



FLATGLASS

2018 world directory



SprintCut
Maximise speed and
sprint to success

- > Suppliers' Profiles
- > Suppliers' Products & Yellow Pages
- > Agents & Sales Offices
- > Glassworks' Profiles

One of the secrets behind the success of the SprintCut is the linear drive technology with the integrated measuring system. The small number of moveable parts leads to lower mechanical wear, which is in addition to the out-standing maximum acceleration of 16 m/s² and a top speed of 310 m/min one of the drive technology's advantages. The SprintCut is especially suitable for cutting of large, high-quality glass sheets with various coatings.

- automated cutting pressure control -> reduction of unwanted breakages
- positioning accuracy of +/- 0.1 mm -> precise cutting results
- automated grinding pressure control -> best possible result of edge deletion for all coatings

Learn more about this and other LiSEC innovations:

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LiSEC

best in glass processing



DESKTOP

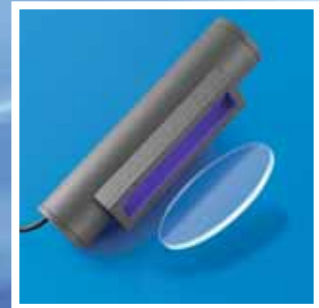
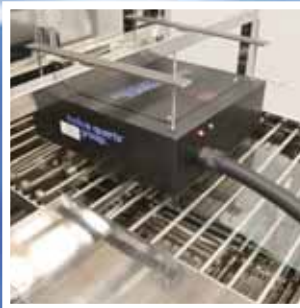
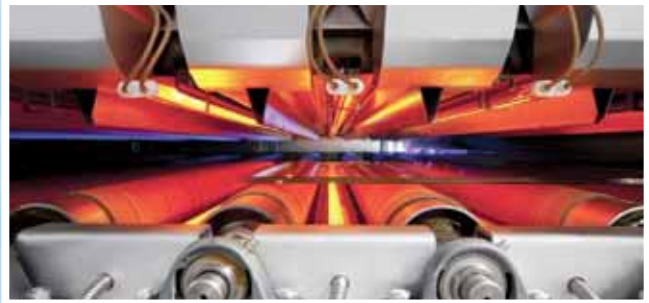
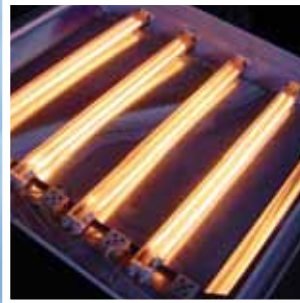
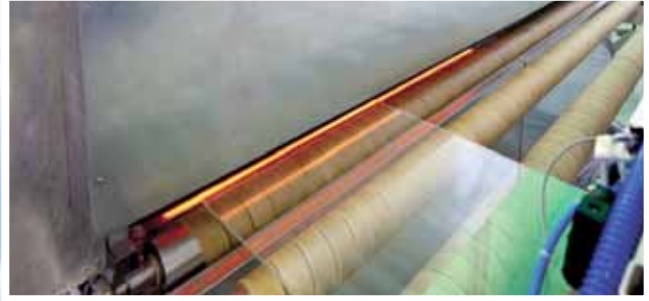
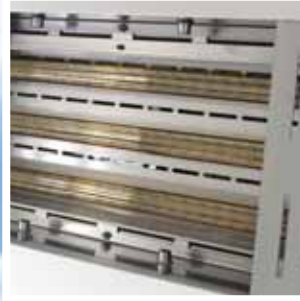


MOBILE
& TABLET



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GLASS APPLICATIONS



IR medium wave twin tubes emitters for:

- laminating lines
- mirroring lines
- dry screen printing lines

IR medium wave single tube emitters for:

- bending furnaces
- fusion furnace

IR fast medium wave twin tube emitters for:

- laminated glass cutting machines

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Glaston iLook Anisotropy – automatic scanning of all tempered glass

Online scanning of anisotropy has now been made easy for all glass produced and available for all tempering lines. The system includes a monitor at the unloading end where an anisotropy scan is shown and saved automatically in a database for load traceability.

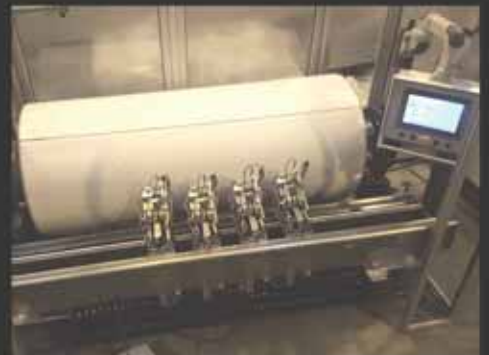


www.glaston.net - www.glastory.net

More information: Glaston, Tel. +358 10 500 500, info@glaston.net, www.glaston.net



Glass MACHINERY MANUFACTURER



FLAT GLASS

- Washing machines for flat glass until Jumbo size
- Polishing machines until Jumbo size
- Auto loaders & unloaders for Jumbo size (aerea & tilting)
- Stockers, rolls & belt conveyors, aerial & terrestrial transfers
- Mills for float, pattern & wire glass
- Complete lines for load & unload coater, laminated & silvering lines
- Tin bath periferics (coolers, top-rolls, side sealing)
- Dross box, hood, lip plate, dedrossing pocket

AUTOMOTIVE GLASS

- Vacuum bag furnace (heatable & non heatable)
- De-airing windshields furnace
- Auto packing machines for automotive sidelites
- Washing machines for flat & curved glass
- Windshields control lines
- PVB cutting machines (squar & trapecial)
- Drum for heated PVB (paralel & trapecial)
- Stockers for flat & curved glasses
- Complete lines of manufacture, printing, load & unload furnaces
- Robots for Load, Unload, MB & packing
- Automatic PVB trimming for windshields
- Special machines for automotive glass industry

ECCOL

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Service



Quality



Customization

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**China
Glass**



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29 MAY
1 JUNE 2018





MILAN
FIERA MILANO RHO - HALL 14

GLASS PACKAGING: DESIGN, PRODUCTION AND CUSTOMIZING - 2ND SHOW CONFERENCE



WWW.GLASSPACK.SHOW

The magazine will be distributed at the following Trade Fairs

issue	exhibition/conference	date	venue	deadlines
2018 1	EURASIA GLASS	7-10 March	ISTANBUL Turkey	Deadline Adv files: 26-01-2018
	FENSTERBAU FRONTALE	21-24 March	NURNBERG Germany	
2018				Deadline Adv files: 26-02-2018
2018 2	CHINA GLASS	19-22 April	SHANGHAI China	Deadline Adv files: 16-03-2018
2018 3	GLASS SOUTH AMERICA	9-12 May	SAO PAULO Brazil	Deadline Adv files: 16-04-2018
	MIR STEKLA	28-31 May	MOSCOW Russia	
2018 4	GLASSBUILD AMERICA	12-14 September	LAS VEGAS (NV) USA	Deadline Adv files: 27-07-2018
2018 5	GLASSTEC	23-26 October	DUSSELDORF Germany	Deadline Adv files: 28-09-2018
	<p>ALL GLASSTEC EXHIBITORS ADVERTISING IN THIS ISSUE ALSO RECEIVE A FREE GLASSTEC PREVIEW</p> 			
2018 6	 CHILE GLASS	27-28 November	SANTIAGO Chile	Deadline Adv files: 31-10-2018
	GLASSTECH ASIA	14-16 November	KUALA LUMPUR Malaysia	
	ZAK GLASS TECHNOLOGY	6-9 December	MUMBAI India	



FLATGLASS

2018 world directory

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- PRODUCT RANGES
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AVAILABLE IN INTERACTIVE VERSIONS TOO



DESKTOP



MOBILE
& TABLET



PDF

A+W Software

for Glass, Windows & Doors



A+W SOFTWARE GmbH

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E-mail: info@a-w.com • www.a-w.com

COMPANY DATA

Contacts

Peter Dixen - CEO
Kai Frenzel - CFO

Annual turnover

EUR 25,000,000

Percentage of turnover from glass (%)

75

Number of Employees

190

Founding Year

1977

Registered Trademarks

A+W DynOpt



COMPANY PROFILE

A+W

Software for Glass, Windows and Doors

A+W is the global market leader for software in the flat glass industry as well as the windows and doors business. The company develops ERP-, PPS- and optimization software in order to make glass and window manufacturers even more efficient.

A+W solutions control and optimize the whole value chain, from basic glass to finished windows or façade elements. A+W products are suitable for small-, mid-sized and large companies.

Of course, A+W offers individual advice and consulting for its entire product range and supports users from the presentation of the systems through to live operation.

With automatic updates and upgrades, the global maintenance service makes sure that the installed software is always up to date. A+W optimizes its customers' yield, reduces production costs, shortens lead times, improves quality and thus increases customer satisfaction.

A+W has been active on the market for more than 40 years and sells its products worldwide. A+W cooperates with the most experienced and competent companies in the industry. This close networking helps A+W to always provide the best possible solution for its customers' demands.

A+W is a wholly owned company of Constellation Software Inc., which is listed on the Toronto Stock Exchange under the symbol 'CSU'. The Corporation acquires, manages and builds vertical market software businesses.



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SCANDINAVIA

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Correns Corporation

Iino Building, 1-1 Uchisaiwai-cho - 2-chome
Chiyoda-ku - Tokyo 100

MEXICO / LATIN AMERICA

TI Glass, SA DE CV

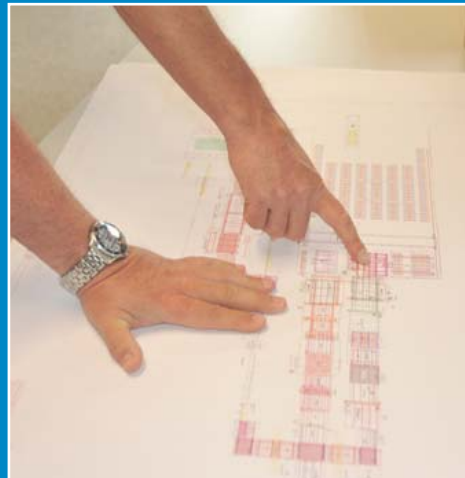
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E-mail: info@adeliolattuada.com • www.adeliolattuada.com • www.lattuada-na.com

COMPANY DATA

Contacts

Adelio Lattuada - President
Nicola Lattuada - Sales Manager
Michela Lattuada - Communication Manager

Sales

Domestic 5% / International 95%

Area

Office area 500 m² / Plant area 3,500 m²

Number of Employees

39

Founding Year

1978

Capital

EUR 90,000.00

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018
Seebe - Belgrade, Serbia - 18 / 21 April 2018
China Glass - Shanghai, China - 19 / 22 April 2018
Glass South America
São Paulo, Brazil - 09 / 12 May 2018
Mir Stekla - Moscow, Russia - 28 / 31 May 2018
GlassBuild America
Las Vegas, USA - 12 / 14 September 2018
Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

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USA (WEST COAST)

TSS SALES & SERVICE

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COMPANY PROFILE

With 40 years of experience, **Adelio Lattuada** produces the widest range of edging and vertical washing machines currently on the market.

Always focused on the future, the company would like to highlights of its **Lattuada Robotic Solution**:

- Automatic and integrated online-measuring of the glasses (no need to pre-set the different glass sizes)
- Automatic adjustment of the working speed according to the glass size
- Ease of use: standard edging machines with standard maintenance (Lattuada models require very low maintenance)
- Possibility to turn the glass 90° or 180°
- Customized solutions (the grippers - Venturi vacuum system - are also customizable): to achieve the maximum results, possibility of customized modules and software designed as per request
- High flexibility: glasses of different sizes processed one next to the other (very small distance needed between the glasses)
- Increased productivity thanks to the high speed of this solution (cycle time of the configuration exhibited at Vitrum 2017: 10 sec.)
- Costs reduction: only one operator required
- Price (ROI): very competitive price
- Non-stop quality control, having access to the area



Discover all the Lattuada integration solutions.

ADI

INDUSTRIAL DIAMOND APPLICATION



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COMPANY DATA

Contacts

Lorenzo Aliprandi - President
Dino Zandonella Necca - General Manager and CEO

Mother company

Surfaces Technological Abrasives SPA



Annual turnover of the Group

EUR 80 million

Annual turnover of the Company

EUR 35 million

Percentage of turnover from glass

18%

Sales

Domestic: 25% / International: 75%

Banks

Unicredit, Intesa San Paolo

Area

Office area: 2,900 m²
Plant area: 9,100 m²

Number of Employees

180

Founding year

1980

Paid-in capital

EUR 2,000,000.00

Patents obtained in

3 for the Glass Industry

Registered brands

UHS ; ADI

Parent and Sister Companies

Domestic: 1 / International: 3

Planned Exhibitions

- China Glass** - Shanghai, China - 19 / 22 April 2018
- Glass South America** - São Paulo, Brazil - 09 / 12 May 2018
- GlassBuild America** - Las Vegas, USA
12 / 14 September 2018
- Marmomac** - Verona, Italy - 24 / 28 September 2018
- Tecnargilla** - Rimini, Italy - 24 / 28 September 2018
- Glasstec** - Düsseldorf, Germany - 23 / 26 October 2018

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U.A.E

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COMPANY PROFILE

ADI SpA has been founded in 1980 and now, after 37 years, ADI has 3 plants in Italy and 3 abroad, 180 people in Italy and 12 abroad. The growth has been possible thanks to the continuous R&D investments and the focus on the real customer's needs.

ADI manufactures diamond tools not only for glass, but also for stone, ceramics, mechanics and optics. The big advantage coming from this wide range of products is that the experience made in one application can be transferred to the others. A good example of this, is the UHS bond, which has been studied initially for the Glass Automotive industry and now it has been successfully transferred to the CNC tools for glass, stone and mechanics.

ADI is one of the very few companies in the world with all sintering technologies in house. ADI is in fact able to manufacture metal bond, resin bond, vitrified and plated bonds. In the last years an increasing number of patents has been registered worldwide. In particular, related to the glass industry, there is the GOLDFINGER router; the W.E.T. trapezoidal wheel, which allows an even deformation thanks to the patented refrigeration system; the flexible seaming wheels, which have been developed for the SKG machine.

ADI is extremely proud to offer products that are 100% Made in Italy. Many Companies have tried to reduce the production costs by selling imported products or by setting production plants in Countries with lower manpower and healthcare costs. ADI reduces the customer's Total Cost of Ownership with products innovation.

At the end of 2016 ADI, together with the company Surfaces Technological Abrasives SPA become part of a big group. This will not bring any change in the Company Values. On the contrary, the entire Group will be stronger and capable to invest even more in Innovation for the Customer's benefit.





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COMPANY DATA

Contacts

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Richard Green - Senior Manager - Business Development

Annual turnover of the Company

EUR 5,000,000

Percentage of turnover from glass (%)

100

Sales

Domestic (20%) / International (80%)

Number of Employees

35

Founding Year

1983

Planned Exhibitions

Glassbuild America - Las Vegas, USA - 12 / 14 September 2018

Glasstec - Dusseldorf, Germany - 23 / 26 October 2018

SALES NETWORK

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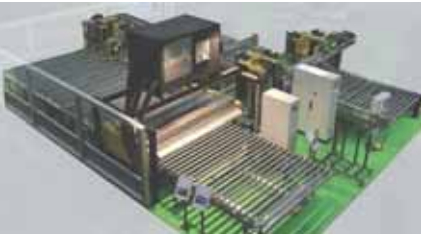
PRODUCT RANGE

- Fully Automatic Seaming/Arrissing Lines
- Fully Automatic Shape Seaming/Arrissing Lines
- Furnace Batch Building Systems
- Robot Loading & Unloading Stations
- Horizontal & Vertical Washing Machines
- Manual Seaming/Arrissing Machines (Wet & Dry Versions)
- Laser Marking Systems in-line and off-line
- Edge Deletion Systems – manual and automated
- IG Production Lines and associated equipment
- Glass Handling machinery for transporting, turning, rotating, flipping, tilting
- Shuttle conveyors for linking multiple lines
- Custom designed equipment and solutions

Ashton Industrial, founded in 1983, is now a world leading manufacturer of pre-tempering systems, exporting over 80% of machinery to every corner of the world. We design and manufacture high-quality, heavy-duty machinery for professional glass processors, with 24/7 reliability. Available in standard or custom-built configurations giving maximum production with minimum labour.

AUTOMATIC SEAMING/ARRISSING, WASHING AND FURNACE BATCHING EQUIPMENT

Our range of high performance automatic lines includes:



SeamMaXX PRO - Fully automatic high-speed seaming, producing a 1m² lite fully processed on all 4 edges, top and bottom every 8 seconds. Maximum glass sizes up to 6mx3m and minimum size down

to 300x150mm. Options include wet or dry operation, on-line laser marking, edge deletion and corner dubbing, out-of-square mode, high volume mode, vertical edge grinding, operating modes to suit customer production flow.



SeamMaXX SOLO PLUS - Fully automatic seaming in straight line configuration, average 3 lites per minute seamed top and bottom on all 4 edges. Options include wet or dry operations, on-line laser marking, corner dubbing, high volume mode.



SeamMaXX SOLO - Semi-automatic seaming, can be specified for glass sizes up to 5m x 2.8m and handles minimum dimensions as small as 150mm. The output

capacity depending on glass size, averages around 2.5 lites a minute. Options include wet or dry operation, on-line laser marking, edge deletion and corner dubbing, out-of-square mode, high volume mode, vertical edge grinding.

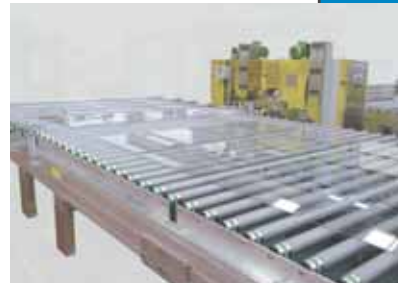


ShapeSeam PRO - Fully automatic high speed processing of any flat glass shape, truly random loading in any sequence, no pre-programming of shape, size or thickness.

HWM PRO - High Performance Compact Horizontal Washing Machines. Fully stainless-steel construction, available in various standard widths from 1.3m to 3.3m. Can be spe-

cified with additional pre-spray, washing and drying sections to suit application and speed of operation.

BatchMasta PRO - System to automatically batch lites after seaming, prior to tempering. Totally random mixed sizes, for example from an Ashton SeamMaXX Pro Seaming line, are arranged into multiple-row batches and transported directly on to the furnace load conveyor with absolutely no manual intervention. Batch layout and glass sizes can be passed directly to the end of the furnace to aid identification during unloading.



MANUAL SEAMING/ARRISSING, LASER MARKING, EDGE DELETION & ROBOT HANDLING EQUIPMENT



UNIX Manual Seaming / Arrissing - models available in wet and dry versions, both with the option of castor tables or our 'high float' air floatation tables. Various standard sizes are available.



LaserMark PRO V4 - Standalone Compact Mobile Laser Unit, suitable for rectangular and shaped glass. Mobile with 'plug and play' connection, fully guarded to latest standards.



EDPRO-A Edge Deletion - Fast, efficient and clean deletion of soft coatings on glass. Air floatation table incorporating an edge deletion head and datum alignment bars for simple quick operation. Options of wide band edge deletion and standalone units also available.



RoboLoad PRO - System for high speed loading or unloading of lites and general glass handling. 6-axes robot with custom vacuum frame and conveyor system to suit individual customer requirements. Custom built solutions to suit customer requirements.



AYROX INNOVATION & SAVINGS

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COMPANY DATA

Contacts

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Andre Silnov
Martine Maitrejean
Salla Suomi

Sales

Domestic (2%) / International (98%)

Founding Year

1991

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018

China Glass - Shanghai, China
19 / 22 April 2018

Mir Stekla - Moscow, Russia - 28 / 31 May 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

Zak Glass Technology - Mumbai, India
8 / 9 December 2018



COMPANY PROFILE

PVB Shaping, relaxation and Cutting

- **Ayrox** has a long history as a specialist in PVB treatment, from roll handling to cut sheets ready for lamination. This includes roll transfer, shaping, relaxation and cutting.
- The advantage of PVB shaping and stretching is that it generates considerable material savings for laminated wind-screen producers.
- Ayrox newest product is an innovation in wedged PVB roll handling and cutting.

PVB Wiring

- Wiring technology enables to produce heatable PVB, suitable for both architectural and automotive applications.





Production Accessories

An example of production accessories in our product range include:

- For lamination:
 - Silicon rubber vacuum rings
 - Special silicone-free non-EPDM vacuum rings. These vacuum rings leave no silicone residue on glass and last tens times longer than normal silicone-free EDPM vacuum rings.
- For tempering, we supply aramide fiber tapes of different sizes and thicknesses.

Optical quality control

- Ayrox provides a wide range of high-precision non-destructive optical measurement instruments. They are designed for Quality Control requirements and worldwide norms and regulations. Our product range also includes optical equipment such as:
 - Polariscope for visual inspection of stresses in glass
 - Polarimeters for a quantitative evaluation
 - GASP for surface stress measurement
 - VRP for non-destructive residual stress measurement on black paint areas
 - Edge stress metres, etc.

- Surface stress (mechanical strength) gauges for annealed, tempered and heat strengthened glass
- Our qualified technicians perform annual calibrations, repairs and preventive maintenance, and are available for theoretical and practical trainings.

Heatable backlite soldering and testing

- We offer machinery to perform testing of:
 - electric circuits
 - continuity of lines
 - mechanical strength of soldering
- Our soldering range includes:
 - Manual, semi-automatic and custom automated soldering machines, with a positioning jig.

Ayrox continuously innovates and expands its product range and machinery, responding to special production needs.

PRODUCT RANGE

- PVB shaping, relaxation and cutting lines
- Heatable PVB wiring technologies
- Heatable backlite soldering and testing systems
- Silk printing machinery
- Flat and bent glass tempering machinery
- Sourcing and trading in safety glass for various applications
- Distributor of Strainoptics products

Non-invasive gas measurement of IGU





B SOLUTION Srl

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COMPANY DATA

Contacts

Gianluca Bonfanti - General Manager
Raffaello Bonfanti - Technical Manager
Nardo Daniele - Sales Manager

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey
7 / 10 March 2018

COMPANY PROFILE

B Solution has 30 years of experience and has developed a complete range of products suitable for both small and large glassworks, satisfying the most modern production requirements.

B Solution is specialized in:

GRINDING LINES

- Vertical NC Speed Edge
- Bilateral grinding flat edge
- Bilateral grinding round edge
- Shape rounding
- Shape radius

DRILLING AND MILLING LINES

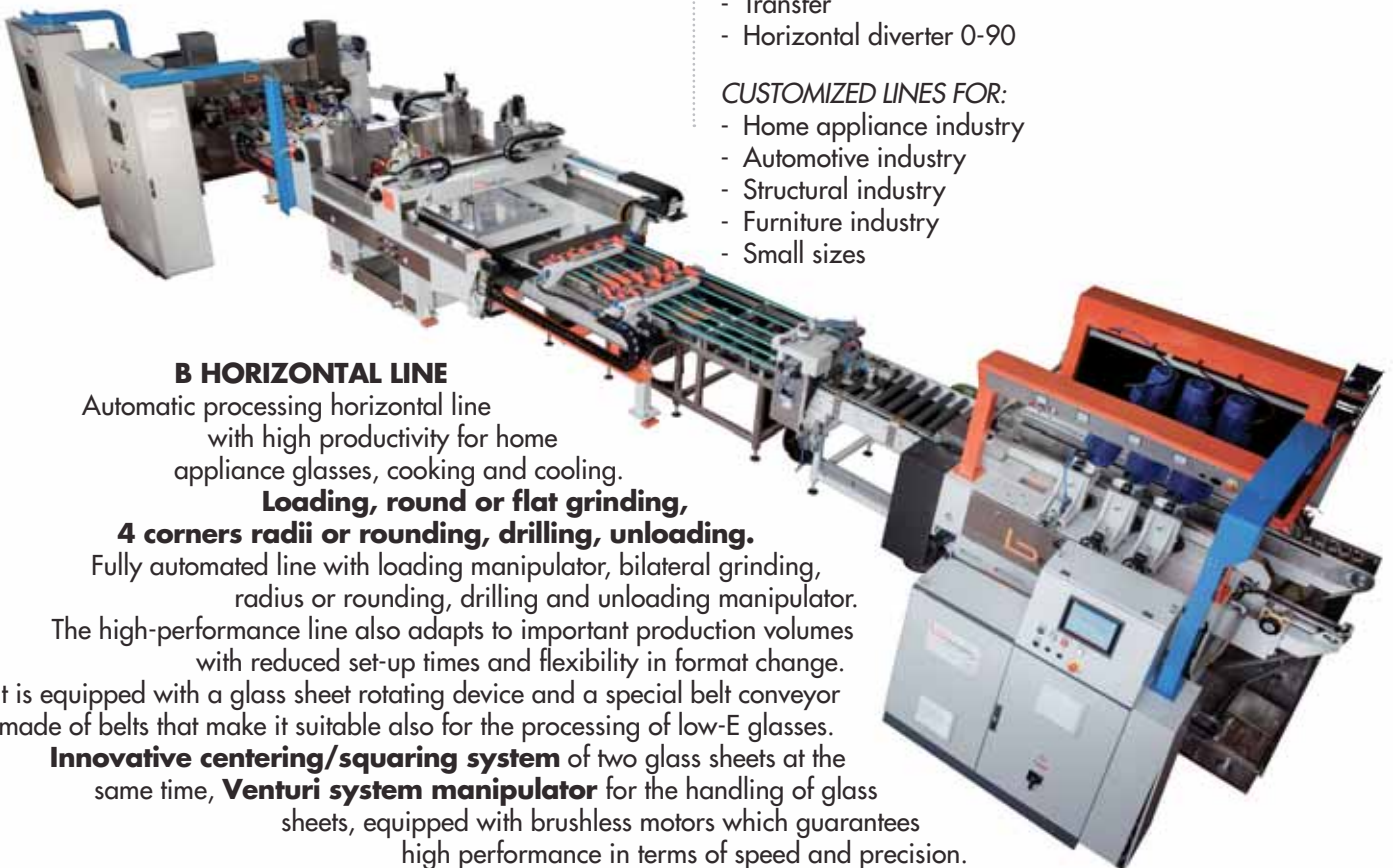
- Vertical NC Speed drilling and milling
- Multi-head vertical drill
- Vertical drill template
- Horizontal modular drill

AUTOMATION AND MANIPULATION

- Loading manipulator
- Unloading manipulator
- Rotating platform
- Shuttle
- Turning device
- Transfer
- Horizontal diverter 0-90

CUSTOMIZED LINES FOR:

- Home appliance industry
- Automotive industry
- Structural industry
- Furniture industry
- Small sizes



B HORIZONTAL LINE

Automatic processing horizontal line with high productivity for home appliance glasses, cooking and cooling.

Loading, round or flat grinding, 4 corners radii or rounding, drilling, unloading.

Fully automated line with loading manipulator, bilateral grinding, radius or rounding, drilling and unloading manipulator.

The high-performance line also adapts to important production volumes with reduced set-up times and flexibility in format change.

It is equipped with a glass sheet rotating device and a special belt conveyor made of belts that make it suitable also for the processing of low-E glasses.

Innovative centering/squaring system of two glass sheets at the same time, **Venturi system manipulator** for the handling of glass sheets, equipped with brushless motors which guarantees high performance in terms of speed and precision.



HORIZONTAL MODULAR DRILL

Horizontal modular drill for drilling and countersinks in series of rectangular glass sheets. Ideal for use in line or as stand-alone. Automatic loading and unloading of glass.

Modular: with the possibility of adding or dividing drilling stations from 2 up to 6. Extremely compact, ensuring maximum precision.



B VERTICAL LINE

Automatic compact vertical line with high productivity.

Rough or polished grinding, flat or round edges, arissing, coating removing of low-E glasses, milling and drilling.

The modular and selective vision of the line, with grinding and drilling stations, responds to the needs to have flexible and interchangeable machines responding to a constantly evolving market.

Innovative follow-glass system is the grinding head which follows the glass sheets anchored by means of suction cups, guaranteeing maximum performance without vibrations.

The complete electronic control of the drilling heads and positioning guarantees the highest precision of the distances and of drilling depth.

The compact system integrates loading and unloading operations into a single solution.



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Patrizia Pastorino - Sales Manager
Renato Genocchio - Technical Manager
Gianni Marengo - Technical Manager
Marta Pesce - Sales & Marketing

Sales

Domestic (15%) / International (85%)

Quality Certifications

ISO 9001:2008 QS - E-16-056

Banks

Intesa San Paolo - Carige Italia

Area

Offices 200 m² / Plants 2500 m²

Number of Employees

26

Founding Year

2003

Paid-in Capital

EUR 100,000

Parent and Sister Companies

1) Elettromeccanica Bovone Srl

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2) Bovone Maquinas e Equipamentos Industriais

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Sy 132 bh, Whithchurch

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COMPANY PROFILE

BDT was founded in 2003 to support and complete Elettromeccanica Bovone: Vittorio Bovone, together with his daughters Federica and Giulia, and all the BDT Staff, wanted to produce and manage wheels for straight-line edgers and bevellers in-house. This represented just the beginning, and now BDT is a strong and consolidated company with well-prepared and experienced staff. Market demand focus and technical improvement are the keywords of BDT history and evolution.

Over the years this small company has grown a lot: 25 employees nowadays and a large production capacity including the range metal bond and resin bond diamond cup and peripheral wheels for bevellers, edgers, double-edgers, CNC peripheral wheels, drill bits and glass tools to make holes. In 2015 two young employees were recruited, one in the Production Department and the second one for Sales & Marketing.

In 2010 the new revolutionary and performing GOLDNET router was patented. Today it's one of the most highly appreciated tools of the range.

Bovone Maquinas e Equipamentos Industriais, the Sister Company of BDT, based in São Paulo, which deals with Bovone machines and BDT tools all over Brazil, was also founded during this same year.

Since 2010 the company has also been producing stone tools, investing on high-performance machines to provide high quality wheels, which can grind new materials such as Dekton.

The company has always experienced step-by-step development recording a steady and progressive increase in sa-



**QUALITY &
PERFORMANCE**
JOINED FOR EXCELLENCE

STAINLESS QUALITY AND GOLD PERFORMANCE

**BOVONE
GROUP**

les volumes year after year. The only exception was in 2009 when sales decreased, but in 2010 the previous targets were completely restored. 2015 was a successful year since the company reported a 25% increase on total volume.

Also 2016 was a very positive year thus considering sales volume and accounting balance sheet.

The formula never changes: investments in innovation, research, development and performance in machines and human resources, these are the secrets of growth. At BDT, employees are, first and foremost people, and they are, in fact, very responsive people, part of a very big family, always ready to intensify rhythms when a customer needs an order urgently, since their efforts are always rewarded: they are always granted the best working conditions and always receive what they ask for. BDT uses the same philosophy with customers: first of all they are people, who need to be taken care of in the best way. Our company aims at establishing positive business relationships with them, and, thanks to this behaviour over the years, simple partnerships have often evolved into something more. This also happens with agents, dealers, suppliers, both Italian and international, and even forwarding agents (they are always welcome to a good Italian coffee!).

This virtuous circle keeps on producing important advantages, giving our brand name extra value which represents BDT's long-lasting seriousness and reliability.

www.bovone.com
bovone
MADE IN EXCELLENCE



ELETTROMECCANICA BOVONE Srl

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COMPANY DATA

Contacts

Federica Bovone - Sales Manager
Massimo Arata - Sales Manager

Annual turnover of the Group

EUR 18 million

Percentage of Turnover from glass (%)

100%

Sales

Domestic (2%) / International (98%)

Quality Certifications

ISO 9001 - ISO 14000 - ISO 18000

Banks

NR 10

Nominal Capital

EUR 1 million

Area

Offices 1.000 m² / Plants 12.000 m²

Number of Employees

120

Founding Year

1954

Registered Trademarks

Bovone

Parent and Sister Companies

BDT - Bovone Diamond Tools

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E-mail: sales@bovonediamond.com

Planned Exhibitions

China Glass - Shanghai, China - 19 / 22 April 2018
Glass South America - São Paulo, Brazil
09 / 12 May 2018
GlassBuild America - Las Vegas, USA
12 / 14 September 2018
Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

SALES NETWORK

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BELGIUM

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DMT APS

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ARGENTINA

GIL BARBARA SRL

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CZECH REPUBLIC

TEKNIKA

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Elettromeccanica Bovone, a 'historical' name among glass machinery manufacturers

The company founded in 1954 by Luigi Bovone started its history with the galvanic coppering process to protect the silver layer of mirrors, soon followed by further improvements, finally leading to the production of whole lines for mirror production.

In 1974 Bovone introduced a revolutionary straight beveller, able to work at twice the speed of machines of the most skilled competitors! In the following years, Bovone enlarged its production range, with straight line edging machines and lines for laminated and bullet-resistant glass.

The company is currently one of the world leaders for straight bevelling and edging machines: since 1974, more than 4,000 machines have been sold.

Elettromeccanica Bovone s.r.l. is present worldwide, thanks to a consolidated network of qualified agents that often also provide technical service and spare parts. Moreover, Bovone experienced technicians are always on call. Bovone has always stood for excellence and lasting quality: to maintain this recognition is the chief aim for anyone who works in the company.

Its commitment towards quality and constant innovation has been known ever since its founding, and continues now and in the future, facing ever renewing challenges.

Straight line bevellers and edgers

The body and other parts of its machines made of cast iron, make Bovone's bevellers and edgers the most reliable on the market. The stability given by cast iron allows a precision that nobody else can reach.

The product range includes two series of bevellers and a wide



range of edgers: for the processing of flat edges to 45° arris, with or without liquid cerium.

Moreover, the machines can be customized for high loads up to 2,250 kilos.

BRS Bovone Robotic Systems

Following the market and the requests of more and more automation either for an increase in production or for security reasons due to the handling of big sheets of glass, Elettromeccanica Bovone has expanded its range of products offering Robotic Systems.

Robots can be supplied as stand-alone, applied to existing edgers or as customized islands with two machines and two robots to satisfy customers' production needs.

Laminating glass lines

Bovone offers various types of laminating glass lines:

Glass width from 1,600 to 3,300mm, automatic or manual PVB laying, straight or 'U' shaped configuration.

Lines can also be upgraded in the future to meet changing market demands as follows:

From the first level manual line LLB to upgrading to a LLS semi-automatic line, which can then be upgraded to a larger LGL automatic line in the future.

Mirror lines

Msl, modular mirror lines, produced for glass sheets with widths of 2,250, 2,600 and 3,300mm, with a production speed of a 8 m/min: made in 12 different sections: automatic loading, scrubbers, chemical sections, pre-painting oven, curtain coaters, intermediate oven, final oven, cooling section and automatic unloading. These lines can be supplied with traditional copper/silvering processes or copper free, with electrical ovens or with new gas ovens for energy saving.





Bystronic
glass

BYSTRONIC GLASS
C/O BYSTRONIC LENHARDT GMBH

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Because we care

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COMPANY DATA

Contact

Dr. Burghard Schneider - CEO Bystronic glass

Quality certifications

ISO 9001:2015

Founding Year

1966

Parent and Sister Companies

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Registered brands

TPS®

Planned Exhibitions

Bystronic glass
will be present at all major
glass exhibitions in 2018

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BRAZIL

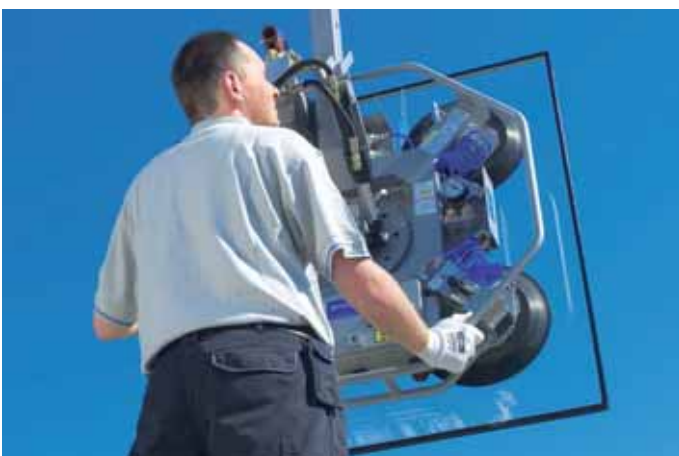
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COMPANY PROFILE

Future-oriented systems for glass processing

Bystronic glass symbolizes innovation in machinery, systems and services for architectural and automotive glass processing for tomorrow's market – from basic requirements to entire, customized installations.

Bystronic glass is an international brand with globally operating companies that support customers on site and through own sales and service companies. Bystronic glass has been part of Conzzeta AG, a renowned Swiss industrial holding company, since 1994.

Insulating glass manufacturing

Irrespective of whether it's a fully-automatic I.G. production line with warm-edge spacers or an entry-level solution, every I.G. manufacturer will find the line or machine that meets their requirements at Bystronic glass. The benchmark in this sector is the modern **B'SPEED** production line, which can produce triple I.G. units in the time it takes other lines to produce double I.G. units. At the other end of the product range is the **B'COMFORT**, the ideal entry-level solution for industrial I.G. production.

Remember – the trend is towards ever larger I.G. units and façade elements. With the **B'JUMBO** production line, XXXL units up to 18 meters long – can be manufactured economically.

Handling equipment

Glass processing industry customers have been impressed by **B'EASY** handling systems with their rigid guidance and low

dead weight since 1998. In recent years, the **B'EASY** handling systems have also been making headway with large window manufacturers as their flexibility in terms of frame design fulfil many requirements. Track-mounted equipment and battery-powered suction frames complete the range.

Automotive glass pre-processing

Bystronic glass is a world market leader in automotive glass pre-processing. The **B'CHAMP** machine generation enables quick and precise cutting, breaking, grinding and drilling of automotive glass ensuring system reliability for 24/7 operation. Thanks to its modular design, several cells can be combined to adapt to the specific requirements of individual customers. **B'CHAMP** solutions are also available for processing of solar glass, appliance glass, display glass and thin glass.





CUGHER GLASS Srl

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COMPANY DATA

Contacts

Barbara Mazza - CEO
Marino Bonetti, Cristiano Ferrario, Elena Siviero
Sales & Marketing Department

Mother Company

Cugher Glass Srl

Annual Turnover of the Company

EUR 12,500,000

Percentage of Turnover from Glass

95%

Sales

Domestic (5%) / International (95%)

Quality Certifications

ISO 9001

Area

Offices 600 m² / Plants 4,000 m²

Number of Employees

80

Founding Year

1967

Planned Exhibitions

China Glass - Shanghai, China - 19 / 22 April 2018
Glass South America - São Paulo, Brazil - 09 / 12 May 2018
GlassBuild America - Las Vegas, USA - 12 / 14 September 2018
Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

SALES NETWORK



360° Customer Service

- Turnkey Solutions** → Your partners in the pre - production settings and starting process
12 months warranty assistance (basic charge 10% M)
 - Customer Service & Technical support** → World Wide Technical Assistance
Spares parts
- DEDICATED CHANNEL - service@cugher.com





COMPANY PROFILE

Since it was founded in the 60's, **Cugher** has been developing technologies for future needs and analysing market evolution and production requirements in order to identify in advance forthcoming trends.

The open dialogue with Customers has enabled us to develop and create fully reliable solutions to match our Customers' demand.

Cugher's divisions:

Automotive

The automotive division provides silk screen printing lines with a high level of automation, precision and repeatability, for automotive car sets, tempered and laminated.

Home Appliance

The home appliance division is able to provide silk screen printing solutions for a sector in which printing speed is essential.

Architectural

Architectural silk screen printing machines are specially designed to print large glass formats up to Jumbo size 3000x6000 mm.

Furnaces

IR and UV Dryers and customized heat treatment solutions. All Cugher dryers comply with the highest energy standards and are designed as an integral part of the line.

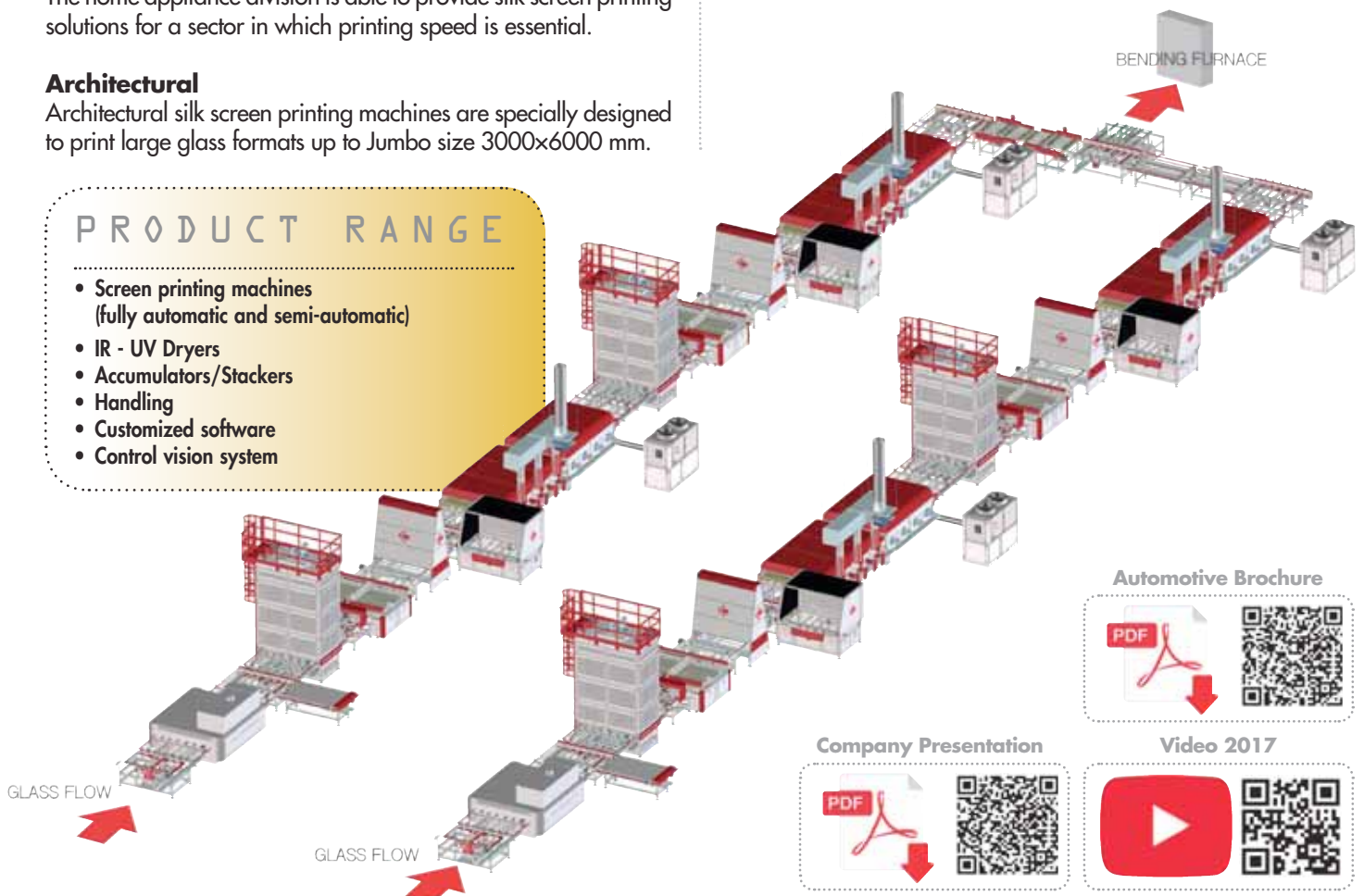
Handling

The high range of Cugher handling products allows transportation and stacking of glasses with any dimension and shape in all the directions inside production plant.

Our Customers are testimonials for our reliability and quality. Among them there are, leading glass manufactures such as AGC, Sisecam, Central Glass & Carlex NSG-Pilkington, PGW, Saint-Gobain, Schott, Guardian.

PRODUCT RANGE

- Screen printing machines (fully automatic and semi-automatic)
- IR - UV Dryers
- Accumulators/Stackers
- Handling
- Customized software
- Control vision system



Automotive Brochure



Company Presentation



Video 2017



DIAMUT



DIAMUT - BIESSE SpA

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COMPANY DATA

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Planned Exhibitions

China Glass - Shanghai, China
19 / 22 April 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

Mir Stekla - Moscow, Russia - 28 / 31 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

SALES NETWORK

FRANCE

DIAMUT FRANCE

UK

DIAMUT UK

DEUTSCHLAND

DIAMUT DEUTSCHLAND

AMERICA

DIAMUT AMERICA

BRASIL

DIAMUT BRASIL

AUSTRALIA

DIAMUT AUSTRALIA





Diamut is the division of Biesse Group dedicated to the design, manufacture and distribution of tools for processing glass, stone and ceramic materials. The company was established just over 30 years ago, founded on the intuition of just three business partners. Over time, Diamut has grown and developed through the company's entry into the world of Biesse (2002), and has evolved into one of the leading competitors on the global scene, with the ability to respond to a host of requests at international scale.

Today, Diamut is a successful, trusted partner in the aeronautics, household appliance, consumer electronics, furniture and architecture industries. The needs, requests and incentives received from these markets, combined with the expertise of Diamut's people, its industrial capacity and its widespread global distribution network, come together to create the blend of ingredients that go into making every Made in Diamut tool. Before being fitted in the machines belonging to artisan-, as well as those used by major companies engaged in large-scale production, Diamut tools are developed and tested on Intermac (Biesse Group's division specialized in glass, stone and metal processing technologies) machines.

All the details of each tool are carefully designed to ensure reliability and be ready for use even in the most demanding machining applications.

PRODUCT RANGE

Glass tools

- DRILLS, ROUTERS
- PERIPHERAL PROFILE WHEELS
- CUP WHEELS
- WHEELS FOR BEVELLED EDGES
- RECESS GRINDING WHEELS
- ENGRAVING WHEELS
- CUTTING DISCS
- WRITING BITS AND SPHERICAL TOOLS
- TOOLS FOR THIN GLASS SHEETS
- TOOLHOLDERS

Stone tools

- DRILLS, ROUTERS
- EDGE POLISHER TOOLS
- PERIPHERAL WHEELS
- RECESS DRAIN TOOLS
- FUNERARY ART
- WRITING AND BAS-RELIEF
- CUTTING DISCS
- TOOLS FOR SINTERED MATERIALS, DEKTON
- TOOLHOLDERS



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COMPANY DATA

Parent and Sister Companies

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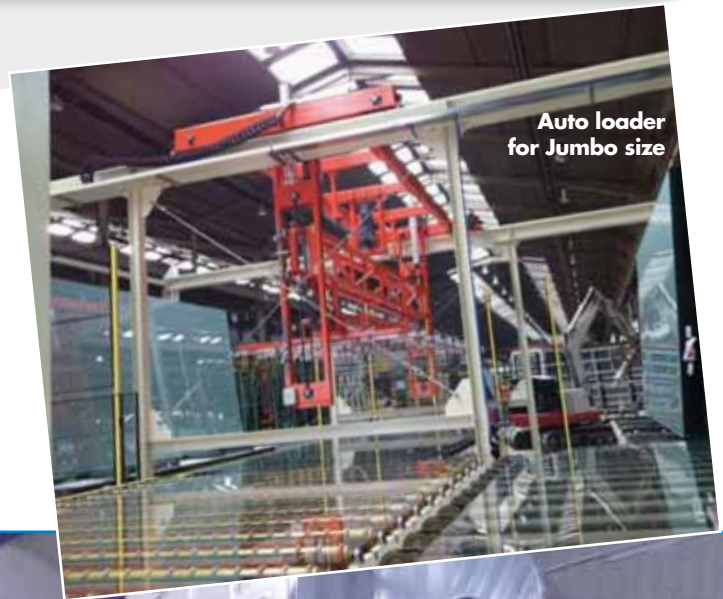
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Auto loader
for Jumbo size



Vacuum bags furnace

Ecol is a group of companies that designs, manufactures and implements both mechanical and electrical components and machinery. The companies also design full turnkey production lines, especially for the glass industry. Ecol has an industrial painting and shot blasting service at its facilities and in third-party companies.

Group staff is made up by a group of people who have been trained and specialised in different work areas, distributed in engineering and development, administration, mechanical and adjustment, electricity and programming area.

Ecol has own facilities with all the necessary facilities for the manufacture, assembly and testing of manufactured equipment.

The group has a wide range of products, among which:



Auto packing machines line

AUTOMOTIVE GLASS

- Vacuum bag furnace (heatable & non heatable)
- De-airing windshields furnace
- Auto packing machines for automotive sidelites
- Washing machines for flat & curved glass
- Windshields control lines
- PVB cutting machines (square & trapezoidal)
- Drum for heated PVB (parallel & trapezoidal)
- Stockers for flat & curved glasses
- Complete lines of manufacture, printing, load & unload furnaces
- Robots for Loading, Unloading, MB & packing
- Automatic PVB trimming for windshields
- Special machines for the automotive glass industry

FLAT GLASS

- Washing machines for flat glass up to Jumbo sizes
- Polishing machines up to Jumbo sizes
- Auto loaders & unloaders for Jumbo sizes (aerial & tilting)
- Stockers, rolls & belt conveyors, aerial & terrestrial transfers
- Mills for float, patterned & wired glass
- Complete lines for loading & unloading coaters, laminated & silvering lines
- Tin bath peripherals (coolers, top-rolls, side sealing)
- Dross box, hood, lip plate, de-drossing pocket

In the last years a high percentage of Ecol products have been exported to international markets such as Poland, Czech Republic, South Africa, Belgium, Brazil, Colombia, Portugal, China

PRODUCT RANGE

- Complete Stocking Lines / Engineering
- Complete Handling and Movement Lines
- Machines for Handling Glass Sheets
- Handling Robots
- Handling Equipment for Float Glass
- Vacuum Lifting Equipment
- Conveyor Belts
- Packaging Materials and Systems
- Loading and Tilting Machines
- Horizontal Washing Machines
- Vertical Washing Machines
- Washing Machines for Automotive Glass
- Laminated Windscreen Bending Furnaces
- Infrared Ovens
- PVB - Shaping and Cutting Equipment
- PVB - Wiring Technology for Heatable Laminates
- Cullet Handling Systems
- Screen Printing Drying Systems





EDGETECH EUROPE GmbH

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Super Spacer® Warm Edge Spacers provide a complete flexibility package

Edgetech's Super Spacer® flexible foam-based spacer systems act as energy-efficient Warm Edge spacers in insulating glass windows. They significantly reduce energy loss to the outside, largely prevent condensation and also contribute to the lifespan of windows.

The age of flexible spacers has now arrived in the form of the window generation 4.0 according to warm edge specialist Edgetech. Therefore the main focus of Edgetech will be upon the technical benefits of the Super Spacer® spacers during processing in automatic production lines, in addition to the topic of 'preventing thermal bridges'.

The company is convinced that new developments such as quadruple insulating glazing and complex superstructures with integrated, intelligent functions can only be produced economically and precisely with a high degree of automation in combination with flexible spacers. A robot can set the foam-based products in parallel down to the last millimetre in a matter of seconds, thus guaranteeing an impeccable and tight edge compound. Automation and digitisation will also provide medium-sized window producers with competitive advantages in the medium term, offering high-quality products and flexible manufacturing that respond quickly to customer requirements and economically produce smaller series.

Countdown to Edgetech's 30th anniversary

In 1989 the Warm Edge pioneer launched the first flexible structural foam spacer with an integrated desiccant onto the market. The company now supplies some 300 million metres of the product a year to more than 90 countries. At the start of the 1990s a large section of the industry also started investing in the automation of individual manufacturing steps. Due to a shortage of skilled workers and high competitive pressures, many window producers are now faced with the decision of whether to move in the direction of full automation whilst the warm edge has at the same time established itself as an energy-efficient edge seal compound for windows. So flexible spacers like Super Spacer® are now experiencing a new lease of life, because in view of the manufacturing technology involved, they outperform rigid spacers in terms of their flexibility, application speed and precision.

The advantages of the Super Spacer®

- low thermal conductivity
- fast dew point drop
- durable edge seal, continuous vapour barrier at corners
- moisture-adsorbing, flexible foam matrix
- high desiccant content adsorbs more moisture than two-sided and generally also more than four-sided filled conventional systems
- no chemical fogging*
- attractive aesthetic appearance
- high-quality silicone for superior resistance to UV-light and oxidation
- very good gas-loss rate values according to EN 1279 part 3
- optimum values for energy efficiency (Psi-Values up to 0.031**)
- enhanced comfort and well-being near windows
- excellent condensation resistance, shape retention and colour stability
- excellent durability for sustainable performance
- higher productivity through ease of processing (only three process steps)
- North America ASTM E2188/E2189/E2190
- Passive House certificate for Arctic Climate
- Europe EN 1279
- Canada CGSB 12.8
- CEKAL - certified for France
- P1 Industry standard USA

* safe up to approx. +80°C, higher depending on the test method.

** Super Spacer® T-Spacer™ Premium Plus made from structural foam processed in triple-pane insulating glass; source: Bundesverband Flachglas e.v. (German flat glass association).

Edgetech Europe GmbH is a fully-owned subsidiary of Quanex Building Products Corporation, a leading global provider of energy-efficient components such as window and door profile systems, flexible insulating-glass spacers, edge seals for photovoltaic modules, wooden floors and ceiling profiles, as well as window and door grilles, with its head offices in Houston, Texas. Based on turnover Edgetech/Quanex is the world's largest manufacturer of spacers. Edgetech Europe GmbH is a sales location for the markets in continental Europe and one of the three worldwide Edgetech production plants, with a total of 450 employees and 16 extruders.



