Evaluation of Wildland Fire Chemicals

STANDARD TEST PROCEDURES

Effect of UV Radiation on Enhanced Water Mixtures

Summary: The susceptibility of water enhancers to degradation by sunlight and/or ultraviolet radiation may be assessed by exposure of the mixed product for a specific amount of time under a standard light array.

A solar simulator is used as the standard light array. It is equipped with a combination of cool white, UVB fluorescent lamps, UVA fluorescent lamps, and halogen flood lamps. This combination results in light similar to that outdoors having a nominal irradiance, in $\mu W/cm^2$ of 3941 in the visible range, 2385 in the UVA range, and 241 in the UVB range.

Equipment:

Solar simulator
Brookfield LVF viscometer, set to a rotational speed of 60 rpm
Spindle set with spindle numbers 2, 3, and 4
Exposure container – shallow, glass container such as a baking dish

Test Method:

1. Prepare approximately 1 liter of the enhanced water mixture using deionized water. Use the previously determined mix method for the specific product.
2. Measure the viscosity of the mixed product at 10 minutes and 60 minutes after mixing. Record the dial reading, the spindle used, and the rotational speed, used to obtain each reading.
3. Place 500 mL of mixed product in a clean glass jar, cap tightly. This jar shall be kept in the lab away from direct sunlight to act as a control.
4. Place two samples in exposure containers to a depth of 1/4 inch.
5. Place the exposure containers under the solar simulator.
6. After 4-hours exposure, remove one sample from the solar simulator.
7. Measure the Brookfield viscosities of the control and 4-hour exposure sample. Record the dial reading, the spindle used, and the rotational speed used to obtain each reading.
8. After 8-hours exposure, remove the second sample from the solar simulator.
9. Measure the Brookfield viscosities of the control and 8-hour exposure sample. Record the dial reading, the spindle used, and the rotational speed used to obtain each reading.
10. Determine the change in viscosity of the product exposed to solar simulator and of the product kept in the lab.