Reference Materials

As a supplement to the contents of JCIA Annual Report 2017, this pamphlet introduces various data and initiatives relating to the activities of the Japan Chemical Industry Association. Please read it together with JCIA Annual Report 2017.
Environmental Protection (Prevention of Global Warming)

CO₂ Emissions Index

Data are reviewed annually.

Reduction of Emissions of CO₂ and Four Alternatives to Freon

- CO₂ emissions (10,000 tons/CO₂): Energy source CO₂ emissions
- Estimated emissions in manufacture of HFCs, etc.: CO₂e emissions of four alternatives to Freon

* CO₂e (CO₂ equivalent): Corresponding value of CO₂ emissions

CO₂ Emissions Index

Emissions have reduced each year since the “Commitment to a Low-carbon Society” activities was started in FY 2013. In the last FY, CO₂ emission has been reduced by 9,200,000 tons (13.5%) compared to FY 2005 taken as the base year.

Reduction of Emissions of CO₂ and Four Alternatives to Freon

When the reduction of CO₂ emissions and the reduction of emissions in the manufacture of four alternatives to Freon (HFCs, PFCs, SF₆, NF₃) are combined, emissions in 2016 were down 27% from the base years (= 100%).

Base years: The base year for CO₂ emissions is FY 1990; the base year for estimated emissions associated with manufacturing of HFCs, etc. is 1995 (calendar year).
Progress in Achievement of FY 2016 Target for Final Disposal Volume

In accordance with the Keidanren (Japan Business Federation) Voluntary Action Plan on the Environment, JCIA set a target in FY 2011 (a reduction in final disposal volume by about 65% from the FY 2000 level by FY 2015) and has been working to achieve that goal.

Industrial Waste Volume and Effective Resource Utilization Ratio

Industrial waste volume in FY 2016 was 4,036,000 tons, down 43% from the level in the base year of FY 2000. We are also making positive efforts to encourage sorting and reuse. The effective resource utilization ratio (the ratio to the volume of waste discharged by effectively used resources) increased from 42% in FY 2000 to 67% in FY 2016.

Final Landfill Disposal Volume

The final landfill disposal volume in FY 2016 was 190,000 tons, down 70% from the FY 2000 level. Furthermore, as well as reducing the final landfill disposal volume, in accordance with legal revisions member companies are strengthening their verification of the proper disposal of waste by, among other things, the issuance, recovery, and verification of industrial waste manifestos and the inspection of final disposal sites.
Chemical industrial companies in Japan have significantly reduced emissions of air and water pollutants. In particular, member companies not only comply with regulatory standards but also agreements with municipalities. They also set their own voluntary management criteria, which are more rigorous than government standards, to intensify their ongoing efforts to reduce emissions.
Environmental Protection
(Reduction of Chemical Emissions)

Emissions of PRTR Substances

- **Atmosphere**
- **Water**
- **Soil**

<table>
<thead>
<tr>
<th>Year</th>
<th>Atmosphere (1,000 tons/year)</th>
<th>Water (1,000 tons/year)</th>
<th>Soil (1,000 tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>46.1</td>
<td>10</td>
<td>9.8</td>
</tr>
<tr>
<td>2009</td>
<td>35.4</td>
<td>20</td>
<td>17.0</td>
</tr>
<tr>
<td>2010</td>
<td>20</td>
<td>20</td>
<td>17.0</td>
</tr>
<tr>
<td>2011</td>
<td>17.0</td>
<td>17.0</td>
<td>17.0</td>
</tr>
<tr>
<td>2012</td>
<td>20</td>
<td>20</td>
<td>17.0</td>
</tr>
<tr>
<td>2013</td>
<td>17.0</td>
<td>17.0</td>
<td>17.0</td>
</tr>
<tr>
<td>2014</td>
<td>17.0</td>
<td>17.0</td>
<td>17.0</td>
</tr>
<tr>
<td>2015</td>
<td>17.0</td>
<td>17.0</td>
<td>17.0</td>
</tr>
<tr>
<td>2016</td>
<td>17.0</td>
<td>17.0</td>
<td>17.0</td>
</tr>
</tbody>
</table>

Emissions of PRTR* Substances

In FY 2016 Emissions of PRTR substances amounted to 9,800 tons, a reduction of about 79% from the FY 2000 level. Because the number of designated substances increased following a revision of the law, the volume of emissions temporarily increased in FY 2010, but since then the downward trend has continued. Emissions into the atmosphere accounted for 92% of the total, and emissions into water areas for 8%. No emissions to soil were reported.

