

News Release

April 15, 2024
Proterial, Ltd.

Proterial Develops Blade Steel with High Hardness and High Corrosion Resistance

Proterial, Ltd. (hereinafter, "Proterial") announces it has developed YBS™ 1 and YBS™ 2 blade steels with high hardness and high corrosion resistance. The new products are expected to have a broad range of applications that require both sharpness and corrosion resistance, such as in the manufacture of surgical knives, replaceable blades, bladed cooking utensils and outdoor-use knives.

1. Background

There is a timeless need for highly maintainable blades that cut well, stay sharp after repeated use and are rust resistant. It is believed that the sharpness of a blade is mainly determined by factors such as hardness, blade angle and surface roughness. How rust proof or rust resistant a blade is mainly depends on how much chromium and other elements are included in the alloy. General blade steel is largely divided into the two categories of high-carbon steel and martensitic stainless steel that contains many alloy elements. SK materials and Aogami™ 2 are representative examples of high-carbon steel, while examples of martensitic stainless steel mainly including SUS420J2 and GIN® 3. Steel materials are selected to obtain the required hardness and durability for specific applications.

Although high-carbon steel can become harder than 800 HV*¹ through quenching and tempering, its corrosion resistance is very poor. On the other hand, martensitic stainless steel is more corrosion-resistant than high-carbon steel but is inferior in terms of hardness. For this reason, achieving a high degree of compatibility between the hardness and corrosion resistance of conventional blade steel has been difficult.

This led Proterial to decide to develop a blade steel that fulfills both of the above requirements, high hardness and high corrosion resistance.

2. Outline

Proterial has successfully developed YBS 1 and YBS 2*² blade steels with high hardness and high corrosion resistance leveraging the company's texture and composition control technologies with a focus on metals, the materials that are the company's strengths.

It has been shown that, when properly quenched, both YBS 1 and YBS 2 become as hard as Aogami 2, the high-carbon steel used to make high-class professional-use kitchen knives.³ Salt spray tests showed that YBS 1 is as corrosion-resistant as SUS420J2 martensitic stainless and the corrosion resistance of YBS 2 is equivalent to that of GIN 3, the martensitic stainless steel suitable for use in kitchen knives that are not very resistant to corrosion but focus more on sharpness.*³

With the above tests results demonstrating their high hardness and high corrosion resistance, it is expected that YBS 1 and YBS 2 will have a broad range of applications where both sharpness and corrosion resistance are necessary, such as the manufacturing of surgical knives, replaceable blades, bladed cooking utensils and outdoor-use knives.

1. HV: Vickers hardness Generally used as a measure of hardness.
2. YBS 1 and YBS 2 differ in their corrosion resistance (rust-proofness) and hardness (sharpness). YBS 1 is designed with a greater focus on corrosion resistance while YBS 2 places more importance on hardness.
3. See page 55 of Proterial Technical Review Vol. 39 (2024) for detailed test results.
https://www.proterial.com/rad/pdf/2024/vol39_s08.pdf (Japanese)



Photo: Example of finished goods made using blade steel with high hardness and high corrosion resistance

Proterial, Ltd.

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■ 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, 2023)

Representative: Sean M. Stack

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

Sales revenue: 1,118.9 billion yen (Term ended March 2023)

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.

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