

SPANDREL
GLASS

CERAMIC FRIT

DATA SHEET / Quebec

Version 2.1

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MULTIVER
Cutting edge of the glass industry

Glass with

MULTIVER CERAMIC FRIT

SPANDREL GLASS DEFINITION

A glass panel assembled with an opaque layer in position 2 or 4 of a sealed unit. Spandrel glass is generally used to hide the building's structure between floors. Spandrel glass must be placed in front of an opaque insulated panel with a minimum air gap of 25 mm to avoid thermal bridging and improve air flow.

CERAMIC FRIT SPANDREL GLASS DEFINITION

A glass product on which a coating composed of coloured enamels is uniformly applied. Following the tempering or semi-tempering of the glass (heat strengthening of the glass), vitrification of the coloured enamel will occur on the glass surface to which the enamel layer(s) has/have been applied.

! Ceramic frit spandrel glass does not look perfectly even when exposed to light sources passing through both sides of the glass. For this reason, this product must always be placed in front of an opaque panel.

STANDARDS AND CERTIFICATES :

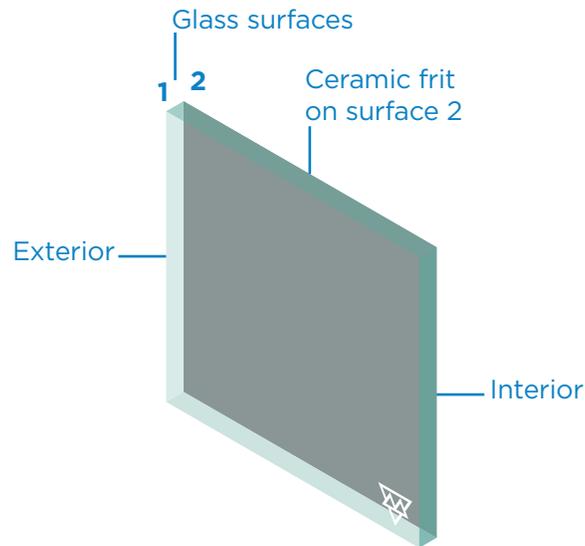
Multiver meets the following requirements :

- CAN/CGSB-12.9-M91 – Spandrel Glass
- CAN/CGSB 12.1 – Tempered or Laminated Safety Glass
- ASTM C1048 – Heat-Treated Flat Glass
- ASTM C346 – Test Method for 45-deg Specular Gloss of Ceramic Materials

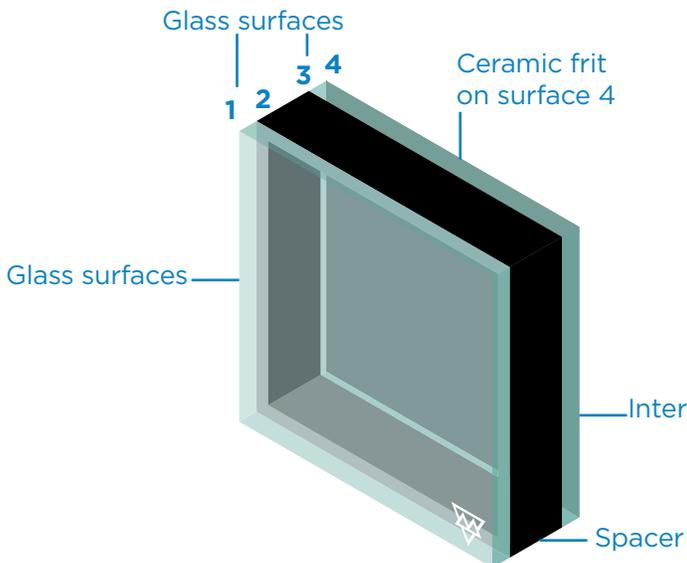
*Other standards and certificates may apply.

