SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

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\*\* NOTE TO SPECIFIER \*\* KARNAK; fluid-applied membrane air barriers.
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This section is based on the products of KARNAK, which is located at:330 Central Ave.Clark, NJ 07066Toll Free Tel: 800-526-4236Tel: 732-388-0300Fax: 732-388-9422Email: [request info (info@karnakcorp.com)](https://arcat.com/rfi?action=email&company=KARNAK&message=RE%253A%2520Spec%2520Question%2520(07276kar)%253A%2520&coid=33521&spec=07276kar&rep=&fax=732-388-9422)
Web: <https://www.karnakcorp.com>
 [ [Click Here](https://arcat.com/company/karnak-33521) ] for additional information.
Karnak manufactures a complete line of reflective coatings, cements and sealants for roofing and waterproofing. Karnak is the leading manufacturer of Energy Star labeled coatings. Products are tested for fire resistance and wind uplift by UL and FM. Products are certified to comply with ASTM Specifications by UL Laboratories. Karnak Energy Star labeled coatings can help buildings obtain LEED points. Products are CRRC listed.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Fluid-applied membrane air and water-resistive barrier for exterior assemblies.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
		2. Section 04 20 00 - Unit Masonry.
		3. Section 06 16 36 - Wood Panel Product Sheathing.
		4. Section 07 25 00 - WeatherBarriers.
		5. Section 07 50 00 - Membrane Roofing.
		6. Section 07 60 00 - Flashing and Sheet Metal.
		7. Section 07 65 26 - Self-Adhering Sheet Flashing.
		8. Section 07 90 00 - Joint Protection.
		9. Section 09 26 13 - Gypsum Veneer Plastering.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. AATCC Test Method 127. "Water Resistance - Hydrostatic Pressure Test".
		2. ASTM International (ASTM):
			1. ASTM C 734 - Standard Test Method for Low-Temperature Flexibility of Latex Sealants after Artificial Weathering.
			2. ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
			3. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
			4. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep slope roofing Underlayment for Ice Dam Protection.
			5. ASTM D 5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay.
			6. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
			7. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
			8. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
			9. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.
			10. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
		3. Canadian General Standards Board (CGSB) 71-GP-24M - Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation.
		4. National Fire Protection Association (NFPA) 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop drawings showing locations and extent of air barrier and details of all typical conditions.
		4. Manufacturers Instructions: For installation and field quality control testing.
		5. Site Quality Control Submittals:
			1. Preconstruction compatibility and adhesion test reports.
			2. Field quality control adhesion test reports.

\*\* NOTE TO SPECIFIER \*\* Retain one of two subparagraphs below based upon LEED rating applicable to project; first subparagraph applies to LEED-NC and LEED-CS; second subparagraph applies to LEED for Schools. This LEED requirement related only to products located inside the building weather envelope; its applicability is subject to interpretation. Delete if not required.

* + 1. LEED Submittals:
			1. Product Data for LEED-NC Credit IEQ 4.2 Low-Emitting Materials-Paints and Coatings, including printed statement of VOC content.
			2. Laboratory Test Reports for LEED for Schools Credit IEQ 4 Low-Emitting Materials: indicating compliance with California DHS standard.
		2. Qualification Data: For qualified applicator.

\*\* NOTE TO SPECIFIER \*\* Retain first subparagraph below if seeking ABAA certification of Project. Delete if not required.

