

DP-210

THE DURUS™ SYSTEM

**Mechanically Attached
Engineered Brick Rainscreen System**

Specification

R3:09/27/2022



DURUS BRICK RAINSCREEN SYSTEM

Section 042513

MECHANICALLY ATTACHED ENGINEERED BRICK RAINSCREEN SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Work Includes: The work of this Section shall include but not be limited to the following:

1. Bricks
2. Durus stainless steel metal trays
3. Pre-mixed mortar
4. Aluminum sub framing
5. Miscellaneous anchors, fasteners, insulation, vapor barrier, sealants, and related accessories

B. Related Sections:

1. Section 033000 - Cast-in-Place Concrete
2. Section 051200 - Structural Steel
3. Section 055000 - Metal Fabrications
4. Section 061000 - Rough Carpentry
5. Section 072100 - Building Insulation
6. Section 076200 - Flashing and Sheet Metal
7. Section 078413 - Fire Stop Systems
8. Section 079200 - Joint Sealers
9. Section 084413 - Glazed Aluminum Curtain Walls and Sloped Glazing

1.2 SYSTEM DESCRIPTION

- A. A complete pre-engineered brick rainscreen façade with mechanically and adhesively attached bricks mortar, stainless steel trays (G-90 galvanized steel, optional), 2” open cavity and thermally broken aluminum sub framing. The vertical (head) and horizontal (bed) joints between the bricks are mortared or pointed. The basis of design is for the Desana Brick Rainscreen System.
- B. Design system to allow for all movements within structure, and to support loads transferred from the adjacent construction and to fit within the space allotted without projections.
- C. Design Criteria:
 - 1. Strength: Design system to withstand loadings as required by applicable codes, but not less than following minimum loadings.
 - a. Wind: Uniform pressure of ____ psf inward and outward wind pressures per ASCE-7.
 - b. Seismic: Conform to applicable codes. Allow for inter-story drift during seismic event.
 - 2. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within brick system.
 - 3. The drawings indicate sizes, finishes, and dimensional requirements of the exterior wall system required and are based on specific types and models specified. With no less than 10 days prior to the bid, exterior wall system components by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as solely judged by the Architect. The burden of proof of equality is on the proposer.

1.3 PRECONSTRUCTION TESTING OF BRICK AND BRICK SYSTEM

- A. ASTM E330/E330M-14 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- B. AAMA 509-14 – Voluntary Test and Classification Method for Drained and Back Ventilated Rain Screen Wall Cladding Systems
- C. EDC2016-198_Thermal Analysis_v2.0 - overall thermal performance of the Desana Sub-Framing System was calculated using HEAT3 6.0. Typical 6” steel frame and CMU substrates were analyzed, using both 2” and 4” exterior stone wool insulation, with and without a thermal break pad.
- D. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
- E. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)
- F. ASTM C1088 - Standard Specification for Thin Veneer Brick Units Made from Clay or Shale
- G. ASTM C270 - Standard Specification for Mortar for Unit Masonry
- H. ASTM C144 –Mortar Standard Specification for Aggregate for Masonry

1.4 PERFORMANCE REQUIREMENTS

- A. General: Design, fabricate, and install components so that the completed exterior wall system will withstand live loads, the inward and outward pressures specified, and loads stipulated by the Building Code in effect for this Project.
1. The system shall have a design load of positive and negative pressures to satisfy project requirements.
 2. Deflections within the system are to be limited to L/360 or less when tested in accordance with positive and negative pressures and as required to prevent cracking or damage to brick facing.
 3. The exterior wall system shall be designed to meet all specified performance requirements. Where performance requirements result in more than one load or pressure, the load or pressure which produces the greatest stress shall govern.
- B. Movement: Design, fabricate and install system to withstand building, seismic and thermal movements including loading deflections, temperature change without buckling, distortion, joint failure, glass breakage, or undue stress on system components, anchors, or permanent deformation of any kind.
1. Provide for thermal movement over an ambient temperature range of 120°F (49°C) and a surface temperature range of 180°F (82°C).
- C. Air/Water Performance:
1. Air Infiltration: 0.06 CFM/SF of wall area at 6.24 psf per ASTM E283,
 2. Water Infiltration – No water infiltration shall occur under a differential static pressure of 12 lb./ft² after 15 minutes of exposure in accordance with ASTM E 331.
- D. Acceptable Substrates
1. Light gauge cold formed steel studs: Minimum 16ga, Grade 50 ($F_y = 50$ ksi)
 2. Wood studs: Douglas Fir-Larch ($G = 0.50$) or better
 3. CMU Block: Fully grouted at anchor locations
 4. Concrete: Minimum 3,000psi, normal weight

*Note: The system is adaptable to many substrates. When conditions are not as noted above, additional engineering may be necessary and may result in additional anchors, added subframing components, or tighter spacing, to accommodate substrate conditions.

1.5 SUBMITTALS

- A. Submit complete and detailed shop drawings, calculations indicating conformance with load and performance requirements, anchorage to structure, product data, and installation instructions prior to start of any fabrication. Include building elevations showing location and designation of subgirt component, as well as a detailed brick schedule showing size and configuration. Drawings shall include dimensions and shall indicate interface with adjacent materials. Differentiate on drawings between factory fabrication and work performed in field. Show locations and details of all anchors and back up structure; indicate on drawings all dead load and lateral load connections and expansion joints and width tolerances necessary to accommodate thermal movement.

- B. Shop Drawings of Construction or Visual Mock-Up: Submit shop drawings of exterior wall system mock-up showing details. Include detailed description of each test procedure to be performed.
- C. Calculations: Submit calculations for the design of the exterior wall system, including deflections, in place stresses, negative pull-off loads, and capacity of fasteners. Calculations shall be signed and sealed by a Professional Engineer registered in the State of _____.
- D. Product Data: Manufacturer's latest published literature describing each product selection.
- E. Samples: Submit three sets of the following samples in the selected finishes and color for Architect approval.
 - 1. Each type and composition of brick for each color and texture required, at specified full size.
 - 2. Three samples, 1 ft (.3 m) each of DURUS stainless steel metal trays.

1.6 QUALITY ASSURANCE

- A. Performance Test Standards: Provide exterior wall system which has been tested and certified by manufacturer to provide specified resistance to air and water infiltration when installed as indicated and when tested in accordance with AAMA 509.14, "Voluntary Test and Classification Method for Drained and Back Ventilated Rainscreen Wall Cladding Systems."
- B. Field Test: Provide suitable small sample area for field testing by Owner/Consultant for resistance to air infiltration and water penetration of a small representative sampling of installed brick, cladding assemblies, and adjacent perimeter construction per requirements of AAMA 501.5-07 – Test Method for Thermal Cycling of Exterior Walls.
- C. Resistance to air infiltration using static air pressure difference: ASTM E283-04(12) Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
- D. Resistance to water penetration using static air pressure difference: ASTM E331-00(09) – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- E. Manufacturer's Qualifications: Provide evidence of system usage for a period of 5 years and completed projects of similar scope to those indicated for this project and have a record of successful in-service performance.
- F. Qualifications of Installers:
 - 1. The cladding installer shall be approved by the manufacturer of the cladding.
 - 2. The installer will have experience with 25,000 SF of rainscreen installation.
 - 3. For actual installation of cladding, use only competent and skilled mechanics completely familiar with the products and the manufacturer's currently recommended methods of installation.
- G. Source Responsibility:
 - 1. The rainscreen system, excluding the bricks, will be supplied by the same company.

H. Field Measurements: Prior to fabrication of exterior wall system, field measurements of structure and substrates to receive wall system may be required.

I. Mock-Up:

1. Provide a completely assembled, typical wall area installed with all related accessories, in composite configurations designed to fulfill the performance criteria, and representative of the design as shown on the Drawings.
2. Extent of mock-up shall be the same as that which will be provided in the final work.
3. Mock-up shall be installed simulating actual construction conditions, including actual structural supports and connections. Use means, methods and techniques proposed for final installation.
4. Locate mock-up in location as directed by the Architect.
5. Personnel assembling mock-up shall be the same personnel that will perform the actual final units of work at the project site.
6. Mock-up shall be subjected to testing criteria specified for final installation.

1.7 PRE-INSTALLATION COORDINATION

A. Pre-Installation Conference: Prior to start of cladding work, and at General Contractor's direction, meet at site and review installation procedures and coordinate with other work.

1. Meeting shall include Contractor, Installer, Architect, major material manufacturers, and subcontractors whose work must be coordinated with cladding work.

B. Installer shall examine parts of supporting structure and conditions under which cladding work is installed.

1. Notify Contractor in writing of conditions detrimental to proper and timely completion of work.
2. Do not proceed until unsatisfactory conditions have been corrected in manner acceptable to Installer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver exterior wall system components packaged to comply with manufacturer's/fabricator's requirements and adequately protected from damage during shipment.

B. Protect components from adverse job conditions prior to installation.

C. Protect components from other trades after installation.

D. Stack brick system components on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Avoid standing water. Store components so that water accumulations will drain freely.

E. Mortar materials must be protected, stored, and used as stated on the material packaging.

1. Do not store exterior wall system components in contact with other materials that might cause staining, denting, surface damage, or other deleterious effect.

1.9 WARRANTY

- A. Warrant the materials of this Section for a period of 10 years from date of Substantial Completion against defects.
- B. Warrant the workmanship of this Section for a period of 2 years from date of Substantial Completion against defects in workmanship.

PART 2 – PRODUCTS

2.1 ACCEPTABLE FABRICATOR/INSTALLER

- A. Subject to compliance with requirements, fabricator/installers offering exterior wall systems that may be incorporated in the work include the following:
 - 1. Fill in the Company Name & Address

2.2 EXTERIOR WALL SYSTEMS

- A. Subject to compliance with requirements, manufacturer of the Desana Brick Rainscreen system that may be incorporated in the work include the following:
 - 1. DURUS Brick Rainscreen System
Distributed by:

Desana Partners, Inc.
10 Worthington Road
Suite K
Cranston, RI 02920
(401) 942-5640

2.3 MATERIALS

- A. Bricks (ASTM C216, SW meeting Precast Concrete Industry (PCI) Guide Specification) complying with the following requirements:
 - 1. Finish: (insert desired finish, color, glaze)
 - 2. Size: (insert desired brick size, standard 2.25 in x 7.75)
 - 3. Color: (insert desired brick color from standard color palette)
 - 4. Brick shall be Minimum 3/4” (19.05 mm) to 1” (25.4 mm) thickness as shown in the Drawings.
 - 5. Brick color should be full body and not surface only.
- B. DURUS Stainless Steel (galvanized tray optional) Trays:
 - 1. Supplied in accordance with manufacturer’s recommendations to meet load requirements specified.
 - 2. Cold formed 304B stainless steel 20 gauge and height to accommodate brick size and thickness. Shall be sawtooth design to hold bricks. Tray shall be perforated at base for additional drainage.

A. Optional: Hot dipped galvanization G90 Commercial Quality (per ASTM A123), CS type B, nonchemical treated steel.

C. Adhesive (Depending on Design)

D. Mortar: Pre-mixed, 50lb pre-bagged, ASTM C270, Type N Mortar Cement, ASTM C177 Sand with proprietary polymer additives. (Depending on Design)

E. Subframing:

Material: Alloy 6005A T6 mill finish, thermally isolated, aluminum brackets and profiles engineered to meet project design requirements and rainscreen cladding support.

1. Gauge, Configuration, Dimensions, and Spacing: Minimum gauge and as required to conform to design criteria for each assembly.
2. Stainless steel trays are secured to vertical L profiles, 16" (406mm) to 32" (813mm) spacing with stainless steel screws.

F. Accessories:

1. Fasteners: Stainless steel capable of supporting cladding system and superimposed design loads to secure trays to aluminum profiles and brackets; design to allow adjustments of system prior to being permanently fastened in place.
2. Fasteners: Securing brackets to structurally sound substrate (steel studs, concrete, wood framing) by others.

G. Thermal Barrier

1. Material: Injection molded Polypropylene copolymer.
2. Size: To accommodate plate.
 - a. Framing Member bracket to structural element - Isolation: Minimum 0.25 inch thick, 5mm.
 - b. Isolator must match support bracket and must not decrease structural performance of system.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 PREPARATION

- A. Supply metal anchors to be built into other trades for placement. Provide sufficient quantity and direct placement.
- B. Ensure items built in by other trades for this work are properly located and sized.
- C. Establish lines, levels, and shims as required. Protect from disturbance.
- D. Do not install broken, chipped, or cracked units.

3.3 INSTALLATION

- A. Installation can be carried out in adverse weather conditions with the exception of the mortar which must be completed at 40 °F (4 °C) and rising conditions and according to manufacturer's instructions.
- B. Installation must be done by installers approved by manufacturer.
- C. Provide structurally sound substrate that will enable the system to be applied plumb and square and adequately support the load applied by the fixings.
- D. The system thermally isolated system brackets must be attached through to the structural member at 16" (406 mm) OC maximum 32" OC (813 mm) horizontally or required by design load and vertical spacing will be shown as per shop drawings.
- E. The system aluminum profile shall be fixed, running vertically, to the brackets. Profiles shall be plumbed and level before attachment of brick trays.
- F. The first system tray must be set out level and attached to the aluminum profile or supporting structure with the next tray above or beneath, to provide a continuous steel drainage plane.
- G. Installation proceeds horizontally and vertically from the first steel tray.
- H. Ensure assembly is plumb, level, and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.
- I. If applicable, apply (1-1/2" to 1-9/16") dabs of adhesive to stainless steel trays no less than two dabs per brick. Each dab should be 1/2" minimum thick to assure contact with brick. Adhesive should be applied at perforations at back of trays to increase bond.
- J. Steel trays and brick surfaces must be clean and free from deposits before installing bricks. Bricks should be inserted by inserting the bottom edge of the brick into the trays first and locking the brick into place with rubber mallet. Assure even spacing is achieved for stacked or running bond as per drawings. If adhesive is to be used wipe trays with alcohol wipe to remove contaminants.
- K. Pointing with Mortar by hand or with gun applicator. The mortar should be tooled when ready with recesses to approximately .12 in (3mm) below the surface of the brick.
- L. Clean Brick surface after completion of the mortar application, with non-acidic cleaning as approved by brick manufacturer.
- M. Consult manufacturer Installation Instructions for comprehensive package

3.4 CLEANING

- A. Clean soiled surfaces using materials which will not harm brick clay units or adjacent materials.
- B. Consult manufacturer for acceptable cleaners. Use non-metallic tools in cleaning operations.
- C. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces, exercising care to avoid damage of finish.

Remove excess mortar, dirt, or other foreign substances.