

## BRIEF INTRODUCTION

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- Advanced Facilities
  - Integrated series of products
  - Leading products and application field
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# Advanced facilities

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# Specialized production line

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- ❑ Short flow continuous rolling line: 90t EAF+90t LF/VD+CCM+continuous rolling line for alloy steel bar, the production capacity per year is 50,000 tons (Beiman)
  - ❑ Continuous rolling line : 60t EAF+60t LF/VD+CCM+ continuous rolling line for alloy steel bar, the production capacity per year is 40,000 tons (Fushun)
  - ❑ Special steel wire line: to produce stainless steel , bearing steel (Dalian)
  - ❑ Die flat steel line: to produce high quality die flat steel (Fushun /Dalian)
  - ❑ Bright steel and cold drawn steel line:alloy steel deeply-processed (Dalian)
  - ❑ Special metallurgical line: heat-resisting super alloy, titanium alloy (Fushun)
  - ❑ Precision alloy line (Dalian)
  - ❑ Forging facilities: 3500t and 3000t (Beiman/Fushun)
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## Six producing bases

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- ❑ Automotive steel base (Fushun) .
  - ❑ Bearing steel base (Beiman) .
  - ❑ Tool and die steel base (Fushun、Beiman) .
  - ❑ Super alloy base (Fushun) .
  - ❑ Stainless steel , bearing steel, alloy spring steel wire rod base (Dalian) .
  - ❑ Deeply-processed special steel base (bright steel, cold drawn, special steel wire) (Dalian) .
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## Advanced facilities — Electric arc furnace

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- 1 × 90t/*CONCAST*
- 1 × 60t/*FOCUS*
- 1 × 50t/*KRUPP*
- 1 × 45t/*KRUPP*
- 2 × 40t
- 8 × 25t



# UHP EAF : 90t / CONCAST( Beiman )



UHP EAF: 60t /FOCUS; 50t /KRUPP ( Fushun )



## Advanced facilities — refining furnace

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- ❑ 90tLF/VD *CONCAST*
- ❑ 2 × 60tLF/VD  
*DANIELI*
- ❑ 30t/60tVOD/VHD  
*LEVSOLD-HERAEUS*
- ❑ 25tAOD; 25tVOD





# VOD/VHD:30t/60t/LEVSOLD-HERAEUS ( Fushun )



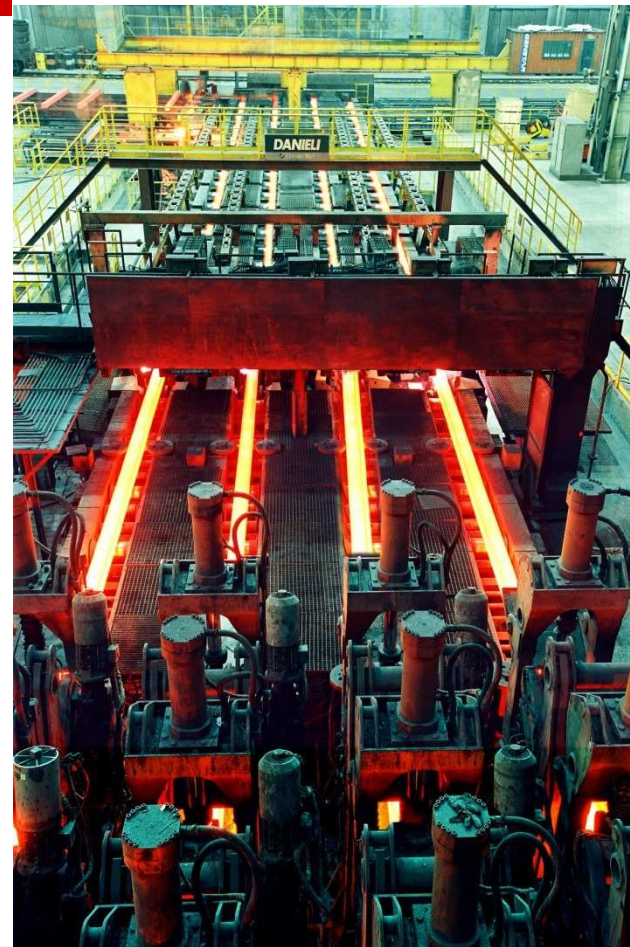
# AOD:25t ( Dalian )



