



Sto Guide Specification A1000V

StoGuard[®] Waterproof Air Barrier Membrane – Sto VaporSeal[™]

Section 07 27 26: Fluid Applied Membrane Air Barriers – Vapor Impermeable

This specification is intended for use by the design/construction professional and user of Sto products to assist in developing project specifications for the application of StoGuard Waterproof Air Barrier – Sto VaporSeal to vertical above grade concrete, concrete masonry, and sheathed wall construction. StoGuard Waterproof Air Barrier – Sto VaporSeal is designed for use beneath claddings such as brick veneer with a cavity, vinyl, wood, and fiber cement siding. It can also be used behind portland cement stucco with code compliant metal lath and a slip sheet, typically code approved building paper or felt. For EIFS claddings Sto Gold Coat is recommended. See StoTherm[®] NExT Specifications A100G, E100G, and L100G.

StoGuard functions as an air barrier component and secondary water-resistive barrier (WRB) in wall assemblies. The secondary moisture protection provided by StoGuard protects walls against moisture damage from rain during the construction process and in the event of a breach in the wall cladding while in service. It is not intended to correct faulty workmanship such as the absence or improper integration of flashing in the wall assembly, nor is it intended to correct defective components of construction such as windows that leak into the wall assembly. Flashing must always be integrated with the WRB in the wall assembly to direct water to the exterior of the cladding, not into the wall assembly, particularly at potential leak sources such as windows.

An air barrier system minimizes the risk of condensation within the building envelope by eliminating mass transfer of warm moisture laden air into the wall assembly to a cold surface where it can condense. A complete air barrier system consists of individual air barrier components and the connections between them. The air barrier components must be continuous to become an effective air barrier assembly. The design/construction professional must take material compatibility and construction sequencing into account when designing an "air tight" assembly to ensure continuity and long term durability. The effects of air tightness on mechanical ventilation should also be included in the overall project evaluation.

The function of an air barrier should not be confused with that of a vapor retarder (vapor impermeable). A vapor retarder is placed in the wall to resist differential vapor pressures, whereas the air barrier is designed to resist the structural live loads induced by air pressure difference. Generally a vapor retarder is placed on the warm side of the wall. Specifically, it is placed on the interior side of the insulation in cold climates and on the exterior side of the insulation in warm humid climates to minimize condensation within the wall assembly. A vapor retarder may not be necessary depending on the wall components, the range of temperature/humidity conditions inside and outside, and the mechanical ventilation of the building. A vapor retarder should not be used on the interior side of walls in warm humid climates. If a vapor permeable air barrier is desired refer to Sto Specification A1000E or A1000G.

Notes in italics, such as this one, are explanatory and intended to guide the design/construction professional and user in the proper selection and use of materials. This specification should be modified where necessary to accommodate individual project conditions. Verify that section titles in this specification are correct for the Project Specifications. Verify that table headers and spacing are aligned after final edit, including table header repeated at top of table, at any new pages.

PART 1 GENERAL

1.1 RELATED DOCUMENTS

Retain or delete this article in all sections of the Project Manual

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes materials and installation of fluid applied waterproof air barrier membrane over vertical above grade concrete walls, concrete masonry walls, and wall sheathing.
- B. Related Requirements (*add/delete, depending on specific project requirements*):
 - 1. Section 03 30 00: Cast-In-Place Concrete
 - 2. Section 04 22 00: Concrete Unit Masonry
 - 3. Section 06 16 00: Sheathing
 - 4. Section 07 25 00: Weather Barriers
 - 5. Section 07 26 00: Vapor Retarders
 - 6. Section 07 50 00: Membrane Roofing
 - 7. Section 07 60 00: Flashing and Sheet Metal
 - 8. Section 07 90 00: Joint Protection
 - 9. Section 08 50 00: Windows

1.3 DEFINITIONS

- A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air Barrier Auxiliary Material: A transitional component that provides air barrier continuity furnished by a source other than the primary air barrier manufacturer.
- D. Air Barrier Assembly: The collection of air barrier materials, accessory and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference

1. Review air barrier installation requirements and installation details, mock-ups, testing requirements, protection, and sequencing of work.

