

## Mizushima Plant

### Introduction to Mizushima Plant

#### [Establishment]

1969

#### [Main functions and products]

A plant to make comprehensive use of C5\* fraction extracted from naphtha.

- Isoprene rubber
- Thermoplastic elastomer
- Petroleum resin
- Synthetic aroma chemicals
- High-performance resin
- RIM molded articles
- Isoprene monomer
- Butadiene monomer

\* C5

Hydrocarbon molecules containing five carbon atoms. They are the byproduct of thermal cracking, or breaking down, of naphtha, and also include ingredients for raw materials of synthetic rubber and resin.



Aerial view of the Mizushima Plant

### Plant Policy (from Plant Manager)

At the Mizushima Plant, we have the slogan “Let’s advance production innovation, business innovation and process innovation with an ABC culture!” and we are making efforts for this ABC (atarimae, bakashoujiki, and chanto, or in English: to earnestly and properly perform all of the routine but necessary tasks) culture to take hold and these three innovations.

This is because I believe that when each employee properly practices things they have decided without fail such as procedures and rules based on compliance with the law, then this is the starting point for offering stable high-quality products to society with the highest priority on safety and environmental protection.

In addition, at the Mizushima Plant, we have established the Monozukuri Training Center as an educational institution for all operators. We accept trainees from each plant, and through conducting basic education for working in a chemical factory, we train operators that can perform the routine but necessary tasks.

We are working to ensure that the Mizushima Plant meets the expectations of the local community and society at large in its pursuit of safety and stability, achieved by firmly rooting ABC culture and through the three innovations.



Corporate Officer and Mizushima Plant Manager Tomoyuki Kose

### Safety initiatives

#### [Policy]

In order to realize a stable, safe and competitive plant, we will thoroughly tackle all business as production innovations

#### [Concrete efforts]

- Memorial morning note

We distribute a note of past accident dates and use past cases as training.

•4R-KYT\* trainer one day training

In order to promote improved sensibility and awareness of danger, we implement this at subcontractors as well as for employees.

\* 4R-KYT

Four-round risk assessment activities One risk prediction method to discuss, think about and understand risk factors in the workplace and in working conditions and the phenomena that cause them in small groups, in order to solve them before acting. The name 4R-KY comes from the division of the procedure from 1R (round) to 4R.

## Efforts to Reduce Environmental Impact

### [Policy]

In order to minimize environmental impacts, in addition to continuously tackling energy-saving, we promote reduction of environmentally hazardous substances.

### [Concrete efforts]

#### 1. Reducing toxic chemical emissions

Since 2002 we have achieved zero atmospheric emissions of butadiene.

We will continue to reduce VOCs\*

\* VOC

Volatile Organic Compounds Generic name for organic compounds that exist in the air as gas.

#### 2. Reducing industrial waste

Goal for landfill: 5 tons or less

Fiscal 2015 result: 3.5 tons (achieved goal)

We will reduce the amount by implementing efforts including reducing waste, reusing beverage bottles, and recycling plastics as solid fuels (the "3Rs"), which will lead to reducing final waste amounts.

#### 3. Saving resources and energy

In fiscal 2015, while energy consumption increased accompanying an expansion of production volume, we are reducing the intensity index. Continuing on from the previous year, in fiscal 2014 in addition to stabilizing our processes, we conducted a diagnosis of steam traps throughout the plant in order to plan improvements for defective areas. In addition, our new and efficient combustion and heat recovery boilers began operating from August 2015, and are expected to make ongoing incremental resource and energy savings.

#### 4. Reducing air pollution

We updated our boiler in fiscal 2015.

#### 5. Reducing water pollution

We installed measuring equipment in various places in the wastewater treatment system, and will strengthen our management through more accurately understanding the processing status.

