



A global provider of integrated high-temperature alloy solutions for industrial furnaces





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COMPANY PROFILE

Qingdao NPA Industry Co., Ltd. is a subsidiary of China Iron & Steel Research Institute Group. It serves the high-temperature alloy industry of global industrial furnace and enhances the value for customers with integrated product solution output and total life cycle management, producing high-temperature alloy products with operating temperature between 900-1250 C, mainly used in petrochemical ethylene cracking furnace, hydrogen/methanol/ammonia conversion furnace, styrene superheated steam furnace, metallurgical auto plate continuous annealing line/galvanizing line, wide thick plate production line, silicon steel line, glass building materials float line and other fields.



The total investment is
USD 111 million



Production capacity
30,000 Tonnes / year



Covers an area of
190,000 square meter



More than
1500 equipments



R & D CAPABILITIES

Technological innovation and industrial upgrade

180⁺

scientific research and development projects

286⁺

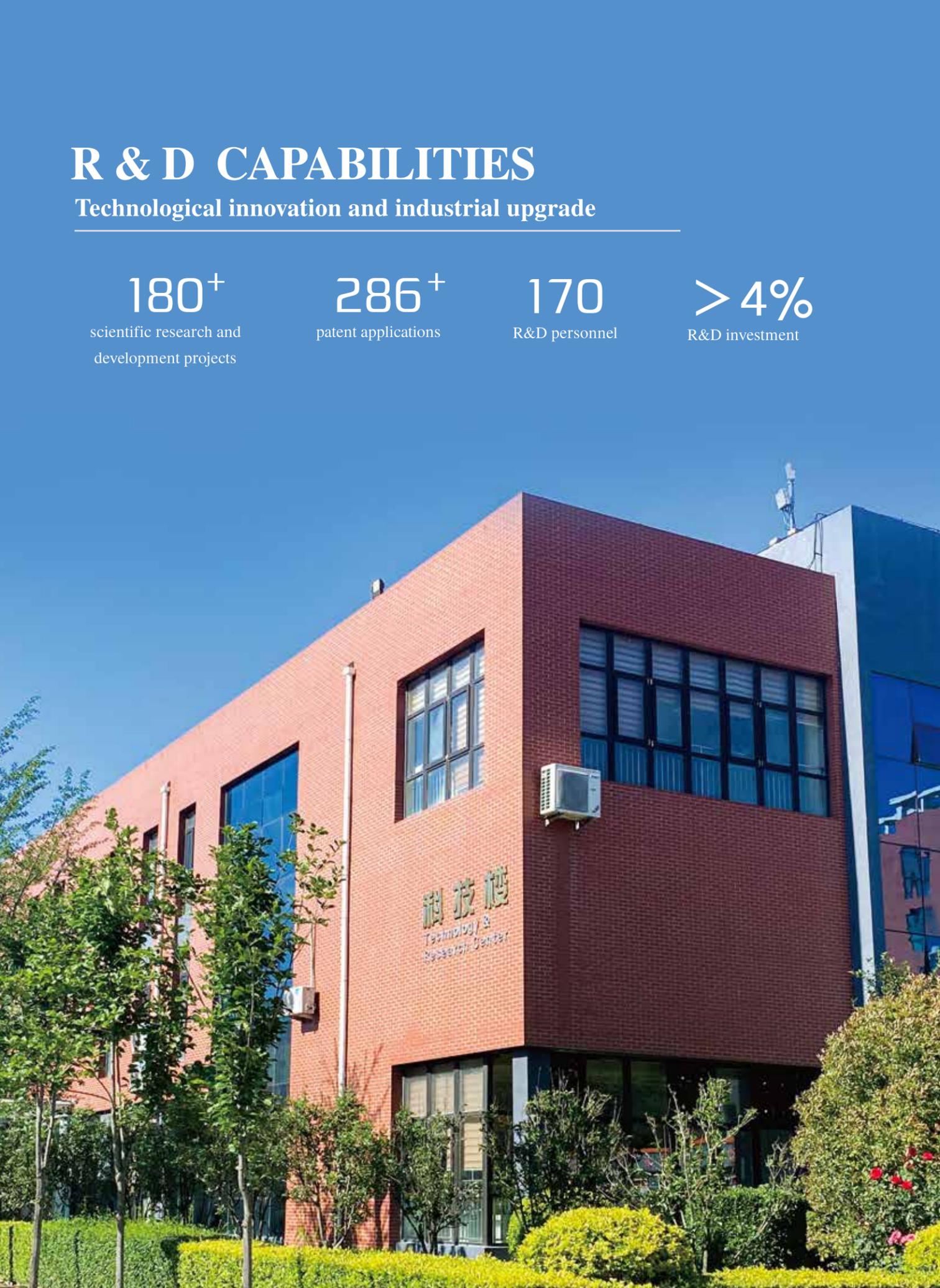
patent applications

170

R&D personnel

>4%

R&D investment



NEW ACHIEVEMENTS IN SCIENTIFIC RESEARCH

3D digital tube bending machine

- **Welding firstly:** After welding and grinding, the straight pipe is bent into U shape and S shape.
- **Bending integrally:** As for the moderate long pipe, the whole pipe section directly be bent U and S shape.
- **Reducing the coking of the furnace tube:** The welding seam of the elbow disappears or the welding root is cleaned up neatly, which solves the problem of coking caused by the failure grinding of the root of the welding seam between the U-shaped tube and the S-shaped tube.



NH1949 new anti-coking material

- The first in China innovative anti-coking superalloy furnace tube.
- The comprehensive anti-coking performance has reached the highest level in the world.
- Breaking through the worldwide coking problem of cracking furnace tube in the petrochemical industry.
- **Anti-coking:** Extend the coking period by 2-5 times, reduce the amount of coke
- **Anti-oxidation:** It can completely resist oxidation in 1200 C
- **Energy saving and consumption reduction:** it can save 600 yuan / ton / year for the domestic ethylene industry.

The company has completed the layout of intellectual property rights in 42 countries around the world, and has obtained the invention patent authorization from China, the European Union, Japan, Russia, Saudi Arabia, South Africa, South Korea, Singapore, Canada, India, Brazil, Ukraine, and in other countries, NH1949 has passed the first and second patent trials.



EQUIPMENT CAPABILITY

Resonable process of multi-variety production and NPA's production equipment technology leads the field.

Melting Capacity

- 22 intermediate frequency furnaces 250-1000kg
- 1 electric arc furnaces 1500-5000kg
- 2 vacuum furnaces 50-150kg
- 4 drying ovens

Centrifugal Casting Equipments

- 25 horizontal casting machines
- 2 vertical casting machines
- Over 800 sets of moulds

Static Castings

- 2 complete, automatic, precision casting, production lines
- 2 complete sand mould production lines

Machining Facilities

- 40 boring machines
- 29 CNC cutting and bevelling machines
- 45 CNC lathes
- 8 CNC drilling machines
- 6 CNC milling machines
- 6 CNC grinders
- 1 gantry boring and milling centre
- 8 horizontal milling and boring machines

Welding

- 98 argon arc welding machines
- 4 sets of automatic welding machines
- 6 welding robots

Others

- 14 shot blasting machines
- 5 3D digital stereo pipe benders
- 8 heat treatment furnaces

① Automatic casting

② Automatic straightening

③ Gantry truss

④ CNC Boring and Milling Machine

⑤ Automatic feeding deep hole boring

⑥ Self-fusing bottoming automatic welding



QUALITY ASSURANCE ABILITY

Our quality assurance goal is to ensure and improve quality.

Test on Production Line

- Spectrometer
- Positive material identification
- Liquid penetrant inspection
- Eddy current tester
- Radiographic examination or digital radiographic examination
- Air tightness testing machine
- Hydraulic testing machine
- Endoscope
- Ultrasonic thickness gauge
- Roughness detector
- Size and appearance inspection
- Dynamic/Static Balancer
- Roll Formers



Laboratory testing

- Spectrometer
- Oxygen, nitrogen and hydrogen analyser
- Wet analysis (analysis of trace element content)
- Carbon and sulphur analyser
- Macro-corrosion
- Microscopic metallography
- Chloride ion tester
- Material corrosion resistance testing machine
- Room temperature and high temperature short-term mechanical performance testing machine
- High temperature endurance testing machine (800-1200°C/41 sets)
- Hardness testing machine



SUPPLY ASSURANCE CAPABILITY

Take multiple measures to ensure delivery



- **Quick response:**

NPA is able to scheme, analyze and control the factors which may affect delivery date by designing and purchasing moulds and booking butout pieces especially import items for example.

- **Project Planning**

Each project includes a project planning meeting to clarify the project plan, execution nodes and follow-up inspections.

- **Production schedule control**

The project operation department and the manufacturing centre jointly control the production schedule, and the project dispatch tracks the production schedule.

- **Procurement and logistics control**

The project operations department and the procurement department jointly control the purchase of raw materials and outsourced parts, they also conduct the track, and quality control activities.

- **Logistics Control**

The logistics team plans the route to ensure speedy despatch and delivery. The factory is close to Qingdao sea-port, airport and the Express.

SERVICE INTEGRATION

Integration of pre-sales, in-sales, and after-sales services.



Service philosophy

- Customer-centred
- Enthusiastic service, with a quick resolution of any issues that arise



Service Commitment

- Short lead time with high quality



Integrated service

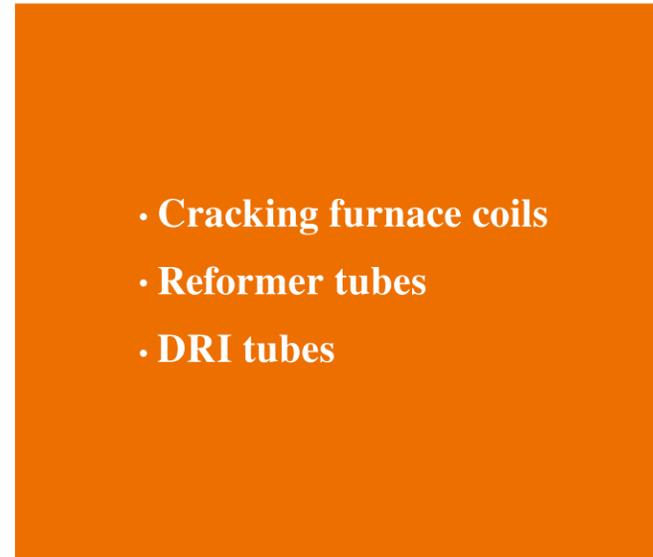
- Pre-sales:disadvantage correction & new product development
- In-sales: technical solutions & business negotiation
- After-sales: quality assurance & service leadership

INTEGRATED SOLUTION

Sinopec ethylene framework agreement:We are NO.1 in this agreement for 8 consecutive years (2015-2025), accounting for more than 60% of the market share, and providing hundreds of furnace tube spare parts for the refining and chemical enterprises within the framework agreement.

Anti-coking new material (NH1949):The new material has excellent high-temperature mechanical properties, It can automatically form a uniform, dense, and thermally stable oxide film in a high-temperature environment.It ensures that the alloy has excellent resistance to oxidation, carburization and coking.Its operating temperature can reach to 1250°C.

The division of production is more clear:The production lines of cracking furnace tubes and reforming furnace tubes are clearly divided,and the production lines of new materials and conventional materials are clearly divided.And we have also built 4 automated production lines to ensure the quality, quantity and delivery date of orders.



PRODUCT TYPE

01. Ethylene cracking furnace

- Working condition: 850-1050 °C (max 1100 °C)
- Outer diameter: 50-200mm
- (Pipe section) length: ≤6400mm
- Inner wall finish: Ra≤3.2μm (internal control 1.6μm)
- Bayberry particle layer: ≤0.8mm
- Service life: 8 years

02. Hydrogen production/Methanol production/Ammonia synthesis reformer furnace tube

- Working condition: 800-980 °C
operating pressure 2.5-3.5MPa
- Outer diameter: 100-300mm
- (Pipe section) length: ≤6400mm
- Inner wall finish: Ra≤3.2μm (internal control 1.6μm)
- Bayberry particle layer: ≤0.8mm
- Service life: >15 years

03. DRI tubes

- Working condition: 800-1200 °C, operating pressure 0.5-2MPa
- Outer diameter: 90-300mm
- (Pipe section) length: ≤6400mm
- Inner wall finish: Ra≤3.2 μm (internal control 1.6 μm)
- Bayberry particle layer: ≤0.8mm
- Service life: 8 years



STATIC CASTING

CAE(Computer Aided Engineering) process design technology

CAE(Computer Aided Engineering)simulates the temperature distribution, the filling and solidification process, performs repeated design and confirmation, and adopts the precise upper and lower box design, and finally produces a useable pre-production casting program.

Advantages

- To obtain the best casting process, casting stability, and increase the pass rate of static castings;
- The structure of the cast product is more dense and the mechanical properties, more stable.
- To prevent the formation of cracks, shrinkage porosity, and shrinkage holes, and ensure that product quality meets the requirements of the design.

Resin sand static casting

Using furan resin, curing agent and quartz sand mixed modeling, it is mostly used for casting complex large castings and static castings with wall thickness greater than 15mm.

Advantages

- The cavity is sprayed with a zircon powder coating which has high temperature-resistance, and gives good surface quality and finish. This process also gives high casting strength and is suitable for the production of complex castings with large wall thickness;
- The moulding sand has good collapsibility, is easy to clean, has good moulding properties, low air generation, high thermal stability and good air permeability;
- The process reduces casting defects such as sand sticking, sand inclusion, blisters, pores, shrinkage holes, and cracks.

Lost wax precision casting

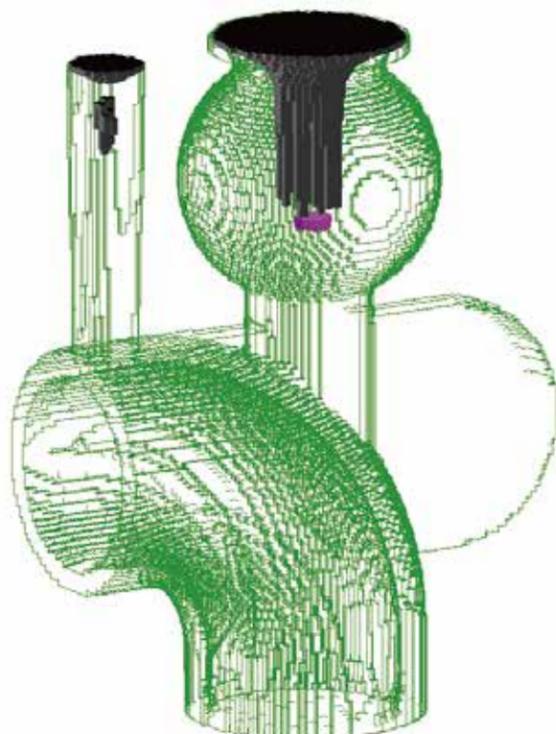
The shell is made of silica sol, zircon powder, medium temperature wax, and mullite, this process is mostly used to produce thin-walled castings, such as twisted pieces, small Y-shaped tubes, etc.

Advantages

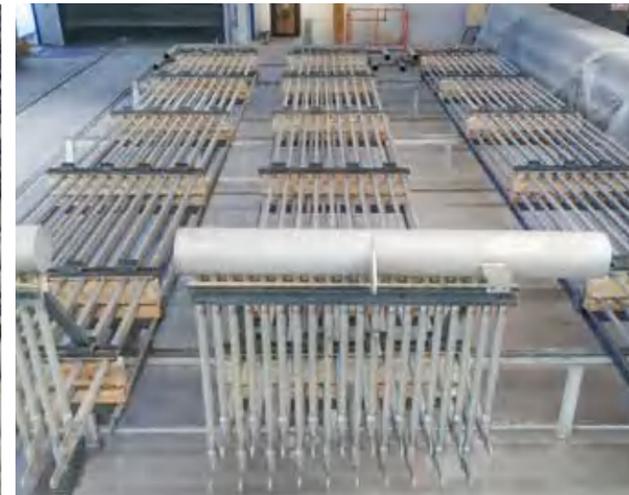
- The surface finish quality is high, the finish can be down to Ra 3.2 micro metres;
- The shell has high strength, minimum deformation of the casting and high dimensional accuracy.

Complete mold

- We have more than 800 sets of wooden and metal molds such as elbows, Y-shaped tubes, twisted sheet tubes, palm tubes, reducer tubes, tees, crosses, etc;
- Suitable for cracking furnace tube fittings, reformer tube fittings, metallurgical radiant tube elbows, brackets and other specifications and models;
- They can be customized by to suit many customers.



TYPICAL PRODUCTS



CUSTOMER VALUES

To meet customer requirements as the baseline;
to exceed their expectations as the goal, and consistently create greater value for our customers

Strategic Cooperation

- Sinopec ethylene furnace pipe framework agreement No. 1 (8 consecutive since 2015)
- 5-year framework agreement with Technip, a leading international petrochemical engineering company
- 5-year framework agreement with Sabic, a leading international petrochemical company
- 3-year framework agreement with France Fives Stein, an international renowned metallurgical engineering company
- Cooperation with excellent supplier of JFE in Japan

Number of clients

Total number of customers 600+
Domestic customers 400+
Foreign customers 200+



CUSTOMER CASE

Performance description

- International Petrochemical:

Continuously provide integrated solutions for international petrochemical end-users such as Sabc, Exxon Mobill, Braskem Idesa, PCS, SIBUR and international petrochemical engineering & design companies such as Technip, Heurtey, Lummus, Linde, KT, Air Liquide, ITT, TOYO.

In 2021, NPA successfully signed a contract with ExxonMobil Huizhou Ethylene Project to supply 7/10 furnances ethylene cracking tube rows, and in 2022, signed a contract with BASF Zhanjiang Project to supply 7/7 furnances ethylene cracking tube rows.

NPA are involved in Xinpu Olefin (Taixing) 400K Tons/Year Vinyl chloride project in 2021, BASF Zhanjiang integration project in 2022, supplied 6+1 furnances, Brazil Petrochemical HDT project and India HMEL project in 2023, 148 sets of reforming tubes project of PetroINEOS in 2024, 18 Sub-Harps project of Eurochem in 2024; Also in 2024, we supplied Mobarakeh Steel Complex with 350 sets of reforming tubes, Persian Gulf Saba Steel with 510 sets of reforming tubes, BALTIC CHEMICAL PLANT with 4 furnances, and Pacific with 10 furnances.

- Domestic petrochemical:

NPA are involved in domestic new large-scale ethylene projects, we supply 18 furnances to Zhejiang Petrochemical Phase I and II, 6 furnances in Hengli, 3 furnances in Xinpu, 8 furnances in Lianyungang Petrochemical, 6 furnances in Yantai Wanhua, 4 furnances in Zhanjiang Zhongke, 4 furnances in Gulei Petrochemical, 5 furnances in Zhenhai Refining, 4 furnances in Hainan Refining, 4 furnances in Tianjin Petrochemical, 11 furnances in Yulongdao Project, 7 furnances in Wanhua Phase II, 5 furnances in Jihua, 8 furnances in Xinhua Jin; market share in the domestic ethylene cracking tube market is over 60%;

In the past five years, the market share of Sinopec's reforming tube project is more than 70%, for example, the contracted 100,000 standard cubic meters of hydrogen production project of Tianjin Petrochemical Company was well received by the end-user and the design institute, and the 766 sets of reforming tubes of Qinghai Guilu were completed and delivered to the site within 35 days, which created a miracle in the industry;

In the past five years, NPA has supplied 100+ whole furnances of cracking radiant section tubes and 50+ whole hydrogen reforming tubes to Sinopec, PetroChina, CNOOC and local refineries;

NH1949 new material has started to be fully promoted, and was first applied in Dushanzi Petrochemical Company's million-ton ethylene plant in October 2020. 2 additional furnances have been signed in 2021 in Dushanzi.

In 2022, we have signed 1 furnace with Liaoyang Petrochemical and Lanzhou Petrochemical respectively, and in 2023, we have signed 2 furnances with Yantai Wanhua Chemical, 1 furnace with Dalian Hengli Petrochemical, 1 furnace with Birwelco America, 2 furnances with BALTIC CHEMICAL PLANT, 10 furnances with Pacific Corp. and other contracts of new materials.



ExxonMobil

1.6 million tons of ethylene
December 2022



BASF

1 million tons of ethylene
May 2024



SABIC Fujian Petrochemical Complex

1.5 million tons of ethylene
December 2024



LUMMUS

SRT Cracking Furnaces -
HMEL Project
July 2023



Pacific Corp.

10 Furnaces (Technip design)
NH1949 new anti-coking material
December 2024



Heurtey

54 sets of catalyst tubes
assemblies
May 2022



PetroINEOS

148 Sets of Reforming Tubes
November 2024



Saba Steel

510 pcs reforming tubes(DRI)
November 2024



EUROCHEM

18 Sub-Harps
December 2024

NPA PRODUCT PROFILE
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COMPANY CULTURE



Vision

To be the global leader in technological innovation and system services for high-temperature alloys in industrial furnaces, building an industrial ecosystem for furnace energy efficiency management



Mission

To equip the "industrial heart" with "bulletproof" reliability, safeguarding the safety and value of customer assets through technology and integrity



Core Values

Integrity, Responsibility
Harmony, Improvement



企业责任

To conserve resources and ensure safety and environmental protection; to build smart and green factories; and to create a happy and fulfilling work-life platform for our employees

SOCIAL HONOUR



System Certification

TUV ISO certifications
European pressure vessel standard PED certification
Intellectual property management system certification



Industry Recognition

Outstanding Supplier of ExxonMobil
Outstanding Supplier of Sinopec Shanghai Petrochemical
Outstanding Supplier of Sinopec Hainan Refining & Chemical
Outstanding Supplier of Wison Engineering (China)
Outstanding Contractor of CNOOC Dongfang Petrochemical
High-quality Supplier of Sinopec EC Procurement Platform
Outstanding Supplier in the Steel Industry
Outstanding Supplier of JFE

