CARLISLE SPRAY FOAM INSULATION

SealTite™ PRO

SealTite PRO Open Cell
Light-DENSITY, SPRAY POLYURETHANE FOAM INSULATION

SUBMITTAL PACKET

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CARLISLE SPRAY FOAM INSULATION

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OPEN CELL FOAM
SealTite PRO Open Cell

SealTite PRO Open Cell is a two component, light density, one to one by volume spray-applied polyurethane foam. SealTite PRO Open Cell is an insulation system designed for use in commercial and residential applications. Use in lieu of more traditional forms of insulating materials such as fiberglass, cellulose or other loose fill products. Typical area's where SealTite PRO Open Cell is applied are exterior and interior walls, vented attics, un-vented attic assemblies and between floors. SealTite PRO Open Cell contains ZERO ozone depleting blowing agents and can be used in Assembly specific attic applications without an Ignition Barrier Coating.

TYPICAL PHYSICAL PROPERTIES:

Property	SealTite	Test
R-Value	3.7 @ 1" 13 @ 3.5"	ASTM C 518
Core Density	0.50 LB/ Cubic Foot	ASTM D 1622
Open Cell Content	> 90%	ASTM D 2856
Water Vapor Transmission - Permeance	21 perms @ 1"	ASTM E 96
Air Impermeable	< 0.02 (L/s-m2) @ 3.5"	ASTM E 283
Tensile Strength (PSI)	> 3.0 psi	ASTM D 1623
Dimensional Stability	< 15%	ASTM D 2126

Building Code Certifications / Fire Test Data		
Evaluation Service Report	INTERTEK UVA IAMPO	CCRR - 1121 UES - 624
Building Types	Approved	I, II, III, IV, V-B: Nonstructural Insulation material
Flame Spread	ASTM E84	Class I < 25
Smoke Development	ASTM E84	Class I < 450
NFPA 259	Pass: Standard fire test method for evaluation of fire propagation characteristics of exterior non- load bearing wall assemblies containing combustible components.	
NFPA 285	Pass: Standard fire test method for evaluation of fire propagation characteristics of exterior non- load bearing wall assemblies containing combustible components.	
NFPA 286	Pass: Can be used without a 15-minute thermal barrier when covered with one of the approved intumescent coatings as shown on page 2.	
NFPA 286 AC377 Appendix X	Pass: Complies with the applicable requirements of ICC-ES AC377 Appendix X for use in attics and crawlspaces when covered with one of the approved intumescent coatings as shown on page 2	
Greenguard	Certified: UL 2818 – 2013 Standard for Chemical Emissions for Building Materials, Finishes and furnishings.	
UL Listing	FWFX.R38039	Exterior Wall System Component
UL Listing	FWFO.EWS0013 & EWS0029	Exterior Wall System
Unvented Attics	No Ignition Barrier Coating required – when used in assembly specific attic applications. Reference CCRR-1121 Sec 5.4.4 for more information.	

SealTite™ PRO

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OPEN CELL FOAM
SealTite PRO Open Cell

THERMAL BARRIER:

Current International Building Code (IBC) and International Residential Code (IRC) require that spray polyurethane foam be separated from the building interior by a code prescribed 15-minute thermal barrier or a code-approved alternative. Gypsum board at a minimum thickness of ½" is a code prescribed 15-minute thermal barrier. The following intumescent coatings when installed per manufacturer specifications are approved as thermal barrier alternatives for SealTite PRO Open Cell:

Approved Intumescent Coatings:

DC315™ manufactured by: International Fireproof Technology, Inc	Application Rates: 14 Wet Mils - 9 Dry Mils
Fireshell BMS TC manufactured by: TPR Corporation	Application Rates: 20 Wet Mils - 12 Dry Mils
Plus ThB manufactured by: No Burn Inc.	Application Rates: 14 Wet Mils - 9 Dry Mils

IGNITION BARRIER:

SealTite PRO Open Cell meets the requirements of ICC- ES AC377 Appendix X for use in attics and crawlspace without a prescriptive ignition barrier when covered with one of the following approved intumescent coatings and the following conditions are met:

a	Entry is only to service utilities in the attic or crawl space and no storage is permitted.
b	Attic or crawl space areas cannot be connected.
c	Air from the attic or crawl space cannot be circulated to other parts of the building.
d	In accordance with IBC 2024 Section 1202.3 or IRC 2024 Section R408, under floor (crawlspace) ventilation is provided as applicable.
e	In accordance with IBC 2024 Section 1202.2 or IRC 2024 Section R806, attic ventilation is provided as applicable.
f	In accordance with 2012 and 2009 IMC (International Mechanical Code®) Section 701, or 2006 IMC Sections 701 and 703, combustion air is provided.
g	The foam plastic insulation is limited to the maximum thickness and density tested.
h	The installed coverage rate of coatings, if part of the insulation system shall be equal or greater than that tested.

Approved Intumescent Coatings:

Flame Seal FS-IB	Application Rates: 7.5 Wet Mils - 4 Dry Mils
DC315 manufactured by: International Fireproof Technology, Inc	Application Rates: 4 Wet Mils - 3 Dry Mils
Fireshell IB manufactured by: TPR2 Corporation	Application Rates: 7 Wet Mils - 4 Dry Mils
Plus, Plus XD or Plus ThB manufactured by: No Burn Inc.	Application Rates: 6 Wet Mils - 4 Dry Mils

GENERAL PROPERTIES: SealTite PRO Open Cell is a low viscosity, 0.5 pcf density open cell insulating material. SealTite PRO Open Cell is designed to provide significant control of air infiltration along with a high R-value per inch. When properly installed by a professional application company SealTite PRO Open Cell quickly expands to fill the cracks, crevices, gaps and voids that exist in every structure. In addition, SealTite PRO Open Cell will conform to the curves, irregular surfaces and spaces to form a superior thermal envelope around your entire structure.

EQUIPMENT AND COMPONENT RATIOS: The mix ratio is 1 to 1 by volume. The pre-heater temperatures should be set between 115°F - 140°F and able to maintain +/- 5°F.

VAPOR RETARDER: Open cell foam insulation is vapor permeable and will allow some dillusion of moisture through the product. Consult local building code officials for specific requirements. Climate zone tables are available in current IBC and IRC publications.

APPLICATION GUIDELINES: Polyurethane foam systems should be processed through commercially available spray equipment designed for that purpose by a qualified professional applicator. Consult the current Carlisle Spray Foam Insulation application guidelines for SealTite PRO Open Cell prior to installation. It is the responsibility of the professional applicator to thoroughly understand all equipment technical information and safe operating procedures that pertain to a spray polyurethane foam application.

MATERIAL HANDLING: Due to the reactive nature of these components respiratory protection is mandatory. The vapors and liquid aerosols present during application and for a short period thereafter must be considered – and appropriate protective measures taken – to minimize potential risks from overexposure through inhalation, skin, or eye contact. These protective measures include adequate ventilation, safety training for installers and other workers, use of appropriate personal protective equipment, and a medical surveillance program. It is imperative that the applicator read and become familiar with all available information on proper use and handling of spray polyurethane foam. Additional information is available at www.carlislesfi.com or by contacting the Technical Services department of Carlisle Spray Foam Insulation.

PROPER STORAGE OF RAW MATERIALS: Shelf life is Six (6) months from date of manufacture when stored indoors, in the original unopened containers and between the temperatures of 50°-80°F.

TECHNICAL ASSISTANCE: For additional assistance please contact the Technical Services department of Carlisle Spray Foam Insulation at (844) 922-2355.

DISCLAIMER: To the best of our knowledge, all technical data contained herein is true and accurate as of the date of issuance and subject to change without prior notice. User must contact Carlisle Spray Foam Insulation to verify correctness before specifying or ordering. We guarantee our products to conform to the quality control standards established by Carlisle Spray Foam Insulation. We assume no responsibility for coverage, performance or injuries resulting from use. Liability, if any, is limited to replacement of the product. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARLISLE SPRAY FOAM INSULATION EXPRESSED OR IMPLIED; STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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CARLISLE SPRAY FOAM INSULATION

APPLICATION GUIDE

OPEN CELL FOAM
SealTite PRO OPEN CELL

SealTite PRO Open Cell is suitable for application to most construction materials including but not limited to wood, masonry, concrete, and metal. All surfaces to be sprayed with foam should be clean, dry, and free of dew or frost. All metal to which the foam is to be applied must be free of oil, grease, etc. Multiple layers can be applied to reach the desired thickness and R-value. As with all spray polyurethane foam systems, improper application techniques should be avoided. Examples of improper techniques include, but are not limited to, off ratio material and spraying into or under rising foam. Potential results of improperly installed spray polyurethane foam include dangerously high reaction temperatures that may result in fire and offensive odors that may or may not dissipate. Improperly installed foam must be removed and replaced with properly installed spray polyurethane foam. It is the responsibility of the applicator to thoroughly understand all equipment technical information and safe operating procedures that pertain to a spray polyurethane foam application.

Application Parameters

Storage Temperature	50°F – 80°F
In Use Temperature	80°F – 90°F
Ambient Air Temperature	40°F – 120°F*
Substrate Temperature	40°F – 120°F*
Moisture Content of Substrate	Less Than 19%

* For cold weather substrates below 40°F refer to the spray process section on page 2.

Mixing Requirements

Resin (B side)	Mix on high for 30 minutes prior to use. Mixer speed may be reduced to low for remainder of the application process.
	Continuously mix with a 3 blade mixer during use for best results and highest yields.

Processing Requirements

All material must be a minimum of 80°F before dispensing.

Equipment Settings

Pre-Heaters: (A) Component - ISO	115°F – 140°F	These are recommended "Initial" Settings. Settings may vary based on the type of equipment used and the substrate temperatures at the time of the application.
Pre-Heaters: (B) Component - Resin	115°F – 140°F	
Hose Heat	115°F – 140°F	
Fluid Pressure	1,000 – 1,500 psi - Dynamic	
Mixing Ratio	1:1 By Volume	
Recommended Mix Chamber/ Module Size:	10 – 15 Lbs./Minute (i.e. 01-GRACO AR4242)	

APPLICATION GUIDELINES: Polyurethane foam systems should be processed through commercially available spray equipment designed for that purpose by a qualified professional applicator. The proportioning equipment must be capable of maintaining all designated ratios, temperature settings, etc. as shown in the settings chart. The gun should be of the internal mix type, which provides thorough blending of the two components. The equipment shall be of the heated airless type capable of maintaining 160°F at the gun by use of both primary heaters and heated hoses. The use of 2:1 transfer pumps is recommended for supplying the liquid components to the Proportioner. It is the responsibility of the professional applicator to thoroughly understand all equipment technical information and safe operating procedures that pertain to a spray polyurethane foam application.

PROPER STORAGE OF RAW MATERIALS: Shelf life is six (6) months from date of manufacture when stored in original unopened containers at 50°F to 80°F. Store in a dry and well-ventilated area.

Raw materials must be kept warm. Cold chemicals can cause poor mixing, pump cavitation, or other process problems due to higher viscosity at lower temperatures. The material will need to be conditioned between 70°F to 90°F for 48 hours before use. Avoid storing drums on concrete or metal floors in cold (winter) conditions. Do not store in direct sunlight. Keep drums tightly closed when not in use.

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CARLISLE SPRAY FOAM INSULATION

OPEN CELL FOAM
SealTite PRO OPEN CELL

MATERIAL HANDLING: Due to the reactive nature of these components respiratory protection is mandatory. The vapors and liquid aerosols present during application and for a short period thereafter must be considered – and appropriate protective measures taken – to minimize potential risks from overexposure through inhalation, skin, or eye contact. These protective measures include adequate ventilation, safety training for installers and other workers, use of appropriate personal protective equipment, and a medical surveillance program. It is imperative that the applicator read and become familiar with all available information on proper use and handling of spray polyurethane foam. Additional Information is available at carlislesfi.com or by contacting the Carlisle Spray Foam Insulation Technical Services dept. of Carlisle Spray Foam Insulation.

PERSONAL PROTECTION EQUIPMENT: Spraying of polyurethane foam results in the atomizing of the components to a fine mist. Inhalation and exposure to the atomized particles must be avoided.

Spraying of polyurethane foam results in the atomizing of the components to a fine mist. Inhalation and exposure to the atomized droplets must be avoided. Applicators must use personal protective equipment recommended by the Center for Polyurethanes Industry for use in high-pressure spray foam application. Precautions include, but are not limited to:

a. Full-face mask or hood with fresh air source

b. Fabric coveralls

c. Non-permeable gloves

d. Solvent-resistant gloves when handling new materials and cleaning solvents

WARNING: EXPOSURE MAY OCCUR EVEN WHEN NO NOTICEABLE ODOR IS ENCOUNTERED.

Applicators must use personal protective equipment recommended by the Center for Polyurethanes Industry for use in high-pressure spray foam application. Please visit www.spraypolyurethane.org for additional information on appropriate personal protection equipment selection and use.

SAFE HANDLING OF LIQUID COMPONENTS: When removing bungs from containers use caution, contents may be under pressure. Loosen the small bung first and let any built up gas escape before completely removing. Avoid prolonged breathing of vapors. For further information refer to "MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal" publication AX-119 published by the Alliance For The Polyurethanes Industry, Arlington, VA.

DISSIMILAR RESINS: When changing the "B" side (resin) to another type of spray polyurethane foam, it is very important that the supply hoses, recirculation lines and drum pumps are completely drained. Any resin on the drum pump must be completely removed before inserting into the drum of new material. Mixing of dissimilar product types (particularly closed cell into open cell) will contaminate the resin in the new and/or old drum. It is the responsibility of the applicator to follow this guideline to avoid contaminating the resin.

MECHANICAL VENTILATION REQUIREMENTS: Carlisle Spray Foam Insulation requires that a mechanical ventilation system be utilized in a workplace where SealTite spray polyurethane foam is applied. The requirement for this ventilation system is at a minimum ventilation rate during spray application and for a period of 24 hours after the spray application is complete. The mechanical ventilation system to be used in the workspace needs to be able to exhaust air directly to the exterior of the building at a minimum rate of 0.3 Air Changes per Hour (ACH). The volume of the workspace would need to be determined for system design. If, for example, the volume of the workspace is 4,000 ft^3 then the minimum capacity of the ventilation system equals 4,000 ft^3 x 0.3 ACH = 1,200 ft^3/h = 20 ft^3/min (cfm).

Note that 0.3 ACH is a minimum ventilation rate at which most commercial ventilation fans can easily achieve. It is recommended that this level be exceeded. More ventilation utilized in the workspace the better.

Further information can be found in the "Guidance on Ventilation During Installation of Interior Applications of High-Pressure Spray Polyurethane Foam" available from the American Chemistry Council, Spray Foam Coalition.

SPRAY PROCESS: For application to cold weather substrates, the use of cold weather techniques may be required. During cold weather application the thermal shock to the open cell may cause leveraging from the substrate, pocketing, voiding and separation from the studs. **Note: spraying to colder substrates can greatly reduce yield. It is always recommend to heat the building and substrate to ensure proper yield and best physical properties.**

Recommended cold weather techniques include but are not limited to:

a. Warm the substrate with a thinner 1–3" lift, allow to cool before applying a second lift.

b. Picture framing the bay before or after the warming pass will promote better adhesion.

c. Spraying up to but not on the studs to prevent the foam from "leveraging" from the substrate.

d. Spraying thinner passes to achieve desired thickness.

As with all spray polyurethane foam systems, improper application techniques should be avoided. Examples of improper techniques include, but are not limited to, application to an improperly prepared substrate, application outside of the recommended substrate conditions, spraying with improperly maintained equipment. Every attempt should be made to not spray into or under rising foam. Spraying into or under rising foam can create elongated cell structure leading to dimensional stability concerns, and the potential for foam shrinkage and or cracking foam.

Polyurethane foam not applied at the correct equipment settings and application parameters may result in polyurethane foam with poor physical and adhesion properties. Any polyurethane foam applied off-ratio must be completely removed and replaced with properly installed spray polyurethane foam.

It is the responsibility of the applicator to thoroughly understand all equipment technical information and safe operating procedures that pertain to a spray polyurethane foam application.

SealTite PRO Open Cell insulation is a combustible material with a maximum in-service working temperature of 180°F. SealTite PRO Open Cell should not come into direct contact with high heat emitting devices, chimneys, flues, etc. Refer to the heat emitting device manufacturers

recommended clearance from combustible materials. A minimum of 3" clearance should be maintained around recessed lighting fixtures. High intensity heat sources such as welding or cutting torches must not be used in close proximity to any polyurethane foam. Large masses of spray polyurethane foam should be removed to an outside safe area, cut into smaller pieces, and allowed to cool and dowse with water if possible before discarding into a trash receptacle.

ENVIRONMENTAL AND SUBSTRATES CONDITIONS: Applicators must recognize and anticipate climatic conditions prior to application. Ambient air, substrate temperature and moisture are all critical determinants of foam quality. Variations in ambient air and substrate temperature will influence the chemical reaction of the two components, directly affecting the expansion rate, amount of rise, yield, adhesion and the resultant physical properties of the foam insulation.

It is the foam applicator's responsibility to ensure the system is being applied within physical parameters. Proper applications may require adjustments to one or more of the following: spray techniques, substrate, application, or job site temperature.

SealTite PRO Open Cell is suitable for application to most construction materials including wood, masonry, concrete, and metal. All surfaces to be sprayed with foam should be clean, dry and free of dew or frost. Metal substrate must be free of any surface residue such as oil, grease, etc.

Substrate temperature at the time of the SealTite PRO Open Cell application is recommended between 40°F to 120°F. If spraying below 40°F refer to the spray process section or contact the Carlisle Spray Foam Insulation Technical Services department prior to application. The warmer the surface, the better the adhesion and yield.

The presence of moisture will greatly affect the physical characteristics of the polyurethane foam. The moisture content of the substrate should not exceed 19%. Polyurethane foam cannot be applied to any substrate that has surface moisture such as rain, condensation, dew, frost, etc. The moisture acts as a blowing agent that will react with the "A" side of the system. This can result in off-ratio polyurethane foam with poor physical and adhesion properties. Any polyurethane foam applied during these conditions must be completely removed and the substrate allowed to thoroughly dry prior to a new application.

Cold weather temperature application may require changing of spray technique, material temperatures, application temperatures, substrate preparation and environmental conditioning. Consult a Carlisle Spray Foam Insulation Technical Representative for details.

PROXIMITY TO HEAT SOURCES: Keep a minimum distance of three (3) inches between SealTite PRO Open Cell and heat sources such as combustion appliance flues, recessed light fixtures, insulation contact rated (IC) light fixtures, fireplace flues, etc.

FINISHED FOAM PROTECTION: The finished surface of the sprayed polyurethane foam should be protected from the adverse effects of direct exposure of ultraviolet light from the sun. This exposure will cause dusting and discoloration. Protective coatings designed for use with polyurethane foams are available from Carlisle Spray Foam Insulation.

SKIN EXPOSURE: Immediately remove any clothing soiled by the product. Immediately wash skin with water and soap and rinse thoroughly. Remove breathing apparatus only after contaminated clothing have been completely removed. In case of irregular breathing or respiratory arrest provide artificial respiration. First Aid responders should pay attention to self-protection and use the recommended protective clothing.

INHALATION: Supply fresh air or oxygen; call for doctor.

