



ALBUQUERQUE PUBLIC SCHOOLS

Facilities Design & Construction / Maintenance & Operations

GLAZING AND WINDOW STANDARDS

David Ritchey
Pete Trujillo
Marty Sais
Tyler Mason
Rupal Engineer
Willard Eastman
Doug Longfield
Alex Gutierrez

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A. Glass Selection (for vertical windows):

1. Glass Color:

Glass shall be limited in color and coatings so that the M&O Glazing Shop can do on-site replacement and assembly of insulated glass units using colors and sizes that M&O is able to stock and handle. This not only allows for quick response, but also for low cost compared to ordering manufactured insulated glass units.

The allowable colors are:

- a) Clear
- b) Grey
- c) Green
- d) Bronze

2. Glass Safety Type:

a) Insulated glazing units shall be:

- laminated glass on the outside pane
- tempered glass on the inside pane (except where unusual impact exposure would require laminated glass on the inside pane as well.)

(This arrangement allows the laminated glass to protect the interior pane from vandalism and makes it difficult to enter a building by breaking out the glass. It also allows M&O to field cut replacement laminated glass to reconstruct the insulated glass unit on-site.)

b) Single pane interior glazing shall be tempered glass, unless otherwise required for unusual safety exposure or security, in which case laminated may be used.

c) Fire rated glazing (typically single glazed, interior locations): Any fire rated glazing allowable under the currently adopted version of the International Building Code is acceptable. However, architects need to research this question carefully since the use of wired glass in schools has been greatly restricted within the 2003 IBC, and the question continues to be hotly debated and may result in continuing changes of interpretation.

3. Glass Coating:

a) Low-e coating: Shall be placed on the third surface of the insulated glass units, (that is, the outer surface of the inside pane).

4. Glass Size:

a) Glass panels shall be a maximum of 48" square, actual glass dimensions. (This means that a 48" center-to-center dimension will be acceptable on a storefront system, but a 48" visible opening width would NOT be acceptable, since the glass would need to be larger than 48" to extend into the glazing recess or stop.)

5. Spandrel Glass:

Spandrel glass and other opaque glazing are NOT allowed. If there is a need for an opaque panel within a glazing framing system, it shall be of some other durable, non-breakable material.

B. Framing Systems for Glazing

1. Hollow Metal Fixed Window Framing:

Painted hollow metal frames have long been an APS standard for fixed window framing because of their durability. However, they are not available in a thermally-broken, energy efficient form, so, from this point forward, hollow metal shall be used for glazing frames ONLY at interior applications.

(Hollow metal frames are still the recommended choice under these standards for stand-alone exterior utility doors that are not part of a larger glazing framing system, including utility doors that have a glass view lite within the door itself.)

2. Aluminum Storefront Framing:

Although aluminum storefront glazing systems are less resistant to vandalism than hollow metal, they can be made with thermal breaks and do not require painting.

Consequently, exterior glazing framing shall be one of the following thermally broken conventional storefront systems (no substitutions; no prior approvals of other manufacturers or systems):

- a) Kawneer - 451-T.
- b) Vista Wall 3000 Thermal Multiplane.
- c) Tubelite T14000

Architects shall use the APS standard specifications section for "Aluminum Framed Entrance and Storefront" systems, located on the APS Facilities Design & Construction website.

3. Aluminum Curtain Wall Systems:

These systems will NOT be allowed on APS projects due to the difficulty of replacing broken glass, which often requires significant disassembly and reassembly of the entire curtain wall. Use of such a system will require special approval from both FD&C and M&O.

4. Glass Installation:

All glazing framing systems shall be specified to have:

- exterior side glass installation on ground floor windows
- interior side glass installation on upper floor windows.

C. Operable Windows

1. Window Frame Materials:

Because of energy efficiency demands, all operable windows shall be one of the following thermally-broken, aluminum systems:

- a) Kawneer - Isolock or Isoweb, thermally broken
- b) VistaWall - "Merit", thermally broken.
- c) Tubelite – VW3700, thermally broken.

Painted wood windows, vinyl-clad wood windows, and steel windows are NOT allowable.

Aluminum-clad wood windows are ONLY allowed in historic buildings, when used to replace existing wood windows, and then only with special permission from both M&O and FD&C.

2. Operation Types:

The following types of window operation will be allowed when the conditions listed for each are met:

- a. Casement: Acceptable if pedestrians are protected from walking into them by wing walls or sloping exterior sills.
- b. Awning: Acceptable if pedestrians are protected from walking into them by wing walls or sloping exterior sills.
- c. Sliding: Acceptable generally.
- d. Hopper: Acceptable if window opens inward and there is a deep sill to prevent children from walking into the open window edge.
- e. Single Hung or Double Hung: NOT acceptable, except in historic buildings with special permission from both FD&C and M&O.

3. Insect Screening:

All insect screening shall be mill finish aluminum.
(Fiberglass screens are NOT acceptable.)

4. Upper Floor Window Locations:

The design architect shall carefully evaluate the maximum opening width, the opening height above floor, and other factors to ensure that operable windows located above the ground floor do NOT create a risk of students falling out of the windows.

D. Hardware for Storefront Doors & Operable Windows:

1. Aluminum Doors:

- a) Hinges: Continuous geared hinges are recommended on all exterior doors.
- b) Panic Devices: Shall be surface-mounted, without any concealed components.
- c) Reinforcement: Doors and jambs shall be adequately reinforced with metal at all hardware mounting locations.
- d) Removable Mullions: Every double door pair shall have a keyed, removable center mullion.
- e) General Door Hardware: All other door hardware shall be as called for by the standard APS Door Hardware Specifications.

2. Operable Windows:

- a) Cranks: Shall use separate right- and left-hand cranks. Shall NOT use a double arm crank.
- b) Shock, String & Band Balances: These are NOT allowable.

E. Clerestory & Light Monitor Glazing Selection:

Vertical glazing in clerestory and light monitors may use any of the glass selection options listed above in "A. Glass Selection (for vertical windows)".

In addition, the design architects are encouraged to consider using one of the following non-glass options that provide resistance to vandalism and that utilize lightweight materials that are easier to handle in high locations:

- a. Kalwall insulated fiberglass panels.

- b. Cellular polycarbonate panels.

F. Skylights:

1. Domed Skylights:
 - a. Shall be a maximum size of 48" x 48" (measured to outside of frame).
 - b. Shall use insulating double domed acrylic glazing.
2. Sloping Skylights:
 - a. Shall use insulated fiberglass panels (such as Kalwall) for glazing.

G. Water Test:

Before final acceptance of any window or glazing system, the Contractor shall be required to perform a water leak test, using a standard utility hose, in the presence of one of the FD&C Construction Managers or M&O Glaziers.

H. Landscaping:

Landscaping near any glazed building shall NOT have rocks or cobbles greater than "crusher fines" size, unless the rocks are partially embedded in concrete or gunnite.

I. Mirrors:

1. Thickness: 1/4" minimum.
2. Backing: All mirrors shall be fully tape backed to prevent fragments of falling glass in the event of breakage.
3. Frame: All mirrors shall have a J-metal edge frame at the bottom and clips at the top.
4. Locations:
 - Elementary Schools: Mirrors are allowed to be placed in a normal manner within the interiors of the toilet & lavatory spaces.
 - Middle Schools and High Schools: Mirrors shall be located ONLY in hallways adjacent to toilet rooms OR in lavatory areas that are open to, and directly visible from, the adjacent main hallway. This requirement is to ensure that mirrors can be monitored against vandalism.

J. Glass Block:

Glass block masonry is not an allowable material for either exterior or interior construction.