力。Good resistance to stress corrosion craking.  
 高的抗均匀腐蚀能力。Good resistance to uniform corrosion.  
 导热系数大, 线膨胀系数小。The material has bigger heat conductivity, and smaller linear expxpansibility.  
 良好的可焊性, 热裂倾向小。Good welding performance, small tendency of hot cracking.

#### ● 牌号对照 grade

中国 China		美国 US	瑞典 SW	德国 DE
GB/T21833 钢号	原习惯用钢号			
022Cr19Ni5Mo3Si2N	00Cr18Ni5Mo3Si2	S31500	3RE60	1.4417
022Cr22Ni5Mo3N	00Cr22Ni5Mo3N	S31803	—	1.4462
022Cr23Ni5Mo3N	00Cr22Ni5Mo3N	S32205	SAF2205	—
022Cr25Ni7Mo4N	00Cr25Ni7Mo4N	S32750	SAF2507	1.4410

#### 主要钢种(牌号)的化学成分 Chemical composition of main steel grade (trademark)

钢号 grade	化学成分 (Wt%) chemical composition									
	C	Mn	P	S	Si	Ni	Cr	Mo	N	Cu
022Cr19Ni5Mo3Si2N	≤0.030	1.2-2.0	≤0.030	≤0.030	1.4-2.0	4.30-5.20	18.0-19.0	2.50-3.00	0.05-0.10	—
022Cr22Ni5Mo3N	≤0.030	≤2.0	≤0.030	≤0.020	≤1.0	4.50-6.50	21.0-23.0	2.50-3.50	0.08-0.20	—
022Cr23Ni5Mo3N	≤0.030	≤2.0	≤0.030	≤0.020	≤1.0	4.50-6.50	22.0-23.0	3.00-3.50	0.14-0.20	—
022Cr25Ni7Mo4N	≤0.030	≤1.2	≤0.035	≤0.020	≤0.8	6.00-8.00	24.0-26.0	3.00-5.00	0.24-0.32	≤0.5



主要钢种(牌号)的力学性能 Mechanical property of main grade(trademark)

钢号 grade	Rm (MPa)	Rp0.2 (MPa)	A <sub>[50]</sub> %	HRC
022Cr19Ni5Mo3Si2N	≥630	≥440	≥30	≤30
022Cr22Ni5Mo3N	≥620	≥450	≥25	≤30
022Cr23Ni5Mo3N	≥655	≥485	≥25	≤30
022Cr25Ni7Mo4N	≥800	≥550	≥15	≤32

022Cr19Ni5Mo3Si2N 物理性能 Physical property

物理性能 physical property	温度 TEP (°C)						
	20	100	200	300	400	500	600
密度 density (g/cm <sup>3</sup> )	7.8	—	—	—	—	—	—
弹性模量 elasticration (KN/mm <sup>2</sup> )	200	185	177	167	—	—	—
线膨胀系数 CLTE (×10 <sup>-6</sup> /°C)	—	12.2	13.1	13.5	14	14.2	14.5
导热系数 heat conductivity (W/m·°C)	15	16	17	18	—	—	—
热容量 thermal capacity (J/kg·°C)	450	500	530	560	—	—	—
电阻率 specific resistance (μΩm)	800	850	900	1000	—	—	—

金相组织 Metallographic structure

固溶状态下的金相组织为铁素体 – 奥氏体双相, 其奥氏体含量为 40~60%, 不允许有 σ 相等脆性相析出。

Duplex of ferrite-austenite under solution condition, content of austenite is 40~60%, no brittleness precipitation of σ, etc.

产品标准 : GB/T21833-2008、ASTM A789/ASME SA789、ASTM A789/ASME SA790、企标等。

**Standard:** GB/T21833-2008, ASTM A789/ASME SA789, ASTM A789/ASME SA790, and enterprise standards, etc.

产品规格 **size:** 外径 (OD) 16~219 mm, 壁厚 (WTK) 1~20 mm。

国标 GB/T 21833-2008 奥氏体 – 铁素体型双相不锈钢无缝钢管, 起草负责单位

Our company drafted out and in charged of the GB/T 21833-2008 austenitic-ferritic duplex stainless steel seamless tube.

