

Laminated glass pvb testing method essay sample



**ASSIGN
BUSTER**

Sample Preparation

All exposure test samples are made by preparing 2" x 12" (50 x 305 mm) laminates with Saflex interlayer. The samples are flush trimmed to the aligned edges of the glass after tacking. These laminates are then put through the final bonding in an air autoclaved using a standard heat and pressure cycle. All edges tested for sealant compatibility are autoclaved. The laminates edges are no longer cut for sealant compatibility testing. It is generally accepted that an autoclaved edge will have the best stability on an overall basis regardless of sealant application. This is due to the various cutting methods employed by the industry. Solutia is unable to replicate the cutting techniques used in the field on a laboratory scale therefore we felt that reporting on cut laminate edges would not yield data that correlates to the industry. In considering cut laminated glass edges and sealant application it is prudent to assume that an increase in the depth and area affected by sealant incompatibility effects will be increased over the average data presented in this bulletin if the sealant is in intimate contact with the cut edge.

The amount of increase is dependent upon the amount of stress and manipulation the interlayer undergoes during laminate cutting. If laminated architectural glass is to be used in an installation where edge defect must be minimized such as butt glazing, field cutting should be kept to a minimum. If field cutting is necessary, care should be taken to limit the degree to which the interlayer is stretched and special consideration should be given to compatibility during the sealant selection. Sample retainer platforms are prepared with a taunt polyethylene covering to facilitate easy removal of the

cured sealant product and allow movement of prepared samples to the designated curing location without disturbing. Sample dividers with non-stick tape applied to the edges that will come in contact with the sealant are laid on the retainer platforms and secured with double faced adhesive tape.

These dividers are placed approximately three inches (76mm) apart. The opening that is created must be large enough to receive the 2" (50mm) laminate and allow for 3/8" to 1/2" (10 - 12mm) of sealant to be caulked between the laminate and the non-stick divider edge. The front and back flat faces of the laminate can be protected with a removable tape for easier caulking and cleaning. Once the retainer and divider system is secured the laminate edges are cleaned by wiping with a lint free cloth moistened with methyl ethyl ketone (MEK). The cleaned laminates are placed in the middle of the dividers with equal gap distance on each side. The laminates are secured to the retainer system and sealant is carefully caulked into the gap on either side of the laminate. The sealant is tooled to be ensure intimate contact with the sealant and the laminate edge. These samples are allowed to cure under ambient (70°F, 50%RH) conditions for 21 days.

These samples are then removed from the retainer system, evaluated for zero time exposure ratings (initial screening test) and placed in the accelerated weathering chamber for the intended duration of exposure. Samples are rated in predetermined intervals to study the formation and propagation of edge effects during exposure. A laminate with no sealant applied (bare edge) is placed in each weathering unit to serve as a laminate control. We used this as a feature to determine if a delamination defect would occur without sealant. An initial evaluation or screening test can be

<https://assignbuster.com/laminated-glass-pvb-testing-method-essay-sample/>

performed prior to placing the samples in the weathering chamber. If severe delaminations are visible at this time, the sealant can be deemed as grossly incompatible and no further testing is performed. If additional data on rate of edge effect propagation with weathering is desired than it is recommended that the sample be weathered.

Accelerated Exposure

The accelerated test was developed to simulate actual outdoor exposure results as closely as possible in a reduced amount of time and still be capable of producing data that could yield a reasonable estimate of sealant compatibility. From previous studies we estimate that 3, 200 hours of accelerated exposure using the set conditions of UV and condensation described below with yield comparable results to 2. 5 years of natural exposure in Florida. The accelerated weathering chamber allows close control of alternating cycles of UV radiation and condensation at selected temperatures. The cycle used to predict natural Florida exposure is: 16 hours of UV (no condensation) at 150°F (66°C), followed by 8 hours of condensation (no UV light) at 140°F (60°C). The UV lamps used in this study are UVB-313. Due to their shortwave UV emission, and high energy, these lamps quickly inducing sealant curing reactions which can propagate migration of volitiles and/or plasticizers into or out of the PVB.

They can also cause aging, and other changes in the sealant which could promote edge effects in the laminate edges contacting the sealant. The condensation cycle which alternates with the UV cycle functions as an accelerator in the curing and aging of the sealant. It also helps to detect

glass-to-sealant adhesion loss which could be detrimental to a laminate if left undetected. The water vapor transmission is assessed through use of the condensation cycle. The test protocol was specifically designed to give a severe sealant-interlayer exposure condition to accelerate possible interactions and permit comparison of results among various sealant types.

However, this does not mean a sealant showing edge effects from sealant compatibility in the accelerated tests cannot be used successfully in a properly designed system. It also does not guarantee good performance with a sealant showing good performance in these tests. Other factors in preparing the glass or frame in an actual installation, sealant production, sealant formulation changes and shelf life which were outside the scope of this program also may have an effect. For the conditions tested, however, the results provide a reasonable basis for comparing and predicting the interactions of these sealants with Saflex interlayer in laminated glass. Consideration of the visible effects of sealants and an understanding of their development by the party accepting the design is recommended.

Sealant Compatibility Rating

The results of Solutia's sealant compatibility test program are based on the exposure of numerous sealants to accelerated weathering. These data are summarized in the following tables and graphs. The data reported in the following have been rated and defined as follows: Average Depth Edge Effect: the average depth, measured in millimeters, in which bubbles, discoloration or haze were observed to penetrate from the laminate edge during the exposure period. Maximum Depth Edge Effect: the maximum

depth, for any laminate in the set, measured in millimeters, in which bubbles, discoloration or haze were observed to penetrate from the laminate edge during any exposure period.

Length Affected: the sum of the length of the laminate edge to which sealant is applied, measured in millimeters, of which bubbles, discoloration, or haze were observed during the exposure period. Percent Length Affected: the average length affected by edge effects divided by the total length of the laminate to which the sealant was applied. Average Area Affected: the average depth of edge effect observed multiplied by the average length.

Delamination Plateau: No change in the average depth of defect greater than 1mm (+/-) for the final three consecutive rating periods of the accelerated exposure. " Y" indicates that a plateau in the edge effect has occurred, " N" indicates not plateau in edge effect formation has occurred.