SECTION 07210

THERMAL INSULATION

\*\* NOTE TO SPECIFIER \*\* Demilec; spray foam thermal insulation.
.
This section is based on the products of Demilec, which is located at:
3315 E. Division St.
Arlington, TX 76011
Toll Free Tel: (888) 261-7705
Tel: (817) 640-4900
Email: buildingscience@demilec.com
Web: [https://www.demilec.com](http://https://www.demilec.com)
 [ [Click Here](http://www.arcat.com/arcatcos/cos43/arc43706.html) ] for additional information.

Demilec is a forerunner in the development of innovative technology and advanced science to create a line of open-cell and closed-cell spray foam insulation and coating products. During the past 30 years, we have established a widely-recognized reputation as a leader in the polyurethane field for our unsurpassed quality and performance of our products, supported by superior service. In addition, Demilec has seen continued growth year after year, which has provided jobs for the economy, while we continue to develop products which decrease the demand for fossil fuels worldwide.

As the importance of environmentally friendly products has grown, we have dedicated our company to developing environmentally friendly spray foam insulation products that are setting new standards for affordability, performance and energy efficiency in commercial and residential construction.

1. GENERAL
	1. SECTION INCLUDES

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

* + 1. Spray-in-place semi-rigid open-cell polyurethane foam insulation in assemblies indicated on the Drawings, to provide an air barrier and improved thermal resistance. (SEALECTION 500) (Demilec APX 1.2) (Agribalance).
		2. Spray-in-place rigid closed-cell polyurethane foam insulation in assemblies indicated on the Drawings, to provide an air barrier and improved thermal resistance. (HEATLOK SOY 200 PLUS) (HEATLOK XT) (HEATLOK HFO High-Lift) (HEATLOK HFO Pro).
		3. Water based intumescing coating. (BLAZELOK IB4) (BLAZELOK TBX) (DC315).
	1. RELATED SECTIONS

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

* + 1. Section 03300 - Cast in Place Concrete.
		2. Section 03400 - Structural Pre-cast Concrete.
		3. Section 04200 - Unit Masonry.
		4. Section 05300 - Metal Decking.
		5. Section 05400 - Cold Formed Metal Framing.
		6. Section 06100 - Rough Carpentry.
		7. Section 07100 - Waterproofing.
		8. Section 07260 - Vapor Barrier.
		9. Section 07400 - Preformed Roofing and Cladding/Siding.
		10. Section 07650 - Flexible Flashing.
		11. Section 07800 - Fireproofing.
		12. Section 07840 - Thermal Barrier.
		13. Section 09110 - Metal Support Systems.
		14. Section 09250 - Gypsum Board.
	1. REFERENCES

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

* + 1. ASTM International (ASTM):
			1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
			2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
			3. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
			4. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
			5. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
			6. ASTM D 2856 - Standard Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer.
			7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
			8. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
			9. 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.
			10. ASTM E 413 - Classification for Rating Sound Insulation.
		2. Canadian General Standards Board (CGSB) 51.23 - Spray Applied Rigid Polyurethane Cellular Plastic Thermal Insulation.
		3. International Code Council - International Residential Code:
			1. Section 103.7 - Alternate Materials and Methods.
			2. 2006 IRC Section R314 - Foam Plastic Insulation.
			3. 2009, 2012, and 2015 IRC Section R316 - Foam Plastic Insulation.
			4. Section 806.4 - Unvented Attic Assemblies.
		4. International Code Council - International Building Code:
			1. Section 104.11 Alternative materials, design and methods of construction and equipment.
			2. Section 2603 Foam Plastic Insulation.
	1. SUBMITTALS
		1. Submit under provisions of Section 01300.
		2. Before commencing work, submit in accordance with local code:
			1. Technical data sheet from the manufacturer showing the test results from the ASTM E84 (Surface Burning Characteristics).
			2. Other technical data sheets and samples as required by local code officials.
		3. 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.
	2. QUALITY ASSURANCE
		1. Installer Qualifications:
			1. Contractor performing work under this section shall be trained by Demilec in applying spray polyurethane foam insulation.
			2. Provide current Demilec Authorized Contractor Certification.