1.5 REFERENCES

A. Building Codes and Standards

1. 2009 IBC, International Building Code
2. 2009 IRC, International Residential Code
3. 2009 IECC, International Energy Conservation Code
4. ICC ES AC 212, par. 4.8.3 - March 1, 2005, ICC Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing
5. May, 1997, CCMC (Canadian Construction Materials Centre) Technical Guide for Air Barrier Material

B. ASTM Standards

1. C 1177-08, Specification for Glass Mat Gypsum Substrate for Use as Sheathing
2. D 783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
3. D 1970-00, Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
4. D 4541-09, Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
5. E 84-98, Test Method for Surface Burning Characteristics of Building Materials
6. E 96-00, Test Method for Water Vapor Transmission of Materials
7. E 779-10, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
8. E 783-02, Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
9. E 1186-03 (2009), Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
10. E 1827-96 (2007), Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
11. E 2178-03, Test Method for Air Permeance of Building Materials
12. E 2357-05, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

- C. APA – The Engineered Wood Association
 - 1. E30U-2007, Engineered Wood Construction Guide
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
 - 1. 2005 ASHRAE Handbook--Fundamentals
 - 2. ASHRAE 90.1 – 2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
 - 3. ASHRAE 189.1 – 2009, Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings
- E. South Coast Air Quality Management District (SCAQMD)
 - 1. Rule 1113 (2007) – Architectural Coatings

1.6 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. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.
- B. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- C. Provide sill flashing to direct water to the exterior before windows and doors are installed.
- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Install diverter flashings wherever water can enter the assembly to direct water to the exterior.
- F. Install parapet cap flashing and similar flashing at copings and sill to prevent water entry into the wall assembly.
- G. Install cladding within 60 days of waterproof air barrier installation.

1.7 SUBMITTALS

- A. Manufacturer's specifications, details and product data.
- B. Manufacturer's standard warranty.
- C. Samples for approval as directed by architect or owner.
- D. Shop drawings: substrate joints, cracks, flashing transitions, penetrations, corners, terminations, and tie-ins with adjoining construction, interfaces with separate materials that form part of the air barrier assembly.

1.8 QUALITY ASSURANCE

- A. Manufacturer requirements
 - 1. Manufacturer of exterior wall waterproof air barrier materials for a minimum of 30 years in North America.
 - 2. ISO 9001:2000 Certified Quality System and ISO 14001:2004 Certified Environmental Management System
- B. Contractor requirements
 - 1. Knowledgeable in the proper use and handling of Sto materials.
 - 2. Employ skilled mechanics who are experienced and knowledgeable in waterproofing and air barrier application, and familiar with the requirements of the specified work.
 - 3. Provide the proper equipment, manpower and supervision on the job-site to install the air barrier assembly in compliance with the project plans & specifications, shop drawings, and Sto's published specifications and details.
- C. Regulatory Compliance
 - 1. Primary air barrier and joint treatment materials:
 - a. Comply with VOC requirements of SCAQMD Rule 1113.
 - b. Comply with ASHRAE 90.1 – 2010
 - c. Comply with ASHRAE 189.1 - 2009
 - 2. Joint treatment reinforcement materials
 - a. Listed by IBC and recognized for use on all types of construction.
 - b. Listed by CCMC and recognized for use on all types of construction.
- D. Mock-ups
 - 1. Build stand-alone site mock up or sample wall area on as-built construction to incorporate back-up wall construction, typical details covering substrate joints, cracks, flashing transitions, penetrations, corners, terminations, tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

1.9 PRE-CONSTRUCTION TESTING

- A. Conduct testing by qualified test agency or building envelope consultant.
 - 1. Conduct assembly air leakage testing in accordance with ASTM E 783.
 - 2. Conduct adhesion testing to substrates in accordance with ASTM D 4541.
 - 3. Conduct wet sealant compatibility testing in accordance with sealant manufacturer's field quality control test procedure.

