

SECTION 08900
EXTERIOR WALL SYSTEMS - GENERAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for exterior wall systems, including the following related exterior wall components. Requirements of this Section apply to work specified in the following Sections:
1. Section 03490: Glass Fiber Reinforced Concrete.
 2. Section 07210: Building Insulation.
 3. Section 07412: Manufactured Wall Panels.
 4. Section 07423: Prefabricated Roof Panels.
 5. Section 07920: Joint Sealants.
 6. Section 08410: Aluminum Entrances and Storefronts.
 7. Section 08630: Metal Framed Skylights.
 8. Section 08800: Glazing.
 9. Section 08920: Glazed Aluminum Curtain Walls.
 10. Section 10200: Louvers.

1.2 SYSTEM DESCRIPTION

- A. General Requirements: This section includes minimum performance requirements for the design and installation of all exterior wall systems. Comply with the following minimum requirements and performance criteria for the exterior wall components as listed above. Additional performance requirements are specified in each of the technical specification sections listed.
1. Provide the engineering and coordination of all submittals, shop drawings, components and materials, as well as installation of exterior wall components.
 2. Installed exterior wall components shall maintain an airtight and waterproof assembly on the structure, within the established performance requirements specified for each individual component.
 3. Design and engineer the systems with the information provided.
 - a. As performance documents, the Drawings and Specifications do not indicate or describe all the work required for the performance and completion of the Work. Provide all items required for compliance with performance requirements.
 - b. Provide reinforcements in order to comply with the design and performance criteria.
 4. Dimension and profile adjustments may be made in the design in the interest of fabrication, erection methods or techniques, the weatherability, or the ability of the design to satisfy the design and performance requirements, provided that the design intent and the intent of the specifications are maintained.
 - a. Adjustments to dimensions and profile may only be made within the limits of the established by the Drawings, and any and all such adjustments are subject to the Architect's review.
 5. Methods of fabrication and assembly shall be at the discretion of the Contractor, provided that the exterior and interior visible architectural effect is not changed, the work of other trades is not affected, and the weathertightness (air and water infiltration) and structural performance, as demonstrated by engineering calculations and measured by the results of the tests for performance requirements, are not reduced.
- B. Exterior wall systems shall accommodate the tolerances of the surrounding conditions, including the structural support.

1. The work shall be designed to accommodate variation in location of surrounding and supporting work, as specified in other sections of these specifications or as may exist at the site, as determined by field measurements of the existing work taken by the Contractor.
- C. Exterior wall systems, as installed, shall meet or exceed the following minimum structural and weather resistance requirements, as demonstrated by engineering calculations and testing of mock-ups:
1. Provision for Thermal Movements: As specified in respective specification sections.
 2. Structural Properties:
 - a. Design Wind Loads: Exterior wall systems shall be designed to withstand wind loads indicated on the Structural Drawings
 - 1) Design corners for simultaneous inward design pressure on both surfaces, and simultaneous outward design pressure on both surfaces. Partial loading on one surface shall be considered.
 - b. Exterior wall systems shall sustain, without damage, 1.5 times design wind loads when tested in accordance with ASTM E330.
 - c. Deflection Criteria: As specified in respective specifications sections.
 - d. Provision for Movement of the Structure:
 - 1) The work shall be designed to accommodate dead load and live load deflection, thermal expansion, elastic shortening and/or sway and torsion of the building, as may be anticipated.
 - 2) Obtain necessary projected data and make such provision in the work as may be necessary. The amount of such movement that is accommodated in the Contractor's design shall be identified on Contractor's submittal drawings.
 - 3) Allow for 1/2" differential movement at the mid-point bay for perimeter floor slab deflection, when this load is transferred through exterior wall support system.
 - 4) Exterior wall support systems shall accommodate a 1/8" per floor long term column shortening when anchored to the columns.
 - e. Obtain necessary dead load information for exterior wall components supporting other wall components, including precast concrete panels supporting aluminum window framing. Make provision in the work as may be necessary to accommodate support and transfer of loads.
 3. Seismic Design: Comply with requirements shown on Structural Drawings.
 4. Air Infiltration: Air leakage through exterior wall systems shall not exceed the following, as a minimum, when tested in accordance with ASTM E-283:
 - a. Not less than 0.06 cfm per square foot of fixed wall area, at a test pressure of 6.24 psf and as specified in respective specifications sections.
 5. Water Penetration: Water penetration is defined as the appearance of uncontrolled water on the indoor face of any part of the work. "Controlled" water or condensation is that which is demonstrably drained to the exterior of the work without endangering or wetting adjacent surfaces or insulation, and is not visible in the final construction.
 - a. No uncontrolled water penetration shall occur when the work is tested in accordance with ASTM E331 at a test pressure of not less than 8 psf minimum and as specified in respective specifications sections.
 - b. Exterior wall systems shall include the design of a dual line of air and water control at joints.
 - c. Provision shall be made at each floor level to drain to the exterior face of the work, any water entering at joints, and/or any condensation occurring within the work. Exterior wall systems shall be designed to collect and remove all secondary water from the surrounding conditions. At insulated areas, gutter shall extend to the inside vertical plane of the insulation.
 6. Condensation Resistance: Provide system with condensation-resistance factor (CRF) of not less than the following when tested according to AAMA 1503.1 for framing:

- a. Exterior wall components: 55 minimum
- 7. Support systems shall be attached to slab edges. Perimeter spandrel beams are not designed to accommodate lateral forces. Slab edges have been designed to accommodate a maximum dead load of two stories of exterior enclosure. Slab edge inserts for dead load and wind load connections are to be engineered by the manufacturer/installer. Provide for vertical movements (thermal, structural, etc.) at two floor intervals, maximum

1.3 REFERENCES

- A. Work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply.
 - 1. American Society for Testing and Materials, various specifications, as applicable.
 - a. ASTM E330: Structural Performance of Exterior Windows, Curtain walls, and Doors by Uniform Static Air Pressure Difference.
 - b. ASTM E283: Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
 - c. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.4 SUBMITTALS

- A. Refer to respective exterior wall component Sections for other required submittals.
 - 1. For installed products required to comply with design loads, include shop drawings and structural analysis signed and sealed by the qualified structural engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Subcontractor (Fabricator) Qualifications: To avoid divided responsibility, engage a single subcontractor to assume undivided responsibility for the complete weathertight installation of exterior wall components identified in this section. Responsibility shall include the system to system integration, material compatibility, including sealants, and perimeter sealing.
 - 1. This firm must demonstrate not less than 5 years successful experience in installation of work similar to the work of this project.
 - 2. This firm is responsible for coordination, compatibility and design integrity to secure a weather and water tight seal with all systems, surfaces and related materials.
- B. Engineering Qualifications: Each component of exterior wall systems shall be engineered by a registered structural engineer, licensed in the location of the project, in accordance with the local codes, and the specifications stated herein.
- C. Field Sample Installations:
 - 1. Accepted sample installations may be incorporated in the finished construction.
 - 2. Sample installations are for purpose of review by Architect for aesthetics and workmanship. Sample installations will be used to establish the acceptability of work for the rest of the project.
 - 3. Extent of the sample installations is shown on the drawings.
- D. Sealant Compatibility Coordination: Prior to mock-up installation or fabrication, provide to sealant manufacturer samples of all relevant substrates, including finished aluminum, coated glass, gaskets, stone, backers and any other substrates which will require sealant contact. Samples shall be labeled and identified for this project. Sealant manufacturer shall perform tests to verify adhesion, staining and chemical compatibility. Use sealants and substrates only in combinations for which favorable adhesion and compatibility results have been

obtained. Submit for record sealant manufacturer's written test reports, and recommendations regarding cleaning and priming required to obtain acceptable adhesion.

