

SECTION 072708

MECHANICALLY ATTACHED FLEXIBLE SHEET AIR BARRIERS (BUILDING WRAPS)

1. GENERAL
	* + 1. SECTION INCLUDES
				1. This section includes the following:

Mechanically attached flexible sheet air barrier (building wraps) located in the non-accessible part of the wall.

Materials to bridge and seal the following air leakage pathways and gaps:

Connections of the walls to the roof air barrier.

Connections of the walls to the foundation air barrier.

Seismic and expansion joints.

Openings and penetrations of window frames, storefront, curtain wall.

Barrier precast concrete and other envelope systems.

Door frames.

Piping, conduit, duct and similar penetrations.

Masonry ties, screws, bolts and similar penetrations.

All other air leakage pathways in the building envelope.

SPEC NOTE: COORDINATE RELATED WORK REQUIREMENTS WITH CONTENTS OF REFERENCED SPECIFICATION SECTIONS.

* + - * 1. Related Work in other Sections includes the following:
1. Section 014000 - Quality Requirements; coordination with Owner’s independent testing and inspection agency.
2. Section 014339 - Mock-Ups; exterior wall mock-ups.
3. Section 015000 - Temporary Facilities and Controls; requirement to schedule work to prevent sunlight and weather exposure of materials beyond limits established by manufacturer; requirement to protect materials from damage after installation and prior to installation of enclosing work.
4. Section 033000 – Cast-In-Place Concrete; requirement that backup concrete be smooth without protrusions.
5. Section 042000 – Unit Masonry; requirement that backup masonry joints are flush and completely filled with mortar and that excess mortar on brick ties will be removed; requirement for gap at deflection joints and fillers; coordination with sequencing of through-wall flashing.
6. Section 061600 – Sheathing; requirement that backup sheathing has been installed.
7. Section 075000 - Membrane Roofing; requirement for coordination with sequencing of membrane roofing; requirement to seal roof membrane to wall air barrier.
	* + 1. PERFORMANCE REQUIREMENTS
				1. Material Performance: Provide air barrier materials which have an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (0.004 cfm/ft2 @ 1.57 psf), [0.02 liters per square meter per second under a pressure differential of 75 Pa (0.02 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
				2. The water vapor permeance [Desiccant method, (Procedure A) and Water method (Procedure B)] shall be determined in accordance with ASTM E96 and shall be declared by the material manufacturer.

SPEC NOTE: THE WATER VAPOR PERMEANCE IS DECLARED BY THE MANUFACTURER AND INCLUDED IN THIS DOCUMENT SO THAT THE DESIGN PROFESSIONAL HAS THIS INFORMATION READILY AVAILABLE.

* + - * 1. Assembly Performance: Provide a continuous air barrier in the form of an assembly that has an air leakage not to exceed 0.04 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (0.04 cfm/ft2 @ 1.57 psf) [0.2 liters per square meter per second under a pressure differential of 75 Pa (0.2 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2357. The assembly shall accommodate movements of building materials by providing expansion and control joints as required. Expansion / control joints, changes in substrate and perimeter conditions shall have appropriate accessory materials at such locations.

The air barrier assembly shall be capable of withstanding combined design wind, fan and stack pressures, both positive and negative on the envelope without damage or displacement, and shall transfer the load to the structure.

Materials of the air barrier assembly shall not displace adjacent materials in the assembly under full load.

The air barrier assembly shall be joined in an airtight and flexible manner to the air barrier materials of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations, creep, and anticipated seismic movement.

* + - * 1. Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:

Foundation and walls, including penetrations, ties and anchors.

Walls, windows, curtain walls, storefronts, louvers and doors.

Different assemblies and fixed openings within those assemblies.

Wall and roof connections.

Floors over unconditioned space.

Walls, floor and roof across construction, control and expansion joints.

Walls, floors and roof to utility, pipe and duct penetrations.

Seismic and expansion joints.

All other potential air leakage pathways in the building envelope.

