Evaluation of Wildland Fire Chemicals

STANDARD TEST PROCEDURES

STP 10.1 Spectral Color Analysis

Summary: Coloring agents have historically been used in Wildland fire chemicals to help with identification from the air. Responses from field personnel have indicated a need for different fire chemical categories (i.e. retardant, water enhancers) to have separate color ranges. This is in effort to reduce misidentifying one fire chemical for another in the field, which could potentially lead to safety concerns. This testing uses a spectrophotometer to evaluate a fire chemical's color values. These values are then used to compare against the acceptable color ranges for each product type as outlined in each of the fire chemical specifications (FS 5100-306b for water enhancers and FS 5100-304c for retardants).

This test is contracted through a GSA approved third party laboratory.

Equipment:

HunterLab Spetrophotometer (or equivalent)
White acrylic or glass application panels

Method:

This testing is conducted by an external laboratory using their own established methods. Testing is completed at an ISO 17025 accredited laboratory.

Current lab protocol is as follows:
Color measurement will be performed using either the HunterLab (L,a,b), CiELab (L*,a*,b*), or CiE (X,Y,Z) color spaces by preference of the USDA Forest Service in conformance with ASTM D2244. Data will be presented in tabular form, including color-balanced photos of the liquid samples for reference in the report. At its discretion, the reported color data can be converted by USDA Forest Service to RGB values, which then can be converted to wavelength via one of several online converter calculators.

Results:

1. Once results are reported from the external lab, the color values are converted to dominant wavelength using chromaticity calculations and an online tool CIE color calculator. Current one in use is www.brucelindbloom.com and checked with http://colorizer.org for reporting accuracy.
2. The results are then reported to the company as to their acceptance within their submitted fire chemical category.

References:

American Society for Testing and Materials D2244.