

PVC/Chlor-Alkali Business

Business Overview

Polyvinyl chloride resins (PVC) are general-purpose resins used in a wide range of applications, from everyday products to all kinds of industrial materials. This is one of the Group's core businesses, the forerunner of international expansion.

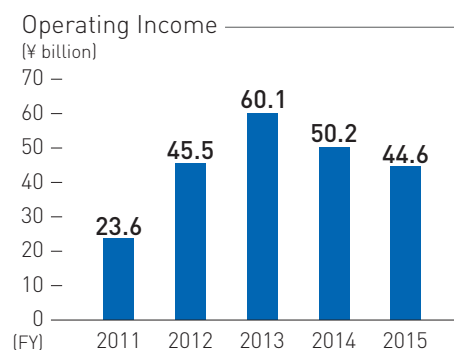
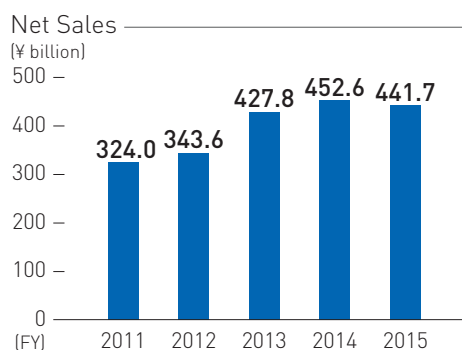
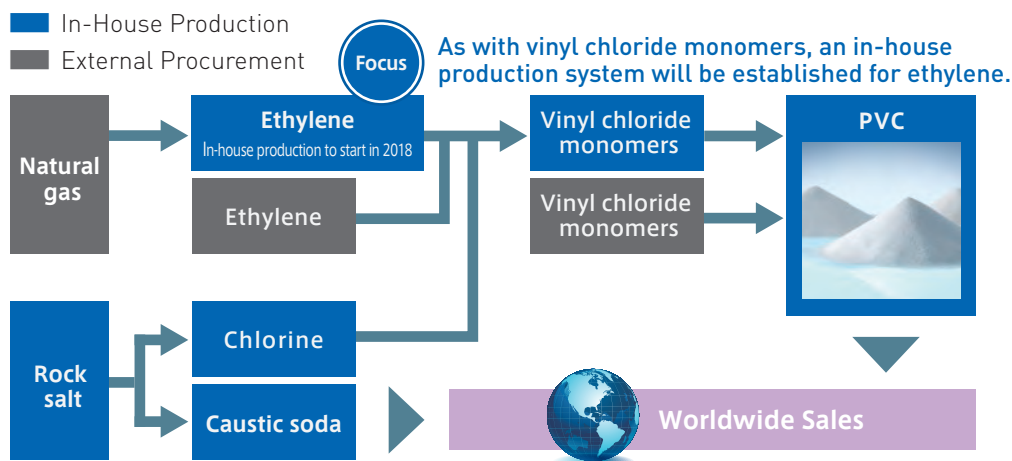
In 1960, the Group became the first Japanese chemical manufacturer to establish a polyvinyl chloride manufacturing base overseas (Portugal). In 1973, Shintech was established in the United States as the Group advanced into the world's largest market. In 1999, Shin-Etsu PVC was established in the Netherlands via a business acquisition. At present, the Group has large-scale manufacturing capabilities in the three major markets of the United States, Europe and Japan. With annual production of 4.15 million tons, the Group is the world's largest maker of PVC, providing a stable supply of superior materials to customers around the world.

Resolving Social Issues through Products

Of the raw materials used to make PVC, 60% is salt, which in terms of weight ratio is abundant throughout the world, and 40% is petroleum, making this a general-purpose resin less dependent on petroleum resources. PVC manufacturing has a low environmental impact and consumes only 60% of the energy required to make other general-purpose resins. Highly durable and easy to recycle, PVC is used in a wide range of construction materials, including window profiles and water and sewer pipes.

Shintech's Integrated Production Facilities

Integrated Production to Begin with Raw Materials



- ▶ In Japan, although exports increased, domestic housing-related demand was slow.
- ▶ Despite North American demand decreasing year-on-year in the whole industry, Shintech in the U.S. expanded its domestic sales and at the same time aggressively carried out sales to its worldwide customers, and its shipments continued to be firm. Shin-Etsu PVC in the Netherlands was affected by facility problems that occurred at a raw materials supplier during the latter half of the previous fiscal year.