\*\* 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. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect.
			2. Do not proceed with remaining work until installation is approved by Architect.
			3. Rework mock-up area as required to produce acceptable work.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Materials shall be delivered in manufacturer's original containers clearly labeled with manufacturer's name, product identification, safety information, net weight of contents and expiration date.
		2. Material shall be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.
		3. Empty containers shall be removed from site on a daily basis.
	2. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
		2. Ventilate area to receive insulation to maintain safe working conditions.
		3. Protect workers as recommended by standards and manufacturer's recommendations.
		4. Protect adjacent surfaces, windows, equipment and site areas from damage of overspray.
	3. WARRANTY
		1. Manufacturer's Warranty: Demilec warrants spray-in-place urethane foam insulation, when installed by authorized contractors using factory-trained applicators and applied in accordance to the Installation Instructions, will perform as stated in the Product Technical Data Sheet.
			1. This warranty is in effect throughout the life of the building provided the original purchaser registers with the Warranty Department of the Manufacturer within thirty days of occupancy.
			2. Manufacturer's sole responsibility under this Limited Lifetime Warranty shall be to repair or replace any defective Product at the cost of the material only.
			3. Manufacturer shall not be responsible for labor cost or any other costs whatsoever related to, or in connection with the removal or installation of either the original or replacement product.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Demilec, which is located at: 3315 E. Division St.; Arlington, TX 76011; Toll Free Tel: (888) 261-7705; Tel: (817) 640-4900; Email: buildingscience@demilec.com; Web: [https://www.demilec.com](http://https://www.demilec.com)

\*\* NOTE TO SPECIFIER \*\* Delete two of the following three 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 01600.
	1. SPRAY FOAM INSULATION

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

* + 1. Spray Applied Semi Rigid Polyurethane Open Cell Foam Insulation System:
			1. Product: SEALECTION 500 manufactured by Demilec, Arlington, TX.
			2. Product Approval:
				1. International Code Council Evaluation Services Report #1172.

Approved for building types I, II, III, IV, & V.

* + - * 1. Passed NFPA 286 in accordance with IBC 803.2.
				2. Warnock Hersey Evaluation # 193-7081.
				3. CCMC Evaluation # 12697-R.
			1. Installation:
				1. Application with a prescriptive Thermal Barrier:

Up to 9-1/4 inches (235 mm) for wall cavities and 14 inches (356 mm) in floors or ceilings with 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

* + - * 1. Application without a Thermal or Ignition Barrier (exposed foam)

Up to 7-1/2 inches (191 mm) in walls and 11-1/2 inches (292 mm) in floors and ceilings with all foam surfaces covered with 11 dry mils (17 wet mils) of BLAZELOK TBX.

* + - * 1. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

Application with BLAZELOK IB4 Intumescent Coating:

Up to 9-1/2 inches (241 mm) on vertical surfaces and 11-1/2 inches (292 mm) on the underside of the top of the space with all foam surfaces covered with a minimum nominal thickness of 3 dry mils (0.08 mm) (5 wet mils (0.13 mm)) of BLAZELOK IB4.

Refer to ESR 1172 Section 4.3 Thermal Barrier.

* + - * 1. Use on Attic Floors:

Applied between and over the joists in an attic floor.

Up to 14 inches (356 mm).

SEALECTION 500 may be left exposed without an intumescent coating in accordance with ASTM E 970.

* + - * 1. One-Hour Fire-Resistance-Rated Wall Assemblies: Non load-bearing.

Refer to ESR1172 Section 4.5.

* + - * 1. Exterior Walls of Type I, II, III, and IV.

Up to 3-5/8 inches (92 mm).

* + - * 1. Non load-bearing NFPA 285-tested Wall Assembly.

Refer to ESR 1172 Section 4.6.1.

* + - 1. Physical Properties:
				1. Density (ASTM D 1622): 0.45 - 0.5 lb/cf (0.007 to 0.008 gm/cu. cm).
				2. Thermal Resistance (ASTM C 518):

R-3.81 (sf.h degree F/BTU) at 1 inch at 90 days at 76 degree F (24.4 degree C).

Refer to ESR 1172 for R-value table.

* + - * 1. Air Leakage (ASTM E 283-04):

3.5 inches (89 mm) At 75 Pa (25 mph wind): 0.001 L/s•m².

5.5 inches (140 mm) At 75 Pa (25 mph wind): 0.001 L/s•m².

10 inches (254 mm) At 75 Pa (25 mph wind): 0.002 L/s•m².

Sustained Wind Load for 60 minutes At 1000 Pa (90 miles/hr. wind): No Damage.

Gust Wind Load Test at 3000 Pa (160 miles/hr.): No Damage.

* + - * 1. Compressive Strength (ASTM D 1621): 0.7 psi (4.83 kPa).
				2. Tensile Strength (ASTM D 1623): 5.6 lbf/sq. inch (38.6 kPa).
				3. Sound Transmission Class (STC) (ASTM E 413-87 1999): 49-51. Based on Specific wall design.
				4. Noise Reduction Coefficient (NRC) (ASTM C 423): .75.
				5. Water Vapor Transmission (ASTM E 96):

3.5 inches (89 mm): 6.6 Perms.

