



SW-846 Methods Program Update and Path Forward

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Office of Land and Emergency Management (OLEM)
Office of Resource Conservation and Recovery (ORCR)*

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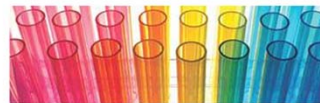
Topics to be Covered

- SW-846 Methods Program
- SW-846 Publication Process
- Update VII
- Future Projects

Hazardous Waste Test Methods / SW-846

The Resource Conservation and Recovery Act (RCRA) governs waste management and materials recovery and reuse, including the disposal of both hazardous and non-hazardous solid waste. In support of RCRA, EPA developed test methods for the analysis of various environmental media. These test methods can be found in the EPA publication, [Test Methods for Evaluating Solid Waste: Physical/Chemical Methods](#), also known as SW-846.

What's New with SW-846



- [Update VI to SW-846 - Public Comment Period](#)
Open **NEW**
- [Validated Methods \(including LEAF Methods\)](#)
- [SW-846 Database of Technical Questions & Answers](#)

Technical Guidance



- [Waste Sampling Guidance](#)
- [Test Method Development Process](#)

What is SW-846 and How Is It Organized?



- [SW-846 Basics](#)
- [Which Method\(s\) Should I Use?](#)
- [Chapters and Methods in the SW-846 Publication](#)

Regulations, Rules and Policies



- [Federal Register Notices Related to SW-846](#)
- [The Methods Innovation Rule and Method](#)

Can't Find What You Are Looking For?

- Search the [EPA Archive](#) for older methods
- Read the [SW-846 Frequent Questions](#)
- Search the [SW-846 Database](#) for answers to technical questions
- Learn more about the [Resource Conservation and Recovery Act](#)



SW-846 Background

- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium (SW-846)
 - EPA's official collection of methods for use in complying with the Resource Conservation and Recovery Act (RCRA) regulations
- Organization
 - Chapters: guidance on how to use the methods
 - Series: groups of methods organized by topic
- Interactive table
 - Find methods by number, analyte, Chemical Abstracts Service (CAS) number, analytical technique, or matrix
- Validated methods
 - Tested and validated by laboratories, but have not been incorporated into SW-846 through the public comment process



SW-846 Chapters

- Chapter 1: [Quality Control](#)
- Chapter 2: [Choosing the Correct Procedure](#)
- Chapter 3: [Inorganic Analytes](#)
- Chapter 4: [Organic Analytes](#)
- Chapter 5: [Miscellaneous Test Methods](#)
- Chapter 6: [Properties—Physical and Chemical Properties of Materials](#)
- Chapter 7: [Characteristics—Introduction and Regulatory Definitions](#)
- Chapter 8: [Methods for Determining Characteristics](#)
- Chapter 9: [Sampling Plans](#)
- Chapter 10: [Sampling Methods](#)
- Chapter 11: Ground Water Monitoring
 - In 2008, Update VI to SW-846 removed Chapter 11 from the compendium because it was out of date and no longer relevant. However, for more information on ground water monitoring please see the [RCRA Ground Water Monitoring Technical Enforcement Guidance Document \(TEGD\)](#).
- Chapter 12: [Land Treatment Monitoring](#)
- Chapter 13: [Incineration](#)



SW-846 Method Series

0010-0100: Air Sampling and Stack Emissions	+
1000 Series: Waste Characteristics and Leaching/Extraction Methods	+
3000 Series: Inorganic Sample Preparation	+
3500 Series: Organic Sample Extraction	+
3600 Series: Organic Extract Cleanup	+
4000 Series: Immunoassay Methods	+
5000 Series: Sample Preparation and Introduction for Volatile Organic Compounds	+
6000 Series: Inorganic Determinative Methods - Inductively Coupled Plasma (ICP) and Other Methods	+
7000 Series: Inorganic Determinative Methods - Atomic Absorption (AA) and Other Methods	+
8000 Series: Chromatographic Separation Methods	+
9000 Series: Miscellaneous Test Methods	+



SW-846 Methods Publication

- Non-regulatory Methods
 - Posted for public comment on SW-846 website (via EPA Docket)
 - Method users are notified via mailing list
 - Contact orcrSW846@epa.gov to sign up for mailing list
- Regulatory Methods (MDPs)
 - Published using the Action Development Process
 - Posted for public comment in the Federal Register

Sign up for our Mailing List or Submit Other Questions or Comments

- To receive email updates related to SW-846, sign up for our mailing list below.
- To ask a question, provide feedback, or report a problem, please fill out the form below. Be sure to include your email address if you would like a response.

Name
Please enter a name to address you by.

Email Address
If you would like a response, please add your email address.

Email List Sign-up
Click "Yes" if you want to receive email updates related to SW-846.
 Yes
 No



Method-Defined Parameters

- 29 SW-846 methods were designated MDPs in the 2005 Methods Innovation Rule
- Physical or chemical properties of materials determined with specific methods used to evaluate whether the materials comply with certain RCRA Subtitle C regulations
 - Incorporated by reference at 40 CFR Section 260.11
- Must be followed exactly as written, or the resulting data cannot be used to demonstrate regulatory compliance



Non-Regulatory Method Flexibility

- 2005 Methods Innovation Rule defined the majority of SW-846 methods as non-regulatory, providing certain flexibilities
- Laboratories may (for non-MDPs):
 - Modify SW-846 methods
 - Use non-SW-846 methods
 - Provided that
 - Modifications or alternative methods are acceptable to the end data user;
 - Associated data meets project-specific Data Quality Objectives (DQOs) defined in an approved Quality Assurance Project Plan (QAPP)
- Recommend completing initial demonstration of performance or other proof-of-concept prior to collecting data
- Flexibilities do not require prior EPA review or approval



Update VII

- **Modernizing Ignitable Liquids Determinations (MILD) Rule**
 - Methods 1010B and 1020C – Flashpoint methods
 - Methods 0010, 0011, 0020, 0023A, and 0051 – Air emissions and stack sampling methods
- **Organic**
 - Method 8327 – PFAS external standard LC/MS/MS method and associated prep methods
 - Method 8328 – PFAS isotope dilution LC/MS/MS method and associated prep methods
- **Inorganic**
 - Method 3050C – Acid digestion for soils

SW-846 Update VII Announcements

EPA is releasing Update VII to the SW-846 compendium of methods.

On this Page:

- [Phase I - Modernizing Ignitable Liquids Determination](#)
- [Phase II - PFAS Methods 8327 and 3512](#)

Phase I – Modernizing Ignitable Liquids Determination

EPA is proposing changes to the hazardous waste regulations that will modernize how the hazardous waste character is determined under the Resource Conservation and Recovery Act. The proposal will also allow the use of non-mercury based analytical methods that currently require mercury thermometers. These proposed amendments, which will allow for the use of modern equipment and techniques for making ignitability determinations for waste. In addition, the proposal will reduce the potential mercury exposures to humans and the environment by reducing the overall use of mercury-containing products.

EPA sought input from waste generators, laboratories, state officials, trade associations and members of the public during a 60-day comment period that ended on June 3, 2019. EPA is currently reviewing comments. [View the comment period in the Federal Register](#). For more information, [check out the Modernizing Ignitable Liquids Determination web page](#).

Rel

[Update VI Anno](#)

[Modernizing Ignit
Determination](#)



MILD (Ignitability) Rule

- The Agency identified a need to revise the RCRA ignitability characteristic for hazardous waste, 40 CFR 261.21
 - Outdated, instrumentation no longer commercially available
 - Require Hg thermometers
- Proposed rule signed March 21, 2019
- Proposed revision of two EPA methods required by 40 CFR 261.21(a)(1)
 - Methods 1010A and 1020B refer to ASTM standards from 1978-1980
 - Two new methods accepted and published by ASTM in April, 2018:
 - ASTM D8174-18 – Small scale closed cup
 - ASTM D8175-18 – Pensky-Martens closed cup
 - Method 1010B: ASTM D93-79, D93-80, or D8175-18
 - Method 1020C: ASTM D3278-78 or D8174-18



MILD (Ignitability) Rule

- Proposed removal of Hg thermometer requirements in five MDP methods for air sampling and stack emissions
 - Methods 0010, 0011, 0020, 0023A, and 0051
- Proposed to codify guidance for sampling multiple phase wastes
- Requested public comment on aqueous alcohol exclusion at 40 CFR 261.21(a)(1)
 - Currently excludes ignitable wastes with under 24% alcohol
 - Can have large amounts of non-alcoholic ignitable constituents



MILD (Ignitability) Rule

- Final rule published July 7, 2020
- Finalized all test methods as proposed
 - Method 1010B: ASTM D93-79, D93-80, or D8175-18
 - Method 1020C: ASTM D3278-78 or D8174-18
- Finalized definition of “aqueous” as 50% water by weight
- Reiterated existing policy for sampling multiple phase wastes and discussed aqueous alcohol exclusion in preamble
- Authorized state programs must adopt the rule for it to go into effect



Update VII – Organic

- Method 3512 – Non-potable Water by Solvent Dilution (sample preparation)
 - *Validated and published for public comment with Method 8327*
- Method 8327 – external standard LC/MS/MS determinative method
 - *24 PFAS analytes*
 - Perfluorinated C4-C14 carboxylic acids and C4-C10 sulfonic acids
 - 4:2, 6:2, 8:2 fluorotelomer sulfonates
 - Perfluorooctyl sulfonamide and sulfonamidoacetic acids
 - *Uses isotopically labeled compounds as surrogates*
- Methods released for public comment in Summer 2019
 - Received over 400 public comments from 24 commenters
 - Finalizing responses to comments, method revisions
- Anticipated publication in Fall 2020



Update VII – Organic

- PFAS isotope dilution validation study plan
 - *Coordinating with OW, ORD, DoD*
 - *Potential SW-846 Methods*
 - Sample Preparation
 - *Solid phase extraction for waters (proposed **Method 3536**)*
 - *Basic solvent extraction for solids (proposed **Method 3551**)*
 - Cleanup - graphitized carbon (proposed **Method 3670**)
 - Determinative - PFAS by isotope dilution calibration LC/MS/MS (proposed **Method 8328**)
 - *25+ PFAS analytes, including GenX*
 - *Single laboratory validation has begun*
 - *Holding time study, multi-laboratory validation study to follow*



Update VII – Inorganic

- Method 3050C – Acid Digestion of Sediments, Sludges, and Soils
 - ❑ Strong acid digestion to dissolve almost all elements that could become “environmentally available”
 - ❑ Updates include:
 - *One procedure for ICP-OES and ICP-MS analysis*
 - ❑ Multi-lab validation study – completed Winter 2020
 - *Currently working on statistical analysis of data*
 - *Workgroup will revise method as necessary based on results*



Future Projects (FY21)

- Inorganic

- **New Method 3110** – Extraction of Seafood for Arsenic Species (Region 10)
- **New Method 6870** – Arsenic Speciation Analysis in Seafood Using IC/ICP-MS (Region 10)
- **New Method 2010** - Incremental Sampling Method for Metals
- **Chapter 9** – Sampling Plans
 - *revisit draft sampling guidance & incorporate into Chapter 9*



Future Projects (FY21)

- Organic

- **Method 8330B** – Nitroaromatics and Nitramines by HPLC

- *Add appendix for insensitive munitions compounds (collaboration with DOD)*

- **New Method 2120** – Passive sampling for PAHs and PCBs in sediment

- **Publish ‘Validated’ Methods**

- *E.g., Method 5035A- Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples*



Potential Future Projects

- ❑ PFAS by solvent dilution (Method 3512) with analysis by isotope dilution LC/MS/MS (proposed Method 8328)
- ❑ Revise Methods 0023A and 8290A to be consistent with changes proposed to Method 23
- ❑ New or revised determinative method for electrospray ionization LC/MS/MS
- ❑ New method for light hydrocarbons in water
- ❑ Revise Method 6200 for field XRF to include quantitative mode
- ❑ Revise Method 3060A to improve performance
- ❑ Revise Method 1340 to include arsenic bioavailability



Resources and Contact Information

- Methods Home Page: <https://www.epa.gov/hw-sw846>
- Christina Langlois-Miller – SW-846 Methods Team Lead (Inorganics), Waste Characterization Branch
 - E-mail: Langlois-Miller.Christina@epa.gov
- Troy Strock – SW-846 Methods Team (Organics), Waste Characterization Branch
 - E-mail: Strock.Troy@epa.gov
- Kim Kirkland – Chief, Waste Characterization Branch
 - E-mail: Kirkland.Kim@epa.gov



Thank you!

Thank you to the labs and chemists who have volunteered time, materials, etc. for SW-846 validation studies

- *EPA Region 10*
- *Brooks Applied Labs*
- *Analytical Resources Inc.*
- *EPA ORD NRMRL*
- *Hampton Roads Sanitation District*
- *High Purity Standards*
- *Pace Analytical*
- *Eurofins TestAmerica*
- *USACE CEERD*
- *ERA*
- *NIST*
- *EPA ORD NHEERL*
- *EPA OPP ACB*
- *EPA Region 3*
- *EPA Region 4*
- *EPA Region 5*
- *New York State Department of Health*
- *New Jersey Department of Health*
- *California Department of Toxic Substance Control*
- *Ohio EPA*
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- *Shimadzu*
- *Agilent*
- *Waters*