* + - 1. SUBMITTALS
				1. Submittals: Submit in accordance with Division 1 requirements.
				2. Quality Assurance Program: Submit evidence of current Contractor accreditation and Installer certification under the Air Barrier Association of America’s (ABAA) Quality Assurance Program (QAP). Submit accreditation number of the Contractor and certification number(s) of the ABAA Certified Installer(s).
				3. Product Data: Submit material Manufacturer’s Product Data, material manufacturer's instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, Technical Data, and tested physical and performance properties.

Submit letter from primary air barrier material manufacturer indicating approval of materials that are proposed to be used that are not currently listed in the accessories section of this specification for that manufacturer’s material.

Include statement from the primary air barrier material manufacturer that the materials used in their air barrier assembly which will be used to adhere to the underlying substrate are chemically compatible to the substrate material.

* + - * 1. Samples: Submit clearly labeled samples, three (3) inch by four (4) inch [75 mm by 100 mm] minimum size of each material specified.
				2. Shop Drawings of Mock-Up: Submit Shop Drawings of proposed mock-ups showing plans, elevations, large-scale details, and air barrier transitions and terminations.
				3. Field Test Results of Mock-Up: Submit test results of air leakage test and water leakage test of mock-up in accordance with specified standards, including retesting if initial results are not satisfactory.
				4. Shop Drawings: Submit Shop Drawings showing locations and extent of air barrier assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated, how materials that cover the materials are secured with air-tight condition maintained, and how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.

Include VOC content of each material, and applicable legal limit in the jurisdiction of the project.

Include statement that materials are compatible with adjacent materials proposed for use.

* + - * 1. Compatibility: Submit letter from primary material manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from primary material manufacturer stating that cleaning materials used during installation are chemically compatible with adjacent materials proposed for use.
				2. Air Barrier Subcontractor Qualifications: Air barrier Subcontractor(s) shall be accredited at the time of bidding and during the complete installation period by the Air Barrier Association of America (ABAA) whose Installer(s) are certified in accordance with the site Quality Assurance Program used by ABAA.

Mechanically Attached Flexible Sheet Air Barrier Installers shall be certified by BPQI (Building Performance Quality Institute) for the ABAA Quality Assurance Program in accordance with the requirements outlined in the QAP program used by ABAA. Installers shall have their photo-identification air barrier certification cards in their possession and available on the project site, for inspection upon request.

* + - * 1. Manufacturer: Obtain primary ABAA Evaluated Materials from a single ABAA Evaluated Manufacturer regularly engaged in manufacturing specified mechanically attached flexible sheet. Obtain secondary materials from a source acceptable to the primary materials manufacturer.
				2. Accredited Laboratory Testing for Materials: Laboratory accredited by International Accreditation Service Inc. (IAS), American Association for Laboratory Accreditation (A2LA), or the Standards Council of Canada (SCC).
				3. VOC Regulations: Provide products which comply with applicable regulations controlling the use of volatile organic compounds.
				4. Preconstruction Meeting: Convene a minimum of two weeks prior to commencing Work of this Section. Agenda shall include, at a minimum, construction and testing of mock-up, sequence of construction, coordination with substrate preparation, air barrier materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction and chemical/fire safety plans. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.
				5. Field Quality Assurance: Implement the site Quality Assurance Program requirements used by ABAA. Cooperate with ABAA Auditors and any independent testing and inspection agencies engaged by the Owner. Do not cover the air barrier assembly until it has been inspected, tested and accepted.
				6. Mock-Ups: Build mock-up representative of primary air barrier assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Architect. Mock-up shall be dimensioned no less than eight (8) feet long by eight (8) feet high [2.50 meters long by 2.50 meters high] and include the air barrier materials and air barrier accessories proposed for use in the exterior wall assembly. Mock-ups shall be suitable for testing as specified in the following paragraph.

SPEC NOTE: COORDINATE TESTING WITH PROJECT REQUIREMENTS. DELETE PARAGRAPH BELOW IF NOT REQUIRED, OR IF OWNER’S INDEPENDENT TESTING AGENT WILL PERFORM TESTING.

* + - * 1. Mock-Up Tests for Air and Water Infiltration: The third party testing agency shall test the mock-up for air and water infiltration in accordance with ASTM E1186 (air leakage location), ASTM E783 (air leakage quantification) at a pressure differential of 1.57 lb/ft² (75 Pa) and ASTM E1105 (water penetration). Use smoke tracer to locate sources of air leakage. If deficiencies are found, the air barrier Contractor shall reconstruct mock-up at their cost for retesting until satisfactory results are obtained. Deficiencies include air leakage beyond values specified, uncontrolled water leakage, unsatisfactory workmanship.

Perform the air leakage test and water penetration test of mock-up prior to installation of cladding and trim but after installation of all fasteners for mechanically attached flexible sheet air barrier and other penetrating elements.

* + - * 1. Air Barrier Assembly Testing: Verify air barrier assembly testing by the material manufacturer by visiting the ABAA website to ensure an ASTM E2357 test has been completed and to obtain results. Visit the ABAA website for the reported air barrier assembly leakage rate and illustrations or CAD details which includes the methods in which the assembly test mock-ups shall be assembled.
			1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver materials to Project site in original packages with seals unbroken, labeled with the material manufacturer's name, product, date of manufacture, and directions for storage.
				2. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by Mechanically Attached Flexible Sheet Air Barrier Manufacturer. Protect stored materials from direct sunlight.
				3. Handle materials in accordance with material manufacturer’s recommendations.
			2. PROJECT CONDITIONS
				1. Temperature: Install Mechanically Attached Flexible Sheet Air Barriers within range of ambient and substrate temperatures recommended by the primary air barrier manufacturer. Do not apply air barrier to a damp or wet substrate.
				2. Field Conditions: Do not install air barrier in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the primary material manufacturer.
				3. Sequencing. Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building
				4. Compatibility. Do not allow mechanically attached flexible sheet air barriers to come in contact with chemically incompatible materials.
				5. Ultra-violet exposure. Do not expose air barrier materials to sunlight longer than as recommended by the primary material manufacturer
			3. WARRANTY

SPEC NOTE: VERIFY WARRANTY LENGTH WITH MANUFACTURERs specified.

* + - * 1. Material Warranty: Provide primary material manufacturer’s standard product warranty, for a minimum three (3) years from date of Substantial Completion.
				2. Subcontractor (approved by ABAA and manufacturer) Installation Warranty: Provide a two (2) year installation warranty from date of Substantial Completion, including all accessories and materials of the air barrier assembly, against failures including loss of air tight seal, loss of watertight seal and loss of attachment.
1. MATERIALS
	* + 1. AIR BARRIER MATERIALS:
				1. Mechanically Attached Flexible Sheet Air Barriers: Air Barrier. Subject to compliance with requirements, provide one of the following:

Material: DuPont™ Tyvek® Commercial Wrap® D by DuPont Weatherization Systems:[www.tyvek.com](http://www.tyvek.com/)

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being 0.00045 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (0.00045 cfm/ft2 @ 1.57 psf), [0.00225 liters per square meter per second under a pressure differential of 75 Pa (0.00225 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
3. The water vapor permeance for this material has been tested and reported as being 2437 nanograms per second per square meter divided by the pascals of vapor pressure per meter (2437 ng/(Pa·s·m2) [42.7 US Perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).

