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Innovation through Formulation

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Technical Bulletin for Spraying DuraShield 310/310-61

This document is a technical bulletin for spraying DuraShield 310/310-61 (DS310). It is in response to a number of inquiries that LifeLast has received in recent months that our applicators have not been able to build/hang DS310, 4 Build in the manner that is stated in its Technical Data Sheet. LifeLast, in considering the inquires, decided that it would be helpful to publish a technical bulletin for our applicators on the best practices for spraying DS310 to achieve the maximum build/hang properties of the material. This technical bulletin will outline the proper equipment set-up to achieve the maximum build/hang characteristics of the DS310, as well as address why an applicator might not be able to achieve high build levels in certain application conditions.

There are several factors to consider when setting up to spray DuraShield 310 to achieve maximum hang/build. They are as follows:

1. **Definitions**

    a. **Build:** the ability of the hang, or build, on a vertical surface. The higher the build, the more able the coating is to hang on to vertical surfaces at high thicknesses.
    b. **Onboard Heat:** the spray machine has heaters built into it (e.g. Graco Reactor heat package, or Graco Viscon heaters), which increase the temperatures of the two components as they move through the spray system.
    c. **No Onboard Heat:** the spray machine does not contain built-in heaters.
    d. **Remote Lines:** lines that deliver the components – resin and iso – to a spray manifold, with each component flowing through its own line (components do not mix). LifeLast recommends that remote lines have heating capabilities, thereby ensuring the two components are at the proper temperature for spraying when they reach the spray manifold.
    e. **Spray Line:** a line that attaches to the outbound side of the spray manifold and delivers the combined mixture to the static mixers.
    f. **Whip Line:** a line that connects to the outbound side of the static mixer tubes and delivers the combined and mixed material to the spray gun.

2. **Pre-heating and Mixing:**

    Regardless if you are spraying from hoppers, drums or totes, both the Resin (Part A) and the Iso (Part B) will need to be preheated prior to spraying.

    a. Onboard Heat Capabilities
        - Part A: if the spray equipment has on board heat capabilities, Part A needs to be 100°F, minimum, and well mixed before feeding into the spray equipment. Mixing Part A is important and should be done every time the material is sprayed. Length of time for mixing will vary depending upon the size of the container, but it should be performed long enough to ensure the Part A is thoroughly mixed. Failing to thoroughly mix Part A can have an effect on the

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hang/build characteristics. While preheating Part A, care must be taken to not overheat (or cook) the material.

Note: *if Part A is heated above 160°F the material will be irreversibly damaged in a manner that will not allow it to have proper high- build characteristics. This has been an issue that LifeLast has seen happen in the field with our applicators on multiple occasions.*

- Part B: Part B should be heated to a minimum temperature of 80°F and mixing is not required. If Part B is heated higher than 110°F during spray application, the maximum hang/build characteristics for the DS310 will be reduced.

b. No Onboard Heat Capabilities
   - Part A: if the spray equipment does not have onboard heat capabilities, Part A will need to be heated and mixed to spray temperature between the range of 120°F-140°F. The temperature range is to account for the pressure capabilities of the equipment.

     Note*: when pre-heating Part A, it is especially important to not overheat (cook) the material as stated above. LifeLast recommends the use of blanket heaters for pre-heating the material in drums. Band heaters may also be used, however, care should be taken to ensure that the temperature of Part A does not exceed 160°F, particularly as the volume in the drum decreases and the effectiveness of the heater increases.*

   - Part B: heat to a temperature of at least 90°F; mixing is not required. If Part B is heated higher than 110°F during spray application, the maximum hang/build characteristics for the DS310 will be reduced.

3. Spray Temperatures:

a. Onboard Heat Capabilities: the optimum spray temperature ranges for DS310, for equipment with onboard heating capabilities, to achieve maximum build/hang characteristics, are as follows:
- Resin (Part A) – 120°F-140°
- Iso (Part B) – 90°F-100°F
- Remote Heated Lines – 110-130°F

Note: *constant monitoring of the onboard heat controls is recommend during application (especially with units that have Graco Viscon heaters) to make sure that the heaters do not overheat the material. As stated before, heating beyond the recommend spray temperatures during application can lead to a reduction in build/hang characteristics of the DS310.*

b. No Onboard Heat Capabilities: if using equipment without onboard heating capabilities, then the DS310 components must be heated, while in their respective containers, to their recommended spray temperatures.

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Note: *The primary reason for heating DS310 for spray application is to lower the viscosity, especially for Part A. The reasons for lowering the viscosity are as follows:*

- *The viscosity of Part A is low enough to achieve proper pre-spray mixing, especially in drums and totes*
- *The viscosity of both Part A and Part B are low enough to facilitate the proper feed flow rate to the equipment, which helps eliminate the potential for cavitation of the feed pumps and spray pump during application.*
- *The viscosity of the DS310 is low enough to achieve proper mixing during spray application.*
- *The viscosity of the DS310 is low enough to achieve a good spray pattern.*

If you elect to spray at higher temperatures than those recommended for the DS310 above, there is a high likelihood that the DS310 will not hang/build to its maximum capabilities.

GOOD RULE OF THUMB: THE HOTTER YOU GET BOTH PART A AND PART B, THE SMOOTHER THE MATERIAL WILL SPRAY, BUT THE LESS BUILD YOU WILL ACHIEVE.

4. Remote Lines:

When spraying with equipment that will utilize a remote spraying manifold, the lines leading to that manifold should be insulated and have heating capabilities. LifeLast also recommends sizing the hoses as follows:

- Size lines to where the volume of the Part A line is as close to three times the volume of the Part B line.
- For remote lines with 50 feet or less in total length, we recommend the setup to be 3/8” x 1/4" (Part A to Part B), at a minimum. This setup produces a 2.25:1 volumetric ratio.
- Please consult your LifeLast Technical Services Representative for recommendations of hose configurations longer than 50 feet.

The remote hoses should be set at approximately 120°F. Please note, if the heated hoses are set higher than 130°F, it can affect the ability for the DS310 to achieve its maximum build/hang.

Note: *the heated hoses can be at less than 120°F, provided the machine is capable of producing enough pressure to provide an adequate spray pattern.*

5. Spray Lines:

The spray line should be no more than 1/4” in diameter.

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Note: *using spray lines with a larger diameter than 1/4" can cause the DS310 to not hang/build to its maximum capabilities. The higher volume of the large spray lines increases the residence time of the mixed material. This, in turn, leads to a decline in viscosity due to the heat given off by the chemical reaction.*

The overall length of the spray line for DS310 can be between 10'-75'.

Note: *a limiting factor for using a long spray line (>50'), while still achieving the maximum build/hang of the DS310, is the orifice size of the spray tip. When using a small spray tip (orifice size of .029" or smaller) with a long spray hose (>50'), you may see a decline in the maximum build/hang due to the longer residence time the material has in the spray line.*

6. Spray Tip:

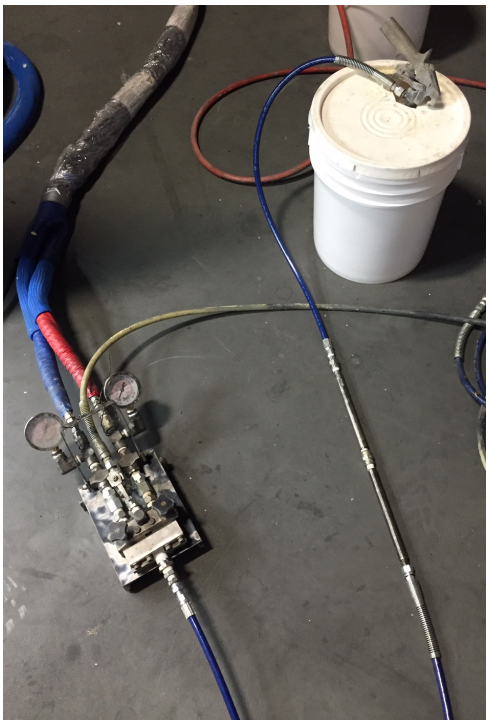
DS310 can be sprayed using spray tip orifices from .021" to as large as your equipment can support. The most commonly used tip sizes are .031" to.035".

Good rule of thumb: the smaller the spray tip orifice size (for control of spray pattern), the shorter the spray hose needs to be for maximum hang/build of the DS310.

7. Static Mixers and Whip Hose:

LifeLast recommends the use of two, 8" long static mixer tubes with 24-turn static mixers in each tube (a total of 48 turns for 2 tubes) to achieve the best mix of the DS310.

The placement of the static mixers is **very** important to achieve maximum hang/build of the DS310. The static mixers need to be as close to the spray gun as possible to achieve the maximum hang/build of the DS 310-61. As such, they should be placed at the end of the mixed spray line, with a short (3'-6') whip hose used to connect the static mixers to the spray gun.



Example of DS310 high film build spray set-up is as follows (from the mix manifold to the spray gun):

- Spray manifold
- 25' 1/4" spray line directly connected to the manifold
- Two 8" x 1/4" static mixers attached to the spray line (the end closest to the gun)
- 3' to 6' whip hose from static mixer to gun
- Spray gun with a .031"-.035" spray tip
- Spray pressure 2500-3000 psi

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8. Spray Pressure:

LifeLast recommends that DS310 be sprayed at a minimum pressure of 2000 psi **at the gun**.

Good rule of thumb: the hotter the DS310, the less pressure it will take to atomize and produce an adequate spray pattern. However, the hotter the material, the less you can hang/build. The cooler the DS310, the more pressure it will take to atomize and produce an adequate spray pattern. Although, the cooler the material, the more you will be able to hang/build.

***Product Explanation:* DS310 is a non-Newtonian fluid, like ketchup in a bottle. The more mixing/ energy that is given to the DS310, the more fluid the material becomes (lower viscosity). In other words, if the material is over-mixed, it will affect the ability of the DS310 to hang to its maximum ability. This why placing the static mixers close to the gun and strictly monitoring the temperatures is very important to achieve maximum film hang/build.

9. Other Factors:

There are other factors that can contribute to why an applicator might not realize the full hang/build capabilities of the DS310, besides equipment set-up, and they are as follows:

a. Old and Repeatedly Re-Heated Material:
   - If the DS310 is more than six months old, it may not have the same ability to build/hang as when originally manufactured.
   - If the DS310 has been heated and cooled repeatedly, then the material can see a reduction in its ability to hang/build properly over time.

b. Improperly Stored Material:
   - If DS310 is stored outside the conditions recommend in the DS310 Technical Data Sheet, then the material can see a reduction in its ability to hang/build properly over time. This is especially true if the material is stored in a manner where it experiences temperatures above the recommend storage temperature of 120°F for prolonged periods of time.

c. Contaminated Material:
   - If the DS310 becomes contaminated, it will affect its ability to build/hang properly. For example, if solvent is introduced to the system by either being present in the equipment during startup or as a result of a leaking flush valve, it will affect the ability of the DS310 to build/hang properly.

d. Surface Temperature of the Substrate:
   - Substrate surface temperatures above 75°F at time of application can have an effect on DS310 to reach its maximum build/hang capabilities.

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- Substrates that are in direct sunlight, especially those located in areas exposed to sunlight during increasing temperatures, can have an effect on the DS310 to build/hang initially.

Note: *LifeLast recommends that when working with warm/hot substrates, especially those in excess of 90°F or in direct sun light, the applicator should plan on doing a test patch to see how the DS310 will hang/build on the substrate prior to commencing an entire project spray out.*

e. Substrate Surface Profile:
- A smooth substrate surface profile can affect the ability of the DS310 to hang/build to its maximum ability. One instance of a smooth substrate surface is when the Primall-160 epoxy primer is applied to concrete at a high thickness, in which case the Primall-160 primer buries the surface profile of the concrete not leaving any roughness for the DS310 to hang/build on.

f. Spray Technique:
- The following spray techniques can affect the hang/build of the DS310:
  - *Excessive spray pressure*: pressure higher than needed to atomize the DS310 can add excess energy to the material being applied, causing it to run prematurely.
  - *Triggering*: triggering the gun on and off the substrate while not moving (stationary bursts) can add excess energy to the DS310 being applied, thereby causing it to prematurely sag/run.
  - *Gun distance to substrate:* maintaining a gun that is exceptionally close to the substrate (less than 16") can add excess energy to the DS310, thereby reducing its ability to hang/build.

  Note: LifeLast recommends an optimum distance of between 20" to 24" between the spray gun and the substrate.