

2021 Virginia Construction Code

CHAPTER 24 GLASS AND GLAZING

SECTION 2404 WIND, SNOW, SEISMIC AND DEAD LOADS ON GLASS

2404.1 Vertical glass.

Glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind loads due to basic design wind speed, V , in [Section 1609](#) for components and cladding. Glass in glazed curtain walls, glazed storefronts and glazed partitions shall meet the seismic requirements of [ASCE 7](#), Section 13.5.9. The load resistance of glass under uniform load shall be determined in accordance with [ASTM E1300](#).

The design of vertical glazing shall be based on [Equation 24-1](#).

$$0.6F_{gw} \leq F_{ga}$$

where:

(Equation 24-1)

F_{gw} = Wind load on the glass due to basic design wind speed, V , computed in accordance with [Section 1609](#).

F_{ga} = Short duration load on the glass as determined in accordance with [ASTM E1300](#).

2404.2 Sloped glass.

Glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, sunrooms, sloped roofs and other exterior applications shall be designed to resist the most critical combinations of loads determined by [Equations 24-2](#), [24-3](#) and [24-4](#).

$$F_g = 0.6W_o - D$$

$$F_g = 0.6W_i + D + 0.5S$$

(Equation 24-2)

$$F_g = 0.3W_i + D + S$$

(Equation 24-3)

where:

(Equation 24-4)

D = Glass dead load psf (kN/m²).

For glass sloped 30 degrees (0.52 rad) or less from horizontal,

= $13 t_g$ (For SI: $0.0245 t_g$).

For glass sloped more than 30 degrees (0.52 rad) from horizontal,

= $13 t_g \cos \theta$ (For SI: $0.0245 t_g \cos \theta$).

F_g = Total load, psf (kN/m²) on glass.

S = Snow load, psf (kN/m²) as determined in [Section 1608](#).

t_g = Total glass thickness, inches (mm) of glass panes and plies.

W_i = Inward wind force, psf (kN/m²) due to basic design wind speed, V , as calculated in [Section 1609](#).

W_o = Outward wind force, psf (kN/m²) due to basic design wind speed, V , as calculated in [Section 1609](#).

θ = Angle of slope from horizontal.

Exception: The performance grade rating of unit skylights and tubular daylighting devices shall be determined in accordance with [Section 2405.5](#).

The design of sloped glazing shall be based on [Equation 24-5](#).

$$F_g \leq F_{ga}$$

where:

(Equation 24-5)

F_g = Total load on the glass as determined by [Equations 24-2](#), [24-3](#) and [24-4](#).

F_{ga} = Short duration load resistance of the glass as determined in accordance with [ASTM E1300](#) for [Equations 24-2](#) and [24-3](#); or the long duration load resistance of the glass as determined in accordance with [ASTM E1300](#) for [Equation 24-4](#).

2404.3 Wired, patterned and sandblasted glass.

2404.3.1 Vertical wired glass.

Wired glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind loads in [Section 1609](#) for components and cladding according to

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the following equation:

$$0.6F_{gw} < 0.5 F_{ge}$$

where:

(Equation 24-6)

F_{gw} = Wind load on the glass due to basic design wind speed, V , computed in accordance with Section 1609.

F_{ge} = Nonfactored load from ASTM E1300 using a thickness designation for monolithic glass that is not greater than the thickness of wired glass.

2404.3.2 Sloped wired glass.

Wired glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, sun-spaces, sloped roofs and other exterior applications shall be designed to resist the most critical of the combinations of loads from Section 2404.2.

For Equations 24-2 and 24-3:

$$F_g < 0.5 F_{ge}$$

For Equation 24-4:

(Equation 24-7)

$$F_g < 0.3 F_{ge}$$

where:

(Equation 24-8)

F_g = Total load on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ge} = Nonfactored load in accordance with ASTM E1300.

2404.3.3 Vertical patterned glass.

Patterned glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors and other exterior applications shall be designed to resist the wind loads in Section 1609 for components and cladding according to Equation 24-9.

$$F_{gw} < 1.0 F_{ge}$$

where:

(Equation 24-9)

F_{gw} = Wind load on the glass due to basic design wind speed, V , computed in accordance with Section 1609.

F_{ge} = Nonfactored load in accordance with ASTM E1300. The value for patterned glass shall be based on the thinnest part of the glass. Interpolation between nonfactored load charts in ASTM E1300 shall be permitted.

2404.3.4 Sloped patterned glass.

Patterned glass sloped more than 15 degrees (0.26 rad) from vertical in skylights, sunspaces, sloped roofs and other exterior applications shall be designed to resist the most critical of the combinations of loads from Section 2404.2.

For Equations 24-2 and 24-3:

$$F_g < 1.0 F_{ge}$$

For Equation 24-4:

(Equation 24-10)

$$F_g < 0.6 F_{ge}$$

where:

(Equation 24-11)

F_g = Total load on the glass as determined by Equations 24-2, 24-3 and 24-4.

F_{ge} = Nonfactored load in accordance with ASTM E1300. The value for patterned glass shall be based on the thinnest part of the glass. Interpolation between the nonfactored load charts in ASTM E1300 shall be permitted.

2404.3.5 Vertical sandblasted glass.

Sandblasted glass sloped 15 degrees (0.26 rad) or less from vertical in windows, curtain and window walls, doors, and other exterior applications shall be designed to resist the wind loads in Section 1609 for components and cladding according to Equation 24-12.

$$0.6F_{gw} < 0.5 F_{ge}$$

where:

(Equation 24-12)

F_g = Wind load on the glass due to basic design wind speed, V , computed in accordance with Section 1609.

F_{ge} = Nonfactored load in accordance with ASTM E1300. The value for sandblasted glass is for moderate levels of sandblasting.

2404.4 Other designs.

For designs outside the scope of this section, an analysis or test data for the specific installation shall be prepared by a

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