

LOW EMISSIVITY
(LOW-E) 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

LOW EMISSIVITY (LOW-E) GLASS

When it comes to the renovation, expansion or construction of a building, **having the best possible thermal resistance** is a fundamental aspect that must always be taken into account. With all the technological advances made in the glass industry and since Multiver offers hundreds of possibilities with low-e glass, we are now able to improve the overall thermal resistance of your building or home and adapt it to your specific needs. We can also make a huge difference when it comes to **ENERGY STAR®** energy-efficient doors and windows, the **NOVOCLIMAT®** program for new, high energy performance homes, not to mention the **LEED®** home certification program (consult the Multiver **LEED®** Points document).

STANDARDS AND CERTIFICATES

Multiver meets the following requirements :

- CAN/CGSB 12.8 - Insulating Glass Units
- ASTM E2190 - Insulating Glass Unit Performance and Evaluation
- ASTM C1376 - Pyrolytic and Vacuum Deposition Coatings on Flat Glass
- ASTM C1036 - Flat Glass

*Other standards and certificates may apply.



Glass Manufacturing Process

LOW-E GLASS

1

PYROLYTIC METHOD (HARD COATING) :

When the glass, at a very high temperature, is on the float line, **a chemical vapour** is deposited onto the air-exposed glass using pressure. The chemical vapour deposition contains certain metallic oxides. Glass and metallic oxide molecules then combine and form a homogeneous composition, which provides the glass with a number of beneficial properties. With this method, glass has very good visible light transmittance. However, only a very limited number of metallic oxide layers can be applied to the glass.

2

MAGNETRON SPUTTERING (SOFT COATING) :

After manufacture, metal layers are applied to the glass with a coating machine that uses **vacuum magnetron sputtering technology**. This method allows to apply several metal layers to the glass, which allows us to offer a wide selection of products with different performance profiles as well as different tints and/or reflections.





USES

Low-e glass can be used in a number of applications, such as :

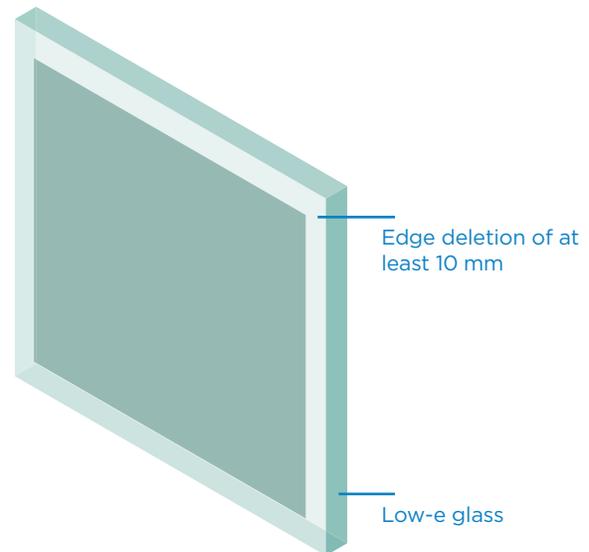
Windows and curtain walls Spandrel glass



Skylights



Door glazing



EDGE DELETION

Regarding the manufacture of insulated units with soft coat low-e glass, **Multiver strongly recommends a minimum edge deletion of 10 mm on the glass surface to which the metallic oxide layers were applied.** Edge deletion involves removing from the edge metallic oxide layers that could come into contact with the sealant. Edge deletion has a number of benefits : it allows the sealant to better adhere directly to the glass, rather than the metallic oxides; it increases the lifespan of insulated units; and it reduces the risk of contamination and corrosion. **Multiver encourages specialists in architecture to mention edge deletion in their architectural specifications.**



