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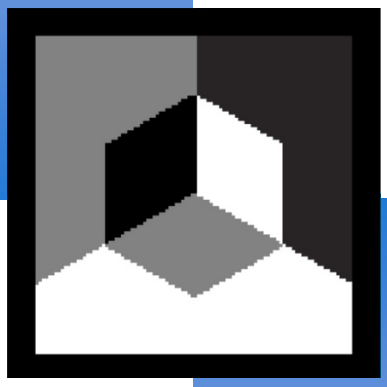
AMERICAN ARCHITECTURAL

ANSI/AAMA 1102.7-89

Voluntary Specification for Aluminum Storm Doors



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FOREWORD

(This Foreword is not a part of American National Standard Specifications for Aluminum Storm Doors, ANSI/AAMA 1102.7-89.)

These specifications are primarily for use with, and are a part of, the American Architectural Manufacturers Association (AAMA) Certification Program which, in turn, is symbolized by the "AAMA" label.

Participation in the AAMA Certification Program and use of the copyrighted "AAMA" label are not limited to members of the Association. Any manufacturer willing to be licensed pursuant to the AAMA Certification Program, must submit his products to independent, officially-authorized, AAMA-approved testing laboratories and permit unannounced, periodic, in-plant inspections by an authorized AAMA inspection agency can qualify for use of the "AAMA" label. Use of the label will be authorized impartially and scrupulously in the public interest to manufacturers who comply with the rules and regulations and whose products fulfill these requirements.

For those not licensed pursuant to this Program, conformance with these specifications must not be claimed or implied for products coming within their scope unless such products do in fact meet all of the descriptive, safety, performance and rating requirements specified herein. AAMA, as the sponsor of these specifications, reserves the right to question any claims of conformance and to test the products of any manufacturer making such claims. Unauthorized or improper use of the label will be prosecuted.

HOW TO USE THESE VOLUNTARY SPECIFICATIONS

To simplify the writing of specifications for aluminum storm doors, AAMA has prepared a "Short Form Specification" which is recommended for use whenever possible. It may be used for the most common types of aluminum storm doors by merely inserting the applicable specification designation(s).

SHORT FORM SPECIFICATION

All aluminum storm doors shall conform to the . . . (see Note as follows) Voluntary specification(s) in ANSI/AAMA 1102.7-89, be labeled with the "AAMA" label, have the sash and/or louver arrangement(s) and be of the size(s) shown on the drawings and be as manufactured by_____ or _____ or approved equal.

Note to Specification Writer:

Insert type of Storm door desired by specification designation such as a CSD-1 for combination storm-and-screen doors and/or JSD-1 for jalousie storm doors. For specification designations, see list in Table of Contents and detailed requirements in Section 2.

CHANGES FROM PREVIOUS EDITION

1. All reference standards have been updated indicating the most recent edition.
2. A section on Closers and Wind Chains has been added (1.2.4).
3. The Fasteners and Hardware sections have been combined into one section (1.2.2) and the AAMA 902.2-1987 Counterbalancing Specification has been added.
4. The section on Anti-Galling Devices, Section C1.2.6 in the 1977 standard has been eliminated.
5. Doors of laminated construction are added in section 1.3.1, "Assembly". A lamination test has been added (Sections 2.1.3.10 and 2.2.5.9). Page 16 of the specification contains a sketch showing locations for taking the core samples.
6. The Uniform Load Tests (Sections 2.1.3.3 and 2.2.5.3) provides for equal positive and negative loading to one of the 14 performance classes indicated on Table #1, page 15.
7. The maximum allowable air infiltration rate for combination storm doors (Section 2.1.3.1) has been reduced to 3.0 cfm per square foot (from 5.0 cfm per square foot).
8. The Concentrated Load and Adherence Test (Sections 2.1.3.6 and 2.2.5.6) has been revised to utilize test procedure ASTM E 987-84.

1.0 GENERAL REQUIREMENTS

NOTE: *This part contains the general requirements applicable to aluminum storm doors and is to be used in conjunction with the "Specific Requirements" in Section 2.*

1.1 GENERAL

1.1.1 Scope
Aluminum storm doors covered in this voluntary specification are units to be used on the exterior of and in tandem with prime doors to improve interior climate control. Their use singly, or as prime doors, is not recommended.

1.1.2 Reference Standards
The following standards and specifications of the latest revision are part of this specification where referenced:

AAMA (American Architectural Manufacturers Association)

AAMA 603.8-85, "Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum"

AAMA 701.2-1974, "Voluntary Specification for Pile Weather-strip"

AAMA 800-86, "Voluntary Specifications and Test Methods for Sealants," containing the following specifications and test methods:

AAMA 802.3-85, "Voluntary Specification for Ductile Back-Bedding Compound"

AAMA 803.3-85, "Voluntary Specification for Narrow-Joint Seam Sealer"

AAMA 804.1-85, "Voluntary Specification for Ductile Back-Bedding Glazing Tapes"

AAMA 805.2-85, "Voluntary Specification for Bonding-Type Back-Bedding Compound"

AAMA 806.1-85, “Voluntary Specification for Bonding-Type Back-Bedding Glazing Tapes"

AAMA 807.1-85, "Voluntary Specification for Oil-Extended Cured Rubber Back-Bedding Glazing Tapes"

AAMA 808.3-85, "Voluntary Specification for Exterior Perimeter Sealing Compound"

AAMA 809.2-85, "Voluntary Specification for Non-Drying Sealants"

AAMA 810.1-85, "Voluntary Specification for Expanded Cellular Glazing Tape"

AAMA 902.2-87, "Voluntary Specification for Sash Balances"

ANSI (American National Standards Institute)

ANSI H35.2-1985, "Dimensional Tolerances for Aluminum Mill Products"

ANSI A58.1-1982, "Building Code Requirements for Minimum Design Loads in Buildings and Other Structures"

ANSI Z97.1-1984, "American National Standard for Safety Glazing Materials Used in Buildings-Safety Performance Specifications and Methods of Test"

SMA (Screen Manufacturers Association)

ANSI/SMA 1004-1976, "Specifications for Aluminum Tubular Frame Screens for Windows"