* + - 1. Submit list of ABAA certified air barrier installation personnel performing the work.
			2. Provide evidence to the Architect of installer qualification by the air barrier manufacturer.
		1. Certification: Certification of compatibility by manufacturer, listing all materials on the project with which the product and accessories may come into contact.
		2. Certification: Certification that the air leakage rates of the air barrier system assembly, primary membrane, primer and sealants have been tested to meet ASTM E2357.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Certification: Certification that the air leakage and vapor permeance rates of the air barrier system, including primary membrane and transition material, meet or exceed the requirements of the Massachusetts Energy Code.
			1. Test report shall include test results on porous substrate and include sustained wind load and gust load air leakage results.
		2. NFPA Assembly: Manufacturer's list and description of wall assemblies, incorporating product, approved per NFPA 285.
		3. Verification Sample: Free film sample of product at representative cured thickness, minimum 2 inches by 3 inches (51 mm by 76 mm) size.
		4. Flashing Sample: Sample of detail flashing and transition membrane, minimum 2 inches by 3 inches (51 mm by 76 mm) size.
		5. Operation and Maintenance Data: Manufacturer's cleaning and maintenance instructions.
		6. Warranties: Sample of special warranty.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
		2. Applicator Qualifications: Experienced in applying the same or similar materials and shall be specifically approved in writing by Manufacturer.
			1. Employer of ABAA-certified air barrier installers.
		3. Single-Source Responsibility: Obtain product and accessories from single manufacturer, including air barrier system sealants, primers, mastics, and adhesives.
		4. Product and Accessories shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
		5. Maintain copy of air barrier system manufacturer written instruction on project site.
		6. Allow site access to air barrier system manufacturer representative.
		7. Comply with the provisions of the Owner's building envelope commissioning program in accordance with Division 01.
		8. Ensure continuity of the specified materials throughout the scope of this section.
			1. Air barrier system to include liquid applied air barrier system, transition materials and seals at all penetrations.
			2. Drainage plane to include flexible flashing material to exterior.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Field-Constructed Mock-Ups: Prior to installation on Project, apply product and accessories on mock-up to verify details under shop drawing submittals, to demonstrate tie-ins with adjoining construction and other termination conditions and to become familiar with properties of materials in application:

\*\* NOTE TO SPECIFIER \*\* Incorporate sub paragraph 1 or 2 into Paragraph. Delete subparagraph not required.

* + - 1. Apply in field-constructed mockups of assemblies as specified in Section 01 43 39 - Mockups.
			2. Construct typical exterior wall panel, 6 feet long by 6 feet wide (1829 mm by 1829 mm), incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing, building corner condition, junction with roof system foundation wall and typical penetrations and gaps; illustrating interface of materials and seals.
			3. Allow for inspection of mock-up by architect before proceeding with air barrier work.
			4. Allow full cure of product and test mock-up in accordance with Section 01 43 00 - Quality Assurance and test in accordance with ASTM E 783 and ASTM E1105 for air and water infiltration.
		1. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed product unless it has been inspected, tested and approved.
	1. PRE-INSTALLATION MEETINGS
		1. Pre-Installation Meeting: Convene one week prior to commencing Work of this Section, in accordance with Division 01.
		2. Convene minimum one week prior to starting work of this section.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, lot number and directions for storage.
		2. Store materials in accordance with manufacturer instructions.
		3. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.
			1. Do not store product where temperature will exceed 90 degrees F.
		4. Avoid spillage. Immediately notify Owner, Architect if spillage occurs and start clean up procedures. Clean spills and leave area as it was prior to spill.
	3. WASTE MANAGEMENT AND DISPOSAL
		1. Separate and recycle waste materials in accordance with Division 01, and with the Waste Reduction Work Plan.
		2. Place materials defined as hazardous or toxic waste in designated containers.
		3. Ensure emptied containers are stored safely for disposal away from children.
	4. PROJECT CONDITIONS
		1. Do not apply product or accessories during rain or accumulating snowfall.
		2. Apply product and accessories within approved ambient and substrate temperature range stated in manufacturer's literature.
		3. Do not apply product or accessories over incompatible materials.
		4. Observe safety and environmental measures indicated in manufacturer's MSDS, and mandated by federal, state and local regulations.
	5. SEQUENCING
		1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	6. WARRANTY
		1. Warranty: Provide manufacturer's standard ten year material warranty for air barrier system materials, sealant, and flashing system.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: KARNAK, which is located at:330 Central Ave.Clark, NJ 07066Toll Free Tel: 800-526-4236Tel: 732-388-0300Fax: 732-388-9422Email: [request info (info@karnakcorp.com)](https://arcat.com/rfi?action=email&company=KARNAK&message=RE%253A%2520Spec%2520Question%2520(07276kar)%253A%2520&coid=33521&spec=07276kar&rep=&fax=732-388-9422);Web: <https://www.karnakcorp.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. PERFORMANCE REQUIREMENTS
		1. Materials and installation are intended to bridge and seal the following air leakage pathways and gaps:
			1. Connections of the walls to the roof air barrier.
			2. Connections of the walls to the foundations.
			3. Seismic and expansion joints.
			4. Openings and penetrations of window frames, door frames, store front, and curtain wall.
			5. Barrier pre-cast concrete and other envelope systems.
			6. Piping, conduit, duct and similar penetrations.
			7. Masonry ties, screws, bolts and similar penetrations.
			8. All other air leakage pathways through the building envelope.
		2. Installed product and accessories constitute a continuous air barrier, as described in ASHRAE Standard 90.1-2010 Section 5.4.3.1
		3. Installed product and accessories shall perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration.
		4. Installed product and accessories shall exhibit an air leakage rate, infiltration and exfiltration modes, measured after pressure cycling, not to exceed 0.2 L/s\*m2 at 75 Pa (0.040 CFM/ft2 at 1.57 PSF) according to ASTM E 2357.
		5. Product shall be formulated with UV resistance, having an exterior exposure limit of \_\_\_ days or longer.

