

It is important to understand that the DuPont Glass Laminating Solutions Strength Calculator is only meant to be a helpful tool and does not imply any guarantee of true glass laminate behavior in the design or engineering of your particular example.

Information that can be obtained from this calculator include the following:

- Maximum glass stress under load and comparison to design strength specified in various standards such as ASTM E1300
- Laminate deflection
- Effective laminate thickness
- Laminate behavior as a function of time and temperature

Information that is needed for the calculations include the following:

Support conditions

- 1-sided support (examples: balustrades, balconies, stairs)
- 2-sided support (examples: floors, stairs, often bolted glass can be approximated as 2-side support to determine global deflection)

Laminate construction

- Support type (1-sided or 2-sided are allowed with this calculator)
- Interlayer thickness
- Glass type (annealed, heat strengthened, tempered)
- Laminate dimensions
- Edge finish of glass plies (clean-cut, seamed, polished)

Load information

- Type of load
 - Uniform pressure (kPa)
 - Line load (kN/m)
- Load duration
 - Examples: short duration of 3-seconds may be appropriate for wind load
 - Intermediate duration of 1 month is often used for snow loads on overhead glazing.
 - Long duration may be appropriate for furniture on a floor

An example follows:

1. Choose a case by clicking on one of the illustrated pictures that represents your construction. See above information regarding support conditions for 1-sided and 2-sided support.

➤ Case 4: Uniform pressure, 2-sided support

2. Click on the “Choose beam parameters” button in the lower right hand corner

3. Click on the “Accept” button to indicate that you have read and accept the disclaimer.

The upper half of the screen is where you can input your parameters. The arrow next to each entry indicates a pull down menu where different choices can be made. The picture below shows the pull-down menu for Time.

4. Choose the appropriate input parameters:

- Laminate: Symmetric
- Temperature: 30°C
- Time: >1yr
- Edge finish: Polished
- Glass type: Tempered

Input Area

The screenshot shows the 'STRENGTH OF GLASS CALCULATOR' interface. The 'Input Area' is circled in red, containing the following parameters:

- Laminate: Symmetric
- Temperature: 30C
- Time: >1yr (with a pull-down menu open showing options: 3s, 1min, 1mo, >1yr)
- Glass Thickness, h: 2.5 mm
- Interlayer Thickness: 1.52
- Edge Finish: Polished
- Glass Type: Tempered
- Length, L: (0.3-4m) m
- Uniform Load: (0.1-10.0 kPa) kPa

The interface also includes a 'Calculate' button, a 'Back' button, and a 'Glass Thickness, h(mm)' slider at the bottom. The bottom of the screen contains the DuPont logo and the slogan 'The miracles of science'.

5. Put the length of the beam and uniform load in the input boxes.

DuPont Glass Laminating Solutions **STRENGTH OF GLASS CALCULATOR** Close window X

SELECT LAMINATE PROPERTIES, BEAM GEOMETRY, AND LOADING CONDITIONS

Laminate: Symmetric | Temperature: 30C | Time: >1yr | Length, L (0.3-4m): 1.5 m

Glass Thickness, h: 2.5 mm | Interlayer Thickness: 1.52 mm | Uniform Load (0.1-10.0 kPa): 4.8 kPa

Edge Finish: Polished | Glass Type: Tempered

Calculate stress, deflection

Glass Stress (MPa)

SentryGlas®Plus | PVB

Design Strength (MPa) (ASTM E1300-02): 22.63

Laminate Deflection (mm)

SentryGlas®Plus | PVB

Deflection δ (mm)

Case 4 pressure P

Laminate Thickness (h+h_v): mm

Effective Thickness(mm) SentryGlas®Plus | PVB

Effective Thickness(mm) SentryGlas®Plus | PVB

Back

Glass Thickness, h (mm)

2.5 3.0 4.0 5.0 6.0 8.0 10.0 12.0 16.0 19.0 2.5mm

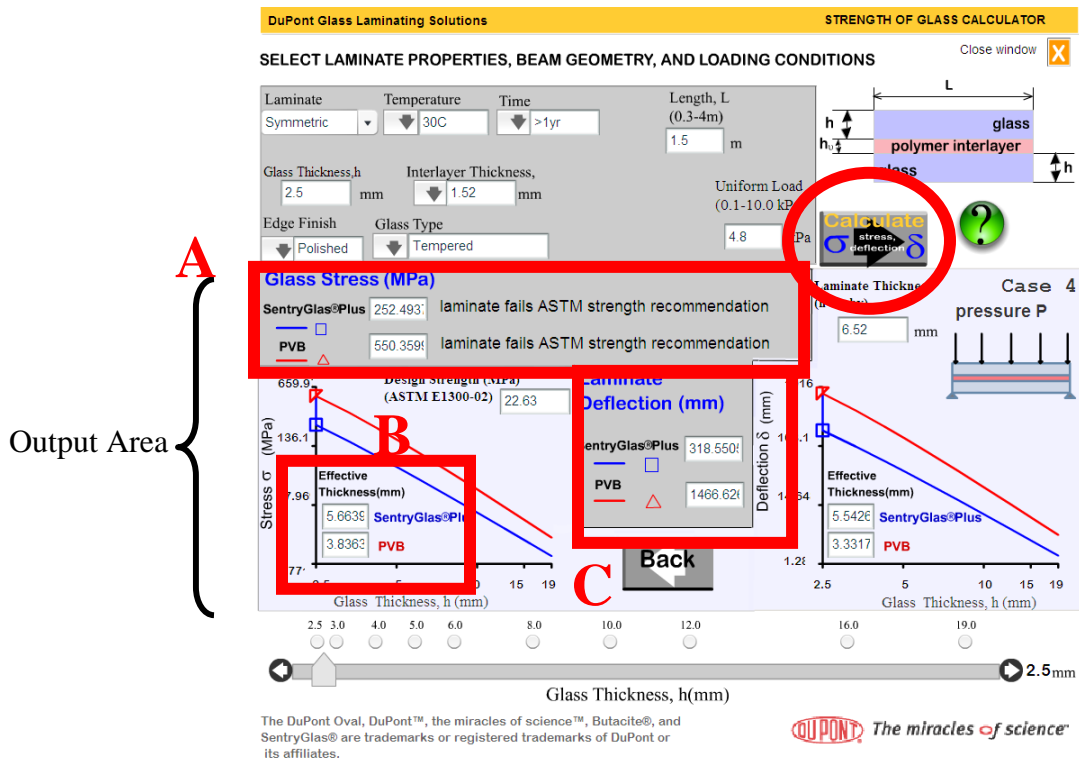
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6. Click on the “Calculate” button

There are three different areas in the output area:

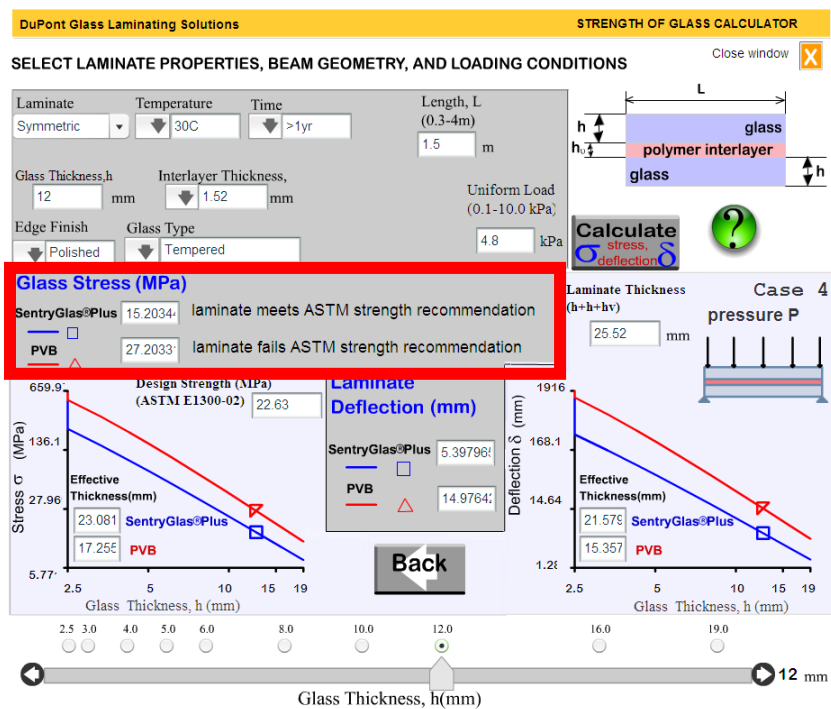
- A. Glass Stress for both SentryGlas® Plus and PVB laminates, also indicating where the construction fails or meets the ASTM E1300-02 strength recommendation. Also visualized in graphical form.
- B. Effective Thickness for both the SentryGlas® Plus and PVB laminate construction
- C. Laminate deflection expected for the SentryGlas® Plus and PVB laminates of this construction. Also visualized in graphical form.



Notice the slider bar at the bottom indicates the thickness of each glass lite. The thickness can be changed using this slider bar, and the calculation will update automatically.

In this example so far, a 2.5 mm thick glass lite will not meet the ASTM strength recommendation with either SentryGlas® Plus or PVB. By changing the thickness of the glass lite to 12 mm, we can see the following:

A glass laminate of this construction using SentryGlas® Plus interlayer will meet the ASTM strength requirement, while a laminate of the same construction using a PVB interlayer will not meet the ASTM strength requirement. In addition, the deflection calculated for the SentryGlas® Plus laminate is only 5.4 mm, whereas a PVB laminate is expected to deflect 15 mm.



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