

**HAMAMATSU**  
PHOTON IS OUR BUSINESS



# Environmental Report 2017

## Message from the President

# Working toward the Achievement of a Sustainable Society, We Use Photonics Technology to Help Solve Environmental Problems

### Introduction

Last year, following the adoption of the Paris Agreement, the 22nd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 22) launched the formulation of its rules. Part of its rules include the expectation that the world would continue to pursue reduction plans for a post-carbon society, while continuing to implement long term global warming countermeasures. These activities will play an important role for achieving Sustainable Development Goals (SDGs). Furthermore, with the tightening of product environmental regulations, such as the treaty on mercury, the European RoHS Directive and REACH Regulation there was an increase in the demand for environmentally sustainable business activities and product manufacturing operations across the entire value chain.

In order to cope, it is important to clarify the risks and opportunities in business activities and to position the environment within a management strategy. Environmental management based on the revised ISO 14001 standard will be beneficial.

### Working toward the Achievement of a Sustainable Society

Hamamatsu Photonics K.K. (HPK) believes that businesses have a social responsibility to run their activities in an environmentally responsible way. Under our Fundamental CSR Policy and Environmental Policy, we have deployed an environmental organization that continues to promote environmental management.

For fiscal year 2017, we have been working toward further improvements as an extension of the previous year's environmental activities. In the area of Environmental Management, we are promoting compliance with the revised version of ISO 14001. Within our business activities, we have completed processing all high and low-concentration PCB waste we possess. In product activities, we are working with suppliers to respond to product environmental regulations. In our biodiversity conservation activities, we are carrying out cleanup activities, tree planting, and distributing memorial trees to employees in line with the Biodiversity Hamamatsu Strategy.

Furthermore, to disseminate our environmental information to society, our activities on climate change and water were reported to the CDP, as well as having third party verification on our greenhouse gas emissions in accordance with ISO 14064-3.

### Using Photonics Technology to Help Solve Environmental Problems


The mission of HPK is to use photonics technology to benefit society by making the world a healthier and more peaceful place. The application of photonics technology has been expanding year by year. It is one of the key enabling technologies indispensable not only for the advancement of science and technology but also for social life. We recognize that further advancement of photonics technology is required worldwide for technological innovation and for the creation of new industries.

Focusing on the theme of "Life Photonics", HPK continues to promote basic research in unexplored areas of light, and we develop products that contribute to society and the environment through our unique photonics technology. In fiscal year 2016, we developed a compact assembly incorporating a photomultiplier tube effective for measuring environmental pollutants, and a mini-spectrometer equipped with a thin, low-power CMOS image sensor that can be used for environmental analysis.

In addition, at our photonics innovation research base, which we operate as a collaborative project between industry and academia, we are contributing to the development of photonics technology and the expansion of its applications. As we continue to work to reduce the environmental impact of our business activities, we will help to solve environmental problems by using photonics technology to offer products that are eco-friendly and benefit the environment.

I would like to ask our stakeholders for their continued support and guidance in these efforts.

Hamamatsu Photonics K.K.  
President and CEO  
Akira Hiruma



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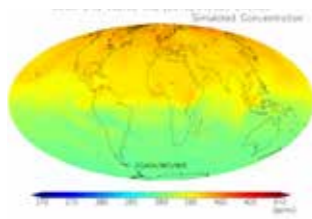
# Photonics That Are Helping the Environment

The products of Hamamatsu Photonics are being used in a variety of environmental impact reduction activities. These activities include the measurement of environmental air and water quality, the analysis of concentrations of regulated chemicals, and the enhancement of energy efficiency of the common electrical equipment.



## Topic

### Observation of greenhouse gases around the world from outer space



Greenhouse Gases Observing Satellite "IBUKI" Example of observation data\*

\* ©JAXA/NIES/MOE

Greenhouse gases Observing Satellite "IBUKI" (GOSAT) is an artificial satellite developed as a joint project by JAXA, the Ministry of the Environment, and the National Institute for Environmental Studies. It measures greenhouse gases such as carbon dioxide and methane from outer space, and our infrared detectors are used for its observation sensors.



Infrared detectors

Since the launch of the satellite in 2009, observation data has been collected. This data is being utilized to further scientific understanding of global warming and climate change and develop related countermeasures.

<b>Infrared image sensors</b>  Foreign object screening and non-destructive inspection	<b>Quantum cascade lasers</b>  Gas analysis	<b>Photomultiplier tubes</b>  Environmental analysis and measurement	<b>Delayed luminescence measuring device</b>  Ecological impact assessment	<b>Deuterium lamps</b>  Atmospheric and water quality analysis	<b>Infrared detectors</b>  Environmental analysis and measurement	<b>Stealth dicing engine</b>  Next-generation laser dicing technology	<b>Mini-spectrometers</b>  Soil analysis and aquametry	<b>X-ray line sensor cameras</b>  Recycling/material screening
<b>Raman spectroscopy</b>  Water quality inspection, agricultural, toxicology testing	<b>Xenon lamps and hollow cathode lamps</b>  Atmospheric and water quality analysis	<b>Solar cell evaluation systems</b>  Solar cell evaluation	<b>CO<sub>2</sub> gas sensor modules</b>  Atmospheric and water pollution analysis	<b>Photonic multichannel analyzer</b>  Light source evaluation	<b>Radiation detection modules</b>  Shows areas of concentrated radioactive material	<b>Gamma-ray imaging</b>  Shows areas of concentrated radioactive material	<b>Visible light/illuminance sensors</b>  Ambient light level detection	<b>Distance sensors</b>  Weather measurement

# Promoting Environmental Management

## HPK Fundamental Environmental Policy

**Principle** In our conduct of business activities, we, Hamamatsu Photonics K.K., recognize that maintaining harmony with the global environment is one of essential issues facing mankind. We are determined to always act with this in mind as we endeavor to create new science, new industries, and to establish true health for mankind by studying, applying and expanding photonics technologies.

- Policy**
1. Initiate an internal organization for environmental protection and establish environmental management system in each plant in order to carry out activities related to environmental protection.
  2. Assess the impact on the environment by our activities, products and services, and constantly improve our environmental protection activities and environmental management.
  3. Comply with our internal procedures and policy as well as all governmental laws and regulations related to environmental protection, and impose our own voluntary standards if necessary, to reduce the stress on the environment.
  4. Take preventative measure to curb pollution, save energy and resource, reduce waste and control chemical substances.
  5. Strive to raise the awareness of all our employees regarding environmental issues through environmental education, and to understand and apply this Fundamental Environmental Policy through in-house publication of the Policy.