1. The water vapor permeance for this material has been tested and reported as being 2427 nanograms per second per square meter divided by the pascals of vapor pressure per meter (2427 ng/(Pa·s·m2)  [42.5 US Perms] when tested in accordance with ASTM E96 (water method - unmodified).
2. AIR BARRIER ACCESSORY MATERIALS:
3. Sealing Tape: DuPont™ Tyvek® 3" Tape.
4. Fasteners: Steel Frame Construction:  2" DuPont™ Tyvek® Wrap Cap Screws, 1-1/4" metal gasketed washers, 2" metal gasketed washers with screws.
5. Fasteners: Wood Frame Construction:  DuPont™ Tyvek® Wrap Caps, #4 nails with 1" plastic cap, 1" plastic cap staple with leg length sufficient to achieve 5/8" penetration.
6. Fasteners: For Masonry Construction Tapcon® fasteners with 2’’ plastic caps.
7. Flashing: DuPont™ FlexWrap™, DuPont™ FlexWrap™ NF, DuPont™ StraightFlash™, DuPont™ StraightFlash™ VF, Thru-Wall Flashing.
8. Caulks and Sealants:  DuPont™ Commercial Sealant or DuPont recommended sealant,  DuPont™ Window and Door Foam.

Material: DuPont™ Tyvek® Commercial Wrap® by DuPont Weatherization Systems:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being 0.00046 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (0.00046 cfm/ft2 @ 1.57 psf), [0.0023 liters per square meter per second under a pressure differential of 75 Pa (0.0023 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
3. The water vapor permeance for this material has been tested and reported as being 1446 nanograms per second per square meter divided by the pascals of vapor pressure per meter (1446 ng/(Pa·s·m2)  [25.3 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
4. The water vapor permeance for this material has been tested and reported as being 1867 nanograms per second per square meter divided by the pascals of vapor pressure per meter (1867 ng/(Pa·s·m2)  [32.7 US perms] when tested in accordance with ASTM E96 (water method - unmodified).
5. AIR BARRIER ACCESSORY MATERIALS:
6. Sealing Tape: DuPont™ Tyvek® 3" Tape.
7. Fasteners: Steel Frame Construction:  2" DuPont™ Tyvek® Wrap Cap Screws, 1-1/4" metal gasketed washers, 2" metal gasketed washers with screws.
8. Fasteners: Wood Frame Construction:  DuPont™ Tyvek® Wrap Caps, #4 nails with 1" plastic cap, 1" plastic cap staple with leg length sufficient to achieve 5/8" penetration.
9. Fasteners: For Masonry Construction Tapcon® fasteners with 2’’ plastic caps.
10. Flashing: DuPont™ FlexWrap™, DuPont™ FlexWrap™ NF, DuPont™ StraightFlash™, DuPont™ StraightFlash™ VF, Thru-Wall Flashing.
11. Caulks and Sealants:  DuPont™ Commercial Sealant or DuPont recommended sealant,  DuPont™ Window and Door Foam.

Material: GreenGuard MAX Building Wrap by Pactiv Building Products:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being < 0.0002 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (< 0.0002 cfm/ft2 @ 1.57 psf), [< 0.001 liters per square meter per second under a pressure differential of 75 Pa (< 0.001 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
3. The water vapor permeance for this material has been tested and reported as being 773 nanograms per second per square meter divided by the pascals of vapor pressure per meter (773 ng/(Pa·s·m2)  [13.52 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
4. AIR BARRIER ACCESSORY MATERIALS:
5. Fasteners (Metal Framing): 1 ¼ in. (32 mm) galvanized or corrosion-resistant screws with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
6. Fasteners (Wood Framing): 1 in. (25 mm) galvanized or corrosion-resistant nails with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
7. Fasteners (Masonry): 1 ¾ in. (44 mm) Tap Con masonry fasteners with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
8. Seam Tape: 3 in. (75 mm) GreenGuard® Contractor Tape or equivalent seam tape approved by Pactiv.
9. Self-Adhering Flashing: GreenGuard® Butyl Flashing in widths of 4 in. (102 mm), 6 in. (152 mm), 9 in. (229 mm) and/or GreenGuard SuperStretch Butyl Flashing in widths of 7 in. (178 mm), 9 in. (229 mm) or equivalent self-adhering flashing approved by Pactiv.
10. Sealant: Use adhesives and sealants as recommended in Pactiv's Technical Bulletin TB-011.

