

# NIEHOFF Magazine

Expertise, Customer Driven, Service – in Good Hands with NIEHOFF

2/2024



Meet us at wire China 2024  
in Shanghai



# Drawing more with less!



Our MSM 86 rod breakdown machine is designed for wires made of copper, copper alloys, aluminum, aluminum alloys, and other non-ferrous metals. State-of-the-art technological features and modular design result in dependably high quality wire surfaces and high production output. The real innovative power comes from unprecedented energy efficiency and an energy consumption which is 10 % lower than that of its predecessor model MSM 85 and 20 % lower than that of conventional rod breakdown machines.

The MSM 86 is designed to be combined with the R 502 continuous resistance annealer. With an annealing power of 530 kW, the R 502 is one of the most powerful NIEHOFF annealers. Power consumption

is reduced by 20 % compared to state-of-the-art DC annealers due to the voltage control system NAC (NIEHOFF Annealing Controller) and the AC annealing principle.

High efficiency: 2 wires Cu 2.60 mm with 24 m/s = 8,100 Kg/h

NIEHOFF combines outstanding expertise along your entire value chain with customer proximity and reliable service, for the entire lifecycle of your investment. It is just this combination that will make the difference, so you can concentrate on what is most important to you: your decisive competitive advantage.



**Expertise, Customer Driven, Service – in Good Hands with NIEHOFF**



## Editorial

Dear Friends of NIEHOFF,



This issue of *NIEHOFF Magazine* focuses on the wire China 2024 trade fair and the Chinese market. Our activities in China go back to the early 1970s, and we are proud to maintain close and trusting relationships with many Chinese wire and cable manufacturers. Time and again, they have confirmed the importance of our machines' and systems' performance to their business, not least because they help to optimize their energy balance and bear significant material cost savings potentials.

Three examples will be shown at wire China, booth E1B51:

- an MMH 121 + RM 201 type multiwire drawing line
  - a D 632 type double twist bunching machine with ARH 630 type pay-off
  - a BMV 24 type braiding machine
- On pages 6 to 9 we provide detailed information about their special features and customer benefits.

On pages 4 to 5 we present an outline of our Chinese subsidiary NIEHOFF Machinery Changzhou Co., Ltd. (NMC), running a newly built factory in the Wujin Economic Zone (WEZ) industrial park in Changzhou, about 125 miles west of Shanghai. NMC manufactures various types of wire and cable machines exclusively for the Chinese market under license from NIEHOFF. Our Chinese customers can as well rely on being supplied with after-sales services and NIEHOFF Original<sup>+</sup> spare parts for all NIEHOFF machinery.

In this *NIEHOFF Magazine* we will also introduce another Chinese market player using NIEHOFF technology: Ningbo Jintian Copper (Group) Co., Ltd., a leading manufacturer of copper conductors, copper alloys and advanced materials and provider of products and

services for the development of new energy vehicles, 5G communication, clean energy, consumer electronics and other industries (pages 16 to 19). The Chinese market and its increasing demand for wire and cable products is scrutinized in the market report on pages 10 to 15. With its technical innovations, NIEHOFF is opening doors for wire and cable manufacturers to explore new solutions and to improve their competitive edge.

Looking forward to welcoming you personally at the NIEHOFF booth at wire China, we wish you a good time and hope you will enjoy reading our *NIEHOFF Magazine*!

Three handwritten signatures in blue ink, arranged horizontally. The first signature is 'Ralf Kappertz', the second is 'Elena Graf', and the third is 'Bernd Lohmüller'.

Ralf Kappertz   Elena Graf   Bernd Lohmüller

Schwabach, September 2024

## Contents

20-37



**50 successful years of innovation** 4-5  
NIEHOFF and NIEHOFF Machinery  
Changzhou NMC

**Cutting-edge wire and cable manufacturing equipment** 6  
NIEHOFF and NMC at wire China 2024

**Pioneering multiwire drawing technology** 6-7  
The MMH 121 + RM 201 type multiwire drawing line

**Spools filled to perfection and substantial cost savings** 8  
The D 632 type double twist bunching machine

**Precision braiding with high efficiency and a wide range of applications** 9  
The BMV type vertical braiding machine

**A rapidly increasing demand for wires and cables** 10-15  
China and its perspectives for the wire and cable industry

**On the way to an industry benchmark** 16-19  
Ningbo Jintian Copper (Group) Co., Ltd. and  
Ningbo Jintian Electrical Material Co., Ltd.,  
Ningbo, China

# 50 successful years of innovation

## NIEHOFF and NIEHOFF Machinery Changzhou NMC

Maschinenfabrik NIEHOFF's activities in China go back to the early 1970s, when the first contacts with Chinese wire and cable manufacturers were made. Supported by experienced Chinese colleagues, NIEHOFF in the meantime has successfully introduced rod breakdown and multiwire drawing machines as well as bunching technology, stranding technology, tin plating technology, braiding machines and NPS spoolers to the Chinese wire and cable industry.



### A brief look back

In 1994, NIEHOFF opened a service center in Shanghai, which was transformed into the NIEHOFF Shanghai Representative Office in 2000. Later, with the founding of NIEHOFF Machinery Changzhou (NMC) Co., Ltd. in 2011, the representative office became the Shanghai Sales Branch of NMC.

### Manufacturing for China

NMC, a wholly owned subsidiary of the NIEHOFF Group, runs a completely new factory in the Wujin Economic Zone (WEZ) industrial park in Changzhou, approximately

200 km (about 125 miles) west of Shanghai. In this state-of-the-art plant, NMC manufactures various types of wire and cable machines exclusively for the Chinese market under NIEHOFF licenses. Simultaneously, NMC is also responsible for the entire after-sales service and the reliable supply of Chinese NIEHOFF customers with NIEHOFF Original<sup>+</sup> parts for all NIEHOFF machines. Another service in NMC's portfolio is the overhaul of existing NIEHOFF machines while at the same time equipping them with new controls and control cabinets.

### Modern production facilities

NMC put its new factory into operation in April of 2021. The new plant is less than 500 m away from NMC's original facility that had been opened in 2011. In view of the increasing order volume, the previous factory had become too small after ten years of operation and no longer offered any scope for expansion. The new plant was designed to meet NMC's exact requirements and includes modern production facilities with a floor area of 10,000 m<sup>2</sup> and a three-level administration building with a ground area of 1500 m<sup>2</sup>.

The factory is equipped with state-of-the-art production facilities complying with the high quality standards of NIEHOFF and NMC. Both the exterior and the interior of the buildings are similar to the NIEHOFF headquarters in Germany. Like the headquarters, NMC also makes use of geothermal energy for heating and cooling of the production halls and the office building. Consequently, the working conditions of the employees were improved and a stable temperature was achieved during parts testing and machine assembly.



**Original<sup>+</sup> spare parts and modernizations**

With NMC, all Chinese NIEHOFF customers benefit from NIEHOFF's high-quality service. A dedicated contact person will guarantee fast service if malfunctions occur on a machine or repairs are required. From spare parts to service, your contact person will personally coordinate everything to do with NIEHOFF Original<sup>+</sup> parts and after-sales matters.

**Service by well-trained Chinese engineers**

NMC's service technicians are continuously trained by NIEHOFF. As a result, they have a lot of practical field experience and in-depth process know-how and are able to train the Chinese users of NIEHOFF machines so that they can use all the equipment as efficiently as possible. NMC has inhouse mechanical and electrical engineers who can maintain a reliable contact for

first aid troubleshooting. NMC's service team can handle almost all types of NIEHOFF machines supplied to the Chinese market.



**NIEHOFF Machinery Changzhou Co., Ltd.**  
 Shanghai Sales Branch  
 Room 2302, Hong Kong Plaza,  
 283 Huai Hai Zhong Road  
 Shanghai 200021, P.R. China,  
 Phone +86 21 61202800  
 Fax +86 21 63906192  
 E-mail info@niehoff.cn

**NIEHOFF Machinery Changzhou Co., Ltd.**  
 No. 5-3 Ling Xiang Road,  
 Wujin Economic Development Zone,  
 Changzhou 213149, P.R. China  
 Phone +86 519 81098800

# Cutting-edge wire and cable manufacturing equipment



NIEHOFF and NMC at wire China 2024

Maschinenfabrik NIEHOFF and its Chinese subsidiary NIEHOFF Machinery Changzhou Co., Ltd. (NMC) will display at booth E1B51 the following exhibits:

- an MMH 121 + RM 201 type multiwire drawing line
- a D 632 type double twist bunching machine with ARH 630 type pay-off
- an BMV 24 type braiding machine

## Pioneering multiwire drawing technology

### The MMH 121 + RM 201 type multiwire drawing line

Multiwire drawing has become a standard process in the copper and aluminum wire industry – and NIEHOFF has played an important part in this development for decades. Around 2,500 NIEHOFF multiwire drawing machines of the MMH type are now in use worldwide. NMC has been building such lines under NIEHOFF license for the Chinese market since 2020. These lines consist of components manufactured and supplied by the NIEHOFF headquarters in Germany and components built by NMC. The mechanics of the MMH drawing machine are made in Germany, while the annealer, the switch cabinet and the spoolers are made by NMC. Finally, all components are assembled at NMC, where also the test runs are carried out. A line is only delivered to the customer after successful test runs. NMC technicians are responsible for the installation check and the commissioning.

The **main advantages** of the **MMH 121 + RM 201** type multiwire drawing line on display are a **compact design** that allows space saving use of the production area, **high productivity**, and a **low wire break rate** thanks to higher practical running speeds.

The **RM 201** type resistance annealer works with the field-proven 2/3 zone annealing system, which can be chosen with or without wire reheating. The result is **optimum wire drying** and **economical use of energy** for larger wire dimensions.



#### MMH 121 + RM 201

NMC has the complete production portfolio of various licensed take-up systems such as the classic dynamic single spoolers type S 632, SNH 631 or SNH 801 and has successfully launched the fully automatic single spooler system SPH 801 on the Chinese market. Automation is a big trend internationally. In this area, NMC can provide successful references when it comes to

combining the SPH 801 systems of the Multiwire Drawing Lines with AGV systems, which automatically provide the empty spools and remove the full spools from the spooler conveyors.

#### High quality wires for demanding applications

The wires drawn on this drawing line have very homogeneous and

tightly toleranced properties over their entire length. Such wires can be processed into multiwire bundles with excellent specifications and are ideal for final applications or downstream processing into high-quality strands or braids.

#### Technical data MMH 121

Max. production speed	35 m/s
Wire inlet diameter	2.00 or 1.80 mm*
Wire finished diameter	0.16 ... 0.55 mm
Max. number of wires	24

\*Cu hard



# Spools filled to perfection and substantial cost savings

## The D 632 type double twist bunching machine



The D 632 type double twist bunching machine on display in Shanghai was built by NMC (NIEHOFF Machinery Changzhou) under NIEHOFF license and meets NIEHOFF's high quality criteria. NMC has the perfect experience for producing double twist bunchers since 2011. And since 2022, NMC has been producing the new type D 632 with Siemens controls and drives.

The machine features **high productivity** and delivers **high-quality products** on **perfectly filled spools**. Those who use the D 632 benefit from a number of advantages. The single-bow design in combination with the energy-saving

Eco-Bow used here saves considerable amounts of energy. This results in significant **energy cost savings** compared to conventional bunching machines.

