4.1 Physical and Chemical Characteristics of Waste and Residues

The permit application for a miscellaneous unit, must include waste characterization data that are sufficient to assure that the wastes managed by the facility can be (1) adequately and safely stored at the facility and (2) effectively treated in the miscellaneous unit. For each hazardous waste and hazardous debris treated, stored, or disposed of at the facility, the permit application must include a description of the waste and its EPA or state hazardous waste code, its hazard characteristics, the basis for its designation as hazardous, and the results of chemical and physical analyses of representative samples of the waste. However, certain types of wastes, such as

those that usually are treated at OB/OD units, may not be analyzed easily or safely, because of their reactivity. For such wastes, existing information such as published or historical analytical data, knowledge of the chemical substances used in the manufacturing process and product formulations, or data provided by off-site generators may be presented in the permit application to fulfill this requirement.

For all Subpart X units, waste characterization data must demonstrate that the wastes are compatible with the construction materials of the unit. For example, for Subpart X units that have geomembrane liners, methods described in SW-846 can be used to demonstrate that hazardous wastes are compatible with the liner(s). For units that do not have secondary containment, the data also must demonstrate that the wastes do not contain free liquids. EPA's standard protocol for determining whether free liquids are present is the Paint Filter Liquids Test method 9095 in SW-846.

For Subpart X units that employ thermal treatment (other than OB units), methods applicable to incinerators, boilers, or industrial furnaces may be used. For such units, waste characterization data must include the following, as appropriate for the type of controlled thermal treatment being conducted: physical form of the waste; viscosity of liquids; identification and approximate quantification of the Appendix VIII hazardous organic constituents reasonably expected to be present in the waste; concentrations of chlorine and metals; and ash content. If blending is to occur before firing, the permit application must identify the blending material and blending ratios and describe blending procedures.

Permit applications for units treating energetic wastes should clearly identify the waste item (e.g., name, munition item type, etc.), EPA waste code, waste composition data (including nonenergetic components), waste properties and waste treatment quantities. The waste description information should be provided as a function of energetic classification

and munition category. Example energetic classifications are presented below:

- Propellants are low explosive agents such as explosive powder or fuel that provides the energy for propelling ordnance to the target. Propellants include both rocket and gun propellants.

- Primary or initiating explosives are high explosives generally used in small quantities to detonate larger quantities of high explosives. Initiating explosives will not burn, but if ignited, they will detonate. In general, propellants are ignited by applying a flame, while bursting explosives are ignited by a severe shock. The initiating device used to set off a propellant is called a primer, and the device used to initiate the reaction of a bursting explosive is called a detonator.

- Auxiliary or booster explosives are used to increase the flame or shock of the initiating explosive to ensure that the burster charge performs properly. High explosives used as auxiliary explosives are less sensitive than those used in initiators, primers, and detonators, but are more sensitive than those used as filler charges or bursting explosives.

- Bursting explosives, burster charges, or fillers are high explosive charges that are used alone or as part of the explosive charge in mines, bombs, missiles, and projectiles.

- Pryotechnics are low explosives used to send signals, to illuminate areas of interest, to simulate other weapons during training, and as ignition elements for certain weapons. Pyrotechnic compositions are considered low explosives because of their low rates of combustion. Examples of pyrotechnics are illuminating flares, signaling flares, smoke generators, tracers, incendiary delays, and photo-flash compounds.

- Small arms munitions contain projectiles that are 0.5 inches or less in caliber and no longer than

approximately 4 inches. Unexploded small arms munitions may explode if thrown into a fire or struck with a sharp object.

- Hand grenades are small explosive -or chemical -type munitions designed to be thrown at short range. All greandes are composed of three main parts: a body, a fuze with a pull ring and safety clip assembly, and a filler.

Small arms munitions are typically not appropriate for OB/OD treatment because they can generally be safely transported offsite for treatment by alternative technologies.

Many of the energetic waste to be treated by OB/OD units may be characterized by manufacturers and other sources. For example, the Munitions Items Disposition Action System (MIDAS) program, operated by the U.S. Army, includes a database of the composition of many military munitions. Although all of the military munition items are not currently included, a representative number of items have been characterized and additional items are routinely added. The MIDAS web site is at www.dac.army.mil/default1.html (registration is required for access).

