

SPECIFICATIONS – WINDOWS

SECTION 085200 – WOOD WINDOWS

PART 1 — GENERAL

1.1 SUMMARY

A. Section includes:

Edit the following listing as required for applicability to the specific project, particularly window types required and specific trim inclusions.

1. Windows: Fixed frame, fixed sash, storefront, casement, hopper, awning, tilt/turn, and/or single-hung type operating sash, all with factory glazed components and reinforcing as required.
2. Trims (if applicable).
3. Flat steel mullion stiffeners (if applicable).
4. All labor equipment, materials to furnish and perform work as specified and shown on contract documents.

B. Related Work Specified Elsewhere

Edit the following listings as required for applicability to the specific project.

1. Section 051000 – Structural Metal Framing
2. Section 061053 – Miscellaneous Rough Carpentry: Wood framing or blocking
3. Section 062000 – Finish Carpentry
4. Section 064000 – Architectural Woodwork
5. Section 076000 – Flashing and Sheet Metal
6. Section 079200 – Joint Sealants: Perimeter sealants and backup materials
7. Section 081400 – Exterior Stile and Rail Wood Doors
8. Section 088000 – Glazing
9. Section 099300 – Staining and Transparent Finishes

1.2 SYSTEM REQUIREMENTS

A. General Qualifications: Wood framed windows shall withstand the effects of the performance requirements indicated without failure due to defective manufacture, fabrication or installation.

1. Fabricator: Single fabricator regularly engaged for at least ten years fabricating products of the kind and quality required for the project.
2. Installer: Experienced carpenter contractor who has completed comparable work.

B. Design Criteria

1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
2. Wall openings: Accommodate allowable building wall construction tolerances and moisture-caused brick masonry swell without stressing or deforming window units or overstressing anchorage.
3. Moisture changes: Accommodate wood shrinking and swelling caused by ambient conditions at the project, without stressing window units, overstressing anchorage, causing sash to bind, or exceeding air/water entry limits.
4. Comply with applicable provisions in AAMA/WDMA I.S. 2, "Standard Specification for Windows, Doors and Skylights" for operating force, air infiltration, water penetration, structural performance, and forced-entry resistance for wood windows.

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5. Glazing provisions: As recommended by the glass manufacturer.

C. Reference Standards

List reference standards that are included within the text of the specification. Edit the listings below as required for applicability to the specific project.

1. ASTM E 283 Test method for determining air leakage.
2. ASTM E 330 Test method for determining structural performance.
3. ASTM E 331 Test method for determining water penetration using static air pressure differential.
4. ASTM E 547 Test method for determining water penetration using cyclic air pressure differential.
5. ASTM F 588 Test method for forced entry resistance.
6. ASTM E 783-02 Standard test method for field measurement of air leakage through installed exterior windows and doors.
7. AAMA 501.3 Field check of water and air leakage through installed exterior windows, curtain walls and doors by uniform air pressure difference.
8. AWI: *Architectural Woodwork Quality Standards*, 7th edition, version 1.0, 1997, of the Architectural Woodwork Institute.
9. AAMA/WDMA/CSA 101/I.S.2/A440-05 *Standard/Specification for Windows, Doors and Unit Skylights*.

1.3 PERFORMANCE REQUIREMENTS

A. Performance Requirements:

1. Air Infiltration: Air leakage shall not exceed 0.15 CFM per square foot of surface area for fixed units and 0.30 CFM per foot of sash crack when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water Infiltration: No uncontrolled leakage when tested in accordance with ASTM E547 at test pressure of 6.24 psf, or 20 percent of full positive design wind load, whichever is greater.
3. Thermal Transmittance: Provide window units with the following U-value as determined according to NFRC 100 or calculated according to LBNL Window 5.2 computer analysis.

Indicate required U-value below.

- a. U-value =

4. Forced-Entry Resistance: Comply with Performance Level 10 requirements when tested according to ASTM F588.

Under following section, Structural Requirements, provide project design pressure.

- #### B. Structural Requirements:
- When tested in accordance with ASTM E330 at 150 percent of design pressure, no failure or permanent deflection in excess of 0.003 of any member's span after removing the imposed load, for a positive (inward) and negative (outward) design pressure of 60 psf.

1.4 SUBMITTALS

- #### A. Wood Samples:
- Duplicate pairs of samples for each species of unfinished and transparent finished wood proposed for production work.

1. Samples shall be large enough to accurately show typical appearance characteristics.
2. Each pair of samples shall show extremes of appearance characteristic of range proposed for the work. Wood used for production shall be within this range.

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If FSC® (Forest Stewardship Council™) certified lumber is mandated for the project, include the following reference. Otherwise, delete 1.4.A.3.

3. Provide chain-of-ownership documentation for all FSC® certified lumber.
- B. Sample Windows/Mock-Ups (where specified): Window assemblies for typical wall openings shall be provided, complete and ready to install.
- C. Shop Drawings
 1. Schedule: Window types, sizes, locations, and quantities, keyed to scale elevations. Identify materials, finish and species of woods, glazing types, hardware, and anchoring provisions.
 2. Details: Full or large scale, keyed to scale elevations. Show frame and sash construction, glazing, weep/vent provisions, hardware, weather-stripping and anchorage.
 3. Installation: Clearly show relation to adjoining construction. Give blocking requirements, clearances, weather proofing & flashing recommendations and all other instructions necessary for proper installation.

If maintenance stock is to be required, clearly list quantities and types of stock required. Otherwise, delete section 1.4.D.

- D. Maintenance Stock: Per project requirements (glass, hardware, etc.)

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility:
 1. Provide window and door systems that are products of a single manufacturer.
 2. Glass, glazing, and glazing sealants for window and door systems are required as work of this section for single source responsibility.
- B. Certifications
 1. Fabricator qualifications: Not less than 10 years prior successful production of units similar to those required. List projects having windows of the kind required for the project. Installations shall have been done to meet job conditions and performance requirements of the kind shown and specified for this project. Give installation dates, locations, contact names, addresses, and phone numbers for each project.
 2. Test report: Certified independent testing agency reports to show compliance with specified window performance requirements. Tests shall have been made within 5 years of submission. Reports shall include test descriptions and results, as well as sufficient product descriptions to show that tested products are representative of those proposed for the project.
 3. Installer Qualifications: Certified in writing by manufacturer with documented experience on at least 5 projects of similar nature in past 5 years.
- C. Maintenance Instructions: Two copies of window manufacturer's product manual with recommendations for routine owner maintenance of window units, hardware and wood finishes; and instructions for removing and replacing sash and glass.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver factory-assembled, preglazed windows in enclosed vans. Bundle and label loose materials as necessary to prevent loss and damage.
- B. Store products in a clean, protected, dry, well-ventilated building, on platforms or blocking at least 4 inches above floor. Stack products so they do not warp, bend or twist. Store windows upright, not flat or leaning, with at least ¼" air space between units. General contractor is responsible for storage on site.
- C. Protect glazing and frame components from adverse job conditions before, during, and after installation including but not limited to:
 1. Condensation, temperature changes, direct exposure to sun or other causes that could otherwise damage the assemblies

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2. The work of other trades before, during, and after installation (e.g., weld slag, run down staining, masonry dust and similar)
 3. Adhere to glass manufacturer's recommendations for venting and sealing insulated units to avoid hermetic seal ruptures or glass breakage at high altitude locations.
- D. Handle windows with clean hands or canvas gloves.

1.7 PROJECT CONDITIONS

- A. Connecting Work: Constructed to specified tolerances. Field dimensions agreed upon prior to fabrication.
- B. Reference Points: Benchmarks and other required reference points shall be established.
- C. Environmental Conditions: Air temperature during installations shall be at least 40° F and rising, and the wind light or still. Work areas and materials shall be dry and free of ice and snow. Ensure ambient and surface temperatures and joint conditions are suitable for installation of materials.

1.8 WARRANTY

- A. Provide written warranty signed by manufacturer stating that work is free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail under normal operation.
 1. Material and workmanship warranty term: 3 years from date of Substantial Completion.
- B. Provide written warranty agreeing to replace defective insulating glass units and stating that insulating glass units will be free from condensation, fogging and obstruction of vision due to film on internal surfaces for 10 years from date of installation. Replacement includes labor and materials.
 1. Glass seal failure warranty term: 10 years from date of Substantial Completion.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Duratherm Corporation, 720 Main Street, Vassalboro, ME 04989
Telephone: (800) 996-5558 / Email: info@durathermwindow.com.
- B. Other Acceptable Manufacturers: Subject to compliance with requirements listed herein, provide either the named product or a comparable product that meets visual, physical and performance criteria as judged solely by the architect.

2.2 FRAME MATERIALS

- A. Lumber: All pieces shall be dried to an average moisture content of 12% (9-14% for individual pieces) before assembly and treatment.
- B. Wood Species: Different species at interior and exterior
 1. Exterior: Extension sill nosing, exterior frame and sash facing.

*Edit the following list of exterior wood species according to material used on project. If more than one exterior wood type is used, give indication as to where the different woods occur on project.
Indicate that lumber is to be FSC® certified if appropriate.*

- a. Teak (*Tectona grandis*)
- b. Sapele mahogany (*Entandrophragma cylindricum*)
- c. African Mahogany (*Khaya ivorensis*)
- d. Honduran Mahogany (*Swietenia macrophylla*)
- e. Cypress (*Taxodium distichum*)
- f. Douglas Fir (*Pseudotsuga menziesii*)

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- g. Spanish Cedar (*Cedrela odorata*)
 - h. Redwood (*Sequoia sempervirens*)
 - i. Jarrah (*Eucalyptus marginata*)
2. Interior: All inside frame and sash components.

Edit the following list of interior wood species according to material used on project. If more than one interior wood type is used, give indication as to where the different woods occur on project. Indicate that lumber is to be FSC® certified if appropriate.

- a. African Mahogany (*Khaya ivorensis*)
- b. Sapele mahogany (*Entandrophragma cylindricum*)
- c. Honduran Mahogany (*Swietenia macrophylla*)
- d. Cherry (*Prunus serotina*)
- e. Maple (*Acer saccharum*)
- f. White Oak (*Quercus alba*)
- g. Red Oak (*Quercus vubra*)
- h. Spanish Cedar (*Cedrela odorata*)
- i. Redwood (*Sequoia sempervirens*)
- j. Douglas Fir (*Pseudotsuga menziesii*)
- k. Teak (*Tectona grandis*)

2.3 HARDWARE

- A. Anchor Bolts and Screws: Hex head through-bolts and flat head wood screws shall be of corrosion resistant type (zinc chromate, galvanized or stainless steel).
- B. Waterproof Adhesive: Resorcinol, melamine, or polyvinyl acetate emulsion type.
- C. Anchor Clips: Teco, Simpson Strong-Tie Connectors®, or equal.
- D. Operating Hardware

*Edit the following hardware types to conform to requirements of project.
Edit finish/style/material within each listing as required.
If there are no operable window units on project, delete sections 2.3.D and 2.3.E.*

- 1. Sash locks (awning, out-swing casement, hopper, single-hung): Oxidized bronze alloy latch designed to be manually operated. Finishes: Lacquered Red Bronze (US 20A), Oil Rubbed Bronze (US 10) and White Bronze (US 26D).
- 2. Pushbar operator (out-swing casement and awning): Comprised of oxidized bronze alloy components and a solid brass bar, copper plated and oxidized to match bronze. The pushbar operator shall be designed to be manually operated for entire length and to hold sash at intermediate points. Finishes: Lacquered Red bronze (US 20A), Oil Rubbed Bronze (US 10) and White Bronze (US 26D).
- 3. Roto-crank operator (out-swing casement, awning): Truth Maxim® stainless steel roto-crank. Finishes: Satin Nickel (US15), Oil Rubbed Bronze (US 10).
- 4. Multi-latchpoint operating hardware (tilt/turn, in-swing casement): G-U Jet Contura with single lever handle and concealed hinging. Finishes: Lever handle style and finish per project requirements.
- 5. Hinges (awning, out-swing casement, hopper): Heavy duty stainless steel extension type. Heavy duty zinc chromate coated steel or solid brass available for oversized units.
- 6. Sash balances (single-hung): Concealed Ultralift 88L series 670 heavy duty tube / spring balances by Caldwell mounted within sash stile with no exposed cables or chains.

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7. Insect screens (all unit types): Frames – 1" x 5/16" tubular aluminum extrusions in manufacturer's standard colors. Mesh – 18 x 16 screen mesh in manufacturer's standard materials and finishes: charcoal aluminum, mill finish aluminum, stainless steel, bright brass, or bright copper. Optional wood framed insect screens available.
 8. Specialty hardware (per project requirements): Egress, sash restrictors, security locks, remote operators.
- E. Weather-Stripping: Extruded ethylene propylene, neoprene or other plastic that remains flexible and non-sticky at project ambient temperature extremes.

2.4 FABRICATION

A. General

1. Windows: Produced from standard components. Wood components shall be solid lumber. Like parts shall be interchangeable. Fitting, machining for hardware and glazing shall be done in the factory.
2. Frames: AWI Custom Grade Exterior Frames.
3. Sash: AWI Custom Grade Finished Exterior Sash. Fixed and operable sash incorporate removable interior glass stops for ease of reglazing.

B. Permanent Joints and Facings: Bonded with water-resistant adhesive.

C. Wood Finish:

1. Exterior: Note that all corners and edges of units receiving film-forming finishes (Sikkens, paint, etc.) are to be eased/radiused to promote finish adhesion and maintain proper film thickness.

Edit the following list of exterior wood finish options according to finish used on project. If more than one exterior finish type is used, give indication as to where the different finishes are used.

- a. One (1) coat ICA #IM116 water-based impregnating agent, tinted per project requirements, one (1) coat #FA34 water-based bicomponent polyurethane sealer, two (2) coats #LA409 water-based monocomponent acrylic finish, 30 sheen.
- b. One (1) coat factory-stained or -primed, with additional coats applied by others in field after installation.
- c. Four (4) coat Sikkens finish: Two (2) coats Sikkens Cetol® 1 and two (2) coats Sikkens Cetol® 23.
- d. Three (3) coat Sikkens Cetol® Door and Window finish.
- e. Unfinished for jobsite finish by others in field after installation.

