SECTION 072419 - WATER DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

CONTACT LA QUINTA STO REPRESENTATIVE : CHUCK DUFFIN STO CORP. OFFICE: 940-894-2092 CELL: 940-366-1159

PART 1 - GENERAL

A. This section includes air and moisture barrier, and compatible EIFS for vertical above grade exterior walls at locations where EIFS was not an existing exterior wall system.

1.2 SUBMITTALS A. Manufacturer's specifications, details, installation instructions and product data

B. Manufacturer's code compliance report

C. Manufacturer's standard warranty D. Applicator's industry training credentials

E. Samples for approval as directed by architect or owner F. Sealant manufacturer's certificate of compliance with ASTM C 1382 G. Prepare and submit project-specific details

1.3 REFERENCES A. ASTM Standards:

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 1382 Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints

D 522 Test Methods for Mandrel Bend Test of Attached Organic Coatings D 882 Standard Test Methods for Tensile Properties of Thin Plastic Sheeting

D 968 Test Method for Abrasion Resistance of Organic Coatings by Falling Abrasive D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC)

D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

D 3273 Test for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber E 84 Test Method for Surface Burning Characteristics of Building Materials E 96 Test Methods for Water Vapor Transmission of Materials

E 119 Method for Fire Tests of Building Construction and Materials E 330 Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure

E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference E 1233 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference

E 2098 Test Method for Determining Tensile Breaking Strength of Glass Fiber Reinforcing Mesh for Use in Class

PB Exterior Insulation and Finish System after Exposure to a Sodium Hydroxide Solution E 2134 Test Method for Evaluating the Tensile-Adhesion Performance of an Exterior Insulation and Finish System E 2178 Test Method for Air Permeance of Building Materials

E 2273 Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish System (EIFS) Clad Wall Assemblies E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies E 2485 Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and

E 2486 Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems E 2568 Standard Specification for PB Exterior Insulation and Finish Systems E 2570 Test Method for Water-Resistive (WRB) Coatings used Under Exterior Insulation and Finish Systems

(EIFS) or EIFS with Drainage G 153 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials G 154 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

B. Building Code Standards AC 235 Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (November, 2009)

C. National Fire Protection Association (NFPA) Standards NFPA 268 Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat

NFPA 285 Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies containing Combustible Components Using the Intermediate-Scale, Multistory Test

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

1.4 DESIGN REQUIREMENTS A. Wind Load

Water Resistive Barrier Coatings

1. Design for maximum allowable system deflection, normal to the plane of the wall, of L/240. 2. Design for wind load in conformance with code requirements.

3. Maximum wind load resistance: + 188 psf (9.00 kPa), provided structural supports and sheathing/sheathing attachment are adequate to resist these pressures. B. Moisture Control

1. Prevent the accumulation of water behind the EIFS or into the wall assembly, either by condensation or leakage through the wall construction, in the design and detailing of the wall assembly: a. Provide flashing to direct water to the exterior where it is likely to penetrate components in the wall assembly, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, at floor lines, and at the base of the wall. b. Air Leakage Prevention – provide continuity of the air barrier system at foundation, roof, windows, doors, and other penetrations through the wall with connecting and compatible air barrier components to minimize condensation

and leakage caused by air movement. c. Vapor Diffusion and Condensation – perform a dew point analysis and/or dynamic hygrothermal modeling of the wall assembly to determine the potential for accumulation of moisture in the wall assembly by diffusion. Adjust insulation thickness and/or other wall assembly components accordingly to minimize risk. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.

C. Impact Resistance 1. Provide ultra-high impact resistance of the EIFS to a minimum height of 6'-0" (1.8 m) above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact.

1. Select finish coat with a light reflectance value of 20 or greater. (The use of dark colors is not recommended over expanded polystyrene [EPS]. EPS has a service temperature limitation of approximately 165° F [74°C]).

1. Provide minimum 3/4 inch (19 mm) wide joints in the EIFS where they exist in the substrate or supporting construction, where the cladding adjoins dissimilar construction or materials, at changes in building height, at expansion, control, and cold joints in construction, and at floor lines in multi-level wood frame construction. Size joints to correspond with anticipated movement. Align terminating edges of EIFS with joint edges of through wall expansion joints and similar joints in construction.

