

Temporary Protective Film Fabrication Guidelines

GENERAL OVERVIEW

1.1 Temporary Protective Film (TPF) is a full surface coverage, low adhesive, recyclable polyethylene film that is applied to select Solarban[®] Solar Control Low-e Glass.

1.2 TPF protects the micro-thin *Solarban* low-e coating from mechanical damage that can be experienced during transportation and subsequent fabrication into glazing units.

1.3 TPF is fabricator friendly and can be easily removed from the glass prior to heat treatment. The film requires no special setups and can be disposed of in a variety of ways.

1.4 Glass with TPF does process somewhat differently through the fabrication process. This document provides the general fabrication guidelines in order to successfully process glass with TPF. These guidelines may require slight modification depending on the characteristics of a given process and equipment.

*NOTE: The temporary protective film can be removed at the beginning of the fabrication process. However, the Solarban coating will no longer be protected and extra **CAUTION** must be used during the handling, stacking, loading & unloading of harp racks, storing of work in process, and running the Solarban glass through process equipment. In this case, the fabricator accepts all responsibility should the Solarban coating get damaged.*







TEMPORARY PROTECTIVE FILM (TPF) CHARACTERISTICS AND GENERAL FABRICATION GUIDELINES

2.1 The protective film is designated as “Temporary Protective Film” or TPF.

- TPF is a polyethylene (LDPE) polymer thin film that is applied directly to the coated surface shortly after the *Solarban* coating is deposited onto the glass.
- The adhesive used in the TPF is low tack and the TPF is easily removed by peeling it off the surface.
- The primary process is to supply product that has a single continuous film covering.
 - The back-up process will incorporate a splice depending on if the processed width is greater than 100”. If the processed glass is 130” wide, the splice will be located slightly off the center of that dimension.
 - The splice in the film incorporates one additional feature that provides coating protection in the splice area.

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2.2 Precautions:

-  TPF provides protection for the coated surface; however, *Solarban* coated glass products must always be run with the coated side up!
-  TPF must never be allowed to enter the tempering furnace!
-  The back-up alternative of the TPF application incorporates a splice and temporary protective coating by design that will be visible after TPF removal and should not be considered a defect!
-  TPF should remain on the coated surface through the pre-furnace fabrication processes to avoid handling and process damage!
-  TPF may appear to have surface damage (scratches, pitting, etc.) which is not a concern unless the TPF has been broken through in which case the coating may be damaged. Therefore, close inspection of this glass during processing should be done.
-  TPF splice applications incorporate a temporary protective coating by design that will flash off and disappear after heat treatment and will not affect production or the quality of the product.

Any small amounts of splice protective coating residue left behind after heat treatment will clean off in subsequent washing of the glass. It should not be considered a defect prior to the heat treatment process.

CUTTING

3.1 TPF should remain on the coated surface during cutting.

3.2 Although cutting fluid is not required when cutting through the TPF, cutting fluid **SHOULD** still be used to lubricate the cutting wheel and achieve the optimal scoring of the glass. Any of the cutting fluids on the approved list can be used with TPF. Excessive cutting fluid should be avoided so as not to get under the film since it could reduce adhesion of the film with the coated surface (observed after 6 hours) which could lead to insufficient coated surface protection in subsequent glass washing.

3.3 Results from research studies indicate that a regular grind cutting wheel is optimal for cutting the TPF and scoring the glass consistently and achieving a high quality edge. See TD-119 for additional information and recommendations regarding conventional glass cutting.

3.4 Suggested cutting parameters for glass with TPF are 5 – 10° sharper wheel (lower angle value). Pressure may also have to be increased by 5-10 lbs especially as the wheel wears. Cutting speed also affects the

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cut/score and each parameter may need to be altered to achieve the best result for particular cutting equipment and process.

- A 130°-135° cutting wheel for 6mm glass with or without a TPF splice and 5-10 lbs additional pressure over un-filmed glass. (typically in the range of 12-20lbs)

3.5 The cutting speed plays an important role in the amount of pressure that could be necessary to achieve good cut edge quality. Slower cutting speeds will require more pressure than was recommended above and faster speeds could require less depending on the machine and other parameters.

3.6 The cutting wheel may need to be changed more frequently to achieve optimal results. The cutting wheel will cut through wrinkles in the TPF given proper process settings.

3.7 All adjacent score lines should cross so the TPF is completely cut through allowing the glass to breakout and separate properly.

3.8 Recommend minimum 1" trim in order to properly breakout the glass with TPF.

3.9 If the desire is to have clean glass cullet, the TPF should be removed from the glass trim prior to discarding it in the cullet bin. The TPF can be removed from the glass trim either before or after glass breakout.

Note: These guidelines are suggested starting points and further adjustments may be needed to optimize the cutting and break-out results for your specific cutting machine and process setup. As always, the cut edge quality should be visually inspected for excessive chips, sharks teeth, and other defects that will affect the glass strength and appearance.

EDGE DELETION

4.1 Post heat-treatment automated edge deletion on the IG line is recommended for TPF coated glass, as this approach addresses edge deletion near the final steps in the fabrication process after the TPF is removed.

4.2 Manual edge deletion table and hand-style edge deletion may also be performed post-furnace. Consider the following deletion wheels:

- 3M Scotch-Brite™ SST Unitized Wheel
- Norton Bear-Tex Convolute Wheel
- Edgeworks 607-8783-LPX (more aggressive wheel)

4.3 Edge deletion through the TPF performed at the automated cutting system is also achievable and can obtain good results as long as one of the following practices is followed:

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4.3.1 Cutting equipment manufacturers are now developing new technologies and upgrading current systems to perform edge deletion through the TPF. For more information on qualifying systems, please consult the automated cutting table manufacturer.

4.3.2 Cutting systems currently equipped with automated edge deletion may require some upgrades as follows: a) a higher capacity vacuum system for the removal of more debris generated during the deletion of the TPF and underlying coating, b) a more aggressive abrasion wheel such as Edgeworks 607-8783-LPX may also be required along with increased frequency of dressing the wheel to remove residue buildup.

4.3.3 Edge deletion through the TPF at the cutting table may be performed without capital investment or modifications by slowing the edge deletion bridge speed to approximately 10 meters (~400 inches) / minute (± 1 meter / minute), and somewhat increasing the wheel's down force. Some TPF debris will likely accumulate on the cutting table surface. Regular cleaning of the cutting table's surface will be required with this approach. The vacuum system will also require more frequent cleaning, otherwise the debris will quickly overwhelm the canister and the vacuum will become clogged. The vacuum system must be functioning properly at all times in order to collect the silver based coating dust.

4.4 Regardless of the approach used, fabricators must assure that the edge deletion process completely removes the conductive silver layer(s) of the coating, that the width of the deletion is sufficient (coating covers no more than 50% of the PIB seal) but doesn't encroach into the vision area (sight line) of the unit, and that the deletion band is aesthetically acceptable for structural glazing units as applicable.

4.5 For more specific information regarding edge deletion, see TD-141 on edge deleting Solarban coatings.

SEAMING

5.1 TPF should remain on the coated surface during the seaming process.

5.2 Dry seaming is the preferred and recommended method of seaming glass with TPF.

5.3 Wet seaming, especially with excessive coolant, may dislodge the edges of the TPF. Liquid may also get under the film and dry making it harder to remove in subsequent glass washing.

5.4 The optimal seaming belt abrasive spec is 120 grit (for 6mm) depending on glass thickness.

WASHING

6.1 TPF should remain on the coated surface during the washing process.

6.2 Standard float glass washer settings may be utilized on glass with TPF although low-e type brushes are still preferred. Good washer practices should still be followed including TDS of the final rinse should be maintained below 20ppm.

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6.3 TPF should remain on the surface during post-washing handling and transport when the washer is not directly in line with the furnace entry conveyor.

6.4 If the TPF has holes or tears, or partially comes loose during or prior to washing, it is recommended to remove the TPF and process the glass through the furnace. Do not allow the glass to sit for an extended time period which allows moisture, which may get under the film, to react with the coating.

Note: For TPF with a splice, the temporary protective coating in the splice area will remain on the glass after TPF removal but will flash off during the heating process. This temporary coating mark will disappear after heat treatment and it will not affect production or the quality of the end product. Any small amounts of residue left behind after heat treatment will clean off in subsequent washing of the glass. It should not be considered a defect prior to the heat treatment process.

REMOVAL

7.1 TPF must be removed prior to entering into the furnace!

7.2 Do not try to start the removal of the TPF with bare hands or gloves.

7.3 Removal is simplified with the use of double-sided tape and/or a tacky roller (similar to that used to remove lint from clothing). Start at any one of the corners of the lite and peel the TPF towards the center of the glass.

7.4 Once the edge of the film is a safe distance from the surface (2–3 in.), removal by hand can be performed. Avoid dragging the removed film across the coated surface.

7.5 Static charge can build up on coated glass with TPF and consideration should be given to minimize this utilizing standard methods.

7.6 Localized removal of the TPF may be required in order to apply the logo to the glass.

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DISPOSAL

8.1 TPF can be disposed of in a variety of ways:

8.1.1 The polyethylene (PET) TPF can be recycled directly. Contact your local recycler about disposal options. A list of PET recyclers in your area or region can be provided upon request.

8.1.2 Though not preferable, TPF can normally be disposed of in landfills. Refer to local waste disposal codes regarding landfill disposal of TPF.

ADDITIONAL INFORMATION

9.1 Every effort has been made to ensure the accuracy of the information in this document. This information is intended to assist in the proper application and use of *Solarban* coated glass with TPF and does not constitute a warranty of this product for any particular purpose.

9.2 If you require additional information or technical support with this product or any other flat glass products, please contact your Sales Representative or the Technical Service Group at 412-820-8500.

HISTORY TABLE		
ITEM	DATE	DESCRIPTION
TD-152	8/26/2016	Initial Release
Revision #1	10/4/2016	Updated to Vitro logo and format
Revision #2	10/11/2018	Updated information related to TFP splice and associated cutting parameters
Revision #3	1/29/2019	Updated the Vitro Logo and format
Revision #4	2/25/2019	Updated TPF splice information (removal of tape and wax related info)
Revision #5	1/20/2020	Updated TPF process information; primary is single continuous width, back-up incorporates splice. Removed "new and improved" reference to splice protective coating

This document is intended to inform and assist the reader in the application, use, and maintenance of Vitro Flat Glass products. Actual performance and results can vary depending on the circumstances. Vitro makes no warranty or guarantee as to the results to be obtained from the use of all or any portion of the information provided herein, and hereby disclaims any liability for personal injury, property damage, product insufficiency, or any other damages of any kind or nature arising from the reader's use of the information contained herein.