4. Notify design professional minimum 7 days prior to testing.

1.10 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 temperatures and temperatures in excess of 90 degrees F (32 degrees 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.
- D. Protect and store accessory and auxiliary products in accordance with manufacturer's written instructions.

1.11 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) during application and drying period, minimum 24 hours after application of waterproof air barrier materials.
- B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.12 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sto Corp.
- B. Obtain primary air barrier and accessory air barrier materials from single source.

2.2 MATERIALS

- A. Primary Air Barrier Material: StoGuard with Sto VaporSeal - ready-mixed flexible spray or roller applied waterproof air barrier membrane material
- B. Accessory Materials
 1. Joint Treatments
 - a. Sto Gold Fill[®] with StoGuard Mesh: ready mixed flexible trowel or spray applied air barrier material.

- b. StoGuard Rapid Seal™ with StoGuard Mesh: moisture cure elastomeric waterproof air barrier material.
 - c. Sto VaporSeal with StoGuard Fabric: flexible waterproof air barrier membrane material
2. Joint Reinforcements
- a. StoGuard Mesh: nominal 4.2 oz/yd² (142 g/m²) self-adhesive, flexible, symmetrical, interlaced glass fiber reinforcing mesh, with alkaline resistant coating for compatibility with Sto materials.
 - b. StoGuard Fabric: non-woven integrally reinforced cloth reinforcement.
 - c. StoGuard RediCorner™: non-woven integrally reinforced pre-formed cloth.
3. Transition Membranes
- a. Sto Gold Fill with StoGuard Mesh: ready mixed flexible trowel or spray applied air barrier material with treated glass fiber reinforcing mesh.
 - b. StoGuard RapidSeal or StoGuard RapidSeal with StoGuard Mesh: moisture cure elastomeric waterproof air barrier material with treated glass fiber reinforcing mesh (where applicable).
 - c. Sto VaporSeal with StoGuard Fabric: flexible waterproof air barrier membrane material with non-woven integrally reinforced cloth.
 - d. StoGuard Tape: self adhering rubberized asphalt tape with polyester fabric facing.
4. Primers
- a. StoGuard Primer: rubber resin emulsion primer for use with StoGuard Tape to enhance adhesion and allow installation down to 35 degrees F (1.7 degrees C).
- C. Auxiliary Materials (*by others*)
- 1. Wet sealant: Dow Corning 790, 791, and 795 sealants
 - 2. Pre-cured sealant tape: Dow 123
 - 3. Spray adhesive: 3M Super 77 Spray Adhesive
 - 4. Spray foam: Dow Great Stuff for Gaps and Cracks
- D. Patching and Leveling Material for Concrete and Masonry
- 1. Sto Leveler: polymer modified cementitious patch and leveling material for prepared concrete and masonry surfaces for up to 3/8 inch (3 mm).
 - 2. Sto BTS Xtra: polymer modified lightweight cementitious patch and leveling material for prepared concrete and masonry surfaces for up to 1/8 inch (3 mm).

2.2 PERFORMANCE REQUIREMENTS

- A. Water penetration resistance: joint treatment and primary air barrier material, comply with ICC ES AC 212, par 4.8.3, no water penetration after 5 hours hydrostatic pressure