2. Provide minimum 1/2 inch (13 mm) wide perimeter sealant joints at all penetrations through the EIFS (windows, doors, mechanical, electrical, and plumbing penetrations, etc.). 3. Specify compatible backer rod and sealant that has been evaluated in accordance with ASTM C 1382, and that meets minimum 50% elongation after conditioning. 4. Provide joints so that air barrier continuity is maintained across the joint, and drain joints to the exterior, or provide other means to prevent or control water infiltration at joints.

F. Grade Condition 1. Do not install EIFS below grade (unless designed for use below grade and permitted by code) or for use on surfaces subject to continuous or intermittent water immersion or hydrostatic pressure. Provide minimum 6 inch (152 mm) clearance above grade or as required by code. G. Trim, Projecting Architectural Features and Reveals

1. All trim and projecting architectural features must have a minimum 1:2 [27°] slope along their top surface. All reveals must have minimum ¾ inch (19 mm) insulation thickness at the bottom of the reveal. All horizontal reveals must have a minimum 1:2 [27°] slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface. Where trim/feature or bottom surface of reveal projects more than 2 inches (51 mm) from the face of the EIFS wall plane, protect the top surface with waterproof base coat. Periodic inspections and increased maintenance may be required to maintain surface integrity of the EIFS finish on weather exposed sloped surfaces. Limit projecting features to easily accessible areas and limit total area to facilitate and H. Insulation Thickness

1. Minimum EPS insulation thickness is 1 inch (25 mm). 2. Maximum EPS insulation thickness is 12 inches (305 mm), except as noted below for fire-resistance rated wall

1.5 PERFORMANCE REQUIREMENTS A. Comply with ASTM E 2568, ASTM E 2570, and the following:

* Note: Sto Gold Fill testing with Sto Detail Mesh reinforcem

TEST	METHOD	CRITERIA	RESULT	
Water Penetration Resistance	AATCC 127 (Water Column)	Resist 21.6 in (55 cm) water for 5 hours before and after aging	Pass	
Water Penetration Resistance after Cyclic Wind Loading	ASTM E 1233 / ASTM E 331	No water at exterior plane of sheathing after 10 cycles @ 80% design load and 75 minutes water spray at 6.24 psf (299 Pa) differential	No water penetration	
Water Resistance Testing	ASTM D 2247	Absence of deleterious effects after 14 day exposure	No deleterious effects	
4. Water Vapor Transmission	ASTM E 96 Method B (Water Method)	Measure	Sto Gold Fill®*: 7.10 perms [408 ng/(Pa·s·m²)] Sto Gold Coat: > 10 perms [574 ng/(Pa·s·m²)]	
5. Air Leakage (material)	ASTM E 2178	≤ 0.004 cfm/ft2 at 1.57 psf (0.02 L/s•m2 at 75 Pa)	Pass	
6. Air Leakage (assembly)	ASTM E 2357	≤ 0.04 cfm/ft2 (0.2 L/s•m2)	Pass	
7. Structural Integrity	ASTM E 330	2-inches (51 mm) H ₂ O pressure (positive & negative) for 1 hour.	Pass	
8. Dry Tensile Strength	ASTM D 882	20 lbs/in (3503 N/m), minimum before and after aging	Sto Gold Fill:* 159 lbs/in (27845 N/m)) before aging 213 lbs/in (37302 N/m) after aging	
9. Pliability	ASTM D 522	No Cracking or Delamination using ½" (3 mm) mandrel at 14°F (-10°C) before and after aging	Pass	
10. Surface Burning	ASTM E 84	Flame Spread 0 – 25 for NFPA Class A, UBC Class I	Flame Spread: 5 Smoke Density: 10	
11. Tensile Adhesion	ASTM C 297	>15 psi (103 kPa)	>30 psi (207 kPa) to Plywood, OSB, Glass Mat	

Faced Gypsum sheathings

Table 1 Air/Moisture Barrier Performance

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Table 2 EIFS Weather Resistance and Durability Performance* 1. Accelerated ASTM G 153 No deleterious effects* at 2000 hours when viewed Pass (Formerly ASTM under 5x magnification 2. Accelerated ASTM G 154 No deleterious effects* at 2000 hours (Formerly ASTM 3. Freeze/Thaw ASTM E 2485 No deleterious effects* at 10 cycles when viewed under Pass No water penetration beyond the plane of the base Pass at 12.0 psf (575 > coat/insulation board interface after 15 minutes at 6.24 psf (299 Pa) or 20% of design wind pressure, whichever after 30 minutes ES AC 235) ASTM E 2273 90% minimum 6. Tensile ASTM E 2134 Minimum 15 psi (103kPa) tensile strength 7. Water ASTM D 2247 No deleterious effects*at 14 day exposure Pass @ 28 days 8. Salt Spray ASTM B 117 No deleterious effects* at 300 hours Pass @ 300 hrs 9. Abrasion ASTM D 968 No cracking or loss of film integrity at 528 quarts (500 L) Pass @ 528 quarts 10. Mildew ASTM D 3273 No growth supported during 28 day exposure period Pass @ 28 days 11. Impact ASTM E 2486 Level 1: 25-49 in-lbs (2.83-5.54J) Pass with one layer Sto Level 2: 50-89 in-lbs (5.65-10.1J) Pass with two layers Sto Level 3: 90-150 in-lbs (10.2-17J) Level 4: >150 in-lbs (>17J) Pass with one layer Sto Pass with one layer Sto

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

Table 4 EIFS Component Performance							
TEST	METHOD	CRITERIA	RESU				
Alkali Resistance of Reinforcing Mesh	ASTM E 2098	Greater than 120 pli (21 dN/cm) retained tensile strength	Pass				
Requirements for Rigid PVC Accessories	ASTM D 1784	Meets cell classification 13244C	Pass				

1.6 QUALITY ASSURANCE

A. Manufacturer Requirements 1. Member in good standing of the EIFS Industry Members Association (EIMA)

2. Air/moisture barrier and EIFS manufacturer for a minimum of thirty (30) years 3. Manufacturing facilities ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System B. Contractor Requirements

1. Engaged in application of similar systems for a minimum of three (3) years 2. Knowledgeable in the proper use and handling of Sto materials

. Employ skilled mechanics who are experienced and knowledgeable in air/moisture barrier and EIFS application, and familiar with the requirements of the specified work 4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified

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

D. Mock-up Testing 1. Construct full-scale mock-up of typical air/moisture barrier and EIFS/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, ASTM E 331 and ASTM E 330, respectively, through independent laboratory. Mock-up shall comply with requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site

as reference standard. If tested off-site accurately record construction detailing and sequencing of approved

E. Inspections 1. Provide independent third party special inspections. 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 B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from

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 A. Maintain ambient and surface temperatures above 40°F (4°C) during application and drying period, minimum 24 hours after application of Air/Moisture barrier and EIFS products

B. Provide supplementary heat for installation in temperatures less than 40°F (4°C) C. Provide protection of surrounding areas and adjacent surfaces from application of products A. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuously connected air and moisture barrier

B. Provide protection of rough openings before installing windows, doors, and other penetrations through the C. Install window and door head flashing immediately after windows and doors are installed D. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior E. 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 F. Install copings and sealant immediately after installation of the EIFS when coatings are dry, and such that, where sealant is applied against the EIFS surface, it is applied against the base coat or primed base coat

G. Schedule work such that air/moisture barrier is exposed to weather no longer than 30 days H. Attach penetrations through the EIFS to structural support and provide water tight seal at penetrations

1.10 WARRANTY A. Provide manufacturer's standard warranty

mock-up for replication during construction.

