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USACE / NAVFAC / AFCEC / NASA **UFGS-07 27 19.01 (May 2017)**

Change 2 - 08/20

Preparing Activity: NAVFAC

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2023
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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 27 19.01

SELF-ADHERING AIR BARRIERS

05/17, CHG 2: 08/20

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SECTION 07 27 19.01

SELF-ADHERING AIR BARRIERS

05/17, CHG 2: 08/20

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NOTE: This guide specification covers the requirements for self-adhering air barrier, for use inside exterior wall cavities. This air barrier will serve as the primary component of the air barrier system and, depending on the system specified, may also serve as a vapor retarder. The designer must determine whether a vapor permeable or a vapor retarding system is appropriate for the project. The designer must also verify the appropriate location within the wall assembly by using the tools described in UFC 3-101-01 Architecture, Section "Vapor Retarders".

Compatibility with other materials and components are critical to the success of the air barrier. Coordinate with other building enclosure components (such as wall assemblies, doors, windows) to ensure a complete barrier system that adheres to performance requirements, primarily air leakage. Coordinate with materials that will penetrate the barrier such as flashing, embed items, and ties for brick veneer.

Use this section in conjunction with Section 07 27 10.00 10, BUILDING AIR BARRIER SYSTEM and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS and coordinate requirements across these sections.

Performance requirements for products herein must contribute to the sustainable goals of the project, including but not limited to Energy Policy Act of 2005 (EPACT 2005), Energy Independence and Security Act of 2007 (EISA 2007), Executive Order (EO) 13423, Executive Order (EO) 13514, UFC 1-200-02 High Performance and Sustainable Building Requirements, UFGS Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, and other energy and water conservation requirements applicable to the project.

Specify self-adhering air barriers where the type of construction favors its economical use and where application would be less difficult than other air barrier applications. This product is susceptible to UV degradation, therefore specify product limit for full exposure in accordance with anticipated construction durations and include requirements for replacement if durations exceed exposed product life.

IBC 2015 introduces a change to the location within wall cavities of class I, II and III vapor retarders depending on their climate zone to avoid condensation within wall assemblies. See IBC Section 1405.3, and the new International Energy Conservation Code (IECC) 2015 referenced by this section of the IBC, coordinate dewpoint with mechanical design, and specify type and location within the cavity accordingly.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

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NOTE: On the drawings, show:

1. Locations where various barriers, retarders and insulation will be used.

2. Transitions between various materials of the building air barrier system.

3. Method of attachment of barriers, retarders and insulation.

4. Location and size of ventilation openings where required.

5. Details for each type of penetration through the air barrier.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR BARRIER ASSOCIATION OF AMERICA (ABAA)

ABAA Accreditation	Accreditation
ABAA QAP	Quality Assurance Program

ASTM INTERNATIONAL (ASTM)

ASTM D146/D146M	(2004; E 2012; R 2012) Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing
ASTM D412	(2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D570	(1998; E 2010; R 2010) Standard Test Method for Water Absorption of Plastics
ASTM D903	(1998; R 2017) Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
ASTM D1876	(2008; R 2015; E 2015) Standard Test Method for Peel Resistance of Adhesives (T-Peel Test)
ASTM D4263	(1983; R 2018) Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

ASTM D4541	(2017) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2022a) Standard Test Methods for Gravimetric Determination ofWater Vapor Transmission Rate of Materials
ASTM E154/E154M	(2008a; R 2013; E 2013) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
ASTM E283	(2019) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E331	(2000; R 2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E2178	(2021a) Standard Test Method for Air Permeance of Building Materials
ASTM E2357	(2017) Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 285	(2012) Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.2 RELATED REQUIREMENTS

Coordinate the requirements of Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM[, Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS] and other building enclosure sections to provide a complete building air barrier system. Submit all materials, components, and assemblies of the air barrier system together as one complete submittal package.

