

# Asahi Glass

## Japan's pioneer in glass

*Among the world's largest glassmakers, Japan's Asahi Glass Co. saw an unexpected fall in financial performance for the 1998 first fiscal half, partly due to the decline in the country's glass demand. Lower market prices and falls in exports also affected the company's overall balance. However, the firm's electronics division performed well; jointly with researchers from Nagoya University, this unit recently developed an innovative glass optical switch material for use in optical computers.*

*Sofia Jennifer Teodori*



**A**mong the largest glass manufacturers in the world, Asahi Glass Co. has a very diversified history.

The company began as a plate glass producer in 1907, and to meet the needs of its own production facilities it began producing soda ash, as well. The firm is now expanding its technological experience on four fronts: glass, chemicals, ceramics and electronics. Asahi Glass manufactures products for virtually every industrial field, including construction, transportation, telecommunications, medicine and environmental protection, as well as for education and consumer use.

Asahi Glass' expanding global network comprises nearly 400 subsidiaries, of which 114 are consolidated. It has affiliates in Japan and fifteen other countries. According to a recent report, the firm has set up a new subsidiary in Mexico to manufacture and sell automotive safety glass (one of the company's main divisions) to meet fast-growing demand in the country (see page 97).

**Hiromichi Seya, Chairman and CEO of Asahi Glass**



Asahi Glass' international operations network

## MAJOR OVERSEAS SUBSIDIARIES AND AFFILIATES

### REGIONAL HEADQUARTERS

Asahi Glass America, Inc.	USA
Singapore Branch	Singapore
Beijing Office	China
Shanghai Representative Office	China

### SUBSIDIARIES AND AFFILIATES

#### ASIA

Thai-Asahi Glass Public Co. Ltd.	Thailand
Bangkok Float Glass Co., Ltd.	Thailand
Thai Safety Glass Co., Ltd.	Thailand
Siam Asahi Technoglass Co., Ltd.	Thailand
THASCO Chemical Co., Ltd.	Thailand
Thai Refined Salt Co., Ltd.	Thailand
Thai-Asahi Electronic Devices Co., Ltd.	Thailand
P.T. Asahimas Flat Glass Co., Ltd.	Indonesia
P.T. Video Display Glass Indonesia	Indonesia
P.T. Asahimas Subentra Chemical	Indonesia
P.T. Riken Asahi Plastics Indonesia	Indonesia
Asahi Allglass (Asia) Pte. Ltd.	Singapore
Asahi Techno Vision (Singapore) Pte. Ltd.	Singapore
Asahi TV-Glass Pte. Ltd.	Singapore
MCIS Safety Glass Sdn. Bhd.	Malaysia
Bintulu Silica Industries Sdn. Bhd.	Malaysia
Republic-Asahi Glass Corporation	Philippines
The Indo-Asahi Glass Co. Ltd.	India
Floatglass India Limited	India
Asahi India Safety Glass, Ltd.	India
Lim Shang Hang Temper-Safe Glass Factory Co., Ltd.	Taiwan
Pacific Glass Corporation	Taiwan
Guangdong Float Glass Co., Ltd.	China
Dalian Float Glass Co., Ltd.	China
Beijing Pennvasia Glass Co., Ltd.	China

Nanjing Asahi-Jiantong New Building Materials Co., Ltd.	China
Qinhuangdao Haiyan Safety Glass Co., Ltd.	China
Beijing Asahi Glass Electronics Co., Ltd.	China
Shanghai Asahi Electronic Glass Co., Ltd.	China
Guangzhou Xuyou Chemicals Co., Ltd.	China
Shanghai Zi Jiang Asahi Urethane Co., Ltd.	China
Zibo Asahi Glass Fused Materials Co., Ltd.	China
Asahi Glass Hong Kong, Ltd.	China

#### NORTH AND CENTRAL AMERICA

AFG Industries, Inc.	USA
AP Technoglass Company	USA
AP Tenntech Corporation	USA
Belltech Corporation	USA
AA Glass Corporation	USA
Corning Asahi Video Products Company	USA
American Video Glass Company	USA
Solvay Soda Ash Joint Venture	USA
AG Soda Corporation	USA
AGA Chemicals, Inc.	USA
AGPR, Inc.	USA
AG Electronic Materials, Inc.	USA
AGA Capital, Inc.	USA
AFG Industries, Ltd.	Canada
AP Mexitech Corporation S.A. De C.V.	Mexico
AP Technoglass de Mexico SA	Mexico

#### EUROPE

Glaverbel SA	Belgium
Splintex SA	Belgium
N.V. Euro Safety Glass SA	Belgium
MaasGlas BV	Netherlands
Asahi Glass Europe BVò	Netherlands
ACT Tech (UK) Ltd.	UK
Glaverbel Czech	Czech Republic

### CHANGES IN MANAGEMENT

### FINANCIAL PERFORMANCE

Asahi Glass' recurring profit for the fiscal first half of 1998 (April-September) dropped 30.9 per cent from the same period in 1997 to ¥ 10.414 billion. The glassmaker's half-year sales fell 15.9 per cent to ¥ 393.751 billion, since sales in all divisions but one fell 16-21 per cent. The only unit which saw positive results was the electronics division, owing to the strong performance of glass substrates for thin-film transistor LCDs. In the six months Asahi Glass suffered its first operating loss - amounting to ¥ 2.8 billion - since its stock exchange listing in 1950. Cost-cutting efforts failed, in fact, to offset drops in sales volume and product prices.

The company saw first-half after-tax profit sink 49.7 per cent to ¥ 5,043 million.

#### *Estimates for full fiscal year '98 to '99*

In view of these results, Asahi Glass slashed its consolidated net profit estimate for the year to March 1999 to ¥ 12 billion from ¥ 26 billion.

The downward revision was blamed on a prolonged slump in Japan's glass demand, lower market prices and steeper-than-expected falls in exports due to Asia's economic turmoil. The projection for group recurring profit was altered to ¥ 43 billion, down from the earlier figure of ¥ 58 billion announced in May 1998. Consolidated revenue was expected to total ¥ 1.3 trillion, down from ¥ 1.36 trillion. In the previous term to last March, Asahi Glass earned a consolidated recurring profit of approximately ¥ 56.8 billion, on revenue of ¥ 1.35 trillion. Net profit came to about ¥ 20.4 billion. Asahi Glass also lowered parent-only earnings estimates for the full year to March 1999. The company foresaw a recurring profit of ¥ 17 billion (a 45.9 per cent fall from a

After its 90th anniversary celebrated in 1997, Asahi Glass plans to continue its Companywide Challenge '97 campaign to consolidate its corporate strengths, revitalize management structure and give a more dynamic approach to business management throughout the group. The firm has created new posts to support its business division system. In fact,

on 26 June 1998, at an extraordinary Board of Director's meeting held after the General Shareholders' meeting, the firm decided to change its management team, the members of which took their new posts on the same day; Mr. Hiromichi Seya, formerly President and CEO, now holds the titles of Chairman and CEO. Mr. Yasuhiko Furukawa, formerly Senior Executive Vice

President, is now Vice Chairman of the firm, and Mr. Shinya Ishizu (who has been with Asahi Glass since 1962), from Executive Vice President and Director & General Manager of the Corporate Planning Division, was renamed President of the group. Mr. Jiro Furumoto, who was a member of the Board and Executive Advisor, retired from the Board the same day.

year earlier), down from the previously estimated ¥ 28 billion, on sales of ¥ 740 billion (down from ¥ 830 billion). Furthermore, a slump in construction demand was expected to hurt sales of the firm's mainstay glass and construction materials by 13.3 per cent. Sales of chemicals were also expected to slide 17.1 per cent. After-tax profit was expected to amount to ¥ 10 billion, against ¥ 17 billion, down 50.2 per cent. The company planned to pay an annual dividend of ¥ 9 per share, down from the previous term's ¥ 10, by dropping a commemorative payment. In an attempt to improve the situation, the firm will integrate its production bases and rationalize its distribution system to cut its fixed expenses by ¥ 30 billion, or 15 per cent of the total, by the end of March 2000.

Windows made with Sunbalance glass



### SOPHISTICATED GLASS PRODUCTS

#### *Architecture*

The main products manufactured in Asahi Glass' Flat Glass and Construction Materials division are:

- float glass;
- figured glass;
- wired glass;
- heat-reflective glass;
- double-glazing units;
- tempered safety glass;
- laminated safety glass;
- mirrors;



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- polycarbonate resin sheet;
- suspension glass system;
- interior glass;
- many varieties of sash;
- fire-resistant exterior siding boards;
- glassfibre-reinforced cement;
- autoclaved lightweight concrete.

While expanding its line of glass products and their applications, Asahi Glass is also developing advanced composite construction materials to enhance the quality of life through aesthetic value, safety, sound-proofing and energy conservation.

### **Automotive glass**

The main products in the firm's Fabricated Glass unit are:

- laminated glass for automotive windscreens;
- tempered glass for automobile side and rear windows;
- heat-reflecting glass;
- UV ray-resistant glass;
- glass antennas;
- module assembly windows;
- many varieties of glass for railway carriages and industrial-use vehicles;
- double-glazing units for refrigerated display cases.

The demand for high-performance glass



**High-speed train with multi-layer laminated glass windows**

products is growing as modern transportation systems increase in speed, safety and efficiency. Asahi Glass is committed to developing high-performance glass which enhances four main functions: safety, amenity, environmental soundness and design. The firm is currently developing infrared-reflective glass, anti-fogging glass and vehicle window assemblies, as well as glass panels with head-up displays and bi-layer glass-plastic composites.

**Workers at AP Technoglass, USA inspect car windscreens**

The company is in the forefront in UV cut glass in Japan, for which demand has soared in recent years. The firm also developed and launched new versions of bronze-tinted UV cut glass, and a further addition was a high-quality water-repellent automotive glass that enhances driver visibility in rainy weather, hence improving safety. The firm's Lamisafe is a laminated glass that resists penetration and prevents scattering of glass shards under impact, which secures safety and visibility for high speed transport.



Asahi Glass is also developing heated defogging windscreens for electric cars, as the traditional system, which uses warm breezes for defogging glass, is not feasible for the new type of car. For this reason, two systems - the Electrically Heated Windshield (EHW) and the Automotive Heated Wire Windshield (AHW) - have been developed and adopted by major automotive manufacturers. The EHW system consists of a transparent, electrically conductive coating on the laminated side of the glass which heats the glass electrically. The AHW system uses very thin wires instead of the coating. Both systems are capable of preventing misting and icing. Asahi Glass is aggressively marketing these two systems for electric cars, which are expect-



Lamisafe laminated glass resists shattering under impact



Part of Asahi Glass' range of glass bulbs

The company also commercialized a reinforced frit glass for larger CRTs that improves the adhesion of panel and funnel glass. Another new product was Wide-ARAS, a coated panel that dramatically intensifies the performance of low-reflection and low-electromagnetic wave emissions.

ed to be commercialized in the future because of increasing concern for the environment.

Recently, Asahi Glass has invested US \$ 40 million in its new subsidiary for the production of automotive safety glass, AP Technoglass de Mexico SA, which was established in El Salto, Jalisco, Mexico. It is expected to begin full-scale production in the July-September quarter of 1999. The new company will initially supply products to Mexican units of Nissan Motor Co., Honda Motor Co. and General Motors Corp. of the United States, but plans to gradually expand its sales network.

**Glass bulbs**

This division mainly produces:

- glass bulbs for colour CRTs;
- neck tubes for colour CRTs;
- powder glass for sealing colour CRTs;
- gun-mounting pillars for colour CRTs;
- silica coating liquid for colour CRTs.

Asahi Glass produces CRT glass bulbs in many sizes supporting specialized applications such as monitors for airport control towers, TVs and a number of other uses, as well as wide-screen HDTV monitors and high-resolution computer display monitors. In 1997, the firm started making 37-inch extra large glass bulbs, which were launched in North America.

A series of other products were recently introduced by the company, including a large and light-weight reinforced panel called TLIPRED (Tempered Lightened Precise Dimensions) for light and flat CRTs.

In July 1996, Asahi Glass established P.T. Video Display Glass Indonesia with LG Electronics Inc. of Korea and local partners. In China, joint venture Shanghai Asahi Electronic Glass Co., Ltd., began operations following its Beijing subsidiary.

In November 1996, this company began full-scale production and sales of glass bulbs for colour CRTs.

The joint venture with Marubeni Corp. of Japan and local partners, including Shanghai Vacuum Electron Device Co., Ltd., was Asahi Glass' first glass bulb joint venture in China.

In North America, American Video Glass Company, a joint venture between Sony Electronics, Inc., and Corning Asahi Corporation of the United States, started up in June 1997.

**Refractories operations**

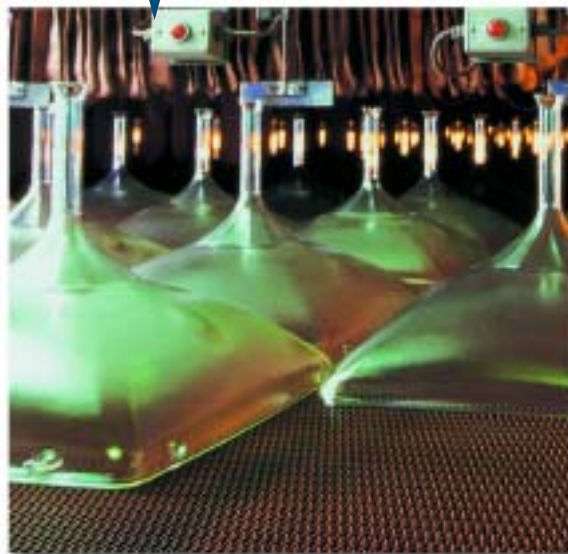
The main products manufactured in this unit are:

- fused cast refractories;
- bonded refractories;
- castable refractories;
- aluminous cement;
- speciality ceramics.

The company's Ceramics and Refractories division initially began as a supplier of refractories for its glass furnaces. Since then, Asahi Glass has broadened its business field to include other glass companies (as well as metal and cement industries).

The firm has also expanded into advanced fine ceramics.

Tlipred funnels



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### Electronics

This division mainly concentrates on fine glass, and includes the production of:

- ICs, hybrid ICs;
- glass delay lines;
- synthetic quartz glass;
- fused quartz glass;
- high-purity silicon carbide;
- glass substrates for TFT, LCD and electro-luminescent displays;
- optoelectronic devices;
- glass substrates for plasma display panels;
- optical fibres;
- powder glass and glass paste.

This unit centres on areas such as semiconductors, displays and optoelectronics.

Fine-glass operations contributed most to the unit's performance in fiscal 1997, and continued to do so throughout 1998, reflecting solid demand for thin-transistor (TFT) displays used in notebook computers, as well as for a number of other products requiring the use of fine glass. In 1997, the company started commercial production of glass substrates for plasma display panels. Recently, the company has developed a new glass material for optical switches together with researchers from Nagoya University.

The new optical switch material is to be an essential part of such devices as optical computers. The material is a glass whose index of refraction changes greatly depending on the intensity of the light moving through the material.

According to a recent report, this substance is the first in the world to incorporate the above function with a high rate of transparency and a short response time.

Materials that provide high efficiency and low absorption (low loss of light) have been known, but no optical device has ever allowed high-speed processing at the rate of one picosecond: the problem of slow reaction time remained. Since with this material the transmission of one terabit of data per second is possible, it can be used in the development of switches and memory for super high-speed optical computers and the like, thus opening the way for the next generation of optical computers.

The material was produced by dispersing fine particles (about ten nanometres in diameter) of cuprous chloride - after giving necessary

heat treatment - uniformly in glass. When this material is chilled suddenly from a certain temperature zone, crystal structures of cuprous chloride are frozen and optically excited electrons in fine particles are released at an extremely high speed. The research and development involving the new material were consigned by the New Energy Development Organization (NEDO) as part of an industrial and scientific technology promotion project.

### A CONTRIBUTOR TO SOCIETY

Asahi Glass is involved in global environmental problems and academic, educational and cultural activities. Among the firm's initiatives in the cultural field are the open exhibitions it holds every year to promote glass art. In 1992 it established the Blue Planet Prize, a global environmental award which recognizes industries and organizations that are actively involved in resolving environmental problems. The company also supports research activities through the Asahi Glass Foundation, funding researchers to promote the sciences. Furthermore, the firm grants scholarships to promising students; in 1997, the Asahi Glass Scholarship Foundation provided 500 students with scholarships.

*Source: Asahi Glass Co. Ltd., Annual Report 1997.*

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