

**Tech Talk From**

**Prisco®**

*Tech Talk #C2*

## **VISCOSITY MEASUREMENT & DILUTING PROCEDURES**

This Tech Talk covers the procedures necessary to perform viscosity measurements using a Zahn cup, as well as the proper coating dilution procedures.

### **Zahn Cup:**

Proper and consistent use of a Zahn cup is important for accurate results. Zahn cups are made in various sizes, each size having a different Zahn cup number. Printers' Service uses the #3 size BYK Gardner or EZ Zahn cups for testing viscosity for sheetfed coatings and heatset web. The #2 size is used for Flexographic and Gravure applications

The Zahn cup is a stainless steel, bullet-shaped cup with a 12" handle. Each cup delivers approximately 49 cc of coating through the orifice. The handle allows the cup to be dipped into the coating. A Zahn "dip-type" cup is used as a flow comparator for evaluation and adjusting the consistency of similar liquids under controlled conditions. Slight cup-to-cup variations can occur, even from the same manufacturer. Some major differences in measurement may occur from one Zahn cup manufacturer to another. Printers' Service recommends the use of a Zahn cup that conforms to ASTM D 816, ASTM D1084, and ASTM D4212 standards.

### **VISCOSITY PROCEDURE:**

#### **1. Preparation of product to be tested.**

- Obtain a sample of coating to be tested. It is important to make sure the sample from a drum is mixed well and is homogenized. A minimum of 6 oz. (177.4ml) is required for this test.
- Filter the sample through a paint strainer or a 50 to 100 micron filter if the sample is contaminated with solids.
- Zahn viscosity is measured at 77°F (25°C). Check product temperature, if 77°F (25°C) go to step 2. If temperature is below 77°F (25°C), bathe sample in hot water until 77°F (25°C) is reached. If temperature is above 77°F (25°C), bathe sample in cold or ice water until 77°F (25°C).

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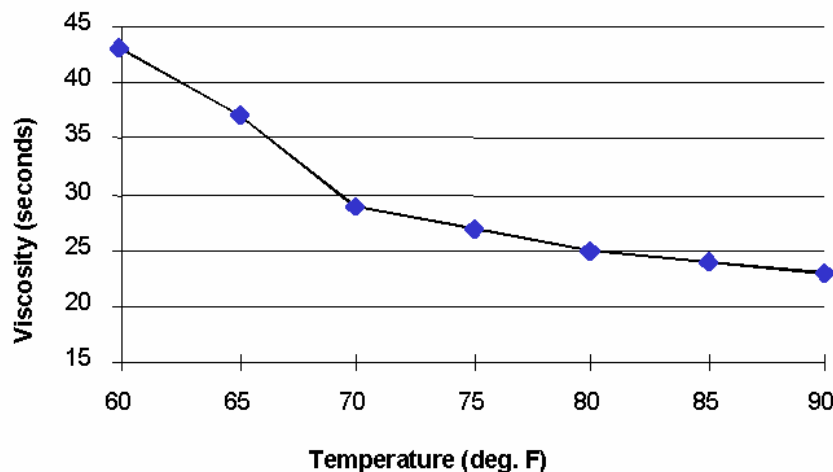
2. Position the sample under the cup.
3. Immerse the Zahn cup into the sample.
4. Lift the Zahn cup from the sample and start the stopwatch when the cup breaks the surface of the coating.
5. Observe the flow of the sample from the bottom opening of the Zahn cup.
6. When flow breaks (the first break in the stream of coating) approximately 1/4" (6mm) from the Zahn cup, stop the stopwatch.
7. Record the number as it appears on stopwatch. This is the viscosity reading.
8. Clean the Zahn cup immediately, using warm water.

Check the viscosity every 2-3 hours during the running of a job.

### AQUEOUS COATING DILUTION DO'S AND DON'TS

Prior to diluting coating, it is important to understand the difference between manufactured and applied viscosity. The viscosity of aqueous coating is temperature dependent. As the coating gets warmer the viscosity decreases and the coating becomes thinner. When the coating is chilled the viscosity increases, and the coating becomes thicker.

THE EFFECT OF TEMPERATURE ON VISCOSITY



- **Manufactured Viscosity** - The measurement of the viscosity of the coating at 77°F (25°C). This is the standard temperature for measurement of viscosity in the Quality Control Lab during manufacturing.
- **Pressroom or "Applied" Viscosity** - The measurement of the viscosity of the coating in the environment in which it is being used. The temperature of the coating and its viscosity is directly related to the temperature and humidity of the pressroom

## **PROCEDURE FOR DILUTION OF THE AQUEOUS COATING:**

We suggest that you contact your local Prisco representative before diluting coatings. But, if you must dilute, the following is a commonly used procedure:

Record the temperature of the coating prior to dilution. If the coating is below 77°F (25°C), it is possible that it will warm up and the viscosity will lower due to re-circulation and the ambient temperature around the press. Therefore, circulate the coating through the coating unit for 15 minutes and then check the viscosity again.

### **Viscosity Do's:**

- Do keep the coating in the pressroom at least 3 days prior to use so it can acclimate to pressroom conditions. The longer the better.
- Do thoroughly mix the drum prior to doing anything.
- Do monitor the environment from day to day prior to adjustment.
- Do make sure the Zahn cup is at room temperature prior to viscosity measurement.
- Do make sure the Zahn cup is clean prior to viscosity measurement.
- Do make sure the Zahn cup is cleaned immediately after each measurement.
- Do use the proper procedure of immersing the Zahn cup into the coating.
- Do use only water or a one-to-one ratio of water/alcohol mixture to adjust the coating.
- Do allow proper mixing time for the water to be homogenized in the coating prior to application.
- Do keep the coating away from unnecessary air exposure.

### **VISCOSITY DON'TS:**

- Don't bring the coating from truck to press with immediate intent to run.
- Don't allow the coating to freeze.
- Don't just remove the bung, put the pumps in, and go.
- Don't add water from day-to-day without checking coating temperature and environmental conditions.
- Don't allow the coating to dry on the Zahn cup or in the orifice.
- Don't use a Zahn cup that is too hot or too cold from a wash-up.
- Don't use straight alcohol or any form of ammonia to adjust the coating.
- Don't allow the coating to remain uncovered for any length of time.

As always, your local PRINTERS' SERVICE office is happy to answer your questions:

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