On the coaxial double ring test for float glass. Towards a new standardized configuration

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Abstract

The macroscopic properties of float glass are governed by the opening of surface cracks in mode I. To separate the influence of crack orientation and defectiveness of the borders (due to the cutting process), in the experimental measurement of the material strength the *panacea* would be to induce an equibiaxial state of stress in the core of the specimen. The Coaxial Double Ring (CDR) test achieves this ideal condition when geometric non-linearities are of minor importance. To this aim, ASTM C1499-09 proposes a CDR configuration with variable geometry according to the specimen thickness, whereas EN 1288-2 proposes to apply to large specimens an additional overpressure to compensate for second-order spurious components. An analytical theoretical study of the non linear effects in a CDR test is here presented. Assuming a Weibull statistical distribution of defects, for the CDR configuration with no overpressure, we obtain expressions in closed form for the effective area, a parameter that allows re-scaling the experimental data to a reference condition (equibiaxial stress on a unitary area) according to a criterion of equal failure probability. This method is used to

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