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Sto Specification S 502

StoPowerwall™ Stucco Direct Application to Concrete and Concrete Masonry (CMU) Walls

Section 09 24 23 – Portland Cement Stucco

This specification is intended for use by the design/construction professional and any user of Sto products to assist in developing project specifications. It provides guidance on the application of StoPowerwall stucco to sound, properly prepared vertical above-grade concrete or concrete masonry wall construction. StoPowerwall Stucco is a portland cement plaster that serves as a base for Sto primers and textured finishes. It functions as a decorative and protective exterior wall covering. As with any exterior wall covering the proper integration of other components of construction, in particular, the use of flashing to direct water to the exterior, not into the wall assembly, particulary at potential leak sources such as windows, is essential. Refer to Sto Guide Details and 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. Efflorescence is a normal occurrence in portland cement based products and can affect final appearance of finish products installed over stucco. Some degree of cracking is normal in portland cement stucco and should be expected. Cracking is generally not caused by a material defect in the stucco and can be minimized by following sound design and construction practice such as the the use of properly graded sand (see Sto Tech Hotline No. 0603-S, All Sands Are NOT Created Equal), proper incorporation of stress relief joints in the construction, moist curing of the stucco after it has been applied, and proper sequencing of construction to avoid stresses in the freshly placed stucco. Surface alkalinity (pH) is an important consideration for stucco surfaces to receive acrylic or elastomeric finishes and should be checked to verify pH less than 10 before primer or finish is applied. Sto Hot Prime is the preferred primer for use on stucco surfaces to "mask" surface alkalinity. Refer to Sto Tech Hotline No. 1202-CF, Alkaline Substrates and Polymeric Finishes. For complete technical information on Sto components refer to product 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 professional/specifier and user in the proper selection and use of materials. This specification should be modified where necessary to accommodate individual project conditions.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Materials and installation of exterior stucco wall covering.

1.02 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 07 26 00:	Vapor Retarders
D.	Section 07 27 00:	Air Barriers
E.	Section 07 50 00:	Membrane Roofing
F.	Section 07 62-00:	Sheet Metal Flashing and Trim
G.	Section 07 92 00:	Joint Sealants
H.	Section 08 40 00:	Entrances, Storefronts, and Curtain Walls

I. Section 08 50 00: Windows

1.03 REFERENCED DOCUMENTS *(add/delete depending on specific project requirements)*

A. ASTM Standards:

1.	A 641	Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
2.	A 653	Specification for Sheet Steel Zinc coated (Galvanized) by the Hot-Dip Process, Commercial Quality
3.	B 69	Specification for Roller Zinc
4.	C 144	Specification for Aggregate for Masonry Mortar
5.	C 578	Specification for Preformed, Cellular Polystyrene Thermal Insulation
6.	C 897	Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters
7.	C 1063	Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
8.	D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
9.	E 84	Standard Test Method for Surface Burning Characteristics of Building Materials
10.	E 96	Standard Test Methods for Water Vapor Transmission of Materials
11.	E 283	Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
12.	E 330	Test Method for Structural Performance of Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
13.	E 331	Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
14.	E 2430	Standard Specification for Expanded Polystyrene (“EPS”) Thermal Insulation Boards For Use in Exterior Insulation and Finish Systems (“EIFS”).
15.	G 154	Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

C. ICBO ES (International Conference of Building Officials Evaluation Service)

1. AC 11, Acceptance Criteria for Cementitious Exterior Wall Coatings
2. ICC ESR 2323, StoPowerwal and StoPowerwall NExT Stucco Systems

D. SCAQMD (South Coast Air Quality Management District)

1. Rule 1113, Architectural Coatings

1.04 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. Consult applicable code compliance report for limitations that may apply.

B. Moisture Control

1. Prevent the accumulation of water into or behind the stucco, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly.
   a. Provide corrosion resistant flashing to protect exposed elements and to direct water to the exterior, including, above window and door heads, beneath window

and door sills, at floor lines, at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.

b. Air Leakage Prevention—prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
c. Vapor Diffusion and Condensation -- perform a dew point analysis of the wall assembly to determine the potential for accumulation of moisture in the wall assembly as a result of water vapor diffusion and condensation. Adjust wall assembly components accordingly to minimize the risk of condensation. Avoid the use of vapor retarders on the interior side of the wall in warm, humid climates.
d. Protect rough openings with StoGuard rough opening treatment extended no further than the stucco termination accessory expanded flange (as stucco will not adhere to StoGuard rough opening treatments). Refer to Sto Guide Details.
e. Where casing bead is used back-to-back at expansion joints, back joints with appropriate StoGuard transition or backer material. Refer to Sto Guide Details.
f. Seal accessory butt joints with sealant.

