

Sto Guide Specification QS200D - EPD StoQuik® Silver DrainScreen for Frame Wall Construction

Section 07 24 23 Direct-Applied Finish Systems

This guide specification is intended for use by the design/construction professional and any user of Sto products to assist in developing project specifications for a direct applied cement board stucco wall assembly applied to code compliant frame wall construction. The assembly incorporates a fluid applied air/moisture barrier, drainage mat, cement board, and Sto reinforcing meshes, base coats, and finishes. The assembly complies with IBC and IRC building code requirements for use on all Types (I, II, III, IV, and V) of construction. Refer to this specification, Sto Guide Details, and ICC-ESR Report Nos. 1233, 1510, and 2536 for additional information. Notes in Italics, such as this one, are explanatory and intended to guide the design/construction professional and user in the proper selection and use of materials.

StoGuard, the air/moisture barrier, functions in tandem with other compatible air barrier and flashing components of the building envelope to resist air and water infiltration. Sto DrainScreen, the drainage mat, creates a cavity behind the cement board to promote drainage and drying of the wall assembly in the event of incidental water infiltration through a crack in the outer surface of the assembly. National Gypsum PermaBase™ Brand cement board is the substrate for Sto base coat, reinforcing mesh, and finishes that complete the direct-applied cement board stucco wall assembly.

Limitations of direct-applied cement board stucco wall assemblies include:

- *Ultimate wind load resistance is typically limited by the fasteners and fastening schedule of the cement board. (assuming supporting studs and sheathing assembly are sufficient to resist wind loads). Refer to Specification Section 1.04A.*
- *The system is generally recommended for low-rise residential and commercial wall construction (4 stories or less). In some cases such as balcony infill walls the system may be used on taller buildings. See wind load data under Design Requirements and verify conformance with project design wind pressure requirements. Always construct a mock-up to verify design details, aesthetics, and test to verify performance as deemed by design professional.*
- *The installed cement board surface must be straight and true to within ¼ inch in 10 feet (2 mm/m) for best aesthetics. Planar irregularities/waviness may be visible in the finished wall surface because of out of plane studs or other framing irregularities. Heavy texture finishes (> 1.5 mm) and/or two coats of base coat will minimize these effects.*
- *For use on vertical above grade wall surfaces only. Do not use below grade or on roofs or roof-like surfaces*
- *Joints are required, including at intervals in the field of the wall to accommodate thermal movement.*
- *Light finish colors are recommended to minimize thermal stress*
- *Air Barrier and drainage mat are not intended for prolonged weather exposure. Refer to Product Bulletins.*

StoQuik Silver DrainScreen, as with any exterior wall assembly, requires proper design detailing and integration with other components, in particular flashing and air barrier transition materials, to provide a wall assembly that resists air and water infiltration. The weather protection afforded by StoQuik Silver DrainScreen should be evaluated by the design/construction professional in relation to building design, height, orientation, climate zone, and any other factors that affect the severity of exposure to rain and water infiltration. Refer to Sto Tech Hotline Nos. 0403-BSc, Critical Detail Checklist for Wall Assemblies, and 0603-BSc, Moisture Control Principles for Design and Construction of Wall Assemblies. Modifications should be made to this specification as deemed necessary by the design/construction professional to ensure a watertight building envelope without water entry or accumulation anywhere within the wall assembly, an airtight building envelope, and control of condensation

from water vapor diffusion. For complete technical information on Sto components and other reference materials, refer to product and system bulletins, guide details, and other technical information available at www.stocorp.com.

