The easy-to-use Calculator is designed to help designers and architects accurately model a variety of glass-mounting solutions in combination with glass types, interlayer materials and external factors such as loads, load duration and temperatures. Once variables have been entered, the Calculator offers analysis, results and pass/fail criteria based on the ASTM E1300 “Effective Thickness Approach” code. Users can then fine tune panel formulations until the result meets the standards to which they are designing.

Hosted within the “Architects Corner” on the mobile-optimised Kuraray Interlayer Solutions website (http://glasslaminatingsolutions.kuraray.com/), the calculator, which can calculate values for both SentryGlas® ionoplast interlayer and PVB, includes seven calculation scenarios – including a newly incorporated four-sided support, uniform pressure calculation. The calculation for this new four-sided model is based on ABAQUS, a unified FEA solution from Dassault Systemes, which deploys a non-linear calculation, including the bearing properties of the laminate and the membrane effect.

Developed initially to address the ever increasing popularity of glass structures that are not supported along all four edges, such as canopies and balustrades, the Calculator helps designers to confirm that their designs and panel formulations are capable of handling the anticipated loads and that they meet the ASTM International’s ASTM E 1300 Standard Practice for Determining Load Resistance of Glass in Buildings.

In addition to the new four-sided support calculation, users can also model single- and two-edge support applications with either line load, uniform pressure or line load + uniform pressure in combination. The line load model simulates a line load applied across a particular line of the glass, for example when somebody might lean against it, while the uniform pressure model simulates a load across the entire surface of the glass by, for example wind or snow.
Seven different test calculation scenarios can be modelled
Once the mounting and load-type have been determined, the user clicks on the appropriate icon, which will take them to a clear and intuitive data-entry page where they can enter parameters such as glass span, line load, uniform load, glass type, nominal glass thickness, minimum glass thickness, interlayer thickness and type, load duration and temperature. Before the calculations are performed, some variables are pre-populated, including allowable stress, shear modulus and Young’s modulus.

The clear and intuitive data-entry page is used to enter parameters
Upon pressing the calculate button, results are displayed in the lower portion of the screen and include the effective thickness, laminate deflection and the glass stress figure, which will either be in green or red depending on a pass/fail against ASTM E1300. Should the construction fail the ASTM code, users can revise the panel details in the upper portion of the screen hit recalculate, repeating the process until a desirable result has been achieved.

The results screen highlights pass/fail figures
While the Calculator helps users consider the relative influence of common laminated glass design variables, it only considers simply supported constructions and a few loading conditions. For more complicated systems, other analysis methods will have to be employed. Design professionals should consider working with engineering professionals, such as those at Kuraray Interlayer Solutions, to determine appropriate configurations; actual proof testing is also recommended.