skyline windows

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# ALUMINUM WINDOWS

# SECTION 08 51 13

**In-Swing Multi-Lock Hopper**
**Model 1000MH**
**AP-HC-130**

## PART 1 - GENERAL

### 1.1 SUMMARY

A. The Conditions of the Contract, and all Sections of Division 1, are hereby made a part of this Section.

B. Section Includes: Factory glazed windows complete with insect screens, reinforcing, shims, anchors, and attachment devices.

C. Related Sections:
1. Division 7 Section “Joint Sealants.”
2. Division 8 Section “Glass and Glazing.”

D. 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.

E. Conduct field testing of windows when specified in Division 1 by an independent lab using AAMA field test procedures.

### 1.2 SYSTEM DESCRIPTION

A. General: In addition to requirements shown or specified comply with applicable provisions of AAMA/WDMA/CSA 101/I.S.2/A440-05 for design, materials, fabrication and installation of component parts.

B. Window Replacement Requirements:
1. Work Included: Provide labor, materials and equipment necessary to complete the work of the Replacement Window Contract, and without limiting the generality thereof include:
2. Removal of existing sash, fixed glazing, frames and other accessories as required by the proposed replacement system.
3. Removal of other existing work as required for the proper installation and operation of the new units.
4. Removal from site and legal disposal of all removed materials, debris, packaging, banding and all other surplus materials and equipment.

5. Provide new factory glazed, thermally broken, aluminum windows, types as specified herein, together with necessary mullions, panning, trim, expanders, operating hardware, installation hardware and all other accessories as required.
6. Insulated panels and frames as required in selected transoms and other locations.
7. Treated wood blocking, fillers and nailers as required for secure installation. Bidders shall survey conditions of existing sills and jambs prior to bidding. Contractor shall be responsible for providing new blocking for portions of same that are deteriorated.
8. Fiberglass insulation between window frames and adjacent construction.
9. Sealing of all joints within each window assembly.
10. Sealing of entire exterior perimeter of window units after installation.
11. Field observations and measurements of existing openings and conditions.
12. Furnishing and delivering of extra materials as specified.

C. Performance Requirements: Requirements for aluminum windows, terminology and standards of performance, and fabrication and workmanship are those specified and recommended in AAMA/WDMA/CSA 101/I.S.2/A440-05 and applicable general recommendations published by AAMA. Conform to more stringent of specified AAMA standards and following:
1. Air Infiltration Test: Not exceed 0.20 cubic feet per minute per foot of crack length when tested at a pressure of 6.24 psf. Adjust sash to operate in either direction with a force not exceeding 45 pounds after the sash is in motion. Perform tests in accordance with ASTM E 283 with the sash in a closed and locked position.
2. Water Resistance Test: Subject window unit to a water resistance test in accordance with ASTM E 331 with no water passing the interior face of the window frame and no leakage as defined in the test method. Mount the glazed unit in its vertical position continuously supported around the perimeter and the sash placed in the fully closed and locked position. When a static pressure of 10 pounds per square foot has been stabilized, apply five gallons of water per square foot of window area to the exterior face of the unit for a period of 15 minutes.
3. Uniform Load Deflection Test: ASTM E 330 at 50 pounds per square foot: No member deflection more than 1/175 of its span. Maintain test load for a period of 10 seconds resulting in no glass breakage, permanent damage of fasteners, hardware parts, support arms, actuating mechanisms or any other damage causing the window to be inoperable.
4. Uniform Load Structural Test: Apply a minimum exterior and interior uniform load of 75 pounds per square foot to the entire outside surface of the test unit. Maintain this test load for a period of 10 seconds. Results: No glass breakage, permanent damage of fasteners, hardware parts, support arms, actuating mechanisms, or any other damage causing the window to be inoperable. And no permanent deformation of any frame or vent member in excess of 0.2 percent of its span.
5. Life Cycle Test: Per AAMA 101 and AAMA 910, provide proof that the product meets the criteria including passing air and water tests at the conclusion of the cycle tests.