双相不锈钢 00Cr18Ni5Mo3Si2 钢管获国家科技进步一等奖

The duplex stainless steel 00Cr18Ni5Mo3Si2 tube gain the first award of National science and technology progress



## 石油化工用无缝钢管 Seamless pipe in petrochemical industry area

### 镍基合金无缝管 Nickel based alloy seamless tube

- **用途:** 具有优良的耐应力腐蚀性能和耐高温腐蚀性能, 对碱有高的抗蚀性, 其中镍铜、镍铬耐蚀合金分别在还原性介质及氧化性介质中具有良好的耐蚀性。应用于化学和石化工业以及海洋开发制造加热器、换热器、蒸发器、冷凝器及输送管线; 常规电厂、化工、石化工业中的换热器、蒸发器、过热器等。
- **Usage:** good stress etching and hot corrosion resistant performance, high resistance to alkali, ambrose alloy and nickle chromium alloy has good resistant performance in reductant and oxidant. Wildly used in manufacturing of heaters, heat exchangers, evaporators, condensator, overheaters in ocean developing industry as well as in chemical and petro industries, civil electric generating stations, etc.
- **订货标准 Standard:** ASTM B163、ASME SB163
- **可供规格 Size:** 外径(OD) 16~219mm, 壁厚(WTK) 1~20mm

### 主要钢种(牌号)的化学成分 Chemical composition of main grade (trademark)

牌号 trademark	化学成分 chemical composition									
	Ni	Cu	Fe	Mn	C	Si	S	Cr	Al	Ti
	Wt%									
UNS N08800	30.0-35.0	≤0.75	≥39.5	≤1.5	≤0.10	≤1.0	≤0.015	19.0-23.0	0.15-0.60	0.15-0.60
UNS N04400	≥63.0	28.0-34.0	≤2.5	≤2.0	≤0.30	≤0.5	≤0.024			
UNS N06600	≥72.0	≤0.5	6.0-10.0	≤1.0	≤0.15	≤0.50	≤0.015	14.0-17.0		
UNS N02200	≥99.0	≤0.25	≤0.40	≤0.35	≤0.15	≤0.35	≤0.010			
UNS N02201	≥99.0	≤0.25	≤0.40	≤0.35	≤0.02	≤0.35	≤0.010			

### 主要钢种(牌号)的力学性能 Mechanical property of main grade (trademark)

UNS N08800	Rm ≥ 517MPa	Rp0.2 ≥ 207MPa	A ≥ 30%
UNS N04400	Rm ≥ 483MPa	Rp0.2 ≥ 193MPa	A ≥ 35%
UNS N06600	Rm ≥ 552MPa	Rp0.2 ≥ 241MPa	A ≥ 30%
UNS N02200	Rm ≥ 379MPa	Rp0.2 ≥ 103MPa	A ≥ 40%
UNS N02201	Rm ≥ 345MPa	Rp0.2 ≥ 83MPa	A ≥ 40%

## 钛及钛合金无缝管 Ti and Ti alloy seamless tube

- 用途：对氯离子有优良的耐蚀性，适用于海洋舰船、石油化工、化学工程、生物医药。
- **Usage:** resistant to  $Cl^-$ , widely used in marine ships, petrochemical industry, chemical engineering, biological medicine and daily life.
- 订货标准 **Standard:** ASTM B861、ASTM B337、ASTM B338、GB/T3625、GB/T3624
- 可供规格 **Size:** 外径 (OD)6~89mm，壁厚 (WTK)0.5~10mm

### 主要钢种(牌号)的化学成分 Chemical composition of main grade (trademark)

牌号 trademark	化学成分 chemical composition								
	N	C	H	Fe	Al	V	残余元素 (每个) residual elements (each)	残余元素 (总计) residual elements (total)	Ti
	Wt%								
TA1(GR1)	≤0.03	≤0.08	≤0.015	≤0.20	≤0.1	≤0.4	-	-	余量 bal
TA2(GR2)	≤0.03	≤0.08	≤0.015	≤0.30	≤0.1	≤0.4	-	-	余量 bal
TA3(GR3)	≤0.05	≤0.08	≤0.015	≤0.30	≤0.1	≤0.4	-	-	余量 bal
TA18(GR9)	≤0.03	≤0.08	≤0.015	≤0.25	2.5-3.5	2.0-3.0	≤0.1	≤0.4	余量 bal

