



Designation: **D5761 – 96 (Reapproved 2012) D5761 – 96 (Reapproved 2017)**

Standard Practice for Emulsification/Suspension of Multiphase Fluid Waste Materials¹

This standard is issued under the fixed designation D5761; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the generation of a single-phase suspension or emulsion from multiphase samples which are primarily liquid in order to facilitate sample preparation, transfer, and analysis.

1.2 This practice is designed to keep a multiphase fluid sample in an emulsified/suspended state long enough to take a single, composite sample that is representative of the sample as a whole. The sample may reform multiple layers after standing.

1.3 The emulsion/suspension generated by following this practice can be used only for analytical procedures designed for the total sample and procedures not significantly affected by the emulsifier or the presence of an emulsion/suspension.

1.4 This practice assumes that a representative sample of not more than ~~1 L~~ 1 L has been obtained.

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

1.6 *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.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D4057 Practice for Manual Sampling of Petroleum and Petroleum Products](#)

[D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products](#)

2.2 *EPA Standard:*

[SW846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods](#)³

3. Terminology

3.1 *Definitions:*

3.1.1 *emulsion, n*—a suspension of fine particles or globules, or both, of one or more liquids in another liquid.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *multiphase fluid waste material, n*—a substance or mixture of chemicals that is no longer useful for its original purpose that visibly involves a solid and at least one liquid phase or more than one liquid phase without any solid present.

4. Summary of Practice

4.1 An emulsifier is added and mixed well with a sample of multiphase fluid waste material, to produce a uniform mixture suitable for subsequent aliquoting. A satisfactory homogenization has been attained when the sample appears to remain as a single phase for ~~30 s~~ 30 s or longer.

¹ This practice is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

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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.

³ Available from the Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.

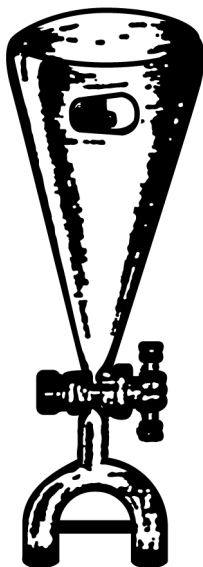


FIG. 1 Sample Splitter Funnel

4.2 A calcium sulfonate emulsifier is used when the original sample is primarily organic in nature; a polyethylene glycol monoalkyl ester is used when the original sample is primarily aqueous in nature. A blend of the two emulsifiers is used when the original sample contains roughly equal volumes of organic and aqueous material.

5. Significance and Use

5.1 This practice is intended as a solution to the difficulty of obtaining reproducible test results from heterogeneous samples.

5.2 This practice works best with multilayered liquids, but can also be applied to samples with solid particles that are sufficiently small in size to be suspended in an emulsion.

5.3 The emulsified/suspended sample can be used for all bulk property testing such as microwave digestion/inductively coupled argon plasma (ICAP), ion chromatography, heat of combustion, ash content, water, nonvolatile residue, and pH. It may be prudent to retain a portion of the sample in its original, multiphase form for some types of analyses.

6. Interferences

6.1 Not all samples can be emulsified, due to varying chemical reactions with the surfactants. If the emulsion is not stable for at least 30 s after shaking, it may not be suitable for testing as an emulsion.

6.2 Due to their physical composition, some samples are not suitable for splitting and, as a result, cannot be emulsified if a nonemulsified retain is required. For example, excessive amounts of solids and semisolids or tars do not permit splitting.

6.3 In some instances, the amount of sample submitted may not be sufficient for splitting and, as a result, cannot be emulsified if some unemulsified sample must be retained.

6.4 Erroneous results can be obtained if precautions are not taken to avoid the loss of volatile material. Do not open containers unnecessarily. Results for samples from leaky containers must be marked to indicate that the sample integrity was not maintained during shipping/storage.

7. Apparatus

7.1 *Funnel, Splitting*—2-L separatory funnel fitted with twin 0.7-mm inside diameter glass discharge tubes as shown in Fig. 1.⁴

7.2 *High-Intensity Lamp.*

7.3 *Polyethylene Transfer Pipet, 3.5-mL draw.*

⁴ The sole source of supply of the apparatus known to the committee at this time is Universal Instrument Co., 315 W. Colfax, Palatine, IL 60067 (Part No. F-4001). If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.