The other unique selling points of NIEHOFF bunching machines such

as the electric lay-length adjustment (changing lay-length without changing gears) and the constant tension control of the strands from empty to full spool still remain the same in the new type D 632. As the D 632 produces strands with very tight tolerances, only the minimum required copper cross section is generated. Consequently, this leads to major **savings in material and operating costs**. The variable and controlled wire tension – independent of the spool filling – together with the integrated opto-electronic NBAT (NIEHOFF Bunching Automatic Traverse) system allow the spools to be filled with a perfect winding pattern. It is thus possible to pay-off the strands **tangle-free** at **extremely high pay-off speeds**.

Thanks to the machine's **precise mode of operation** and the automatic NBAT system, one operator can simultaneously supervise the operation of several machines. The result is substantial **savings in labour costs**.

All process data can be documented so that the user of a D 632 can provide his customers with written **quality documentation**. Important production parameters such as winding tension, lay length and the number of twists can be logged.

### High quality strands for challenging applications

The D 632 buncher is ideal for processing fine wires made of **copper alloys such as CuSn0.3** into strands for automotive cables. Thanks to the patented *Stretch Forming and Straightening Technology*, the D 632 avoids the crowning and spiraling effect typical for wires made from certain copper alloys.

#### Technical data D 632

Max. production speed	300 m/min
Strand cross section*	0.09 ... 6.00 mm <sup>2</sup>
Lay length (steplessly variable)	6 ... 100 mm
Max. number of twists:	7000 twists/min

\*Cu soft



# Precision braiding with high efficiency and a wide range of applications

## The BMV type vertical braiding machine



### Technical data BMV 24

Cross section	0.02 ... 0.56 mm <sup>2</sup> *
Max. braiding pitch	6 ... 180 mm
Central passage	50 mm

\*Cu soft

NIEHOFF has been supplying BMV type vertical lever-arm rotary braiding machines equipped with 12, 16 or 24 braiding bobbins for more than twenty years. Ever since, these machines have been and continue to be developed further. From this proven series, a braider type BMV 24 with 24 bobbin carriers will be on display at the trade fair booth.

Like the other models in the BMV series, this machine features several **key advantages**, namely infinitely variable electronic control of the line speed and braiding pitch along with an automatic central lubrication system. Several monitoring systems enable unattended operation over longer periods of time and without frequent operator intervention.

BMV type braiders can be equipped with three patented systems that ensure **additional advantages**. The braiding speed of a BMV 24 type model can be automatically accelerated from 110 rpm to a maximum value of 130 rpm, while a BMV 16, the 16 bobbin carrier ver-

sion, can even accelerate the speed from 175 rpm to 200 rpm. The result is a **10% higher braiding performance**.

With the help of the *NIEHOFF Wire Tension Control System*, all braiding wires – from the full to the empty braiding bobbin – can be applied to the product to be braided under uniform tension. The result is a perfect shielding.

*NIEHOFF's Coverage Control System* ensures a **constant braiding coverage ratio** at the set value. Since only the absolutely necessary amount of braiding wire is applied, up to **10% braiding material savings** can be achieved. All process data can be documented

so that the user of a BMV 24 can provide his customers with **quality documentation**. Important parameters such as braiding coverage, braiding tension, etc. can be logged.

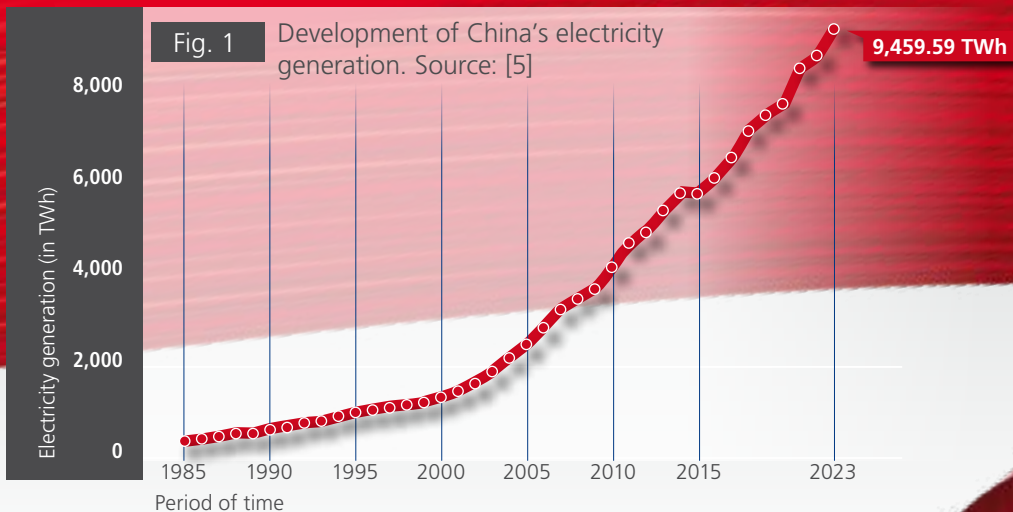
The BMV type braiders can be used for a wide **range of applications**. They are designed for processing bare or plated round or flat wires made from copper, aluminum or stainless steel, and also artificial yarn and fibers. The machines can be employed to manufacture cable screenings, copper braids, hollow braids, stranded braids, textile braids and steel wire braids with different braid patterns.

# A rapidly increasing demand for wires and cables

## China and its perspectives for the wire and cable industry

The People's Republic of China with more than 1,425 million inhabitants, which is equivalent to 17.7% of the world population, is the world's second-largest economic power behind the USA [1]. Since China began to open up and reform its economy in 1978, its gross domestic product (GDP) growth has averaged over 9% a year. Following a post-Covid-19 pandemic growth of 5.2% in 2023, the *World Bank* projects growth at 4.5% in 2024 [2]. The *International Monetary Fund (IMF)* expects that China's economy will grow by 5% in 2024 and 4.5% in 2025 [3].

Since virtually all sectors of an industrial country like China depend on a reliable supply of electrical power and the exchange of electronic data, China has a rapidly increasing demand for wires and cables. The growth in China's wire and cable market is anticipated to be driven by rapid urbanization, expanding infrastructure projects, and the increasing demand for energy transmission and communication solutions. Wires and cables are critical in various sectors such as renewable energy systems, building and construction, telecommunications and data centers, industrial applications, transportation infrastructure, and healthcare facilities [4]. Three exemplary application areas are the electricity sector, the infrastructure and the automotive sector.



### The electricity sector

In 2023, China's power plants generated nearly 9,460 TWh of electricity (Fig. 1) [5]. On the other side, the country consumed around 9,220 TWh. This was an increase of 6.5 % compared to the previous year with a consumption of approximately 8,640 TWh (Fig. 2). The largest electricity consumer was the secondary sector, which includes the manufacturing industries, with some 6,070 TWh of electricity (65.8 %), while Chinese households consumed around 1,340 TWh (14.5 %) [6].

The *International Energy Agency (IEA)* found out that China's electricity demand rose by 6.4 % in the year 2023 compared with

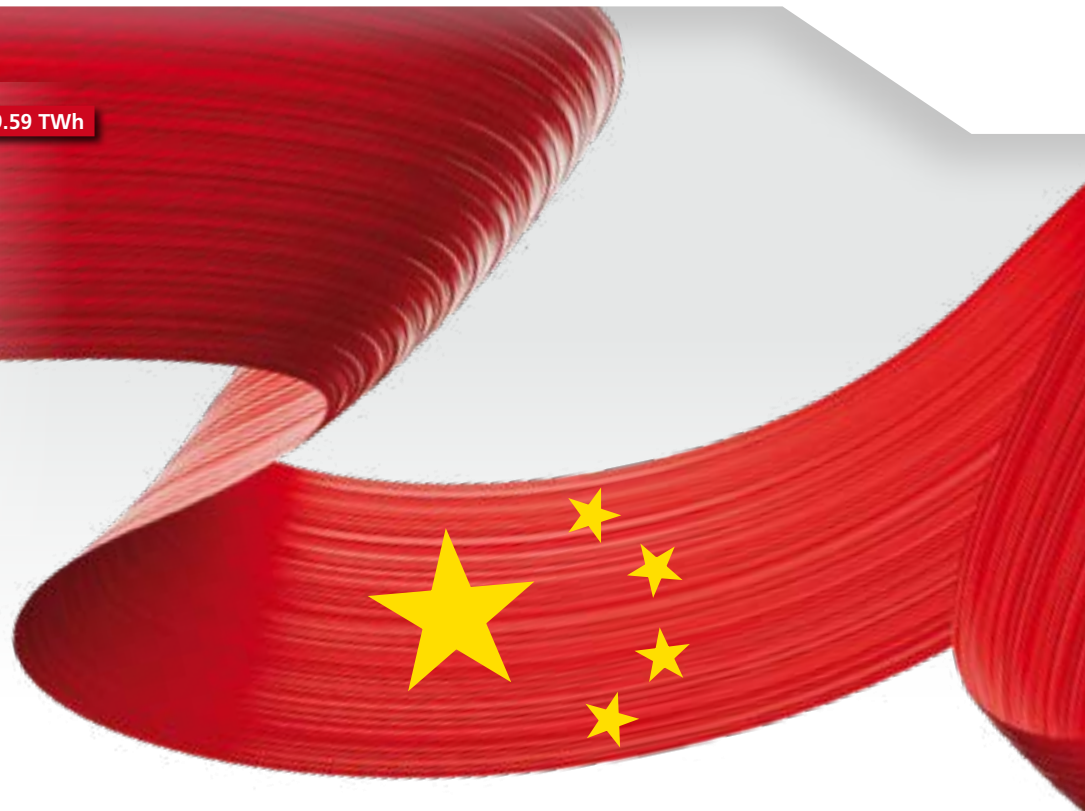
the previous year. With the country's economic growth expected to slow and become less reliant on heavy industry, the *IEA* estimates that the pace of electricity demand growth will ease to 5.1 % in 2024, 4.9 % in 2025 and 4.7 % in 2026. The total increase in China's electricity demand through 2026 is forecast to be about 1,400 TWh [7]. According to *DNV's Energy Transition Outlook China*, the country's grid-connected electricity generation is expected to grow from 9.2 PWh in 2022 to 16.5 PWh by mid-century (1 PWh = 1000 TWh) [8]. The rapidly expanding production of solar PV modules and electric vehicles (EVs), and the processing

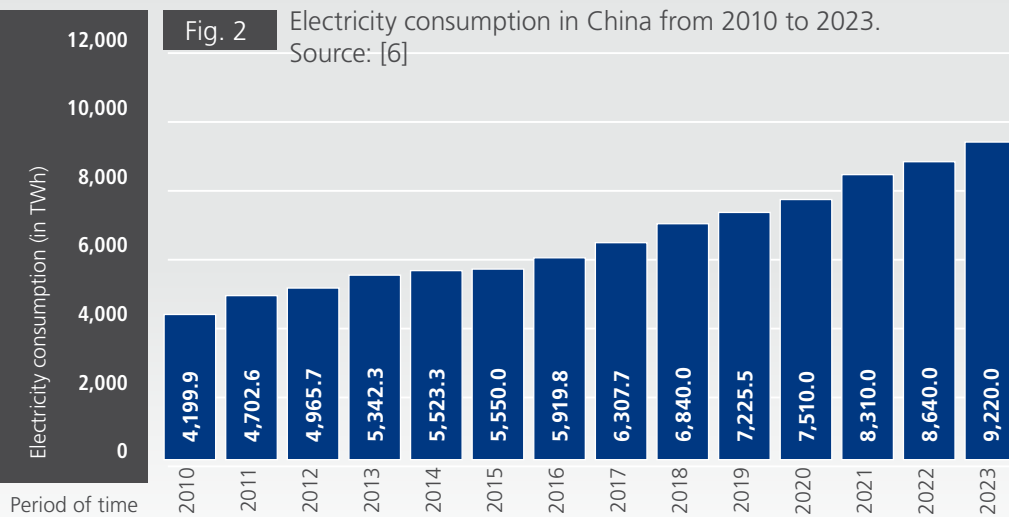
of related materials, will support ongoing electricity demand growth in China [7].

