

Firestable™ Application Guidelines

NFPA 275 Closed-Cell Spray Polyurethane Foam Insulation Application Guidelines FS 2.0

Firestable™ FS 2.0 is closed-cell, medium density spray polyurethane foam (ccSPF) insulation material. FS 2.0 is highly fire resistant, meets code for flame resistance and also protects flammable materials from igniting when applied over them at a minimum of 2 ½ inches. The ccSPF is created by the chemical reaction between a specific isocyanate and a resin. Firestable™ can only be processed with 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 FS 2.0 product is Cloud White (standard) or Charcoal. Firestable™ FS 2.0 is a H2O-based formulation.

TO BE INSTALLED ONLY BY PROPERLY TRAINED CONTRACTORS

Installation of Firestable™ spray foam requires special equipment and training. Only individuals that have completed training through verifiable sources (i.e. ABAA, Approved Distributor training, CPI Online Health & Safety Training, SPFA Professional Certification Program [PCP] Training) **AND THE FIRESTABLE COMPANY APPROVAL PROGRAM** can install FS 2.0 Series SPF.

This Application Guideline is 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 FS 2.0 Series, please refer to the Technical Data Sheet and Firestable™ Approval documentation. To speak to Firestable™ regarding further closed-cell foam application and processing guidelines, call 1-800-767-8773 or email mail@firestable.com

SHELF LIFE AND STORAGE CONDITIONS:

B SIDE PRODUCT MUST BE MIXED BEFORE SPRAYING-SEE DRUM OR MIXING GRAPHIC BELOW FOR SPECIFIC MIXER AND MIXING DURATION. SEE FIGURE 1.

Note that FS 2.0 resin has a shelf life of approximately 6 months when stored in original, unopened containers at 50-90°F. Every effort should be made to use open containers up as quickly as possible. 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.

A. PROPER APPLICATION

1. 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. RH> 80% could cause blistering problems and weaken foam adhesion.	
Ambient Temperature	The quality of FS 2.0 Series is dependent on ambient and substrate temps. The following are AMBIENT temp. range which FS 2.0 can be sprayed:	
60°F to 100°F (15.6°C to XX°C)	FS 2.0 CC Thermal Barrier SPF	Up to 4 inches in a single pass 2 ½ inches for Thermal Barrier compliance For IBC 2603.9 compliance, refer to QAI listing B1134 and IAPMO ER 857
30°F to 65°F (- 1.1°C to 18.3°C)	FS 2.0 CC Thermal Barrier SPF	Flash coat of 1 inch followed by up to 4 inches per pass 2 ½ inches for Thermal Barrier compliance
Below 30°F (-1.1°C)	NOT RECCOMENDED	

TABLE 1



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2. Substrate Service Temperature

Before beginning an application, ensure the continuous substrate temperature onto which the product is to be applied 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)
Firestable™ FS 2.0 cc SPF	30°F* to 120°F (-1.1°C to 48.9°C)	50°F* to 120°F (10°C to 48.9°C)

TABLE 2

3. Substrate Preparation

Providing a proper substrate prior to application is responsibility of the owner, an owner's appointed representative, the contractor, and/or the inspector. Manufacturer's recommendations are as follows. However, based on given specialized or unique application circumstances, other preparation techniques may be required. Contact Firestable technical support at 860-767-8772 with any additional questions.

Prior to beginning application, determine if the substrate can be used with FS 2.0 Series by conducting an adhesion test in accordance with ABAA, approved distributor 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.

If substrate is concrete, the surface should be structurally sound, clean, and have cured for at minimum 28 days. Large voids should be filled with appropriate backer rods or fillers. While priming and/or blasting are not always required, it is the responsibility of the contractor/end user to determine proper adhesion and/or suitability. For additional information, reach out to Firestable technical support.

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 or >19% moisture content, and wood with moisture content over 18%, etc.). See training material for further information.

4. Pass Thickness and Multiple Passes

Though FS 2.0 is highly fire resistant and actually protects flammable materials from igniting when applied over them, 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.

FS 2.0 ccSPF must be applied to a minimum of 1" (25.4mm) pass thickness and to a **maximum** pass 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 their core temperature allowed to cool before discarding into an appropriate trash receptacle.

When spraying a second pass, a cooling/dwell time of 10 minutes per inch 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. If a third layer of a material, at the maximum allowable pass thickness, is required, there must be a cooling period of at least 1 hour between passes before spraying additional passes. Maximum four passes, at the maximum allowable pass thickness, per 12 hrs (evenly spaced).

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.

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	FS 2.0 cc thermal barrier SPF	
Minimum pass thickness	1"	
Maximum lift thickness per pass	4"	
Dual Pass Method (no dwell)	1 + 1½"	
Optimal thickness range	2½" - 3"	

TABLE 3

5. 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 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, EPS/XPS 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 FS 2.0 around these materials, be sure to build the material up to the desired thickness in thinner passes with proper cooling times. This is especially true when spraying over EPS/XPS. 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 goal is to protect the material so that the high potential temperature created by the foam reaction doesn't cause damage.

B. PROCESSING AND APPLICATION INSTRUCTIONS AT 70°F AMBIENT AND ABOVE

The following equipment settings are recommended:

- See Technical Data Sheet (TDS) for starting equipment settings and minimum equipment requirements.
- 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 from 1-3 feet from the substrate. 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. Smooth, steady movements ensure proper application and uniform density.
- 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.

C. PROCESSING AND APPLICATION INSTRUCTIONS IN COLDER CONDITIONS AND HEAT SINK MATERIALS (TABLE 2)

- See Technical Data Sheet (TDS) for starting equipment settings and minimum equipment requirements.
 - Do not allow product to freeze as B side material can separate and A side can form crystals. Ensure drums are stored between 50-90°F (10-32.22° C), never in direct sunlight. This may require keeping drums off floor and conditioning the storage area.
1. 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
 2. Pre-warm material to between 70-80°F in a warm room or with heat blankets prior to use.
 3. 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.
 4. Picture framing technique in studs in addition to "flash pass coating" help prevent curling and shrinkage.
 5. Spraying terminations and allowing proper cooling before tying in the remainder of the foam will help reduce strain from curing.
 6. If possible, maintain ambient temperature of spray area to allow for the complete curing of end product.
 7. Friability (powdery surface on SPF during cold weather conditions) results from lack of heat during the foaming reaction which extends the time line 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

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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.

8. 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.

Mixing:

Step 1: Mixing Required -

15 minutes of mixing recommended

Step 2: Recirculate B Hose 'Manifold to Drum' as last step of mixing

(Do NOT Recirculate before mixing)

Step 3: Clean and ensure 20 mesh Y-Screen

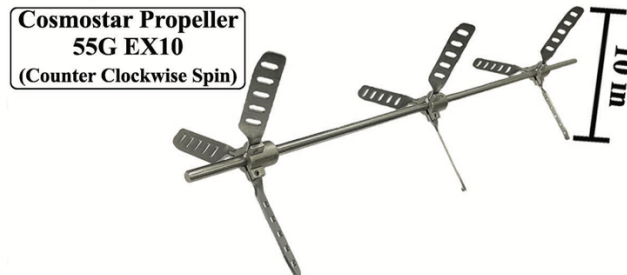


Figure 1

For detailed spray instructions, refer to Training materials.

IT IS STRONGLY ENCOURAGED TO COMPLETE A QUALITY CONTROL DAILY REPORT.

AN INSULATION CARD IS REQUIRED FOR EACH PROJECT, and a link can be found at **this QR code:**

This card must be supplied to Firestable™ for validation of warranty.



D. DIRECTIONS FOR FLUSHING MATERIALS

When transitioning between different spray foam products, take care to ensure cross contamination does not occur. This is especially critical after spraying Firestable™ FS 2.0 since it is a new class of cc SPF. Material should be purged out and/or captured in the transition. Every 50 ft of hose contains approximately ½ gallon of resin. For 200 ft of hose, approximately 2+ 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. Refer to mixing graphic:

E. EXPOSED FOAM

Sunlight adversely affects urethane foams. It is recommended that a UV protective coating be applied over the finished foam if it is to be exposed longer than 5 days on exterior applications. This will protect against the deteriorating effects of ultraviolet radiation and atmospheric moisture.

F. 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 Toll-Free at: 1-860-767-8773

Email: Mail@Firestable.com Website: Firestable.com

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