

INDUSTRY OVERVIEW

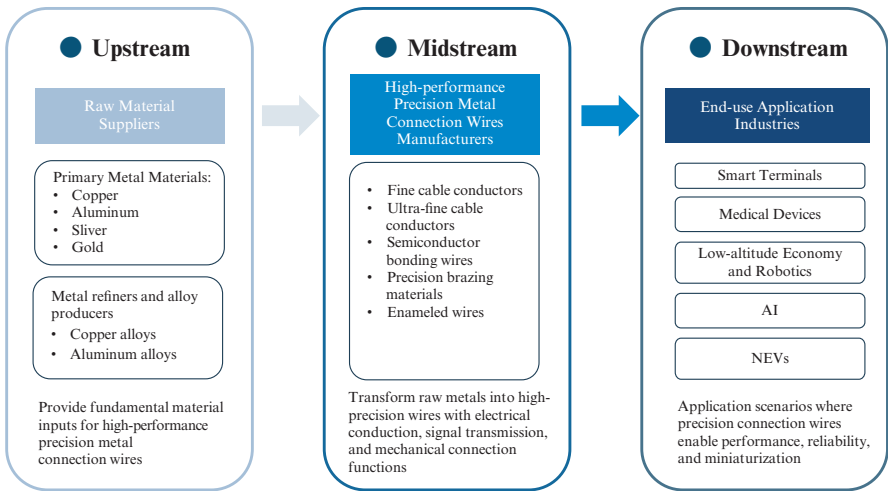
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THE GLOBAL HIGH-PERFORMANCE PRECISION METAL CONNECTION WIRES MARKET

Wire is one of the most commonly used forms of connection materials. High-performance precision metal connection wires refer to high-end metal wires that demand stringent standards for dimensional accuracy, material purity, surface quality and comprehensive mechanical properties, with a remarkably higher overall added value than ordinary wires. They serve to enable critical interconnection functions such as electrical conduction, signal transmission, mechanical fastening and structural support, and are manufactured through high-end processing techniques including precision metallurgy, precision forming, and precision rolling, drawing, etching and welding modification.

The global market for high-performance precision metal connection wire is large and structurally complex, driven by diverse application requirements across advanced industries. The size of this market was USD52.8 billion in 2025, and is expected to reach USD80.5 billion in 2030 and USD97.6 billion in 2035, at a CAGR of 8.8% from 2025 to 2030 and 3.9% from 2030 to 2035.

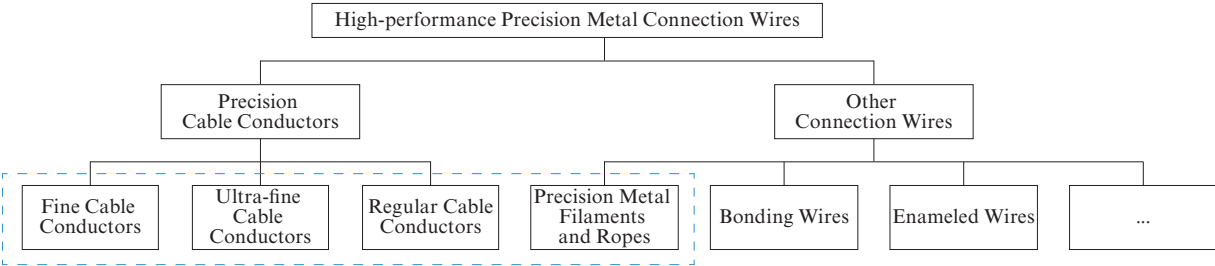
The industry value chain of the high-performance precision metal connection wires market includes (i) upstream raw material suppliers that provide pure metals and metal alloys, (ii) midstream manufacturers that process the raw materials into high-performance precision metal connection wires that serve as essential building blocks that enable electrical conduction, signal transmission and mechanical connection in downstream applications, and (iii) downstream end-use application industries, details of which are illustrated in the below diagram:



Source: the F&S Report

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High-performance precision metal connection wires can be divided into (i) precision cable conductors, designed for electrical conduction and signal transmission, details of which are set forth in “— The Global Precision Cable Conductors Market,” and (ii) other connection wires, such as precision metal filaments and ropes, which provide mechanical strength and structural support, details of which are set forth in “— The Global Precision Metal Filaments and Ropes Market,” bonding wires and enameled wires, among other things, as illustrated below:



Source: the F&S Report

Note: products provided by the Group

THE GLOBAL PRECISION CABLE CONDUCTORS MARKET

Overview

Precision cable conductors are long strip-shaped cylindrical conductive metal with relatively uniform cross-sections, often in rolls and spools and usually produced bare or without insulation coating. They are the essential raw material and conductive core of products like wires, cables and wiring harnesses that are used to transmit electrical current or signals, serving as the building blocks for various critical downstream applications.

