



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

This standard is issued under the fixed designation D3636; 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 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.*

(<https://standards.iteh.ai>)

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](https://standards.iteh.ai/catalog/standards/sist/c2685929-8ee5-4734-9d45-fe27e991e303/astm-d3636-13)

Document Preview

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.

Current edition approved January 1, 2013. Published May 2013. Originally approved in 1977. Last previous edition approved in 2011 as D3636 – 11. DOI: 10.1520/D3636-13.

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:

[ASTM D3636-13](https://standards.iteh.ai/catalog/standards/sis/585929-8ee5-4734-9d45-fe27e9903/astm-d3636-13)

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	A	A	A	A	A	A	B
9	A	A	A	A	A	B	C
16	A	A	B	B	B	C	D
26	A	B	B	C	C	D	E
51	B	B	C	C	C	E	F
91	B	B	C	D	D	F	G
151	B	C	D	E	E	G	H
281	B	C	D	E	F	H	J
501	C	C	E	F	G	J	K
1201	C	D	E	G	H	K	L
3201	C	D	F	G	J	L	M
10 001	C	D	F	H	K	M	N
35 001	D	E	G	J	L	N	P
150 001	D	E	G	J	M	P	Q
500 001 and over	D	E	H	K	N	Q	R

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

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

		Acceptable Quality Levels (tightened inspection)																										
Sample size code letter	Sample size	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	
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																											

 = Use first sampling plan below arrow. If sample size equals 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)

		Acceptable Quality Levels (reduced inspection) [†]																																							
Sample size code letter	Sample size	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	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														
B	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	2	4	3	5	6	7	8	10	11	14	15	21	22	30	31			
C	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
D	3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
E	5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
F	8	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
G	13	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
H	20	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
J	32	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
K	50	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
L	80	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
M	125	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
N	200	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
P	315	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
Q	500	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31
R	800	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	3	1	4	2	5	3	6	5	8	7	10	10	13	14	17	21	24	30	31

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 reinspect normal inspection (see 10.1.4).
 If the acceptance number has been exceeded, but the rejection number has not been reached, accept the lot, but reinspect normal inspection (see 10.1.4).



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

Sample size letter	Sample code letter	Sample size	Acceptable Quality Levels (normal inspection)																										
			Cumulative sample size		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
Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite	Ac	Ite
A																													
B	First	2																											
	Second	2	4																										
C	First	3	3																										
	Second	3	6																										
D	First	5	5																										
	Second	5	10																										
E	First	8	8																										
	Second	8	16																										
F	First	13	13																										
	Second	13	26																										
G	First	20	20																										
	Second	20	40																										
H	First	32	32																										
	Second	32	64																										
J	First	50	50																										
	Second	50	100																										
K	First	80	80																										
	Second	80	160																										
L	First	125	125																										
	Second	125	250																										
M	First	200	200																										
	Second	200	400																										
N	First	315	315																										
	Second	315	630																										
P	First	500	500																										
	Second	500	1000																										
Q	First	800	800	*																									
	Second	800	1600	*																									
R	First	1250	1250																										
	Second	1250	2500																										

-  Use first sampling plan below arrow. If sample size equals lot or batch size, do 100 percent inspection.
 Use first sampling plan above arrow.
 Ac Acceptance number
 Ite 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	Ac	Re	
A																												
B	First	2	2																									
	Second	2	4																									
C	First	3	3																									
	Second	3	6																									
D	First	5	5																									
	Second	5	10																									
E	First	8	8																									
	Second	8	16																									
F	First	13	13																									
	Second	13	26																									
G	First	20	20																									
	Second	20	40																									
H	First	32	32																									
	Second	32	64																									
J	First	50	50																									
	Second	50	100																									
K	First	80	80																									
	Second	80	160																									
L	First	125	125																									
	Second	125	250																									
M	First	200	200																									
	Second	200	400																									
N	First	315	315																									
	Second	315	630																									
P	First	500	500																									
	Second	500	1000																									
Q	First	800	800																									
	Second	800	1600																									
R	First	1250	1250																									
	Second	1250	2500																									
S	First	2000	2000																									
	Second	2000	4000																									

 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	
Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	
A																							
B																							
C																							
D	First	2	2																				
	Second	2	4																				
E	First	3	3																				
	Second	3	6																				
F	First	5	5																				
	Second	5	10																				
G	First	8	8																				
	Second	8	16																				
H	First	13	13																				
	Second	13	26																				
I	First	20	20																				
	Second	20	40																				
K	First	32	32																				
	Second	32	64																				
L	First	50	50																				
	Second	50	100																				
M	First	80	80																				
	Second	80	160																				
N	First	125	125																				
	Second	125	250																				
P	First	200	200																				
	Second	200	400																				
Q	First	315	315	*																			
	Second	315	630																				
R	First	500	500	↑																			
	Second	500	1000	↑																			

 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 alternative), 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 re-inspect some lot inspection (see 10.14).

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*)

The fire 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.

- 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)

		Acceptable Quality Levels (normal inspection)																												
Sample size code letter	Sample size	Characteristics sample size	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		
K	First	J2	64	128	256	512	1024	2048	4096	8192	16384	32768	65536	131072	262144	524288	1048576	2097152	4194304	8388608	16777216	33554432	67108864	134217728	268435456	536870912	1073741824	2147483648	4294967296	8589934592
	Second	J2	96	192	384	768	1536	3072	6144	12288	24576	49152	98304	196608	393216	786432	1572864	3145728	6291456	12582912	25165824	50331648	100663296	201326592	402653184	805306368	1610612736	3221225472	6442450944	
	Third	J2	128	256	512	1024	2048	4096	8192	16384	32768	65536	131072	262144	524288	1048576	2097152	4194304	8388608	16777216	33554432	67108864	134217728	268435456	536870912	1073741824	2147483648	4294967296	8589934592	
	Fourth	J2	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Fifth	J2	192	384	768	1536	3072	6144	12288	24576	49152	98304	196608	393216	786432	1572864	3145728	6291456	12582912	25165824	50331648	100663296	201326592	402653184	805306368	1610612736	3221225472	6442450944	12884901888	
	Sixth	J2	224	448	896	1792	3584	7168	14336	28672	57344	114688	229376	458752	917504	1835008	3670016	7340032	14680064	29360128	58720256	117440512	234881024	469762048	939524096	1879048192	3758096384	7516192768	15032385536	
L	First	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
	Second	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
	Third	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
	Fourth	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
	Fifth	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
	Sixth	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800
M	First	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Second	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Third	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Fourth	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Fifth	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
	Sixth	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	
N	First	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
	Second	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
	Third	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
	Fourth	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
	Fifth	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
	Sixth	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	
P	First	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800		
	Second	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800		
	Third	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800		
	Fourth	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800		
	Fifth	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800		
	Sixth	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	67108864			

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

		Acceptable Quality Levels (tightened inspection)																											
Sample size code letter	Sample size	Cumulative sample size	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	
A	B	C																											
D	First	2	2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	
	Second	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
	Third	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
	Fourth	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
	Fifth	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
	Sixth	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
	Seventh	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
E	First	3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	
	Second	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
	Third	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
	Fourth	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
	Fifth	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
	Sixth	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
	Seventh	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	
F	First	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	
	Second	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
	Third	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
	Fourth	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
	Fifth	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
	Sixth	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
	Seventh	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	
G	First	8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216
	Second	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
	Third	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
	Fourth	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
	Fifth	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
	Sixth	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
	Seventh	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224
H	First	13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	
	Second	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
	Third	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
	Fourth	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
	Fifth	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
	Sixth	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
	Seventh	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	
I	First	20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	
	Second	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	
	Third	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	
	Fourth	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	
	Fifth	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	
	Sixth	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	
	Seventh	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	

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

— Inspection 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.

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

		Acceptable Quality Levels (tightened inspection)																																																																																																																																																																																																
		Acceptable Quality Levels (tightened inspection)																																																																																																																																																																																																
Sample size code letter	Sample size	Cumulative sample size		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																																																																																																																																																																					
A	First Second Third Fourth Fifth Sixth Seventh	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536	131072	262144	524288	1048576	2097152	4194304	8388608	16777216	33554432	67108864	134217728	268435456	536870912	1073741824	2147483648	4294967296	8589934592	17179869184																																																																																																																																																																			
		80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	21474836480	42949672960	85899345920																																																																																																																																																																		
L	First Second Third Fourth Fifth Sixth Seventh	50	100	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800	26843545600	53687091200																																																																																																																																																																		
		80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	21474836480	42949672960	85899345920																																																																																																																																																																		
M	First Second Third Fourth Fifth Sixth Seventh	80	160	320	640	1280	2560	5120	10240	20480	40960	81920	163840	327680	655360	1310720	2621440	5242880	10485760	20971520	41943040	83886080	167772160	335544320	671088640	1342177280	2684354560	5368709120	10737418240	21474836480	42949672960	85899345920																																																																																																																																																																		
		125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	33554432000	67108864000	134217728000	268435456000	536870912000																																																																																																																																																																
N	First Second Third Fourth Fifth Sixth Seventh	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	33554432000	67108864000	134217728000	268435456000	536870912000																																																																																																																																																																
		125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000	2048000	4096000	8192000	16384000	32768000	65536000	131072000	262144000	524288000	1048576000	2097152000	4194304000	8388608000	16777216000	33554432000	67108864000	134217728000	268435456000	536870912000																																																																																																																																																																
P	First Second Third Fourth Fifth Sixth Seventh	200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800	26843545600	53687091200	107374182400	214748364800	429496729600	858993459200																																																																																																																																																																
		200	400	800	1600	3200	6400	12800	25600	51200	102400	204800	409600	819200	1638400	3276800	6553600	13107200	26214400	52428800	104857600	209715200	419430400	838860800	1677721600	3355443200	6710886400	13421772800	26843545600	53687091200	107374182400	214748364800	429496729600	858993459200																																																																																																																																																																
Q	First Second Third Fourth Fifth Sixth Seventh	215	430	860	1720	3440	6880	13760	27520	55040	110080	220160	440320	880640	1761280	3522560	7045120	14090240	28180480	56360960	112721920	225443840	450887680	901775360	1803550720	3607101440	7214202880	14428405760	28856811520	57713623040	115427246080	230854492160	461708984320	923417968640	184683593720	369367187440	738734374880	147746874960	295493749920	590987499840	118197499760	236394999520	472789999040	945579998080	1891159996160	3782319992320	7564639984640	15129279969280	30258559938560	60517119877120	121034239748240	242068479496480	484136958992960	968273917985920	1936547835971840	3873095671943680	7746191343887360	15492382687774720	30984765375549440	61969530751098880	12393906150219760	24787812300439520	49575624600879040	99151249201758080	198302494023516160	396604988047032320	793209976094064640	1586419952188129280	3172839904376258560	6345679808752517120	12691359617505034240	25382719235010068480	50765438470020136960	101530876940402673920	203061753880805347840	406123507761610695680	812247015523221391360	1624494031046442782720	3248988062092885565440	6497976124185771130880	12995952248371542261760	25991904496743084523520	51983808993486169047040	10396761798977233809440	20793523597954467618880	41587047195908935237760	83174094391817870475520	16634818878363574091040	33269637756727148182080	66539275513454296364160	133078551026908592728320	266157102053817185456640	532314204107634370913280	1064628408215268741826560	2129256816430537483653120	4258513632861074967306240	8517027265722149834612480	17034054531444299669224960	34068109062888599338449920	68136218125777198676899840	136272436255554397353799680	272544872511108794707599360	545089745022217589415198720	1090179490444435178830397440	2180358980888870357660794880	4360717961777740715321589760	8721435923555481430643179520	1744287184711096285328559040	3488574369422192570657118080	6977148738844385141314236160	1395429747768877028262852320	2790859495537754056525704640	5581718991075508113051409280	11163437982150516226102818560	22326875964301032452205637120	44653751928602064904411274240	89307503857204129808822548480	178615007714408259617645976960	357230015428816519235391953920	714460030857633038470783907840	1428920061715266076941567815680	2857840123430532153883135631360	5715680246861064307766271262720	11431360493722128615532544535440	22862720987444257231065089070880	45725441974888514462130178141760	91450883949777028924260356283520	18290176789555405784852071256720	36580353579110811569704142533440	73160707158221623139408285066880	14632141436444324627801657013360	29264282872888649255603314026720	58528565745777298511206628053440	117057131491554597022413256106880	23411426298310919404482651221360	46822852596621838808965302442720	93645705193243677617930604885440	18729141038648735523587120970880	37458282077297471047174241941760	74916564154594942094348483883520	14983312830918988418869696776720	29966625661837976837739393553440	59933251323675953675478787106880	11986650264735986735095757421360	23973300529471973470191514842720	47946601058943946940383029685440	95893202117887893880766059370880	19178640423577578776153211874160	38357280847155157552306423748320	76714561694310315104612847496640	15342912338862063020925694993320	30685824677724126041851389986640	61371649355448252083702779973280	12274329871089650416740555994640	24548659742179300833481111989280	49097319484358601666962223978560	98194638968717203333924447957120	19638927793543406667848885989440	39277855587086813335697771978880	78555711174173626671395543957760	15711142234834725334787108795520	31422284469669450669574217591040	62844568939338901339148435182080	125689137786677802678296870364160	251378275573355605356593740728320	502756551146711210713187481456640	100551310229342422142637496291320	201102620458684844285274992582640	402205240917369688570549985165280	804410481834739377141099970330560	160882096366947875428219994066120	321764192733895750856439988132240	643528385467791501712879976264480	1287056770935583003425799524528960	2574113541871166006851599049057920	5148227083742332001703199098115840	1029645416748466003406299096223680	2059290833496932006812599092447360	4118581666993864001305199084894720	8237163333987728002610399069789440	1647432667597545600520599039557840	3294865335195091201041199079115680	6589730670387582402082399058231360	1317946134077564804016499036462640	2635892268155129608032999072925280	5271784536310259201665999045850560	1054356907262058403331199091701120	2108713814524116806662399083402240	4217427629048233601332399066804480	8434855258096467202664799033608960	1686971051619294404132799067217920	3373942103238588808265599034435840	6747884206477177601631199068871680	1349