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An American National Standard

Standard Practice for Sampling a Stream of Product by Attributes Indexed by AQL[1]

This standard is issued under the fixed designation E2234; 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 establishes lot or batch sampling plans and procedures for inspection by attributes using MIL-STD-105E as a basis for sampling a steady stream of lots indexed by AQL.

1.2 This practice provides the sampling plans of MIL-STD-105E in ASTM format for use by ASTM committees and others. It recognizes the continuing usage of MIL-STD-105E in industries supported by ASTM. Most of the original text in MIL-STD-105E is preserved in Sections 4 – 6 of this practice.

1.3 No system of units is specified in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E456 Terminology Relating to Quality and Statistics

E1994 Practice for Use of Process Oriented AOQL and LTPD Sampling Plans

E2586 Practice for Calculating and Using Basic Statistics

2.2 *Other Standard:*

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

3. Terminology

3.1 *Definitions:*

3.1.1 For a more extensive list of terms in E11 standards, see Terminology E456.

3.1.2 *acceptance quality limit (AQL), n*—quality limit that is the worst tolerable process average when a continuing series of lots is submitted for acceptance sampling.

3.1.2.1 *Discussion*—This definition supersedes that given in MIL-STD-105E.

3.1.3 *average outgoing quality (AOQ), n*—the average percent defective of outgoing product including all accepted lots or batches after any defectives found in them are replaced by acceptable units, plus all lots or batches which are not accepted after such lots or batches have been effectively 100 % inspected and all defective units replaced by acceptable units. **E1994**

3.1.4 *average outgoing quality limit (AOQL), n*—the AOQL is the maximum of the AOQ's for all possible incoming percentages defective for the process for a given acceptance sampling plan. **E1994**

3.1.5 *classification of defects, n*—the enumeration of possible defects of the unit of product classified according to their seriousness, that is, critical, major, or minor defect.

3.1.6 *critical defect, n*—a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product, or a defect that judgment and experience indicate is likely to prevent performance of the function of a major end item.

3.1.7 *defect, n*—any nonconformance of the unit of product with specified requirements.

3.1.8 *double sampling plan, n*—a multiple sampling plan in which up to two samplings can be taken and evaluated to accept or reject a lot.

3.1.9 *inspection, n*—the process of measuring, examining, testing, or otherwise comparing the unit of product with the requirements.

3.1.10 *inspection by attributes, n*—inspection whereby either the unit of product is classified simply as defective or non-defective, or the number of defects in the unit of product is counted, with respect to a given requirement or set of requirements.

3.1.11 *inspection lot, n*—a collection of units of product produced under conditions that are considered uniform and from which a sample is drawn and inspected.

[1] This practice is under the jurisdiction of ASTM Committee E11 on Quality and Statistics and is the direct responsibility of Subcommittee E11.30 on Statistical Quality Control.

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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 American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

3.1.12 *major defect, n*—a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

3.1.13 *minor defect, n*—a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

3.1.14 *multiple sampling plan, n*—a sampling plan in which successive samples from a lot are drawn and after each sample is inspected a decision is made to accept the lot, reject the lot, or to take another sample, based on quality level of the combined samples.

3.1.14.1 *Discussion*—When the quality is much less or much more than the AQL, the decision can be made on the first sample, which is smaller than that of a single sampling plan with equivalent acceptance quality level. For samples that are close to the AQL in quality, additional samples are required and the total sample size will be larger than the corresponding single sampling plan.

3.1.15 *operating characteristic, n*—probability of acceptance using a specified acceptance sampling plan, as a function of parameters describing quality of the lot.

3.1.16 *sample, n*—a group of observations, test results, taken from a large collection of observations, test results, which serves to provide information that may be used as a basis for making a decision concerning the larger collection. **E2586**

3.1.16.1 *Discussion*—A sample consists of one or more units of product drawn from an inspection lot, the units of the sample being selected at random without regard to their quality. The number of units of product in the sample is the sample size.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *batch (in inspection), n*—a collection of units of product produced under conditions that are considered uniform and from which a sample is drawn and inspected, and may differ from a collection of units designated as a batch for other purposes, for example, production, shipment, etc.

3.2.2 *batch size, n*—the number of units of product in a batch.

