

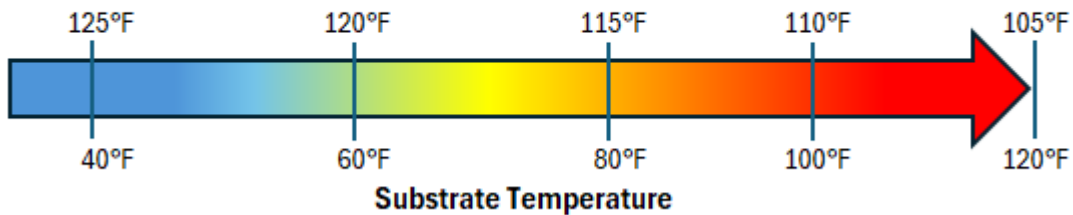
NCFI 11-033 InsulStar® 1.7 OPTIMAXX

APPLICATION SETTINGS

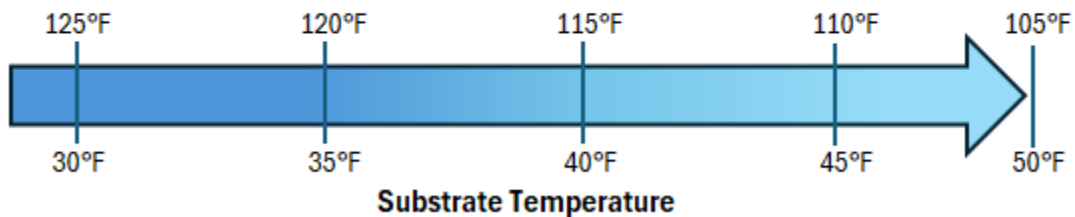
The “Recommended Processing Parameters” listed below are suggested starting parameters; adjustments will vary depending on temperature, humidity, elevation, substrate type, hose condition, sprayer speed, and mix chamber. Additional adjustments during the day may be necessary as ambient conditions change.

Recommended Processing Parameters	
Primary Heater Temperature	110 - 130°F
Hose Heat Temperature	110 - 130°F
Material Temperature	65 - 85°F
Dynamic Pressure	1000-1200 psi
Substrate Temperature	Regular: 40-120°F
	Cold (Fast): 30-50°F

Regular Blend- Starting Equipment Temperatures



Fast Blend- Starting Equipment Temperatures



Target Brown Time: 0.5-1 second

Test spray should be performed to ensure that the proper processing temperatures and pressures are set. You are dialed in when the foam has a 0.5–1 second brown time. If your spray hits as white foam you are too hot. If the temperatures are set too high, the mixing chamber may clog more often, and the pattern will worsen. Turn your temps down in 2–3° increments until you have a correct brown time. If your spray hits as brown and runny before turning into white foam, then you are too cold. Bring your temps up in 2–3° increments until your brown time is dialed in.

For optimal pressure settings, target a dynamic pressure of 1000-1200 psi while spraying as a starting point. Higher pressures may be required for longer hoses and larger mix chambers. Actual pressure drops vary based on hose length, viscosity of the material, material temperature, mix chamber, flow rate, restrictions and hose diameter. If the actual mix pressure is too low, it can result in poor atomization, incomplete mix, off-ratio foam, and poor cell structure.

For overhead applications, a dynamic pressure of 850-1000 psi and a 5°F increase in setpoint temperatures is recommended to prevent blowoff and reduce dripping.

PRECONDITIONING

Material Temperature: 65-85°F

Starting chemical temperatures should be between 65-80°F to ensure proper processing through the spray equipment. It is recommended to slowly bring up the temperature of the material 24-48 hours before application. Cold chemicals can cause poor mixing, pump cavitation, pressure imbalances or off ratio foam. Exercise caution when removing bungs as contents may be under pressure. Slowly loosen the bung to let the gas escape in a well-ventilated area. Once the hissing has stopped, it is safe to fully remove the bung.

