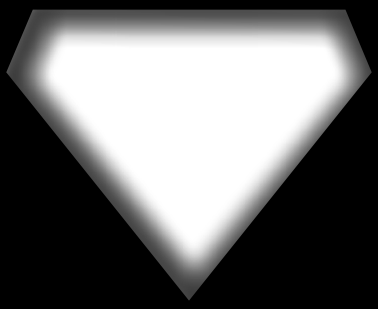
sapphire

ELECTRONIC DISPLAY

"Best in Show" award winner of "SID Display Week 2014"

SEE WHAT'S IMPORTANT



NO REFLECTION

Sapphire™ virtually eliminates glare by reducing reflection to as low as 0.5%.

IMPROVED TRANSMISSION

Sapphire™ increases light transmission up to 99% and ensures unparalleled color rendering. The clarity of transmitted information and images makes anti-reflective coatings a must for HD and 3D displays.

NEUTRAL COLORS IN REFLECTION AND NO COLOR SHIFT UNDER AN ANGLE

Sapphire™ has neutral and uniform reflected colors, and they remain stable under various angles of viewing.

EASY TO PROCESS TO YOUR SPECIFICATIONS

Can be heat strengthened, thermally-toughened (tempered), laminated, bent, printed on, drilled, UV glued, screen printed and edge-worked.*

HIGH DURABILITY AND LONG LIFETIME OF THE COATING

Durability performance meets ISO standards. Suitable for outdoor use.

ABRASION RESISTANT AND EASY TO CLEAN

Now with a proprietary top coating, Sapphire™ can be easily cleaned with any appropriate cleaner.* The top coating makes the Sapphire™ product line scratch-resistant for easier processing and use.

*Please refer to Groglass® Handling Guidelines

SAPPHIRE™ BY GROGLASS® FOR ELECTRONIC DISPLAYS

SAPPHIRE™ COATING FOR GLASS AND ACRYLIC COVERS OF ELECTRONIC DISPLAYS VIRTUALLY ELIMINATES UNWANTED REFLECTIONS, CREATING AN UNOBSTRUCTED VIEW OF THE INFORMATION AND IMAGES.

ANTI-REFLECTIVE COATING CAN ALSO BE COMBINED WITH UV-BLOCKING FEATURES TO PROTECT OUTDOOR DISPLAYS FROM DAMAGING UV RADIATION.

Sapphire™ anti-reflective glass and acrylic is produced in the world's largest vertical double-side magnetron sputtering coater in a process where anti-reflective coating is applied in a single manufacturing step on one or both sides of the glass and consists of multiple layers of metal oxides. The vertical sputtering method ensures the manufacture of the highest quality anti-reflective glass. The process gives the glass the ability to reduce the residual reflection of glass to as low as 0.5% and simultaneously increases light transmission by up to 99%, providing uniformity and neutral reflection color over the entire sheet.

Sapphire™ is available with either one or two-side anti-reflective coating on low iron, regular float and hard coated Low-e glass and on other specialized substrates like etched and borosilicate glasses.

Sapphire™, like conventional glass*, can be process-strengthened, thermally-toughened, laminated, bent, screen printed, drilled and edge-worked.

Sapphire™ in addition to its anti-reflective properties, is also produced combining anti-reflective coating with UV-blocking features to provide a high >90% UV block or on a wide variety of thicknesses of pre-laminated glass substrates and acrylic to ensure up to 100% UV protection and shatter resistance.

PRODUCT DETAILS

GLASS SUBSTRATE*	GLASS THICKNESS* (mm)	MAXIMUM SIZE (mm)	LIGHT TRANSMISSION	LIGHT REFLECTION (per side)
LOW-IRON	2 - 12	2250x3210	~99%	~0.25%
REGULAR FLOAT	2 - 12	2250x3210	~97%	~0.25%
LAMINATED GLASS	4.4 - 12.8	2250x3210	~98%	~0.25%
LOW-IRON ETCHED GLASS	2 - 12	2250x3210	~99%	~0.25%
HARD LOW-E	4, 6	2250x3210	~93%	~0.60%
ACRYLIC	3, 4.5, 6	For details please contact us at sales@groglass.com		

*For other substrate types (e.g., Borosilicate) and thicknesses (e.g., 1mm), please contact us at sales@groglass.com