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

Table of Contents

PART 1 GENERAL 5

1.1 SUMMARY 5

1.2 RELATED SECTIONS 5

1.3 REFERENCED DOCUMENTS 5

1.4 DESIGN REQUIREMENTS..... 6

1.5 PERFORMANCE REQUIREMENTS..... 9

1.6 SUBMITTALS 10

1.7 QUALITY ASSURANCE 10

1.8 DELIVERY, STORAGE AND HANDLING 11

1.9 PROJECT/SITE CONDITIONS 12

1.10 COORDINATION/SCHEDULING 12

1.11 WARRANTY 13

PART 2 PRODUCTS..... 13

2.1 MANUFACTURERS..... 13

2.2 AIR/MOISTURE BARRIER 13

2.3 ACCESSORIES FOR CEMENT BOARD STUCCO 13

2.4 DRAINAGE MAT..... 14

2.5 CEMENT BOARD 14

2.6 MECHANICAL FASTENERS FOR CEMENT BOARD 14

2.7 FOAM INSULATION BOARD FOR TRIM..... 15

2.8 JOB MIXED INGREDIENTS 15

2.9 CEMENT BOARD STUCCO JOINT REINFORCEMENT 15

2.10 CEMENT BOARD STUCCO AND FOAM TRIM BASE COAT..... 15

2.11 CEMENT BOARD STUCCO AND FOAM TRIM REINFORCING MESH 15

2.12 FINISH COAT **ERROR! BOOKMARK NOT DEFINED.**

2.13 MIXING..... 15

PART 3 EXECUTION..... 16

3.1 ACCEPTABLE INSTALLERS..... 16

3.2 EXAMINATION 16

3.3 SURFACE PREPARATION 17

3.4 AIR/MOISTURE BARRIER INSTALLATION 17

3.5 STARTER TRACK AND BACK MOUNT CASING BEAD ACCESSORY
INSTALLATION 19



3.6	DRAINAGE MAT INSTALLATION.....	19
3.7	CEMENT BOARD STUCCO INSTALLATION	20
3.8	PROTECTION	22
3.9	CLEANING, REPAIR AND MAINTENANCE	23

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes materials and installation of exterior direct-applied cement board stucco backed with drainage mat and fluid applied air/moisture barrier, for frame walls.

1.2 RELATED SECTIONS

(add/delete, depending on specific project requirements)

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

1.3 REFERENCED DOCUMENTS

(add/delete depending on specific project requirements)

- A. ASTM International (ASTM)
 - C 150 Specification for Portland Cement
 - C 297 Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
 - C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation
 - C 1177 Specification for Glass Mat Gypsum for Use as Sheathing
 - C 1325 Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets
 - D 4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
 - E 84 Test Method for Surface Burning Characteristics of Building Materials
 - E 96 Standard Test Methods for Water Vapor Transmission of Materials
 - E 283 Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

- E 331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- E 779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- E 2178 Standard Test Method for Air Permeance of Building Materials
- E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- E 2430 Standard Specification for Expanded Polystyrene (“EPS”) Thermal Insulation Boards for Use in Exterior Insulation and Finish Systems (EIFS)

- B. APA Engineered Wood Association
 - PS 1 Voluntary Product Standard, Structural Plywood
 - PS 2 Performance Standard for Wood-Based Structural-Use Panels
 - E 30 APA Engineered Wood Construction Guide

- C. ICC (International Code Council)
 - 2012 and 2015 IBC (International Building Code)

- D. ICC ES (International Code Council Evaluation Service)
 - AC 59 Acceptance Criteria for Direct Applied Exterior Finish Systems (DEFS)
 - ICC ESR 1233 StoGuard with Gold Coat, StoGuard with EmeraldCoat, and StoGuard VaporSeal Water-Resistive Barriers and StoEnergy Guard (StoGuard with Continuous Insulation)
 - ICC ESR 1510 PermaBase Brand Cement Board
 - ICC ESR 2536 StoQuik Silver I, StoQuik Silver II, and StoQuik Silver NExT Cement Board Stucco Systems

- E. National Fire Protection Association (NFPA) Standards
 - NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multi-storey Test Apparatus
 - NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source

- F. South Coast Air Quality Management District (SCAQMD)
 - Rule 1113 (2007) Architectural Coatings

- G. USEPA (United States Environmental Protection Agency)
 - 40 CFR Part 59 (Code of Federal Regulations Title 40 Part 59 – National Volatile Organic Compound Emission Standards for Consumer and Commercial Products)

1.4 DESIGN REQUIREMENTS

- A. Structural (wind and axial loads)
 - 1. Design for maximum allowable deflection, normal to the plane of the wall of L/360

