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Standard Guide for Waste Acceptance at Hazardous Waste Incinerators[1]

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1. Scope

1.1 This guide addresses the acceptance of wastes at hazardous waste incinerators.

1.2 The purpose of this guide is to assist the user in determining the information and chemical and physical characteristics to be used when assessing the suitability of a waste for incineration.

1.3 This guide is intended to assist in meeting the requirements of applicable permits.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 56 Test Method for Flash Point by Tag Closed Tester[2]
D 88 Test Method for Saybolt Viscosity[3]
D 92 Test Method for Flash and Fire Points by Cleveland Open Cup[2]
D 93 Test Methods for Flash Point by Pensky-Martens Closed Tester[2]
D 129 Test Method for Sulfur in Petroleum Products (General Bomb Method)[2]
D 240 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter[2]
D 482 Test Method for Ash from Petroleum Products[2]
D 808 Test Method for Chlorine in New and Used Petroleum Products (Bomb Method)[2]
D 891 Test Methods for Specific Gravity of Liquid Industrial Chemicals[4]
D 1292 Test Method for Odor in Water[5]
D 1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)[2]
D 2015 Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter[6]
D 2196 Test Method for Viscosity Measurements and Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer[7]
D 2361 Test Method for Chlorine in Coal[6]
D 2983 Test Method for Low-Temperature Viscosity of Automotive Fluid Lubricants Measured by Brookfield Viscometer[8]
D 3177 Test Method for Total Sulfur in the Analysis Sample of Coal and Coke[6]
D 3286 Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter[6]
D 3761 Test Method for Total Fluorine in Coal by the Oxygen Bomb Combustion/Ion Selective Electrode Method[6]
D 3828 Test Method for Flash Point by Setaflash Closed Tester[9]
D 4007 Test Method for Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure)[9]
D 4208 Test Method for Total Chlorine in Coal by the Oxygen Bomb Combustion/Ion Selective Electrode Method[6]
E 203 Test Method for Water Using Karl Fischer Reagent[4]
E 260 Practice for Packed Column Gas Chromatography[10]
E 663 Practice for Flame Atomic Absorption Analysis[11]
E 775 Test Methods for Total Sulfur in the Analysis Sample of Refuse-Derived Fuel[12]
E 776 Test Method for Forms of Chlorine in Refuse-Derived Fuel[12]
E 819 Test Method for Trace Amounts of Arsenic in Organic Industrial Chemicals[4]
E 885 Test Method for Analysis of Metals in Refuse-Derived Fuel (RDF) by Atomic Absorption Spectrophotometry[12]
E 926 Test Method for Preparing Refuse-Derived Fuel (RDF) Samples for Analyses of Metals[12]
F 873 Guide for Incinerating Oil Spill Wastes at Temporary Field Locations[12]

[1] This guide is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.06 on Recovery and Reuse.

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[2] *Annual Book of ASTM Standards*, Vol 05.01.
[3] *Annual Book of ASTM Standards*, Vol 04.04.
[4] *Annual Book of ASTM Standards*, Vol 15.05.
[5] *Annual Book of ASTM Standards*, Vol 11.01.
[6] *Annual Book of ASTM Standards*, Vol 05.05.
[7] *Annual Book of ASTM Standards*, Vol 06.01.
[8] *Annual Book of ASTM Standards*, Vol 05.02.
[9] *Annual Book of ASTM Standards*, Vol 05.03.
[10] *Annual Book of ASTM Standards*, Vol 14.01.
[11] *Annual Book of ASTM Standards*, Vol 03.06.
[12] *Annual Book of ASTM Standards*, Vol 11.04.

