



Update on the Partnership of the BHSC and ASTM International: Surface Sampling Guide and Beryllium Wipe Specification

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Beryllium Health and Safety Committee Fall 2010 Meeting

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- **Mention of commercial products or companies in this presentation does not imply endorsement of those products or companies.**
- **The partnership described herein has not been officially established by either the BHSC or ASTM International. It is simply an informal arrangement that has served to benefit both parties and the larger “beryllium community.”**

Why We Need Standards

- Consistent methodology
- Meet minimum performance requirements
- Data comparability
- Legal defensibility

Challenges in Standards Development

- Achieving consensus
- Obtaining performance data
- Finding the time
- **BUT the alternatives to participating are:**
 - No standards, or
 - Standards imposed on you by someone else

Standards Development

- **Within DOE, development of beryllium related technical standards has been stalled for several years**
- **The BHSC is not, nor should it be, a standards developing body – its role is to collect and provide information in white papers and forums such as this meeting**
- **However, the BHSC has a body of experts that can contribute, in the proper venue, to development of useful standards**

Where Standards Come From

- **Consensus standards bodies**
 - ASTM International
 - ISO
 - CEN
- **Government agencies – examples:**
 - U.S. – NIOSH, OSHA, EPA
 - U.K. – Health and Safety Laboratory (HSL)
 - Comparable agencies in other nations
- **U.S. National Technology Transfer and Advancement Act (1995)**
 - Promotes development and use of voluntary consensus standards by government agencies

History of the BHSC-ASTM Partnership

- Began informally through contact between Kathy Creek (previous BHSC Chair) and Kevin Ashley, chair of ASTM International Subcommittee D22.04 on Workplace Atmospheres
- Speaker began attending ASTM D22.04 meetings in 2005
- Sampling and Analysis subcommittee saw opportunity for development of beryllium-related standards in D22.04
- In same time frame, standard methods were being developed for fluorescence method developed at LANL

Standards Previously Developed through Partnership

- **ASTM D7035 (ICP-ES for elements including Be)**
 - Original version 2005; revised 2010 with addition of hot block digestion and other updates
- **ASTM D7202 (Be in filters/wipes by fluorescence)**
 - Two analogous NIOSH methods (7704, 9110) also developed
- **ASTM D7296 (Be dry wipe method)**
- **ASTM D7439 (ICP-MS for elements including Be)**
- **ASTM D7458 (Be in soils by fluorescence)**
- **Current efforts:**
 - ASTM D7659-10, published Oct 1, 2010
 - ASTM beryllium wipe specification
 - ASTM practice for dermal sampling of beryllium

ASTM D7659-10

- Title: “*Standard Guide for Strategies for Surface Sampling of Metals and Metalloids for Worker Protection*”
- Covers metals/metalloids generally, not just beryllium
- Initial draft developed with support of DOE-HSS
- Draft refined over one-year period by international group of both BHSC and ASTM D22.04 members
- BHSC members: Kenn White*, Geoff Braybrooke*, Warren Hendricks*, Gary Whitney, Charles Davis, Mike Brisson*
- ASTM D22.04 members: Kevin Ashley, Greg Day, Mary Eide, Alan Howe
- (*) denotes members of both committees

Why Perform Surface Sampling?

- Hazard identification and evaluation
- Exposure assessment for epidemiology
- Facility characterization
- Housekeeping
- Selection/evaluation of engineering controls
- Evaluation of exposure pathways
- Selection of personal protective equipment
- Compliance with regulations and standards
 - Lead: 40 CFR 745
 - Beryllium (DOE): 10 CFR 850
 - Asbestos: 40 CFR 763
- Source identification
- Education and training
- Investigation of complaints

(ASTM D7659-10, Section 6)

Surface Sampling – General Guidance

- **Development of sampling plans**
- **Number of samples to collect**
- **When, where, what to sample**
- **Selection of sampling methods**
 - Type of surface (smoothness, hardness, porosity, fragility)
 - Amount of settled dust on surface (e.g., bulk vs. wipe)
- **Selection of analytical methods**
- **Data evaluation**

Beryllium Wipe Specification Development

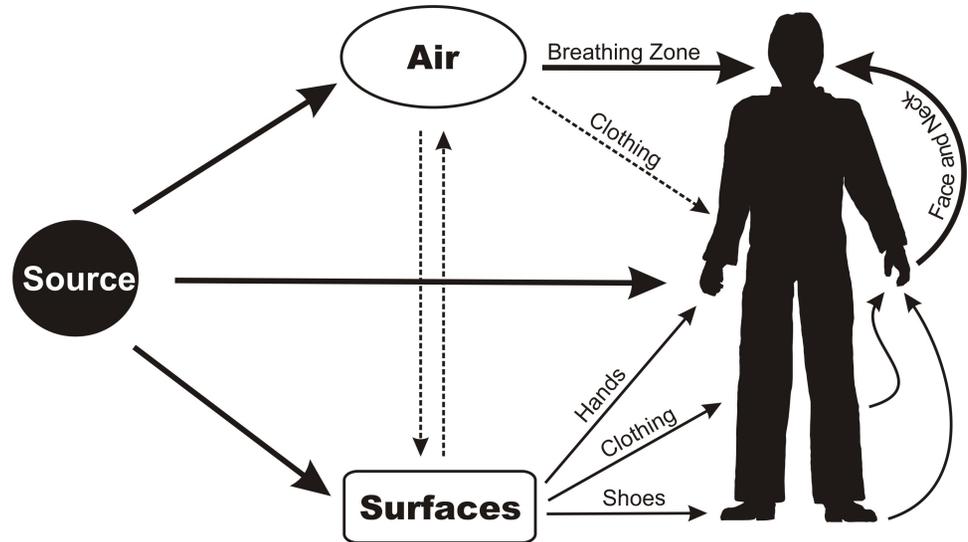
- **WK29823, Specification for Wipe Sampling Materials for Beryllium in Surface Dust**
- **Technical Lead: Kenn White**
- **Again has involved combination of BHSC and ASTM D22.04 members**
- **Current status:**
 - Minor comments received on subcommittee ballot
 - Preparing for main committee ballot

Beryllium Wipe Specification Rationale

- **Originated from work performed separately at SRS (Linda Youmans-McDonald) and Berylliant, Inc. (Anoop Agrawal et al.)**
 - Some lots of wipes have shown interference at beryllium fluorescence wavelength
- **Provides for two sizes of wipes:**
 - Smaller wipe for 100 cm² surface (“no smaller than 16 cm² and no larger than 38 cm² with the mean dimension of a side no smaller than 4.0 cm or larger than 8.0 cm”)
 - This size could require less solution for dissolution of beryllium, which could lead to lower reporting limits
 - Larger wipe, same as currently available per ASTM E1792 (for wiping 1000 cm² surface)
- **Pre-moistened**
- **Background Be <0.5 ng**
- **Being tested via round robin**

Why Perform Dermal Sampling?

- Over 650 chemicals have “skin” notation in NIOSH *Pocket Guide to Chemical Hazards*
- Importance of dermal exposure pathway appears to be greatly underestimated
 - Example: beryllium



(Adapted from Day et al.,
Ann. Occup. Hyg., 51(1): 67-80, 2007)

Beryllium Dermal Wipe Sampling

- Uses individually packaged, pre-wetted wipes
- Wipe skin surface of 25 cm² for 30 sec
- Status of ballot item:
 - Received negatives on initial subcommittee ballot in March 2009
 - Revived in recent meeting/teleconference
 - Updated draft to subcommittee ballot February 2011

Summary

- **Informal BHSC/ASTM partnership has contributed to six new standards in five years**
 - DOE-HSS has provided some support
- **Two additional standards in the pipeline**
- **Efficient and beneficial to far more than the “beryllium community”**