5.5 inches (140 mm): 4.2 Perms.

7 inches (178 mm): 3.3 Perms.

10 inches (254 mm): 2.3 Perms.

* + - * 1. Off Gassing Tests (VOC Emissions) CGSB 51.23-92: Pass or compliant (No toxic vapors).
				2. Surface Burning Characteristics (ASTM E 84) 6 inches (152 mm): Class I. Flame Spread Index 21, Smoke Developed Index 216.
			1. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.
			2. Equipment used to apply the water based intumescing coating shall be an airless sprayer approved by the manufacturer.

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

* + 1. Spray Applied Semi Rigid Polyurethane Foam Insulation System: (Open Cell Foam):
			1. Product: Demilec APX 1.2 manufactured by Demilec, Arlington, TX.
			2. Product Approval:
				1. International Code Council Evaluation Services Report #3470.
				2. Passed NFPA 286 in accordance with IBC 803.2 as an interior finish. Refer to section 3.b.1 of this specification for assembly details.
			3. Installation:
				1. Application with a prescriptive Thermal Barrier:

Demilec APX 1.2 spray foam insulation must be separated from the interior of the building by an approved thermal barrier of 1/2 inch-thick (12.7mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC 2603.4 of IRC 316.4, as applicable, except where insulation is in an attic or crawl space as described in section 4.4 of ESR #3470, Demilec APX 1.2 foam thickness is not limited when the insulation is separated from the interior of the building by an approved thermal barrier, based on fire testing in accordance with NFPA 286 and AC377.

* + - * 1. Application without a Thermal Barrier (exposed foam):

The prescriptive 15-minute thermal barrier or ignition barrier may be omitted when installation is in accordance with this section. Demilec APX 1.2 Spray foam insulation and BLAZELOK TBX intumescent coating may be spray-applied to the interior facing of the walls and the underside of roof sheathing or roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or ignition barrier. The foam plastic insulation thickness must not exceed 7-1/2 inches (191 mm) in walls and 11-1/2 inches (292 mm) in floors and ceilings. All foam surfaces must be covered with an 11-mil dry thickness (0.28 mm) [17 mils wet thickness (0.43 mm) of BLAZELOK TBX intumescent coating. The intumescent coating must be sprayed applied over the insulation in accordance with the coating manufacturer's instructions at a rate of 85 square feet per gallon (2.09m2/L).

Refer to ESR 3470 Section 4.3 Thermal Barrier.

* + - * 1. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286:

The insulation may be spray-applied to the underside of the roof sheathing and/or rafters, to the underside of wood floors and to vertical surfaces as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed 11-3/4 inches (298 mm), and the thickness when applied to vertical surfaces must not exceed 7-3/4 inches (197 mm). The insulation does not require an ignition barrier or coating.

* + - * 1. Use on Attic Floors:

Up to 11-3/4 inches (298 mm) between and over the joists in an attic floor without an ignition barrier, coating or covering.

* + - 1. Physical Properties:
				1. Density (ASTM D 1622): 0.45 - 0.5 lb/cf (7.2 - 8 Kg/m3).
				2. Thermal Resistance (ASTM C 518):

R-3.7 (sf.h degree F/BTU) at 1 inch (25 mm).

Refer to ESR 3470 for R-value table.

* + - * 1. Air Leakage (ASTM E 283-04): 3.5 inches (89 mm) At 75 Pa (25 mph wind): 0.003 L/s•m².
				2. Compressive Strength (ASTM D 1621): 1.1 psi.
				3. Tensile Strength (ASTM D 1623): 3.7 lbf/sq. inch.
				4. Water Vapor Transmission (ASTM E 96): 1.008 inches (25 mm): 16.0 perms
				5. Off Gassing Tests (VOC Emissions) Berkeley Analytical Certificate 130104-01: Pass or Compliant (No toxic vapors).
				6. Surface Burning Characteristics (ASTM E 84) 4 inches (117 mm): Class I. Flame Spread Index 15, Smoke Developed Index 350.
			1. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.
			2. Equipment used to apply the water based intumescing coating shall be an airless sprayer approved by foam manufacturer.

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

* + 1. Spray Applied Semi Rigid Polyurethane Foam Insulation System: (Open Cell Foam):
			1. Product: Agribalance manufactured by Demilec, Arlington, TX.
			2. Product Approval:
				1. International Code Council Evaluation Services Report #2600.

