



Accelerated Exposure Testing: Uni-Solar Laminate on PVDF Coated Panel

LABORATORY TEST REPORT

Subject

Accelerated Exposure Testing of Uni-Solar Laminate on PVDF Coated Panel

Samples

Samples of Uni-Solar Laminate were submitted for evaluation of accelerated weathering characteristics when applied to Centria SRS 3 metal roofing panel. Samples were evaluated for resistance to QUV Weatherometer, 120° F Humid aging and Freeze-Thaw cycle testing. Samples of the Uni-Solar Laminate system were evaluated over profiled and non-profiled examples of the SRS 3 panel. The objective of the evaluation was to determine the integrity of the bond between the solar panel and the SRS 3 panel system after accelerated exposure.

Laboratory Testing and Evaluation

Laboratory Testing was conducted in accordance with standard accepted procedures. The test methods used were:

QUV

- ASTM G151-97, Standard Practice for Exposing Nonmetallic Materials Sources
- ASTM G 154-00, Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
- Testing was conducted using Cycle 3 as described in Table X2.1. UVB-313 Bulb, 8 hours UV at 70° C and 4 hours Condensation at 50° C.

Humidity Test

- ASTM D2247-97, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity operated at 120° F air temperature

Freeze-Thaw

- Cycle consisted of 4 hours room temperature water soak, 4 hours water immersed freezer, 4 hours room temperature water soak, 12 hours water immersed freezer

Test Results

QUV Weatherometer, 1,000 Hours, ASTM G154-00

- This test procedure incorporates exposure to ultra violet light and condensing humidity with heat to 70°C.
- After exposure there was no observable change to the surface of the Uni-Solar panels. There was no deterioration of the adhesive bond between the panel and the PVDF coated panel.
- The Uni-Solar panel attached at the stiffening rib of the SRS 3 panel was not in total contact when it was originally applied. After the exposure there was no loss in adhesion.

120°F Condensing Humidity, 1,000 Hours, ASTM D2247-97

- This test procedure exposes the panel face to continuous condensing humidity.
- After exposure there was no observable change to the surface of the Uni-Solar panels. There was no deterioration of the adhesive bond between the panel and the PVDF coated panel.
- The Uni-Solar panel attached at the stiffening rib of the SRS 3 panel was not in total contact when it was originally applied. After the exposure there was no loss in adhesion.

Freeze-Thaw

- Freeze-Thaw cycling was conducted for a total of 50 days.
- After exposure there was no deterioration of the adhesive bond between the panel and the PVDF coated panel.
- The Uni-Solar panel attached at the stiffening rib of the SRS 3 panel was not in total contact when it was originally applied. After the exposure there was no loss in adhesion.

Discussion of Results

When the Uni-Solar Laminate was applied to the SRS 3 panel on flat unembossed metal, the laminate was adhered to 100% of the surface area. After the accelerated exposure tests, there was no deterioration of the adhesive bond in any of the tests.

When the Uni-Solar Laminate was adhered to the SRS 3 panel at the stiffening rib, there was not 100% contact and adhesion to the metal panel. After the accelerated exposure tests there was no observable loss of adhesion in any of the test samples. As a result of the heat exposure, the adhesive layer flowed somewhat and resulted in a slight increase in the actual contact area of the panel.

The test samples were not evaluated for change in adhesive strength of the laminated assembly. However, the samples were prepared with a non-attached tab so that adhesion tests could be conducted after exposure if it is so desired. Adhesion testing of the exposed samples could be conducted after exposure if it is so desired. Adhesion testing of the exposed samples could be done in shear or in peel. They could also be conducted at room or elevated temperature.

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