GCP Applied Technologies Guide Specifications in CSI Format

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SECTION 07 27 00

SHEET-APPLIED MEMBRANE AIR BARRIERS, VAPOR IMPERMEABLE

PART 1 — GENERAL

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

1. This Section includes the following:
2. Materials and installation methods for self-adhered vapor impermeable air barrier membrane system located in the non-accessible part of the wall.
3. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping, and other penetrations through the wall assembly.
4. Related Sections include the following:
	1. Section 03300 – Cast-In-Place Concrete
	2. Section 04810 – Unit Masonry Assemblies
	3. Section 06161 - Gypsum Sheathing
	4. Section 07115 – Bituminous Dampproofing
	5. Section 07131 – Self-Adhering Sheet Waterproofing
	6. Section 07530 – Elastomeric Membrane Roofing
	7. Section 07620 – Sheet Metal Flashing and Trim
	8. Section 07920 – Joint Sealants

1.03 DEFINITIONS

1. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 PERFORMANCE REQUIREMENTS

1. General: Air barrier shall be capable of performing as a continuous vapor-impermeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
2. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:
3. It must be continuous, with all joints made airtight.
4. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 1.57 psf (equal to 0.02L/s/sq. m @ 75 Pa), when tested in accordance with ASTM E2178.
5. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
6. It shall be durable or maintainable.
7. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.
8. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
	1. Foundation and walls.
	2. Walls and windows or doors.
	3. Different wall systems.
	4. Wall and roof.
	5. Wall and roof over unconditioned space.
	6. Walls, floor and roof across construction, control and expansion joints.
	7. Walls, floors and roof to utility, pipe and duct penetrations.

1.05 REFERENCES

1. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
2. NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components
3. American Society for Testing and Materials (ASTM)
4. ASTM D412 Standard Test Methods for Rubber Properties in Tension
5. ASTM D570 Test Method for Water Absorption of Plastics
6. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
7. ASTM E96 Test Methods for Water Vapor Transmission of Materials
8. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
9. ASTM E1186 Standard Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
10. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
11. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.06 SUBMITTALS

1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
2. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
	1. Include details of interfaces with other materials that form part of air barrier.
	2. Include details of mockups.
3. Samples: Submit representative samples of the Air Barrier Membrane for approval.
4. Qualification Data: For Applicator.
5. Warranty: Submit a sample warranty.

1.07 QUALITY ASSURANCE

1. Manufacturer: Air barrier materials shall be manufactured and marketed by a firm with a minimum of 20 years of experience in the production and sales of waterproofing and air barriers. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.
2. Source Limitations: Obtain primary air-barrier material and air barrier assembly materials from a single manufacturer. Should project require a vapor impermeable and a vapor permeable air barrier on same project, obtain vapor-impermeable and vapor permeable air barrier from a single manufacturer.
3. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this project, whose work has resulted in applications with a record of successful in-service performance.
4. Mockups: Before beginning installation of air barrier, provide air barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
5. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed.
6. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
7. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, Air Barrier Applicator, Architect, and air barrier manufacturer's representative. Agenda for meeting shall include but not be limited to the following:
8. Review of submittals.
9. Review of surface preparation, minimum curing period and installation procedures.
10. Review of special details and flashings.
11. Sequence of construction, responsibilities, and schedule for subsequent operations.
12. Review of mock-up requirements.
13. Review of inspection, testing, protection, and repair procedures.

1.08 DELIVERY, STORAGE, AND HANDLING

1. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer’s instructions, recommendations, and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures, and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
2. Do not double-stack pallets of fluid applied components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
3. Sequence deliveries to avoid delays but minimize on-site storage.

1.09 PROJECT CONDITIONS

1. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a wet substrate or during snow, rain, fog, or mist.

1.10 WARRANTY

1. Material Warranty: Provide written 5-year material warranty issued by the air barrier manufacturer upon successful completion of the work.

PART 2 — PRODUCTS

* 1. SHEET APPLIED AIR BARRIER MEMBRANE
1. Perm-A-Barrier® Ultra™ Wall Membrane manufactured by GCP Applied Technologies [www.gcpat.com](http://www.gcpat.com); a 25 mil (0.635 mm) of self-adhesive butyl integrally bonded to 5 mil (0.127 mm) of high-density polyethylene film laminated to aluminum facer to provide a min. 30 mil (0.76 mm) thick robust membrane. Membrane shall be interleaved with disposable silicone-coated release liner until installed, conforming to the following.
2. Air Permeance: ASTM E2178: <0.004 cfm/sq. ft. under a pressure differential of 1.57 psf (equal to 0.02L/s/sq. m @ 75 Pa)
3. Assembly Air Permeance: ASTM E2357: <0.004 cfm/sq.ft. under a pressure differential of 1.57 psf (equal to 0.2 L/s/sq. m @ 75 Pa)
4. Water Vapor Permeance: ASTM E96, Method B: < 0.01 perm.
5. Puncture Resistance: ASTM E154: <70 lbs. (311 N)
6. Pliability, Low Temperature Flexibility: ASTM D1970: Pass at -20F (-29C)
7. Tensile Strength: ASTM D882: Min. 5000 psi (34.5 MPa)
8. Elongation: ASTM D882: Min. 200%
9. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
10. Peel adhesion to primer gypsum sheathing: ASTM D 903: >5 pli
11. Maximum in-service temperature: 300°F (149°C)
	1. TRANSITION MEMBRANE AND FLEXIBLE MEMBRANE WALL FLASHING
12. HIGH TEMPERATURE TRANSITION MEMBRANE: **Perm-A-Barrier Ultra Flashing**; a 25 mil (0.635 mm) of self-adhesive butyl integrally bonded to 5 mil (0.127 mm) of high-density polyethylene film laminated to aluminum facer to provide a min. 30 mil (0.76 mm) thick robust membrane. Membrane shall be interleaved with disposable silicone-coated release liner until installed.