Glass with MULTIVER CERAMIC FRIT

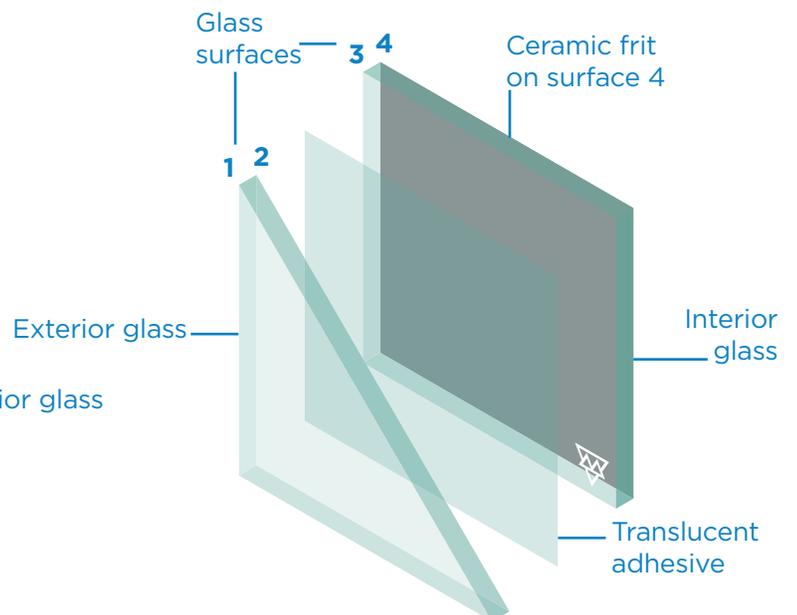
SPANDREL GLASS



SPANDREL INSULATED GLASS UNIT



LAMINATED



BENEFITS

- ▶ Building's **esthetic** quality.
 - ▶ Gives a **uniform** and **homogeneous** look to buildings.
 - ▶ Can be **matched** to the colours of the glass and sealed units of a building's windows or curtain walls.
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- ▶ No discoloration or staining caused by sun exposure, sealants, volatile material deposits or condensation due to the **chemical resistance** of ceramic frit.
 - ▶ **Wide array of colours** to choose from, allowing for varied visual effects.
 - ▶ Easy to install and requires **minimal maintenance**.
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- ▶ **Elegantly** dissimulates building elements that are visually undesirable
 - ▶ May allow for **beneficial heat gain** in certain parts of a building.
 - ▶ Colours have **virtually no risk of delaminating or cracking** due to the fusion of the coloured enamels and glass under high heat.
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- ▶ Ceramic frit is **non toxic, non-combustible** and easy to remove.
 - ▶ Multiver ceramic frit is as strong as glass because they were fused together. There is **no risk of scratching** the ceramic frit coating during its manufacture, transportation, handling and installation.

Spandrel Glass Manufacturing Process

MULTIVER CERAMIC FRIT

1 **Precise glass cutting** using our computer numerical control (CNC) machine.

2 **Shaping**, washing and drying of the glass. The shaping of the glass allows us to refine the edges of the glass, thus limiting the risk of breakage in the tempering furnace. At this stage of the manufacturing process, it is possible to make notches or holes into the glass, under certain conditions. Consult us for more detailed technical studies. The glass is then washed to remove any impurities or dirt that could still be on the glass.



3 **Application of a ceramic coating.** As the glass moves forward on a conveyor belt, an even coating of enamel of the desired colour is applied to the glass as it passes under a rotating roller that simultaneously touches both the paint and glass.

4 **Drying of the ceramic** on the glass. Ventilators lightly dry the ceramic coating to make the tempering process easier.

5 **Tempering of the ceramic coated glass.** By increasing the temperature, the enamel (composed of frits and coloured pigments) merges into the glass surface. The glass is then quickly cooled to increase the safety and resistance factors of the glass.

MANUFACTURING SIZE

Minimum : 16 inches (406 mm) diagonally

Maximum : 86 inches X 144 inches (2,180 mm X 3,658 mm)*

Thickness of glass : Minimum 3.3 mm and maximum 19 mm

*The maximum size may vary with glass less than 6 mm thick.

Standard colours available for MULTIVER CERAMIC FRIT

Clear Anodized



Azurlite



Black



Charcoal



Evergreen



Ford Blue



Graphite



Gun Metal



Bronze Lava



Sable



Smoke



Solar Bronze



Solar / Dark Gray



Solex Green



Walnut



Warm Gray



White



NEW FEATURES

*Granite ceramic frit adds a silver or golden sheen to any colour of your choice.

*The colour appearance of ceramic frit may vary on the surface, depending on the type of glass selected. Colours shown above are for reference only.

*In the case of orders including non-standard colours, a minimum quantity is required for colour development.

*It is recommended to use a single glass thickness for a given project to ensure that the whole project be of the same uniform colour, unless otherwise intended.

*In order to maintain the integrity of the colour of the spandrel glass, it is recommended to use low iron glass, especially for lighter colours.

*Prices may vary for Granite products.

INSTALLATION

Make sure that the installation **complies with the regulation currently in effect**. The installation of ceramic frit spandrel glass assembled as a sealed unit must be approved by a curtain wall specialist or supplier.

MAINTENANCE

Once the ceramic frit spandrel 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 nonaggressive 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.

Never use any products containing solvents.

Exposed glass surfaces must also be protected during the construction and renovation of a building in order to limit the risk of breakage and scratches.

SEALED UNIT ASSEMBLY

It is possible to use Multiver's ceramic frit spandrel glass on **surface 4 of a sealed unit** to improve the overall performance of a building's envelope. There is also a multitude of new options now available to achieve the desired look.

GLAZING REPLACEMENT

To help us identify the insulated unit with spandrel glass that needs to be replaced, we strongly recommend that you **look at the spacer in the sealed 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.

Ceramic frit spandrel glass must be either tempered or heat strengthened. You should therefore be able to see a **laser-engraved logo** in one of the corners, 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

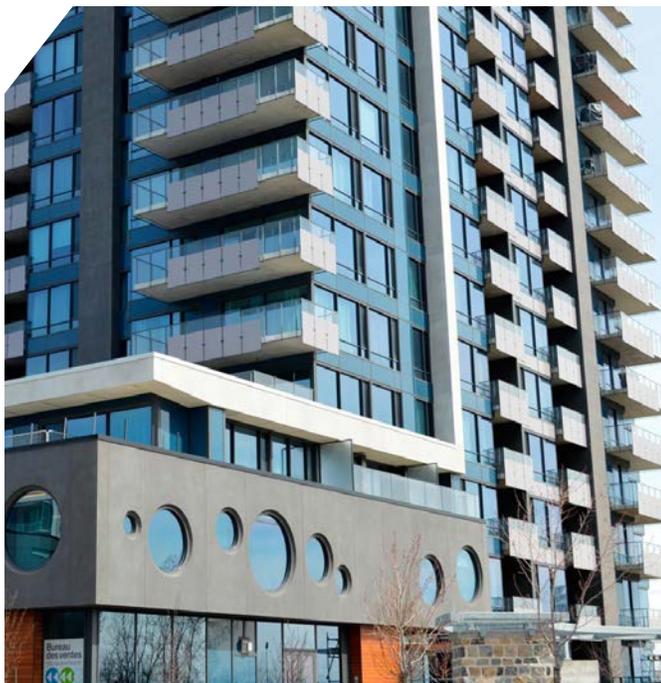
Slight glass and ceramic colour variations

may cause differences from the original colour of the spandrel glass, in the event of a replacement.

USEFUL INFORMATION

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.

We do not recommend the application of a coloured ceramic coating to surface 1 and/or 3 of a sealed unit.



Evolve's Condominiums

WHY HEAT STRENGTHEN OR TEMPER MULTIVER CERAMIC FRIT SPANDREL GLASS?

HEAT STRENGTHENED

Ceramic frit coated glass

Heat strengthened glass has approximately twice the mechanical strength and thermal resistance of annealed glass. In the event of breakage, the glass will break into large pieces (lower release of energy) because the glass has been subject to less stress during the tempering process, unlike tempered glass. For this reason, when heat strengthened glass breaks it is highly probable that the glass will remain in its frame or sealant. Heat strengthened spandrel glass is therefore often used in multi-storey projects because the risk of glass falling down is considerably reduced in the case of a broken glass pane.

TEMPERED

Ceramic frit coated glass

Tempered glass has a better mechanical strength and thermal resistance than heat strengthened glass. It is approximately four times more impact resistant than regular non-tempered glass. If the glass breaks, it will do so with a high energy release of small fine round pieces, which reduces the risk of injury to those nearby. As a result, tempered spandrel glass is recommended for the lower floors of a project.