\*\* NOTE TO SPECIFIER \*\* Retain "Fire Propagation Characteristics" Paragraph for projects where an NFPA 285-tested exterior wall assembly is required by authorities having jurisdiction. IBC 2012 requires wall assemblies to pass NFPA 285 testing when 1) assemblies incorporate foam plastics; 2) walls over 40 ft in height are clad with metal composite materials, high-pressure decorative laminates, or fiber-reinforced plastics; and 3) walls over 40 ft in height incorporate combustible water-resistive barriers. Verify local requirements. Delete if not required.

* + 1. Fire Propagation Characteristics: Provide air barrier coatings and accessory materials that are tested for compliance with NFPA 285 when used as part of an exterior wall assembly identical to that required for Project.
			1. When testing of identical wall assembly is not available, provide engineering judgment by qualified third party testing agency acceptable to authorities having jurisdiction demonstrating equivalent compliance with requirements.
		2. System shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air sealant materials at such locations, changes in substrate, perimeter conditions, and penetrations.
		3. Product shall be a nominal 0.040 inch (40 mils) thickness membrane, with dry film thickness of installed product measuring a minimum of 0.030 inch (30 mils) with a comb gauge.
	1. AIR BARRIER ASSEMBLY
		1. Product: Spray Applied: K-NRG Seal VP as manufactured by Karnak Corp.
		2. Single component, water based, liquid applied, elastomeric membrane designed to provide a vapor permeable weather barrier when applied to above-grade wall assemblies.
		3. Cures to a tough monolithic, rubber-like membrane.
		4. Product shall meet the following requirements:
			1. Air Permeability: 0.0014 CFM/ft2 at 1.57 PSF when tested in accordance with ASTM E 2178 and ASTM E 283. No increased air leakage when subjected to a sustained wind load of 10.5 PSF for 1 hour and gusting wind load pressure of 62.8 PSF for 10 seconds when tested at 1.57 PSF in accordance with ASTM E 331.
			2. Air Leakage: Pass when tested in accordance with ASTM E 2357.
			3. Fastener Sealability: No water leaking through nail penetration after 24 h. (ASTM D 1970).
			4. Water Resistance: Pass when tested in accordance with AATCC 127.
			5. Water Vapor Permeance (30 mil dry thickness): 12 Perms (ASTM E96, Method B).
			6. Nominal Wet Film Thickness: 60 mil.
			7. Volatile Organic Compound (VOC) Content: Less than 50 g/L.
			8. Solids by Weight: 60 percent.
			9. Weight: 10.4 lbs/gallon.
			10. Drying Time: 2 hours to touch, 24 hours to firm dry.
			11. Service Temperature: -40 to 158 degrees F (-40 to 70 degrees C).
			12. Tensile Strength (ASTM D412): 150 PSI.
			13. Elongation (ASTM D412): 800 percent.
			14. Peel Strength, to Dry Concrete (ASTM C836): 98.4 kPa.
			15. Low Temperature Flexibility (ASTM C836): Pass.
			16. Aging Long Term Flexibility (CGSB 71-GP-24M): No fracturing.
			17. Resistance to Mold, Mildew and Fungal Growth (ASTM D5590): 0, No Growth.
		5. No primer required.
	2. LIQUID JOINT SEALANT AND FIBERGLASS MESH REINFORCEMENT
		1. Liquid joint and penetration sealant:
			1. Product: K-NRG Gap Seal as manufactured by Karnak Corp.
			2. Compatible with air barrier system, roofing, and waterproofing membranes and substrates.
			3. Weight per Gallon: 11.8 pounds.
