



# Evaluation of Wildland Fire Chemicals

## STANDARD TEST PROCEDURES

### Effect of Water Quality on Enhanced Water Mixtures

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Summary: Water quality and perhaps temperature affect the consistency/viscosity development 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

Test Method:

1. Prepare the mixed product using deionized water. Use the previously determined mix method for the specific product.
2. Measure and record the viscosity of the mixed product 10 minutes and 60 minutes after mixing. Record the spindle number used for each measurement.
3. Prepare artificial water samples as described below.
4. Determine the conductivity and pH of the prepared water samples.
5. Prepare mixed product using each of the water samples and the previously determined mix method for the specific product.
6. Measure and record the viscosity of the mixed product at 10 minutes and 60 minutes after mixing. Record the spindle number used for each measurement.
7. Tabulate the data for each product, showing the differences in viscosity for each water quality, compared to the values obtained for samples prepared using deionized water.

A. Preparation of artificial sea water and dilutions, as required in step 3 above:

1. Add the amounts of the chemicals listed below to 95.84 grams of deionized water.

Magnesium chloride, hexahydrate	1.10 grams
Calcium chloride, dihydrate	0.16 grams
Sodium sulfate, anhydrous	0.40 grams
Sodium chloride	2.50 grams

2. Stir well until all chemicals are dissolved.
3. Prepare three test waters by mixing the artificial sea water prepared in step 1 with deionized water as follows:
  - S-L: 25 mL of artificial sea water to 75 mL of deionized water
  - S-M: 10 mL of artificial sea water to 90 mL of deionized water
  - S-H: 1 mL of artificial sea water to 99 mL of deionized water
4. Using the three water samples described in this section, follow the directions in steps 4 through 7 on the first page.

B. Preparation of standard hard and soft waters, as required in step 3 above:

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

	<u>Very Hard</u>	<u>Hard</u>	<u>Soft</u>	<u>Very Soft</u>
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, follow the directions in steps 4 through 7 on the first page.