

GUIDE SPECIFICATION

Manufacturer:

U.S. Aluminum

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SECTION 08 44 13 GLAZED ALUMINUM CURTAIN WALLS Series 2202 & 2202SG High Performance

This guide specification has been prepared by U.S. Aluminum in printed and electronic format as an aid to specifiers in preparing written construction documents for glazed aluminum curtain wall systems.

This section includes aluminum exterior curtain wall systems for multi-story cladding, shop fabricated, factory pre-finished.

Section 01 41 10 is intended for use along with this section; coordinate requirements accordingly.

Sealants are referenced in Section 07 92 00, Joint Sealants.

Glass and glazing are referenced in Section 08 81 00, Glass and Glazing.

Firestopping is referenced in Section 07 27 00.

Where a storefront or slope glazed system integrates with curtain wall system, carefully coordinate both sections to function together, or alternately include extracts from sections 08 41 13 and 08 44 13 in this section as appropriate.

Refer to AAMA Curtain Wall Design Guide Manual for description of the rain screen principle and pressure equalized wall design. Rain screen is usually used on sophisticated curtain walls in northern climates.

Edit entire master to suit project requirements. Modify or add items as necessary. Delete items which are not applicable. Words and sentences within brackets [] reflect a choice to be made regarding inclusion or exclusion of a particular item or statement. This section may include performance, proprietary and descriptive type specifications. Edit to avoid conflicting requirements.

Editor notes are included within the text of this section to assist the Specifier in knowledgeable decision-making.

This guide specification is written using imperial measurements with metric conversions in parentheses behind. These may be switched or one may be deleted to suit project requirements. The conversion to metric is "soft" in the fact that rounding was utilized to the nearest unit.

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Conditions of the Contract, Division 1 - General Requirements, and Drawings apply to Work of this Section.

Edit this paragraph to briefly describe the contents of the section. After editing section, refer back to this paragraph to verify no conflicts exist.

- B. Section Includes:
1. Aluminum curtain wall systems, complete with reinforcing, shims, anchors and attachment devices.
 2. Accessories necessary to complete Work.

This document incorporates CSI (Construction Specifications Institute) Manual of Practice and MasterFormat (2011 edition) principles of cross referencing to Division 1 sections and other sections. The cross references must be edited to retain only those other sections used. Other guide specifications for U.S. Aluminum products include:

Section 08 32 13 - Aluminum Framed Mall Sliding Doors

Section 08 41 13 - Aluminum - Framed Entrances and Storefronts

Section 08 42 36 - Aluminum Balanced Entrances

Section 08 43 29 - Aluminum Elephant Sliding Storefront System

Section 08 43 13 - Aluminum - Framed Window Walls

Section 08 05 13 - Aluminum Windows

Section 08 70 00 - Hardware

- C. Related Sections:

1. Section 08 80 00 - Glazing
2. Section 08 41 13 - All Glass Entrances.
3. Section 08 42 33 - Revolving Entrance Doors.
6. Section 08 43 13 - Aluminum Framed Storefronts and Window Walls.
7. Section 08 71 00 - Door Hardware
8. Section 08 81 00 - Glass and Glazing
9. section 08 44 33 - Slope Glazed System
10. Section 12 51 00 - Horizontal Louvers

List reference standards that are included within the text of this section. Edit the following as required for project conditions.

1.2 REFERENCES

- A. Aluminum Association (AA):
 - 1. DAF-45 Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association (AAMA):
 - 1. Aluminum Curtain Wall Design Guide Manual.
 - 2. 501.2 Field Check of Metal Curtain Walls for Water Leakage.
 - 3. 503.1 Test Method for Condensation Resistance of Windows, Doors and Glazed Wall Systems.
 - 4. 605.2-92 Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - 5. 607.1 Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
 - 6. 608.1 Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
 - 7. 701.2 Specifications for Pile Weatherstripping.
 - 8. Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.
- C. American National Standards Institute (ANSI):
 - 1. Z97.1 Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- D. American Society for Testing and Materials (ASTM):
 - 1. A36 Structural Steel.
 - 2. B209 Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. B221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 - 4. B308 Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
 - 5. C509 Cellular Elastomeric Pre-formed Gasket and Sealing Material.
 - 6. C864 Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers.
 - 7. C920 Elastomeric Joint Sealants.
 - 8. E283 Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
 - 9. E330 Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 - 10. E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- E. Federal Specifications (FS):
 - 1. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.
- F. Flat Glass Marketing Association (FGMA):
 - 1. Glazing Manual.

