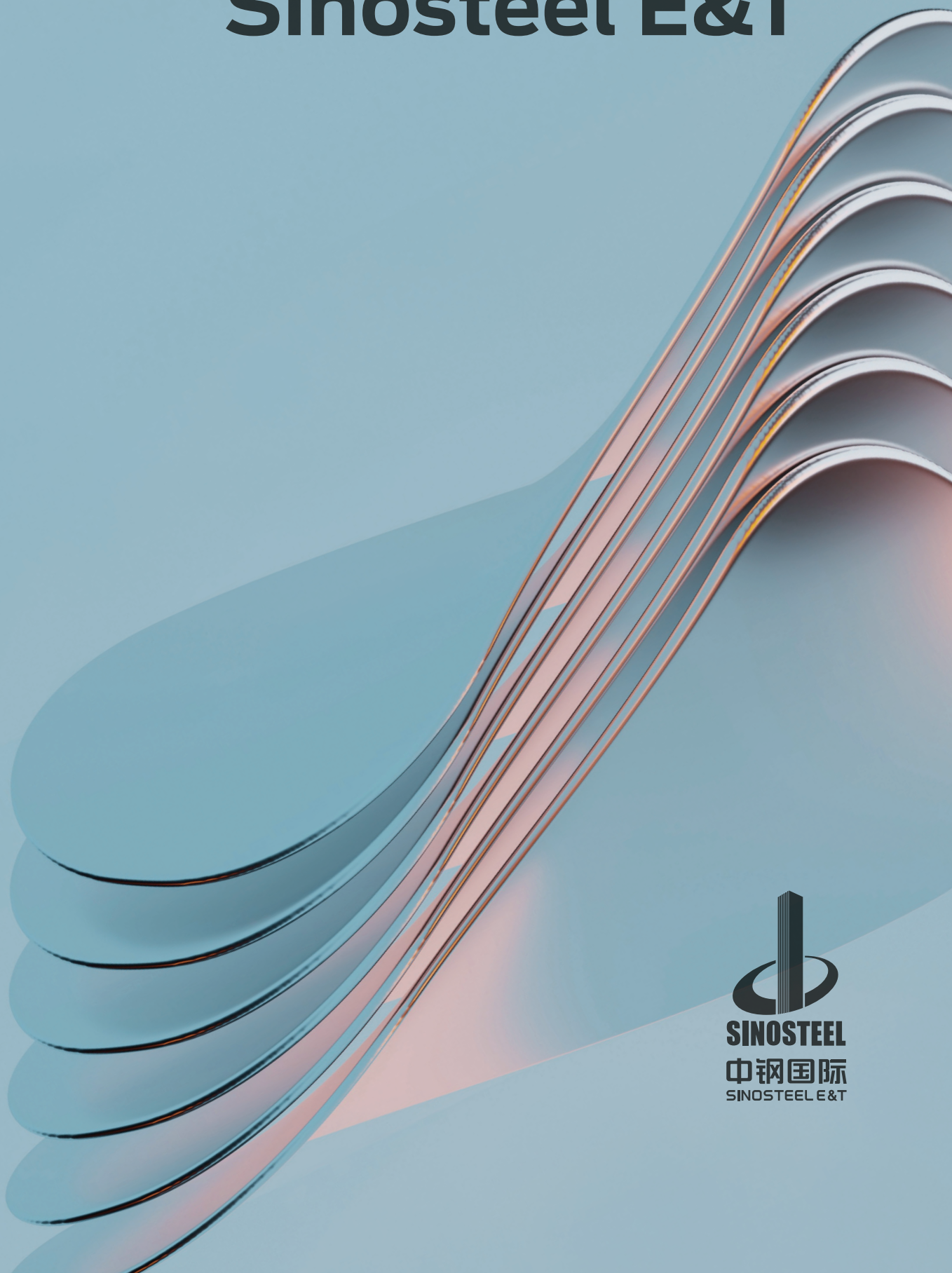
Sinosteel E&T



SINOSTEEL
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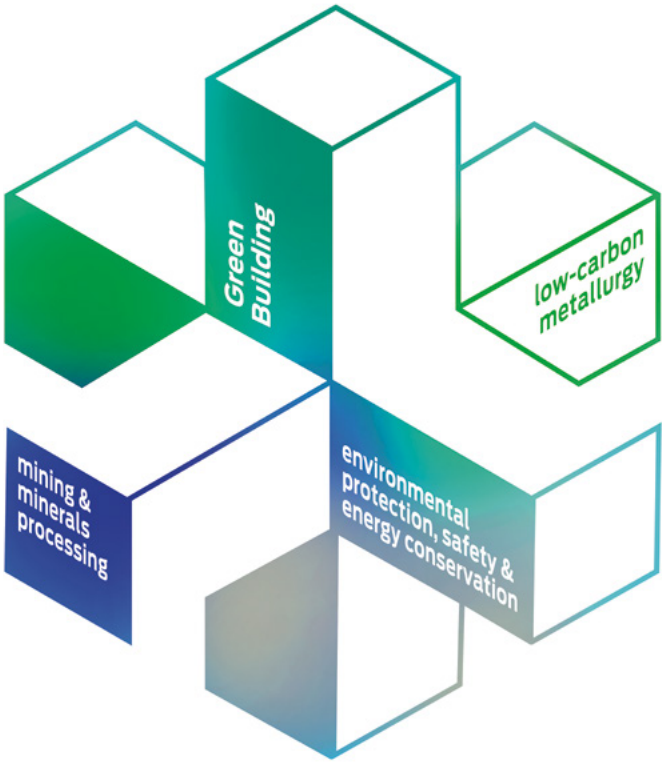


Strive to become a world-leading service provider in industrial engineering and technology.

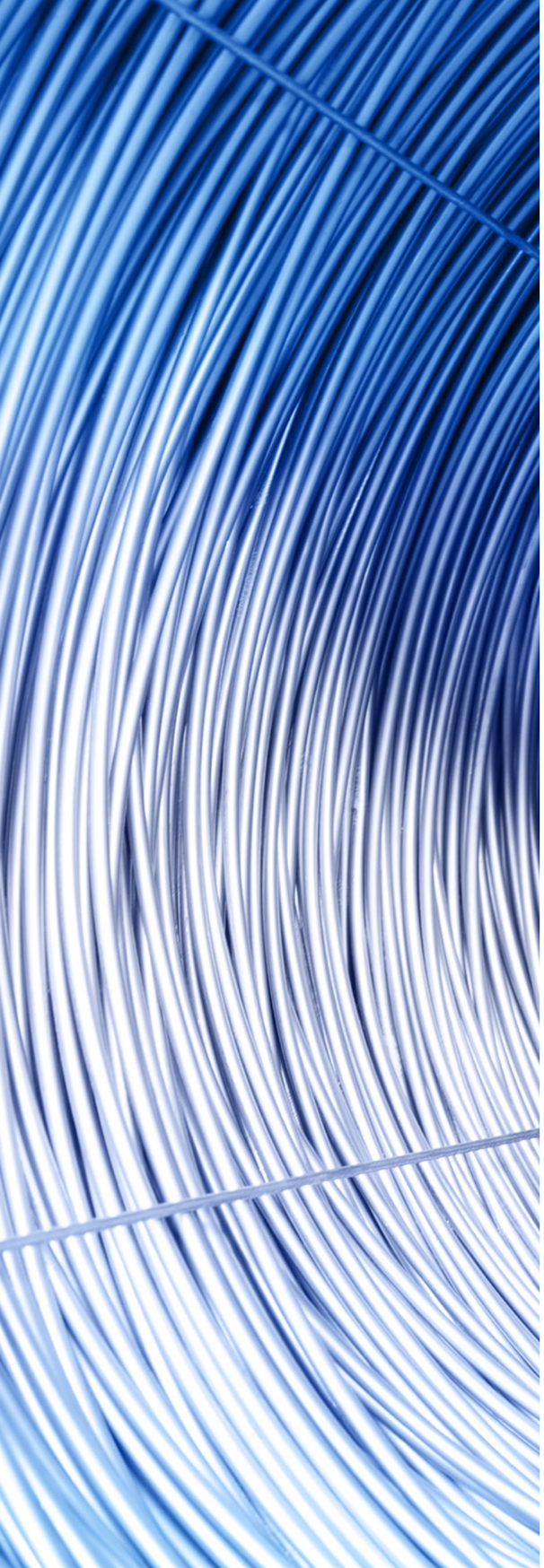
SINOSTEEL E&T

Towards a Greener and Smarter Industry.
Towards a Better Life and Better Society.

An Engineering & Technology Service provider with *Green, Smart, and Innovative System Solutions* covering the *Full Lifecycle.*

SINOSTEEL E&T

Beyond Expectations



01

Who We Are

An engineering & technology service provider with green, smart, and innovative system solutions covering the full life cycle.

Sinosteel Engineering & Technology Co., Ltd. (Sinosteel E&T, stock code: 000928) is a member of China Baowu Steel Group Corporation (China Baowu). As a listed company leading industrial engineering and technology at home and abroad with business in more than 40 countries worldwide, we devote ourselves to becoming “an engineering and technology service provider with green, smart, and innovative system solutions covering the full lifecycle”.