➤ Main Products and Applications

PVC pipes and conduits

A backbone material supporting lifelines



Window profiles

Used for thermal insulation, sound insulation and superior condensation prevention, PVC window profiles are attracting attention as a construction material that conserves energy and creates a comfortable residential environment.



Plastic greenhouses for agriculture

An excellent flame retardant that is easy to recycle, plastic greenhouses for agriculture use a resource-saving material that boasts a recycling rate of more than 50%.

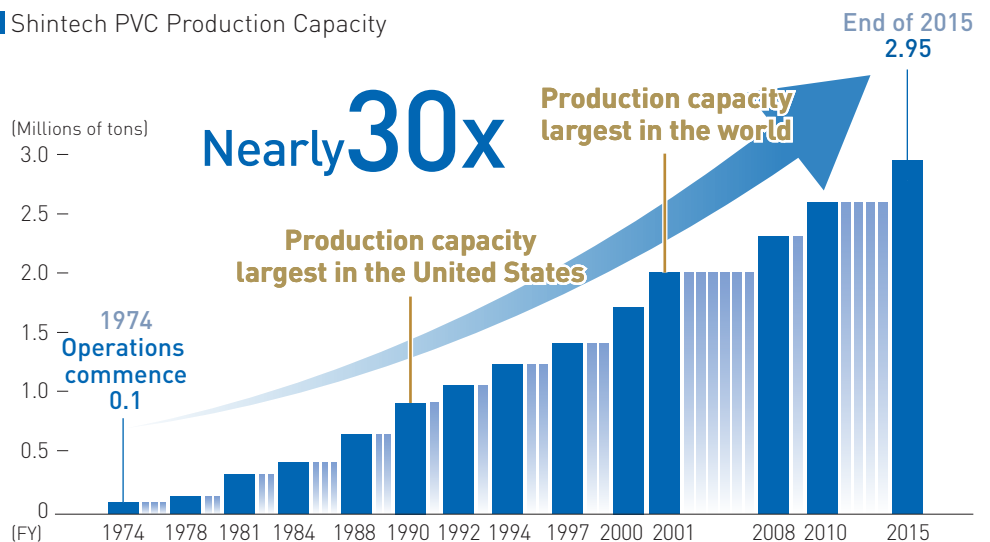


Vinyl sidings

This is a lightweight, easy-to-install exterior material for a house. In addition to superior weather and impact resistance, this material provides excellent protection against rust and corrosion.



Shintech PVC Production Capacity



Semiconductor Silicon Business

Business Overview

Since the establishment of Shin-Etsu Handotai in 1967, the Group has been the leader in large diameter and ultra-flat technological innovations as the world's leading provider of silicon wafers for semiconductors. The Group successfully achieved early mass production of next-generation 300-mm wafers and silicon-on-insulator (SOI) wafers utilizing the world's highest level of its own single crystallization technologies, advanced processing technologies and quality control technologies. At present, local subsidiaries have been established in the United States, Malaysia, the United Kingdom and Taiwan where the high-quality semiconductor silicon wafers are manufactured, providing a stable supply of excellent products as the world's largest supplier of silicon wafers. We are also gaining attention as a manufacturer engaged in the integrated production of Gallium phosphide (GaP) as a material used in light-emitting diodes, from compound semiconductor crystals to chips.