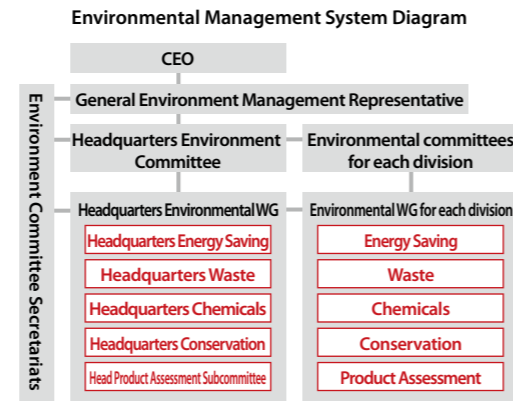
## Environmental Management System

### Framework for Promoting Environmental Management

Under the HPK Fundamental Environmental Policy, each business year we set environmental goals and targets for our environmental management system (EMS). We evaluate results from our activity, and work to constantly improve our EMS on the basis of management review.

To implement the above cycle smoothly, we have established a Headquarters Environmental Committee that is directed by a General Environment Management Representative (Koei Yamamoto, Senior Managing Director) and serves as a decision-making body for matters pertaining to our EMS. The Headquarters Environmental Committee is composed of five specialized environmental working groups, each division's environmental committee, and the Environment Committee Secretariats. By establishing a similar organizational structure in each division, integrated environmental activities are made possible.

Incidentally, each division has received ISO14001 certification, an international standard for environmental management systems. At present, we prepare the ground to comply with ISO14001-2015, the latest revised version of that standard.



### Organizations That Acquired ISO Certifications

Organization	Site	Acquisition Date
Main Office	Main Office	March 2012
Central Research Lab	Central Research Lab	March 2012
Electron Tube Div.	Toyooka Factory and Tenno Glass Works (Koso Corporation*)	December 2003 (December 2011)
Solid State Div.	Main Factory and Mitsue Factory, Shingai Factory	December 2003 January 2012
Systems Div.	Joko Factory	August 2004
Miyakoda Factory	Miyakoda Factory	February 2012

\*ISO 14001 certification includes Koso Corporation, an affiliated company.

### Environmental Initiatives of the Photonics Group

Under the HPK Fundamental Environmental Policy, we will go forward with our environmental initiatives with the cooperation of our affiliated companies. We monitor energy usage, greenhouse gas emissions, and waste generation, while considering more effective measures.

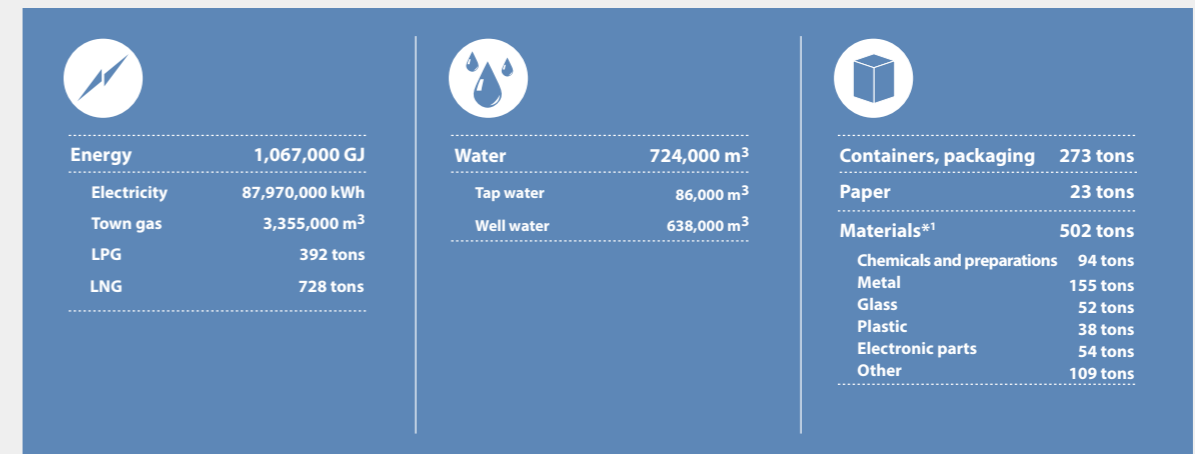
### Environmental Accounting

We are internally promoting environmental accounting as a means of providing information necessary for environmental management.

## Environmental Impact of Business Activities

We are quantifying the environmental impact of our business activities and working to reduce our impact on the environment. The following figures are a summary of our environmental impact for fiscal year 2016.

### INPUT

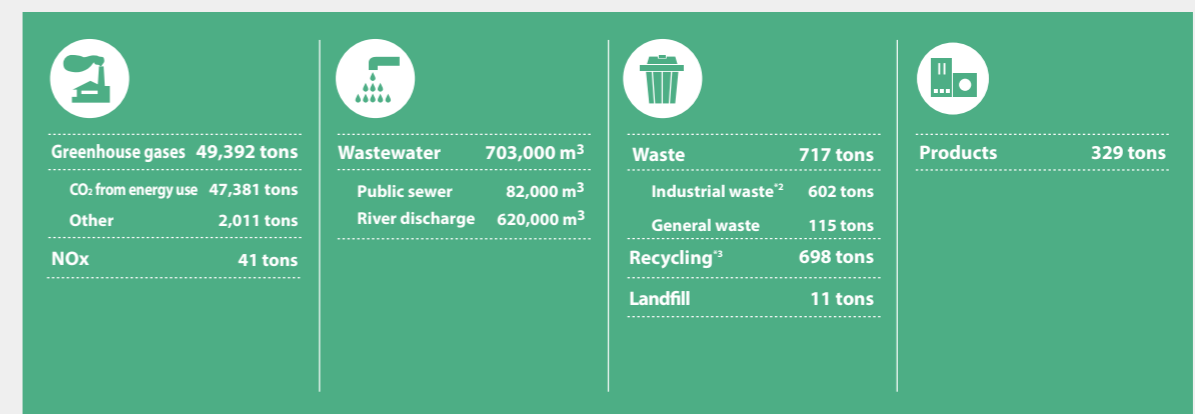


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Business Activities

Power generation systems  
8,845,000 kWh

### OUTPUT



\*1 Total for materials whose weight data was available

\*2 Including chemical waste

\*3 The amount of recycling is the total amount of material and thermal recycling added to the amount of valuables.

## Dealing with Risks

### Framework for Reducing Environmental Risks

We are working to reduce living-environment contamination and stress related to factors such as air, water, noise, soil quality, and foul odors.

We regularly measure and analyze wastewater, noise, vibration, and at facilities where problems are found, we take appropriate measures, proactively promoting compliance with environmental laws and regulations.

Further, the headquarter conservation WG, which meet four times a year, also conduct inspections of environmental preservation facilities at each factory.

### Emergency Response Training

We have prepared accident and disaster response manuals, and we regularly hold customized disaster response training for each type of business and division. In fiscal year 2016, training sessions have included evacuation training for gas leaks, respirator tank attachment training, and response training for chemical spills.

### Business Continuity Plan (BCP)

We have established a Business Continuity Plan (BCP) to ensure that we continue our business and/or to recover operations as quickly as possible in the face of a large-scale natural disaster. To minimize the risks to our business operations as well as customers' businesses and society, we have set up plans for our response to crises, including preparatory activities, in order to ensure supply of products even in a crisis, and we regularly hold various trainings for evacuation, disaster coordination, and safety confirmation.

The basic policy of HPK' BCP is as follows.



Wastewater analysis



Emergency Response Training



Evacuation training

Basic Policies of Business Continuity Plan	
Protection of human life	The continuation of business operations will proceed with first priority given to the protection of the lives of our employees and their families, our customers and related parties.
Continuation of business operations	With foremost consideration given to our employees' safety, we will initiate efforts to quickly put into place the organization necessary to provide a stable supply of products to our customers, thus sustaining the trust of our customers which forms the foundation of our business.
Contribution to society	In addition to resuming the stable supply of products, we will contribute to society by proactively engaging as much as possible with relief efforts in regions affected by the disaster.

About Hamamatsu > CSR > Business Continuity Plan

## Targets and Results of Environmental Activities

Each year, from October 1st to September 30th, we set environmental objectives and targets, and then work to reduce negative impacts on the environment and to protect the environment. The following table is a summary of those targets and results for fiscal year 2016.

Item	Main Targets of 2016	Main Results of 2016	Evaluation
Environmental Management System	→ Improving EMS and renewing certification for divisions approved to ISO 14001.	→ Received audits from external certification bodies and renewed certification. → Worked on obtaining and understanding ISO 14001 revision information and carried out training of internal auditors for compliance with revised version (68 participants)	○
	→ Being in compliance with environment-related laws and regulations.	→ Violations of environment-related laws and regulations: 1	×
Making Products Environmentally Friendly	→ Implementing and revising the "Management Standards for Chemical Substances."	→ Issued Management Standards (13th Edition). → Educational training (domestic center:8 times, Global subsidiaries: 7 times)	○
	→ Conforming to each country's environmental regulations for products.	→ Implemented compliance with RoHS,minamata convention on mercury, China RoHS, conflict mineral rule.	○
Making Business Activities Environmentally Friendly	<b>Fighting Global Warming</b>		
	→ Saving energy programs and its promotional activities.	→ Received Hamamatsu City's 2015 Top Runner Grand Prize. → Received 2015 Excellent Engineer of Energy Conservation Award. → Promoted energy-saving activities as a Fun to Share sponsor company.	○
	→ Reducing energy use per unit of sales by at least 3% compared to 2013.	→ Reduced energy use per unit of sales by 13.0% compared to 2013.	○
	→ Promoting the introduction of renewable energy.	→ Installed solar panels at Central Research Laboratory, and hybrid outdoor lights using wind-solar energy at Central Research Laboratory.	○
	<b>Appropriate Management of Chemicals</b>		
	→ Checking chemical usages every six months.	→ Conducted surveys on chemical usage in October and April.	○
→ Promoting the collection of GHS compliant SDSs.	→ The ratio of holding GHS compliant SDSs is 65% or higher.	○	
→ Ensuring employees treat chemicals properly.	→ Held educational trainings at Toyooka, Ichino, Joko,Hamakita, and Miyakoda, attended by a total of 808 people.	○	
3R Activities	<b>3R Activities</b>		
	→ Final waste Landfill rate : 3% or less	→ 1.17%	○
	→ Making sure that our entrusted wastes were treated in an appropriate manner.	→ Confirmed at 20 waste-disposal facilities	○
Prevention of Pollution	<b>Prevention of Pollution</b>		
	→ Complying with the self-regulation standards.	→ Confirmed and conformed to environmental regulations. Inspected our facilities that could affect the environment.	○
→ Reduce VOC emissions into the atmosphere by 30% compared to the year 2000 and achieve recovery rate of 50% or higher.	→ 24% reduction, recovery rate: 58.6%	△	
Social and Environmental Communication	<b>Social and Environmental Communication</b>		
	→ Promoting biodiversity conservation activities.	→ Distributed happy memorial trees. → A total of 575 people participated in local cleaning activities 16 times during the year. → Participated in Lake Hamana Cleanup Campaign and tree planting in Tsunami mitigation forest.	○
→ Publishing our environmental information to the public and our employees.	→ Disseminated environmental information including environmental reports and online dissemination. → Posted ECO communications 4 times a year in company newsletter.	○	

In the Evaluation column, ○ means accomplished, and △ means partially accomplished, and × means not accomplished.

# Making Products Environmentally Friendly

## Developing Environmentally Friendly Products

As a means of making our products more environmentally friendly, we are working to promote the sale of products that use less resources and power and with longer service life. Below are a few examples of products we have developed in fiscal year 2016.

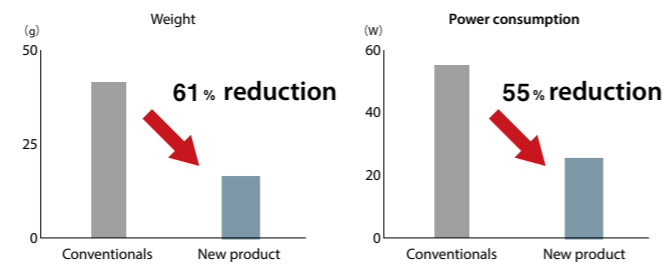
### Compact Micro PMT Module



[Related Products Information >Micro PMT module](#)

This module using a fingertip size next-generation photomultiplier tube ( $\mu$ PMT) is used as the highly sensitive light receiving element of a small portable inspection device in Point of Care Testing (POCT), or bedside testing.

Through further miniaturization of the  $\mu$ PMT and internal circuits, this newly developed product realizes a weight reduction of 61% and a power consumption reduction of 55% compared with the previous product.



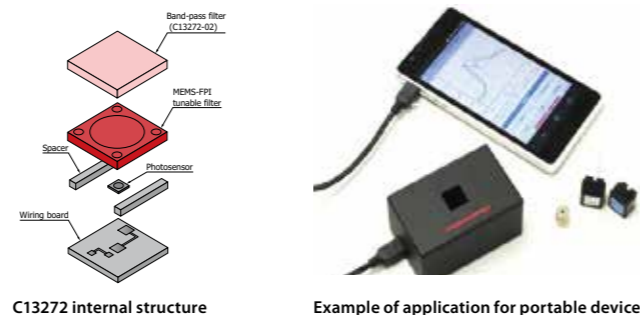
### MEMS-FPI Spectrum Sensor



[Related Products Information >MEMS-FPI](#)

The C13272 series is a near infrared spectrum sensor that can change the transmission wavelength by varying the applied voltage. Near infrared rays are widely used for applications such as the plastics sorting, gas analysis, water quality analysis, and food sorting.

Development of this product allows reduction of the size and weight of the devices used, making it possible to shift from conventional stationary type devices to portable devices that can be used also outdoors.

