Post Breakage Strength Testing for Overhead Laminated Glass

Design and structural performance of laminated glass in over-head glazing applications like canopies, skylights is very critical as it has an impact on the safety of occupants of a building and its maintenance workers. For such applications post breakage strength of laminated glass construction is of utmost importance. Laminated glass has a significant improvement in the post breakage strength over a monolithic layer of glass, the glass fragments adhere to the interlayers so that a certain remaining structural capacity is obtained as the glass fragments ‘arch’ or lock in place. This capacity depends on the fragmentation of the glass and increases with increasing fragment size. Therefore, laminated glass elements would typically achieve a particularly high remaining structural capacity when made from annealed or heat strengthened glass that breaks into large fragments. The post breakage behavior furthermore depends on the interlayer material.

No matter EN14449, American standards of other laminated glass standards only contains several limited tests,such as high temperature test, appearance, ball drop test and impact test. While when glass are used in glass skylight, the glass loading capability and sustain capability after breakage cannot be measured.

Post breakage strength is significantly affected by the breakage pattern of the glass layers, support conditions, and temperature. Breakage pattern of glass can be a big variable even for the same type of glass and this makes analytical modeling of its post breakage strength a near impossible task. Thus engineers have to rely on destructive testing for this. Post breakage strength can be categorized as follows.

A. Immediate Post Breakage Strength against “fall through”
B. Medium Duration Post Breakage Strength Testing (More than 30 Mins. As per pr DIN 18008 – 61)

Around the world, there’s only one test and standard that can test the post breakage strength of overhead laminated glass:
DIN18008-6: Glass In Building - Design And Construction Rules - Part 6 Additional Requirements For Walk-on Glaz,

Mr I. Stelzer & M. Singh Rooprai from Kuraray Europe Gmbh conducted the tests for several kinds of laminated glass: PVB laminated glass, EVA laminated glass, SGP laminated glass and stiff PVB laminated glass to show the glass sustain capability.

This will help overhead glazed laminated glass, for example, glass floor, glass skylight, glass walkway, glass bridge etc to better understand and decide what kinds of laminated glass shall be used.
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The test got below conclusions:

1. At -20°C, laminates made from the 4 interlayer candidates i.e 0.89 mm Ionomer, 1.52 mm Ionomer, mm Standard PVB, 1.52 Stiff PVB pass the post breakage strength requirements of the new German Standard pr DIN 18008 – 6. At -20°C, all 4 candidates had their ultimate strength more than 400 Kg as there was no collapse of the panel due to tearing of the interlayer at rotules.

2. At +21°C, Ionomer and Stiff PVB laminates pass the post breakage strength requirements of DIN 18008 – 6 but Standard PVB laminate does not (for this type of construction).

3. For tropical climate regions where the ambient temperature is more than +45°C, Ionomer interlayer laminates meet and exceed the requirements of pr DIN 18008-6 Standard.

4. Further testing and research will be conducted to get a better understanding of the post glass breakage behavior of laminated glass and to develop appropriate design methods.

Please download the detailed test procedure and test result here:

**Post Breakage Strength Testing for Overhead Laminated Glass**

Morn also got all the test videos, welcome contact us to get related info.

Morn is your turnkey architectural laminated glass supplier in China, welcome contact us for more info.

Tags: laminated glass structural performance, Overhead Laminated Glass, Post Breakage Strength Test, Laminated glass, DIN18008-6, glass loading capability, glass sustain capability, Kuraray Europe Gmbh, Ionomer interlayer

**About Morn Building Materials:**

Morn Building Materials Co., Ltd is trading company offering the right facade materials for a wide range of applications for architectural, design and system requirements. Cooperating with China premium glass fabricators, Morn is able to supply whatever glass products applied in facade, Spandrel, roof, handrail, partition, balustrade, canopy, greenhouse, sun room, interior exterior application.

Other facade materials: Aluminium alloy profiles, aluminium plates, aluminium windows & doors, Assa Abloy hardware, spider fitting, railing systems, shower rooms, polyurethane panels, machines & tools, steel structure, are also available since 2019. From aesthetics, to strict environmental and energy specifications, to critical budget and delivery requirements, our input can make a difference.

**Contact us:**

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