

REFLECTIVE
GLASS

USES AND APPLICATIONS

DATA SHEET / Quebec

Version 2.0

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MULTIVER
Cutting edge of the glass industry



Type of glass offered by Multiver

REFLECTIVE GLASS

What is reflective glass ? During the manufacturing process, glass manufacturers add certain reflective metallic oxides to the surface of clear or tinted glass, or to the glass composition (pyrolytic method), which helps increase glass reflectance. Glass reflectance allows to reflect a certain proportion of the radiation emitted by various sources. Multiver offers a wide selection of reflective glass products.

It is important to specify that glass reflectance is **very closely related to the ratio of illumination levels between the two sides of the glass**, which is why at night we see inside buildings with reflective glass when a light is on in the exposed room.



*Various low emissivity (low-e) glass products have a reflective quality. For further information, consult the Low Emissivity (Low-E) Glass document.

STANDARDS AND CERTIFICATES

Multiver meets the following requirements :

- ASTM C1036 – Flat Glass
- CAN/CGSB-12.3-M91 – Flat, Clear Float Glass

*Other standards and certificates may apply.





USES

Reflective glass can be used in a number of applications, such as :

Glass partitions



Windows and curtain walls



Spandrel glass



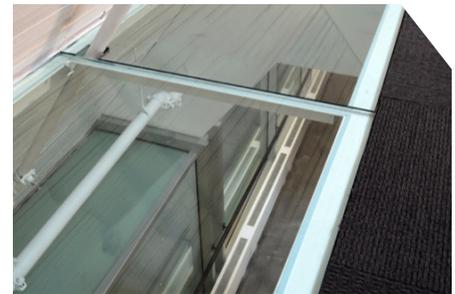
Balustrades



Skylights



Glass floors



Door glazing



Automotive glass



Decorative crafts





BENEFITS

- ▶ From an **esthetic** point of view, reflective glass gives buildings a distinguished and/or private look.
- ▶ **It helps reduce heat gain**, thus reducing air conditioning costs and enhancing occupants' well-being (see solar heat gain coefficient in Table 2 on reflective glass performance data).
 - ▶ It **reduces ultraviolet radiation** inside the building.
 - ▶ **Extremely versatile**, this product can be utilized in commercial, residential and institutional projects.
 - ▶ **The wide variety** of reflective glass allows for a multitude of visual effects.
 - ▶ It can be **combined with low-e glass** to improve thermal resistance (R-value) and overall performance of the insulated unit. Virtually unlimited combinations allow to modify glass performance.
 - ▶ **Reflective glass can be used in monolithic form as well as in double- or triple-glazed insulated glass units. It can also be sandblasted, silk-screened, shaped, laminated, bevelled and enamelled.**
 - ▶ **Indoors**, it can be used for its esthetic appeal and to complement the furniture and decoration.
 - ▶ **Its acoustic and mechanical performance** is similar to that of standard glass of the same thickness and size.
- ▶ When reflective glass is **combined in an insulated glass unit with spandrel glass in position 4**, the resulting combination can create a reflective effect similar to that of insulated units with reflective glass of a building in daylight.
- ▶ Considering the lower light transmittance associated with reflective glass, **interior glare is also reduced** while providing privacy from the outside.
- ▶ It can be assembled with **integral blinds as well as smart glass**, thus providing the ultimate comfort.



SUPPLIERS OF AVAILABLE REFLECTIVE PRODUCTS

Multiver offers a large variety of reflective glass products, most of which are listed below. Products may be added to the list or removed from it, depending on demand.

TABLE 1 : Name and thickness of available glass products

							
Stopsol® Clear	6 mm	SunGuard® Silver 20	6 mm	Eclipse Advantage™ Clear	6 mm	Solarcool® Azuria**	6 mm
Stopsol® Grey	6 mm			Eclipse Advantage™ Blue-Green	6 mm	Solarcool® Graylite®	6 mm
Stopsol® Bronze	6 mm			Eclipse Advantage™ EverGreen	6 mm	Solarcool® Pacifica**	6 mm
Stopsol® Green	6 mm			Eclipse Advantage™ Arctic Blue	6 mm	Solarcool® Solarblue®	6 mm
Stopsol® Dark Blue	6 mm			Eclipse Advantage™ Bronze	6 mm	Solarcool® Solarbronze®	6 mm
				Eclipse Advantage™ Grey	6 mm	Solarcool® Solargray**	6 mm
				Mirropane™ (transparent mirror)	6 mm	Solarcool® Solexia®	6 mm
				MirroView™ MirroView™ 50/50	6 mm		

*Certain glass products are not kept in stock. A minimum quantity is required for some products.

