

**2405.5 Unit skylights.** Unit skylights shall be tested and labeled as complying with AAMA/WDMA/CSA 101/I.S.2/A440. The label shall state the name of the manufacturer, the approved labeling agency, the product designation and the performance grade rating as specified in AAMA/WDMA/CSA 101/I.S.2/A440. If the product manufacturer has chosen to have the performance grade of the skylight rated separately for positive and negative design pressure, then the label shall state both performance grade ratings as specified in AAMA/WDMA/CSA 101/I.S.2/A440 and the skylight shall comply with Section 2405.5.2. If the skylight is not rated separately for positive and negative pressure, then the performance grade rating shown on the label shall be the performance grade rating determined in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 for both positive and negative design pressure and the skylight shall conform to Section 2405.5.1.

**2405.5.1 Unit skylights rated for the same performance grade for both positive and negative design pressure.** The design of unit skylights shall be based on the following equation:

$$F_g \leq PG \quad \text{(Equation 24-13)}$$

where:

$F_g$  = Maximum load on the skylight determined from Equations 24-2 through 24-4 in Section 2404.2.

$PG$  = Performance grade rating of the skylight.

**2405.5.2 Unit skylights rated for separate performance grades for positive and negative design pressure.** The design of unit skylights rated for performance grade for both positive and negative design pressures shall be based on the following equations:

$$F_{gi} \leq PG_{Pos} \quad \text{(Equation 24-14)}$$

$$F_{go} \leq PG_{Neg} \quad \text{(Equation 24-15)}$$

where:

$PG_{Pos}$  = Performance grade rating of the skylight under positive design pressure;

$PG_{Neg}$  = Performance grade rating of the skylight under negative design pressure; and

$F_{gi}$  and  $F_{go}$  are determined in accordance with the following:

For  $W_o \geq D$ ,

where:

$W_o$  = Outward wind force, psf (kN/m<sup>2</sup>) as calculated in Section 1609.

$D$  = The dead weight of the glazing, psf (kN/m<sup>2</sup>) as determined in Section 2404.2 for glass, or by the weight of the plastic, psf (kN/m<sup>2</sup>) for plastic glazing.

$F_{gi}$  = Maximum load on the skylight determined from Equations 24-3 and 24-4 in Section 2404.2.

$F_{go}$  = Maximum load on the skylight determined from Equation 24-2.

For  $W_o < D$ ,

where:

$W_o$  = Is the outward wind force, psf (kN/m<sup>2</sup>) as calculated in Section 1609.

$D$  = The dead weight of the glazing, psf (kN/m<sup>2</sup>) as determined in Section 2404.2 for glass, or by the weight of the plastic for plastic glazing.

$F_{gi}$  = Maximum load on the skylight determined from Equations 24-2 through 24-4 in Section 2404.2.

$F_{go}$  = 0.

**SECTION 2406  
SAFETY GLAZING**

**2406.1 Human impact loads.** Individual glazed areas, including glass mirrors, in hazardous locations as defined in Section 2406.3 shall comply with Sections 2406.1.1 through 2406.1.4.

**2406.1.1 CPSC 16 CFR 1201.** Except as provided in Sections 2406.1.2 through 2406.1.4, all glazing shall pass the test requirements of CPSC 16 CFR 1201, listed in Chapter 35. Glazing shall comply with the CPSC 16 CFR, Part 1201 criteria, for Category I or II as indicated in Table 2406.1.

**2406.1.2 Plastic glazing.** Plastic glazing shall meet the weathering requirements of ANSI Z97.1.

**2406.1.3 Glass block.** Glass-block walls shall comply with Section 2101.2.5.

**2406.1.4 Louvered windows and jalousies.** Louvered windows and jalousies shall comply with Section 2403.5.

**2406.2 Identification of safety glazing.** Except as indicated in Section 2406.2.1, each pane of safety glazing installed in haz-

**TABLE 2406.1  
MINIMUM CATEGORY CLASSIFICATION OF GLAZING**

EXPOSED SURFACE AREA OF ONE SIDE OF ONE LITE	GLAZING IN STORM OR COMBINATION DOORS (Category class)	GLAZING IN DOORS (Category class)	GLAZED PANELS REGULATED BY ITEM 7 OF SECTION 2406.3 (Category class)	GLAZED PANELS REGULATED BY ITEM 6 OF SECTION 2406.3 (Category class)	DOORS AND ENCLOSURES REGULATED BY ITEM 5 OF SECTION 2406.3 (Category class)	SLIDING GLASS DOORS PATIO TYPE (Category class)
9 square feet or less	I	I	No requirement	I	II	II
More than 9 square feet	II	II	II	II	II	II

For SI: 1 square foot = 0.0929m<sup>2</sup>.

ardous locations shall be identified by a manufacturer's designation specifying who applied the designation, the manufacturer or installer and the safety glazing standard with which it complies, as well as the information specified in Section 2403.1. The designation shall be acid etched, sand blasted, ceramic fired, laser etched, embossed or of a type that once applied, cannot be removed without being destroyed. A label as defined in Section 1702.1 and meeting the requirements of this section shall be permitted in lieu of the manufacturer's designation.

#### Exceptions:

1. For other than tempered glass, manufacturer's designations are not required, provided the building official approves the use of a certificate, affidavit or other evidence confirming compliance with this code.
2. Tempered spandrel glass is permitted to be identified by the manufacturer with a removable paper designation

**2406.2.1 Multilight assemblies.** Multilight glazed assemblies having individual lights not exceeding 1 square foot (0.09 m<sup>2</sup>) in exposed areas shall have at least one light in the assembly marked as indicated in Section 2406.2. Other lights in the assembly shall be marked "CPSC 16 CFR 1201."