2.2 *SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*[13]
1010 Test Method for Pensky-Martens Closed-Cup Method for Determining Ignitability
1020 Test Method for Setaflash Closed-Cup Method for Determining Ignitability
1110 Test Method for Corrosivity Toward Steel
3020 Test Method for Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Furnace Atomic Absorption Spectroscopy
3040 Test Method for Dissolution Procedures for Oils, Greases, or Waxes
3050 Test Method for Acid Digestion of Sediments, Sludges, and Soils
6010 Inductively Coupled Plasma Method
7060 Test Method for Arsenic (AA, Furnace Technique)
7080 Test Method for Barium (AA, Direct Aspiration)
7090 Test Method for Beryllium (AA, Direct Aspiration)
7130 Test Method for Cadmium (AA, Direct Aspiration)
7190 Test Method for Chromium (AA, Direct Aspiration)
7470 Test Method for Mercury in Liquid Waste (Manual Cold-Vapor Technique)
7471 Test Method for Mercury in Solid or Semi-Solid Waste (Manual Cold-Vapor Technique)
7520 Test Method for Nickel (AA, Direct Aspiration)
7610 Test Method for Potassium (AA, Direct Aspiration)
7740 Test Method for Selenium (AA, Furnace Method)
7770 Test Method for Sodium (AA, Direct Aspiration)
7840 Test Method for Thallium (AA, Direct Aspiration)
7910 Test Method for Vanadium (AA, Direct Aspiration)
7950 Test Method for Zinc (AA, Direct Aspiration)
8010 Test Method for Halogenated Volatile Organics
8015 Test Method for Non-Halogenated Volatile Organics
8020 Test Method for Aromatic Volatile Organics
8080 Test Method for Organochlorine Pesticides and PCBs
8120 Test Method for Chlorinated Hydro-Carbons
8240 GC/MS Method for Volatile Organics
8250 GC/MS Method for Semivolatile Organics: Packed Column Technique
8270 GC/MS Method for Semivolatile Organics: Capillary Column Technique
9041 Test Method for pH Paper Method
9045 Test Method for Soil pH
2.3 *Code of Federal Regulations*:[13]
40 CFR, Protection of Environment, Parts 260, 261, 262, 263, 264, 265, 266, 267, 268, and 270.
49 CFR, Transportation, Parts 171 and 172
29 CFR, Labor, Parts 1910.100 through 1910.1046

3. Terminology

3.1 *Definitions:*

3.1.1 *incineration*—controlled burning of waste products or other combustible material (see Guide F 873).

3.1.2 *incinerator*—a device constructed for the purpose of containing a material for thermal oxidation (see Guide F 873).

[13] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

4. Significance and Use

4.1 This guide has been developed to assist in establishing the information and chemical and physical characteristics upon which hazardous waste incineration acceptance criteria can be based.

4.2 This guide is not intended to serve as a set of rigid criteria since acceptable conditions will vary with the type and size of equipment. The appropriate regulatory and permit requirements must be followed for the wastes that may be incinerated.

4.3 This guide does not obviate the need to follow all local, state, and federal regulations and permits.

5. Preacceptance

5.1 The decision to accept a waste for incineration requires an evaluation of the information and chemical and physical characteristics discussed in Sections 6 and 7. This type of information should be known before actual shipments of waste are accepted at the facility. This information is necessary in order to make a determination that the facility can properly manage the waste prior to its receipt. Failure to do this can result in long delays in handling waste shipments or ultimate rejection of these wastes.

6. Required Information

6.1 The following information must be supplied prior to the receipt of a waste at the incineration site, either by the generator or developed through analysis of a sample of the waste (see section 40 CFR, Parts 264 and 265). This information is the criterion used for determining the acceptance or rejection of the waste for incineration.

6.2 *General Information provided by the Generator*:

6.2.1 Generator name, address, Federal Environmental Protection Agency (EPA) facility identification number (and state EPA facility identification number, if applicable), technical contact, and phone number. This information provides the identity and location of the waste generated. It also provides a technical person who can be contacted regarding additional information prior to or during handling of the waste. Examples are waste nonconformity, safety information, special handling, and waste composition clarification.

6.2.2 Waste name/generic description. The description identifies the specific waste from a generating location. It provides a name that describes the waste adequately.

6.2.3 Process generating the waste. This provides information used in the determination of proper regulatory classifications and may indicate properties of the waste.

6.2.4 Department of Transportation (DOT) shipping information (see section 49 CFR, Parts 171 and 172). This is used as a basis for on-site storage and compatibility. Waste arriving on-site must also be classified properly on the hazardous waste manifest. In addition, proposed shipping frequency and shipment packaging (for example, 20 or 55 gallon drums per week, etc.) should be included.