COMPANY DATA

Contacts

Robert E. Daniels - President / IG Systems (USA)
Joachim Stoss - Managing Director of Edgetech Europe GmbH
Chris Alderson - Managing Director of Edgetech (UK) Ltd.

Mother company

Quanex Building Products Corporation

Area

Cambridge, Ohio USA: 38,740 m²
 Coventry, UK: 2,522 m²
 Heinsberg, Germany: 4,368 m²

Number of Employees

450

Founding Year

1989

Registered brands

Super Spacer®

Parent and Sister Companies

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Planned Exhibitions

Mir Stekla - Moscow, Russia - 28 / 31 May 2018
Glassbuild America - Las Vegas, USA - 12 / 14 September 2018
Windows, Doors & Facades - Dubai, UAE
 23 / 25 September 2018
Glasstec - Düsseldorf, Germany - 23 / 26 October 2018
BAU - Munich, Germany - 14 / 19 January 2019

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FOREL



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Founding Year

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Planned Exhibitions

Fensterbau - Nuremberg, Germany - 21 / 24 March 2018

China Glass - Shanghai, China - 19 / 22 April 2018

Glass South America - São Paulo, Brazil

09 / 12 May 2018

Forel Open House - Treviso, Italy - 28 / 30 June 2018

The AGGA National Conference GA18

Gold Coast, Australia - 29 / 31 August 2018

GlassBuild America - Las Vegas, USA

12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

Veteco - Madrid, Spain - 13 / 16 November 2018

Windoer - Quebec City, Canada - 3 / 5 December 2018

Zak Glass Technology - Mumbai, India

6 / 9 December 2018



COMPANY PROFILE

Forel is an Italian company and world leader in the design and production of machinery for the flat glass and double glazing industries.

Established in 1976, for more than 40 years Forel has invested, researched and persevered to deliver technical projects using know-how, technical skills and creativity.

"Made in Forel" technology covers the following families of products: Vertical Cutting Line for Laminated Glass, Laminating PVB line, Edging Machines, Sorting System and IGU Machinery.



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COMPANY PROFILE

Forvet 25 years providing innovative solutions in special glassworking machinery

The company is located in Volvera (near Turin) – ideally positioned to benefit technologically from the highly developed Automotive and Aerospace industry in North Western Italy. These factors have enabled Forvet to produce highly sophisticated, technically advanced and reliable machinery.

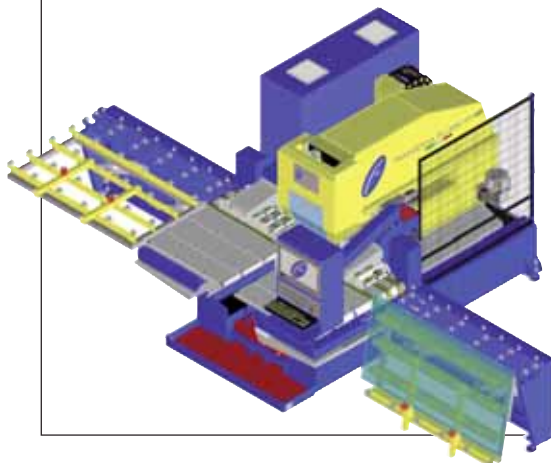
The people at Forvet strongly believe that everything in the life can be achieved, but not for free, of course. So, Forvet always tries to consider any solution not good enough, continuously searching for the best, something really special that could be never classed as standard.

Forvet's vision is to create new generations of machines for the glass industry with new ideas and great people.

FRANCESCA FC 1250 H.O AIR

Forvet is the first company in history to create a CNC drill.

This innovation brought with it many benefits such as high precision, high speed and better quality.



The other main benefits are a smaller footprint and the drastically reduced workload for the operator.

Over time this idea has evolved into the market leading range of drilling machines.

The FRANCESCA FC 1250 H.O AIR with vertical or horizontal loading/unloading is the latest evolution of this now proven drilling technology

FRANCESCA F.C. 1600 water jet TWO MACHINES IN ONE



drilling, countersinking and milling operations with tools and water jet system.

Forvet uses **water jet technology** following its company philosophy, resulting in the first water jet machine with loading, positioning, processing and unloading all carried out completely automatically.

FRANCESCA F.C. PORTAL

The Francesca F.C. 2000/2500/3300 is Forvet's answer to the problem of processing the big glass sheets.

The 3300 model **processes two glasses simultaneously.**

Support during transport is obtained thanks to **the Forvet patented transport system** based on dynamic vacuum belts, which maintain the glass in its correct position along the entire length.

This special feature enables to process low-E magnetron



glass without contact with its surface. Francesca FC machines the only equipment able to carry out drilling and milling operations completely automatically, including loading, positioning, setting and unloading.

CHIARA EDGE PROCESSOR



The Chiara project has revolutionized the grinding sector thanks to high flexibility this equipment ensures. Chiara can produce 1,000 pieces completely different from each other in size, thickness, even out of square, by processing them as all equals.

CHIARA MULTIFLEX



Chiara MTP10 MULTIFLEX is designed to produce large volumes up to 3,300x18,000mm with 10 spindle grinding heads. **The integration with a CNC working centre** enables to carry out radii corners, cut outs, milling (also polished) as well as drilling implementations, without repositioning the glass. It also allows the production of flat and/or pencil polished edge finish. The machine can also manage two glasses (even different from each other) simultaneously. As the glass flow is in a straight line, the Multiflex uses a third of the space required for a traditional double edger machine, for the same maximum dimensions.

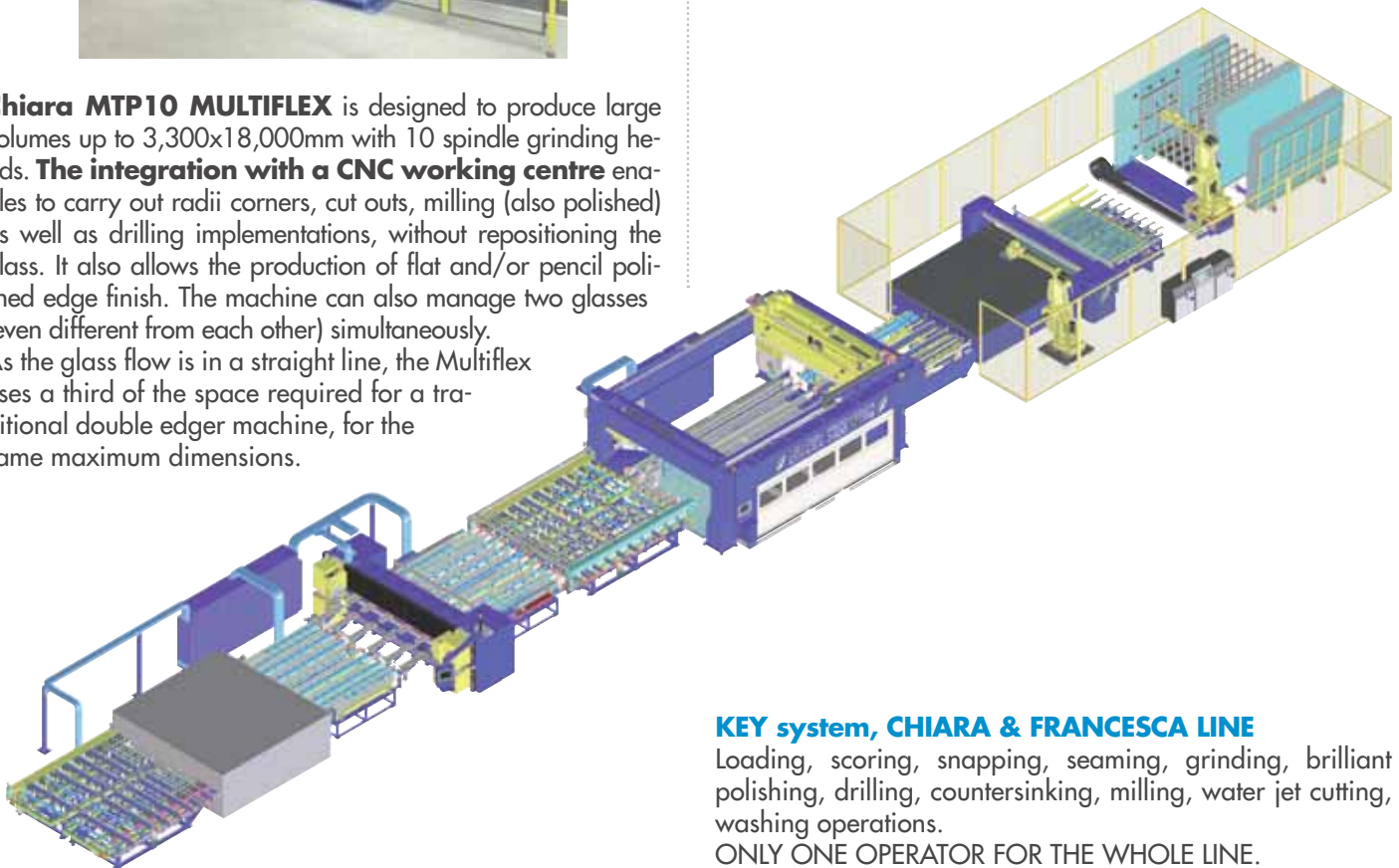


Combiflex

The considerable experience gained with Chiara and Francesca machines has led to the development of the **COMBIFLEX island**, a stand-alone production line that incorporates different glass processes within one structure.

Occupying a space of only 32 sq.m., the Combiflex can process glass up to 1,500x3,000mm with different working finishes for each edge. This Forvet proposal is the solution that combines limited space and extremely flexible productivity. The possibility to integrate additional process such as CNC, water jet cutting, washing machine, automatic loading and unloading, after purchase, enables users to modulate their economic investment with the possibility to implement future technologies.

With the full configuration, the COMBIFLEX becomes an independent stand-alone productive island, where the positioning of the rack sheets is the only manual operation required.



KEY system, CHIARA & FRANCESCA LINE

Loading, scoring, snapping, seaming, grinding, brilliant polishing, drilling, countersinking, milling, water jet cutting, washing operations.

ONLY ONE OPERATOR FOR THE WHOLE LINE.



G. TECH Srl

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COMPANY DATA

Contacts

Roberto Smaniotto - CEO
Roberto Piccoli - International Sales

Annual Turnover of the Company

EUR 1,500,000

Percentage of Turnover from Glass

90%

Percentage of Third-Party Turnover

10%

Sales

Domestic (5%) / International (95%)

Quality Certifications

ISO Standard UL/CSA

Banks

CRV - BNL

Area

Offices 150 m² / Plants 600 m²

Number of Employees

6

Registered Trademarks

FORZA G[®]



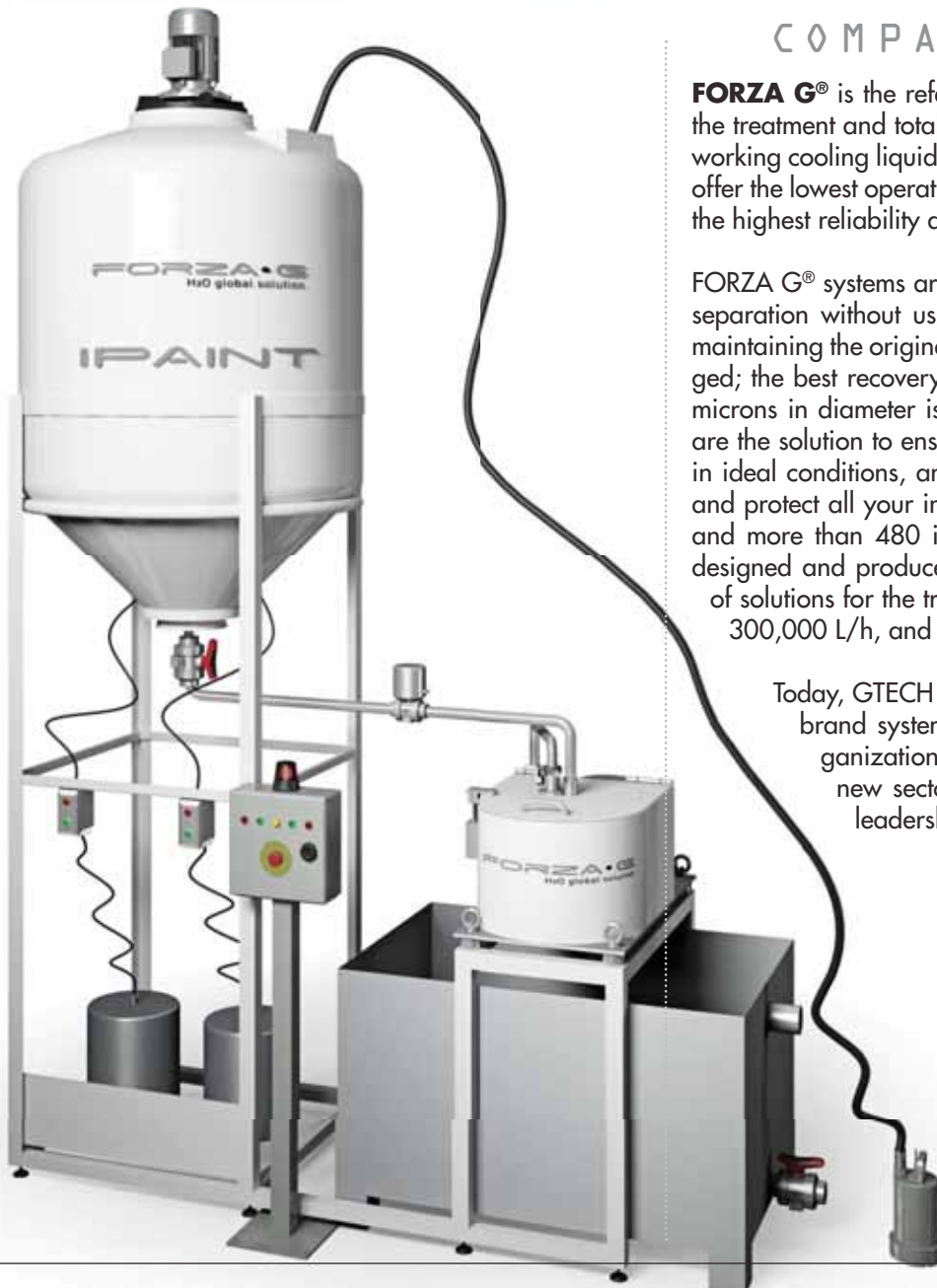


COMPANY PROFILE

FORZA G® is the reference brand in technical solutions for the treatment and total recovery of production line and glass working cooling liquids. FORZA G® products are designed to offer the lowest operating costs, the best energy optimization, the highest reliability and the longest lifetimes.

FORZA G® systems are champions of solid-liquid centrifugal separation without using any chemical additives, therefore maintaining the original properties of cooling liquids unchanged; the best recovery of all particles in suspension up to 2 microns in diameter is guaranteed. The FORZA G® systems are the solution to ensure that all machine tools are working in ideal conditions, and so lengthen the lifetime of the tools and protect all your investments. With 20 years' experience and more than 480 installations worldwide, FORZA G® is designed and produced as the widest range on the market of solutions for the treatment of volumes from 6,000 L/h to 300,000 L/h, and operating 24/7 without interruption.

Today, GTECH designs and manufactures FORZA G® brand systems and has started a three-year reorganization of its FORZA G® production, to define new sector industrial standards and uphold its leadership in the field.



FPE
FRATELLI PEZZA



FRATELLI PEZZA Srl

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COMPANY DATA

Contacts

Alessandro Pezza - Owner
Michela Pezza - Managing Director
Paolo De Borzatti - Sales Director

Annual turnover of the Company

EUR 2,000,000

Percentage of turnover from glass (%)

98

Sales

Domestic (30%) / International (70%)

Area

Offices 274 m² / Plants 1250 m²

Number of Employees

6

Paid-in capital

EUR 19,000

Planned Exhibitions

Glass South America

c/o VETROMAQUINAS
São Paulo, Brazil - 09 / 12 May 2018

Mir Stekla

c/o TB TECHNOLOGY
Moscow, Russia - 28 / 31 May 2018

GlassBuild America

c/o SALEM DISTRIBUTING CO.
Las Vegas, USA - 12 / 14 September 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

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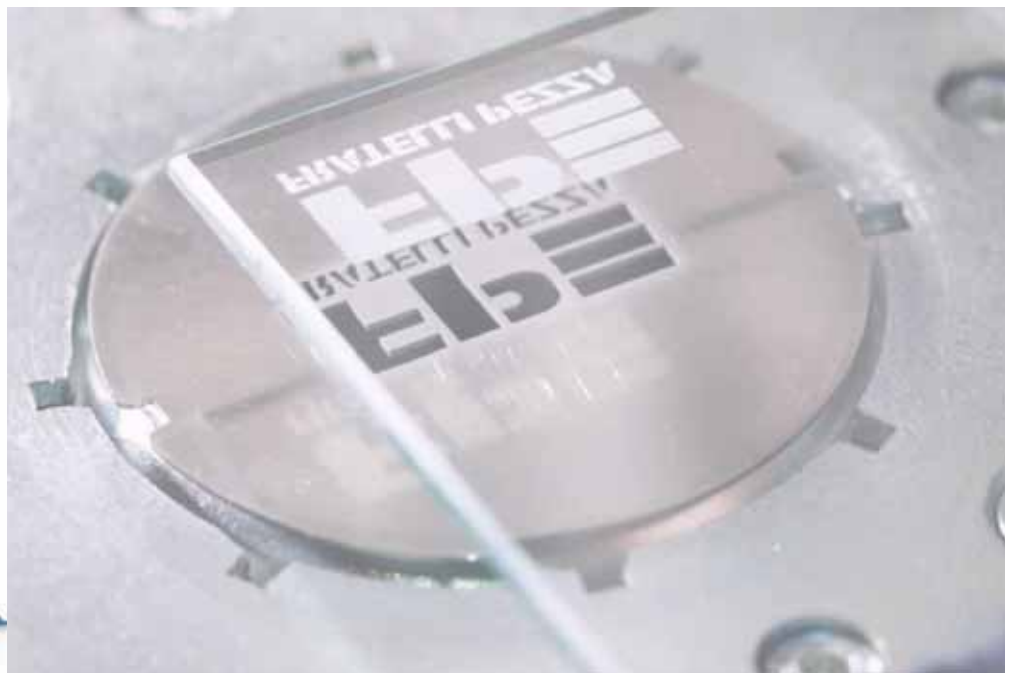


Italian **FRATELLI PEZZA** srl, founded in 1970, is a worldwide leader in the manufacture of sandblasting systems for flat glass, with the well know automatic machines of the MISTRAL EV and ZEPHIR series. The cabins of the MISTRAL EV series allow to programme up to 50 blasting areas on the glass plate, even of different type (normal, light, engraved, shading), as well as to create and store up to 50 customized working programmes. The ZEPHIR series, on the other hand, is the basic automatic sandblaster of Pezza's product range. Both series are equipped with a revolutionary system to prevent the accumulation of static electricity within the cabin, a very common problem while blasting mirrors.



The company has recently invested considerable energy and resources in the development of a new line of glass marking equipment - EASYMARKER. This new series of fully automatic marking devices is available in the two models EASYMARKER EV and EASYMARKER UP. The EASYMARKER EV is suitable to be combined with vertical machines, while on the contrary the EASYMARKER UP is for use with horizontal machines. Set-up is extremely quick and intuitive and marking operations can be activated via the touchscre-

en, button or pedal. Most important, the EASYMARKER can be connected to other glass working machinery (tempering line, double-glazing, washing machines, etc.) in order to receive an impulse from them and start operating in a totally automatic way, without the need of having an operator constantly on site. EASYMARKER EV also enables to mark the edges of the glass. Customers also have the chance to purchase spare parts and accessories using the new e-commerce platform available at shop.fratellipezza.com.





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COMPANY DATA

Contacts

Stefano Mauri - Member of Board

Riccardo Mauri - Member of Board

Stefano Tibé - Sales Director

Mother company

Giardina Finishing Srl

Annual turnover of the Group

EUR 16,000,000

Annual turnover of the Company

EUR 13,000,000

Percentage of third-party turnover

EUR 2,000,000

Sales

Domestic (10%) / International (90%)

Area

Offices 2000 m² / Plants 9000 m²

Number of Employees

56

Founding Year

1972

Paid-in capital

EURO 90,000

Planned Exhibitions

Fensterbau - Nuremberg, Germany

21 / 24 March 2018

Glass South America - São Paulo, Brazil

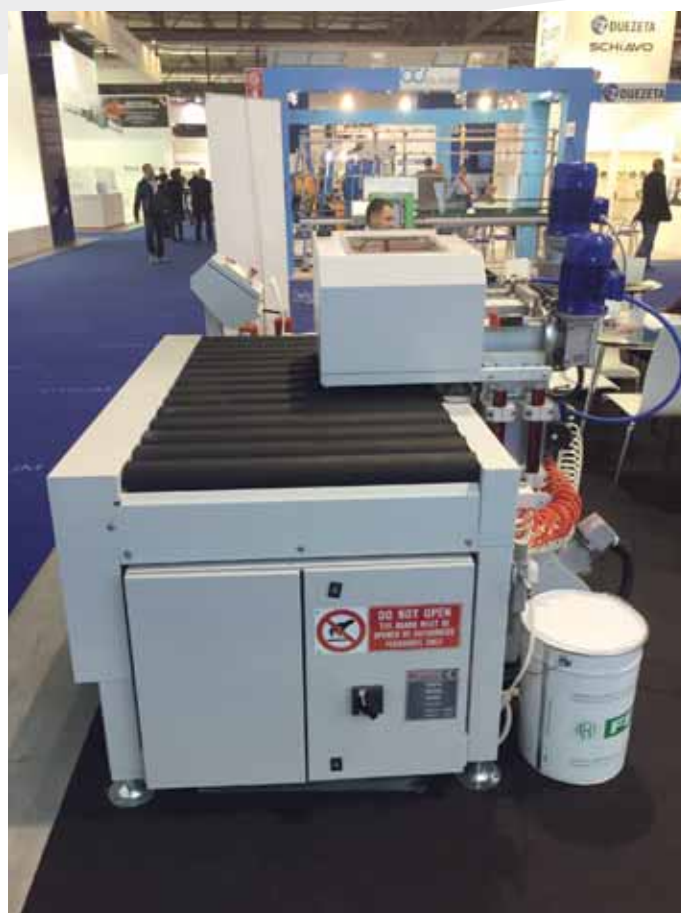
09 / 12 May 2018

Mir Stekla - Moscow, Russia

28 / 31 May 2018

Glasstec - Düsseldorf, Germany

23 / 26 October 2018

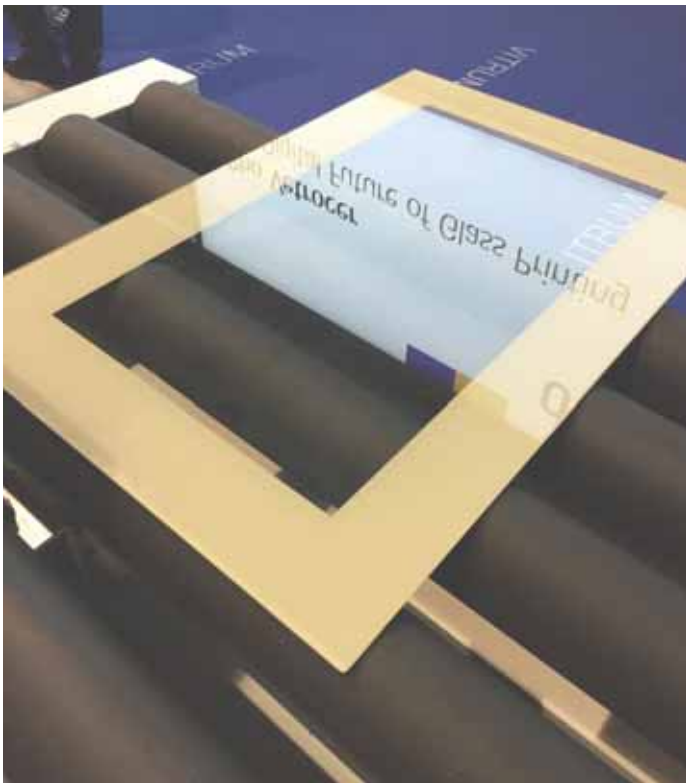


COMPANY PROFILE

Giardina Finishing specializes in coating and drying systems to the highest standards using the very latest techniques and environmental friendly finishing solutions available, including cost effective UV and Selected Microwaves (MOS®) dryers for water-based products. The highest standards in finishing and cost effective methods, coupled with environmental protection are one of the ongoing targets that Giardina, supported by many years of experience, successfully employ with many customers throughout the world.

Among our products:

- Heavy Precision Roller Coaters suitable for lacquer application on glass. Standard working widths as follows: mm 1300-1800-2200-2500, wider machines on request.
- Roller Coaters for special glass decoration.
- Automatic Spray machines, either with disposable paper belt conveyor or with paint recovery belt. Curtain coaters with double bed and 1- or 2 coating heads on fix or removable trolleys.
- 3D Glass Finishing with combined systems MOS® IR for water-based products.
- Quick drying systems such as MOS®UV dryers.
- Flash-off and hot air tunnels.
- Cooling tunnels.



glasstech
WHERE INNOVATION CONTINUES



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Jay Molter - Senior Vice President Marketing & Sales

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1) Glasstech, Inc. Mumbai

Liason Office: Mumbai, India - Tel.: +91 - 98 - 3392-2876

COMPANY PROFILE

Glasstech, Inc. is the world's leading manufacturer of glass bending and tempering technology for the solar, automotive and architectural glass markets.

Innovative ideas and concepts were largely responsible for Glasstech's early success, after the company's founding in 1971. Today, that spirit of innovation continues as a new generation of products - from a new generation of technology - is being brought to market by a new generation of management.

Glasstech is based in Perrysburg, Ohio USA, with facilities in New York City; Shanghai, China and Mumbai, India.



Planned Exhibitions

China Glass - Shanghai, China - 19 / 22 April 2018

GlassBuild America - Las Vegas, Nevada, USA - 12 / 14 September 2018

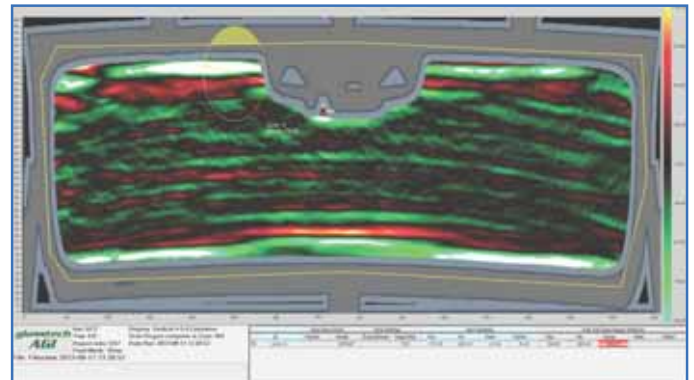
Glasstec - Düsseldorf, Germany - 23 / 26 October 2018



- Manufacturer of advanced glass bending and tempering systems
- Over 500 systems sold in over 50 countries
- Provides solutions to the Automotive, Solar, Architectural and Specialty Glass Markets
- Technological leader with more than 600 patents and patent filings
- Experienced, capable organization

Glasstech is the world leader in the production of OE automotive glass bending and tempering systems and bending and annealing systems. Glasstech also offers:

- Retrofit & upgrade to current technology
- Glass inspection equipment
- Tooling production
- Shape Modeler™ software
- System auditing
- Service contracting
- Spare parts



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SHANGHAI, CHINA

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glaston



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Senior Vice President Machines, Deputy to CEO

Artturi Mäki - Senior Vice President Services

Päivi Lindqvist - CFO

Taina Tirkkonen - General Counsel and
Senior Vice President, Human Resources

Juha Liettyä

Senior Vice President, Emerging Technologies

Pekka Hytti - Senior Vice President EMEA

Frank Zhang - Senior Vice President Asia

Annual Turnover of the Group

EUR 110.4 million

Number of Employees

420

Registered Patents

130

Planned Exhibitions

GPD Istanbul - Istanbul, Turkey - 7 / 10 March 2018

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018

GPD China - Shanghai, China - 17 April 2018

China Glass - Shanghai, China - 19 / 22 April 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

Glass TEXpo™ - San Antonio, USA - 10 / 11 May 2018

Glass Expo Pacific Northwest - Washington, USA
31 May / 1 June 2018

Mir Stekla - Moscow, Russia - 28 / 31 May 2018

The AGGA National Conference GA18

Gold Coast, Australia - 29 / 31 August 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

Glass Expo Midwest - Indiana, USA
8 / 9 November 2018

Glasstech Asia - Kuala Lumpur, Malaysia
14 / 16 November 2018



PRODUCT RANGE

- FLAT GLASS TEMPERING MACHINES
- FLAT GLASS LAMINATING LINES
- GLASS BENDING AND TEMPERING MACHINES
- WINDSHIELD BENDING FURNACES
- MODERNIZATIONS OF SAFETY GLASS MACHINERY
- DIAMOND & POLISHING TOOLS
- SERVICES

More about our products and services:
www.glaston.net



Glaston Corporation

Glaston is a leading company in glass processing technologies. We provide high-quality heat treatment machines and services for architectural, solar, appliance and automotive applications. We are committed to our customers' success over the entire lifecycle of our offering. Moreover, we continuously innovate and develop technologies to enable the glass processing industry to reach ever higher standards in quality and safety. Glaston's shares (GLA1V) are listed on NASDAQ Helsinki Ltd.

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HEGLA[®]

HEGLA

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COMPANY DATA

Contacts

Jochen H. Hesselbach - Managing Director
Bernhard Hötger - Managing Director

Annual Turnover of the Group

EUR 77,000,000

Percentage of Turnover from Glass

100%

Quality Certifications

DIN EN ISO 9001:2015

Number of Employees

600

Registered Trademarks

SortJet, ReMaster, Optimax

Planned Exhibitions

Fensterbau - Nuremberg, Germany - 21 / 24 March 2018

China Glass - Shanghai, China - 19 / 22 April 2018

Mir Stekla - Moscow, Russia - 28 / 31 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

Glasstech Asia - Kuala Lumpur, Malaysia
14 / 16 November 2018

Glass & Stone - Poznań, Poland - 14 / 17 November 2018

Zak Glass Technology - Mumbai, India
6 / 9 December 2018

COMPANY PROFILE

Loading

For loading **HEGLA** offers different solutions such as Automatic Floor Loading Systems, Compact and Gantry Loaders. Alongside security aspects for operators, this equipment is suitable to increase output and expand the possibilities of using special glass types. Double sided floor loaders of 3 x 2 metres and 6 x 3 metres are available with up to 6 positions (12 racks), while the gantry systems are infinitely variable and can use 'A' and 'L' frames as well as compact storage systems. 6 x 3-metre gantry loaders can also load directly from Float Liner delivery racks dropped in the crane area.

Float Glass Cutting

With its wide range of cutting systems, **HEGLA** offers a perfect solution for each and every customer needs. For the industrial volume cutting of float glass for example the Galactic with its shortest processing time and full automation was invented. **RAPIDLINE**, with its optional grinding device for low-E, is **HEGLA's** universal cutting machine for float glass.



Linear Driven Cutting Machine for float glass: Hegla Galactic

Laminated Glass Cutting

For the cutting of laminated glass **HEGLA** became known with its ProLam series which cuts precise and quickly. To offer customers more flexibility **HEGLA** offers the ProLam Kombi which can cut even float glass and laminated glass. As a space-saving solution for automatic scoring of free forms and models of laminated glass **Hegla** designed the new RapidLam which can be used as a stand-alone solution or as an add-on for an existing cutting line. Two synchronous cutting heads achieve high precision results which can be reproduced at any time.



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RapidLam: Compact model cutting system for laminated glass

ReMaster

The ReMaster System for optimised processing of remnant sheets was first presented at glasstec in 2002 and has been constantly improved since then. This innovative system allows sub-plates of any type to be stored without manual handling above the cutting line. Without interrupting the production process the remnant can be used for following glass runs, thus reducing sub plate waste drastically. This creates the basis for efficient production of IG-units of all glass types and thicknesses. It offers optimal utilization of subplates, decreases material costs and reduces unnecessary handling.

SortJet

With the need for more and more automation and high-speed operations in glassworks, HEGLA invented the SortJet. Since its first

CHINA

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WORLDWIDE

Preferred Partner Bystronic glass



HEGLA SortJet: Invented to reduce material costs and improve production flow

presentation at glasstec 2004, the SortJet has proved in practice to be an innovative product that not only improves material flow but also reduces material costs to a minimum. After cutting the glass in random order to reduce offcuts, all panes are stored in the dynamic buffer of the SortJet. Just 250 bays can accommodate multiple panes to buffer all the glasses in the production process for an insulation glass line.

When the panes for an IG-unit are required on the line, the individual panes are handed over directly in production orientation and sequence. The separate processes in front of and behind the dynamic buffer contribute towards a production process that significantly reduces downtime while at the same time accelerating the material flow and reducing cutting costs.

helios quartz



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Luigi Gastaldo - CEO

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HELIOS QUARTZ TURKEY

Commercial branch for Turkey region

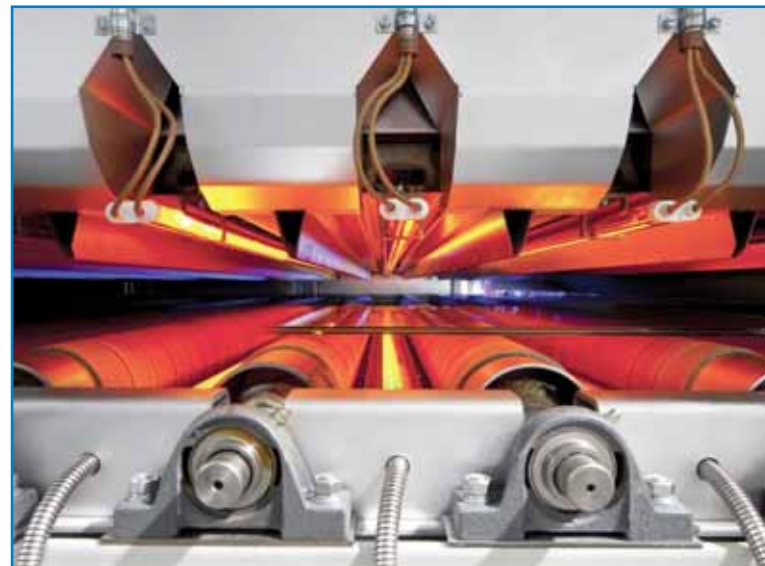
Mimaroba Mh. Mustafa Kemal Bulvarı.

Colorist A Blok. Kat 3 D.50

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Planned Exhibitions

Eurasia Glass - Istanbul, Turkey

7 / 10 March 2018

China Glass - Shanghai, China - 19 / 22 April 2018

China Plas - Shanghai, China

24 / 27 April 2018

NPE - Orlando (Usa) - 07 / 11 May 2018

Fespa - Berlin, Germany

15 / 18 May 2018

Plast - Milan, Italy - 20 May / 01 June 2018

Achema - Frankfurt, Germany

11 / 15 June 2018

Fakuma - Friedrichshafen, Germany - 16 / 20 October 2018

Glasstec - Düsseldorf, Germany

23 / 26 October 2018

Inprint - Milan, Italy - 20 / 22 November 2018

SALES NETWORK

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SPAIN

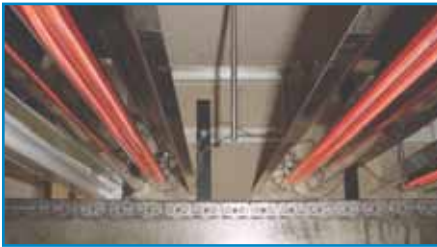
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COMPANY PROFILE

Founded in 1940, **Helios Quartz** is a family-owned company with two production plants in Italy (Helios Italquartz S.r.l.) and Switzerland (Helios Quartz Group SA) combined with distribution channels in the USA, South America and Asia. Helios Quartz has grown into a major international supplier for Quartz Glass processing and the manufacturing of Infrared Emitters and Ultraviolet Lamps. Helios Quartz also produces Specialized Equipment for Industrial, Scientific, and Medical applications.

TÜV certified, Helios Quartz is a very flexible and dynamic group which is deeply oriented towards internationalization and which is living a strong and stable growing phase with great momentum: in the last 6 years, Helios Quartz has opened commercial branches in USA (Helios Quartz America), in China (Shenyang Helios Tech) and Hong Kong (Helios Quartz Asia). Thanks to its long track record and to its

cutting-edge testing laboratory located in the historical Helios Italquartz S.r.l. plant in Cambiagio (Italy), Helios Quartz can advise customers and provide them with the best solution for every specific application.

Helios Quartz product range for the glass industry includes:

- QUARTZ INFRARED HEATERS in short, medium and fast medium wavelength, in single and twin tube, with or without gold reflector for:
 - Laminating lines (plastic film coupling);
 - Screen printing lines;
 - Bending furnaces;
 - Fusion furnaces;
 - Laminated glass cutting tables;
- UV POLYMERIZATION EQUIPMENT: UV high and medium pressure lamps for drying screen printing of reactive inks, paints, coatings and adhesives for the decorating and furnishing sector;



- MANWOOD 25-N: UV black light apparatus able to identify the tinned coated side of the float glass even under high brightness conditions. Such identification is very important prior to laminating, mirroring, printing and decorating processes;
- AUTOMATIC TIN DETECTOR: the technological development of the Manwood 25-N. It can be fixed directly on the glass transportation line, before the process starts, in order to check each and every piece of glass. Thanks to the simplicity of installation and the great flexibility, it is suitable for mass manufacturing where methodological control is essential to support the rate of production.

INTERMAC



INTERMAC

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COMPANY DATA

Contacts

Franco Angelotti - Sales Manager

Mother Company

Biesse SpA

Number of Employees

4,400

Founding Year

1987

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018

Seebe - Belgrade, Serbia - 18 / 21 April 2018

China Glass - Shanghai, China - 19 / 22 April 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

SALES NETWORK

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OCEANIA

INTERMAC AUSTRALIA

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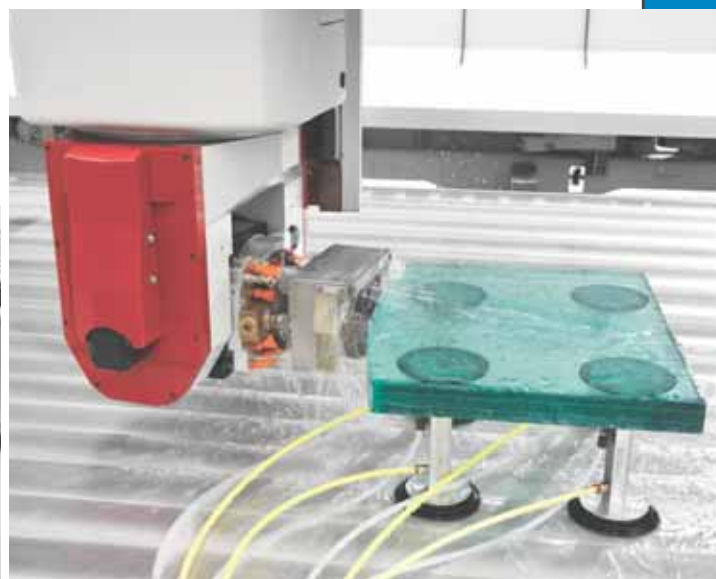
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COMPANY PROFILE

Intermac is the division of the Biesse Group specialized in the production and distribution of machines and systems for the working of flat glass and more in general for the sectors of furniture, auto-motive and building.

Founded in 1987, thanks to the idea to introduce in the glass sector all the experience and technology already developed for the wood working sector, Intermac has been a powerful engine behind the innovation in this industrial segment, becoming in brief the synonym for centres for the working of glass.

The very first line of machinery already made new processes possible, and immediately caught the attention of designers and architects, thus creating new markets. The high technological level of the products, built with the most advanced components and with a winning building philosophy, have enabled Intermac to conquer a leading position in this sector worldwide.

Thanks to its widespread network of subsidiaries, dealers and agents, Intermac is able to grant global professional pre-sales advice and after-sales and spare parts service, employing structures and personnel close to customers and with solid technical knowledge and great in the field experience.



PRODUCT RANGE

TABLES FOR FLOAT GLASS CUTTING

Genius RS-A
Genius CT-A series
Genius CT-RED series

TABLES FOR LAMINATED GLASS CUTTING

Genius LM series
Genius LM-A series

MACHINES FOR LAMINATED AND FLOAT GLASS CUTTING

Genius Comby Lines

LINES FOR LAMINATED OR FLOAT GLASS CUTTING

Genius Lines & Systems

WATERJET

Primus series

DOUBLE EDGING MACHINES AND SYSTEMS

Busetti F series
Busetti P series
Customised solutions

WORK CENTRES

Master 23
Master 30
Master 33.3-38.3-45.3
Master 33.5-38.5-45.5- 45.5Plus

SPECIAL WORK CENTRES AND AUTOMATIC CELLS

Master 63-65
Master 95
Master 185
Master with belts
Master working cell

WORK CENTRES ENGRAVING

Master 34
VERTICAL MACHINES
Vertmax series
V-Loader

TOOLS FOR GLASS

Diamut tools



ITALCARRELLI Srl

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COMPANY DATA

Contacts

Agostino Negrin - President
Stefania Negrin - CEO
Alessandro Negrin - CEO
Davide Schiavon - Sales Manager

Annual Turnover of the Company

EUR 10 / 50 mil

Sales

Domestic (3%) / International (97%)

Quality Certifications

ISO 9001:2008

Banks

CARIVENETO - Arzignano Branch

Number of Employees

<100

Founding Year

1962

Registered Patents

Telescopic Arm for rack handling in autoclaves,
Collar Handling Device, ABV Device/EN Box for glass
handling in containers

Registered Trademarks

Italtcarrelli - Negrin



SIDE LOADERS



TAILOR MADE SOLUTIONS



LAMINATED GLASS HANDLING



PLATFORM TRANSPORTERS



INLOADER TRANSPORTERS



CONTAINER LOAD/UNLOAD

COMPANY PROFILE

SMART WORKING, SAFE WORKING WITH TOP HANDLING SOLUTIONS

Italcarrelli designs and builds special machines, technology and accessories for the transport and storage of glass. After many years of hard work, the third generation of the Negrin family – the owners of Italcarrelli – have put into practice their idea of smart work.

- Smart – with clients to create personalized machines responding to their precise needs and demands;
- Smart – with suppliers to have the constant availability of top class material and components;
- Smart – solutions both with regards to technology and energy savings;
- Smart – for safety each and every day.

Thanks to the perfect synergy between the company's design departments and software development, Italcarrelli's machines have the highest levels of performance and ease of use, with low energy consumption levels.

PRODUCT RANGE

- PLATFORM TRANSPORTERS
- INLOADER TRANSPORTERS
- SIDE LOADERS
- TAILOR MADE SOLUTIONS
- CONTAINER LOAD/UNLOAD
- LAMINATED GLASS HANDLING



KERAGLASS INDUSTRIES Srl

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E-mail: info@keraglass.com • www.keraglass.com

COMPANY DATA

Contacts

Stefano Spezzani – Board of Directors

Maicol Spezzani - Board of Directors

Paolo Righi – Area Manager

Simone Ceci – Area Manager

Mother Company

Keraglass Industries (Cifin Group)

Annual Turnover of the Company

EUR 20,000,000.00

Sales

Domestic (20%) / International (80%)

Area

Offices 1.400 m² / Plants 4.000 m²

Founding Year

1996

Parent and Sister Companies

Keraglass South America Do Brasil Ltda

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COMPANY PROFILE

An overall view that makes the difference. What characterises **Keraglass** and has enabled the company to succeed as a world leader in the sector is its 'all-round' approach to the glass industry. With innovative, functional and targeted solutions. Developed from a concrete and direct analysis of the problems that can arise in glass processing. Particularly in flat and bent tempered glass, screen printing, roller-coating and laminating.

Founded in the early 90s by Stefano Spezzani, in the space of a few years Keraglass became a point of reference in the



sector of plant engineering for glass processing. Keraglass remains a driver of innovation in the sector, thanks also to the synergies developed with the key players on the market. An example can be found in the creation of the Kfo Double Star, a new glass tempering furnace with a pre-heating convective chamber, successfully tested by the experimental glass station and designed to respond to the requirements of UNI marking in an increasingly specific and efficient manner and to temper the latest generation of low-E glass with the maximum quality. In 2004 Keraglass entered the world of shaping and tempering bent glass, installing the first 'KBFO', forming close and profitable collaboration with Techint SpA and acquiring the exclusive licence for the use of the patented technology. In 2010 the company patented the 'RCK machine' roller cleaning device, an automatic machine that allows the complete cleaning of the rollers, directly inside the furnace, without having to remove them.

In the wake of these great technological and commercial successes, Keraglass inaugurated the new head offices, first in 2004 and then in 2009, in the Baiso industrial estate, in the hills near Reggio Emilia. Two large modern and multifunctional structures that reflect the company's dynamic spirit in their architectural concept.

With a view to continuous growth and extension of the offer and the company expertise, in 2014 Keraglass signed a technological partnership agreement with the Cifin Group, world leader in the production of machining systems for aluminium profiles, light alloy, PVC and iron.

Glass is therefore added to aluminium, light alloys, iron, wood and PVC in a complete production range and a commercial network operating on five continents.

In 2015, Keraglass expands its product range, enhancing its range of oscillating tempering furnaces by including the Vision line, and launching the iPlotter and i5 single pass machines to gain a foothold on the digital glass printing market. After one year spent consolidating the new structure, the Cifin Group decided to strengthen its partnership with Keraglass by moving into position as the majority shareholder.



Planned Exhibitions

Eurasia Glass

Istanbul, Turkey
7 / 10 March 2018

Glass South America

São Paulo, Brazil
09 / 12 May 2018

Mir Stekla - Moscow, Russia

28 / 31 May 2018

GlassBuild America

Las Vegas, USA
12 / 14 September 2018

Windows, Doors & Facades - Dubai (UAE)

23 / 25 September 2018

Glasstec - Düsseldorf, Germany

23 / 26 October 2018

SALES NETWORK

EGYPT

STAR JET MIDDLE EAST

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CONCEPT SOLUTION

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BAHRAIN - OMAN - QATAR

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LandGlass



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COMPANY DATA

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Zhao Yan - General Manager

Planned Exhibitions

China Glass - Shanghai, China - 19 / 22 April 2018

Mir Stekla - Moscow, Russia
28 / 31 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

Glasstech Asia - Kuala Lumpur, Malaysia
14 / 16 November 2018

COMPANY PROFILE

LandGlass Cyclone: ideal partner for tempered glass manufacturers

In May 2015, **LandGlass** announced the all new Cyclone series jet convection tempering furnace at China Glass Expo. Now, Cyclone has found its place in various places around the world and gained its reputation among customers with unparalleled performance and attentive after-sales services. LandGlass invested heavily in designing and developing the series. Built on eight major technologies developed independently by LandGlass, Cyclone has taken the quality of tempered glass products to a new level with improved productivities and further reduction of energy consumption. It has successfully realized the integration of intelligent operations and remote control.





LandVac® fully tempered vacuum insulated glass production line unveiled

The world's first LandVac® tempered vacuum insulated glass production line developed by LandGlass adopts a U-shaped layout with highly intelligent, fully automated control technology and annual production capacity of up to 80,000m². The production line is 400m in length, mainly consisting of a 'glass pretreatment section' and a 'vacuum insulated glass production section' divided into a total of 23 processes. An ordinary piece of glass sheet must first undergo the processes of cutting, edge grinding, drilling, and cleaning by a sophisticated preparation line in the 'glass pretreatment section'.

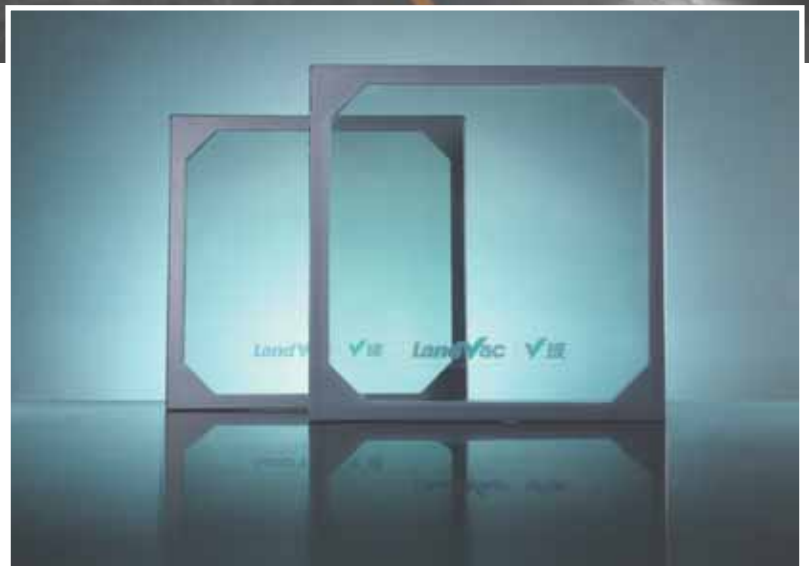
The glass is then tempered by the LandGlass Cyclone™ JetConvection™ glass tempering furnace to ensure the flatness and tempering uniformity of the tempered glass.

The tempered glass is then transported to the 'vacuum insulated glass production section'. In a class 10,000 clean room, the equipment and control system developed by LandGlass will automatically complete placement (of spacers and getter material), laminating, edge sealing and other processes.

Last but not least, the glass with sealed edges is transported to a vacuum chamber. The 50-meter-long vacuum chamber built with 16 patented technologies, maintains a vacuum level 10⁻⁴pa or above in the inner space between the glass panes, ensuring the superior performance of the vacuum insulated glass.

Every piece of LandVac® has to undergo strict raw material inspection, process control, quick inspection, and sampling test under the supervision of ISO9001 Quality System to ensure the superior quality of every piece of LandVac®.

LandVac® is a wholly-owned brand of LandGlass. LandVac® Tempered Vacuum Insulated Glass, is backed by five major technologies developed by LandGlass. Its U-value is as low as 0.4W/ (m²·K), which means that its thermal insulation is better than that of 1m thick brick wall. It has a weighted sound isolation of 36 dB and it is free of condensation below -40°C.



LandVac® has passed the U.S. ANSI Z97.1 certification with a surface stress that uniformly exceeds 90MPa and last, but not least, LandVac® has passed the U.S. ATI ±7200Pa wind pressure resistance test, which indicates that it can withstand level 11 storms.

Today, the global marketing network of LandGlass is providing on-site technical consultation and customized solutions regarding improved safety and quality of life that our latest innovation can bring.

PRODUCT RANGE

- Landglass Cyclone™ Series Glass Tempering Furnaces
- Variable Curvature Glass Tempering Furnaces
- Gas Heating Glass Tempering Furnaces
- Jetconvection Flat Glass Tempering Furnaces
- Jetconvection Combined Glass Tempering Furnaces
- Jetconvection Continuous Glass Tempering Furnaces
- Flat And Bent Bi-Directional Glass Tempering Furnaces
- Bent And Bent Bi-Directional Glass Tempering Furnaces
- Landvac® Tempered Vacuum Insulated Glass

LiSEC



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COMPANY DATA

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Founding Year

1961

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Schraml Glastechnik GmbH

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Number of Employees

1,300

Planned Exhibitions

China Glass - Shanghai, China - 19 / 22 April 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018

Glasstech Asia - Kuala Lumpur, Malaysia
14 / 16 November 2018

Zak Glass Technology - Mumbai, India - 6 / 9 December 2018



COMPANY PROFILE

LiSEC based in Hausmening/Amstetten is a globally active group, which has been offering innovative individual and overall solutions in the field of processing and refining of flat glass for more than 50 years. LiSEC's service portfolio comprises machines, automation solutions and services. In 2016, the group with its approximately 1,300 employees and more than 25 locations generated an aggregate turnover of about 230 million Euros at an export rate of more than 95 percent. LiSEC develops and produces glass cutting and sorting systems, individual components and entire production lines for the production of insulating and laminated glass as well as machines for the processing of glass edges and tempering systems. With a reliable technology and intelligent automation solutions, LiSEC sets standards in terms of quality and technology and makes a substantial contribution to the success of its customers.

