

## Calculation Methods for Data of Indicators Related to Environment

Calculation methods for data of indicators related to environment are as follows.

### 【Main Raw Materials, Energy, Products】

Main Raw Materials	Raw materials calculated in or converted to tons
Energy Consumption	Energy consumption is calculated based on the Energy Saving Law (Act on the Rationalization etc. of Energy Use of Japan). However, the amount of electricity or steam sold by Kaneka to outside parties is not deducted from Kaneka's energy consumption. The boundaries are consistent with the Energy Saving Law and the Act on Promotion of Global Warming Countermeasures of Japan and include all manufacturing sites and other facilities. GWh conversions are also shown as units of energy. Converted at 1GWh = 3,600GJ.
Energy Intensity Index	Energy intensity is a numerical value calculated by dividing the energy used in manufacturing by the volume of activity (production volume at all parent manufacturing sites). The energy intensity index is calculated by indexing the energy intensity, with fiscal 2013 used as the base year of 100.
Products	Products calculated in or converted to tons

### 【Greenhouse Gas (GHG)】

GHG Emissions	GHG emissions are calculated referring the Greenhouse Gas Protocol, "A Corporate Accounting and Reporting Standard REVISED EDITION". Figures represent the total amount of energy origin CO <sub>2</sub> emissions, non-energy origin CO <sub>2</sub> emissions, and the CO <sub>2</sub> equivalent of methane and N <sub>2</sub> O emissions. CO <sub>2</sub> emission factors for steam, units of heat for each fuel, and CO <sub>2</sub> emission factors for each fuel both in Japan and outside Japan use values specified by the Act on Promotion of Global Warming Countermeasures of Japan. Outside Japan, however, if a value is specified in the country concerned, that value is used. As CO <sub>2</sub> emission factors for electricity, the adjusted value for each power company was used for calculations in Japan and the value for each power company and IEA country emission factors were used for calculations outside Japan. IEA country emission factors are calculated using data from two years prior to the year calculated (e.g. 2019 emission factors are used for calculations of fiscal 2021 GHG emissions). The boundaries are the same as those for energy consumption.
Energy Origin CO <sub>2</sub> Emission Intensity Index	CO <sub>2</sub> emission intensity is a numerical value calculated by dividing energy origin CO <sub>2</sub> emissions associated with production activities, which are calculated using a fixed emission factor unique to Kaneka, by the volume of activity, with fiscal 2013 indexed to 100. Using a fixed emission factor makes it easier to see the impact of our activities.

## 【Water】

Water Consumption	Total industrial water, water supply, seawater, river water, groundwater, and other water consumed at each site.
Wastewater Discharges	Total wastewater discharged to public waterways (sea, lakes, rivers, etc.) and wastewater discharged to sewers. At some sites that do not get accurate quantity of wastewater discharges, wastewater discharge is considered to be the same as water consumption.

## 【Water Quality in Water Areas】

Chemical Oxygen Demand	Total chemical oxygen demand emissions into public waterways (sea, lakes, rivers, etc.). Calculated as chemical oxygen demand concentration at the discharge outlet multiplied by amount of drainage from each drain to public waterways.
Suspended Solids	Total suspended solid emissions to public waterways (sea, lakes, rivers, etc.). Calculated as suspended solid concentration at the discharge outlet multiplied by amount of drainage from each drain to public waterways.
Nitrogen	Total nitrogen emissions to public waterways (sea, lakes, rivers, etc.). Calculated as nitrogen concentration at the discharge outlet multiplied by amount of drainage from each drain to public waterways.
Phosphorous	Total phosphorous emissions to public waterways (sea, lakes, rivers, etc.). Calculated as phosphorous concentration at the discharge outlet multiplied by amount of drainage from each drain to public waterways.

## 【Atmospheric Emissions】

SOx	Total sulfur oxides emitted from facilities as defined by the Air Pollution Control Act of Japan. Calculated as annual amount of dry exhaust gas at each facility multiplied by SOx (SO <sub>2</sub> ) concentration. Sulfur oxide (SOx) emissions (tons) = SOx concentration (ppm) × 10 <sup>-6</sup> × dry exhaust gas (Nm <sup>3</sup> /h) × annual facility operation hours (h) × 64/22.4 × 10 <sup>-3</sup>
NOx	Total nitrogen oxides emitted from facilities as defined by the Air Pollution Control Act of Japan. Calculated as annual amount of dry exhaust gas at each facility multiplied by NOx concentration. Nitrogen oxides (NOx) emissions (tons) = NOx concentration (ppm) × 10 <sup>-6</sup> × dry exhaust gas (Nm <sup>3</sup> /h) × annual facility operation hours (h) × 46/22.4 × 10 <sup>-3</sup>
Soot and Dust	Total soot and dust emitted from facilities as defined by the Air Pollution Control Act of Japan. Calculated as annual amount of dry exhaust gas at each facility multiplied by soot and dust concentration. Soot and dust emissions (tons) = soot and dust concentration (g/Nm <sup>3</sup> ) × dry exhaust gas (Nm <sup>3</sup> /h) × annual facility operation hours (h) × 10 <sup>-6</sup>

## 【Environmental Accounting (Investments, Expenditures) 】

Pollution Prevention	Pollution prevention costs in order to control environmental impacts that occur in our business areas (air and water pollution prevention)
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Environmental Conservation	Figures do not include investment and expense amounts related to environmental conservation.
Resource Recycling	Costs of processing industrial and general waste
Upstream and Downstream	Costs of recycling, collection, and appropriate processing of products, and costs of recycling, collection, and appropriate processing of containers and packaging. Includes supply chain management costs (green purchasing, guidance for vendors on reducing environmental impacts and building environmental management systems, etc.).
Management Activities	Costs required for environmental conservation activities at each manufacturing site (environmental education for employees and environmental impact monitoring and measurement).
Research and Development	Costs for research and development of products contributing to environmental conservation and of ways of reducing environmental impacts at the product manufacturing stage (figures do not include research and development investment amounts)
Social Activities	Costs of greening, beautification, landscape preservation, and disclosure of environmental information
Environmental Damage	Costs for addressing environmental damage (payment of sulfur oxide emission charges, etc.)

#### 【Environmental Accounting (Economic Impacts)】

Revenue from Recycling	Total sales amount of off-grade materials and collected items obtained by recycling that resulted in paid transactions (valuable resources).
Cost Reductions by Better Resource Efficiency (Output per Unit of Input)	Total amount of reduction in purchase costs of raw materials, etc. through resource conservation activities and unit cost improvements.
Waste Disposal Cost Reductions by Recycling	Total amount of reduction in processing costs due to reduction of waste through recycling activities.
Cost Reductions by Energy Conservation	Total amount of reduction in energy costs through energy conservation activities.

#### 【Environment Efficiency】

Total Environmental Impact	<p>Kaneka assesses the environmental impacts of our production activities using Environmental Impact Points (EIP), which are compiled using the JEPIX methodology (*1).</p> <p>*1 The Japan Environmental Policy Priorities Index (JEPIX) methodology involves the calculation of an "eco-factor" coefficient for each emitted substance that has an environmental impact, using a ratio of the annual target for emissions under national environmental policies versus actual annual emissions ("Distance to Target"). The eco-factors are then multiplied by a quantity for each environmental impact to produce a single integrated indicator known as Environmental Impact Points (EIP).</p>
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	Calculations of eco-factors are done by the JEPIX Project ( <a href="http://www.jepix.org">www.jepix.org</a> , in Japanese).
Environmental Efficiency	Environmental efficiency is a yardstick to measure efforts to maximize value while minimizing environmental impacts, with the aim of achieving sustainable growth. Kaneka calculates this by dividing net sales (yen) by the EIP.

#### 【Scope 3 GHG Emissions】

Category 1 Purchased Goods/Services	The calculation was made using emission factors listed in the LCI database “IDEA ver. 3.2” (National Institute of Advanced Industrial Science and Technology / Sustainable Management Promotion Organization) with the purchase results in this fiscal year considered as the volume of activity. The coverage rate was 99.4% on a main and auxiliary raw material weight basis.
Category 2 Capital Goods	The calculation was made by multiplying investments in each capital formation area by emission factors listed in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain, (ver. 3.2) published by the Ministry of the Environment of Japan. The coverage rate was 100% on an investment amount basis.
Category 3 Fuel-and Energy- related Activities	The calculation was made by multiplying electric power, steam, and fuel consumption by emission factors listed in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain (ver. 3.2) published by the Ministry of the Environment of Japan and in the IDEA database ver. 3.2 (for the calculation of supply chain GHG emissions) published by the National Institute of Advanced Industrial Science and Technology and the Sustainable Management Promotion Organization. The coverage rate for organizations subject to the calculation was 100% on an energy consumption.
Category 4 Upstream Transportation and Distribution	The calculation was made using a calculation method stipulated in the Measures Pertaining to Consigners of the Energy Saving Law. Emission results have been calculated every year since fiscal 2006 according to the Energy Saving Law. The coverage rate was 100% on a transportation volume (ton-kilometer) basis.
Category 5 Waste Generated in Operations	The calculation was made by multiplying the volume of waste by type from all Kaneka facilities by emission factors listed in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain (ver. 3.2) published by the Ministry of the Environment of Japan and listed in IDEA Ver. 3.2 (for calculating GHG emissions in the supply chain) from the National Institute of Advanced Industrial Science and Technology and the Sustainable Management Promotion Organization. The coverage rate was 100% on an amount of industrial waste generated basis.
Category 6 Business Travel	The calculation was made by multiplying travel costs by transportation mode and the number of stays by emission factors listed in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain (ver. 3.2) published by the Ministry of the Environment of Japan. The coverage rate was 100% on a basis of applied business travel expenses.
Category 7 Employee Commuting	The calculation was made by multiplying travel costs by transportation mode by emission factors listed in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain (ver. 3.2) published by the Ministry of the Environment of Japan. The coverage rate was 100% on a basis

	of applied commuting method.
Category 8 Upstream Leased Assets	According to company policy, we do not use leased assets for upstream operations, in principle. However, if some assets are leased, out of necessity, the emissions from them are included in Scope 1 or 2. The coverage rate was 100%.
Category 9 Downstream Transportation and Distribution	This category was excluded from the scope of calculation because it is difficult to accurately grasp a wide range of downstream logistics operations due to the high percentage of intermediate products and to calculate the emissions using a rational calculation method.
Category 10 Processing of Sold Products	This category was excluded from the scope of calculation because it is difficult to accurately grasp a wide range of downstream product processing operations due to the high percentage of intermediate products and to calculate the emissions using a rational calculation method.
Category 11 Use of Sold Products	Most products sold by Kaneka are plastics, chemicals, foods, and pharmaceuticals which do not generate emissions when used. Although some medical devices and organic LED lightings generate emissions upon used, it is difficult to accurately grasp the gauging usage, we used assumptions to estimate emission volumes. Our results confirmed that such emissions represented less than 0.1% of Kaneka's total Scope 3 emissions, the category was thus excluded from the calculation range.
Category 12 End-of-Life Treatment of Sold Products	Assuming that all products manufactured by Kaneka are discarded within the reporting year, production quantities are classified according to type of waste outlined in the Emissions Unit Database for Calculation of Greenhouse Gas Emissions, etc. by Organizations throughout the Supply Chain (ver. 3.2) published by the Ministry of the Environment of Japan. Figures are calculated by multiplying by the emission factors listed in the database.
Category 13 Downstream Leased Assets	The calculation was made by multiplying the activity volume of leased assets by emission factors stipulated in the Act on Promotion of Global Warming Countermeasures according to the Basic Guidelines on the Calculation of Greenhouse Gas Emissions throughout the Supply Chain (ver. 2.4) published by the Ministry of the Environment of Japan. Since the emissions associated with assets leased to Group companies are included in the Scope 1 or 2 emissions of each company, they are included in Category 15.
Category 14 Franchises	This category was considered as an exception for calculation because Kaneka Corporation has no franchise stores.
Category 15 Investments	The emissions of Group companies were calculated using a calculation method stipulated in the Act on Promotion of Global Warming Countermeasures according to the Basic Guidelines on the Calculation of Greenhouse Gas Emissions throughout the Supply Chain (ver. 2.4) published by the Ministry of the Environment of Japan and then being multiplied by the relevant equity ratio. Investment in companies other than Group companies was excluded from the scope of calculation because it has not been made to obtain profits.

#### 【Energy Consumptions in Logistics, CO<sub>2</sub> Emissions】

Energy Consumption (Crude Oil Equivalents)	Calculated based on the Energy Conservation Law Guidebook for Consigners issued by the Agency for Natural Resources and Energy of Japan.
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Energy Intensity Index	Energy intensity index is calculated by using a calculation method stipulated in the Measures Pertaining to Consigners of the Energy Saving Law, indexing the energy intensity, with fiscal 2006 used as the base year of 100.
CO <sub>2</sub> Emissions	Calculated based on the Greenhouse Gas Emissions Calculation and Reporting Manual (ver. 4.8) published by the Ministry of the Environment of Japan.

#### 【Chemical Substances】

Emissions of Substances Subject to the PRTR Law	Emissions to the atmosphere, water areas, soil at each site and landfills at each site, the amount transferred into sewers and into waste are calculated based on the revised Enforcement Order of the Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement of Japan (the revised Enforcement Order of PRTR Law) (Enforced on April 1, 2010).
VOC	Total emissions of VOCs into the atmosphere among substances subject to the PRTR Law and the substances that Japan Chemical Industry Association selected from the PRTR Law substances.
Hazardous Atmospheric Pollutants	Of the 23 revised “substances requiring priority action” in the report of the Central Environment Council (9th report) in October 2010, emissions to the atmosphere of acrylonitrile, vinyl chloride monomers, chloroform, 1,2-dichloroethane, dichloromethane, and 1,3-butadiene are calculated based on the atmospheric emissions of substances subject to the PRTR Law.

#### 【Industrial Waste】

Industrial Waste Generated	Total amount of the amount of reduction by incineration at each site (difference between incinerated amount and the residue), the amount of landfill at each site and the amount of waste outsourced for external treatment.
Internal Reductions	Amount of reduction by incineration at sites (difference between incinerated amount and the residue).
Internal Landfill	Amount of final landfilled at sites.
Waste Outsourced	Amount of waste treated by external contractors.
External Recycling	Of outsourced waste, the total amount of industrial waste recycled through reuse, recycling, and heat recovery.
External Reductions	Of outsourced waste, the amount obtained by subtracting total incineration residue from the total amount of industrial waste incinerated without heat recovery and reduced in weight.
Volume of Waste Sent to Final Landfill	The total amount of waste outsourced to be sent directly to final landfill and sent to final landfill after outsourced incineration.
Rate of Waste Sent to Final Landfill	Percentage of the total amount of waste outsourced to be sent directly to final landfill and sent to final landfill after outsourced incineration divided by the total amount of industrial waste generated (%).