



# ENVELO-SEAL™ 2.0 IB S

ENVIRONMENTALLY FRIENDLY SPRAY FOAM

IGNITION BARRIER SPRAY FOAM

PRELIMINARY

## DESCRIPTION

ENVELO-SEAL™ 2.0 IB S spray foam wall insulation is a two-component polyurethane foam insulation system. It has a 1.9 - 2.2 PCF spray in place density. ENVELO-SEAL™ 2.0 IB S was developed using an EPA approved zero ODP blowing agent. This product provides superior energy efficiency and air filtration control. The product can be used in open wall cavities, crawlspaces, perimeter rim joists, cathedral ceilings, and garage ceilings. ENVELO-SEAL™ 2.0 IB S meets the USDA criteria for incidental food contact.

## FEATURES

- Contains rapidly renewable resource components.
- Bio-based contents 20% ("B" side).
- Utilizes recycled plastic materials.
- No dangerous heavy metal catalysts (such as lead or mercury).
- No ozone depleting products (ODP).
- No bromine or other halogenated components.
- No formaldehyde components.
- Mildew, bacteria, and fungus resistant.
- Considered safe for burial and landfill disposal.
- Compliant with USDA/FDA requirements for incidental food contact.

## RECOMMENDED USES

- Residential insulation
- Industrial insulation
- Vented attics
- Floors
- Crawl spaces
- Fluid tanks
- Commercial insulation
- Exterior walls
- Unvented attics
- Foundations
- HVAC ducts
- Cold storage units in conjunction with vapor barrier

## SURFACE BURNING CHARACTERISTICS

<b>ASTM E84</b>	CLASS I
<b>Flame Spread</b>	< 25
<b>Smoke Development</b>	< 450
<b>Nominal Thickness (inches)</b>	4.0
<b>NOTE: The flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.</b>	

## CONTAINER SIZES

This product sold in standard 100 gallon drum sets and 500 gallon tote sets. Available in other container sizes, contact sales representative for further information. Non-standard containers may require a longer lead time.

## TYPICAL PHYSICAL PROPERTIES

<b>Viscosity @ 77°F (25°C)</b>	"A" 200 ± 50 cps "B" 550 - 600 ± 50 cps	
<b>Weight per gallon (approx.)</b>	9.90 lbs. (4.50 kg)	
<b>Aged R-Value: ASTM C518 75°F (24°C)</b>	6.7 at 1" 26.8 at 4"	
<b>Core Free Density: ASTM D1622</b>	1.9 - 2.2 pcf	
<b>Closed Cell Content: ASTM D6226</b>	>90%	
<b>Compressive Properties: ASTM D1621</b>	25 psi	
<b>Tensile Strength: ASTM D1623</b>	55 psi	
<b>Rate of Air Leakage: ASTM E283</b>	Meets Criteria	
<b>Dimensional Stability: ASTM D2126 (% volume change)</b>	-20°F	28 days, -0.9
	158°F 100% R.T. Humidity	28 days, 5.2
	158°F Dry	28 days -3
<b>Performance Permeability: ASTM E96</b>	Class II	
<b>Sound Transmission Class: ASTM E90 ASTM C423</b>	39 75	
<b>VOC Content: CA01350</b>	Exceeds Criteria	
<b>Fungi Resistance: ASTM C1338</b>	No Growth	
<b>Bio Based Content: ASTM D6866</b>	8%	
<b>Shelf Life: stored in original unopened containers between 50° - 90°F (10° - 32°C)</b>	"A" side 1 year "B" side 6 months	

The data presented here should only be used as a guide since the actual foam properties are influenced by the efficiency of the spray gun, component temperatures, foam thickness and ambient conditions.

## PROCESSING PARAMETERS & PHYSICAL CHARACTERISTICS

<b>Cream</b>	1.0 - 2.0 sec
<b>Tack Free Time</b>	6.0 - 7.0 sec
<b>Initial Cure Time</b>	< 1 hour **
<b>Pre-Heater/Hose Temperature:</b>	“A” and “B” ± 125°F (52°C) ±5°
<b>Pressures:</b>	1100 - 1400 psi dynamic, at gun
<b>Mix Ratio Parts:</b>	1:1 by volume “A” to “B”
<b>Substrate/Air Temperature:</b>	40°F (4°C) min 95°F (35°C) max
<b>Thickness Per Lift:</b>	2” (5 min cure between lifts) 3” 10 min cure between lifts

These settings will ensure thorough mixing in the spray gun mix chamber in typical applications. Optimum hose pressure and temperature may vary as a function of the type of equipment, ambient, and substrate conditions, and the specific application. It is the responsibility of the applicator to properly interpret equipment technical literature, particularly information that relates acceptable combinations of gun chamber size, proportioner output, and material pressures. The relationship between proper chamber size and the capacity of the proportioner pre-heat is critical. The nominal physical properties reported were achieved using a Graco H25 Proportioner and Fusin gun with #01 or #02 module with a static proportioner pressure setting of 1200 psi. Older equipment may be upgraded with “Arctic Booster Pack” heaters or minimum E-20 proportioners are required to adequately preheat the components. Spray guns such as; D-gun, GAP gun, GX-7, Fusion gun, or Probler guns fitted with smaller output tips (15 - 18lbs./min) for better spray control for stud wall applications at recommended processing temperatures recommended. \*\* Complete cure will depend on temperature, humidity and degree of ventilation. Complete cure usually occurs within 24 - 72 hours. For applications below 32°F (0°C), SPI technical personnel should be consulted. Flash passes should be avoided.

## IGNITION BARRIER

ENVELO-SEAL™ 2.0 IB S is compliant with NFPA 286 Appendix X without a prescriptive ignition, thermal barrier or intumescent coating.

## THERMAL BARRIER

IRC and IBC codes require that SPF be separated from the interior of a building by a thermal barrier, which is applied over SPF to slow thermal rise, and delay its involvement in a fire. A building code definition of an approved thermal barrier is one that is equal in fire resistance to ½ inch gypsum board. Thermal barriers limit the temperature rise of the underlying SPF to not more than 250°F (121°C) after 15 minutes of fire exposure in compliance with ASTM-E119 (Test Methods for Fire Tests of Building Construction Materials). Thermal barriers meeting this criteria are termed a “15 minute thermal barrier” or classified as having an “index of 15”. Specialty Products, Inc. recommends that an approved thermal barrier separate ENVELO-SEAL™ 2.0 IB S foam from the building interior unless waived by a local building code official.

## PRODUCT APPLICATION

ENVELO-SEAL™ 2.0 IB S should be applied in 2” to 3” lifts with maximum pass thickness of 3” lifts; with suggested cure time between lifts. Note: Re-spraying too soon may result in charring and possible spontaneous ignition of foam. ENVELO-SEAL™ 2.0 IB S should only be applied to approved substrates recommended by the manufacturer. The data presented here should only be used as a guide since the actual foam properties are influenced by the efficiency of the spray gun, component temperatures, foam thickness, and ambient conditions. While the above technical information is based on results of actual tests, it should only be used as a guideline for typical chemical and physical properties. The user must test and qualify the product. Final determination of suitability is the responsibility of the user. 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. The resin “B” component will froth at elevated temperatures.

## INITIAL PROCESSING RECOMMENDATIONS

<b>Ambient</b>	32 - 50°F	50 - 80°F	>80°F
<b>Component A</b>	130°F	125°F	110°F
<b>Component B</b>	130°F	125°F	110°F
<b>Hose</b>	130°F	125°F	110°F

These temperatures are typical of those required to produce acceptable product using conventional Gusmer or Graco equipment. It is the responsibility of the applicator to determine the specific temperature settings to match the environmental conditions and specific spray equipment.

## RECOMMENDED PROCESSING TEMPERATURE RANGE

<b>Component A</b>	110 - 125°F
<b>Component B</b>	110 - 125°F
<b>Hose</b>	110 - 125°F
<b>Pressure</b>	900 - 1200 psi

Processing temperatures are critical to achieve viscosity to allow balanced pressure during spraying. Balanced chemical output pressures are important to producing good mix. Foam output pressures greater than 50 psi differential indicate either improper chemical temperatures, or worn gun/packing parts. Unequal pressures will cause poor chemical mixing through the module and uneven backpressure. A critical requirement for good spray mixing requires appropriate tip/module sizing to the proportioner and adequate heating capacity. Unequal pressure (>50 psi) can cause excessive pump wear.

## EQUIPMENT

The proportioning equipment shall be manufactured specifically for heating, mixing, and spray application of polyurethane foam and be able to maintain 1:1 metering with a +2% variance and adequate main heating capacity to deliver heated and pressurized materials up to 130°F. Heated hose must be able to maintain preset temperatures for the full

length of the hose. Minimum 2:1 on A side and 1:1 on the B side ratio feeder pumps are required to supply stored materials through minimum 1/2-inch supply hoses. Pressurized and heated tank systems may be used if sized appropriately to provide adequate flow at maximum operating capacity and temperatures. Guns such as D-gun, Gap Pro, Fusion-gun, Probler with tip size approximately 16 lbs./min are suitable for most residential applications. Commercial cold storage, freezer applications and large metal buildings may utilize higher output guns.

## CLIMATE CONDITIONS & HUMIDITY

Moisture in the form of rain, dew, frost can seriously affect the quality and adhesion of the ENVELO-SEAL™ 2.0 IB S to the substrate itself. SPI does not recommend the spraying of this system when the relative humidity (RH) exceeds 85% or within 5°F of the dew point. When heating the interior of a building the relative humidity can change dramatically and should be constantly monitored.

## SURFACE PREPARATION

ENVELO-SEAL™ 2.0 IB S is suitable for application to most construction materials including wood, masonry, concrete, and metal. All surfaces to be sprayed with foam should be clean, and dry, free of dirt, oil, solvent, grease, loose particulates, dew, frost, ice and other foreign matter which could inhibit adhesion. Moisture content and surface conditions of substrate are critical to adhesion of ENVELO-SEAL™ 2.0 IB S and need to be verified by installing contractor in small test areas before proceeding with full application. Plywood, OSB, and lumber shall not have greater than 18% moisture content. Generally a primer is not required for these surfaces. On substrates where the moisture content cannot be determined or exceeds 18% a suitable primer is recommended. Adhesion spray tests may be performed by test spraying small areas to check for good cell structure and adhesion. Warming of these surfaces during winter conditions may increase adhesion. CMU, structural, and poured-in-place concrete must have a minimum 28 day cure and moisture content below 18%. Residential footings, seam-walls, and basements generally do not require priming. Commercial controlled atmosphere structures, cold storage, and freezer buildings require and appropriate primer to insure adequate adhesion where curing agents may have been used. Generally use a two-component epoxy primer designed to seal and provide adhesion to concrete surfaces. Contact and SPI technician for suggested primer options. **Painted steel, galvanized steel, and aluminum panels:** check surfaces for mill oil used in the manufacturing process and moisture. All oil must be removed and the surface clean and dry before priming. Washed and dry painted steel panels may not require priming. All aluminum and galvanized panels must be primed using **Cardinal 7860-420 or Sherwin Williams® DTM Wash Primer.**

## SPRAYING

Thin “flash passes” to very cold surfaces are recommended. Thin passes (1/2”) can be done when the substrate moisture or adhesion is less than desired. It is recommended that the total design thickness be completed each day. Application temperatures below 32°F may require reduction in single pass application thickness if flash passes are used. Yield and in-place-density is dependent upon the temperature

of the substrate, ambient air temperature, gun speed application, gun tip size, and the output of the proportioning unit. Excessive pass thickness above 3” can reduce physical properties and cause local overheating and possible fire. In freezing conditions (below 32°F), job site air temperature must be maintained above 32°F, especially during the initial cure cycle to minimize any extreme temperature drops to the newly curing foam product. 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, excessive thickness of spray polyurethane foam, 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. When changing the “B” side (resin) to another type of spray polyurethane foam it is very important that the supply hoses and pumps are completely drained. Mixing of dissimilar product types will have an adverse effect on the foam. Spray polyurethane foam insulation is combustible. 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 before discarding into a trash receptacle. ENVELO-SEAL™ 2.0 IB S is **NOT** designed for use as an exterior roofing product. Please contact Specialty Products, Inc. for information on our spray polyurethane roofing systems. Cold chemicals can cause poor mixing, pump cavitation, or other process problems due to higher viscosity at lower temperatures. Storage temperatures should be 50°F to 90°F for several days before use, and should not exceed 90°F. Do not store in direct sunlight. Keep drums tightly closed when not in use and under dry air or nitrogen pressure of 2 - 3 psi after they have been opened. Store in a dry and well-ventilated area.

## JOB SITE VENTILATION

During SPF application a minimum of 30 - 60 ACH is recommended. Cross ventilation is required with negative pressure in the spray area and exhaust to a second empty area. For increased ventilation rates a commercial unit is recommended. For more detailed information, please visit <http://polyurethane.american-chemistry.com/Spray-Foam-Coalition/Guidance-on-Ventilation-During-Installation-of-Interior-Applications-of-High-Pressure-SPF.pdf>.

**When using fuel fired heating units the exhaust must be vented directly outdoors to prevent unsafe carbon monoxide conditions in the work area.** Electrical heating units are preferred. All heaters must be turned off before the application of foam begins.

For the most up to date technical data sheet and/or safety data sheet visit our website at [www.specialty-products.com](http://www.specialty-products.com).



## GENERAL SAFETY, TOXICITY, & HEALTH

Safety Data Sheets are available for this coating material. Any individual who may come in contact with these products should read and understand the S.D.S. **CHEMTREC EMERGENCY NUMBER 1-800-424-9300**

**WARNING:** Contact with skin or inhalation of vapors may cause an allergic reaction. Causes eye damage/irritation. Avoid eye contact with liquid or spray mist. Hypersensitive persons should wear protective clothes, gloves and use protective cream on face, hands and other exposed areas. **CONTAMINATION:** Avoid moisture contamination in containers. Containers should not be resealed if contamination is suspected, carbon dioxide created pressure can develop. Do not attempt to use contaminated material. **EYE PROTECTION:** Safety eye wear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. **SKIN PROTECTION:** Personal protective equipment for the body should be selected based on the task being performed; the risks involved, and should be approved by an industrial hygiene specialist before handling this product. Chemical resistant gloves complying with applicable health and safety standards shall be worn when handling this product. Cover as much of the exposed skin area as possible with appropriate clothing. Refer to safety data sheet (SDS). **RESPIRATORY PROTECTION:** Harmful if inhaled and may cause allergy or asthma symptoms. Ensure adequate ventilation. If the respirator is the sole means of protection, use a full-face supplied respirator. Use respirators and components tested and approved under appropriate government standards such as OSHA 29CFR 1910.134, NIOSH (US), or CEN (EU). Consider the application and environmental concentrations when deciding if additional protective measures are necessary. **INGESTION:** Do not take internally. It is believed that ingestion of polymeric isocyanates would not be fatal to humans, but may cause inflammation of mouth and stomach tissue. **FIRE HAZARD:** Fires involving "A" or "B" components may be extinguished with carbon dioxide, dry chemical, or inert gas. Application of large quantities of water spray is recommended for spill fires. Personnel fighting the fire must be equipped with NIOSH approved self contained breathing apparatus. **Cleaning of Spills or Leakage** Cover the area with an inert absorbent material such as clay or vermiculite and transfer to metal waste containers. Saturate with water but do not seal the container with the isocyanates and water mixture. The area should then be flushed with large amounts of water, in the case of the "B" component, or 5% aqueous ammonia, in the case of the "A" component. Dispose of these materials in compliance with federal, state and local regulations.

Caution: Isocyanates will react with water and generate carbon dioxide. This could result in rupture of closed containers.

## WARRANTY & DISCLAIMER

VF Specialty Products has no role in the manufacture of the finished polymer other than to supply its two components. It is vital that the person applying this product understands the product, and is fully trained and certified in the use of plural-component equipment. VF Specialty Products warrants only that the two components of this product shall conform to the technical specifications published in the product literature. The quality and fitness of the product are dependent upon the proper mixture and application of the components by the applicator. There are no warranties that extend beyond the description on the face of this instrument. Failure to apply the product within the parameters stated on this document shall void the warranty. VF SPECIALTY PRODUCTS MAKES NO WARRANTY OF MERCHANTABILITY OF THE PRODUCT OR OF FITNESS OF THE PRODUCT FOR ANY PARTICULAR PURPOSE. VF Specialty Products makes no warranty as to the quality of any product modified, supplemented, tinted, or altered in any way after it leaves the manufacturing plant. VF Specialty Products does not warrant that this product is suitable for use as a liner for potable water containers. Use of this product in a potable water container could be hazardous to health if it is improperly processed or applied. The liability of VF Specialty Products for any nonconformity of the product to its technical specifications shall be limited to replacement of the product. The sole exclusive remedy of buyer, which is to have VF Specialty Products replace any nonconforming product at no cost to buyer, is conditioned upon buyer notifying VF Specialty Products or its distributor in writing of such defect within thirty days of the discovery of such defect. VF Specialty Products shall not be liable for any direct, incidental, or consequential damages resulting from any breach of warranty. The data presented herein is intended for professional applicators or those persons who purchase or utilize this product in the normal course of their business. The potential user must perform any pertinent tests in order to determine the product's performance and suitability in the intended application, since final determination of fitness of the product for any particular use is the responsibility of the buyer. The aforementioned data on this product is to be used as a guide and is subject to change without notice. The information herein is believed to be reliable, but unknown risks may be present. VF Specialty Products makes no warranties, expressed or implied, including patent warranties or warranties of merchantability or fitness of use, with respect to products or information set forth herein. Nothing contained herein shall constitute permission or recommendation to practice any invention covered by a patent without a license from the owner of the patent. Accordingly, the buyer assumes all risks whatsoever as to the use of these materials and buyer's exclusive remedy as to any breach of warranty, negligence, or other claim shall be limited to the purchase price of the materials. Failure to adhere to any recommended procedures shall relieve VF Specialty Products of all liability with respect to the materials and the use thereof.

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