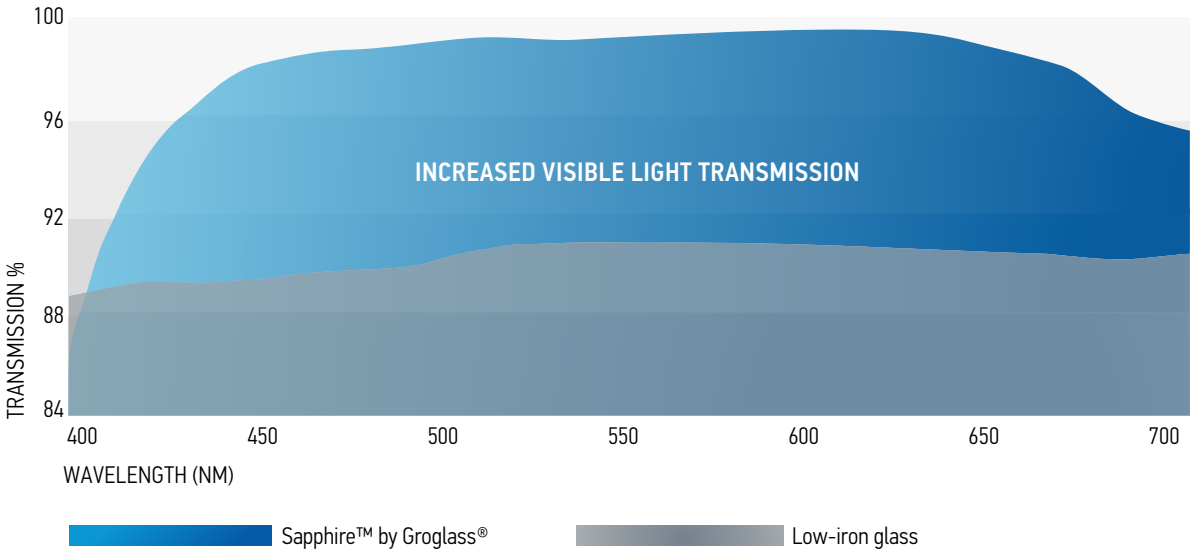
DURABILITY

SAPPHIRE™ IS IDEALLY SUITED FOR OUTDOOR USE AND ITS COATING
HAS PASSED THE FOLLOWING DURABILITY TESTS

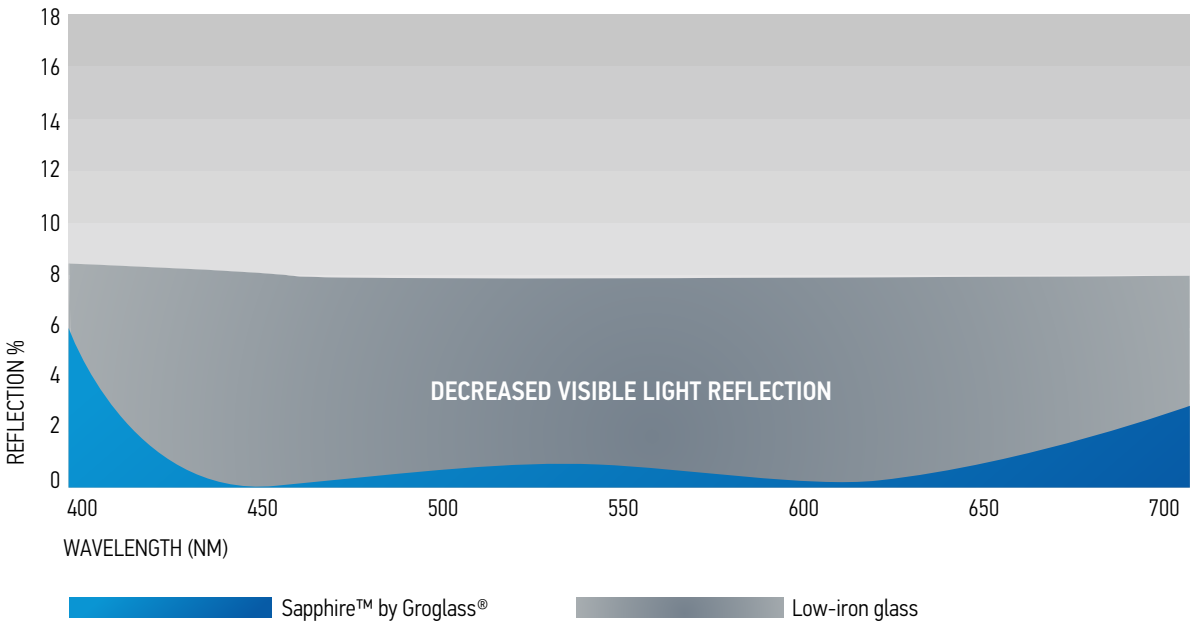
ABRASION TEST (ISO 9211)	The coating shows no damage after 500 cycles with taberabraser (1kg load)
CLIMATE CYCLING TEST (EN 1279-2)	The coating shows no changes in optical properties after exposure to a thermal cycling test from -20oC to +80oC, at >90% relative humidity. Test duration 1176 hours (49 cycles)
COATING ADHESION (ISO 9211)	The coating shows no damage after snap removal of firmly placed adhesive tape
UV AND CONDENSATION (EN 1096-2)	The coating shows no changes in optical properties after exposure to UV irradiance (0.71 W/m^2) at 60°C for 4 hours, followed by condensation at 50°C for 4 hours. Test duration 1000 hours (125 cycles)
NEUTRAL SALT SPRAY (EN 1096-2)	The coating shows no damage after salt fog application: 40oC (4 hours), dry off at 60oC (<35% RH) (2 hours), Humidity at 50oC (>95% RH) (2 hours). Test duration 504 hours (63 cycles)
CE	Groglass® declares that Sapphire™ products comply with the essential requirements of the relevant EU health, safety and environmental protection legislation.