Copper or copper alloy are the most widely used raw materials to produce precision cable conductors, due to their high electrical conductivity, decent ductility and cost-effectiveness. Copper’s electrical conductivity is second only to silver among all metals, while its price is less than 1% of that of silver. Other metal alternatives include aluminum and gold. The following table sets forth a comparison between the different types of raw materials used to produce precision cable conductors:

Material type	Advantages	Disadvantages	Main applications
Copper	Has good electrical conductivity, excellent flexibility and ductility, strong chemical stability and oxidation resistance	Has a high density and is relatively more expensive compared to other options on the market	All fields of electricity and electronics, including power transmission, electronic devices, communication systems, and residential electrical wiring
Silver	Has the best electrical and thermal conductivity in the nature and excellent ductility and workability, and suits high-frequency scenarios	Has low strength and a high density which restricts large-scale applications, and is extremely costly	High value-added fields such as ultra-high-speed interconnection, high-end components for new energy and aerospace

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Material type	Advantages	Disadvantages	Main applications
Aluminum	Has low density and costs, abundant resources, corrosion resistance via dense oxide film formation through surface energy	Has poor electrical conductivity (and therefore needs larger cross-sections for the same current compared to many alternatives), and weaker strength, ductility and fatigue resistance than copper	High-voltage lines, medium-voltage cables and building busbars
Gold	Has good electrical conductivity with excellent resistance to oxidation, which ensures stable and reliable signal transmission	Is extremely costly which limits its use in large-scale power transmission applications	High-reliability electronic interconnections, including connectors, bonding wires, and precision contact components

Source: the F&S Report

Accordingly, precision cable conductors made from copper or copper alloys are the dominant form among the different types of raw materials, and therefore they are defined as “precision cable conductors” and their relevant market is referred to as the “precision cable conductors market,” for purpose of this document.

By diameter, precision cable conductors can be categorized into three groups: (i) regular cable conductors, with a diameter of no less than 0.1 mm; (ii) fine cable conductors, with a diameter of more than 0.03 mm but less than 0.1 mm; and (iii) ultra-fine cable conductors, with a diameter of no more than 0.03 mm. The following table sets forth a comparison between the different diameters of precision cable conductors:

Diameter	Features	Main applications
Regular (≥ 0.1 mm)	Relatively low technical requirements and intense market competition, except for regular cable conductors in high-speed copper cables of AI applications, which have relatively high technical requirements	Power transmission, building wiring, industrial control, transportation infrastructure, electronic device power connections and AI data centers
Fine (> 0.03, < 0.1 mm)	Relatively high requirements for processing precision and surface quality, the production of which demands the adoption of precision wire drawing and surface treatment processes	Consumer electronics, small motors, precision instruments, low-altitude economy and robotics
Ultra-fine (≤ 0.03 mm)	Relatively higher current density and lower resistance loss, resulting in remarkable improvement in energy efficiency and representing the highest level of conductor manufacturing technology (currently possessed by only a handful of enterprises worldwide)	High-precision medical devices, NEVs, microelectronic components, low-altitude economy and robotics

Source: the F&S Report

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The precision cable conductors market is increasingly evolving toward higher-performance and miniaturized applications, driven primarily by the need for lighter, more efficient components from downstream application industries such as the automotive, electronics and medical device industries. Accordingly, fine and ultra-fine cable conductors are exhibiting tremendous growth potential in light of such trend compared to regular cable conductors, benefiting from their compactness. In recent years, the rapid development of AI infrastructure and AI data centers has further driven demand for conductors products in high-speed copper cables, creating new growth opportunities for higher-performance regular cable conductors. For details, see “— Key End Markets of Precision Cable Conductors and Precision Metal Filaments and Ropes — The AI Industry.”

The following table sets forth some details on the major application fields of fine and ultra-fine cable conductors:

Application field	Industry challenges	Advantages of fine and ultra-fine cable conductors
Smart terminals	As electronic devices continue to become thinner and embedded with more features, the requirements for miniaturization and precision on conductors are also increasing.	Provide greater space-saving efficiency and more stable connections
Medical devices	Medical instruments are required to be more miniaturized and flexible, while also demanding higher stability and biocompatibility.	Provide device flexible design and stable interconnection performance
NEVs	As NEVs become increasingly intelligent, miniaturization and low power consumption of electrical components are conducive to vehicle design and driving range optimization.	Provide greater flexibility, lightweight characteristics and space optimization capability
Robotics	Conventional twisted conductors have insufficient resistance to ultra-high cycle bending fatigue and limited electromagnetic signal transmission capability.	Provide greater bendability, significantly reduce cable harness weight, while enabling space optimization.
Low-altitude economy and aerospace	The performance and scenario requirements of this application field cannot be satisfied if regular cable conductors are used.	Enable weight reduction while maintaining high-strength characteristics to be better adapted to tasks in harsh environments

Source: the F&S Report

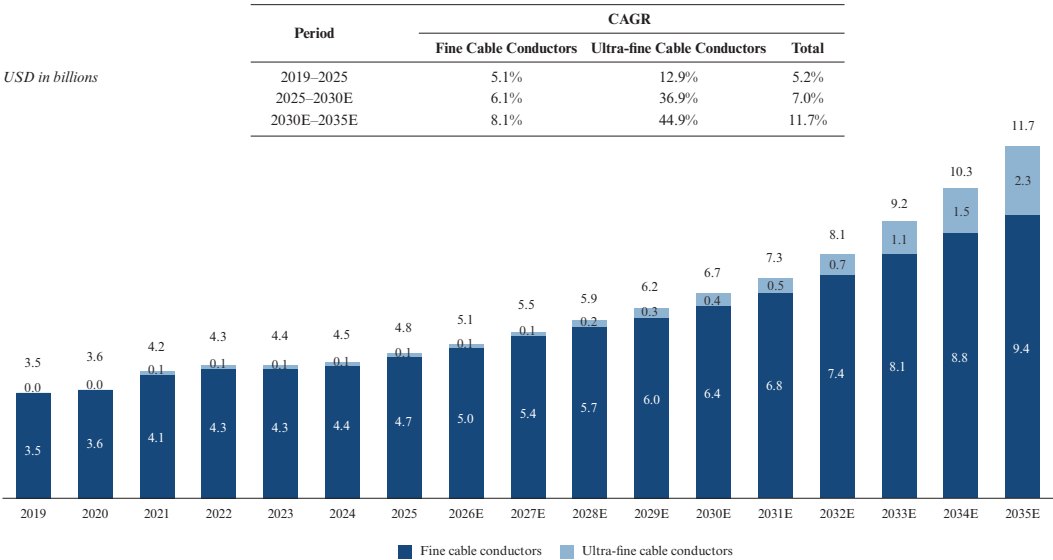
For details on the application of fine and ultra-fine cable conductors in each key end market, see “— Key End Markets of Precision Cable Conductors and Precision Metal Filaments and Ropes.”

