Evaluation of Wildland Fire Chemicals

STANDARD TEST PROCEDURES

Effect of Water Temperature on Enhanced Water Mixtures

Summary: Water temperature may affect the consistency, viscosity development, or stability of some water enhancers. Viscosity measurements of products prepared with defined water quality can be used to determine this effect on each concentrate.

Equipment:

Brookfield LVF viscometer with spindles 2, 3, and 4
Conductivity meter
pH meter
Containers for prepared waters
Chemicals listed below
Water Bath or other means of controlling temperature

Test Method:

1. Prepare the mixed product using deionized water at 70°F. Use the previously determined mix method for the specific product.
2. Measure and record the viscosity of the mixed product 10 minutes, 60 minutes, 24 hours, and 48 hours after mixing. Record the time since mixing and the spindle number used for each measurement.
3. Repeat step 1 using deionized water at 40°F.
4. Measure and record the viscosity of the mixed product 10 minutes after mixing. Record the time since mixing and the spindle number used for each measurement.
5. Place the sample in a water bath held at 40°F, removing the samples long enough to measure the viscosity at 60 minutes, 24 hours, and 48 hours after mixing. Record the time since mixing and the spindle number used for each measurement.
6. Repeat steps 3 through 5, using deionized water at 100°F and having the water bath at a constant temperature of 100°F.
7. Tabulate the data for each product, showing the differences in viscosity for each water temperature, compared to the values obtained for samples prepared using 70°F water.
8. Optional: Repeat the entire sequence using the water samples prepared in accordance with the instructions on the following page.

Optional water quality samples for additional testing:

1. Mix the listed quantities of each chemical in a 1-liter volumetric flask.

	Very Hard	Hard	Soft	Very Soft
Sodium bicarbonate	384 mg	192 mg	48 mg	12 mg
Calcium sulfate, dehydrate	240 mg	120 mg	30 mg	7.5 mg
Magnesium sulfate	240 mg	120 mg	30 mg	7.5 mg
Potassium chloride	16 mg	8 mg	2 mg	0.5 mg

2. Dilute to the mark with deionized water.
3. Stir well until all chemicals are dissolved.
4. Using the water samples described in this section, prepare enhanced water mixtures as described in step 1 on the first page.
5. Follow the directions in steps 3 through 6 to determine the effect of water temperature.