

Review of Operations

PVC Chlor-Alkali

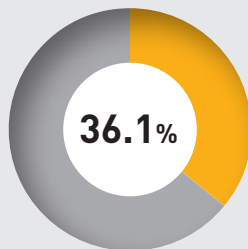
Main Products

- Polyvinyl chloride
- Caustic soda
- Chloromethane



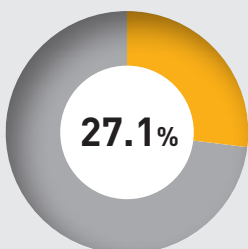
Polyvinyl chloride

Net Sales (Billions of yen)



2015	452.7	↑	Up
2014	427.9		5.8%

Operating Income (Billions of yen)



2015	50.3	↓	Down
2014	60.2		16.4%

Silicones

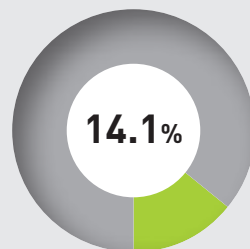
Main Product

- Silicones



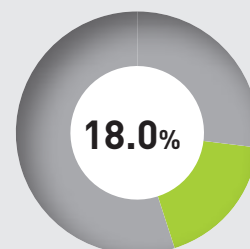
Silicone oil

Net Sales (Billions of yen)



2015	177.4	↑	Up
2014	156.4		13.4%

Operating Income (Billions of yen)



2015	33.4	↑	Up
2014	31.8		5.1%

Specialty Chemicals

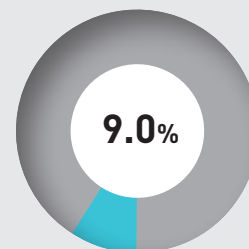
Main Products

- Cellulose derivatives
- Silicon metal
- Poval (Polyvinyl alcohol)
- Synthetic pheromones



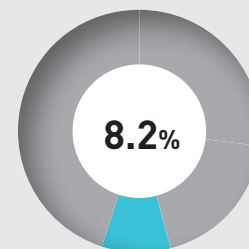
Cellulose derivatives powder

Net Sales (Billions of yen)



2015	112.3	↑	Up
2014	103.2		8.9%

Operating Income (Billions of yen)



2015	15.3	↑	Up
2014	12.8		19.8%

Semiconductor Silicon

Main Product

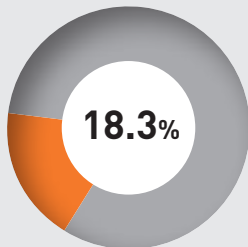
- Semiconductor silicon



Single crystal silicon ingot and wafers

Net Sales

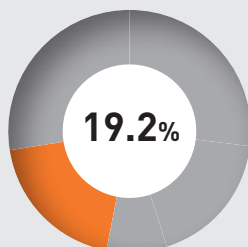
(Billions of yen)



2015	230.0	↑ Up 7.9%
2014	213.2	

Operating Income

(Billions of yen)



2015	35.6	↑ Up 45.6%
2014	24.5	

Electronics & Functional Materials

Main Products

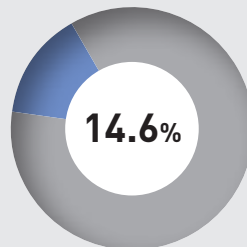
- Rare earth magnets
- Encapsulation materials
- Photoresists
- Photomask blanks
- Synthetic quartz products
- Epoxy molding compounds
- Pellicles



Rare earth magnets

Net Sales

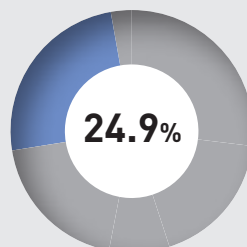
(Billions of yen)



2015	183.5	↑ Up 7.3%
2014	171.0	

Operating Income

(Billions of yen)



2015	46.2	↑ Up 12.8%
2014	41.0	

Diversified Business

Main Products and Services

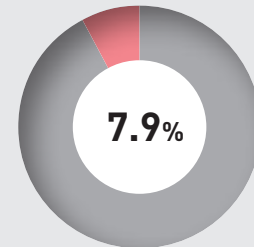
- Processed plastics
- Export of plant equipment
- International trading
- Engineering
- Information processing
- Wafer container