Use this article carefully; restrict statements to identify system performance requirements or function criteria only. Delete paragraphs not appropriate to project.

1.3 SYSTEM REQUIREMENTS

- A. General Standard: In addition to requirements shown or specified, comply with applicable provisions of Aluminum Curtain Wall Design Guide Manual for design, materials, fabrication and installation of component parts.
- B. Design Requirements:
 - 1. Metal stick framed systems with interior and exterior exposed metal framing.
 - 2. System manufacturer shall provide curtain wall systems, including necessary modifications to meet specified requirements and maintaining visual design concepts.
 - 3. Fabricate glazing systems for [interior] [exterior] glazing at vision areas and [interior] [exterior] glazing at spandrel areas.
 - 4. Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
 - 5. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
 - 6. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
 - 7. Do not assume glass, sealants and interior finishes contribute to framing member strength, stiffness or lateral stability.
 - 8. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
 - 9. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
 - 10. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
 - 11. Allow for expansion and contraction without detriment to appearance or performance.
 - 12. System shall drain to the exterior of system any water entering system.
 - 13. Provide concealed fastening.

14. Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of Architect.
15. Provide uniform color and profile appearance at components exposed to view.

Retain item below when structural silicone glazing is utilized.

16. [Stresses placed on structural silicone sealants shall be kept within sealant manufacturer's recommended maximum.]
17. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

Coordinate performance requirements with section 01400.

In C1 below, 6.24 psf (300 Pa) is equal to a 50 mph (80 km/h) wind. Air infiltration requirements for all U.S. Aluminum curtain wall systems meet 0.06 cfm/sq. ft (0.0003 m³/sm²). Specify test pressure for C2 below based on system selected.

Series 2202 meets 15.0 psf (700pa.)

C. Performance Requirements:

1. Air infiltration: Air leakage shall not exceed 0.06 cfm per square foot (0.0003 m³/sm²) of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf (300 Pa).
2. Water infiltration: No uncontrolled water penetration when tested in accordance with ASTM E 331 at test pressure of 15 psf (700Pa), or 20 percent of full positive design wind load, whichever is greater.

Coordinate wind loads with applicable building code, or appropriate wind loads may be determined by using ANSI A58.1-1982, "Minimum Design Loads for Buildings and Other Structures".

An allowable deflection less than 1/175 of clear span is industry standard. Smaller deflections will often require use of heavier cross sections or internal reinforcements.

Edit following paragraph accordingly. Coordinate provisions with Section 01400.

D. Structural Requirements:

1. Wind loading:
 - a. Basic zones: Resist wind pressure of [] psf ([] Pa) psf positive and [] psf ([] Pa) psf negative.
 - b. Corner zones: Resist wind pressure of [] psf [] Pa) psf positive and [] psf [] Pa) negative for areas extending []

- feet (M [____]) feet from corners.
- c. [Parapet zones: Resist wind pressure [____] psf ([____] Pa) positive and [____] psf ([____] Pa) negative.]
 2. Deflection under uniform loading: When tested in accordance with ASTM E330 at design pressure, maximum deflection of exterior member shall not exceed 1/175 of span.
 3. Deflection of members parallel to the plane of the wall, when carrying its full dead load, shall not exceed an amount that will reduce glass bite by less than 75 percent of the design dimension and shall not reduce edge clearance between itself and the panel, glass or other fixed member immediately below to less than 1/8 inch (3.2 mm).
 4. Do not regard points of contraflexure as lateral braces or as end points of unbraced length; unbraced length is actual distance between effective lateral braces as defined above.
 5. Where framing member reaction is resisted by continuous element, maximum assumed effective length of the resisting element is 4 times bearing length, but not more than 12 inches (305 mm).
- E. Seismic Loads: Provide glazed aluminum curtain wall system, including anchorage, capable of withstanding the effects of earthquake motions. The curtain wall system shall exceed maximum seismic lateral displacement requirements specified in section 1628.8.2 of the Uniform Building Code, 1994 edition. Upon successful completion of Phase I seismic testing, the curtain wall shall once again be subjected to a must successfully pass the specified air and water tests before proceeding to Phase II seismic testing.
- F. Thermal Requirements: Framing systems shall accommodate expansion and contraction movement due to surface temperature differential of 180 degree Fahrenheit (82 degree Celsius) without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance or other detrimental effects.
- G. [Laboratory Testing: Refer to Section 01400 for requirements.]
- H. [Interface:
1. Furnish inserts and anchoring devices which need to be preset and built into structure to appropriate trade.
 2. Supply on timely basis to avoid delay in Work.
 3. Instruct other trades of proper location and position.
 4. Furnish setting drawings, diagrams, templates and installation instructions.]

Include submittal requirements below which are consistent with scope of project and extent of work of this section. Only request submittals which are absolutely necessary.

1.4 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
- B. Product Data:
 1. Submit manufacturer's descriptive literature for each manufactured product.

2. Include information for factory finishes, accessories and other required components.

Retain item below when manufacturer's standard colors are specified for pigmented finishes; coordinate with finish article.

3. [Include color charts for finish indicating manufacturer's standard colors available for selection.]
- C. Shop Drawings:
1. Submit drawings indicating elevations, detailed design, dimensions, member profiles, joint locations, arrangement of units and member connections.
 2. Show following items:
 - a. Details of special shapes.
 - b. Reinforcing.
 - c. Anchorage system.
 - d. Interfacing with building construction.
 - e. Provisions for expansion and contraction.
 - f. [Thermal breaks.]
 3. Indicate typical glazing details, [locations of various types and thickness of glass] [, emergency breakout locations,] and internal sealant requirements as recommended by sealant manufacturer.
 4. Clearly indicate locations of exposed fasteners and joints for Architect's acceptance.
 5. Clearly show where and how manufacturer's system deviates from Contract Drawings and these Specifications.
- D. [Mock-up Drawings: Submit drawings for mock-ups; refer to Section 01400 for mock-up requirements.]

Retain data within brackets in first subparagraph when pigmented finish is specified; coordinate with article 2.07.

- E. Samples:
1. Submit samples indicating quality of finish, in required colors, on alloys used for work, in sizes as standard with manufacturer.
 2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
 3. [Submit samples of structural glazing gaskets, 12 inch (300 mm) lengths.]

Following paragraph permits option to submit results of pre-tested existing fixed curtain wall designs. Retain when applicable.

- F. [Test Reports: Submit certified copies of previous test reports by independent laboratory substantiating performance of system. Include other supportive data as necessary.]
- G. Certificates:
1. Submit manufacturer's certification stating that installed system is in

compliance with specified requirements.

- H. Qualification Data:
 - 1. Submit installer qualifications verifying years of experience.
 - 2. Include list of projects having similar scope of work identified by name, location, date, reference name and phone number.
- I. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.
- J. Warranty: Submit specified warranties.

Include quality assurance requirements consistent with size and scope of project and extent of work of this section. Edit following article accordingly.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. To ensure quality of appearance and performance, obtain materials for each system from either a single manufacturer or from manufacturer approved by each system manufacturer.
- B. Installer Qualifications: Certified in writing by Contractor as qualified for installation of specified systems.
- C. Perform Work in accordance with manufacturer's written instructions.
- D. Conform to requirements of ANSI A117.1 and local amendments.

Depending on scope of work, mock-ups may not be required; retain and edit following article accordingly. Ensure section 01400 includes details for each mock-up required.

1.6 [MOCK-UPS

- A. Visual Mock-up: Provide mock-up to demonstrate visual features and workmanship; refer to Section 01400 for requirements.
- B. Test Mock-up: Provide mock-up for laboratory testing; refer to Sections 01400 for requirements. [Visual mock-up must be approved by Architect prior to construction of test mock-up.]]

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of Section 01600.
- B. Protect finished surfaces to prevent damage.
- C. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
- D. Do not leave coating residue on surfaces.

1.8 PROJECT CONDITIONS

- A. Ensure ambient and surface temperatures and joint conditions are suitable for installation of materials.

Contractor's statutory one-year warranty may be sufficient and following article can be deleted. U.S. Aluminum offers, at no additional cost, a 2 year warranty on products and materials, and a lifetime warranty on door corner construction. When special coatings, insulating glass, or high quality applications are specified or owner has requested an extended warranty, retain following article. Edit article commensurate with project

1.9 WARRANTY

- A. Provide warranties in accordance with Section 01700.
- B. Provide written manufacturer's warranty, executed by company official, warranting against defects in materials and products for 2 years from date of Substantial Completion. Warrant door corner construction for the life of the project.
- C. [Provide written installer's warranty, warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within [2] [] years from date of Substantial Completion.
 - 1. Warranty shall cover following:
 - a. Complete watertight and airtight system installation within specified tolerances.
 - b. Completed installation will remain free from rattles, wind whistles and noise due to thermal and wind pressure.
 - c. System is structurally sound and free from distortion.
 - d. Glass and glazing gaskets will not break or "pop" from frames due to design windload pressure, expansion or contraction movement, or structural loading.
 - e. Glazing sealants and gaskets will remain free from abnormal deterioration or dislocation due to sunlight, weather or oxidation.]

Delete paragraph below if high performance fluoropolymer finish is not used.

- D. Provide written warranty stating organic coating finish will be free from fading more than 10%, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer's descriptive standards for 5 years from date of Substantial Completion and agreeing to promptly correct defects.

Delete paragraph below if thermal barrier framing system is not used. This 2 year warranty is offered by U.S Aluminum, exclusively.

- E. Provide a written thermal integrity warranty for 2 years from date of Substantial Completion against thermal barrier system failure resulting from the following:
 - 1. Longitudinal and transverse thermal barrier shrinkage.
 - 2. Thermal barrier cracking.
 - 3. Structural failure of the thermal barrier material.
 - 4. Loss of adhesion or loss of prescribed edge pressure on glazing material resulting in excessive air and water infiltration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

In this article, list the manufacturers acceptable for this project.

A. Subject to compliance with requirements indicated, provide products by one of the following:

1. **U.S. Aluminum**

2450 E. Vernon Ave Los Angeles, California 90058-1802

Toll Free Phone: (800) 262-5151 Phone: (323) 268-4230

Toll Free Fax: (866) 262-3299

Email: usalum@crlaurence.com

www.usalum.com

B. Substitutions: Submit under provisions of Section 01 60 00, a minimum of 10 days prior to bid date.

When specifying manufacturer's standard product or manufacturer's standard product with modifications, describe using manufacturer's name and model numbers.

Refer to U.S. Aluminum technical literature for additional information.

C. Acceptable Systems:

Series 2202 & 2202SG High Performance Curtain Wall Systems are Thermally Broken by A continuous Thermal Spacer interlocked with pressure plates and our Fill and Debridge Technology. The 2202 is fully captured and the Series 2202SG is vertically Structural Glazed.

D. Thermal Performance Glazing Selection Charts:

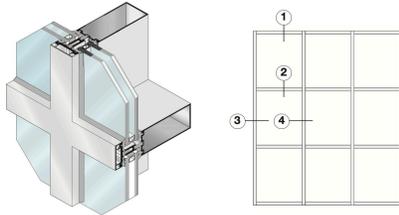
THERMAL PERFORMANCE - GLAZING SELECTION CHART

Contact CRL-U.S. Aluminum Technical Sales at (800) 262-5151 in the U.S. or Canada, or (323) 588-1281 (International). Ask for Extension 5305. Additional product details are available online at crlaurence.com/curtain-walls.

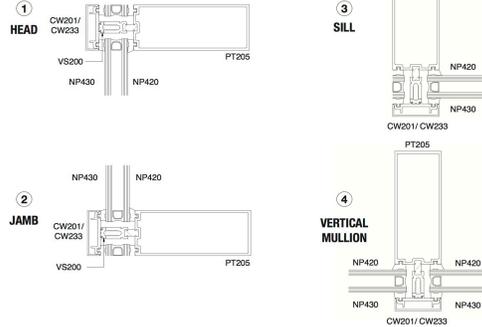


Series 2202 Curtain Wall

Below are various insulating glazing assemblies and spacer combinations that will provide this system with U-factors ranging from a low of 0.24 to a high of 0.58. If your particular combination of glazing and spacer isn't shown, please contact a CRL-U.S. Aluminum Technical Sales Representative and initiate a request. One of our on-staff thermal simulation engineers will conduct the calculations and return a report that can be utilized for bidding and design purposes.



TYPICAL DETAILS:



GLAZING ASSEMBLY - 1" INSULATING	CENTER OF GLAZING U-FACTOR ³	CENTER OF GLAZING SHGC ⁶	CENTER OF GLAZING VT ⁶	SPACER	OVERALL SYSTEM U-FACTOR ⁵	OVERALL SYSTEM SHGC ⁶	OVERALL SYSTEM VT ⁶
1/4" SunGuard SNX 62/27 Clear ¹ / 1/4" Xenon / Heat Mirror 77 Film / 1/4" Xenon / 1/4" SunGuard IS 20 Clear ²	0.09	0.20	0.48	Super Spacer	0.24	0.19	0.44
1/4" SunGuard SNX 62/27 Clear ¹ / 1/2" Xenon / 1/4" SunGuard IS 20 Clear ²	0.18	0.25	0.60	Stainless	0.32	0.24	0.55
1/4" Solarban 70XL Starphire ¹ / 1/2" Argon / 1/4" Clear	0.24	0.27	0.64	Stainless	0.37	0.26	0.59
1/4" Solarban 60 Clear ¹ / 1/2" Argon / 1/4" Clear	0.24	0.38	0.70	Aluminum	0.39	0.35	0.65
1/4" Cardinal 272 Clear ¹ / 1/2" Argon / 1/4" Clear	0.25	0.40	0.70	Aluminum	0.40	0.38	0.64
1/4" Solarbronze / 1/2" Air / 1/4" Solarban 60 Clear ²	0.29	0.31	0.42	Aluminum	0.43	0.30	0.39
1/4" Clear / 1/2" Air / 1/4" Solarban 70XL Starphire ²	0.29	0.37	0.64	Aluminum	0.43	0.35	0.59
1/4" Solarban 60 Clear ¹ / 1/2" Air / 1/4" Clear	0.29	0.38	0.70	Aluminum	0.43	0.36	0.65
1/4" Cardinal 272 Clear ¹ / 1/2" Air / 1/4" Clear	0.29	0.40	0.70	Aluminum	0.43	0.38	0.64
1/4" Clear / 1/2" Air / 1/4" Clear	0.47	0.70	0.79	Aluminum	0.58	0.65	0.72

1. Low-e on #2 surface 2. Low-e on #3 surface 3. Low-e on #6 surface 4. Low-e on #4 surface 5. In accordance with NFRC 100 6. In accordance with NFRC 200

Solarban, Starphire, SunGuard, and Solarbronze are registered trademarks of PPG Industries Ohio, Inc. Heat Mirror is a registered trademark of Southwall Technologies, Inc. Cardinal is a registered trademark of Cardinal Glass Industries, Inc. SunGuard is a registered trademark of Guardian Industries Corp.

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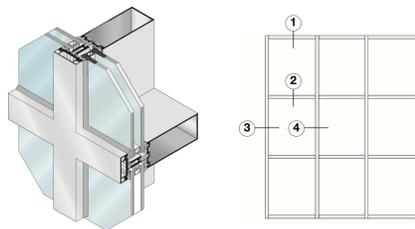
THERMAL PERFORMANCE - GLAZING SELECTION CHART

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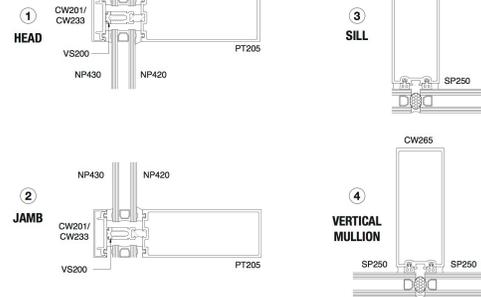


Series 2202SG Curtain Wall

Below are various insulating glazing assemblies and spacer combinations that will provide this system with U-factors ranging from a low of 0.18 to a high of 0.56. If your particular combination of glazing and spacer isn't shown, please contact a CRL-U.S. Aluminum Technical Sales Representative and initiate a request. One of our on-staff thermal simulation engineers will conduct the calculations and return a report that can be utilized for bidding and design purposes.



TYPICAL DETAILS:



GLAZING ASSEMBLY - 1" INSULATING	CENTER OF GLAZING U-FACTOR ³	CENTER OF GLAZING SHGC ⁶	CENTER OF GLAZING VT ⁶	SPACER	OVERALL SYSTEM U-FACTOR ⁵	OVERALL SYSTEM SHGC ⁶	OVERALL SYSTEM VT ⁶
1/4" SunGuard SNX 62/27 Clear ¹ / 1/4" Xenon / Heat Mirror 77 Film / 1/4" Xenon / 1/4" SunGuard IS 20 Clear ²	0.09	0.20	0.48	Super Spacer	0.18	0.21	0.44
1/4" SunGuard SNX 62/27 Clear ¹ / 1/2" Xenon / 1/4" SunGuard IS 20 Clear ²	0.18	0.25	0.60	Stainless	0.28	0.26	0.55
1/4" Solarban 70XL Starphire ¹ / 1/2" Argon / 1/4" Clear	0.24	0.27	0.64	Stainless	0.33	0.28	0.59
1/4" Solarban 60 Clear ¹ / 1/2" Argon / 1/4" Clear	0.24	0.38	0.70	Aluminum	0.36	0.39	0.65
1/4" Cardinal 272 Clear ¹ / 1/2" Argon / 1/4" Clear	0.25	0.40	0.70	Aluminum	0.37	0.41	0.64
1/4" Solarbronze / 1/2" Air / 1/4" Solarban 60 Clear ²	0.29	0.31	0.42	Aluminum	0.40	0.33	0.39
1/4" Clear / 1/2" Air / 1/4" Solarban 70XL Starphire ²	0.29	0.37	0.64	Aluminum	0.40	0.38	0.59
1/4" Solarban 60 Clear ¹ / 1/2" Air / 1/4" Clear	0.29	0.38	0.70	Aluminum	0.40	0.39	0.65
1/4" Cardinal 272 Clear ¹ / 1/2" Air / 1/4" Clear	0.29	0.40	0.70	Aluminum	0.40	0.41	0.64
1/4" Clear / 1/2" Air / 1/4" Clear	0.47	0.70	0.79	Aluminum	0.56	0.69	0.73

1. Low-e on #2 surface 2. Low-e on #3 surface 3. Low-e on #6 surface 4. Low-e on #4 surface 5. In accordance with NFRC 100 6. In accordance with NFRC 200

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2.2 FRAMING MATERIALS AND ACCESSORIES

- A. Aluminum:
 - 1. ASTM B 221, alloy 6063-T6 for extrusions; ASTM B 209, alloy 5005-H34 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
- B. [Internal Reinforcing:
 - 1. ASTM A 36 for carbon steel; or ASTM B 308 for structural aluminum.
 - 2. Shapes and sizes to suit installation.
 - 3. Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.]
- C. Inserts and Anchorage Devices:
 - 1. Manufacturer's standard formed or fabricated assemblies, steel or aluminum, of shapes, plates, bars or tubes.
 - 2. Shop coat steel assemblies after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645
- D. Fasteners:
 - 1. Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with components being fastened.
 - 2. Do not use exposed fasteners, except where unavoidable for application of hardware.
 - 3. For exposed locations, provide countersunk Phillips head screws with finish matching items fastened.
 - 4. For concealed locations, provide manufacturer's standard fasteners.
 - 5. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is unacceptable.
- E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.
- F. Shims: Non-staining, non-ferrous, type as recommended by system manufacturer.
- G. Protective Coatings: Cold applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil (0.77 mm) thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.
- H. Glazing Gaskets:
 - 1. Compression type design, replaceable, molded or extruded neoprene, or ethylene propylene diene monomer (EPDM).
 - 2. Comply with ASTM C509 or C864.
 - 3. Profile and hardness as necessary to maintain uniform pressure for watertight seal.
 - 4. Provide in manufacturer's standard black color.
 - 5. [Factory molded corners required at exterior.]
- I. Internal Sealants: Types recommended by sealant manufacturer to remain permanently elastic, tacky, non-drying, non-migrating and weathertight.
- J. [Curtain Wall Insulation and Fire Safing: Refer to Sections 07200 and 07270.]

Retain paragraph below if architectural aluminum panels are required in curtain wall or place in another appropriate section.

- K. [[Spandrel Panels] [Exterior Column Covers] [Soffits]:
 - 1. Type: Aluminum sheet, 1/8 inch (3 mm) thick, suitably reinforced on concealed surface for surface flatness, or prefabricated sandwich panels at manufacturer's option.
 - 2. Surface flatness: 0.015 inch (0.038 mm) maximum deviation when measured with 6 inch (152 mm) rule.
 - 3. Squareness: 0.002 inch (0.050 mm) maximum for each inch of length at panel edge.
 - 4. Anchorage: Allow for expansion and contraction, to minimize oil-canning and distortion.]
- L. "Anti-Walk" Edge Blocking: "W" shaped E.P.D.M. blocks for use in keeping glazing material stationary under vibration or seismic loading. Edge blocking may be used for pressure plate systems.

2.3 GLASS AND GLAZING ACCESSORIES

- A. Refer to Section 08810.

2.4 SYSTEM FABRICATION

- A. Take accurate field measurements to verify required dimensions prior to fabrication.
- B. Location of exposed joints are subject to Architect's acceptance.
- C. Provide rigid, thermal break isolators to prevent exterior and interior aluminum framing members from being in contact with each other.
- D. Fabricate components in accordance with approved shop drawings. Remove burrs and smooth edges. Shop fabricate to greatest extent practicable to minimize field cutting, splicing and assembly. Disassemble only to extent necessary for shipping and handling limitations.
- E. Steel Components:
 - 1. Clean surfaces after fabrication and immediately prior to application of primer in accord with SSPC-SP2 or SSPC-SP3 at manufacturer's option.
 - 2. Apply specified shop coat primer in accord with manufacturer's instructions to provide 2.0 mil (0.050 mm) minimum dry film thickness.
- F. Fabricate components true to detail and free from defects impairing appearance, strength or durability. [Fabricate custom extrusions indicated and as necessary for complete installation.]
- G. Fabricate components to allow for accurate and rigid fit of joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections will be flush and weathertight. Ensure slip joints make full, tight contact and are weathertight.
- H. Reinforce components as required at anchorage and support points, at joints, and at attachment points for interfacing work.
- I. Provide structural reinforcing within framing members where required to maintain rigidity and accommodate design loads.
- J. Provide holes or slots, deflector plates, water deflectors, and sealants to accommodate internal weep and drainage to the exterior of curtain wall system.
- K. Allow for adequate clearance around perimeter of system to enable proper installation and for thermal movement within system.
- L. Separate dissimilar metals with protective coating or pre-formed separators to

prevent contact and corrosion.

Retain paragraph below if solid spandrel and column infill panels are required.

- M. [Provide framing members to rigidly glaze spandrel panels and column covers within framing system.]
- N. [Provide special shapes and filler pieces with tight corners.]

Retain paragraphs below when applicable.

- O. [Fabricate window stool, jamb and head extensions with gypsum board receivers and mating tabs to fit window extrusions with tight fit hairline joints.]

Select and edit following items for appropriate finish; delete inapplicable types. U.S. Aluminum is a licensed applicator for all of the coating manufacturers listed below. U.S. Aluminum offers, at no additional cost, a 5 year warranty on either of the finishes below.

2.5 FINISH

- A. Organic Coating (high performance fluoropolymer):
 - 1. Comply with requirements of AAMA 605.2-92.
 - 2. Surfaces cleaned and given conversion coating pre-treatment prior to application of 0.3 mil (0.0076 mm) dry film thickness of epoxy or acrylic primer following recommendations of finish coat manufacturer.

