



RAM Industries

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SPECIFICATION GUIDE SERIES 900 CASEMENT WINDOW

RAM Industries Series 900 Casement is a custom residential and commercial window product system with a poured-in-place thermally improved aluminum frame and sash. The Casement window family is available in an operable project out or fixed design and may be combined with RAM Series 800 or 840 Fixed Heavy Picture windows, RAM Series 990 Awning windows and RAM Louver windows in a wide range of sizes and configurations (certain restrictions apply).

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Casement operating and fixed windows complete with hardware, glazing, weather-stripping, screens, internal muntin divided light, applied traditional and contemporary muntins, and standard or specified anchorages, mullions and accessories. Mullied Transoms and Stand alone Transoms are also available.

1.02 RELATED WORK

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E283-04 - Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
 - 2. ASTM E330-02 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 3. ASTM E547-00. - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 - 4. ASTM E2190-02 "Standard Specification for Insulating Glass Unit Performance and Evaluation."
 - 5. ASTM E774-97 "Standard Specification for the Classification of the Durability of Sealed Insulating Glass."
- B. American Architectural Manufacturers Association/Window and Door Manufacturers Association (AAMA/WDMA), American National Standards Institute/Window and Door Manufacturers Association (ANSI/WDMA).
 - 1. ANSI/AAMA/NWWDA 101/I.S.2-97, 101/I.S.2/NAFS-02, or 101/I.S.2/A440-05 Voluntary Specifications for Aluminum, Vinyl (PVC), and Wood Windows and Doors.
 - 2. AAMA 2604-05 – Voluntary Specification, Performance Requirement and Test Procedures for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels.
- C. National Fenestration Rating Council (NFRC)
 - 1. NFRC 100-2001 & 2004 - Determining Fenestration U-Factor.

2. NFRC 100-2001 & 2004 - Test Procedure for Thermal Transmittance of Fenestration.
 3. NFRC 200-2001 - Determining Fenestration SHGC & Tv.
 4. ASTM E1423-99 - Determining Thermal Transmittance of Fenestration Systems.
 5. AAMA 1503.1-98 - Test Derived CRF.
- E. Consumer Product Safety Commission (CPSC)
1. CPSC 16 CFR 1201 - Safety Glazing Standards.
 2. ANSI Z-97.1 - Safety Glazing Standards for Tempered Glass.

1.04 SYSTEM REQUIREMENTS

All casement windows to be furnished under this section have been tested in accordance with and are to conform to the criteria of ANSI/AAMA 101-I.S.2-97. See the Technical Information section at the beginning of this manual for Air, Water, Structural Test Reports and Energy Rating Reports. For updated reports, please visit our website at www.ramwindows.com.

- A. Design and Performance Requirements
1. Applications of windows include:
 - a. Residential: C40 rating (design test pressure of 60 psf required).
 - b. Light Commercial: C40 rating (design test pressure of 60 psf required).
 - c. Air, water, structural, and forced entry resistance shall be at levels which meet the specified design pressure as per ANSI/AAMA/NWDA 101/I.S.2-97, 101/I.S.2/NAFS-02, or AAMA/WDMA/CSA 101/I.S.2/A440-05.
 2. Air Infiltration:
 - a. Complete testing in accordance with ASTM E 283, at a static air pressure of 1.57 psf with resultant air infiltration not to exceed 0.30 cfm/ft.
 3. Water Resistance:
 - a. Complete testing in accordance with ASTM E 331 and ASTM E 547, at a static pressure difference of 6.00 psf with no resulting uncontrolled water leakage.
 4. Uniform Structural Load:
 - a. Complete testing in accordance with ASTM E 330-02, at a static pressure of 60 psf positive load and 60 psf negative load with no resulting glass breakage, permanent damage to fasteners, hardware parts, frame or other components.
 - b. The entire window system shall not deflect more than 0.411 inches at a design pressure (DP) of 40 psf.
 5. Forced Entry Resistance:
 - a. Complete testing in accordance with ASTM F 588-07 Grade 10 with no entry.
 6. Unique, non-listed unit's performance, when not tested, may be addressed by a manufacturer's Statement of Qualification.
 7. Mullion design can be adequate for specified design pressure.
- B. Energy Ratings
1. All units tested are identified with RAM ID No. as listed on the NFRC label adhered to each unit. Values are certified per NFRC and units are labeled per state requirements.
 2. U-Factor:
 - a. Values to range between 0.45 and 0.61 per NFRC 100-2004 depending on specified design.

3. SHGC:
 - a. Values to range between 0.19 and 0.56 per NFRC 200-2004 depending on specified design.
 4. Unique, non-listed units may have U-Factor & SHGC determined by NFRC procedures and listed on a manufacturer's Statement of Qualification.
- C. Emergency Escape and Rescue
1. Larger widths/heights with standard hardware will comply with emergency escape and rescue requirements of Building Codes (greater or equal to 5.7 Sqft. of clear opening).

1.05 SUBMITTALS

- A. Shop Drawings: Submit sets of Blueline drawings showing all internal and surrounding details / conditions associated with the required windows.
- B. Product Data: Submit sets as needed.
- C. Samples: Submit request for sample materials as needed including corner construction, frame sections, color chips, glass units, fasteners, anchors, mullion sections and others. Include glazing system, quality of construction, specified finish, and color.
- D. Installation Instructions: Submit sets as needed.
- E. Certificates: Submit performance test results reported by independent laboratory or manufacturer's Statement of Qualification indicating compliance with specified performance and design requirements.

1.06 QUALITY ASSURANCE

- A. Insulating Glass – two certification programs: IGCC and IGMAC. Possible IGMA Certification (harmonized IGMAC & SIGMA).
- B. NFRC Certification Program for Energy Rating of Fenestration.
- C. Mock Up (If Required): Provide sample installation for field testing unit performance requirements for approval - Contractor to perform tests in accordance with AAMA 502-02 using Method A and/or Method B.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Proceed in accordance with product storage and handling requirements included in the manufacturer's Installation Instructions.
- B. Deliver in original packaging, store in an upright position off the ground in a clean, dry area. Protect from weather and construction activities.
- C. Handle window unit by jambs, do not drag or drop the window unit and open the window only after the unit is fully secured in opening.

1.08 WARRANTY

- A. RAM offers a comprehensive warranty. For more detailed information, please visit our website at www.ramwindows.com for a full copy.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Frame and Sash: Constructed of extruded 6063-T5 aluminum alloy with poured-in-place polyurethane thermal break. Assembled frames have integral nailing fins with

1-9/16 inch set-back from front of frame. Nailing fin options include reversed location with 1-1/16 inch set-back from front of frame as well as block frame (no nailing fin).

1. Jamb, Head and Sill Width: 2-3/4 inches.
2. Overall Frame Depth: 2-5/8 inches.
3. All aluminum extrusions have a nominal wall thickness of not less than 0.0625 inches.
4. The thermal break consists of a two part, air drying, polyurethane, poured-in-place separator contained within a specifically designed receiving cavity. After de-bridging, the thermal break will produce a separation of the interior and exterior aluminum of not less than 0.150 inches.
5. Corner Construction: Mitered corners use internal corner key and self-leveling seam sealer.
6. Mechanical Fasteners: Stainless steel screws.
7. Sash interior has recessed channel for flush screen alignment.
8. Glazing Stop: Snap in stop that locks into receiving channel on exterior of sash with no exposed screw heads.
9. Internal Mullion: Multiple window units shall be directly mullioned together with internal mullion constructed of extruded 6063-T5 aluminum alloy with poured-in-place polyurethane thermal break. Internally secured and fastened mullion allows for exterior of frames to be directly butted together for flush appearance.

B. Surface Finish:

1. Coating: Valspar Super Dynapon® H.M.P. polyester based coating meets performance requirements of AAMA 2604-05 specifications. Optional 70% PVDF Fluoropon® based coating that meets performance requirements of AAMA 2605-05 specifications available upon request.
2. Anodized: Exposed aluminum finished with electrolytically deposited color, in accordance with the standards of the Aluminum Association designation AA-M12-C22-A31 Class II Clear Anodized and AA-M12-C22-A34 Class I Dark Bronze Anodized.
3. Color: Colors as selected from manufacturer's color spectrum. Custom colors available upon request through custom color matching process.

C. Hardware:

1. Operator and Operator Arms: Factory installed single arm Maxim operator with concealed egress 4-bar heavy duty adjustable stainless steel hinge. Corrosion resistant hardened steel drive worm and gears. Exterior operator parts are coated with corrosion resistant materials. Egress 4-bar hinge allows approximately 90 degree of opening.
2. Operator Handles: Folding handles are standard with T-handles available as an option. Material: Corrosion resistant. Finish: Baked enamel and plated. Color Options: Standard is Aluminum, Bronze, Beige, Black and White.
3. Operator Cover: Die cast zinc operator cover. Finish: Baked enamel and plated. Color Options: Standard is Aluminum, Bronze, Beige, Black and White.
4. Locking System: Factory installed positive acting locking system with double detent handle and adjustable keeper. Two locking units are utilized when window height exceeds 48 inches. Material: Corrosion resistant. Finish: Baked enamel and plated. Color Options: Standard is Aluminum, Bronze, Beige, Black and White.
5. Optional Sash Control Device: Factory installed stainless steel limiting device inserted and fastened to operator track. Degree of operation limit is pre-specified.

D. Weather-stripping:

1. Frame: Perimeter 60 durometer flex polyolefin bulb – Black.
2. Sash: Perimeter flex polyolefin bulb – Black.

E. Screens: Included with all operating units.

1. Screen Mesh: Charcoal fiberglass with 18 × 16 wires-per-inch screen cloth.
 2. Screen Mesh Options: Ultravue, Grey fiberglass, Solarscreen, and aluminum.
 3. Screen Channels: 0.024 inch thick roll formed aluminum with removable vinyl spline.
 4. Sash Attachment: Thumb-turn pointer latches.
 5. Mitered Corner Construction: Channels are joined and reinforced with a corner key.
 6. Finish Color: Screen channels available in Beige, Bronze, White and Clear Anodized.
- F. Muntins (Grilles)-in-the-Airspace: Installed inside the dual sealed glass unit.
1. Material: Aluminum flat bars (grilles), 5/8 inch wide. Optional depth of 1/4 inch and 1/2 inch to completely fill airspace inside the insulated glass unit.
 2. Color options: Bronze, White, Sand (Champagne), Black and Mill.
 3. Patterns: Rectangular and radius with custom cut configurations. (Some limitations apply for radius and special grid patterns.)
- G. Simulated Divided Lights (SDL): SDL system utilizes permanently adhered aluminum muntin bars (grilles) to the interior and exterior of the insulated glass unit.
1. Material: Muntin is constructed of 0.812 x 0.250 inch thick 6063-T5 extruded aluminum alloy.
 2. Design: Two design options offered - flat contemporary and contour traditional muntin (grille) designs.
 3. Color: Colors as selected from manufacturer's color spectrum to match frame and sash finish. Custom colors available upon request through custom color matching process.
 4. Patterns: Rectangular and radius with custom cut configurations. (Some limitations apply for radius and special grid pattern SDL bars.)

2.03 GLAZING

- A. Factory Glazing:
1. Standard one-light IG is 7/8 inch with Cardinal 366 low-e over clear glass (low-e coating on second surface) with 5/8 inch air space (argon gas in-fill).
 2. Standard IG or single glazed has standard design test pressure of 75 psf (DP 50). See Website at www.ramwindows.com for high performance ratings.
 3. Stainless steel insulated glass spacer with black or mill finish color.
 4. High altitude IG has open breather tube.
 5. All glass is select quality complying with FS-DD-G-451D.
 6. IG complies with IGCC and ASTM E774-97 and ASTM E2190-02.
- B. Glazing Methods:
1. Operating and fixed units are all glazed with acrylic sealant / adhesive.
 2. Clear anodized frame finish units may have 1/2 inch glazing tape or acrylic sealant / adhesive.
- C. Glass Options:
1. Cardinal 240, Cardinal 270, Guardian RLE 70/36, Solarban® 70XL, Solarban® 60, and other high performance low-e glass.
 2. Spectrally selective tinted glass.
 3. Pattern and etched glass including Matlux Sateen, Rain, Pattern 62, and others.
 4. Tempered or laminated glass.
 5. Protective film.
 6. Other options: Standard to the industry.
- D. Glazing Bead:
1. Snap-in glazing stop constructed of extruded 6063-T5 aluminum alloy. No exposed screw heads except where required for curved or radius units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of conditions: Before installation, verify that openings are plumb and square and of proper dimension. Report frame defects or unsuitable conditions to the General Contractor before proceeding.
- B. Acceptance: Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Use only skilled mechanics for the installation of the windows and components specified within this section.
- B. Install windows in strict accordance to manufacturer's published Installation Instructions. See Website at www.ramwindows.com for Installation Instructions.
- C. Erect the windows square, plumb and level and furnish adequate anchoring to maintain position and integrity of the windows when subject to normal building movement and windload.
Note: Certain codes require the use of pressure-treated lumber to line rough openings. Corrosion-resistant materials, such as stainless steel or hot-dip galvanized steel, must be used for fasteners and anchors having direct contact with pressure-treated lumber.
- D. Install sealant and related flashing materials at perimeter of assembly in accordance with manufacturer's published installation instructions to provide a weather tight seal between the window and the surrounding construction.

3.03 ADJUSTMENT AND CLEANING

- A. Clean window frame, glass and components in accordance with manufacturer's published Care and Maintenance Instructions. For Care and Maintenance Instructions, see website at www.ramwindows.com.
Note: Do not remove the permanent ANSI/AAMA or NFRC labels.
- B. Adjust operable sash to work freely with hardware functioning properly. Re-adjust at completion of the project if directed.
- C. Leave windows in a job clean condition.

3.04 PROTECTION

- A. Cover windows, in accordance with manufacturer's published Care and Maintenance Instructions, during spray painting or other construction operations (such as muriatic acid washing after completion of masonry) that might cause damage.

END OF SECTION