Switch device for power window

Net Sales

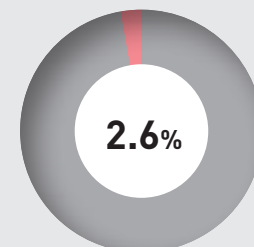
(Billions of yen)



2015	99.6	↑ Up 5.8%
2014	94.1	

Operating Income

(Billions of yen)



2015	4.8	↑ Up 31.5%
2014	3.7	

PVC/Chlor-Alkali Business



Business Profile

PVC is a commodity resin that is easy to process, environmentally friendly, easy to recycle, highly durable, and has other valuable properties. This material is used to make products that are vital to people’s lives, including infrastructure components such as water and sewer pipes, and also housing, construction materials, and household products.

In 1960, the Shin-Etsu Group started manufacturing PVC in Europe. In 1973, we established Shintech, a U.S. subsidiary that has grown to become the world’s largest PVC manufacturer. Now we have manufacturing bases in the U.S. and Europe as well as Japan. Today, we are the world’s largest PVC manufacturer with an annual production capacity of 3.83 million tons. Demand for PVC is increasing worldwide. In emerging countries, demand is growing for use in infrastructure construction projects. In developed countries, rising interest in energy conservation is supporting the growing use of PVC products such as window profiles. In this manner, PVC demand is expanding globally.

Positive Environmental Impact

Chlorine accounts for about 60% of the raw materials used to make PVC. Chlorine is made from salt, a material in abundant supply worldwide. This differs from most other plastics, which use petroleum as their main feedstock. Therefore, PVC usage helps to conserve the world’s limited fossil fuel resources.

PVC window frames have superior insulation properties, and are resistant to condensation, making them mainstays in the U.S. and Europe and their usage is also accelerating in Japan and in China. Also, PVC pipes help combat global warming, as they have lower life cycle carbon dioxide emissions* compared to ductile cast iron pipes, which consist of spheroidized graphite and iron.

* Life cycle carbon dioxide emissions: Total carbon dioxide emissions for a product life cycle, from the raw materials mining stage through the processes of manufacture, use, disposal and recycling stage



Polyvinyl chloride

Major Product and Applications

- PVC
 - PVC pipes
 - Window profiles
 - Vinyl sidings
 - Films and sheets
 - Electrical wire covering

Silicones Business

Business Profile

Silicone is a highly functional material that has many kinds of characteristics and various physical forms, such as an oil, resin or rubber. Moreover, it is possible to add new functions to silicone's inherent properties as well as create combinations with the properties of other materials to achieve new degrees of functionality.

The Shin-Etsu Group constantly develops new products and technologies with know-how accumulated over 60 years. Currently, we supply more than 5,000 types of silicone products. Markets are diverse, including home appliances, automobiles, cosmetics, health care and housing. This diversity provides a sound base for consistent earnings.

Positive Environmental Impact

In 2012, silicone industry associations in Japan, the U.S. and Europe carried out a study of the entire silicone market, examining silicone greenhouse gas emissions and how much greenhouse gas emissions are curbed by the use of silicone. The study found that the use of silicone products in Japan, North America, and Europe has made it possible to reduce greenhouse gas emission by 54 million tons of carbon dioxide (CO₂) per year.

Source: "Silicone-Chemistry Carbon Balance," Silicone Industry Association of Japan.



Silicone oil

Major Product and Applications

● Silicones

- Electric and electronics products
- Cosmetics and toiletries
- Automobiles
- Construction and civil engineering

Specialty Chemicals Business

Business Profile

Cellulose derivatives are made from wood pulp used in a wide variety of applications. They are used in pharmaceutical coatings and binders for tablets and granules. They are also used in applications including construction and civil engineering materials. The Shin-Etsu Group has the world's top class shares of cellulose derivatives.

This segment also includes the manufacture of silicon metal in Australia, the primary raw material for semiconductor silicon, silicone and synthetic quartz, all of which are major products of the Shin-Etsu Group.

Positive Environmental Impact

Synthetic pheromones are revolutionary and environmentally friendly products for controlling agricultural pests. They have a lower risk for the environment and humans in comparison with that of conventional agricultural chemicals. Pest controls with synthetic pheromones have been accepted among apple and grape growers in Europe and apple growers in the U.S. due to concern about agricultural chemical residues on crops. Recently, growers in South America have started considering the use of synthetic pheromones to protect grapes.



Cellulose derivatives powder

Major Product and Applications

● Cellulose derivatives

- Pharmaceuticals (such as pills)
- Construction and civil engineering (such as paints)
- Industrial applications (such as honeycomb ceramics for exhaust gas filters of automobiles)

Semiconductor Silicon Business



Business Profile

Silicon wafers are essential for the production of semiconductor devices, which are used in products such as PCs, smartphones, digital home appliances and automotive electronics. High integration and advanced performance of these devices have made the miniaturization of electronic products possible, and led to the development of innovative products like tablet PCs and smartphones.

The Shin-Etsu Group is the world's foremost supplier of semiconductor silicon wafers with multiple production sites in Japan, Malaysia, Taiwan, the U.S. and the U.K. We have supported the evolution of semiconductor devices for decades through the supply of large diameter wafers and ultra-flat wafers. We produce 300 mm wafers, the most widely used size today, at four locations in Japan and the U.S., and maintain a stable supply of high quality wafers for our customers worldwide.

Positive Environmental Impact

Interest is growing in power semiconductors, a device which can cut electricity consumption to a minimum. Power semiconductors are structurally different from conventional semiconductor devices, and can accommodate high voltages and currents. They are mainly used to convert electricity to maintain a stable power supply for electrical equipment. Application examples include precise motor control from low to high speeds, and efficient electricity transfer from generators to transmission lines. These energy-conserving power transistors are one of the markets served by the Shin-Etsu Group's semiconductor wafer business.



Single crystal silicon ingot and wafers

Major Product and Applications

- Silicon wafers
 - Information and communication equipment (including PCs and mobile phones)
 - Home appliances (including digital cameras and televisions)

Electronics & Functional Materials Business

Business Profile

This business provides many types of products to a wide range of industries. Rare earth magnets are used in the motors of automobiles, home appliances and hard disk drives for PCs. This business includes a number of products that are essential for the semiconductor lithography process. Demand for our photoresists, photomask blanks and pellicles is growing in tandem with rising semiconductor device output and progress with miniaturization. SHIN-ETSU SIFEL[®], a liquid fluoroelastomer, is another product in this business. For synthetic quartz products, major applications include preforms for optical fiber and large photomask substrates for LCD panels. Also, we supply LED packaging materials that meet the numerous requirements of high brightness LEDs. LED lights are attracting interest because of their energy efficiency.



Positive Environmental Impact

Rare earth magnets have a magnetic force of about 10 times stronger than conventional ferrite magnets. Even small rare earth magnets can exhibit powerful magnetic fields. In hybrid and electric vehicle motors, these magnets reduce size and weight while increasing power. Compressors of energy-efficient air conditioners also use rare earth magnets. The higher energy efficiency of these products lowers carbon dioxide emissions.



Rare earth magnets

Major Products and Applications

- Rare earth magnets
 - Motors (automobiles, home appliances, factory automation, hard disk drives)
- Photoresists
 - Semiconductor device production processes

Diversified Business

Business Profile

Shin-Etsu Polymer Co., Ltd., manufactures semiconductor-related containers, input/output devices for electronic products, construction materials, and other processed plastic products. Shin-Etsu Engineering Co., Ltd., provides services for expanding capital investment projects of the Shin-Etsu Group, automating equipment, and making other improvements. Shin-Etsu Engineering also receives many orders from companies outside the Group.



Switch device for power window

Major Applications

- Shin-Etsu Polymer:
 - Electric and electronic equipment
 - Automotive
 - Semiconductor-related containers
 - Medical and chemical
 - Packaging materials
 - Construction materials