General Description

Sample Preparation

Measure the Viscosity

Selection of Optimum Mixing

General Description

Wet and dry components are added to water and agitated to prepare mixed retardant. Each product must be mixed by an appropriate method, in order to give each mixed retardant the best chance to perform acceptably during qualification testing. An appropriate optimum mixing method must be determined for each product prior to performing other laboratory tests.

Sample Preparation

All samples will be prepared in 1-quart, glass jars with straight sides. Measure the amount of dry or wet components required for addition to 800 milliliters of water. Pour 800 milliliters of 70 °F (21 °C) water, into a clean jar.

Attach a double bladed, 2-tier agitator (Indco Jiffy Model LM105) to an adjustable mixer motor. This agitator was selected due to the ability to mix quickly without splashing or entraining air into the mixture. Insert the agitator into the jar of water. Adjust the mixer so that the bottom of the agitator is about one-half inch above the bottom of the jar.

Adjust the mixer speed as shown in table 3.1. With the mixer running, quickly add the premeasured dry or wet components to the water. Mix for the time shown in the table.

Record the time that mixing started. Remove the agitator from the solution and clean with tap water.

Repeat the mixing process using all conditions shown in the table.

Measure the Viscosity

Measure the viscosity of each sample at 10 minutes, 60 minutes, 24 hours and 7 days after mixing, following the procedure below. A single viscosity measurement is sufficient at 10 minutes. However, take 3 measurements and determine the average, at 60 minutes, 24 hours, and 7 days.

Attach spindle number 2 for viscosities 1 to 500 centipoise (cP) and spindle number 4 for viscosities above 500 cP to a Brookfield Model LVF viscometer while holding the shaft with the other hand to prevent movement.

Caution - This is a left-hand thread.

Ensure that the speed setting is on 60 rpm. 60 will be in the uppermost position. Lower the viscometer head and spindle into the test solution, using the threaded knob, until the surface of the solution is even with the indicator ring on the spindle.

While firmly holding the brake down, start the viscometer, release the brake and let the viscometer run for 60 seconds. Depress the brake firmly and stop the viscometer.

Keeping the brake depressed, turn the viscometer on and off until the red indicator needle over the scale can be seen.

Record the location of the needle on the scale and then release the brake. Multiply the scale reading by the appropriate multiplier (multiply by 5 for spindle 2, multiple by 100 for spindle 4) to obtain the viscosity. Record all viscosities and the average on the data sheet. See table 3.1. Transfer the average values to table 3.2.

Selection of Optimum Mixing

The optimum mixing procedure is selected by choosing the mixing condition that gives a combination of fast viscosity development (measured at 60 minutes and 24 hours) and viscosity stability (measured at 7 days).

This mixing procedure will be used throughout the remainder of the laboratory evaluation.

Table 3.1—Data Sheet

Mixer Speed	Mixing Time	10-minute Viscosity	Average 10-minute Viscosity	60-minute Viscosity	Average 60-minute Viscosity	24-hour Viscosity	Average 24-hour Viscosity	7-day Viscosity	Average 7-day Viscosity
600 rpm	1 minute								
600 rpm	1 minute								
600 rpm	1 minute								
600 rpm	2 minutes								
600 rpm	2 minutes								
600 rpm	2 minutes								
600 rpm	5 minutes								
600 rpm	5 minutes								
600 rpm	5 minutes								
1200 rpm	1 minute								
1200 rpm	1 minute								
1200 rpm	1 minute								
1200 rpm	2 minutes								
1200 rpm	2 minutes								
1200 rpm	2 minutes								
1200 rpm	5 minutes								
1200 rpm	5 minutes								
1200 rpm	5 minutes								
1800 rpm	1 minute								
1800 rpm	1 minute								
1800 rpm	1 minute								
1800 rpm	2 minutes								
1800 rpm	2 minutes								
1800 rpm	2 minutes								
1800 rpm	5 minutes								
1800 rpm	5 minutes								
1800 rpm	5 minutes								

Table 3.2—Mixing Text Summary

Mixer Speed	Mixing Time	10-minute Viscosity	60-minute Viscosity	24-hour Viscosity	7-day Viscosity
600 rpm	1 minute				
600 rpm	2 minutes				
600 rpm	5 minutes				
1200 rpm	1 minute				
1200 rpm	2 minutes				
1200 rpm	5 minutes				
1800 rpm	1 minute				
1800 rpm	2 minutes				
1800 rpm	5 minutes				