

Open-Cell Low Density Spray Polyurethane Foam Insulation Application Guidelines ENERTITE® Series (G)

ENERTITE Series products are open-cell, low density spray polyurethane foam (ocSPF) insulation materials. These ocSPF are created by the chemical reaction between an isocyanate and a resin. ENERTITE Series can only be processed with BASF ELASTOSPRAY® 8000A Isocyanate. When these materials are combined in the spray gun's mixing chamber, a chemical reaction occurs, generating heat. This heat, or exothermic reaction, causes the chemicals to expand creating foam. The final cured ENERTITE product is yellow/off white. ENERTITE Series is a water-blown formulation.

ENERTITE (ET) Series comes in one reactivity grade, and these ocSPF Application Guidelines refer to open cell spray foam.

TO BE INSTALLED ONLY BY PROPERLY TRAINED CONTRACTORS

Installation of BASF spray foams requires special equipment and training. Only individuals that have completed training through verifiable sources (i.e. ABAA, Approved Distributor training, BASF TTC Training, CPI Online Health & Safety Training, SPFA Professional Certification Program [PCP] Training) can install ENERTITE Series SPF.

These Application Guidelines are for general reference only. Qualified individuals must be familiar with one or more of these industry guidelines: Spray Foam Coalition Guidance on Best Practices For the Installation of SPF, SPFA PCP Manuals or ASTM Standard C1848. For any questions regarding how to properly apply ENERTITE Series, please refer to the Technical Data Sheet and Code Compliance Research Report 1032 or Evaluation Service Report 3102. To speak to BASF regarding further open-cell foam application and processing guidelines, call 1-800-706-0712 Option 2 (CST) or email spf.techsales@basf.com

SHELF LIFE AND STORAGE CONDITIONS:

Note that ENERTITE resin has a shelf life of approximately six (6) months and ELASTOSPRAY 8000A Isocyanate has a twelve (12) month shelf life from the date of manufacture when stored in original, unopened containers at 50-80°F. As with all industrial chemicals, this material should be stored in a covered, secure location and never in direct sunlight. Storage temperatures below the recommended range will shorten shelf life. Using product out of shelf life will produce a non-credentialed product.

PROPER APPLICATION

Weather and Environmental Conditions

Before beginning an application, ensure the surrounding environment meets the following conditions:

Wind	When applying outdoors, wind speed must not be higher than 10 mph unless windscreens are used.
Humidity & Dew Point	No spraying should be done when the ambient temperature is within 5 degrees of the dew point. When the relative humidity is above 80% spray foam applications must be monitored and inspected frequently for adequate adhesion. High RH could cause blistering problems and weaken foam adhesion.
Ambient Temperature	ENERTITE G has an AMBIENT temp. range: 20°F to 120°F (-6.7°C to 48.9°C)

Substrate Service Temperature

Before beginning an application, ensure the continuous substrate temperature onto which ENERTITE Series is to be applied remains within the following range at all times:

Normal substrates (i.e. wood, wood-based products)	Heat sink materials (i.e. concrete, metal)
20°F* to 120°F (-6.7°C to 48.9°C)	30°F* to 120°F (-1.1°C to 48.9°C)

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Substrate Preparation

Prior to beginning application, determine if the substrate can be used with ENERTITE Series by conducting an adhesion test in accordance with ABAA, approved distributor training, BASF TTC Training, CPI Online Health & Safety Training, SPFA PCP Training, and/or ASTM C1848 Standard.

All substrates to be sprayed must be free of frost, dew, moisture, dust, oil, wax, mold release, grease, oxidization (rust), loose particles, and any other element that may inhibit proper adhesion of the SPF to the substrate.

Metal surfaces (i.e. ferrous or galvanized metals) may require the application of a primer or may require specialized treatments i.e. wire brush, chemical treatment, or commercial sand blasting prior to priming. Other surfaces may require additional preparation – pay special attention to substrates with high moisture content (concrete less than 28 days cured, and wood with moisture content over 18%, etc.). See training material for further information.

Pass Thickness and Multiple Passes

The heat created by the exothermic reaction during application creates a risk of scorching and/or fire, as well as irritating odors. This risk increases with greater pass thickness.

All ENERTITE Series must be applied to a minimum of ½" (15mm) pass thickness and to a 6" (180 mm) **maximum** thickness in one pass or lift. Pay close attention to areas where thick pockets of foam may develop during application, such as rim joists, header spaces, exterior wall corners, small stud spaces, and wall intersections, to ensure that no section of a pass exceeds the maximum thickness in a pass/lift.

If you spray a pass in excess of the maximum pass thickness, those areas must be immediately removed from the substrate using a non-flammable tool such as a crowbar – do not use your hands. After removal, break up large pieces of foam on a non-flammable surface using the non-flammable tool. Large masses of SPF should be removed to an outside safe area, cut into smaller pieces and allowed to cool before discarding into an appropriate trash receptacle.

