

**Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")****PART 1 - GENERAL****1.01 GENERAL PROVISIONS:**

- A. The Conditions of the Contract and all Sections of Division 1 are hereby made a part of this Section.
- B. Coordinate work with that of all construction contractors affecting or affected by work of this Contract. Cooperate with such contractors to assure the steady progress of the Work.
- C. Pre-Bid Qualifications: All bids must be based on pre-qualified products; to qualify, the bidder must furnish one complete window unit and additional information as shown below ten (10) days prior to bid date.
  - 1. This sample must be identical to the model of the window the bid is based on, with the finish being the only exception.
  - 2. The prospective bidder shall also include in his pre-bid qualification package, copies of the independent laboratory tests which certify that the proposed product meets or exceeds a H-C50 1400 x 2300 (56" x 91") classification as specified herein and shall show continuing compliance by furnishing a Notice of Product Certification from an Administrator of a Certification Program. The product shall also have successfully passed large missile impact testing pursuant with AAMA 506, ASTM E-1886 & E-1996 as conducted by an independent laboratory.

**1.02 RELATED WORK:**

- A. Provide labor, materials and equipment necessary to complete the work of the window portion of the contract, and without limiting the generality thereof shall include: **(edit following for either retro-fit or new construction)**
  - 1. Removal of existing sash, parting beads, stops and other accessories as required by the proposed replacement system.
  - 2. Removal of other existing construction work as required for the proper installation and operation of the new window system.
  - 3. Removal from site and disposal of all materials, debris packaging, banding and all other materials and equipment.
  - 4. Provide anchoring calculations as prepared by a licensed professional engineer capable of affixing his/ her stamp onto those calculations.
  - 5. Provide new factory-glazed, thermally broken, aluminum windows, types as specified herein, together with necessary mullions, panning, trim, extenders, operating hardware, all installation hardware and all other accessories as may be required.
  - 6. Treated wood blocking, shims, fillers and nailers as required for a secure installation.
  - 7. Field observations and measurements of existing openings and conditions.
  - 8. Bidders shall survey conditions of existing sills and jambs prior to bidding. Contractor shall be responsible for the replacement of portions of same that are deteriorated.
  - 9. Provide and chink fiberglass insulation between window frames and adjacent construction.
  - 10. Proper sealing of all panning or compensation channel joints within each window assembly, per AAMA 803.3-92.
  - 10. Sealing of entire exterior perimeter of window units after installation, per AAMA 808.3-92.
  - 11. Furnishing of any extra materials as specified herein.

**1.03 ITEMS FURNISHED BUT NOT INSTALLED:**

- A. **Architect and/or Specifier should add any applicable requirements to this section, as he/she deems necessary.**

*Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")*

**1.04 ITEMS INSTALLED BUT NOT FURNISHED:**

- A. Architect and/or Specifier should add any applicable requirements to this section, as he/she deems necessary.

**1.05 TESTING AND PERFORMANCE REQUIREMENTS:**

- A. Standards: Except as otherwise indicated, requirements for all aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA/NWWDA 101 I.S.2-A440-05 and applicable general recommendations published by AAMA, GANA, AA and that of ASTM.
- B. Performance and Testing: Except as otherwise indicated, comply with air infiltration tests, water resistance tests and applicable load tests specified in AAMA/NWWDA 101 I.S.2-A440-05 for type, rating and classification of the window units required herein.
- C. Testing: Where manufacturer's standard window units comply with requirements and have been tested, in full size required, and in accordance with specified test's procedures, provide independent certification of such testing.
1. Test reports shall be no more than four years old.
  2. Sample submitted for tests shall be of manufacturer's standard construction and at least 1400 x 2300 (56" x 91"). The sequence of tests shall be optional between manufacturer and testing laboratory except that in all cases, the air infiltration test shall be performed before the water resistance test.
- D. Specific Requirements: Windows shall conform to specified standards or those specified herein, whichever are the more stringent:
1. Air Infiltration Test: With the sash in a closed and locked position, the window shall be subjected to an air infiltration test in accordance with ASTM E 283. Air infiltration shall not exceed 1.6 L/s/m<sup>2</sup> when tested at 75 Pa (0.03 ft<sup>3</sup>/min/ft<sup>2</sup> at 1.57 psf).
  2. Water Resistance Test: The glazed unit shall be mounted in a vertical position, continuously supported around perimeter and with sash in the fully closed and locked position. The window unit shall be subjected to a water resistance test of 360 Pa (7.52 psf) in accordance with ASTM E547 both with and without insect screen.
  3. Use a system that shall deliver water uniformly at a minimum rate of 3.4 L/m<sup>2</sup> · min ( 5.0 US Gal/ft<sup>2</sup> · hr ). Testing shall consist of four cycles of five minutes of water on, then one minute off, for a total of four cycles, 23 minutes minimum. No water shall pass the interior plane of the window frame and there shall be no uncontrolled leakage.
  4. Uniform Structural Load Test: A minimum exterior and interior uniform load of 3600 Pa (75.19 psf ) shall be applied to the entire surface of the test unit. At the conclusion of tests, there shall be no glass breakage, permanent damage of fasteners, hardware, or any other damage causing the window to be inoperable.
  5. Uniform Load Deflection: Per ASTM E 330, the sample shall be tested at a load equal to the design pressure for 10 second duration. Deflection shall be measured and reported in millimeters ( inches ). The load shall be applied both positively ( inward ) and negatively ( outward ).
  6. Large missile impact testing per AAMA 506, ASTM E-1886 & E-1996 as conducted by an independent laboratory. Using a "large missile" of at least 2.5 m ( 96 inch ) and weighing no less than 4082 g ( 9.0 lbs ), impact three identical samples, then subject those same samples to the 4,500 pressure cycles pursuant with ASTM E-1886. Products shall also meet the requirements of Section 7 of ASTM E-1996.

*Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")*

7. Thermal performance: The window shall be tested in accordance with NFRC standards and tests of thermal performance and shall yield a condensation resistance factor of no less than a CR of 39.
8. Coefficient of Heat Transfer, or "U-Value" Test: Thermal Transmittance (U-Value) shall be tested to be 0.60.
9. Operating Force: The sash shall have been adjusted to operate, in either direction, with a force not exceeding 45 pounds, after the sash is in motion.

**1.06 QUALITY ASSURANCE:**

- A. Provide test reports from an independent laboratory certifying that the performance for air infiltration, water resistance, uniform structural load, and condensation resistance and large missile impacting has been met or exceeds the criterion as set forth herein.

**1.07 REFERENCES:**

- A. American Architectural Manufacturers Association (AAMA), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), Aluminum Association (AA), National Wood Window & Door Association (NWWDA).

**1.08 SUBMITTAL REQUIREMENTS:**

- A. General: Provide submittals pursuant with the following:
  1. Product Data: Submit manufacturer's specifications, any recommendations and standard Product details for aluminum window units, including independent laboratory certified test report as necessary to show compliance with requirements.
  2. Shop Drawings: Submit shop drawings, including typical unit elevations and showing full scale details of Product's head, jamb and sill being supplied and typical installation detail. Show anchor locations and other components not included in manufacturer's standard literature. Call out type of glazing, screening, and window finish that will be supplied.
  3. Samples: Submit samples as follows:
    - a) Three samples of each required finish, on a 3 inch long section of flat aluminum stock.
    - b) Additional samples as requested by Architect, to show fabrication techniques, workmanship, type of component parts and the type, design or finish of hardware proposed.

**1.09 PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Store and handle windows, hardware and all related items in strict compliance with the manufacturer's instructions.
- B. Protect and insure windows and all accessory and related materials adequately against damage from the elements, construction activities and other hazards before, during and after installation.

**1.10 PROJECT WARRANTIES:**

- A. Manufacturer's Warranties: Submit written warranties from window manufacturer for the following:
  1. Windows: Windows furnished shall be certified as fully warranted against any defects in material or workmanship, under normal use and service, for a period of one year from date of fabrication.
  2. Finish: The pigmented organic finishes on windows and component parts shall comply fully with requirements of AAMA 2603, for pigmented organic coating and fully warranted against chipping, peeling, cracking and blistering for a period of one year.

***Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")***

- a) Glass: Any insulated glass shall be warranted from visual obstruction, due to internal moisture, for a period of one year.

**PART 2 – PRODUCTS**

**2.01 GENERAL:**

- A. Manufacturer: Subject to compliance with Contract Documents and specifications, provide one of the following:
  - 1. Model 4000 IM Single Hung, H-C50 1400 x 2300 (56" x 91") as manufactured by SEAL CRAFT
    - a) or;
    - b) or;
- B. Thermal Break Construction: Fabricate aluminum window units with an integral low-conductance polyurethane thermal barrier, located mid-frame between exterior and interior of the window, and in a manner, which eliminates direct metal-to-metal contact.
- C. Window Construction: Provide manufacturer's standard construction, which has been in use on similar window units for a period of not less than ten years, and has been tested to demonstrate resistance to thermal conductance and condensation and has been tested to show adequate strength for this purpose.

**2.02 FABRICATION:**

- A. Aluminum Extrusions: All extruded sections shall be of 6063-T5 aluminum alloy and temper recommended by window manufacturer for strength, corrosion resistance, and application of required finish. Shall meet 22,000 psi ultimate tensile strength, yield of 16,000 psi.
- B. Fasteners: Aluminum, stainless steel, or other materials warranted by fastener manufacturer to be non-corrosive and compatible with aluminum window members, and related components of window units.
  - 1. Do not use exposed fasteners, except where unavoidable.
  - 2. Provide stainless steel Phillips flathead machine screws for any exposed fasteners, where required, or tamperproof fasteners.
  - 3. Locate all fasteners so as not to bridge the thermal break.
- C. Anchors, clips and window accessories, depending on strength and corrosion-inhibiting requirements, fabricate such items of aluminum, stainless steel or hot-dip zinc coated steel or iron, complying with ASTM A 123-89a or ASTM B 633-85.
- D. Glazing with cured rubber tape, expanded cellular glazing tape or units may be wet glazed with a high quality bedding compound. Both fixed and operable sash shall be glazed using vinyl (or aluminum) glazing beads.
- E. Provide weather-stripping using silicone coated woven pile with polypropylene fin center complying with AAMA 702-92.
- F. Sealant: Unless otherwise indicated for sealants required within fabricated window units, provide elastomeric type as recommended by window manufacturer for joint size and movement, to remain permanently elastic, non-shrinking and non-migrating. Provide product complying with AAMA 803.3-92 and/or 808.3-92.

*Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")*

**2.03 WINDOW CONFIGURATION:**

- A. General: The following defines operating arrangements for types of sash required in window units and specifies the minimum provisions for each type. Project Drawings will show which sash operate, by arrow.
- B. H-C50 1400 x 2300 (56" x 91") Large Missile Impact Resistant Single Hung aluminum windows, with one balanced and vertically sliding sash, requiring block and tackle mechanisms complying with AAMA 902-94 and as required and appropriate to hold the sash in a stationary position when opened to any distance. Balances shall be accessible and replaceable.
  - 1. Provide sash which, are non-tilting, but which may be removed and serviced from the interior of the building.

**2.04 FABRICATION AND ACCESSORIES:**

- A. General: Provide manufacturer's standard fabrication and accessories that comply with specifications indicated. Include complete system for assembly of components and anchorage of window units prepared completely pre-glazed from factory.
- B. Window Members including any muntin bars shall be of aluminum. Secondary members such as friction shoes, weather-stripping, sash guides, etc. shall also be of aluminum or a compatible material.
  - 1. Mainframe and sash members shall have aluminum thickness as allowed by AAMA/NWWDA 101 I.S.2-A440-05. The standard wall thickness tolerance as defined by the Aluminum Association shall apply.
  - 2. The master frame shall be no less than 63.5mm (2 ½ inches) in depth. The sash shall have hollow extruded sections and a functional thermal break.
- C. Thermal Break: The thermal barrier shall provide a continuous uninterrupted thermal break around the entire perimeter of the frame and sash, and shall not be bridged by conductors such as fasteners.
- D. Hardware having component parts, which are exposed, shall be of aluminum, stainless steel or other non-corrosive materials and compatible with aluminum. Cadmium or zinc-plated steel, if used, must be in accordance with ASTM Specification A-164 or A-165.
  - 1. Primary sash locks shall be an extruded 4 inch (101.6mm) snap action sill lock, no plastic will be permitted, no lock at meeting rail shall be allowed.
- E. Frame and sash shall be assembled in a secure and workmanlike manner to perform as specified herein. All joints of mainframe and sash shall be of butt type, coped and neatly joined by means of cadmium plated or stainless steel screws anchored in an integral boss. All joinery of mainframe and sash shall be sealed with joint sealant per AAMA 803.3-92.
- F. Structural Members: When mullions occur, whether they are joined by integral mullions, or independent mullions, or by a combination of frame members, the resulting members must be capable of withstanding the specified design pressures herein and to a maximum deflection of L/175 of its span. When integral or independent mullions are used to join windows, evidence of compliance may be by mathematical calculations.
- G. Balances: Balances of appropriate size and capacity to hold operable sash stationary in any open position shall be used. Sash balances shall be easily accessible and replaceable in the field without the use of special tools. All balances have a visible code to aid in replacement.
- H. Sash: Shall be joined at the corners with screws in integral screw ports, factory assembled and glazed.

**Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")**

1. The lower sash must be easily removed from the frame for either cleaning or repair. Reglazing shall be easily accomplished from the interior without the aid of unique tools.
- I. Glazing:
1. All glass / glazing shall be glazed at the factory as follows:
    - a) All units shall be glazed to withstand a 50 psf minimum Design Pressure.
    - b) Exterior lite of clear 6 mm laminated or of sufficient strength to meet loading, missile impacts and applicable Codes.
    - c) Interior lite of clear 3mm or of sufficient strength to meet loading and applicable Codes.
    - d) All washrooms shall have obscure glass of sufficient strength to meet loading and applicable Codes on the interior. Pattern # 62 by AFG is hereby pre-approved.
  2. The sash shall be bead glazed, with reusable bead. No tilting sash will be accepted for sash weighing more than 25 pounds.
- J. Screens: If drawings indicate screens, supply insect screens for operable sections of windows in accordance with manufacturer's standard product. Provide aluminum ( or fiberglass ) screen cloth.
- K. Accessories: If indicated on drawings, panning shall be of a receiver type, extruded and finished to match, and;
1. Panning extrusions shall be site assembled, secured at the corners with cadmium plated steel screws in integral screw boss with the joints back sealed per AAMA 803.3-92. Exposed fasteners are not acceptable on the exterior of pan system.
  2. Interior trims: Shall be as depicted on drawings and provided in extruded profiles only. No break form shapes are permissible without prior approval.
  3. Exterior mullion covers, when they occur, shall be of extruded profiles, finished to match window system. No break form shapes are permissible without prior approval.
  4. Integral nail-fin frame, with minimum fin of 28.6 mm ( 1 1/8 in. ) and utilized on all four sides.
  5. Receptor Systems, if indicated on drawings, shall be a two-piece snap-lock receptor system and shall serve to anchor windows in place. The receptor shall be extruded and finished to match window with polyurethane thermal break. The receptor system shall be at head and jamb or head only, as is indicated on the drawings. An optional extruded aluminum subsill may be called for on the drawings and must offer thermal break design. No break form shapes are permissible without prior approval.

**2.05 ALUMINUM FINISHES:**

- A. Provide organic coating of type and color indicated or selected by Architect. Comply with AAMA 2603. Application of finish must be by window manufacturer for all components to ensure match.
1. Manufacturer's standard electrostatically applied baked enamel coating of manufacturer's standard color(s) as selected by the Architect and applied over manufacturer's standard substrate preparation including cleaning, degreasing, and appropriate pre-treatments.

*High performance finish per AAMA 2604 and 2605 and/or anodic finishes are also available for architectural selection. Please contact Seal Craft or your Sales Representative with any questions concerning finish options.*

**PART 3 – EXECUTION****3.01 - PREPARATION**

- A. Prepare openings and chink with insulation, if necessary, to avoid excessive air infiltration from wall cavity; and to be in tolerance, plumb, level, and block as necessary to provide for secure anchoring in accordance with industry standards and the approved shop drawings.

*Model 4000-IM Single Hung H-C50 1400 x 2300 (56" x 91")*

**3.02 - INSTALLATION**

- A. Install windows in accordance ASTM E 2112, per approved shop drawings and anchoring calculations and using skilled craftspeople that have demonstrated a successful history of installing commercial window systems for at least five years. If units are to be installed in EIFS veneer, it shall be the General Contractor's responsibility to insure that openings are properly back-wrapped, prepared per EIMA guidelines and current procedures prior to window installation.
- B. Installing contractor shall provide required treated blocking and support, securely fasten and set windows plumb, square, and level without twist or bow. For single hung units, care must be taken to insure that jambs are not twisted, bowed inward or outward. Block jambs to insure that they remain in tolerance, plumb and that sash operate correctly.
- C. Apply sealant per AAMA 800-92, 808.3-92, and pursuant with sealant manufacturer's recommendations, at all exterior joinery. Wipe off any excess sealant and tool all sealant leaving exposed surface clean and smooth.

**3.03 - FIELD TESTING**

- A. After 10% of the windows are installed, test installed units in conformance with AAMA 502-02 for air and water infiltration. Offer adequate notice to insure presence of window manufacturer, contractor, architect and/or owner's representative during testing.
- B. Select test units as directed by the owner's representative and use an independent laboratory, as provided by the owner or contractor.

**3.04 - ADJUSTING AND CLEANING**

- A. Installing contractor shall clean all aluminum surfaces promptly after installation, following either AAMA 609-93 and/or 610.1-79 standards. Comply with AAMA CW-10-82. Report any shipping damages, in writing, to window manufacturer and General Contractor with 72 hours of receipt.
- B. Installing contractor shall make all final adjustments to sash, balances and/or other hardware, to insure proper operation and weather-ability, and shall touch up any minor blemishes.
- C. Installing contractor shall clean glass, after installation, to remove any labels, excess glazing compound or other sealant and any other foreign substances. Initiate protection and precautions as required insuring that windows are not misused or abused by other Trades until inspection and/or acceptance by Architect.

**END OF SECTION**