Sinosteel E&T, with a focus on “Green manufacturing, Green lifecycle”, is dedicated to fostering green development, propelled by innovation in science and technology through digitized and intelligent processes. We primarily engage in EPC contracting and industrial services as our core business, delivering comprehensive solutions for our clients. Our offerings span the entire spectrum of low-carbon metallurgy, mining & mineral processing, safety, energy conservation, environmental protection, and green building. We strive to create value and contribute to the sustainable development of the steel industry and other related sectors.

Milestones

1972

Founded.

1999

Started the international project contracting by exporting 750,000t bar mill to ICDAS Türkiye.

2004

Contracted a group of large-scale projects with world-class influence, including the then largest blast furnace (3,050m^3), sinter (300m^2), and coke oven (6m, 2×65 chambers) projects in Türkiye and coke oven (6m, 2×60 chambers) project in Sumitomo, Japan, which marked a technological breakthrough in China's large-scale blast furnace, sinter, and coke oven exported to overseas countries.

2014

Listed on the Shenzhen Stock Exchange (stock code: 000928).

2015

Signed an EPC contract of 2.3mtpa steel complex project with Tosyali in Algeria, the largest integrated steel plant in North Africa and the world's only whole-process low-carbon steel production line from pellet to DRI+EAF+Steel rolling, including the world's largest DRI (2.5mtpa) and EAF projects.

2016

Signed an EPC contract for mutun' steel complex project in Bolivia, the first integrated steel plant project in Latin America.

2019

Ranked 107th in ENR's Top 250 International Contractors list, a new record high.

2021

Contracted a group of green and low-carbon metallurgy projects including a 430m^3 Hydrogen-enriched Carbonic oxide Recycling Oxygenate Furnace (HyCROF) for China Baowu Xinjiang Bayi Iron & Steel, Tosyali Algeria Phase IV integrated steel plant project (short-process), and Baosteel Zhanjiang's million-ton hydrogen-based shaft furnace project.

2022

Signed a 1mtpa green and low-carbon thin-strip casting and rolling project to build the first thin-strip casting and rolling line with independent intellectual property rights in China.

2023

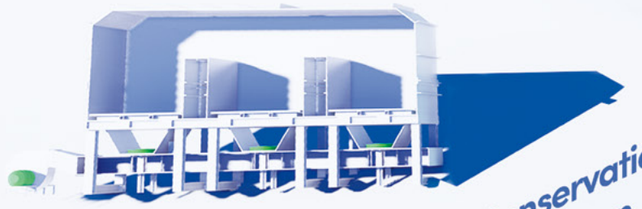
Put into use the first coke oven of the MMK 2.5mtpa cokemaking project in Russia, the most heavily invested and largest Russian cokemaking project in the last 40 years and also the largest overseas cokemaking project signed by a Chinese EPC contractor to date.

02

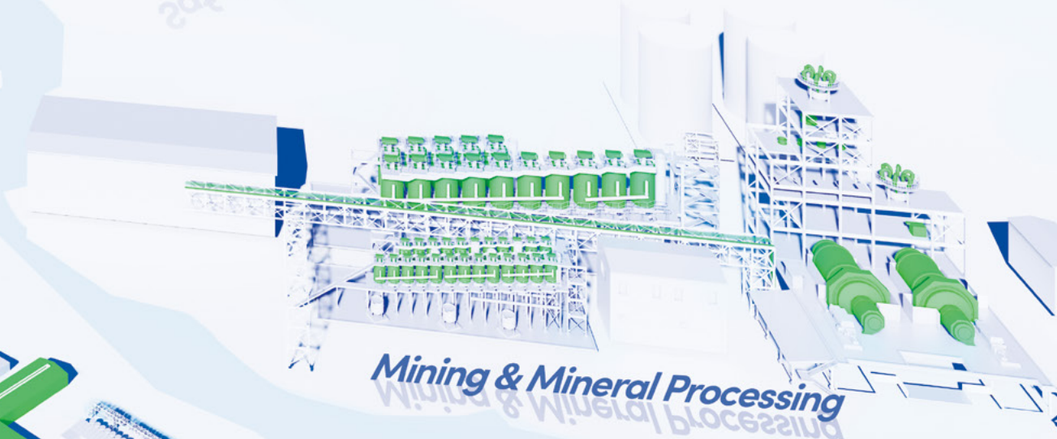
Business Overview

Covering the full lifecycle, our integrated service portfolios include whole-process low-carbon metallurgy engineering, mining and mineral processing, as well as safety, energy conservation, and environmental protection.

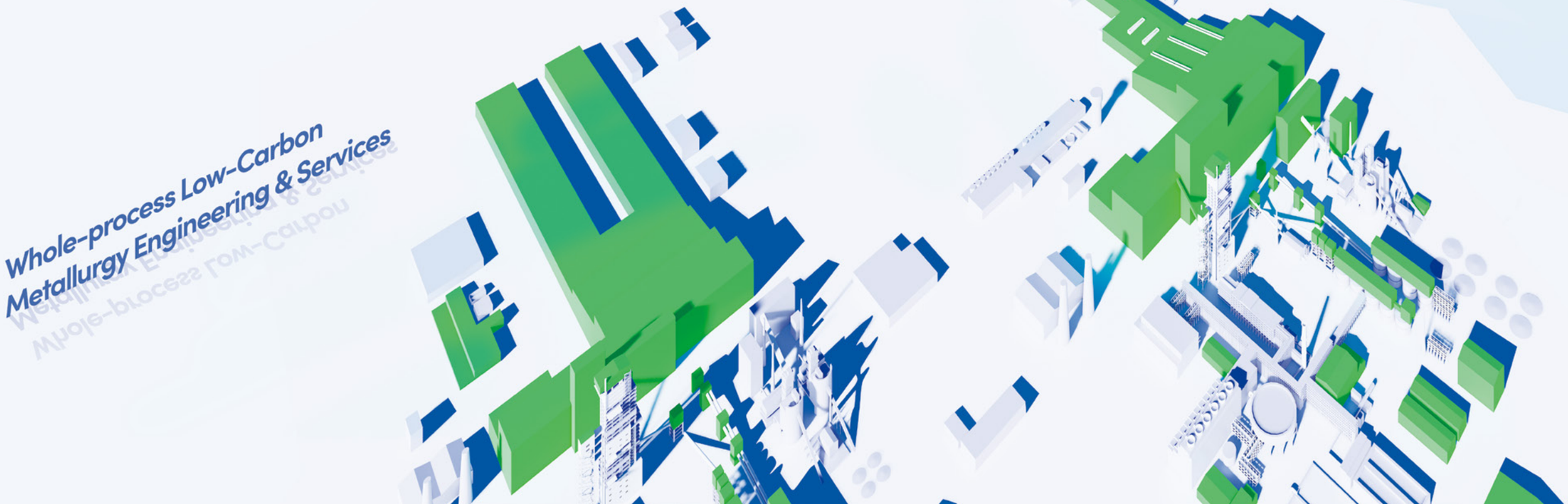
We are always ready to customize integrated solutions to satisfy our customers.



Safety, Energy Conservation & Environmental Protection



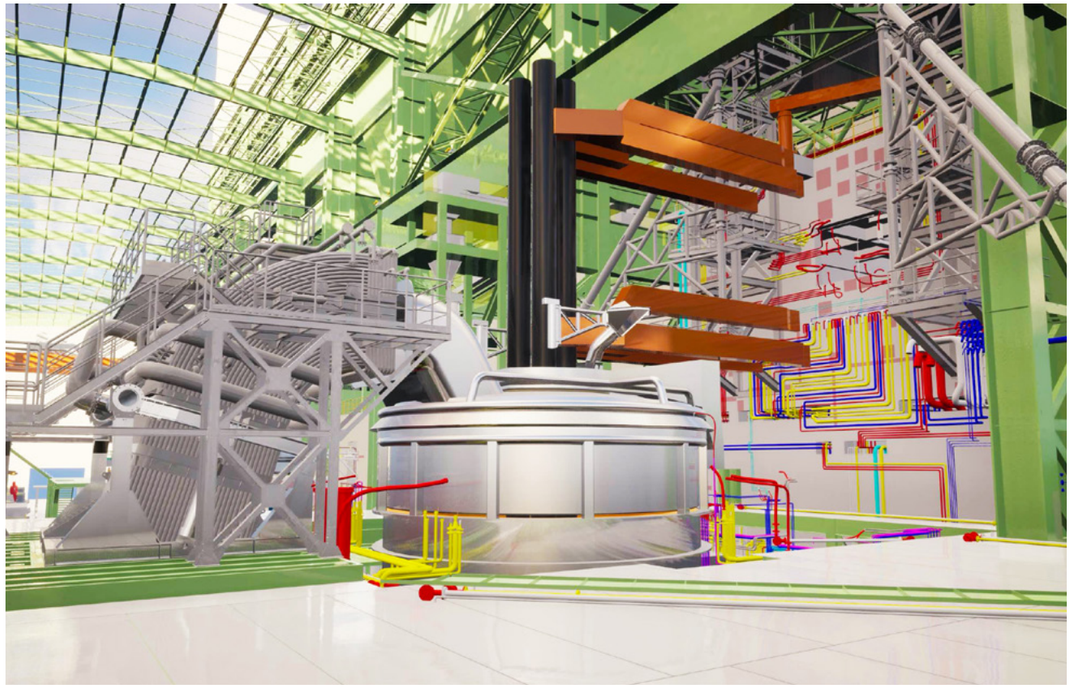
Mining & Mineral Processing



Whole-process Low-Carbon Metallurgy Engineering & Services

Whole-process Low-Carbon Metallurgy Engineering & Services

As the sole company in China possessing integrated EPC (Engineering, Procurement, and Construction) capabilities for large-scale steel complexes, we provide services covering the entire process from mining to final steel products. We are committed to enhancing sustainability, profitability, and efficiency for our clients with our comprehensive and low-carbon solutions. With five decades of metallurgy expertise applied to our cutting-edge technology in carbon emissions reduction and environmental protection, we offer a diverse range of services. These include hydrogen metallurgy, HyCROF, EAF, thin-strip casting and rolling, efficient and precise rolling techniques and equipment for long products, cold rolling, and other subsequent processing lines.



