



Design Standard Windows & Window Treatments

Purpose:

This design standard has the purpose of creating a consistent installation of windows throughout the South San Francisco Unified School District thereby achieving a standard of aesthetic quality, maintenance and performance throughout all renovation and new building projects.

Design Standard:

General Requirements for all Windows

- Provide operable windows in all new classrooms.
- For windows and skylights exposed to the sun, especially southern and western orientations, first priority shall be given to exterior shading via overhangs, side fins, vegetation, or other devices to prevent overheating and reduce glare. Otherwise, if exterior shading is not feasible, then the window solar heat gain coefficient (SHGC) is to be no greater than 0.40 and visible light transmittance no less than 0.50 (may be lower if necessary to control glare and provide visual comfort). Where laminated safety glass is required, the inner PVB layer shall be spectrally selective (tinted bronze or grey colors are acceptable) to minimize solar heat gain while retaining good visible light transmission.
- Provide etched label on the glass.
- Consider the shading effect of security grills over windows and skylights.
- To ensure thermal comfort during cold weather, glass with low-e coating shall be used wherever occupants are seated within about ten feet of large windows. The SHGC and visible light transmittance for the glazing shall be determined as appropriate for the solar exposure. Insulated units not allowed without District approval.
- Windows over 10'-0" in any direction require structural calculations at the time the project documents are submitted to DSA or they shall be noted clearly on the drawings as a deferred submittal, for which calculations shall be provided by the window manufacturer for approval by DSA prior to fabrication and installation. The use of deferred submittals to DSA must be approved by the District.
- Limit the weight of any one single glass lite to 75 pounds.
- Windows that swing open and whose bottom edge is 6'-8" or less above the interior finished floor or exterior finished grade shall not project more than 4" into a path of travel. Provide opening restrictors where required.
- Provide opening restrictors (stops) on windows subject to children falling out of the opening.
- Internal gutters and weeps to the outside are required for all individual glazed fixed windows and ventilating windows.



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- Check STC requirements for the windows and compare them against the acoustical requirements for the site. Schools in proximity to airport flight path will need enhanced sound mitigation measures.
- All windows installed in compensation channels should be bedded in sealant upon installation into compensation channel framing. Follow manufacturer's written instructions.
- Remove old sash only when new windows are on-site, verified to fit, and ready to be installed.
- Spare parts amounting to 10% of the job shall be supplied by the sash installer for use by SSFUSD Facilities.
- Salvage old hinges and operating hardware and turn over to SSFUSD Facilities if requested.
- Provide small working sample window (with specified glass and hardware) for review by District, prior to any installation with all specified hardware attached.
- District shall review Architect Drawings prior to construction, submittals during construction, and in-place testing of windows prior to Contract Closeout, provide one AAMA-certified tester who reports to District, for all in-place testing.
 - District is to approve an AAMA certified testing agency or laboratory. Installers shall be qualified by a minimum of 5 years experience in multi-story applications. Architectural Testing, Inc, of Fresno CA is an acceptable testing consultant.
 - Provide sample installation (mock-up) in field for window test before proceeding with window installation job.
 - Test further, after successful completion at 50% and 90% of work completion.
 - Windows are to be field tested per ASTM E-1105.00 prior to accepting work. Perform ASTM E-1105.00 tests on finished installed products only.
 - No uncontrolled water, penetrating the glazing or the framing system, is to appear on normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to the exterior and water that cannot damage adjacent materials or finishes.
 - No water intrusion allowed at 80% of design load.
- Use splice plates with bond breaker tape applied at exposed portion of splice plate prior to sealant application.
- All windows are to have metal head flashing unless the frames are flanged.
- All windows shall have a continuous bead of sealant applied after frames are inserted on panning sills, at heads, and jambs. Follow manufacturer's written instructions.
- Use end dams at all corners of pan flashing and compensation panels.
- Provide maintenance manuals and parts lists to SSFUSD Facilities.

Design

- Windows shall be designed to incorporate either compensation channel (receptor) at head, sill, and jambs or full panning (flashing) system.



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- Provide metal window head drip flashing at all exterior openings that do not have integral flanges.
- Provide Fortiflash “High Performance Window Flashing System”, waterproof flashing membranes with Moistop Corner Shields (or approved) around all exterior flanged window openings. www.fortifiber.com
- All window components, sash, frame, compensation channel, or panning (flashing) systems shall be from the same manufacturer and designed to function as an integrated system to prevent water and air infiltration.
- All windows (operable or fixed) should comprise a system whereby through compensation channels or panning any uncontrolled water leakage will be weeped (diverted to escape) completely outside window at exterior wall.
- If using compensation channels, use starter sills along with head and jamb components. Allow for weepage to sill and weepage outside sill. Follow manufacturer’s written instructions. Drill weep holes as necessary.
- If using compensation channels install sealant on to channels prior to installation of window frames. Bed compensation channels with sealant prior to inserting windows.

Configuration

- Window sash configuration shall typically be in three or four sections (depending on height of opening) with an awning vent at the sill and head, with one or two equal fixed sections in between. On a four lite high sash, the first and second sections from the sill may be awning vents in addition to awning at the head.
- Provide operable windows that project in or out.
- Sliding windows are not allowed.
- Casement windows are allowed when they are located to provide emergency egress.
- All fasteners, blocking, etc. securing the sash to the frame perimeter must be non magnetic stainless steel (18-8).
- Any substitutions of windows or window parts must be in writing and subject to approval by the District.

Warranty

- All windows, both steel and aluminum shall have a 10-year warranty on manufacture and installation against water leakage.
- References:
 - o Glass Association of North America of Topeka, Kansas
 - o GANA Glazing Manual 1990 edition
 - o GANA Sealant Manual 1990 edition
 - o American National Standard for Voluntary Specifications of Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
 - o American Society of Testing Materials ASTM E-1105-00 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Air Pressure Difference



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Screws

- All sash hardware must be installed with non-magnetic stainless steel round, Phillips head screws.

Anchorage

- Refer to DSA Interpretation of Regulations (IR).

Glass

- Use of dual glazed insulated glass units are encouraged at exterior windows their thermal and sound mitigation properties.
- Provide laminated, annealed glass for all exterior windows. It is acceptable to use tempered glass units at inaccessible window locations where approved by the District.
- Glass is 7/32" thick with interlayer of .030 Poly-Vinyl Butryl (PVB).
- Provide etched identifying labels on the glass.
- Use clear glass where possible. Use grey or bronze tinting for shading as needed.
- Privacy glazing where needed at toilet rooms shall be translucent, white, laminated glass.

Window Hardware

General Requirements

- Provide restrictor blocks on each hinge to limit lower operable light opening dimensions so students cannot fall out of the opening.
- Ventilating windows over 6'-0" above the floor are to have ring handles with poles for operation.
- Clerestory sash operating hardware is to be non-motorized, surface mounted cables on walls. Handles to be removable.
- Clerestory sash operating hardware recommended manufactured by
 - o 14 Clearline Inc. North Wales, PA., www.clearlineinc.com
 - o Bronze Craft Corporation, Nashua, NH., www.bronzecraft.com, or approved.

Handles

- Each operable window shall have two handles so that if one is damaged or otherwise become inoperable the window can still be secured using the remaining handle until Facilities can repair the hardware.
- Cam handles to be manufactured by:
 - o Bronze Craft Corporation, Nashua, NH, www.bronzecraft.com



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- Handles aluminum-bronze alloy (18% nickel min.) with polished-satin finish (US 25D) to be used with aluminum sash.
- Red-bronze alloy (81% copper min.) with polished-satin finish (red bronze US 10) to be used with steel sash.
- On project-out vent (awning type), use the following handles in conjunction with #282 series strikes (aluminum-bronze alloy, US 25D, 18% nickel minimum).
 - Hand-Operated Handles: Bronze Craft #162-001-4504 (right-handed handle) or 162-003-4504 (left-handed handle)
 - Pole-Operated Handles: Bronze Craft #164-001-4504 (right-handed handle) or 164-003-4504 (left-handed handle)
- Consideration of handle operation in conjunction with shade hardware is essential.