PART 2 - PRODUCTS

2.2 AIR/MOISTURE BARRIER

2.1 MANUFACTURERS A. Provide Air/Moisture Barrier and EIFS coatings and accessories from single source manufacturer or approved supplier B. Acceptable manufacturers:

1. Sto Corp. – Air/Moisture Barrier, EIFS 2. Plastic Components, Inc. – EIFS Accessories

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 c. StoGuard RapidFill™ – one component rapid drying gun-applied joint treatment for sheathing. Also used at static transition joints or seams in construction and to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air barrier materials. Also used as a detail component to splice over back flange of starter track, flashing, and similar ship lap details d. StoGuard RapidSeal™ – one component rapid drying gun-applied rough opening protection for frame and CMU walls without mesh or fabric reinforcement. Also use as a joint treatment for sheathing when used with

StoGuard Mesh. Also used to seal fish mouths, wrinkles, seams, gaps, holes, or other voids in StoGuard air 2. Waterproof Coating: Sto Gold Coat® – ready mixed waterproof coating for concrete, concrete masonry, vood-based sheathing, and glass mat gypsum sheathing 3. Transition Membrane: StoGuard Transition Membrane – flexible air barrier membrane for continuity at transitions such as sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, flashing shingle lap transitions, floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction

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A. Sto BTS Plus – factory blended one-component polymer-modified portland cement based high B. Sto BTS Xtra – lightweight factory blended one-component polymer-modified portland cement based high build 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 BTS Plus – factory blended one component polymer modified portland cement based high build base coat. Also used as a leveler for concrete and masonry surfaces 2. Sto BTS Xtra – lightweight factory blended one component polymer modified portland cement based high build base coat. Also used as a leveler for concrete and masonry surfaces B. Noncementitious Base Coat

1. Sto RFP – ready mixed acrylic based plaster base coat material C. Waterproof Base Coat

1. Sto Watertight Coat – pre-packaged two component fiber reinforced acrylic based waterproof base coat (for use as a waterproof base coat over Sto BTS Plus or BTS Xtra for foundations,

parapets, splash areas, trim and other projecting architectural features) 2.6 REINFORCING MESHES A. Standard Mesh

1. Sto Mesh – nominal 4.5 oz/yd2 (153 g/m2), symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials

A. Sto Primer Sand – acrylic based tintable primer with sand for roller application B. Sto Primer Smooth – acrylic based tintable primer for spray application

2.8 FINISH COAT A. Stolit® Lotusan® – acrylic based textured wall finish with graded marble aggregate and self-

2.9 JOB MIXED INGREDIENTS

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

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

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 BTS Plus – mix ratio with water: 5-6.5 quarts (4.7-6.2 L) of water per 47 pound (21.3 kg) bag of Sto BTS Plus. Pour water into a clean mixing pail. Add Sto BTS Plus, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Plus or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum water amount in mix ratio. D. Sto BTS Xtra – mix ratio with water: 4.75- 5 quarts (4.5-4.7 L) of clean potable water per 38 pound (17.2 kg) bag of Sto BTS Xtra. Pour water into a clean mixing pail. Add Sto BTS Xtra, mix to a uniform consistency and allow to set for approximately 5 minutes. Adjust mix if necessary with additional Sto BTS Xtra or water and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. Do not exceed maximum amount of water in mix ratio. E. Sto Watertight Coat – pour liquid component into a clean mixing pail. Add dry component, mix to a uniform consistency and allow to set for approximately five minutes. Adjust mix if necessary and remix to a uniform trowel consistency. Avoid retempering. Keep mix ratio consistent. F. Sto primer – mix with a clean, rust-free high speed mixer to a uniform consistency G. Stolit Lotusan – mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.

H. Mix only as much material as can readily be used I. 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 6. Compliance with specification tolerances—record areas that are out of tolerance (greater than 1/4 inch in 8-0 feet [6mm in 2438 mm] deviation in plane) 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 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. Report deviations from the requirements of project specifications or other conditions that might adversely affect the Air/Moisture Barrier and the EIFS installation to the General Contractor. Do not start work until deviations are corrected.

3.3 SURFACE PREPARATION A. Remove surface contaminants on 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 E. Seal over-driven fasteners with air barrier material and install additional fasteners as needed to comply with fastener spacing requirement 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 3.4.1 Air/Moisture Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in Compliance with ASTM C 1177, and Concrete, or Concrete Masonry (CMU) Wall Construction A. Transition Detailing with StoGuard Transition Membrane At floor line deflection joints up to 1 inch (25 mm) wide, and static joints and transitions such as:

sheathing to foundation, dissimilar materials (i.e., CMU to frame wall), flashing shingle-lap

transitions, and wall to balcony floor slab or ceiling: 1. Apply waterproof coating (Sto Gold Coat) liberally to properly prepared surfaces with brush, 2. Place pre-cut lengths of StoGuard Transition Membrane centered over the transition in the wet coating. At changes in plane crease the membrane and similarly place the membrane material in the wet coating. At floor line deflection joints achieve a slightly concave profile (recessed into the joint) of the membrane. 3. Immediately top coat the membrane with additional coating and apply pressure with brush or roller to fully embed the membrane in the coating and achieve a smooth and wrinkle-free surface without gaps or voids. 4. Apply coating liberally along all top horizontal edges on walls and along all edges on balcony floor slabs to fully seal the edges. 5. Overlap minimum 2 inches (51 mm) at ends and adhere lap seams together with coating. Shingle lap vertical seams and vertical to horizontal intersections with minimum 2 inch (51 mm)

At movement joints up to 1 inch (25 mm) wide with up to + 50% movement such as masonry control joints, and through wall joints in masonry or frame construction: 1. Insert backer rod sized to friction fit in the joint (diameter 25% greater than joint width). 2. Recess the backer rod ½ inch (13 mm). 3. Apply the waterproof coating liberally to properly prepared surfaces with brush, roller, or spray along the outer surface on each side of the joint (not in the joint).

4. Immediately place the membrane by looping it into the joint against the backer rod surface to

5. Embed the membrane in the wet coating along the outer surface on the sides of the joint by top coating with additional coating material and applying pressure with a brush or roller. For all applications, after the membrane installation is complete and the waterproof coating is dry: 1. Apply a final liberal coat of the waterproof coating to all top horizontal edges on walls to ensure waterproofing integrity. Similarly apply coating at all edges on balcony floor slabs. 2. Inspect the installed membrane for fish mouths, wrinkles, gaps, holes or other deficiencies. Correct fish mouths or wrinkles by cutting, then embedding the area with additional coating applied under and over the membrane. 3. Seal gaps, holes, and complex geometries at three dimensional corners with StoGuard,

RapidFill or StoGuard RapidSeal. C. Transition Detailing with StoGuard RapidFill At flashing shingle laps, and through wall penetrations such as pipes, electrical boxes, and

1. Flashing leg or penetration flange must be seated flat against the wall surface without gaps. Apply StoGuard RapidFill liberally with a caulking gun in a zig-zag pattern across the flashing leg or flange/wall surface seam and spread to a thickness that covers the flange and fastener penetrations and directs water away from the wall. Extend application minimum 1 inch (25 mm) onto both surfaces (flashing leg/flange and wall surface). 2. At through wall penetrations without flanges ensure the penetrating element (i.e., pipe or scupper) is fitted snug against abutting wall surfaces. Apply a fillet bead with a caulking gun around the penetration and tool against both surfaces (penetration and wall surface) to create a bead profile that directs water away from the penetration. Extend application minimum 1 inch (25 mm) onto both surfaces.

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D. Rough Opening Protection:

1. Sto Gold Fill with StoGuard Mesh: apply 9 inch (229 mm) wide StoGuard Mesh at rough openings. Immediately apply Sto Gold Fill by spray or trowel over the mesh and spread with a trowel to create a smooth surface that completely covers the mesh (refer to Sto Detail 20.20M) 2. Sto 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. 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 StoGuard RapidSeal (refer to Sto Detail 20.20F). 3. StoGuard RapidSeal: apply a generous bead of StoGuard RapidSeal with a caulking gun in a zig-zag pattern

along the inside and outside surface of the rough opening. Spread with a 6 inch (152 mm) wide plastic drywall knife all the way around the opening (refer to Sto Details 20.20R and 21.20R) E. Sheathing Joint Treatment

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 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

3. StoGuard RapidFill: apply a thick bead of StoGuard RapidFill with a caulking gun along sheathing joints, or apply in a zig-zag pattern across and down the joints. Spread to a uniform thickness of 20-30 mils (0.5-0.6 mm). Spread 1 inch (25 mm) beyond the sheathing joint on each side. Follow the same procedure for inside and

F. Air/Moisture Barrier Coating Installation 1. Plywood and Gypsum Sheathing: apply waterproof coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10 mils in one coat. Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.

2. OSB Sheathing: apply waterproof coating by spray or with a ¾ inch (19 mm) nap roller to sheathing surface to a uniform wet mil thickness of 10 mils. Protect rough openings, joints, and parapets (Paragraph 3.04D), then apply a second coat of waterproof coating.

CMU Surfaces: a. Repair static cracks up to 1/2 inch (13 mm) wide with StoGuard RapidFill. 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 ½ inch [13mm]), consult with a structural engineer for repair method). Protect repair from weather until dry. b. Liberally apply two coats of Sto Gold Coat to the surface with a ¾ inch nap roller or spray equipment to a minimum wet thickness of 10 – 30 mils each, depending on surface condition. Additional coats may be necessary to provide a void and pinhole free surface. Protect from weather until dry.

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

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

3.4.2 EIFS Installation

mechanical fastener.

A. Starter Track 1. Strike a level line at the base of the wall to mark where the top of the starter track terminates 2. Attach the starter track even with the line into 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. Butt sections of starter track together. Miter cut outside corners and abut. Snip front flange of one inside corner piece (to allow EPS insulation board to be seated inside of track) and abut. 4. Install Starter Track at other EIFS terminations as designated on detail drawings: above roof along dormers or gable end walls, and beneath window sills with concealed flashing (refer to Sto Details).

B. Detail Splice Strips for Starter Track, Flashing at Floor Lines, Head of Windows and Doors 1. Starter Track, Window/Door Head Flashing, Floor Line Flashing, and Roof/Side Wall Step Flashing: Install minimum 4 inch (100 mm) wide detail component over back flange of starter track, floor line flashing, head flashing, and roof/side wall step flashing. Center the detail component so it spans evenly between the back leg of flashing (or accessory) and the coated sheathing. 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. 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.) except where the Starter Track is installed. The mesh must be wide enough to adhere approximately 4 inches (100 mm) of mesh onto the wall, be able to wrap around the insulation board edge and cover a minimum of 2 ½ inches (64 mm) on the outside surface of the insulation board. Attach mesh strips to the air/moisture barrier and allow them to dangle until the backwrap procedure is completed (paragraph 3.04 G1). Alternatively, pre-wrap terminating edges of insulation board. 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 30 days of the application of the air/moisture barrier coating (Sto Gold Coat), or clean the surface and recoat with Sto Gold Coat. 2. Rasp the interior lower face of insulation boards to provide a snug friction fit into the Starter Track. (Note: rasping prevents an outward bow at the Starter Track).

3. Use either polyurethane spray foam adhesive (Sto TurboStick) or cementitous adhesive (Sto BTS Plus or Sto a. Polyurehane Spray Foam Adhesive (Sto TurboStick): apply adhesive to the back of the insulation board with the dispensing pistol approximately 3/4 inch (19 mm) from ends. Apply 5 additional ribbons spaced equally at no greater than 7 inches (177 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 $\frac{1}{2}$ inch (51 mm) in diameter which will expand to $\frac{3}{4}$ – 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

Place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track. Apply 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 to keep board joints flush, as post expansion of the adhesive may force boards slightly outward. b. Cementitious Adhesive (Sto BTS Plus or Sto BTS Xtra): apply adhesive to the back of the insulation board with the proper size (1/2 x ½ x 2 inch [13 x 13 x 51 mm]) stainless steel notched trowel. Apply uniform ribbons of adhesive parallel with the SHORT dimension of the board so that when boards are placed on the wall the ribbons will be VERTICAL. Apply adhesive uniformly so ribbons of adhesive do not converge. Immediately place insulation boards in a running bond pattern on the wall with the long dimension horizontal. Start by inserting the lower edge of the boards inside the starter track at the base of the wall until they contact the bottom of the track.

Apply firm pressure over the entire surface of the boards to ensure uniform contact of adhesive. IMPORTANT:

do not delay installation once adhesive is applied. If adhesive "skins" remove it and apply fresh adhesive.

4. Bridge sheathing joints by a minimum of 6 inches (152 mm). Interlock inside and outside corners.

5. Butt all board joints tightly together to eliminate any thermal breaks. Care must be taken to prevent any adhesive from getting between the joints of the boards. 6. Cut insulation board in an L-shaped pattern to fit around openings. Do not align board joints with corners of 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

E. Slivering and Rasping of Insulation Board Surface 1. Make sure insulation boards are fully adhered to the substrate before proceeding to steps 3.04 E2 and 3.04 E3 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

F. Trim, Reveals and Projecting Aesthetic Features 1. Attach features and trim where designated on drawings with adhesive to a base layer of insulation board or to the coated sheathing surface. Fill any gaps between the trim and base layer of insulation with spray foam adhesive and rasp flush with the trim surface. Slope the top surface of all trim/features minimum 1:2 (27°) and the bottom of all horizontal reveals minimum 1:2 (27°).

2. Cut reveals/aesthetic grooves with a hot-knife, router or groove-tool in locations indicated on drawings. 3. Offset reveals/aesthetic grooves minimum 3 inches (75 mm) from insulation board joints. 4. Do not locate reveals/aesthetic grooves at high stress areas. 5. Ensure minimum ¾ inch (19 mm) thickness of insulation board at the bottom of the reveals/aesthetic grooves. G. Completion of Backwrapping 1. Complete the backwrapping procedure by applying base coat to exposed edges of insulation board and

approximately 4 inches (100 mm) onto the face of the insulation board. Pull mesh tight around the board and

embed it in the base coat with a stainless steel trowel. Use a corner trowel for clean, straight lines. Smooth any

wrinkles or gaps in the mesh. H. Accessory Installation 1. Corner Bead: cut the corner bead accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of 1/8 inch (3 mm) to the outside corner area that will receive the accessory. Immediately place the accessory directly into the wet base coat material. Do not slide into place. Press the accessory into place. A corner trowel is best for this purpose. Embed and completely cover the mesh and PVC by troweling from the corner to the edge of the mesh so that no mesh or PVC color is visible. Avoid excess build-up of base coat and feather along mesh edges. Adjoin separate pieces by abutting PVC to PVC

and overlapping the mesh "tail" from one piece onto the next piece. Fully embed the accessory and mesh "tail" in

base coat material. When installing field mesh reinforcement overlap accessory mesh and PVC. Remove any excess base coat from the outside corner. 2. Drip Edge: install the drip edge accessory prior to application of field mesh (paragraph 3.4.2 I5 below). Install with arrow on mesh pointing UP. Cut the accessory to proper length as needed. Use full pieces wherever possible and avoid using short filler pieces. Offset accessory butt joints from substrate joints. Apply base coat with a stainless steel trowel to an approximate thickness of 1/8 inch (3 mm) to the area that will receive the accessory. Immediately place the accessory directly into the wet base coat material and press into place. Do not slide into place. Embed and completely cover the mesh and PVC by troweling from the drip edge screed rail to the edge of the mesh. Avoid excess build-up of base coat, feather along mesh edges, and remove any excess base coat from the drip edge nosing. Abut adjoining pieces and install as described above. When installing field mesh reinforcement overlap accessory mesh 4 inches (10 cm) on both vertical and horizontal faces so the PVC is overlapped, and remove any excess base coat from the drip edge nosing. On vertical and horizontal faces of the accessory install finish to the drip edge lines and remove any protruding finish from the drip edge nosing.

<u> SECTION 072419 – WATER DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS):</u>

I. Base Coat and Reinforcing Mesh Application 1. Ensure the insulation board is firmly adhered and free of surface contamination or UV degradation, and is thoroughly 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.

base coat. Trowel from the base of reveals to the edges of the mesh. 4. Ultra-High impact mesh application (recommended to a minimum height of 6'-0" [1.8 m] above finished grade at all areas accessible to pedestrian traffic and other areas exposed to abnormal stress or impact, and where indicated on contract drawings): apply base coat over the insulation board with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016 mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Butt ultra-high impact mesh at seams. Allow the base coat to dry. 5. Standard mesh application: Apply base coat over the insulation board, including areas with Ultra-High impact mesh, with a stainless steel trowel to a uniform thickness of approximately 1/8 inch (3 mm). Work horizontally or vertically in strips of 40 inches (1016mm), and immediately embed the mesh into the wet base coat by troweling from the center to the edge of the mesh. Overlap mesh not less than 2-1/2 inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Double wrap all inside and outside corners with minimum 6 inch (152 mm) overlap in each direction (optional if corner bead accessory is used – see NOTE to paragraph 3.4.2 H1 above). Avoid wrinkles in the mesh. The mesh

3. Apply detail mesh at trim, reveals and projecting architectural features. Embed the mesh in the wet

additional base coat if mesh color is visible. 6. Sloped Surfaces: for trim, reveals, aesthetic bands, cornice profiles, sills or other architectural features that project beyond the vertical wall plane more than 2 inches (51 mm) apply waterproof base coat with a stainless steel trowel to the sloped surface and minimum four inches (100 mm) above and below it. Embed standard mesh or detail mesh in the waterproof base coat and overlap mesh seams a minimum of 2-1/2 inches (65 mm).

must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with

7. Allow base coat to thoroughly dry before applying primer or finish. J. Primer Application

3.6 CLEANING, REPAIR AND MAINTENANCE

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

1. Ensure the base coat surface or primed base coat is free of surface contamination before commencing the finish application. 2. Apply finish directly over the base coat or primed base coat when dry. Apply finish by spray or stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish: a. Avoid application in direct sunlight.

b. Apply finish in a continuous application, and work to an architectural break in the wall. c. Weather conditions affect application and drying time. Hot or dry conditions limit working time and accelerate drying. Adjustments in the scheduling of work may be required to achieve desired results. Cool or damp conditions extend working time and retard drying and may require added measures of protection against wind, dust, dirt, rain and freezing. Adjust work schedule and provide protection. d. Do not install separate batches of finish side-by-side.

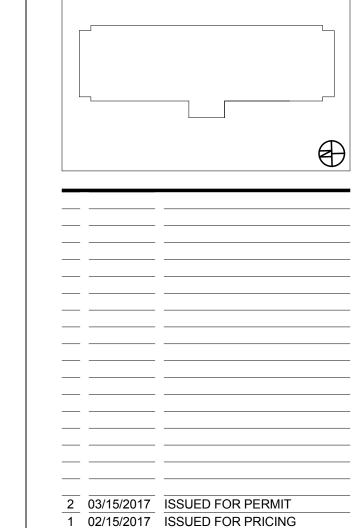
e. Do not apply finish into or over sealant joints. Apply finish to outside face of wall only. f. Do not apply finish over irregular or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

A. Provide protection of installed materials from water infiltration into or behind them

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

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

ALL DIMENSIONS SHOWN TO BE FIELD VERIFIED U.N.O.





600 W. Fulton Street

Chicago, IL 60661-1259 T 312.454.9100 www.epsteinglobal.com PROJECT NUMBER 16303 PROJECT MANAGER: ARCH/ENG: SCALE: 3/32" = 1'-0"

Bucharest

JASON P. CHANDLER

OUTLINE

SPECIFICATIONS

Structural Engineer

EPSTEIN 600 West Fulton Chicago, IL 60661 312.454.9100

600 West Fulton Chicago, IL 60661 312.454.9100

Architect

LQ ACQUISITION PROPERTIES,LLC. 909 Hidden Ridae Irving, Texas 75038 214.492.6600

Owner

La Quinta Inn No. 2049 340 Park Ave Portland, ME 04102

Project Address

DRAWN BY:

CHECKED BY: