Modifications to ASTM Test Methods D7202 and D7458

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Method Summary

• **Method D7202**: Standard Test Method for Determination of Beryllium in the Workplace by Extraction and Optical Fluorescence Detection (for surface wipes and air filters)

• **Method D7458**: Determination of Beryllium in Soil, Rock, Sediment, and Fly Ash Using Ammonium Bifluoride Extraction and Fluorescence Detection (for bulk samples)
Method Capabilities

- Sensitivity comparable to ICP-MS
- Portable fluorometer can be deployed in field locations or mobile labs

Automated high-throughput system

BeFinder Portable Fluorometer
Modification Rationale

The methods are being modified to include changes to the fluorescent dye solution. These changes result in one or more of the following advantages:

1. Increased method sensitivity: The method is capable of detecting down to 0.1 ng of beryllium in wipes and filters which is about an order of magnitude better.

2. Ability to use more acidic solutions for sample dissolution which helps in dissolving the samples faster or even use alternative acids which are more effective in dissolving certain samples (e.g., Al metal).

3. Simplifies the preparation of the dye solution.
Details of Changes to the Dye Solution

Uses the same Fluorescent dye (HBQS) as in the existing method.

The changes to the dye solution are:

1. No need to add lysine
2. Increased pH from 12.85 to 13.2

The methods preserve the use of current dye solution while adding the changes to the dye solution as an alternative formulation.
Impact on Testing Procedures

• The new dye solution has been evaluated by testing on wipes, filters and bulk samples.
• There is no impact on procedure where the analysis is conducted by measuring fluorescence from a mixture of the dye and the sample solution (typically an acidic solution in which beryllium from a solid sample is dissolved).
• One may use lower dilution ratios – down to 3X (amount of dye solution to the sample solution) to enhance detection limits.