# Closed-cell Spray Foam Application Guidelines

## WALLTITE® Series HFO (Max and LWP) Spray Foam Insulation Guidelines

WALLTITE Series products are closed-cell, medium density spray polyurethane foam (ccSPF) insulation materials. These ccSPF are created by the chemical reaction between an isocyanate and a resin. WALLTITE Series products 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, releasing heat. This heat, or exothermic reaction, causes the blowing agent to expand creating foam. The final cured product is pale yellow/off white. WALLTITE Series products are low-global warming potential, HFO-based SPF formulations.

WALLTITE (WT) Series come in two reactivity grades: Regular Speed ("R") and Fast Grade for colder / winter conditions ("W"). Unless specified, all references to WALLTITE Series in these ccSPF Application Guidelines refer to all grades.

**TO BE INSTALLED ONLY BY PROPERLY TRAINED CONTRACTORS**

Installation of BASF spray foams require 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 BASF WALLTITE Series spray foams.

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 WALLTITE Series foams, please refer to the Technical Data Sheet and Code Compliance Research Report 1031 or Evaluation Service Report 2642. To speak to BASF regarding further closed-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:**

WALLTITE Series resins (LWP & Max) have a shelf life of six (6) months and ELASTOSPRAY 8000A Isocyanate has a 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 above the recommended range will shorten shelf life and may also result in elevated headspace pressure within packages. 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 15 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 (RH) 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 | The reactivity grade of WALLTITE Series is dependent on ambient and substrate temps.<br>The following grades are recommended for each AMBIENT temperature range on the left: |
| **60°F** to 120°F | ***Regular Reactivity***<br>**WALLTITE LWP R** |
| **40°F** to 120°F | ***Regular Reactivity***<br>**WALLTITE Max R** |
| **30°F** to 65°F | ***Fast Reactivity***<br>**WALLTITE LWP W** |
| **20°F** to 65°F | ***Fast Reactivity***<br>**WALLTITE Max W** |

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**Substrate Service Temperature**
Before beginning an application, ensure the continuous substrate temperature that the WALLTITE product is to be applied to remains within the following range at all times**:**

| Foam Formulation | Normal substrates (i.e. wood, wood-based products) | Heat sink materials (i.e. concrete, metal) |
|---|---|---|
| **WALLTITE Max** | 20°F to 120°F | 30°F to 120°F |
| **WALLTITE LWP** | 30°F to 120°F | 40°F to 120°F |

**Substrate Preparation**
Prior to beginning application, determine if the substrate can be used with WALLTITE 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 WALLTITE products must be applied to a minimum of ½" (13mm) pass thickness and to a **maximum** thickness indicated in the table below. 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.

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 of WALLTITE LWP a cooling/dwell time of **10 minutes per inch** applied must be allowed for the dissipation of heat. Not allowing adequate cooling/dwell time with these systems 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. If a third layer of a material of any of these systems is required, at the maximum allowable pass thickness, is required, there must be a cooling period of at least 1 hour before spraying additional passes. A maximum of four passes, at the maximum allowable pass thickness, should be allowed per 12-hour period. WALLTITE Max can be applied in two back-to-back passes up to 3.5" each, with no cooling time required between passes. Additional passes over the 7" total should allow for cooling time of 10 minutes per inch.

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

| HFO Closed-cell SPF System | WALLTITE LWP | WALLTITE Max |
|---|---|---|
| **Minimum pass thickness (Inch)** | ½ | ½ |
| **Maximum lift thickness per pass (Inch)** | 2 | 4 |
| **Dual Pass Method (no dwell) (Inch)** | NA | 3.5 + 3.5 |
| **Optimal pass thickness range (Inch)** | 1½- 2 | 3-4 |

For more detailed spray instructions, refer to BASF Spray Foam Training offerings.



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

**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 ccSPF is 180ºF. 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. These are well within the temperature limits of thinner applications and would surely be surpassed by thicker foam applications. When spraying high lift formulations around these materials, be sure to build the material up to the desired thickness in thinner passes with proper cooling times. Use flash coats with all SPF systems for the initial application around these products, to isolate and minimize the heat generation, then apply more after cooling. The alternative is to protect the material so that the high potential temperature created by the foam reaction doesn't cause damage.

**PROCESSING AND APPLICATION INSTRUCTIONS -** The following equipment settings are recommended:

- Hose heat and primary heater temperatures of 115ºF-130°F in colder climates and 110°F-125°F in warmer climates
- Dispensing (dynamic or spraying) pressure at 900 – 1200 psi in all climates.
- Start with a hose heat of 120ºF and a dispensing pressure of 1100psi. Make adjustments to those settings in small increments (+/- 3°F, +/- 50 psi).
- The optimum temperature may vary with the type of equipment used and the particular application. 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.

- 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.
- The thickness of a pass depends on the speed of the applicator arm movement while spraying. Smooth, steady movements ensure proper application and uniform density. Hold the spray gun perpendicular, from 1-3 feet from the substrate. Arm extension and stretching should be minimized while spraying.
- Application space must be properly ventilated during and after application.
  - Consult the EPA's "Ventilation Guidance for Spray Polyurethane Foam Application" document and the American Chemistry Council's "Ventilation Considerations for Spray Polyurethane Foam" documents for specific requirements.
  - 24-hour re-occupancy time is advised

**PROCESSING AND APPLICATION INSTRUCTIONS IN COLDER CONDITIONS**

WALLTITE W reactivity products must be applied the same way as R reactivity products, with special attention to the substrate and ambient temperature guidelines, as well as the following important additional instructions.

- Select the right reactivity for your climate and conditions.
- Do not allow product to freeze as B side material can separate and A side can form crystals. Ensure drums are stored between 50- 80ºF (10-26.7º C), never in direct sunlight. This may require keeping drums off floor and conditioning the storage area.
- **Prior to use:** Store material between 70-80ºF in a warm room or cover with heat blankets.
- Material should be brought as close to 70ºF as possible before beginning processing to ensure proper heating of both components. If warming is required, it may take hours or days to heat up from low temps. Material colder than 60ºF may be difficult to pump.
- Preheat spray area and substrate in advance targeting to have temperatures on site to be 32°F and rising. 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. It is important to wet the studs during application to ensure the heat from reaction is transferred to the substrate to aid adhesion.
- Foams that are capable to be applied in lifts greater than 3" will have less heat developed if sprayed in thinner lifts. Supplemental heat and wetting the studs may be required to avoid thermal shock.
- 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.



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- Friability, or a powdery surface on SPF during cold weather conditions, results from lack of heat during the foaming reaction which extends both curing time and polymerization of the plastic foam. During this period, the foam is in a fragile state but will firm up with time.
- Thermal Shock happens 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 and may lead to disbondment before the foam fully cures to obtain all of its physical properties, including a firm bond to the substrate and studs.
- Quality control – small scale test areas provide an opportunity to see how all materials are installed and to evaluate their properties prior to proceeding. Stop and correct any issues before continuing.

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

## DIRECTIONS FOR FLUSHING MATERIALS

When transitioning between different spray foam products, take care to ensure cross contamination does not occur. Material should be purged out and/or captured in the transition. Every 50 ft of hose contains approximately ½ gallon of resin. For 300 ft of hose, approximately 3 gallons of material needs to be purged from the lines to get to fresh material. After flushing, spray out a test sample to ensure sufficient flushing has occurred.

## 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 if the foam is applied on exterior applications, to 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 are required to be protected by either a thermal barrier or ignition barrier. If a prescribed barrier is not covering the foam, then an alternative intumescent coating must use the approved coatings for application over BASF SPF's can be found on the closed cell ESR 2642 / CCRR 1031. 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 Support at:
Toll-Free: 1-800-706-0712, Option 2
Email: spf.techsales@basf.com
Website: https://spf.basf.com/
Technical Resources: Contractor Resource Center

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