When spraying multiple passes, a cooling/dwell time of 5 minutes per pass applied **must** be allowed for the dissipation of heat. Not allowing adequate cooling/dwell time raises the risk of scorching and/or fire. Once the installed material has cooled, it is possible to add additional passes in order to increase the overall installed thickness of SPF. Maximum four passes, at the maximum allowable pass thickness, per 12 hrs. Odor level of spray polyurethane foam is dependent on proper application using the recommended processing parameters and proper ventilation during the application.

The table below is designed to indicate the minimum and maximum application rate as well as the optimal coverage for each closed cell system. Applications less than the optimal pass range could lead to increased density and reduced yield.

	ENERTITE G water blown open cell SPF
Minimum pass thickness	½"
Maximum lift thickness per pass	6"
Optimal thickness range	4" – 6"

Impact of Exotherm on Construction Materials

In addition to temperature control within the foam itself, care must be given to applications over materials that the foam contacts, and/or encapsulates. Maximum service temperature of ocSPF is 180°F. Common construction materials such as wiring (both NM (non-metallic) electrical wiring and low-voltage wiring (security, electronic, etc.), as well as plastic pipes, including but not limited to PEX, PVC, cPVC and ABS, typically have maximum exposure temperature of 140°F-220°F. If spraying on a heat sensitive product, adequate heat mitigation techniques include the use of a flash coat, applying ocSPF so that the product does not end up in the point of hottest exotherm, and shielding the material from encapsulation.

PROCESSING AND APPLICATION INSTRUCTIONS

The following equipment settings are recommended:

- Hose heat and primary heater temperature of 125°F-135°F in colder climates and 105°F-125°F in warmer climates
- Proportioner set (static) pressure of 1150-1450 psi for a dispensing (dynamic) pressure 900 – 1200 psi in all climates.
- Start with a hose and primary heater heat setting of 120°F and a dispensing (dynamic) pressure of 1000 psi. Make adjustments to those settings in small increments (+/- 5°F, +/- 100 psi).
- The optimum temperature may vary with the type of equipment used, the particular application conditions, and the climate zone. For more information on equipment consult the Spray Polyurethane Foam Alliance (SPFA) technical document AY-137.
- BASF's SPF systems are formulated to produce foam with physical properties representative of our published data sheets within the factory set tolerances of commercially available fixed ratio proportioner units.

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PROCESSING AND APPLICATION INSTRUCTIONS (continued)

- A small “test area” of spray foam should be applied and inspected prior to commencing the project.
 - Check the reactivity, density, spray pattern, mix quality, and foam cell quality by test spraying onto a disposable piece of substrate.
 - This simple, low-cost test area can indicate inadequate adhesion, improper surface preparation and/or primer requirements, surface contamination, improper substrate and/or ambient temperature, equipment malfunctions, material contamination, or improper application technique.
 - Visual inspection of a sample cut from first test area and periodic job samples can reveal potential problems that may be due to one or more of the above conditions.
- Hold the spray gun perpendicular 18-24 inches from the substrate if spraying a cavity and 18-36 inches from the substrate if spraying an open wall or underside of a roof. Arm movement, extension and stretching should be minimized while spraying.
- The thickness of a pass depends on the speed of the arm movement while spraying and the overlap of the spray pattern. Smooth, steady movements ensure proper application and uniform density.

PROPER VENTILATION

Application space must be properly ventilated during and after application of ENERTITE Series. Consult the EPA’s “Ventilation Guidance for Spray Polyurethane Foam Application” document, the American Chemistry Council’s “Ventilation Considerations for Spray Polyurethane Foam” documents for specific requirements, and the BASF Technical Tip #20 Jobsite Ventilation Re-occupancy & Re-entry time for Open & Closed cell Spray Polyurethane Foam. A 24-hour re-occupancy time with proper ventilation rates is advised.

In the American Chemistry Council – Center for the Polyurethanes Industry website you will find two open cell studies conducted by BASF, “Spray Polyurethane Foam Monitoring and Re-Occupancy of High-Pressure Open Cell Applications to New Residential Constructions” and “Open Cell Monitoring, a Follow-up After Reformulation.” It is within these studies that the suggested values of the table below were extrapolated.

BASF Product	Reentry @ 20 ACH*	Reentry with minimal ventilation	Reoccupancy
ENERTITE G	2 hours	4 hours	24 hours

*Ventilation rates based upon ventilation used DURING the time of application and for the time frame listed.

Properly designed work zone containment including, but not limited, to controlled negative pressure, contained air flow/movements, appropriate air supply /exhaust system together prevent contaminants from moving into adjacent spaces and provide a way to eliminate lingering odors and contaminants. Provide proper ventilation and isolation of the spray area in order to ensure no entry or exposure by other trades or occupants, during the spray period and after completion while the materials cure. Consult appropriate design professionals.

PROCESSING AND APPLICATION INSTRUCTIONS IN COLDER CONDITIONS

ENERTITE Series, with special attention to the substrate and ambient temperature guidelines as well as the following important additional instructions.

- Start by not allowing product to freeze as B side material can separate and A side can form crystals. Ensure drums are stored between 50-80°F (10-26.7° C), never in direct sunlight. This may require keeping drums off floor and conditioning the storage area.
- Material should be brought as close to 70°F before beginning processing to ensure proper heating of both components. If warming of material is required, it may take hours or days to heat up from low temperatures. Material colder than 50°F may be difficult to pump.
- Store material between 70-80°F in a warm room or with heat blankets prior to use.
- Preheat spray area and substrate in advance. Properly address “heat sink” materials such as concrete or metal. Stay away from heaters that produce moisture/condensation (i.e. propane, kerosene). Inspect substrate for visible moisture (i.e. condensation, frost, ice or snow). Frequently re-inspect during the spraying process.
- Picture framing technique in studs in addition to “flash pass coating” help prevent curling and shrinkage.
- Spraying terminations and allowing proper cooling before tying in the remainder of the foam will help reduce strain from curing.
- If possible, maintain ambient temperature of spray area to allow for the complete curing of end product.
- Friability (powdery surface on SPF during cold weather conditions) results from lack of heat during the foaming reaction which extends the timeline for both curing and polymerization of the plastic foam. During this time the foam is in a fragile state but will firm up with time. Thermal Shock (when the exotherm of the spray foam is subject to rapid cool down because it is applied to a cold target or exposed to cold air after application) may lead to disbondment before the foam fully cures to obtain all of its physical properties, including a firm bond to the target.
- Quality control – small scale test areas provide an opportunity to see how all materials are installed and evaluate their properties prior to proceeding. Stop and correct any issues before continuing.

For detailed spray instructions, refer to Training materials.

IT IS STRONGLY ENCOURAGED TO COMPLETE A QUALITY CONTROL DAILY REPORT AND AN INSULATION CARD FOR EACH PROJECT

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DIRECTIONS FOR FLUSHING MATERIALS

- Going from the ENERTITE Series to any BASF closed-cell material or vice versa only requires a few special steps. One material can be pushed through the lines with the other. The material can be either **bled out** or **sprayed out**.
- Every 50 ft of 3/8" hose contains approximately ½ gallon of material (¼ gallon resin and ¼ gallon isocyanate). For 300 ft of hose, approximately 4 gallons of material needs to be purged from the lines to get to fresh material.
- If material is **bled out**, please note that where one is pushing out, there will be some cross contamination of the two resins. The bled material can be re-used as long as cross contamination has not occurred. Please note that the same Isocyanate (A- side) material is used for both BASF closed and open cell SPF and therefore, the resin (B-side) is the only side that is required to be bled out.
- If material is **sprayed out**, purge the cross-over material out onto polyethylene plastic or cardboard until you get to the material you are intending on spraying. Once you have all the first material out of the system, you will need to do a quality check prior to spraying the foam into cavities.
- CROSSOVER MATERIAL SPRAYED IN THE WALL CAVITY SHOULD BE REMOVED IMMEDIATELY BEFORE CONTINUING. Dangerous exotherm could occur if the crossover material is sprayed too thick (> 2 inches in a single pass).
- If transitioning from ENERTITE Series to another manufacturer's closed-cell resin, flushing is required. Follow any flushing or processing guidelines required by that manufacturer.

EXPOSED FOAM

Sunlight adversely affects urethane foams. For this reason, it is recommended that a UV protective coating be applied over the finished foam if it is to be exposed longer than 90 days. This would help protect against the deteriorating effects of ultraviolet radiation and atmospheric moisture. In addition, spray foam is combustible and is required by building codes and the insurance industry to be covered for fire protection. Nearly all applications of spray foam inside a home or building is required to be protected by either a thermal barrier or ignition barrier, those approved for application over BASF SPF's can be found on the open cell Evaluation Reports [ESR 3102 / CCCR 1032](#). For more information regarding these requirements you can consult with BASF Technical Advisors, SPFA Technical Document AY-126 or www.spraypolyurethane.org.

DISPOSAL

Disposal of containers or unused chemical must be done in compliance with all applicable Federal, State, County or Municipal guidelines. Do not burn materials in drums containing residue. Empty containers that have been properly prepared should be recycled by contacting RIPA – The Reusable Industrial Packaging Association at www.reusablepackaging.org for the nearest drum reconditioner near you.

TECHNICAL ASSISTANCE

For more detailed information, contact Inside Technical Sales at Toll-Free: 1-800-706-0712, Option 2 (CST)

Email: spf.techsales@basf.com

Website: www.spf.basf.com

Technical data sheets: <http://www.spf.basf.com/TDS-SDS-INFO.php>

ENERTITE® is a registered trademark of BASF Corporation.

BASF Spray Foam APP available for download:



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Warning: These products can be used to prepare a variety of polyurethane products. Polyurethanes are organic materials and must be considered combustible.

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