English

Technical information

Autoclave free laminating

with Trosifol® HR PVB

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kuraray

Trosifol®

Introduction

Interlayer strength, depth and capabilities

Delivering your window into the world of advanced interlayers for laminated safety glass, Kuraray's Advanced Interlayer Solutions Division (AIS) is underpinned by decades of innovation, application knowledge, domain experience and market success.

OUR ADVANCED INTERLAYER PORTFOLIO – comprising Trosifol® PVB and SentryGlas® ionoplast interlayers – has continually revolutionized aesthetic, structural and functional glass design, fabrication and installation in the architectural and automotive/transportation segments.

Designed to benefit consumers, society and industry, our products are advancing the functionality of glass, while our engineers and consultants are setting new application benchmarks by collaborating on solutions that both sustain and inspire.

We are committed to helping you transform your mindset and take your applications to the next level – aesthetically, functionally and structurally. Enjoy greater design freedom and give your glazing strength, clarity, character and purpose with solutions that cover safety, security, sound insulation, UV/solar/energy management, color and print.

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OUR DIVERSE PRODUCT RANGE, the broadest on the global market and our domain expertise create strength; and we channel this strength into helping you succeed. We strive to be your strongest ally and supporter and will help you navigate and conquer the ever-changing demands of the global glass industry. Worldwide production, R&D and support, means we are always by your side … no matter where you are.

THE ORIGINAL
SentryGlas®

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Production process

1. Trosifol® HR PVB film is particularly suitable for autoclave free processing. Even though other grades of Trosifol® PVB may also be used, due to the rougher surface pattern, HR allows for more efficient de-airing.

2. For best results, dry the 0.76 mm Trosifol® HR PVB (and all material to be used in the vacuum bagging process if using disposable bags) overnight freely suspended for at least 12 hours at ≤ 10 % relative humidity at a temperature less than 25 °C. Insufficiently dry interlayer has the potential of forming edge bubbles. If the PVB is hanging in single sheets, the drying is more effective than drying the PVB as a small roll.

3. Wash the glass using your standard washing process. Demineralized water or a reverse osmosis process is recommended with a water quality of <20 µS. The primary function of washing is to eliminate any visible particles from the glass surface to obtain an optically perfect laminate without visual defects. Since the adhesion of PVB to glass is also dependent on the chemical composition of the glass surface and any ions deposited on the glass surface, the quality of washing is very critical to obtain the expected final adhesion.

4. It is recommended to construct the laminates inside a clean room environment whenever possible. This not only keeps the PVB at a low moisture level, it also reduces the risk of contaminates getting on the glass and sheeting. A tacky roller may be used on the glass and sheeting to insure that both are contaminate free. Tempered glass used during lamination should be nested / spooned to reduce interlayer intrusion during the laminating process (See troubleshooting guide on page 6).

5. Both re-usable silicone rubber vacuum bags and disposable vacuum bags can be used for this process (See figures 1 and 2).

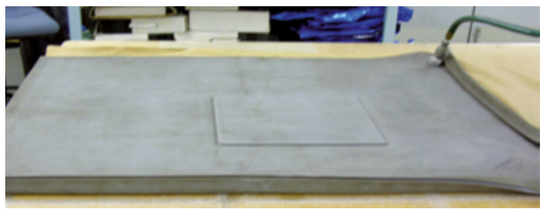

FIG 1 ➔ Re-usable silicone envelope bag

FIG 2 ➔ Disposable vacuum bag

6. When using disposable vacuum bags, it is necessary to use a breather material along the edge of the laminate inside the plastic bag to allow complete de-airing of the laminate. If sticking occurs between the strip and the interlayer, use of a perforated release film between the two is recommended. Any material used in the vacuum process should be rated for high temperature.

7. Re-usable silicone vacuum bags, such as the ones that come with non-autoclave oven systems, generally come with a mesh material to facilitate de-airing. It may be necessary to add additional breather material around the laminate to obtain maximum de-airing. Laminates may also be "framed" to aid in reduction of edge pinching (See figures 3 and 4).

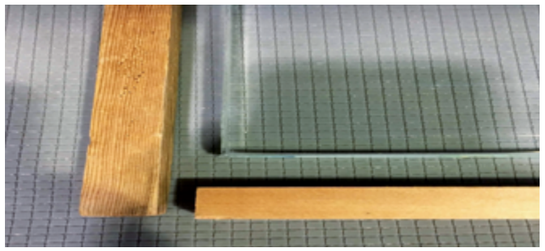

FIG 3 ➔ Laminate framing

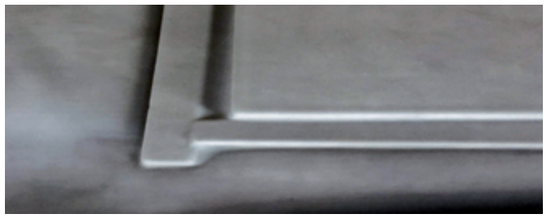

FIG 4 ➔ Framing after applying vacuum

8. After placing the prepared laminates on the trays, apply vacuum (≥ 28" Hg). After a few minutes of vacuum, verify the bag is properly sealed by pinching the vacuum hose or turning off the vacuum and listening or looking for leaks. A minimum of "cold" vacuum time of 15 minutes is recommended. Additional time can be added to assist in removing moisture from the interlayer.

9. As a general guide, heat the laminates up to 135°C (275°F) under vacuum and hold for a minimum of 1 hour. Thicker laminate constructions will need additional time. Once this step is complete, cool down to a temperature ≤ 50°C with the vacuum still on prior to opening the bags. Breaking the vacuum bag seal prior to cooling below ≤ 50°C can cause edge bubbles in the laminate.

10. Due to the increasing number and types of non-autoclave laminating ovens that are now available, specifying the proper conditions for each in this guide is not practical. Contact your Kuraray Technical Representative for assistance in optimizing non-autoclave process parameters to produce defect free laminates while minimizing process time.

Performance monitoring testing

All customers are strongly encouraged to submit Trosifol® PVB test laminates to Kuraray on a regular basis for Performance Monitoring (PM) Testing. The results are then sent to the customer to monitor quality as a function of time by Kuraray.

THE FOLLOWING ARE THE RECOMMENDED PM SUBMISSION GUIDELINES

- **1. Laminates should be submitted representing the customer process. However, since the number of laminates and the frequency of submissions may vary by location, please consult your Kuraray account manager or technical representative for more information.**
- **2. The Trosifol® roll number and the lamination date on the label should be included with the submitted samples.**
- **3. If in house testing is performed, QA test results should be included on the label.**
- **4. Sample labels and boxes are available by contacting your Kuraray account manager or technical representative. Below is an example of the preferred label for submitted test laminates (See figure 5).**

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TROSIFOL® PERFORMANCE MONITORING

Customer Name	CUSTOMER – X
Production Date	2016. 5. 18
Trosifol® Roll Number	66A0123 – 1
(Sheeting/Laminate) Moisture	0.45 %
Other Data	PART NO. ABC-C01A
	LINE 2 SHIFT 3, POMMEL 4.5
	BAKE/BOIL OK, 4M BALL DROP OK

FIG 5 ➔ Preferred Performance Monitoring Label Information

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Troubleshooting guide

Troubleshooting guide

Problem	Potential cause	Solution
Small spherical bubbles along the perimeter of the laminate especially in the corners	High moisture in interlayer	Dry out the interlayer Lower relative humidity level in clean room
Bubbles throughout laminate	Loss of vacuum Insufficient sealing of vacuum bag tray	Check vacuum level and bags for leaks
Random bubbles inside of laminate	Insufficient de-airing channels	Open up de-airing channels using a breather material or add additional vacuum ports Move laminate closer to vacuum port
Edge kink	Distortion from the tempered glass	Nest the glass to minimize the edge kink Improve tempering process Use thicker interlayer
Contamination in laminates	Improper practice of clean room protocol	Control transferring path of rolls from storage to lay-up and unwinding path of PVB to glass to prevent any external contamination getting into the clean room Clean glass washer on a regular basis Use a tacky roller to remove any possible surface contaminates from the glass and interlayer If source of contamination is difficult to trace, contact your Kuraray Technical Representative to assist you with recommendations for preventative measures and lab identification

TAB 6

Additional information

If there are questions regarding Kuraray Trosifol® PVB lamination or for processing requests that fall outside of this laminating guide, please contact your Kuraray representative. Product safety information is available upon request. It is the user's responsibility to determine the level of risk and the proper protective equipment needed for the user's particular purposes.

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Contact

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on products from Kuraray, please visit www.kuraray.com.
You can find further information on our Trosifol® and SentryGlas® products at www.trosifol.com.

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