



# ENVELO-SEAL™ 2.7 CLI

ENVIRONMENTALLY FRIENDLY SPRAY FOAM  
CLOSED-CELL ROOFING FOAM INSULATION  
PRELIMINARY

## DESCRIPTION

ENVELO-SEAL™ 2.7 CLI is a two-component closed-cell polyurethane foam insulation system, designed for spray applications. ENVELO-SEAL™ 2.7 CLI was developed using an EPA approved Zero ODP blowing agent. This product provides superior energy efficiency and air infiltration control. This product is an approved roofing material.

## RECOMMENDED USES

- Roofing systems.
- Commercial construction.
- Industrial construction.

## SURFACE BURNING CHARACTERISTICS

<b>ASTM E84</b>	Class I
<b>Flame Spread</b>	<25
<b>Smoke Development</b>	<450

**Note:** The flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

ENVELO-SEAL™ 2.7 CLI foam-forming system is available in a Class 1 formulation, as set forth under Underwriters Laboratories UL 723 (ASTM E84), and possesses the flammability characteristics shown below.

ENVELO-SEAL™ 2.7 CLI is an approved roofing material and has completed the Underwriters Laboratories testing for UL-790 approval and is listed as a Class A Roofing System under U.L. File #7622

ENVELO-SEAL™ 2.7 CLI includes three 2.7 pcf density systems designed for processing on substrates 45 – to 140°F. For single pass applications the recommended temperature range applies to the substrate temperature; for multiple-pass applications the temperature recommendations apply to the ambient temperature. Substrate composition will influence product selection. Consult your SPI representative to determine which product best satisfies you application requirements

## TYPICAL PHYSICAL PROPERTIES

<b>R-Value (aged) ASTM C518</b>	6.64 at 1 inch
<b>Compressive Strength ASTM D1621</b>	44 psi
<b>Core Density (nominal) ASTM D1622</b>	2.7 lbs/ft <sup>3</sup>
<b>Closed Cell Content ASTM D2856</b>	>90%
<b>Tensile Strength ASTM D1623</b>	60 psi
<b>Water Vapor Transmission ASTM E96 B</b>	1.56 perms at 1 inch
<b>Dimensional Stability ASTM D2126</b>	% volume change
<b>7 days at 158°F, ambient RH</b>	>4%
<b>7 days at 158°F, 97% RH</b>	>4%
<b>7 days at -22°F, ambient RH</b>	>4%
<b>Water Absorption ASTM D2842 96 hour immersion</b>	0.08 96 hour immersion
<b>Shear Strength ASTM C273</b>	40 (lbs/in <sup>2</sup> )
<b>Shelf Life stored in original unopened containers between 60° - 80°F (16° - 27°C)</b>	6 months

## PRODUCT REACTIVITY

<b>Processing Designation</b>	Surface Temperature
<b>Winter</b>	45 - 70°F
<b>Regular</b>	65 - 110°F
<b>Summer</b>	95 - 140°F

**Note:** Adhesion should not be tested within one hour of application.

## PROCESSING PARAMETERS

<b>MATERIAL/HOSE TEMPERATURE:</b>	"A" and "B" 80 - 100°F (27 - 38°C) ±5°
<b>HOSE TEMPERATURE:</b>	"A" and "B" 120 - 130°F
<b>PRESSURES:</b>	50 - 300 psi dynamic at gun
<b>MIX RATIO PARTS:</b>	1 to 1 by volume "A" to "B"
<b>Viscosity at 70°F:</b>	500 - 650 cps "B" Component
	150 - 250 cps "A" Component

## PRODUCT SELECTION GUIDE

ENVELO-SEAL™ 2.7 CL1 includes two 2.7 density systems designed for processing on substrates of 45° - 140°F (7° - 60°C). The following should act as a selection guideline.

ENVELO-SEAL™ 2.7 CL1 "S" - 95° - 145°F (35° - 63°C)

ENVELO-SEAL™ 2.7 CL1 "W" - 45° - 75°F (7° - 24°C)

For single pass applications the recommended temperature range applies to the substrate temperature; for multiple-pass applications the temperature applies to the ambient temperature. Substrate composition will influence product selection. Consult your SPI representative to determine which product best satisfies your application requirements.

## ENVIRONMENTAL CONSIDERATIONS

Applicators must recognize and anticipate climatic conditions prior to application to ensure highest quality foam and to maximize yield. Ambient air, substrate temperatures, moisture, and wind velocity are all critical determinants of foam quality and selection of the appropriate reactivity formulation. Variations in ambient air and substrate temperatures 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.

To obtain optimal results the ENVELO-SEAL™ 2.7 CLI should be spray-applied to substrates when ambient air and surface temperatures fall within the range of 50° - 120°F. All substrates to be sprayed must be dry at time of application. Moisture in the form of rain, fog, frost, dew, or high humidity (>85%R.H.), will react chemically with the mixed components, adversely affecting the polyurethane foam formation, dimensional stability and physical properties of the finished product. Wind velocities in excess of 12 miles per hour may result in loss of exotherm and interfere with the mixing efficiency, affecting foam surface, cure, and physical properties, and will cause overspray. Precautions must be taken to prevent damage to adjacent areas from overspray.

## PROCESSING EQUIPMENT

Store materials between 60° to 80°F in a dry and well-ventilated area. Keep material from freezing. Material in containers should be maintained at 65° to 75°F while in use. Heated trailers, hotboxes, or heated tank storage may be necessary. Material temperature should be confirmed with a thermometer or an infrared gun.

2:1 transfer pumps are recommended for material transfer from container to proportioner. The plural-component proportioner must be capable of supplying each component within ± 2% of the desired 1:1 mixing ration by volume. Hose heaters should be set to deliver 120° to 130°F material to the spray gun. These settings will ensure thorough mixing in the spray gun mix chamber in typical applications. Optimum hose pressure and temperature will vary with equipment type and condition, ambient and substrate conditions, and the specific application. Some equipment may require you to warm containers to achieve optimum material temperature. It is the responsibility of the applicator to properly interpret equipment technical literature, particularly information that relates to acceptable combinations of gun chamber size, proportioner output, and material pressures. The relationship between proper chamber size and capacity of the proportioner's pre-heater is critical.

**CAUTION:** Extreme care must be taken when removing and reinstalling drum transfer pumps so as NOT to reverse the "A" and "B" components.

## PER PASS LIMITATIONS

For optimal physical properties, foam made with ENVELO-SEAL™ 2.7 CLI system pass thickness should be limited to 2" per pass. If subsequent passes are needed, applicators should wait 10 minutes between passes to allow reaction heat to dissipate. The exotherm reaction can cause temporary substrate thermal rise in excess of 150°F, which may result in substrate thermal expansion. If the substrate then contracts when the reaction heat dissipates, substrate deformation can occur.

### EMERGENCY FIRST AID PROCEDURES:

**EYES:** Causes eye irritation. **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. **IF eye irritation persists:** Get medical advice/attention.

**SKIN:** Causes skin irritation and may cause allergic skin reaction/sensitization. **IF ON SKIN:** wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before use.

**INHALATION:** May be harmful **IF INHALED.** **IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a **POISON CENTER** or doctor/physician if you feel unwell.

**INGESTION:** May be harmful if swallowed. **IF SWALLOWED:** Rinse mouth. Call a **POISON CENTER** or doctor/physician **IF** you feel unwell.

**FIRE HAZARD:** Fires involving either of these 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 a 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.



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SPI Website

### CONTACT US

2410 104<sup>th</sup> St. C. S. Suite D, Lakewood, WA 98499  
[WWW.SPECIALTY-PRODUCTS.COM](http://WWW.SPECIALTY-PRODUCTS.COM)  
1 800 627 0773 FAX 253 588 7196  
[info@specialty-products.com](mailto:info@specialty-products.com)



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