BENEFITS

- ▶ **Low-e glass improves the thermal resistance (R-value)** of insulated units.
- ▶ It helps **reduce or increase heat gain, thus reducing air conditioning or heating costs and enhancing occupants' wellbeing** (see solar heat gain coefficient in the Comparative Table with Low Emissivity Glass PDF document).
- ▶ It can help **reduce harmful radiation** inside the building, depending on the components of the insulated glass unit.
 - ▶ **Extremely versatile**, this product can be utilized in commercial, residential and institutional projects.
 - ▶ **The wide range of colours available** with low-e glass allows for a multitude of visual effects.
 - ▶ **Virtually unlimited combinations** allow to modify glass performance.
- ▶ Both surfaces or either one of them can generally be **sandblasted, silk-screened, shaped, laminated, bevelled or enamelled**.
- ▶ New : it is now possible to put **two low-e glass panes in a double-glazed insulated glass unit on surfaces 2 and 4 to improve thermal resistance (R-value)**.
- ▶ **It can be assembled with Privavision integral blinds as well as smart glass**, providing the ultimate comfort.
 - ▶ **From an esthetic point of view**, low-e glass gives buildings a distinguished and/or private look.
 - ▶ **It can be used in an insulated glass unit with ceramic frit or OPACI-COAT 300®** on surface 4 (insulated glass unit with spandrel glass).



SUPPLIERS OF AVAILABLE LOW-E PRODUCTS

Multiver offers a large variety of low-e 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 of Available Glass Products

S	Select 63	S	SN-68	S	Neutral 70	P	Energy Advantage
P	Select 73	S	SNX-6227	S	AG-43	P	Solar-E
S	Select 40	S	SN-54	S	AG-50		
S	Select 36	S	SNX-5123	S	TE-67		
S	Select R42	S	SNR-43	S	80/70		

KEY

S Soft coating)

P Pyrolytic coating)

*Several other low-e glass products are available. For further information, please contact us.

*Certain glass products are not kept in stock. A minimum quantity may be required.

*Low-e glass is available in various thickness. For further information, please contact us.



LOW-E GLASS PERFORMANCE

Consult the [Comparative Table with Low Emissivity Glass](#) PDF document available on our Web site to find out how various products available on the market compare to each other.

MANUFACTURING SIZE

On average, the maximum size of glass sheets used by Multiver is approximately **96 inches X 144 inches** (2438 mm X 3657 mm). Upon request, we can obtain glass sheets of 102 inches X 168 inches (2590 mm X 4267 mm).

Insulated units with low-e glass larger than 55 square feet (approximately 5.1 square metres) must be tempered for safer transportation and handling.

MAINTENANCE

Once the insulated units are 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.

GLAZING REPLACEMENT

To help us identify the insulated unit 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 insulated units including one or more tempered or heat-strengthened glass layers, **you should be able to see a laser-engraved logo in one of the corners** of the heat-treated glass layer(s), unless it is 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 shade, in the event of a replacement.