Do not recirculate, agitate, or use portable heaters and drum blazers to superheat the material as these items will cause the material to froth. Frothy resin can easily overflow the container, causing it to run out onto the ground. You are also at higher risk of pressure imbalances and creating off ratio foam which can lead to quality issues. Before application, ensure the drum pump is fully screwed in and tightly sealed. NCFI recommends applying a 2-3 psi pressure as an air blanket during application to prevent frothing. A pressure regulator can be used to prevent over pressurization and potential drum rupture. The positive pressure blanket is not required when the system is not in use, but drums must remain tightly sealed.

SUBSTRATE PREPARATION

Substrate Temperature: 40-120°F (Regular) 30-50°F (Fast)

Substrate temperatures should be between 40-120°F for the regular blend and 30-50°F for the fast blend. 11-033 is suitable for application to most construction materials including wood, masonry, concrete, and metal. To ensure proper adhesion, substrates should be clean of dust or flaking surface, loose scale, dry, and free from oil, grease, rust or wax. Uncoated metals may require a primer coat. Do not spray foam when substrate moisture is $\geq 18\%$ or surface temperatures are less than 5°F above the dew point.

SPRAY TECHNIQUE

Distance: 18-24" @ 90-degree angle

Always hold spray gun perpendicular (90-degree angle) to the substrate. Spraying at an angle can cause a lack of adhesion and an irregular surface of the foam. Hold the gun approximately 18-24" away from the substrate. Apply the foam by spraying into the wet line, the section right before it starts rising, with a 60-80% overlap in passes. Avoid spraying onto rising foam as this can lead to poor quality foam and excessive dripping. For overhead applications, triggering the gun during the spray will reduce dripping and blowoff compared to a continuous spray application.

APPLICATION PASS THICKNESS

Minimum: ½ inch

Maximum: 4 inches

Recommended: 2 inches

The maximum recommended pass thickness for 11-033 is 4 inches. Spraying sections too thick will generate more heat and may result in poor quality foam, splitting foam, charring foam, or spontaneous combustion in extreme conditions.

The minimum recommended pass thickness for 11-033 is ½ inch. Thin foam layers often result in poor physical properties, lower yields and poor chemical reaction due to the lack of exothermic heat generated from the chemical reaction.

When applying multiple layers, restrict each pass thickness to ≤3 inches and allow the surface temperature of the foam to cool below 120°F before applying the second layer to ensure good cohesion. For applications of ≥3 layers, allow the core temperature of the foam to cool below 100°F or wait 10 minutes before the 3rd and subsequent layers are applied. Spraying multiple layers too fast will prevent the heat from dissipating and could lead to poor quality foam, splitting foam, charring foam, or spontaneous combustion in extreme conditions. Multiple layers can be applied to reach the desired thickness and R-value.

COLD WEATHER PROCESSING

For temperatures below 50°F, NCFI recommends heating the area with an indirect heater. Never use open flame or direct heaters during the spraying process. Do not heat enclosures with kerosene or propane fueled heaters as these add substantial moisture to the air and may result in condensation forming on the substrate. For lower substrate temperatures or application to highly conductive materials such as concrete or metal, a ½ inch flash pass is recommended.

HIGH ELEVATION APPLICATIONS

B-11-033 is not recommended for use at elevations above 4,500 ft. Foam expands more at higher elevations and the density will drop too much. This will increase the possibility dimensional stability issues related to lower densities.

STORAGE & SHELF LIFE

B-11-033 Resin- 6 months

A2-000 Isocyanate- 24 months

Keep drums tightly closed when not in use and under dry air or nitrogen pressure of 2-3 psi after opening to prevent the loss of the blowing agent. Ensure the material has cooled to below 80°F before pouring over drum heels and immediately replace the bung to prevent loss of blowing agent. Do not store in direct sunlight or high temperatures. HFO formulations are more susceptible to heat, and it is important to store the product between 50-80°F to ensure a 6-month shelf life. Storage above 90°F will cause the product to age quicker and reduce the reactivity of the product. At higher temperatures, material stored in drums can begin to bulge which can cause them to rock. Ensure drums are secured so they cannot easily fall from a pallet.