3.2.3 *critical defective, n*—a unit of product which contains one or more critical defects and may also contain major and/or minor defects.

3.2.4 *defective, n*—a unit of product which contains one or more defects.

3.2.5 *defects per hundred units, n*—any given quantity of units of product is one hundred times the number of defects contained therein (one or more defects being possible in any unit of product) divided by the total number of units of product, that is:

$$\text{Defects per hundred units} = \frac{\text{Number of defects} \times 100}{\text{Number of units inspected}} \quad (1)$$

3.2.6 *lot, n*—see *batch*.

3.2.7 *lot size, n*—see *batch size*.

3.2.8 *major defective, n*—a unit of product which contains one or more major defects, and may also contain minor defects but contains no critical defect.

3.2.9 *minor defective, n*—a unit of product which contains one or more minor defects but contains no critical or major defect.

3.2.10 *percent defective, n*—any given quantity of units of product one hundred times the number of defective units of product contained therein divided by the total number of units of product, that is:

$$\text{Percent Defective} = \frac{\text{Number of defectives} \times 100}{\text{Number of units inspected}} \quad (2)$$

3.2.11 *process average (in inspection), n*—the average percent defective or average number of defects per hundred units (whichever is applicable) of product submitted by the supplier for original inspection.

3.2.11.1 *Discussion*—Original inspection is the first inspection of a particular quantity of product as distinguished from the inspection of product which has been resubmitted after prior rejection.

3.2.12 *sample size code letter, n*—a device used along with the AQL for locating a sampling plan on a table of sampling plans.

3.2.13 *sampling plan (in inspection), n*—a plan that indicates the number of units of product from each lot or batch which are to be inspected (sample size or series of sample sizes) and the criteria for determining the acceptability of the lot or batch (acceptance and rejection numbers).

3.2.14 *unit of product, n*—that which is inspected in order to determine its classification as defective or non-defective or to count the number of defects.

3.2.14.1 *Discussion*—It may be a single article, a pair, a set, a length, an area, an operation, a volume, a component of an end product, or the end product itself. The unit of product may or may not be the same as the unit of purchase, supply, production, or shipment.

4. Significance and Use

4.1 *Purpose*—This publication establishes lot or batch sampling plans and procedures for inspection by attributes. This publication shall not be interpreted to supersede or conflict with any contractual requirements. The words "accept," "acceptance," "acceptable," etc, refer only to the contractor's use of the sampling plans contained in this standard and do not imply an agreement by the customer (formerly "Government" in original text) to accept any product. Determination of acceptability by the customer shall be as described in contractual documents. The sampling plans described in this standard are applicable to AQL's of 0.01 percent or higher and are therefore not suitable for applications where quality levels in the range of parts per million levels can be realized.

4.2 *Application*—Sampling plans designated in this publication are applicable, but not limited, to inspection of the following: (*1*) end items, (*2*) components and raw materials, (*3*) operations or services, (*4*) materials in process, (*5*) supplies in storage, (*6*) maintenance operations, (*7*) data or records, (*8*) administrative procedures. These plans are intended primarily to be used for a continuing series of lots or batches. The plans may also be used for the inspection of isolated lots or batches, but, in this latter case, the user is cautioned to consult the

operating characteristic curves to find a plan which will yield the desired protection (see 6.11).

5. Definitions

5.1 *Acceptable Quality Level (AQL)*—When a continuous series of lots is considered, the AQL is the quality level which, for the purposes of sampling inspection, is the limit of a satisfactory process average (see 5.19).

5.1.1 A sampling plan and an AQL are chosen in accordance with the risk assumed. Use of a value of AQL for a certain defect or group of defects indicates that the sampling plan will accept the great majority of the lots or batches provided the process average level of percent defective (or defects per hundred units) in these lots or batches be no greater than the designated value of AQL. Thus, the AQL is a designated value of percent defective (or defects per hundred units) for which lots will be accepted most of the time by the sampling procedure being used.

5.1.2 The sampling plans provided herein are so arranged that the probability of acceptance at the designated AQL value depends upon the sample size, being generally higher for large samples than for small ones, for a given AQL. The AQL alone does not identify the chances of accepting or rejecting individual lots or batches but more directly relates to what might be expected from a series of lots or batches, provided the steps indicated in this publication are taken. It is necessary to refer to the operating characteristic curve of the plan to determine the relative risks.