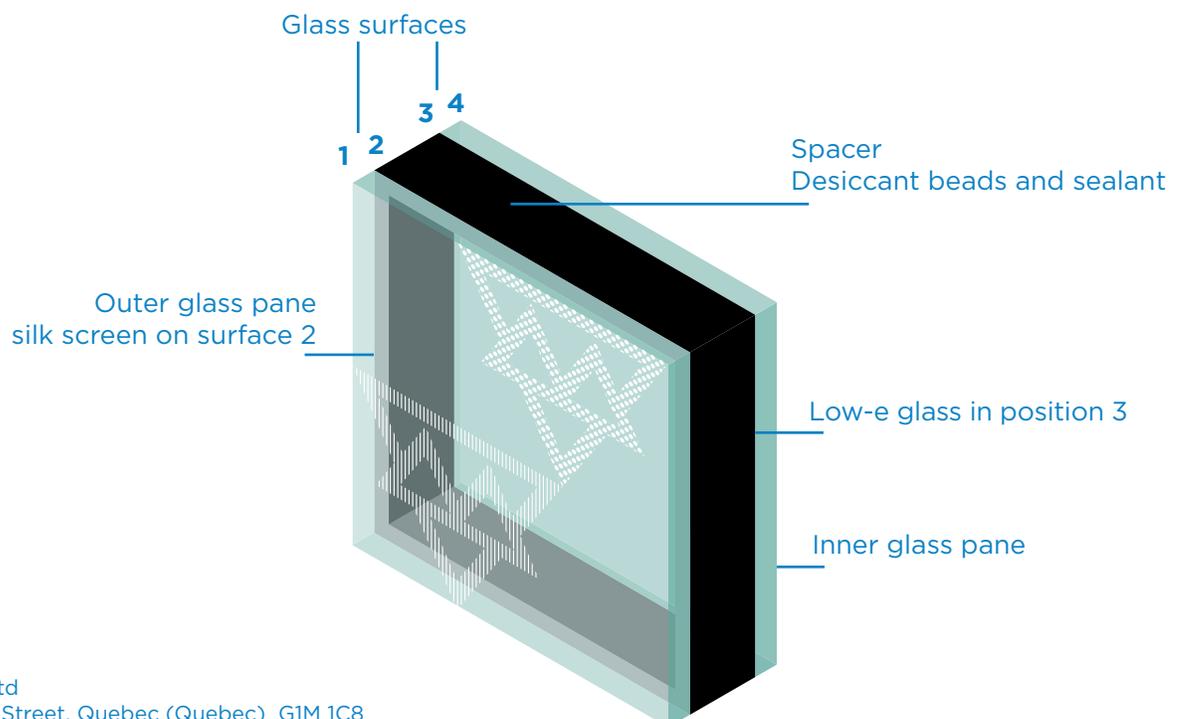


USEFUL INFORMATIONS

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, **low-e glass can be heat-strengthened, tempered and/or laminated.** Due to its colour, low-e 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.

Depending on the thickness of a given low-e glass, its colour will be more or less intense. It is therefore recommended that **the same glass thickness be used for a given project**, unless the designer wishes to produce such effect. **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 low-e glass. **With our glass etching (sandblasted designs) and silk-screen processes**, you can choose any design and we will transfer it onto glass. You can also pick a Pantone or RAL colour of your choice (certain conditions apply).





GASES

Using inert gases such as **argon, krypton and xenon is strongly recommended when using low-e glass in an insulated unit. Inert gases have a much lower thermal conductivity than air** and therefore offer significantly higher thermal performance (R-value). During the assembly of insulated units, Multiver fills the cavity between the glass panes in a controlled environment using automated production lines. Doing so allows to entrap the optimum percentage of gas in the insulated unit. **The most popular gas and best choice in terms of price/performance is argon**, which is what we use in the majority of insulated units we manufacture. Krypton and xenon are both very expensive gases. It should be noted that inert gases used by Multiver in manufacturing insulated units are odourless, colourless and non-toxic. Also, such gases have no known impact on the environment.





ADVICE ON APPLICATIONS WITH LAMINATED GLASS

Here are a few options we recommend :

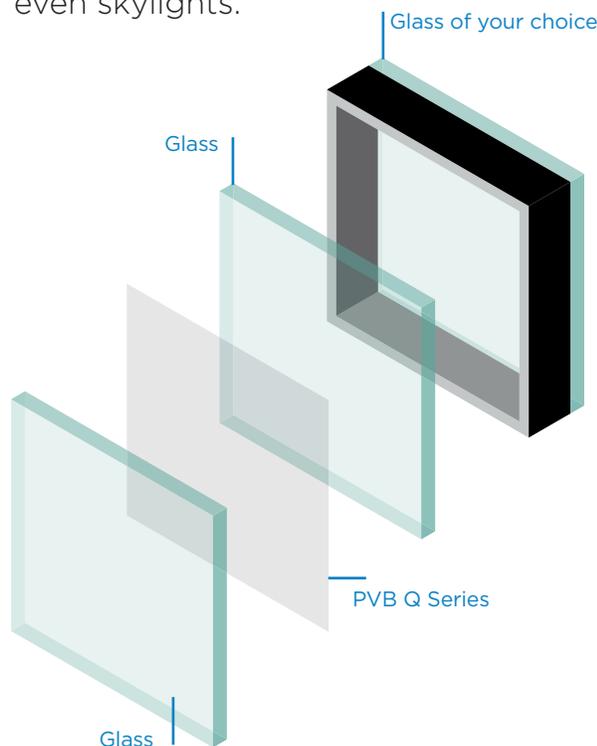
FOR ENHANCED ACOUSTIC PERFORMANCE :

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.

Assembling the laminated glass described above **in an insulated unit with low-e glass** offers a wide range of new options.

PURPOSE :

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



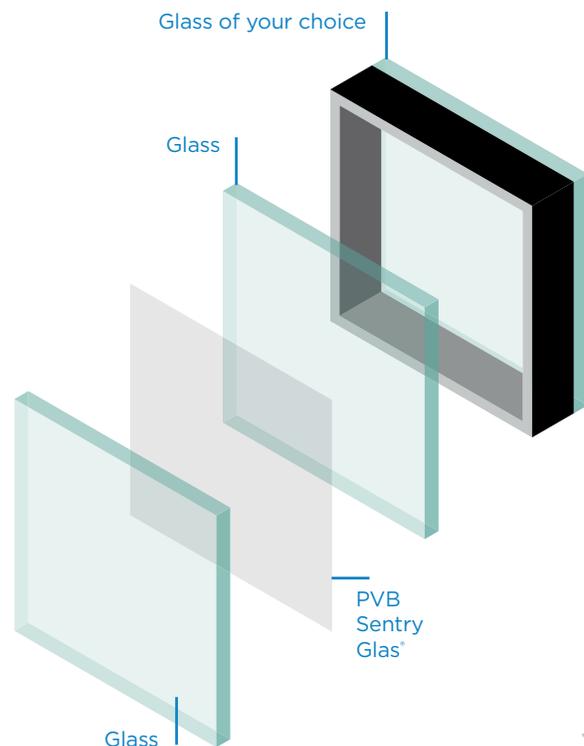
TO INCREASE GLASS SAFETY FACTOR AND MECHANICAL STRENGTH :

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.

Assembling the laminated glass described above **in an insulated unit with low-e glass** offers a wide range of new options.

PURPOSE :

Insulated glass units resistant to impacts, powerful wind gusts, gunfire, explosions, vandalism, falling broken glass, etc. (certain conditions apply). Useful for protecting valuables against theft. Note that other combinations should be considered to meet your specific needs.





ADVICE ON APPLICATIONS WITH LAMINATED GLASS

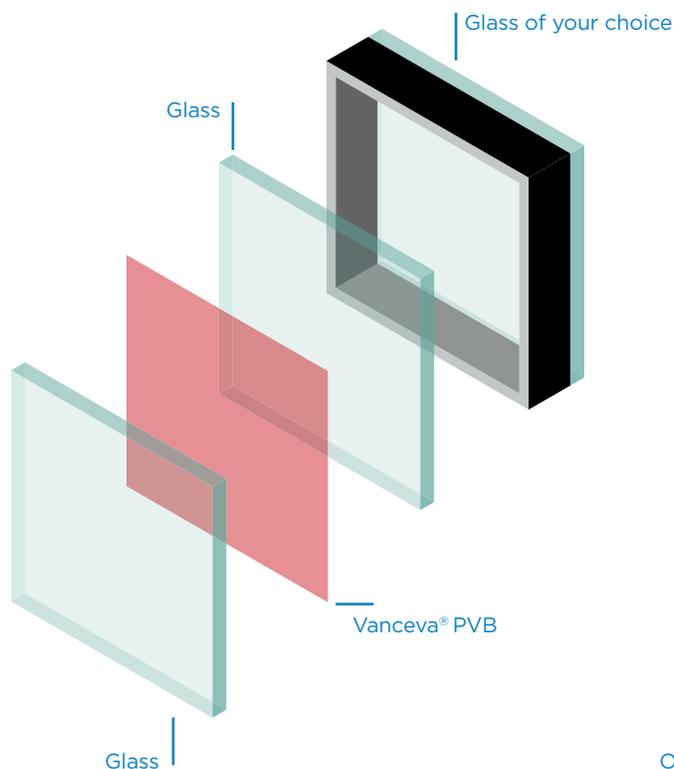
FOR AN OPAQUE GLAZING OR ORIGINAL COLOURS :

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.

Assembling the laminated glass described above **in an insulated unit with low-e glass** offers a wide range of new options.

PURPOSE :

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



TO REDUCE GLARE :

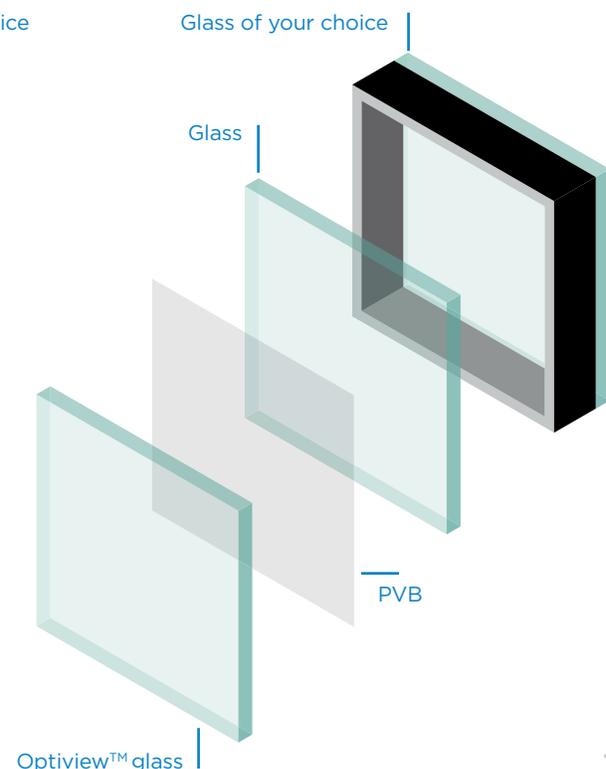
OptiView™ anti-reflective glass laminated to a PVB interlayer of your choice as well as another type of glass. By reducing reflections and increasing visible light transmittance, this product offers better visibility through the glass.

Assembling the laminated glass described above **in an insulated unit with low-e glass** offers a wide range of new options.

PURPOSE :

For any projects **where reflections are undesirable**, such as condos, museums, storefronts, car dealerships, etc.

*It is recommended to not laminate the surface of low-e glass as it could cause variations in colour and result in a significant loss in low-e glass performance.





ADVICE ON APPLICATIONS WITH LOW-E GLASS

Here are a few options we recommend :

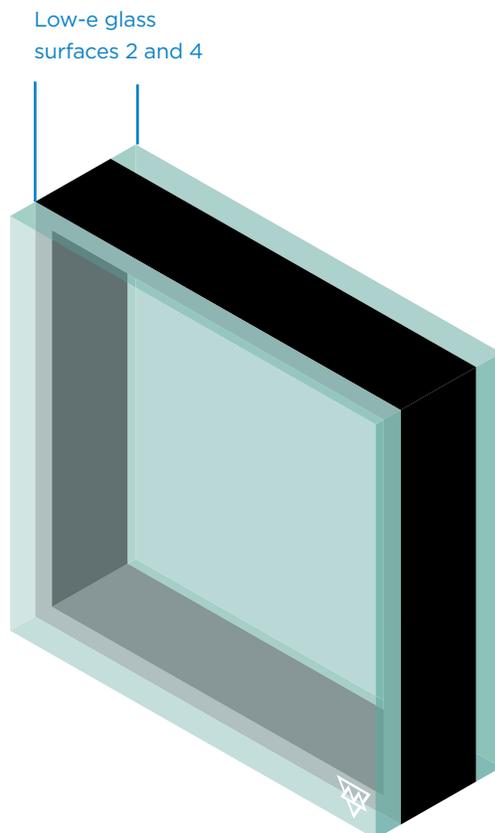
*** **NEW** ***

FOR MAXIMUM IMPROVEMENT OF THE THERMAL RESISTANCE (R-VALUE) OF DOUBLE-GLAZED INSULATED GLASS UNITS :

Assembling a low-e glass of your choice on surface 2 with another pyrolytic low-e glass on surface 4.

PURPOSE :

Improve the thermal resistance of a building without having to use tripleglazed insulated glass units, which are thicker and more expensive. Multiple purposes.