2. Interior

Edit the following list of interior wood finish options according to finish used on project. If more than one interior finish type is used, give indication as to where the different finishes are used.

- a. One (1) coat Sher-Wood® vinyl sealer T67F3 and two (2) coats Sher-Wood® Hi-Bild Catalyzed Lacquer T77F58.
- b. Factory-finished with one (1) sealer coat of sanding sealer for jobsite sanding and recoat by others in the field after installation.
- c. Factory-oiled with one (1) coat exterior grade wood oil for jobsite re-coat by others in field after installation.
- d. Factory-primed for sanding and finish by others in field after installation.
- e. Unfinished for jobsite finish by others in field after installation.

D. Glazing

1. Products and installation: Satisfy requirements specified in Section 088000 Glazing.
2. Glazing System

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Edit the following Glazing System options according to that which is to be used on project.

- a. Wet Glazing: Provide two-part wet glazing system recommended by manufacturer for each type window and door specified
- b. Dry Glazing: Provide compression type design utilizing extruded neoprene or silicone glazing gasket system recommended by manufacturer.
3. All units to be factory-pre-glazed.
4. Interior removable glazing stops to be screwed in-place for ease of removal and maintenance.
5. Glazing channel shall be weeped/pressure relief vented per window manufacturer's requirements.
6. Where required, glass at heat absorbent unit to be suitably tempered.
7. Where required, glass at windows with blinds to be suitably tempered.
8. Insulated units for high elevation projects to include breather tubes. Tubes to be sealed within two days of arrival at jobsite following manufacturer's written instructions.
- E. Measurements:
 1. Take accurate field measurements to verify required dimensions prior to fabrication.
 2. Where field dimensions can not be made without delaying the work, establish opening dimensions and proceed with fabricating windows without field dimensions. Coordinate wall construction to ensure that the actual opening dimensions correspond to established dimensions
- F. Fabricate components in accordance with manufacturer's tested assemblies. Shop fabricate, glaze, and finish to greatest extent practical to minimize field assembly. Disassemble only to extent necessary for shipping and handling limitations.
- G. Fabricate components true to detail and free from defects impairing appearance, strength or durability.

PART 3 — EXECUTION

3.1 EXAMINATION

- A. Examine conditions with installer present for compliance with all requirements. Inspect wall flashings, vapor retarders, water and weather barriers, and other built in components to ensure a weather tight installation.
- B. Verify dimensions, tolerances, and method of attachment with other work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install windows per approved shop drawings, in proper relation to adjoining construction. Do not twist frames or force fit them into poorly prepared openings. Anchor windows as required to satisfy design requirements. See manufacturer's installation instructions and shop drawings.
- B. Center window units in wall openings leaving a uniform interface caulking recess on all four sides. The manufacturer strongly suggests that sealant be selected for its adhesion compatibility with the specified exterior wood and adjacent wall materials. Consult the manufacturer for recommended sealant.
- C. Level Units: Install shims at bearing locations, anchors, and latchpoint, so they are not dislodged by subsequent operations. Test sash operation and sash alignment before permanently anchoring units.
- D. Anchorage: Install anchors through frame centerline beside shims. Anchor window units to wood blocking with wood screws and to metal framing with Tek screws; countersink anchor heads. All anchors shall be concealed by closed sash or with wood plugs.

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- E. Installation to conform to window manufacturer's requirements as indicated in the manufacturer's product manual.

If field testing is to be performed, include section 3.3. Otherwise remove section 3.3 in its entirety.

3.3 FIELD QUALITY CONTROL

- A. Field Tests: Independent testing laboratory will perform air infiltration tests in accordance with ASTM E783, and water infiltration tests in accordance with AAMA 501.3.
1. Cost of initial testing to be born by owner.
 2. Costs for any remedial work and subsequent re-testing to be born by responsible party depending on nature of remedial work required.

3.4 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.
- B. Clean exposed surfaces exercising care to avoid damage.
1. Remove adhered matter and excess sealant materials.
 2. Replace glass which is broken, cracked, chipped, scratched, abraded or damaged in other ways.
- C. Wash glass on interior and exterior to remove paint, soil, prints and foreign matter. It is strongly advised that procedures and methods outlined in the following documents be strictly adhered to when cleaning Architectural glass:
1. Glass Association of North America (GANA) Technical Bulletin 01-0300: *Glass Cleaning Procedure*
 2. GANA Technical Bulletin TD-02-0402: *Heat-treated Glass Surfaces Are Different*
 3. PPG Glass Technical Document TD-142: *Glass Cleaning Recommendations*

3.5 PROTECTION

Institute protective measures required throughout the construction period to ensure that both interior and exterior of wood doors will be without damage or deterioration, other than normal weathering.