6.2.5 Resource Conservation and Recovery Act (RCRA) classifications (see section 40 CFR, Part 261). The proper EPA and state hazardous waste numbers must be designated for each waste in order to meet regulatory and permitting requirements.

6.2.6 Waste stream profile. A general list of organic and

inorganic components and their percentage ranges in the waste. For example,

oil	10–20 %
water	40–50 %
dirt	1–2 %
methylene chloride	15–28 %

This should be a breakdown of the waste constituents provided to the best of the generator's knowledge (or through analyses) and should include an estimate of the variability of the waste. It is used to determine proper RCRA classifications, toxicity, compatibility, safety and health considerations (see section 29 CFR, Part 1910), and conformity of waste shipments. In addition, it indicates waste variability, which is used in determining storage and handling.

6.2.7 Special handling. This may be information on air or water reactivity, explosivity, or shock sensitivity of the waste. This information is very useful in determining additional safety and health considerations (see section 29 CFR, Part 1910), handling, storage, packaging, method of introduction into the incinerator, and feed rates.

6.3 *Specific Information*—This information may be provided through the generator's knowledge of the waste or through analysis of a representative sample. An estimated variability of these values should be provided.

6.3.1 *Physical Characteristics*:

6.3.1.1 *Physical State*— For example, solid, liquid, semi-solid, powder, multi-phased, layers. This information is used to determine the proper storage and feed type or rate.

6.3.1.2 *Flashpoint/Flammability Potential*—These values or ranges can be expressed by liquid flashpoint or the tendency of solids to burn vigorously when ignited (a subjective evaluation). They provide the basis for storage and handling (see Test Methods D 56, D 92, D 93, D 3828, 1010, and 1020).

6.3.1.3 *Specific Gravity/Apparent Bulk Density*—These data are used for volume to weight conversions, pump selections, storage, and feed rates (see Test Methods D 891).

6.3.1.4 *Viscosity*—The viscosity is useful in the determination of pump selection, storage, tank off-loading capabilities, and feed rates (see Test Methods D 88, D 2196, and D 2983).

6.3.1.5 *pH/Corrosivity*— These values or ranges provide necessary information in determining the compatibility of wastes with tank and processing equipment materials of construction. The information provides insight into the nature of the waste and its suitability for incineration. For example, mineral acids and caustics may not be suited for a particular incinerator, whereas organic acids and amines are (see Test Methods D 1292, 1110, 9045, and 9041).

6.3.1.6 *Radioactivity*— Information regarding radioactivity is critical for safe handling and processing of wastes. Many incineration facilities are not designed to store or handle wastes containing radioactivity. It is recommended that each facility perform some type of screening of waste for radioactivity. This screen must be based on the situations specific to each facility. A survey meter with an appropriate detector is useful in providing this type of screening. A facility may place this type of screening device in a location appropriate to the facility's operations (for example, in the laboratory or at the vehicle receiving gate, staging area, load area, etc.).

6.3.2 *Chemical Characteristics*:

6.3.2.1 *Heating Value*— The heating value may be necessary to meet some permit requirements. It can be used to establish waste stream feed rates and auxiliary fuel requirements (see Test Methods D 240, D2015, and D3286).

6.3.2.2 *Ash Content*— The ash content may be necessary to meet some permit requirements. It may be used to predict refractory or slag buildup and volumes of ash for disposal. It may also be used to estimate particulate generation (see Test Method D 482).

6.3.2.3 *Halogen and Sulfur Content*—The halogen and sulfur contents are necessary to meet permit requirements. They are useful in tracking refractory degradation and estimating acid gas generation, for example, HCl, SOx, etc. Individual halogens may need to be determined, depending on the type of incinerator and air pollution control systems (see Test Methods D 129, D808, D2361, D3177, D3761, D4208, E775, and E776).

6.3.2.4 *Metals*—The analysis of metals may be necessary to meet permit requirements. Specific metals and concern are dependent on the incinerator type, air pollution control system, and ash disposal requirements. Table 1 lists typical metals that are of primary concern (see Practice E 663 and Test Methods E 819, E 885, E 926, 3020, 3040, 3050, 6010, 7060, 7080, 7090, 7130, 7190, 7470, 7471, 7520, 7610, 7740, 7770, 7840, 7910, and 7950).

