



TECHNICAL BULLETIN

**TO: FIRESTONE CONTRACTORS
FIRESTONE DISTRIBUTORS
FIRESTONE SALES REPRESENTATIVES**

OCTOBER 2020

RE: COLD WEATHER APPLICATION GUIDELINES 2020-2021

Cold temperatures change the physical properties of adhesives, sealants, primers, and coatings, and alter the handling characteristics of roofing membranes due to increased rigidity. The information in this bulletin is intended to help installers successfully apply Firestone materials in cold weather. Firestone recommends cold weather application procedures be used when ambient and substrate conditions fall below 40 °F (4 °C). Refer to applicable Technical Information Sheets (TIS) for specific storage and application recommendations.

ADHESIVES, SEALANTS, PRIMERS, AND COATINGS

STORAGE

- Store all adhesives, sealants, primers, and coatings between 60 °F (16 °C) and 80 °F (27 °C) to ensure proper mixing and dispensing of the products, and to promote appropriate application rates.
- If the properties and application characteristics of the materials begin to change during cold weather application, restore them to room temperature. Materials stored below 60 °F (16 °C) must be brought to room temperature, thoroughly mixed, and examined to verify proper consistency (no marbling or separation of components) prior to application. **NOTE: Never mix EPDM Solvent-Free Bonding Adhesive.**

MIXING & DISPENSING

When liquid materials are cold, their viscosity increases which may cause solvents and solids to separate. This separation can make mixing and dispensing difficult. To minimize the potential for materials cooling on the roof before application, follow these additional guidelines:

- Only bring materials from warm storage to the roof 1 to 4 hours prior to application, or as necessary to ensure materials are close to 60 °F (16 °C) when dispensed.
- Always thoroughly mix adhesives, primers, and coatings to a smooth, uniform state before and during use. Follow mixing instructions provided with each product. Do not use mixing equipment that could generate a spark, which could ignite flammable material.
- In extreme conditions, it may be necessary during application to rotate material between a hot box or warm storage area and the roof to maintain the appropriate application temperature.

APPLICATION

- Drying times depend on ambient conditions. Cool and overcast conditions lengthen open times (or “tack times”), while sunny and dry conditions shorten open times. Expect and plan for longer open times in cold weather prior to adhering insulation or membrane.
- Do not apply water-based products when freezing temperatures are expected within 24 hours after application and do not apply solvent-free products when freezing temperatures are expected within 12 hours after application.
- Blisters may occur when membranes are installed using solvent-based adhesives or primers that have not sufficiently dried. During cold temperatures, a false reading may be given if a “touch-push” test is not performed properly. Be sure to conduct “touch-push” tests in areas with the heaviest application of adhesive or primer, using a clean finger and adequate pressure to verify solvents have flashed-off. Additionally, some products’ readiness may not be verified by a “touch-push” test but should be determined instead by the specific open times for those products. Refer to the Firestone website for current TIS and application instructions for each product.
- Follow all local air quality management requirements when installing products containing Volatile Organic Compounds (VOCs).



SOLVENT EVAPORATION RATES

The table below shows various flash-off times associated with solvent components of Firestone adhesives, sealants, primers, and coatings. Our products may contain one or more of the solvents listed below. Because the ratios of solvents in each product vary, a definitive flash-off time for each product cannot be assigned. Reference the specific product's Safety Data Sheet (SDS) for chemical components and compare that information to the table below for an indication of relative flash-off efficiency. Ambient conditions will affect flash-off times, but the effects are proportional.

Solvent	VOC Exemption	Evaporation Rate*	Relative Flash-off
Water	VOC Exempt	0.3	Extremely Slow
PCBTF	VOC Exempt	0.9	Slow
Naphtha	Not VOC Exempt	1.4	Medium
Toluene	Not VOC Exempt	2.2	Medium
TBAc	VOC Exempt, except for applicable CA Air Quality Districts	2.8	Medium
Acetone	VOC Exempt	5.6	Fast
Hexane	Not VOC Exempt	8.3	Extremely Fast

* The standard reference for Evaporation Rate is n-butyl acetate with an evaporation rate of 1.0.

I.S.O. STICK™ INSULATION ADHESIVE (WINTER GRADE)

- Consider using I.S.O. Stick Insulation Adhesive (Winter Grade) in lieu of other insulation adhesives during cold weather if the project specification permits. The Winter Grade formula may be used when ambient and substrate temperatures range from 25 °F (-3 °C) to 65 °F (18 °C).
- Storage requirements are 60 °F (16 °C) and 80 °F (27 °C).

ADHESIVE “BLUSHING” (CONDENSATION)

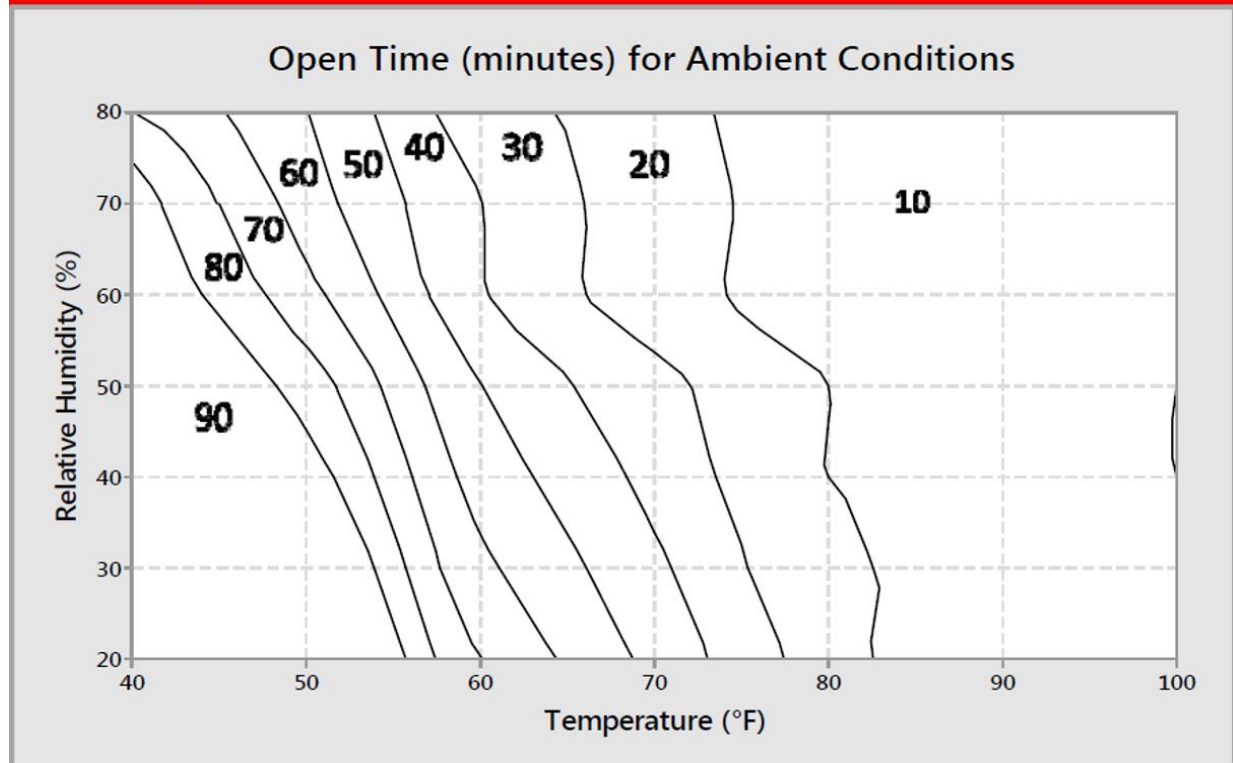
- Blushing occurs when the evaporative cooling of the material during dry time lowers the surface temperature at or below the dew point, resulting in condensation on adhesive and primer films. This condensation prevents proper adhesion. Discontinue application immediately if blushing occurs.
- The use of adhesives and primers should be closely monitored for blushing when the ambient temperature is close to the dew point. The gap between the ambient temperature and the dew point is typically narrower in early morning and late afternoon, so midday is often the optimal time to use adhesives and primers when applying Firestone products in cold weather conditions. Greater exposure to sunlight at any time of day decreases the risk of blushing.

EPDM SOLVENT-FREE BONDING ADHESIVE (SFBA)

- Store containers of SFBA at temperatures between 60 °F and 80 °F (16 °C and 27 °C) until ready for use. **DO NOT allow product to freeze.**
- Only use SFBA when ambient and substrate temperatures exceed 40 °F (4 °C). If SFBA is exposed to temperatures below 40 °F (4 °C), restore to room temperature before use. Do not use when temperatures are expected to fall below freezing within 12 hours after installation.
- **Do not mix or agitate SFBA prior to installation.** Remove any skin coat that may develop in the container to expose fresh adhesive for application.
- Conduct “touch-push” tests in areas with the heaviest application of SFBA and use adequate pressure to verify that sufficient open time has occurred to initiate curing of the adhesive. Compared to standard EPDM Bonding Adhesive, SFBA should be slightly easier to push with the finger when it is ready to bond to the membrane.
- **Although SFBA does not contain solvents, the adhesive must achieve its optimal open time to set up prior to bonding to the roofing membrane.** See chart below for the approximate open times for SFBA when the ambient relative humidity and temperature are known.



Open Time for EPDM Solvent-Free Bonding Adhesive



FIRESTONE PVC ADHESIVES

- When the outside temperature is below 40 °F (4.4 °C), certain combinations of temperature and humidity may cause condensation on the surface of solvent-based adhesives. If this condition occurs, discontinue application. When ambient air conditions no longer cause condensation on adhesive surfaces and the membrane is clean and dry then proceed with application of adhesive.
- The consistency of sealants and adhesives will begin to thicken as the temperature drops. To minimize this consequence:
 - Start work with sealants and adhesives that have been stored between 60 °F to 80 °F (16 °C to 27 °C).
 - Complete test areas to determine if conditions will cause problems such as condensation with the application of the materials.
 - Stop the operation or change to another warm container when material becomes too thick to properly apply.
- When the outside temperature is below 40 °F (4.4 °C), installation of the Firestone PVC System requires additional precautionary measures:
 - Ensure that the roof surface is dry. Even trace amounts of moisture may cause poor adhesion and lead to moisture entrapment within the roofing system.
 - Use of temporary roofs should be considered when roof applications must occur in cold or potentially wet weather to permit continued interior construction or roof-top work.
 - Refer to the product Technical Information Sheets for individual product temperature restrictions or limitations if applicable.



- If using Firestone PVC Water-Based Bonding Adhesive, ambient and substrate temperatures must be at least 50 °F (10 °C) and rising, during and 48 hours after application, for the material to be applied and perform as designed. Expect longer drying times during lower temperatures or higher humidity. Plan for material staging.

ROOFING MEMBRANES AND FLASHINGS

MEMBRANE PREPARATION

- Store roofing membranes in a clean, dry location out of direct sunlight, and away from sources of punctures or other physical damage.
- Prior to installation, unroll membranes and allow them to relax for a minimum of 30 minutes.
- During cold weather, folded membrane panels become more difficult to relax and install, especially with adhered systems. The use of no-fold panels in cold weather is highly recommended.

ULTRAPLY™ TPO and FIRESTONE PVC INSTALLATION

- Thermoplastic membranes become more rigid in cold temperatures. To help membranes relax (including all standard, TPO-SA, TPO Flex Adhered, and XR membranes), early on the day of installation, remove the outer wrapping and leave the roll in the sunlight as long as possible. This will enable the darker bottom ply of the membrane to absorb as much heat as possible and increase the membrane's flexibility.
- To ensure TPO and PVC seams are properly welded when using an automatic welder, it is critical that test welds are completed:
 - At daily start-up
 - When ambient conditions change
 - When welding stops for a significant period of time (e.g., lunch breaks)
- When using a hand welder, test welds should be performed on scrap membrane or unsupported flashing material to ensure the operator is using the proper technique and temperature setting.

FIRESTONE JET BOND SPRAY ADHESIVE

- The Firestone Jet Bond Spray Adhesive should be stored to maintain the desired product temperature at 70 °F (21 °C).
- Apply only when minimum ambient temperature for application is 25 °F (-4 °C) or above.
- Do not apply when wind speed conditions are 15 mph or greater.

FULLFORCE™ EPDM and ULTRAPLY TPO SA INSTALLATION

- FullForce EPDM and UltraPly TPO SA membranes utilize Firestone's Secure Bond™ technology to adhere to various horizontal roofing and vertical wall substrates.
- Store FullForce EPDM and TPO SA in a clean, dry location, and keep dry prior to installation.
- FullForce EPDM and TPO SA may be installed when ambient and substrate temperatures exceed 20 °F (-7 °C). Remember to observe cold weather guidelines whenever primers are required for application.

INVISIWELD™ SYSTEM APPLICATIONS (ULTRAPLY TPO / FIRESTONE PVC)

- The minimum safe application temperature for induction welding of Firestone thermoplastic membranes to InvisiWeld or InvisiWeld-S plates is 0 °F (-18 °C).
- Before induction welding with the appropriate tool, ensure there is no moisture or condensation present on the top surface of the plate or on the bottom surface of the roofing membrane. Moisture will affect the ability of the induction tool to weld and may result in partial or incomplete welds.



- Always follow the induction tool manufacturer's guidelines for calibration and use of the tool in cold temperatures. In general, the tool must be calibrated regularly, in real time, **ON-SITE**, using materials (membrane and plates) in the same temperature conditions as the jobsite materials.

RUBBERGARD™ EPDM FLASHING INSTALLATION

- Uncured EPDM flashing products (both standard and EcoWhite™ EPDM) are designed to be formable, but cold weather may require supplemental warming by using a heat gun during application.
- Care should be taken to keep heat guns away from cleaners, primers, adhesives, or other flammable materials.
- Ambient conditions (sunlight, wind, and temperature) and flashing color will determine the need for supplemental heat. Typically, temperatures below 60 °F (16 °C) may require the use of additional heat to ensure the formability of uncured flashing products.

SBS, APP and BUR INSTALLATION

- Store SBS and APP modified bitumen rolls and BUR ply felts between 50 °F and 100 °F (10 °C and 38 °C) and install when ambient and substrate temperatures are 40 °F (4 °C) and rising. Attempting to install asphalt-based products below 40 °F (4 °C) can reduce adhesion, resulting in delaminating or blistering during subsequent heating cycles.
- Materials must be used within 4 hours of removal from a heated storage area. Materials that are not used within 4 hours must be returned to a heated storage area until they return to 50 °F to 100 °F (10 °C and 38 °C), which typically takes 24 hours.
- Hot Asphalt
 - Cold substrates can rapidly cool mopped asphalt. Asphalt cools and thickens more quickly at low temperatures, which may cause application rates to be less uniform.
 - All handling equipment should be insulated to minimize drops in asphalt temperature prior to application.
 - **Asphalt temperature shall be within the published equiviscous temperature (EVT) but not less than 420 °F (216 °C) and must be maintained at the point of application of the roofing membrane).**
 - Mop lead should be no more than five (5) feet (1.5 m) from the roll.
 - Roll cap sheets into hot asphalt using positive pressure, ensuring proper side and end lap width.
 - Stop the operation and/or change to another container when asphalt temperature at the point of application cannot be maintained within the published EVT.
 - Never overheat asphalt to compensate for cold weather conditions and never heat asphalt above its EVT or its flash point. Always remain within the asphalt manufacturer's approved application range, but never below 420 °F (216 °C).
 - Always follow OSHA and NRCA safety regulations.

MULTI-PURPOSE MB COLD ADHESIVE and FLASHING CEMENT

- Store Multi-Purpose MB Cold Adhesive and Multi-Purpose MB Flashing Cement between 60 °F to 80 °F (16 °C and 27 °C) in their original, unopened containers.
- Multi-Purpose MB Cold Adhesive is best applied during cold weather by use of a heated spray rig. Squeegee-applied Cold Adhesive is not recommended during cold weather. Ambient and substrate temperatures should be 40 °F (4 °C) and rising at the time of application.
- Firestone Multi-Purpose MB Flashing Cement should only be used when ambient and substrate temperatures are greater than 40 °F (4 °C) and rising.



AC FAST FR PMMA LIQUID-APPLIED FLASHING

- Firestone AC Fast FR PMMA should be stored between 65 °F to 70 °F (18 °C to 21 °C) in a controlled environment to facilitate mixing and fleece saturation. DO NOT store materials outside in cold weather as the cooled materials will be difficult to mix and apply due to their thick consistency.
- Do not attempt to mix or apply unless ambient and substrate temperatures are at least 35 °F (2 °C) and rising, and materials have been properly stored until just prior to use. The required quantity of AC Catalyst Powder and cure times are dependent upon the ambient temperature. Follow mixing instructions closely.

BARRIERS AND UNDERLAYMENTS

AIR and VAPOR BARRIERS

- Enverge™ Air and Vapor Barrier SA (40 mil) and SA-Solvent Based (SB) Primer have a minimum installation temperature of 14 °F (-10 °C). The minimum installation temperature for Enverge Air and Vapor Barrier SA (25 mil) is 50 °F (10 °C).
- V-Force™ Vapor Barrier Membrane may be applied at ambient temperatures as low as 25 °F (-4 °C) provided the V-Force has been stored between 50 °F to 100 °F (10 °C to 38 °C) prior to application. Refer to the TIS for the intended primer's application instructions and limitations, if applicable.

UNDERLAYMENTS

- Underlayments should be stored out of the weather in a clean, dry area in original, unopened packaging.
- CLAD-GARD™ R has a minimum application temperature of 40 °F (4 °C) at the time of application.
- CLAD-GARD SA has a minimum application temperature of 40 °F (4 °C) or 50 °F (10 °C) at the time of application, depending on region (north or south).
- CLAD-GARD SA-FR has a minimum application temperature of 40 °F (4 °C) at the time of application. However, when CLAD-GARD SA-FR will be installed under 50 °F (10 °C), Firestone recommends using SA-Water Based Primer (WB) or SA-Solvent Based (SB) Primer.

For further information or assistance, please contact Firestone Technical Services at 800-428-4511.

Sincerely,

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