Note: A less expensive finish coat containing a minimum of 50% fluoropolymer resin is also available, and meets AAMA 605.2-92, but with reduced performance over time.

- 3. Finish coat of [50 percent] [70 percent] minimum fluoropolymer resin fused to primed surfaces at temperature recommended by manufacturer, 1.0 mil (0.25 mm) minimum dry film thickness.
- 4. Acceptable coating manufacturer's: PPG Industries Inc. and The Valspar Corporation.
- 5. Provide in either 2, 3, or 4 coat system as required for color selected.
- 6. [Custom colors as selected by Architect.]

***** OR *****

- 7. [Manufacturer's standard colors as selected by Architect.]

***** OR *****

- B. [Clear Anodized:
 - 1. Conforming to AA-M12C22A31 and AAMA 607.1.
 - 2. Architectural Class II, etched, medium matte, clear anodic coating, 0.4 mil (0.010 mm) minimum thickness.]

***** OR *****

Note: AA class 44 is a type I coating and is 0.7 mil (0.018 mm) thick. AA Class 34 is a type II coating and is 0.4 mil (0.010 mm) thick. United States Aluminum offers, at no additional cost, a 5 year warranty on either of the finishes below.

- C. Color Anodized:
 - 1. Conforming to AA-M12C22A [34] [44] and AAMA 608.1.
 - 2. Architectural Class [II] [I], etched, medium matte, [black] [dark bronze] [medium bronze] [light bronze] colored anodic coating, [0.4] [0.7] mil (0.010) [0.018] mm) minimum thickness.]

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions and proceed with Work in accordance with Section 01400.
- B. Verify dimensions, tolerances and method of attachment with other Work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and applicable provisions of AAMA Aluminum Curtain Wall Design Guide Manual.
- B. Align assemblies plumb and level, free of warp or twist, aligning with adjacent Work.
- C. Tolerances:
 - 1. Limit variations from plumb and level:
 - a. 1/8 inch in 20 feet (3 mm in 6 M) vertically and horizontally.
 - b. 1/4 inch in 40 feet (6 mm in 12 M) either direction.
 - 2. Limit offsets in theoretical end-to-end and edge-to-edge alignment:
 - a. 1/16 inch (2 mm) where surfaces are flush or less than 1/2 inch (13 mm) out of flush and separated by not more than 2 inches (51 mm).
 - b. 1/8 inch (3 mm)
 - c. for surfaces separated by more than 2 inches (51 mm).
 - 3. Step in face: 1/16 inch (2 mm) maximum.
 - 4. Jog in alignment: 1/16 inch (2 mm) maximum.
 - 5. Location: 1/4 inch (6 mm) maximum deviation of any member at any location.
 - 6. Tolerances are not accumulative.
- D. Provide attachments and shims to permanently fasten system to building structure.
- E. Anchor securely in place, allowing for required movement, including expansion and contraction.
- F. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with protective coating or pre-formed separators

to prevent contact and electrolytic action.

- G. Seal perimeter members as shown on manufacturer's installation instructions or as required for unique job conditions. Set other members with internal sealants and baffles as called for in manufacturer's installation instructions. Use sealants as recommended by sealant manufacturer.

Retain following paragraph when curtain walls are installed adjacent to stone.

- H. [Provide adequate support for all the aluminum frames, glass deadloads, and for the end reactions to specified windloads.]
- I. Glazing:
 - 1. Install glazing gaskets and sealants in accordance with manufacturer's instructions without exception, including surface preparations. Refer to Section 08810 for additional requirements. Utilize "anti-walk" edge blocking on all vertical edges of glazing.

Delete article below if not applicable.

3.3 FIELD QUALITY CONTROL

Edit paragraph below to include required field tests; air and water infiltration tests usually not required. Coordinate provisions with referenced section.

- A. Field Tests: Independent testing laboratory will perform [air infiltration,] [water infiltration] [and] hose test; refer to Section 01400 for requirements.

3.4 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears and other foreign materials.
- B. Clean metal surfaces exercising care to avoid damage.

END OF SECTION