#### 6. Environmental Data

| Mizushima Plant       |                              | FY2011  | FY2012  | FY2013  | FY2014  | FY2015  |
|-----------------------|------------------------------|---------|---------|---------|---------|---------|
| Toxic substances      | Butadiene consumption (tons) | 136,385 | 130,154 | 110,704 | 141,100 | 138,029 |
|                       | Butadiene emissions (tons)   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
| Substances subject to | Consumption (tons)           | 442,900 | 431,800 | 393,777 | 478,178 | 476,200 |
|                       | Amount emitted (tons)        | 4.4     | 4.6     | 5.3     | 6.0     | 6.5     |

|  |   |         |         |         |         |         |
|--|---|---------|---------|---------|---------|---------|
| PRTR law   |   |         |         |         |         |         |
| Industrial waste   | Amount generated (before volume reduction) (tons)   | 60,400  | 56,270  | 59,253  | 70,584  | 69,824  |
|  | Amount generated (after volume reduction) (tons)    | 5,935   | 4,830   | 5,999   | 6,956   | 5,418   |
|  | Amount sent to landfill (tons)                      | 3.7     | 5.4     | 1.3     | 6.5     | 3.5     |
| Atmospheric emissions  | CO <sub>2</sub> emissions (tons)                    | 259,651 | 197,855 | 182,800 | 211,420 | 235,360 |
|  | SOx emissions (tons)                                | 3.8     | 2.7     | 1.2     | 1.4     | 1.1     |
|  | NOx emissions (tons)                                | 80      | 66      | 47      | 54      | 54      |
|  | Soot emissions (tons)                               | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |
|  | Leakage of CFCs (tons of CO <sub>2</sub> )          | —       | —       | —       | —       | 0.0     |
| Water resources (Industrial water + Ground water + Waterworks) consumption (1,000 m <sup>3</sup> ) |   | 2,481   | 2,351   | 2,665   | 2,713   | 2,510   |
| Waste water  | Total waste water discharge (1,000 m <sup>3</sup> ) | 2,640   | 2,429   | 2,674   | 2,602   | 2,411   |
|  | COD emissions (tons)                                | 15      | 13      | 17      | 20      | 15      |
|  | Total phosphorus discharge (tons)                   | 0.6     | 0.7     | 0.6     | 0.5     | 0.4     |
|  | Total nitrogen discharge (tons)                     | 16      | 15      | 17      | 12      | 12      |
| Energy   | Total consumption (crude oil equivalent, kL)        | 91,566  | 73,148  | 67,850  | 77,517  | 87,860  |
|  | Unit consumption index (1990 = 100)                 | 56%     | 46%     | 41%     | 40%     | 45%     |
| Production of PDR equivalent (tons)  |   | 731,500 | 705,400 | 714,800 | 840,400 | 834,400 |

## Quality Assurance Efforts

### [Policy]

As we work to achieve the Enterprise Blueprint for 2020 “Zeon makes the future today through the Power of Chemistry” laid out in the medium-term management plan SZ-20, the Mizushima Plant will properly manage Materials, Machines, Methods and Man, aiming to realize production technology that can manufacture the same quality goods anywhere in the world and by anyone.

### [Concrete efforts]

- Stabilized processes with the three innovations and improved process capability
- Strictly managed the manufacturing conditions and achieved world-class quality

## Relationship with Employees

### [Policy]

Smoothly promote technology and skill transfer

Number of employees: Male 313 Female: 19

**[Concrete efforts]**

We carry out education and training at the “Monozukuri Training Center”, the company-wide training institution in the Mizushima plant site. The Center is a place for education and development of beginner operators that provides guidance on being a member of society and the plant’s stability and safety.

**Living Together with the Local Community**

**[Concrete efforts]**

**1. Community dialogue activities**

In an effort to proactively interact with the region, we participated in community-organized events, such as the summer festival and rice-cake making.

**2. Plant tours**

On December 17, 2015, we received 30 second graders from Okayama Prefectural Kurashiki Minami High School.

**3. Regional volunteering**

We have performed voluntary neighborhood cleanups since fiscal 2006.



Participation in Honjo district *mochi* (sticky rice cake) pounding event and market

Plant tours

Cleanup volunteering together with local residents