

# 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.



Aerial view of Tokuyama Plant

### 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

With production innovations driving plant reforms, we cooperate with the two Zeon Group companies of Zeon Yamaguchi Co., Ltd. and Zeon North Co., Ltd. to realize stable and safe plant operations and deepen our roots in the local community.

With the motto of “greetings and the 3S’s (sort, straighten, and scrub) are the foundation of everything we do,” we pursue dynamic and forward-looking plant operations with the participation of all employees in production innovations.

We aim to gain the trust of society by making contributions to resolving social issues and having employees engage with the local community.



Tokuyama Plant Manager  
Masao Akasaka

## Safety Initiatives

### Policy

Safety first! Employees take responsibility for their actions to realize zero accidents and disasters.

### Specific Initiatives

- We routinely implement, and are proceeding with the intensification of, four types of safety activities that are implemented on a company-wide basis (risk awareness activities, activities relating to near-miss incidents, foolproofing activities, and risk assessment activities in relation to operations and chemical products), and we are also implementing occupational accident prevention measures.
- We identify manufacturing process hazards (hazard sources) and work to prevent accidents through risk assessment and risk mitigation activities.

## Environmental Impact Reductions

### Policy

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

- (1) We analyze factors causing our energy consumption per unit to deteriorate and devise systems to prevent performance from backsliding.
- (2) We identify ways to conserve energy on an ongoing basis to achieve our mid- to long-term plan.

### 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  |  | FY2014  | FY2015  | FY2016  | FY2017  | FY2018  |
|---|--|---------|---------|---------|---------|---------|
| Hazardous substances  | Butadiene consumption (tons)                       | 170,327 | 195,538 | 152,247 | 179,158 | 142,574 |
|   | Butadiene emissions (tons)                         | 1.1     | 0.7     | 1.6     | 0.8     | 0.8     |
|   | Acrylonitrile consumption (tons)                   | 14,379  | 16,983  | 13,476  | 19,060  | 16,654  |
|   | Acrylonitrile emissions (tons)                     | 0.7     | 0.6     | 0.6     | 0.6     | 0.6     |
| Substances subject to the PRTR Act  | Consumption (tons)                                 | 397,637 | 422,439 | 347,496 | 412,431 | 342,547 |
|   | Emissions (tons)                                   | 2.7     | 2.1     | 2.9     | 3.0     | 1.9     |
| Industrial waste  | Amount generated before compacting (tons)          | 24,063  | 23,163  | 24,738  | 28,898  | 25,496  |
|   | Amount generated after compacting (tons)           | 4,674   | 4,737   | 5,208   | 4,932   | 5,222   |
|   | Amount sent to landfills (tons)                    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| Atmospheric emissions   | CO <sub>2</sub> emissions (tons)                   | 237,362 | 263,215 | 228,574 | 261,456 | 231,443 |
|   | SO <sub>x</sub> emissions (tons)                   | 507     | 622     | 603     | 796     | 689     |
|   | NO <sub>x</sub> emissions (tons)                   | 179     | 191     | 200     | 256     | 216     |
|   | Soot emissions (tons)                              | 2.2     | 10.9    | 4.3     | 7.3     | 3.8     |
| Water resource consumption (1,000 m <sup>3</sup> )<br>(industrial water + groundwater + waterworks) |  | 8,393   | 8,812   | 8,703   | 8,705   | 7,852   |
| Wastewater  | Total wastewater discharge (1,000 m <sup>3</sup> ) | 7,785   | 8,051   | 8,148   | 8,206   | 7,457   |
|   | COD emissions (tons)                               | 42      | 57      | 49      | 52      | 47      |
|   | Total phosphorus discharge (tons)                  | 0.6     | 0.8     | 0.7     | 0.6     | 0.5     |
|   | Total nitrogen discharge (tons)                    | 27      | 28      | 25      | 26      | 22      |
| Energy  | Consumption (crude oil equivalent, kL)             | 92,423  | 104,326 | 93,669  | 105,323 | 93,430  |
|   | Unit consumption index (FY 1990 = 100)             | 94%     | 85%     | 96%     | 92%     | 97%     |
| Production equivalent (tons)  |  | 537,497 | 603,368 | 532,374 | 626,406 | 527,914 |

## 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 for manufacturing operators
  - (1) Education at the Monozukuri Training Center at Mizushima Plant for employees in their first to third years of employment
  - (2) Professional development that transfers operational skills and technical knowledge
- 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



Higashikawa Cleanup Campaign

#### 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.
- Participation 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.

#### 3. Plant tours

- Plant tours  
Held in conjunction with Japan Responsible Care Council community dialogue events. Leaders of five residents' associations near the plant participated in the tours
- Summer vacation parent and child classroom (organized by the Chamber of Commerce and Industry)  
Experimental classroom (making a super ball), plant bus tour
- Plant tours for junior high school and senior high school students