- E. Field Mock-Up: Provide full size field mock-ups for external wall elements. Mock-up to be erected at the site to match exactly the installation to be used on the building. Retain mock-up until accepted field sample installation is complete.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all curtain wall system assemblies so as to prevent damages at all times, as per manufacturer's recommendations.
- B. All materials delivered to the site shall be stored in spaces provided on each floor of the building. These spaces shall be located where the stored materials will not be exposed to wetting or damage, and shall permit easy access to the handling of the materials. Materials shall be stored neatly, properly stacked.
- C. Deliver other materials, except bulk materials, to project site in manufacturer's unopened containers with name, brand, type, grade and color fully indicated thereon. Store bulk materials as required to avoid any deleterious effects of weather, soiling or contamination.
- D. Special care shall be exercised when handling, shipping and erecting factory-finished aluminum to avoid abrasion or any other damage to the finished surfaces. Stacking and storing of the components in the shop, in transit and at the job site shall be done using softeners and timbers too keep individual members free from contact with the ground, and with each other. The components shall be protected from soiling by adjacent fabrication or construction operations.
- E. Remove delivered materials which are disfigured, cracked, chipped, or scratched, or otherwise not suitable for installation from the job site and replace with new materials at no cost to any other party.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence and schedule the erection, the sealing, and the glass and glazing of the exterior wall systems so the specified field water tests can be conducted at the proper intervals of the wall erection.
- B. Schedule delivery of embedments to be cast into the structure so as not to delay the placement of the concrete.

1.8 MAINTENANCE DATA

- A. Provide complete maintenance data for exterior wall systems including:
 - 1. Names, addresses, and phone numbers of Contractor, exterior wall system subcontractor, and all sub- subcontractors involved in exterior wall system work.
 - 2. Product data for all products used.
 - 3. Specific instructions for recommended cleaning and maintenance schedules and procedures, including procedures for re-glazing.
 - 4. Recommended repair procedures.
 - 5. Copies of executed warranties for exterior wall systems and their components.

1.9 WARRANTY

- A. Special Exterior Wall Systems Warranty: Fabricator's special warranty for the exterior wall systems in which the fabricator agrees to repair or replace exterior wall systems that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
1. Failure to meet performance requirements.
 2. Structural failures including excessive deflection.
 3. Water leakage, air infiltration, or condensation.
 4. Faulty operation of operable units and hardware.
 5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 6. Insulating glass failure.
- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FABRICATORS

- A. Exterior wall Subcontractor (fabricator) shall be one of the following:
1. Crown Corr
 2. A. C. Dellovade
 3. Preformed Systems, Inc.
 4. Limo
 5. MR&D
 6. BHN Corp.

2.2 EXTERIOR WALL SPECIFICATION REQUIREMENTS

- A. Refer to respective Sections for exterior wall products, materials, and components.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine and verify that the receiving substrate surfaces and the structure have no defects or errors which would result in poor or potentially defective installation or performance of exterior wall systems or would cause latent defects in workmanship.

3.2 PREPARATION

- A. Prepare the structure to insure proper and adequate structural support for exterior wall systems.
- B. Prepare the substrate surfaces to insure proper and adequate installation in exact accordance with the contract documents and approved shop drawings, or manufacturer's requirements.
- C. Field measure and verify dimensions as required, such as floor elevations, floor to floor heights, clearances between wall system and structure or surrounding conditions, or other permissible tolerances.
- D. Protect adjacent areas or surfaces from damage as a result of exterior wall systems work.

3.3 FIELD QUALITY CONTROL

- A. Satisfactory results of the field quality control testing shall not relieve the Contractor from conforming with requirements of the Contract Documents and final shop drawings. Installation of work following the field quality control testing shall be performed as it was for the tested area, unless otherwise instructed in writing.
 - 1. Remedial measures shall be recorded in writing during the field quality control procedures and submitted to the Construction Manager.
- B. Remedial measures found necessary through the field quality control testing procedures shall be used in fabricating and installing the remainder of the exterior wall system on the building.

3.4 PROTECTION

- A. After installation and erection and until Owner acceptance, protect exterior wall system from damage.
- B. Remove any damaged elements, materials, or glass and replace with new, undamaged materials all at no cost to the Owner.

END OF SECTION 08900