EYE CONTACT: Immediately rinse opened eye for several minutes under running water. Consult a doctor and the SDS sheet for proper treatment.

AFTER SWALLOWING: Immediately call a doctor. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

ENVIRONMENTAL PRECAUTIONS: Inform the relevant authorities if the product has caused environmental pollution. Do not allow material to enter sewers/surface or ground water systems.

MATERIAL SPILL CONTAINMENT AND CLEAN UP: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Spilled material may cause slipping hazard. Ensure adequate ventilation. Contain spilled material if possible. Absorb with materials such as: dirt, sand, sawdust. Collect in suitable and properly labeled containers. Contact local and state government for proper cleanup and disposal procedures.

WASTE DISPOSAL: Dispose of raw chemical in a licensed disposal facility. Do not discharge into waterways or sewer systems. Contact Chemtrec (800) 424-9300 or Clean Harbors (800) 444-4244.

CONTAINER DISPOSAL: Steel drums must be emptied (as defined by RCRA, Section 261.7 or state regulations that may be more stringent) and can be sent to a licensed drum re-conditioner for reuse, a scrap metal dealer, or an approved landfill. Drums destined for a scrap dealer or landfill must be punctured or crushed to prevent reuse.

TECHNICAL ASSISTANCE: For additional assistance please contact the Carlisle Spray Foam Insulation Technical Services dept. of Carlisle Spray Foam Insulation at (844) 922-2355.

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CARLISLE SPRAY FOAM INSULATION

WALL ASSEMBLY GUIDE

NFPA 285

Per Chapter 26 of the International Building Code, the wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. The listed assemblies in this document have met that criteria.

SEALTITE™ PRO SPRAY FOAM INSULATION AS THE CAVITY INSULATION

BASE WALL SYSTEM **Use item 1, 2, 3, or 4**	1. Concrete Wall 2. Concrete Masonry Wall 3. Steel Stud Wall – 1-layer ⅝ inch thick type X gypsum wallboard on the interior, installed on minimum 3⅝ inch deep, 20-gauge steel studs, spaced a maximum of 24 inches on center 4. Fire Retardant Treated (FRT) Stud Wall – 1-layer ⅝ inch thick type X gypsum wallboard on the interior, installed on 2x4 (min.) Fire Retardant Treated studs spaced a maximum of 24 inches on center
FIRE STOPPING IN STUD CAVITY AT FLOOR LINES **Use item 1 or 2**	1. 4 inch 4 pcf mineral wool (friction fit or installed with Z-Clips) 2. FRT lumber - 1.5 inches thick (min.) **FRT firestop may only be used with FRT framing**
CAVITY INSULATION **Use Items 1, 2, or 3 when steel framing is used.** **Use Items 1 or 3 when FRT framing is used.**	1. None 2. Full stud cavity depth or less of Carlisle **SealTite™ PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO XTR, SealTite PRO No Trim 21, SealTite PRO OCX, SealTite PRO HFO** 3. Any Noncombustible or fiberglass insulation (faced or unfaced)
EXTERIOR SHEATHING	Minimum ½ inch thick exterior-type gypsum sheathing
WEATHER RESISTANT BARRIER OVER BASE WALL **Use item 1 or 2** **Note: Approvals from IAPMO, DrJ Engineering, ICC-ES, Intertek, UL, or other qualified 3rd parties may be used**	1. None 2. Any WRB/AVB barrier that has been approved to be used in an NFPA 285 compliant assembly paired with mineral wool, polyisocyanurate, EPS or XPS insulation or no exterior insulation for claddings approved for that WRB. **See note for approval agencies**
EXTERIOR INSULATION **Use item 1, 2, or 3** **Note: Approvals from IAPMO, DrJ Engineering, ICC-ES, Intertek, UL, or other qualified 3rd parties may be used**	1. None – only where the cladding is listed to be approved with specific WRBs (see Note 1) 2. 2-inch thick (min.) 4 pcf mineral fiber insulation allowed for use with any WRB on the base wall surface (see Note 1) 3. Any polyisocyanurate, EPS or XPS insulation that has been approved (see note) to be used in an NFPA 285 compliant assembly paired with the WRBs in Item 2 above and claddings in Item 2 below (see Note 2)

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CARLISLE SPRAY FOAM INSULATION

NFPA 285

EXTERIOR CLADDING **Use item 1 or 2** **Note: Approvals from IAPMO, DrJ Engineering, ICC-ES, Intertek, UL, or other qualified 3rd parties may be used**	1. Claddings below may only be used with noncombustible exterior insulation Item 2 above (mineral fiber) a. Any noncombustible cladding, such as brick, stone, terra cotta, fiber cement, concrete, sheet metal, etc. b. Combustible cladding – use any cladding that has been successfully tested by the panel manufacturer (or fabricator) via the NFPA 285 test method (see Note 2) 2. Claddings below may be used with any approved (see note) combustible exterior insulation item 3 above Any cladding (combustible or noncombustible) that has been approved to be used in an NFPA 285 compliant assembly paired with approved polyisocyanurate, EPS, XPS, or SPF insulation. Each insulation must be specifically approved for the exact cladding types listed in the approval (see Note 2) IMPORTANT: See the next item (Window/Door perimeter details for specific insulation types that require unique detailing
WINDOW/DOOR PERIMETERS	Must use approved design for specific system being considered (see note) Note: EPS and XPS require specific door/window header and jamb details to be compliant with NFPA 285. Polyisocyanurate and SPF may or may not require specific header/jamb details. See approvals from IAPMO, DrJ Engineering, ICC-ES, Intertek, UL, or other qualified 3rd parties for the particular header/jamb detail required for each insulation type

Note 1: Examples for use with no exterior insulation or with mineral wool insulation per the table above

Cladding Lists 1 and 2 below are for use with no exterior insulation. However, this will expose the substrate to moisture, in which case a WRB must be added to the system. For these applications, WRBs approved for use with each cladding must be used

1. Any combustible cladding that has passed NFPA 285 testing (examples below)
   a. NFPA 285 approved MCM/ACM Metal/Aluminum Composite building panels
   b. NFPA 285 approved stone/aluminum honeycomb composite
   c. NFPA 285 approved HPL High-Pressure Laminate Panels
2. Any noncombustible cladding such as (but not limited to)
   a. **Brick** – Nominal 4-inch clay brick or veneer
   b. **Stucco** – ¾ inch exterior cement plaster and lath. A secondary water-resistive barrier can be installed between the insulation and lath. The secondary WRB may not be full coverage asphalt or butyl based self-adhering membranes
   c. **Natural Stone** (granite, limestone, marble, sandstone) – 2-inch thick
   d. **Artificial Cast Stone** – 1½-inch thick
   e. **Terra Cotta Cladding** – 1¼-inch thick
   f. **¼-Inch Thick Glass Fiber-Reinforced Concrete Panels** (installed per manufacturer instructions)
   g. **Concrete** – 2-inch-thick
   h. **CMU blocks** – 4-inch-thick
   i. **Sheet Metals** such as aluminum, copper or zinc – any thickness

Note 2: Combustible WRB/Insulation/Cladding

If the base wall is covered with a combustible WRB/Insulation and various claddings (combustible or noncombustible), each insulation/WRB/cladding combination allowed must have explicitly been tested or approved to be used with each other. Approvals from IAPMO, DrJ Engineering, ICC-ES, Intertek, UL, or other qualified 3rd parties may be used.

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CARLISLE SPRAY FOAM INSULATION

WALL ASSEMBLY GUIDE

NFPA 285

Per Chapter 26 of the International Building Code, the wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. The listed assemblies in this document have met that criteria.

SEALTITE™ PRO SPRAY FOAM INSULATION AS EXTERIOR AND/OR CAVITY INSULATION

BASE WALL SYSTEM **Use item 1, 2, 3, or 4**	1. Concrete Wall 2. Concrete Masonry Wall 3. Steel Stud Wall – 1-layer ⅝ inch thick type X gypsum wallboard on the interior, installed on minimum 3⅝ inch deep, 20-gauge steel studs, spaced a maximum of 24 inches on center 4. Fire Retardant Treated (FRT) Stud Wall – 1-layer ⅝ inch thick type X gypsum wallboard on the interior, installed on 2x4 (min.) Fire Retardant Treated studs spaced a maximum of 24 inches on center
FLOOR LINE FIRE STOPPING **Use item 1 or 2**	1. 4 inch 4 pcf mineral wool (friction fit or installed with Z-Clips) 2. Fire Retardant Treated (FRT) lumber – 1.5-inch-thick (min.) FRT firestop may only be used with FRT framing
CAVITY INSULATION **Use items 1, 2, or 3 when steel framing is used. Use item 1 or 3 when FRT framing is used.**	1. None 2. Full stud cavity depth or less of Carlisle **SealTite™ PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO XTR, SealTite PRO No Trim 21, SealTite PRO OCX, SealTite PRO HFO** 3. Any Noncombustible or fiberglass insulation (faced or unfaced)
EXTERIOR SHEATHING	Minimum ½ inch thick exterior type gypsum sheathing
GIRTS **Use item 1, 2, or 3**	1. None 2. Metallic Girts 3. Smart Ci GreenGrit as listed in TER 1501-06 (Horizontal only) Note: Use girts only when mineral wool is being used. Mineral wool thickness must match the girt depth.
EXTERIOR INSULATION	1. **3½ in. max. SealTite PRO Closed Cell, SealTite PRO One Zero** (without coating for cladding 1-7, or with coating for Claddings 8 - 20). 2. **3½ in. max. SealTite PRO HFO** (without coating for Claddings 1 - 7, or with coating for Claddings 8 - 21). Coating over foam for Claddings 8 - 21 - IFTI DC315 (17 mil WFT) with Top Coat Paint (8 mils) WFT Sherwin Williams Sher-Cryl

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CARLISLE SPRAY FOAM INSULATION

NFPA 285

WALLS WITH CARLISLE SPRAY FOAM INSULATION ON THE EXTERIOR

EXTERIOR CLADDING

Use only Items 1-7 when the DC315 coating system is not used.

Use any of Items 1 -20 when exterior SPF is coated with IFTIDC315 (17 mils WFT)with Top Coat Paint(8 mils WFT Sherwin Williams Sher-Cryl)

For Exterior Insulation 1,

Items 8-20, Air Gap cannot Exceed 2½ inches. All claddings non-open joint. Panel claddings may use vertical or horizontal metallic Z girt or horizontal GreenGirt attachment. Panel claddings may be vertical or horizontal.

For Exterior Insulation 2, "SealTite PRO HFO"

Items 8-21, Air Gap cannot Exceed 3¼ in. All claddings non-open joint. Panel claddings may use vertical or horizontal metallic Z girt or horizontal GreenGirt attachment. Panel claddings may be vertical or horizontal.

1. **Brick** – Nominal 4-inch clay brick or veneer with a maximum 2-inch air gap behind the brick. Brick Ties/Anchors 24-inch OC (max.)
2. **Precast Concrete Panels** – min. 1½ in. thick using any standard non-open joint installation technique such as shiplap, with max. 2 in. air gap behind the cladding
3. **Concrete Masonry Units** – Min. 2 in. thick with max 2 in. air gap between exterior wall insulation and concrete masonry units
4. **Stucco** – min. ¾ in. thick exterior cement plaster and lath with approved WRB over exterior insulation
5. **Natural Stone** (granite, limestone, marble, sandstone) – 2-inch (min.) using any standard non-open joint installation technique
6. **Artificial Cast Stone** – 1½ inch (min.) using any standard non-open joint installation technique.
7. **Terra Cotta Cladding** – 1¼ inch (min.) using any standard non-open joint installation technique
8. **Aluminum Cladding** – 0.030 in. min. thickness – non-open joint
9. **Steel Cladding** – 0.0149 in. min. thickness – non-open joint
10. **Copper Cladding** – 0.0216 in. min. thickness – non-open joint
11. **Zinc Cladding** – 0.040 in. min. thickness – non-open joint
12. **Terreal Zephir Evolution Rainscreen System** (or similar terra cotta), minimum 9⁄16 in. thick – non-open joint
13. **¼ In. Min. Fiber Cement Cladding** – non-open joint
14. **SwissPearl Carat Panels** – 0.315 in. min. thickness – non-open joint
15. **FunderMax M.Look** (min. ¼ in.) – non-open joint
16. **Concrete** – min. 1 in. thick - non-open joint
17. **CMU** – min. 1 in. thick – non-open joint
18. **Stone Veneer** – minimum 1 in. thick – non-open joint
19. **One Coat Stucco** – ⅜ in. (min.) exterior cement plaster and lath – non-open joint
20. **Thin Brick** adhered (with non-combustible mortar) to stucco base (min. ¾ in.) – non-open joint
21. **Any ACM or MCM** that has successfully passed NFPA 285 with foam insulation of comparable thickness (only with SealTite PRO HFO coated with the DC315/Shercryl coating listed above). The tested ACM was 4 mm Reynobond FR ACM.

WINDOW/DOOR PERIMETERS/ FLASHINGS

For Exterior Insulation 1, the window opening perimeters shall be per UL Design Listings EWS0013, EWS0029, or EWS0054, as applicable.

For FRT stud construction, openings are lined with 1½-inch thick FRT lumber.

For Exterior Insulation 2 (SealTite PRO HFO), the perimeter flashing may be 0.040 in. aluminum flashing or materials with higher melting points than aluminum.

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CARLISLE SPRAY FOAM INSULATION

MATERIAL COMPATIBILITY SHEET

Spray-Applied Polyurethane Foam

All SealTite PRO spray-applied polyurethane foam insulation products are compatible with and readily adhere to many common building materials including but not limited to:

- Gypsum Board
- PEX Tubing[1]
- Polyvinyl Chloride (PVC)
- Polyisocyanurate Board
- OSB
- Common Blow-in Insulation
- Acrylonitrile Butadiene Styrene (ABS)
- SealTite PRO Open Cell Products applied to SealTite PRO Closed Cell Products
- One Component Polyurethane Foams
- Two Component Low Pressure Polyurethane Foams (Froth Packs)
- Exterior Gypsum Board
- Concrete Masonry Unity (CMU)
- Polyethylene
- Polypropylene
- Chlorinated Polyvinylchloride (CPVC)[2]
- Common Electrical Wiring
- Galvanized Metal
- Common Batt Insulation
- Steel Studs
- Wood Studs
- Concrete
- Aluminum
- Copper
- Stainless Steel
- Carbon Steel
- Plywood
- Vinyl
- Spray-applied fire-resistive materials (SFRM)

COMMON LOW VOLTAGE WIRING[3]

Romex Brand SIMpull Type NM-B Coaxial cables: RG6 Metal Clad cable (MC cable)
Ethernet cables: Cat5E & Cat6 Fire Alarm Cable: 16AWG/2, 14AWG/2, 18AWG/4

RECOMMENDED APPLICATION PROCEDURE FOR TEMPERATURE SENSITIVE MATERIALS:

1) PEX Tubing	1st Pass	2nd Pass
SealTite PRO Open Cell, High Yield, and No Mix	No Limit	–
SealTite PRO OCX and No Trim 21	6"	No Limit
SealTite PRO Closed Cell Products	0.5"	2"

Note: Some PEX tubing connector manufactures do not allow their PPSU based connectors to contact SPF. In this situation, CSFI recommends wrapping the PPSU connector with minimum 4 mils of polyethylene prior to SPF application.

2) Chlorinated Polyvinylchloride (CPVC)	1st Pass	2nd Pass +
SealTite PRO Open Cell, High Yield, and No Mix	No Limit	–
SealTite PRO OCX, and No Trim 21	6"	No Limit
SealTite PRO Closed Cell Products	0.5"	2"

3) Common Low Voltage Wiring	1st Pass	2nd Pass +
SealTite PRO Open Cell Products	3.5"	6"
SealTite PRO Closed Cell Products	0.5"	2"

Disclaimer: It is the responsibility of the applicator to ensure equipment and ambient/substrate conditions are appropriate for SPF application. It is the responsibility of the applicator and/or construction manager ultimately to prove product suitability. Sufficient time must be allowed for SPF to cool between passes. For more information please refer to product Technical Data Sheets and Application Guides.

SealTite™ PRO

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CARLISLE SPRAY FOAM INSULATION

Spray-Applied Polyurethane Foam

Carlisle Coatings & Waterproofing (CCW) and Henry® Products Compatible with SealTite PRO Spray-Applied Polyurethane Foam Insulation

Through-Wall Flashing Installed with Unit Masonry	Sec 04 05 23	CCW-705 TWF, Blueskin TWF Pre-Kleened™ EPDM TWF CCW-705 TWF XLT
Adhered Sheet Blindside Waterproofing	Sec 07 13 00	MiraPLY™-H MiraPLY-V Blueskin PreSeal 320 Blueskin PreSeal 435
Sheet Waterproofing	Sec 07 13 00	CCW Sure-Seal® 60-Mil EPDM CCW-711 70 CCW-711 90 MiraDRI® 860 ULT MiraDRI 860/861 Henry WP200
Cold Fluid-Applied Waterproofing	Sec 07 14 16	MiraSEAL™ CCW-703 V Barricoat® CCW-570 System Henry Pumadeq system Henry Prodeq System Henry CM100 Aqua-Bloc WB Aqua-Bloc 2P
Sheet Wall Membranes & Flashings	Sec 07 27 13	CCW-705, Blueskin SA CCW-705 XLT, Blueskin SA LT Fire Resist™ 705 FR-A, Blueskin Metal-Clad Fire Resist 705 FR-A XLT, Blueskin Metal-Clad LT Aluma-GRIP™ 701, Blueskin Butyl-Flash, SURE-SEAL P/S Elastoform Foil-GRIP™ 1402
	Sec 07 27 26	Fire Resist 705 VP, Blueskin VP160
Fluid-Applied Wall Membranes & Flashings	Sec 07 27 26	Fire Resist Barritech VP, Air-Bloc 17MR, Air-Bloc 33MR Fire Resist Barritech NP™ Fire Resist Barritech NP LT, Air-Bloc 16MR Fire Resist Barrithane VP, Air-Bloc All Weather STPE Barriseal® Barribond, Barribond HP, Air-Bloc LF Barribond XL
Hot Fluid-Applied Waterproofing	Sec 07 14 13	CCW-500 Henry 790-11

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SealTite PRO

ENVIRONMENTAL, HEALTH, AND SAFETY

Carlisle Spray Foam Insulation Safety Data Sheet

1. Identification of Substance:

Product Name: SEALTITE PRO OPEN CELL

Supplier Identification:
Carlisle Spray Foam Insulation

Address:
100 Enterprise Dr.
Cartersville, GA 30120

Telephone:
(770) 607-0755

24-Hr. Emergency Phone Number:
CHEMTREC (800) 424-9300
INTERNATIONAL: +1-(703) 527-3887

Product Use: Polyurethane polyol component

2. Hazards Identification:

GHS Ratings:

Oral Toxicity	Acute Tox. 4	Oral>300+<=2000mg/kg
Inhalation Toxicity	Acute Tox. 4	Gases>2500+<=5000ppm, Vapors>10+<=20mg/l, Dusts&mists>1+<=5mg/l
Skin corrosive	1B	Destruction of dermal tissue: Exposure < 1 hour Observation < 14 days, visible necrosis in at least one animal
Eye corrosive	1	Serious eye damage: Irreversible damage 21 days after exposure, Draize score: Corneal opacity >= 3, Iritis > 1.5

GHS Hazards

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H332	Harmful if inhaled

GHS Precautions

P260	Do not breathe dust/fume/gas/mist/vapors/spray
P261	Avoid breathing dust/fume/gas/mist/vapors/spray
P264	Wash hands thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P271	Use only outdoors or in a well-ventilated area
P280	Wear protective gloves/protective clothing/eye protection/face protection
P310	Immediately call a POISON CENTER in case of overexposure.
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P321	Specific treatment is urgent (see Section 4 First Aid measures)
P330	Rinse mouth
P363	Wash contaminated clothing before reuse
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

P305+P351+P338	IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
P405	Store locked up
P501	Dispose of contents/container in accordance with existing federal, state, and local environmental control laws.