Approved for Building Type V-B construction under IBC and Dwellings under IRC.

VAR 1006:

10 percent Biobased Content per ASTM D 6886.

* + - * 1. Passed AC 377 Appendix X compliant NFPA 286.
			1. Installation:
				1. Application with a prescriptive Thermal Barrier:

Up to 9-1/4 for wall cavities (235 mm) and 14 inches (356mm) in floors or ceilings with 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

* + - * 1. Attics and Crawl Spaces:

Application with BLAZELOK IB4 Intumescent Coating:

Up to 9-1/4 inches (235mm) on vertical surfaces and 11-1/4 inches (285.8mm) on the underside of the top of the space with all foam surfaces covered with a minimum nominal thickness of 5 dry mils (0.13mm) [9 wet mils (0.23mm)] of Blazelok IB4.

Application with HEATLOK SOY 200 PLUS Coating (See HEATLOK SOY 200 PLUS Tech Data and Specifications for more details).

Up to 5-1/2 inches (140mm) on vertical surfaces and 9-1/2 inches (241mm) on the underside of the top of the space with all foam surfaces covered with 2 inches (51mm) of HEATLOK SOY 200 PLUS spray polyurethane foam coating.

Application without a Thermal or Ignition Barrier (exposed foam).

Up to 5-1/2 Inches (191 mm) in walls and 11-1/2 inches (292 mm) in floors and ceilings with all foam surfaces covered with 15 dry mils, 23 wet mils of BLAZELOK TBX.

* + - * 1. Use on Attic Floors:

Applied between and over the joists in an attic floor. All foam surfaces must be covered by one of the following intumescent coatings:

Up to 9-1/4 inches (235mm) covered by 5 dry mils (0.13mm) [9 wet mils (0.23mm)] BLAZELOK IB4

Up to 5-1/2 inches (140mm) covered 2 inches (51mm) by HEATLOK SOY 200 PLUS.

Refer to ESR 2600 Section 4.3 Thermal Barrier.

* + - 1. Physical Properties:
				1. Density (ASTM D 1622): 0.60 - 0.80 lb/cf (0.0096 to 0.013 gm/cu. cm).
				2. Thermal Resistance (ASTM C 518): R value per inch - 4.45 sf.h degree F/BTU.
				3. Air Permeance (ASTM E 283): 3.5 inches (89 mm) thick.

At 500 Pa: 0.003 L/s•m².

At 1000 Pa: 0.006 L/s•m².

At 1500 Pa: 0.011 L/s•m².

At 2000 Pa: 0.018 L/s•m².

* + - * 1. Compressive Strength (ASTM D 1621): 1.86 psi (12.9 kPa).
				2. Tensile Strength (ASTM D 1623): 3.87 psi (26.7 kPa).
				3. Vapor Permeance (ASTM E 96): 5 inches (127 mm): 4.95 Perms.
				4. Surface Burning Characteristics (ASTM E 84) 6 inches (152 mm): Class I. Flame Spread Index 15 to 20, Smoke Developed Index 400.
				5. Bio-based Solid Content (ASTM D 6866): 10%
				6. Off Gassing Tests (VOC Emissions) Berkeley Analytical Certificate 130312-01: Pass or Compliant (No toxic vapors).
			1. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

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

* + 1. Spray Applied Rigid Polyurethane Closed Cell Foam Insulation System:
			1. Product: HEATLOK SOY 200 PLUS manufactured by Demilec, Arlington, TX
			2. Product Approval:
				1. International Code Council Evaluation Services Report #3210.
				2. Approved for non-structural walls in building types I, II, III, IV, and V construction under IBC and dwellings for IRC.
				3. Approved for exterior walls in building types I, II, III, and IV construction. (In progress.)
				4. Passed AC 377 Appendix X compliant NFPA 286.
			3. Installation:
				1. Application with a prescriptive Thermal Barrier:

Up to 9-1/4 inches (235 mm) for wall cavities and 11-1/4 inches (286 mm) in floors or ceilings with 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

* + - * 1. Application without a Thermal or Ignition Barrier (exposed foam)

Up to 9-1/4 inches (235 mm) in walls and 11-1/4 inches (286 mm) in floors and ceilings with all foam surfaces covered with BLAZELOK TBX intumescent coating.

* + - * 1. Application without a Thermal or Ignition Barrier (exposed foam)

Up to 5-1/2 inches (171 mm) in walls and 7-1/2 inches (190 mm) in floors and ceilings with all foam surfaces covered with 12 dry mils (18 wet mils) of BLAZELOK TBX intumescent coating.

