

HIGH EFFICIENCY VINYL WINDOW SPECIFICATION

SECTION 8C VINYL (PVC) DOUBLE HUNG WINDOWS

8C.01 GENERAL: Comply with all of the Contract Documents.

8C.02 SCOPE OF WORK: Refer to “Division Scope of Work”

8C.03 WORK INCLUDED IN THIS SECTION

- A. Material: vinyl (PVC) windows as shown on drawings and specified in this section
- B. Installation of the windows.
- C. Glass and Glazing

8C.04 WORK NOT INCLUDED

- A. Installation of child guards (See Section 5A.15 Child window guards)

8C.05 REFERENCES

- A. AAMA – American Architectural Manufacturers Association
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440-08 “NAFS North American Fenestration Standard/Specification for Windows, Doors, and Skylights
 - 2. AAMA 502 “Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
 - 3. AAMA 800 “ Voluntary Specification and Test Methods for Sealants”
 - 4. AAMA 902 “ Voluntary Specification for Sash Balances”
 - 5. AAMA 307 “Voluntary Performance Requirements and Test Procedures for Laminates Intended for Use on AAMA Certified Plastic Profiles”
 - 6. AAMA 303 “Voluntary Specification for Rigid Polyvinyl Chloride (PVC) Exterior Profiles Section 5

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- B. ASTM – American Society for Testing and Materials
1. ASTM 90 “ Standard Test Method for Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions and Elements
 2. ASTM 2190 “Standard Specification for Insulating Glass Unit Performance and Evaluation.
 3. ASTM 2188 – Standard Test for Insulating Glass Unit Performance
 4. ASTM 2189 – Standard Test Method for Testing Resistance to Fogging in IG Units
 5. ASTM-E413 Classification for Rating Sound Insulation
 6. ASTM E1322 Standard Classification for Outdoor/Indoor Transmission Class
 7. ASTM E2235 Standard Test Method for Determining of Decay Rates for use in Sound Transmission Test Methods
- C. NFRC – National Fenestration Rating Council: NFRC 100-04 “Procedure for Determining Fenestration Product U Factor

8C.06 PERFORMANCE REQUIREMENTS

- A. General: Windows shall be capable of complying with performance requirements, based on testing manufacturer’s windows that are representative of those specified and that are of minimum test size required by AAMA/WDMA/CSA 101/I.S.2/A440-08
- B. Structural Performance: Windows shall be capable of withstanding the following, including wind loads based on passing AAMA/WDMA/CSA 101/I.S.2/A440-08, Uniform Load Structural Test, at basic window indicated:
1. Basic Window Speed: As indicated in miles per hour at 33 feet above grade. Determine window loads and resulting design pressures applicable to Project according to ASCE 7, “Minimum Design Loads for Buildings and Other Structures,” Section 6.4.2, “Analytic Procedure”; based on mean roof heights above grade as indicated on drawings.
 2. Deflection: The Uniform Load Deflection test data, when tested at maximum DP (design pressure) of 50 psf, shall be recorded for this product for information only.
- C. Air Infiltration: Maximum rate not more than .20 cfm per square foot of glazing area when tested at a pressure of 1.57 psf (25 mph) as tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08, Air Infiltration Test.
- D. Water Resistance: No water leakage as defined in AAMA/NWWDA referenced test Methods at a water test pressure equaling 7.5 pounds per square foot when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08, Water Resistance Test.

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- E. Forced Entry Resistance: Comply with Performance Level 10 Requirements when tested according to ASTM 588.

- F Condensation Resistance Factor of Frame: Provide windows tested for thermal performance according to AAMA 1503, showing a minimum CRF of 70.
- G Thermal Transmittance: Provide windows with a whole-window-U-value maximum of .32 or less (on whole window) at 15 mph exterior window velocity and winter condition temperatures when tested according to NFRC 100.
- H. Certification of all of the above requirements shall be made to the Architect by an officially authorized AAMA test laboratory.

8C.07 WINDOW MATERIALS AND CONSTRUCTION

B Vinyl (PVC) Double Hung Tilt-Wash Windows, System description:

1. AAMA Designation: CW PG50

Vinyl (PVC) double hung window, with independent laboratory tests which certify that the window meets or exceed the H-CW50 classifications specified herein and shall show continuing compliance by furnishing a Notice of Product Certification from the Administrator/Validator of the American Architectural Manufacturing Association (AAMA) Certification Program.

