



Evaluation of Wildland Fire Chemicals

STANDARD TEST PROCEDURES

4.2- Refractometer Reading



Summary: A hand-held refractometer is a simple to operate, moderately priced instrument that is suitable for field use. In most cases sample preparation is limited to suitable dilution of a wet concentrate or blending of a dry concentrate with water. Although many refractometer are temperature compensated to allow accurate readings over a range of solution temperatures, they are sensitive to large temperature changes to which they may be subjected during field work.

The scale reading on a hand-held refractometer can be used to provide an estimate of the salt content of a retardant, provided that a reference table has been prepared for use in converting the scale reading to salt content.

The conversion from scale reading to salt content is specific to a particular product or chemical combination; therefore care must be taken to ensure that an appropriate conversion table is used.

Because, there are several different scales used for hand-held refractometers, caution must be exercised to ensure that the refractometer scale and the prepared conversion table use the same scale.

Equipment:

- Handheld refractometer and conversion table
- Test product
- Squirt bottle or other source of clean water
- Lab wipes or other disposable tissue

Method:

1. Place a small drop of test product onto the prism glass of the refractometer using the plastic applicator. Use caution when using an applicator other than the one provide with the refractometer as the prism can be easily scratched. This will affect the accuracy and ease of use of the instrument.
2. Close the cover on the prism.
3. Hold the refractometer with the covered prism pointing to a strong light source.
4. Look through the eyepiece and read the number at the interface of the light and dark sections of the scale.
 - a. The refractometer scale can sometimes be difficult to read.

- b. While looking through the eyepiece, slowly move the refractometer to change the amount of light on the prism.
 - c. Lowering the refractometer will usually increase the amount of light and improve readability.
5. If the color through the eyepiece is so diffuse that there is no line (not enough sample) or the entire view is dark (too much sample), remove the sample from the prism and try again.
 6. Remove the sample from the prism by rinsing with clean water and carefully drying the prism with a clean lab wipe.
 7. Occasionally it is not possible to read the sample. This is usually because it is too concentrated.
 8. Retardant concentrates must be diluted before obtaining a reading. Use the mix ratio approved for the specific product.
 9. Record the refractometer reading.
 10. Compare the obtained reading to the approved range or correlation scale for the specific product to determine quality or approximate salt content.

References:

National Wildfire Coordinating Group and USDA Forest Service. Lot Acceptance, Quality Assurance, and Field Quality Control for Fire Retardant Chemicals, Sixth Edition. 2000.

Shirley Zylstra, USDA Forest Service. Assessments of Seven Refractometers for Evaluating Wildland Fire Retardants. 2005.