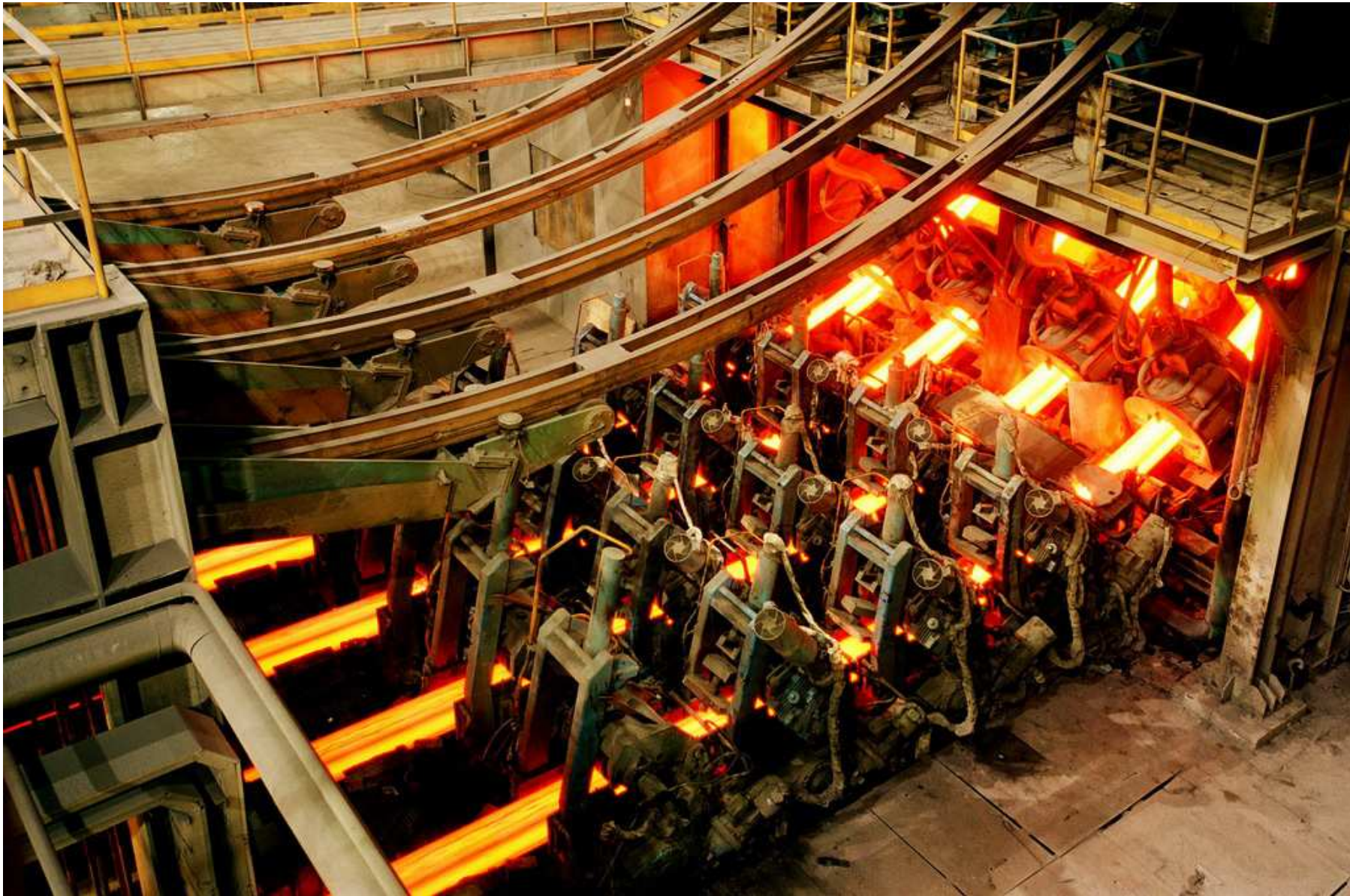
## Advanced facilities —concaster

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- R12m×4strain/*CONCAST*  
180×180、240×240mm
- R12m×4strain /*DNNIELI*  
200×200、240×240、  
280×320、Φ450mm
- R8m×2strain  
150×150、Φ180mm



concaster:low alloy steel/four units with four strands / CONCAST (Beiman)



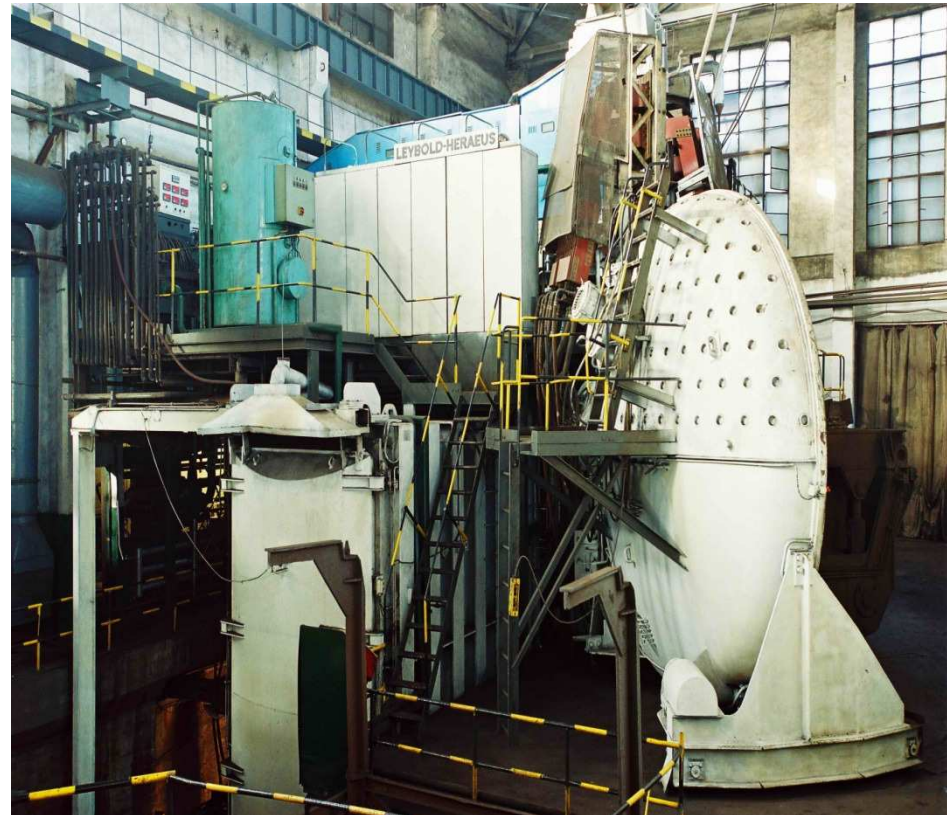
concaster:stainless steel/two units with two strands (Dalian)



## Advanced facilities —special remelting

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- VIM
  - 12t、 3/6t、 2.5t
- VAR
  - 12t、 7t、 1t
- ESR
  - 10t×1 ;
  - 15t×1 (26,5t) ;
  - 5t×11;
  - 3t×6;
  - 2t×4;
  - 1t×7。



# VIM:12t/ALD ( Fushun )



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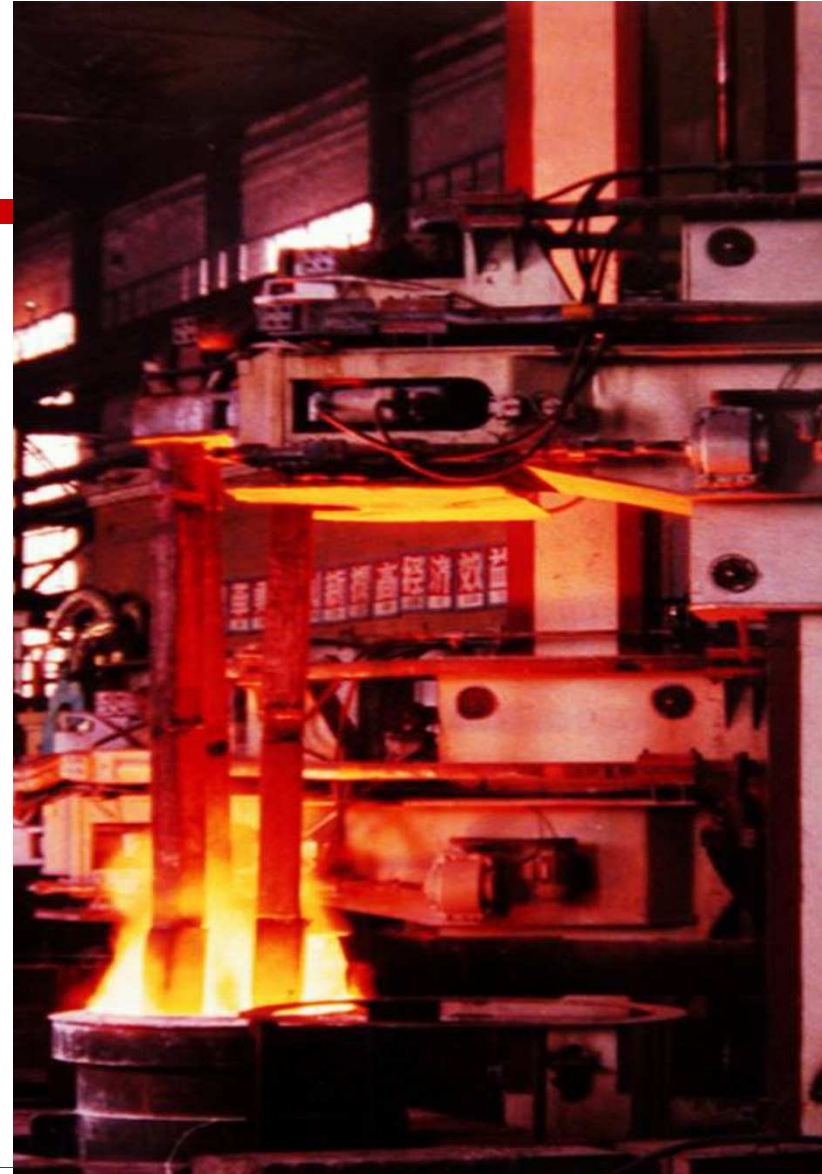
□ VAR  
12t/ALD  
(Fushun)