Tosyali Integrated Steel Plant (short - process) Phase III & IV, Algeria

EPC

2016 – 2018/2021 – 2024*

Two 4mtpa beneficiation plants, two 4mtpa traveling grate iron ore pelletizing (TGIOP) plants, two 2.5mtpa DRI plants, two 240t EAF, a 1.95mtpa bar mill, a 1800mm hot-strip rolling mill and supporting public auxiliary facilities.

PhaseIII & IV:

- The largest integrated steel plant in North Africa with high energy efficiency
- Equipped with Sinosteel E&T's patented TGIOP technology, long product rolling, and the world's largest EAF
- With a green and low-carbon production line from a gas-based shaft furnace for DRI to EAF steel-making
- Carbon emission as low as 0.5~0.6 tons per ton of DRI products
- HDRI power consumption per ton of steel reduced from 550kWh to 400kWh
- Smelting time 17% shorter
- EAF capacity up by over 17%

Mutún Integrated Steel Plant, Bolivia

EPC

2019 – 2024*

An 820,000tpa beneficiation plant, 400,000tpa pellets, 250,000tpa DRI, a 202,000tpa steel-making workshop, a 194,000tpa steel-rolling workshop and supporting public auxiliary systems (108MW isolated grid power supply and 115KM water intake pipeline)

- The first integrated steel plant in Bolivia
- Key governmental project in Bolivia's National Development Plan (Plan Nacional de Desarrollo, PND)

Plan Consulting

As a domestic leader in planning a whole process and system for iron and steel enterprises, Sinosteel E&T collaborates with top technical experts to provide clients with planning and consulting services covering the whole process from mining to steel metallurgy oriented by green, low carbon and intelligent technologies, including layout and planning for iron and steel bases, industrial structure adjustments and optimization, overall design, logistics system diagnosis and optimization, due diligence and evaluation, project initiation planning and research together with the base general layout management.

- Steel base layout and planning
- Industrial structure adjustment and optimization
- Overall design
- implementation
- Base layout management
- Project planning and research
- Due diligence and evaluation
- Logistics system diagnosis and optimization

Overall Design for Baosteel's Steel Plant in Yancheng, China

Overall Design

2019 – 2021

Envisioned to design a future steel plant with

- Stable and high-quality supply of advanced technical equipment
- Low energy consumption and high labor productivity
- Effective environmental protection
- Reasonable project investment
- The highest-level competency
- Living up to standards of "no solid waste, zero waste water discharge, and ultra-low waste gas emission"

Research Report on Industrial Layout Adjustment and Product Structure Optimization for China Baowu Steel Group, China

Industrial Planning Research

2019 – 2021

- Explores the regions and varieties with the greatest potential in structural optimization for development
- Predicts development trends in steel consumption volume, structure, and supply in different regions of China
- Analyzes market competitiveness of self-developed products and major challenges for each base
- Offers comments and insights about development trends in steel demand

Hydrogen metallurgy

A veteran in technologies for carbon emission reduction during the steel-making process and as China's first enterprise to construct a gas-based shaft furnace for DRI projects, Sinosteel E&T can provide tailor-made solutions to equipment and technology, engineering construction, and project management. Current technologies under R&D include new non-BF technologies (direct reduction, smelting reduction and hydrogen metallurgy) and low-carbon metallurgy technologies, equipment, and engineering in gas preparation, purification, heating and reforming, integration of steel energy with carbon emission reduction, CCUS, materials for low-carbon metallurgy, and clean energy (wind, solar and hydrogen energy).

We have signed and implemented **6 DRI projects** worldwide, **including two of world's largest DRI** projects that have been put into production.

6 DRI projects

2 of world's largest DRI

Hydrogen metallurgy

Technology & Benefits:

Direct reduction - a low-carbon iron making process

- To reduce ~50% CO_2 emissions per ton of steel with the combination of a hydrogen-based shaft furnace and EAF in a short process (natural gas used as a supplementary gas, without regard to carbon capture and utilization) compared to the performance of a long process in blast furnaces
- Cut down 80% carbon emissions where all hydrogen utilized as a reducing gas
- Gas-based shaft furnace for both high-grade iron ore via direct reduction and for low-grade iron ore combined with a smelting furnace, leading a significant technological pathway toward carbon neutrality in the steel making industry

50%
CO_2

80%
carbon emissions

Optimization & Integration of engineering

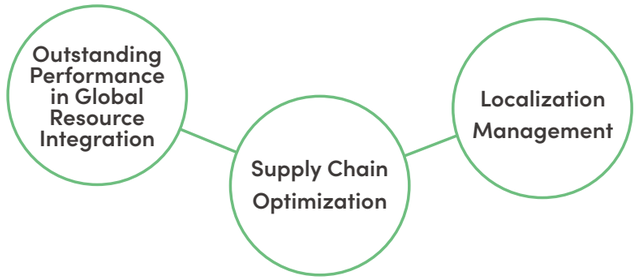
To design considering local conditions such as iron ore quality, energy infrastructure, and existing equipment, as well as local design criteria, rules and regulations

Whole - process project management+digitalization

Highly efficient Building Information Management (BIM) and digital delivery

Adaptability to different standards and development conditions in different countries

- Outstanding performance in global resource integration, supply chain optimization, and localization management
- Two of the world's largest DRI projects completed with the design, supply, and construction in line with European and American standards, and major equipment made in and supplied from China

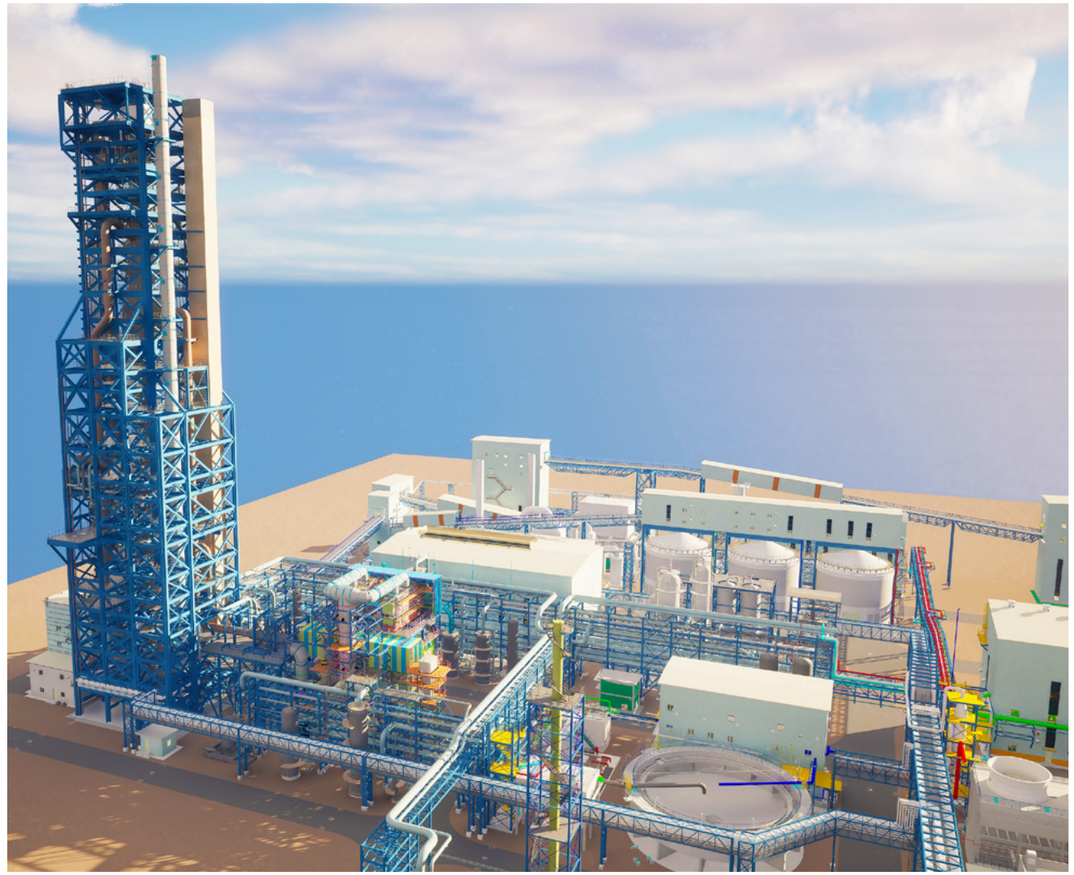


Tosyali 2.5mtpa DRI project, Algeria

EPC

2016 – 2018

One of the world's largest single DRI equipment



Baosteel Zhanjiang's 1mtpa hydrogen-based shaft furnace project, China

Design and key equipment supply, China

2022 – 2023*

- China's first self-integrated million-ton shaft furnace
- The world's first 1mpta-scale shaft furnace for direct reduction with hydrogen
- Available process of hydrogen-rich (50%), high-hydrogen (70%), and even full-hydrogen (80 - 90%) smelting production and testing

Iron making

With rich experience in equipment integration for over five decades and EPC capability for over 20 years, as well as digital know-hows, we excel at engineering design, equipment integration and project construction for a series of 450-4350m^3 blast furnaces. **Greener than ever before,** our technologies and services are combined to **achieve lower emission and lower energy consumption** in intelligent BF iron-making. In addition, such services as new construction, revamp and upgrade are also available at Sinosteel E&T, featuring long campaign life, reliability and higher efficiency. The delivery of digital twin factory is based on BIM three-dimensional design as well. We now rank top in the domestic market share, with the construction of 51 blast furnaces in place at home and abroad totaling the volume of 73,040m^3, among which the contracted overseas projects stand at 13,680m^3.