**2406.3 Hazardous locations.** The following shall be considered specific hazardous locations requiring safety glazing materials:

1. Glazing in swinging doors except jalousies (see Section 2406.3.1).
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above a standing surface.
6. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the walking surface.

#### Exceptions:

1. Panels where there is an intervening wall or other permanent barrier between the door and glazing.
2. Where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in this application shall comply with Section 2406.3, Item 7.

3. Glazing in walls perpendicular to the plane of the door in a closed position, other than the wall towards which the door swings when opened, in one- and two-family dwellings or within dwelling units in Group R-2.
7. Glazing in an individual fixed or operable panel, other than in those locations described in preceding Items 5 and 6, which meets all of the following conditions:
  - 7.1. Exposed area of an individual pane greater than 9 square feet (0.84 m<sup>2</sup>);
  - 7.2. Exposed bottom edge less than 18 inches (457 mm) above the floor;
  - 7.3. Exposed top edge greater than 36 inches (914 mm) above the floor; and
  - 7.4. One or more walking surface(s) within 36 inches (914 mm) horizontally of the plane of the glazing.

**Exception:** Safety glazing for Item 7 is not required for the following installations:

1. A protective bar 1½ inches (38 mm) or more in height, capable of withstanding a horizontal load of 50 pounds plf (730 N/m) without contacting the glass, is installed on the accessible sides of the glazing 34 inches to 38 inches (864 mm to 965 mm) above the floor.
2. The outboard pane in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet (7620 mm) or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) (0.78 rad) surface adjacent to the glass exterior.
8. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where all of the following conditions are present:
  - 9.1. The bottom edge of the glazing on the pool or spa side is less than 60 inches (1524 mm) above a walking surface on the pool or spa side of the glazing; and
  - 9.2. The glazing is within 60 inches (1524 mm) horizontally of the water's edge of a swimming pool or spa.
10. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface; when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.

11. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

**Exception:** Safety glazing for Item 10 or 11 is not required for the following installations where:

1. The side of a stairway, landing or ramp which has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1013 and 1607.7; and
2. The plane of the glass is greater than 18 inches (457 mm) from the railing.

**2406.3.1 Exceptions.** The following products, materials and uses shall not be considered specific hazardous locations:

1. Openings in doors through which a 3-inch (76 mm) sphere is unable to pass.
2. Decorative glass in Section 2406.3, Item 1, 6 or 7.
3. Glazing materials used as curved glazed panels in revolving doors.
4. Commercial refrigerated cabinet glazed doors.
5. Glass-block panels complying with Section 2101.2.5.
6. Louvered windows and jalousies complying with the requirements of Section 2403.5.
7. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.

**2406.4 Fire department access panels.** Fire department glass access panels shall be of tempered glass. For insulating glass units, all panes shall be tempered glass.

## SECTION 2407 GLASS IN HANDRAILS AND GUARDS

**2407.1 Materials.** Glass used as a handrail assembly or a guard section shall be constructed of either single fully tempered glass, laminated fully tempered glass or laminated heat-strengthened glass. Glazing in railing in-fill panels shall be of an approved safety glazing material that conforms to the provisions of Section 2406.1.1. For all glazing types, the minimum nominal thickness shall be  $\frac{1}{4}$  inch (6.4 mm). Fully tempered glass and laminated glass shall comply with Category II of CPSC 16 CFR 1201, listed in Chapter 35.

**2407.1.1 Loads.** The panels and their support system shall be designed to withstand the loads specified in Section 1607.7. A safety factor of four shall be used.

**2407.1.2 Support.** Each handrail or guard section shall be supported by a minimum of three glass balusters or shall be otherwise supported to remain in place should one baluster panel fail. Glass balusters shall not be installed without an attached handrail or guard.

**2407.1.3 Parking garages.** Glazing materials shall not be installed in handrails or guards in parking garages except for pedestrian areas not exposed to impact from vehicles.

## SECTION 2408 GLAZING IN ATHLETIC FACILITIES

**2408.1 General.** Glazing in athletic facilities and similar uses subject to impact loads, which forms whole or partial wall sections or which is used as a door or part of a door, shall comply with this section.

### 2408.2 Racquetball and squash courts.

**2408.2.1 Testing.** Test methods and loads for individual glazed areas in racquetball and squash courts subject to impact loads shall conform to those of CPSC 16 CFR, Part 1201, listed in Chapter 35, with impacts being applied at a height of 59 inches (1499 mm) above the playing surface to an actual or simulated glass wall installation with fixtures, fittings and methods of assembly identical to those used in practice.

Glass walls shall comply with the following conditions:

1. A glass wall in a racquetball or squash court, or similar use subject to impact loads, shall remain intact following a test impact.
2. The deflection of such walls shall not be greater than  $1\frac{1}{2}$  inches (38 mm) at the point of impact for a drop height of 48 inches (1219 mm).

Glass doors shall comply with the following conditions:

1. Glass doors shall remain intact following a test impact at the prescribed height in the center of the door.
2. The relative deflection between the edge of a glass door and the adjacent wall shall not exceed the thickness of the wall plus  $\frac{1}{2}$  inch (12.7 mm) for a drop height of 48 inches (1219 mm).

**2408.3 Gymnasiums and basketball courts.** Glazing in multipurpose gymnasiums, basketball courts and similar athletic facilities subject to human impact loads shall comply with Category II of CPSC 16 CFR 1201, listed in Chapter 35.

## SECTION 2409 GLASS IN ELEVATOR HOISTWAY

**2409.1 Glass in elevator enclosures.** Glass in elevator enclosures shall be laminated glass conforming to ANSI Z97.1 or 16 CFR Part 1201. Markings as specified in the applicable standard shall be on each separate piece of glass and shall remain visible after installation.