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- ESR  
15t(26.5t)  
(Beiman)



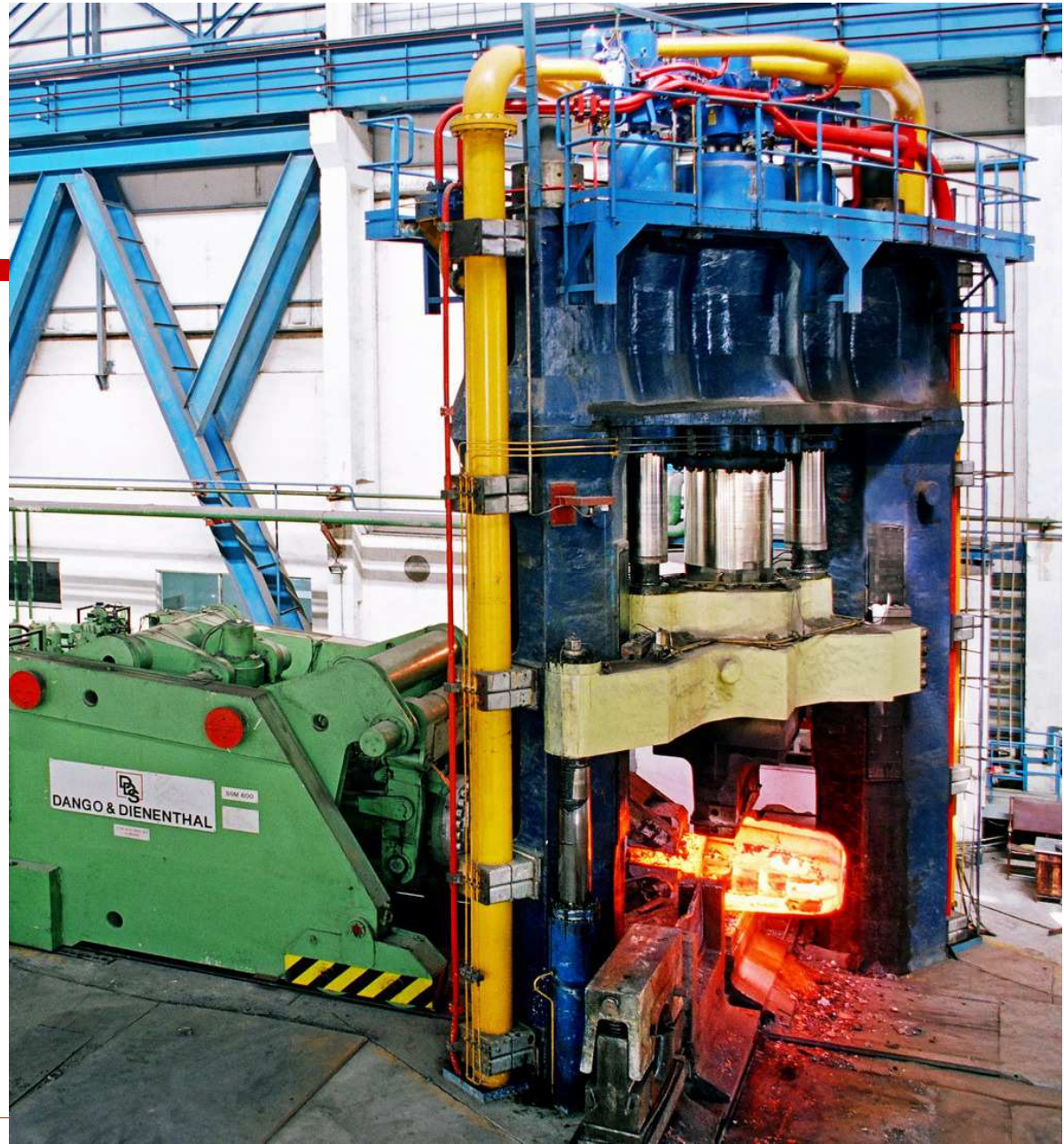
## Advanced facilities — forging

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- Hydraulic forging press  
30MN/PAHNKE  
20MN/DEMAG MEER  
35MN/DEMAG MEER
  
- Fine forging press  
10MN/GFM
  
- hydropress  
30MN  
12.5MN



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- Hydraulic  
forging  
press  
3500t  
DEMAG MEER  
(Fushun)



Fine forging press :1000t/GFM (Fushun)



## Advanced facilities——bar and wire rod rolling mill

- Bar and wire rod rolling mill

H-V×20stand+Block×10stand  
*/SMS*

- Bar rolling mill

- H-V×24stand/POMINI

- H-V×23stand/POMINI

- H-V×10stand



Bar and wire rod rolling mill:H-V×20stand+Block×10stand/SMS (Dalian)



Bar rolling mill : H-V×24 stand/POMINI (Fushun)



Bar rolling mill block: H-V×23stand/POMINI (Beiman)





Big diameter round bar rolling mill block: H-V×10stand (Dalian)