1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal

items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications of Manufacturer; G[, [_____]]

Qualifications of Installer; G[, [_____]]

SD-02 Shop Drawings

Self-adhering Air Barrier; G[, [_____]]

SD-03 Product Data

Self-adhering Air Barrier; G[, [_____]]

Primers, Adhesives, and Mastics; G[, [_____]]

Safety Data Sheets; G[, [_____]]

SD-04 Samples

Self-adhering Air Barrier Mockup; G[, [_____]]

SD-06 Test Reports

Field Peel Adhesion Test; G[, [_____]]

Flame Propagation of Wall Assemblies; G[, [_____]]

Flame Spread and Smoke Developed Index Ratings; G[, [_____]]

Site Inspections and Testing; G[, [_____]]

SD-07 Certificates

Self-adhering Air Barrier; G[, [_____]]

SD-08 Manufacturer's Instructions

Self-adhering Air Barrier; G[, [_____]]

Primers, Adhesives, and Mastics; G[, [_____]]

1.4 MISCELLANEOUS REQUIREMENTS

For self-adhering air barrier provide the following:

1.4.1 Shop Drawings

Submit self-adhering air barrier shop drawings showing locations and extent of air barrier assemblies and details of all typical conditions, intersections with other building enclosure assemblies and materials, and membrane counterflashings. Show details for bridging of gaps in construction, treatment of inside and outside corners, expansion joints, methods of attachment of materials covering the self-adhered barrier without compromising the barrier. Indicate how miscellaneous penetrations such as conduit, pipes, electric boxes, brick ties, and similar items will be sealed.

1.4.2 Product Data

Submit manufacturer's technical data indicating compliance with performance and environmental requirements, manufacturer's printed instructions for evaluating, preparing, and treating substrates, temperature and other limitations of installation conditions, safety requirements for installation, and Safety Data Sheets. Indicate flame and smoke spread ratings for all products.

1.4.3 Mockup

Provide a mockup of the self-adhering air barrier system specified. Apply product in an area designated by the Contracting Officer. Apply an area of not less than 5 square meters 54 square feet. Include all components specified as representative of the complete system. Notify the Contracting Officer a minimum of 48 hours prior to the test application. Select a test area representative of conditions to be covered including window or door openings, wall to ceiling transitions, flashings, and penetrations, as applicable.

1.4.4 Test Reports

Submit test reports indicating that field peel-adhesion tests on all materials have been performed and the changes made, if required, in order to achieve successful and lasting adhesion. Submit test reports for flame propagation of wall assemblies tested in accordance with NFPA 285. Submit test reports for flame spread and smoke developed index ratings of barrier system materials tested in accordance with ASTM E84.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Inspect materials delivered to the site for damage and store out of weather. Deliver materials to the jobsite in their original unopened packages, clearly marked with the manufacturer's name, brand designation, description of contents, and shelf life of containerized materials. Store and handle to protect from damage.

1.5.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling. Protect stored materials from direct sunlight. Keep materials sealed and separated from absorptive materials, such as wood and insulation.

1.6 FIELD PEEL ADHESION TEST

Perform a field peel-adhesion test on the construction mockup. Test the self-adhering air barrier for adhesion in accordance with ASTM D4541 using a Type II pull tester except use a disk that is 100 mm 4 inches in diameter and cut through the membrane to separate the material attached to the dish from the surrounding material. Perform test after curing period in accordance with manufacturer's written recommendations. Record mode of failure and area which failed in accordance with ASTM D4541. Compare adhesion values with the manufacturer's established minimum values for the particular combination of material and substrate. Indicate on the inspection report whether the manufacturer's requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product and substrate combination, the inspector must record actual values.

1.7 AIR BARRIER TESTING

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NOTE: Choose first bracketed specification section to address air barrier requirements of the building enclosure. Choose the second bracketed option for projects whhere the particular service branch requires pressure testing the building enclosure for airtightness. See UFC 3-101-01 for more information.

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Perform air barrier testing in accordance with[Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM][and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS].

1.8 QUALITY ASSURANCE

1.8.1 Qualifications of Manufacturer

Submit documentation verifying that the manufacturer of the self-adhering air barrier is currently accredited by Air Barrier Association of America (ABAA Accreditation https://www.airbarrier.org/).

1.8.2 Qualifications of Installer

Submit documentation verifying that installers of the self-adhering air barrier are currently certified in accordance with the ABAA QAP Quality Assurance Program (https://www.airbarrier.org/qap/).

1.9 PRECONSTRUCTION MEETING

Conduct a preconstruction meeting a minimum of two weeks prior to commencing work specified in this Section. Agenda must include, at a minimum, construction and testing of mockup, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials, adjacent materials, and materials and components of the air barrier system.

1.10 ENVIRONMENTAL CONDITIONS

1.10.1 Temperature

Install air barrier within the range of ambient and substrate temperatures as recommended in writing by the air barrier manufacturer. Verify that the surface to receive self-adhering air barrier is dry for a minimum of 48 hours prior to the installation of the barrier. Do not apply air barrier to damp or wet substrates. Do not apply during inclement weather or when ice, frost, surface moisture, or visible dampness is present on surfaces to be covered, or when precipitation is imminent.

1.10.2 Exposure to Weather and Ultraviolet Light

Protect air barrier products from direct exposure to rain, snow, sunlight, mist, and other extreme weather conditions. Replace, at no additional cost to the government, barrier products that have been exposed to ultraviolet (sun)light longer than allowed by manufacturer's written requirements.

PART 2 PRODUCTS

2.1 SELF ADHERING AIR BARRIER

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NOTE: IBC 2015 introduces a change to the location within wall cavities of class I, II and III vapor retarders depending on their climate zone to avoid condensation within wall assemblies. See IBC Section 1405.3, and the new International Energy Conservation Code (IECC) 2015 referenced by this section of the IBC, coordinate dewpoint with mechanical design, and specify type and location

within the cavity accordingly.

NOTE: Provide vapor permeable or vapor retarding barrier in accordance with building enclosure analysis. Choose first bracketed option for vapor permeable barriers. Choose second bracketed option for vapor retarding barriers.

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Provide minimum 40 mils 0.040 inch thick self-adhering, vapor[permeable][retarding], air barrier membrane consisting of a cross-laminated high density polyethylene (HDPE) film, fully coated with rubberized asphalt adhesive. Provide membrane in rolls of various widths interleaved with disposable silicone release paper. Self-adhering air barrier must exhibit no visible water leakage when tested in accordance with ASTM E331 and must perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Use regular or low temperature formulation depending on site conditions, within temperature ranges specified by manufacturer.

2.1.1 Physical Properties

a. Air Permeance (ASTM E2178): [In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM][Less than 0.02 L per s-m2 at 75 Pa 0.004 CFM per sf at 1.57 psf.]

b. Air Leakage (ASTM E2357, ASTM E283): [In accordance with Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM[and Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS]][less than 0.02 L per s-m2 at 75 Pa 0.004 CFM per sf at 1.57 psf at 25 mm one inch].

c. Tensile Strength (ASTM D412 die C modified): Not less than 2.8 MPa 400 psi.

d. Tensile Elongation (ASTM D412 die C modified): Not less than 200 percent.

e. Puncture Resistance (ASTM E154/E154M): Not less than 178 N 40 lbs.

f. Pliability (ASTM D146/D146M): Unaffected at minus 32 degrees C minus 25 degrees F, 1.6 mm 0.063 inch mandrel.

g. Lap Adhesion (ASTM D1876 modified): Not less than 700 N per meter 4.0 lbs per inch.

h. Peel Adhesion (ASTM D903): Not less than 875 N per meter 5.0 lbs per inch.

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NOTE: Choose first bracketed option for vapor permeable barriers. Choose second bracketed option for vapor retarding barriers.

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[i. Water Vapor Permeance (Vapor Permeable Air Barrier) (ASTM E96/E96M, desiccant method B): greater than 570 ng/Pa s m2 10.0 perms.

][i. Water Vapor Permeance (Vapor Impermeable Air Barrier) (ASTM E96/E96M,

desiccant method A): 5.7 ng/Pa s m2 0.1 perms or less.

] j. Water Absorption (ASTM D570): Not to exceed 0.12 percent by weight.

k. Flame propagation of wall assemblies (NFPA 285): Pass

l. Surface Burning Characteristics (ASTM E84):

(1) Flame Spread Index Rating not higher than 75 [_____].

(2) Smoke Developed Index Rating not higher than 150 [_____].

2.2 PRIMERS, ADHESIVES, AND MASTICS

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NOTE: Specify adhesives and mastics for substrates where adhesion to particular substrates may require such materials. Require contractor to provide in accordance with manufacturer's written recommendations for installation.
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Provide primers, adhesives, mastics and other accessory materials as recommended in writing by the manufacturer of the self-adhering air barrier for adequate bonding to each type of substrate.

2.3 SHEET METAL FLASHING

Provide as specified in Section 07 60 00 FLASHING AND SHEET METAL.

2.4 JOINT SEALANTS

Provide as specified in Section 07 92 00 JOINT SEALANTS. Verify compatibility with adjacent products that are or will be in contact with one another.

PART 3 EXECUTION

3.1 EXAMINATION

Before installing air barrier, examine substrates, areas, and conditions under which air barrier assemblies will be applied, with Installer present, for compliance with requirements. Ensure the following conditions are met:

a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.

b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.

c. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method in accordance with ASTM D4263 and take suitable measures until substrate passes moisture test.

d. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel adhesion test on materials to which sealants are adhered.

3.2 PREPARATION

Clean, prepare, and treat substrate in accordance with manufacturer's written instructions. Ensure clean, dust-free, and dry substrate for air barrier application.

a. Prime masonry and concrete substrates with conditioning primer.

b. Prime gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.

c. Prime wood, metal, and painted substrates with primer.

d. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions.

3.3 INSTALLATION

3.3.1 Installation of Self-adhering Air Barrier

Install materials in accordance with manufacturer's recommendations and the following:

a. Apply primer at rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application. Apply as many coats as necessary for proper adhesion.

b. When membrane is properly positioned, press into place and roll membrane with roller immediately after placement.

c. Apply membrane sheets to shed water naturally without interception by a sheet edge, unless that edge is sealed with permanently flexible termination mastic.

d. Position subsequent sheets of membrane applied above so that membrane overlaps the membrane sheet below by a minimum of 65 mm 2-1/2 inches, unless greater overlap is recommended by manufacturer. Roll into place with roller.

e. Make all side laps a minimum of 65 mm 2-1/2 inches and all end laps a minimum of 127 mm 5 inches, unless greater overlap is recommended by manufacturer. Roll seams with roller.

f. Roll membrane to adhere to substrate. Cover corners and joints with two layers of reinforcement by first applying a 300 mm 12 inch width of membrane centered along the axis. Flash drains and projections with a second ply of membrane for a distance of 150 mm 6 inches from the drain or projection.

g. Seal around all penetrations through the air barrier resulting from pipes, vents, conduit, electrical fixtures, structural members, or other construction passing through it. Seal with termination mastic, extruded silicone sealant, membrane counterflashing or other sealing methods in accordance with manufacturer's written recommendations.

h. Continuously connect the air barrier between walls, roof, floor and below grade assemblies to form a continuous integrated air barrier system around the entire building enclosure. Extend the air barrier

membrane into rough openings such as doors, windows, louvers, and other exterior penetrations. Seal edges of barrier at junctures with rough openings.

i. At changes in substrate plane, provide transition material (e.g. bead of sealant, mastic, extruded silicone sealant, membrane counterflashing or other material recommended by manufacturer) under membrane to eliminate all sharp 90 degree inside corners and to make a smooth transition from one plane to another.

j. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Continuously support membrane with substrate.

k. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.

l. At expansion and seismic joints provide transition to the joint assemblies.

m. Apply a bead or trowel coat of mastic along membrane seams at reverse lapped seams, rough cuts, and as recommended by the manufacturer.

n. At end of each working day, seal top edge of membrane to substrate with termination mastic.

o. Do not allow materials to come in contact with chemically incompatible materials.

p. Counterflash upper edge of thru-wall flashing and air barrier. Counter flashing and thru-wall flashing are specified in Section 07 60 00 FLASHING AND SHEET METAL.

3.4 FIELD QUALITY CONTROL

3.4.1 Site Inspections and Testing

Provide site inspections and testing in accordance with ABAA protocol to verify conformance with the manufacturer's instructions, the ABAA QAP Quality Assurance Program (https://www.airbarrier.org/qap/), Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM,[, Section 07 05 23 PRESSURE TESTING AN AIR BARRIER SYSTEM FOR AIR TIGHTNESS,] and this section.

a. Conduct inspections and testing at 5, 50, and 95 percent completion of this scope of work. Forward written site inspections and testing reports to the Contracting Officer within five working days of the inspection and test being performed.

b. If inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Government.

3.5 FIELD PEEL ADHESION TEST

Conduct in accordance with test protocol indicated in Part 1, paragraph FIELD PEEL ADHESION TEST.

3.6 PROTECTION AND CLEANING

3.6.1 Protection

3.6.1.1 Adjacent Surfaces

Protect exposed adjacent surfaces that could be damaged by primers and adhesives associated with air barrier membrane. Provide protection during application and the remainder of construction in accordance with manufacturer's written instructions.

3.6.1.2 The Air Barrier Assembly

Protect finished portions of the air barrier assembly from damage during ongoing application and throughout the remainder of the construction period in accordance with manufacturer's written instructions. Coordinate timing of installation of materials that will cover the air barrier membrane to ensure the exposure period does not exceed that recommended by the air barrier manufacturer's written installation instructions. Remove and replace, at no additional cost to the government, membrane products that exceed the manufacturer's allowed exposure limits.

3.6.2 Cleaning

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

-- End of Section --