SALES NETWORK

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E-mail: lisc@liscamerica.com



SprintCut

Linear drive technology

Maximum acceleration of 16 m/s²

Top speed of 310 m/min

Low-noise in operation and low-maintenance

Automatic control of cutting pressure and grinding pressure

Monitoring of cutting oil consumption

You can find a full list of our Sales Network on:
www.lisc.com/about-lisc/locations-contact

PRODUCT RANGE

- Glass Cutting machines
- Insulating Glass Production machines
- Sorting & Logistic Systems
- Laminated Glass Production machines
- Flat Glass Processing machines
- Glass Processing & Washing machines
- Tempering
- Business Software
- Service



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COMPANY DATA

Contacts

Nancy Mammaro - Managing Director
Ermanno Petitti - Sales Manager
Sergio Cosano - Sales Manager

Annual Turnover of the Company

EUR 11,000,000

Percentage of Turnover from Glass

100%

Sales

Domestic (10%) / International (90%)

Area

Offices 1000 m² / Plants 4000 m²

Number of Employees

55

Founding Year

1993

Registered Trademarks

Mappi

Parent and Sister Companies

Mappi America

3888 Mannix Dr.#314 - FL 34114, Naples - USA
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Planned Exhibitions

- GPD Istanbul** - Istanbul, Turkey - 7 / 10 March 2018
- Fenevision User Conference** - Paris, France - 15 / 17 April 2018
- China Glass** - Shanghai, China - 19 / 22 April 2018
- Glass South America** - São Paulo, Brazil
09 / 12 May 2018
- Glass TEXpo™** - San Antonio, USA - 10 / 11 May 2018
- Glass Expo Pacific Northwest** - Washington, USA
31 May / 1 June 2018
- Glasscon Global** - Chicago, USA - 5 / 7 September 2018
- GlassBuild America** - Las Vegas, USA - 12 / 14 September 2018
- Glasstec** - Düsseldorf, Germany - 23 / 26 October 2018
- Glass Expo Midwest** - Indiana, USA - 8 / 9 November 2018
- Veteco** - Madrid, Spain - 13 / 16 November 2018
- Chile Glass** - Santiago, Chile - 27 / 28 November 2018

SALES NETWORK

USA: see **MAPPI AMERICA**

UK - IRELAND

PROMAC

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FÜLDNER MACHINES BV

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SPAIN

VETROTEC

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DUMATEK SARL

Villeneuve Loubet

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ERTEKA UAB

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POLAND

MEKANIKA SP. Z O. O.

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SLOVENIA - SERBIA - CROAZIA - HUNGARY - BULGARIA - CZECH REP. -

SLOVAKIA - BOSNIA HERZEGOVINA

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ROMANIA

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RUSSIA

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MIDDLE EAST

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JAPAN

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AUSTRALIA - NEW ZEALAND

OGA - OVERSEAS GLASS AGENCIES PTY. LTD.

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COMPANY PROFILE

MAPPi INTERNATIONAL, 25 YEARS AT THE FOREFRONT OF INNOVATION

Since 1993, **Mappi** International has been designing and manufacturing high quality tempering systems for the glass industry. More than 300 plants installed all over the world represent the company's stages of steady growth, important investments in research and development, uncompromising quality, and great attention to the specific needs of each and every customer. Mappi America, located in Florida, enables the customer service department to reach each and every plant within 24 hours.

Nancy Mammaro, CEO of Mappi says: "Our payoff, *beyond glass perfection*, sums up in three words our everyday aim shared at every level and in every area in Mappi. For all

of us to go beyond glass perfection means to take a unique material like glass and commit ourselves to make it even better because we know that glass is an unforgiving material, it clearly shows its excellence and its flaws." Mappi International utilizes in-house production for each and every product. This enables the company to have complete quality control over each component, guaranteeing the highest quality performance and functionality of its machines – constantly. This path, which combines every stage of realization and relationships with customers is called MCQ: Mappi Constant Quality.

From design to assistance, quality is at the centre of everything. Every single piece, each component, and every person employed at Mappi International is responsible for the quality of a valid brand. Products and people are the expression of Mappi's thoughts and actions.

This constant quality is found both in the design and in the range of products, where machines are different in size, technical solutions, mechanical engineering, and software solutions. User-friendly machines that have been designed to minimize downtime during shutdown and subsequent restart, along with the constant perfection of glass, and vast energy savings show just how Mappi produces tempering furnaces that go beyond perfection day after day.

This year is Mappi's 25th anniversary and over the years the company has never changed its aim: to become the leader in tempering furnaces and manufacturing, and to constantly increase quality and customization to satisfy the specific needs of each customer.



ANTONIO MAZZAROPPI



MAZZAROPPI ENGINEERING Srl

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COMPANY DATA

Contacts

Antonio Mazzaroppi - General Manager

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey
7 / 10 March 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

SALES NETWORK

GERMANY, AUSTRIA AND SWITZERLAND

LECHNER SRL

Arquata Scrivia (AL)

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USA

Besana USA

Winston-Salem - E-mail: commerciale@mazzaroppi.com

SPAIN

MAQUIGLASS SA

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POLAND

ITALPOL

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COMPANY PROFILE

Our factory is characterized by a dynamic and experienced team that has long worked at the forefront of machinery and ovens especially for the treatment of the glass.

Our products are classified into the category of **machines for glass tempering**, occupying an important position in the **bending and laminating**, achieving outstanding performance in the fields of employment.

Over the years, the long process of research and development and continuous attention to detail, has led us to develop the machinery complete with **patented technology** aimed at achieving the main objectives and requirements of the customer.

In the construction of the machinery we boast the application of original solutions that make our product unique, through the search of solution for each individual customer.

Also thanks to twenty years experience in the industry, we performed revamping, upgrade, modernization of older machines both our production and of the competitors.





Italian masterpiece Capolavoro italiano



Advantages machine

- **Quick heating up** (with ignition power equal to approximately half the power of work). This characteristic is attributed to through the use of materials with low absorption and a thermal mass contained inside the oven, which is constructed so as to be able to absorb temperature ranges. The materials are placed such that they can expand and narrow depending on the temperature range without deterioration. Thanks to this characteristic it provides flexibility in the oven. The same can in fact be turned off whenever it is not used (see night and weekend) and then on bringing in maximum temperature in one hour.

- Optimization of consumption, waste reduction and energy savings. Thanks to the technologies described above, the machines designed by Mazzaroppi reach the real energy savings up to 35% compared to standard machines. This was a result of a thorough analysis and documented by customers who have decided to invest in these innovative patented technologies.
- **Flexibility change size and thickness:** the special construction machinery and their flexibility allows switching from one product to another very quickly. In different areas of the plant (load, heating chamber, blower and unload) it will be able to find several glasses in both the type either in the thickness and in size.
- **No use of SO²:** thanks to a special construction and use of special materials, the heating chamber does not experience expansions and contractions, therefore it does not create vibrations on the ceramic rollers, as well as other components within the heating chamber, which tend to break down with usage. The mechanical transmission that drives the ceramic rollers is constructed to eliminate vibration as well. Therefore, it is not necessary to use SO² gas, which is highly dangerous and harmful.
- **CE European materials and accurate construction:** all the components of our machines are of the highest quality and exclusively European brand. The special care taken during the design phase, guarantees the installation of vanguard materials and available over the years
- **Residual value:** through all the elements that characterize the accurate construction of the machinery, we have a product that appears to be durable over time. Normally with 10 years of use, our machinery on the market has a residual value of about 50%. An excellent investment for who choose Mazzaroppi.

The positive results encourage Mazzaroppi to create advanced technologically machinery and adapted to customer needs, always aiming at the end quality of products.

The latest machine arrived in Mazzaroppi family is the revolutionary furnace for glass lamination **LM REVOLUTION 2.1** with 2 patents that allow to obtain **clean edges** and **speed in production cycles**.





MOVETRO Srl

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COMPANY DATA

Contacts

Gruppo Biesse - Owner

Giorgio Mistrello - Owner

Davide Mistrello - Owner



Loader

COMPANY PROFILE

Movetro Srl is a leading company for the manufacture and installation of automatic plants for the storage and handling of glass sheets.

The acquisition of Movetro by Intermac, which was completed in July 2017, expands the product range with the offer of special fully-automated and integrated turnkey systems and production lines. Intermac and Movetro are able to offer a high-value consulting approach, providing classifiers, shuttle magazines, automatic loaders, loaders and filters, in addition to its current range, designing dedicated management software.

Movetro is a real industrial company, able to accept new technological challenges, counting on technical and human resources, listening to and understanding customers' needs, which are always satisfied with highly customized designs and which have, as their main considerations, reliability, safety and efficiency of the plants.

Movetro guarantees a very high quality level which positions the company among the leaders of similar glass industries as all machines are entirely manufactured and tested in-house at the company's metal workshop, while welding, painting and

assembling lines are positioned in order to reach the very ambitious target of 'total product quality'.

Movetro does not only manufacture and install automatic systems, but goes beyond this point thanks to the fact that all plants can be fully connected and integrated to existing processing lines manufactured by any other company.

From the smallest to the largest glass processing company: all can find in Movetro the right partner who can, thanks to a wide product range and well qualified technical staff, provide the correct solution when space, storage or handling needs cannot be satisfied by the standard market offer.



Drawer



Crane loader



Shuttle storage system

PRODUCT RANGE

AUTOMATIC STORAGE AND HANDLING SYSTEMS



LUOYANG NORTH GLASS TECHNOLOGY INDUSTRIAL Co., Ltd.

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COMPANY DATA

Contacts

Gao Xueming - Chairman

Gao Li - President

Mother Company

Luoyang North Glass Technology Co., Ltd.

Annual turnover of the Group

EUR 128 Million

Percentage of turnover from glass (%)

30

Sales

Domestic (50%) / International (50%)

Quality Certification

ISO9001, 3C, CE, UL

Number of Employees

2600

Founding Year

1995

Patents obtained in

322 items

Planned Exhibitions

China Glass - Shanghai, China

19 / 22 April 2018

Glass South America - São Paulo, Brazil

09 / 12 May 2018

Mir Stekla - Moscow, Russia

28 / 31 May 2018

GlassBuild America - Las Vegas, USA

12 / 14 September 2018

Glasstec - Düsseldorf, Germany

23 / 26 October 2018

Glasstech Asia - Kuala Lumpur, Malaysia

14 / 16 November 2018

Zak Glass Technology - Mumbai, India

6 / 9 December 2018

SISTER COMPANIES

CHINA

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Luoyang North Glass Technology Co., Ltd.

was established in Luoyang National High & New Technology Development Zone in 1995. It is one of the earliest Chinese enterprises active in the developing, design and manufacturing of glass deep-processing equipment. In 2011, NorthGlass created a precedent in the glass deep processing machine industry, going public at Shenzhen Stock Exchange (stock code: 002613).

Today, NorthGlass has developed into a high-tech industry group with complete industrial chain and continuous innovation capability, with five production bases respectively in Luoyang, Shanghai, Tianjin, Beijing and Guangdong.

NorthGlass independently developed the main products of glass tempering furnaces, low-E coating machines, and upscaled processed glass as its core competitiveness. Furthermore, NorthGlass has also expanded its product series with general and HVLS industrial fans, glass automation systems, glass storage systems, glass cutting machines, screen printing machines, auto glass pre-processing lines, etc., now with more than 300 product models in total.

The cumulative domestic market share of flat/bent glass tempering furnace, which is NorthGlass's major product, is almost 50% and more than 4000 NorthGlass glass tempering furnaces are running in 83 countries around the world. The Low-E coating line developed and produced by NorthGlass is becoming one of the global leaders in glass coating industry and led to a rapid development of coated glass industry in China. More than 20 coating machines have been put into production within last 10 years. The low-E coating line deve-



loped and produced by NorthGlass is becoming one of the global leaders in the glass coating industry and is leading to a rapid development of the coated glass industry in China. More than 20 coating machines have been put into production over the last 10 years.

Another key product for NorthGlass is upscaled processed glass, which has been widely applied in a lot of famous construction projects all over the world, for example 'Sun Valley' & 'Shiliupu Pier' of 2010 Shanghai Expo, 'Bird Nest' & 'Water Cube' of the 2008 Beijing Olympics, China National Center for the performance arts, New Beijing South Railway Station, Beijing Capital International Airport, Shanghai Tower, Abu Dhabi International Airport, Singapore Changi Airport, Vietnam APEC Exhibition Center, Leadenhall Building in London, Van Gogh Museum in Amsterdam, etc.

NorthGlass is also one of two qualified architectural glass suppliers for the most famous electronics company in the world, for its dozens of Flagship Stores in the world as well as the new Headquarters Building in Silicon Valley.

NorthGlass' products have been sold not only in China, but also exported in more than 80 countries in the world, such as USA, UK, Germany, France, Japan, Russia, Middle East, Southeast Asia, etc., via NorthGlass' complete domestic and international sales and service network.





OPTIMA SRL

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COMPANY DATA

Contacts

Marco Menzolini - Research & Development Director
Cristian Zanca - Sales Director

Annual Turnover of the Group

EUR 4,125,000.00

Annual Turnover of the Company

EUR 2,325,000.00

Percentage of Turnover from Glass

100%

Sales

Domestic (35%) / International (65%)

Banks

Unicredit – Intesa Sanpaolo

Area

Offices 350 m²

Number of Employees

17

Founding Year

1994

Registered Trademarks

OPTY-WAY

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey
7 / 10 March 2018

China Glass - Shanghai, China
19 / 22 April 2018

Glass South America - São Paulo, Brazil
09 / 12 May 2018

Mir Stekla - Moscow, Russia
28 / 31 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

COMPANY PROFILE

ERP System

High-tech software system for the input of orders, shipping documents and invoices, warehouse management, production planning, batch creation, cutting optimization, production running by means of barcodes.

Opty-Way Enterprise is **Optima's** network-integrated software solution able to manage all the needs and problems of glassworks. Developed using SQL Database, it enables to input and plan any type of production order thanks to the use of a powerful and flexible distinct base.

Monitoring

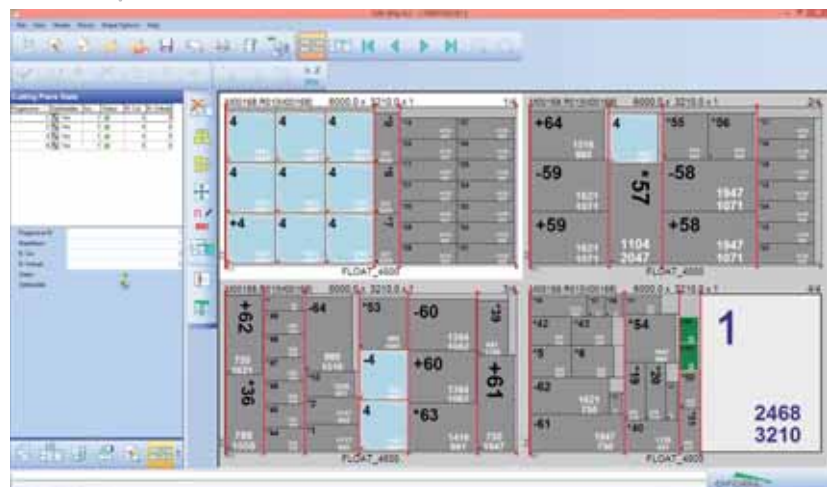
Specific production modules for visualization of each and every phase of production, data regarding the items being produced, orders and batches, supervisors for production running using barcodes, as well as the recording of production times, visualization of cutting diagrams, organization of racks and shipping all visualized on monitors.

Optimization Tools

High-yield systems for the optimization of waste product, suitable for straight-line- (1D), guillotine- (2D) or nesting cutting of complex geometric shapes. With more than 25 years of development and over 8,000 installations all over the world, Opty-Way and Nest-Way are the most widespread used optimization systems used for the glass sector.

Single User Solutions

Office-based or on-board solutions for the optimization of



SALES NETWORK

SPAIN

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ROMANIA

ACCORDING GROUP SRL

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MEXICO

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GREECE

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E-mail: sales@prismaglass.gr

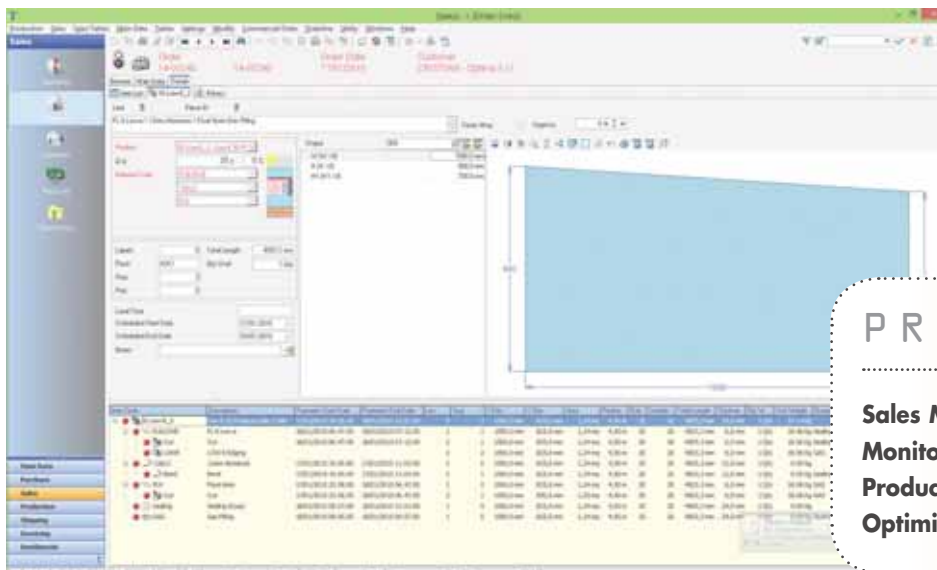
FRANCE

CILPAK INFORMATIQUE

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straight-line and shaped cutting, also for laminated glass, warehouse and waste product management, manual editing

of cutting diagrams, creation of templates using laser, interface with existing ERP systems.



Drawing Systems

Complete range of products for the conversion of graphical formats, for the design of complex geometric figures by means of parametric shapes or CAD 2D design systems, as well as for the preparation of images using scanner or digital camera.

PRODUCT RANGE

Sales Management
Monitoring
Production Tracking
Optimizer Systems

Vectorizing Systems
Cad/Cam Systems
Nesting



R.C.N. SOLUTIONS Srl

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COMPANY DATA

Contacts

Elena Calvi - Owner
Davide Ricchi - Research and Development
Simone Vecchi - Sales Manager
Roberta Cometti - International Department

Annual Turnover of the Company

EUR 3,000,000

Percentage of Turnover from Glass

70%

Percentage of Third-Party Turnover

30%

Sales

Domestic (30%) / International (70%)

Area

Offices 500 m² / Plants 2000 m²

Number of Employees

16

Founding Year

1993

Paid-in Capital

EUR 50,000

Planned Exhibitions

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

PRODUCT RANGE

SMART AND LAMMY

Laminating furnaces with simple or modular bag system

POWERLAM

Continuous laminating furnaces without bags

ECO

Fusion, bending and special bending furnaces

COMPANY PROFILE

In 2017, **R.C.N. SOLUTIONS Srl** revolutionized and re-structured its company image with a more active and compact team. Moreover, it has started an important collaboration regarding the construction of chemical tempering furnaces. Working with Gianfranco Rivaroli, who has more than 40 years' experience in the construction and sale of chemical tempering machines, has enabled RCN SOLUTIONS to take an important leap forward in its machinery range, completing an important triad in the glass sector: bending, tempering and laminating.

BENDING FURNACES

The demand for curving furnaces started up again a couple of years ago, in particular with regards to special bending requiring a furnace suitable for temperature control and heat uniformity.

RCN has therefore continuing developing its ECO Special furnaces, which have three upper and lower heating zones, all working independently one from another. This feature enables to have higher or less concentration of heat in certain areas of the glass sheet, in turn allowing for complex and perfect glass curves.

RCN can develop personalized solutions, as per each and every client's needs and demands.





LAMINATING FURNACES

Diverse solutions for high-speed laminating and important production quantities, ranging from kilns with silicon bags to Modular systems, one or two laminating chambers, up to continuous systems without silicon bags. The kilns can be combined with transport systems, preparation tables and lifting platforms.



CHEMICAL TEMPERING FURNACES

The new chemical tempering system – ‘RIVA by RCN’.

This tempering system is becoming more and more important in all sectors that require tempered glass completely flat and free from optical distortions resulting in chemically tempered glass that can be processed following tempering.

The system is available in standard sized plants, along with a feasibility study according to clients’ needs.

REVA BF

At long last a laminating film made in Europe that respects the double needs of adhesion and transparency, totally compliant with European norms, as well as being conform to AINSI regulations as of January 2015. This material is always new and available as stock, since R.C.N. has dedicated a specially equipped area of its premises to the storage and transport of rolls of REVA

FILM. The film is available in different thicknesses and sizes and responds to diverse manufacturing needs. The production of coloured REVA FILM is presently being studied.





ROLLMAC A DIVISION OF GEMATA SPA

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COMPANY DATA

Contacts

Mauro Pellizzari - Sales Director
Gianpietro Portinari - Sales Manager
Michele Fassina - Sales Manager
Matteo Sommaggio - Sales Manager
Marco Pretto - Sales Manager

Mother Company

GeMaTa Spa

Sales

Domestic (24%) / International (76%)

Quality Certifications

ISO9002, 14001, 9001:2000

Number of Employees

110

Founding Year

1971

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018

Glass South America - São Paulo, Brazil

09 / 12 May 2018

Mir Stekla - Moscow, Russia

28 / 31 May 2018

GlassBuild America - Las Vegas, USA

12 / 14 September 2018

Glasstec - Düsseldorf, Germany - 23 / 26 October 2018





COMPANY PROFILE

Rollmac is the division of GeMaTa Spa, one of the leaders among leather finishing equipment manufacturers, dedicated to the production of machinery for the enamelling of float glass sheets. Thanks to experience acquired, it has developed a new system based on engraved roller technology in continuous operations, also launching drying compartments. Rollmac manufactures a wide range of machinery and lines for the glazing and decoration of flat glass for the most diverse requirements.

Production

Gemata/Rollmac technology includes the enamelling machines Multiglass, Colorglass, Glassdrier drying tunnel, which allows easy working systems, perfect application homogeneity and drying performance on sheets with minimum dimensions up to very large ones and the possibility to apply both traditional ceramic and organic as well as silicon paints.

Multiglass and Colorglass can both be used as stand-alone units in automatic glazing lines, as well as equipped with a Glassdrier IR and conveyor rollers, if required.

Last but not least is Glassline, the brand new machine to enamel the edges of float glass sheets by means of a steel engraved cylinder. It is a completely new project based on the well-known technologies of enamelling using a reverse roller.

Rollmac – Gemata is certified as per ISO 9001, ISO 14000, and Italian "Safe Work" standards.





OFF. MECC. SCHIATTI ANGELO Srl

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COMPANY DATA

Contacts

Angelo Schiatti - President
Cinzia Schiatti - Sales Manager
Emanuela Schiatti - Account Manager
Alessandro Schiatti - Technical Manager

Sales

Domestic (20%) / International (80%)

Number of Employees

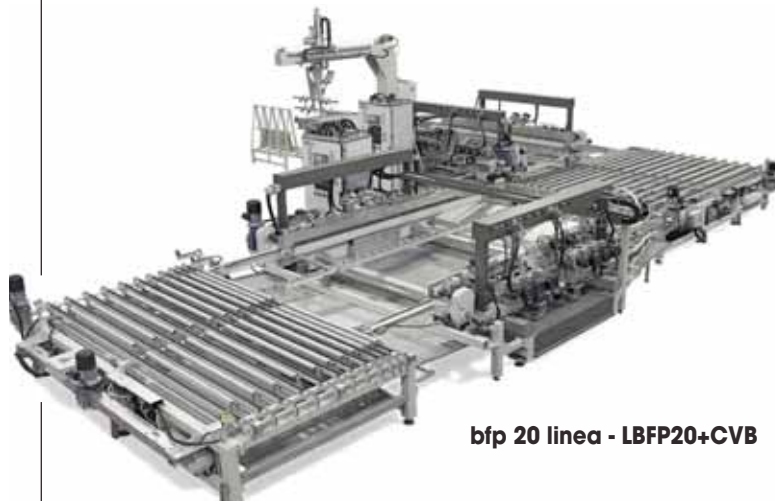
44

Founding Year

1950

Planned Exhibitions

- China Glass** - Shanghai, China - 19 / 22 April 2018
- Glass South America** - São Paulo, Brazil - 09 / 12 May 2018
- GlassBuild America** - Las Vegas, USA
12 / 14 September 2018
- Glasstec** - Düsseldorf, Germany - 23 / 26 October 2018
- Veteco** - Madrid, Spain - 13 / 16 November 2018
- Glasstech Asia** - Kuala Lumpur, Malaysia
14 / 16 November 2018



bfp 20 linea - LBFP20+CVB

COMPANY PROFILE

Schiatti Angelo has been manufacturing glass processing machinery since 1950. The company's current production range includes:

- Seven models of straight grinding machines for the processing of pencil, flat and arris, ogee and waterfall edges. Cerium oxide finishing. Suitable for small, medium and large glassworks specifically for the production of mirrors, shelves for bathroom, laminated glass and table tops.
- 25 models of straight-edge grinding machines for the processing of flat edges and arris - 45° mitres - cerium oxide polishing on the edge. Especially suitable for small- and medium glass companies for the production of mirrors, shelves for furniture, laminated glass, glass tables and stairs.
- 16 models of double edging machines for the processing of polished pencil and flat +arris profiles, available in diffe-

rent sizes. Especially suitable for medium/large glass companies for the production of mirrors, shelves for furniture, laminated glass, stairs and photovoltaic glass.

- Corner machine for the production of variable radii or cant corners. Especially suitable for medium/big glass companies for the production of mirrors and **glass for kitchen appliances**.
- Straight-edge bevelling machines for the processing of bevels from 0° to 45° - with cerium oxide polishing. Especially suitable for medium/big glass companies for the production of mirrors, furniture and interiors.
- Glass loaders/unloaders especially suitable for medium/large glass companies for coupling with horizontal edging or drilling machines.
- Drilling machines with opposite heads suitable for the production of mirrors, shelves for furniture, laminated glass, tables tops and household appliances.
- Multi-head drilling machines for the execution of 2, 3 or 4 holes at the same time. Especially suitable for the production of mirrors, shelves for furniture, laminated glass and household appliances.
- Vertical drilling machines for the execution of holes and notches. Especially suitable for medium/large glass companies for the production of mirrors, shelves for furniture, laminated glass, table-tops, household appliances and doors.
- **Special machines** such as complete vertical grinding lines composed of 4 straight edgers and 3 turnover units for the complete processing of the 4 sides of the glass, drilling centers customizable according to customers' needs and special solutions for smart factories.

SALES NETWORK

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COMPANY DATA

Contacts

Michele Schiavo - General Manager
Francesco Schiavo - General Manager

Percentage of turnover from glass

100%

Sales

Domestic (20%) / International (80%)

Founding Year

2003

PRODUCT RANGE

- Vertical and horizontal washing machines
- Manual, Semi-automatic • Automatic Storage Systems
- Vertical Milling/drilling machines
- Manual, Semi-automatic • Automatic Cutting tables
- Automatic Loaders/Unloaders • Clamps
- Fixed, Manual • Motorized Vacuum Lifters
- Manipulators • Unloaders for packs



Glass storage system UCS3300-S

COMPANY PROFILE

Products

SCHIAVO machines are well-known the world over for their quality, reliability and advanced technology. As of today, more than 5,000 machines have been installed in over 50 countries.

Its machines are made 100% in Italy with 100% high-quality European components.

Washing

SCHIAVO horizontal and vertical washers have been developed to offer high-quality and high-performing machines, and for clients needing affordable and quality machinery. The company's washing machines can be equipped with from 2 to 6 brushes or more, and are made entirely of stainless steel.

Milling - Drilling

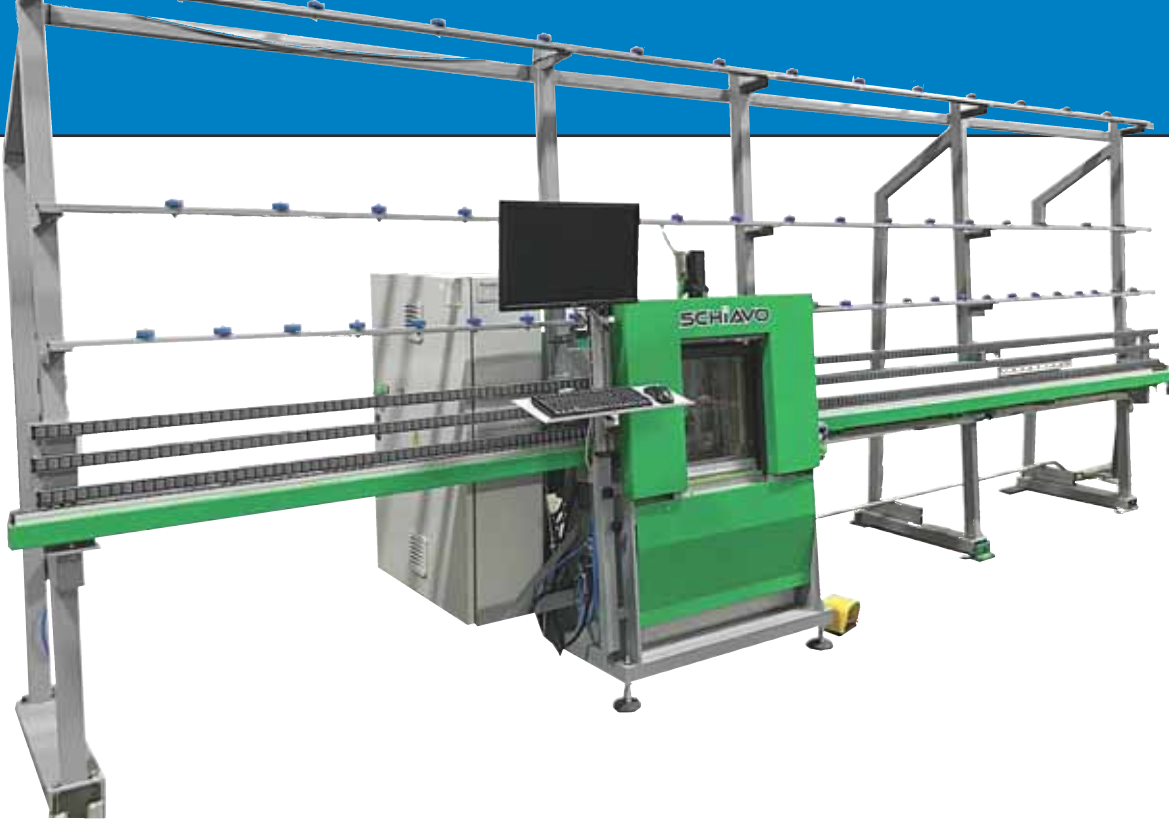
Very precise and CNC controlled, the new FV series of vertical milling machines are versatile machines to obtain every type of cuts, notches and holes needed for the installation of hinges, handles, locks and accessories on glass doors and glass furniture, with a small-business budget.

Storage systems

Glass storage systems are essential for glassworks to organize production efficiently and to optimize available space. In



Glass washing machine 1600 pre-washing



FV200 vertical milling machine

this sector, SCHIAVO is a leader, with highly reliable solutions for the needs of its clients. CLO is a sideways-moving storage system available in manual, semiautomatic and full automatic versions. UCS is the new, ultra-compact, ultra-low storage system for glass sheets and offcut glass, patented by Schiavo.

Cutting

The company's cutting tables are available in diverse types of configuration, all customizable, with either belt or rack and pinion transmission. The high quality of the components used and the attention to details are the strong points of SCHIAVO tables.

Handling

With regards to machinery for the lifting and handling of glass, SCHIAVO offers: tongs, vacuum lifters for all kinds of flat glass, including IG glass, manipulators, jib cranes, automatic loaders and unloaders for glass packs.



Horizontal glass washing machine HTL2600



Glass washing machine TOP3000-6



softeco



SOFTECO OY QUALITY & GAINS

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COMPANY DATA

Contacts

Timo Suomi
Reima Mäkinen
Mikko Suomi

Sales

Domestic (1%) / International (99%)

Founding Year

1984

Planned Exhibitions

Eurasia Glass - Istanbul, Turkey - 7 / 10 March 2018

China Glass - Shanghai, China - 19 / 22 April 2018

Mir Stekla - Moscow, Russia - 28 / 31 May 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

Zak Glass technology - Mumbai, India
6 / 9 December 2018

COMPANY PROFILE

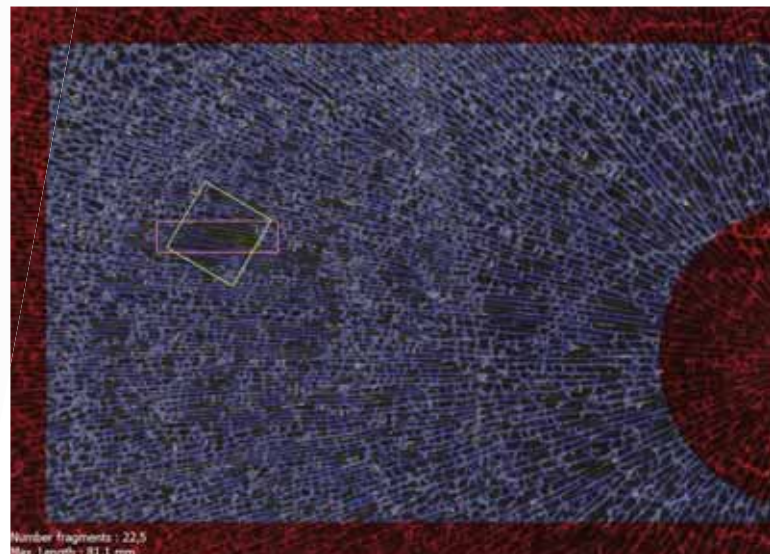
Softeco is the worldwide leading supplier of Quality Control Equipment for the flat glass industry, both architectural and automotive. We closely follow changes in EU regulations and international norms, and update our supply and services accordingly.

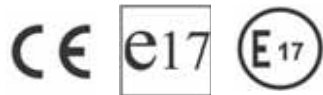
Quality control for automotive glass:

- Softeco provides expertise in all normative and informative tests according to ECE R43.
- We supply all the necessary QC equipment, such as:
 - Dropping towers and supports for test pieces
 - Impact objects
 - Projectors and slides
 - Resistance to radiation test equipment
 - Light transmission measurement
 - Collimator for the automatic double image test
 - etc.
- We can coordinate ECE R, DOT and CCC certification processes.

Quality control for architectural glass:

- We provide knowledge and consultation services for CE marking and tests.
- We supply equipment and machinery to perform obligatory and non-obligatory tests, such as:
 - Spring loaded punch
 - Roller wave gauges and edge lift gauge
 - Optical surface and edge stress measurement equipment
 - Resistance to high temperature test oven





- Insulated glass unit desiccant performance tester
- Low-E emissivity tester
- etc.

Gains through quality:

Some of the quality control equipment we provide can also be used to optimise productions parameters: avoiding waste and increasing yield.

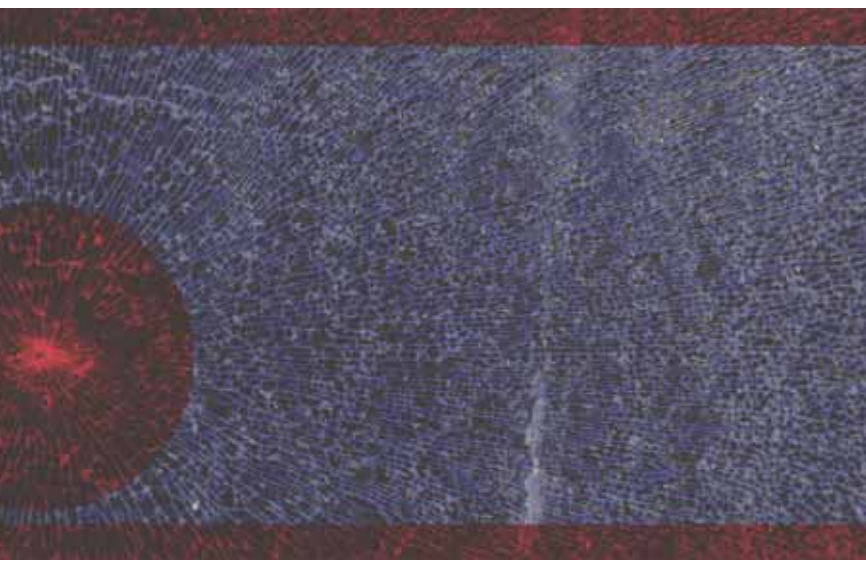
Non-destructive and automated tests:

We aim at developing automated and non-destructive tests, such as the Grazing Angle Surface Polarimeter - GASP - designed to evaluate the strength of the compressive layer, which can be used instead of the 4-point-bender machine for mechanical strength tests. An example of an automated test is the FragGlass software, used in mandatory fragmentation tests for heat-treated glass.

Other control tools:

In addition to all mandatory QC instruments, we also provide instruments for daily or random testing, such as:

- Coating detection for IGU glass
- Tin-side detector
- PVB humidity meter, etc.



PRODUCT RANGE

- QC equipment for tempered and laminated glass
- Complete range of quality control equipment for automotive safety glass
- QC plans and information for architectural and laminated building glass
- QC plans and information for automotive safety glass production
- ECE R 43 and DOT ANSI Z 26.1 approval services
- Testing services for safety glass according to different norms, including EN
- PVB shaping, relaxation and cutting machinery



TECNO-GLASS Srl

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ENGINEERING • DEPARTMENT

COMPANY DATA

Contacts

Franco Canzano - Owner and Sales Manager
Sandro Canzano - Technical Manager
Manuela Canzano - Sales & Marketing

Sales

Domestic (95%) / International (5%)

Number of Employees

30

Planned Exhibitions

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

COMPANY PROFILE

Tecno-Glass was founded 40 years ago by the Canzano family. The Company is now a leader in the construction and sale of machinery and equipment for glassworks in the Italian and international markets. For over 15 years, the company has been designing and making different glass processing machines, that highly reliable, easy to use and to maintain, and, of course, with functional and aesthetic features that make Tecno-Glass machines unique and irreplaceable.



TKD-3000 PLUS (Profile Cutting Machine)

Two cutting disks and two motors. The TKD-3000 PLUS guarantees perfect processing of all types of profiles on today's market. Windows management software.

HM-1 (HOT-MELT extruder)

The HM-1 is reliable and compact. It has last-generation components to minimize consumption and reduce noise to a minimum. The stainless steel carter facilitates cleaning operations.

BRX-700 (butyl extruder 7KG)

The BRX-700 is the top of the series of BRX butyl extruders, featuring high speed and automatically adjusted pressure. Precision and continuity of operations are guaranteed.



We are really happy with our work and the goals that we have reached, proud to be 'Made in Europe, proud to be Made in Italy'.

Sandro Canzano



• **MFC-ROCKER**
Extruder for silicone sealants



• **MFC-RADIANT**
Extruder for polysulphuric and polyurethane sealants.

MFC extruders are built with carefully selected components, coming from top Italian and American mechanical companies. They are also equipped with a series of optional devices to facilitate operations, such as the centring guide roller and the mixing unit with AISI 316 stainless steel propellers. The MFC-Rocker extruder is also equipped with the innovative MD2 gun.

Centring guide roller

The centring guide roller has been created especially to support the weight of the mixing-dosing unit. It guarantees the axial centring in the interspace and, thanks to the lower blocking belt, it facilitates the tightening of the extruder gun rubber nozzle.



Mixing unit with AISI 316 stainless steel propellers

Made up of two calibrated containment sleeves with two AISI 316 stainless steel propellers used to mix the sealant with the catalyst.



MD2 pistol gun

The MD2 pistol enables to stop production with only 90g of waste mixed material, considerably reducing environmental impact and bypassing all types of coolant used to block crosslinking.

TUROMAS

OUR PASSION, YOUR PROGRESS



TUROMAS

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COMPANY DATA

Founding Year

1985

Registered brands

Tuomas

Planned Exhibitions

Glass South America - São Paulo, Brazil
09 / 12 May 2018

GlassBuild America - Las Vegas, USA
12 / 14 September 2018

Glasstec - Düsseldorf, Germany
23 / 26 October 2018

Veteco - Madrid, Spain - 13 / 16 November 2018

Chile Glass - Santiago, Chile
27 / 28 November 2018

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COMPANY PROFILE

Since 1985, TUROMAS has been manufacturing equipment for glass storage, loading and cutting, becoming an undisputed industry reference through its continuous R&D investment and commitment to reliability, versatility and performance. Nowadays the company has an intensive and strong presence in Europe and America, and its products are increasingly acclaimed in Africa, Asia and Oceania.

SMART STORAGE AND LOADING MACHINERY

Thanks to the experience gained over more than 20 years in the field of automatic storage and loading of glass, TUROMAS has redesigned its entire line of intelligent warehouses to provide more performance, reliability and flexibility. The new SR has revolutionized the concept of storage space utilization, while significantly reducing the loading cycle, making it the current market benchmark.

PIONEERS IN MAGNET DRIVEN CUTTING TABLES

TUROMAS presented the first ever cutting table with linear drives back in 2000, enabling to achieve an accuracy of $\pm 0,1$ mm, maximum speeds of 310 m/min and, most importantly, accelerations of up to 19 m/s², which allowed for unprecedented performance. Since then, many of the world's leading glass processing companies have relied on the reference technology and expertise offered by our machines.

4-TOOL: CUTTING 4 PERFECTION

The exclusive 4-TOOL cutting technology by TUROMAS offers unparalleled cutting quality in any glass from only 0.55mm to 25mm thickness. It uses specific pressure cylinders, lubrication and cutting wheels for each glass thickness, automatically adjusted without the operator intervention.

The result is a perfect, vertical cut in any thickness, achieving the famous TUROMAS Open Cut and optimizing the company's time and resources.

100% EUROPEAN MACHINERY

Quality, reliability and service is not a joke, it is a must. TUROMAS production is carried out 100% at our Spanish factories, using only top rated European components and following the highest quality controls to ensure reliability and performance over the years.

READY FOR THE FUTURE

A future-proof investment needs machines able to integrate with other equipment, flexible enough to adapt to new requirements and even capable to grow with the company. Automation and the philosophy of Industry 4.0 are leading the glass industry towards a new model for which we need to be prepared.



PRODUCT RANGE

- SMART GLASS STORAGE AND LOADING SYSTEMS
- FLOAT GLASS CUTTING SYSTEMS
- LAMINATED GLASS CUTTING SYSTEMS
- CUSTOMIZED PROJECTS

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 **LandGlass**

LANDGLASS TECHNOLOGY
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Glassprinting
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Lisec Group
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Tuomas

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Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
ECOL
Forel
Hegla
IOCCO Group
Italcarrelli
Keraglass
Lisec Group
Schiavo
Tuomas

HANDLING ROBOTS

Bavelloni

Bottero
CMS Brembana
ECOL
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IOCCO Group
Lisec Group
Schiavo
Tuomas

HANDLING EQUIPMENT FOR FLOAT GLASS

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ECOL
Hegla
IOCCO Group
Italcarrelli
Lisec Group
Schiavo
Tuomas

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Tuomas

TRANSPORTATION SYSTEMS/ TRUCKS

Di Gregorio
Giardina Finishing + HS
Glassprinting
Hegla

Italcarrelli
Lisec Group
Schiavo

VACUUM LIFTING EQUIPMENT

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CMS Brembana
ECOL
Forel
Hegla
Lisec Group
RBB
Schiavo
Si.Ste
Tuomas

CRANE SUCTION CUPS FOR LARGE SHEETS

Bottero
Bystronic glass Group
C.M.B. - Besana
Hegla
Lisec Group
Schiavo
Tuomas

TRANSPORTATION TONGS

Bottero
C.M.B. - Besana
IOCCO Group
Schiavo
Tuomas

SUCTION CUPS

ADI
Bottero
Bystronic glass Group
C.M.B. - Besana
CMS Brembana
Hegla
RBB
Schiavo
Si.Ste
Tecno-Glass
Tuomas

CONVEYOR BELTS

Ashton Industrial Sales
Bystronic glass Group
Cugher Glass
ECOL

Schiavo
Tuomas

PACKAGING MATERIALS AND SYSTEMS

ECOL
Hegla
Schiavo

ACCESSORIES

Bottero
CMS Brembana
Hegla
Helios Quartz
RBB
Schiavo
Tuomas

Straight-edge and shape cutting

COMPLETE STRAIGHT-EDGE LINES

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Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Euromec
Forvet
Fushan
Hegla
Lisec Group
Luoyang North Glass Technology
RBB
Schiavo
Schiatti Angelo

COMPLETE SHAPE CUTTING LINES

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Fushan
Hegla
Lisec Group
Luoyang North Glass Technology
Schiavo
Tuomas

AUTOMATIC CUTTING MACHINES FOR AUTOMOTIVE GLASS

Bando Kiko
Bottero

Bystronic glass Group

CMS Brembana
Glaston
IOCCO Group
Lisec Group
Schiavo

LOADING AND TILTING MACHINES

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Bavelloni
Bottero
Bystronic glass Group
C.M.B. - Besana
CMS Brembana
ECOL
Euromec
Forel
Fushan
Hegla
Intermac - Biesse
IOCCO Group
Lisec Group
Schiavo
Tenon (Beijing) Equipment
Tuomas

CUTTING TABLES

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Di Gregorio
Euromec
Forel
Fushan
Hegla
IOCCO Group
Lisec Group
Macotec
Schiavo
Tecno-Glass
Tekno Kilns
Tenon (Beijing) Equipment
TK
Triulzi
Tuomas

CUTTING OPTIMIZERS

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Deltamax Automazione
Euromec
Forel
Hegla
IOCCO Group

Lisec Group

Optima
Schiavo
Tuomas

CUTTING PATH OPTIMIZERS

Bando Kiko
Bottero
Bystronic glass Group
CMS Brembana
Euromec
IOCCO Group
Lisec Group
Optima
Schiavo

CAD SYSTEMS

Bavelloni
CMS Brembana
Lisec Group
Prodim
Schiavo

ARMoured AND LAMINATED GLASS CUTTING MACHINES

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
C.M.B. - Besana
CMS Brembana
Hegla
Lisec Group
RBB
Schiavo
Tuomas

ROUND OR SHAPE CUTTING MACHINES

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Hegla
Lisec Group
RBB
Schiavo
Tuomas

CUTTING ACCESSORIES

ADI
Ayrox
Bando Kiko
Bottero
IOCCO Group
RBB
Schiavo
Softeco
Talamoni
Tecno-Glass

Tuomas

Tyrolit Vincent

SAW MACHINES

Di Gregorio
Glass M 2013
RCN Solutions
Schiavo / OCS Glas

AUTOMATIC SAWS FOR CUTTING LAMINATED AND BULLET-PROOF GLASS

CMS Brembana
Schiavo

BREAKING SYSTEMS

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
CMS Brembana
Euromec
Fushan
Hegla
IOCCO Group
Lisec Group
Schiavo
Tuomas

CUTTING MACHINES WITH BREAKING AND EDGE DELETING DEVICES

Bando Kiko
Bottero
Bystronic glass Group
CMS Brembana
Euromec
Hegla
IOCCO Group
Lisec Group
Schiavo
Tuomas

GLASS CUTTING FLUIDS

Schiavo
Tecno-Glass
Tuomas

ACCESSORIES

Schiavo
Schiatti Angelo
Talamoni
Tuomas

Edging and bevelling

COMPLETE EDGING LINES

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Ashton Industrial Sales
B Solution Licensee of BF Project

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Bavelloni
Bottero
C.M.B. - Besana
CMS Brembana
Filtraglass
Forel
Forvet
Fushan
Glass M 2013
IOCCO Group
Schiavo
Schiatti Angelo
SKG - Skill Glass

COMPLETE BEVELLING LINES

Adelio Lattuada
Bando Kiko
Bottero
C.M.B. - Besana
CMS Brembana
Filtraglass
Fushan
Glass M 2013
IOCCO Group
Schiavo

COMPLETE AUTOMOTIVE GLASS EDGING AND BEVELLING LINES

Adelio Lattuada
Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
Intermac - Biesse
IOCCO Group
SKG - Skill Glass

DOUBLE-EDGE GRINDING MACHINES

Ashton Industrial Sales
B Solution Licensee of BF Project
Bando Kiko
Bavelloni
Bottero
C.M.B. - Besana
CMS Brembana
Forvet
Fushan
Intermac - Biesse
IOCCO Group
Schiatti Angelo

VERTICAL-EDGE GRINDING MACHINES

Adelio Lattuada
B Solution Licensee of BF Project
Bando Kiko
Bavelloni
Bottero
Bystronic glass Group

C.M.B. - Besana
Forel
Fushan
Luoyang North Glass
Technology
Schiavo
Schiatti Angelo
SKG - Skill Glass
Vismara

GRINDING SPINDLES

Schiavo
BEVELLING MACHINES FOR
ROUND AND SHAPED GLASS

Adelio Lattuada
Bando Kiko
Bavelloni
CMS Brembana
Fushan
Intermac - Biesse
RCN Solutions
Schiavo

STRAIGHT-EDGE BEVELLING MACHINES

Adelio Lattuada
Bando Kiko
Bavelloni
Bottero
Bovone Elett.
CMS Brembana
Fushan
RCN Solutions
Schiavo
Schiatti Angelo

BEVEL POLISHING MACHINES

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Bando Kiko
Bavelloni
Bovone Elett.
CMS Brembana
Glass M 2013
Intermac - Biesse
RCN Solutions

STRAIGHT-EDGE ENGRAVING MACHINES

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CMS Brembana
Intermac - Biesse
SKG - Skill Glass

SHAPED GLASS ENGRAVING MACHINES

Bavelloni
Bottero
CMS Brembana
Intermac - Biesse

CORNER GRINDING MACHINES

Adelio Lattuada

Ashton Industrial Sales
B Solution Licensee of BF Project
Bavelloni
CMS Brembana
Fushan
Intermac - Biesse
SKG - Skill Glass

SHAPED GLASS GRINDING MACHINES

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Ashton Industrial Sales
Bando Kiko
Bavelloni
Bottero
CMS Brembana
Forel
Fushan
Glass M 2013
Intermac - Biesse

BELT GRINDING MACHINES

Adelio Lattuada
Ashton Industrial Sales
C.M.B. - Besana
Fushan
Glass M 2013
IOCCO Group
Si.Ste
Tenon (Beijing) Equipment

LATHES - VERTICAL AND HORIZONTAL

C.M.B. - Besana
CMS Brembana

EMBOSSING MACHINES

C.M.B. - Besana
CMS Brembana

PORTABLE MACHINES

Helios Quartz
Si.Ste

DIAMOND TOOLS

Adelio Lattuada
ADI
Ashton Industrial Sales
Bando Kiko
Bottero
Bovone Diamond Tools
Diamut - Biesse
Glaston
Pomdi
RCN Solutions
Schiavo
Tecno-Glass
Talamoni
Tyrolit Vincent

DIAMOND TOOLS

Ashton Industrial Sales

SEAMING LINES

Ashton Industrial Sales

MANUAL LINES

Ashton Industrial Sales

POLISHING WHEELS

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ADI

Bando Kiko
Bottero
Bovone Diamond Tools
Diamut - Biesse
Glaston
Italmole
Pomdi
RBM Italia
RCN Solutions
Schiavo
Si.Ste
Tecno-Glass
Tyrolit Vincent

POLISHING AGENTS AND OXIDES

ADI

Bovone Diamond Tools
RCN Solutions
Schiavo
Tecno-Glass
Tyrolit Vincent

POLISHING BELTS

Schiavo
Si.Ste
Tecno-Glass

COOLANTS

Adelio Lattuada
Bovone Diamond Tools
Filtraglass
Schiavo

GLASS GRINDING AND BEVELLING COOLANTS

Filtraglass
Schiavo

SEPARATORS FOR GLASS-SOLIDS

Ashton Industrial Sales
Filtraglass
Schiavo
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ACCESSORIES

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CMS Brembana
Forza G / G. Tech
Helios Quartz
IOCCO Group
RCN Solutions
Schiavo

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Washing

HORIZONTAL WASHING MACHINES

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Bavelloni
Bovone Elett.
Bystronic glass Group
ECOL
Forel
Fushan
Glass M 2013
IOCCO Group
Lisec Group
Neptun
Schiavo
Si.Ste
Triulzi

VERTICAL WASHING MACHINES

Adelio Lattuada
Ashton Industrial Sales
Bavelloni
Best Makina
Bystronic glass Group
Di Gregorio
ECOL
Forel
Glass M 2013
IOCCO Group
Lisec Group
Luoyang North Glass Technology
Neptun
Schiavo
Si.Ste
Stefiglass
S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Triulzi

WASHING MACHINES FOR AUTOMOTIVE GLASS

Bando Kiko
Bystronic glass Group
ECOL
IOCCO Group
Triulzi

WASHING PURIFICATION SYSTEMS

Bystronic glass Group
Forel
Forza G / G. Tech

IOCCO Group
Lisec C.M.I.
Schiavo
Tenon (Beijing) Equipment

LIQUID WASHING CONCENTRATES

Schiavo
ACCESSORIES
Deltamax Automazione
Helios Quartz
Idrotecnica
Schiavo
S.T. Group

Mirror production

COMPLETE PLANTS & CONVEYORS FOR MIRROR PRODUCTION

Bovone Elett.
Fushan
IOCCO Group
Triulzi

PAINTING EQUIPMENT

Giardina Finishing + HS Glassprinting
IOCCO Group
RegaLead
Triulzi

DRYING OVENS

Bovone Elett.
Cefla Finishing
CMS Brembana.
Giardina Finishing + HS Glassprinting

AUTOMOTIVE MIRROR BENDING FURNACES

Bovone Elett.

PAINTS AND CHEMICAL PRODUCTS

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ACCESSORIES
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1

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4

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3

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Di Gregorio
Forel
Neptun
Schiavo
Stefiglass
S.T. Group
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

AUTOMATIC SEALING LINES

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Bystronic glass Group
Forel
Lisec Group
S.T. Group

AUTOMATIC SPACER BENDING MACHINES

Bavelloni
Best Makina
Bystronic glass Group
Forel
IOCCO Group
Lisec Group
Lombarda Macchine
Schiavo
S.T. Group
Tenon (Beijing) Equipment
Thermoseal Group

DESICCANT SALT FILLING MACHINES

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Bavelloni
Best Makina
Bystronic glass Group
Di Gregorio
Forel
Lisec Group
Lombarda Macchine
Neptun
Schiavo
S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

SPACER CUTTING SAWS

Ashton Industrial Sales
Bavelloni
Best Makina
Forel
Lisec Group
Neptun
Schiavo

S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Thermoseal Group

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Belfortglass
Best Makina
Bystronic glass Group
Di Gregorio
Forel
Lisec Group
Neptun
Schiavo
Si.Ste
Stefiglass
S.T. Group
Tecno-Glass
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Lisec Group
Neptun
Schiavo
Si.Ste
Stefiglass
S.T. Group
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Tenon (Beijing) Equipment
Thermoseal Group
Triulzi

POLYURETHANE EXTRUDERS

Bavelloni
Best Makina
Bystronic glass Group
Di Gregorio
Forel
Lisec Group
Schiavo
Stefiglass
S.T. Group
Tecno-Glass

POLYURETHANE ENCAPSULATION

Bystronic glass Group
Lisec Group
Schiavo

SILICONE EXTRUDERS

Best Makina
Bystronic glass Group
Di Gregorio
Forel

Lisec Group
Schiavo
S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Triulzi

POLYSULPHIDE SEALANT EXTRUDERS

Best Makina
Bystronic glass Group
Di Gregorio
Forel
Lisec Group
Schiavo
Tecno-Glass
Tenon (Beijing) Equipment
Triulzi

GAS FILLING EQUIPMENT

Bystronic glass Group
Forel
HyGear
Lisec Group
Neptun
Schiavo
Si.Ste
Sparklike
S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Thermoseal Group

DESICCANT SALTS

Ashton Industrial Sales
Neptun
Schiavo
S.T. Group
Tecno-Glass
Thermoseal Group

SPACERS/PROFILES

Ashton Industrial Sales
Edgetech Europe
Schiavo
S.T. Group
Tecno-Glass
Thermoseal Group

GEORGIAN BARS

Ashton Industrial Sales
Hegla
Tecno-Glass
Thermoseal Group

BUTYL

Ashton Industrial Sales
Tecno-Glass
Thermoseal Group

HOT MELT

Ashton Industrial Sales

Tecno-Glass
Thermoseal Group

OTHER SEALANTS

Tecno-Glass

PANTOGRAPHES

Fratelli Pezza
Tecno-Glass

ACCESSORIES

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Forel
Forza G / G. Tech
Helios Quartz
Schiavo
Sparklike
S.T. Group
Tecno-Glass
Tenon (Beijing) Equipment
Triulzi

Tempering

TEMPERING FURNACES (ARCHITECTURAL GLASS)

CNUD-EFCO
Fushan
Glaston
Glasstech Inc.
Hornos Industriales Pujol
Keraglass
Landglass Technology
Lema
Lisec Group
Luoyang North Glass
Technology
Mappi International
Mazzaroppi Engineering
Schiavo
Taifin
Tekno Kilns
TK

TEMPERING FURNACES (AUTOMOTIVE GLASS)

Glaston
Glasstech Inc.
Keraglass
Landglass Technology
Luoyang North Glass
Technology
Mappi International
Mazzaroppi Engineering
SGLASS

ACCESSORIES

CNUD-EFCO
Deltamax Automazione
Glaston
Helios Quartz
Hornos Industriales Pujol
Keraglass
Landglass Technology
Mappi International
Mazzaroppi Engineering
RCN Solutions
SGLASS
Taifin
Tekno Kilns
TK

Bending

BENDING FURNACES
(ARCHITECTURAL GLASS)
Fushan
Glaston
Glasstech Inc.

Hornos Industriales Pujol

Keraglass
Mappi International
Mazzaroppi Engineering
RCN Solutions
SGLASS
Si.Ste
Tekno Kilns
TK

BENDING FURNACES (AUTOMOTIVE GLASS)

CNUD-EFCO
Glaston
Glasstech Inc.
Keraglass
Mappi International
Mazzaroppi Engineering
Taifin

ACCESSORIES

Ayrox
Deltamax Automazione
Glaston
Glasstech Inc.
Hornos Industriales Pujol

Keraglass

Mappi International
RCN Solutions
Softeco
Taifin
Tema
Tekno Kilns
TK

Laminated glass production

COMPLETE PLANTS

Bottero
Bovone Elett.
Bystronic glass Group
Forel
Fushan
Glaston
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Mazzaroppi Engineering
Si.Ste

Tema

Triulzi
LAMINATED WINDSCREEN
BENDING FURNACES
ECOL
Glaston
Glasstech Inc.
Keraglass
Mappi International
Taifin

AUTOCLAVES

Bystronic glass Group
Glaston
Hornos Industriales Pujol
Lisec Group
Panini
Triulzi

CLIMATIC CABINS

Bystronic glass Group
Forel
IOCCO Group
Lisec Group
Triulzi

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- ▶ Calibration, repairs and preventive maintenance of optical QC equipment.
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- ▶ PVB wiring machinery for heatable laminates.
- ▶ Production accessories for laminated and tempered glass such as silicone free vacuum rings, aramide fibre tapes, and tungstene wire.

INFRARED OVENS

Bystronic glass Group
ECOL
Forel
Hornos Industriales Pujol
IOCCO Group
Lisec Group
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Tema
Triulzi

PRESSES/BENDING MACHINES

Forel
IOCCO Group
Lisec Group
Triulzi

RESIN LAMINATING MATERIALS AND EQUIPMENT

IOCCO Group

PVB - SHAPING AND CUTTING EQUIPMENT

Ayrox
Bystronic glass Group
ECOL
Forel
IOCCO Group
Lisec Group
Softeco

PVB - WIRING TECHNOLOGY FOR HEATABLE LAMINATES

Ayrox
ECOL
Softeco

ACCESSORIES

Ayrox
Bottero
Deltamax Automazione
Glaston
Helios Quartz
Hornos Industriales Pujol
IOCCO Group
Lisec Group
Panini
Softeco
Taifin
Triulzi

Drilling

AUTOMATIC DRILLING LINES

B Solution Licensee of BF Project
Bando Kiko
Bavelloni
Bystronic glass Group
C.M.B. - Besana

Forvet
Intermac - Biesse
IOCCO Group
Schiatti Angelo
SKG - Skill Glass
Vismara

MULTI-SPINDLE DRILLING MACHINES

B Solution Licensee of BF Project
Bando Kiko
Bavelloni
Bystronic glass Group
C.M.B. - Besana
CMS Brembana
Forvet
Glass M 2013
Intermac - Biesse
IOCCO Group
Schiavo
Schiatti Angelo
SKG - Skill Glass
Vismara

DRILLING MACHINES WITH OPPOSITE DRILLING HEADS

B Solution Licensee of BF Project
Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
C.M.B. - Besana
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Fushan
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RBB
Schiavo / OCS Glas
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Vismara

COLUMN DRILLING MACHINES

B Solution Licensee of BF Project
Bottero
Di Gregorio
Schiavo
Si.Ste
Vismara

PORTABLE DRILLING MACHINES

CMS Brembana
Schiavo
Si.Ste
Tecno-Glass

DRILLING AND MILLING MACHINES

Bavelloni
Bottero

C.M.B. - Besana
CMS Brembana
Forvet
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Schiavo
SGLASS
SKG - Skill Glass
Vismara

DIAMOND DRILLS

ADI
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Diamut - Biesse
Glaston
Diamond Drills
Pomdi
Schiavo
Si.Ste
Tecno-Glass
Tyrolit Vincent

ACCESSORIES

CMS Brembana
Deltamax Automazione
Schiavo
Si.Ste

Other equipment and plants

TURNKEY PLANTS / ENGINEERING - FOR BUILDING GLASS

Bando Kiko
Bottero
Bystronic glass Group
Cugher Glass
Intermac - Biesse
IOCCO Group
Keraglass
Lisec Group

TURNKEY PLANTS / ENGINEERING - FOR AUTOMOTIVE GLASS

Bando Kiko
Bottero
Bystronic glass Group
Cugher Glass
Easy Automation
Intermac - Biesse
IOCCO Group

KEY PLANTS / ENGINEERING - FOR DISPLAY GLASS

Bando Kiko
Bottero
Cugher Glass

WORKING CENTRES - CNC CONTROLLED

Bando Kiko
Bavelloni
Bottero
Bystronic glass Group
C.M.B. - Besana
Fushan
Glasstech Inc.
Hegla
Intermac - Biesse
SKG - Skill Glass
Vismara

FLOAT PLANTS/LINES (EQUIPMENT & ACCESSORIES)

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Filtraglass
IOCCO Group

CONSULTING SERVICES

Horn

CULLET HANDLING SYSTEMS

ECOL

COMPLETE BATCH PLANTS

Zippe

VACUUM COATING EQUIPMENT AND PLANTS

Luoyang North Glass Technology

ENAMELLING EQUIPMENT AND PLANTS

Cefla Finishing
Giardina Finishing + HS Glassprinting
Rollmac division of GeMaTa

HOT- AND COLD-END COATING SYSTEMS AND MATERIALS (CVD, ROLLER, CURTAIN COATERS, DRYERS)

Cefla Finishing
Giardina Finishing + HS Glassprinting
Horn

SANDBLASTING SYSTEMS, EQUIPMENT AND PLANTS - OPTIMIZERS

Di Gregorio
Fratelli Pezza
Fushan
Schiavo
SKG - Skill Glass

DIGITAL INKJET PRINTERS

Durst

SCREEN PRINTING EQUIPMENT AND PLANTS

Ayrox

COMSS

Cugher Glass
Deltamax Automazione
ECOL
Giardina Finishing + HS
Glassprinting
Keraglass
Luoyang North Glass
Technology
Rollmac division of GeMaTa
Softeco

SCREEN PRINTING FRAMES

COMSS

SCREEN PRINTING DRYING SYSTEMS

COMSS

Cugher Glass
Rollmac division of GeMaTa

ACIDING GLASS EQUIPMENT AND PLANTS

Lisec Group
Rollmac division of GeMaTa

LASER DECORATING MACHINES

Ashton Industrial Sales

LASER MARKING

Ashton Industrial Sales

Artistic glass production

CERAMIC FIBER PANELS

RCN Solutions

CERAMIC INKS

Durst
RegaLead

CHAMBER ELECTRIC KILNS

Keraglass
RCN Solutions
Tekno Kilns
TK

DECORATING ENAMELS AND COLOURS - PRECIOUS METALS

RCN Solutions

DETACHING MATERIALS AND EQUIPMENT

RCN Solutions

ACCESSORIES

Deltamax Automazione
Helios Quartz
RCN Solutions

Miscellaneous

ADHESIVES FOR GLASS BONDING

Si.Ste

AUTOMATION

Ashton Industrial Sales
IOCCO Group
Horn

AUTOMOTIVE GLASS APPROVAL SERVICES

Ayrox
Softeco

AUTOMOTIVE GLASS QUALITY CONTROL

Ayrox
Bando Kiko
Bystronic glass Group
Cugher Glass
Deltamax Automazione
Easy Automation
GlasStress
Glaston
IOCCO Group
Softeco

CE MARKING - QUALITY CONTROL EQUIPMENT FOR GLASS IN BUILDING

Ayrox
GlasStress
Softeco

COLOURS & ENAMELS - OTHER APPLICATIONS

RegaLead

CUTTERS

Si.Ste
Talamoni

CUTTING WHEELS

Pomdi
Si.Ste
Talamoni

DEIONIZING AND WATER SOFTENING EQUIPMENT

Forel
Idrotecnica
Lisec Group
Triulzi

ELECTRIC FOILERS FOR COPPER RIBBONS

RCN Solutions

FLAT GLASS QUALITY CONTROL DEVICES

Ayrox

Deltamax Automazione

Forel

GlasStress
IOCCO Group
Softeco

GASES

HyGear

GLASS COATING AND TINTING

Cefla Finishing
Giardina Finishing + HS
Glassprinting
Rollmac division of GeMaTa

HEATING EQUIPMENT - STANDARD (GAS FIRING, BURNERS, AIR GAS MIXERS, SAFETY DEVICES, ELECTRICAL RESISTORS)

Horn
Keraglass

HINGES FOR GLASS DOORS

Si.Ste

INFRARED TUBES

Helios Quartz
Deltamax Automazione

INSPECTION INSTRUMENTS & INTENSIMETERS

GlasStress

KILNS

Horn
Keraglass
Lisec Group
RCN Solutions
Tekno Kilns
TK

METAL ACCESSORIES

Si.Ste

NUMERICAL CONTROL SYSTEM (CNC) FOR ALL GLASS PROCESSING MACHINES

IOCCO Group
Prodim

OPTICAL DISTORTION ANALYSERS FOR AUTOMOTIVE GLASS

IOCCO Group
Keraglass

POWDER OR LIQUID APPLICATION SYSTEMS FOR PROTECTING FLOAT GLASS

Cugher Glass
Giardina Finishing + HS
Glassprinting

PUMPING AND APPLICATION SYSTEMS (AUTOMOTIVE GLASS)

IOCCO Group

PURIFIERS FOR REFLUENT WATER

Forza G / G. Tech

QUARTZ EQUIPMENT

Helios Quartz

SHAPE CHECKING DEVICES

Deltamax Automazione
Easy Automation
IOCCO Group

SIC HEATERS

Helios Quartz

SOFTWARE SYSTEMS FOR PRODUCTION CONTROL

A+W Software
CMS Brembana
Cugher Glass

Deltamax Automazione

Edgetech Europe

Fenetech

Forel

Lisec Group

Optima

Prodim

SOLDERING EQUIPMENT FOR ELECTRICAL CONNECTORS FOR WINDSCREENS AND BACKLITES

Ayrox

Easy Automation

Softeco

SORTING SYSTEMS

Bystronic glass Group
Lisec Group

SURFACE STRESS MEASUREMENT INSTRUMENT

Jeffoptics

TESTING FOR SOLDERINGS

Ayrox

Easy Automation

Softeco

TESTING DEVICES OF BACKLITES

ELECTRICAL HEATING

Ayrox

Softeco

THERMAL IMAGING SYSTEMS

Easy Automation

TIN FLOAT BATH FURNACES

IOCCO Group

UV ADHESIVES

Si.Ste

UV LAMPS

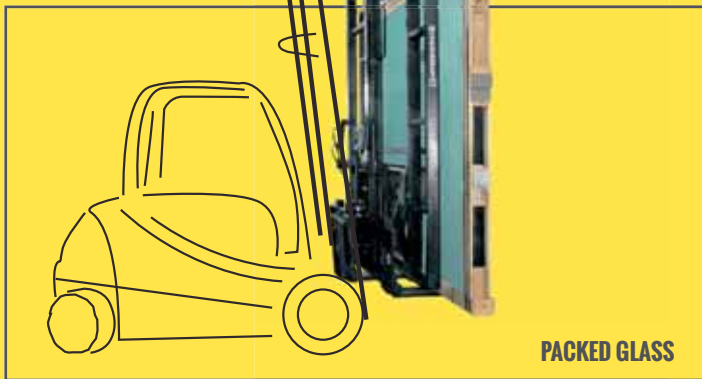
Helios Quartz

UV PORTABLE MACHINES

Helios Quartz

ABV GLASS HANDLING

Italcarrelli® has developed a new glass handling device called an ABV. This new solution allows the handling of packed/unpacked glass by standard forklift trucks for virtually all aspects of glass handling including the loading of trucks.



PACKED GLASS



UNPACKED GLASS

EASY TO INSTALL

The ABV can be easily installed on a wide variety of standard forklift trucks enabling the operator to handle and transport glass packs quickly and safely.

EVERYTHING UNDER CONTROL

The ABV is made up of a frame where the glass is positioned, two overhead clamps with video camera and two forks. The operator can easily adjust to the thickness and the height of the packs of glass from his seat without needing assistance from other operators. To enhance productivity, the ABV is equipped with a system to enable $\pm 2.5^\circ$ horizontal positioning allowing for lifting the glass without needing to be perfectly aligned with the glass pack.

SAFETY CONTROL SYSTEMS

As per all Italcarrelli® products, the ABV is produced to exceptional quality and safety standards.

AFFORDABLE, ADVANCED TECHNOLOGY SOLUTION

With the ABV, Italcarrelli® provides an affordable solution to handle glass quickly and safely. The first step to improving productivity in glass handling operations.



agents & sales offices

👉 DIRECT LINKS

GERMANY

CARLO NETWORK GMBH

Agent for: A+W Software

DTS HANDELSGESELLSCHAFT MBH

Agent for: Schiatti, Adi

EMMEGI DEUTSCHLAND GMBH

Agent for: Keraglass

FÜLDNER MACHINES BV

Adelio Lattuada, Mappi

GLASTECHNIK HOLGER KRAMP GMBH

Agent for: Ashton Industrial Sales, BDT - Bovone Diamond Tools, Bovone Elettromeccanica

GLASTON GERMANY GMBH

Agent for: Glaston

HEGLA MASCHINENBAU GMBH & CO.

Agent for: HEGLA

INTERMAC DEUTSCHLAND

Agent for: Intermac

KMS E.K.

Agent for: Adi

LECHNER SRL

Agent for: Mazzaroppi Engineering

LISEC DEUTSCHLAND GMBH

Agent for: lisec

PRO-GLAS

Agent for: Forel

CANADA

DROLET MACHINERIE INC.

Agent for: Schiatti

INTERMAC CANADA

Agent for: Intermac

MATODI

Agent for: Keraglass

MPM - MARC PREVOST MACHINERY INC.

Agent for: Adelio Lattuada

OPTIMA NORTH AMERICA INC.

Agent for: Optima

BRAZIL

BOVONE MÁQUINAS E EQUIP. INDUSTRIAIS LTDA

Agent for: BDT - Bovone Diamond Tools, Bovone Elettromeccanica

BYSTRONIC GLASS DO BRASIL

Agent for: Bystronic Glass

GLASTON SOUTH AMERICA

Agent for: Glaston, Forel

GUSMAO REPRESENTAÇÕES

Agent for: Schiatti

INTERMAC BRASIL

Agent for: Intermac

ITALOTEC

Agent for: Schiatti

KERAGLASS SOUTH AMERICA DO BRASIL LTDA

Agent for: Keraglass

VETRO MÁQUINAS LTDA

Agent for: Optima, Fratelli Pezza

UAE - UNITED ARAB EMIRATES

CORPOTRADE L.L.C. DUBAI

Agent for: A+W Software,

Bovone Elettromeccanica, Mappi

GLASTON - DMCC BRANCH

Agent for: Glaston

GULF STAR INTERNATIONAL

Agent for: Schiatti, Adi

HIET - HUDA INDUSTRIAL EQUIPMENT TRADING

Agent for: Ashton Industrial Sales

IBA MIDDLE EAST FZE

Agent for: Keraglass

JOLECO (JOLICO TRADING)

Agent for: Adelio Lattuada

LISEC MIDDLE EAST LTD. FZE

Agent for: LISEC

TEC-PRO GROUP DMCC

Agent for: Forel

ALBANIA

ARVIS SH. P. K.

Agent for: Keraglass, Forel

BELLUCCI SRL

Agent for: Schiatti

EDGETECH EASTERN EUROPE / MR. GEORG JANIK

Agent for: Edgetech

ESTE TEAM D. O. O.

Agent for: Adelio Lattuada

ALGERIA

PACARD SAS

Agent for: Adelio Lattuada

ANDORRA LA VELLA

TEKVIMO - PLADENEX S.L.

Agent for: Edgetech

ANGOLA

JLE - J. LEMOS ESTEVES LDA

Agent for: Adelio Lattuada

ARGENTINA

CASA FIGINI

Agent for: Forel

GIL BARBARA SRL

Agent for: BDT - Bovone Diamond Tools, Bovone Elettromeccanica, Fratelli Pezza

GLASSTEK MAQUINARIA PARA TRABAJAR VIDRIO

Agent for: Adelio Lattuada,

Ashton Industrial Sales

RUBEN MIKLASZEWSKI - EMAR

Agent for: Emar

AUSTRALIA

ELEGANT I.G. SUPPLYLINE

Agent for: Schiatti

GLASTON BRANCH OFFICE AUSTRALIA

Agent for: Glaston

INTERMAC AUSTRALIA

Agent for: Intermac

LISEC AUSTRALIA PTY LIMITED

Agent for: lisec

NFK GLAZING & INDUSTRIAL SUPPLIES

Agent for: BDT - Bovone Diamond Tools

OVERSEAS GLASS AGENCIES

Agent for: Adelio Lattuada, Forel, Mappi

AUSTRIA

EMMEGI DEUTSCHLAND GMBH

Agent for: Keraglass

FK HANDELSAGENTUR

Agent for: Adi

FÜLDNER MACHINES BV

Agent for: Adelio Lattuada

K&K PROVITRUM GMBH

Agent for: Ashton Industrial Sales

LECHNER SRL

Agent for: Mazarroppi Engineering

PRO-GLAS

Agent for: Forel

BAHRAIN

IBA MIDDLE EAST FZE

Agent for: Keraglass

JOLECO SARL

Agent for: Adelio Lattuada

BELARUS

EDGETECH EASTERN EUROPE / MR. GEORG JANIK

Agent for: Edgetech

IDELIS UAB

Agent for: Forel

BELGIUM

EDGETECH SOUTHERN EUROPE / MR. ALAIN MONRIBOT

Agent for: Edgetech

FÜLDNER MACHINES BV

Agent for: Adelio Lattuada, Mappi

PIETERMAN GLASTECHNIEK NV

Agent for: Schiatti, Bovone Elettromeccanica, BDT - Bovone Diamond Tools, Forel

BOLIVIA

GLASSTEK MAQUINARIA PARA VIDRIO

Agent for: Ashton Industrial Sales

OSAMU - ORLANDO KHIARA

Agent for: Forel

BOSNIA AND HERZEGOVINA

ESTE TEAM D. O. O.

Agent for: Adelio Lattuada

GLASMIK - IMSA

Agent for: Schiatti, Forel, Mappi

BRAZIL

BOVONE MÁQUINAS E EQUIP. INDUSTRIAIS LTDA

Agent for: BDT - Bovone Diamond Tools, Bovone Elettromeccanica

BYSTRONIC GLASS DO BRASIL

Agent for: Bystronic Glass

GLASTON SOUTH AMERICA

Agent for: Glaston, Forel

GUSMAO REPRESENTAÇÕES

Agent for: Schiatti

INTERMAC BRASIL

Agent for: Intermac

ITALOTEC

Agent for: Schiatti

KERAGLASS SOUTH AMERICA DO BRASIL LTDA

Agent for: Keraglass

VETRO MÁQUINAS LTDA

Agent for: Optima, Fratelli Pezza

BULGARIA

ESTE TEAM D. O. O.

Agent for: Adelio Lattuada

GLASMIK - IMSA

Agent for: Forel, Mappi

IMSA D. O. O.

Agent for: Edgetech

CANADA

DROLET MACHINERIE INC.

Agent for: Schiatti

INTERMAC CANADA

Agent for: Intermac

MATODI

Agent for: Keraglass

MPM - MARC PREVOST MACHINERY INC.

Agent for: Adelio Lattuada

OPTIMA NORTH AMERICA INC.

Agent for: Optima

CAPE VERDE

JLE - J. LEMOS ESTEVES LDA

Agent for: Adelio Lattuada

CHILE

DIAMANCHILE

Agent for: Forel

GLASSTEK MAQUINARIA PARA TRABAJAR VIDRIO

Agent for: Adelio Lattuada, Ashton Industrial Sales

CHINA

BYSTRONIC GLASS CO. LTD. SHANGHAI

Agent for: Bystronic Glass

GLASSTECH INC. - SHANGHAI

Agent for: Glasstech Inc.

GLASTON MANAGEMENT SHANGHAI CO., LTD.

Agent for: Glaston

GLASTON (TIANJIN) CO., LTD.

Agent for: Glaston

GUANGDONG NORTH GLASS AND JUISUN GLASS TECHNOLOGY INDUSTRY CO., LTD.

Agent for: North Glass

INTERMAC CHINA

Agent for: Intermac

LISEC SHANGHAI TRADING CO., LTD

Agent for: lisec

OPTIMA SOFTWARE (TIANJIN) CO. LTD.

Agent for: Optima

OUFENG TRADING (HANGZHOU) CO LTD

Agent for: HEGLA

SHENYANG HELIOS TECH. CO. LTD

Agent for: Helios Quartz

TIANJIN NORTH GLASS INDUSTRIAL TECHNICAL CO. LTD

Agent for: North Glass



USE ELECTRONICS CO. LTD. / GUANGZHOU

Agent for: **Bovone Elettromeccanica**

USE ELECTRONICS CO. LTD. / HONG KONG

Agent for: **Bovone Elettromeccanica**

USE ELECTRONICS CO. LTD. / SHANGHAI

Agent for: **Bovone Elettromeccanica, Forel**

YICHEN INFORMATION TECHNOLOGY CO. LTD.

Agent for: **A+W Software**

COLOMBIA

DISTRIBUIDORA CADICOL SAS

Agent for: **Schiatti**

GLASSTEK MAQUINARIA PARA VIDRIO

Agent for: **Ashton Industrial Sales**

GLASSTOOLS

Agent for: **Adelio Lattuada**

PROTECH COLOMBIA

Agent for: **Keraglass**

CROATIA

ESTE TEAM D. O. O.

Agent for: **Adelio Lattuada**

FORMATOR - SIGURNOSNA STAKLA DOO

Agent for: **Edgetech**

GLASMIK - IMSA

Agent for: **Schiatti, Forel, Mappi**

CYPRUS

A. JACOVIDES LTD

Agent for: **Adelio Lattuada**

EDGETECH SOUTHERN EUROPE / MR. JOACHIM STOSS

Agent for: **Edgetech**

CZECH REPUBLIC

EWCOO S.R.O.

Agent for: **Edgetech**

GLASMIK - IMSA

Agent for: **Schiatti, Mappi**

ITALCOMMA SLOVAKIA

Agent for: **Adelio Lattuada**

PRO-GLAS

Agent for: **Forel**

TEKNIKA

Agent for: **Bovone Elettromeccanica**

DENMARK

DMT DIAMANT & MASKIN-TEKNIK APS

Agent for: **Bovone Elettromeccanica**

GLAS X GLASTEKNIK

Agent for: **Schiatti**

ECUADOR

GLASSTEK MAQUINARIA PARA VIDRIO

Agent for: **Ashton Industrial Sales**

PROTECH COLOMBIA

Agent for: **Keraglass**

EGYPT

CORPOTRADE EGYPT

Agent for: **A+W Software,**

Bovone Elettromeccanica, Mappi

STAR JET MIDDLE EAST

Agent for: **Keraglass**

ESTONIA

GLASTECH AS / PROJECTA GROUP

Agent for: **Adelio Lattuada, Keraglass**

IDELIS UAB

Agent for: **Forel**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

FINLAND

GLASTECH OY / PROJECTA GROUP

Agent for: **Adelio Lattuada, Forel, Keraglass**

GLASTON FINLAND

Agent for: **Glaston**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

FRANCE

A+W SOFTWARE AUSTRALIA

Agent for: **A+W Software**

A+W SOFTWARE FRANCE

Agent for: **A+W Software**

CILPAK INFORMATIQUE

Agent for: **Optima**

COVADIS SARL

Agent for: **Schiatti, Adi**

CVMI SARL - CLAUDE VRIGNAUD

Agent for: **BDT - Bovone Diamond Tools,**

Bovone Elettromeccanica

DUMATEK SARL

Agent for: **Forel, Mappi**

EDGETECH SOUTHERN EUROPE / MR. ALAIN MONRIBOT

Agent for: **Edgetech**

HEGLA FRANCE S.A.R.L.

Agent for: **HEGLA**

INTERMAC FRANCE

Agent for: **Intermac**

PACARD SAS

Agent for: **Adelio Lattuada**

GERMANY

CARLO NETWORK GMBH

Agent for: **A+W Software**

DTS HANDELSGESELLSCHAFT MBH

Agent for: **Schiatti, Adi**

EMMEGI DEUTSCHLAND GMBH

Agent for: **Keraglass**

FÜLDNER MACHINES BV

Adelio Lattuada, Mappi

GLASTECHNIK HOLGER KRAMP GMBH

Agent for: **Ashton Industrial Sales,**

BDT - Bovone Diamond Tools,

Bovone Elettromeccanica

GLASTON GERMANY GMBH

Agent for: **Glaston**

HEGLA MASCHINENBAU GMBH & CO.

Agent for: **HEGLA**

INTERMAC DEUTSCHLAND

Agent for: **Intermac**

KMS E.K.

Agent for: **Adi**

LECHNER SRL

Agent for: **Mazzaroppi Engineering**

LISEC DEUTSCHLAND GMBH

Agent for: **lisec**

PRO-GLAS

Agent for: **Forel**

GREECE

DG TECH GEORGE DIKAIOS

Agent for: **Bovone Elettromeccanica**

EDGETECH SOUTHERN EUROPE / MR. JOACHIM STOSS

Agent for: **Edgetech**

GARIFALLOU SA - PRISMA

Agent for: **Optima**

STEFANOS THEMELIS

Agent for: **Schiatti**

GUINEA BISSAU

JLE - J. LEMOS ESTEVES LDA

Agent for: **Adelio Lattuada**

HONG KONG - CHINA

HELIOS QUARTZ ASIA LTD.

Agent for: **Helios Quartz**

HUNGARY

ESTE TEAM D. O. O.

Agent for: **Adelio Lattuada**

GLASMIK - IMSA

Agent for: **Forel, Mappi**

HUNGARY

IMROGLASS SRL

Agent for: **Edgetech**

K&K PROVITRUM GMBH

Agent for: **Schiatti**

ICELAND

PER MORDT A/S

Agent for: **Adelio Lattuada**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

INDIA

GLASSTECH INC. - INDIAN LIAISON

Agent for: **Glasstech Inc.**

GOBAL GLASS TECHNICAL SOLUTIONS

Agent for: **Schiatti**

HEGLA TRADING & SERVICE GMBH

Agent for: **Hegla**

INTERMAC INDIA

Agent for: **Intermac**

MASCOT ENGINEERING CO.

Agent for: **Adelio Lattuada, Forel, Sorg, SKS, EME, Olivotto-Antas-Lybh-Lindner, Commersald**

IRAN

BEST MACHINE - GLASS INDUSTRY

Agent for: **Keraglass**

JAHAN ATLAS TECH

Agent for: **BDT - Bovone Diamond Tools**

MEGA ENTERPRISE FZCO

Agent for: **Ashton Industrial Sales**

IRAQ

JOLECO SARL

Agent for: **Adelio Lattuada**

IRELAND

P.A.L. GLASS MACHINERY LTD

Agent for: **Adelio Lattuada, Mappi**

PETER HAWKINS LTD.

Agent for: **Schiatti**

PROMAC

Agent for: **Mappi, Forel**

ITALY

EDGE TECH SOUTHERN EUROPE / MR. TOMMASO PASCUCCI

Agent for: **Edgetech**

FABIO ZUCAL

Agent for: **HEGLA**

GLASTON TOOLS

Agent for: **Glaston**

STRATOS SERVICE SNC

Agent for: **Keraglass**

JAPAN

CORRENS CORPORATION

Agent for: **A+W Software,**

Ocmi Group, Olivotto-Antas-Lybh-Lindner

GLASS LINK CO. LTD.

Agent for: **Adelio Lattuada**

TGM CO. LTD

Agent for: **Optima, Forel, Mappi, Keraglass**

JORDAN

JOLECO SARL

Agent for: **Adelio Lattuada**

LANA INTERNATIONAL EST.

Agent for: **Schiatti**

KAZAKHSTAN

VETTE D.O.O.

Agent for: **Schiatti**

KOSOVO

ARVIS SH.P.K.

Agent for: **Keraglass**

GLASMIK - IMSA

Agent for: **Forel, Mappi**

KUWAIT

IBA MIDDLE EAST FZE

Agent for: **Keraglass**

JOLECO SARL

Agent for: **Adelio Lattuada**

TEC-PRO GROUP DMCC

Agent for: **Forel**

LATVIA

IDELIS UAB

Agent for: **Forel**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

LEBANON

CORPOTRADE S.A.R.L.

Agent for: **A+W Software, Bovone Elettromeccanica, Mappi**

JOLECO SARL

Agent for: **Adelio Lattuada**

LITHUANIA

ERTEKA UAB

Agent for: **Mappi**

IDELIS UAB

Agent for: **A+W Software, Forel**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

LUXEMBOURG

FÜLDNER MACHINES BV

Agent for: **Adelio Lattuada**

MACEDONIA

ARVIS SH.P.K.

Agent for: **Keraglass**

ESTE TEAM D. O. O.

Agent for: **Adelio Lattuada**

GLASMIK - IMSA

Agent for: **Schiatti, Forel, Mappi**

IMSA D. O. O.

Agent for: **Edgetech**

MALAYSIA

INTERMAC ASIA

Agent for: **Intermac**

USE ELECTRONICS SDN. BHD.

Agent for: **Bovone Elettromeccanica**

YICHEN INFORMATION TECHNOLOGY CO. LTD.

Agent for: **A+W Software**

MALTA

EDGE TECH SOUTHERN EUROPE / MR. TOMMASO PASCUCCI

Agent for: **Edgetech**

MEXICO

EMMEGI IBERICA SA

Agent for: **Keraglass**

GLASTON MÉXICO, S.A. DE C.V.

Agent for: **Glaston, Fratelli Pezza MARBOLZ VETROSTILE SA DE CV**

Agent for: **Optima, Adi**

MAVHISA S.A. DE C.V.

Agent for: **Adelio Lattuada**

PROVIGLASS

Agent for: **Forel**

TI GLASS SA DE CV

Agent for: **A+W Software**

MOLDAVIA

IMROGLASS SRL

Agent for: **Edgetech**

MONTENEGRO

ESTE TEAM D. O. O.

Agent for: **Adelio Lattuada**

GLASMIK - IMSA

Agent for: **Schiatti, Forel, Mappi**

IMSA D. O. O.

Agent for: **Edgetech**

MOROCCO

PACARD SAS

Agent for: **Adelio Lattuada**

MOZAMBIQUE - AFRICA

JLE - J. LEMOS ESTEVES LDA

Agent for: **Adelio Lattuada**

NEW ZEALAND

GLASSCORP LTD.

Agent for: **Schiatti**

INTERMAC NEW ZEALAND

Agent for: **Intermac**

OVERSEAS GLASS AGENCIES

Agent for: **Forel, Mappi**

NORWAY

PER MORDT A/S

Agent for: **Adelio Lattuada**

SINCHRIJO AGENTURER AB

Agent for: **Edgetech**

OMAN

IBA MIDDLE EAST FZE

Agent for: **Keraglass**

JOLECO SARL

Agent for: **Adelio Lattuada**

TEC-PRO GROUP DMCC

Agent for: **Forel**

PANAMA

PROTECH COLOMBIA

Agent for: **Keraglass**

PERU

GLASSTEK MAQUINARIA PARA VIDRIO

Agent for: **Adelio Lattuada, Ashton Industrial Sales**



HECMAQ SAC

Agent for: **Schiatti**

MASVIDRIO

Agent for: **Schiatti**

OSAMU - ORLANDO KHIARA

Agent for: **Fratelli Pezza, Forel**

POLAND

A+W SOFTWARE POLSKA

Agent for: **A+W Software**

EDGETECH EASTERN EUROPE / MR. GEORG JANIK

Agent for: **Edgetech**

GLASSMAK

Agent for: **Forel**

IN-VENTO

Agent for: **Adelio Lattuada, Adi**

ITALPOL

Agent for: **BDT - Bovone Diamond Tools,**

Bovone Elettromeccanica,

Mazzaroppi Engineering

LUSPOL RYSZARD KOWALCZYK

Agent for: **Optima, Keraglass**

MC DIAM SP.Z O.O.

Agent for: **Hegla**

MCS TECHNO

Agent for: **Schiatti**

MEKANIKA SP. Z.O.O.

Agent for: **Mappi**

PORTUGAL

APPGLASS SL

Agent for: **A+W Software**

HMGLASS UNIPESSOAL LDA

Agent for: **Keraglass**

JLE - J. LEMOS ESTEVES LDA

Agent for: **Adelio Lattuada, Adi**

SOLUTEC GLASS

Agent for: **Forel**

TEKVIMO - PLADENEX S.L.

Agent for: **Edgetech, Schiatti**

PUERTO RICO

MATODI

Agent for: **Keraglass**

QATAR

JOLECO SARL

Agent for: **Adelio Lattuada**

TEC-PRO GROUP DMCC

Agent for: **Forel**

REP. OF SOUTH AFRICA

BWT LTD

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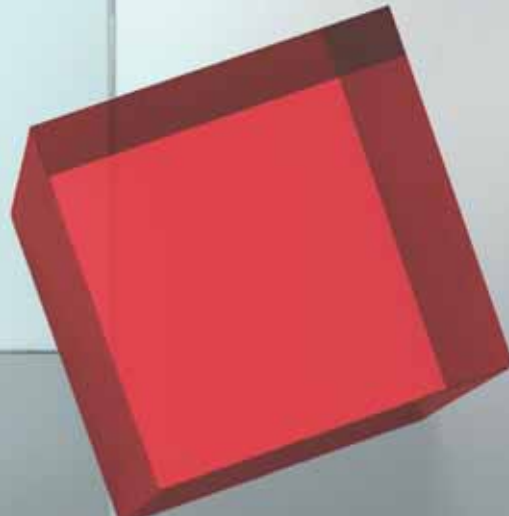
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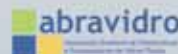
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FLACHGLAS

Experts for
toughened safety
glass and innovative
solutions for
construction glazing

The company's glass and glass systems for construction and automotive glazing fulfill all the required functions and are characterized by excellent technical and optical properties. Flachglass Wernberg employs innovative production facilities to manufacture insulation and safety glass, and its special glass and system glass for buildings, rolling stock and ships.

The products of Flachglass Wernberg comply with the highest international quality requirements – regarding not only mass production and manufacturing of a small number of pieces but also the production of unique copies. All business domains of Flachglass Wernberg are certified according to DIN EN ISO 9001:2000.

Facade glass

• **THERMAL INSULATION GLASS**
When it is getting cold outside, the thermal insulation glass types offer double performance: they let pass much light keeping the heat inside the room. All glass specifications feature a particularly low heat transfer coefficient. At the same time, they offer a high total solar

“Flachglas: all the options of construction and automotive glazing.”

factor for passive energy generation.

Thermal insulating spacers (TPS=Thermo-Plastic Spacers) potentiate this effect and ensure optimised thermal insulation also in the edge area of the glass. As a result, the room-sided surface temperatures are higher than with conventional metal spacers, and the formation of condensate in the interior is minimised. What's more: with thermal insulating spacers the heat transfer coefficient of the whole pane element can be improved of at least 0,1 W/m²K.

• SOLAR CONTROL GLASS

The solar control glass types INFRASTOP® and SOLARWER® have decisively influenced the development of glass architecture. Today, the cityscape of many international megacities is shaped by elegant glass transparency. The combination of different functions is creating continuously new options. INFRASTOP® and SOLARWER® perform an efficient energy management combining extremely effective solar protection and thermal insulation with good light transmission. In summer, the heating radiation is rejected. In winter, the heat remains inside the room. Independent of the season, the major part of visible light is getting inside. In

addition, the company's solar control glass types feature a wide range of reflecting paints. Based on a special technology, the Wernberg Thermal Coating, up to 80 different colours and colour tones respectively are possible. The combined use with INFRACLAD® facade spandrels is a perfect solution for the structuring of the whole facade.

• SOUND CONTROL GLASS

Noise has become a common stress factor. The high-performance sound control insulation glass minimises the acoustic impact providing at the same time a maximum incidence of light – generous glazing is, therefore, also possible in extremely noise-exposed areas. Adjusted to local factors and any individual needs, PHONSTOP® creates pleasant silence increasing quality of life. Depending on the sound level and the frequency spectrum of its source, completely different types of noise reducing insulation glasses are frequently required: in the proximity of the airport it would be another one than near the motorway. With a wide range of diversified sound control glass types, Flachglass Wernberg offers tailor-made solutions for living and working situations in noise-exposed locations.

PHONSTOP® can be combined with other function glass types thus ensuring thermal or burglary protection simultaneously, for example.

• SAFETY GLASS

What used to be breakable and fragile today has now become a solid building material, thanks to innovative technologies and processes. Today, glass provides transparent safety and high protection. With the Safety insulation glass, Flachglass Wernberg offers protection from burglars and aggressors. Toughened safety glass is highly resistant to mechanical and thermal loads featuring at the same time many interesting design options. For structural glass applications, such as fall protection devices, overhead glazing, glass projecting roofs or walkable glass, Laminated safety glass offers optimal solutions with different variants.

Automotive glazing

• RAIL VEHICLES

The development and production of innovative glazing systems for rail vehicles has been a tradition with Flachglass Wernberg for over sixty years now. It was the German Imperial Railway who ordered the first functional insulation glass units in Wernberg.

Nowadays, the company cooperates at international level with customers in the most different fields: rail-vehicle manufacturers, vehicle operators, registration offices, institutes as well as designers and developers make use of a professional know-how and flexibility offering individual solutions for almost any kind of demand. Its wide product range includes glasses and glazing systems for regional, long-distance and high-speed trains as well as for cogwheel trains, cable cars and trams.

• ROAD VEHICLES

During the last 40 years, the use of glass in the field of vehicle construction has doubled and functional demands have increased. Today, automotive glazing is above all a basic element for the optimisation of the passive and active safety. Consequently, the company's glazing systems are always processed with safety glass - independent from other functions - and have the necessary regulatory approvals. Its coatings for solar control and thermal insulation provide perfect visibility, even at extremely low temperature or intense sun radiation. The individual screenprint design offers additional aesthetic and technical possibilities. For the production of single and small

Company Presentation

The company based in Wernberg-Koebnitz manufactures highly functional flat glass panes in imposing sizes in a production area of more than 80,000 sqm. In the automotive glazing segment Flachglas Wernberg has also become a synonym for excellent product quality, individual service and high flexibility, both on national and international markets. The company's activities are not only focused on the production of insulation glass and laminated safety glass but also on the marketing of the complete range of construction glazing. Besides the company headquarter in Wernberg-Koebnitz, Flachglas also comprises others production sites in Germany and Switzerland.

● Flachglas Nord-Ost

With high-performance machinery and production lines the Osterburg-based company is setting standards in the fields of safety glass and insulation glass. Optimal processing of latest-generation glass types ensures precise and quick processes. More than 100 employees guarantee the prompt and need-based completion of customized products.

series, Flachglas Wernberg is also a flexible and efficient partner.

● WATER VEHICLES

In the field of ship-building, glass has also become an indispensable stylistic element with a high functional advantage. Here, the individual technical and aesthetic demands on glass require the application of innovative finishing process as well as a higher-than-average precision and visual quality. Flachglas Wernberg is experienced and competent in the finishing of productive and multifunctional glasses for luxury yachts as well as for any kind of ships and boats.

From planar or curved glass, from complex safety glass and insulation glass to thermal and solar control glass - the most different glass types are being employed. In order to increase the design diversity in the ship-building field, all

glass panes can also be screen printed. The combination of glasses with varying functions provide many further possibilities. All of the company's glasses fulfill the specifications according to ISO 614; they are wash-resistant and can be finished with the "ice class" qualification.

● SYSTEM SOLUTIONS

Flachglas Wernberg does not consider itself to be a pure glass refiner, but a contemporary modules supplier with own development. The field of automotive glazing is an independent business area of Flachglas Wernberg with sales and production departments. This enables the company to offer its customers an individual care with a high specialised team and to develop tailor-made technical solutions for the application of its products. *

● GLASPROFI

GLASPROFI (based in Luhe-Wildenau) is specialised in the supply of all types of toughened safety glass. One focus of the company's activities is on sanitary areas and bathrooms, being the company based in the region of Upper Palatinate market leader in Germany. What's more: All-glass doors, all-glass systems and all-glass sliding panels (HSW) with the corresponding fittings also form part of the production line. Actually, GLASPROFI has about 115 employees and is operating all over Europe.

● Flachglas Schweiz

Besides the company headquarters in Wikon, Flachglas Schweiz also comprises others two production sites in Thun and Münchenbuchsee. The company's activities are not only focused on the production of insulation glass and laminated safety glass but also on the marketing of the complete range of construction glazing. The prime market is Switzerland.

HISTORY

The innovative character of the actual Flachglas Wernberg GmbH is based on a long lasting, significant tradition in glass processing. Originally founded in 1938 under the trading name of SIGLA GmbH, the company then expanded continuously as Deutsche Tafelglas AG (DETAG) and was restructured in 1998 - after its fusion with the DELOG in 1970 forming the Flachglas AG that was part of the Pilkington Group since 1980. Since 1999, the company has been operating under its actual name, Flachglas Wernberg domiciled in Wernberg-Köblitz.

In brief:

- 1938** foundation of a subsidiary plant of the Sicherheitsglas GmbH, Kunzendorf/Niederlausitz (now Poland) in Wernberg, production of SIGLA® laminated safety glass
- 1946** the Wernberg plant is leased by the Deutsche Tafelglas AG (DETAG)
- 1949** acquisition of the Wernberg plant by DETAG
- 1970** DETAG and DELOG merging to Flachglas
- 1980** takeover of the majority of shares by Pilkington plc.
- 1999** withdrawal of the plant from Pilkington Group, independent status as Flachglas Wernberg GmbH
- 1999** foundation of the employee participation model
- 2005** acquisition of the GLASPROFI GmbH
- 2007** acquisition of the Flachglas Nord-Ost GmbH, Osterburg
- 2009** acquisition of Pilkington Schweiz merging to Flachglas (Schweiz) AG with 3 production sites in Wikon, Thun and Münchenbuchsee



FLACHGLAS WERNBERG GMBH

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Euroglas

Production with an accurate look at the protection of the environment

EUROGLAS Group produces float glass, extra-white glass, laminated and thermally toughened safety glass, solar glass as well as coated glass panes for applications within thermal and solar protection.

Basic glass

Clear and extra-white float glass to specific dimensions or as

standard panes. For subsequent production of laminated and thermally toughened safety glass, coated glass, insulated.

EUROFLOAT is the base material for all glass products. Characteristic for float glass is the light green colour. You can see it clearly at the glass edge.

A standard panel is available in a maximum size of 3,210 mm

width x 6,000 length. Larger dimensions are available on request.

It forms the basis of all glass, regardless of whether it will be used as part of indoor or outdoor architecture. Float glass, also referred to as molten tin bath glass, is produced as part of a complex production method involving vast thermal

“Euroglas GmbH produces and processes float glass, heat insulating and laminated safety glass.”

input and a bath in liquefied tin before the batch is slowly cooled.

The float glass process facilitates the efficient production of clear, transparent glass with flat surfaces.

Laminated safety glass (LSG)

Laminated safety glass and sound insulation glazing to specific dimensions or as standard panes. Thermally toughened safety glass and heat strengthened glass to specific dimensions.

For many everyday applications **EUROLAMEX LSG** is paramount that glass panes retain their intended protective effect in the event of accidental or intentional damage.

Laminated safety glass consist of two or more glass planes, connect with an elastic and tearproof layer. The using purpose defines the needed foil. Customer can decide between clear or colour appearance and also if a noise reduction foil is needed. polyvinyl butyral (PVB). This procedure is also known as lamination of glass. The safety glass may shatter as a result of excessive stress upon impact, but the shards remain on the undamaged PVB layer. The damaged pane consequently retains a degree of residual stability and the glazed surface remains sealed. A further effect is that the risk of injuries is reduced as a result of the bond between shards and foil.

Thermally toughened safety glass

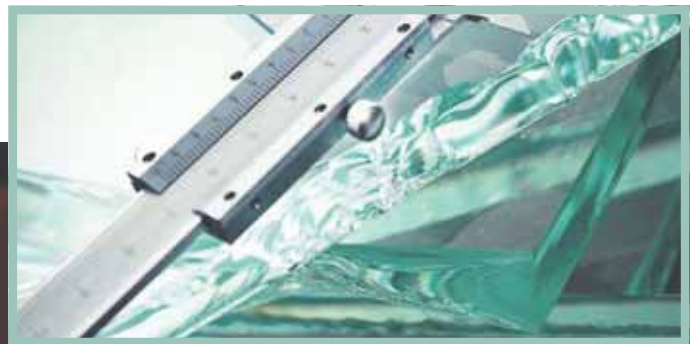
Thermally toughened safety glass and heat strengthened glass to specific dimensions or as standard panes featuring edge finishing and/or drilled holes.

EUROGLAS ESG Flat is manufactured in series production on two pre-cut lines and a tempering furnace. It is thermally tempered glass that acquires its constant stress distribution by means of heating and then fast cooling under controlled conditions. This procedure means that TSG boasts a higher resistance to alternating temperatures

as well as greater flexural tensile strength. In the worst case it shatters into thousands of individual pieces thus preventing severe injuries caused by glass splinters.

Coated glass

Insulated glass and solar control glass, anti-condensation glass to combat external condensation available to specific dimensions or as standard panes. Produced using the magnetron. Windows were previously considered to be thermal bridges, letting in the cold in winter and creating an unpleasant greenhouse effect in summer. This results from glass



being not only transparent to the human eye, but also to infra-red rays, thus allowing thermal radiation to pass through virtually unhindered. Float glass is coated to reduce this negative effect. The coating's objective is to influence the transmittance characteristics of glass to the extent that it meets current, energy-specific requirements,



Company Presentation

HISTORY

The company was founded in 1998 and is based in Haldensleben, Germany. Euroglas GmbH operates as a subsidiary of Glas Trösch Holding Ag.

The four Euroglas plants in Haldensleben (D), Osterweddingen (D), Hombourg (F) and Ujazd (PL) were founded together with medium-sized partner companies.

One specific goal marked the beginning of Euroglas' history: an independent glass supply for processing companies within the Glas Trösch Group and its partners. Ever since, it has been implementing this goal every day. For instance the company established the first float glass plant in Hombourg (France) together with Glaswerke Arnold.

Only two years later, Erich Trösch (representing the fourth generation of the Swiss family company), Glaswerke Arnold and Nowak Glas inaugurated the second float glass plant at the Haldensleben site

in Germany. Last, but not least, a cooperation with Semcoglas Group and Glas Sprinz led to the establishment of the third plant in Osterweddingen (Germany) in 2006.

PRODUCTION WITH AN ACCURATE LOOK AT THE PROTECTION OF THE ENVIRONMENT

Euroglas GmbH produces and processes float glass and heat insulating and laminated safety glass.

Euroglas GmbH is a European float glass manufacturer and coating provider with Swiss roots. Today it is based in Haldensleben, Germany. Glas Trösch is the parent company and is based in Switzerland.

Euroglas Group produces float glass, extra-white glass, laminated and thermally toughened safety glass, solar glass as well as coated glass panes for applications within thermal and solar protection.

The company creates a fascinating material made from quartz sand, fire and energy – glass, and produces this at four sites in Europe.

including elements like lower levels of thermal dissipation. The total energy transmittance and the thermal conductivity coefficient represent vital factors in window glass.

Solar glass

Float glass or extra-white flat glass in any format featuring special edge finishing or drilled holes, toughened on request.

Glass creates aesthetically pleasing solar modules.

Although the sensitive PV cells require durable and transparent protection. Solar glass provides these properties.

A front pane based on extra-white float glass and subsequently processed to form thermally toughened safety glass (TSG) allows plenty of light to penetrate the PV

cell, whilst the toughened glass with its high flexural strength protects against inclement conditions.

Special-purpose glass

Providing privacy screening or razor-sharp transparency - the LUXAR product series. This type of glass is used in display cabinets, shop windows and at the checkout.

LUXAR glass coating offers architects, interior designers and manufacturers of technical products abroad spectrum of new opportunities for creativity. Innovative magnetron technology transforms commercially available glass types, ranging from simple float glass to insulation glazing and armoured glass, into non-reflective or reflective glazing. *

EUROGLAS GMBH

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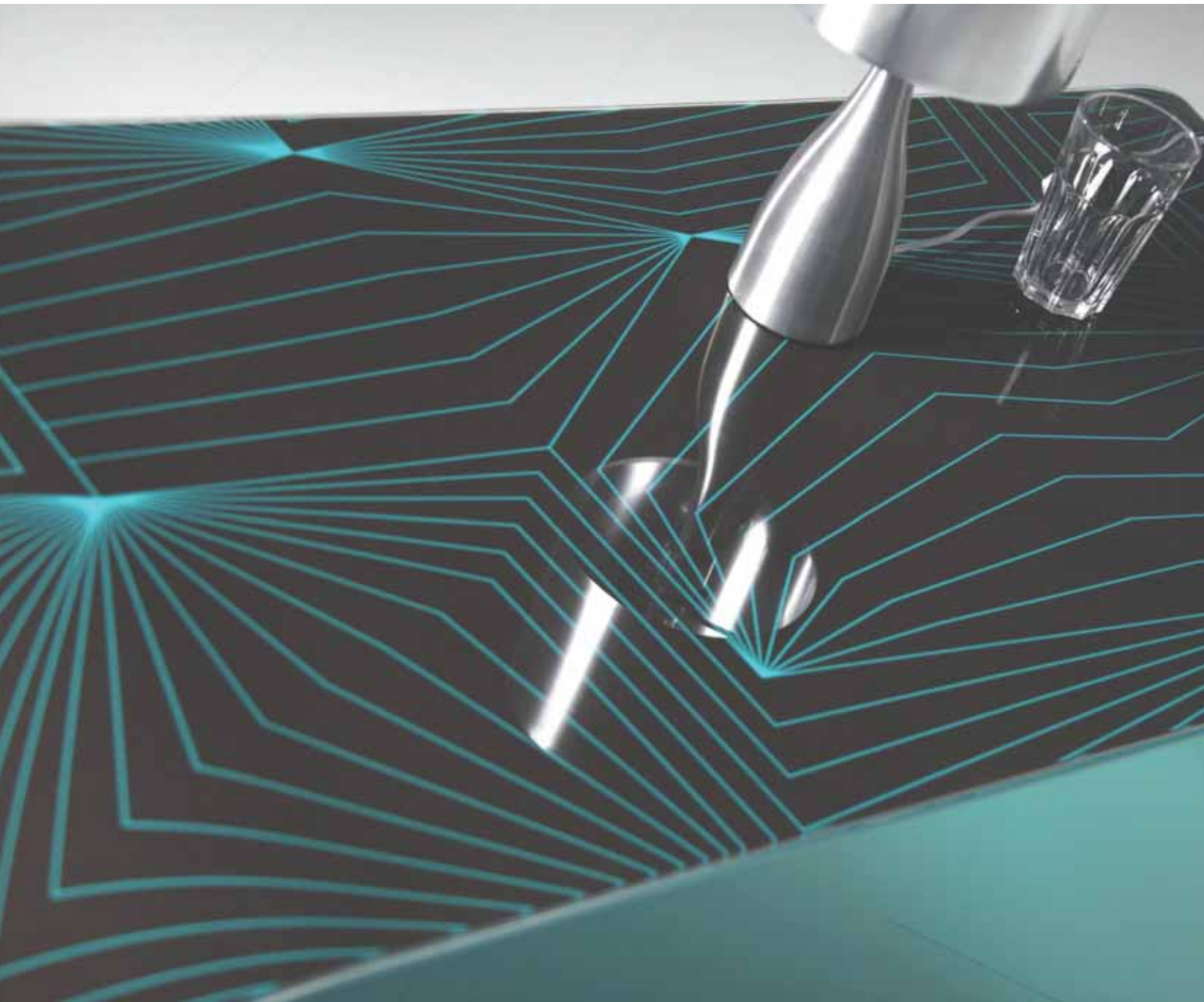
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Glas Trösch Holding offers a wide range of glass solutions for architectural exteriors. The company processes and surface-finishes flat glass to produce tempered safety glass, laminated safety glass and insulating glass. The high level of through-vision afforded by insulating and

façade glass has a direct and positive impact on quality of life. Depending on requirements, the glass offers thermal insulation, solar control, sound insulation or fire proofing. It can also meet the most stringent safety demands. Glass unites form and function in a harmonious way.

Glass production

GLASS FOR WINDOWS, FRENCH DOORS AND FACADES

The insulating glass used today is the result of continuous development and improvement of the good “old window”. Large windows, window fronts and glass facades bring

brightness and quality of life. Modern, coated multi-pane insulating glass meets the highest requirements and convinces as a translucent building material with excellent thermal insulation and sun protection properties. It requires a small installation

Glas Trösch

Refined glass made in Switzerland for architecture

*“Glas Trösch Holding AG
produces for both exterior
architectural and refined interiors”*

depth and achieves peak values that meet the needs and requirements of modern architecture. For example, in heat, sun, sound and fire protection, while at the same time flawless security and high incidence of light.

Ug values of 0.4 W / m²K

or sound insulation values of 50 dB are possible today. In addition to the maximum amount of thermal insulation and energy gains through passive use of solar energy are possible. Insulating glass is a well thought-out and highly researched high-performance building material.

DESIGN AND DECORATIVE GLASS FOR EXTERIOR ARCHITECTURE

Glass is aesthetic and decorative. Whether glass cladding, partitions or facades - with innumerable shades, surface variants and printing

options, glass solutions can be ideally matched to individual needs. From plain monochrome fronts to sophisticatedly printed glass, Glas Trösch offers tailor-made solutions for every architectural concept. Last but not least, sophisticated glass design combines with visual, sun or glare protection and other functions depending on the application - a harmonious combination of expressive aesthetics and high utility value.

RAILINGS, PARAPETS, STAIRS AND GLASS FLOORS

Railings and parapets fulfill an

important function in buildings. Glas Trösch offers complete systems that are aesthetically perfect as well as easy and quick to install. Many variations can be made: with colored and printed foils as well as transparent, transparent or opaque. All-glass balustrades and railings are used where elegant design should combine with individuality and safety. The systems are suitable for both indoor and outdoor applications. All solutions are quick and easy to assemble and compatible with any substructure.



The possibilities of creating atmospherically dense spaces with glass are becoming more diverse from year to year.

Crystal clear stairs open up new perspectives for interior design and lighting design. Dark areas become light-flooded rooms, interiors appear optically more open and spacious. In addition, glass absorbs light and colors of the environment and achieves attractive effects through the reflection. Stair systems create a transparent and bright connection of levels and sets clear accents.

SWISSDOOR

Doors are the most important interfaces within a building, they receive, connect and make spaces more generous. The high-quality, fully or semi-transparent doors by Glas Trösch bring brightness to any angle and create an airy, light interior. SWISSDOOR continues where other materials reach their limits, because only glass offers such a variety from clear to opaque, from glossy

to satined, from colorless to colorful and from purist to printed.

Glass coatings

Whether thermal insulation, solar protection or special coatings – the Glas Trösch and Euroglas coating plants trust in quality and innovation. Modern glass facades are an expression of contemporary architecture. Glass ensures plenty of natural daylight, which has a direct positive influence on well-being and quality of life. However, large areas of glass may also give rise to undesirable heat build-up in summer. SILVERSTAR solar control insulating glass units permit optimum use of the natural light source and can also prevent solar energy causing excessive increases in room temperatures. With SILVERSTAR solar control glass, the indoor climate remains pleasant and comfortable even in summer while energy costs for air-conditioning are also reduced. These interrelated functions

Historical highlights

- 1905** As a glass specialist, Johann Friedrich Trösch makes his name with writing glasses and a pioneering process for the transfer of images to glass and porcelain.
- 1938** Rudolf Friedrich Trösch, son of Johann Friedrich Trösch, founds today's stock corporation and lays the foundation for future industrial development with a glass grinding mill and a mirror factory.
- 1956** The next generation with Heinz and Erwin Trösch lays the foundation for a rapid and successful expansion of the group of companies with the pioneering production of insulating glass.
- 1977** The trade and later the manufacture of windscreens SWISSLAMEX will be started. Trösch Autoglas quickly becomes an efficient partner for garages and car bodies. From Alfa to Zastava everything comes from own production.
- 1978** The manufacture of the single-pane safety glass SWISSDUREX begins. A little later, the composite safety and armored glass SWISSLAMEX follows. Meanwhile, Glas Trösch employs around 330 people.
- 1988** Entry into large-scale vacuum coating with commissioning of the magnetron coating system in Bützberg and introduction of the most modern generation of highly insulating SILVERSTAR insulating glass. Later, the sun protection coatings SUNSTOP and the non-reflecting glass LUXAR follow.
- 1993** The fourth generation representative, Erich Trösch, builds the flat glassworks EUROGLAS in Hombourg, Alsace, with a daily output of 500 tons of glass. 90 years after its founding, the family business employs around 1380 people.
- 1997** In Haldensleben, near Magdeburg, the second glassworks is being built. This ensures the long-term supply of raw materials to the group of companies.
- 2001** With the acquisition of the Schwabenglasgruppe in Germany, the workforce of Glas Trösch is increasing to 2,500 employees worldwide.
- 2006** Another EUROGLAS plant opens in Osterweddingen, Germany.
- 2007** The production of laminated safety glass will be further expanded with the commissioning of the EUROLAMEX Osterweddingen (D) and SWISSLAMEX Bützberg factories.
- 2008** Glas Trösch takes over the insulating glass plant TOV LineWood Artjomowks (Ukraine). The Automobile division moves to Trimbach. The company now employs around 3110 people.
- 2009** The fourth and with 1000 tons of daily production so far the largest float glass plant is fueled in the Polish city of Ujazd.
- 2010** New construction of the insulating glass plant in St. Gallen-Winkeln. Glas Trösch takes over the Evroglass insulating glass factory in Ukraine with new locations and a branch in Moldova. The number of employees increases to over 4600.
- 2011** With the takeover of the companies Mecaplex and Josef Weiss Plastic, Glas Trösch continues to expand its expertise in the automotive sector. Across Europe, the company now employs more than 4,700 people.
- 2013** Following the reintegration of the EuropTec companies into the technical glass business segment, the Glas Trösch Group now has around 5,100 employees.



optimise the overall energy management of buildings in a cost-effective way. Following all the detailed options of a wide range of solar control products with balanced ratios of light transmission (LT value) and total solar energy transmittance (g value):

- **SILVERSTAR SELEKT:** The colour-neutral insulating glass provides the optimum combination of solar protection and thermal insulation for a pleasant indoor climate throughout the year. SILVERSTAR SELEKT is therefore also described as "4-seasons glass".
- **SILVERSTAR SUPERSELEKT:** The SILVERSTAR SUPERSELEKT insulating glass units are optimised to achieve the highest possible selectivity (ratio of luminous transmission factor and total solar energy transmittance).
- **SILVERSTAR COMBI:** The SILVERSTAR COMBI insulating glass offers a balanced range of colour-neutral and colour-nuanced coatings with graduated light transmission and total solar energy transmittance values.
- **SILVERSTAR SUNSTOP:** Insulating glass units which have been optimised to guard against the sun, offer the best protection against solar radiation. Thanks to the coloured appearance of the

strongly reflective glasses, SILVERSTAR SUNSTOP also opens up exceptional design opportunities.

- The complex **SILVERSTAR coating systems** reflect the long-wave infrared ray component of the incident solar radiation, which is primarily responsible for heating up interior spaces. The short-wave, visible radiation, on the other hand, passes through almost unhindered. In this way, solar control coatings reduce the inward transmission of energy, while still allowing natural daylight to enter the room.
- The special magnetron combi coatings used for the **SILVERSTAR SELEKT, SILVERSTAR SUPERSELEKT and SILVERSTAR COMBI** also ensure good thermal insulation in winter. An additional thermal insulation coating for triple insulating glass reduces the heat loss even further. This multifunctional property makes the insulating glass units a valuable building material for various application areas. SILVERSTAR SUNSTOP also offers the facility to cut heat losses efficiently by using additional colour-neutral SILVERSTAR thermal insulation coatings. *

Company Presentation

Since company founder Johann Friedrich Trösch made his name as a glass specialist in 1905, the company Glas Trösch Holding has steadily developed. Not in Bützberg, in the place of incorporation and headquarters of the company. But at more than sixty locations in Switzerland, Germany, France, Poland, Moldova, Ukraine, Hungary, Turkey, the Czech Republic, Slovakia and the USA. From Bulle to St. Gallen - Glas Trösch is at home in over 12 locations across much of Switzerland. The individual companies are united under the umbrella of the processing Switzerland.

COMPANY STRUCTURE

Glas Trösch Holding has become one of the major suppliers to the construction industry. There are many reasons for success. For example, the company has been constantly investing in the development of new products, and its services have been continually expanded to better meet the needs of each customer. In addition, the traditional family business impresses with Swiss values such as reliability, flexibility and perfection in every detail. Last but not least, there are over five thousand Glas Trösch employees who are motivated and happy to do their job.

OFFER AND SERVICE

- Swiss quality products from company-owned factories, where each production step is controlled
- A complete range from the well thought-out system to the sophisticated one-off production
- Technically sophisticated, aesthetic and cost-effective solutions
- The know-how of the glass expert par excellence
- A professional and constructive cooperation
- Services that stand out from the average



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PRESS GLASS



Press Glass

Supplying enhanced products, services and solutions with continuously improving features

Products

As an independent company, PRESS GLASS offers products from all of the greatest suppliers: AGC Glass, Euroglas, Fenzi, Guardian, IKG Isolierglasklebstoffe, Kömmerling, Pilkington, Rolltech, Saint-Gobain Glass, Technoform. The company

provides independent technical advice regarding the choice of components in its finished products.

PRESS GLASS is active in searching for effective solutions which can guarantee its clients optimized production.

The company, inspired by its customers, is open to

implementing new products and solutions (for example: company developed dedicated customer service team which provides efficient and prompt information flow at each stage). PRESS GLASS products are divided into three categories: glazed units, special glass and single glass.

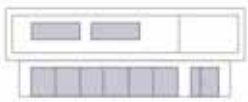


PRESS GLASS

PRESS GLASS serves :



Commercial market



Residential market



PRESS GLASS processes glass for fabricators of:



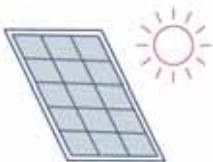
Windows & doors



Facades



Interior glass constructions



Solar and photovoltaic panels



Constructions with single tempered glass used in large volumes

Glazed Units

In modern construction there is a variety of challenges facing transparent wall partitions. Thanks to modern solutions double glazed glass can protect against the loss of heat, prevent over-heating, protect against noise and constitute a temporary form of protection against burglary. PRESS GLASS offers following types of glazed units: low emission glass, glazed units with warm edge, solar control glass, safety and security glass, bullet-proof glass, acoustic glass units, fire-resistant glass and decorative glass.

Special Glass

The great expansion of solutions involving glass as a construction element in buildings, as well as its use in the furniture sector and household equipment requires more complicated machining of this type of material. PRESS GLASS offers the following under the name of special glass: toughened glass, bent toughened glass, glass with heat soak test, glass with machining of edges, glass with drillings and cuttings, digital print on glass, silk-screen printing, spandrels, laminated glass and solar glass.

Single Glass

Among all the types of glass offered there is also a need in various branches for single glazed glass. It is a product which is less processed than double glazed glass. PRESS GLASS offers single glazed glass that is cut to the required dimensions on the base of the following types: float glass, tinted glass, reflective and hardcoated, while also chemically treated. Single glazed glass is offered without additional machining of edges. *



Company Presentation

PRESS GLASS, from the date of its creation, has been driven by a clear vision: "building a modern, dynamic and globally active company that contributes to the development, and strengthening the competitiveness, of its business partners by meeting their individual expectations." As time shows it has driven PRESS GLASS to nowadays market position described as Europe's largest independent flat glass processing operation.

Currently company's production exceeds 7 million m² of glass units p.a. To produce all its products PRESS GLASS uses more than 16 million m² of basis glass. So far company has produced over 60.000.000 m² of glass units for fabricators of windows & doors, facades, interior glass constructions, solar and photovoltaic panels, constructions with single tempered glass used in large volumes.

Company operates in 11 factories in the Europe and in North America. Its factories are located in the UK, Poland, Croatia and in the United States. On global market company offers its products under the PRESS GLASS brand, equally on North America commercial market also under the GLASS DYNAMICS brand, as well as for the United Kingdom residential market under the GLASS SYSTEMS brand.

PRESS GLASS is a partner to branded window producers who have sophisticated supply requirements. Highest quality and service are the basis for cooperation. It means - factories have often apply additional certification procedures for components and enhanced production processes to provide extended product warranties. All of products made by PRESS GLASS meet the requirements of European and North America Standards and the individual building regulations. Company also follows individual agreements with its customers. All PRESS GLASS plants operate under the production management system ISO 9001. Plants working under the PRESS GLASS brand operate based on environmental management system ISO 14001. Currently, as a mother company located in Poland or by its subsidiaries in the UK, USA and Croatia it cooperates with some hundreds of regular customers across the Europe and other continents, still searching and spreading Business Partners network.

HISTORY

PRESS GLASS commenced its operations in 1991, with glass units manufactured on a single line in Central Europe in Poland. Back then its core market was window frame manufacturers. Within the next ten years, PRESS GLASS established its position as the leading Polish producer of insulating glass units. In 2001 PRESS GLASS embarked on sales to other countries and started to build additional

plants in Poland. Company also expanded its offer to new market segments.

Thanks to Customers' trust in PRESS GLASS brand and its values, PRESS GLASS have become the leading European producer of processed flat glass for the construction industry.

PRESS GLASS first foreign subsidiaries were established in 2014 and subsequently in the next year first foreign manufacturing plants. At the same time, company also commenced its development through acquisitions of glass manufacturing and processing companies.

- 1991** Company foundation
- 1991** Window Glass Department
- 1993** Factory in Nowa Wieś (PL)
- 2000** Facade & Interior Glass Department
- 2001** Window Glass Export Department
- 2002** Factory in Tychy (PL)
- 2002** The leading producer of glass units in Poland
- 2004** Factory in Tczew (PL)
- 2004** Sales development in Scandinavia
- 2008** Minority interest in Euroglas Polska - glassworks in Ujazd (PL)
- 2008** Factory in Radomsko (PL)
- 2008** Sales development across Western Europe
- 2009** Facade & Interior Glass Export Department
- 2011** The leading independent manufacturer of processed flat glass in Europe
- 2012** Factory build up in Radomsko (PL)
- 2012** Solar Glass Department
- 2014** Establishment of subsidiaries in the United Kingdom and Croatia
- 2015** The second expansion of the plant in Radomsko
- 2015** Plant in Varaždin (Croatia)
- 2015** Acquisition of companies of the Glass Systems Group (UK)
- 2016** Establishment of the subsidiary in US
- 2016** Minority interest in Heliotrope Tech Inc. (US)
- 2017** The acquisition of two production plants of Pilkington group and the rights to the Cervoglass brand (UK)
- 2017** Acquisition of the Glass Dynamics Inc. (US)

SELECTED PRODUCTION CAPACITY	maximum size
assembling	7000 x 3200 mm
tempering	7000 x 3200 mm
Digital Print - full colour printing	7000 x 3200 mm
laminating	7000 x 3200 mm
edgework, holes and notched processing	7000 x 3200 mm



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RGC Russian Glass Company

High quality glass with architectural style in the land of the Zars!

Russian Glass Company is one of the leader in the industrial processing of glass and production of insulating glass units in various sectors: commercial glazing, residential glazing, vehicle glazing. At present the Russian Glass Company has the manufacturing potential and advanced equipment that makes possible a production and delivery to the Russian construction market more than 6000 thousand sq. m per a year of high quality insulating glass units completely corresponding to European and world

standards. The maximum sizes of insulating glass units are 3210x6000 mm. The progressive equipment and advanced manufacturing sciences provide high quality glazing of various purpose of function objects with architectural style – from hi-tech and art nouveau to classicism and empire style. It makes possible an active using of modern glass and glass products. The city architecture is enriching with modern, original buildings filled with light, air and freedom. The production of RGC is

manufactured using advanced industrial processes on modern equipment made in Austria, Finland and Italy. Unique equipment represented at the Company's plants gives opportunity to make all kind of work for industrial glass processing, including:

- manufacturing of complex insulating glass units with use of energy-saving, solar-control and multifunctional glasses produced by the largest worldwide glass manufactures such as AGC, PILKINGTON, GUARDIAN;
- manufacturing of insulating

glass units for structural glazing, bent insulating glass units;

- manufacturing of insulating glass units for planar glazing (pendant facades with a point strengthening), any glass pass through Heat Soak Test
- test of glass excepted risk of spontaneous destruction of complete products with the lapse of time;
- manufacturing of insulating glass units with use of safe glass: tempered, laminated and fireproof;
- manufacturing of insulating glass units with use of

“Russian Glass Company has the manufacturing potential and advanced equipment that makes possible a production and delivery to the Russian construction market more than 6000 thousand square metre of high quality insulating glass unit”



tempered glass and painted by fired enamel glass, and glass with a silk-screen print.

This is the division by typology and the related main products:

INSULATED GLAZING

For manufacturing of insulated glass RGC uses in its production besides the regular polished glass special types of glass with coatings that are different from

the conventional with such indicators as light transmittance, light reflectance, solar factor, emission factor, and color.

As and when necessary, in accordance with the requirements of the building codes and regulations, glazing safety standards and glass design specifications, the glasses for the production of insulating glass units in RGC can be

hardened, thermo-strengthened, laminated, there can be used a special Fire resistant glass. According to customer requirements of the glass can be moulded, painted to obtain the cellulose dope or a pattern can be applied on the glass.

FIRE RESISTANT GLAZING

Standard polished glass, laminated glass, insulating glass unit glass cannot withstand rapid temperature rise during a fire and they burst within 8-10 minutes.

For protection against fire, smoke and combustion products, there are 2 types of fire resistant glass:

- Monolithic fire resistant glass
- Laminated fire resistant glass

Monolithic fire resistant glass is a monolithic specially tempered glass which meets the criteria for fire resistance classes of preserving the integrity of E15 to E60 (of double glazed units). Due to exposure to high temperature such glass does not become turbid and does not expand, it maintains its integrity during the time specified in the formula (in minutes).

LAMINATED GLASS

Laminated Glass is widely used in architectural, residential and transportation glazing due to its unsurpassed characteristics for safety, soundproof properties, as well as wide selection of colour palette. Today JSC “RGC”

offers its customers the widest range of the products from laminated glass with all types of glass (including coated, mass-coloured) of different protection class, with the possibility of selection of the necessary shade on the RAL scale with application of the silk screen printing or digital image.

Laminated Glass - glass consisting of two or more glass sheets and one or more intermediate layers of PVB-film (PVB) (polyvinyl butyral) or EVA (ethylene-vinyl acetate).

PVB films are produced as colourless, opaque or painted on RAL scale, as well as anti-noise. EVA films are used for manufacturing of decorative laminated glass when the glass is laid between the film and different materials: textured fabric, photos, composition of the wood elements, leaves of plants, metal, etc.

Laminated glass composition and number of intermediate layers define the protection level of the laminated glass for providing safety of people and property, protection against theft, armed assaults and explosions. Multilayer laminated glass (triplex) is an excellent design element for safety glazing.

TEMPERED GLASS

Manufacturing of a tempered safety glass is one of the priorities of the Russian Glass Company. Increasing

the strength of glass 5 times, maintaining large temperature differences, safety when broken - these advantages of the tempered glass are widely used in architectural glazing facilities, in housing and vehicle glazing. Tempered glass is 4-5 times stronger than non-tempered one, used as a source material. Tempering of the glass is one of the ways to increase glass strength by changing its characteristics. Thermally tempered glass is considered safe, as in the case of the glass fracture its splinters are not sharp and far smaller than that of a simple glass, which limits the risk of cuts.

HEAT STRENGTHENED GLASS

Russian Glass Company manufactures heat-strengthened glass used in architectural glazing to provide additional strength for wind, snow loads and thermal stress. The engineering capabilities of the company allow manufacturing heat-strengthened glass of Jumbo-format. Heat strengthened glass is more resistant to mechanical and temperature loads than the usual polished one and it withstands temperature differences up to approximately 100°C. Heat-strengthened glass is not susceptible to spontaneous destruction caused by the

presence of nickel sulphide inclusions; therefore, it does not require a subsequent heat soak test. When broken, heat-strengthened glass splits into large sharp pieces like float glass. So, it is not considered a safety glass.

MOULDED (CURVED) GLASS

Moulded (curved) glass of JSC "RGC" is produced by the newest equipment, providing bending of large format glass. Vast engineering capabilities of the company allow producing curved triplex, curved insulating glass units, with the application of any graphic image that provides unlimited possibilities of application in facade and interior glazing. Any architectural solutions are feasible with the capabilities of the Russian Glass Company. Curved glass - polished glass heated up to a softening temperature and bent by using metal mould according to the given radius. All the glass, which has passed the moulding process in JSC "RGC" is tempered and is considered to be a safety glass.

ENAMELLED GLASS

The enamelled glass is widely used in facade and interior glazing as functional and decorative glazing element. JSC "RGC" offers a wider choice of colours, unlimited possibilities in size and all possible variants

of finished products: from single enamelled glass to cellulose dope in the composition of triplex and insulating glass unit, in flat and curved form. The enamelled glass (stemalit) is a tempered or heat strengthened glass, one of the surfaces of which is colored opaque by burnt in enamels. The colour shades of the enamelled glass of JSC "RGC" production is available for viewing in the Catalogue of colours on RAL scale. Stemalit is designed for decorative glazing of blind plots of the building facades and interior finishing.

SCREEN PRINTING GLASS

Silk-screen printing is widely used for mechanical engineering - glazing of railway transport and special-purpose equipment, as well as in the construction industry - facade glazing, glass for interior decorating use. Silk-screen printing is a technology of applying mainly monochrome images on sheet glass. Applying images on the glass surface is carried out through the screen-printing (matrix). Ceramic baked paints are used for the silk-screen printing.

GLASS CUTTING. CUT-OUTS, HOLES, SHAPES

The RGC group of companies has a wide range of different types of glass processing - grinding, polishing, dulling the

edges, drilling holes, creating a variety of glass shapes.

Glass cutting according to a size is carried out on high-precision LISEC equipment. Modern equipment of CJSC "RGC" enables glass cutting at the highest quality level, preventing chipping and cracking on the edge of the glass. LISEC lines allow cutting monolithic glass, as well as laminated glass. Edging of the glass reduces the possibility of cracking and chipping, ensures the safety of the follow-up work with the glass and protects against possible cuts, gives the product an attractive appearance.

If necessary, followed by quenching the product, its edges are treated to avoid glass fracturing due to residual stresses.

GLASS AND MIRROR ENGRAVING

Russian Glass Company offers unique products made of tempered glass and mirror with an engraving. Any drawing or pattern, any form of the finished product, with a polished edge or facet to create a unique design of any interior.

Engraving on glass and mirrors - a technology that allows to put any design, pattern or text on a transparent, enlightened or tinted glass or mirror.

Products are made in a special high-precision equipment that provides high quality finished product. *

Company Presentation

Russian Glass Company (Closed-Joint Stock Company "RGC") integrates a group of industrial glass processing plants situated in Moscow, St.-Petersburg, Nizhny Novgorod, Krasnodar, Samara, Yaroslavl, Kazan and Sterlitamak regions.

The main production capabilities are in three plants situated in St.-Petersburg. In 2008 the oldest enterprise of group celebrated its 16th anniversary.

At present the production facilities include 30 modern LISEC lines for insulating glass production, 8 lines for glass tempering, 2 lines for triplex processing, 3 fire-resistant sawing machines and a complete set of auxiliary equipment. CJSC "RGC" starts up a laminated LISEC (Austria) line 3210 x 6000 mm.

The principal Russian Glass Company profile is industrial glass processing for the construction industry, furniture and domestic appliances production, interior decoration, etc.

The group enterprises supply the glass products for such significant object as "Moscow-City", "Mega IKEA" and other business centers and architectural designs in Moscow, St.-Petersburg, et al.

For plants location Russian Glass Company considers the largest cities. Till 2012 the company plans to open new thirteen enterprises in Russian Federation.

Russian Glass Company widely uses a high-quality, large-size (3,21 x 6,00 m) multifunctional float glass of world leading glass producers such as "AGC", "Pilkington", "Guardian". The glass has a wide color spectrum which gives an opportunity for the new original architectural solutions.

Thanks to skilled personnel, production and technical facilities of the company and original architectural solutions the new modern buildings had transformed the image of largest Russian cities such as Moscow, St.-Petersburg, Nizhny Novgorod, Novosibirsk, Samara, Yaroslavl and Krasnodar.

HISTORY

The history of Russian Glass Company originates from **1992**, when the largest glass manufacturer in Russia OJSC «Bor Glassworks» created CJSC «Bor Glass» in St. Petersburg. The established company started its market activity in St. Petersburg and Northwest of Russia as a supplier of high-quality polished glass of various thicknesses.

In **1997** the Belgian glass monopoly «Glaverbel» came to Russia and purchased OJSC «Bor Glassworks». In Russia the production of the processed glass sheet is situated in Moscow, St. Petersburg, Nizhny Novgorod, Krasnoyarsk, Novosibirsk, Samara and Yaroslavl.

In **2000** «Glaverbor Petersburg» became the official representative of the Glaverbel Group and «Bor Glassworks» in St.Petersburg. The plant began to provide transparent structures for windows of residential buildings, facade glazing, as well as glassware for construction companies in St. Petersburg and the whole North-West of Russia.



Since **2002**, the modernization of production capacities began at «Glaverbor Petersburg» plant, as a result of which the plant was equipped with the most advanced and unique equipment for industrial glass processing in the North-West region.

2006 – seven factories for glass sheet processing in Moscow (Zhukovsky town), St. Petersburg, Nizhny Novgorod, Krasnoyarsk, Novosibirsk, Samara and Yaroslavl are acquired from Glaverbel by «Adamant» Holding. «Adamant» Holding is one of the largest diversified holdings in Russia, leader of St. Petersburg retail property, in the structure of which there are dozens of manufacturing and construction companies, retail, medical and advertising companies, hotels, restaurants and other enterprises in various business areas.

In May **2006** creation of JSC «RGC» (Russian Glass Company).

In **2007**, JSC «RGC» joins JSC «Neva stained glass», previously part of the «Adamant» holding structure.

In **2008**, opening of the factories in Yaroslavl, Samara and Krasnodar and the largest factory in Eastern Europe for glass processing and manufacturing of insulating glass units in Osinovaya Rosha in St. Petersburg. Investment in the factory in Osinovaya Rosha amounted to more than 50 million Euro. The factory is equipped with a unique complex of equipment that allows to solve a full range of tasks for the industrial glass processing, producing the technologically sophisticated products: architectural glazing of complicated forms, insulated glass for structural glazing, moulding glazing of large forms, laminated glass and tempered glass in a maximum format 3210 x 6000 mm.

In May **2013** – the reconstruction and modernization of the old factory RGC Knipovich. In July 2013 Russian Glass Company acquires «Kazan Construction Glass» increasing the number of its plants up to 11 and opening new markets in the Republic of Tatarstan.

In December **2016** "Solarex Style" company becomes a member of "RGC" Family and it's total amount of production sites comes up to 13. March **2017** - launching of the production site in Kolomna (Moscow region)

In **2017**, the production capacity of the 14 factories of JSC «RGC» included 38 modern production lines for insulating glass, 10 glass-tempering furnaces, 2 lines for laminated glass manufacturing, digital printer, as well as a full range of auxiliary equipment for cutting and glass processing.

At the moment Russian Glass Company holds more than 25% of the facade glazing market in Russia and is one of the largest Russian companies for the Glass processing. The most advanced production equipment and many years of experience provide RGC being the best supplier of glazing projects in Russia and abroad and to look to the future.

RGC RUSSIAN GLASS COMPANY



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Main plant and SCHOTT
headquarters in Mainz, Germany





SCHOTT

A leading expert
in the areas
of specialty
glass and
glass-ceramics

SCHOTT Flat Glass

SCHOTT Flat Glass has been supplying processed soda-lime flat glass with extraordinary designs since the 1980s. These glasses are produced in series suitable for a variety of applications in home appliances and commercial cooling.

SCHOTT Flat Glass manufactures globally in ten countries around the world, including the US, Canada, Brazil, Italy, France, China and Turkey. Leading home appliance manufacturers worldwide rely on its outstanding quality and delivery reliability.

“ SCHOTT is an innovative enabler for many industries, including the home appliance, pharma, electronics, optics, life sciences, automotive and aviation industries. ”



The solutions for the home appliance market offer a wide range of designs and colors. SCHOTT Flat Glass is a strong partner when it comes to unique product designs in best quality.

Solutions for home appliances:

- Wide range of functional and design options, broad color choices
- Various possibilities in processing, for instance of commercially available float glass in different thicknesses and sizes (even over a meter)
- Numerous corner, edge, shape and borehole designs
- Infinite printing options and custom color matching
- Various functional coatings, including the leading coating for inner oven window surfaces (SCHOTT CleanPlus)
- Always innovations to offer customers unique opportunities. For example, SCHOTT Duo Design offers unprecedented visual and

haptic effects thanks to innovative printing; SCHOTT MetalLook refines flat glass with a metallic surface effect; SCHOTT Smart Touch provides digital controls haptic feedback through precisely ground geometric details

Solutions for commercial cooling:

- A great variety of glass door systems, including horizontal glass covers for islands and horizontal lid systems
- Accessories that attract consumers and improve the

shopping experience, for example lighting systems for improving visibility of displayed products

- Innovations like SCHOTT Termofrost® Smart Access that was recently awarded the German Design Award Gold 2018, where the chiller cabinet opens automatically, when the sensor installed in the head runner recognizes a customer's hand approaching.

SCHOTT Technical Glass Solutions

With SCHOTT Technical Glass Solutions GmbH (TGS) the competence and expertise in the field of technical special flat glass is concentrated in Jena, Germany. The core competence lies in the development,





the case of a fire and makes it much easier to evacuate a burning building safely. Excellent color reproduction and high transmission in the visible and UV range ensure that this increase in security is not achieved at the expense of appearance. It is certainly no coincidence that PYRAN® has been proving itself in airports, hospitals, hotels, industrial buildings, museums, offices, schools, shopping centers, sports facilities and even on cruise ships for decades.

production and processing of highly stable and extremely thermal-resistant special glass.

BOROFLOAT®

- Key benefits are its **outstanding thermal resistance, exceptionally high transparency, high chemical durability and excellent mechanical strength.**
- SCHOTT manufactures

BOROFLOAT® 33 glass using proprietary, state-of-the-art microfloat technology. The microfloat process delivers highly homogeneous glass quality with a mirror-like surface, excellent flatness and outstanding optical properties.

- Whether it be as an oven door window or a biochip used in modern medical technology, or as a component utilized in theater spotlights, film projectors or diving robots, few glass types

can claim to be as versatile as BOROFLOAT®. Even space exploration has adopted the material as a key component in research telescopes.

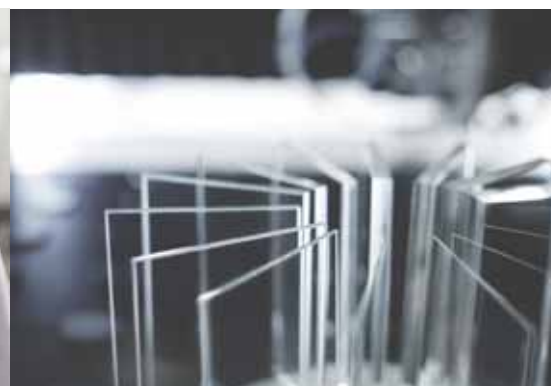
PYRAN® - superior safety glass

PYRAN® fire resistant glazing made of borosilicate glass is far superior to conventional safety glasses with a soda-lime composition. PYRAN® remains transparent, even under high thermal loads. This ensures vital insight in

Areas of applications are e.g.:

- Façades: Fire protective glazing is used to prevent fire from spreading vertically and thus to protect neighboring structures from catching fire.
- Roofs: Fire protective glazing is used in roofs whenever the goal is to prevent fire from spreading vertically.
- Partitions: Transparent fire-rated partitions provide protection in case of fire while at the same time

BOROFLOAT® 33 Borosilicate glass. The world's first floated borosilicate glass – "Made in Germany".





The Bálua Budapest center is known simply as “the whale” to the locals. It is equipped with fire-resistant PYRAN® glass.

allowing day light to flow freely from room to room.

- Smoke Screens: PYRAN® is ideal for use in smoke screens in heavily frequented areas such as atria, shopping centers and underground train stations.

Shaping the future with innovations

SCHOTT stands for “glass made of ideas.” Since company founder Otto Schott laid the foundations for modern glass science and technology more than 130 years ago, the company has highly prioritized

research and development. Innovation development in the company is driven by the challenges customers face, as well as the product and technology roadmaps for important future markets. SCHOTT invests between EUR 70 and 80 million in research and development each year. 450 highly skilled researchers work on future-oriented solutions in a global R&D network throughout the group. Its focus is on the core competencies material development, melting, hot forming, floating techniques, laser processing



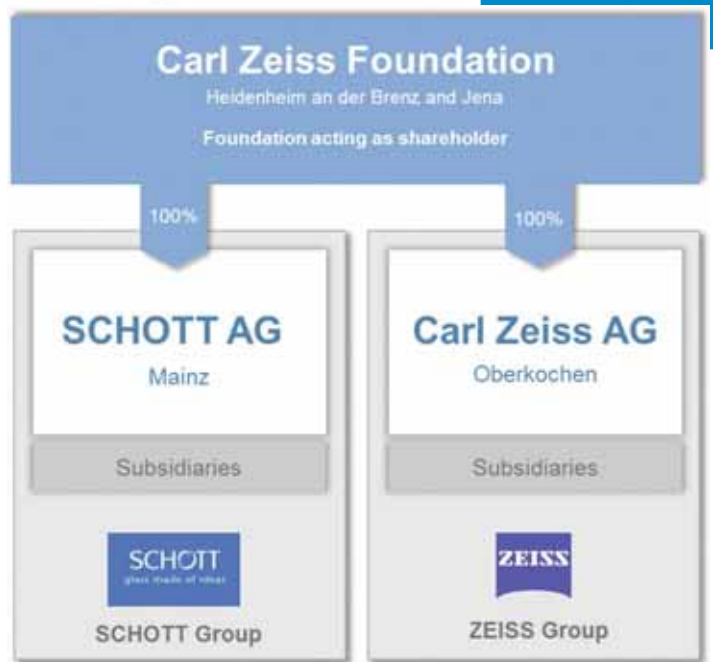
SCHOTT was awarded the German Industry Innovation Award in 2016.



Sales by region

The Carl Zeiss Foundation is not only the sole shareholder of SCHOTT AG, but also of optics and optoelectronics specialist Carl Zeiss AG.

and mathematical process simulation. SCHOTT also relies on intensive cooperation with customers and other external industrial partners, universities and research institutions worldwide. The company uses the individual strengths of players in the sense of a Connected R&D Community. Our external partnerships are on the one hand based on basic research and on the other hand on the industrial processing of new materials for future applications. SCHOTT's innovative strength is also reflected in the number of around 3,000 patents worldwide. SCHOTT's innovations have put the company on a successful course. It came as no surprise when the company was awarded the German Industry Innovation Award in the Large Enterprise category for its ultra-thin glass in 2016. The innovative glass with a minimum thickness of only 0.025 millimeters is thinner than a human hair – yet extremely flexible and stable. These advantages



open up new possibilities for technical progress for product developers in a wide range of industries.

SCHOTT worldwide

The SCHOTT Group's parent company is SCHOTT AG, headquartered in Mainz, Germany. The group maintains a global presence with production sites and sales offices in 33 countries. SCHOTT's global orientation can be seen in the fact that the company generates 86 percent of its sales outside Germany.

A sustainable corporate model

SCHOTT has the legal form of a stock corporation (AG) and is managed in accordance with corporate governance rules. SCHOTT AG is not listed on the stock exchange, however, having only the Carl Zeiss Foundation as its sole shareholder. Selling shares is not permitted by the Foundation Statute – ruling out the possibility of an IPO. The Carl Zeiss Foundation, founded in 1889, to which Carl Zeiss AG also belongs as another



The Run for Children® charity event is a flagship project in SCHOTT's social commitment. Proceeds benefit sick, disabled and socially disadvantaged children.



A family-friendly employee policy is of great importance to SCHOTT.

foundation company, gives SCHOTT the opportunity to think and act for the long term. This is where SCHOTT differs from listed stock corporations that must constantly look to current stock market prices and quarterly results. As a foundation company, SCHOTT is committed to sustainable growth because it must generate its own equity to secure its future. Profits largely remain in the company. The dividend paid to the Carl Zeiss Foundation is used to promote the sciences.

Special responsibility for employees and society

SCHOTT's position is not defined solely by technological expertise and premium products. As a foundation company, SCHOTT also assumes special responsibility for employees, society and the environment.

SCHOTT

Its internal focus is primarily on promoting employee health and stable work-life balance. Resource-conserving and environmentally friendly production is also important, as well as environmentally friendly products. Externally, SCHOTT shows strong commitment to supporting social projects in the communities around its sites. Projects focusing on education, social and recreational sports especially benefit children and teens.

Its social commitment goes back to company founder Otto Schott and was underpinned and strengthened by his partner Ernst Abbe when he founded the Carl Zeiss Foundation. To this day, their values shape the commitment of SCHOTT and its employees worldwide.

Exceptional company history

The SCHOTT Group was founded in Jena, Germany, in 1884 by glass scientist Otto Schott, physicist Ernst Abbe and optician Carl Zeiss as the small "Glass Technology Laboratory Schott & Associates." Otto Schott developed revolutionary new types of optical and technical glasses, establishing himself as the founder of modern glass science and technology.

SCHOTT's specialty glasses were in global demand from the beginning. The continuing

development of new special glasses along with increasing global demand has transformed the small glass laboratory into a large-scale industrial enterprise since the 1890s. That change was accelerated in 1911 by the introduction of continuous tank melting and again in 1923 by the advent of mechanical production.

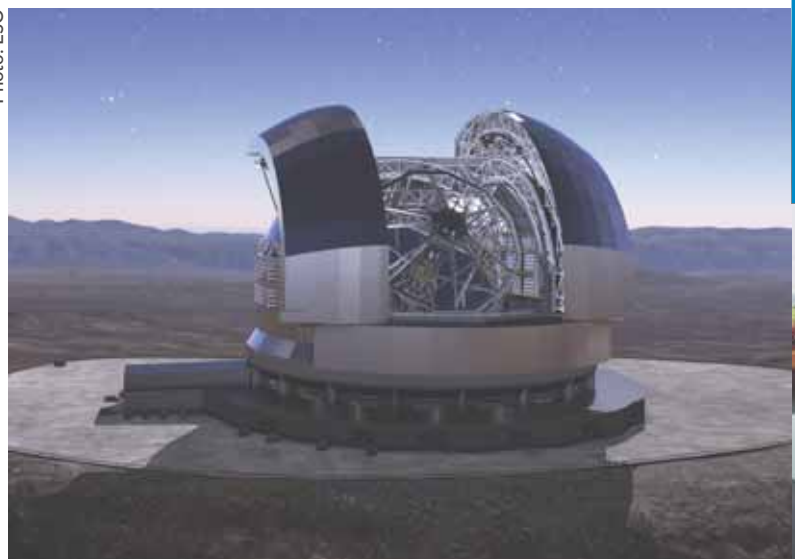
Acquisitions of glass plants in Zwiesel, Grünenplan and Mitterteich in 1927 and 1930 marked the birth of the SCHOTT Group. In the aftermath of World War II, not only Germany but SCHOTT as well was split into East and West. American troops brought a group of management and select specialists – who became known as the "41 glassmakers" – from Jena to West Germany to secure their outstanding

SCHOTT was founded in 1884 as a small glass laboratory.

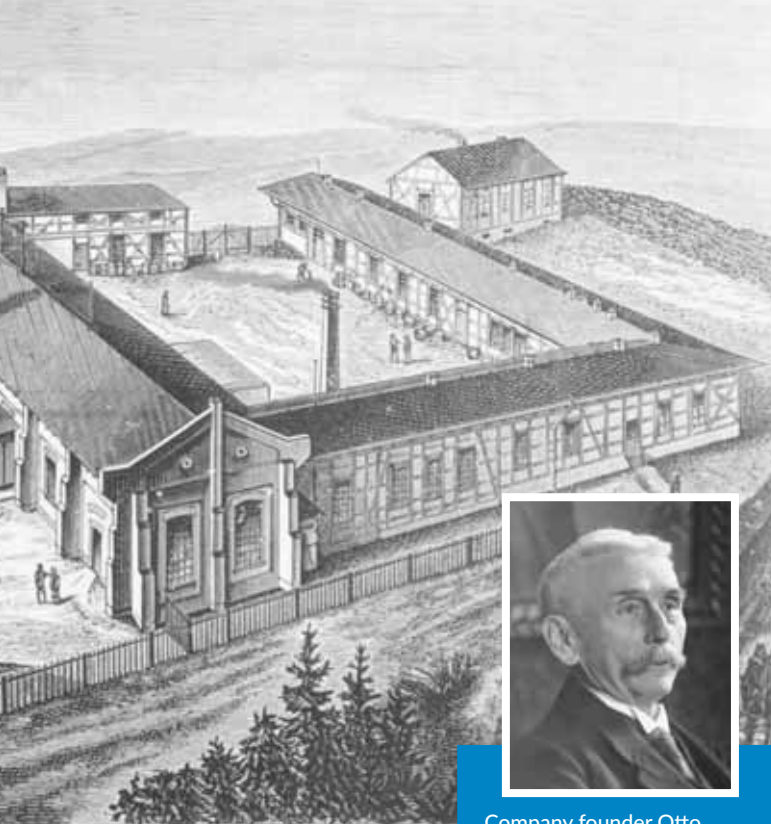


expertise for the Western Allies. The 41 glassmakers opened a new main plant in Mainz in 1952. SCHOTT remained two separate entities for decades to follow: its old headquarters in Jena in the East now a state-owned enterprise (VEB) embedded in the socialist planned economy of the German Democratic Republic (GDR); its new modern plant in Mainz

Photo: ESO



Four out of five mirrors for the Extremely Large Telescope (ELT) from the European Southern Observatory (ESO) are being manufactured using ZERODUR® glass-ceramic from SCHOTT.



Company founder Otto Schott (1851 - 1935) is regarded as the founder of modern glass science and technology.

in the West in the Federal Republic of Germany (FRG). After German Reunification in 1990, SCHOTT also seized the opportunity for reunification. SCHOTT Mainz has gradually established production sites

Pharmaceutical packaging from SCHOTT meets the highest requirements of the pharmaceutical industry.



and sales offices in all major global markets since the 1960s. Its orientation as an international technology group has become increasingly dynamic since the early 1990s with the fall of the Iron Curtain, the end of the Cold War and the onset of globalization. *



By developing innovative CERAN® glass-ceramic cooking surfaces, SCHOTT enables home appliance manufacturers to develop intelligent cooking systems.

Company Presentation

SCHOTT is a leading international technology group in the areas of specialty glass and glass-ceramics. The company has more than 130 years of outstanding development, materials and technology expertise and offers a broad portfolio of high-quality products and intelligent solutions. SCHOTT is an innovative enabler for many industries, including the home appliance, pharma, electronics, optics, life sciences, automotive and aviation industries. SCHOTT strives to play an important part of everyone's life and is committed to innovation and sustainable success.

KEY FIGURES FY 2016/17

- 2.05 billion in global sales
- 15.100 employees worldwide
- Production sites and sales offices in 34 countries

BROAD PORTFOLIO FOR MANY INDUSTRIES

SCHOTT offers a broad portfolio of special glass and glass-ceramics with a variety of properties, shapes and functions. The technology group's experts bend glass, coat it, connect it with metal, let it shine, turn it into powder or make it as thin as possible.

The range of applications extends from the kitchen to the cosmos. SCHOTT has been the world's leading supplier of glass-ceramic cooktop panels since 1971. SCHOTT CERAN® glass-ceramic cooktops bring high-end technology and sophisticated design into every kitchen. SCHOTT is also one of the world's leading manufacturers of pharmaceutical primary packaging. Its glass and polymer ampoules, vials, syringes and cartridges meet the highest quality requirements of the international pharmaceutical industry. Customers also benefit from the fact that SCHOTT manufactures pharmaceutical glass tubing as well, the starting product for producing pharmaceutical primary packaging. Hermetic housings made of glass and metal, ceramic and metal or pure ceramic protect highly sensitive electronic components. Optical glasses are used in high-tech applications in consumer goods optics, electronics, laser technology, medicine and biotechnology, as well as optical fibers in automotive, aircraft and medical lighting solutions. ZERODUR® glass-ceramic has been the substrate material of choice for astronomical mirror telescopes for 50 years. ZERODUR® has SCHOTT once again involved in a unique project: the ESO's Extremely Large Telescope (ELT) will be the world's largest eye on the universe after its completion in 2024.



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WWW.SCHOTT.COM

ŞİŞECAM FLAT GLASS



ŞİŞECAM FLAT GLASS

High-quality products and state-of-the-art technology for industries' multiple types

ARCHITECTURAL GLASS PRODUCTS

ŞİŞECAM ULTRA CLEAR

FLOAT GLASS:

Şişecam Ultra Clear Float

Glass is the low iron clear float glass of Şişecam Flat Glass.

Şişecam Ultra Clear Float Glass is manufactured with reduced iron content thus the greenish tint in standard clear glass is not present when viewed from the edge. With its higher light

transmission and clarity, it gives you the feeling that there is no glass.

The Advantages of the Product Are:

- Higher light transmittance and clarity
- Due to its transparency, the objects displayed behind are seen in their true colors and brightness.
- With its higher light transmission and clarity,

Şişecam Ultra Clear Float Glass offers unique beauty and performance for shop windows, museum displays, atriums, staircases, glass doors, separators, furniture, mirrors, baths, glass elevators etc.

- The greenish tint in standard clear glass is not present with Şişecam Ultra Clear Float Glass when viewed from the edge.

“Şişecam Flat Glass serves many sectors such as construction, automotive, energy, white goods and furniture”

ŞİŞECAM FLAT GLASS

FLOTAL E:

Flotal E is the trademark of ecological mirror of Şişecam Flat Glass. Flotal E is produced copper- and lead-free. During the environment-friendly production process, a lower amount of solid and gas wastes are formed.

Advantages

- Flotal E brightens the interior spaces by reflecting both natural and artificial light sources.
- Flotal E offers aesthetics and spaciousness to the places where it is being used.
- Flotal E provides a new perspective to awkwardly



shaped, dimly lit and tight rooms.

- Flotal E is being produced without copper and lead in paint.
- Less waste is being created thanks to eco-friendly production process.
- The protective wet paint used on top is 100% lead free. The primer contains less than 0.5% lead salt.
- Flotal E has high moisture resistance.
- Flotal E has high corrosion resistance

ISICAM SYSTEMS K SERIES:

Isicam Systems K series is made of high quality heat and solar

control coated Şişecam Solar Low-E Glass. By providing maximum thermal insulation and solar control, it reduces your heating costs in winter and cooling costs in summer.

Advantages

- Compared to ordinary double glazing units, it reduces thermal losses by 50% saving heating costs in winter, and it reduces solar heat gains by 40%, thus reducing cooling costs and saving energy in summer.
- It does not compromise transparency and natural daylight while providing thermal and solar control.

- It prevents cold window fronts in winter and hot window fronts in summer, and delays condensation compared to ordinary double glazing units.
- Compared to ordinary double glazing units, your spending on Isicam K will return you in 1 to 2 years time with your heating costs saved in winter.

ŞİŞECAM TEMPERABLE SOLAR CONTROL LOW-E GLASS:

Şişecam Temperable Solar Control Low-E Glass is Şişecam Flat Glass' heat and solar control glass.

Advantages

- The coating provides heat and solar control properties at the same time.
- Heating and cooling expenses are reduced.
- Provides alternative solutions to projects with its different performance choices.
- In accordance with architectural trends, provides solutions to safety requirements which is rising in line with expansion of the glass surface area and increase in glass thickness. It eliminates the risk of injury by dividing into small pieces which are not sharp, when breaks.



ŞİŞECAM FLAT GLASS

- Reduces condensation on glass surface.
- In winter cold spots, in summer hot spots by windows are eliminated and heat inside the room is radiated equally.

Şişecam Temperable Solar Control Low-E Glass provides comfortable living areas to end users with its thermal insulation and solar control property; also provides best solutions for safety requirements when it is tempered.

- Neutral 70/37; ensures to benefit from maximum daylight in projects such as dwellings, residences, villas and store front glazing where transparency and low reflection are required; also reduces solar energy transmission by 40% compared to ordinary

Insulating Glass Unit and decreases cooling expenses.

- Neutral 58/32; provides solutions for residences, offices and commercial buildings where high light transmission and efficient solar control are necessary.
- Neutral 62/44; is preferred in residences and education complexes where high light transmission is needed.
- Neutral 50/33; provides solutions for green building certified (LEED and BREEAM) projects such as offices, hotels and hospitals where optimum daylight transmission and efficient solar control are necessary.
- Neutral 41/27; is preferred in skylights or warm climate areas where daylight control and more efficient solar protection are required

ŞİŞECAM LAMINATED GLASS:

Şişecam Laminated Glass is laminated safety and security glass of Şişecam Flat Glass. It minimizes risks of injury due to accidental impact.

ŞİŞECAM ACOUSTIC LAMINATED GLASS:

Şişecam Acoustic Laminated Glass is sound insulation glass of Şişecam Flat Glass. Made of at least two glass panes and one PVB (polyvinyl butyral) layer, acoustic laminated glasses are specially developed sound insulation glasses offering effective soundproofing in high-noise environments. Besides the usual security and safety characteristics of laminated glass, it also offers protection against high noise sources. The special PVB layer between two

glass panes in Şişecam Acoustic Laminated Glass absorb sound, blocking undesired noise.

Advantages

- The outdoor noise level can be lowered down to the level of a quiet atmosphere, and thus the quality of life is improved for the individuals.
- Decreases physiological and psychological aspects of noise pollution.

ŞİŞECAM LACQUERED GLASS:

Şişecam Lacquered Glass is a decorative varnished glass which is produced by applying a high quality paint on float glass surface. Şişecam Lacquered Glass is an aesthetic solution for interior design which offers different options to the designers and its users with seven standard colors.



ŞİŞECAM PATTERNED GLASS:

Şişecam Patterned Glass has a texture imprinted onto its surface and used for decorative purposes. One of the most natural materials used in home and office design, glass will bring the shiny touch of the sun to the interiors where you live.

ŞİŞECAM TENTESOL:

Şişecam Tentesol is Şişecam Flat Glass' reflective solar control glass. Şişecam Tentesol is intended primarily for facades and/or windows of commercial buildings, balcony glazing; and provides solutions to interior architecture in terms of partition walls and decorative applications.

Advantages

- Prevents solar heat transmission into buildings, control the luminosity of

sunlight and provides a comfortable working and living environment.

- Reduces the cooling energy consumption and provides savings on cooling expenses.
- Creates mirror effect from brighter direction of light. For example, it provides one way view from inside to outside during day hours and from outside to inside during night.
- With its high reflectance, Şişecam Tentesol offers a uniform appearance for buildings with curtain walls by covering background features such as spandrels, columns, beams, suspended ceilings etc.
- The coating can be placed facing outside (surface 1) or inside (surface 2) of the Insulating Glass Units. Reflectance is emphasized

with first; and color is emphasized with second surface applications.

- Due to its hard coating, it has no shelf life.
- Can be toughened, heat strengthened and bent. Lamination and enameling is also possible.

AUTOMOTIVE GLASS PRODUCTS

As it is one of the most significant parts of the automobiles, automotive glass is special in terms of safety and appearance. On processing side, Şişecam Automotive Glass' most important feature is that it is produced via brief pressing or sag bending.

Şişecam Automotive Glass is made from the highest quality float glass, which have become the standard automotive glass,

sidelining all other flat glass production techniques. In Turkey, float glass is produced at glass furnaces built by Şişecam technical personnel at Trakya Cam Sanayii AŞ. High quality float glass raw materials with suitable composition, impurity and grain size are melted at approximately 1600° C. All grains are then removed from molten glass, which is then homogenized. Molten glass is then spread out onto a molten tin pool through a continuous process and shaped; after a tempering process called annealing, cut in desired sizes, and packaged. At room temperature, glass displays complete elasticity, i.e., it does not exhibit flowing behavior prior to breakage. The endurance of glass is solely determined by the micro cracks created on the surface during usage or as a result of unintentional hits. Glass has no alternative in automobile windows because of its high chemical resistance, scratch resistance, optical excellence, malleability, and its surface that always maintains its shine. Glass is heated before shaping, gaining fluidity in a continuous and rapid fashion depending on heat. High level of control needs to be exerted on shaping temperature and period because of the narrow tolerances regarding the final shape the glass will take. The highest quality



ŞİŞECAM FLAT GLASS



of float glass is the automotive standard. Float glass that will be used in automotive has to meet the high quality requirements of the automotive industry in terms of optical quality, faults arising from melting, and thickness tolerances.

ŞİŞECAM DOUBLE GLAZING:

The double glazings used in the side windows of the buses are produced by combining two panes of Şişecam Tempered Glass with 6-12 mm air space. Through this, effective heat and

noise insulation can be provided in vehicles like buses with large window areas.

ŞİŞECAM ENCAPSULATED GLASS:

After production some Şişecam Tempered Glass is encapsulated as an additional process. By injecting PVC and rubber around the glass that is placed in the encapsulation mould, various profiles are gained to assemble to the vehicle. The subparts that are used to assemble the glass to the vehicle can be affixed

during encapsulation. Via encapsulation, glass gains visibility and impermeability. Perfect sealing is ensured between the glass and the body. Şişecam Encapsulated Glass is generally used on the front and rear fixed windows.

ŞİŞECAM LAMINATED GLASS:

Laminated glass, which is the standard of windshields, can also be used in side and rear windows and sunroofs. Laminated windshields, besides being produced to avoid

accidental injuries resulting from head impacts, are also bound to comply with the superior quality standards.

• Classic Laminated Windshield

The basic windshield is produced by placing PVB layer in between two glasses. Windshields gain various functional features by the assembled subparts.

- **Wire-heated Windshield:** Resistance wires, which are thin enough for not blocking the sight of the driver, are



being placed in between two glasses very delicately. Thus, the windscreen is defrosted and demisted effectively in a very short time. Preferred to be used in the vehicles especially

- **Acoustic Windshield:**

Produced by placing an acoustic featured layer in between two glass. With acoustic feature, traveling comfort is increased via the absorption of both engine and wind noise.

- **Athermique Windshield**

By applying a special coating on the glass, solar energy is reflected back to exterior, thus thermal comfort in the vehicle is improved. By reducing the need for air conditioning, athermique windshield enables to use engine with less power, helps to decrease the vehicle weight and reach the target emission level.

- **ŞİŞECAM SLIDING GLASS:**

Şişecam Sliding Glass is widely used for commercial vehicles.

- **ŞİŞECAM TEMPERED GLASS:**

Şişecam Tempered Glass is mainly used in the windows apart from the windshields. The mechanical endurance of the glass is increased through a special tempering process, and their shattering behavior is changed so as to minimize the risk of injury in the case of a possible accident.

- **Moveable Door Windows**

These include moveable and fixed door windows. They have holes and various parts

depending on their function. Moveable door windows are mounted on the mechanism within the door body through brackets or holes.

SOLAR GLASS

ŞİŞECAM GLASS

- **FOR PHOTOVOLTAICS:**

Şişecam Glass For Photovoltaics is Şişecam Flat Glass' low iron, patterned, tempered glass used in photovoltaic modules. Glass For Photovoltaics is an integral and important component of photovoltaic



preparation and preservation, usage of glass is necessary and indispensable in home appliances sector.

Global warming and energy efficiency are the top most important topics of today.

Glass with functional coatings also gives significant savings in energy plus products.

Toughened/tempered glasses are preferred in home appliances for their mechanical and thermal resistance properties. Toughened/tempered glasses are resistant against heat and impacts and the toughened/tempered glasses break up into small

pieces which are safe in case of a breakage. The brand for Şişecam Flat Glass's toughened (tempered) safety glass is **Şişecam Tempered Glass**.

Float glasses for Refrigerators passes through processes such as edge processing, drilling, groove processing, printing and tempering according to requested specifications.

ŞİŞECAM GLASS FOR OVENS:

Glass is an environment-friendly, healthy, hygienic, esthetic and transparent material. Due to all these features, since basic features of home appliances are food preparation and preservation, usage of glass is necessary and indispensable in home appliances sector.

Global warming and energy efficiency are the top most

modules that generate electricity from solar energy, protecting the internal parts of the modules from environmental factors and directly affecting their efficiency with their high light transfer coefficient. Şişecam Solar Panel glasses has low iron oxide levels, which increases their light permeability compared to normal glass.

Low iron, patterned glass that come in Sandy and Prism patterns reduce reflections on the glass surface and provide maximum efficiency in terms of performance of solar panels with their high light permeability and low reflectivity values. The anti-reflective coating (AR) applied to glass surfaces minimizes light reflection. AR coating increases the light permeability of glass,

leading to a performance increase and greater efficiency in solar panels.

ŞİŞECAM GLASS FOR SOLAR THERMAL COLLECTOR:

Şişecam Glass For Solar Thermal Collector is Şişecam Flat Glass' low iron, patterned, tempered glass used in solar thermal collectors.

Glass For Solar Thermal Collector is an integral and important component of thermal collectors which collects heat by absorbing sunlight to produce hot water. The top layer of solar thermal collectors is made of glass, which protects the internal parts of solar energy systems from environmental effects. Also, its high heat transfer coefficient directly affects the

efficiency of solar thermal collectors.

Low iron, patterned glass that come in Sandy and Prism patterns reduce heat losses and provide maximum efficiency in terms of performance of solar thermal collectors. Şişecam Flat Glass also manufactures sandy-textured patterned glass in size of 190 x 90 cm to meet the needs of patterned glass for solar thermal collectors.

HOME APPLIANCES GLASS

ŞİŞECAM GLASS FOR REFRIGERATORS:

Glass is an environment-friendly, healthy, hygienic, esthetic and transparent material. Due to all these features, since basic features of home appliances are food

important topics of today.

Glass with functional coatings also gives significant savings in energy plus products.

Toughened/tempered glasses are preferred in home appliances for their mechanical and thermal resistance properties. Toughened/tempered glasses are resistant against heat and impacts and the toughened/tempered glasses break up into small pieces which are safe in case of a breakage. The brand for Şişecam Flat Glass's toughened (tempered) safety glass is Şişecam Tempered Glass.

Raw materials used in home appliances glass production, are the brands of Şişecam Flat Glass;

- Şişecam Clear Float Glass
- Şişecam Tinted Float Glass
- Şişecam Patterned Glass
- Şişecam Tentesol
- Şişecam Tentesol Titanium
- Şişecam Ultra Clear Float Glass
- Home appliances glass design with no limits, customized corner and edge work contribute to meet individual requirements, leading color expertise design with a wide variety of color effects according to the requested specifications *

Company Presentation

Operating under the body of **Şişecam Group**, the global player of the glass industry, Şişecam Flat Glass is not only the Turkish flat glass market leader, but also has the distinction of being the largest producer of Europe. **Carrying out its production activities** in its Kırklareli, Mersin, Bursa and Ankara facilities in Turkey, as well as its facilities located in other 9 countries consisting of Bulgaria, Romania, Germany, Slovakia, Hungary, Russia, Italy, India and Egypt, Şişecam Flat Glass is the **5th largest flat glass manufacturer in the world**.

Operating in four main product categories consisting of "architectural glass" (flat glass, frosted glass, mirror, laminated glass, coated glass, glass for architectural applications), "automotive glass", "solar energy glass" and glass for home appliances, Şişecam Flat Glass serves many industries such as construction, automotive, energy, white goods and furniture.

Meeting customers' expectations in its targeted markets, Şişecam Flat Glass carries out its activities by increasing its competitiveness with its qualified and high-quality products, state-of-the-art technology, and its efforts focused on saving energy for environment protection.

SISTER COMPANIES AND PLANTS:

Trakya Glass Rus, Automotive Glass Alliance Rus, Richard Fritz-Aurach Germany, Richard Fritz - Besigheim Germany, Richard Fritz - Malacky, Glasscorp Romania, Şişecam Flat Glass Italy, Richard Fritz - Aszod Hungary, Trakya Glass Bulgaria, Şişecam Automotive Bulgaria, Trakya Cam - Kırklareli Turkey, Trakya Cam - Mersin Turkey, Trakya Polatlı - Ankara Turkey, Trakya Yenişehir - Bursa Turkey, Şişecam Otomotiv - Kırklareli Turkey, Saint Gobain Glass Egypt, HNG Float Glass Limited India

NUMBER OF EMPLOYEES: 6.836 employees

TURNOVER: 3.016.237.618 TRY

YEAR OF COMPANY FOUNDATION: 1961

CAPITAL: 930.000.000 TRY

TRADEMARKS:

Şişecam Clear Float Glass, Şişecam Ultra Clear Float Glass, Şişecam Tinted Float Glass, Şişecam Tentesol, Şişecam Tentesol Titanium, Şişecam High Reflective Glass, Isıcam Systems C, S and K Series, Şişecam Low-E Glass, Şişecam Laminated Low-E Glass, Şişecam Acoustic Laminated Low-E Glass, Şişecam Temperable Low-E Glass, Şişecam Solar Control Low-E Glass, Şişecam Temperable Solar Control Low-E Glass, Şişecam Laminated Glass, Şişecam Ultra Clear Laminated Glass, Şişecam Acoustic Laminated Glass, ,Flotal, Flotal Ultra Clear, Flotal E, Şişecam Lacquered Glass, Şişecam Ultra Clear Lacquered Glass, Şişecam Patterned Glass, Şişecam Mirrored Patterned Glass Şişecam Wired Glass, Şişecam Picture Frame Glass, Şişecam Laminated Glass, Şişecam Tempered Glass, Şişecam Encapsulated Glass, Şişecam Sliding Glass, Şişecam Double Glazing

AREAS OF ACTIVITY:

Architectural Glass, Automotive Glass, Solar Glass, Home Appliances Glass, Şişecam Glass for Solar Panels, Şişecam Glass for Solar Thermal Collectors, Şişecam Glass for Ovens, Şişecam Glass for Refrigerators

INNOVATIONS:

Şişecam Temperable Solar Control Low-E Glass Neutral 70/37
Şişecam Temperable Solar Control Low-E Glass Neutral 58/32

SALES NETWORK:

Wholesalers, processors, hybrids (wholesaler and processor)
Exhibitions: Turkey-Build Istanbul, Eurasia Glass, Solarex Turkey, Glasstech Dusseldorf Germany, Intersolar Munich Germany, Dubai Big 5 Show UAE, Seebbe International Trade Fair Serbia

INTERACTIVITY IN DIGITAL FORMAT:

sisecamflatglass.com

ŞİŞECAM FLAT GLASS

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WWW.SISECAMFLATGLASS.COM/EN

TVITEC



Tvitec Digital Printed



Tvitec

High-performance and eco-efficient glass products in more than fifty countries

Tvitec high-performance and eco-efficient glass products are present in more than fifty countries on all five continents around the world. Tvitec is one of the few industries in Europe and in the United States with capacity to produce large insulating glass units up to 12 meters (oversize glass units).

Tvitec Architectural Products

SINGLE PANES

Duritec. Glass subjected to a heat process (Tempering, Tempering + HST or Heat Strengthened) which increases the thermal and mechanical resistance. The tempered panes get the products as safety glass. In case of

rupture, its fragments will be harmless.

Lamistar. Safety glass formed by two or more pieces of glass joined by an interlayer sheet. The laminated glass could be manufactured with basic panes annealed or "Duritec" to reach the required safety and mechanical characteristics. In



“Tvitec is one of the world’s largest high-performance architectural glass manufacturers for project specialized in façade and building envelopes”

TVITEC



case of rupture of one or both panes, the fragments will remain attached to the interlayer. Besides the ultraviolet rays will be reduced.

Tvitec Printed glass. Glass with colored paints vitrified on one surface and applied with silk screen or digital process. With a thermal process, the resistance, durability and color stability are achieved and the quality of pattern could be warranted over a long period of time. All type of images may be screen printed. **Digital print up to 12.000mm.**

Insulatig Glass Units (IGU)

ISOLAR GLASS.

- TVITEC manufacture has Insulating Glass Units under "ISOLAR" trade mark and according with the most important National Rules. The Double Glazing Units (DGU) and Triple Glazing Units (TGU) are available in dimensions up to 12.000 x 3210 mm and



*Tvitec Isolar Glass.
Insulated Glass Unit*

Tvitec Lamistar



even offers the possibility to integrate smart coating able to meet the necessity of the current market.

- Isolar Neutralux. Insulated Glass Unit (IGU) with Low-e or selective coatings which can reduce the energy exchange thereby

guaranteeing an adequate comfort level on the buildings. The maximum insulating coefficient is equivalent to the one of a brick wall with an energy reduction up to 70% compared to traditional glass. A high combination

of compositions and coatings could reach a high number of light and thermal performances that are able to satisfy all the request of our Clients.

- Isolar Solarlux. Insulated Glass with solar control coating benefits the



Tvitec Oversized glass

building's temperature control and contributes to the energy saving. A large amount of combinations are available.

- Isolar Akustex. Insulated

Glass Units could improve also the acoustic performances and insulate the room from the external noise. These characteristics could be added to the

ones of Neutralux and Solarlux units.

Tvitec Oversized glass

The TVITEC equipment are available for big formats

allowing a clean and continuous façade taking into account the features required for any project. **TVITEC capacity is up to 12 meters for almost any type of process. ***



Tvitec Printed Glass

Tvitec System Glass is an international glass manufacturer which after ten years of activity has become the first Spanish architectural glass transformer. The company and its 500 employees have developed into the world's technology an innovation leader for insulating, safety and digital printed glass. Tvitec was founded in 2008. Its main manufacturing center is located in Cubillos del Sil - León (Spain). Its organizational structure an investment plans are focused on turning Tvitec into one of the world's largest high-performance architectural glass manufacturers for projects specialized in façade and building envelope on a global scale. Tvitec invoiced in 2017 over 92 Million Euros with an important increase in its turnover with respect to the previous year. The major part of these sales were generated in the international market.

Tvitec sees itself as a partner for façade constructors, architects and designers. Tvitec is committed to environmental sustainability, looking for ways to increase energy efficiency and reduce the impact on the environment.

CAPACITIES

Tvitec is one of the few industries in Europe and in the United States with capacity to produce large insulating glass units (mega-jumbos) up to 12 meters.

CUTTING

6 monolithic cutting tables.
4 laminated glass cutting tables.

MANUFACTURE

3 double edge grinding machines.
2 single edge grinding machines.
1 arise edge machine (KSR).
2 CNCs (Numeric Control Machines).
1 CNC drilling machine.
1 CNC for other manufactures.
CNC CHIARA - Edge work, drills, CNC, an other manufactures in units up to 12.000 x 3.210 mm.

DIGITAL FRIT

2 lines to process glass in sizes of 12.000 x 3.210 mm.

CERAMIC FRIT

2 lines for ceramic frit: silk screen frit and roller enameled 100% surface.

TEMPERING FURNACES

1 tempering furnace (6.000 x 3.210 mm)
1 tempering furnace (12.000 x 3.210 mm)
1 Glaston FC1000 double chamber furnace.

LAMINATING LINES

1 Laminating line (6.000 x 3.210 mm)
2 laminating lines (4.500 x 3.210 mm)
Working on the development of a new vacuum laminating machinery up to 12.000 mm.

AUTOCLAVES

1 autoclave size 4.500 x 3.210 mm
1 autoclave size 7.000 x 3.210 mm
1 autoclave size 14.000 x 3.210 mm

IG (INSULATING GLASS) LINES

5 lines up to 6.000 x 3.210 mm
1 line up to 12.000 x 3.210 mm

CNC CHIARA. MANUFACTURE

Edge works, drills and other manufactures in units up to 12.000 x 3.210 mm

PLANT OF VILLENA (ALICANTE)

Equipped with: Single and laminated cutting lines | Grinding machines and CNC machines | Water Jet machine | Laminating line | Autoclave | Tempering furnace | Insulating glass line.

PLANT OF PORTO (PORTUGAL)

Equipped with: Single and laminated cutting lines | Grinding machines | Tempering furnace | Insulating glass line.

HISTORY

Tvitec System Glass is an international company which, after 10 years of activity, has become the first Spanish architectural glass manufacturer one of the leading companies in the European market. Tvitec was founded in 2007-2008 in Cubillos del Sil (León-Spain) and its main manufacturing center is located in this village. Mr Javier Prado is your founder and CEO. Its organizational structure an investment plans are focused on turning Tvitec into one of the world's largest high-performance architectural glass manufacturers for project specialized in façade and building envelopes on a global scale. Since 2008 its turnover has multiplied by 10. Tvitec is one of the "1000 Companies to Inspire Europe", according to a report by London Stock Exchange Group (www.1000companies.com), published by Financial Times.



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Cardinal Glass Industries

Residential glass for
windows and doors with an
“eco friendly” philosophy



“Cardinal Glass Industries designs, manufactures, and supplies glasses for windows and doors for residential customers in the United States and internationally. Its business of manufacturing insulating glass products is fully integrated.”



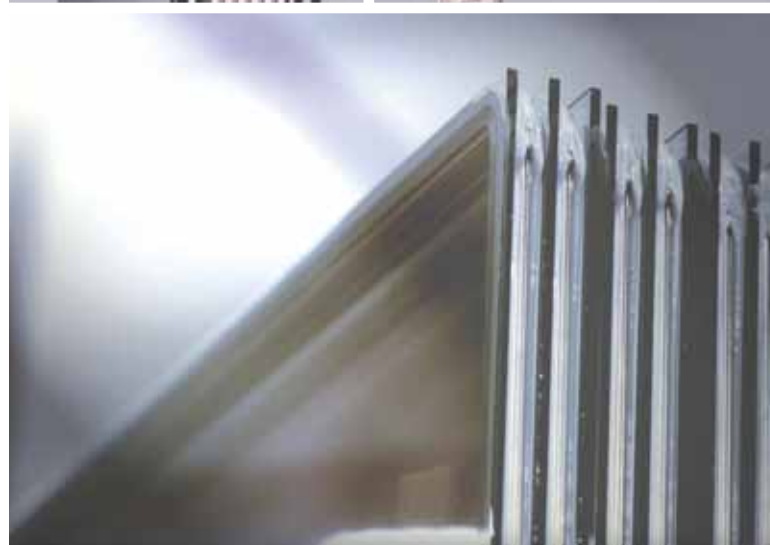
Cardinal's business of manufacturing insulating glass products is fully integrated. Therefore, the company experiences significant gas emissions through the combustion of natural gas in glass melting and the consumption of electrical power in glass coating, tempering and insulating glass fabrication. The company's advanced energy-conserving LoE³ (low-e cubed) insulating glass products help homes to significantly reduce peak and annual energy consumption. The prevention of CO₂ emissions through conservation must also be considered when judging industrial activity

such as Cardinal's. Without the production of efficient glass products, significant emission savings would not be accomplished in the housing sector, which is the largest single consumer of energy in the United States (40% of all U.S. energy is consumed by buildings).

Insulating glass

ENDUR IG™

Endur IG continues the Cardinal tradition of long-term performance. It delivers the industry's lowest failure rate, the only comprehensive 20-year factory warranty plus outstanding thermal performance and solar control. Endur IG is built on the proven technologies that help Cardinal IG units achieve the industry's lowest failure rate – only 0.20% over twenty years – allowing



CARDINAL GLASS INDUSTRIES



the company to offer the industry's only comprehensive 20-year factory warranty, because of the meaning of "endurance".

XL EDGE GLASS

Since XL Edge is a warm-edge IG, the possibility of indoor condensation is greatly reduced. Cardinal also estimates that the real cost for every glass unit a window company replaces is approximately \$200. This includes hard and soft costs for replacement windows, service calls, factory overhead, business disruption, and a damaged customer faith. XL Edge insulating glass comes with the lowest failure rate in the industry – developed in part from Cardinal's 50 years of experience in manufacturing IG units, with nearly 40 years utilizing a dual-seal silicone system.

PRESERVE™

Cardinal IG Company's Preserve™ window film provides an end-to-end solution to dirty and marred windows. Pre-applied on Cardinal insulating glass (IG) units, Preserve Film protects everybody's interests, whether it be the window manufacturer, construction supplier or contractor. After it leaves the production facility, glass can be damaged in shipping and handling. And the job site during construction of a

new home can be a "battlefield". Glass can easily be scratched or damaged.

Preserve is a clear solution to window protection. Factory-applied to both the outer and inner surfaces in overlapping layers, it ensures that the entire glass surface is protected. A recent market research study found that Preserve could save hundreds of dollars per house in cleanup costs. Not exactly pocket change. Finally, because Preserve contains no harmful chemicals or by-products, it can be disposed of with the rest of normal construction site debris.

Coated glass

LOE³-366 GLASS

Cardinal LoE³-366® glass is the ultimate performance glass. It provides the highest levels of year-round comfort and energy savings.

When the temperature soars, ordinary window glass just can't handle the heat. And tinted glass spoils the view. Cardinal LoE³-366, however, has been specially formulated to reject the sun's heat without affecting the view. It lets more light in and keeps more heat out. What's more, LoE³-366 provides exceptional fading protection as well. It blocks 95% of the sun's damaging ultraviolet rays (a leading cause of fading), so it will help furnitures, carpets, curtains and wall coverings stay beautiful for years to come.



LoE³-340 GLASS

The solar performance of LoE³-340 glass is unprecedented in a double-pane unit – no room-darkening tint required. With its SHGC of just 0.18, it greatly reduces oppressive solar heat gain. And wherever glare is a problem, LoE³-340 controls that as well. Then when cold weather rolls around, its low U-Factor reduces indoor heat loss.

When it comes to reducing solar heat gain from the blazing sun, LoE³-340 works efficiently. Tinted glass has several other glaring deficiencies. Regular tinted glass works by absorbing sunlight, so the glass becomes hot in the sun. The color of the glass also changes with its thickness. On the other hand, LoE³-340's appearance and performance remain the same

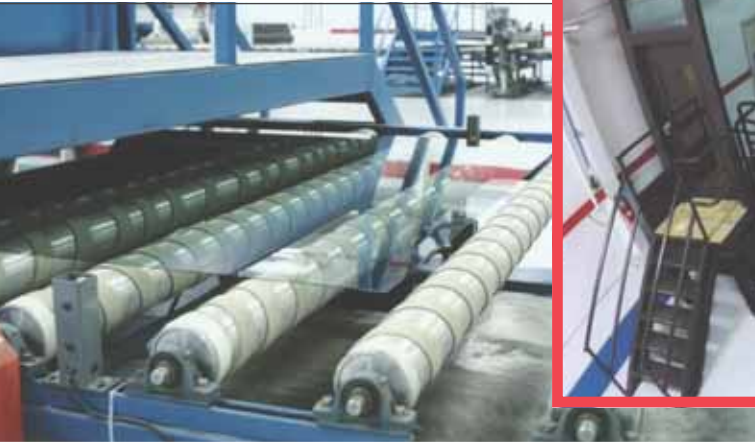
regardless of glass thickness. What's more, LoE³-340 has a very high LSG (light to solar gain ratio) of 2.17. So even though solar gain is being controlled, plenty of visible light is still allowed inside.

LoE² GLASS

A glass for all climates! Cardinal LoE² glass includes two variations, LoE²-272 and LoE²-270. LoE²-272 offers a little more light transmittance, while LoE²-270 gives a little more solar control.

When the temperature is heading to the top of the thermometer, ordinary window glass simply welcomes in the heat. Cardinal LoE², however, has been specially formulated to reject the sun's heat and damaging rays and keep the home cool and comfortable.





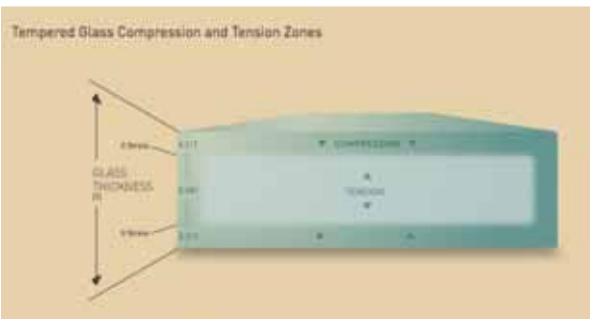
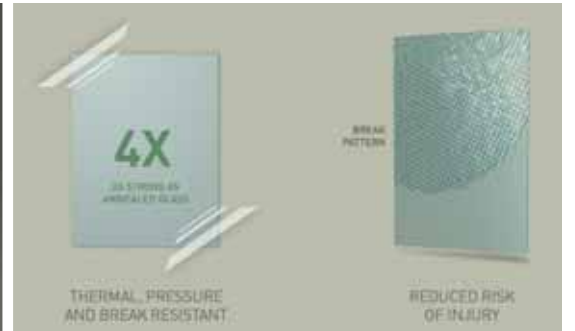
The patented LoE² coating provides high performance solar control and visual clarity. The end result of all this engineering is that Cardinal LoE² provides the ultimate in comfort because it reduces window heat gain by 50% or more when compared to ordinary glass.

Laminated glass

LAMINATED GLASS products from Cardinal LG Company can help, offering a level of security and serenity that can't be realized with ordinary glass. Ordinary annealed glass breaks easily. Tempered glass, while stronger, shatters under a greater impact. But laminated glass is different. If laminated

glass is broken, the vinyl interlayer remains in the frame, with glass fragments adhering to the interlayer. This provides a strong barrier against forced entry and cannot be cut from one side only, which renders glasscutters useless. Cardinal's laminated glass meets rigorous industry codes, including the American Society of Testing Materials standard for preventing forced entry (ASTM F1233) and the burglary resistant guidelines issued by Underwriters Laboratories (UL972). The company's laminated glass is customized to meet the requirements of any security application, providing the best options available.





Custom tempered glass

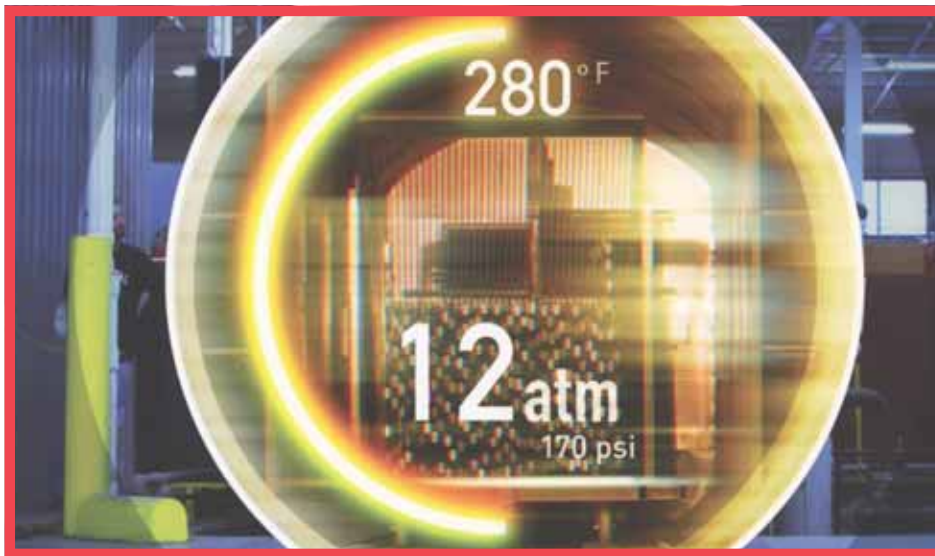
CUSTOM TEMPERED GLASS

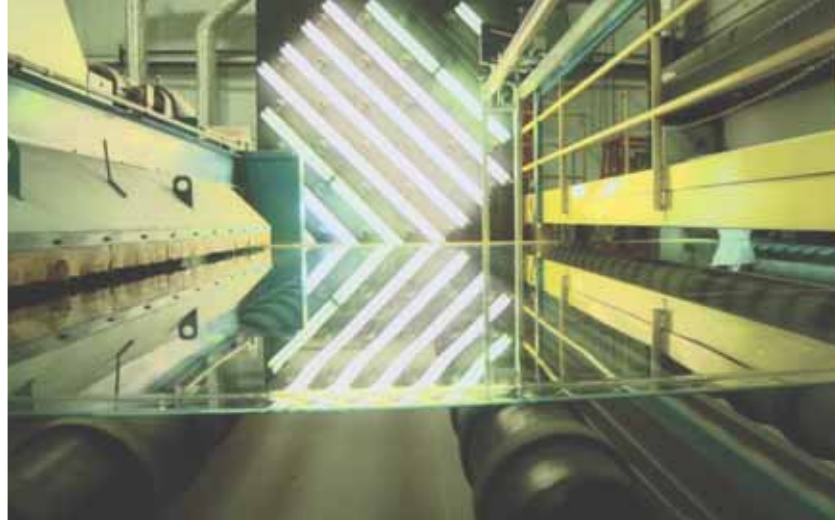
Tempered glass is necessary in situations where safety glazing is required by building codes or toughened glass is needed for high load applications. Cardinal's CT glass operations provide consistent high quality tempered glass that can be made in nearly any configuration.

More importantly the process capabilities allow for the quick delivery and short lead times demanded by today's custom design market. In the tempering process, glass is heated to approximately 1200° F (650° C) and then rapidly cooled with air. This process locks the outer surface of the glass in compression which dramatically

increases the glass strength. When fully tempered this glass is approximately four times stronger than a piece of annealed glass. More importantly, when tempered breaks it dissociates into small pieces which is considered a break-safe pattern. Cardinal's tempered glass meets important safety codes, including ANSI

Z-97.1-2009 and CPSC 16CFR 1201 categories I and II. Heat strengthening is an intermediate level of compression that doubles the strength, and can provide flatter glass with better aesthetics. Heat strengthening is not considered safety glazing as it will break into large shards like ordinary annealed glass.





Float glass

FLOAT GLASS

Cardinal's float glass plants are designed to provide for the demands of residential window manufacturers, which rely on a constant supply of high quality float glass.

Its furnace design gives Cardinal an excellent system for producing float glass in a nonstop environment. The capabilities that have been built into the process allow operations to have

maximum flexibility to produce the many different thicknesses of glass - from 1.6 to 7mm that are required for the residential market.

The need for clean production has resulted in a system that minimizes contact with the glass surfaces during the packing phase. This capping system uses 90° rotators, barrel turnovers, robots and stackers to ensure proper glass orientation for downstream operations. *

Company Presentation

Cardinal Glass Industries is a management-owned S-Corporation leading the industry in the development of residential glass for windows and doors. It has grown to more than 6,000 employees located at 37 manufacturing locations around the United States. Cardinal Glass Industries, Inc., through its subsidiaries, designs, manufactures, and supplies glasses for windows and doors for residential customers in the United States and internationally. It offers coated, insulating, sea-storm hurricane, laminated, and float glasses, as well as fracturing and glass sand products and protective films. The company was founded in 1962 and is based in Eden Prairie, Minnesota with R&D centers in Minnesota and Wisconsin. It also has manufacturing locations in the United States. The company provides a turnkey solution to window manufacturers: whether it starts with insulating glass, coated, laminated, tempered or just plain float glass, it is all designed to provide the latest in applied glass science.

COMPANY STRUCTURE

Cardinal Glass Industries is a corporation with these wholly-owned subsidiaries:

- Cardinal FG Company (float and high volume tempered glass)
- Cardinal CT Company (custom tempered glass)
- Cardinal LG Company (laminated glass)
- Cardinal CG Company (coated glass and optical mirrors)
- Cardinal IG Company (insulating glass)

THE "GREEN" AND "ECO FRIENDLY" VISION

The company is very aware of the importance of such topic as climate change and gas emissions. For Cardinal Glass Industries it is important to be judged on the entire enterprise including the

energy-conserving nature and performance of its products. And is aware of how much energy-efficient windows and doors can do to help. They can significantly reduce energy consumption in both hot and cold climates. Cardinal's generation of carbon dioxide from all of its manufacturing and transportation activities is 1.1 million tons per year. After this point of neutralization, significant conservation of energy and consequently the prevention of the generation of "greenhouse" gases begins to take place. However, its product performance offsets the production emissions and neutralizes its entire carbon footprint in about a year.

HISTORICAL HIGHLIGHTS

- 1962** Founded in Minneapolis, Minnesota by M.L. Gordon.
- 1977** Introduced triple-pane insulating glass for energy savings.
- 1978** Began use of silicone dual-seal insulating glass for improved durability.
- 1983** Introduced LoE™ coatings to produce triple-pane performance in dual-pane construction.
- 1983** Built dedicated factory to supply LoE coatings for residential windows.
- 1987** Introduced argon gas filling of insulating glass units: combined with LoE this provides "quad-pane" performance in a dual pane IG unit.
- 1991** Introduced LoE2® coatings for year-round energy performance.
- 1992** Built first float glass plant to stabilize a glass supply chain for IG and CG plants.
- 1993** Launched XL Edge® glass, a durable, warm edge IG spacer system.
- 2002** Introduction of easier-to-clean LoE2 Plus® glass – built for the busy lifestyle.
- 2002** Preserve® film application launched. Protects windows through the entire construction process.
- 2006** Neat® glass introduced, the next generation of easier-to-clean glazing.
- 2010** LoE-i81®. A durable low-E coating that can be used in exposed applications without the haze attributable to most "hard-coat" products.
- 2011** LoE-180. High solar gain low-E, re-engineered. The highest light transmission and lowest U-factor of any passive solar glazing.
- 2012** LoE-i89®. Energy-saving 4th surface coated glass. It offers more light transmittance and less reflectance than the i81 product.



CARDINAL
Glass Industries

CARDINAL GLASS INDUSTRIES

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Cebrace

From 600 to 920 tons a day: from Brasil the largest furnace of the Americas

With more than 40 years of experience, 3 units spread throughout Brazil and 5 production lines, the company manufactures everything from float glass to self-cleaning glass and industrial refrigeration, and is responsible for the most complete and innovative product line in the Brazilian market.

COMMERCIAL WORKS

Glass solutions for commercial enterprises, such as buildings, malls, hotels, etc.

BIOCLEAN

Self-cleaning glass Bioclean takes advantage of the strength

of UV rays and rainwater to combat the dirt and debris that accumulate outside the glass.

MAIN BENEFITS

- Visually identical to normal glasses;
- The self-cleaning layer is integrated into the glass itself and therefore has a high level of durability, not wearing down over time;
- Requires constant cleaning and use of detergents;
- It ensures a clear view, even on rainy days, because its surface does not accumulate dirt.

APPLICATION

- Monolithic
- Insulated
- Laminate

COOL LITE K LINE

More light, less heat. Selective line of glasses, that is, allow light to enter the environment, barring heat and UV rays.

MAIN BENEFITS

- Neutral appearance;
- Low-e glasses: reduce thermal transfer between two environments.

APPLICATION

- Insulated
- Laminate

COOL LITE S LINE

Line of sun protection glasses that block heat and UV rays.

COME BACK

MAIN BENEFITS

- Reduces heat input by up to 80%;

“The mix of products of Cebrace includes flat glass, safety glass, mirrors, among other types”

- Prevents UV penetration by up to 99% (when laminated);
- It allows greater visual comfort, as it avoids glare.

APPLICATION

- Monolithic
- Insulated
- Laminate

COOL LITE SK LINE

Much more light, much less heat. Glass with high selectivity and performance: allow great passage of light, barring heat and UV rays.

MAIN BENEFITS

- Low reflection;
- Low-e glasses: reduce thermal transfer between two environments.

APPLICATION

- Insulated
- Laminate

EMERALD

Intense green float glass, which allows thermal control without the use of reflective layers. Sun protection with excellent light transmission.

MAIN BENEFITS

- Excellent passage of light, from 71% to 62%, according to thickness;
- Low reflection, compared to reflective glasses;
- Average reduction of 40% of the heat, in relation to the colorless glass of the same thickness;
- It allows greater visual comfort, as it avoids glare.

APPLICATION

- Monolithic
- Insulated
- Laminate

INTERIOR ARCHITECTURE

Glasses and mirrors to decorate spaces.

COVERGLASS GLASS

With a lot of brightness and a colorful finish, Coverglass is one of the favorites of the decoration market and the furniture industry. Painted glass is available in white, extra-white, black and red-opera

colors.

MAIN BENEFITS

- Varnished and sophisticated appearance;
- Provides a quick renewal of the environment, as it is easy to install;
- Contemporary and versatile solution, can be used in homes, shopping malls, hotels, hospitals, shops, among other places.

APPLICATION

- Monolithic
- Laminate

DIAMANT

Diamant is an extremely transparent glass, without the greenish tint common in ordinary glasses. The highlight is due to its great neutrality and superior light transmission, which transmits more vivid and real colors.

MAIN BENEFITS

- Can be combined with any kind of glass and laminate with PVB, EVA or resin;
- The only glass that allows a true and natural reproduction of the colors white and pastel when enamelled, varnished or silkscreen.

APPLICATION

- Monolithic
- Laminate

PRISMA EXTRA

Thick glass, with thicknesses of 12 mm, 15 mm and 19 mm, that can be applied in the most diverse forms, giving modernity

and sophistication to the projects.

MAIN BENEFITS

- Uniform color;
- Ease in cutting;
- Because it is thicker, it has greater mechanical resistance.

APPLICATION

- Monolithic
- Laminate

MIRAGE 3G

Mirror consecrated in the market, indicated exclusively for the furniture industry and for applications reduced with frame.

MAIN BENEFITS

- Does not distort the image;
- Free of copper and lead.

APPLICATION

- Monolithic
- Laminate

RESIDENTIAL WORKS

Sun protection glasses for homes that reduce the heat input to the environment by up to 70%.

LINHA HABITAT

A line of sun protection glasses for homes, which reduces indoor heat of up to 70% and blocks almost 100% of UV rays.

MAIN BENEFITS

- Reduction of heat within environments;
- By blocking UV rays it protects furniture, curtains and carpets from fading early;
- Differentiated design;
- Reduces the use of air



conditioning and artificial lighting.

APPLICATION

- Monolithic
- Insulated
- Laminate

ELECTRICAL SYSTEMS

Low-e (low-emissive) glasses for commercial refrigeration and appliances.

PLANITHERM

The Planitherm 1.3 T is low-e glass ideal for use in doors of freezers and refrigerators. With high optical quality, it conserves the foods and drinks inside the equipments without fogging.

MAIN BENEFITS

- Allows high light transmission (77%), providing better visualization of the products;
- It has the reflection comparable to a colorless glass;
- Reduces heat input by more than 40% even when used outdoors;
- Ideal for passive cooling;
- Prevents condensation of the glass without the need for electric heating, saving energy.

APPLICATION

- Insulated
- Laminate

REFLECTA FLOAT

Conveys brightness and elegance through its modern and mirrored appearance.

MAIN BENEFITS

- When applied on oven doors it helps in performance, since it conserves the internal heat.

APPLICATION

- Monolithic
- Laminate

TEC GLASS

Low-e (low-emissive) glass is the best choice for applications that require good thermal performance and low emissivity. Glasses can be applied for temperatures ranging from + 7 ° C to -25 ° C.

MAIN BENEFITS

- Glass of neutral color, which allows a clear view of the exposed products;
- When energized, the Tec guarantees the maximum performance in the control of the thermal insulation;
- Economical, since a unit of double glass Tec exceeds a unit of colorless glass;
- Easy processing and storage.

APPLICATION

- Monolithic
- Insulated
- Laminate

TRANSPORTS

Glasses for road, air and sea transportation

FLOAT

Cebrace offers glazing for air, road and maritime transport vehicles

Increasingly, the means of transport value comfort and



Company Presentation

Cebrace is a joint venture between french group Saint Gobain and the japanese NSG/Pilkington and its manufacturing process unites the know-how and technology of these two worldwide giants of the glass industry. Established as market leader in the Brazilian flat glass sector. With more than 40 years of experience, 3 units spread throughout Brazil and 5 production lines, the company manufactures from float glass to self-cleaning and industrial cooling glass, being responsible for the most complete and innovative line of products of the national market.

Leader in the production of flat glass in Brazil, the company is also the largest producer of windows and mirrors in South America, its main market abroad, Central America and Africa. The mix of products of the company includes flat glass, safety glass, mirrors, among other types.

Through the year 2009 Cebrace invested € 60 million in the improvement and enlargement of the furnace of the plant located in Jacareí (SP). The new furnace had the capacity increased from 600 to 920 tons a day, becoming the biggest one in the Americas and one of most modern of the world.

The reconstruction of the C-1 furnace, main equipment used in the process of manufacturing of glass, is made every 12 years. With the enlargement, the Jacareí plant had its capacity increased to 1500 tons of glass a day.

Cebrace also operates units in Caçapava (SP) and Barra Velha (ES), each one with a daily production of 600 tons. The plants of Jacareí and Barra Velha are aimed at the sectors of civil construction and decorations and the unit of Caçapava aims at the car industry. The three units employ 850 employees..

HISTORY HIGHLIGHTS

1974 FOUNDATION

Founded on May 14 under the name of CEBRACE - Companhia Brasileira de Cristal, in Jacareí, interior of SP.

1982 FLOAT LINE START

On November 11, 1982, the industrial park began its activities through the first float glass line in Brazil, called C1.

1989 LAUNCH OF THE FIRST GLASS OF SOLAR PROTECTION

Cebrace begins the production of the first solar protection glass in the country. This year, the second line (C2) of float glass is also inaugurated in Caçapava, in the state of São Paulo.

1996 THIRD FLOAT GLASS LINE INAUGURATED

Inaugurated the third float glass line, in Jacareí (C3). The Cool Lite solar protection glass begins to be manufactured.

1998 INAUGURATED LINE OF MIRRORS

Mirage line of mirrors in Caçapava is inaugurated, now known as Mirage 3G.

MAIN BENEFITS

- Acoustic protection;
- Protection against UV rays;
- Safety;
- Interior decoration.

APPLICATION

- Monolithic
- Laminate *



interaction with the external environment. Therefore, the increase of glazed area has been remarkable in boats, buses, trains, automobiles and subways.

1999 LAUNCHED LAMINATED GLASS LINE

Cebrace launches the laminated glass line for civil construction.

2001 OPTIMIRROR MIRROR RELEASED

The Mirror Optimirror - currently known as Mirror Cebrace - begins to be produced in Caçapava.

2004 INAUGURATED THE FOURTH PRODUCTION LINE

Inaugurated the C4, fourth production line, in Barra Velha, Santa Catarina. This extends the company's productive capacity to 800 thousand tons / year.

2005 LAUNCH OF REFLECTA FLOAT

Launch of the Reflecta Float, sun protection glass with great versatility in the application.

2006 LAUNCHING OF SPECIAL GLASSES

Cebrace launches special glasses: Bioclean (self-cleaning) and Optiview (anti-reflection)

2007 ECO LITE RELEASE

Taking into account the needs of the market, Cebrace begins to produce the Eco Lite, sunscreen that looks like a regular glass.

2008 NEW PRODUCTS AND NEW LOGO

Cebrace brings to Brazil the Cool Lite KNT and Cool Lite SKN sun protection glasses used in the largest works in the world. In this same year Cebrace has its redesigned logo. Becomes a founding member of the Green Building Council Brazil (GBC).

2009 NEW PRODUCTS AND REFORM OF THE FIRST FLOAT LINE

Launch of Planitherm and Tec products (both low-e), Diamant (extra-clear) and Prisma (extra-thick). In 2009 Cebrace reformed the C1, increasing the productive capacity to 900 tons / day.

2010 LAUNCH OF COVERGLASS PAINTED GLASS

Cebrace launches Coverglass painted glass and inaugurates a Distribution Center in Fortaleza, CE.

2012 INAUGURATION OF THE FIFTH PRODUCTION LINE

Inauguration of C5, fifth float glass production line, in Jacareí, SP.

2013 INAUGURATION OF THE NEW LINE OF MIRRORS AND COATER

Cebrace inaugurates in Caçapava the first line of mirrors in Latin America capable of producing in jumbo size. Inauguration, in Jacareí, of the largest coater of the NSG / Pilkington and Saint-Gobain groups.

2014 CEBRACE: 40 YEARS OF HISTORY

Cebrace celebrates 40 years launching a book with of the history of glass and of the company.

2015 PRODUCT BREAKING

The launch of Cool Lite KS, a sun protection glass specially created for the Brazilian market. Cebrace also launches the Cool Lite KBT, both belonging to the K-Line, of selective sun protection glasses.



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Main Event of
Russian Glass Industry



MINPROMTORG
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MIR STEKLA

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Advertising 12+





Corning is one of very few manufacturers with deep capabilities in materials science, optical design, shaping, coating, finishing, and assembly. For customers, this means reduced complexity, shortened manufacturing cycles, and ultimately, increased value.

Display Glass

Corning Advanced Optics manufactures precision optical systems for inspecting the patterned glass used in flat-panel televisions, cell phones and other consumer electronics.


Additionally Advanced Optics offers laser cutting systems used to cut display glass and other brittle materials. Products include:

CORNING® EAGLE XG® SLIM GLASS substrates enable panel manufacturers to innovate for thinner, lighter, and more environmentally conscious display panels. EAGLE XG Slim Glass delivers dimensional stability and exceptionally clean, smooth, flat surfaces – qualities essential to the successful manufacturing of LCD displays.

The glass composition includes no added heavy metals, reducing the environmental impact of manufacturing. EAGLE XG Slim Glass also features exceptional thinness, helping panel-makers reduce or completely avoid the potential environmental and health hazards associated with panel thinning. EAGLE XG Slim Glass is available in 0.25 mm up to Gen 5.5, 0.3 mm up to Gen 6, 0.4 mm up to Gen 8.5, and 0.5 mm up to Gen 10.5 to enable thinner, lighter, and curved

display panels. By working in close collaboration with its customers, Corning developed a substrate that withstands the demanding manufacturing process involved in creating high-performance displays.

LOTUS NXT GLASS provides industry-leading levels of low total pitch variation, outperforming competitor products using this metric by up to 45 percent. This results in brighter, more energy-efficient displays with higher resolutions



Corning

When glass meets materials science

“Corning is one of very few glass manufacturers with deep capabilities in materials science, optical design, shaping, coating, finishing, and assembly.”

for consumers and better yields for panel makers.

Thermally and dimensionally stable, Lotus NXT Glass is formulated to perform exceptionally well in OLED and high-resolution LCD manufacturing processes that use either low-temperature poly-silicon (LTPS) or oxide thin-film transistor (TFT) backplanes. As the mobile display market looks more and more to OLED technology, Lotus NXT Glass continues to emerge as this industry's display-glass leader for rigid and flexible OLED



Corning Lotus™ XT Glass

CORNING



Corning Incorporated World Headquarters-Corning, N.Y



Corning Iris™ Glass

panels. Lotus NXT Glass is an ideal solution for two glass layers within a rigid OLED panel: the substrate and encapsulant. And while flexible OLED panels generally use a plastic substrate to enable curved – and even bendable – device designs, these plastic panels rely on a display-quality carrier like Lotus NXT Glass to thrive through the demanding manufacturing process.

CORNING IRIS™ GLASS offers outstanding dimensional stability while ensuring superior optical performance that

enables manufacturers to offer thinner TVs.

Large, bright, colorful displays rely on the uniform and pure distribution of light; the trend to thin has become limited by challenges using polymer light-guide plates (LGP).

An LGP is used in the back-light of edge-lit LCD displays to distribute light evenly throughout the display, a key factor in a crisp, brilliant image. Polymer LGPs lack the dimensional stability required for ultra-slim displays. When a polymer LGP is subjected to heat and humidity, the

material can warp and expand, compromising its opto-mechanical performance. The instability of polymer requires designers to add a wider bezel and thicker backlight with air gaps to compensate for this movement. Replacing polymer with glass solves this problem, but standard glass compositions have not met the optical requirements, until now. Color purity is another key requirement of an LGP. A combination of Corning's proprietary fusion process and Iris™ Glass' composition positions Corning's light-guide plate offering to achieve color shift performance that matches the best-in-class material.

Pharmaceutical Glass

Corning Pharmaceutical Glass is a world-leading supplier of high-quality glass tubing to the pharmaceutical packaging industry.

Glass is the ideal material for pharmaceutical applications. With over 160 years of unparalleled glass expertise, Corning Pharmaceutical Glass is uniquely suited to supply high-quality pharmaceutical glass tubing to meet the rigorous needs of the pharmaceutical packaging industry. Corning Pharmaceutical Glass operations in the United States and Europe manufacture a variety of clear and amber borosilicate glass tubing,

which is converted by global customers into glass vials, cartridges, ampules and syringes for drug storage and delivery.

CORNING VALOR™ is a revolutionary pharmaceutical glass package.

Valor™ pharmaceutical packaging meets USP Type I hydrolytic criteria with a pristine, chemically durable drug contacting surface.

The composition and uniform interior surface of Valor™ containers eliminate delamination and have low extractable concentrations – making them ideally-suited to protect drug products.

Potentially harmful elements such as arsenic are not added to the Valor™ Glass composition.

Valor™ packaging is the ultimate solution for all pharmaceutical filling environments. It is inherently strong and damage resistant, making it better able to withstand extreme events during pharmaceutical processing and field applications. These more robust vials and containers also reduce down time due to glass-related interventions and provide enhanced protection for medicines in the hands of end users.

Valor™ containers are extremely damage resistant and significantly reduce particle generation, and have demonstrated up to a 96% reduction in peak particle

counts on commercial filling lines, substantially reducing risk of particulate contamination. Valor™ is engineered with higher internal energy than conventional packaging. Damage introduced on filling lines or during shipping can create sub-visible flaws and cracks in conventional pharmaceutical packaging that can compromise drug

product sterility and result in serious contamination. Valor™ is uniquely designed to prevent cracks and improve the quality of pharmaceutical packaging. This brings a higher level of protection to parenteral drugs and reduces the likelihood of global drug product recalls, supply interruptions, and drug shortages. In addition to eliminating

delamination and dramatically reducing the probability of cracks, breaks and the risk of contamination by glass particles, the Valor™ pharmaceutical packaging technology enables smoother filling operations. Use of Valor™ containers reduces line interventions, enabling lines to run at much higher speeds with improved yields. This results

in more reliable access to medicines for patients around the world.

Those are the variants for the **PHARMACEUTICAL GLASS TUBING** area:

- **CORNING® 51-L TUBING**
Amber borosilicate glass tubing - Thermal expansion coefficient 51
- **CORNING® 51-D TUBING**
Clear borosilicate glass

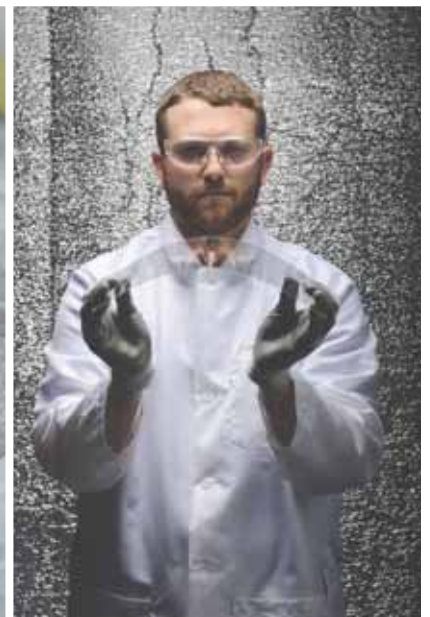


Corning® Gorilla® Glass



Gorilla® Glass 4:
And up to 2 times better than competitive Aluminosilicate glass designs.

CORNING



Corning® Willow® Glass



tubing formulated for closed ampules - Thermal expansion coefficient 51

- **CORNING® 51-C TUBING**
Clear borosilicate glass tubing with cerium added for gamma sterilization - Thermal expansion coefficient 51
- **CORNING® 51-A TUBING**
Amber borosilicate glass tubing - Thermal expansion coefficient 51
- **CORNING® 33 TUBING**
Clear borosilicate glass tubing - Thermal expansion coefficient 33
- **CORNING® 51-V TUBING**
Clear borosilicate glass tubing - Thermal expansion coefficient 51
- **CORNING® 51-L TUBING**
Amber borosilicate glass tubing - Thermal expansion coefficient 51



- **CORNING® 51-D TUBING**
Clear borosilicate glass tubing formulated for closed ampules - Thermal expansion coefficient 51
- **CORNING® 51-C TUBING**
Clear borosilicate glass tubing with cerium added for gamma sterilization - Thermal expansion coefficient 51
- **CORNING® 51-A TUBING**
Amber borosilicate glass tubing - Thermal expansion coefficient 51
- **CORNING® 33 TUBING**
Clear borosilicate glass tubing - Thermal expansion coefficient 33
- **CORNING® 51-V TUBING**
Clear borosilicate glass tubing - Thermal expansion coefficient 51
- **CORNING® 51-L TUBING**
Amber borosilicate glass

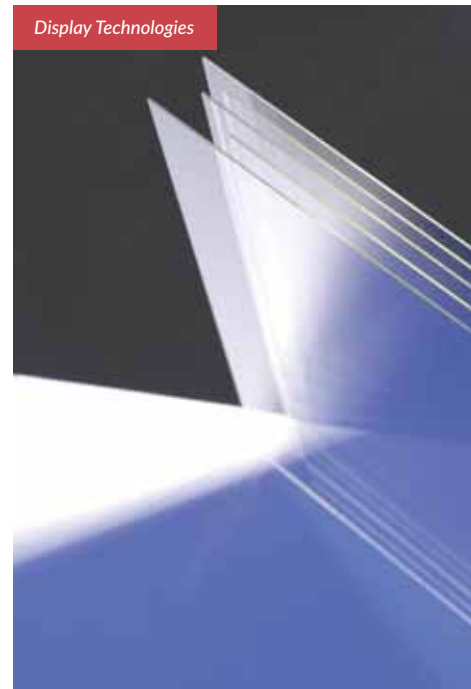
tubing - Thermal expansion coefficient 51

- **CORNING® 51-D TUBING**
Clear borosilicate glass tubing formulated for closed ampules - Thermal expansion coefficient 51

Medical Optics

Corning Advanced Optics has several different products that touch the medical optics market from optical fiber to full detection systems. Advanced Optics is working in applications spaces such as DNA sequencing and hyperspectral imaging, just to name a few. Advanced Optics also supports other Corning entities for optical design and integration for full systems such as the Corning Epic® BT System. Integrated advanced optical

Display Technologies



sensor solutions and complete opto-mechanical solutions for Products include:

CUSTOM OPTICAL COMPONENTS

- Corning produces reflective and refractive optical components including aspheres and free-forms;
- Corning has extensive experience with aspheric fabrication and testing: focal point testing with true conics, reflective null design and fabrication for higher order aspheres, and the use of computer generated holograms (CGH's);
- Free-form (*geometries*) — Corning engineers are experienced with producing complex free-form optical surfaces up to Ø1 m;
- Volume Production — Corning has capacity and experience

to optimize fabrication processes for volume production requirements;

EOIR SYSTEMS

- Corning's EOIR systems include:
- Active Illumination: for targeting, LIDAR, or free-space telecommunication;
- Passive Imaging: single or multiple waveband systems for Intelligence, Surveillance and Reconnaissance (ISR);
- Hyperspectral and multispectral: Visible through long wave systems for security and ISR applications;
- Field of View (FOV) switching for multiple field of view applications (Corning has built systems with over 5 FOVs in a single payload);
- Zoom systems up to 30X with thermal compensation;
- Passive or Active Thermal compensation demonstrated on tactical and space-based systems;
- Weight reduction through extensive light-weighting and optical design optimization;
- Reflective, Absorptive, and Multi-band Filters can be included in multi-element filter wheels, which could include calibration and reference standards.
- Hyperspectral Imaging
- Opto-Mechanical Assemblies
- Telescope Mirror and Lens Blanks

DIAMOND TURNED OPTICS

The Corning Specialty Materials facility in Keene, NH is one of the world's largest diamond-turning manufacturing operations. The proprietary diamond-turning process produces surfaces with drastically reduced or eliminated diffraction effects typically associated with diamond turning. This eliminates the need for post polishing which, in turn, reduces manufacturing time and costs, and also avoids the potential risk of altering the surface figure.

Diamond-turned reflective, refractive, and diffractive optical systems are manufactured for use in variety of military, aerospace, and commercial applications including tactical aircraft targeting, night vision, missile guidance, hyperspectral imagers, helmet mounted displays, medical, analytical instrumentation, and semiconductor optics.

PRECISION DIAMOND TURNING CAPABILITIES

- Geometries (Spheres, Aspheres, Flats, non-rotationally symmetric freeforms,
- diffractives, mirror arrays);
- Corning can achieve very accurate optical surfaces
- (~1/4 wave at 0.6328 um or better depending on the design);

- Surface Finishes down to ~35 Å rms or better depending on base material and design;
- White Light Interferometer, Profilometer, and Aspheric Null Testing;

OPTO-MECHANICAL ASSEMBLIES

Corning designs and fabricates opto-mechanical assemblies to meet customer's demanding performance requirements. The OM solutions create value across many applications and environments.

- All designs are optimized for manufacturability, performance and quality;
- Tolerance analysis and fabrication experience are utilized to minimize adjustment during integration;
- A proven track record for producing systems: on budget, on schedule, and at specification;
- Corning utilizes optical and mechanical models to verify performance, fabrication, and test conditions;
- Prototype through volume production capacity and capability.

TROPEL UCAT UV

MICRO-OBJECTIVES

Corning's Tropel® μ CAT™ family of catadioptric, long working distance micro-objectives are designed for use down to Deep Ultraviolet wavelengths. The μ CAT's

superior design attributes outperform Schwarzschild objectives. Before considering an all-mirror system, take a closer look at the Tropel μ CAT. The μ CAT design incorporates reflective and refractive elements, resulting in a micro-objective with high numerical aperture, long working distance and low obscuration. High resolution and advantaged light collection, with a working distance that can work with a pellicle, the μ CAT's features combine performance and flexibility in a cost effective solution.

All materials selected for use in the μ CAT objectives are ultra-low outgassing to minimize sources of contamination.

ULTRA-LOW EXPANSION GLASS

ULE® 7972 is a titania-silicate glass with near zero expansion characteristics that have made it the material of choice in unique applications such as machine tool reference blocks, gratings, reference blocks, interferometer reference mirrors, to telescope mirrors. ULE® glass is a single-phase, supercooled liquid with a CTE very near 0 ppb/K.

EUV ULE® 7973 glass has been tailored to meet the needs for mask and optical substrates for EUVL applications.

The lithography transition from 193nm to 13.4nm required a major design shift in stepper

optics from refractive to reflective. In reflective optics, substrate materials should be purely passive. The incident light should reflect off of the multilayer coatings of the optics and the photomask without the introduction of any mechanical or optical distortion caused by the underlying substrate. To minimize distortion from the minute temperature changes and meet the stringent EUVL specifications, the substrates must have a near-zero coefficient of thermal expansion (CTE) and low peak-to-valley (P-V) CTE

variations. The extremely low CTE requirements are specified in parts per billion per degree kelvin (ppb/K). The demanding CTE requirements are forcing improvements in metrology as well and Corning continues to improve metrology methods to meet EUVL demands. Discrete tailoring of the zero cross-over temperature is possible. TSGTM 7972 Low Expansion Glass is the third member of Corning's titania silicate low expansion glass family. TSG has a relaxed absolute

coefficient of thermal expansion (CTE) requirement for those applications that do not require a near zero-expansion material.

Analytic Instruments

Corning Tropel manufactures a complete line of non-contact metrology instruments that measure surface form for flatness, parallelism, height, depth, surface finish, roughness or thickness, with sub-micron to nanometer accuracy in just seconds. Tropel systems are designed to operate in a wide range of environments, from the shop floor to the QC lab.

The Corning OEM Instruments group provides specialized value added engineering and manufacturing services. For over 30 years the company has provided robust measurement solutions for the semiconductor industry, together with highly specialized expertise in optical, mechanical, electrical and software, systems integration, engineering, design and manufacturing solutions. The focus is on helping customers make the leap from prototype to market ready product in a cost effective and timely manner.

The company serves the following markets: automotive, display, semiconductor, hydraulics, pneumatics, data storage, consumer electronics, and spectroscopy..

Products include:

CORNING TROPEL® ULTRAFLAT 200 MASK SYSTEM

The Tropel® UltraFlat™ 200 Mask System was designed specifically for the photomask industry. It delivers the lowest measurement uncertainty for ever-tightening mask flatness specifications. Shrinking device features require not only flatter wafers, but flatter masks. The UltraFlat™ system is used to measure flatness of photoblanks and photomasks throughout every stage of manufacturing and use, including substrate polishing, coating and patterning to analyze film stress, and verification.

The UltraFlat™ system utilizes near-normal incidence interferometry, rock-solid structural design, state-of-the-art optical fabrication techniques and Tropel's renowned phase-shifting analysis software to deliver 20 nanometer measurement uncertainty.

The system is National Institute of Standards and Technology (NIST)-traceable and provides measurements that conform to SEMI standards. An automated photomask handling and measurement configuration is also available.

TROPEL® FLATMASTER® MSP

The Tropel® FlatMaster® MSP (Multi-Surface Profiler) is a frequency stepping



interferometer that provides fast and accurate metrology for semiconductor wafers up to 300mm in diameter. In seconds up to 3 million data points are collected with sub-micron accuracy enabling total thickness and flatness characterization over the entire surface.

The FlatMaster MSP provides robust metrology for a variety of applications from complex components and assemblies to transparent materials and wafer metrology. The FlatMaster MSP-DH is configured to simultaneously measure two sides of a component or assembly providing absolute thickness and parallelism measurements.

The ability to measure flatness, thickness, and thickness variation of 300 millimeter glass and silicon wafers is critical for successful integration of 3DIC assemblies. Traditional contact probes or conventional interferometry systems are too slow or do not have the necessary accuracy for larger fields of view.

TROPEL® WAFER ANALYSIS SYSTEMS

Corning Specialty Materials has a long heritage of providing solutions to semiconductor equipment manufacturers. The TropeL line of wafer analysis equipment enables measurement of wafer



Erwin Manufacturing Plant, Erwin, N.Y.



Sullivan Park Research and Development Center, Erwin, N.Y.



substrates from 2" to 450mm regardless of material type and surface finish.

The continued demand for higher-density chips with smaller critical dimensions leads to tighter substrate form tolerances both on the global scale and on the individual die-site scale. Corning Tropel® has optimized the patented interferometry technologies for the highest-precision wafer flatness measurements. All Tropel® wafer systems measure flatness, taper, thickness variation, thickness, stress, bow, warp, SORI, and all SEMI standard parameters including stepper simulation of any wafer surface.

FLATMASTER® WAFER SYSTEM

The FlatMaster® Wafer System is ideal for processes development, regardless of material type. Combined with the state-of-the-art optical fabrication techniques and Tropel's renowned phase-shifting analysis software, the

FlatMaster Wafer system offers full-form surface information with 50 nanometer accuracy in seconds.

TROPEL® FLATMASTER® SYSTEM

The Tropel® FlatMaster® provides industry-leading performance of surface form measurements for precision-component manufacturers. This non-contact optical technique records the entire surface in seconds.

The FlatMaster® offers five-nanometer resolution and a standard accuracy of 50 nanometers (2.0 μm). It rapidly and accurately measures flatness, line profile, radius, and other surface parameters from a variety of surfaces.

Several standard versions of the FlatMaster® are available to optimize accuracy over different component size ranges. The FlatMaster® 40, 100, and 200 measures parts up to 40 mm, 100 mm, and 200 mm respectively. *

Company Presentation

Corning is one of the world's leading innovators in materials science, with a 166-year track record of life-changing inventions. It applies its unparalleled expertise in glass science, ceramics science, and optical physics - along with its deep manufacturing and engineering capabilities - to develop category-defining products that transform industries and enhance people's lives. Corning succeeds through sustained investment in RD&E, a unique combination of material and process innovation, and deep, trust-based relationships with customers who are global leaders in their industries. Corning's world headquarter is located in the namesake city in the New York country side.

The company has five major business sectors: Display Technologies, Environmental Technologies, Life Sciences, Optical Communications, and Specialty Materials. As an integrated supplier, Corning Advanced Optics is one of a few manufacturers with deep capabilities in material science, glass melting/forming, optical design, finishing, coating, and assembly. For customers, this means less complexity, shortened manufacturing cycles, and ultimately, increased value.

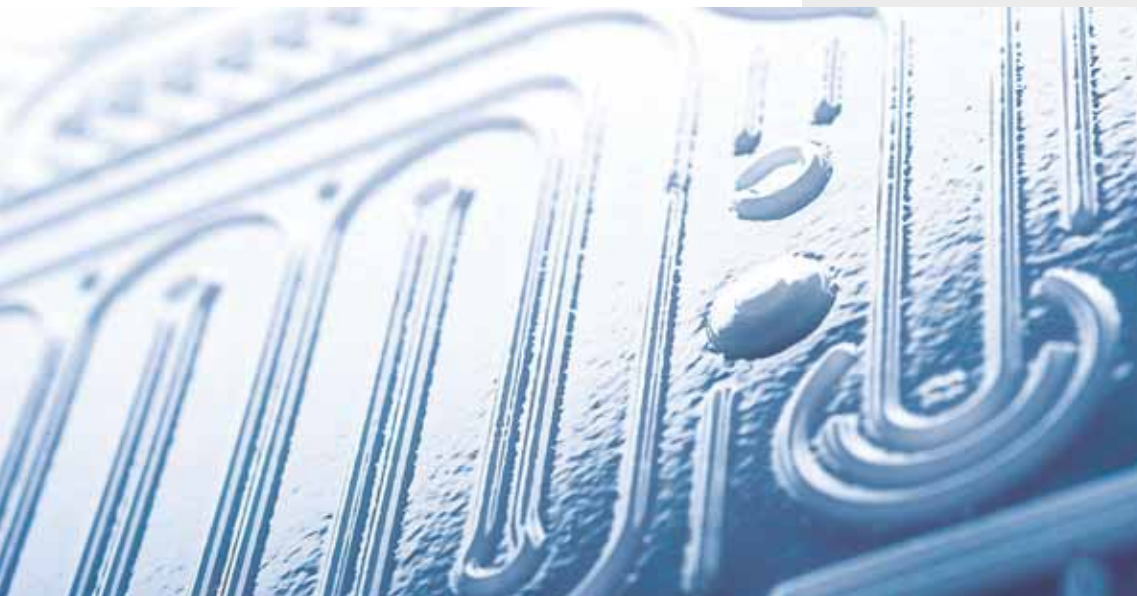
Corning's capabilities are versatile and synergistic, which allows the company to evolve to meet changing market needs, while also helping its customers capture new opportunities in dynamic industries. Today, Corning's markets include optical communications, mobile consumer electronics, display technology, automotive, and life sciences vessels. Corning's industry-leading products include damage-resistant cover glass for mobile devices; precision glass for advanced displays; optical fiber, wireless technologies, and connectivity solutions for state-of-the-art communications networks; trusted products to accelerate drug discovery and delivery; and clean-air technologies for cars and trucks.

HISTORICAL BACKGROUND

Corning Glass Works was founded in 1851 by Amory Houghton, in Somerville, Massachusetts, originally as the Bay State Glass Co. It later moved to Williamsburg, Brooklyn, New York, and operated as the Brooklyn Flint Glass Works. The company moved again to its ultimate home and namesake, the city of Corning, New York, in 1868 under leadership of the founder's son, Amory Houghton, Jr.

Over 147 years later, Corning continues to maintain its world headquarters at Corning, N.Y. The firm also established one of the

first industrial research labs there in 1908. It continues to expand the nearby research and development facility, as well as operations associated with catalytic converters and diesel engine filter product lines. Corning has a long history of community development and has assured community leaders that it intends to remain headquartered in its small upstate New York hometown.[7]
The California Institute



of Technology's 200-inch (5.1 m) telescope mirror at Palomar Observatory was cast by Corning during **1934–1936** out of low expansion borosilicate glass.[8] In 1932, George Ellery Hale approached Corning with the challenge of fabricating the required optic for his Palomar project. A previous effort to fabricate the optic from fused quartz had failed. Corning's first attempt was a failure, the cast blank having voids. Using lessons learned, Corning was successful in the casting of the second blank. After a year of cooling, during which it was almost lost to a flood, in **1935** the blank was completed. The first blank now resides in Corning's Museum of Glass.

In **1935**, Corning formed a partnership with bottle maker Owens-Illinois, which formed the company known today as Owens Corning. Owens Corning was spun off as a separate company in **1938**.

The company had a history of science-based innovations following World War II and the strategy by management was research and "disruptive" and "on demand" product innovation.

In **1962** Corning developed Chemcor, a new toughened automobile windshield designed to be thinner and lighter than existing windshields, which reduced danger of personal injury by shattering into small granules when smashed. This toughened glass had a chemically hardened outer layer, and its manufacture incorporated an ion exchange and a "fusion process" in special furnaces that Corning built in its Blacksburg, Virginia facility. Corning developed it as an alternative to laminated windshields with the intention of becoming an automotive industry supplier. After being installed as side glass in a limited run of **1968** Plymouth Barracudas and Dodge Darts, Chemcor windshields debuted on the **1970** model year Javelinsand AMXs built by American Motors Corporation (AMC). As there were no mandatory safety standards for motor vehicle windshields, the larger automakers had no financial incentive to change from the cheaper existing products. Corning terminated its windshield project in **1971**, after it turned out to be one of the company's "biggest and most expensive failures". However, like many Corning innovations, the unique process to manufacture this automotive glass was resurrected and is today the basis of their very profitable LCD glass business.

In the fall of **1970**, the company announced that researchers Robert D. Maurer, Donald Keck, Peter C. Schultz, and Frank Zimar had demonstrated an optical fiber with a low optical attenuation of 17 dB per kilometer by doping silica glass with titanium. A few years later they produced a fiber with only 4 dB/km, using germanium oxide as the core dopant. Such low attenuations made fiber optics practical for telecommunications and networking. Corning became the world's leading manufacturer of optical fiber.

In **1977**, considerable attention was given to Corning's Z Glass project. Z Glass was a product used in television picture tubes. Due to a number of factors, the exact nature of which are subject to dispute, this project was considered a steep loss in profit and productivity. The following year the project made a partial recovery. This incident has been cited as a case study by the Harvard School of Business.

Company profits soared in the late **1990s** during the dot-com boom, and Corning expanded its fiber operations significantly with several new plants. The company also entered the photonics market, investing heavily with the intent of becoming the leading provider of complete fiber-optic

systems. Failure to succeed in photonics and the collapse in **2000** of the dot-com market had a major impact on the company, and Corning stock plummeted to \$1 per share. However, as of **2007** the company had posted five straight years of improving financial performance. Today Corning is involved in two joint ventures: Dow Corning and Pittsburgh Corning. Quest Diagnostics and Covance were spun off from Corning in **1996**. Corning is one of the main suppliers to Apple Inc. since working with Steve Jobs in **2007** to develop the iPhone. It is one of the world's biggest glassmakers

Main Values

Corning is guided by an enduring set of values that defines its relationship with employees, customers, and communities.

QUALITY

Total Quality is the guiding principle of Corning's business life. Total Quality demands continuous improvement in all processes, products, and services. The company success depends on its ability to learn from experience, to embrace change, and to achieve the full involvement of all its employees.

INTEGRITY

Integrity is the foundation of Corning's reputation. The company earned the respect and trust of people around the world through more than a century of behavior that is honest, decent, and fair.

PERFORMANCE

Providing Corning shareholders a superior long-term return on their investment is a business imperative. This requires that the company allocates its resources to ensure profitable growth, maintain an effective balance between today and tomorrow.

INNOVATION

Corning leads primarily by technical innovation and shares a deep belief in the power of technology. The company has a history of great contributions in science and technology, and it is this same spirit of innovation that has enabled it to create new products and new markets, to introduce new forms of corporate organization, and to seek new levels of employee participation.



CORNING

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CRISVISA





Crivisa

Providing value-added solutions for glass and its applications

All the Crivisa's products are developed for the construction, furniture, and general industries markets.

Vidrio Templado

Screen-printed tempered glass is subjected to an exact temperature point in electric ovens and then suddenly cooled down under controlled

pressure. The tempered glass is subjected to an exact point of temperature in electric furnaces before being abruptly cooled under controlled pressure, redistributing the thermal wave until homologating the molecular position of the crystal providing a great resistance to the traction in the interior, that is, to the tensions of mechanical

origin (flexion, shock ...) and thermal (differences in temperature without altering the spectrophotometric properties of the base product)

Vidrio Sicure

Set of two or more sheets of glass with one or more layers of PVB (Polyvinyl butyral). The perfect adhesion glass-PVB, is

“All the Crivisa's products are developed for the construction, furniture, and general industries markets”





obtained by a heat and pressure treatment. By varying the number or layer thickness of one of its components, different compositions are obtained from the laminated safety glass range. In turn, the PVB sheets may be colorless, translucent or colored.

Vidrio Sicure Colour

They are two sheets of glass or more together with a polymer called color PVB (Poly Vinyl Butyral) by a process of heat and pressure. In addition to being able to combine any type of thicknesses there is also a wide range of colors in the PVB making this one of the most versatile products for the design.

Vidrio Sicure Sentryglas

These are two or more sheets of glass interspersed with Sentryglas between them, these adhesions allow the company to have a glass resistant to the ravages of wind counting with glasses of smaller thickness

than with the between layers of PVB.

Vidrio Sicure Control

This is a three layer laminated tempered glass, with its special resin layer. Any glass laminated with this film reduces the temperature to 10 ° C. This film is capable of significantly reducing the transmission of infrared rays, without this affecting the passage of visible light, as it remains practically at the same level. It also has the ability to block UV rays by more than 99%.

Any glass laminated with this film, reduces the temperature to 10 ° C less than one laminated with standard PVB.

Climaglass

It is an insulating glazing formed by two sheets of glass, it is an excellent thermal insulator that allows to have a saving in air conditioning. The main objective of these units is to take advantage of the insulating properties of the camera in

order to reduce the thermal transmittance (U value) of the glazing.

Vidrio Satinlite

It is obtained by applying an acid treatment on one or both sides of a glass, it can be applied on any glass substrate. It can be made, on one side, double sided and special designs, as well as on any glass and mirror substrate; counting on one of the products that offer privacy and elegance and an innumerable range of possibilities for the design.

Satinlac

It is an acid-etched and lacquered glass whose opaque and colored appearance is obtained by depositing on one of the faces of the glass, the special paint adheres uniformly on the face of the glass with the ideal resistance for indoor or outdoor use.

Pearlite

It is a mirror matted with acid,

which gives a touch of elegance and aesthetics where it is placed, it is excellent for interior design.

Prismalac

It is a lacquered glass by means of a special paint on one of its faces can be applied to almost any type of glass. Can be used outdoors and indoors. Its wide range of colors allow the company to give solution to all the projects that look for an opaque and colored aspect. CRISVISA PRISMALAC Glass gives life to designs by enhancing the brightness and intensity of any colors. Their faint reflections filter in the environment and light produces changing effects on surfaces that acquire depth.

Serilite

It is the process of placing a ceramic paint and then baking it so that it is adhered to the glass.

Its application can be absolute or by means of a mesh to give



different designs, as well as it helps the company to reduce the entrance of light. It can be applied to almost all float glasses that do not contain metals in their mass.

Matelite

Digital printing and high definition glass, is a process that

allows to have any image on the glass in order to have a continuous printing pattern on different pieces of glass.

Vidrio Chip

The "glue chip" is a commonly transparent glass with a texture that looks like ferns or frosty ice. *

Company Presentation

CRISVISA is a mexican group of leading companies dedicated to the manufacture, supply and installation of aluminum glass and profiles with added value for the construction, furniture, refrigeration and general industries market.

The company's mission is to develop and implement cutting-edge industrial and business procedures worldwide. Offering value-added solutions in relation to glass and its applications in multiple areas' production:

- corporate
- business
- residential
- manufacturing glass construction
- furniture

HISTORICAL HIGHLIGHTS

- 1970** The business Cristales y Vidrios S.A. of C.V. in a 150m2 room, known as CRISVISA. Being then the 13th distributor of "Flat Glass" of Mexico.
- 1991** Opening of CRISVISA La Viga, S.A. of C.V. in a land of 2000m2, 14 trailers, 40 vans, 200 employees, being the largest workshop in Latin America.
- 1994** It was invested in the most modern workshop for the processing of flat glass (polished edges, bevels, flutes, drills, holes, etc).
- 1996** Being the largest and most efficient distributor in the country, the commercial and strategic alliance is made with the French group Saint Gobain Glass, leaders in technology and manufacturing worldwide.
- 1997** CRISVISA Aragón, S.A. opens simultaneously of C.V. of 2700m2. CRISVISA Aragón is considered, due to its design and versatility, one of the best wineries in Latin America.
- 1999** In which the first furnace of the company is acquired.
- 2000** Opening of CRISVISA Aluminio, S.A. of C.V. Completing the circle of products and services for glass and construction customers.
- 2003** Opening of CRISVISA Neza, S.A. of C.V.
- 2004** Opening of CRISVISA Tlahuac, S.A. of C.V.
- 2008** Its excellent technology includes the company's second furnace.
- 2008** CRISVISA, S.A. of C.V. 10000m2 of surface. Incorporating the 3rd tempering furnace of the group, positioning CRISVISA in the leadership in quality and capacity of glass production in the different processes and finishes.



CRISVISA

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CRISVISA.COM

WHERE IT ALL COMES TOGETHER

September 12 – 14, 2018

Las Vegas, Nevada

GlassBuild 
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THE GLASS, WINDOW & DOOR EXPO

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NGA

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Oldcastle

Irish roots for complex and rich architectural glass



“Oldcastle Inc. is one of North America’s leading supplier of architectural glass with a comprehensive portfolio of products available”



The company is one of North America’s leading supplier of architectural glass with a comprehensive portfolio of products available. Thanks to the Oldcastle BuildingEnvelope division, it also has extensive experience in the design and engineering of structural glass systems. Glass production mainly concerns two areas: Architectural Glass and Structural Glass.

Architectural Glass - Products

ARMORRESIST®

Laminated glass can be designed to resist attacks by a wide range of weapons. There are many standards and test methods available. Almost all of these have two main requirements: (1) the glazing must resist penetration by a specified bullet and (2); the spall or flying shards of glass leaving the rear face, as a result of the impact, must be eliminated. Bullet-resistant laminated glass can meet both of these

requirements. It is important to note that ArmorResist® glazing materials are not classified as forced-entry resistant.

CERAMIC ENAMEL FRIT®

Ceramic enamel frit is applied to the glass surface in a horizontal roller coating process. Available in a variety of colors to harmonize or contrast with the vision area, the ceramic enamel frit is applied to the surface of the glass. Ceramic enamel frits contain finely ground glass mixed with inorganic pigments



to produce a desired color. The coated glass is then heated to about 1,150°F, fusing the frit to the glass surface, which produces a ceramic coating almost as hard and tough as the glass itself. A fired ceramic enamel frit is durable and resists scratching, chipping, peeling, fading and chemical attacks.

FINWALL®

Finwall® is an exclusive structural wall system comprised of facade glass panels and vertical glass

mullions designed to resist wind load and seismic forces. Finwall® can be used in openings less than 16' high. The system provides the aesthetic design characteristics of an exterior flush-glazed wall using interior glass mullions or fins instead of metal mullions. The glass fins provide support to the main glass plates. Finwall® is free from visual obstructions, limiting the need for metal framing to the perimeter, thus creating a seemingly floating glass facade.

ARMORPROTECT®

ArmorProtect® is used where glazing is required to resist penetration for some considerable time, typically measured in minutes rather than seconds. These types of attacks are usually planned, sustained attacks using more than one type of weapon. Oldcastle BuildingEnvelope® offers three types of protection: ArmorProtect®, ArmorProtect® Plus and ArmorProtect® Max.

FULLY TEMPERED®

Oldcastle BuildingEnvelope® fully tempered glass is approximately four times stronger than annealed glass of the same thickness and configuration. When it is broken, tempered glass fractures into small fragments that reduce the probability of serious injury as compared to annealed glass. Tempered glass meets all safety glazing standards including the federal safety glazing standard, CPSC 16 CFR 1201. Because tempered glass fractures into many small pieces, it tends to vacate the opening, when broken, more than heat-strengthened and annealed glass does.

HEAT STRENGTHENED

Oldcastle BuildingEnvelope® heat-strengthened glass is approximately twice as strong as annealed glass of similar thickness and configuration. Heat-strengthened glass

generally fractures in a manner similar to annealed glass and tends to remain in the opening when broken. It is intended for general glazing where additional strength and/or resistance to mechanical and/or thermal stress are desired. Heat-strengthened glass is NOT a safety glazing product and therefore should not be used where safety glazing is required.

I-GLASS®

i-Glass® is manufactured using a digital printing process in which ceramic inks are applied directly to the surface of glass. Unlike traditional silk-screened glass technology, i-Glass® printing allows multiple colors to be applied simultaneously in a single printing session to create a broad range of design possibilities.

INSULATING GLASS

By combining Low-E coatings, standard and high performance tinted glasses, reflective coatings, silk-screened patterns, laminated glass products and more, a wide variety of insulating glass configurations are available to satisfy performance and aesthetic requirements.

LIGHT & SOLAR CONTROL

Laminated architectural glass may be designed to reduce solar energy transmittance, control glare and screen out ultraviolet (UV) radiation. Transmitted solar energy is reduced by the use of

tinted or coated glass, colored interlayers, silk-screened glass or combinations of each that absorb or reflect part of the solar radiation in the ultraviolet, visible and near-infrared ranges. The absorbed energy is converted to heat, and a large portion is dissipated to the exterior.

OPACI-COAT-300® SILICONE PAINT

OPACI-COAT-300® silicone paint is a water-based, elastomeric coating that provides optimal glass opacification. Applied without heat during the final stage of the spandrel fabrication process, OPACI-COAT-300® can be used with equal effectiveness on annealed glass (interior only) or heat-treated glass. OPACI-COAT-300® creates a rubberlike film when applied to glass, and, when specified, may satisfy criteria for fallout protection without the need for taping or the application of scrim films.

OVERHEAD GLAZING

Glass which slopes more than 15° from the vertical is considered sloped glazing by the major model building codes. Laminated glass is the preferred product for sloped and overhead glazing, because the glass is retained in the opening, even when broken, reducing the possibility of injury from falling glass.

POINT SUPPORT

Point-supported canopies and facades are comprised of

stainless steel spider fittings and tempered glass to resist wind load and snow load requirements. Glass attachment fittings are designed to flex when the glass is under loading to reduce stresses in the glass at the fitting connection's. Spider fittings are typically bolted to a steel back-up structure.

SAFETY & BURGLARY

Laminated safety glass is a multifunctional glazing material that when impacted, typically breaks safely and remains an integral part of the opening. Impulse burglaries are resisted by the tough plastic interlayer.

SEISMIC EARTHQUAKES

Laminated glass lites are typically manufactured with annealed, heat-strengthened or fully tempered glass. Laminated glass performs very well in seismic applications because the plastic interlayer holds most of the glass fragments following cracking, which significantly reduces the potential of glass falling to the ground. In addition, the complete glass unit tends to be retained in the frame.

SILK-SCREENED

Oldcastle BuildingEnvelope® silk-screened ceramic enamel frit products offer building designers exciting and different ways to customize exterior and interior glass, by using standard and custom screened patterns in a

variety of colors. Silk-Screened glass is offered monolithically, in insulating glass units, or as laminated glass, providing beauty, safety and functionality.

SOUND CONTROL

Sound-dampening inter-layers reduce noise levels by up to 50%. Ideal for airport applications or any building in cities or near highways.

SPECIALTY SYSTEMS

Specialty Systems are unique in their design and application. These systems require review in the early stages of design to determine the proper structural requirements of the building steel. Specialty Systems can integrate spider fitting or patch plate fittings.

STACKWALL®

Stackwall® is an exclusive structural wall system facade glass panels joined to vertical glass mullions with metal patch or "spider" fittings. Vertical glass mullions are designed to resist wind loads and seismic forces. Oldcastle BuildingEnvelope® Stackwall® is engineered to integrate with Finwall®.

VANCEVA®

Laminated glass allows great flexibility for decorative glass. Many different effects can be created by deliberately adding or substituting alternative interlayers to the laminate. Most

of the decorative effects offered by Oldcastle BuildingEnvelope® are light- and heat-stable and therefore can be used both internally and externally.

Structural Glass-Products

FINWALL®

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POINT SUPPORT

Point-supported canopies and facades are comprised of stainless steel spider fittings and tempered



Company Presentation

Oldcastle Inc., together with its subsidiaries, engages in the production and supply of building materials in the United States. It offers aggregates, asphalt, and ready mixed concrete, as well as construction and paving services; and architectural glass and aluminum glazing systems, including custom-engineered curtain and window walls, architectural windows, storefront systems, doors, and skylights to architects, building developers and owners, contractors, and the commercial glazing community.

The company also distributes exterior and interior products, such as roofing, siding, window, drywall, steel studs, and acoustical ceiling systems to specialty contractors in residential and commercial construction, and remodeling industries. In addition, it manufactures concrete masonry, precast, lawn, garden and paving, and clay brick products; and produces packaged cement mixes, lightweight aggregates, bagged decorative stone, and lime and concrete roof tiles. The company is based in Atlanta, Georgia. Oldcastle, Inc. operates as a subsidiary of the Irish company CRH plc., which is an international building materials group.



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Oldcastle Inc. is divided into three organizational units: **Oldcastle Building Products**, **Oldcastle Distribution**, and **Oldcastle Materials**. **Oldcastle Building Products** includes the following three distinct businesses:

- **Oldcastle BuildingEnvelope** is the leading supplier of products specified to close the building envelope. These products include: custom-engineered curtain wall and window wall, architectural windows, storefront systems, doors, skylights and architectural glass;
- **Oldcastle Architectural Products** is the North American leader in concrete masonry and hardscape products. This group also specializes in the manufacturing of bagged products such as Sakrete and bagged stone, and soil and mulch;
- **Oldcastle Precast** is the leading North American manufacturer of concrete and polymer-based products, including containment vaults and modular buildings.

Oldcastle Distribution is the leading building products distributor to specialty contractors in residential and commercial construction.

Oldcastle Materials supplies aggregates, asphalt, and ready-mix concrete, and provides paving and construction services. This group is the largest among Oldcastle Inc. businesses with over 1,200 locations in 44 states. Oldcastle Materials is the number one asphalt producer and the number one asphalt paver in the United States.

Oldcastle Inc. include more than 1,750 operations in 43 states and 8 Canadian provinces. The company has 42,600 employees.

HISTORY

In 1932 two Irish brothers, Donald and Tom Roche, the founders of Roadstone Ltd., went into business with nothing more than a sand and gravel pit and truck. Separately in 1936, Cement Ltd. was established following a move by the Irish government to gain self-sufficiency in key resources. Both companies grew through Ireland's period of industrial development and merged in 1970 to create CRH.

With ambitions to expand, CRH crossed the pond seven years later in search of new opportunities in the "geographically distant but culturally close" United States. They sent good friend Don Godson, armed with a checkbook and his optimism. He was a leader in establishing enduring relationships based on trust. By 1978, Godson was joined in the U.S. by Michael Lynch. And with his support, Godson made a deal to purchase Amcor, the first acquisition of many.

In 1979, Joe McCullough strengthened the team as they built relationships, sealed deals, and pioneered the future of CRH's North American division, Oldcastle. Acquiring small and mid-sized family businesses, they expanded Oldcastle across the country.

The acquired businesses were successful. With Oldcastle's success, competition to consolidate the industry grew.

Through the decades Oldcastle went on to become one of the largest building products and materials company in North America.



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Pittsburgh Glass Works

Automotive glass industry: marketplace today and innovation for the future

Automotive Glass

Pittsburgh Glass Works is the leading supplier of auto glass and shop accessories, with more than 100 distribution branches throughout the U.S. and Canada.

Offering more than glass, the distribution network provides small order, same-day or overnight auto glass delivery to more than 27,000 customers. Its **automotive replacement**

glass is manufactured with the same process controls, tooling and quality inspections used for original equipment parts. As a result, the replacement laminated and tempered parts

(i.e. windshields, side and back lights):

- **Fit closer to original equipment**
- **Look more like original equipment**

“Pittsburgh Glass Works business comprises engineering development and application of sophisticated automotive glass technologies coupled with glass manufacturing and assembly operations in North America, Europe and Asia”



- **Meet the same safety standards as original equipment**
- **Have the same optical quality as original equipment**

FOR INSTALLERS, glass from original equipment manufacturers such as PGW is easier to install. The parts are made with OEM-style tooling, with size and bend verified against OEM-style check fixtures. This means part-to-part consistency of size, shape and color, and less likelihood of stress and breakage during installation.

FOR CONSUMERS
For consumers, glass made to

OEM specifications fits better in the vehicle opening, so there is less of a likelihood of wind noise, leakage or appearance problems. Attention to detail and rigid quality assurance requirements ensure consumers the high level of optical quality they expect of an OEM windshield.

Vintage Glass

PGW offers hard-to-find vintage glass parts for many makes and models of foreign and domestic vehicles. The company offers a large inventory of hard-to-find windshields, side and back windows, with worldwide shipping from its central

warehouse facility in Cedar Rapids, Iowa.

Aftermarket Glass

As a wholesale distributor, the company enables local installers to replace windshields and other glass. PGW has over 110 locations which provide "More than Glass" services to the end user, with innovative solutions. The company carries an inventory of hard-to-find glass, and supplies more than 7800 shop accessories.

Sundries

With more than 9000 shop accessories available, PGW is a call for convenience and savings. From adhesives to hand

tools, gloves to power tools, paper towels to tapes, resins and razor blades. PGW Sundries offers everything the shop needs - available same day/next day delivery.

MAIN VALUES

Pittsburgh Glass Works has identified some core competencies which represent its main values:

- **Accountability:** Accepts personal responsibility for the outcome of one's own work and the outputs of the work group;
- **Communicate and Share Information:** The ability to effectively express thoughts and ideas clearly, concisely

- and professionally in verbal and written forms; expresses thoughts easily in groups and in one-on-one conversations;
- **Continuous Improvement:** Ability to build methods for measuring how effectively processes meet business objectives. Demonstrates an achievement orientation by persistently working towards objectives and getting results;
 - **Demonstrate Technical Excellence:** Relates to the technical skills needed to perform a given job function, including technical and non-technical disciplines;
 - **Diversity Awareness:** Accurately understands people and values differences; sensitive to cultural and gender differences; promotes and supports a multicultural environment that respects the dignity and worth of all individuals;
 - **EH&S Commitment:** Demonstrates through example the importance of safety and environmental stewardship in accomplishing tasks;
 - **Flexibility:** The ability to adapt easily to change, to see the merits of differing positions, and to adapt one's own positions and strategies in response to new information or changes in the situation;
 - **Initiative:** Tendency to be self-directed. Seizes opportunities as they arise and contributes significantly more;
 - **Teamwork and Collaboration:** The ability to demonstrate cooperative behavior by seeking input from the group, encouraging participation, sharing information, collectively resolving issues and seeking solutions that benefit all involved parties;
 - **Understand Customer and Market Perspective:** Demonstrate that the internal and external customers enable the company to thrive as a business. *

Company Presentation

Pittsburgh Glass Works (PGW), a Vitro Glass Company, is a leader in the design, production and distribution of automotive glass to high-volume Auto-OEM applications (*Original Equipment Manufacturer*) and glass replacement markets worldwide. Employing more than 4,500 people globally, PGW's business comprises engineering development and application of sophisticated automotive glass technologies coupled with glass manufacturing and assembly operations in North America, Europe and Asia.

PGW deals with all of the major car manufacturers and produces windshields, rear and side windows, sunroofs and assemblies. It has 13 manufacturing locations currently in U.S., Canada, and Poland. The 2017 Q1 acquisition of PGW by Vitro signifies an exciting advancement in the company's future and for the OEM automotive glass industry overall. Vitro has a proud legacy and positive reputation in the glass industry dating back to 1909. The PGW acquisition by Vitro, coupled with Vitro's recent acquisition of PPG Flat Glass, will provide opportunities for continued investment, resources and scale to pursue the next phase of the company's exciting growth strategy.

Today PGW offers original equipment manufacturers windshields, rear and side windows, sidelites, backlites, sunroofs, and assemblies for auto and truck manufacturers; and replacement automotive glass products for use in the aftermarket. The company also provides automotive coatings; consumer products; and sundries that range from adhesives to hand tools, gloves to power tools, paper towels to tapes, and resins and razor blades. In addition, it offers insurance claims services; glass management software and Internet marketing services; and e-business solutions.

HISTORICAL BACKGROUND

The company was founded in 2000. It was formerly known as PPG Auto Glass, LLC and changed its name to Pittsburgh Glass Works LLC in October 2008. In March 2017, the company was acquired by Mexican "giant" Vitro, S.A.B. de C.V., along with its subsidiaries, and manufactures.

PGW operates worldwide with production facilities in many locations in the United States (Kentucky, Ohio, Pennsylvania, North Carolina, Indiana, Michigan, Missouri, Alabama), as well as in Canada, Mexico, Poland, Germany, Hungary, and Japan. The company also has a manufacturing facility in Zibo, China.



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Trulite Glass

Starting with projects from design concepts to get to a final installation by the glazing contractor



Trulite Glass & Aluminum Solution offers a complete line of architectural aluminum products, fabricated glass, all glass entrances, decorative glass and mirrors.

Architectural Aluminum

Trulite's architectural aluminum entrances and framing systems have been designed to meet the needs of the building team, improving fabrication time and ease of installation.

• ENTRANCE DOORS

Trulite Glass & Aluminum Solution's 200, 300 & 500

Entrances are engineered to provide simple fabrication, easy assembly and problem free installation in an easy to use, economical entrance system.

• STOREFRONT SYSTEMS

Trulite Storefront systems are both an economical solution and flexible when it comes to design. These center glazed systems can accommodate 1/4", 3/8", 1/2", and 1" glazing infill. These systems are ideal for single span storefronts and feature punched opening and strip window capability.

• WINDOW WALL

Trulite's Window Wall is both an economical solution and flexible when it comes to design. It's inside glazed design has an option for thermally broken applications. This front set glazed system accommodates 1" glazing infill and is ideal for punched opening and strip window capability.

• CURTAIN WALL

The Trulite Curtain Wall Systems are second to none. These systems are engineered to meet a variety of design and energy efficiency demands

while maintaining architectural appeal. Available in single span and multi-span applications.

• HURRICANE RESISTANT SYSTEMS

Trulite's Window Wall is both an economical solution and flexible when it comes to design. It's inside glazed design has an option for thermally broken applications. This front set glazed system accommodates 1" glazing infill and is ideal for punched opening and strip window capability.

• BLAST RESISTANT SYSTEMS

Trulite Glass & Aluminum



“Trulite Glass & Aluminum Solutions offers a complete line of architectural aluminum products, fabricated glass, all glass entrances, decorative glass and mirrors.”

Solution's 350 Resistor Blast Resistant Entrance is engineered, designed and tested in accordance with the demanding Blast Standards of GSA, DoD & ASTM, as well as the Impact Standards of Miami-Dade County (NOA) and the Florida Building Code (FBC).

Architectural Glass

Joined with the architectural aluminum products, in house capability of laminating, heat-treating and fabrication technology, the design professional can depend on the one of the single source supplier for the industry.

- **HEAT-TREATED**

Heat treating is a process that imparts additional strength to flat glass products. Heating and cooling cycles are carefully controlled to produce Heat Strengthened or Fully Tempered glass.

- **LAMINATED GLASS**

Trulite's laminated glass is produced in-house at one of eight manufacturing plants. The process encompasses two or more pieces of glass that are permanently bonded together with a polyvinyl butyral interlayer (PVB) by the introduction of heat and pressure in an autoclave.

- **INSULATING GLASS**

Trulite has the ability and

technology to provide high performance, certified, insulating glass units. The Guardian and PPG supplier certified plants allow the company to offer a limitless array of high performance insulating units with the latest technology.

- **SPANDREL**

The term spandrel, borrowed from Medieval architecture, meaning the rough triangular area between arched openings. The area was the natural outcome of the design and though unintended became a pallet for artistic detail.

- **SILKSCREENED CERAMIC FRIT**

Silk-screening is the process of spraying ceramic frit paint through a pre-designed screen to achieve a desired pattern.

- **BIRD FRIENDLY GLASS**

Scientists estimate as many as 600 million birds die in window collisions in the U.S.A. and Canada every year. The growing awareness of the threats to bird populations has prompted new laws and voluntary guidelines in cities throughout the U.S.A and Canada.

- **TURTLE GLASS**

When Sea Turtles hatch, they go towards the ocean, guided by the light of the moon. If there is too much artificial light back

TRULITE GLASS

on the beach, newly hatched turtles can be confused and go the wrong way. To protect these hatchlings, the visible light transmission of a glass product used to comply with a Turtle Ordinance must be .45 or less.

- **MIRRORS**

ScarGard is a unique product exclusively manufactured by Trulite Glass & Aluminum Solutions. There is simply no better mirror product available in today's market!

- **DISTRIBUTION PRODUCTS**

Trulite Glass & Aluminum offers the most complete offering of distribution products available. Stock sheets and cases are available for float glass, mirror, standard and custom shower doors, shower enclosure hardware, aluminum standard and custom doors as well as stock lengths.

Specialty Glass Products

Trulite has the ability to create decorative glass solutions by combining different glass types and processes to achieve the visual appearance desired.

- **FIRE RATED SYSTEMS**

Trulite Glass and Aluminum Solutions, through a partnership with Technical Glass Products, can help design and provide a full line of products for Fire Protective and Resistive needs.



- **BULLET RESISTANT GLASS**

As an industry leader in glass and lamination fabrication Trulite Glass & Aluminum Solutions can supply a full range of products to meet any glass fabrication project needs. With an extensive line of all glass and glass clad polycarbonate bullet resistant make-ups.

- **PATTERN GLASS**

Traditionally pattern glass products have been used to

obscure vision areas requiring privacy but allowing virtually the same light transmission as clear glass. The level of obscurity depends on the pattern which has been imprinted into the glass as it is made.

- **DECORATIVE LAMINATED GLASS**

Decorative laminated glass by Trulite, Sumiglass, is manufactured by encapsulating a variety of materials between

two or more layers of adhesive and two or more panes of glass. Using a proprietary technology and dedicated equipment insures a permanent bond.

- **DIGITAL CERAMIC PRINTING**

Trulite uses Dip-Tech digital ceramic printing, the most advanced and versatile glass printing machines; ideal for both external and internal architectural and transportation

glass print applications. Fully compatible with Dip-Tech's digital ceramic inks and unique image processing software, these high-tech printers go far beyond the capabilities of traditional screen and UV glass printing.

• CABINET DOORS

Glass cabinet door inserts are an ideal compromise between solid cabinetry and open shelving. They help to open a kitchen up visually and showcase striking dishware and decorative item while keeping out dust and debris.

• DECORATIVE V-GROOVING

Any pattern can be designed by engraving a groove in the surface of the glass. Different profiles and groove widths are available and can be duplicated time after time by the state of the art CNC grooving equipment.

All Glass Systems

Envision® Glass Systems provide architects and glazing contractors with an extensive range of design solutions.



From doors & walls, to shower enclosures & handrails..

• ENTRANCE SYSTEMS

Envision All-Glass Doors from Trulite Glass & Aluminum Solutions deliver a stunning entry into any space, using durable hardware and a variety of glass options..

• HANDRAIL SYSTEMS

Envision Handrails from Trulite Glass & Aluminum Solutions are a favorite of both designers and architects, offering functionality and beauty. The "see-through" properties of glass handrails complemented by subtle color or design create endless enhancement opportunities.

• STRUCTURAL SYSTEMS

Structural glass wall design elements utilize point supported glass fitting to create glass walls by stacking glass panels. Glass stabilizers (fins) may be used to provide structural support.

Stainless steel spider fittings provide total all-glass vision without obstruction and add maximum flexibility to design.

• SHOWER ENCLOSURES

The combination of sparkling tempered glass with optional patterns, surface treatments, polished edges, attractive

hinges and towel bars that double as handles, these enclosures have caught the eye of many designers of not only residential but also hotel, motel and condominium projects. Shower door hardware is available in a range of superb architectural finished. *

Company Presentation

Trulite Glass & Aluminum Solutions - based in Peachtree City, Georgia - manufactures and distributes line of architectural aluminum products, fabricated glass, glass entrances, decorative glass, and mirrors in many areas of the world. With over 26 fabrication facilities throughout the United States and Canada - and delivery on its own fleet of trucks - the company has the right flexibility to meet its customers' needs: counting on the products, equipment and an experienced team to take projects from design concepts - with the architect - to final installation by the glazing contractor.

HISTORY

The company was founded in 1978. It has fabrication facilities in the United States and Canada.

In 2014 Trulite Glass & Aluminum Solutions announced it has finalized the acquisition of Houston-based Texas Tempered Glass Inc.

With this transaction, Trulite has expanded its presence in the Texas market with an array of tempered, insulated, and mirrored fabricated offerings supplying materials for architectural, industrial, commercial and custom applications. Additionally, the TTG product offering will include laminated and PPG/Guardian certified products, according to the company.



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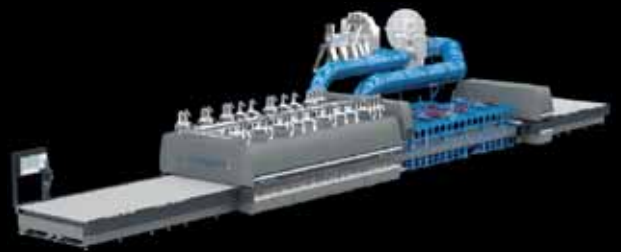
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OSCILLATING FURNACE FOR TEMPERING
LATEST GENERATION GLASS



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- + HIGH OPTICAL QUALITY
- + EXEMPLARY FLATNESS



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LAMI

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WASH



keraglass ::



Vitro

Enhance processes and innovative operations in the “heart” of Mexico

The good performance of Vitro’s products is backed by their strict compliance with several international standards.

Products are made of the most reliable material: glass; an icon that represents quality, trust, and transparency.

Each piece manufactured by Vitro is sustainable and has the capacity to always exceed the expectations of clients, and also of consumers.

This achievement is the result of a comprehensive offer of solutions to multiple industries, which produce food, beverages, wines, liquors, beer, cosmetics,

pharmaceuticals, and automobiles; Vitro also provides services to those who construct buildings, or who require raw materials, machinery, and equipment for industrial use.

Glass Containers

The company provide solutions to the needs of the perfume, cosmetic and pharmaceutical industries. Vitro’s glass containers preserve the properties of the products they contain.

This perception is backed by the various certifications Vitro has obtained under the

“Vitro offers glass solutions for multiple markets, including architectural and automotive as well as cosmetic, pharmaceutical and toiletries.”



highest international standards, in recognition to the quality, safety, hygiene, innovation, and sustainability of its containers. The company is amongst the leaders in service to the perfume, cosmetic and pharmaceutical industries.

Float Glass

Vitro's float glass means innovation. Specialists recognize that Vitro's float glass, manufactured by Vidrio y Cristal (VyC), is one of the best option when they are looking for an esthetic, versatile, reliable, and quality product.

This kind of glass may also undergo several additional processes: tempering, lamination, silk-screen printing, Duvent® units, and digital printing, to name a few examples.

Additionally, the Centro de Diseño Arquitectónico (CDA) provides specialized project advisory services, with sustainable and cutting edge solutions that have been recognized by authorities and internationally renowned organizations.

Automotive OEM Glass

Vitro's automotive glass is a remarkable option for the main car manufacturers in the world. Its laminated, tempered, and encapsulated products have a great performance in the most demanding safety, resistance,

and quality tests in the industry as a result of the expertise of the project engineers, who work directly with each client.

Vitro assistance includes from designing the glass and the components that will set it on the vehicle, to the creation of packaging for delivery at the assembly line.

Automotive Replacement Glass

With a wide range of products, the company products windshields, door, quarter and back glasses under the CRINAMEX® and VPM® trademarks in Mexico, United States, Brazil, Colombia, Ecuador, Venezuela, and Panama.

The company's experience as OEM supplier for large car manufacturers makes Vitro among the preferred options for distributors, insurance companies, fleets, and professional installers, for whom it offers customized services.

Machinery & Equipment

The high quality machinery and equipment offered by Fabricación de Máquinas (FAMA) are a fundamental part of Vitro's success in the metal working industry, which includes: foundry, molds, IS machinery and equipment. Examples of this processes include PTA welding for CNC





machining centers, computer-aided design & manufacturing, as well as CNC machines for irregular shapes.

As a result of its vertical integration, Vitro also uses high-tech tools to increase productivity and reduce costs for its customers.

Chemicals

Vitro has consolidated significant leadership as a result of implementing cutting edge technology to better serve its clients in the sodium carbonate, sodium bicarbonate, sodium chloride, and calcium chloride lines.

Solid competition at a domestic level has driven the diversification of the company presence in international markets: preserving quality, customer service, and flexibility as competitive advantages in emerging markets.

Vitro is one of the few companies in the chemical industry to have ever received the Premio Iberoamericano de Calidad (Iberoamerican Quality Award) and the Premio Nacional de Calidad (National Quality Award) in Mexico. Furthermore, the company is certified under ISO-9000:2000, ISO-14000 and Industria Limpia.

Residential Window Glass

With more than a century of experience providing energy-

efficient glass for residential windows, Vitro Architectural Glass (formerly PPG glass) offers a proven portfolio of window glass products that provide comfort in any climate.

The most important range of Vitro's glass for residential windows are **Solarban® 60 glass** and **Clarvista® Glass**.

Solarban® 60 glass meets homeowner demands with a proven ability to deliver value and performance by allowing more daylight in, making living spaces more inviting and energy efficient.

The advanced low-e coating of Solarban® 60 glass transmits more than 70% of the sun's available light into a home while blocking 79% of the sun's damaging UV energy and other contributors to fading—in all, 24% better than standard clear insulating glass. This helps to protect interior furnishings, fabrics and carpets from fading. More importantly, Solarban® 60 glass helps homeowners shield their homes—and their utility bills—from summer heat and winter cold. Measured against windows assembled with ordinary clear glass, Solarban® 60 glass lessens solar heat gain by more than half. When the seasons turn cold, the high insulating value of Solarban® 60 helps reduce furnace heat loss through windows by up to 50%. Those qualities have made Solarban® 60 glass one of the



Company Presentation

Vitro, S.A.B. de C.V. (VITROA.MX), is the largest glass producer in Mexico and one of the world's main organizations in its industry. Founded in 1909 in Monterrey, Mexico, this corporation has 30 subsidiaries in Mexico, United States, Brazil, Colombia, Bolivia, Costa Rica, Guatemala and Panama, offering quality products and reliable services to meet the needs of two businesses: flat glass and glass containers.

Vitro offers solutions for multiple markets, including architectural and automotive as well as cosmetic, pharmaceutical and toiletries. The company is also a supplier of chemical products and raw material, machinery, molds and equipment for industrial use.

As a socially responsible organization, Vitro works on several initiatives aligned to its Sustainability Model, aiming to create a positive influence in the economic, social, and environmental aspects relevant to its stakeholders, in a responsible corporate management framework.

In March 2017 Vitro acquired Pittsburgh Glass Works' (PGW) automotive original equipment manufacturer (OEM) glass business from LKQ Corporation. The acquisition completes the agreement announced last December for US\$310 million, free of cash and debt. The final acquisition price is subject to potential post-closing purchase price adjustments.

Vitro's main mission is to provide efficiently the best solutions in products and services to the industries in which it participates in order to create value for its clients, shareholders, employees, suppliers and the communities where it operates.

The company operates under a philosophy of customer service and satisfaction, nourished by a century of experience and, above all, a strong commitment towards transparency.



that helps the shower glass stay cleaner longer and makes it easier to clean. If left unprotected, even the highest-quality glass can become dull and hazy after years of heat and humidity in a shower enclosure.

names to know in the window industry for year-round comfort and energy performance.

Clarvista® Glass function is to protect the clarity right from the beginning and keeps it clear for the lifetime of a shower glass.

With the durable Clarvista^W Glass coating, customers get a super-smooth, protective seal

Unlike sprayed-on coatings, the Clarvista® Glass coating is fused to the glass during manufacturing, sealing the glass surface with a lifetime protective barrier. So with regular maintenance, shower enclosures built with Clarvista® Glass will maintain their beauty and clarity for many years to come. *

HISTORY

- 1909** Vidriera Monterrey, the first Glass Containers plant, starts operations in Monterrey, Nuevo León.
- 1929** The first Flat Glass Factory is inaugurated, in Nuevo León.
- 1935** The Company starts exporting products to other Latin American countries.
- 1942** It is created what today is known as Industria del Álcali to produce raw materials.
- 1943** Fabricación de Máquinas, S.A., starts its operations in order to develop in house industrial technology.
- 1968** The first line of float glass starts in Vidrio Plano de Mexico, S.A.
- 1974** Vitro is listed in the Mexican Stock Exchange.
- 1981** Vidrio Plano, S.A. de C.v. installs a float glass plant in García, Nuevo León.
- 1985** Located in Texas Vitro Packaging is born for the sale and distribution of glass containers in the U.S.
- 1991** MUVi - Glass Museum opened its doors to record, preserve and promote the history of glass.
- 1995** Vitro acquires Vidrio Lux, the largest glass container producer in Bolivia.
- 1996** Vitro Colombia is created to produce and distributes automotive and architectural glass.
- 2007** Starts operations one of the world's largest glass containers plants towards meeting the requirements of the CFT market.
- 2008** Vitro obtains for the first time the label: Socially Responsible Company.
- 2011** Vitro receives for the first time the Sustainable Business Seal by the Mexican Stock Exchange.



VITRO

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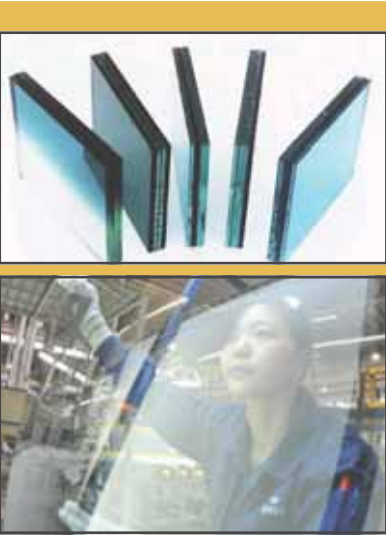
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Fuyao Group

Automotive and architectural glass for industry 4.0



Automotive Glass

High quality automotive glass spoke Vanguard, coupled with improved product lines and huge production capacity, constitute Fuyao industrial matrix and core competitiveness.

- **HUD WINDSHIELD**
 - Reduce the frequency of the driver looked down to see the instrument;
 - Avoid outside interference distract the driver, increasing the reaction rate;
 - Release eyes, Imagine driving,

and improve comfort and security-type;

- **HEATING GLASS**
 - Available clip wire heating, heating coating, printing heating;
 - Rain and fog to provide a clear vision, improve driving safety

- **HYDROPHOBIC GLASS**
 - Greatly improve the car's vision and visibility rain;
 - Easy to remove dirt on automotive glass, clay, wax, oil and other contaminants impede vision glass;
 - Easy to remove ice winter glass, frost, snow;

“Fuyao Group has grown into one of the world’s largest automotive glass supplier, with its products recognized and purchased by world’s top automobile manufacturers”

- Provide a clearer vision, and improve comfort and security-type;
- **SOUNDPROOF GLASS**
 - By absorption of acoustic PVB noise, reduce engine, tire friction, dry wind noise and other incoming car, for the most uncomfortable hearing the human auditory range 1000 ~ 4000HZ can reduce 5 ~ 10db of noise;
 - Weight loss, to ensure the noise reduction effect of the premise, you can use the thinner glass;
- **ELECTROCHROMIC**
 - Electricity regulator transmittance, personalized and increase privacy;
 - Sandwich configuration, enhanced security type
- **COATED GLASS**
 - In the car, slowing the car temperature;
 - Sun, radiation, energy saving;
 - Reduce night driving glare stimulation, and improve comfort and security type;
- **SOLAR GLASS**
 - By solar energy into electricity for the car to provide energy;
 - When you can stop, the power to provide energy for charging the car, automatically adjust the interior temperature;
 - Improve comfort and reduce fuel consumption;

- **PANORAMIC SUNROOF**
 - Maximize broaden their horizons, sitting in the car can be above the panoramic views, like being in nature;
 - Front and rear seat has skylights feeling excellent lighting effects to bring clearer occupants mood;
 - Ventilated;
 - Sandwich of glass, with better security and excellent sound;
- **INTEGRATED MODULAR HEMMING**
 - Achieve multifunctional glass parts;
 - Integration of multiple automotive parts in one;
 - Improve the accuracy of the various components with increased shapes, sizes overall stability;
 - Improve the efficiency of automobile assembly line assembly;
- **EDGING OUT**
 - Achieve multifunctional glass parts;
 - Simple and elegant design, the exposed edge glass design of the typical technology program, loading simple and beautiful;
 - Design and development cycle is short, low tooling costs;
- **ADHESION HEMMING**
 - Achieve multifunctional glass parts;
 - Material selectivity wide;

- Mold Tooling low development cost, short development cycle;
 - **INJECTION HEMMING**
 - Easy with the car frame design needed to achieve a variety of cross-sectional shape edging, can compensate for fluctuations in the assembly of the body;
 - Edging strip and glass bonding firm, car rubber can be directly hit the side of the package;
 - Mold injection molding, good form stability, high dimensional accuracy;
 - Integration of various types of functional accessories;
- Architectural Glass**
- Fuyao Group introduces the most advanced types of architectural glass production line and a variety of cold equipment, which produces the advantages of high-quality float glass and has a stable of quality management system, the introduction of off-line coating line leading international technology, and other advanced equipment .To provide quality engineering glass for large construction projects, large-scale public construction projects, and real estate.
- **TEMPERED GLASS**

Tempered glass is safety glass, to enhance the strength of the glass, usually using chemical or

- physical methods, the formation of compressive stress in the glass surface, when the surface of the glass to withstand external forces first counteract stress, thereby increasing the carrying capacity of reinforced glass itself wind pressure resistance, cold and heat resistance, impact resistance.
- **SEMI-TEMPERED**

Semi-tempered glass between a variety of ordinary plate glass and tempered glass between which both parts of the advantages of glass, such as the strength of the higher ordinary float glass, is two times that of ordinary float glass, while avoiding the glass flatness of the poor, vulnerable blew, once the damage that is not satisfactory overall crushing of weakness.
 - **CHEMICALLY TEMPERED**

Chemically tempered glass surface compressive stress of the glass strength can be improved, when the glass broken glass and float glass fragments similar, it is not chemically toughened safety glass must be used for dissection. Strength chemical tempered glass is 6-8 times that of ordinary glass.
 - **INSULATED GLASS**

Insulating glass is two (or three-piece) glass, using high strength and tightness composite adhesive bonding glass and

Company Presentation

Fuyao Glass Industry Group Co. Ltd (briefly "Fuyao Group") is a joint venture company in the People's Republic of China, engaged in the production of float glass, automobile glass and construction glass. It is one of the largest auto glass producers in the world,[1] with customers including large international automobile manufacturers such as Ford, General Motors and Volkswagen Group. It was established in 1987 and is headquartered in Fuqing, Fujian. It was listed on the Shanghai Stock Exchange in 1993 and on the Hong Kong Stock Exchange in 2015.

At present, Fuyao Group has grown into one of the world's largest automotive glass supplier, with its products recognized and purchased by world's top automobile manufacturers and OEMs, such as Bentley, Mercedes-Benz, BMW, Audi, GM, Toyota, Volkswagen, Ford, and Chrysler. Providing services supporting OEMs globally and customized solution packages for automobile glass, the company has been awarded excellent global supplier recognitions by various automakers.

Fuyao Group is proactively exploring and carrying forth the industry 4.0 concept (through the Research & Development department). With its development motivated by knowledge and innovation, Fuyao aims to provide quality glass with "spirit" for its customers through intelligent manufacturing. It ranks among the top companies in the global glass industry in terms of information technology and production automation.

the aluminum frame contains desiccant, made of high-performance noise insulation, anti-frost, moisture, high-strength glass wind pressure.

• LAMINATED

Laminated glass is sandwiched between two pieces of glass into a layer of polyvinyl butyral as the main component of PVB interlayer. Even broken glass, debris will be glued to the film, broken glass surface remains clean and smooth. Laminated glass also has good sound insulation.

• GLAZED

Glazed glass is inorganic glaze (also known as ink), printing to the glass surface, and then by drying or heating steel processing, will give a glaze firing permanent wear-resistant

glass surface, acid decorative glass products. This product has a high functional and decorative. There are many different colors and patterns, such as strip, mesh-like pattern, etc., and electrical. Pattern can be designed according to different needs of customers.

Float Glass

Fuyao Group mainly produces tinted float glasses. As the raw material for auto-glasses, float glass occupies an important position in the company's production chain.

These are the main kinds of float glasses :

- **Clear Glass;**
- **Gray Glass;**
- **F Green Glass;**
- **UV-CUT;**
- **Solar green glass;**
- **Clear Glass. ***

HISTORY

Fuyao Group. was founded in Fuzhou, China, in 1987.

Since its inception, Fuyao Group has always been committed to manufacturing quality glass independently for Chinese people and playing a supporting, but significant role in China's automotive industry. To this end, it upholds the core values of "diligence, simplicity, learning and innovation," and adheres to its strategic path of independence, applied R&D, openness and inclusiveness.

After more than three decades of development, Fuyao Group now boasts a number of modern production bases in 16 provinces and cities in China and 9 foreign countries, including United States, Russia, Germany, Japan, and South Korea; as well as four R&D centers in China, United States and Germany, with over 26,000 employees worldwide. In 2016, its business income totaled 16.621 billion yuan, with a net profit of 3.144 billion yuan.

In recent years, it has received various awards and titles for its innovation capabilities, such as the Finalist for the China Quality Award (CQA), Demonstration Enterprise for Intelligent Manufacturing, National Innovation Demonstration Enterprise, and National Enterprise Technology Center. Fuyao Group has been included in the list of Top 500 companies and Top 500 private enterprises in China by Fortune magazine for several years. It has also received various social awards and honors, such as the Outstanding Corporate Citizen of the Year Award, the Outstanding Listed Company of the Year Award, and the CCTV Outstanding Employer of the Year Award.

Since the year of 1987, Cho Tak Wong, as an individual donor, has donated more than eight billion yuan, which won him the reputation as the "real top philanthropist". In 2009, he was awarded Ernst & Young's World Entrepreneur of the Year, equivalent to the Oscars, but for entrepreneurs. In 2016, he won the Phoenix Award, the most prestigious prize in the global glass industry, and the panel observed that "led by Cho Tak Wong, Fuyao Group has changed the global structure of the automotive glass industry".



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Taiwan Glass

Advanced Technology and Total Quality Management: keys to success



The company's products consist of flat glass, including float glass, processed glass, and automobile glass; photoelectric glass, including photovoltaic glass and concentrating solar power mirrors; and fiber glass, including glass fiber and glass fabrics. Its products also comprise containers, such as glass bottles and jars; tableware, including tumblers, beer and

whisky glasses, mugs, canisters, storage jars and boxes, ashtrays, candleholders, bowls/plates, and others; and kitchenware comprising tea pots, coffee pots, pitchers, storage jars, glass covers, etc.

FLAT GLASS

FLOAT GLASS

- **Clear Float Glass**

Clear Float Glass is made of

molten glass which flows through tweek to tin bath and then to lehr. While floating through the molten tin, the glass under the works of gravity and the surface tension becomes smooth and flat at both sides.

- **Tinted Float Glass**

Tinted Float glass is made of molten glass mixing with a prescribed quantity of tint

agent, which flows through tweek to tin bath and then to lehr. While floating through the molten tin, the glass under the works of gravity and surface tension becomes smooth and flat at both sides. Tints available are French green, Ocean blue, Bronze, Grey.

- **Super Clear Glass**

Super Clear Glass is made up

“Taiwan Glass’ production incorporates flat glass, photoelectric glass and fiber glass”

of clear float glass by reducing its green tint and iron content to achieve optimum clarity and vision.

Super Clear Glass can be further processed, such as tempering, laminating, insulating, coating, bending and so on. In addition to widely used on the building facade. The high level of transparency is more suitable for car windows and the interior of the house, for example mirror, display cabinet, ceramic silkscreen glass, picture frame, glass furniture and table tops.

• **Rolled Glass**

Rolled glass is made by patterned rollers which roll over glass plates whilst they are still hot and moldable. It not only provides function of visual screen but also creates aesthetic senses of changing lights and shades.

PROCESSED GLASS

• **Reflective Glass**

Reflective Glass is manufactured by using the magnetron sputtered vacuum deposition technique. In vacuum chambers, a homogeneous film of metal or metal compound is coated directly on float glass. By adjusting specific factors in the process different thickness of this metallic film coated will lead to various colors and high thermal performance of reflective glass products.

• **Low-E Glass**

Low-E Glass" refers to a series of high-performance low-emissivity products manufactured by TGI introducing state-of-the-art vacuum sputtering coating equipment and technology from Germany's Von Ardenne.

The vacuum sputtering process coats glass surfaces with several layers of different materials. Among these, a silver layer effectively reflects infrared rays while maintaining excellent thermal performance.

• **Low-E Vacuum Glass**

Consists of one piece of float glass and one piece of Low-E Glass, there are tiny spacers to form a gap between two glass plates with a vacuum space 0.2mm. All edges are sealed by frit frame to enclose the space. Insert a tube connected to this space for degassing. Seal the tube after degassed, this panel is formed as a Low-E vacuum glass.

• **Insulating Glass**

Insulating Glass is manufactured by fusing together 2 panes of glass spaced by dry air or Argon gas. Its excellent efficiency in solar heat insulation, greatly reduces cooling loads.

• **Tempered Glass**

Tempered Glass is made by heating flat glass to just below its softening temperature and suddenly chilling it with jets of cold air. It results the outer skins under powerful compressive stress and the

interior with severe tensile stress. In consequence, the impact applied to the glass will be overcome by the compressional stress on the surfaces to assure safety of use.

• **Heat Strengthened Glass**

Heat Strengthened Glass is made by evenly heating flat glass to approximately 620°C. The ceramic roller transmits glass at a stable speed to ensure an even temperature and optical performance. Heat strengthened glass has similar production process to that of tempered glass, except for a longer chilling duration.

• **Laminated Glass**

Laminated Glass is formed as sandwich of 2 sheets of glass, between which is bonded together with a tough and thermoplastic polyvinyl butyral (PVB) interlayer under heat and pressure. The PVB interlayer withstands penetration from impact. Even if the glass cracks, splinters will adhere to the interlayer and not scatter. In comparison with other kinds of glass, laminated glass has much higher strength to resist shock, burglary, burst and bullets. Laminated glass with a tinted interlayer will beautify the buildings and harmonize their appearances with surrounding views which meet the demand of architects.

• **Ceramic Silkscreen Glass**

Ceramic Silkscreen Glass is made by using ceramic frit



to print graphics through a special screen onto float glass. Melt colorant into glass surface in tempering furnaces and subsequently a silkscreen glass product with qualities of non-fading and multi-pattern is manufactured.

• Bent Glass

The glass is heated on a mold and bends by its own gravity and is then slowly cooled to produce bent glass. Buildings glazed with bent glass have the advantages of diversified facade and interior partition. Glazed on stair railings and gates, bent glass will improve spectacular and aesthetic senses of buildings. Glazed on aquariums and showcases, bent glass will create special visual effects. Bent Glass can be processed into laminated bent glass and insulating bent glass.

• Mirror Glass

Mirror Glass is produced by coating a silver film, a copper film and two layers of waterproof paint on the back of flat and parallel float glass.

PHOTOELECTRIC GLASS

PHOTOVOLTAIC GLASS

• Photovoltaic Cover Glass

Low Iron Patterned Solar Glass is produced by TG Fujian Photovoltaic Glass Co., Ltd, Which can be used as the cover glass of solar module and has the merits of low iron, high transmittance, small thickness

difference, tempered easily, low self-cracking, efflorescence resistance, hailstones resistance and impact resistance.

CONCENTRATING SOLAR POWER MIRROR

• Concentrating solar

mirror - The concentrating solar mirror is an important component of the solar thermal power generation system and works as reflectors concentrating a large area of sunlight onto the collector.

• Solar thermal power generation

- also called as concentrating solar power(CSP).

• Power generation

- The system concentrates the sunlight to heat the fluid media in the collector to high temperature and turns the thermal energy into the mechanical energy.

FIBER GLASS

• Glass Yarn

TGI Fiber Glass Yarn, undertaking compounded high quality material with precise portion, rigorous production control and refinement by high temperature, has achieved recognition in correspondent with international specification; who are mainly applied on woven glass fabric as being the mainly material of PCB (Printed Circuit Board), also extends its application field like wise the reinforcement and others.

• Glass Fabric

The product 'Glass Fabric' wove from Taiwan glass' home-made yarn, is mainly applied for Copper Clad Laminate (CCL) industry who reworks on it to 'prepreg' and laminate as the preparatory status in making Printed Circuit Board (PCB) The Taiwan glass made 'Glass Fabric' undertakes good properties of stable, advanced and high quality as well as yarn serves global well-known CCL manufacturers with premium and reliable quality. It is honored with goodwill by customers appraisal.

CONTAINER, TABLEWARE & KITCHENWARE

TGI glass containers are non-porous, with exceptional transparency to allow the products to show their true colors. High tensile strength means these containers retain their shape, resist shattering, and are easy to seal, preserving flavor, color and aroma for the long term. In addition, glass containers can withstand gradual heating without losing their shape.

From an environmental standpoint, glass containers are an ideal packaging choice, 100% recyclable. TGI has long been involved actively in enhancing the glass recycling system, and in 1996 established a waste glass recycling factory to raise

the recycling rate throughout Taiwan.

Those are the main **destinations** for the category:

CONTAINER

- Liquor, Wine & Beer
- Food Jar, Pepper, Spice, Sauce, Oil & Vinegar
- Soft Drink, Juice & Milk
- Pharmaceutical
- Cobalt blue

TABLEWARE

- Bowls and Plates
- Water Tumbler
- Wine Glass
- Mugs
- Color
- Storage Jar & Box
- Ashtrays
- Candleholder
- Others

KITCHENWARE

- Tea Pot
- Pitcher
- Bubble Ball
- Storage Jar
- Coffee Pot
- Glass cover *



Company Presentation

Advanced Technology and Total Quality Management: keys to success

Taiwan Glass' production incorporates flat glass, photoelectric glass and fiber glass

Taiwan Glass Ind. Corp. produces and sells glass products. The company exports its products to China, Japan, Korea, South-East Asia, North America, the Middle East, Australia, Europe, South Africa, Russia, and other markets. Taiwan Glass Industrial Corporation was founded in 1964 and is based in Taipei City, Taiwan. Taiwan Glass a highly effective organization with outstanding achievement through global perspective, sound operating strategy and strong financial foundation.

Taiwan Glass Group has been established for 50 years with dedication to its management philosophy, persistence of high technology and total quality control in order to provide high-quality products to customers.

Its mission is to create strong customer relationships through delivering outstanding quality and comprehensive service at reasonable prices to satisfy customers; make contributions to society through rewarding shareholders and taking care of employees. The main "words" to refer for production are **Advanced Technology** and **Total Quality Management**.

HISTORICAL HIGHLIGHTS

- 1964** Company established, capital NT\$150 million
- 1965** Asahi, Japan for Sheet Glass TAA.
- 1967** TS Factory Sheet Glass Plant Production
- 1970** Wheaton Glass PLC. USA for Container Glass TAA.
- 1972** TGI Building inaugurated
- 1973** TGI Stock listed on Taiwan Stock Exchange
- 1974** Pilkington PLC. UK for Tinted Glass TAA.
- 1977** Veba Glass Ag. Germany for Tableware Glass TAA.
- 1980** Pilkington PLC. UK for Float Glass TAA.
- 1983** TF Factory Float Glass Plant Production
- 1987** Owens Corning Fiberglas Corp. USA for Fiber Glass TAA. Sibata Hario, Ltd. Japan for Heat-Resistant Glass TAA.
- 1988** Kanebo, Ltd. Japan for Fabric Glass TAA.
- 1990** TT Factory Fabric & Fiber Glass Plant Production
- 1992** Founder Lin, business visit to China
- 1993** Taiwan Glass China Holding Ltd. established
- 1994** Hermann Heye, Germany for Container Glass TAA 30 th Anniversary QFG Construction
- 1995** Ishizuka Glass Co., Ltd. Japan for Tableware TAA. TF, TT, TS, Factory ISO-9002 Certification Qingdao Float Glass Co., Ltd. Plant Production
- 1997** Changjiang Float Glass Co., Ltd. Plant Production
- 1998** TL Factory Glass Fabric Plant Production
- 2001** TT, TS, TF, TL, Factory ISO-14001 Certification
- 2002** Founder Lin, Awarded with the Phoenix Award (USA) Changjiang Float Glass Co., Ltd. CFG-2 Plant Production
- 2004** 40 th Anniversary TG Donghai Glass Co., Ltd. Plant Production TG Chengdu Glass Co., Ltd. Plan Production
- 2005** TG Huanan Glass Co., Ltd. Plant Production Taichia Glass Fiber Co., Ltd. TGF-2 Plant Production
- 2006** TG Kunshan Glass Co., Ltd. CFG-3 Plant Production TG Tianjin Glass Co., Ltd. Plant Production TL Factory TF-4 Flat Glass Plant Production
- 2007** Taichia Glass Fiber Co., Ltd. TGF-3 Plant Production 2008 TG Chengdu Glass Co., Ltd. CDG-2 Plant Production.

- TG Huanan Glass Co., Ltd. HNG-2 Plant Production. Taichia Glass Fiber Co., Ltd. TGF-4 Plant Production. Hsinchu Factory TS-7 Rolled Glass Furnace Rebuilding to Container Glass Furnace.
- 2009** Taoyuan Factory TT-1 Glass Fiber Furnace Rebuilding & Expansion. Lukang Factory TF-4 Low-E Glass Coating Technology. TG Fujian Photovoltaic Glass Co., Ltd Established & GroundBreaking
- 2010** TG Yueda Autoglass Established TG Taicang Architectural Glass Established & Groundbreaking TG Xianyang Glass Co.,Ltd Established TG Anhui Glass Co.,Ltd Established TG Wuhan Architectural Glass Co.,Ltd Established
- 2011** Changpin Factory Plant Production TS Factory ISO-22000 Certification TG Yueda Solar Mirror Co.,Ltd Established Taichia Chengdu Glass Fiber Co.,Ltd Groundbreaking TG Anhui Glass Co.,Ltd Groundbreaking TG Wuhan Architectural Glass Co.,Ltd Groundbreaking TG Teco Vacuum Insulated Glass Corp. Established
- 2012** TG Huanan Glass Co., Ltd. / TG Taicang Architectural Glass Co., Ltd Low-E Glass Production TG Fujian Photovoltaic Glass Co., Ltd FPG-2 Production
- 2013** TG Xianyang Glass Co., Ltd Plant Production Hsinchu Factory TS-10/ TS-11 Production TG Yueda Solar Mirror Co., Ltd Plant Production TG Anhui Glass Co., Ltd Plant Production TG Donghai Glass Co., Ltd DHG-2.DHG-3 Plant Production Shihlien Chemical Industrial Jiangsu Co., Ltd Plant Production
- 2014** Hsinchu Factory TS-4 Production TG Donghai Glass Co., Ltd. DHG-3 Plant Production 50 th Anniversary of TG TG Teco Vacuum Insulated Glass Corp.Plant Production Taichung Factory TF-5 Electronic Grade Ultra-thin Glass
- 2015** TG Yueda Solar Mirror Co., Ltd Established.Plant Production Taichia Chengdu Glass Fiber Co., Ltd.



TAIWAN GLASS

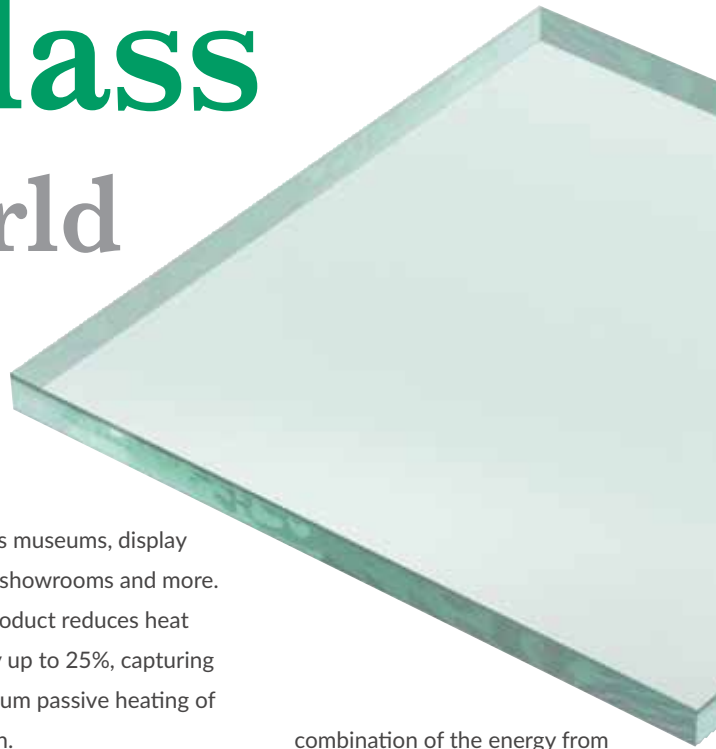
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WWW.TAIWANGGLASS.COM

Viridian Glass

Vision of the world in crystal clear



The company offers residential and commercial glass products, including safety glass, laminated, security, self-cleaning, insulated low-E glass, and double glazed windows; and interior glass products, such as splashbacks, partitions, and wardrobe doors, as well as privacy, decorative, mirror, and one-way mirror glass products. It also provides storm and cyclone, bushfire, architectural, float, décorpatterned, laminated safety, toughened safety and laminated, coated, screen printed, formed, and insulating glass units. In addition, the company offers bushfire resistant, storm resistant, low reflectivity,

protective, bullet-resistant, jail, and military level glass products. It provides its products through a distribution network in Australia and New Zealand.

Clear Vision “VISION OF THE WORLD” IN CRYSTAL CLEAR

OPTIVIEW™

*Low reflection glass – for clear
& unobstructed views*

OptiView™ reduces glass reflection to less than 2% from the standard 7%, thanks to its transparent yet durable anti-reflective coating.

OptiView™ is suitable for a range of applications that require a crystal clear view,

such as museums, display cases, showrooms and more. The product reduces heat loss by up to 25%, capturing maximum passive heating of the sun.

OptiView™ can offer an improved level of noise reduction compared to ordinary glass, keeping all spaces nice and quiet.

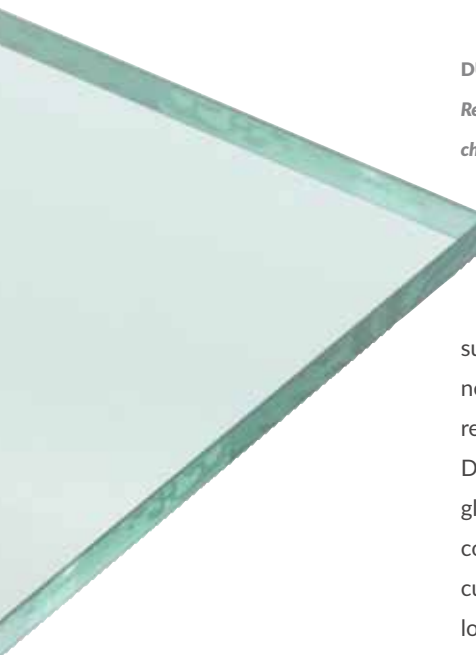
RENEW™

*Self-cleaning glass - low maintenance
vision*

Renew™ is a self-cleaning glass with a specially developed, transparent exterior coating. Applied to the clear glass during manufacture, this is an active coating which uses a

combination of the energy from the sun and a water attractive surface effect to deliver an innovative dual cleaning action. Renew™ has a special dual action coating that breaks down dirt and washes it away, saving the customers on time and money spent on keeping the windows pristine. The special coating on Renew™ keeps glass sparkling clean by allowing water to spread across it easier and breaking down compounds that make dirt stick to glass.

“Viridian is Australia’s largest provider of glass and the only Australian manufacturer of float glass and hard coat performance products”



the spaces from the sun and reducing reliance on heating.

DURACLEAN™

Residue-resistant glass - the obvious choice for shower screens

Unlike standard glass, DuraClean™ is micro-coated with metal oxides that make water slip right over the surface. The coating is colour-neutral and durable, reducing residue build-up.

DuraClean™ is extremely clear glass featuring an anti-corrosive coating on one side. So the customers can enjoy the great look of crystal clear glass in the bathroom, without the constant cleaning!

Suitable for multiple bathroom applications in residential, multi-residential and hotel settings, throughout the years, DuraClean™ will minimise limescale and other unsightly marks that appear on shower screens.

Core Products

SETTING THE STANDARD FOR QUALITY, LOCALLY MANUFACTURED GLASS WITH INFINITE POTENTIAL

VFLOAT™

Premium float glass

The VFloat™ range offers consistently high clarity and low distortion, with a choice of colour and solar heat reduction. VFloat™ is crafted using the float process which creates glass of extraordinary quality with a consistently flat surface.

The colour of VFloat™ will never fade or alter over time. The consistency of the manufacturing and testing processes ensure customers can count on the reliable colour and quality of the glass to last well into the future.

VLAM™

Laminated float glass - the first step in safety, security & noise control

The range is a durable, adaptable, high performance glass solution. VLam™ resists penetration from accidental or deliberate impact. If the glass is broken, fragments adhere to the interlayer and are retained in place for safety purposes. Also by thickening the interlayer, VLam™ can be used for protective purposes. VLam™ offers high UV protection, reducing the rate of fading for furnishes & finishes. It also provides good noise dampening over the same thickness as usual glass.

VTOUGH™

Quality toughened glass - for superior strength, safety & resilience

VTough™ offers a total glass solution that allows greater scope in every kind of design. Five times stronger than ordinary glass, VTough™ is perfectly suited to a wide range of applications that would normally put ordinary glass at risk of breaking. This includes splashbacks, basketball

backboards and lots more. VTough™ is toughened to avoid thermal breakage and resist soft object impacts to last significantly longer than ordinary glass. It is safer than ordinary glass because it forms small fragments if broken, instead of shattering into sharp pieces.

The product is suitable for use in larger areas than ordinary glass of the same thickness because of its resistance to wind loads.

Interior and decorative

BRING SPACE TO LIFE WITH UNIQUE DECORATIVE SOLUTIONS

SPECTRADUO™

Colour-backed glass - for colour and subtle light reflection

Ideal for wardrobe doors and wall panels, SpectraDuo™ is paint-coated glass that delivers a sense of depth and luminosity to any space.

SpectraDuo™ is scratch-resistant and easy to maintain. The vinyl backing applied to the painted surface of SpectraDuo™ provides Grade A safety glass protection.

SPECTRASERAPHIC™

Ceramic painted glass - for colourful and lustrous surfaces

Made by screen printing a ceramic coating onto the glass, SpectraSeraphic™ can help customers liven up their space. Paint is fused to the glass

VFLOAT SUPERCLEAR™

High clarity glass for crystal clear & colour-true views

VFloat SuperClear™ is manufactured to a different recipe to conventional float glass – a low-iron formulation that results in far less of the green pigmentation observed in ordinary clear glass. This provides a glass with bright clarity, dazzling edge effect, and faithful transmission of backing colour. The extreme clarity of VFloat SuperClear™ allows for the transmission of over 90% of natural light – making every space lighter and brighter.

VFloat SuperClear™ maintains the integrity of colours painted or printed onto it or behind it. The transparency of VFloat SuperClear™ maximises passive solar heating, warming

VIRIDIAN GLASS



surface, creating a permanent and durable finish, so with the lasting quality assured. SpectraSeraphic™ is suitable for safety glass standards and will not crack in demanding applications, such as high temperatures of up to 250°C.

SPECTRAPRISM™

Coloured laminated glass – for colourful light in the space

SpectraPrism™ is suitable for a wide range of applications and a variety of different spaces. Its range helps to create inspiring interior designs.

SPECTRAELEMENTS™

Coloured decorative glass - for creating stylish spaces

Named to reflect the natural phenomena from which it draws inspiration, SpectraElements™ is sure to add a special design touch to any space. SpectraElements™ offers colour, depth and reflection to any design. The range is also pre-painted, making it a convenient solution to suit a range of

applications.

When toughened to the relevant standard, SpectraElements™ becomes a Grade A safety glass – making it highly resistant to impact, thermal shock, scratches and more.

SPECTRACOLOUR™

Coloured glass – for bright and beautiful spaces

SpectraColour™ is easy to fit, ultra durable and requires minimal maintenance. The range is ideal for kitchen splashbacks, wall features, wardrobe doors and more.

With 20 colours in the standard range, the customers can add an exciting touch of colour to their space. All 20 standard colours are held in stock at all times and installation is quick and easy.

SCALATEXTURE™

Textured glass – for light diffusion and privacy

Whether it be at home or in the office, some spaces crave natural light yet still demand a

level of privacy. ScalaTexture™ range is the cost-effective option when lighting up a room – without sacrificing the privacy.

Select from a wide range of styles and effects that dramatically change the aesthetic of a setting. From modern facades to old-world interiors, ScalaTexture™ diffuses the light that enters a space, transferring the very best qualities of natural light whilst blocking out onlookers. ScalaTexture™ offers a low-cost decorative touch to a room with a range of styles and visual effects to suit any setting.

Colour is laminated between two sheets of glass, ensuring that the colour remains consistent across various glass thicknesses as well as over time.

SCALASERAPHIC™

Ceramic patterned glass – for privacy and solar control with decorative screening
ScalaSeraphic™ is a range of screen printed designs available

in the SpectraSeraphic™ colour range. Ideal for internal partitions, sunshades and more. ScalaSeraphic™ offers a new design element to the interior palette. With unlimited possibilities for different colours and custom designs, ScalaSeraphic™ diffuses light for a more uniformly lit glazed area.

SCALAMIRAGE™

Patterned-etched glass – for visual texture and luxurious designs

The patterned finish of ScalaMirage™ offers an attractive way to keep the home or a building private. With so many modern pattern options available, ScalaMirage™ offers a unique design element to enhance the space.

The translucency of ScalaMirage™ offers high light transmission to provide natural illumination whilst maintaining privacy.

SCALADESIGN™

Textured architectural glass - create a dynamic aesthetic
Fusing material and light into a sophisticated, new design element of extraordinary quality, the engraving-like textures of ScalaDesign™ create a dynamic aesthetic that transcends the visual stasis of traditional finishes. Its high degree of translucency ensures optimal illumination, while providing subtle obscurity appropriate for

privacy or screening uses. A Grade safety glass when toughened or laminated to the relevant standards, ScalaDesign™ is suitable for interior and exterior uses in both private and public buildings.

MIRRAECHO™

Premium quality silvered glass – for seeing more of the world and reflecting light. Mirrors add a great sense of space to a room and provide valuable light reflection to enhance the available natural lighting. MirraEcho™ offers excellent light reflection, perfectly complementing a sleek modern design. MirraEcho™ is produced with two coats of special backing paint, offering additional protection to the silver coating from steam, moisture and chemicals.

MIRRA CLOUD™

Acid-etched silvered glass – for diffused light without spectral reflection. MirraCloud™ range is an addition to any stylish design. The range combines the best features of LuminaCloud™ and MirraEcho™ – offering a metallic finish and diffused light reflection. MirraCloud™ is produced with two coats of special backing paint, offering additional protection to the silver coating.

MIRRASHIELD™

Laminated silvered glass – for a resilient mirror that enhances light and space

MirraShield™ delivers all the decorative benefits of a mirror, with the additional benefit of being a Grade A safety glass.

Tougher than most mirrors, the range maintains its structural integrity even when cracked. MirraShield™ has a high light reflectance of up to 94% – significantly brightening up any room.

It is produced with two coats of special backing paint, offering additional protection to the silver coating.

A resilient laminated silvered glass, MirraShield™ maintains its integrity even when cracked, and is a Grade A Safety Glass (AS/NZS2208).

MIRRATRUST™

Reflective silvered glass – for opening up the space with peace of mind

MirraTrust™ range is backed with a smooth vinyl film, making it last longer than most standard mirrors. Reflect light and create the illusion of space with the peace of mind of added security.

MirraTrust™ benefits from a protective film. It stays together if cracked, and qualifies as Grade A safety glass.

The product has a high light reflectance of up to 92%, significantly brightening up a

room.

MirraTrust™ has a lower overall impact on the environment compared to other mirrors.

MIRASTAR®

Toughenable semi-reflective glass – for reflecting natural light around the space

MirraStar® is a chromium based reflective coated glass which can be toughened to be suitable for a range of applications where ordinary mirrors don't deliver the benefits of safety glass.

The reflectivity of MirraStar® creates a striking look, while serving the practical purpose of bouncing light around the space to maximise natural light.

The durable coating of the product ensures its long life even in conditions otherwise strenuous for mirrors.

MirraStar® is suitable for a range of applications where ordinary mirrors usually are not. For example in hot areas, like behind stoves – making it the perfect splashback.

LUMINACLOUD™

Acid-etched glass – for privacy and diffused daylight

LuminaCloud™ is a high quality translucent glass that diffuses light to provide natural illumination whilst still maintaining privacy. The translucent satin finish suits modern spaces and is a practical solution suited to a range of applications.

The satin matte finish of the LuminaCloud™ range perfectly complements a sleek, modern design – suitable for both internal and external spaces. LuminaCloud™ is suitable for safety glass applications when toughened, also reducing the risk of thermal breakage.

LUMINAMIST™

Translucent laminated glass – for low-maintenance privacy and soft daylighting

LuminaMist™ is durable, reliable and designed to secure the privacy. The product offers improved level of noise reduction compared to ordinary glass.

PIXAGRAPHIC™

Digitally printed safety glass - for limitless possibilities

PixaGraphic™ transforms glass into a creative medium without limitation for internal and external applications – including retail settings and full-scale external facades.

The PixaGraphic™ manufacturing process combines hardwearing, lightfast ceramic inks, with the very latest in direct-on-glass digital printing technology for a durable finish.

FUTURASCREEN™

Transform surfaces. Conceal digital displays. Endless possibilities

Combining high reflectivity with high light transmission,

VIRIDIAN GLASS



FuturaScreen™ enables digital display and video screens to be full viewable when required, and fully concealed behind a mirror surface when not.

A television or digital display can be an eyesore when not in use. So it's easy to picture the aesthetic benefits, not to mention the utility that FuturaScreen™ can bring to a space - be it a domestic living room, office meeting room, or showroom environment. That's only the beginning.

There are two variants of FuturaScreen™ available - Vivid, which is developed for spaces with a higher level of ambient light, and Mood, for those with lower levels of ambient light. The product is manufactured with a highly durable, scratch resistant pyrolitic coating which makes it easier to process and gives the product

a virtually unlimited shelf life. FuturaScreen™ can also be further strengthened through toughening or lamination making it suitable, when assessed, for a wide range of applications.

Energy Efficiency DESIGNED TO PROVIDE YEAR-ROUND COMFORT & REDUCE RELIANCE ON HEATING & COOLING

THERMOTECH™ *Double glazing - for enhanced comfort and design flexibility*

ThermoTech™ range offers plenty of glass combinations and spacer options within double glazed units, helping the customers create the perfect product to keep their space comfortable and energy efficient.

Suitable for hot and cold climates, products in the

ThermoTech™ range are capable of keeping the space naturally lit without increasing energy consumption or power bills. ThermoTech™ products offer superior thermal insulation and a range of solar control levels without sacrificing on natural light - keeping the space a comfortable temperature.

COMFORTPLUS™ *Laminated insulating glass in a range of tones - creating a sanctuary from the elements*

ComfortPlus™ is one of Australasia's leading Low E performance laminate, suitable for both commercial and residential applications and available in a contemporary and comprehensive range of tones. ComfortPlus™ gives improved insulation and a choice of solar control compared to ordinary glass.

Each tone from the range has benefits suitable for different residential and commercial applications, widening the opportunity to choose the best glass type based on the needs of a project.

ComfortPlus™ reduces UV radiation by 99%, increasing the life of the furniture in the home or building.

COMFORTPLUS™ TRANSLUCENT *Laminated insulating glass - for comfort, sanctuary & privacy*

ComfortPlus™ Translucent offers improved insulation

and greater solar control, maintaining the ideal temperature in the space while maximising energy efficiency.

The translucent interlayer obscures the glass, addressing privacy concerns in spaces while letting in sunlight.

ComfortPlus™ Translucent is laminated glass, reducing UV radiation by 99% and increasing the life of the furniture.

ENVIROSHIELD PERFORMANCE™ *Advanced laminated insulating glass - for high light & clarity with minimal heat*

EnviroShield Performance™ achieves the energy efficiency of translucent glass while maintaining the visual impact of clear glass. It delivers high daylight transmission.

There are a range of solar control levels available in the range to offer improved insulation and maintain a comfortable temperature in any space without heavy reliance on heating and cooling systems.

The high selectivity of Enviroshield Performance™ ensures less heat radiates from the windows, lowering energy consumption.

ENERGYTECH™ AND SOLTECH™ *Energy Efficiency*

EnergyTech™ and SolTech™ can both keep the temperature of a room controlled, lowering the energy consumption and

reducing the need for additional heating and cooling.

EnergyTech™ and SolTech™ provide better insulation and enhanced solar control levels to keep the space comfortable across all seasons.

The low visible light reflectivity of the range allows natural light to flood into the room, making a space lighter and brighter.

PERFORMATECH™

High performance double glazing – for top-tier thermal performance & light transmission

PerformaTech™ balances high levels of light transmission with very low levels of solar heat gain to provide a brighter and more comfortable space.

PerformaTech™ offers superior thermal insulation and a range of solar control levels – keeping any space at an ideal temperature.

The product offers a high level of design flexibility because of the high ratio of daylight to radiant heat.

PerformaTech™ can be combined with other Viridian products in a double glazed unit to deliver multiple benefits including additional privacy, security, noise and other benefits.

Fire Protection

PROTECTING HOME AGAINST THE THREAT OF BUSHFIRES WITHOUT COMPROMISING ON NATURAL LIGHT

PYROGUARD 40™

Double-glazed bushfire-rated glazing – for peace of mind without compromising on comfort

PyroGuard 40™ is specially insulated glass that gives homeowners the benefits of larger windows yet still provides a barrier to heat exposure in the event of a fire. It also transmits low levels of heat – reducing the risk of secondary fires.

When living in a BAL40 zone, PyroGuard 40™ is the only fire protection system required for windows – eliminating the need to install unsightly shutters or screens.

The energy efficiency and range of solar control allows PyroGuard 40™ to deliver a comfortable living environment no matter the season.

Noise

DESIGNED TO REDUCE THE OUTSIDE NOISE SO PEOPLE CAN ENJOY A LITTLE PEACE AND QUIET

COMFORTHUSH™

Insulating acoustic laminated glass – for quiet comfort from unwanted noise

ComfortHush™ glass absorbs external noise and maintains a comfortable temperature at home.

The product absorbs outside sound, allowing people to enjoy the view without taking in the outside commotion.

The ComfortHush™ range has enhanced UV protection,

helping reduce the rate at which the furniture fades.

VLAM HUSH™

Acoustic laminated glass – for safety, security & superior noise reduction

VLam Hush™ is a thinner, lighter solution to help customers stay connected with their surroundings, without all the racket.

The product buffers outside sound, decreasing sound by 34% in comparison to ordinary glass^ – allowing to enjoy a little peace and quiet.

The VLam Hush™ range has enhanced UV protection, helping reduce the rate at which the furniture fades.

Security

ALL NATURAL LIGHT FOR BUILDINGS PROTECTION

ASSAULTGUARD™

Security laminated glass for added protection for the home or workplace

AssaultGuard™ delivers the beautiful aesthetic of glass, while still offering a strong and affordable barrier against forced entry.

AssaultGuard™ is made with a thick interlayer which retains its integrity and continues to act as barrier – even after suffering repeated blows from bricks and other heavy objects.

AssaultGuard™ provides high UV protection, reducing the rate of furniture fading.

ASSAULTGUARD ULTRA™

specialist security laminate – defined protection levels for high threat facilities

Specially developed for use in areas like police stations and mental health facilities, AssaultGuard™ Ultra the step up from AssaultGuard™ for delivering security.

Made using a variety of glass types and thicknesses and combined with security interlayers, AssaultGuard™ Ultra is designed to resist a wide range of attacks.

AssaultGuard™ Ultra is available in a range of options for colour, toned and Low E combinations to meet energy efficiency and privacy requirements.

BULLETPROTECT™

Specialist security laminate – for protecting against firearm attacks

BulletGuard™ range protects from the threat of firearm attacks. What makes it extra special is that it also delivers excellent daylight transmission and clarity.

BulletGuard™ provides resistance to defined attack levels under the Australian and New Zealand Standard AS/NZS2343. The range is also customisable to specific threat levels and offers design expertise through life durability and high visual quality, it also maintains visual integrity even after attack.

BulletGuard™ offers a lightweight option, which is ideal for many situations where

VIRIDIAN GLASS

bullet resistant glass is needed – especially in armoured and defence vehicles.

INTRUDERGUARD™

Security laminated glass – for transparent home security

IntruderGuard™ looks like normal glass but provides a barrier to forced entry that is 20 times harder to break through than standard float glass.

IntruderGuard™ is specifically developed to offer a resilient and long-lasting barrier that resists penetration even upon breakage. There are a range of options for colour, translucency and glass coating available within IntruderGuard™.

The product reduces the rate at which the furniture fades by absorbing 99% of UV radiation.

OBSERVA™

Two-way security mirror – for discreet monitoring & reduced sound transmission

Observa™ provides a two way mirror that offers offers high quality vision and effectively provides discreet, unobtrusive monitoring. It has the appearance of a mirror on the subject side, while providing privacy for observers.

The product achieves privacy for observers as long as a light ratio of 1:7 is achieved, where the subject side is brightly illuminated and the observer side is dimly lit. Observa™ can be tailored to suit a variety of applications and needs, for example adding

a heavy interlayer to provide enhanced protection.

Structural Systems

PROVIDING A RANGE OF PRACTICAL SOLUTIONS THAT DELIVER UNRESTRICTED VIEWS OF THE WORLD

VTOUGH™ POOL FENCING

Its range provides the safety, flexibility and stylish design needed for customers' next pool fence project.

Viridian VTough™ Pool Fence panels and hardware provide flexibility to secure a pool whilst meeting building regulations when installed to the relevant standards and guidelines.

Available in a variety of sizes, providing flexibility for install and design.

VTough™ Pool Fencing has undergone vigorous testing by both Viridian and the product.

DÉCORFLOOR™

Custom structural laminates – for creating spectacular entrances

Ideal for creating feature staircases, walkways, display areas and so much more, DécorFloor™ lets natural light enter the building across all levels, while also adding a distinct design touch to any space.

.DécorFloor™ has a range of non-slip patterns that not only offer an aesthetic benefit, but also prevent any safety issues. The product creates a striking feature with a range of coloured options and custom designs available. *

Company Presentation

Viridian Glass manufactures float glass and hardcoat performance glass products in Australia.

The company was founded in 2007 and is based in Dandenong, Australia. Viridian Glass operates as a subsidiary of CSR Building Products Ltd.

Viridian is Australia's largest provider of glass and the only Australian manufacturer of float glass and hard coat performance products. With a range covering most types of residential and commercial glass variants including innovative energy-efficient and special-use materials, Viridian delivers New World Glass. The company has helped shape the way Australians see glass; from being just a functional building product, to something that adds value to people's homes and lives.

As a business, Viridian leads the industry for quality and innovation and processes glass from manufacturing through to installation. To service the wide range of customers across Australia with quality glass products, Viridian operates its manufacturing operations in conjunction with a major distribution centre (DC) out of its Dandenong headquarters in Melbourne. The DC comprises seven warehouse buildings, housing glass products for commercial and residential usage.

HISTORY

Viridian was born in 2007 when CSR acquired Pilkington Australia and DMS Glass, becoming a part of CSR's building and construction products family.

Both Pilkington and DMS have proud histories of new and innovative ideas, with Pilkington's heritage in Australia dating back to 1856. Today, the company continues this passion and love for glass as the leading glass provider and only local manufacturer of architectural glass in Australia.



Viridian
New World Glass

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1989

Glass-Technology
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GLASS-TECHNOLOGY INTERNATIONAL is the leading international magazine for professionals involved in the flat and bent glass industry, from building to automotive, and from furniture to household appliances. **G-TI** is useful for those working in float glass plants as well as glass processors/fabricators, glazing contractors, automotive glass installers, window and door manufacturers, glass merchants, wholesalers, etc. With about 100 pages per issue, it is the bi-monthly tool for keeping abreast of new technology, new products, company life and all innovations in the world of flat and bent glass.



1990

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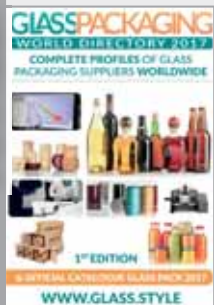
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2013

FLATGLASS
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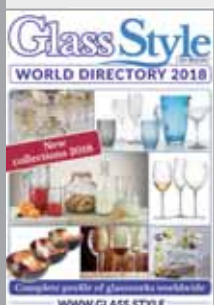


2017

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The **GLASS PACKAGING WORLD DIRECTORY 2017**, the first international directory dedicated to the production of the glass packaging industry, provides company profiles of suppliers, enabling them to present their companies and activities, along with photos of products and the companies. The profiles will be available on the glass.style website, for all potential users and users of container glass and accessories.

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
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