Signal Word: Danger

Acute Toxicity:
Eyes: Corrosive to eyes.
Skin: Irritating to skin.
Inhalation: Not expected to be a route of exposure.
Ingestion: Harmful if swallowed. Consult physician.

Chronic Effects: Possible harmful target organ effects

3. Composition/Data on Components:

Chemical Name	CAS number	Weight Concentration %
2-Propanol, 1-chloro-, phosphate (3:1)	13674-84-5	20.00% - 30.00%
Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched	127087-87-0	10.00% - 20.00%
Dimethylaminoethoxyethanol	1704-62-7	5.00% - 10.00%
1,3-Propanediamine, N'-[3-(dimethylamino)propyl]-N,N-dimethyl-	6711-48-4	1.00% - 5.00%
Alkanolamie	N/A	0.10% - 1.00%
1,4-Dioxane	123-91-1	0.00% - 0.10%

4. First Aid Measures:

Inhalation: If inhaled and symptoms ensue, move to fresh air. If breathing is difficult, give oxygen.

After Eye Contact: Rinse opened eye for at least 15 minutes under running water. Remove contact lenses if present and easy to do so, and continue rinsing. If irritation persists contact physician

After Skin Contact: Clean affected area with soap and plenty of water.

After Swallowing: Consult physician.

Notes to Physician: Treat symptomatically.

5. Fire Fighting Measures:

Flash Point: 200 C (392 F)

LEL: N/A UEL: N/A

Upper and Lower Explosive Limits listed if known.

Suitable Extinguishing Agents: Water spray, CO2, Foam, Dry chemical.

Information about Protection against Explosions and Fires: Keep away from flames and sources of heat. Closed containers may rupture when exposed to extreme heat.

Dangerous Products of Decomposition: Oxides of carbon, oxides of nitrogen, oxides of phosphorus, hydrocarbons, traces of HCN, hydrogen chloride gas.

Protective Equipment: Firefighters should wear a pressure demand self-contained breathing apparatus and protective clothing.

6. Accidental Release Measures:

Person-Related Safety Precautions: Use appropriate personal protective equipment during clean up. Evacuate and keep unnecessary people out of spill area. Avoid contact with skin and eyes.

Measures for Environmental Protection: Cover and contain spill with absorbent material. Collect for proper disposal according to local, state, and federal regulations.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e g. cloth, fleece) clean surface thoroughly to remove residual contamination.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

7. Handling and Storage:

Information for Safe Handling: Avoid contact with eyes, skin, or inhalation.

Storage Requirements: Store in dry, well ventilated area. Keep containers tightly closed. Store between 50°F-80°F. Material may settle.

Regulatory Requirements: Obey all local, state, and federal requirements.

8. Exposure Controls and Personal Protection:

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits

2-Propanol, 1-chloro-, phosphate (3:1) 13674-84-5	Not Established	Not Established	Not Established
Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched 127087-87-0	Not Established	Not Established	Not Established
Dimethylaminoethoxyethanol 1704-62-7	Not Established	Not Established	Not Established
1,3-Propanediamine, N'-[3-(dimethylamino)propyl]-N,N-dimethyl- 6711-48-4	Not Established	Not Established	Not Established
Alkanolamie N/A	Not Established	Not Established	Not Established
1,4-Dioxane 123-91-1	100 ppm TWA	20 ppm TWA	Not Established

Engineering Controls: No specific measures required if proper PPE precautions are followed.

General Protective and Hygienic Measures: Usual precautionary measures should be adhered to when handling chemicals.

Respiratory Protection: In spray applications, an organic vapor/particulate respirator or air supplied unit is necessary.
Protection of Hands: Protective chemical resistant gloves.
Eye Protection: Chemical resistant goggles must be worn.
Body Protection: Protective work clothing. Launder separately.

Contaminated Gear: Observe local requirements. Dispose of in accordance with local/state/federal regulations.

9. Physical and Chemical Properties:

Physical properties listed where known.

Appearance: Amber liquid	**Odor:** Amine odor
Vapor Pressure: N/A	**Odor threshold:** N/A
Vapor Density: N/A	**pH:** N/A
Specific Gravity 1.08	**Melting point:** N/A
Freezing point: N/A	**Solubility:** N/A
Boiling range: 100 - 342°C	**Flash point:** 392°F,200°C
Evaporation rate: N/A	**Flammability:** N/A
Explosive Limits: N/A	**Partition coefficient (n-octanol/water):** N/A
Autoignition temperature: N/A	**Decomposition temperature:** N/A

10. Stability and Reactivity:

Chemical Incompatible Materials: Avoid contact with isocyanates and strong oxidizing agents.

Hazardous Polymerization: Not expected to occur.

Dangerous Products of Decomposition: Oxides of carbon, oxides of nitrogen, oxides of phosphorus, hydrocarbons, traces of HCN, hydrogen chloride gas.

11. Toxicological Information:

Mixture Toxicity

Oral Toxicity LD50: 1,330mg/kg
Dermal Toxicity LD50: 2,248mg/kg
Inhalation Toxicity LC50: 17mg/L

Component Toxicity

13674-84-5	2-Propanol, 1-chloro-, phosphate (3:1) Oral LD50: 500 mg/kg (Rat) Dermal LD50: 1,230 mg/kg (Rabbit) Inhalation LC50: 5 mg/L (Rat)
127087-87-0	Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched Oral LD50: 1,310 mg/kg (Rat) Dermal LD50: 2,000 mg/kg (Rabbit)
1704-62-7	Dimethylaminoethoxyethanol Oral LD50: 2,460 mg/kg (Rat) Dermal LD50: 1,410 mg/kg (Rabbit)
6711-48-4	1,3-Propanediamine, N'-[3-(dimethylamino)propyl]-N,N-dimethyl- Oral LD50: 1,250 mg/kg (Rat) Dermal LD50: 370 mg/kg (Rabbit)
123-91-1	1,4-Dioxane Oral LD50: 4,200 mg/kg (Rat) Inhalation LC50: 49 mg/L (Rat)

Individual Toxicity Values Listed if Known

Acute Toxicity:
Eyes: Corrosive to eyes.
Skin: Irritating to skin.
Inhalation: Not expected to be a route of exposure.
Ingestion: Harmful if swallowed. Consult physician.

Chronic Effects: Possible harmful target organ effects.

Routes of Entry: Ingestion, skin contact, eye contact.
Target Organs: Skin, eyes, reproductive system, kidneys
Chemicals with Known or Possible Carcinogenic Effects:

CAS Number	Description	% Weight	Carcinogen Rating
123-91-1	1,4-Dioxane	0.0 to 0.1%	1,4-Dioxane: IARC group 2B - Possibly carcinogenic to humans

12. Ecological Information:

General Information: Based on experience, no adverse effects are to be expected if correct disposal procedures have been followed as indicated in section 13.

Individual component ecotoxicity listed if known.

Component Ecotoxicity

2-Propanol, 1-chloro-, phosphate (3:1)	96 Hr LC50 Brachydanio rerio: 56.2 mg/L [static]; 96 Hr LC50 Pimephales promelas: 98 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 30 mg/L [static] 48 Hr EC50 Daphnia magna: 63 mg/L 72 Hr EC50 Desmodesmus subspicatus: 45 mg/L; 96 Hr EC50 Pseudokirchneriella subcapitata: 4 mg/L
Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched	48 Hr LC50 Pimephales pormelas (fathead minnow): 3.8 - 6.2 mg/L 48 Hr EC50 Daphnia magna: 9.3 - 21.4 mg/L 16 Hr IC50 Bacteria: >1,000 mg/L
1,3-Propanediamine, N'-[3-(dimethylamino)propyl]-N,N-dimethyl-	3 Hr EC50 Bacteria >1000 mg/l [Static] 48 Hr EC50 Daphnia 50.3 mg/l [Static] 72 Hr ErC50 (growth rate) Algae 7.9 mg/l [Static] 96 Hr LC50 Fish 21.4 mg/l [Static]

13. Disposal Considerations:

Recommendation: Observe local requirements. Dispose of in accordance with local/state/federal regulations.

Empty Container Precautions: Recondition or dispose of empty container in accordance with governmental regulations. If container is to be disposed, ensure all product residues are removed and container is empty prior to disposal.

14. Transport Information:

DOT Regulated Components:

This product is not regarded as dangerous goods according to the national and international regulations on the transport of dangerous goods unless specifically cited below:

Agency	Proper Shipping Name	UN Number	Packing Group	Hazard Class
	None			

15. Regulatory Information:

OSHA HAZARD COMMUNICATION STANDARD: This material is classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

SARA 311/312 Hazard Categories: Acute health hazard, chronic health hazard.

WARNING: This product can expose you to chemicals listed below, which are known to the State of California to cause cancer, birth defects, or reproductive harm. For more information, visit www.P65Warnings.ca.gov

Ethylene Oxide 75-21-8 1 PPM CARC
1,4-Dioxane 123-91-1 3 PPM CARC

Massachusetts Right To Know List:

- None

New Jersey Right To Know List:

Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched 127087-87-0 10 to 20 %

Pennsylvania Right To Know List:

Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched 127087-87-0 10 to 20 %

SARA 302 Extremely Hazardous Substances:

- None

Chemicals subject to SARA 313 Reporting:

Poly(oxy-1,2-ethanediyl), .alpha.-(4-nonylphenyl)-.omega.-hydroxy-, branched 127087-87-0 10 to 20 %
Emissions

Country	Regulation	All Components Listed
Canada	Canada DSL	Yes
US	Toxic Substances Control Act	Yes

16. Other Information:

Safety Data Sheet issued by Product Safety Department

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Carlisle Spray Foam Insulation. The data on these sheets relates only to the specific material designated herein. Carlisle Spray Foam Insulation assumes no legal responsibility for use or reliance upon this data. It is the user's responsibility to ensure that their activities comply with federal, state, or local laws.

Date revised: 7/23/2019 Reviewer Revision 1

Date Prepared: 7/23/2019

Carlisle Spray Foam Insulation Safety Data Sheet

1. Identification of Substance:

Product Name: POLYURETHANE FOAM A-COMPONENT

Supplier Identification:
Carlisle Spray Foam Insulation

Address:
2500 Adie Road
Maryland Heights, MO 63043

Telephone:
314-872-8700

24-Hr. Emergency Phone Number:
CHEMTREC (800) 424-9300
INTERNATIONAL: +1-(703) 527-3887

Product Use: Polyurethane isocyanate component

2. Hazards Identification

GHS Ratings:

Inhalation Toxicity	Acute Tox. 4	Gases>2500+<=5000ppm, Vapors>10+<=20mg/l, Dusts&mists>1+<=5mg/l
Skin corrosive	2	Reversible adverse effects in dermal tissue, Draize score: >= 2.3 < 4.0 or persistent inflammation
Eye corrosive	2A	Eye irritant: Subcategory 2A, Reversible in 21 days
Respiratory sensitizer	1	Respiratory sensitizer
Skin sensitizer	1	Skin sensitizer
Organ toxin single exposure	3	Transient target organ effects- Narcotic effects- Respiratory tract irritation
Organ toxin repeated exposure	1	Significant toxicity in humans- Reliable, good quality human case studies or epidemiological studies Presumed significant toxicity in humans- Animal studies with significant and/or severe toxic effects relevant to humans at generally low exposure (guidanc

GHS Hazards

H315	Causes skin irritation
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H332	Harmful if inhaled
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H372	Causes damage to organs through prolonged or repeated exposure

GHS Precautions

P260	Do not breathe dust/fume/gas/mist/vapors/spray
P261	Avoid breathing dust/fume/gas/mist/vapors/spray
P264	Wash hands thoroughly after handling
P270	Do not eat, drink or smoke when using this product
P271	Use only outdoors or in a well-ventilated area
P272	Contaminated work clothing should not be allowed out of the workplace

P280	Wear protective gloves/protective clothing/eye protection/face protection
P285	In case of inadequate ventilation wear respiratory protection
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P314	Get Medical advice/attention if you feel unwell
P321	Specific treatment is urgent (see Section 4 First Aid measures)
P362	Take off contaminated clothing and wash before reuse
P363	Wash contaminated clothing before reuse
P302+P352	IF ON SKIN: Wash with soap and water
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P304+P341	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
P305+P351+P338	IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
P332+P313	If skin irritation occurs: Get medical advice/attention
P333+P313	If skin irritation or a rash occurs: Get medical advice/attention
P337+P313	Get medical advice/attention
P342+P311	Call a POISON CENTER or doctor/physician
P405	Store locked up
P403+P233	Store in a well ventilated place. Keep container tightly closed
P501	Dispose of contents/container in accordance with existing federal, state, and local environmental control laws.

Signal Word: Danger

Acute Health Effects:
Eyes: Severe irritation, tearing, swelling, and possible damage to cornea.
Skin: Irritation, redness, swelling, skin sensitization, rash, scaling, and blistering.
Inhalation: Mucous membrane and respiratory tract irritation, tightness of chest, isocyanate sensitization.
Ingestion: Irritating and corrosive to mouth, stomach, and digestive tract.

Conditions Aggravated by Exposure: Asthma, respiratory disorders, skin disorders, and eye disorders.

Chronic Health Effects: Isocyanates may cause skin and respiratory sensitivity in some individuals. Sensitized individuals may react to very low levels diisocyanates below the PEL. Sensitized people who continue to work with diisocyanates may develop symptoms sooner after each exposure. Limited evidence of possible carcinogenic effects. Possible other harmful target organ effects.

3. Composition/Data on Components:

Chemical Name	CAS number	Weight Concentration %
Isocyanic acid, polymethylenepolyphenylene ester	9016-87-9	50.00% - 60.00%
4,4'-Methylenediphenyl diisocyanate	101-68-8	30.00% - 40.00%
Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]-	5873-54-1	1.00% - 5.00%

4. First Aid Measures:

After Inhalation: May cause severe irritation to upper respiratory tract and lungs, respiratory sensitization, decreased lung capacity.

Remove from exposure area to fresh air. Administer oxygen or artificial respiration as needed. Obtain medical attention.

After Eye Contact: Rinse opened eye for at least 15 minutes under running water.
Remove contact lenses if present and easy to do so, and continue rinsing. If irritation persists contact physician

After Skin Contact: Remove contaminated clothing. Clean affected area with soap and plenty of water. Call a physician if irritation or rash develops.

After Swallowing: Do not induce vomiting. If conscious, give 1 to 2 cups of milk or water to drink. Consult a physician at once.

Notes to Physician: Treat symptomatically. Following severe exposure the patient should be kept under medical observation for a least 48 hours.

5. Fire Fighting Measures:

Flash Point: 230 C (446 F)

LEL: N/A UEL: N/A

Upper and Lower Explosive Limits listed if known.

Suitable Extinguishing Agents: Water spray, CO2, Foam, Dry chemical

Information about Protection against Explosions and Fires: During the incipient stage of a fire, containers should be kept cool by spraying with water (i.e., water suppression system) on the outside of container. Water spray will help prevent containers from overheating. Use cold-water spray to cool fire-exposed containers to minimize risk of rupture. Large fires can be extinguished with high volumes of water, such as from a fire hose applied from a safe distance. Closed containers may rupture when exposed to extreme heat due to build-up of pressure from thermal degradation and/or carbon dioxide generation.

Section 5 pertains to fire-fighting measures and reactivity is addressed in section 10.

Dangerous Products of Decomposition: Oxides of carbon, oxides of nitrogen, isocyanates, and traces of HCN.

Protective Equipment: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters.

6. Accidental Release Measures:

Person-Related Safety Precautions: Evacuate all non-essential personnel. Avoid contact with skin. Do not breathe aerosols or vapors.

Measures for Environmental Protection: Cover and contain spill with absorbent material. Place waste in open container. Remove to well ventilated area and dilute with ammonia solution (water 90%, concentrated ammonia 8%, detergent 2%). Collect for proper disposal according to local, state, and federal regulations.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e g. cloth, fleece) clean surface thoroughly to remove residual contamination.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place

Into a container for later disposal. Following product recovery, flush area with water.

7. Handling and Storage:

Information for Safe Handling: Do not breathe fumes, vapors or mists. Use only with adequate ventilation. Avoid contact with skin or eyes. Immediately report spills or leaks.

Storage Requirements: Store containers in a dry, well ventilated area. Keep containers tightly closed and prevent moisture contamination. Do not re-seal the container if contamination is suspected. Store between 60ºF and 100ºF.

Regulatory Requirements: Store according to all local, state, and federal regulations.

8. Exposure Controls and Personal Protection:

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
Isocyanic acid, polymethylenepolyphenylene ester 9016-87-9	Not Established	Not Established	Not Established
4,4'-Methylenediphenyl diisocyanate 101-68-8	0.005 ppm TWA 0.02 ppm STEL	0.005 ppm TWA (listed under Methylene bisphenyl isocyanate (MDI))	NIOSH: 0.005 ppm TWA (listed under Methylene bisphenyl isocyanate); 0.05 mg/m3 TWA 0.020 ppm Ceiling (10 min); 0.2 mg/m3 Ceiling (10 min)
Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]- 5873-54-1	Not Established	Not Established	Not Established

Engineering Controls: Use local exhaust ventilation to maintain airborne concentrations below the TLV, especially if heating or spraying. Use only in a well ventilated area to keep vapors below exposure limits. Use local exhaust ventilation if necessary.

General Protective and Hygienic Measures: Usual precautionary measures should be adhered to when handling chemicals.

Personal Protective Equipment:
Respiratory Protection: Do not inhale vapors. Use NIOSH approved respiratory protection if TLV/PEL is exceeded. Do not enter storage area unless adequately ventilated.
Hand Protection: Protective butyl rubber or nitrile rubber gloves.
Eye Protection: Chemical safety goggles.
Body Protection: Impervious protective work clothing. Launder separately.

Contaminated Gear: Observe local requirements. Dispose of in accordance with local/state/federal regulations.

9. Physical and Chemical Properties:

Physical properties listed where known.

Appearance: Brown liquid	**Odor:** Musty

Vapor Pressure: N/A	**Odor threshold:** N/A
Vapor Density: N/A	**pH:** N/A
Specific Gravity 1.23	**Melting point:** N/A
Freezing point: N/A	**Solubility:** N/A
Boiling range: N/A	**Flash point:** 446°F,230°C
Evaporation rate: N/A	**Flammability:** N/A
Explosive Limits: N/A	**Partition coefficient (n-octanol/water):** N/A
Autoignition temperature: 240°C	**Decomposition temperature:** N/A

10. Stability and Reactivity:

Chemical Incompatible Materials: MDI will react with a wide range of common chemicals. During use of this product in the work environment, protect the product from contamination such as inadvertent contact with water, amines, strong bases and alcohols. For example, allowing water inside an MDI container will lead to the generation of carbon dioxide gas and result in the development of excess pressure if the container is tightly re-sealed.