### 主要钢种(牌号)的力学性能 Mechanical property of main grade (trademark)

TA1 (GR1)	Rm≥240MPa	Rp0.2≥170MPa	A≥24%
TA2 (GR2)	Rm≥345MPa	Rp0.2≥275MPa	A≥20%
TA3 (GR3)	Rm≥450MPa	Rp0.2≥380MPa	A≥18%
TA18 (GR9)	Rm≥860MPa	Rp0.2≥725MPa	A≥10%





## 油气田开采用无缝钢管 Seamless tube in oil-gas field offtake

- 用途：适用于含氯离子、硫化氢、二氧化碳等腐蚀介质的油气田开采用油套管
- **Usage:** oil bushing resistant to  $Cl^-$ ,  $H_2S$ ,  $CO_2$  and other corrosion media in oil-gas offtake.
- 订货标准 **Standard:** ISO13680
- 可供规格：油管外径26.67~298.5mm，壁厚2.87~22.22mm；接箍按油管规格配套
- **Size:** oil pipe outside diameter 26.67~298.5mm, wall thickness 2.87~22.22mm; coupling will meet oil pipe.

### 主要钢种(牌号)的化学成分 Chemical composition of main grade (trademark)

牌号 grade	标准号 standard	化学成分 chemical components												
		Ni	Cr	Fe	Mn	Mo	C	Si	S	P	Al	Ti	Cu	其它 others
		Wt%												
S41426	ISO13680	4.5-6.5	11.5-13.5	余 surplus	≤0.5	1.5 -3.0	≤0.03	≤0.5	≤0.005	≤0.020	-	0.01- 0.5	-	V≤0.5
N08028	ISO13680	29.5- 32.5	26.0-28.0	余 surplus	≤2.5	3.0- 4.0	≤0.03	≤1.0	≤0.030	≤0.030	-	-	0.6- 1.4	
N08535	ISO13680	29.0- 36.5	24.0-27.0	余 surplus	≤1.0	2.5- 4.0	≤0.03	≤0.50	≤0.030	≤0.030	-	-	≤1.50	
N08135	ISO13680	33.0- 38.0	20.5-23.5	余 surplus	≤1.0	4.0- 5.0	≤0.03	≤0.75	≤0.030	≤0.030	-	-	≤0.70	W: 0.2-0.8
N08825	ISO13680	38.0- 46.0	19.5-23.5	余 surplus	≤1.0	2.5- 3.5	≤0.05	≤0.5	≤0.030	≤0.030	≤0.2	0.6- 1.2	1.5- 3.0	
N06985	ISO13680	余 surplus	21.0-23.5	18.0- 21.0	≤1.0	6.0- 8.0	≤0.015	≤1.0	≤0.030	≤0.040	-	-	1.5- 2.5	W≤1.5 Co≤5.0 Nb+Ta≤0.5

### 主要钢种(牌号)的力学性能 Mechanical property of main grade (trademark)

牌号 grade	钢级 class	交货状态 delivery condition	Rp0.2 (MPa)		Rm (MPa)	e* %	HRC	
			min	max	min	min	max	
S41426	80	热加工或 淬火加回火 (HF or QT)	552	655	621	b		27
	95	热加工或 淬火加回火 (HF or QT)	655	758	724	b		28
	110	热加工或 淬火加回火 (HF or QT)	758	965	793	b		32
N08028	110	冷加工强化 (CH)	758	965	793	11		35
	125	冷加工强化 (CH)	862	1034	896	10		37
	140	冷加工强化 (CH)	965	1103	1000	9		38
N08535	110	冷加工强化 (CH)	758	965	793	11		35
	125	冷加工强化 (CH)	862	1034	896	10		37
	140	冷加工强化 (CH)	965	1103	1000	9		38
N08135	110	冷加工强化 (CH)	758	965	793	11		35
	125	冷加工强化 (CH)	862	1034	896	10		37
	140	冷加工强化 (CH)	965	1103	1000	9		38
N08825	110	冷加工强化 (CH)	758	965	793	11		35
	125	冷加工强化 (CH)	862	1034	896	10		37
		冷加工强化 (CH)	965	1103	1000	9		38
N06985	110	冷加工强化 (CH)	758	965	793	11		35
	125	冷加工强化 (CH)	862	1034	896	10		37
	140	冷加工强化 (CH)	965	1103	1000	9		38