USEFUL INFORMATION (CONT)

Several factors may have a considerable impact on the appearance of a selected ceramic frit colour such as **glass thickness, glass tint and reflectance, the surrounding environment, lighting, and more.** It is therefore recommended to ask for a **product sample** (see the Sample Request form) before making the final selection of your spandrel glass. For example, standard clear glass has a slightly green tinge due to the iron oxides found within its composition. Therefore, the reflected colour will inevitably alter the tint of the coloured ceramic coating.

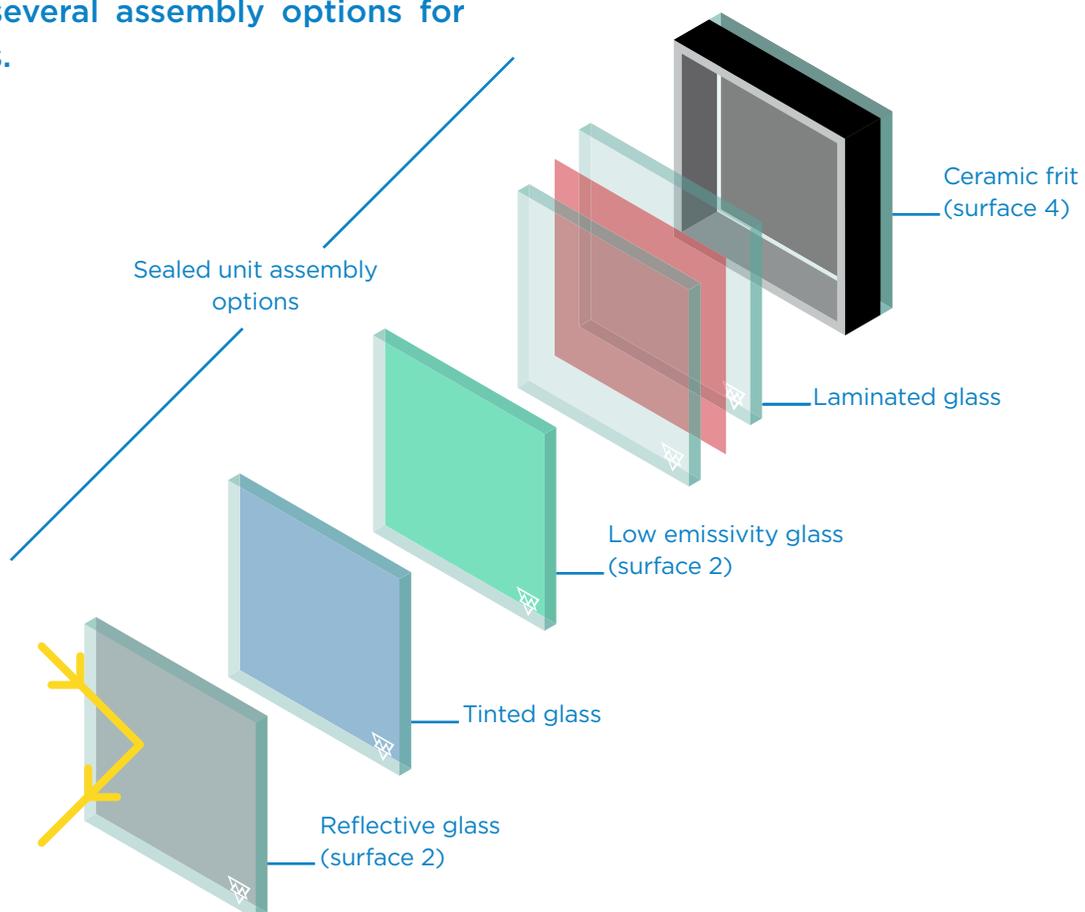
There are several assembly options for sealed units.

It is possible to use ceramic frit spandrel glass in a sealed unit in combination with tinted or reflective glass by coating surface 4 with a coloured ceramic.

Ceramic frit can also be combined with pyrolytic or soft coated low emissivity glass in a sealed unit.

Multiver ceramic frit glass can also be combined with laminated glass in a sealed unit using laminated glass on the outer pane and ceramic frit on surface 4.

In addition to lowering the risks in the event of breakage, coloured laminates offer a wide variety of interesting looks (see the Laminated Glass document).





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