Hazardous Polymerization: Not expected to occur under normal conditions.

Dangerous Products of Decomposition: Oxides of carbon, oxides of nitrogen, hydrocarbons, isocyanates, and traces of HCN.

11. Toxicological Information:

Mixture Toxicity

Inhalation Toxicity LC50: 2mg/L

Component Toxicity

9016-87-9	Isocyanic acid, polymethylenepolyphenylene ester Dermal LD50: 490 mg/L (Rat) Inhalation LC50: 490 mg/m3 (Rat)
101-68-8	4,4'-Methylenediphenyl diisocyanate Dermal LD50: 0 mg/L (Rat) Inhalation LC50: 369 mg/m3 (Rat)

Individual Toxicity Values Listed if Known

Acute Toxicity:
Eyes: Severe irritation, tearing, swelling, and possible damage to cornea.
Skin: Irritation, redness, swelling, skin sensitization, rash, scaling, and blistering.

Inhalation: Mucous membrane and respiratory tract irritation, tightness of chest, isocyanate sensitization.

Ingestion: Irritating and corrosive to mouth, stomach, and digestive tract.

Chronic Effects: Isocyanates may cause skin and respiratory sensitivity in some individuals. Sensitized individuals may react to very low levels diisocyanates below the PEL. Sensitized people who continue to work with diisocyanates may develop symptoms sooner after each exposure. Limited

evidence of possible carcinogenic effects.

Routes of Entry: Inhalation, Ingestion, skin contact, eye contact.
Target Organs: Respiratory tract, eyes, skin.
Chemicals with Known or Possible Carcinogenic Effects:

CAS Number	Description	% Weight	Carcinogen Rating
None			None

12. Ecological Information:

General Information: Based on experience, no adverse effects are to be expected if correct disposal procedures have been followed as indicated in section 13.

Individual component ecotoxicity listed if known.

Component Ecotoxicity	
4,4'-Methylenediphenyl diisocyanate	24 Hr LC50 Brachydanio rerio: >500 mg/L 24 Hr EC50 Daphnia magna: >500 mg/L

13. Disposal Considerations:

Recommendation: Observe local requirements. Dispose of in accordance with local/state/federal regulations.

Empty Container Precautions: Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without thorough commercial cleaning and reconditioning. If container is to be disposed, ensure all product residues are removed and container is empty prior to disposal. Contact the Reusable Industrial Packaging Association (RIPA) at 301-577-3786 to find a drum re-conditioner in North America (www.reusablepackaging.org).

14. Transport Information:

DOT Regulated Components:

4,4' Methylene Diphenyl Diisocyanate
Reportable Quantity: 5000 lbs

When in individual containers of less than the substance RQ, this material ships as non-regulated. Containers above RQ ship as:

Agency	Proper Shipping Name	UN Number	Packing Group	Hazard Class
DOT	Environmentally Hazardous Substance, N.O.S. (Contains Diphenylmethane Diisocyanate)	3082	III	9

15. Regulatory Information:

OSHA HAZARD COMMUNICATION STANDARD: This material is classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

SARA 311/312 Hazard Categories: Acute health hazard, chronic health hazard

WARNING: This product can expose you to chemicals listed below, which are known to the State of California to cause cancer, birth defects, or reproductive harm. For more information, visit www.P65Warnings.ca.gov

- None

Massachusetts Right To Know List:

4,4'-Methylenediphenyl diisocyanate 101-68-8 30 to 40 %

New Jersey Right To Know List:

Isocyanic acid, polymethylenepolyphenylene ester 9016-87-9 50 to 60 %

Pennsylvania Right To Know List:

4,4'-Methylenediphenyl diisocyanate 101-68-8 30 to 40 %

SARA 302 Extremely Hazardous Substances:

- None

Chemicals subject to SARA 313 Reporting:

4,4'-Methylenediphenyl diisocyanate 101-68-8 30 to 40 % Emissions
Isocyanic acid, polymethylenepolyphenylene ester 9016-87-9 50 to 60 % Emissions

Country	Regulation	All Components Listed
Canada	Canada DSL	Yes
US	Toxic Substances Control Act	Yes

16. Other Information:

Safety Data Sheet issued by Product Safety Department

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Carlisle Spray Foam Insulation. The data on these sheets relates only to the specific material designated herein. Carlisle Spray Foam Insulation assumes no legal responsibility for use or reliance upon this data. It is the user's responsibility to ensure that their activities comply with federal, state, or local laws.

Date revised: 2018-12-07 Reviewer Revision 0
Date Prepared: 12/7/2018

Carlisle Spray Foam Insulation Safety Data Sheet

1. Identification of Substance:

Product Name: RIGID POLYURETHANE/ POLYISOCYANURATE FOAM

Supplier Identification:
Carlisle Spray Foam Insulation

Address:
100 Enterprise Dr.
Cartersville, GA 30120

Telephone:
(770) 607-0755

24-Hr. Emergency Phone Number:
CHEMTREC (800) 424-9300
International: (703) 527-3887

Product Use: Cured polyurethane foam for construction uses

2. Hazards Identification

GHS Ratings: N/A

GHS Hazards: N/A

GHS Precautions: N/A

Signal Word: N/A

There are no GHS ratings that apply to this product at this time.

This product is classified as an article under the OSHA Hazard Communication Standard 29 CFR 1910.1200(c)
Article means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

3. Composition/Data on Components:

Chemical Name	CAS number	Weight Concentration %
Cured Polyurethane/polyisocyanaurate foam	N/A	100

4. First Aid Measures:

Inhalation: Not expected to pose an inhalation hazard.

After Eye Contact: Rinse opened eye for at least 15 minutes under running water.
Remove contact lenses if present and easy to do so, and continue rinsing. If irritation persists contact physician.

After Skin Contact: Clean affected area with soap and plenty of water. Ordinary means of personal hygiene are adequate.

After Swallowing: Consult physician.
Notes to Physician: Treat symptomatically. Not expected to require any special measures.

5. Fire Fighting Measures:

Flash Point: N/A
LEL: N/A UEL: N/A
Upper and Lower Explosive Limits listed if known.
Suitable Extinguishing Agents: Water spray, CO2, Foam, Dry chemical

Information about Protection against Explosions and Fires: No unusual hazards expected.
Dangerous products of decomposition: Oxides of carbon, oxides of nitrogen, oxides of phosphorus, hydrocarbons, thick black smoke, Isocyanates, traces of HCN.
Protective equipment: Firefighters should wear pressure demand self-contained breathing apparatus and protective clothing.

6. Accidental Release Measures:

Person-related safety precautions: Avoid inhaling dusts.

Measures for environmental protection: Collect for proper disposal according to local, state, and federal regulations.

7. Handling and Storage:

Information for Safe Handling: Avoid inhaling dusts. Wash skin after contact.
Storage Requirements: Keep away from flames and sources of heat.

8. Exposure Controls and Personal Protection:

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
Cured Polyurethane/polyisocyanaurate foam / N/A	Not Established	Not Established	Not Established

Engineering Controls: No specific measures expected.

General protective and hygienic measures: No additional precautionary measures should be expected other than standard personal protective equipment for handling inert articles requiring moderate physical labor.

Personal Protective Equipment:

Respiratory Protection: None expected.

Hand Protection: Protective gloves standard in a normal work environment.

Eye Protection: Safety glasses.

Body Protection: Protective work clothing. Launder separately.

9. Physical and Chemical Properties:

Physical properties listed where known.

Appearance: Off white solid	**Odor:** Mild
Vapor Pressure: N/A	**Odor threshold:** N/A
Vapor Density: N/A	**pH:** N/A
Density: N/A	**Melting point:** N/A
Freezing point: N/A	**Solubility:** N/A
Boiling range: N/A	**Flash point:** N/A
Evaporation rate: N/A	**Flammability:** N/A
Explosive Limits: N/A	**Partition coefficient (n-octanol/water):** N/A
Autoignition temperature: N/A	**Decomposition temperature:** N/A

10. Stability and Reactivity:

Chemical Incompatible Materials: None known.

Hazardous Polymerization: Not expected to occur.

Dangerous products of decomposition: Oxides of carbon, oxides of nitrogen, oxides of phosphorus, hydrocarbons, thick black smoke, Isocyanates, traces of HCN.

11. Toxicological Information:

Mixture Toxicity
Individual Toxicity Values Listed if Known

Acute Toxicity:
Eyes: Possible irritation
Skin: Possible irritation
Inhalation: Possible irritation.
Ingestion: Possible irritation.

Chronic Effects: None known.

Routes of Entry: Inhalation, skin contact, eye contact
Target Organs: Skin, eyes, respiratory tract
Chemicals with Known or Possible Carcinogenic Effects: None known.

12. Ecological Information:

General Information: Based on experience, no adverse effects are to be expected if correct disposal procedures have been followed as indicated in section 13. Individual component ecotoxicity listed if known.

13. Disposal Considerations:

Recommendation: Observe local requirements. Dispose of in accordance with local/state/federal regulations.

14. Transport Information:

Not considered a dangerous good according to transport regulations unless specifically cited below:

Agency	Proper Shipping Name	UN Number	Packing Group	Hazard Class
	No data available			

15. Regulatory Information:

OSHA HAZARD COMMUNICATION STANDARD: This material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

SARA 311/312 Hazard Categories: None.

California Proposition 65
(Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute unless otherwise listed:

Warning: This product contains chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm:

- None

Massachusetts Right To Know List:

- None

New Jersey Right To Know List:

- None

Pennsylvania Right To Know List:

- None

SARA 302 Extremely Hazardous Substances:

- None

Chemicals subject to SARA 313 Reporting:

- None

Country	Regulation	All Components Listed
Canada	Canada DSL	Yes
US	Toxic Substances Control Act	Yes

16. Other Information:

Polyurethane elastomers are fully reacted polymers forming articles which are not considered hazardous under OSHA's criteria in 29 CFR 1910.1200.

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Carlisle Spray Foam Insulation. The data on these sheets relates only to the specific material designated herein. Carlisle Spray Foam Insulation assumes no legal responsibility for use or reliance upon this data. It is the user's responsibility to ensure that their activities comply with federal, state, or local laws.

Date revised: 1/9/19 Reviewer Revision 0

Date Prepared: 1/9/19

LEED CERTIFICATION GUIDE

CARLISLE SPRAY FOAM INSULATION

The Leadership in Energy and Environmental Design (LEED) certification program outlines a rating system for the design, construction, operation, and maintenance of green buildings, homes, and neighborhoods. The LEED program assists building owners and operators to incorporate environmentally responsible and sustainable features for all building types and all building phases including new construction, interior fit outs, operations and maintenance, and core and shell.

This document provides guidance regarding the contribution of SealTite Pro Spray Foam Insulation products manufactured by Carlisle Spray Foam Insulation to the overall LEED certification of a project.

ENERGY & ATMOSPHERE (EA)

EA Credit 1: Optimize energy performance (1–19 points)

Intent: To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements: Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2: Minimum Energy Performance.

Option 1. Whole building energy simulation (1–19 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard[2].

SealTite Pro Spray Foam Insulation functions as both insulation and air barrier creating a sealed building envelop with fewer air changes per hours and significantly less air infiltration. Engineers can specific more efficient HVAC systems to condition the interior air space increased occupant comfort.

The below chart shows how LEED credits are awarded. For Example: An increased efficiency of 12% above the baseline building performance will earn 1 point toward this credit for new construction, while a 48% increase over the baseline performance will earn 19 points. Specific LEED credits are determined by the individual project).

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7
26%	22%	8
28%	24%	9
30%	26%	10
32%	28%	11
34%	30%	12
36%	32%	13
38%	34%	14
40%	36%	15
42%	38%	16
44%	40%	17
46%	42%	18
48%	44%	19

SealTite™ PRO

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LEED CERTIFICATION GUIDE

MATERIALS AND RESOURCES (MR)

MR Credit 4: Recycled Content (1–2 points)

Intent: To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Requirements: Use materials with recycled content such that the sum of post-consumer recycled content plus ½ of the pre-consumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is as follows: 10% – 1 point, or 20% – 2 points.

MR Credit 6: Rapidly Renewable Materials (1 point)

Intent: To reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements: Use rapidly renewable building materials and products for 2.5% of the total value of all building materials and products used in the project, based on cost. Rapidly renewable building materials and products are made from plants that are typically harvested within a 10 year or shorter cycle.

	Recycled Content		Rapidly Renewable Materials
	Pre-Consumer	Post-Consumer	
SealTite PRO Open Cell	-	-	1.5%
SealTite PRO High Yield	-	-	0.7%
SealTite PRO XTR	-	-	1.4%
SealTite PRO No Mix	-	-	1.5%
SealTite PRO No Trim 21	-	-	3.1%
SealTite PRO OCX	-	-	11.5%
SealTite PRO HFO Regular	4.8%	4.2%	-
SealTite PRO HFO Winter	4.8%	4.2%	-
SealTite One Regular	3.3%	2.9%	0.8%
SealTIte One Winter	3.2%	2.8%	0.8%

MR Credit 5: Regional Materials (1–2 points)

Intent: To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirements: Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within a specified distance of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) must contribute to the regional value.

SealTite Pro Spray Foam Insulation products are considered to be manufactured at the project site.

INDOOR ENVIRONMENTAL QUALITY (IEQ)

IEQ Credit 4.1: Low Emitting Materials – Adhesives and Sealants (1 point)

Intent: To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements: All adhesives and sealants used on the interior of the building (i.e. inside the weatherproofing system and applied on-site) must comply with the following requirements as applicable to the project scope:

Adhesives, sealants, and sealant primer must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. Volatile organic compounds (VOC) limits listed below correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005.

Architectural Application	VOC Limit (g/L Less Water)
Plastic Foams	50

Carlisle Spray Foam insulation products have achieved Greenguard certification for low chemical emissions

	Greenguard Certification
SealTite Pro Open Cell	Certified
SealTite Pro High Yield	Certified
SealTite Pro XTR	Gold
SealTite Pro No Mix	Certified
SealTite Pro No Trim 21	Certified
SealTite Pro OCX	Certified
SealTite PRO HFO	Gold
SealTite One	Gold

IEQ Credit 7.1: Thermal Comfort Design (1 point)

Intent: To provide a comfortable thermal environment that promotes occupant productivity and well-being.

Requirements: Design heating, ventilating and air conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy (with errata but without addenda). Demonstrate design compliance in accordance with the Section 6.1.1 documentation.

SealTite Pro Spray Foam Insulation functions as both insulation and air barrier creating a sealed building envelop with fewer air changes per hours and significantly less air infiltration. Engineers can specific more efficient HVAC systems to condition the interior air space increased occupant comfort.

CARLISLE SPRAY FOAM INSULATION

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ENVIRONMENTAL PRODUCT DECLARATION

SPRAY POLYURETHANE FOAM INSULATION

SEALTITE PRO, SEALTITE, PREMISEAL, AND PREMIR+ PRODUCTS

CARLISLE SPRAY FOAM INSULATION

Carlisle Spray Foam Insulation (CSFI) is a leading manufacturer of open-cell and closed-cell spray polyurethane foam (SPF) insulation products for residential and commercial applications. Previously marketed under Accella Polyurethane Systems, Covestro, and Bayer Material Science, Carlisle Spray Foam Insulation is backed by the technology resources and grounded on the corporate stability of a century-old icon in the building ecosystem, Carlisle.

Now part of Carlisle Weatherproofing Technologies, CSFI is focused on developing spray foam insulation solutions to help architects design safe, resilient, and energy-efficient buildings with low environmental impacts.

CSFI is committed to product transparency as part of our mission to help deliver a more sustainable future by supplying innovative and energy-efficient products while reducing our operational greenhouse gas emissions. For more information, visit www.carlislesfi.com.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION ULCOM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

CARLISLE SPRAY FOAM INSULATION

Spray Polyurethane Foam Insulation
SealTite PRO, SealTite, PremiSEAL, and PremiR+ EVO Products

According to ISO 14025, and ISO21930:2017

EPD Program and Program Operator Name, Address, Logo, and Website	UL Environment 333 Pfingsten Rd, Northbrook, IL 60062 www.ul.com www.spot.ul.com
General Program Instructions and Version Number	Program Operator Rules v 2.7 2022
Manufacturer Name and Address	Carlisle Spray Foam Insulation | 100 Enterprise Drive, Cartersville, GA 30120
Declaration Number	4790550934.101.1
Declared Product & Functional Unit or Declared Unit	1 m² of installed insulation material with a thickness that gives an average thermal resistance RSI=1 m2·K/W
Reference PCR and Version Number	Part A: Product Category Rules for Building Related Products and Services (UL Environment, 2018) Part B: Building Envelope Thermal Insulation EPD Requirements (UL Environment, 2018)
Description of product application/use	Two-component polyurethane mixture insulation spray applied at installation site.
Product RSL Description (if appl.)	75 years
Markets of Applicability	United States and Canada
Date of Issue	December 1, 2022
Period of Validity	5 Years
EPD Type	Product Specific
Range of Dataset Variability	NA
EPD Scope	Cradle to Grave
Year(s) of reported primary data	2020
LCA Software & Version Number	GaBi 10
LCI Database(s) & Version Number	GaBi 2022 (CUP 2022.2)
LCIA Methodology & Version Number	TRACI 2.1 (2012), IPCC AR6 (2021)

Type text here

The PCR review was conducted by:	UL Environment PCR Review Panel epd@ul.com
This declaration was independently verified in accordance with ISO 14025: 2006. ☐ INTERNAL ☒ EXTERNAL	Cooper McCollum Cooper McCollum, UL Environment
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Sphera
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine James Mellentine, Thrive ESG

CARLISLE SPRAY FOAM INSULATION

Spray Polyurethane Foam Insulation
SealTite PRO, SealTite, PremiSEAL, and PremiR+ EVO Products

According to ISO 14025
and ISO 21930:2017

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

1. Product Definition and Information

1.1. Description of Company/Organization

Carlisle Spray Foam Insulation is a leading manufacturer of spray polyurethane foam systems in North America. Previously marketed under Accella Polyurethane Systems, Covestro, and Bayer Material Science – Carlisle Spray Foam Insulation is a fully integrated, spray foam insulation solution, backed by the technology resources—and grounded on the corporate stability—of a century-old icon in the building ecosystem—Carlisle.

Now part of Carlisle Weatherproofing Technologies (CWT) Carlisle Spray Foam Insulation is the only spray foam manufacturer that provides everything needed to completely seal and protect the entire building envelop. Together with other Carlise brands such as Hunter Panels, Insulfoam, CCW, Henry, and PAC-CLAD, CSFI offers architects the most flexibility and design options to create high performance building envelope solutions from a single source ensuring material compatibility and total system performance.

1.2. Product Description

Product Identification

This EPD covers the following spray polyurethane foam insulation products manufactured by Carlisle Spray Foam Insulation and Carlisle Roof Foam and Coatings in Cartersville, GA:

- Open Cell: SealTite™ PRO Open Cell, SealTite PRO High Yield, SealTite PRO No Mix, SealTite PRO OCX, SealTite PRO No Trim 21, SealTite PRO Open Cell XTR
- Closed-cell Hydrofluorocarbon (HFC): SealTite PRO Closed Cell (HFC)
- Closed-cell Hydrofluoroolefin (HFO): SealTite PRO HFO, SealTite One
- Closed-cell Roofing (HFC): PremiSEAL 40/60/70/80
- Closed-cell Roofing (HFO): PremiR+ EVO 40/60/70

Product Specification

Spray polyurethane foam (SPF) is made on the jobsite by combining polymeric methylene-diphenyl diisocyanate (pMDI/MDI or A-side) with an equal volume of a polyol blend (B-side). Sides A and B react and expand at the point of application in the building envelope to form polyurethane foam. The formed-in-place SPF provides both thermal insulation and air sealing to the building.