450-4350m^3

73,040m^3

Industrial Trial HyCROF at China Baowu Group Xinjiang Bayi Iron & Steel, China

EPC

2021 – 2022

A 430m^3 BF applied full-oxygen, hydrogen-rich, and furnace top gas injection after heating with CO_2 removed

- Heating highly reductive gas through regenerative stove
- Electric heating through top-charging closed-circuit gas
- Reductive gas injections from the tuyere and the furnace body
- A 2500m^3 BF upgrading and rebuilding to HyCROF process, expected to be put into production in Oct, 2023

Isdemir 3050m^3 Blast Furnace Project, Türkiye

EP+S+F

2005 – 2010

- The largest blast furnace exported by China at the time
- Winner of National Quality Engineering Award of China

Iron making

Technology & Benefits:

Blast furnace – Long campaign life & Lower energy consumption

- Extension of service life to up to 15 years and reduce 5% in energy consumption
- Extreme energy conservation and consumption reduction
- New cooling stave structure with segmented precision control of heat flows on the cooling stave, and BPRT technology

Extension of service life 15 Yrs

5%
Energy Consumption

15%
manpower

Blast furnace – Higher efficiency

- Digital technologies to save more than 15% of manpower and enhance production efficiency and operation rate
- Intelligent iron making, an expert system for blast furnaces
- Equipment online monitoring system
- Smart furnace equipment and water slag grasping
- Intelligent injection of pulverized coal
- Location and tracking systems for molten iron transportation

HyCROF (Hydrogen-enriched Carbonic oxide Recycling Oxygenate Furnace) -Substantial CO_2 reduction for long-process

- Carbon emissions reduction by over 18%
- A closed-circuit injection of pure oxygen and blast furnace gas with carbon dioxide removed and coal injection for comprehensive smelting to reduce solid fuel consumption by 30%
- Combined with hydrogen-rich injection and green power applications to reduce carbon footprint as high as 40%

30%

18%~40%
CO_2

OY Furnace - Coke saving & Pollutant emission cut

- Designed for a two-stage smelting reduction for iron making
- Integrated with a number of independent innovations such as dust removal by gas filter, gas TRT power generation, shaft furnace center gas, smelting gasification back injection and smelting gasification top injection based on the Corex furnace
- Partnered well with long-and short-process iron making for CO_2 emission reductions

15%+
Manpower

Steel-making & Continuous Casting

We are extremely proud of our outstanding EPC capabilities covering the integrated value chain of steel making from hot metal treatment, ferroalloy, converter, EAF, refining to continuous casting. Holding the lion's share in the Chinese market for RH refining equipment, we are able to realize "**one-stop steel-making and casting**" and construct one of the largest EAFs operating overseas. Based on Baostrip, a self-developed thin-strip casting and rolling technology, Sinosteel E&T offers a short-process system solutions to secure high productivity, reliable production, and low carbon emissions with "**EAF+ thin-strip casting and rolling**" and "**EAF + long products rolling**" as core components.

We have rich experience and successful references in steel-making & continuous casting.

38+	66.35	30+	43.35
Converter	mt	EAF	mt
40	56	50+	90
Desulfurization	LF refining	set of RH/VD	mt
247	70		
Billet strands	Slab strands		

Tosyali 240t EAF (Phase III & IV), Algeria

EPC

2015 – 2017/2021 – 2024*

- DRI hot charging process
- Less environmental pollution and energy consumption
- Shorter process, less investment demand, faster construction
- More energy conservation and emission reduction

1mtpa Green and Low-carbon Thin-strip Casting and Rolling of Shanxi Hongda Iron & Steel, China

EPC

2022 – 2024*

- Self-developed Baostrip technology
- China's first independent, green and low-carbon thin-strip casting and rolling line
- Less engineering investment and floor space
- Less energy consumption and harmful gas emission during production
- Only 11% of energy consumption and 18% of GHG emission in a traditional process

Steel-making & Continuous Casting

Steel Making-Technology & Benefits:

Hot metal treatment pretreatment

- 40-300t hot tank mechanical stirring desulphurization
- 100-300t injection desulfurization
- 40-110t injection dephosphorization
- Sulfur in the hot metal decreasing from 0.18% to 0.005% with the desulfurization rate up to 95%

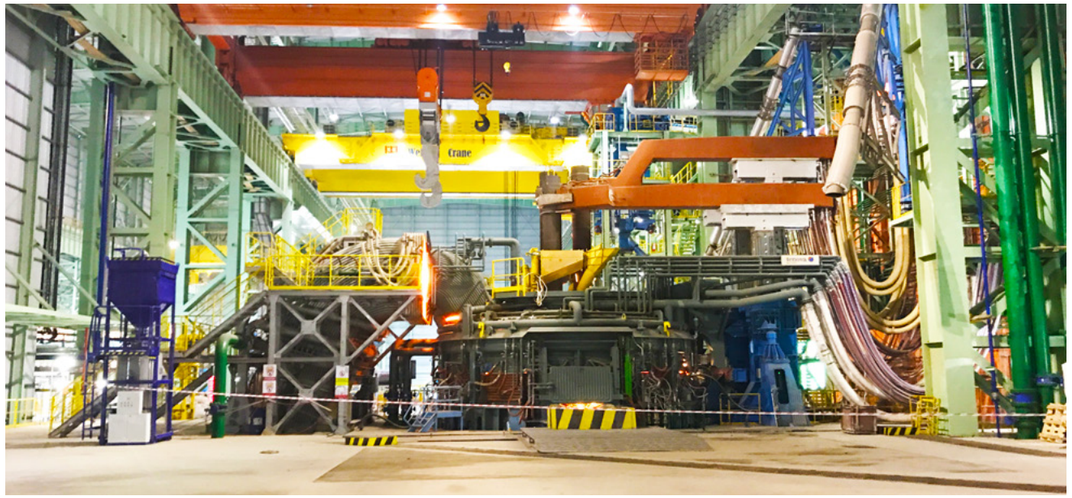
> 95%

A series of 50-350t converters

- Equipped with oxygen lance featuring large flows and high efficiency
- Dynamically controllable sublance and single-channel controlled bottom-blown converter
- Independent converter control model for "one-stop steel-making"

EAF - Max 240t

- Building and renovation of 240t and 240t-below EAF
- Continuous feeding
- Melt DRI in induction furnace
- HDRI hot charging and delivery



Refining-Energy conservation, Consumption reduction and Clean manufacturing

RH—Lion's share in the Chinese market with tailored solutions to meet the requirements of RH refining technology for silicon steel and 980Mp-above high strength steel