			4. Percent NV by Volume: 65 percent.
			5. Tensile Strength: 40 PSI
			6. Elongation: 500 percent.
			7. Low Temperature Flexibiity (ASTM C734): Pass, no cracking. Recovery 75 percent minimum.
1. EXECUTION
	1. EXAMINATION
		1. Examine substrates, areas, and conditions affecting installation of the air and vapor barrier and accessory products for compliance with 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.
		2. Verify that areas where curing compounds were used are clear of resin, oil, wax, and pigments.
		3. Surfaces shall be sound, dry and free of oil, grease, dirt, excess mortar or other contaminants.
		4. Fill voids, gaps and spalled areas in substrate to provide an even plane.
		5. Mortar joints shall be struck flush.
		6. Do not proceed with application of air barrier system if rain is expected within 24 hours.
		7. Inform Architect in writing of the following:
			1. Cracks in concrete and masonry.
			2. Gaps or obstructions such as steel beams, angles, plates and projections which cannot be spanned or covered by Product or Accessories.
			3. Anticipated problems applying product and accessories over substrate.
	2. SURFACE PREPARATION
		1. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid substrate.
	3. JOINT AND CRACK TREATMENT
		1. Joints: Seal joints 14 inch (6 mm) and less between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB, or cementitious panels with liquid joint tape.
			1. Fill joint between sheathing with Karna-Flex WB sealant ensuring contact with all edges of sheathing board.
			2. Seal gaps and voids or irregular joints greater than 1/4 inch (6 mm) between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with a 1/16th inch thick application of K-NRG Gap Seal minimum of 1-1/2 inches (38 mm) on both sides of the joint.
				1. Align and position Karnak No. 31 Fiberglas Mesh into K-NRG Gap Seal making sure reinforcement is fully embedded.
				2. Apply a 1/16 inch ( mm) thick application of Karnak K-NRG Gap Seal over the reinforcing making sure it is completely covered with a minimum of 1-1/2 inches (38 mm) on both sides of the joint.
		2. Corners: Seal inside and outside corners with K-NRG Gap Seal. Seal joints 1/4 inch (6 mm) and less between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with liquid joint tape.
			1. Fill joint between sheathing with Karnak K-NRG Gap Seal ensuring contact with all edges of sheathing board.
			2. Seal gaps and voids or irregular joints greater than 1/4 inch (6 mm) between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with a 1/16 inch (3 mm) thick application of K-NRG Gap Seal minimum of 1-1/2 inches (39 mm) on both sides of the joint.
				1. Align and position Karnak ReSat-Mat into K-NRG Gap Seal making sure reinforcement is fully embedded.
				2. Apply a 1/16 inch (3 mm) thick application of Karnak K-NRG Gap Seal over the reinforcing making sure it is completely covered with a minimum of 1-1/2 inches (38 mm) on both sides of the joint.
		3. Masonry and Concrete:
			1. Seal cracks 1/4 inch (6 mm) and less in masonry and concrete with Karnak K-NRG Gap Seal applied over the crack.
			2. Seal cracks and voids in masonry and concrete greater than 1/4 inch (6 mm) with a 1/16 inch (3 mm) thick application of Karnak K-NRG Gap Seal minimum of 1-1/2 inches (38 mm) on both sides of the joint.
				1. Align and position Karnak ReSat-Mat into K-NRG Gap Seal making sure reinforcement is fully embedded.
			3. Where NFPA 285 Compliance is required, consult NFPA 285 test results for detailed system component requirements.
		4. Transition Areas:
			1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering transition membrane.
				1. Prime surfaces as per manufacturers' instructions and allow to dry.
				2. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch (76 mm) lap to all substrates.
				3. Ensure minimum 2 inch (52 mm) overlap at all end and side laps of membrane.
				4. Roll all laps and membrane with a counter top roller to ensure seal.
		5. Windows and Rough Openings:
			1. Wrap jamb or rough openings with specified self-adhering transition membrane as detailed.
			2. Apply Karna-Flex WB into all rough window openings sufficient to provide a connection to interior vapor retarder.
		6. Interface of dissimilar substrates: Flashing or reinforcement shall bear 3 inches (76 mm) minimum onto either side of joint. Select any:
			1. Minimum 9 inch detail flashing.
			2. 12 inches (305 mm) reinforcing fabric imbedded in roller-applied product.
			3. 12 inches (305 mm) glass mat imbedded in roller-applied product.
	4. AIR BARRIER INSTALLATION
		1. Allow damp substrates to dry. Drying time may vary depending on interior and exterior temperature, and relative humidity.
		2. Apply by brush, roller, or spray in a complete continuous unbroken film.
		3. Apply Air Barrier Coating at a uniform rate of 40 square feet per gallon to achieve a minimum required dry film thickness of 40 mils.
		4. Apply when temperatures are a minimum of 40 degrees F and rising.
		5. Do not apply when inclement weather is imminent.
		6. Trowel sealant around all projections and penetrations ensuring a continuous air barrier system reinforcing with fiberglass mesh where applicable.
		7. Depending on the porosity of the substrate, it is recommended to adjust coverage rate accordingly. It is advisable to back roll spray applications.
		8. Allow air barrier system to dry per manufacturers recommendations prior to placement of cladding materials.
		9. Penetrations:
			1. Seal terminations, fasteners, masonry ties, penetrations, duct work, electrical and other projections through the air barrier system and around the perimeter edge, terminations at window and door frames using fiberglass mesh reinforcement where applicable with K-NRG Gap Seal.
			2. Seal the leading edge of system terminations with K-NRG Gap Seal.
	5. INSTALLATION - INSULATION
		1. Coordinate with Thermal Insulation Section 07 21 26 - Blown Insulation for insulating materials.
	6. FIELD QUALITY CONTROL
		1. When sections of work are complete, allow review prior to covering air barrier system.
		2. Owner to engage manufacturer and/or independent consultant to observe substrate and system installation prior to placement of cladding systems and provide installation documentation including but not limited to photos or videos.
	7. PROTECTION
		1. Protect exposed back-up walls against weather conditions during and after application of Air Barrier System.
		2. Protect uncured air barrier from wet weather conditions for a minimum of 24 hours.
		3. Protect air barrier system from damage and inclement weather during the construction.
		4. Air barrier system is not designed for permanent UV exposure. Cover as soon as possible.

END OF SECTION