*AGC offers the Supersilver series with tinted glass. These products are slightly more reflective than products from the Stopsol series and are also available from Multiver.

*Several other reflective glass products are available. For further information, please contact us.



REFLECTIVE GLASS PERFORMANCE DATA

Below is a comparative table of various possible performance aspects of reflective glass combined or not with low-e glass. We compared a grey (Silver 20) reflective glass with a bronze (Solarcool Solarbronze) and a green-tinted (Solarcool Solexia) reflective glass. By varying the glass composition, you can obtain high-performance products. Performance data were collected using Window 6.3, an independent software by LBNL specially designed to determine the performance of different products

PRODUCT	U-VALUE BTU/ HFT ² -°F	R-VALUE H-FT ² - °F/BTU	TRANSMITTANCE %			VISIBLE LIGHT REFLECTANCE %		SHA- DING COEF.	SOLAR HEAT GAIN COEF.	RELATIVE HEAT GAIN BTU/H- FT ²
			VISIBLE LIGHT	SOLAR TRANSM.	UV TDW- ISO	OUT	IN			
CLEAR GLASS										
- 6 mm clear - 13.39 mm argon - 6 mm clear	0.445	2.2	80.1	65.7	71.0	14.9	14.8	0.84	0.73	175.5
SOLARCOOL SOLARBRONZE REFLECTIVE GLASS										
- 6 mm Solarcool Solarbronze - 13.39 mm argon - 6 mm clear	0.445	2.2	18.6	21.8	12.6	36.7	19.0	0.36	0.31	77.6
- 6 mm Solarcool Solarbronze - 13.39 mm argon - 6 mm Econover Select 63 (surf. 3)	0.254	3.9	17.8	13.7	11.6	36.5	15.6	0.24	0.20	50.2
SOLARCOOL SOLEXIA REFLECTIVE GLASS										
- 6 mm Solarcool Solexia - 13.39 mm argon - 6 mm clear	0.445	2.2	27.0	19.0	18.4	37.3	27.0	0.32	0.28	70.8
- 6 mm Solarcool Solexia - 13.39 mm argon - 6 mm Econover Select 63 (surf. 3)	0.254	3.9	25.8	13.4	17.0	36.9	23.0	0.23	0.20	48.2
SILVER 20 REFLECTIVE GLASS										
- 6 mm Silver 20 - 13.39 mm argon - 6 mm clear	0.359	2.8	18.1	12.5	19.0	31.2	26.7	0.24	0.21	52.6
- 6 mm Silver 20 - 13.39 mm argon - 6 mm Econover Select 63 (surf. 3)	0.252	4.0	17.3	10.2	16.9	31.1	22.7	0.19	0.16	41.0
- 6 mm Silver 20 - 12.70 mm argon - 6 mm Econover Select 63 (surf. 3) - 12.70 mm argon - 6 mm Econover Select 63 (surf. 5)	0.128	7.8	15.1	7.7	13.8	31.2	22.6	0.15	0.13	31.5



MANUFACTURING SIZE GLAZING

Due to the wide selection of products available as well as the number of suppliers, maximum sizes may vary depending on the suppliers and demand. Minimum sizes may also vary depending on intended uses.

That being said, the average maximum size of a glass sheet is approximately **96 inches X 144 inches** (2,438 mm X 3,657 mm). Upon request, we can obtain glass sheets of 102 inches X 168 inches (2,590 mm X 4,267 mm).

MAINTENANCE

Once the reflective glass is installed, **it is recommended that all exposed surfaces be cleaned, if needed**, in order to preserve the esthetic qualities of the product. Rub gently with a soft cloth, using cold or warm water and non-aggressive chemicals for all glass surfaces. Caution should be exercised when choosing cleaners. Abrasive cleaners must never be used as they can cause damage to the glass surface. Several products are specifically designed to clean glass. Metallic objects should not be used because they could scratch the glass.

Cleaners containing solvents must never be used.

Exposed glass surfaces must be protected during the construction or renovation of the building to minimize the risk of scratches and glass breakage.

REPLACEMENT

To help us identify the insulated unit with reflective glass that needs to be replaced, we strongly recommend that you **look at the spacer in the insulated unit**. You will then know **who was the original manufacturer of the unit as well as its year of manufacture**. We also require the **project name and location** to conduct extensive research.

In the case of tempered or heat-strengthened monolithic reflective glass, **you should be able to see a laser-engraved logo** in one of the corners of the glass, that is, if it is not covered. A date as well as the name of the company that tempered the glass should also be indicated.



Multiver Logo - Tempered glass

Slight **glass colour variations** can occur during the manufacturing process and result in a colour different from the original tint, in the event of a replacement.



USEFUL INFORMATIONS

Mirropane™ reflective glass is the perfect product for interrogation rooms as well as observation rooms. The ratio of illumination levels must be of at least 8 (observed side) to 1 (observing side), and the mirror coating must be on the observed side (consult the Pilkington Mirropane™ Datasheet document).

It is essential to always **ensure the compatibility of sealants** that are close to or in contact with Multiver products. Failure to comply with this instruction could result in the voiding of the Multiver warranty. Consult our documents on sealant compatibility to avoid potential problems with our products.

To prevent thermal stress breakage and increase the safety factor, **reflective glass can be heat-strengthened, tempered and/ or laminated.** Reflective glass absorbs more heat than standard clear glass, thus increasing the risk of thermal stress breakage. A laser-engraved logo appears at one of the edges of all tempered and heat-strengthened glass products.

Caution must however be exercised when **tempering reflective glass as tempering causes distortions of the glass, which are far more visible** with reflective glass due to its mirror quality.

In general, we recommend **putting the reflective surface on position 2 of a double-glazed insulated glass unit** to avoid that the reflective surface deteriorate with time as a result of exposure to the weather (surface 1).

The chosen glass thickness and tint as well as its level of reflection, the building's surroundings, the lighting and many other factors significantly influence the appearance of the selected colour. It is **recommended to ask that samples be provided** (see the Sample Request form) before making your final decision on reflective glass.



ADVICE ON APPLICATIONS WITH LAMINATED GLASS

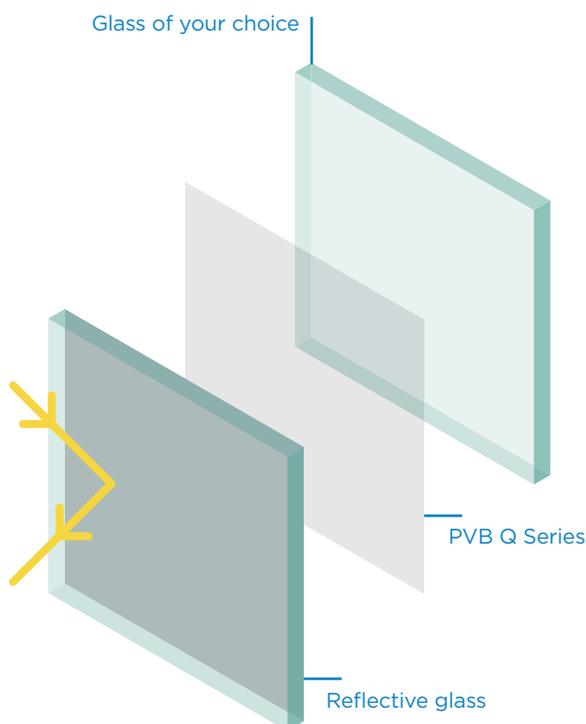
Here are a few options we recommend :

FOR ENHANCED ACOUSTIC PERFORMANCE :

Reflective glass laminated with an acoustic polyvinyl butyral interlayer, commonly known as **Saflex® Q series acoustic PVB interlayer** (see the Laminated Glass document), and laminated with another type of glass of your choice. Several layers can be laminated, offering virtually endless combination possibilities.

PURPOSE :

Reducing inside and outside noise opposite insulated glass units, glass partitions or even skylights.

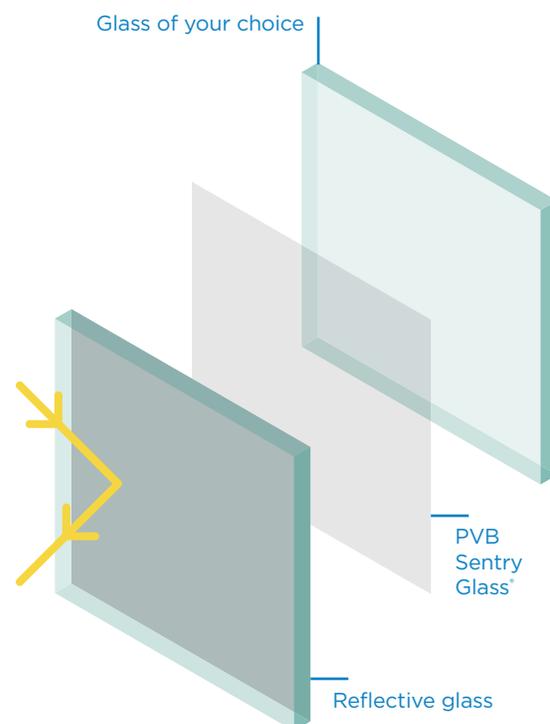


TO INCREASE GLASS SAFETY FACTOR AND MECHANICAL STRENGTH :

Reflective glass laminated to a **PVB DuPont™ SentryGlas®** interlayer, and laminated with another type of glass. PVB SentryGlas® is nearly 100 times stiffer and five times stronger than standard PVB.