The country is establishing itself as a green energy leader with an unrivalled build out of renewable energy technologies and export of renewable energy technologies. On the other hand, *DNV* forecasts fossil fuels will still account for 40 % of its energy mix in 2050 [8]. Strong policy support is reflected by the rapid uptake of renewable energy technologies. China, already a leader in renewable energy invest-

ments, will more than quintuple renewable energy installations by 2050.

In 2010, wind power made up 1 % of China's electricity generation. Today wind is China's third-largest source of electricity after coal and hydropower, delivering 9.4 % of the total electricity supply in 2023. By midcentury China is expected be the world's largest wind power market [8]. Variable renewable energy sources such as solar and wind power have overtaken coal and

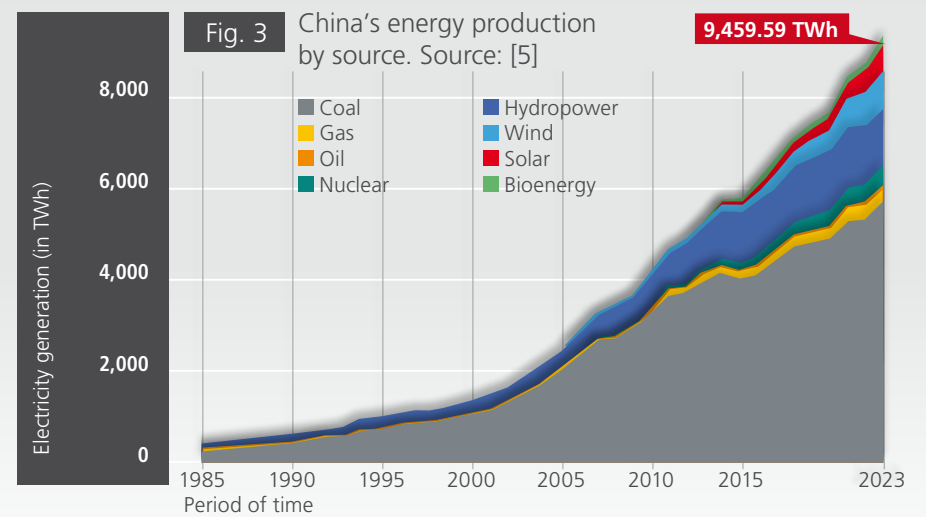




gas-fired power plant installations since 2019. Besides kick-starting the clean energy industries, curbing excessive local air pollution caused by coal-fired power plants was a major motivation for installing renewable energy sources. Until 2030, coal, however, will continue to play an important role in the electricity supply. Fig. 3 shows China's energy production by source until 2023. The share of coal will be reducing gradually from 2023, and variable renewable energy sources will account for more than 50% of on-grid electricity generation in 2030 [8].

### The infrastructure

Infrastructure spending has played a vital role in China's economic rise over the past three decades, from laying thousands of miles of railway tracks to building record-breaking skyscrapers. The market research company *Mordor Intelligence* estimates the infrastructure sector in China at USD 1.10 trillion in 2024 and to reach USD 1.49 trillion by 2029, growing at a CAGR of 6.32% during the period from 2024 to 2029. The country is focusing on developing green energy, resulting in increasing investments in renewable power projects [9]. China invested more than USD 34 billion (238.8 billion yuan) in water conservation and hydropower from

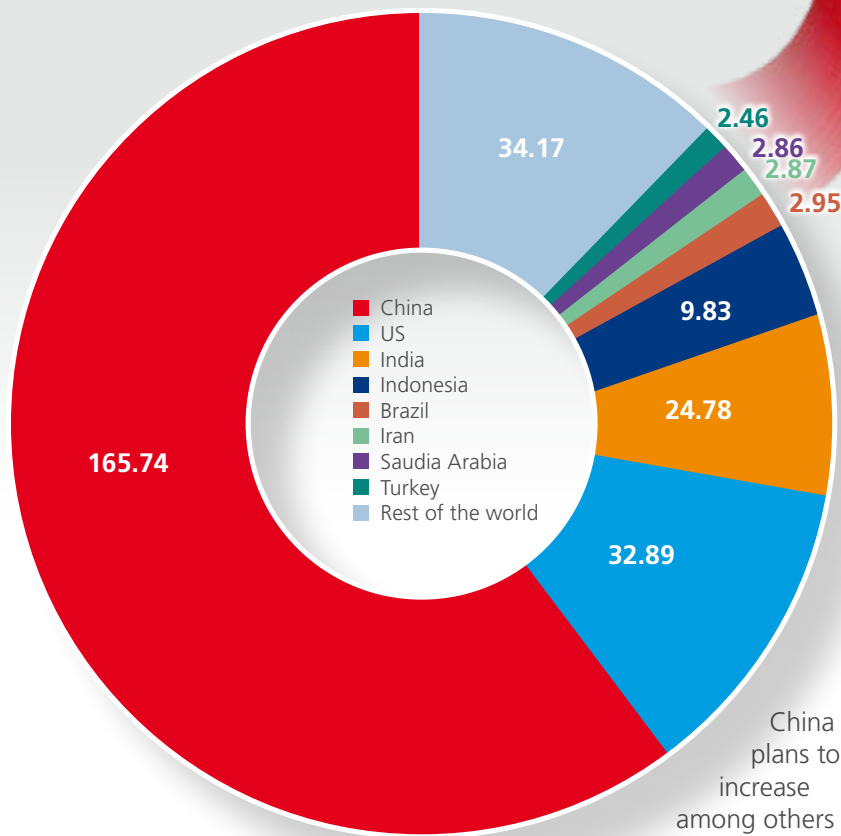


January 2023 to September 2023, for example. With the investment in hydropower projects, the need for electricity transmission and management will increase, along with the number of wires and cables used for the same [4]. China intensifies its focus on power infrastructure, particularly grid expansion. In January 2023, *China's State Grid Corporation* announced a USD 77 billion investment in grid transmission for the year 2023, as well as a commitment to modernize and expand its power grids with USD 442 billion in investments over the Five-Year Plan 2021-2025 [4]. Electricity grid operations will have to become smarter to "marry surges" in demand from electric

vehicles (EVs), heat pumps and heating, ventilation, and air conditioning (HVAC) systems with more variable, decentralised power generation systems like wind turbines and solar panels, which will lead to surging supply at other moments. China is investing more in transmission grids than every other country in the world combined. In 2022, China's investments amounted to nearly USD 166 billion (1.19trn yuan), while other countries collectively invested USD 118 billion (Fig. 4) [10].

Another important infrastructure sector is China's railway system. The country's High-Speed Rail (HSR) Network is the world's largest HSR network with a total length of

**Fig. 4** Spending on electricity transmission in 2022 by country (in USD billion). Source: [10]



45,000 km (28,000 miles) by end of 2023. It is also the world's most extensively used HSR network with 1.3 billion passengers in 2022 [11]. Fig. 5 shows at how much China's HSR network has grown from its beginnings in 2008 into by far the world's largest network in 2024 [11].

Like other regions in East and Southeast Asia, China suffers from heatwaves and other climatic changes [12]. As a result, there is

China plans to increase among others its HSR network to 70,000 km (43,500 miles) by 2035, up by more than 84 % compared to 2020 [9].

growing demand for HVAC systems for residential and commercial buildings. These systems are used to regulate the temperature, humidity, and air quality of buildings and to reduce energy consumption. The Chinese HVAC equipment market is expected to reach an estimated USD 80.9 billion by 2030, and it is forecast to grow at a CAGR of 2.4 % from 2024 to 2030 (Fig. 6). The major drivers of growth are higher rate of building construction and strict regulations regarding energy efficient buildings in China to make existing facilities energy efficient [13].

### The automotive sector

China is the largest car market in the world. In 2023, Chinese automotive sales increased to a record 30.1 million vehicles, up 11.9 % from 2022. Much of the increase came in commercial vehicle sales, up 22 % to 4.0 million for the year as commercial sales continued to recover from Covid-19 lows. Intensive promotional campaigns and discounts led

**LITERATURE**

- [1] China Population. Worldometer. June 14, 2024. <https://www.worldometers.info/world-population/china-population/>
- [2] The World Bank In China. Washington, D.C., Beijing, April 2024. <https://www.worldbank.org/en/country/china/overview>
- [3] IMF Staff Completes 2024 Article IV Mission to the People's Republic of China. International Monetary Fund IMF, Washington D.C., May 28, 2024. <https://www.imf.org/en/News/Articles/2024/05/28/pr24184-china-imf-staff-completes-2024-art-iv-mission>
- [4] China Wire and Cable Market Overview. Focus on Application, Product, and Voltage - Analysis and Forecast, 2023-2032. BIS Research Inc., Fremont, CA/USA, 2023. <https://bisresearch.com/industry-report/china-wire-and-cable-market.html>
- [5] Hannah Ritchie and Max Roser: China: Energy Country Profile. Our World in Data, Oxford. <https://ourworldindata.org/energy/country/china>
- [6] Daniel Slotta: Power consumption in China 2010-2023. Statista, Hamburg, February 6, 2024. [www.statista.com/statistics/302203/china-electricity-consumption/](https://www.statista.com/statistics/302203/china-electricity-consumption/)
- [7] Electricity 2024. Analysis and forecast to 2026. <https://iea.blob.core.windows.net/assets/18f3ed24-4b26-4c83-a3d2-8a1be51c8cc8/Electricity2024-Analysisand-forecastto2026.pdf>
- [8] Energy Transition Outlook China 2024. A national forecast to 2050. DNV, Beijing, April 23, 2024. [https://safety4sea.com/wp-content/uploads/2024/04/DNV-Energy\\_Transition\\_Outlook\\_China\\_2024\\_04.pdf](https://safety4sea.com/wp-content/uploads/2024/04/DNV-Energy_Transition_Outlook_China_2024_04.pdf)
- [9] China Infrastructure Market Size & Share Analysis - Growth Trends & Forecasts (2024 - 2029). Mordor Intelligence, Hyderabad, 2023. <https://www.mordorintelligence.com/industry-reports/infrastructure-sector-in-china>
- [10] Nick Ferris: Weekly data: grid investment in China more than every other country combined. In: Power Technology, March 15, 2024. <https://www.power-technology.com/news/weekly-data-grid-investment-in-china-more-than-every-other-country-combined/?cf-view>
- [11] Insane Growth of China's High-Speed Rail Network Between 2008 & 2024. Brilliant Maps, June 6, 2024. <https://brilliantmaps.com/high-speed-rail-china/>