However, there are major complicating factors regarding providing detailed waste description information for potential future OB/OD treatment as follows:

- Potential for a wide range of energetic items to be treated.

- Variability of waste composition between items and potentially even for the same items (because many of the military munition specifications are performance based, not composition based).

- Uncertainties for item-specific treatment quantities.

Thus, the permit application should include waste description information based on historical data (a minimum of 5 years) and for future OB/OD

operations. In order to address the uncertainties associated with the waste description information and quantities, the applicant should provide sufficient information in the permit application to demonstrate that OB/OD is the appropriate treatment for a waste and to establish risk-based levels for permit conditions. This approach is similar to defining the potential waste streams for a hazardous waste incinerator and or industrial furnace.

SW-846

Mice Service

PBMS

National Environmental Monitoring Conference (NEMC)

Methods Development & Approval Process

Related Links

What's New

The Methods Team is the focal point within the US EPA's Office of Solid Waste (OSW) for expertise in analytical chemistry and characteristic testing methodologies, environmental sampling and monitoring, and quality assurance. The Methods Team provides technical support to other OSW Divisions, EPA Program Offices and Regions, state regulatory agencies, and the regulated community. To contact us, please either write, phone or fax us at:

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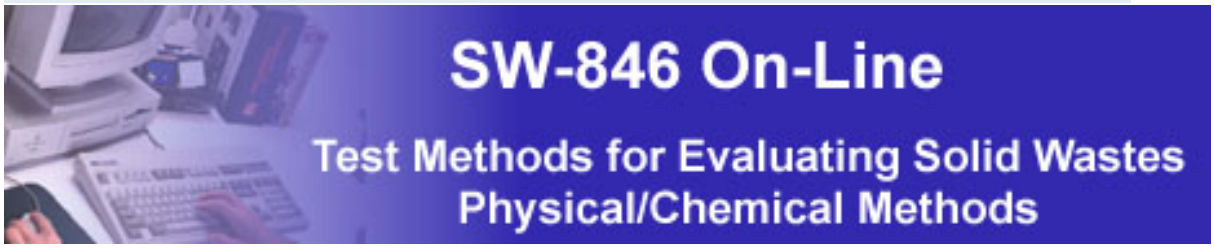

9000 Series Methods

The SW-846 methods and other documents can now be viewed and/or printed using the Adobe Acrobat Reader. You may download the reader for free EXIT EPA if you do not have Adobe Acrobat on your computer. The size of the pdf file is provided with the document title.

9000 Series Methods

Method 9010B: [PDF Format 78 KB]
Total and Amenable Cyanide: Distillation

Method 9012A: [PDF Format 109 KB]
Total and Amenable Cyanide (Automated Colorimetric, with Off-Line Distillation)

Method 9013: [PDF Format 157 KB]
Cyanide Extraction Procedure for Solids and Oils

Method 9014: [PDF Format 72 KB]
Titrimetric and Manual Spectrophotometric Determinative Methods for Cyanide

Method 9020B: [PDF Format 190 KB]
Total Organic Halides (TOX)

Method 9021: [PDF Format 197 KB]
Purgeable Organic Halides (POX)

Method 9022: [PDF Format 248 KB]
Total Organic Halides (TOX) by Neutron Activation Analysis

Method 9023: [PDF Format 92 KB]
Extractable Organic Halides (EOX) in Solids

Method 9030B: [PDF Format 113 KB]
Acid-Soluble and Acid-Insoluble Sulfides: Distillation

Method 9031: [PDF Format 316 KB]
Extractable Sulfides

Method 9034: [PDF Format 60 KB]
Titrimetric Procedure for Acid-Soluble and Acid-Insoluble Sulfides

Method 9035: [PDF Format 215 KB]
Sulfate (Colorimetric, Automated, Chloranilate)

Method 9036: [PDF Format 225 KB]
Sulfate (Colorimetric, Automated, Methylthymol Blue, AA II)

Method 9038: [PDF Format 186 KB]
Sulfate (Turbidimetric)

