Tech Tip

Application Considerations During Seasonal Temperature Changes

BASF
We create chemistry

BASF offers different reactivity grades for different seasonal environmental conditions for our closed cell spray foam portfolio. The contractor is responsible for utilizing the appropriate reactivity grades based on the most current Technical Data Sheets (TDS) and product application guidelines. Although applying foam reactivity grades outside of the published temperature ranges will still produce quality products, the below points should be taken into account by the applicator to ensure the best performance for their installation.

Basic Reaction

The foam chemistry creates an exothermic reaction (generate heat) when the ISO and resin combine. The proportioner helps the reaction through temperature and pressure processing settings. The heat in the reaction is required to create good quality foam with proper foam characteristics. Cold ambient conditions, cold substrates, and cold material all slow the foam reaction and reduce the exotherm produced by the foam. There is a catalyst in the resin chemistry that controls the speed of reaction. In summer systems, there is slightly less catalyst in the product versus the winter grade system. In colder winter conditions rob the heat from the reaction, so higher catalyst in winter formulas helps speed up the reaction, makes more heat and helps create the proper foam.

Using Summer grade in winter – Watchouts during application

- Insufficient heat in the reaction to make proper foam that could affect adhesion
- Foam rises slower and has a longer cure
- Higher temperature settings on equipment
- Gun clogging
- Low yield

Using Winter grade in summer – Watchouts during application

- Excessive catalyst in the chemistry that will generate too much heat – hot foam
  - May be necessary to reduce pass thickness and/or increase dwell time between lifts
  - Scorching of foam potentially causing odors
  - Foam could shrink
  - Foam could pull away from studs
- Gun clogging
- Low yield

The seasonal transitions of Spring and Fall would be the main time frames when one sees these temperature overlaps. For example, cold mornings, which may require Winter grade product and as the day warms up, which would mean that the material may need to be changed out to a Summer grade product to follow the application guidelines for that product's ranges, depending on substrate/ambient temperatures. In Spring and Fall situations, below are some recommendations.

Summer grade in colder conditions

- Increase processing temperatures around products upper application temperature limit.
- Adjust pressures setting based on foam reaction

Winter grade in warmer conditions

- Decrease processing temperatures around products lower application temperature limit.
- Adjust pressures setting based on foam reaction

Please keep in mind the variable temperature ranges for each BASF SPF system and the amount of time to wait between passes. This information is available on the Technical Data Sheet or the Application Guidelines.

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Additionally, with the advent of the cold weather or hot weather transitions comes the importance of keeping the chemical in your Iso and Resin product temperatures within the stated storage temperature range (indicated on the product TDS). One of the best ways to know what the temperature of the Iso and Resin chemical is at all times in the product drums is to install a thermometer in your supply lines back of the SPF processing equipment (especially if your SPF processing equipment does not have product inlet thermometers). Having the ability to know what the temperature is in your drums is just as important in the summer as it is in the winter.

Special Notes about Drum Storage Temps:

In cold weather conditions: the importance of keeping the product drums at 70°F or above at the time of application is paramount to the ability of primary heaters of your SPF processing equipment to bring the temperature of the chemical from drum temperature to upper product application temperature setpoints.

In hot weather conditions: the importance of keeping the product drums below the stated storage high temperature range is to prevent resin product blowing agent loss and having product shelf life impacted.

In summary, the temperature ranges for the reactivity grades are used as guidelines to assist the sprayer in setting their process temperatures, to maintain a suitable reactivity profile which helps control the application of the foam. The applicator will need to be aware of the grade that they are using and adjust the processing temperature to the appropriate settings, to help create the proper foam for the conditions of the day (and often throughout the day in swing seasons like Fall and Spring). The applicator should verify the cure of the foam and visually check for adhesion throughout the application to ensure that temperature conditions do not have a negative effect on the curing of the foam.

The TDS or applications guideline documents can be accessed from the BASF SPF website or from the BASF Spray Foam US Portal, where there are additional troubleshooting tips for evaluating proper installation.

TECHNICAL ASSISTANCE
For more information, contact Inside Technical Support at:
Toll-Free at 800-706-0712, Option 2
Email: spf.techsales@basf.com
Website: https://spf.basf.com/
Technical Resources: Contractor Resource Center

BASF Corporation | 1703 Crosspoint Avenue, Houston, TX 77054, United States

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