Materials Mag!c

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Hitachi Metals COMPANY PROFILE

Hitachi Metals, Ltd.

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⚠ Safety Precaution

**Before using any of the products introduced in this catalog,
please read the respective user manuals thoroughly.
The contents of this catalog are subject to change without prior notice.**

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Printed in March 2021

HITACHI

Hitachi Metals

Company Profile

Hitachi Metals, Ltd.

Delivering Value Unique to Hitachi Metals

Aiming to become a high-performance materials company that can support a sustainable society

Hitachi Metals continues to offer distinctive materials and products to automotive, industrial infrastructure, electronics, and other thriving markets.
While leveraging the growth driven by our highly diverse organization, we bring innovation to materials by taking advantage of our original technologies and the synergies they produce.

We offer “Only 1” products that only Hitachi Metals can make.
We offer “No. 1” products that make Hitachi Metals stand out.

Our aim is to become a high-performance materials company that contributes to the creation of a sustainable society and a bright future by meeting ever more complex and diversified needs for materials and by expanding collaboration with customers.

INDEX

Business Divisions of Hitachi Metals

Two Business Divisions Drawing on Our Original Technologies and Their Synergies

With a wide range of advanced technologies, Hitachi Metals operates in highly diverse business domains.
The Advanced Metals Division and the Advanced Components and Materials Division leverage their respective strengths and synergies to enable Hitachi Metals to deliver “Only 1, No. 1” value.

Division		Automobile-related Field	Industrial Infrastructure-related Field	Electronics-related Field
Advanced Metals Division	**Specialty Steel** Molds and tool steel, Automobile-related materials, Razor and blade materials, Precision cast components, and Aircraft- and energy-related materials, Display-related materials, Semiconductor and other package materials, and Battery-related materials	 CVT Belt Materials	 DAC-i™ the Next-generation Hot Working Tool Steel **Specialty Steel**  Turbine Case	 Clad Materials  Lead Frame Materials
	Roll Rolls for steel mills, Injection molding machine parts, Structural ceramic products, and Steel-frame joints for construction		 HINEX™ Rolls for Iron and Steel Rolling **Roll**  Cylinders and Screws for Plastic Molding Machines	
	Automotive Casting HNM™ high-grade ductile cast iron products, Cast iron products for transportation equipment, HERCUNITE™ heat-resistant exhaust casting components, and Aluminum components	 High-toughness Ductile Cast Iron Products **Automotive Casting**  HERCUNITE™ Series of Heat-Resistant Cast Components		
	Piping Components Piping and infrastructure components (™ Gourd brand pipe fittings, valves, stainless steel and plastic piping components, water cooling equipment, precision mass flow control devices and sealed expansion tanks)		 Pipe Fittings for General Use **Piping Components**  Polyethylene Gas Piping Systems	
Advanced Components and Materials Division	**Magnetic Materials** NEOMAX® rare-earth magnets, Ferrite magnets, and Other magnets and applied products	 Neodymium Magnets NEOMAX® Series **Magnetic Materials**		 Ferrite Magnets NMF™ Series
	Power Electronics Materials Soft magnetic materials (Metglas® amorphous metals; FINEMET® nanocrystalline magnetic material; and soft ferrite) and applied products, and Ceramic components		 FINEMET® Nanocrystalline Magnetic Alloys **Power Electronics Materials**  Soft Ferrite Cores	
	Electric Wire & Cable Industrial cables, Electronic wires, Electric equipment materials, and Cable assemblies	 Wires and Cables for Rolling Stock **Electric Wire & Cable**		 Industrial Robot Cables
	Automotive Components Electronic components for automotive, and Brake hoses	 Harness for Electric Parking Brakes **Automotive Components**		

Advanced Metals Division

Our steel manufacture and casting technologies draw upon over a century of tradition. It is into this tradition that we weave innovative concepts.

We add innovative concepts to existing foundational technologies stemming from the tradition - namely, steel manufacture technologies such as YASUGI SPECIALTY STEEL, and the casting technologies, which have yielded our proprietary Gourd brand ™ pipe fitting products- to develop cutting-edge metal materials. Our products are extensively used in different industrial sectors. Beyond core industrial sectors including automobile and industrial infrastructure, they have penetrated into the fast-growing industries such as those of aircraft and energy sectors.
With world-class capabilities for the development of materials and products, as well as production scale and sales system that leverage our global network, we are able to promptly and accurately provide products to match needs arising in the markets of different countries worldwide.

Specialty Steel A history of innovation in advanced metallurgical technology and materials development

As can be seen in "Tamahagane" produced by the ancient iron-making method "Tatara", with our material development capability in producing high purity steel by using selected raw material and traditional steel manufacturing technology, we provide a wide range of high functional materials to support the development of industries.

DAC-i™ the Next-generation Hot Working Tool Steel


Clad Materials


CVT Belt Materials


Turbine Case

Roll Advanced roll technological capabilities

In addition to our leading brand of HINEX™ rolls for steel mills, we offer cylinders for injection molding machines and the processing of structural and other components for construction.

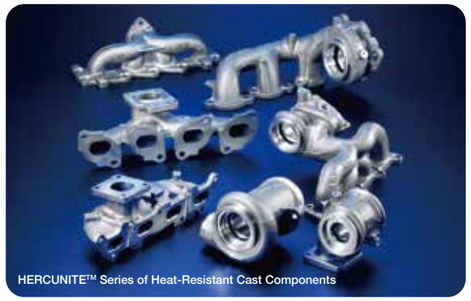

HINEX™ Rolls for Iron and Steel Rolling


Cylinders and Screws for Plastic Molding Machines

Automotive Casting Global development of eco-friendly products

Drawing on its roots that date back to Tobata Foundry Co., Hitachi Metals has applied malleable cast iron manufacturing technologies to produce casting components for automobiles. In recent years, we have developed HERCUNITE™ heat-resistant exhaust casting components and been striving to meet the growing need for products helpful in reducing environmental load.


High-toughness Ductile Cast Iron Products


HERCUNITE™ Series of Heat-Resistant Cast Components

Piping Components Development of (Gourd brand) gas and water piping components

When the Tobata Foundry Co., the forerunner of Hitachi Metals, Ltd., shipped its first product in 1910, it bore a (Gourd) symbol. This symbol bore the hopes and aspirations that products would be “tougher, smoother, and aesthetically pleasing.” Since this time, the Gourd brand has been widely used in industrial and household fields, as well as overseas markets. Today, the (Gourd brand) is well respected throughout the world.


Pipe Fittings for General Use


Polyethylene Gas Piping Systems

Advanced Components and Materials Division

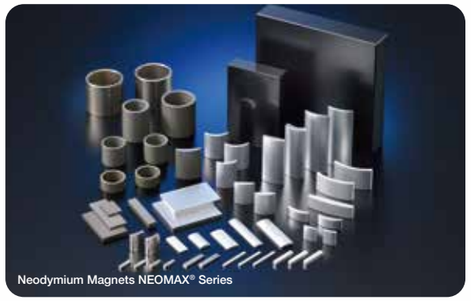
We deepen new material development and our unique innovative part design technology capabilities to bring unique products into existence.

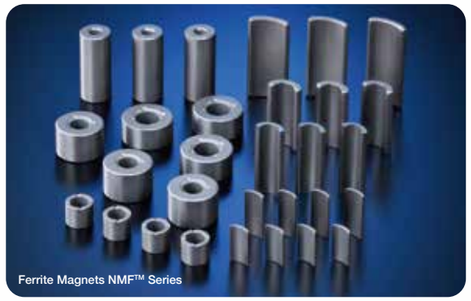
We have developed NEOMAX®, world-class neodymium magnet, Metglas®, amorphous metal material with excellent soft magnetic properties, and HiFC™ high-performance pure copper with softening characteristics comparable to high purity copper. The functional members with specific characteristics have been integrated into xEVs* to support their progress. In addition, our products with different capability of improving environmental performance and energy efficiency support industrial infrastructure sectors, including railway, medical devices, and industrial robots.
We combine our proprietary materials and technologies to develop advanced products.

*Term referring to electric vehicles (EV), hybrid electric vehicles (HEV), and plug-in hybrid electric vehicles (PHEV).

Magnetic Materials NEOMAX® brand, key material for industries

We boast an extensive magnet range, which includes NEOMAX® rare earth magnets and ferrite magnets, and provide our products across a wide range of fields, encompassing automobiles, electronics and home appliances. As pioneers in the field of magnetic materials, we take on the challenge of new materials and new production technologies, meeting our customers' diverse needs and contributing to the creation of a more energy-efficient society.

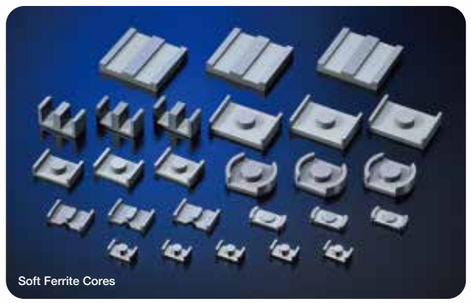

Neodymium Magnets NEOMAX® Series


Ferrite Magnets NMF™ Series

Power Electronics Materials Our advanced soft magnetic and ceramic materials contribute to energy conservation and ICT innovations

We contribute to the downsizing and energy efficiency of devices with products that offer distinctive features, including MaDC-A™ magnetic domain control type Fe-base amorphous metal, MaDC-F™ magnetic domain control type high-performance soft ferrites, FINEMET® nanocrystalline materials, and high-performance ceramics.


FINEMET® Nanocrystalline Magnetic Alloys


Soft Ferrite Cores

Electric Wire & Cable Contribute to more sophisticated social infrastructure

We develop and offer wires and cables for rolling stock and railroad infrastructure, medical and electronic devices, electrical appliances and automobiles. We meet our customers' needs for more compact and high-performance devices making use of our technological strengths and know-how to transfer energy and transmit information efficiently and quickly.


Wires and Cables for Rolling Stock


Industrial Robot Cables

Automotive Components We address today's needs for ever greater safety, energy efficiency, and convenience

Our sensors, power harnesses, and brake harnesses and hoses are all developed and manufactured to provide efficient and reliable energy and signal transmission. They are supported by a global supply system that encompasses production, marketing, and quality assurance to satisfy a diverse range of customer needs.


Harness for Electric Parking Brakes

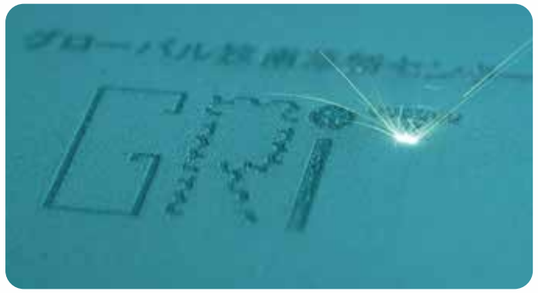

Brake Hoses

Hitachi Metals' Core Technologies Supporting a Sustainable Society

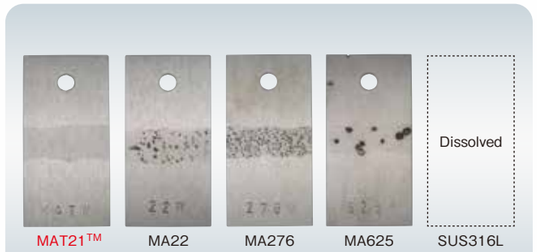
Hitachi Metals delivers solutions to issues facing society with its advanced microstructure control technology and design technology for advanced components and materials, which have been developed over its more than 110-year history.

Advanced Microstructure Control Technology

Our advanced microstructure control technology has been derived and evolved from structural control technology, alloy design technology, and production technology in the specialty steel field and the functional components and equipment field. Day by day, we advance our long-accumulated expertise with state-of-the-art techniques, such as materials analysis aided by artificial intelligence (AI). This enables us to speedily optimize the effects of melting, casting, sintering, forging, and other manufacturing processes to get the best out of materials.
A typical field of application is additive manufacturing, which has recently become a booming industry. In addition to our proprietary super corrosion-resistant alloys, we offer structural control technology and modeling technology that can combine structural complexity and high corrosion resistance to help customers resolve their challenges.