7. Optional Information

7.1 The following information may be provided by the generator's knowledge of the waste or through analysis of a representative sample. Estimated variability of these values should be provided.

7.1.1 *Solids Content*— This information is useful in determining pump requirements, feed rates, and storage designations. It may also be useful in determining particulate generation (see Test Methods D 1796 and D 4007).

7.1.2 *Volatile and Semi-Volatile Organics*—This information may be necessary in determining organic constituents, which is a permitting issue. It also provides additional information on the waste (see Practice E 260 and Test Methods 8010, 8015, 8020, 8080, 8120, 8240, 8250, and 8270).

7.1.3 *Water Content*— These data are useful in determining storage, phase composition, compatibilities, and feed rates (see Test Method E 203).

TABLE 1 Typical Metals of Concern

Metals	Concerns
Arsenic	Air emissions
Barium	Ash disposal
Beryllium	Refractory degradation
Cadmium	Scrubber effluent
Chromium (hexavalent)	
Copper	
Mercury	
Potassium	
Sodium	
Nickel	
Lead	
Selenium	
Thallium	
Vanadium	
Zinc	

7.1.4 *Material Safety Data Sheets*—These documents provide vital information for handling and storing out-of-date or off-specification products. Other sources may be product information and technical data sheets.

8. Incoming Shipment Evaluation

8.1 Once the decision has been made to accept a waste for incineration and the waste arrives at the facility, a plan must be in place to identify that the waste approved is indeed the waste received. The following evaluations must be made prior to commingling the waste shipment with other wastes: (*1*) sampling, (*2*) screening tests, (*3*) site procedural requirements, and (*4*) acceptance.

8.1.1 *Sampling*—At a minimum, a site sampling protocol must yield a representative sample or samples of each incoming shipment. The sample or samples should be collected in accordance with "Test Methods for the Evaluating Solid Waste Physical/Chemical Methods," SW-846, EPA, or 40 CFR, Part 261, Appendix XI.

8.1.2 *Analysis*—All or some of the information and chemical and physical characteristics in Sections 6 and 7 may be required to evaluate the acceptance of a shipment of waste. The information and chemical and physical characteristics to be considered may depend on the type and size of the operation.

8.2 If a waste must be rejected due to nonconformity, and returned to the generator, the waste must be properly DOT classified prior to shipment.

9. Keywords

9.1 hazardous waste incinerators; waste acceptance

APPENDIX

(Nonmandatory Information)

X1. EPA DOCUMENTS AND REGULATIONS

X1.1 The following EPA documents and regulations are useful in establishing the information that is necessary for hazardous waste incinerator material acceptance.

X1.2 *EPA Guidance Manuals:*

X1.2.1 *Permit Applicant's Guidance Manual for the General Facility Standards of 40 CFR, Part 264* (EPA SW-968).

X1.2.2 *Guidance Manual for Hazardous Waste Incineration Permits* (EPA SW-966).

X1.2.3 *Engineering Handbook for Hazardous Waste Incineration* (EPA SW-889).

X1.2.4 *Practical Guide—Trial Burns for Hazardous Waste Incinerators* (EPA/600/2-86/050).

X1.2.5 *Test Methods for Evaluating Solid Waste Physical/Chemical Methods* (EPA SW-846).

X1.2.6 *Waste Analysis Plans A Guidance Manual* (September 1984).

X1.2.7 *Sampling and Analysis Methods for Hazardous Waste Combustion* (EPA Contract No. 68-01-3111).

X1.3 *Code of Federal Regulations:*

X1.3.1 40 CFR, Protection of Environment, Part 260.

X1.3.2 40 CFR, Protection of Environment, Part 262.

X1.3.3 40 CFR, Protection of Environment, Part 263.

X1.3.4 40 CFR, Protection of Environment, Part 266.

X1.3.5 40 CFR, Protection of Environment, Part 267.

X1.3.6 40 CFR, Protection of Environment, Part 268.

X1.3.7 40 CFR, Protection of Environment, Part 270.