

COMMENT ON AS1288 DRAFT STANDARD

This draft Standard (“draft”) states that it makes recommendations for design and installation practice based on “proven techniques”. Legislation requires that glass installed in buildings is “fit for purpose”.

In 3.3.2 the draft states (without reference to any source) that the characteristic tensile Strength of glass is a function of thickness (t) as follows:

$$\text{Strength (in MPa)} = -9.85\ln(t) + 71.34$$

All subsequent sections of the draft rely on this variable strength to calculate the allowable thickness of glass to be installed, having regard to the glass type, wind load, live load, panel size etc.

The notion that the strength properties of a uniform, monolithic and homogeneous material is a function of its thickness is manifestly absurd.

So is the implication of the equation that this variable strength is accurate to ± 0.01 MPa. The fitting of “data points” with a logarithmic function replete with terms implying accuracy to four significant digits is a ruse to imply accuracy and credibility which is without any basis, as exposed below. It is simply fraudulent.

The design strength of float glass, when properly determined by testing sizes representative of windows in buildings has been established by replicable testing to be 23 to 25 MPa, and values in this range have been adopted for ALL GLASS THICKNESSES by glass Standards around the world. There is no published Standard other than AS1288:2006 with glass strength which varies with thickness.

If it can be claimed that glass strength varies with thickness, why not other properties such as density, Poisson’s ratio, linear and torsional elastic modulus?

The absurdity of the proposition that glass strength varies with thickness is also obvious if other homogeneous materials such as metals, polymers and ceramics are considered. In the world of glass, a “fantasyland” proposition was foisted on members of a technical committee by postulating one sham equation.

The equation for characteristic strength in the 2006 Standard and in the draft was conjured in the final stages of the publication process (after a value of 23 MPa for all thicknesses was accepted at the Public Comment stage) for AS1288:2006 by curve fitting data from a non-reviewed paper which reported test results on small samples of glass. The paper used incorrect analysis of the results, which has been repudiated by the author (Kikuta). Fitting an equation to one set of incorrectly analysed results does not, on any reasonable view, constitute “a proven technique” for establishing variable glass strength as the basis of the Australian Standard for glass in buildings. Remarkably, when the data in Kikuta’s paper is analysed using proven techniques, the data does not evidence that glass strength varies with thickness.

When variable glass strength was proposed at a BD-007 committee meeting prior to AS1288:2006 being published without a further Public Comment review (and where the variable strength fraud was first adopted), the proponent supported its introduction by an alternative (but not quantitative) proposition stating that because thicker glass is much heavier than thin glass, it is more likely to be damaged in handling and installation, which would render it less strong. However, the strength postulated by AS1288:2006 for thick glass was not reduced (27 MPa for 25 mm annealed glass in Table B1), but the allowable strength of thinner glass was increased (3 mm glass in Table B1 is 41 MPa). So, he argued, the propensity to damage thick glass (unproven, not quantified and without any evidence) makes thinner glass stronger. This alternative proposition is another fraud to convince those who find the curve fitting fraud too technical, that the design strength of glass varies with thickness. However, all the tables and charts in the draft are based on the first fraud, with the second fraud not supported by any data to which an equation can be “fitted” (or “fitted up”).

You couldn’t make this stuff up. Not unless your services were procured for the purpose of subverting an Australian Standard so that glass thickness installed in buildings could be less than it needs to be, in particular in Queensland where the design wind loads in AS1147 had just been increased.

This Public Comment draft, in all aspects which are affected by the variable glass strength fraud, including critical design tables (e.g. B1) and all the charts, is not “fit for purpose”. It must be withdrawn, corrected

and properly reviewed in accordance with “proven techniques” which are made available for public scrutiny at Public Comment.

In the meantime, Standards Australia should publish warnings to those relying on AS1288:2006 that it is technically incorrect, and that a glass strength value of 23 MPa (which was the value in the 2006 draft at its Public Comment release, and was not challenged at that stage) should be used in design calculations for all thicknesses of annealed float glass.

Anything less is a continuing fraud on the Australian public, perpetuating the fraud persisting since AS1288:2006 was published.

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November 2020