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## **Sto Guide Specification S507i StoPowerwall® ci for Frame Wall Construction (Insulation Inbound of Sheathing)**

### **Section 09 24 23 Portland Cement Stucco**

*This guide specification is intended for use by the design/construction professional and any user of Sto products to assist in developing project specifications for a stucco wall assembly applied to code compliant frame wall construction. The stucco assembly incorporates a fluid applied air/moisture barrier, continuous insulation, code compliant paper or felt water-resistive barrier (WRB), drainage mat, code compliant metal plaster base and portland cement stucco, and Sto primers and finishes. The assembly complies with IBC and IRC building code requirements for use on all Types (I-V) of construction. It has been tested in accordance with NFPA 285 and meets criteria for use on noncombustible construction (Types I-IV). It has also been tested in accordance with ASTM E 119 as a one hour non load bearing fire resistive rated wall assembly. Refer to this specification, Sto Guide Details, and ICC ESR Report 1233 for more complete information. Notes in Italics, such as this one, are explanatory and intended to guide the design/construction professional and user in the proper selection and use of materials.*

*StoGuard, the air/moisture barrier, functions in tandem with other compatible air barrier and flashing components of the building envelope to resist air and water infiltration. Code compliant asphalt saturated felt or paper WRB is applied over StoGuard and similarly functions in tandem with flashing to resist water infiltration. Owens Corning or Dow Type IV extruded polystyrene insulation (XPS) is the ci component of the assembly. Sto DrainScreen, the drainage mat, creates a cavity behind the stucco cladding to promote drainage and drying of the wall assembly in the event of incidental water infiltration through a crack in the stucco. StoPowerwall and Sto listed stuccos are ICC ES listed or ASTM C 926 compliant portland cement stuccos. Sto exterior primers and finishes complete the exterior stucco wall assembly and are applied over the properly cured stucco base.*

*Like all building materials portland cement stucco has limitations. For example, efflorescence is a normal occurrence in portland cement based products and can affect final appearance of finish products installed over stucco. Some degree of cracking is normal in portland cement stucco and should be expected. Cracking is generally not caused by a material defect in the stucco and can be minimized by following sound design and construction practice such as: proper installation of lath, proper incorporation of stress relief joints in the construction, properly graded sand for field mixed stucco, proper proportioning of stucco mix ingredients, use of the minimum amount of water in the stucco mix for placement and avoiding the use of excess water, moist curing of the stucco after it has been applied, and proper sequencing of construction to avoid stresses in the freshly placed stucco. Surface alkalinity (pH) is an important consideration for stucco surfaces that will receive acrylic or acrylic elastomeric finishes and should be checked to verify pH less than 10 before primer or finish is applied. StoPrime Hot is the preferred primer for use on stucco surfaces to "mask" surface alkalinity. Refer to Sto Tech Hotline No. 1202-CF, Alkaline Substrates and Polymeric Finishes.*

*StoPowerwall ci, as with any exterior wall assembly, requires proper design detailing and integration with other components, in particular flashing and air barrier transition materials, to provide a wall assembly that resists air and water infiltration. The weather protection afforded by StoPowerwall ci should be evaluated by the*

*design/construction professional in relation to building design, height, orientation, climate zone, and any other factors that affect the severity of exposure to rain and water infiltration. Refer to Sto Tech Hotline Nos. 0403-BSc, Critical Detail Checklist for Wall Assemblies, and 0603-BSc, Moisture Control Principles for Design and Construction of Wall Assemblies. Modifications should be made to this specification as deemed necessary by the design/construction professional to ensure a watertight building envelope without water entry or accumulation anywhere within the wall assembly, an airtight building envelope, and control of condensation from water vapor diffusion. For complete technical information on Sto components and other reference materials, refer to product bulletins, guide details, and other technical information available at [www.stocorp.com](http://www.stocorp.com).*

*Notes in italics, such as this one, are explanatory and intended to guide the design/construction professional and user in the proper selection and use of materials. This specification should be modified where necessary to accommodate individual project conditions.*



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## PART 1 GENERAL

### 1.1 SUMMARY

- A. This section includes materials and installation of exterior stucco wall covering with continuous insulation, air/moisture barrier, WRB, and drainage mat over frame walls.

### 1.2 RELATED SECTIONS

*(add/delete, depending on specific project requirements)*

- |    |                  |   |
|----|------------------|---|
| A. | Section 03 30 00 | Cast-In-Place Concrete                    |
| B. | Section 04 20 00 | Unit Masonry                              |
| C. | Section 06 16 00 | Sheathing                                 |
| D. | Section 07 26 00 | Vapor Retarders                           |
| E. | Section 07 27 00 | Air Barriers                              |
| F. | Section 07 50 00 | Membrane Roofing                          |
| G. | Section 07 62 00 | Sheet Metal Flashing and Trim             |
| H. | Section 07 92 00 | Joint Sealants                            |
| I. | Section 08 40 00 | Entrances, Storefronts, and Curtain Walls |
| J. | Section 08 50 00 | Windows                                   |

### 1.3 REFERENCED DOCUMENTS

*(add/delete depending on specific project requirements)*

- |    |                 |   |
|----|-----------------|---|
| A. | ASTM Standards: |   |
|    | A 641           | Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire                             |
|    | A 653           | Specification for Sheet Steel Zinc coated (Galvanized) by the Hot-Dip Process, Commercial Quality |
|    | B 69            | Specification for Rolled Zinc   |
|    | C 144           | Specification for Aggregate for Masonry Mortar  |
|    | C 297           | Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions                      |
|    | C 578           | Specification for Preformed, Cellular Polystyrene Thermal Insulation                              |
|    | C 847           | Standard Specification for Metal Lath   |
|    | C 897           | Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters                 |
|    | C 926           | Standard Specification for Application of Portland Cement-Based Plaster                           |
|    | C 1063          | Standard Specification for Installation of Lathing and Furring for Portland Cement Plaster        |
|    | C 1177          | Specification for Glass Mat Gypsum for Use as Sheathing   |

C 1513	Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
D 226	Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
D 4541	Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
E 84	Test Method for Surface Burning Characteristics of Building Materials
E 96	Standard Test Methods for Water Vapor Transmission of Materials
E 283	Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
E 330	Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
E 331	Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
E 783	Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
E 2178	Standard Test Method for Air Permeance of Building Materials
E 2357	Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
E 2430	Standard Specification for Expanded Polystyrene (“EPS”) Thermal Insulation Boards For Use in Exterior Insulation and Finish Systems (“EIFS”)
G 154	Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials
<b>B. APA Engineered Wood Association</b>	
PS 1	Voluntary Product Standard, Structural Plywood
PS 2	Performance Standard for Wood-Based Structural-Use Panels
E 30	APA Engineered Wood Construction Guide
<b>C. AISI (American Iron and Steel Institute)</b>	
AISI S200-2007	North American Standard for Cold-Formed Steel Framing-General Provisions
<b>D. ICC (International Code Council)</b>	
IBC	2012 and 2015 IBC (International Building Code)
<b>E. ICC ES (International Code Council Evaluation Service)</b>	
AC 11	Acceptance Criteria for Cementitious Exterior Wall Coatings
AC 212	Acceptance Criteria for Water-resistive Coatings used as Water-resistive Barriers over Exterior Sheathing
ICC ESR 1233	StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-resistive Barriers, and StoEnergy Guard
ICC ESR 2323	StoPowerwall and StoPowerwall NExT Stucco Systems

ICC ESR 2142 Styrofoam Brand Insulation Boards and Dow Fan-Fold Products

- F. National Fire Protection Association (NFPA) Standards
- NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus
- NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source
- G. South Coast Air Quality Management District (SCAQMD)  
Rule 1113 (2007) Architectural Coatings
- H. Sto Corp.  
Addendum to Sto Stucco Specifications
- I. US EPA (United States Environmental Protection Agency)  
40 CFR Part 59 (Code of Federal Regulations Title 40 Part 59 – National Volatile Organic Compound Emission Standards for Consumer and Commercial Products)

## 1.4 DESIGN REQUIREMENTS

- A. Structural (wind and axial loads)
1. Design for maximum allowable deflection, normal to the plane of the wall of L/360
  2. Design for wind load in conformance with code requirements
  3. Metal framing: 18 gage (0.043 mil) or heavier, maximum 1-5/8 inch flange width, cold formed steel stud framing in conformance with AISI Standard S200-07
  4. Maximum stud spacing: 16 inches (406 mm) on center
  5. Sheathing: minimum 5/8 inch (19 mm) glass mat faced gypsum sheathing in conformance with ASTM C 1177
  6. Insulation board: minimum 1 inch (25 mm), maximum 2 inch (51 mm) XPS (extruded polystyrene) insulation board in conformance with ASTM C 578 Type IV requirements
  7. Drainage mat: maximum ¼ inch (6 mm) thick tangled filament nylon core with fabric facing
  8. Metal Lath: minimum 2.5 lb / yd<sup>2</sup> (1.4 kg / m<sup>2</sup>) self-furred galvanized steel diamond mesh metal lath in conformance with ASTM C 847
  9. Lath fasteners and plates: corrosion resistant fasteners in conformance with AISI Standard S200-2007 and ASTM C 1513 with minimum three thread penetration beyond steel framing members, and minimum 1-1/4 inch (32 mm) corrosion resistant lath plates, with minimum fastener size and length of,
    - a. #8 x 3 inch (76 mm) for 1 inch (25 mm) insulation board thickness
    - b. #10 x 3-1/2 inches (89 mm) for 1-1/2 inch (38 mm) insulation board thickness
    - c. #10 x 4 inch (102 mm) for 2 inch (51 mm) insulation board thickness
  10. Lath fastener spacing: maximum 6 inches (152 mm) vertically along studs

11. Stucco: minimum ¾ inch (19 mm) or 7/8 inch (22 mm) portland cement stucco in conformance with ASTM C 926 of uniform thickness applied in two coats, scratch and brown coat.

**B. Moisture Control**

1. Prevent the accumulation of water into or behind the stucco, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly:
  - a. Provide corrosion resistant flashing to protect exposed elements and to direct water to the exterior, including, above window and door heads, beneath window and door sills, at floor lines, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
  - b. Air Leakage Prevention – prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
  - c. Vapor Diffusion and Condensation -- perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation. Adjust wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.
  - d. Provide StoGuard Air/Moisture Barrier over sheathing.
  - e. At through wall expansion joints and at joints formed with back-to-back casing beads, back joints with StoGuard Transition Membrane. Refer to Sto Guide Details at [www.stocorp.com](http://www.stocorp.com).
  - f. Seal stucco terminations and accessory butt joints with appropriate sealant. Seal all penetrations through the stucco wall assembly with appropriate sealant, or backer rod and sealant, as dictated by joint type.

**C. Grade Condition**

1. Do not specify stucco for use below grade or on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 4 inch (100 mm) clearance above earth grade, minimum 2 inch (51 mm) clearance above finished grade (pavers/sidewalk). Provide increased clearance in freeze/thaw climate zones.

**D. Sloped surfaces, Including Foam Trim and Projecting Architectural Features Attached to Stucco.**

1. Avoid the use of stucco on build-outs or weather exposed sloped and horizontal surfaces (refer to 2 and 3 below).
2. Build out trim and projecting architectural features from the stucco wall surface with code compliant EPS foam. All foam trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All foam horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the wall plane, protect the top surface with waterproof base coat. Limit foam thickness to a maximum of 4 inches (102 mm). Periodic inspections and increased maintenance may be required to maintain surface integrity of finishes on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto Guide Details at [www.stocorp.com](http://www.stocorp.com)



3. Do not use foam on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Guide Details at [www.stocorp.com](http://www.stocorp.com)

#### E. Joints and Accessories

1. Provide two piece expansion joints in the stucco system where building movement is anticipated: at joints in the substrate or supporting construction, where the system is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, at columns and cantilevered areas.
2. Provide one piece expansion joints every 144 ft<sup>2</sup> (13 m<sup>2</sup>). Cut and wire tie lath to the expansion joint accessory so lath is discontinuous at or beneath the accessory. Do not exceed length to width ratio of 2-1/2:1 in expansion joint layout and do not exceed more than 18 feet (5.5 m) in any direction without an expansion joint. Where casing bead is used back-to-back as the expansion joint, back the joint with StoGuard Transition Membrane.
3. Provide one piece expansion joints at through wall penetrations, for example, above and below doors or windows.
4. Provide minimum 3/8 inch (9 mm) wide joints where the system abuts windows, doors and other through wall penetrations.
5. Provide appropriate accessories at stucco terminations and joints.
6. Avoid the use of channel reveal accessories which can interfere with proper drainage and proper stress relief.
7. Provide appropriate sealant at stucco terminations and at stucco accessory butt joints.
8. Indicate location of joints, accessories and accessory type on architectural drawings.

#### F. Fire Protection

1. Provide 15 minute thermal barrier, typically minimum ½ inch thick interior gypsum wall board, to separate foam plastic insulation from interior.
2. Noncombustible Type Construction: provide full width firestops at floor lines, typically 4 pcf (64 kg/m<sup>3</sup>) semi-rigid mineral wool, where metal framing runs continuously past floor line and provide minimum ¾ inch (19 mm) uniform stucco thickness.
3. Fire Resistance Rated Non-load Bearing Wall Assembly: provide ¾ or 7/8 inch (19 or 22 mm) uniform stucco thickness. Refer to Sto Guide Details for a one hour non-load bearing fire-resistive rated wall assembly.

#### G. Stucco Thickness (does not include primer or textured finish coat)

1. Application to Metal Plaster Bases: stucco thickness shall be uniform ¾ inch or 7/8 inch (19 or 22 mm). Stucco thickness shall not exceed 7/8 inch (22 mm).
2. Stucco shall be applied in 2 coats, scratch and brown coat, to achieve the prescribed thickness.
3. Thickness shall be uniform throughout the wall area.

## 1.5 PERFORMANCE REQUIREMENTS

#### A. Continuous Insulation

1. Compliant with ASTM C 578 Type IV requirements

**B. Waterproof Air Barrier**

1. Compliant with ICC ES Acceptance Criteria AC 212 (ICC ESR 1233)
2. Material Air Leakage Resistance, ASTM E 2178: less than 0.02 L/s·m<sup>2</sup> at 75 Pa (0.004 cfm/ft<sup>2</sup> at 1.57 psf)
3. Assembly Air Leakage Resistance, ASTM E 2357: less than 0.2 L/s·m<sup>2</sup> (0.04 cfm/ft<sup>2</sup> at 1.57 psf)
4. Water Vapor Permeance, ASTM E 96, Method B: greater than 10 perms [573 ng/(Pa·s·m<sup>2</sup>)]
5. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed, less than 450, Class A Building Material
6. Tensile Adhesion, ASTM C 297:
  - a. Gypsum Sheathing, exceeds strength of substrate
  - b. Plywood, > 85 psi (590 kPa)
  - c. OSB, > 30 psi (206 kPa)
7. VOC, calculation:
  - a. Less than 100 g/L
  - b. Compliant with US EPA 40 CFR 59 for waterproofing/sealer
  - c. Compliant with South Coast AQMD Rule 1113 for waterproofing/sealer

**C. Drainage Mat**

1. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A Building Material
2. Flame Propagation, NFPA 285: meets requirements for use on noncombustible (Types I, II, III, and IV) construction.

**D. Stucco Base (*select one*)**

1. Stucco scratch and brown coat material in compliance with ASTM C 926 and manufactured or listed by Sto Corp. (see Addendum)
2. One coat stucco material in compliance with ICC AC 11, listed by ICC ES, and manufactured or listed by Sto Corp. (see Addendum)

**E. Primers (*select one*)**

1. Alkaline Resistant Primer for freshly placed (minimum 4 day old) stucco surfaces:
  - a. Resistant to alkaline surfaces with pH of 13 or less
  - b. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
  - c. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
2. Acrylic Primer for fully cured (minimum 28 day old or pH less than 10) stucco surfaces:
  - a. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material

- b. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
- F. Finishes (*select one*)
1. Lotus-Effect Technology Finish (Stolit Lotusan)
    - a. Super-hydrophobic textured finish with Lotus-Effect Technology
    - b. Accelerated Weathering, ASTM G 154: 2500 hours, no blistering, checking cracking, crazing, or other deleterious effects
    - c. Water Vapor Permeability, ASTM E 96, Method B: > 30 perms [(1172 ng/(Pa·s·m<sup>2</sup>))]
    - d. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
    - e. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
  2. Silicone Enhanced Elastomeric Finish (Sto Powerflex Silco)
    - a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
    - b. Water Vapor Permeability, ASTM E 96, Method B: > 10 perms [(574 ng/(Pa·s·m<sup>2</sup>))]
    - c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
    - d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
  3. Elastomeric Finish (Sto Powerflex)
    - a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
    - b. Water Vapor Permeability, ASTM E 96, Method B: > 5 perms [(287 ng/(Pa·s·m<sup>2</sup>))]
    - c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
    - d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
  4. Flexible Acrylic Finish (Sto Powerwall)
    - a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
    - b. Water Vapor Permeability, ASTM E 96, Method B: > 15 perms [(861 ng/(Pa·s·m<sup>2</sup>))]
    - c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
    - d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings
  5. Acrylic Finish (Stolit, Stolit X, Sto Essence DPR, Sto Powercryl)
    - a. Accelerated Weathering, ASTM G 154 or G 155: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
    - b. Water Vapor Permeability, ASTM E 96, Method B: > 10 perms [572 ng/(Pa·s·m<sup>2</sup>)]

- c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
- d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

## 1.6 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data.
- B. Manufacturer's code compliance report and UL Listing for continuous insulation
- C. Manufacturer's code compliance report for air barrier and water-resistive barrier
- D. EPS board manufacturer's certificate of compliance with ASTM E 2430-05
- E. Manufacturer's NFPA 285 assembly report or ICC ESR indicating compliance of stucco assembly, including continuous insulation, air/moisture barrier, and drainage mat, with requirements of NFPA 285 for use on Types I, II, III, and IV construction
- F. Manufacturer's code compliance report for stucco where ICC listed one coat stucco is used
- G. Manufacturer's standard warranty
- H. Samples for approval as directed by architect or owner
- I. Fastener manufacturer's pull-out or withdrawal capacity testing for frame construction
- J. Prepare and submit project-specific details (when required by contract documents)

## 1.7 QUALITY ASSURANCE

- A. Manufacturer requirements
  - 1. Stucco and air barrier products manufacturer for a minimum of twenty (20) years.
  - 2. Stucco finish products and air/moisture barrier products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.
- B. Contractor requirements
  - 1. Licensed, insured and engaged in application of portland cement stucco for a minimum of three (3) years.
  - 2. Knowledgeable in the proper use and handling of Sto materials.
  - 3. Employ skilled mechanics who are experienced and knowledgeable in portland cement stucco application, and familiar with the requirements of the specified work.
  - 4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
  - 5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.
- C. Insulation board manufacturer requirements

1. Listed by an approved agency. Label insulation board with information required by Sto, the approved listing agency, and the applicable building code.

#### D. Testing

1. Construct full-scale mock-up of typical stucco/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, ASTM E 331 and ASTM E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.
2. Conduct air barrier adhesion testing in accordance with ASTM D 4541.
3. Conduct air barrier assembly testing in accordance with ASTM E 783.
4. Verify adequacy of pull-out or withdrawal capacity of fasteners used for frame construction with manufacturer in relation to negative design wind pressures.
5. Conduct pH testing to check stucco surface alkalinity before application of primer or finish materials. Where alkaline resistant primer is used pH testing may be waived.
6. Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
7. Notify design professional minimum 7 days prior to testing.

#### E. Inspections

1. Provide independent third party inspection where required by code or contract documents.
2. Conduct inspections in accordance with code requirements and contract documents.

### 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect insulation materials from prolonged UV exposure, keep away from sources of heat, sparks, flame, flammable or volatile materials. Store on a clean, flat surface, off the ground in a dry area.
- C. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
- D. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.
- E. Handle all products as directed on labeling.

### 1.9 PROJECT/SITE CONDITIONS

*(Weather conditions affect application, drying time and curing requirements. Hot or dry conditions limit working time and accelerate drying and may require adjustments in application, scheduling and curing to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing.)*

- A. Maintain ambient and surface temperatures above 40°F (4°C) during application and for 24 hours after set of stucco, and application of waterproof air barrier and finish materials.
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C) such that material temperatures are maintained as in 1.09A. Prevent concentration of heat on uncured stucco and vent fumes and other products of combustion to the outside to prevent contact with stucco.
- C. Prevent uneven or excessive evaporation of moisture from stucco during hot, dry or windy weather. For installation under any of these conditions provide special measures to properly moist cure the stucco. Do not install stucco if ambient temperatures are expected to rise above 100°F (38°C) within a 24 hour period.
- D. Provide protection of surrounding areas and adjacent surfaces from application of materials.

## 1.10 COORDINATION/SCHEDULING

*(The work in this section requires close coordination with related sections and trades. Sequence work to provide protection of construction materials from weather deterioration and from damage from trades)*

- A. Protect continuous insulation from prolonged UV exposure. Protect with wall covering within 60 days of installation.
- B. Protect sheathing from climatic conditions to prevent weather damage until the installation of the waterproof air barrier.
- C. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
- D. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier and continuous moisture protection. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing. Coordinate installation of air/moisture barrier components with window and door installation to provide weather proofing of the structure and to prevent moisture infiltration and excess air infiltration.
- E. Install window and door head flashing immediately after windows and doors are installed.
- F. Protect air/moisture barrier with stucco cladding within 180 days of installation.
- G. Protect drainage mat with stucco cladding within 30 days of installation.
- H. Commence the stucco installation after completion of all floor, roof construction and other construction that imposes dead loads on the walls to prevent excessive deflection (and potential cracking) of the stucco.
- I. Sequence interior work such as drywall installation prior to stucco installation to prevent stud distortion (and potential cracking) of the stucco.
- J. Provide site grading such that the stucco terminates above earth grade minimum 4 inches (100 mm) and above finished grade (pavers/sidewalk) minimum 2 inches (51 mm). Provide increased clearance in freeze/thaw climate zones.

- K. Install copings and sealant immediately after installation of the stucco and when finish coatings are dry.
- L. Attach penetrations through stucco to structural support and provide air tight and water tight seals at penetrations.

## 1.11 WARRANTY

- A. Provide manufacturer's standard warranty.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Air/Moisture Barrier, Drainage Mat, Portland Cement Stucco, Stucco Primers, and Stucco Finishes

1. Sto Corp., 3800 Camp Creek Parkway, Building 1400, Suite 120. Atlanta, GA 30331

*NOTE: Other sources for portland cement stucco may be permissible – refer to Addendum.*

### 2.2 AIR/MOISTURE BARRIER

- A. StoGuard-- fluid applied waterproof air barrier for sheathing, concrete, and concrete masonry substrates consisting of multiple compatible components:
  1. Sto Gold Fill -- ready mixed acrylic based flexible joint treatment for rough opening protection, joint treatment of wall sheathing, CMU crack repair, and detail component for shiplap connections with flashing, weep screed, and similar ship lap details.
  2. Sto EmeraldCoat -- ready mixed flexible waterproof coating for wall sheathing, concrete and CMU wall surfaces
  3. Sto AirSeal™ - ready mixed medium-high build coating applied by brush, roller or spray for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Fabric. Also used as a detail component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar shingle lap details.
  4. StoGuard Mesh-- nominal 4.2 oz/yd<sup>2</sup> (142 g/m<sup>2</sup>), self-adhesive, flexible, symmetrical, interlaced glass fiber mesh, with alkaline resistant coating for compatibility with Sto materials, used with Sto Gold Fill to reinforce rough openings, inside and outside corners, sheathing joints, and detail component for shiplap connections with flashing, weep screed, and similar shingle lap details
  5. StoGuard Fabric – nonwoven cloth reinforcement used with Sto EmeraldCoat for rough opening protection, joint treatment of wall sheathing, and detail component for shiplap connections with flashing, weep screed, and similar shingle lap details
  6. StoGuard RediCorner – a preformed fabric piece used in the corners of rough openings in tandem with StoGuard Fabric for quicker installation
  7. StoGuard Tape – self adhering rubberized asphalt tape for rough opening protection in wood or metal frame construction
  8. StoGuard Primer – primer for use with StoGuard Tape



9. StoGuard Transition Membrane – flexible air barrier membrane for continuity at static transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.
10. Sto RapidGuard™ - one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap over flashing, wall to balcony floor slab or ceiling, and through wall penetrations – pipes, electrical boxes, and scupper penetrations
11. StoGuard RapidSeal – one component quick drying waterproof air barrier material for rough opening protection, sheathing joints (with StoGuard Mesh), CMU crack repair, and for sealing fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials
12. StoGuard RapidFill – one component rapid drying gun-applied joint treatment for sheathing. Also used at static transition joints or seams in construction and to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials. Also used as a detail component for shiplap connections to flashing, weep screed, and similar ship lap details

## 2.3 CONTINUOUS INSULATION

*(supplied by others)*

- A. Owens Corning Type IV XPS rigid insulation board in compliance with ASTM C 578.
- B. Dow Type IV XPS rigid insulation board in compliance with ASTM C 578.

## 2.4 SPRAY FOAM ADHESIVE, CI SEAM AND GAP FILLER

- A. Sto TurboStick – single component polyurethane spray foam adhesive for attaching foam insulation and filling seams and gaps in insulation board surface.

## 2.5 WATER-RESISTIVE BARRIER *(supplied by others)*

- A. Minimum No. 15 asphalt saturated felt complying with ASTM D 226, Type 1, or one layer of Grade D kraft building paper, or paper-backed stucco lath conforming to 2.07.

## 2.6 DRAINAGE MAT

*(Some building code jurisdictions require a 3/8 inch [10 mm] drainage gap. Check local codes and select Sto DrainScreen 10mm where required)*

- A. Sto DrainScreen 6mm – nominal ¼” (6 mm) tangled filament nylon core drainage mat with fabric facing.
- B. Sto DrainScreen 10mm – nominal 3/8” (10 mm) tangled filament nylon core drainage mat with fabric facing.

## 2.7 LATH

*(supplied by others)*



- A. Minimum 2.5 lb./yd<sup>2</sup> (1.4 kg/m<sup>2</sup>) self-furred galvanized steel diamond mesh metal lath in compliance with ASTM C 847

**NOTE:** *Metal lath is susceptible to corrosion in coastal environments. Provide weather protection to prevent moisture entry into wall construction as outlined in Design Requirements Section 1.04B. Consider the use of stainless steel lath for coastal environments. Exercise care when attaching metal lath and accessories through the water-resistive barrier so that fasteners go into [not between] framing supports. Do not use power, powder-actuated or other fastening tools/methods that can damage the air barrier, water-resistive barrier or substrate.*

## 2.8 MECHANICAL FASTENERS FOR METAL LATH

*(supplied by others)*

- A. Non-corroding fasteners in compliance with AISI S200 – 2007 and ASTM C 1513 with minimum 1-1/4 inch (32 mm) corrosion resistant lath plates:
1. Wood Framing--minimum #10 Type S wafer head fully threaded corrosion resistant screws with minimum 1 inch (25 mm) penetration into studs.
  2. Steel Framing – corrosion resistant fasteners and plates with minimum three thread penetration beyond steel framing members, and with minimum fastener size and length of,
    - a. #8 x 3 inch (76 mm) for 1 inch (25 mm) insulation board thickness
    - b. #10 x 3-1/2 inches (89 mm) for 1-1/2 inch (38 mm) insulation board thickness
    - c. #10 x 4 inch (102 mm) for 2 inch (51 mm) insulation board thickness

**NOTE:** *Pull-out or withdrawal capacity of the selected fastener must be verified with respect to anticipated wind load, desired safety factor and building code requirements. Consult applicable code compliance report for specific assemblies and fastening schedules or conduct project specific testing to verify compliance with design wind pressure requirements.*

- B. Tie Wire – 18 gauge galvanized and annealed low-carbon steel in compliance with ASTM A 641 with Class I coating.

## 2.9 ACCESSORIES

*(supplied by others)*

- A. Weep screed, casing bead, corner bead, corner lath, expansion and control joint accessories. All accessories shall meet the requirements of ASTM C 1063 and its referenced documents
1. PVC plastic in compliance with ASTM D 1784, cell classification 13244C.
  2. Zinc in compliance with ASTM B 69.
  3. Galvanized metal in compliance with ASTM A 653 with G60 coating.
- B. All accessories shall have perforated or expanded flanges and shall be designed with grounds for the specified thickness of stucco.

**NOTE:** *Metal accessories are susceptible to corrosion in coastal environments. Consider the use of zinc alloy or PVC accessories in these environments. Metal corner beads with solid metal noses are susceptible to corrosion in exposed exterior applications. Consider the use of several layers of woven-wire mesh or other corner accessories in lieu of corner bead and completely encase the metal in stucco. Care must be taken when attaching metal lath or other wall assembly components so that fasteners go into [not between] framing supports. Powder actuated or other fastening devices that can damage the water-resistive barrier, sheathing, or CI should be avoided. CAUTION: AVOID THE USE OF CHANNEL REVEAL ACCESSORIES THAT INTERFERE WITH PROPER DRAINAGE OR STRESS RELIEF.*

## 2.10 JOB MIXED INGREDIENTS

*(supplied by others)*

- A. Water: clean and potable.
- B. Sand: in compliance with ASTM C 897 or ASTM C 144, for use with one coat and ASTM C 926 stucco concentrates

## 2.11 STUCCO

*(refer to Addendum for other stucco products that may apply)*

- A. 102 StoPowerwall Stucco Pre-Blended: fiber reinforced one coat portland cement stucco pre-blended with graded sand, and in compliance with ICC AC 11. See ICC ESR 2323.
- B. 103 StoPowerwall Stucco: fiber reinforced one coat portland cement stucco concentrate in compliance with ICC AC 11. See ICC ESR 2323.
- C. 108 Powerwall Scratch & Brown: portland cement-based stucco concentrate in compliance with ASTM C 926.
- D. Other code compliant portland cement stucco as listed by Sto Corp. (refer to Addendum)

## 2.12 FOAM TRIM AND BUILD-OUTS

- A. Adhesive and Base Coat *(select one)*
  - 1. Sto BTS Xtra – light weight one component polymer modified cement-based extra high build base coat material
  - 2. Sto BTS Plus – one component polymer modified cement-based high build base coat material
  - 3. Sto Primer/Adhesive-B – one component polymer modified cement-based base coat material
  - 4. Sto Primer/Adhesive – two component acrylic based base coat material field mixed with portland cement
  - 5. Sto RFP – ready mixed non-cementitious fiber reinforced base coat material

6. Sto Flexyl – two component fiber reinforced acrylic based waterproof base coat material field mixed with portland cement (for use as a waterproof base coat to waterproof foundations, parapets, splash areas, trim and other projecting architectural features).
- B. Foam Insulation Board for Trim
1. Sto EPS Insulation Board--nominal 1.0 lb/ft<sup>3</sup> (16 kg/m<sup>3</sup>) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and ASTM E 2430 (*Note: minimum required thickness is 1 inch [25 mm] and maximum allowable thickness is typically 4 inches [100 mm] for noncombustible type construction unless thicker dimensions are approved by the code official*).
- C. Reinforcing Mesh
1. Sto Mesh--nominal 4.5 oz./yd<sup>2</sup> (153 g/m<sup>2</sup>), symmetrical, interlaced open-weave glass fiber mesh treated with alkaline resistant coating for compatibility with Sto materials (*achieves Standard Impact Classification over foam insulation board*).
  2. Sto Detail Mesh--nominal 4.2 oz/yd<sup>2</sup> (143 g/m<sup>2</sup>), flexible, symmetrical, interlaced open-weave glass fiber fabric treated with alkaline resistant coating for compatibility with Sto materials (*used for standard foam backwrapping and aesthetic detailing*).

## 2.13 CRACK DEFENSE

*(optional components for added crack resistance)*

- A. Base Coat (*select one*)
1. Sto BTS Xtra – light weight one component polymer modified cement-based extra high build base coat material
  2. Sto BTS Plus – one component polymer modified cement-based high build base coat material
  3. Sto Primer/Adhesive-B – one component polymer modified cement-based base coat material
  4. Sto Primer/Adhesive – two component acrylic based base coat material field mixed with portland cement
  5. Sto RFP – ready mixed non-cementitious fiber reinforced base coat material
  6. Sto Flexyl – two component fiber reinforced acrylic based waterproof base coat material field mixed with portland cement (for use as a waterproof base coat to waterproof foundations, parapets, splash areas, trim and other projecting architectural features).
- B. Reinforcing Mesh
1. Sto Mesh – nominal 4.5 oz./yd<sup>2</sup> (153 g/m<sup>2</sup>), symmetrical, interlaced open-weave glass fiber mesh made with alkaline resistant coating for compatibility with Sto materials.

## 2.14 PRIMER

*(select one)*

- A. StoPrime Hot – acrylic based primer/sealer for freshly placed (minimum 4 day old) and high pH stucco surfaces.

- B. StoPrime Sand – acrylic based tinted, sanded primer for fully cured (minimum 28 day old or pH less than 10) stucco surfaces.
- C. StoPrime – acrylic based tinted primer for fully cured (minimum 28 day old or pH less than 10) stucco surfaces.

*NOTE: Priming is recommended to provide uniform substrate absorption and finish color, to improve adhesion and water resistance, and to retard efflorescence. StoPrime Hot may be applied 48 hours after moist curing the brown coat. Other Sto primers require 28 days curing of brown coat or pH less than 10 before application.*

## 2.15 FINISH COAT

*(select one)*

- A. Stolit Lotusan Finish – integrally colored, factory blended textured Lotus-Effect Technology wall finish with graded marble aggregate
- B. Sto Powerflex Silco Finish – integrally colored, factory blended, silicone enhanced elastomeric textured wall finish with graded marble aggregate
- C. Sto Powerflex Finish – integrally colored, factory blended, elastomeric textured wall finish with graded marble aggregate
- D. StoPowerwall Finish – integrally colored, factory blended, flexible acrylic textured wall finish with graded marble aggregate.
- E. Stolit Finish – integrally colored, factory blended, acrylic textured wall finish with graded marble aggregate
- F. Stolit X – acrylic based textured wall finish with graded marble aggregate and enhanced polymer technology for easy spread and float application
- G. Sto Essence DPR Finish – integrally colored, factory blended, acrylic textured wall finish with graded marble aggregate
- H. Sto Powercryn Finish – integrally colored, factory blended, acrylic textured wall finish with graded marble aggregate
- I. StoSignature Finishes – Stolit acrylic based textured wall finish applied over Sto Crack Defense with specialized techniques to achieve unique textures, impressions or effects. Refer to [www.stocorp.com](http://www.stocorp.com) for StoSignature Finishes Brochure and Installation Guides.

## 2.16 MIXING

- A. StoGuard
  - 1. Sto Gold Fill – mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
  - 2. Sto AirSeal – mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
  - 3. Sto EmeraldCoat – mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.

- B. StoPowerwall Stucco
  - 1. Refer to mix instructions on packaging. USE ONLY THE AMOUNT OF WATER NECESSARY FOR A WORKABLE MIX. Use of excess water is detrimental to performance.
- C. Adhesive and Base Coats for Sto Crack Defense and Foam Build-outs:
  - 1. Refer to applicable Sto [Product Bulletin](#) for selected adhesive/base coat material(s).
- D. Primer--mix with a clean, rust-free high speed mixer to a uniform consistency.
- E. Finish--mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water (up to 12 ounces [0.4 L]) may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- F. Mix only as much material as can readily be used.
- G. Do not add lime, anti-freeze compounds, or other additives to any of the materials.

## **PART 3 EXECUTION**

### **3.1 ACCEPTABLE INSTALLERS**

- A. Pre-qualify under Quality Assurance requirements of this specification (section 1.07.B).

### **3.2 CONTINUOUS INSULATION INSTALLATION**

- A. Attach insulation boards to open framing with corrosion resistant bugle head metal screws and 1-1/4 inch metal lath locks or other corrosion resistant cap fastener. Use only enough fasteners (typically 3 per board mid-span) to temporarily hold the board in place (sheathing attachment is intended to permanently hold it in place).
- B. Attach in courses with vertical joints staggered.
- C. Cut insulation board in an “L” shape around openings. Tightly abut insulation board joints and interlock inside and outside corners. Trim or rasp board flush for square corners.
- D. Seal gaps or open joints with Sto TurboStick spray foam and rasp or shave flush with surface.
- E. Do not allow insulation board to be exposed to weather from more than 60 days.

### **3.3 SHEATHING INSTALLATION**

- A. Install sheathing in courses over the continuous insulation to permanently hold the insulation boards in place. Install immediately following or in tandem with the continuous insulation.
- B. Abut gypsum sheathing joints. Gap wood sheathing 1/8 inch (3 mm) at joints.
- C. Install in compliance with applicable code and sheathing manufacturer’s instructions, except: offset sheathing joints from continuous insulation board joints by a minimum of 6 inches (152 mm). Support all vertical joints with studs, and use minimum #8 corrosion resistant screw fasteners with minimum three thread penetration into metal studs, minimum 1 inch (25 mm) penetration into wood studs. Space fasteners no greater than 8 inches (203 mm) on center along framing members for gypsum sheathing



- D. Verify attachment and installation conforms with requirements for design wind pressures.

### 3.4 EXAMINATION

- A. Inspect sheathing surfaces for:
  1. Damage and deterioration.
  2. Moisture damage—record any areas of moisture damage.
- B. Inspect sheathing application for compliance with applicable requirement:
  1. Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177 – refer to manufacturer's instructions and/or ICC evaluation report
  2. Exterior Grade and Exposure 1 wood based sheathing – APA Engineered Wood Association E 30.

*NOTE: Sheathing attachment can determine ultimate wind load resistance. Verify attachment in conformance with design wind pressure requirements as determined by building code requirements and/or project specific testing. Wood-based sheathing must be gapped 1/8 inch (3mm) at edge and end joints to prevent cracking in the stucco.*

- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the waterproof air barrier, CI, or stucco installation to the General Contractor. Do not proceed with air barrier, CI, or stucco installation until deviations are corrected.

### 3.5 SURFACE PREPARATION

- A. Sheathing
  1. Remove surface contaminants and replace damaged sheathing.
  2. All sheathing must be handled and installed in compliance with applicable building code and/or manufacturer requirements. Installed sheathing must be clean, dry and free from damage, frost, and all bond-inhibiting materials. Abut gypsum sheathing joints. Gap wood sheathing 1/8 inch (3 mm) at joints. Should gaps exceed 1/8 inch (3 mm) up to 1/2 inch (13 mm) wide, use Sto RapidGuard or StoGuard RapidFill to fill joints, or apply low expanding urethane foam into joints and rasp or shave flush with sheathing surface in preparation for installation of StoGuard joint treatment.
  3. Spot surface defects in sheathing with joint treatment (Sto Gold Fill, Sto RapidGuard, StoGuard RapidSeal, StoGuard RapidFill, or Sto EmeraldCoat).

### 3.6 AIR/MOISTURE BARRIER INSTALLATION

*(refer to Sto Guide Details as needed)*

*IMPORTANT: The air/moisture barrier installation described below is one component of the air barrier assembly for the building envelope and the moisture protection of the wall construction. Installation of the air/moisture barrier must be integrated with other air and moisture barrier components in the construction. This requires coordination with other trades to ensure proper sequencing of work, to achieve air barrier continuity, and to direct rain water to the exterior, not into the wall assembly. Always protect rough openings in wall construction BEFORE installing windows, doors, louvers, etc. Where water is likely*

*to penetrate the wall assembly, such as windows, flashing must be installed to direct water to the exterior at the leak source.*

- A. The following instructions are applicable to:
1. Exterior or Exposure I Plywood in compliance with PS-1
  2. OSB (Oriented Strand Board) in compliance with PS-1 or PS-2
  3. Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177
- B. Transition Detailing with StoGuard Transition Membrane
1. Detail transition areas with Sto RapidGuard (static joints and seams) or StoGuard Transition Membrane (dynamic joints and seams) to achieve air barrier continuity. For illustrations of installation, refer to Sto Guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide ([www.stocorp.com](http://www.stocorp.com))
- C. Rough Opening Protection (*select 1, 2, 3 or 4 for frame construction; for concrete or concrete masonry rough openings with wood bucks and similar openings with complex 3-dimensional geometry, select no. 3 or 4, Sto RapidGuard or StoGuard RapidSeal*):
1. Sto Gold Fill with StoGuard Mesh: apply 9 inch (229 mm) wide StoGuard Mesh at rough openings. Immediately apply Sto Gold Fill by spray or trowel over the mesh and spread with a trowel to create a smooth surface that completely covers the mesh (refer to Sto Detail 20.20M).
  2. Sto EmeraldCoat or Sto AirSeal with StoGuard Fabric: apply coating liberally by spray or roller to corners of openings, immediately place StoGuard RediCorners in the wet coating, and apply additional coating over the RediCorners to completely embed them. After all corners have been completed apply coating liberally to the entire rough opening, immediately place StoGuard Fabric in the wet coating, smooth any wrinkles with a brush or roller, and apply additional coating over the fabric to completely embed it. Overlap all seams minimum 2 inches (51 mm). Once completed top coat with additional coating as needed to completely seal the surface. Allow to dry and inspect for pinholes or voids. If pinholes or voids are present, seal with additional coating or Sto RapidGuard.
  3. Sto RapidGuard: apply a fillet bead of material with a caulking gun at interior corners inside the opening to seal jamb/sill and jamb/head seams. Apply material in a zig-zag pattern along sill, jambs, and head to form a generous bead of material along the surface to be covered. Use a 6 inch (152 mm) wide plastic drywall knife to spread the material to a uniform thickness of 12-20 mils (0.3-0.5 mm) before the material skins. Treat the entire rough opening surface in this manner and overlap onto the face of the sheathing 2 inches (51 mm) minimum all the way around
  4. StoGuard RapidSeal: apply a generous bead of StoGuard RapidSeal with a caulking gun in a zig-zag pattern along the inside and outside surface of the rough opening. Spread with a 6 inch (152 mm) wide plastic drywall knife all the way around the opening (refer to Sto Details)
- D. Sheathing Joint Treatment (*select one*)
1. Sto Gold Fill with StoGuard Mesh: place 4 inch (102 mm) wide mesh centered along sheathing joints and minimum 9 inch (229 mm) wide mesh centered and folded at inside and outside corners. Immediately apply Sto Gold Fill by spray or trowel and spread smooth with a trowel to completely cover the mesh.



2. Sto AirSeal or Sto EmeraldCoat with StoGuard Fabric: apply coating liberally by spray or roller along sheathing joints and immediately place 4 inch (102 mm) wide fabric centered over the joints into the wet coating, and 6 inch (152 mm) wide fabric centered and folded at inside and outside corners into the wet coating. Smooth any wrinkles with a brush or roller and apply additional coating to completely embed the fabric. Overlap seams minimum 2 inches (51 mm).
3. Sto RapidGuard: apply to properly installed sheathing – joints butted for gypsum sheathing, and joints gapped for plywood and OSB sheathings (wood-based sheathing typically requires 1/8 inch [3 mm] spacing at edge and end joints). Apply a thick bead of Sto RapidGuard with a caulking gun along sheathing joints, or apply in a zig-zag pattern across and down the joints. Spread to a uniform thickness of 20-30 mils (0.5-0.6 mm) before the material skins. Spread 1 inch (25 mm) beyond the sheathing joint on each side. Follow the same procedure for inside and outside corners.
4. StoGuard RapidFill: apply a thick bead of StoGuard RapidFill with a caulking gun along sheathing joints, or apply in a zig-zag pattern across and down the joints. Spread to a uniform thickness of 20-30 mils (0.5-0.6 mm). Spread 1 inch (25 mm) beyond the sheathing joint on each side. Follow the same procedure for inside and outside corners.

E. Air/Moisture Barrier Coating Installation

1. Plywood and Gypsum Sheathing: apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform mil thickness of 10 wet mils in one coat (Sto Emerald Coat) or 50 wet mils in one coat (Sto AirSeal). Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.
2. OSB Sheathing: apply waterproof coating by spray or with a ¾ inch (19 mm) nap roller to sheathing surface to a uniform wet mil thickness of 10 wet mils (Sto EmeraldCoat) or 50 wet mils in one coat (Sto AirSeal). Allow to dry, inspect surface for raised wood stands, and touch up these areas with a second coat.

F. Air /Moisture Barrier Connections and Shingle Laps

1. Coordinate installation of connecting air barrier components with other trades to provide a continuous air tight membrane.
2. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
3. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

**NOTE:** *Windows and doors are typically installed immediately following installation of the air/moisture barrier and work should be sequenced accordingly. Consult with window manufacturer for installation requirements to maintain air barrier continuity and for head, jamb, sill flashing and perimeter sealant requirements needed to prevent leaks into the wall assembly).*

**NOTE:** *DO NOT ALLOW WATERPROOF AIR BARRIER INSTALLATION TO REMAIN EXPOSED MORE THAN 180 DAYS. PROTECT WITH STUCCO WALL COVERING PROMPTLY AFTER INSTALLATION.*



### 3.7 SHEET WATER-RESISTIVE BARRIER INSTALLATION

- A. Install in compliance with the applicable building code requirements for building paper. Lap paper over foundation weep screed attachment flange, floor line flashing, and window/door head flashings. Refer to Sto Guide Details at [www.stocorp.com](http://www.stocorp.com)

*NOTE: Code requirements may vary. Always consult the applicable code and the manufacturer's code compliance report. Typically building paper in compliance with the code is lapped shingle style, upper courses over lower courses, by minimum 2 inches (51 mm), with vertical laps of minimum 6 inches (150 mm). Courses are staggered so that vertical joints do not align. Care must be taken to prevent tears in the paper and to limit penetrations to only those required for attachment. Flashing must be in place and properly integrated with the sheet WRB at sills, above windows and doors, at floor lines, decks and at roof/wall intersections such that water is directed to the exterior.*

### 3.8 DRAINAGE MAT INSTALLATION

- A. Place drainage mat against the wall surface and unroll horizontally with the fabric facing out. Hammer-tack or staple into place with corrosion-resistant fasteners. Use as few fasteners as needed to hold the mat in place, starting from the bottom of the wall at base flashing or weep screed and working up. Do not fasten through flashing. Shingle lap fabric at horizontal courses. Shingle lap drainage mat over weep screeds, flashing at floor lines, decks, roof lines, window heads, and other areas where flashing is required, to direct water to the exterior. Butt ends of rolls and vertical seams. Trim around windows, doors, vents, or other penetrations through the wall. Do not install behind window nail flanges. Immediately follow installation of drainage mat with stucco lath installation. Where stucco lath installation will not immediately follow installation of drainage mat, use corrosion-resistant cap nails, cap staples, or cap screws every 16 inches (406 mm) on center along framing for more secure attachment. Cover drainage mat with stucco within 30 days of installation.

### 3.9 STUCCO INSTALLATION

*(refer to Sto Guide Details as needed)*

Apply the stucco in discrete panels without interruption to avoid cold joints and differences in appearance. Abut wet stucco to set stucco at natural or architectural breaks in the wall such as expansion joints, pilasters, terminations, or changes in plane. Hot or dry conditions accelerate drying and moisture loss from stucco which can diminish strength and resistance to cracking. Under these conditions adjustments in the application, scheduling and curing of stucco to prevent rapid loss of moisture are necessary to achieve a satisfactory stucco installation. Cold temperatures retard drying and strength gain and adjustments may have to be made in the application, scheduling and curing of stucco to prevent damage from frost and other trades. Do not install stucco during extremely hot, dry and/or windy conditions. Do not install stucco during freezing conditions or on frozen substrates. Do not install stucco onto grounds of accessories. Completely embed lath and flanges of accessories and completely cover fastener attachments with stucco. Moist cure stucco minimum 48 hours for optimum strength gain and resistance to cracking. Allow final stucco application to completely dry (28 days) before applying primer or finish or until pH of stucco surface is less than 10 (except in the case of StoPrime Hot which can be applied 48 hours after completing moist cure of stucco). The finished installation must be true, plumb and square. Should stucco get into control or expansion joints, remove the stucco from within the joint before the stucco sets.

After satisfactory inspection of surfaces and correction of any deviations from specification requirements commence the stucco installation as described below:

A. Installation over StoGuard/Sto DrainScreen

1. Weep Screed Installation *(may also be done in conjunction with flashing and air/moisture barrier installation to facilitate shingle lapping of components at base of wall)*
  - a. Install foundation weep screed at the base of the wall securely to solid substrate or framing with the appropriate fastener. Locate foundation weep screed so that it overlaps the joint between the foundation and framing by a minimum of 1 inch (25 mm). Locate the foundation weep screed nosing minimum 4 inches (100 mm) above earth grade, 2 inches (51 mm) above finished grade (paved surfaces, for example). Lap waterproof air barrier, sheet water-resistive barrier, and drainage mat over the weep screed attachment flange.
2. Casing Bead and Two Piece Expansion Joint Installation
  - a. Install casing beads at stucco terminations – doors, windows and other through wall penetrations. Install two piece expansion joints (or back-to-back casing beads) at building expansion joints, thru-wall joints in concrete or CMU, where the stucco is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, columns, and cantilevered areas. Install full accessory pieces where possible and avoid small pieces. Seal adjoining pieces by embedding ends in sealant. Abut horizontal into vertical joint accessories (except where horizontal movement joints exist that prevent continuous vertical runs of accessories). Attach at no more than 7 inches (178 mm) into solid substrate/framing with appropriate fasteners.

**NOTE:** *Refer to architectural drawings for joint locations and accessory type. Air barrier and moisture protection must be continuous behind joints and accessories – refer to Sto Guide Details.*

3. Lath Installation

- a. Diamond Mesh Metal Lath – conform to ASTM C 1063
  - i. General--install metal lath with the long dimension at right angles to structural framing (horizontally on solid substrates). Terminate lath at expansion joints. Do not install continuously at joints.
  - ii. Seams/Overlaps--overlap side seams minimum 1/2 inch (13 mm) and end seams minimum 1 inch (25 mm). Stagger end seams. Overlap casing beads and expansion joints minimum 1 inch (25 mm) over narrow wing accessories, minimum 2 inches (51 mm) over expanded flange accessories. Do not install lath continuously beneath expansion joints.
  - iii. Attachment--fasten securely through sheathing into structural framing at 6 inches (152 mm) on center maximum vertically and 16 inches (406 mm) on center horizontally\* (refer to Section 2.08 for fastener types, lath-locks, and minimum required penetration into framing). Wire tie at no more than 9 inches (225 mm) on center at: side laps, accessory overlaps, and where end laps occur between supports.
- b. Paper-backed lath – follow installation as for diamond mesh metal lath. Lap lath over lath, not paper to lath overlap. For horizontal overlaps the paper backing must lap shingle style behind the lath to lath overlap.