2. Design for wind load in conformance with code requirements using framing members designed to comply with the standards, strength, and stiffness requirements of the applicable code.
3. Maximum stud spacing: 16 inches (406 mm) on center
4. Sheathing: minimum ½ inch (13 mm) glass mat faced gypsum sheathing in compliance with ASTM C 1177 or minimum 7/16 inch (11 mm) Exterior or Exposure I plywood or OSB wood-based sheathing in compliance with US DOC PS-2
5. Drainage mat: maximum ¼ or 3/8 inch (6 or 10 mm) thick tangled filament nylon core with fabric facing.
6. Screw fasteners for cement board:
 - a. Wood framing – minimum #9 Type S corrosion resistant screws with minimum 0.395 inch (10 mm) wafer head diameter, and minimum 1 inch (25 mm) penetration into framing
 - b. Steel framing – minimum #8 Type S-12 corrosion resistant screws with minimum 0.395 inch (10 mm) wafer head diameter and minimum 3/8 inch (9.5 mm) and three thread penetration into framing
7. Cement board fastener spacing: maximum 8 inches (203 mm) vertically along studs
8. Ultimate wind load resistance capabilities:
 - a. Wood framing capable of achieving ultimate wind load resistance of +99 psf, -111 psf (+4.74 kPa, -5.31 kPa): minimum 2 x4 kiln dried wood studs with minimum specific gravity of 0.50 spaced 16 inches (406 mm) on center maximum.
 - b. Metal framing capable of achieving +159 psf, -81 psf (+7.61 kPa, -3.88 kPa): minimum 18 gage (0.045 mil) or heavier, minimum 3-5/8 inch (92 mm) depth and 1-5/8 inch (41.3 mm) flange width, cold formed C-shaped steel stud framing spaced 16 inches (406 mm) on center maximum.
 - c. Metal framing capable of achieving +166 psf, -94 psf (+7.94 kPa, -4.50 kPa): minimum 16 gage or heavier, minimum 6 inch (152 mm) depth and 2 inch (50.8 mm) flange width, cold formed C-shaped steel stud framing spaced 16 inches (406 mm) on center maximum.

B. Moisture Control

1. Prevent the accumulation of water into or behind the cement board stucco, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly:
 - a. Provide corrosion resistant flashing to protect exposed elements and to direct water to the exterior, including, above window and door heads, beneath window and door sills, at floor lines, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
 - b. Air Leakage Prevention – prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
 - c. Vapor Diffusion and Condensation – perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation. Adjust wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

- d. Provide StoGuard Air & Moisture Barrier and Sto DrainScreen over sheathing.
- e. At through wall expansion joints and at joints formed with back-to-back casing beads, back joints with StoGuard Transition Membrane. Refer to Sto Guide Details at www.stocorp.com.
- f. Seal cement board stucco accessory butt joints with appropriate sealant. Seal all cement board stucco terminations and penetrations through the cement board stucco wall assembly with appropriate sealant, or backer rod and sealant, as dictated by joint type.

C. Grade Condition

1. Do not specify cement board stucco for use below grade or on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 6 inch (150 mm) clearance above grade. Provide increased clearance in freeze/thaw climate zones.

D. Sloped surfaces, Including Foam Trim and Projecting Architectural Features Attached to Cement Board.

1. Avoid the use of cement board stucco on build-outs or weather exposed sloped and horizontal surfaces (refer to 2 and 3 below).
2. Build out trim and projecting architectural features from the cement board wall surface with code compliant EPS foam. All foam trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All foam horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the wall plane, protect the top surface with waterproof base coat. Limit foam thickness to a maximum of 4 inches (102 mm). Periodic inspections and increased maintenance may be required to maintain surface integrity of finishes on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate maintenance and minimize maintenance burden. Refer to Sto Guide Details at www.stocorp.com
3. Do not use foam on weather exposed projecting ledges, sills, or other projecting features unless supported by framing or other structural support and protected with metal coping or flashing. Refer to Sto Guide Details at www.stocorp.com

E. Joints and Accessories

1. Provide back-to-back casing beads in the cement board stucco assembly where building movement is anticipated: at joints in the substrate or supporting construction, where the system is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, at columns and cantilevered areas. Back the joint with StoGuard Transition Membrane.
2. Provide one piece control joints at no greater than 25 ft (7.6 m) intervals and 625 ft² (58 m²) for light colors (LRV \geq 70), and at no greater than 16 ft (4.68 m) and every 256 ft² (23.5 m²) for dark colors (LRV $<$ 70 and \geq 30). Do not exceed length to width ratio of 2-1/2:1 in expansion joint layout.
3. Provide one piece control joints at through wall penetrations, for example, at corners above and below windows, above doors, and similar penetrations through the wall. Alternatively use minimum 9 inch (229 mm) wide diagonal mesh reinforcement at corners over cement board sheathing that is cut in an “L” shape around the corner of the opening.

4. Provide minimum 3/8 inch (9 mm) wide joints where the system abuts windows, doors and other through wall penetrations.
5. Provide appropriate accessories at cement board stucco terminations and joints.
6. Avoid the use of channel reveal accessories which can interfere with proper drainage and proper stress relief.
7. Provide appropriate sealant at cement board stucco terminations and at stucco accessory butt joints.
8. Indicate location of joints, accessories and accessory type on architectural drawings.

