

# Zeon Corporation – Tokuyama Plant

## Tokuyama Plant Profile

### Main Products

Butadiene monomers, synthetic rubbers, synthetic latex, polymerized toners, single-walled carbon nanotubes

Established in 1965, Tokuyama Plant is the main Zeon production plant for synthetic rubber using butadiene monomer extracted from naphtha. Approximately half of the synthetic rubbers it produces are exported from the nearby Port of Tokuyama to Europe, Asia, and other parts of the world. In 2015, Tokuyama Plant successfully mass-produced single-walled carbon nanotubes, a world first.



### Environment and Safety Policy

The Tokuyama Plant has formulated the following environment and safety policy, based on being a petrochemical plant that handles high-pressure gases as well as hazardous and poisonous substances, and which is located in the Shunan Industrial Zone near residential areas and railway lines.

1. With the participation of all employees, we are committed to maintaining safe and reliable operations and to being a plant that is trusted by everyone in the local community.
2. We set targets and conduct activities in the areas of the environment, safety, and occupational health and safety; we aim to improve our various management systems on an ongoing basis, so as to enhance our environmental and safety performance.
3. We identify all sources of danger in the workplace, and by reducing and eliminating them, we aim to achieve zero occurrence of environmental and safety incidents and occupational accidents.
4. We strive to prevent environmental contamination and conserve energy, to help protect the environment.
5. We comply with environment- and safety-related laws and regulations, agreements, and internal rules and regulations; we also strive to maintain and improve our level of environmental and safety performance.
6. We strive to maintain and improve the physical and mental health of all employees, and to create a vibrant and engaging workplace.

## Plant Policy by the Plant Manager

### Policy

The Tokuyama Plant engages with the local community and actively participates solutions to social issues with strong local ties with the aim of gaining the trust of society. To achieve this, the plant engages in dialog centered on production innovations, the foundations of production activities, exchanges knowledge, and continuously strives to be a safe and secure plant. Each employee works with a positive and enthusiastic attitude so that the Tokuyama Plant can be a plant where employees can enjoy their work and feel a sense of reassurance.



Tokuyama Plant Manager  
Masao Akasaka

## Safety Initiatives

### Policy

Learn from examples and actual work, act with a sense of ownership, and achieve zero accidents and disasters.

### Specific Initiatives

- Firmly establish and maintain four types of safety activities (risk awareness activities, activities relating to near-miss incidents, foolproofing activities, and risk assessment activities in relation to operations and chemical products) and enhance the culture of safety.
- Learn from examples and actual work and promote autonomous safety activities

## Environmental Impact Reductions

### Policy

Achieve our reduction targets for per-unit energy consumption and per-unit CO<sub>2</sub> emissions.

- (1) Investigate the introduction of energy-saving technologies
- (2) Reinforce day-to-day management of energy consumption and CO<sub>2</sub> generation

### Scope of Environmental Management System

- (1) Organizational unit : Departments of the Tokuyama Plant, Zeon Corporation  
 Function : Manufacturing of synthetic rubbers, synthetic latex, film materials, and carbon nanotubes, and pilot research on synthetic rubbers and thermoplastic resins  
 Physical boundary : The entire area of the Tokuyama Plant, Zeon Corporation, 2-1 Nachi-cho, Shunan City, Yamaguchi Prefecture
- (2) Organizational activities : Business processes from raw materials procurement through to manufacturing, packaging, storage and shipping, and utility operations  
 Products and services : Synthetic rubbers, synthetic latex, film materials and carbon nanotubes, providing information to customers, and responding to complaints from customers and local residents
- (3) Authority and capacity of managing and influencing organization : Head Office divisions (including design and development), partner companies (product logistics, disposal of industrial waste, etc.), vendors (companies supplying raw materials, etc.)

### Specific Initiatives

#### 1. Reducing emissions of hazardous chemical substances

- We are striving to control emissions of PRTR substances through production process improvements and the effective operational management and monitoring of exhaust gas purification equipment.

#### 2. Reducing industrial waste

- We are continuing to maintain our record of zero waste sent to landfills by practicing the 3R's (Reduce, Reuse, and Recycle) in relation to industrial waste.

#### 3. Conserving resources and energy

- We are working to improve our per-unit energy consumption through day-to-day management and problem identification by the Plant's Energy Conservation Working Group and Energy Conservation Promotion Committee, and through the implementation of technological counter-measures in collaboration with Zeon's head office.

#### 4. Reducing impacts on air quality and on water quality

- We are striving to reduce our NO<sub>x</sub>, SO<sub>x</sub>, and CO<sub>2</sub> emissions through stable operation of boiler equipment.
- We are striving to reduce our COD and total nitrogen emissions through effective operational management and monitoring of wastewater treatment facilities.

#### 5. Environmental Data \* "0" indicates less than 0.5 tons, and "0.0" indicates less than 0.05 tons

Tokuyama Plant		FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Hazardous substances	Butadiene consumption (tons)	195,538	152,247	179,158	142,574	170,882
	Butadiene emissions (tons)	0.7	1.6	0.8	0.8	1.0
	Acrylonitrile consumption (tons)	16,983	13,476	19,060	16,654	18,769
	Acrylonitrile emissions (tons)	0.6	0.6	0.6	0.6	0.6
Substances subject to the PRTR Act	Consumption (tons)	422,439	347,496	412,431	342,547	397,462
	Emissions (tons)	2.1	2.9	3.0	1.9	2.4
Industrial waste	Amount generated before compacting (tons)	23,163	24,738	28,898	25,496	23,063
	Amount generated after compacting (tons)	4,737	5,208	4,932	5,222	4,080
	Amount sent to landfills (tons)	0.0	0.0	0.0	0.0	0.0

Atmospheric emissions	CO <sub>2</sub> emissions (tons)	263,215	228,574	261,456	231,443	258,305
	SO <sub>x</sub> emissions (tons)	622	603	796	689	770
	NO <sub>x</sub> emissions (tons)	191	200	256	216	224
	Soot emissions (tons)	10.9	4.3	7.3	3.8	6.1
Water resource consumption (1,000 m <sup>3</sup> ) (industrial water + groundwater + waterworks)		8,812	8,703	8,705	7,852	8,063
Wastewater	Total wastewater discharge (1,000 m <sup>3</sup> )	8,051	8,148	8,206	7,457	7,576
	COD emissions (tons)	57	49	52	47	61
	Total phosphorus discharge (tons)	0.8	0.7	0.6	0.5	0.7
	Total nitrogen discharge (tons)	28	25	26	22	30
Energy	Consumption (crude oil equivalent, kL)	104,326	93,669	105,323	93,430	102,984
	Unit consumption index (FY 1990 = 100)	85%	96%	92%	97%	93%
Production equivalent (tons)		603,368	532,374	626,406	527,914	604,514

## Relationship with Employees

### Human Resource Development Policy

At Tokuyama Plant, we develop human resources through education programs designed to draw out, develop, and mobilize the potential of employees, based on the ideal of employees “working toward ambitious goals, always thinking things through and taking action independently, and remaining open to change.”

### Specific Initiatives

- We implement employee education and training based on an education scheme that covers basic education, environmental and safety education, vocational education, quality management education, obtaining qualifications, and personal development.
- Basic education at the Monozukuri Training Center in the Mizushima Plant for employees in their first to third years of employment
- Transfer of specialized techniques and skills and developmental education
- Grade-specific education
- Support for obtaining qualifications

## Relationship with the Local Community

### Specific Initiatives

#### 1. Contributing to the community through volunteering

- Beautification activities in the area surrounding the plant
- Higashikawa Cleanup Campaign
- Tree thinning in the forest that is the industrial water source, conducted jointly with other companies that use the industrial water and forest operators

#### 2. Interactions with the local community

- Zeon Waraku Odori Dance Festival

We have held the festival since 1974 to deepen interaction with employees' families and community residents. Approximately 2,000 people participated this year.

- Participate in Responsible Care Council community dialogue events (twice/year)

We provide reports on our Responsible Care activities, including environmental improvements and safety measures, to local authorities and community representatives.

- Experimental classroom (making a super ball) (twice/year)



Higashikawa Cleanup Campaign

### **3. Plant tours**

- Plant tours

- Held in conjunction with Japan Responsible Care Council community dialogue events Leaders of residents' associations near the plant participated in the tours

- Summer vacation parent and child classroom (organized by the Chamber of Commerce and Industry)

- Plant bus tours (twice/year)

- Plant tours for junior high school and senior high school students