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Sto Guide Specification M100
StoTherm® ci L.M.I 180 CMU
Miami-Dade County NOA No. 20-0211-04
Section 07 24 00

This specification is intended for use by the design/construction professional and any user of Sto products to assist in developing project specifications and to provide guidance on the application of StoTherm ci

L.M.I. 180 over Concrete Masonry Units (CMU) for exterior wall construction. StoTherm ci L.M.I. 180 over Concrete Masonry Units (CMU) is a water-drainage exterior insulation and finish system (EIFS) that includes an air and moisture barrier beneath it. The full system consists of six components: air and moisture barrier, adhesive, continuous insulation, reinforcing mesh (standard and high impact), base coat, and finish coat. No substitutions or additions to this system should be made without prior approval from the design professional or AHJ (authority having jurisdiction) for any project.

StoGuard® is the air and moisture barrier component for the L.M.I. 180 over Concrete Masonry Units (CMU). It is installed 8" minimum hollow core concrete blocks. StoGuard provides protection against moisture damage during the construction process and in the event of a breach in the EIFS while in service. It is not intended to correct faulty workmanship such as the absence or improper integration of flashing in the wall assembly, nor is it intended to correct other defective components of construction such as windows that leak into the wall assembly. Flashing should always be integrated in the wall assembly to direct water to the exterior, not into the wall assembly, particularly at potential leak sources such as windows.

As a component of an air barrier system StoGuard minimizes the risk of condensation within the building envelope by resisting mass transfer of moisture in the air to a cold surface in the wall assembly. A complete air barrier system consists of individual air barrier materials and the connections between them. The air barrier materials must be continuously connected with all six sides of the building envelope to perform as an effective air barrier system. The design/construction professional must take material compatibility and construction sequencing into account when designing an "air tight" assembly to ensure continuity and long-term durability. The effects of air tightness on mechanical ventilation should also be included in the overall project evaluation.

An air barrier should not be confused with a vapor retarder, which may also be used in the wall assembly to retard water vapor diffusion and reduce the risk of condensation. Generally, a vapor retarder is placed on the warm side of the insulation. Specifically, it is placed on the interior side in cold climates. A vapor retarder may not be necessary, or appropriate, depending on the wall components and the range of temperature/humidity conditions inside and outside. A vapor retarder should not be used on the inside of walls in warm, humid climates. A dew point analysis and/or dynamic hygrothermal modeling should be performed to determine whether a vapor retarder is appropriate.

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. Provide air and moisture barrier, and compatible EIFS for vertical above grade exterior walls
- B. Related Sections [\(add/delete, depending on specific project requirements\)](#)
 - 1. Section 06 16 00: Sheathing
 - 2. Section 07 26 00: Vapor Retarders
 - 3. Section 07 27 00: Air Barriers
 - 4. Section 07 50 00: Membrane Roofing
 - 5. Section 07 62 00: Sheet Metal Flashing and Trim
 - 6. Section 07 90 00: Joint Protection
 - 7. Section 08 10 00: Doors and Frames
 - 8. Section 08 40 00: Entrances, Storefronts, and Curtain Walls
 - 9. Section 08 50 00: Windows

1.2 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data
- B. Manufacturer's code compliance report
- C. Manufacturer's standard warranty
- D. Applicator's industry training credentials
- E. Samples for approval as directed by architect or owner
- F. Sealant manufacturer's certificate of compliance with ASTM C 1382
- G. Prepare and submit project-specific details (when required by contract documents)

1.3 REFERENCES

- A. ASTM Standards:
 - B 117 Test Method for Salt Spray (Fog) Testing
 - C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
 - C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
 - C 1382 Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints
 - D 968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive
 - D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

- D 3273 Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
 - E 72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
 - E 84 Test Method for Surface Burning Characteristics of Building Materials
 - E 96 Test Methods for Water Vapor Transmission of Materials
 - E 119 Method for Fire Tests of Building Construction and Materials
 - 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, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 - E 1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference
 - E 2098 Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class PB Exterior Insulation and Finish System after Exposure to a Sodium Hydroxide Solution
 - E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)
 - E 2178 Test Method for Air Permeance of Building Materials
 - E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish System (EIFS) Clad Wall Assemblies
 - E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
 - E 2485 Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water Resistive Barrier Coatings
 - E 2486 Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS)
 - E 2570 Test Method for Water-Resistive (WRB) Coatings used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage
 - E2568 Standard Specification for PB Exterior Insulation and Finish Systems
 - G 153 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials
 - G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Material
- B. Building Code Standards
- AC 235 Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (November 2009)
 - TAS 201-94 Impact Test (Large Missile)
 - TAS 202-94 Uniform Static Air Pressure
 - TAS 202-94 Air Infiltration
 - TAS 202-94 Water Resistance
 - TAS 203-94 Cyclic Wind Pressure Loading
- C. National Fire Protection Association (NFPA) Standards
- NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source

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, Multi-story Test Apparatus

D. Other Referenced Documents

1. American Association of Textile Chemists and Colorists AATCC-127 Water Resistance: Hydrostatic Pressure Test
2. APA Engineered Wood Association E 30, Engineered Wood Construction Guide
3. ICC-ES ESR-1233, StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-Resistive Barriers and StoEnergy Guard
4. ICC-ES ESR-1748, StoTherm® ci

1.4 DESIGN REQUIREMENTS

NOTE: Coordinate this section with other material specification sections and detail drawings as applicable.

A. Wind Load

1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240.
2. Design for wind load in conformance with code requirements.
3. Maximum wind load resistance: Refer to Miami-Dade NOA for maximum design pressures and assembly requirements.

B. Moisture Control

1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly:
 - a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall.
 - b. Air Leakage Prevention – provide continuity of the air barrier system at foundation, roof, windows, doors, and other penetrations through the wall with connecting and compatible air barrier components to minimize condensation and leakage caused by air movement.
 - c. Vapor Diffusion and Condensation – perform a dew point analysis and/or dynamic hygrothermal modeling of the wall assembly to determine the potential for accumulation of moisture in the wall assembly by diffusion. Adjust insulation thickness and/or other wall assembly components accordingly to minimize risk. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

C. Impact Resistance

1. Provide ultra-high impact resistance of the EIFS to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Indicate the areas with impact resistance other than "Standard" on contract drawings.

- D. Color Selection
1. Select finish coat with a light reflectance value of 20 or greater. (The use of dark colors is not recommended over expanded polystyrene [EPS]. EPS has a service temperature limitation of approximately 165° F [74°C]).
- E. Joints
1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS where they exist in the substrate or supporting construction, where the cladding adjoins dissimilar construction or materials, at changes in building height, at expansion, control, and cold joints in construction, and at floor lines in multi-level wood frame construction. Size joints to correspond with anticipated movement. Align terminating edges of EIFS with joint edges of through wall expansion joints and similar joints in construction. Refer to Sto Details.
 2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (windows, doors, mechanical, electrical, and plumbing penetrations, etc.).
 3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning.
 4. Provide joints so that air barrier continuity is maintained across the joint, and drain joints to the exterior, or provide other means to prevent or control water infiltration at joints.
- F. Grade Condition
1. Do not specify the EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 6 inch (152 mm) clearance above grade or as required by code.
- G. Trim, Projecting Architectural Features and Reveals
1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All reveals must have minimum 3/4 inch (19 mm) insulation thickness at the bottom of the reveal. All 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 EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS finish on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate and minimize maintenance. Refer to Sto Details.
 2. Do not use the EIFS 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 Detail 52.61.
- H. Insulation Thickness
1. Minimum EPS insulation thickness is 1 inch (25 mm).
 2. Maximum EPS insulation thickness is 12 inches (305 mm), except as noted below for fire-resistance rated wall assemblies.
- I. Fire Protection
1. Do not use EPS foam plastic in excess of 12 inches (305 mm) thick on types I, II, III, or IV construction unless approved by the code official.
 2. Where a fire-resistance rating is required by code use the EIFS over a rated concrete or concrete masonry assembly. Limit use over rated frame assemblies to non-load bearing assemblies (the EIFS is considered not

to add or detract from the fire-resistance of the rated assembly). Maximum allowable EPS thickness: 4 inches (102 mm).