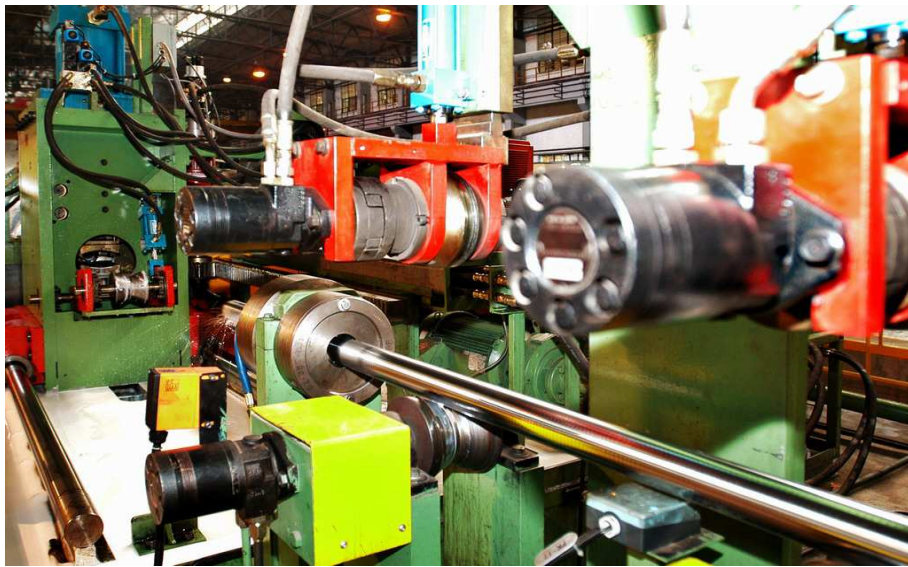
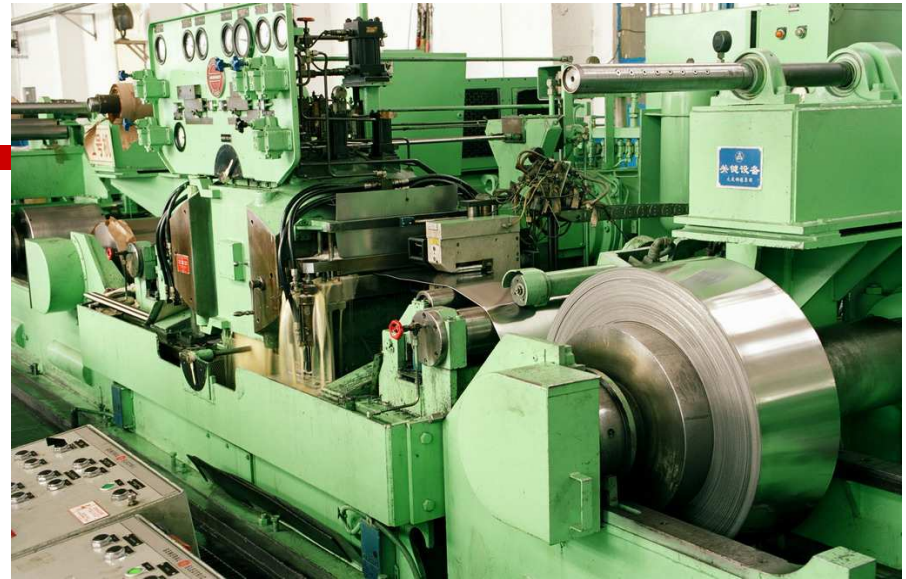
## Advanced facilities——GFM rolling mill

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- ❑ WF5-40 rolling mill with high precision
- ❑ Flat steel rolling mill with big sizes



# Advanced facilities——deeply-processed facilities



## Advanced facilities—Ultrasonic and Surface test



# R&D and testing facilities

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The instrument and facilities for technical development whose initial value 82.67 million RMB. In recent years, the three bases had imported several advanced analyzers and testing facilities from USA, Japan, Germany, Switzerland. the the condition for researching and testing and testing facilities has been in the leader in China.

- Chemical analyzer
- Physical analyzer



## R&D and testing facilities — Chemical analyzer

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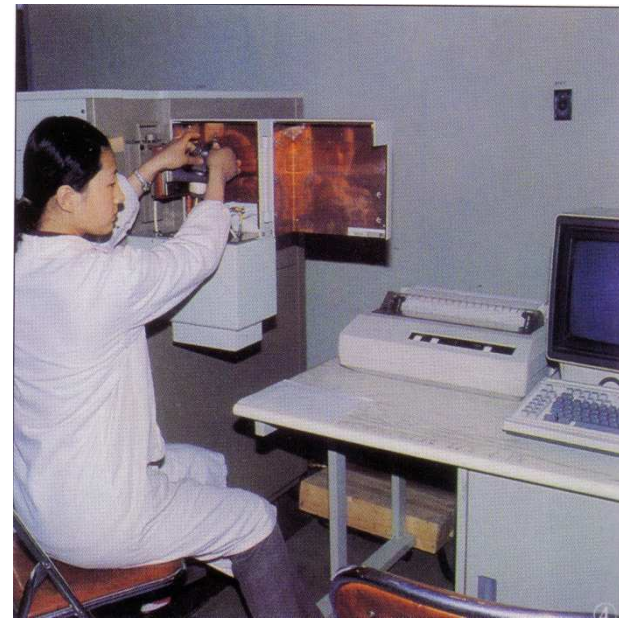
- ❑ Emission spectrograph **ICP USA**
- ❑ Infrared carbon and sulphur analyzer **CS600C USA**
- ❑ spectrometer **ARL4460 Switzerland**
- ❑ Oxygen analyzer **RO600C USA**
- ❑ Nitrogen analyzer **TN600C USA**
- ❑ Hydrogen analyzer **RH600C USA**
- ❑ Photoemissive direct-reading spectrograph **PDA-5500 II Japan**
- ❑ ICP emission spectrograph **Intrepid USA**
- ❑ carbon and sulphur tester **CS-444、CS-344 USA**
- ❑ Oxygen and nitrogen tester **TC-500 、TC-436**



## R&D and testing facilities — Chemical analyzer

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- Atomic absorption spectrophotometer  
**PE-4000 USA**
- ARL4460-Direct-readingspectrometer  
**ARL Switzerland**
- X-fluorescencespectrometer **Japan**
- ICP spectrometer **PE USA**
- Emission spectrograph **Hilton England**
- RO-600 Oxygen analyzer **LECO USA**
- Oxygen and nitrogen tester **LECOUSA**
  
- Infrared instrument444 CS **LECO USA**
- 621W Hydrogen analyzer **Japan**
  
- Infrared instrument 8200CS **Japan**



## R&D and testing facilities— Physical analyzer

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- ❑ Metallographic microscope **Neophot2 Germany**
- ❑ Metallographic microscope **Epittp2 Germany**
- ❑ Metallographic microscope **NEOPHOT32 Germany**
- ❑ **LEC0300** microscope **LECO USA**
- ❑ vertical microscope **AXIOVERT2 Germany**
  
- ❑ Quantitative metallographic microscope **EPLQVANT**
- ❑ **LEJCA** Metallographic microscope **DMRME**
- ❑ X diffraction instrument Netherland **PW1700**  
automation
- ❑ Scanning electron microscope Netherland **SEM505**
- ❑ **JSM-35C** Scanning electron microscope Japanese  
electronics





