



Designation: D5058 – 12

Standard Practices for Compatibility of Screening Analysis of Waste¹

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1. Scope

1.1 These practices cover assessment of the compatibility/reactivity of waste. The individual practices are as follows:

Practice	Sections
Practice A—Commingled Waste Compatibility	8-12
Practice B—Polymerization Potential (Reaction with Triethylamine)	13-18
Practice C—Water Compatibility	19-25

1.2 These practices are applicable to waste liquids, sludges, semi-solids, and solids.

1.3 These practices are designed and intended as a preliminary or supplementary test to complement the more sophisticated quantitative analytical techniques that should be used to determine waste composition and compatibilities. This standard offers the user the option and the ability to screen wastes for potentially hazardous reactions when the more sophisticated techniques are not available and the total waste composition is unknown and to screen compatibility when the composition is known. (**Warning**—Delayed or slow reactions of wastes may go unnoticed.)

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4.1 *Exception*—The values given in parentheses are for information only.

1.5 *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.* For specific hazard and warning statements, see Sections 1.3, 6.1, 10, 11.2.3, 11.5.2, 16 and 23.

¹ These practices are under the jurisdiction of ASTM Committee D34 on Waste Management and are the direct responsibility of Subcommittee D34.01.05 on Screening Methods.

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2. Referenced Documents

2.1 ASTM Standards:²

D1193 Specification for Reagent Water

D5681 Terminology for Waste and Waste Management

E1 Specification for ASTM Liquid-in-Glass Thermometers

E200 Practice for Preparation, Standardization, and Storage of Standard and Reagent Solutions for Chemical Analysis

3. Terminology

3.1 *Definitions*—For definitions of terms used in this screening practice, refer to Terminology D5681.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *screening*—a preliminary qualitative or semi-quantitative test, developed from classical qualitative and quantitative techniques, that is designed to efficiently give the user specific information about a waste that will aid in determining waste identification, process compatibility, and safety in handling.

4. Summary of Practices

4.1 *Practice A*—Representative samples of waste are added to each other. The generation of heat or violent reaction is noted. In addition, the production of mists, fumes, dusts, gases, layering, polymerization, precipitation, emulsification or increase in viscosity and other chemical or physical changes are noted.

4.2 *Practice B*—Reactivity of wastes is determined by adding an aliquot of a sample to an equal volume of reagent and observing any characteristic reaction, such as temperature increase, gas evolution, gelling, or polymerization.

4.3 *Practice C*—Water and the waste are mixed in an approximate 10 + 1 ratio to test for compatibility. A thermometer is used to measure heat generation when applicable. Qualitative solubility and relative apparent density are observed concurrently.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

5. Purity of Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³ Other grades may be used provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination (see Practice E200).

5.2 *Purity of Water*— Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type III of Specification D1193.

6. Sampling

6.1 **Warning**—Avoid inhalation of or skin contact with any hazardous waste.

6.2 Obtain representative samples of waste. If composite samples are taken, report any generation of heat, gases or solids during compositing. If reactions are observed during compositing, then individual samples should be taken. If the waste is suspected of containing varying proportions of reactive compounds, take individual samples and conduct tests on each sample.

6.3 Allow all samples to stabilize to room temperature and analyze as soon as possible.

6.4 Always perform this procedure in a hood with the sash down as far as possible.

7. Quality Assurance

7.1 Thermometers are evaluated and verified at a frequency specified by the laboratory (see Specification E1).

7.2 Care is taken to ensure that samples are representative of the total wastes involved.

PRACTICE A—COMMINGLED WASTE COMPATIBILITY

8. Significance and Use

8.1 This practice is intended for use by those in the waste management industries to aid in determining the compatibility of hazardous wastes before they are commingled.

9. Apparatus

9.1 *Graduated Cylinders*, 100 mL.

9.2 *Thermometer*, 20 to 110°C or equivalent with 0.5°C divisions.

9.3 *Disposable Pipet*.

9.4 *Spatula*.

9.5 *Beakers*, 500 mL.

9.6 *Funnels*.

9.7 *Vortex Mixer* (optional).

10. Hazards

10.1 **Warning**—Avoid inhalation of and skin and eye contact with any hazardous material.

10.2 **Warning**—This procedure must be performed within a laboratory fume hood with the sash down as far as possible.

10.3 **Warning**—By keeping the sample size small and by first screening for very reactive wastes, the overall hazard is small. The small hazard is justified due to the much larger hazard of mishandling reactive waste at plant scale.

11. Procedure

11.1 Determine the total quantity *A* of the incoming waste to be added to the storage or treatment unit.

11.2 Determine the total quantity *B* of the waste in the storage tank or treatment unit.

11.2.1 Both quantities *A* and *B* must be stated in the same units of measure; pounds or gallons are typically used.

11.2.2 The waste in a tank can be estimated from the design volume of the tank. The volume of a tank truck can be determined from the contents' net weight and an estimate of the density. A value of 3.75 kg/L (8.34 lb/gal) can be used as an approximate density for a wide range of aqueous wastes.

11.2.3 The total volume of *A* and *B*, upon mixing, should not exceed 300 mL. The initial volume *A* (150 mL) may be adjusted proportionally to accommodate total volume specification. (**Warning**—Perform a pre-test using 1 or 2 mL of each sample to reduce the risk when mixing potentially highly reactive wastes.)

11.3 Place in a 500-mL beaker 150 mL of a representative sample from the storage tank or treatment unit.

11.3.1 Measure the temperature, when applicable, of the test sample and remove the thermometer.

NOTE 1—High precision thermometers may be employed to provide higher sensitivity in temperature readings.

11.4 Use the ratio $A + B$ of wastes to determine the aliquot, *V*, in milliliters, of incoming waste to now be added. Use the following equation:

$$V = V(A/B) \quad (1)$$

where *V* is the volume in milliliters used in step 11.3 (150 mL), and *A* and *B* are as defined in 11.1 and 11.2 respectively.

11.5 Slowly and very carefully add the aliquot *V* of incoming waste to the test sample volume *V* already in the beaker.

11.5.1 The recommended rate of addition is approximately 1 mL/s.

11.5.2 While the addition is in progress, watch for adverse reactions. (**Warning**—If a reaction is observed, stop the addition immediately and report the observation.)

11.6 If after adding the aliquot *V* of incoming waste no adverse reaction is observed, mix well and immediately measure the temperature.

³ Reagent Chemicals, American Chemical Society Specifications, Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Reagent Chemicals and Standards*, by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the *United States Pharmacopeia*.