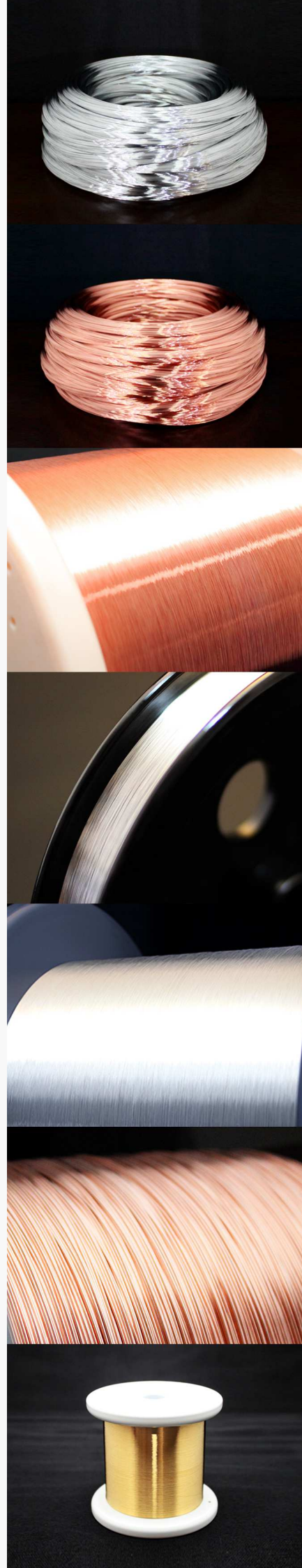


# MARUBISHI PRODUCTS

Marubishi Co., Ltd.





# We are a manufacturer specializing in extra fine wire and fine wire.

Marubishi is a steel wire manufacturer founded in 1969.

Our galvanized steel wire "Mac Wire" is widely used as a wire material for precision springs used in items, such as home electric appliances, office automated equipment, and on-vehicle equipment by many major and listed companies, earning high praise on stable supply, product quality, and instant delivery system for over 35 years.

We also developed copper-plated steel wire for conductive springs according to your needs and offer products in a wide range of fields, such as medical, communications, semiconductors, and environmental energy as well as springs.

We will further improve the technology we have cultivated over many years and add various functions according to your needs to help you not only add values but also develop technology in cutting-edge fields.

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# Our strength, and reason why we are chosen

## Technology to meet your needs

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We are a steel wire manufacturer specializing in extra fine wire and fine wire.

We specialize in extra fine drawn wire and precision drawn wire, such as extra fine piano wire with a wire diameter of 0.03mm and ultra-high precision wire with a wire diameter tolerance of  $\pm 0.1\mu\text{m}$ .

We can also wiredraw not only hard drawn steel wire and piano wire but also stainless-steel wire, copper wire, brass wire, alloy wire, and other types of wire to widely support joint development and OEM supply of these products.

We will help you conduct *monozukuri* (manufacturing) with our long-term experience and technical skills.

## Agile order receiving and production system

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We receive orders from one coil and one bobbin plated steel wire for springs.

We have built an instant delivery system, handling many types of hard drawn steel wire in all wire diameters and piano wire mainly in extra fine wire diameter.

We also have non-spring products, such as saw wire and copper wire for micro catheters.

We accept orders for paid samples of our inventory items.

So, consult us if you consider using our products for prototyping or other purposes.

## A wide range of achievements

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Our plated steel wire is used for precision spring materials for items, such as digital cameras, printers, copiers, mobile phone, audio equipment, and on-vehicle equipment made by leading manufacturers in Japan and overseas.

In addition, our wire is used for various applications, such as springs in a variety of industries, such as automobile, medical, communication, and environmental energy industries.

We also supply wire for research institutes in the most advanced fields including universities and JAXA.

# Galvanized steel wire for spring



Our galvanized steel wire “Mac Wire”, having excellent corrosion resistance and uniform plating color with gloss, is a VA suggested material not requiring post-plating.

## Characteristics

- “Mac Wire” with high wire diameter accuracy and circularity.
- Also available for products focusing on appearance with beautiful glossy silver color.
- Superior in corrosion resistance against steel wire surfaces with the galvanized plating characteristics.
- Effective for eliminating problems, such as tangling of springs and plating defects that may occur after post-plating.
- Chrome-free and environmentally friendly pure galvanized steel wire.
- Recommended for substitutions, having more excellent spring strength and setting resistance than stainless steel wire.
- Enabling wire diameter drawing in increments of 0.001mm to support your desired wire diameter, such as the inch size.

Product type	Product name	Product number	Standard	Diameter range
Galvanized hard drawn steel wire	Mac Wire 80	MAC-80	SW-C	0.20–0.80mm
Galvanized piano wire	Mac Wire PA	MAC-PA	SWP-A	0.05–0.80mm
Galvanized piano wire	Mac Wire PB	MAC-PB	SWP-B	0.05–0.80mm
Galvanized piano wire	Mac Wire PH	MAC-PH	SWP-H	0.05–0.19mm

## Standard wire diameter

Diameter	Tensile strength (N/mm <sup>2</sup> )				Diameter tolerance (mm)	Diameter deviation (mm)	Plating
	MAC-80	MAC-PA	MAC-PB	MAC-PH			
0.05mm	N/A	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Galvanizing
0.06mm	N/A	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Galvanizing
0.07mm	N/A	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Galvanizing
0.08mm	N/A	2890–3190	3190–3480	3750–4150	+0 -0.002	≤0.001	Galvanizing
0.09mm	N/A	2840–3140	3140–3430	3600–4000	+0 -0.002	≤0.001	Galvanizing
0.10mm	N/A	2790–3090	3090–3380	3550–3950	+0 -0.002	≤0.001	Galvanizing
0.11mm	N/A	2750–3040	3040–3330	3500–3850	+0 -0.002	≤0.001	Galvanizing
0.12mm	N/A	2750–3040	3040–3330	3500–3850	+0 -0.002	≤0.001	Galvanizing
0.13mm	N/A	2700–2990	2990–3290	3450–3750	+0 -0.002	≤0.001	Galvanizing
0.14mm	N/A	2700–2990	2990–3290	3450–3750	+0 -0.002	≤0.001	Galvanizing
0.15mm	N/A	2650–2940	2940–3240	3400–3700	+0 -0.002	≤0.001	Galvanizing
0.16mm	N/A	2650–2940	2940–3240	3400–3700	+0 -0.002	≤0.001	Galvanizing
0.17mm	N/A	2600–2890	2890–3190	3300–3600	+0 -0.002	≤0.001	Galvanizing
0.18mm	N/A	2600–2890	2890–3190	3300–3600	+0 -0.002	≤0.001	Galvanizing
0.19mm	N/A	2600–2840	2840–3090	3200–3500	+0 -0.002	≤0.001	Galvanizing
0.20mm	2500–2790	2600–2840	2840–3090	N/A	+0 -0.002	≤0.001	Galvanizing
0.23mm	2450–2750	2550–2790	2790–3040	N/A	+0 -0.002	≤0.001	Galvanizing
0.25mm	2400–2700	2500–2750	2750–2990	N/A	+0 -0.002	≤0.001	Galvanizing
0.26mm	2400–2700	2500–2750	2750–2990	N/A	+0 -0.002	≤0.001	Galvanizing
0.29mm	2350–2650	2450–2700	2700–2940	N/A	+0 -0.002	≤0.001	Galvanizing
0.30mm	2300–2600	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Galvanizing
0.32mm	2300–2600	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Galvanizing
0.35mm	2300–2600	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Galvanizing
0.38mm	2260–2550	2350–2600	2600–2840	N/A	+0 -0.002	≤0.001	Galvanizing
0.40mm	2260–2550	2350–2600	2600–2840	N/A	+0 -0.002	≤0.001	Galvanizing
0.45mm	2210–2500	2300–2550	2550–2790	N/A	+0 -0.002	≤0.001	Galvanizing
0.50mm	2210–2500	2300–2550	2550–2790	N/A	+0 -0.002	≤0.001	Galvanizing
0.55mm	2160–2450	2260–2500	2500–2750	N/A	+0 -0.002	≤0.001	Galvanizing
0.60mm	2110–2400	2210–2450	2450–2700	N/A	+0 -0.002	≤0.001	Galvanizing
0.65mm	2110–2400	2210–2450	2450–2700	N/A	+0 -0.002	≤0.001	Galvanizing
0.70mm	2060–2350	2160–2400	2400–2650	N/A	+0 -0.002	≤0.001	Galvanizing
0.75mm	2010–2300	2110–2350	2350–2600	N/A	+0 -0.002	≤0.001	Galvanizing
0.80mm	2010–2300	2110–2350	2350–2600	N/A	+0 -0.002	≤0.001	Galvanizing

# Copper plated steel wire for spring



Our copper plated wire “Mac Wire CP” is excellent in spring characteristics and fatigue strength with conductivity, suitable for substitutions of phosphor bronze wire and beryllium copper wire.

## Characteristics

- Designed with a copper plating thickness with 13–15% IACS conductivity.
- “Mac Wire CP” with high wire diameter accuracy and circularity.
- Suitable for battery contact springs and conductive strings for items, such as small mortars.
- Excellent in solderability, and optimum for electronic parts.
- Available for identification applications using copper plating oxidation interference color.
- Copper plated piano wire having an antibacterial effect on O157 and influenza virus.
- Excellent in spring characteristics and fatigue strength than phosphor bronze wire and beryllium copper wire as a VA suggestion material, realizing miniaturized springs and cost reductions.
- Enabling wire diameter drawing in increments of 0.001mm to support your desired wire diameter, such as the inch size.

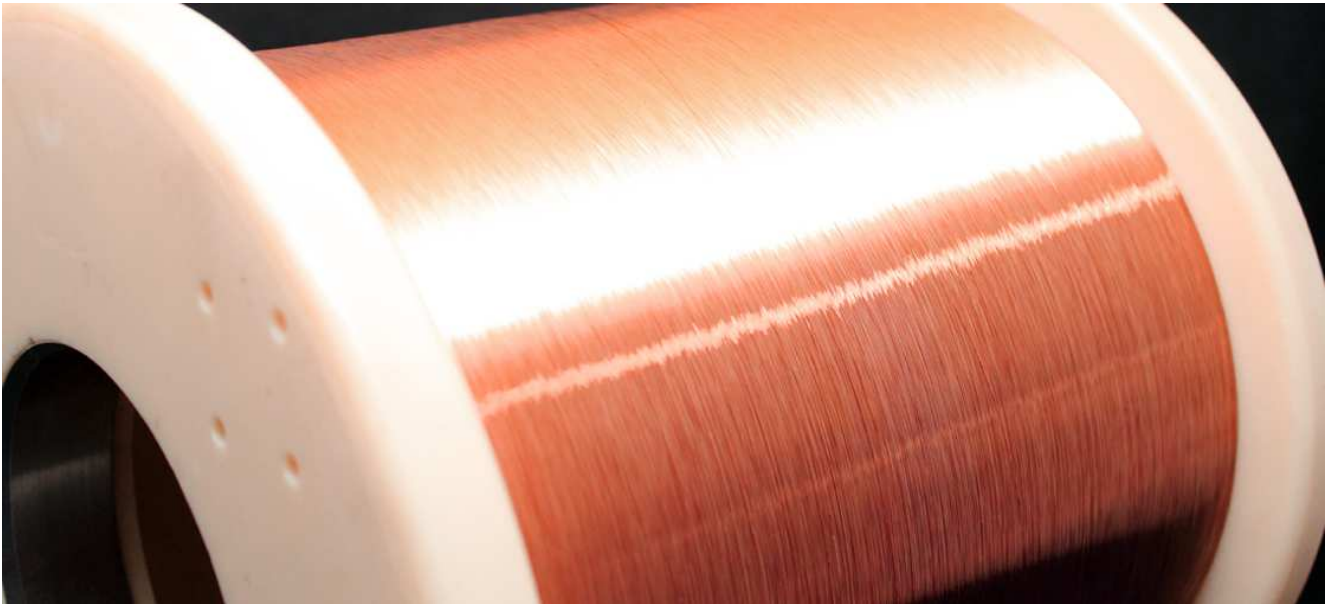
Product type	Product name	Product number	Standard	Diameter range
Copper plated piano wire	Mac Wire CP-PA	CP-SWPA	SWP-A	0.03–0.80mm
Copper plated piano wire	Mac Wire CP-PB	CP-SWPB	SWP-B	0.03–0.40mm
Copper plated piano wire	Mac Wire CP-PH	CP-SWPH	SWP-H	0.03–0.19mm



## Standard wire diameter

Diameter	Tensile strength (N/mm <sup>2</sup> )			Diameter tolerance (mm)	Diameter deviation (mm)	Plating	Conductivity
	CP-SWPA	CP-SWPB	CP-SWPH				
0.03mm	3090–3480	3480–3820	4100–4500	+0 -0.002	≤0.001	Copper plating	13–15%
0.04mm	2990–3280	3280–3580	3900–4300	+0 -0.002	≤0.001	Copper plating	13–15%
0.05mm	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Copper plating	13–15%
0.06mm	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Copper plating	13–15%
0.07mm	2940–3230	3230–3530	3800–4200	+0 -0.002	≤0.001	Copper plating	13–15%
0.08mm	2890–3190	3190–3480	3750–4150	+0 -0.002	≤0.001	Copper plating	13–15%
0.09mm	2840–3140	3140–3430	3600–4000	+0 -0.002	≤0.001	Copper plating	13–15%
0.10mm	2790–3090	3090–3380	3550–3950	+0 -0.002	≤0.001	Copper plating	13–15%
0.11mm	2750–3040	3040–3330	3500–3850	+0 -0.002	≤0.001	Copper plating	13–15%
0.12mm	2750–3040	3040–3330	3500–3850	+0 -0.002	≤0.001	Copper plating	13–15%
0.13mm	2700–2990	2990–3290	3450–3750	+0 -0.002	≤0.001	Copper plating	13–15%
0.14mm	2700–2990	2990–3290	3450–3750	+0 -0.002	≤0.001	Copper plating	13–15%
0.15mm	2650–2940	2940–3240	3400–3700	+0 -0.002	≤0.001	Copper plating	13–15%
0.16mm	2650–2940	2940–3240	3400–3700	+0 -0.002	≤0.001	Copper plating	13–15%
0.17mm	2600–2890	2890–3190	3300–3600	+0 -0.002	≤0.001	Copper plating	13–15%
0.18mm	2600–2890	2890–3190	3300–3600	+0 -0.002	≤0.001	Copper plating	13–15%
0.19mm	2600–2840	2840–3090	3200–3500	+0 -0.002	≤0.001	Copper plating	13–15%
0.20mm	2600–2840	2840–3090	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.23mm	2550–2790	2790–3040	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.25mm	2500–2750	2750–2990	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.26mm	2500–2750	2750–2990	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.29mm	2450–2700	2700–2940	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.30mm	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.32mm	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.35mm	2400–2650	2650–2890	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.38mm	2350–2600	2600–2840	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.40mm	2350–2600	2600–2840	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.45mm	2300–2550	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.50mm	2300–2550	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.55mm	2260–2500	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.60mm	2210–2450	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.65mm	2210–2450	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.70mm	2160–2400	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%
0.80mm	2110–2350	N/A	N/A	+0 -0.002	≤0.001	Copper plating	13–15%

# Saw wire



This product is high strength steel wire for core wire of diamond wire with high adhesion to diamond abrasive grains and excellent slicing performance.

## Characteristics

- Having high adhesion to abrasive grains in all fixed abrasive grain types for nickel-plating, brazing, and resin bonding.
- Having high slicing performance using our proprietary manufacturing technology enabling uniform plating thickness and finishing with high strength and high roundness.
- Hard to break and excellent in durability with ultra-high cleanliness steel used for the base material.
- Also available for free abrasive grain saw wire as well as diamond wire.
- We also receive small orders such as samples. Please contact us.

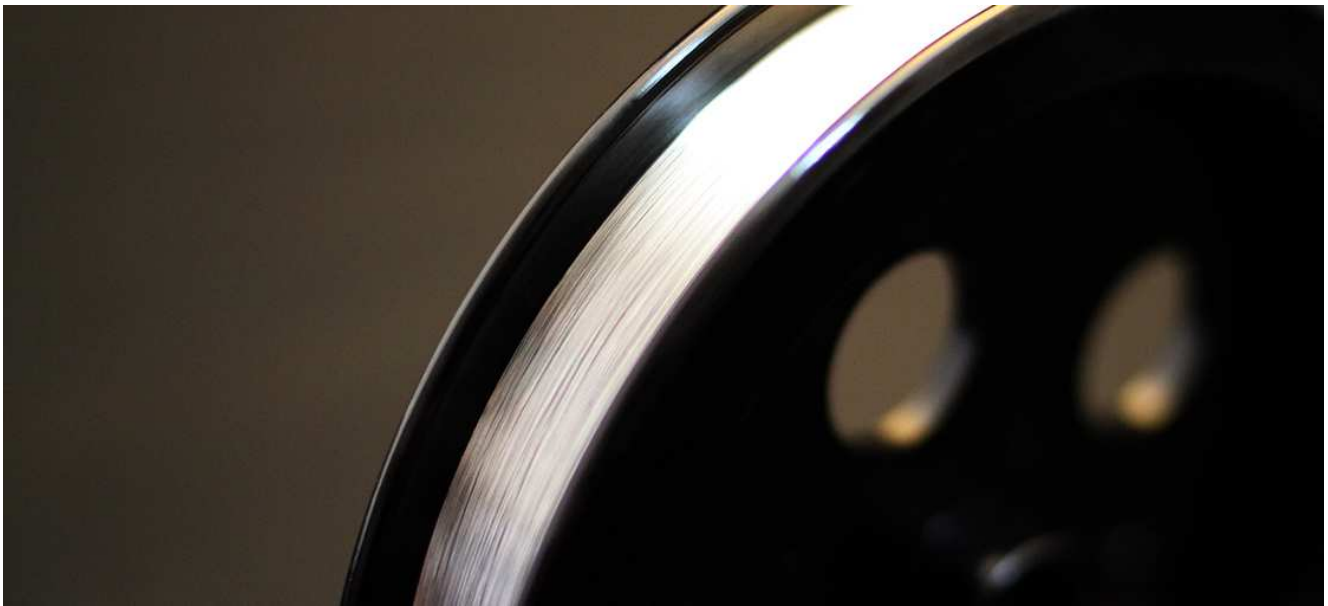
## Applications

- Core wire of diamond wire, which cuts silicon for solar cells
- Free abrasive grain saw wire, which cuts materials, such as sapphire for LED lighting, ceramics, and magnet

Diameter range	Tensile strength	Diameter tolerance	Diameter deviation	Plating
0.05–0.08mm	3900 N/mm <sup>2</sup> over	±0.001mm	0.001mm or less	Copper plating
0.09–0.12mm	3800 N/mm <sup>2</sup> over	±0.001mm	0.001mm or less	Copper plating

\* If you desire other wire diameter, please contact us.

# Ferrule polishing wire



This product is high-strength piano wire having excellent precision and high roundness developed for polishing the inner diameter of zirconia ferrule, which is the core part of the optical communication connector.

## Characteristics

- High-strength piano wire having high precision with a wire diameter tolerance of  $\pm 0.1\mu\text{m}$
- Having high roundness with a diameter deviation of less than  $0.2\mu\text{m}$
- We perform adjustment of diamond dies in our company, enabling quick response to your desired wire diameter in increments of  $0.1\mu\text{m}$ .
- Hard to break and excellent in durability with ultra-high cleanliness steel used for the base material.

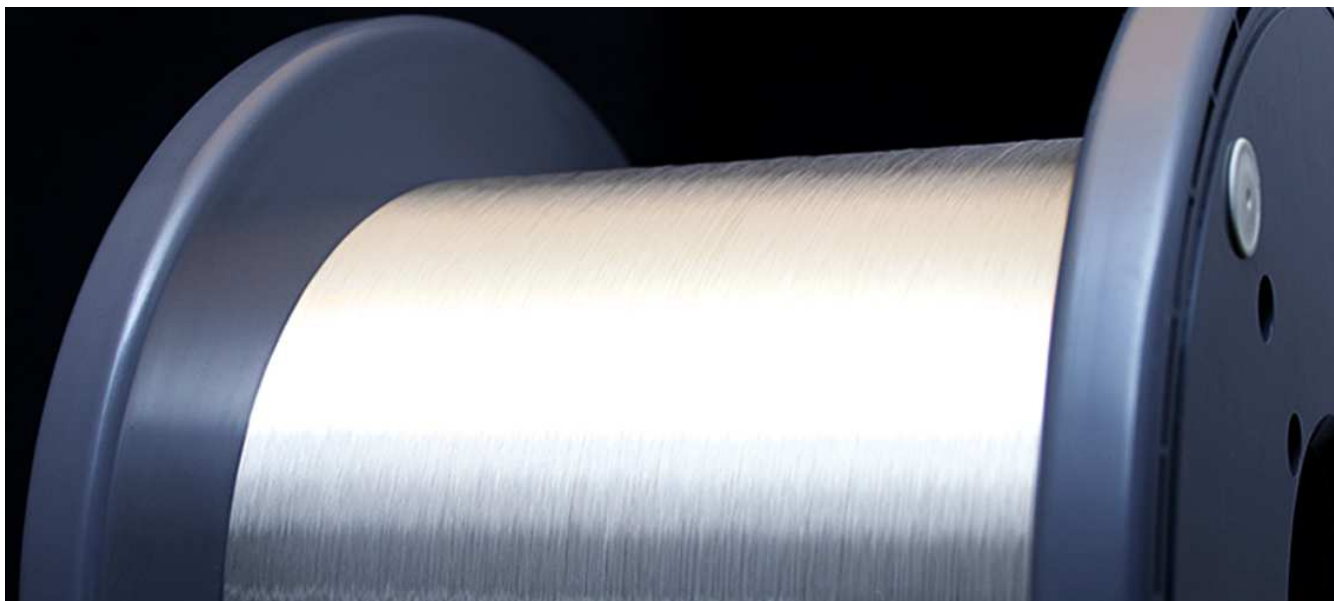
## Applications

- Polishing the inner diameter of zirconia ferrule

Product name	Diameter range	Diameter tolerance	Diameter deviation
Ferrule polishing wire	80–200 $\mu\text{m}$ (0.08–0.20mm)	$\pm 0.1\mu\text{m}$ ( $\pm 0.0001\text{mm}$ )	0.2 $\mu\text{m}$ or less (0.0002mm or less)

\* If you desire other wire diameter, please contact us.

# Silver plated steel wire



This is silver plated piano wire excellent in conductivity and radio wave reception performance.

## Characteristics

- Optimum for medical equipment with excellent antibacterial properties specific to silver plating.
- Suitable for applications requiring conductivity for items, such as electronic parts, using copper plated piano wire with a conductivity of 13–15% for the wire material of silver plated wire.
- Also suitable for communication equipment parts, having excellent radio wave reception performance.

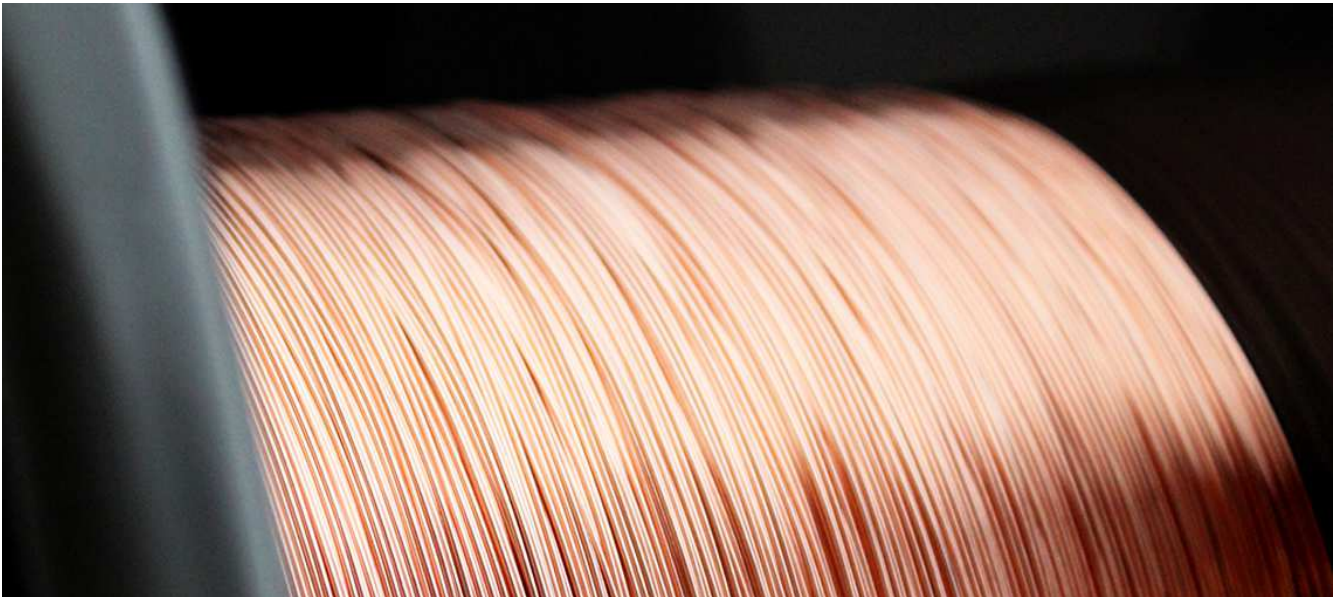
## Applications

- Communication parts for items, such as smartphones, tablet computers, and mobile terminals
- Endoscope control wire
- Lead wire for AED
- Antennas

Product name	Standard	Plating	Under plating	Conductivity
Silver plated piano wire	SWP-A SWP-B	Silver plating	Copper plating	13–15%IACS



# Copper wire for catheter tube



This is copper wire for micro-catheters developed to focus on releasability from resin and reduction of wire surface contamination.

## Characteristics

- High precision copper wire with a wire diameter tolerance of  $\pm 0.005\text{mm}$ , suitable for micro-catheters.
- Wire drawing performed for your desired wire diameter in increments of  $0.01\text{mm}$  according to the inner diameter of the catheter tube.
- Improved releasability from resin compared with conventional products in the drawing process of copper wire.
- Wiping finish performed to reduce surface contamination of copper wire.
- We also receive small orders with short delivery time for prototyping or other applications.

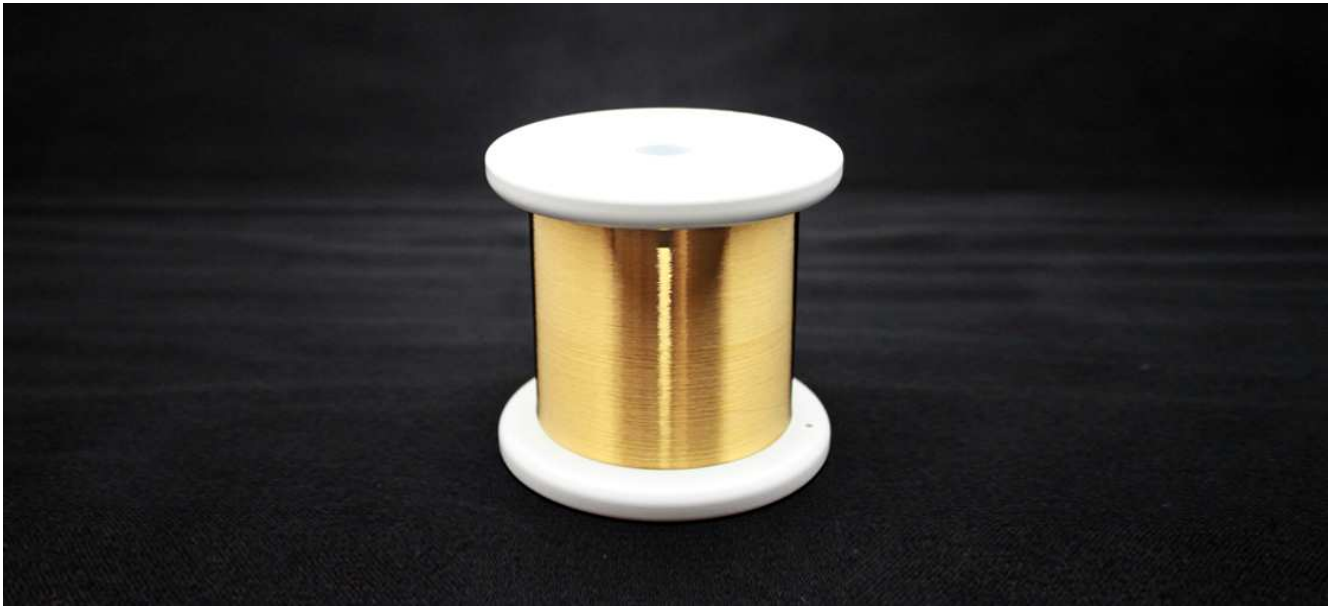
## Applications

- Core material of micro-catheter tube

Diameter range	Diameter tolerance	Stretch ratio	Material	Finishing
0.20–1.50mm	$\pm 0.005\text{mm}$	20% or over	Tough pitch copper (C1100)	Bright annealing and Wiping surface

Brass wire with a minimum wire diameter of 0.04mm

# Extra fine brass wire



This is extra fine brass wire with a minimum wire diameter of 0.04mm, which can be also used for fiber applications.

## Characteristics

- Our extra fine brass wire is optimum for medical use, having antibacterial effect for deactivating O157, influenza, and norovirus.
- It is extra fine brass wire, which can be used for antibacterial fiber applications.
- We also receive small orders such as samples. Please contact us.

## Applications

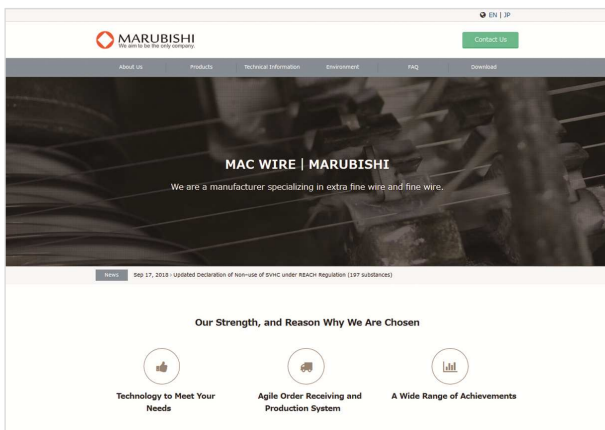
- Antibacterial fiber

Product name	Diameter range	Material	Chemical composition
Extra fine brass wire	0.04–0.10mm	C2700	Cu 63–67% Zn Balance (Pb 0.05% or less Fe 0.05% or less)

## Company overview

Company name	Marubishi Co.,Ltd.
Head office	399 Minaminaka-Kashii, Izumisano-shi, Osaka, 598-0035 Japan
Foundation	February 8, 1969
Establishment	November 21, 1974
Paid-in capital	JPY 30 million
URL	<a href="http://www.mac-wire.com/en/">www.mac-wire.com/en/</a>
E-mail	<a href="mailto:e-marubishi@mac-wire.com">e-marubishi@mac-wire.com</a>

[www.mac-wire.com/en/](http://www.mac-wire.com/en/)



Our website has technical information of our products on it.

And you can download PDF documents, such as RoHS, REACH and MSDS.

# MARUBISHI

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