Material: GreenGuard C500 Building Wrap by Pactiv Building Products:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being 0.000 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot ( 0.000 cfm/ft2 @ 1.57 psf), [< 0.001 liters per square meter per second under a pressure differential of 75 Pa (< 0.001 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
3. The water vapor permeance for this material has been tested and reported as being 629 nanograms per second per square meter divided by the pascals of vapor pressure per meter (629 ng/(Pa·s·m2)  [11.0 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
4. AIR BARRIER ACCESSORY MATERIAL:
5. Fasteners (Metal Framing): 1 ¼ in. (32 mm) galvanized or corrosion-resistant screws with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
6. Fasteners (Wood Framing): 1 in. (25 mm) galvanized or corrosion-resistant nails with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
7. Fasteners (Masonry): 1 ¾ in. (44 mm) Tap Con masonry fasteners with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
8. Seam Tape: 3 in. (75 mm) GreenGuard® Contractor Tape or equivalent seam tape approved by Pactiv.
9. Self-Adhering Flashing: GreenGuard® Butyl Flashing in widths of 4 in. (102 mm), 6 in. (152 mm), 9 in. (229 mm) and/or GreenGuard SuperStretch Butyl Flashing in widths of 7 in. (178 mm), 9 in. (229 mm) or equivalent self-adhering flashing approved by Pactiv.
10. Sealant: Use adhesives and sealants as recommended in Pactiv's Technical Bulletin TB-011.

Material: GreenGuard C2000 Building Wrap by Pactiv Building Products:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being < 0.0006 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (< 0.0006 cfm/ft2 @ 1.57 psf), [< 0.003 liters per square meter per second under a pressure differential of 75 Pa (< 0.003 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).
3. The water vapor permeance for this material has been tested and reported as being 5377 nanograms per second per square meter divided by the pascals of vapor pressure per meter (5377 ng/(Pa·s·m2)  [94 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
4. AIR BARRIER ACCESSORY MATERIALS:
5. Fasteners (Metal Framing): 1 ¼ in. (32 mm) galvanized or corrosion-resistant screws with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
6. Fasteners (Wood Framing): 1 in. (25 mm) galvanized or corrosion-resistant nails with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
7. Fasteners (Masonry): 1 ¾ in. (44 mm) Tap Con masonry fasteners with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
8. Seam Tape: 3 in. (75 mm) GreenGuard® Contractor Tape or equivalent seam tape approved by Pactiv.
9. Self-Adhering Flashing: GreenGuard® Butyl Flashing in widths of 4 in. (102 mm), 6 in. (152 mm), 9 in. (229 mm) and/or GreenGuard SuperStretch Butyl Flashing in widths of 7 in. (178 mm), 9 in. (229 mm) or equivalent self-adhering flashing approved by Pactiv.
10. Sealant: Use adhesives and sealants as recommended in Pactiv's Technical Bulletin TB-011.

Material: Greenguard Ultra Wrap by Pactiv Building Products:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being < 0.00002 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (< 0.00002 cfm/ft2 @ 1.57 psf), [< 0.0001 liters per square meter per second under a pressure differential of 75 Pa (< 0.0001 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).

1. The water vapor permeance for this material has been tested and reported as being 2600 nanograms per second per square meter divided by the pascals of vapor pressure per meter (2600 ng/(Pa·s·m2)  [45.45 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
2. AIR BARRIER ACCESSORY MATERIALS:
3. Fasteners (Metal Framing): 1 ¼ in. (32 mm) galvanized or corrosion-resistant screws with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
4. Fasteners (Wood Framing): 1 in. (25 mm) galvanized or corrosion-resistant nails with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
5. Fasteners (Masonry): 1 ¾ in. (44 mm) Tap Con masonry fasteners with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
6. Seam Tape: 3 in. (75 mm) GreenGuard® Contractor Tape or equivalent seam tape approved by Pactiv.
7. Self-Adhering Flashing: GreenGuard® Butyl Flashing in widths of 4 in. (102 mm), 6 in. (152 mm), 9 in. (229 mm) and/or GreenGuard SuperStretch Butyl Flashing in widths of 7 in. (178 mm), 9 in. (229 mm) or equivalent self-adhering flashing approved by Pactiv.
8. Sealant: Use adhesives and sealants as recommended in Pactiv's Technical Bulletin TB-011.