- B. Nail sealability: ASTM D 1970, 7.9.1, primary air barrier passes
- C. Material air leakage: ASTM D 2178, primary air barrier and joint treatment ≤ 0.004 cfm/ft² at 1.57 psf (0.02 L/s·m² at 75 Pa)
- D. Adhesion: joint treatment and primary air barrier material, ASTM D 4541, ≥ 30 psi (207 kPa), or exceeds strength of glass mat facing on glass mat gypsum substrates
- E. Surface burning: ASTM E 84, joint treatment and primary air barrier material flame spread ≤ 25 , smoke developed ≤ 450 , Class A building material
- F. Water vapor permeance: ASTM E 96 Method A, < 0.1 perms (5.7 ng/Pa·s·m²)
- G. Assembly air leakage: ASTM E 2357, ≤ 0.04 cfm/ft² (0.2 L/s·m²) air leakage after conditioning protocol
- H. Field adhesion testing: ASTM D 4541, ≥ 30 psi (207 kPa) or exceeds strength of glass mat facing on glass mat gypsum substrates
- I. Building envelope air leakage: ASTM E 779 or 1827, ≤ 0.4 cfm/ft² (2 L/s·m²)
- J. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier material ≤ 100 g/L

2.3 DESIGN CRITERIA

- A. Structural (Wind and Axial Loads)
 - 1. Design for maximum allowable deflection normal to the plane of the wall: L/240
 - 2. Design for wind load in conformance with code requirements.
- B. Moisture Control
 - 1. Prevent the accumulation of water in the wall assembly and behind the exterior wall cladding:
 - a. Minimize condensation within the assembly.
 - b. Drain water directly to the exterior where it is likely to penetrate components in the wall assembly (windows and doors, for example).
 - c. Provide corrosion resistant flashing to direct water to the exterior in accordance with code requirements, including: above window and door heads, beneath window and door sills, at roof/wall intersections, floor lines, decks, intersections of lower walls with higher walls, and at the base of the wall.
- C. Air Barrier Continuity: provide continuous air barrier assembly of compatible air barrier components.

- D. Substrates
 - 1. Concrete Masonry Units: provide normal weight units with flush joints (struck flush with the surface) and allow for a minimum of 2 coats of the primary air barrier material, or a cementitious parge coat to fill and level irregular surfaces and 1 coat of the primary air barrier material, prior to the air barrier application, such that a void and pinhole free air barrier surface is achieved.
- E. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2005 ASHRAE Handbook—Fundamentals).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect concrete and concrete masonry surfaces for:
 - 1. Contamination — algae, dirt, dust, efflorescence, form oil, fungus, grease, mildew or other foreign substances.
 - 2. Surface deficiencies – weak, friable, chalkiness, laitance, bugholes, and spalls.
 - 3. Cracks — measure crack width and record location of cracks.
 - 4. Damage or deterioration.
 - 5. Moisture content and moisture damage — use a moisture meter to determine if the surface is dry enough to receive the waterproof air barrier and record any areas of moisture damage or excess moisture.
 - 6. Flush masonry mortar joints completely filled with mortar.
- B. Inspect sheathing application for compliance with applicable requirement:
 - 1. Exterior Grade and Exposure I wood based sheathing: E30U-2007, Engineered Wood Construction Guide, and the requirements of the applicable building code.
 - 2. Glass mat faced gypsum sheathing in compliance with ASTM C 1177: consult manufacturer's published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
 - 3. Cementitious sheathing — Consult manufacturer's published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the waterproof air barrier installation. Do not start work until deviations are corrected.

3.2 SURFACE PREPARATION

- A. Concrete Masonry
1. Remove surface contamination and weak surface conditions. Use chemical cleaners such as TSP (trisodium phosphate) detergent to remove oil and grease and rinse with potable water. Use chemical cleaners to remove efflorescence or other surface contamination in accordance with manufacturer's written instructions. Use mechanical methods such as waterblasting, sandblasting, and wire brushing to remove weak surface conditions.
 2. Repair cracks up to 1/8 inch (3 mm) wide by raking with a sharp tool to remove loose, friable material and blow clean with oil-free compressed air. Apply joint treatment material over crack, embed reinforcement (where applicable), and smooth joint treatment material with a trowel, drywall or putty knife to cover the reinforcement.
 3. Remove projecting fins, ridges, and mortar by mechanical means. Remove excess mortar from masonry ties, lintels and shelf angles.
 4. Fill honeycombs, aggregate pockets, holes and other voids with patching material.
- B. Sheathing
1. Remove and replace damaged sheathing.
 2. Spot surface defects such as over-driven fasteners, knot holes, or other voids in sheathing with knife grade joint treatment material.
 3. Spot fasteners with knife grade or coating joint treatment material.

3.3 INSTALLATION

- A. Coordinate work with other trades to ensure air barrier continuity with connections at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
- B. Rough opening protection (*select one*):
1. Install transition membrane into and around rough opening. Refer to Sto details 20.03a-e and applicable Sto product bulletins.
- C. Sheathing joints
1. Install joint treatment material with applicable reinforcement over sheathing joints. Refer to Sto detail 20.00a and applicable Sto product bulletins.
- D. Transitions
1. Install air barrier accessory materials (with reinforcement where applicable), or auxiliary material at transition areas: foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks

and balconies, and roof line. Refer to Sto Tech Hotline No. 0211-BSc and applicable Sto product bulletins.

- E. Waterproof air barrier membrane
 - 1. Concrete, Concrete Masonry, and Sheathing
 - a. Roller application - install one liberal coat of Sto VaporSeal in a uniform, continuous film of 16 wet mils to the prepared substrate, and allow to dry. Install a second liberal coat in a uniform, continuous film of 16 wet mils to achieve a void and pinhole free surface. A minimum of 20 dry mils is required for water vapor impermeability. Apply additional coats if needed to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
 - b. Airless spray application – install one liberal coat of Sto VaporSeal in a uniform, continuous film of minimum 32 wet mils to the prepared substrate to achieve a void and pinhole free surface and allow to dry. A minimum of 20 dry mils is required for water vapor impermeability. Apply additional coats if needed to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.

IMPORTANT NOTE: for concrete masonry the number of coats and thickness of Sto VaporSeal is highly dependent on CMU composition, unit weight (lightweight or normal weight), porosity, joint profile, and other variables that may exist. For “rough” CMU wall surfaces skim coat the entire wall surface with the leveling material to fill and level the surface prior to applying the waterproof air barrier membrane and transition materials. Use the mock-up and site tests as the basis for the work.

3.4 FIELD QUALITY CONTROL

- A. Owner’s qualified testing agency or building envelope consultant shall perform inspections and tests.
- B. Inspections: air barrier materials are subject to inspection to verify compliance with requirements.
 - 1. Condition of substrates and substrate preparation.
 - 2. Installation of primary air barrier material, accessory materials, and compatible auxiliary materials over structurally sound substrates and in conformance with architectural design details, contractor’s shop drawings, project mock-up, and manufacturer’s written installation instructions.
 - 3. Air barrier continuity and connections without gaps and holes at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
- C. Tests: air barrier materials and assembly are subject to tests to verify compliance with performance requirements:

1. Qualitative air leakage test: ASTM E 1186
 2. Quantitative air leakage test: ASTM E 779, E 783, and E 1827
 3. Adhesion test: ASTM D 4541
 4. Qualitative adhesion and compatibility testing: wet sealant manufacturer's field quality control adhesion test
- D. Repair non-conforming substrates and air barrier material installation to conform with project requirements.
- E. Take corrective action to repair and replace, or reinstall materials, seal openings, gaps, or other sources of air leakage to conform with project performance requirements.

3.5 PROTECTION AND CLEANING

- A. Protect air barrier materials from damage during construction caused by wind, rain, freezing, continuous high humidity, or prolonged exposure to sun light.
- B. Protect air barrier materials from damage from trades, vandals, and water infiltration during construction.
- C. Repair damaged materials to meet project specification requirements.
- D. Clean spills, stains, soiling from finishes or other construction materials that will be exposed in the completed work with compatible cleaners.
- E. Remove all masking materials after work is completed.

END OF SECTION 07 27 26

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