Additive manufacturing

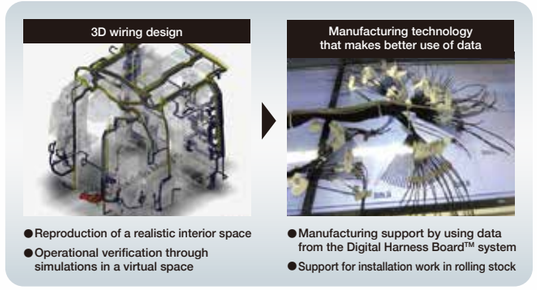


Example of pitting corrosion resistance test results for Hitachi Metals' corrosion-resistant material 24 hours at boiling temperature (104°C) in 11.5% H_2SO_4 + 1.2% HCl + 1% $FeCl_3$ + 1% $CuCl_3$

Design Technology for Advanced Components and Materials

Our design technology for advanced components and materials enables us to produce magnetic materials, power electronics materials, electric wire and cable materials, and many other components and materials with distinctive features. We closely communicate with customers and propose solutions to their problems by integrating our original composite dispersion control technology and processing technology for high-performance materials with leading-edge technologies like materials informatics.
Hitachi Metals delivers advanced components and materials that meet the needs of different sectors. Our products help make vehicles more efficient, compact, and lightweight in the xEV field, where rapid growth is expected; enhance safety and workability in the globally developing rail sector; and achieve higher resolution and reduce the burden on patients in the ever-advancing healthcare field.

On-board charger that combines higher output and smaller size

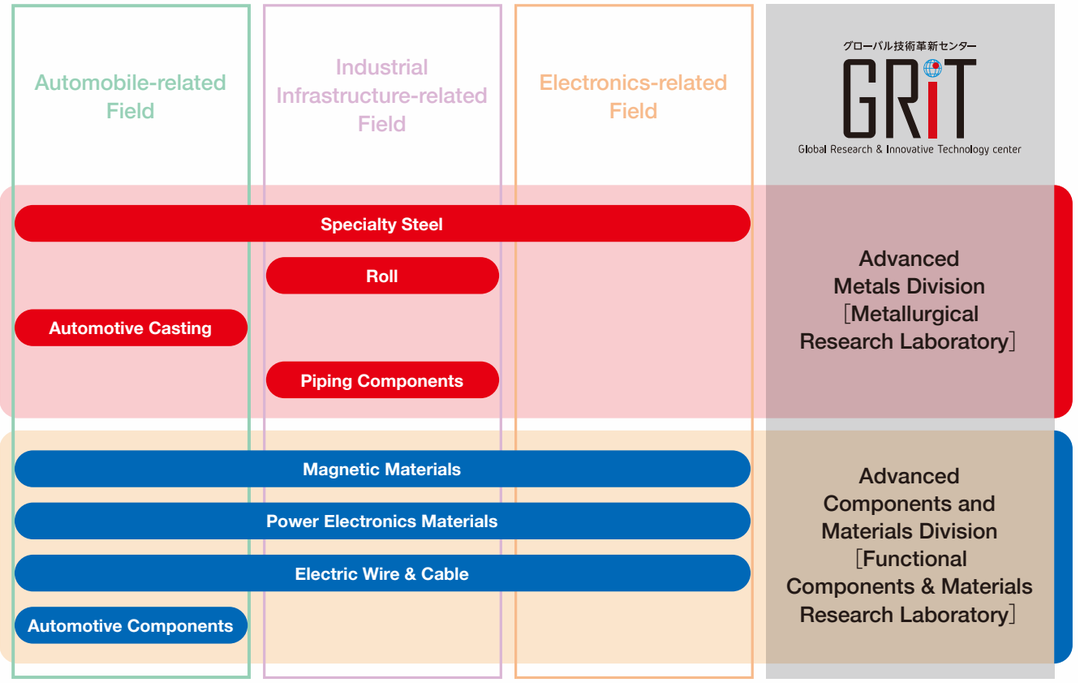


Rolling stock wire harness solutions based on digital twin technology

* Digital Harness Board is a registered trademark of Hitachi Metals in Japan.

Research & Development Structure

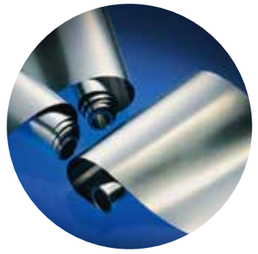
The Global Research & Innovative Technology center (GRIT) is a Corporate Research Lab of Hitachi Metals. It was established to promote research on advanced materials over the medium to long term and future-oriented process research with a view to achieving sustainable growth and making social contributions. We are witnessing huge waves of change that will dramatically alter our society. These include a major transformation in production systems, which is fueled by the development of the Internet of Things (IoT), as well as a shift from gasoline-powered vehicles to electric vehicles. GRIT is poised to respond to these rapid changes by creating new products and businesses that take potential threats and opportunities into consideration. To this end, open innovation will be pursued together with research institutes, universities, and corporations in Japan and abroad.
Our division labs, which are research centers operated by individual business divisions, are also eager to develop products directly connected to their respective business domains through down-to-earth R&D activities.



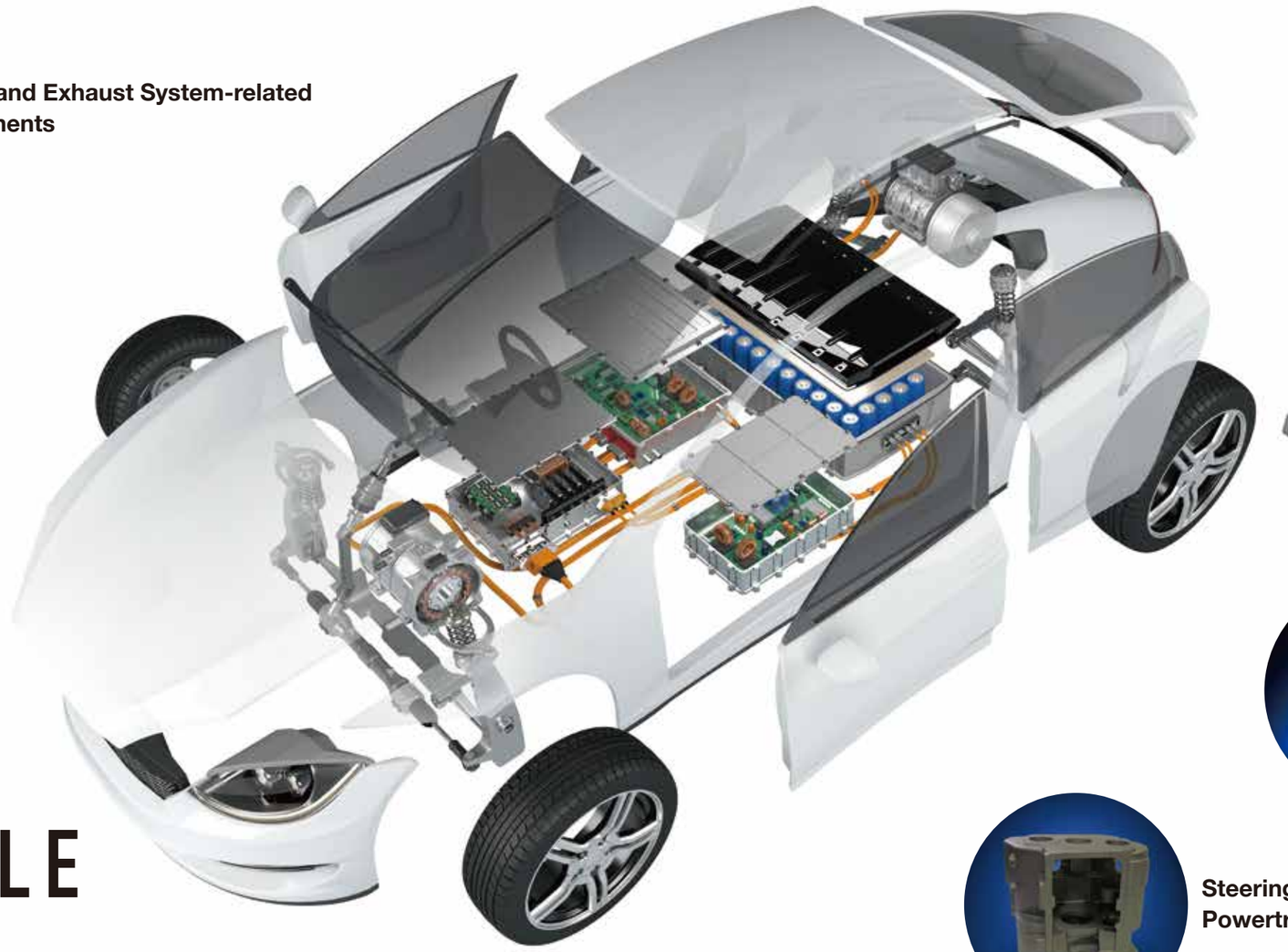
xEV (for Inverter,
On-board Charger, etc.)

xEV (for Power Module)

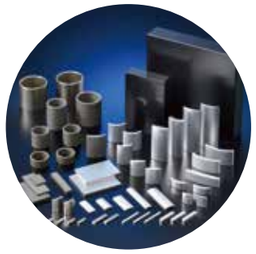
xEV (for Battery)



Engine and Exhaust System-related
Components



xEV
(for Rapid Charger)



xEV (for Motor)

Manufacturing
Facilities

AUTOMOBILE

Automobile-related Field

Proliferating eco cars and improving fuel economy and safety performance
— We appropriately capture changes in environmental performance required for automobiles,
thus relentlessly pursuing the evolution of all of our products.
Ranging from drive motor components and exhaust system components to chassis components
— We use our development and technological capabilities
to support automobile manufacturing around the world.

Related link

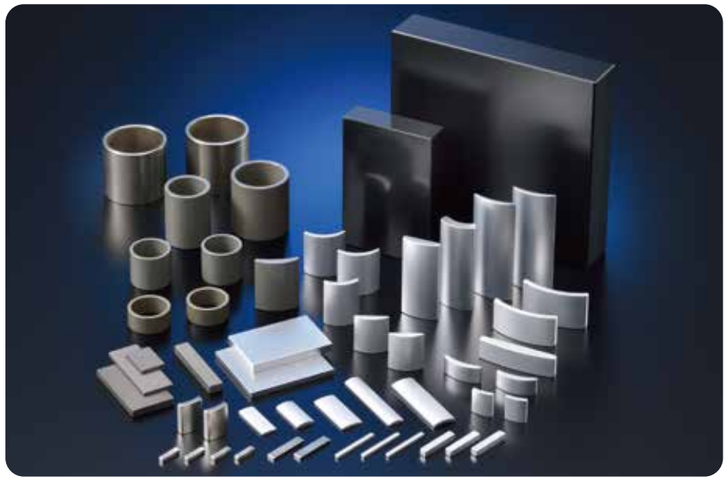
Steering System and
Powertrain-related Components

Chassis-related
Components

Automobile-related Field

xEV (for Motor)

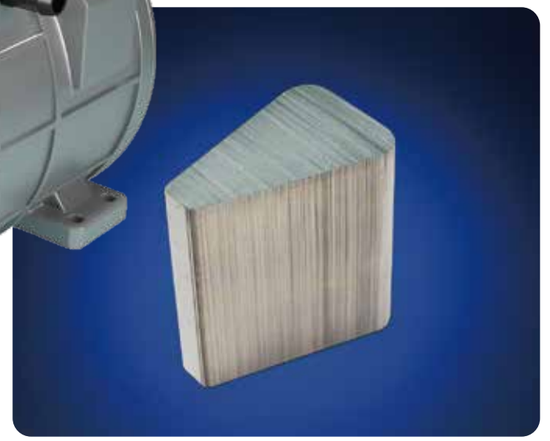
Our magnets, soft magnetic components and materials, enameled wires, and other unique products support the evolution of xEV motors.



Neodymium Magnets NEOMAX® Series

Our neodymium-iron-boron (Nd-Fe-B) sintered magnets offer the best magnetic properties for use mainly in drive motors of electric and hybrid vehicles. Hitachi Metals pioneered the development and mass production of this material, and commercialized it as the NEOMAX® series. It withstands a broad range of ambient conditions, from room temperature to much higher temperatures around the engine. These magnets are also characterized as environmentally friendly, containing lower heavy rare-earth elements while offering better performance. They contribute to vehicle downsizing, weight reduction, and efficiency improvement.

Drive Motor for EV

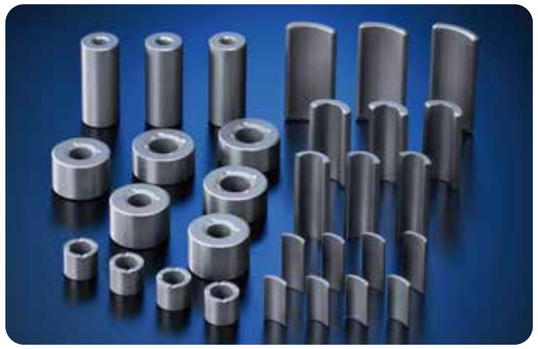


Amorphous Soft Magnetic Alloy for Motors

Amorphous soft magnetic alloy is prominent core materials for use in next-generation high-efficiency motors. With about one-tenth the iron loss of non-oriented magnetic steel sheets, these materials contribute to core loss reduction in motors.

Aluminum Motor Housings Containing EV/HEVComponents

These Aluminum casting housings are manufactured by high pressure die cast or low pressure casting processes. They help make the motors smaller, lighter, and more powerful because of optimized high-strength material. Being castings, realizes a high degree of freedom cooling circuit and contributes to maximizing cooling characteristics.



Ferrite Magnets NMF™ Series

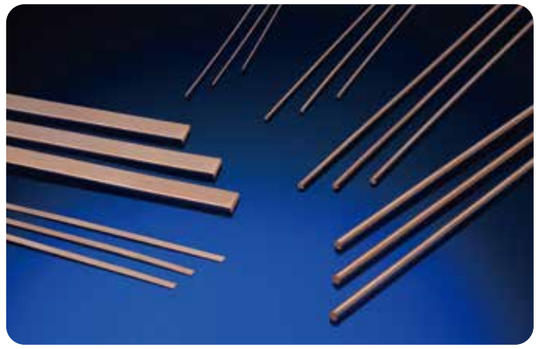
Ferrite magnets, which consist primarily of iron oxide, are cost effective and the most widely used magnets in motors built into automotive electrical and electronic components. The series NMF-15 is the world's leading mass-produced ferrite magnets in terms of magnetic properties. Excellent magnetic properties and resistance to temperature changes make this material suitable for a wide range of applications, including starter motors, power window motors, cooling fan motors, electric power steering motors, and windshield wiper motors.

Ultrahigh Density Bonded Magnets HIDENSE™ Series

The HIDENSE™ is a high-performance bonded magnet developed with the high-compression technology. This magnet is highly flexible in shape and magnetization and can be integrated with metal components, thus contributing to a wide range of product designs.

Enamelled Wires for High-Efficiency Motors

This wire product supports the compact design and higher outputs required for electric and hybrid vehicles while reducing environmental impact and saving energy, leading to the development of higher-performance electric and hybrid vehicles.



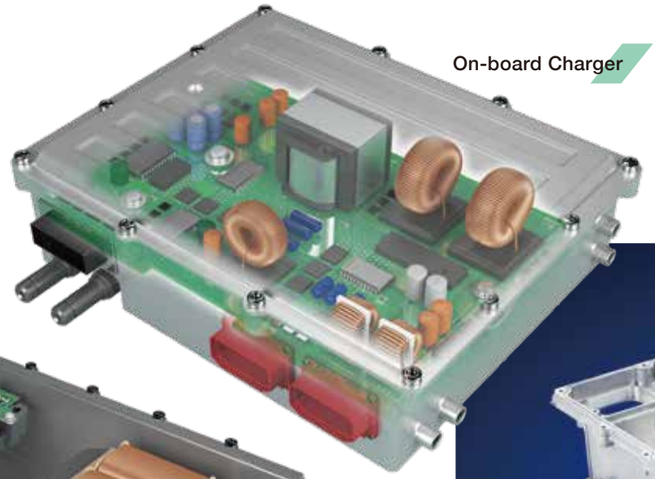
High-performance Pure Copper HiFC™

Pure copper includes impurities such as oxygen and sulfur. The function of these impurities is under control by trace amounts of titanium added to molten copper (dissolved electrolytic copper). In this way, copper appears to be highly purified, increasing its softness, weldability, resistance to embrittlement due to hydrogen, and electrical conductivity.

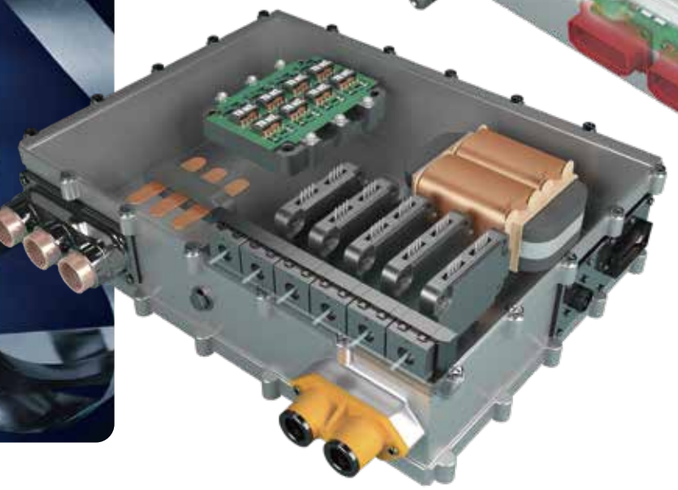
Automobile-related Field

xEV (for Inverter, On-board Charger, etc.)

We offer products with distinctive features, including energy saving, noise reduction, vehicle downsizing, and weight reduction, thereby accelerating the electronification of automobiles.



On-board Charger



Inverter

FINEMET® Nanocrystalline Magnetic Alloys

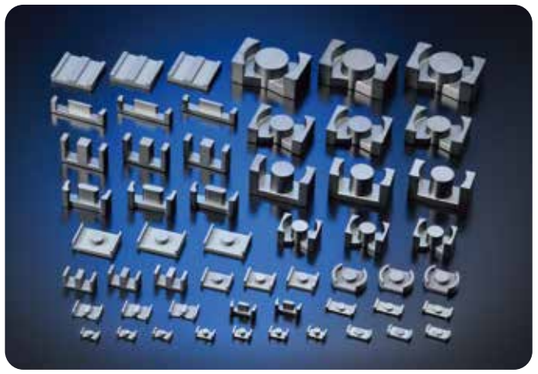
FINEMET® is the world's first nanocrystalline soft magnetic alloy developed by Hitachi Metals. This new Fe-based soft magnetic alloy is composed of nanocrystals. It has high saturation induction, high permeability, excellent temperature characteristics and temporal stability. FINEMET® is utilized in high-frequency power transformers, noise-suppression components and other applications where it contributes to downsizing and lightening.

Aluminum Cases Containing EV/HEV Components (Battery and Inverter)

These Aluminum cast cases are manufactured by a gravity die casting processes. They help reduce the weights of the Battery unit because of their material composition and higher freedom in shaping. And the cases may accommodate any water-cooling circuits, which helps contributes to maximizing cooling characteristics.

FINEMET® Common Mode Choke Cores and Coils

Instilled with high magnetic permeability and low Q factors, these cores and coils furnish high impedance over a broad frequency range, allowing them to manifest major noise suppression effects. Moreover, because impedance does not vary widely by temperature, stable noise suppression effects can be obtained over a broad temperature range.

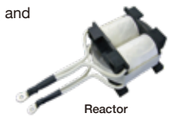


Soft Ferrite Cores

Although these cores have a lower saturation flux density than other soft magnetic materials, their electrical resistance is higher, and they are characterized by overwhelmingly excellent magnetic properties in high-frequency bands from 100 kHz to several tens of MHz. With the addition of the MaDC-F™ series, which have low losses in the high-frequency range, these products help to make passive components smaller, lighter, and more efficient in many fields, including xEV, mobile devices, and industrial equipment.

Amorphous Powder Cores/Coils

These cores and coils are designed to combine high saturation flux density and low loss by using a Fe-based amorphous metal powder. They are suitable for smoothing choke coils for both input and output of power supply, choke coils for normal-mode noise reduction, and choke coils for power factor correction circuits. The coils are able to operate at frequencies as high as 100 kHz and contribute to making equipment smaller and more efficient.



Reactor

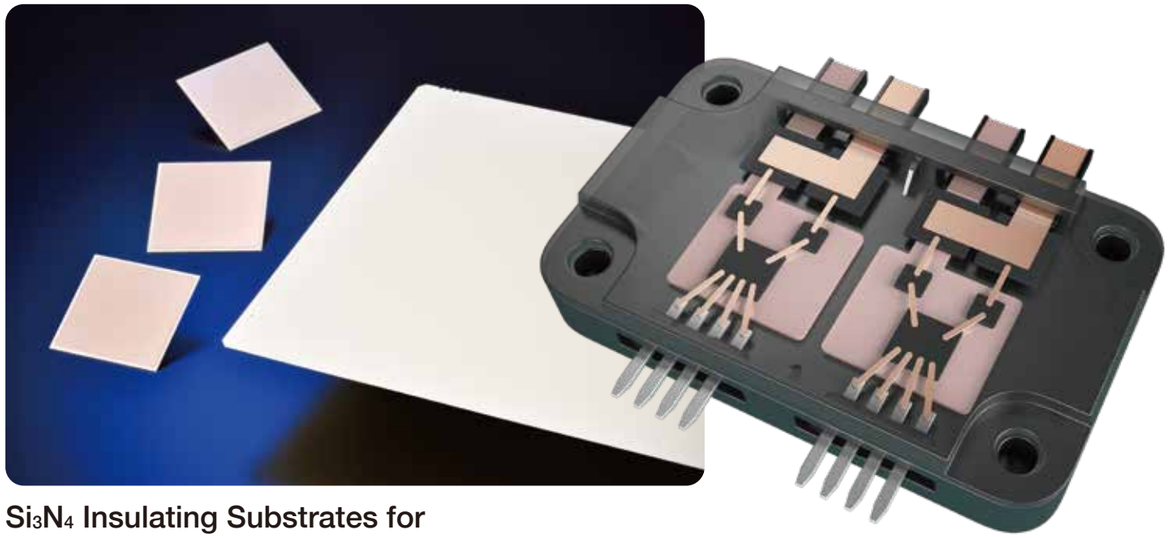
Isolating Transformers

These transformers use ferrite cores that are less likely to saturate during high-temperature operation and employ our original isolating structure to achieve high dielectric strength and a compact body.

Automobile-related Field

xEV (for Power Module)

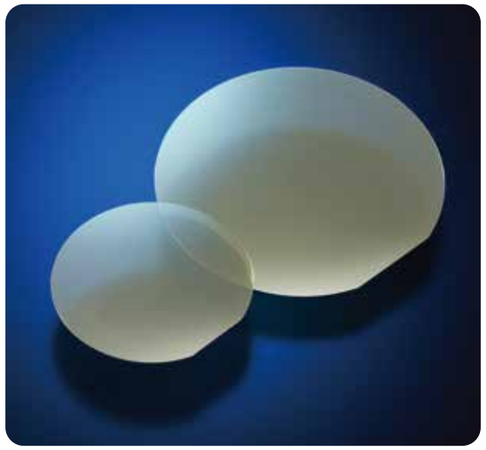
We contribute to enhancing the performance of power modules with highly thermal-conductive components and technologies conducive to improving the quality of next-generation power semiconductors.



Power Module

Si_3N_4 Insulating Substrates for Power Semiconductor Modules

Our insulating substrates are used in power semiconductor modules for inverters in hybrid and electric vehicles. Because of their superb heat conduction and mechanical strength, Hitachi Metals' silicon nitride substrates are best suited as insulated substrates for large power semiconductors that require high reliability, including insulated gate bipolar transistors (IGBT) and silicon carbide (SiC) devices. Our product lineup also includes 130W/mK substrates to support reductions in thermal resistance.

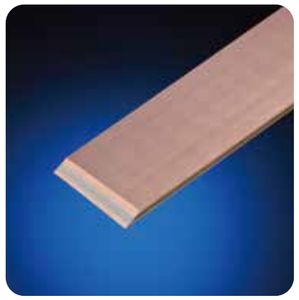


SiC Wafers for Power Semiconductors

We undertake SiC power semiconductor wafer production processes with Hi-LoDe Lap™, which harnesses our ceramic material polishing technologies accumulated over the years, and Hi-LoDe Epi™, which is aimed at reducing defects.

Copper Alloy Strips, Dual Gauge Copper Strips

Copper strips with outstanding thermal conductivity and heat resistance are available. Our dual gauge copper strips, which integrate thin plate and thick plate into a single structure, enhance the heat dissipation in power semiconductor modules for automobiles.



Clad Metals

Developed according to our proprietary technology, these clad metals feature low thermal expansion and high thermal conductivity. They are best-suited for heat-dissipating substrates of power semiconductor modules and lead wires for power semiconductors.

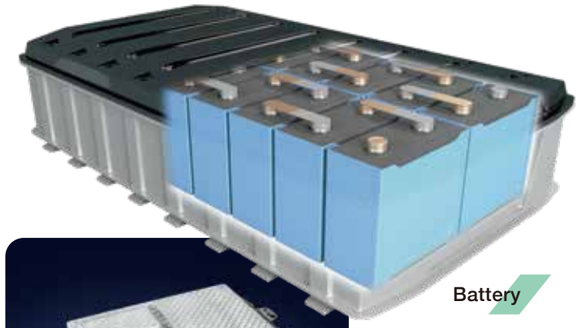
Automobile-related Field

xEV (for Battery)

Contributing to the weight reduction, downsizing, and capacity increase of batteries.

Clad Foils for Lithium Ion Battery's Power Collector

Our rolled clad foils, which are made of Ni alloy and Cu, contribute to achieving electric characteristics required for power-collecting foils and increasing the strength of power-collector.



Battery

Aluminum Cases Containing EV/HEV Components (Battery and Inverter)

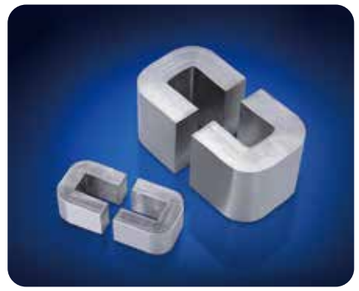
These Aluminum cast cases are manufactured by a gravity die casting processes. They help reduce the weights of the Battery unit because of their material composition and higher freedom in shaping. And the cases may accommodate any water-cooling circuits, which helps contributes to maximizing cooling characteristics.

Automobile-related Field

xEV (for Rapid Charger)

Our products contribute to reducing charging losses and making chargers smaller and lighter.

Rapid Charger



FINEMET® Cut Cores for High-frequency Transformers
FINEMET® Non-Cut Cores for High-frequency Transformers

FINEMET® nanocrystalline soft magnetic materials have far lower core losses than magnetic steel sheets, rendering them suitable as core materials for isolating transformers operating at high frequencies of 5 to 20 kHz. They contribute to equipment downsizing when used in isolating transformers for inverters, typically those in rapid chargers.

Automobile-related Field

Engine and Exhaust System-related Components

Using our alloy design techniques cultivated in the specialty steel field and our casting techniques refined in the long history of the company to produce heat-resistant components that meet needs.

Piston Ring Materials

Hitachi Metals offers a wide variety of materials that cater to the needs of advanced engines and manufactures near-net-shape wire materials to achieve optimal ring shape. Through high-mix, low-volume production adaptable to customers' needs, we can deliver pre-hardened ring materials excellent in performance and precision.

Engine Valve Materials

Designed for use in exhaust engine valves that can help reduce engine emissions, these materials are exceptionally resistant to high temperatures and high-temperature fatigue, based on our technology. These products contribute to cost reduction with nickel saving compared to conventional super heat resistant steel.

Others

Other products we provide include materials for fuel injection systems, spark plugs, sintered strip, semiconductor producing equipment material, bearing materials, etc.

Ni-based Amorphous Brazing Foils

This amorphous brazing foil is primarily made of nickel and copper. It has low environmental impact because it does not contain organic binders. Being thin and resistant to corrosion, the material is suitable for the brazing of heat exchangers.

Metglas

HERCUNITE™* Series of Heat-Resistant Cast Components

This series of heat-resistant cast-steel/cast-iron product helps reduce CO_2 emissions and fuel consumption in gas engine vehicles etc. The products are applied in turbine housings, exhaust manifolds and other exhaust system. They are able to withstand the extreme heat generated by an internal combustion engine and contribute to improving a car's environmental performance.

*The origin of the name HERCUNITE™
The name HERCUNITE is an acronym for HEat Resisting Cast materials for UNIT of Exhaust parts. However, the name has another derivation. The suffix nite, which stands for a metal compound, is preceded by the name Hercules, a hero in Greek mythology.

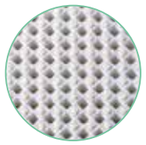
Turbine Wheels for Turbochargers

These products are made of nickel-based heat-resistant super alloy that exhibits superior resistance to heat. Investment casting is employed to produce complicated three-dimensional components through near-net-shape forming.

Diesel Particulate Filter

Hitachi Metals' Diesel Particulate Filters are honey comb structured cordierite ceramics filter developed for an after treatment device of medium and heavy duty trucks and buses which can remove PM* efficiently from exhaust gas from diesel engines.

*PM: Particulate Matter



Close-up
Cross-section

Automobile-related Field

Steering System and Powertrain-related Components

Developing high-quality metal materials and various magnetic materials that are essential for CVTs (continuously variable transmission), electric power steering systems, and transmissions.

CVT Belt Materials

Maraging steel belt materials developed for the continuously variable transmission (CVT), which is a major contributor to a fuel-efficient engine. Based on metallographic innovations, we have developed thin cold-rolled materials with world-class fatigue strength that contribute to upgraded transmission performance and increased reliability.

Neodymium Magnets NEOMAX® Series – Radially Anisotropic Ring Magnets

Neodymium magnets are often used for electric power steering systems to meet the needs of downsizing and high efficiency. Hitachi Metals offers not only commonly-used block and arc-shaped magnets but also radially anisotropic ring magnets. The magnets have a higher freedom in setting the number of poles, and they may be magnetized at a skewed angle relative to the rotation axis to reduce cogging torque (rotation unevenness). Our ring magnets can help increase the efficiency of devices for motorization (e.g. EGR).

Cast Iron Products for Automobiles (Transmission Cases for Commercial Vehicles and Clutch Housings for Off-highway Vehicles)

Waupaca Foundry, Inc. is the world's largest foundry of iron castings, providing a wide variety of products for use in items ranging from passenger cars, commercial vehicles to construction and off-highway vehicles. Waupaca Foundry's iron castings are superior in dimensional accuracy, and can be delivered to customers in a near-net-shape state, thus contributing to the production of weight reduction, thinner-walled components.

Automobile-related Field

Chassis-related Components

Continuing to pursue best suited materials, shapes, and manufacturing techniques, thereby reducing weight, increasing fuel economy, and improving safety.

High-toughness Ductile Cast Iron Products HNM™ and NMS™

Our ductile cast iron products exhibit high toughness at low temperature and high dimensional accuracy. Our products come in a wide variety of materials and sizes to support broad applications worldwide, ranging from small passenger cars to large commercial vehicles. By capitalizing on high-precision CAE techniques, we have developed new products that can help make automobiles even lighter. A notable example is OMEGA KNUCKLE™, which employs a new structural design that is a lightweight, thin-walled, and half-hollow shape with strength.

Harness for Electric Parking Brakes

We developed harnesses for use in electric parking brakes that excel in flexural resistance and durability. Their high integrability with the ABS sensor harness allows effective space conservation inside the cabin and increases vehicle safety and convenience.

Brake Hoses

With outstanding durability and low expansion characteristics, our brake hoses have been widely acclaimed and are used by the world's leading automakers.

Automobile-related Field

Manufacturing Facilities

Developing materials for manufacturing facilities, including flexibly processable and highly durable steel for tools, according to needs, thereby contributing to the improvement of production efficiency.

DAC-i™ Steel for the Next-generation Standard Die-casting Dies

Compared to generic JIS SKD61, and DAC, our general-purpose steel for die-casting dies, this general-purpose steel is superior in high-temperature strength and ductility. In addition to our proprietary alloy composition and structure control technology, a 10,000-ton-class free forging press introduced to our Yasugi Works delivers high performance.

Chassis

SLD-MAGIC™ Cold Work Tool Steel

This die steel is suited to high-tensile plates widely used in making lighter cars with safer designs. Its characteristics are high machinability and fewer dimensional deformities following heat treatment. It contributes to overall die cost reductions because its superior quality means that dies last longer.

Steel for Plastic Tools HI-PM™ and CENA™ Series

We offer a wide variety of materials for tools so that customers can choose best suited materials to meet various manufacturing property requirements for plastic products.

Sialon Ceramics Die Cast Sleeve

Our sialon die cast sleeve consists of two layers: the inner sialon engineering ceramics layer and the outer specialized alloy layer. This product excels at maintaining the temperature of molten metal and achieving stable injection and a longer service life, thus contributing to the improvement of productivity and quality of die casting.

Electric Discharge Machining [EDM] Wires

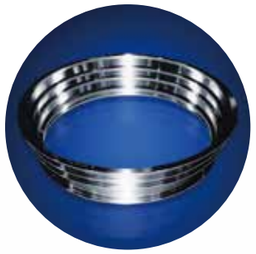
Our EDM wires, which are made of carefully selected materials, enable high-speed and high-precision cutting. We offer a wide variety of electrode wires for different applications to meet various needs.

Friction Stir Welding (FSW) Tools

These FSW tools are manufactured by investment casting of an ultra-high thermal resistance and compressive strength cobalt alloy. They are used to connect different materials including high-tension steel, carbon steel, titanium alloys, aluminum alloys, and magnesium alloys.

YASUGI SPECIALTY STEEL
OUR HERITAGE, YOUR ADVANTAGE

Telecommunication
Infrastructure Components

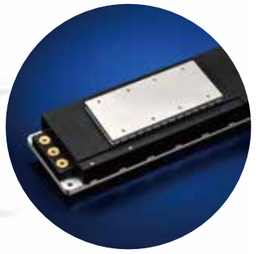


Materials for
Aircraft Components

Additive Manufacturing
Materials and Precision
Forming

Power Generating
Equipment-related
Components

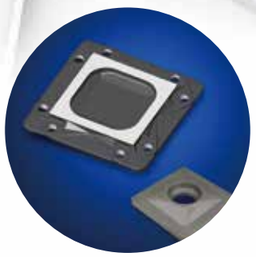
Medical and
Healthcare-related
Components



Industrial Robot
Components

Piping Components

Rolling
Stock-related
Components



Building and Construction
Components and Materials

Facility Equipment
and Components

INFRASTRUCTURE

Industrial Infrastructure-related Field

Aircraft components, power generating equipment-related components,
rolling stock components and other industrial equipment are all exposed to severe operating conditions.
Our technologies, quality and product development capabilities, which were developed and
proved over many years, have always been bringing innovation.
We will continue to provide high-level reliability and
innovation for infrastructure globally.

Related link

Industrial Infrastructure-related Field

Rolling Stock-related Components

Our cast iron products and soft magnetic materials, as well as our wires and cables,
which have long been used for rolling stock, have contributed to railway development locally and globally.

Wires and Cables for Rolling Stock

Wires and Cables for Rolling Stock / Contact Wire

For bullet trains and many other trains, operated both in Japan and overseas, our wires and cables are used in cabs, underfloor wiring, and wiring between rolling stock. We also provide railway vehicle cables and contact wires as well as signal cables, thus supporting power supply and information transmission for railways.

Contact Wire

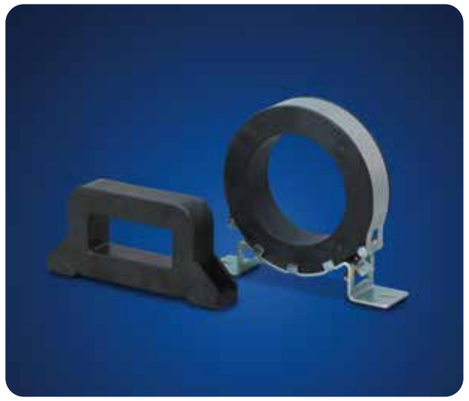
Rolling Stock

Silicon rubber terminal Caps for Extra-high-tension Cables Dedicated to High-speed Railway Vehicles

Silicon rubber insulator allows for small, lightweight end connections for extra-high-tension cables. The connections are easily connected and help increase energy efficiency of high-speed railway vehicles.

Ductile Cast iron products for Bogie of Rolling Stock

The products have high low-temperature toughness and dimensional precision. The near net shape and the integrated casting with high shaped flexibility. The weldingless structures help to improve the reliability and reduce the weight.



FINEMET® Common Mode Choke Cores

These common mode choke cores are made of FINEMET® nanocrystalline soft magnetic material. These products furnish high impedance over a broad frequency range and contribute to reducing the size and weight of EMI filters.

Threaded Pipe Fittings

Our ™ Gourd brand Malleable Iron Pipe Fittings has lived up to its reputation for the excellence in quality and variety of products, which is known the world over, since 1912.

Category 7 (Cat 7) LAN Cables for High-speed Communications

Our LAN cables deliver the required electrical properties while complying with the European railway fire safety standards. We have accomplished these features by improving the LAN cable structure and adopting a halogen-free sheath material with high flame retardancy, which we have developed ourselves.

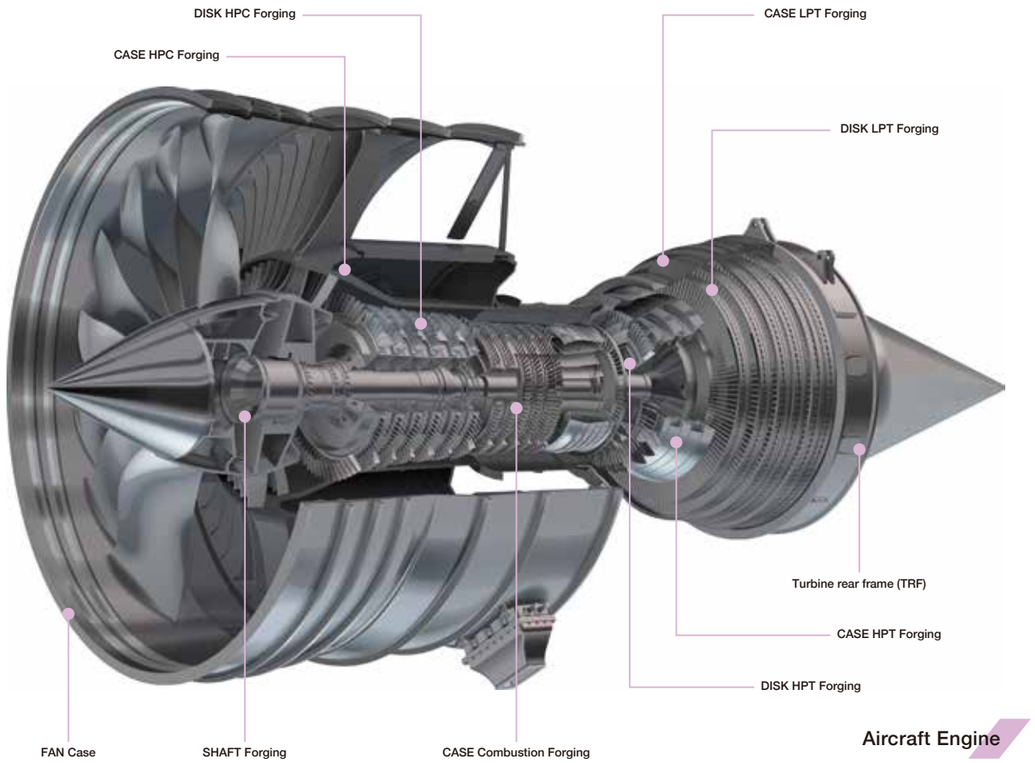
Primestar™ VCI Remote Monitoring System for Fiber-optic Lines

Hitachi Metals' optical fiber products are critical components of the patented low-loss optic connection technology. The technologies support highly reliable optical fiber monitoring system, Primestar VCI, required for important data communication services in financial and broadcasting businesses. They also simplify monitoring and maintenance processes, and contributes to improving efficiency and labor saving of wiring and maintenance activities, which are indispensable in the data center.

Industrial Infrastructure-related Field

Materials for Aircraft Components

Our special melting technologies and manufacturing processes, which were developed over many years, deliver materials for aircraft featuring world-class reliability and durability.



Aircraft Engine

Shafts

Turbine Case

Materials for Aerospace Engines and Structural Parts

Materials for aerospace engines and structural parts, such as landing gears, must be durable to withstand high-temperature, high-pressure combustion gases, high-speed revolutions, and repetitive heavy loads for an extended period of time. Therefore, such component materials must be highly reliable and durable. Our materials for aerospace components are highly acclaimed and trusted thanks to our special melting technologies and manufacturing processes that have been nurtured over the years.

Industrial Infrastructure-related Field

Industrial Robot Components

We help to advance industrial robots by offering magnetic materials with world-class properties and distinctive electric wires and cables.

Industrial Robot

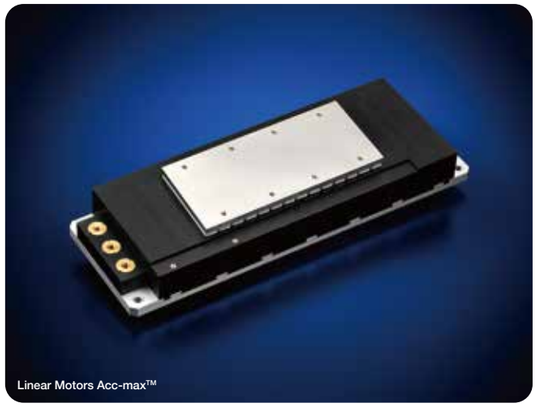
High-performance Magnets (Neodymium-Iron-Boron Magnets, Ferrite Magnets, Bonded Magnets, Cast Magnets, and Rolled Magnets)

We provide different types of magnets ideal for various applications, including NEOMAX®, a Neodymium-Iron-Boron Magnets with the world's best class magnetic properties, Ferrite Magnets, Bonded Magnets, Cast Magnets, and Rolled Magnets.

Industrial Robot Cables

Industrial Robot Cables

The highly flex-resistant and flexible cables are ideal for moving portions of industrial robots, where resistance to repeated bending and twisting and durability are critical requirements. In addition, a wide range of wire and cable products are available to meet many different needs for power supply, control, and signal transmission cables and wires connecting components within and between equipment.



Linear Motors Acc-max™

Linear Motors / Linear Stages

The coreless and iron-core linear motors are designed and manufactured internally for use as a driving force for straight-line motion. They meet diverse requirements of precision stage design, where high-precision positioning, constant velocity, and fast feeding are needed.

Industrial Infrastructure-related Field

Additive Manufacturing Materials and Precision Forming

Unprecedented products are delivered, based on our expertise in materials and the best of our additive manufacturing technology.

High Corrosion Resistant and High Strength Alloy ADMUSTER™-C00P

Multi-element alloys are said to be difficult to cast and machine, although they are excellent in strength and corrosion resistance. Hitachi Metals developed metal powder made of multi-element alloy by applying laser-powder additive manufacturing and identified process conditions for metal additive manufacturing.

ADMUSTER™-W285P Low-cobalt Maraging Steel Powder

With a cobalt content of not more than 1%, the material falls outside the scope of specified chemical substances (Group 2 monitoring substances). However, it is as strong as general maraging steel and thus easy to handle in additive manufacturing.

High Corrosion Resistance Nickel-based Alloy ADMUSTER™-C21P

This product is a nickel-based alloy with high corrosion resistance, which is enabled through the addition of chromium, molybdenum, and tantalum. The identification of process conditions for the metal additive manufacturing process has enabled us to manufacture near-net-shape components with high corrosion resistance, such as those used in semiconductor manufacturing equipment and chemical plants.

Hard Particle Dispersion Type Chromium-based Alloy ADMUSTER™-C574P

This hard particle dispersion type chromium-based alloy is excellent in corrosion resistance, resistance to soil abrasion, and workability. When built up with this alloy on the component surface, excavation equipment will have a longer service life and need less maintenance work.

Metal Powder Injection Moldings (MIM)

The metal injection moldings (MIM) process is a technique to manufacture metal components by injecting metal powder into specific molds. It produces high-density, high-strength sintered components that combine two advantages: the freedom of shape-forming allowed by injection molding and the strength of metal components. The Hitachi Metals Group also manufactures products that are among the largest available in the industry.

Precision Cast Components (Investment Casting)

Hitachi Metals is capable of manufacturing near-net-shape cast products that have complex shapes and are widely varied in size, capitalizing on our diverse materials portfolio, unique production technologies, and development capacity.

Industrial Infrastructure-related Field

Medical and Healthcare-related Components

With our ultra-fine cable, tube and ceramic products, we will help improve the performance of medical devices and contribute to the progress of medical treatment.

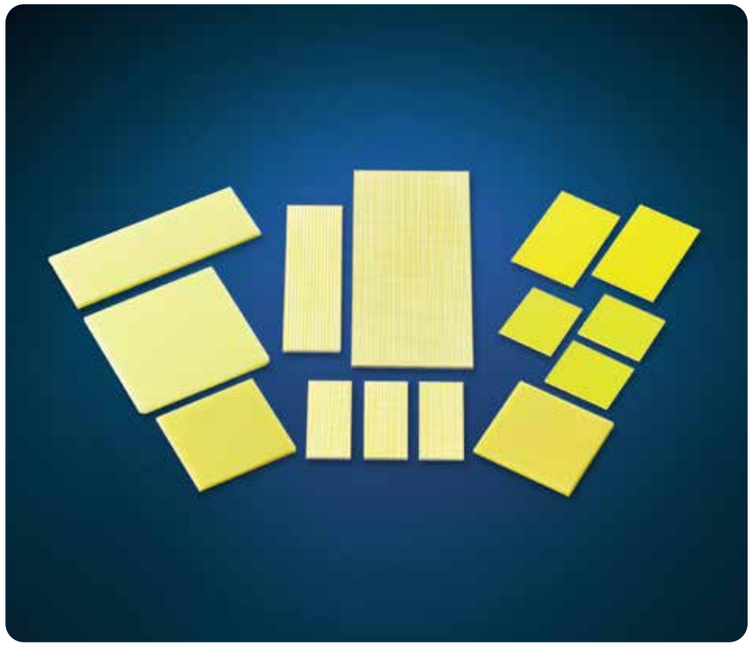
Tubing for Medical Application

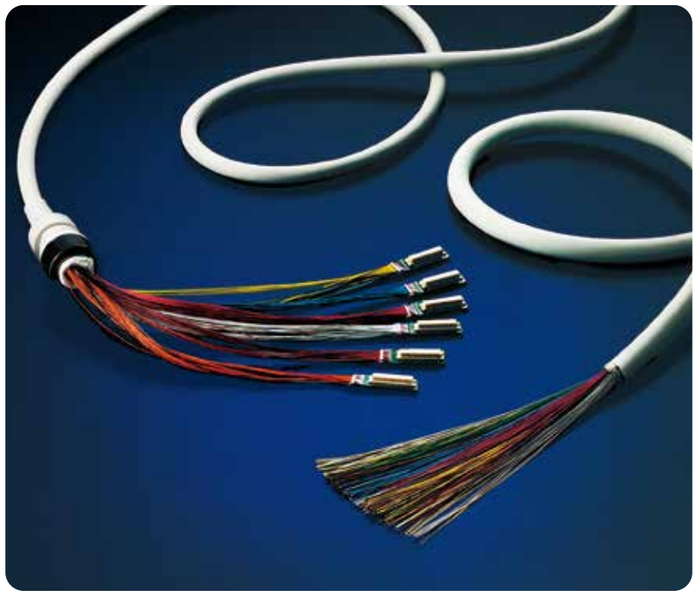
In addition of manufacturing capability of precision extrusion tooling, the experience and extrusion technology for tubing would provide high-end tubing* for medical application such as vascular access.

*Including multi-lumen, multi-layer assemblies

Ceramic Scintillator Materials

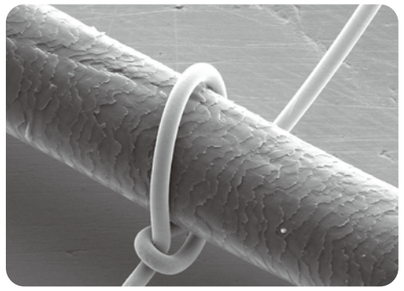
Scintillator materials absorb the energy of radiation that strikes them and emit it as visible light. Because of their high sensitivity and large X-ray absorption coefficients, they contribute to reductions in device size. They are used in X-ray CT scanners and other medical equipment as well as analytical devices. We have also developed materials for security applications.



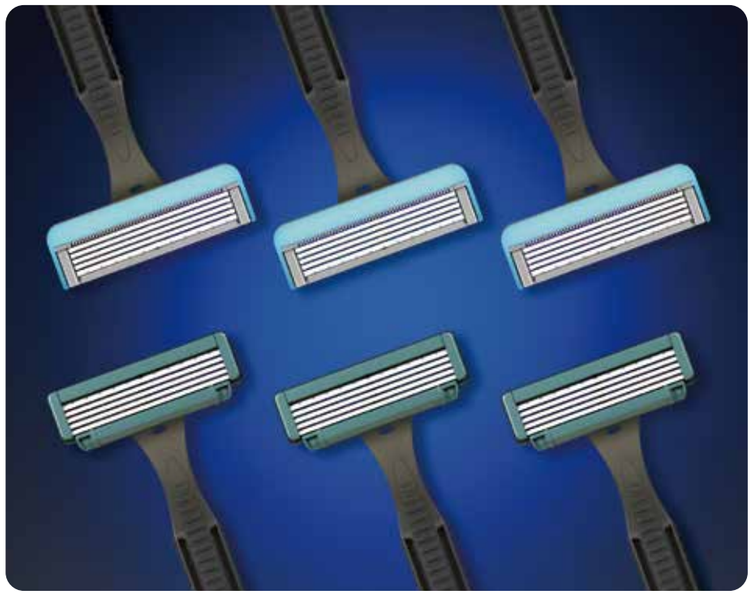


Probe Cables for Ultrasound Diagnostic Equipment

The cable connects the main body of ultrasound diagnostic equipment and the probe used for echo graphic investigation. It is lightweight, excels in elasticity and flexibility, and has high-quality electric characteristics, realizing ease of handling and high-definition images, thereby contributing to the development of medical equipment.



［10μm-diameter copper alloy wires and hair］



Razor Blade Materials

These traditional razor blade materials embody our pursuit of the cutting performance of the Japanese sword and sharp cutting edges that will not chip easily. The use of carefully selected raw materials and advanced carbide control technology allow them to continue to evolve technically. Recognizing the high reliability they can bring, we are expanding their applications to surgical knives and other fields.

Industrial Infrastructure-related Field

Piping Components

™ brand represents our world top manufacturing quality. Our tough, beautiful and highly workable piping components meet requirements of any piping equipment.

Gourd brand

Polyethylene Gas Piping Systems

Our complete line of products for gas piping systems includes electrofusion (EF) fittings, polyethylene pipes and valves, various transition joints, and EF controllers. Piping systems that use polyethylene pipes are very flexible and typically do not suffer much damage compared to conventional systems that use steel or cast iron pipes when ground displacement occurs due to ground subsidence, earthquakes, frozen ground, etc. Our systems include a wide spectrum of joints and pipes in diameters from 25A to 300A. Characterized by superior corrosion resistance and the exceptional ease with which they can be installed, they contribute to cutting overall installation costs.

Threaded Pipe Fittings for General Use

Our ™ Gourd brand Malleable Iron Pipe Fittings has lived up to its reputation for the excellence in quality and variety of products, which is known the world over, since 1912.

Valve Products

We have an extended portfolio of valves including Malleable™ valves. Their materials include stainless, cast and forged steels and polyethylene. Automatic operated valves are also available. Our valves are widely used in manufacturing plants and construction equipment.

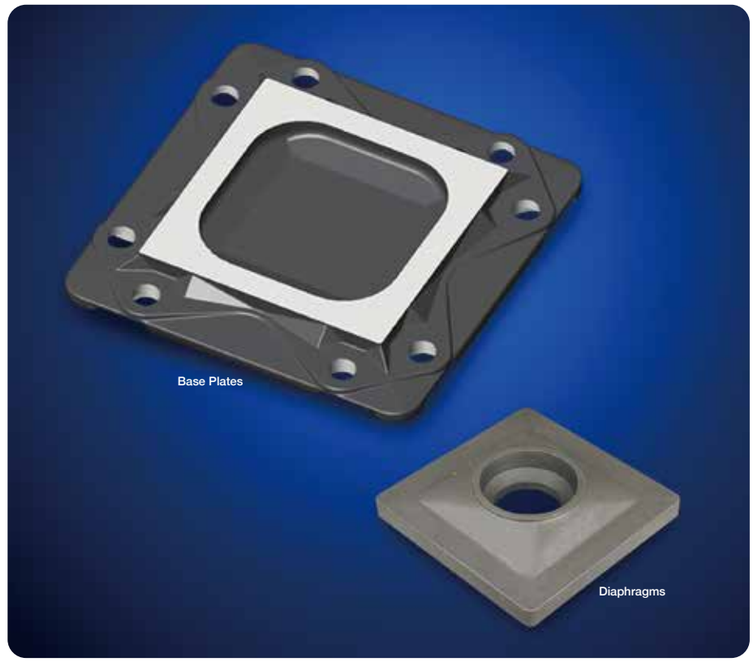
™ SOFLEX™ Corrugated Stainless Steel Tubes and Fittings (Push Impact™)

SOFLEX™ is the name of our line of flexible stainless steel gas tubes and fittings. They are easy to install and maintain because the tubes require few connections along the way. It also provides highly trusted connection from its unique design.

Industrial Infrastructure-related Field

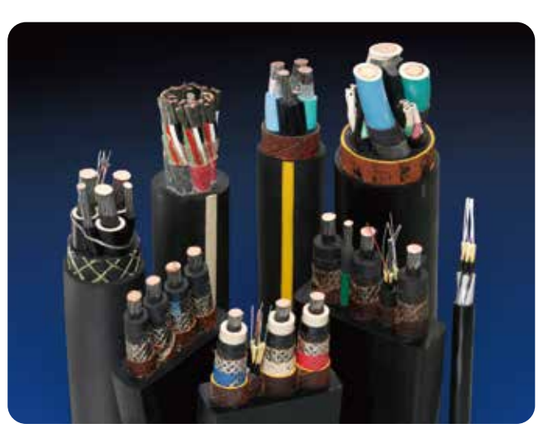
Building and Construction Components and Materials

Our construction products support a variety of living and industrial settings through their unique construction methods, technologies and materials.



Base Plates and Diaphragms

These base plates are used as exposed-type fixed column bases to construct steel frame buildings. The highly workable column bases provide superior earthquake resistance, significantly shorter work periods, and reduced installation space.
Our diaphragms are used in a beam-column joint that connects upper and lower story columns of different width. We run a production line dedicated to volume manufacturing to meet shorter delivery times.



Flexible Cables

Cables with superior flexibility are used to supply power and signals to cranes and hoists inside plants (supplemental equipment for cranes). Since they are also durable enough to be used in harsh environments, these cables are expected to play a role in mining and other areas of the resource extraction sector.

MLFC™ Flame-retardant Polyflex Insulated Wires

MLFC™ flame-retardant polyflex insulated wire has been widely used for electric wiring, including insulated wire inside switchboards and motor lead wires, because of its outstanding heat resistance, flame-retardant properties, and flexibility.

Industrial Infrastructure-related Field

Facility Equipment and Components

Our technologies, developed in many different fields, help create products with unique features.

SAM™ Aera™

SAM™ and Aera™ Mass Flow Controllers

Mass flow controllers are devices that precisely control the volume of gas flowing within a gas supply system used for deposition and etching in a semiconductor manufacturing line. Our products are featured with a waveform diaphragm made of our proprietary Ni-Co alloy installed within the valve. They have clean structures in which the parts that come in contact with gases are equipped with metal seals, and we have a complete lineup suited to a range of purposes. We continue to release digital mass flow controllers that address the requirements of the ever-evolving semi-conductor process in order to contribute to further advance of semiconductor manufacturing technologies.


HINEX™ Rolls

Rolls for Steel Mills

Our rolls for steel rolling mills have higher strength and wear resistance, and enable more efficient production of high-precision rolled products. A wide variety of products are available to manufacture steel plates, pipes, bars, and wires, as well as other shaped steels, to meet diverse demands from steelmakers. Most notably, our HINEX™ products, which were the first commercially available high-speed steel-based composite rolls in the world, and other high-speed steel composite rolls have significantly better rolling performance than traditional rolls and help improve rolling productivity and quality.

Cylinders and Screws for Plastic Molding Machines

The H-ALOY™ cylinders lined with nickel- or cobalt-based alloy and the high-performance YPT™ screws are designed for plastic molding machines. With excellent resistance to abrasion and corrosion, both products, when used together, help to stabilize the operation of the plastic molding process.

Closed Type Diaphragm Expansion Tanks

Our closed type diaphragm expansion tank loses less thermal energy. Our closing systems eliminate potential intrusion of dust or foreign materials from outside of system and maintain high level of cleanliness. Less oxygen is supplied to the systems, which reduce chance of corrosion within piping.


Metal Bandsaw Blade

Blade Materials

Hitachi Metals' blade materials date back to the "Tatara" method, a traditional ironmaking technique that Japan can proudly stand behind. For their Japanese sword-like cutting performance and superior resistance to edge chipping, our blade materials are well received by professional users, especially artisans. Our representative cutlery steel brands include Shirogami™, Kigami™, Aogami™, Gingami™, and ATS™34.

The large SPring-8 synchrotron radiation facility and SACLA, an adjacent X-ray Free Electron Laser (XFEL) facility
(Photo credit: RIKEN)

Undulators

We supply undulators to SPring-8, a large synchrotron radiation facility capable of producing the most powerful synchrotron radiation in the world, and SACLA, an adjacent X-ray Free Electron Laser (XFEL) facility. To generate synchrotron radiation, magnets are used to change the path of electrons that have been accelerated to nearly the speed of light. Extremely bright and highly directional synchrotron radiation contributes to wide-ranging research in everything from nanotechnology and biotechnology to industrial applications.

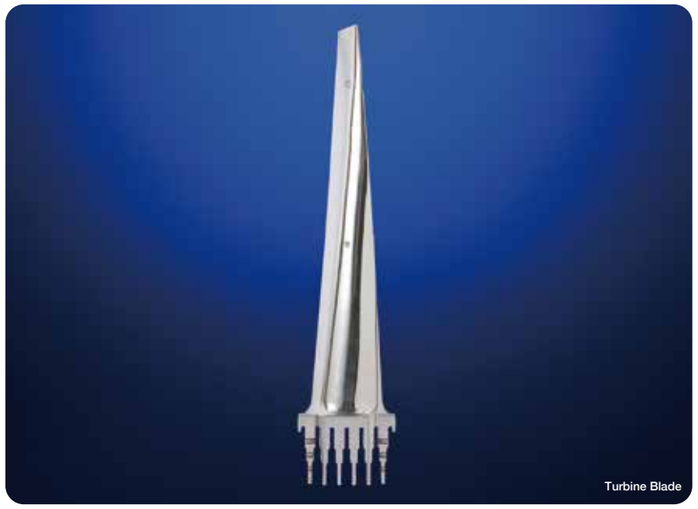
Solenoids

The products are widely used to control valves in hydraulic machines in such fields as construction, agriculture, and industrial machinery and vehicles. Our broad lineup of solenoids, including proportional and on/off types, are available with high sucking force, high pressure resistance, and a waterproofing property, contributing to the advancement of hydraulic equipment.

Industrial Infrastructure-related Field

Power Generating Equipment-related Components

Our high-quality products meet requirements of diversified power generation technologies: thermal, wind and photovoltaic.


Turbine Blade

Turbine Blade Materials

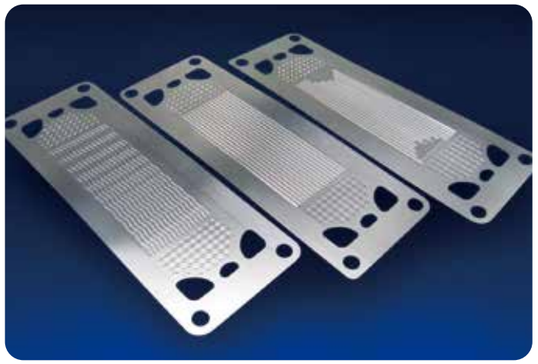
Turbine blades rotate at very high speeds and are vital components that need to be durable to withstand extreme conditions such as exposure to high temperature steam. As such, they must be strong at high temperatures, have a high degree of fracture toughness, and be reliable in terms of quality. We provide reliable products by utilizing our integrated manufacturing system, which draws upon our broad expertise and the latest technologies, helping our customers generate power more efficiently.

Amorphous Alloys Metglas®

This material is used in the cores of distribution transformers, such as those mounted on utility poles, and in cut cores for reactors built into power conditioner systems for solar photovoltaic, wind power, and other renewable energies. When the core material is changed from magnetic steel sheets to amorphous alloy, no-load loss (standby power consumption) in the core reduces, resulting in higher efficiency and greater power savings. Demand is growing for this product for its recognition as a material effective for reducing CO_2 emissions, which is essential for mitigating global warming. With the low-loss MaDC-A™ series added to the portfolio, Metglas® is expected to find wider applications in Japan and abroad.

Metglas


Transformer Core



ZMG™232G10 for Solid Oxide Fuel Cell (SOFC) Interconnects

This material, made of a ferrite alloy consisting primarily of iron and chrome, is used in interconnects that electrically link cells in SOFCs. It has oxidation resistance over long periods, has good conductivity in high-temperature environments, and achieves nearly the same thermal expansion coefficient as that of electrode materials.

Industrial Infrastructure-related Field

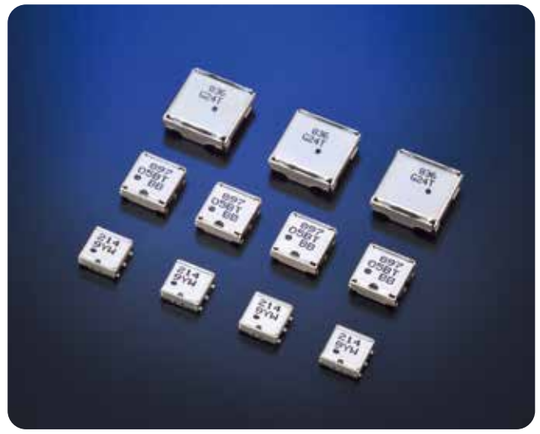
Telecommunication Infrastructure Components

We will offer various products and solutions to mobile station bases and data centers.

Primestar™ VCI Remote Monitoring System for Fiber-optic Lines

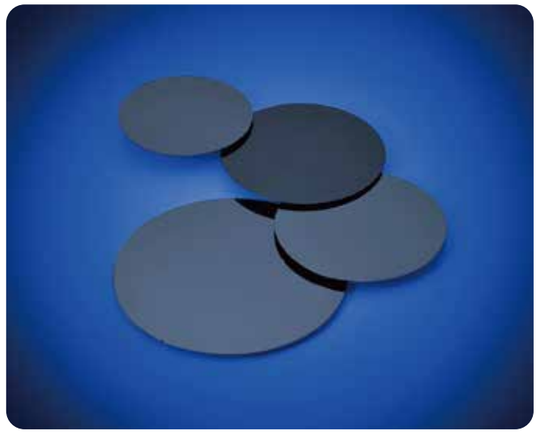
Hitachi Metals' optical fiber products are critical components of the patented low-loss optic connection technology. The technologies support highly reliable optical fiber monitoring system, Primestar VCI, required for important data communication services in financial and broadcasting businesses. They also simplify monitoring and maintenance processes, and contributes to improving efficiency and labor saving of wiring and maintenance activities, which are indispensable in the data center.

PrimeStar™ VCI



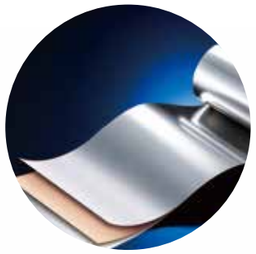
Wireless Base Station Isolators/Circulators

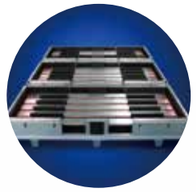
These components are designed to stabilize the operation of the amplifier that regulates audio during communications and to prevent cross-modulation. Using internally developed high-performance ferrite magnets and low-loss garnets, these isolators and circulators enable size and weight reductions and are compatible with next-generation (5G) network specifications.



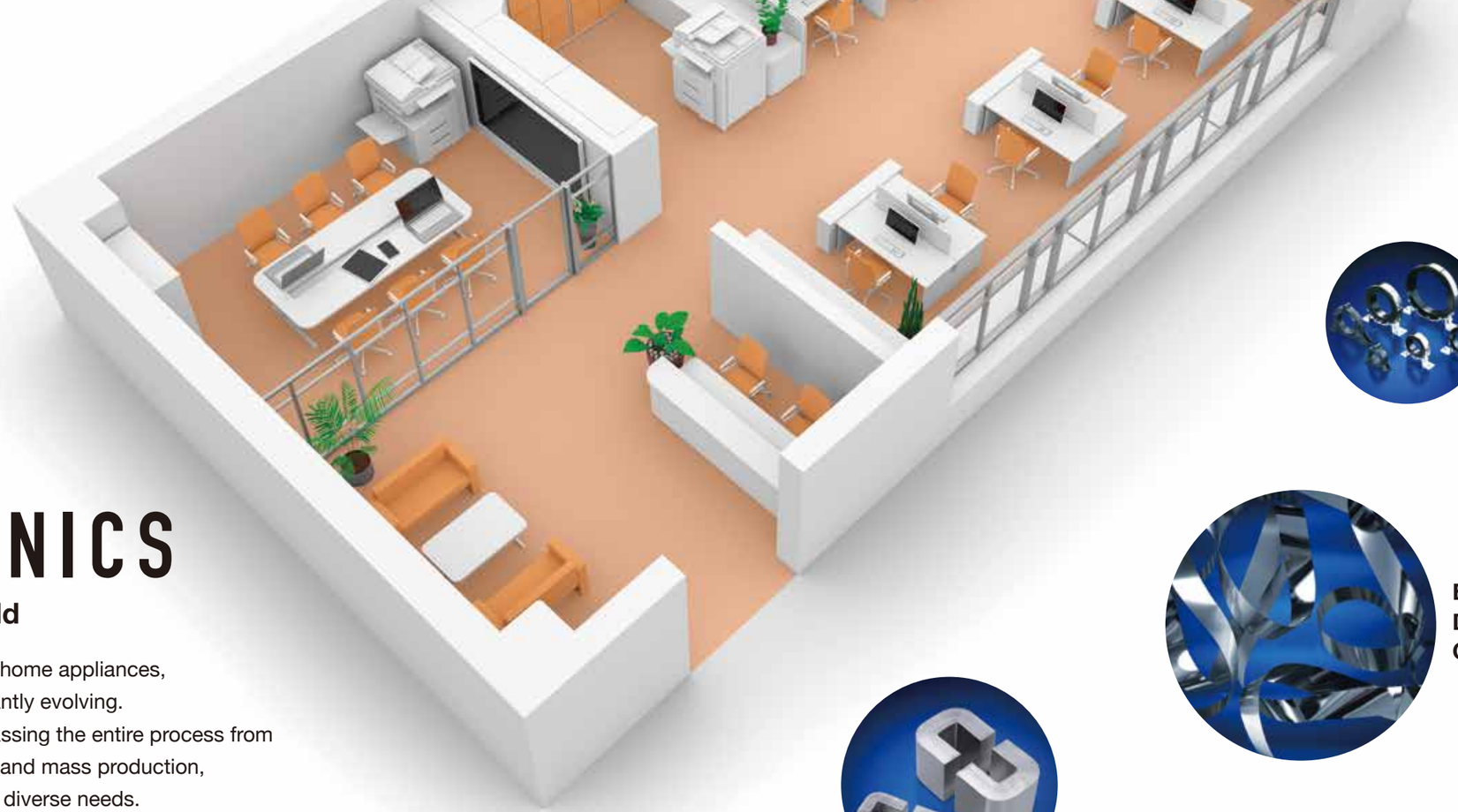
AlTiC Substrates for Thin Film Magnetic Heads

These substrates are used in thin film magnetic heads for hard drives. They have made it possible to provide the properties required for highly precise data scanning, contributing to larger capacity drives that are more reliable.





IT and Home Appliance-related Components



ELECTRONICS

Electronics-related Field

The fields of video/IT equipment, home appliances,
and electronic devices are constantly evolving.
Our production system, encompassing the entire process from
prototyping to commercialization and mass production,
allows us to meet our customers' diverse needs.
We will continue to support the growth of society at large with
high-performance components and materials.

Electronic Device-related Components

Related link

Electronics-related Field

IT and Home Appliance-related Components

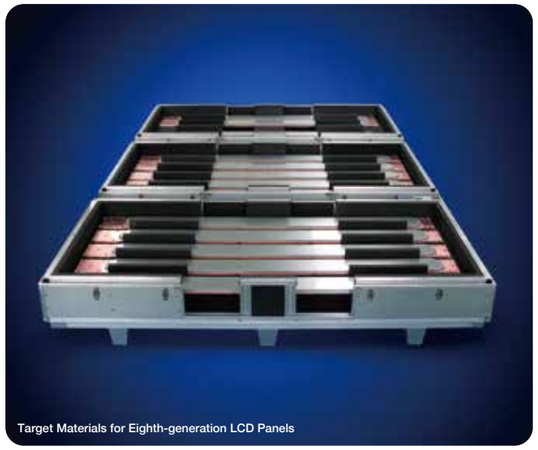
Hitachi Metals offers alloys for electronic products and magnetic materials with outstanding properties to contribute to the evolution of flat displays and mobile terminals.

Materials for Organic Electroluminescent Display

The materials are used for metal masks needed for the production of organic electroluminescent display backboards and panels. They are available in the form of thin sheets that restrict thermal expansion deformation, produced by our control technology of alloy composition and cold rolling technology developed over the years.
We also offer high-strength stainless steels used for the back panels of foldable devices.

Clad Metals for Heat Spreaders

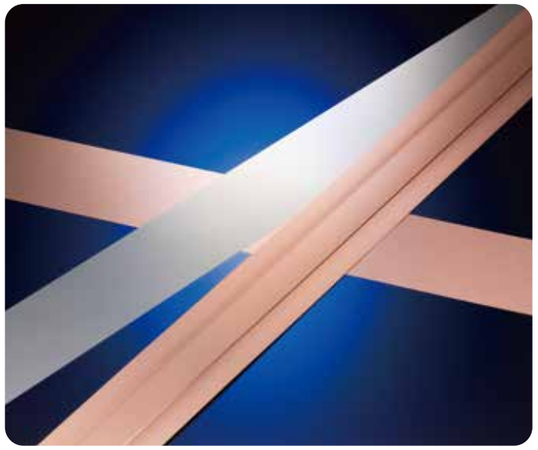
These clad metals combine stainless steel and copper to achieve both high strength and high thermal conductivity. They are useful for reducing the thickness, weight, and the number of components of mobile devices, such as smartphones and tablets.



Target Materials for Eighth-generation LCD Panels

Sputtering Target Materials for LCDs

The Sputtering Target materials are used for thin film interconnects of LCDs. Our HIP (Hot Isostatic Press) method enables to obtain fine and homogeneous structure, which corresponds to the requirement of increasing in size. Furthermore, our alloy design technology enables to provide various alloy materials as usage, which responds to the requirement like low-value resistance, high heat resistance, and high moisture-resistance.



Lead Frame Materials

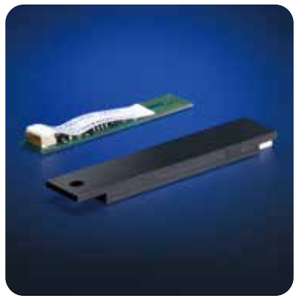
We provide an extensive lineup of iron nickel-based and copper-based lead frame materials; materials for logic families and power semiconductors, and dual gauge copper strips which has a multi thickness design in width direction.

High-Performance Magnets (Neodymium-Iron-Boron Magnets, Ferrite Magnets, Bonded Magnets, Cast Magnets, and Rolled Magnets)

We provide different types of magnets ideal for various applications, including NEOMAX®, a Neodymium-Iron-Boron Magnets with the world's best class magnetic properties, Ferrite Magnets, Bonded Magnets, Cast Magnets, and Rolled Magnets.

Magnet Rolls

We offer the optimal magnet rolls for a variety of magnetic development from low- to high-speed color printing. Available sizes range from small-diameter (A4 size) to large-diameter rolls (A0 size).



Toner Sensors

Thanks to planar coils and unique detection systems, our toner sensors are both ultra-thin and high-precision. This contributes to further reducing the size of photocopying machines and improving image quality.

Electronics-related Field

Electronic Device-related Components

Soft magnetic materials with unique features allow us to make electronic devices smaller and more energy-efficient.

FINEMET® Nanocrystalline Magnetic Alloys

FINEMET® is the world's first nanocrystalline soft magnetic alloy developed by Hitachi Metals. This new Fe-based soft magnetic alloy is composed of nanocrystals. It has high saturation induction, high permeability, excellent temperature characteristics and temporal stability. FINEMET® is utilized in high-frequency power transformers, noise-suppression components and other applications where it contributes to downsizing and lightening.

Cut Cores

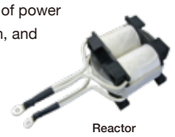
Used in medium-frequency power transformers and choke coils, our cut cores contribute to higher efficiency and smaller sizes. FINEMET® nanocrystalline magnetic materials and amorphous metal products suited to various uses are available.

FINEMET® Common Mode Choke Cores and Coils

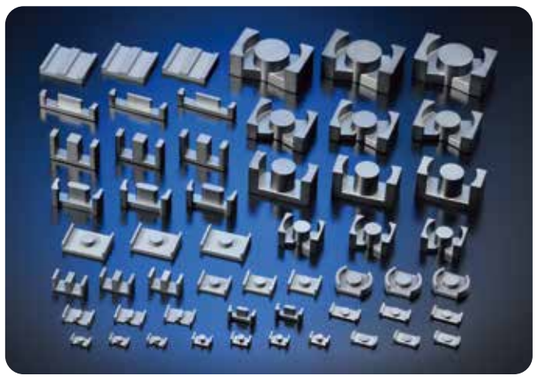
Instilled with high magnetic permeability and low Q factors, these cores and coils furnish high impedance over a broad frequency range, allowing them to manifest major noise suppression effects. Moreover, because impedance does not vary widely by temperature, stable noise suppression effects can be obtained over a broad temperature range.

Amorphous Powder Cores/Coils

These cores and coils are designed to combine high saturation flux density and low loss by using a Fe-based amorphous metal powder. They are suitable for smoothing choke coils for both input and output of power supply, choke coils for normal-mode noise reduction, and choke coils for power factor correction circuits. The coils are able to operate at frequencies as high as 100 kHz and contribute to making equipment smaller and more efficient.

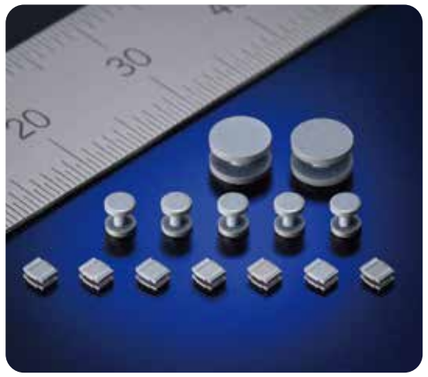


Reactor



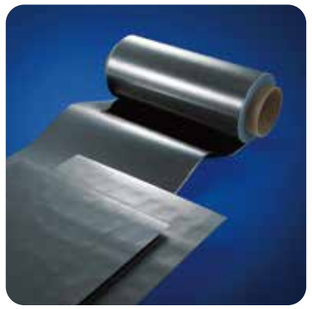
Soft Ferrite Cores

Although these cores have a lower saturation flux density than other soft magnetic materials, their electrical resistance is higher, and they are characterized by overwhelmingly excellent magnetic properties in high-frequency bands from 100 kHz to several tens of MHz. With the addition of the MaDC-F™ series, which have low losses in the high-frequency range, these products help to make passive components smaller, lighter, and more efficient in many fields, including xEV, mobile devices, and industrial equipment.



Metal Powder Core HRM Series

The products have about three times the saturation magnetic flux density and almost twice the radial crushing strength of Ni-Zn ferrite products, which were conventionally used. These characteristics make them relatively superior in electrical resistance, rustproofing, and reliability (e.g., temperature stability) among metallic materials. Serving as cores for power inductors embedded in various information equipment and automotive electrical equipment, they contribute to smaller and higher-current inductors (improvement of DC superimposition properties).



FM SHIELD™ Magnetic Shield Sheets

The product consists of laminated FINEMET® nanocrystalline soft magnetic material ribbon and polyethylene terephthalate film. The shield sheet protects electronic devices from electromagnetic noise and provides robust shield in shield boxes or rooms within buildings exposed to environmental magnetic fields like electric power distribution facilities.

FINEMET® Multilayered Sheets

These shield yoke sheets are used in wireless chargers for smartphones, tablet PCs, and other communications devices. The lamination processing of FINEMET®, a high magnetic permeability material with low core loss, enables a slimmer size and lighter weight and achieves impressive cuts in power transmission noise and energy loss.

CSR at the Hitachi Metals Group

Moving Forward as Society's Trusted Partner

By creating value for our customers through our corporate activities,
we hope to be able to contribute to solving social issues in a range of different areas.
Furthermore, we will aim to earn our place as society's trusted partner by taking responsibility
for the impact exerted on the public by our corporate activities,
and by addressing the needs of a variety of stakeholders.

Hitachi Metals Group Codes of Conduct (Summary)

All officers and employees of the Hitachi Metals Group shall act with sincerity and
fairness in a highly ethical manner based on "obey the law and walk the path of virtue."

1 Toward a Sustainable Society

We will provide innovative solutions to society and integrate social and environmental responsibility into our business activities.

2 Sincere and Fair Business Activities

We will act in compliance with legislation and sound corporate ethics, build fair and equal partnerships with suppliers, and ensure quality and safety of our products and services.

3 Respect for Human Rights

We will promote our understanding of and respect for internationally recognized human rights and will not discriminate or engage in any acts that may impair self-dignity.

4 Building a Work Environment That Brings Out Employee Strengths

Prioritizing health and safety above all else, we will promote sustainable growth of the organization and individuals.

5 Information Management and Communication

We will manage personal and other information properly and respond to stakeholders responsibly through various means of communication.

6 Protection of Intellectual Property and Brand

We will protect our own intellectual property, respect third-party intellectual property, and protect and enhance the value of the Hitachi Metals Brand.

7 Securing Corporate Assets

We will use and manage our corporate assets properly to protect their value.

8 Crisis Management

We will make concerted efforts in case of disasters and threats such as cyberattacks and terrorism.

9 Responsibilities of Employees

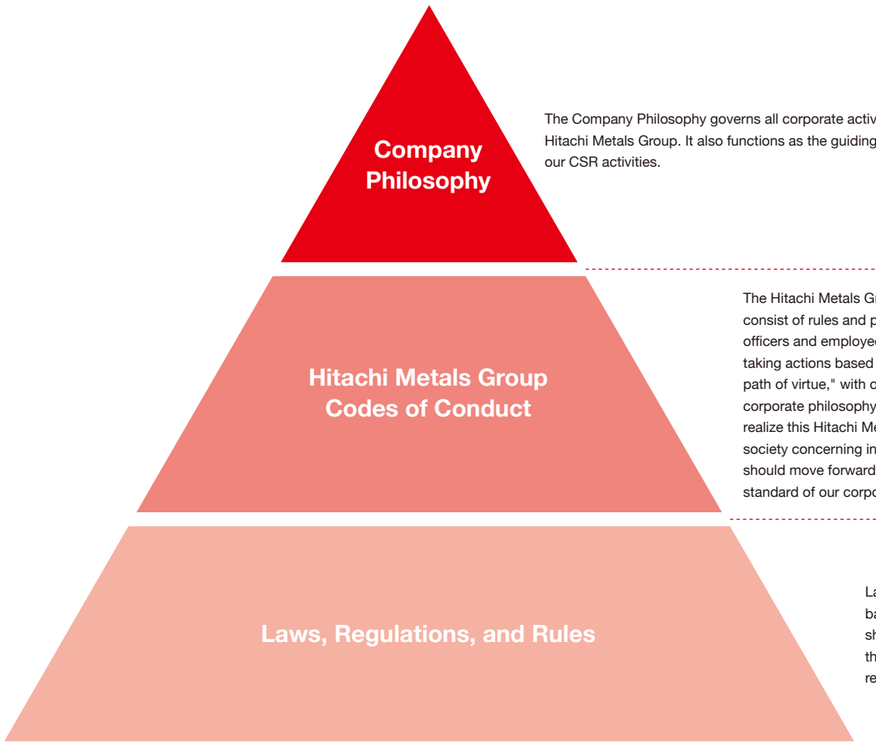
Employees shall acknowledge and affirm their compliance with the Codes of Conduct. If they become aware of any non-compliant activity, they shall report it immediately.

10 Responsibilities of Top Management

Top managers shall comply with the Codes of Conduct in business management. In the event of violation of the Codes, they shall swiftly take corrective measures and actions to prevent a recurrence of similar incidents.

Guidelines for CSR Activities

Hitachi Metals Group systematically established guidelines for CSR activities as follows:



The Company Philosophy governs all corporate activities of the Hitachi Metals Group. It also functions as the guiding principles of our CSR activities.

The Hitachi Metals Group Codes of Conduct is consist of rules and principles intended to assist officers and employees in making decisions and taking actions based on "obey the law and walk the path of virtue," with our corporate creed and corporate philosophy as a foundation, in order to realize this Hitachi Metals WAY. It is a declaration to society concerning in which direction our Group should move forward and it also serves as the standard of our corporate ethics.

Laws and regulations are the basic rules of corporate activity. It should be noted, however, that they stipulate minimum requirements only.

Hitachi Metals Group aims to carry out its social responsibility and realize its management philosophy through the observance, by all directors and employees, of laws and regulations and the Hitachi Metals Group Code of Conduct, and their implementation of the Hitachi Metals Group Corporate Principles, in their daily duties.

Index of Listed Products

Aluminum Motor Housings Containing EV/HEVComponents

Automobile-related Field

Industrial Infrastructure-related Field

Electronics-related Field

alphabetical order

COMMUNICATION SYMBOL

The "Materials Mag!c" communication symbol is an expression of the overall value of the Hitachi Metals Group.

Materials Mag!c

- The red box is the source of the Group's competitive strength.
- The yellow sections represent our technology and structure, enhanced by the ideas and actions of each individual.
- The base of the box is our corporate culture and the building blocks that constitute our DNA.
- Finally, the legs supporting the box itself are the efforts and abilities of each and every Hitachi Metals Group employee.

From a Customer Standpoint

"Materials" encompass people, products, technologies, designs, ideas and services that solve problems and generate value. At the Hitachi Metals Group, we deliver optimal solutions that embody customer needs. This is what we call "Materials Mag!c"

About Our Manufacturing Philosophy

As a development-driven company distinguished for its advanced technology and development capabilities, the philosophy of Hitachi Metals reflects a single-minded focus on quality. In relentless pursuit of the creation of quality, we will continue to deliver highly functional component materials that contribute to the wellbeing and prosperity of society. This, too, is "Materials Mag!c"

Each and Every One of Us

Consolidating our wisdom and knowledge, the experience we have amassed over the years and all of the other "Materials" that we possess as an engine for growth, we will forge ahead in the 21st Century. This is yet another facet of "Materials Mag!c"