F. Fire Protection

1. Noncombustible Type Construction: provide full width firestops at floor lines, typically 4 pcf (64 kg/m³) semi-rigid mineral wool, where metal framing runs continuously past floor line. Refer to Sto Details.
2. Provide 15 minute thermal barrier, typically minimum ½ inch thick interior gypsum wall board or exterior gypsum sheathing, to separate combustible components on the exterior from interior space.
3. Fire-Resistance Rated Construction: where an hourly fire-resistance rating is required consult ICC ESR 1510 and provide analysis of the final proposed wall assembly to verify rating is met.

G. Color Limitations

1. Select colors with a lightness reflectance value (LRV) of ≥ 30 and as dictated by allowable joint spacing (1.04 E2). Refer to Sto Color Chart for LRVs.

1.5 PERFORMANCE REQUIREMENTS

A. Air & Moisture Barrier

1. Compliant with ICC ES Acceptance Criteria AC 212 (refer to ICC ESR 1233)
2. Material Air Leakage Resistance, ASTM E 2178: less than 0.02 L/s·m² (0.004 cfm/ft² at 1.57 psf)
3. Assembly Air Leakage Resistance, ASTM E 2357: less than 0.2 L/s·m² (0.04 cfm/ft² at 1.57 psf)
4. Water Vapor Permeance, ASTM E 96, Method B: greater than 10 perms [573 ng/(Pa·s·m²)]
5. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A Building Material
6. Tensile Adhesion, ASTM C 297:
 - a. Gypsum Sheathing, exceeds strength of substrate
 - b. Plywood, > 85 psi (590 kPa)
 - c. OSB, > 30 psi (206 kPa)
7. VOC, calculation:
 - a. Less than 100 g/L
 - b. Compliant with US EPA 40 CFR 59 for waterproofing/sealer
 - c. Compliant with South Coast AQMD Rule 1113 for waterproofing/sealer

- B. Drainage Mat
 - 1. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A Building Material
 - 2. Flame Propagation, NFPA 285: meets requirements for use on noncombustible (Types I, II, III, and IV) construction. Refer to ICC ESR 1233
- C. Direct-Applied Cement Board Stucco Finish System and Components
 - 1. Compliant with ICC ES AC 59.
 - 2. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
 - 3. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

1.6 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data
- B. Manufacturer's code compliance report for air barrier and water-resistive barrier
- C. Manufacturer's code compliance report for cement board stucco
- D. Manufacturer's standard warranty
- E. Samples for approval as directed by architect or owner
- F. Fastener manufacturer's pull-out or withdrawal capacity testing for frame construction
- G. Prepare and submit project-specific details (when required by contract documents)

1.7 QUALITY ASSURANCE

- A. Manufacturer Requirements
 - 1. Cement board stucco and air barrier products manufacturer for a minimum of twenty five (25) years.
 - 2. Cement board stucco finish products and air/moisture barrier products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.
- B. Contractor Requirements
 - 1. Licensed, insured and engaged in application of stucco for a minimum of three (3) years.
 - 2. Knowledgeable in the proper use and handling of Sto materials.
 - 3. Employ skilled mechanics who are experienced and knowledgeable in stucco application, and familiar with the requirements of the specified work.
 - 4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
 - 5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.

- C. Foam Trim Insulation Board Manufacturer Requirements
 - 1. Manufacturer of ASTM C 578 compliant insulation board, listed by an approved agency. Label insulation board with information required by Sto, the approved listing agency, and the applicable building code
 - 2. Insulation board listed in a current ICC ES evaluation report
- D. Cement Board Manufacturer Requirements
 - 1. Manufacturer of ASTM C 1325 compliant cement board
 - 2. Cement board listed in a current ICC ES evaluation report
- E. Testing
 - 1. Construct full-scale mock-up of typical cement board stucco/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, E 331 and E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction.
 - 2. Conduct air barrier adhesion testing in accordance with ASTM D 4541.
 - 3. Conduct air barrier assembly testing in accordance with ASTM E 779.
 - 4. Verify adequacy of pull-out or withdrawal capacity of fasteners used for frame construction with manufacturer in relation to negative design wind pressures.
 - 5. Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
 - 6. Notify design professional minimum 7 days prior to testing.
- 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.

1.8 DELIVERY, STORAGE AND HANDLING

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

- F. Handle and store all products as directed on labeling.

1.9 PROJECT/SITE CONDITIONS

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

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

1.10 COORDINATION/SCHEDULING

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

- A. Protect sheathing from climatic conditions to prevent weather damage.
- B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier and continuous moisture protection. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing. Coordinate installation of air/moisture barrier components with window and door installation to provide weather proofing of the structure and to prevent moisture infiltration and excess air infiltration.
- C. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.
- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Splice-in head flashing, floor line flashing, diverter flashing, and similar flashing with air/moisture barrier detail component to provide a shingle lap that directs water to the exterior.
- F. Protect air/moisture barrier with cement board stucco cladding assembly within 180 days of installation.
- G. Protect drainage mat with cement board or other protection within 30 days of installation.
- H. Commence the cement board stucco installation after completion of all floor, roof construction and other construction that imposes dead loads on the walls to prevent excessive deflection (and potential cracking) of the cement board stucco.
- I. Sequence interior work such as drywall installation prior to cement board stucco installation to prevent stud distortion (and potential cracking) of the cement board stucco.

- J. Provide site grading such that the stucco terminates above earth grade minimum 6 inches (152 mm). Provide increased clearance in freeze/thaw climate zones.
- K. Install copings and sealant immediately after installation of the cement board stucco finishes and when finish coatings are dry.
- L. Attach penetrations through cement board stucco to structural support and provide air tight and water tight seals at penetrations.

1.11 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Air/Moisture Barrier, Drainage Mat, Cement Board Stucco Base Coat, Finishes
 - 1. Sto Corp., 3800 Camp Creek Parkway, Building 1400, Suite 120. Atlanta, GA 30331
- B. Cement Board
 - 1. National Gypsum Company, Inc., 2001 Rexford Road, Charlotte, NC 28211
- C. Cement Board Stucco Accessories
 - 1. Plastic Components, Inc., 9051 NW 97th Terrace, Miami, Florida 33178

2.2 AIR/MOISTURE BARRIER

- A. StoGuard-- fluid applied air/moisture barrier for sheathing, concrete, and concrete masonry substrates consisting of multiple compatible components:
 - 1. Sto Gold Coat -- ready mixed flexible waterproof coating for wall sheathing, concrete and CMU wall surfaces
 - 2. StoGuard Fabric – nonwoven cloth reinforcement used with Sto EmeraldCoat for rough opening protection, joint treatment of wall sheathing, and detail component for shiplap connections with flashing, starter track, and similar ship lap details
 - 3. StoGuard Transition Membrane – flexible air barrier membrane for continuity at transitions: 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.
 - 4. Sto RapidGuard - one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap over flashing, wall to balcony floor slab or ceiling, and through wall penetrations – pipes, electrical boxes, and scupper penetrations

2.3 ACCESSORIES FOR CEMENT BOARD STUCCO

(supplied by others unless indicated otherwise)

- A. Starter Track – Starter Track Drip Edge (Product No. STDE-xx) or i Drip Track (Product No. iDT-xx), rigid PVC (polyvinyl chloride) plastic tracks with weepholes as furnished by Plastic

Components, Inc., for use at terminations such as base of wall, floor lines, roof lines, and similar weep termination lines.

- B. Casing Bead – Starter Trac (Product No. ST-xx), a rigid PVC (polyvinyl chloride) plastic accessory as furnished by Plastic Components, Inc., for use at terminations such as windows, doors, and similar through wall penetrations, and used back-to-back at movement joints such as dissimilar materials, through wall expansion joints, and floor line deflection joints. May also be used back-to-back in lieu of a single piece control joint.
- C. Outside Corners – Sto-Mesh Corner Bead Standard, one component PVC (polyvinyl chloride) accessory with integral reinforcing mesh for outside corner reinforcement.
- D. Control Joint – “V” Control Joint (Product No. PL 093), rigid PVC (polyvinyl chloride) plastic single piece control joint as furnished by Plastic Components, Inc., for use at intervals in the field of the wall, and at corners of penetrations such as windows, doors, and similar through wall penetrations.

NOTE: *Powder actuated or other fastening devices that can damage the air/moisture barrier, or sheathing, should be avoided. CAUTION: AVOID THE USE OF CHANNEL REVEAL ACCESSORIES THAT INTERFERE WITH PROPER DRAINAGE AND STRESS RELIEF.*

2.4 DRAINAGE MAT

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

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

2.5 CEMENT BOARD

(supplied by others)

- A. PermaBase™ Brand Cement Board – minimum ½ inch (13 mm) thick cement board in Compliance with ASTM C 1325

2.6 MECHANICAL FASTENERS FOR CEMENT BOARD

(supplied by others)

- A. Corrosion resistant screw fasteners:
 - 1. Wood Framing – minimum #9 Type S wafer head fully threaded corrosion resistant screws with minimum 1 inch (25 mm) penetration into framing and minimum 0.395 inch (10 mm) head diameter.
 - 2. Steel Framing – minimum #8 Type S-12 corrosion resistant wafer head fasteners with minimum 3/8 inch (9.5 mm) and three thread penetration into framing and minimum 0.395 inch (10 mm) head diameter

NOTE: *Pull-out or withdrawal capacity of the selected fastener must be verified with respect to anticipated wind load, desired safety factor and*

building code requirements. Consult applicable code compliance report for specific assemblies and fastening schedules or conduct project specific testing to verify compliance with design wind pressure requirements.

2.7 FOAM INSULATION BOARD FOR TRIM

- A. Sto EPS Insulation Board--nominal 1.0 lb/ft³ (16 kg/m³) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and ASTM E 2430

NOTE: Minimum required thickness is 1 inch [25 mm] and maximum allowable thickness is typically 4 inches [100 mm] for noncombustible type construction unless thicker dimensions are approved by the code official.

2.8 JOB MIXED INGREDIENTS

(supplied by others)

- A. Water: clean and potable.
B. Portland cement: Type 1 in compliance with ASTM C 150

2.9 CEMENT BOARD STUCCO JOINT REINFORCEMENT

- A. StoGuard Mesh with Sto base coat

2.10 CEMENT BOARD STUCCO AND FOAM TRIM BASE COAT

- A. Base Coat
1. Sto BTS Plus – one component lightweight polymer modified portland cement-based base coat material

2.11 CEMENT BOARD STUCCO AND FOAM TRIM REINFORCING MESH

- A. Sto Mesh--nominal 4.5 oz./yd² (153 g/m²), symmetrical, interlaced open-weave glass fiber mesh treated with alkaline resistant coating for compatibility with Sto materials (*achieves Standard Impact Classification over foam insulation board*).
B. Sto Detail Mesh--nominal 4.2 oz/yd² (143 g/m²), flexible, symmetrical, interlaced open-weave glass fiber fabric treated with alkaline resistant coating for compatibility with Sto materials (used for standard foam backwrapping and aesthetic detailing).

2.12 FINISH COATS *(select one)*

- A. Stolit[®] Textured Finishes acrylic based, integrally colored textured finishes
Stolit 1.0, Stolit 1.0 Dark Colors, Stolit 1.5, Stolit 1.5 Dark Colors, Stolit Freeform, Stolit Freeform Dark Colors, Stolit R1.5, Stolit R1.5 Dark Colors,

Stolit[®] Lotusan[®] – acrylic based textured wall finish with graded marble aggregate and self cleaning properties

Stolit Lotusan 1.0, Stolit Lotusan 1.0 Dark Colors, Stolit Lotusan 1.5, Stolit Lotusan 1.5 Dark Colors, Stolit Lotusan Freeform, Stolit Lotusan Freeform Dark Colors

2.13 MIXING

- A. StoGuard
 - 1. Sto Gold Coat – mix with a clean, rust-free electric drill and paddle to a uniform consistency. Do not thin, or dilute with water.
- B. Adhesive and Base Coats for Cement Board Stucco and Foam Build-outs:
 - 1. Refer to applicable Sto [Product Bulletin](#) for selected adhesive/base coat material(s).
- C. Finish--mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water (up to 12 ounces [0.4 L]) may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.
- D. Mix only as much material as can readily be used.
- E. Do not add lime, anti-freeze compounds, or other additives to any of the materials.

PART 3 EXECUTION

3.1 ACCEPTABLE INSTALLERS

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

3.2 EXAMINATION

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

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

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

3.3 SURFACE PREPARATION

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

3.4 AIR/MOISTURE BARRIER INSTALLATION

(refer to Sto Guide Details as needed)

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

- A. The following instructions are applicable to:
1. Exterior or Exposure I Plywood in compliance with PS-1
 2. OSB (Oriented Strand Board) in compliance with PS-1 or PS-2
 3. Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177
- B. Transition Detailing
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).
- C. Rough Opening Protection (select 1, 2, 3, or 4 for frame construction; for concrete or concrete masonry rough openings with wood bucks and similar openings with complex 3-dimensional geometry, select no. 3 or 4, Sto RapidGuard):
1. Sto Gold Coat with StoGuard Fabric: apply Sto Gold Coat 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. For deep section studs cut minimum 4 inch (102 mm) strips of StoGuard Fabric to seal sill and head to jamb corners. Crease and center the fabric strips at the sill/head to jamb intersection and embed the fabric strips in Sto Gold Coat. After all corners have been completed apply Sto Gold Coat 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.

2. 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

D. Sheathing Joint Treatment (*select one*)

1. Sto Gold Coat with StoGuard Fabric: apply Sto Gold Coat 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).
2. 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.

E. Air/Moisture Barrier Coating Installation

1. Plywood, OSB and Gypsum Sheathing: apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10 mils in one coat. Use ½ inch (13 mm) nap roller. Inspect surface and touch up areas (such as where OSB wood strands are raised) with a second coat of Sto EmeraldCoat to completely seal the surface. Protect from rain and freezing until completely dry.

F. Air /Moisture Barrier Connections and Shingle Laps

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

NOTE: *Windows and doors are typically installed immediately following installation of the air/moisture barrier and work should be sequenced accordingly. Consult with window manufacturer for installation requirements to maintain air barrier continuity and for head, jamb, sill*

flashing and perimeter sealant requirements needed to prevent leaks into the wall assembly.

NOTE: *DO NOT ALLOW WATERPROOF AIR BARRIER INSTALLATION TO REMAIN EXPOSED MORE THAN 180 DAYS. PROTECT WITH CI AND CEMENT BOARD STUCCO CLADDING PROMPTLY AFTER INSTALLATION.*

3.5 STARTER TRACK AND BACK MOUNT CASING BEAD ACCESSORY INSTALLATION

- A. Strike a level line at the base of the wall to mark where the top of the starter track terminates.
- B. Attach the starter track even with the line onto the structure a maximum of 16 inches (406 mm) on center with the proper fastener: Type S-12 corrosion resistant screws for steel framing with minimum 3/8 inch (9 mm) penetration, and galvanized or zinc coated nails for wood framing with minimum 3/4 inch (19 mm) penetration. Blocking installed between the studs may be necessary to secure the track flat against the wall surface. For solid sheathing attach directly into sheathing at 12 inches (305 mm) on center maximum.
- C. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow the cement board to be seated inside of track) and abut.
- D. Install Starter Track at other cement board system terminations as designated on detail drawings: above windows and doors, at floor lines, above roof along dormers or gable end walls, and beneath window sills with concealed flashing.
- E. Install casing beads similarly at cement board stucco termination points—window and door jambs and other through wall penetrations. Install back-to-back casing beads at building expansion joints, thru-wall joints, where the cement board stucco abuts dissimilar construction or substrates, at changes in building height, at floor lines, columns, and cantilevered areas. Install full accessory pieces where possible and avoid small pieces. Where casing bead is used back-to-back as an expansion joint back the membrane with StoGuard Transition Membrane.
- F. Splice-in starter track at base of wall, 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.

3.6 DRAINAGE MAT INSTALLATION

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

3.7 CEMENT BOARD STUCCO INSTALLATION

(refer to Sto Guide Details as needed)

After satisfactory inspection of surfaces and correction of any deviations from specification requirements commence the cement board stucco installation as described below. Ensure the installed cement board surface is straight and true within ¼ inch in 10 feet (2 mm/m), and is clean, dry and free from damage, frost, and all bond-inhibiting materials before application of coatings or accessories to cement board surface. Ensure the installed base coat or primed base coat surface is clean, dry, free from damage, frost, and all bond inhibiting materials, including dust, dirt, salts, oil, grease, or laitance, before application of finish.

A. Cement Board Installation

1. Install cement board horizontally or vertically. Offset joints from sheathing joints by minimum six inches (152 mm). Insert bottom edge of board into the starter track, and then attach the board through the sheathing to studs/framing members with fasteners spaced 8 inches (203mm) on center maximum at the perimeter and in the field of the board, making sure that the fasteners seat flush with the surface of the cement board and do not penetrate the surface of the cement board.
2. Install cement boards with vertical joints staggered and with ends and edges closely butted but not forced together and flush at the surface. Cut boards in an “L” shape around openings such as windows, doors, and similar penetrations.
3. Provide for expansion joints and control joints in cement board layout (see Design Requirements, Section 1.04).

NOTE: *Cement board fasteners may need to be spaced closer, depending on design wind pressures. Verify fastening schedule is adequate for design wind pressures. Refer to Section 1.04 A8.*

B. Face Mount Accessory Installation

1. Install one piece control joints at wall penetrations, for example, above and below windows and doors. Refer to Sto Tech Hotline No. 0307-S. Install control joints in accordance with the following guidelines:
 - a. Light colors (LRV \geq 70) – at no greater than 25 ft (7.6 m) intervals and 625 ft² (58 m²)
 - b. Dark colors (LRV $<$ 70 and \geq 30) – at no greater than 16 ft (4.68 m) intervals and every 256 ft² (23.5 m²)
 - c. Do not exceed length to width ratio of 2-1/2:1 in expansion joint layout.

NOTE: *Where drainage is intended at the return, the drip edge accessory may not be applicable, depending on design details. Refer to Sto Guide Details.*

C. Cement Board Joint Reinforcement, Accessory Overlaps, and Corners of Wall Penetrations

1. Embed Detail Mesh centered over cement board joints. After embedding mesh over joints skim coat the surface with base coat to completely cover the mesh.
2. Embed Detail Mesh over perforated accessory flanges up to the “stop bead” on the accessory – starter tracks, casing beads, corner beads, and control joints. After embedding mesh over flanges skim coat the surface up to the “stop bead” on the accessory with base coat to completely cover the mesh.

3. At corners of wall penetrations where no control joint is used embed 9 x 12 inch (230 x 305 mm) detail mesh diagonally in base coat.

D. Foam Trim and Build-Outs

1. Where foam build-outs terminate at a dissimilar material such as a window, door or other non-cement board stucco surfaces, backwrap the foam build-out by installing detail mesh onto the terminating edge of the cement board. Embed the mesh in the base coat. Allow the mesh to dangle until the backwrapping procedure is completed (B4).
2. Install foam build-outs directly over cement board with foam trim adhesive. Apply adhesive with the appropriate size notched trowel to the back of the insulation board and immediately place build-out in the proper location on the wall. Press firmly into place and trim or tool excess adhesive from ends and edges of foam trim for a smooth void-free connection to the cement board substrate.
3. After the adhesive has cured sufficiently to hold the build-out firmly in place, rasp the entire foam surface smooth.
4. Complete the backwrapping procedure by applying the foam trim base coat to the exposed edges of the foam build-out and minimum 2-1/2 inches (64 mm) onto the face. Pull the backwrap mesh around the foam build-out and fully embed it into the base coat. Use a corner trowel for neat straight corners.
5. Apply the base coat to the foam build-out and approximately 3 inches (76 mm) onto the adjacent cement board surfaces to an approximate thickness of 1/8 inch (3 mm). Immediately embed the reinforcing mesh in the wet base coat. Trowel from the center to the edges of the mesh to avoid wrinkles and remove excess base coat. Overlap mesh seams minimum 2-1/2 inches (64 mm). Overlap mesh onto adjacent cement board wall surfaces minimum 2-1/2 inches (64 mm) at terminations of the foam build-out and feather onto the cement board wall surface.

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

E. Reinforced Base Coat Installation

1. Apply base coat over the cement board, including any areas of unreinforced foam trim/build-outs, 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 fully overlap mesh at accessories to the accessory “stop bead.” Fully overlap backwrap reinforcing mesh along foam trim/build-outs if these surfaces have not yet been reinforced with base coat/mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 8 inch (203 mm) overlap in each direction where mesh is used in lieu of a corner bead accessory. 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 or if necessary to correct planar irregularities in the wall surface.
2. Sloped Surfaces: for foam 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 weather exposed 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). Allow base coat to thoroughly dry before applying finish.

NOTE: *All foam 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 wall plane, protect the weather exposed sloped surface with waterproof base coat. Avoid the use of trim and features that exceed the maximum allowable thickness of foam permitted by code (typically 4 inches [100 mm]) unless approved by the code official. Periodic inspections and increased maintenance may be required to maintain surface integrity of finish 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 foam trim 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 details.*

F. Finish Installation

1. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified, to the dry base coat (or primed base coat) surface. Follow these general rules for application of finish:
 - a. Avoid application in direct sunlight.
 - b. Apply finish in a continuous application, and work a wet edge towards the unfinished wall area. Work to an architectural break in the wall before stopping to avoid cold joints.
 - c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results; cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection.
 - d. Float “R” (rilled or swirl texture) finishes with a plastic float to achieve their rilled texture
 - e. Do not install separate batches of finish side-by-side.
 - f. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only.
 - g. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.8 PROTECTION

- A. Provide protection of installed materials from water infiltration into or behind them.
- B. Provide protection of installed materials from dust, dirt, precipitation, and freezing.
- C. Provide protection of installed primer and finish from dust, dirt, precipitation, freezing and continuous high humidity until fully dry.
- D. Provide sealant and backer material at cement board stucco terminations and at fixture penetrations through the cement board stucco to protect against air, water and insect

infiltration. Provide weeps at floor lines, window and door heads, and other areas to conduct water to the exterior.

3.9 CLEANING, REPAIR AND MAINTENANCE

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

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