





# Installation Instructions



- You are now able to spray **ICYNENE ProSeal LE™**.
- Follow the same procedure if you are switching back to another ICYNENE product.

## **Drum Temperature (before and during application):**

- During processing, both the Base Seal® (Component 'A', Isocyanate) and **ICYNENE ProSeal LE™** Resin (Component 'B') temperatures need to be in the range of 60° to 85°F.

**Be careful not to exceed 85°F as the blowing agent will start to come out of the resin blend which may lead to frothing, poor quality foam and a possible pressure build up in the drum. In-line temperature and pressure gauges should be used.**

## **Proportioner Temperature (A + B + Hose – while spraying):**

- The primary A and B heaters as well as the hose heat for **ICYNENE ProSeal LE™** should be set for an ideal application.

**A temp = 115-125°F**

**B temp = 115-125°F**

**Hose temp = 115-125°F**

- The temperature settings are a guideline and substrate temperatures may require temperature settings outside of these parameters.
- **If the ambient temperature is TOO HIGH:** decrease all temperatures gradually.
- **If the ambient temperature is TOO LOW:** increase all temperatures gradually.

## **Application:**

- Experienced medium density sprayers should find that **ICYNENE ProSeal LE™** sprays the same or better than other 2 lb products they are used to. First time users of **ICYNENE ProSeal LE™** should contact Icyne Technical Services for guidance.
- The two main factors in proper application will be the choice of mixing chamber and the material pressure on the spray lines you set. Below is a chart outlining recommended pressures and distances from the substrate to achieve a smooth spray surface:

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| <u>Mix Chamber Size</u> | <u>Pressure (psi)</u> | <u>Distance</u>  |
|-------------------------|-----------------------|------------------|
| 00                      | 700-900               | 14" - 18"        |
| 01                      | 900-1100              | 18" - 24"        |
| <b>02</b>               | <b>1000-1300</b>      | <b>18" - 24"</b> |
| 03                      | 1200-1500             | 18" - 24"        |

- The spray gun should always be held perpendicular to the substrate being sprayed as different angle can cause elongation of cells diminishing the physical and thermal properties.
- Spraying too thick in one pass or spraying multiple passes without waiting for the foam to cool can cause the foam to scorch or even to catch fire due to excessive heat build up within the foam.
- ICYNENE ProSeal LE™ can be sprayed up to 7 inches in one pass in either a full 7 inch lift or a combination of a 4 inch lift followed immediately by another 3 inch lift.
- Please be aware that if spraying multiple passes to obtain a 7 inch lift, there will be a slight reduction in yield.
- For thickness greater than 7 inches, the above procedure can be repeated after 30 minutes or once the surface temperature drops below 90°F.
- A minimum foam thickness of 1/2" is required so as not to affect the adhesion of the foam to the substrate.

## General Application Guidelines:

The following areas are suitable for the installation of **ICYNENE ProSeal LE™**:

- All wall, ceiling and floor spaces for the purpose of thermal insulation and air leakage control.
- It may be applied directly to wood, metal, masonry and concrete substrates.
- It may be applied in single and multi family residential buildings, commercial, industrial, institutional, and agricultural buildings of any type.
- It may be applied above or below grade; interior or exterior (see below).
- Air sealing and insulating attic spaces.

The following areas are not recommended for **ICYNENE ProSeal LE™**:

- For roofing applications where the material is applied above the roof decking.
- Exterior applications where the material is exposed to ambient weather, unless material is coated with a protective coating.

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There are potential, specialized applications that fall outside of the lists above. Whenever an application is proposed that is beyond the scope of this chapter, Technical or Engineering support is recommended from Icnene-Lapolla.

## **Troubleshooting:**

Good Material classification:

- Color: cream
- Cell structure: uniform, small and tight.
- Skin: smooth, orange peel like and dense
- Density: 2.0 – 2.2 lbs/ft<sup>3</sup>

These characteristics should be observed whenever spraying **ICYNENE ProSeal LE™**.

Poor material classification:

**ISO Rich:** the resulting foam will be a darker brown color and may exhibit signs of shrinkage and be friable (chalky surface).

**RESIN Rich:** the resulting foam will be a darker color and may exhibit signs of shrinkage and will be tacky (sticky) to the touch.

The most common reasons for substandard material are mix or technique related:

- Mix related problems are a result of any one or both of the following :
  1. **Temperature:** uneven temperatures of components A and B during application or insufficient heat in the drums.
  2. **Pressures:** too low pressure, uneven pressures of components A and B, or uneven temperatures of the components which lead to one component developing a higher pressure than the other and poor mixing.
- Spray technique related problems are a result of any one of the following:
  1. **Distance:** holding the gun too close to the substrate when spraying tends to blow material and air into the rising foam as you overlap to build thickness, and causes dripping when spraying overhead, holding the spray gun too far away from the surface allows the outer edges of the spray pattern to fall on part of the foam that is done expanding, making it a higher density material with a rough, popcorn like finish and lower yield, which also makes it difficult to cover when applying a coating over it.
  2. **Gun speed:** moving the spray gun too slow causes the foam to ripple making a rough foam surface, affecting the density, cell structure and yield, and may also lead to dripping when spraying overhead.

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## Material Trouble Shooting:

Poor material can be corrected or avoided by following some basic troubleshooting techniques. These are mainly preventive measures that ensure good quality material:

- Follow storage recommendations.
- Pre heat the components in the drums between 65°F to 85°F. Band heaters or drum blankets on the material drums may be necessary to aid the pre heating and to keep the material drums warm during the processing. **When using heaters, be careful not to exceed the recommended drum temperatures which can cause frothing in the drum.**
- Do not open the drums until needed. This will avoid airborne moisture getting into the ISO, A drum which will lead to crystallization of the ISO. This crystallization can clog filter screens and may damage equipment and spray gun parts. As well the resin can lose blowing agent resulting in loss of yield and poor quality foam.
- The entire length of hose should be uncoiled and strung out of the rig, the hose thermocouple unit should be within the same environment as the spray gun, this ensures a more accurate and even delivery of the heated material components to the spray gun.

## Environmental Issues:

### **Ambient conditions:**

- **ICYNENE ProSeal LE™** may be sprayed at ambient/substrate temperatures between 23°F to 122°F.

### **Humidity:**

- Care should be taken whenever the relative humidity rises above 80% as high relative humidity could cause blistering and weaken foam adhesion.

### **Wind:**

- Applications where wind speed is over 10 miles per hour require the use of wind screens. As the overspray will stick to almost any substrate, care must be taken to seal up the spray area when applying material in locations that are subject to wind or air movement.

### **Wet Surfaces:**

- Wet, saturated substrates will cause bubbling in the foam, and loss of foam properties and adhesion. Surfaces should be clean and dry.

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## Flashing:

- A strategy to deal with cold substrates is a technique called flashing. Flashing is applying a thin layer of material to the cold substrate to warm it up and insulate, and then applying a second thicker pass, not to exceed 7 inches thick.
- Flashing works well to warm cold surfaces, but tends to use extra material, as the flash coat does not expand into foam very well.

## Metal and Steel:

- Galvanized steel should be cleaned with mineral spirits, dried and a suitable primer applied.
- Bare steel should have loose scale and rust removed before application.
- Steel tanks must be primed before application, as per standard D.01.01.
- Aluminum should be cleaned with a mineral spirit. Do not use caustic solutions. Must always be primed prior to the application to prevent corrosion.
- Stainless steel surfaces should be cleaned with mineral spirits or xylene and then primed. In some cases, it may be necessary to sandblast.

## Concrete and Masonry:

- Surface to be sprayed must be completely cured and dry and free of release agents, grease, oils, dirt and other foreign matter or contaminants which will interfere with the total adhesion of **ICYNENE ProSeal LE™**. A test spray should be performed if adhesion is suspect.
- Flashing is recommended for cold concrete and masonry.

## Wood, gypsum board and fibreboard:

- Wood-frame walls and ceilings are insulated by applying material to both the backing, and along the sides of the studs or joists, failure to apply material to the sides of the studs/joists may leave gaps between the wood members and the foam, these gaps may lead to air leakage in the wall or ceiling. As the medium density product requires greater distance for a smooth application, applying the material in an up and down motion rather than side to side would be helpful to minimize overspray on the face of the studs when doing wall cavities.
- The moisture content of wood, gypsum or fibreboard should be less than 19%. Special care should be taken in case of laminates with surface treatment, because the treatment may adversely affect adhesion of the insulation to the substrate.

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## Pre-painted Substrates

- The strength of adhesion can vary with the type of paint used. When the adhesion is uncertain, the paint should be mechanically scored or abraded by sand blasting

## Glass

- Except for cleaning, no special preparation is required for glass. However, when the insulation is applied to the interior of a window, an ultraviolet-blocking coating should be applied to the glass prior to application to prevent degradation of the insulation by sunlight.

## Polyvinyl Chloride (PVC)

- Washing with a mild solvent, such as mineral spirits, is sufficient to prepare the surface of PVC. Polyvinyl chloride should be used as a substrate with caution. If the plasticizer content is high, the plasticizer may migrate to the surface of the PVC after the application of the spray polyurethane foam and result in loss of adhesion. (Plasticizer content is usually highest in flexible PVC and is quite low in rigid PVC, which is used in pipes.)

## Acrylonitrile Butadiene Styrene (ABS)

- Acrylonitrile Butadiene Styrene (ABS) — ABS surface should be cleaned with mineral spirit and primed.

## Polypropylene and Polyethylene

- Adhesion of spray polyurethane foam to these two plastics is extremely poor. The only practical way to apply the insulation is to provide some sort of mechanical attachment to the substrate, such as chicken wire.

## Asphalt and Tar

- The asphalt or tar must be solvent-free when the insulation is applied over it. Therefore, the asphalt or tar must be old enough to assume that there is no solvent present. Spray polyurethane foam should not be applied over fresh asphalt or tar.

## Solvents

- The presence of solvents in the substrate or on the surface of it must be avoided. Many primers are solvent-borne and thus adequate time for the complete evaporation of the solvent should be allowed prior to application of the insulation.

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## Spray Polyurethane Foam

- Areas that show ultraviolet degradation (as evidenced by chalking at the surface) should be cleaned by wire brushing prior to the application of more insulation.

## Earth

- No special requirements are needed when installing spray polyurethane foam in contact with earth. The manufacturer shall be consulted in cases where a constant hydrostatic pressure will be exerted on the spray polyurethane foam.

## Modified Bitumen Membrane

- The modified bitumen membrane must be adhered to the substrate. The installer shall have the membrane manufacturer confirm that the material has been installed properly.

## Spray application of ICYNENE ProSeal LE™

### Keep other trades away from applicator:

- All other personnel must be kept at least 50ft away from the applicator while spraying. It is the responsibility of the helper to ensure that all other trades and spectators are kept away from the applicator while spraying. The sprayer and helper shall wear a full-face, fit tested supplied air respirator (SAR) or hood, as well as full skin protection when working within 50ft of applicator while spraying.
- Installer's shall post warning signs that read:
  - "Do not enter while spraying in progress"
  - "Respiratory protection must be worn while entering work area"
  - "No smoking, eating or drinking"

### Masking:

- Mask off all areas that are not to be sprayed. This is very important, as overspray will stick to most surfaces. Ensure that any surface and finish is carefully covered to avoid damage from overspray.

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## Spray Technique:

### Building thickness:

- To build thickness it is necessary to spray on the material as it is expanding, how much you overlap on the expanding material depends on gun speed, distance from substrate and the thickness required, for instance; for a 3" pass you may need to overlap about a third of the spray pattern over the expanding material, and two thirds on the substrate ahead of it, and if you need to build a 4" pass, you overlap about half of the spray pattern over the expanding material, and so on, the thicker the pass you are trying to build, the more you overlap on the expanding material. It's important to remember to overlap only on the cream part of material (the transition from liquid to foam) and not on the foam that is done expanding, as any material sprayed on the foam will increase the density and lower the yield. Spraying on the cream material does not kill the expansion nor will it blow it off, unless you are too close and or are using excessively high pressure.

### Smoothness:

- When it comes to Medium Density Material, there are good reasons to try to spray smooth foam:
  - **Yield:** the smoother the surface of the foam the better the yield. Look at it this way, when you measure across corrugated metal and keep the measuring tape flat you get one figure, but if you measure following the curve of the corrugation, you'll find that it is a bigger surface, the same goes for the foam surface.
  - **Coating:** if the foam is to be coated with a thermal coating or any other type of protective coating, it would take a lot less coating material to cover a smooth surface than a rough uneven surface, as well as being able to coat the entire surface and not leave any exposed foam.

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## 2 Hour Re-occupancy Considerations:

Before and during spraying

- Place warning signs on the attic access door (hatch) and all entry points.
- Shut off all forced-air HVAC systems.
- Seal off all vents and intakes in the work area (e.g. soffits, areas over unheated porches, garages, etc.)
- Place a suitably-sized exhaust fan(s) (capable of removing at least 40 Air Changes per Hour (ACH) from the work area) such that it vents directly to the exterior away from the building and begin exhausting air from the space.

Attic volume can be calculated when the roof pitch is the same on both sides of the roof, you can multiply the length of the roof times half the building width times the height of the roof.

For a roof section 42 ft. long by 28 ft. wide by 6.5 ft. high, the calculation would be:  
 $42 \times 14 \times 6.5 = 3,822 \text{ ft}^3$

To achieve 40 ACH, the fan required =  $3,822 \text{ ft}^3 \times 40 \text{ ACH} \div 60 \text{ mins} = 2,548 \text{ cfm}$ .  
Therefore the fan must have a capacity of 2,548 cfm or greater.

| Attic Volume (cu. ft.) | Fan Capacity for 40 ACH (cfm) |
|------------------------|-------------------------------|
| 1000                   | 667                           |
| 2000                   | 1334                          |
| 3000                   | 2001                          |
| 4000                   | 2668                          |
| 5000                   | 3335                          |



- Seal any openings that separate the work area from the rest of the building.
- Ensure Sprayer and Helper are wearing full Personal Protective Equipment (PPE) including a Supply-Air Respirator (SAR)

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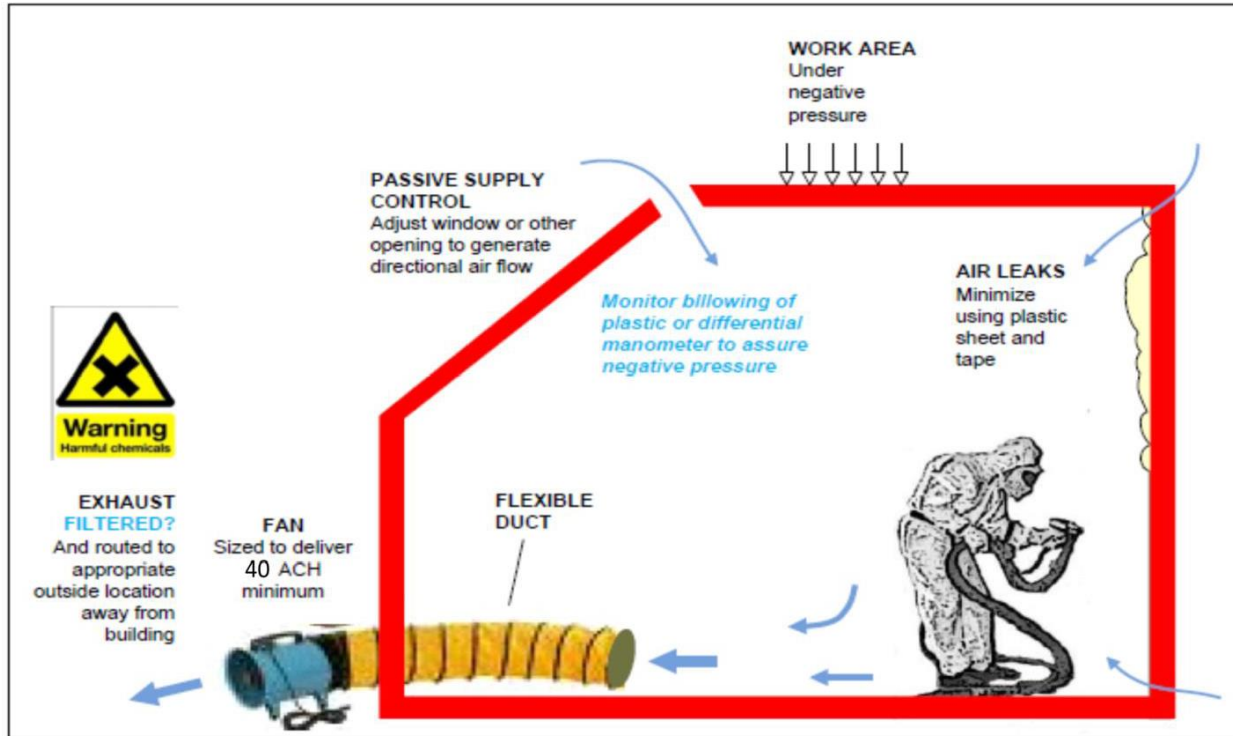
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- Remove any insulation from the floor of the attic
- Apply thermal barrier on exposed foam if area is going to be accessed for storage or other uses or if it is designated as a plenum area.



## After spraying

- Ventilate for a minimum of 1 hour for re-entry and 2 hours for re-occupancy at 40 ACH to control odors.
- After 2 hours of 40 ACH ventilation:
  - Remove any sealing between work area and living space.
  - Turn on the HVAC system.
  - Repair any ventilation or access holes created to carry out the work.
  - Remove all tarps and signs from the work area.

## Re-entry and re-occupancy periods (based upon ventilating during and after spray application):

| Ventilation Rate<br>(Air Changes per Hour) | Re-entry period for sprayers,<br>helpers, informed trade workers<br>and contractors | Re-occupancy period for all<br>others |
|--|---|---------------------------------------|
| At 0.3 ACH                                 | 24 hours  | 24 hours                              |
| At 1.0 ACH                                 | 12 hours*   | 24 hours                              |
| At 10.0 ACH                                | 4 hours*  | 24 hours                              |

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|   |          |           |
|---|----------|-----------|
| At 10.0 ACH<br>For Icynene Classic Ultra Select | 1 hour*  | 24 hours  |
| At 10.0 ACH<br>For Icynene Classic Ultra        | 1 hour** | 2 hours** |
| At 18.0 ACH<br>For Icynene ProSeal HFO          | 1 hour** | 2 hours** |
| At 40.0 ACH                                     | 1 hour** | 2 hours** |

\* Twelve (12) and four (4) hour re-entry for trades applies to all Icynene products sold in the United States.

\*\* One (1) hour re-entry and two (2) hour re-occupancy applies only to Low VOC products

- Icynene Classic Ultra at 10 ACH
- Icynene ProSeal HFO at 18 ACH
- Icynene ProSeal / Icynene ProSeal LE at 40 ACH

**Icynene’s safe distance recommendations remain unchanged as follows:**

|                               |  |   |
|-------------------------------|--|---|
| Distance from SPF application | Safe distance where no PPE is required when there is no barrier between non-SPF workers and spray activities | Safe distance from exhaust discharge of SPF ventilation system where no PPE is required |
|                               | 50 feet  | 25 feet   |

If the spray area is contained and exhaust ventilated as prescribed herein, or there is a sealed partition (Engineering Control) enclosing the work area such as a floor or wall, there is no need to vacate adjacent spaces (i.e. floors above/below the work area and/or adjacent units) provided air from the work area does not circulate to these spaces.

For further considerations on ventilation for spray polyurethane foam, please visit:

<http://polyurethane.americanchemistry.com/Spray-Foam-Coalition/Guidance-on-Ventilation-During-Installation-of-Interior-Applications-of-High-Pressure-SPF.pdf>

<http://www.epa.gov/oppt/spf/ventilation-guidance.html>

As with all of our products, if you have any questions, please do not hesitate to contact Icynene-Lapolla Technical Services and ask to speak to an Icynene-Lapolla Technical Services Representative.

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