3. Refer to manufacturer’s testing or applicable code compliance report for other limitations that may apply.

1.5 PERFORMANCE REQUIREMENTS

- A. Comply with ASTM E 2570 (Air/Moisture Barrier) and ASTM E 2568 (EIFS):

Table 1 Air/Moisture Barrier Performance

TEST	METHOD	CRITERIA	RESULT
1. Weathering	AATCC 127 (Water Column)	No cracking, bond failure or water penetration after 210 hours UV exposure, 25 wet/dry cycles, and 21.6 in (55 cm) water column	Pass
2. Durability	ASTM E 1233 / ASTM E72 / ASTM E 331	No cracking or water penetration at sheathing joints after 10 cycles transverse loading, 1 cycle racking, 5 cycles environmental conditioning, and 15 minutes water spray at 2.86 psf (137 kPa) pressure differential	No cracking or water penetration
3. Water Resistance	ASTM D 2247	Absence of deleterious effects after 14 day exposure	No deleterious effects
4. Water Vapor Transmission	ASTM E 96 Method B (Water Method)	Measure	Sto Gold Fill®: 7.10 perms [408 ng/(Pa·s·m²)] Sto Gold Coat: > 19 perms [1067 ng/(Pa·s·m²)]
5. Air Leakage (material)	ASTM E 2178	≤ 0.004 cfm/ft² at 1.57 psf (0.02 L/s•m² at 75 Pa)	Pass
6. Air Leakage (assembly)	ASTM E 2357	≤ 0.04 cfm/ft² (0.2 L/s•m²)	Pass¹
7. Freeze-Thaw	ASTM E 2485	No delamination or surface changes after 10 cycles when viewed under 5X magnification	No delamination or surface changes
8. Surface Burning	ASTM E 84	Flame Spread less than or equal to 25 Smoke developed less than or equal to 450	Flame Spread: <25 Smoke Density: <450
9. Tensile Bond	ASTM C 297	Greater than 15 psi (103 kPa)	Pass over Plywood, OSB, Glass Mat Faced Gypsum sheathings, CMU

1. Based on testing of air barrier joint treatment material at sheathing joints and no top coat

Table 2 EIFS Weather Resistance and Durability Performance*

TEST	METHOD	CRITERIA	RESULTS
1. Accelerated Weathering	ASTM G 153 (Formerly ASTM G 23)	No deleterious effects* at 2000 hours when viewed under 5x magnification	Pass
2. Accelerated Weathering	ASTM G 154 (Formerly ASTM G 53)	No deleterious effects* at 2000 hours	Pass
3. Freeze/Thaw Resistance	ASTM E 2485	No deleterious effects* at 10 cycles when viewed under 5x magnification	Pass

TEST	METHOD	CRITERIA	RESULTS
4. Water Penetration	ASTM E 331 (modified per ICC-ES AC 235)	No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes at 6.24 psf (299 Pa) or 20% of design wind pressure, whichever is greater	Pass at 12.0 psf (575 Pa) after 30 minutes
5. Drainage Efficiency	ASTM E 2273	90% minimum	> 90%
6. Tensile Adhesion	ASTM E 2134	Minimum 15 psi (103kPa) tensile strength	Pass
7. Water Resistance	ASTM D 2247	No deleterious effects* at 14 day exposure	Pass @ 28 days
8. Salt Spray	ASTM B 117	No deleterious effects* at 300 hours	Pass @ 300 hrs
9. Abrasion Resistance	ASTM D 968	No cracking or loss of film integrity at 528 quarts (500 L) of sand	Pass @ 528 quarts (1000 L)
10. Mildew Resistance	ASTM D 3273	No growth supported during 28 day exposure period	Pass @ 28 days
11. Impact Resistance	ASTM E 2486	Standard: 25-49 in-lbs (2.83-5.54J) Medium: 50-89 in-lbs (5.65-10.1J) High: 90-150 in-lbs (10.2-17J) Ultra-High: >150 in-lbs (>17J)	Pass with one layer Sto Mesh Pass with one layer of 6 oz Mesh Pass with one layer Sto Intermediate Mesh Pass with one layer Sto Armor Mat and one layer Sto Mesh

* No deleterious effects: no cracking, checking, crazing, erosion, rusting, blistering, peeling or delamination

Table 3 Air/Moisture Barrier and EIFS Fire Performance

TEST	METHOD	CRITERIA	RESULT
1. Fire Endurance	ASTM E 119	Maintain fire resistance of existing rated assembly	Pass (4 inch [102 mm] maximum allowable insulation thickness)
2. Intermediate Scale Multi-Story Fire Test	NFPA 285 (formerly UBC Standard 26-9)	1. Resistance to vertical spread of flame within the core of the panel from one story to the next 2. Resistance to flame propagation over the exterior surface 3. Resistance to vertical spread of flame over the interior surface from one story to the next 4. Resistance to significant lateral spread of flame from the compartment of fire origin to adjacent spaces	Pass with 12 inches (305 mm) insulation
3. Radiant Heat Ignition	NFPA 268	No ignition @ 20 minutes	Pass with 1 and 12 inches (25 and 305 mm) insulation
4. Surface Burning (individual components)	ASTM E 84	Individual components shall each have a flame spread of 25 or less, and smoke developed of 450 or less	Flame Spread: < 25 Smoke Developed: < 450

Table 4 EIFS Component Performance

TEST	METHOD	CRITERIA	RESULT
1. Alkali Resistance of Reinforcing Mesh	ASTM E 2098	Greater than 120 pli (21 dN/cm) retained tensile strength	Pass
2. Requirements for Rigid PVC Accessories	ASTM D 1784	Meets cell classification 13244C	Pass

1.6 QUALITY ASSURANCE

- A. Manufacturer Requirements
 - 1. Member in good standing of the EIFS Industry Members Association (EIMA)
 - 2. Air/moisture barrier and EIFS manufacturer for a minimum of thirty (30) years
 - 3. Manufacturing facilities ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System
- B. Contractor Requirements
 - 1. Engaged in application of similar systems 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 air/moisture barrier and EIFS 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. EPS board listed by an approved agency
 - 2. EPS board manufactured under Sto licensing agreement and recognized by Sto as being capable of producing EPS insulation board to meet EIFS requirements
 - 3. EPS board labeled with information required by Sto, the approved listing agency, and the applicable building code.
- D. Mock-up Testing
 - 1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/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.
- 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

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product
- B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.
- C. Protect Portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.8 PROJECT/SITE CONDITIONS

(Weather conditions affect application and drying time of most products. Hot or dry conditions limit working time and accelerate drying and may require adjustments in the scheduling of work 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 drying period, minimum 24 hours after application of Air/Moisture barrier and EIFS products
- B. Provide supplementary heat for installation in temperatures less than 40°F (4°C)
- C. Provide protection of surrounding areas and adjacent surfaces from application of products

1.9 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)

- A. Provide site grading such that the EIFS terminates above grade a minimum of 6 inches (150 mm) or as required by code
- B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuously connected air and moisture barrier
- C. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall
- D. Install window and door head flashing immediately after windows and doors are installed
- E. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior
- F. Install splices or tie-ins from air/moisture barrier over back leg of flashings, starter tracks, and similar details to form a shingle lap that directs incidental water to the exterior
- G. Install copings and sealant immediately after installation of the EIFS, when coatings are dry, and such that, where sealant is applied against the EIFS surface, it is applied against the base coat or primed base coat surface
- H. Schedule work such that air/moisture barrier is exposed to weather no longer than 180 days if Sto Gold Coat is used
- I. Attach penetrations through the EIFS to structural support and provide water tight seal at penetrations

1.10 WARRANTY

- A. Provide manufacturer's standard warranty

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide Air/Moisture Barrier and EIFS coatings and accessories from single source manufacturer or approved supplier
- B. The following are acceptable manufacturers:
1. Sto Corp. – Air/Moisture Barrier, EIFS
 2. Plastic Components, Inc. – EIFS Accessories

2.2 AIR/MOISTURE BARRIER

(Select any of the listed joint treatment/rough opening protection/detail component options and top coat with one of the listed air barrier coatings)

- A. StoGuard®
1. Joint Treatment, Rough Opening Protection, and Transition Components:
 - a. Sto Rapid Guard™ - one-component air barrier and waterproof material used to protect rough openings, sheathing joints, seams, cracks, penetrations, and other transitions in above grade wall construction. Rapid drying time will usually allow for same day installation of other Sto air barrier components.
 - b. Sto Gold Fill® – ready mixed coating applied by trowel or knife for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Mesh. Also used as a detail component with StoGuard Mesh to splice over back flange of starter track, flashing, and similar ship lap details
 2. Waterproof Coating:
 - a. Sto Gold Coat® – ready mixed waterproof coating for concrete, concrete masonry.
 3. Transition Membrane: StoGuard Transition Membrane – flexible air barrier membrane for continuity at transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions, floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction

2.3 ADHESIVE

- A. Sto Primer Adhesive-B – factory blended one-component polymer-modified portland cement based adhesive

2.4 INSULATION BOARD

- A. Sto EPS Insulation Board: nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) insulation board in compliance with ASTM E 2430 and ASTM C 578 Type I requirements listed, labeled, and furnished in accordance with Section 1.6C.

2.5 BASE COAT

- A. Cementitious Base Coat
 1. Sto Primer/Adhesive-B – factory blended one component polymer modified portland cement based base coat. Also used as a leveler for concrete and masonry surfaces
- B. Waterproof Base Coat *(choose one)*
 1. Sto Flexyl – fiber reinforced acrylic based waterproof base coat mixed with portland cement (for use as a waterproof base coat over Sto Primer/Adhesive-B for foundations, parapets, splash areas, trim and other projecting architectural features)
 2. Sto Watertight Coat – pre-packaged two component fiber reinforced acrylic based waterproof base coat (for use as a waterproof base coat over Sto Primer/Adhesive-B for foundations, parapets, splash areas, trim and other projecting architectural features)

2.6 REINFORCING MESHES

NOTE: Designate areas with impact resistance other than "Standard" on architectural drawings.

- A. Standard Mesh
 1. Sto Mesh – nominal 4.5 oz/yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials *(achieves Standard Impact Classification)*
- B. Ultra-High Impact Mesh
 1. Sto Armor Mat – nominal 15 oz/yd² (509 g/m²), ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials *(recommended to a minimum height of 6'-0" [1.8m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact. Achieves Ultra-High Impact Classification when applied beneath Sto Mesh)*
 2. Sto Armor Mat XX – nominal 20 oz/yd² (679 g/m²), ultra-high impact, double strand, interwoven, open-weave glass fiber fabric with alkaline resistant coating for compatibility with Sto materials *(to be embedded in approved Sto base coat, on the face of the CMU prior to the application of the StoGuard air & moisture barrier to achieve hurricane impact resistance).*
- C. Specialty Meshes
 1. Sto Detail Mesh – nominal 4.2 oz/yd² (143 g/m²), flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials *(used for standard back wrapping, aesthetic detailing, and reinforcement and protection of rough openings with trowel applied air/moisture barrier)*

2.7 PRIMER

Select one. The primer is an optional component [except for some specialty finishes] which reduces surface water absorption of the base coat, and enhances finish color, texture, and coverage.

- A. StoPrime Sand – acrylic based tintable primer with sand for roller application
- B. StoPrime – acrylic based tintable primer for spray application

2.8 FINISH COAT

- A. Stolit® Textured Finishes and Sto Specialty Textured Finishes
 - 1. Stolit acrylic based, integrally colored textured finish
 - 2. Stolit X acrylic based, integrally colored textured finish for superior fade resistance
 - 3. Stolit Lotusan integrally colored textured finish with Lotus-Effect™ technology
 - 4. Sto Decocoat acrylic based textured finish with variegated aggregate for superior abrasion resistance
 - 5. StoCreativ Granite acrylic based textured finish that provides the look of cut or polished granite
 - 6. StoCreativ Lux acrylic based textured finish that provides a modern look with the added luster of reflective materials
 - 7. Sto GraniTex acrylic based textured finish in a range of color combinations designed to look and feel like natural stone

2.9 JOB MIXED INGREDIENTS

- A. Water – clean and potable
- B. Portland cement – Type I, Type II, or Type I-II in conformance with ASTM C 150

2.10 ACCESSORIES

- A. Starter Track – Rigid PVC (polyvinyl chloride) plastic track Part No. STDE as furnished by Plastic Components, Inc., 9051 NW 97th Terrace, Miami, Florida 33178 (800 327-7077).
- B. Sto-Mesh Corner Bead Standard – one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh for outside corner reinforcement.
- C. Sto Drip Edge Profile - one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh that creates a drip edge and plaster return

2.11 MIXING

- A. Mix all products in conformance with manufacturer’s written instructions.

PART 3 EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (section 1.06 B)

3.2 EXAMINATION

- A. Inspect CMU application for compliance with applicable requirement and installation in conformance with specification and manufacturer requirements:
- B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the General Contractor. Do not start work until deviations are corrected.

3.3 SURFACE PREPARATION

- A. Remove surface contaminants on CMU surface
- B. Apply additional air barrier coating as needed with the air barrier to achieve a void pin-hole free surface with air barrier material

3.4 INSTALLATION

NOTE: The air/moisture barrier described below is one set of materials in the air barrier system and the moisture protection for the structure. Installation of the air/moisture barrier must be integrated with flashing and other air and moisture barrier materials to ensure that where water is likely to penetrate the wall assembly, it will be drained to the exterior at the source of the leak. Proper air barrier connections and integration of the air/moisture barrier through proper sequencing of work and coordination of trades is necessary for a complete air barrier system and complete moisture protection.

IMPORTANT: Ensure the air/moisture barrier surface, insulation board surface, and reinforced base coat surface are free of surface contamination. Install Sto EPS Insulation Board within 180 days of the application of Sto Gold Coat.

3.4.1 Air/Moisture Barrier Installation over approved CMU in compliance manufacturers guidelines.

- A. Transition Detailing
 - 1. Detail transition areas with Sto RapidGuard or StoGuard Transition Membrane to achieve air barrier continuity. For illustrations or installation, refer to Sto Guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide (www.stocorp.com)
- B. Rough Opening Protection *(select 1, 2, or 3 for frame construction, for concrete or concrete masonry rough openings with wood bucks and similar openings with complex 3-dimensional geometry, select Sto RapidGuard.*
 - 1. Sto Rapid Guard: 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. Sto Rapid Guard: apply a generous bead of Sto Rapid Guard 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 22s.20RG)
 - 2. 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 20.20G).
- C. 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.

3.4.2 EIFS Installation

- A. Starter Track
 1. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
 2. Attach the starter track even with the line into concrete block with the proper masonry screw, minimum 3/4 inch (19.05 mm) penetration.
 3. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut.
 4. Install Starter Track at other EIFS terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing (refer to Sto Details).
- B. Detail Splice Strips for Starter Track, Flashing at Floor Lines, Head of Windows and Doors
 1. Starter Track, Window/Door Head Flashing, Floor Line Flashing, and Roof/Side Wall Step Flashing: Install minimum 4 inch (100 mm) wide detail component over back flange of starter track, floor line flashing, head flashing, and roof/side wall step flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated CMU. Make a smooth transition to the coated CMU with a trowel, knife, or roller, depending on the detail component material being used. When Sto Gold Fill with StoGuard Mesh is the detail component apply another coat of the waterproof coating over the detail area. Do not leave detail components exposed for more than 90 days.
- C. Backwrapping
 1. Apply a strip of detail mesh to the dry air/moisture barrier at all system terminations (windows, doors, expansion joints, etc.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2 ½ inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed (paragraph 3.04 G1). Alternatively, pre-wrap terminating edges of insulation board.

NOTE: Backwrapping can be replaced by "pre-wrapping" terminating edges of insulation board with Sto Mesh or Sto Detail Mesh embedded in the Sto base coat. This method is often preferred to facilitate installation in the field. This method may also be used in conjunction with flashing at the base of the wall, roof/wall intersections, floor lines, and similar terminations to replace the starter track.

D. Adhesive Application and Installation of Insulation Board

1. Ensure the air/moisture barrier surface (Sto Gold Coat) is free of surface contamination. Install the insulation board within 180 days of the application of the air/moisture barrier coating (Sto Gold Coat) or clean the surface and recoat with Sto Gold Coat.
2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. *(Note: rasping prevents an outward bow at the Starter Track).*
3. Use Sto Primer/Adhesive-B:
 - a. Cementitious Adhesive (Sto Primer/Adhesive-B): apply adhesive to the back of the insulation board with the proper size (1/2 x 1/2 x 2 inch [13 x 13 x 51 mm]) stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. IMPORTANT: do not delay installation once adhesive is applied. If adhesive “skins” remove it and apply fresh adhesive.
4. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.
5. Butt all board joints tightly together to eliminate any thermal breaks. Care must be taken to prevent any adhesive from getting between the joints of the boards.
6. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of openings.
7. Check for satisfactory contact of the insulation board with the substrate. If any boards have loose areas use the spray foam adhesive dispensing pistol to create a hole through the board and inject adhesive to attach the loose area. Allow the adhesive to expand to the outer face of the board while withdrawing the pistol. Cut excess adhesive flush with the surface of the insulation. Do not use nails, screws, or any other type of non-thermal mechanical fastener.

E. Slivering and Rasping of Insulation Board Surface

1. Make sure insulation boards are fully adhered to the substrate before proceeding to steps 3.04 E2 and 3.04 E3 below.
2. Fill any open joints in the insulation board layer with slivers of insulation or the spray foam adhesive.
3. Rasp the insulation board surface to achieve a smooth, even surface and to remove any ultraviolet ray damage.

F. Trim, Reveals and Projecting Aesthetic Features

NOTE: Reveals/aesthetic grooves may be designed into the system to accommodate workability on multi-level buildings or lengthy wall sections.

1. Attach features and trim where designated on drawings with adhesive to a base layer of insulation board or to the coated CMU surface. Fill any gaps between the trim and base layer of insulation with spray foam adhesive and rasp flush with the trim surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveal's minimum 1:2 (27°).
2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings.
3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints.

4. Do not locate reveals/aesthetic grooves at high stress areas.
 5. Ensure minimum $\frac{3}{4}$ inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves.
- G. Completion of Backwrapping
1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any wrinkles or gaps in the mesh.
- H. Accessory Installation
1. Corner Bead: cut the corner bead accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of $\frac{1}{8}$ inch (3 mm) to the outside corner area that will receive the accessory. Immediately place the accessory directly into the wet base coat material. Do not slide into place. Press the accessory into place. A corner trowel is best for this purpose. Embed and completely cover the mesh and PVC by troweling from the corner to the edge of the mesh so that no mesh or PVC color is visible. Avoid excess build-up of base coat and feather along mesh edges. Adjoin separate pieces by abutting PVC to PVC and overlapping the mesh "tail" from one piece onto the next piece. Fully embed the accessory and mesh "tail" in base coat material. When installing field mesh reinforcement overlap accessory mesh and PVC. Remove any excess base coat from the outside corner.

NOTE: Install the corner bead accessory prior to the application of field mesh. If installing a multi-layer mesh system such as StoTherm ci high impact systems with Sto Armor Mat or Sto Armor Mat XX, install the corner bead accessory over the first layer of mesh and before the final layer of mesh is installed.

For additional reinforcement at the corner the field mesh (paragraph 3.4.2 15 below) may be wrapped around the corner and extend a minimum of 6 inches (152 mm) in one or both directions.
 2. Drip Edge: install the drip edge accessory prior to application of field mesh (paragraph 3.4.2 15 below). Install with arrow on mesh pointing UP. Cut the accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of $\frac{1}{8}$ inch (3 mm) to the area that will receive the accessory. Immediately place the accessory directly into the wet base coat material and press into place. Do not slide into place. Embed and completely cover the mesh and PVC by troweling from the drip edge screed rail to the edge of the mesh. Avoid excess build-up of base coat, feather along mesh edges, and remove any excess base coat from the drip edge nosing. Abut adjoining pieces and install as described above. When installing field mesh reinforcement overlap accessory mesh 4 inches (10 cm) on both vertical and horizontal faces so the PVC is overlapped and remove any excess base coat from the drip edge nosing. On vertical and horizontal faces of the accessory install finish to the drip edge lines and remove any protruding finish from the drip edge nosing.
- I. Base Coat and Reinforcing Mesh Application
1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly rased before commencing the base coat application.
 2. Apply minimum 9x12 inch (225x300 mm) diagonal strips of detail mesh at corners of windows, doors, and all penetrations through the system. Embed the strips in wet base coat and trowel from the center to the edges of the mesh to avoid wrinkles.

3. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
4. Ultra-High impact mesh application (recommended to a minimum height of 6'-0" [1.8 m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact, and where indicated on contract drawings): apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry.
5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with 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. Double wrap all inside and outside corners with minimum 6 inch (152 mm) overlap in each direction (optional if corner bead accessory is used – see NOTE to paragraph 3.4.2 H1 above). 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.
6. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2-1/2 inches (65 mm).
7. Allow base coat to thoroughly dry before applying primer or finish.

NOTE: *All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All 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 EIFS wall plane, protect the weather exposed sloped surface with waterproof base coat. **Maximum insulation board thickness is 12 inches (305 mm), which includes trim and architectural features.** Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS on sloped, weather exposed surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto Details.*

Do not use the EIFS 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 Detail 52.61.

J. Primer application

NOTE: *The primer is an optional component [except for some specialty finishes] which reduces surface water absorption of the base coat and enhances finish color, texture, and coverage)*

1. Ensure the base coat surface is free of surface contamination before commencing the primer application.
2. Apply primer evenly with brush, roller or proper spray equipment over the clean, dry base coat and allow to dry thoroughly before applying finish.

- K. Finish Coat Application
1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application.
 2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or 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 to an architectural break in the wall.
 - 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. Do not install separate batches of finish side-by-side.
 - e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
 - f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.5 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them
- B. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry

3.6 CLEANING, REPAIR AND MAINTENANCE

- A. Clean and maintain the EIFS for a fresh appearance and to prevent water entry into and behind the system. 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 or behind the EIFS and anywhere into the wall assembly
- C. Refer to Sto reStore Repair and Maintenance Guide ([reStore Program](#)) for detailed information on restoration – cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding

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