B. FLEXIBLE MEMBRANE WALL FLASHING: Perm-A-Barrier Wall Flashing; a 32 mil (0.8 mm) of self-adhesive rubberized asphalt integrally bonded to 8 mil (0.2 mm) of cross-laminated, high-density polyethylene film to provide a min. 40 mil (1.0 mm) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Puncture Resistance: ASTM E154: Min. 80 lbs.(356 N)
2. Pliability, Low Temperature Flexibility: ASTM D1970: Pass at -45F (-43C)
3. Tensile Strength: ASTM D412, Die C Modified: Min. 1,200 psi (8.3 MPa)
4. Elongation: ASTM D412, Die C: Min. 200%

2.03 PRIMERS

1. Primer for self-adhered air barrier membrane, transition membrane and flexible membrane wall flashing: Primers which imparts an aggressive, high tack finish on the treated substrate are as follows.
2. Perm-A-Barrier Adhesive Primer (Solvent based)
3. Perm-A-Barrier WB Primer (Water based)

2.04 PENETRATIONS & TERMINATION SEALANT

1. Sealant and Liquid Flashing for Terminations and Flashing of Rough Openings: Perm-A-Barrier Universal Flashing & Sealant; a single component sealant.
2. Liquid Membrane for Details, Terminations and Substrate Preparation: Bituthene Liquid Membrane; a two-part, elastomeric, trowel grade material.

PART 3 — EXECUTION

3.01 EXAMINATION

1. Verify that substrates and conditions are ready to accept the Work of this section. Notify authority having jurisdiction in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

3.02 SURFACE PREPARATION

1. Refer to manufacturer’s literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate, and sharp protrusions. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone, debris, and any material that may interfere with proper adhesion of the air barrier to the substrate. Use repair materials and methods that are acceptable to manufacturer of the air barrier assembly.
2. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws in accordance with exterior sheathing manufacturers written instructions.
3. Masonry Substrates: Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat. Mortar joints shall be struck full and flush with the surface of the masonry substrate to receive air barrier.
4. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
5. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with a lean mortar mix, non-shrinking grout or parge coat.
6. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
7. At changes in substrate plane, apply a sealant acceptable to the air barrier manufacturer or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.
8. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 AIR BARRIER MEMBRANE INSTALLATION

1. Refer to manufacturer’s literature for installation instructions.
2. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
3. Install air barrier to dry surfaces at air and surface temperatures in accordance with manufacturer's recommendations, at locations indicated on Construction Documents.
4. Prime substrate to receive air barrier membrane as required per manufacturers written instructions.
5. Apply primer to substrates to receive membrane at required rate and allow to dry. Limit priming to areas that will be covered in same day. Re-prime areas exposed for more than 24 hours.
6. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
7. Precut pieces of air barrier into easily handled lengths.
8. Remove release linear before or during membrane installation.
9. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
10. When properly positioned, place against surface by pressing firmly into place. Roll membrane with roller immediately after placement.
11. Overlap adjacent pieces 50 mm (2 in.) and roll seams.
12. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place.
13. Seal around masonry reinforcing or ties and all penetrations with penetration & termination sealant.
14. Coordinate the installation of air barrier with roof installer to ensure continuity of membrane with roof air barrier.
15. At end of each working day seal top edge of air barrier to substrate with termination sealant.
16. Do not expose air barrier membrane to sunlight beyond limits reported in manufacturer’s literature prior to enclosure.
17. Inspect installation prior to enclosing and repair punctures, voids, deficient lapped seams and damaged areas in membrane. Slit and flatten fish-mouths and blisters. Patch with membrane sized to extend 6 in. (150 mm) beyond the area to be patched in all directions.

3.04 TRANSITION MEMBRANE INSTALLATION

1. Install membrane according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
2. Apply primer to substrates to receive membrane at required rate and allow to dry. Limit priming to areas that will be covered in same day. Re-prime areas exposed for more than 24 hours.
3. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.
4. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
5. At end of each working day, seal top edge of membrane to substrate with termination sealant.
6. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.
7. Roll membrane with roller immediately after placement.
8. Inspect installation prior to enclosing and repair punctures, voids, deficient lapped seams and damaged areas in membrane. Slit and flatten fish-mouths and blisters. Patch with membrane sized to extend 6 in. (150 mm) beyond the area to be patched in all directions.

3.05 FIELD QUALITY CONTROL

1. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.
2. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
3. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
4. Continuous structural support of air barrier system has been provided.
5. Substrates are smooth, clean, free of cavities, protrusions, and in accordance with air barrier manufacturer’s requirements.
6. Site conditions for application temperature and dryness of substrates have been maintained.
7. Maximum exposure time of materials to UV deterioration has not been exceeded.
8. Surfaces have been primed, if applicable.
9. Laps in membrane have complied with minimum requirements and have been shingled in the correct direction, or termination sealant has been applied on exposed edges, with no fish-mouths.
10. Termination sealant has been applied on cut edges.
11. Membrane has been firmly adhered to substrate.
12. Compatible materials have been used.
13. Transitions at changes in direction and structural support at gaps have been provided.
14. Connections between assemblies have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
15. All penetrations have been sealed.
16. Tests: Testing to be performed will be determined by Owner's testing agency. Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, smoke pencil with pressurization or depressurization.
17. Remove and replace deficient air barrier components and retest as specified above.

3.06 CLEANING AND PROTECTION

1. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
2. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier that has been exposed to UV light beyond limits reported in manufacturer’s literature.
3. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
4. Remove masking materials after installation.

**End of Section**