**6.** Condensation Resistance Factor: Test in accordance with AAMA 1502 standards and tests of thermal performance resulting in a CRF of no less than 39 using Clear-Clear insulating glass. **Note: CRF and U Value will vary depending on glass specified. If higher CRF or Lower U Value is desired, contact manufacturer to obtain factors and modify this paragraph.**

**7.** "U" Value Tests: (Co-efficient of Heat Transfer): Thermal Transmittance of Conduction with a 15 mph perpendicular dynamic wind: 0.70 BTU/hr/ft$^2$/F with clear-clear glass and 0.54 BTU/hr/ft$^2$/F using one sheet low-E glass**. Note: CRF and U Value will vary depending on glass specified. If higher CRF or Lower U Value is desired, contact manufacturer to obtain factors and modify this paragraph.**

8. Product Certification: Per AAMA Certification Program, window manufacturer must submit certification that their base window system meets the AW criteria.

9. Testing: Where manufacturer's standard window units comply with requirements and have been tested in accordance with specified AAMA/WDMA/CSA 101/I.S.2/A440-05 tests, provide certification by AAMA certified independent laboratory showing compliance with such tests. Submit copy of the test report signed by the independent laboratory.

## 1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, recommendations and standard details for aluminum window units.

B. Shop Drawings: Submit shop drawings, including location floor plans or exterior wall elevations showing all window openings, typical unit elevations at 1/4 inch scale, and half size detail sections of every typical composite member. Show anchors, hardware, operators and other components as appropriate if not included in manufacturer's standard data. Include glazing details and standards for factory glazed units.

C. Samples:
1. Submit one sample of each required aluminum finish, on 3 x 3 inch long sections of extrusion shapes or aluminum sheets as required for window units.
2. Submit additional samples, if and as directed by Architect, to show fabrication techniques, workmanship of component parts, and design of hardware and other exposed auxiliary items.

D. Certifications: Submit certified test laboratory reports by independent laboratory substantiating performance of system. Include other supportive data as required or as necessary including AAMA certification.

## 1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Store and handle windows, mullions, panels, hardware and all pertinent items in strict compliance with the manufacturer's instructions.

B. Protect units adequately against damage from the elements, construction activities and other hazards before, during and after installation.

## 1.5 WARRANTY

A. Manufacturer's Warrantees: Submit written warrantees from window manufacturer for the following:
1. Windows: Windows furnished are certified as fully warranted against any defects in material or workmanship under normal use and service for a period of one (1) year from date of fabrication.
2. Finish: The pigmented organic finishes on exposed surfaces of windows and component parts (such as panning, trim, mullions and the like) are certified as complying fully with requirements of AAMA 2603 [2604] [2605] for pigmented organic coating and fully warranted against chipping, peeling, cracking or blistering for a period of five (5) years from date of installation. [Warrant finishes meeting AAMA 2604 and 2605 against fading beyond AAMA standards.]
3. Insulated Glass: Warranted from visual obstruction due to internal moisture for a period of [ten (10) years].

## 1.6 MAINTENANCE MATERIAL

**Note: Please specify below additional material desired and quantity or percentage of additional material.**

A. Upon delivery, obtain signed receipt from Owner's representative. Include copy of receipt with submittals required at time of Substantial Completion.

# PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

A. Basis of Design: Model 1000H, as manufactured by Skyline Windows, Bronx, New York.

B. Thermal Barrier: Provides a continuous uninterrupted thermal barrier around the entire perimeter of the frame and all sash and not be bridged by any metal conductors at any point. Provide manufacturer's standard construction which has been in use on similar window units for a period of not less than three years, has been tested to demonstrate resistance to thermal conductance and condensation and has been tested to show adequate strength per AAMA 505.

C. Structural reinforcements or anti bow devices required to meet above performance criteria must allow for tilting function of each sash with out need to remove such devices.

D. Stating this product in no way prohibits other manufacturers from submitting alternate products of approved quality under the provisions of Division 1 Section “Substitutions.” Architect will record time required for evaluating substitutions proposed by Contractor after receipt of bids, and for making changes in the Contract Documents. Whether or not Architect accepts Contractor proposed substitution, Contractor shall reimburse Owner for charges of Architect and Architect’s consultants for evaluating each proposed substitution.

E. Document each request with supporting data substantiating compliance of proposed substitution with Contract Documents, including:
   1. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, sight lines and other pertinent characteristics.
   2. Net change to Contract Sum if substitution is accepted.
   3. Changes required in other Work.
   4. AAMA Certified test data and reports to show compliance with performance characteristics specified.
   5. Samples of product, finishes, and glazing when applicable.
   6. Additional supporting information as necessary or requested.

