



# ASTM International and the Building of Consensus Standards Supporting Environmental and Analytic Laboratories

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Chair ASTM D22.03, D22.11, D03.12 and D34

# ASTM International Overview



- Global forum for the development of voluntary consensus standards
  - Every member/interest has an equal say in activity
    - Producers
    - Users
    - General Interest
    - Consumer
    - Unclassified
- Strives for high technical quality and stakeholder relevancy
  - **Required review every 5 years and approve/reapproval within 8 years of last approval**

# ASTM Membership

- Over 30,000 of the world's leading technical experts
- More than 140 countries represented
- More than 140 technical standards writing committees
- More than 12,500 standards
- Dedicated to developing and publishing technically sound and relevant standards
- Open to all interested parties



## Standard Uses

- Developed voluntarily and used voluntarily except where required by law
- Government agency reference them in codes, certification, regulations, and laws (US: P.L. 104-115)
- Cited in a contract
- Used by tens of thousands of individuals, companies, and agencies globally
- Over 5,000 ASTM International standards are used as the basis for national standards by reference in regulation in over 50 countries

# NTTA and OMB Circular A-119

## ■ National Technology Transfer and Advancement Act (1995) (Pub. L. 104-115)

- Established policy for US Federal Government to participate in development and adoption of consensus standards
- Government must consider consensus standards in lieu of Government specific requirements

## ■ Office of Management and Budget's Circular A-119

- Authorized National Institute of Standards Technology (NIST) for conformity assessment
- Federal agencies report to NIST and Congress on consensus standard use

# ASTM Consensus Process



- Facilitates standards without borders
- Process for private and public sector cooperation
- Enables implementation of Public Law 104-113 encouraging governmental usage of consensus standards
- Eliminates duplicative standards development, saving taxpayers and other stakeholders millions of dollars

# The Consensus Process

- Ensure Due Process
- Everyone has the opportunity and is encouraged to provide input
- All responses must be considered and resolved by technical committee
- Technical and Procedural
- Appeals (Committee on Standards; COS)

# The Standard Review Process

## ■ The review cycle

- Five years after last approval
  - Notice that standard is due for review
- December 31 of eighth year after last approval
  - Standard is removed from active status

## ■ Review indicates revision unnecessary

- Renewal ballot to entire committee

## ■ Review indicates standard is obsolete

- Allow to expire December 31 of eighth year after last approval or
- Submit to a withdrawal ballot
  - Identifies whether there are users
  - Find a new technical lead



# The Standard Review Process

- Standard is relevant but requires revision
  - Reviewer reports need to relevant subcommittee/Chair
  - Subcommittee/Chair approves revision
    - Work Item created
    - Collaboration group formation may be created
  - Revisions made and standard submitted to a revision ballot with a revision justification statement



**INTERNATIONAL Designation: D7614 – 12**

**Date:** January 26, 2018  
**To:** Subcommittee D22.03  
**Tech Contact:** Raul Dominguez, Jr., [rdominguez@aqmd.gov](mailto:rdominguez@aqmd.gov) (909) 396-2225  
**Work Item #:** WK62073  
**Ballot Action:** Revision of D7614/ Determination of Total Suspended Particulate (TSP) Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography (IC) and Spectrophotometric Measurements  
**Rationale:** Editorial revision for improved clarity, substantive revision of precision and bias and addition of “wrist action shaker” option for filter extraction.

# The Standard Revision Process

## ■ Revision submitted to subcommittee ballot

- Affirmative – Moves to a Main Ballot
- Affirmative with comment – Comments addressed
- Negative – Evaluated as persuasive or non-persuasive
- Abstain – Important since ballots must exceed 60% of the official voting members

## ■ Main Ballot

- Affirmative
- Affirmative with comment – Comments addressed
- Negative – Evaluated as persuasive or non-persuasive
- Abstain – Important since ballot must exceed 60% of the official voting members

## ■ Approval



# The Standard Creation Process

## ■ Proposal

- Need and scope – presented to subcommittee/committee
- Outline or draft
- Decision to pursue
- Creation of collaboration group (optional)

## ■ Example

- Practice for Microplastic Characterization from Air Using Thermal Desorption

# The Standard Creation Process

## ■ Proposal

- Presentation given to subcommittee D22.03 October 2020
  - Proposal: Microplastics by TD-GC-MS
  - Described why this standard is needed – A recent UN reports explain that microplastic pollution remains an overlooked problem. WHO has made recommendations for action such as monitoring and managing microplastics in the environment. However, there is a lack of methodology to carry out those recommendations .
  - Proposed Scope –This practice describes the sampling and analysis of Microplastics from Ambient (Indoor/Workplace) Air. Direct desorption of filtrates containing microplastics provides a simple and streamlined sample preparation step while GCMS analysis produces information rich in volatile organic compound (VOC) profiles. The VOC profiles contain marker compounds to identify and quantify the plastic, along with other chemical signatures that could prove useful in source apportionment, toxicity assessment and regional profiling.
- Subcommittee and Chair Approved standard development activity (WK74436)
- Collaboration group created
- Outline or draft – In preparation.

# The Standard Creation Process

## ■ Ballot Process Identical to that for Standard Revision

- Draft submitted to subcommittee ballot
  - Affirmative
  - Affirmative with comment – Comments addressed
  - Negative – Evaluated as persuasive or non-persuasive
  - Abstain – Important since ballot must exceed 60% of the official voting members
- Main Ballot (Concurrent ballot)
  - Affirmative
  - Affirmative with comment – Comments addressed
  - Negative – Evaluated as persuasive or non-persuasive
  - Abstain – Important since ballot must exceed 60% of the official voting members

## ■ Approval



# ASTM Committee D22 – Air Quality

- Established in 1951
- Meets in March-April and October
- 9 Technical Subcommittees
  - **D22.01 Quality Control**
  - **D22.03 Ambient Atmospheres and Source Emissions**
  - D22.04 Workplace Air Quality
  - **D22.05 Indoor Air**
  - **D22.07 Sampling and Analysis of Asbestos**
  - **D22.08 Assessment, Sampling, and Analysis of Microorganisms**
  - D22.11 Meteorology
  - D22.12 Sampling and Analysis of Lead for Exposure and Risk Assessment
  - D22.13 Compressed Air Quality
- Participation in ISO TAG for ISO/TC 146

## • D22.01 Quality Control

- Concerned with monitoring and improving the quality of Standards produced by Committee D22. Focused on terminology consistency within D22, calibration techniques and methods, and the assurance that every Test Method has had proper testing to assure the precision and accuracy required for issuance. Nine active and two standards under development are currently under subcommittee jurisdiction.
- Example standard
  - D3614 Standard Guide for Laboratories Engaged in Sampling and Analysis of Atmospheres and Emissions
- Standards under development
  - WK85719 Standard Guide for Determination of Detection Limits in Air Quality Methods
  - WK86723 Standard Guide for Air Quality Measurements in Response to Emergency Incidents



- **D22.03 Ambient Atmospheres and Source Emissions**

- Develops and maintains standard methods or practices for sampling and analysis of gases or particulates, including radionuclides from source and ambient atmospheres. Fifty three active and eight standards under development are currently under subcommittee jurisdiction.

- Example standards

- D5953M Standard Test Method for Determination of Non-methane Organic Compounds (NMOC) in Ambient Air Using Cryogenic Preconcentration and Direct Flame Ionization Detection
- D7036 Standard Practice for Competence of Air Emission Testing Bodies



# D22.03 Ambient Atmospheres and Source Emissions

## ■ Example standards under development

- WK74436 Microplastic Characterization from Air Using Thermal Desorption (Technical Contact: Caroline Widdowson; [cwiddowson@markes.com](mailto:cwiddowson@markes.com))
- WK72475 Real-time Dust Monitoring at Construction, Demolition, and Other Fugitive Dust Emission Sites. (Technical Contact: Geoff Henshaw; [geoff.henshaw@aeroqual.com](mailto:geoff.henshaw@aeroqual.com))
- WK67973 Determination of Ethylene Oxide in Ambient Atmospheres (Technical Contact: Barry Prince; [Barry.Prince@syft.com](mailto:Barry.Prince@syft.com))
- WK81715 Standard Test Method for Method for Quantification of Emissions of Air Pollutants from Stationary Sources Using Mobile Optical Remote Sensing. (Technical Contact: Olga Pikelnaya; [opikelnaya@aqmd.gov](mailto:opikelnaya@aqmd.gov))

## D22.04 Workplace Air Quality

- Develops and maintains standard methods or practices for sampling and analysis of chemical and biological agents related to occupational exposures.
- Example standards
  - D4856-11(2016) Standard Test Method for Determination of Sulfuric Acid Mist in Workplace Atmospheres Collected on Mixed Cellulose Ester Filters (Ion Chromatographic Analysis)
  - D7035 Standard Test Method for Determination of Metals and Metalloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)
- Example Standard Under Development
  - WK67946 Standard Practice for Surface Sampling of Selected Organic Compounds for Worker Protection (Technical Contact: Steven Verpaele)

## D22.05 Indoor Air

- Focused on measurement of concentrations of organic and inorganic chemicals, particulate matter, and radionuclides in the non-occupational, indoor environment.
- Example standards
  - D5197 Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology)
  - D5466 Standard Test Method for Determination of Volatile Organic Compounds in Atmospheres (Canister Sampling Methodology)
- Example Standards Under Development
  - WK81752 Standard Guide for Determination of Airborne PFAS in the Indoor Environment (Technical Contact: Dustin Poppendieck)

## D22.07 Sampling, Analysis, Management of Asbestos, and Other Microscopic Particles

- Provides stakeholders with effective solutions towards the observation, measurement, and detection of various matrices (air, soil, built environment, dust, pathological tissue, etc.) that may be contaminated with asbestos or related sub-micron particles. Example standards
  - E2356 Standard Practice for Comprehensive Building Asbestos Surveys – USEPA recommended standard
  - D6281 Standard Test Method for Determination of Indoor and Ambient Airborne Asbestos by TEM – used routinely by investigators.
  - Example Standard Under Development
  - WK74406 Standard Practice for Determination of Asbestos Minerals using Scanning Electron Microcopy and Electron Back Scattering Diffraction technique. (Technical Contact: Bryan Bandli)

# D22.08 Assessment, Sampling, and Analysis of Microorganisms

- Focused on development of sampling, analytical, and field instrumentation methods, practices, guides, strategies and terminology pertaining to the assessment and remediation of microorganisms (fungi and bacteria) in the indoor environment.
- Example standards
  - D7338 Standard Guide for Assessment Of Fungal Growth in Buildings
  - D7391 Standard Test Method for Categorization and Quantification of Airborne Fungal Structures in an Inertial Impaction Sample by Optical Microscopy
- Example Standard Under Development
  - WK64471 Standard Test Method for Assessment of Fungal Biomass on Surfaces, or Coatings by Measuring Fungal  $\beta$ -N-acetylhexosaminidase (NAHA) Activity  
(Technical Contact: Michael Kaniuga)

# ASTM Committee D34 – Waste Management

- Focused on the promotion of knowledge, stimulation of research, and the development of test methods, specifications, practices, terminology, classifications, and guides relating to the management of wastes (industrial, commercial, residential and institutional sources).
  
- Example standards
  - D4978 Standard Test Methods for Screening of Reactive Sulfides in Waste
  - D6052 Standard Test Method for Preparation and Elemental Analysis of Liquid Hazardous Waste by Energy-Dispersive X-Ray Fluorescence
  
- Example Standards Under Development
  - WK84158 Standard Test Method for Finite Flash Point determination of Liquid Wastes by Modified Continuously Closed Cup (MCCCFP) Tester (Technical Contact: Andreas Schwarzmann)
  - WK85822 Standard Test Method for Determining Industrial Compost Disintegration of Materials and Products in the Field (Technical Contact: Alex Thomas)

# Why Participate in ASTM

- Opportunities for the environmental lab
- Participate in development and revision of standardized laboratory methods
- Contribute to the assessment of method capabilities (P&B and the ILS program)
- Learn about analytic alternatives including those on the cutting edge of science

## Why Participate in ASTM Workshops and Symposia

- D22 Workshop on PFAS in Atmosphere – Sources, Sampling, and Standards - November 1-2, 2023/Washington D.C.
- D22 Third ASTM Symposium on Respirable Crystalline Silica and Other Minerals and Metals – October 10-11, 2024/Orlando, FL.
- D34 Workshop on Composting Sampling and Analytic Needs and Development - TBA



# Contact

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# D22.03 Ambient Atmospheres and Source Emissions Standard Development Needs

- Determination of Per- and Polyfluoroalkyl Substances (PFAS) in Ambient Atmospheres
- Wet deposition sampling practice
- Low volume PM sampler standard practice needed – hexavalent chromium including BGI PQ100, BGI Omni FT, and XONTECH 924
- Method for Ambient Air Quality Field Surveys and Monitoring Using Mobile Platform Mounted Advanced Spectroscopic Instruments (PTR-TOF-MS)
- Open Path FT-IR Standard
- Open Path Ultraviolet Differential Optical Absorption Spectroscopy (UV DOAS)