Market Size

The global fine and ultra-fine cable conductors market has experienced notable growth in recent years, driven by increasing demand for miniaturization, high transmission efficiency and enhanced reliability across downstream industries. This market increased from USD3.5 billion in 2019 to USD4.8 billion in 2025, at a CAGR of 5.2%, and is expected to reach USD6.7 billion by

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2030 and USD11.7 billion by 2035, at a CAGR of 7.0% from 2025 to 2030, and 11.7% from 2030 to 2035. The following diagram sets forth the historical and projected size of this market from 2019 to 2035:



Source: companies’ annual reports, expert interview, the F&S Report

Note: The market size estimation here for fine and ultra-fine cable conductors excludes enameled wires, binding wires, and communication cables, but considers cable conductor diameters of below 0.03 mm (ultra-fine) and 0.03 mm to 0.1 mm (fine), and only includes the in-house R&D and manufacturing portion.

In particular, the global fine cable conductors market increased from USD3.5 billion in 2019 to USD4.7 billion in 2025, at a CAGR of 5.1%, and is expected to reach USD6.4 billion by 2030 and USD9.4 billion by 2035, at a CAGR of 6.1% from 2025 to 2030 and 8.1% from 2030 to 2035. The fine cable conductors market largely benefits from broad downstream applications in smart terminals, communication systems, medical devices and intelligent equipment.

The global ultra-fine cable conductors market increased from USD36.3 million in 2019 to USD89.8 million in 2025, at a CAGR of 16.3%, and is expected to reach USD0.4 billion by 2030 and USD2.3 billion by 2035, at a CAGR of 36.9% from 2025 to 2030 and 44.9% from 2030 to 2035. The ultra-fine cable conductors market is characterized by higher technical barriers and superior performance requirements compared to the fine cable conductors market, and is mainly applied in high-precision and high-density interconnection scenarios, including medical devices, robots, and low-altitude economy applications.

In addition, regular cable conductors have historically been widely applied across traditional power transmission, industrial equipment and various cable-related applications, with new growth drivers in higher-performance regular cable conductors in recent years, resulting in a market size by revenue of over hundreds of billions of US dollars globally. With respect to regular cable conductors adopted in high-speed copper cables, the size of this market increased from RMB0.1 billion in 2019 to RMB0.7 billion in 2025, at a CAGR of 36.0%, and is expected to reach RMB2.1 billion by 2030 and RMB4.2 billion by 2035, at a CAGR of 24.7% from 2025 to 2030 and 14.6% from 2030 to 2035.

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Competitive Landscape

Manufacturers of precision cable conductors products with similar materials composition and diameter specifications represent the most direct competitors of the Group. The market players in the fine and ultra-fine cable conductors markets typically compete with respect to product quality, cost efficiency, manufacturing capabilities and product adaptability to serve diverse downstream applications, among other things.

The global fine cable conductors market features a pyramid-shaped tiered competitive landscape with obvious divergence and involves a relatively large number of participants among which there are more than a hundred manufacturers worldwide with scaled mass production capabilities. Within this market, some enterprises focus on production scale and mainly produce relatively thicker-diameter products, while others prioritize finer-diameter products or products that require stricter production processes. The top five players of the global fine cable conductors market collectively accounted for approximately 20% of the market share by revenue in 2025, dominated by Chinese and Japanese companies. The remaining share of this market is largely fragmented.

Meanwhile, the global ultra-fine cable conductors market is generally characterized by higher concentration due to greater technical requirements, as its superior performance requirements entail higher entry barriers, which limits its participation to a smaller number of capable players. Accordingly, this market has fewer market participants compared to the global fine cable conductors market. To establish and maintain competitive positions in this market, participants need to be equipped with advanced manufacturing technologies, production stability, stringent quality controls and relatively high qualification for certification, among other things. In 2025, the top three players of the global ultra-fine cable conductors market accounted for a total of approximately 79.5% by total revenue scale, details of which are set forth below:

Ranking ⁽¹⁾	Company name ⁽²⁾	Brief introduction	Listing status as of the Latest Practicable Date	Market share of the global ultra-fine cable conductors market
1	Company A	A global technology and manufacturing group with operations spanning automotive systems, info-communications, electronics, energy infrastructure and industrial materials founded in 1897 and headquartered in Osaka, Japan, which has developed extensive expertise in advanced materials, wire and cable technologies, optical fiber, semiconductor materials and precision electronic components, serving industries such as automotive, telecommunications and data centers	Listed on Tokyo Stock Exchange, Nagoya Stock Exchange and Fukuoka Stock Exchange	~47%
2	Company B	A materials manufacturer with competitive core technologies for highly functional metal materials founded in 1910 and headquartered in Tokyo, Japan, which operates across a broad range of businesses related to industrial infrastructure, automobiles and electronics with globally recognized brands in its portfolio	Unlisted	~17%
3	The Group		Unlisted	15.5%
	Total			~79.5%

Source: public information, expert interview, the F&S Report

Notes: (1) The ranking estimation here excludes enameled wires, binding wires and communication cables, but considers cable conductor diameters of below 0.03 mm (ultra-fine), and only includes the in-house R&D and manufacturing portion.