\* b :  $e=1944 \times A^{0.2} / Rm^{0.9}$

A: 基于规定的外径或者试样名义厚度和规定的壁厚而得到的拉伸试样的横截面积, A值取计算值或490mm<sup>2</sup>的较小者

A: Is the cross-sectional area of the tensile test specimen, expressed in square millimetres, based on the specified outside diameter or nominal specimen width and the specified wall thickness, or 490 mm<sup>2</sup>, whichever is smaller

N08028宝钢牌号BG2830; N06985宝钢牌号BG2250。



# 质量保证

Quality Guarantee

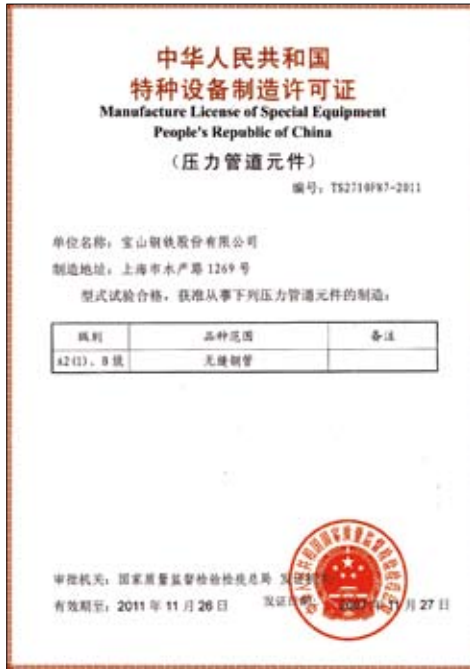


## 质量认证 Quality certificates

- 特钢事业部从1995年开始逐步按照ISO9001、AS9100B、GJB9001A、HAF003、ISO/TS16949标准以及顾客的特殊要求，建立航空航天、军工、核电及汽车质量管理体系，并形成一整套质量体系文件。
- 特钢事业部确定并运行的质量体系过程共有21个，包括：管理策划过程、管理评审过程、内部审核过程、纠正预防措施改进过程、数据分析和利用过程、顾客满意度监视和测量过程、需求识别和评审过程、设计和开发过程、生产过程、交付过程、服务过程、生产计划过程、设备和工装管理过程、文件管理过程、人力资源管理过程、采购和供方管理过程、产品防护过程、检验和试验管理过程、测量设备管理过程、标识和可追溯性管理过程、不合格品控制过程。
- 特钢事业部通过制定和落实质量目标、定期开展内部质量审核和管理评审等，持续改进质量体系。
- 特钢事业部的各类质量体系均通过了第三方的认证。
- Since 1995, Baosteel Special Steel Business Unit has established aviation and aerospace, military, nuclear and automotive quality management system and formed a complete set of quality system documents in accordance with ISO9001, AS9100B, GJB9001A, HAF003, ISO/TS16949 standard and specific requirements of customer
- Special Steel Business also determines and runs a quality system which has totally 21 processes, including: Management planning process, management review process, internal checking process, corrective and preventive measures to improve the process, data analysis and use processes, customer satisfaction monitoring and measurement process, needs identification and assessment process, the design and development process, production process, delivery process, service process, production planning process, equipment and tooling management processes, document management process, human resource management processes, procurement and supplier management processes, product protection, process, inspection and test management processes, measuring equipment management processes, identification and traceability management process and nonconforming product control process.
- Through the development and implementation of quality objectives, regularly carrying out internal quality checking and management reviews, etc., Special Steel Business Unit continues to improve the quality system
- All kinds of quality system had gotten certificates given by the third-party.



必维国际检验集团(ANAB)AS9100-B航空航天质量管理体系认证  
It has been certificated by ANAB:AS9100-B



宝钢无缝钢管许可证



中启计量体系认证中心  
ISO 10012:2003测量管理体系认证  
Certificate of conformity for measurement management systems, ISO 10012:2003;



中华人民共和国民用核安全设备制造许可证



中国新时代认证中心  
GJB9001A-2001军工质量管理体系认证  
It has been certified by China Xinshidai Quality System Certification Center, GJB9001A-2001;



## 质量检测 Quality examination



中国冶金质量认证中心ISO9001:2000质量管理体系认证  
It has been certified by China Metallurgy Quality System Certification Center  
ISO9001:2000 Quality Management System



中国商检质量认证中心ISO9001:2000质量管理体系认证  
ISO9001:2000 Quality Management system of China Commodity Inspection Quality  
Certification Center

化学检测 Chemical examination



电感耦合等离子体发射光谱仪  
ICP



AA300火焰原子吸收光谱仪  
AA300 FAES



EMIA-820V 红外碳硫分析仪  
EMIA-820V CS Analyzer



EMGA-620W氧氮联测仪  
EMGA-620W Oxygen and Nitrogen  
comparison Analyzer



AA600石墨炉原子吸收光谱仪  
AA600 Graphite Furnace Atomic  
Absorption Spectrophotometer



ARL4460光电直读光谱仪  
ARL4460 OES

## 质量检测 Quality examination

### 物理检测 Physical examination



50吨万能试验机  
50t universal tester



高温拉力机  
Hyperthermia tensile machine



硬度计  
Sclerometer



疲劳试验  
Fatigue test

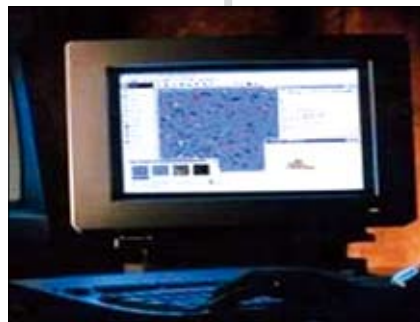


微机控制摆锤式冲击试验机  
Pendulum impact testing machine  
with micro computer control



电子蠕变试验机  
Creep testing machine

金相分析 Metallographic Analysis



金相图像分析系统  
Metallographic Analysis system



大型金相显微镜  
Large metallscope



金相自动磨样机  
Metallographic microsection machine





## 用户服务

Customer Service





## 技术支撑 Technical support

### 客户代表

是用户使用宝钢特钢产品的技术联络人，负责为用户提供选材咨询、订货、物流跟踪、货款结算、质量异议处理、使用技术指导、信息沟通等全方位服务。

### 产品工程师

来自宝钢特钢制造单元的资深工程师，为用户提供各类产品的生产、使用技术服务，并根据用户的特殊需求进行个性化的质量设计，与客户代表共同解决技术难题，必要时提供现场服务。

### 技术专家与首席工程师

来自宝钢特钢研究部门、制造单元的专业技术专家与首席工程师，针对用户和市场的需求，研发特钢新产品，并提供产品检测、腐蚀、焊接、热处理等用户技术服务。

### 产销研一体化小组

由宝钢特钢制造、销售、研发等各单元的骨干力量组成，以专业的团队方式解决用户使用及生产、研发方面的问题，提高宝钢特钢产品的市场竞争力。



### Sales representative

Technical contact person, to provide customer service concerning products advisory, order placing, logistic tracing, loan and accounts, objection handling, operation guide etc.

### Production engineer

Senior engineers from special steel division, to provide technical support concerning production and quality design; onsite service available if necessary

### Technique experts and chief engineer

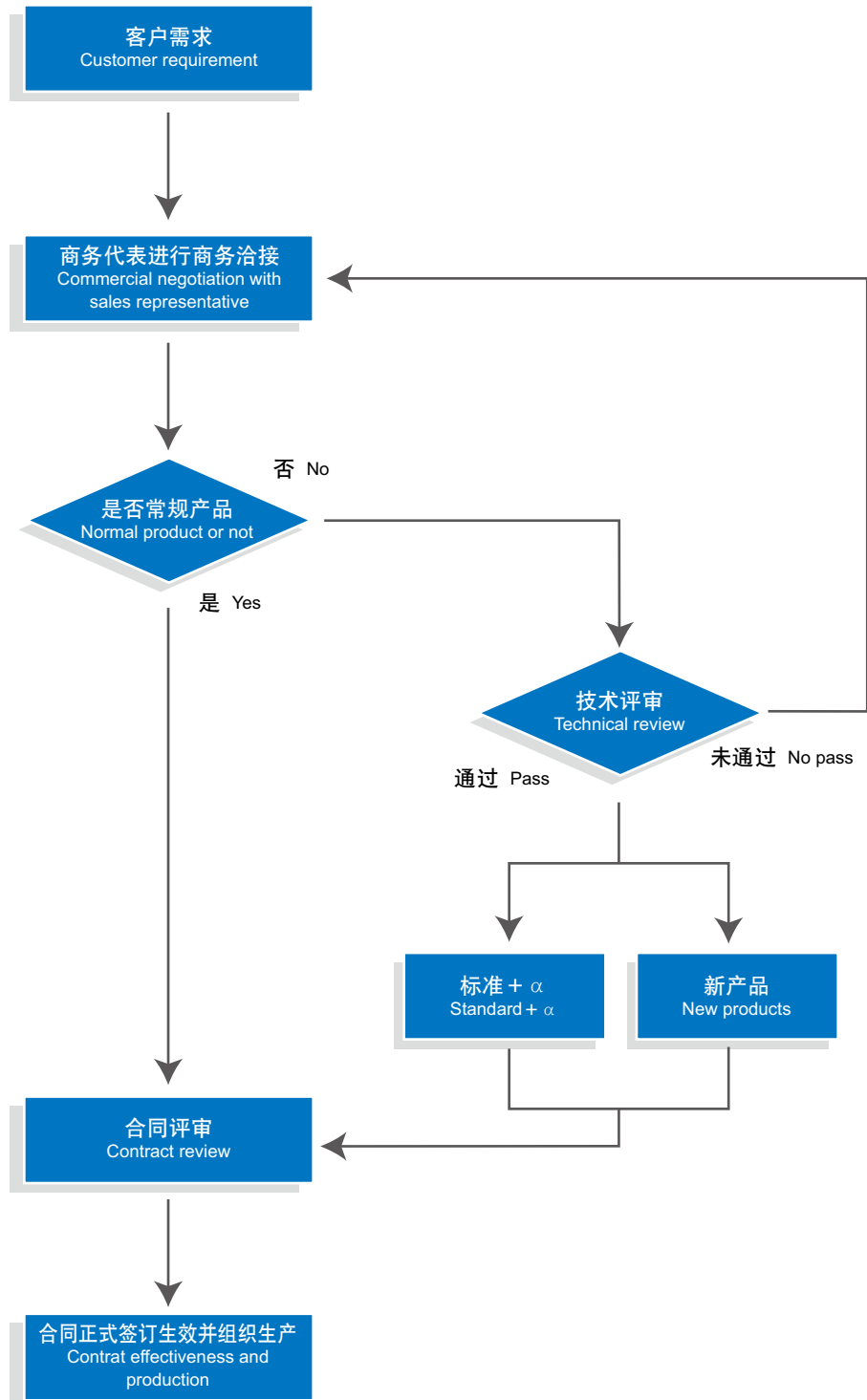
Researching on developing of new products to meet the requirements of the market; provide post service such as inspection, corrosion test, welding, heat treatment etc.

### Production, sales, research team (PSRT)

Consist of people from different departments of Production, sales, research; the team is to solve the problems of the customers on using, production and researching.

## 合同签订流程 Contract procedure

<http://www.baosteel.com>





## 异议处理 Objection handlings

### 1 产品投诉 Complaint



### 2 投诉受理 Acceptance



### 3 异议立案 Case Registration



### 4 实物确认 Identification of the Material in Kind



### 5 商务谈判 Business Negotiation



### 6 异议结案 Case Closed



### 7 整改反馈 Rectification - Feedback



### 8 异议处理回访 Visit After Settlement

一旦您在使用宝钢特钢产品中出现问题，请您将存在问题的产品尽量以供货状态保留，并在第一时间联系客户代表、商务代表或合同供货方。您的投诉将被及时反馈至宝钢特钢。投诉信息应包括合同号、交货量、异议量、问题描述、联系人、联系电话等内容。

In case of any problems related with products manufactured by Baosteel Special Steel Business Unit, the customer shall try his best to keep the problem product in delivery state as much as possible, and immediately contact Sales Representative, Business Representative, or the supplier of the contract indicating the contract number, quantity of delivery, quantity of the problem product, descriptions of the problem, full name of contact person and telephone number, etc. The complaint will be forwarded to related department of the Company in time.

我们接收到您的投诉后，客户代表或地区公司商务代表将会在第一时间对您的投诉进行初步确认，协助您解决问题。对于确系由宝钢特钢产品缺陷造成无法正常使用的情况，您的投诉将转入产品异议处理程序。

On receiving the complaint, Sales Representative or Business Representative will make a preliminary investigation on the complaint immediately and assist the user to solve the problem. In case the product can not be used because of defects, the complaint will be handled via claim handling procedure.

对于确系宝钢特钢产品缺陷造成无法正常使用的情况，经特钢事业部立案确认，启动异议处理流程。

Once it is confirmed by Baosteel Special Steel Business Unit that the product can not be used because of defects, the complaint will be registered for handling.

我们将在最短时间内派出服务人员到达现场，了解钢材使用情况，必要时进行相应取样检测和现场试验，与您充分沟通，共同对异议产生的原因进行判定达成一致意见。

Service personnel will be sent to the site in the shortest time to investigate the issue. Sampling and on-site test may be done, if necessary. Discussion with the customer will be held to reach the agreement on the causes of the problem.

在实物确认的基础上，根据异议责任判定达成的共识，宝钢特钢将与您进行友好协商，在确定异议理赔处理方案后，形成《产品异议处理表》并邮寄给您开具《进货退出及索取折让证明》。

Based on the identification of material in kind and agreement on the responsible party for the problem, consultation on claim settlement will be held in a friendly way to find a solution. *Form of Claim on Products Settlement and Goods Rejection and Discount Certificate* will be sent to the customer.

我们将根据《产品异议处理表》，对您的损失作出相应赔偿，异议结案。

Compensation will be made for the related losses of the customer according to *Form of Claim on Products Settlement* and the case closed.

宝钢特钢会根据异议产生的原因对相关责任单位进行内部整改，并将整改结果反馈给用户。

Rectification will be made in the responsible manufacturing department(s) for the cause of the claim. The result of rectification will be fed back to the customer.

异议结案之后，宝钢特钢将对异议处理进行回访，并对回访中发现的问题进行跟踪落实。

After the settlement, Baosteel staff members will visit the customer tracing the settlement.





必维国际检验集团ISO 14001:2004 环境体系认证证书  
ISO 14001:2004 Certificate issued by ANAB

## 环境方针 Environment Policy

节约资源， 减少排放， 实行全过程污染控制， 不断减轻环境负荷。持续改进， 遵法守约， 推行全方位清洁生产， 努力建设绿色特钢。

Saving resources, Reducing emissions, Carrying out pollution control through the process, Reducing environmental load consistently. Continuously improving , Persistently observing the law, Pursuing "clean production", Striving for "Green Special Steel".

## 环境目标 Environment Objective

推行清洁生产审计， 建设“绿色特钢”， 实现“世界一流清洁钢铁企业”。

Carrying out clean production audits, Building "Green Special Steel", Being a "world-class clean iron and steel enterprise."



必维国际检验集团OHSAS 18001:2007职业健康和安全管理体系统认证证书  
OHSAS 18001:2007 Certificate issued by ANAB

**宝山钢铁股份有限公司**<http://www.baosteel.com>**BAOSHAN IRON & STEEL CO., LTD.**<http://www.baosteel.com>

宝山钢铁股份有限公司特钢事业部  
**BAOSHAN IRON & STEEL CO., LTD.**  
**Special Steel Business Unit**  
**1269 Shuichan Road Shanghai 200940 China**  
 地址: 上海市宝山区水产路1269号  
 邮编: 200940  
 电话 TEL: international-86-21-26032973  
 传真 FAX: international-86-21-26032162

宝钢服务热线  
**BAOSTEEL SERVICE HOT LINE**  
 800-820-8590  
 021-26648888

宝钢在线  
<http://www.baosteel.net.cn>

**国内贸易平台 Domestic**

上海宝钢钢材贸易有限公司  
**SHANGHAI BAOSTEEL STEEL TRADING CO., LTD.**  
 电话: 021-50509696  
 传真: 021-84298224

