

## <Company Profile>

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URL	<a href="http://www.sanalloy.co.jp/">http://www.sanalloy.co.jp/</a>
Employees	196
Capital	JPN 45,000,000
Established	July 28, 1975 (Started business in 1963)
President & CEO	Seiji Yamamoto

## <Business Overview>

Manufacture and sales of cemented carbides and the related business

## <Technology>

**Manufacturing started from R&D**

**Hard but not brittle! A new ideal cemented carbide has been created!**

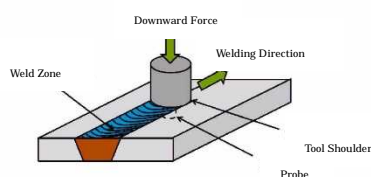


Developed Material of "P series", A Cemented Carbide for Friction Stir Welding Tools "FSW7"



### FSW (Friction Stir Welding)

FSW achieves joining by plastic fluidization which is occurred by pressing fit high speed rotation tools into workpieces.



Schematic Picture of FSW (Friction Stir Welding)

Challenge to achieve smoothness – P series

Take advantage of heat – FSW tool

Compared with iron, cemented carbides have a high Young's modulus (elastic modulus), lower coefficient of thermal expansion, and enhanced hardness. Owing to these features, cemented carbides are indispensable as a metallic material for tools and forging dies that require precise dimensioning. However, measures for durability (long life) have always led to strong demand for cemented carbides. To meet such demand, Sanalloy Industry Co., Ltd. has created the ideal cemented carbide "P series" having hardness

and brittle resistance with a double structure by improving the surface of hard particles in a conventional cemented carbide. We have also achieved reduction of the frictional coefficient without impairing existing features. By suppressing frictional heat generated during processing, the product can express superior resistance against friction and seizure while processing copper alloys, aluminum alloys and stainless steel, which can easily generate seizing. This feature leads to not only a reduction in tool costs but a reduction in tool replacement time and improvement in quality, reducing running costs brought about by bringing forward the delivery date.

The development model of this P series is FSW7, a cemented carbide for friction stir welding tools. It is superior in rigidity under high temperature, frictional resistance, anti-oxidizability, and seizure resistance, gaining a high reputation as a tool to improve joint strength.

### **[Development history]**

Since the 1990s, this company has conducted research and development of functional cemented carbides having surface hardness and brittle resistance inside the alloy. When we obtained an opportunity to use Spring-8, we began to elucidate the mechanism and analyzed specific defects that often occurred. As a result, we obtained unexpected results showing that the phenomenon is reproduced under certain conditions. So we decided to apply this phenomenon to the development of a functional cemented carbide which had been studied for a long period. The new cemented carbide, which was completed by a process of repeated trial and error, has a function to reduce friction on the alloy surface, which no one expected. This was the start of development of the P series.

### **[Uniqueness]**

Seizure is the greatest problem for cemented carbide tools. Conventional methods to prevent seizure are to provide coating treatment on the surface or to select materials with a lower amount of binder metals. Sanalloy Industry Co., Ltd. focused on the frictional coefficient, and successfully developed a cemented carbide material with a reduced frictional coefficient, which has never been discovered before. By improving resistance against seizure and friction with the reduced frictional coefficient, the life of tools at various processing sites has been extended by 1.5 to 6 times their normal life.

### **[Future development]**

In processing with cemented carbide tools, the cemented carbide is applied to friction resistant tools such as titanium alloys and aluminum alloys that had previously been considered difficult due to the occurrence of seizure. Since the P series utilizes a material having excellent heat resistance, they can be applied to the tools for hot/warm forming used under high temperature. In particular, we aim to apply the products in a wide variety of fields such as powder molding and processing, friction stir welded joints, and precision processing of heat resistant materials used in the aerospace industry where demand has been increasing in recent years.

## <Topics>

**From long-sustained joint studies and development with universities,  
Many patents were obtained and new products were developed!**

Sanalloy Industry Co., Ltd. has been conducting joint studies with several universities for a long time. We have obtained many patents from basic research spanning ten years. Currently, we commercialize products at a frequency of one every two to three years from these joint studies. For example, we succeeded in developing a cemented carbide material suitable for FSW (friction stir welding) through a joint study with Osaka University. In a joint study with the University of Hyogo, we developed a rare metal reduction material and hydrogen catalyst technology. We also established a recycling plant for cemented carbides to allow cyclic use of rare metals which are precious resources.

**Active involvement in exhibitions in Japan and overseas  
Aim to expand sales channels to the aviation and medical industries**

Sanalloy Industry Co., Ltd. actively and continuously exhibits at exhibitions in Japan and overseas. In 2018, we exhibited at DIE & MOULD CHINA 2018 held in the National Exhibition and Convention Center (Hongqiao, Shanghai) from June 5 to 9 and JIMTOF 2018 held in Tokyo Big Sight from November 1 to 6. In 2019, we exhibit at DIE & MOULD CHINA (National Exhibition and Convention Center, Hongqiao, Shanghai, from June 11 to 15), Metal Form China 2019 (Shanghai New International Expo Center, from July 17 to 20), MF-TOKYO 2019 (Tokyo Big Sight from July 31 to August 3) and others to showcase FSW technology. We aim to expand our sales channels to the aviation and medical industries, not only the existing automobile and electronics industries.

## <Company History>

1963: Established Sanyo Alloy Research Institute. Started manufacturing and sales of cemented carbides

1966: Reorganized as Sanyo Alloy Research Institute and incorporated as Sanyo Alloy Manufacturing Co., Ltd.

Started sales of SAN ALLOY as a brand name

1975: Changed company name to Sanalloy Industry Co., Ltd.

1980: Built new headquarters plant

1984: Succeeded in developing and commercializing tough-to-fracture cermet

2001: Relocated entire headquarters to Fukusaki-cho, Kanzaki-gun, Hyogo Prefecture

2003: Opened Malaysia office

2005: Established SANALLOY INDUSTRY (THAILAND) CO., LTD.

2006: Opened China Office

2011: Started recycling cemented carbides