



**Technical Bulletin
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Spandrel Glass

I. What is Spandrel Glass? Spandrel glass is made by coating a vision glass with an opaque coating. This prevents people from looking through the glass and seeing structural features inside the building. Spandrel glass is most often used in curtain wall construction where the glass and the aluminum framing on a multi-story building passes on the exterior side of the floor slabs. A typical high-rise building will have a top-of-slab to top-of-slab distance of about 12 feet, but the slab-to-ceiling height is usually 8 feet. The 4 feet above the suspended ceiling contains the “spandrel beams” (the beams that hold up the floor slabs), electrical wiring, plumbing, mechanical ducts (heating and air conditioning) and fire suppression systems. Since most of these items are rather ugly, spandrel glass is used to hide them from public view.

Spandrel glass is NOT intended for use in a “vision glass” area. If you look at spandrel glass from the interior of a building looking out toward daylight, you will see pinholes and variations in the density of the coating. This is a normal condition for this product and is not considered a defect. Spandrel glass is not intended nor recommended for use as a wall cladding material when it can be viewed from a short distance. If spandrel glass is being used in a “vision” area, it must be backed up with an opaque building material such as gypsum board, paneling, hardboard, metal panels or some similar opaque building material.

Production Sizes:	Maximum Size	82 X 120
	Minimum Size	12 X 20

II. How is Spandrel Glass made?

- **Ceramic frit Spandrel** Ceramic frits are made by making a batch of colored, opaque glass and then grinding the glass to a powder and suspending the powder in either an oil-based or a water-soluble emulsion. Annealed glass is cut to size, coated with the ceramic “paint” applied by a roll-coater. The glass is then run through a horizontal tempering furnace.



The high temperature of the furnace, approximately 1250° F, burns off the suspension liquid and melts the glass powder, which then fuses to the glass surface. Because the frit actually becomes part of the glass surface, it is very durable and highly resistant to scratching. The frit will have the same characteristics as the base glass.

- **Opaci-Coat 300®** Opaci-Coat is a silicone-based paint manufactured by ICD, Inc. Silicone adheres well to glass, and paint has the advantage of being easily colored. Therefore, Opaci-Coat paint is the preferred material for making custom-colored spandrel glass. Opaci-Coat is applied to a cut-sized piece of tempered or heat strengthened glass using a roll-coater. Pinholes and variations in density will be evident when looking at Opaci-Coat from the interior of the building toward daylight. Therefore, Opaci-Coat will also have to have the interior surface covered with gypsum board or some opaque material if it is used in a “vision” area. Opaci-Coat is very sensitive to abrasion. OpaciCoat is easily damaged by rubbing during transit or installation and is not warranted against abrasion damage; “touch-up” paint is available for field repairs.

III. Appearance All spandrel glass products must be Heat Strengthened or Fully Tempered to avoid thermal stress breakage. Heat Treated glass is subject to distortion caused by the heating and cooling cycles which produce the increased strength. This distortion is a normal condition of the manufacturing process and cannot be eliminated; it is not considered a defect.

Light or pastel colors may be translucent rather than completely opaque. This may allow “read-through” of structural items in the spandrel cavity. These products are required to be double-coated at extra cost. The following ceramic frits require double coating:

<u>ACI Color #</u>	<u>Color Name</u>	<u>ACI Color #</u>	<u>Color Name</u>
10-1237	Kaiser/Aspen Green	10-4141	Cambridge White
10-2262	Sea Gull	10-4570	Phantom Gray
10-2331	White Foam		

Replacement spandrel glass may be noticeably different than the original glass. Many older spandrel glass installations used lead-based frits, and the frit was usually applied by spraying. Lead can no longer be used, and even non-lead frit cannot be sprayed. These production differences will slightly change the color. In addition, the existing glass will be weathered and have less surface gloss than the new spandrel glass. This will also create a slightly different appearance for the new spandrel glass.

IV. Custom Colors Custom colors are possible in both ceramic frit and Opaci-Coat silicone paint. However, it is much easier, quicker and less expensive to do a custom color in Opaci-Coat. Both products have a minimum charge for making a sample of a custom color; however, ceramic frit is about 6 times more expensive than Opaci-Coat. The lead-time required is also vastly different. A custom color sample of ceramic frit generally takes 4 – 5 weeks after we receive the architect's sample. A custom color sample of Opaci-Coat usually takes 1 – 2 weeks after we receive the architect's sample. If the first custom color sample doesn't achieve the color the architect is looking for, the time sequence starts all over again. So, advise the architect and General Contractor to allow an appropriate amount of time to get samples, obtain approval and order the appropriate color of ceramic frit or Opaci-Coat. **Vitro America will NOT apply white Opaci-Coat to ordinary clear glass substrates. PPG Starphire Low Iron glass is the only clear glass substrate that Vitro America will use with white Opaci-Coat paint.**

V. Structural Silicone Glazing Structural silicone glazing systems use silicone sealant to “glue” a lite of glass to an aluminum framing member. The silicone joint actually holds the glass in place when it's under windload. Most silicone sealants adhere very strongly to glass and aluminum. Problems may arise, however, when using spandrel glass in a structural silicone system. The following guidelines may be useful.