Material: GreenGuard RainDrop Building Wrap by Pactiv Building Products:

1. AIR BARRIER MATERIAL PROPERTIES:
2. Air permeance for this material has been tested and reported as being < 0.0002 cubic feet per minute per square foot under a pressure differential of 1.57 pounds per square foot (< 0.0002 cfm/ft2 @ 1.57 psf), [< 0.001 liters per square meter per second under a pressure differential of 75 Pa (< 0.001 L/(s·m2) @ 75 Pa)] when tested in accordance with ASTM E2178 (unmodified).

1. The water vapor permeance for this material has been tested and reported as being 705 nanograms per second per square meter divided by the pascals of vapor pressure per meter (705 ng/(Pa·s·m2)  [12.33 US perms] when tested in accordance with ASTM E96 (desiccant method - unmodified).
2. AIR BARRIER ACCESSORY MATERIALS:
3. Fasteners (Metal Framing): 1 ¼ in. (32 mm) galvanized or corrosion-resistant screws with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
4. Fasteners (Wood Framing): 1 in. (25 mm) galvanized or corrosion-resistant nails with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
5. Fasteners (Masonry): 1 ¾ in. (44 mm) Tap Con masonry fasteners with 1 ¾ in. (44 mm) GreenGuard® Caps or gasketed metal washers.
6. Seam Tape: 3 in. (75 mm) GreenGuard® Contractor Tape or equivalent seam tape approved by Pactiv.
7. Self-Adhering Flashing: GreenGuard® Butyl Flashing in widths of 4 in. (102 mm), 6 in. (152 mm), 9 in. (229 mm) and/or GreenGuard SuperStretch Butyl Flashing in widths of 7 in. (178 mm), 9 in. (229 mm) or equivalent self-adhering flashing approved by Pactiv.
8. Sealant: Use adhesives and sealants as recommended in Pactiv's Technical Bulletin TB-011.
9. EXECUTION
	* + 1. EXAMINATION
				1. The ABAA Certified Air Barrier Contractor shall examine substrates, areas, and conditions under which the air barrier assembly will be installed, with General Contractor, ABAA Certified Installer present, for compliance with the following requirements.

Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

Verify substrate is visibly dry.

Ensure that the following conditions are met:

Surfaces are sound, dry, even, and free of excess mortar or other contaminants.

Inspect surfaces to be smooth without large voids or sharp protrusions. Inform General Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.

Inspect masonry joints to be reasonably flush and completely filled, and ensure all excess mortar sitting on masonry ties has been removed. Inform General Contractor if masonry joints are not acceptable and need to be repaired by the mason sub-trade.

Verify sealants are compatible with flexible sheet air barrier proposed for use.

Notify Architect in writing of anticipated problems installing the air barrier material over substrate prior to proceeding.

* + - 1. INSTALLATION
				1. Installation instructions for Mechanically Attached Flexible Sheet Air Barrier: Install flexible sheet air barrier in a way that provides continuity throughout the building envelope. Install materials in accordance with manufacturer's instructions and the following (unless manufacturer requires other procedures in writing based on project conditions or particular requirements of their recommended materials):

Install the head flashing material over all doors and windows which will be later covered by the air barrier material for proper drainage of water away from the window.

Install building wrap over cast-in-place concrete, masonry, backup sheathing board, rigid insulation or other fully-supported continuous substrates as per manufacturers instructions.