Refer to ESR 3210 Section 4.3 Thermal Barrier.

* + - * 1. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

Up to 7-1/2 inches (190.5 mm) on vertical surfaces and 11-1/2 (292 mm) inches on the underside of the space with no intumescent coating.

* + - * 1. Use on Attic Floors:

Up to 7-1/4 inches (190.5 mm) between and over the joists in attic floors.

* + - * 1. Use as Water-Resistive Barrier:

Minimum 1-1/2 inches (38 mm) continuous layer applied to suitable exterior substrate.

Refer to ESR # 3210 Section 4.5.

* + - * 1. One-hour Fire-resistance-rated Wall Assembly: Nonload-bearing:

Refer to ESR #3210 Section 4.6.

* + - 1. Physical Properties:
				1. Density (ASTM D 1622): 2.1 lb/ft3 (34 Kg/m3).
				2. Thermal Resistance (ASTM C 518): Aged R value at 1 inch (180 days at 76 degrees F (23 degrees C)) - R-7.4 (sf.h degree F/BTU).
				3. Water Vapor Permeance at 1.2 inches (ASTME 96-05): Less than 1 perms (is a vapor barrier per IBC Section 202 definitions at 1.2 inches)
				4. Air Permeance at 75 Pa at 1 inch (ASTME 2178-03): 0.02 L/sm2.
				5. Air Leakage of Air Barrier Assembly (static loading to 600 Pa and gust loading to 1,200 PA) Complies with ABAA requirements (ASTME 2357-05): Less than 0.02L/sm2 .
				6. Compressive Strength (ASTM D 1621): 28.7 psi (198 kPa).
				7. Tensile Strength (ASTM D 1623): 46.2 psi
				8. Off Gassing Test (VOC Emissions) (CGSB 51.23-92): Pass (no toxic vapor).
				9. Surface Burning Characteristics (ASTM E 84) 4 inches: Class I. Flame Spread Index 20, Smoke Developed Index 400.
				10. Closed Cell Content (ASTM D2856) : Greater than 90%.
			2. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

\*\* NOTE TO SPECIFIER \*\* HEATLOK XT, a closed cell Spray Polyurethane Foam Insulation, has a unique ecological benefit that recycles plastic waste into a Rigid Spray Polyurethane Foam. This helps to more efficiently utilize the world's non renewable resources. HEATLOK XT can reduce excess waste and energy consumption in buildings by up to 50%. This closed-cell spray foam insulation offers both an air-barrier and vapor barrier in a single application and can be used in exterior or below grade applications. This material is approved by California Department of Consumer Affairs and is certified by GREENGUARD Gold for Office and Classrooms. Readily contributes to LEED certification. Delete if not required.

* + 1. Spray Applied Rigid Polyurethane Closed Cell Foam Insulation System:
			1. Product: HEATLOK XT manufactured by Demilec, Arlington, TX
			2. Product Approval:
				1. International Code Council Evaluation Services Report 3824: HEATLOK XT-s.
				2. International Code Council Evaluation Services Report 3883: HEATLOK XT-w.
				3. Code Compliance Research Report, (CCRR) designed by Deer Ridge Consulting, Inc.
				4. Approved for use in building types I, II, III, IV, and V construction under IBC and dwellings for IRC.
				5. Approved for use in wall cavities, floor assemblies, ceiling assemblies, and attics and crawl spaces in Type VB construction under IBC and dwellings under IRC.
				6. Passed AC 377 Appendix X compliant NFPA 286.
			3. Installation:

\*\* NOTE TO SPECIFIER \*\* Select one of the application methods below. Delete application methods not required.

* + - * 1. Application with a prescriptive Thermal Barrier:

There is no thickness limit when installed in floors or ceilings behind 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

* + - * 1. Application without a Thermal or Ignition Barrier (exposed foam)

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces with all foam surfaces covered with 12 dry mils of DC-315 Fireproof Paint.

* + - * 1. Application without a Thermal or Ignition Barrier (exposed foam)

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces with all foam surfaces covered with 12 dry mils (18 wet mils) of BLAZELOK TBX intumescent coating.

Refer to ESR 3824 & 3883 Section 4.3 Thermal Barrier.

* + - * 1. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces, the insulation may be left exposed without a thermal barrier, ignition barrier or intumescent coating.

* + - * 1. Use on Attic Floors:

Up to 11-1/2 inches (190.5mm) between and over the joists in attic floors.