## R&D and testing facilities— Physical analyzer

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- ❑ Torsion testing machine **NJ-100B**
- ❑ Fatigue tester with high temperature and speed **PWC510WG**
- ❑ Pure bend Fatigue tester **PQ1-6 (PWC-600)**
- ❑ Mechanical tension tester **LJ-500**
- ❑ Electronic universal tester **AGIOOA**
- ❑ Electronic tension tester USA **INSTRON**
- ❑ Jominy hardness meter USA **INSTRON**
- ❑ Contact fatigue tester **JP-52**



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# Integrated series of products

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# Integrated series of products

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- High Quality carbon steel
  - Alloy structural steel
  - Automotive steel
  - Bearing steel
  - Die steel and Tool steel
  - Stainless steel
  - Super alloy
  - Special metallurgical commercial products (precision alloy, corrosion-resistant alloy, electrothermic alloy)
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# Integrated series of products

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- ❑ We can make bearing steel, stainless steel ,automotive steel, tool & mould steel and special material for Hi-Tech field.
  - ❑ We have full sizes, including steel bar, wire, square, flat, sheet, strip and heavy forgings.
  - ❑ The products are widely used in aerospace, electronics, machine manufacture, petrochemical, automotive, communication, transportation and medical instruments.
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# Integrated series of products——alloy steel wire rods

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□  $\Phi 5.5 \sim 20\text{mm}$



# Integrated series of products—— hot-rolled steel bar

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- $\Phi 10\sim 310\text{mm}$
- $\square 12\sim 250\text{mm}$



# Integrated series of products—— forged bar

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- $\Phi 60\sim 1000\text{mm}$
- $\square 60\sim 1000\text{mm}$



# Integrated series of products—— hot-rolled flat steel

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- 6~130×  
60~610mm





# Integrated series of products—— forged mould block

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- 180~800×  
300~1300×  
350~6000  
mm



# Integrated series of products—— forged discs and hole discs

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□  $\Phi 300\sim 2000$   
 $\times \geq 100\text{mm}$



# Integrated series of products—— forged tube

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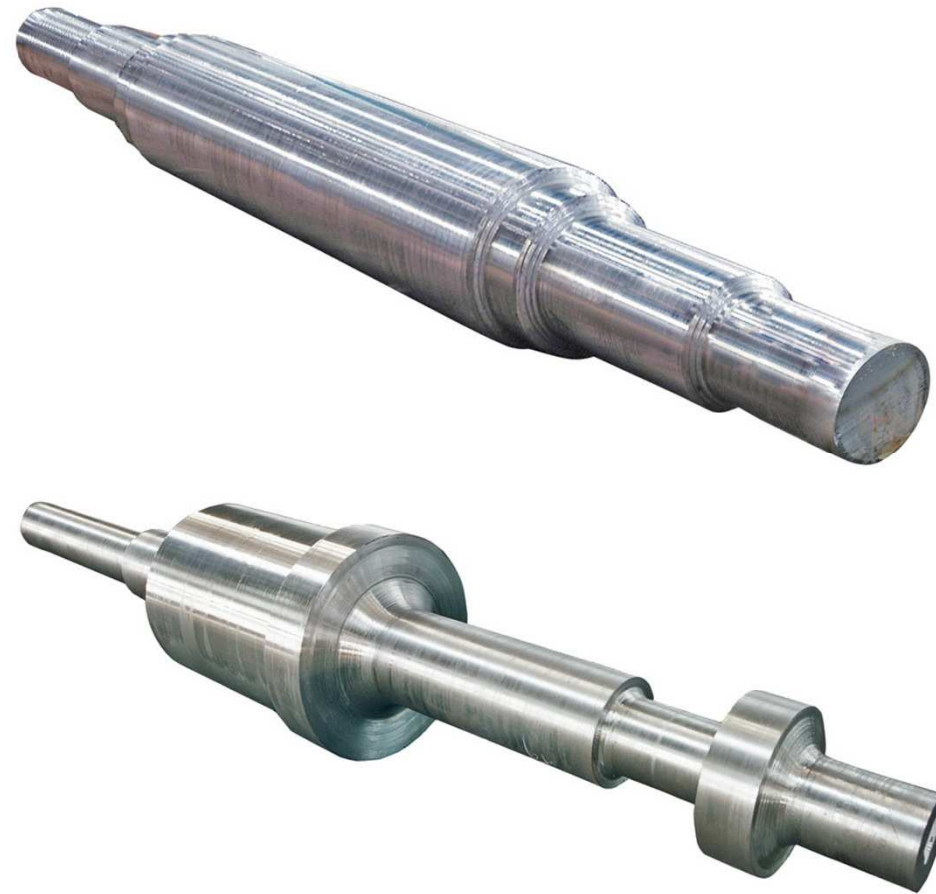
- $\Phi 450 \sim 1800$   
× 200~750  
× 1000~3000  
mm



# Integrated series of products—— forged roller and shaft

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- $\Phi$  450~800
- × 250~500
- × 200~500
- × 2000~600mm



# Integrated series of products—— bright steel bar

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□  $\Phi 10 \sim 280$  mm



# Integrated series of products—— cold –drawn steel wire

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□  $\Phi 1\sim 18\text{mm}$



# Integrated series of products—— cold-drawn bar

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□  $\Phi 6\sim 19\text{mm}$



# Integrated series of products—— precision alloy strip

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- $0.05\sim 3.0\times\leq$   
400mm





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## Fourth part

Leading products and application field

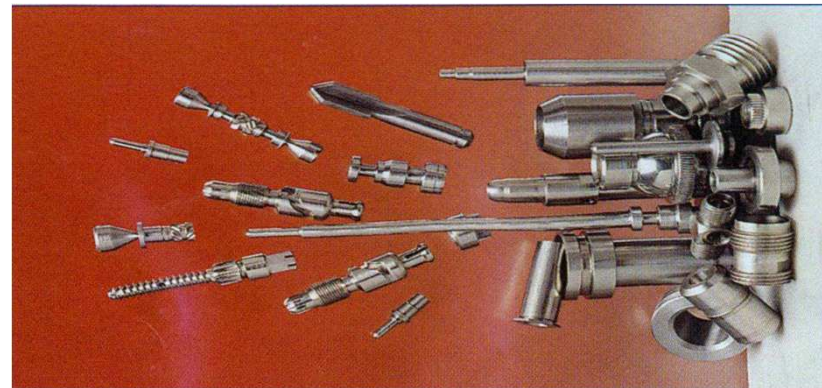
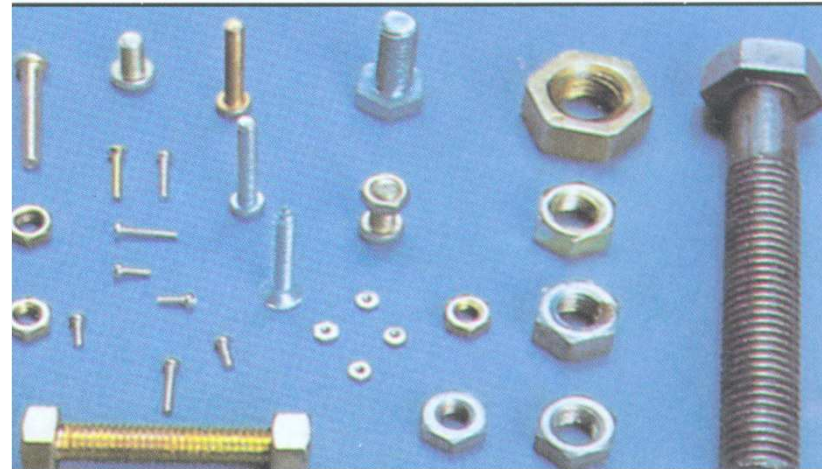
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# Product and application——stainless steel

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## ❑ cold-heading stainless steel

302HQ、304Cu、  
316 (L)、304M、  
304M4、304EST、  
201Cu、200Cu、321  
410 (1Cr13)、420F、  
430 (1Cr17)、  
431 (1Cr17Ni2)



# Product and application——stainless steel

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## □ welding stainless steel

H308(L)、ER308LHSi、

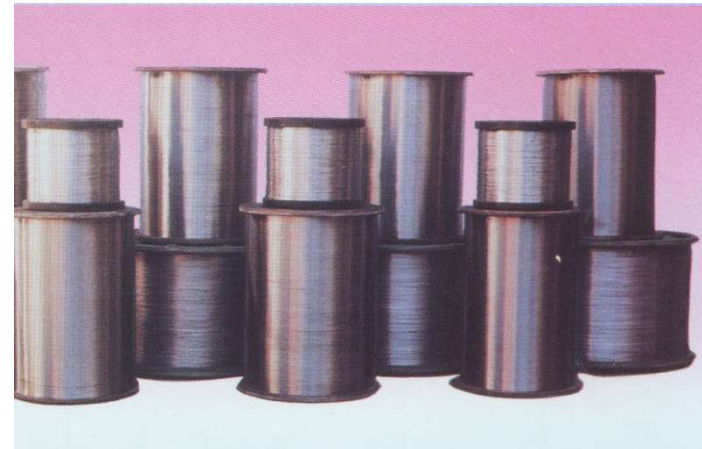
H316 (L) ER316LHSi、

H309 (L) 、ER309LHSi

ER310、H1Cr21Ni10Mn6

HS367、D605

H1Cr13、H2Cr13



# Product and application——stainless steel

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□ cutlery, knife and cooking  
stainless steel

420、X50CrMoV15

440A、440B、440C

304、304HC



# Product and application——stainless steel

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□ fiber, mesh and cleaning ball stainless steel

304 (L) 、 304HC、 316 (L) 、  
430 (L) 、 409 series、 434  
309S、 310S、 304EST、 446



## Product and application——stainless steel

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### □ Precision shaft stainless steel

416、T416、T416MS、420J2 (3Cr13)、420F (Y3Cr13)、3Cr13Mo、T420、4Cr13、4Cr17Mo、440A、440B、440C、5Cr13 (Mo)、6Cr13Mo、DSR7B、303、303Cu、Y130M、D661、D662、D663、(202、205)

### □ High-strength spring stainless steel

304H、302 (TH)、321、631 (17-7PH)、304M

### □ Medical apparatus stainless steel

317L、00Cr18Ni14Mo3、00Cr18Ni15Mo3N、1-3Cr13 (Mo)、305

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## Product and application——stainless steel

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### □ Valve steel

4Cr9Si2、4Cr10Si2Mo、5Cr8Si2、5Cr21Mn9Ni4N、  
6Cr21Mn10MoVNbN

### □ turbine blade steel and mould steel

1Cr13、1Cr12、1Cr12Mo、1Cr11MoV、  
1Cr12W1MoV、1Cr12Ni2W1Mo1V、2Cr13、  
X20Cr13、2Cr12NiMo1W1V、2Cr12NiWMoVNb、  
2Cr11NiMoNbVN、0Cr17Ni4Cu4Nb、B50A789、  
3Cr17Mo、3Cr13

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# Product and application——stainless steel

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- The stainless steel for aerospace  
special remelting methods are used to maintain high purity and high toughness and high –corrosion –resistant in order to keep international standard stainless steel products. We have more than 50 stainless steel products and over 300 sizes, each year we provide over thousands tons of material for aerospace. We have complete sizes, including steel bar, wire, square, flat, sheet, pipe, strip and heavy forgings.
- martensitic hot strength steel  
S/SAV、 S/STV、 S/SJV、 S/SJ2、 S/607、 3II 866、 3II 517、  
3II 607、 3II 56、 3II 961、 GX-8  
Oxidation - resisting and heat- resisting steel  
S310 、 2520Nb
- corrosion resistant steel  
904、 316L、 1Cr21Ni5Ti、 0Cr21Ni5Ti;
- high strength stainless steel  
~~17-4PH、 15-5PH、 17-7PH、 PH13-8Mo、 00Cr14Ni6Mo2AlNb~~



## Product and application——stainless steel

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### □ Non-magnetic stainless steel

40Mn18Cr3N (V)、 1Cr18Mn12NiSiN、  
50Mn18Cr4V、 1Cr13Mn18NiMoNbN

### □ super- stainless steel

0Cr13Ni4Mo、 00Cr13Ni5Mo、 00Cr13Ni6MoNb、  
00Cr14Ni5Mo3A 、 0Cr15Ni5 (Ti)

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## Product and application—automotive steel industry

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### □ Product category

gear, linking rod, crankshaft, alloy spring, quality carbon steel, low alloy steel.

### □ sizes

wire rod :  $\Phi 5.5\sim 20\text{mm}$ .

bar steel:  $\Phi 12\sim 310\text{mm}$ ,  $\Phi 60\sim 1000\text{mm}$  (forged).

bright steel bar:  $\Phi 10\sim 280\text{mm}$ .

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## Product and application——automotive steel industry

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### □ Gear box and rear gear box steel

Cr series : SCr420H、20CrH

Cr-Mn series: 16—28MnCr5

Cr-Mo serie: SCM420H、SCM822H、20CrMoH、22CrMoH、  
SAE4130RH

Cr-Ni-Mo serie: 8620RH (H) 、 8627RH (H) 、 8720H、  
SAE4320H、17CrNiMo6H、SAE8822H、  
20CrNi2MoH、20CrNiMoH、21CrNiMoH、  
16NiCrMo12 、 SNCM420H-K

Cr-Mn-Ni serie: 14CN5、19CN5

Cr-Mn-Ti serie: 16—20CrMnTiH (S)

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## Product and application——automotive steel industry

- Crankshaft and connecting rod

non-quenched and tempered steel

48MnV、49MnVS3、35MnVS、  
50MnVS、C38、C38N2、  
40MnV、SAE1045、  
35Mn2Q、40MnS、C70S6、  
CM35、YF35MnVS、S48C、  
SC38、38MnVS6、FAS2230、  
S45CVS

quenched and tempered steel

42CrMo、40CrAH、20CrMo、  
40MnB



## Product and application——automotive steel industry

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### □ front shaft

non-quenched and tempered steel

16Mn2VB、

12Mn2VB、

25-35Mn2CrV

quenched and tempered steel

42CrMo、 40Cr

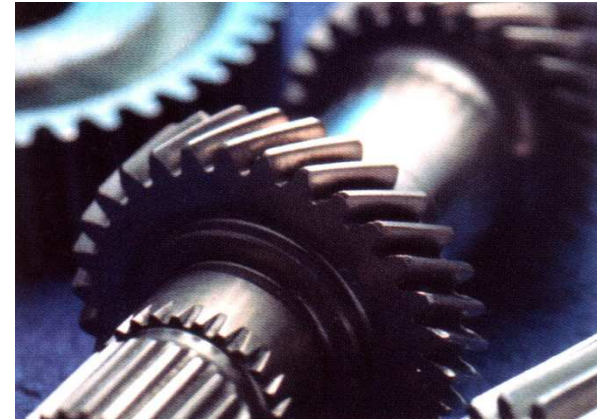


## Product and application—automotive steel industry

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### □ drive shaft steel

18CD4、CF53、27CD4、  
36CrMn4 、 CM45 、  
SCM17 、 S53 、 S48 、  
SMn40 、 SCM17 、  
SVdH20S1 、 SAE4135H 、  
SAE1541H

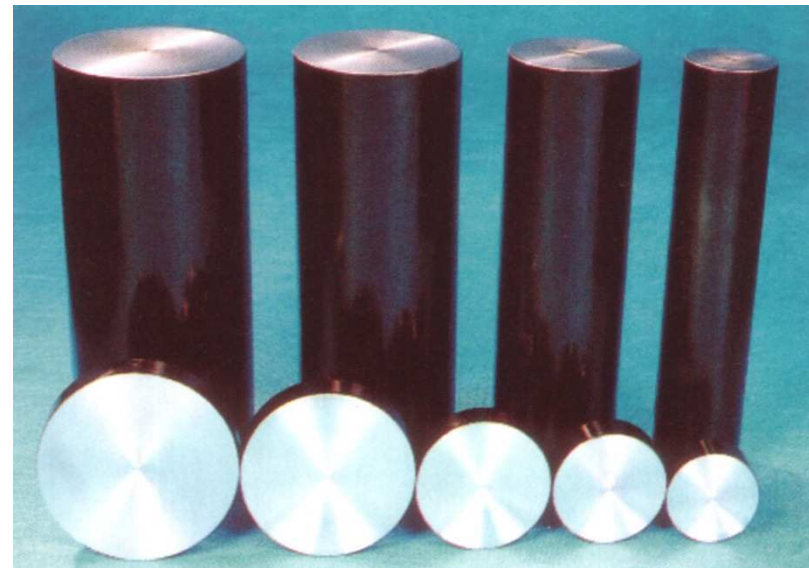


## Product and application——automobile steel industry

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□ other automotive steel

30MnVS、 SAE1045  
18CrNi3Mo、  
42CrMo4 、 AF70、  
37CrS4HL。



# Quality management system

ISO9000:the authentication approved in 1997; the authentication approved for 2002 version in 2002.

ISO/TS16949: the system approved in November 2005 (BVQI approved by authentication institution)





## The approved Certs by the second or third parts

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- **Mn-Cr series of gear steel**——it is approved by Volkswagen, and which is used in Jetta cars.
  - **50CrV4**——it is approved by First Automotive Group, which has become standard supplier for suspension spring in Hongqi car.
  - **C70S6**—— it is approved by First Automotive Group.
  - **48MnV**——it is approved by Second automobile Cummins generator.
  - **CM35**—— it is approved by Shanghai Volkswagen, and has become exclusive supplier.
  - **42CrMo4**——it is approved by Italy SEW, which becomes standard supplier for torsion bar spring in car.
  - **S48C、S53C、SCM420H、S12C、SMn40**——it is approved by Toyota, has become standard supplier for CVJ steel in Tianjin Forging Factory.
  - **18CD4、27CD4**——it is used in Natiefu drive shaft steel in Shanghai.
  - **8620RH、8627RH**——it is approved by Eaton USA.
  - **SCR420** - it is approved by Hyundai Korea .
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## Product and application——tool and mould steel

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- Product category

hot work die steel, cold work die,  
plastic die steel ,razor steel.

- sizes

wire rod :  $\Phi 5.5 \sim 20\text{mm}$ 。

steel bar:  $\Phi 10 \sim 150\text{mm}$ ,  $\Phi 60 \sim 1000\text{mm}$ (forged)

bright steel bar:  $\Phi 8 \sim 280\text{mm}$

forged block:  $180 \sim 800 \times 300 \sim 1300\text{mm}$

flat steel bar:  $6 \sim 130 \times 60 \sim 610\text{mm}$

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## Product and application——tool and mould steel

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### □ Hot work Die steel

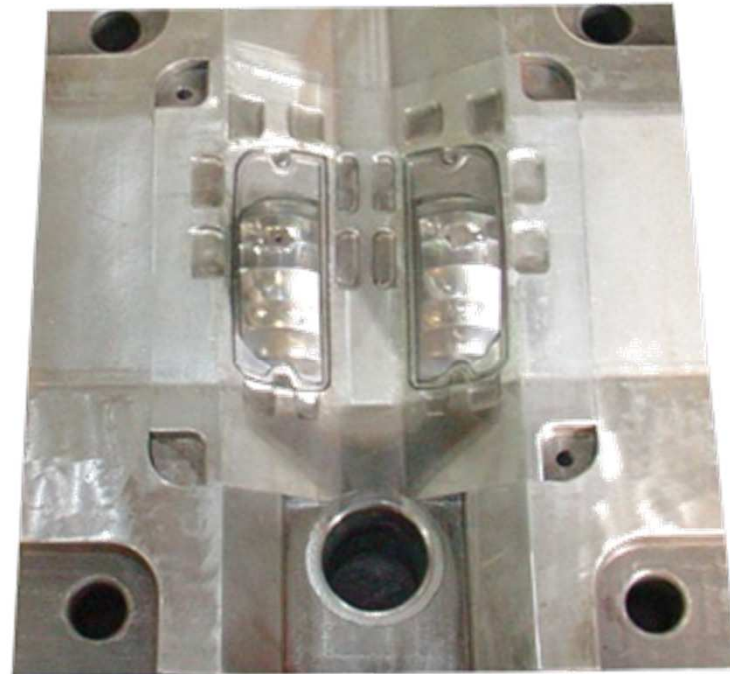
H13 (4Cr5MoSiV1)

