

# News Release

October 30, 2024  
Proterial, Ltd.

## **Developing HBZ-B40 EDM Wire with Thick 0.4 Millimeter Diameter —Contributing to the Improvement of Cutting Speed and Surface Accuracy\*<sup>1</sup> in Wire Electrical Discharge Machining—**

Proterial, Ltd. (“Proterial”) has developed the HBZ-B40 series of thick electrical discharge machining wire (“EDM wire”) with a 0.4 mm diameter designed to increase the cutting speed of electrical discharge machining and the surface accuracy of work materials. This wire will fulfill needs regarding the continued decrease of machining time as needs for the wire electrical discharge machining of large components such as large dies for automobiles, airplanes, electricity generating turbine components and metal additive manufacturing are increasing.

The HBZ-B40 series of products will be exhibited at the Makino Milling Machine Co., Ltd. (“Makino”) booth at the 32nd Japan International Machine Tool Fair (“JIMTOF2024”) to be held at Tokyo Big Sight beginning on and Tuesday, November 5, 2024. Makino is a partner in the development of the HBZ-B40 series of products.

### **1. Background**

Recently, work materials in die machining and component machining processes have become larger and thicker due to increased demand for xEVs and airplanes and initiatives to improve productivity. These changes have led to relative increases in machining time and the degree of difficulty of machining, which in turn has increased demand for thick EDM wire that improves both the cutting speed of wire electrical discharge machining and its surface accuracy.



The EDM wire product line

Today, the commonly used EDM wire diameters range from 0.1 to 0.3 mm in Japan due to processing machinery restrictions. Wire with a 0.3 mm diameter, which had been previously regarded as thick, had a breaking load which decreased the efficiency of machining because heat would break the wire when a large current was applied during the machining of large work materials or when attempting to shorten machining time. Additionally, it has recently become necessary to improve the surface accuracy of finish machining processes (reducing surface roughness). Therefore, electrical discharge performance must be improved, and wire diameter must be increased to shorten machining time and improve surface accuracy at the same time.

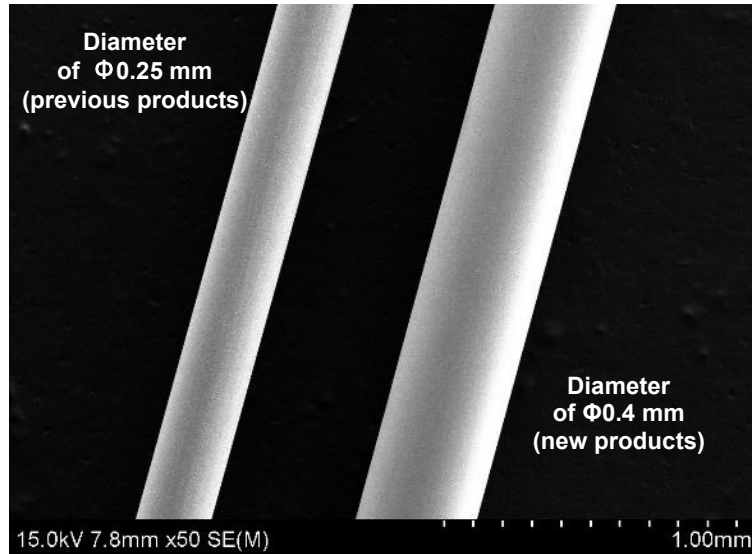
**2. Outline**

With many years of experience with EDM wire, Proterial has been providing HBZ-U high-zinc brass wire (60% Cu, 40% Zn), which Proterial developed before other manufacturers. Refining this technology, Proterial has developed HBZ-B40 Series high-zinc brass (57% Cu, 43% Zn ) which has even greater zinc content and a 0.4 mm diameter.

Wire with a diameter of 0.4 mm has almost double the breaking load of the commonly used 0.25 mm wire. The increased zinc content improves electrical discharge efficiency and electrical discharge performance. As a result, **the**

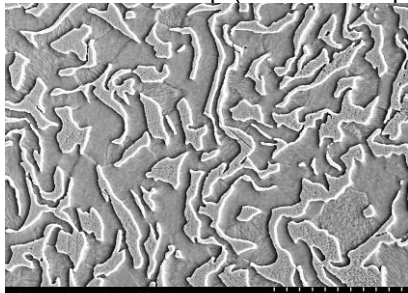
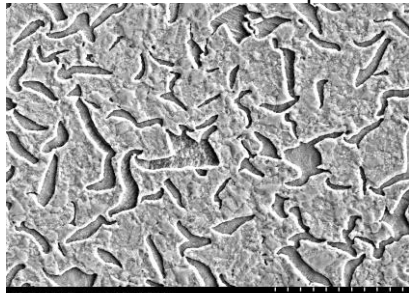
**new series of products makes it possible**

**to achieve cutting speeds 10% faster than when using the previous products with the same 0.4 mm diameter, and to achieve high-precision machining with an approximately 7% reduction in the surface roughness of the worked surface and improved surface accuracy** (in a demonstration experiment in cooperation with Makino).

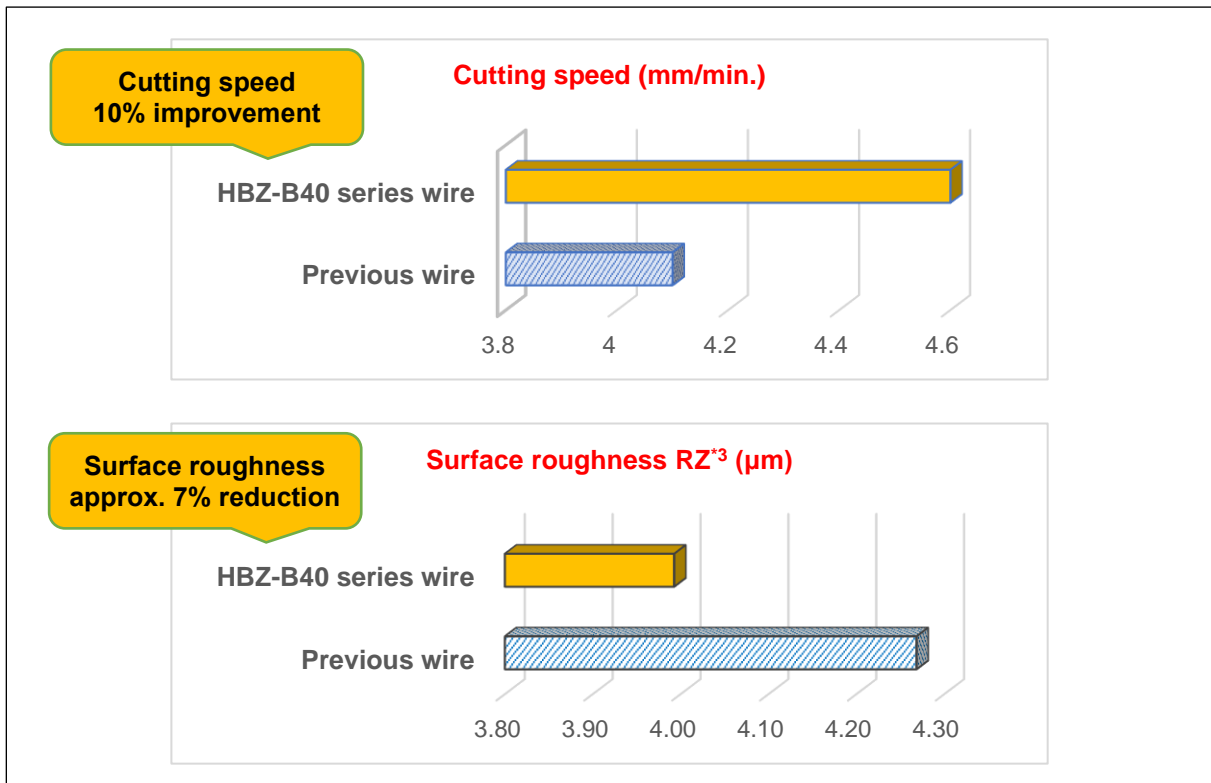


Comparison of product diameters

**Product Characteristics**

Specifications/product name	<b>HBZ-B (New Products)</b>	HBZ-U (Previous Products)
Wire diameter (mm)	0.4	0.4
Wire diameter tolerance (mm)	+0, -0.002	+0, -0.002
Composition (%)	<b>Cu57/Zn43</b>	Cu60/Zn40
Base metal structure <sup>*2</sup>	Phase α + Phase β (more Phase β) 	Phase α + Phase β 

**Demonstration Experiment (in cooperation with Makino)**



Proterial will promote the use of HBZ-B40 series products in Japan and abroad in cooperation with Makino which sells Wire EDM that can use these products. HBZ-B40 series products will be exhibited at the Makino booth at JIMTOF2024 which will be held at Tokyo Big Sight beginning on Tuesday, November 5, 2024.



U6 H.E.A.T., a Wire EDM that can use HBZ-B40 series products (the photo provided by Makino)



Spool-shaped HBZ-B40 (HBZ-B40 is installed outside the Wire EDM)

**3. Patents**

Applications already filed

Media Inquiries: Corporate Communications Dept.

[https://www.cntct.proterial.com/contact/publish/inquiry\\_eng?g=01&c=001-01](https://www.cntct.proterial.com/contact/publish/inquiry_eng?g=01&c=001-01)

- \*1 Degree of specularly and smoothness of the surface of a finished material that is molded using a die
- \*2 Phase  $\alpha$  is flexible and easy to machine while phase  $\beta$  is hard and difficult to machine. If the zinc content is higher, the phase  $\beta$  ratio increases whereas electrical discharge performance is excellent and it is difficult to manufacture EDM wire. Therefore, advanced texture control technology and wire drawing processing technology are necessary.
- \*3 General index for defining surface roughness and standard based on the maximum measured values in JIS B 0601:2001.

## ■About PROTERIAL

# PROTERIAL

“Proterial” reflects the essence of our corporate philosophy, which consists of three elements: Mission: “Make the best quality available to everyone;” Vision: “Leading sustainability by high performance;” and Values: “Unflinching integrity” and “United by respect.” It combines “**pro-**” with the word “**material.**”

“Pro-” represents our “three pros”:

- **Professional — work that exceeds expectations**
- **Progressive — a spirit that keeps challenging**
- **Proactive —an enterprising attitude**

“Material” refers to the high-performance materials that our original technologies produce and underpinned by the three pros. With our focus on solving customer issues and bringing new levels of value, we promise to contribute to the realization of a sustainable society through the products and services that embody our philosophy.

## ■Proterial, Ltd. — Company Overview

Established: April 1956

Head office: Toyosu Prime Square, 5-6-36 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Capital: 310 million yen (as of March 31, 2024)

Representative: Sean M. Stack

Representative Director, Chairman, President and Chief Executive Officer (CEO)

Sales revenue: 1,033.2 billion yen (Term ended March 2024)

History: 1910: Founded as Tobata Foundry Co.

1937: Merged with Hitachi, Ltd.

1956: Established separately as Hitachi Metals Industries, Ltd.

2023: Company separated from the Hitachi Group, and renamed from Hitachi Metals, Ltd. to Proterial, Ltd.