LF—Core technologies for dust removal and intelligent refining

AOD—60-120t, Independent AOD integration for core stainless steel refining

VD/VOD/VD - OB—70-240t, Steam jet pump or mechanical vacuum pump

LATS—120-350t, Cost-effective equipment and services

Ferrochrome and manganese-silicon alloy

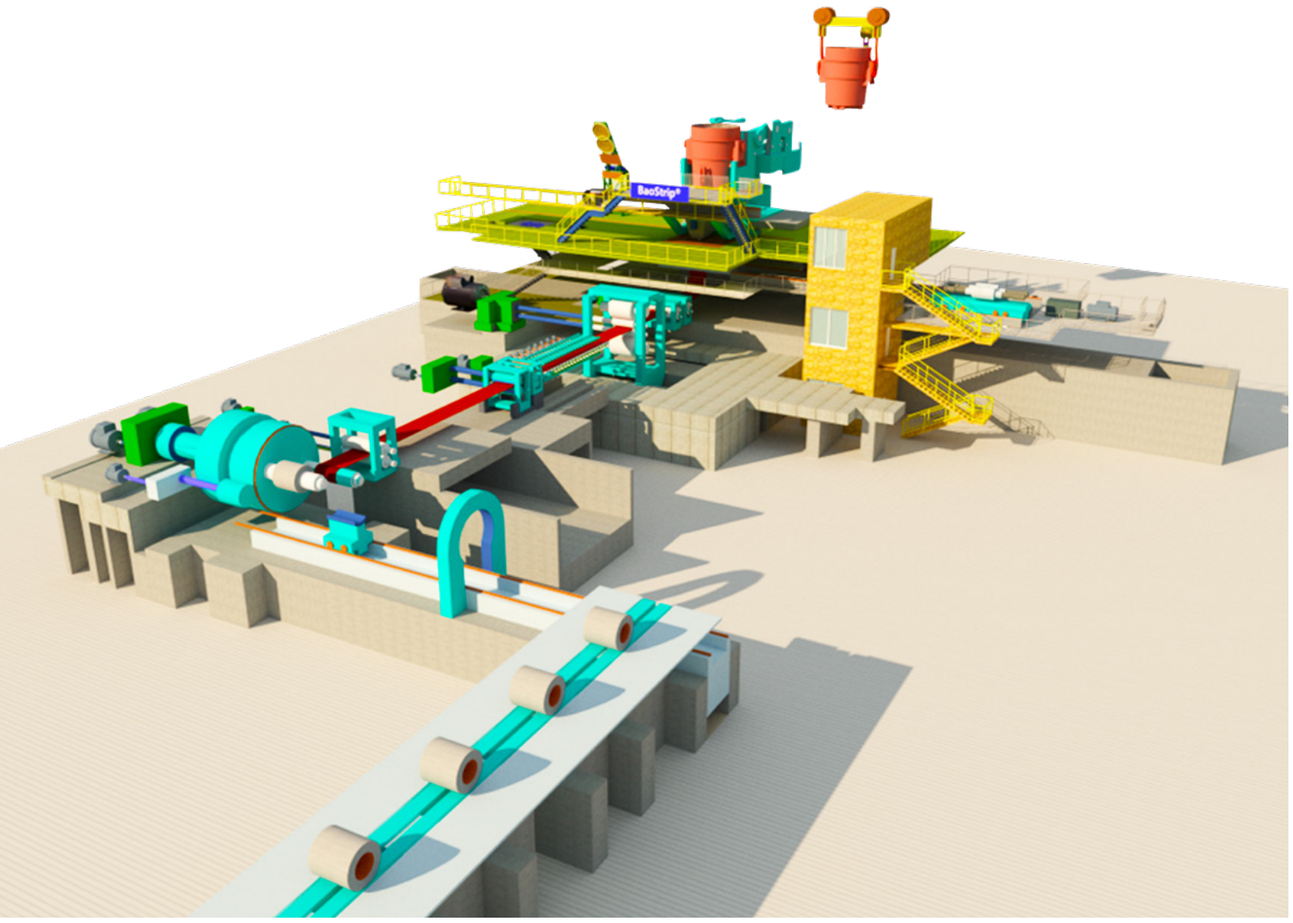
Feeding of hot material in furnaces, utilization of waste heat from flue gas of submerged arc furnaces, and a fully automatic system for material feeding in submerged arc furnaces

Steel-making & Continuous Casting

Continuous Casting-Technology & Benefits:

Baostrip-Leading Thin-strip continuous casting and rolling

- A self-developed thin-strip casting production and process equipment technology
- 11% of energy consumption and 18% greenhouse gas (GHG) emission in the traditional process
- Short process, low energy consumption, low costs, high efficiency, high quality and advanced technology



Slab continuous casting, One-stop steel casting

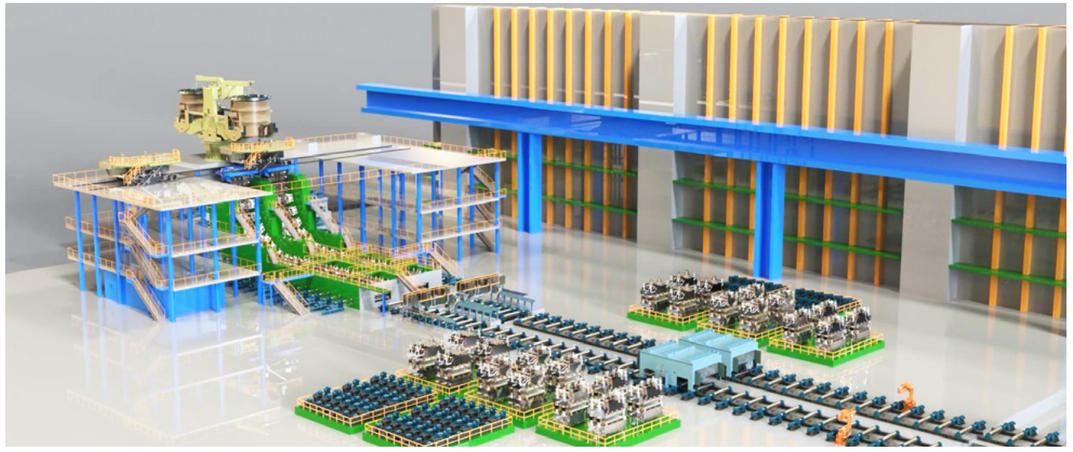
- Advanced engineering technologies to lead a complete system with equipment + automation + model + robot + digitalization
- Cutting-edge independent technologies of mold level control, mold vibration and online width adjustment
- Fully independent process control models, continuous casting unmanned, steel pouring solutions, and "one-stop steel pouring" techniques

Unmanned steel pouring for greater flexibilities & stable quality

- Self-developed continuous steel casting using robots
- Customized development driven by 3D simulation and visual systems for robot-enabled temperature measurement, sampling and covering agent supplement
- Greater flexibilitis, less equipment for on-site transformation, and more stable product quality

Digital factory for continuous casting

- A real-time digital twin factory mapped with its physical entity
- The first intelligent continuous casting project completed in China
- Equipment diagnosis, production and operation optimization, new production and operation means, and data support for management and decision-making



Steel Rolling—Hot Rolling

Thanks to our independent intellectual rolling technology of long products, leading hot strip rolling technology and the world's first innovated seamless pipe forming technology, Sinosteel E&T is able to provide a complete portfolio and state-of-the-art solutions to steel rolling in bars, hot-rolled strips, section steel, axles, seamless steel pipes, and spiral-welded pipes etc. Drawing on rich general contracting experience and expertise, we offer reliable and diversified services to achieve efficient rolling, high durability, lower costs and flexibility. Be it long product, hot rolled strip or plate, Sinosteel E&T is always your reliable partner to help build an ideal plant with lower investment, higher productivity and great performance.

In the past 5 years, Sinosteel E&T was awarded with more than 50 wire rod & bar rolling line contracts, with total production capacity up to 59.5 million tons, ranking No.1 of the market share in China; and 6 hot-strip mill projects, with total production capacity up to 20 million tons.

50+ Long product

59.5 mt

6 Strip

20 mt

5.8mtpa Long Product Project for Fangchenggang Steel Base, Liuzhou Iron & Steel Group, China

EPC

2018 – 2020

3 high-speed wire mills, 2 high-speed bar mills, and 2 conventional bar mills

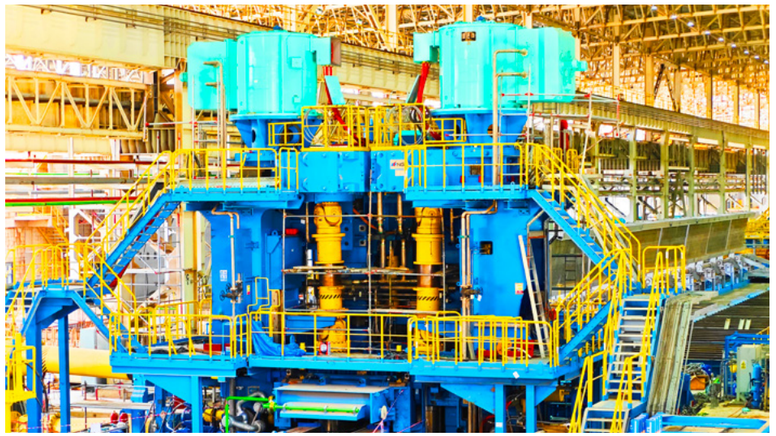
- Independently TMCP technology, flexible water quenching and high-speed steel delivery
- Domestic high-speed modular design mill with rolling speed up to 112m/s

Tosyali 3.5mtpa 1800mm Hot-strip Rolling Mill Project, Türkiye

EP

2020 – 2023*

- The largest overseas hot strip mill project constructed by a Chinese enterprise
- Finishing mill stands equipped with powerful WR bending, shifting systems and VCS roll profile for extremely thin gauge products
- Energy optimization and management systems, unmanned overhead cranes, intelligent warehouse management systems, etc.



Steel Rolling—Hot Rolling

Long Products Technology & Benefits:

Wire rod & Bar mills: Tailor - made tech & solutions to cut production costs

- Independently developed technology and equipment to realized higher speed, reliability, flexibility and lower costs
- High-speed delivery system, intelligent serial modular mill, and intelligent flexible water cooling technologies
- Lead in separate transmission of wire units with reduced diameters
- Refine grains and improve product performance without adding vanadium or other alloys; min 0.6% manganese in high-speed wires and 0.8% in high-speed bars

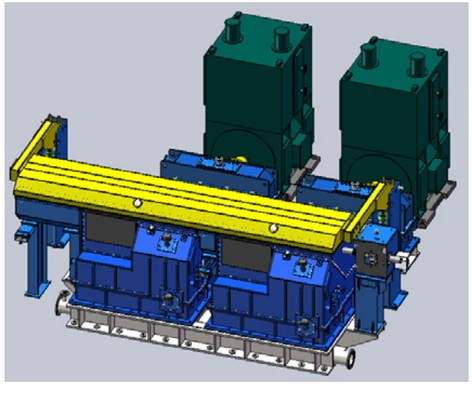
Min Mn content

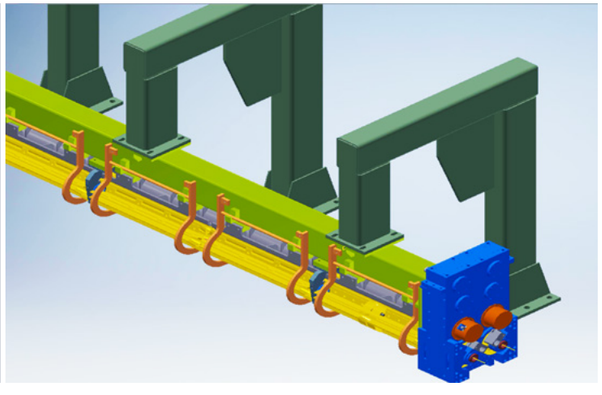
0.6% wires **0.8%** bars

- A guaranteed rolling speed: wire rod - 112m/s, Φ8mm coiled rebar - 95m/s, Φ10mm coiled rebar - 72m/s

Max rolling speed **115** m/s **95** m/s **72** m/s

- Modular single drive mills in series: RVM150 / RVM230 / RWM265 / RVM290 / RVM310 / RVM330





Steel pipe

- Technical integration of hot-rolled steel pipe and welded steel pipe, EPC capabilities for heat treatment, finishing, and pipe processing
- Completed the world's first set of hot centering machine units and China's first high-pressure off-line quenching with a slow flow rate

Seamless steel pipe: 21.3 - 1420mm with world's 1st core equipment

World's first core equipment of control rolling process in hot-rolled seamless steel pipe to remove excessive reliance on alloying and achieve off-line heat treatment by technical means

Long product pickling

Technical integration and EPC of pickling and surface treatment for bars, wires, pipes, and sections

Steel Rolling—Hot Rolling

Flat products Technology & Benefits:

Hot strip rolling mill - State-of-the-art complete series of engineering and service

- Production capacity up to Max 5.5mtpa and advanced production equipment and complete process technological package
- Roughing mill in form of reversible twin-stands, suitable for medium and wide strip rolling process with higher yields and better performance indexes comparing with other similar hot rolling mills
- Leading wide strip production process, capable of production of automotive steel, pipeline steel, duplex steel, and multiphase steel products
- FM WR negative bending to ensure the production of ultra-thin gauge products
- Advanced automation control system, consisting of AWC, AGC, AJC, shape control, and microstructure property predictions

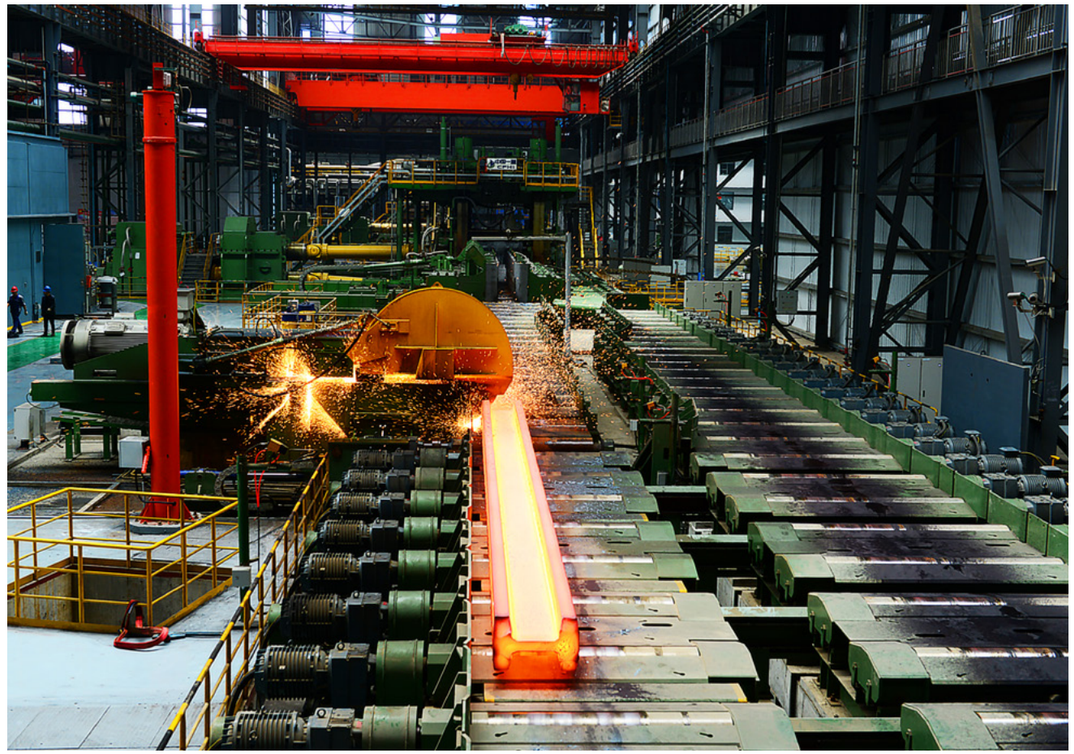
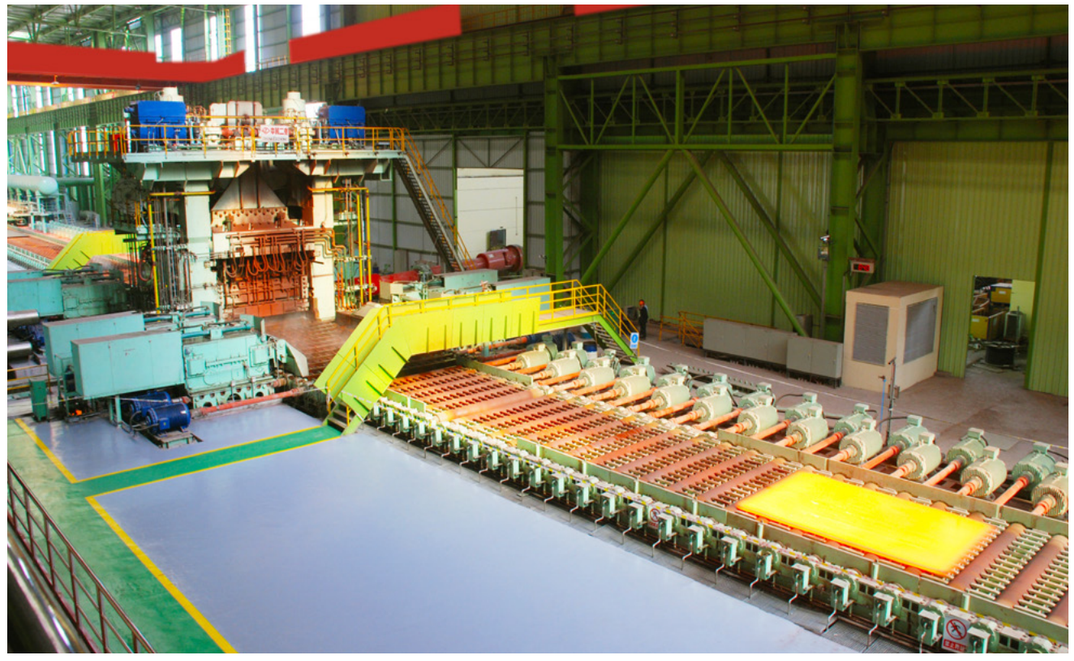


Plate and Heavy Wide Plate Mill- Greater performance & Higher quality

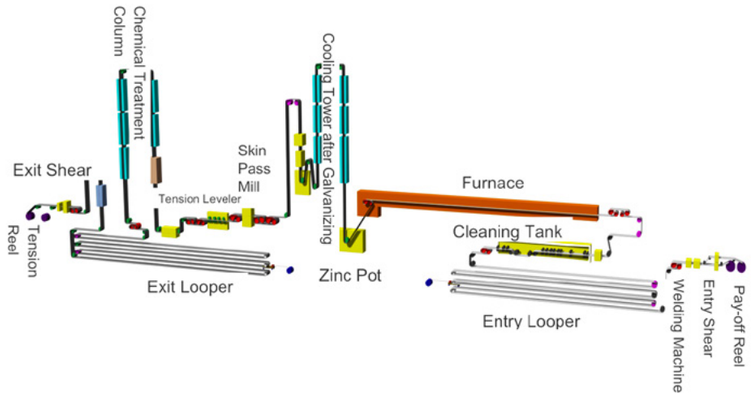
- Engineering and service of complete series of steel products
- Production capacity of 3500mm plate mills up to 3mtpa
- Latest WR shifting technology to meet the requirements of large roll gap production when incoming material with steel ingots
- Mono-block or Multi-block mill housing design
- Multi-bar rolling technology
- TMCP technology with ACC+DQ
- Advanced hot plate leveler with hydraulic bending and setting cylinder
- Rolling disc type cooling bed and walking beam type cooling bed
- Double-side trimming shear + slitting shear
- Heat treatment line with quenching machine to maximize customer satisfaction
- Complete automation system, including flat shape control technology



Steel Rolling—Cold Rolling

With a focus on carbon steel, stainless steel, and other products, we are able to provide customers with solutions and support packages for cold-rolling mills. Combined with continuous technological innovation and integration, we complete our portfolio covering the whole process from pickling, mill, and post-treatment production lines to annealing furnaces in steel processing lines such as cold rolling and continuous annealing/coating and new material production lines such as zinc aluminum and magnesium, non-standard design, and delivery of complete sets of equipment. Based on integration of independent equipment and technologies, we have completed more than 100 cold rolling production lines, among which numerous projects about large wide strip cold rolling and high strength steel cold-rolling satisfy every customer. Those proven references are examples to show our capabilities and confidence to offer green and optimized services and system solutions throughout the whole process for the development of technologically advanced ultrahigh-strength steel, Zinc-Aluminum-Magnesium, and other new materials.

- Continuous Pickling
- Continuous Pickling and Tandem Cold Rolling Mill
- Continuous Annealing
- Continuous Hot - Dip Galvanizing
- Color Coating
- Finishing and Recoiling

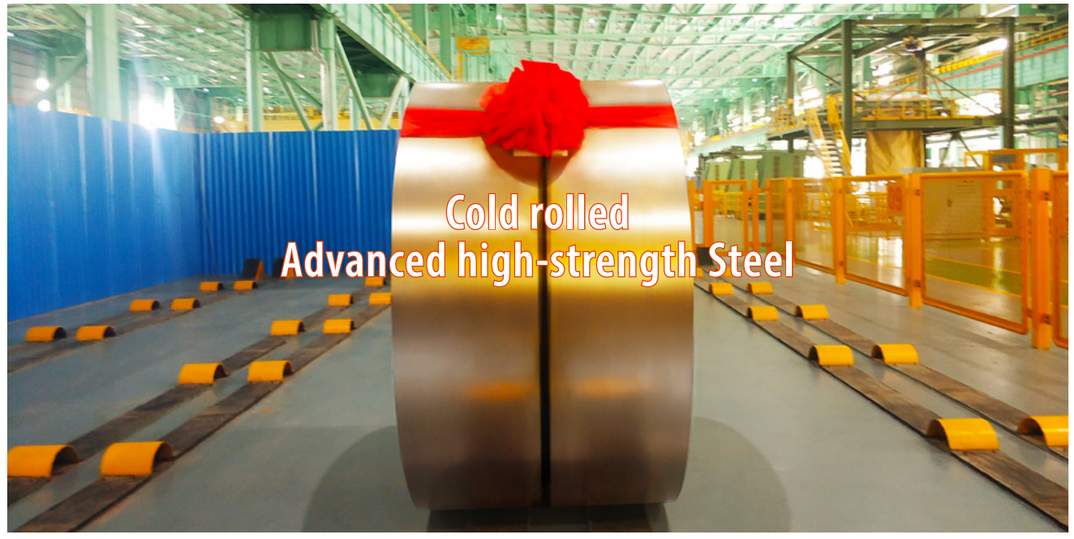


1750mm Cold Rolling Project for Baosteel Zhanjiang Iron & Steel, China

EP + factory design

2018 – 2021

- Core engineering equipment, technology, and products leading the development of cold rolled ultrahigh-strength steel
- Advanced, highly efficient and quality projects of million-ton level cold rolled ultrahigh-strength steel
- Production lines covering machine units for pickling, continuous annealing, hot galvanizing, recoiling, packaging, and other activities



Products available

- Continuous pickling & tandem cold mill of high-strength steel
- Annealing & hot galvanizing lines of advanced high-strength steel
- Hot galvanizing, electro - galvanizing, and color - coating lines of automotive, electrical appliance and construction sheets
- Preparing & finishing lines of carbon steel and stainless steel
- Skin pass mill of stainless steel

Cokemaking & By-product

We are a national pacesetter in cokemaking with the largest number of completed projects and a complete portfolio of technologies in China and a leader in smart coke ovens with low energy consumption, low emission, gas refining, and chemical product processing.

Sinosteel E&T boasts rich EPC experience in turnkey projects, including top-charging coke ovens, stamp-charging coke ovens, heat recovery coke ovens, coke dry quenching, gas purification, by-product plants design, equipment supply, and civil installation of chemical products and carbon materials.

We have carried out over 30 coke oven EPC projects where 55% are overseas projects in countries including Japan, Türkiye, Russia, India, Vietnam, and Indonesia, and we are the biggest Chinese contractor for Indian coke oven projects. Responding to our customers' needs, we have also completed over 20 CDQ projects and fulfilled tar processing and needle coke projects for more than 20 Chinese enterprises, over 10 projects for crude benzene hydrogenation and over 10 large and medium-sized gas refining projects.

Low energy consumption

Low emission coke ovens

30+ Coke oven plants

20+ CDQ

MMK 2.5mtpa Coke Oven and Coke Dry Quenching Project, Russia

EPC

2018 – 2023*

- 7.1m large top-charging coke oven with independent IPR
- The largest and most heavily invested coke oven project in Russia over the past 40 years

Technology & Benefits:

Eco-friendly Top-charging & Stamp-charging coke ovens

- Proprietary 7.5m low-energy consumption and low-emission top-charging coke ovens: first in China, with both the unit energy consumption and pollutant emission meeting or exceeding current standards in China
- Compliant with stricter regulations of emission control, environmental protection and energy conservation
- **Intelligence to enhance efficiency:**

  Automatic measurement of top temperature (by robot) and automatic temperature measurement at the pusher ram and on the furnace wall

2~4 Manpower/shift

2~5% Solid fuel

Advanced clean stamp-charging heat recovery coke ovens

- Clean, low-carbon, energy-saving and intelligent development
- Negative pressures in the coking chamber, and no smoke or VOCs leakage from the furnace body during the process of coking
- Save water 1.9t and reduce power consumption by 38kWh per ton of coke

75t/h - 260t/h Coke dry quenching

- Recycle ~ 83% sensible heat from red coke
- Cut 2% - 5% of coke ratio in BF iron making
- Increase ~ 1% of productivity of blast furnaces

Crude benzene refining & Tar processing

- Various processes and scales of coking benzene hydrogenation technology, with low solvent consumption, triphenyl yield of ≥99%
- Normal/Reduced pressure, with/without alkali addition tar separation process, with the largest processing ability of single set of equipment reaching 360,000t/a
- Naphthalene, anthracene, methylnaphthalene and various specifications of asphalt and other products
- Coal-based needle coke uses a proprietary pre-treatment process, with an asphalt yield of 72~85% and the capacity of single set of equipment reaches 80,000 tons (coking), CTE<1.1
- Lithium battery anode materials and carbon fiber production technology

Mining & Mineral Processing

Mining & Beneficiation

We provide comprehensive solutions for global mining & mineral companies in the fields of mining, beneficiation, bulk material handling, green mines planning and construction, covering the whole process from consultation, exploration, feasibility study, engineering design, equipment supply, EPC to operation and maintenance.

We own independent R&D center of processing flowsheet for different minerals including ferrous, nonferrous metal, and non-metallic minerals. We also have more than 10 independent technologies for green and smart mines, and more than 40 core technology patents in mining & beneficiation. Our overseas business currently spans 13 foreign countries, including Australia, South Africa, Brazil, Bolivia, Russia, India, Türkiye, Algeria, and Angola, while our domestic business covers more than 20 provinces and municipalities. Sinosteel E&T has been responsible for dozens of development and construction projects for metal and non-metal mines at home and abroad, involving iron, chromium, copper, PGMs, nickel, magnesium, rare earth, gold and coal, etc.

13 Countries

Technology & Benefits:

- Mining and beneficiation of large-scale metal mines
- Efficient utilization of ultra-low-grade iron ore resources
- Beneficiation of complex and refractory ores
- Quality improvement and impurity reduction of iron ore concentrate
- Long-distance transportation of mineral slurry
- Suspension magnetization roasting (SMR)
- Patented technology of processing of high-phosphorus iron ore
- Dense Medium Separation

- A dozen of core technologies for green and smart mines such as pebble crushing by High Pressure Grinding Roll (HPGR) to provide green solutions for metal and non-metal mines in different sizes

CuDeco 3mtpa Copper Beneficiation Project, Australia

EPC

2011 – 2016

3mtpa raw ore (final products include native copper, copper concentrate, pyrite concentrate with Co and magnetite concentrate)

One of the most successful EPC projects contracted by a Chinese enterprise in Australia

Mineral Processing

Based on leading omni-chain technologies and engineering services in raw material storage, sintering, and pelletizing, we build clean, low-carbon and efficient plants for customers. From diversified raw materials to optimized products, our leading technology and comprehensive metallurgical know-how lay a solid foundation for high-quality sinter and pellet.

Sinosteel E&T is the **only enterprise in China with leading and self-developed Traveling Grate Iron Ore Pelletizing technology and equipment,** ranking first in market share. Using less than 18kgce/t energy consumption in the production of magnetite, we provide green, low-carbon, and digital system solutions. We have also preliminarily acquired the ability of comprehensively utilizing coal gangue to serve clients.

With 92 sintering production lines in operation totaling 24,844m^2, 52 - 600m^2 effective ventilation areas in a single production line, 17 Traveling grate pelletizing production lines with a capacity of more than 62millon tons, and 11 complete lines in operation.

