UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2021
****

SECTION TABLE OF CONTENTS

DIVISION 08 - OPENINGS

SECTION 08 53 00

PLASTIC WINDOWS

08/20

PART 1 GENERAL

1.1 REFERENCES
1.2 SUBMITTALS
1.2.1 Shop Drawing Information
1.2.2 Window Samples Information
1.2.3 Window Test Report Data
1.2.4 Plastic Identification O & M Data
1.3 QUALITY ASSURANCE
1.3.1 Labels
1.3.2 Certification
1.4 DELIVERY, STORAGE, AND HANDLING
1.5 PROTECTION
1.6 MATERIAL IDENTIFICATION
1.6.1 Plastic Identification
1.7 WINDOW PERFORMANCE
1.7.1 Thermal Performance
1.7.1.1 Southern Climate
1.7.1.2 South-Central Climate
1.7.1.3 North-Central Climate
1.7.1.4 Northern Climate
1.7.1.5 Non-residential Windows

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR WINDOWS
2.2 MATERIALS
2.2.1 Windows
2.2.2 Glass and Glazing
2.2.3 Caulking and Sealing
2.2.4 Adhesives
2.2.5 Insect Screening
2.2.6 Accessories
2.3 WINDOW TYPES
2.3.1 Awning Windows
2.3.2 Casement Windows

2.3.3 Hung Windows
2.3.4 Horizontal Sliding Windows
2.3.5 Projected Windows
2.3.6 Fixed Windows
2.3.7 Dual Action (Tilt/Turn) Windows
2.3.7.1 Construction
2.3.7.2 Hardware
2.3.7.3 Performance Requirements
2.4 FABRICATION
2.4.1 Subframes, Mullions and Transom Bars
2.4.2 Combination Windows
2.4.3 Frames and Sash
2.4.3.1 Corners and Reinforcement
2.4.3.2 Adjustability
2.4.3.3 Drips and Weep Holes
2.4.3.4 Provisions for Glazing
2.4.4 Hardware
2.4.5 Weatherstripping
2.4.6 Screens
2.4.7 Color
2.4.8 Fasteners
2.4.9 Accessories
2.4.9.1 Anchors
2.4.9.2 Grills
2.4.9.3 Integral Venetian Blinds

PART 3 EXECUTION

3.1 INSTALLATION
3.1.1 Anchors and Fastenings
3.2 ADJUSTING
3.3 CLEANING
3.4 PROTECTION

-- End of Section Table of Contents --

****

USACE / NAVFAC / AFCEC / NASA	**UFGS-08 53 00 (August 2020)**

Preparing Activity: NAVFAC	**Superseding**
	UFGS-08 53 00 (August 2011)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2021

****

SECTION 08 53 00

PLASTIC WINDOWS
08/20

****

NOTE: This guide specification covers the requirements for prime and replacement PVC windows.

In most projects, window upgrades for antiterrorism other than glazing requirements do not apply. When security analysis identifies an explosive threat and antiterrorism upgrades for blast resistance are required in accordance with Appendix B-3 of UFC 4-010-01, DoD Minimum Antiterrorism Requirements for Buildings, do not use plastic windows as defined in this guide specification.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Do not use plastic windows in humid locations or project locations with Environmental Severity Classifications (ESC) of C3 thru C5. Humid locations are those in ASHRAE climate zones 0A, 1A, 2A, 3A, 3C, 4C and 5C (as identified in ASHRAE 90.1). See UFC 1-200-01 for determination of ESC for project locations.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

****

****

NOTE: Specify the following items of related work under other sections of the specifications:

1. Glass and glazing and the furnishing of glazing clips and gaskets.

2. Caulking and sealants.

3. Structural building supports at window mullions.

4. Wood or metal subframes for windows in frame walls.

5. Drilling and tapping for attachment of window shades, drapery rods, and venetian blinds. The drilling and tapping of window frames to receive brackets for shades, venetian blinds, and curtain rods has been omitted from this specification. It is contemplated that this work will be done after erection of windows by the trade for the item to be installed. On projects where factory drilling for these items is required, revise this specification accordingly.

6. Brackets and supports for window shades, drapery rods, and venetian blinds.

****

****

NOTE: On the drawings, show:

1. Sizes and types of windows; subframes, casings, stools, and hardware.

2. Sizes, location, and swing of ventilators; direction of slide for sliding ventilators; location and details of fixed sash.

3. Typical window sections and details. Show glass thickness and air spaces of insulating glass. Show special glazing, if any.

4. Method of anchoring windows to adjoining construction; size and types of clips, anchors, screws, and other fasteners.

5. Details of nonstructural mullions and mullion covers. Details of transom bars.

6. Types and details of accessories to be furnished, such as, trim, screens, grills, and integral venetian blinds.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: This paragraph is used to list the publications cited in the text of the guide

specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 1503	(2009) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
AAMA/WDMA/CSA 101/I.S.2/A440	(2017) North American Fenestration Standard/Specification for Windows, Doors, and Skylights

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 169	(2013) Climate Data for Building Design Standards

ASTM INTERNATIONAL (ASTM)

ASTM D3656/D3656M	(2013) Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns

NATIONAL FENESTRATION RATING COUNCIL (NFRC)

NFRC 100	(2017) Procedure for Determining Fenestration Product U-Factors
NFRC 200	(2017) Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 4-010-01	(2018;with Change 1, 2020) DoD Minimum Antiterrorism Standards for Buildings

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

1.2 SUBMITTALS

****
NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.
****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Windows; G[, [_____]]

Schedule of Windows; G[, [_____]]

SD-03 Product Data

Windows; G[, [_____]]

[Energy Star Label for Residential Windows; S

] Fasteners

Hardware

Screens

Weatherstripping

Accessories

[Adhesives

] SD-04 Samples

Windows; G[, [_____]]

SD-06 Test Reports

Windows; G[, [_____]]

SD-10 Operation and Maintenance Data

Windows, Data Package 1; G[, [_____]]

Plastic Identification

1.2.1 Shop Drawing Information

Indicate elevations of windows, full-size sections, thicknesses of PVC, reinforcing members, fastenings, proposed method of anchoring, size and spacing of anchors, details of construction, method of glazing, details of operating hardware, [mullion details,] [method and materials for weatherstripping,] [method of attaching screens,] [material and method of attaching subframes,] [fins,] [stools,] [casings,] [sills,] [trim,] accessories, installation details, window flashings and other related items.

Submit schedule of windows with drawings indicating location of each window unit.

1.2.2 Window Samples Information

Submit one full-size window of each type, complete with certification label indicating conformance to AAMA/WDMA/CSA 101/I.S.2/A440, glazing, hardware, [fins,] anchors, and other accessories.[Where screens or weatherstripping are required, fit sample windows with such items that are to be provided.] After approval, install each sample in the work, clearly identified, and record its location.

1.2.3 Window Test Report Data

Submit for each window type attesting that identical or larger windows have been tested and meet the requirements specified herein for conformance to AAMA/WDMA/CSA 101/I.S.2/A440 and the specified minimum Condensation Resistance Factor (CRF).

1.2.4 Plastic Identification O & M Data

****
NOTE: This paragraph is tailored for inclusion in Navy projects only.
****

When not labeled, identify types in Operation and Maintenance Manual per paragraph MATERIAL IDENTIFICATION.

1.3 QUALITY ASSURANCE

1.3.1 Labels

Each window unit must bear a certification label from an independent, nationally recognized testing organization validating that the product complies with AAMA/WDMA/CSA 101/I.S.2/A440 for the type, grade, and performance class specified.

1.3.2 Certification

Certified test reports attesting that the window units meet the requirements of AAMA/WDMA/CSA 101/I.S.2/A440 as specified will be acceptable in lieu of product labeling or marking.

1.4 DELIVERY, STORAGE, AND HANDLING

****
NOTE: Include bracketed sentence for cold climate installations of PVC windows.
****

Deliver windows to the project site in an undamaged condition. Use care in handling and hoisting windows during transportation and at the job site. Store windows and components out of contact with the ground, under a weathertight covering, to prevent bending, warping, or otherwise damaging the windows.[Store windows and components so they will not have to be handled at minus 28 degrees C 20 degrees F or colder.] Repair damaged windows to an "as new" condition as approved. Provide new units if windows cannot be repaired.

1.5 PROTECTION

Protect finished surfaces during shipping and handling using the manufacturer's standard method, except do not apply coatings or lacquers on surfaces to receive caulking and glazing compounds.

1.6 MATERIAL IDENTIFICATION

****
NOTE: This Article is tailored for inclusion in Navy projects only.
****

1.6.1 Plastic Identification

****
NOTE: The system indicated below is intended to

provide assistance in identification of products for making subsequent decisions as to handling, recycling, or disposal.
****

Plastic products to be incorporated into the project provide product data indicating polymeric information in Operation and Maintenance Manual.

Type 1: Polyethylene Terephthalate (PET, PETE).

Type 2: High Density Polyethylene (HDPE).

Type 3: Vinyl (Polyvinyl Chloride or PVC).

Type 4: Low Density Polyethylene (LDPE).

Type 5: Polypropylene (PP).

Type 6: Polystyrene (PS).

Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

1.7 WINDOW PERFORMANCE

Provide vinyl windows meeting the following performance requirements. Perform testing requirements by an independent testing laboratory or agency.

1.7.1 Thermal Performance

****
NOTE: Window properties are critical to energy performance and comfort. Specify low U value (rate of heat transfer) to reduce winter heat loss and summer heat gain.

Energy Star labeling is applicable to residential units only.

For nonresidential applications, refer to UFC 1-200-02, High Performance and Sustainable Building Requirements, for minimum requirements for energy efficiency and meeting minimum building envelope requirements of UFC 3-101-01 including fenestrations and glazing.

Coordinate with Section 08 81 00 GLAZING. Designer must verify availability and adequate competition for products meeting bracketed energy performance requirements before specifying and edit as needed.
****

Windows (including frames and glass) will be independently tested and certified with a Solar Heat Gain Coefficient (SHGC) determined according to NFRC 200 procedures and a whole window U-factor determined in accordance with NFRC 100 within the ranges as indicated below according to

the ASHRAE 169 Climate Zone of the project location.[Windows used solely within the interior of a conditioned envelope are exempted from meeting U-Factor and SHGC requirements, unless otherwise noted.] Provide visual Transmittance (VT) of 0.5 or greater.

[Residential glazed systems (including frames and glass) must be energy star label for residential windows labeled products for the [Northern] [North-Central] [South-Central] [Southern] climate zone. Provide proof of Energy Star label for residential windows.

][1.7.1.1 Southern Climate

Windows installed in Climate Zone [1] [2] will have a U-Factor of [1.3] [1.25] [_____] W/m^2·degrees C [0.40][_____] BTU/h·ft^2·degrees F or less and a SHGC of [0.25] [_____] or less.

][1.7.1.2 South-Central Climate

Windows installed within Climate Zone 3 will have a U-Factor of [0.85] [1.25] [_____] W/m^2·degrees C [0.30][_____] BTU/h·ft^2·degrees F or less and a SHGC of [0.25] [_____] or less.

][1.7.1.3 North-Central Climate

Windows installed within Climate Zone 4 will have a U-Factor of [0.85] [1.25] [_____] W/m^2·degrees C [0.30] [_____] BTU/h·ft^2·degrees F or less and a SHGC of [0.40] [_____] or less.

][1.7.1.4 Northern Climate

Windows installed within Climate Zone [5] [6] [7] will have a U-Factor of [0.65] [1.25][_____] W/m^2·degrees C [0.27] [_____]BTU/h·ft^2·degrees F or less. There is no SHGC limit for this climate zone.

][1.7.1.5 Non-residential Windows

Non-residential glazed systems (including frames and glass) must be certified by the National Fenestration Rating Council with a whole-window Solar Heat Gain Coefficient (SHGC) maximum of [_____] determined according to NFRC 200 procedures and a U-factor maximum of [_____] W per square m by K Btu per square foot by ht by degree F in accordance with NFRC 100.

]PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR WINDOWS

****

NOTE: Edit to indicate materials and items required. Consult AAMA 1503, "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections" and select the minimum Condensation Resistance Factory (CRF) required for the particular project conditions.