SMA/SMT 31-1967, "Testing Procedures and Equipment Bulletin for Attachment of Screening to Frame"

ASTM (American Society for Testing and Materials)

ASTM A 165-80, "Specification for Electrodeposited Coatings of Cadmium on Steel"

ASTM B 456-85, "Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium"

ASTM B 633-85, "Specification for Electrodeposited Coatings of Zinc on Iron and Steel"

ASTM C 297-61 (1980), "Method for Tension Test of Flat Sandwich Constructions in Flatwise Plane"

ASTM C 1048-85, "Standard Specification for Heat-Treated Flat Glass— Kind HS, Kind FT Coated and Uncoated Glass"

ASTM D 1183-70 (1987), "Test Methods for Resistance of Adhesive to Cyclic Laboratory Aging Conditions"

ASTM D 3656-83, "Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated-Glass Fiber Yarn"

ASTM E 283-84, "Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors"

ASTM E 330-84, Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference"

ASTM E 331-86, "Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference"

ASTM E 774-84a, "Specification for Sealed Insulating Glass Units"

GSA (General Services Administration)

FS-RR-W-365, "Federal Specification—Wire Fabric (Insect Screening)"

CPSC (Consumer Product Safety Commission)

16 CFR 1201, "Architectural Glazing Materials"

1.2 MATERIALS

1.2.1 Alloys

Aluminum shall be of commercial quality and of proper alloy for door construction, free from defects impairing strength and/or durability.

Where aluminum extrusions are used for main frame and sash sections, they shall have a minimum ultimate tensile strength of 22,000 psi (150 MPa) and a minimum yield strength of 16,000 psi (110 MPa).

As an example, commercial alloy 6063-T5 is one of several alloys that will meet the above requirements.

1.2.2 Fasteners and Hardware

All screws, nuts, washers, bolts, rivets and other miscellaneous fastening devices and hardware incorporated in the product shall be of aluminum, stainless steel or other non-corrosive materials compatible with aluminum. Steel may be used, provided it is zinc-plated steel in accordance with ASTM B 633-85 or cadmium-plated in accordance with ASTM A 165-80 (type OS) or nickel- or chrome-plated, in accordance with ASTM B 456-85 (type SC). Counterbalancing mechanisms, when used, shall meet AAMA 902.2-87, Balance Class I.

1.2.3 Weatherstrip
Weatherstrip shall be of material compatible with aluminum and resistant to weather. Pile weatherstrip, where used, shall conform to AAMA 701.2-1974.

1.2.4 Closers and Wind Chains
All doors submitted for testing shall be equipped with a suitable closer which shall be sufficient to perform its intended function and wind chain sufficient to provide reasonable protection against wind damage.

1.3 CONSTRUCTION

1.3.1 Assembly
Doors shall be assembled in a secure manner to perform as hereinafter specified and to assure neat, weather-resistant construction. Welding of brazing flux, if used, shall be completely removed immediately upon completion of welding or brazing operation.

If sealant is used to seal mechanically fixed joints, it shall meet AAMA 803.3-85 or 809.2-85. Gaskets may be used to seal mechanically fixed joints.

Doors of laminated construction shall be sealed with sealant or other suitable gasket material at every penetration of fasteners and hardware which might be exposed to moisture. Core material shall not be trimmed so as to remove factory applied sealants, without resealing to manufacturer's factory standards.

1.3.2 Hardware, Frame
Doorframes may be equipped with satisfactory hardware to permit operation of the unit as designed and to securely latch door in closed position.

1.3.3 Maintenance
Glazed sash and glazing materials shall be designed to permit reglazing and rescreening.

1.4 FINISH

1.4.1 Exposed Surfaces
Exposed surfaces of all aluminum members shall be clean and free from serious surface blemishes. If exposed welded joints are used, they shall be dressed and finished.

1.4.2 Coatings
Pigmented organic coatings, when furnished, shall meet AAMA 603.8-85.

NOTE: *For information and further references to electrochemical and organic finishes, see Appendix.*

1.5 SCREENS

1.5.1 General
Screens shall be provided of manufacturer's standard approved design.

1.5.2 Construction
Screens not part of door frame shall have aluminum frames, either roll-formed or extruded, of suitable alloy. Where screens are made from tubular roll-formed sheet shapes, they shall comply with ANSI/SMA 1004-1976. Frames shall be of sufficient rigidity, cross-braced as required, to lie flat against the door and to prevent excessive bow in frame members, sag in screening, or open gaps between screen and door frame. Frame corners shall be firmly joined in a secure and workmanlike manner.

1.5.3 Screening
Insect or solar screening shall be of material compatible with aluminum. Aluminum screening shall conform to FS-RR-W-365. Plastic screening shall conform to ASTM D 3656-83.

1.5.4 Spline
Screen spline shall be aluminum, vinyl or material compatible with aluminum and fastened to frame in such a manner as to permit replacement of screening.

1.6 GLASS AND GLAZING MATERIALS

1.6.1 Glazing materials shall conform to ANSI Z97.1-1984 or CPSC 16 CFR 1201. Tempered glass, where used, shall meet ASTM C 1048-85 (Kind FT).

NOTE: *For additional information concerning recommended sizes and wind load information, refer to Appendix.*

Sealed insulating glass, where used, shall conform to ASTM E 774-84a, Class C or higher.

1.6.2 Conformance Tests
Products submitted for tests under Section 2 shall contain glass as per Section 1.6.1, unless otherwise stipulated in this specification. The manufacturer may select other glazing materials under the following conditions:

a) Products tested with plastic materials shall not qualify glass glazing materials, nor products tested with glass qualify plastic glazing materials.
b) Products tested with sealed insulating glass shall not qualify single glazed products.

1.6.3 Glazing

1.6.3.1 Channel-Type Gaskets, if used, shall be of material compatible with aluminum and resistant to weathering.

1.6.3.2 Glazing Beads Glazing beads or retainers of any material compatible with aluminum may be used, and if required to retain the glass, shall be of sufficient strength and fixation to serve this purpose.

1.6.3.3 Back-Bedding Materials Back-bedding materials using metal or vinyl, interior or exterior face stops shall conform to one or more of the following listed specifications:

Ductile Back-Bedding Compound	AAMA 802.3-85
Ductile Back-Bedding Glazing Tape	AAMA 804.1-85
Bonding-Type Back-Bedding Compound	AAMA 805.2-85
Bonding-Type Back-Bedding Glazing Tape	AAMA 806.1-85
Cured, Rubber Back-Bedding Glazing Tape	AAMA 807.1-85
Expanded Cellular Glazing Tape	AAMA 810.1-85

Back-bedding compounds or glazing tapes meeting these specifications may be used singly or in combination.

1.7 INSTALLATION
Manufacturer shall furnish standard details showing recommendations for installation of storm products. See Appendix for additional information.

2.0 SPECIFIC REQUIREMENTS

NOTE: *This Section contains the specific requirements applicable to particular types of aluminum storm doors. It is to be used in conjunction with Section 1.*

2.1 COMBINATION STORM DOORS (CSD-1)

2.1.1 Construction

2.1.1.1 Frames in doors with operating sash shall be constructed to permit normal movement of sash.

2.1.1.2 Meeting rails shall contact tightly with each other or with weatherstripping.

2.1.1.3 For doors with vertically operating sash, there shall be a sash latch position to provide an open space at least 1" (25 mm) but not more than 2" (50 mm) high between sash and bottom rail, or sash may have infinite (friction) positioning mechanisms, which promptly stops free fall. Upper sash must be held in place by means other than screen insert.

2.1.1.4 For doors with operating sash, sash shall be removable for cleaning.

2.1.2 Hardware
Glass-sash frames, in doors with operating sash, shall have self-activating locks or latches, or other hardware devices, designed to hold sash secure and level in ventilating positions.

2.1.3 Performance Requirements

NOTE: *Sample(s) submitted for test shall be a completely assembled door of manufacturer's standard construction, and shall contain manufacturer's standard inserts for door being tested and suitably mounted, with hinges. The sample(s) shall be of the manufacturer's largest standard size but in all cases must be at least suitable to mount in a test buck having standard inside dimensions of 3!0" (.9lm) wide x 7'8" (2.03m) high. The test buck shall have a sill pitched upward from the outside at a 7° angle. A 1" (25 mm) tolerance is permitted for leaf size of test sample. Mounting strips shall be fastened to test buck in position to place plane at outside surface of door 3 5/8" (92 mm) to 3 3/4" (95 mm) from interior edge of sloped sill. (See Page 8 for test buck design details.)*

If screen is normally provided with storm door, door shall be tested with screen in normally stored position. Test sequence shall be optional between manufacturer and testing laboratory except that, in all cases, Air Infiltration Test shall precede Water Drainage Test. Concentrated Load and Glass Adherence Tests may be performed on separate sash of identical size, design and construction as used with the test unit. In absence of any other instruction from manufacturer with regard to test sequence, laboratory shall perform all tests in order given below.

2.1.3.1 Air Infiltration Test
With door (and operating sash, if any) in the closed and latched position, the door shall be subjected to an air infiltration test in accordance with ASTM E 283-84. Air infiltration shall not exceed 3.0 cfm per sq. ft (46.5 x 10^{-4} $m^{3/s}$-m) of rough opening at a pressure of 1.57 psf (75 Pa).

2.1.3.2 Water Drainage Test
With door (and operating sash, if any) in the closed and latched position, water drainage test shall be run in accordance with ASTM E 331-86, except pressure drop shall be zero and test duration shall be three minutes. Unit shall pass if no water runs over interior edge of sloped test-buck sill.

2.1.3.3 Uniform Load Test
Door shall be subjected to a uniform load as indicated in Table No. 1 for the performance class required first the exterior pressure (positive) and then the interior pressure (negative). Sequence of applying load may be reversed at the option of the laboratory. Each load shall be maintained for 10 seconds. Tests shall be conducted in accordance with ASTM E 330-84.

At the conclusion of the test, there shall be no evidence of breakage, and door (and operating sash, if any) shall operate freely.

2.1.3.4 Rack Test
The door with all sash inserts, operating sash and screens in place, but with the latch and closer removed, shall be secured at top outermost corner in closed position. Bottom outermost corner shall be subjected to a 30 lbf (134 N) concentrated load applied perpendicular to plane of door in continually increasing manner, so as to push the frame away from the opening, within 5 seconds and maintained for 5 seconds. A calibrated spring scale or gage may be used to apply and measure load. After removal of the load, the permanent deflection on line with load application as measured at bottom outermost corner of door shall not exceed 0.250" (6.35 mm) as measured to accuracy of 0.01" (0.254 mm).

2.1.3.5 Sag Test
The door, with all sash inserts in place, and, additionally for self-storing doors, with screen insert(s) in place, but with latch and closer removed, shall be opened 90° and a total load of 40 lbf (178 N) distributed equally on both sides of lock stile at the center or latch hold position, shall be applied in a downward direction, utilizing dead weights to apply load, in a continually increasing manner in no less than 2 seconds and retained for 3 minutes. After removal of the load, permanent sag shall not exceed 0.063" (1.6 mm).

2.1.3.6 Concentrated Load and Glass Adherence Test, Sash
There shall be no disengagement of glazing surrounding members of operable sash when tested in accordance to ASTM E 987-84. The load shall be equal to the weight of the sash but in no case shall be less than 15 lbf (66.9 N)

2.1.3.7 Safety Drop Test
When glazed sash is allowed to "free fall" the maximum distance provided by latch positions, it shall automatically stop in the next lower latch position, or where friction positioning mechanisms are used, shall stop within 1" (25.4 mm) of point of release on the first attempt and the glass shall be unbroken, or if broken, all pieces retained in the insert.

NOTE: *Safety Drop Test applies only to combination storm doors with operating sash.*

2.1.3.8 Glass and Screen Inserts Squareness Test
A measure of the distances between both diagonally opposite pairs of corners of each insert with a steel measuring rule shall not exceed a difference between these measurements of more than 7.94 mm (5/16 in).

2.1.3.9 Attachment of Insect Screening to Frame Test
The amount of force required to permanently unseat screening and/or spline ,1/8" (3.18 mm) from its original seated position or to permanently move screening 2 strands shall be at least 40 lbf-in. (4.52Nm) when tested in accordance with SMA SMT-31-1967. Test shall be performed on each of 4 sides of one screen insert, at the center of the frame member.

