



Promoting Management that Meets Societal Demands

The Central Glass Group undertakes voluntary management activities aimed at making improvements by taking care to ensure the environment, safety, and health and environmental protection over the total life cycle of our products, from the R&D stages through to the procurement of raw materials, production, distribution, use, and disposal. We pay meticulous attention in order to maintain, manage, and guarantee the quality of the products that we deliver to our customers, and have set in place structures for their production, transportation, and supply. We promote management that is responsive to the societal demands of every one of our stakeholders as we aspire to be a company that is truly beneficial and contributes to society.

Mid-term Targets and FY2016 Results

Progress Accomplished: ⊙ Made steady progress: ○ Additional measures required: △

Major Issues	(P)Mid-Term Targets	(D)FY2016 Results	(C)Ratings	(A)FY2017 Plans
Establishment & maintenance of environmental management system	<ul style="list-style-type: none"> Renew and maintain certification at Ube, Kawasaki, and Matsusaka Plants (including the Sakai Manufacturing Site). 	The Ube Plant, Kawasaki Plant, and Matsusaka Plant (including the Sakai Manufacturing Site) maintained their ISO 14001 certification and underwent a periodic review for certification renewal.	⊙	Renew and maintain certification at Ube, Kawasaki, and Matsusaka Plants (including the Sakai Manufacturing Site).
	<ul style="list-style-type: none"> Renew and maintain certification and promote acquisition of new certification at affiliates. Improve self-management level at affiliates that have not acquired certification. 	Domestic affiliates that have already acquired certification maintained and continued their certification. During onsite audits, provided guidance on self-management to affiliates that have not yet acquired certification.	○	Renew and maintain certification and promote acquisition of new certification at affiliates. Improve self-management level at affiliates that have not acquired certification.

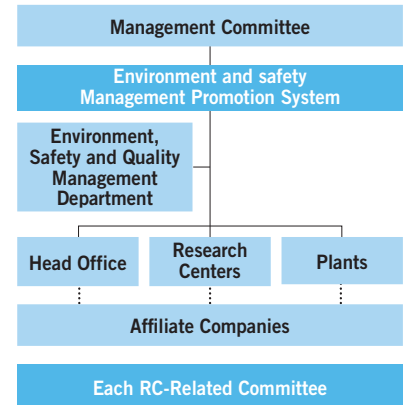
Environment, Safety, and Quality Management Promotion Systems

The various supervisory departments for each area form the core when it comes to promoting the environment, safety, and quality management systems at Central Glass. They coordinate with other related departments in order to follow up on the various activities at our head of ce, plants, research centers, and affiliate companies.

As indicated in the figure on the right, our Environment Safety Promotion Committee forms the core of our responsible care activities, while our Environment, Safety and Quality Management Department serves as the secretariat for this. They support and promote activities related to environmental and safety matters carried out by each of our departments.

Environmental safety aspects...Environment, Safety, and Quality Management Department
Product safety aspects...Glass Quality Assurance Department; Chemicals Quality Assurance Department; Environment, Safety, and Quality Management Department
Occupational safety and health aspects...Personnel Department; Environment, Safety, and Quality Management Department
Social demands...Corporate Administration Department
Education/human resource building aspects...Personnel Department

Environment and Safety Management Promotion System



Acquisition Status for Environmental, Safety, and Quality Management System

Workplaces	Environment	Quality		Safety
	System ISO 14001, etc.	ISO 9001	ISO/TS 16949	OHSAS 18001
Ube Plant	○	○		○
Kawasaki Plant	○	○		
Matsusaka Plant (including Sakai Manufacturing Site)	○	○	○ (Matsusaka Plant)	
Central Chemical Co., Ltd. - Ube Plant	○			○
Mie Glass Industry Co., Ltd. - Matsusaka Plant	○	○		
Central Glass Plant Services Co., Ltd. - Matsusaka Plant	○			
Central Glass Plant Services Co., Ltd. - Urayasu Plant		○		
Central Glass Plant Services Co., Ltd. - Sakai Plant / Sakaide Manufacturing Site	○ (Sakai Plant)	○		
Central Glass Fiber Co., Ltd. - Matsusaka Plant / Kasugai Plant	○ (Matsusaka Plant)	○		
Central Glass Engineering Co., Ltd.		○		
Central Glass Module Co., Ltd. - Head Office / Kyushu Plant			○	
Japan Tempered & Laminated Glass Co., Ltd.	○ ¹	○		
Carlex Glass America, LLC (Vonore Plant) (US)	○		○	
Carlex Glass America, LLC (Nashville Plant) (US)	○		○	
Carlex Glass America, LLC (Ligonier Plant) (US)	○		○	
Carlex Glass America, LLC (Auburn Plant) (US)	○		○	
Carlex Glass Luxembourg, S.A. (Luxembourg)	○		○	
Apollo Scientific Limited (UK)	○	○		
JCEL Co., Ltd. (South Korea)	○	○		
Taiwan Central Glass Co., Ltd. (Taiwan)	○	○		
Central Glass (Zhangjiagang) Co., Ltd. (China)		○		
Giga Gas & Electronic Materials Company (Taiwan)		○		
Central Glass Chemspec Company Ltd. (China)		○		

*Affiliates shown are those over which Central Glass has the right of control.
 *Acquisition statuses for overseas affiliates are as of December 31, 2016.

*Acquisition statuses of Central Glass and affiliates in Japan are as of March 31, 2017.
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Environment and Safety Audits

Central Glass carries out environment and safety audits every year focusing on our plants, research centers, and domestic affiliates, in order to verify the status of their responsible care activities. Our audits are conducted in two stages: a self-audit in which all targeted workplaces use a checklist to check the status of their RC activities, and an onsite audit in which the Environment Safety Department checks workplaces, selected based on the self-audit results, through direct visits.

In FY2016, onsite audits were carried out at 17 of our workplaces, and we also instituted site visits, documentation checks, and hearings on matters of concern and important issues.

During onsite audits, we verify whether RC activities are being implemented appropriately and perform detailed checks including confirming environmental compliance and conducting safety risk assessments. This helps improve initiatives at

each of our workplaces.

Continuing from FY2015, we conducted audits of four overseas affiliates in FY2016.



Environment and safety onsite audit (Kawasaki Plant)

Education and Training for Environmental and Safety Aspects

Under the recognition that “all of our employees are talented individuals and treasures to the company”, each of the workplaces in the Central Glass Group focuses its efforts on education and training. Education and training are indispensable for every one of our employees as members of society to deepening the understanding of the environment as one of CSR activities, as well as to acting in a responsible manner or minimizing damage when disasters occur. We offer education and training at each workplace in a timely manner by choosing themes that are suited to the timing of implementation and targeted employees, with the goal of raising their awareness of such environmental, safety, and other issues.

In FY2016 we carried out disaster drills and provided education related to the environment and safety at many of our workplaces on several occasions.

At the Head Office, we conducted a safety training workshop (focusing on “5 Whys” analysis) for employees responsible for safety at Central Glass and domestic affiliates (twenty-four people). Safety-related problem-solving requires every individ-

ual to be engaged, correctly recognize problems, and act with self-awareness.

A partial list of the education/trainings related to the environment, safety, and other issues offered at our head office, research centers, plants, and affiliate companies in FY2016 is shown in the table below.



Safety training workshop (Head Office)

Examples of environmental education and training held in FY2016

Workplaces	Overview of education and training	Targeted persons	Dates held	Number of attendees
Head Office	Safety training workshop (“5 Whys” analysis)	Employees responsible for safety at Central Glass and domestic affiliates	December 2016	24
Chemical Research Center	Emergency call training	Center staff	February 2016	Approx. 100
Chemical Research Center (Ube)	Risk assessment of chemical substances	Center staff	August 2016	57
Glass Research Center	Education on health checkups (significance and details of special examinations)	Center staff	August 2016	67
Ube Plant	Education on disaster prevention (for line managers, process supervisors, and operation leaders)	All employees of the Ube Plant and affiliates/ Cooperating worksites	November/ December 2016	419
Matsusaka Plant	ISO 14001 environmental education	All employees within the ISO 14001 site	Different for each department	Approx. 1,000
Matsusaka Plant – Sakai Manufacturing Site	Safety education using the safety video “Preventing Daily Work Accidents”	All employees of manufacturing sections	May 2016	36
Kawasaki Plant	Tsunami evacuation training	All employees	February 2017	140
Central Engineering Co., Ltd.	Education on “Rules for the Management of Chemical Substances Used in Products”	All employees	July 2016	155
Japan Tempered & Laminated Glass Co., Ltd.	Training for response to emergency situations (methods of shutting off LP gas)	All employees	November 2016	85

Environmental Accounting

We calculate the environmental costs related to our environmental preservation initiatives for air, water, soil, and disposal of waste at Central Glass and our main affiliates in Japan.

Our investments increased from the previous fiscal year due to capital investment in facilities for the production of next-generation replacements for CFCs. In expenses, a decline in the volume of production of certain products caused the volume of industrial waste produced by manufacturing process-

es to decrease, and our waste processing expenses were reduced as a result. In terms of environmental preservation effects, our emissions of pollutants affecting water quality increased as a result of plant operations. We and our domestic affiliates will continue to work to promote environmental preservation by maintaining appropriate environmental preservation costs.

Environmental Preservation Costs

(Unit: million yen)

Category	Major initiatives	FY2015		FY2016	
		Investments	Expenses	Investments	Expenses
(1) Business area costs		711	3,327	1,605	3,047
Pollution prevention costs	Preventing the pollution of the air, water, soil, etc.	186	1,685	1,350	1,660
Global environmental preservation costs	Preventing global warming, measures to conserve energy, etc.	520	177	185	172
Resource recycling costs	Waste disposal, recycling treatment, etc.	5	1,465	70	1,215
(2) Upstream/downstream costs	Collection, recycling, and appropriate disposal of products, etc.	0	0	0	0
(3) Cost of management activities	Maintaining the EMS, environmental monitoring, environmental education costs, etc.	3	230	0	247
(4) Cost of R&D activities	R&D of products involved in environmental preservation	6	449	19	526
(5) Cost of social activities	Improving the environment, contributing to local communities, etc.	0	3	0	2
(6) Cost of dealing with environmental damage	Restoring the environment, environmental preservation compensation, etc.	0	0	0	0
Total		720	4,008	1,624	3,822

Environmental Preservation Effects (Environmental Impact Indices): Results for FY2016

Effect in business areas	Environmental impact	FY 2015	FY 2016	Year-on-year change (%)
Greenhouse gases	CO ₂ equivalent (t-CO ₂)	577	540	▲6.4
	Atmospheric impact (SO _x , NO _x , ash dust) (tons)	3,913	3,604	▲7.9
Environmental pollutant	Water-quality impact (COD, total phosphorous, total nitrogen) (tons)	74	87	17.0

The Flow of Substances at the Central Glass Group

The Central Glass Group quantitatively tracks the environmental impact of manufacturing processes in order to identify environmental issues and implement measures for making improvements as we constantly strive to reduce the burden on the environment.

A huge amount of heat energy is needed to melt raw ma-

terials in the glass business, so its central issue is measures to prevent global warming. The development of environmentally friendly products and reducing waste are the central issues of the chemicals business, and sustained efforts are being made toward energy saving activities and to establish recycling systems.

INPUT

Total amount of materials input...1,085,000tons		Amount of water resources input...22.252million m ³		Amount of net energy input.....12,741TJ*	
Central Glass	Affiliate companies	Central Glass	Affiliate companies	Central Glass	Affiliate companies
444,000tons	641,000tons	12.443million m ³	9.809million m ³	6,561TJ	6,180TJ

*TJ (terajoules) is a unit for energy (joules). One terajoule is equal to one trillion joules.



OUTPUT

Atmosphere		Water		Waste	
Emissions of greenhouse gases...807,000tons-CO ₂		Net amount of discharged water...18.195million m ³		Net emissions of waste106,000tons	
Central Glass	Affiliate companies	Central Glass	Affiliate companies	Central Glass	Affiliate companies
460,000tons-CO ₂	347,000tons-CO ₂	10.131million m ³	8.064million m ³	39,000tons	67,000tons
Emissions of substances that damage the atmosphere...3,755tons		Emissions of substances that affect water quality...95tons		Final amount of waste disposed.....19,000tons	
Central Glass	Affiliate companies	Central Glass	Affiliate companies	Central Glass	Affiliate companies
3,597tons	158tons	87tons	8tons	12,000tons	7,000tons
				Recycling rate for waste.....82%	
Central Glass	Affiliate companies				
69%	90%				

Reporting range

•Central Glass...Three plants, one manufacturing site, three research centers, and the head office

•Affiliate companies : Seven major domestic affiliates and eleven major overseas affiliates

Tabulation of emissions of environmental impact substances at overseas affiliates began in FY2013. Some worksites for which calculations were unavailable are excluded.