Method 9040B: [PDF Format 129 KB]
pH Electrometric Measurement

Method 9041A: [PDF Format 66 KB]

pH Paper Method

Method 9045C: [PDF Format 138 KB]
Soil and Waste pH

Method 9050A: [PDF Format 31 KB]
Specific Conductance

Method 9056: [PDF Format 217 KB]
Determination of Inorganic Anions by Ion Chromatography

Method 9057: [PDF Format 44 KB]
Determination of Chloride from HCl/Cl_2 Emission Sampling Train (Methods 0050 and 0051) by Anion Chromatography

Method 9060: [PDF Format 123 KB]
Total Organic Carbon

Method 9065: [PDF Format 212 KB]
Phenolics (Spectrophotometric, Manual 4-AAP with Distillation)

Method 9066: [PDF Format 223 KB]
Phenolics (Colorimetric, Automated 4-AAP with Distillation)

Method 9067: [PDF Format 160 KB]
Phenolics (Spectrophotometric, MBTH with Distillation)

Method 9070A:
See Method 1664, Publication No. EPA-821-R-98-002.
To get a copy of Method 1664, please go to the Office of Water Office of Science and Technology

Method 9071B: [PDF Format 228 KB]
n-Hexane Extractable Material (HEM) for Sludge, Sediment, and Solid Samples

Method 9075: [PDF Format 62 KB]
Test Method for Total Chlorine in New and Used Petroleum Products by X-Ray Fluorescence Spectrometry (XRF)

Method 9076: [PDF Format 81 KB]
Test Method for Total Chlorine in New and Used Petroleum Products

by Oxidative Combustion and Microcoulometry

Method 9077: [PDF Format 334 KB]
Test Methods for Total Chlorine in New and Used Petroleum Products (Field Test Kit Methods)

Method 9078: [PDF Format 32 KB]
Screening Test Method for Polychlorinated Biphenyls in Soil

Method 9079: [PDF Format 46 KB]
Screening Test Method for Polychlorinated Biphenyls in Transformer Oil

Method 9080: [PDF Format 266 KB]
Cation-Exchange Capacity of Soils (Ammonium Acetate)

Method 9081: [PDF Format 135 KB]
Cation-Exchange Capacity of Soils (Sodium Acetate)

Method 9090A: [PDF Format 611 KB]
Compatibility Test for Wastes and Membrane Liners

Method 9095A: [PDF Format 29 KB]
Paint Filter Liquids Test

Method 9096: [PDF Format 249 KB]
Liquid Release Test (LRT) Procedure

Method 9100: [PDF Format 866 KB]
Saturated Hydraulic Conductivity, Saturated Leachate Conductivity, and Intrinsic Permeability

Method 9131: [PDF Format 301 KB]
Total Coliform: Multiple Tube Fermentation Technique

Method 9132: [PDF Format 236 KB]
Total Coliform: Membrane-Filter Technique

Method 9210: [PDF Format 58 KB]
Potentiometric Determination of Nitrate in Aqueous Samples with Ion-Selective Electrode

Method 9211: [PDF Format 68 KB]
Potentiometric Determination of Bromide in Aqueous Samples with Ion-Selective Electrode

Method 9212: [PDF Format 69 KB]
Potentiometric Determination of Chloride in Aqueous Samples with Ion-Selective Electrode

Method 9213: [PDF Format 65 KB]
Potentiometric Determination of Cyanide in Aqueous Samples and Distillates with Ion-Selective Electrode

Method 9214: [PDF Format 68 KB]
Potentiometric Determination of Fluoride in Aqueous Samples with Ion-Selective Electrode

Method 9215: [PDF Format 66 KB]
Potentiometric Determination of Sulfide in Aqueous Samples and Distillates with Ion-Selective Electrode

Method 9250: [PDF Format 206 KB]
Chloride (Colorimetric, Automated Ferricyanide AAI)

Method 9251: [PDF Format 204 KB]
Chloride (Colorimetric, Automated Ferricyanide AAII)

Method 9253: [PDF Format 140 KB]
Chloride (Titrimetric, Silver Nitrate)

Method 9310: [PDF Format 165 KB]
Gross Alpha and Gross Beta

Method 9315: [PDF Format 202 KB]
Alpha-Emitting Radium Isotopes

Method 9320: [PDF Format 267 KB]
Radium-228