Three types of SPF with varying performances and applications are assessed in this declaration. Closed-cell spray foam for roofing systems (Roofing) is used on the external surface of low slope roofs. Its higher density provides additional compressive strength needed for roofing applications. Open-cell spray foam (ocSPF) provides insulation and air sealing. Closed-cell foam provides a water-resistant insulation, air-sealing, water vapor control and delivers added structural performance to the building envelope.

SPF can be categorized based on the type of blowing agent utilized in the product. Roofing and closed cell foam use chemical blowing agents that transform into a gas during installation due to the exothermic foam reaction that occurs. These physical blowing agents are either hydrofluorocarbons (HFC) or hydrofluoroolefins (HFO).

SPF products are commonly used in residential, light commercial, commercial, institutional, and certain industrial applications. Table 1 shows the typical properties of the various SPF product types.

Table 1: Typical SPF Properties by Product Type

NAME	ROOFING	CLOSED-CELL	OPEN-CELL
Density [lb / ft^3]	3.0	2.0	0.5
Thermal resistivity [R / in]	6.3-6.7	6.9 to 7.2	3.7
Air impermeable material	✓	✓	✓
Integral vapor retarder	✓	✓	
Water resistant	✓	✓	
Cavity insulation		✓	✓
Continuous insulation	✓	✓	
Soil Gas Barrier	✓	✓	
Fungi Resistant	✓	✓	✓
Air Quality - Greenguard	✓	✓	✓
Low-slope roofing	✓		
Structural improvement	✓	✓	

Flow Diagram

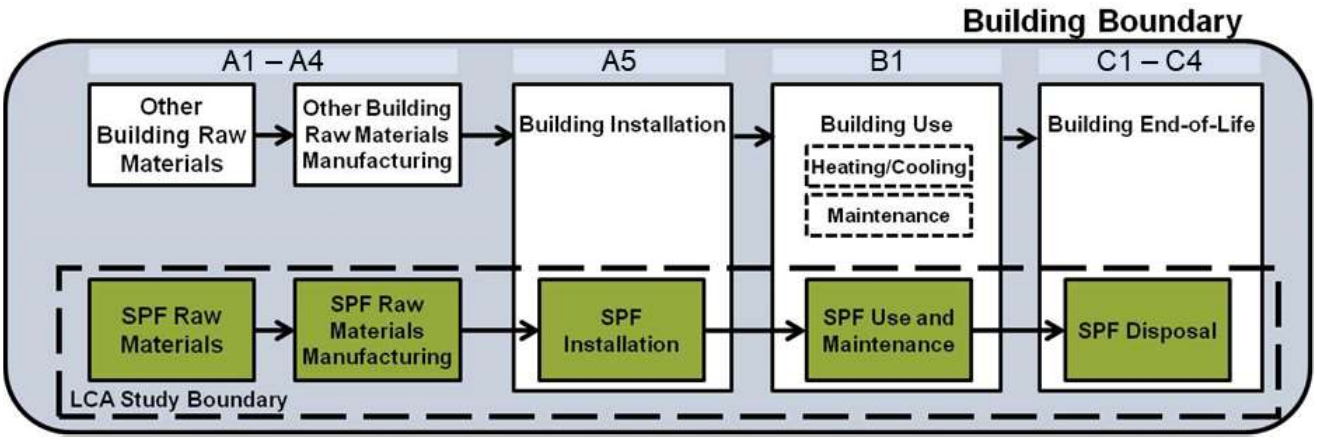

Figure 1. Flow diagram of SPF life cycle

1.3. Application

Open-cell products are applied to the interior side of the building envelope as an insulation and air-sealing material. They are used to insulate the underside of roof decks, on attic floors, above-grade walls, and between floors. Closed-cell spray foam insulation is applied to either the interior or exterior side of the building envelope and can be used in the same applications as open-cell. Due to its water resistance, it can also be used on below grade walls and under slabs. Roofing SPF is applied to the exterior surface of low-slope roofs. A variety of polymeric coatings are used over Roofing SPF to provide protection against ultraviolet light and mechanical abrasion.

1.4. Declaration of Methodological Framework

This EPD is declared under a cradle-to-grave system boundary. As such, it includes all life cycle stages including any off-gassing emissions from the blowing agent associated with use of the product. Per the product category rules (UL Environment, 2018), the assessment was conducted using a building service life of 75 years. Material and energy inputs were allocated on a mass basis. Recycled content and disposal at end-of-life follow the cut-off allocation approach. No inputs or outputs were deliberately excluded from this EPD.

1.5. Technical Requirements

All SPF products must meet numerous peformance requirments to comply with building codes. The details of these requirements are described in specific tests listed in consensus standards for material performance and code compliance. A summary of these consensus standards is provided in Table 2 below:

Table 2: Summary of Technical Standards for SPF in Construction

Standard Type	Roofing	Closed cell	Open cell
ASTM	ASTM C1029 Type III and IV or ASTM D7425	ASTM C1029 Type I and II	ASTM WK30150
CAN/ULC		S705.1	S712.1
ICC Building Code Compliance	ICC-ES AC-377 ICC-1100 20xx		

ASTM Standards

- C1029-15 Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
- D7425-13 Standard Specification for Spray Polyurethane Foam Used for Roofing Applications
- WK30150 (under development) Standard Specification for Spray-Applied Open Cellular Polyurethane Thermal Insulation

UL Canada Standards

- S705.1 Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density
- S712.1 Standard for Thermal Insulation - Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam

International Code Council Standards

- ICC-ES AC-377 Acceptance Criteria for Spray-Applied Foam Plastic Insulation
- ICC-1100-20xx Standard for Spray-applied Polyurethane Foam Plastic Insulation

Table 3: Summary of Typical Material Performance Requirements for SPF in Construction

Standard Type		ROOFING	CLOSED CELL	OPEN CELL
Thermal Performance (R-value)	ASTM C518, C177 or C1363	As reported (typ R6.0-7.0/inch)	As reported (typ R6.5-7.2/inch)	As reported (typ R3.6-4.3/inch)
Surface Burning Characteristics	ASTM E84 or UL723	Flame spread index ≤ 75	Flame spread index ≤ 75 Smoke developed ≤ 450	Flame spread index ≤ 75 Smoke developed ≤ 450
Core Density	ASTM D1622	As reported (typ 2.5-4.0 pcf / 40-64 kg/m^3)	As reported (typ 1.5-2.5 pcf / 24-40 kg/m^3)	As reported (typ 0.4-1.5 pcf / 6.4-24 kg/m^3)
Closed-Cell Content	ASTM D2856 or ASTM D6226	>90%	>90%	NR
Tensile Strength	ASTM D1623	40 psi min (276 kPa)	15 psi min (103 kPa)	3 psi min (21 kPa)
Compressive Strength	ASTM D1623	40 psi min (276 kPa)	15 psi min (103 kPa)	NR
Dimensional Stability	ASTM D2126	15% max change	15% max change	15% max change
Water Vapor Permeance	ASTM E96 (dry cup)	As reported (typ 1 US perm @ 2" thk / 0.66 SI perm @ 51 mm)	As reported (typ 1 US perm @ 2" thk / 0.66 SI perm @ 51 mm)	NR
Air Permeance	ASTM D E283 or D2178	As reported (typ imperm @ 1.5" thk / 38 mm)	As reported (typ imperm @ 1.5" thk / 38 mm)	As reported (typ imperm @ 3-5" thk / 76-127 mm)
Water Absorption	ASTM D2842	<5% max	<5% max	NR

1.6. Properties of Declared Product as Delivered

The A-side and B-side chemicals required to produce SPF are delivered to the job site in separate containers. On the job site, these chemicals are mixed in equal volume proportions to create SPF.

1.7. Material Composition

The A-side of SPF is made from a blend of polymeric methylene diphenyl diisocyanate (MDI). The B-side is a mixture of polyester and or polyether polyols, flame retardants, blowing agents, catalysts, and other additives that, when mixed with A-side, creates foam that can be applied for insulation.

Since one half of the formulation by volume is MDI (A-side), the table focuses on the other multi-component half (B-side). The product composition is proprietary, so an approximate composition of chemical components is shown.

While some of the ingredients may be classified as hazardous, per the Resource Conservation and Recovery Act (RCRA), Subtitle 3, the product as installed and ultimately disposed of is not classified as a hazardous substance, as hazardous ingredients are rendered chemically inert after installation.

Table 4. Generic B-side formulations

Chemical (% Composition)		Roofing	Closed cell	Open Cell
Polyol	Polyester	35	50	
	Polyether	10	5	34
	Mannich	35	15	
	Compatibilizer			10
Fire Retardants	Various	8	15	25
Blowing Agent	Reactive (H_2O)	2	3	20
	HFO or HFC	7	7	
Catalyst	Catalyst, amine	1	3	9
	Catalyst, metal	1	1	1
Surfactant	Silicone	1	1	1

1.8. Manufacturing

The majority the A-side of SPF is manufactured by four U.S. based chemical manufacturing companies with processing facilities located in Texas and Louisiana. The B-side formulation is made by a facility in Georgia. Most of the primary chemicals used in the B-side formulation are processed in facilities in Texas, Louisiana, New Jersey, and North Carolina.

During the B-side production process, materials are blended in tanks and packaged. The B-side blending process utilizes internal scrap from a manufacturer's own operations. Additionally, the facility utilizes technology to minimize the release of gaseous material inputs, such as blowing agents, during material transfer and processing. Waste materials are typically reintegrated into the formulation without additional collection, transport, or processing.

1.9. Packaging

High-pressure SPF chemicals are packaged in 55-gallon (208 L) steel drums. Finished packaged products are loaded onto pallets, where additional shipping materials, such as strapping, cardboard, and plastic wrap, are applied. In this study, it is assumed that the empty chemical containers are properly cleaned and taken to a drum recycler.

1.10. Transportation

Final products are distributed via dry van truck, either directly to customers, or first to warehouse, prior to being sent to customers.

1.11. Product Installation

High-pressure SPF, including open-cell, closed-cell and roofing SPF, is installed by professional applicators by on-site mixing of the A-side and B-side chemicals.

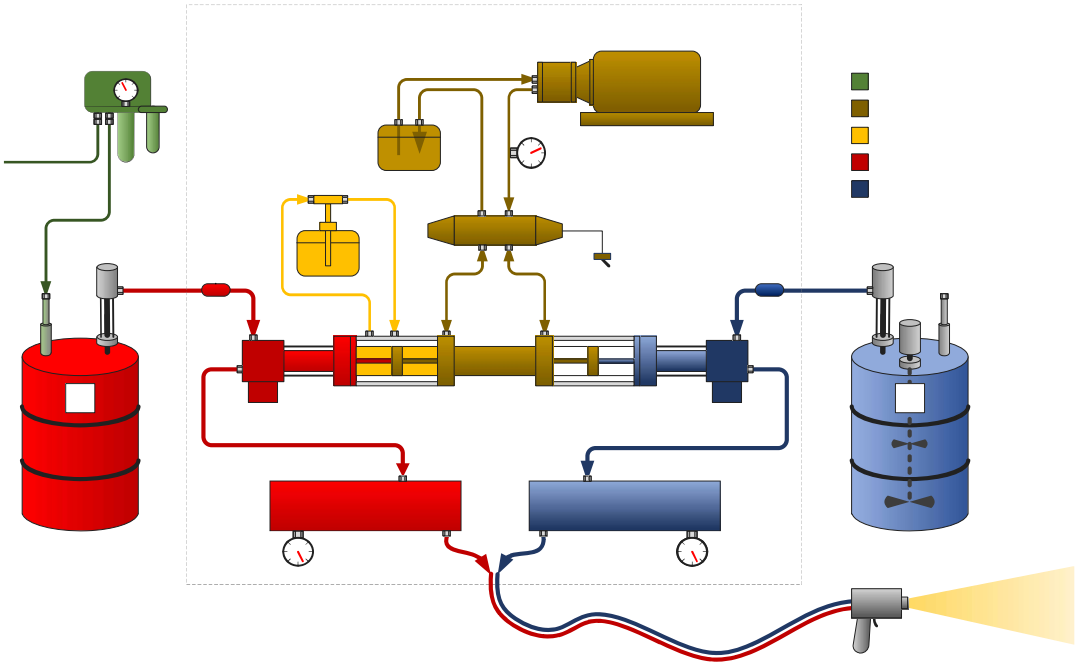

Figure 2. Schematic of a High-Pressure SPF system

Installation includes insulation of the walls, floors and ceilings of entire buildings, or application as an insulated low-slope roofing system. These chemicals are delivered to the jobsite in unpressurized containers (usually 55-gallon / 208 L drums) and heated to approximately 120-130 °F (49-54 °C) and pressurized to about 1000 psi (6,895 kPa) by specialized equipment. The chemicals are transferred by a heated hose and aerosolized by a spray gun and combined by impingement mixing at the point of application. Personal protective equipment such as goggles, protective suits, and respirator cartridges is required to protect applicators from chemical exposure during installation. Also needed are disposable materials such as masking tape and drop cloths. The schematic in Figure 2 shows the typical equipment components used to produce high-pressure SPF foam, including unpressurized A-side and B-side liquid drums with transfer pumps, which are connected to the proportioner system for heating and pressurizing the chemicals, and then through a heated hose connected to a spray gun for application.

After the foam cures and expands, any excess that may prevent installation of the interior cladding is cut off and discarded. For SPF with physical blowing agents, this study assumes 10% of the installed blowing agent is released to surrounding air during the installation phase. Discarded foam from installation also experiences blowing agent release while in landfill. Disposal of packaging materials is modeled in accordance to the assumptions outlined in Part A of the PCR (UL Environment, 2018). All ancillary installation materials are assumed to be sent to landfill.

1.12. Use

As this study only looks at the life cycle of spray foam insulation, and not the building, the use phase only contains the emissions of any chemicals off-gassed from the foam. This study assumes 24% of the original chemical blowing agent is off-gassed over a 75-year lifetime (Honeywell International).

1.13. Reference Service Life and Estimated Building Service Life

Lorem The reference service life (RSL) for SPF is the life of the building or 75 years. Additional information is provided in Table 7.

1.14. Disposal

When the building is decommissioned, it is assumed that only manual labor is involved to remove the foam. Wastes are assumed to be transported 100 miles (160 km) to the disposal site. The spray foam is assumed to be landfilled at end-of-life, as is typical for construction and demolition waste in the US. This study assumes 16% of the original physical blowing agent is emitted at this stage in the life cycle. It is further assumed the spray foam is inert in the landfill and 50% of the blowing agent remains in the product after disposal (Kjeldsen & Jensen, 2001).

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

The product function is providing insulation to buildings. Accordingly, the functional unit for the study is 1 m² of installed insulation material with a thickness that gives an average thermal resistance of R_{SI}=1m²·K/W (In imperial units, R_{SI}=1 is equivalent to R = 5.68 h·ft²·°F/Btu) with a building service life of 75 years (packaging included).

2.2. System Boundary

The study uses a cradle-to-grave system boundary. As such, it includes upstream processing and production of materials and energy resources needed to produce SPF, transport of materials (all chemical inputs for production and packaging) to SPF formulation sites, formulation of SPF components, transport of the components to the installation site, installation of insulation, removal and transport of insulation to disposal site, and end-of-life-disposal. Building energy savings from the use of insulation are excluded from this analysis.

2.3. Estimates and Assumptions

The material and energy inputs and outputs were modeled according to data provided by the representative site, while the electricity grid and natural gas mix were chosen based on the location of the production facility.

Lastly, this study assumes 50% of blowing agent consumed in the production of the formulation is eventually emitted, 10% during installation, 24% during its lifetime in the building, and 16% during end-of-life. The remaining 50% remains in the product (Honeywell International) (Kjeldsen & Jensen, 2001).

2.4. Cut-off Criteria

The cut-off criteria for including or excluding materials, energy and emissions data of the study are as follows:

- **Mass** – If a flow is less than 1% of the cumulative mass of the model it may be excluded, providing its environmental relevance is not a concern.

- **Energy** – If a flow is less than 1% of the cumulative energy of the model it may be excluded, providing its environmental relevance is not a concern.
- **Environmental relevance** – If a flow meets the above criteria for exclusion yet is thought to potentially have a significant environmental impact, it was included. Material flows which leave the system (emissions) and whose environmental impact is greater than 1% of the total of an impact category that has been considered in the assessment must be covered. This judgment was made based on experience and documented as necessary.

Packaging of incoming raw materials (e.g. pallets, totes, super-sacks) are excluded as they represent less than 1% of the product mass. Capital goods and infrastructure required to produce and install SPF (e.g. batch mixers, spraying equipment) are presumed to produce millions of units over the course of their life, so impact of a single functional unit attributed to these equipment is assumed to be negligible; therefore, capital goods and infrastructure were excluded from this study. No known flows are deliberately excluded from this EPD.

2.5. Data Sources

The LCA model was created using the GaBi Software system for life cycle engineering, developed by Sphera Solutions. The GaBi 2022.2 LCI database provides the life cycle inventory data for several of the raw and process materials obtained from the background system.

2.6. Data Quality

A variety of tests and checks were performed by the LCA practitioner throughout the project to ensure high quality of the completed LCA. Checks included an extensive review of the LCA model as well as the background data used.

Temporal coverage

The data are intended to represent spray polyurethane foam production during the 2020 calendar year. As such, CSFI provided primary data for 12 consecutive months during the 2020 calendar year.

Geographical coverage

This background LCA represents CSFI's products produced in the United States. Primary data are representative of these countries. Regionally specific datasets were used to represent each manufacturing location's energy consumption. Proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their technological representativeness of the actual materials.

Technological coverage

Data on material composition were collected directly from CSFI. Manufacturing data were provided by CSFI for the Open Cell, Closed-Cell (HFC and HFO) and Roofing (HFC and HFO) products. Waste, emissions, and energy use are calculated from reported annual production during the reference year.

2.7. Period under Review

Primary data collected represent production during the 2020 calendar year. This analysis is intended to represent production in 2020.

2.8. Allocation

The cut-off allocation approach is adopted in the case of any post-consumer and post-industrial recycled content,

which is assumed to enter the system burden-free. Only environmental impacts from the point of recovery and forward (e.g., inbound transports, grinding, processing, etc.) are considered.

3. Life Cycle Assessment Scenarios

Table 5. Transport to the building site (A4)

NAME	UNIT	ROOFING	CLOSED CELL	OPEN CELL
Fuel type		Diesel	Diesel	Diesel
Fuel economy, outbound transport (medium truck)	l/100km	44.0	44.0	44.0
Outbound distance	km	805	805	805
Capacity utilization (including empty runs, mass based	%	69	69	69
Weight of products transported (if gross density not reported)	kg	1.1-1.21	0.704-0.737	0.341

Table 6. Installation into the building (A5), per functional unit

NAME	UNIT	ROOFING	CLOSED CELL	OPEN CELL
Ancillary materials	kg	0.0184-0.0202	0.0117-0.0123	0.00571
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	m^3	-	-	-
Other resources	kg	-	-	-
Electricity consumption	kWh	0.0619-0.0658	0.0383-.0400	0.0187
Diesel for construction equipment	MJ	4.33-4.61	2.69-2.81	1.31
Product loss per functional unit	kg	0.1-0.11	0.064-0.067	0.031
Output materials resulting from on-site waste processing (for recycling)	kg	0.0268	0.0556-0.0576	0.0889-0.0948
Biogenic carbon contained in packaging	kg CO2	-	-	-
VOC content	$\mu g/m^3$	-	-	

Table 7. Reference Service Life

NAME	VALUE	UNIT
RSL	75	Years
Declared product properties (at the gate) and finishes, etc.	1	m^2
	1	R_{SI}

Table 8. End of life (C1-C4)

NAME	UNIT	ROOFING	CLOSED CELL	OPEN CELL
Collected as mixed construction waste	kg	1.0-1.1	0.64-0.67	0.31
Landfill	kg	1.0-1.1	0.64-0.67	0.31

4. Life Cycle Assessment Results

Table 9. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUC-TION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
Cradle-to-grave	x	x	x	x	x	x	MND	MND	MND	MND	MND	MND	x	x	x	x	MND

4.1. Life Cycle Impact Assessment Results

North American LCIA results are declared using TRACI 2.1 methodology. Note that the IPCC AR6 GWP (IPCC, 2021) results are also presented as they are more current than the TRACI 2.1 GWP results and represent accurate values for the GWP of the blowing agents. The TRACI 2.1 methodology refers to an earlier version of the IPCC report.

Table 10. Open Cell Results

TRACI V2.1	A1-A3	A4	A5	B1	C2	C4
GWP 100 [kg CO_2 eq]	1.12E+00	1.77E-02	1.27E-01	0.00E+00	3.08E-03	1.13E-02
GWP 100, IPCC AR6 [kg CO_2 eq]	1.13E+00	1.79E-02	1.28E-01	0.00E+00	3.10E-03	1.14E-02
ODP [kg CFC-11 eq]	4.32E-09	2.96E-17	1.09E-15	0.00E+00	5.15E-18	3.66E-16
AP [kg SO_2 eq]	2.01E-03	6.08E-05	1.31E-03	0.00E+00	9.61E-06	4.97E-05
EP [kg N eq]	4.80E-04	6.65E-06	1.01E-04	0.00E+00	1.09E-06	2.76E-06
POCP [kg O_3 eq]	3.60E-02	1.41E-03	4.71E-02	0.00E+00	2.22E-04	8.73E-04
ADP_{fossil} [MJ, LHV]	2.72E+00	3.50E-02	3.01E-01	0.00E+00	6.08E-03	2.20E-02

Table 11. Closed Cell, HFC Results

TRACI v2.1	A1-A3	A4	A5	B1	C2	C4
GWP 100 [kg CO_2 eq]	2.74E+00	3.81E-02	3.21E+00	6.27E+00	6.47E-03	4.16E+00
GWP 100, IPCC AR6 [kg CO_2 eq]	2.76E+00	3.83E-02	3.02E+00	5.86E+00	6.51E-03	3.89E+00
ODP [kg CFC-11 eq]	6.37E-14	6.36E-17	2.66E-15	0.00E+00	1.08E-17	7.61E-16
AP [kg SO_2 eq]	4.66E-03	1.30E-04	3.20E-03	0.00E+00	2.02E-05	1.03E-04
EP [kg N eq]	5.02E-04	1.43E-05	2.46E-04	0.00E+00	2.30E-06	5.76E-06
POCP [kg O_3 eq]	8.53E-02	3.02E-03	1.14E-01	4.58E-06	4.66E-04	1.82E-03
ADP_{fossil} [MJ, LHV]	6.96E+00	7.50E-02	7.29E-01	0.00E+00	1.27E-02	4.58E-02

Table 12. Closed Cell, HFO Results

TRACI v2.1	A1-A3	A4	A5	B1	C2	C4
GWP 100 [kg CO_2 eq]	2.67E+00	3.65E-02	3.08E-01	4.93E-03	6.21E-03	2.59E-02
GWP 100, IPCC AR6 [kg CO_2 eq]	2.69E+00	3.67E-02	3.09E-01	4.93E-03	6.25E-03	2.61E-02
ODP [kg CFC-11 eq]	7.57E-14	6.09E-17	2.55E-15	0.00E+00	1.04E-17	7.32E-16
AP [kg SO_2 eq]	4.46E-03	1.25E-04	3.07E-03	0.00E+00	1.94E-05	9.95E-05
EP [kg N eq]	5.02E-04	1.37E-05	2.35E-04	0.00E+00	2.21E-06	5.54E-06
POCP [kg O_3 eq]	8.24E-02	2.89E-03	1.10E-01	0.00E+00	4.47E-04	1.75E-03
ADP_{fossil} [MJ, LHV]	6.64E+00	7.19E-02	6.98E-01	0.00E+00	1.22E-02	4.41E-02

Table 13. Roofing, HFC Results

TRACI v2.1	A1-A3	A4	A5	B1	C2	C4
GWP 100 [kg CO_2 eq]	4.60E+00	6.25E-02	4.52E+00	8.98E+00	1.08E-02	5.97E+00
GWP 100, IPCC AR6 [kg CO_2 eq]	4.64E+00	6.29E-02	4.25E+00	8.39E+00	1.08E-02	5.58E+00
ODP [kg CFC-11 eq]	1.60E-09	1.04E-16	3.43E-15	0.00E+00	1.80E-17	1.27E-15
AP [kg SO_2 eq]	7.19E-03	2.14E-04	4.18E-03	0.00E+00	3.36E-05	1.72E-04
EP [kg N eq]	6.64E-04	2.34E-05	3.21E-04	0.00E+00	3.82E-06	9.60E-06
POCP [kg O_3 eq]	1.36E-01	4.96E-03	1.50E-01	6.56E-06	7.76E-04	3.03E-03
ADP_{fossil} [MJ, LHV]	1.17E+01	1.23E-01	9.64E-01	0.00E+00	2.12E-02	7.64E-02

Table 14. Roofing, HFO Results

TRACI v2.1	A1-A3	A4	A5	B1	C2	C4
GWP 100 [kg CO_2 eq]	4.44E+00	5.88E-02	4.07E-01	8.73E-03	1.01E-02	4.25E-02
GWP 100, IPCC AR6 [kg CO_2 eq]	4.48E+00	5.92E-02	4.09E-01	8.73E-03	1.02E-02	4.29E-02
ODP [kg CFC-11 eq]	1.46E-09	9.82E-17	3.46E-15	0.00E+00	1.68E-17	1.19E-15
AP [kg SO_2 eq]	6.94E-03	2.01E-04	4.19E-03	0.00E+00	3.15E-05	1.61E-04
EP [kg N eq]	6.47E-04	2.20E-05	3.22E-04	0.00E+00	3.58E-06	8.99E-06
POCP [kg O_3 eq]	1.31E-01	4.66E-03	1.51E-01	0.00E+00	7.27E-04	2.84E-03
ADP_{fossil} [MJ, LHV]	1.10E+01	1.16E-01	9.63E-01	0.00E+00	1.99E-02	7.15E-02

4.2. Life Cycle Inventory Results

Table 15. Resource Use, Open Cell

PARAMETER	A1-A3	A4	A5	B1	C2	C4
RPR_E [MJ, LHV]	1.82E+00	1.09E-02	1.49E-01	0.00E+00	1.89E-03	1.63E-02
RPR_M [MJ, LHV]	1.84E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$ [MJ, LHV]	2.43E+01	2.84E-01	2.16E+00	0.00E+00	4.94E-02	1.88E-01
$NRPR_M$ [MJ, LHV]	4.82E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	4.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	-	-	-	-	-	-
NRSF [MJ, LHV]	-	-	-	-	-	-
RE [MJ, LHV]	-	-	-	-	-	-
FW [m^3]	7.29E-03	4.63E-05	2.13E-04	0.00E+00	8.04E-06	2.50E-05

Table 16. Resource Use, Closed Cell, HFC

PARAMETER	A1-A3	A4	A5	B1	C2	C4
RPR_E [MJ, LHV]	2.73E+00	2.33E-02	3.55E-01	0.00E+00	3.97E-03	3.40E-02
RPR_M [MJ, LHV]	7.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$ [MJ, LHV]	5.98E+01	6.10E-01	5.34E+00	0.00E+00	1.04E-01	3.92E-01
$NRPR_M$ [MJ, LHV]	1.43E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	9.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	-	-	-	-	-	-
NRSF [MJ, LHV]	-	-	-	-	-	-
RE [MJ, LHV]	-	-	-	-	-	-
FW [m^3]	1.59E-02	9.93E-05	5.60E-04	0.00E+00	1.69E-05	5.20E-05

Table 17. Resource Use, Closed Cell, HFO

PARAMETER	A1-A3	A4	A5	B1	C2	C4
RPR_E [MJ, LHV]	3.06E+00	2.24E-02	3.40E-01	0.00E+00	3.81E-03	3.27E-02
RPR_M [MJ, LHV]	7.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$ [MJ, LHV]	5.77E+01	5.84E-01	5.12E+00	0.00E+00	9.95E-02	3.77E-01
$NRPR_M$ [MJ, LHV]	1.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	8.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	-	-	-	-	-	-
NRSF [MJ, LHV]	-	-	-	-	-	-
RE [MJ, LHV]	-	-	-	-	-	-
FW [m^3]	1.54E-02	9.51E-05	5.37E-04	0.00E+00	1.62E-05	5.00E-05

Table 18. Resource Use, Roofing, HFC

PARAMETER	A1-A3	A4	A5	B1	C2	C4
RPR_E [MJ, LHV]	4.54E+00	3.83E-02	4.85E-01	0.00E+00	6.60E-03	5.66E-02
RPR_M [MJ, LHV]	-	-	-	-	-	-
$NRPR_E$ [MJ, LHV]	1.01E+02	1.00E+00	6.80E+00	0.00E+00	1.72E-01	6.53E-01
$NRPR_M$ [MJ, LHV]	2.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	1.49E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	-	-	-	-	-	-
NRSF [MJ, LHV]	-	-	-	-	-	-
RE [MJ, LHV]	-	-	-	-	-	-
FW [m^3]	2.47E-02	1.63E-04	6.26E-04	0.00E+00	2.81E-05	8.67E-05

Table 19. Resource Use, Roofing, HFO

PARAMETER	A1-A3	A4	A5	B1	C2	C4
RPR_E [MJ, LHV]	5.23E+00	3.61E-02	4.80E-01	0.00E+00	6.19E-03	5.30E-02
RPR_M [MJ, LHV]	-	-	-	-	-	-
$NRPR_E$ [MJ, LHV]	9.67E+01	9.42E-01	6.88E+00	0.00E+00	1.62E-01	6.12E-01
$NRPR_M$ [MJ, LHV]	2.07E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM [kg]	1.40E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ, LHV]	-	-	-	-	-	-
NRSF [MJ, LHV]	-	-	-	-	-	-
RE [MJ, LHV]	-	-	-	-	-	-
FW [m^3]	2.39E-02	1.53E-04	6.61E-04	0.00E+00	2.63E-05	8.11E-05

Table 20. Output Flows and Waste Categories, Open Cell

PARAMETER	A1-A3	A4	A5	B1	C2	C4
HWD [kg]	2.18E-05	1.09E-12	1.36E-11	0.00E+00	1.89E-13	6.51E-12
NHWD [kg]	2.10E-02	2.45E-05	2.40E-02	0.00E+00	4.25E-06	2.72E-01
HLRW [kg]	4.76E-07	7.39E-10	2.95E-08	0.00E+00	1.28E-10	1.74E-09
ILLRW [kg]	4.02E-04	6.24E-07	2.47E-05	0.00E+00	1.08E-07	1.52E-06
CRU [kg]	-	-	-	-	-	-
MR [kg]	0.00E+00	0.00E+00	2.68E-02	0.00E+00	0.00E+00	0.00E+00
MER [kg]	-	-	-	-	-	-
EE, Steam [MJ, LHV]	-	-	-	-	-	-
EE, Electricity [MJ, LHV]	-	-	-	-	-	-

Table 21. Output Flows and Waste Categories, Closed Cell, HFC

PARAMETER	A1-A3	A4	A5	B1	C2	C4
HWD [kg]	2.67E-09	2.33E-12	3.36E-11	0.00E+00	3.97E-13	1.36E-11
NHWD [kg]	4.37E-02	5.25E-05	5.54E-02	0.00E+00	8.92E-06	5.66E-01
HLRW [kg]	9.12E-07	1.59E-09	7.14E-08	0.00E+00	2.69E-10	3.62E-09
ILLRW [kg]	8.23E-04	1.34E-06	5.98E-05	0.00E+00	2.27E-07	3.17E-06
CRU [kg]	-	-	-	-	-	-
MR [kg]	0.00E+00	0.00E+00	5.76E-02	0.00E+00	0.00E+00	0.00E+00
MER [kg]	-	-	-	-	-	-
EE, Steam [MJ, LHV]	-	-	-	-	-	-
EE, Electricity [MJ, LHV]	-	-	-	-	-	-

Table 22. Output Flows and Waste Categories, Closed Cell, HFO

PARAMETER	A1-A3	A4	A5	B1	C2	C4
HWD [kg]	2.56E-09	2.24E-12	3.22E-11	0.00E+00	3.81E-13	1.31E-11
NHWD [kg]	4.27E-02	5.03E-05	5.31E-02	0.00E+00	8.57E-06	5.44E-01
HLRW [kg]	9.64E-07	1.52E-09	6.84E-08	0.00E+00	2.59E-10	3.48E-09
ILLRW [kg]	8.99E-04	1.28E-06	5.73E-05	0.00E+00	2.18E-07	3.05E-06
CRU [kg]	-	-	-	-	-	-
MR [kg]	0.00E+00	0.00E+00	5.56E-02	0.00E+00	0.00E+00	0.00E+00
MER [kg]	-	-	-	-	-	-
EE, Steam [MJ, LHV]	-	-	-	-	-	-
EE, Electricity [MJ, LHV]	-	-	-	-	-	-

Table 23. Output Flows and Waste Categories, Roofing, HFC

PARAMETER	A1-A3	A4	A5	B1	C2	C4
HWD [kg]	8.11E-06	3.83E-12	4.24E-11	0.00E+00	6.60E-13	2.26E-11
NHWD [kg]	6.95E-02	8.63E-05	7.98E-02	0.00E+00	1.49E-05	9.44E-01
HLRW [kg]	1.69E-06	2.61E-09	9.43E-08	0.00E+00	4.49E-10	6.04E-09
ILLRW [kg]	1.50E-03	2.20E-06	7.89E-05	0.00E+00	3.79E-07	5.29E-06
CRU [kg]	-	-	-	-	-	-
MR [kg]	0.00E+00	0.00E+00	9.48E-02	0.00E+00	0.00E+00	0.00E+00
MER [kg]	-	-	-	-	-	-
EE, Steam [MJ, LHV]	-	-	-	-	-	-
EE, Electricity [MJ, LHV]	-	-	-	-	-	-

Table 24. Output Flows and Waste Categories, Roofing, HFO

PARAMETER	A1-A3	A4	A5	B1	C2	C4
HWD [kg]	7.38E-06	3.61E-12	4.30E-11	0.00E+00	6.19E-13	2.12E-11
NHWD [kg]	6.63E-02	8.11E-05	7.78E-02	0.00E+00	1.39E-05	8.84E-01
HLRW [kg]	1.82E-06	2.45E-09	9.42E-08	0.00E+00	4.20E-10	5.65E-09
ILLRW [kg]	1.70E-03	2.07E-06	7.89E-05	0.00E+00	3.55E-07	4.96E-06
CRU [kg]	-	-	-	-	-	-
MR [kg]	0.00E+00	0.00E+00	8.89E-02	0.00E+00	0.00E+00	0.00E+00
MER [kg]	-	-	-	-	-	-
EE, Steam [MJ, LHV]	-	-	-	-	-	-
EE, Electricity [MJ, LHV]	-	-	-	-	-	-

5. LCA Interpretation

For HFC containing products, installation (A5), use (B1), and disposal (C4) are the greatest contributors to the GWP category due the emissions of HFCs over the course of its lifecycle. HFO formulations and Open-cell do not have pronounced GWP impacts across the life cycle due to lower blowing agent GWP characterization factors.

In nearly all other impact categories, SPF environmental performance is driven primarily by raw materials (A1). Installation tends to be the second highest driver of impact due to the use of on-site diesel generator, which contributes significantly to Acidification, Eutrophication, and Smog Formation Potential.

The inbound transportation module (A2) has a modest contribution to overall impact. Other transportation modules representing transport to site (A4) and transport to end-of-life (C2), have negligible contribution to life cycle results.

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

Manufacturing of SPF formulations and upstream chemicals is performed in an industrial manufacturing facility. Like many manufacturing processes, hazardous chemicals and manufacturing procedures may be employed. The Carlisle Spray Foam Insulation manufacturing facility follows all local, state and federal regulations regarding safe use and disposal of all chemicals (US EPA), as well as safety requirements required of the generally manufacturing operation of equipment and processes (US and State OSHA) and safe transport of all materials (US DOT) Environment and Health During Installation

6.2. Environment and Health During Installation

Installation of SPF involves potential exposure to certain hazardous chemicals that requires risk mitigation through the use of personal protective equipment and on-site actions including ventilation and restricted access. Of greatest concern is the potential exposure to airborne and liquid isocyanates during and immediately after installation of SPF. Isocyanates are known chemical sensitizers and exposure can occur through contact with the skin, eyes and respiratory system. Ventilation of the work zone, coupled with use of proper personal protective equipment is required during and immediately after installation SPF. For more information on health and safety during and immediately after SPF installation, please visit www.spraypolyurethane.org.

6.3. Extraordinary Effects

Fire

Spray polyurethane foam, like all foam plastics and many construction materials – including wood - is a combustible material and will emit toxic gases including carbon monoxide during a fire. When used in buildings and other construction applications, foam plastics employ flame retardants to control ignition the spread of fire and development of smoke. In addition, foam plastics may need to be protected with fire-resistant coverings or coatings when used in certain construction applications, as dictated by the building codes. All foam plastics materials and assemblies should meet the fire test requirements of the applicable building codes.

Water

The closed-cell and roofing SPF products meet the FEMA Class 5 requirements[1] for flood-damage resistant insulation materials for floors and walls.

Mechanical Destruction

Should the assembly the SPF is installed in, i.e. the wall or roof, have to be replaced then the SPF will have to be replaced as well.

6.4. Delayed Emissions

This study assumes 16% of the original physical blowing agent is emitted at end of life. It is further assumed the spray foam is inert in the landfill and 50% of the blowing agent remains in the product after disposal. (Honeywell International)

6.5. Environmental Activities and Certifications

CSFI has certified or tested its insulation products to various VOC standards to measure emissions of volatile or semi-volatile compounds. These standards include:

- UL Environment GREENGUARD® Certification – The GREENGUARD® Certification Program specifies strict certification criteria for VOC's and indoor air quality. This voluntary program helps consumers identify products that have low chemical emissions for improved indoor air quality.
- California Department of Health Services – Also known as Section 01350, this small-chamber emissions test standard is detailed under: Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers (CA/DHS/EHLB/Standard Method v1.1-2010).
- Canadian ULC – Required for SPF insulation products, this standard provides a similar VOC emissions test protocol specifically for SPF: CAN/ULC S774-09 Standard Laboratory Guide for the Determination of Volatile Organic Compound Emissions from Polyurethane Foam
- Currently, an ASTM workgroup is developing a small-chamber emissions test protocol for chemical compounds specific to SPF that include MDI, blowing agents, flame retardants and catalysts.

