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Flame Seal-TB™ Fire Retardant Coating
Application Instructions

Flame Seal-TB™ technical support contact information: (800) 783-3526, (713) 668-4291 or email at flameseal@flameseal.com (24/7 year-round technical HOT LINE available for Qualified Applicators)

NOTICE: SECTIONS PRINTED IN BLUE ARE FOR QUALIFIED APPLICATORS & EXPANDED WARRANTIES.
(All other instructions and procedures must be followed to qualify an application for the Manufacturer's Standard Warranty.)

General Information

Flame Seal-TB™ is an intumescent, industrial coating for use on spray polyurethane foam (SPF) insulation. Flame Seal-TB™ has received critical ICC certifications, which assure users that what you buy is the same product that was "tested", and that there is audited and "monitored" Quality Control.

SPF properly coated with Flame Seal-TB™ will meet Thermal Barrier requirements of IBC 2603.4 and 2603.9 and/or Ignition Barrier requirements of IBC 2603.4.1.6 and ICC-ES AC377 Appendix X.

Flame Seal-TB™ is provided in 5-Gallon Kits consisting of:

- One - 5 gallon pail (4 gallons of resin)
- One - 1 gallon pail T50-TB™ cross-linker

50-gallon kits are available on special order, with special approval of Flame Seal only. These require 4 – 5 weeks lead time and a minimum purchase of 1000 gallons. Factors considered for using 50-gallon kits are:

1. Size of the project
2. Accessibility and openness of the area of application
3. Capability of spray equipment AND applicator to process entire 50 gallon kit prior to the end of pot life (pot life times are listed below).

POT LIFE (of cross linked material)	
65°F	**120 – 150 min**
75°F	**110 – 130 min**

85°F	**80 – 100 min**
95°F	**50 – 70 min**
Ambient & *Surface Temperatures: **Must be a minimum 50 - 95°F throughout the application process (See Dew Point issues, RETURN TO SERVICE next page).**	
Never allow the temperature of liquid resin or curing agent to drop below 40°F	
Flame Seal-TB™ must be stored at a temperature between 40° – 90°F. If the temperature drops below 60°F, it should slowly be warmed to 60° - 80° F before using.	

Storage Requirements

Flame Seal-TB™ components should be stored between 60° - 90°F, in tightly sealed containers. If the temperature drops below 60°F, the Flame Seal material must be slowly brought back above 60°F before using.

NOTE: Prolonged storage of Flame Seal-TB™ components below 40°F or above 90°F may cause irreversible damage.

Return to Service and Cure Time

In accord with commonly accepted coating practices, the foam *SURFACE temperature must be at least 5°F above the Dew Point during application, as well as during the cure period. *MAXIMUM HUMIDITY = 85%. (See attached "Dew Point Calculation Chart"). Based on this, the RETURN TO SERVICE times are:

- 80°F or above: 18-24 hours.
- 60 - 80°F: 24-36 hours.
- 50 - 60°F: 36-48 hours.
- Freezers: 4-7 days (See "FREEZING" below)

Return to Service means dry to touch and moderate contact. CURE TIME is 48 hours or more.

NOTE: There are three phases: Return to Service (OK for contact), Cure Time (dry 100% solid), Fully cured (washable).

*MAX Humidity during APPLICATION = 85%. During the CURE PERIOD, Humidity must not exceed 85% more than 4 hours / day. If such occurs on any given day, the cure period must be extended by 24 hours.

Washing

Flame Seal-TB™ has cured enough to be cleaned after 3 months of curing under proper conditions as stipulated in these instructions (all surfaces at least 5° above the dew point, with good ventilation & air movement at all times.) This may take longer with variations in dew point conditions. To clean, use light to moderate pressure tap water sprayed through a dispersion tip with a wide spray pattern. The spray pattern must be at least 24" wide and must be moving at all times. DO NOT FOCUS ON ONE SPOT FOR MORE THAN A FEW SECONDS AT A TIME. If heavy dirt does not come off with the spray alone, then use the spray method first to remove loose dirt, then wipe stubborn areas with wet sponge or similar type apparatus, then, rinse again with tap water spray. Let the surface air dry. (Do not dry with cloth or sponges.) If there is a need to force a quicker dry, use warm, dry moving air (convection).

IMPORTANT NOTE: DO NOT CLEAN WITH CONCENTRATED HOSE STREAM, FOCUSED NOZZLES, HIGH PRESSURE WASHERS, HOT WATER OR STEAM CLEANERS.

In-Service Requirements

WATER EXPOSURE

Flame Seal-TB™ is an interior product. DO NOT immerse or expose to any environment in which the surface is wet continuously. (This includes condensation caused by interior conditions whereby surfaces temperatures are at or below the Dew Point much of the time.) Occasional exposure to moisture (including cleaning procedures) is allowed.

NOTE: CONDITIONS THAT MAY KEEP SURFACES WET CONTINUOUSLY REQUIRE A WEATHER PROOF TOP COAT TO BE APPLIED OVER THE FLAME SEAL-TB™.

VENTILATION

Flame Seal-TB™ may be applied on SPUF insulation in any interior space, so long as there is a ventilation system in place (HVAC, power ventilators, turbines, ridge vents, gable vents, attic fan, etc.).

****FOR "QUALIFIED" APPLICATORS & EXPANDED WARRANTY:** Applicators must make sure the coated area maintains ventilation that meets the requirements of Chapter 4 of the International Mechanical Code (IMC), in accord with acceptable building practices. If it is unclear which IMC code applies, Flame Seal Products' default (minimum) requirement is 0.12 CFM/FT².

AIR MOVEMENT DURING APPLICATION & CURE

To facilitate a proper cure, there must be air movement in the application area during the application and cure period. In mid-to-high humidity conditions (65% - 80%), extra care must be taken to ensure there is detectable air movement, especially over all ceiling SPUF surfaces during the application AND curing period. Air at the ceiling that is absolutely STILL OR STAGNANT is not permissible. If any areas are doubtful, portable auxiliary fans should be used during application and cure periods to assure air movement.

****HIGH HUMIDITY / MOISTURE CONDITIONS (Only for Level Three applicators):**

When applying Flame Seal-TB™ in areas with "borderline" high humidity (85%+) conditions during application and curing (examples: ceilings directly over equipment that generates steam that is not fully

vented, or ceilings over anything that generates a high volume of water vapor): In addition to the above requirements, a good quality humidity meter must be used to monitor RH levels throughout the application and cure period. Also, there must be high volume, continuous air movement that will visibly move a 1" x 18" strip of cotton fabric held vertically near the ceiling. Check this in several locations. (In other words, there must be strong air movement in all areas of the surface to be sprayed.) Auxiliary fans may need to be placed in the work area during application and cure periods. If dew point is borderline, auxiliary heaters or de-humidifiers may need to be employed to assure a good cure.. (NOTE: The planned procedures for these extreme job conditions must be approved by Flame Seal Products, Inc. before proceeding to maintain manufacture's warranties.)

****FREEZING - FOR "QUALIFIED" APPLICATORS ONLY (+ EXPANDED WARRANTY.)**

Flame Seal-TB™ may be applied in cold storage or freezer units ONLY by a "Qualified Applicator" who has completed Flame Seal's LEVEL THREE Qualified Applicator Training Program.

If Flame Seal-TB™ is applied in areas that will freeze (inside freezer units), the product must be allowed to fully cure FOR A MINIMUM OF 4 DAYS in accord with these Instructions: SPF surface temperatures must be between 60°F - 90°F. Air temperatures must be between 50°F - 90°F. The application must cease if any of these temperatures do not remain within these ranges. Maintain APPLICATION LEVEL ventilation & air movement, zero water exposure, and Always Follow the Dew Point rule:

"In accord with commonly accepted coating practices, the foam *SURFACE temperature must be at least 5°F above the Dew Point during application, as well as during the cure period. (See attached "Dew Point Calculation Chart")."

****DO NOT ALLOW THE COATED SURFACES TO FREEZE PRIOR TO THE END OF THIS CURE PERIOD, OR WITHOUT ADHERING TO THESE REQUIRED CONDITIONS.**

****NOTICE: For Freezers that will experience "warm / freeze" cycles on a regular basis, the above cure period must be extended to 7 days.**

****WARNING: THE CLIENT MUST BE NOTIFIED THAT ANY "WARM/FREEZE" PROCESS MUST NOT INCLUDE WARMING BY OPENING DOORS TO EXPOSE THE SPACE TO OUTSIDE AIR, AS THIS CAN CREATE EXCESSIVE CONDENSATION. ELECTRIC OR VENTED GAS HEATERS MUST BE USED AS THE SPECIFIED PROCEDURE FOR WARMING A FREEZER UNIT.**

Coverage Rates

- **Thermal Barrier** - Applied at 25 wet mils (18 dry mils):
  - Coverage of 65 sq. ft. per gallon or 1.6 gallons per 100 sq. ft. on foam with average, moderately smooth surface profile*
  - Cross linked Flame Seal-TB™ is formulated to hang on a vertical surface @ 25 mils. More than 25 mils may cause product to sag, less than 25 mils may not hide the foam surface color.

NOTICE: For Thermal Barrier applications on 0.5 lb open cell SPF insulation, the recommended coverage rate is 30 wet mils, in accord with test results. This equates to 21 dry mils, 54 sq. ft. per gallon, or 1.85 gallons per 100 sq. ft. on foam with an average, moderately smooth surface profile*

- **Ignition Barrier** – Applied at 4-12 wet mils (3-7 dry mils), depending on the SPF brand (**See >NOTE**):
    - Coverage of 125 sq. ft. per gallon or 0.64 gallons per 100 sq. ft. on foam with average, smooth surface profile*

* Rough foam surfaces will require more product and should be accounted for when calculating the amount of needed material.

>NOTE: Coverage rates vary with each SPF manufacturer's test reports. At the time of this writing, the range of specified coating thickness for Ignition Barrier work is 4-12 wet mils.

Application Equipment Requirements

IMPORTANT NOTE: Flame Seal-TB™ is a specialized fire protection coating, and is NOT a paint! EVERY component of Flame Seal-TB™ is a Fire Retardant, and contains NO flammable latex binders (that's why it is so superior!). As a result, it is a LOW pH coating, and will react with any HIGH pH material. (MOST paints are HIGH pH.) THEREFORE, we recommend dedicated spray guns, hoses and pump* for "perfect" results every time. If not feasible, then extra care must be taken to THOROUGHLY clean the spray equipment (guns, hoses and pumps) to remove ALL contaminants (high pH) such as latex or other coatings. IF YOU DO NOT DO THIS, FLAME SEAL-TB™ MIGHT SOFTEN AND LOOSEN OLD RESIDUES INSIDE THE SYSTEM, WHICH CAN CAUSE CLOGGING OF YOUR SPRAY GUN. (The Flame Seal-TB™ is, in effect, trying to "clean" out your system)

Most common airless paint equipment will work with Flame Seal-TB™. The size and power of the spray equipment is determined by the size of the job and total length of hoses.

The minimum requirements: (this will work well, but only for small jobs, as the pace will be slow)

- 3/4 HP Electric Motor (or)
- 1 HP Gas powered
- Output capability of 0.4 gallons per minute with 2000+ PSI (dynamic) at the gun
- RAC tip size .021 - .031 - determined by paint pump capability and desired spray pattern.

NOTE: Do not use a spray tip with a diffuser. **Remove paint strainers from the spray pump and gun**, as they may restrict the flow of Flame Seal product. Flame Seal-TB™ is pre-strained through an 80 mesh filter.

***If you cannot dedicate a pump to this product, make sure it is as clean as possible every time you use your dedicated guns and hoses!**

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

- A "Fresh Air System" is recommended for applications in areas without adequate ventilation
- An Organic Vapor Cartridge Respirator is recommended for applications in well ventilated areas i.e., 3M-5201 Organic Vapor Assembly
- Safety Glasses
- Gloves
- Protective Coveralls

Application Procedures

Conditions to Proceed with Application

Before beginning an application, make sure the conditions meet all requirements of these INSTRUCTIONS, as:

- All surfaces to be coated are clean and dry.
- All equipment for application and clean-up is on site, and as specified in these instructions.
- The Temperature of all Flame Seal-TB™ and T50-TB™ to be used is between 60° - 80°F.
- The Temperature of all surfaces to be coated is at least 5°F ABOVE the dew point (see attached chart).
- MAXIMUM HUMIDITY AT THE TIME OF APPLICATON = 85%
- The above temperatures, including coating components and surfaces will remain in spec throughout the day.
- The surfaces will remain at least 5°F above the dew point for a minimum of 48 hours after application.
  **NOTE: For Freezers / Freeze applications, this period will be 4-7 days. (See "FREEZING" section)
- The spray area meets minimum ventilation and air movement in accord with these instructions.
  *If application is in high humidity area, additional air movement is required.
  See "AIR MOVEMENT" section.

Blending and Mixing Procedures

Prior to starting the mixing and blending process, Flame Seal-TB™ components must be a minimum temperature of 60°F and maximum 90^0F. SPF surface temperatures must also be between 60°F - 90°F. Air temperatures must be between 50°F - 90°F. The application must cease if any of these temperatures do not remain within these ranges. **Always Follow the Dew Point rule:**

"In accord with commonly accepted coating practices, the "Foam *SURFACE Temperature" must be at least 5°F above the Dew Point during application, as well as during the cure period. (See attached "Dew Point Calculation Chart")."

Upon opening the Flame Seal-TB™ resin container, you may notice a spongy top layer. This is normal, and will mix into the liquid easily.

1. Mix Flame Seal-TB™ resin thoroughly until mixture is homogenous - until there are no spongy pieces larger than ¼" diameter, and the mix looks smooth. DO NOT DRAW EXCESSIVE AIR INTO THE MIX, AS BUBBLES MAY CAUSE PROBLEMS WHEN SPRAYING. (Use an "aggressive" drill mixer, designed for 5 gallon pails, with a ½" chuck drill motor and mix at 600 – 800 rpm. Spin in direction that pulls the liquid UP. **DO NOT** use a cordless drill motor.)

2. Shake the one gallon jug of T50-TB™ Cross Linker for a few seconds prior to adding to the Resin. The T50-TB™ may be slightly thicker near the bottom of pail, so be sure to do this. (Unless it is being used (poured), T50-TB™ must always be kept sealed.)

3. Add the T50-TB™ Cross Linker to the resin and mix with the same mixer used in step #1. Mix for approximately one minute, or until thoroughly mixed. Avoid drawing air into the mixture while stirring. T50-TB™ Cross Linker adds instant viscosity and body to the mixture. Once the Cross Linker is added and mixed in, the mixture's pot life begins. **DO NOT** stir or mix further as it may shorten the pot life of the mixture. (NOTE: If the mixture is left still for a time, and spraying becomes difficult, stir or agitate for a few seconds to restore proper viscosity for continued spraying.)

   ***NOTE:** It is crucial that the mixture is not under mixed, which could result in an uneven mixture, causing incomplete curing in some areas.

4. Verify the mixture temperature with a thermometer. The temperature of the mixture will determine pot-life as indicated on the resin pail label.

Application Procedures

Spray Application:

Spray in a cross hatch pattern to achieve 25 wet mils coverage on vertical surfaces. 25 wet mils (.017 - .018) coverage will provide a 15 minute thermal barrier. 12 wet mils (.007 - .008) coverage will provide an ignition barrier.

- An ignition barrier application requires one coat of 4-12 mils. (depending on the Brand and tests)
- A thermal barrier application requires one 25 mil coat on vertical surfaces. Ceilings require two thin coats that add up to 25 wet mils. (Ex: First coat = 10 mils, Second coat = 15 mils).

NOTE: Product is designed to 'hang' on a vertical surface at 25 wet mils. Anything greater than 25 wet mils may sag or run.

Roller Application:

- Vertical surfaces: Apply in two coats using 3/8" nap roller. Allow 6 – 10 hours dry time between coats.
- Overhead surfaces: Apply in two coats using 3/8" nap roller. Allow 6 – 10 hours dry time between coats.

***NOTE:** Roller application of Flame Seal-TB™ is difficult and is not recommended. Whenever possible, apply with airless spray equipment. Manufacturer recommends roller application only for small jobs or difficult to reach areas where spraying would be difficult, or overspray would be a problem.

Spray Equipment Cleaning Procedures

After each use, you can clean the equipment quickly and easily with HOT SOAPY WATER as follows:

1. Use a 1 tablespoon of non-Ionic soap such as *Dawn*® detergent in 4-5 gallons of hot water.
2. Use water from a hot water tap. (at least 110 degrees F for best results)
3. Use a standard or infrared thermometer to verify water temperature.
4. Flush out the pump system, hoses and guns until water runs clear.

Note: If a water heater is not available, and water is cold, it is best to heat 2-3 gallons of water to get the equipment well cleaned. If only COLD water is available, it is recommended that the cleaning procedure should be followed with cold water, leaving the equipment full of clean water… then; a hot soapy water flush must be performed upon return to the Contractor's facility to get maximum cleaning of the equipment.

TINT / PIGMENT

Flame Seal Products, Inc. has not yet completed third party certifications for the use of tints or pigments, but has successfully tested black pigment internally that allows for shades of gray and very dark gray (almost black) coloring of the coating. Due to these test results, Flame Seal will supply (upon request) a letter of recommendation based on these tests. However, the client must seek approval from local code officials before using gray / black colors on any project.

TOP COATS

Flame Seal Products, Inc. has not yet completed third party certifications for the use of Top Coats yet, but has tested a number of coatings internally and has proven their efficacy. Due to these test results, Flame Seal will supply (upon request) a letter of recommendation based on these tests. However, the client must seek approval from local code officials before using top coats over Flame Seal-TB™ on any project.

Warranties

Products are guaranteed to perform their fire retardant function as represented by third party tests, if applied according to manufacturer's published instructions. Products may not be diluted or altered prior to use.

There are no other warrantees either expressed or implied since Flame Seal Products, Inc. cannot control the actual application of the products. Users must determine usability and suitability for their particular requirements, as well as compatibility with the exact materials to be treated or coated.

*Exception: An Expanded Warranty is available for work performed by Certified Applicators. An Expanded Warranty applies to applications of Flame Seal-TB™ by Qualified Applicators trained by Flame Seal Products, Inc. via it QAP training program. Said Qualified Applicators are documented and

listed in Flame Seal's QAP records. (Expanded Warranty documents available upon request, or from a local Qualified Applicator.)

****EXPANDED WARRANTY (Available upon request ONLY for Level Three Certified Applicators and their customers.)**

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