

As the SHIKOKU CHEMICALS CORPORATION Group,
we do what we can do for the earth

Environmental Report 2017

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- Applicable period : April 1, 2016 to March 31, 2017
- Coverage : All offices and plant facilities of SHIKOKU CHEMICALS CORPORATION
 Nine subsidiaries (in Japan) subject to consolidated accounting of
 SHIKOKU CHEMICALS CORPORATION

Corporate Profile (as of the end of March, 2017)

Foundation:	October 10,1947
Capital:	6,867 million yen
Number of employees:	599 (SHIKOKU CHEMICALS alone), 1,074 (including employees in consolidated subsidiaries)
Sales:	44,111 million yen (SHIKOKU CHEMICALS alone), 49,467 million yen (consolidated statement)
Description of business:	[Chemical products] Inorganic Chemicals, Organic Chemicals, Fine Chemicals [Housing materials] Interior, Exterior Finishes and Paving Materials, Home Exterior Products, Decorative Exterior Products
Establishments:	Head Office / 8-537-1, Doki-cho Higashi, Marugame, Kagawa Branch Offices / Makuhari, Osaka Sales Offices / Tokyo, Osaka, Nagoya, Fukuoka, Sendai, Okayama, Shikoku, Kanagawa, Kitakanto, Shizuoka R&D Center / Utazu (Kagawa) Plants / Marugame, Tokushima (Kitajima and Yoshinari), Tadotsu, Naruto, Ranzan (Saitama), Oita
Subsidiaries subject to consolidated accounting (in Japan)	SHIKOKU KEIZAI CORPORATION, SHIKOKU KEIZAI KANTO CORPORATION, SHIKOKU KOSAN CORPORATION, SHIKOKU SYSTEM KOHBOH CORPORATION, Shikoku Foods & Trading Company, Shikoku Foods & Insurance Service Co., Ltd., Shikoku Analytical Laboratories, Shikoku Environmental Business Company, Nippon Ryutan Kogyo Co., Ltd.

Greeting



In corporate management, importance is increasingly being placed on specific efforts for the “Realization of a Recycling Society and Continued Reduction of Environmental Burden,” in order to address environmental issues including global warming.

We, SHIKOKU CHEMICALS, a company with core businesses of manufacturing chemical products and housing materials, were quick to start development focused on “Life-Related Environmental Issues” such as germicides and disinfectants for pools and interior wall materials (the latter to prevent sick house syndrome). We deliver products which will reduce burden on the global environment, including wastewater treatment agents using microbial and enzyme technologies, pavement materials and roof and wall greening products which will contribute to reducing the urban heat island effect, and 100% natural interior wall materials made without any chemical substances.

As described in our basic policy of Responsible Care (RC), our philosophy is that “To protect the global environment, we strive to perform as a spiritually rich corporate citizen who cherishes harmony with nature and contributes to society.” We have engaged in voluntary control activities, considering “environment, safety and health,” beginning at product development and continuing through manufacturing, distribution, use, final consumption, and, finally, ending at disposal. We plan to continuously update the system we established for environmental conservation, so that it is more effectively utilized at both Marugame and Tokushima Plants certified with ISO 14001.

The purpose of this environmental report is to help you to understand our environmental conservation efforts and our environment- and people-friendly products, as well as to enhance active communication with society, resulting in an improvement of our environmental activities.

We continue to make efforts to be a company harmonized with the environment, and to contribute towards forming a sustainable and recycling society. We would appreciate it if you could read through this report and give us your opinions and comments.

August 2017

Kunio Tamaki
President and C.E.O.

Basic Policy for Responsible Care

Philosophy

We are committed to protecting the global environment, as a broad-minded corporate citizen that contributes to a society in which harmony with nature is a priority.

Basic Policy

- 1 Our actions are based on the idea that every company is obliged to take steps to conserve resources and energy and minimize industrial waste, both to protect the environment and to ensure safety.
- 2 We make products that are friendly for both people and nature.
- 3 We committed to protecting the environment and to the safety and health of our employees and citizens. We will maintain good relations with the community.
- 4 Our consideration of safety and the environment will be reflected throughout the lifecycle of all of our products in a way that reduces the burden on the environment.
- 5 We follow the manual for promotion of RC activity to ensure continuous reduction of environmental burden.
- 6 We provide product information on safety and the environment.
- 7 We follow domestic and overseas laws and regulations and take active environmental protection measures.
- 8 Our Marugame Plant and Tokushima Plant acquired ISO 14001 certification, the international standard for environmental management. We will follow the standard to the fullest possible extent.

SHIKOKU CHEMICALS CORPORATION
Responsible Care Committee
Kunio Tamaki
Committee Chairman; President and C.E.O.

What is Responsible Care (RC) ?

Responsible care (RC) refers to voluntary activities conducted by the business operators manufacturing or handling chemical substances, for the purpose of protecting the environment, safety and health throughout the entire life cycle from development, manufacturing, distribution, use, final consumption to disposal of products.



Activity and Activity Organization Chart

RC, which refers to voluntary control activities to protect the environment, safety and health, comprises seven activities.



① Environmental Conservation

Conserve environment and protect peoples' safety and health.

② Product Safety

Educate customers on safe use of our products and provide information on reducing environmental impacts.

③ Safety in Logistics

Be prepared for unexpected accidents in transit.

④ Increasing Efficiency of Logistics

Limit emissions of carbon dioxide through efficient transport.

⑤ Security and Disaster Prevention

Take disaster prevention and control measures.