[1] "Flood Damage-Resistant Materials Requirements", FEMA Technical Bulletin 2, 2008, Table 2.

6.6. Further Information

This EPD is based on LCAs of SPF products that use HFCs and HFOs as blowing agents. Because of the low global warming potential factor of HFOs (~1.0 g CO_2-eq./kg) the emissions of these blowing agents account for a small percentage of the global warming potential life cycle results for HFO containing foams. Despite being released at the same rate over the course of the life of the product as HFOs, HFCs have a substantially higher contribution to GWP due to their GWP characterization factor of HFC-134a and HFC-245fa (1,300 and 858 kg CO_2-eq./kg, respectively, over a 100 year time horizon (IPCC, 2021))[2].

7. References

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[2] Note that the TRACI 2.1 GWP methodology uses an earlier version of the IPCC report where the characterization factors of HFC-134a and HFC-245fa are 1,430 and 1,030 kg CO_2-eq./kg, respectively.

CERTIFICATE
OF COMPLIANCE

Carlisle Spray Foam Insulation

SealTite Pro Open Cell

99585-410
Certificate Number

10 Jun 2019 - 14 Apr 2025
Certificate Period

Certified
Status

UL 2818 - 2022 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Building materials are determined compliant in accordance with a Classroom environment with an air change of 0.82 hr^{-1} and a loading of 94.60 m^2. ; and Building materials are determined compliant in accordance with an Office environment with an air change of 0.68 hr^{-1} and a loading of 28.10 m^2.

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.

GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC (A)	-	0.22	mg/m³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m³
Total Aldehydes (B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m³
Particle Matter less than 10 µm (C)	-	20	µg/m³
1-Methyl-2-pyrrolidinone (D)	872-50-4	160	µg/m³
Individual VOCs (E)	-	1/2 CREL or 1/100th TLV	-

(A) Defined to be the total response of measured VOCs falling within the C_6 – C_{16} range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

(D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day

(E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

Hydrofluorocarbon (HFC) Compliance Statement

Over the past couple of years, twelve states have enacted legislation that prohibits the use of hydrofluorocarbon (HFC) blowing agents in spray polyurethane foam (SPF) insulation. As of Jan 1, 2022, the following states prohibit the use of HFCs in high-pressure spray polyurethane foam insulation:

California	Maryland	Rhode Island
Colorado	Massachusetts	Vermont
Delaware	New Jersey	Virginia
Maine	New York	Washington

HFC blowing agents have been the workhorse of the SPF industry for the past 20 years in closed-cell, medium-density spray foam insulation products. Despite having zero ozone depletion potential, HFCs contribute to an increase in Global Warming Potential (GWP). In response to this environmental risk, spray foam manufacturers formulated products based on hydrofluoroolefins (HFOs) – next-generation foam blowing agents with an ultra-low GWP. With the absence of a federal mandate and the availability of more environmentally responsible substitute products, individual states are now leading the transition away from products containing HFCs.

SealTite PRO HFO medium-density, closed-cell spray polyurethane foam insulation exclusively uses HFO blowing agent technology and has a GWP of 1. SealTite PRO HFO is free of any HFC chemicals and meets the environmental regulation requirements of all U.S. States.

Global warming potential (GWP) is the heat absorbed by any greenhouse gas in the atmosphere, as a multiple of the heat that would be absorbed by the same mass of carbon dioxide (CO_2). Blowing agent technology has evolved over the last few decades, greatly reducing the environmental impact. Fourth generation blowing agents based on HFO technology have reduced the GWP to be equivalent with CO_2.

BLOWING AGENT	GWP
CFC-12 (Freon 12)	10,900
HCFC-141b	725
HFC-365mfc	794
HFC-245fa	1,030
HFOs	1
CO_2	1

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SealTite PRO

PRODUCT CERTIFICATIONS

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SEALTITE™ PRO OPEN CELL SPRAY APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

SealTite™ PRO Open Cell spray-applied polyurethane foam plastic insulation described in this report has been evaluated for use as thermal insulation. The physical properties, thermal resistance, surface burning characteristics, air permeability, water vapor transmission, fire-resistance-rating, attic and crawl space installations, and uses in Types I through V construction were evaluated for compliance with the following codes and regulations:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2021, 2018, and 2015 International Energy Conservation Code® (IECC)
- 2020 Florida Building Code, Building (FBC, Building) – Supplement attached
- 2020 Florida Building Code, Residential (FBC, Residential – Supplement attached

2.0 LIMITATIONS

Use of SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The insulation shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report, and the applicable code. If there are any conflicts between the manufacturer's published installation instructions and this report, the more restrictive shall govern.

2.2 In accordance with Sections 4.6.1 and 4.6.2 of this report, the insulation shall be separated from the interior of the building by a code-complying thermal barrier.

2.3 The insulation shall not exceed the nominal density and thickness for the installation conditions described in this report.

2.4 During application, the insulation shall be protected from exposure to weather.

2.5 The insulation shall be installed by professional spray polyurethane foam installers approved by Carlisle Spray Foam Insulation, or by the Spray Polyurethane Foam Alliance (SPFA).

2.6 Use of the insulation in areas of "very heavy" termite infestation probability shall be in accordance with IBC Section 2603.8, or IRC Section R318.4, as applicable.

2.7 When required by the applicable code, a vapor retarder shall be installed.

2.8 Labeling and jobsite certification of the insulation and coatings shall comply with the following code sections as applicable:

- IBC Section 2603.2
- IRC Section R316.2
- IRC Section N1101.10.1.1
- IECC Sections C303.1.1.1 or R303.1.1.1

2.9 Foam plastic used in plenums as interior finish or interior trim shall comply with Section 2603.7 of the IBC.

2.10 The insulation recognized in this report is produced by Carlisle Spray Foam Insulation in Cartersville, Georgia.

3.0 PRODUCT USE

SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation complies with IBC Section 2603, IRC Section R316, and IECC Sections C303, C402, R303, and R402. When installed in accordance with Section 4.0 of this report, the foam plastic insulation may be used in wall cavities, floor assemblies or ceiling assemblies, and/or in attics and crawl spaces as nonstructural thermal insulation material. SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation can be used in Types I, II, III, IV, and V construction under the IBC and in one- and two-family dwellings under the IRC.

SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation may be used as air impermeable insulation when installed in accordance with Section 4.4 of this report.

4.0 PRODUCT DESCRIPTION

4.1 Properties: SealTite PRO Open Cell is a low-density, open cell, spray-applied polyurethane foam plastic insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation has a nominal in-place density of 0.5 pcf (8 kg/m^3).

The two-component spray foam plastic is produced in the field by combining a polymeric isocyanate (A component) and a polymeric resin (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 50°F and 80°F (10°C and 27°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is six months.

4.2 Thermal Resistance (R-Values): SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation has thermal resistance (R-Value) at a mean temperature of 75°F ± 5°F (23.8°C ± 2.8°C) as shown in Table 1 of this report.

TABLE 1 – Thermal Resistance (R-Values)[1]

Thickness (inch)	SealTite PRO Open Cell R-Value (°f•ft²•h/Btu)
1	3.7
2	7.3
3	11
3.5	13
4	15
5	18
5.5	20
6	22
7	26
7.5	27
8	29
9	33
9.5	35
10	37
11.5	42
12	44
16	59

For **SI:** 1 inch = 25.4 mm, 1°F·ft²·h/Btu = 0.176 110 K·m²/W.

4.3 Surface Burning Characteristics: At a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pcf (8.0 kg/m³), SealTitePRO Open Cell spray-applied polyurethane foam plastic insulation yields a flame spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E84.

Foam insulation thicknesses are not limited when covered by a code complying thermal barrier and installed in accordance with Section 4.6.1.1 of this report.

4.4 Air Permeability: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation is classified as an air-impermeable insulation when tested in accordance with ASTM E283 at a minimum thickness of 3 inches (76 mm), in accordance with 2021 and 2018 IBC Section 1202.3, 2015 IBC Section 1203.3, and IRC Section R806.5.

4.5 Fire- Protective Coatings and Coverings: Fire protective coatings for use as part of alternative thermal barrier assemblies or alternative ignition barrier assemblies, shall be in accordance with Tables 2 or 3 of this report, as applicable, and installed in accordance with Section 4.6 of this report.

4.6 Installation: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation shall comply with IECC Sections C402.1 or R402.1, as applicable.

The manufacturer's published installation instructions for SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation and this report shall be available on the jobsite during installation. Where conflicts occur, the most restrictive governs.

SealTite PRO Open Cell insulation shall be spray-applied on the jobsite using equipment specified in the manufacturer's published installation instructions. The maximum in-service temperature for all areas shall not exceed the maximum temperature stated in the manufacturer's published installation instructions. The insulation shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during and after application and shall not be used in electrical outlets or junction boxes or in contact with rain or water.

4.6.1 Thermal Barrier

4.6.1.1 Application with a Prescriptive Thermal Barrier: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation, in any thickness, in ceiling cavities and in wall cavities, shall be separated from the interior by a prescriptive thermal barrier. The thermal barrier shall comply with, and be installed in accordance with IBC Section 2603.4, or IRC Section R316.4, as applicable.

Exception: The thermal barrier is not required when the insulation is installed in attics or crawlspaces as described in Section 4.6.2 but shall be installed between the insulation and the interior of the building.

4.6.1.2 Alternative Thermal Barrier Assemblies: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation may be installed without a prescriptive thermal barrier as defined in Section 4.6.1.1 of this report when installed with a fire-protective coating as described in Table 2 of this report.

4.6.2 Installation in Attics or Crawl Spaces: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation may be installed in attics or crawl spaces when installed in accordance with this section. The insulation may be installed in unvented attics and unvented enclosed rafter spaces for use as air-impermeable insulation described in Section 4.4 of this report.

When installed in attics or crawl spaces where entry is made only for the service of utilities, SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation need not be surfaced with a thermal barrier. However, such attic and crawl space areas shall be separated from the interior of the

building by a thermal barrier in accordance with Section 4.6.1 of this report.

4.6.2.1 Installation Using a Prescriptive Ignition Barrier: When installed within attics or crawl spaces where entry is made only for the service of utilities, SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation shall be covered with a prescriptive ignition barrier in accordance with IBC Section 2603.4.1.6, or IRC Sections R316.5.3 and R316.5.4, as applicable.

Exception: The prescriptive ignition barrier may be omitted when installed with an alternative ignition barrier assembly in accordance with Section 4.6.2.2 and Section 4.6.2.3 of this report.

4.6.2.2 Installation Using an Alternative Ignition Barrier Assembly: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation may be installed in attics and crawl spaces using an alternative ignition barrier assembly provided:

a. Entry is only to service utilities in the attic or crawl space and no storage is permitted.
b. Attic or crawl space areas cannot be interconnected.
c. Air from the attic or crawl space cannot be circulated to other parts of the building.
d. Attic ventilation is provided as required by the 2021 and 2018 IBC Section 1202 or 2021 and 2018 IRC Section R806 except where air-impermeable insulation is permitted in unvented attics and shall comply with the following code sections as applicable:

   For Unvented Attics:
   - 2021 and 2018 IBC Section 1202.3
   - 2015 IBC Section 1203.3
   - IRC Section R806.5

   Crawl space ventilation is provided as required by the following code sections as applicable:
   - 2021 and 2018 IBC Section 1202.4
   - 2015 IBC Section 1203.4
   - IRC Section R408.1

e. The foam plastic insulation is limited to the maximum thickness and density tested.
f. In accordance with IMC (International Mechanical Code®) Section 701, combustion air is provided.
g. For SealTite PRO Open Cell, the installed coverage rate or thickness of coatings shall be as described in Section 4.6.2.3 of this report.

4.6.2.3 Installation Using an Alternative Ignition Barrier Assembly with Application of Fire-Protective Coatings: SealTite PRO Open Cell may be spray-applied in attics to the underside of roof sheathing or roof rafters, and vertical surfaces; and may be spray-applied in crawl spaces to the underside of floors and vertical surfaces as described in this section.

The SealTite PRO Open Cell foam plastic insulation shall be covered with a fire-retardant intumescent coating described in Table 3 of this report. The coating shall be applied over the insulation using airless spray equipment, roller, or a brush in accordance with the coating manufacturer's published installation instructions and this report. The ambient and substrate temperatures shall be within a range of 50°F (10°C) to 90°F (32°C), and the surface shall be dry, clean, free of dirt and loose debris, and any other substance that could interfere with adhesion of the coating.

4.7 Use in Exterior Walls of Types I, II, III, or IV Construction (IBC)

4.7.1 General: When SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation is used in exterior walls of Types I, II, III, or IV construction of any height, the insulation shall comply with IBC Section 2603.5 and Section 4.7 of this report.

4.7.2 Complying Exterior Wall Assemblies: Wall assemblies that comply with Section 2603.5.5 of the IBC and this report that may be used in exterior walls of buildings of Type I, II, III, or IV construction of any height are described in Table 4 and Table 5 of this report.

The potential heat of SealTite PRO Open Cell is 11,718 BTU/lb (27,256 kj/kg).

4.8 Non-Loadbearing One-Hour Fire-resistance-rated Wall Assemblies: SealTite PRO Open Cell may be used in non-loadbearing one--hour fire-resistance-rated wall assemblies in accordance with this section.

4.8.1 Framing: Steel studs shall be nominally 5½ inch (140 mm) deep, minimum No. 20 gauge, spaced a maximum of 24 inches (610 mm) on-center.

4.8.2 Wallboard: The interior of the wall assembly shall be covered with minimum $^{5}/_{8}$ inch (15.9 mm) thick Type X gypsum wallboard complying with ASTM C1396 fastened with No. 6, 1¼ inch (32 mm) long self-drilling drywall screws spaced 8 inches (203 mm) on-center around the perimeter and 12 inches (305 mm) on-center in the field.

4.8.3 Insulation: The foam plastic insulation shall be spray-applied into the stud cavities to a maximum nominal thickness of 4-inches (102 mm).

4.8.4 Exterior: The exterior of the wall assembly shall be covered with minimum $^{5}/_{8}$ inch (15.9 mm) thick Type X exterior gypsum sheathing complying with ASTM C1396 fastened with No. 6, 1¼ inch (32 mm) long self-drilling drywall screws spaced 8 inches (203 mm) on-center around the perimeter and 12 inches (305 mm) on-center in the field. A layer of DuPont Tyvek HomeWrap water-resistive barrier shall be attached over the Type X exterior gypsum sheathing. The water-resistive barrier shall be covered with $^{5}/_{16}$-inch (7.9 mm) thick HardiPanel® cement board fastened with

screws spaced 6 inches (152 mm) on-center around the perimeter and 12 inches (305 mm) on-center in the field.

4.9 Load-bearing One-hour Fire-resistant-rated Wall Assembly: SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation is recognized for use in loadbearing one-hour fire-resistance-rated wall assemblies in accordance with UL Assembly U305.

4.10 Fire-resistance-rated Wall Assembly 4 (2-hr Rated Load-bearing Double Stud Wall): Double stud wall construction where each wall leaf shall consist of nominal 2 x 4 wood studs, spaced a maximum of 16" OC, with blocking at mid-height. The double-wall assembly shall include a minimum 1-inch gap between the framing for the individual wall leaves. Each wall leaf of the assembly shall be covered with 2 layers of minimum ⅝" type X gypsum wallboard applied vertically or at right angles to the wall leaf framing. The base layers shall be secured to the framing using min. #6 - 1⅝" long type W screws spaced at 8" OC. along the perimeter and in the field of the gypsum wallboard. The face layers, with vertical panel joints staggered from the base layer, shall be secured to the framing using #8 - 2½" long type W screws spaced at 8" OC along the perimeter and in the field, with the face layer screws staggered from the base layer screws. All face layer joints shall be covered using paper joint tape and joint compound. All fastener heads shall be covered using joint compound. SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation shall be spray-applied into the stud cavities in any thickness from partial fill to fully filling the stud cavities.

4.11 Water Vapor Transmission Using SealTite PRO VRC-2:

4.11.1 SealTite PRO VRC-2: SealTite PRO VRC-2 is an interior latex waterborne, vapor retarder paint coating formulated for use on SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation. The coating has a shelf life of 12 months.

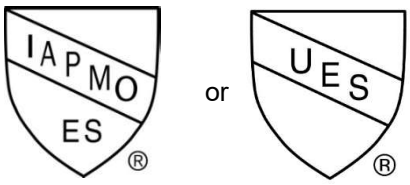
4.11.2 Application: When tested to the requirements of ASTM E96, desiccant method, SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation at a minimum thickness of 1-inch, with SealTite PRO VRC-2 coating applied at a minimum coating thickness of 32 wet mils (17 dry mils), achieves a Class II vapor retarder rating.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

a. Manufacturer's name (Carlisle Spray Foam Insulation)
b. address and telephone number,
c. the product trade name (SealTite PRO Open Cell)
d. use instructions
e. density, flame-spread and smoke-development indices
f. date of manufacture or batch/run number
g. thermal resistance values
h. the evaluation report number (ER-624)

Either IAPMO UES Mark of Conformity may also be used as shown below:



IAPMO UES ER-624

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2020, including Appendix X. (Editorially Revised in July 2020).

6.2 IAPMO ES1000-2020 Building Code Compliance of Spray-Applied polyurethane Foam.

6.3 ICC 1100-2019 Standard for Spray-applied Polyurethane Foam Plastic Insulation.

6.4 Reports of room corner fire testing in accordance with NFPA 286.

6.5 Report of Fire Tests of Building Construction in accordance with ASTM E119.

6.6 Report of air permeance testing in accordance with ASTM E283.

6.7 Report of room corner fire testing in accordance with UL 1715.

6.8 Report of testing for water vapor transmission with ASTM E96, desiccant method.

6.9 Test reports are from laboratories in conformance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on SealTite PRO Open Cell to assess its conformance to the codes and standards shown in Section 1.0 of this report and documents the product's certification. Products are manufactured at the location noted in Section 2.10 of this report under a quality control program with periodic inspections under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

TABLE 2 - ALTERNATIVE THERMAL BARRIER ASSEMBLIES

FIRE-PROTECTIVE COATING/COVERING[1]			MAXIMUM SPF THICKNESS (inch)	
TYPE	MINIMUM THICKNESS (mils)	THEORETICAL APPLICATION RATE	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
DC315[2]	14 WFT 9 DFT	115 ft²/gal.	8.5	14
Fireshell® BMS TC[3]	20 WFT (12 DFT)	83 ft²/gal.	7.5	9.5
Plus ThB[4]	14 WFT (9 DFT)	115 ft²/gal.	8.5	14

For **SI:** 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft² = 0.0929 m²
[1] Fire-protective coatings and coverings shall be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's instructions and this report.
[2] International Fireproof Technology, Inc, recognized in IAPMO UES ER-499 and tested to the requirements of NFPA 286.
[3] TPR² Corporation
[4] No-Burn®, Inc., recognized in IAPMO UES ER-305 and tested to the requirements of UL 1715.

TABLE 3
ALTERNATIVE IGNITION BARRIER ASSEMBLIES

FIRE-PROTECTIVE COATING/COVERAGE[1]			MAXIMUM SPF THICKNESS (inch)	
TYPE	MINIMUM THICKNESS (mils)	THEORETICAL APPLICATION RATE	WALLS AND VERTICAL SURFACES	CEILINGS AND OVERHEAD SURFACES
No Burn Plus XD[2]	6 WFT (4 DFT)	267 ft²/gal.	11.25	16
Flame Seal FS-IB™[3]	7.5 WFT (4 DFT)	200 ft²/gal.	12	16
Fireshell IB 4[4]	5 WFT (3.5 DFT)	83 ft²/gal.	7.5	9.5
Fireshell® BMS IC[4]	7 WFT (4 DFT)	230 ft²/gal.	7.0	9.5
DC 315[5]	4 WFT (3 DFT)	400 ft²/gal	7.5	11.5

For **SI:** 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft² = 0.0929 m²
[1] Fire-protective coatings and coverings must be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's instructions and this report.
[2] No-Burn, Inc., recognized in IAPMO UES ER-305.
[3] Flame Seal Products, Inc. recognized in IAPMO UES ER-600.
[4] TPR² Corporation.
[5] International Fireproof Technology, Inc, recognized in IAPMO UES ER-499.

TABLE 4 – NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES WITH SEALTITE PRO OPEN CELL APPLIED IN WALL STUD CAVITY

Wall Component	Material Description
Base Wall (BWS) Use either 1, 2, 3 or 4	1) Concrete Walls 2) Concrete Masonry Unit Walls 3) Steel Stud Wall - 1 layer of ⅝-inch Type X gypsum wallboard installed on the interior side of minimum 3⅝-inch deep No. 20 gauge steel studs spaced a maximum of 24 inches on center. 4) Fire-retardant-treated wood (FRTW) Stud Wall – 1 layer of 5/8-inch thick Type X gypsum wallboard on the interior, installed on 2x4 (min.) FRTW studs spaced a maximum of 24 inches on center.
Fire-Stopping in Stud Cavity at Floor Lines	1) 4-inch 4 pcf mineral wool (friction fit or installed with Z-Clips) 2) FRTW lumber -1.5 inches thick (minimum) (FRTW firestop shall only be used with FRTW framing)
Cavity Insulation Use Item 1, 2 or 3 when steel framing is used. Use Item 1 or 3 when FRTW framing is used.	1) None 2) Full stud cavity depth or less of SealTite PRO Open Cell 3) Any noncombustible fiberglass insulation (faced or unfaced).
Exterior Sheathing	Minimum ½-inch thick exterior gypsum sheathing.
WRB over Base Wall Use Item 1 or 2	1) None 2) Any water-resistive barrier or air vapor barrier approved to be used in an NFPA 285 compliant assembly paired with mineral wool, polyisocyanurate, EPS, or XPS insulation or no exterior insulation for claddings approved for that WRB. Approvals shall be from an evaluation report by an approved evaluation entity.
Exterior Insulation Use Item 1, 2 or 3	1) None – only where the cladding is listed to be approved with specific water-resistive barriers. (Note 1) 2) Minimum 2-inch-thick. 4 pcf mineral fiber insulation allowed for use with any water-resistive barrier on the base wall surface. (Note 1) 3) Any polyisocyanurate, EPS, or XPS insulation approved (see note) to be used in an NFPA 285 compliant assembly paired with the water-resistive barriers in Item 2 above and claddings in Item 2 below. (Note 2)
Exterior Cladding Use Item 1 or 2	1) Claddings below may only be used with noncombustible exterior insulation Item 2 above (mineral fiber). a. Any noncombustible cladding, such as brick, stone, terra cotta, fiber cement, concrete, sheet metal, etc. b. Combustible cladding. Use any cladding that has been successfully tested by the panel manufacturer (or fabricator) via the NFPA 285 test method. (Note 2) 2) Claddings below may be used with any approved (see note) combustible exterior insulation Item 3 above. Any cladding (combustible or noncombustible) approved to be used in an NFPA 285 compliant assembly paired with approved polyisocyanurate, EPS, XPS, or SPF insulation. Each insulation must be specifically approved for the exact cladding types listed in the approval. (See Note 2) It is important to note the following item (Window/Door perimeter details) for specific insulation types that require unique detailing. Note: Approvals shall be by evaluation reports from approved evaluation entities.
Window/Door Perimeters	The approved design for the specific system being considered shall be used. Note: EPS and XPS required specific door/window header and jamb details to be compliant with NFPA 285. Polyisocyanurate and SPF may or may not require specific header/jamb details. Approvals from approved evaluation reports by approved evaluation entities for the header/jamb detail required for each insulation type.
Notes on next page	

Notes for Table 4:

Note 1: Examples for use with no exterior insulation or mineral wool insulation per the table above. Cladding Lists 1 and 2 below are for use with no exterior insulation. However, this will expose the substrate to moisture, in which case a water-resistive barrier shall be added to the system. For these applications, water-resistive barriers approved for use with each cladding shall be used.

1) Any combustible cladding that has passed NFPA 285 testing (examples below)
   a. NFPA 285 approved MCM/ACM Metal/Aluminum Composite building panels
   b. NFPA 285 approved stone/aluminum honeycomb composite
   c. NFPA 285 approved HPL High-pressure Laminate Panels.

2) Any noncombustible cladding such as (but not limited to):
   a. Brick – nominal 4-inch clay brick or veneer
   b. Stucco – $^{7}/_{8}$ -inch exterior cement plaster and lath. A secondary water-resistive barrier can be installed between the insulation and lath. The secondary WRB may not be full coverage asphalt or butyl-based self-adhering membranes.
   c. Natural Stone (granite, limestone, marble, sandstone) – 2 inches thick
   d. Architectural Cast Stone – $2^{1}/_{2}$ inches thick
   e. Terra Cotta Cladding – $1^{1}/_{4}$ inches thick
   f. $^{1}/_{4}$ -inch-thick glass-fiber-reinforced concrete panels (installed per manufacturer instructions)
   g. Concrete – 2 inches thick
   h. CMU blocks – 4 inches thick
   i. Sheet metals such as aluminum, copper, or zinc – any thickness

Note 2: Combustible WRB/Insulation/Cladding

If the base wall is covered with a combustible WRB/Insulation and various claddings (combustible or noncombustible), each insulation/WRB/cladding combination for approval shall have explicitly been tested or approved to be used with each other. Evaluation reports from approved evaluation entities may be used.

TABLE 5. NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES WITH SEALTITE PRO OPEN CELL APPLIED IN WALL STUD CAVITY WITH SPRAY FOAM INSULATION APPLIED ON THE EXTERIOR OF WALL ASSEMBLY

Wall Component	Material Description
Base Wall System (BWS) – Use Item 1, 2, 3 or 4	1) Concrete Walls 2) Concrete Masonry Unit Walls 3) Steel Stud Wall - 1 layer of $^{5}/_{8}$-inch Type X gypsum wallboard installed on the interior side of minimum 3$^{5}/_{8}$-inch No. 20 gauge steel studs spaced a maximum of 24 inches on center. 4) Fire-retardant-treated wood (FRTW) stud wall – 1 layer of $^{5}/_{8}$-inch thick Type X gypsum wall board on the interior, installed on 2x4 (minimum FRTW studs spaced a maximum of 24 inches on center.
Fire-Stopping at floor lines – Use Item 1 or 2	1) 4-inch 4 pcf mineral wool (friction fit or installed with Z-clips) 2) FRT lumber -1$^{1}/_{2}$ -inch thick (min) (FRT firestop shall only be used with FRT framing)
Cavity Insulation Use Item 1, 2, 3 or 4	1) None 2) Full stud cavity or less of SealTite PRO Open Cell 3) Any noncombustible insulation per ASTM E136 4) Any fiberglass insulation (faced or unfaced)
Exterior Sheathing	Minimum ½ - inch thick exterior gypsum sheathing
Exterior Insulation Item 1 limited to cladding types 1-7	1) SealTite PRO Closed Cell, SealTite PRO One Zero, and SealTite PRO HFO – 4-inch nominal thickness (max) 2) SealTite PRO Closed Cell, SealTite PRO One Zero, and SealTite PRO HFO – 3.5-inch nominal thickness (max)
Exterior Cladding - Items 1-7 are allowed to be used without the DC315 coating system. Use of any of Items 1-20 when exterior SPF is coated with IFTI DC315 (16 mil WFT) with Top Coat Paint (8 mils WFT Sherwin Williams Sher-Cryl or equivalent) For Items 8-20, air gap cannot exceed 2$^{1}/_{2}$ inches. All claddings non-open joint. Panel claddings may use vertical or horizontal Z girt attachment. Panel claddings may be vertical or horizontal.	1) Brick – Nominal 4-inch clay or concrete brick or veneer with maximum 2-inch air gap behind the brick. Brick Ties/Anchors 24 inches on center (maximum) 2) Precast Concrete Panels – minimum 1$^{1}/_{2}$-inch-thick using any standard non-open joint installation technique such as shiplap, with maximum 2-inch airgap behind the cladding. 3) Concrete Masonry Units – Minimum 2-inch-thick with maximum 2-inch air gap between exterior wall insulation and concrete masonry units. 4) Stucco – minimum $^{7}/_{8}$-inch-thick exterior cement plaster and lath. A secondary water-resistive barrier (WRB) may be installed between the exterior insulation and the lath. The secondary WRB shall not be full-coverage asphalt or butyl-based self-adhered membranes. 5) Natural Stone Veneer – minimum 2-inch-thick natural stone (granite, limestone, marble, sandstone). Any standard non-open joint installation technique may be used. 6) Cast Artificial Stone – minimum 1½-inch thick complying with ICC-ES AC 51 using any standard non-open joint installation technique. 7) Terra Cotta Cladding – minimum 1¼-inch thick (solid or equivalent by weight) using any standard non-open joint installation technique such as shiplap. 8) Aluminum cladding – 0.030-inch minimum thickness – non-open joint. 9) Steel cladding – 0.0149-inch minimum thickness – non-open joint 10) Copper cladding – 0.0216-inch minimum thickness – non-open joint. 11) Zinc cladding – 0.040-inch minimum thickness – non-open joint. 12) Concrete – 1-inch-thick minimum thickness using any standard non-open joint installation technique. 13) One-coat Stucco – 3/8-inch minimum exterior cement plaster and lath – non-open joint 14) Thin brick adhered with noncombustible mortar to ¾-inch minimum stucco base – non-open joint. 15) CMU: Minimum 1-inch-thick concrete masonry unit. Any standard non-open joint installation technique may be used. 16) ¼-inch fiber cement cladding – non-open joint. 17) Stone veneer – minimum 1-inch thick – non-open joint. 18) Terreal Zephir Evolution Rainscreen System (or similar Terra Cotta) minimum 9/16-inch thick – non-open joint.[1] 19) SwissPearl Carat Panels (ER-551)– 0.315-inch minimum thickness – non-open joint 20) FunderMax M.Look (minimum ¼-inch) – non-open joint[1]
Window/Door Perimeters	The window opening perimeters shall be per UL Design Listings EWS0013, EWS0029, or EWS0054, as applicable where approved by the engineer and the local building official. For FRTW stud construction, openings are lined with 1$^{1}/_{2}$-inch-thick FRTW lumber.

For **SI:** 1 inch = 25.4 mm

Notes:

[1]Approval of this product is beyond the scope of this review. Documentation of code compliance of this product shall be provided to the building official.

FLORIDA SUPPLEMENT

CARLISLE SPRAY FOAM INSULATION
100 Enterprise Drive
Cartersville, GA 30120
www.CarlisleSFI.com

SEALTITE PRO OPEN CELL SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATIONS

CSI Section:
07 21 00 - Thermal Insulation

1.0 SCOPE OF EVALUATION

- 2020 Florida Building Code, Building (FBC, Building)
- 2020 Florida Building Code, Residential (FBC, Residential)

2.0 FINDINGS

SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation reported in IAPMO UES Evaluation Report ER-624 is a satisfactory building product alternative to those prescribed in the 2020 FBC, Building, and the 2020 FRC, Residential. Installation of the foam plastic insulation shall be in accordance with the 2018 International Building Code and the 2018 International Residential Code as noted in ER-624. SealTite PRO Open Cell Insulation complies with the High-velocity Hurricane Zone provisions of the FBC, Building, and FBC, Residential.

3.0 LIMITATIONS

Use of SealTite PRO Open Cell spray-applied polyurethane foam plastic insulation recognized in this report supplement is subject to the following limitations:

3.1 In order to provide for inspection for termite infestation, clearance between exterior wall coverings and final earth grade on the exterior of a building shall not be less than 6 inches (152 mm) in accordance with Section 1403.7 of the FBC, Building or Section R704 of the FRC, Residential.

3.2 This supplement expires concurrently with ER-624.

4.0 STATE PRODUCT APPROVAL

For products falling under Florida Rule 61G20-3.001, verification shall be provided that a quality assurance agency audits the manufacturer's quality assurance program and audits the production quality of products, in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess an approval by the Commission).

SealTite PRO

QUALITY ASSURANCE

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc., has audited the Quality Management System of:

Accella Polyurethane Systems

100 Enterprise Drive, Cartersville, GA 30120 United States

(This is a single site scheme. See appendix for site specific activity.)

(Hereinafter called the Organization) and hereby declares that Organization is in conformance with:

ISO 9001:2015

This Registration is in respect to the following scope:

Design and Manufacture of Polyurethane Foam and Silicone Coatings

This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
755 West Big Beaver Road, Suite 1340
Troy, Michigan 48084
(248) 358-3388

PERRY JOHNSON REGISTRARS, INC.

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

PERRY JOHNSON REGISTRARS, INC.

UKAS MANAGEMENT SYSTEMS 0105

The use of the UKAS accreditation symbol is in respect to the activities covered by the Accreditation Certificate Number 0105.

The validity of this certificate is dependent upon ongoing surveillance.

Effective Date: March 9, 2021
Expiration Date: March 8, 2024

Certificate No.: C2021-00529

PERRY JOHNSON REGISTRARS, INC.

Appendix

100 Enterprise Drive, Cartersville, GA 30120 United States	***Customer Orders, Purchasing, Receipt, Design, Production, Inventory Raw Materials, and Inspection of Polyurethane and Silicon Coatings***
400 North Main Street, Adairsville, GA 30103 United States	***Receipt, Storage, and Ship Finished Packaged Product***

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
755 West Big Beaver Road, Suite 1340
Troy, Michigan 48084
(248) 358-3388

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Perry Johnson Registrars, Inc., has audited
the Environmental Management System of:

Accella Polyurethane Systems
100 Enterprise Drive, Cartersville, GA 30120 United States

(Hereinafter called the Organization) and hereby declares that Organization is in conformance with:

ISO 14001:2015

This Registration is in respect to the following scope:

Manufacture of Polyurethane Wall Roof Spray Foam and Liquid Applied Silicone Roof Coating

This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.

PERRY JOHNSON REGISTRARS, INC.

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17021-1
MANAGEMENT SYSTEMS CERTIFICATION BODY

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)
755 West Big Beaver Road, Suite 1340
Troy, Michigan 48084
(248) 358-3388

The validity of this certificate is dependent upon ongoing surveillance.

Effective Date:	Expiration Date:	Certificate No.:
June 1, 2023	May 31, 2026	C2023-02919

air barrier
abaa
association of
america

MEMBER CERTIFICATE

Carlisle Spray Foam Insulation

THE MEMBER AGREES TO ACTIVELY CHAMPION THE AIR BARRIER INDUSTRY WHILE SUSTAINING HIGH INDUSTRY STANDARDS, PROFESSIONALISM AND ABIDING BY THE PRINCIPLES OF ABAA.

2025

510-0414

MEMBER #

SINCE 2013

RYAN DALGLEISH, COO OF ABAA

Manufacturer's Defect Warranty

Carlisle Spray Foam Insulation (CSFI) warrants that our Products meet the published physical and chemical properties (Product Specifications) of the liquid products at the time they are shipped.

Physical characteristics of spray-applied polyurethane foam insulation are dependent upon various factors at the time of installation. These factors include but are not limited to, the temperature of the product at the time of application, environmental conditions such as air temperature, substrate temperature and relative humidity, and capabilities of application equipment including mixing chamber size, tip size, as well as equipment pressure and temperature settings, and the skill of the applicator(s). These factors are outside the control of CSFI. Physical characteristics of applied products are determined by the applicator.

CSFI warrants that, if applied according to our published processing parameters, the finished product will have the physical characteristics as defined in the product technical data sheets.

Terms and Conditions

1. Property Owner shall notify CSFI within 30 days from the date any defect is discovered, or of any products that do not conform to the finished physical characteristics.
2. Property Owner's sole remedy and CSFI's sole liability for claims of breach of warranty shall be CSFI's choice of either:
    a. replacement of non-conforming Products; or
    b. refund of monies paid to CSFI for the non-conforming Products
3. CSFI shall have the opportunity to inspect all Products that Property Owner claims are non-conforming. Property Owner shall hold, at no cost to CSFI, the Products pending such inspection. The conditions of any test of the Products for conformance with any specification shall be mutually agreed upon and CSFI shall be notified of, and may be represented at, all tests that may be made by or for Property Owner.
4. Property Owner assumes all risk for misuse of the Products.
5. As CSFI is not the applicator, CSFI assumes no liability for misapplication or any other error or omission of applicator.
6. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ORAL OR WRITTEN, STATUTORY OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTIBILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE EXPRESSLY DISCLAIMED.

The Parties hereby agree that CSFI does not represent or warrant that the importation, use or sale of the Products is/are free from infringement of any third-party patent(s), trademark(s), or copyright(s).

Limited Lifetime Insulation Warranty

Carlisle Spray Foam Insulation (CSFI) warrants that the CSFI spray polyurethane foam insulation products, when applied in conformity to local building codes and according to CSFI's published application guidelines, by a contractor authorized by CSFI, will conform to the physical properties shown on the respective Product Technical Data Sheet in effect on the date the Products are purchased from CSFI.

This warranty is valid for the life of the building and is conditioned upon the original purchaser completing the Warranty Registration Form and returning it to CSFI within 60 days of occupancy. This warranty extends to subsequent property owners upon written notice to CSFI, and providing that the building use remains the same.

CSFI's sole responsibility under this warranty will be for the replacement of Products only. CSFI will not be liable for any labor or other costs, including, but not limited to, costs associated with the removal of insulation or the installation of replacement Products.

CSFI will have no liability under this warranty for defects, damages or failures caused by improper storage of Products, improper application of Products, including failure to follow CSFI published application guidelines, fire, weather, floods, acts of God, abuse, structural failures, breaks, movement, or penetrations or alterations made after installation of the Products.

To file a claim under this warranty, within 30 days after discovery of the alleged nonconformity, the property owner must submit a statement to CSFI, which describes the nonconformity. The statement must include the property address, proof of the date of occupancy, and the name and address of the contractor, who installed the Products.

THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, WHETHER AT LAW OR IN EQUITY, OR WHETHER ARISING UNDER STATUTE OR OTHERWISE. CSFI DISCLAIMS ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMTED TO, IMPLIED WARRANTIES OF MERCHATABILITY AND FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES WILL CSFI BE LIABLE FOR SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES.