HAMAMATSU

PHOTON IS OUR BUSINESS

Environmental and Social Report

2018

HAMAMATSU PHOTONICS K.K.

Message from the President

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

Introduction

In November 2017, over 30,000 participants including heads of state, cabinet ministers, enterprises, and local governments took part in the 23rd Conference of the parties (COP 23) to the United Nations Framework Convention on Climate Change (UNFCCC). There, the assembled parties deliberated on policy for implementation of the Paris Agreement and global measures to combat climate change. Japan announced that it was undertaking resolute countermeasures domestically while advancing efforts to ensure transparency. It also heightened expectations that Japan would play a vital role in the international community dedicated to accelerating the shift toward a carbon-free society.

The UN set in place 17 Sustainable Development Goals (SDGs) for addressing social and economic issues while solving environmental problems, encouraging the public/private sector to contribute toward the achievement of those targets. The UN also declared Principles of Responsible Investment (PRI), it leads the wide scale growth on ESG (Environmental, Social, and Governance) investing to evaluate comprehensive companies' values.

Meanwhile, regulations are tightening internationally. The Minamata Convention on Mercury, EU RoHS Directive, REACH Regulation, and others require companies environmentally friendly business and manufacturing through the value chain.

Considering these issues, Hamamatsu Photonics K.K. (HPK) recognizes it is important to clarify risks and opportunities on business, address socioeconomics challenging with management integrating environment into business strategy, and disclose information.

For all the reasons above, we have added a social issues section on our report to publish this Environmental and Social Report.

Summary for Fiscal Year 2017

HPK builds an environment-friendly organization and pursues environmental management on the basis of our Fundamental CSR Policy and Fundamental Environmental Policy.

In fiscal year 2017, HPK intensified its environmental action. In light of updates to ISO14001, proclamation of the SDGs, and other global developments, we revised our own Fundamental Environmental Policy and signed the UN Global Compact. In activated to fight global warming, a new buildings which is outstanding energy-saving performance was completed. In efforts to safeguard biodiversity, we planted trees and donated Happy Memorial Trees to employees. Among product related measures, we introduced chemSHERPA, a scheme for disclosing information on chemicals substances in products, into our management systems, encouraging our business partners to respond effectively to product environmental regulations. To disseminate environmental information to the general public in consideration of ESG evaluations, we continued to advance disclosure and dialogue with stakeholders through reporting to CDP and participating in "Environmental Reporting Platform Development Pilot Project."

Using Photonics Technology to Help Solve Environmental Problems

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 environment through our proprietary photonics technologies we have cultivated over many years. In fiscal year 2017, we developed following new products;

The world's smallest stable, high-voltage power module that supports automatic mounting processes. This product enables customers to downsize their equipment and greatly shorten working times in their manufacturing processes.

The high speed, sensitivity infrared detectors operate at normal temperatures while expanding long wavelength detection range. With these, customers can also downsize theirs since they can measure substances such as ammonia and ozone, and together with air pollutants such as nitrogen oxides (NO_x) and sulfur oxides (SO_x).

Further, guided by the Photonics Declaration in Hamamatsu, we established the innovative Photonics Evolution Research Center as part of a framework for an industrial-academic partnership in order to create revolutionary innovations, driving development and expanding applications in the field of photonics technologies from here in Hamamatsu-Preeminent Photonics city.

In the beginning of November 2018 we will proudly host Photon Fair 2018. This Hamamatsu Photonics trade show will showcase many of the products and research projects we are working on today, as well as our activities to protect the environment and serve society. We look forward to welcoming you to Photon Fair 2018.

As we continue to work to reduce the environmental impact of our business activities, we will help to solve environmental problems and achieve SDGs through our eco-friendly products using photonics technologies.

We humbly ask all stakeholders for their continued warm support and encouragement.

Akira Hiruma
President and CEO
Hamamatsu Photonics K.K.

A Proud Participant in the UN Global Compact

HPK is a signatory to the UN Global Compact, a framework established by the United Nations. On August 18, 2017 HPK registered as a participating company.

The UN Global Compact is a voluntary initiative to inspire responsible and creative leadership in businesses and organizations. It encourages members to join in an international framework for conduct as good corporate citizens and the achievement of sustainable growth.

Through the UN Global Compact, HPK proudly contributes to society and humanity by instilling strong ethical sensibility in each and every employee and creating new industries through photonics technology. Aiming to grow and develop as a sound and trusted enterprise, HPK will continue to uphold the 10 Principles of the UN Global Compact and contribute to the sustainable development of society.

Press releases

UN GLOBAL COMPACT
Network Japan
WE SUPPORT

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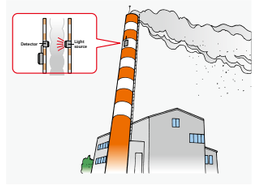
Topics

Infrared detectors containing no substances controlled under the EU RoHS Directive

InAsSb photovoltaic detector



Application in flue monitors

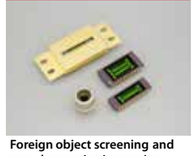
Indium-arsenide-antimonide (InAsSb) photovoltaic detectors are used in the measurement of a variety of greenhouse gases, including CO_2, CH_4, NO_X, and SO_X. We developed this new type of infrared detector using exclusive crystal-growth and processing technologies, achieving sensitivity in wavelength range up to 11 µm.

Unlike conventional infrared detectors, the InAsSb photovoltaic detectors contain no mercury or cadmium. This innovation not only reduces environmental impact but also enables high sensitivity and speed for true high-precision measurement. We expect these detectors to contribute significantly in a variety of fields of environmental monitoring.

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.

Infrared image sensors



Foreign object screening and non-destructive inspection

Quantum cascade lasers

Gas analysis

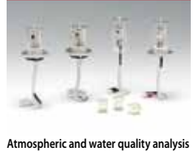
Photomultiplier tubes

Environmental analysis and measurement

Delayed luminescence measuring device

Ecological impact assessment

Deuterium lamps

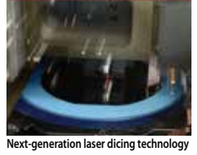


Atmospheric and water quality analysis

Infrared detectors

Environmental analysis and measurement

Stealth dicing engine



Next-generation laser dicing technology

Mini-spectrometers

Soil analysis and aquametry

X-ray line sensor cameras

Recycling/material screening

Raman spectroscopy

Water quality inspection, agrichemical, toxicology testing

Xenon flash lamp

Atmospheric and water quality analysis

Solar cell evaluation systems

CO_2 gas sensor modules

Photonic multichannel analyzer

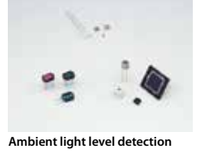
Light source evaluation

Radiation detection modules

Gamma-ray imaging

Shows areas of concentrated radioactive material

Visible light/illuminance sensors



Ambient light level detection

Distance sensors

Weather measurement

Promoting Environmental Management

HPK Fundamental Environmental Policy

Principle

Hamamatsu Photonics, as a company that contributes to society through photonics technology, aims to realize a sustainable society toward a future with balance among all forms of life, whilst considering the importance to harmonize environment with society and economy.

Policy

1. **Providing Environmentally Friendly Products**
   Manage chemical substances contained in products, as well as develop and provide products that contribute to environmental improvement and reduce the burden throughout the product life cycle.
2. **Actions to Address Environmental Activities**
   Encourage all our employees to take environmentally friendly actions, achieving our environmental goals based on the identification of risks and opportunities that can influence our business activities, products and services.
3. **Protection of the Environment, Prevention of Pollution**
   Address energy saving, global warming prevention, waste reduction, sustainable resource use, chemical management, biodiversity protection, conserving water and preventing pollution.
4. **Compliance of Environmental Regulations**
   Comply with domestic and international legal requirements, individual agreements and other requirements to which we subscribe voluntary.
5. **Continual Improvement of Environmental Management System**
   Make efforts to improve our environmental performance by the continual improvement of our environmental management system, through the evaluation of the environmental impact at regular intervals.
6. **Promoting Environmental Communication**
   Promote environmental consciousness and friendly communication with stakeholders and our employees by widely disclosing environmental information both internally and externally.

Environmental Management System

Framework for Promoting Environmental Management

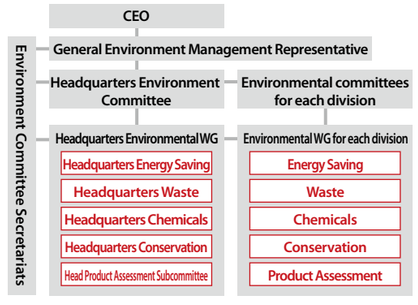
Under the HPK Fundamental Environmental Policy, each business year we set environmental goals and targets for our environmental management system (EMS). We evaluate results from our activity, and work to constantly improve our EMS on the basis of management review.

To implement the above cycle smoothly, we have established a Headquarters Environmental Committee that is directed by a General Environment Management Representative (Kenji Yoshida, 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.

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.

Environmental Management System Diagram



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 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 2017.

INPUT

Energy	1,093,000 GJ
Electricity	90,310,000 kWh
Town gas	3,349,000 m^3
LPG	409 tons
LNG	776 tons

Water	703,000 m^3
Tap water	95,000 m^3
Well water	608,000 m^3

Containers, packaging	318 tons
Paper	24 tons
Materials*1	636 tons
Chemicals and preparations	114 tons
Metal	203 tons
Glass	79 tons
Plastic	46 tons
Electronic parts	75 tons
Other	119 tons

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Business Activities

Power generation systems
8,980,000 kWh

OUTPUT

Carbon	50,387 tons
Carbon from energy use	48,581 tons
Other	1,806 tons
NOx	46 tons

Wastewater	631,000 m^3
Public sewer	95,000 m^3
River discharge	536,000 m^3

Waste	869 tons
Industrial waste*2	728 tons
General waste	141 tons
Recycling*3	870 tons
Landfill	9 tons

Products	421 tons

*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.

Environmental Accounting

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

Dealing with Risks

Framework for Reducing Environmental Risks

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

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

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

In fiscal year 2017, two problems were identified. We omitted the reporting of stored chemicals not currently in use and defects in inspection records. Each case was promptly reported to the authorities. We took appropriate corrective action, and both issues were discussed with our environmental committee to avoid a recurrence.

Wastewater analysis

Emergency Response Training

We have prepared accident and disaster response manuals, and regularly hold customized disaster response training for each type of business and division. In fiscal year 2017, training sessions have included evacuation for gas leaks, respirator tank attachment, and response to chemical spills.

Training in operation of final release sluices

Targets and Results of Environmental Activities

Medium-term and Long-term targets

Item	Medium-/long-term targets	Item	Medium-/long-term targets
Environmental Management Systems	→ Advancement of environmental management systems (EMS) → Support and improvement of the objectives and targets of the Fundamental Environmental Policy	Fighting Global Warming	→ Reducing energy consumption per unit of sales 8% by fiscal year 2021 compared to 2013 → Reducing energy consumption per unit of sales 18% by fiscal year 2031 compared to 2013
Making Products Environmentally Friendly	→ Measures to develop and manufacture environmentally friendly products and expand operations to new markets and customers	3R Activities	→ Support of landfill rate below 1.8% company-wide → Achievement of landfill rate below 1% company-wide by fiscal year 2021
Appropriate Management of Chemicals	→ Establishment of appropriate systems for managing chemicals → Promotion of understanding and management of chemical hazards → Possession of GHS SDS in 85% or more by fiscal year 2022	Protect Water Resources	→ Reducing water use per unit of sales 5% by fiscal year 2021 compared to 2016
Prevention of Pollution	→ Compliance with laws and regulations and efforts to prevent environmental pollution	Environmental and Social Communication	→ Promoting of environmental communication

Targets and Results in Fiscal Year 2017 and Activity Targets in Fiscal Year 2018

Item	Main targets in fiscal year 2017	Main results in fiscal year 2017	Evaluation	Main targets in fiscal year 2018
Environmental Management Systems	→ Continued maintenance and improvement of EMS at business locations certified under ISO14001	→ Underwent maintenance/renewal auditing from external auditors. → Advanced support for the revised ISO14001 and obtained 2015 certification at Electron Tube Division and Miyakoda Factory.	○	→ Continued maintenance and improvement of EMS at business locations certified under ISO14001
	→ Compliance with environmental laws and regulations	→ Violations of environmental laws and regulations: 2 - Violation of reporting duties regarding special facilities under the Water Pollution Control Law - Violation of inspection duties regarding special facilities under the Water Pollution Control Law	×	→ Compliance with environmental laws and regulations
Making Products Environmentally Friendly	→ Company-internal/external operation based on the Standards for Use of Environmentally Controlled Substances (Management of Chemical Substances) and update of the Standards	→ Updated to version 14 of Standards for Use of Environmentally Controlled Substances. → Provided in-house training (in Japan: 7 times; overseas affiliates and dealerships: 7 times).	○	→ Company-internal/external operation based on the Standards for Use of Environmentally Controlled Substances (Management of Chemical Substances) and update of the Standards
	→ Advancement of R&D in environmentally contributing and friendly products	→ Advancement at each business location	○	→ Advancement of R&D in environmentally contributing and friendly products
Making Business Activities Environmentally Friendly	**Appropriate Management of Chemicals**			
	→ Promoting the collection of GHS compliant SDSs	→ The ratio of holding GHS compliant SDSs is 65% or higher, putting in our internal database.	○	→ Promoting the collection of GHS compliant SDSs
	→ Ensuring employees treat chemicals properly	→ Held educational trainings for appropriate use of chemical substances, attended by a total of 605 people.	○	→ Ensuring employees treat chemicals properly
	Prevention of Pollution			
	→ Reduce VOC emissions into atmosphere per unit of sales by 30% compared to 2000 and recovery rate of 50% or higher	→ 61.1% reduction, recovery rate: 64.9%	○	→ Reduce VOC emissions into atmosphere per unit of sales by 30% compared to 2000 and recovery rate of 50% or higher
	→ Complying with the self-regulation standards	→ Confirmed and conformed to environmental regulations. Inspected our facilities that could affect the environment	○	→ Complying with the self-regulation standards
	Fighting Global Warming			
	→ Saving energy programs and its promotional activities	→ Promoted energy-saving activities as a Fun to Share sponsor company. - Held an energy-saving contest at home in 2017 with 612 participants. - 11 business locations in Japan participated in the Light Down Champaign.	○	→ Saving energy programs and its promotional activities
	→ Reducing energy use per unit of sales by at least 4% compared to 2013	→ Reduced energy use per unit of sales by 17.7% compared to 2013.	○	→ Reducing energy use per unit of sales by at least 5% compared to 2013
	3R Activities			
	→ Support of landfill rate below 1.8% company-wide	→ Landfill rate was reduced to 0.7% (company-wide tabulation)	○	→ Support of landfill rate below 1.8% company-wide
	→ Support of management of waste-disposal contractors	→ Through confirmation, etc. of implementation with waste-disposal contractors, it was confirmed that contracted waste disposal is handled correctly.	○	→ Support of management of waste-disposal contractors
	Protect Water Resources			
	→ Reducing water use per unit of sales 5% by fiscal year 2021 compared to 2016	→ Reduced water use per unit of sales by 10% compared to 2016	○	→ Reducing water use per unit of sales 5% by fiscal year 2021 compared to 2016
	→ Evaluation of water risks	→ Using water-risk evaluation tools, water risks were evaluated at all production facilities and research centers.	○	→ Evaluation of water risks
Environmental and Social Communication	→ Promoting biodiversity conservation activities	→ Distribution of Happy Memorial Trees → A total of 540 people participated in local cleaning activities 16 times during the year. → Participated in the Lake Hamana Cleanup Campaign and tree planting in Tsunami mitigation forest. → Awarded the Hamamatsu City CSR Activities Commendation in 2016 (Joko and Miyakoda Factory).	○	→ Promoting biodiversity conservation activities
	→ 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.	○	→ Publishing our environmental information to the public and our employees

Evaluation standard: Achieved ○ Not achieved ×

Making Products Environmentally Friendly

Developing Environmentally Contributing and Friendly Products

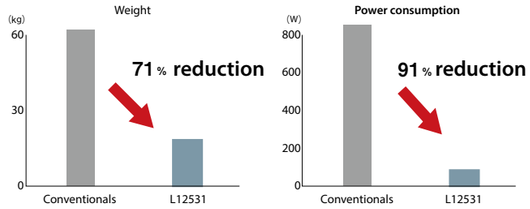
HPK strives to expand sales of products for which environmental measures are built into the product. These products incorporate fewer resources (are smaller and lighter), use less energy, or have a longer working life than conventional products. They work to reduce environmental impact and/or contribute to solutions of environmental problems. In this section, we look at some case studies for fiscal year 2017.

Sealed type microfocus X-ray source (MFX) using the target GND system

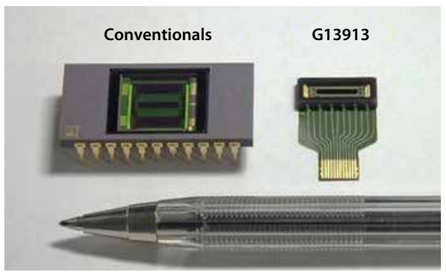
Related Products Information > Microfocus X-ray sources

The L12531 is a microfocus X-ray source used in non-destructive X-ray inspection of components such as electronics and auto parts.

The structure of the sealed type MFX is further improved with the adoption of a transmission target, delivering high resolution similar to that of a conventional open type MFX while reducing weight by approx. 71% and energy consumption by approx. 91%.



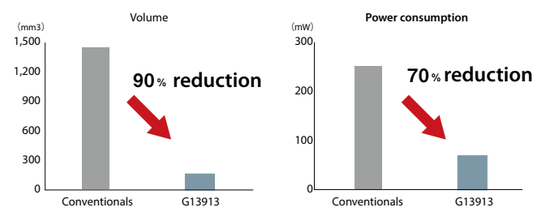
InGaAs Linear Image Sensor



Related Products Information > InGaAs image sensor

The G13913 Series is a non-cooled indium-gallium-arsenide (InGaAs) linear image sensor with sensitivity in the near-infrared range. By revising the circuits and overall design, HPK has succeeded in reducing this product's footprint, weight, and power consumption in comparison with conventional products.

Near-infrared rays are widely used in gas, water, soil, and other environmental analysis, as well as food screening. This sensor switches the near-infrared spectrometer from a heavy, fixed-installation design to a lighter, portable configuration.

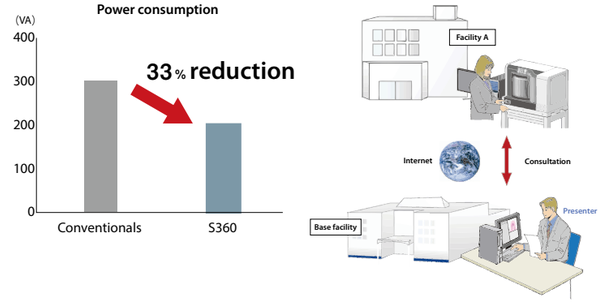


Digital Slide Scanner

Related Products Information > Digital slide scanners

The NanoZoomer S360 is a digital slide scanner that can scan up to 360 pathology slide samples at once, at high speed, and convert them into high-resolution digital data.

By changing the light source and camera, HPK succeeded in reducing power consumption by approx. 33% compared with conventional products.



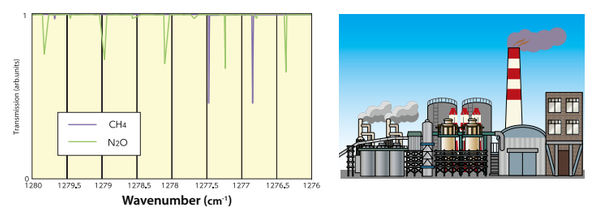
Pulsed QCL Module

Related Products Information > Quantum Cascade Laser (QCL)

The L14147 Series is a series of pulsed quantum cascade laser (QCL) modules. These modules generate wavelengths that match the absorption wavelengths of gases such as methane (CH_4) and nitrous oxide (N_2O).

Because they measure concentrations of these greenhouse gases with high precision, these pulsed QCL modules are used to identify the sources of these gases and to monitor emissions from bio plants. They therefore play a valuable role in contributing to the earth's environment.

Gas absorption wavelengths (around 7.82 µm)



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 regarding chemicals through industrial associations and responding swiftly and appropriately to new regulations.

In response to the RoHS Directive, we have completed and established compliance measures to the current 6 restricted substances. We have been supplying products conforming to the current directive[1] while promoting upcoming measures for the new 4 phthalates with our business partners.

We are also working with them on procurement regarding conflict minerals. 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, 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 14th edition of the standards in October 2017.

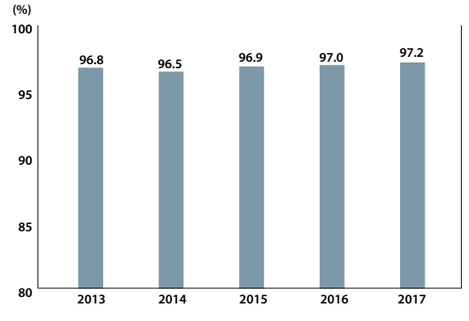
On the basis of these standards, we conduct green procurement surveys with our business partners. These surveys collect information on the concentrations of regulated chemicals in parts and how the parts are used. The survey results are collected in a company-wide system that stores environmental information 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 2017 was 97.2%, exceeding our 90% target rate.

About Hamamatsu > CSR > Procurement > Green procurement

Green Procurement and Chemical Substance Management Guide

Green purchasing rate



Making Business Activities Environmentally Friendly

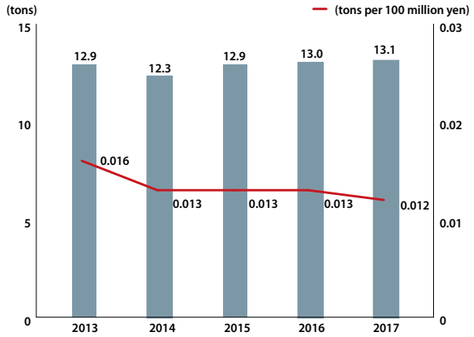
Appropriate Management of Chemicals

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

In fiscal year 2017, under the PRTR Law,[1] we used 13.1 tons of substances designated as Class 1 Chemical Substances. In 2017, we reported the use of two substances at our Main Factory (2-aminoethanol and hydrogen fluoride and its water-soluble salts).

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.

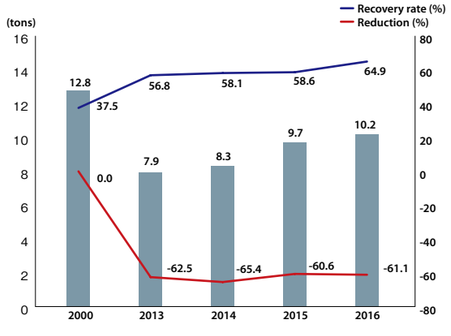
Internal SDS database

Reducing VOC (Volatile Organic Chemicals) Emissions

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

In 2016, we worked toward maintaining a 30% reduction in atmospheric emissions compared to year 2000. We achieved a 61.1% reduction in atmospheric emissions and a recovery rate of 64.9% .

VOC emissions, reductions and recovery rate by year



Chemical Substance Education

The Chemical Working Group at each business facility and division, regularly educates users of chemical substances on their hazards and how to properly handle them. In this period, we also received chemical substance safety education from chemical manufacturers.

Chemical substance education

Fighting Global Warming

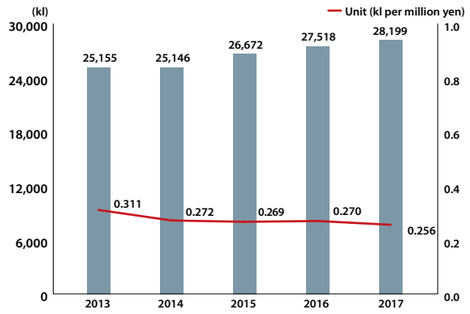
Transition of Energy Consumption and Carbon Emissions

HPK has set a new target for reducing our unit energy consumption by at least 18% by 2031 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 2017. As a result, our energy use per unit of sales decreased by 17.7% compared to the previous year.

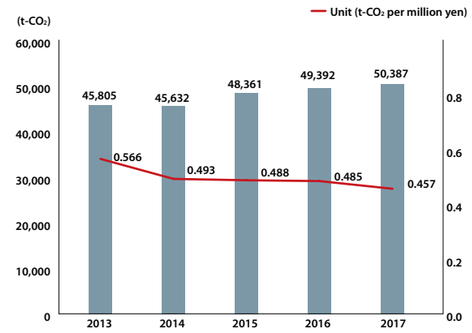
Our carbon emissions[1] in fiscal year 2017 increased by 2.0% compared to the previous year, while carbon emissions per unit of sales declined by 5.8%. We have introduced detoxifying equipment to suppress the emission of semiconductor fabrication gases such as PFCs and SF_6, which are carbon causing global warming.

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

Energy use and its ratio of sales



Carbon emissions and its ratio to sales



1 Carbon emissions refer to a calculation range based on the Law Concerning the Promotion of the Measures to Cope with Global Warming. The coefficient used for carbon emissions from electrical power is 0.417 (value obtained in fiscal year 1990 by the Federation of Electric Power Companies of Japan).

Environmental Measures in New Buildings

A new building was completed at Shingai Factory in March 2017. This building expands HPK's production capacity in the post-processing of opto-semiconductors. This new building has reduced carbon emissions, energy saving measures, installation of high efficiency HVAC Systems, LED and natural lighting as well as many other measures implemented to restrain global warming.

This building has earned an A (excellent) rating using the Comprehensive Assessment System for Built Environment Efficiency (CASBEE).

Exterior view of new building, Shingai Factory

LED lighting

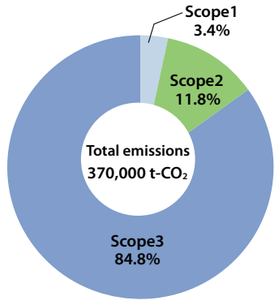
Natural lighting system

Value Chain Carbon Emissions

To grasp the environmental impact of the value chain[2], HPK is working on the calculation of Scope 3 (shown below) which is based on the Greenhouse Gas (GHG) Protocol.

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

Carbon emissions



Category	Emissions (t-CO₂)	(%)
Scope1 All Direct Carbon Emissions	12,719	3.4
Scope2 Indirect Carbon Emissions[3]	43,853	11.8
Scope3 Other Indirect Carbon Emissions	313,785	84.8
(Category 1: Purchased products and services)	(151,373)	(48.2)
(Category 11: Use of sold products)	(87,639)	(27.9)
(Category 2: Capital goods)	(60,243)	(19.2)
(Other : Business travel, Employee commuting, logistics, disposal, etc.)	(14,530)	(4.7)

2 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.

3 The carbon emission factor we use is Chubu Electric Power's emission factor.

Energy Savings through Upgrading of HVAC Heat Sources

With the installation of new equipment and the upgrading of existing equipment, we are moving forward with the introduction of equipment targeted in the Top Runner Program which includes high efficiency equipment. In fiscal year 2017, we installed company wide, 67 targeted equipment, which includes high efficiency chillers, electric motors, power transformers and LED lighting.

In April 2017, our Toyooka Factory began upgrading chillers for the HVAC cold water and installing inverters on heat pumps. Thanks to these measures, the factory will be able to reduce power consumption by approx. 565 MWh/year—the equivalent of 145 kl of crude oil.

Upgraded HVAC heat sources

Hamamatsu Photonics Receives the Chairman's Award from the Chubu Electricity Use Rationalization Committee for Excellence in Energy Management

At the 2016 Tokai Region Energy Saving Month awards ceremony, HPK's Mitsue Factory was honored with the Chairman's Award from the Chubu Electricity Use Rationalization Committee, for excellence in energy management.

Our Mitsue Factory was selected for the award out of 7,000 places of business in Aichi, Gifu, Mie, Shizuoka, and Nagano Prefectures. Mitsue Factory's strong efforts to advance energy management were highly evaluated. The plant's 37% reduction in unit energy consumption as a result of energy conversion and energy-saving measures was particularly noteworthy.

Award ceremony

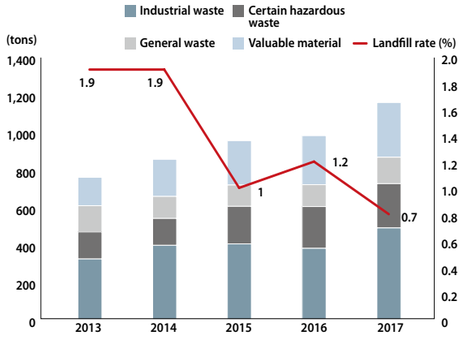
Chairman's Award presented to Mitsue Factory

3R Activities

Reducing Waste Levels to Zero

We have been promoting 3Rs[1] and managing wastes properly to achieve the idea of zero emissions[2], to reduce their negative impact on the environment and use resources efficiently. For fiscal year 2017, we recorded the landfill rate[3] of 0.7 % and achieved zero emissions. This was accomplished by separating and reducing wastes, reducing inferior goods, reusing equipment and packaging materials and promoting recycling.

Output and Landfill rate



	2013	2014	2015	2016	2017
Output (tons)	770	873	968	980	1,165
(Industrial waste)	(330)	(395)	(417)	(379)	(492)
(Certain hazardous waste)	(145)	(145)	(200)	(223)	(236)
(General waste)	(140)	(123)	(114)	(117)	(141)
(Valuable material)	(156)	(211)	(237)	(261)	(298)
Recycling[4] (tons)	638	745	675	699	873
Landfill (tons)	14.5	17	9.5	11.3	8.7

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. We define that as having a landfill rate of 3 % or less for all wastes, considering The Target for Establishing Recycling-based Society in Shizuoka Prefecture.
3 Landfill rate shows a ratio of Output to the amount of land filed wastes.
4 The amount of recycling is the total amount of material and thermal recycling added to the amount of valuable materials.

Meeting on Proper Waste Management for Companies

In July 2017, the Shizuoka Industrial Association hosted this meeting at our Toyooka Factory. The 21 participants working for companies in Shizuoka Pref. observed our waste storage and wastewater facility, and then exchanged their views regarding waste management problems. The feedback received from this meeting was that it was very informative especially in our way of informing our employees of proper waste managements.

Meeting on Proper Waste Management for Companies

Promoting 3Rs

In promoting the 3Rs, we have joined the 3Rs Campaign of Industrial Waste. This is lead by Shizuoka Pref. This governmental target is to reduce the landfill rate to 1.8% or less. As a corporate citizen of Shizuoka, we enthusiastically support this initiative.

In addition to promoting 3Rs initiatives in the business domain, we also encourages our employees to value 3Rs in their private life. In fiscal year 2017, we launched a website called "Encouragement of 3Rs" on our intranet.

Certificate of participation in the industrial-waste 3Rs campaign

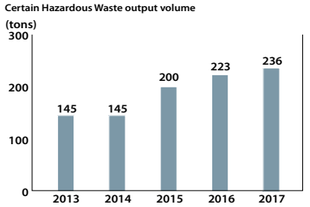
Encouragement of 3Rs

Dealing with Certain Hazardous Waste

Certain industrial wastes are identified as Hazardous Waste in several laws and regulations.[5] These kinds of wastes require special attention and needs to be disposed of properly. We have entrusted contractors whose facilities provide disposal in an environmentally sound manner. We then confirm this with a follow up visit at these sites on a regular basis.

5 Certain Hazardous Waste includes sludge, acid waste, and waste alkaline (these contain heavy metals, organochlorine compounds, dioxin, etc., over a certain concentration), as well as waste PCBs, waste asbestos, waste mercury, and so on.

Certain Hazardous Waste output volume

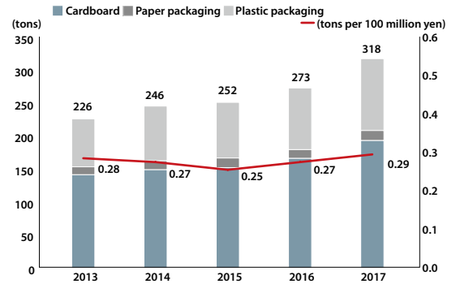


Shipping Measures

Reducing Containers and Packaging Materials

We are using packaging materials as efficiently as possible to improve product accommodation ratios. In fiscal year 2017, our use of containers and packaging materials was 318 tons. Our use of containers and packaging materials per unit of sales was 0.29 tons per 100 million yen.

Container and packaging use and its ratio of sales



Downsizing of Cartons and Reduction of Packing Materials

To reduce waste generated by customers purchasing only the Photo Ionizer Controller, we improved the carton. In the past, the carton designed for the head and the controller was used for customer's requesting just the controller. With the improvement, a dedicated carton strictly for the controller is now used. This reduced the mass of the packing cartons by approxmately 53% and their volume by approximately 56%. This reduction, also made disposal easier.

Before improvement

After improvement

Change of Shock-Absorbing Material for Better Environmental Performance

We changed the shock-absorbing material for SPOLD LD light sources to cardboard. When we consider the entire life cycle of cardboard, we find that it is a low-environmental-impact material, as it emits little carbon when recycled. It can also be folded easily for disposal. The use of cardboard improves the ease of discarding the packaging.

Cardboard shock-absorbing material

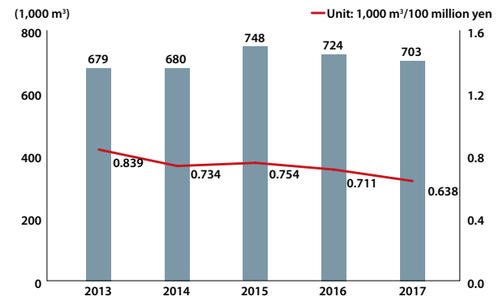
Protecting Our Water Resources

Using Water Resources Effectively and Risk Assessment

HPK recognizes the importance of water resources and is dedicated to reducing its use, as well as recycling the water it does use. In addition to its water conservation activities within the company, HPK is reducing waste water though the introduction of pure water recycling. We also reuse waste water from pure water production for spraying on the grounds and rooftop scrubber feed water. For example, the dicing water recycling system introduced at Shingai factory has a water reuse rate of 99.5%, and we were able to reduce 1,400 tons of water annually.

We also participate and respond to CDP Water, an international project in which many companies around the world disclose information on water. We regularly evaluate water risks at domestic and overseas production sites, recognize water problems and set their targets.

Water use and its ratio of sales



Site Data

From Oct. 1, 2016 to Sep. 30, 2017



Environmental Impact	(Unit)	Toyooka Factory	Tenno Glass Works	Joko Factory
Energy	(thousand GJ)	311.3	4.2	23.4
Water	(thousand m^3)	229.7	1.8	8.5
Chemicals subject for PRTR Law*1	(tons)	0.49	0.003	0.006
Paper	(tons)	6.1	0.2	3.4
Containers and Packaging Materials	(tons)	152.5		33.4
Carbon emission from the energy*2	(tons)	13,592	185	1,001
Other Carbons*3	(tons)	1.2	—	1.5
Wastewater	(thousand m^3)	229.7	1.8	8.5
Waste	(tons)	238.0	4.2	32.3
Landfill	(tons)	0.36	0.003	0.33
Landfill rate	(%)	0.1	0.0	0.5




Environmental Impact	(Unit)	Main Factory	Mitsue Factory	Shingai Factory	Miyakoda Factory
Energy	(thousand GJ)	420.1	73.6	70.5	56.2
Water	(thousand m^3)	335.7	56.2	22.2	12.7
Chemicals subject for PRTR Law*1	(tons)	11.4	0.07	1.1	0.13
Paper	(tons)	5.8	2.1	1	0.4
Containers and Packaging Materials	(tons)		131.2		0.7
Carbon emission from the energy*2	(tons)	18,931	3,489	3,082	2,475
Other Carbons*3	(tons)		1,723		51.7
Wastewater	(thousand m^3)	288.1	56.2	22.2	9.1
Waste	(tons)	420.2	33.5	28.2	24.7
Landfill	(tons)	5.00	0.20	0.05	0.77
Landfill rate	(%)	1.1	0.3	0.1	2.0




Environmental Impact	(Unit)	Main Office	Central Research Laboratory	Industries Development Center	Tsukuba Research Center
Energy	(thousand GJ)	2.6	95.3	29.3	3.7
Water	(thousand m^3)	1.4	32.2	2.1	0.3
Chemicals subject for PRTR Law*1	(tons)	—	0.12	0.01	0.001
Paper	(tons)	2.3	2.4	0.3	0.1
Containers and Packaging Materials	(tons)	—	—	—	—
Carbon emission from the energy*2	(tons)	120	4,175	1,259	153
Other Carbons*3	(tons)	—	28.5	—	—
Wastewater	(thousand m^3)	1.4	12	2.1	0.3
Waste	(tons)	17.8	50.2	3.2	17.6
Landfill	(tons)	0.03	1.05	0.05	0.86
Landfill rate	(%)	0.2	1.2	0.5	4.9

*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 carbon and calculate the carbon from energy use is 0.417.
*3 The emitted carbons other than carbon from energy use are converted to equivalent amounts of carbon.

Environmental and Social Communication

Promoting Community and Employee Communication through Ecological 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, 2017, a total of 676 people have applied to participate in this activity. Of all the applicants, 301 built new homes, 194 were married, and 181 had their children enter primary school. So far, a total of 522 applicants received their trees. Many commemorative photos of themselves with the tree were offered by those employees.

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


Happy memorial trees



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.

About Hamamatsu > CSR > Environmental Initiatives

Life Photonics website


Company newsletter

Clean-up activities in line with the Biodiversity Hamamatsu Strategy

As an effort to conserve biodiversity, we support the Biodiversity Hamamatsu Strategy by participating in conservation activities in areas around our businesses and the local municipalities and prefectures. We participated in the "Lake Hamana Cleanup Campaign" and "Welkame Cleanup Campaign" to protect local biodiversity and to pass on bountiful nature to our future generations. In fiscal year 2017, we had 540 employees participate in cleanup activities, a total of 16 times.

Additionally, we are planting an acorn to make a forest on the company premises.

We also participated in the tree planting in Tsunami mitigation forest.


Lake Hamana Cleanup Campaign

Tree planting in
Tsunami mitigation forest


Toyodagawa cleaning activities

Social Initiatives

Corporate Philosophy

Since its foundation, HPK has aggressively pursued research and development and invested in growth, to contribute to society through the establishment of new industries using photonics.

Corporate Philosophy of the Hamamatsu Photonics Group

HPK pursues the unknown and unexplored. By leveraging photonics technology to establish new industries and reach for the world's highest levels of manufacturing excellence, we build enterprise value and contribute to the development of science and technology.

Photonics technology is a fundamental technology that supports a wide range of industries. Further advances in photonics technology are in high demand worldwide, as companies seek to revolutionize technologies and boost the performance and precision of electronic components. Yet even today, the true nature of light is poorly understood. By pushing back the frontiers of photonics technology, HPK is deriving fresh knowledge that opens up new applications, thereby creating new industries and expanding business operations, to enhance enterprise value.

At the same time, we have a duty to generate the stable earnings base and continuous growth on which long-term research and development depend. To ensure that the Hamamatsu Photonics Group can respond flexibly and quickly to the expansion of the photonics industry and changes in the business environment, we have developed a medium-to-long-term vision. This vision guides a proactive program of investment in R&D and productive capital, forming a framework for continuously stable and high earnings.

We believe that employees, technology, and knowledge are the bedrock of sound management. We encourage our employees to improve themselves everyday through their work and discover the things that only they can do. To fulfill HPK's mission of building the photonics industry, our people enhance their knowledge, exploit market opportunities, and develop competitive technologies. Guided by a spirit of "harmony", our employees combine their individual talents to form a whole that is greater than the sum of its parts. As fostering such a corporate culture is a vital duty, we believe in bottom-up operational efforts based on a hands-on management style.

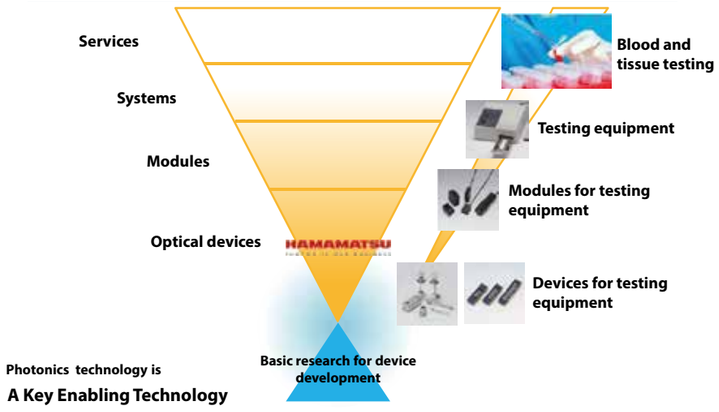
A Key Enabling Technology

The scope of application of photonics technology continues to broaden worldwide. As it proves indispensable in the production and improvement of leading-edge devices used in medical, industrial, and other fields, photonics technology is emerging as a key enabling technology, the driving force behind a technological innovation.

Photonics technology is the foundation of a wide range of industries, as the performance of optical devices that use photonics technology determines the performance of modules, systems, and a swath of services. Industries that apply photonics technology can be thought of as an inverse pyramid, with the optical devices HPK supplies supporting the entire structure at the bottom.

HPK will continue to press forward with basic research, creating innovative devices that drive socioeconomic development.

Industries That Apply Photonics Technology



Measures on UN SDGs

HPK is committed to doing its part to achieve the Sustainable Development Goals (SDGs) as proposed by the United Nations for 2030. We strictly comply with the 10 Principles of the UN Global Compact. We contribute to the SDGs through our products and technologies that are key for industries that apply photonics technology.

Business Continuity Plan (BCP)

In the face of a large scale natural disaster, we have established a Business Continuity Plan (BCP) to ensure that we continue our business and/or recover operations as quickly as possible. To minimize risks to our business and customers operations, we have in place plans for our response to crisis. This includes preparatory activities, various evacuation training, disaster coordination, and safety confirmation.

The basic policy of HPK' BCP is as follows.

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

Fire fighting training

Evacuation training

Third-Party Opinion

Hidenori Mimura, Director of the Research Institute of Electronics, Shizuoka University agreed to offer his opinion on Hamamatsu Photonics' 2018 Environmental and Social Report.

Hidenori Mimura

Director, Research Institute of Electronics, Shizuoka University

Hamamatsu Photonics K.K. (HPK) has contributed to the receipt of the Nobel Prize by a number of researchers. Its products stand at the very pinnacle of the global photonics industry. As a pioneer of basic research in the still largely unknown and untrodden field of photonics technology, HPK has for many years applied its exclusive photonics technologies in the development of products that contribute significantly to environmental preservation and social development. To understand the business activities of this manufacturer of state-of-the-art photonics products, I read the 2018 Hamamatsu Photonics Environmental and Social Report. I also visited HPK's Central Research Laboratory, which conducts photonics research on themes of life in its broadest sense, encompassing the soul, living things, human life, energy sources, and ways of living. There I reviewed a number of case studies with environmental and social implications.

On Reading the 2018 Environmental and Social Report

HPK revised its Fundamental Environmental Policy in view of factors such as international conditions, changes in environmental problems in Japan and overseas, and revisions to ISO14001. Also, the 2018 report includes social activities for the first time. HPK's appropriate responses to social change testify to its strong awareness of environmental and social issues.

The report accurately discloses data on business activities and environmental impact, so that readers can understand the environmental context of HPK's operations in specific detail. Environmental activities, targets, and results are listed in detail. In the 2018 edition, medium- and long-term targets are listed as well. As I read these reports, I notice that HPK develops new environmentally friendly products each year. I also notice that important metrics such as VOC emissions, carbon emissions per unit of energy used, and water consumption all trend downward, even as HPK's net sales increase. In short, this report provides a clear understanding of the environmental activities of HPK.

Central Research Laboratory

I observed the Central Research Laboratory in late December 2017. I learned that, ahead of all of HPK's operating departments, the Laboratory was introducing ESCO operations, upgrading to high-efficiency equipment, implementing appropriate operations of clean rooms, and had earned numerous awards for its environmental activities. I noted that HPK is an enthusiastic user of renewable energy such as solar and wind energy and observed HPK's implementation of high-efficiency equipment, wastewater treatment facilities, and on-site greening activities. I also observed that HPK is thorough in its implementation of 5S and carries out environmental activities with keen awareness. I was deeply impressed with the Central Research Laboratory's leadership in research at HPK, a company that manufactures the world's most cutting-edge photonics equipment, and my expectation swelled that its advances in research could contribute significantly to the solution of environmental and social issues. In particular, the Laboratory's research in photonics technology on the theme of life leads me to expect new cases studies in environmental preservation.

Response to the Third-party Opinion

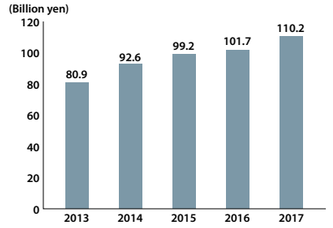
Hamamatsu Photonics is deeply grateful to Prof. Mimura for his highly valued opinion on HPK's activities and the Environmental and Social Report. Going forward, HPK will continue to make every effort to respond appropriately to changes in conditions, improve its activities on the environmental and social fronts, and provide transparency and disclosure through reports, online content, and other media. HPK continues to be as deeply committed as ever to contributing to a sustainable society through photonics technology.

Executive Office
Headquarters Environment Committee

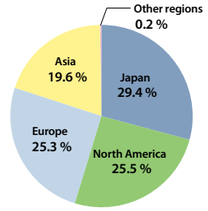
Company Overview

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)	110,200 million yen
Employees (Non-consolidated)	3,357
Products	Photonic Detectors, Light Sources, Cameras & Systems

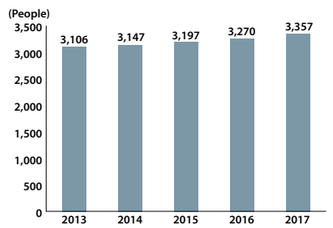
Sales over Time (Non-consolidated)



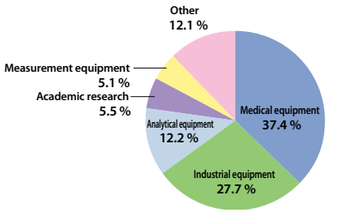
Sales (Consolidated) by Region



Number of Employees (Non-consolidated)



Sales (Consolidated) by Business Area



Editorial Policy

Time Period Covered	Fiscal year 2017: From Oct. 1, 2016, to Sep. 30, 2017
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, Industries Development Center, Tsukuba Research Center, and Headquarters) and 5 sales offices (Tokyo Sales Office, Osaka Sales Office, Sendai Sales Office, Tsukuba Sales Office, and Nishinihon Sales Office)
Reference Guidelines	2012 Environmental Report Guidelines
Subject Matter	Environmental aspect, Social aspect
Publication	March 2018

Webpage

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

About Hamamatsu > CSR

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

[CONTACT] Environment Committee Secretariats
5000, HIRAKUCHI, HAMAKITA-KU, HAMAMATSU-CITY SHIZUOKA-PREF., 434-8601 JAPAN. PHONE +81535840268 FAX +81535840276

Published in March 2018
Ver.2
* Recalculation for GHGs due to change in scope.