F. A request for substitution constitutes a representation that Contractor:
   1. Has investigated proposed product and determined that it is equal or superior in all respects to specified product.
   2. Will provide identical warranty as required for specified product.
   3. Will coordinate installation and make changes to other Work which may be required.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Certifies that proposed product will not affect or delay Construction Progress Schedule.
   6. Will pay for changes to building design, including architectural or engineering design, detailing, and construction costs caused by the requested substitution.

G. Pre-Bid Qualifications:

1. All bids must be based on pre-qualified products. To qualify, the bidder must furnish one complete typical project size window unit 10 days prior to the time set for bids. Accompanying the sample will be certified test reports from an accredited AAMA Laboratory verifying that the performance of the product meets or exceeds the AW50 classification.
2. This sample must be a true and accurate representation of the window the bid is based on with the finish being the only exception. No verbal approvals will be given. Each submitter will be notified in writing of acceptance or rejection.
3. The manufacturer must verify that it has been engaged in the manufacturing of the product in their production facility for a period of five (5) years.
4. Maintenance manuals accompany the product sample being submitted for approval.
5. Sight lines to match the base product specified.
6. The qualified bidder must verify that the bidder has been involved with the installation of this type of product in a minimum of 5 projects of similar scope and quality.

## 2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by window manufacturer for strength, corrosion resistance and application of required finish, but not less than 22,000 psi ultimate tensile strength, a yield of 16,000 psi. Comply with ASTM B 221.

B. Fasteners: Aluminum, stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
1. Do not use exposed fasteners on exterior except where unavoidable for application of hardware. Match finish of adjoining metal.
2. Provide non-magnetic stainless steel, tamper-proof screws for exposed fasteners, where required, or special tamper-proof fasteners.
3. Locate fasteners so as not to disturb the thermal barrier construction of windows.

C. Anchors, Clips And Window Accessories: Depending on strength and corrosion-inhibiting requirements, fabricate units of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with ASTM A 123.

D. Compression Glazing Strips And Weatherstripping: At manufacturer's option, provide neoprene gaskets complying with ASTM D 2000 Designation 2BC415 to 3BC415, PVC gaskets complying with ASTM D2287, or expanded neoprene gaskets complying with ASTM C 509, Grade 4.

E. Sliding Weatherstripping: Provide double weatherstripping using silicone coated woven pile with a polypropylene center fin complying with AAMA 701.

F. Sealant:
1. 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 Specification 803 and 808.
2. Refer to Division 7 for perimeter sealants between window units and surrounding construction.

## 2.3 WINDOW TYPES (OPERATION)

A. General: Except as otherwise indicated, provide window units complying with requirements of AAMA Classification "AW" grade windows. Windows for this project will be rated a minimum of

AW50 for full size test units per AAMA/WDMA/CSA 101/I.S.2/A440-05 to withstand a design pressure of 50 psf minimum.

B. Fixed Aluminum Windows or Panel Frames (F): Except for guardians or special provisions as indicated for maintenance, cleaning, and removal, no operating hardware or equipment is required.

C. Double/Single-Hung Aluminum Windows (DH/SH):
   1. Units: Two balanced, mechanisms complying with AAMA 902 “Sash Balance Specifications”.
   2. Provide units which have “tilt-in” feature permitting both sides of both sash to be cleaned form interior.

## 2.4 FABRICATION AND ACCESSORIES

A. General: Provide manufacturer's standard fabrication and accessories which comply with specifications. Include complete system for assembly of components and anchorage of window units and provide complete pre-glazing at the factory.

B. Window Material:
   1. Windows and Muntin Bars: Aluminum.
   2. Secondary Members (friction tabs, shoes, weatherstripping guides, etc.): Aluminum or a material compatible with aluminum.
   3. Main Frame and Sash: Nominal thickness of not less than 0.062 inches, except for fin trim either integral or applied.
   4. Frame Sill: Nominal thickness of not less than 0.093 inches.
   5. Standard wall thickness tolerance: In accordance with the Aluminum Association.

C. Master Frame: Not less than 4 inches in depth.

D. Sash: Hollow extruded horizontal sections and not less than 1-9/16 inches in depth.

E. Hardware:
   1. Material: Aluminum, stainless steel or other non-corrosive materials compatible with aluminum for hardware having component parts which are exposed. Cadmium or zinc-plated steel where used must be in accordance with ASTM Specification B 766 or B 633.
   2. Primary Locking Devices: Extruded aluminum spring activated latches located at the head and sill. Finish latches to match the window.

F. Tilt Locks: Sufficient strength to meet applicable structural performance.
   1. Spring loaded tilt locking mechanisms or AUTOMATIC LATCH action when closing sash from tilt cleaning or repair position will not be accepted.
   2. Use tamper proof Hex key system to secure tilt locking mechanism from operating. Flush head screws with meeting rails surface when in a secured and locked position. Use Hex Key system for tilt lock mechanism.
   3. Locked position prohibits sash from tilting out.

G. Pivot Assembly:
   1. Pivot Shoe: Molded polycarbonate, Delrin or Celcon material. For added strength, fabricate the cam within the shoe of molded Zamac. Design shoe such that the sash is securely held in place through the full range of tilting.
   2. Pivot Bars: Steel coated with zinc, compatible with aluminum with a strength able to withstand an applied torque of not less than 30 foot pounds. Zinc die castings are not permitted.

H. Thermal Barrier: Provides a continuous uninterrupted thermal barrier around the entire perimeter of the frame and all sash and shall not be bridged by any metal conductors at any point.

I. Construction:
   1. Assembly: Fabricate butt joints of the main frame and the sash, coped and joined neatly and secured by means of screws anchored in integral ports. Seal main frame from the back with a narrow joint sealant meeting AAMA 803 specification for narrow joint sealants.
   2. Sash: Screwed together construction so that they may be easily repaired.
   3. Meeting rails of the top and bottom sash shall interlock in the closed position.
   4. Meeting Rail Interlock: Two separate and distinct metal interlocks with fin-seal weatherstripping.

J. Mullions - Other structural members: When mullion units occur, whether they are joined by integral mullions, independent mullions or by a combination of frame members, the resulting members must be capable of withstanding the load outlined under Uniform Load specified load requirements, without deflecting more than 1/175th of its span. When independent or integral mullions are used to join windows, the mullions shall contain a thermal barrier as specified. Evidence of compliance may be by mathematical calculations.

K. Balances: Size and capacity required to hold both top and bottom sash stationary in any open position. Easily accessible and replaceable in the field without the use of special tools. Spiral balances will not be accepted.
   1. Standard Balances: Block and tackle type. Class II AAMA 902-93, with a MAF ratio of 0.6 Force required to keep a moving sash moving up or down, not to exceed 45 pounds. Maximum sash weight of approximately 65 pounds per sash.
   2. High Performance Balances: Meet or exceed Class V performance with a MAF ratio of 0.30 Maximum sash weight not to exceed 80 pounds. High performance balances typically operate with 30 pounds of operating force or less. Allowable is 45 pounds. Furnish Class V (Ultra-Lift) balances when sash weight exceeds 65 pounds or windows are typically large for the project.

L. Sash:
   1. Join at the corners with screws in integral screw ports.
   2. The sash must be easily removed from the frame for either cleaning or repair.

M. Glazing:
   1. Pre-glaze all units (except insulated panels as required for installation) at the factory with insulated glass as follows:
      a. Typical Insulated Glass: Overall thickness of 5/8 inch – 1 inch with two lites of 1/8 inch or 3/16 inch or 1/4 inch as size and loading require.
      b. Typical 5/8 inch insulated glass units (Dual Seal).
         (1) Primary Sealant: Polyisobutylene applied to the edge of the spacer.
         (2) Secondary Sealant: Silicone.
         (3) Air Spacer: Continuous metal spacer with formed corners and an in-line connector, containing desiccant.
   2. Glaze units to allow for glass replacement without the use of special tools.
   3. [Insulated Panels: 1 inch total thickness with factory acrylic enamel exterior and interior smooth aluminum skins to match window frame finish. Provide tempered hardboard substrate on urethane core or other substrate as selected for the project. Install panels in accordance with manufacturer's recommendations.]

N. Weather Protection:
   1. Provide means of drainage for water and condensation which may accumulate in members of window units.
   2. Weatherstripping: Provide sliding weatherstripping for operating sash.

## 2.5 CASING COVER SYSTEM: (Panning, Trims, Receptors, Mullions, Sills etc.)

A. Exterior Casing Covers (Panning, Receptors, Subsills, Sills): Provide extruded prime alloy aluminum 6063-T5 no less than nominal 0.078 inch wall thickness. Casing covers of less than 2 inches in depth from the window frame may be of 0.062 inch wall thickness. Provide aluminum sections of one piece designed to lock around the entire window frame for a weathertight connection.
   1. Secure the casing cover section at the corners with stainless steel screws in integral screw ports with the joints back sealed using a compatible sealant.
   2. Exposed screws, fasteners or pop rivets are not acceptable on the exterior of the casing cover system.

B. Exterior mullion covers: Extruded aluminum shape to provide rigidity, no less than nominal 0.062 inch wall thickness. Seal against the casing cover sections with continuous bulbous vinyl weatherstrip interlocked within the mullion cover.

C. Interior trim:
   1. Interior Trim, Closures and Angles: As detailed, of extruded shapes no less than 0.062 inch nominal wall thickness.
   2. Snap Trim: Apply in full length without splices and attach with clips spaced no more than 18 inches on center. Clips shall be no less than 3 inches long. No exposed screws will be allowed on interior trim.

## 2.6 ALUMINUM WINDOW FINISHES

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**Select appropriate finish. Custom color baked on finishes available upon request. Silicone Polyester is not available in all colors.**

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A. Finish Options

1. AAMA 2603
   a. Provide manufacturer's standard acrylic or polyester, baked-on, electrostatically applied enamel coating of manufacturer's standard color(s) [custom] as selected by the Architect, applied over manufacturer's standard substrate preparation including cleaning, degreasing, and chromate conversion coating.
   b. Finish shall meet or exceed AAMA 2603 (formerly AAMA 603). (Custom colors available when specified.)
      (1) Color:
      (2) Manufacturer's Code:

2. AAMA 605

   a. Provide manufacturer's standard 2 coat 50% Fluoropolymer or Silicone Polyester, baked on, electrostatically applied enamel coating. Color to be selected from manufacturer's standard colors [custom non-exotic color] [custom exotic color] as selected by the Architect, applied over manufacturer's standard substrate preparation including cleaning, degreasing, and chromate conversion coating. Finish shall meet or exceed AAMA 2604 (formerly AAMA 605).
      (1) Color:
      (2) Manufacturer's Code:

3. AAMA 2605

   a. Provide manufacturer's standard 2 coat Fluoropolymer 70% Kynar baked on, electrostatically applied enamel coating. Color to be selected from manufacturer's standard colors [custom non-exotic color] [custom exotic color] as selected by the Architect, applied over manufacturer's standard substrate preparation including cleaning, degreasing, and chromate conversion coating. Finish shall meet or exceed AAMA 2605.
      (1) Color:
      (2) Manufacturer's Code:

4. Provide Class II, Clear Anodized finish to all exposed areas of aluminum windows. Finish shall meet AAMA 611.

5. Provide Class I, Clear Anodized finish to all exposed areas of aluminum windows. Finish shall meet AAMA 611.

6. Provide Class I, Color Anodized finish to all exposed areas of aluminum windows. Finish shall meet AAMA 611. Color: [Light bronze] [Medium bronze] [Dark bronze] [Black].

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Existing Construction:
   1. Do not remove existing windows until new replacements are available and ready for immediate installation. Do not leave any openings uncovered at end of working day, during wind-driven precipitation or during excessively cold weather.
   2. Remove existing work carefully; avoid damage to existing work to remain.

B. Perform operations as necessary to prepare openings for proper installation and operation of new retrofit units or new construction units.

C. Verify openings are in accordance with shop drawings and Architects Drawings.

### 3.2 INSTALLATION

A. Comply with manufacturer's specifications and recommendations for installation of window units, hardware, operators and other components of work. In no case shall attachment to structure or to components of the window system be through or affect the thermal barriers of the window units.

B. Set units plumb, level and true to line, without warp or rack of frames or sash. Anchor securely in place. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action.

C. Wedge fiberglass insulation between frames of new windows and construction to remain, or between frames and new receptor as applicable. Compress fiberglass to no less than 50 percent of original thickness.

D. Set sill members and other members in bed of compound as shown, or with joint fillers or gaskets as shown, to provide weathertight construction. Seal units following installation and as required to provide weathertight system.

## 3.3 ADJUST AND CLEAN

A. Adjust operating sash and hardware to provide tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.

B. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and moving parts.

C. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.

D. Existing windows and other materials removed from site become property of the Contractor who shall promptly remove same and legally dispose of at no additional cost to the Owner.

E. Comply with all applicable laws, rules and regulations.

## 3.4 PROTECTION

A. Initiate all protection and other precautions required to ensure that window units will be without damage or deterioration (other than normal weathering) at time of acceptance.

B. Send to Architect, with copy to Owner, written recommendations for maintenance and protection of windows following Substantial Completion of Window Contract.

**END OF SECTION**