

## Site Reports

### Tokuyama Factory

Location: 1-1, Mikage-cho, Shunan-shi, Yamaguchi 745-8648, Japan  
 Number of employees: 1,577  
 Total site area: 1.91 million m<sup>2</sup>  
 Main products: Cement, inorganic chemical products, organic chemical products, polycrystalline silicon, fumed silica, polyvinyl chloride, and other products



Hideki Adachi  
Tokuyama Factory General Manager



Still situated at the Company's first business site, the Tokuyama Factory is the Group's main manufacturing facility, and its products account for about 90% of non-consolidated sales. The factory operates with the motto, "Go to work healthy and return home happy." In fiscal 2019, the Tokuyama Factory is placing top priority on measures to comprehensively remove risks and increase safety awareness and risk sensitivity, in an effort to ensure no accidents or disasters occur. Specifically, the plant is: (1) identifying and eliminating risks from contact with harmful substances, being caught in or between equipment, contact with high temperatures, and falling from height or to the same level; (2) pursuing dialogue on safety to eliminate the root causes of continuing risks on the production floor; (3) verifying that actual work conditions are consistent with work standards for subcontracted work, and identifying and eliminating risks; (4) implementing pointing and calling at crosswalks within the plant; and (5) verifying, executing, and reviewing the goals of safety activities on a daily basis.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
SOx emissions	Metric tons	550	680	750	780	800
NOx emissions	Metric tons	8,850	8,900	9,500	10,100	10,100
Soot emissions	Metric tons	135	138	138	168	122
Industrial water consumption	Million metric tons	41.7	42.1	44.1	44.5	44.7
Effluent discharged	Million metric tons	23.9	24.2	24.2	24	24
COD level	Metric tons	110	124	114	119	127
Total nitrogen discharged	Metric tons	89	92	145	173	159
Total phosphorous discharged	Metric tons	2.6	2.2	2.1	2.1	2.3
PRTR-designated substance emissions	Metric tons	25	36	29	29	33
Waste generated	Thousand metric tons	354	389	376	366	339
Waste sent to landfills	Metric tons	313	383	368	382	397
Energy consumption	Thousand gigajoules	44,200	45,100	47,100	49,500	49,000
CO <sub>2</sub> emissions (originating from fossil fuel)	Thousand metric tons	4,040	4,110	4,290	4,500	4,430
Complaints	Cases	0	1	0	0	3

#### Emissions and Transfer of Specific PRTR-Designated Substances in Fiscal 2018

Substance name	Regulatory number	Amount of emissions (mg-TEQ equivalency for dioxins)				Amount transferred
		Atmospheric	Water	Soil	Subtotal	
1,2-Dichloroethane	157	10.0	0.0	0.0	10.0	1.8
Chloroethylene (vinyl chloride)	94	6.8	0.0	0.0	6.8	0.0
Chloromethane (methyl chloride)	128	3.8	0.0	0.0	3.8	0.0
Chlorodifluoromethane	104	3.0	0.0	0.0	3.0	0.0
Cresol	86	0.0	2.6	0.0	2.6	0.0
Toluene	300	2.4	0.0	0.0	2.4	6.7
Dichloromethane (methylene chloride)	186	1.3	0.0	0.0	1.3	0.0
Chloroform	127	0.8	0.0	0.0	0.8	0.0
1,2-Epoxypropane (propylene oxide)	68	0.6	0.0	0.0	0.6	1.8
Hydrazine	333	0.0	0.6	0.0	0.6	0.0
Water-soluble compounds of zinc	1	0.0	0.5	0.0	0.5	0.0
1-Bromopropane	384	0.5	0.0	0.0	0.5	0.8
1,2-Dichloropropane	178	0.4	0.0	0.0	0.4	146.1
Carbon tetrachloride	149	0.1	0.0	0.0	0.1	0.0
2,2-Azobisisobutyronitrile	16	0.0	0.0	0.0	0.0	0.0
Water-soluble copper salt	272	0.0	0.0	0.0	0.0	0.0
Hydrogen fluoride and its water-soluble form	374	0.0	0.0	0.0	0.0	0.0
Benzene	400	0.0	0.0	0.0	0.0	0.0
Boron compounds	405	0.0	0.0	0.0	0.0	1.1
Dioxins	243	35.6	2.4	0.0	38.0	0.0
Total (excluding dioxins)		29.6	3.8	0.0	33.4	158.3

Substances are listed in descending order of emissions levels; substances with no emissions are listed in order of the regulatory number

Water refers to public waters

Amount transferred indicates the sum of the quantity transferred to sewage systems and the quantity subject to intermediate treatment

Total figures have been rounded to the first decimal place

### Kashima Factory

Location: 26 Sunayama, Kamisu-shi, Ibaraki 314-0255, Japan  
 Number of employees: 78  
 Total site area: 101,000m<sup>2</sup>  
 Main products: **Produced by Tokuyama Corporation**  
 Bulk pharmaceuticals for diabetes drugs, anti-hypertensive agents, eye drops, allergy medicines; optical materials (plastic lens monomer, light modulating materials, and hard coating solutions)  
**Produced by Tokuyama Dental Corporation**  
 Dental materials (composite resins, orthodontic materials, rebasing and relining materials, impression materials, and investment materials)



Yoshiyuki Kitajima  
Kashima Factory General Manager



The Kashima Factory designates policies for process safety management and ensures that all workers follow them to create a safe workplace. In fiscal 2019, the factory is focusing on identifying and eliminating risks using change management to eliminate accidents and prevent disasters. It is also securing compliance with environmental regulations and prioritizing the reduction of environmental impacts through waste recycling. In fiscal 2018, the factory achieved an 86% waste effective utilization rate, generating eight metric tons of landfill waste and achieving a 99% recycling/reuse rate. The factory will increase the effective utilization rate for all waste by studying the feasibility of implementing materials recycling and thermal recycling.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
Industrial water consumption	Thousand metric tons	48	43	36	39	25
Effluent discharged	Thousand metric tons	63	54	50	54	39
COD level	Metric tons	3	2	2	2	2
PRTR-designated substance emissions	Metric tons	2	2	2	2	1
Waste generated	Metric tons	1,020	735	775	761	831
Waste sent to landfills	Metric tons	11	20	9	9	8
Energy consumption	Thousand gigajoules	36	33	37	39	36
CO <sub>2</sub> emissions (originating from fossil fuel)	Metric tons	2,465	2,246	2,670	2,697	2,594
Complaints	Cases	0	0	0	0	0

#### Emissions and Transfer of Specific PRTR-Designated Substances in Fiscal 2018

Unit: metric tons

Substance name	Regulatory number	Amount of emissions				Amount transferred
		Atmospheric	Water	Soil	Subtotal	
Dichloromethane	186	0.5	0.0	0.0	0.5	2.4
Chloroform	127	0.4	0.0	0.0	0.4	30.5
Toluene	300	0.1	0.0	0.0	0.1	4.0
Acetonitrile	13	0.0	0.0	0.0	0.0	0.8
N,N-Dimethylacetamide	213	0.0	0.0	0.0	0.0	2.0
N,N-Dimethylformamide	232	0.0	0.0	0.0	0.0	5.7
2-Vinylpyridine	338	0.0	0.0	0.0	0.0	0.2
Methyl methacrylate	420	0.0	0.0	0.0	0.0	0.0
Total		1.0	0.0	0.0	1.0	45.6

All figures are numerical sums for Tokuyama Corporation and Tokuyama Dental Corporation

Substances are listed in descending order of emissions level; substances with no emissions are listed in order of the regulatory number

Water refers to public waters

Amount transferred indicates the sum of the quantity transferred to sewage systems and the quantity subject to intermediate treatment

Total figures have been rounded to the first decimal place

## Sun•Tox Co., Ltd.

Established: February 14, 1992  
 Shareholders: Tokuyama Corporation (80%), Rengo Co., Ltd. (20%)  
 Head office: ORIX Ueno1chome Building, 1-1-10 Ueno, Taito-ku, Tokyo, Japan  
 Business activities: Manufacture and sale of biaxial-oriented polypropylene films and cast polypropylene films



Kazunori Shimada  
Plant Manager



Location: 3075-18 Shimasu, Itako-shi, Ibaraki, Japan  
 Number of employees: 205  
 Total site area: 89,800m<sup>2</sup>

### ■ Kanto Plant

Sun•Tox's Kanto Plant manufactures biaxial-oriented polypropylene films and cast polypropylene films, which are used for food packaging and other applications. In fiscal 2017, the plant received the Cogeneration Grand Prize for upgrading its gas cogeneration facilities and added another line to its biaxial-oriented polypropylene film manufacturing facility. These high efficiency facilities will help the Kanto Plant to further reduce energy consumption and environmental impacts. The plant also takes part in clean-up activities inside and around the industrial complex to promote harmony with the local community. As it continues to implement three management systems, namely Japan's Occupational Safety and Health Management System (OSHMS), ISO 14001, and ISO 9001, the plant is building on its achievements with the aim to be a community-based factory.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
Waste generated	Metric tons	20	15	23	38	44
Waste sent to landfills	Metric tons	10	5	10	17	44
Energy consumption	Thousand gigajoules	351	356	403	467	514
CO <sub>2</sub> emissions	Thousand metric tons	20	21	23	23	25
SOx emissions	Metric tons	0.3	0.3	0.1	—	—
NOx emissions	Metric tons	0.6	0.7	0.4	1.0	1.3
Soot emissions	Metric tons	0.05	0.04	0.02	0.01	0.04

### ■ Tokuyama Plant

Sun•Tox's Tokuyama Plant manufactures biaxial-oriented polypropylene films, which are mainly used for food and beverage packaging, amounting to about 23,000 metric tons annually. As part of its environmental initiatives, the plant is actively working to reduce per-unit energy consumption and increase recycling rates. With respect to safety, it acquired OSHMS certification in 2013 for all of its departments including R&D departments. Under the slogan, "Strictly following safety procedures, making manufacturing enjoyable, and never compromising quality," the plant aims to keep its facilities operating safely so it can be depended upon by the community, customers and employees.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
Waste generated	Metric tons	76	74	84	68	86
Waste sent to landfills	Metric tons	1	1	1	1	1
Energy consumption	Thousand gigajoules	458	471	463	422	368
CO <sub>2</sub> emissions	Thousand metric tons	27	27	28	25	20
PRTR-designated substance emissions	Metric tons	0.0	0.0	0.0	0.0	0.0
Complaints	Cases	0	0	0	0	0



Nobuhiko Nakayama  
Plant Manager



Location: 7-7, Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 144  
 Total site area: 24,100m<sup>2</sup>

## Sun Arrow Kasei Co., Ltd.

Established: February 1, 1999  
 Shareholder: Tokuyama Corporation (100%)  
 Head office: 1-2 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Business activities: Manufacture and sale of polyvinyl chloride compounds



Yasuto Yasuzawa  
Plant Manager



Location: 1-2 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 29  
 Total site area: 3,280m<sup>2</sup>

### ■ Tokuyama Plant

Sun Arrow Kasei's Tokuyama Plant manufactures and sells polyvinyl chloride compounds used for pipes, joints, and other items essential for upgrading infrastructure, as well as PVC windows, which are highly effective for saving energy. Practicing ISO 14001 environmental management and having all employees take part in safety and accident prevention efforts has helped the plant to maintain a record of zero accidents requiring work absences for all 20 years it has been operating. Since acquiring ISO 9001 certification in fiscal 2017, the plant has further improved customer satisfaction with a focus on the environment, safety and quality control, while strictly enforcing internal controls and carrying out Responsible Care activities.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
Power consumption	Thousand kilowatt hours	2,473	2,659	2,490	2,533	2,631
Waste plastic produced	Metric tons	108	141	135	128	171
Waste plastic effectively used	Metric tons	105	141	135	128	171
Waste sent to landfills offsite for disposal	Metric tons	8	6	0	0	0
Steam usage	Metric tons	240	240	240	240	240
Industrial water consumption	Thousand metric tons	65	65	65	65	65

## Tokuyama Polypropylene Co., Ltd.

Established: April 2, 2001  
 Shareholders: Tokuyama (50%), Prime Polymer Co., Ltd. (50%)  
 Location: 1-1 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Business activities: Manufacture and sale of polypropylene resin and flexible polypropylene resin



Yuichi Taguchi  
Plant Manager



Location: 1-1 Harumi-cho, Shunan-shi, Yamaguchi, Japan  
 Number of employees: 63  
 Total site area: 70,997m<sup>2</sup>

### ■ Tokuyama Plant

Tokuyama Polypropylene's Tokuyama Plant conducts risk assessments of processes, facilities, and operations, and takes measures to identify near-miss situations and points of concern, in order to enhance the plant's safety culture. The result has been a perfect accident- and disaster-free record since the time it was first established as Tokuyama's polypropylene film business 43 years ago. The plant is scheduled to obtain recertification in 2019 under the High Pressure Gas Safety Act and the Ordinance on Safety of Boilers and Pressure Vessels, and is pursuing Responsible Care activities with the goals of extending its accident- and disaster-free record, reducing its environmental impact, and eliminating customer complaints related to quality.

#### Performance Data

	Unit	FY2014	FY2015	FY2016	FY2017	FY2018
Industrial water consumption	Thousand metric tons	308	370	333	378	343
Waste generated	Metric tons	89	35	77	35	66
Waste sent to landfills	Metric tons	2.4*	0	1.8*	0	1.6*
Unit energy consumption index (fiscal 2002=100)	%	76	71	73	69	70

\* Year with periodic maintenance