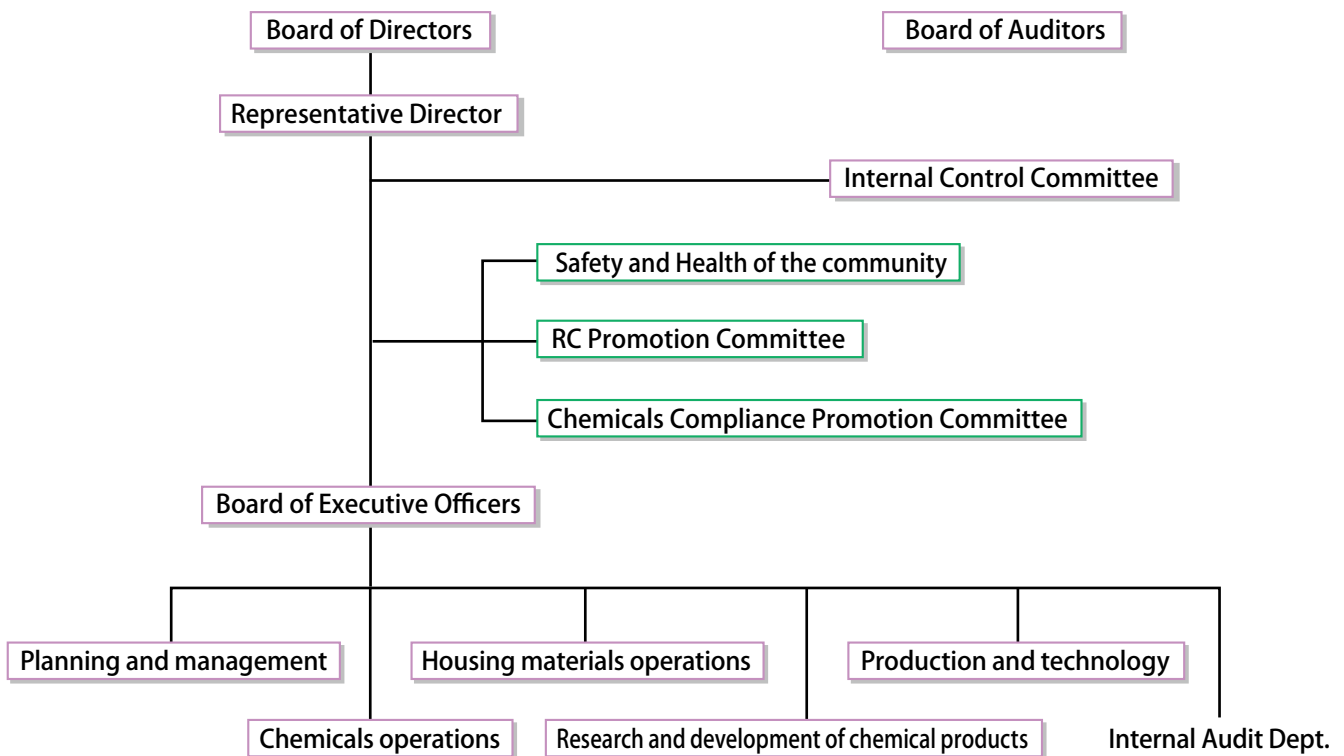
⑥ Occupational Safety and Health

Prevent accidents and ensure worker safety.

⑦ Communication with Local Community

Make efforts to maintain a harmonious relationship with communities and residents.

Activity Organization Chart





Progress on Activities related to ISO 14001

Our Marugame Plant and Tokushima Plant (Kitajima location) acquired the certification of ISO 14001, the international standard for environmental conservation in 2002. We have been developing our environmental conservation activities with the participation of all employees.

Marugame Plant ISO 14001 certificate



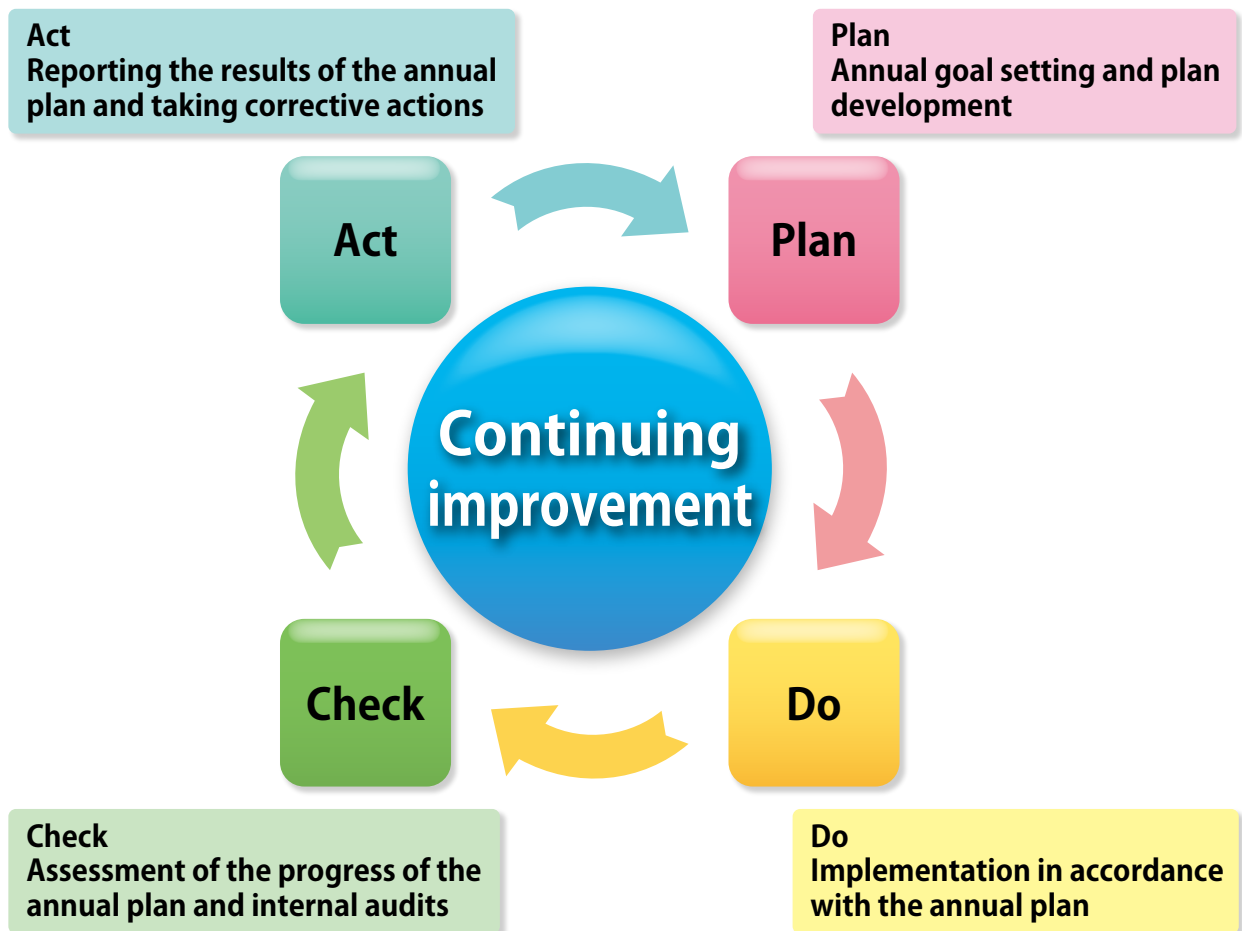
Tokushima Plant (Kitajima location) ISO 14001 certificate



Continuous improvement activities based on the Plan-Do-Check-Act (PDCA) cycle.

Annual plans are developed by every production and non-production site, in order to achieve “Priority Goals of Environmental Protection,” and continuous improvement activities are carried out.

The results of these activities are assessed by management, and necessary corrective actions are taken to incorporate the outcome into the plan for the coming year, resulting in improved environmental protection activities.



Priority Goals of Environmental Protection in 2017

1. Reduction of Carbon dioxide Emissions and Promotion of Energy Saving

Company activities led to the emission of 46 thousand ton of greenhouse gas (carbon dioxide) in 2016, an increase of 2% compared to 45 thousand ton in 2015, mainly due to increased production of NEO-CHLOR. The greenhouse gas reduction target pledged by the government at the twenty-first session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change was "Reduction of 26% below of 2013 levels by 2030." The pledge also aimed at reducing carbon dioxide produced by power plants and corporate activities, etc. by 21.9%. Energy policy, including the restart of nuclear power plants and introduction of renewable energy, will play a major role in achieving these targets. The company should also continue to facilitate energy saving measures to cooperate with efforts to address global warming.

- 1 Each of our plant facilities aims to reduce energy consumption by 1% or more (energy consumption rate) compared to the previous year.
 - Promote total productive maintenance (TPM) activities to increase production efficiency, reduce waste, and improve equipment performance. In addition, energy saving has to be promoted by reusing waste heat or cooling water. Furthermore, facilities that use heat, air-conditioning equipment, and freezers and refrigerators have to be inspected periodically.
 - Promote the use of night-time electricity for charging equipment in an effort to level out electricity use.
- 2 Each of our office aims at reducing electricity use by 1% or more (per person) compared to the previous year.
 - We facilitate energy saving by 1) strictly obeying the rule to set the temperature at energy saving ranges (28°C or above in summer and 20°C or below in winter) by thoroughly implementing Cool Biz and Warm Biz, 2) conducting periodic inspections of air conditioning equipment and updating to highly efficient equipment as needed, and 3) introducing LED luminaire.
- 3 The logistics and purchasing departments make efforts to improve the efficiency in transportation of products to reduce the CO₂ emissions intensity related to transportation by at least 1% compared to the previous year.
- 4 We use eco-cars as commercial vehicles to save energy, and optimize the volume of the catalogs and other materials loaded on the cars for energy-efficient driving.

2. Promotion of Reducing Industrial Waste

- 1 Each of our plant facilities aims to reduce externally-treated industrial wastes to a level below that of the previous year (waste per unit of production).
 - We also aim to reduce to zero the wastes generated due to troubles in operation of equipment or quality nonconformities.
 - The specifications and packaging forms of raw materials and waste properties and management are reviewed to promote reduction and reuse of generate industrial waste volume.
 - Aim to switch to a truly paperless environment by actively using libraries and internal e-mail, and consider introducing tablet devices.

3. Promotion of Reducing Emissions of Hazardous Chemical Substances to Outside of Plant Facilities

- 1 Complying with the environment-related laws, each of our plant facilities formulates and implements a plan to reduce emissions of hazardous chemical substances that is specified in the PRTR system.
- 2 The plant facilities involving emissions of COD, BOD, nitrogen, etc. to the water system reduce the emissions.

4. Promotion of Safe Operation

Each of our plant facilities ensures maintenance and management of equipment, security and disaster prevention to promote stable and safe operation.

5. Active Participation and Cooperation in Environmental Preservation Activities

- 1 We actively participate in the community's environmental conservation activities.
- 2 We promote the environmental conservation activities in cooperation with our clients .

6. Operation of environmental management system

Each of our plant facilities actively utilizes ISO14001 to control various burdens on the environment.

Efforts for Protection of Environment, Safety and Health

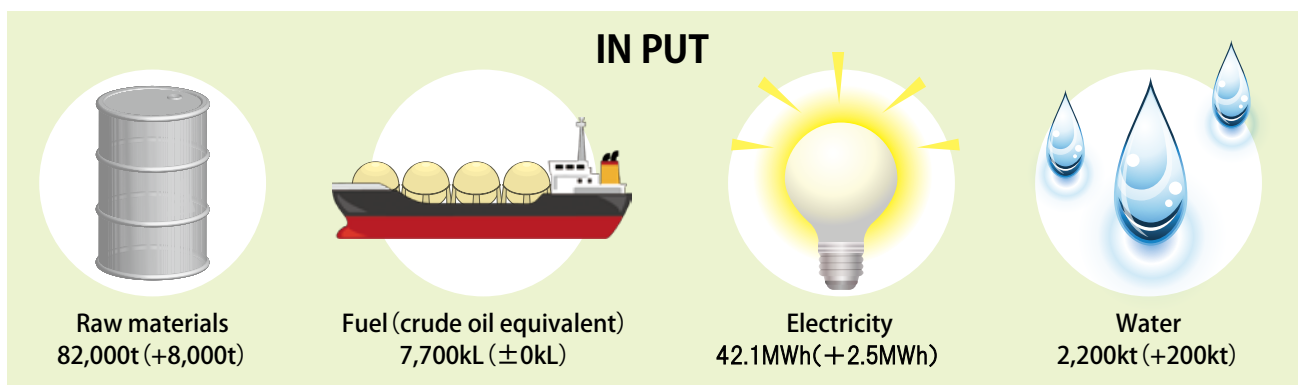
Environmental Conservation

We aim to contribute ensuring protection of the environment, safety and health of the community residents and our employees by continuously reducing environmental burdens caused by the greenhouse gas, chemical substances, and industrial wastes emitted from each of our plants and facilities.

Overview of environmental burden

(to understand the environmental burden of production activities)

Materials balance at production sites in 2016



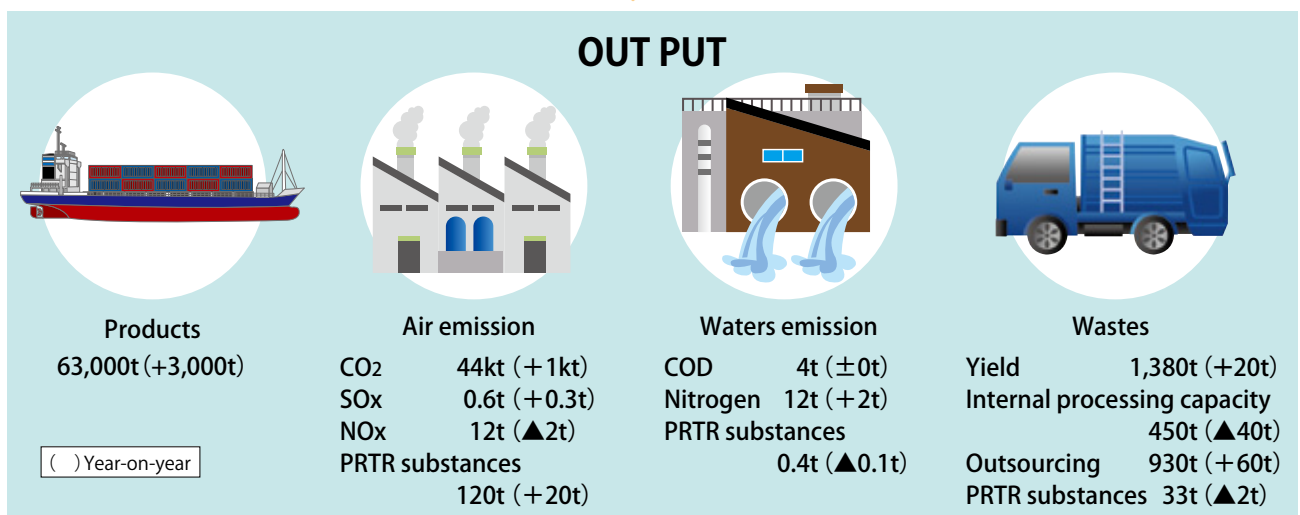
Marugame Plant and Tokushima Plant

IN PUT

Raw materials, energy, and water used to manufacture products

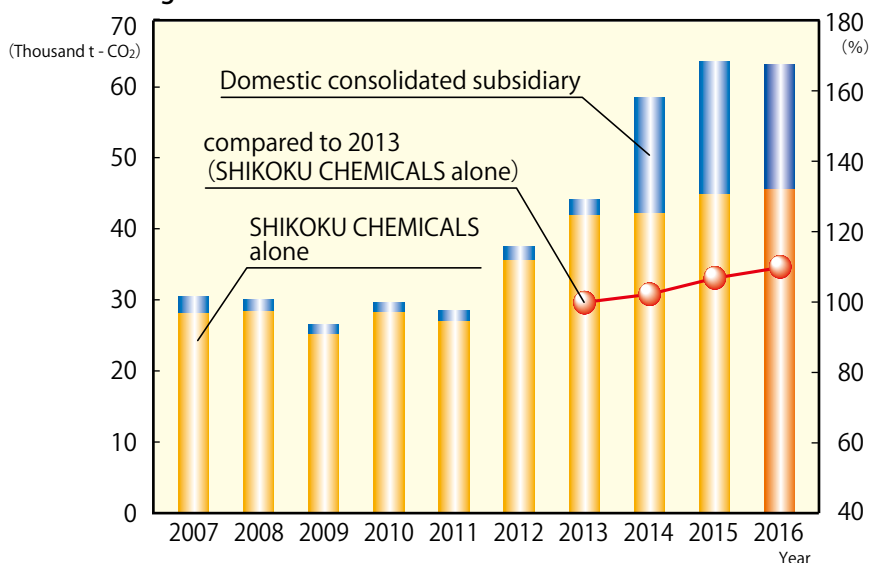
OUT PUT

Products manufactured, as well as emissions to air, emissions to water, and wastes generated by business activities



1. Efforts for Reduction of CO₂ Emission and Energy Saving

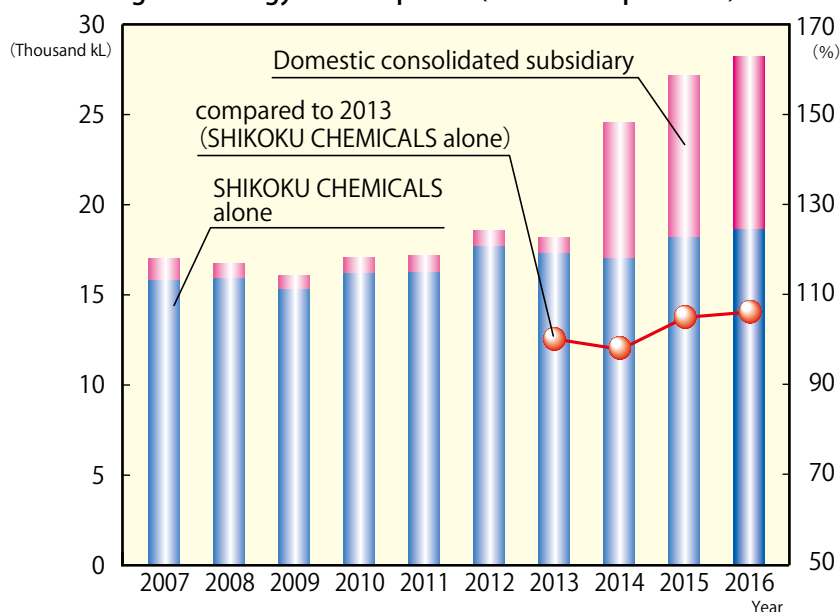
■ Changes of CO₂ emissions



The carbon dioxide emissions^(※1) by the company alone in 2016 was 46 thousand ton -CO₂, an increase of 2% compared to the previous year, due to increased production of NEO-CHLOR, itself a 9% increase compared to 2013. Nippon Ryutan Kogyo Co., Ltd. joined our group as a domestic consolidated subsidiary in 2014.

※1 : The emission factor after adjustment by operator of electric utilities was used for electricity.

■ Changes of energy consumption (crude oil equivalent)



The company's energy usage alone 18.7 thousand kL crude oil equivalent in 2016 increased by 3% compared to the previous year, and that in 2016 was 108% compared to that in 2013 due to increased production of insoluble sulfur.

Nippon Ryutan Kogyo Co., Ltd. joined our group as a domestic consolidated subsidiary in 2014.

2. Efforts for Prevention of Air Pollution

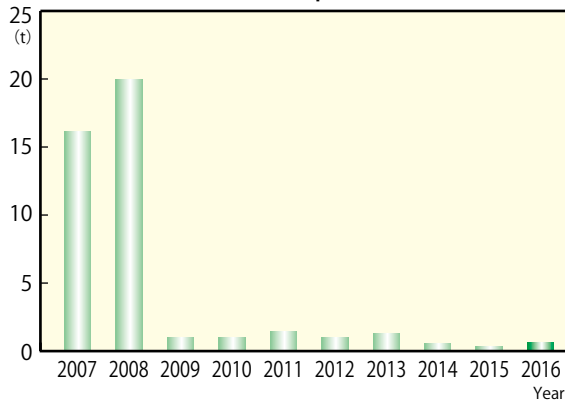
We have been addressing the reduction of air pollutants through measures such as converting fuels to city gas and low-sulfur fuel oil A and establishing an exhaust gas treatment facility.

◆ Volatile organic compound (VOC) treatment facility (Tokushima Plant (Kitajima location))

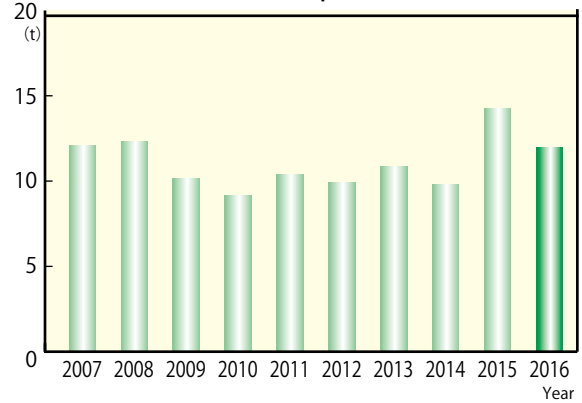


▲ The directly-fired gas emission incinerator to incinerate and detoxify VOC generated in the drying process was installed in March 2010.

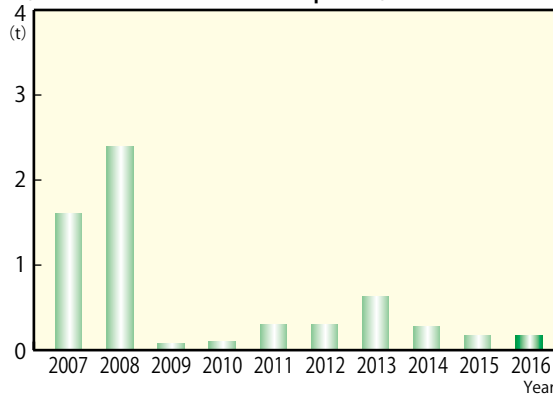
■ Changes in SOx emissions
(total of those in the three plants)



■ Changes in NOx emissions
(total of those in the three plants)



■ Changes in smoke and dust emissions
(total of those in the three plants)



SO_x : Sulfur oxides, substances that cause acid rain and asthma
 NO_x : Nitrogen oxides, substances that produce photochemical oxidants
 VOC : Volatile Organic Compounds
 Volatile organic compounds and substances that produce photochemical oxidants

※The "three plants" refer to Marugame Plant, Tokushima Plant (Kitajima location), and Tokushima Plant (Yoshinari location).

3. Efforts for Prevention of Water Contamination

In Marugame Plant, water is circulated and reused; using industrial water lowers dependence on groundwater. In Tokushima Plant (Kitajima location), wastewater containing organic substances and nitrogen compounds is processed at the activated sludge effluent treatment facility, and COD^(※2) and emissions of phosphorus and nitrogen compounds are automatically and continuously monitored.