****

Provide windows conforming to AAMA/WDMA/CSA 101/I.S.2/A440 and to requirements specified herein. Provide windows of materials, types,

grades, performance classes, combinations and sizes indicated or specified. Provide each window as a unit consisting of [subframe,] frame, sash, glass, hardware, [mullions,] [fins,] [trim,] [casing,] [screen,] [weatherstripping,] anchors and accessories complete. Design windows to accommodate glass, hardware, [screens,] [weatherstripping,] and accessories to be furnished. Provide factory or field installed glass. Provide windows with a minimum CRF of [_____] when tested in accordance with AAMA 1503.

2.2 MATERIALS

2.2.1 Windows

Provide PVC, reinforcing members, fasteners, hardware, weatherstripping, and anchors conforming to AAMA/WDMA/CSA 101/I.S.2/A440 and as specified herein.

2.2.2 Glass and Glazing

As specified in Section 08 81 00 GLAZING.

2.2.3 Caulking and Sealing

As specified in Section 07 92 00 JOINT SEALANTS.

2.2.4 Adhesives

Provide sealants as specified in Section 07 92 00 JOINT SEALANTS.

2.2.5 Insect Screening

ASTM D3656/D3656M, Class 2, 18 by 14 mesh, color [charcoal] [gray] [_____].

2.2.6 Accessories

As standard with the manufacturer and as specified herein.

2.3 WINDOW TYPES

****
NOTE: Edit for window types to be included in the project and delete window types not used. Consult the AAMA "Window Selection Guide" or the Certified Products Directory for definitions of each type and design consideration. The most commonly used window types have been listed in this specification; windows are available in other types and can be made in various combinations and custom fabrications. Select window types on basis of functional requirements and economic considerations. Functional requirements include operation of window, weather environment, conditions of usage and aesthetic factors. Economic considerations include initial cost as well as maintenance costs over life of the facility.
****

****
NOTE: Consult AAMA/WDMA/CSA 101/I.S.2/A440 to

calculate design pressure(s) applicable to the project. Adjust "design factors" because naval facilities are typically less than 100 miles from hurricane oceanline.
****

****
NOTE: Performance Grades represent design pressure values for which products have been tested. Specify an Optional Performance Grade where a higher than minimum Performance Grade is desired due to severe weather conditions and wind loadings. Optional Performance Grade windows must be tested in compliance with AAMA/WDMA/CSA 101/I.S.2/A440. Testing must substantiate requirements for uniform loading (structural), water resistance, and air infiltration.
****

Provide windows of the following types, as indicated.

2.3.1 Awning Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type A- [R 15] [C 20] [[_____] (Optional Performance Class)]. Provide compression-type weatherstripping.

2.3.2 Casement Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type C- [R 15] [C 20] [HC 40] [[_____] (Optional Performance Class)]. Provide [rotary crank] [handle] operated ventilators. Provide ventilators over 1675 mm 66 inches high with two separate locking devices or a two-point locking device operated by rods from a single lever handle. Conceal rods where possible. Provide compression-type weatherstripping.[Provide casement windows in combination with [fixed] [projected] windows specified below.]

2.3.3 Hung Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type H- [R 15] [(Optional Performance Class)].

2.3.4 Horizontal Sliding Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type HS- [R 15] [(Optional Performance Class)].

2.3.5 Projected Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type P- [R 15] [(Optional Performance Class)]. Provide projected windows with concealed four bar friction hinges only.

2.3.6 Fixed Windows

AAMA/WDMA/CSA 101/I.S.2/A440, Type F- [R 15] [(Optional Performance Class)].

2.3.7 Dual Action (Tilt/Turn) Windows

Provide dual action windows with a ventilator which swings into the room from the top for ventilation and swings in from the side for cleaning of the outside surface. When swung from the side, the ventilator must swing in sufficiently to allow safe access to the outside surface.

2.3.7.1 Construction

Provide ventilators with one or more stabilizing arms attached to the frame when ventilator is opened from top. When ventilator is in the tilt-open position, stabilizing arms must provide positive positioning of the ventilator.

2.3.7.2 Hardware

Equip each ventilator with one handle to provide both tilt and swing operation. The tilt or swing operation must be individually selected and rendered operable starting only from the closed sash position. Provide a secondary locking device for each ventilator to prevent accidental swing operation.

2.3.7.3 Performance Requirements

Provide dual action windows to meet the primary performance requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440 for Grade and Performance Class [R 15] [(Optional Performance Class)].

2.4 FABRICATION

Conform to AAMA/WDMA/CSA 101/I.S.2/A440 and to the requirements specified herein.

2.4.1 Subframes, Mullions and Transom Bars

****
NOTE: Edit and include this paragraph when PVC subframes, mullions and transom bars are included, otherwise delete. Specify the design pressure used to specify the Performance Class or the Optional Performance Class for the adjoining windows. Avoid mullion covers in cold climate installations.
****

Provide subframes, transom bars and mullions between multiple window units which meet the design pressure of [72] [96] [192] [_____] kilograms per square meter (kg/sq m) [15] [20] [40] [_____] pounds per square foot (psf). Fabricate mullions and transom bars in such a manner as to permit expansion and contraction between adjoining construction and window units and to form a weathertight joint.[Provide mullion covers on the interior and exterior to completely close exposed joints and recesses between window units and to present a neat appearance.][Provide special covers over structural support at mullions as indicated.]

2.4.2 Combination Windows

Provide factory assembled combination windows of the same grade and performance class. Where factory assembly of individual windows into larger units is limited by transportation considerations, prefabricate,

match mark, transport, and field assemble.

2.4.3 Frames and Sash

2.4.3.1 Corners and Reinforcement

****

NOTE: Specify mechanically fixed and sealed or welded corners for most applications. Specify only welded corners for cold climate applications.

****

Provide [mechanically fixed and sealed or welded] [welded] corners on PVC frames and sashes. Reinforce frames and sash as necessary to meet the requirements for the performance classes or grades specified herein.

2.4.3.2 Adjustability

Ventilating sash must be adjustable vertically and horizontally to ensure smooth operation.

2.4.3.3 Drips and Weep Holes

****

NOTE: Include the first two sentences when operable windows are included in the project, otherwise delete.

****

[Provide continuous drips over heads of top ventilators. Where fixed windows adjoin ventilators, provide continuous drips across tops of fixed windows.]Provide drips and weep holes as required to return water to the outside.

2.4.3.4 Provisions for Glazing

****

NOTE: Design must meet the requirements of UFC 1-200-02, "High Performance and Sustainable Building Requirements" which invokes the requirements within UFC 3-101-01, "Architecture". UFC 1-200-02 and UFC 3-101-01 make references throughout to various ASHRAE documents governing energy efficiency and requirements for the components of building envelope design including fenestrations and glazing.

Specify glass thickness in Section 08 81 00 GLAZING. Inside glazing is preferred, especially for windows above first floor and other locations where access is difficult. Windows designed for inside glazing may not be available in double-hung type. Check manufacturer's literature. Where project requires insulating glass, show sash members, glazing beads, and hardware of sufficient size and weight to receive and support glass of specified thickness. Allow sufficient space between each side of insulating glass and frame for glazing compound or glazing gaskets and expansion as well as sufficient space between edges of glass and frame.

Drawings must clearly indicate method for securing insulating glass in place. Specify windows which will require glazing beads if they are indicated as such; specify vinyl, EPDM or silicone rubber gaskets in Section 08 81 00 GLAZING. Do not use glazing compound, vinyl glazing gaskets or exterior glazing beads in cold climates; dry glaze with EPDM or silicone rubber gaskets.

NOTE: Include the last bracketed sentence where the antiterrorism requirements of UFC 4-010-01 apply based on the facility's occupancy classification and occupancy load.

****

Design windows and rabbets suitable for glass thickness shown [or specified]. Design sash for [inside] [outside] [single] [double] [triple] glazing and for securing glass with [glazing beads,] [glazing clips,] [glazing channels,] [glazing gaskets,] [or glazing compound].[For windows required to comply with antiterrorism provisions, design in accordance with Standard 10 of UFC 4-010-01.]

2.4.4 Hardware

The item, type, and functional characteristics must be the manufacturer's standard for the particular window type. Provide hardware of suitable design and of sufficient strength to perform the function for which it is used. Equip operating ventilators with a lock or latching device which can be secured from the inside.

2.4.5 Weatherstripping

Provide for ventilating sections of windows to ensure a weathertight seal meeting the infiltration requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440. Provide easily replaceable factory-applied weatherstripping.

2.4.6 Screens

Provide one insect screen for each operable exterior sash or ventilator. Design screens to be rewirable, easily removable from inside the building, and to permit easy access to operating hardware.

2.4.7 Color

****

NOTE: Standard PVC window color is white and should be specified for most projects. A number of other colors are available, particularly tan (ivory, beige, almond), gray and dark brown (architectural bronze), at additional cost. Colors co-extruded to the exterior of the window are especially designed to prevent heat build-up. Specify premium colors only after verification of availability, cost and aesthetic need.

****

Provide [white] [_____] window PVC color. Color must be integral or co-extruded to the PVC to prevent heat build-up.

2.4.8 Fasteners

Provide fastener types as standard with the window manufacturer for windows, trim, and accessories. Fasteners exposed to the environment to be corrosion resistant coated steel, aluminum, or stainless steel compatible with the window material and adjoining construction, and of a type and size recommended by the manufacturer to meet the performance requirements.

2.4.9 Accessories

****

NOTE: Edit for accessories to be included. Check availability of integral venetian blinds before specifying. Indicate windows to receive grills or integral venetian blinds on the drawings. If venetian blinds are to be separate from the windows, delete the paragraph INTEGRAL VENETIAN BLINDS and specify venetian blinds in Section 12 21 00 WINDOW BLINDS.

****

Provide windows complete with clips, fins, anchors, [grills,] [venetian blinds,] and other appurtenances necessary for complete installation and proper operation.

2.4.9.1 Anchors

Provide concealed anchors of the type recommended by the window manufacturer for the specific type of construction. Provide corrosion resistant anchors and fasteners compatible with the window and the adjoining construction. For each jamb 900 mm 36 inches or longer, provide a minimum of three anchors located approximately 150 mm 6 inches from each end and at midpoint. For jambs less than 900 mm 36 inches long, provide two anchors.

2.4.9.2 Grills

Provide the manufacturer's standard grills for the windows indicated. Grills must be removable type or sealed within insulating glass units. Provide manufacturer's standard grill pattern design or as approved, unless otherwise indicated.

[2.4.9.3 Integral Venetian Blinds

Provide the manufacturer's standard venetian blinds mounted within the window frame for the windows indicated. Venetian blinds must be fully adjustable allowing full angle tilting and stops at any position. Provide [white]blinds[to match color of the PVC].

]PART 3 EXECUTION

3.1 INSTALLATION

Install in accordance with the window manufacturer's printed instructions and details. Build in windows as work progresses or install without forcing into prepared window openings. Set windows at proper elevation, location, and reveal; plumb, square, level, and in alignment; and brace,

strut, and stay properly to prevent distortion and misalignment. Bed screws or bolts in sill members, joints at mullions, contacts of windows with sills, built-in fins, and subframes in mastic sealant of a type recommended by the window manufacturer. Install and seal windows in a manner that will prevent entrance of water and wind.[Fasten insect screens securely in place.] Fasten hardware to windows.

Any materials that show visual evidence of biological growth due to the presence of moisture must not be installed on the building project.

3.1.1 Anchors and Fastenings

Secure units to each other, to masonry, and to other adjoining construction with clips, fins, screws, or other devices recommended by the window manufacturer.

3.2 ADJUSTING

After installation of windows and completion of glazing and field painting, adjust ventilators and hardware to operate smoothly and to provide weathertight sealing when ventilators are closed and locked. Lubricate hardware and operating parts as necessary. Verify products are properly installed, connected, and adjusted.

3.3 CLEANING

Clean interior and exterior surfaces of window units of mortar, plaster, paint spattering spots, and other foreign matter to present a neat appearance, to prevent fouling of weathering surfaces and weatherstripping, and to prevent interference with operation of hardware. Replace stained, discolored, or abraded windows that cannot be restored to their original condition with new windows.

3.4 PROTECTION

Protect ventilators and operating parts against accumulation of dirt and building materials by keeping ventilators tightly closed and locked to frame.

-- End of Section --