



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 1
Date: 30/11/2020	By: CC

On Level Ltd.,
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On Level General

1459-1 Juliette Glass Balustrade

Analysis By	Checked By
CC	T.S.

0	30/11/2020	T.S.	Issued
Revision	Date	Issued By	Comment

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Actions/Result Summary:

Actions:

Balustrade load = 0.75kN/m (Table NA.5 IS1991-1-1:2002)

Point load = 0.5kN (Table NA.6 IS1991-1-1:2002)

Infill load = 1.0kN/m² (Table NA.6 IS1991-1-1:2002)

Maximum wind load 1.0kN/m²

Balustrade load = 1.5kN/m (Table NA.5 IS1991-1-1:2002)

Point load = 1.5kN (Table NA.6 IS1991-1-1:2002)

Infill load = 1.5kN/m² (Table NA.6 IS1991-1-1:2002)

Maximum wind load 1.5kN/m²

Assumption

Concrete Grade = C30/37

Result Summary:

Two design cases were checked.

1/. The post and Skyforce channel will work for a uniformly distributed loading of 0.75kN/m and associated loading spanning up to 2.0m. The glass will also work at this loading for a span of 2.0m as a 6/6/1.52 toughened laminate glass with a PVB interlayer.

2/. The post and Skyforce channel will work for a uniformly distributed loading of 1.5kN/m and associated loading spanning up to 1.2m. The glass will also work at this loading for a span of 1.2m as a 6/6/1.52 toughened laminate glass with a PVB interlayer.

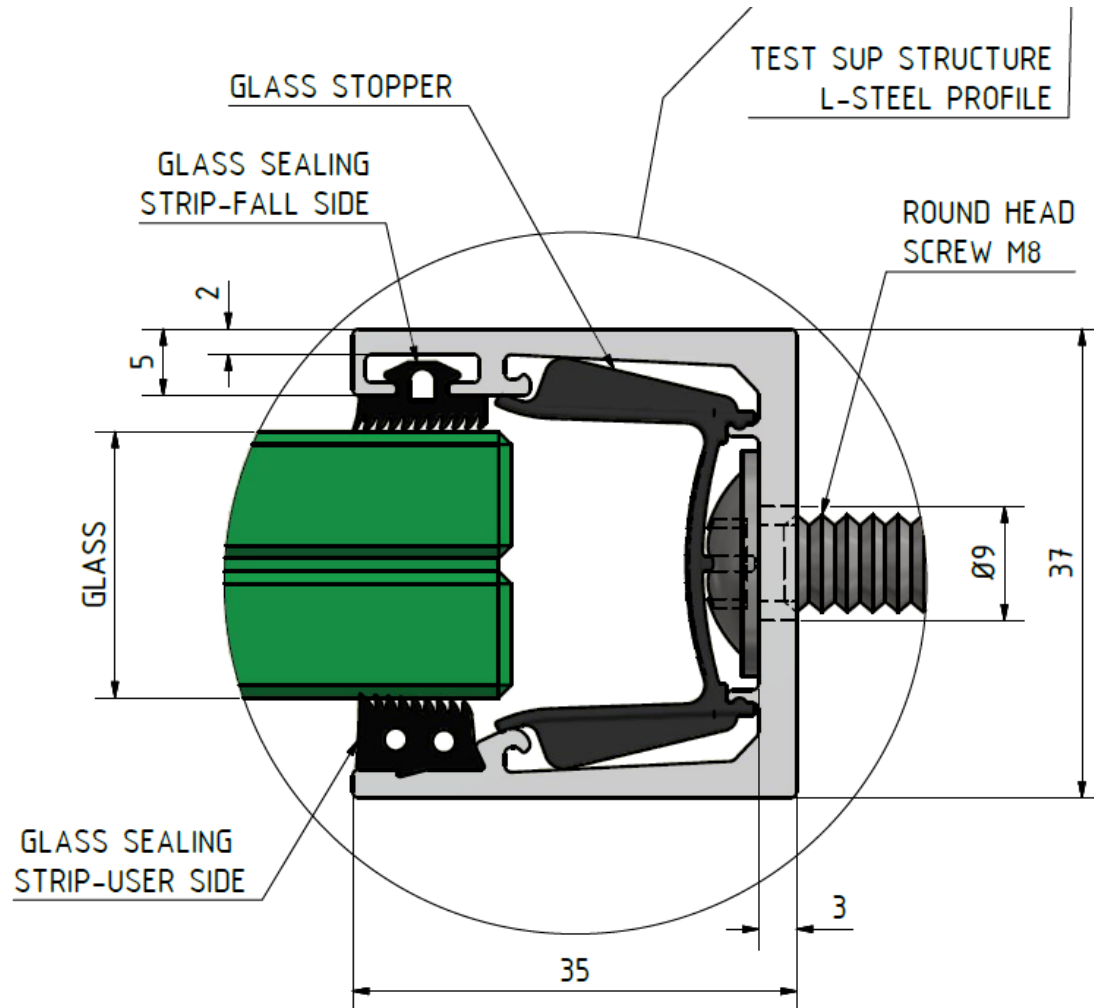
It would be recommended that bolt spacing of channel to post would consist of a concentration of 3no. bolts at 100mm c/c at the top of the glass and bolts at 300mm c/c through the height of the post.



TSA
TED SINGLETON & ASSOCIATES
CONSULTING ENGINEERS

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Sketch Of System:



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Introduction:

TSA was instructed by On Level to determine the maximum span of glass for the two conditions mentioned in the Actions section above.

Glass Calculation:

13.52mm, 6/6/1.52mm, Toughened Laminated Glass with a PVB interlayer.

Balustrade Loading:

< 5mins duration => $k_{mod} = 0.77$

$$f_{gd} = (k_{mod})(k_{sp})(f_{gk})/\gamma_{ma} + k_v(f_{bk}-f_{gk})/\gamma_{mv}$$

$$f_{gd} = (0.77)(1.0)(45)/1.6 + 1.0(120-45)/1.2$$

$$\underline{f_{gd} = 84.2\text{N/mm}^2}$$

Wind Loading: 10min duration, Multiple Gust Storm => $k_{mod} = 0.74$

$$f_{gd} = (k_{mod})(k_{sp})(f_{gk})/\gamma_{ma} + k_v(f_{bk}-f_{gk})/\gamma_{mv}$$

$$f_{gd} = (0.74)(1.0)(45)/1.6 + 1.0(120-45)/1.2$$

$$\underline{f_{gd} = 83.3\text{N/mm}^2}$$

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Skyforce Rail Check:

Skyforce Rail Check for Channel Loading:

The Skyforce Rail has the following particulars:

$$f_y = 170 \text{ MPa}$$

$$E = 69,000 \text{ MPa}$$

$$I = 1302 \text{ mm}^4/\text{m} \quad (37 \times 35 \times 2.5 \text{ mm Channel})$$

$$Z = 1041.7 \text{ mm}^3/\text{m} \quad (37 \times 35 \times 2.5 \text{ mm Channel})$$

$$\gamma_Q = 1.5 \quad (\text{Table 6.10 EN 1991-1-1:2002})$$

Maximum Loading into Skyforce rail is $1.0\text{m} \times W \times 1.5 = 1.5 \times W (\text{kN/m})$

Maximum Moment:

$$M_H = 1.5 \times 0.035 \times W$$

$$M_H = 0.0525W \text{ kNm}$$

$$\sigma_{\max} = \frac{M}{Z}$$

$$\sigma_{\max} = \frac{(0.0525 W) \times 10^6}{1041.7} = 170 \frac{\text{N}}{\text{mm}^2} \quad \text{Okay}$$

$W = 3.373 \text{ kN/m}$ (SLS) for strength

Check deflection in Channel due to this loading:

Maximum Deflection:

$$\alpha_H = \frac{Pl^3}{3EI}$$

$$\alpha_H = \frac{(3.373 \times 1000) \times 32^3}{3 \times 69000 \times 1302} = 0.410 \text{ mm} < 0.177 \text{ mm} \rightarrow \left(\frac{32}{180}\right)$$

Allowable udl is $3.373 \times 0.177 / 0.410 = 1.46 \text{ kN/m}$ (SLS) for deflection

Local Bending at Bolt Positions:

$$P (\text{kN/m}) \times 0.017 \text{ m} \times 1.5 = 0.0255P$$

$$Z_{xx} = 43 \times 3.0^2 / 6 = 64.5 \text{ mm}^3$$

$$\text{Stress in rail is: } 0.0255 P \times 10^6 / 64.5 = 170 \text{ N/mm}^2$$

Implies $P = 0.43 \text{ kN} / \text{Bolt}$ ($0.43 \text{ kN} / 0.3 \text{ m}$) = 1.433 kN/m (SLS) for local effects

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Local Bending at Bolts due to Line Load:

Assuming 3no. bolts carry the loading.

Pt Load = $1.5\text{kN/m} \times \text{Span}/2 = 0.75 \times \text{Span}$

From Above the maximum load a bolt can carry is 0.43kN (SLS).

$0.43 \times 3 = 0.75 \times \text{Span}$

Span = 1.72m for 1.5kN/m Line Loading.

Span = 3.44m for 0.75kN/m Line Loading.

From above the maximum span of glass based on Skyforce channel check is:

Applied Loading	Allowable Span for Glass Check Based on Skyforce Channel Capacity
0.75kN/m	3.44m
1.50kN/m	1.72m
1.0kN/m ²	2.866m
1.5kN/m ²	1.911m

The above table is based on a concentration of bolts (3no.) at 100mm c/c near the top of the glass and bolts spaced at 300mm c/c through the height of the glass. This applies to both the 1100mm high and 1200mm high glass.

Glass checks will be for 0.75kN/m; 1.0kN/m²; and 0.5kN glass span of 2.0m.

Glass checks will be for 1.5kN/m; 1.5kN/m²; and 1.5kN glass span of 1.2m.



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Glass Check for 13.52mm Laminate Glass:

Design cases are to BS6180:

0.75kN/m ; 1.0kN/m² ; 0.5kN ; on glass dimensions 2000mm wide x 1100mm high.