SPRAY EQUIPMENT

The system should be processed through spray equipment capable of delivering the proper 1:1 ratio by volume. Ensure the equipment can maintain a temperature of up to 140°F and a minimum dynamic pressure of 1000 psi. NCFI recommends 2:1 transfer pumps for supplying the liquid components to the proportioner. Diaphragm pumps are not recommended for closed cell foams containing HFO blowing agent. The use of an impingement mix type spray gun is required and static mixers are not sufficient to properly mix the product. It is the responsibility of the applicator to thoroughly understand all information related to their equipment for safe operating procedures.

For optimal performance, NCFI recommends the following mix chambers or equivalents. If you are spraying with the Graco FX gun, you will need to step down one on the mix chamber size for the same performance.

Mix Chamber	Orifice Size (in.)
AR4242	0.042
AR4747	0.047
AR5252	0.052
FX37RD	0.037
FX42RD	0.042
FX47RD	0.047

CHANGING OVER TO 11-033 INSULSTAR OPTIMAXX 1.7 HFO

Before loading the 11-033 chemicals into equipment that has been used to spray other brands/types of chemicals, purge the previous material from your system. It is important to flush between different brands of closed cell spray foam. Manufacturers may use different catalysts and there is an interaction between two of the metal catalysts. Bismuth and Tin can react and cause a yellow mustard like resin. When this is observed, do not contaminate this with other material and this should be wasted as it will not produce an acceptable product. This 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 Code Evaluation Report. Refer to NCFI's Technical Bulletin on "[2025 NCFI TECH BULLETIN- SPF-CHANGEOVER PROCEDURE USING COMPRESSED AIR.pdf](#)" for more detailed instructions.

CODE-COMPLIANT FIRE RESISTANCE

Building Codes require foam plastic insulation, such as 11-033, to be separated from the interior of the building by a 15 minute thermal barrier of ½" gypsum wallboard or other approved material. Refer to UES ER 677 for details. When Fire Resistive Wall Assemblies are required, contact NCFI Polyurethanes for specific alternate approvals for InsulStar®1.7 OPTIMAXX.

APPLICATION AROUND PLASTIC PIPES

Based on a series of extensive studies, the 11-033 system can be applied in contact with PVC, CPVC, ABS, PP-R and PEX plastic pipes. The pipes must not be pressurized during the foam application. The foam pass applied in contact with the pipe should not exceed 2" thickness in order to prevent excessive exothermic heat at the pipe to foam interface. Wait the required 2 minutes between each additional foam pass to allow the foam to cool. The total foam thickness is limited to the thickness permitted in that area of the building assembly. See [2025 NCFI TECH BULLETIN- SPF TO CPVC AND OTHER PLASTIC PIPES.pdf](#) for more information.

ATTICS AND CRAWL SPACES

11-033 has passed testing for application in limited access attics and crawl spaces without the code prescribed ignition barrier covering. The foam thickness can be up to 8” on wall cavities and 10” in ceiling cavities.

APPLICATION AROUND ELECTRICAL WIRES

Based on NCFI testing, the 11-033 system can be applied in contact with electrical wires. Spray foam applicators must spray the foam in such a manner that the expanding foam does not stretch and distort the wires. To encapsulate light gauge wires in the foam, spray foam behind the wires and allow it to cool for 2 minutes before applying a lift of approximately $\frac{3}{4}$ inch to cover the wire. Allow this pass to cool to near ambient temperature to avoid excessive heat buildup before applying additional passes to achieve the desired R-value thickness. See [2025 NCFI TECH BULLETIN- SPF APPLICATION AROUND ELECTRICAL WIRES.pdf](#) for more information.

VAPOR BARRIER PROTECTION ON COLD STORAGE APPLICATIONS

When the 11-033 system is used in structures subject to continuous cold or hot temperatures, such as coolers/freezers or indoor swimming pools, a Class I moisture vapor barrier (0.1 perm or less) is normally required on the “warm” side of the foam insulation. Contact NCFI for specific recommendations.

HEALTH AND SAFETY HANDLEING

When spraying or handling InsulStar Iso and resin, the following protective steps and equipment are recommended:

Protective Measures

- Adequate ventilation
- Safety training for installers
- Use of appropriate personal protective equipment
- Medical surveillance program

Protective Equipment

- Coverall (non-porous)
- Nitrile gloves
- Protective eyewear
- Supplied full face fresh air respirator

Exposure

- Avoid all contact with skin
- Avoid all contact with eyes
- Do not ingest
- Do not inhale vapors

The NCFI’s Product Stewardship Manual contains additional information and should be reviewed by all spray foam applicators. The American Chemistry Council (ACC) www.polyurethane.org, the Center for Polyurethanes Industry (CPI) www.spraypolyurethane.org, and the Spray Polyurethane Foam Alliance (SPFA) www.sprayfoam.org are good resources for additional information regarding the safe handling and application of spray foam chemicals.

Applicators should ensure the safety of the jobsite and other personnel in the area. Insulation is combustible and no hot work such as welding and soldering should take place until the foam is covered with an approved barrier.

VENTILATION OF SPRAY AREA

Spraying foam will generate a mist and airborne particulates. For interior applications, the building area must be vented with fresh air to dissipate the particulates. The amount of air flow and time for venting will vary based on each situation. Refer to the NCFI Technical Bulletin "[2025 NCFI TECH BULLETIN- VENTILATION REQUIREMENTS FOR REENTRY AFTER SPF APPLICATIONS.pdf](#)". SPF contractors should refer to this guidance prior to beginning any spray foam application project. Other workers and occupants should remain out of the immediate area during this venting time.

LIMITATIONS

11-033 should not be used when the continuous service temperature of the substrate is >180°F. The foam shall not be applied in electrical outlets, in junction boxes, to substrates over 120°F, or in direct contact with water. Maintain a minimum clearance of 3 inches between recessed lighting and other heat sources (chimney, flue, steam pipe, etc.). 11-033 is not approved for use in exterior applications and should only be used in interior applications.

BACTERIA AND FUNGUS RESISTANCE

InsulStar®1.7 OPTIMAXX is naturally able to inhibit the growth of bacteria and fungus (mold) per the ASTM C1338 test. The anti-microbial properties do not protect occupants of spaces insulated with InsulStar®1.7 OPTIMAXX from potential deleterious effects of molds, mold spores, or disease organisms that may be present in the environment.

ENVIRONMENTAL PRECAUTIONS

Do not allow liquid material to enter sewers, drains or ground water systems. Notify the relevant authorities in the case of accidental release of product that has caused environmental pollution.

MATERIAL SPILL CONTAINMENT AND CLEAN UP

Contain the spilled material if possible, then isolate the area to prevent personnel from walking into the material. Ensure there is adequate ventilation. Absorb the material with materials such as: absorbent clay, vermiculite, cat litter, sand, or sawdust. Collect the absorbed material in suitable and properly labeled container. Dispose of the material through a licensed disposal facility or contact local and state government for disposal procedures.

For MDI spills, the majority of the MDI then use a neutralization solution that consists of 2% liquid detergent, 10% sodium carbonate 88% water to decontaminate the spill.

WASTE DISPOSAL

Dispose of liquid 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. Small quantities of resin and isocyanate can be mixed in an open top bucket or large trash bag in a well-ventilated area. Always wear appropriate PPE when mixing chemicals. Keep quantities small to avoid excessive heat build-up. Once cool, it can be disposed of in a landfill.

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. Do not torch cut, weld, or heat drums. All NCFI labels should be removed, covered with spray paint, or wiped with solvent to remove all label content before disposal. The Reusable Industrial Packaging Association (RIPA) can help you find a drum recycler www.reusablepackaging.org.

Some metal recyclers or re-conditioners may require the drums to be decontaminated prior to accepting the drum. "A"-side drums can be neutralized with a solution that consists of 2% liquid detergent, 10% sodium carbonate and 88% water. Neutralizer solution can be stirred rapidly into the waste isocyanate in a well-ventilated area. Keep the drum open – remove all closure bungs. Separate the solid waste from liquid, the collected neutralizer solution may be stored and reused. Check with your local landfills to determine if the solid waste may be considered hazardous.

TECHNICAL ASSISTANCE

For assistance, please contact NCFI's Technical Services dept. at (336) 783-3491 or techservice@ncfi.net

DISCLAIMER

The information on our data sheets is to assist customers in determining whether our products are suitable for their applications. The customers must satisfy themselves as to the suitability for specific cases. NCFI warrants only that the material shall meet its specifications. This warranty is in lieu of all other written or unwritten, expressed or implied warranties, and NCFI expressly disclaims any warranty of merchantability, fitness for a particular purpose, or freedom from patent infringement. Accordingly, buyer assumes all risks whatsoever as to the use of the material. Buyer's exclusive remedy as to any breach of warranty, negligence or other claim shall be limited to the purchase price of the material. Failure to adhere to any recommended procedures shall relieve NCFI of all liability with respect to the material or the use thereof.

TROUBLESHOOTING

Drippy & Runny Foam – (1) Temperatures are set too low, and the material is cold. Increase setpoints in 3-5°F increments. (2) The substrate temperature is too cold. Prewarm the substrate or apply a ½ inch flash pass.

Blowoff- (1) You are spraying too close, and the foam is blowing off. Adjust your distance away from the substrate. (2) The speed that you are spraying is too slow and causing blow off. Increase the speed of your application.

Poor Adhesion – (1) Substrate temperature is too cold. Prewarm the substrate or apply a ½ inch flash pass. (2) – Substrate moisture is too high and should not be sprayed. (3) – Wrong side is being sprayed. OSB can sometimes be installed with the incorrect side facing towards the interior and the foam will have poor adhesion to this surface.

Poor Cohesion – (1) Subsequent layer was applied too quickly. Allow the foam temperature to cool below 100°F or wait 10 minutes between subsequent passes. (2) The subsequent layer was applied at too great an angle causing the foam to creep along the surface of the substrate.

Popping and Cracking – (1) Substrate temperature is too cold. Prewarm the substrate or apply a ½ inch flash pass. (2) Foam was applied is a pass thickness >4 inches. Do not spray more than 4 inches per pass. (3) Sufficient cooling time was not allowed between passes. Allow the foam temperature to cool below 100°F or wait 10 minutes between subsequent passes.

Blistering – (1) Too much moisture in the substrate. Check the substrate moisture and bring in indirect heaters to dry out the substrate. (2) Blisters between layers may result colder applications where the pass thickness is below ½ inch. The foam did not have enough exotherm to drive the reaction, then it kicks off and releases excess gas resulting in a blister when the next layer is applied.

Dark Brittle Foam – Material is off ratio and iso rich. There is a blockage on the resin side. Check in-line filters on the proportioner and spray gun.

Light Spongy Foam - Material is off ratio and resin rich. There is a blockage on the iso side. Check in-line filters on the proportioner and spray gun.

Gun Clogging – (1) Material temperature is set too high. Lower setpoints in 3-5°F increments. (2) Air pressure is insufficient. You should have an inlet air pressure of 80-130 psi.

Poor Yield – (1) Temperatures are set too low, and the material is cold. Increase setpoints in 3-5°F increments. (2) The substrate temperature is too cold. Prewarm the substrate or apply a ½ inch flash pass. (3) Lifts are too thin. Spray the maximum amount per pass and avoid excess touch-ups.

Pulls Away from Studs – (1) Foam was applied is a pass thickness >4 inches. Do not spray more than 4 inches per pass. (2) Sufficient cooling time was not allowed between passes. Allow the foam temperature to cool below 100°F or wait 10 minutes between subsequent passes. (3) – Substrate moisture is too high and should not be sprayed. (4) Substrate temperature is too cold. Prewarm the substrate or apply a ½ inch flash pass.

Frothing – (1) The material is too hot. Allow the material to cool back below 85°F. (2) Do not recirculate or mix closed cell systems.

Poor Cell Structure – (1) Contamination from an improper change-over. (2) Expired or aged material.

Friable – (1) The foam was applied below the recommended temperature window for the specific system. Change to a winter grade material or utilize a sacrificial ½” pass to warm the substrate.