C. Grade Condition

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

D. Sloped surfaces, including Foam Trim and Projecting Architectural Features attached to stucco.

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

E. Joints

1. Provide one or two piece expansion joints, or back-to-back casing beads in the stucco assembly where building movement is anticipated as determined by the design professional: at joints in the substrate or supporting construction such as cold joints or construction joints, through wall expansion joints, joints between precast conrete panels, where the stucco is to be installed over dissimilar construction or substrates, including concrete to CMU joints, at changes in building height, at floor lines, at columns and cantilevered areas. DO NOT INSTALL STUCCO CONTINUOUSLY OVER JOINTS IN CONSTRUCTION.

2. Provide one piece control joints every 250 ft^2 (23 m^2). Do not exceed length to width ratio of 2-1/2:1 in control joint layout and do not exceed more than 18 feet (5.5 m) in any direction without an expansion or control joint. Where casing beads are used back-to-back as the joint accessories, back the joint with appropriate StoGuard transition or backer material, however, do no allow transition/backer material to extend beyond the expanded flange (as stucco will not adhere to StoGuard).
3. Provide one piece expansion joints at through wall penetrations, for example, above and below doors or windows.
4. Provide minimum 3/8 inch (9 mm) wide joints where the stucco abuts windows, doors and other through wall penetrations.
5. Provide appropriate accessories at stucco terminations and joints.
6. Provide appropriate sealant at stucco terminations and at accessory butt joints so they are watertight.
7. Indicate location of joints, accessories and appropriate accessory type on architectural drawings.

F. Fire Protection

1. Do not use foam trim in excess of 4 inches (102 mm) thick unless approved by the code official on buildings of noncombustible construction.
2. Refer to the applicable code compliance report for other limitations and fire-resistive assemblies that may apply.

G. Surface Conditions and Surface Preparation

1. Provide surface plane tolerance not to exceed ¼ inch in 10 feet (6 mm in 3.0 m).
2. Remove form ties, trim projecting concrete and fill honeycombs or other surface defects with appropriate patch and repair material.
3. Concrete—provide for removal of form oil, curing compounds, efflorescence, coatings or other surface contamination and laitance or other surface conditions that could interfere with adhesion. Provide an absorbent surface, slightly scarified or with surface roughness, or both (refer to Section 3.03D).
4. Concrete Masonry—provide open texture concrete masonry units with flush joints, free of efflorescence, coatings, or other surface contamination, weak surfaces or surface conditions that could interfere with adhesion.
5. Do not install stucco, stucco bonding agent, primers or finishes over efflorescence, laitance or weak surface conditions, painted, coated, salt-contaminated, non-absorbent, smooth, or high density concrete surfaces, or any concrete or CMU substrate where adhesion is in question, or when total stucco thickness (including finish coat) will exceed 5/8 inch (16 mm). Use appropriate metal plaster base in these cases.

(Note: Always verify bond to the properly prepared substrate as specified by the design professional, at minimum 28 day age of stucco. Where the substrate surface is too smooth, dense, or non-absorbent for stucco adhesion, install appropriate metal lath plaster base as specified by the design professional).

H. Stucco Thickness

1. Scratch Coat: ¼ inch (6 mm) uniform thickness
2. Brown Coat: ¼ inch (6 mm) uniform thickness
3. Finish Coat: uniform, and in accordance with published instructions of Sto Corp. (refer to applicable product bulletin, depending on finish selected)
4. Stucco thickness shall be uniform throughout the wall area and total thickness shall not exceed 5/8 inch (16 mm) applied in 3 coats.

1.05 PERFORMANCE REQUIREMENTS

A. StoPowerwall Stucco: complies with ICC AC 11 and listed by ICC ES (see ICC ESR 2323)

B. Primers (select one)

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

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

E. Finishes (select one)

1. Lotus-Effect Technology Finish
   a. Super-hydrophobic textured finish with Lotus-Effect Technology
   b. Accelerated Weathering, ASTM G 154: 2500 hours, no blistering, checking cracking, crazing, or other deleterious effects
   c. Water Vapor Permeability, ASTM E 96, Method B: > 30 perms [(1172 ng/(Pa•s•m2)]
   d. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
   e. VOC: less then 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

2. Silicone Enhanced Elastomeric Finish
   a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
   b. Water Vapor Permeability, ASTM E 96, Method B: > 10 perms [(574 ng/(Pa•s•m2)]
   c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
   d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

3. Elastomeric Finish
   a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
   b. Water Vapor Permeability, ASTM E 96, Method B: > 5 perms [(287 ng/(Pa•s•m2)]
   c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
   d. VOC: less then 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

4. Flexible Acrylic Finish
   a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
   c. Water Vapor Permeability, ASTM E 96, Method B: > 15 perms [(861 ng/(Pa•s•m2)]

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

5. Acrylic Finish
   a. Accelerated Weathering, ASTM G 154: 2000 hours, no blistering, checking cracking, crazing, or other deleterious effects
   b. Water Vapor Permeability, ASTM E 96, Method B: > 30 perms [1722 ng/(Pa•s•m2)]
   c. Surface Burning, ASTM E 84: Flame Spread less than 25, Smoke Developed less than 450, Class A building material
   d. VOC: less than 50 g/L, compliant with South Coast AQMD Rule 1113 for architectural coatings

1.06 SUBMITTALS

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

B. Manufacturer’s code compliance report.

C. Manufacturer's standard warranty.

D. Samples for approval as directed by architect or owner.

E. EPS board manufacturer's certificate of compliance with ASTM E 2430.

F. Fastener manufacturer’s pull-out or withdrawal capacity testing for solid substrates.

G. Prepare and submit project-specific details (when required by contract documents).

1.07 QUALITY ASSURANCE

A. Manufacturer requirements

1. Stucco products manufacturer for a minimum of twenty five (25) years.
2. Stucco finish products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.

B. Contractor requirements

1. Licensed, insured and engaged in application of portland cement stucco for a minimum of three (3) years.
2. Knowledgeable in the proper use and handling of Sto materials.
3. Employ skilled mechanics who are experienced and knowledgeable in portland cement stucco application, and familiar with the requirements of the specified work.
4. Successful completion of minimum of three (3) projects of similar size and complexity to the specified project.
5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Sto's published specifications and details and the project plans and specifications.
6. Maintain daily records of surface preparation methods, area covered, and resulting surface condition.
7. Maintain daily records of stucco batch control, including sand and water added, weather conditions during application and drying, and moist curing after application.

C. Insulation board manufacturer requirements

1. Recognized by Sto as capable of producing insulation board to meet system requirements, and hold a valid licensing agreement with Sto.
2. Listed by an approved agency. Label insulation board with information required by Sto, the approved listing agency, and the applicable building code.

D. Testing (*as directed by design professional)*

1. Construct full-scale mock-up of typical stucco/window wall assembly with specified tools and materials and test air and water infiltration and structural performance in accordance with ASTM E 283, 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. Identify and correct any conditions of excess air leakage, water infiltration into the stucco wall assembly, or structural failure in excess of allowable design pressures, and carry out corrective actions throughout the project.
2. Conduct analysis of sand samples, including sieve analysis, to verify compliance with applicable standard. Conduct sand analyses throughout the project to verify compliance as specified by design professional. Where pre-sanded stucco is used the sand analysis may be waived.
3. Conduct adhesion testing on prepared concrete and concrete masonry mock-up substrates that are representative of the type concrete and concrete masonry to be used on the project. Conduct tests as specified by the design professional at least 28 days after placement of stucco.
4. Conduct adhesion tests throughout project on properly prepared concrete and concrete masonry substrates at minimum 28 day age of stucco at locations and frequency specified by design professional, and as dictated by the type, location, height, and other features of the structure and its exposure.
5. Conduct pull-out or withdrawal capacity testing of proposed fasteners for accessory attachment into concrete or masonry and verify adequacy with respect to negative design wind pressure. Conduct sufficient tests such that reliable and predictable pull-out values are obtained. Verify adequacy of pull-out or withdrawal capacity of fasteners used with manufacturer in relation to negative design wind pressures.
6. Conduct pH testing to check stucco surface alkalinity before application of primer or finish materials. Where alkaline resistant primer is used pH testing may be waived.
7. Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
8. Notify design professional minimum 7 days prior to testing.

E. Inspections

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

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing and temperatures in excess of 90°F (32° C). Store away from direct sunlight.

C. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.09 PROJECT/SITE CONDITIONS

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

A. Maintain ambient and surface temperatures above 40°F (4°C) during application and for 24 hours after set of stucco and application of finish materials.

B. Provide supplementary heat for installation in temperatures less than 40°F (4°C) such that temperatures are maintained as in 1.09A. Prevent concentration of heat on uncured stucco and vent fumes and other products of combustion to the outside to prevent contact with stucco.

C. Prevent uneven or excessive evaporation of moisture from stucco during hot, dry or windy weather. For installation under any of these conditions provide special measures to properly moist cure the stucco. Do not install stucco should ambient temperatures be expected to rise above 100ºF (38ºC) 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)

A. Provide minimum 28 day cure of concrete and concrete masonry units before the installation of stucco.

B. Sequence work such that placement of stucco closely follows surface preparation and prevent surfaces from being contaminated by atmospheric conditions, dust, dirt, salts, trades, or other sources of surface contamination.

C. For load bearing concrete or concrete masonry wall assemblies, commence the stucco installation after completion of all floor, roof construction and other construction that imposes dead loads on the walls to prevent excessive deflection (and potential cracking) of the stucco.

D. Provide site grading such that the stucco terminates above earth grade minimum 4 inches (100 mm) and above finished grade (pavers/sidewalk) minimum 2 inches (51 mm). Provide increased clearance in freeze/thaw climate zones.

E. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall and provide sill flashing.

F. Install window and door head flashing immediately after windows and doors are installed.

G. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior.

H. Install copings and sealant immediately after installation of the stucco and when finish coatings are dry.

I. Attach penetrations through stucco into structural support and provide water tight seal at penetrations.

1.11 WARRANTY

A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

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

2.02 SURFACE PREPARATION *(optional component, depending on substrate condition)*

A. Sto Bonding Agent and Admixture—acrylic bonding agent for brush or roller application to properly prepared concrete or CMU surfaces.

2.03 MECHANICAL FASTENERS *(supplied by others)*

A. Appropriate non-corroding fasteners, depending on the type framing or substrate:

1. Concrete or Masonry—minimum # 8 wafer head fully threaded corrosion resistant screws for masonry with minimum 1 inch (25 mm) penetration into substrate.

(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.)

2.04 ACCESSORIES *(supplied by others, select one type)*

A. Weep screed, casing bead, corner bead, corner lath, expansion and control joint accessories. All accessories shall meet the requirements of ASTM C 1063 and its referenced documents:

1. PVC plastic in compliance with ASTM D 1784, cell classification 13244C.
2. Zinc in compliance with ASTM B 69.
3. Galvanized metal in compliance with ASTM A 653 with G60 coating.

B. All accessories shall have expanded flanges and shall be designed with grounds for the specified thickness of stucco.

(Note: metal accessories are susceptible to corrosion in coastal environments. Consider the use of zinc alloy or PVC accessories in these environments. Metal corner beads with solid metal noses are susceptible to corrosion in exposed exterior applications. Consider the use of several layers of woven-wire mesh in lieu of corner bead and completely encase the metal in stucco. Powder actuated or other fastening devices that can damage the substrate should be avoided).

2.05 JOB MIXED INGREDIENTS

A. Water—clean and potable.

B. Stucco Admixture

1. Sto Bonding Agent and Admixture—acrylic admixture for stucco.

2.06 STUCCO

A. 102 StoPowerwall Stucco Pre-Blended: fiber reinforced one coat portland cement stucco pre-blended with graded sand, and in compliance with ICC AC 11. See ICC ESR 2323.

B. 103 StoPowerwall Stucco: fiber reinforced one coat portland cement stucco concentrate in compliance with ICC AC 11. See ICC ESR 2323.

2.07 FOAM BUILD-OUTS

A. Adhesive and Base Coat *(select one)*

1. Sto BTS Xtra - light weight one component polymer modified cement-based extra high build base coat material
2. Sto BTS Plus - one component polymer modified cement-based high build base coat material
3. Sto Primer/Adhesive-B - one component polymer modified cement-based base coat material
4. Sto Primer/Adhesive – two component acrylic based base coat material field mixed with portland cement
5. Sto RFP – ready mixed non-cementitious fiber reinforced base coat material
6. Sto Flexyl – two component fiber reinforced acrylic based waterproof base coat material field mixed with portland cement (for use as a waterproof base coat to waterproof foundations, parapets, splash areas, trim and other projecting architectural features).

B. Insulation Board

1. Sto EPS Insulation Board--nominal 1.0 lb/ft^3 (16 kg/m^3) Expanded Polystyrene (EPS) Insulation Board in compliance with ASTM C 578 Type I requirements, and ASTM E 2430 (Note: minimum required thickness is 1 inch [25 mm] and maximum allowable thickness is typically 4 inches [100 mm] for noncombustible type construction unless thicker dimensions are approved by the code official).

C. Reinforcing Mesh

1. Sto Mesh--nominal 4.5 oz./yd^2 (153 g/m^2), symmetrical, interlaced open-weave glass fiber fabric treated with alkaline resistant coating for compatibility with Sto materials (achieves Standard Impact Classification).

2. Sto Detail Mesh--nominal 4.2 oz/yd^2 (143 g/m^2), 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).

2.08 ARMOR GUARD *(optional components for added crack resistance)*

A. Base Coat *(select one)*

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

6. Sto Flexyl – two component fiber reinforced acrylic based waterproof base coat material field mixed with portland cement (for use as a waterproof base coat to waterproof foundations, parapets, splash areas, trim and other projecting architectural features).

B. Reinforcing Mesh

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

2.09 PRIMER *(select one)*

A. Sto Hot Prime—acrylic based primer/sealer for freshly placed (minimum 4 day old) and high pH stucco surfaces.

B. Sto Primer Sand—acrylic based tinted, sanded primer for fully cured (minimum 28 day old or pH less than 10) stucco surfaces.

C. Sto Primer Smooth -- acrylic based tinted primer for fully cured (minimum 28 day old or pH less than 10) stucco surfaces.

2.10 FINISH COAT (select one)

A. Stolit Lotusan Finish – integrally colored, factory blended textured Lotus-Effect Technology finish with graded marble aggregate

B. Sto Powerflex Silco Finish – integrally colored, factory blended, silicone enhanced elastomeric textured finish with graded marble aggregate

C. Sto Powerflex Finish – integrally colored, factory blended, elastomeric textured finish with graded marble aggregate

D. StoPowerwall Finish – integrally colored, factory blended, flexible acrylic textured finish with graded marble aggregate

E. Stolit Finish – integrally colored, factory blended, acrylic textured finish with graded marble aggregate

F. Sto Essence DPR Finish - integrally colored, factory blended, acrylic textured finish with graded marble aggregate

G. Sto Powercryl Finish - integrally colored, factory blended, acrylic textured finish with graded marble aggregate

Note: surface alkalinity (pH) is an important consideration for stucco surfaces to receive acrylic or elastomeric finishes and should be checked to verify pH less than 10 before primer or finish is applied. Sto Hot Prime is the preferred primer for use on stucco surfaces to "mask" surface alkalinity. Priming is also recommended to provide uniform substrate absorption and finish color, to improve adhesion and water resistance, and to retard efflorescence. Sto Hot Prime may be applied 48 hours after moist curing the brown coat. Other Sto primers and finishes require 28 days curing of brown coat or pH less than 10 before application. Other specialty finishes manufactured by Sto Corp., such as StoCreativ Brick, Sto Creativ Granite, Sto Creativ Lux, Sto Limestone Finish, Sto GraniTex, and Sto Decocoat may also be used over StoPowerwall Stucco. Refer to Product Bulletins for more complete information on textured finish options.

2.11 MIXING

A. StoPowerwal Stucco *(select one)*

1. 102 StoPowerwall Stucco Pre-Blended – mix approximately 1-1.5 gallons (3.8-5.7 L) of clean, potable water with each 80 lb (36 kg) bag of pre-blended stucco. Add slight amount of water if needed for consistency . Measure total amount of water and use the same amount for each batch. Add ½ to 2/3 of the required water and one bag of StoPowerwall Stucco Pre-Blended in a paddle type mortar mixer. Then add sufficient water to achieve a uniform mix of workable consistency. Mix for 3-5 minutes after all materials are in the mixer. Stucco material can be re-tempered once in the first hour after mixing. Avoid re-tempering after the first hour and discard material older than 1.5 hours. Keep mix ratio consistent from batch to batch and mix each batch separately. USE ONLY THE AMOUNT OF WATER NECESSARY FOR A WORKABLE MIX. Use of excess water is detrimental to performance.

2. 103 StoPowerwall Stucco Concentrate – mix approximately 4 gallons (15 L) of clean, potable water and 200 lbs (90 kg) of washed plaster sand meeting ASTM C 897 or ASTM C 144 with each 80 lb (36 kg) bag of stucco concentrate. Add water if needed, up to a maximum of 6 gallons (22 L) per bag. Measure total amount of water and use the same amount for each batch. For best results use sand in compliance with ASTM C 897. Add ½ to 2/3 of the required water, ½ of the sand, and one bag of StoPowerwall Stucco in a paddle type mortar mixer. Then add the rest of the sand and sufficient water to achieve a uniform mix of workable consistency. Mix for 3-5 minutes after all materials are in the mixer. Stucco material can be re-tempered once in the first hour after mixing. Avoid re-tempering after the first hour and discard material older than 1.5 hours. Keep mix ratio consistent from batch to batch and mix each batch separately. USE ONLY THE AMOUNT OF WATER NECESSARY FOR A WORKABLE MIX. Use of excess water is detrimental to performance.

B. Sto Bonding Agent and Admixture – Use at full strength. Shake sealed container before use to a homogeneous consistency. Refer to Product Bulletin for application as a bonding agent to proplerly prepared substrates.

C. StoPowerwall Stucco Polymer Modified – Shake sealed container before use to a homogeneous consistency. Dilute Sto Bonding Agent and Admixture with 3 parts water to one part Sto Bonding Agent by volume by adding clean, potable water to Sto Bonding Agent and Admixture in a clean mixing pail and mixing with a high speed electric drill mixer. Follow normal mix ratio and procedures for mixing StoPowerwall Stucco (2.11 A1 or A2), except use diluted Sto Bonding Agent and Admixture in lieu of water.

D. Adhesive and Base Coats for Sto Armor Guard and Foam Build-outs:

1. Refer to applicable Sto Product Bulletin for selected adhesive/base coat material(s)

E. Primer--mix with a clean, rust-free high speed mixer to a uniform consistency.

F. Finish--mix with a clean, rust-free high speed mixer to a uniform consistency. A small amount of water (up to 12 ounces) may be added to adjust workability. Limit addition of water to amount needed to achieve the finish texture.

G. Mix only as much material as can readily be used.

H. Do not use anti-freeze compounds or other additives.

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

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

3.02 EXAMINATION

A. Inspect surfaces for:
   1. Contamination—algae, chalkiness, dirt, dust, efflorescence, form oil, fungus, grease, salts, mildew or other foreign substances.
   2. Surface absorption, laitance, chalkiness, honeycombs, or other surface conditions that could affect adhesion
   3. Cracks—measure crack width and record location of cracks.
   4. Damage and deterioration.
   5. Moisture damage—record any areas of moisture damage.

C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the stucco installation to the General Contractor.

3.03 SURFACE PREPARATION

A. Concrete (cast-in-place or precast)

   1. Remove form ties and trim projecting concrete so it is even with the plane of the wall. Fill honeycombs or other surface defects with compatible patch and repair material. Remove form release agents or other surface contamination by chemical or mechanical means. Provide a surface that is structurally sound, free of laitance and other surface defects, absorbent, and slightly scarified or with surface roughness, or both. Ensure that the surface is structurally sound and free of all dust, dirt, grease, efflorescence, coatings, salts or other surface contamination before proceeding with work. Ensure that the surface is sufficiently absorbent and roughened for adequate adhesion. Pre-moisten highly absorbent surfaces with water just prior to placement of stucco, especially during hot, dry conditions. Verify adhesion with load tests after stucco has fully cured (28 days) on mock-up wall, and throughout the project as directed in 1.07D, Testing.

B. Concrete Masonry Units

   1. Remove projecting joint mortar so it is even with the plane of the wall. Remove surface contaminants such as efflorescence, existing paint or coatings, or any other surface contamination by chemical or mechanical means. Pre-moisten the surface with water just prior to placement of stucco. Verify adhesion with load tests after stucco has fully cured (28 days) on mock-up wall, and throughout the project as directed in 1.07D, Testing.

C. For A and B above, where bond inhibiting material cannot be removed, where concrete or masonry surface irregularities are such that more than 5/8 inch (16 mm) of stucco (including finish coat) must be applied, or where the surface is too smooth, dense, or non-absorbent to receive the stucco, install furred or self-furred lath as specified by the design professional. Verify adequacy of lath attachment with respect to design wind pressures. Do not install stucco over unprepared substrates or any substrate where adhesion is in question.

3.04 INSTALLATION

Apply the stucco in discrete panels without interruption to avoid cold joints and differences in appearance. Abut wet stucco to set stucco at natural or architectural breaks in the wall such as expansion joints, pilasters, terminations, or changes in plane. Hot or dry conditions accelerate drying

and moisture loss from stucco which can diminish strength and resistance to cracking. Adjustments in the application, scheduling and curing of stucco to prevent rapid loss of moisture are necessary to achieve a satisfactory stucco installation. Cold temperatures retard drying and strength gain and adjustments may have to be made in the application, scheduling and curing of stucco to prevent damage from frost and other trades. Do not install stucco during extremely hot, dry and/or windy conditions. Do not install stucco during freezing conditions or on frozen substrates. Do not install stucco onto grounds of accessories. Completely embed expanded flanges of accessories and completely cover attachments with stucco. Moist cure stucco minimum 48 hours for optimum strength gain and resistance to cracking. Allow final stucco application to sufficiently age before applying primer or finish as indicated below. The finished installation must be true, plumb and square. Should stucco get into control or expansion joints, remove the stucco from within the joint before the stucco sets.

A. After satisfactory inspection of surfaces and correction of any deviations from specification requirements commence the stucco installation. Use accessories as dictated by the design professional on drawings (examples below):

1. Install foundation weep screed at the base of the wall.
2. Install casing beads at stucco terminations—doors, windows and other through wall penetrations. Install two piece expansion joints (or back-to-back casing beads) at joints in the supporting construction such as building expansion joints or other dynamic joints in the construction. Install one or two piece expansion joints (or back-to-back casing beads) where the stucco is to be installed over dissimilar construction or substrates, at changes in building height, at floor lines, columns, and cantilevered areas. Install one piece control joints at corners of windows, doors and similar through wall penetrations, and every 250 ft^2 (23 m^2). Install corner bead at outside corners, corner lath or inside corner control joints at inside corners. Install full accessory pieces where possible and avoid small pieces. Seal adjoining pieces by embedding ends in sealant. Abut horizontal into vertical joint accessories. Attach at no more than 7 inches (178 mm) on center into concrete/masonry with appropriate fasteners.
3. Pre-moisten concrete masonry units and highly absorbent concrete prior to the placement of stucco (unless bonding agent has been applied to the surface).
4. Scratch Coat: apply the stucco with sufficient pressure to ensure intimate contact with the substrate and complete coverage to an approximate thickness of ¼ inch (6 mm). Score the stucco upon completion of each panel in preparation for a second coat. Score horizontally.
5. Brown Coat: as soon as the first coat is firm enough to receive the second coat without damage, apply the second coat. Alternatively, moist cure the first coat up to 48 hours and dampen the scratched surface with water immediately before applying the second coat. Apply the second coat with sufficient pressure to ensure intimate contact with the first coat to an approximate thickness of ¼ inch (6 mm) and as needed to bring the stucco to the desired thickness. Use a rod or straight edge to bring the surface to a true, even plane. Fill depressions in plane with stucco. Final thickness of stucco shall not exceed 1/2 inch (13 mm), not including finish coat.
6. After the stucco has lost sufficient moisture so that the surface sheen has disappeared, float the surface lightly with a darby or wood float to densify the surface and to provide a smooth, even surface. Float before the stucco becomes so rigid that it cannot be moved beneath the float.
7. Moist cure after the stucco has set by lightly fogging the surface for at least 48 hours. Fog as frequently as required during the 48 hour period to prevent loss of moisture from the stucco. Avoid eroding the stucco surface with excess moisture. If relative humidity exceeds 75% the frequency of moist-curing can be diminished.

B. Foam Build-Outs

1. Where foam build-outs terminate at a dissimilar material such as a window, door or other non-stucco surface, backwrap the foam build-out by installing detail mesh onto the terminating edge of the stucco. Embed the mesh in the foam adhesive. Allow the mesh to dangle until the backwrapping procedure is completed (B4).
2. Install foam build-outs directly over hardened stucco with cementitious foam trim adhesive (see 2.07). 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.
   After the adhesive has cured sufficiently to hold the build-out firmly in place, rasp the entire foam surface smooth.
3. Complete the backwrapping procedure by applying the foam trim base coat (see 2.07) 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.
4. Apply the base coat to the foam build-out and approximately 3 inches (76 mm) onto the adjacent stucco surfaces to an approximate thickness of 1/8 inch (3 mm). Immediately embed the reinforcing mesh in the wet base coat. Trowel from the center to the edges of the mesh to avoid wrinkles and remove excess base coat. Overlap mesh seams minimum 2-1/2 inches (64 mm). Overlap mesh onto adjacent stucco wall surfaces minimum 2-1/2 inches (64 mm) at terminations of the foam build-out and feather onto the stucco wall surface.

(Note: do not install foam build-outs over joints in the stucco wall assembly. Terminate foam build-outs and backwrap in accordance with instructions above).

C. Armor Guard

Note: Sto Armor Guard is optional. It provides additional crack resistance to the stucco wall surface

1. Apply base coat over the moist cured stucco (and foam build-outs if not already reinforced with mesh) with appropriate spray equipment or a stainless steel trowel to a uniform thickness of approximately ⅛ 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 2-½ inches (64 mm) at mesh seams and at overlaps of detail mesh. Feather seams and edges. Avoid wrinkles in the mesh. The mesh must be fully embedded so that no mesh color shows through the base coat when it is dry. Re-skim with additional base coat if mesh color is visible. Do not install base coat or mesh over joints or accessories in the stucco wall assembly.

D . Primer Installation

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

E. Finish Installation

1. Apply finish to primed stucco and foam build-outs when dry. Apply finish by spraying or troweling with a stainless steel trowel, depending on the finish specified. Follow these general rules for application of finish:

   a. Allow 28 day stucco age or check for pH < 10 before applying finish. If Sto Hot Prime is used, allow minimum 7 day age of stucco.
   b. Avoid application in direct sunlight.
   c. 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.
   d. 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.
   e. Float “R” (rilled or swirl texture) finishes with a plastic float to achieve their rilled texture
   f. Do not install separate batches of finish side-by-side.
   g. Do not apply finish into or over sealant joints or joint accessories. Apply finish to outside face of wall only.
   h. Do not apply finish over irregular, high pH, or unprepared surfaces, or surfaces not in compliance with the requirements of the project specifications.

3.05 PROTECTION

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

B. Provide protection of installed stucco from dust, dirt, salts, or other surface contamination, precipitation, and freezing.

C. Provide protection of installed primer and finish from dust, dirt, salts, precipitation, freezing and continuous high humidity until fully dry.

3.06 CLEANING, REPAIR AND MAINTENANCE

A. Clean and maintain the stucco finish for a fresh appearance and to prevent water entry into and behind the stucco. Repair cracks, impact damage, spalls or delamination promptly.

B. Maintain adjacent components of construction such as sealants, joints in construction, windows, doors, and flashing, to prevent water entry into the wall assembly.

C. Refer to Sto reStore Repair and Maintenance Guide (reStore Program) for detailed information on stucco restoration - cleaning, repairs, recoating, resurfacing and refinishing, or re-cladding.

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