



# Asahi Glass Sustainability Report 2004



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# Editorial Policy

## Moving Steadily Forward

This year's edition of the Asahi Glass Sustainability Report is the fifth since we published the inaugural Environmental Report in 2000. In line with inquiries from readers and increased general interest in the topic, this year we have broadened the scope of the report to cover corporate social responsibility (CSR).

The CSR concept is still in a transitional phase, and we continue to develop our CSR activities at Asahi Glass. The report status reflects the fact that we have social policies in place and a variety of data, but we also plan to expand disclosure steadily as our activities develop further in this field.

The basic report structure follows the four shared values contained in the AGC Group Vision “Look Beyond”. Several sections labeled “Bright Focus on Sustainability” aim to explain our thinking on social and environmental issues to those unfamiliar with Asahi Glass. As in previous years, we have attempted to make the report as accessible and comprehensible as possible to encourage more stakeholders to read it. We would be most grateful if you could provide your opinions and other feedback to us by our website.

### (Scope of reporting)

This report covers social and environmental activities of the Asahi Glass Group (AGC Group) in fiscal 2003. Due to a change in year-end, this was an irregular 9-month period from April to December 2003. The report also mentions some actions from fiscal 2004.

In the text, “Asahi Glass” generally refers to the parent company, Asahi Glass Co., Ltd.

### (Reference publications/guidelines)

Sustainability Reporting Guidelines 2002, Global Reporting Initiative  
Environmental Reporting Guidelines (2003), Japanese Ministry of the Environment  
Environmental Performance Indicators for Businesses (2002), Japanese Ministry of the Environment

Environmental Reporting Guidelines 2001-With Focus on Stakeholders-, Japanese Ministry of Economy, Trade and Industry

The 15th Corporate White Paper on “Market Evolution” and CSR Management: Toward Building Integrity and Creating Stakeholder Value”, Japan Association of Corporate Executives

### (Other AGC Group publications)

Please refer to the Annual Report for detailed financial information. This is available for download from the Investor Relations section of the Asahi Glass website.

The information on AGC Group products given in this report only refers to some leading examples. Please refer to the Asahi Glass website for details on the performance of all AGC Group products.

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Asahi Glass website  
URL <http://www.agc.co.jp/english>

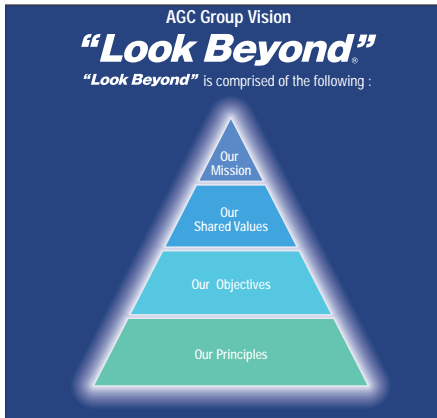
Asahi Glass website (Environment section)  
URL <http://www.agc.co.jp/english/environment>

Asahi Glass website (Investor Relations section)  
URL <http://www.agc.co.jp/english/ir>

# AGC Group Vision

## “Look Beyond”

The AGC Group adopted “Look Beyond” in April 2002 as a declaration of its resolve to become a truly global enterprise. This clear vision commits AGC Group to create value on a continuous basis for the world through the fulfillment of corporate social responsibilities to stakeholders.



### The Vision of Global Management

“Look Beyond” captures and expresses the AGC Group Vision. It signifies anticipating and envisioning the future; embracing perspectives beyond familiar fields of expertise; and relentlessly pursuing innovation without becoming complacent with the status quo. It inspires the Group’s mission to develop its full potential as a global materials and components supplier. It is the slogan of the Group and inspires the Group’s mission and shared values to which every member of the Group must subscribe. It comprises “Our Mission”, “Our Shared Values”, “Our Objectives” and “Our Principles.”

### Our Mission

We, the AGC Group, “Look Beyond” to make the world a brighter place. The AGC Group defines the value that it adds to the world in terms of “brightness.” Our Mission reaffirms the purpose of the AGC Group to add brightness to the world. Accomplishment of this purpose will also create a bright future for the AGC Group.

To accomplish Our Mission, every member of the AGC Group must adopt the slogan, “Look Beyond”, anticipating and envisioning the future, having perspectives beyond our own fields of expertise, pursuing innovations and never becoming complacent with the status quo.

By doing so, we will continue to create value worldwide, using the vast potential of our entire organization.

### Our Shared Values

Four shared values are of the foremost importance to the AGC Group in the accomplishment of Our Mission. These serve as the basis for all judgments made and actions taken, whether collectively or individually. “Innovation & Operational Excellence” are the sources of the Group’s competitive advantage. Unless we continuously foster innovation in technology, products, services, business models and human resources, we will fall behind in the rapidly changing times. Also, without “Operational Excellence”, i.e., unless we collectively as well as individually continuously aim for maximum efficiency and quality, we will be unable to create value for our customers and shareholders. Therefore, in order to be able to accomplish Our Mission, we

### Our Shared Values that support “Look Beyond”

Our shared values are declarations of values all members of the Group must share as the basis of every action we take.



\* Look Beyond is a registered trademark of Asahi Glass Co., Ltd. in Japan.

cannot dispense with either “Innovation” or “Operational Excellence”. “Diversity”, “Environment” and “Integrity” are the three main pillars of the Group as a global

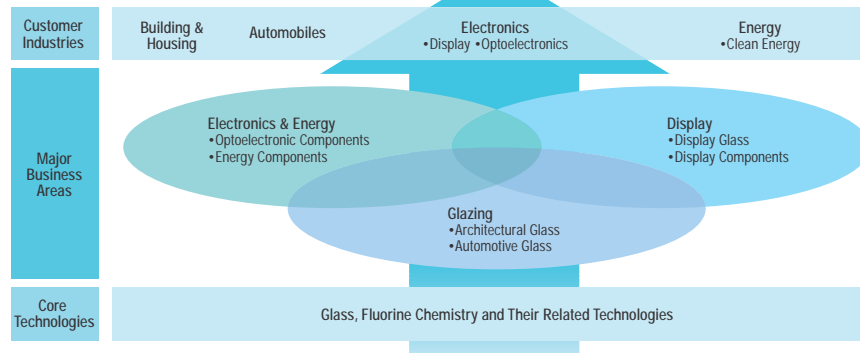
enterprise. The trust of the global community is essential for a successful global organization. Helping to build a sustainable society through active global citizenship is our obliga-

tion. To build open and fair relationships with all of our stakeholders, i.e., customers, shareholders, society and employees, is a responsibility we welcome.

## Our Objectives

The AGC Group aims to maximize corporate value by concentrating resources on three major business areas of materials and components for Glazing, Display and Electronics & Energy. The AGC Group has already established top global market positions (No. 1 or No. 2) in architectural glass, automotive glass and display glass. The Group also possesses world-leading technologies in glass, fluorine chemistry and related fields. Through the relentless pursuit of innovation, operational excellence and a comprehensively customer-oriented approach, the Group plans to build on its competitive base to become a highly profitable and fast-growing global enterprise.

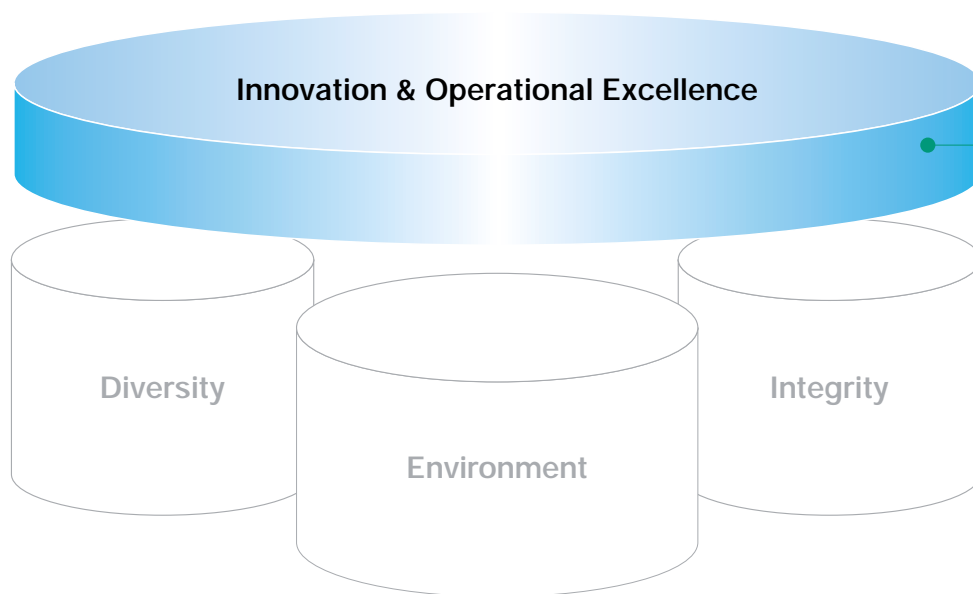
### Three Major Business Areas Envisioned for the Future



## Our Principles

In order to accomplish Our Mission, we have developed Our Principles as a set of guidelines and an extension of Our Shared Values. We, as AGC Group employees, at all times and on all occasions, will act according to Our Principles and embrace Our Shared Values in all of our relations with our stakeholders, i.e., customers, shareholders, society and fellow employees.

Our Shared Values	Our Principles
<p><b>Innovation &amp; Operational Excellence</b></p>	<ul style="list-style-type: none"> <li>• To always think with customers' needs as the starting point and to act with speed</li> <li>• To never become complacent and to constantly strive for ever higher goals</li> <li>• To continuously seek out innovations in technology, products, services, business models and human resources, and to proactively cultivate new fields</li> <li>• To continuously improve our operations toward maximum efficiency and quality in every activity and to achieve excellence in all of the work we do collectively and individually</li> </ul>
<p><b>Diversity</b></p>	<ul style="list-style-type: none"> <li>• To respect cultural diversity in race, ethnicity, religion, language, nationality, gender and background</li> <li>• To respect individuals and the diversity of their capabilities</li> <li>• To respect different perspectives and opinions</li> </ul>
<p><b>Environment</b></p>	<ul style="list-style-type: none"> <li>• To respect environmental conservation</li> <li>• To contribute to the development of a sustainable society</li> <li>• To be trusted as a responsible global citizen by the world community</li> <li>• To maintain and improve occupational health and safety and working environments</li> </ul>
<p><b>Integrity</b></p>	<ul style="list-style-type: none"> <li>• To be confident and take pride in fulfilling responsibilities without compromise</li> <li>• To develop open and fair relationships with every stakeholder</li> <li>• To strictly observe our business conduct code</li> </ul>



# Innovation & Operational Excellence

In the **“Look Beyond”** AGC Group Vision, which combines in a forward-thinking manner those elements demanded by CSR, the most important shared value is characterized as “Innovation & Operational Excellence.” This commits the AGC Group to pursue continuous innovation in technology, products, services, business models and human resources to improve operations for maximum efficiency and quality. This spirit of generating continuous gains in corporate value through relentless improvement is summarized in the management policy “JIKKO” Execution for Excellence.



# A Business Continually Focused on the Future and Sustainability

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Masahiro Kadomatsu  
President & CEO



## AGC Group Vision ***“Look Beyond”***

***“Look Beyond”*** is the slogan that sums up the vision of the AGC Group. In reaffirming the reason for the existence of the AGC Group and focusing on the value that we add to society, we have defined “Our Mission” as “We, the AGC Group, ***“Look Beyond”*** to make the world a brighter place.” In this fully integrated approach, we have also established “Our Shared Values” and “Our Principles” as key elements of the way we plan to achieve “Our Objectives.”

Our Shared Values consists of four values shared by our nearly 56,000 AGC Group employees worldwide. Although our business spans a number of different areas, these shared values provide a common foundation for all our employees in finding the right answer when faced with difficult choices.

Having been appointed to my position in March 2004, I am determined to ensure these shared values permeate every facet of what we accomplish within the AGC Group.

## Our Shared Values: Inspiring All We Do

**“Look Beyond”** which dates from 2002, contains all the elements of what is demanded of us in terms of our corporate social responsibility (CSR). Four shared values form the foundation for inspiring the actions of all AGC Group employees. The first and most important of these values is “Innovation & Operational Excellence.” This is the source of competitive advantage for the AGC Group. It captures the founding spirit of Asahi Glass to take up the constant challenge of innovation, never refusing it on the grounds of mere difficulty. I believe this drive will fuel the future growth of the AGC Group.

The second value, “Diversity,” goes to the

heart of what is needed to develop a business with people of differing cultures, nationalities and backgrounds. This demands mutual respect of individual differences to build trust. For this reason, we require that all employees appreciate the value of diversity.

In the same vein, we operate in an age when companies that lose the trust of society can easily fade away. The third shared value, “Integrity,” emphasizes the fact that a company needs to gain the abiding trust of society through its actions to survive.

The fourth shared value is “Environment.” The AGC Group consumes vast amounts of energy and other resources. Ours is a busi-

ness that can exert a substantial impact on the global environment. Our employees need to be aware of this fact constantly. In this regard, I believe we have two fundamental responsibilities as a corporate citizen: to contribute to the health of the global environment and the creation of a sustainable society; and to ensure high standards of occupational health and safety. It is incumbent on all of us within the AGC Group, including myself, to take proactive action on the environment.

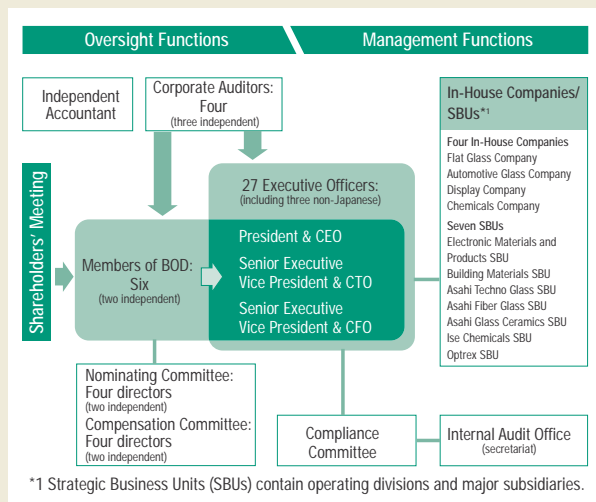
### CSR Elements of **“Look Beyond”** Vision



Based on the pillars of “Our Shared Values” shared by Group employees, the Group Vision **“Look Beyond”** describes the aim of the AGC Group to fulfill its social responsibilities as a good global corporate citizen.

## AGC Group Corporate Governance

The two basic aims of the AGC Group corporate governance system are to achieve a clear separation of oversight and management functions and to distinguish between the corporate and operational functions of management. In June 2002, Asahi Glass reduced the number of board directors, appointed two independent directors, and shortened the term of office of directors to one year. At the same time, Asahi Glass introduced the executive officer system, in which executive officers that are clearly distinguished from directors as defined by Japan’s Commercial Code, and are responsible for the execution of the AGC Group’s management and business operations. In June 2003, to further strengthen the corporate governance system and increase the objectivity of the evaluation, nomination and remuneration of directors and executive officers, Asahi Glass established the Nominating Committee and the Compensation Committee. To ensure a high level of transparency and fairness in internal audits, three of the four corporate auditors are independent. The system of management execution is based on an In-House company system that dates from April 2002. The introduction of this system facilitated a shift from a regionally centered business model to a revised approach focused on global consolidated management. Coincident with these moves, responsibility and authority for management functions were substantially transferred to each In-House Company or SBUs\*1.



## Harnessing Execution Potential Through Communication

Establishment of management systems as well as thorough implementation of the PDCA (Plan-Do-Check-Act) cycle in all our business processes are the key aspects in ensuring these four values permeate throughout the entire organization. This cycle needs to be a common approach not just in our manufacturing activities, but also throughout R&D, marketing, sales, human resources, accounting, purchasing, and as

part of our management of environmental and occupational health and safety issues. Strict adherence to the PDCA cycle ensures top-down management policies reach every employee, to the point where individuals fully internalize what Our Mission entails.

As part of this, it is my personal mission to visit AGC Group operating sites and affiliates to communicate this message to employees. I plan to talk to as many people

as possible to share the vision and the mission, to boost understanding, and to discuss ways of solving problems and tackling the issues that can get in the way of execution.

## Medium-Term Management Plan Outlines Economic, Social and Environmental Actions

In line with the first management policy formulated as part of the AGC Group Vision, called “Shrink to Grow,” we selectively

focused on core businesses. Moving on from that stage, our new management focus is “JIKKO”-Execution for Excellence.

In particular, we aim to develop world-class management capabilities in the areas of the environment and occupational health and

New Management Policy: “JIKKO”-Execution for Excellence

**“JIKKO”-Execution for Excellence**  
Aiming for growth on top of the results achieved in the “Shrink to Grow” plan

**Aiming for Sustained Growth in Value of AGC Group**

A focus on execution combined with adherence to the PDCA (Plan-Do-Check-Act) cycle in all processes

- Striving to raise customer satisfaction
- Pursuit of Innovation & Operational Excellence
- Importance of employee work-related motivation and pride
- Contribution to society through fulfillment of responsibilities
- Broad-based certification and increased integration of management systems (QC/QA, environment, occupational health and safety):
  - ISO 9001 series
  - ISO 14001 series
  - OHSAS 18001
  - ILO guidelines
  - Ministry of Health, Labor & Welfare guidelines, etc.

### Basic Operational Policy

- Enhance Group vision **“Look Beyond”**
- Focus on “JIKKO” (Execution)
- Develop Group-wide monitoring system for PDCA
- Boost customer satisfaction (CS)
- Bolster employee satisfaction, motivation and pride in the AGC Group(ES)
- Contribute to society by fulfilling corporate social responsibilities (CSR)
- Promote open, flat organizational operations
- Ensure effective utilization of group-wide human resources

### Reinforce Competitive Superiority

- Succeed the philosophy of “Shrink to Grow” and implement strategic selection and concentration of businesses
- Develop core technologies centered on glass
- Take advantage of highly developed global operations



safety (OH&S). As part of this, we are integrating our environmental management system (EMS), bringing stand-alone systems at each site into an integrated whole, with the headquarters EMS functioning as the senior model. Our goal is to achieve parent company certification of this unified, integrated EMS in late 2004. We will then repeat the process at subsidiaries in Japan and overseas.

Our thinking on the environment is to mix the negative (reduction of the environmental impact of the AGC Group) with the positive (developing products with a positive impact). There is certainly demand from customers for eco-friendly products that we are developing, such as energy-saving glass, systems for eliminating diesel engine soot, fuel cells, and arsenic-free LCD glass. Our ongoing shift toward green procurement will

also benefit customers. We plan to differentiate Asahi Glass from other companies with the technical excellence we apply to the development of environmentally effective products.

## Creating a Positive Spiral of Value-Adding Growth

I believe our greatest challenge at the AGC Group is to generate sustained growth in corporate value. To achieve this, we must first ensure our employees are highly satisfied, motivated and take pride in their work. This will translate into good products, ones that our customers will appreciate and value. This in turn will boost the value of the AGC Group. To create this positive spiral, we must focus on applying the PDCA cycle to manufacturing processes as well as to our environmental and OH&S activities.

## Toward a Deeper Understanding of Social and Environmental Activities

By taking this step-by-step approach, we plan to address economic, social and environmental issues as a leading manufacturer of glass products.

This report is important because it discusses the role of the AGC Group in activities for the benefit of all stakeholders across a range of social and environmental fields. Our stakeholders include customers, shareholders, suppliers, employees, local communities, and related organizations such as NGOs. I hope the report will reach a wide audience so that we can deepen understanding of the issues we face in these key areas.



# Company Profile

The AGC Group is one of the world's leading manufacturers of glass products. Asahi Glass commands high shares of all major segments of the global glass market. The Group extends to over 250 consolidated subsidiaries operating in 23 countries, making the Group a truly global enterprise.

## Unified Group Building Corporate Value

The AGC Group is a global enterprise with businesses in four segments: Glass Operations; Electronics and Display Operations; Chemicals Operations; and Other Operations. Overseas sales account for about half of the total, and 70% of AGC Group employees are based outside Japan. The AGC Group brings together a diverse variety of people in the pursuit of high profits and growth. As a unified entity, the AGC Group works to build corporate value while fulfilling its responsibilities as a good corporate citizen.

### Corporate Profile

Name:	Asahi Glass Co., Ltd.
Head office:	1-12-1, Yurakucho, Chiyoda-ku, Tokyo 100-8405, Japan
Date of establishment:	September 8, 1907
Date of incorporation:	June 1, 1950
Paid-in capital:	¥90,472 million (as of Dec. 31, 2003)
Stock issued:	1,175,242,497 shares (as of Dec. 31, 2003)
Number of employees:	Nonconsolidated: 6,217; Consolidated: 55,732 (as of Dec. 31, 2003)
President & CEO	Masahiro Kadomatsu

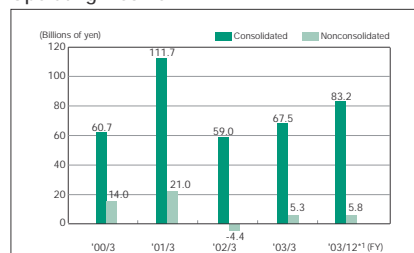
### Business Fields

Segment	In-House Company or SBU	Main Products	
Glass	Flat Glass Company	Flat glass	Float glass Double glazing Wired glass Heat reflective & absorbing glass Figured glass Fabricated glass Mirrors
	Automotive Glass Company	Automotive glass	Laminated glass Tempered glass
	Building Materials SBU	Others	Fire-resistant exterior siding boards
	Asahi Fiber Glass SBU		Glass fiber products
	Asahi Techno Glass SBU (glass-related)		Specialty glass (i.e. fluorescent light glass)
Electronics & Display	Display Company	Display	CRT CRT glass FPD TFT-LCD glass PDP glass TV/STN LCD glass
	Electronic Materials and Products SBU	Electronic materials	Optoelectronics Frit and paste
	Asahi Techno Glass SBU (electronics-related)		Semiconductor-related products
	Optrex SBU		Small- and medium-sized displays
Chemicals	Chemicals Company	Fluorochemicals	Fluorinated resins, gases, solvents, water and oil repellent agents Ion-exchange membrane Pharmaceutical and bulk intermediates PDP filters
		Chlor-alkalis	Soda ash Caustic soda Caustic potassium Hydrochloric acid PVC
		Urethane and others	
	Ise Chemical SBU, etc.	Iodine related products, etc.	
Other	Asahi Glass Ceramics SBU	Ceramic related products and others	

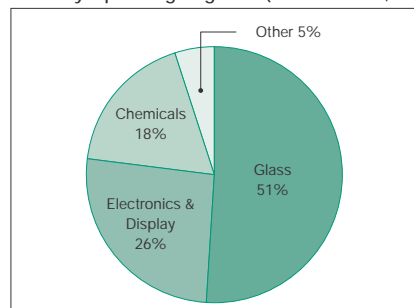
### Net Sales



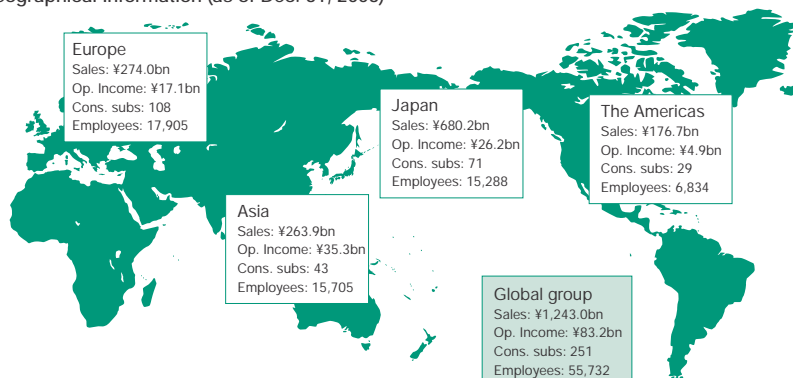
### Operating Income



### Sales by Operating Segment (as of Dec. 31, 2003)



### Geographical Information (as of Dec. 31, 2003)



\*1 Fiscal 2003 (April-December 2003) was an irregular 9-month period due to a change in accounting year-end.

# Business Areas and Major Products

The AGC Group manages its business on a global basis through a system of In-House Companies, each with its own international operations. The main areas of operations are in glass (construction and automotive), electronics, displays and chemicals. Together, AGC Group operations supply a diverse range of customers.

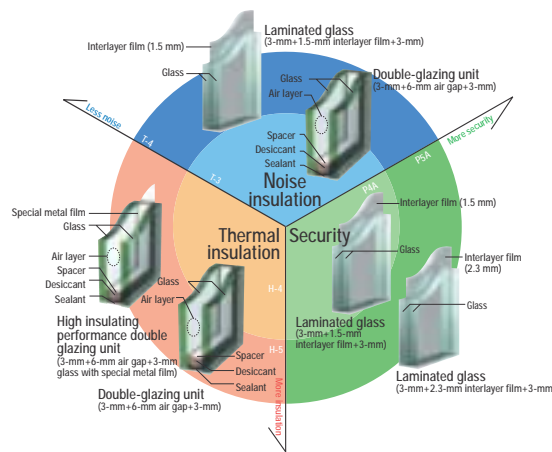
## Glass Operations

### Flat Glass Company

The Flat Glass Company operates on a global basis, headquartered in Belgium. It has 35 float furnaces operating around the world that supply flat glass of many types, principally for use in building construction. Flat glass operations have a strong regional nature because local customers have specific needs and standards. Day-to-day operations are thus run by regional offices in Japan/Asia, North America and Europe in a manner that matches the different characteristics and needs of each region.

The float glass manufacturing method enables glass with differing functionalities to be produced depending on the exact composition of raw materials used. Secondary processing steps further modify the function and design of the glass to produce a wide variety of products. Asahi Glass has developed a range of window replacement and addition techniques designed to boost performance. Such component window products

are widely used for added thermal or sound insulation.



**mado<sup>2</sup>™**

A set of windows to install additionally to existing window panes from inside of the house to increase thermal and sound insulation and security.

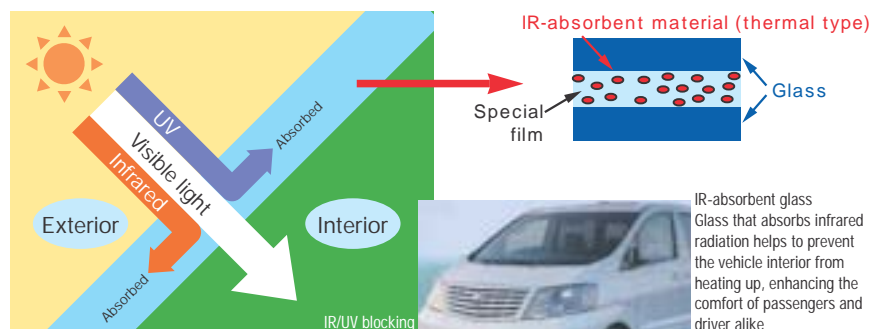


### Automotive Glass Company

Headquartered in Japan, the Automotive Glass Company supplies glass to numerous Japanese and other automakers. A network of production bases and product development centers in 18 countries forms the basis of a global supply chain closely integrated with customer production facilities. Flat glass produced by the float method is processed further to increase its safety and molding flexibility for various applications. Automotive glass falls into two main categories: laminated glass and tempered glass. With 30% of the global market, the AGC Group is the world's leading supplier of automotive glass. Windshields are made of laminated glass. They comprise a film of flexible plastic sandwiched between two sheets of pre-formed

glass, which are then pressed together under high temperature and pressure. Asahi Glass has also developed a wide range of value-added functional windshields designed to enhance comfort or boost resistance to the

elements. Examples include glass that cuts out infrared or UV radiation, low-reflectivity glass, water-repellent glass, and glass antenna.



**IR-absorbent glass**  
Glass that absorbs infrared radiation helps to prevent the vehicle interior from heating up, enhancing the comfort of passengers and driver alike

## Glass Operations

### ■Building Materials Div.

The main product of this division is AG-WALL, a range of exterior housing materials sold in Japan that combines superior design with a high degree of fire resistance. Production of AG-WALL at the Kashima Plant involves cement created using natural materials, which is then reinforced with non-toxic glass and organic fibers. Only water-based paints are used to boost safety characteristics. AG-WALL also incorporates recycled building materials, a fact that has earned the division the distinction of being given the status of a designated wide-area recycler of industrial wastes by Japanese authorities\*1. In another initiative, Asahi Glass is simplifying

the packaging used with AG-WALL to reduce expanded polystyrene waste at building sites (see P51).

\*1 This designation from the Minister of the Environment signifies that a manufacturing firm is actively collecting (over an extended area), recycling and reusing its own products and other industrial wastes to incorporate into production, using its own transportation systems.



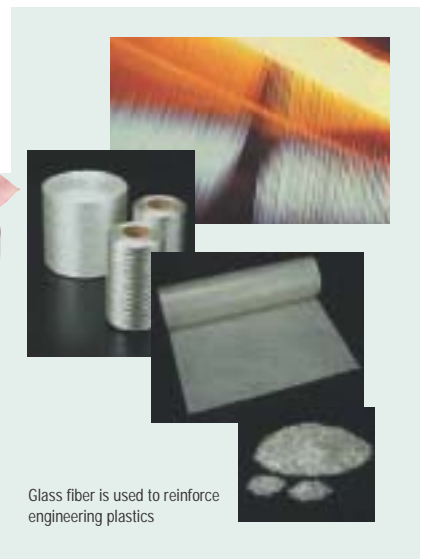
AG-WALL: eco-friendly, people-friendly exterior housing materials

### ■Asahi Fiber Glass Co., Ltd.

Based in Japan, this company manufactures and sells glass wool, which is widely used in homes as an insulation material, and glass fiber for use as plastic-reinforcing materials. Manufactured at plants in Shonan and Kyushu, glass wool is used as a thermal and sound insulator in houses, and also in building construction, capital equipment and related facilities, and in automobiles. Its broad range of applications help cut energy consumption while creating more pleasant living environments. Manufactured at the Ibaraki Plant, glass fiber is used to reinforce various high-performance plastics. Other applications encompass cars, shipping, industrial materials, electronics and housing fixtures.



Glass wool saves energy in homes



Glass fiber is used to reinforce engineering plastics

### ■Asahi Techno Glass Corporation

This company manufactures a comprehensive range of specialty glass. Capitalizing on the unlimited possibilities of glass, Asahi Techno Glass supplies highly specific, high-quality glass products for a diverse range of applications, including electronic materials, industrial materials, lighting and a host of other scientific and environmental uses. Supplying many specialty materials, Asahi Techno Glass is highly respected in its field.



Electronic materials are an integral part of our advanced IT society



Industrial materials showcase advanced glass formation technologies



# Electronics & Display Operations

## ■Display Company

The AGC Group supplies glass substrates for all types of displays, including cathode-ray tube (CRT), liquid crystal display (LCD) and plasma display panel (PDP) glass. The technical development, manufacturing and sales operations of global AGC Group display-

related businesses are managed from the Display Company headquarters in Japan. CRT glass is used mainly in computer monitors and televisions. Asahi Glass manufactures an eco-friendly arsenic-free form of LCD glass that is also highly resistant to heat, flex-

ing and chemicals (see P30).

Display Company manufacturing operations are global in scope, with bases in Japan, China, Taiwan, South Korea, Thailand, Indonesia and Singapore.



High-quality LCD glass from Asahi Glass is also eco-conscious

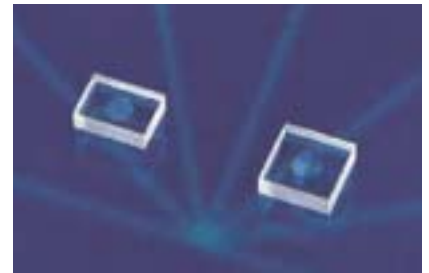


Flat CRT glass

## ■Electronic Materials & Products General Div.

This division channels AGC Group proprietary technical expertise in fields such as glass, chemicals and ceramics into the production of a range of electronic components and materials, materials for semiconductor equipment, and other integrated circuit-related products. The division operates at the forefront of electronics technology, applying state-of-the-art methods in materials finishing, surface-mount processing and component fabrication. Products supplied by the

division include semiconductor production equipment made from silicon carbide or quartz; frit and paste (an applied product made from glass powder) for PDP; and planar devices for optical pick-ups used in DVD and CD players.



Planar devices for optical pick-ups, used in reading disks

## ■Optrex Corporation

Optrex manufactures small- and medium-sized LCDs that are used in a variety of end products. Based in Japan, it continues to expand into overseas markets. In automotive applications, Optrex commands over 60% of the global LCD market due to the extremely high reliability of its products. This is a valuable trait in the automotive field, where resistance to shock and wide variation in ambient

temperature is highly prized. Optrex is also applying its skills in automotive LCDs to develop products for a diverse range of consumer items, including digital camcorders, PDAs, mobile phones, measuring devices and amusement equipment.



LCDs are now used in mobile phones, measuring equipment and various onboard automotive products



## Chemicals Operations

### ■ Chemicals Company

The Chemicals Company is based in Japan. Its business divides into two main areas: commodity industrial chemicals, mainly chlor-alkalis used as raw materials for glass; and specialty chemicals, including pharmaceutical intermediates. In specialty chemicals, the company focuses on the application of fluorochemistry and urethane technology to fields ranging from energy and life sciences to electronics and displays.

The AGC Group aims to become the leading provider of material solutions in the field of fluorochemicals in Japan, America and Europe. Development programs concentrate on advanced specialty products such as high-performance fluoropolymers and films,

which are used in PDP optical filters for displays.

With a zero ozone-depletion potential, and low global warming potential and non-flammability, the fluorinated solvent ASAHI-KLIN™ AE-3000 has rapid drying property



Fluon™ ETFE film will be used in the construction of the Allianz-Arena soccer stadium for the 2006 World Cup in Germany

### ■ Ise Chemicals Corporation

Ise Chemicals is a leading global producer of iodine, which is used in pharmaceuticals, X-ray contrast agents, photography developer chemicals, agrochemicals, catalysts and other products. The company also produces natural gas, which is a form of clean energy, as well as nickel and cobalt compounds, which are used in battery materials and other applications.



Iodine (left) and a blowing-out tower (right) used in its production



## Other Operations

### ■ Asahi Glass Ceramics Co., Ltd.

An expert in glass and ceramics technology, the company operates in two major areas: glass engineering (specially developed solutions for specific customer problems); and the application of advanced high-temperature materials technology to environmental and energy-related fields.



Ceramics technology is widely applicable to various fields

### ■ Lucina Business Development

Lucina™ is a completely new type of optical fiber made from plastic that combines the easy connectivity of copper wire with the broadband capabilities of glass fiber. It contains a proprietary perfluorinated resin that is transparent in the near infrared.



Lucina™ can be used to wire up houses and offices for broadband

### ■ ASPEX Business Development

ASPEX is a gene expression system developed by Asahi Glass using a fission yeast as a host\*1, which enables efficient mass-production of complex proteins. These proteins have potential applications such as pharmaceuticals, feed additives, and industrial enzymes for waste degradation. The division is engaged in contract manufacturing and development for production of various proteins.



300-liter culture vat for protein production

\*1 A host is a genetically modified organism or cell.



Explanatory booklets



Code of Conduct

# Integrity

In the **“Look Beyond”** vision, the AGC Group defines Integrity as a critical shared value that functions as a pillar to support company activities. The compliance system based on this shared value ensures that code of conduct is never illegal or against the interests of society. The integrity-based corporate culture developed across the AGC Group works to gain the abiding trust of all stakeholders.

# Shared Values Expressed in Individual Employee Actions

Corporate ethics and compliance are key aspects of Integrity in the Group vision **“Look Beyond”**. The essential values implicit in this notion of integrity are set out in principles that govern the code of conduct. Asahi Glass seeks to ensure full compliance with this code and to broaden its application where appropriate.

## Adoption and Application of Principles Expressing Integrity

The essence of integrity at Asahi Glass is a set of principles governing the code of conduct. Asahi Glass management policy rejects all illegal actions. The principles governing the code of conduct adopted by Asahi Glass aim to ensure illegal actions cannot and do not occur. Asahi Glass officially formulated principles of the code of conduct in April 1998 as a set of guidelines. Applicable to Asahi Glass and

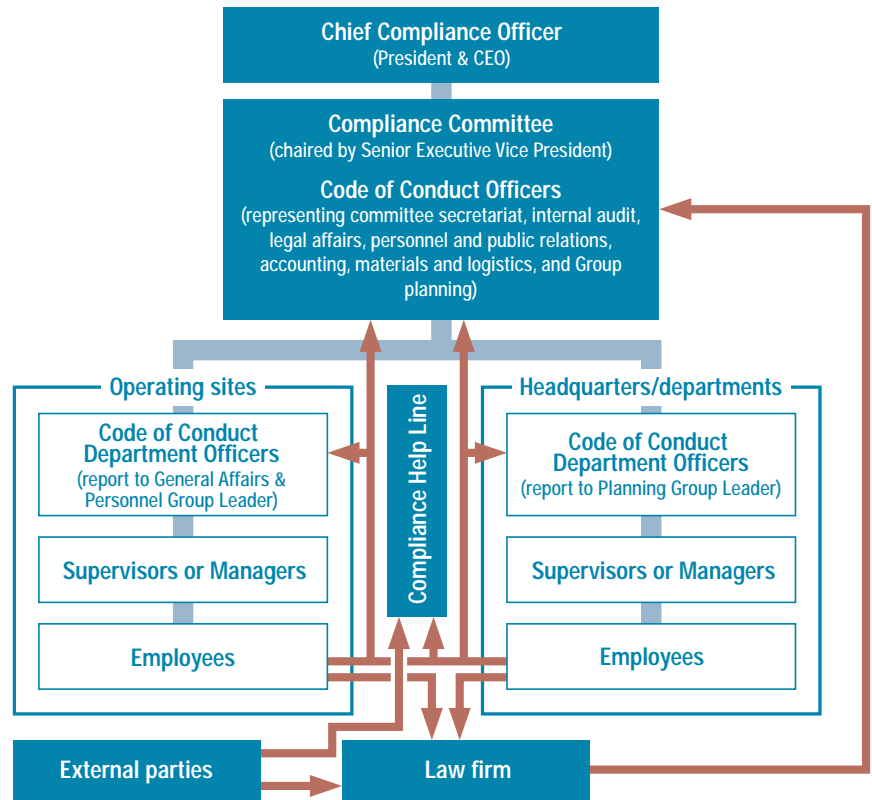
all consolidated subsidiaries in Japan and overseas, they cover the actions of 59 companies in Japan. After the adoption of the **“Look Beyond”** vision in April 2002, the guidelines were extensively revised in April 2003. At overseas subsidiaries, observance of local laws and customs supplement this basis. The main features of the 2003 revision are shown in the box to the right.

- 1 Establishment of Compliance Committee to oversee compliance-related planning and actions
- 2 Establishment of external resource (legal office) to supplement internal help line for receiving of compliance violations and related counseling
- 3 All assistant managers or above are obliged to sign an annual compliance certificate
- 4 Principles reclassified by stakeholder and extended to cover legal and regulatory compliance systems

## Promoting and Strengthening Compliance

At the top of Asahi Glass’ compliance structure, the President & CEO acts as the Chief Compliance Officer. Chaired by a Senior Executive Vice President, the Compliance Committee plans, formulates and executes AGC Group compliance measures. The Internal Audit provides administrative support on all compliance matters. Besides the heads of the committee secretariat and the Internal Audit, the members of the Compliance Committee are group leaders that head up the various departments and centers overseeing legal affairs, personnel and public relations, accounting, materials and logistics, and Group planning. The committee meets at least twice a year. Other managers are responsible for assessing compliance status as well as developing and executing compliance-related policies within the head office, individual departments and operating sites. Independent directors provide objective oversight of the compliance system.

Asahi Glass Compliance System



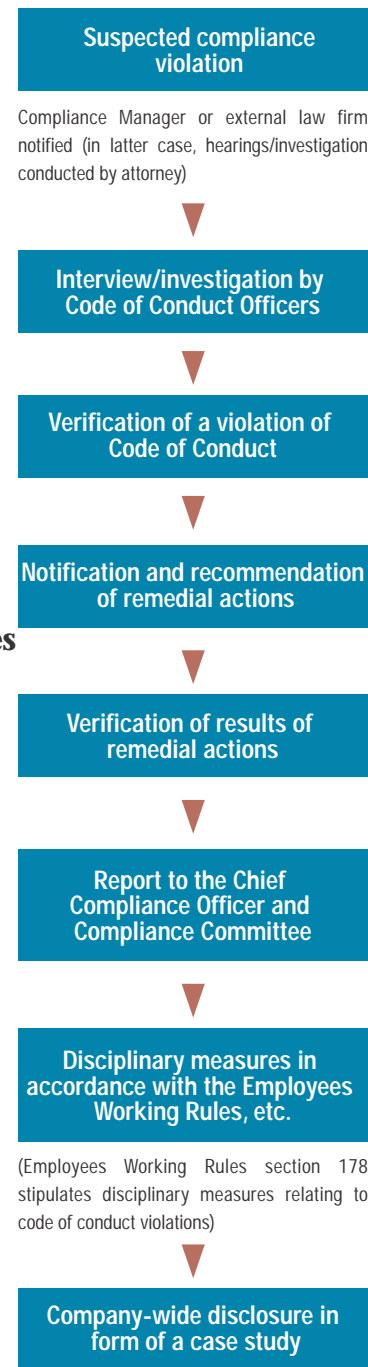
## Compliance Help Line Provides Reporting and Counseling Facility

Any Asahi Glass employee discovering a confirmed or suspected compliance violation would normally report this in the first instance to a workplace superior. In cases where the nature of the violation makes such recourse unavailable, a Compliance Help Line exists to provide a resource outside of the organization for compliance-related reporting and counseling. Employees also have the option of communicating on the issue with the relevant Compliance Manager by telephone, e-mail or in writing, or reporting it directly to the Compliance Committee secretariat. The confidentiality of all such communications is strictly protected to ensure the interests of informants are not prejudiced by their actions. Anonymity is also respected if informants want to with-

hold their identity. The operation of the help line and other aspects of the compliance system can also be accessed via the Asahi Glass intranet.

An external legal office provides an alternative avenue for compliance-related reporting and counseling, by facsimile, e-mail or in writing. Asahi Glass also provides access to a specialist external call center for support in cases of sexual harassment. An ombudsman system provides a reporting outlet for employees of Asahi Glass suppliers. In addition, instead of using the help line system, managers can signal concerns about any compliance issues by noting them in the “free comments” section of annual compliance certificates.

Compliance Help Line  
Corrective Action Sequence



**Suspected compliance violation**

Compliance Manager or external law firm notified (in latter case, hearings/investigation conducted by attorney)

**Interview/investigation by Code of Conduct Officers**

**Verification of a violation of Code of Conduct**

**Notification and recommendation of remedial actions**

**Verification of results of remedial actions**

**Report to the Chief Compliance Officer and Compliance Committee**

**Disciplinary measures in accordance with the Employees Working Rules, etc.**

(Employees Working Rules section 178 stipulates disciplinary measures relating to code of conduct violations)

**Company-wide disclosure in form of a case study**

## Reporting Always Generates Feedback and Corrective Measures

Prior to the 2003 revision of code of conduct guidelines that strengthened AGC compliance measures, the Compliance Help Line only received a few communications per year. This number has since risen to an average of one per month. Of these, about 60% are reports of compliance violations and the remaining 40% are requests for counseling. Most informants remain anonymous, although some reports come through management. E-mail, which is accessible on a 24-hour basis, has proved the most popular medium.

The nature of all reports is fully investigated by the Internal Audit. Typically, the investigation takes two separate routes, one relying on a report from the relevant line manager and the other going through senior management. If the completed investigation unearths any problems, this triggers another process to determine corrective measures.

Reports on the investigation are made to the Compliance Committee and top management, on the basis of which executive officers may hold hearings at the division.

In all cases, the informant receives feedback on the investigation and any subsequent corrective measures. Since many informants choose to remain anonymous, the status of the compliance-related measures is circulated within the relevant division as quickly as possible, and meetings are held to explain improvements. If deemed sufficiently important, the Compliance Committee can also notify the relevant division of any concerns related to compliance issues noted in the annual compliance certificate signed by managers. In 2003, a total of 70 compliance-related issues were raised in this way. All 70 employees received feedback on the measures taken to resolve these particular issues.



### Steady Cultivation of Corporate Culture of Integrity

Director & General Manager, Internal Audit  
Eisuke Yanagisawa

The Internal Audit assumed responsibility for the Compliance Committee secretariat in December 2002. A strong organizational unit is needed to establish policies, provide training and awareness programs, check the progress of such programs, undertake compliance-related investigations and tackle corrective measures. Doing all this in an integrated manner requires a dedicated team of people. Our office has ten full-

time and three part-time staff, including several with broad experience within Asahi Glass. Compliance reports might involve managers in Human Resources or Legal, and in such cases these divisions cannot act as an independent investigator. The Internal Audit is expected to take fair corrective action due to our independent audit functions. I believe it is vital that we continue to make steady progress on compliance issues by cultivating a corporate culture of integrity. Personally, I think we are now halfway to our goal.

# Measures to Promote a Pro-Compliance Environment

Besides having managers sign compliance certificates, Asahi Glass undertakes various measures to promote compliance among all employees. One duty of the Compliance Committee chairperson is to encourage compliance by holding internal seminars. Asahi Glass also surveys managers to gauge compliance status and to generate data for continuous improvement.

## Compliance Certificate and Other Compliance-Related Managerial Obligations

Thorough understanding and acceptance of the AGC Group compliance policy and principles of its code of conduct by employees in their everyday activities is the best insurance against compliance violations. To this end, all assistant managers or above are required to submit signed compliance certificates on an annual basis. These pledges certify that managers have read the Asahi Glass Code of Conduct and will take the lead in preventing

compliance violations within their area of jurisdiction. In 2003, a total of 2,415 managers and 24 executive officers submitted such compliance certificate. From 2004 onward, Asahi Glass plans to circulate these certificates to employees.



Managers must sign this web-based compliance certificate

## Ongoing Compliance Education and Awareness Activities

Through its audit functions, the Internal Audit Office, which acts as the Compliance Committee secretariat, works to confirm the operation of compliance systems while trying to prevent, detect and correct violations. Planned site audits in fiscal 2004 include 40 AGC Group subsidiaries in Japan and Asia. Including internal audits conducted in AGC Group companies in the West by a specially designated unit, the number of planned audits worldwide will exceed 100 sites. Pro-compliance education and awareness programs are another key role played by the

Internal Audit Office to cultivate an integrity-oriented corporate culture. Working with the Compliance Committee chairperson, the unit organizes regular seminars to explain compliance issues. To date, over 1,500 Asahi Glass employees have attended such events, which are being extended to include subsidiaries. The Human Resources and Administration Center also features compliance in its training curriculum, and each operating division holds specific meetings to highlight and discuss relevant high-risk themes.

### Elements of Asahi Glass Code of Conduct

Asahi Glass aims to build open and fair relationships with all stakeholders based on the highest ethical standards. All employees are expected to conduct business activities that are fully compliant with laws and regulations as part of Asahi Glass fulfilling its corporate social responsibility.

1. Legal Compliance
2. Fair Competition
3. Relationship with Customers
  - (1) Safety of Products
  - (2) Fair Transactions with Distributors and Customers
4. Relationship with Suppliers and Contractors
  - (1) Fair Transactions with Suppliers and Contractors
  - (2) Business Gifts and Entertainment
5. Relationship with Competitors
  - (1) Fair Competition with Competitors
6. Relationship with Society and Region
  - (1) Environment and Safety
  - (2) Export Control
  - (3) Relations with Government and Political Activities
  - (4) Confrontation with Anti-Social Activities
7. Relationship with Employees
  - (1) Work Environment and Safety
  - (2) Respect for Human Rights
8. Relationship with the Company and Its Properties
  - (1) Prohibition of Improper Payments/Transactions
  - (2) Protection of Intellectual Property
  - (3) Protection of Trade Secrets and Prohibition of Misappropriation
  - (4) Proper Use of Company Properties
  - (5) Prohibition of Insider Trading
  - (6) Conflict of Interest

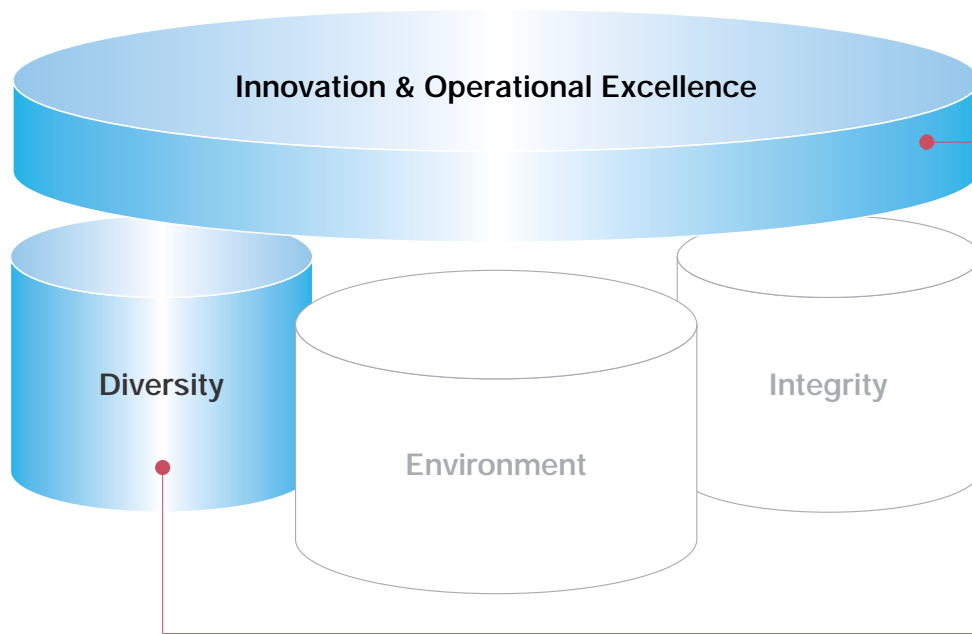
### Legal Environment

Asahi Glass operates in the environment shown below in terms of relevant legislation. Internal programs aim to raise awareness of related legal issues.



(top) Pamphlets and cards distributed to all Asahi Glass employees  
(bottom) Explanatory booklets on Japanese laws





# Diversity

In the AGC Group, people are the driving force as we pursue “Innovation & Operational Excellence” in our business activities. To allow people to reach their fullest capabilities, the AGC Group implements human resource management that strengthens the development of diverse and independent individuals. Respecting individuals with different cultures, capabilities and personalities, we strive to unlock the potential of people without regard to nationality, gender or background, enabling them to experience a sense of challenge and fulfillment. “Diversity” is one of the key shared values in our vision, **“Look Beyond”**.

# Human Resource Management (HRM)

We recognize employees are the source of the dynamism to create corporate value through the pursuit of "Innovation & Operational Excellence". Our HRM systems aim to utilize and develop employees respecting individual capabilities, aptitudes and motivations.

## Global Human Resource Management

We are promoting global HRM as one of the key issues in realizing and spurring the evolution of globally integrated management in the AGC Group. Each year, we identify capable people worldwide without regard to nationality or home company. In order to improve our sense of unity as members of the AGC Group, we have also launched the "AGC Institute," which consists of the following two programs this year:

**Global Leadership Session** — this workshop is designed to develop global leadership for the AGC Group. Held in Tokyo in May 2004, this session was attended by nine executives and senior managers from Japan/Asia, Europe and Americas selected by Group CEOs. At the session, the participants made presentations and took part in discussions that helped to improve their knowledge — a necessity for global leaders.

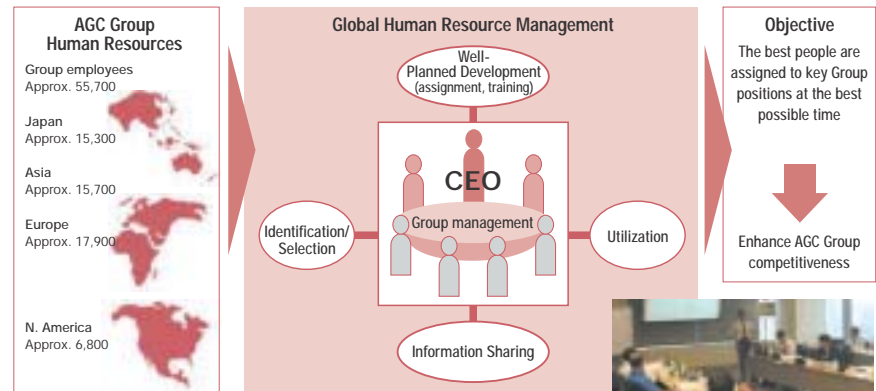
**Dynamic Leadership Session** — started in September 2004, this series of sessions and taskforces included a total of 24 middle

managers from Japan/Asia, Europe, and the Americas, and covered training at a business school in Switzerland and task-force activities in teams composed of diverse nationalities.

Moreover, we started a training program for Asian managers, called "Asian University," in

March 2003. The goal of the program is to enhance management of our Group subsidiaries by developing managers that share the Group's business philosophies and policies, and have acquired the latest management skills and knowledge. The second course in this program was held in July 2004.

### Global HRM (Overview)



## HRM system of Asahi Glass

The HRM policy of Asahi Glass is to establish a culture and system in which diverse and independent individuals can contribute to enhancement of the company and experience a sense of challenge, accomplishment and fulfillment, while exercising his or her abilities. We have established four goals to realize our HRM policy (see right). To achieve these goals, we have introduced a separate HRM system based on roles and functions for non-managers, divided into three courses. Asahi Glass' expectations for our people in each course are as follows:

- E course (Expert): To drive business strategies and enhance divisions.
- S course (Skill): To ensure smooth production by mastering

### Our goals of HRM

1. Strengthen The individual.
2. Create a culture in which we can enhance our competitiveness and improve on our result-oriented mindset.
3. Develop and utilize people to respond to improvements in globally integrated management.
4. Establish a culture and environment in which diverse people with different employment patterns and approaches to their jobs can demonstrate their abilities.

### Employee Gender and Career Groups (Asahi Glass)

Group		No.		On transfer (men)	On transfer (women)
		Men	Women		
Managers		1,588	38	823	6
Non-managers	E course	633	74	175	12
	S course	3,540	34	436	3
	C course	0	394	0	81

Average length of service : 20.2 yrs  
 Disabled as proportion of workforce : 1.77%  
 Prescribed working hours : approx. 1,883 (annual)  
 7hrs 45mins (per day)  
 Average overtime worked : 14.9 hrs (per month)  
 Proportion of annual paid leave taken : 77%  
 (approx. 15 days)

productive techniques and skills and passing those on to next generation of people.

- C course (Clerk): To execute operations accurately and speedily.

For managers, we implement a merit system in which we evaluate abilities and individual performance. The system consists of three classes based on abilities.

### Measures for HRM Policy

Objectives	1. Strengthen The Individual.	2. Create a culture in which we can enhance our competitiveness and improve on our result-oriented mindset.	3. Develop and utilize people to respond to improvements in globally integrated management.	4. Establish a culture and environment in which diverse people with different employment patterns and approaches to their jobs can demonstrate their abilities.
Process				
Recruit	Recruitment of new graduates emphasizing competency and diversity			
	Mid-career recruitment			
Assign & Develop	Challenging careers Self-development support	Selective HR development Assign best people to key positions	HR development program for subsidiaries in Japan Group Human Resources Management	Flextime system without core working hours Course change
Evaluate & Reward	HRM system for managers HRM system for non-managers	Bonus system based on operating performance (certain managers and above)		
Others	Selective benefit package			

## Infrastructure of HRM System

Various committees exist at Asahi Glass to provide assistance to decision-makers on employee assignments, evaluation and compensation. The two main committees are:

- Human resource management committee (HRMC): Focused on general managers
- Human resource development committee (HRDC): Focused on managers and non-managers

Following directions from the committees, line managers assign jobs and missions to these employees. We make use of the

Mission & Achievement Management Program (MAP) to evaluate individual performance by achievement of missions in line with company policies at various levels.

The MAP system consists of series of processes such as assignment of missions, setting of objectives/targets, formation of action plans, progress review and performance evaluation, and the processes are implemented annually. Feedback on MAP evaluation is provided to each employee and is the basis for determining his or her assign-

ment and development. Overall process transparency and satisfaction in the fairness of reviews are key factors of the MAP system.

All employees on E course (non-managers) and managers hold regular career planning meetings with superiors. This type of “human resource development communication,” or HDC, is designed to generate practical career development to enable people to make progress in their careers at Asahi Glass.

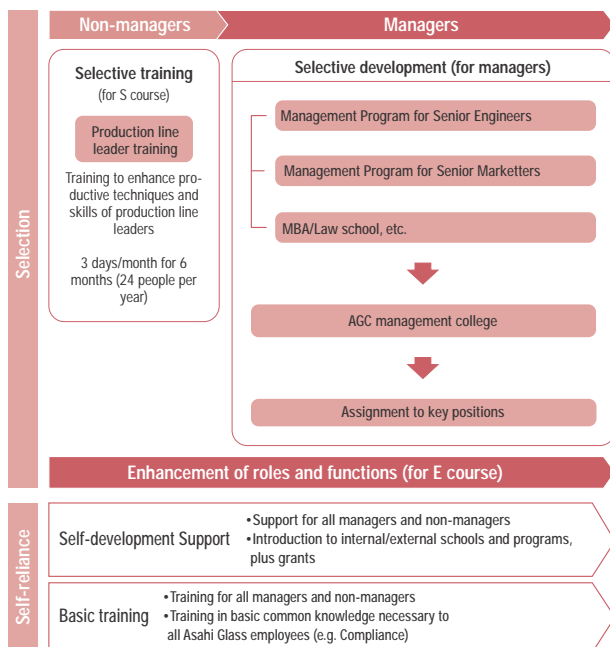
## Training/Development System and Career Planning

We train and develop people based on two key concepts, “selection” and “self-reliance.” Our system, therefore, is designed to meet

an employee’s role or function, regardless of their length of service. The system has also been introduced at our subsidiaries in Japan

to implement planned development of managers and to enhance the abilities of AGC Group employees.

### Training/Development System



### Career and Skills Development



# Career Development, Human Rights & Benefits

We, Asahi Glass, are promoting development of systems in which people in a diversified and capable workforce can fulfill their abilities. Moreover, we aim to create a sound and comfortable work environment and prohibit any form of discrimination.

## In-house Career Changes

We have introduced an in-house career change system to promote the flexible transfer of people among divisions, which should allow people to fulfill their abilities and to experience a sense of challenge in their jobs. This two-part system is as follows:

**Challenging Careers** — this program consists of an in-house voluntary recruitment system and in-house “free agent” system.  
**Specialist Career Paths** — this program enables eligible people to receive assignment as a specialist instead of a manager.

### Career Change



## Human Rights Educations and Training

A specific department of human rights in our HR division copes with human rights issues and promotes the establishment of sound and fair work environments free of discrimination. Respect for human rights and the prohibition of discrimination are explicitly stated in the Asahi Glass Code of Conduct and Asahi Glass employee regulations. These principles

are also shared by all employees through our periodic training programs. Concerning sexual harassment, we maintain counseling and a hotline system to prevent harassment and to ensure immediate action if it happens. In addition, we make efforts to prevent unintentional harm toward others caused by institutionalized gender discrimination, a situation

whereby people are unconsciously biased against recognizing another gender as an equal partner in the workplace. Reported cases are treated through retraining of perpetrators combined with an emphasis on reforming the consciousness of the whole workplace.

## Employee Benefits

The policies guiding our benefit packages are:

- (1) Enrich individuals through self-selection and personal responsibility
- (2) Maintain fairness among people and address their changing needs

Based on these policies, we have operated a selective benefit package system (cafeteria plan) called “My Story” since 2002. This point-based system allows employees to choose from 24 menus of options which suit their needs. They can receive up to 1,200 points per year, with 1 point equal to ¥100 in value.

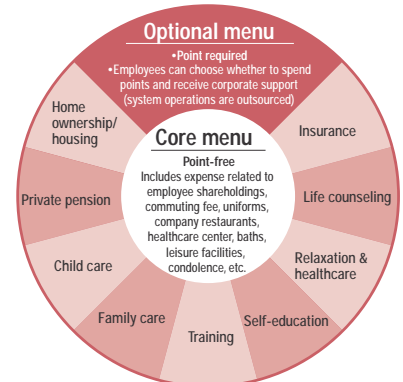
Besides the optional menus, we also have point-free core menus. The childcare leave system at Asahi Glass allows employees to

take leave until a child reaches a year old. Other systems permit employees to take up to 12 months’ leave to care for families, or to work part-time for child or family care. Employees on leave receive a portion of their salary and are also eligible for support payments from Asahi Glass as well as government-sponsored benefit packages. Those systems enable employees to balance their working and family lives more easily.

### Selective Employee Welfare Program

Selective benefit package (cafeteria plan) “My Story”

- Individual independent choice from diverse menu
- Fair benefits regardless of age, gender, position and years of service
- Corporate support or grant up to the half of costs employees spend



### Employees Taking Child Care Leave (Parent)

	2000	2001	2002
No. of people	31	28	35

### Employees Taking Family Care Leave (Parent)

	2000	2001	2002
No. of people	0	1	1

# Social Contribution Activities

Asahi Glass believes its responsibility to society extends beyond business activities. The company undertakes a variety of activities designed to promote harmony and contribute to society. These include support for the arts, community activities and scholarship programs. Through independent foundations, Asahi Glass also sponsors award programs and provides grants to support research in a variety of areas.

## Support for the Arts and Community Activities

As a good corporate citizen, Asahi Glass maintains a policy of trying to contribute to society in socially inclusive ways that promote harmony. Besides sponsoring glass art, Asahi Glass organizes sports events and provides access to site facilities as part of supporting local community activities. Separate programs are undertaken by an independent foundation established by the company.

Having been the first firm to mass-produce flat glass, Asahi Glass is closely associated with the development of glass in Japan. Asahi Glass remains committed to communicating the attraction of glass as a material to a wider audience, and sponsors various exhibitions of glass art. In fiscal 2003, Asahi Glass sponsored a second glass art exhibition at the Crystal Park Modern Glass

Museum in Koganezaki, which is located in the western Izu peninsula, a part of Japan famous for its deposits of silica sand, a major glass raw material. The theme of the exhibition was the innovative shapes of containers made using glass.



Grand Prix-winning entry at Koganezaki glass art exhibition (2003)



Other prize-winning entries at Koganezaki glass art exhibition (2003)



### Major Social Contribution Activities (Fiscal 2003)

#### Principal arts sponsorship activities

- Koganezaki Crystal Park Sponsorship of exhibition on utensil morphology
- Sponsorship of exhibition of cast glass

#### Principal community activities

- Asahi Glass Cup Aikawa Youth Baseball Tournament (Sagami Plant)



Asahi Glass Cup Aikawa Youth Baseball Tournament (2003)

## Asahi Glass Scholarship Foundation

The Asahi Glass Scholarship Foundation was established in 1957 to commemorate Asahi Glass' 50th anniversary with a mission to foster talent. The foundation provides economic assistance to deserving students from Japan and other countries. Sponsorship activities for Indonesian and Thai students studying in

Japan were inherited in 1990 from Asahi Glass foundations in those two countries.

### Results of Social Contribution Activities

#### Scholarship payments

- Total number of scholarship recipients (as of March 2004)  
Japanese students: 92 (¥76 million)  
Foreign students: 12 (¥13 million)
- Cumulative totals:  
Japanese students: 3,436 (¥1,695 million)  
Foreign students: 85 (¥152 million)

## Overseas Scholarships

To commemorate its 75th anniversary in 1982, Asahi Glass endowed foundations in Thailand and Indonesia to return profits to

society outside Japan. These establishments reflected the long history of large-scale AGC Group operations in these countries. Both

organizations provide scholarships to local university and high-school students.



# The Asahi Glass Foundation

The Asahi Glass Foundation strives to contribute to the creation of a richer, more vibrant society. To this end, the Foundation supports research in leading-edge scientific and technological fields and recognizes individual and organizational efforts to solve issues of concern to people around the world.

## The Blue Planet Prize

The Asahi Glass Foundation established the Blue Planet Prize in 1992 to commend outstanding achievements in scientific research and its application by individuals and organizations that have helped provide solutions to global environmental problems. It is one of the world's leading environmental awards. Each year two award recipients are chosen. Each winner receives a certificate, trophy and a supplementary award of ¥50 million.

### Areas for Recognition

- Environmental problems related to global warming, acid rain, ozone depletion, deforestation, desertification, oceans and fresh water resources, ecosystem and biodiversity.
- Environmental issues related to energy, population, food, water resources, disease caused by environmental change, waste treatment and environmental policies, and issues extending into multiple areas which are closely related to conservation and regeneration of the global environment and are useful in realizing a sustainable society.

### Blue Planet Prize Recipients

1st	1992	Dr. Syukuro Manabe (USA)	International Institute for Environment and Development (IIED; UK)
2nd	1993	Dr. Charles D. Keeling (USA)	The World Conservation Union (IUCN; Switzerland)
3rd	1994	Prof. Dr. Eugen Seibold (Germany)	Mr. Lester R. Brown (USA)
4th	1995	Dr. Bert Bolin (Sweden)	Mr. Maurice F. Strong (Canada)
5th	1996	Dr. Wallace S. Broecker (USA)	The M.S. Swaminathan Research Foundation (India)
6th	1997	Dr. James E. Lovelock (UK)	Conservation International (USA)
7th	1998	Prof. Mikhail I. Budyko (Russia)	Mr. David R. Brower (USA)
8th	1999	Dr. Paul R. Ehrlich (USA)	Prof. Ou Geping (PRC)
9th	2000	Dr. Theo Colborn (USA)	Dr. Karl-Henrik Robèrt (Sweden)
10th	2001	Lord (Robert) May of Oxford (Australia)	Dr. Norman Myers (UK)
11th	2002	Dr. Harold A. Mooney (USA)	Prof. J. Gustave Speth (USA)
12th	2003	Dr. Gene E. Likens, Dr. F. Herbert Bormann (USA)	Dr. Vo Quy (Vietnam)



Prize awarded for pioneering an approach that has become a model for the scientific world, and for the comprehensive understanding of ecosystems through long-term measurement of the flows of water and chemical substances in watersheds.



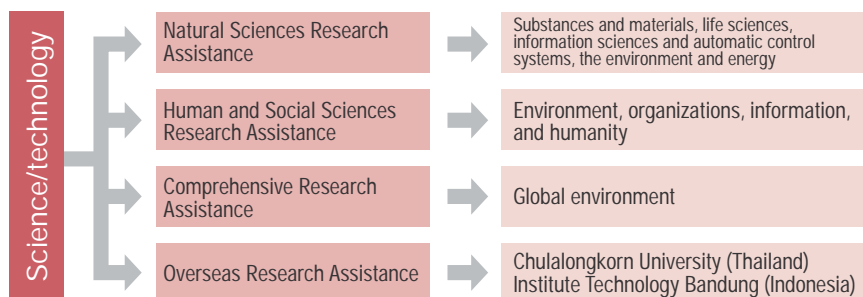
Prize awarded for investigating the war-damaged forests of Vietnam and for the dedication to its restoration and conservation, as well as for the development of environmental laws and the contributions to the conservation of wildlife.

## Research Assistance Program

The Asahi Glass Foundation provides grants to support original research in the natural and social sciences that could contribute to the future of society or provide solutions for important social issues. Environment-related

research projects are frequently selected for support. In fiscal 2003, the foundation provided assistance to 170 projects with grants totaling ¥250 million.

### Research Assistance Program



Announcement of research assistance awards for fiscal 2003 at United Nations University U Thant Conference Center as part of seminar on "Control and Applications of Nanostructures" (July 15, 2003)



# Environment

Companies need to shoulder the responsibility of helping to create a sustainable society in harmony with nature. In the

AGC Group Vision **“Look Beyond”**, Environment is positioned as a key shared value. The AGC Group operates separate management systems for the two main environments with which it is involved: the natural environment and the working environment. While seeking to integrate the operation of the corresponding management systems, the AGC Group continues to work toward attaining world-leading performance standards in both areas.

## Environment is Key to Survival

The AGC Group Vision **“Look Beyond”** commits us to shoulder our responsibility as a good global citizen by contributing to a sustainable society in harmony with nature. “Environment” is positioned as one of the core shared values of the Group. It lies at the heart of our management approach. Our survival as a company depends on it.

We should also bear in mind that the word “environment” essentially refers to that which surrounds us. In this sense, we are dealing with two environments: the global one and the working environment.

AGC Group operations now span 23 countries around the globe. Our aim is to promote integrated global management. While

local and regional differences are important as with business activities, in general, we are working to integrate our environmental management approach at the global level.

## Operation of Globally Integrated Environmental Management System

Our aim is to establish a globally integrated environmental management system (EMS) for the entire AGC Group. The glass and chemicals operations are the parts of the Group that have the highest environmental impact in relative terms. In chemicals, the products themselves have varying degrees of toxicity, and we have a duty to manage these operations responsibly to lower the impact, based on in-depth knowledge. Equally, we

also have a duty to disclose both internally and externally the results of our EMS-based efforts to tackle environmental issues. Since, as a global enterprise, we recognize the importance of diversity, we benchmark our regulatory status in different countries and try to adopt the best practices.

In October 2003, we began full-scale development of an integrated EMS based on ISO 14001 for the entire AGC Group. From late

2004, we will begin the process of certifying this integrated EMS for all operational activities, with the headquarters setting the example. In due course, we plan to include all consolidated subsidiaries in Japan and overseas within a unified system.



“We are taking an integrated approach across the AGC Group to environmental management and occupational health and safety.”

**Hajime Amemiya**  
Senior Executive Vice President  
General Manager  
Corporate Environment & Safety Directorate

A handwritten signature in black ink, appearing to read 'H. Amemiya', written in a cursive style.

### FY 2003: a Year of Further Progress Toward Zero Emission

Two projects that we undertook in fiscal 2003 concerned site pollution countermeasures. At our Chiba Plant, we began planning a decontamination program for soil polluted with organic chemicals after an expert site assessment. We also initiated a decontamination program at Seimi Chemical Co., Ltd., an affiliate, to tackle soil and groundwater pollution.

At the same time, we are making steady progress

toward Zero Emission. We have accelerated our development of recycling technologies and systems for fluorochemicals and automotive glass. We are also focusing on the development of products that will make a positive contribution to environmental efforts. Examples include membrane-electrode assemblies (MEAs) for use in fuel cells; high-capacity electric double layer capacitors, which have potential applications in hybrid automobiles; and diesel particulate filters (DPFs) for cleaning up diesel engine exhaust emissions.

## AGC Group Environmental Policy

Revised December 18, 2003

### Basic Policy

Aware that its activities use relatively large amounts of resources and energy, the AGC Group has positioned the environmental activities as one of the core values in our group vision **“Look Beyond”**.

As a leading company in the materials industry, we shall contribute to the creation of the sustainable society.

### Slogan

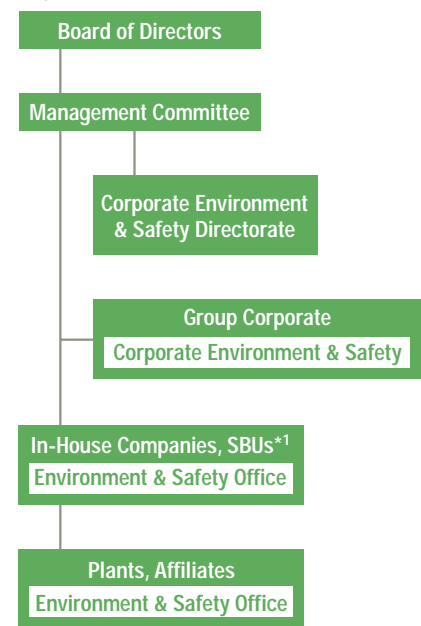
Play your part as a responsible citizen in creating a better environment.

### Guidelines for Environmental Activities

1. We will make continuous improvements based on the Integrated Environmental Management System.
2. We will comply with all regulations and standards prescribed by environmental laws, ordinances, treaties and agreements.
3. We will take steps to lower various forms of environmental impact and prevent pollution in every stage of our operations, while setting voluntary targets in a variety of areas, especially in respect of resource conservation, global warming countermeasures, waste reduction and recycling, and the proper handling of chemical substances. We will work to accomplish these goals while making further improvements.
4. We will develop and provide eco-conscious products, technologies, services and facilities for society in all areas of our activities.
5. We will actively communicate with society to foster a deeper understanding of all aspects of our environmental management activities.

The AGC Group Environmental Policy is disclosed to the public.

## AGC Group Environment & Safety Organization



\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.

## Construction of Global Occupational Health & Safety Management System (OHSMS)

**“Look Beyond”** also includes the workplace within its definition of environment. Here, our goal is to create a pleasant environment while ensuring that people make safety a top priority. Basically, our thinking on the global and workplace environments is the same. The difficulty in both instances is to boost individual awareness of the need to take action, particularly concerning safety. Our approach with workplace safety is the same as with the global environment: develop an integrated global management

system. By the end of March 2004, we had completed the creation of an OHSMS at all parent company operating sites. The Keihin Plant was actually the first facility in the flat glass industry to obtain OHSAS 18001 certification for its OHSMS (in April 2000). Operation of OHSMS helps to reduce serious risks. Unfortunately, Asahi Glass’ frequency rate of industrial accidents actually increased in fiscal 2003, to 0.38 (from 0.16 in fiscal 2002), against an average for the Japanese chemical industry of 0.49. We plan

to redouble our efforts to reduce the frequency of accidents toward zero. We also benchmark the safety of our capital equipment and facilities against recognized standards. In this area, too, we plan to incorporate the best practices from around the world.

## Site Risk Reappraisal to Strengthen Industrial Safety

When we face the risk of disasters such as earthquakes, a critical point is to ensure we are completely prepared. This is in order to minimize the risk of secondary disasters. Our system is geared to raising internal

awareness of the risks and ensuring management takes appropriate preventive measures. In fiscal 2003, our President & CEO ordered comprehensive site readiness reappraisals across the AGC Group to strengthen preven-

tive safety countermeasures against accidents. The Corporate Environment & Safety Directorate followed up at In-House Companies and affiliates.

## Aiming for World-Class Management Capabilities

Our goal is to reach world-class standards of environmental management, which is why we are devoting our efforts to an integrated global EMS approach. In deciding to take this path, we assumed major diversity in the

countries where the AGC Group operates around the world. I hope this report will help all AGC Group stakeholders to understand our policies and actions better.

# FY2003 Actions and FY2004 Plans

The AGC Group sets annual performance targets for its environment and safety programs as part of its medium-term business planning. These plans commit Group corporate operations, In-House Companies, SBUs\*1 and other parts of the AGC Group to attain specified levels of performance in various activities related to the environment, occupational health and safety, and industrial safety.

## Environment and Safety Activities: FY2003 Plans and Results, FY2004 Plans

Medium-term Management Plan elements		AGC Group environment and safety activity plans (FY2003)	
Environment	Environmental management	Global integration of environmental management system Asahi Glass (parent): establishment of integrated EMS AGC Group: affiliate obtaining ISO 14001 certification and system upgrade support Environmental accounting evaluation and management feedback	
	Development of sustainable society	Make further progress toward Zero Emission Global warming countermeasures, energy saving measures	
	Reduction of environmental impact	Decontamination of polluted soil and groundwater Proper management of chemical substances, reduced chemical emissions, reduced toxic atmospheric and water emissions	
	Communication and disclosure	Start studying publication of sustainability report Intranet: major upgrade of environment and safety content Internet: creation of separate, improved environmental section on Asahi Glass web site Apply for external environmental awards Continued organization of AGC Group Environmental Forum (for reporting environmental performances of businesses) Promote environment-related communications with stakeholders	
OH&S	Green procurement, Logistics-related environmental measures, others	Green procurement (raw materials, components, etc.) Green purchasing (office equipment and supplies, etc.) Undertake Life Cycle Assessment (LCA) studies Develop environmental business Execute environmental measures in logistics and distribution section	
	OHSMS establishment Risk assessment	Promote improved working environment and increased machine safety in AGC Group (parent company operating sites, Japanese consolidated subsidiaries) Complete establishment of OHSMS at all parent company operating sites by end of FY2003 Support introduction of risk assessments at all AGC Group companies in Japan Provide support and guidance to partner firms	
	Industrial safety	Explosion/fire countermeasures	Check industrial safety condition
		Earthquake/natural disaster countermeasures	Promote ongoing hazard management measures Reinforce disaster emergency response capabilities

\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.



The main environment and safety goals of the medium-term management plan for 2003-5 formulated in November 2002 were:

- Planning and formulation of basic policy and strategy for the entire AGC Group on a global, consolidated basis
- Support and guidance based on audits undertaken at all In-House Companies,

SBU\*s\*<sup>1</sup> and affiliates

The main goals for fiscal 2003 were as follows:

- Environment: preparations for globally integrated EMS; waste reduction
- OH&S: completion of OHSMS at all parent company operating sites; introduction of risk assessments at affiliates

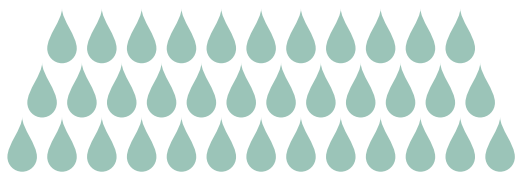
Industrial safety: status checks at all AGC Group operating sites

The plan for fiscal 2004 adds actions in some new areas (emissions trading, environmental taxes, etc.) and features comprehensive implementation of PDCA cycle-based activities.

Major FY2003 results, evaluation	Page ref.	FY2004 plan
Establishment of integrated EMS commenced (October 1, 2003)	36	Register for certification in late 2004 (parent company) Formulate road map toward global consolidated coverage Create foundation of environmental database
Environmental accounting evaluation and analysis completed	37	Upgrade level and provide feedback to management
Recycling ratio of 95.2% achieved for parent company	49	Ongoing activities toward Zero Emission by end of FY2005
Reduction in CO <sub>2</sub> emissions of parent company relative to 1990 levels of 35% achieved	42	Target setting and implementation by Environmental Committee
Voluntary site surveys completed and decontamination programs initiated	40	Continued voluntary site surveys and decontamination programs
Rules for communication of latest regulatory information implemented	46	Ongoing chemical management and reduced chemical, atmospheric and water emissions
Publication of 2003 report: "Relationship with Society"	56	Publication of sustainability report
Environment and safety content upgraded	56	Study possible AGC Group developments
Information included on environmental measures	56	Ongoing improvements to web site
Award for plant excellence received from Tohoku Bureau of Economy, Trade and Industry	43	Ongoing applications for external awards
Number of domestic affiliates attending forum increased	36	Promote internal AGC Group communications
Briefing meetings organized at all operating sites	56	Ongoing activities
Implementation in line with characteristics of each enterprise	41	Ongoing green procurement activities
Activities commenced in April 2003	41	Disclose targets and results achieved
Implementation in line with local characteristics, but not yet on company-wide basis	—	Ongoing activities
World-first development of commercial recycling technology for fluoropolymers	46	Development ongoing
Introduction of sheet pallets; fewer journeys by empty vehicles	48	Promote energy conservation and environmental measures
Improved operating performance: site reappraisals result in more effective dust and noise pollution countermeasures	54	Ongoing working environment improvements and inherent safety of machinery
Increased machine safety: internal safety standards revised		
OHSMS establishment completed by March 2004 at all parent company operating sites (8 plants, 1 Research Center)	54	Plan upgraded OH&S levels through PDCA cycle execution
Implementation on track at five major subsidiaries	54	Delineate and evaluate risks using integrated risk assessments
Preparations for introduction ongoing at other companies		involving operators
OH&S management executed at same level as Asahi Glass operating sites	54	Ongoing support and guidance
Guidance and oversight for partner firms ongoing		
Industrial safety inspections completed Kashima Plant commended for high-pressure gas installations	55	Follow-up on site inspections
Earthquake countermeasure outline plans revised Satellite phones introduced (12)	55	Revise emergency response manuals
Industrial safety seminar organized (two external lecturers invited)	36	Organize industrial safety seminars

# Relationship Between Asahi Glass Business Activities and Environment

## INPUT



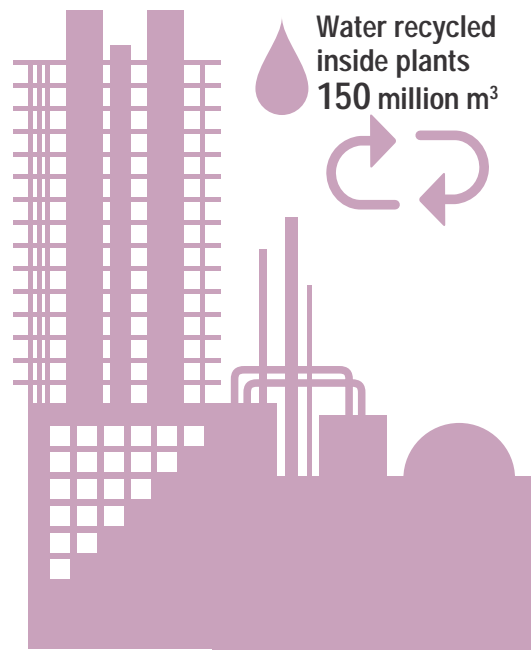
**Water** P44  
**21 million m<sup>3</sup>**



**Total energy consumption** P42  
**29 PJ\*<sup>1</sup>**  
•Fuel oil **250 million liters**  
•Purchased electric power **1.8 billion kWh**

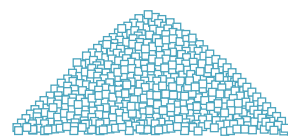


**Purchased raw materials**  
**Total: 1.4 million tons**  
Industrial raw materials, including silica sand, soda ash, salt, fluorite and potassium chloride



**Manufacturing** P30-35, 60-61

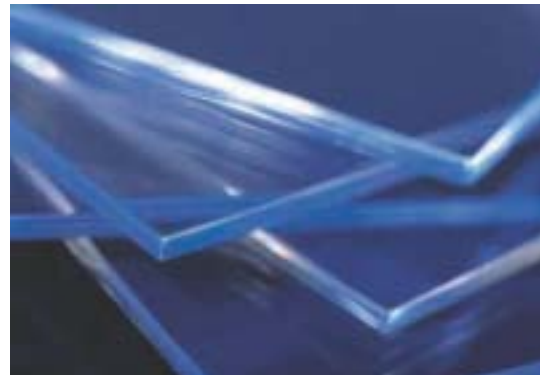
Recycled as raw materials



**Glass cullet, etc.**

\*1 1PJ (petajoule) equals 10<sup>15</sup> Joules.

- Scope of data: all Asahi Glass operating sites (including effect of Funabashi Plant closure at end of 2003)
- Period covered: April-December 2003
- All data below are rounded to two significant figures
- Please refer to pp. 60-61 for performance data on individual plants and five Japanese affiliates (not included in data below)
- Please refer to pp. 62-63 for PRTR-related data



# OUTPUT



## Products

P2, 8-12

- Construction flat glass
- Automotive glass
- Building materials
- Display glass
- Electronic materials and products
- Chemicals, etc.



## Air

P42-45

- |                   |                         |
|-------------------|-------------------------|
| • CO <sub>2</sub> | <b>1.7</b> million tons |
| • NO <sub>x</sub> | <b>3,400</b> tons       |
| • SO <sub>x</sub> | <b>390</b> tons         |
| • Soot and dust   | <b>120</b> tons         |



## Water

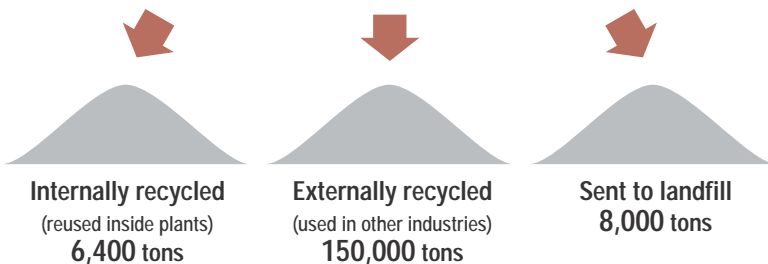
P44

- |                     |                                  |
|---------------------|----------------------------------|
| • Wastewater volume | <b>18</b> million m <sup>3</sup> |
| • COD               | <b>710</b> tons                  |

## Industrial waste

P49-51

Total generated **170,000** tons



# Development of Arsenic-Free Technology Heralds New Future for Flat Panel Display Glass Substrates



Hiroyuki Ishikawa  
GM, Technology Div.,  
FPD Glass General Div.

Asahi Glass is a market leader in flat panel display (FPD) glass substrates, which are used in products such as flat-panel televisions. Asahi Glass produces both TFT-LCD (thin-film transistor liquid crystal display) and PDP (plasma display panel) glass. This section looks at the development of two forms of glass: “AN100” non-alkaline TFT-LCD glass, which is entirely free of toxic arsenic; and “PD200” PDP glass, which boasts low susceptibility to thermal shrinkage.

## Strong Competitive Edge in Glass Production Technology

The principal approach used in the production of flat glass for architectural and automotive applications, the float method involves forming the glass by drawing it out horizontally inside a giant furnace with a float bath. Asahi Glass has accumulated decades of experience in perfecting this process for the supply of high-quality glass. Glass substrates for use in electronic materials are typically made by a completely different process, the fusion method. This involves small furnaces and formation processes that draw out the glass while in a vertical orientation. This production method is better suited to making small batches of multiple product types. Without any prior experience in this field, we faced widespread skepticism at Asahi Glass when we started trying to adapt the float method to

the production of high-precision FPD glass substrates.

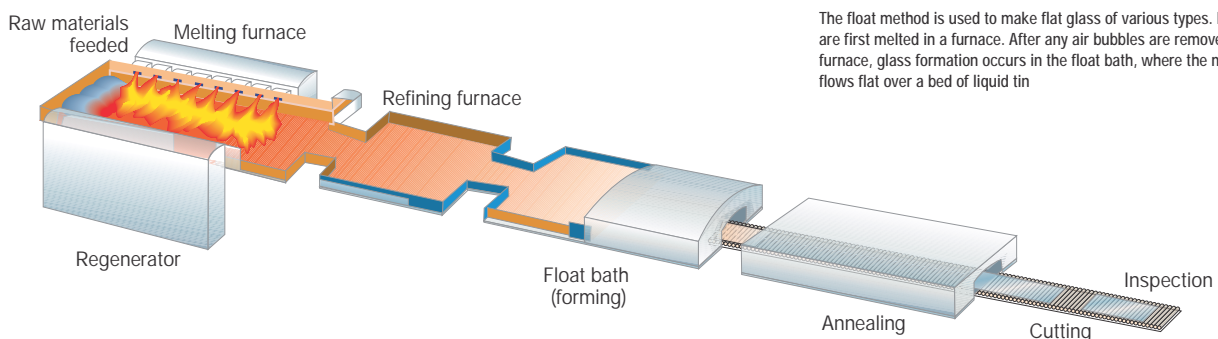
We persisted, however, realizing the huge market potential if we could perfect a mass-production method for FPD glass based on float technology. After much trial and error, we were the first company in the world to achieve this feat. A single float furnace has the capacity to produce the same output as four to six fusion furnaces. Furthermore, since the float process is able to accommodate multiple glass substrates, there is a considerable cost advantage to our approach.

Even though we were the last to enter the market for TFT-LCD glass substrates, we have a competitive edge over other manufacturers because of our different production method. The float method yields glass of large surface area and high quality. In addition,

it is more eco-friendly because it is completely free of arsenic.

The result is that two opposing camps in terms of technological production culture supply the market for TFT-LCD glass. But as the market shifts toward larger panels and starts to value eco-friendly characteristics more highly, our float method-produced substrates are attracting a greater degree of market attention.

Glass Production by the Float Method

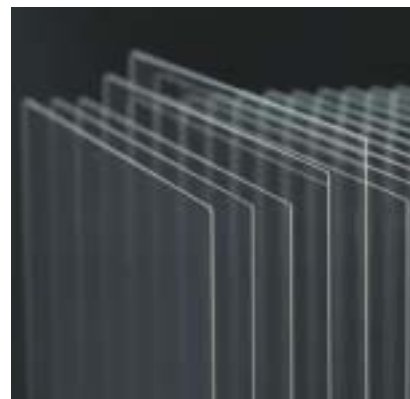


The float method is used to make flat glass of various types. Raw materials are first melted in a furnace. After any air bubbles are removed in a refining furnace, glass formation occurs in the float bath, where the molten glass flows flat over a bed of liquid tin

## TFT-LCD Glass Substrates: an Eco-Friendly Material

TFT-LCD glass production requires the application of a thin film of transistors to the glass surface. These act as switches for the liquid crystals in the display. Prior to this step, all the alkali used in flat glass production must be removed. Traditional methods use additives such as arsenic and antimony to prevent air bubbles forming in the melting process. Arsenic is designated as a Type 1 substance in the PRTR Law, and its usage is controlled by a number of other regulations and laws in Japan. At Asahi Glass, we have developed new production technology that results in arsenic-free non-alkaline glass. Removing arsenic from production

processes that operate on the scale of dozens of tons of materials forced us to modify not only our glass formation technology, but also the furnace combustion methods and the flow processes for molten glass. By solving all of these issues, we were able to develop a new method for eliminating bubbles using existing substances, but in a manner with much less environmental impact.



This particular TFT-LCD glass is 0.7 mm thick. The surface is required to be perfectly flat, free of even the smallest particle of dirt

## Developing PDP Glass Substrates to World-Leading Quality Standards

Since PDP production processes operate at high temperatures, manufacturers demand PDP glass substrates with high thermal stability that are resistant to deformation at such temperatures. They also require glass that has the same thermal expansion coefficient as conventional flat glass (i.e., that expands by the same amount for a specified increase in temperature). These two demands are actually contradictory. If the thermal stability is increased, the thermal expansion coefficient will drop. This requirement made it extremely difficult to develop processes for manufacturing PDP glass substrates. After seven years of effort, we were finally able to strike the correct balance with "PD200" glass, which has a high strain point.

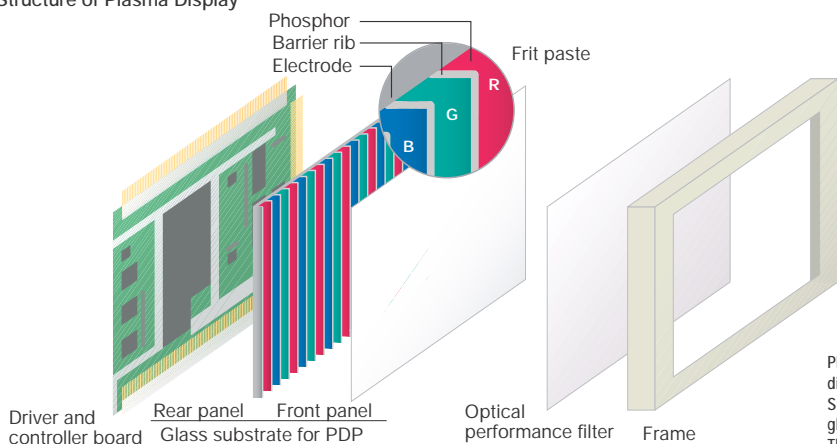
Although our competitors were also developing PDP glass substrates around the same time, we were the first to succeed in making a commercial prototype sample using the float method. Because we were the first to produce a PDP glass substrate with "PD200," other manufacturers have followed our lead on the quality characteristics of the other peripheral materials and components for PDPs. Our substrate has become the de facto standard in the field. Today, LC and plasma flat-panel televisions feature increasingly large screens. As a result, there is a trend toward large glass substrates. The seventh generation of TFT-LCD glass substrates measure 1.9m by 2.1m.

At the same time as glass panels get larger, manufacturers continue to seek thinner screens, reduced product weight and lower prices. To meet these demands, we remain focused on the development of the future of glass substrate technology. Eco-friendly characteristics are still an important goal.



PDP glass substrates are used in flat panel display televisions

Structure of Plasma Display



PDPs work by inserting gas between two glass panels. Plasma electrical discharges cause light to be emitted from phosphors coating the panels. Since there are thousands of elements attached to their surface, the glass substrates must combine high transparency and heat resistance. The surfaces must also be perfectly flat



# Environment Related Technology at Asahi Glass Research Center

The Asahi Glass Research Center is engaged in R&D activities to create new enterprises and to reinforce Asahi Glass' technological base. Environment-related research themes to develop eco-friendly products and technologies form an important part of the work of the Research Center. This section introduces some of the current areas of greatest potential.

## Environment-Oriented R&D for the Greater Benefit of Mankind

In the spirit of the **"Look Beyond"** vision, the Asahi Glass Research Center conducts R&D activities to contribute to the health of the environment and the welfare of mankind, focusing on core technical competences in glass, fluorochemistry and related technologies. Aiming to develop products with low environmental impact, these activities also involve eco-conscious elements such as proper management of all substances used, environmental evaluation of products and technologies, and efforts to conserve energy and resources. The center gained ISO 14001 certification in July 2000.

Research targets are classified in the table below as new glass, fluorine-related or coating technologies. Programs encompass development of new materials and businesses.

Areas of Research at Asahi Glass Research Center

Core technology / Target area	Glass	Fluorine Chemistry	Coatings
Information and communications, and IT devices and equipment	Optical fiber for WDM amplifiers; silicon carbide ceramics for semiconductor production	Fluoropolymer resins for use as optical fibers, resist, and low-k materials	Hard coats; semiconductor production materials (silicon carbide, synthetic quartz, resist); glass antenna
Displays	Glass substrates for displays; frit and paste		Organic thin-film materials; polymer glass
Energy and environment	High-performance insulating glass; ceramic filters; glass substrates for solar cells	Electrolytic ion-exchange membranes; fuel cells; capacitors; next-generation electrolytes	Solar cells
Specialty chemicals		Next-generation fluorocarbons and fluorosolvents	Functional films (printing films and papers, non-reflective films); inorganic functional materials (coating materials, batteries, catalysts)
Next-generation production technology	Glass melting technology for eliminating bubbles at low pressure; ultra-fine glass processing; precision glass formation	Direct fluorination technology; combinatorial chemistry; new chemical process technology	Plasma precision control process technology

## Boosting Energy Efficiency Using High-Capacity Electric Double Layer Capacitors

Asahi Glass research teams are engaged in developing next-generation capacitors to boost the efficiency of the charge and discharge of electrical energy in a device. In the range of alternatives, electric double layer capacitors have the potential to charge rapidly and to discharge large quantities of electricity. They can also sustain repeated charge-discharge cycles, which lends them semi-perpetual life. These attributes give these capacitors the potential to become a new, efficient and eco-friendly device for storing energy.

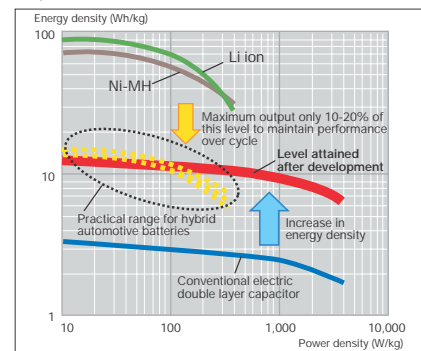
New types of electric double layer capacitor developed at the Asahi Glass Research Center feature original electrode and electrolyte technology that boost the energy density (energy storage capacity per unit of weight or volume) to three times that of conventional systems.

In recent years, the spotlight in automobile

research has fallen on the commercialization of eco-friendly hybrid vehicle technology, which promises to lower the environmental impact of cars by reducing fuel consumption, while making exhaust emissions much cleaner. Most of the secondary batteries used in hybrid systems use lead or nickel as the main raw material. Asahi Glass is targeting the market for hybrid vehicle technology in the development of new, high-performance capacitors.

This new capacitor technology is also potentially applicable to trains, construction machinery, elevators and other motorized equipment as well as automobiles. Such capacitors could store energy dissipated when these vehicles or equipment decelerate and stop as electrical energy that can be re-used. Recycling energy in this fashion promises to boost the effective use of energy considerably.

Performance Levels of Electric Double Layer Capacitors



High-capacity electric double layer capacitors and high-voltage module

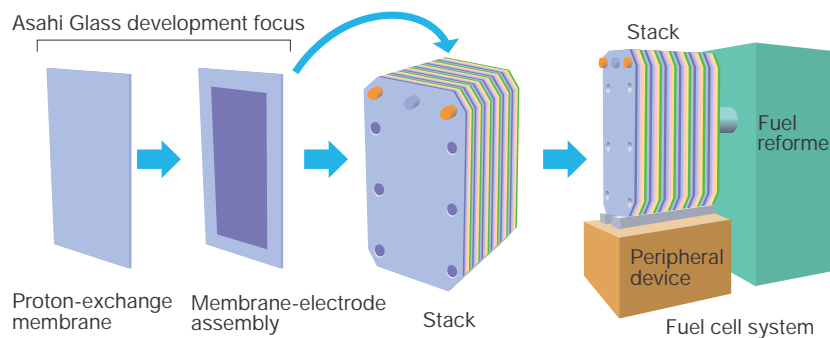
## Fuel Cell Membrane-Electrode Assembly (MEA) Offers Clean Energy Future

Fuel cells are the latest possible clean energy solution for producing energy efficiently without the carbon dioxide emissions that are thought to contribute to global warming. Using catalysts spread over a specially designed membrane, the PEM (proton-exchange membrane) fuel cell works by splitting hydrogen into protons ( $H^+$  ions) and electrons, which generate an proton-exchange current. The protons pass through the proton-exchange membrane and then combine with atmospheric oxygen on the other side to form water ( $H_2O$ ).

The use of fuel cells has traditionally been restricted to relatively specialized areas such as space travel. Recent advances by Asahi Glass in fluoropolymer proton-exchange membrane technology for power generation open up the possibility of developing commercial clean-energy residential co-generation systems. Other potential applications include power sources for portable electronic devices or even automobiles. Applying in-house expertise in fluoropolymer proton-exchange membrane and electrode technology from the electrolysis of salt, the

Asahi Glass Research Center has also developed a membrane-electrode assembly (MEA) for use in fuel cells that combines the membrane and the electrodes in a single unit. MEAs are potentially critical components of commercial fuel cells. Asahi Glass has developed MEAs that boast highly efficient power generation with excellent durability (the units are based on fluoropolymer proton-exchange membrane technology gained from refining caustic soda production processes).

### Structure of MEA and Fuel Cell



A membrane-electrode assembly (MEA) consists of a proton-exchange membrane and electrodes in a single unit. Sandwiched between separators, these can be packed on top of each other to form a stack. Together with peripheral devices, the stack forms a fuel cell system for clean power generation

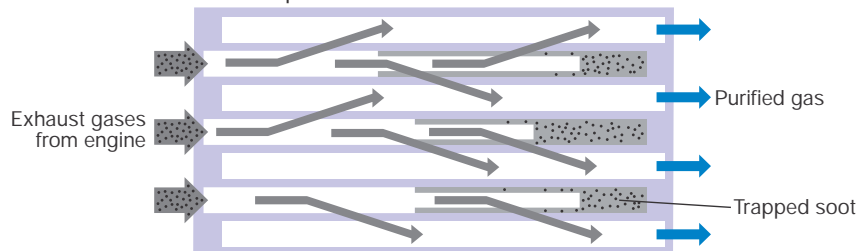
## Diesel Particulate Filters (DPFs): Making Diesel Engines Cleaner

Many regulatory bodies are focusing on environmental pollution caused by exhaust emissions from diesel-engine vehicles. High power output and durability make diesel engines a common choice in large commercial vehicles such as trucks and buses. Cheaper fuel prices and the development of the common rail diesel engine, which combines low fuel consumption with reduced  $CO_2$  emissions, have led to the increased use of high-performance diesel engines in cars as an eco-friendly alternative to gasoline engines. In Europe, 45% of all new vehicles are now powered by diesel engines. While fuel cells offer the ultimate clean solution from

a regulatory perspective, diesel engines can help reduce the environmental impact in the interim commercialization period. One outstanding problem of diesel engines is the soot contained in exhaust emissions (which causes the characteristic "black smoke"). Although progress has been made on this front, tighter regulations demand further progress. Diesel particulate filters (DPFs) offer a potential solution. The Asahi Glass Research Center has developed original technology to improve previous heat-resistant DPF designs based on silicon carbide by using silicon nitride in a new material. This involves using inexpensive silicon metallides

as base materials to create extremely heat-resistant multiporous silicon nitride ceramics that expand little when hot. This patented technology also facilitates the creation of much larger DPF units than previously possible due to the strength imparted by the porous structure. An added advantage is that a catalyst can be efficiently spread over a large surface area. Asahi Glass is working to gain the interest of automakers and catalyst manufacturers while undertaking commercial performance evaluation tests and developing related production technology.

### Structure of Asahi Glass-Developed DPF

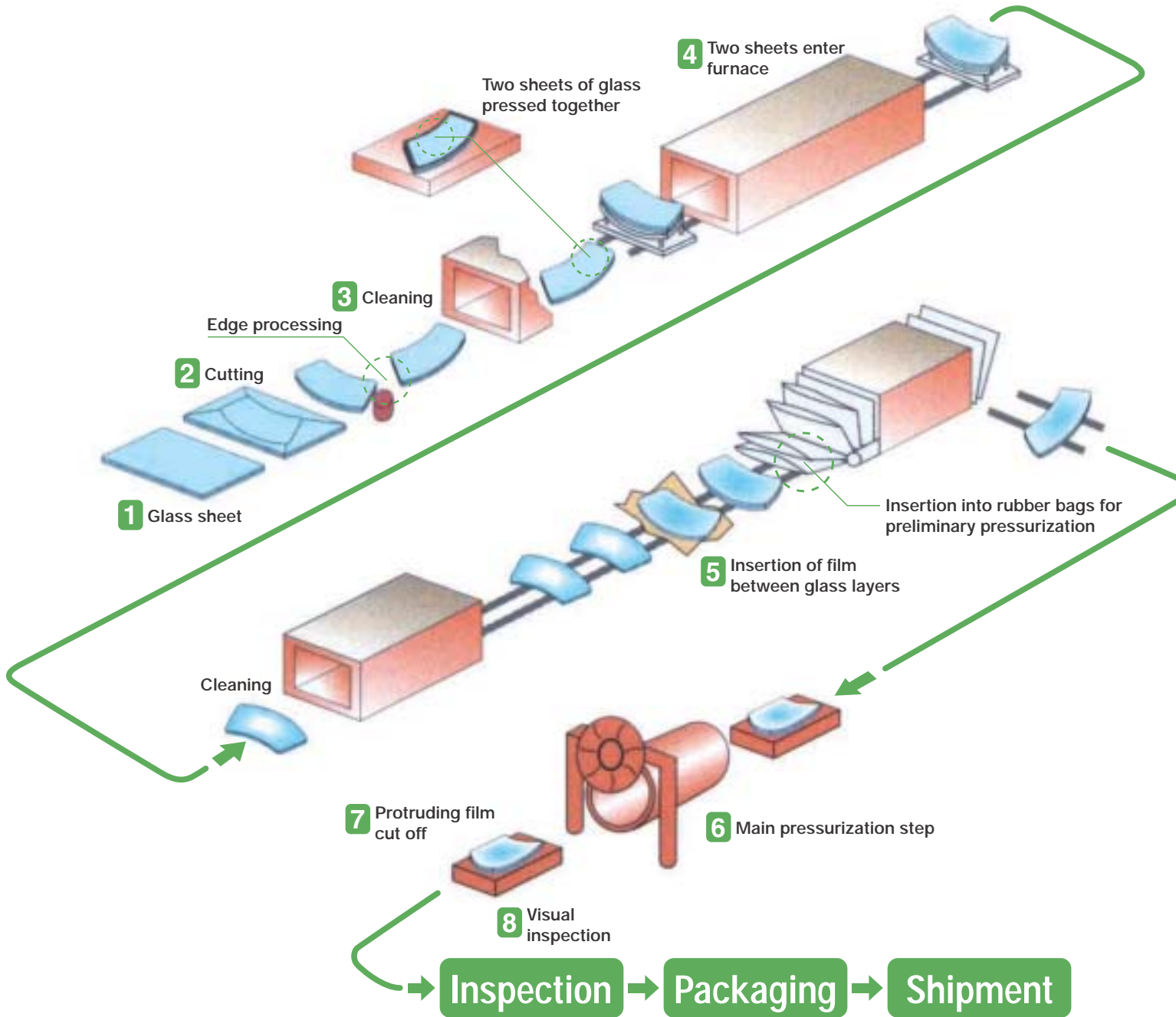


These silicon nitride filters contain around 40 pores/cm<sup>2</sup>. The internal structure resembles a honeycomb

# Reduction of Environmental Impact of Manufacturing Processes

## Environmental Measures Applied to Production of Automotive Laminated Glass

The AGC Group is engaged in various projects to reduce the environmental impact of operations. In this section, we look at eco-conscious steps involved in the manufacturing processes used with automotive laminated glass (the “safety glass” used in windshields) at the Asahi Glass Sagami Plant.



### 1 Buffer packing materials for glass sheets brushed away

Plastic granules pressed between the sheets protect the automotive glass arriving from another plant. The acrylic resin granules are removed by brushing and recycled in asphalt. In fiscal 2003, this procedure generated 875kg of resin.



### 2 Glass cut according to final vehicle model

The glass is cut into shape according to vehicle specifications. The cut glass piece is transported to the next step using suction pads while the remaining glass is collected and taken by a conveyor belt to a storage tank. Collected glass is re-used as a raw material in other AGC Group operations.



### 3 Edge processing followed by cleaning

The edge of the cut glass is processed. The next cleaning step removes the sludge created by processing. This sludge can be used in other industries in soil reformation materials. The water used in cleaning is also recycled for industrial use.



### 4 Inner and outer glass layers pressed together and fired

Two layers of glass are laid up together per windshield and shaped according to vehicle specifications by heating them on a special mold. The heating elements (shown red in the picture) heat the glass to around 600°C to enable mold-based forming. This step consumes about 70% of all the energy used in the complete process. Asahi Glass is working on applying insulators to improve the efficiency of this heating process.



### 5 Plastic film inserted between two glass layers

After washing using plant-recycled water, a film is inserted between the curved glass layers. During a collision, this film prevents glass flying and helps to reduce passenger injuries. The film is made out of polyvinyl butyral (PVB). Excess film is removed by cutting. Film manufacturers recycle the white segment of this film and the colored segment is thermally recycled.



### 6 Two-step pressurization

The glass is put into rubber bags for an initial vacuum pressurization step designed to seal the units lightly. Next, the units are subjected to high pressure in an autoclave for about 30 minutes at a temperature of around 140°C. The initial pressurization step uses electric power; the main step is powered by electricity and LPG.



### 7 Any excess film cut off

After the main pressurization step, typically a few millimeters of film still protrudes from the units. This is cut off by machine. The shreds of cut film are thermally recycled.



### 8 Final visual inspection

Inspectors perform visual inspection checks of the final product. Defective parts are pulverized and the film is extracted for use as a thermal recycling material. The glass is re-used within the AGC Group in glass product manufacturing. Even the emery powder used to stamp the Asahi Glass logo on the product exterior and create other identifying marks is collected and recycled to make asphalt for road surfaces.





# Environmental Management System

The AGC Group is currently working on the development of an integrated EMS. Plans call for the completion of this process at the parent company by late 2004. AGC Group firms are also engaged in EMS construction to fortify environmental management.

## EMS Integration at Parent Company Due to Finish by Late 2004

EMS development continues across the AGC Group. All Asahi Glass parent company operating sites have adopted the ISO 14001 environmental management standard for benchmarking purposes. The aim of the current process is to unify and integrate the separate site systems into a single EMS under the head office system. Plans call for this to be completed by late 2004. This will bring the Asahi Glass headquarters and sales branches within the system and create an EMS that covers all parent company operations. The next stage will be to extend the newly integrated EMS to Asahi Glass subsidiaries and affiliates.

### AGC Group ISO 14001 Certification Status

Region/designation		Companies	Manufacturing sites	Certifications
Affiliates	Asahi Glass (parent)	1	9	10
	Japan	70	64	16
	Asia	43	27	11
	The Americas	29	24	4
	Europe	108	53	13
TOTAL		251	177	54

### New ISO1 4001 Certifications (FY2003)

Company name	Location	Site/department	Month achieved
Asahi Glass Engineering Co., Ltd.	Japan	Chiba Plant	Jun.
Automotive Glass Company (Japan/Asia Pacific)	Japan	Design/Development	Oct.
Takahashi Glass Industry Co., Ltd.	Japan	Tochigi site	Oct.
Asahi Techno Vision (S) Pte. Ltd.	Singapore		Dec.
Asahi TV-Glass Pte. Ltd.	Singapore		Dec.
Precision Molds Singapore Pte. Ltd.	Singapore		Dec.
Bor Glassworks	Russia		Nov.
Glaverbel France S.A.	France	Donchery Plant	Apr.
	France	Boussois Plant	Dec.
Actotec U.K. Ltd.	U.K.	Northampton	Dec.
Glaverbel Italy S.R.L.	Italy	Salerno	Dec.

## Environmental Audits Shift to Single Company Focus

Since 1994, the Corporate Environment & Safety Directorate has organized site environmental audits across Asahi Glass. These audits assess the status of environmental activities, check PDCA cycle effectiveness, and institute corrective measures if any faults are found. With the shift to an In-House Company system, since 2003 the audits have focused on entire companies or SBUs\*, which now audit their own sites and affiliates.

### Affiliate Environmental Audits by Group Corporate Environment & Safety (FY2003)

Audited company	Location
Asahi Fiber Glass Co., Ltd.	Japan
P.T. Asahimas Chemical	Indonesia
Optrex Electronics (Zhangjia) Co., Ltd.	China



Chemicals Company Audit of Asahi Glass Fluoropolymers (U.S.)

## Intensive EMS Training Commences

Asahi Glass has commenced an intensive training schedule as part of the development of an integrated EMS. In addition, to promote environmental communication, Asahi Glass organized the AGC Group Environmental Forum at which external lecturers gave talks

and successful Group EMS case studies were discussed. In-House Companies and sites are also organizing training on specific environmental matters.

### Asahi Glass and AGC Group Personnel Training (Group Corporate Environment & Safety)

Training subject	Participants
Introduction of integrated EMS	74
AGC Group Environmental Forum	94
Industrial safety seminar	35

\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.



# Environmental Accounting

Environmental accounting is a tool for evaluating quantitatively the costs and benefits of environmental conservation measures. Asahi Glass uses data generated in this way to improve environmentally aware management. In fiscal 2003, Asahi Glass also sought the professional opinion of the Center for Environmental Information Science on its environmental accounting data.

## Divisional Environmental Accounting Starting in FY2004

Asahi Glass views accurate assessment of the costs and benefits of environmental measures as an essential part of improving performance in this area. The Asahi Glass environmental accounting system is based on guidelines about cost classification structures and related matters issued by the Japanese Ministry of the Environment. Asahi Glass has also compiled its own manual on environmental accounting procedures and methods. Accounting data is collected for each In-House Company and SBUs\*1 to ensure its utility as a management tool. The compilation of data by division began in 2003. Asahi Glass is also considering the introduction of material flow cost accounting\*2 methods.

While the Asahi Glass environmental accounting system is still evolving, a working group is examining the issue of compiling consolidated environmental accounts. Asahi Glass plans to continue developing its environmental accounting system to upgrade environmental management practices.

Scope of accounts:

Asahi Glass (parent)

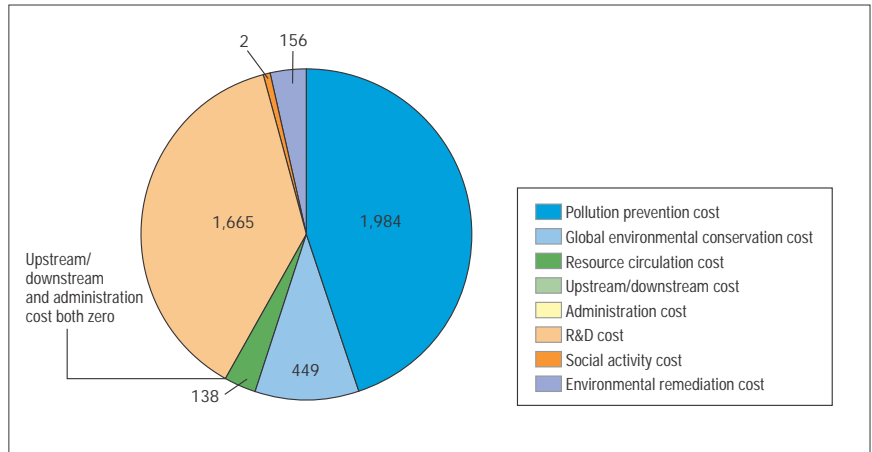
Period covered by data:

April 1, 2003 - December 31, 2003

(9 months due to change in year-end)

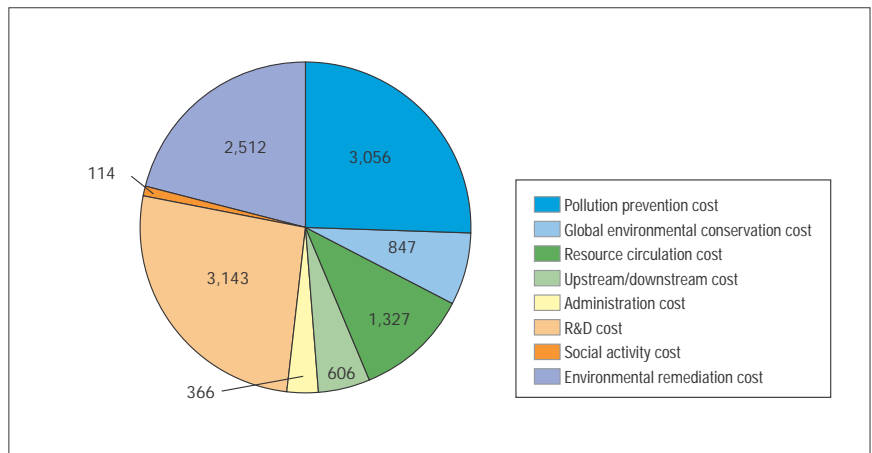
Breakdown of Investment (FY2003)

(Millions of yen)

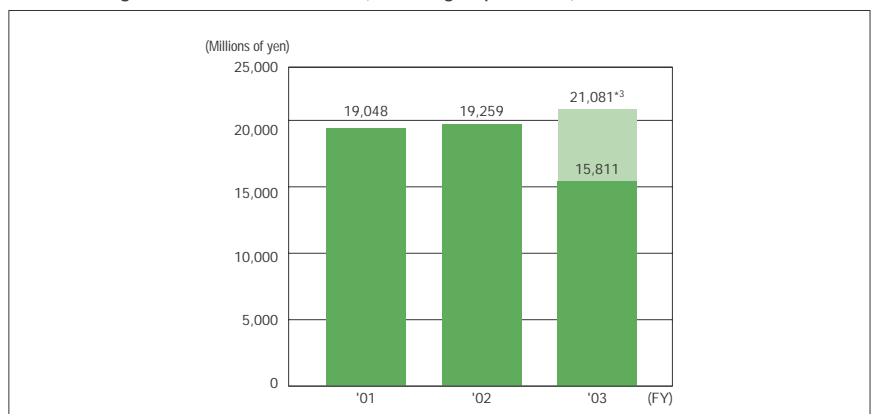


Breakdown of Cost (FY2003)

(Millions of yen)



Annual Change in Investments and Cost (Excluding Depreciation)



\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.

\*2 Material flow cost accounting is a way of measuring how the flow of materials and energy absorbed by manufacturing processes generates outputs in terms of product volume and value.

\*3 The light green portion of the chart shows the total annualized 12-month costs for FY2003, which was a 9-month period, based on extrapolation.

## Environmental Conservation Cost

Environmental conservation costs put a monetary value on efforts by Asahi Glass to reduce environmental impact. Such measures can prevent, constrain or avoid the generation of the original impact, eliminate the related effect, or seek to restore any damage. Costs include capital investments in environmental facilities as well as running expenses incurred in the operation of equipment designed to prevent pollution. After the shorter 9-month period has been corrected for an annualized basis, environmental conservation cost increased in fiscal 2003 in terms of R&D cost related to environment and energy projects, but were largely unchanged from fiscal 2002 in other respects.

Environmental Conservation Cost

(Millions of yen)

Cost category	FY2001		FY2002		FY2003*1	
	Investment	Cost	Investment	Cost	Investment	Cost
Business area	5,923	6,163	3,721	7,287	2,571	5,230
Break down						
Pollution prevention	3,436	4,008	2,584	4,628	1,984	3,056
Global environmental conservation	1,999	531	1,009	1,038	449	847
Resource circulation	489	1,625	127	1,621	138	1,327
Upstream/downstream	0	566	0	1,276	0	606
Administration	5	616	0	592	0	366
R&D	966	2,999	796	3,554	1,665	3,143
Social activity	0	132	0	111	2	114
Environmental remediation	0	2,895	1,824	1,738	156	2,512
<b>TOTAL</b>	<b>6,894</b>	<b>13,371</b>	<b>6,341</b>	<b>14,558</b>	<b>4,394</b>	<b>11,971</b>
Depreciation portion		1,219		2,222		1,116

## Environmental Conservation Benefit

Environmental conservation benefits measure volume-based changes in outputs. These effects reflect prevention, constraint or avoidance of impact generation, elimination of related effects, or damage restoration. In fiscal 2003, the cessation of chemicals operations at the Kitakyushu Plant significantly reduced water input and wastewater output volumes. On the other hand, reduced recycling of sludge into asphalt raw materials led to an increase in the volume of waste sent to landfill.

Environmental Conservation Benefit (FY2003)

		Impact reduction	Simple YoY change	Sales-corrected change	
Benefit corresponding to business area cost	Operating input reduction benefit	Energy usage	12.2PJ	29%	7%
		Water usage	71 million m <sup>3</sup>	77%	70%
	Benefit from reduced impact of emissions or waste	CO <sub>2</sub> emission	592,000 tons	26%	3%
		NO <sub>x</sub> emission	2,110 tons	38%	19%
		SO <sub>x</sub> emission	238 tons	38%	18%
		Soot and dust emission	84 tons	42%	23%
		Wastewater	70 million m <sup>3</sup>	80%	73%
		COD	402 tons	36%	16%
		Waste sent to landfill	1,000 tons	14%	-12%
Benefit corresponding to upstream/downstream cost	Recycling of product shipment packing materials	(actual benefit listed in table below)			
	Cullet collection	180,000 tons			
Other environmental conservation benefit	Benefit associated with transport and other operations (not measured by Asahi Glass)				

$$\text{Environmental impact reduction} = (\text{FY2002 output volume}) - (\text{FY2003 output volume})$$

$$\text{Sales correction factor} = \frac{1 - (1 - \text{simple YoY change})}{(\text{YoY sales ratio})}$$

$$\text{Asahi Glass (parent) YoY sales ratio} = \frac{\text{FY2003 sales}}{\text{FY2002 sales}} = 0.762$$

## Environmental Conservation Economic Benefit

Asahi Glass measures the economic benefit of environmental conservation measures as the contribution to profit of net positive changes. This could be measured either in real, quantitative terms, or as a theoretical estimate. Asahi Glass prefers the former approach, based on collected data. After correcting for the shorter 9-month period, the net economic benefit in fiscal 2003 was not significantly different to that recorded in fiscal 2002.

Environmental Conservation Economic Benefit (Actual benefit)

(Millions of yen)

Nature of benefit		FY2001	FY2002	FY2003*1
Revenue	Revenues from recycling	605	493	304
Expense savings	Effect of energy savings	933	1,400	1,241
	Lower waste treatment cost	2,042	1,645	992
<b>TOTAL</b>		<b>3,580</b>	<b>3,538</b>	<b>2,537</b>

\*1 FY2003 data only reflect a 9-month period.

# Analysis of Asahi Glass Environmental Accounting

Assistant Division Chief, Research Division **Yasushi Ishimaru**  
Center for Environmental Information Science<sup>\*1</sup>



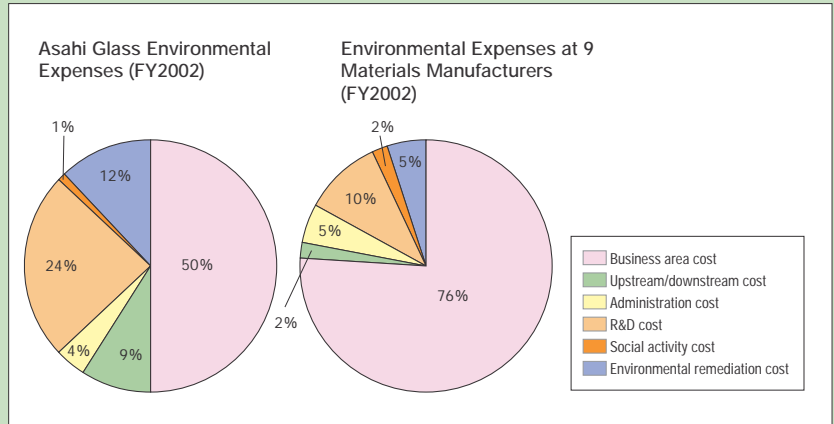
Many Japanese companies have adopted environmental accounting since the publication of Environment Ministry guidelines. The following independent analysis of Asahi Glass' performance is provided by courtesy of the Center for Environmental Information Science.

## What Does the Asahi Glass Environmental Accounting Data Reveal?

To gauge the performance of Asahi Glass, I compared its fiscal 2002 environmental accounting data with that for nine Japanese firms from the materials sector, which includes glass, chemicals and steel manufacturers.

The average distribution of environmental costs are compared here without giving considerations to its effects.

The proportion of environmental costs attributed to site operations was much less at Asahi Glass than the average for the nine peer firms. Moreover, Asahi Glass spent 24% of total cost on environmental R&D, whereas the nine firms spent 10% on average.



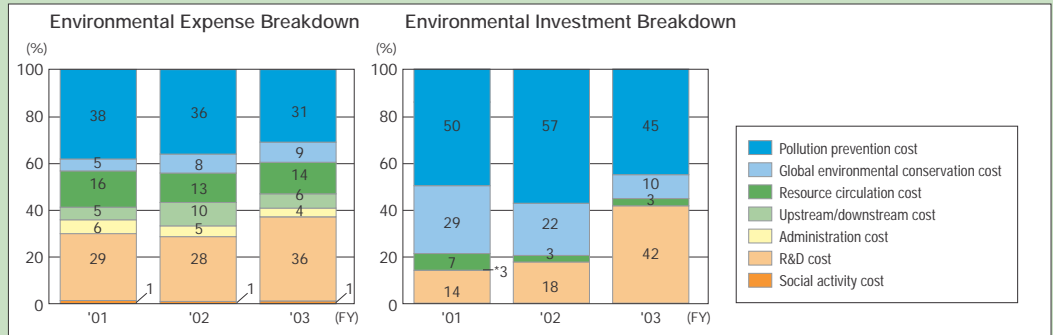
## What Does Asahi Glass Environmental Accounting Data Say About the Company's Policy?

I examined Asahi Glass' environmental policies in light of the environmental conservation costs for FY2001-3<sup>\*2</sup>. The graph of the environmental expenses breakdown over the three-year period shows only small fluctuations.

On the other hand the investment breakdown graph clearly shows a reduction in global conservation cost, while R&D investments rise significantly.

This shows that Asahi Glass has been shifting its

main efforts to environment-focused R&D investments from energy conservation and greenhouse-gas emission reduction.



<sup>\*2</sup> Environmental remediation cost was excluded from the analysis because classification methods differ between years for cost and investments in this cost category.

<sup>\*3</sup> Administration cost represented 0.1% of investment in FY2001; upstream/downstream investment cost was zero in all three years studied.

## Expectations of Asahi Glass Environmental Accounting

Asahi Glass has been compiling environmental accounting data since fiscal 2001. One difficulty is a cost-benefit analysis. This is a general problem in environmental accounting not limited to Asahi Glass. Since the company's management is well committed to the environment, I hope that Asahi Glass will continue to develop accounting techniques

not bound to conventions and also search for other management tools to evaluate environmental activities.

<sup>\*1</sup> Center for Environmental Information Science (CEIS)

Established in 1972. Since 1977, approved by the Ministry of the Environment as a non-profit foundation, CEIS has undertaken educational activities to raise awareness for environmental science. CEIS also takes contract researches in the field. Its main activities are:

Publication of Environmental Information Science, organization of symposia and seminars, acquisition and analysis of environmental science information, contract environmental science research, independent research guided by expert committees and in collaboration with overseas research institutions and international bodies.

## Soil Decontamination Programs

Asahi Glass and AGC Group subsidiaries in Japan and overseas voluntarily conduct internal surveys to assess the pollution status of soil and groundwater at sites operated and owned by Asahi Glass. Appropriate decontamination measures are taken in line with local government orders at any polluted sites. Asahi Glass also discloses information on the progress of such programs on its website.

### Progress on Soil and Groundwater Decontamination Program at Chiba Plant Site

In compliance with local government requests, Asahi Glass and affiliate Asahi-Penn Chemical Company have jointly conducted feasibility studies for permanent soil and groundwater decontamination programs at the Chiba Plant site aimed at preventing the further spread of pollutants. The final results of the site study were presented on March 27, 2003, based on the findings of the technical committee, which included outside

experts. The clean-up program already under way continued from April 2003 with a combined water-pumping and gas extraction operation to remove pollution from the upper strata of the No.1 aquifer. Separately, a decision was taken to repair observation wells after a second survey ordered by the overseeing committee failed to confirm the presence of any pollution in excess of legal limits within the strata of the No.3 aquifer.

Furthermore, groundwater level monitoring results conducted in pumping wells after pumping operations had finished established the effectiveness of the impervious wall that was constructed to prevent any pollution from leaking out. Further details are available on the Asahi Glass website.

URL <http://www.agc.co.jp/environment>  
(Japanese only)

### Soil and Groundwater Decontamination Program at Seimi Chemical

Seimi Chemical Co., Ltd., an Asahi Glass affiliate, voluntarily undertook site surveys of its Chigasaki Plant in December 2002 and April 2003 to determine the presence of soil or groundwater pollution. The survey results showed concentrations of arsenic and volatile organic compounds (VOCs) above legal limits in soil and groundwater.

#### 1. Survey results

A survey in December 2002 that examined surface groundwater samples at seven site locations found concentrations of arsenic in excess of the legal limit of 0.01mg/ℓ at five locations. The highest concentration detected was 13.8mg/ℓ, or 1,380 times the legal limit. Surveys of downstream-flowing groundwater at these seven locations plus two deeper locations near the site boundary took place in April 2003. Of these nine locations, five reported illegal arsenic levels, the highest being 3.08mg/ℓ, or 308 times the legal limit. Illegal VOC concentrations were

detected at one location.

#### 2. Pollution cause

Seimi Chemical manufactured an arsenic compound for use in the sorting of tin ore suspensions between 1966 and 1978. Process-related leaks during that period are believed to have caused the pollution. The firm no longer uses arsenic in any manufacturing process. VOCs also played a role in some production processes in the past. Associated leakage is presumed to be the reason, although no clear cause-and-effect relationship has been established. Although Seimi Chemical still uses small quantities of VOCs today, strict measures are in place to prevent further soil or groundwater pollution.

#### 3. Decontamination measures

Complying with local council regulations, Seimi Chemical submitted a detailed soil and groundwater pollution survey proposal. The surface soil survey was completed in October 2003, and borehole surveys for the whole site

were finished in December 2003. The clean-up program has been started. Plans call for an accelerated program of decontamination measures. Further details are available on the Seimi Chemical website.

URL <http://www.seimichemical.co.jp>  
(Japanese only)



Groundwater decontamination pumping equipment installed at Chigasaki Plant site

### Dismantling and Removal at Funabashi Plant Site

Following the cessation of operations at the Funabashi Plant in December 2003, dismantling and removal of buildings and production equipment began in April 2004. This process

is due to finish in December 2004. Asahi Glass plans to conduct a soil survey at the cleared site in compliance with Japanese soil pollution legislation.

# Green Procurement and Green Purchasing

Depending on business characteristics, AGC Group is actively pursuing green procurement policies for materials and components. In FY 2003, the parent company led a new green purchasing initiative, establishing standards for the purchase of eco-friendly office supplies and other items.

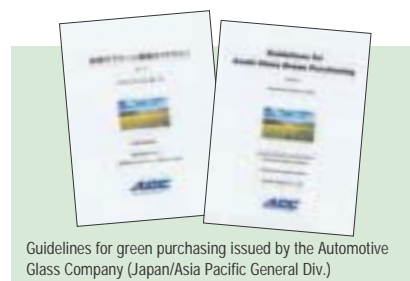
## Automotive Glass Company Promotes Online Environmental Impact Surveys

The Japan/Asia Pacific General Div. of the Automotive Glass Company seeks to supply customers with eco-friendly products that contain reduced amounts of resources, have a lower environmental impact, and are more recyclable. This drive requires examination of the environmental impact of products at all stages, from development and production to use and disposal.

In fiscal 2002, to make these activities more

effective, the Automotive Glass Company compiled green procurement guidelines for purchased materials and outsourced operations in collaboration with the Asahi Glass Purchase & Logistics Center. Presentations were held to explain the new policy. Activities in fiscal 2003 included the publication of revised guidelines for green purchasing in October 2003, a review of regulated chemicals in use, and a move to conduct environ-

mental impact surveys online.

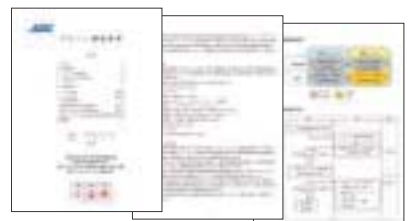


Guidelines for green purchasing issued by the Automotive Glass Company (Japan/Asia Pacific General Div.)

## Electronic Materials & Products General Division Introduces Green Procurement Standards

The Electronic Materials and Products General Division introduced green procurement standards in April 2004. Along with three affiliated firms (Asahi Glass Koriyama Electrical Materials Co., Ltd., Asahi Fine Materials Co., Ltd. and Asahi Precision Circuit Co., Ltd.), the division is seeking the cooperation of suppliers on the application of

these standards, which aim to specify clearly the environmental impact of substances contained in all supplied materials. The overall aim is to reduce environmental impact through proper management of such standards.



Green procurement standards (Electronic Materials and Products General Div.)

## Planned Elimination of Six RoHS-Designated Chemicals by March 2005 (Optrex Corporation)

To comply with the EU RoHS directive<sup>\*1</sup>, Optrex is taking action on six designated chemical substances<sup>\*2</sup> contained in LCD products that it manufactures and sells. Plans call for the total elimination<sup>\*3</sup> of these substances by March 2005. With lead solder,

Optrex aims to eliminate its use and replace it with lead-free solder in all products made in Japan (including procured items) by December 2004, and on all products made overseas (including procured items) by March 2005. Optrex has consistently promoted less

use of products with high environmental impact. It adopted green procurement guidelines in September 2003, and continues to examine ways to make its products more eco-friendly.

## Green Purchasing Guidelines for Office Items

The AGC Group is introducing green purchasing guidelines for office items. These add environmental impact to selection criteria such as price, quality, function and design. The guidelines accord highest priority to items with the lowest environmental impact, given equality on other criteria.

The AGC Group introduced green purchasing guidelines in fiscal 2003, which initially applied to purchases of printing and copy paper and other office supplies by the parent

company. To qualify as eco-friendly items, products must be certified as compliant with green purchasing legislation, be listed on the Green Purchasing Network database, or have at least one recognized Japanese eco-label such as the Eco Mark (products useful for environmental protection permitted by Japan Environment Association) or the Green Mark (recycled paper products). Asahi Glass plans to extend this policy gradually to the entire AGC Group.

### Green Purchasing Results and Targets

Items affected	Green purchasing criteria	FY2003 results (purchase value base)	FY2004 target (purchase value base)
Printing and copy paper	Copy paper: 100% recycled, 70% white content	72%	80%
	Other paper: Any eco-friendly grade		
Office equipment (PCs, copiers, printers, fax machines)	Choose eco-friendly items in catalogs	97%	100%
Office supplies		68%	80%
Office furniture (chairs, desks, shelves, etc.)		97%	100%

\*1 RoHS (Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment) directive (2002/95/EC) issued by the EU in 2002 limits the use of six designated chemical substances in all such products launched in EU countries from July 2006.

\*2 The six designated chemical substances are: Lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyl) and PBDE (polybrominated diphenyl ether)

\*3 Excluding applications listed in RoHS directive annex or items that fall within regulatory limits.



# Energy Conservation and Global Warming Countermeasures

The AGC Group recognizes that, as a member of the materials industry, it consumes large amounts of energy and resources. Led by the Environmental Committee, which is headed by the GM of the Corporate Environment & Safety Directorate, Asahi Glass is focusing intently on reducing the environmental impact of the AGC Group through a combination of energy conservation efforts and measures to cut emissions of CO<sub>2</sub> and other greenhouse gases.

## Reductions in Energy Consumption and CO<sub>2</sub> Emissions

Total energy consumption at Asahi Glass in fiscal 2003 on an annualized basis\*<sup>1</sup> was down year on year, due to the cessation of operations at the Funabashi Plant and furnace repair work at the Takasago Plant.

On aggregate, AGC Group plants in 23 countries worldwide consume about three times the total energy of the parent company plants in Japan. Global warming prevention programs are under way overseas via measures such as the application of the total oxygen combustion method (see P59) in Indonesia and Thailand, and the modification of glass melting furnaces in Europe, North America, Thailand and Indonesia to use natural gas.

Glass melting furnace conversion for total oxygen combustion significantly reduces CO<sub>2</sub> emissions. Besides promoting this shift, Asahi Glass is also using new high-performance ion-exchange membrane technology to cut emissions from salt electrolysis operations. Production lines continue to implement separate measures to cut emissions further.

On an annualized basis, total CO<sub>2</sub> emissions

by the parent company in fiscal 2003 were 35% below the FY1990 level, in part due to facility stoppages and closures. Emissions per unit of sales were also lower than in fiscal 2002. Asahi Glass expects total energy consumption and CO<sub>2</sub> emissions to increase gradually in fiscal 2004 and beyond due to projected increases in production.

\*1 The data required correction because fiscal 2003 was an irregular 9-month period due to a change in accounting year-end.

## Reductions in Emissions of Other Greenhouse Gases

Of the six greenhouse gases (GHGs) listed in the Kyoto Protocol (CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), HFCs, SF<sub>6</sub>, and PFCs), Asahi Glass produces two, HFC and SF<sub>6</sub>. Asahi Glass has instituted strict operating procedures and invested in capital equipment to prevent the atmospheric emission or accidental release of these gases. Asahi Glass has reduced emissions of these gases\*<sup>2</sup> to levels that easily meet emission targets for fiscal 2010 set in a voluntary reduction plan by a Japanese industry association. Emission levels continue to trend downward.

Asahi Glass has also commenced the operational introduction of fluorinated solvents with lower global warming potential\*<sup>3</sup> as commercial HFC substitutes. Moreover, since 1997

Asahi Glass has been engaged in the destruction and recycling of used fluorocarbons.

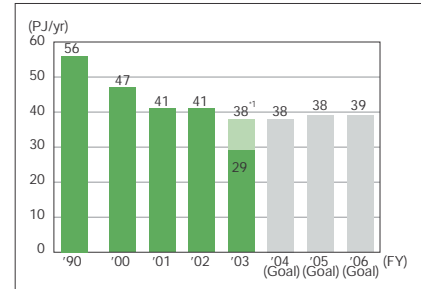
\*2 Emissions of HFCs are measured as ratios calculated as the volume of emissions (in kg) divided by production volumes of the gas (in tons); in the case of HFC-23, production volumes of HCFC-22 are used as the denominator.

\*3 Global warming potential (GWP) measures the estimated greenhouse effect of a GHG relative to carbon dioxide (= 1). HFCs have GWPs ranging from 140 to 11,700, while SF<sub>6</sub> has a GWP of 23,900.

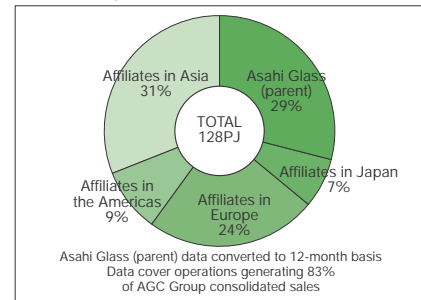
### Comparison of Other GHG Emissions (in terms of production-based emission ratios)

Name	Reduction at Asahi Glass (FY2003 vs. FY1995)	Industry reduction goal (FY2010 vs. FY1995)
HFC-23	-94%	-70%
Other HFCs	-73%	-14%
SF <sub>6</sub>	-93%	-75%

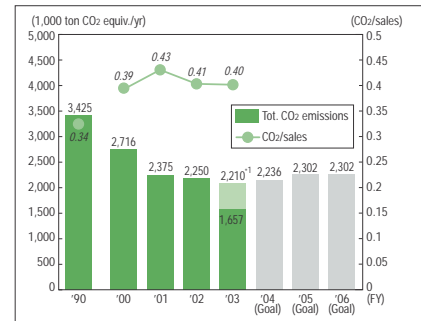
Asahi Glass: Total Energy Consumption (Parent)



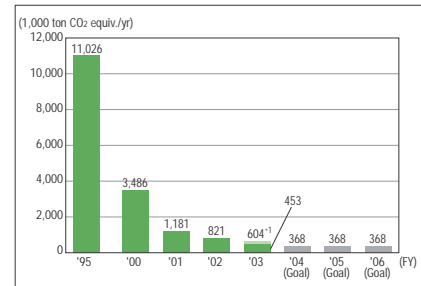
Total Energy Consumption in FY2003 (AGC Group)



Asahi Glass: CO<sub>2</sub> Emissions (Parent)



Asahi Glass: Fluorinated GHG Emissions (Parent)



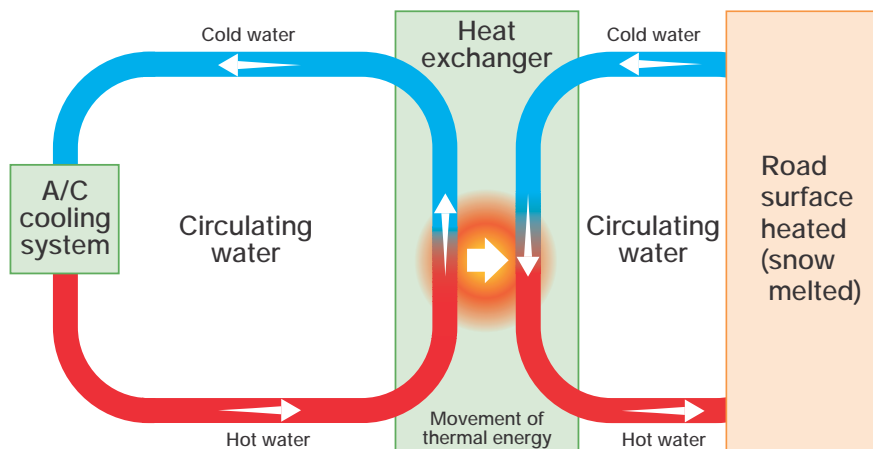
# Focus on Global Warming Prevention

## Award From Tohoku Bureau of Economy, Trade and Industry (Asahi Glass Fine Techno Co., Ltd.)

Asahi Glass Fine Techno has made steady progress in introducing energy-saving measures into production processes alongside greater efficiencies in the operation of utilities such as compressed air and industrial water. In addition, tackling the problem of its location in a region that receives heavy annual snowfall, the company has devised a method to recycle surplus heat to melt snow, thereby contributing to further energy savings.

These measures have enabled the firm to achieve a reduction in power consumption per unit of output of 30% in the four-year period FY1999-2002. The company's efforts were recognized in February 2004 with an award from the Tohoku Bureau of Economy, Trade and Industry. Efforts by all the company's employees continue to conserve energy.

Winter Road-Heating Energy Conservation Scheme



The company is located in a region that receives heavy annual snowfall. The company designed a scheme that heats the road surface around the loading areas using electricity generated by surplus heat from cooling stacks in the air conditioning and refrigeration systems without increasing electricity consumption.



The heating system under the road melts the snow

## Efficiency Boost by Heat-Exchange Refractories (Aichi Plant)

The Aichi Plant, which makes both automotive and flat glass, has set its own energy conservation targets. The results of energy-saving programs in fiscal 2003 are shown in the table on the right.

In fiscal 2002, the plant had a cold repair of its melting furnace for flat glass. The repair included major modifications to the regenerator, in which the refractories were altered and converted to a more highly efficient cross-shaped arrangement that boosted both the

heat exchange and retention functions for the secondary air intake. This renewal of the composition and arrangement of the refractories helped to raise combustion efficiency, resulting in energy savings.

Energy Consumption Targets and Results (Aichi Plant)

	FY2003	
	Target	Result
Automotive glass	8% lower than FY2000	8.7% lower
Flat glass	10% lower after FY2002 cold repair	11.6% lower

## Entry into Fluorocarbon Destruction Business (Chiba Plant)

With the aim of preventing global warming and protecting the ozone layer, Asahi Glass is developing a destruction business for SF<sub>6</sub> and fluorinated hydrocarbons (including CFCs, HCFCs and HFCs). Since 1997, the Chiba Plant has accepted orders from customers to collect and dispose of batches of such substances on a contract basis. As part of the service, Asahi Glass issues a certificate as proof of final disposal.

For the decomposition process, Asahi Glass employs the liquid injection method prescribed by the United Nations Environment Programme (UNEP). This involves the incineration of ozone-depleting substances in liquid or gas form with fuel in a thermal decomposition furnace at over 1,000°C. In the year ended March 2004, the Chiba Plant disposed of 123 tons of CFCs by this method. The plant has an annual processing capacity of

1,000 tons, and plans call for processing at least 200 tons in fiscal 2004. From fiscal 2005, Asahi Glass intends to develop the business further by recycling the decomposed fluorocarbons into fluorspar and hydrogen fluoride, a raw material for fluorinated resins.

# Protection of Water Resources and the Atmosphere

Asahi Glass continues to invest in equipment and manufacturing process modifications to cut emissions of atmospheric pollutants. Moreover, conscious of its large consumption of water, Asahi Glass recycles cooled water inside manufacturing facilities and removes hazardous substances from emitted wastewater. These efforts aim to protect water resources and prevent any degradation in water quality.

## Reductions in Atmospheric Pollutants

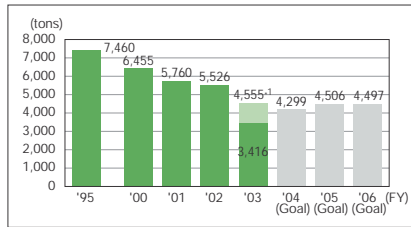
In compliance with laws aimed at preventing atmospheric pollution, Asahi Glass facilities have signed anti-pollution agreements with local authorities that commit Asahi Glass to reduce emissions of NOx (nitrogen oxide), SOx (sulfur oxide) and soot and dust. Asahi Glass has invested in specific equipment to remove pollutants, including electric precipi-

tator, denitrification equipment (NOx) and desulfurization equipment (SOx). Some glass melting furnaces have also been converted to total oxygen combustion operation, which substantially reduces NOx and SOx emissions at source.

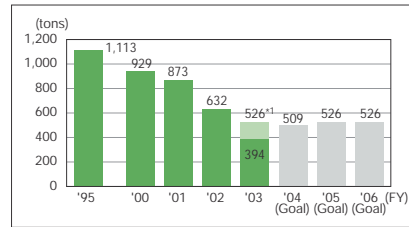
NOx emissions by Asahi Glass in fiscal 2003 fell substantially year on year, even on an

annualized basis<sup>\*1</sup>, due in part to repairs at the Takasago Plant. SOx and soot and dust emissions also fell as the Kitakyushu Plant ceased producing chemicals. Asahi Glass expects emissions to rise slowly in fiscal 2004 and beyond in line with projected increases in production.

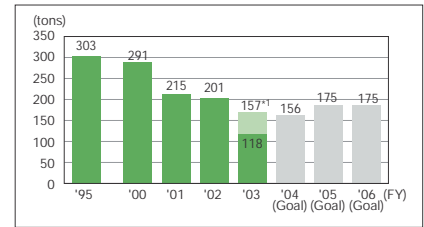
Asahi Glass: NOx Emission Volumes (Parent)



Asahi Glass: SOx Emission Volumes (Parent)



Asahi Glass: Soot and Dust Emission Volumes (Parent)



## Protection of Water Resources and Prevention of Water Quality Degradation

While it uses copious amounts of water in production, both as a raw material and for cooling and cleaning purposes, Asahi Glass strives to reduce water usage and emissions to protect water resources. In fiscal 2003, cessation of chemicals production at the Kitakyushu Plant contributed to a substantial

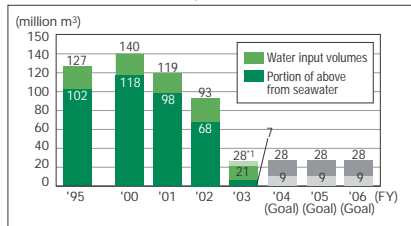
reduction in water consumption and wastewater emissions.

Internal water conservation programs based on repeated recycling of cooling water, mainly at glass manufacturing facilities, also play a role at Asahi Glass in protecting valuable water resources. Recycled water vol-

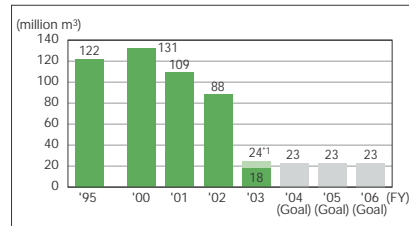
umes at Asahi Glass (parent) in fiscal 2003 totaled 150 million m<sup>3</sup>, more than ten times the volume of water input.

Asahi Glass also processes used water properly to ensure quality is not compromised by the presence of any harmful effluents in wastewater emissions.

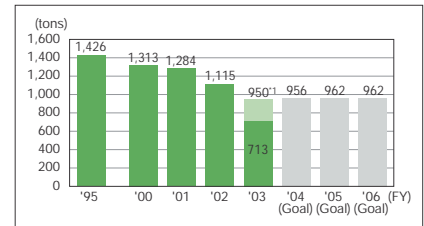
Asahi Glass: Water Input Volumes (Parent)



Asahi Glass: Water Emission Volumes (Parent)



Asahi Glass: COD<sup>\*2</sup> Emission Volumes (Parent)



\*1 The data required correction because fiscal 2003 was an irregular 9-month period due to a change in accounting year-end.

\*2 COD (Chemical Oxygen Demand) measures the equivalent amount of oxygen required to oxidize organic substances in the water. It provides a measure of the water quality in terms of the presence of organic pollutants.

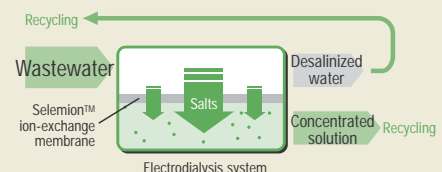
## Wastewater Recycling System Business

Asahi Glass Engineering Co., Ltd. sells recycling systems for wastewater based on the Selemion™ ion-exchange membrane technology developed by Asahi Glass. The membrane separates out salts (such as sodium chloride and nitrate) from wastewater, creating a desalinated water stream and a concentrated salt

solution. Both of these can be recycled. This system can help reduce wastewater emissions substantially, making it particularly effective in dry regions where water is scarce.

URL <http://www.agec.co.jp/>

### Wastewater Recycling Schematic



# Focus on Protection of Water Resources and the Atmosphere

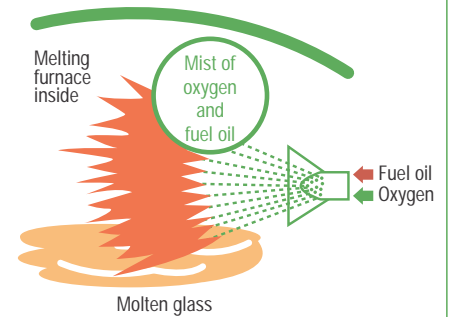
## Oxygen Combustion Method (Flat Glass Company, Keihin Plant)

In 2001, the Flat Glass Company introduced the oxygen combustion process into the Keihin plant for the first time in Japan in manufacturing flat glass. This method replaces air in the furnace intake, which contains a lot of noncombustible nitrogen, with oxygen to improve combustion. A mist of fuel oil and oxygen is injected into the glass melting furnace through intake jets on both sides, resulting in uniform dispersion of a highly combustible mixture throughout the furnace (see diagram).

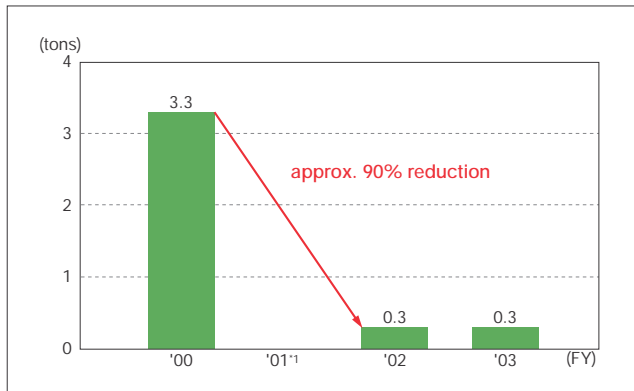
This method is highly effective in reducing emissions of NOx, SOx and soot and dust. In particular, the absence of nitrogen virtually eliminates NOx emissions.

In the first two years after its introduction at the Keihin Plant, the oxygen combustion technology has been proven to reduce environmental impact. Emissions of NOx, SOx and soot and dust per unit of glass production in 2002 and 2003 were approximately 90%, 70% and 70-80% lower, respectively, than corresponding emissions in 2000, prior to the furnace modifications. In addition, energy consumption and CO<sub>2</sub> emissions per unit of glass production have also been cut by approximately 30% over the same period.

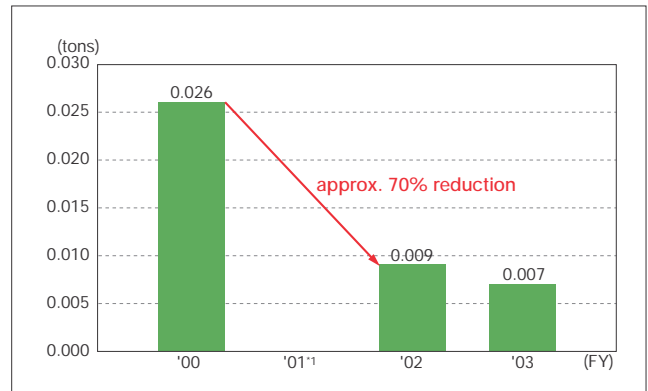
Oxygen Combustion Schematic



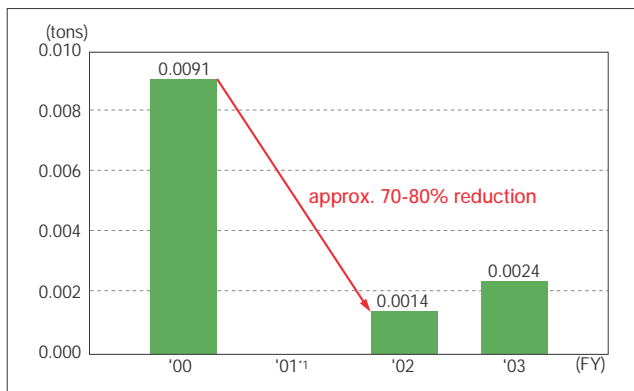
NOx Emissions Per Unit of Glass Production



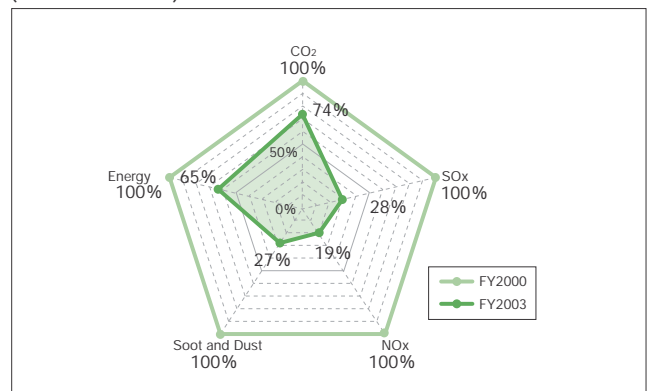
SOx Emissions Per Unit of Glass Production



Soot and Dust Emissions Per Unit of Glass Production



Emissions and Energy Consumption Per Unit of Glass Production (relative to FY2000)



\*1 No comparative data available for FY2001 due to repairs undertaken.

# Proper Management of Chemical Substances

The AGC Group manufactures and handles a wide variety of chemical substances. As part of efforts to improve local and global environments, Asahi Glass strives to manage chemical substances properly throughout product life cycles from development to disposal.

## Reducing Emissions of Substances Regulated by PRTR Law

Asahi Glass is working to reduce emissions of chemical substances regulated by the Pollutant Release and Transfer Register (PRTR) Law. These include chemicals such as chloroform and dichloromethane, which are widely used as raw materials and cleaning agents. Asahi Glass has also invested to upgrade internal incineration capacity for

volatile organic compounds (VOCs). Asahi Glass' emissions of chloroform and dichloromethane in the year ended March 2004 were 84% and 77% lower, respectively, than in the year ended March 1996.

Asahi Glass regularly monitors environmental concentrations in the vicinity of operating sites. Asahi Glass also formulates potential

countermeasures based on computer simulations designed to gauge potential exposure effects, depending on prevailing wind conditions, in the event of a site accident such as a chemical spill or leak.

## Chiba Plant Receives Responsible Care Audit

Responsible Care (RC) is a voluntary initiative by the chemical industry to safeguard the environment, health and safety through responsible management of chemical substances during development, manufacture, distribution, usage, final consumption and disposal. RC also entails a proactive communications stance to gain the trust of society. As demands for transparency and reliability rise, the industry has formulated a code of

RC standards and instituted a system of RC audits designed to provide objective evaluations of company and site performance.

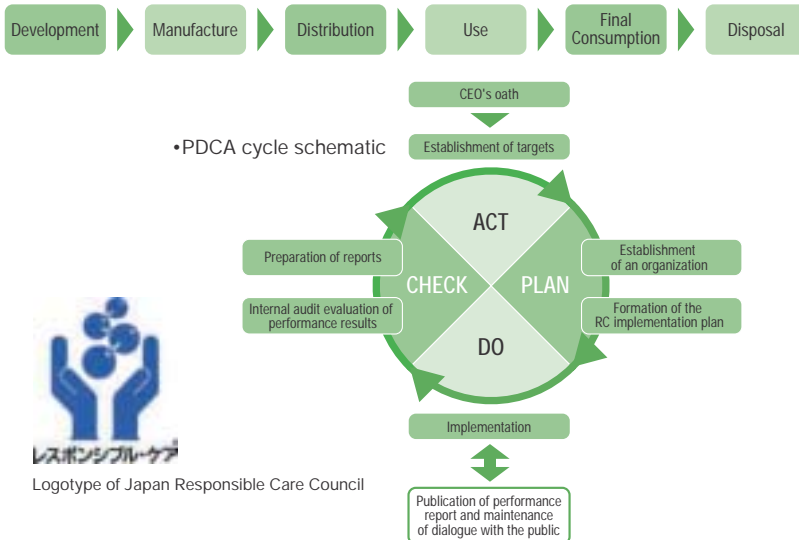
The code of RC standards specifies performance criteria in seven basic areas that provide benchmarks for any company undertaking RC activities. RC audits evaluate performance against such standards, providing a compliance status level for the various aspects of RC activities.

On November 21, 2003, the Chiba Plant was selected for an RC audit on two of the seven codes relating to occupational health and safety (OH&S) and social dialog. The audit provided a detailed analysis of the plant's strengths and weaknesses in both these areas. This information is helping Asahi Glass to improve its RC activities.

### Responsible Care (RC)

#### Execution of RC Activities

All companies that are members of the Japan Responsible Care Council (JRCC) undertake to abide by the performance standards and guidelines drawn up by the JRCC to govern RC activities, which are fundamentally based on the PDCA (Plan-Do-Check-Act) cycle. Member companies are also obligated to issue annual reports of their RC activity plans and results to the JRCC.



Source: *Do You Know Responsible Care?* (pamphlet issued by JRCC)



Official report following RC audit (November 2003)



## Tighter Legal and Regulatory Compliance

The Chemicals Company devotes resources to updating information and databases on regulations and laws governing chemical substances as part of its efforts to ensure full compliance. Internal rules have mandated the

sharing of this information with all affiliated firms since October 2003. Feedback stemming from the latest information also plays a key role in PDCA cycle-based management.

## Safety Evaluation of Chemical Substances in Use

The safety of many chemical substances currently being manufactured has not been fully evaluated. Asahi Glass is an original participant of the High Production Volume Chemicals Initiative organized by the International Council of Chemical Associations to compile safety data on chemical

substances in use. To date, Asahi Glass has committed to sponsoring the evaluation of 25 substances, of which 15 have been completed. Evaluation analyses are released into the public domain through UNEP, and are also published on the OECD website.

## Boosting Safety at Usage and Disposal Stages

Asahi Glass takes various measures to ensure the safety of chemical substances at the usage and disposal stages. Since 1992, Asahi Glass has compiled and distributed MSDS (Material Safety Data Sheets) that detail methods for the safe handling and disposal of specific chemical substances as well as data on environmental effects. An original MSDS issuance system for the benefit of customers operates via company LANs.

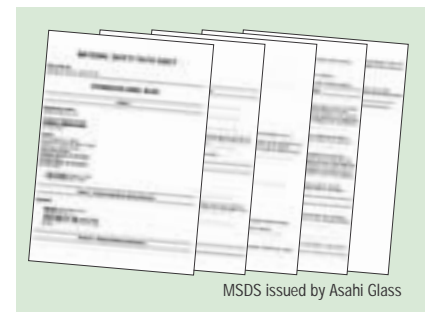
At the end of 2003, Asahi Glass started producing Japanese MSDS to a different interna-

tional standard, the JIS standard. This is a translation of the international standard for MSDS, ISO11014-1, which was originally formulated in 1994 (the JIS standard for MSDS, JIS Z 7250, was first adopted in 2000). Asahi

Glass also began publishing MSDS on its website in June 2004.

Issuance of MSDS by Chemicals Company (as of March 2004)

	published
In Japanese	1,409
In other languages	715



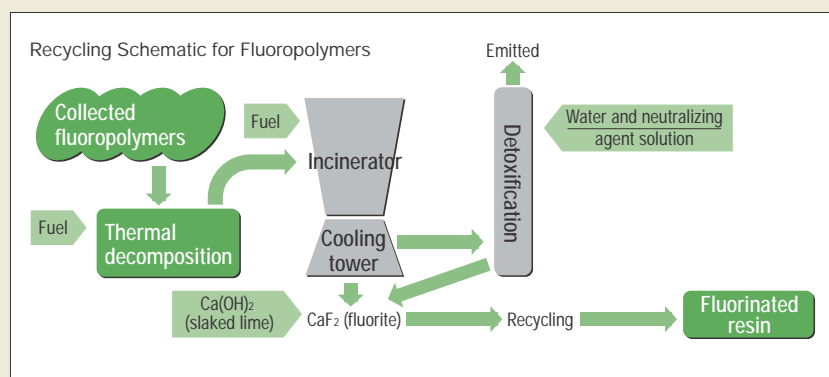
## Development of World's First Fluoropolymer Recycling Technology

In conjunction with Nittetsu Chemical Engineering Ltd., Asahi Glass has commercialized recycling technology for fluoropolymers, a world first. A recycling plant began operation on the Asahi Glass Chiba Plant site in June 2004. Plans involve recycling waste from internal production before expanding operations to process orders for batches collected from customers.

Fluoropolymers are used in protective sheaths for heat-resistant wiring, as materials in semiconductor production, and in electronic components. Recycling is technically difficult due to the mixture of gases produced by thermal decomposition. To date, fluoropolymers have typically ended up as industrial waste sent to landfill.

Fulfilling its responsibility as a manufacturer of these chemicals, Asahi Glass began work on fluoropolymer recycling methods in 2001. The successful development of materials for use in the thermal decomposi-

tion equipment finally unlocked the key to recycling these substances.

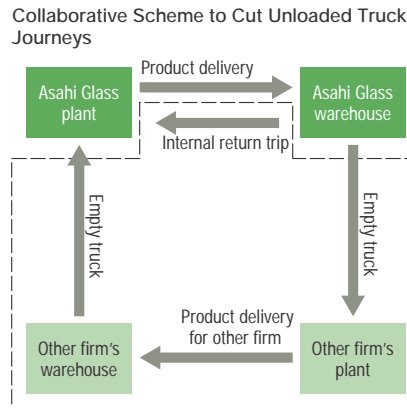


# Environmental Impact Reduction in Logistics

Asahi Glass' distribution operations tend to have a substantial environmental impact because of the weight and bulk of products such as glass, building materials and chemicals. Asahi Glass' distribution operations are working with customers and transportation firms to achieve consistent reductions in environmental impact and to prevent accidents.

## Distribution by Truck

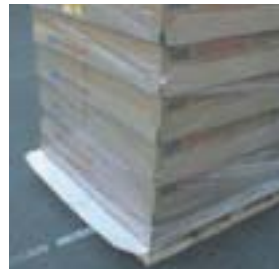
Asahi Glass typically contracts with a specialist road transportation firm for all deliveries by road where the distance exceeds 20km. The rationale for this rule is that the use of highways helps to minimize the impact of exhaust emissions near to ordinary roads. Asahi Glass is also working to lower environmental impact by reducing the number of journeys made by empty trucks through the promotion of return trips between company sites, together with collaborative efforts with other companies (see diagram).



Highways recommended for longer journeys

## Usage of Sheet Pallets for Storage and Transport

Seeking cooperation with customers, Asahi Glass is gradually switching from the wooden pallets previously used for shipments to distant destinations and countries with tight fumigation regulations on wood to sheet pallets. These pallets do not use wood resources and do not need to be fumigated. They are also expected to save space during transport and are lighter in weight. An additional benefit is a reduction in waste generated at the shipment destination.



Goods packed on top of sheet pallet



Carrying by forklift

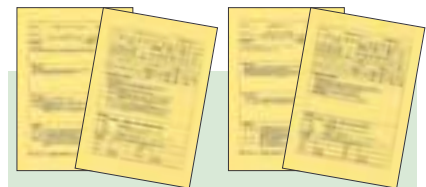


Format for container packing and delivery

## Safety Considerations in Chemicals Transport

Asahi Glass has adopted the Yellow Card system. The appropriate cards are carried for each delivery of chemicals, and provide instructions on what to do in emergencies, depending on the characteristics of different products. As of March 2004, Asahi Glass had

created Yellow Cards for 87 types of chemical. Asahi Glass also provides logistics personnel with training on these issues.



Yellow Cards distributed by Asahi Glass

## Prevention of Environmental Accidents

Besides safety programs at its own sites, Asahi Glass also implements measures to prevent spillages and other environmental accidents from occurring with chemicals while in transit inside contract shipping or during storage at warehouses and other facil-

ities. To help minimize damage in the event of any spillage, Asahi Glass ensures contractors provide periodic emergency-response training for employees, and takes steps to assess results.



Training drill at storage base



Training on board transport vessel

# Waste Reduction

The Asahi Glass Environmental Committee has set a goal of Zero Emission for the AGC Group in fiscal 2005. Waste reduction measures are the main method we use for achieving this goal. Asahi Glass In-House Companies and operating sites are engaged in activities such as recycling of packaging. Asahi Glass is also working to develop related technologies.

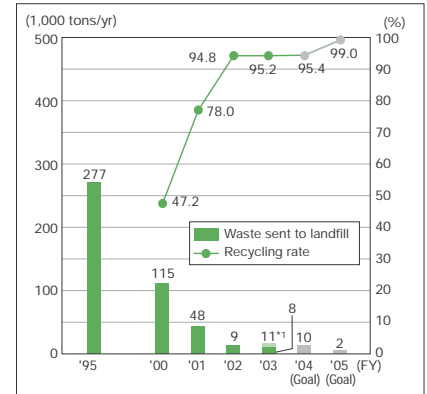
## Goal of Zero Emission in Fiscal 2005

In fiscal 2003, gross waste emissions by Asahi Glass (parent) totaled 168,000 tons. There were reductions in waste sent to landfill for final disposal as a result of recycling and waste emissions reduction activities involving ground glass sludge (Flat Glass Company), piece and sludge (Building Materials Division) and waste plastics (Research Center), among others. In contrast, less recycling of sludge into asphalt raw materials at the Display Company and Chemicals Company resulted in an increase in the volume of waste sent to landfill in fiscal 2003, of approximately 2,000 tons. The equivalent figure for the whole of Asahi Glass was 8,000 tons, which represented a year-on-year increase of 13% on an

annualized basis\*1. The overall recycling rate for the year was 95.2%.

Asahi Glass aims to achieve Zero Emission\*2 in fiscal 2005. In fiscal 2004, plans call for the Chemicals Company to begin sludge recycling activities at the Kashima Plant, as well as the Chiba Plant. Other initiatives include upgrading the value of recycling activities (production of raw materials rather than simple thermal recycling) and efforts to reduce waste emissions at source.

Asahi Glass: Recycling Rates and Volumes of Waste Sent to Landfill (Parent)



## Changes in Measurement of Wastes

The AGC Group defines waste in terms of "materials generated in normal manufacturing and other operations." The following changes in the internal measurement of waste were made in fiscal 2003.

### Additions to categories of waste measured:

General waste (paper and other office trash, etc.)  
Production in FY2003: 5,000 tons; sent to landfill: 180 tons

### Exclusions from waste measurement:

Waste generated in building construction  
Production in FY2003: 19,000 tons

### Recycling rate definition (in %):

1 - (waste sent to landfill / total industrial waste generated) x 100

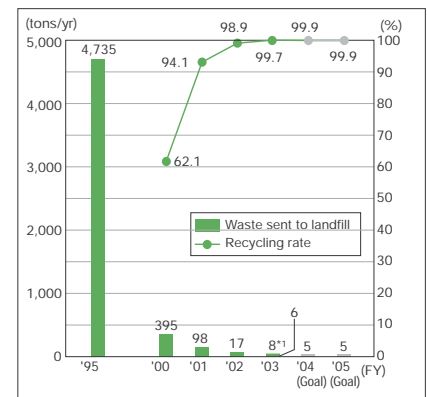
# Focus on Waste Reduction

## Zero Emission Activities (Kansai Plant)

The Kansai Plant has urged all employees to take part in waste reduction activities consistently since 2000. In addition to undertaking activities to reduce industrial waste, employees also focus on reducing volumes of general everyday trash. As a result, the recycling rate in fiscal 2003 rose to 99.7%, and the total volume of waste sent to landfill was 6 tons. The Kansai Plant received a special

award and commendation from the President & CEO for its contribution toward the achievement of Zero Emission by the AGC Group.

Asahi Glass Kansai Plant: Recycling Rates and Volumes of Waste Sent to Landfill



\*1 Data was annualized to correct for the irregular 9-month period of FY2003, caused by a change in accounting year-end.

\*2 Asahi Glass defines "Zero Emission" as achievement of a recycling rate for waste materials of over 99%.

## Recycling of Laminated Glass (Aichi Plant, Automotive Glass Company)

The Automotive Glass Company has developed a commercial recycling system for automotive glass over a number of years. Although automotive glass is not one of the items that will become subject to compulsory recycling once recycling legislation for cars is enacted in Japan in 2005, Asahi Glass has developed the system in view of its social responsibilities as a leading manufacturer of such products.

The laminated glass used in car windshields contains a thin film sandwiched between two sheets of glass. This film must be removed before the glass can be recycled. Another key aspect of recycling is to sort the pulverized glass into appropriately sized pieces.

The Aichi Plant is developing a special type of crushing machine capable of separating glass from the intermediate film layer for a suitable pulverized size. Furthermore, the plant has developed equipment for separating film or metallic impurities from automotive glass using techniques based on differences in specific gravity or magnetic properties. The plant is refining and upgrading the recycling technology through repeated testing and validation of this equipment, using both in-house-produced defective items and commercially collected glass.

## Recycling of CRT Glass (Takasago Plant)

The Takasago Plant began recycling CRT glass from post-use televisions in January 2001 after the enactment of Japanese legislation mandating recycling of major household appliances. The plant buys glass cullet from intermediate processing firms and recycles it into raw materials.

Mixed CRT glass cullet provides no clues as to the place or time of production, which means the composition is uncertain. A key step involves sorting the CRT glass depending on whether it is clear or gray-tinted. The fact that cullet samples of similar colors can have different compositions makes this process technically challenging. Volumes of cullet used are gradually rising despite the difficulties. Monthly usage volume targets in fiscal 2004 are 1,000 tons for panel glass (CRT front) and 800 tons for funnel glass (CRT rear).

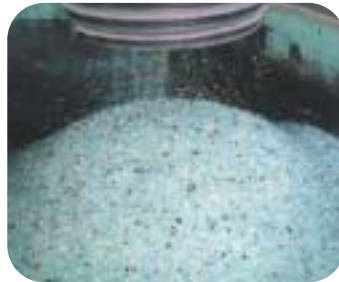
### Recycling Process for Automotive Glass



Defective and collected post-use laminated glass



Laminated glass put into crusher

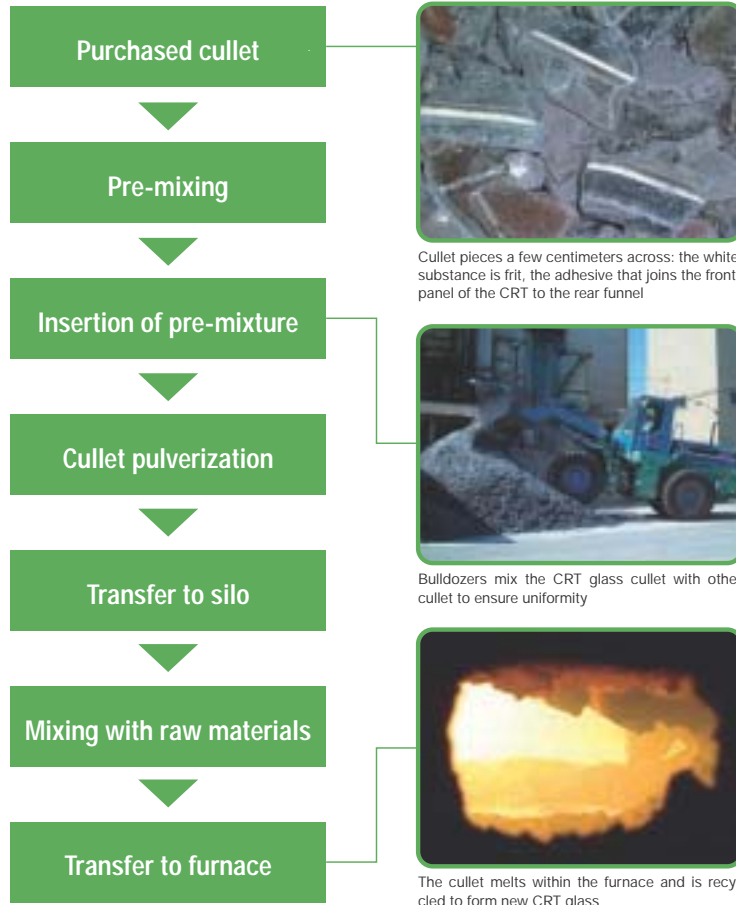


Pulverized glass (cullet) is sorted by size



Intermediate film layer after extraction

### Recycling Process for CRT Glass



## Collection and Recycling of Glass Sludge (Sagami Plant)

The Sagami Plant collects and recycles the glass sludge formed in the edge-processing step of making windshields (see pp. 34-35). This sludge has a fine, muddy consistency. The sludge is separated from the water used for cleaning in a special-purpose pit outside the plant. After the sludge settles to the bot-

tom, the water can be drawn off for recycling, while the sludge is re-used in soil reformation materials or other fillers. The recycling process currently generates about 20 tons of sludge per month.



Separated sludge

## Reduced Customer Waste Through Simplified Packing (Building Materials Division)

The Building Materials Division has simplified the packing used for its AG-WALL exterior siding boards to reduce the volume of packing materials produced as waste at housing construction sites. Production incorporating the simplified packing commenced in May

2004. The internal development process was initially stimulated by customer comments derived from onsite experience.

Simply reducing the amount of packing materials used carried a risk of mid-transit breakages. As a result, the new technical

approach tackles the issue by focusing on the protective function of the packing materials.

### Comparison of Packing Method and Volume of Waste Materials Generated

**Previous packing method**

Labels in diagram: PP bands, Edge covers, Wrapping film, Wooden supports.

Waste materials generated by previous packing method

**New simplified packing method**

Labels in diagram: PP bands eliminated by using combination of shrink-wrap (polyethylene) and wrapping film for outer wrapping, Hot melt (prevents slippage), Wrapping film (unchanged), Caution! Product type, Pallet widened to increase safety distance, Printed cap labels (product code, batch no.), Cardboard buffers (inside wrapping film), Caution label, Product labeling.

Waste materials generated by simplified packing method



# Ensuring Employees Work in a Safe, Secure Environment

**Occupational Health & Safety Management System (OHSMS) at Keihin Plant**  
**The Asahi Glass Keihin Plant started constructing its OHSMS in 1999, gaining the first OHSAS 18001 site certification within the Japanese glass industry the following year. The plant continues to place great importance on reducing significant risks on an ongoing basis. This section looks at the development of the OHSMS and its results.**

## OHSMS Initiative Targeted More Effective System

In 1999, the Keihin Plant had a number of safety training and awareness programs in place. These included a “5S house-keeping campaign”<sup>1</sup> system of safety pointers as well as a system of collecting data on any close-call safety incidents to boost prevention by spotting hazards in advance. Yet the measures lacked any systematic effectiveness and had become stale in practice. Progress on reducing the incidence of accidents had stalled.

Around the same time, the glass industry in Japan and around the world was increasingly recognizing the need to adopt OHSMS to regain momentum in reducing the number of industrial accidents within the sector.

Moreover, from 1997 Asahi Glass had begun undertaking comprehensive risk assessments, which form the basis for OHSMS development. Related training programs were also under way. Having already gained certification under the ISO 14001 and ISO 9001 standards, the Keihin Plant decided to lead the way in OHSMS development. The basic rationale for the move was that it would help make the safety systems at the plant work much more effectively together.

<sup>1</sup> 5S represent as follows; “Seiri” Orderliness, “Seiton” Neatness & Tidiness, “Seiketsu” Cleanliness, “Seisou” Cleaning, and “Shitsuke” Good manner.

Route to OHSAS 18001 Certification

Date	Activity
June 1999	OHSMS project team formed
September 1999	Project initiated with plant risk assessment
December 1999	OHSMS operation commences Preliminary site audit by OHSAS 18001 certification body
February 2000	Internal audit and process changes Advance audit by certification body
March 2000	Final audit and inspection by certification body
April 2000	OHSAS 18001 certification received

## System Requirements and Need for Prior Risk Assessment

An OHSMS project team was formed in June 1999. The basic goal was to obtain certification under the international standard OHSAS 18001, which would require the development of systems to reduce serious safety risks within the plant and ensure full compliance with OH&S laws and regulations. The slogan adopted for this initiative emphasized the cooperation of all employees to develop an OHSMS that could eliminate risks and increase safety.

The OHSMS project team prepared booklets and organized study meetings to explain the OHSMS structure and requirements, as well as the 25 OH&S-related laws and ordinances, to all 610 employees on the site and 750 workers at affiliated firms. Alongside this, improvements were implemented based on the risk assessment, which evaluated all risks and systematically prioritized the need for corrective measures (see table).

Risk Evaluation & Classification (for risk assessment)

		Probability of injury				Risk evaluation level	
		Definite	High	Medium-Low	Negligible		
		a	b	c	d		
Severity of injury (worst case)	Fatal	16	15	12	8	High risk	16 } 14 } ( points ) Rank: A Unacceptable (immediate cessation/ improvement)
	Serious	14	13	10	5		
	Light	11	9	6	3		9 } 6 } ( points ) Rank: C Problematic (improvement, training, labeling)
	None of the above	7	4	2	1		5 } 1 } ( points ) Rank: D Tolerable

The risk assessment process begins with hazard discovery. This involves teams of 3-8 people systematically analyzing all operational processes based on standard procedure manuals to determine all the sources of risk within each process. These are evaluated and graded according to the chance of injury and its potential severity.

After this points-based grading, all processes are ranked from A (intolerable) to D (acceptable), and a list of all the A- or B-ranked risks is compiled. Specific goals for risk reduction are established. Attention then turns to implementing changes to equipment (“hardware”) and to other factors such as

workplace rules (“software”). All A-ranked risks typically require capital investment to improve the safety of the relevant process.

This entire process took about 10 months in the case of the Keihin Plant, after which the developed OHSMS received OHSAS 18001 certification (in April 2000). This was one of the first ten such certifications in Japan, illustrating the speed of the plant’s response.

### PDCA Cycle Execution Key Aspect of Functioning OHSMS

After the initial construction of the OHSMS and its OHSAS 18001 certification, the Asahi Glass Keihin Plant maintains the system through annual reviews. The cumulative number of incidents recorded to the end of fiscal 2003 was 12,127, of which 1,253 posed serious risks requiring action. These reviews have led to risk-reduction measures in all cases.

On the hardware side, Asahi Glass needs to invest each year to replace obsolete machinery and install new equipment. Reviews highlight the areas where equipment-related risks arise. Execution of the PDCA cycle ensures that risk-reduction measures are fully implemented on an ongoing basis.

On the software side, the main challenge is to ensure safety-related awareness, routines and motivation are maintained over time.

The aim is to make these part of the site culture, irrespective of personnel changes.

OHSMS operation has substantially upgraded the levels of OH&S knowledge and awareness among site-based and affiliate employees. Nevertheless, efforts continue to guard against mistakes caused by carelessness or ignorance. Hazard patrols by managers and members of the safety and hygiene committees also help to identify risks. The plan is to maintain high-level system operation through constant PDCA cycle execution.

#### Risk Assessment & Improvement: Example 1



Risk: snapping of cord suspending bag of raw materials  
Injury probability: medium-low; severity: serious; risk level: 10

**Improvement** Construction of guard for material entry point and posting of usage instructions.  
Result: injury probability: negligible; severity: light; risk level: 3

#### Risk Assessment & Improvement: Example 2



Risk: falling during inspection/repair of cooling tower belts  
Injury probability: definite; severity: serious; risk level: 14

**Improvement** Installation of walking platform around inspection area.  
Result: injury probability reduced to negligible; risk level: 5

#### Risk Assessment & Improvement: Example 3



Risk: slippage of jack during loader tire change causing trapping  
Injury probability: medium-low; severity: serious; risk level: 10

**Improvement** Placement of support next to jack during operation.  
Result: injury probability reduced to negligible; risk level: 5  
Above right: Written instructions for changing the tire safely. These instructions are mounted inside the loader to ensure all workers know and follow them rigorously.

#### Safety Record of Asahi Glass Keihin Plant

Category of injury		FY1998	FY1999	FY2000 (OHSMS certification: April)	FY2001	FY2002	FY2003*1
No. incapacitated for work (overall accident frequency)	Employees	0 (0.00)	1 (0.72)	2 (1.60)	0 (0.00)	0 (0.00)	0 (0.00)
	Cooperating Companies	1 (0.36)	3 (2.12)	1 (0.78)	1 (0.68)	0 (0.00)	1 (0.80)
TOTAL		1	4	3	1	0	1

\*1 9-month period



#### PDCA Cycle Forms Heart of the System

Assistant Manager, Environment & Safety Office, Keihin Plant  
Mitsuru Mochizuki (Secretary, OHSMS Office)

When constructing an OHSMS, it is important to avoid excessive precision, as this impedes smooth system operation. Precision must be balanced with flexibility to

make the system function well. I see OHSMS implementation as a facet of our shared value of Integrity, which requires the same sort of attitude as a mother protecting her baby. In addition, the PDCA cycle is the driving force that keeps the system functioning continually. Without it, the OHSMS would be just a shell. I feel confident that repeating the PDCA cycle will help employees feel secure and happy.

# Occupational Health & Safety (OH&S) Activities

The AGC Group philosophy involves according high priority to all aspects of OH&S. Efforts across the AGC Group are aimed at promoting the dynamism of activities in this area. OHSMS are under establishment across AGC Group sites in Japan. Risk assessments are also being carried out at all affiliated firms in Japan and overseas.

## OH&S Policy

AGC Group OH&S activities aim to maintain the health and safety of all employees at work while also improving operating and working conditions, based on the AGC Group OH&S Policy (see right).

OH&S activities are organized in a structure comprising three levels: Group Corporate functions; In-House Companies and SBUs\*1; and individual operating sites. The Group Corporate level is responsible for sharing of information on workplace accidents and the management of integrated OH&S activities at all AGC Group consolidated subsidiaries and affiliates (see P25 for organizational chart).

## AGC Group Basic OH&S Policy (Provisional Translation)

Adopted February 9, 2001

The philosophy of the AGC Group is to accord high priority to all workplace-related occupational health and safety matters. The AGC Group strives to ensure all employees understand and share this philosophy while working to create an atmosphere that promotes these values. OH&S activities focus proactively on upholding the following three pillars that underpin OH&S performance and its continuous improvement.

1. Top-down communication of OH&S policies to employees  
(Creating motivation to prioritize OH&S issues)

2. Thorough management of OH&S-related issues on all production lines  
(Ensuring production activities balance quality and productivity with health and safety)
3. Promotion of voluntary participation in OH&S activities by all employees  
(Ensuring all employees participate in OH&S activities willingly)

## Establishment of OHSMS

Fiscal 2003 marked the completion of the establishment of OHSMS at all Asahi Glass (parent) operating sites in Japan. From fiscal 2004, each site has initiated the execution of the PDCA cycle to improve management and operation of OH&S systems on a continuous basis. AGC Group affiliates in Japan began conducting risk assessments in fiscal 2003. This process has been extended to overseas affiliates in fiscal 2004.

### OHSMS Establishment Status of Asahi Glass Operating Sites

Site	Adopted standard	Completion method	Completion date
Keihin Plant	OHSAS18001	Certification obtained	Apr. 2000
Kansai Plant	OHSAS18001	Declaration by plant GM	Mar. 2002
Aichi Plant	OHSAS18001	Declaration by plant GM	May 2003
Kashima Plant	MHLW guidelines	Declaration by plant GM	Jun. 2003
Takasago Plant	OHSAS18001	Declaration by plant GM	Dec. 2003
Sagami Plant	MHLW guidelines	Declaration by plant GM	Jan. 2004
Kitakyushu Plant	OHSAS18001	Declaration by plant GM	Feb. 2004
Chiba Plant	MHLW guidelines	Declaration by plant GM	Mar. 2004
Research Center	MHLW guidelines	Declaration by center GM	Mar. 2004



Risk assessment training class and evaluation chart, Shanghai Asahi Electronic Glass Co., Ltd. (in Chinese)

## Safety Training and OH&S Audits

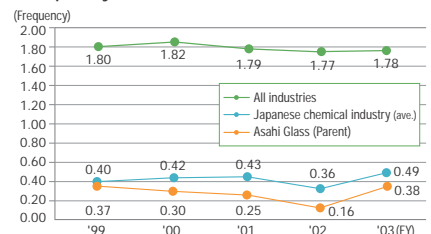
The Group Corporate Environment & Safety organized 12 seminars on safety training in fiscal 2003 targeting different managerial levels and topics. A course on "Sensing Safety" was added to the training curriculum in fiscal 2004 to boost awareness and knowledge of safety issues among employees. OH&S audits are conducted by the Corporate Environment & Safety Directorate and by Group Corporate and Company Environment

& Safety Offices at operating sites and affiliates in Japan and overseas.

### Safety Training Seminar Attendees (Group Corporate Environment & Safety)

	FY2002	FY2003
Asahi Glass employees	141	73
Affiliated firms and cooperating companies	162	125

### Frequency Rates of Industrial Accidents



Asahi Glass data include employees at all operating sites (including cooperating companies)

$$\text{Frequency of accidents} = \frac{\text{(No. of workers injured)} \times 1 \text{ million}}{\text{Total hours worked}}$$

\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.

# Industrial Safety Activities

Proactive execution of industrial safety activities is a key aspect of the AGC Group earning the enduring trust of local communities. Fulfilling its duty as a corporate citizen, Asahi Glass has instituted policies designed to prevent serious accidents. A variety of activities, including the compilation of specific disaster prevention manuals, helped the Kashima Plant earn professional recognition for the safety of its high-pressure gas installations.

## Basic Policy and Site Inspections

The AGC Group has formulated a basic policy on disaster prevention and site safety (see below). Prioritized activities in fiscal 2003 included site inspections to ensure disaster and accident readiness, revision of hazard management measures and reinforcement of

disaster emergency response capabilities. In particular, top management ordered site inspections to ensure comprehensive prevention measures are in place against fires and other disasters across the AGC Group. SBU site managers reported disaster response

capability status to top management at a meeting in November 2003 organized by the Corporate Environment & Safety Directorate.

### AGC Group Basic Industrial Safety Policy (Provisional Translation)

Adopted February 7, 2003

The philosophy of the AGC Group is that industrial safety and site safety activities are part of its responsibility as a corporate citizen toward local communities. Asahi Glass commits to the following activities as part of its efforts to build trust.

1. Management of industrial safety activities shall be based on proactive public relations programs aimed at gaining the understanding of local communities, and

shall aim to promote harmonious coexistence.

2. The AGC Group shall comply with all laws, ordinances and treaties, and all self-imposed regulations concerning industrial safety based thereon, and shall strive to improve the level of management of such activities.

3. The AGC Group shall construct management systems, develop the necessary rules and planning frame-

works, and invest in the required equipment to ensure industrial safety. The Group shall also strive to execute and improve related activities continuously.

4. The AGC Group shall undertake educational and training activities to raise levels of awareness, knowledge and skills related to industrial safety, while also striving to reinforce accident prevention and response capabilities.

## Kashima Plant Commended for High-Pressure Gas Installations

On October 24, 2003, the Kashima Plant received an Excellent Manufacturing Company Site award for its pressurized gas installations from a professional association dedicated to promoting the safety of high-pressure gas equipment in Japan. In March 2003, the plant completed official accreditation procedures to certify compliance with laws governing pressurized gas installations and completion of related site audits. The professional commendation reflected official certifications and voluntary activities related to safety, equipment and manufacturing.



## Earthquake Response Manual

Due to its location in a region officially designated as being susceptible to another major earthquake, the Aichi Plant maintains an especially high level of earthquake readiness. The plant has created and distributed to all employees a pocket-sized manual covering issues ranging from mental preparedness to actions in the event of an earthquake.



## Fires and Other Incidents in Fiscal 2003

Three fires were recorded at Asahi Glass (parent) sites in fiscal 2003, two at the Kashima Plant and one at the Aichi Plant. A fire also broke out at the Kitakyushu Plant on one occasion in March 2004. All the fires were localized and damage was minimal thanks to the firefighting efforts of the Self-Defense Fire Brigade. The public fire authorities were notified in each case, and there were no casualties. Measures were subsequently taken to prevent any reoccurrence.

\*1 Strategic Business Units (SBUs) contain operating divisions and major subsidiaries.



# Environmental Communications

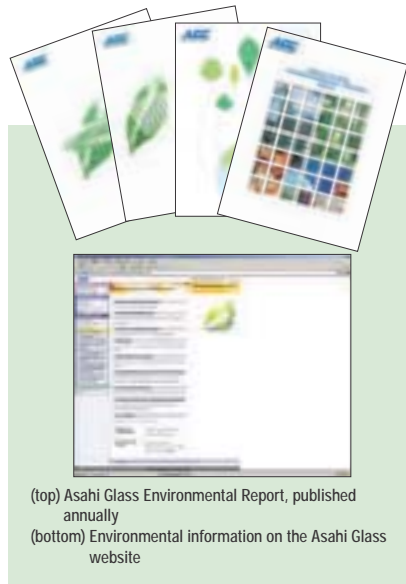
AGC Group environmental communications include disclosure of related information via the publication of an annual environmental report, site tours and meetings held to explain environmental measures to local community residents. Information is shared internally on the Asahi Glass intranet and through various publications, which also encourage employees to participate in environmental activities.

## Participation in Local Community Environmental Activities

Local community initiatives supplement print and web media-based environmental disclosure. An annual environmental monitoring meeting organized by the Kitakyushu Plant is one example. The meeting, held in November 2003, was attended by about 20 local residents, and focused on Asahi Glass manufacturing activities and plans to dismantle production facilities after the cessation of chemical business activities. Another example of local communications in fiscal 2003 was a presentation on plant repairs made by Kashima Plant representatives to local bureaucrats on behalf of companies with facilities in the eastern Kashima coastal petrochemical complex.

In June 2003, in its capacity as the leader of "The Association of Business Enterprises for Keeping the Ebi River Clean," a consortium of eight firms formed to preserve the cleanliness of the local Ebi river, Asahi Techno Glass (ATG) organized an exhibition as part of the annual Funabashi Environment Fair, an event organized jointly by citizens, companies and government officials. ATG is also involved in planning activities for the creation of a reservoir designed to regulate the river level. Other local environmental activities involving ATG employees in fiscal 2003 included a garbage

clean-up program to clear a site for the reservoir, the sowing of rapeseed and harvesting of rapeseed plants.



Environmental monitoring meeting (Kitakyushu Plant)



Presentation at the Kashima petrochemical complex



ATG employees are involved in various projects associated with preserving the local Ebi River



Asahi Glass Environmental Communications in FY2003 (parent)

Content	Results
Stakeholder-oriented seminars	21 events: aggregate attendance 1,300
Social and environmental activities in local communities*1	26 events: aggregate attendance 1,029

\*1 Site vicinity beautification programs, etc.

## Internal Communications to Promote Environmental Awareness

Information on environmental and safety-related matters for employees is shared across the AGC Group using intranets and the Web. Topics include new legislation, updates on other environmental regulatory developments and details of internal training programs.

In addition, each edition of the monthly magazine for Asahi Glass employees (and assignees to other companies) during the year ended March 2004 featured voluntary environment-related activities by employees.



Environmental information on the Asahi Glass intranet



Features on volunteerism: this edition focused on car-pooling and garbage clean-up activities by Aichi Plant employees



# Asahi Glass Environmental Report 2003: Results of Questionnaire

The 2003 edition of the Asahi Glass Environmental Report 2003 contained a number of new features, including an interview with the GM of the Corporate Environment & Safety Directorate as well as sections on soil decontamination programs and occupational health and safety. Here we review comments and opinions received through the questionnaire.

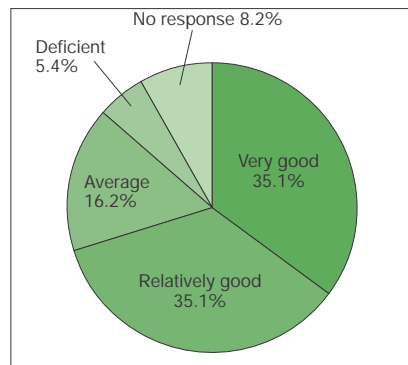
## Internal and External Opinions Received via Questionnaire

The questionnaire contained in the 2003 report generated 37 valuable opinions, 23 from outside the company and 14 from within AGC Group. Over 70% of questionnaire respondents rated the report as either "very good" or "relatively good" in terms of overall content. 62.1% of respondents rated the report as "very satisfactory" or "relatively satisfactory". Marks for ease of comprehension were poorer, however, with 35.1% rating the report as "relatively good" on this score and 29.7% as "average." These results pointed to a need for greater effort in this area.

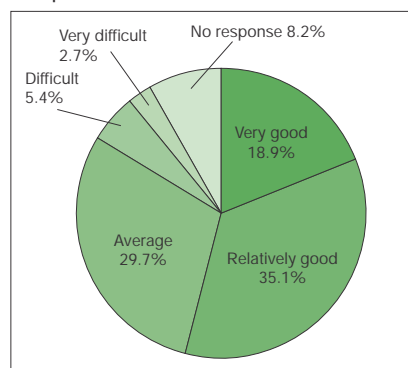
The feature on soil pollution and decontamination attracted a lot of attention, reinforcing the impression that transparency is highly valued by readers of these reports. The interview with top management also gained high marks for helping to explain management policy in an accessible manner.

These opinions are extremely valuable to Asahi Glass in terms of providing feedback for the creation of future reports. The company would like to thank everyone who took the trouble to reply to the questionnaire.

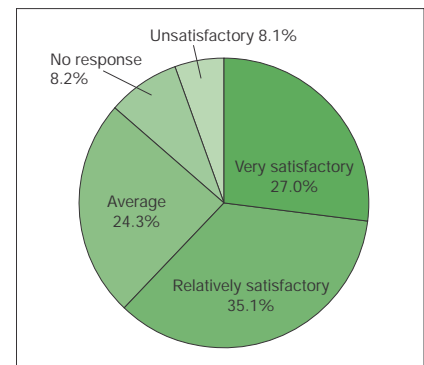
Questionnaire Responses: Composition



Questionnaire Responses: Ease of Comprehension



Questionnaire Responses: Content



Which features were the most interesting or made the greatest impression? (top 12, multiple-selection format)

Interview with the General Manager of the Corporate Environment & Safety Directorate	12
Soil/Groundwater Examination and Serious Considerations in Decontamination Measures	12
Activities for Realization of Zero Emission of Waste	12
Activities at Research Center and Plants	12
Environmental Accounting	11
Activities at Major Affiliates in Japan	11
Research and Development Technology Friendly to the Environment	9
Execution of Energy-Saving Activities in Manufacturing Processes	9
Protection of Water Resources	9
Material Flow of Products and Environmental Burdens	8
Reduction of CO <sub>2</sub> Emission through Introduction of New Technology	8
Compliance with Laws and Regulations of Recycling	8

### Individual Comments (Extracts)

- A systematic and detailed approach. But the print was small and hard to read, plus several words used were obscure. I thought the plant-specific environmental performance data was good, but I wanted an explanation of why NOx and particulate emissions had risen at the Chiba Plant. Including photographs of those responsible for environmental matters at each plant and subsidiary gives a nice human touch. (Association official)
- Reading the report helped me appreciate the sheer breadth of environmental activities at Asahi Glass. (Company employee)
- I think it would be better to explain the responses to specific environmental impacts at each plant. I found the information on energy conservation, recycling and public relations activities extremely helpful. (Company employee)
- The printing is bad. Not enough effort was made to make the report easy to comprehend from a consumer's perspective. Please make it easier for readers to understand. (Individual)
- Given the increasing emphasis on corporate social responsibility (CSR) in recent years, I think the report also needs to tackle issues such as green purchasing and social activities. (Public servant)

- Compared with the content in the first half of the report, the discussions of activities at the Research Center and each plant were too general. I think Asahi Glass' environmental approach would look better by highlighting specific efforts at 1-2 plants and covering general conservation activities in greater detail. (Anonymous)
- I appreciated the fact that Asahi Glass was open about results achieved and problems still to be solved. Even so, the layout was monotonous, and it was difficult to work out clearly the real points at issue. (Person involved in university education)
- Statements that we are "working to integrate the environmental management system" need to be accompanied by disclosure of planned schedules. Also, the environmental impact flow chart needs to include product shipment volumes. (Asahi Glass employee)
- I think the more problematic issues need to be discussed in greater depth. (Asahi Glass employee, 2004 entry-level)

# Environmental Activities at Overseas Sites

The AGC Group operates in more than 20 countries around the world. Efforts to reduce environmental impact and improve occupational health and safety are on a global scale. This section looks at environmental programs adopted by two AGC Group companies, which are part of the Automotive Glass Company and the Display Company.

## AGC Automotive Americas Co.

### Reinforcing Global Business and Environmental Strategies

AGC Automotive Americas is the North American regional company for Asahi Glass Automotive Glass Company. The company has operating bases in Ohio and Kentucky in the United States as well as Canada and Mexico. These basis all types of automotive glass for both local and export markets. The company describes its mission in terms of making the right decisions to strengthen the business and of respond to change. It aims

to minimize its long-term environmental impact by basing its strategy on the development of sustainable enterprises, and by working to reduce environmental risk.

The company has also adopted an eco-conscious management strategy as part of the drive toward "Operational Excellence" expressed in the AGC Group global vision, **"Look Beyond"**. It introduced the Lean Six Sigma\*1 method to drive increased efficiency

and eliminate waste of time and money. The company utilized the Lean Six Sigma methodology in fiscal 2003 to verify environmental demands and adopt the environmental management practices.

\*1 Lean Six Sigma is a statistically based approach to business and product quality control that emphasizes the elimination of waste.

### Promotion of Waste Reduction and Recycling Activities

The company plays an active role in the various global environmental activity teams formed by the Automotive Glass Company. Established in 2003, these teams are working to establish an integrated EMS that covers AGC Group companies operating across Asia, Europe and North America. Besides setting goals and working to raise standards of environmental performance and communication, this involves activities such as defining common internal documentation.

Specific environmental projects involve efforts to reduce and promote recycling of wastes, and to protect natural resources by preventing pollution. Specific wastes targeted for reduction and recycling include iron, alu-

minum, wood, cardboard, plastics, glass cullet, fluorescent tubes, switches, gloves, waste rags and waste oil.

Beginning in fiscal 2004, the company has significantly reduced the glass sludge from wastewater processes. The newly installed sand pressure filter systems are removing over 400 kilograms of waste per day. This has enabled the recycling of glass sludge, which previously generated over 90 tons of landfill waste per year. In addition, the Bradford and Ontario plants have installed paper compression machinery for recycling. In fiscal 2003, the company recycled 57 tons of kraft paper in this way.



Members of the Ohio site wastewater recycling team

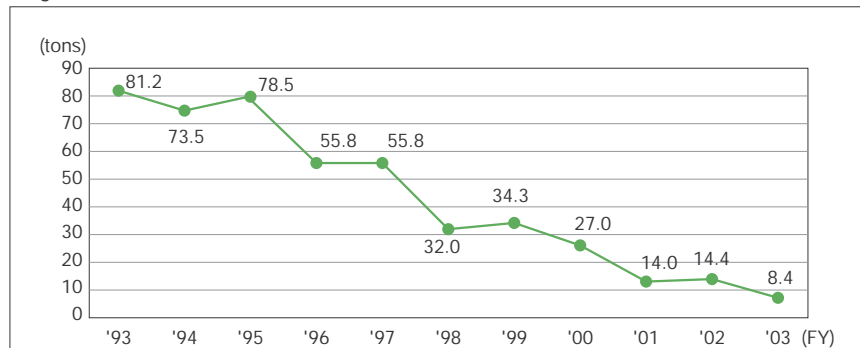


Sand pressure filter system for elimination of glass sludge



Paper compression machinery for recycling of kraft paper

Progress in Hazardous Waste Reduction



# Siam Asahi Technoglass Co., Ltd.

## World-Class QC, Safety and Environmental Systems

Siam Asahi Technoglass (SAT) operates a manufacturing facility for all types of CRT glass in Chonburi, Thailand. Products made by SAT include front and rear CRT glass, electron gun charger component glass, and coating liquid for glass surfaces.

SAT began constructing an environmental management system to ISO standards in 2001. This involved initiatives to reduce waste, boost recycling rates and conserve resources. The plant obtained ISO 14001

certification in June 2001 and OHSAS 18001 certification for its OHSMS in August 2002. In fiscal 2003, the company adopted a new business vision to attain world-class standards of quality, safety and environmental performance based on ongoing operation of these various systems. The theme of this new vision is, "The World Class in Thailand, We Are SAT."



## Adoption of Gas/Oxygen Combustion Methods, Recycling of Cullet

In 2001, SAT converted a furnace from fuel oil and air combustion to a new method involving gas injection and oxygen combustion. This change reduced fuel consumption, cutting CO<sub>2</sub> emissions by about 40%. SAT plans similar furnace conversions during future scheduled cold repairs.

SAT recycles most of the dust collected in electric precipitator into raw materials for glass production. Cullet generated by SAT and customers is also washed and recycled as raw materials. In fiscal 2002, SAT broadened its supply sources for cullet by initiating

imports from Singapore. Recycling volumes for cullet reached about 3,000 tons in fiscal 2003. Future plans call for imports of cullet from Japan.



Color-coded waste recycling bins for paper, iron scraps, packing material and plastics



The furnace uses an oxygen combustion method based on injection of gases locally produced in Thailand. This cuts fuel usage and reduces emissions of CO<sub>2</sub> and NO<sub>x</sub> (a cause of photochemical smog).

## Disaster Prevention Training

Every year, employees at SAT participate in disaster-response training drills. In 2003, these took place in November, when a total of 295 workers took part in four training sessions. Fire prevention and firefighting to extinguish blazes quickly form the core of training due to the plant's use of flammable fuels, gases and high-temperature glass.



Disaster-response training drills at SAT



# Site Performance Data

## Asahi Glass Operating Sites

### Research Center

1150 Hazawacho, Kanagawa-ku, Yokohama, Kanagawa 221-8755  
 Tel: +81-45-374-8888 Fax: +81-45-374-8850  
 Employees (Dec. 31, 2003): 501 Industrial accident frequency (FY2003): 0.00

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	6	6	6	32.9%	
	NOx (tons)	0	0.3	0.3	16.6%	
	SOx (tons)	0	0	0		
	Soot and Dust (tons)	0	0	0		
Water	Wastewater (1,000m <sup>3</sup> )	43	48	36	0.3%	
	COD <sup>2</sup> (tons)	0.3	0	0		
Waste	Landfill (tons)	384	454	228		

References in this report: P32-33

### Kashima Plant

25 Touwada, Kamisu-machi, Kashima-gun, Ibaraki 314-0195  
 Tel: +81-299-96-2215 Fax: +81-299-96-7970  
 Employees (Dec. 31, 2003): 532 Industrial accident frequency (FY2003): 1.01

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	641	658	529	7.3%	
	NOx (tons)	565	580	400	-7.9%	
	SOx (tons)	48	26	16	-18.4%	
	Soot and Dust (tons)	11	31	9	-64.1%	
Water	Wastewater (1,000m <sup>3</sup> )	7,568	7,318	5,105	-7.0%	
	COD <sup>2</sup> (tons)	1,069	984	664	-10.0%	
Waste	Landfill (tons)	3,654	1,619	1,878		

References in this report: P55,56

### Chiba Plant

10 Goikaigan, Ichihara, Chiba 290-8566  
 Tel: +81-436-23-3121 Fax: +81-436-23-3167  
 Employees (Dec. 31, 2003): 707 Industrial accident frequency (FY2003): 0.92

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	481	513	417	8.2%	
	NOx (tons)	436	836	626	-0.1%	
	SOx (tons)	105	76	53	-7.9%	
	Soot and Dust (tons)	41	73	54	-1.4%	
Water	Wastewater (1,000m <sup>3</sup> )	17,965	12,782	8,272	-13.7%	
	COD (tons)	74	65	38	-22.1%	
Waste	Landfill (tons)	2,891	2,274	1,665		

References in this report: P24, 40, 46-47

### Funabashi Plant

1-10-1 Kitahoncho, Funabashi, Chiba 273-0864  
 Tel: +81-47-424-1101 Fax: +81-47-425-0760  
 Employees (Dec. 31, 2003): 61 Industrial accident frequency (FY2003): 0.00

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	179	112	58	-31.2%	
	NOx (tons)	1,560	1,067	600	-25.0%	
	SOx (tons)	17	9	4	-40.7%	
	Soot and Dust (tons)	12	5	2	-46.7%	
Water	Wastewater (1,000m <sup>3</sup> )	984	994	675	-9.5%	
	COD (tons)	4	4	2	-33.3%	
Waste	Landfill (tons)	632	676	951		

References in this report: P40

### Keihin Plant

1-1 Suehirocho, Tsurumi-ku, Yokohama, Kanagawa 230-0045  
 Tel: +81-45-503-7100 Fax: +81-45-503-9635  
 Employees (Dec. 31, 2003): 613 Industrial accident frequency (FY2003): 0.47

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	116	159	131	9.3%	
	NOx (tons)	107	153	119	3.7%	
	SOx (tons)	3	6	3	-33.3%	
	Soot and Dust (tons)	1	1	2	122.2%	
Water	Wastewater (1,000m <sup>3</sup> )	1,253	1,227	929	0.9%	
	COD <sup>2</sup> (tons)	5	3	2	-16.7%	
Waste	Landfill (tons)	1,001	608	1,380		

References in this report: P25, 45, 52-53

### Sagami Plant

426-1 Sumida, Aikawa-machi, Aiko-gun, Kanagawa 243-0301  
 Tel: +81-46-286-1254 Fax: +81-46-286-1688  
 Employees (Dec. 31, 2003): 531 Industrial accident frequency (FY2003): 0.00

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	47	41	31	-0.3%	
	NOx (tons)	8	11	9	9.9%	
	SOx (tons)	0	0	0		
	Soot and Dust (tons)	0.1	0.1	0.1	-5.3%	
Water	Wastewater (1,000m <sup>3</sup> )	140	158	98	-17.3%	
	COD <sup>2</sup> (tons)	1	0.4	0.2	-31.7%	
Waste	Landfill (tons)	81	95	80		

References in this report: P34-35, 51

### Aichi Plant

1 Asahi, Taketoyo-cho, Chita-gun, Aichi 470-2394  
 Tel: +81-569-73-1110 Fax: +81-569-72-4890  
 Employees (Dec. 31, 2003): 1,042 Industrial accident frequency (FY2003): 0.25

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	335	317	275	15.7%	
	NOx (tons)	1,040	798	567	-5.3%	
	SOx (tons)	561	410	293	-4.7%	
	Soot and Dust (tons)	72	68	41	-18.8%	
Water	Wastewater (1,000m <sup>3</sup> )	2,244	2,322	1,722	-1.1%	
	COD (tons)	6	6	5	-1.9%	
Waste	Landfill (tons)	1,350 <sup>3</sup>	1,329 <sup>3</sup>	1,213		

References in this report: P43, 50, 55, 56

### Kansai Plant

2 Nishimukoujimacho, Amagasaki, Hyogo 660-0857  
 Tel: +81-6-6413-3325 Fax: +81-6-6417-5129  
 Employees (Dec. 31, 2003): 251 Industrial accident frequency (FY2003): 0.93

Business activities:		Environmental Performance Data				
		2001	2002	2003	2002-3	2002-3
		chg <sup>1</sup>				
Air	CO <sub>2</sub> (1,000 tons)	106	101	90	18.1%	
	NOx (tons)	410	422	360	13.6%	
	SOx (tons)	17	13	8	-22.1%	
	Soot and Dust (tons)	5	6	3	-32.2%	
Water	Wastewater (1,000m <sup>3</sup> )	444	373	308	9.9%	
	COD (tons)	2	0.4	0.3	6.4%	
Waste	Landfill (tons)	98	17	6		

References in this report: P49

## Takasago Plant

5-6-1 Umei, Takasago, Hyogo 676-8655

Tel: +81-794-47-7304 Fax: +81-794-48-6631

Employees (Dec. 31, 2003): 575 Industrial accident frequency (FY2003): 0.95

### Business activities:

manufacture of CRT glass bulbs, high-purity silicon carbide

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)	182	177	108	-18.2%
	NOx (tons)	1,349	1,498	734	-34.7%
	SOx (tons)	42	28	19	-13.1%
	Soot and Dust (tons)	40	9	7	1.9%
Water	Wastewater (1,000m <sup>3</sup> )	980	1,128	505	-40.3%
	COD (tons)	2	3	2	-28.6%
Waste	Landfill (tons)	5,613	437	540	

References in this report: P50

## Kitakyushu Plant

5-1-1 Makiyama, Tobata-ku, Kitakyushu, Fukuoka 804-8520

Tel: +81-93-871-1551 Fax: +81-93-871-2842

Employees (Dec. 31, 2003): 137 Industrial accident frequency (FY2003): 0.00

### Business activities:

manufacture of automotive safety glass

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)	282	165	12	-90.7%
	NOx (tons)	285	160	0	-100.0%
	SOx (tons)	80	64	0	-100.0%
	Soot and Dust (tons)	33	9	0	-100.0%
Water	Wastewater (1,000m <sup>3</sup> )	77,148	61,431	210	-99.5%
	COD (tons)	121	49	0.1	-99.8%
Waste	Landfill (tons)	33,388	2,996	59	

References in this report: P55, 56

## Major Subsidiaries in Japan

### Asahi Fiber Glass Co., Ltd.

3-6-3 Kajicho, Kanda Chiyoda-ku, Tokyo 101-0045

Tel: +81-3-5296-2031 Fax: +81-3-5296-2044

Capital: 6,000 million yen Employees (Dec. 31, 2003): 789

### Business activities:

manufacture and sale of glass fiber, composite materials (SMC, FTP), glass wool, and other glass-fiber-reinforced products

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)		233	192	10.0%
	NOx (tons)		1,000	919	22.6%
	SOx (tons)		1,415	1,252	18.0%
	Soot and Dust (tons)		202	145	-4.4%
Water	Wastewater (1,000m <sup>3</sup> )		1,206	1,196	32.2%
	COD (tons)		36	12	-56.3%
Waste	Landfill (tons)		4,093	3,251	

References in this report: P10

### Asahi Techno Glass Corporation

1-50-1 Gyoda, Funabashi, Chiba 273-0044

Tel: +81-47-421-2121 Fax: +81-47-421-2071

Capital: 7,233 million yen Employees (Dec. 31, 2003): 786

### Business activities:

manufacture and sale of glass for various electronic, industrial, lighting, scientific, medical and residential applications

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)		91	81	20.4%
	NOx (tons)		640	501	4.5%
	SOx (tons)		188	159	12.8%
	Soot and Dust (tons)		34	4	-84.3%
Water	Wastewater (1,000m <sup>3</sup> )		1,834	1,461	6.2%
	COD (tons)		3	6.5	186.7%
Waste	Landfill (tons)		1,117	420	

References in this report: P10, 56

### Asahi Glass Ceramics Co., Ltd.

4-1-23 Shiba, Minato-ku, Tokyo 108-0014

Tel: +81-3-5442-9179 Fax: +81-3-5442-9190

Capital: 3,500 million yen Employees (Dec. 31, 2003): 218

### Business activities:

manufacture and sale of fire-resistant and fine ceramics; design and installation of glass and other industrial furnaces, sale of associated equipment

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)		13	10	0.1%
	NOx (tons)		2	1	-33.3%
	SOx (tons)		0	0	
	Soot and Dust (tons)		1	0.4	-51.5%
Water	Wastewater (1,000m <sup>3</sup> )		460	393	14.0%
	COD (tons)		0.8	0.6	0.0%
Waste	Landfill (tons)		961	809	

References in this report: P12

### Ise Chemicals Corporation

1-13-1 Kyobashi, Chuo-ku, Tokyo 104-0031

Tel: +81-3-3535-0760 Fax: +81-3-3535-0773

Capital: 3,599 million yen Employees (Dec. 31, 2003): 170

### Business activities:

manufacture and sale of iodine, iodine compounds, natural gas, nickel and cobalt compounds

### Environmental Performance Data

		2001	2002	2003 <sup>4</sup>	2002-3 chg
Air	CO <sub>2</sub> (1,000 tons)		24	21	-11.9%
	NOx <sup>5</sup> (tons)				
	SOx <sup>5</sup> (tons)				
	Soot and Dust (tons)		0	0	
Water	Wastewater (1,000m <sup>3</sup> )		23,826	23,916	0.4%
	COD (tons)		1,072	1,076	0.4%
Waste	Landfill (tons)			244	

References in this report: P12

### Optrex Corporation

4F, Cosmo Park Bldg., 5-7-18 Higashi Nippori, Arakawa-ku, Tokyo 116-0014

Tel: +81-3-5811-8760 Fax: +81-3-5811-8781

Capital: 2,500 million yen Employees (Dec. 31, 2003): 356

### Business activities:

manufacture and sale of LCD equipment and other electronic components and materials

### Environmental Performance Data

		2001	2002	2003	2002-3 chg <sup>1</sup>
Air	CO <sub>2</sub> (1,000 tons)			1	
	NOx (tons)			0	
	SOx (tons)			0	
	Soot and Dust (tons)			0	
Water	Wastewater (1,000m <sup>3</sup> )			20	
	COD (tons)			0	
Waste	Landfill (tons)			60	

References in this report: P11, 41

\*1 Figures equal percentage change of annualized FY2003 performance (correcting for 9-month period) relative to FY2002

\*2 COD undergoes proper processing after all or part of wastewater is discharged into public sewerage system

\*3 Figures based on new compilation methodology (see P49)

\*4 Figures for Jan.-Dec. 2003

\*5 No appropriate equipment installed



# PRTR\*1 Data

Name, Emission Volumes and Transfer Volumes of Reported Substances (Units: kg [mg-TEQ for dioxins])  
 Data collection periods: FY2003: April 2003 to March 2004; FY2002: April 2002 to March 2003

Operating site	Name of substance	FY2003			FY2002		
		Emissions		Transfers	Emissions		Transfers
		Air	Water		Air	Water	
Research Center	HCFC-225	210	0	2,200	-*	-	-
	N, N-dimethyl formamide (DMF)	0	0	650	-	-	-
Kashima Plant	Zinc compounds (water-soluble)	0	0	1,700	0	0	2,600
	Antimony and its compounds	0	0	10,000	0	0	5,000
	Epichlorohydrin	7,200	0	20,000	5,400	0	0
	Propylene oxide	120,000	0	0	120,000	0	0
	Xylene	47,000	0	39,000	48,000	0	19,000
	Silver and its compounds (water-soluble)	0	0	0	-	-	-
	HCFC-22	39,000	0	0	38,000	0	0
	Allyl chloride	23,000	0	0	15,000	0	0
	Chloroform	9,900	0	69	21,000	0	26
	Chloromethane (methyl chloride)	12,000	0	0	21,000	0	0
	Tetrachloromethane	31,000	0	5.8	32,000	0	2
	CFC-12	1,400	0	0	-	-	-
	HCFC-123	7,900	0	0	0	0	0
	HCFC-21	6,800	0	0	6,700	0	0
	1,2-dichloropropane	130,000	0	1,000	91,000	0	290
	Dichlobenil	0	0	0	0	0	0
	HCFC-225	27,000	0	0	34,000	0	0
	Dichloromethane (methylene chloride)	15,000	0	9.3	36,000	0	92
	Dioxins	10	0	4.5	8.1	0	3.4
	Tetrafluoroethylene	37,000	0	0	54,000	0	0
Water-soluble copper salts (excluding complex salts)	0	0	0	-	-	-	
CFC-113	4,300	0	0	3,400	0	0	
CFC-11	660	0	0	-	-	-	
Lead and its compounds	0	0	2,600	0	0	2,600	
Hydrogen fluoride and its water-soluble salts	0	0	51	0	0	48	
Chiba Plant*	Acrylic acid	0	0	0	0	0	0
	Acetonitrile	0	0	0	-	-	-
	2,2'-azobisisobutyronitrile	0	0	0	0	0	4
	Antimony and its compounds	0	72	2,500	0	0	9,000
	Ethylbenzene	1,600	0	0	1,500	0	0
	Ethylenediaminetetraacetic acid (EDTA)	0	0	0	0	0	0
	Xylene	4,600	0	180	4,200	0	95
	Vinyl chloride	1,200	0	0	1,200	0	0
	HCFC-142b	4,400	0	0	4,400	0	0
	HCFC-22	96,000	0	0	69,000	0	0
	Chloroform	18,000	35	0	27,000	0	0
	Chloromethane (methyl chloride)	3,800	0	0	8,900	0	0
	Tetrachloromethane	3,200	0.4	0	15,000	0	0
	1,4-dioxane	0	0	0	-	-	-
	1,2-dichloroethane	5,100	0	0	5,000	0	0
	Vinylidene chloride	0	0	0	0	0	0
	CFC-12	5,000	0	0	27,000	0	0
	CFC-114	0	0	0	-	-	-
	HCFC-141b	38,000	0	1	29,000	0	230
	HCFC-21	19	0	0	100	0	0
	HCFC-225	43,000	0	3,100	28,000	0	7,100
	Dichloromethane (methylene chloride)	64,000	25	1,800	63,000	0	1,300
	N, N-dimethyl formamide (DMF)	0	0	2.9	0	0	0
	Styrene monomer	0	0	320	-	-	-
Dioxins	16	8.4	3.8	7	6.9	1.3	
Tetrachloroethylene	330	1	0	430	0	0	
Tetrafluoroethylene	210,000	0	0	216,000	0	0	
1,1,1-Trichloroethane	7,100	0.4	2,100	6,100	0	0	

Operating site	Name of substance	FY2003			FY2002		
		Emissions		Transfers	Emissions		Transfers
		Air	Water		Air	Water	
Chiba Plant*	Trichloroethylene	4,200	2.4	82	2,600	0	3,200
	Toluene	3,700	0	3,800	-	-	-
	Nickel	0	0	20	0	0	20
	Nickel compounds	-	-	-	0	0	0
	Hydroquinone	0	0	0	-	-	-
	Hydrogen fluoride and its water-soluble salts	1	9,000	0	0	0	1,360
	Hexamethylene diisocyanate	0	0	0	0	0	0
	Poly(oxyethylene) alkyl ether (C=12-15)	0	0	0.4	0	0	0
	Poly(oxyethylene) octylphenyl ether	0	0	0	0	0	0
	Poly(oxyethylene) nonylphenyl ether	0	0	0	0	0	0
	2-Ethylhexyl methacrylate	0	0	0	-	-	-
	Methyl methacrylate	0	0	0	-	-	-
Funabashi Plant	Antimony and its compounds	130	74	400	280	110	900
	Nickel compounds	0	3	13	0	4.9	11
Keihin Plant	Barium and its water-soluble compounds	0	17	3,400	-	-	-
	Boron and its compounds	7,000	540	39,000	8,500	580	0
Sagami Plant	Silver and its compounds (water-soluble)	0	0	0	-	-	-
	Chromium and chromium(III) compounds	0	0	1.5	0	0	1.8
	Lead and its compounds	0	0	0.9	0	0	1.9
Aichi Plant	Silver and its compounds (water-soluble)	0	0	0	-	-	-
	Chromium and chromium(III) compounds	0	0	210	0	0	570
	Dichloromethane (methylene chloride)	1,100	0	0	-	-	-
	Selenium and its compounds	2.7	2.0	0	-	-	-
	Water-soluble copper salts (excluding complex salts)	0	0.4	0	-	-	-
	Toluene	1,200	0	0	-	-	-
	Lead and its compounds	0	0	610	0	0	1,040
	Nickel compounds	0	2.5	0	0	0.5	0
	Boron and its compounds	0	0	25	-	-	-
Manganese and its compounds	0	0	69	-	-	-	
Kansai Plant	Barium and its water-soluble compounds	3.7	0	0	2.4	0	0
	Boron and its compounds	3,000	1.4	43	-	-	-
Takasago Plant**	Antimony and its compounds	180	61	0	90	350	0
	Ethylene glycol	0	0	14	-	-	-
	Chromium and chromium(III) compounds	0	5.6	670	0	7.5	560
	Chromium(VI) compounds	-	-	-	0	6.6	6
	Dioxins	-	-	-	13	0	0.14
	Lead and its compounds	660	16	370	870	18	33,000
	Nickel compounds	20	3.2	55	6	3.3	89
	Boron and its compounds	24	290	2,800	34	320	3,900
Kitakyushu Plant	Silver and its compounds (water-soluble)	0	0	130	-	-	-
	Chromium and chromium(III) compounds	0	0	290	-	-	-
	Lead and its compounds	0	0	230	-	-	-

\*1 The Pollutant Release and Transfer Register (PRTR) is a legally mandated system in Japan whereby companies must report volumes of specified chemical substances with known or suspected harmful effects on human health and biological ecosystems that are either emitted from operating sites into the environment (air, water or soil) or transferred as waste to other sites. Companies are obliged to measure these volumes and report them to national authorities, which are responsible for collecting and publishing the chemical emissions and transfer data.

\*2 A dash indicates that volumes in that year were below minimum reporting levels.

\*3 Asahi Glass Co., Ltd. merged with Asahi Glass Fluoropolymers Co., Ltd. on January 1, 2004, with the latter becoming part of the Chiba Plant. Hence, the FY2002 and FY2003 data for the Chiba Plant contain data for Asahi Glass Fluoropolymers Co., Ltd.

\*4 FY2002 and FY2003 data for the Takasago Plant contain data for Asahi Glass Ceramics Co., Ltd.

# GRI Content Index\*1

This table provides page references for individual reporting indicators contained in the GRI Sustainability Reporting Guidelines (2002).

Item	Indicator	Page ref.
<b>1 Vision and Strategy</b>		
1.1	Statement of organization's vision and strategy regarding its contribution to sustainable development.	1-2
1.2	Statement from the CEO (or equivalent senior manager) describing key elements of the report.	4-7, 24-25
<b>2 Profile</b>		
<b>Organization Profile</b>		
2.1	Name of reporting organization.	8
2.2	Major products and/or services, including brands if appropriate.	8-12
2.3	Operational structure of the organization.	5,8
2.4	Description of major divisions, operating companies, subsidiaries, and joint ventures.	8-12
2.5	Countries in which the organization's operations are located.	8
2.6	Nature of ownership; legal form.	8
2.8	Scale of the reporting organization.	8
2.9	List of stakeholders, key attributes of each, and relationship to the reporting organization.	16
<b>Report Scope</b>		
2.10	Contact person(s) for the report, including e-mail and web addresses.	Back cover
2.11	Reporting period (e.g., fiscal/calendar year) for information provided.	Inside front cover
2.13	Boundaries of report (countries/regions, products/services, divisions/facilities/joint ventures/subsidiaries) and any specific limitations on the scope.	Inside front cover
2.14	Significant changes in size, structure, ownership, or products/services that have occurred since the previous report.	Inside front cover
<b>Outline of Report</b>		
2.17	Decisions not to apply GRI principles or protocols in the preparation of the report.	Inside front cover
2.20	Policies and internal practices to enhance and provide assurance about the accuracy, completeness, and reliability that can be placed on the sustainability report.	5,25,36
2.21	Policy and current practice with regard to providing independent assurance for the full report.	39,65
2.22	Means by which report users can obtain additional information and reports about economic, environmental, and social aspects of the organization's activities, including facility-specific information (if available).	Inside front cover
<b>3 Governance Structure and Management Systems</b>		
<b>Structure and Governance</b>		
3.1	Governance structure of the organization, including major committees under the board of directors that are responsible for setting strategy and for oversight of the organization.	5
3.6	Organizational structure and key individuals responsible for oversight, implementation, and audit of economic, environmental, social, and related policies.	5,25
3.7	Mission and values statements, internally developed codes of conduct or principles, and policies relevant to economic, environmental, and social performance and the status of implementation.	1,2
<b>Overarching Policies and Management Systems</b>		
3.16	Policies and/or systems for managing upstream and downstream impacts.	14-16,41
3.19	Programmes and procedures pertaining to economic, environmental, and social performance.	26-27
3.20	Status of certification pertaining to economic, environmental, and social management systems.	36,54
<b>4 GRI Content Index</b>		
4.1	A table identifying location of each element of the GRI Report Content, by section and indicator.	64
<b>5 Performance Indicators</b>		

\*1 URL for more information on GRI Guidelines  
<http://www.globalreporting.org/>

<b>Economic Performance Indicators</b>		
Item	Indicator	Page ref.
<b>Direct Effects</b>		
<b>Core Indicators</b>		
<b>Customers</b>		
EC1	Net sales.	8
EC2	Geographic breakdown of markets.	8
<b>Public sector</b>		
EC10	Donations to community, civil society, and other groups broken down in terms of cash and in-kind donations per type of group.	21-22
<b>Environmental Performance Indicators</b>		
Item	Indicator	Page ref.
<b>Core Indicators</b>		
<b>Energy</b>		
EN3	Direct energy use segmented by primary source.	28,42
<b>Water</b>		
EN5	Total water use.	28,44
<b>Emissions, Effluents, and Waste</b>		
EN8	Greenhouse gas emissions. (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs, SF <sub>6</sub> )	29,42-43, 60-61
EN10	NO <sub>x</sub> , SO <sub>x</sub> , and other significant air emissions by type.	29,44-45, 60-61
EN11	Total amount of waste by type and destination.	29,49-51, 60-61
EN12	Significant discharges to water by type.	28,44, 60-61
<b>Additional Indicators</b>		
<b>Water</b>		
EN22	Total recycling and reuse of water.	28,44
<b>Transport</b>		
EN34	Significant environmental impacts of transportation used for logistical purposes.	48
<b>Overall</b>		
EN35	Total environmental expenditures by type.	37,39
<b>Social Performance Indicators</b>		
Item	Indicator	Page ref.
<b>Labour Practices and Decent Work</b>		
<b>Core Indicators</b>		
<b>Employment</b>		
LA1	Breakdown of workforce.	18
<b>Health &amp; Safety</b>		
LA5	Practices on recording and notification of occupational health and diseases.	52-54
<b>Diversity and Opportunity</b>		
LA10	Description of equal opportunity policies or programmes, as well as monitoring systems to ensure compliance and results of monitoring.	18-20
LA11	Composition of senior management and corporate governance bodies (including the board of directors), including female/male ratio and other indicators of diversity as culturally appropriate.	18-20
<b>Additional Indicators</b>		
<b>Employment</b>		
LA12	Employee benefits beyond those legally mandated.	20
<b>Health &amp; Safety</b>		
LA14	Evidence of substantial compliance with the ILO Guidelines for Occupational Health Management Systems.	52-55
<b>Product Responsibility</b>		
<b>Core Indicators</b>		
<b>Customer Health and Safety</b>		
PR1	Description of policy for preserving customer health and safety during use of products and services, and extent to which this policy is visibly stated and applied, as well as description of procedures/programmes to address this issue, including monitoring systems and results of monitoring.	46
<b>Products &amp; Services</b>		
PR2	Description of policy, procedures/management systems, and compliance mechanisms related to product information and labelling.	47

# Observer's Opinion

Valdez Society\*1

Yasunobu Okada/Kojiro Tanaka/

Yoshiki Midorikawa/Tamio Yamaguchi

The materials industry is one that consumes large quantities of energy and resources. The average stakeholder of a materials manufacturer is rarely familiar with the environmental impact of the company, its manufacturing processes or its corporate philosophy. Reports covering such aspects thus fulfill an important role in advancing understanding. The purpose of this evaluation is to judge to what extent this report accomplishes this goal.

## A Novel Experiment

It is a novel experiment for Asahi Glass to issue this Sustainable Report and we find several original and unique presentations in it. The composition of the report is based around ongoing efforts to realize the four shared values of the AGC Group corporate vision. This approach merits attention at a time when CSR reporting is still in its development phase. Report coverage of social aspects is limited, however. If this structural composition is adopted in future reports, disclosure must be more systematic and exhaustive. Reinforcing the **“Look Beyond”** vision would be a place to start.

In terms of disclosure, the report deserves praise for its honesty and

## Next Stage: Quantitative Plans and Self-Evaluation Standards

The environmental reporting sections provide a suitable amount of information to evaluate the performance of Asahi Glass in its activities to reduce environmental impact. On the other hand, there remains a need for additional content on internal or independent evaluation of efforts at continuous improvement. In the absence of any evaluation standards, simply stating, “Results were in line with goals” is ultimately unconvincing. Since the reporting structure does not have a chrono-

## Need to Continue Expanding Content

The section on “Innovation and Operational Excellence” reveals a clear and positive attitude toward economic aspects, but does not make sufficient mention of risk management, which is a critical element of corporate sustainability. We believe this issue needs to be tackled more consciously in future reports.

The sections on compliance systems and operational status are adequate, but there is a need for more expansive coverage of the sort of compliance violations being reported and the corrective measures taken.

In terms of expanding the coverage on social aspects, we would like Asahi Glass to consider higher levels of disclosure or complete sections on some of the following issues: human rights; supply chain



Discussion

efforts to make the content suitably accessible. Disclosure of matters such as soil pollution, fire outbreaks, basic labor conditions and employment status, and internal compliance whistle-blowing provisions display a commendable degree of initiative. The “Bright Focus on Sustainability” sections, notably discussions with senior managers, help boost reader comprehension. However, there are inconsistencies in the level of reporting that make it difficult to follow in places. For instance, for the topic of environmental accounting, the objective expert explanation helps make it much easier for the general reader to digest.

logical focus, there are many aspects that are difficult to evaluate fully (for instance, waste volumes). We believe the fundamental cause is the essentially qualitative nature of the report. We would expect the certification of an integrated EMS in late 2004 to provide an opportunity for the adoption of quantitative plans and self-evaluation standards.

management; communications with consumers and local communities; issues relevant to Japanese society, such as extension of working lives as a solution to the pension problem associated with low birth rates and increased longevity; employment and promotion of women; and child care and welfare issues.

Finally, although we were able to exchange opinions with those responsible for producing the report, we believe the value of this kind of independent evaluation could be further enhanced by holding more extensive discussions with managers and report originators.

\*1 The Valdez Society is a Japanese NGO that was established in 1991 with the three aims of promoting corporate environmental management, socially responsible investment and eco-conscious consumerism. It provides companies with contract research and consulting services on topics related to environmental and social responsibilities. It is the only registered Japanese member of CERES (Coalition for Environmentally Responsible Economies), the originator of the Global Reporting Initiative (GRI).

**ASAHI GLASS CO., LTD.**  
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**30% Minimum** At least 30% of the fiber used in the manufacturing process of this product comes from well-managed forests independently certified according to the rules of the Forest Stewardship Council.  
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