广州宝钢南方贸易有限公司  
**GUANGZHOU BAOSTEEL SOUTHERN TRADING CO., LTD.**  
 电话: 020-32219999  
 传真: 020-32219555

天津宝钢北方贸易有限公司  
**TIANJIN BAOSTEEL NORTHERN TRADING CO., LTD.**  
 电话: 022-84905800  
 传真: 022-84905806

成都宝钢西部贸易有限公司  
**CHENDU BAOSTEEL WESTERN TRADING CO., LTD.**  
 电话: 028-85335388  
 传真: 028-85335680

武汉宝钢华中贸易有限公司  
**WUHAN BAOSTEEL CENTRAL CHINA TRADING CO., LTD.**  
 电话: 027-84298800  
 传真: 027-84298224

上海宝钢商贸有限公司  
**SHANGHAI BAOSTEEL TRADING CO., LTD.**  
 电话: 021-56121212  
 传真: 021-56126584

上海宝钢浦东国际贸易有限公司  
**SHANGHAI BAOSTEEL PUDONG INTERNATIONAL TRADING CO., LTD.**  
 电话: 021-36014655  
 传真: 021-51266522 51266533

上海宝钢宝山钢材贸易有限公司  
**SHANGHAI BAOSTEEL BAOSHAN STEEL PRODUCTS TRADING CO., LTD.**  
 电话: 021-36014688  
 传真: 021-51266500

**亚澳地区 Asia and Australia**

宝和通商株式会社  
**HOWA TRADING CO., LTD.**  
 TEL: 0081-3-3237-9121  
 FAX: 0081-3-3237-9123

宝和通商首尔事务所  
**HOWA TRADING CO., LTD., SEOUL OFFICE**  
 TEL: 0082-2-5080893  
 FAX: 0082-2-5080891

宝钢澳大利亚贸易有限公司  
**BAO AUSTRALIA PTY LTD.**  
 TEL: 0061-8-94810535  
 FAX: 0061-8-94810536

宝钢新加坡贸易有限公司  
**BAOSTEEL SINGAPOER PTE LTD.**  
 TEL: 0065-63336818  
 FAX: 0065-63336819

宝钢越南代表处  
**REPRESENTATIVE OFFICE IN VIETNAM**  
 TEL: 0084-8-39100126  
 FAX: 0084-8-39100124

宝钢泰国代表处  
**REPRESENTATIVE OFFICE IN THAILAND**  
 TEL: 0066-2-6543008  
 FAX: 0066-2-6543010

**欧非地区 Europe and Africa**

宝钢欧洲贸易公司  
**BAOSTEEL TRADING EUROPE GMBH**  
 TEL: 0049-40-41994101  
 FAX: 0049-40-41994120

宝钢西班牙有限公司  
**BAOSTEEL ESPANA, S.L**  
 TEL: 0034-93-4119325  
 FAX: 0034-93-4119330

宝钢中东代表处  
**BAOSTEEL MIDDLE EAST REPRESENTATIVE OFFICE**  
 TEL: 00971-4-8810788  
 FAX: 00971-4-8810789

宝钢意大利钢材集散中心有限公司  
**BAOSTEEL ITALIA DISTRIBUTION CENTER SPA**  
 TEL: 0039-010-530881  
 FAX: 0039-010-5308895

**美洲地区 America**

宝钢美洲贸易有限公司  
**BAOSTEEL AMERICA INC.**  
 TEL: 001-201-4571144  
 FAX: 001-201-4570909

宝钢底特律代表处  
**REPRESENTATIVE OFFICE IN DETROIT**  
 TEL: 001-248-2089918  
 FAX: 001-248-2080999

宝钢休斯顿代表处  
**REPRESENTATIVE OFFICE IN HOUSTON**  
 TEL: 001-281-4847333  
 FAX: 001-281-4843655

宝钢洛杉矶代表处  
**REPRESENTATIVE OFFICE IN LOS ANGELES**  
 TEL: 001-949-7526789  
 FAX: 001-949-7521234

宝钢里约代表处  
**BAOSTEEL DO BRAZIL LTDA.**  
 TEL: 0055-21-25311363  
 FAX: 0055-21-25310298