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Sto Guide Specification 5700 StoTherm® ci MVES

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 MVES to vertical above grade exterior wall construction. StoTherm ci MVES (Masonry Veneer Engineered System) is a water-drainage Exterior Insulation and Finish System (EIFS) that includes a compatible fluid-applied air and moisture barrier beneath it. The full system consists of six components: air and moisture barrier, adhesive, continuous thermal insulation, reinforcing mesh, base coat, and adhesive for Adhered Masonry Veneer (AMV)

StoGuard® is the air and moisture barrier component in StoTherm ci MVES. It is installed over wood-based sheathing, glass mat gypsum sheathing, cementitious sheathing, concrete, or concrete masonry substrates. StoGuard provides protection against moisture damage during the construction process and in the event of a breach in the EIFS/AMV assembly 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, compatible EIFS, and Adhered Masonry Veneer (AMV) adhesive for vertical above grade exterior walls
- B. Related Sections *(add/delete, depending on specific project requirements)*
 - 1. Section 03 30 00: Cast-in-Place Concrete
 - 2. Section 04 22 00: Concrete Unit Masonry
 - 3. Section 04 42 00: Exterior Stone Cladding
 - 4. Section 04 71 00: Manufactured Brick Masonry
 - 5. Section 04 72 00: Cast Stone Masonry
 - 6. Section 06 16 00: Sheathing
 - 7. Section 07 26 00: Vapor Retarders
 - 8. Section 07 27 00: Air Barriers
 - 9. Section 07 50 00: Membrane Roofing
 - 10. Section 07 62 00: Sheet Metal Flashing and Trim
 - 11. Section 07 92 00: Joint Sealants
 - 12. Section 08 10 00: Doors and Frames
 - 13. Section 08 40 00: Entrances, Storefronts, and Curtain Walls
 - 14. Section 08 50 00: Windows
 - 15. Section 09 30 00: Tiling

1.2 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data
- B. Manufacturer's code compliance certification
- 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 C1382
- G. Prepare and submit project-specific details (when required by contract documents)

1.3 REFERENCES

- A. ASTM Standards:
 - C297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions

- C482 Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste
- C1177 Specification for Glass Mat Gypsum for Use as Sheathing
- C1382 Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints
- D1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
- E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
- E84 Test Method for Surface Burning Characteristics of Building Materials
- E96 Test Methods for Water Vapor Transmission of Materials
- E119 Method for Fire Tests of Building Construction and Materials
- E330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- E1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference
- E2098 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
- E2134 Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System (EIFS)
- E2178 Test Method for Air Permeance of Building Materials
- E2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish System (EIFS) Clad Wall Assemblies
- E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- E2570 Test Method for Water-Resistive (WRB) Coatings used Under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage

- B. Building Code Standards
 - AC 235 Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (January 2015)

- 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 Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies containing Combustible Components

- D. Other Referenced Documents
 1. American Association of Textile Chemists and Colorists AATCC-127 Water Resistance: Hydrostatic Pressure Test
 2. APA Engineered Wood Association E30, Engineered Wood Construction Guide
 3. ICC ESR-1233, StoGuard Air Barrier and Water-Resistive Barrier System

1.4 DESIGN REQUIREMENTS

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

A. Fire Protection

1. EPS insulation is limited to 4 inch (102mm) maximum thickness on types I, II, III, or IV construction.
2. Where an hourly fire-resistance rating is required the EIFS/AMV assembly does not detract from the hourly rating of a rated concrete or concrete masonry wall assembly. Tested 1-hour load bearing steel frame wall assembly: 16 gage studs at maximum 16 inches (406mm) on center, 6 inches (152mm) deep with maximum 4 inch (102mm) thick EPS insulation in the EIFS/AMV assembly. Results may be extended to non-load bearing assemblies. Results may also be extended to other steel frame wall assemblies with analysis or modeling by a qualified fire protection engineer.

