Fracture toughness of stiff adhesives: Design and dimensioning of experiments on glass specimen

TECHNISCHE UNIVERSITÄT DARMSTADT

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Institute of Structural Mechanics and Design
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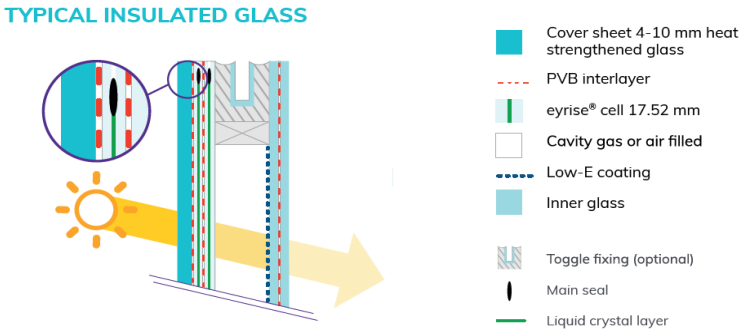
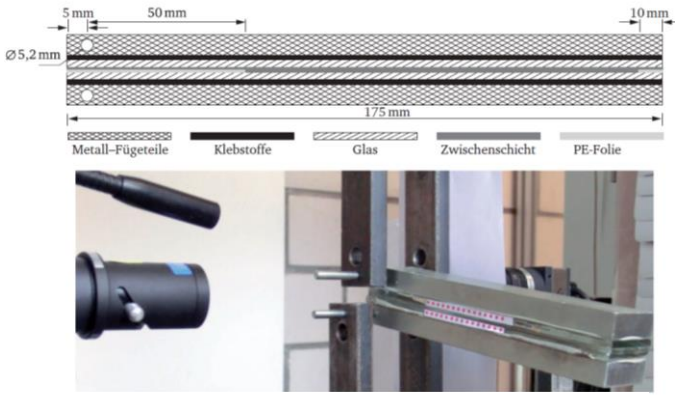
Masterthesis
on the topic of glass adhesives



Geometry of Smart Windows/Eyrise
(Source: https://www.eyrise.com)

The innovative and smart glass product eyrise®, based on liquid-crystal technology, can change its transparence and color within seconds. The edges of the glass panes are sealed with a stiff polymeric adhesive. The employed adhesive layers are thin and thereby shear resistant while simultaneously providing a high adhesion between the two adherends. Due to the geometry of the adhesive layer and the requirements of later numerical investigations, two experimental setups are to be dimensioned. By those means, the fracture toughness for both crack opening mode I and II are to be determined while the similar strength of adhesive and adherends have to be considered.



Double-Cantilever-Beam-Test (Source: Dissertation J. Franz)

Aim of the present work is the dimensioning of two experimental setups for the determination of fracture toughnesses $G_{I,c}$ and $G_{II,c}$ at stiff adhesive layers and the calibration of a cohesive zone model for this adhesive layer. Therefore, finite element computations have to be performed with a subsequent evaluation of experimental.

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