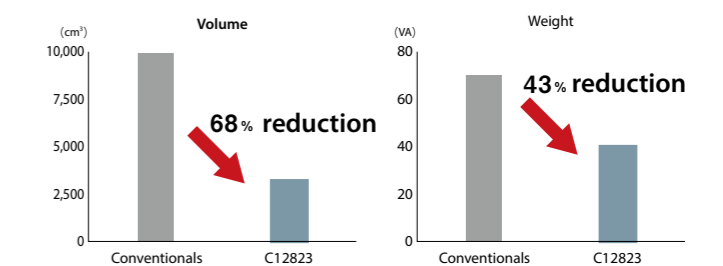


### Photonic Multichannel Analyzer for LED sorter

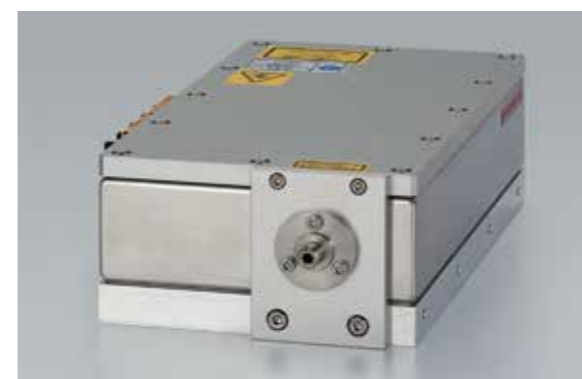


[Related Products Information > Spectrometers](#)

The C12823 is a high speed spectrophotometer for LED evaluation with high measurement reproducibility. By adopting a BT-CCD sensor and improving the start-up circuit, we realized higher speed, higher sensitivity and lower stray light than our previous product, as well as a smaller size and lower power consumption.

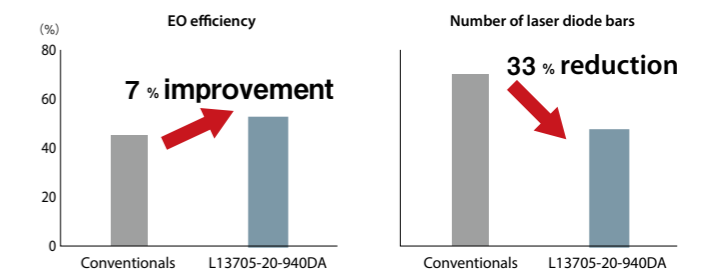


### Fiber Output Laser Diode Bar Module



[Related Products Information >Fiber Output Laser Diode Bar Module\(FOLD\)](#)

The L13705-20-940DA is a fiber output laser diode bar module with high power of 200 W used for laser resin welding. Traditionally, such products are forced-cooled with high-pressure deionized water, but through the use of efficiency-boosting technology and optimization of the structural design, the number of laser diode bars has been reduced to two-thirds, thereby improving the electric-to-light conversion (E/O) efficiency by 7% and realizing energy saving. This has also made it possible to cool the device with just low-pressure distilled water using a compact and lightweight general-purpose chiller.



# Making Business Activities Environmentally Friendly

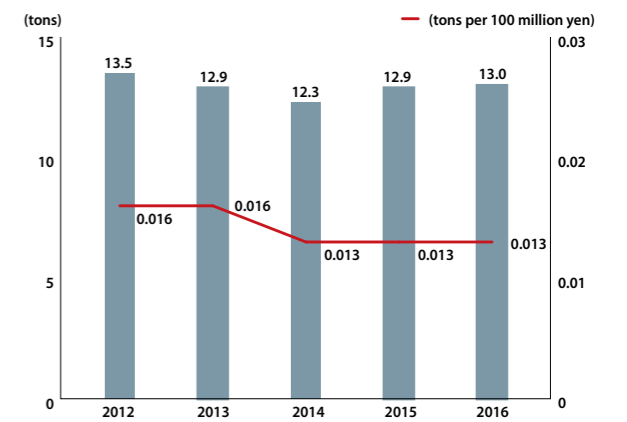
## Appropriate Management of Chemicals

### Handling of Chemicals Subject to the Pollutant Release and Transfer Register (PRTR) Law

In fiscal year 2016, we used 13.0 tons of substances designated as class 1 chemical substances under the PRTR Law<sup>1</sup> (yearly use of 1 kg of more by all divisions subject to tracking). In 2016, we reported the use of three substances at our Main Factory (2-aminoethanol and hydrogen fluoride and its water-soluble salts and pyrocatechol).

1 PRTR Law: A law regarding the promotion of precise knowledge of emissions of designated substances into the environment and management improvements based on that knowledge

Chemicals subject to the PRTR Law and its ratio of sales



### Promotion of SDS (Safety Data Sheet) Collection

As stipulated in the Industrial Safety and Health Law, SDSs are essential for assuring the safety of workers who handle chemical materials and for reducing the risks of these chemicals to the environment. We are promoting risk assessment of chemical substances and reducing risks in the workplace by promoting the collection of the latest SDSs, putting those SDSs in our internal company database, and disclosing and using them throughout the company.

Internal SDS database



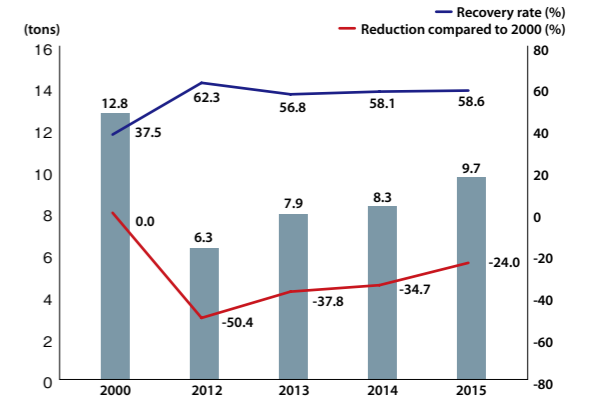
### Reducing VOC (Volatile Organic Chemicals) Emissions

We are working to reduce emissions of VOCs into the atmosphere by reducing our use of VOCs.

We are working to reduce emissions of VOCs into the atmosphere by reducing our use of VOCs, taking measures to inhibit emissions, and the like.

In 2015, we worked toward maintaining a 30% reduction in atmospheric emissions compared with 2000 and achieving a recovery rate of 50% or higher, and as a result achieved a 24% yoy reduction in atmospheric emissions compared with 2000, and a recovery rate of 58.6%.

VOC emissions and reductions by year



## Conforming to Regulations Regarding the Chemicals Contained in Our Products

### Compliance with Regulations

Since 2004, we have been managing chemical substances in products. We are committed to staying up to date with the latest information about these chemicals through industrial associations, and responding swiftly and appropriately to new regulations.

In response to the RoHS Directive, we have completed the establishment of compliance measures for applicable products and been supplying products conforming to the directive.<sup>1</sup>

We are also working together with our business partners for procurement that avoids conflict minerals, and we continue to provide our customers with appropriate information regarding these minerals.

1 Excluding some custom products subject to special requests from customers

About Hamamatsu > CSR > Procurement > our approach to conflict minerals



"Our Measures against Conflict Minerals" website

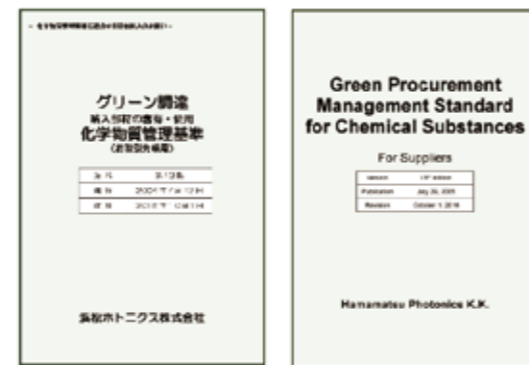
### Green Procurement and Purchasing

To conform to regulations, such as RoHS Directive, regarding chemical substances contained in products and to provide products that meet the demands of our customers, we have established company-wide management standards for chemical substances. We issued the 13th edition of the standards in October 2016.

On the basis of these standards, we are conducting green procurement surveys with our business partners regarding the concentrations of regulated chemicals in parts and how the parts are used. The survey results are collected in a company-wide system that stores environmental information about our products, and the results are used for the centralization of environmental management of parts and the evaluation of compliance with regulations.

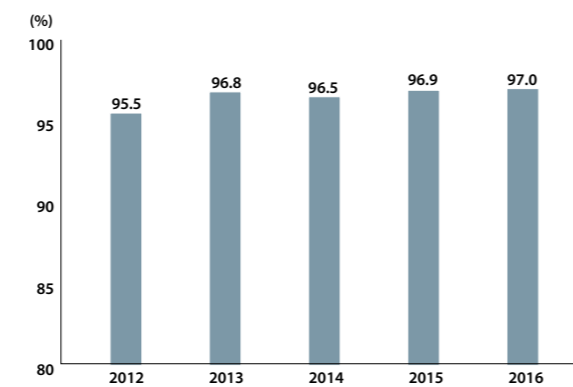
We also promote purchasing of environmentally friendly office supplies. Our green purchasing rate for fiscal year 2016 was 97.0%, exceeding our 90% target rate.

About Hamamatsu > CSR > Procurement > Green procurement



Green Procurement and Chemical Substance Management Guide

Green purchasing rate



### Checks for Chemical Handling Condition

The Chemicals Working Groups manage checks on chemical storage facilities and workplaces that handle chemical substances. When problems are found, we would discuss them, think about solutions, and share that information under the Headquarters Chemicals Working Group.



Performing a check at a clean room

# Fighting Global Warming

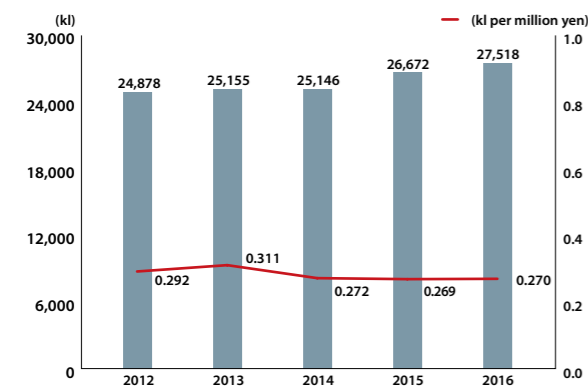
## Changes in Energy Conservation and CO<sub>2</sub> Reduction

HPK has set a target for reducing our unit energy consumption by at least 8% by 2021 compared to 2013, and is currently promoting energy conservation activities. To achieve this target, we have been incorporating highly efficient equipment and renewable energy, while working on energy saving of buildings in fiscal year 2016. As a result, our energy use per unit of sales decreased by 13.0% compared to the previous year.

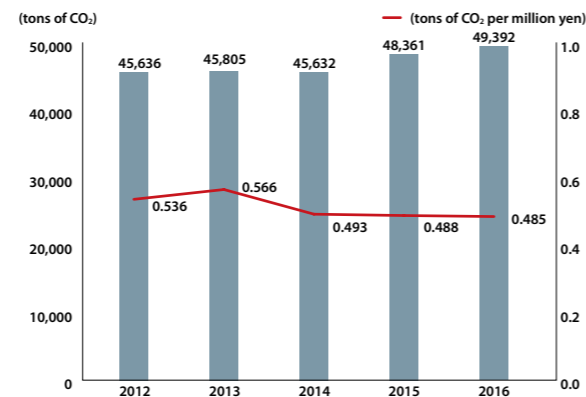
Our CO<sub>2</sub> emissions in fiscal year 2016 increased by 2.1% compared to the previous year, while CO<sub>2</sub> emissions per unit of sales declined by 0.5%. We have introduced detoxifying equipment to suppress the emission of semiconductor fabrication gases such as PFCs and SF<sub>6</sub>, which are greenhouse gases causing global warming.

Going forward, HPK will promote its energy saving and global warming prevention activities.

Energy use and its ratio of sales<sup>1</sup>



CO<sub>2</sub> output and its ratio to sales<sup>1,2,3</sup>



- 1 Some past data has been changed because of revisions to the scope of data collection and the data collected.
- 2 For CO<sub>2</sub> emissions, we cover the calculation scope based on the Act on Promotion of Global Warming Countermeasures.
- 3 The CO<sub>2</sub> emission factor for electric power we use is 0.417 (1990 value specified by the Federation of Electric Power Companies).

### Use of inverter technology in air conditioners

In fiscal year 2016, we converted a total of 44 air conditioners (air handling units, etc.) to inverter technology through the "2014 CO<sub>2</sub> Reduction Potential Diagnosis" project run by the Ministry of the Environment as part of measures against global warming, thereby reducing our energy usage by approximately 446,000 kWh per year.

We intend to continue to introduce efficient equipment and improve energy efficiency going forward.



Air handling unit

### Energy saving awards

At the "2015 Fujinokuni Eco Challenge CUP" prefectural campaign event for global warming prevention, we won the Grand Prix in the Office Division (TRY Project) in recognition of HPK's energy saving activities. HPK also renewed its S rank certification under the Top Runner Grand Prize for Alternative Energy and Energy Conservation awarded by Hamamatsu City, and won the 2015 Top Runner Grand Prize.



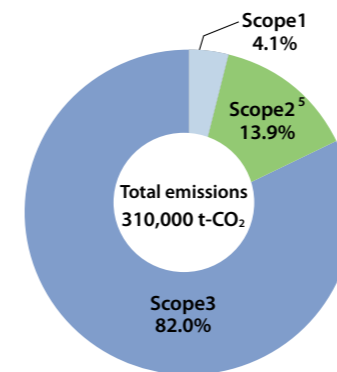
Fujinokuni Eco Challenge CUP Award Ceremony

## Value Chain Greenhouse Gas Emissions

To grasp the environmental impact of the value chain<sup>4</sup>, HPK is working on the calculation of Scope 3 (other indirect emissions from the upstream and downstream activities), besides Scope 1 (all direct GHG emissions from consumption of fuels, etc.), and Scope 2 (indirect GHG emissions from consumption of purchased electricity, etc.), based on the Greenhouse gas(GHG) protocol, which is a GHG calculation guidance.

Going forward, we will expand the calculation scope of Scope 3, improve accuracy, and strive to reduce emissions throughout the value chain.

GHG emissions



Category	Emissions (t-CO <sub>2</sub> )	(%)
Scope 1 All Direct GHG emissions	12,736	4.1
Scope 2 Indirect GHG emissions <sup>5</sup>	43,212	13.9
Scope 3 Other Indirect GHG emissions	255,773	82.0
(Category 1: Purchased products and services)	(134,470)	(52.6)
(Category 11: Use of sold products)	(75,624)	(29.6)
(Category 2: Capital goods)	(32,860)	(12.8)
(Other: Business travel, Employee commuting, logistics, disposal, etc.)	(12,819)	(5.0)

- 4 A value chain refers to the full life cycle of a product or process, including material sourcing, production, consumption and disposal processes. Includes the upstream and downstream parts of our supply chain.
- 5 The GHG emission factor we use is Chubu Electric Power's emission factor.

## Third-party verification of GHG emissions based on ISO 14064-3

In order to provide and disclose highly transparent and reliable information, the fiscal year of 2016 GHG emissions data (Scope 1, 2, 3) calculated by HPK underwent third-party verification by SGS Japan Inc. and HPK was issued a verification report. We will continue to make efforts to continuously improve data reliability and reduce GHG emissions.

### <Verification scope>

- Scope 1, 2: 16 domestic sites (11 divisions, 5 sales offices)
- Scope 3: Category 11 "Emissions associated with the use of sold products"

Verifier's comment : SGS Japan Inc. Mr. Nohara

In this verification, we confirmed the accuracy and validity of the data to be reported, and we verified the establishment of a calculation system and the competence of the calculation personnel. Our findings are that the effectiveness of the checking functions and change point management with regard to the organization's data verification will be points that will require attention going forward. Overall, we have confirmed that the organization has established a calculation system, and that the Secretariat as well as the calculation personnel at the visited sites are staffed by competent personnel.



Verification Statement

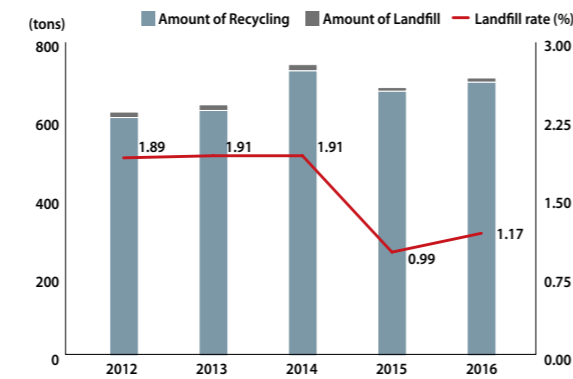


## 3R Activities

### Reducing Waste Levels to Zero

We have been promoting 3Rs<sup>1</sup> and managing wastes properly to achieve the idea of zero emissions<sup>2</sup>, to reduce their negative impact on the environment and use resources efficiently. Though we defined zero emissions as having a total recycling rate of 97% or more for all wastes other than acid and alkali wastes, we modified this as having a final waste landfill rate of 3% or less for all wastes because we think we should pay more attention to landfill wastes which cannot be recycled as resources. For fiscal year 2016, we recorded a final waste landfill rate of 1.17% and achieved zero emissions. Other key indicators for our waste management are as follows: amount of all wastes 977 tons; that amount per sales volume 0.7 tons per 100 million yen (4.5% lower compared to previous year); amount of recycling<sup>3</sup> 698 tons; amount of all landfill wastes 11.3 tons.

Amount of Recycling, Amount of All Landfill Wastes, and Final Waste Landfill Rate



- 1 The 3Rs stands for Reduce, Reuse, and Recycle.
- 2 Zero emission: The idea that we should strive for a society with no waste through resource conservation and waste reduction in production activities, and by recycling the waste that is unavoidably generated.
- 3 The amount of recycling is the total amount of material and thermal recycling added to the amount of valuables.

### HAMAMATSU Awarded Shizuoka Governor Prize in Waste Management

We were awarded the Shizuoka Governor Prize for promoting the proper disposal of industrial waste. The award recognizes our effort to reduce industrial waste, reuse used materials, or develop technology to help solve waste problems. We continuously make sure that our activities for zero emissions contribute in conserving the environment.



Award ceremony (Kenji Yoshida, Managing Director of HPK)

### Reuse of Cushioning Material

Although we've been reusing the cushioning materials in the packaging delivered by our suppliers, the reusing was done in closed-loop, meaning one division can only utilize its own materials. It is preferable to allow our divisions to reuse the materials other divisions have. So, we go forward with our reuse activity by making those materials available across divisions.



Cushioning materials with eco label

### Disposal of highly concentrated PCB Waste

Highly concentrated PCB (Polychlorinated Biphenyl) wastes have to be disposed before the legally set deadline and also are socially required to be disposed soon if possible. Although we had been concerned about the above mentioned naturally, we got this concerned disposal done in fiscal year 2016 much earlier than the legally set deadline.



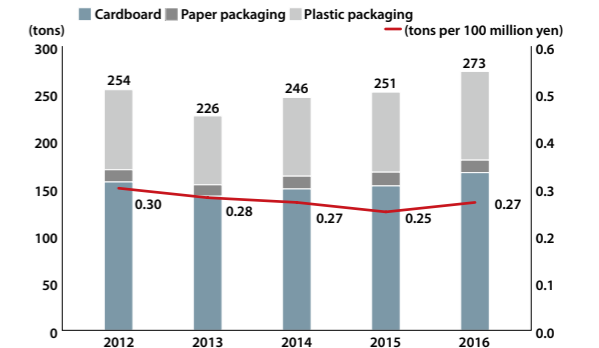
Highly concentrated PCB Waste

## Shipping Measures

### Reducing Containers and Packaging Materials

We are using packaging materials as efficiently as possible to improve product accommodation ratios. In fiscal year 2016, our use of containers and packaging materials was 273 tons. Our use of containers and packaging materials per unit of sales was 0.27 tons per 100 million yen.

Container and packaging use and its ratio of sales



### Environmentally Conscious Shipping through improved product accommodation ratio

The newly designed packaging box of 1-inch photomultiplier tubes (PMTs) resulted in improving product-to-package ratio. The conventional packing box containing PMTs horizontally was switched to the new packing box containing these vertically. This change increases product accommodation ratio by twice, from 25 PMTs to 50 PMTs, and also leads to save packaging materials and shipping costs.



Before improvements



After improvements

## Protecting Our Water Resources

### Using Water Resources Effectively and Risk Assessment

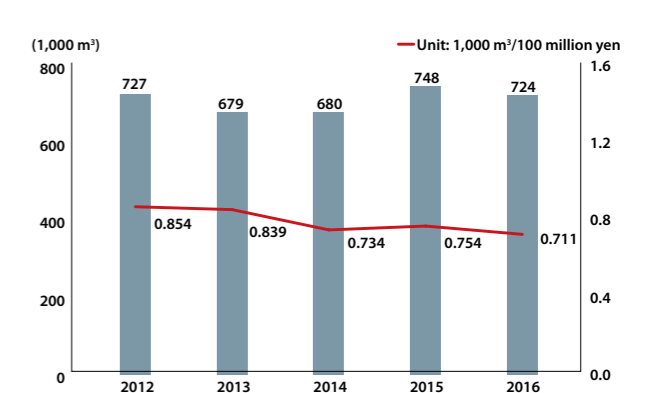
HPK recognizes the importance of water resources and works toward reducing water use and recycling the water that we do use. In addition to water conservation activities inside the company, we are recycling rainwater saved on the premises for use for watering, recycling water for cooling towers, and other uses we see as beneficial.

Recently, investors have also become increasingly interested in water risks in business activities. We provided our data to CDP Water, an international scheme that evaluates water usage.

In fiscal year 2016, we used 724,000 m<sup>3</sup> of water. Our use of water per unit of sales of 711 m<sup>3</sup> per 100 million yen.

1 Some past data has been changed because of revisions to the scope of data collection and the data collected.

Water use and its ratio of sales



# Site Data

From Oct. 1, 2015 to Sep. 30, 2016

Environmental Impact (Unit)	Toyooka Factory	Tenno Glass Works	Joko Factory
Energy (thousand GJ)	298.5	3.9	23
Water (thousand m <sup>3</sup> )	244.1	1.7	7.1
Chemicals subject for PRTR Law <sup>*1</sup> (tons)	0.45	0.003	0.004
Paper (tons)	6.1	0.2	3.5
Containers and Packaging Materials (tons)	131		21
GHG emission from the energy <sup>*2</sup> (tons)	13,001	174	981
Other GHGs <sup>*3</sup> (tons)	5.2	—	3.5
Wastewater (thousand m <sup>3</sup> )	244	1.7	7.1
Waste (tons)	197	3.2	28
Landfill (tons) [Landfill rate(%)]	0.35 [0.14]	0.09 [2.02]	0.21 [0.38]
Recycling (tons) [Recycling rate <sup>*4</sup> (%)]	216 [92.3]	4 [97.9]	55 [99.4]

Environmental Impact (Unit)	Main Factory	Mitsue Factory	Shingai Factory
Energy (thousand GJ)	418.4	73.5	52.3
Water (thousand m <sup>3</sup> )	361	46.1	15.4
Chemicals subject for PRTR Law <sup>*1</sup> (tons)	11.2	0.06	0.93
Paper (tons)	5.8	2.1	0.2
Containers and Packaging Materials (tons)	120		—
GHG emission from the energy <sup>*2</sup> (tons)	18,846	3,468	2,306
Other GHGs <sup>*3</sup> (tons)	1,965		—
Wastewater (thousand m <sup>3</sup> )	361	46.1	15.4
Waste (tons)	359	33	26
Landfill (tons) [Landfill rate(%)]	8.39 [2.05]	0.2 [0.32]	0.04 [0.08]
Recycling (tons) [Recycling rate <sup>*4</sup> (%)]	221 [79.5]	57 [94.8]	42 [98.2]

Environmental Impact (Unit)	Miyakoda Factory	Central Research Laboratory	Main Office	Industries Development Laboratory
Energy (thousand GJ)	62.0	96.6	2.1	31.8
Water (thousand m <sup>3</sup> )	12.3	32	1.3	2.4
Chemicals subject for PRTR Law <sup>*1</sup> (tons)	0.19	0.15	—	0.02
Paper (tons)	0.3	2.4	2.4	0.2
Containers and Packaging Materials (tons)	0.6	—	—	—
GHG emission from the energy <sup>*2</sup> (tons)	2,732	4,234	88	1,365
Other GHGs <sup>*3</sup> (tons)	0	37.5	—	—
Wastewater (thousand m <sup>3</sup> )	8.5	15.1	1.3	2.1
Waste (tons)	27	35	6.5	1.8
Landfill (tons) [Landfill rate(%)]	0.96 [3.02]	0.96 [0.93]	0.04 [0.55]	0.07 [2.05]
Recycling (tons) [Recycling rate <sup>*4</sup> (%)]	10 [92.4]	84 [97.5]	7 [99.3]	3 [98]

\*1 Quantities of 1kg or more and are designated as class 1 chemical substances under the PRTR Law.  
 \*2 The factor we use to convert power to CO<sub>2</sub> and calculate the CO<sub>2</sub> from energy use is 0.417.  
 \*3 The emitted GHGs other than CO<sub>2</sub> from energy use are converted to equivalent amounts of CO<sub>2</sub>.  
 \*4 The recycling rate does not include acid or alkali waste.

# Social and Environmental Communication

## Promoting Community and Employee Communication through Ecological Activities

### Clean-up activities in line with the Biodiversity Hamamatsu Strategy

In an effort to conserve biodiversity, we support the Biodiversity Hamamatsu Strategy, participate in conservation activities in areas around our businesses and the local municipalities and prefectures. We participate in the "Lake Hamana Cleanup Campaign" and "Welkame Cleanup Campaign" to protect local biodiversity and pass on a bountiful nature to future generations. In fiscal year 2016, a total of 575 employees participated in cleanup activities. In recognition of our continued participation in such activities, we were awarded the Hamamatsu City CSR Activities Commendation in 2016 at the Joko Factory and Miyakoda Factory. We also participated in the tree planting in Tsunami mitigation forest.



Lake Hamana Cleanup Campaign



Toyodagawa cleaning activities



Community cleaning activities

### Happy Memorial Trees and Tree Planting on Company Grounds

As part of our biodiversity conservation activities, we donated "Happy Memorial Trees" to employees who have built a new home, recently married, or had their children enter primary school. As of September 30, 2016, a total of 559 people have applied to participate in this activity. Of all the applicants, 259 built new homes, 170 were married, and 130 had their children enter primary school. So far, a total of 422 applicants received their trees. The planting of the Happy Memorial Trees serves as a reminder to employees and their families the importance of being green. Many commemorative photos of themselves with the tree were offered by those employees.



Happy memorial trees

To beautify and maintain the environment, each division continues to make the company grounds greener and utilize Green Curtains in summer.



Green wall

### Environmental Communication Using Various Media

By providing information through a variety of media, we are able to inform members of the community and our stakeholders the ways we are working to help the environment. They are able to view our environmental reports and environmental initiatives on our website. Our employees are also notified of HPK's environmental initiatives through the company newsletter.



Photon Terrace website

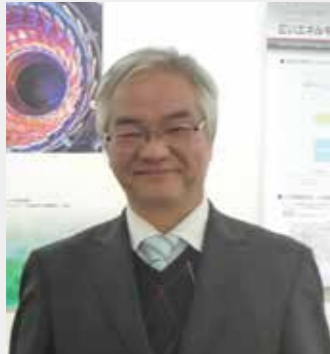


Company newsletter

[About Hamamatsu > CSR > Environmental Initiatives](#)

## Third Party Opinion

We asked for the opinion of Hidenori Mimura, the Director of the Research Institute of Electronics at Shizuoka University, regarding the Hamamatsu Photonics 2017 Environmental Report.



The Director of the Research Institute of Electronics at Shizuoka University

### Professor Hidenori Mimura

Hamamatsu Photonics (HPK) is a company that manufactures world-class optical products that have contributed to numerous Nobel Prizes. The company's products contribute to solving environmental problems in various areas including environmental measurement of air and water quality, content analysis of environmentally controlled substances, and energy saving in electrical equipment. In order to understand the environment-conscious business activities of Hamamatsu Photonics, a state-of-the-art manufacturer of optical products, I have carefully read the company's 2017 Environmental Report. I also visited the Main Factory of the Solid State Division, which manufactures optical semiconductor elements, which is the company's main products, and learned about their environmental activities.

### Reading the 2017 Environmental Report

Information on business activities and environmental impacts is properly disclosed, and the targets and achievements of environmental activities are published in detail. Every year, the company develops new environmentally conscious products, and it also responds appropriately to regulations on chemical substances contained in products such as the RoHS Directive. The company's environmental activities such as proper management of chemical substances, efforts to prevent global warming, efforts for the 3Rs (reduce, reuse, recycle), efforts in the area of shipping, and efforts to protect water resources, are also evident in its 2017 Environmental Report. In particular, the fact that the company underwent third-party verification of its greenhouse gas emissions based on ISO 14064-3 attests to the reliability of the company's data and deserves special notice. Such reading of the Environmental Report gives one a high appreciation of HPK's proactive attitude with regard to environmental load reduction and environmental conservation activities even as the scale of its operations is growing.

### On my visit of the Solid State Division's Main Factory

I visited the Solid State Division's Main Factory in mid-December. The Division has formulated a BCP that equips it to continue core operations inasmuch as possible in order to fulfill its supply responsibilities toward customers in the event of various emergency scenarios in case of a major disaster, and the various measures in place to ensure quick recovery made me feel that it practices thorough risk management. Further, the Solid State Division, which uses a lot of energy to manufacture semiconductor products, is actively promoting energy conservation by switching to pumps with inverter technology and energy-saving air conditioning, and lighting. On the day of my visit, I toured the division's cogeneration systems and wastewater treatment facilities, which normally cannot be visited, and thus was able to gain a good understanding of the Solid State Division's many environmental initiatives. I have come away feeling that the Main Factory truly reflects the philosophy of Hamamatsu Photonics to implement high-level environmental activities with a high degree of awareness.

#### Response to the Third Party Opinion

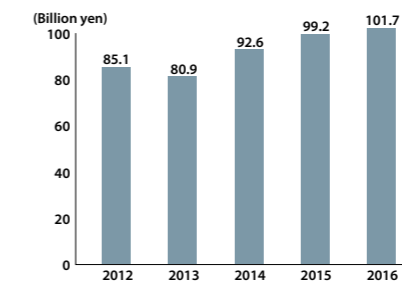
Thank you very much for your valuable opinions regarding our environmental report. We will continue to work steadfastly on environmental initiatives and reliable information dissemination, contribute to solving environmental problems by developing and providing products that contribute to environmental improvement by reducing the environmental burden throughout the product life cycle.

Headquarters Environment Committee Secretariats

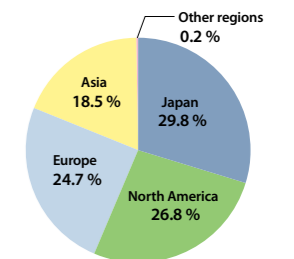
## Company Overview

Company Name	Hamamatsu Photonics K.K.
Headquarters	325-6 Sunayama-cho, Naka-ku, Hamamatsu City, Shizuoka Pref. 430-8587, Japan
Established	September 29, 1953
Representative	Akira Hiruma, President and CEO
Capital	34,928 million yen
Sales (Non-consolidated)	101,786 million yen
Employees (Non-consolidated)	3,270
Products	Photonic Detectors, Light Sources, Cameras & Systems

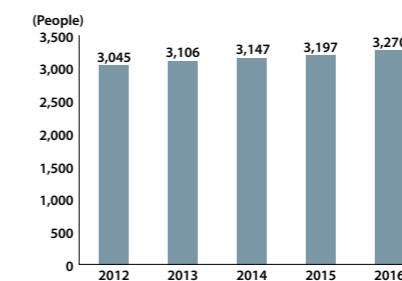
Sales over Time (Non-consolidated)



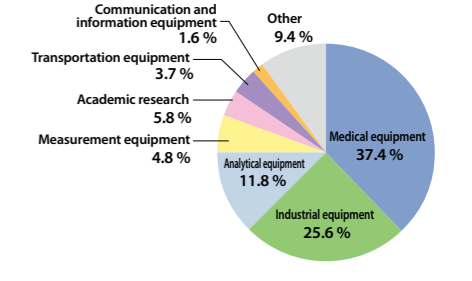
Sales (Consolidated) by Region



Number of Employees (Non-consolidated)



Sales (Consolidated) by Business Area



## Editorial Policy

Time Period Covered	Fiscal year 2016: From Oct. 1, 2015, to Sep. 30, 2016
Organization	Hamamatsu Photonics K.K. (Non-consolidated)
Environmental Performance Data	11 business facilities (Toyooka Factory, Tenno Glass Works, Main Factory, Mitsue Factory, Shingai Factory, Joko Factory, Miyakoda Factory, Central Research Laboratory, Headquarters, Industries Development Laboratory, and Tsukuba Research Laboratory) and 5 sales offices (Tokyo Sales Office, Osaka Sales Office, Sendai Sales Office, Tsukuba Sales Office, and Nishinoh Sales Office)
Reference Guidelines	2012 Environmental Report Guidelines
Subject Matter	Environmental aspect
Publication	February 2017

### Webpage



We provide the latest information about our environmental efforts on our Website.

About Hamamatsu > CSR > Environmental Initiatives

**HAMAMATSU PHOTONICS K.K.** [www.hamamatsu.com](http://www.hamamatsu.com)



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Published in February 2017

Ver.2