- **Opacified Spandrel Glass** High performance, vacuum coated glass uses a polyethylene or polyester film glued to a lite of vision glass to create a spandrel material. The adhesive that holds the film to the glass is rather weak. If a structural silicone joint is used to attach this type of spandrel glass to the mullion, the silicone will adhere to the film, but the film may not hold the glass in place under the pressure of a negative windload. This type of spandrel must be “edge deleted” (the film must be cut back from the edge of the glass) along the edges of the glass that will be siliconed. This way, the silicone will adhere to the glass rather than the plastic film.
- **Opaci-Coat 300® Spandrel Glass** Opaci-Coat 300® is a silicone based paint that can be used to create spandrel glass. Again, the Opaci-Coat 300® does not form a strong bond to the glass substrate. Therefore, the paint must be “edge deleted” around the perimeter of the glass so the silicone sealant can adhere directly to the glass.
- **Ceramic Frit Spandrel Glass** Ceramic frit melts into and becomes part of the glass surface when it is heated to approximately 1250° during the



heat treating process. The ceramic frit has all the properties of the glass itself, so silicone sealants usually adhere very well to ceramic frit spandrel glass. Therefore, no edge deletion is necessary when using ceramic frit spandrel glass in a structural silicone glazing system.

Please remember that the glass and silicone must always be tested for proper adhesion and compatibility before glazing begins. This testing should be done by the sealant manufacturer or a testing laboratory and a letter stating the results should be kept in your job file.

VI. Reflective Spandrel Glass Ceramic frit will react with some reflective coatings, and Opaci-Coat is required for making spandrel glass with those products. Vitro America uses only Opaci-Coat on the following reflective glass products:

Product Name

All Pilkington Eclipse (now obsolete)

All Pilkington Eclipse Advantage

Versalux Blue 2000 T

Versalux Green 2000 T

All Guardian Sun-Guard coatings

Any reflective insulating unit can be made into a spandrel unit by using either ceramic frit or Opaci-Coat spandrel as the inboard lite of the insulating unit. Because of the characteristic appearance of roll-coated spandrel, the spandrel coating should be placed on the # 4 surface of the insulating unit.

VII. Spandrel Insulating Units Insulating units can be made with spandrel glass. Remember that both lites will have to be Heat Strengthened or Fully Tempered regardless of the type of glass being used. When using tinted insulating units for the vision area, the best visual results for spandrel glass will be achieved by making a spandrel insulating unit with tinted glass for the outboard lite and spandrel glass for the inboard lite with the spandrel coating on the # 4 surface. Sometimes Vitro America is asked to make an insulating unit with spandrel glass for the outboard lite with the spandrel coating on the # 2 surface and clear for the inboard lite. This can be done **only** with ceramic frit on the # 2 surface. **Vitro America does not recommend sealing Opaci-Coat into the air space of an insulating unit.**

Some of Vitro America's customers ask for insulating units made with spandrel glass on both the # 2 and # 3 surfaces. This can be done if a ceramic frit is used on both surfaces. **However, this type unit may not be satisfactory if used in**



a “**vision**” area. Using two lites of spandrel may not mask all of the pinholes and the coating density variations that will exist in the spandrel coatings.

VIII. Spandrel glass and insulation Spandrel glass is commonly used in areas where the mechanical engineer wants to use additional insulation to improve thermal performance in the building. Insulation contractors frequently try to attach their flexible or rigid insulation to the spandrel glass, because it is easy to do. While this may solve their problems, it can cause massive problems with the spandrel glass. **Building insulation must be mechanically held a minimum of 2” away from any type of spandrel glass.** Improperly installed insulation can cause glass breakage, damage to the ceramic frit or the Opaci-Coat paint or seal failure of a spandrel insulating unit. Or, it could cause all of these problems simultaneously. Insulation impaling nails may not be adhered to the spandrel glass. The adhesive may attack the ceramic frit, and will damage Opaci-Coat. Chicken wire should be attached to the aluminum curtain wall or storefront (with a dielectric material to prevent electrolysis between the aluminum and the steel) so the insulation cannot possibility fall forward against the spandrel glass. This will prevent the possibility of a massive glass failure.