※2 COD: Chemical Oxygen Demand
 The amount of oxygen required for chemical decomposition of contaminated substances (mainly organic substances) in water, with an oxidizer

◆ Equipment for circulation and reuse of cooling water (Marugame Plant)



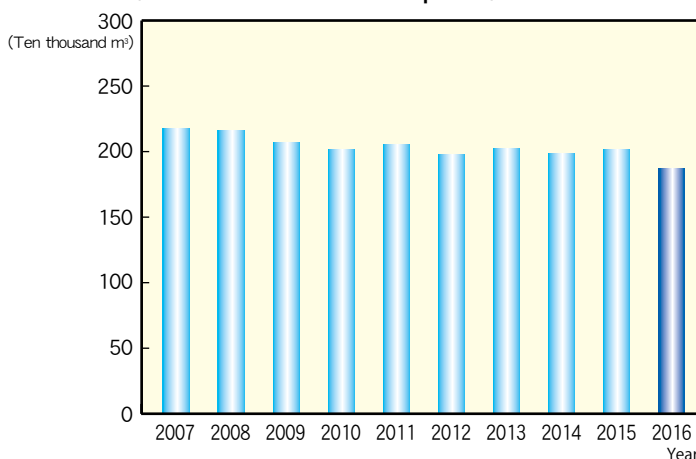
▲ Equipment to treat and reuse the water used in industrial processes.

◆ Active sludge wastewater treatment facility (Tokushima Plant (Kitajima location))

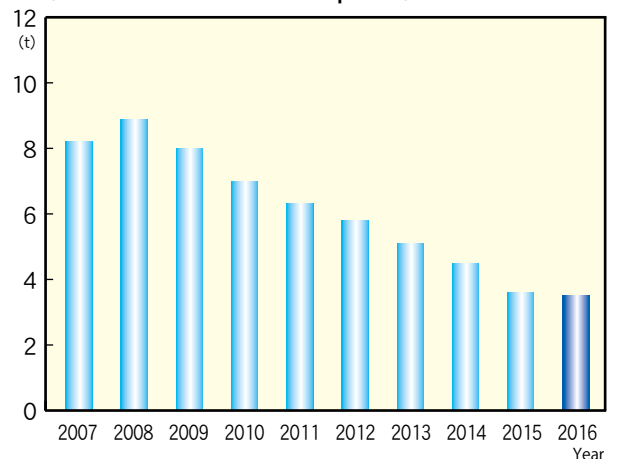


▲ Wastewater containing such as organic substances and nitrogen compounds is purified using our water treatment technology.

■ Changes in wastewater
(total of those in the three plants)

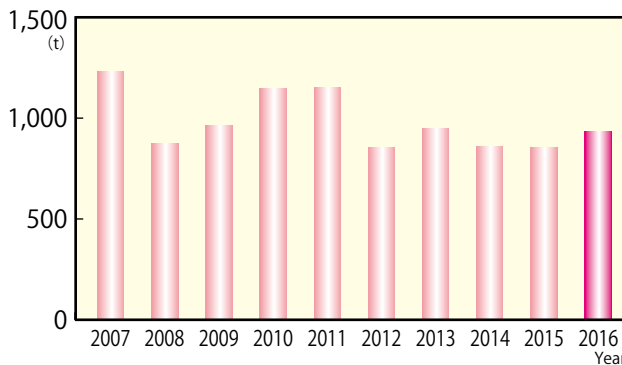


■ Changes in COD emission
(total of those in the three plants)

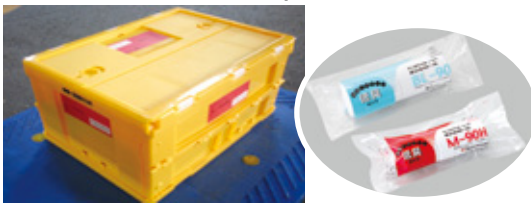


4. Efforts for Reduction of Industrial Wastes

Changes in emissions of wastes (total of those in the three plants)



"Returnable boxes" and Sanitizer/disinfectant for septic tanks, "PONCYLOR" to be packed in the boxes



We define all wastes generated from business activities as industrial waste.

Despite efforts made at each site to reduce waste generation and emissions by setting goals, total emissions from all production sites was 930 ton in 2016 due to increased production of NEO-CHLOR, which was 7% increase compared to the previous year.

4) "Returnable boxes" and Sanitizer/disinfectant for septic tanks, "PONCYLOR" to be packed in the boxes

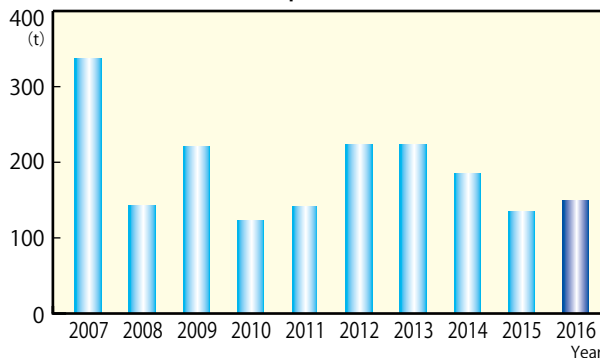
Flexible containers repeatedly used between the tire plant and Marugame Plant



5. PRTR System

	Substances			Emission and movement in 2016			
				Air	Public waters	Sewer	Industrial waste
Substances subject to the PRTR system	27 substances	Marugame Plant	4 substances	120 t	0.4 t	—	33 t
		Tokushima Plant (Kitajima location)	22 substances				
		Tokushima Plant (Yoshinari location)	1 substances				
* Top three substances (accounting for 95%) of emissions and movement : carbon disulfide, toluene and xylene.							

Changes in emission and movement of substances subject to PRTR (total of those in the three plants)



Gas emission washing treatment facility (Tokushima Plant (Kitajima location))



▲ This is the facility for gathering chlorine generated in the process manufacturing chlorinated isocyanuric acid and treating it by washing.