* PRTR (Pollutant Release and Transfer Register): The PRTR system is designed to identify, collect and disseminate data on the amounts and sources of a variety of toxic chemicals released to the environment or transferred outside of facilities in the form of waste. PRTR Law: Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Emissions of Voluntary Surveyed Substances

The emissions of voluntary surveyed substances was 17,000 tons, resulting in over 69% reduction compared to FY 2000. The breakdown of the emission quantities was 92% for emissions into the air and 8% for emissions into water areas. No emissions to soil were reported.

Note) Change in the number of substances voluntarily surveyed by JCIA:
- From FY 2000 to 2009: 126 substances
- From FY 2010 to 2012: 106 substances
- From FY 2013 to the current: 90 substances

VOC* Emissions

Member companies are making tremendous efforts to install equipment and improve processes for controlling emissions of VOCs. The VOC emissions in FY 2016 amounted to 24,500 tons, a 73% reduction compared with FY 2000 level, continuing a significant downward trend.

* VOC (volatile organic compound): VOC is a collective term for a wide variety of volatile organic compounds that turn into gas and enter the atmosphere, including toluene, xylene and ethyl acetate.

Environmental Protection
(Environmental Investment)

Investment in Environmental Measures

In FY 2016, investment for the installation and maintenance of environment-friendly equipment, such as energy-saving and CO₂-reduction equipment, and for the development of environment-friendly products and technologies remained at roughly the same level as in recent years, amounting to ¥69.3 billion, or the equivalent of 0.40% of sales, with some yearly fluctuation in the amount of investment depending on the number of companies submitting the data. Member companies are implementing the planned investment in environmental measures and steadily linking that investment to sustained improvements in their environmental performance.

Breakdown of Environmental Investment in FY 2016

- **Soil and ground water pollution countermeasures**
- **Promotion of greening**
- **Measures to prevent noise, vibration, and offensive odor**
- **Measures to reduce emissions of harmful substances**
- **Industrial waste and recycling measures**
- **Atmospheric pollution countermeasures**
- **Energy-saving and CO₂-reduction measures**

JCIA Annual Report 2017 Reference Materials
Process Safety and Disaster Prevention (Efforts to Prevent Plant Accidents)

Accident Occurrences (Explosions, fires, leakage, etc.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of leakage accidents</td>
<td>86</td>
<td>38</td>
<td>84</td>
<td>76</td>
<td>83</td>
<td>83</td>
<td>81</td>
<td>77</td>
</tr>
<tr>
<td>Number of explosions and fires</td>
<td>1,000</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
</tr>
<tr>
<td>Number of plant accidents per company</td>
<td>0.83</td>
<td>0.38</td>
<td>0.84</td>
<td>0.76</td>
<td>0.83</td>
<td>0.83</td>
<td>0.81</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Note: The number of plant accidents is divided into leakage accidents and explosion/fire accidents. The figures in the bars indicate the number of companies that submitted data.

Investment in Safety, Security, and Disaster-Prevention Measures

<table>
<thead>
<tr>
<th>Year</th>
<th>Safety and disaster-prevention investment amount</th>
<th>Ratio to sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>559,000,000 yen</td>
<td>0.01</td>
</tr>
<tr>
<td>2010</td>
<td>691,000,000 yen</td>
<td>0.09</td>
</tr>
<tr>
<td>2011</td>
<td>831,000,000 yen</td>
<td>0.43</td>
</tr>
<tr>
<td>2012</td>
<td>1,043,000,000 yen</td>
<td>0.88</td>
</tr>
<tr>
<td>2013</td>
<td>1,043,000,000 yen</td>
<td>0.63</td>
</tr>
<tr>
<td>2014</td>
<td>1,043,000,000 yen</td>
<td>0.50</td>
</tr>
<tr>
<td>2015</td>
<td>1,043,000,000 yen</td>
<td>0.35</td>
</tr>
<tr>
<td>2016</td>
<td>1,043,000,000 yen</td>
<td>0.35</td>
</tr>
</tbody>
</table>

The figures at the bottom of the bars indicate the number of companies that submitted data.

Industrial Health and Safety

Occurrence of Occupational Accidents

LTIR* (Lost Time Injury Rate) Trends

In 2016 LTIR for member companies and their contractors was lower than in the manufacturing industry as a whole and in the chemical industry as a whole, although the figure is hovering around the same level.

\[
\text{LTIR} = \frac{\text{Number of lost time injuries}}{\text{Total working hours (per one million hours)}}
\]

Lost Time Injury Severity Rate* Trends

The severity rate of the member companies and their contractors in 2016 improved compared to 2015. However, further efforts for improvement by contractors continue to be needed.

\[
\text{Lost Time Injury Severity Rate} = \frac{\text{Number of work days lost}}{\text{Total work hours (per thousand hours)}}
\]

Number of Fatalities from Occupational Accidents

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>120</td>
</tr>
<tr>
<td>2010</td>
<td>120</td>
</tr>
<tr>
<td>2011</td>
<td>120</td>
</tr>
<tr>
<td>2012</td>
<td>120</td>
</tr>
<tr>
<td>2013</td>
<td>120</td>
</tr>
<tr>
<td>2014</td>
<td>120</td>
</tr>
<tr>
<td>2015</td>
<td>120</td>
</tr>
<tr>
<td>2016</td>
<td>120</td>
</tr>
</tbody>
</table>

* Data publicly announced by Ministry of Health, Labour and Welfare (MHLW)
Implementation of Regional Dialogue Meetings

Areas where implemented in FY 2016
- Eastern Yamaguchi, Okayama, Hyogo, Osaka, Yokkaichi, Aichi, Chiba, Kashima

Areas where implemented in FY 2015
- Oita, Western Yamaguchi, Iwakuni & Otake, Sakai & Senboku, Toyama & Takaoka, Nigata-Kita, Kaisaki

Members’ Self-Assessment

Details of Self-Assessment Scores (Average scores for all member companies based on a five-level assessment system)

<table>
<thead>
<tr>
<th>Code</th>
<th>MS</th>
<th>EP</th>
<th>PS</th>
<th>OSH</th>
<th>DS</th>
<th>CPS</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessed item</td>
<td>Important items</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td>4.7</td>
<td>4.7</td>
<td>4.6</td>
<td>4.7</td>
<td>4.3</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Identification of striking environmental aspects, identification of dangerous and harmful factors, etc.</td>
<td>4.5</td>
<td>4.6</td>
<td>4.6</td>
<td>4.4</td>
<td>4.0</td>
<td>4.5</td>
<td>—</td>
</tr>
<tr>
<td>Legal and other requirements</td>
<td>4.7</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Objectives</td>
<td>4.7</td>
<td>4.5</td>
<td>4.3</td>
<td>4.4</td>
<td>3.9</td>
<td>4.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Plans</td>
<td>4.6</td>
<td>4.2</td>
<td>4.4</td>
<td>4.5</td>
<td>3.9</td>
<td>4.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Organization</td>
<td>4.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Education and training</td>
<td>4.2</td>
<td>4.2</td>
<td>4.4</td>
<td>4.5</td>
<td>4.2</td>
<td>4.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Communication</td>
<td>4.3</td>
<td>4.0</td>
<td>3.8</td>
<td>4.7</td>
<td>4.3</td>
<td>4.3</td>
<td>4.1</td>
</tr>
<tr>
<td>Documentation and document management</td>
<td>4.3</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Operation management</td>
<td>4.3</td>
<td>4.2</td>
<td>—</td>
<td>—</td>
<td>4.1</td>
<td>4.7</td>
<td>—</td>
</tr>
<tr>
<td>Response to emergency situations</td>
<td>4.5</td>
<td>—</td>
<td>4.2</td>
<td>—</td>
<td>3.7</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Inspection and monitoring</td>
<td>4.5</td>
<td>4.5</td>
<td>4.4</td>
<td>4.4</td>
<td>3.8</td>
<td>4.4</td>
<td>3.8</td>
</tr>
<tr>
<td>Corrections and preventive measures</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.6</td>
<td>4.1</td>
<td>4.5</td>
<td>—</td>
</tr>
<tr>
<td>Collection of information and management of records</td>
<td>4.4</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Auditing</td>
<td>4.6</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Revisions by management</td>
<td>4.7</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>(Overall assessment)</td>
<td>4.5</td>
<td>4.4</td>
<td>4.4</td>
<td>4.6</td>
<td>4.1</td>
<td>4.1</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Details of Self-Assessment Scores (Average scores for all member companies)

<table>
<thead>
<tr>
<th>Code</th>
<th>MS</th>
<th>EP</th>
<th>PS</th>
<th>OSH</th>
<th>DS</th>
<th>CPS</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-assessment score</td>
<td>Classification</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management system</td>
<td>4.5 points or over</td>
<td>Very satisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental protection</td>
<td>3.5 to under 4.5 points</td>
<td>Just about satisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process safety and disaster prevention</td>
<td>2.5 to under 3.5 points</td>
<td>Somewhat unsatisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational health and safety</td>
<td>Under 2.5 points</td>
<td>Unsatisfactory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemicals and product safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social dialogue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Responsibility Care Verification

Companies Undergoing a Responsible Care Verification

In FY 2016, 11 companies underwent a responsible care verification (11 for verification of reports and 0 for verification of actions). The total number of companies that have undergone an RC verification is 196 (151 for verification of reports and 45 for verification of actions).


Please refer to the publications posted on the JCIA website regarding other information such as the aggregate results on the questionnaire for member companies.
October 23 is Chemistry Day

Access Information

Kayabacho Station. (Tokyo Metro Hibiya and Tozai Lines)
Approximately 3 minutes on foot from Exit No.1 or Exit No.3

Hatchobori Station. (JR Keiyo Line)
Approximately 8 minutes on foot from Exit No.B1

Contact

General Affairs Department
TEL 03 3297 2550
FAX 03 3297 2610

Public Relations Department
TEL 03 3297 2555
FAX 03 3297 2615

International Affairs Department
TEL 03 3297 2576
FAX 03 3297 2615

Department of Business/Economic Information
TEL 03 3297 2559
FAX 03 3297 2615

Labor Department
TEL 03 3297 2563
FAX 03 3297 2615

Technical Affairs Department
TEL 03 3297 2578
FAX 03 3297 2615

Environment and Safety Department
TEL 03 3297 2568
FAX 03 3297 2606

Chemicals Management Department
TEL 03 3297 2567
FAX 03 3297 2612

Responsible Care Department
TEL 03 3297 2583
FAX 03 3297 2606

Chemical Products PL Consulting Center
TEL 03 3297 2602
FAX 03 3297 2604

Dream Chemistry 21 Committee
TEL 03 3297 2555
FAX 03 3297 2615

Japan Chemical Industry Association

7F Sumitomo Fudosan Rokko Building, 1-4-1 Shinkawa, Chuo-ku, Tokyo
104-0033
TEL 03 3297 2555  FAX 03 3297 2615

http://www.nikkakyyo.org/

Access Information

Kayabacho Station. (Tokyo Metro Hibiya and Tozai Lines)
Approximately 3 minutes on foot from Exit No.1 or Exit No.3

Hatchobori Station. (JR Keiyo Line)
Approximately 8 minutes on foot from Exit No.B1

Contact

General Affairs Department
TEL 03 3297 2550
FAX 03 3297 2610

Public Relations Department
TEL 03 3297 2555
FAX 03 3297 2615

International Affairs Department
TEL 03 3297 2576
FAX 03 3297 2615

Department of Business/Economic Information
TEL 03 3297 2559
FAX 03 3297 2615

Labor Department
TEL 03 3297 2563
FAX 03 3297 2615

Technical Affairs Department
TEL 03 3297 2578
FAX 03 3297 2615

Environment and Safety Department
TEL 03 3297 2568
FAX 03 3297 2606

Chemicals Management Department
TEL 03 3297 2567
FAX 03 3297 2612

Responsible Care Department
TEL 03 3297 2583
FAX 03 3297 2606

Chemical Products PL Consulting Center
TEL 03 3297 2602
FAX 03 3297 2604

Dream Chemistry 21 Committee
TEL 03 3297 2555
FAX 03 3297 2615

Japan Chemical Industry Association

7F Sumitomo Fudosan Rokko Building, 1-4-1 Shinkawa, Chuo-ku, Tokyo
104-0033
TEL 03 3297 2555  FAX 03 3297 2615

http://www.nikkakyyo.org/