* + - * 1. Use as Vapor Retarder:

Class II vapor retarder at less than 1.0 perm, HEATLOK XT-s minimum thickness of 1.625 inches, HEATLOK XT-w minimum thickness of 1.10 inches.

* + - 1. Physical Properties:

\*\* NOTE TO SPECIFIER \*\* There are two formulations for HEATLOK XT, Summer and Winter. The formulation is chosen by the installer based on environmental conditions at time of installation. While the physical properties of the two are similar, there are some differences. Physical properties for both are listed below.

* + - * 1. Density (ASTM D 1622): 2.1 lb/ft3 (34 Kg/m3).

Summer: 2.23 lb/ft3 (34 Kg/m3).

Winter: 2.17 lb/ft3 (34 Kg/m3).

* + - * 1. Thermal Resistance (ASTM C 518): Aged R value at 1 inch (180 days at 76 degrees F (23 degrees C)):

Summer: R 6.7 (sf.h degree F/BTU).

Winter: R 6.9 (sf.h degree F/BTU).

* + - * 1. Water Vapor Permeance (ASTME 96-05):

Summer: At 1.625 inches, less than 1 perms.

Winter: At 1.1 inches, less than 1 perms.

* + - * 1. Air Permeance at 75 Pa at 1 inch (ASTME 2178-03): 0.02 L/sm2.
				2. Air Leakage of Air Barrier Assembly (static loading to 600 Pa and gust loading to 1,200 PA) Complies with ABAA requirements (ASTME 2357-05): Less than 0.02L/sm2 .
				3. Compressive Strength (ASTM D 1621):

Summer: 18.0 psi (124 kPa).

Winter: 23.1 psi (139 kPa).

* + - * 1. Tensile Strength (ASTM D 1623): 46.2 psi

Summer: 37.9 psi (261 kPa).

Winter: 53.7 psi (370 kPa).

* + - * 1. Dimensional Stability (ASTM D 2126): percent volume change at 158 degrees F (70 degrees C) and 97 percent relative humidity:

Summer: 5.45 percent.

Winter: 4.14 percent.

* + - * 1. Off Gassing Test (VOC Emissions) (Greenguard Gold): Pass, Meets Criteria.
				2. Surface Burning Characteristics (ASTM E 84) 4 inches: Class I. Flame Spread Index 5:

Summer: Smoke Developed: 350-400.

Winter: Smoke Developed : 250-300.

* + - * 1. Recycled Content:

Summer: 22.7 percent.

Winter: 21.0 percent.

* + - * 1. Fungi Resistance (ASTM C 1338): No Fungal Growth.
				2. Closed Cell Content (ASTM D2856) : Greater than 90%.
			1. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

\*\* NOTE TO SPECIFIER \*\* HEATLOK HFO High Lift, is a two component, closed cell, spray applied, rigid polyurethane foam system. The product uses recycled plastic materials, rapidly renewable soy oils, and the blowing agent has zero ozone depleting potential HEATLOK HFO High Lift complies with the intent of the International Code Council's residentail and commercial building codes and is commonly used as a thermal insulation, air barrier, vapor retarder and water resistive barrier in above grade, blow grde, interior and exterior applications. This material is approved by California Department of Consumer Affairs and is certified by GREENGUARD Gold for Office and Classrooms. Readily contributes to LEED certification. Delete if not required.

* + 1. Spray Applied Rigid Polyurethane Closed Cell Foam Insulation System:
			1. Product: HEATLOK HFO High Lift manufactured by Demilec, Arlington, TX
			2. Product Approval:
				1. Code Compliance Research Report, (CCRR) designed by Deer Ridge Consulting, Inc.
				2. Approved for use in building types I, II, III, IV, and V construction under IBC and dwellings for IRC.
				3. Approved for use in wall cavities, floor assemblies, ceiling assemblies, and attics and crawl spaces in Type VB construction under IBC and dwellings under IRC.
				4. Passed AC 377 Appendix X compliant NFPA 286.
			3. Installation:

\*\* NOTE TO SPECIFIER \*\* Select one of the application methods below. Delete application methods not required.

* + - * 1. Application with a prescriptive Thermal Barrier:

There is no thickness limit when installed in floors or ceilings behind 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

* + - * 1. Application without a Thermal Barrier:

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces with all foam surfaces covered with a minimum of 12 mils DFT of DC-315 Fireproof Paint or a minimum of 12 mils DFT of Blazelok TBX.

* + - * 1. Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces, the insulation may be left exposed without a thermal barrier, ignition barrier or intumescent coating.

* + - * 1. Use on Attic Floors:

Up to 11-1/2 inches (190.5mm) between and over the joists in attic floors.

* + - * 1. Use as Vapor Retarder:

Class II vapor retarder at less than 1.0 perm, HEATLOK HFO High Lift minimum thickness of 0.7 inches.

* + - 1. Physical Properties:
				1. R-Value/in at 4 inch (ASTM C518): 7.5 ft2hdegreesF/BTU.
				2. R-Value/in at 1 inch (ASTM C518): 6.3 ft2hdegreesF/BTU.
				3. R-Value at 6.5 inches (ASTM C518): 48 ft2hdegreesF/BTU.
				4. R-Value at 4 inches (ASTM C518): 30 ft2hdegreesF/BTU.
				5. R-Value at 2 inches (ASTM C518): 14 ft2hdegreesF/BTU.
				6. Core Density (ASTM D 1622): 2.2 lb/ft3/
				7. Water Vapor Permeance (ASTM E 96): Less than 1 perm at 0.7 inches.
				8. Air Permeance at 75 Pa at 1inch (ASTM E 2178): Less than 0.02 L/sm2.
				9. Air Leakage at 75 Pa at 1 inch (ASTM E 283): Less than 0.02 L/sm2.
				10. Compressive Strength (ASTM D 1621): 34.8 lb/in2 (240 kPa).
				11. Tensile Strength (ASTM D 1623): 101.3 lb/in2 (699 kPa).
				12. Dimensional Stability (ASTM D 2126): 11.4 (% volume change) at 158 degrees F (70 degrees C) 97% R.H.
				13. VOC Content, Greenguard Gold: PASS, Meets Criteria/
				14. Flame Spread (ASTM E84): Class I, 0-15.
				15. Smoke Developed (ASTM E84): Class I, 350 - 400.
				16. Recycled Content, Finished Foam Renewable & Recycled Content: 12%.
				17. Recycled Content, Polyol Renewable Content: 6%
				18. Recycled Content, Polyol Recycled Content: 19%.
				19. Fungi Resistance (ASTM C 1338): No Fungal Growth.
				20. Closed Cell Content (ASTM D 2856): 91%.
			2. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

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

* + 1. Spray Applied Rigid Polyurethane Closed Cell Foam Insulation System:
			- 1. Product: HEATLOK HFO Pro manufactured by Demilec, Arlington, TX
				2. Product Approval:

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Approved for use in building types I, II, III, IV, and V construction under IBC and dwellings for IRC.

Approved for use in wall cavities, floor assemblies, ceiling assemblies, and attics and crawl spaces in Type VB construction under IBC and dwellings under IRC.

Passed AC 377 Appendix X compliant NFPA 286.

* + - * 1. Installation:

\*\* NOTE TO SPECIFIER \*\* Select one of the application methods below. Delete application methods not required.

Application with a prescriptive Thermal Barrier:

There is no thickness limit when installed in floors or ceilings behind 1/2 inch gypsum wall board or equivalent 15 minute thermal barrier in accordance with IBC 2603.4 or IRC R316.4.

Application without a Thermal Barrier:

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces with all foam surfaces covered with a minimum of 12 mils DFT of DC-315 Fireproof Paint or a minimum of 12 mils DFT of Blazelok TBX.

Attics and Crawlspaces: Passed AC 377 Appendix X compliant NFPA 286.

Up to 11-1/2 inches (292 mm) on the underside of the roof sheathing or in floor assemblies and 7-1/2 inches (191 mm) on vertical surfaces, the insulation may be left exposed without a thermal barrier, ignition barrier or intumescent coating.

Use on Attic Floors:

Up to 11-1/2 inches (190.5mm) between and over the joists in attic floors.

Use as Vapor Retarder:

Class II vapor retarder at less than 1.0 perm, HEATLOK HFO Pro minimum thickness of 0.7 inches.

* + - * 1. Physical Properties:

R-Value/in at 4 inch (ASTM C518): 6.5 ft2hdegreesF/BTU.

R-Value/in at 1 inch (ASTM C518): 7.4 ft2hdegreesF/BTU.

R-Value at 4 inches (ASTM C518): 26 ft2hdegreesF/BTU.

R-Value at 2 inches (ASTM C518): 14 ft2hdegreesF/BTU.

Core Density (ASTM D 1622): 2 lb/ft3/

Water Vapor Permeance (ASTM E 96): .91perms at 1 inch.

Air Permeance at 75 Pa at 1inch (ASTM E 2178): Less than 0.02 L/sm2.

Air Leakage at 75 Pa at 1 inch (ASTM E 283): Less than 0.02 L/sm2.

Compressive Strength (ASTM D 1621): 31 psi (214 kPa).

Tensile Strength (ASTM D 1623): 44 psi (1303 kPa).

Dimensional Stability (ASTM D 2126): 3.7 (% volume change) at 158 degrees F (70 degrees C) 97% R.H.

VOC Content, Greenguard Gold: PASS, Meets Criteria/

Flame Spread (ASTM E84): Class I, 12.

Smoke Developed (ASTM E84): Class I, 350 - 400.

Recycled Content, Finished Foam Renewable & Recycled Content: 12%.

Recycled Content, Polyol Renewable Content: 6%.

Recycled Content, Polyol Recycled Content: 19% .

Fungi Resistance (ASTM C 1338): No Fungal Growth.

Closed Cell Content (ASTM D 2856): 98%.

* + - * 1. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

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

* 1. ACCESSORY PRODUCTS

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

* + 1. Water Based Intumescing Coating:
			1. Product: BLAZELOK IB4, Distributed by Demilec, Manufactured by TPR2.
			2. Approval: Complies with 2006 IRC 314.6, 2009 IRC 316.6, IBC 2603.9 and AC 377 over all surfaces of SEALECTION 500 for use without a prescriptive ignition barrier in attics and crawlspaces.
			3. Application: Follow manufacturer's application recommendations.
			4. Physical Properties:
				1. Surface Burning Characteristics (ASTM E 84): Class I. Flame Spread Index 0, Smoke Developed Index 20.
				2. Expands up to 2000 percent.
				3. Flash Point: None.
				4. Volatility/VOC: 0.
				5. Flexible, ductile, elastomeric.
				6. Non-toxic, drain safe, water based, non-fuming.
				7. Can be latex or oil base top coated.
			5. Color: Gray.

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

* + 1. Water Based Intumescing Coating:
			1. Product: BLAZELOK TBX, Distributed by Demilec, Manufactured by TPR2.
			2. Approval: Complies with 2009 IBC 2603.9 and 803.2; 2009 IRC 302.9.4 and 316.6; 2006 IRC 314.6 and 315.4 and the NFPA 101 paragraph 10.2.3.7.2 for use without a prescriptive thermal barrier.
			3. Application: Follow manufacturer's application recommendations.
			4. Physical Properties:
				1. Surface Burning Characteristics (ASTM E 84): Class I. Flame Spread Index less than 25, Smoke Developed Index less than 50.
				2. Expands up to 2000 percent.
				3. Flash Point: None.
				4. Volatility/VOC: Less than 50 g/L.
				5. Non-toxic, drain safe, water based, non-fuming.
				6. Can be latex or oil base top coated.
			5. Color: Dull flat white / gray.
				1. Do not add tint.
				2. Wait minimum 24 hours prior to top coating with quality latex paint. Verify dryness with moisture meter.

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

* + 1. Water Based Intumescing Coating:
			1. Product: DC315 Intumescing Coating, Distributed by Demilec, Manufactured by International Fireproof Technologies, Inc. (IFTI).
			2. Application: Follow manufacturer's application recommendations.
			3. Physical Properties:
				1. Surface Burning Characteristics (ASTM E 84): Class I. Flame Spread Index of 0, Smoke Developed Index less than 25
				2. Expands up to 2000 percent.
				3. Flash Point: None.
				4. Volatility/VOC: Less than 50 g/L.
				5. Non-toxic, drain safe, water based, non-fuming.
			4. Color: Dull flat / ice gray.
				1. Do not add tint.
				2. Wait minimum 24 hours prior to top coating with quality latex paint. Verify dryness with moisture meter.
			5. Refer to products International Code Council Evaluation Services Report for additional Intumescent Coating information.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
		3. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
		3. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install in accordance with manufacturer's instructions. Apply as recommended by manufacturer to thickness as indicated on drawings.
		2. Apply thermal barrier as required by applicable codes noting the following:
			1. Except as provided in Section 314.5 and Section 314.6 of the 2006 International Residential Code, Section 316.5 and Section 316.6 of the 2009 International Residential Code and Section 2603.4.1 and Section 2603.9 of the International Building Code, all plastic insulation shall be separated from the interior of the building by an approved thermal barrier of 1/2 inch (13 mm) gypsum wallboard or equivalent thermal barrier material.
			2. Code compliant fire protection may be achieved with the use of BLAZELOK IB4 and BLAZELOK TBX depending on the details of the application.
	4. PROTECTION
		1. Protect installed products until completion of project.
		2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION