



# Fujian Changting Zorr Technology Co., Ltd.

—Dedicated to be the world-class SmCo and magnetic assembly manufacturer!

# Content



**About Us**



**Product & Technology**



**Company Advantage**

# About Us—Parent Company

Xiamen Tungsten Co., founded in 1958, is China's famous corporation, whose business covers tungsten, molybdenum, rare earth, energy new material and etc. XTC is also a joint-stock group company listed on the Shanghai Stock Exchange (600549)



Total Employee  
11,000+



China's National Key New & High-tech Enterprises  
The Tungsten Material Industry Base  
by China National Torque Program  
First National Recycling Economy Models  
**China's Six Major Rare Earth Groups**

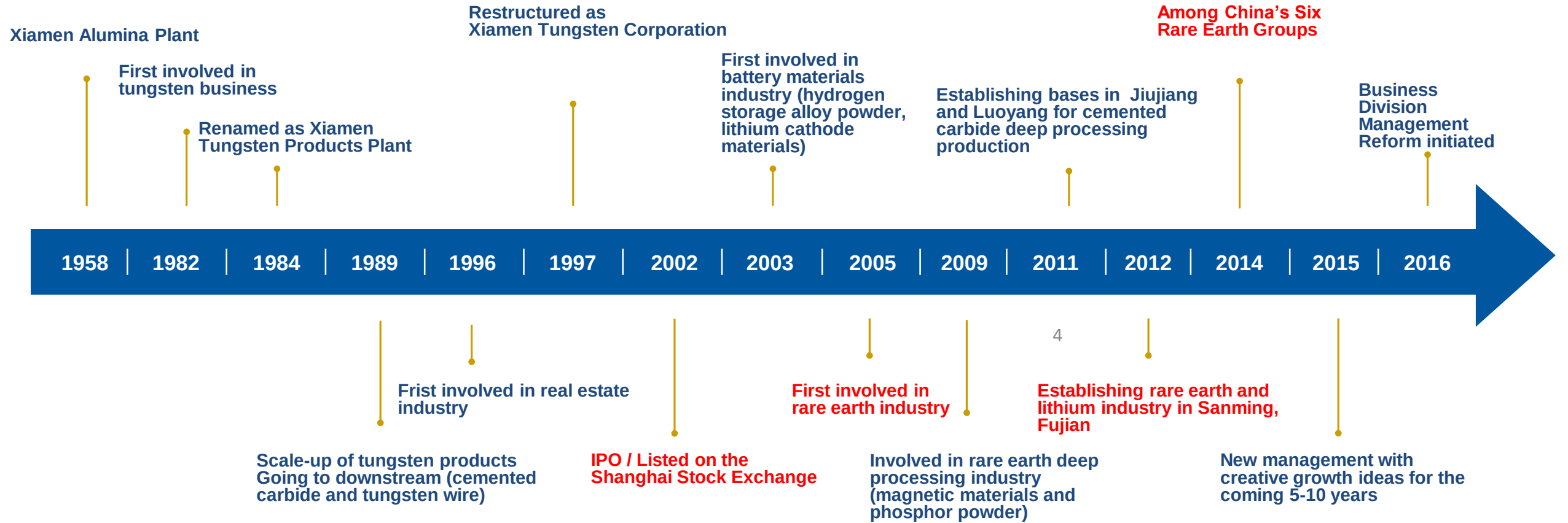


Year 2017  
Revenue: 14.27 billion CNY



24 operations including wholly-owned,  
majority-owned subsidiaries and affiliates  
+40 countries

# About Us—Parent Company



# About Us—Parent Company

Revenue: 14.27 billion CNY  
(Year 2017)

## Tungsten & Molybdenum

- World's No.1 tungsten melting enterprise
- Own 15% tungsten reserve, make up 20% of world's tungsten supply

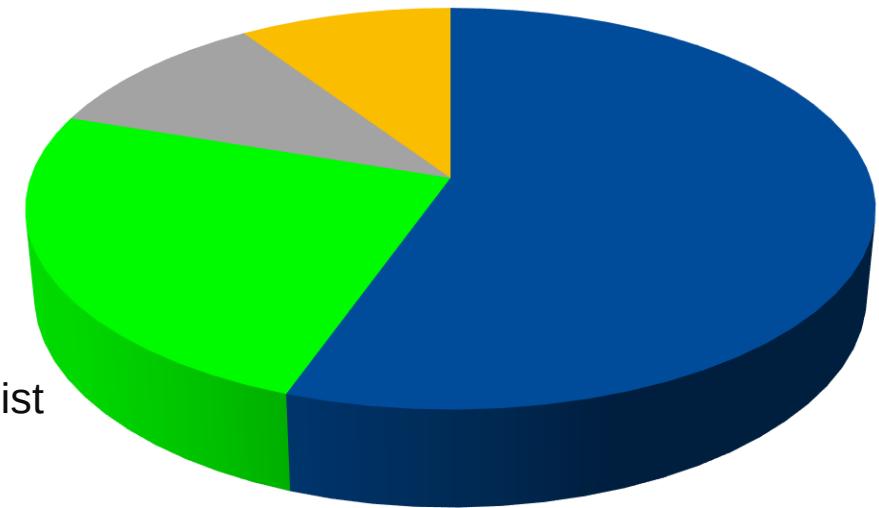
## Rare Earth

- One of the Six Major Rare Earth Corporations in China
- RE oxide, RE metal, and RE permanent magnet sales volume at the top list
- No.1 RE oxide exporter

## New Energy Material

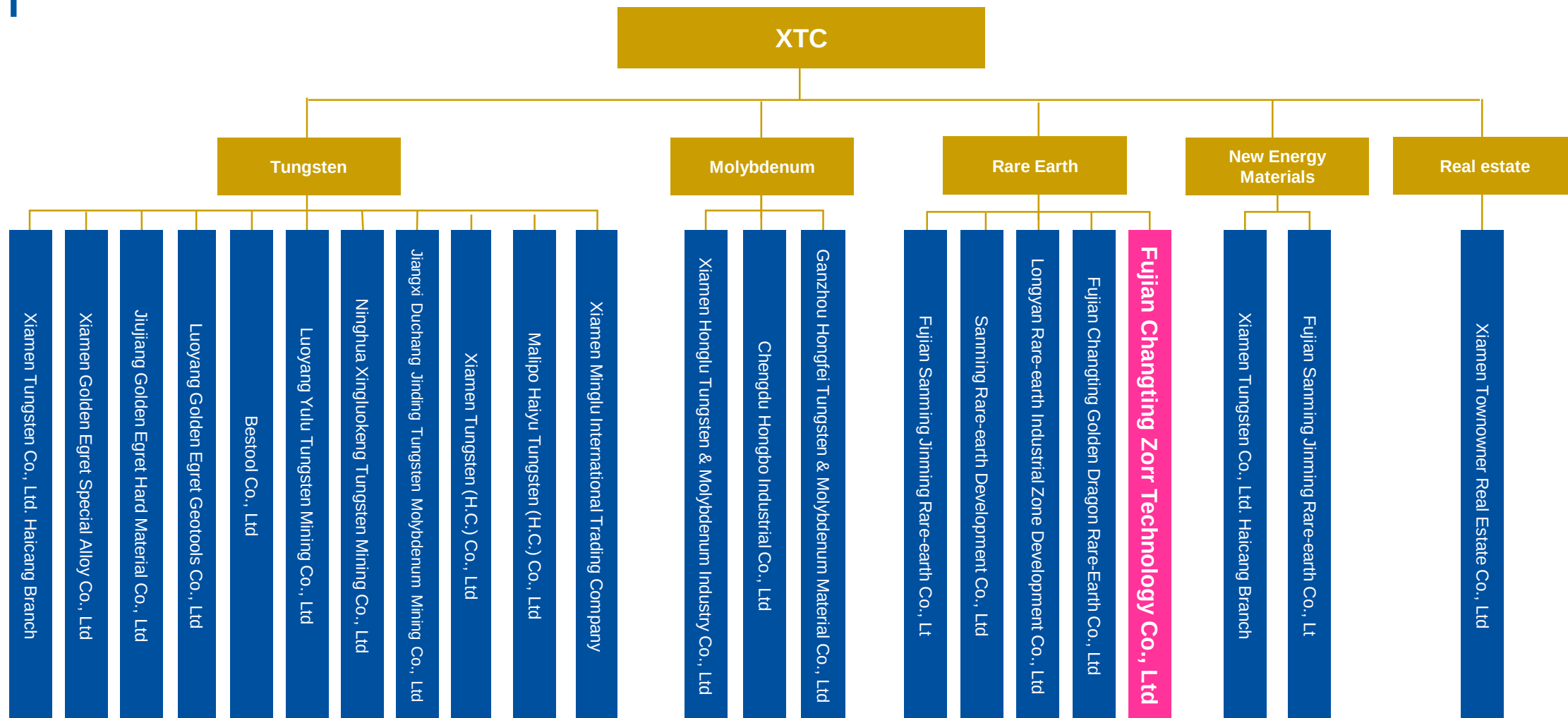
- No.1 hydrogen storage alloy
- No.3 Lithium material in China, market share: 15%

## Real Estate



- Tungsten&Molybdenum
- Energy New Material
- Rare Earth
- Real Estate

# About Us—Parent Company



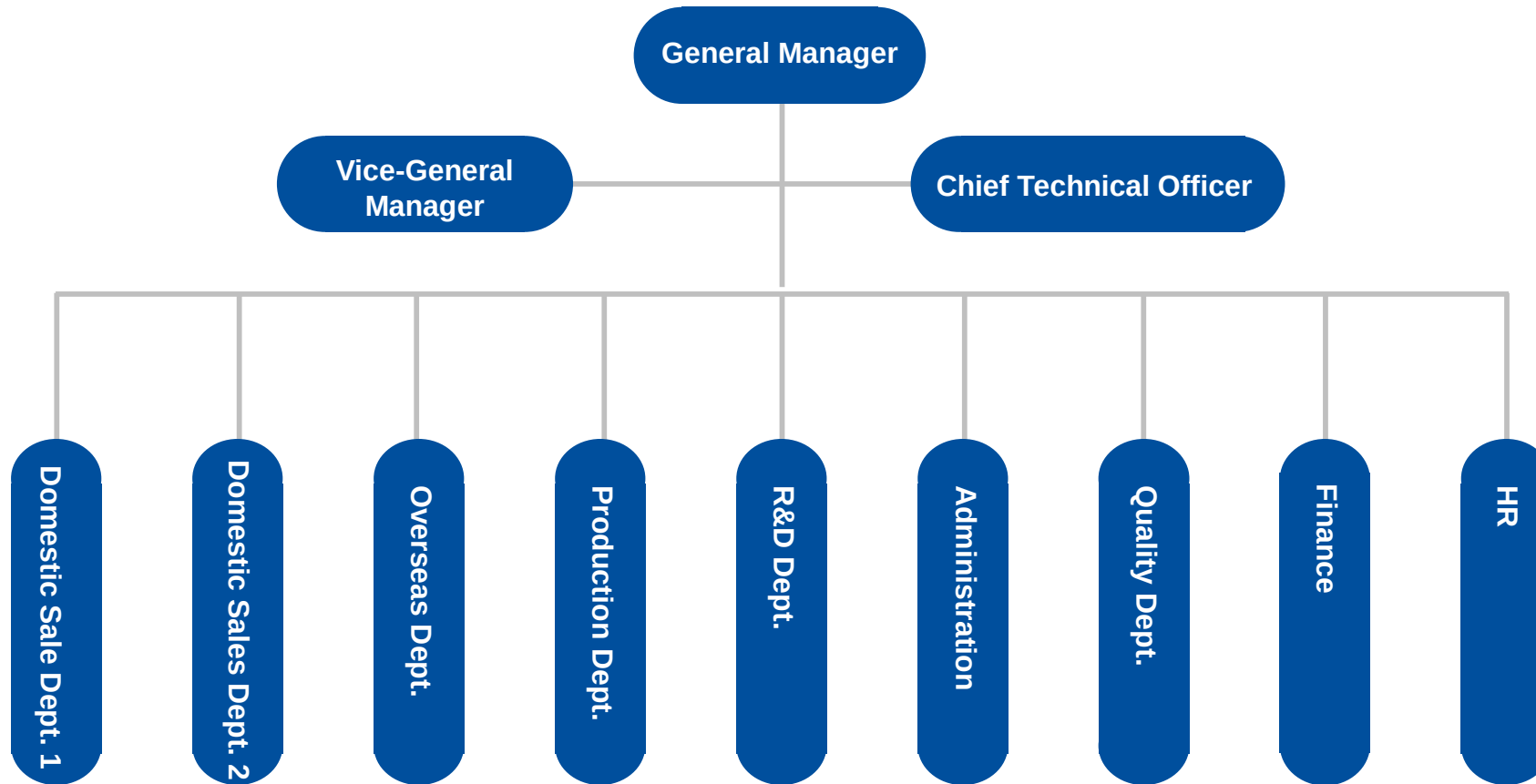
# About Us—Zorr Technology



## Company Background

- ❑ Establishment: Founded in 2017, Zorr Technology bought out Chengdu Zorr's complete set of SmCo magnet production equipment, technology, and key technical staffs, and implemented manufacturing plant relocation and optimization, production capacity reaching 300 tons/year
- ❑ Registered Capital: 20 million CNY
- ❑ Enterprise Type: Incorporated.
- ❑ Address: Rare Earth Industrial Park, Changting, Fujian, China.
- ❑ Planning: To invest 210 million CNY to reach 1000 tons/year SmCo production line before year 2020.

# About Us—Zorr Technology





# About Us—Zorr Technology

Chief Technical Officer

## Mr. Jin Bilun

Nearly **50** years' experience in SmCo magnet production and R&D

Pioneer to be engaged in magnetic functional material and component in China

Pioneer to achieve mass production of **SmCo<sub>5</sub>** and **Sm<sub>2</sub>Co<sub>17</sub>** in China

Co-author of ***“GB/T4180-2000 Permanent Magnetic Material of Rare Earth Cobalt”***  
***(Published in 2000)***



# Content



**About Us**



**Product & Technology**

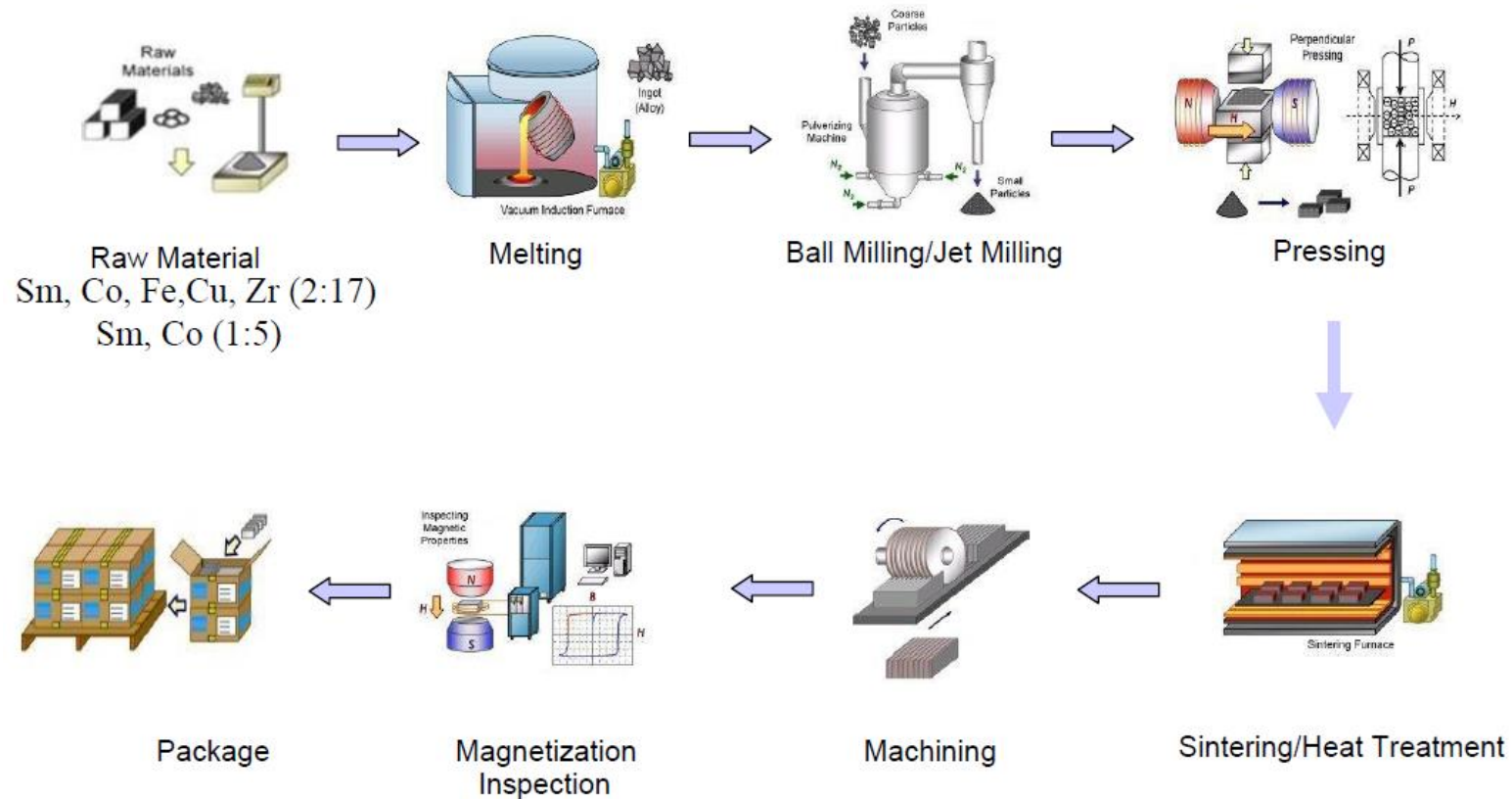


**Company Advantage**

# Products & Technology

## Production Process

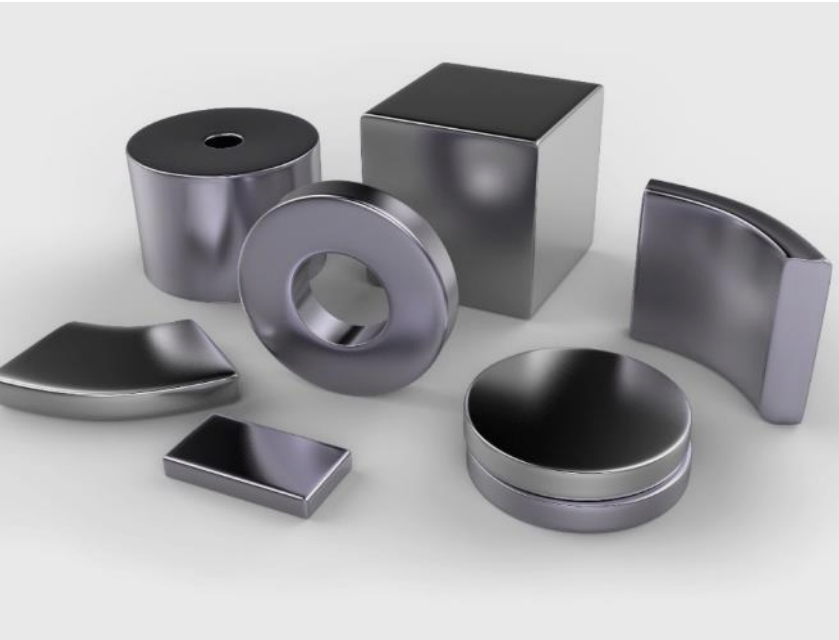
**Zorr Technology owns complete set of production and inspection equipment.**



# Products & Technology

## Magnetic Properties

Comprehensive range of grades, from low RTC series to high operating temp. series



## SmCo<sub>5</sub> and Sm<sub>2</sub>Co<sub>17</sub>

### Main Characteristics:

- High operating temp. up to 550°C
- High energy product up to 32MGOe
- High corrosion-resistance
- RTC is very close to zero

# Products & Technology

## Magnetic Properties

| Grade                                       |         | Residual Induction<br>Br |      |      |      | Coercivity<br>Hcb |      |      |      | Intrinsic<br>Coercivity<br>Hcj |       | Energy Product<br>(BH) max |       |      |       | RTC<br>α(Br)<br>20-150℃ | Maximum<br>Operating<br>Temperature |
|---------------------------------------------|---------|--------------------------|------|------|------|-------------------|------|------|------|--------------------------------|-------|----------------------------|-------|------|-------|-------------------------|-------------------------------------|
|                                             |         | 最大值                      |      | 最小值  |      | 最大值               |      | 最小值  |      |                                |       | 最大值                        |       | 最小值  |       |                         |                                     |
|                                             |         | KGs                      | T    | KGs  | T    | KOe               | kA/m | KOe  | kA/m | KOe                            | kA/m  | MGOe                       | kJ/m³ | MGOe | kJ/m³ | %/℃                     | ℃                                   |
| RECo <sub>5</sub>                           | ZR-10Tc | 6.8                      | 0.68 | 6.0  | 0.60 | 6.6               | 525  | 5.8  | 462  | ≥20                            | ≥1593 | 11                         | 88    | 9    | 72    | -0.002                  | 250                                 |
| SmCo <sub>5</sub>                           | ZR-18   | 9.0                      | 0.90 | 8.3  | 0.83 | 8.8               | 700  | 8.0  | 637  | ≥20                            | ≥1593 | 20                         | 159   | 16   | 127   | -0.040                  | 250                                 |
|                                             | ZR-22   | 9.6                      | 0.96 | 9.2  | 0.92 | 9.4               | 748  | 8.9  | 709  | ≥20                            | ≥1593 | 24                         | 191   | 20   | 159   | -0.040                  | 250                                 |
| RE <sub>2</sub> [Co,Cu,Fe,Zr] <sub>17</sub> | ZR-22Tc | 9.6                      | 0.96 | 9.2  | 0.92 | 9.4               | 748  | 8.0  | 637  | ≥20                            | ≥1593 | 24                         | 191   | 20   | 159   | -0.001                  | 300                                 |
| Sm <sub>2</sub> [Co,Cu,Fe,Zr] <sub>17</sub> | ZR-24L  | 10.2                     | 1.02 | 9.6  | 0.96 | 9.2               | 732  | 6.0  | 478  | ≥6.2                           | ≥495  | 25                         | 199   | 23   | 183   | -0.035                  | 300                                 |
|                                             | ZR-26L  | 10.4                     | 1.04 | 10.2 | 1.02 | 9.4               | 748  | 6.0  | 478  | ≥6.2                           | ≥495  | 27                         | 215   | 25   | 199   | -0.035                  | 300                                 |
|                                             | ZR-28L  | 10.8                     | 1.08 | 10.4 | 1.04 | 9.6               | 764  | 6.0  | 478  | ≥6.2                           | ≥495  | 29                         | 231   | 27   | 215   | -0.035                  | 300                                 |
|                                             | ZR-30L  | 11.4                     | 1.14 | 10.8 | 1.08 | 10.0              | 796  | 6.0  | 478  | ≥6.2                           | ≥495  | 31                         | 247   | 29   | 231   | -0.035                  | 300                                 |
|                                             | ZR-32L  | 12.0                     | 1.20 | 11.2 | 1.12 | 10.2              | 812  | 6.0  | 478  | ≥6.2                           | ≥495  | 34                         | 271   | 30   | 239   | -0.035                  | 250                                 |
|                                             | ZR-24   | 10.2                     | 1.02 | 9.6  | 0.96 | 10.0              | 796  | 8.5  | 677  | ≥12                            | ≥956  | 25                         | 199   | 23   | 183   | -0.035                  | 300                                 |
|                                             | ZR-26   | 10.4                     | 1.04 | 10.2 | 1.02 | 10.2              | 812  | 8.5  | 677  | ≥12                            | ≥956  | 27                         | 215   | 25   | 199   | -0.035                  | 300                                 |
|                                             | ZR-28   | 10.8                     | 1.08 | 10.4 | 1.04 | 10.4              | 828  | 8.5  | 677  | ≥12                            | ≥956  | 29                         | 231   | 27   | 215   | -0.035                  | 300                                 |
|                                             | ZR-30   | 11.4                     | 1.14 | 10.8 | 1.08 | 10.6              | 844  | 8.5  | 677  | ≥12                            | ≥956  | 31                         | 247   | 29   | 231   | -0.035                  | 300                                 |
|                                             | ZR-32   | 12.0                     | 1.20 | 11.2 | 1.12 | 10.8              | 860  | 8.5  | 677  | ≥12                            | ≥956  | 34                         | 271   | 30   | 239   | -0.035                  | 300                                 |
|                                             | ZR-24H  | 10.2                     | 1.02 | 9.6  | 0.96 | 10.0              | 796  | 8.8  | 701  | ≥25                            | ≥1992 | 25                         | 199   | 23   | 183   | -0.035                  | 300                                 |
|                                             | ZR-26H  | 10.4                     | 1.04 | 10.2 | 1.02 | 10.2              | 812  | 9.4  | 749  | ≥25                            | ≥1992 | 27                         | 215   | 25   | 199   | -0.035                  | 300                                 |
|                                             | ZR-28H  | 10.8                     | 1.08 | 10.4 | 1.04 | 10.4              | 828  | 9.5  | 757  | ≥25                            | ≥1992 | 29                         | 231   | 27   | 215   | -0.035                  | 300                                 |
|                                             | ZR-30H  | 11.4                     | 1.14 | 10.8 | 1.08 | 10.6              | 844  | 10.0 | 797  | ≥25                            | ≥1992 | 31                         | 247   | 29   | 231   | -0.035                  | 300                                 |
|                                             | ZR-32H  | 12.0                     | 1.20 | 11.2 | 1.12 | 10.8              | 860  | 10.2 | 813  | ≥25                            | ≥1992 | 34                         | 271   | 30   | 239   | -0.035                  | 300                                 |

Typical Reversible Temperature coefficient (RTC)

Note: For the above mentioned magnet grade, magnetic parameters could be customized for specific requirements; Curie Temp、RTC is only for reference.



# Products & Technology

## Inspection Equipment



**Particle Size  
Distribution Analyzer**



**SEM**



**XRD**



**ICP**



**Automatic Thermal  
Demagnetization  
Detection System**



**PBH**



**ONS  
Analyzer**



**PM Non-destructive  
Testing System**



**XRF**

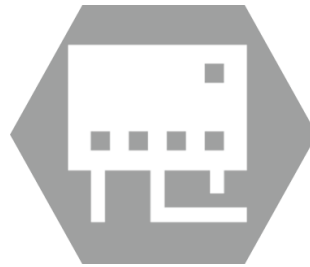


**FE-EPMA**

# Products & Technology

## Application

**Major applications: aerospace, military, industry automation, automotive, communication, oil & gas, instruments and etc.**



# Content



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**Company Advantage**

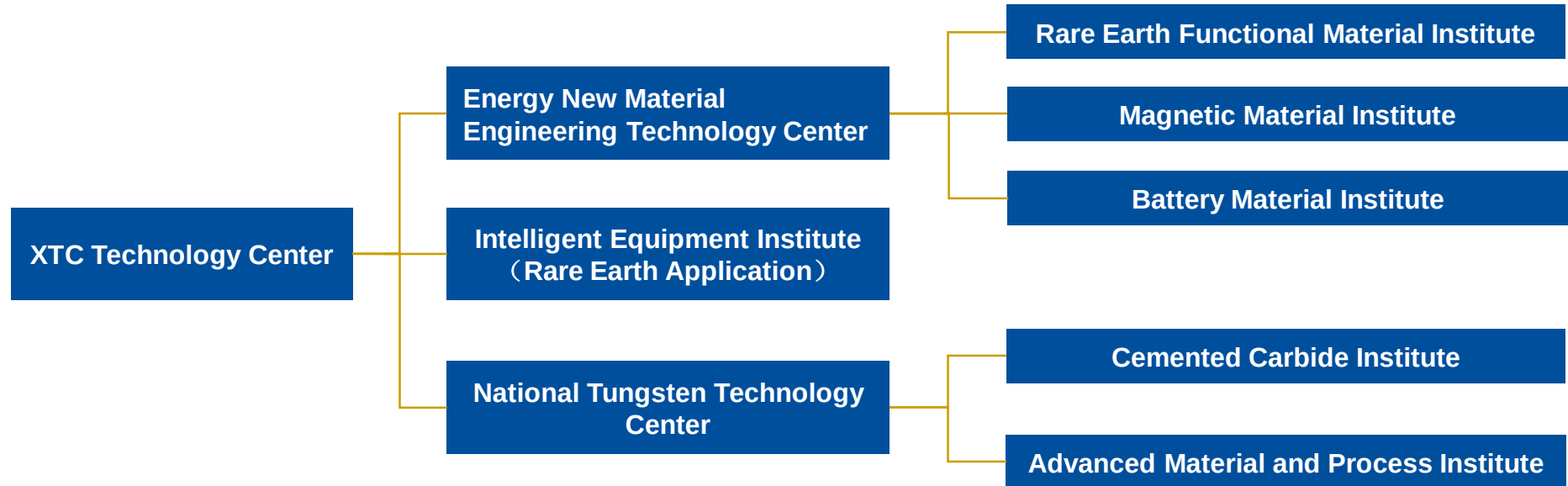


# Company Advantage

## Technology Share Platform

**With 600 million CNY investment, XTC owns national level technology center, intelligent equipment institute, and two post-doctor stations.**

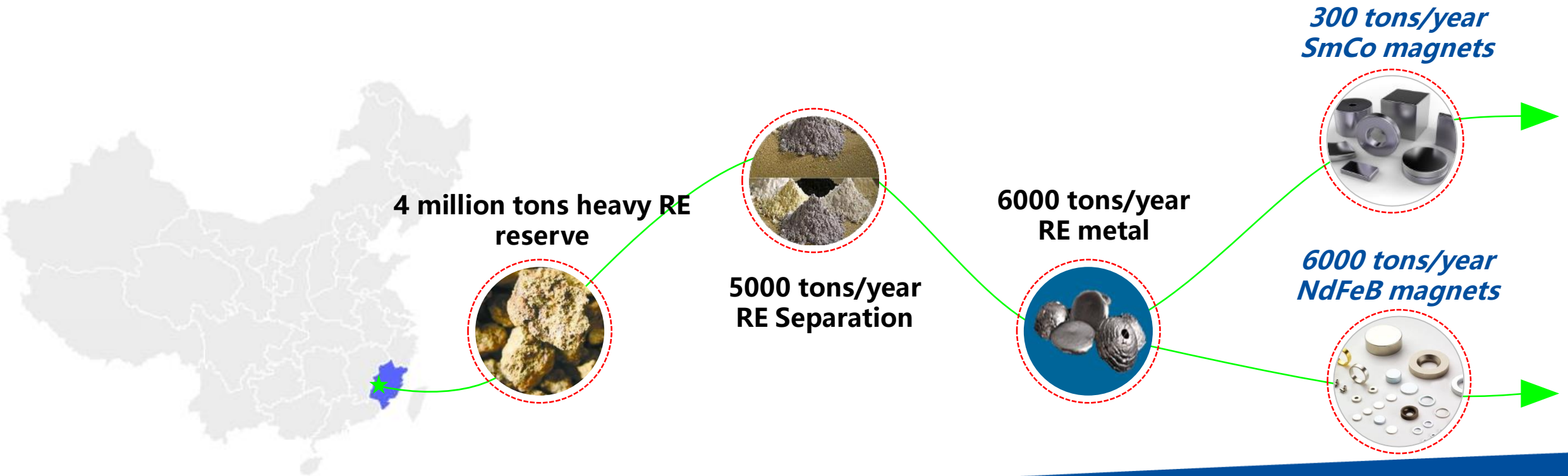
**CAS, Xiamen Government, allied with XTC to build the Chinese Academy of Science West Coast (Xiamen) RE Research Institute.**



# Company Advantage

Complete chain of rare earth industry

Xiamen Tungsten Co. owns complete chain of rare earth industrial system, which covers rare earth mining, smelting and separation, rare earth functional material (rare earth permanent magnet, luminescent material, and storage material), research, application, and etc.

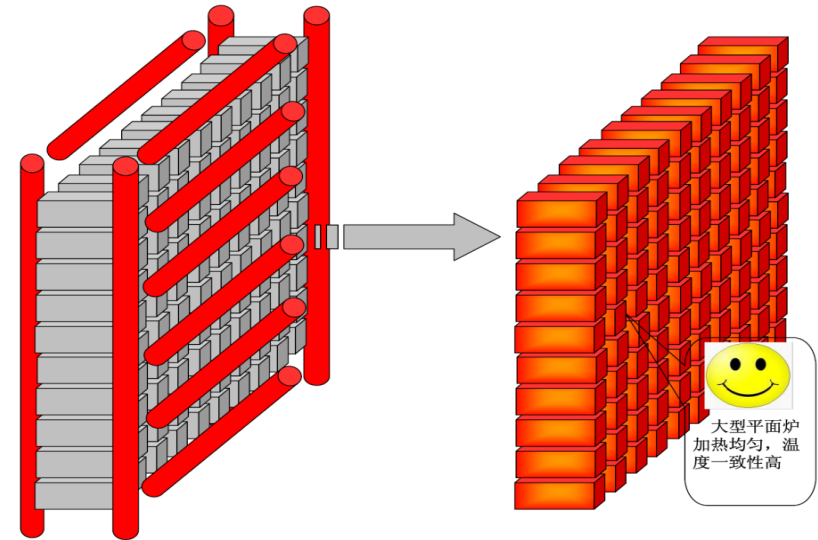


# Company Advantage

## Advanced Equipment



- ❑ Patented flat sintering furnace
- ❑ Even heat ensures quality consistency and stability
- ❑ Enables mass production

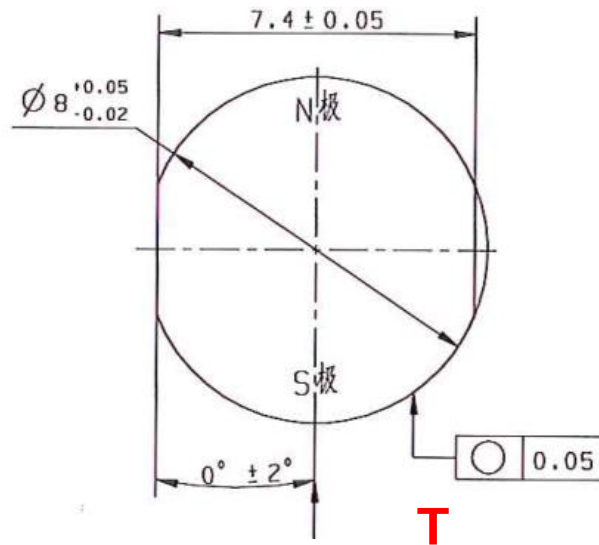


# Company Advantage

## Solution Case Study

### Factors influences magnetic declination

- *Magnetic field diversity*
- *Machining quality*



### Solution

- *Optimize production process*
- *Optimize machining process*

*Ensure magnetic declination less than  $2^\circ$*

# Thanks !

Dedicated to be the leading, reliable and professional manufacturer of SmCo magnet and magnetic assemblies !

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