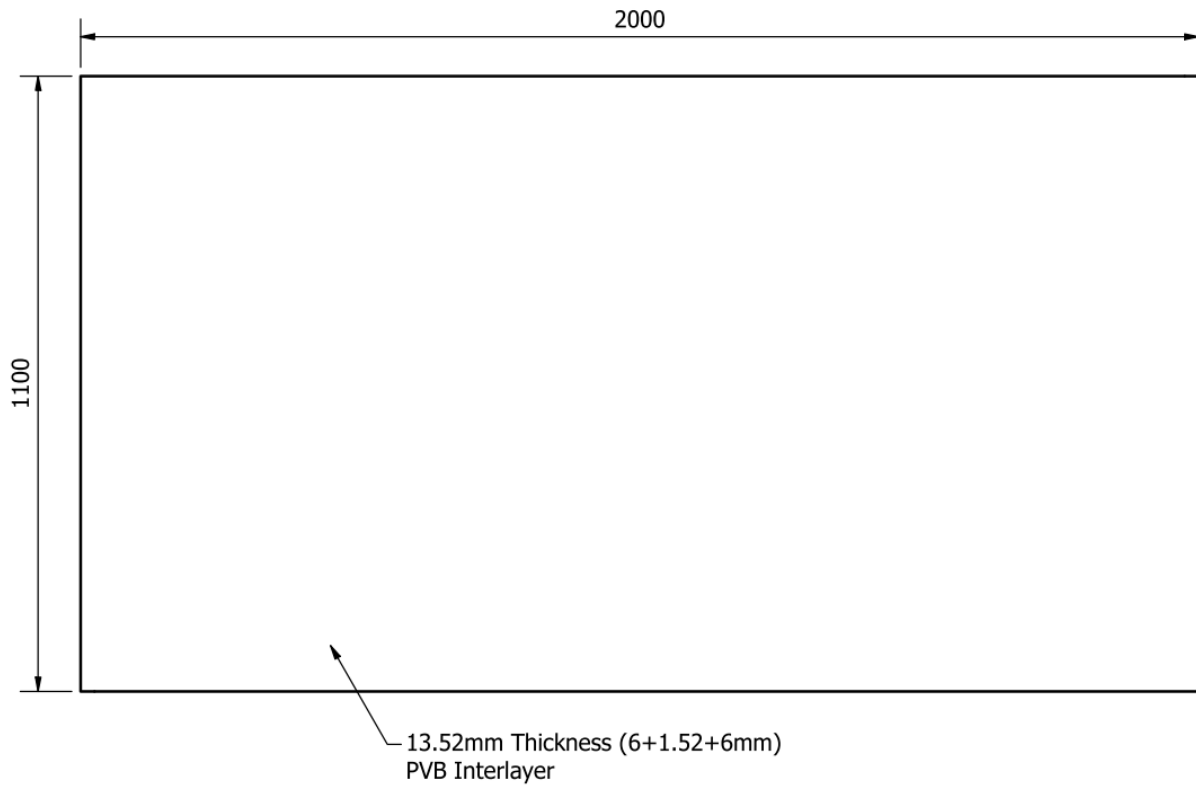
1.5kN/m ; 1.5kN/m² ; 1.5kN ; on glass dimensions 1200mm wide x 1100mm high.

The glass is to be designed for PVB & EVA interlayers.

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Case Study 01:

System Sketch – 13.52mm – PVB Interlayer:



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Glass Analysis – 13.52mm – PVB Interlayer:

Glass Analysis - Bending Stress of Glass Panel due to 1.00kN/m² Infill Loading:

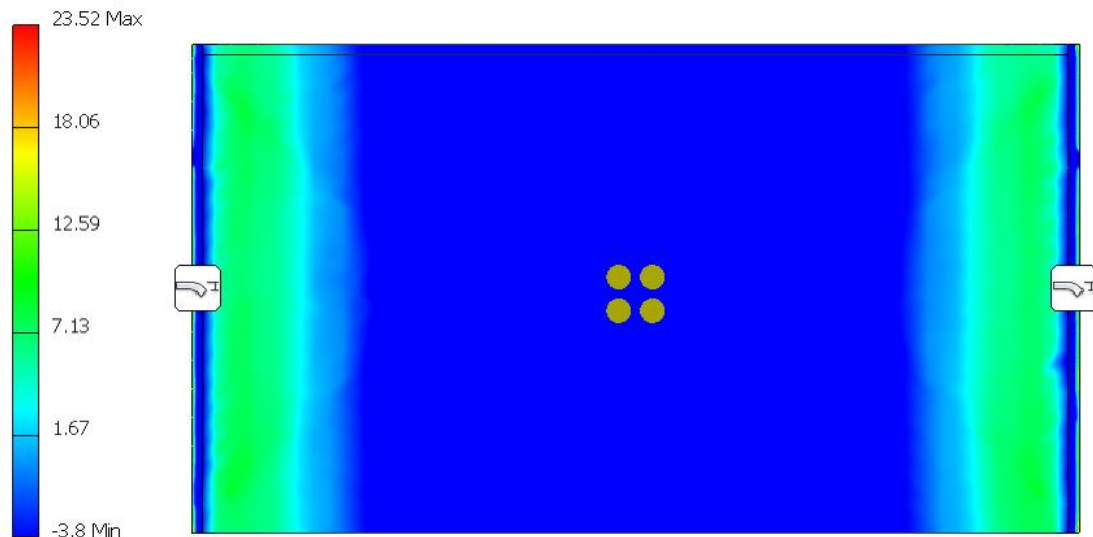
- Analysis Software was used to determine maximum bending stress of the glass due to 1.00N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $23.52\text{N/mm}^2 \times 1.5 = 35.28\text{N/mm}^2 < 83.3\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 09:04:33



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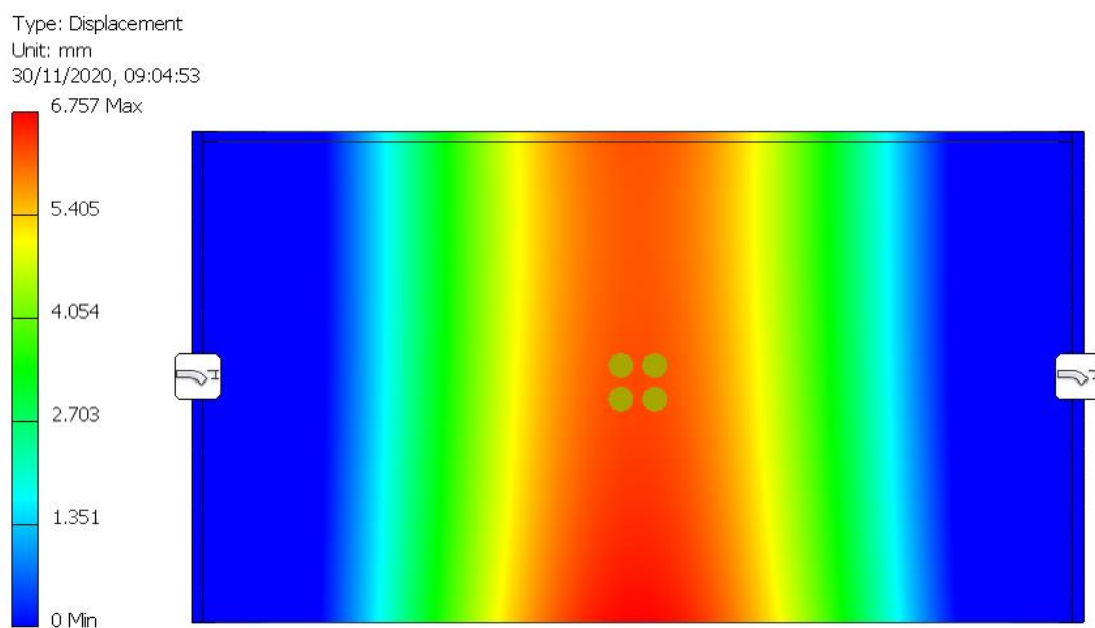
Glass Analysis - Deflection of Glass Panel due to 1.00kN/m² Infill Loading:

- Analysis Software was used to determine maximum deflection of the glass due to 1.00N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 6.757mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)



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Glass Analysis - Bending Stress of Glass Panel due to 0.75kN/m Balustrade Loading:

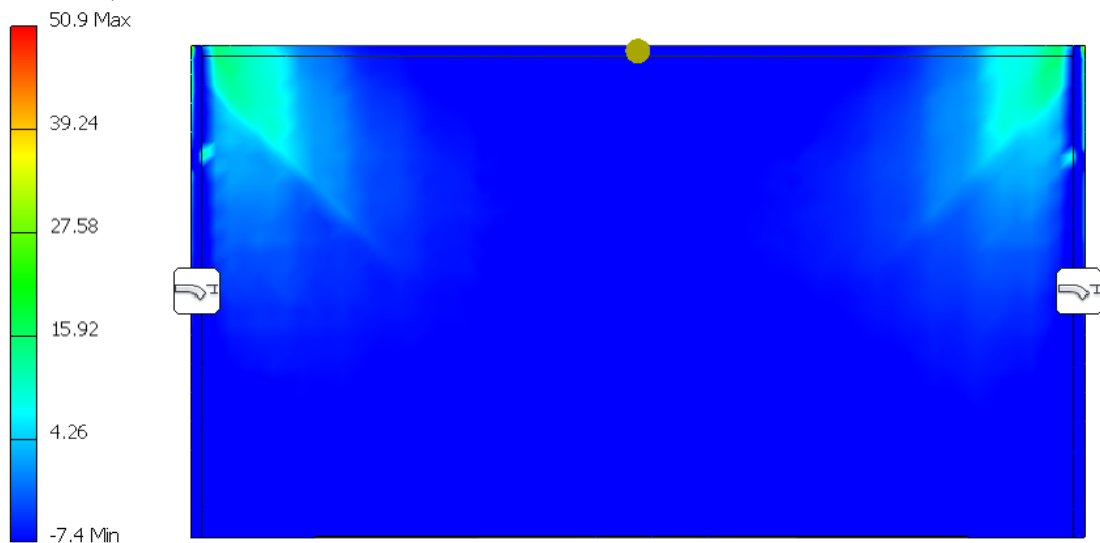
- Analysis Software was used to determine maximum bending stress of the glass due to 0.75kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.5 kN/m (0.75x2.0m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $50.9\text{N/mm}^2 \times 1.5 = 76.35\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 09:17:46





