

FSP



Flame Seal Products
Applicator Training Program



Flame Seal TB-C Thermal Barrier

Why Do Codes Require Thermal Barriers?

- SPF, like most organic materials, is combustible.
- Unprotected SPF will ignite when exposed to fire.
- Smoke and combustible gases can accumulate in interior spaces during fire conditions and lead to flashover.
- **Flashover** is the near-simultaneous ignition of most of the directly exposed combustible material in an enclosed area. When certain organic materials are heated, they undergo thermal decomposition and release flammable gases.

Thermal Barrier

The 2015 National Building Code 3.1.5.12 specifies that foam plastic insulation must be protected from the adjacent space by a thermal barrier.

In Canada, products approved for use as a thermal barrier for foamed plastic must pass either CAN S124-M, *Standard Method of Test for the Evaluation of Protective Coverings for Foamed Plastics*, or CAN/ULC-S101, *Standard Methods of Fire Endurance Tests of Building Construction and Materials*, to comply with the *National Building Code of Canada (NBC)*.

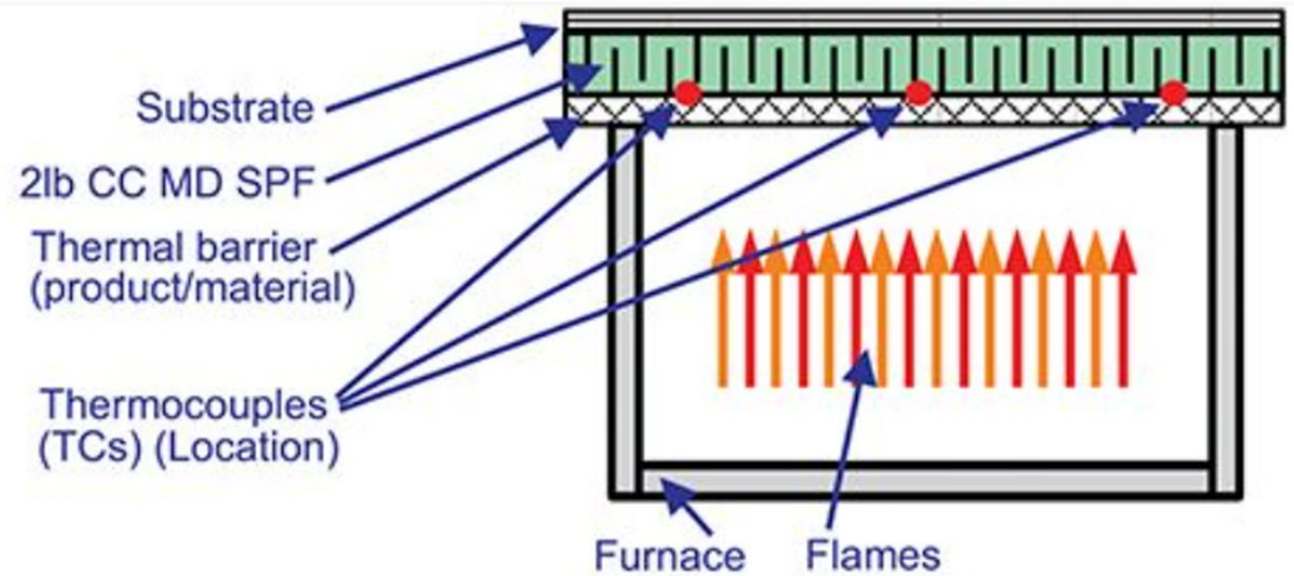
NO OPINION, STRAIGHT FACTS

*CAN/ULC S124-06 or CAN/ S101 are the only two ways to show compliance to the National Building Code 3.1.5.12

“It is the opinion”-Line 1 of Competitor Evaluation Report

Canadian Testing

- The assembly for CAN/ULC S124, Standard Method of Test for the Evaluation of Protective Coverings for Foamed Plastics, for thermal barrier material over sprayed polyurethane foam. Image's courtesy Canadian Urethane Foam Contractors Association



Thermal Barrier Applications

- Commercial Warehousing
- Grow Houses
- Residential
- Parking Garages
- Schools
- Hospitals
- Transportation Buildings



Flame Seal TB-C



TB-C Introduction



- Flame Seal TB-C™ is the first and only thermal barrier coating approved, under ULC S124-06, over spray polyurethane foam (SPF) in Canada. Flame Seal TB-C™ meets all requirements of the Canadian National and Provincial Building Code 3.1.5.12 standard, giving a new advanced option for SPF protection for the Canadian market. Flame Seal TB-C™ is a two-part coating system. The mix ratio is 4 parts resin to 1 part curing agent, by volume.

Product Link: <https://flameseal.com/flameseal-tb-c/>

TB-C Product Overview



- Non-Toxic, Water Based, Environmentally friendly, spray applied intumescent coating for use as a thermal barrier over Spray Polyurethane Foam (SPF) insulation.
- The Product is two-component system that consists of a resin and a cross-linker. The product is mixed in a 4:1 ratio and is applied using industrial spray equipment.
- At exposure to fire the product turns into carbon foam and begins to swell into a carbon matrix that protects the SPF from Thermal Transition, thus protecting the SPF.

TB-C Product Overview



- Flame Seal TB is exclusively designed as a Safety Coating. The product is sold to Professional Applicators and Organizations.
- The product is sold as a system consisting of 1-gallon of T-50 and 4 - gallons of TB resin. The product is white and cures into a semi-gloss coating.

Testing & Certifications



Standard	Result
CAN/ULC S124-06	Class B
CAN/ULC S145	10 Minutes
ASTM E 84	Class A

UL Product IQ

<https://iq.ulprospector.com/en/?qm=10005:6272&p=10005>

TB-C Benefits



- First and only thermal barrier coating approved, under ULC S124-06
- ULC Listed & Certified
- Ideal viscosity for smooth spraying
- Highly regarded for its aesthetics by Architects, project managers, and property owners
- Bright white, semi-gloss finish reflects light and brightens area
- 1 on 1 Product Training
- Exceptional service and support

TB-C Physical Properties

Finish	Semi-Gloss
Color	White
Solids	60%
Shelf Life	1 Year
VOC	Less than 40 g/l
Reducer/Cleaner	Water
Packaging	TB-C: 5 Gallon Pails & T-50: 1 Gallon Bottle
Drying Times	1-4 Hours

Flame Seal TB-C™ meets all requirements of the Canadian National and Provincial Building Code 3.1.5.12.

What is an Intumescent Coating?



- An **intumescent** is a substance that swells as a result of heat exposure, thus increasing in volume and decreasing in density.
- The goal is to keep the protected surface from reaching the temperature which will cause ignition long enough for the safe exit of the building.

Video Link:

<https://www.youtube.com/watch?v=4rA8QCSXsfA&t=18s>

Project Record



Flame Seal Products, Inc
www.flameseal.com
713-668-4291

INTUMESCENT COATING INSTALLATION JOB WORK RECORD

Keeping track of your projects application conditions helps confirm compliance to your Building Official or Authority Having Jurisdiction. If there is a concern on a project the installer can use this document for proof of installation and application conditions. Flame Seal Products recommends keeping this document updated and filed.

CONTRACTOR CONTACT AND INFORMATION

Contractor: _____
Phone Number: _____
Email: _____
Project Start/End Date: _____

PROJECT INFORMATION

Project Name: _____
Project Description: _____
Location: _____
Address: _____
Square Footage: _____
WFT Required: _____
Is the area ventilated? Yes No
Is the area isolated? Yes No

PRODUCT INFORMATION

Product Used: _____
Label Batch Number: _____
Quantity Used: _____
Purchase Date: _____

EQUIPMENT INFORMATION

Airless Sprayer: _____
Tip Size: _____
Hose Length: _____

SUBSTRATE INFORMATION

Substrate: _____
Primer used? Name: _____
Moisture Content: _____
Free of grease and debris? Yes No

Job Work Records are an excellent way to track your installations and confirm compliance to your Building Official or Authority Having Jurisdiction. In the event of a concern on a job the installer can provide documented proof of the installation, for this reason Flame Seal recommends using these forms for all thermal barrier jobs. Project records should be submitted within 7 days of application.

Link: <https://flameseal.com/wp-content/uploads/2021/02/Job-Work-Record-FSP.pdf>

Submit: flameseal@flameseal.com

Personal Protective Equipment (PPE)

Review MSDS-

Respiratory Protection

- Using a full-faced respiratory mask is always mandatory when spraying TB-C due to the strong odor during curing.

- **Skin Protection:**

Gloves and Tyvek to protect skin

- Note: Flame Seal TB contains Isopropyl alcohol that can cause irritation.



Storage

- It is recommended to store material at temperatures above 10°C (50°F) and below (32°C) 90°F
- Best storage practices include protection from freezing during shipping, storage and application. Frozen product may be compromised.

Application Equipment 10,000 sq. ft or Less

Recommended Sprayer: Graco 695 II or Titian 740 or equivalent

PSI: 3300 / 227

Gallons Per Minute (GPM) .80

Tip Size: .017 – 0.21

Filter: 30 mesh, removal of filter is recommended from gun and machine

Hose: 1/4" diameter airless spray line for the first 50' from pump and 1/4" x 6' whip



Application Equipment 30,000 sq. ft or Less

Recommended Sprayer: Graco 795 or Titan 840 or equivalent

PSI: 3300 / 227

Gallons Per Minute (GPM): 1.0

Tip Size: .017 – 0.21

Filter: 30 mesh, removal of filter is recommended from gun and machine

Hose: 1/4" diameter airless spray line for the first 50' from pump and 1/4" x 6' whip



Application Equipment 30,000 sq. ft or More

Recommended Sprayer: Graco Mark 4/5 or equivalent

PSI: 3300 / 227

Gallons Per Minute (GPM): 1.35

Tip Size: .017 – 0.21

Filter: 30 mesh, removal of filter is recommended from gun and machine

Hose: 3/8" diameter airless spray line for the first 50' from pump and 1/4" x 6' whip



Mixing Procedure

- Step 1: Mix 4 gallons of TB resin until smooth, using a drill mixer with a paint spiral attachment (2-3 minutes). Do not use a mixing blade that aerates the product.
- Step 2: Mix the 1 gallon of T-50 into the 4 gallons of TB resin and mix with same equipment as step 1 (2-3 minutes). Do not use a mixing blade that aerates the product. Note: Ensure the blend is homogeneous.



Pot Life

- Once the T-50 Cross-linker has been mixed with Flame Seal TB-C, there will be a Pot Life of 60-90 minutes depending on the weather conditions. After 90 minutes Flame Seal TB-C will become unsprayable as the curing process progresses.
- Mix TB-C as needed on the job site. 5 Gallons will take 5-10 minutes to spray.



Surface Preparation

- Use techniques best suited to the type of foam being applied. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable paint film.
- Be aware of glossy sheen surfaces on the SPF. To address the glossy sheen, spray a light mist coat of SPF over the glossy surface to increase the adhesion of the TB-C.



Glossy Sheen Finish
Poor Adhesion



Textured Finish
Great Adhesion

Application Conditions

Requirements

- Air temperature 15.5°C (60°F) – 32°C (90°F).
- Humidity between 35 - 70%.
- SPF Surface temp 15.5°C (60°F) – 32°C (90°F).
- Product Temp 15.5°C (60°F) – 32°C (90°F).
- Surface temp must be >5°F above *Dew Point during all three phases of the coating, preparation, application, and curing.

*Review Dew Point Chart (Next Slide)

Based on "interior" AIR TEMP & HUMIDITY



Dew Point Calculation

Dew Point Calculation Chart (Fahrenheit)
Ambient Air Temperature °F

	20	30	40	50	60	70	80	90	100	110	120
90	18	28	37	47	57	67	77	87	97	107	117
85	17	26	36	45	55	65	75	84	95	104	113
80	16	25	34	44	54	63	73	82	93	102	110
75	15	24	33	42	52	62	71	80	91	100	108
70	13	22	31	40	50	60	68	78	88	96	105
65	12	20	29	38	47	57	66	76	85	93	103
60	11	19	27	36	45	55	64	73	83	92	101
55	9	17	25	34	43	54	61	70	80	89	98
50	6	15	23	31	40	50	59	67	77	86	94
45	4	13	21	29	37	47	56	64	73	82	91
40	1	11	18	26	35	43	52	61	69	78	87
35	-2	8	16	23	31	40	48	57	65	74	83
30	-6	4	13	20	28	36	44	52	61	69	77

Dew Point: Temperature at which moisture will condense on surface.
 Example: If air temperature is 70°F and relative humidity is 65%, the dew point is 57°F

- For optimal adhesion, the surface temperature must be 5°F or 3°C above Dew Point.

Example

- Ambient Temperature is 70°F, the Relative Humidity is 65% , The Dew Point is now 57°F. No coating should be applied unless the surface temperature of the SPF is 62°F minimum.

Dew point calculator: <http://www.dpcalc.org/>

Air Circulation & Ventilation

- Air circulation during the application is extremely important when applying or curing any water-based coating.
- Air movement helps remove the moisture from the coating and shortens the drying and curing time.
- Ventilation can be provided by engaging the central air unit or strategically placing fans within the application site.
- The building's ventilation must meet minimum code requirements for the structure type and use, according to the International Mechanical Code (IMC - supplied).
- Note: If for any reason, there is no local specified requirement, the structure must meet 0.12 CFM/FT* minimum default values.



Air Circulation & Ventilation

- The product contains Isopropyl Alcohol (rubbing alcohol). In enclosed spaces, the area can develop a strong alcohol smell. Proper Ventilation is required. The building's ventilation must meet minimum code requirements for the structure type and use, according to the International Mechanical Code (IMC - supplied).



Heating

- Application in the winter months will require artificial heating.
- Natural Gas, Propane or Kerosene heaters will produce water vapor in the application area that will impact the relative humidity.
- Note: check with the manufacturer of the heaters to determine the moisture output in order to remain within the required application conditions.
- All Humidity and Temperature ranges should be maintained and monitored throughout the application and curing process.

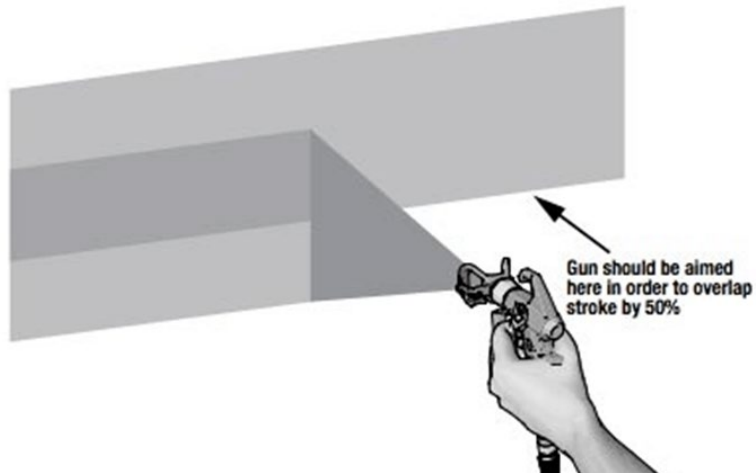


Coverage Rates

Standard	Wet Mils-WFT	Sq/ft Per Gallon
CAN/ULC S124-06-Class B	44 Wet Mils (2 Passes)	38 sq/ft
CAN/ULC S145 (10 Minutes)	24 Wet Mils	67 sq/ft

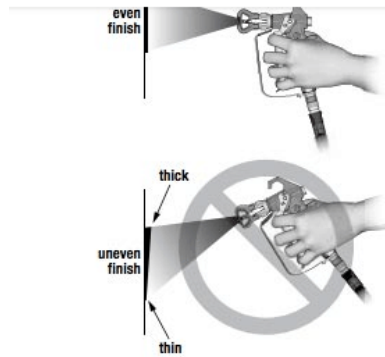
- In order to achieved 44 WFT as required by the CAN/ULC S124-06, 2 passes of 22 WFT will be required. The first pass must dry for 2-4 Hours before proceeding with the second pass. The Dew Point rule must be followed during this process.
- TB-C should never be sprayed over 28 WFT in a single pass.

Spraying



- The use of an overlapping technique is recommended to ensure that a uniform amount of coating is applied onto the foam surface. The applicator should adjust the spray pattern and technique so that each application stroke overlaps by 30-50%.

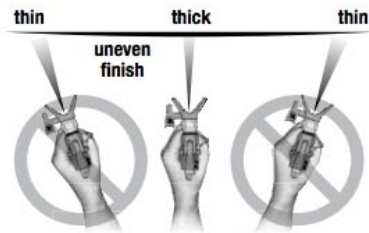
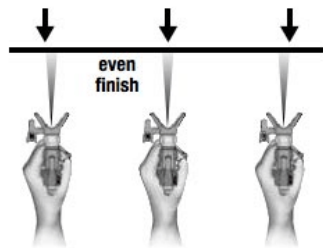
Spraying



Spray gun aimed straight at surface

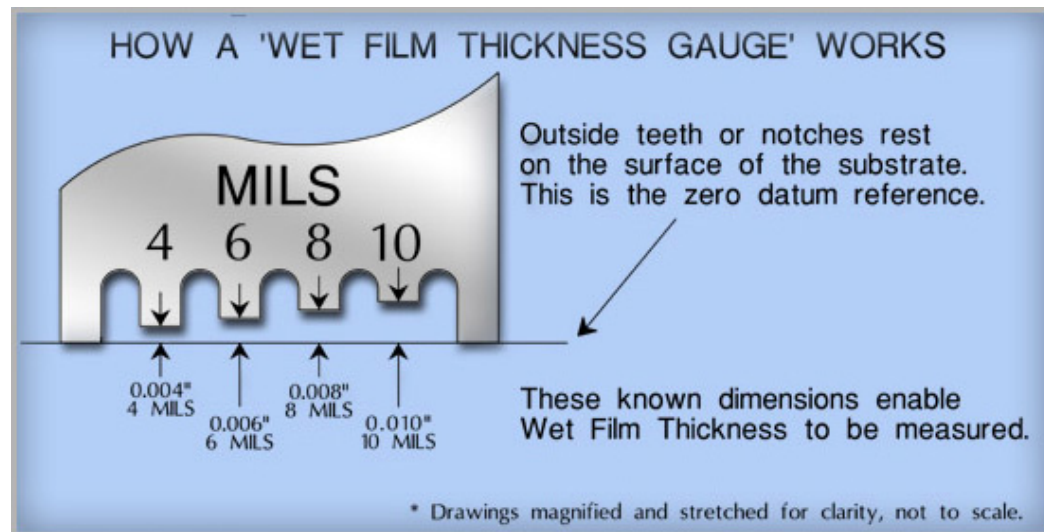
Tilting the gun in one direction or the other to spray at an angle causes an uneven finish.

Spray gun tilted downward or upward will produce an uneven finish



- Spray the gun aimed straight at the surface for an even smooth finish. Bending or breaking the wrist will cause inconsistent coverage across the surface of the SPF.

Wet Film Thickness Gauge



- Wet Film Thickness Gauges are designed to quickly and easily measure the thickness of coatings immediately after they have been applied to a substrate. The wet film thickness of most organic coatings including paints, resins, lacquers, varnishes, gel coat, etc. may be measured. The thickness of powder type coatings may also be measured before curing.

Checking Wet Mils



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INTUMESCENT COATING INSTALLATION JOB WORK RECORD

DAILY APPLICATION CONDITIONS

Day	Date (mm/dd/yyyy)	Temperature (F)	RH%	Surface Temp (F)	Comments (Weather)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

DAILY WET FILM THICKNESS (1 reading per 500 Sq.Ft)

Reading	Date (mm/dd/yyyy)	WFT	Reading	Date (mm/dd/yyyy)	WFT
1			13		
2			14		
3			15		
4			16		
5			17		
6			18		
7			19		
8			20		
9			21		
10			22		
11			23		
12			24		

I, _____, hereby certify that I have installed the listed fire protection per manufacturers' installation instructions and product listings, and in a manner compliant with local building codes in effect at the time of installation.

Signature: _____

Date: _____

Send a copy of this document to flameseal@flameseal.com upon completion of the project.

- Placing metal plates throughout your project is a great way to get an accurate Wet Millage. Since SPF has a rigid surface checking the Wet Mils using a mil gauge directly on the surface of the SPF will result in inaccurate readings. The metal plates will give you a smooth surface to check your Wet Mils. 1 reading per 500 Sq.Ft

- Keep the cured plates for your records. Record, millage, product name, and date on the back of the plate.

Return to Service Cure Time

- TB-C is dry to the touch in 1-4 hours depending temperature and humidity.
- Full Cure will be a minimum of 48 hours.
- High Humidity = Longer Cure Time.
- Monitor the Dew Point during the 48h cure period.
- Make certain there is good air movement & ventilation during the curing period. This is essential for removing odors formed Isopropyl Alcohol

Clean-Up

- Protect all freshly coated surfaces until fully dry
- Clean airless spray equipment with fresh water after every use. If applicable soap and warm water will work best. Recirculate water through pump supply, airless spray pump and spray hose for 3-5 minutes to remove the coating. **TB-C left in the pump and lines will begin to cure after 90 minutes.**
- Rinse off all coating from mixers and equipment before storing.
- Overspray can be cleaned with water or warm soapy water.

Special Applications

- Freezers
- Parking Garages/Parkades
- Cold Storage
- High Humidity Environments

Flame Seal Products does not recommend the use of water-based materials including Flame Seal TB-C in the applications above. If TB-C is requested or required to be used please contact flameseal@flameseal.com.



Final Thoughts

Thermal Barriers

All SPF requires a thermal barrier between foam and all interior spaces as required by the National Building Code of Canada.

Final Thoughts

- #1 Dew Point (Condensation). Failure to follow the Dew Point recommendation throughout the application process can cause adhesion and cure failures.
- #2 Mix TB-C as needed. TB-C has a 90 minute pot life.
- #3 Air Circulation and Ventilation. Failure to provide proper Air Circulation and/or Ventilation can cause adhesion failure and increased cure time.
- #4 Fill out Project Record and send to flameseal@flameseal.com

Checklist Before You Start:

- ✓ Humidity - Is the relative humidity less than 70%?
- ✓ Consistency - Are the contents thoroughly mixed?
- ✓ Surface - Are all substrates clean, dry and sound?
- ✓ Measurement - Wet film gauge on site?
- ✓ Need help - Call 713-668-4291
- ✓ Correct spray tips – .017-.021 recommended
- ✓ Airless sprayer with minimum .08 GPM
- ✓ Power drill & mixer of appropriate size
- ✓ Portable fans to speed drying
- ✓ Work lights for tight areas