(2) The identities of peer companies are presented in code names, as we had not acquired consent from these companies as of the Latest Practicable Date, and unauthorized disclosure may cause potential disputes.

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Furthermore, the global regular cable conductors market is highly fragmented and complex, among which the regular cable conductors market for high-speed copper cables used in AI data centers is relatively concentrated, with fewer than ten major leading market participants globally, primarily due to high technical barriers associated with material performance, signal transmission stability and precision manufacturing.

Growth Drivers and Future Trends

The global fine and ultra-fine cable conductors markets have demonstrated the following growth drivers and future trends:

Consistent demand from downstream applications with increasing performance requirements. Demand for fine and ultra-fine cable conductors is supported by the continuing evolution of downstream applications toward smaller size, higher functional density and more reliable power and signal transmission. Fine cable conductors have been widely adopted in mature application fields such as smart terminals, small motors and precision instruments, where stable demand for compact electrical components supports a broad market base. The ultra-fine cable conductor industry is primarily driven by the rapid development of sectors with advanced application scenarios such as smart terminals, high-end medical devices, the low-altitude economy and NEVs, which raise stricter requirements for miniaturization, lightweight design and interconnection density. Furthermore, as downstream applications are continually evolving, they are imposing increasingly stringent requirements on upstream materials, which continues to drive the demand for improved conductor performance.

Continual technological advancement. The development of fine and ultra-fine cable conductors is supported by ongoing innovations in materials and manufacturing processes. Continuous improvements in precision wire drawing, surface treatment technologies, electroplating and related manufacturing processes enhance dimensional accuracy, surface quality and product consistency, while also improving conductivity and mechanical performance of fine and ultra-fine cable conductors. In addition, the application of digitalization and intelligent manufacturing has positively contributed to the improved performance and production efficiency of these products.

The global fine cable conductors market has demonstrated the following additional growth driver and future trend:

Industry shift toward value-added segments. The fine cable conductors market is gradually transitioning from standardized, volume-driven products to higher value-added and application-specific segments. Manufacturers are increasingly focusing on precision processing, quality control and customized solutions, rather than competing primarily on price. This shift is driving industry consolidation and technological upgrading.

The global ultra-fine cable conductors market has demonstrated the following additional growth drivers and future trends:

Expanding application scenarios. The range of applications of ultra-fine cable conductors is expanding to emerging high-tech end markets such as AR devices, BCI and advanced sensing equipment, in addition to traditional electronics and medical applications. Such expansion is expected to create additional demand for ultra-fine cable conductors.

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Increased competitiveness of PRC manufacturers. China’s position as both the world’s largest producer and consumer of refined copper has provided PRC manufacturers of ultra-fine cable conductors with a favorable industry value chain advantage. In light of continued improvements in technologies, manufacturing capabilities and product quality, PRC manufacturers of this market have gradually gained recognition in the global market.

The global regular cable conductors market has demonstrated the following growth drivers and future trends:

Stable conventional demands. Regular cable conductors continue to support broad and stable demand across conventional applications. A significant portion of the regular cable conductors products are relatively mature and volume-driven, with comparatively lower value-added characteristics.

Expansion toward higher-performance applications. Regular cable conductors have historically been widely used in conventional applications such as power transmission, electrical wiring and industrial equipment. In recent years, the rapid development of AI infrastructure, next-generation communication technologies and AI data centers has driven increasing demand for higher-performance regular cable conductor applications such as conductors products for high-speed copper cables.

Entry Barriers

New market entrants to the global fine and ultra-fine cable conductors markets are confronted with the following barriers:

Process know-how. Both markets rely on accumulated process know-how, operational experience, experienced engineers and technical personnel with expertise in precision manufacturing and materials science. Achieving high yield, consistent product quality and efficient cost control requires long-term process refinement, sustained R&D capabilities and the accumulation of long-term technical know-how, forming a significant barrier for new entrants.

Techniques and manufacturing capabilities. The production of fine and ultra-fine cable conductors requires advanced precision manufacturing capabilities and relatively high standards in processing precision and surface quality. Manufacturers must achieve precise dimensional control, smooth surface finish and stable electrical performance through multi-stage wire drawing and surface treatment processes, while maintaining consistent product quality, performance and reliability in continuous manufacturing.

Customer onboarding. Fine and ultra-fine cable conductors are widely used in sectors where downstream customers place strong emphasis on product consistency, delivery reliability and supplier qualifications. Established suppliers of fine and ultra-fine cable conductors benefit from long-term relationships and proven supply capabilities and certification records, making it difficult for new entrants to access existing supply chains.

Capital investment. Manufacturing of fine and ultra-fine cable conductors requires substantial and continuous investment in production equipment and R&D. The number of pieces of equipment for procurement for producing ultra-fine cable conductors are considerably larger than those for producing fine cable conductors, given more precise production technology and techniques are involved. Accordingly, with respect to ultra-fine cable conductors, established market players with solid equipment R&D capabilities are able to scale their production more easily than those without such R&D capabilities. Additionally, extended payment cycles by customers are common in these markets, which may create relatively higher working capital requirements on the market players, and new entrants may not have the resource and the ability to satisfy such requirements.

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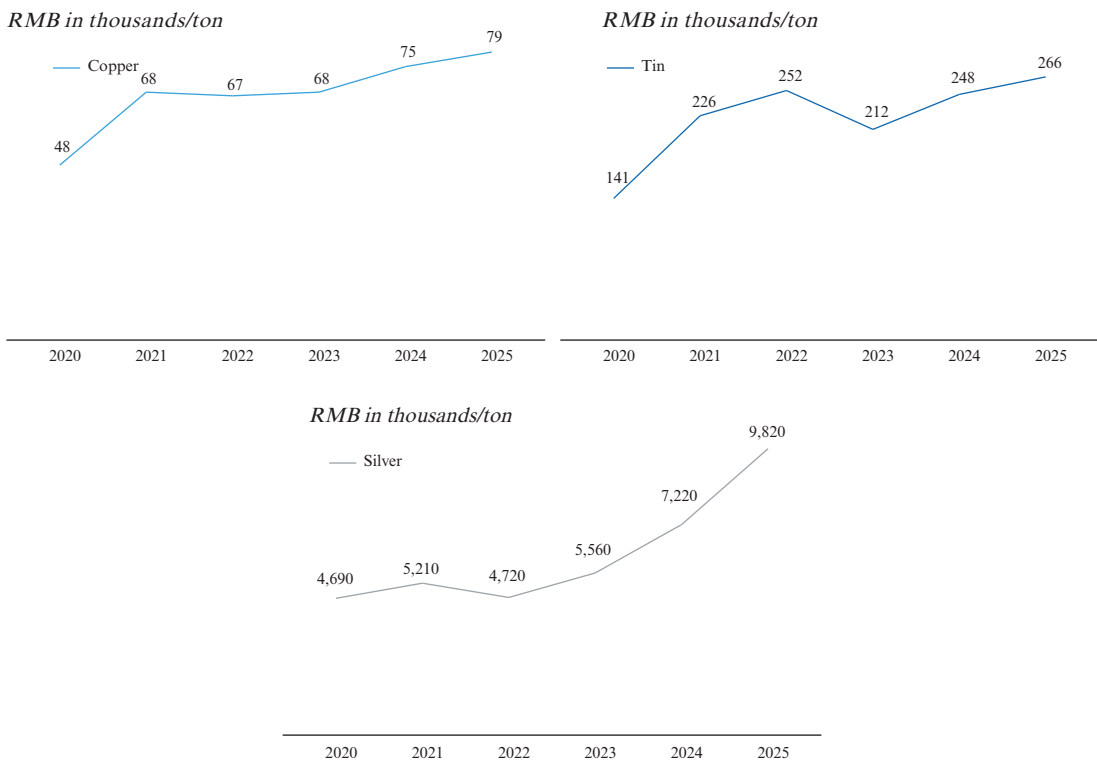
New market entrants to the global ultra-fine cable conductors market are confronted with the additional following barrier:

Scale barriers. The production of ultra-fine cable conductors requires sophisticated manufacturing techniques. Challenges relating to process and production stability hinder the stable mass production of such products. Mature market players with established economies of scale have advantages in cost efficiency, which is hard to achieve by new entrants.

New market entrants to the high-speed copper conductors segment of the global regular cable conductors market are confronted with the following barriers: (i) high capital investment, where new entrants are faced with massive upfront capital expenditures for producing high-speed copper cable conductors; (ii) technical barriers, where new entrants are required to achieve stringent precision requirements during production, which demands meticulous inspections or even real-time testing of conductor dimensions, plating thickness and other parameters as well to ensure the uniformity and stability of products; and (iii) end-user cost sensitivity, where downstream customers are relatively price-sensitive and established players can reduce costs through economies of scale, making it difficult for new entrants to match their pricing strategies.

Major Raw Material Analysis

The major raw materials for manufacturers of fine and ultra-fine cable conductors are copper, silver and tin, where silver and tin are typically used for plating. The following graphs set forth the historical market prices of copper, silver and tin from 2020 to 2025:



Source: government websites, Shanghai gold exchange, the F&S Report

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Copper prices generally showed a stable upward trend with relatively mild fluctuations in recent years, supported by recovering industrial demand, accelerating electrification trends, expanding demand from electric vehicles, AI data centers and precision manufacturing applications. Going forward, copper prices are expected to remain relatively stable with moderate fluctuations.

Silver prices generally exhibited an upward trend with fluctuations in recent years, supported by recovering industrial activities, rising demand from electronics, semiconductors, photovoltaics, AI-related applications and precision manufacturing industries. As a relatively scarce precious metal, the prices of silver were also influenced by investment demand, supply tightness and geopolitical uncertainties, and are expected to remain volatile at relatively high levels.

Tin prices generally experienced an upward trend with relatively high volatility in recent years, driven by semiconductor demand, consumer electronics recovery, supply chain disruptions, geopolitical tensions and tightening supply conditions. Growing demand from emerging electronics and precision manufacturing applications is expected to continue supporting tin prices at relatively high but fluctuating levels.

THE GLOBAL PRECISION METAL FILAMENTS AND ROPES MARKET

Overview

Precision metal filaments generally refer to high-performance load-bearing materials produced through precision manufacturing with a diameter of less than 0.1 mm, which are not limited to conductive applications and are characterized by high tensile strength, fatigue resistance and flexibility. In contrast, a precision metal rope is typically formed by twisting or bundling multiple precision metal filaments together to enhance strength, flexibility and durability. These products may be manufactured from materials such as steel, stainless steel, tungsten, and precious metals such as gold, silver and platinum, depending on the specific performance requirements. The following table sets forth a comparison between precision metal filaments and ropes:

	Precision metal filaments	Precision metal ropes
Flexibility and fatigue resistance	They can achieve a small bending radius, not prone to plastic deformation or fracture, with slower fatigue crack initiation and propagation under high-frequency loads.	Sliding between filaments enhances flexibility and adaptability to complex curved surfaces, and their braided structures absorb vibration energy and improve fatigue resistance for dynamic applications.
Tensile strength	During wire drawing, grain refinement and work hardening occur inside the metal, microdefects are greatly reduced, and the material achieves higher strength.	When stressed, load is more evenly distributed, with lower elongation at break. Failure of a single strand does not lead to overall failure, which improves overall reliability.
Space adaptability	A smaller diameter results in lighter weight and smaller volume, with larger specific surface area and higher efficiency in applications such as heat exchange.	Although metal ropes may have higher volume and weight than filaments, they have better performance with respect to flexibility, fatigue resistance and tensile strength. Their braided structures prevent twisting and provide a higher safety margin for transmission.

Source: the F&S Report

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Precision metal filaments and ropes are widely used as precision structural or functional mechanical components in various industrial applications. Major downstream applications include medical devices, robotics and other advanced manufacturing industries that require high strength, flexibility and reliability. The following tables set forth some details on the major application fields of precision metal filaments and ropes:

	Application field	Application scenarios
Precision metal filaments	Medical industry	Cardiovascular and cerebrovascular interventional devices, such as medical guidewires and heart stents; electrical stimulation interface, such as BCI and electrosurgery devices; stents or fixation devices, such as orthopedic implants and orthodontics
	Electrical industry	Sensor, such as thermocouples, strain gauges and micro contacts; aerospace equipment, such as precise sensing and connection
	Wire mesh	Electromagnetic shielding net, commonly found in medical imaging rooms, communication base station and nuclear industry protection; mesh screen, widely used in scenarios such as screening, filtration and isolation; screen printing, which can be used in the production of PCB boards, photovoltaic products and electronic components
Precision metal ropes	Robotics	Transmission architecture of humanoids, especially dexterous hands
	Automobile industry	Automotive safety systems, transmission systems, electronic control systems and various cable systems
	Medical industry	Surgical robot systems; minimally invasive surgical instruments, such as endoscopes
	Aerospace industry	Precision transmission systems and control systems, such as the deployment mechanism of solar panels and the pointing system of antennas
	Industrial automation	Transmission and control of precision machinery, such as positioning system, feed system and tool control system

Source: the F&S Report

Market Size

Driven by the development of advanced manufacturing, automation technologies, medical devices and other emerging industries, demand for precision metal filaments and ropes products has continued to increase in recent years. For example, metal tendon ropes used in humanoids are expected to experience significant long-term growth potential. As humanoids and precision motion-control systems continue to develop, demand for high-strength, high-flexibility and high-precision transmission materials is expected to increase accordingly.

Currently, due to the relatively broad product scope and diversified downstream applications of precision metal filaments and ropes, it remains difficult to accurately assess the overall size of this market. Market analysis is therefore more commonly conducted on specific product segments and application scenarios, such as metal tendon ropes and precision medical guidewire products.

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KEY END MARKETS OF PRECISION CABLE CONDUCTORS AND PRECISION METAL FILAMENTS AND ROPES

The Smart Terminals Industry

Smart terminals refer to electronic devices capable of data processing, connectivity and intelligent interaction. In light of the rapid development of AI and digital technologies, smart terminals are evolving toward AI-native terminals with enhanced computing and interaction capabilities. Substantial growth potential lies in five major sectors of the smart terminals industry, namely smartphones, personal computers and tablets, smart wearables, security cameras and smart glasses, thereby creating great demand for high-performance electronic components, such as ultra-fine cable conductors. The following table sets forth some details on the development of selected sectors in the smart terminals industry:

Sector	Current status	Development expectations
Smartphones	As the largest sector of the smart terminals industry, global shipments exceeded 1,200 million units in 2025.	The driving force behind market growth is shifting from mere hardware upgrades to value enhancement driven by AI functions. AI phones have become the core growth driver in the market
Personal computers and tablets	Global personal computer shipments reached about 280 million units in 2025, while tablet shipments reached about 162 million units in the same year.	Affected by the supply shortages triggered by the surging demand from AI data centers, PC shipments are expected to maintain the strong growth momentum witnessed at the end of 2025 in the short term. However, in the long run, growth will remain steady.
Smart wearables	The global shipment volume of smart wearable devices was over 200 million units in 2025.	The continuous increase in consumers' demand for personal health monitoring and the continuous penetration of wearable devices in the medical and health fields have both driven the growth of the global smart wearable device market.
Security cameras	The global shipment volume of security cameras is expected to reach 140 million units in 2025.	Supported by technologies such as AI, AIoT, cloud computing and imaging, security cameras are gradually evolving from merely fulfilling basic security needs to providing comprehensive smart security solutions.
Smart glasses	The global smart glasses shipments reached about 15 million units in 2025.	As an excellent carrier for AI, smart glasses are expected to see continuous growth in application penetration across scenarios such as travel, entertainment, learning, and office work in the future, with a CAGR exceeding 80% over the next five years.

Source: companies' annual reports, expert interview, the F&S Report

Illustrative Example: Taking smart glasses as an example, the global shipment volume of smart glasses increased from approximately 1.5 million in 2024 to 14.7 million units in 2025, and is expected to exceed 70 million units by 2030. Each pair of smart glasses typically requires around six to twelve ultra-fine cable conductors, where the total length of ultra-fine cable conductors used per pair is approximately 9 cm to 17 cm, and the total weight of ultra-fine cable conductors used per pair is approximately 5.5 mg to 11.0 mg. Based on the projected shipment volume, the smart glasses sector alone is expected to generate demand for approximately 400 million to 800 million ultra-fine cable conductors by 2030, which corresponds to approximately 370 kg to 735 kg in total shipment weight.

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The Medical Device Industry

Medical devices refer to highly accurate, advanced instruments, equipment and related products designed for high-performance healthcare applications. In light of the continual advancement of medical technologies and increasing healthcare demand, the medical device industry has experienced steady growth globally. In particular, the development of minimally invasive procedures, high-end medical devices and intelligent healthcare technologies has accelerated the adoption of high-precision components in medical devices.

Most medical devices still generally adopt conventional conductor solutions. However, along with the development trends of medical devices toward intelligence, miniaturization and precision, conventional conductors may not be able to satisfy the stringent requirements in high-end medical device fields. Meanwhile, traditional filaments and ropes may not be able to meet the strength, flexibility, fatigue resistance and biocompatibility requirements for high-end medical devices.

Demand for Fine and Ultra-fine Cable Conductors: Fine and ultra-fine cable conductors show advantages in their small diameter, high flexibility and stable electrical conductivity. These characteristics support the development of miniaturized and precision medical devices and are particularly suitable for applications requiring compact internal structures and reliable signal transmission, such as minimally invasive medical devices and precision diagnostic equipment, especially in fields such as ultrasound, endoscopy and brain-computer interfaces.

Demand for Precision Metal Filaments and Ropes: Precision metal filaments and ropes provide high strength, flexibility and durability, making them suitable for use in precision structural components in medical devices. Their mechanical performance and reliability support applications such as surgical instruments, minimally invasive medical devices and other medical equipment that require precise control and stable mechanical performance. In particular, precision metal filaments are mainly used in scenarios such as radiation protection, cardiac stents, brain-computer interface, and precision metal ropes are often used in disposable endoscopes and surgical robots.

Illustrative Example: Disposable endoscopes are widely used in minimally invasive diagnosis and treatment due to their advantages in reducing cross-infection risks and improving clinical efficiency. Global shipments of disposable endoscopes increased significantly in recent years and are expected to continue growing as healthcare institutions increasingly adopt single-use medical devices. As each disposable endoscope typically incorporates (i) multiple ultra-fine cable conductors for signal transmission and device control and (ii) precision metal filaments and ropes, the expansion of this segment is expected to generate increasing demand for fine and ultra-fine cable conductors and precision metal filaments and ropes.

The AI Industry

AI refers to technologies that enable machines to perform tasks that typically require human intelligence, including data processing and pattern recognition. AI applications rely heavily on computing power infrastructure, where high-speed interconnection supports large-scale data exchange and distributed computing. High-speed copper cables that are made from regular cable conductors enable high-bandwidth and low-latency transmission, and are key components of high-speed interconnection systems. Therefore, the development of AI has significantly increased demand for advanced computing power, driving the evolution of computing infrastructure from traditional data centers to specialized computing power centers with enhanced capabilities in high-performance and parallel computing, and has accordingly fueled the demand for regular cable conductors.

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Demand for Conductors in High-speed Copper Cables: The rapid expansion of computing power centers is expected to drive increasing demand for high-speed interconnection solutions. In AI computing scenarios, high-speed copper cables have gained widespread adoption for short-range interconnections, with products such as NVIDIA’s GB200 and GB300 servers and Google’s TPU systems adopting customized copper cables or DAC and AEC solutions. Driven by the rapid growth of AI applications, intelligent computing power in China increased from 75 exa floating point operations per second (“EFLOPS”) in 2020 to 1,037 EFLOPS in 2025, representing a CAGR of 69.1%, significantly outpacing the growth of general computing power. As the scale of intelligent computing centers expands, demand for high-speed copper cables continues to increase, where high-speed precision cable conductors account for approximately 35% to 40% of the total cable cost.

The Low-altitude Economy Industry

Low-altitude economy refers to economic activities conducted in low-altitude airspace using aerial transport equipment. It encompasses the manufacturing and operation of aerial vehicles as well as related service applications. With the advancement of unmanned aerial vehicle technologies and supportive policy developments, the low-altitude economy has experienced rapid growth in recent years. Typical transport equipment includes unmanned aerial vehicles (“UAVs”), electric vertical take-off and landing aircraft (“eVTOL”) and helicopters, which are widely used in logistics and distribution, aerial inspection, emergency rescue and tourism. Equipment for the low-altitude economy imposes stringent technical requirements on conductive materials, which are mainly reflected in multiple dimensions including energy consumption performance, lightweight, mechanical properties and safety. Conventional conductors may not be able to meet such requirements.

Demand for Fine and Ultra-fine Cable Conductors: The small diameter, high conductivity and lightweight characteristics of fine and ultra-fine cable conductors can support compact and lightweight aerial equipment. In addition, their flexibility and reliability enable integration into complex electrical systems in aerial platforms such as UAVs and eVTOL aircraft, supporting efficient power transmission and signal connectivity. In 2025, the Company ranked first globally in the low-altitude economy applications of ultra-fine cable conductors by revenue.

Illustrative Example: According to the Civil Aviation Administration of China data, registered UAVs in China reached 2.2 million units in 2024 and 3.3 million units in 2025, representing year-on-year growth of 69.2% and 50.0%, respectively. The number is expected to exceed 5 million units in China and 10 million units globally by 2030. UAVs are widely used in logistics and distribution, aerial inspection, agricultural operations and emergency rescue, and global shipment volumes have continued to grow in recent years. Ultra-fine cable conductors are used for signal transmission and electrical connections in flight control systems, sensors and other onboard electronic components, particularly for video and image signal transmission in micro and light unmanned aerial vehicles (“UAVs”). China is currently a leading market for ultra-fine cable conductor applications in UAVs. As UAV shipments and onboard electronic integration increase, demand for ultra-fine cable conductors in UAV applications is expected to grow correspondingly.

The Robotics Industry

Robots are intelligent equipment integrating mechanical engineering, automation, sensors, AI and computer technologies. The global robotics industry has developed a relatively mature product ecosystem, with industrial robots representing the most commercialized segment, and humanoids emerging as a key future growth area. Additional segments of the robotics industry include service robots and special-purpose robots, which also keep expanding. These categories jointly drive the global intelligent transformation.

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Among them, humanoids are robots designed with human-like structures and motion capabilities, enabling them to perform tasks in environments originally designed for human operation. As the robotics industry evolves driven by advancements in AI and computing power, the integration of physical form and intelligent capabilities has become an important development trend, where humanoids serves as a natural physical carrier for embodied intelligence. Driven by advances in AI, robotics technology and intelligent manufacturing, transition from prototyping to commercial deployment of humanoids has become an important trend in the robotics industry. According to the F&S Report, the global humanoids market size was approximately US\$14.9 billion in 2025 and is expected to reach US\$101.1 billion by 2030, at a CAGR of 46.7%, which reflects strong growth potential as driven by continual technological advancements and increasing commercial applications. The corresponding market demand for tendon rope products used in humanoids is also expected to increase significantly. Based on current industry estimates, the related tendon rope market size is projected to reach approximately US\$2.5 billion by 2030.

Demand for Precision Metal Filaments and Ropes: Many humanoids adopt tendon-driven transmission structures, in which motors transmit force to finger joints and other articulation systems through tendon ropes to achieve flexible and precise motion control. Metal tendon ropes are typically manufactured from high-strength precision metal filaments or composite metal wires, providing the tensile strength, flexibility and durability required for repetitive mechanical motion. Each degree of freedom (“**DOF**,” referring to the number of independent, movable joints or axes a robot possesses) generally requires two antagonistic tendon ropes, and high-end humanoids can feature seven or more DOFs.

Illustrative Example: High-end humanoids typically adopt dual dexterous hands with approximately 11 to 22 DOFs, resulting in approximately 22 to 44 tendon ropes for a single robot, respectively. Based on current industry estimates, the price of a single tendon rope is approximately RMB40, corresponding to a tendon rope value of approximately RMB1,760 to RMB3,520 per robot depending on system configuration. As humanoids commercialization continues to accelerate, demand for precision metal filaments and ropes used in tendon-driven transmission systems is expected to increase accordingly.

The NEVs Industry

NEVs generally refer to vehicles powered by alternative energy sources such as battery electric vehicles, plug-in hybrid electric vehicles and fuel cell vehicles. The NEV industry has experienced rapid growth in recent years. In 2025, China’s automobile production and sales reached approximately 34.5 million units and 34.3 million units, respectively. Among them, China’s NEV production and sales reached 16.6 million units and 16.5 million units, respectively representing year-on-year growth of 34.4% and 35.5%, respectively. Globally, the NEV sales approached approximately 22 million units in 2025, where China accounted for approximately 75%. The increasingly wider adoption of NEVs is expected to further drive the demand for electrical and electronic components used in their power and control systems.

Demand for Fine and Ultra-fine Cable Conductors: Fine and ultra-fine cable conductors offer advantages in flexibility and high conductivity, which can support their use in components such as cameras, LiDARs sensors, central control systems and intelligent cockpits, enabling driver assistance and even autonomous driving functions. The development of intelligent cockpits also increase demand for miniaturized and high-precision interconnection solutions, creating additional application opportunities for fine and ultra-fine conductors.

Demand for Precision Metal Ropes: Precision metal ropes have relatively high strength, flexibility and fatigue resistance, and are commonly used in components such as skeleton reinforcement structures, vehicle transmission systems and window regulators, supporting reliable mechanical transmission and contributing to vehicle weight reduction and greater layout flexibility.

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SOURCE OF INFORMATION

We commissioned F&S to conduct an independent market research analysis on global and China markets for (i) high-performance precision metal connection wires, and (ii) selected downstream application industries including smart terminals, medical devices, AI, low-altitude economy, robotics and NEV industries, and to prepare the F&S Report. F&S is an independent global consulting firm founded in 1961 in New York that offers industry research and market strategies. We have contracted to pay RMB580,000 to F&S for compiling the F&S Report.

In preparing the F&S Report, F&S conducted detailed primary research, which involved interviews with industry experts and leading market participants across the relevant industry value chain. F&S also conducted secondary research, which involved reviewing publicly available sources, including company reports, industry publications, government statistics, and data from its proprietary research database. Market size estimates were derived from historical data analysis, combined with macroeconomic indicators and industry-specific drivers. The forecasting methodology integrates expert interviews, analysis of market drivers and restraints, assessment of industry challenges, market engineering measurement models, and econometric analysis.

The F&S Report is compiled based on the following assumptions: (i) the social, economic and political environment in the PRC and globally will remain stable during the forecast period; and (ii) the key industry drivers identified will continue to support the development of the relevant markets during the forecast period.