

Oy Steelpro Ltd
Kylänpääntie 4
01750 Vantaa, Finland

LK60, LK63, LK110 and LK112 adjustable profiles, bottom connection, bolts anchored with adhesive anchoring system, short term loads, laminating interlayer with shear force ability

Profile LK60

0,5-1,0 kN/m, rail height 1000 mm, glass 6+6 mm tempered and laminated, bottom connection, calculated with load 1,0 kN/m:

Glass max. bending stress $1,5 \times 1000 \times 900 / (1000 \times 12^2 / 6) \text{ N/mm}^2 = 56,3 \text{ N/mm}^2$
Glass max. deflection $\delta_{\max} = (1000 \times 900^3) / (3 \times 70000 \times (1000 \times 12^3 / 12)) \text{ mm} = 24,1 \text{ mm}$

Profile LK63

1,0-1,5 kN/m, rail height 1200 mm, glass 8+8...10+8 mm tempered and laminated, bottom connection, calculated with load 1,0 kN/m and glass 8+8 mm:

Glass max. bending stress $1,5 \times 1000 \times 1100 / (1000 \times 16^2 / 6) \text{ N/mm}^2 = 38,7 \text{ N/mm}^2$
Glass max. deflection $\delta_{\max} = (1000 \times 1100^3) / (3 \times 70000 \times (1000 \times 16^3 / 12)) \text{ mm} = 18,6 \text{ mm}$

and glass 10+8 mm with load 1,5 kN/m:

Glass max. bending stress $1,5 \times 1500 \times 1100 / (1000 \times 18^2 / 6) \text{ N/mm}^2 = 45,8 \text{ N/mm}^2$
Glass max. deflection $\delta_{\max} = (1500 \times 1100^3) / (3 \times 70000 \times (1000 \times 18^3 / 12)) \text{ mm} = 19,6 \text{ mm}$

Adjustable profile LK110

0,5-1,5 kN/m, rail height 1200 mm, glass 8+8...10+8 mm tempered and laminated, bottom connection, calculated with load 0,5 kN/m and glass 8+8 mm:

Glass max. bending stress $1,5 \times 500 \times 1090 / (1000 \times 16^2 / 6) \text{ N/mm}^2 = 19,2 \text{ N/mm}^2$
Glass max. deflection $\delta_{\max} = (500 \times 1090^3) / (3 \times 70000 \times (1000 \times 16^3 / 12)) \text{ mm} = 9,0 \text{ mm}$

and glass 10+8 mm with load 1,5 kN/m:

Glass max. bending stress $1,5 \times 1500 \times 1090 / (1000 \times 18^2 / 6) \text{ N/mm}^2 = 45,4 \text{ N/mm}^2$
Glass max. deflection $\delta_{\max} = (1500 \times 1090^3) / (3 \times 70000 \times (1000 \times 18^3 / 12)) \text{ mm} = 19,0 \text{ mm}$

Adjustable profile LK112

2,0-3,0 kN/m, rail height 1200 mm, glass 10+10...12+12 mm tempered and laminated, bottom connection, calculated with load 2,0 kN/m and glass 10+10 mm

Glass max. bending stress $1,5 \times 2000 \times 1090 / (1000 \times 20^2 / 6) \text{ N/mm}^2 = 49,1 \text{ N/mm}^2$

Glass max. deflection $\delta_{\max} = (2000 \times 1090^3) / (3 \times 70000 \times (1000 \times 20^3 / 12)) \text{ mm} = 18,5 \text{ mm}$

and glass 12+12 mm with load 3,0 kN/m:

Glass max. bending stress $1,5 \times 3000 \times 1090 / (1000 \times 24^2 / 6) \text{ N/mm}^2 = 51,1 \text{ N/mm}^2$

Glass max. deflection $\delta_{\max} = (3000 \times 1090^3) / (3 \times 70000 \times (1000 \times 24^3 / 12)) \text{ mm} = 16,1 \text{ mm}$

The results are acceptable, stresses in allowable area, min safety factor for tempered glass (120 N/mm^2) is about 2,1 and is in calculated cases about 3

Jarmo Järvinen, M.Sc.(Mech.Eng.)