

# How to reduce wear and tear and increase service life on spray pumps and increase production time in cold season operations!

Have you encountered these in your operations?

Does it takes about 10 minutes to really get the product spray pattern working correctly

- while on job site, even though you recirculated the product before spraying it.
- Is pumping or gravity feeding the product slower than you like?
- Do you find sometimes that the product doesn't pump well?

In May of this year I inquired of my friends Chris and Joe at C J Spray to find out these question, and more. Like ....

1. At what viscosity does the pump stop pumping product?
2. How does temperature impact viscosity and pumping and why?
3. Does colder temperatures wear down pumps quicker?

What I learned was how to reduce, wear and tear on equipment extending the life of it, and how to increase production time significantly particularly in cold seasons on job site.

What do you think is wearing down your pumps and slowing down production of your spray crews? **The answer is cold temperatures.**

**Take look at the chart below.** These are various product at 70 degree F.

Notice Karo Syrup-it is about 5000 CPS (that is how viscosity is measured in Centipoise) also this the average viscosity of waterproofing asphalt emulsions.

We measure the viscosity of Houseguard waterproofing is at 77F which is a standard testing method temperature and we fall between 4000-6000cps.

<b>Approximate Viscosities of Common Materials (At Room Temperature-70°F) *</b>	
<b>Material</b>	<b>Viscosity in Centipoise</b>
Water	1 cps
Milk	3 cps
SAE 10 Motor Oil	85-140 cps
SAE 20 Motor Oil	140-420 cps
SAE 30 Motor Oil	420-650 cps
SAE 40 Motor Oil	650-900 cps
Castrol Oil	1,000 cps
<b>Karo Syrup (Corn Syrup)</b>	<b>5,000 cps</b>
Honey	10,000 cps
Chocolate	25,000 cps

Ketchup	50,000 cps
Mustard	70,000 cps
Sour Cream	100,000 cps
Peanut Butter	250,000 cps

Source - [http://www.vp-scientific.com/Viscosity\\_Tables.htm](http://www.vp-scientific.com/Viscosity_Tables.htm)

Here is what you need to understand about viscosity, really slow down to get this!

**FOR EVERY 10 DEGREES FARENHEIT YOU RAISE THE TEMPERATURE OF THE PRODUCT YOU DECREASE IT'S VISCOSITY IN HALF.**

\_ Example:

If waterproofing is 5000cps at 77degree. Increasing it to 87degrees results in a viscosity being 2500cps:

But more importantly , it works the opposite way also and this is where it impacts your handling and application: **FOR EVERY TEN DEGREES YOU LOWER THE TEMPERATURE OF THE PRODUCT YOU INCREASE ITS VISCOSITY BY DOUBLE**

\_ Example again: Waterproofing is 5000cps at 77degrees. Decrease temp to 67degrees the result is 10,000 CPS. JUST WITH 10 DEGREES TEMP VARRIATION-WOW!

**Two questions needed answered for me:**

1. What is the viscosity of the average waterproofing product at 50 degrees?
2. What is the maximum viscosity capacity of the average spray pump to pick up the product from a drum or tote to spray, like a 733 or 350 Hydromax.

**1. What is the viscosity of product at 50 degrees that is normally between 4000-6000CPS at 77 degrees F?**

- a. Based on Joe at C J Spray, for every 10 degrees **decrease** in temperatures the product **doubles** in viscosity. So at 50-55F, which is generally the temperature range shops are kept at in the winter. Testing temperatures for viscosity is 77F- 55F=22degrees F difference.
- b. I a product for example is 5000CPS average at 77degree F, a 10 degree drop is 67 degrees F-and the viscosity now goes to 10,000 CPS. Go back to the chart, the product just took on the thickness of honey at room temperature.
- c. Now let's go one step further: the temperatures we generally store product at in the shop is 50-55F. So another 10 degree drop- from 67degrees is 57degree F. That means the viscosity doubles again from 67degree at 10,000cps to now 20,000 cps at 57 degree.
- d. The chart tells me my product is now acting more like **chocolate than Karo Syrup**. Do you think that might impact how the product handles?

- e. Does that increase the effort of the pump? Yes
- f. Does that wear down the pump? Yes
- g. Does that increase time waiting to load the truck and increase labor cost?

I estimated an average of **\$2000 in labor cost per year** for two men to wait an extra 15 mins per day for 6 months during winter season?

## What impact does spraying product below 100 degrees have?

1. The pattern is not strong-fingering is present means it comes out in small streams instead of a good spray pattern.
  2. Poor atomizing of the product at the spray tip
  3. Larger particles in the material can clog up the tip easier because the warmer the membrane is the easier it is to move those little bits through it.
  4. Less time cleaning out the tips-increases production and less frustration with crew.
3. Answering #2. **What is the maximum viscosity capacity of the average spray pump to pick up the product from a drum or tote to spray, like a 733 or 350 Hydromax.**

- ✚ Joe at C J Spray tells me that pumps that spray cavitate (stop pumping) at around 6000CPS.
  - Pumps like Graco's 733 or 833 have much less pulling (sucking) capacity than pushing (spraying) capacity.

Here is my take away from this info: **HEAT IS OUR FRIEND!**

If the spray pump is not pumping and the product is under 75 degrees be it, in the tote or drum, shop or truck. **The answer is add heat to the product before pumping.**

### HEATING OPTIONS:

1. Build a **heat box** and store all or most of the material in it-recommended temp-80-100 F. degrees
  - a. Put the product in the heat box 2-3 days prior to use.
2. **Blanket Heaters:** These are the simple method of heating a barrel or tote. These are designed to build heat over time, so it is not a quick heating method. The blankets should be kept on the totes/drums until used, and set at 100 degree F.

**NO Band Heaters Please:** these heaters are popular with solvent based membranes, but wreak havoc with water based emulsions. The reason is, it over heats one isolated area of the drum-'cooking' the membrane and causing the membrane to 'break-down'. This creates small particles of broken material and won't pass through the gun.

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