

# Senju Metal Industry Bolsters up Solder Ball Business

Senju Metal Industry Co., Ltd. has been strengthening its solder ball business. Among these solder ball products, microballs are used for forming semiconductor bumps and for connecting integrated circuits (ICs) in semiconductor package components. The connection in semiconductor packages has been shifting from wire bonding to connection by solder balls, and the density of semiconductor packages has been increasing further.

In particular, mobile devices, as represented by smartphones and notebook computers, are unavoidably subject to the possibility of shocks due to dropping or crash because of their product characteristics. The density of semiconductor packages to be incorporated in these mobile devices is expected to grow further in the future, and therefore, the demand for microballs is expected to increase.

## Mass Production of Microballs

Senju Metal Industry has put into place a mass production system for microballs at the Miyazaki Plant of Senju

Giken.

Eietsu Hasegawa, Chief Executive Officer, says, "We place top priority to efforts toward finer semiconductors. We position this year as the initial year for microballs for forming bumps and to launch mass production on full scale. We have developed a technology for balls with diameter ranging from 100 $\mu$ m to 20 $\mu$ m at the smallest."

The Miyazaki Plant (Miyazaki City, Miyazaki Prefecture) as a mass production base of microballs is built on a 23,000sq.m lot and has four stories above ground with a total floor area of 7,300sq.m.

Hasegawa says, "We produce microballs at 1 trillion units a month and 12 trillion units a year. Although the semiconductor market changes quickly, the demand will continue growing at least for five years. In Miyazaki, we also produce micropowers as well."

Senju Metal Industry has developed a solder ball with excellent drop impact resistance as part of its effort to strengthen its microsoldering business.



**Eietsu Hasegawa,**  
Chief Executive  
Officer of Senju  
Metal Industry

## Improved Drop Impact Resistance

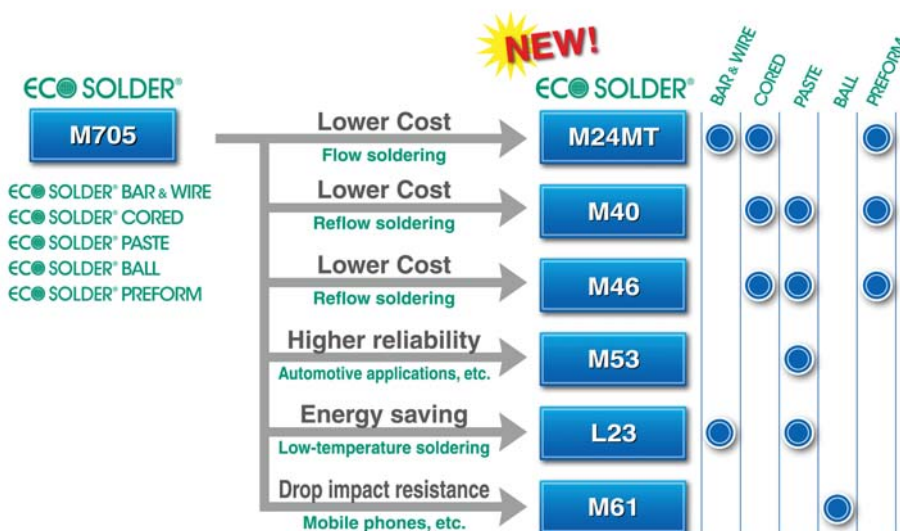
The solder ball is targeted for the connection of electrodes in semiconductor packages to be incorporated in mobile devices, such as smartphones. The solder ball has been commercialized as ECO SOLDER BALL M61, which exhibits stable and high drop impact resistance.

Compared with low-Ag composition, which has conventionally been regarded as effective for drop impact resistance, M61's composition has achieved more than three-fold improvement in drop impact resistance for electrolytic Ni/Au electrode, water soluble preflux processing for Cu and electroless Ni/Pd/Au electrode.

M61 also is characterized by extremely small reduction in drop impact resistance due to the acceleration in the reaction of the bonded interface due to thermal load at the time of bonding. Thus, M61 exhibits stable characteristics in terms of thermal history in each manufacturing process.

Solder balls with excellent thermal shock resistances are also being sought. As products that answer this requirement, Senju Metal Industry has developed the ECOSOLDER BALL M60. While conventional products deteriorate due to the loss of the network structure in the Ag<sub>3</sub>Sn layer, which maintains the strength of alloy, the M60's composition avoids the loss of the network structure even after the thermal shock test. Hence, it provides excellent thermal shock resistance. □

□ NEW ECO SOLDER and supply formats to meet all purposes and applications



Senju Metal Industry boosts its lineup of solder ball products.

## Shenzhen

### Shenzhen Liaison Office

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Products: Soldering products, fluxes

## Versatile Sales System Leveraging Total Capabilities

The Shenzhen Liaison Office is a sales base that serves customers in the South China region and the Fujian area. It sells various soldering products that are used for assembling electronic devices, as well as fluxes and its original factory automation (FA) equipment. The office's parent organization is Senju Metal (Hong Kong) Ltd., which also oversees one manufacturing base in Hong Kong and one in Huizhou. The office also has a Science & Chemical Analysis company, which is an independent third-party organization. The Shenzhen Liaison Office has a versatile sales system that leverages its total capabilities.

Amid the skyrocketing historical prices of bare metals and the impacts of the sharp appreciation of the yen against other currencies, the price of Ag, which has been widely used in solder products, has also been dramatically rising. In terms of the present market trend, the trend toward the reduction of the amount of Ag than before and toward the total elimination of Ag in products, have been accelerating. It is believed that the period for solders with 3 percent Ag, which had conventionally been used, has ended.

In its recent policies, China has lifted the renewal of licenses for the conventional form of business of manufacturing products using customers' materials, and the shift to 100 percent foreign-owned companies, has been accelerating. These trends should naturally lead to the sharp increase in procurement in China down the road. Therefore, Senju Metal Industry will further bolster capital investment in the Huizhou Plant, which becomes the core plant, aiming at stable supply of products at low costs, while placing a premium on quality. The company intends to establish a system, which will enable it to win the race to establish its turf in the Chinese market.



## Beijing

### Beijing Senju Electronics Materials Co., Ltd.

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Products: Solder bars, resin fluxed solders, solder pastes, fluxes

## Aiming to be the Best Company

Since its founding in 1995, Beijing Senju Electronics Materials Co., Ltd. has met customers' needs through sales of originally produced solder bars, resin flux cored solders and solder pastes, as well as fluxes made in Japan and by Senju Metal (Huizhou) Co., Ltd. These products are mainly sold to customers with manufacturing bases in the three provinces in northeast China and in the North China region, including the Shandong Province.

With the motto of implementing thorough quality control, the office obtained an ISO TS16949 certification last August, in an aim to supply products that satisfy more customers.

The office also launched efforts to protect the environment early on and obtained ISO14001 as early as in 2008. The move to protect the environment has recently been gathering momentum in China as well.

Day and night, all employees have been working together as one to become the best company that can contribute to society.



## Shanghai

**Senju Metal (Shanghai) Co., Ltd.**

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Products: Solder paste, solders, fluxe, soldering equipment, microballs

### Actively Introduces New Products to Market

Senju Metal (Shanghai) Co., Ltd. is a local company in charge of the East China region. The company has a paste plant in the Waigaoqiao Free Trade Zone and has been manufacturing and selling various types of solder pastes.

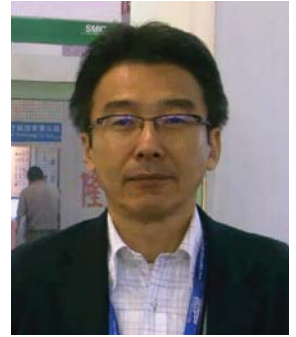
The company also handles various solders, fluxes and soldering equipment manufactured by Senju Metal Industry, Senju Metal (Huizhou) Co., Ltd., and Beijing Senju Electronic Material Co., Ltd.

Senju Metal (Shanghai) has also been making active efforts in the market introduction of microballs. Microballs are solder materials that are used for forming bumps in semiconductors and for connecting integrated circuits in semiconductor package components.

The company has resident engineers who can make proposals not only on solder products that it sells, but also on solderability and soldering methods, focusing on providing better technical services.

At present, Senju Metal (Shanghai) has been actively expanding sales of a low-silver-content solder as a next-generation solder of the M705 Series standard lead-free solder. Senju Metal Industry has developed this product to meet customers' needs.

The company aims to offer new high-reliability products to the market valuing the customers' voice.



## Korea

**Senju Metal Industry Co., Ltd. Korea Branch**

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Products: BGA balls, microballs, solder pastes

### Korea Branch Deepens Relationship of Trust with Customers

In recent years, leading Korean electronics and semiconductor manufacturers, including Samsung Electronics Co., Ltd., LG Electronics Inc., and Hynix Semiconductor Inc. have grown remarkably, significantly increasing their shares in the global market not only in the semiconductor field, but also in the fields of mobile phones, personal computers, and consumer electronics. With the growth of these Korean manufacturers, the solder market has also expanded.

Senju Metal Industry established Senju Metal Industry Co., Ltd. Korea Branch on June 1, 2010 in order to expand the sales of solders in the Korean market. The Korea Branch deepens the relation of trust with its customers by strengthening the marketing, technical support, and delivery system in Korea, the same as leveraging Senju Metal Industry's technological expertise. Senju Metal Industry Korea Branch targets to expand the share of Senju's products in the Korean market. Among Senju's main products are soldering materials for semiconductors, including ball grid array (BGA) balls, microballs and pastes.



## Taiwan

### Senju Metal Industry Co., Ltd. Taiwan Branch

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Products: solder balls, pastes,  
wires, solder bars, fluxes

## Taiwan Branch Deploys Professional Business for Chip Industry

Senju Metal Industry Co., Ltd. Taiwan Branch was established in 1999, and has been selling solder balls, pastes, wires, solder bars, and fluxes. Its main target is the semiconductor industry in Taiwan.

Senju products meet rigorous demand for quality and reliability of the semiconductor industry. Besides meeting the rigorous quality requirement, Senju Metal Industry continues endeavoring to develop new products.

The Taiwan Branch is capable of meeting the market demand for low-priced products through the M40 and M46 low silver-content products. It also employs the fine-pitch bump formation technology through low alpha solder (LAS) pastes, microballs, and precoated by powder sheets (PPSs).

Even when difficult problems that cannot be analyzed by customers develop, Senju helps customers analyze those problems through the use of equipment in its possession, including the EPMA, FE-SEM, FIB, TOF-SIMS, AES, and XPS to find true causes of the problems. Senju is also capable of offering countermeasures to those problems.

### Manufacturing plant

Senju Metal Industry Co., Ltd. Kaohsiung Branch was set up in 2005 as a production base in the Taiwan region. It obtained ISO9001 and ISO14001 in 2006, and has been offering to customers high-quality and high-performance products that are friendly to the environment.

The Kaohsiung Branch produces as its mainstay products Pb-free solder pastes, halogen-free pastes, water-soluble solder pastes and water-soluble fluxes for applying balls. It can produce more than 25,000kg of solder pastes per month.

Measuring instruments for quality control installed in the plant include an induction-coupled plasma emission spectrophotometer for checking impurities, a potentiometric titrator for measuring amounts of Ag and halogen and eight spiral rotating viscometers. A digital microscope and a reflow oven are also installed.



## Philippines

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Products: Solder bars, resin flux  
cored solders, wire solders, solder  
pastes, liquid fluxes

## Thorough Implementation of 5S, Greetings

Senju Solder (Phils.) Inc. is located in the Philippine Economic Zone Authority (PEZA) area in Rosario, Cavite, about 30km southeast from Manila. The plant manufactures solder bars, resin flux cored solders, wire solders for feeding machines, solder pastes, and liquid fluxes for sales mainly to customers in the Philippines. In July this year, Senju Solder (Phils.) separated the Pb-free halogen-free area, in addition to the separation of the Sn/Pb area and the Pb-free area in the cleanroom for manufacturing pastes.

Employees have been working hard every day inspired by the thorough implementation of 5S and good wishes as its motto.

Many Japanese hard disc drive manufacturers and components manufacturers have advanced into the Philippines, and the company has been strengthening its system of instant delivery and technical support to these customers. In addition, there are also many manufacturers of automotive electronics. Senju Solder (Phils.) intends to actively expand sales of solder materials for automotive electronics, including the M53.



## Malaysia

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Products: solder bars, solder  
wires, resin flux cored solders,  
pastes, liquid fluxes

### History of 22 Years in Manufacturing and Sales

Senju (Malaysia) Sdn. Bhd. has 22 years of history since its establishment.

In terms of manufacturing, it is capable of manufacturing general-purpose products, including solder bars, solder wires, resin flux cored solders, pastes and liquid fluxes as a comprehensive plant.

For its sales operations, Senju (Malaysia) has sales offices in Penang in the north and in Johor Bahru in the south, as well as an office in Shah Alam. The company provides support not only in Malaysia but also in neighboring Singapore, Indonesia and Vietnam.

In recent years, more and more companies have advanced into Southeast Asian countries. Senju (Malaysia) welcomes any customer concerns regarding problems related to soldering or soldering equipment.



## Thailand

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Products: Solder, machine,  
equipment

### Consistent Support System from Materials to Equipment

Senju (Thailand) Co., Ltd. has a local person in charge each for materials and equipment, thereby putting in place a system that enables the company to provide fine-tuned services to customers.

The company provides consistent support on materials and equipment not only to customers already operating in Thailand, but also to customers that are establishing new plants in Thailand. Senju (Thailand) Co., Ltd. offers products that satisfy quality, cost and delivery (QCD) on a higher level, and actively proposes products that feature low cost, energy efficiency, and high reliability.

There are many Japanese companies that have made inroads into Thailand, mainly manufacturers of audio products and white goods. To meet the demand of these companies, Senju (Thailand) has put into place a system for instant delivery of solder pastes and solder bars.

Engineers of soldering equipment are being stationed in Thailand to have a support system, which enables the company to swiftly address troubles in manufacturing. This system is appreciated very much by Japanese-affiliated companies, as well as by local companies.

In the future, the company intends to actively expand sales of low-priced low-Ag solders, energy-efficient solders that allow mounting at low temperatures, and high-reliability solders for automotive electronics.

