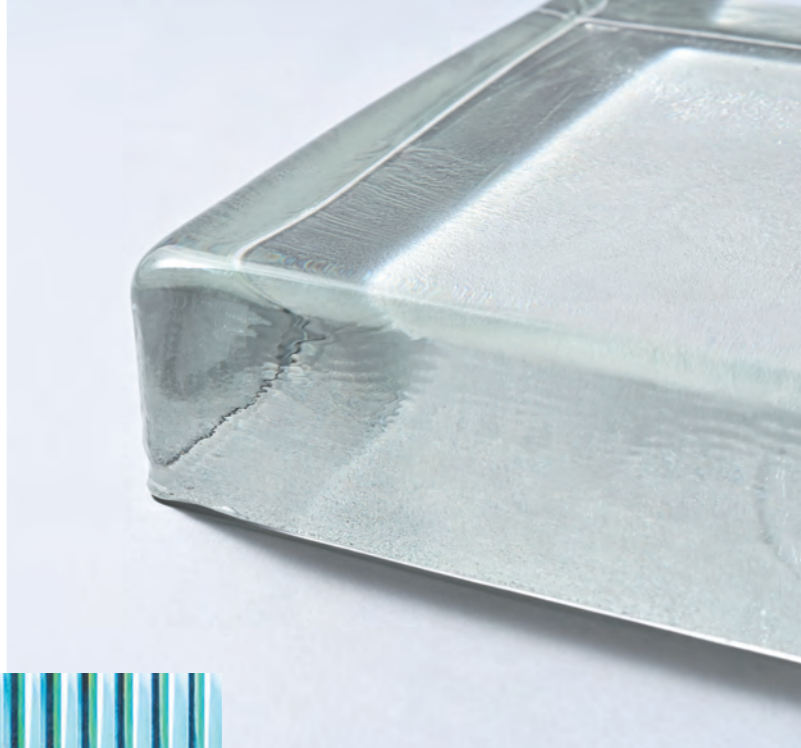


Headquarter 2-1-10 Yasaka-cho, Kishiwada City, Osaka 596-0049, Japan
Phone : +81-72-422-4545 (HQ) Fax : +81-72-436 2265
Phone : +81-72-433-1163 (Global Sales) Fax : +81-72-436-2265

Tokyo Sales Office 2-29-3, Yushima, Bunkyo-ku, Tokyo, 113-0034, Japan
Phone : +81-3-5803-2441 Fax : +81-3-5803-3336

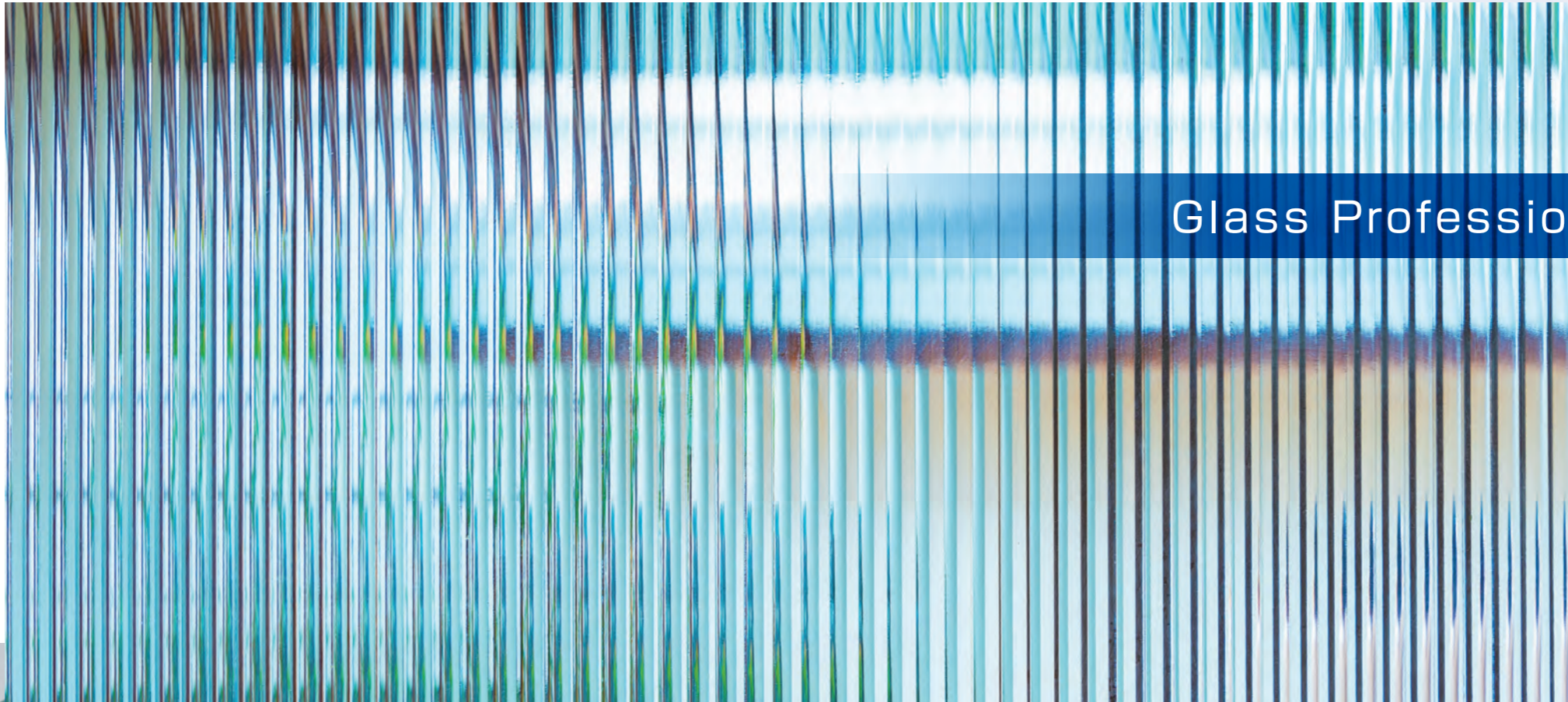
Yumemigaoka Factory 3-2-25, Kishino-oka-cho, Kishiwada City, Osaka 596-0817, Japan
Phone : +81-72-489-3877 Fax : +81-72-489-3878



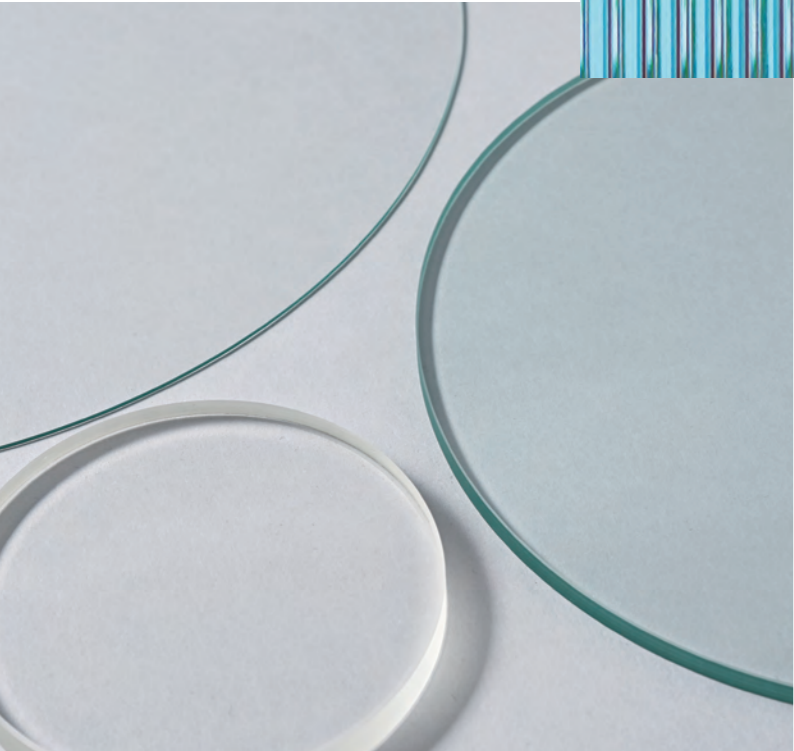
URL for MATSUNAMI GLASS IND., LTD.
<https://www.matsunami-glass.co.jp>



URL for FINE GLASS business segment
<https://www.matsunami-sp.com/customers.html>



Glass Professional



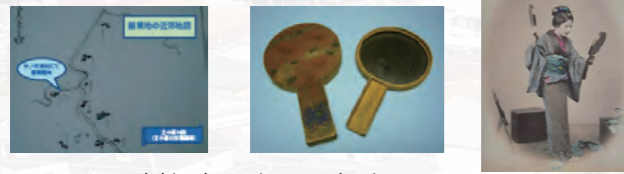
Fine glass technology

MATSUNAMI GLASS IND., LTD. 180-years-long tradition and innovation



History

1844 Touemon MATSUNAMI started thin glass manufacturing in Izuminokuni (current Izumisano City).



1854 Started thin glass mirror production

1877 Toshimichi OKUBO, as Minister of Home Affairs, bestowed us with the "Kamonshohai" medal at the first Japanese National Industrial Exhibition in 1877.



1886 Moved our head office and factory to Kishiwada City.

1904 Started cover glass slips production for microscope specimens first in Japan

1905 Started glass slides production for microscope specimens

1908 Started cover glass slips export to USA

1931 Japan Industrial Association awarded us for industrial trade contribution.

1944 100th anniversary

1948 Built our head office and factory in Shimomatsu-cho, Kishiwada City

Established Matsunami Glass Ind., Ltd with reorganization of Matsunami Glass manufactory (With a capital 5 Mil. JPY)

Sadao Matsunami took office as a President.

1961 Capital increased to 10 Mil. JPY

1963 Certified JIS authorized manufacturer

1964 Started Tokyo branch

Received certification as an export-contributing company

(certified for consequence 8 years)

1973 Started glass production for electronics industries

1984 Built a new head quarter building and installed corporate identity system

1985 Capital increased to 90 Mil. JPY

1987 Akira Matsunami took office as a President.

Started the production at the 2nd factory

1988 Established Matsunami Trading Co., Ltd.

1994 150th Anniversary

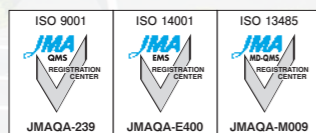
1996 Established the incubation research facility in the Technology

Research Institute of Osaka Prefecture

1997 Built a new main factory and started the production

1998 Launched business of support system for pathology & cytology

1999 Certified ISO 9001



Certified ISO 14001 in 2003, certified ISO 13485 in 2013

2000 Expanded the main factory and capability

Established R&D laboratory

2003 Certified 14001

2010 Awarded the first prize of "Excellent Company of OSAKA" award in craftsmanship and manufacturing
Established Izumi factory and started micro lens array production



2011 Selected as one of KANSAI 2011 Monozukuri Genki Kigyo 100 (100 vital manufacturing companies in Kansai area) by METI Kansai



2013 Established Matsunami Glass USA in Washington state, the United States of America
Certified ISO 13485



2015 Participated in Japan Business Federation (Keidanren)

2018 Awarded 'Excellent 100-year Company Award' at the 3rd 100-year company commendation
Selected to one of 'Companies Driving Regional Growth'



2019 Certified IATF 16949 as automotive industry quality management system
Established Yumemigaoka factory



2020 Selected to the Vibrant HABATAKU Small and Medium Enterprises 300 program for FY2020 promoted by METI
Announcement of Partnership Building Declaration

2021 Akira Matsunami was bestowed 'The Order of the Rising Sun'.
Awarded the excellent company in Kinki area of '55th Good Company Award' promoted by the Medium and Small Business Research Institute

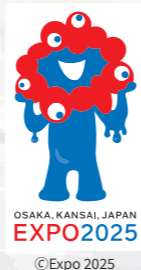
2023 Hiroyasu Yasuhara took office as a President.
Health & Productivity Management Outstanding Organization (certified from 2019 consecutively)

2024 180th Anniversary



Matsunami Glass Ind., Ltd.:
Expo 2025 Osaka, Kansai
Signature Pavilion "null²"
Partner

Expo 2025 Official character
MYAKU-MYAKU



As Glass Professional

General information

Company name Matsunami Glass Ind., Ltd.

President Hiroyasu Yasuhara

Established 1844

Founded 1948

Business area Microscopy cover slips, Microscopy slide glass, Glass for medical / physical chemistry, Support system for pathology & cytology, Substrate glass for display, Glass for general electronics industries, Precisely processed glass for optical parts application, Precise vapor deposition and any other coatings, Chemically strengthened glass, Thermoformed glass

Address Headquarter and main factory : 2-1-10 Yasaka-cho, Kishiwada City, Osaka 596-0049, Japan

Phone : +81-72-422-4545 (HQ) Fax : +81-72-436 2265

Tokyo Sales Office : 2-29-3, Yushima, Bunkyo-ku, Tokyo, 113-0034, Japan

Phone : +81-3-5803-2441 Fax : +81-3-5803-3336

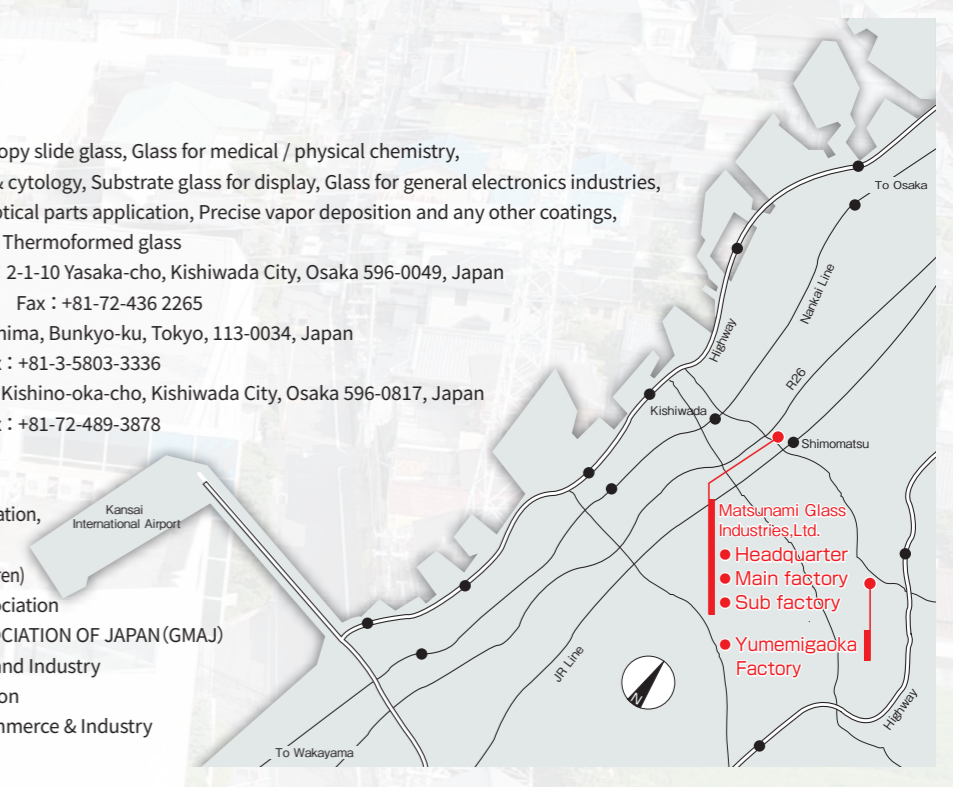
Yumemigaoka Factory : 3-2-25, Kishino-oka-cho, Kishiwada City, Osaka 596-0817, Japan

Phone : +81-72-489-3877 Fax : +81-72-489-3878

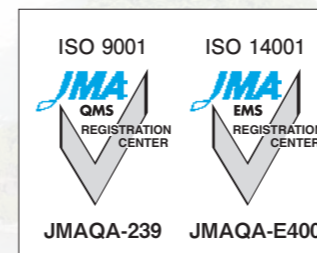
Main banks MUFG Bank, Ltd.,
Sumitomo Mitsui Banking Corporation,
The Senshu Ikeda Bank, Ltd.

Membership Japan Business Federation (Keidanren)
Osaka Glass Manufacturers Association
GLASS MANUFACTURERS' ASSOCIATION OF JAPAN (GMAJ)
Osaka Chamber of Commerce and Industry
Osaka Medical Device Association
The Kishiwada Chamber of Commerce & Industry

Affiliates Matsunami Trading Co., Ltd.
Matsunami USA Corporation



Management system



Registration scope

Design, Development, Production and Sales of Glasses for Medical use and Glasses for Optical, Electric and Electronic use



Registration scope

Design, Development, Production and Sales of IHC adhesive slide



Registration scope

Manufacturing of cover glass and glass substrate for optical, electric and electronic use

We are certified three quality management systems and one environmental management system. We are always maintaining and improving these management systems to supply safe and secured products qualified.

We are providing truly valuable products that will be useful even in the future.

MATSUNAMI GLASS wants to be a supportive company that solves customers' issues.
We will also strive to become an 'Only-One' company that can supply necessary products for the next generation

Our motto for business innovation is "**S·L·I·M**".

Our concept

- S**peed — Adopted environmental changes speedily
- L**owcost — Implement cost reduction continuously
- I**nnovation — Innovative technical development with various viewpoints
- M**ind — Motivate all employees cheerfully

- Small lots
- Short term delivery
- All process in-house / Enable to use various materials
- Construct glass composition and melt them

Various processing

Glass composition

Nano-processing / Imprinting

Cutting

Thin film coating

Never stop doing technical innovation

Edging & Chamfering

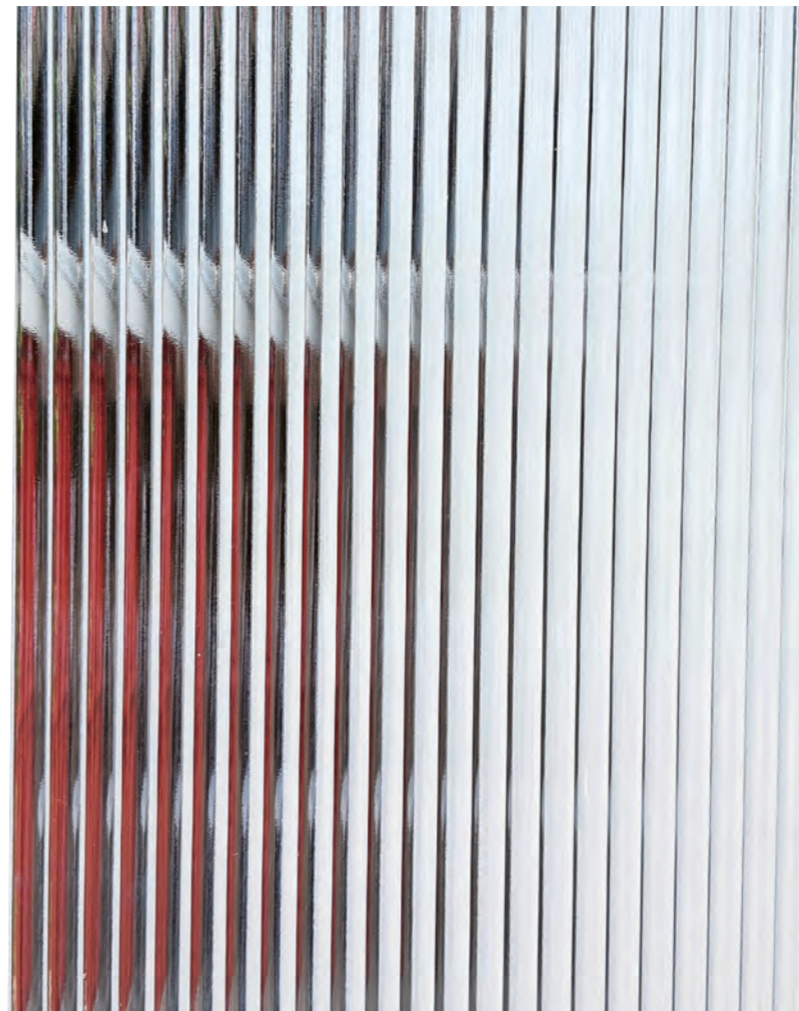
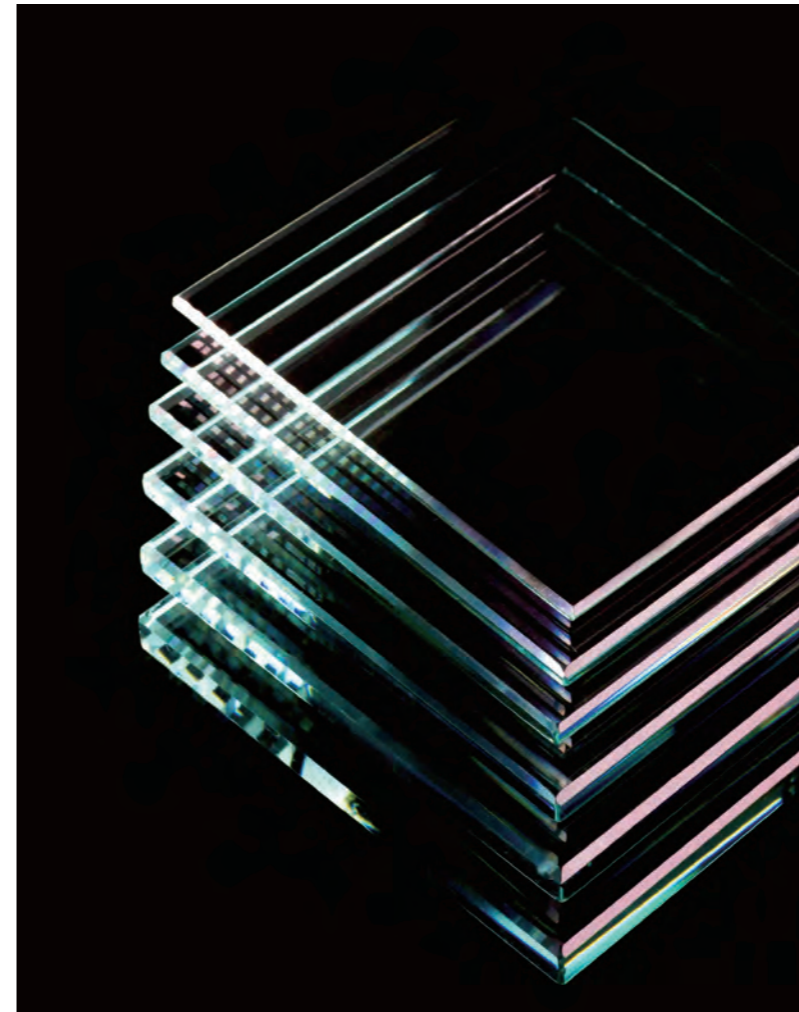
Thermoforming

Polishing

Surface treatment

Printing

Washing



INDEX

- Who is MATSUNAMI GLASS ? 01~04
- Application 05~10
 - Automotive interior cover glass — 05
 - Semiconductor packaging — 05
 - cover glass
 - Ultra thin glass (UTG) — 05
 - Cover glass for line sensor — 06
 - Glass for industrial application — 06
 - Various shaped glass — 06
 - Molten glass in-house — 07
 - IR absorption glass (IR series) ----- 07
 - Visible light absorption glass ----- 07 (LG series)
 - IR transparent glass (CT-6) ----- 07
 - Solid-state electrolyte — 08
 - Lead free glass seal — 08
 - Imprinting technology — 09~10
- Technical introduction 11~16
 - Procurement of raw glass / — 11
 - Glass composition
 - Glass melting ----- 11
 - Glass processing technology — 12~15
 - Cutting / Edging & Chamfering ---- 12
 - Polishing / Coating ----- 13
 - Chemically strengthen / ----- 14
 - Thermoforming
 - Washing / Inspection ----- 15
 - Inspection facility — 16
- Glass specification 17~18

Automotive interior cover glass

Technology related

Page 12 : Cutting / Edging & Chamfering
 Page 14 : Chemically strengthen / Thermoforming
 Page 15 : Washing / Inspection

Functional displays are spreading to various automotive parts, not only as navigation system.

At the same time, high resonance and high reliability are also required very much, so that application of glass is spreading.

Many applications, including HUD, sensor, for automotive segment are requesting to use glass much more.

We can produce not only various shaped glass but also chemically strengthened glass and printed glass and so on.



Semiconductor packaging cover glass

Technology related

Page 12 : Cutting / Edging & Chamfering
 Page 13 : Coating
 Page 15 : Washing / Inspection

High dimension precision and external appearance are required to semiconductor package application. We have a lot of experience for this application.

Laser Diode is being used at various application like optical communication, laser printer, optical receiver and so on. Any packages for laser diode are using glass cover precisely processed to protect from external conditions. And, our processing technology is also being utilized as lid glass for image sensor cover.

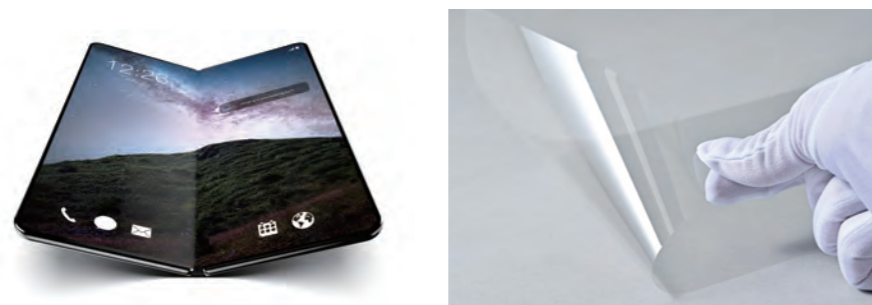


Ultra thin glass (UTG)

Technology related

→ Page 12 : Cutting

We can cut 30μm thin glass with less cracked edge through our special glass cutting method. When it is bent, less broken happen. This technology can be applied to the main process to produce foldable smartphone.



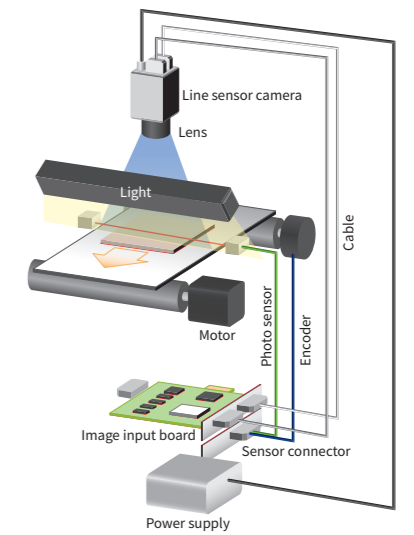
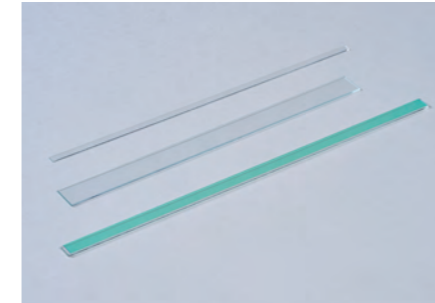
Cover glass for line sensor

Technology related

Page 12 : Cutting / Edging & Chamfering
 Page 13 : Polishing / Coating

We can supply various glass products for line sensor used in card reader, banknote reader, multifunctional printer, copy machine, facsimile and so on.

We can supply specially processed cover glass like surface treatment to reduce wear or deterioration by paper or plastics.



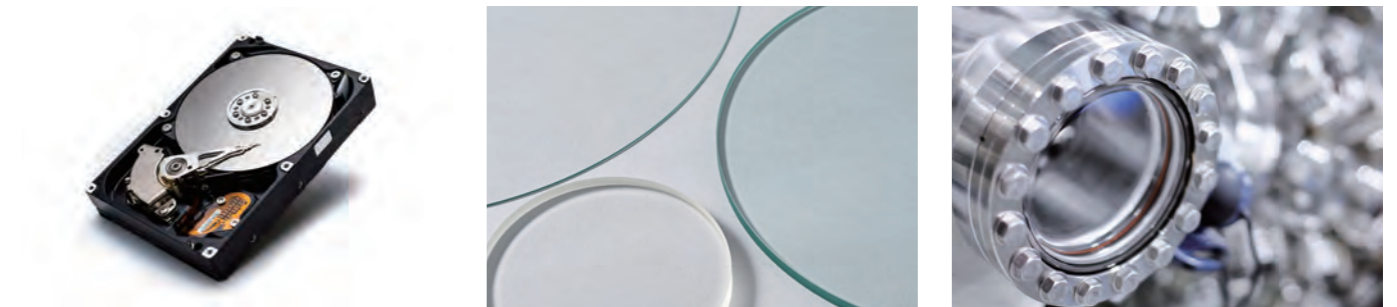
Glass for industrial application

Technology related

Page 12 : Cutting / Edging & Chamfering
 Page 13 : Polishing / Coating

High dimensional accuracy, reliability after processing and durability are required to glass products which are being utilized on test equipment designed for using in severe circumstances and / or for storage devices in the data center.

We can select suitable materials and supply coated products following with customers' requests.



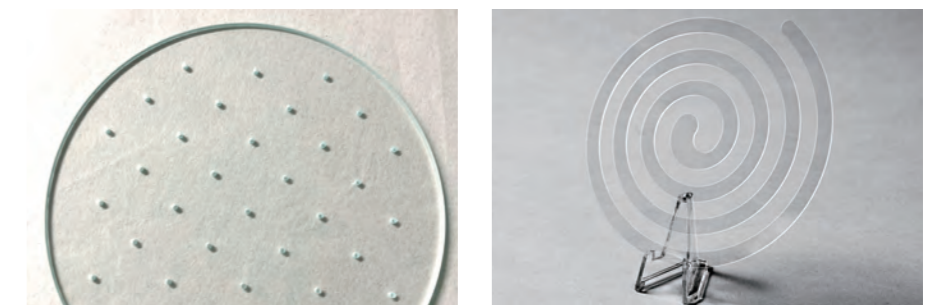
Various shaped glass

Technology related

→ Page 12 : Cutting / Edging & Chamfering

Our laser cutting facilities can not only do straight cutting but also do any kinds of shaped cutting.

At the same time of cutting, holes, vias and ditches can be processed, so that we can answer for various enquiries.



Molten glass in-house

Glass through our own molten process and composition design with our original know-how
We can supply various glass materials for not only industrial markets but also optical market.

IR absorption glass (IR series)

Technology related → Page 11 : Procurement of raw glass / Glass composition
Page 13 : Polishing / Coating

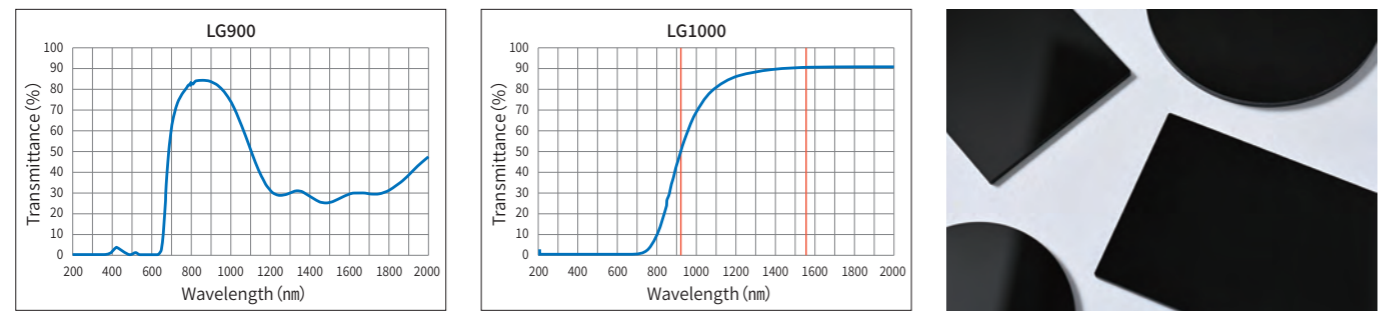
IR series have high transparency with visible light wavelength and high absorption with IR wavelength.
IR series are being adopted to correct colors for image sensor with smartphone, digital camera, surveillance camera and automotive devices.
We can design spectral characteristics to meet the requirement of image sensor with the glass thickness requested, addition to those in our catalogue.
We have experienced to produce 0.20mm to 3.00mm thickness IR series.



Visible light absorption glass (LG series)

Technology related → Page 11 : Procurement of raw glass / Glass composition
Page 13 : Polishing / Coating

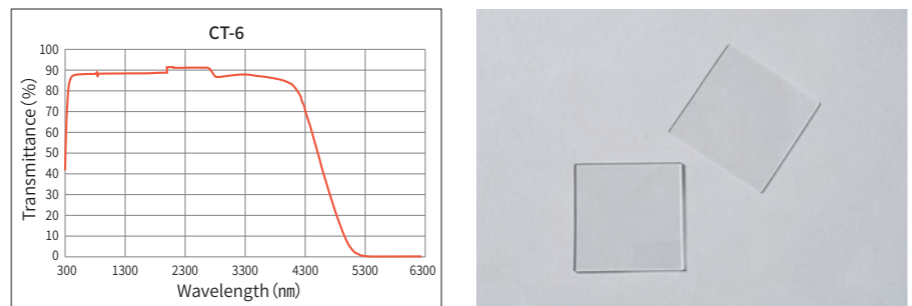
LG series have high transparency with near IR wavelength and high absorption with visible light. LG series are good to be applied as cover glass for LiDAR because of low angular dependence, and lead-free composition to meet environmental requirement.



IR transparent glass (CT-6)

Technology related → Page 11 : Procurement of raw glass / Glass composition
Page 13 : Polishing / Coating

CT-6 has good transmittance with mid-IR wavelength which silicon has less transmittance.
CT-6 is good for application as IR camera and night vision device, because of its good shape stability by low expansion coefficient.



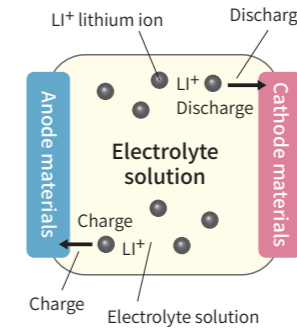
Solid-state electrolyte

Technology related → Page 11 : Procurement of raw glass / Glass composition

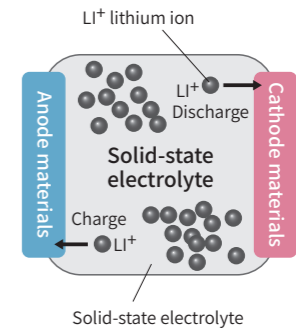
Solid-state electrolyte is the essential material to make solid-state battery safer and to increase energy density.
We can supply mainly oxide type solid-state electrolyte, which is produced with melting method, and which is good for mass production and homogeneity of composition.
We will design composition, particle size and so on to meet customers' requests.



Conventional lithium ion battery



Solid-state battery



- Advantage of solid-state battery
- Improve safety
 - ☆ No electrolyte solution
 - No leakage / No flammable
 - Thermal stability
 - Rapid charging



Lead free glass seal

Technology related → Page 11 : Procurement of raw glass / Glass composition

We can supply various glass, which has different expansion coefficient with low to high working temperature.
And we can adjust expansion coefficient to meet customers' requests. Our glass doesn't include harmful materials like lead.

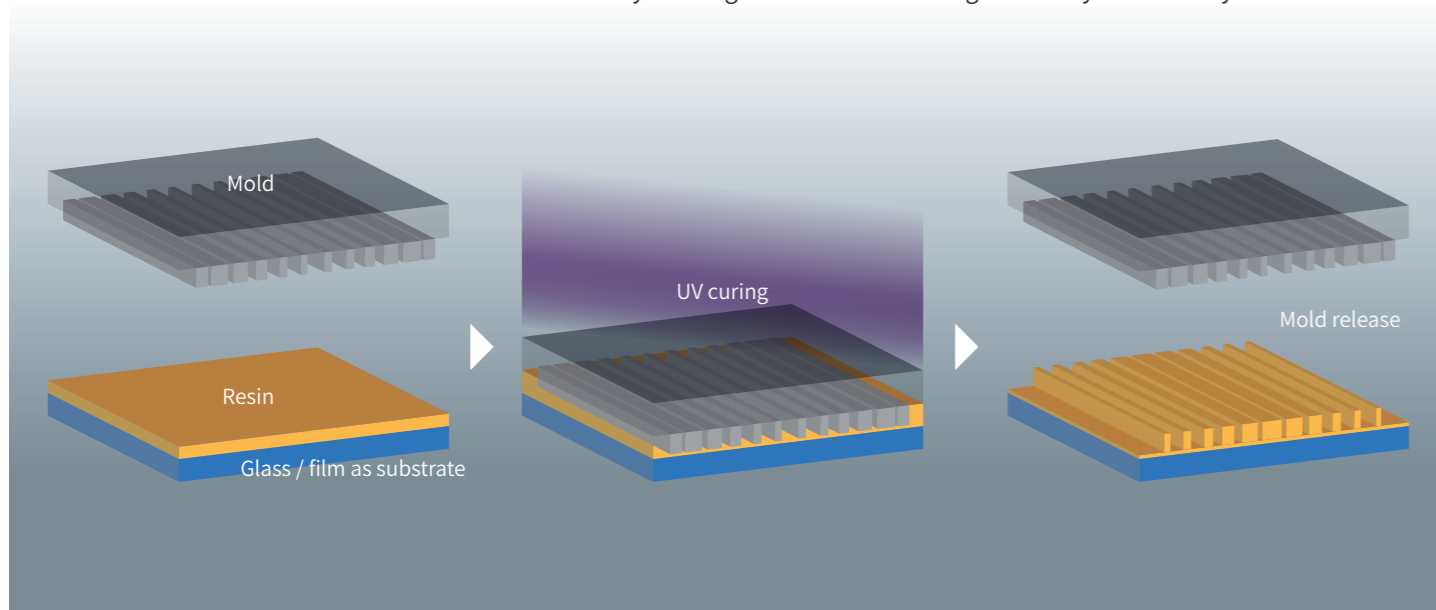
[A80, E67-11, E67-12, CM-0T]

- | | | | |
|-----------------------------|---|-----------------------------|--|
| A80 application examples | Welding aluminum, steel and stainless steel | E67-12 application examples | Welding heat-resistant borosilicate glass equivalent materials |
| E67-11 application examples | Welding Kovar equivalent materials | CM-T application examples | Welding Kovar materials and alumina |

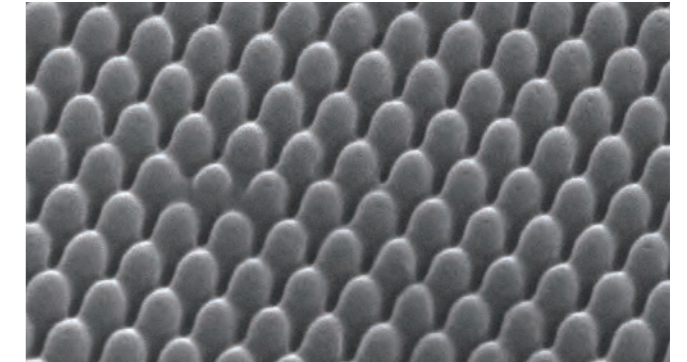
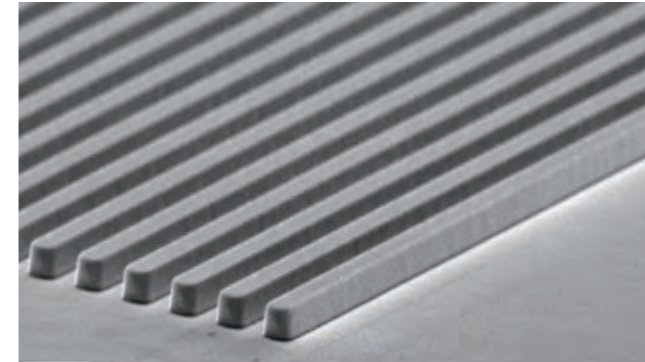
Products	A80		E67-11		E67-12		CM-0T	
Expansion coefficient α [10 ⁻⁷ /°C]	123 (100/200)	126 (100/250)	36 (100/300)	48 (100/420)	21 (100/300)	30 (100/450)	53.4 (100/300)	56 (100/400)
Working temperature (°C)	340°C~		550°C~		600°C~		1000°C~	
Transition point Tg [°C]	288		416		452		715	
Deformation point At [°C]	312		443		483		780	
Softening point Ts [°C]	320		500		550		900	
Materials to be weld with	Aluminum, steel and stainless steel		Kovar equivalent materials		Heat-resistant borosilicate glass equivalent materials		Kovar and alumina	
Composition type	TeO2-V2O5		TeO2-Bi2O3 type		TeO2-Bi2O3 type		SiO2-AL2O3	
RoHS regulated substances / Halogenated substances (Pb,Hg,Cr(VI),Cd)	Not contained							
Characteristics	Welding under 400°C temperature		Welding low expansion coefficient materials under low temperature		Welding low expansion coefficient materials		Without B2O3 for MLCC, LTCC application	

Imprinting technology

Nano-micrometer structure will be constructed directly on the glass substrate with high accuracy and stability.

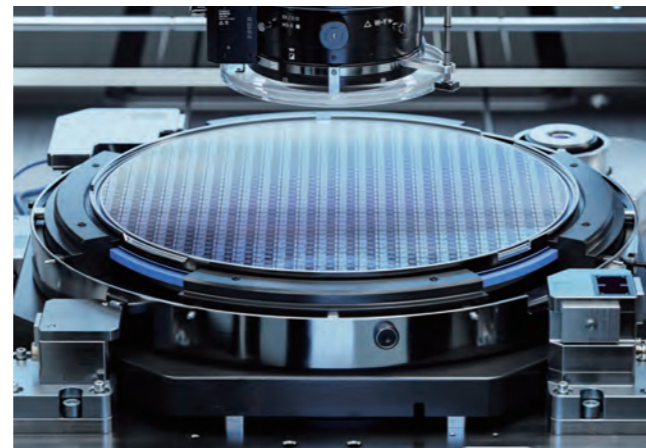
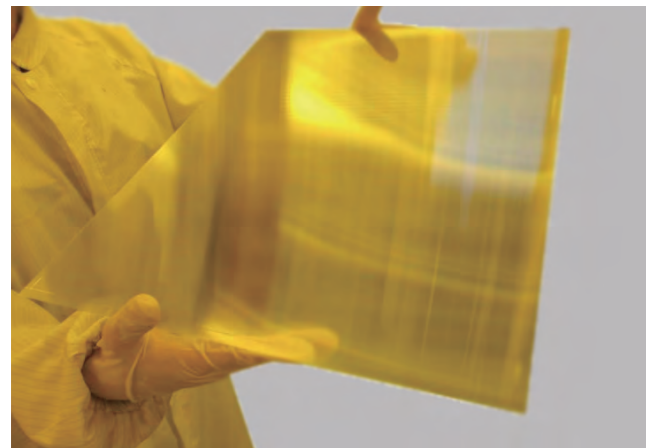


Major structures



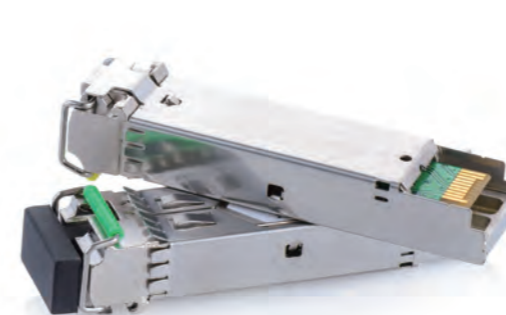
- Pattern designing : Nanometer structure (moth-eye, DOE, meta-surface etc.)
Micrometer structure (lens array, cylindrical, hexagon, square, round shape, random patterning etc.)
- Processing accuracy : < 100nm
- Surface roughness : Ra < 10nm
- Maximum size : Approx. 400×400mm
- Refractive ratio : Approx. 1.4~1.9
- Substrate : various glass, plastic film (0.1mm thickness -)
- Reliability test : 85°C×85%_1000hr -40°C⇄85°C_1000cycle

Characteristics



- Hybridized structure of glass with durability and stability, and easy processed resin
- Better stability for thermal condition compared with all resin structure
- Ability to select various glass (thickness and so on) as for substrate. Available to imprint on plastic films
- Ability to control optical characteristics like refractive index for resin

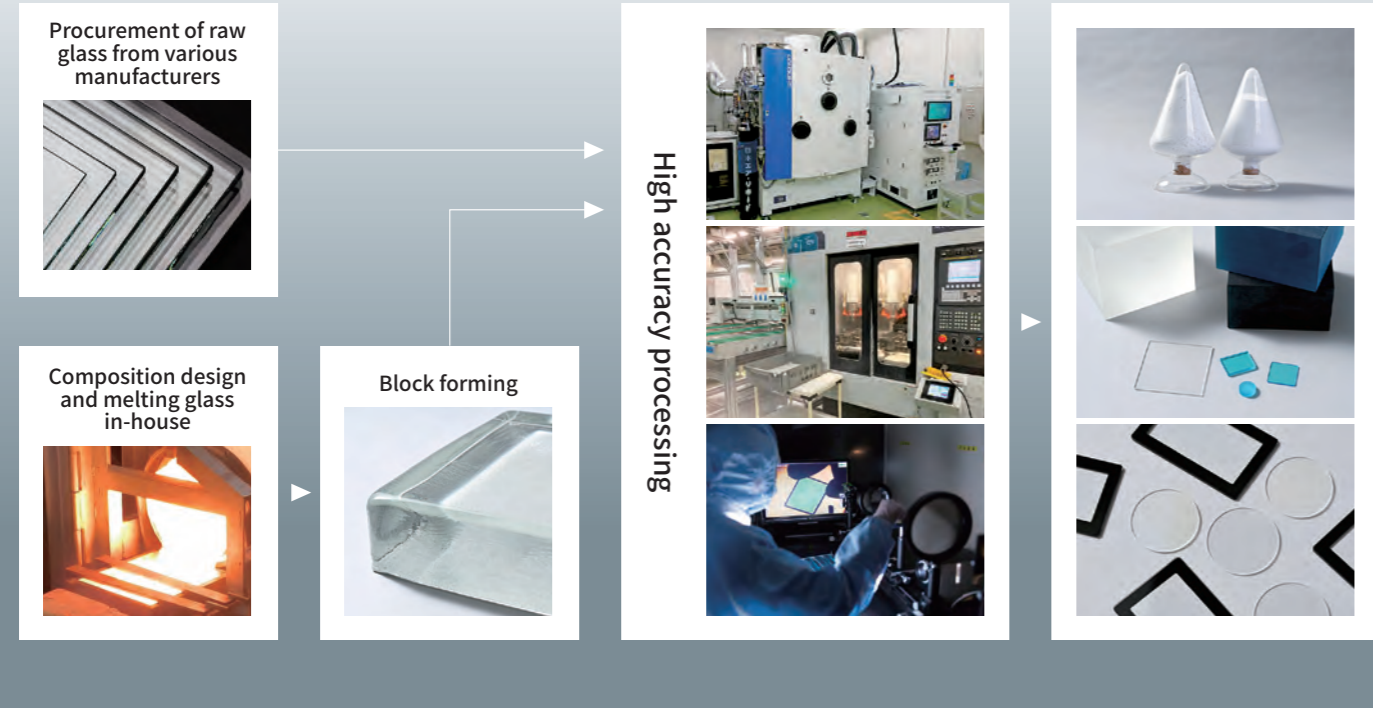
Applications and examples



- Micro optical lens for Spatial Reality Display
- Micro lens for optical tele-communications
- Micro lens array for AR-HUD
- Moth-eye structure for anti-reflective application
- Micro fluidic devices
- 3D sensing method
- DOE (diffractive optical element)
- Meta-lens / Meta-surface / Meta-materials etc.

Procurement of raw glass / Glass composition

We can handle all processes from raw material procurement to inspection / delivery in-house.
We can produce the processed glass with original glass made in-house, which we design the composition to meet customers' requests.



Glass melting

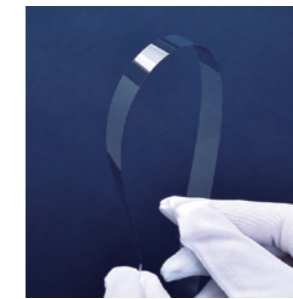
We can supply high quality, stability and homogeneous glass because of high temperature melting.
We can meet customers' various requests, like block forming with small lots and short delivery terms.
These melting process can deliver our oxide type solid-state electrolyte.



Glass processing technology

Cutting

We have a lot of cutting machines which can cut glass straight or various shape
We can cut various glass for various sizes and shapes with customers' requests.
Our thinnest thickness to be cut is 0.03mm (30μm) * Sizes and shapes depend on glass items and thickness.

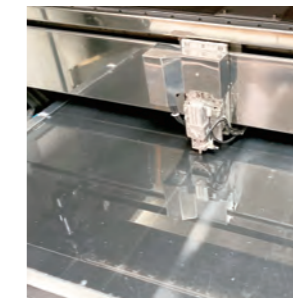


Cutting technology of 30μm thickness

0.03mm thickness glass can be bent without particular treatment after our special cutting

Straight cutting

Size : 1100×1300mm (maximum)
Thickness : 0.03mm ~ 8.0mm

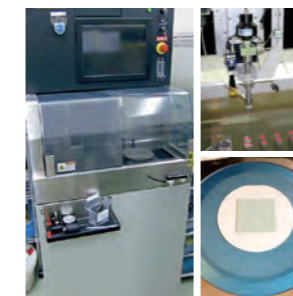


Scriber cutting (straight / free shape)

Round shape (φ6.0mm~) and free drawings will be available.

Free shape cutting

Size : 730×920mm (maximum)
Thickness : 0.03mm ~ 4.0mm

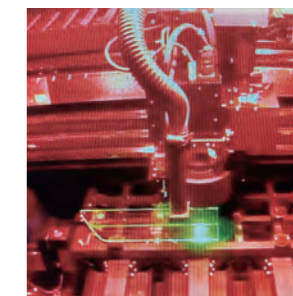


Minute processing (Dicing·Water-jet cutting machine)

Appropriate process for high accurate products like semiconductor wafers

Minute processing

Size : φ150mm (maximum)
Thickness : 0.2mm ~ 5.0mm



LASER cutting (external shape and hole design)

External shape and hole are simultaneously processed with multi-laser head equipment.

Simultaneous processing

Size : 920×920mm (maximum)
Thickness : 0.3mm ~ 6.0mm

(Maximum 10mm is available on straight cutting.)
* It depends on glass material.

Edging & Chamfering

Double edgers for rectangle shapes and CNC facilities for various shapes

W edger (Double edger)



- Chamfering for rectangle shapes (C shape / R shape)
Size : 130×130mm (minimum) 650×550mm (maximum)
Thickness : 0.4mm ~ 2.8mm

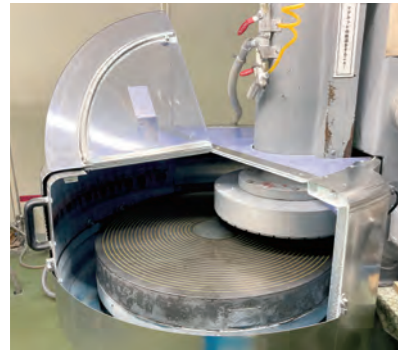
CNC edge chamfering machine



- Available for free shape cutting to utilize various machines
- Available for 25×25mm ~ 560×1100mm
- Diamond tool processing technology can deliver high quality and accurate chamfering

Polishing

Generator



We firstly grind the glass surface with generator to adjust the glass thickness.

Maximum size : φ700mm

Wrapping machine



We make the thickness uniform and polishing with wrapping machine.

Maximum size : φ310mm

Polisher



Polisher can polish glass into the thickness specified by customer and be transparent. High quality polishing as for optical glass is available and can meet the specification required.

Maximum size : φ335mm

Coating

Vapor deposition machine



Maximum size :
 Vapor deposition 260×170mm (R<0.5%)
 300×400mm (3 pcs/batch spectroscopy needs to be discussed)
 Sputtering 101.6×350mm
 Minimum thickness :
 Sputtering 0.145mm
 Vapor deposition (assist less) 0.1mm (size needs to be discussed.)

Sputtering machine



External appearance specification : Only 5um~25um defect on single coat product
 AR + Antifouling function is available to produce with low temperature plasma assist.

Chemically strengthen

Glass will be dipped into the tank filled with potassium nitrate and the ion of glass surface will be exchanged to force compression stress. This compression stress will make glass strong.

Minimum 25×25mm~Maximum 730×920mm

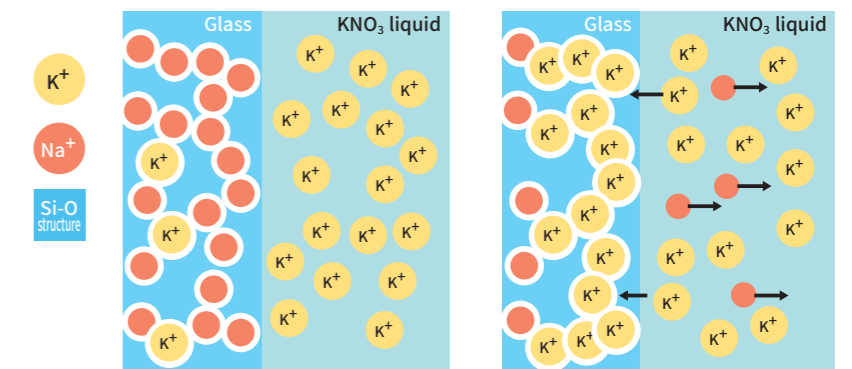
Normal soda-lime glass will have approx. three times strength, and aluminosilicate glass has approx. five to six times strength compared with non-processed glass through chemically strengthen process.

We can customize the treatment to meet customers' requirements and / or applications.



Tank to chemically strengthen

Method to chemically strengthen



Temperature condition is controlled under strain point (400°C-450°C) to exchange Na+ (●) by K+ (○).

Size of K+ is bigger than that of Na+. This size difference makes compression stress on the surface, then compression stress makes glass strong.

Thermoforming

3D thermoforming facility



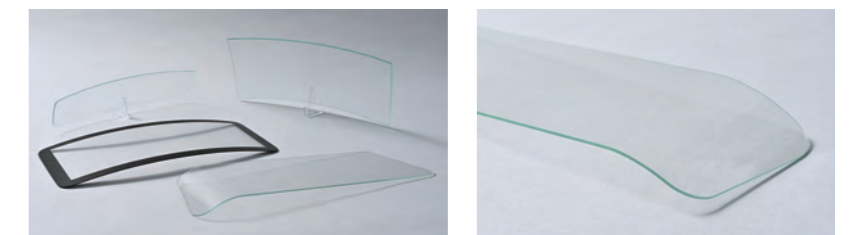
3D thermoforming facility / serial heating machine

Heating glass to softening points and forming glass with mold

Maximum size : W480×D280mm
 (raw glass dimension before forming)



3D thermoforming facility / Press / Vacuum forming machine



Washing

Implementing high precision washing to meet customers' requests
 Deliver glass washed to clean room for inspection directly, so that our products will be delivered to customers without any quality impact

Ultrasonic washing machine



Very fine dirt will be removed by ultrasonic washing.
 Product size between 1.0mm~500mm is available.

Brush washing machine



Brush will remove dirt out physically.
 Product size between 150mm~550mm is available.

Appearance inspection

Implement high precision inspection to meet customers' requests.
 In the clean room well controlled, various inspection process are applied to our products with wider range from certain mm level to FPD size.

Clean room



Clean room class : Less than class 1000

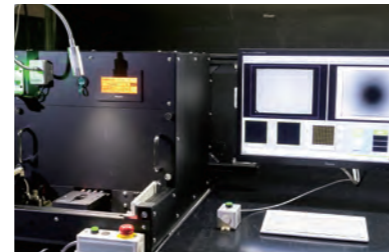
Inspection method

- High-brightness light inspection for micro defects (300,000 lux)
- Microscopy inspection
- Visual inspection with fluorescent lamp (600~8,000 lux)
- Automatic inspection line
- CCD image inspection

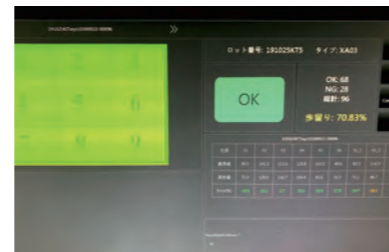
High-brightness light inspection (300,000 lux)



CCD image inspection equipment



Automatic inspection equipment



Inspection facility

In response to each company's requirement, we apply various tests such as environmental test, complicated shape measurement, spectrum measurement to implement quality inspection.
 We have various methods to inspect not only our final products but also its production process in order to secure our quality.

Inspection machine / Measurement machine

Instances of measurement

- Shape : Thickness, dimension, deformed contour shape, thread surface, corner, squareness, circle, 3D shape
- Surface property : Roughness, waviness, flatness, parallelism, wavefront aberration, contact angle
- Optical property : Transmittance, reflectance, haze, refractive index(abbe number), glass strain(internal stress)
- Thermal property : Thermal expansion, glass thermal characteristics(softening point, transition rotation, strain point, slow cooling rotation)
- Mechanical property : Hardness, breaking strength(bending, falling ball test), strengthening stress(CS/DOL)
- Reliability test : Constant temperature and humidity test, high temperature, low temperature, heat cycle test
- Appearance inspection : Matsunami Master System; only qualified and limited inspectors are allowed to conduct visual inspection for products such as optical glass, cover glass for camera module.
 Meet inspection requirements for 3µm•5µm•7µm•10µm•20µm level defects

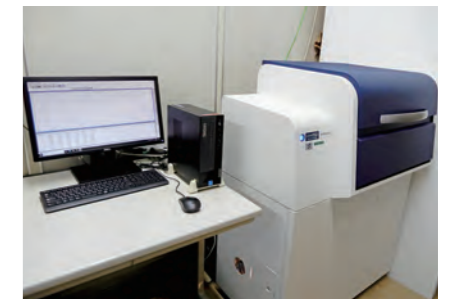
Measurement machine



Image / laser (touch proof)
 CNC Dimension machine



Laser microscope



Spectrophotometer

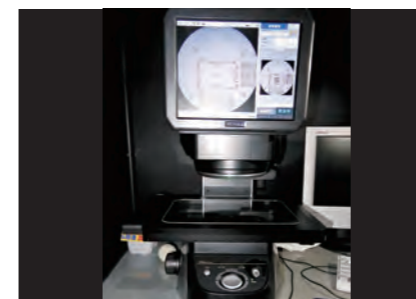
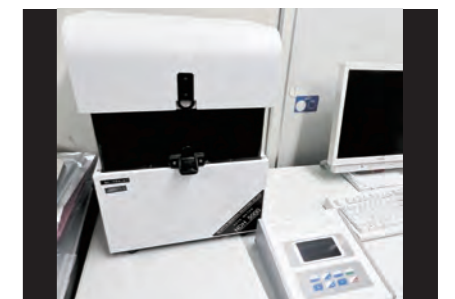


Image measuring machine



Surface shape meter



Haze meter



Environmental test machine



Laser interferometer
 (with G102 analysis equipment)



Microscope

※ We can provide further information regarding optical / sealing glass series that are not described in the list below.

※We have various types of glass products from industrial application to optical application.

We can also meet your requests in new glass development with reasonable costs through MATSUNAMI original melting process.

Code No.	Types/Features Characteristics	Main application	Density	Hardness	Strain point	Annealing point	Transition point	Deformation point	Softening point	Expansion coefficient	Refractive index	Hydrolytic resistance	Dielectric constant	Dielectric loss factor	Young's modulus	Poisson's ratio
			g/cm ³	kg/mm ²	Ps°C	Ta°C	Tg°C	Td°C	Ts°C	$\alpha \times 10^{-7}/^{\circ}\text{C}$	Nd	Na ₂ O mg	ϵ 1MHz	$\tan\delta \times 10^{-4}$ 1MHz	10 ³ kg/mm ²	
307	Borosilicate	Steel Nickel sealing	2.56	517	500	530	513	550	689	89	1.521	0.07	7.1	44.3		
Soda-lime	Blue crown / Soda	Substrate	2.50	540	511	554	539	576	740	87	1.515	0.37	7.3	84.0	7.30	0.20
Soda-lime (Low iron)	White crown / Soda	Substrate	2.50	540	512	549	536	571	733	82	1.520	0.37	7.5	86.3	7.30	0.20
B270	White crown / Potassium	Substrate	2.55	542	511	541	533	590	724	100	1.523	0.44	7.0	36.0	7.20	0.23
7622	Soda-lime potassium	Substrate	2.53	505	508	531	526	564	670	120	1.517	1.27	6.0	15.0	5.70	0.29
D263	Borosilicate	Substrate / cover	2.51	590	529	557	557	580	736	72	1.523	0.07	6.7	61.1	7.29	0.21
700	Borosilicate	Kovar welding	2.31	476	483	505	501	545	704	50	1.489	0.30	4.9	24.0	6.30	0.22
709	Borosilicate	CCD cover	2.43	530	531	587	570	615	735	64	1.506	0.08	5.8		7.27	0.22
EAGLE	Alkali free	Liquid crystal substrate	2.37	640	669	722	720	810	971	32	1.507	0.00			7.36	0.23
Tempax	Heat resistance / Borosilicate	Substrate	2.23	488	522	568	562	652	815	32	1.472	0.01	4.7	55.0	6.42	0.22
Silicon	Silicate	Substrate	2.20	560	990	1075	1060	1210	1580	5	1.458	0.00	3.9	0.2	7.42	0.17
LG900	near IR cut filter 905nm	LiDAR application	2.67	520	508	595	573	635	715	84	1.567					
LG1000	near IR cut filter 1550nm	LiDAR application	2.65	500	478	565	548	613	710	80	1.567					
CT-6	mid IR transmittance filter / highly strengthened	IR sensor	3.50	800	815	917	895	956		49	1.657					
S-2	Orange optical filter	Visible light wavelength cut	2.49		452	543	518	572	650	98						
B408	IR cut filter	Correction of color (3CCD)	2.56	380	480	496	491	544	620	98	1.528					
IR5188	Didymium filter	Correction of color	2.66	430	497	528	522	565	638	80	1.529		5.8	2.3	6.30	0.22
IR-584-13 α	IR cut filter	Correction of color (Alpha ray protection)	2.68	410	486	587	570	631	665	67	1.527					
IR585	IR cut filter	Correction of color (Thicker type)	2.69	410	497	589	574	622	660	70	1.525					
RG600	IR transparent filter	Bar code application	2.51	520	515	542	531	588	743	89						
BK7	Optical application	Substrate for evaporation	2.51	520	491	535	559	614	725	71	1.517				9.28	0.26
SFL6	Optical application	Substrate for evaporation	3.37	530	566	579	595	635	677	91	1.805					
8337B	UV transmittance	Cover	2.21	500	439	465	430	490	650	41	1.488					0.22
801	Soda / Aluminum / Silicate	Substrate for DMDM	2.50	510	505	525	512	575	690	107	1.523					
UV2743	Soda / Aluminum / Silicate	Optical wave guide / Kovar sealing	2.34	500	550	585	576	626	710	58	1.496					
K-1	Low dielectric	High frequency application				Working temperature(900~1000°C)		490	600	700	30		3.9			
BZ5	Lead-free low melting point	Welding	6.46		370	500 (Working point)	417	445	470	※92						
D-150	Lithium silicate	Substrate for crystallization	2.31	498	432	446	442	477	612	103	1.521	5.70	5.1	35.0		
BZ-5D	Lead-free low melting point	Insulator for sheathed heater	7.10		325	470 (Working point)	350	375	400	112						
Reference				Knoop hardness						※ 100~300°C 100~380°C		JIS-R-3502				