2.1.3.10 Lamination Test
This section applies to doors consisting of a laminated core construction.

After the performance tests in Section 2.1.3, the core of the door shall be subjected to the following tests:

A 6" x 6" (152 mm x 152 mm) section of the core shall be removed from below the window sill area and the bottom edge of the kickplate area respectively. (See Page 8.) These core sections shall be sealed on the exposed edges with the same material as the manufacturer uses on the exposed edges of the door. A representative of the manufacturer should be present to audit the application of the sealant to the Core Sections.

2.1.3.10.1 Environmental Cycles and Tension Test
One sample shall then be exposed to an environmental cycle per ASTM D 1183-70 (1987) Procedure C. Upon completion of the ASTM D 1183-70 (1987) test, the sample shall be tested in accordance with ASTM C 297-61 (1980). The exposed sample shall be capable of withstanding a minimum tensile load of 10.0 psi (70 kPa) before the surface material separates from the core material.

2.1.3.10.2 Soak Test
The other sample shall be soaked horizontally under 1 " (25.4 mm) of water for 72 hours. Upon completion of the water soak test, the sample shall not increase in thickness by more than 10% or increase in weight by more than 25%.

2.2 JALOUSIE STORM DOORS (JSD-1)

2.2.1 Definition
Jalousie storm doors are those storm doors in which the glazed area consists of a series of overlapping, horizontal louvers which pivot simultaneously in a common frame and are actuated by one or more operating devices so that the bottom edge of each louver swings toward the exterior and the top edge swings toward the interior when opening. Jalousie storm doors may or may not be equipped with an auxiliary storm panel.

2.2.2 Construction
Jalousie operating sash shall be constructed to permit unobstructed movement of the louvers.

2.2.3 Louver Hardware
Pivot clips, balanced within reasonable limits, shall be provided to house ends of louvers. They shall be designed to securely hold louvers under all normal operating conditions and to prevent louvers from becoming accidentally disengaged. Clips shall be so constructed and applied to jambs that they are free pivoting and galling or abrasive action detrimental to proper operation of louvers will not occur between them and pivot faces of jambs.

2.2.4 Glass and Glazing
Glazing shall be safety-glazing material in accordance with CPSC 16 CFR 1201 at least 0.180" (4.57 mm) thick.

2.2.4.1 Storm Panels
Auxiliary storm panels, where used, shall be constructed in accordance with Section 2.1.1.4

2.2.5 Performance Requirements

NOTE: *Sample(s) submitted for test shall be a completely assembled door of manufacturer's standard construction. Sample(s) shall be manufacturer's largest standard size, with hinges, but not less than a size suitable for mounting in a test buck having standard inside dimensions of 3' 0" (.91m) wide x 7'8" (2.03m) high and a sill pitched upward from outside at a 7° angle. A 1" (2.54 cm) tolerance is permitted for leaf size of test sample. Mounting strips can be fastened to test buck in position to place plane of inside surface of door 2 1/2" (63.5 mm) from interior edge of sloped sill. (See Page 8 for test buck details.)*

Test sequence shall be optional between manufacturer and testing laboratory except that, in all cases, Air Infiltration Test shall precede Water Drainage Test. Concentrated Load and Glass Adherence Tests, Storm Panels, may be performed on a separate storm panel of identical size, design and construction as used in test unit. In absence of any other instructions from manufacturer with regard to test sequence, laboratory shall perform all tests in the following order.

2.2.5.1 Air Infiltration Test
The door shall be subjected to air infiltration tests in accordance with ASTM E 283-84. With louvers closed and screen in place, air infiltration shall not exceed 5.0 cfm per sq. ft. (82.5 x $10^{-4}m^{3/s}$-m) of rough opening at a pressure of 1.57 psf (75 Pa).

If storm panels are to be included with the door, a second air infiltration test shall be performed in accordance with ASTM E 283-84. With louvers closed and screen replaced by auxiliary storm panel, air infiltration shall not exceed 3.0 cfm per sq. ft. (46.5 x $10^{-4}m^{3/s}$-m) of rough opening at a pressure of 1.57 psf (75 Pa). Both tests must be passed for certification, but the door does not have to be equipped with storm panel to be labeled.

2.2.5.2 Water Drainage Test
Glazed unit shall be mounted in its closed position, continuously supported around outside perimeter with louvers closed. Water drainage test shall be run in accordance with ASTM E 331-86, except pressure drop shall be zero and test duration shall be three minutes. Unit is acceptable if no water runs over interior edge of sloped test buck sill. This test shall be conducted without auxiliary storm panel in place.

2.2.5.3 Uniform Load Test
Door shall be subjected to a uniform load as indicated in Table No. 1 for the performance class required first the exterior pressure (positive) and then the interior pressure (negative). Sequence of applying load may be reversed at the option of the laboratory. Louvers shall be closed and screen in place. Tests shall be repeated with screen replaced by auxiliary storm panel, if so equipped. Each load shall be maintained for 10 seconds. Tests shall be conducted in accordance with ASTM E 330-84.

At the conclusion of the test, there shall be no evidence of breakage, and door (and operating sash, if any) shall operate freely.

2.2.5.4 Rack Test
The door with all sash inserts, operating sash and screens in place, but with the latch and closer removed shall be secured at top outermost corner in closed position. Bottom outermost corner shall be subjected to a 30 lbf (134 N) concentrated load applied perpendicular to plane of door in continually increasing manner, so as to push the frame away from the opening, within 5 seconds and maintained for 5 seconds. A calibrated spring scale or gage may be used to apply and measure the load. After removal of the load, the permanent deflection on line with the load application as measured at bottom outermost corner of door shall not exceed 0.250" (6.35 mm) as measured to accuracy of 0.01" (0.254 mm).

2.2.5.5 Sag Test
The door, with all sash inserts in place, and, additionally for self-storing doors, with screen insert(s) in place, but with latch and closer removed, shall be opened 90° and a total load of 40 lbf (178 N) distributed equally on both sides of lock stile at the center or latch hole position, shall be applied in a downward direction, utilizing dead weights to apply load, in

continually increasing manner in no less than 2 seconds and retained for 3 minutes. After removal of the load, permanent sag shall not exceed 0.063" (1.6 mm).

2.2.5.6 Concentrated Load and Glass Adherence Test, Storm Panel
There shall be no disengagement of glazing members of operable sash when tested in accordance to ASTM E 987-84. The load shall be equal to the weight of the sash but in no case shall be less than 15 lbf (66.9 N).

2.2.5.7 Storm Panel and Screen Squareness Test
A measure of the distances between diagonally opposite pairs of corners of storm panel and of screen with a steel measuring rule shall not exceed a difference between these measurements of more than 5/16" (7.938 mm).

2.2.5.8 Attachment of Insect Screening to Frame Test
The amount of force required to permanently unseat screening and/or spline 1/8" (3.18 mm) from its original seated position or to permanently move screening 2 strands shall be at least 40 lbf-in. (4.52 N-m) when testing in accordance with SMA-SMT 31-1967. Test shall be performed on each of 4 sides of the screen, at the center of frame member.

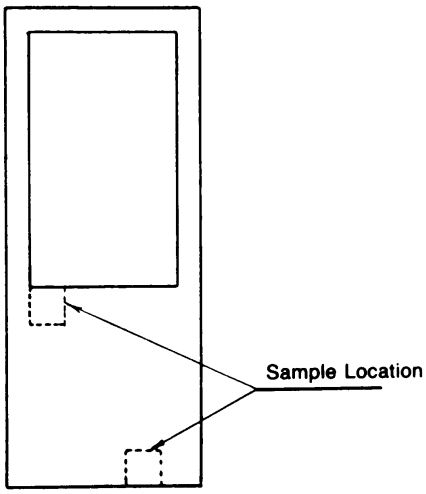
2.2.5.9 Lamination Test
This section applies to doors consisting of a laminated core construction.

After the performance tests in Section 2.1.3, the core of the door shall be subjected to the following tests:

A 6" x 6" (152 mm x 152 mm) section of the core shall be removed from below the window sill area and the bottom edge of the kickplate area respectively. These core sections shall be sealed on the exposed edges with the same material as the manufacturer uses on the exposed edges of the door. A representative of the manufacturer should be present to audit the application of the sealant to the core sections.

2.2.5.9.1 Environmental Cycles and Tension Test
One sample shall then be exposed to an environmental cycle per ASTM D 1183-70 (1987), Procedure C. Upon completion of the ASTM D 1183-70 (1987) test, the sample shall be tested in accordance with ASTM C 297-61 (1980). The exposed samples shall be capable of withstanding a minimum tensile load of 70 kPa (10 psi) before the surface material separates from the core material.

2.2.5.9.2 Soak Test
The other sample shall be soaked horizontally under 25.4 mm (1 in) of water for 72 hours. Upon completion of the water soak test, the sample shall not increase in thickness by more than 10% or increase in weight by more than 25%.



APPENDIX

NOTE: *This Appendix is not part of this American National Standard. It is included for informational purposes only.*

FINISHES
Aluminum possesses a silvery, bright and clean-looking natural finish.

This inherent finish-an ever present, usually transparent, inert surface coating of aluminum oxide-protects aluminum against most atmospheric corrosion. Consequently, architectural aluminum products provide long life with little, if any, maintenance.

Atmospheric conditions may, however, affect the surface appearance of natural aluminum by superficial roughening and soiling. If appearance and/or color other than natural aluminum is a primary consideration, organic coatings may be applied to aluminum.

ORGANIC FINISHES
These include paints, enamels and lacquers. Enamel, which may be of either the air-drying or baking type, are the most versatile of these applied finishes. Baked enamel is most frequently used for shop application where it is cured under carefully controlled conditions. A wide range of colors is achieved through pigmentation. Pigmented organic coatings must meet AAMA 603.8-85.

For further detailed information concerning anodic finishes and organic coatings, the following publications should be consulted.

AAMA 603.8-85, “Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum"

AAMA 604.2-1977, “Voluntary Specification for Residential Color Anodic Finishes"

AAMA 605.2-85, "Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels"

AAMA 606.1-1976, "Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum"

AAMA 607.1-1977, "Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum"

AAMA 608.1-1977, “Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic finishes for Architectural Aluminum”

AAMA CW #1-9, “Aluminum Curtain Wall Design Guide Manual”

Aluminum Association’s, “Designation systems for Aluminum Finishes”

PROTECTION DURING INSTALLATION
Aluminum storm doors are actually “finished" building products and, like lighting fixtures or bathroom fixtures, should be treated accordingly. All trades should exercise care during the handling and installation of all aluminum building products. For further detailed information consult AAMA CW #10, "Care and Handling of Architectural Aluminum from Shop to Site"

ERECTION
Storm doors shall be installed in accordance with ASTM E 737-84, "Standard Practice for Installation of Storm Windows, Replacement Windows, Multi-Glazing, Storm Doors and Replacement Doors," with the following exceptions:

Section 5.2 and 11.1.6-ANSI Z 97.1-1984 shall also be met.

Section 11.2.11 – Applies to sealing of surfaces between storm door frame and master frame.

PERFORMANCE REQUIREMENTS
The performance requirements included in Section 2 of this Specification were developed by AAMA for use by the entire architectural aluminum industry after carrying out experimental tests and observing performance under actual installation conditions over a period of many years. These performance requirements were established in preference to specifically designated physical characteristics. Those required of all products are highlighted below:

AIR INFILTRATION
The standard method of expressing air infiltration for storm doors is in cubic feet per minute (cfm) per square foot of area [cubic meters per second (m^3/s) per square meter (m^2) of area.]

The static pressure and wind velocity relationship is expressed mathematically by the formula:

$P = 0.00256V^2$

Where:
P = pressure, lbf/ft^2, on a flat surface normal to the wind direction.
V = wind velocity, mph

or

$P = 0.0473V^2$

Where:
P = pressure, Pa on a flat surface normal to the wind direction.
V = wind velocity, Km/hr

Field air infiltration tests performed in accordance to ASTM E 783-84 may result in air infiltration rates up to 1.5 times specified values excluding air leakage associated with installation such as leaks between the unit and adjacent construction.

WATER RESISTANCE
Resistance to water leakage can be an important consideration in the appearance and maintenance of the product and surrounding areas and, in some cases, the control of humidity.

The test method used by AAMA for determining water resistance is ASTM E 331-86. This nationally recognized standard requires the uniform application of water against the exterior surface of the product at a rate of 5 gallons per square foot per hour. This rate corresponds to a rainfall of 8" per hour. The severity of this test is seen when it is realized that, according to Technical Paper No. 40 on rainfall frequency published by the National Weather Service (formerly the U.S. Weather Bureau), the greatest rainfall expected anywhere in the contiguous 48 United States for a one-hour period during a span of 50 years is less than 5" per hour.

Since excessive water leakage may jeopardize furnishings and equipment, it is important to design and select products that will not permit significant leakage under normal service conditions. It is generally accepted, however, that water leakage can be tolerated during periods combining high winds and heavy rains.

UNIFORM LOAD
The pressure exerted by the wind on a wall component is assumed to be uniformly distributed across the surface of the product. Its magnitude is dependent on such factors as the geographical location, shape and surroundings of the building as well as height of the product above grade and its location within the wall.

The jurisdiction where the doors will be installed should be contacted to determine the wind load requirements that have been adopted and are enforced. For additional information on wind loads on buildings the following publications should be consulted:

AAMA CW #11, "Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing"

ANSI A58.1-1982, "Minimum Design Loads for Buildings and Other Structures"

The velocity pressure to determine the design pressure in the Load Table has been computed using the following equation:

$VP = 0.00256\ K_z(IV)^2$

Where:
V = Wind velocity (mph) from map on page 11. The wind velocity values on the map are based on a 50-year mean recurrence interval at an elevation of 33 ft (10m) above ground and exposure category C is described as follows:
I = The "Importance Factor" as described in ANSI A58.1-1982. A value of 1.0 was used for the load table.
K_z = "Velocity Pressure Exposure Coefficient" as described in ANSI A58.1-1982 and is dependent upon the height above ground level and the exposure category. Exposure C was used for the Load Table.

AAMA herewith defines Design Pressure, (DP), as follows:

DP=1.25VP

This allows for a shape factor, gust factor, or a combination of the two, of 25%.

The local building codes should be reviewed by the specifying authority to determine the required adjustments to the design pressures given in the tables due to building shape and edge effects, other exposures, etc., not included in the Table.

It is the responsibility of the specifier to stipulate the required Design Pressure in the specifications for each project. In the absence of this information, product manufacturers will be unable to properly bid in accordance with the desires or needs of the architect or owner.

Further, AAMA defines Uniform Load Structural Test Pressure, (STP) as:

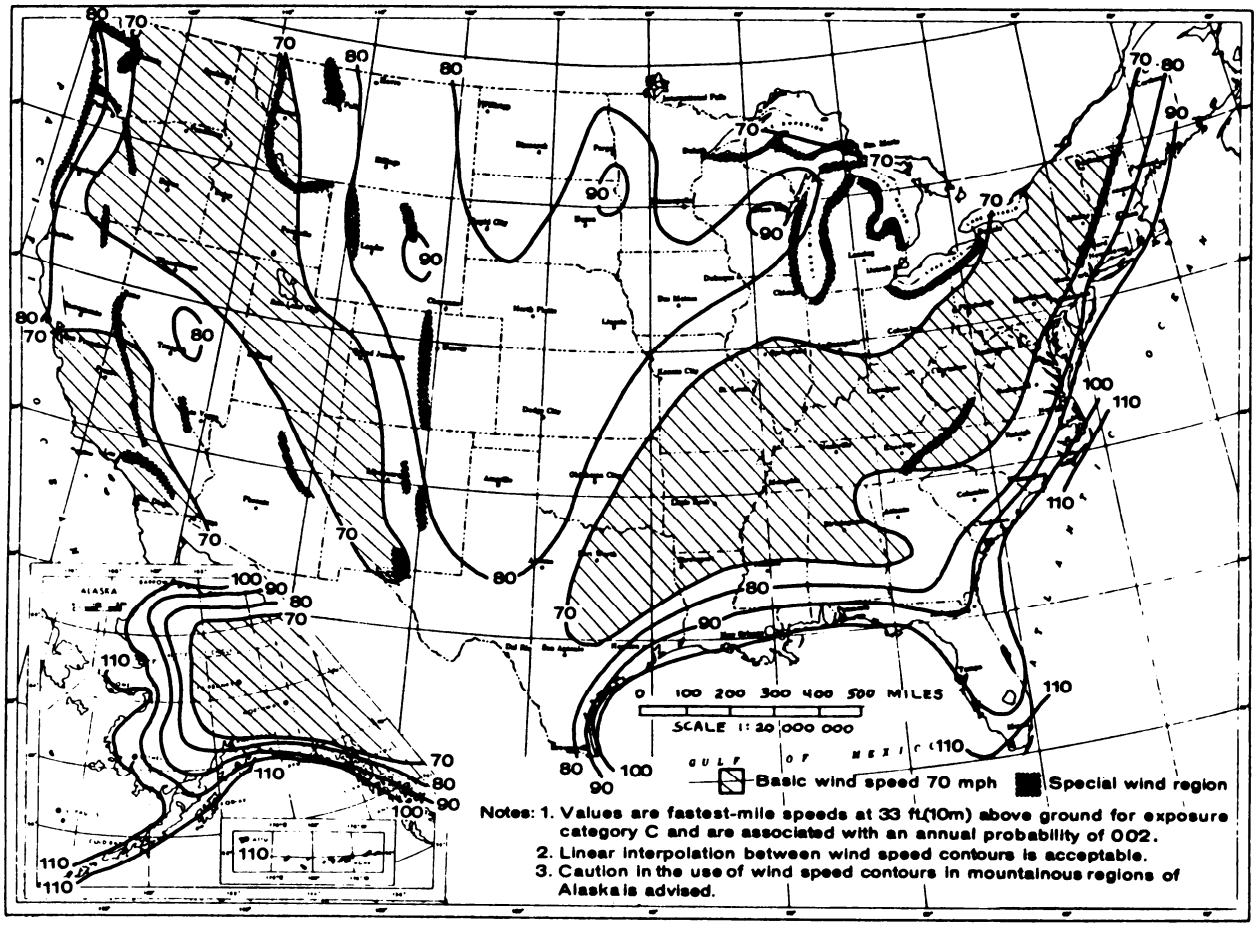
STP = 1.5DP

This provides a safety factor by requiring that the product be tested for resistance to wind loads at a pressure equal to 150% of the Design Pressure.

Those wishing to use higher values than those indicated above for Design Pressure or for air infiltration, water drainage and/or uniform loading may select and specify pressures satisfactory to them.

WIND VELOCITY MAP
The map included in this Appendix has been reproduced from ANSI A58.1-1982. It shows the maximum-expected wind velocity (on a 50-year mean recurrence basis) in the form of isotachs in 10-mph increments from 70 to 110 mph. These velocities are for a uniform elevation of 33' above grade and for exposure C which is defined as open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat, open country and grasslands.

Wind Velocity Map
Basic Wind Speed (miles per hour)



HOW TO USE LOAD TABLE

1. Determine elevation above grade h in feet at center line of window under consideration. If elevation thus determined falls between values given in Table, round off to next higher elevation listed.

2. Using Wind Velocity Map below, select wind velocity at 33 feet elevation for geographical location of the building. If location falls between isotache, use higher 10 mph increment.

3. Enter Load Table in left hand column at elevation resulting from Step 1 and move horizontally to column for Wind Velocity determined in Step 2.

4. Read off Design Pressure required and check against performance class for product under consideration.

LOAD TABLE

The Load Table in the Appendix is offered as a convenience.

The Table provides pre-computed Design Pressures, DP for numerous elevations above grade corresponding to wind velocities from 70 mph through 120 mph at the 33' elevation as shown on the Wind Velocity Map.

Load Table
Wind Velocity – 33 Foot Elevation – From Wind Velocity Map

Elevation above Grade in feet (m)	DESIGN PRESSURE IN PSF (KPA)					
	70 MPH (113 km/h)	80 MPH (129 km/h)	90 MPH (145 km/h)	100 MPH (161 km/h)	110 MPH (177 km/h)	120 MPH (193 km/h)
0-15 (0-4.6)	12.5 (.60)	16.4 (.79)	20.8 (.99)	25.6 (1.23)	31.0 (1.49)	36.9 (1.76)
20 (6.1)	13.6 (.63)	17.9 (.85)	22.5 (1.08)	27.9 (1.34)	33.8 (1.61)	40.1 (1.93)
25 (7.6)	14.6 (.70)	19.0 (.91)	24.1 (1.15)	29.8 (1.43)	36.0 (1.73)	42.9 (2.05)
30 (9.1)	15.4 (.74)	20.1 (.96)	25.4 (1.21)	31.4 (1.50)	38.0 (1.83)	45.1 (2.16)
40 (12.2)	16.6 (.80)	21.8 (1.04)	27.5 (1.31)	33.9 (1.63)	41.0 (1.96)	48.9 (2.34)
50 (15.2)	17.8 (.85)	23.1 (1.11)	29.3 (1.40)	36.1 (1.73)	43.8 (2.10)	52.1 (2.50)
60 (18.3)	18.6 (.89)	24.4 (1.16)	30.9 (1.48)	38.1 (1.83)	46.1 (2.21)	54.9 (2.63)
70 (21.3)	19.5 (.94)	25.4 (1.21)	32.1 (1.54)	39.6 (1.90)	48.0 (2.30)	57.1 (2.74)
80 (24.4)	20.3 (.98)	26.4 (1.26)	33.5 (1.60)	41.2 (1.98)	50.0 (2.40)	59.5 (2.85)
90 (27.4)	21.0 (1.00)	27.5 (1.31)	34.8 (1.66)	42.9 (2.05)	51.9 (2.49)	61.8 (2.96)
100 (30.5)	21.6 (1.04)	28.3 (1.35)	35.8 (1.71)	44.1 (2.11)	53.5 (2.56)	63.8 (2.96)
120 (36.5)	22.7 (1.09)	29.8 (1.43)	37.6 (1.80)	46.4 (2.23)	56.1 (2.69)	66.9 (3.20)
140 (42.7)	23.9 (1.14)	31.1 (1.49)	39.4 (1.89)	48.6 (2.33)	58.9 (2.83)	70.0 (3.35)
160 (48.8)	24.8 (1.19)	32.4 (1.55)	41.0 (1.96)	50.6 (2.43)	61.1 (2.93)	72.9 (3.49)
180 (54.9)	25.6 (1.23)	33.4 (1.60)	4.23 (2.03)	52.1 (2.50)	63.3 (3.03)	75.1 (3.60)
200 (61.0)	26.4 (1.26)	34.4 (1.65)	43.5 (2.09)	53.8 (2.58)	65.0 (3.11)	77.4 (3.70)
250 (76.2)	28.1 (1.35)	36.6 (1.75)	46.4 (2.23)	57.3 (2.74)	69.4 (3.33)	82.5 (3.95)
300 (91.4)	29.5 (1.41)	38.5 (1.84)	48.8 (2.34)	60.1 (2.88)	72.8 (3.49)	86.3 (4.13)
350 (106.7)	30.9 (1.48)	40.4 (1.94)	51.1 (2.45)	63.0 (3.01)	76.3 (3.65)	90.8 (4.35)
400 (121.9)	32.1 (1.54)	42.6 (2.04)	53.1 (2.45)	65.6 (3.14)	79.4 (3.80)	94.5 (4.53)
450 (137.2)	33.3 (1.59)	43.4 (2.08)	55.0 (2.64)	67.9 (3.25)	82.1 (3.94)	97.8 (4.68)
500 (152.4)	34.3 (1.64)	44.6 (2.14)	56.5 (2.70)	69.8 (3.34)	84.4 (4.04)	100.5 (4.81)

QUALIFICATION OF DOOR MODELS FOR CERTIFICATION

1. For aluminum combination storm doors using parts identical in cross section and materials for outside frame, cross bars, glass and screen inserts having identical corner construction and regardless of cross bar placement test results and approval of one such door shall apply to all door models in the same identical group.

2. For designation purposes, door "groups" covered in Item 1 above are as follows:
   a. 1 inch thick door – 2 inch face
   b. 1 inch thick door – 24 1/2 inch face
   c. 1 3/4 inch thick door – 2 inch face
   d. 1 3/4 inch thick door – 2 1/2 inch face
   e. Self-storing doors
   f. Jalousie doors

3. If a manufacturer uses both a Z-bar and an expander arrangement for attachment of door to house jambs, both hinge arrangements must be tested.

4. If a manufacturer makes two or more of the following door models, the order of testing shall be as follows:
   a. 1-lite
   b. 1 ½-lite
   c. Equal-lite
   d. 3-lite
   e. "Colonial"
   f. "Decorator"

5. If, in the opinion of the Validator, engineering changes are apparent that would improve (rather than detract from) performance of the door as tested, a Request for Waiver of Retest shall be granted.

For copies of specifications and standards referenced herein, contact the respective organizations listed below:

AAMA Specifications:

American Architectural Manufacturers Association*
1827 Walden Office Square, Suite #550
Schaumburg, IL 60173
Phone: 847/303-5664
Fax: 847/303-5774
E-mail: webmaster@aamanet.org
Web Site: www.aamanet.org

ANSI Standards:*
American National Standards Institute, Inc.
1430 Broadway
New York, NY 10018
Phone: (212) 642-4900

ASTM Standards:
American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103
Phone: (215) 299-5400

GSA (Federal) Specifications:
Contact nearest Regional Office of General Services Administration or Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
Phone: (202) 541-3000

SMA Specifications:
Screen Manufacturing Association
566 Irving Park Rd. - Suite 201 Park Place
Chicago, IL 60613
Phone: (312) 565-2644

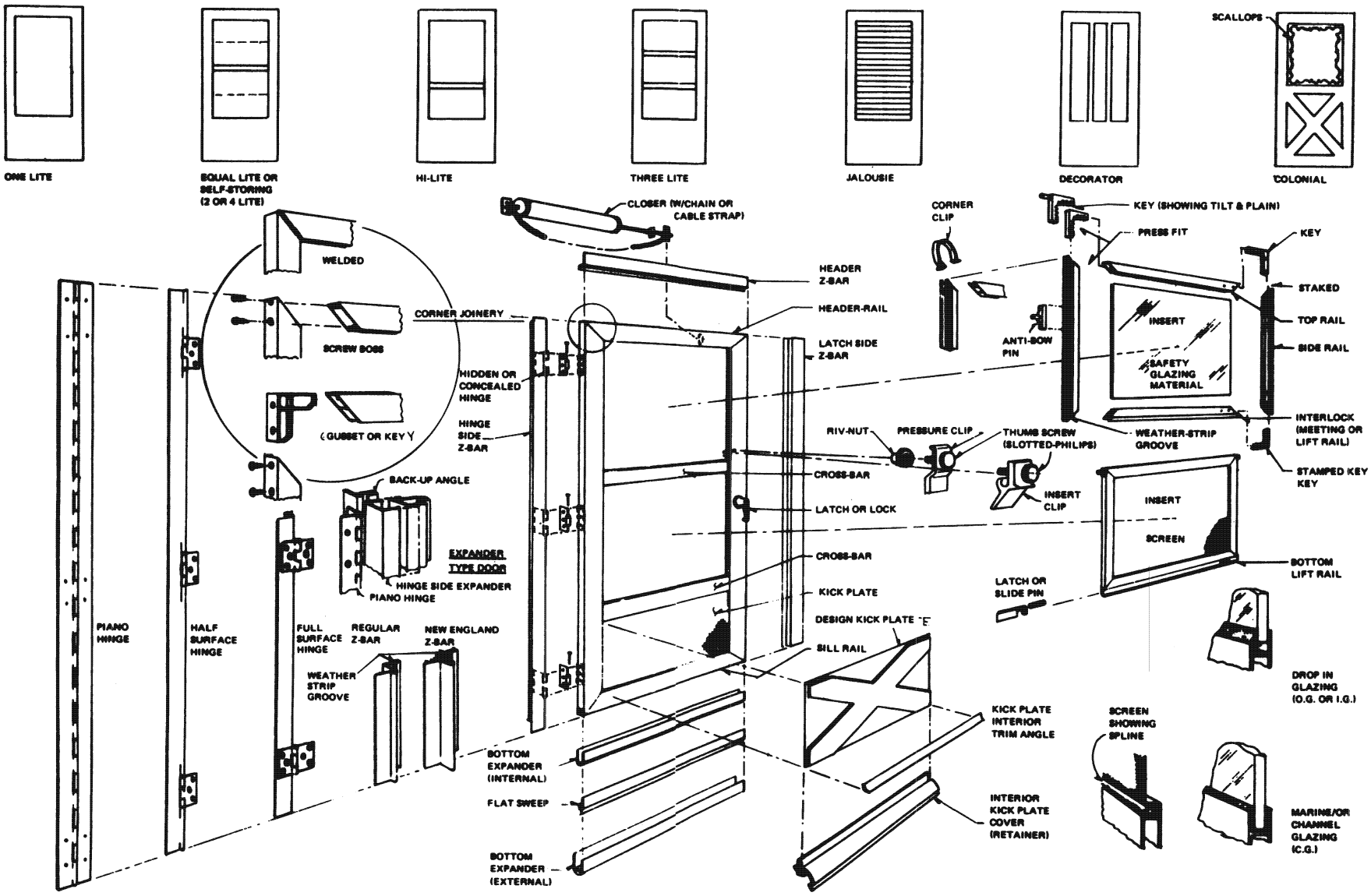
CPSC Standards:
Consumer Product Safety Commission
Washington, D.C. 20036

*The following ANSI standards are also available from AAMA.

AAMA 101-88, "Voluntary Specifications for Aluminum Prime Windows and Sliding Glass Doors"

ANSI/AAMA 1002.10-83, "Voluntary Specifications for Aluminum Insulating Storm Products for Windows and Sliding Glass Doors"

(AAMA does not, however, maintain stocks of any other ANSI Standards nor of any of the other reference standards.)



Illustrated Glossary

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