Begin by aligning the bottom edge of the roll approximately 4 inches [100 mm] below the base of the wall onto the foundation, approximately 24 inches [610 mm] from a corner, with the print side facing out. Fold greater than 4 inches [100 mm] of material under itself and fasten securely to a stud, structural sheathing or through insulation board to an underlying framing member.

Ensure air barrier material is plum and level on foundation, and unroll extending over window and door openings.

Ensure air barrier material is applied over back edge of weep screed for proper water drainage.

Unroll the air barrier material with the printed side facing out, wrapping the entire building, including door and window openings.

Attach into wood stud framing, through insulated sheathing board or into metal stud framing with plastic cap nails or fasteners specified by air barrier material manufacturer. The fasteners must penetrate the framing member a minimum of 1/2 inch [12 mm] on every vertical stud line.

When attaching to masonry, use adhesive or other method of fastening as instructed by the air barrier material manufacturer.

Fasteners need to be installed along every stud vertically and 12” [300 mm] or closer together as specified by the material manufacturer apart horizontally to maintain integrity of air barrier assembly to ensure the material is fastened to building when negative and positive pressures are exerted.

Install with drainage plane surface pattern in horizontal position. Install lower level air barrier material ensuring the upper layers of air barrier material lap the bottom layer to ensure proper shingling and water drainage.

Overlap at all corners of building by a minimum of 12 inches [300 mm].

Overlap vertical seams by a minimum of 6 inches [150 mm].

Prepare each window and door rough opening as recommended by the air barrier manufacturer or prepare by cutting a modified “I” pattern and wrap excess material to the inside of the rough opening and fasten securely to a framing member. At the window header, make a 6 to 8 inch [150 – 200 mm] diagonal cut at the corners of the air barrier and fold the material up above the rough opening, exposing the underlying sheathing. If windows are already in place when installing air barriers, trim as close to them as possible and tape all edges with manufacturer approved sealant tape. Use of window flashing materials is required as described in the International Building Code.

Detail remaining terminations and penetrations with accessory materials as per manufacturers instructions for air leakage and ensuring lapping of the material for proper shingling and drainage of bulk water.

When the end of a roll is reached, fold the edge of the building wrap under itself and attach to the structural sheathing or through non-structural sheathing to the nearest framing member.

Tape all horizontal and vertical seams with manufacturer approved construction tape.

Seal top and bottom edges of rolled out material to substrate with manufacturer approved construction tape.

Seal all tears and cuts with manufacturer approved construction tape.

* + - 1. FIELD QUALITY CONTROL
				1. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency. Allow access to work areas and staging. Notify Owner’s testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted.

* + - * 1. Air Barrier Association of America Installer Audits: Cooperate with ABAA’s testing agency. Allow access to work areas and staging. Notify ABAA in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted. Arrange and pay for site audits by ABAA to verify conformance with the manufacturer’s instructions, the site Quality Assurance Program used by ABAA, and this section of the project specification.
	1. Audits and subsequent testing shall be carried out at the following rate:

Up to 10,000 ft2 of air barrier contract requires one (1)audit.

10,001 – 35,000 ft2 of air barrier contract requires two (2)audits.

35,001 – 75,000 ft2 of air barrier contract requires three (3)audits.

75,001 - 125,000 ft2 of air barrier contract requires four (4)audits.

125,001 – 200,000 ft2 of air barrier contract requires five (5) audits.

200,001 ft2 and over of air barrier contract requires six (6) audits.

* 1. Forward written audit reports to the Architect within 10 working days of the audit and test being performed.
	2. If the audit reveals any defects, promptly remove and replace defective work at no additional cost to the Owner.
		+ 1. PROTECTING AND CLEANING
				1. Protect air barrier materials from damage during installation and the remainder of the construction period, according to primary material manufacturer's written instructions.

Coordinate with installation of materials which cover the air barrier assemblies, to ensure exposure period does not exceed that recommended by the air barrier material manufacturer.

* + - * 1. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION