AGC Data Book

AGC

AGC Inc.

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Corporate Information



Company Profile

Company Name	AGC Inc.	
Head Office	〒100-8405 Shin-Marunouchi Bldg., 1-5-1Marunouchi, Chiyoda-ku, Tokyo, JAPAN	
Incorporated	June 1, 1950 (Founded : September 8, 1907)	
Representative	Representative Director, President& CEO Yoshinori Hirai	
Book closing date	December 31	
Capital	90,873 million yen	
Consolidated Revenue	20,676 billion yen	
Subsidiaries	Subsidiaries:205 including 165 companies overseas (Consolidated subsidiaries 186 including 149 companies overseas) Affiliate companies: 27 including 16 companies overseas	
Employees Consolidated	53,687	

Stock Information

Stock Code	5201	
Stock Exchange Listings	Tokyo	
Minimum Trading Units	100	
Number of shares issued	217,434,681	
Stock Information	○ View the stock information page	
Introduction of Executives	▶ View the Officer information page □	

Personal Profile



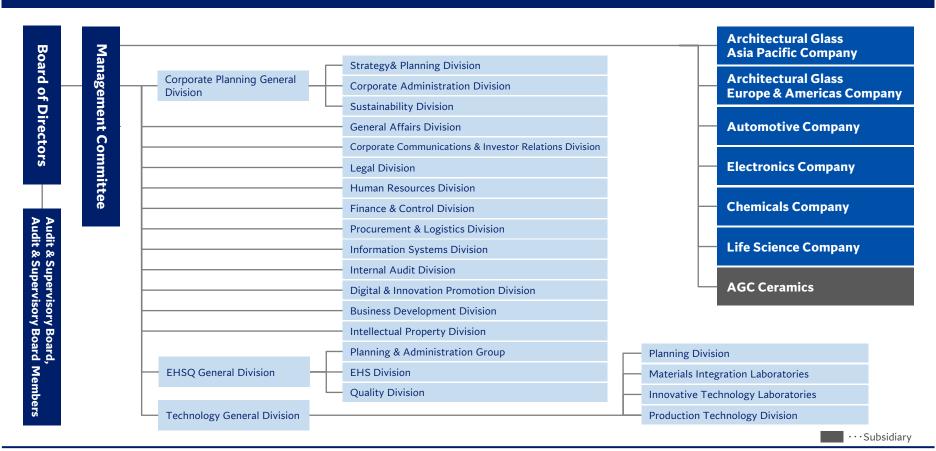


Education/ Business Experience

1978	Graduated from Fukui Prefectural Fujishima High School
1982	Graduated from the University of Tokyo
1987	Ph.D. on Physics from the University of Tokyo
1987	Joined Asahi Glass Co., Ltd. (current AGC Inc.)
1997	LCD Device Group Leader R&D Center for Electronic Technology, Electronics Business Division
2005	Member of the Board and GM, OPTREX
2008	Senior Executive Vice President, OPTREX
2009	GM of Business Planning Office Electronics Company (current AGC Inc.)
2011	GM of Business Development Office
2012	Executive Officer and GM of Business Development Office
2014	Member of the Board Senior Executive Officer GM of Technology General Division
2016	Member of the Board Senior Executive Officer CTO and GM of Technology General Division
2018	Representative Director Executive Vice President and CTO
2021	Representative Director President& CEO

AGC Group Organization Chart





AGC's R&D center & Plants in Japan



Name	Address	Product
Kansai Plant (Amagasaki factory)	₹660-0857 2 Nishimukaijima-cho, Amagasaki-shi, Hyogo Pre.	FPD glass substrates
Kansai Plant (Takasago factory)	₹676-8655 5-6-1 Umei Takasago-shi Hyogo Pre.	FPD glass substrates, Semiconductor production
AGC Yokohama Technical Center (former Keihin Plant)	₹230-0045 1-1 Suehiro-cho, Tsurumi-ku, Yokohama-shi, Kanagawa Pre.	Research & Development Figured glass, Automotive glass
Chiba Plant	₹290-8566 10 Goikaigan, Ichihara-shi, Chiba Pre.	Chlor-alkali, Fluoropolymer, Biopharmaceutical CMO service
Aichi Plant	₹470-2394 1 Asahi, Taketoyo-cho, Chita-gun, Aichi Pre.	Automotive glass and Glass for Solar Cells
Kashima Plant	₹314-0195 25 Higashiwada, Kamisu-shi, Ibaraki Pre.	Flat glass, Fluoropolymer, Sodium bicarbonate
Sagami Plant	₹243-0301 426-1 Sumida, Aikawamachi, Aiko-gun, Kanagawa Pre.	Automotive glass

AGC Group's Global Network



The Group operates in approximately 30 countries and regions in the world.



AGC's position



Commands the top-ranking share in many products worldwide

*Based on AGC's estimates as of January 2025



Float glass

Top share * in Europe, Japan, etc



Glass substrates for TFT-LCD/OLED

No.2 Worldwide *



No.1 in Southeast Asia *



CDMO services for Ex vivo gene therapy products

No.1 Worldwide *



Automotive glass

Top share * worldwide



Super-thin soda lime glass for electronics

Top share * worldwide



Fluorinated resins (Fluon® ETFE)

No.1 Worldwide *



Car-mounted Cover Glass

Top share *worldwide



EUV lithography photomask blanks

No.2 Worldwide *



Fluoropolymer resin for on-site coatings

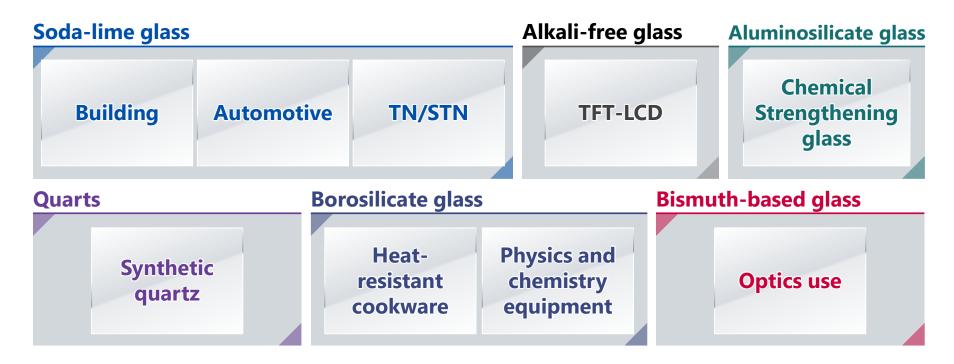
No.1 Worldwide *

*Based on fiscal 2025 estimates by AGC

AGC Group's Glass Variation



 As a comprehensive glass manufacturer, the AGC Group manufactures a wide variety of glass products.



Glass Manufacturing Bases (Float Lines)

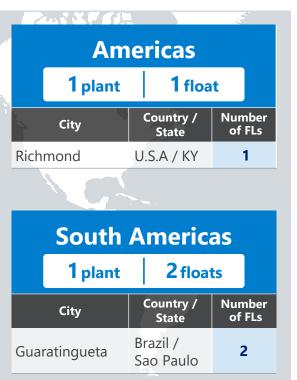


10

■ Total: 26 float lines (two lines are managed by equity method affiliate)

Europe			
7 plants 11 floats		ts	
City	Country / State	Number of FLs	
Moustier	BEL	3	
Mol	BEL	1	
Seingbouse	FRA	1	
Osterweddingen	DEU	1	
Cuneo	ITA	1	
Sagunto	ESP	1	
Retenice	CZE	3	







Architectural Glass

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Architectural Glass Products



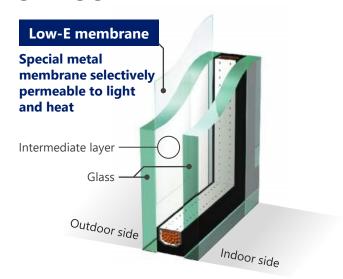
General name	Representative product name	Product description
Float glass	Float glass	Transparent flat sheet glass. The most common type of flat glass used for construction purposes. Thickness :from 3mm to 19mm. Maximum size: around 3m in width, around 10m in height (Maximum size vary depending on area and thickness).
Laminated glass	Lamisafe™ Lamisafe Shelter™	Consists of two pieces of glass with an interlayer film inserted in between. Very few fragments scatter even when glass breaks and has excellent penetration resistance. Excellent for disaster/crime prevention. Also has UV blocking properties.
IGU (Insulated Glass Unit)	Pairglass™ MyMute™ (noise reduction)	Consists of two pieces of glass with dried air and heat-insulating gas enclosed in between. Provides excellent heat insulation, energy conservation and dew condensation prevention.
Low-E IGU	Sunbalance™ Pairplus™ (renovations)	IGU with special metal film coating on the inner surface of one of the glass. Provides enhanced heat insulating/shielding performance.
Tempered glass	Temperlite™/School Temper™ Mistron Ace™/Home Mistron	Safety glass with the strength 3~5 times greater than ordinary glass, produced through special heating and cooling processes. Superior resistance to breakage, and even when breaks, it fragments into small pebble-sized pieces.
Tempered fire resistance glass	Myboka™	Fire-resistant glass with heat-resisting properties, produced through a special tempering process. This non-wired glass provides a clear view.
Mirror	Sunmirror™G	Environmentally friendly mirror with lead-free back paint coating.
Colored glass	LACOBEL™/MATELUX™	Painted glass produced by adding special paint coating on the back surface of glass. Mainly used as interior glass for commercial facilities.
Figured glass	Kasumi™	Flat glass with a template pattern on one side. Provides privacy while letting light through. Also brings interior effect.
Wired glass	Hishiwire™ /Crosswire	Glass with wire mesh enclosed. Used for fire protection doors.

Low-E double glazing glass

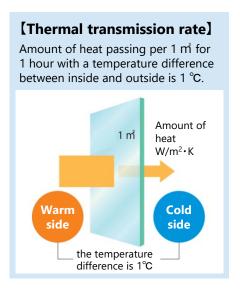


- Selectively transmit light and heat and helps to improve the energy efficiency of buildings
- Approximately 78% less heat transfer than single pane glass*

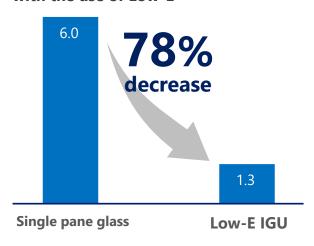
Structure of Low-E double glazing glass



Effect of Low-E double glazing glass



Change in thermal transmittance with the use of Low-E*



Energy-saving Home-improvement Products





Heat insulation

Solar control

Anti condensation

This product allows singlepane glass to be replaced with Low-E double-glazing glass without changing the existing sash.



Mado2[™]

Heat insulation

Solar control

Anti condensation

Noise reduction

Additional layer of glass added to the existing glass/window sash to enhance functionality of the window.



Energy-saving Products for Building renovation







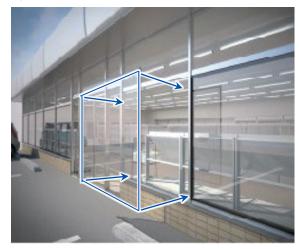
ATT CH

ATTOCH[™] converts single-pane fixed windows of office buildings and stores into energy-saving insulated glass units simply by installing low-E glass from the inside.

Product Lines

WILD ATTOCH™

WILD ATTOCH is enables single-story retail shops to do energy-saving reform without disrupting store operations.



Photovoltaics-embedded glass: SunEwat[™]



- Glass that can generate electricity by solar power
- Encapsulates a solar power generation cell in two glass plates
- Realizes both energy creation and design performances and help bring about a carbonneutral society





Safety Glass/Fire-resistant Glass



Safety Glass (Laminated glass)

This is a "Disaster Prevention Safety Laminated Glass " with a flexible and tough special film of 60mil (about 1.5mm) or more in thickness sandwiched between two sheets of glass.

It has excellent penetration resistance, and the strong adhesion between the special film and glass makes the glass shatterproof.



Fire-resistant Glass

AGC's fire-resistant product lineup consists of wired glass and non-wired heat-resistant tempered glass "Myboka™."



Features of Non-wired tempered fire resistance glass —

1

Provides a clear view

2

No thermal breakage (as compared to wired glass)

3

Lighter-weight & easier open/close than wired glass

Decorative Glass



Lacobel™

Colored glass for interior use

Lacobel is clear float glass featuring a high-quality paint on one side. The glossy look of Lacobel combines seamlessly with its matt alter ego Matelac.

This product creates a beautiful color contrast. adding a stylish atmosphere to the room interior.



Clearsight[™] **I**

Anti-reflective Glass Ideal for Outdoor Use

Clearsight[™] is anti-reflective glass with special coating applied on both surfaces, thereby reducing light reflectance of the glass surface to 0.9%, whereas normally is about 8.0%.

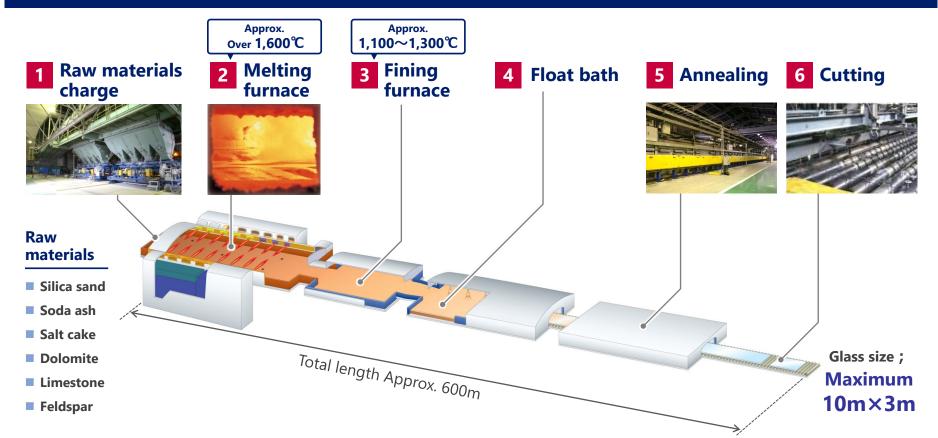
With improved coating durability, Clearsight™ II can be used outdoor. Also, it can be processed into laminated glass.



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Production of Flat Glass - Float Process-







Automotive

Automotive Glass



	General name		Description of the product	
Basic	Laminated glass		Glass with high safety and crime-prevention functions whose fragments do not scatter when it is broken and unlikely to penetrate thanks to adhesion of two sheets of glass that sandwich a film	
glass	Tempered glass		Glass with improved strength and high safety by heating and rapidly cooling glass. When it is broken, fragments are grained.	
		99% UV cut glass	Glass with a function to cut ultraviolet rays by about 99% to reduce long-term damage to the skin such as burns	
			Solar control glass that greatly cuts the wavelength range that we feel is the hottest among solar rays and has radio wave transmissiveness by inserting a special film between two sheets of glass.	
		IR cut glass	Solar control glass that has a function to reflect mainly infrared rays by coating the inner surface of laminated glass with a special film.	
	Comfort	Privacy glass	Glass that secures privacy as well as has high solar control performance thanks to the addition of colored components.	
	Comfort	Sound insulation glass	Glass that contributes to greater silence during driving by improving the sound insulation performance of laminated glass.	
	tion	Laminated side window	Glass that improves theft-prevention performance and sound insulation performance by using laminated glass for side glass.	
High- function		Light Control Glass	A special film is placed between two sheets of glass to freely control light transmission. In transparent mode, the glass provides a sense of openness, while in dimming mode, it provides privacy and blocks sunlight.	
High- function glass Low-E Glass Water repellent door glass Laminated side window Glass that improves theft-prevention performance and sound insulation performance by use A special film is placed between two sheets of glass to freely control light transmission. In provides a sense of openness, while in dimming mode, it provides privacy and blocks sunling Special Low-E coating for automotive use blocks solar heat and provides a cool and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside Special Low-E coating and comfortable cabin temperature in winter by preventing heat inside special Low-E coating and comfortable cabin temperature in winte		Low-E Glass	Special Low-E coating for automotive use blocks solar heat and provides a cool and comfortable cabin temperature in summer and a warm and comfortable cabin temperature in winter by preventing heat inside the car from escaping outside.	
	Door glass that improves visibility in the rain with high water repellency and durability thanks to highly reactive fluorine and silicone coating.			
	Eyesight improvement	Snow-melting/		Glass that melts snow and ice through energization by printing conductive ink (heating element) on the front glass.
		Electro-thermal defogging glass	Glass that defogs through energization by printing conductive ink (heating element) on the rear glass.	
	lf	Printed glass antenna	Automotive antenna with excellent design and durability by casting conductive ink with glass by printing.	
	Information communication	Embedded DTV glass antenna	Digital TV (DTV) glass with excellent design and durability with a seal-type antenna sealed in the front glass.	
		Glass for head-up display	Front glass with a function to display the speedometer, etc. on glass.	
	Design Encapsulated window		Glass with resin parts cast around glass.	

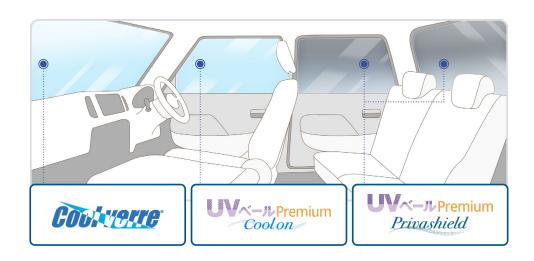
UV 99% cut Glass



UV Verre Premium™

Protects the skin of the driver, front seat passenger, and rear seat passengers from ultraviolet rays that fall from all directions in the car by approximately 99%*.

- In addition to the ultraviolet (UV) blocking function, which causes sunburn and blotches, it also has an infrared (IR) blocking function, which causes heat from the sun and a feeling of being frizzled, eliminating discomfort such as "it is hot inside the car" and "my arms feel frizzled while driving.
- By relieving the heat and enabling a lower air conditioner setting, the system also contributes to the reduction of CO₂ emissions by reducing the cooling load.



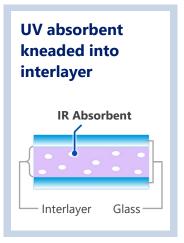
IR-blocking Glass



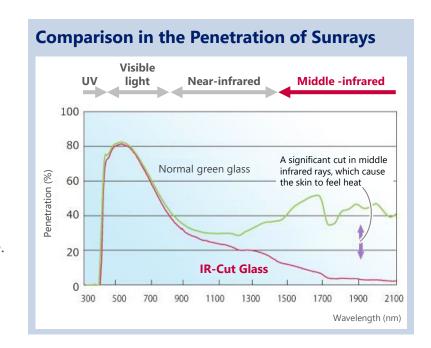
Coolverre[™]



Increased comfort by cutting both IR & UV rays



- Efficiently blocks middle infrared rays (IR), which cause the skin to feel heat under the sun, and reduces irritations caused by direct sunlight.
- Provides greater interior comfort and improves fuel efficiency by controlling temperature increase inside the vehicle.
- Filters out approximately 99% of UV rays, which can cause aging of the skin
- Good radio-wave transmission



Light Control Glass



WONDERLITE™ Dx

Structure of laminated glass that sandwiches a special film. Realize a comfortable in-vehicle space according to the scene.

- World's fastest switch control
- Cuts ultraviolet rays by 99% in both dimming and transmission modes
- Cuts ultraviolet rays to protect the skin of occupants, and contributes to reducing CO₂ emissions by reducing cooling loads



Low-E Glass

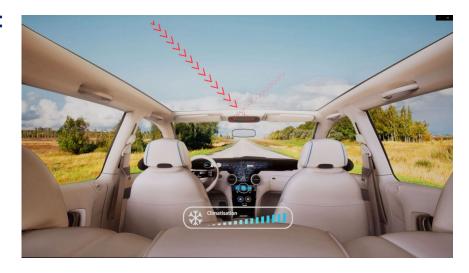


Low-E Glass

Special Low-E coating for automotive use blocks solar heat and provides a cool and comfortable cabin temperature in summer and a warm and comfortable cabin

temperature in winter by preventing heat inside the car from escaping outside.

- It reduces CO₂ emissions by reducing the air conditioning load and improving fuel economy, and contributes to extending the cruising range of EVs.
- When used on roof glass, it enables a shade-less setting, contributing to weight reduction of the vehicle body and securing head clearance (the distance from the top of the head to the ceiling when sitting in the seat).

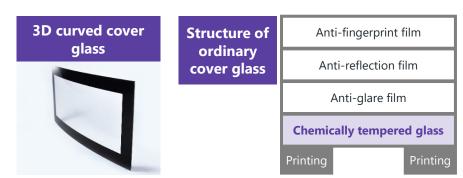


Specialty Glass for Chemical Strengthening



With exceptional strength and high-end appearance, chemically strengthened Dragontrail opens up new possibilities for automotive interior design.

- Strength and stability of Dragontrail contributes to safe and comfort driving experience.
- High scratch resistancy and various surface treatment options provide long lasting surface beauty, clear display image under all environment and smooth touch surface.





Cover glass for car-mounted display



■ **Track record of adoption:** Delivered more than 30 million sheets for over 100 vehicle models since the start of production in 2013

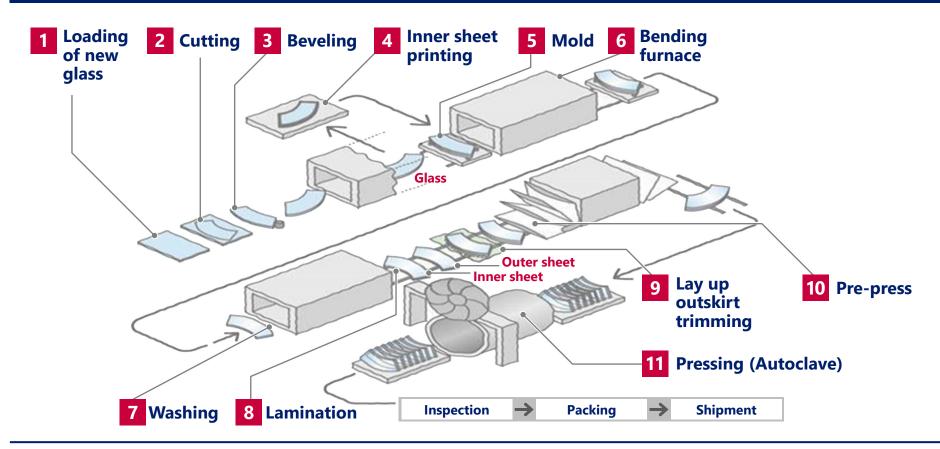


Major adoption cases (excerpts)

- 1	Company	Audi	TOYOTA	General Motors
	Vehicle model	Audi " A8 "	LEXUS " RX "	Cadillac " Escalade "
	Announced date	September 14, 2017	September 2, 2019	September 10, 2020

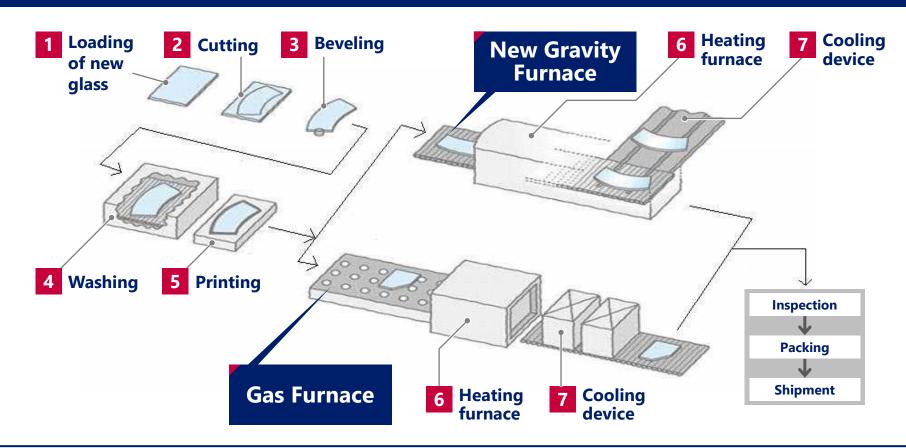
Production of Automotive Laminated Glass





Production of Automotive Tempered Glass





Manufacturing Bases for Automotive Glass



30

Europe	4 plants	
City	Country	
Aniche	FRA	
Roccasecca	ITA	
Chuderice	CZE	
Tatabanya	HUN	

Africa	1 plant
City	Country
Kenitra	Mar

Japan/ Asia Pacific	12 plants
City	Country
Aichi	IDNI
Sagami	JPN
Qinhuangdao	
Foshan	CHN
Suzhou	-
Cikampek	IDN
Bangpakong	THA
Rewari (*)	
Chennai (*)	
Roorkee (*)	IND
Taloja (*)	
Patan Gujarat (*)	

North Americas 3		plants	
City	State	Country	
Elizabethtown	KY	LICA	
Bellefontaine	ОН	USA	
San Luis Potosí	San Luis Potosí	Mexico	

South Americas 1 plant		
City	State	Country
Guaratingueta	Sao Paulo	Brazil



Electronics Segment: Display

Main Products



General name	Product name	Product description
Glass Substrates for TFT-LCD / OLED Displays	AN100	Alkali-free aluminosilicate glass substrates manufactured by the float process. This display material has an exceptionally smooth and flat surface, excellent transparency and thermal resistance.
	AN Wizus™	Glass substrates with the world's lowest level of thermal shrinkage. Optimal for use in high-resolution display panels on smartphones and tablets, etc.
	AN Rezosta™	Large glass substrates for high-definition, large-screen displays with the industry's highest Young's modulus.
Specialty Glass for Chemical Strengthening	Dragontrail™ series	A specialty glass for chemical strengthening used as a cover glass for touchscreens on electronic devices such as smartphones, tablets, PCs, and automotive displays.
High-quality soda-lime glass	AS2	Glass for sensor substrates, various display devices, touch panels for smartphones and tablet PCs, and cover glass.

Glass Substrates for TFT-LCD/OLED Displays



AN100

AGC's Strengths

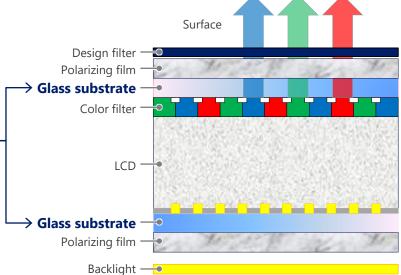
Stable production of aluminosilicate glass, which has transparency, smooth and flat surface, and excellent heat resistance.

TFT glass substrates: AN100



AN100 is alkali-free glass. It does not contain alkaline substances (soda ash) that are harmful to TFTs.

Cross-sectional view of LCD TV



Glass Substrates for TFT-LCD/OLED Displays

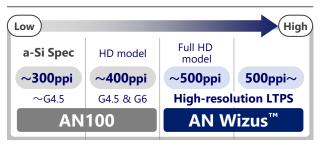


AN Wizus™

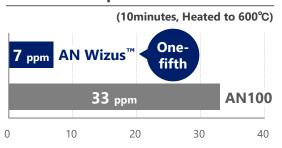
AGC's Strengths

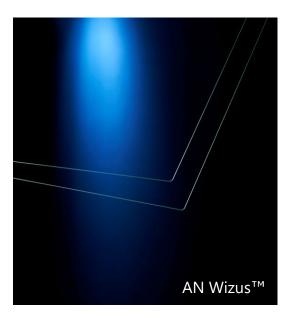
Optimal glass composition design for high-definition panels and production using the float method with a long slow cooling process suitable for producing low thermal shrinkage glass, resulting in overwhelmingly low thermal shrinkage.

Resolution



Thermal Compaction





Glass Substrates for TFT-LCD/OLED Displays



AN Rezosta[™]

AGC's Strengths

With the industry's highest Young's modulus, low thermal shrinkage, and capability of production of 8th-generation and larger area, "AN Rezosta™" will contribute to improving performance and productivity in the large, ultra-high-resolution, high-refresh-rate panels of its customers.



Manufacturing Process for Glass Substrates for TFT-LCD/OLED Displays



Raw Glass Production Process Melting

Thin glass forming

Annealing

Cutting (raw float glass)

Float Process

(mass production, large size and low cost)

Precision Cutting and Polishing Process **Cutting (substrates)**

Beveling

One-sided polishing

Cleaning

Packing and shipping

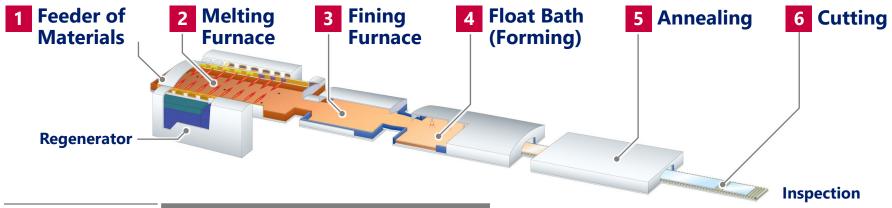
Inline Polishing Process

(very flat precision surface form)

Production Method of Glass Substrates for TFT-LCD/OLED Displays



Float Process



AGC's Float Process Cutting Image



The float process has greater effective width, which allows the production of a multiple number of large-sized glass substrates at a time.

Size Trend of Glass Substrates for TFT-LCD / OLED Displays





Specialty Glass for Chemical Strengthening



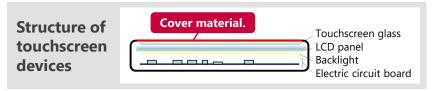
Dragontrail[™] series

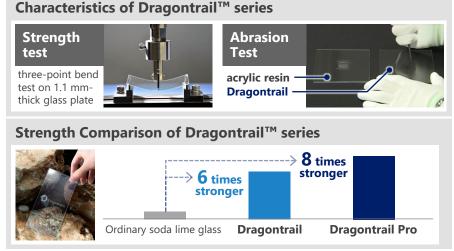


A specialty glass for chemical strengthening used as a cover glass for touchscreens of smartphones, tablet ,PCs and other electronic devices

AGC's Strengths

- Highly resistant to scratches and features a beautiful, pristine finish compared with resin.
- Dragontrail[™] is manufactured by using the float method, a highly efficient production method as compared with fusion method and other manufacturing process.





*Whencompared with glass of the same thickness

High-quality Soda-lime glass



High-quality soda-lime glass "AS2" is used in various parts of display devices and electronic equipment.

It is manufactured by the float method, which is highly efficient in production, and is available in a variety of thicknesses from 0.23 to 1.1 mm. We can meet the needs of a wide range of customers.



For TN/STN-LCD

As a substrate for LCD panels, AS2 contributes to the realization of high yields.



For cover glass

AS2 is used as tempering cover glass for general-purpose devices such as tablets, PCs, car-mounted display and industrial devices.



For touch sensor

Taking advantage of the thermal stability of glass, AS2 is used in touch sensors for carmounted display.

Manufacturing Bases



Product	Plants	Region
	 Kansai Plant (Amagasaki factory) AGC Display Glass Yonezawa 	Japan
	AGC Display Glass Taiwan	Taiwan
Glass Substrates for TFT-LCD / OLED	AGC Fine Techno Korea AGC Display Glass Ochang	Korea
Displays	 AGC Display Glass (Kunshan) AGC Display Glass (Keishu) AGC Advanced Electronics Display Glass (Shenzhen) 	China
Specialty glass for	Kansai Plant (Takasago factory)	Japan
display applications	AGC Flat Glass Protech (Shenzhen) Inc.	China
High-quality soda- lime glass	AGC Flat Glass Thailand	Thailand

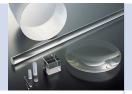


Electronics Segment: Electronic Materials

Semiconductor-related materials (1)



Synthetic Fused Silica Glass



Synthetic Quartz



Ultra thin glass contributes to thinner and dervisified design for electronics devices with touch-panels

(Product Name) Synthetic Fused Silica Glass AQ series

Applications

- Lens material for IC/LCD steppers/scanners
- Photo mask substrate
- Other optical material
- Glass wafer

Features

- High transmittance for deep ultraviolet rays with frequencies
- Excellent Compaction/Rarefaction and Polarization Induced Birefringence(PIB) characteristics
- Excellent heat resistance and durability
- Thermal expansion as low as 1/10 that of conventional glass
- High uniformity, Very high purity, very low metal impurity content
- Low OH group content
- Outstanding chemical resistance, Low dielectric loss

High durability against laser irradiation

(Product Name) Synthetic Quartz Crystal CQ

Applications

■ Prisms, etc.

Features

■ This glass reduces deterioration from laser radiation to 1/5 or less relative to that of conventional artificial crystals, and its light resistance against high-intensity lasers, which are used for IC steppers/scanners, etc., has been greatly improved.

Semiconductor-related materials (2)



Silicon Carbide



CMP Slurry



EUVL mask **blanks**



High purity, high strength, low thermal **expansion Silicon carbide**

(Product Name) ROICERAM™-HS

Applications

- Material for semiconductor production equipment
- Material for LED manufacturing device
- Material for solar cell production equipment

Features

- The product has characteristics of high purity, high strength, low thermal expansion and excellent acid resistance and heat resistance.
- We have over 30 years of experience as a supplier of parts for semiconductor manufacturing furnaces mainly in high temperature process.

AGC offers slurry and polishing solutions for CMP processes

(Product Name) CMP Slurry

Applications

- Front-end semiconductor process (wafer process)
- Various polishing for back-end process (package process)

Features

- Design and manufacturing of abrasive particles
- Accumulated technology of polishing materials for glasses
- Design and manufacturing of various analyses and chemical liquid
- Polishing material evaluation technology

Consumable components required for EUV lithography technology

(Product Name) EUVL mask blanks

Applications

■ EUV lithography

- Producing high-purity substrates with technology and knowledge cultivated over many years
- We have developed a special polishing method to achieve ultra-high planarization through integrated production of substrate and polishing.
- Responds to customer requirements with optimal film design capabilities for high-definition applications and film formation technologies that reduce defects

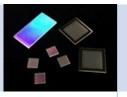
Optoelectronic materials (1)



High refractive index glass



DOE · Diffuser



Glass Ceramics Substrate



Glass substrates for next generation displays

(Product Name) High refractive index glass

Applications

- Glass waveguide used on AR/MR smart glasses
- Glass waveguide for automotive headup display

Features

- High refractive index
- Low absorption loss
- Flatness
- Smoothness
- Good thermal and chemical reliabilities

Micro-structured glass components for various consumer electronics and industrial laser applications

(Product Name) Diffractive optical element(DOE)/Glass diffuser

Applications

- Sensing
- AR/VR/MR
- Projector, Optical communications, Lighting
- Laser beam shaping

Features

- One-stop service from design, prototyping through evaluation
- Accumulated skills and experience on DOE processing
- Small 0th order transmission, high efficiency, high durability
- Capabilities of very large FOV and high density dot projection
- Multi-level steps processing

Products for contributing brightness and high-output of LED and semiconductor laser

(Product Name) GCHP™

Applications

- Visible LED, IR LED, UV LED
- Semiconductor Laser
- headlamp

- Integrated development from glass material to finished products
- High optical reflectance over a wide range of spectrum (UVC-NIR)
- High heat release efficiency
- Package size reduction capability by 3D circuit integration (multilayer)
- High reliability realized by glass (no color change)
- High hermetic properties of dense glass
- Prevention of solder cracking by glass

Optoelectronic materials (2)



Optical Planar Devices



IR cut filter



Optical element that greatly increases the performance and design freedom of light-related devices

(Product Name) Micro lens array, transmission grating, wave plate

Visibility compensation filters for cameras

(Product Name) NF Glass Filter

Applications

- Optical pickup for CD/DVD/Blu-ray
- Optical imaging device
- Optical communication device

Applications

 Digital single-lens reflex camera, compact camera, smartphone camera, cameras for automobiles, surveillance camera, etc.

Features

- The element controls light as intended by using holograms or gratings.
- Customized size-designing
- High efficient polarization filter
- Customized optical beam control

- excellent image quality with absorption type
- It reduces ghosting and flares which have a bad influence on the image quality.
- Incident angle dependence of spectral transmittance is small
- integrated production system in a range from glass melting to forming/processing
- The variety of lineups are available so as to meet the spectral characteristics by the customers' requirements, such as anti-reflection coating and UVIR cut film

Optoelectronic materials (3)



Aspherical Glass Lenses



Aspherical Glass Molded Lenses (Chalcogenide Glass)



Aspherical Glass molded lenses improving the optical performance of precise equipment

(Product Name) Aspherical Glass Molded Lenses

Aspherical glass mold lenses made of chalcogenide glass with high transmittance for infrared light

(Product Name) Aspherical Glass Molded Lenses (Chalcogenide Glass)

Applications

- Digital single lens reflex cameras (DSLR), mirrorless interchangeable lens camera, compact camera, surveillance camera, cameras for automobile
- Projectors
- Sensing equipment

Applications

- Surveillance cameras
- Night vision devices for automobiles
- Analyzers using infrared rays

Features

- Lens shape: biconvex, meniscus (convex and concave), biconcave, toroidal, etc.
- Lens type: single lens and cemented lens (Doublet, Triplet)
- Size: φ1mm to φ48.5mm or so
- Special processing: I cut, D cut, and rectangular cut, etc.

- High infrared light transmittance lenses are realized by chalcogenide glass characteristic.
- High functional anti-reflection coating can be added to the lens surface
- Diffraction grating can be added to the lens surface

Optoelectronic materials (4)



Micro Lens Array



Aspherical Glass Molded Lens



Fly eye lens / Lens array



Optical Elements with one or two dimensionally arrayed small lenses on a glass substrate

(Product Name) Micro Lens Array

Applications

- Digital cameras, light field cameras
- Projectors
- Light control equipment

Features

- Lenses with submicron level accuracy can be formed.
- High accurate and various lens interval (array pitch) can be arranged.
- Not only single-sided arrays but also double-sided arrays can be manufactured.

Glass mold lens that is excellent in heat resistance and durability

(Product Name) Glass mold lens (Aspherical / Spherical)

Applications

- Fly-eye lenses for projectors Condenser lenses
- Multi-lens array for laser illumination
- Aspheric lens for illumination

Features

 Borosilicate glass with high weather resistance required for high-luminance projectors is used to create high-precision lenses through precision mold processing and molding technologies.

Glass mold lens product that is excellent in heat resistance and durability

(Product Name) Fly eye lens / Multi lens array

Optical Thin Film / Polycarbonate Sheet, Thin Sheet, Film (1)



Antireflection Film



Beam Splitter



Interference Filter (Dichroic Mirror)



Reduce the surface reflection and improves the permeation rate

(Product Name) Antireflection Film

Select an arbitrary wavelength and able to separate polarization components

(Product Name) Beam Splitter

Adjustment of permeation and reflection depending on the incidence angle is possible.

(Product Name) Dichroic Mirror/Filter

Applications

 Products using lenses, processing equipment, medical measuring equipment, etc.

Applications

 Semiconductor and LCD lithography equipment, laser interferometers, measurement equipment, etc.

Applications

 Color TV cameras, LCD projectors, color photo enlargers, color fax machines, lighting, other optical systems, etc.

Features

- Single- or multi-layer dielectric films are formed on the surface of optical materials to prevent light reflection on the surface and improve transmittance.
- Suppresses ghosting in optical elements.

Features

- Reflects a portion of the single-incident light and also transmits a portion of the single-incident light. Also capable of separating p- and spolarization components.
- Two types: cube and plate

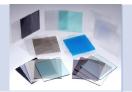
Features

AA multilayer film of dielectrics, each with a different refractive index, separates light in two or more wavelength regions. This action makes it possible to extract specific colors.

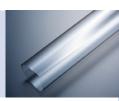
Optical Thin Film / Polycarbonate Sheet, Thin Sheet, Film (2)



Polycarbonate Sheet



Polycarbonate thin Film



Excellent in processability, flame retardancy, lightweight, and tough transparent material

(Product Name) CARBOGLASS™, TWINCARBO™, etc.

Polycarbonate Film with excellent in shock resistance and Flame retardancy

(Product Name) CARBOGLASS™

Applications

- Building materials, industrial materials
- Interiors, exteriors, etc.

Applications

■ Parts for automobiles, home appliances, office equipment, etc.

Features

- High shock resistance
- Lightweight
- Flame retardancy
- Easy processing and forming
- Wide range of working temperature

- Excellent in shock resistance.
- Excellent in screen printing, and has extraordinary adhesion of UV ink.
- Excellent in transparency and can display printing ink colors reliably.
- Excellent heat resistance/cold resistance, and retains dimensional stability.
- Excellent in electric insulation.
- Easy to process (i.e. heat forming, die cutting, and cutting, etc.).

Other (1)



Glass Frit, Glass Pastes and Low Temperature **Hermetic Sealing Parts**



Glass substrate for anodic bonding



SW glass substrate



Materials for electronics applications used for the purposes of insulation, hermetic sealing

(Product Name) Glass Frit, Glass Pastes and Low Temperature Hermetic Sealing Parts

Applications

- electronics applications for insulation, hermetic sealing, and protection purposes
- Chip components (capacitors, inductors, MEMS)

Features

■ We can provide products in various forms such as powder, paste, and molded products

Glass with an expansion coefficient that is very close to silicon

(Product Name) SW glass substrate

Applications

- Wafer-level packages for MEMS substrates
- Pressure sensors, acceleration sensors, Various automotive and industrial sensors and instruments
- LD/UVC-LED packages

Features

- Very close thermal expansion characteristics to silicon over a wide temperature range, and can be bonded tightly to silicon substrates by anodic bonding
- Metal coating and etching through hole completion and spot facing on substrates are also possible without difficulty.

Plastic ware for tissue culture products with reliable "IWAKI" brand

(Product Name) Tissue Culture Products

Applications

- Drug Discovery Research
- Regenerative Medicine Research
- Various research in cell biology

- Strict quality control
- Sales of general-purpose products as well as unique products with specific functions
- Culture vessels with various culture surfaces
- Dish and plate culture vessels are shaped for easy gripping.

Other (2)



Laboratory Glass Ware (Beaker, Flask, etc.)



Heat Resistant Glassware



High-quality heat resistant glass ware for Laboratories

(Product Name) Laboratory Glass Ware

Heat resistant glassware usable everyday for food preparation, cooking, dining and storage

(Product Name) iwaki Heat Resistant Glassware

Applications

■ Various containers (beakers, flasks, etc.) and measuring instruments (scalpels, pipettes, etc.) used in science experiments

Applications

- Kitchenware
- Tableware

Features

- Low-expansion borosilicate glass material with excellent heat resistance, chemical resistance, and transparency
- A lineup of glass products in a wide variety of shapes based on the accumulation of dissolution and processing technologies over many years

- Excellent heat resistance allows cooking in ovens and microwaves, and use in dishwashers and dryers.
- Excellent weather resistance, making it easy to clean and resistant to odor transfer.
- Excellent chemical resistance, unaffected by acids, alkalis, and other food components.

Main Products (Multi Material)



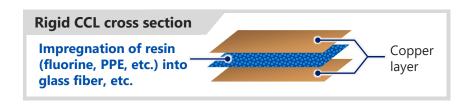
General name	Typical product lines	Product description
CCL (Copper	Meteorwave	A printed circuit board material composed of copper layers and PPE resin based insulating resin, which has excellent electrical characteristics and processability, and is used for high-speed communication and autonomous driving Radar applications.
Clad Laminate)	PTFE	A printed circuit board material composed of copper layers and PTFE resin based insulating resin, which has excellent electrical characteristics and processability, and is used for autonomous driving Radar applications.
	Fabric	A product in which a base material such as glass fabric is impregnated with PTFE resin, which can be used in a wide range of temperatures, has excellent chemical resistance and non-adhesiveness, and is deployed in applications such as solar cell lamination and food processing.
	Таре	A highly functional material coated with a silicone-based or acrylic-based adhesive, which has excellent features, which has excellent heat resistance, electrical insulation, and non-adhesiveness, and has been deployed for FPCB/LCD processing processes and mold release and insulation applications in secondary batteries.
Industrial PTFE composite Derivatives	Belt	A product endlessly processed into a belt using PTFE coated fabric, which has excellent peelability and chemical resistance and can be used for transporting and continuous processing of adhesive materials in a wide temperature and has been deployed for Soldering belt, Printing dryer belt and Food processing belt.
	Architectural Fabric	A product for architectural applications suitable for large membrane structures in which a thin glass fabric is coated with PTFE. The product has excellent weather resistance, flame retardancy, translucency, and self-cleaning properties, and is used in construction applications such as roofing materials, ceiling materials, and interior materials.
	Composite Film	A product in which a fluoropolymer resin such as PTFE or FEP, which has excellent temperature resistance, chemical resistance, electrical insulation and mold release properties, and can be used for electronic parts, semiconductor products, and mold releasing films for fuel cell production processes. Due to its excellent durability, the product can be considered for reuse instead of disposable, contributing to the reduction of waste.

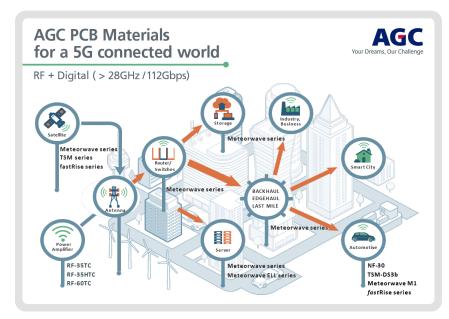
CCL (Copper Clad Laminate)



AGC's Strengths

- Wide range of product lineup from digital to RF area.
- Strengths in material development, resin coating technology, electrical characteristics evaluation technology, and various analysis technologies.
- AGC acquired the CCL business and other businesses from Park Electrochemical and Taconic in 2018-2019 and responds to customer needs with global production and sales support.





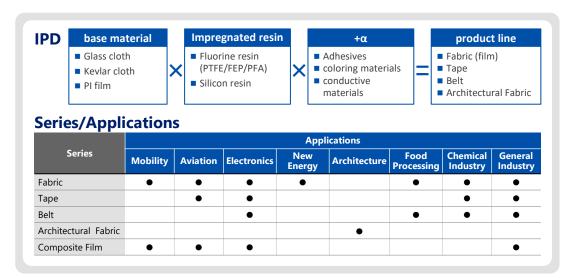
- CCL is a printed circuit board material composed of copper layers and insulating resin.
- Applications are expected in the field of next-generation high-speed communications (5G·6G), including consumer communications (base stations, servers), automotive (millimeter-wave radar), and aerospace (satellite communications), etc.

Industrial PTFE composite Derivatives



AGC's Strengths

- Wide range of product lineup and applications from general industry to advanced functional materials and new energy fields.
- Strengths include unique resin coating technology and customized development capabilities to meet performance requirements and various applications.
- AGC acquired Korea Taconic's IPD business in 2019 and respond to customers' requests with global sales support, demonstrating the synergistic effect of AGC brand on conventional KTC technology.



- IPD is a general term for composite materials in which various base materials are impregnated with PTFE. Products such as industrial fabrics, tapes and belts.
- The unique coating technology has the advantage of being able to customize the design to meet various applications and performance requirements.
- Applications are expected in general industry (e.g., food processing and construction applications), electronics and semiconductors (e.g., FPCB/LED/CMOS packaging processes), aviation (CFRP release sheets), automobile (e.g., fuel cell stacks), and new energy (solar cell).

Major manufacturing Bases



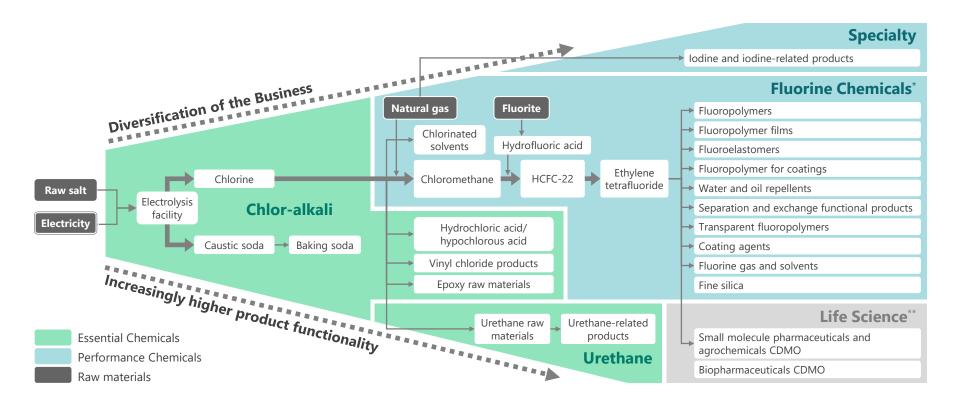
	As of	As of January 2025
Product	Plants	Region
Semiconductor process materials	Kansai Plant (Takasago factory)AGC Seimi ChemicalAGC Electronics	Japan
	AGC Electronics America	USA
Optical materials for cameras	 AGC Techno Glass AGC Micro Glass 	Japan
	AGC Micro Glass (Thailand)	Thailand
Glass-ceramics substrate for high-power LED/LD lighting	AGC Electronics Taiwan	Taiwan
Glass mold lens	AGC Techno Glass (Thailand)	Thailand
Optical Coating Products	Optical Coatings Japan	
Polycarbonate	AGC Polycarbonate	Japan
Glass frit/paste	AGC Electronics	
Tissue Culture Ware	AGC Techno Glass	
CCL (Commercial Laurineta)	AGC Multi Material America	USA
CCL (Copper Clad Laminate)	AGC Multi Material Singapore	Singapore
CCL(Copper Clad Laminate) Industrial PTFE composite Derivatives	- AMMK	Korea



Chemicals: Essential Chemicals Products

Chemical Chain of AGC's Chemical Business





Essential Chemicals Products



General name	Product usage
Caustic Soda	Chemicals, chemical fibers, paper/pulp, etc.
Caustic potash	Chemicals, potassium carbonate raw materials
Potassium carbonate	Food additives, detergent feedstock
Hydrochloric acid	Inorganic chemicals, steel, and chemical seasoning
Sodium hypochlorite	Bleaching pulp and textile, and sterilizing tap water
Liquid chlorine	Bleaching pulp and sterilizing tap water
Vinyl chloride monomer	Polyvinyl chloride raw materials (VCM)
Polyvinyl chloride	Polyvinyl chloride (PVC)
Trichloroethylene, Perchloroethylene	Industrial cleaner, dry-cleaning solvent, fluorinated gas feedstock
Methyl and ethylene chloride	Silicone resin, industrial cleaner, extracting solvent for pharmaceuticals and agrochemicals, paint stripper
Chloroform	Raw materials for fluorochemical products
Epi-chlorohydrin	Epoxy resin
Propylene oxide	Raw materials for propylene glycol, dipropylene glycol and polyols, raw materials for non-ion surfactants
Propylene glycol	Raw materials for unsaturated polyester resins and plasticizers, surfactants, antifreeze and coolants, food additives, perfume and tobacco, toothpaste, cosmetics and medical supplies
Polyols	Rigid and flexible polyurethane foams, coating, adhesives and sealant, elastomers
Sodium bicarbonate	Food additives, pharmaceuticals, bath salts, industrial applications and animal feeds

Caustic Soda, Polyvinyl chloride



- Caustic soda and chlorine are produced from electrolysis of salt.
- Caustic soda is used in a wide range of application as a typical alkaline product for industrial use.
- Chlorine is processed into a variety of products, such as polyvinyl chloride(PVC).



Crude salt, raw material for chloralkali products.



Electrolysis system, using AGC's ionexchange membrane (Flemion™)

Caustic soda



- Paper/pulp
- Alumina refining
- Soap / detergent
- Sewer neutralization

Polyvinyl chloride



- Pipes
- Window sashes

Polyurethane products



- Polypropylene glycol (PPG) is an indispensable main raw material for producing polyurethanes.
- We have an integrated production system from propylene oxide(PO), the raw material for PPG, to polypropylene glycol (PPG).
- AGC also produces modified silicones with high functionality.
- AGC also offers environment-friendly products, such as PPG suitable for water foaming which enables molding without usage of CFCs, and PPG which can be used with HFO, a new environmentally friendly refrigerant.

PO

- Raw material for PPG
- surfaceactivating agent



PG

- Medical
- Cosmetics
- Food additives

PPG EXCENOL, PREMINOL

- Foaming application
 - rigid foam (insulator material)
 - flexible foam(seat cushion)
- Non-foaming application
 - · Coating Adhesive Sealant Elastomer

high function **PPG**



Modified silicones

Sodium Bicarbonate



- Sodium bicarbonate is used in various fields, ranging from home products, medical products to advanced technologies.
- As the largest sodium bicarbonate manufacture in Japan, AGC offers a fine selection of grades. AGC is also committed to develop new products to meet wide range of needs.

Applications

Industrial cleaning	Blast cleaning media, Chemical cleaning new system
Flue gas treatment	Flue gas neutralization
Pharmaceuticals	Stomach medicine (antacid), dialysis
Home products	Cleaners, bath salts, deodorant
Food products	Baking powder, PH control chemicals
Agricultural / Livestock industries Civil engineering / construction	Formula feed ingredients, Animal pharmaceuticals, Agrochemicals ingredients Liquid glass soil hardening agents
Industry	Fire extinguisher, metal surface treatment agents, neutralizer



Sodium bicarbonate can also be used as a highly reactive neutralizer for exhaust gas treatment, efficiently removing acidic components in exhaust gas such as HCL, SOX, sulfuric acid mist, and etc..

Chemicals Manufacturing Bases of Essential Chemicals



Chlor-alkali & urethane

General name	Production base	Country
Caustic Soda	Chiba plantHokkaido SodaKashima plant	Japan
(2 million tons) *	P.T.Asahimas Chemical	Indonesia
	AGC Vinythai	Thailand
Caustic potash	■ Chiba plant	Japan
(130,000 tons) *	AGC Vinythai	Thailand
Potassium	Chiba plant	Japan -
carbonate	AGC Vinythai	Thailand
	Chiba plantHokkaido SodaKashima plant	Japan
Hydrochloric acid	P.T.Asahimas Chemical	Indonesia
	AGC Vinythai	Thailand
	■ Chiba plant ■ Kashima plant	Japan
Sodium	Hokkaido Soda	Japan
hypochlorite	P.T.Asahimas Chemical	Indonesia
	AGC Vinythai	Thailand
	■ Chiba plant ■ Kashima plant	Japan
Liquid chlorine	■ P.T.Asahimas Chemical	Indonesia
	AGC Vinythai	Thailand

		4	
General name	Production base	Country	
Vinyl chloride	Keiyo Monomer	Japan	
monomer	P.T.Asahimas Chemical	Indonesia	
(1.5 million tons) *	AGC Vinythai	Thailand	
	P.T.Asahimas Chemical	Indonesia	
Polyvinyl chloride (1.2 million tons) *	AGC Vinythai	Thailand	
(1.2 million tons)	AGC Chemicals Vietnam	Vietnam	
Trichloroethylene, Perchloroethylen	Chiba plant	Japan	
Methyl chloride	Kashima plant	Japan	
Methylene chloride	- Chiha mlant	lanan	
Chloroform	■ Chiba plant	Japan	
Epi-chlorohydrin	Kashima Chemical Co., Ltd.	Japan	
(170,000 tons)*	AGC Vinythai	Thailand	
Propylene oxide (110,000 tons) *			
Propylene glycol (40,000 tons) *	Kashima plant	Japan	
Polyols (80,000 tons) *			
Sodium bicarbonate (50,000 tons) *			

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Chemicals: Performance Chemicals Products

Products of Performance Chemicals

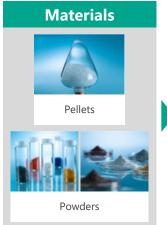


•	General name "Product name"	Product usage
Fluoropolymers "Fluoropolymers"	uon® ", "Fluon+™"	Tubing, sealing, wire insulation, films, filaments, lining, etc. for various industries
Fluoroelastomers "A	AFLAS®"	Wire insulation, high performance sealing materials for semiconductors, food manufacturing, oil & gas application, etc.
Fluoropolymer film Green house film "F	"Fluon® ETFE FILM" -CLEAN®"	Mold releasing films, roofing and architectural facades, interior finishing and photovoltaics Green houses
Transparent Fluorop	polymers "CYTOP®"	Optical materials, semiconductor processing, hi-performance
Fluoropolymer resir	n for coatings "Lumiflon®"	Architectural structures, bridges and aircrafts
	FORBLUE™ FLEMION	Ion-exchange membrane for salt electrolysis (for caustic soda/caustic potash/chlorine production)
lon-exchange membranes	FORBLUE™ S-SERIES	Water electrolysis, redox flow battery, lon-exchange membrane for wide variety of electrolysis and electrodialysis processes
membranes	FORBLUE™ SELEMION	Acid recovery, wastewater reclamation, desalination and concentration, desalination of groundwater
	FORBLUE™ sunsep	Dehumidification and humidification of various gases
Fluorine-based elec	trolyte polymer for fuel cells "FORBLUE™ i-series"	Material for power-generating system of fuel cell vehicles
Fluorinated gases as "AMOLEA™1234yf"	nd solvents , "AMOLEA™1224yd"	Refrigerants for freezer/refrigeration equipment, and air conditioners, working fluid, foaming agent
Fluorinated solvent	"AE-3000", "AC-6000" "AMOLEA™AS-300"	Cleaning, rinsing and drying agents, dewatering, solvents, dispersant, heat transfer fluid
Fluorocoating agen	ts "SFCOAT™"	Damp-proof coating for electronics devices, oil barrier, anti-flux migration, anti-resin adhesion
Fine silica RESIFA™ RESIFA™ SUNLOVEL	M.S.GEL™, RESIFA™ SUNSPHERE™, Y™	Liquid chromatography packing agent, cosmetic materials

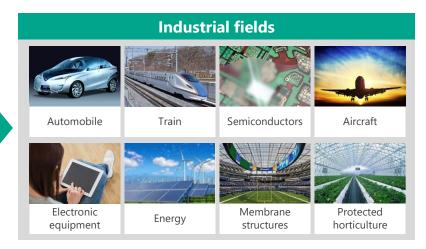
Performance Chemicals: Fluorinated resin Fluon® ETFE



- Fluoropolymers with ease of forming and fabrication while keeping the excellent characteristics of fluorine.
 Widely used in diverse and specific industrial fields, namely transport equipment, electronics, construction, and energy.
- Extrusion molding, injection molding, and powder coating are possible. Used in severe usage environment where thermal resistance, chemical durability, insulation, etc. are required such as wire coatings, tubes, and coating materials.
- With ETFE, film fabrication is also easy. **Used as a mold-releasing film for membrane structure materials and other various fields**







Environmentally friendly refrigerant & solvent AMOLEA™ series









- AGC's AMOLEA[™] is a solvent and refrigerant brand developed under the concept of dramatically reducing Global Warming Potential (GWP) while maintaining conventional performance.
- We have the following three products for each application.

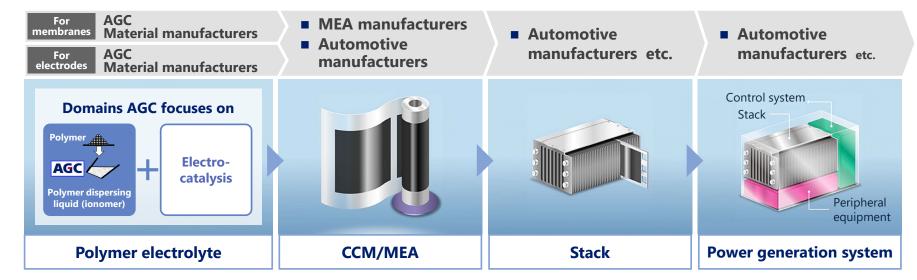
General name	Name of the Product	Applications
New environmentally-friendly refrigerant	AMOLEA™ 1234yf	refrigerant for mobile air-conditioners, refrigerators
New environmentally-friendly refrigerant	AMOLEA™ 1224yd	refrigerant for turbo chillers, working fluid, foaming agent
Low GWP Fluorinated Solvent	AMOLEA™ AS-300	Cleaning, solvent

■ (American Society of Heating, Under-development AMOLEA 1123 mixed refrigerant is a most promising candidate as a next-generation refrigerant which offers high freezing/heating capacity and low GWP at the same time. It is AGC's unique refrigerant, which is promising to lead market growth mainly for air conditioners for residential, commercial and electric vehicles.

Fluorinated electrolytic polymer for fuel cells (PEMFC ionomer)



- Supplying fluorine-based electrolyte polymer (PEMFC ionomer) for fuel cell membranes, an essential component of fuel cells.
- Demand increase accelerated due to the spread of fuel cell vehicles (FCV) and technological development aimed at realizing a hydrogen society.
- AGC achieved No.1 position based on the excellent performance for high power generation and durability.



Fluon+™ EA-2000



Adhesive fluoropolymer for next generation high speed communication.

- Fluon+™ EA-2000 is a low transmission loss fluoropolymer featuring low dielectric constant and low dielectric loss tangent
- Good adhesion and dispersibility that overturns the concept of existing fluoropolymers.
- Printed circuit boards using this product can reduce transmission loss by 30% or more compared to existing materials.

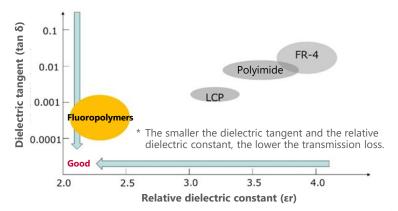
Printed circuit board/flexible printed circuit board applications suitable for Fluon+™ EA-2000

Automotive radar

Flexible printed circuit boards for 5G smartphones

millimeter-wave devices

Dielectric constant and dielectric tangent



Source: Edited by AGC based on data from Nikkei Electronics August 2017 issue



Fluon+™ EA-2000/ PPE laminated CCL



Fluon+™ EA-2000 coat RCC

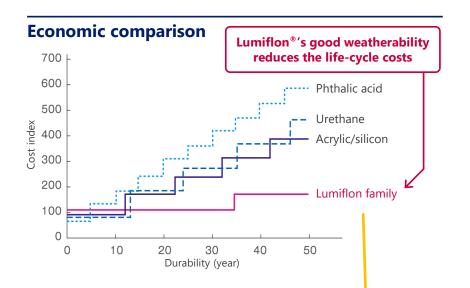
Fluoropolymer Resin for Coatings Lumiflon®



■ Lumiflon® is the world's first solvent-soluble fluoropolymer for coatings, developed by AGC's fluorine technologies, commercialized in 1982.



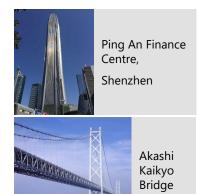
- Chemically-stable fluoropolymer demonstrates greater weatherability than conventional coating materials.
- Proven credibility based on more than 40 years of experience, used for over 200,000 buildings and facilities.



Excellent weatherability



Lumiflon® is used for:



Silica



- AGC Si-Tech, as a professional in the silica business for long years, offers silica products suitable for various applications including cosmetics, industry, and pharmaceutical production.
- Silica is attracting attention as a material that contributes to the reduction of environmental risks since it is a material that originally exists in nature. For example, contributes to various social problem-solving, such as being expected to serve as an alternative to microplastics with concerns about their impact on the ecosystem due to their discharge into the ocean, and being utilized for semiconductor inorganic fillers.



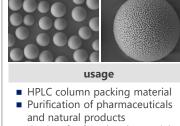


RESIFA™ Product Lineup

SUNSPHERE™ usage ■ Fillers for cosmetics and antiperspirants Fillers for resins and films

Carriers for functional materials

Catalyst carriers



M.S.GEL™

Carriers for functional materials

SUNLOVELY™ usage Binders for coatings Hydrophilic fillers

■ Functional particulate binders

Manufacturing Bases of Performance Chemicals



Production base lant • Kashim gineering Co., Ltd. emicals Europe, Ltd. emicals Americas Inc. lant		Japan England Americas
gineering Co., Ltd. emicals Europe, Ltd. emicals Americas Inc. lant		England
emicals Europe, Ltd. emicals Americas Inc. lant		England
emicals Americas Inc.		
lant	3.5	Americas
a plant		
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Life Science

Strengths of AGC's CDMO business





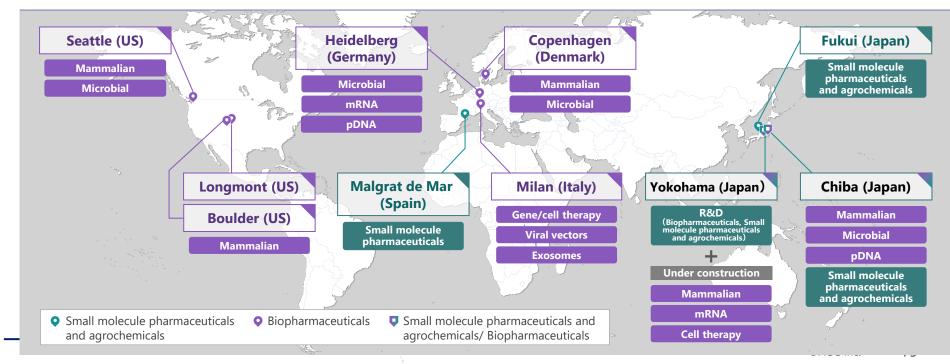
Strengths

- 1. Providing a high standard of services integrated from 10 sites in three regions of Japan, the US, and Europe
- 2. Flexible production system providing services from early-stage development to commercial phase
- 3. Extensive Manufacturing and Inspection Track Record

Global Network



We have established a highly integrated cGMP system in Japan, the U.S., and Europe, and provide the same high standard of development and manufacturing services in a wide range of fields from any of these regions.



Strengths | Flexible to production needs from early-stage development to commercial scale



Addresses a wide range of production scale needs that vary in accordance with the progress of the development phase of the drug product

Small molecule pharmaceuticals

We have both pilot facilities suitable for small-volume production in the early stages of development and large reactors for commercial phase.

Biopharmaceuticals

AGC is a pioneer in the introduction of SUBs, which enable flexible production of small- to medium-scale production, and has the industry's top-class production capacity*. Large-scale SUS was introduced in 2020 to accommodate large-scale commercial production.

Bioreactors used for biopharmaceutical production

The main bioreactors used for biopharmaceutical production are "SUB" and "Large-scale SUS."

SUB (Single-use bag)

A bioreactor that uses single-use bags, which are disposable containers. Since no washing of the bioreactor is required, it is highly efficient and suitable for small- to mediumscale multi-product production.



Large stainless steel bioreactors

Large-scale SUS

Suitable for large scale commercial production



Scale of production

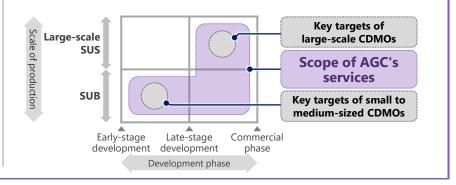
2.000L

12,000L

20.000L

Scope of AGC's services in the biopharmaceutical CDMO business

Combination of SUB and large SUS to meet a wide range of production scale and development phase.

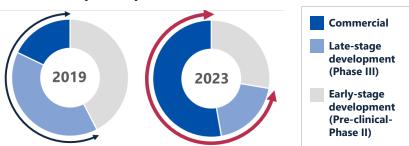


Strengths | Extensive Manufacturing and Inspection Track Record



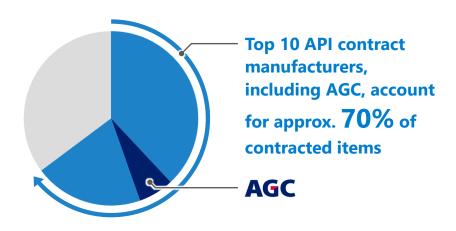
Based on many years of business experience, we have gained a wealth of manufacturing and authority inspection track record, as well as the trust of our customers. Increased orders for commercial and late-stage development projects requiring higher level of cGMP management. The more track records are accumulated, the more orders are received, leading to a virtuous cycle.

Percentage of biopharmaceutical CDMO contracts (value)



Mid- to long-term growth is expected to continue by the cycle of nurturing the projects together with the client from the early stage of development to the commercial stage where the contract is stable.

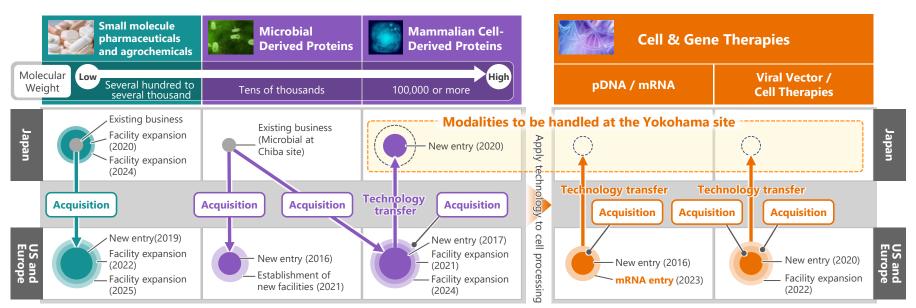
Percentage of contracted biopharmaceutical API* (%)



Service Expansion for Each Modality



- Since acquiring BIOMEVA in 2016, AGC has expanded its business regionally and technologically through substantial capital expenditures and M&As, forming a solid foundation as a pharmaceutical CDMO.
- Now, building on this foundation, further expanding in the cell & gene therapy area.





New Businesses: Solutions for next-generation high-speed communications

Plastic optical fiber cable



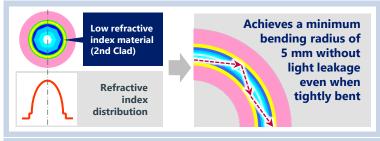
FONTEX®



A consumer fluorine-based plastic fiber featuring high transmission speed and ease of handling and connection

- FONTEX® is world's first optical fiber that enables high bandwidth and large capacity data communication with a transmission speed of 10 Gbps or more. The cable features resistance to tight bending, allowing data communication which could not have been achieved with existing silica-based fibers or POFs.
- Double-clad structure successfully prevents light from leaking out of the core. (See the figure in the upper left.) FONTEX® is an incredibly easy to handle optical fiber that doesn't have any kinks that inherently form in plastic and, above all, allows data communication under tight knots or bends. (See the figure in the lower left.)
- FONTEX® adopts a tight cord structure which the cable covering is directly attached to the fiber circumference (See the figure in the lower left.) This leads to cost reduction and simplified terminal treatment processing, allowing anyone to handle the cable with ease.
- FONTEX® is a safe and reliable plastic optical fiber (POF) for general household use. It is suitable for large-volume data transmissions, which are essential for next-generation 4K-TVs, and enables transmission even when it is handled roughly or is tightly bent.

Double-clad structure of FONTEX®





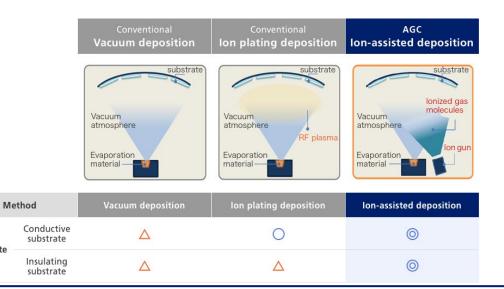
Yttrium Coating (Y2O3/Y5O4F7)

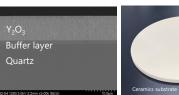
Substrate



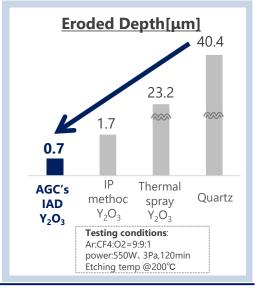
Ion-assisted vapor deposition method achieves dense, high hard coatings. Improved plasma resistance helps extend component life.

- The ion-assisted deposition (IAD) method achieves denser and harder coatings than those by vacuum evaporation and ion plating.
- The coatings have high corrosion resistance in environments requiring plasma resistance, extending the lifespan of equipment components and reducing maintenance costs.
- The capability to form dense coatings reduces particle generation, improving yields in manufacturing processes.











Ceramics / Others

©AGC Inc.

Overview of AGC Ceramics products



Common name	Name of typical product	Product description	
Fused cast refractory	ZB-X950 Series	A high-performance refractory made by electro-fusing at an ultra-high temperature of over 1,800°C and casting. It is adopted as a key material for glass melting furnaces by many customers worldwide.	
Monolithic refractory	Asahi Caster®/GRAM Monolithic refractory is made by blending carefully selected refractory raw material through advanced mixing technology. It is used in various high-temperature plants, AGC Ceramics proposes solutions to meet customer needs such as "shorter installation period" and "energy saving".		
Bonded refractory	BNC/HAS	A refractory material with both corrosion resistance and thermal shock resistance, made by press forming refractory raw materials and sintering them at a high temperature of 1,500°C or above. It is mainly used in cement kilns and has been adopted by many customers worldwide.	
Advanced ceramics	CERAROI-N/CERAROI-C	Ceramics with excellent thermal and corrosion resistance made by forming submicron high-purity raw materials under high pressure and sintering them in a reduction atmosphere. They are used in many fields such as steel, aluminum, and electronics.	
Ceramics material for 3D printers	Brightorb	A ceramics material optimized for ink jetting 3D printer that brings together the manufacturing know-how such as ceramics melting technology that we have accumulated over the years. It is attracting attention for shortening the lead time of the casting process and for craft and art applications.	
Engineering	Eco-lead furnace	We contribute to energy saving, environmental load reduction, longer service life, and stable operation of glass furnaces by providing our engineering services to meet customer needs, including furnace design, construction support, and remote operation monitoring.	

Overview of the AGC Ceramics Group



Japan

AGC Ceramics Co., Ltd.

- Headquarters: Tokyo
- Takasago Plant (Hyogo Prefecture) Manufacturing & Development
- Sales Offices:Tokyo, Osaka, and Kitakyushu

AGC Plibrico Co., Ltd.

Specialized manufacturer of monolithic refractories

- Headquarters: Tokyo
- Chigasaki Plant (Kanagawa Prefecture)
 Manufacturing & Development





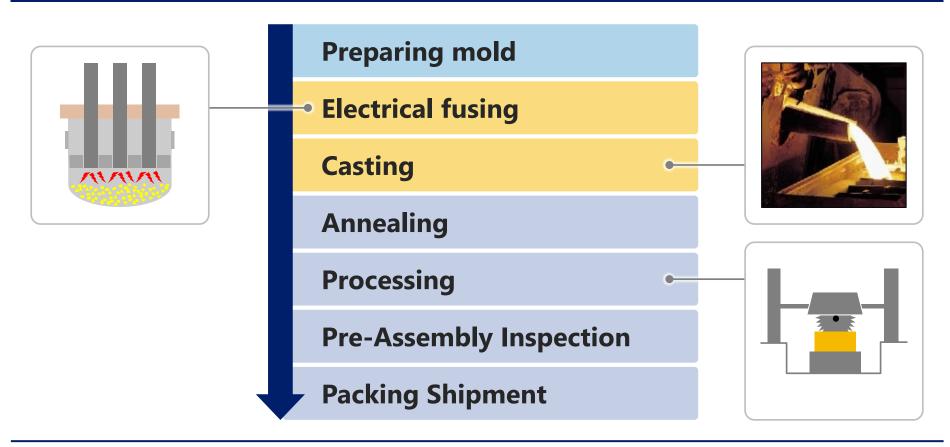
Overseas sites

- 淄博艾杰旭剛玉材料有限公司 (China)
- 艾杰旭派力固(大連)工業有限公司(China)
- 江蘇恒耐杰旭工业陶瓷有限公司 (China)

- 微瓷科技(江西)有限公司 (China)
- AGC Ceramics Singapore Pte. Ltd.

Fused cast refractory manufacturing process





Fused cast refractory



 AGC offers a full line-up of fused cast refractories for glass melting furnaces to meet various customer needs

ZrO₂ (zirconia) fused cast refractories ZB-X950 Series

Fused cast refractories with optimal performance against contamination to molten glass and excellent corrosion resistance required for use in glass melting furnace manufacturing high-quality specialty glass.

ZB-X950



Al₂O₃-ZrO₂-SiO₂ (AZS) fused cast refractories Zirconite Series

Fused cast refractories with excellent resistance to corrosion even under high temperatures



Al₂O₃ (alumina) fused cast refractories Marsnite Series

Fused cast refractories with excellent performance against contamination to molten glass



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Dry gunning Low cement monolithic refractory GRAM Series

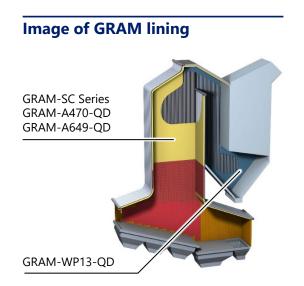


Dry gunning Low cement monolithic refractory **GRAM Series**

To contribute to shortening installation period and reducing installation workers

- Unique product that enables to install high-performance low cement monolithic refractory by dry gunning technique
- Simple installation method and short heating-up time contribute to shortening installation period.
- It contributes to reducing installation workers as it can be installed without complicated wet gunning technique.

Image of GRAM construction method Construction Type of Construction method materials system Cement-type Conven Materials (General-(Powder) Nozzle -tional Dry gunning purpose) Gunning **GRAM** Water tank Low Mixxina cement-type (High strength and high Wet gunning density) Quick compressor Quick-setting agent feeder

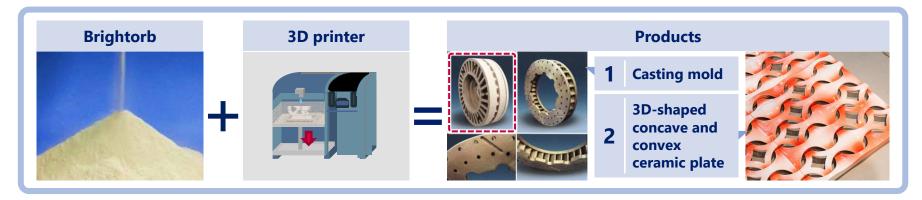


Brightorb



Ceramics material for ink jetting 3D printers*

* AGC Ceramics has a large 3D printer with a 1,000 mm x 600 mm x 500 mm molding box.



Brightorb features

- Applicable to molds for cast metals of 1,600°C or higher such as cast-iron.
- **Shrinkage ratio is less than 1%**** after firing at 1,400°C

 ** Ordinary clay for earthenware has shrinkage of 10% or more and shows shrinkage and deformation after firing.

Value provided

- 1. Designing of high-precision ceramics
- 2. Mass customized production
- 3. Shorter casting process for prototyping and development period



Reference Information

Successive Presidents



	Position	Name	Term	Memo
1	President	Toshiya lwasaki	Sep. 1907 - Oct. 1930	
2	Chairman	Sanjiro Yamada	Mar. 1931 - Jun. 1939	President position is vacant
3	President	Masakichi Ono	Jul. 1939 - Dec. 1943	
4	President	Kamesaburo Ikeda	Mar. 1943 - Mar. 1946	*
5	President	Kanichi Morimoto	Mar. 1946 - Dec. 1946	*
6	President	Kikuo Mori	Dec. 1946 - Apr. 1950	*
7	President	Tokiichiro Kuwata	Apr. 1950 - Jun. 1950	*
8	President	Kiichi Watanabe	Jun. 1950 - Feb. 1952	
9	President	Kanichi Morimoto	Feb. 1952 - Aug. 1967	
10	President	Motoharu Kurata	Aug. 1967 - Feb. 1973	

	Position	Name	Term	Memo
11	President	Hideaki Yamashita	Feb. 1973 - Mar. 1981	
12	President	Takeo Sakabe	Mar. 1981 - Jan. 1987	
13	President	Jiro Furumoto	Jan. 1987 - Mar. 1992	
14	President	Hiromichi Seya	Mar. 1992 - Jun. 1998	
15	President	Shinya Ishizu	Jun. 1998 - Mar. 2004	
16	President	Masahiro Kadomatsu	Mar. 2004 - Mar. 2008	
17	President	Kazuhiko Ishimura	Mar. 2008 - Dec. 2014	
18	President	Takuya Shimamura	Jan. 2015 - Dec. 2020	
19	President	Yoshinori Hirai	Jan. 2021 -	

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Corporate History (1)



- 1907 Asahi Glass Company is established.
- 1909 Flat glass production begins at Amagasaki (now Kansai) for the first time in Japan
- 1914 Makiyama (now Kitakyushu) Plant is established.
- **1916** Production of refractories begins and ceramics business launches.
 - Tsurumi Plant is established.
- **1917** Production of soda ash begins.
- 1939 Iho (now Takasago) Plant is established.
- **1944** Merges with Nippon Chemical Industries and Mitsubishi Chemical Industries is formed.
- Pursuant to the Company Reconstruction and Improvement Law, Mitsubishi Chemical Industries is divided into Asahi Glass, Nippon Kasei Kogyo (now Mitsubishi Chemical) and Shinko Rayon (now Mitsubishi Rayon). Asahi Glass Company is re-established and lists its stock on the stock exchanges in Japan.
- 1954 Production of CRT glass bulbs begins.
- **1956** Production of CRT glass bulbs begins.
 - The Indo Asahi Glass Co., Ltd. is established, and business launches in India.
- 1959 Chiba Plant is established.
- 1964 Caustic soda first is produced at Chiba Plant.
 - Thai Asahi Glass Public Co., Ltd. is established and business launches in Thailand.
- **1965** Hazawa Research Center (now Research Center) is established.
 - Thai Asahi Caustic Soda Co. (now AGC Chemicals (Thailand) Co., Ltd.) is established and production of chemicals products begins in Asia.
- 1970 Aichi Plant is established.
- 1972 Sagami Works (now Sagami Plant) is established.
 - P.T. Asahimas Flat Glass Co., Ltd. is established and business launches in Indonesia.
- 1974 Kashima Plant is established
 - Thai Safety Glass Co., Ltd. (now AGC Automotive (Thailand) Co., Ltd.) is established and automotive glass production begins in Asia.

- **1981** Asahi Glass acquires Glaverbel S.A., (AGC Glass Europe) a glass company in Belgium, and launches business in Europe.
- 1985 AP Techno glass Co. is established automotive glass production begins in the USA.
 - Production of synthetic quartz glass begins.
- 1986 P.T. Asahimas SUBENTRA Chemical (now P.T. Asahimas Chemical) established in Indonesia.
- **1988** Makes capital participation into AFG Industries (now AGC Flat Glass North America) and flat glass production begins in the USA.
- **1991** Makes capital participation into Splintex S.A. (now AGC Automotive Europe Inc) and automotive glass production begins in Europe.
 - Makes capital participation into Glavunion (now AGC Flat Glass Czech a.s. clen AGC Group) and launches business in Czech Republic.
- **1992** Dalian Asahi Float Glass Co., Ltd. (now AGC Flat Glass (Dalian) Co., Ltd.) is established and flat glass production begins in China.
 - Production of TCO glass substrates for LCDs begins at Asahi Glass Fine Techno (now AGC Display Glass Yonezawa Co., Ltd.).
- **1995** Production of alkali-free glass for TFT-LCD glass substrates begins.
 - Qinhuangdao Haiyan Safety Glass Co., Ltd. is established and production of automotive glass business begins in China.
- 1996 Production of glass substrates for Plasma Display Panels (PDPs) begins.
- 1997 Makes capital participation into Bor Glass Works (now OJSC AGC Bor Glassworks) and launches business in Russia.
- **1999** Acquires Imperial Chemical Industries PLC's fluoropolymer business and launches production of fluorochemicals in Europe.
- Asahi Glass Fine Techno Taiwan Co., Ltd. (now AGC Display Glass Taiwan Co., Ltd.)
 is established and production of TFT-LCD glass substrates begins.
- **2002** Global In-House Company System is introduced.
- 2003 Production of PDP glass substrates begins at Hanwook Techno Glass Co., Ltd.

Corporate History (2)



- AGC Automotive Hungary Ltd. is established and automotive glass production begins in Hungary.
 - Asahi Glass Fine Techno Korea Co., Ltd. (now AGC Fine Techno Korea Co., Ltd.) is established and production of TFT-LCD glass substrates begins in South Korea.
- **2007** The corporate brand of the AGC Group is unified to AGC.
 - Transfers the shares of Asahi Fiberglass Co., Ltd. and withdraws from glass fiber business.
- 2008 Transfers the shares of Optrex Corporation and withdraws from LCD display device business.
- 2009 Terminates automotive glass business at Kitakyushu plant.
 - Begins production of specialty glass for chemical strengthening for smart phones, tablet PCs. etc.
- 2010 AGC Display Glass (Kunshan) Co., Ltd. s established as a production base for TFT-LCD glass substrates in China.
 - Terminates production of CRT glass bulbs at Hankuk Electric Glass Co., Ltd. and withdraws from CRT glass bulb business.
- 2011 AGC Glass Brazil inc. is established and business launches in Brazil.
- **2012** Strategic partnership with Interpane in Germany.
- 2013 AGC Automotive Mexico S. DE R.L. DE C.V. is established.
 - Established regional headquarters, AGC Asia Pacific, in Singapore for business in Southeast Asia.
- **2014** Acquires a Vietnamese polyvinyl chloride (PVC) company, Phu My Plastics & Chemicals Co., Ltd. .(now AGC Chemicals Vietnam Co., Ltd.)
 - AGC and Obeikan Glass agreed to set up a JV for architectural glass.
 - Ceased production of glass substrates for PDP.
- 2015 Acquires NordGlass, automotive replacement glass company in Poland.
 - Started supplying HFO-1234yf, a next-generation automotive refrigerant with low environmental impact.

- 2016 Acquired German biopharmaceutical contract manu-facturing organization BIOMEVA.
- **2017** Acquires Vinythai PCL (shareholding ratio of 58.77%)
 - Bioscience businesses in Japan, the U.S., and Europe consolidated and integrated management as AGC Biologics begins.
- **2018** Change of corporate name to AGC Inc. (1st July)
 - AGC acquires the electronics business of US-based Park Electrochemical.
- **2019** AGC's First Automotive Glass Production Base is established in North A frica (Morocco).
 - Acquires Spanish Synthetic Pharmaceutical Active Ingredient Manufacturing Plant Malgrat Pharma Chemicals
 - Acquires US based Taconic's global operations of the Advanced Dielectric Division
- **2020** AGC Acquires Biopharmaceutical Commercial Facility in Colorado, U.S.A.
 - AGC Completes Development of 5G-compatible 'Glass Antenna that Adds Cellular Base Station Capabilities to Windows'
 - AGC to Make Drastic Expansion to Supply System for EUVL Mask Blanks.
 - AGC Biologics Expands Cell and Gene Therapy CDMO Services.
 - AGC Opens New R&D Building.
- Integrated the research and development bases of the former Central Research Laboratory and the former Keihin Plant and began operations as the AGC Yokohama Technical Center.
 - North American architectural glass business transferred to Cardinal Glass Industries.
- 2022 Established a new company, AGC Vinythai Public Company Limited to integrate and reorganize the chlor-alkali business subsidiaries in Thailand and CLMV markets.
- Established a new in-house company, Life Science Company.
 Completed the transfer of its ownership stake in AGC Flat Glass (Dalian) Inc. to
 Shanghai Yaohua Pilkington Glass Group Co. Ltd. (SYP Group)

AGC's Overseas Business Development



Europe/EMEA

- 1981 【Belgium】 Asahi Glass acquires Glaverbel S.A., (AGC Glass Europe S.A.) a glass company in Belgium. First entry into Europe.
- 1997 **(Russia)** Capital participation made in Bor Glassworks (OJSC AGC Bor Glassworks). First entry into the Russian market.
- 1999 **(UK)** Imperial Chemical Industries PLC's (AGC Chemicals Europe, Ltd.) fluoropolymers business acquired. Production of fluorochemicals begins in Europe.
- 2004 [Hungary] AGC Automotive Hungary Ltd. established. Production of automotive glass begins in Hungary.
 - [Saudi Arabia] AGC and Obeikan Glass agreed to set up a JV for architectural glass.
- **2012 [Germany]** Strategic partnership with Interpane in Germany. (Became a consolidated subsidiary)
- **2015 [Poland]** AGC acquires NordGlass, automotive replacement glass company in Poland.
- **2019 (Morocco)** Automotive Glass Production Base established in Morocco.
 - [Spain] Acquires Spanish Synthetic Pharmaceutical Active Ingredient Manufacturing Plant Malgrat Pharma Chemicals.
- 2020 【Italy】 AGC Biologics Expands Cell and Gene Therapy CDMO Services.

ASIA/Japan

- 1907 [Japan] 1907 Asahi Glass Company founded.
- **1956 [India]** Glass production begins in India. AGC becomes one of the first Japanese private companies to enter the Indian market.
- **1964 [Thailand]** Thai Asahi Glass Public Co., Ltd. (AGC Flat Glass (Thailand) Public Co., Ltd.) established.
- **1972 [Indonesia]** P.T. Asahimas Flat Glass Co., Ltd. established in Indonesia. First entry into the Indonesian market.
- 1992 [China] Dalian Asahi Float Glass Co., Ltd. established in China.
 Production of flat glass begins in China.
- 2000 [Taiwan] Asahi Glass Fine Techno Taiwan Co., Ltd. (AGC Display Glass Taiwan Co., Ltd.) established. Production of LCD glass substrates begins in Taiwan.
- **2003 [Korea]** At Hanwook Techno Glass Co., Ltd., production of PDP glass substrates begins in Korea.
- **2014 [Vietnam]** AGC acquire a Vietnamese polyvinyl chloride (PVC) company, Phu My Plastics & Chemicals Co., Ltd.
- 2017 [Thailand] Acquires Vinythai PCL.
- 2022 [Thailand] established a new company, AGC Vinythai Public Company Limited to integrate and reorganize the chlor-alkali business subsidiaries in Thailand and CLMV markets.

Americas

- 1985 [USA] AP Technoglass Co.
 (Automotive glass division in AGC
 Flat Glass North America, Inc.)
 established. Production of
 automotive glass begins in the USA.
- 2011 [Brazil] AGC Glass Brazil, Inc. established. First entry into the Brazilian market.
- **2013 [Mexico]** AGC Automotive Mexico S. DE R.L. DE C.V. established.
- 2018 **[USA]** AGC acquires the electronics business of US-based Park Electrochemical.
 - [USA] AGC Biologics, consolidated and integrated management for bioscience business.
- 2019 [USA] AGC acquires global operations of the Advanced Dielectric Division of US based Taconic.
- **2020 [USA]** AGC Acquires
 Biopharmaceutical Commercial
 Facility in Colorado, U.S.A.

*This list shows AGC's first entry into the region.



END

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