92 Sintering lines

24,844m^2

52-60m^2 Effective Ventilation

17 Traveling Grate Pellet Plant

62mt

1st

MMK 2×300m^2 Sintering Project (including the raw material yard), Russia

EP

2016 – 2018

5.5mtpa finished sintered ores

- The largest sintering project exported from China to Russia
- Full ore concentrate sintering with advanced and reliable intelligent technologies

2×4.8mtpa Traveling Grate Pelletizing Project of HBIS Group, China

EPC

2018 – 2021

- Production base for over 10mtpa high-quality pelleting
- The largest TGIOP project based on self-developed technologies
- Winner of National Quality Engineering Gold Award of China

Mineral Processing

Traveling Grate Iron Ore Pelletizing - Technology & Benefits:

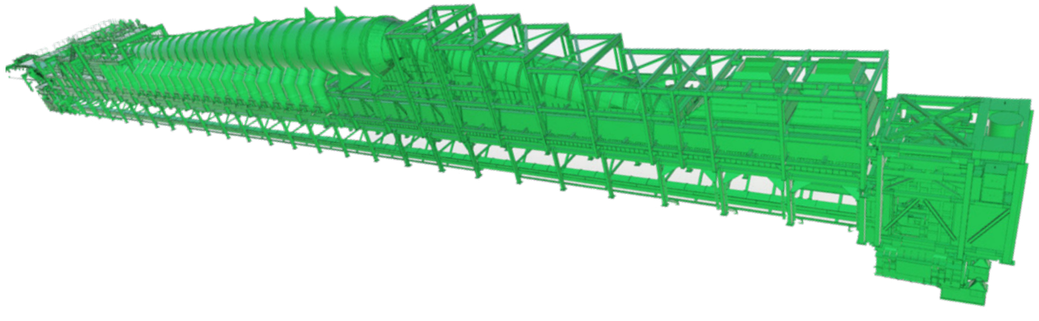
TGIOP - Cutting-edge Technology & Equipment turning metals green

1-8 million tons capacity

Energy consumption **<18** kgce/t

10% CO_2

- The only Chinese company possessing the world-leading and independently developed traveling grate iron ore pelletizing technology & equipment
- System solutions to meet the requirements of different raw materials and products
- Clean burden and a substitute to sinter in blast furnace iron making, optimal raw material for DRI
- Carbon emissions before iron making will drop by 10% in case fraction of pellet for blast furnace is increased from 10% to 50%
- Development of airflow balance control for hot air system ensures effective heat transfer and recycle, and appropriate material flow control, greatly reducing energy consumption and emissions of pollutants and CO_2
- Based on simulation technology and big data analysis
- Self-developed Integrated Platform for Intelligent pelletizing with leading capability in intelligent manufacturing and digitalization in China
- 0.4 - 3mt of grate-rotary kiln pelletizing technology
- 0.6 - 3mt of coal gangue comprehensive utilization



Sintering – Technology & Benefits:

From Raw material yard to Sinter - Eco-friendly & High efficiency

- Large-scale sintering and annular cooling system
- Ensure a sintering machine utilization factor > 1.4t/(m^2h)
- Air leakage of sintering machine ≤ 22% , annular cooler ≤ 3%

Unpowered, zero-emission technology for exhaust gas from annular cooler

- No external power needed to circulate flue gas to the sintering machine with sintered ores reduced by 2 - 3kgce/t
- To optimize wind system, increase exhaust gas temperature, broaden source of hot air and raise the volume of exhaust gas
- To ensure > 30 Kwh heat power generation per unit of sintered ores

>30 Kwh **heat power generation per unit of sintered ores**

Intelligent sintering control system

- High quality sinter
- Reduce energy consumption and CO_2 emissions
- Lower the solid fuel consumption per ton of sintered ores by 0.3 - 0.6kg

0.3-0.6 kg/sinterd ores

solid fuel consumption

Safety, Energy Conservation & Environmental Protection

In terms of safety and health, we provide governments and enterprises with safety consulting, safety evaluation and safety training, occupational health, and smart safety software development services. We further supply R&D, design, consulting, construction, and operation and maintenance of smart safety somatosensory equipment, as well as non-destructive testing, building structural testing, steel structural testing, special equipment inspectation, and labor protection equipment testing.

Using leading self-developed technologies and equipment, we provide engineering design and consulting, environmental protection facilities operation, and EPC services for multi-process and multi-pollutants controlling and ultra-low emission in iron and steel, electric power, petrochemical, and construction materials industries. Our self-developed technologies won two prestigious prizes including the National S&T Progress Award.

We provide energy-saving, carbon-reduction, and circular economy consulting services. We also focus on power generation and energy engineering as well as energy conservation and carbon reduction technologies and services. With advantages in full heat recovery technology, utilization of waste heat, energy and pressure, electricity-saving equipment systems, ladle baking, and renewable industrial resource utilization, we provide our clients with a full range of services including product proposal, design, investment, implementation, commissioning, operation, and maintenance with 419 related projects under construction.

Safety Technology & Benefits:

"5+1+N" risk assessment system

- To help conduct accurate research and judgments
- Improve management and control
- Lower costs of prevention and control, with safety hazards at risky points reduced by 70% and near-miss incidents by 50%
- Effectively prevent major accidents and reduces the costs of safety risk management, control, and operation by 30%

70% **30%**

Mine ventilation - Intelligent decision-making & remote control

- Raise the ratio of effective air quantity to 75%
- Reduce actual power consumption of fans by 30%
- Lower the labor cost by 50%

75% The ratio of effective air quantity

30% Actual power consumption of fans

50% Labor cost

Dust collection systems-Intelligent monitoring & pre-warning

- Reduce the frequency of dust explosion
- Decrease the occurrence of major accidents
- Automatic replacement of personnel to reduce the labor costs by 30%

Environmental Protection

Using leading self-developed technologies and equipment, we provide engineering design and consulting, environmental protection facilities operation, and EPC services for coordinated disposal of industrial flue gas and multi-pollutants in iron and steel, electric power, petrochemical, and construction materials industries.

Whole-process ultra-low emissions solutions

Pre-charged bag filters for fine particulates

- Obvious advantages in purification efficiency, energy conservation, standard stability, and space occupation

30%
Energy consumption

⩽10 mg/Nm³
Particulate emission

Bag filter for sintering machine head flue gas

- Continuous, stable, and ultra-low emissions of particulates at its outlet and guaranteed subsequent stable and safe operation of systems for desulfurization and denitrification

- Reduce pollution and carbon emissions in the sintering process and its derivative multi-pollutant synergistic purification

BSSF slag treatment

Short, clean, resourceful, and safe process with no falling slag and small floor space

Energy and Industrial Energy Efficiency

We provide energy-saving, carbon-reduction, and circular economy consulting services. We also focus on power generation and energy engineering as well as energy conservation and carbon emissions reduction technologies and services.

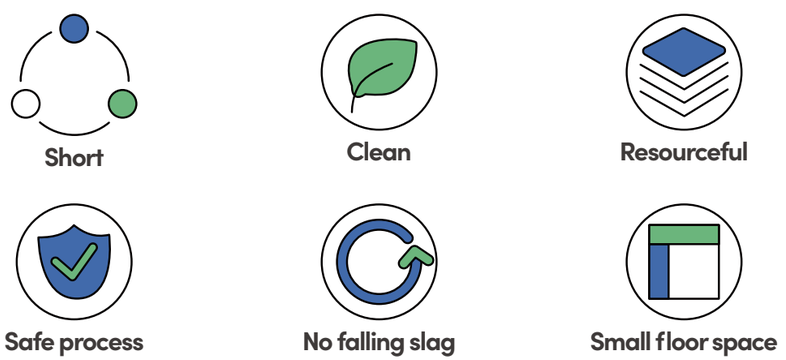
Technology & Benefits:

Waste heat and energy utilization

- Low-temperature waste heat recovery of organic Rankine cycle (ORC) for power generation
- Cascade comprehensive utilization of waste heat
- Jacketed and external thread coil coke oven ascension pipe
- Heat recovery of waste in coke oven ascension pipes and in steel rolling kilns
- Low-temperature waste heat recovery and ladle baking
- Heat recovery of waste from steel rolling furnace
- Cooling of converter vaporization
- EAF waste heat recovery

Energy-saving roaster

- Recover flue gas heat and reduce harmful gas emissions
- Flue gas waste heat recovery, high-efficiency heat storage, empty coal double preheating and intelligent control and monitoring technologies to carry out energy - saving transformation of ladle, iron ladle and tundish roaster



Solution provider of low-carbon metallurgy, Pioneer of green growth.

At Sinosteel E&T, we want to be known not only for our *exceptional technology and services,* but also for the *positive impact* we have on the industry, the society and our citizens.

That's why we build our business on a *foundation of integrity, quality and safety.* We are committed to taking *environmental responsibility and strengthening global resilience* by continuously improving our products and services.

We unite and collaborate.
We act with care and respect.
We are striving towards green and sustainable metallurgy.

SINOSTEEL
中钢国际
SINOSTEEL E&T

Global Business Layout

At Sinosteel E&T, we have a worldwide presence in 49 countries and regions, and set up 14 overseas branches.

So far, we have signed, sealed and delivered industrial engineering projects in many countries, including Australia, Japan, Canada, the United Kingdom, Türkiye, Russia, Bulgaria, Mongolia, Kazakhstan, Ukraine, Bolivia, Brazil, Peru, Algeria, South Africa, Morocco, Malawi, South Sudan, Angola, Saudi Arabia, India, Pakistan, Nepal, Jordan, Cambodia, the Philippines, Indonesia, Malaysia, Vietnam, Thailand, and Laos.

49 Countries & Regions

14 Branches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