

ICYNENE® / 80 HIGH-R

Additional product information can be found on the Huntsman Building Solutions website at www.huntsmanbuildingsolutions.com. Refer to the following documents plus this Product Application Guide to establish processing parameters for varying substrate and climatic conditions:

- Center for Polyurethane Industries, Guidance on Best Practices for the Installation of Spray Polyurethane Foam
- Icynene High-R 80 Technical Data Sheet
- ICC ESR-5494
- Icynene High-R 80 B-side SDS
- A-PMDI SDS

GENERAL PROCESSING GUIDELINE

Icynene® High-R 80 requires heat from the proportioner to complete the chemical reactions necessary to create foam meeting the specifications on the Technical Data Sheet. Fully functional primary heaters and hose heat are needed to process Icynene High-R 80. Please consult the Huntsman Building Solutions Technical Service Department for further assistance.

CHEMICAL CONDITIONING

Before processing Icynene High-R 80 the B-side chemical needs to be warm enough for the primary heater to elevate the drum temperature to the final processing point. The chemical drums should be stored and maintained between 50°F (10°C) and 100°F (38°C) before processing at the job site. The chemicals should be heated from storage temperature to the final “conditioned” temperature by circulation through the proportioner and hoses. Circulation through the proportioner and hoses also helps to make sure the product is well blended in the drum. Additionally, the B-side chemical also needs to be thoroughly mixed with a drum mixer at all times during circulation and processing.

SUBSTRATE PREPERATION

All surfaces to be sprayed must be free of oil, grease, waxes, rust scale, loose dirt and water. In addition, the substrate must be structurally sound. The moisture content of wood substrates must not exceed 19% before foam is applied. Some metal surfaces may require sandblasting and priming prior to foam spraying to ensure adequate adhesion. Consult a Huntsman Building Solutions Technical Service Representative for additional information on surface preparation. When in doubt about the potential for adhesion to a substrate, build a mock-up and spray the foam under similar conditions to that expected in the field, then test for adhesion and cohesion.

Applying foam insulation to concrete:

- Concrete and masonry must be fully cured and “bone-dry.”
- Oils – wash with detergent and allow to dry
- Salt or calcium deposits – wash with detergent and allow to dry
- Muriatic acid can be an effective cleaning agent for preparing concrete substrates prior to spraying foam. Follow the label instructions for dilution and application.

Applying foam insulation to galvanized steel:

- Oils or passivators – clean with solvent, wash with water based cleaner/degreaser, brush blasting may be necessary.
- Do not use hydrocarbon solvents like mineral spirits to clean galvanized metal.
- White rust – wire brushing or scrubbing with a stiff brush or abrasive pad.
- Prime using a DTM (direct to metal) bonding primer suitable for galvanized metal.

Applying foam over previously painted surface:

- Glossy surfaces – sand or abrade surfaces.

Applying foam over bare steel/metal:

- Rust scales – wire brushing or scrubbing with a stiff brush or abrasive pad.
- Corrosion – clean then prime with suitable bonding primer.
- Glossy or very smooth surfaces – sand or abrade surfaces.

Applying foam over stainless steel:

- Oils – wash with mineral spirits and then prime with a suitable primer. Brush blasting, sanding or abrading may be necessary as foam requires a mechanical bond.

Applying foam over aluminum:

- Oils, Hydrated Alumina – clean with solvent, never use a caustic solution, and prime with a high adhesion bonding primer suitable for aluminum.

Applying foam over glass:

- Oils – wash with detergent
- Glossy or very smooth surfaces – sand or abrade surfaces.
- UV degradation – prime glass surface with suitable primer.

Asphalt and Tar:

- Solvents – allow to cure and for solvent to evaporate, prime with suitable primer.

Rigid Polyurethane Foam:

- UV degradation – remove surface of foam with wire brush or wire grinding wheel.

Polypropylene, polyethylene, some silicones and some ceramic surfaces:

- Icynene High-R 80 may not adhere without a mechanical attachment to these substrates.

APPLICATION PARAMETERS

EQUIPMENT – Follow the spray equipment manufacturer’s safe operation guidelines. Every spray unit is slightly different and you will need to adjust your primary heater and hose temperatures accordingly for each polyurethane foam system. Adjust your processing pressures and application technique for an appropriate spray pattern for the substrate and structure.

PROPORTIONER – Use only fixed ratio (one-to-one), volumetric positive displacement pumps connected to a common drive or gear driven systems insuring a one-to-one ratio.

RATIO ASSURANCE TYPE SOFTWARES – Huntsman Building Solutions concurs with allowing a setting of a maximum ratio variance of 5%. Any deviance from that should be addressed immediately before continuing the installation. It should be noted that such tools and information are merely aids to spray foam contractors. *

TRANSFER PUMPS – Use 2:1 or 1:1 double acting transfer pumps assuring equal pressure is delivered from both sides to the proportioner. If diaphragm pumps are used, contact the Huntsman Building Solutions Technical Service Department for recommendations.

PRIMARY HEATERS – The primary heaters should be resistance controlled, direct contact heating rods, either submersible, mass block and tube style or combination of direct heating contact rods and mass block (hybrid heater). The primary heaters should be controlled through independent controllers, separated from the hose heat to ensure an accurate setpoint temperature. Icynene High-R 80 may not be consistently sprayed in conformance with the written specification if the combination of the proportioner’s pumping capacity, the primary heat capability and spray gun discharge rate (mixing chamber size) is out of balance. Contact the Huntsman Building Solutions Technical Service Department for further guidance.

HEATED HOSE – Huntsman Building Solutions recommends the use of heated spray hoses rated at ≥ 2000 psi. Use moisture resistant hoses specifically designed for isocyanate. The heated spray hose should be able to maintain temperatures up to 190°F (88°C) and should be heated using an electrical element with an independent temperature sensor. The heated hose should also be adjusted and monitored separately from the A and B primary heaters, and should be capable of maintaining the temperature from the A and B primary heaters all the way to the spray gun. Follow the published flushing procedure on the Huntsman Building Solutions website. Never flush water through the A-side (iso side). Failure to properly flush will result in off-spec foam and does not comply with the ICC Evaluation Service Report and does not qualify for the Huntsman Building Solutions Limited Lifetime Warranty.

FOAM APPLICATION

In preparation for spraying, an off-target test spray should be performed to verify the processing pressure, primary heater and hose temperature settings. The “initial setpoint temperatures” listed below and on the Technical Data Sheet are suggested general starting parameters; it’s important to observe the foam and the reaction time of the reacting mass and make additional adjustments throughout the day as needed to maintain proper cell structure, adhesion, cohesion and general foam quality.

RECOMMENDED PROCESSING PARAMETERS*	
Initial Primary Heater A-Side (ISO) Setpoint**	120 - 125°F
Initial Hose Heat Setpoint**	120 - 125°F
Initial Primary Heater B-Side (Resin) Setpoint**	120 - 125°F
Initial Recirculating Setpoint	90 - 100°F
Initial Processing Setpoint Pressure	1100 - 1500 psi
Drum Temperature During Storage	50 - 100°F
Drum Temperature During Processing	70 - 75°F
Substrate & Ambient Temperature	20 - 120°F
Moisture Content of Substrate	$\leq 19\%$
Moisture Content of Concrete	Concrete must be cured, dry and free of dust and form release agents.

*Foam application temperatures and pressures can vary widely depending on temperature, humidity, elevation, substrate, equipment and other factors. While processing, the applicator must continuously observe the characteristics of the sprayed foam and adjust processing temperatures and pressures to maintain proper cell structure, adhesion, cohesion and general foam quality. It is the sole responsibility of the applicator to process and apply this product within specification.

**It may be necessary to go outside of the recommended processing parameters or split temps due to ambient temps and material viscosity.

One proven method of applying Icynene High-R 80 is to spray perpendicular (90 degree angle) to the substrate, starting at the bottom of the cavity, holding the gun 10-14” away from the substrate and wetting the substrate and the vertical framing members while slowly working toward the top of the cavity. This technique also helps minimize over spray. Applying at an angle with the gun directed into the reacting mass may cause lack of adhesion, blisters, blow-off, excessive over spray, and an irregular surface finish which may affect yield and create unacceptable physical properties of the finished insulation product.

Always spray perpendicular to the surface in a minimum 3” lift. There is no maximum thickness due to physical properties, so Icynene High-R 80 can be sprayed as thick as possible in a single pass without signs of blow-off from the reacting mass. Thin foam layers often results in poor physical properties, and poor chemical reaction due to low exothermic heat generated from the chemical reaction, which is needed to create proper cell formation.

If touch-ups or subsequent passes are needed to achieve the prescribed thickness, allow the foam lifts to cool and release any steam generated during the spraying process. Wait at least 2-5 minutes before successive foam lifts are applied. Small blisters may form on the surface of the foam if this recommendation isn’t followed.

HOW TO AVOID OVERSPRAY

Over spray with open cell foams occurs for a variety of reasons such as spraying the product too cool, applying the product to a substrate that is too cold, not spraying perpendicular to the surface, and high wind conditions. Flash coating to warm the surface is not a recommended practice and may create unwanted over spray. Flash coats are very thin and may not have enough exothermic reaction present to properly cure. Excessive over spray may lead to blisters or delaminating of additional passes of foam or coating. Over spray can travel long distances and may adhere to objects left unprotected such as windows, buildings and automobiles. Protect anything that should not get foamed.

LIMITATIONS OF USE

Icynene High-R 80 is a combustible material with a maximum continuous service temperature of 180°F (82°C). Icynene High-R 80 should not be used in direct contact with chimneys, flues, steam pipes, recessed lighting or heat emitting devices. Consult the listing or label of such materials for clearance to combustibles. A minimum clearance of 3” should be maintained when applying around recessed lighting, and it’s important to avoid spraying inside electric outlets or junction boxes. Properly prep and secure any material or surface that should not get insulated. If in doubt about the substrate temperature or surface conditions, a trial application should be conducted to check foam quality and spray performance. Water on the surface from rain, fog, condensation, etc. will react chemically with the isocyanate, adversely affecting the foam and physical properties, particularly adhesion.

COLD WEATHER PROCESSING

The minimum substrate and ambient temperature for Icynene High-R 80 is 23°F (-5°C). Low temperatures affect the foaming process in two ways.

1. Chemical reactions can be slowed due to reduced exothermic energy within the expanding mass, which could lead to poor cell structure, dripping and voids from slow plastic formation
2. This reduced temperature often leads to reduced yield.

The temperature and type of substrate has a greater influence on the quality of the foam than the temperature of the air because the rate of heat transfer from liquid to air is much slower than the rate from liquid to substrate. If the substrate temperature is too low, or it is a highly conductive material such as metal or concrete, the heat produced by the chemical reaction may be drawn into the substrate so rapidly that plastic formation and cell generation becomes very slow, thus reducing yield. It is not a good practice to use the heated chemicals to warm the surface (flash coat). Instead, if the substrate to be sprayed is too cold to produce proper foam, the substrate should be heated using an indirect-fired heater or the foam should be sprayed on a warmer substrate on a warmer day. No open flame or direct heating is permitted during the spraying process.

THERMAL AND UV PROTECTION

Like all foam plastics, Icynene High-R 80 must be separated from the living space by a 15 minute thermal barrier in accordance with applicable codes. This product must not be used when the continuous service temperature of the substrate or foam is below -60°F (-51°C) or above 180°F (82°C). Icynene High-R 80 must be protected from direct exposure to sunlight; incidental exposure during construction may cause surface discoloration but will not degrade the performance of the foam.

VENTILATION

Ventilate during spray foam application and for a minimum of 24 hours following the application or until no objectionable odor remains. If not adequately ventilated during and shortly after application, the odors can be absorbed in adjacent materials such as fibrous insulation, wood framing and household or stored items. Sheet plastic should be placed over any absorbent material that cannot be removed during the spray and ventilation operation.

CHEMICAL STORAGE

Icynene High-R 80 B-side resin is packaged in totes or in open-head metal drums. A-PMDI is packaged in totes or in closed-head metal drums. Store both A-PMDI and B-side chemicals at temperatures between 50°F (10°C) and 100°F (38°C). Keep away from direct sunlight. Remove the transfer pump and tightly close the bungs of the A-PMDI and B-side drum after use. Icynene High-R 80 B-side resin has a 12 month shelf life when stored within the acceptable storage temperatures and the drum is in its original condition with the bungs having never been removed. See Icynene High-R 80 B-side SDS for additional product information.

FOR MORE INFORMATION

Visit www.huntsmanbuildingsolutions.com or call 817-640-4900 for more information on health, safety and environmental protection with respect to polyurethane chemicals.

Disclaimer: The information herein is to assist customers in determining whether our products are suitable for their applications. We request that customers inspect and test our products before use and satisfy themselves as to contents and suitability. Nothing herein shall constitute a warranty, expressed or implied, including any warranty of merchantability or fitness, nor is protection from any law or patent inferred. All patent rights are reserved. The foam product is combustible and must be protected in accordance with applicable codes. Protect from direct flame and spark contact, around hot work for example. The exclusive remedy for all proven claims is replacement of our materials.