



Designation: E300 – 03 (Reapproved 2022)

Standard Practice for Sampling Industrial Chemicals¹

This standard is issued under the fixed designation E300; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice covers procedures for sampling several classes of industrial chemicals. It also includes recommendations for determining the number and location of such samples, to ensure their being representative of the lot in accordance with accepted probability sampling principles.

1.2 Although this practice describes specific procedures for sampling various liquids, solids, and slurries, in bulk or in packages, these recommendations only outline the principles to be observed. They should not take precedence over specific sampling instructions contained in other ASTM product or method standards.

1.3 These procedures are covered as follows:

Statistical Considerations	Sections 7 – 11
Simple Liquids	12 – 27
Solids	28 – 35
Slurries	36 – 41

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Sections 6, 19, 20, 30, 34 and 37.

1.5 *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

D270 Methods of Sampling Petroleum and Petroleum Products (Withdrawn 1984)³

D2234/D2234M Practice for Collection of a Gross Sample of Coal

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

3. Terminology

3.1 *Definitions:*

3.1.1 *simple liquid*—a single-phase liquid having a Reid vapor pressure of less than 110 kPa at 37.8°C (16 psi at 100°F) and a Saybolt viscosity of less than 10 000 s (2160 cSt) at 25°C.

3.1.2 *lot*—a discreet quantity of material. It may contain a single batch or several batches, or be the product of continuous process broken into units on the basis of time or shipment. It is very desirable that individual batches in a lot be specifically identified so that they may become individual or stratified units for inspection.

3.1.3 *average sample*—one that consists of proportionate parts from all sections of the container.

3.1.4 *spot sample*—a sample taken at a specific location in a tank or from a flowing stream in a pipe at a specific time.

3.1.5 *composite sample*—a blend of spot samples mixed in proportion to the volumes of material from which the spot samples were obtained.

3.1.6 *all-levels sample*—one obtained by submerging a closed sampler to a point as near as possible to the draw-off level, then opening the sampler and raising it at a rate such that

¹ This practice is under the jurisdiction of ASTM Committee D16 on Aromatic, Industrial, Specialty and Related Chemicals and is the direct responsibility of Subcommittee D16.08 on Handling and Sampling Aromatic and Cyclic Hydrocarbons.

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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 The last approved version of this historical standard is referenced on www.astm.org.

it is about three fourths full as it emerges from the liquid. An all-levels sample is not necessarily an average sample because the tank volume may not be proportional to the depth and because the operator may not be able to raise the sampler at the variable rate required for proportionate filling. The rate of filling is proportional to the square root of the depth of immersion.

NOTE 1—The tube sampling procedure, 26.3, may be used to obtain an all-levels sample from a drum.

3.1.7 *upper sample*—a spot sample obtained from the middle of the upper third of the tank contents (Fig. 1).

NOTE 2—The taking of samples from various levels of the tank permits the detection of variation in composition of the contents caused by stratification. If it is known that the contents are not subject to this variation, the taking of samples at multiple levels may be eliminated.

3.1.8 *middle sample*—a spot sample obtained from the middle of the tank contents (Fig. 1) (Note 2).

3.1.9 *lower sample*—a spot sample of liquid from the middle of the lower one-third of the tank's content (a distance of one-half of the depth of liquid below the liquid's surface) (Fig. 1).

3.1.10 *single-tank composite sample*—a blend of the upper, middle, and lower samples. For a tank of uniform cross section, such as an upright cylindrical tank, the blend consists of equal parts of the three samples. For a horizontal cylindrical tank, the blend consists of the three samples in the proportions shown in Table 1.

3.1.11 *compartment-tank composite sample (ship, barge, etc.)*—a blend of individual all-levels samples from each compartment, which contains the product being sampled, in proportion to the volume of material in each compartment.

3.1.12 *top sample*—a spot sample normally obtained 150 mm (6 in.) below the top surface of the tank contents (Fig. 1).

TABLE 1 Sampling Instructions for Horizontal Cylindrical Tanks

Liquid Depth, Percent of Diameter	Sampling Level, Percent of Diameter Above Bottom			Composite Sample Proportionate Parts of		
	Upper	Middle	Lower	Upper	Middle	Lower
100	80	50	20	3	4	3
90	75	50	20	3	4	3
80	70	50	20	2	5	3
70	...	50	20	1	5	4
60	...	50	20	...	5	5
50	...	40	20	...	4	6
40	...	...	20	...	...	10
30	...	...	15	...	...	10
20	...	...	10	...	...	10
10	...	...	5	...	...	10

3.1.13 *outlet sample*—a spot sample normally obtained with the inlet opening of the sample apparatus at the level of the bottom of the tank outlet (either fixed or a swing line outlet) (Fig. 1).

3.1.14 *continuous sample*—a spot sample obtained from a pipeline conveying the product in such a manner as to give a representative average of the stream throughout the period of transit.

3.1.15 *jar sample*—a spot sample obtained by placing a jar into the path of a free-flowing stream so as to collect a definite volume from the full cross section of the stream.

3.1.16 *mixed sample*—a spot sample obtained after mixing or vigorously stirring the contents of the original container, and then pouring out or drawing off the quantity desired.

3.1.17 *tube or thief sample*—a spot sample obtained with a sampling tube or special thief, either as a core sample or spot sample from the specified point in the container.

3.1.18 *drain sample*—a spot sample obtained from the draw-off or discharge valve. Occasionally, a drain sample may be the same as a bottom sample, as in the case of a tank car.

3.1.19 *bottom sample*—a spot sample obtained from the material on the bottom surface of the tank, container, or line at its lowest point (Fig. 1). (Drain and bottom samples are usually taken to check for water, sludge, scale, etc.).

3.1.20 *laboratory sample*—that portion of the sample which is sent for laboratory testing.

4. Summary of Practice

4.1 This practice describes procedures to be followed for obtaining samples of several classes of industrial chemicals. It addresses in detail the various factors which need to be considered to obtain a representative laboratory sample. This practice also covers the statistical considerations in sampling of industrial chemicals whether they are liquids, solids or slurries in bulk or in packages.

5. Significance and Use

5.1 Representative samples of industrial chemicals are required for the determination of chemical and physical properties which are used to establish standard volumes, prices, and compliance with commercial and regulatory specifications.

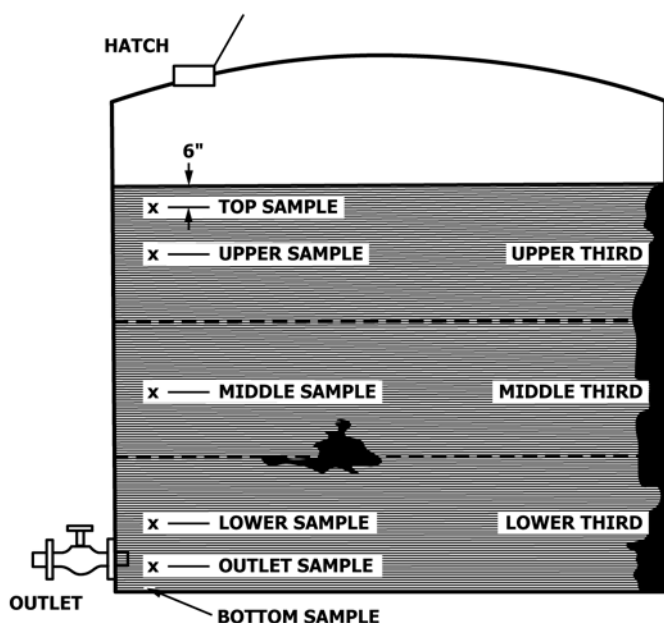


FIG. 1 Sampling Depths