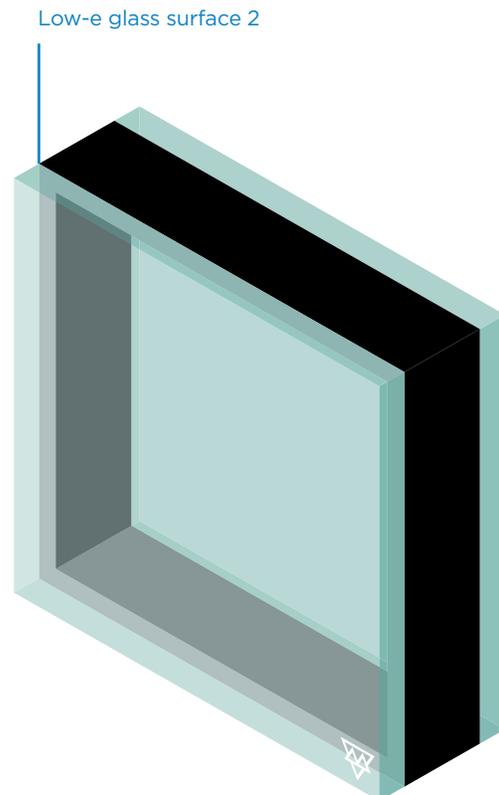


REDUCE HEAT GAIN (LOWER AIR CONDITIONING COSTS) :

Assembling a low-e glass of your choice on surface 2 with another glass of your choice.

PURPOSE :

Very common in the commercial and institutional sectors. Such assembly provides occupants with comfort and results in **considerable savings in air conditioning costs**.





ADVICE ON APPLICATIONS WITH LOW-E GLASS

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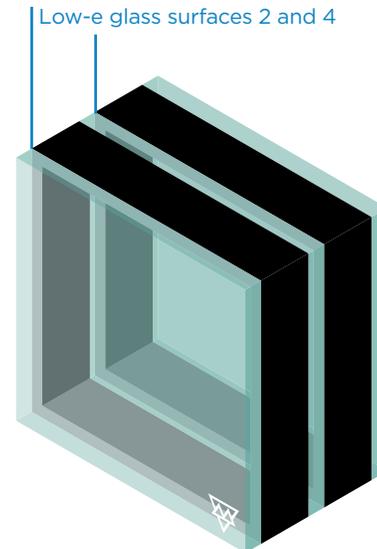
INCREASE HEAT GAIN :

Combining a glass of your choice with a low-e glass on surface 3.

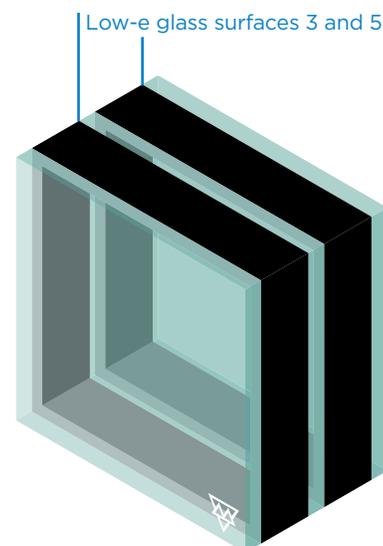
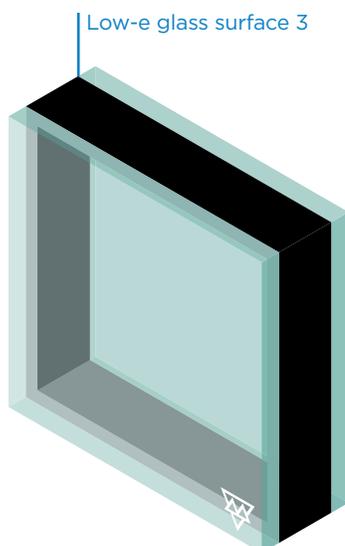
PURPOSE :

Allows our residential customers to be Energy STAR® certified with a nonconductive spacer. This composition is widely used to limit heating costs as well as provide comfort to the occupants.

Triple-glazed insulated glass units are becoming increasingly popular because they significantly improve insulated unit performance. Here are examples of possible compositions.



- ▶ Reduced heat gain coefficient
- ▶ Improved thermal resistance



- ▶ Increased heat gain coefficient
- ▶ Improved thermal resistance



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 is the sole responsibility of the users. Multiver assumes no responsibility for the use of its products.