B. Wind Load and Building Height

1. Design for maximum allowable deflection of L/360, or stiffer when required by veneer manufacturer, local building code, or design professional. Maximum allowable stud spacing: 16 inches (406mm) on center. System is capable of achieving design pressures of: +50, -40 lb/ft² (+2.39, -1.91 kPa). Ultimate wind load resistance depends on sheathing, sheathing attachment, and stiffness of supporting wall construction.
2. Design for wind load in conformance with code requirements.
3. The system is intended for use on vertical above grade walls up to 4-stories or 50ft (15.2m) in height, whichever is less.

C. 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.

D. Joints

1. Provide joints where they exist in the supporting wall construction - at expansion, control, and cold joints, at changes in support construction (e.g., masonry to frame wall), at junctures with dissimilar construction, at different substrates, at floor lines in multi-story wall construction, at changes in building height and other areas of stress concentration, and within areas of not greater than 144 ft² (13.4m²) with length or height not exceeding 12 ft (3.6m) for ceramic tile, and not more than 18 ft (5.5m) for brick or stone, with length/height or height/length ratio not greater than 2-1/2 to 1. Dark colored veneer units may require closer spacing due to increased thermal movement. Consult with design professional. Do not bridge expansion joints, control joints, or cold joints in wall construction with adhered masonry veneer. Size joints to correspond with anticipated movement. Align terminating edges of EIFS/AMV with joint edges of through wall expansion joints and similar joints in construction. Refer to Sto Detail Booklet.
 2. Provide grout or pointing mortar for all AMV joints (open joints are not permitted).
 3. 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.).
 4. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning.
 5. 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.
- E. 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 (152mm) clearance above grade or as required by code.
- F. Insulation Thickness
1. Minimum EPS insulation thickness is 1 inch (25mm).
 2. Maximum EPS insulation thickness is 4 inches (102mm)
- G. AMV Size Limits Based on IBC and IRC
1. Maximum thickness: 5/8 inch (16mm); thicker units permitted if dimensioned for application by the thin set method (consult with veneer unit manufacturer)
 2. Maximum allowable weight: 9 lb/ft² (43.9 kg/m²)
 3. Maximum size: not to exceed 24 inches (610mm) in any face dimension and not in excess of 3 ft² (0.28m²)
- H. AMV Color
1. Dark brick, stone, and ceramic tile colors with LRV (Light Reflectance Value) < 20 are not recommended unless analyzed by the design professional with regard to temperature of EPS insulation (limited to maximum service temperature of 165°F (73.8°).

1.5 PERFORMANCE REQUIREMENTS

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

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 minute 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 Coat®: > 10 perms [574 ng/(Pa·s·m ²)]
5. Air Leakage (material)	ASTM E 2178	≤ 0.004 cfm/ft ² at 1.57 psf (0.02 L/s·m ² at 75 Pa)	Pass
6. Air Leakage (assembly)	ASTM E 2357	≤ 0.04 cfm/ft ² (0.2 L/s·m ²)	Pass
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

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

Table 2 Air/Moisture Barrier and EIFS with AMV Fire Performance

TEST	METHOD	CRITERIA	RESULT
1. Fire Endurance	ASTM E 119	1-hour rated load bearing assembly	Pass with 4 inches (102mm) insulation
2. Intermediate Scale Multi-Story Fire Test	NFPA 285	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 4 inches (102mm) insulation
3. Radiant Heat Ignition	NFPA 268	No ignition @ 20 minutes	Pass with 1 and 4 inches (25 and 102 mm) insulation

Table 3 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 Certified Quality System and ISO 14001 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, EIFS, and AMV 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. AMV Manufacturer Requirements
 - 1. Provide AMV units in conformance with the IBC and IRC size, weight, and durability requirements.
 - 2. Provide AMV units that comply with minimum 50 lb/in² (0.345 N/mm²) shear bond strength when tested in accordance with ASTM C482.

- E. Mock-up and Testing
 - 1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/AMV/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E283, ASTM E331 and ASTM E330, 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.
- F. 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 of AMB/EIFS products - not less than 24 hours
- B. Maintain ambient and surface temperatures between 45 and 85°F (7 and 29°C) during application and drying period of AMV adhesive – not less than 24 hours.
- C. Provide supplementary heat for installation in temperatures less than 40°F (4°C) for AMB/EIFS products, and less than 45°F (7°C) for AMV adhesive.
- D. 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/AMV assembly 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/AMV assembly 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.
- I. Attach penetrations through the EIFS/AMV assembly 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, EIFS materials, and AMV adhesive from single source manufacturer or approved supplier
- B. The following are acceptable manufacturers:
 - 1. Sto Corp. – Air/Moisture Barrier, EIFS, AMV adhesive
 - 2. Wind-lock – EIFS fasteners

2.2 AIR/MOISTURE BARRIER

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

- A. StoGuard
 - 1. Joint Treatment, Rough Opening Protection, and Detail Components:
 - a. 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
 - b. Sto Gold Coat – ready mixed 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 ship lap details

- c. Sto RapidGuard® - one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other transitions in above grade wall construction
- 2. Air and Moisture Barrier Coating
 - a. Sto Gold Coat – ready mixed waterproof coating for concrete, concrete masonry, wood-based sheathing, and glass mat gypsum sheathing
- 3. Transition Detail Components
 - a. StoGuard Transition Membrane – flexible air barrier membrane for continuity at static transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, and shingle lap transitions to flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction
 - b. 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 laps to flashing, wall to balcony floor slab or ceiling, and through wall penetrations – pipes, electrical boxes, and scupper penetrations

2.3 ADHESIVE

- A. Sto TurboStick™ – one component polyurethane spray foam 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 and listed, labeled, and furnished in accordance with Section 1.6C.

2.5 BASE COAT

- A. Cementitious Base Coat
 - 1. Sto Primer/Adhesive – acrylic based base coat mixed with portland cement

2.6 REINFORCING MESHES

- A. Standard Mesh
 - 1. Sto Mesh 6 oz – nominal 6 oz/yd² (203 g/m²), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials
- B. 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 of insulation boards*)

2.7 AMV ADHESIVE

- A. StoColl KM – polymer modified portland cement adhesive mortar for AMV



2.8 AMV GROUT / POINTING MORTAR

- A. Polymer modified portland cement grout in conformance with ANSI 118.7

2.9 JOB MIXED INGREDIENTS

- A. Water – clean and potable
- B. Portland cement – Type I in conformance with ASTM C150

2.10 ACCESSORIES

- A. Fasteners – Wind-lock corrosion resistant fastener with 1-1/4 inch (32mm) diameter galvanized steel lath-plate (legless) washer. Fastener type and length must be sufficient for minimum 3 thread penetration into steel studs and minimum 1 inch (25mm) penetration into concrete or CMU construction.

2.11 MIXING

- A. Sto Gold Fill – mix with a clean, rust-free high speed mixer to a uniform consistency
- B. Sto Gold Coat – mix with a clean, rust-free high speed mixer to a uniform consistency
- C. Sto Primer/Adhesive - mix ratio with portland cement is 1:1 by volume. Pour Sto Primer/Adhesive into a clean mixing pail. Add portland cement, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary by adding up to 8 fluid ounces (0.24L) of potable water per pail and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent.
- D. StoColl KM - mix ratio with water: 8.5 quarts (8.1L) potable water to one 55 lb. (25kg) bag of adhesive. Mix with a slow speed electric drill and paddle. Pour water into a clean mixing container. Mix while slowly adding the product to the water. Mix for approximately 2 minutes, allow to set for approximately 5 minutes, then re-mix for approximately 30 seconds to achieve a uniform, lump-free consistency. Avoid retempering. Do not overmix. Keep mix ratio consistent
- E. Grout / Pointing Mortar – mix in conformance with manufacturer's written instructions
- F. Mix only as much material as can readily be used
- G. Do not use anti-freeze compounds or other additives

PART 3 EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (section 1.6 B)

3.2 EXAMINATION

- A. Inspect concrete and masonry substrates prior to start of application for:

1. Contamination—algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances
 2. Surface absorption and chalkiness
 3. Cracks—measure crack width and record location of cracks
 4. Damage and deterioration such as voids, honeycombs and spalls
 5. Moisture content and moisture damage—use a moisture meter to determine if the surface is dry enough to receive the products and record any areas of moisture damage
- B. Inspect sheathing application for compliance with applicable requirement and installation in conformance with specification and manufacturer requirements:
1. Glass Mat Faced gypsum sheathing compliant with ASTM C 1177
 2. Exterior Grade and Exposure I wood based sheathing – APA Engineered Wood Association E 30
 3. Cementitious sheathing – consult manufacturer
 4. Attachment into structural supports with adjoining sheets abutted (gapped if wood-based sheathing) and fasteners at required spacing to resist design wind pressures as determined by design professional
 5. Fasteners seated flush with sheathing surface and not over-driven
- C. Inspect substrate for compliance with specification tolerances—record areas that are out of tolerance (greater than ¼ inch in 10 feet [6mm in 3m] deviation in plane)
- D. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS/AMV installation to the General Contractor. Do not start work until deviations are corrected.

3.3 SURFACE PREPARATION

- A. Remove surface contaminants on concrete, concrete masonry, gypsum sheathing, or coated gypsum sheathing surfaces
- B. Repair cracks, spalls or damage in concrete and concrete masonry surfaces and level concrete and masonry surfaces to comply with required tolerances
- C. Apply conditioner (consult Sto) by spray or roller to chalking or excessively absorptive surfaces or pressure wash to remove surface chalkiness
- D. Remove fasteners that are not anchored into supporting construction and seal holes with air barrier material
- E. Seal over-driven fasteners with air barrier material and install additional fasteners as needed to comply with fastener spacing requirement
- F. Fill large gaps between sheathing or voids around pipe, conduit, scupper, and similar penetrations with spray foam and shave flush with surface (refer to Sto Details)
- G. Replace weather-damaged sheathing and repair or replace damaged or cracked sheathing

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.*

3.5 Air/Moisture Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in Compliance with ASTM C1177, and Concrete, or Concrete Masonry (CMU) Wall Construction

A. Transition Detailing

1. Detail transition areas with Sto RapidGuard or StoGuard Transition Membrane 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).

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 no. 3, Sto RapidGuard*):

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 22s.20M).
2. Sto Gold Coat 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 (refer to Sto Detail 22s.20F).
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 (refer to Sto Detail 22s.20RG)

- C. 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 with a trowel to create a smooth surface that completely covers the mesh.
 2. Sto Gold Coat 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.
- D. Air/Moisture Barrier Coating Installation
1. Plywood and Gypsum Sheathing: apply the air and moisture barrier coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10-12 mils in one coat (Sto Gold Coat). Use 1/2 inch (13 mm) nap roller for plywood. Use 3/4 inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.
 2. OSB Sheathing: apply the air and moisture barrier coating by spray or with a 3/4 inch (19 mm) nap roller to sheathing surface to a uniform wet mil thickness of 10-12 mils. Touch up any areas with raised OSB strands or voids to provide a void and pinhole free surface. Protect from weather until dry.
 3. CMU Surfaces:
 - a. Repair static cracks up to 1/2 inch (13 mm) wide with Sto RapidGuard. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oil-free compressed air. Apply the crack filler with a trowel or putty knife over the crack and tool the surface smooth. (*Note: For moving cracks or cracks larger than 1/2 inch [13mm], consult with a structural engineer for repair method*). Protect repair from weather until dry.
 - b. Liberally apply AMB coating to the surface with a 3/4 inch nap roller or spray equipment to a wet thickness of 10-30 mils, depending on surface condition. Apply to a uniform thickness. Apply one or more additional coats to provide a void and pinhole free surface. Protect from weather until dry.

IMPORTANT: *The Sto coating functions as an air and moisture barrier on normal weight concrete masonry wall construction with flush (struck flush with the surface of the CMU) or concave joints when minimum two liberal coats are applied. Additional coats may be necessary depending on the condition of the CMU wall surface, CMU porosity, joint profile, and other variables that may exist. For "rough" CMU wall surfaces, skim coat the entire surface with one of Sto's cementitious levelers (Sto BTS Plus or Sto BTS Xtra) before application of coating. A VOID AND*

PINHOLE FREE SURFACE must be achieved for the coating to properly function as an air and moisture barrier on CMU wall surfaces.

- E. Air /Moisture Barrier Connections and Shingle Laps
1. Coordinate installation of connecting air barrier components with other trades to provide a continuous airtight 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 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.

3.6 EIFS Installation

- A. Starter Flashing
1. Strike a level line at the base of the wall to mark where the top of the flashing leg terminates.
 2. Attach flashing leg even with the line into structural supports with the proper fastener: Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) and three-thread penetration, galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration, and corrosion resistant concrete or masonry screws with minimum 1 inch (25 mm) penetration for concrete or CMU. Attach between studs into blocking as needed to secure the track flat against the wall surface. Attach at maximum 16 inches (406 mm) on center into framing. For solid wood sheathing or concrete/masonry surfaces, attach directly at 12 inches (305 mm) on center maximum.
 3. Overlap adjoining pieces of flashing.
 4. Install flashing in a similar manner at other EIFS terminations as designated on detail drawings: at roof/lower wall intersections, at floor lines, along dormers or gable end walls, above window and door headers above scuppers, beneath window sills with concealed flashing, and similar wall penetrations (refer to Sto Details).
- B. Detail Splice Strips for Flashing
1. Install minimum 4 inch (100 mm) wide detail component over back flange of starter track and at overlapping seams. Apply the detail component so it spans evenly between the back leg of flashing and the coated sheathing, and extend the detail component far enough so that fastener attachments are covered. Apply detail component fully across overlaps in flashing on both the vertical and horizontal leg. Make a smooth transition to the coated sheathing 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 when it is dry. Do not leave detail components exposed for more than 30 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.). 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 and to prevent obstruction of the drainage path at horizontal EIFS terminations - at the base of the wall, roof/wall intersections, floor lines, and similar terminations.

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. Apply Sto TurboStick adhesive to the back of the insulation board with the dispensing pistol approximately ¾ inch (19 mm) from ends. Apply 6 additional ribbons spaced equally at no greater than 6 inches (152 mm) apart between the end ribbons. 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 ribbons approximately ½ inch (51 mm) in diameter which will expand to ¾ – 1 inch (19 – 25 mm). Keep adhesive ½ inch (51 mm) short of board edges. Apply adhesive uniformly so ribbons of adhesive do not converge. Allow adhesive to “dwell” and become “tacky” before placing boards on wall. Adhesive will look smooth, not jagged, when ready to apply to wall surface. Place boards while adhesive is “tacky” and before adhesive “skins”.

IMPORTANT: Adhesive tack time varies with temperature and humidity. High temperature or high humidity decreases tack time. Low temperature or low humidity increases tack time. Generally adhesive will remain tacky between 1-5 minutes. If adhesive “skins” remove it and apply fresh adhesive.

3. Place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by placing boards above flashing at the base of the wall, allowing for a joint of minimum ½ inch (51mm) between the EIFS termination and the flashing. Apply light pressure when placing the boards. After boards have been in place for 5-10 minutes use a straight edge to lightly press the boards inward and keep board joints flush, as post expansion of the adhesive may force boards slightly outward.
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 3.6E2 and 3.6E3 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. Joints in EIFS/AMV
1. Cut joints in the EIFS at required locations with a hot-knife, router or groove-tool at locations indicated on drawings (refer to Section 1.4E, Design Requirements, Joints).
 2. Ensure minimum $\frac{3}{4}$ inch (19 mm) thickness of insulation board at the bottom of the scored joints.
- 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. 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 rasped 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 joints in EIFS. Embed the mesh in the wet base coat. Trowel from the base of reveals to the edges of the mesh.
 4. 6 oz mesh application: Apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately $\frac{1}{8}$ 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- $\frac{1}{2}$ inches (64mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 6 inch (152mm) overlap in each direction. 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. Allow base coat to thoroughly dry before installing fasteners.

- I. Fastener Installation
 - 1. Install fasteners with a screw gun into supporting frame, concrete, or concrete masonry wall construction to required depth. Seat fasteners on the surface of the base coat/mesh installation. Space fasteners horizontally at not more than 16 inches (406mm) on center and vertically at not more than 36 inches (914mm) on center.
- J. AMV Installation
 - 1. Mark layout lines in accordance with planning: generally taking into account pattern (e.g., running bond, stacked bond, etc.), size of grout joints, location of expansion joints and other start and stopping points of the installation, and aesthetics.
 - 2. Use the proper size notched trowel for application:
 - a. Thin brick, thin stone, and ceramic tile units up to 5/8 inch (16mm) thick: ¼ x 3/8 x ¼ inch (6x10x6mm) square notched trowel.
 - b. AMV units up to 2-5/8 inch (67mm) thick: ½ x ½ x ½ inch (13x13x13mm) U-shaped or square notched trowel.
 - 3. Spread the adhesive with flat side of the trowel to “wet-out” the prepared substrate. Then use the notched side of the trowel to spread additional adhesive with ribbons of adhesive oriented horizontally. Apply in a small area and immediately install thin tile/brick/stone or AMV before a “skin” forms on the adhesive. If adhesive skins, remove and discard the skinned adhesive, and re-apply fresh adhesive.
 - 4. Just prior to placing units “back-butter” the units by applying fresh adhesive onto the back of the units with the flat side of the trowel, or with a margin trowel:
 - a. Thin brick, thin stone, and ceramic tile units up to 5/8 inch (16mm) thick: scrape the adhesive onto the back surface in a thin layer so it “wets out” the surface.
 - b. AMV units up to 2-5/8 inch (67mm) thick: clean and dampen the back surface with a wet sponge, then apply a nominal ½ inch (13mm) layer of adhesive onto the back surface with the flat side of the trowel.
 - 5. Immediately place units slightly offset from their final position in the freshly applied wall adhesive, then slide into place while applying firm pressure to fully bed the units in the adhesive so no voids exist in the adhesive. Use a straight edge to check for evenness of the surface when installing thin brick/stone/tile.
 - 6. As units are placed, periodically remove a unit to verify full contact of adhesive with the substrate and the back of the unit, and full embedment (no voids) in the adhesive.
 - 7. Before the adhesive dries scrape out any excess mortar in the grout joints or on the surface of the units. Allow to cure for at least 7 days before grouting/pointing.
- K. Grouting/Pointing
 - 1. Use an ANSI 118.7 compliant grout or pointing mortar in conformance with the manufacturer’s instructions.

3.7 PROTECTION

- A. Provide protection of installed materials from dust, dirt, precipitation, freezing and continuous high humidity until they are fully dry.
- B. Protect installed materials from construction damage.

- C. Provide protection against water infiltration with proper flashing, parapet coping and other measures necessary to keep water from getting into or behind the EIFS/AMV assembly. Install compatible backer rod and sealant at expansion joints and other open joints in wall construction, and where the EIFS/AMV assembly abuts dissimilar materials – doors, windows, pipes, scuppers, and other penetrations through the wall – so these joints remain watertight.
- D. Provide weeps at floor lines, window and door heads, and other areas to conduct water to the exterior.

3.8 MAINTENANCE

- A. Maintain the finished wall surface for a fresh appearance and to prevent water entry into or behind EIFS/AMV assembly. Repair cracks, impact damage, spalls, or other damage promptly. Maintain other components of construction such as sealants, windows, doors, and flashing to prevent water entry into or behind the EIFS/AMV assembly.

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