



Standard Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials¹

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1. Scope*

1.1 This practice covers procedures for obtaining data pertaining to the quality of a lot of electrical insulating material and for making a judgement whether the lot meets the requirements of a material specification.

1.2 This practice is not intended to define a producer's internal quality control procedures but is designed to determine the acceptability of all, or some portion, of a quantity of electrical insulating material that is available for inspection by the user of the material.

1.3 This practice is intended to be used in conjunction with an existing material specification that specifies property characteristic limits, acceptable quality level (AQL), standard test methods, and specific sampling instructions.

1.4 In the absence of a specification as described in 1.3, use this practice as a guide, after establishment of agreed-upon property characteristics, limits, AQL, standard test methods, and specific sampling instructions.

1.5 It is intended that this be a practice for inspection by attributes.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E300 Practice for Sampling Industrial Chemicals

2.2 *Military Standard:*

MIL-STD-105D Sampling Procedures and Tables for Inspection by Attributes³

2.3 *Other Document:*

ANSI/ASQC A2 -1987⁴

3. Terminology

3.1 *Definitions:*

3.1.1 *acceptance number, n*—the maximum allowable number of nonconformities for a given AQL and sample size (lot-sample size).

3.1.2 *acceptable quality level (AQL), n*—the maximum percent nonconforming which, for purposes of sampling inspection, is considered satisfactory as a process average.

3.1.3 *critical property, n*—a quantitatively measurable characteristic which is absolutely necessary to be met if a material or product is to provide satisfactory performance for the intended use.

¹ This practice is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.94 on Editorial.

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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 U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

3.1.3.1 *Discussion*—

*A Summary of Changes section appears at the end of this standard

In some situations, specification requirements coincide with customer usage requirements. In other situations, they may not coincide, being either more or less stringent. More stringent sampling (for example, smaller AQL values) is usually used for measurement of characteristics which are considered critical. The selection of sampling plans is independent of whether the term *defect* or *nonconformity* is appropriate.

3.1.4 *defect, n*—a departure of a quality characteristic from its intended level, or state, that occurs with a severity sufficient to cause an associated product or service not to satisfy intended normal, or reasonably foreseeable, usage requirements.

3.1.4.1 Discussion—

The terms *defect* and *nonconformity* and their derivatives are used somewhat interchangeably in the historical and current literature. *Nonconformity* objectively describes the comparison of test results to specification requirements, while the term *defect* has a connotation of predicting the failure of a product or service to perform its intended function in use. Since this latter connotation is often unintended, the term *nonconformity* is preferred in full consensus standards. The selection of any sample plan is independent of whether the term *defect* or *nonconformity* is appropriate.

The term *defect* may be appropriate for specifications mutually agreed upon by a producer and a user where specific use conditions are clearly understood. Even in these cases however, use the term *defect* with caution and consider substituting the term *nonconformity*.

For additional comments, see ANSI/ASQC A2-1987 that also states: “When a quality characteristic of a product or service is “evaluated” in terms of conformance to specification requirements, the use of the term *nonconformity* is appropriate.”

3.1.5 *group AQL*—the AQL assigned to a group of material properties.

3.1.5.1 Discussion—

See 5.2 for additional information about the meaning of AQL.

3.1.6 *lot, n*—an entity of electrical insulating material or product which, insofar as is practicable, consists of a single type, grade, class, size, or composition that was manufactured under essentially the same conditions and is available to the user for sampling at one time.

3.1.7 *lot number, n*—the number used by a producer to identify an entity of electrical insulating material or product.

3.1.8 *major property, n*—a quantitatively measurable characteristic which, if not met, is likely to seriously impair the performance of a material or product for the intended use.

3.1.8.1 Discussion—

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In some situations, specification requirements coincide with customer usage requirements. In other situations, they may not coincide, being either more or less stringent. More stringent sampling (for example, smaller AQL values) is usually used for measurement of characteristics that are considered important. The selection of sampling plans is independent of whether the term *defect* or *nonconformity* is appropriate.

3.1.9 *minor property, n*—a characteristic which, if not met, is not likely to materially reduce the performance of a material or product for the intended use.

3.1.9.1 Discussion—

In some situations, specification requirements coincide with customer usage requirements. In other situations, they may not coincide, being either more or less stringent. More stringent sampling (for example, smaller AQL values) is usually used for measurement of characteristics that are considered important. The selection of sampling plans is independent of whether the term *defect* or *nonconformity* is appropriate.

3.1.10 *nonconforming unit, n*—a unit of product containing at least one nonconformity.

3.1.11 *nonconformities per hundred units, n*—a calculated ratio of nonconforming units to the number of units inspected, the quotient being multiplied by 100 (See 3.1.13.)

3.1.12 *nonconformity, n*—a departure of a quality characteristic from its intended level or state that occurs with a severity sufficient to cause a test result not to meet a specification requirement.

3.1.13 *percent nonconforming, n*—a calculated ratio of nonconforming units to the number of units inspected, the quotient being multiplied by 100.

3.1.14 *rejection number, n*—the minimum number of nonconformities for a given AQL and sample size (lot-sample size) which will subject a lot to rejection.

3.1.15 *sample, n*—one or more units of product taken from a lot without regard to the quality of the unit. (Also often termed lot sample).

3.1.16 *sample size, n*—the number of units of product taken to make up the sample.

3.1.16.1 *Discussion*—

This standard uses only lot sample sizes and not lot sizes since the discriminatory power of any sampling plan is independent essentially of the size of the lot. The sample size selected by the user for a given acceptable quality level (AQL) is optional depending upon the degree of protection desired by the user against the acceptance of nonconforming lots.

3.1.17 *test measurement, n*—a quantitative expression of one value determined for a property of interest by a single application of a specified test procedure.

3.1.18 *test result, n*—the value that expresses the level of a property of the test unit.

3.1.18.1 *Discussion*—

A test result is sometimes a single test measurement but usually a test result is computed from several test measurements.

3.1.19 *test specimen, n*—a portion of a test unit upon which one or more test measurements are made.

3.1.20 *test unit, n*—a fraction of a unit of product from which one or more test specimens are taken for each property.

3.1.20.1 *Discussion*—

If the unit of product is of insufficient size to meet the requirements of a testing method: (1) sample adjacent units of product and aggregate units of product for the test unit or, (2) obtain a test unit of sufficient size, and representative of the unit of product, from the producer.

3.1.21 *unit of product, n*—an entity of electrical insulating material or product for inspection to determine its classification as conforming or non-conforming.

3.1.21.1 *Discussion*—

A unit of product is established by the user and may or may not be the same as a unit of purchase, supply, production, or shipment. Some examples of a unit of product are:

Bag	Case	Reel
Barrel	Container	Roll
Bin	Cop	Sheet
Bobbin	Drum	Skid
Box	Length	Spool
Bundle	Pad	Tank
Car	Pail	Tank compartment
Carton	Pallet	Truckload

4. Summary of Practice

4.1 Instructions are given for obtaining a sample from which specimens are then taken for testing. The test data are compared to the material specification and a judgement is then made as to whether the material meets the requirements of said material specification.

4.2 This practice has been modeled after MIL-STD-105D.

5. Procedure

5.1 *General Considerations:*

5.1.1 Assemble the lot of electrical insulating material so that a lot sample is obtained in a manner that will minimize bias in the selection of the units of product that will be inspected. A scheme that offers a good chance of minimizing bias is the assignment of numbers to each unit of product and then using a table of random numbers to select those units of product from which test units are taken.

5.1.2 For a lot of electrical insulating material that is in bulk form (for example, a tank car of powdered resin) take the lot sample from the unit of product in accordance with Practice E300.

5.1.3 Take the material to be removed from any unit of product in a random manner. When it is impracticable to meet this requirement (for example, in the case of long lengths of material wound onto rolls or large, thick, heavy sheets packed on pallets or skids), economy will dictate the removal of material from the end of a roll, or the top of a pile, etc. in which cases the selection cannot be described as “random.”

5.1.4 Take the necessary amount of material from the test unit so as to meet the specimen requirements of the various test methods that will be used to evaluate the material.

5.1.5 Refer to the material specification for the allowable maximum elapsed time between the assembly of the lot for inspection and the disposition of the lot. If the material specification (or other pertinent document) does not cover this matter, the maximum allowable time is 30 calendar days.

5.1.6 Exercise care to protect the electrical insulating material contained in the test unit from which specimens are to be prepared. An example of this protection is packaging in metal foil or glass containers so as to prevent or minimize contamination of the material from the effects of the environment to which such material is subjected between sampling and testing.

5.1.7 Test units assembled as described above shall be deemed to be representative of the lot of material being inspected. Disposition of the lot, or portions thereof will be based upon the data generated from these test units unless otherwise agreed upon between the user and the producer.

5.2 Establishing Acceptable Quality Levels:

5.2.1 Acceptable quality levels (AQL's) for each critical, major, and minor property shall be as mutually agreed upon by the producer and the user. It is also acceptable to establish group AQL's for given groups of properties. Disclose these AQL's in a purchase order, material specification, or in some other document. This standard is not intended to impose limits upon the risks acceptable to either the user or the producer.

5.2.2 When a user designates some specific value of AQL for a single nonconformity, it indicates that the user's acceptance sampling plan will accept the great majority of the lots submitted by the producer if the process average level of percent nonconforming in the lots is no greater than the designated value of AQL. The preceding statement is also true for a group AQL value designated for a group of nonconformities.

5.2.2.1 The sampling plans of this standard are so arranged that the probability of acceptance, at the designated AQL value, depends upon the sample size. For a given AQL, the probability of acceptance will be generally higher for large sample sizes than for small sample sizes. The AQL alone does not describe the user protection for individual lots, but more directly relates to what a user might expect from a series of lots. Refer to the operating characteristic curve to determine what protection the user will have for a specific AQL.

5.2.3 The designation of an AQL shall not imply that a producer has the right to knowingly supply any nonconforming unit of product.

5.2.4 The values of AQL listed in the accompanying tables (see Section **Appendix X1**) are known as preferred AQL's. If any AQL is designated other than a preferred AQL, these tables are not applicable.

5.3 Sampling Plan Selection:

5.3.1 Use the designated AQL and the sample size code letter from **Table 1** to select a sampling plan from **Tables 2-22**. When no sampling plan is available for a given combination of AQL and code letter, the table directs the user to a different code letter. Use the sample size given by the new code letter, not the original code letter.

5.3.1.1 It is possible this procedure will lead to different sample sizes for different classes of nonconformities. In such cases the user of the electrical insulating material shall designate and authorize, for all classes of nonconformities, the selection and use of the code letter corresponding to the largest sample size derived.

5.3.1.2 As an alternative to a single sampling plan with an acceptance number of 0, use the plan with an acceptance number of 1 with its correspondingly larger sample size for a designated AQL (where available) when designated and approved by the user.

TABLE 1 Sample Size Code Letters (See 5.4)

Lot or Batch Size			Special Inspection Levels				General Inspection Levels		
			S-1	S-2	S-3	S-4	I	II	III
2	to	8	A	A	A	A	A	B	
9	to	15	A	A	A	A	A	C	
16	to	25	A	A	B	B	B	D	
26	to	50	A	B	B	C	C	E	
51	to	90	B	B	C	C	C	F	
91	to	150	B	B	C	D	D	G	
151	to	280	B	C	D	E	E	H	
281	to	500	B	C	D	E	F	J	
501	to	1200	C	C	E	F	G	K	
1201	to	3200	C	D	E	G	H	L	
3201	to	10 000	C	D	F	G	J	M	
10 001	to	35 000	C	D	F	H	K	N	
35 001	to	150 000	D	E	G	J	L	P	
150 001	to	500 000	D	E	G	J	M	Q	
500 001	and	over	D	E	H	K	N	R	

TABLE 2 A Single Sampling Plans For Normal Inspection (Master Table) (See 5.3.1 and 5.3.2)

Sample size code letter	Sample size	Acceptable Quality Levels (normal inspection)																					
		0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000	
A	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M	315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Q	1250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ac = Acceptance number.
Re = Rejection number.

Use first sampling plan below arrow. If sample size equals, or exceeds, lot or batch size, do 100 percent inspection.

Use first sampling plan above arrow.

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TABLE 2 B Single Sampling Plans for Tightened Inspection (Master Table) (See 8.4 and 8.5) (continued)

Sample size code letter	Sample size	Acceptable Quality Levels (tightened inspection)																																	
		0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000								
		Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re		
A	2																																		
B	3																																		
C	5																																		
D	8																																		
E	13																																		
F	20																																		
G	32																																		
H	50																																		
J	80																																		
K	125																																		
L	200																																		
M	315																																		
N	500																																		
P	800																																		
Q	1250																																		
R	2000	0	1																																
S	3150			1	2																														

 = Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 = Use first sampling plan above arrow.
 Ac = Acceptance number.
 Re = Rejection number.

TABLE 2 C Single Sampling Plans for Reduced Inspection (Master Table) (See 5.3.1 and 5.3.2) (continued)

Sample size code letter	Acceptable Quality Levels (reduced inspection)†																					
	0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000	
A	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
B	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
C	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
D	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
E	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
F	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
G	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
H	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
J	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
K	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
L	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
M	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
N	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
P	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
Q	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
R	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re

Ac = Acceptance number.
 Re = Rejection number.
 Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 Use first sampling plan above arrow.
 † If the acceptance number has been exceeded, but the rejection number has not been reached, accept the lot, but reinstate normal inspection (see 10.1.4).

TABLE 3 A Double Sampling Plans for Normal Inspection (Master Table) (See 8.4 and 8.5)

Sample size code letter	Sample size	Cumulative sample size	Acceptable Quality Levels (normal inspection)																						
			0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250
A			↓																						
B	First	2	↓																						
	Second	2	↓																						
C	First	3	↓																						
	Second	3	↓																						
D	First	5	↓																						
	Second	5	↓																						
E	First	8	↓																						
	Second	8	↓																						
F	First	13	↓																						
	Second	13	↓																						
G	First	20	↓																						
	Second	20	↓																						
H	First	32	↓																						
	Second	32	↓																						
J	First	50	↓																						
	Second	50	↓																						
K	First	80	↓																						
	Second	80	↓																						
L	First	125	↓																						
	Second	125	↓																						
M	First	200	↓																						
	Second	200	↓																						
N	First	315	↓																						
	Second	315	↓																						
P	First	500	↓																						
	Second	500	↓																						
Q	First	800	↓																						
	Second	800	↓																						
R	First	1250	↓																						
	Second	1250	↓																						

Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 Use first sampling plan above arrow.
 Ac = Acceptance number
 Re = Rejection number
 * = Use corresponding single sampling plan (or alternatively, use double sampling plan below, where available).

TABLE 3 B Double Sampling Plans for Tightened Inspection (Master Table) (See 8.4 and 8.5) (continued)

Sample size code letter	Sample size	Cumulative sample size	Acceptable Quality Levels (tightened inspection)																									
			0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
			Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re
A			0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B	2	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
C	3	3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
D	5	5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
E	8	8	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
F	13	13	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
G	20	20	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
H	32	32	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
J	50	50	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
K	80	80	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
L	125	125	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
M	200	200	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
N	315	315	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
P	500	500	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Q	800	800	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
R	1250	1250	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
S	2000	2000	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 Use first sampling plan above arrow.
 Ac = Acceptance number
 Re = Rejection number
 • = Use corresponding single sampling plan (or, alternatively, use double sampling plan below, where available).

5.3.2 Types of Sampling Plans—Three types of sampling plans: single, double, and multiple are given in Table 2, Table 3, and Table 4, respectively. When several types of plans are available for a given AQL and code letter, use any one. A decision as to type

TABLE 3 C Double Sampling Plans for Reduced Inspection (Master Table) (continued)

Sample size code letter	Sample size	Cumulative sample size	Acceptable Quality Levels (reduced inspection)†																									
			0.010	0.015	0.025	0.040	0.065	0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
			Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re
A			↑																									
B			↑																									
C			↑																									
U	First Second	2 4	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2
F	First Second	3 6	0	2	0	3	0	2	0	3	0	2	0	3	0	2	0	3	0	2	0	3	0	2	0	3	0	2
F	First Second	5 10	0	2	0	3	0	4	0	3	0	4	0	3	0	4	0	3	0	4	0	3	0	4	0	3	0	4
G	First Second	8 16	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
H	First Second	13 26	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
J	First Second	20 40	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
K	First Second	32 64	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
L	First Second	50 100	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
M	First Second	80 160	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
N	First Second	125 250	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
P	First Second	200 400	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
U	First Second	315 630	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3
R	First Second	500 1000	0	2	0	3	0	4	0	4	0	4	0	3	0	4	0	4	0	3	0	4	0	3	0	4	0	3

* Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 † Use first sampling plan above arrow.
 Ac = Acceptance number.
 Re = Rejection number.
 * = Use corresponding single sampling plan for alternatively, use double sampling plan below, when available.
 † = If, after the second sample, the acceptance number has been exceeded, but the rejection number has not been reached, accept the lot, but misstate normal inspection (see 10.1A).

of plan, either single, double, or multiple, when available for a given AQL and code letter, will usually be based upon the comparison between the administrative difficulty and the average sample sizes of the available plans. The average sample size of

TABLE 4 A Multiple Sampling Plans for Normal Inspection (Master Table) (See 8.4 and 8.5)

Sample size code letter	Sample size	Cumulative lot size	Acceptable Quality Levels (normal inspection)																				
			0.10	0.15	0.25	0.40	0.65	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	200	400	650	1000
			Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac
A	2	2	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
B	3	3	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
C	4	4	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
D	5	5	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
E	6	6	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
F	7	7	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
G	8	8	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
H	9	9	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
I	10	10	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
J	11	11	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	

Use first sampling plan below arrow (refer to continuation of table on following page, when necessary). If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 Use first sampling plan above arrow.
 Ac Acceptance number.
 Re Rejection number.
 Use corresponding single sampling plan (or alternatively, use multiple sampling plan below, where available).
 Use corresponding double sampling plan (or alternatively, use multiple sampling plan below, where available).
 Acceptance not permitted at this sample size.

multiple plans is less than for double (except in the case corresponding to single acceptance number 1) and both of these are always less than a single sample size. Usually the administrative difficulty for single sampling and the cost per unit of the sample are less than for double or multiple.

- 5.3.3 Single Sampling Plans—From any lot, inspect that number of units which equals the sample size given by the plan.
 - 5.3.3.1 Consider any lot acceptable if the number of nonconformities found in the sample is equal to, or less than, the acceptance number.
 - 5.3.3.2 Consider any lot rejectable if the number of nonconformities found in the sample is equal to, or greater than, the rejection number.

TABLE 4 A Multiple Sampling Plans for Normal Inspection (Master Table) (Continued) (See 8.4 and 8.5) (continued)

Sample size code letter	Sample size	Cumulative sample size	Acceptable Quality Levels (normal inspection)																					
			0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000	
K	First	32	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Second	64	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Third	96	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Fourth	128	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	160	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	192	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	224	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
L	First	50	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Second	100	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Third	150	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
	Fourth	200	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	250	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	300	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	350	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
M	First	80	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Second	160	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Third	240	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fourth	320	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	400	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	480	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	560	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
N	First	125	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Second	250	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Third	375	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fourth	500	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	625	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	750	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	875	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
P	First	200	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Second	400	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Third	600	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fourth	800	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	1000	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	1200	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	1400	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Q	First	315	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Second	630	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Third	945	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fourth	1260	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	1575	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	1890	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	2205	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
R	First	500	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Second	1000	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Third	1500	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fourth	2000	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Fifth	2500	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Sixth	3000	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Seventh	3500	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

→ Use first sampling plan below arrow. If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 ← Use first sampling plan above arrow (refer to preceding page, when necessary).
 * Acceptance number.
 • Rejection number.
 • Use corresponding single sampling plan for alternately, use multiple plan below, where available.
 • Acceptance not permitted at this sample size.

5.3.4 Double Sampling Plans—From any lot, inspect that number of units which equals the sample size given by the plan.

5.3.4.1 Consider any lot acceptable if the number of nonconformities found in the first sample is equal to, or less than, the first acceptance number.

5.3.4.2 Consider any lot rejectable if the number of nonconformities found in the first sample is equal to, or greater than, the first rejection number.

5.3.4.3 If the number of nonconformities in the first sample lies between the first acceptance and rejection numbers, inspect a second sample of the size given by the plan.

TABLE 4 B Multiple Sampling Plans for Tightened Inspection (Master Table) (See 8.4 and 8.5) (continued)

Sample size code letter	Sample size	Cumulative sample size	Acceptable Quality Levels (tightened inspection)																				
			0.010	0.015	0.025	0.040	0.065	1.0	1.5	2.5	4.0	6.5	10	15	25	40	65	100	150	250	400	650	1000
A	1	1	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
B	2	2	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
C	3	3	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
D	First Second Third Fourth Fifth Sixth Seventh	2 4 6 8 10 12 14	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
E	First Second Third Fourth Fifth Sixth Seventh	3 6 9 12 15 18 21	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
F	First Second Third Fourth Fifth Sixth Seventh	5 10 15 20 25 30 35	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
G	First Second Third Fourth Fifth Sixth Seventh	8 16 24 32 40 48 56	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
H	First Second Third Fourth Fifth Sixth Seventh	13 26 39 52 65 78 91	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
J	First Second Third Fourth Fifth Sixth Seventh	20 40 60 80 100 120 140	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

Use first sampling plan below arrow (refer to continuation of table on following page, when necessary). If sample size equals or exceeds lot or batch size, do 100 percent inspection.
 → Use first sampling plan above arrow.
 * Acceptance number.
 Use corresponding single sampling plan (or alternatively, use multiple sampling plan below, where available).
 Use corresponding double sampling plan (or alternatively, use multiple sampling plan below, where available).
 Acceptance not permitted at this sample size.

- 5.3.4.4 Accumulate the number of nonconformities found in the first and the second samples.
- 5.3.4.5 Consider any lot acceptable if the cumulative number of nonconformities found in the sample is equal to, or less than, the second acceptance number.
- 5.3.4.6 Consider any lot rejectable if the cumulative number of nonconformities found in the sample is equal to, or greater than, the second rejection number.
- 5.3.5 Multiple Sampling Plans—Use the procedure of 5.3.4 for multiple sampling plans but the number of successive samples required to reach a decision will be more than two.