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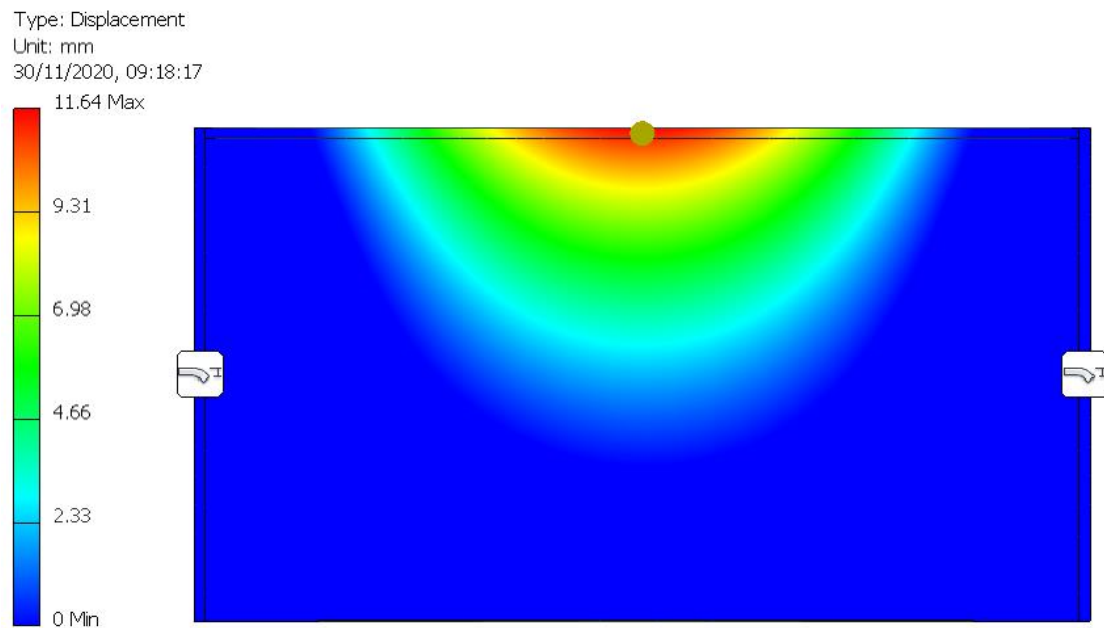
Glass Analysis - Deflection of Glass Panel due to 0.75kN/m Balustrade Loading:

- Analysis Software was used to determine maximum deflection of the glass due to 0.75kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.5 kN/m (0.75x2.0m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 11.64mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)



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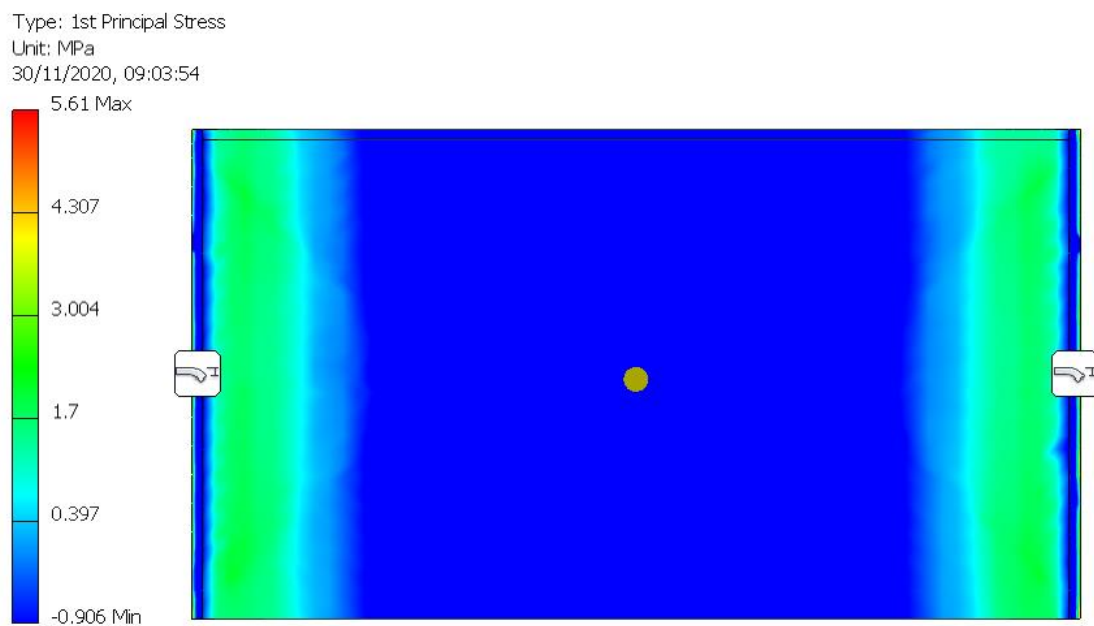
Glass Analysis - Bending Stress of Glass Panel due to 0.5kN/m Point Load:

- Analysis Software was used to determine maximum bending stress of the glass due to 0.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $5.61\text{N/mm}^2 \times 1.5 = 8.415\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending



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Glass Analysis - Deflection of Glass Panel due to 0.5kN/m Point Load:

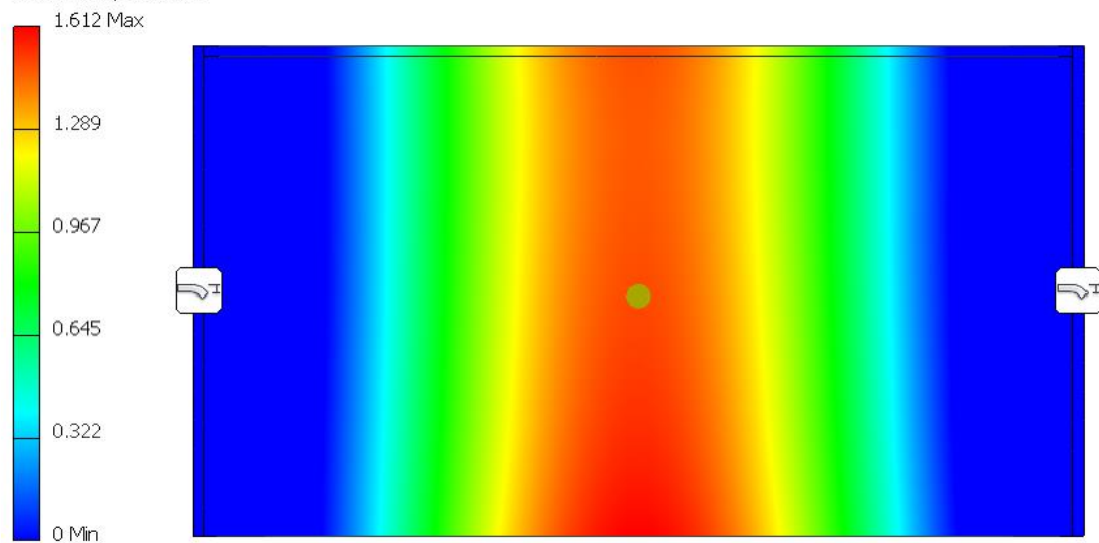
- Analysis Software was used to determine maximum deflection of the glass due to 0.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.612mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

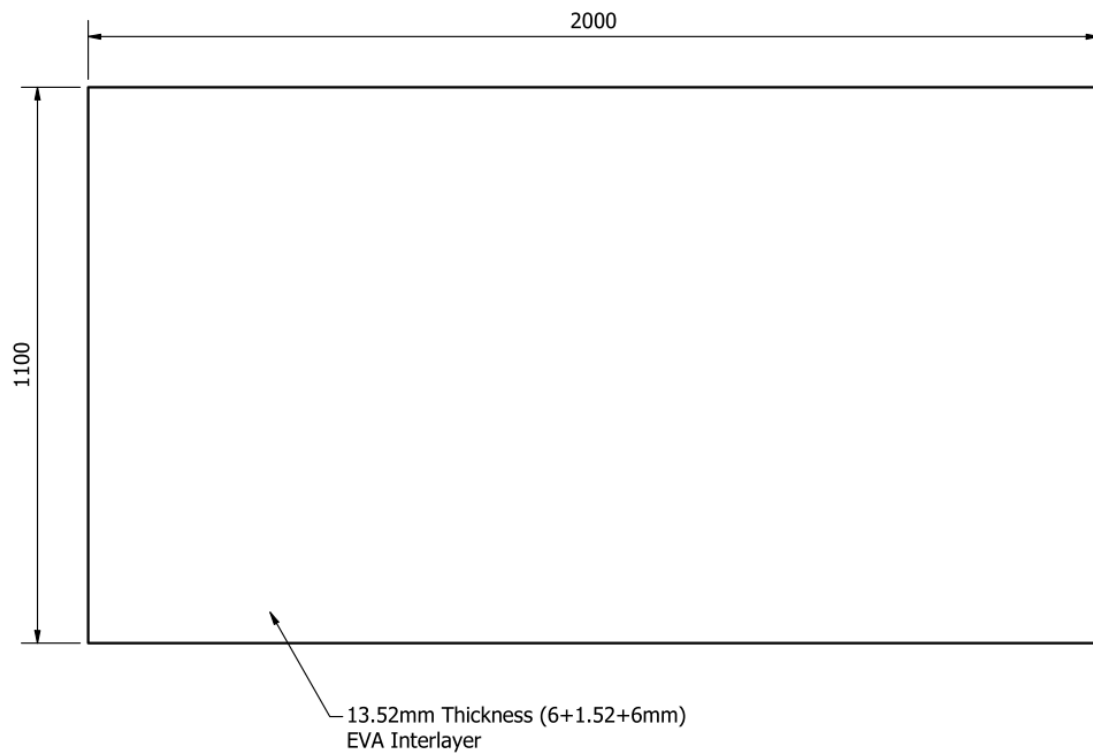
Type: Displacement
Unit: mm
30/11/2020, 09:04:13



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Case Study 02:

System Sketch – 13.52mm – EVA Interlayer:



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Glass Analysis – 13.52mm – EVA Interlayer:

Glass Analysis - Bending Stress of Glass Panel due to 1.00kN/m² Infill Loading:

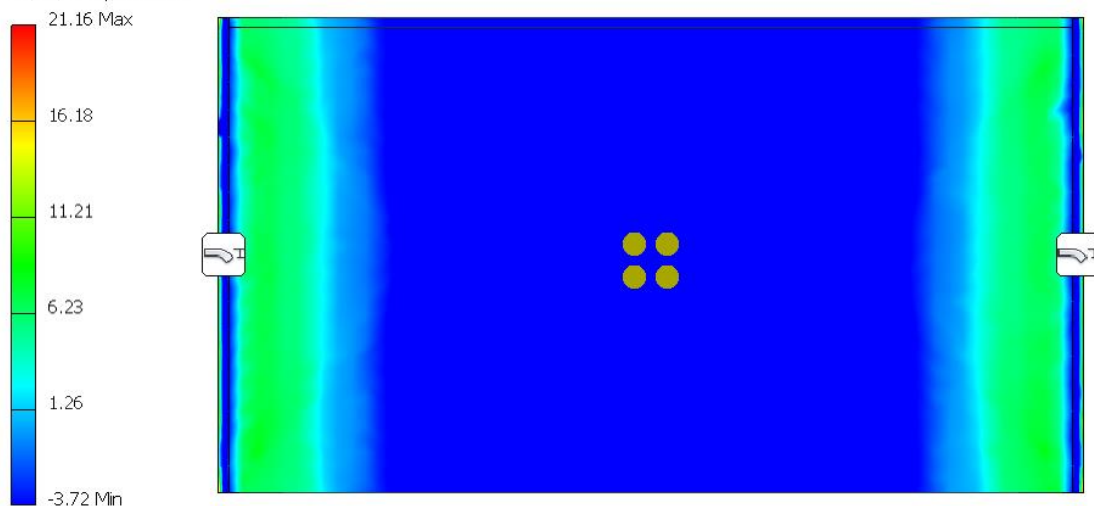
- Analysis Software was used to determine maximum bending stress of the glass due to 1.00N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $21.16\text{N/mm}^2 \times 1.5 = 31.74\text{N/mm}^2 < 83.3\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 12:01:16



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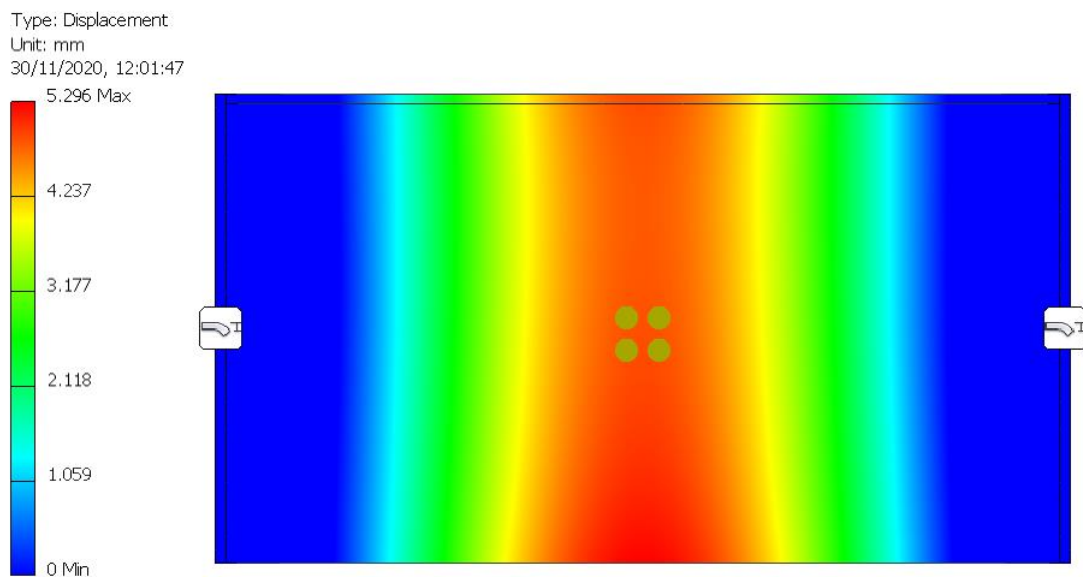
Glass Analysis - Deflection of Glass Panel due to 1.00kN/m² Infill Loading:

- Analysis Software was used to determine maximum deflection of the glass due to 1.00N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 5.296mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)



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Glass Analysis - Bending Stress of Glass Panel due to 0.75kN/m Balustrade Loading:

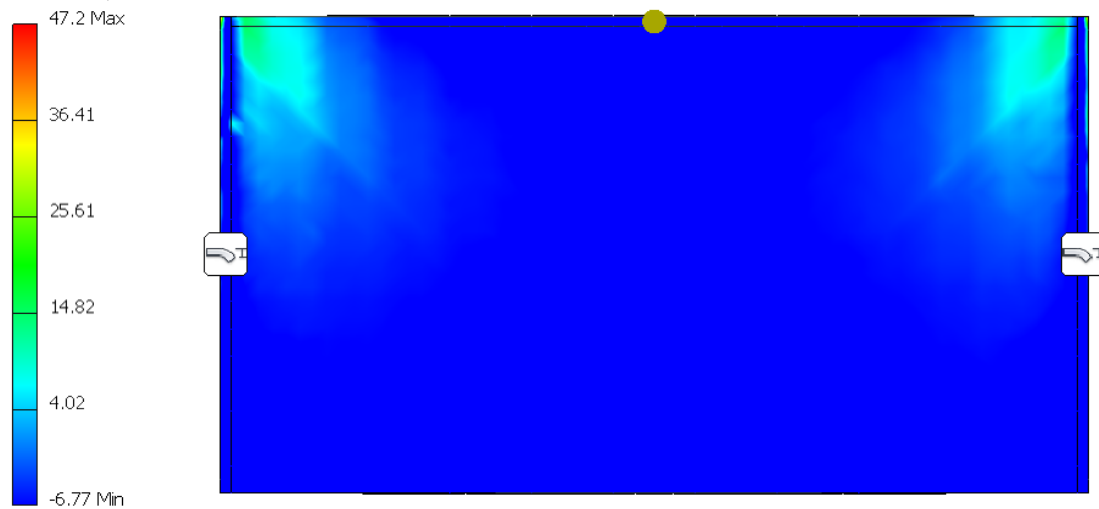
- Analysis Software was used to determine maximum bending stress of the glass due to 0.75kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.5 kN/m (0.75x2.0m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $47.2\text{N/mm}^2 \times 1.5 = 70.80\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 12:02:03



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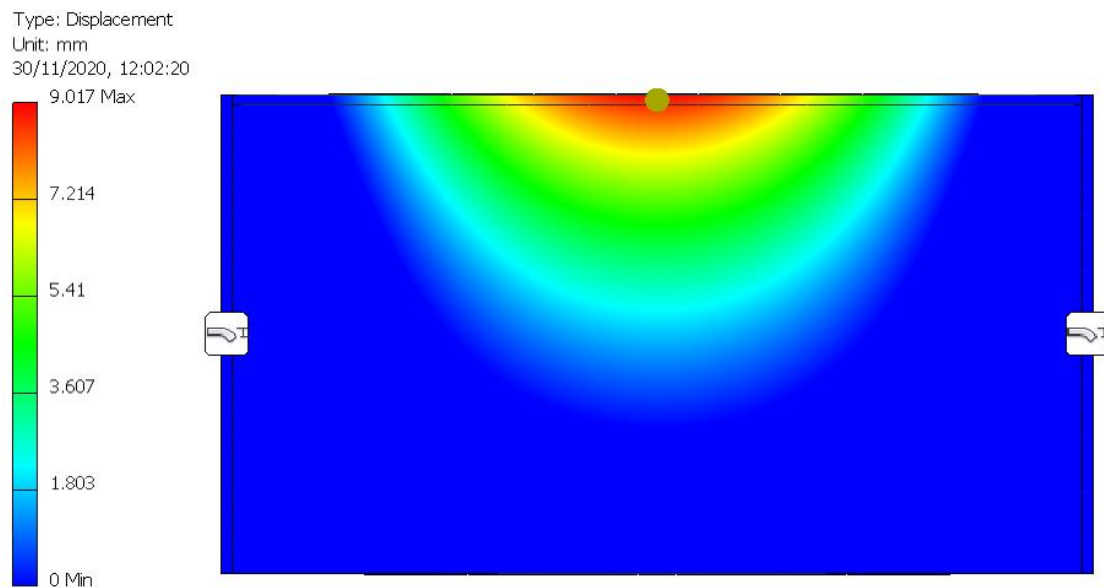
Glass Analysis - Deflection of Glass Panel due to 0.75kN/m Balustrade Loading:

- Analysis Software was used to determine maximum deflection of the glass due to 0.75kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.5 kN/m (0.75x2.0m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 9.017mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)



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Glass Analysis - Bending Stress of Glass Panel due to 0.5kN/m Point Load:

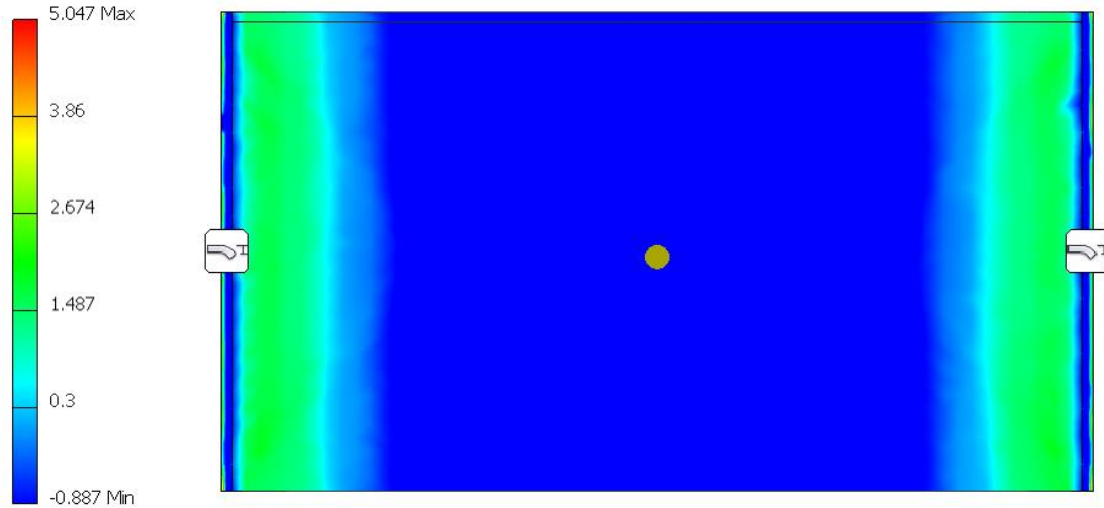
- Analysis Software was used to determine maximum bending stress of the glass due to 0.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $5.047\text{N/mm}^2 \times 1.5 = 7.5705\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 12:02:39