2. Extruded PVC components produced from commercial quality virgin PVC (unplasticised polyvinyl chloride), conforms to AAMA 303 from sections in one piece, straight, true and smooth. Color must be solid throughout the entire extrusion. Provide multi-chambered PVC extruded frames and sash in accordance with the manufacturers standard practice. Make fusion welded frame joints strong enough to develop full strength of members, with an external wall thickness of .070" (nominal)

Head and jamb members shall have Rigid foam insulation, and integral screen stops. Make interior horizontal top surfaces of both meeting rails flat and in the same plane. Meeting rails have an integral interlock with three lines of pile weather strip provided. Upper and lower sash can have the same glass size (not mandatory). Sash shall have fusion welded mitered corners with an external thickness of .070"(nominal).

3. Configuration; double hung window with operating sashes, tilt in for Glass cleaning.
4. Glass shall conform to DD-G-451 and not less than "B" quality. Factory glazed 1" insulated glass conforming to ASTM-E-774, with TGI-Spacer by Technoform, manufactured by Technoform Glass Insulation North America. Twinsburg, Ohio (or like). Glazing shall be integral glazing type system with architectural back bedded silicone and designed to maintain a water tight seal between glass and sash frame. Non-standard glass options may require different insulated glass spacer system and alternate sealing method.

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All Insulated Glass must also be certified for seal durability in accordance with ASTM 2188, ASTM 2189 and ASTM 2190 (NFRC)

5. Factory Applied exterior paint finish to be Royal Bond Spectra, Aqua-Sur Tech, or Blue River Coatings material. Finish may be provided in 24 standard colors, satin finish only, of exterior surfaces as determined by the factory. Exterior painted surface carries a 10 year warranty against non uniform fading. Finish shall meet the performance requirements specified by AAMA614-02.
6. Factory Applied exterior Lamination to be Hornsehuh, or Renolit material. Finish may be provided in 16 standard colors, satin finish only, of exterior surfaces as determined by the factory. Exterior laminated surfaces carries a 10 year warranty against non-uniform fading. Finish shall meet the performance requirements specified by AAMA 303-08 Section 5 and AAMA 307-04.
7. Weather-Stripping: All sash units shall be double weather-stripped where the sash meets the frame using silicone treated pile with a mylar center fin bonded to backing.
8. Reinforcement: When appropriate, sash chambers shall be reinforced with galvanized steel or aluminum in such a manner to comply with structural test requirements to achieve 75psf interior and exterior loads as defined by test methods in Uniform Load Structure test, with the window closed and locked. Testing shall be in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-08, on a test at a static pressure differential of 75 psf. with first the exterior (positive) pressure applied and then the interior (negative) pressure applied
9. Window Size: Maximum allowed width of the window shall be 42” Where
masonry opening exceeds 42”, two (2) equal windows shall be
installed with “H” Vertical Mullion, or under certain conditions, one
(1) oversized window can be provided , as indicated on the window
schedule.

Note: For oversized windows consult Window Manufacturer
regarding type of window frame, sash frame, and type of
balances.
10. At second means of egress, when any windows open onto a fire escape, one of
The windows, with open sash, must provide minimum (not less) of 24 inches high
(clear) and 24 inches wide (clear) or 5.7 Sq.ft.. The sill of the window shall not be more than
36 inches above the floor. This window must provide maximum ease onto the
fire escape. Insect screen shall be provided and installed.

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8C.08 SUBMITTALS

- A. Shop Drawings:
 1. Typical window elevations and cross sections
 2. Details of assemblies, hardware, and glazing details for factory-glazed units.
 3. Installation Drawings with indication of window sub frame, anchorage, caulking, etc

based on field conditions.

- B. Manufacturers Specifications
- C. Structural and Thermal Performance Test Reports, performed at an independent AAMA-accredited testing laboratory.
- D. Valid AAMA “Notice of Product Certification” indicating that the windows for the project conform To AAMA/WDMA/CSA 101/I.S.2/A440-08
- E. Samples:
 - 1. Vinyl (PVC) Window sample with specified finish, hardware and attached;
 - a. Valid AAMA Certification “Gold Label” with indication of;
 - 1) Manufacturers Code Number
 - 2) Specification Identification
 - 3) Window Type, Product Class
 - 4) Manufacturers Series Number
 - b. IGCC (The Insulating Glass Certification Council) Certification Label for insulating glass unit with CBA Rating level.
- F. “Product Certification” from Vinyl (PVC) extruder, indicating that Vinyl extrusions made in the USA and conforms to AAMA 303 from sections in one piece, straight, true and smooth. Extrusions must be multi-chambered PVC extruded frames and sash in accordance with the manufacturers standard practice. Fusion welded frame joints strong enough to develop full strength of members, with an external wall thickness of .070” (nominal)
- G. Manufacturer’s Warranties:
 - 1. Windows; warrant all materials for two (2) years against defects in material or workmanship Under normal use.
 - 2. Balances: manufacturers one (1) year limited warranty.
 - 3. Insulating Units: warrant seal for ten (10) years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.
 - 4. Paint or Lamination; warrant for ten (10) years against chipping, peeling, cracking, or non uniform fading.

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8C.09 MANUFACTURERS

- A. Window shall be product of Diamond Windows, Model 9300C, Stergis Windows and Doors DH93WW Window Incorporated Orlando Florida, DH93WW, or other acceptable manufacturers that have demonstrated a successful history of window manufacturing for five (5) years equivalent Products, approved by Architect.

8C.10 MATERIALS

A. Frame:

1. Extruded PVC components produced from commercial quality virgin PVC (unplasticised polyvinyl chloride), conforms to AAMA 303 from sections in one piece, straight, true and smooth. Provide multi-chambered PVC extruded frames and sash in accordance with the manufacturers standard practice. Make fusion welded frame joints strong enough to develop full strength of members, with an external wall thickness of .070" (nominal)

B. Glazing:

1. Glass Unit; Both Sashes shall utilize – 1" thick insulated glass unit, consisting of two sheets of double strength glass (DSB) and Technoform spacer system (or like) or desiccated spacers that are dually sealed with polyisobutylene sealant. A sealant shall be extruded around the perimeter of the spacer to achieve a seal. .
2. Glass Unit Performance Data;

Glass Unit Thickness	- 1" to 1"-3/8"
Glass Thickness	- 1/8"
Air Space	- 3/4" minimum (90% Argon Filled Cavity) (Magnetic sputtered vacuum deposition application method) on surface #2. Low Emissivity coating Shall be PPG Solarban XL70 (or like) with low emissivity rating of .037 or less (or approved equal).
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Solar Heat Gain Coefficient	- 0.30 (total window value) or lower unless otherwise specified
3. Bathroom and airshaft windows shall have insulating glass units with obscure plate glazing , unless otherwise specified.

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C. Hardware:

1. Meeting rail lock made from white-bronze (Zinc alloy) 2 locks per window
Per window over 28" (under 28" receive one cam lock).
2. Tilt latches made from Zinc alloy with optional tamper resistant screw, open limit for maintenance operation only, spring loaded for automatic jamb engagement when the sash is in the vertical position.
3. Balances:

a. Balance Mechanism (DH). Provide block & tackle balances for each sash. Balances shall be enclosed in a roll formed chamber. Balance covers (optional) shall be installed from the top of the bottom sash to the head of the window unit and shall be finished to match window frames finish and easily removable for field service. Balances shall also have an interlocking pivot bar, for integral frame alignment with sash for keeping window frames straight and true during installation.

- NOTE – Spiral balances for regular windows are unacceptable. Based on Unit Requirements Ultra-Lift Balances (Caldwell) may be required

b. All balances shall be rust proof and shall meet AAMA 902.1 requirements.

c. Locking Device (DH): Provide each window over 28” (inches) in width with two cam action zinc sweep sash locks, and windows under 28” (inches) in width with one lock. The lower sash shall have one continuous integral Liftrail at the bottom of the sash or, and the Lockrail. The upper sash shall have a continuous, integral pull down member on the sash top rail. Provide two (2) tilt latches at the top of each sash for tilting in sash for cleaning. The tilt latches shall be made of die cast zinc and mounted to the surface of the interlock.

NOTE: Tilt latches shall have a limit restrictor, for maintenance operation only.

4. Insect Screens (half/full) set in to extruded tubular aluminum frame, with the same as window finish, held in exterior integral tracks with side flat springs. All corners of screen frame shall be keyed. The screen frame shall be fitted with 18 x 16 mesh rewirable charcoal fiberglass screen cloth or aluminum screen wire mesh, secured to screen frame with flexible PVC spline

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8C.10 WINDOW FABRICATION

- A. Weathering Surfaces. All frame members shall be multi-chambered PVC extrusions utilizing double wall design without the need for reinforcement. Frame corners shall be fusion welded. Sash members shall be multi-chambered PVC extrusions utilizing double wall design at all glazing locations. Horizontal sash members shall be mitered and fusion welded to vertical sash members.
- B. Drip and Weep Holes: Provide as required to return water to the outside.
- C. Fasteners: All fasteners are to be stainless steel type, corrosive resistant. Use flat-head cross recessed type, exposed head screws with standard threads on windows, trim and accessories. Screw

heads shall finish flush with adjoining surfaces. Self tapping sheet metal screws are not acceptable for material more than 1/16" in thickness. All sheet metal screw fasteners shall penetrate into a screw boss consisting of at least two layers of PVC profile for secure fastening and reduced pull out.

- D. Provisions for Glazing: Design sash for outside double or triple glazing and for securing glass with manufacturers' standard glazing system. Provide glazing channels of adequate size and depth to receive and properly support the glass and glazing accessories.
- E. Factory Mulls: Factory mulls to be fully reinforced with extruded aluminum I beam reinforcement of 6005-T6 alloy and assembled utilizing an approved structural mull system consisting of an aluminum extrusion attached to the window units and covered accordingly on the interior and exterior with a PVC cover with manufacturers recommended fasteners providing a continuous and uninterrupted connection at head and sill for the unit in question.
- F. Accessories: Provide windows complete with necessary hardware, fastenings, clips, fins, anchors, glazing beads, and other appurtenances necessary for complete installation and proper operation.
- G. All Windows shall have:
1. Factory applied NFRC, AAMA label with manufacture's code number affixed on top, inside Portion of the frame in such a manner as to last the life of the window.
 2. IGCC Certification Label(s) for insulating glass unit with CBA Rating Level.
- H. Window Size: Maximum allowed width of the window should be 42". Where masonry opening exceeds 42", two (2) equal windows shall be installed with H vertical mullions , or integral mullions. Under certain conditions , one (1) oversized window (not to exceed 54 x 76) can be provided as indicated on the window schedule. For best results single units should not exceed (44" x 70")
- I. A second means of egress, when any window opens to a fire escape, one of the windows , with open sash, must of the provide a minimum (not less) of 24" high (clear) and 20" wide (clear) and 5.7 square feet. The window shall not be more than 36" above the floor. . This window must provide maximum ease of egress onto the fire escape. No insect screen is required for these units.

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- J. Grill Options to be verified by manufacturer.
1. Grill Pattern: Refer to Drawings
 2. Contour internal grids
 3. Simulated Divided Lites (SDL) applied to interior and exterior surfaces of IG units
- K. Weather-Stripping: Provide for ventilating sections of all windows to insure a weather tight seal meeting the infiltration tests specified herein. Use easily replaceable factory applied weather-strip of manufacturers stock type, as specified above. Use EPDM covered open cell foam weather-strip for compression contact between the sill and the bottom rail of the bottom sash. For sliding surfaces, use silicone treated pile, with a mylar center fin bonded to a plastic backing strip.
- L. Screens: Provide one insect screen for each operable ventilating unit. Design screens to fit closely around entire perimeter of each ventilator or opening , easily removable from inside building, and

interchangeable for same size ventilator of similar type windows, with no exposed fasteners and latches. Provide all guides, stops, clips, bolts and screws as necessary, for a secure and insect tight attachment to the window. Provide continuous extruded aluminum screen frame for screen strength.

1. Screen Frames: Provide quality and color finish as the window units. Frames shall have extruded sections not less than .4375" x 1.25" by .050" thick and shall have removable vinyl splines. Hardware, attachment devices, and accessories shall be manufacturers standard and of the same quality, materials and finish as hardware of window unit. Painted windows to have full screens only.
2. Screening: Install screen with weave parallel to frame and stretch sufficiently to present a smooth appearance. Conceal edges of screening in the spline channel.
3. Screen Finish: Exposed surfaces of aluminum extrusions shall be thoroughly cleaned, primed, and given a finish in accordance with AAMA 603.8 with total dry thickness not less than .8 mil. The finish color shall match the vinyl window.

M. Locking Device (DH): Provide each window over 28" (inches) in width with two cam action zinc sweep sash locks, and windows under 28" (inches) in width with one lock. The lower sash shall have one continuous integral Liftrail at the bottom of the sash or, and the Lockrail. The upper sash shall have a continuous, integral pull down member on the sash top rail. Provide two (2) tilt latches at the top of each sash for tilting in sash for cleaning. The tilt latches shall be made of die cast zinc and mounted to the surface of the interlock. The tab at the end of the tilt latch shall nest into a keeper located inside the balance chamber and directly above the housing of the constant force balance coil. When in the closed and locked position, the tabs at the end of the tilt latches will nest and lock into the keeper in the jamb track

NOTE: Tilt latches shall have a limit restrictor, for maintenance operation only.

N. Sash of the window shall be designed to accept 1" overall thickness insulated glass unit and shall be provided with weep holes in bottom member of bottom sash. Glazing sash shall be constructed to allow re-glazing by suitably trained maintenance staff. Sash shall not be removable to the outside. All sashes must have full travel (except beyond sash stops).

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8C.11 FINISHES

- A. White Extruded PVC components produced from commercial quality virgin PVC (unplasticised polyvinyl chloride), conforms to AAMA 303 from sections in one piece, straight, true and smooth. Color must be solid throughout the entire extrusion.
- B. Beige/Almond Extruded PVC components produced from commercial quality virgin PVC (unplasticised polyvinyl chloride), conforms to AAMA 303 from sections in one piece, straight, true and smooth.. Color must be solid throughout the entire extrusion
- C. No solid extruded bronze, brown or cocoa colors will be acceptable without written approval from Architect and manufacturer. No cap stock in brown, bronze, or cocoa will be accepted with an inferior substrate compound.
- D. Only acceptable forms of exterior color applications will be an approved (see section 8C.07_WINDOW MATERIALS AND CONSTRUCTION ,Vinyl (PVC) Double Hung Tilt-Wash Windows, System

description, Item #5) or, an exterior applied weatherable laminate (from a recognized vendor ie, Renolit, Hornsehuh”) and approved by the Architect and Manufacturer. These laminates must be applied to the vinyl extrusions by the vinyl window extruder or by an approved laminating company and must carry a warranty against any surface defects, or non uniform fading for a period of no less than ten (10) years.

8C.12 MEASUREMENTS VERIFICATION

- A. All openings to receive windows shall be field measured for verification of dimensions prior to fabrication.

8C.13 WINDOW INSTALLATION

- A. The windows shall be installed square, plumb, and level in a secure and workmanlike manner to assure neat and weather tight construction in accordance with the manufacturers instructions. The window shall be screwed to (1” x 6”) preservative treated wood frame (for detail see section 6A – Rough Carpentry). Fasteners shall be spaced 2’-6” on center at head, jamb. It is not recommended to secure the window through the sill as the fasteners may interfere with proper water drainage (weeping) In addition, Caulking shall be applied to entire perimeter of window frame to insure further weather tightness.
- B. Contractor shall carefully adjust sash balances and hardware for all windows. All windows shall work Freely and smoothly and the entire installation shall be in proper condition.
- C. The windows shall be installed so exposed surfaces are uniformly proportioned, both inside and outside, for attractive appearance. Proper tolerances must be allowed to install the windows square and aligned. any window not installed in accordance with such requirements will be rejected and must be reinstalled in the proper manner.

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8C.14 WINDOW CAULKING

- A. Exterior caulking shall meet Federal Specification TT-S-00230. It shall be self-priming silicone. Caulking shall be applied in accordance with manufacturer’s instructions, including surface preparation but excluding any weep holes in the frame. Closed cell polyethelene backer rod must be used in all joints deeper or wider than ¼”; such joints shall be kept to a minimum in any event. Caulking shall be guaranteed non-staining, non sagging type capable of 100% elongation under ASTM D412-68. Caulk color shall match closely the finish of the newly installed windows.
- B. Interior caulking shall be paintable non silicone caulk sealer.
- C. Joints and spaces to be caulked shall be thoroughly clean, dry, free of paint, putty oils, grease, dust and other foreign matters, and shall be primed if necessary. All old caulking shall be removed from areas to receive new caulk. All surfaces to accept caulk shall be left broom clean before new application.
- D. Application of caulk to the masonry, plaster and metal surfaces shall be provided in a manner

recommended by the manufacturer. Caulk beads should be smooth and slightly concave. Excess, messy or convex caulking will not be permitted, nor beads in excess of 3/8" width.

- E. All caulking shall be done using approved type of caulking gun and applying the material under pressure, except where the use of a gun is not practical. Caulk joint shall be tooled immediately upon application to assure maximum adhesion and neat joint appearance.

8C.15 FINAL CLEANING AND ADJUSTMENTS OF WINDOWS

- A. All broken and defective parts, hardware, glass shall be replaced, by this contractor.
- B. Immediately prior to occupancy, all window components shall be cleaned on inside and outside of all mortar, plaster, paint, caulking and other foreign matters to present a neat appearance and prevent from fouling of weathering surfaces and weather-stripping.
- C. Lubricate as necessary window components in accordance with manufacturers recommendations.
- D. The contractor shall carefully adjust all sash and hardware. All window components shall work freely and smoothly and entire window installation shall be in proper working condition with AAMA identification label and manufacturer's code number.

8C.16 GUARANTEES

- A. Guarantee all items of work furnished and installed under this Section for one (1) year, in addition to manufacturer's standard warranties. All guarantees to be from the date, when **Final Certificate of Occupancy** is issued from Department of Buildings.

END OF SECTION