Hinges

- Bronzecraft 304 series Stainless Steel Storm hinges, (<http://www.bronzecraft.com/>) Stainless Steel 4 bar hinge with stainless steel slide mechanism and adjustable limit stop (restraining block).
- All awning vent hinges are to have a "restrictor block" to prevent children from crawling out.
- Bronzecraft Storm Hinges adjustable limit stop (restrictor block) setting to be 4" where applicable for access compliance (to avoid excessive encroachment into a path of travel) or safety (to prevent falls).
- All operable windows whose bottom edge is 72" or more above the interior finished floor shall allow for pole operation, using specified pole, pole tip, pole hanger, and pole ring. Pole ring shall be used on projecting (out or in) windows. Locate on middle of top rail of ventilator and indicate on shop drawings.

Operating Poles

- It shall be the responsibility of the sash installer to install the pole and pole hanger in each classroom and office.
- Pole hook assembly to be Aluminum tube with rubber end: Bronze Craft Series #234-007-4504 (7 feet long)
- Pole hanger to be Bronze Craft Series #231-002-4504.
- Pole tip to be #232-004-4504, Bronzecraft. Pole tip attached to pole with screws and epoxy



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- Pole ring to be Bronzecraft #233-005-4504 (aluminum-bronze) at aluminum windows and #233-005-0110 (red bronze) at steel windows.

Security Screens

- Where security screens are required by District, and are to be secured to the aluminum sash and are made of a material other than aluminum or stainless steel, the two dissimilar metals must be separated by barrier, such as bituminous paint, and secured with one way stainless steel screws.
- Perforated metal screen or 2"x 2" wire mesh such as those provided by:
 - o Exeter Crime Shield, Wyoming, PA. www.securityshield.net/doors.html
 - o Western Wire Screen, Sacramento CA. www.thewesterngroup.com
 - o Howard Wire Cloth Co, Hayward, CA. www.howardwire.com
- Only use stainless steel metal.

Aluminum Windows

General Requirements

- Protect against galvanic action.
- Aluminum finishes exposed to the weather shall have heavy-duty coating, suitable for salt air environments (0.018-mm-thick anodic coating).
- A letter certifying / guaranteeing the above anodizing must be furnished by the window manufacturer or anodizer to the District.
- Window testing must be AAMA-certified and approved by District before actual testing occurs. District will provide AAMA-certified testing laboratories if requested.
- Window standards are based on AAMA AW60 grade as a minimum.
- Acceptable manufacturers:
 - o Kawneer
 - o EFCO
 - o TRACO
- Configurations shall not mix vents. These awning type vents must be AAMA-AW rated, AP-AW 60 or higher.
- Caulking: Use silicone or one-part polyurethane sealant on aluminum windows and frames, with associated sealant primer where manufacturer recommends on custom-painted walls and window frames. For example, for one-part polyurethane sealant use sealant primer when caulking fluorocarbon or Kynar-painted finished aluminum frames.



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For painted stucco or concrete walls use sealant primer as recommended by supplier. Use backer rod as recommended by manufacturer.

Aluminum Sash

- All wall thickness shall be a nominal one-eighth inch (1/8") thick, including sill covers.
- Sash to be at minimum two inch (2") thick tubular section; 1-1/2" tubular section can be considered at bungalows or other temporary buildings.
- Provide window maintenance manual from supplier that is required for an architectural weight (AW) rated window.

Glazing

- Neoprene setting blocks shall be used on all glazing.
- Glazing tape shall be used on the outside facing side of the sash opening. The butyl tape shall be kept at 3/16" to 1/8" below the sight line. A bed of clear silicone shall be applied to this outer face to insure a water tight installation.
- Neoprene weather-stripping glazing gaskets are preferred. Weather stripping shall be integral type no push in type of weather stripping shall be used.
- Glazing bead to be square extruded stops.
- All aluminum windows shall be factory glazed to ensure adequate quality control. Field glazing shall be used only when absolutely necessary.
- No putty glazing.
- Inside glazing mandatory.

Aluminum Storefronts

- Acceptable manufacturers: Kawneer, Special-Lite, US Aluminum, Vistawall.
- Submittals to DSA for deferred approval are required for window wall and storefront systems over 10' tall and shall include structural calculations.
- Protect against galvanic action.
- Detail for seismic movement.

Reglazing – Wood



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- Install new with mitered corners.
- Prime and paint wood stops (all surfaces) as part of any re-glazing effort.

Roller Shades

General Requirements

- Provide layout drawings for shade installation showing elevations and sections through the shades and operating (cam) handles. Shade configuration drawings are to include the sill, jamb and head window details, showing how the shades are positioned in relation to the handles.
- Install with clearance, for window operation level and plumb, secure for unencumbered operation.
- Provide maintenance manual showing shade repair guidelines and replacement with parts diagrams from manufacturer.
- Prior to fabrication, vendor/contractor to contact District to arrange sample installation for review and acceptance by Architect and Facilities Department.
- Provide spare parts, amounting to 10% of the job to Facilities Department.
- Coordinate the window hardware, such as handles, with shade hardware.
- Mounting brackets for shades shall not be installed on window stops.
- Warranty: 2 years from manufacturer and 2 years from installers.

Single Roller Shades

- V - double roller shades consisting of two shades one pulling up the other down from light shield in center of window ideal for tall glass lights window sash section system complete with "V" shield demountable pulley and pulley bracket.

Shade Mounts at Window

- Mounts at window bottom pulls up through locking pulley.
- Black-out Shades. Tontine/New port 72" dawn for blackout INS-512-72" Dawn with double hems.

Shade Cloth Material

- All curtains and drapes shall be made of interwoven non-combustible fiber, inherently flame retardant and permanently flame-resistant. Acceptable manufacturers are:
 - o MechoShade



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o Draper 'FlexShade' System

- Room-darkening shades shall be hemmed top and bottom, with both hems double needle stitched and backstitched at edges. Hems must be turned so that stitching passes through three thicknesses of fabric.
- Sufficient length of material to allow two complete wraps around roller when shade is fully extended. Roller in hem construction prevents fabric from being pulled off roller. Fabric is to be attached by double wide staples. No adhesive is allowed.
- Flame resistant washable material water proof and colorfast to water and light. Hauser Shade Company, 510-654-8840.
- Shade Colors:
 - o Classrooms – tan
 - o Offices – tan
 - o Consider darker colors for better glare control and lighter colors provide better heat control.
- Clear View:
 - o North-facing windows: 5%
 - o South-facing windows: 3%
 - o West-facing windows: 3%
 - o East-facing windows: 3%
- Obstructed View:
 - o North-facing windows: 10%
 - o South-facing windows: 5%
 - o West-facing windows: 5%
 - o East-facing windows: 5%

Rollers

- Spring roller with heavy duty springs and positive locking mechanism.
- Spring roller diameter length and material (steel or wood) as needed to support shade length, width and material weight 1-1/4" diameter min. x width needed to cover window.
- Use steel rollers for all shades exceeding 45" in width; heavy-duty springs and positive locking mechanisms.
- For blackout shade rollers, use metal 1-1/2" min. diameter roller.

Mounting Brackets

- Diameter to match roller, closed end projection adequate to clear all hardware galvanized steel finish, compatible with aluminum if aluminum sash, isolate if necessary.
- Brackets must have nylon insert on pin side. Mount brackets with 1/4" hex head screws.
- Pulleys
 - o Pulley tolerances critical to performance.



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- o Spacing between pulley roller and pulley roller bracket arm holding the pulley roller must not allow shade cord to catch.
 - o Closed end stop pulleys on all shades.
 - o Compatible with aluminum if aluminum sash, isolate if necessary.
- All metal roller catches mounted with 1/4" hex head screws.
- Cord- Seine line shade cord hard braided cotton size # 4 - 1/2" attached to slat with # 211 screw eye and cord clasp. eyelets are not acceptable.

Slat

- Kiln dried hard maple, mahogany, or poplar, size as required but none less than 1-1/4" x 5/16". Length to equal width of shade material across window.
- Hem (sew) ends of hem bar or slat to shade material.

Screw Eyes

- Brass screw eyes: Screw eyes shall not be over sized. Any splitting of slats caused by screw eye installation shall be rejected.

Acceptable Manufacturers

- Mechoshade Systems, Inc.
- Approved equal, if performance and quality equivalency can be evidenced.

Mini-blinds:

- White .009 Gauge slats by Levolor Inc., Hunter Douglas Inc., American Draperies and Blinds or equal.

Approved Manufacturers

- See above.

Substitutions allowed?

- Yes if performance and quality can be evidenced.

Associated Design Standards

- Refer to DSA Interpretation of Regulations (IR).
- GANA Glazing Manual current edition
- GANA Sealant Manual current edition
- ASTM E-1105-00

End of Document