Designation: C 224 – 78 (Reapproved 2004)ε1

Standard Practice for Sampling Glass Containers[1]

This standard is issued under the fixed designation C 224; 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.

ε[1] NOTE—The designation of the MIL-STD was editorially corrected in May 2004.

1. Scope

1.1 This practice covers the sampling of glass containers (for example, bottles, jars, and so forth) for performing such tests as mechanical strength, dimensions, and other measurable characteristics, and for visual examination.

1.2 *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:* [2]

C 147 Test Methods for Internal Pressure Strength of Glass Containers

C 149 Test Method for Thermal Shock Resistance of Glass Containers

2.2 *Military Standard:*

MIL-STD 105 E Sampling Procedures and Tables for Inspection by Attributes[3]

3. Classification

3.1 For sampling purposes the pertinent characteristics of glass containers are classified as follows:

3.1.1 Grade of annealing (relative annealing stress).

3.1.2 Hydrostatic pressure.

3.1.3 Thermal shock strength.

3.1.4 Visible characteristics readily graded or judged by visual examination, namely, deformities.

3.1.5 Mold characteristics of a structural character (as distinguished from appearance) where the component part or unit of the manufacturing process that controls the characteristic is the mold or mold cavity (as distinguished from the furnace, feeder, or lehr), namely, capacity, dimensions.

4. Number of Specimens

4.1 Unless otherwise specified, the minimum number of specimens for the various classifications of Section 3 is given in Table 1.

5. Procedure

5.1 *Continuous Process*—Sampling from a continuous manufacturing process shall be in accordance with a time schedule. For those characteristics affected by the degree of annealing, take the samples from the exit of the lehr (or from packed cases whose continuity in point of time is known). For those characteristics not affected by the degree of annealing, quickly cooled samples may be taken ahead of the lehr.

5.2 *Lot*—Select the sample from a lot by a procedure consistent with the purpose of the sample. For some purposes, the sample may come from the lot as a whole; for other purposes, it may be necessary to sort the lot before sampling. Such sorting may be for the purpose of segregating lots based on style, color, size, manufacturer, or mold designation, as examples. Take the specimens composing the sample according to the principles of random sampling; for instance, do not take all the specimens from the same side or location of the lot. If the containers are packed in cases, remove the cases from the lot at random. Take specimens for evaluation, in turn, at random from these cases. The minimum number of cases to be selected shall be determined in accordance with MIL-STD 105 E (see 5.2.1) or that number required to provide the number of individual containers to be evaluated (see 5.2.2), whichever quantity represents the larger number of cases. If more than one independent evaluation can be performed on the same container, no additional sample is required for the multiple evaluation.

5.2.1 *Minimum Number of Cases Determined in Accordance with MIL-STD*—Determine the number of cases in the lot and use this number as "lot size" for Table 1 of MIL-STD 105 E. Find the corresponding sample size code letter (normally Column II) of Table 1. Using the first and second columns of Table II-A, find the sample size corresponding to this code letter. This sample size will designate the number of

[1] This practice is under the jurisdiction of ASTM Committee C14 on Glass and Glass Products and is the direct responsibility of Subcommittee C14.07 on Glass Containers.

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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 Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 1 Minimum Number of Specimens for Sample

Classification (Test or Examination to be Made on Specimen)	Continuous Production (Lehr)		Lot, Minimum Number of Containers
	Minimum Number	Time Schedule	
Annealing	3[A]	3 h or less	20
Internal pressure	1 round[B]	3 h or less	50[C]
Thermal shock	1 round[B]	variable[D]	50[C]
Visible characteristics	not applicable[E]	not applicable[E]	[F]
Dimensional characteristics	1 round	variable[G]	50[H]

[A] The three containers shall represent both sides and center of lehr.

[B] A "round" is one container from each mold or mold cavity of the forming machine. Test to be made on pieces that have passed visual inspection.

[C] For a pass test (attribute testing), 50 containers, randomly selected, but representative of the mold cavities present in the lot, shall be tested as the first sample in a double sampling method, followed, when necessary, by a second sample of 50 containers equally random and representative of all mold cavities present. The acceptance and rejection number shall be chosen from Table X-J-2 of MIL-STD 105 E in accordance with the agreed upon acceptable quality level. Progressive tests (variable testing) shall be based on a single sample of 50 containers. Test Methods C 147 and C 149 shall be followed for test details.

[D] Because of the great variability of potential thermal shock requirements in the trade and the difference in susceptibility to thermal shock of various designs, the appropriate time schedule for each situation must be individually determined.

[E] For this category, a sampling procedure normally is unnecessary since 100 % inspection is usually carried out.

[F] When the intention of the sampler is to classify the ware into acceptable and nonacceptable categories, it is recommended that sampling agreements be made between purchaser and manufacturer on the basis of MIL-STD 105 E. This method recommends sample sizes on the basis of size of a lot and expected frequency of occurrence of objectionable deficiencies.

[G] Because of the great variation in sizes and types and variations in requirements among the various characteristics involved, a definite schedule is impractical. Timing will depend on the degree of control necessary for the characteristics involved. Typical dimensions are height, diameter, weight, capacity, lettering or decoration (position and size), and the principal dimensions of the finish (closure-holding contours).

[H] Fifty containers shall be taken as a first sample, and fifty containers as a second sample, following the principle of Table X-J-2 of MIL-STD 105 E for attribute gaging. A minimum sample of one from each mold cavity represented in the lot shall be taken for measurement by variables.

cases to be selected at random from the lot. As far as possible, an equal number of individual containers shall be taken for evaluation from each case selected.

5.2.2 *Minimum Number of Cases Determined by Number of Individual Containers to be Evaluated*—In the event that 5.2.1 does not provide the number of containers required for the evaluation, select sufficient cases at random to provide the necessary number of containers.

NOTE 1—An example of minimum sampling using MIL-STD 105 E is as follows:

A lot of 1000 cases of 24 containers each would call for sample size code letter J (Column II, Table 1), corresponding to 80 cases (Table II-A). The minimum sample size for visible characteristic determinations for the original lot of 24 000 containers is designated by sample size code letter M. Turning to Table X-M-2, it can be seen that 315 containers (approximately 4 per case selected) are needed for a single sample, 200 (2½ per case) followed by 200 (2½ per case) for the respective first and second samples for double sampling, and 80 (1 per case) for each step of multiple sampling. The containers sampled may be used to determine the relative frequency of occurrence of containers from individual mold cavities. Containers that have passed the visual examination may be used to provide samples (chosen at random from among the cases) for the annealing, internal pressure, thermal shock, and dimensional evaluations as required.

6. Report

6.1 Report the following information:

6.1.1 Style, size, color, and manufacturer of the lot evaluated,

6.1.2 For continuous production sampling, the place of manufacture, the time of sampling, the individual mold designation (if pertinent),

6.1.3 For lot sampling, the shipment identification, or warehouse location, as pertinent,

6.1.4 Sample size, and the number of cases sampled (if from lots in cases),

6.1.5 Method of taking the specimens, and

6.1.6 Results of the evaluation or the disposition of the lot on the basis of the sample taken.

7. Keywords

7.1 glass containers; sampling procedure