*\*NOTE: The type fastener selected, its layout and pullout or withdrawal value from the supporting construction must be verified and approved by the project engineer/architect with respect to design wind load and local building code requirements. Exercise care when attaching metal lath and accessories through the water-resistive barrier so that fasteners go into [not between] framing supports. Do not use power, powder-actuated or other fastening tools/methods that can damage the air barrier, water-resistive barrier or substrate.*

4. One Piece Expansion Joint Installation
  - a. Install one piece expansion joints at through wall penetrations, for example, above and below doors and windows. Install one piece expansion joints at every 144 ft<sup>2</sup> (13 m<sup>2</sup>). Wire tie one piece expansion joints to lath at no more than 7 inches (178 mm) on center. Seal adjoining pieces by embedding ends in sealant. Make certain lath is DISCONTINUOUS at or beneath joints.
5. Inside and Outside Corners
  - a. Install corner lath at inside corners and corner bead at outside corners over lath. Attach through lath into solid substrate or framing at no more than 7 inches (178 mm) on center with appropriate fasteners.
6. Stucco Installation
  - a. Scratch Coat: apply stucco with sufficient pressure to key into and embed the metal lath. Apply sufficient material, 3/8 or 1/2 inch (9 or 12 mm), to cover the metal lath and to permit scoring the surface. Score the stucco upon completion of each panel in preparation for a second coat. Score horizontally.
  - b. Brown Coat: as soon as the first coat is firm enough to receive the second coat without damage, apply the second coat. Alternatively, moist cure the first coat up to 48 hours and dampen the scratched surface with water immediately before applying the second coat. Apply the second coat with sufficient pressure to ensure intimate contact with the first coat and as needed to bring the stucco to a uniform thickness that matches the grounds of the accessories. Use a rod or straight edge to bring the surface to a true, even plane. Fill depressions in plane with stucco. Final thickness of stucco shall be uniform throughout the wall area and shall be either 3/4 inch or 7/8 inch (19 or 22 mm), and shall not exceed 7/8 inch (22 mm).
  - c. After the stucco has become slightly firm float the surface lightly with a darby or wood float to densify the surface and to provide a smooth, even surface. The proper time to float is when the wood float no longer sticks to the surface of the stucco.
  - d. Moist cure after the stucco has set by lightly fogging for at least 48 hours. Fog as frequently as required during the 48 hour period to prevent loss of moisture from the stucco. Avoid eroding the stucco surface with excess moisture. If relative humidity exceeds 75% the frequency of moist curing can be diminished.

#### B. Foam Trim and Build-Outs

1. Where foam build-outs terminate at a dissimilar material such as a window, door or other non-stucco surface, backwrap the foam build-out by installing detail mesh onto the terminating edge of the stucco. Embed the mesh in the foam trim adhesive. Allow the mesh to dangle until the backwrapping procedure is completed (B4).
2. Install foam build-outs directly over hardened stucco with foam trim adhesive. Apply adhesive with the appropriate size notched trowel to the back of the insulation board and immediately place build-out in the proper location on the wall. Press firmly into place and

trim or tool excess adhesive from ends and edges of foam trim for a smooth void-free connection to the stucco substrate.

3. After the adhesive has cured sufficiently to hold the build-out firmly in place, rasp the entire foam surface smooth.
4. Complete the backwrapping procedure by applying the foam trim base coat to the exposed edges of the foam build-out and minimum 2-1/2 inches (64 mm) onto the face. Pull the backwrap mesh around the foam build-out and fully embed it into the base coat. Use a corner trowel for neat straight corners.
5. Apply the base coat to the foam build-out and approximately 3 inches (76 mm) onto the adjacent stucco surfaces to an approximate thickness of 1/8 inch (3 mm). Immediately embed the reinforcing mesh in the wet base coat. Trowel from the center to the edges of the mesh to avoid wrinkles and remove excess base coat. Overlap mesh seams minimum 2-1/2 inches (64 mm). Overlap mesh onto adjacent stucco wall surfaces minimum 2-1/2 inches (64 mm) at terminations of the foam build-out and feather onto the stucco wall surface. Alternatively, if Crack Defense is used apply Crack Defense with its reinforcing mesh continuously from the stucco wall surface over foam build-outs (refer to 3.09 C).

*NOTE: Do not install foam build-outs over joints in the stucco wall assembly. Terminate foam build-outs and backwrap in accordance with instructions above.*

#### C. Crack Defense

*NOTE: Crack Defense is optional. It provides additional crack resistance to the stucco wall surface*

1. Apply base coat over the moist cured stucco (and foam build-outs if not already reinforced with mesh) with appropriate spray equipment or a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible. Do not install base coat or mesh over joints or accessories in the stucco wall assembly.

#### D. Primer Installation

1. StoPrime Hot – Moist cure stucco for a minimum of 48 hours. Allow stucco to dry an additional 48 hours, then apply primer evenly with brush, roller or proper spray equipment over the clean, dry stucco and foam build-outs, and allow to dry. Final age of primed stucco application must be minimum 7 days before application of finish.
2. StoPrime Sand – Moist cure stucco for a minimum of 48 hours. Wait until stucco is 28 days old or the pH level of the surface is below 10 before applying primer. Final age of primed stucco application must be minimum 28 days before application of finish or pH must be below 10.
3. StoPrime – Moist cure stucco for a minimum of 48 hours. Wait until stucco is 28 days old or the pH level of the surface is below 10 before applying primer. Final age of primed stucco application must be minimum 28 days before application of finish or the pH must be below 10.

#### E. Finish Installation

1. Apply finish to minimum 28 day old stucco or primed stucco and foam build-outs, or when pH of stucco surface is less than 10. If StoPrime Hot is used as the primer the primed stucco/foam build-out surfaces need only be minimum 7 days old. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:
  - a. Avoid application in direct sunlight.
  - b. Apply finish in a continuous application, and work a wet edge towards the unfinished wall area. Work to an architectural break in the wall before stopping to avoid cold joints.
  - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
  - d. Float “R” (rilled or swirl texture) finishes with a plastic float to achieve their rilled texture
  - e. Do not install separate batches of finish side-by-side.
  - f. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
  - g. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.
  - h. Do not install finish over high pH ( $\geq 10$ ) stucco surfaces or surfaces that have not been fully cured.

### 3.10 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
- B. Provide protection of installed stucco from dust, dirt, precipitation, and freezing.
- C. Provide protection of installed primer and finish from dust, dirt, precipitation, freezing and continuous high humidity until fully dry.
- D. Provide sealant and backer material at stucco terminations and at fixture penetrations through the stucco to protect against air, water and insect infiltration. Provide weeps at floor lines, window and door heads, and other areas to conduct water to the exterior.

### 3.11 CLEANING, REPAIR AND MAINTENANCE

- A. Clean and maintain the stucco finish for a fresh appearance and to prevent water entry into and behind the stucco. Repair cracks, impact damage, spalls or delamination promptly.
- B. Maintain adjacent components of construction such as sealants, windows, doors, and flashing, to prevent water entry into the wall assembly.
- C. Refer to Sto reStore Repair and Maintenance Guide ([reStore Program](#)) for detailed information on stucco restoration – cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding.

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