The PRTR system specifies requirements for the business operators to grasp and voluntarily control the volume of chemical substances, which can be hazardous to human health and the ecosystem, discharged to the environment and moved as contained in the wastes.

Equipment for recovery of carbon disulfide (Marugame Plant)

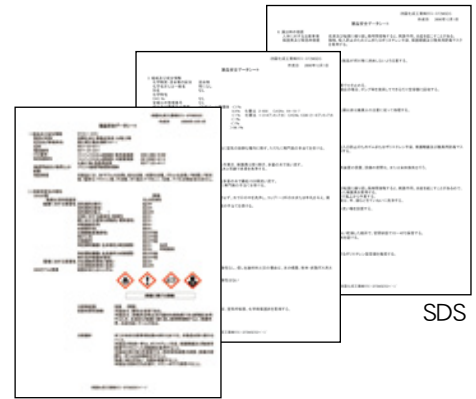


▲ This is the equipment for recovering carbon sulfide used in the process manufacturing insoluble sulfur.

Product Safety

We comply with the regulations in each country based on the GHS^(※3) Guidelines recommended by the United Nations and prepare a safety data sheet (SDS) for every chemical product, which allows us to provide information on hazards and toxicity, first aid measures, measures to be taken in case of fire or leakage, handling and storage precautions, physical and chemical properties, information on environmental impacts, disposal and transport precautions, and applicable laws and regulations, etc. In this way, we show customers how to handle our chemical products safely in an easy-to-understand manner.

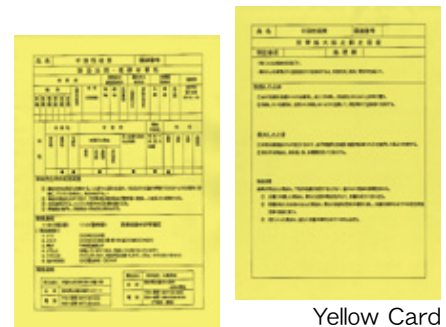
※3 GHS: Globally Harmonized System of Classification and Labelling of Chemicals



SDS

Safety in Logistics

In case of accidents during transportation, we issue the emergency contact card, "Yellow Card," containing the contents of safe measures to be taken by the carrier, police, fire fighters, and other people concerned in dealing with the accidents. We also annually provide contract carriers with training for unexpected accidents including things to be carried with them in transportation. These cards contain information such as names of the substances transported, their properties, first aid measures, and emergency contact.



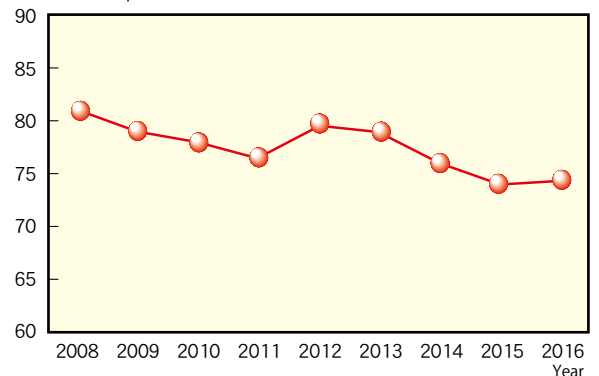
Yellow Card

Increasing Efficiency of Logistics

Our efforts in transporting products include 1) shortening domestic truckload transportation distance by designating ports of discharge for imported products based on the geographical distribution of buyers, 2) promoting the use of ferries and railroads in domestic trunk line transportation, 3) changing stock points to increase load efficiency, and 4) appropriately selecting charter flights and regular flights.

Energy basic unit for product transportation

kL (crude oil equivalent) / million ton-kilometers



Security and Disaster Prevention

We proactively conduct regular education and training programs on disaster prevention and security, as well as comprehensive disaster drills, to be prepared for unexpected accidents.

In addition, we developed BCP^(※4) to secure the safety of employees and ensure early resumption of business activities in preparation for the "Major Nankai Trough Earthquake" that is expected to occur in the near future.

※4 BCP (Business Continuity Plan)

A summary of countermeasures for business continuity in case of disasters and accidents

◆ Comprehensive disaster drill in Marugame Plant



◆ Comprehensive disaster drill in Tokushima Plant



◆ Manufacturing building reinforced for earthquakes in Marugame Plant



Occupational Safety and Health

A “Safety and Health Activity Plan” is developed every year at each site to prevent accidents.

◆ Zero accident/disaster records in each plant



Marugame Plant



Tokushima Plant (Kitajima location)



Tokushima Plant (Yoshinari location)

◆ Holding the Convention for Production/Technology Safety and Health

The Convention for Product/Technology Safety and Health is organized at the Marugame and Tokushima Plants, and aims to make both plants reliable for local communities by building culture fostered on the concept which shows that “Safety overrides everything else.” Top management share their plans to ensure safety, employees communicate with each other through presentations on risk prediction activities, and excellent safety and health activities are recognized.



Commendation for safety



Lecture on safety

◆ Education on safety (Education involving simulations and risk prediction training)

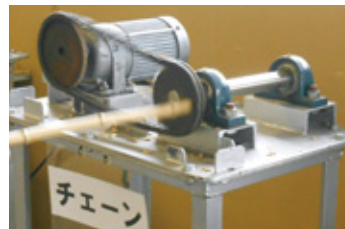
Our safety activities focus on risk assessment, detection of near-miss incidents and concerns, and risk prediction to prevent the occurrence of serious industrial accidents. In addition, our education and training aim to prevent accidents by improving individual risk sensitivity, for example through safety education involving simulations in which participants can virtually experience an accident caught in a machine and a potential risk in a plant such as combustion and explosion, as well as risk prediction training to extract potential risks in operations.



Simulations of falls



Simulations of pharmacological decomposition (hydrogen peroxide decomposition)



Simulations of being caught in a machine



Finger pointing and call training

◆ Education on mental health

In activities for occupational health, we work for employees' health management through the implementation of mental health workshops, periodical health checkups, and counseling for all employees because mental and physical fatigue or poor physical condition may cause occupational accidents.



Mental health workshop

Communication with Local Community

In order to allow the community residents to understand our business activities, we provide them with information in various ways and try to communicate with the local community.

We issue our company profile, guide of the plant or facility, product guide and enhance our web site, and explain summary of the plant to the local community. In addition, we actively participate in the volunteer activities in the local communities and conduct voluntary activities of cleaning the areas around the plants and facilities.



Local cleanup activity

Environmentally and People-Friendly Product Lineup

SHIKOKU CHEMICALS CORPORATION Group continues to make efforts for environmental protection and manufactures products contributing the global environment and living environment, health and safety in the aspect of product development.

NEO-CHLOR



NEO-CHLOR is a high quality chlorinated isocyanurates-based disinfectant/sanitizer produced with our creative technology and widely used for sustaining a range of water environments from a swimming pools and wastewater to home sanitary products, contributing to healthy and safe living through keeping water clean.

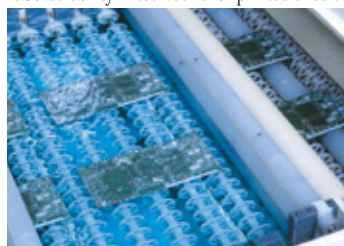
SPACLEAN



In bathing facilities such as hot spring and public bathhouses, it is important to always keep the water in the baths clean. In the hot water which looks clean at a glance, bacteria such as Legionella remain if it is cyclically used after only filth are removed. SPACLEAN is a chlorinated isocyanurates-based chlorine agent dedicated for bathwater. This agent always keeps bathwater hygienic by the action of strong active chlorine and make people take bath without worry. We also provide SPACLEAN BROM 60T for hot spring containing alkali and the Legio Hunter mini tablets for medium-scale and small-scale baths such as social welfare facilities.

Gliccoat-SMD

(Organic Solderability Preservative for printed circuit boards)



High-density surface mounting of parts using lead-free solder is the dominant technique for the printed circuit boards used in the electronic appliances such as PCs and smartphones from the viewpoint of protecting the global environment. Gliccoat-SMD is a heat-resistant water-soluble preflux which is able to provide good solderability demanded by customers even for lead-free solder which cannot be easily soldered. Gliccoat-SMD is people- and environmentally-friendly product because it contains no organic solvent.

Ohdelight

(Agents for reduction of excess sludge)



Ohdelight is the system that reduces excess sludge generated in the wastewater treatment using the activated sludge method. This is the simple system consisting of a dissolver and a dedicated chemical agent, needs no expensive initial investment, and can be additionally installed in the wastewater treatment facilities such as rural community sewerages and food plants. The system was selected as the technology for the "Environmental Technology Verification Project" in 2011 which is the environment technology verification system established by the Ministry of the Environment. Ohdelight passed the objective verification test conducted by the third-party organization and the performance was approved.

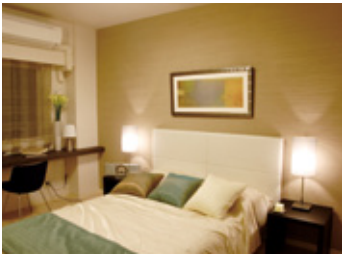


Green Shade



As one measure against the heat-island phenomenon, green roof has been increasingly introduced in buildings. Our mid-air greening system "Green Shade" is a planter containing rainwater storage tank, covered with a two-tier mesh panel, along which a creeper grows to make a shadow of green. Our greening system solves problems seen in the existing products for green roof because it needs no large-scale renovation work and can reduce labor of watering by using rainwater and then it can be made use of green wall, too. This product also helps reduce carbon dioxide.

Keiso-kabe series



The products are wall finishing materials containing diatomaceous earth as a major ingredient and have excellent humidity control feature, heat insulating effect, and sound absorbability. They are people-friendly interior finishing materials which adsorb hazardous formaldehyde and decompose it into harmless substances. The products which can be painted directly to plasterboards needs no intercoating process when blended with carbon fibers, contributing to resource saving.

We also have renovation materials which can be applied on vinyl cloth wallpaper without stripping the wallpaper are also available. SATORI(our wall material brand in the U.S.) acquired the [Indoor Advantage™ Gold](#).

Natulux – Walls made of nature materials



Natulux is an interior wall finish made entirely from natural materials and is therefore free from resin and other chemical substances. Soil or sand is solidified by using sea tangle extract, rather than the commonly used synthetic resin emulsion. This wall finish is made from only naturally derived raw materials and food additives extracted from natural products. Natulux interior material is utilized for humidity conditioning, which, usually, can be provided only by a plastered wall. Moreover, this material is both environment and people friendly.

Link Stone G

(EcoMark-certified product: Certification No.08 131 008)



"Link Stone G" series are environmentally-friendly recycling paving materials made from waste glass materials such as used bottles. With high weather-resistance and excellent water permeability, the products avoid puddles being left over and are safe. This series are the EcoMark-certified products with appropriate asperities allowing people to walk comfortably on them.

– What is the Indoor Advantage™ Gold ? –

The Indoor Advantage™ Gold is the U.S. standard to certify product safety and the certification is given based on the third-party certification agency. For the buildings using the certified products, the points required for the "LEED certification" indicating are given as the indoor air quality of the buildings is good. The buildings are authorized as green buildings based on the total number of points.

– What is LEED (Leadership in Energy and Environmental Design) ? –

LEED is one of the programs established and promoted by the "U.S. Green Building Council" organized and operated by the private companies mainly from the construction industry in the U.S. It is the system to evaluate how a building contributes improvement of the environment from various perspectives such as design concept and materials used.



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Tel. 0877-22-4111

URL. <http://www.shikoku.co.jp>