Resolving Social Issues through Products

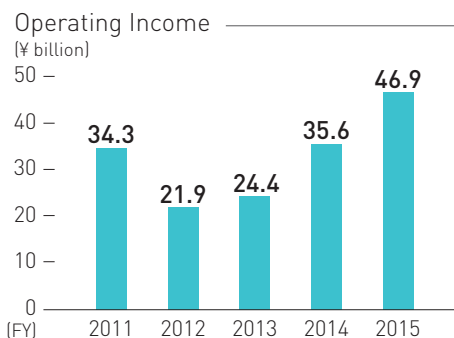
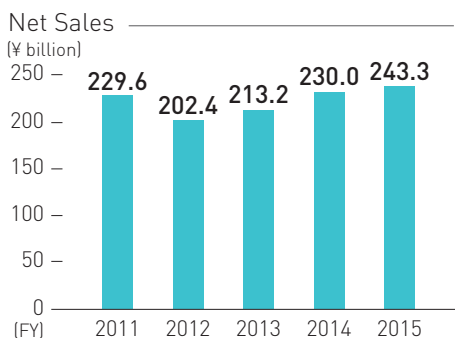
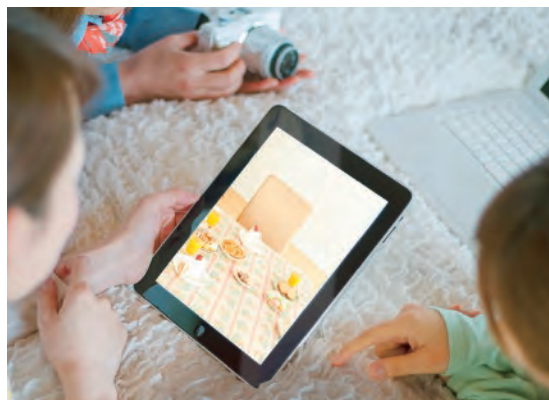
Silicon wafers contribute to society as basic infrastructural materials supporting an advanced information society by reducing the size and weight of electronic equipment, reducing power consumption, improving the fuel efficiency and safety controls of automobiles and advancing medical equipment. Furthermore, they realize a stable supply of electric power mainly to electronic equipment, as power semiconductors can minimize power consumption and accommodate high voltage and high currents. Group products are also used to accurately regulate motor drive controls from high to low speeds and as power-saving transistors enabling the efficient transfer of power from generators to transmission lines.

Main Products and Applications

Silicon wafers are used as substrate materials in semiconductor devices used in our daily lives, including personal computers and smartphones, televisions and digital cameras.

Application examples

- Electrical components for digital equipment and automotive parts
- IC substrates for home appliances
- LED displays



▶ The business was affected by inventory adjustments of logic devices caused by a slowdown in demand for electronics equipment, including for smartphones. However, applications for memory devices on the whole continued to be firm.

Silicones Business

Business Overview

Since being the first to commercialize silicones in Japan in 1953, the Group has continued to maintain its top domestic share through strong technological capabilities and detailed support for market needs. Currently, the Company offers more than 5,000 varieties of silicone products used in a wide range of industries, including electric and electronic applications, automobiles, construction, cosmetics, chemicals and food. Furthermore, our advanced technological capabilities in silicones chemistry create high-value-added products realizing strong profitability.

Resolving Social Issues through Products

The results of a study commissioned by the Global Silicones Council in 2012 show how the use of various functional silicones can lead to the reduction of greenhouse gas emissions. In particular, the use of silicones for automobile, construction and solar battery applications account for a large proportion of greenhouse gas emission reductions from the silicone product cycle, substantially contributing to improved social sustainability.

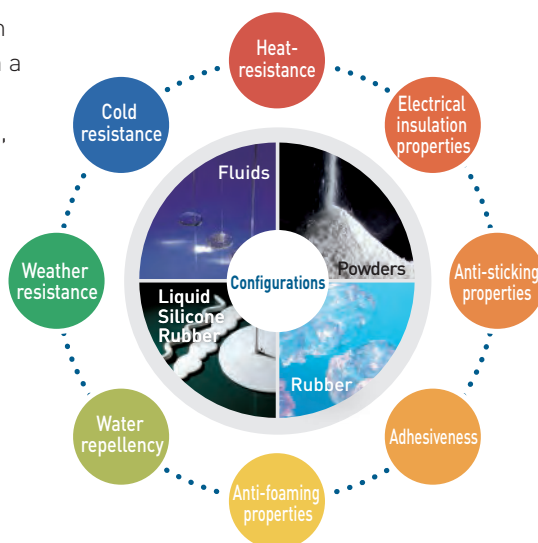
Main Products and Applications

Combining inorganic and organic properties and numerous characteristics, silicone products with various configurations are supplied in a wide range of areas, from electronics and electrical to transport equipment, construction, cosmetics and food.

Application examples

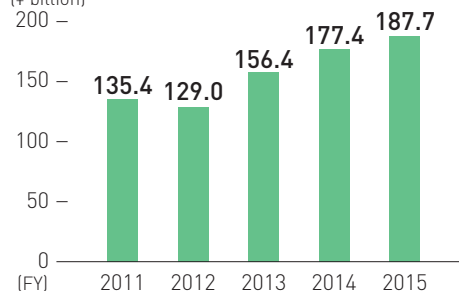
- Cosmetic ingredients
- Electronic device heat dissipation material
- High-performance contact lens material
- Building sealant
- Eco-tires

Silicone configurations and numerous characteristics



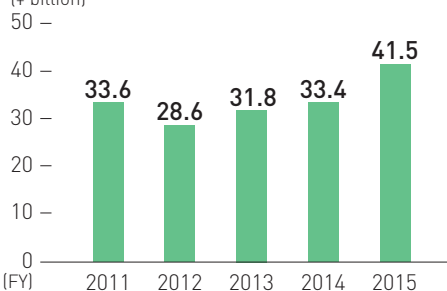
Net Sales

(¥ billion)



Operating Income

(¥ billion)



- ▶ In Japan, although a demand slowdown was seen in some product applications in the electric and electronics fields, in a wide range of fields, including cosmetics and automobile applications, shipments were firm.
- ▶ Outside of Japan continued to do well, particularly for highly functional silicone products for Europe, the United States and Southeast Asia.

Electronics & Functional Materials Business

Business Overview

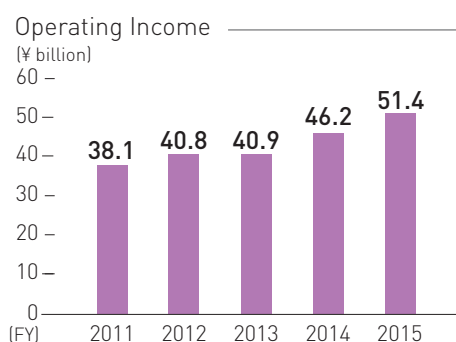
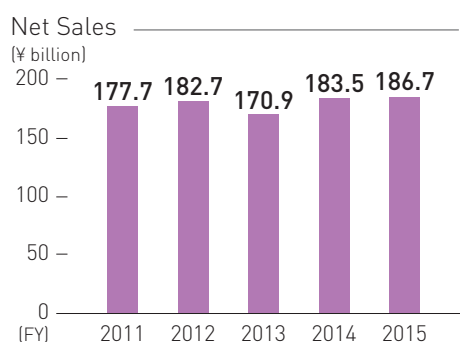
The Group's mission is to develop materials linked to new value creation. In the past, we successfully achieved the world's first mass production of synthetic quartz and liquid fluorinated elastomer. We also develop and supply a wide variety of functional materials, including rare earth magnets to the electronics industry that are indispensable as materials for hard disc drives (HDDs) and rare earth magnets for general industry used in home appliances and automobile motors. We also provide photoresists and photomask blanks, which are materials required for the semiconductor manufacturing process, optical fiber preform and other synthetic quartz products.

Resolving Social Issues through Products

Rare earth magnets have 10 times the magnetic force of conventional ferrite magnets. Even small rare earth magnets generate a powerful magnetic field. When they are used in hybrid and electric cars, they realize increased power with smaller size and weight. Rare earth magnets are also used in compressors for energy-saving air conditioners. These products raise electric power efficiency and realize reduced CO₂ emissions.

Main Products and Applications

- Rare earth magnets
(Automobiles, drive units for computers and digital consumer electronics hard disk drives, etc.)
- Epoxy molding compound
(Semiconductor device encapsulation)
- Photoresists
(Photosensitive material used to write semiconductor circuits)
- Photomask blanks
(Pattern master used to write semiconductor circuits)
- Shin-Etsu SIFEL
(Liquid fluorinated elastomer that hardens into a flexible solid synthetic rubber upon heating)
- Optical fiber preform
- Synthetic quartz substrate for photomasks
(For integrated circuits and liquid crystal displays)



- ▶ With regard to the rare earth magnets business, although products for applications in industrial equipment were slow, products for applications in automobiles continued to be firm, including those for hybrid cars.
- ▶ With regard to the photoresist products business, ArF resists and trilayer materials continued to be steady. Shipments of photomask blanks greatly increased.

Specialty Chemicals Business

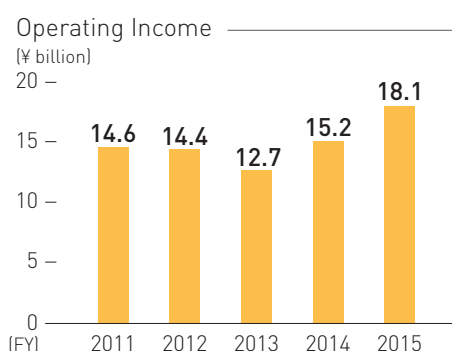
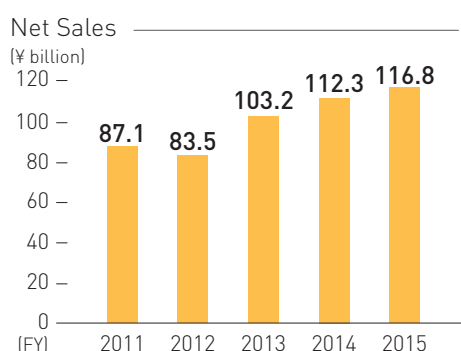


Business Overview

Our main specialty chemical products are cellulose derivatives, nature-friendly materials made from natural polymer cellulose. The Shin-Etsu Group began manufacturing cellulose derivatives in 1962. Currently, we have the largest share in Japan and meet market needs as the world's foremost manufacturer. In addition, we provide synthetic pheromones as pest control and POVAL. We also provide a variety of other products, including silicon metal, a main ingredient in silicones, semiconductor silicon and synthetic quartz.

Resolving Social Issues through Products

Industrial cellulose derivatives reduce the separation of concrete in water, contributing to environmental preservation by enabling concrete to be poured without polluting water, which prevents water pollution. Synthetic pheromones inhibit pests' mating by disturbing signals between male and female agricultural pests. Eliminating only agricultural pests prevents the destruction of biodiversity while reducing the amount of pesticides used, which in turn makes food safer.



Main Products and Applications (Cellulose Derivatives)

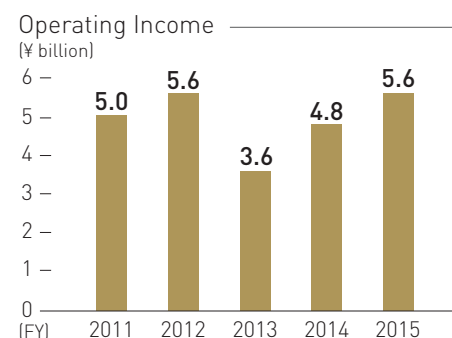
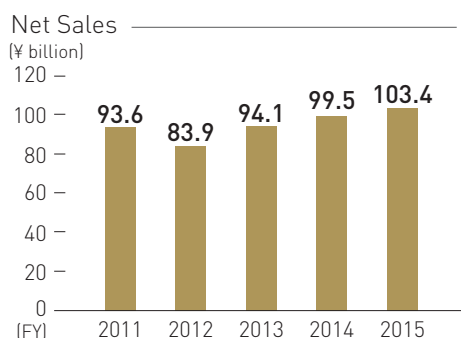
- Drug tablet coating and binder
- Body soap and shampoo foam stabilizer
- Automobile exhaust gas purifying device

- ▶ With regard to cellulose derivatives, in Japan, shipments of pharmaceutical-use products and products for construction materials were firm.
- ▶ The business of SE Tylose in Germany continued to be steady, mainly for coatings products. In the silicon metal business of Simcoa Operations in Australia, shipments continued to be firm.

Diversified Business

Business Overview

As an input device pioneer, Shin-Etsu Polymer Co., Ltd., develops and supplies highly operable and functional products making use of materials and processing technologies. Shin-Etsu Engineering Co., Ltd., is involved in the design and construction of manufacturing plants and manufacturing technologies for Group products. These technologies also have a strong reputation with customers outside the Group.



Main Applications (Shin-Etsu Polymer)

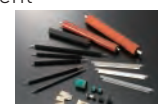
- Input devices
(Switches for car navigation systems and air conditioning, etc.)



- Wafer cases for transporting silicon wafers



- Various rollers for OA equipment



- Shupua (silicone glasses)



- ▶ Shin-Etsu Polymer's business of input devices for automobiles and semiconductor wafer-related containers continued to do well.
- ▶ The engineering business of Shin-Etsu Engineering also continued to be steady.