PURPOSE :

Tinted balustrades, insulated glass units resistant to impacts, powerful wind gusts, gunfire, explosions, vandalism, falling broken glass, etc. Useful for protecting valuables against theft. Note that other combinations should be considered to meet your specific needs.





ADVICE ON APPLICATIONS WITH LAMINATED GLASS

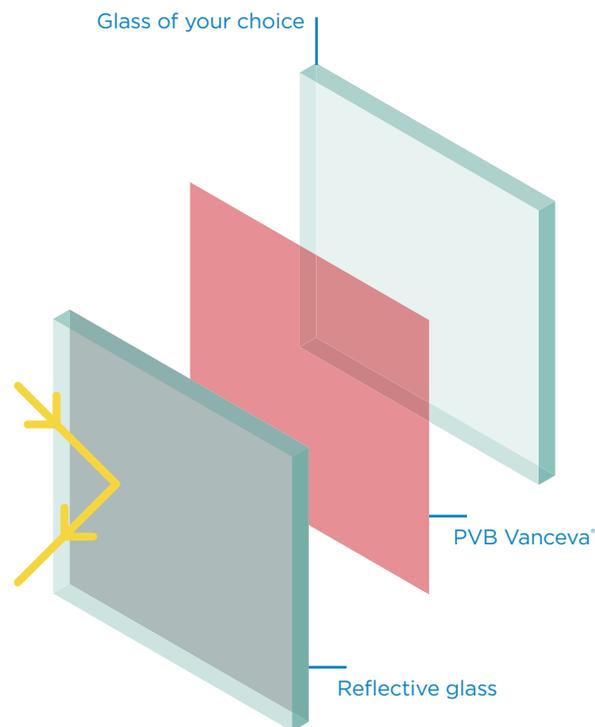
Here are a few options we recommend :

FOR AN OPAQUE GLAZING OR ORIGINAL COLOURS :

Reflective glass laminated to **an opaque black or white PVB interlayer and/or a Saflex® Vanceva® colour PVB interlayer**, and laminated with another type of glass of your choice. To discover the impressive range of colours we offer, go to Vanceva's Web site (www.vanceva.com). Once again, numerous combinations are possible.

PURPOSE :

There is a whole variety of uses to choose from for both indoor and outdoor glazing designs that are anything but ordinary.

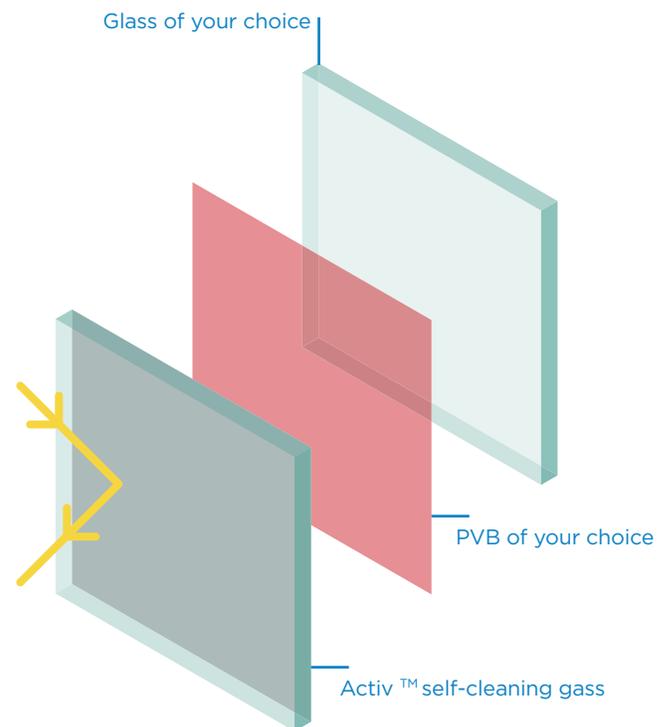


TO COMBINE REFLECTIVE GLASS WITH SELF-CLEANING GLASS :

Activ™ self-cleaning glass for indoor or outdoor use offered by Multiver laminated to a PVB interlayer and reflective glass. This will provide you with the desired light reflectance while minimizing glass maintenance. Activ™ self-cleaning glass also has recognized antibacterial properties.

PURPOSE :

For institutional, commercial or residential projects, for indoor and outdoor use, depending on your needs.





This document gives a general description of the product. For further information, please contact an authorized supplier of Multiver products. The use of any of the products mentioned here in is the sole responsibility of the users. Multiver assumes no responsibility for the use of its products.