OPTICAL PERFORMANCE AND DATA

LIGHT TRANSMISSION CHART (VISIBLE LIGHT SPECTRUM)



LIGHT REFLECTION CHART (VISIBLE LIGHT SPECTRUM)



NEW! SAPPHIRE AR ACRYLIC™

NEW SAPPHIRE AR ACRYLIC™ BY GROGLASS® IS A NEW GENERATION, ANTI-REFLECTIVE, LIGHTWEIGHT AND SHATTER-RESISTANT PRODUCT. THESE QUALITIES MAKE IT THE BEST CHOICE FOR HIGH QUALITY OUTDOOR AND INDOOR DISPLAYS.

SAPPHIRE AR ACRYLIC™ USERS ENJOY:

99% UV BLOCK – protects your electronic display from harmful UV radiation.

ANTI-STATIC FEATURE – makes long-term cleaning and maintenance easier in a range of environments.

NON-YELLOWING – gives perfect transmission of information and colors.

ABRASION RESISTANCE – makes it the best choice for outdoor applications regardless of where it is or the weather and climate conditions.

NEUTRAL REFLECTION COLOR – has neutral and uniform reflected colors, and they remain stable under various angles of viewing.

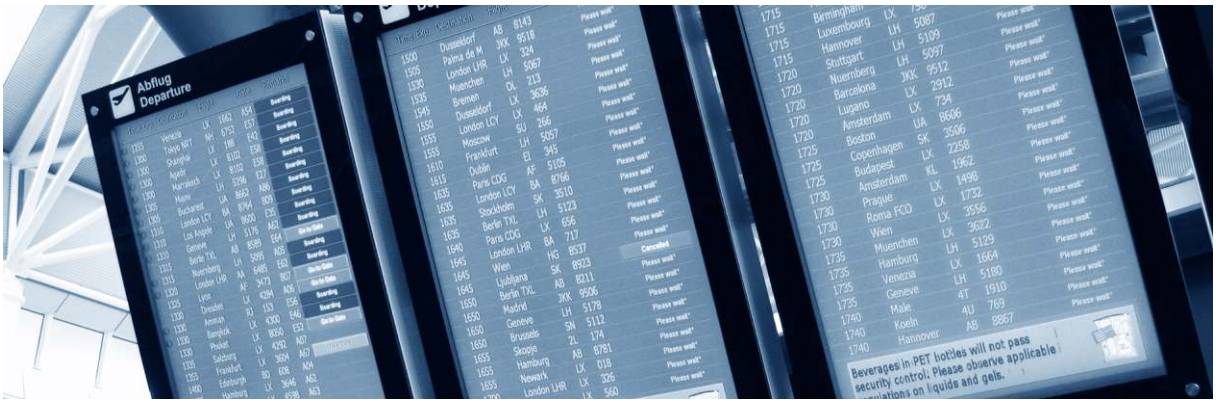
EASY HANDLING – makes delivery and set-up easy.

THERMAL INSULATING – protects your displays from negative effects of heat by reducing thermal conductivity and prevents condensation and heat loss on the inner part of the display.

NEW! SAPPHIRE AR UV™ BY GROGLASS®

Now Sapphire™ by Groglass® on glass is available also with additional over 90% UV-block configuration.
In addition to the maximum protection for the display from harmful UV radiation, SAPPHIRE AR UV™ offers the same premium qualities as all other Sapphire™ products - reduced reflection to as low as 1%, improved transmission in visible light spectrum, neutral color in reflection and no color shift under angle, easy processing, high durability and long lifetime of the coating as well as scratch-resistance and easiness to clean. These qualities make SAPPHIRE AR UV™ the preferred protection solution, especially for outdoor displays.

SAPPHIRE™ CAN BE USED



ABOUT US

Sapphire™ is manufactured by Groglass® - located in Riga, Latvia. Groglass® delivers anti-reflective glass worldwide - to more than 40 countries. Sapphire™ is used for a wide range of applications - high-end electronic displays, lighting fixtures, picture framing and luxury architectural solutions.

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