3Cr2W8V

5CrNiMo

5CrMnMo

4Cr2MoVNi



## Product and application——tool and mould

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### ❑ Cold work Die steel

D2 (Cr12Mo1V1)

D3M(Cr8) , Cr12,

DC53 (C8Mo2WSiV)

A18, O1, O2,

S2



## Product and application——tool and mould

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- Plastic mould steel  
prehardening plastic  
mould steel P20, 718  
mirror plastic mould  
steel P80R, NAK80  
(10Ni3MnCuAl)  
non-quenched and  
tempered plastic mould  
steel P120, P20M



## Product and application——tool and mould

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- Corrosion resistant mould plastic steel

3Cr17Mo, FS136,  
1.2083, 1.2316



## Product and application——tool and mould

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- cutting tool steel  
CrWMn,  
5Cr8Mo2WSiV,  
6Cr5WMoV,  
7CrWMoV。



## Product and application——tool and mould

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### □ Mould block

FS136:

$\leq 1200 \sim 1300 \text{mm} \times$   
 $\leq 600 \text{mm} \times \geq 2000$  (ESR)  
 $\leq 1400 \text{mm} \times \leq 600 \text{mm} \times \geq 2000$   
(refining)

P20:

$\leq 1300 \text{mm} \times$   
 $\leq 300 \text{mm} \times \geq 2000$  (refining)

718:

$\leq 1400 \text{mm} \times \leq 550 \text{mm} \times \geq 2000$   
(refining)





# 718 718 MOULD BLOCK :510×1200×2230/10960k (Fushun)



# S136 MOULD BLOCK : Fushun



## Product and application—heat resisting superalloy and titanium alloy

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- It is China's biggest base for studying and developing heat resisting superalloy and titanium alloy, and 70% superalloy materials were provided for China's aerospace and the materials for aviation motor for China's aerospace are supplied by Dongbei Special Steel.
  - Complete deformation high temperature superalloy material system: Nickel- base, iron-base, cobalt -base alloy, solution, precipitation strengthening alloy. we have control of more than one hundred technologies for making heat resisting superalloy . Normally batch production produce 40 kinds of superalloy each year.
  - Dongbei is the earliest special steel enterprise for developing titanium alloys in China. It produced more than 10 titanium alloy such as Ti-6Al-4V, meanwhile it made forged bar and discs, rolled bar, furthermore its turbine blade TC11 had attained National First Class progressive awards.
  - Its products include turbo plate die forgings, turbo-rotor blank, rolled bar for blade, forging bar for installation edge, plates for combustion chamber.
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## Product and application——heat resisting super alloy and titanium alloy

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- Material for turbo plate  
A-286、  
Inconel718、  
GH4133B、  
Incoloy901、  
Waspaloy、  
Udimet500、  
Rene41、  
Inconel706、 3И  
698、 3П 742。



## Product and application——heat resisting superalloy and titanium alloy

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- Material for turbo blade

Nimonic80A、 Nimonic105 、 3И 929、  
3И 826

- Turbo outside ring and installation edge

Incoloy903、 Incoloy907、 3И 696

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## Product and application——heat resisting superalloy and titanium alloy

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- Material for combustion chamber

Hayens188、  
Hayens25、  
Hastlloy-x、  
Nimnic263、  
Inconel625、 3П 99、  
3П 693、 3П 708、  
3П 199、 3П202、  
3П 648 。



# R-R authentication

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- In 2005, Dongbei Special Steel Group was approved by ROLLS—ROYCE for heat resisting superalloy and stainless steel products.



## Product and application——bearing steel

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- With such prestigious customers as SKF、TIMKEN、INA、NSK into Chinese market,the bearing steel is purchased increasingly.
  - Dongbei Special Steel Group has the cutting-edge in technological innovation, and positively attracts advanced technology and talented people to ensure that bearing steel products are made complying with international standards in order to enhance the real product quality .
  - Dongbei Special Steel Group integrated the advantages from three bases, and makes great effort to adjust the product mix, division of labor, development, to promote the formation of bearing steel series. in 2004, our output of bearing steel was 0.48 million tons, in 2005, 0.51 tons, it has become a leading product in the development of enterprise.
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## Product and application——bearing steel

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year	National output of bearing steel /million ton	Dongbei Output of bearing steel /million ton	Output amount to national output/%
2004	1.34	0.48	32.84
2005	1.58	0.51	32.28

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# INA attestation

- In 2005, IMS was approved by INA for bearing steel products.

Technical Performance Evaluation



FAG Kugelfischer AG / INA Schaeffler KG / LUK



## Certificate

**supplier :**

**DALIAN JINNIU CO., Ltd.**

material : 100Cr6  
semi finished product: wire; bar; max. diameter 30 mm

product verification :  
quality through hardening bearing steel  
specification S130000, N01124; N01121; N01100;  
N01102  
process ingot casting

basis for judgement:  
Process freeze, technical visit and sampling; potential  
analysis; APQP;

The supplier is approved to deliver the material  
listed above to all Schaeffler companies  
worldwide.

Herzogenaurach, 28.09.2005

Roelting  
GC M s ltp., wire bar, bar

# Product and application——special alloy and forged products

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- Resistance alloy
  - Precision alloy
  - Heavy and section forging
  - Bimetal strip
  - Bimetal saw
  - Steel pipe
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# Product and application—— special alloy and forged products

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## □ Precision alloy

It was produced in 1961, and was the first enterprise for studying and producing precision alloy, and the first set of technical specification were drawn up and issued by it.

the precision alloy including soft- magnet, permanent magnet, elastics , expansion , thermal bimetal ,resistance heating, thermocouple, are also called metal functional material. The category includes bar, plate, strip, wire and tube.

it is widely used in aerospace, navigation , weapon and petrochemicals, precision machinery and instrument, and light industry, which is the key material for national defence, military and hi-tech. Dongbei has made a great contributions for national defence construction and social economic development.

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# Product and application—— special alloy and forged products

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## □ electro thermal alloy

the advanced methods is applied to make Fe-Cr-Al, maximum weight is 1000Kg, it is sole company that can make heavy coil in China. Reliable quality and winning high praise from customers.



# Product and application—— special alloy and forged products

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- Heavy and section forging  
3000t and 1250t water press is used to produce heavy and section forging,(barrel, ring and disc), they are high added value products with advanced technology,for example, cannon barrel, 925A submarine structural element, big caldron with high pressure.



Forged barrel:outside diameter1800mm (Beiman)