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Glass Analysis - Deflection of Glass Panel due to 0.5kN/m Point Load:

- Analysis Software was used to determine maximum deflection of the glass due to 0.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 2.0 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.263mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 12:03:02

1.263 Max

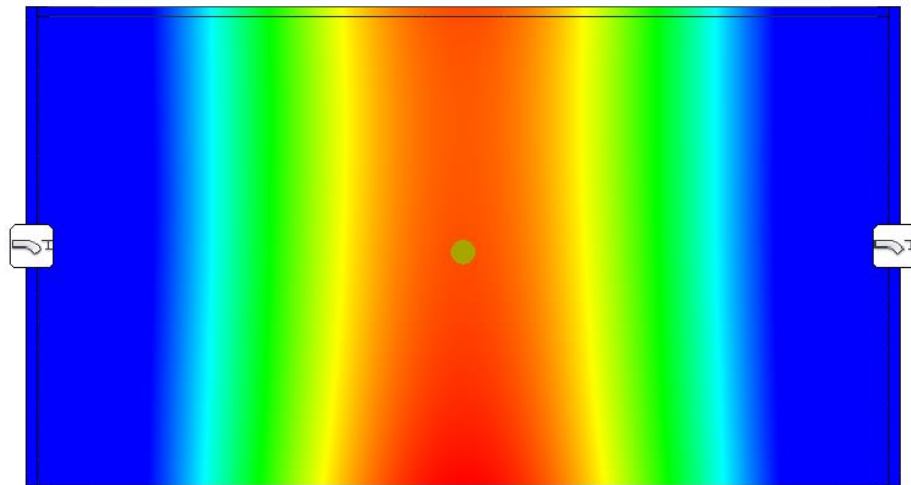
1.011

0.758

0.505

0.253

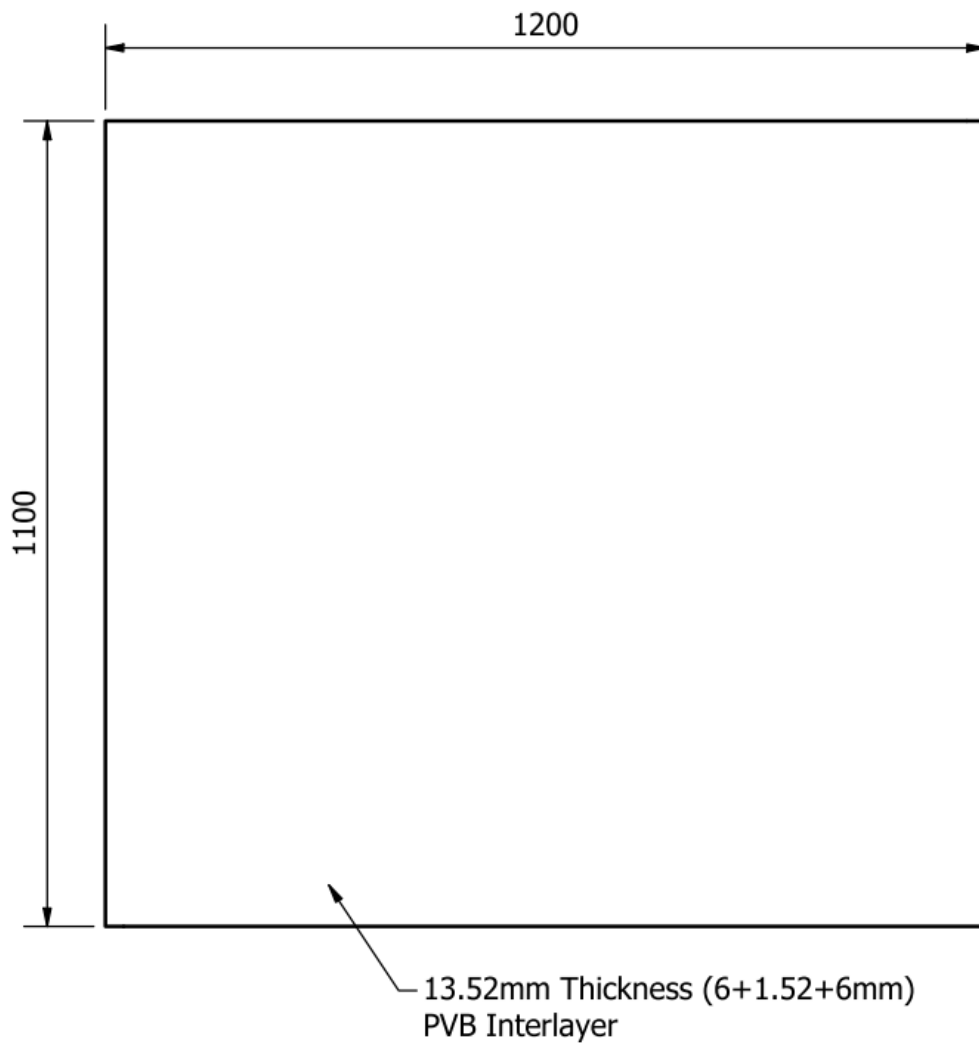
0 Min



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Case Study 03:

System Sketch – 13.52mm – PVB Interlayer:



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Glass Analysis – 13.52mm – PVB Interlayer

Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m2 Infill Loading:

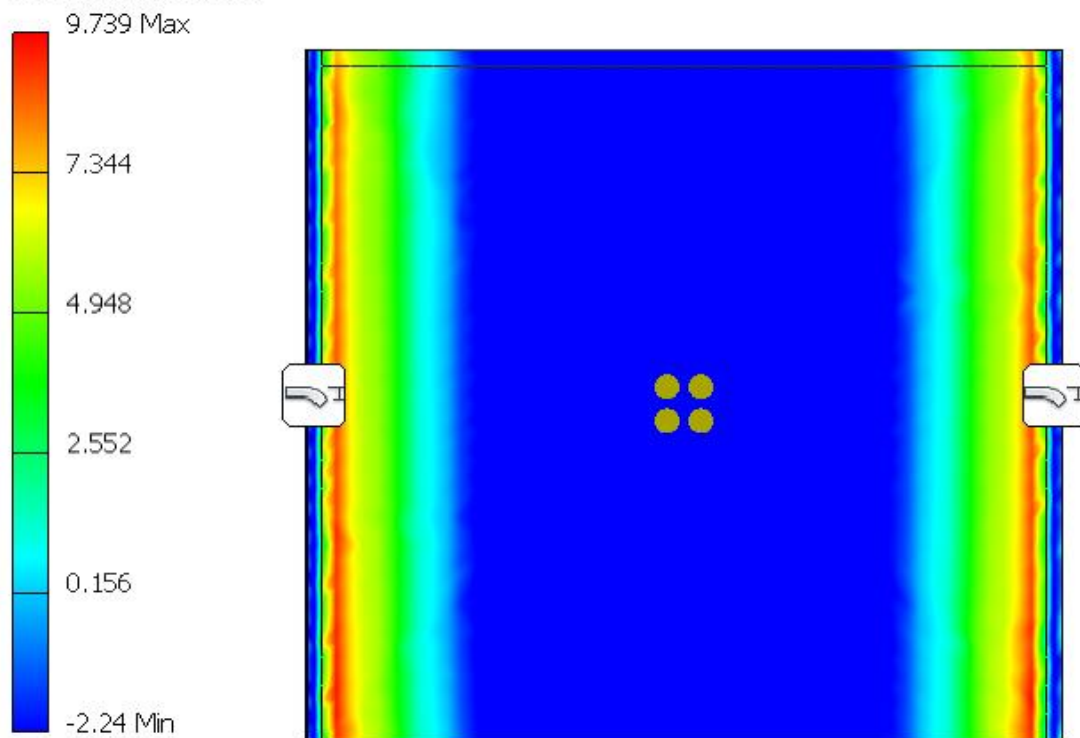
- Analysis Software was used to determine maximum bending stress of the glass due to 1.5N/m2 Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $9.739\text{N/mm}^2 \times 1.5 = 14.6085\text{N/mm}^2 < 83.3\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 09:24:27



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Glass Analysis - Deflection of Glass Panel due to 1.5kN/m² Infill Loading:

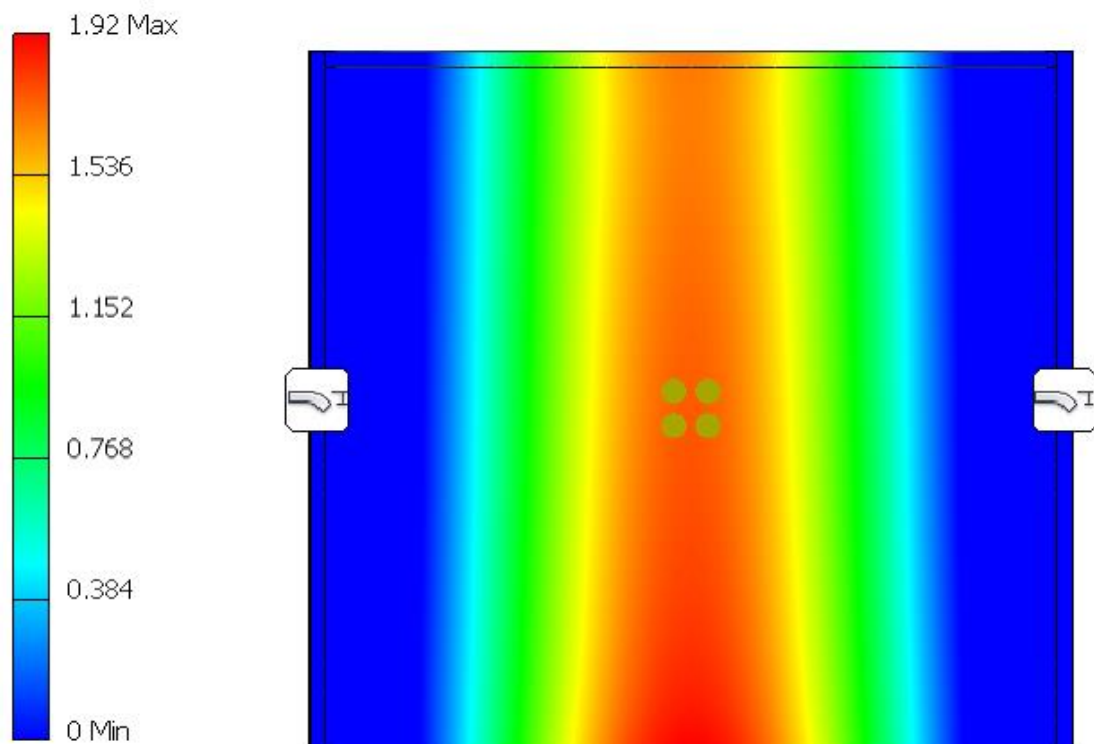
- Analysis Software was used to determine maximum deflection of the glass due to 1.5N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.92mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 09:24:45



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Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m Balustrade Loading:

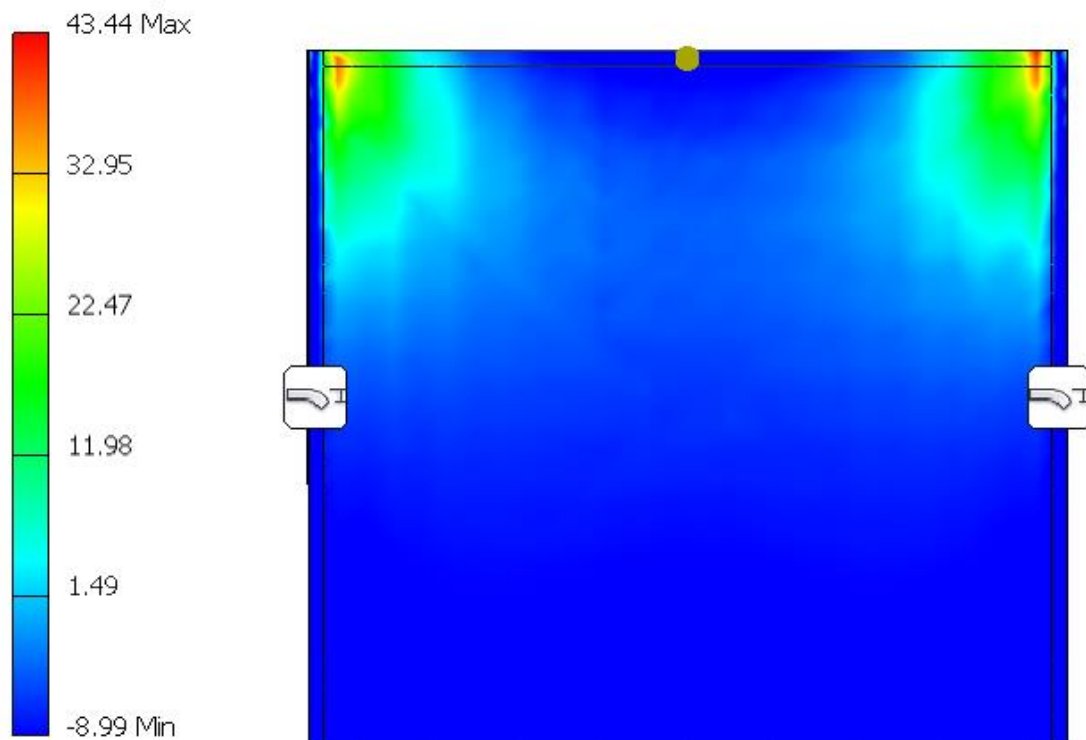
- Analysis Software was used to determine maximum bending stress of the glass due to 1.5kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.8 kN/m (1.5x1.2m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $43.44\text{N/mm}^2 \times 1.5 = 65.15\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 09:25:02



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 27
Date: 30/11/2020	By: CC

Glass Analysis - Deflection of Glass Panel due to 1.5kN/m Balustrade Loading:

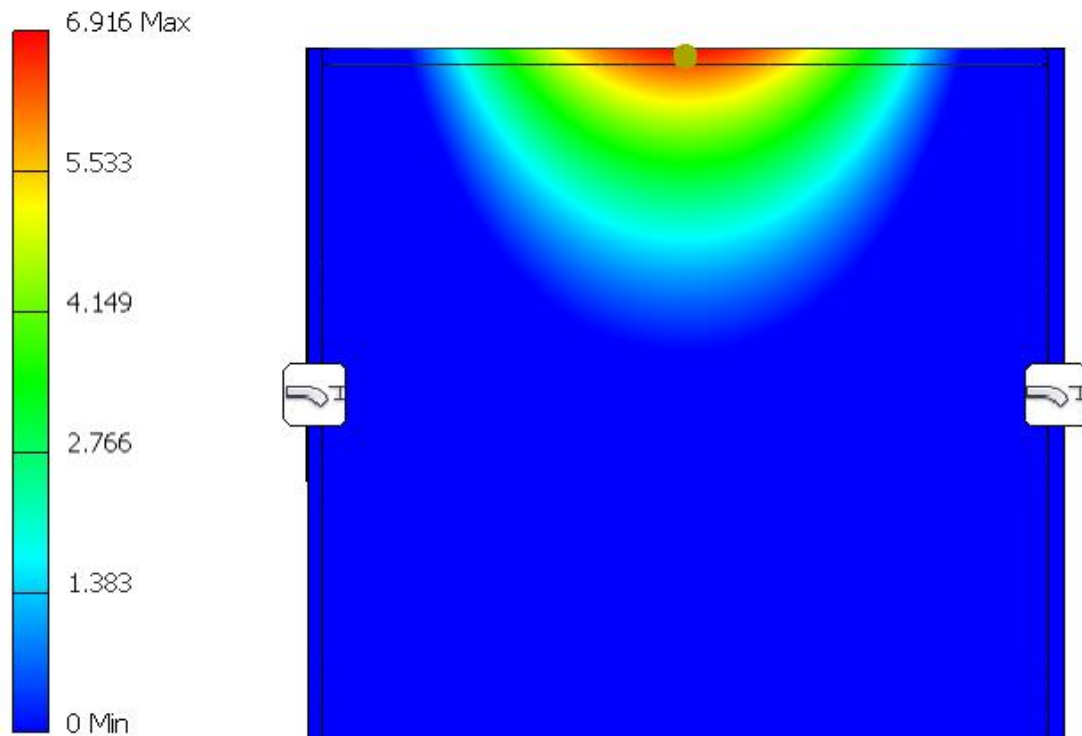
- Analysis Software was used to determine maximum deflection of the glass due to 1.5kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.8 kN/m (1.5x1.2m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 6.916mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 09:25:14



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 28
Date: 30/11/2020	By: CC

Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m Point Load:

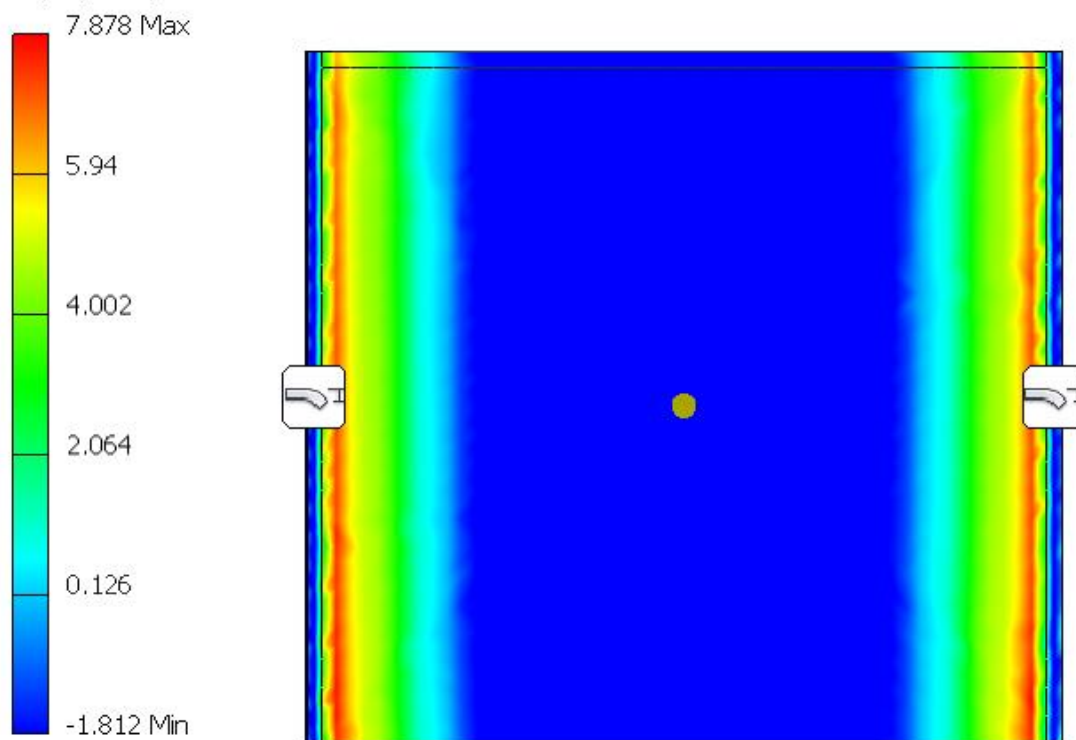
- Analysis Software was used to determine maximum bending stress of the glass due to 1.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $7.878\text{N/mm}^2 \times 1.5 = 11.817\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 09:28:11



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 29
Date: 30/11/2020	By: CC

Glass Analysis - Deflection of Glass Panel due to 1.5kN/m Point Load:

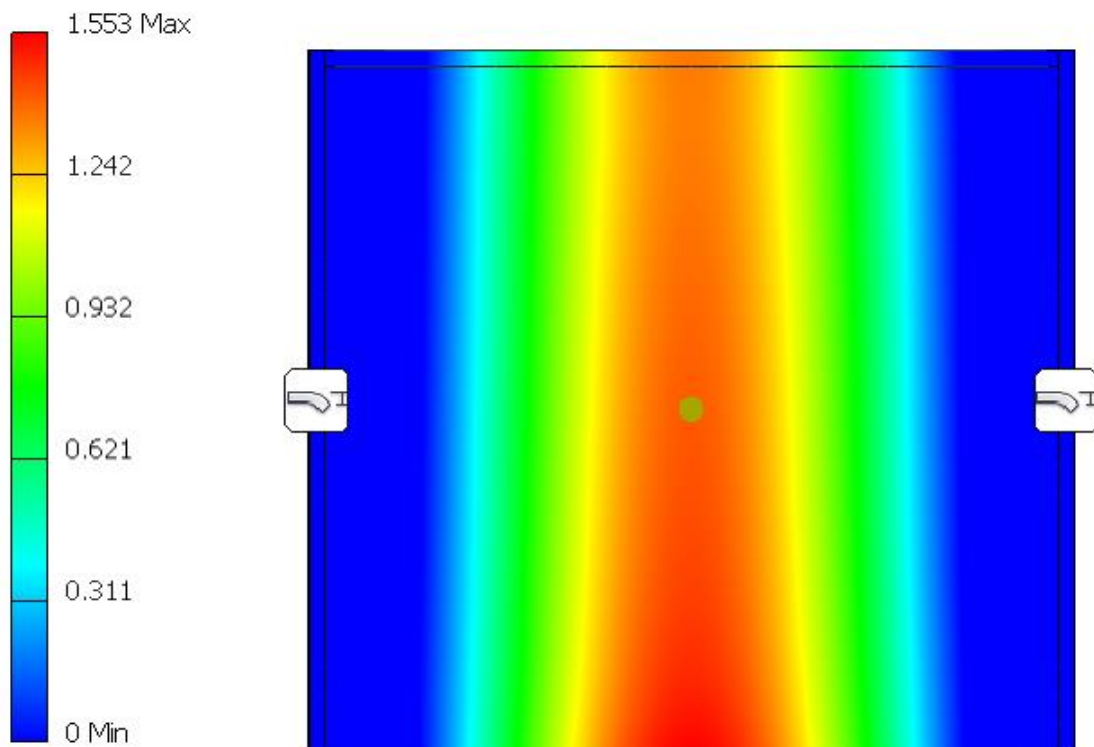
- Analysis Software was used to determine maximum deflection of the glass due to 1.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 3MPa, G = 1MPa PVB
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.553mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

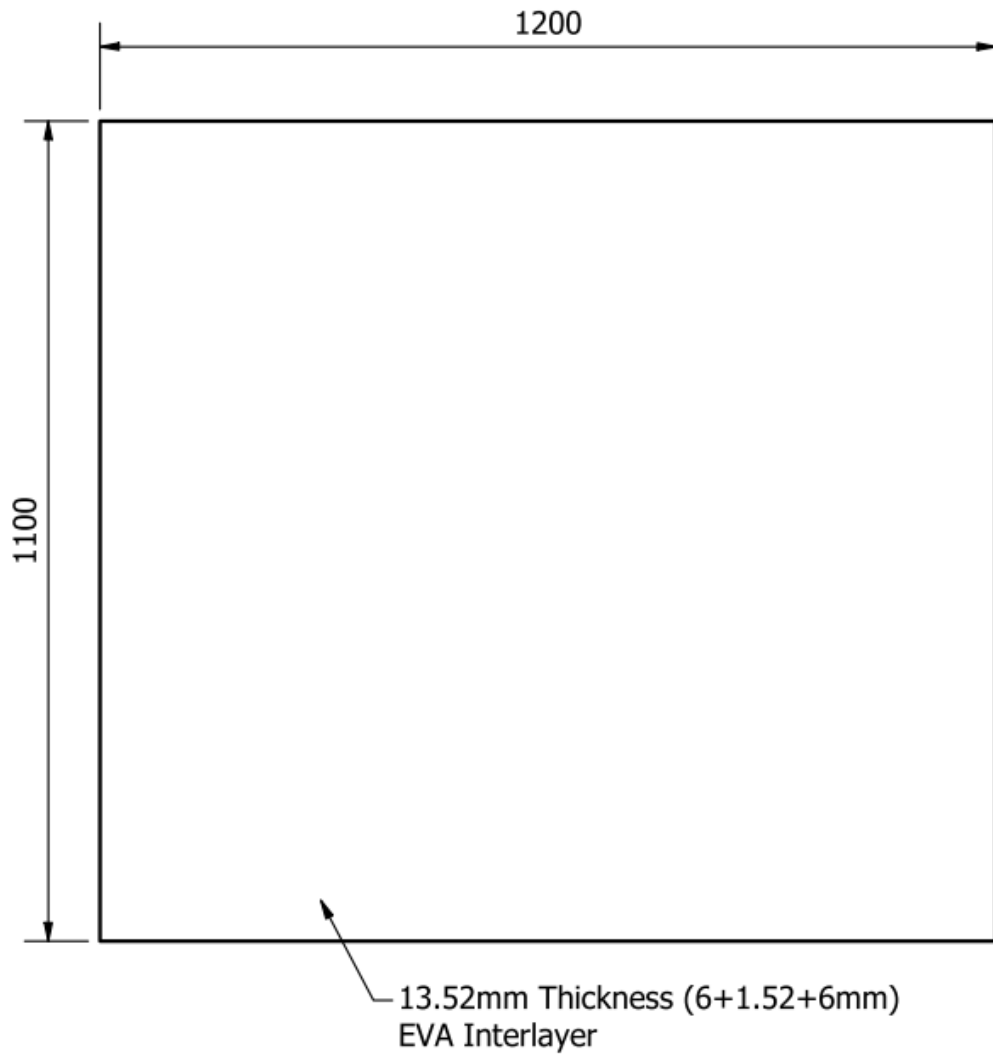
Type: Displacement
Unit: mm
30/11/2020, 09:28:49



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 30
Date: 30/11/2020	By: CC

Case Study 04:

System Sketch – 13.52mm – EVA Interlayer:



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 31
Date: 30/11/2020	By: CC

Glass Analysis – 13.52mm – EVA Interlayer

Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m2 Infill Loading:

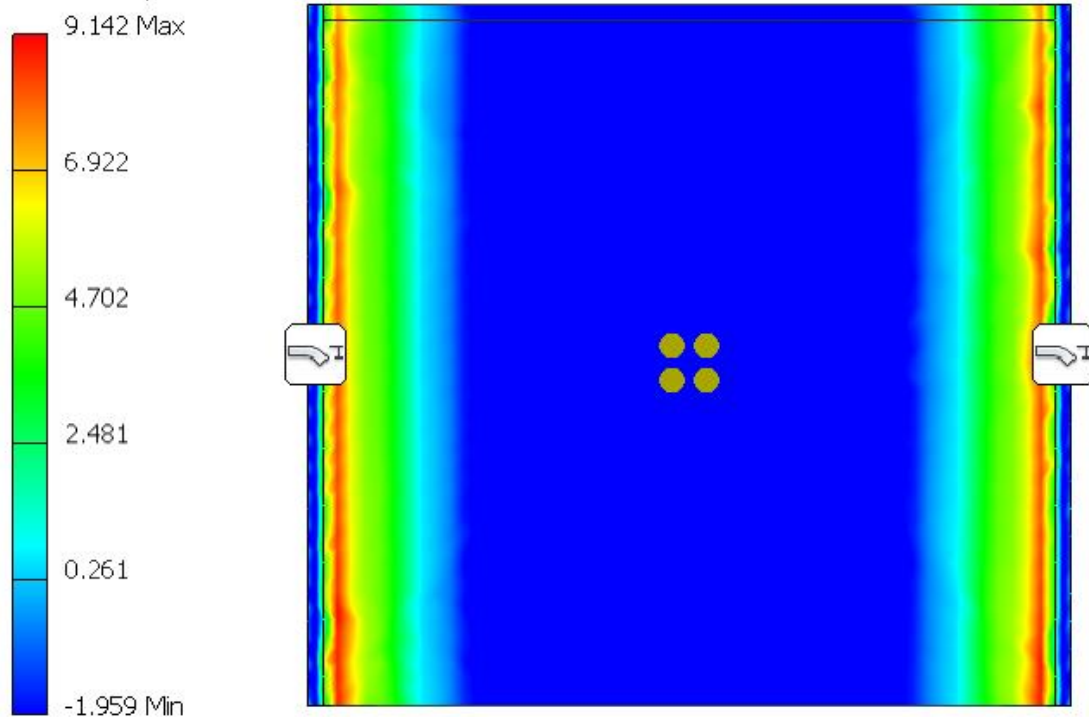
- Analysis Software was used to determine maximum bending stress of the glass due to 1.5N/m2 Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $9.142\text{N/mm}^2 \times 1.5 = 13.713\text{N/mm}^2 < 83.3\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 12:15:41



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 32
Date: 30/11/2020	By: CC

Glass Analysis - Deflection of Glass Panel due to 1.5kN/m² Infill Loading:

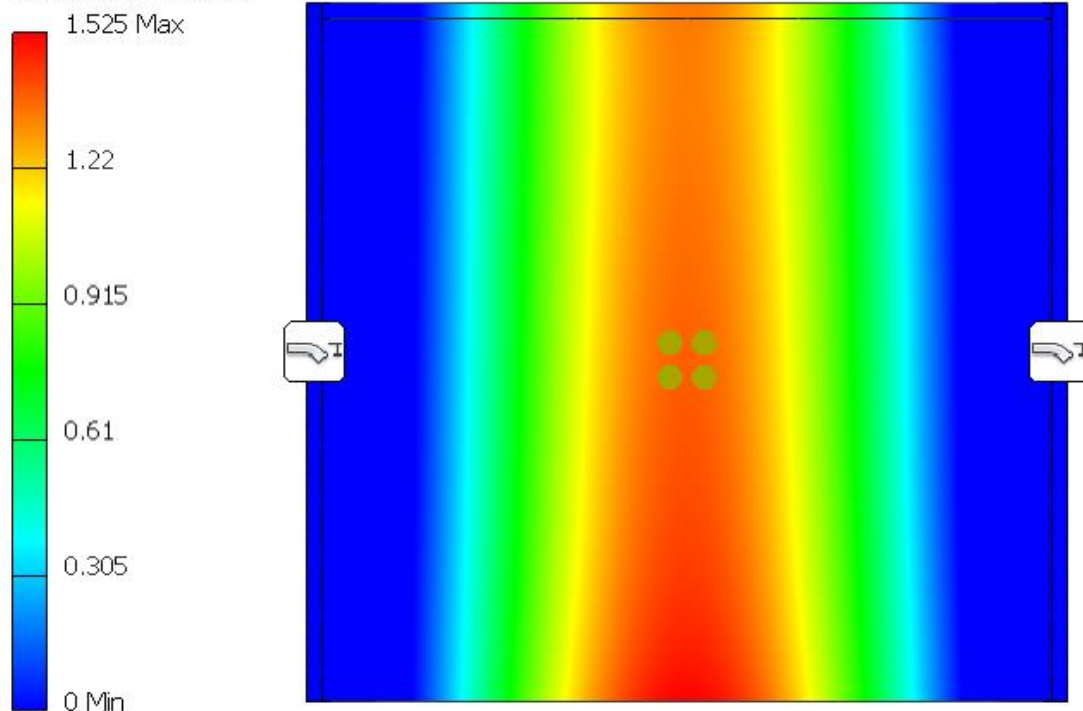
- Analysis Software was used to determine maximum deflection of the glass due to 1.5N/m² Infill Loading
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.525mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 12:16:20



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 33
Date: 30/11/2020	By: CC

Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m Balustrade Loading:

- Analysis Software was used to determine maximum bending stress of the glass due to 1.5kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.8 kN/m (1.5x1.2m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

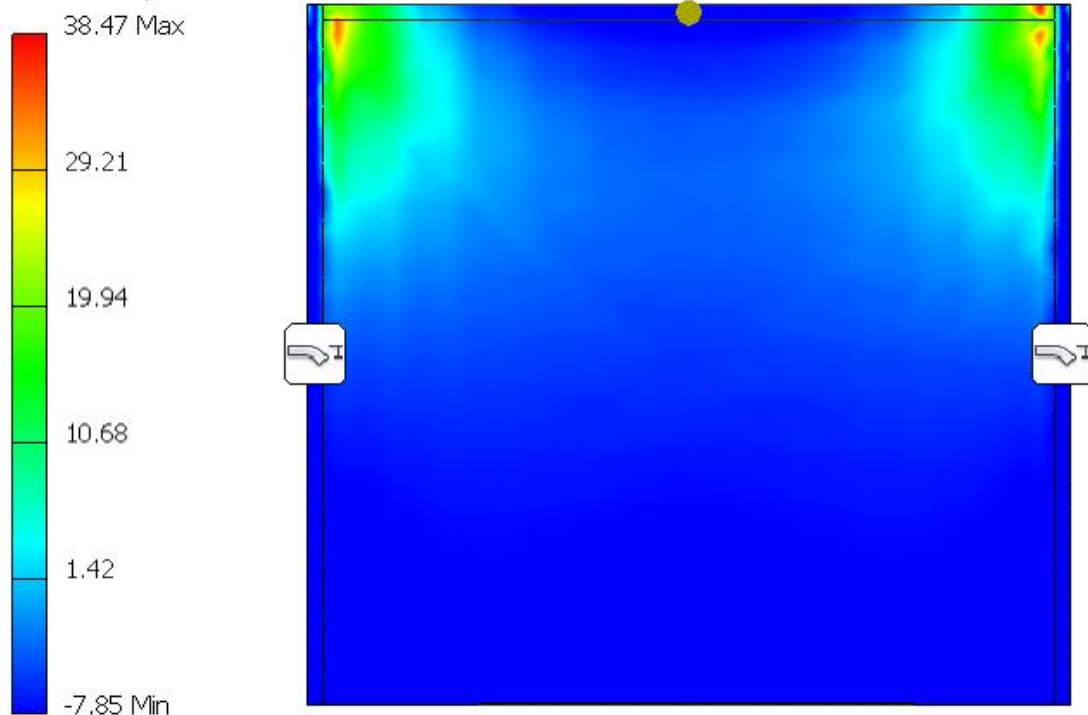
Max. Bending Stress = $38.47\text{N/mm}^2 \times 1.5 = 57.705\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress

Unit: MPa

30/11/2020, 12:16:34



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 34
Date: 30/11/2020	By: CC

Glass Analysis - Deflection of Glass Panel due to 1.5kN/m Balustrade Loading:

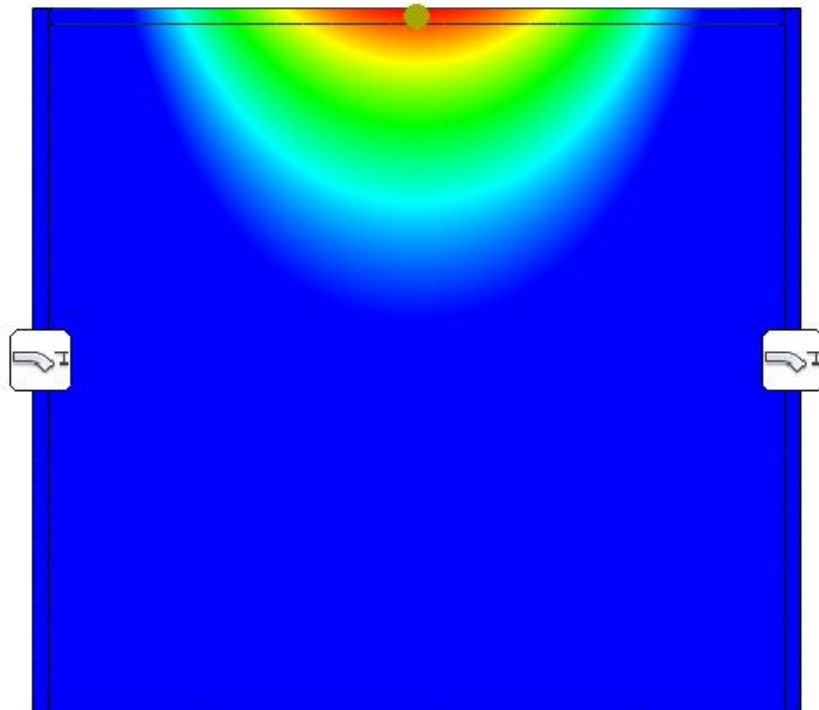
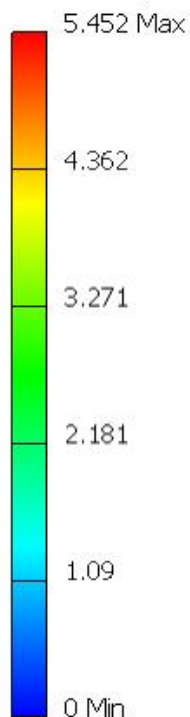
- Analysis Software was used to determine maximum deflection of the glass due to 1.5kN/m Balustrade Loading
- Actual Balustrade Load applied to the glass is 1.8 kN/m (1.5x1.2m)
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 5.452mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 12:16:46



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 35
Date: 30/11/2020	By: CC

Glass Analysis - Bending Stress of Glass Panel due to 1.5kN/m Point Load:

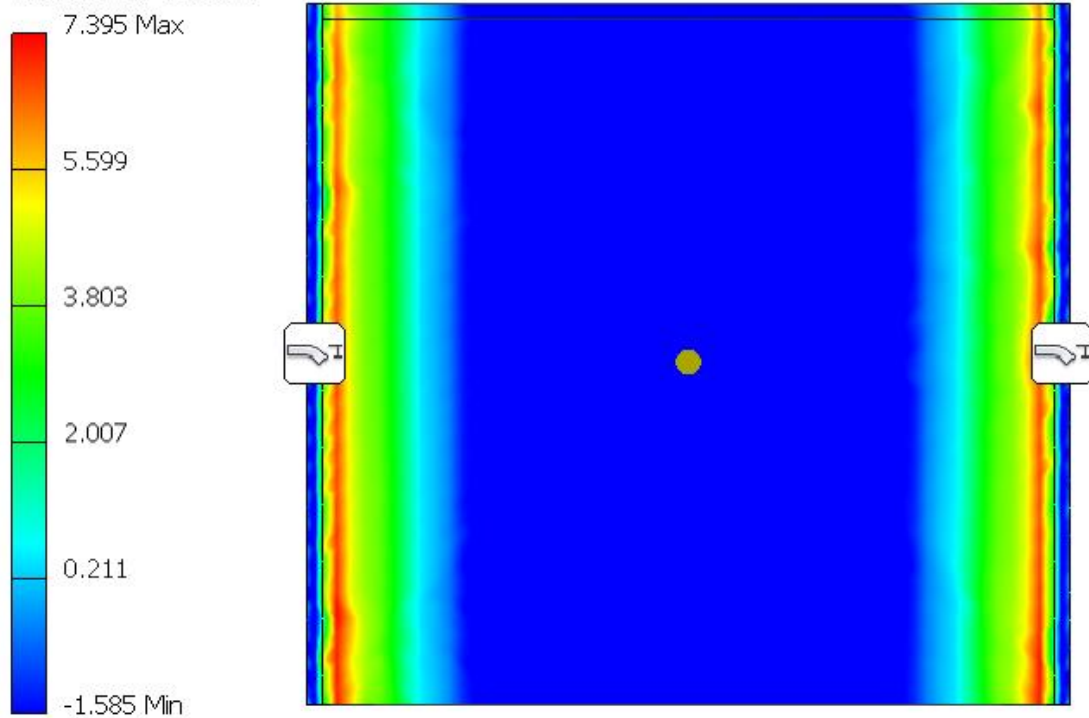
- Analysis Software was used to determine maximum bending stress of the glass due to 1.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Bending Stress analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Bending Stress = $7.395\text{N/mm}^2 \times 1.5 = 11.0925\text{N/mm}^2 < 84.2\text{N/mm}^2$

OK in Bending

Type: 1st Principal Stress
Unit: MPa
30/11/2020, 12:16:59



Project: One Level Ltd	Contract: 1459-1
Subject: Juliette Glass Balustrade	Sheet No. 36
Date: 30/11/2020	By: CC

Glass Analysis - Deflection of Glass Panel due to 1.5kN/m Point Load:

- Analysis Software was used to determine maximum deflection of the glass due to 1.5kN/m Point Load
- 6/6/1.52mm T/L/T Glass analysed, horizontally toughened Laminated
- Interlayer Properties used for analysis, E= 18MPa, G = 6.82MPa EVA
- Deflection analysed based on glass panel of 1.2 (l) x 1.1 (h) m

Result:

Max. Deflection = 1.234mm < 25mm {BS6180:2011 cl. 6.4.1}

OK in Deflection (Glass Only)

Type: Displacement
Unit: mm
30/11/2020, 12:17:10

