SPEC NOTE: This Section specifies tubular aluminum exterior curtain wall system for multi-story cladding; site assembled "stick" frame or shop fabricated "unitized" subassemblies; factory prefinished, vision glass, glass or insulated metal panel infill, column covers, louvres, and glazing. With moderate editing, this section could be utilized for bronze or stainless steel systems or could incorporate granite, marble, or stone panels. Air barriers, vapour retarders, intake or exhaust louvres, each integral with the curtain wall system, should be included in this section.

SPEC NOTE ENVIRONMENT: This Section specifies environmentally responsible material choices, including recycling and reuse options, and generally available disposal.

SPEC NOTE: This Section is not specifically structured for special or custom configured wall systems. Glass and glazing is referenced to Section 08800 - Glazing. Sealants are referenced to Section 07900 - Joint Sealers. Stone panels within the curtain wall system will be specified in a Division 4 section.

# General

## RELATED SECTIONS

SPEC NOTE: Curtain wall testing can be identified in a special section or included in this section.

### Fire Stopping: Fire stopping between floor edge and curtain wall system.

### Joint Sealers: System perimeter sealant and back-up materials.

### Glazing.

## REFERENCES

SPEC NOTE: Edit list of standards to include only those standards referenced in project specification.

### Aluminum Association Designation System For Aluminum Finishes (AA)

#### DAF 45 [1997], Designation System For Aluminum Finishes.

### Architectural Aluminum Manufacturers Association (AAMA)

#### AAMA CW-DG-1-[96], Aluminum Curtain Wall Design Guide Manual.

#### AAMA CW-10-[97], Curtain Wall Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.

#### AAMA CW-11-[85], Curtain Wall Manual - Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.

#### AAMA T1R-A1-[75], Sound Control for Aluminum Curtain Walls and Windows.

#### AAMA 501-[94], Methods of Test for Exterior Walls.

#### AAMA 503-[92], Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.

#### AAMA 606.1-[76], Specifications and Inspection Methods for Integral Colour Anodic Finishes for Architectural Aluminum.

#### AAMA 607.1-[76], Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

#### AAMA 608.1-[77], Specification and Inspection Methods for Electrolytically Deposited Colour Anodic Finishes for Architectural Aluminum.

#### AAMA 2603-[98], Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

#### AAMA 2604-[98], Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

### American Society for Testing and Materials (ASTM)

#### ASTM A 36/A 36M-[97ae1], Specification for Structural Steel.

#### ASTM A 123M-[97ae1], Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

#### ASTM A 167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

#### ASTM B 209M-[95], Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].

#### ASTM B 221M-[96], Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

#### ASTM E 283-[91], Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

#### ASTM E 330-[97e1], Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

#### ASTM E 331-[96], Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

#### ASTM E 413-[87(1999)], Classification for Rating Sound Insulation.

#### ASTM E 1105-[96], Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.

### Canadian General Standards Board (CGSB)

#### CAN/CGSB 1.108-[M89], Bituminous Solvent Type Paint.

#### CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.

### Canadian Standards Association (CSA)

#### CSA G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

#### CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.

#### CAN/CSA-S136-[M95], Cold Formed Steel Structural Members.

#### CAN/CSA-S157-[M83], Strength Design in Aluminum.

#### CSA W59.2-[M1991(1998)], Welded Aluminum Construction.

### Environmental Choice Program (ECP)

#### ECP-45-[92], Sealants and Caulking Compounds.

#### ECP-67-[95], Recycled Water-Borne Surface Coatings.

#### ECP-76-[1998], Surface Coatings.

### Steel Structures Painting Council (SSPC)

#### SSPC - Paint 20 Zinc Rich Coating.

#### SSPC - Paint 25 Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments).

## SYSTEM DESCRIPTION

SPEC NOTE: Specify in the following paragraph statements that describe the combined result of the components used to assemble the system.

### Vertical glazed aluminum curtain wall system includes thermally broken tubular aluminum sections with self supporting framing, shop fabricated, factory prefinished, vision glass, spandrel infill, related flashings, anchorage and attachment devices.

SPEC NOTE: An adjacent sloped glazing system which integrates or is joined with the curtain wall system may be edited into this section so as to function together or alternately, may be prepared as a separate section. The sloped glazing system may be self supporting or supported by structural mullion framing.

### Assembled system to permit re-glazing of individual glass (and infill panel) units without requiring removal of structural mullion sections.

SPEC NOTE: Specify in the following paragraph statements that identify system performance requirements or function criteria only. Delete paragraphs not appropriate to project. Performance specifying permits system manufacturers the latitude to adjust or redesign proprietary systems to achieve specified requirements. Edit those statements appropriate to sloped glazing or delete same if not required.

## PERFORMANCE REQUIREMENTS

SPEC NOTE: Use the following paragraph as the basis for curtain wall system specifying; minimize the material and component statements so not to conflict with performance criteria. The following paragraphs represent a suggested listing of criteria. If more stringent criteria or mock-up testing is being considered, refer to AAMA and ASTM test methods and associated documents for guidance.

### Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC.

### Design and size components to withstand seismic loads and sway displacement as calculated in accordance with NBC.

SPEC NOTE: Specify in the following paragraph mullion corner, special change of wall plane conditions, and other special conditions; edit accordingly.

### Limit mullion deflection to L/240; with full recovery of glazing materials.

### Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

### Provide system to accommodate, without damage to components or deterioration of seals:

#### Movement within system.

#### Movement between system and perimeter framing components.

#### Dynamic loading and release of loads.

#### Deflection of structural support framing.

#### Shortening of building concrete structural columns.

#### Creep of concrete structural members.

SPEC NOTE: Delete the following paragraph if glass thermal resistance is specified in Section 08800 - Glazing.

### Thermal Resistance of:

#### Overall System: U of 0.61.

#### Vision glass areas: U of 0.48.

SPEC NOTE: Local regulatory agencies may dictate sound attenuation criteria.

### Sound attenuation through wall system (exterior to interior): STC 45.

SPEC NOTE: Air infiltration in both the AAMA 501 and ASTM E 283 standards are measured in m3/s/m2 in lieu of the preferred designation of l/s/m2. Refer to CSC TEK.AID 07195 - Air Barriers for discussion on air infiltration.

### Limit air infiltration through assembly to 0.0003 m3/s/m2 of wall area, measured at a reference differential pressure across assembly of 75 Pa.

### Vapour seal with interior atmospheric pressure of 25 mm sp, 22ºC, 40% RH: No failure.

### Water leakage: none.

SPEC NOTE: Edit the following paragraph to specify differing expansion and contraction coefficient for dark versus light coloured surfaces.

### System to provide for expansion and contraction within system components caused by a cycling temperature range of 95ºC over a 12 hour period without causing detrimental effect to system components.

### Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

### Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

### Ensure no 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 occur.

### Reinforce curtain wall system to accommodate window washing guide rails.

## PRODUCT DATA

### Submit product data in pdf format.

### Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

## SHOP DRAWINGS

### Submit shop drawings in pdf format.

### Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.

## SAMPLES

SPEC NOTE: Use the following paragraph for submission of physical samples for selection of finish, colour, and texture.

### Submit two samples illustrating prefinished aluminum surface, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

## REGULATORY REQUIREMENTS

SPEC NOTE: Only include the following paragraph when required by applicable code criteria.

### Conform to applicable code for acoustic attenuation, sound transmission, and thermal requirements.

SPEC NOTE: Use the following paragraph for assessing full sized erected assemblies for review of construction, coordination of work of several sections, testing, or observation of operation. A mock-up may also be used for assessing field applied finishes.

## DELIVERY, STORAGE, AND HANDLING

### Deliver, store, handle and protect materials.

### Handle work of this section in accordance with AAMA CW-10.

### Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

## ENVIRONMENTAL REQUIREMENTS

SPEC NOTE: Edit the following two paragraphs based on sealant type being specified; the higher performance sealants may be successfully applied at lower temperatures.

### Do not install sealants when ambient [and surface] temperature is less than 5ºC.

### Maintain this minimum temperature during and after installation of sealants.

## SEQUENCING

SPEC NOTE: Include in the following paragraph, firestopping and air barrier and vapour retarder option statements if that work is specified in another section.

### Coordinate work of this section with installation of firestopping, air barrier placement, vapour retarder placement, flashing placement and other components or materials.

## WARRANTY

SPEC NOTE: Use the following paragraph for federal government projects.

### For the Work of this Section the 12 months warranty period is extended to 60 months.

SPEC NOTE: Use the following paragraph for private sector projects.

### Contractor hereby warrants that Glazed Aluminum Curtain Wall will stay in place and remain leak proof including coverage for complete system failure in accordance with GC 24, but for 60 months.

SPEC NOTE: Use the following paragraph to specify extra glass units the owner may wish to inventory for future use; edit this article after consultation with the owner.

## WASTE MANAGEMENT AND DISPOSAL

SPEC NOTE ENVIRONMENT: The disposal of packing waste into landfill site demonstrates an inefficient use of natural resources and consumes valuable landfill space.

### Remove from site and dispose of all packaging materials at appropriate recycling facilities.

### Dispose of all corrugated cardboard, polystyrene, plastic and packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

# Products

SPEC NOTE: A context sensitive link to McGraw-Hill Construction's product information web site has been added to this NMS section by Spex.ca, as a publisher enhancement. To review potentially suitable products for use in this section, go to [http://sweets.construction.com](http://sweets.construction.com/index/xref.htm?specname=NMS&sectionid=08920). This link does not imply Spex.ca's nor PWGSC's endorsement of any information provided by McGraw-Hill, nor it's suitability for use.

Spec NOTE: Edit the following descriptive specifications to identify project requirements.

## MATERIALS

### Kawneer 1600 series or approved equal.

SPEC NOTE: Insert appropriate text from Section 08800 - Glazing.

### Glazing: double glazed with clear outer lite, clear inner lite and low-E gas.

SPEC NOTE: Insert appropriate text from Section 07900 - Joint Sealers.

SPEC NOTE ENVIRONMENT: The application of caulkings releases volatile organic compounds (VOCs) into the atmosphere. VOCs contribute to numerous environmental problems including the degradation of indoor air quality, the formation of ground level ozone and photochemical smog. The specification of caulkings and sealants that have a low VOC content and reduced toxicity will help to protect the environment and reduce possible adverse health effects. The specification of products that are certified to meet the specification of the Environmental Choice Program ECP-45 will provide reduced environmental impacts.

## COMPONENTS

SPEC NOTE: Use the following paragraph to specify the nominal dimensions of the primary framing members. If performance specifying, ensure no conflict exists.

### Mullion profile: 6" x 2" nominal dimension; thermally broken with interior tubular section insulated from exterior pressure plate; matching stops and pressure plate of sufficient size and strength to provide adequate bite on glass and infill panels; drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system; internal mullion baffles to eliminate "stack effect" air movement within internal spaces.

SPEC NOTE: Use the following paragraph for wall systems with insulated infill panels.

## FABRICATION

### Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

### Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

### Prepare components to receive anchor devices. Install anchors.

### Arrange fasteners and attachments to ensure concealment from view.

### Prepare system components to receive exterior doors and hardware.

### Visible manufacturer's identification labels not permitted.

## FABRICATION: INFILL PANELS

SPEC NOTE: Use only where metal clad insulated infill panels are required in the system.

### Fabricate infill panels with metal covered edge seals around perimeter of panel assembly, enabling installation and minor movement of perimeter seal.

### Reinforce interior surface of exterior panel sheet from deflection caused by wind and suction loads.

### Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

### Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.

### Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.

### Arrange fasteners and attachments to ensure concealment from view.

SPEC NOTE: The wide variety of finishes for aluminum preclude listing all the available options; the following paragraphs offer the commonly specified finishes. Specify the finish colour whenever possible, as the cost varies considerably between colours. One issue that is not specified in this section, nor is it easy to address, is finish colour variations.

SPEC NOTE: Reference to aluminum finishes can be AA or AAMA (which have very similar designations) or by generic or proprietary description. Before specifying either the M series (mechanical) or C series (chemical) pretreatment to aluminum, confirm the treatment required in conjunction with the final finish. These pretreatment processes can also be utilized in conjunction with organic coatings or other finishes.

## FINISHES

SPEC NOTE: The AAMA A40 series finishes are anodized 0.7 mils thick or greater (termed Architectural Class I); A41 is clear, A42 has integral colour, A43 has impregnated colour, A44 is anodized in two steps. The A20 and A30 series coatings are thinner. Resinous, vitreous and electroplated coatings are also available. Only include the following paragraph when project conditions warrant or a custom finish is specified.

### Exterior exposed aluminum surfaces: clear anodized

SPEC NOTE: Select either of the next two paragraphs.

### Exterior exposed infill panel surfaces: to match glazing

SPEC NOTE: Select either of the next two paragraphs.

### Interior exposed aluminum surfaces: clear anodized

# Execution

## EXAMINATION

### Verify dimensions, tolerances, and method of attachment with other work.

### Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

## INSTALLATION

### Install curtain wall system in accordance with manufacturer's instructions.

### Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

### Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.

### Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

### Provide thermal isolation where components penetrate or disrupt building insulation.

### Install sill flashings.

### Coordinate installation of fire stop insulation, at floor slab edge.

### Coordinate attachment and seal of perimeter air barrier and vapour retarder materials.

### Fill shim spaces at perimeter of assembly with foam-in-place insulation to maintain continuity of thermal barrier.

SPEC NOTE: The glazing method chosen for sloped glazing is critical to the success of the system. Placing sealant on the up-slope side of the pressure plate cap is optional, depending on the proprietary glazing system used and the design of the cap and pressure plate.

### Install glass and infill panels to glazing method required to achieve performance criteria.

### Install perimeter sealant to method required to achieve performance criteria.

## SITE TOLERANCES

### Maximum variation from plumb: 1.5 mm/m non-cumulative or 12 mm/30 m, whichever is less.

### Maximum misalignment of two adjoining members abutting in plane: 0.8 mm.

### Maximum sealant space between curtain wall and adjacent construction: 13 mm.

## MANUFACTURER'S FIELD SERVICES

SPEC NOTE: The following paragraph is included to assist in field quality control of work being installed. The legal affect of this type of article is questionable and will not relieve the design professional of legal responsibility for the work described in this section.

### Curtain wall product manufacturers to provide field surveillance of the installation of their Products.

### Monitor and report installation procedures and unacceptable conditions.

## CLEANING

### Remove protective material from prefinished aluminum surfaces.

### Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

### Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

## PROTECTION

### Protect finished Work from damage.

END OF SECTION