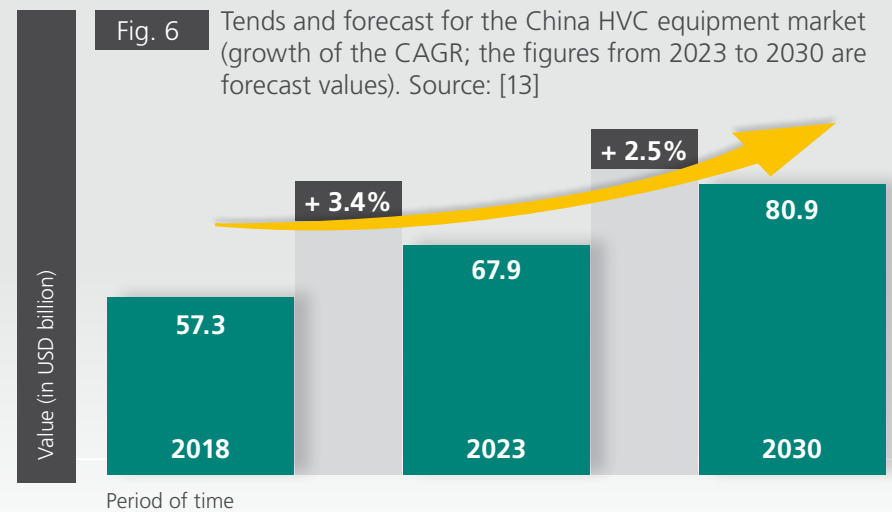
**Fig. 5** Development of China's High-Speed Rail (HSR) network. Source: [9]



Lawrence, Martha; Bullock, Richard; Liu, Ziming, CC BY 3.0 IGO <<https://creativecommons.org/licenses/by/3.0/igo/deed.en>>, via Wikimedia Commons

Von Howchou - Eigenes Werk, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=59380944>

to the increased domestic consumption. Exports rose 58 %, as sales to Russia increased after many other car manufacturers withdrew from the market following the Russia-Ukraine war. China is expected to see another year of strong growth, with light vehicle sales to grow by 4.2 % in 2024. Sales increases are expected to be supported by improving consumer confidence and the continued pent-up demand from pandemic lockdowns [14]. China continues to dominate the electric vehicle (EV) market, as over 35 % of new vehicles sold in 2023 were EVs. Yearly EV market share is

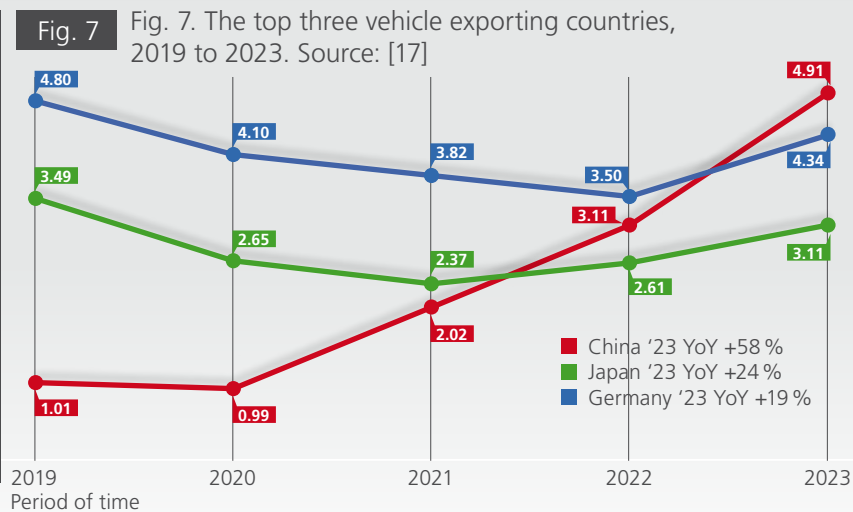


expected to surpass 50 % by 2026. EV sales are expected to further increase in 2024 as battery prices continue to fall and China's EV tax exemption is extended. EV market share is expected to reach 44 % for the full year [14]. China has also become the leading automobile export nation in the world, and surpassed Germany in 2022 and Japan in 2023 (Fig. 7).

China achieved this success thanks largely to domestic companies such as Chery, SAIC, Geely and BYD. But the number of car exports includes also cars built by foreign carmakers that have manufacturing facilities in China. Carmakers, including VW and BMW, aim to make parts

and cars inside China due to limited production capacities in their home markets. 18 foreign brands, led by Tesla, exported 910,000 cars from China in 2023, accounting for about a fifth of the country's total vehicle exports. Tesla alone exported 344,000 EVs from its Shanghai plant, its biggest factory worldwide, to Asia, Europe, Australia and New Zealand [15], [16]. Given the continued demand weakness and hyper-competitive conditions that exist among the competitors in China, a continued rise in exports in 2024 can be expected [17]. China is busy further developing E-related technologies and plans, for example, to invest around USD 845 million to develop the next-generation battery

Exported cars (in million units)



technology powering EVs. Six companies – including CATL, the world’s biggest battery manufacturer, and major automakers like BYD and Geely – are eligible for government support to develop all-solid-state batteries (ASSBs) [18]. China’s capital Beijing plans to increase the number of EV charging piles to 360,000 and to expand its automated driving demonstration area to 600 km<sup>2</sup> [19].

### The Chinese wire and cable market

According to the market research company *BIS Research*, China’s wire and cable market was valued by revenue at more than USD 45 billion in 2022, and it is expected to

grow at a CAGR of 7.43 % and reach nearly USD 97 billion by 2032. Some challenges for wire and cable manufacturers are: Regulatory complexities pose hurdles, requiring market players to navigate intricate standards and compliance measures. Intense market competition also prevails, urging companies to differentiate themselves and continuously adapt to evolving technological requirements. Amid the challenges lie significant opportunities for the wire and cable market in China. The push for technological innovations in the sector opens doors for wire and cable manufacturers to explore new solutions and enhance their competitive edge [4].



### Cable manufacturing solutions from NIEHOFF

In order to comply with the challenging requirements, cable manufacturers need up-to date processing equipment. NIEHOFF delivers machinery and process knowledge, all founded on more than 70 years of continuously grown experience. Supported by its subsidiary NIEHOFF Machinery Changzhou (NMC) Co., Ltd., NIEHOFF has been active in China for about 50 years now and has proved to be a reliable partner of Chinese wire and cable manufacturers assisting them to solve power transmission and other cable-related projects.

**LITERATURE**

[12] Heather Chen and Kathleen Magramo: ‘Blast-furnace heat every day’: Record temperatures cancel classes, widening learning gaps across Southeast Asia, CNN, Atlanta, GA/USA, May 9, 2024. <https://edition.cnn.com/2024/05/09/asia/southeast-asia-heatwaves-education-school-closures-intl-hnk/index.html>

[13] China HVAC Equipment Market: Trends, Opportunities and Competitive Analysis [2024-2030]. Lucintel, Dallas, TX/USA, December 2023. <https://www.lucintel.com/china-hvac-equipment-market.aspx>

[14] Kroll Automotive Industry Report. Spring 2024. Kroll, New York, May 9, 2024. <https://www.kroll.com/-/media/kroll-images/pdfs/executive-summary-automotive-industry-insights-spring-2024.pdf>

[15] Foreign auto brands boost exports as China sales remain weak. Market Screener, Anney, France, January 22, 2024. <https://www.marketscreener.com/quote/stock/TESLA-INC-6344549/news/Foreign-auto-brands-boost-exports-as-China-sales-remain-weak-data-45783416/>

[16] Dan Mihalascu: China’s Exports Of Electric Vehicles To Europe Reach Record Levels. InsideEVs, New York, NY/USA, January 4, 2023. <https://insideevs.com/news/629493/china-exports-electric-vehicles-europe-reach-record-levels/>

[17] State of China’s Auto Market – March 2024. Automobility Ltd., Shanghai, May 2024. <https://automobility.io/2024/03/state-of-chinas-auto-market-march-2024/>

[18] Laura He: China to invest \$845 million on ramping up its advanced EV battery ambitions. CNN, Atlanta, GA/USA, May 30, 2024. <https://edition.cnn.com/2024/05/30/tech/china-investment-advanced-ev-batteries-intl-hnk/index.html>

[19] Beijing set to launch 300 major engineering projects in 2024. China.org.cn, Beijing, January 18, 2024. [http://www.china.org.cn/china/2024-01/18/content\\_116950063.htm](http://www.china.org.cn/china/2024-01/18/content_116950063.htm)

# On the way to an industry benchmark

Ningbo Jintian Copper (Group) Co., Ltd. and  
Ningbo Jintian Electrical Material Co., Ltd., Ningbo, China

Ningbo Jintian Copper (Group) Co., Ltd. is a globally leading manufacturer of copper conductors, copper alloys and advanced materials. The industrial company was founded in 1986 and has since then been focusing on copper processing.





### Products and applications

The main products include copper tube, rod, wire, strip, electromagnetic wire, valve, magnetic materials and besides high quality copper high-end alloys such as brass, bronze, and copper-nickel. Ningbo is committed to providing first-class products and services. The products are used among others for the development of new energy vehicles (NEVs), 5G communication systems, the exploitation of electricity from renewable source (“clean energy”), consumer electronics and in other industry branches.

### International activities

Based in Ningbo, a city in north-east Zhejiang province, in Hangzhou Bay at the East China Sea, with an eye on the world, the company has eight production bases, 46 subsidiaries and more than 7,000 employees worldwide. It has set up branches in the United States, Germany, Thailand, Japan, South Korea and other places, with business in more than 100 countries and regions. The company is the long-term partner of many world-renowned enterprises.

### Figures and ranking

In 2023, the sales volume of Ningbo’s copper processing activities reached 1.91 million tons, with a total revenue of more than 140 billion RMB (about 17.9 billion EUR). Ningbo ranked 94th among the Chinese top 500 industrial manufacturing companies.

### Ningbo Jintian Electrical Material Co., Ltd.

Ningbo Jintian Electrical Material Co., Ltd. is a wholly-owned subsidiary of Ningbo Jintian Copper (Group) Co., Ltd. The subsidiary was

established in 1998 and is committed to providing customers with world-class electrical conductor materials. After more than 20 years of development and production, the company currently has its headquarters in Ningbo and runs several production bases in Hangzhou Bay New Zone, Guangzhou, and Chongqing.

### Production equipment

At present, Ningbo Jintian Electrical Material Co., Ltd. operates four world-leading American SCR continuous casting and rolling lines with an annual production capacity of more than 1 million tons.

As early as in 2011, the company established in copper conductor processing a deep cooperation with NIEHOFF Group.

A large number of advanced equipment was imported from NIEHOFF Germany or provided by NIEHOFF Machinery Changzhou Co., Ltd. (NMC). Until now, Ningbo Jintian Electrical Material Co., Ltd., has purchased in total 16 two-wire rod breakdown (RBD) lines with supporting spoolers and coilers, two tin-plating lines, 37 multiwire drawing lines with various types of drawing machines and dozens of bunching machines in single-bow-version with NBAT. The annual production capacity reaches more than 100,000 tons.

### **Quality and digitalization**

At the same time, the company has introduced international first-class testing instruments and equipment from Germany, Japan, the United States and so on and has been certified in accordance with the following standards:

- ISO 9001:2015 (quality management system),
- ISO 14001:2015 (environmental system),
- ISO 45001:2018 (occupational health and safety management system) and received the
- IATF16949 automotive industry quality management system certification.

Ningbo Jintian Electrical Material integrates the application of WMS, MES, SCADA and other information systems to build a digitalized production workshop.

### **Copper wire products**

The workshop is dedicated to the manufacturing of electrical round copper wire (rod), copper stranded wire and multiwire bundles (including tinned wire). These products are mainly used in the production of electromagnetic wires, high and low voltage cables, automotive wiring harnesses, and industries of electronics, photovoltaic, communications, mechanical hardware, construction etc. The company has established good relationships with many well-known companies around the world.



### **Mission and vision**

Ningbo Jintian Electrical Material is driven by the mission and the vision of "creating customer value, building a century-old enterprise, becoming an industry benchmark, and contributing to modern industrial civilization". Consequently, the company adheres to the spirit of "seeking changes every day, never being satisfied, daring to compete, and pursuing excellence". It adheres to the path of new industrialization, with a first-class management level and an experienced talent team.



### Facing the future

Ningbo Jintian Electrical Material continues to adhere to the business philosophy of "legal operation, honest business, independent innovation, and scientific development" emphasizing quality, keeping good faith, building brands, being oriented by the market and being centered on customers, keeping adhering to invigorating the enterprise through science and technology, accelerating transformation

and upgrading, optimizing product structure, improving product quality, and being committed to becoming an international leading electrical materials supplier with first-class quality and service.

### NIEHOFF, NMC and Ningbo Jintian Electrical Material

Maschinenfabrik NIEHOFF and its Chinese subsidiary NIEHOFF Machinery Changzhou Co., Ltd. (NMC) are happy to assist Ningbo Jintian

Electrical Material with their expertise, experience and customer service to manufacture highest quality products and to continue its successful progress.



### Ningbo Jintian Copper Group Co., Ltd.

No.1 Chengxi West Road,  
Cicheng Town, Jiangbei District  
Ningbo 315034, China

Phone +86-057483005999

+86 57 483005059

Fax +86 57 487597573

E-mail [service@jtgroup.com.cn](mailto:service@jtgroup.com.cn)

Web <http://www.jtgroup.com.cn>

<https://jtcopper.com>

# Drawing more with less!



Our MSM 86 rod breakdown machine is designed for wires made of copper, copper alloys, aluminum, aluminum alloys, and other non-ferrous metals. State-of-the-art technological features and modular design result in dependably high quality wire surfaces and high production output. The real innovative power comes from unprecedented energy efficiency and an energy consumption which is 10 % lower than that of its predecessor model MSM 85 and 20 % lower than that of conventional rod breakdown machines.

The MSM 86 is designed to be combined with the R 502 continuous resistance annealer. With an annealing power of 530 kW, the R 502 is one of the most powerful NIEHOFF annealers. Power consumption

is reduced by 20 % compared to state-of-the-art DC annealers due to the voltage control system NAC (NIEHOFF Annealing Controller) and the AC annealing principle.

High efficiency: 2 wires Cu 2.60 mm with 24 m/s = 8,100 Kg/h

NIEHOFF combines outstanding expertise along your entire value chain with customer proximity and reliable service, for the entire lifecycle of your investment. It is just this combination that will make the difference, so you can concentrate on what is most important to you: your decisive competitive advantage.



NIEHOFF  
Original+



Convincing  
Quality



Top  
Performance

Expertise, Customer Driven, Service – in Good Hands with NIEHOFF



## 编者按

亲爱的读者和NIEHOFF的朋友们:



本期《NIEHOFF 杂志》的内容与 2024 年中国国际线缆及线材展览会(wire China 2024) 和中国市场有关。尼霍夫与中国市场的渊源可以追溯到 20 世纪 70 年代初, 非常荣幸能够与中国的电线电缆制造企业保持密切且互信的合作关系。他们也一再告诉我们, 我们的设备和系统的能力是如此重要, 尤其因为其具备节省能源和材料成本的巨大潜能。我们将在此次展

会的第E1B51 号展台展示以下设备:

- 一条MMH 121 + RM 201 型多头拉丝生产线
- 一台D 632型双节距束线机, 配备ARH 630型放线架
- 一台BMV 24型编织机

在杂志第 24–27 页, 您将详细了解到这些设备的功能特色和它们能够给客户带来的效益。

在杂志第 22–23 页, 我们将向您介绍我们在中国的全资子公司尼霍夫机械制造(常州)有限公司(NMC)。这是一家全新的工厂, 位于常州市武进经济开发区(WEZ), 距离上海以西约 200 公里。通过NIEHOFF的授权, NMC专为中国市场生产各种类型的电线电缆制造设备, 并负责为中国客户提供售后服务, 以及为所有的尼霍夫设备提供可靠的 NIEHOFF Original+ 原厂备件。此外, 通过本期杂志, 您还将了解到一家采用尼霍夫技术的中国公司: 宁波金田铜业(集团)股份有限公司。

这是一家领先的铜导体、铜合金和先进材料制造商, 为新能源汽车、5G 通信、清洁能源、消费电子等行业的发展提供产品和服务(第 34–35 页)。

杂志第 28–33 页的市场报告中, 介绍了中国市场及其对电线电缆产品日益增长的需求。此外, 技术创新的推动也为电线电缆制造商探索新的解决方案和增强其竞争优势打开机会之门。

我们将非常高兴地在 wire China 的 NIEHOFF 展台上恭候您的光临! 在此之前, 请尽情阅读我们的 NIEHOFF 杂志。

Ralf Kappertz Elena Graf Bernd Lohmüller

施瓦巴赫, 2024九月

## 目录

	50年的成功创新 尼霍夫集团和尼霍夫机械制造(常州)有限公司	22-23
高端电线电缆制造设备 德国尼霍夫和常州尼霍夫在 Wire China 2024		24
领先的多头拉丝技术 MMH 121 + RM 201 型多头拉丝生产线		24-25
完美排线, 大幅节约成本 D 632型双节距束线机		26
编织效率高、应用范围广的精密编织机 BMV 型立式编织机亮相		27
对电线电缆的需求迅速增长 中国及其对电线电缆行业的展望		28-33
宁波金田		34-35

# 50年的成功创新

## 尼霍夫集团和尼霍夫机械制造（常州）有限公司

德国尼霍夫与中国市场的渊源可以追溯到 20 世纪 70 年代初，那是首次与中国的电线电缆制造企业建立联系。在经验丰富的中国同事们的支持下，尼霍夫成功地向中国电线电缆行业引进了大拉机、多头拉丝机，以及束线技术、绞合技术、镀锡技术、编织机和 NPS 收线机。



### 数字见证历史

1994 年，尼霍夫在上海成立了服务中心，并于 2000 年更名为尼霍夫上海代表处。随着 2011 年尼霍夫机械制造（常州）有限公司（NMC）的成立，该代表处成为 NMC 的上海销售分公司。

### 为中国而制造

NMC 是尼霍夫集团在中国的全资子公司，这是一家全新的工厂，位于常州市武进经济开发区（WEZ），距离上海以西约 200 公里。在这所先进的工厂内，NMC 在 NIEHOFF 的许可下专门为中国市场生产各种类型的电线电缆制造设备。同时，NMC 还负责为中国客户提供全程售后服务，为所有的尼霍夫设备提供可靠的 NIEHOFF Original+ 原

厂备件。NMC 的另一项服务是对现有的尼霍夫设备进行大修，并为其配备新的控制器和控制柜。

### 现代化的生产设施

NMC 新工厂于 2021 年 4 月投入运营。新工厂距离 2011 年启用的老厂不到 500 米。鉴于订单量不断增加，老厂在运营十年后已经过于狭小，不再有任何扩建空间。新工厂的设计完全符合 NMC 的要

求，包含建筑面积 10000 平方米的现代化生产设施和 1500 平方米的三层行政大楼。工厂配备了最先进的生产设备，符合 NIEHOFF 和 NMC 的高质量标准。厂房的外观和内部结构与 NIEHOFF 德国总部相似。与总部一样，NMC 利用地热能作为生产车间和办公楼供暖和制冷。因此，员工的工作条件得到了改善，零件测试和设备组装时的温度也得以保持稳定。



**Original+** 原厂备件和现代化改造通过 NMC, 所有中国的客户都能享受到 NIEHOFF 的优质服务。如果机器出现故障或需要维修, 专门的联系人将保证提供快速服务响应。从备件到服务, 您的联系人将亲自协调同 NIEHOFF Original+ 原厂备件和售后服务有关的一切事宜。

由训练有素的中国工程师提供服务 NMC 的服务技术人员不断接受来自 NIEHOFF 的培训。因此, 他们拥有非常丰富的现场实践经验和全面的工艺知识, 有能力对中国用户进行培训, 让客户能够尽可能高效地使用所有设备。NMC 也有内部的机械和电气工程师, 他们可以保持可靠高

效的联系, 以便在第一时间排除故障。NMC 的服务团队可以处理好供应给中国市场的几乎所有类型的 NIEHOFF 设备。



尼霍夫机械制造(常州)  
有限公司上海分公司  
上海市淮海中路283号香港广场2302室  
电话: +86 21 61202800  
传真: +86 21 63906192  
邮箱: info@niehoff.cn

尼霍夫机械制造(常州)  
有限公司  
常州市武进经济开发区菱香路5-3号  
电话: +86 519 81098800

# 高端电线电缆制造设备



德国尼霍夫和常州尼霍夫在  
Wire China 2024

## 领先的多头拉丝技术

### MMH 121 + RM 201 型多头拉丝生产线

多头拉丝技术已经成为铜线和铝线行业的标准工艺,几十年来, NIEHOFF 在这一发展过程中发挥了重要作用。目前,全球约有 2500 台 MMH 型 NIEHOFF 多头拉丝机在投入使用。自 2020 年以来, NMC 在 NIEHOFF 的许可下为中国市场制造此类生产线。这些生产线由德国 NIEHOFF 总部制造和提供的部件以及 NMC 制造的部件共同组成。拉丝机主机的机械部分由德国完成,退火机、开关柜和收线装置由 NMC 制造。

德国尼霍夫机器制造有限公司及其中国的全资子公司尼霍夫机械制造(常州)有限公司(NMC)将在第E1B51号展位展出:

- 一条MMH 121 + RM 201 型多头拉丝生产线
- 一台D 632型双绞束线机, 配备 ARH 630型放线架
- 一台BMV 24型编织机

最终,所有部件都在 NMC 进行组装,并在此试运行。只有在试运行成功完成后,生产线才会交付给客户。NMC 技术人员负责安装检查和调试。

此次展出的 MMH 121 + RM 201 型多头拉丝生产线的主要优势在于设计紧凑,节省了生产区域的空间,生产率高,实际运行速度快,断线率低。





MMH 121 + RM 201

RM 201 型电阻式退火机采用经过实践验证的 2/3 段式退火系统, 可选择是否需要导线再加热功能。这样可以获得最佳的线材干燥效果, 并在生产大线规时节约能源。在总部授权下, NMC 拥有完备的收线系列产品, 例如经典的单盘动盘收线机 S 632、SNH 631 或

SNH 801, 并成功在中国市场推出了全自动换盘单盘收线机 SPH 801。自动化符合国际趋势。在这一领域, NMC 已经具备多个将多头拉丝生产线的 SPH 801 系统与 AGV 系统相结合的成功案例, AGV 系统可以自动运输空盘, 并将满盘从收线机输送带上取下。

生产适应高要求应用的高质量线材在该拉丝生产线上拉制的线材整体具有非常均匀和紧密公差的特性。生产出的并丝可以加工成性能优良的线束, 适合终端应用或下游加工所需高质量的线束或编织。

MMH121 技术参数

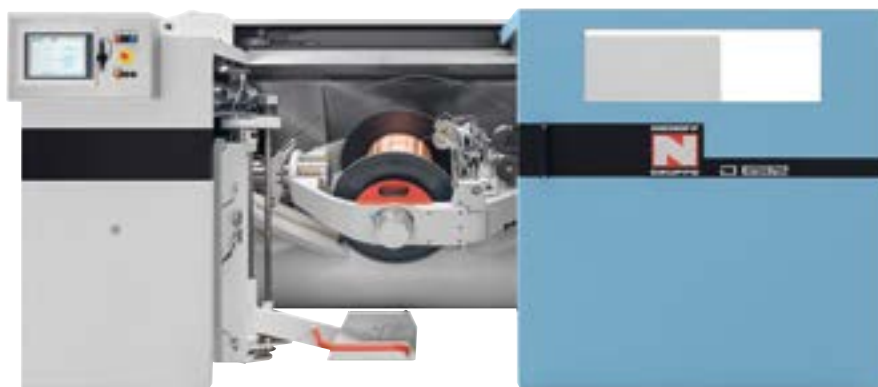
最高生产速度:	35米/秒
进线直径:	2.00 或 1.80 mm*
出线直径:	0.16 ... 0.55 mm
最多导线数量:	24

\*硬铜线



# 完美排线, 大幅节约成本

## D 632型双节距束线机



此次在上海展出的 D 632 型双节距束线机是由 NMC (尼霍夫机械制造(常州)公司) 在 NIEHOFF 德国总部的授权下生产的, 符合 NIEHOFF 的高质量标准。自 2011 年以来, NMC 在生产双节距束线机方面积累了丰富的经验。2022 年起, NMC 开始生产采用西门子控制器和驱动的新型 D 632 设备。

### D632 技术参数

最高生产速度:	300米/分钟
截面:	0.09 ... 6.00 mm <sup>2</sup>
节距(无级可调):	6 ... 100 mm
最大扭数:	7000扭/分钟

\*铜软线

设备生产效率高,能够生产高质量的产品,同时实现完美的排线质量。

使用 D 632 的用户可从该设备诸多优势中获益。单弓设计结合节能绞弓“Eco-Bow”,更为节能。与传统的束线机相比,大大降低能耗成本。

NIEHOFF 束线机的其他独特卖点,如电子节距调节(无需更换齿轮即可改变节距)和从空盘到满盘的导线恒张力控制,在 D 632 中仍然保持不变。该型设备生产的线束可以提供非常小的生产公差,从而实现产生最小截面要求的铜线束。

这大大节省了材料和运营成本。

可变但受控的收线张力 – 独立的线盘填充 – 配合自动激光排线系统 NBAT (NIEHOFF Bunching Automatic Traverse) 可实现完美的收

线。也因此可以实现在极高的放线速度下放线不打结。

得益于该设备的精准控制功能和 NBAT 系统,一位操作工可以同时操作更多束线机,从而降低了生产企业的人工成本。

所有的过程数据都可以被记录下来,便于 D 632 的用户向其客户提供书面质量文件。一些重要的生产参数,如收线张力、节距和扭数也可以被记录。

适用于生产特殊用途的高质量线束 D 632 束线机非常适合生产汽车线用铜合金细线线束(如 CuSn0.3)。采用专利的“拉伸成形和校直技术”, D 632 设备能够避免一般铜合金汽车线裁线时容易出现的翘起和打卷问题。

# 编织效率高、应用范围广的精密编织机

## BMV 型立式编织机亮相



### BMV 24 技术参数

横截面:	0.02 ... 0.56 mm <sup>2</sup> *
最大编织节距:	6 ... 180 mm
中心通道:	50 mm

\*铜软线

二十余年来, NIEHOFF 一直供应 BMV 型立式摆杆型旋转编织机, 分别为12锭、16锭或24锭的设备。从那时起, 这些编织机也一直在技术上不断发展进化。在这个久经考验的系列中, 此次我们选择了一台24锭的 BMV 24 型编织机, 它将会在展会上展出。

与 BMV 系列的其他机型一样, 该设备具有以下关键特点, 即无级电子控制编织速度和编织节距, 和自动控制的中央润滑系统。多种监控系统可实现长时间无人值守运行, 无需操作人员频繁干预。

BMV 型编织机可配备三种专利系统, 确保具有更多优势。

BMV 24 的编织速度可从 110 转/分钟自动加速到最高 130 转/分钟。而 BMV 16, 即16 锭编织机, 则可以从 175 转/分钟加速到 200 转/分钟。编织效率提高了 10%。

在 NIEHOFF 导线张力控制系统 WTC 的帮助下, 所有编织丝 - 从满锭到空锭 - 都能在均匀的张力下进行编织, 从而实现完美的屏蔽质量。

NIEHOFF 的覆盖率控制系统可确保编织覆盖率保持在设定值不变。

由于只使用到绝对必要数量的编织用线, 因此最多可节省 10% 的编织材料。

所有的过程数据均可以被记录下来, 便于 BMV 24 的用户向其客户提供质量文件。一些重要的生产参数, 如编织覆盖率、编织张力也可以被记录。

BMV 型编织机用途广泛。专为加工编织材料而设计, 例如由铜、铝或不锈钢制成的裸线或镀锡的圆线或扁线, 以及人造纱线和纤维。

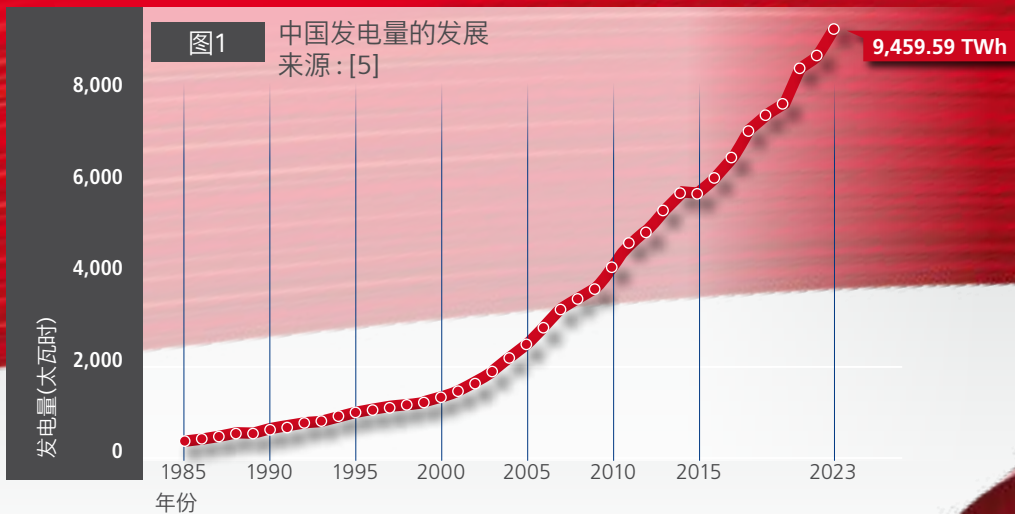
该设备可用于生产不同编织图案的电缆屏蔽、铜编织线、空心编织线、绞合编织线、纺织编织线和钢丝编织线。

# 对电线电缆的需求迅速增长

## 中国及其对电线电缆行业的展望

中华人民共和国拥有 14.25 亿人口,相当于世界总人口的 17.7%,是仅次于美国的世界第二大经济强国[1]。自 1978 年改革开放以来,中国的国内生产总值(GDP)年均增长超过 9%。继 2023 年后疫情时代增长了 5.2%之后,世界银行预计 2024 年中国国内生产总值的增长率将为 4.5%[2]。国际货币基金组织(IMF)也预计,2024 年中国经济将增长 5%,2025 年将增长 4.5%[3]。

像中国这样的工业国家,几乎所有行业都依赖可靠的电力供应和电子数据交换,因此中国对电线电缆的需求迅速增加。预计快速的城市化、不断扩大的基础设施建设以及对能源传输和通信解决方案日益增长的需求会不断推动中国电线电缆市场加速增长。电线电缆对于可再生能源系统、建筑施工、电信和数据中心、工业应用、交通基础设施、以及医疗保健设施等各个领域都至关重要[4]。其中有三个典型的应用领域,分别是电力领域、基础设施领域和汽车领域。



### 电力领域

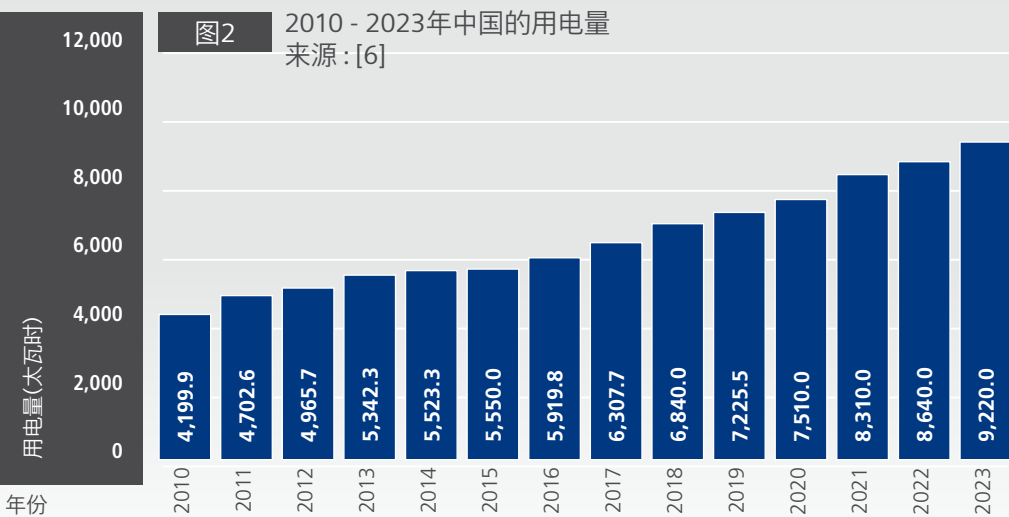
2023年,中国发电厂总发电量接近9,460太瓦时(图1)[5]。同年,中国的总用电量约为9,220太瓦时;与上一年约8,640太瓦时的总用量相比,增长了6.5%(图2)。用电量最多的是包括制造业在内的第二产业,其总用量约为6,070太瓦时(65.8%),与此同时,中国家庭的总用电量约为1,340太瓦时(14.5%)[6]。

国际能源署(IEA)发现,2023年中国的电力需求与上一年相比增长了6.4%。随着中国经济增长放缓,对重工业的依赖程度降低,国际能源署预估,2024年电力需求增长速度将放缓至5.1%,2025年至4.9%,2026年至4.7%。预计到2026年,中国电力需求的总增长量约为1,400太瓦时[7]。

根据DNV发布的《中国能源转型展望》报告,到本世纪中叶,中国的并网发电预计将从2022年的9.2拍瓦时增长到16.5拍瓦时(1拍瓦时=1000太瓦时)[8]。

太阳能光伏组件和电动汽车(EV)的快速扩张生产,以及相关材料的加工将支持中国电力需求的持续增长[7]。

凭借无与伦比的可再生能源技术开发和可再生能源技术出口,中国正在确立其绿色能源领导者的地位。另一方面,据DNV预测,到2050年,化石燃料仍将占其能源结构的40%[8]。



可再生能源技术的迅速普及体现了强有力的政策支持。中国已经成为可再生能源投资的领头羊，到 2050 年，可再生能源装置将增加五倍以上。

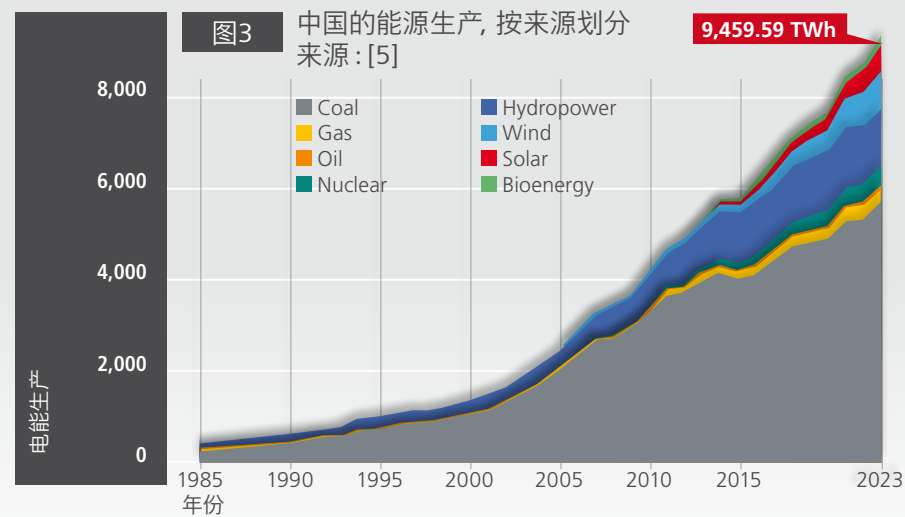
2010 年，风力发电占中国发电总量的 1%。如今，风能已成为中国仅次于煤炭和水电的第三大电力来源，在 2023 年占总电力供应的 9.4%。预计到本世纪中叶，中国有望成为世界上最大的风力发电市场[8]。

自 2019 年以来，太阳能和风能等可变可再生能源的装机容量已超过燃煤和燃气发电厂。除了启动清洁能源

产业外，遏制燃煤发电厂对当地造成的过度空气污染也是安装使用可变可再生能源发电厂的主要原因之一。直到 2030 年，煤炭仍将在电力供应中发挥重要作用。图 3 显示了 2023 年前中国能源生产的来源。从 2023 年起，煤炭所占比例逐渐减少，到 2030 年，可变可再生能源将占电网发电量的 50%以上(图 4) [8]。

#### 基础设施领域

过去三十年来，从铺设数千英里的铁路到建造破纪录的摩天大楼，基础设施支出在中国经济崛起的过程中发挥了至关重要的作用。据市场调研公司Mordor Intelligence预

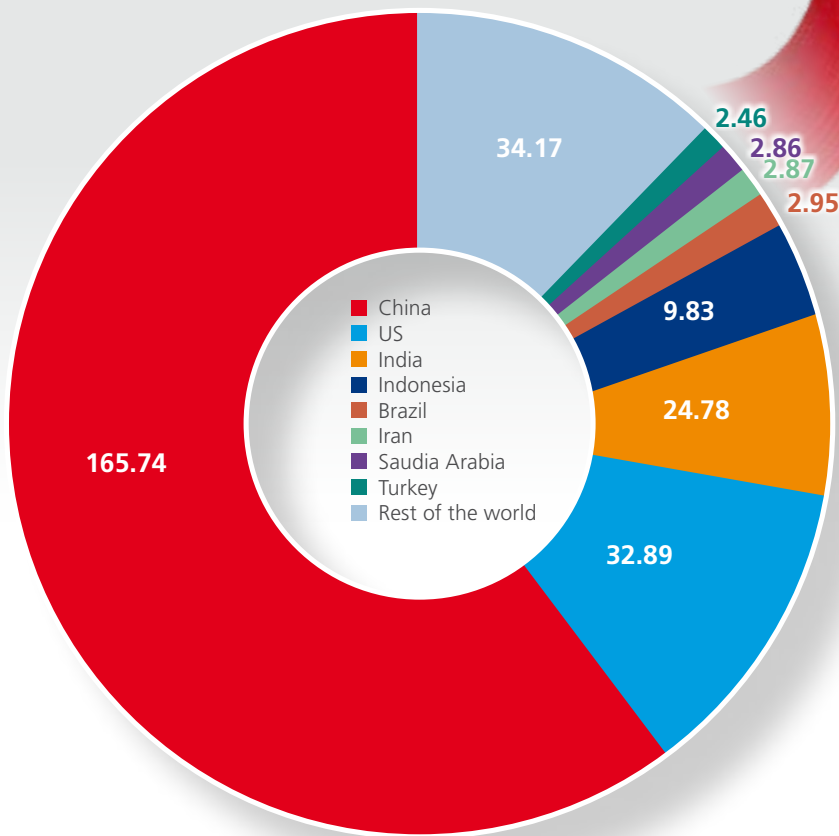


计，2024 年中国基础设施领域的支出将达到 1.10 万亿美元，到 2029 年将达到 1.49 万亿美元，2024-2029 年期间的年复合增长率为 6.32%。中国注重发展绿色能源，因此对可再生能源发电项目的投资不断增加[9]。例如，从 2023 年 1 月到 2023 年 9 月，中国在水利水电方面的投资超过 340 亿美元 (2388 亿元人民币)。随着水力发电项目投资的增加，对电力输送和管理的需求也会相应增加，使用的电线电缆数量也会相应[4]。

中国加强对电力基础设施的关注，尤其是电网扩建。2023 年 1 月，中国国家电网宣布在 2023 年投资 770 亿美元用于电网传输，并承诺在 2021-2025 五年计划期间投资 4,420 亿美元用于电网的现代化建设和扩建[4]。电网运行必须变得更加智能，才能“满足”电动汽车 (EVs)、热泵供暖、通风和空调 (HVAC) 系统与风力涡轮机和太阳能电池板等更多变、更分散的发电系统“联姻”，而这将在某一时刻导致电力供应激增。

图4

2022年各国输电支出 (单位:十亿美元)  
来源:[10]



中国在输电网方面的投资超过了世界上所有其他国家的总和。2022年,中国的投资总额接近1660亿美元(1.19万亿元人民币),而其他国家的投资总额为1180亿美元(图4)[10]。

另一个重要的基础设施领域是中国的铁路系统。中国的高铁(HSR)网络是世界上最大的高铁网络,到2023年底其总长度已达到45,000公里(28,000英里)。它也是世界上使用最广泛的高铁网络,2022年其

乘客量达到了13亿人次[11]。图5显示了中国的高铁网络从2008年的起步阶段到如今2024年成为世界上最大的高铁网络的发展情况[11]。中国计划到2035年将高铁网络增加到70,000公里(43,500英里),比2020年增长84%以上[9]。

与东亚和东南亚其他地区一样,中国也饱受高温和其他气候变化的困扰[12]。因此,住宅和商业用房对暖通空调系统的需求日益增长。暖通空调系统能够帮助调节建筑物的温度、湿度和空气质量,并降低能耗。预计到2030年,中国的暖通设备市场规模将达到809亿美元,2024-2030年的年均复合增长率将达到2.4%(图6)。导致这一增长的主要因素是中国较高的建筑施工率以及为提高现有设施的能效而制定的严格的节能建筑法规[13]。

- [1] China Population. Worldometer. June 14, 2024. <https://www.worldometers.info/world-population/china-population/>
- [2] The World Bank In China. Washington, D.C., Beijing, April 2024. <https://www.worldbank.org/en/country/china/overview>
- [3] IMF Staff Completes 2024 Article IV Mission to the People's Republic of China. International Monetary Fund IMF, Washington D.C., May 28, 2024. <https://www.imf.org/en/News/Articles/2024/05/28/pr24184-china-imf-staff-completes-2024-art-iv-mission>
- [4] China Wire and Cable Market Overview. Focus on Application, Product, and Voltage - Analysis and Forecast, 2023-2032. BIS Research Inc., Fremont, CA/USA, 2023. <https://bisresearch.com/industry-report/china-wire-and-cable-market.html>
- [5] Hannah Ritchie and Max Roser: China: Energy Country Profile. Our World in Data, Oxford. <https://ourworldindata.org/energy/country/china>
- [6] Daniel Slotta: Power consumption in China 2010-2023. Statista, Hamburg, February 6, 2024. [www.statista.com/statistics/302203/china-electricity-consumption/](https://www.statista.com/statistics/302203/china-electricity-consumption/)
- [7] Electricity 2024. Analysis and forecast to 2026. <https://iea.blob.core.windows.net/assets/18f3ed24-4b26-4c83-a3d2-8a1be51c8c88/Electricity2024-Analysisand-forecastto2026.pdf>
- [8] Energy Transition Outlook China 2024. A national forecast to 2050. DNV, Beijing, April 23, 2024. [https://safety4sea.com/wp-content/uploads/2024/04/DNV-Energy\\_Transition\\_Outlook\\_China\\_2024\\_04.pdf](https://safety4sea.com/wp-content/uploads/2024/04/DNV-Energy_Transition_Outlook_China_2024_04.pdf)
- [9] China Infrastructure Market Size & Share Analysis - Growth Trends & Forecasts (2024 - 2029). Mordor Intelligence, Hyderabad, 2023. <https://www.mordorintelligence.com/industry-reports/infrastructure-sector-in-china>
- [10] Nick Ferris: Weekly data: grid investment in China more than every other country combined. In: Power Technology, March 15, 2024. <https://www.power-technology.com/news/weekly-data-grid-investment-in-china-more-than-every-other-country-combined/?cf-view>
- [11] Insane Growth of China's High-Speed Rail Network Between 2008 & 2024. Brilliant Maps, June 6, 2024. <https://brilliantmaps.com/high-speed-rail-china/>



图5 中国高铁 (HSR) 网络的发展  
来源: [9]。

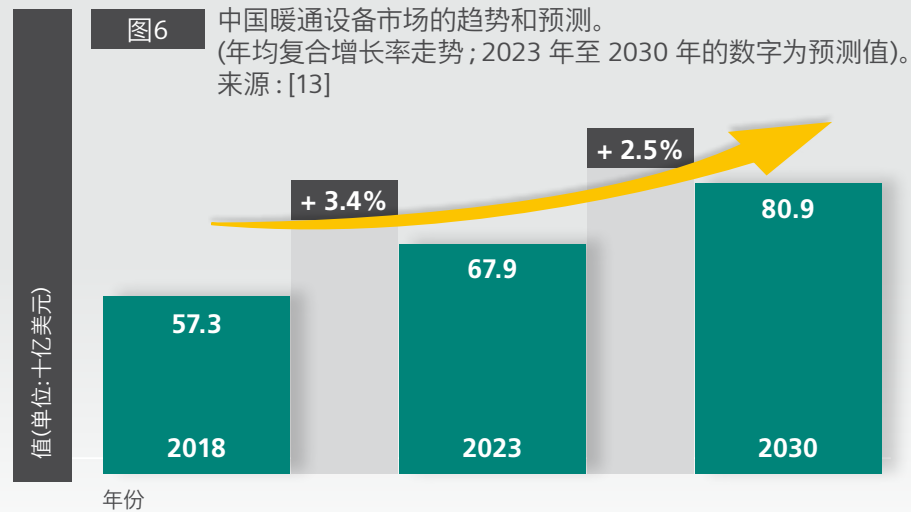


### 汽车领域

中国拥有全球最大的汽车场。2023 年, 中国汽车销量增至创纪录的 3010 万辆, 比 2022 年增长 11.9%。其中商用车销量的增幅最大, 从疫情时期的低点持续回升, 达到了 400 万辆, 比 2022 年增长 22%。一方面, 密集的促销活动和折扣推动了国内消费增加; 另一方面, 出口增长了 58%。由于俄乌战争, 许多其他汽车制造商退出了俄罗斯市场, 而中国对该市场的销售有所增加。预计 2024 年中国轻型汽车销量

Lawrence, Martha; Bullock, Richard; Liu, Ziming, CC BY 3.0 IGO <<https://creativecommons.org/licenses/by/3.0/igo/deed.en>>, via Wikimedia Commons

Von Howchou - Eigenes Werk, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=59380944>



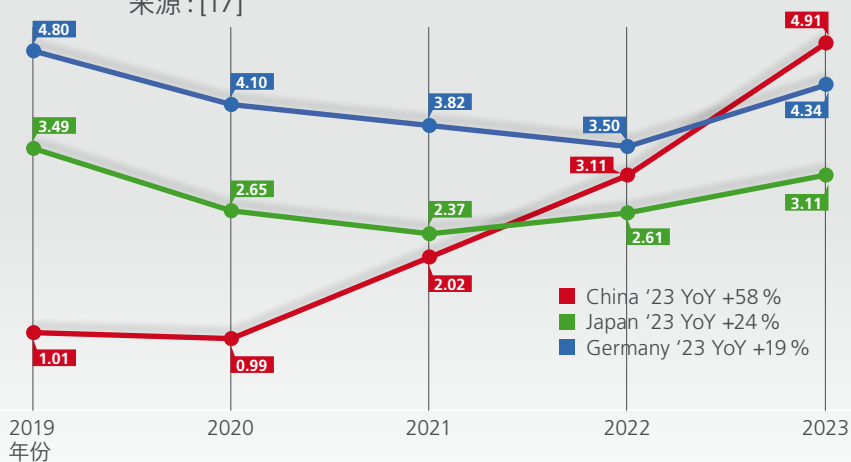
将增长 4.2%, 这将是强势增长的一年。消费者信心的提高以及疫情封锁带来的持续压抑需求预计将为销售增长提供支持[14]。

中国将继续主导电动汽车 (EV) 市场, 2023 年售出的新车中有 35% 以上是电动汽车。预计到 2026 年, 电动汽车的年市场份额将超过 50%。随着电池价格的持续下降和中国电动汽车免购置税政策的延长, 预计 2024 年中国电动汽车销量将进一步增长, 全年电动汽车市场份额将达到 44%[14]。中国也已成为世界领先的汽车出口国, 并在 2022 年超过德国, 在 2023 年超过日本。

中国能取得这样的成就, 主要归功于奇瑞、上汽、吉利和比亚迪等国内企业。汽车出口数量也包含在中国拥有生产基地的外国汽车制造品牌。包括大众和宝马在内的汽车制造商, 由于在本国生产能力有限, 纷纷致力于在中国生产零部件和汽车。2023 年, 以特斯拉为首的 18 个外国品牌从中国出口了 91 万辆汽车, 约占中国汽车出口总量的五分之一。仅特斯拉一家公司就从其全球最大的上海工厂向亚洲、欧洲、澳大利亚和新西兰出口了 34.4 万辆电动汽车[15], [16]。鉴于在中国持续的需求疲软和车企间存在的高度竞争关系, 预计 2024 年出口量将持续增长 [17]。



图7 2019 - 2023年的三大汽车出口国。  
来源: [17]



中国正致力于进一步开发与电动汽车相关的技术,并计划投资约 8.45 亿美元开发新一代电池技术。包括全球最大的电池制造商宁德时代CATL,以及比亚迪和吉利等主要汽车制造商在内的六家公司有资格获得政府支持,开发全固态电池 (ASSB)[18]。

中国首都北京计划将电动汽车充电桩数量增加到 36 万个,并将自动驾驶示范区扩大到 600 平方公里 [19]。

**中国电线电缆市场**  
根据市场调研公司 BIS Research 的数据,2022 年中国电线电缆市场的收入超过 450 亿美元,预计年复合增长率为 7.43%,到 2032 年将达到近 970 亿美元。电线电缆制造商也面临一些挑战,包括监管复杂性带来的阻碍,以及要求市场参与者遵循复杂的标准和合规措施。此外,激烈的市场竞争也促使企业不断调整并革新技术,从而展现出自己与众不同的特点。企业面对挑战的同时,中国电线电缆市场也蕴藏着巨大的机遇。该行业对技术创新的推动为电线电缆制造商探索新的解决方案、增强竞争优势打开了大门[4]。

来自 NIEHOFF 的电缆制造解决方案为了更好地应对挑战,电缆制造商需要最新的加工设备。而尼霍夫提供的机械和工艺知识都建立在 70 多年持续增长的经验基础之上。在其子公司尼霍夫机械制造(常州)有限公司的支持下,尼霍夫集团在中国开展业务近 50 年,是中国电线电缆制造商的可靠合作伙伴,协助他们解决电力传输和其他电缆相关项目。



[12] Heather Chen and Kathleen Magramo: 'Blast-furnace heat every day': Record temperatures cancel classes, widening learning gaps across Southeast Asia, CNN, Atlanta, GA/USA, May 9, 2024. <https://edition.cnn.com/2024/05/09/asia/southeast-asia-heatwaves-education-school-closures-intl-hnk/index.html>

[13] China HVAC Equipment Market: Trends, Opportunities and Competitive Analysis [2024-2030]. Lucintel, Dallas, TX/USA, December 2023. <https://www.lucintel.com/china-hvac-equipment-market.aspx>

[14] Kroll Automotive Industry Report. Spring 2024. Kroll, New York, May 9, 2024. <https://www.kroll.com/-/media/kroll-images/pdfs/executive-summary-automotive-industry-insights-spring-2024.pdf>

[15] Foreign auto brands boost exports as China sales remain weak. Market Screener, Annecy, France, January 22, 2024. <https://www.marketscreener.com/quote/stock/TESLA-INC-6344549/news/Foreign-auto-brands-boost-exports-as-China-sales-remain-weak-data-45783416/>

[16] Dan Mihalascu: China's Exports Of Electric Vehicles To Europe Reach Record Levels. InsideEVs, New York, NY/USA, January 4, 2023. <https://insideevs.com/news/629493/china-exports-electric-vehicles-europe-reach-record-levels/>

[17] State of China's Auto Market - March 2024. Automobility Ltd., Shanghai, May 2024. <https://automobility.io/2024/03/state-of-chinas-auto-market-march-2024/>

[18] Laura He: China to invest \$845 million on ramping up its advanced EV battery ambitions. CNN, Atlanta, GA/USA, May 30, 2024. <https://edition.cnn.com/2024/05/30/tech/china-investment-advanced-ev-batteries-intl-hnk/index.html>

[19] Beijing set to launch 300 major engineering projects in 2024. China.org.cn, Beijing, January 18, 2024. [http://www.china.org.cn/china/2024-01/18/content\\_116950063.htm](http://www.china.org.cn/china/2024-01/18/content_116950063.htm)

# 宁波金田



宁波金田铜业（集团）股份有限公司创建于1986年，专注铜加工产业三十八年，是全球领先的铜导体、铜合金及先进材料制造企业。主要产品有铜管、棒、线、带、排、电磁线、阀门、磁性材料及黄铜、青铜、紫铜、白铜等高端合金。致力于为新能源汽车、5G通讯、清洁能源、消费电子等产业发展提供全球一流的产品和服务。



公司立足宁波,放眼世界,在全球有八大生产基地,7000余名员工。在美国、德国、泰国、日本、韩国等地设立分支机构,业务遍及100多个国家和地区,是众多世界知名企业的长期合作伙伴。

2023年,集团铜加工产销达191万吨,营收总额超1400亿元人民币(相当于约179亿欧元)。位列中国制造业500强第94位。

集团全资子公司宁波金田电材有限公司成立于1998年。经过20多年的发展与沉淀,目前拥有宁波本部、杭

州湾新区、广州、重庆等多个生产基地,致力于为客户提供国际一流的电工材料。

目前公司拥有4条全球领先的美国SCR连铸连轧生产线,年产能达100余万吨。在铜导体深加工方面,公司早在2011年开始就和德国尼霍夫集团开展深度合作,铜导体深加工大量采用先进的尼霍夫进口及尼霍夫常州工厂提供的各类设备,目前已累计采购了16台双头大拉机及配套的紧密收线和梅花落线系统,2条镀锡生产线,37台不同型号规格的多头拉丝机,数十台单弓激光排线高速束线机,年产能达到10万余吨。同

时公司从德国、日本、美国等引进国际一流检测仪器及设备,融合应用WMS、MES、SCADA等信息化系统建设数字化生产车间,致力于电工圆铜线(杆)、铜绞线和多头并线(含镀锡)产品的生产制造,产品主要应用于电磁线、高低压电缆、汽车线束、电子、光伏、通讯、机械五金、建筑等行业,与全球范围内众多知名企业建立了良好的合作关系。

在“创造客户价值,打造百年企业,成为行业标杆,为现代工业文明做贡献”的使命愿景牵引下,公司秉承“天天求变、永不满足、勇于竞争、追求卓越”的企业精神,坚持走新型工业化发展道路,拥有一流的管理水平和经验丰富的人才队伍,通过ISO9001:2015质量管理体系、ISO14001:2015环境体系、ISO45001:2018职业健康安全管理体系及IATF16949汽车行业质量管理体系认证。

面向未来,公司继续坚持“依法经营、诚信经营、自主创新、科学发展”的经营理念,讲质量、守诚信、铸品牌,以市场为导向,以客户为中心,坚持科技兴企,加快转型升级,优化产品结构,提升产品品质,致力于成为国际领先、质量服务双一流的电工材料供应商。



**Ningbo Jintian Copper Group Co., Ltd.**

No.1 Chengxi West Road,  
Cicheng Town, Jiangbei District  
Ningbo 315034, China

Tel.: +86-057483005999  
+86 57 483005059

Fax +86 57 487597573

E-mail: [service@jtgroup.com.cn](mailto:service@jtgroup.com.cn)

Web: <http://www.jtgroup.com.cn>  
<https://jtcopper.com>

**Maschinenfabrik NIEHOFF GmbH & Co. KG**

Walter-Niehoff-Strasse 2, 91126 Schwabach, Germany  
Phone +49 9122 977-0 / Fax +49 9122 977-155  
info@niehoff.de

**NIEHOFF ENDEX North America Inc.**

Swedesboro, New Jersey, USA

**NIEHOFF Machinery Changzhou Co., Ltd.**

Shanghai Sales Branch, Shanghai, P.R. China

**NIEHOFF-Herborn Máquinas Ltda.**

Barueri, São Paulo, Brazil

**NIEHOFF Singapore Pte. Ltd.**

Singapore

**Nippon NIEHOFF Co., Ltd.**

Tokyo, Japan

**NIEHOFF of India Private Limited**

Medak District, Telangana, India

**Maschinenfabrik NIEHOFF (CZ), s.r.o.**

Nymburk, Czech Republic

**Maschinenfabrik NIEHOFF GmbH & Co. KG**

Marktobersdorf/Leuterschach, Germany

**NIEHOFF Stranding Technology, S.L.**

Badalona, Barcelona, Spain

**H.Folke Sandelin AB**

Motala, Sweden

[www.niehoff.de](http://www.niehoff.de)