5.2 *Average Outgoing Quality (AOQ)*—For a particular process average, the AOQ is the average quality of outgoing product including all accepted lots or batches, plus all rejected lots or batches after the rejected lots or batches have been effectively 100 percent inspected and all defectives replaced by non-defectives.

5.3 *Average Outgoing Quality Limit (AOQL)*—The AOQL is the maximum AOQ for a given acceptance sampling plan. Factors for computing AOQL values are given in Table V-A for each of the single sampling plans for normal inspection and in Table V-B for each of the single sampling plans for tightened inspection.

5.4 *Classification of Defects* —A classification of defects is the enumeration of possible defects of the unit of product classified according to their seriousness

5.5 *Critical Defect*—A critical defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product, or a defect that judgment and experience indicate is likely to prevent performance of the tactical function of a major end item such as a ship, aircraft, tank, missile, or space vehicle.

5.6 *Critical Defective*—A critical defective is a unit of product which contains one or more critical defects and may also contain major and/or minor defects.

5.7 *Defect.*—A defect is any nonconformance of the unit of product with specified requirements.

5.8 *Defective*—A defective is a unit of product which contains one or more defects.

5.9 *Defects per Hundred Units*—The number of defects per hundred units of any given quantity of units of product is one hundred times the number of defects contained therein (one or more defects being possible in any unit of product) divided by the total number of units of product, that is:

$$\textit{Defects per hundred units} = \frac{\textit{Number of defects} \times 100}{\textit{Number of units inspected}}$$

5.10 *Inspection*—Inspection is the process of measuring, examining, testing, or otherwise comparing the unit of product with the requirements.

5.11 *Inspection by Attributes*—Inspection by attributes is inspection whereby either the unit of product is classified simply as defective or non-defective, or the number of defects in the unit of product is counted, with respect to a given requirement or set of requirements.

5.12 *Lot or Batch*—The term lot or batch shall mean "inspection lot" or "inspection batch", that is, a collection of units of product from which a sample is to be drawn and inspected and may differ from a collection of units designated as a lot or batch for other purposes (for example, production, shipment, etc.).

5.13 *Lot or Batch Size*—The lot or batch size is the number of units of product in a lot or batch.

5.14 *Major Defect*—A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

5.15 *Major Defective*—A major defective is a unit of product which contains one or more major defects, and may also contain minor defects but contains no critical defect.

5.16 *Minor Defect*—A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

5.17 *Minor Defective*— A minor defective is a unit of product which contains one or more minor defects but contains no critical or major defect.

5.18 *Percent Defective*—The percent defective of any given quantity of units of product is one hundred times the number of defective units of product contained therein divided by the total number of units of product, that is:

$$\textit{Percent Defective} = \frac{\textit{Number of defectives} \times 100}{\textit{Number of units inspected}}$$

5.19 *Process Average.*— The process average is the average percent defective or average number of defects per hundred units (whichever is applicable) of product submitted by the supplier for original inspection. Original inspection is the first inspection of a particular quantity of product as distinguished from the inspection of product which has been resubmitted after prior rejection.

5.20 *Sample*—A sample consists of one or more units of product drawn from a lot or batch, the units of the sample being

selected at random without regard to their quality. The number of units of product in the sample is the sample size.

5.21 *Sample Size Code Letter*—The sample size code letter is a device used along with the AQL for locating a sampling plan on a table of sampling plans.

5.22 *Sampling Plan*—A sampling plan indicates the number of units of product from each lot or batch which are to be inspected (sample size or series of sample sizes) and the criteria for determining the acceptability of the lot or batch (acceptance and rejection numbers).

5.23 *Unit of Product.*— The unit of product is the thing inspected in order to determine its classification as defective or non-defective or to count the number of defects. It may be a single article, a pair, a set, a length, an area, an operation, a volume, a component of an end product, or the end product itself. The unit of product may or may not be the same as the unit of purchase, supply, production, or shipment.

6. General Requirements

6.1 *Written Procedures*—Written procedures are ordinarily developed and made available for the customer's review, upon request. When the written procedures indicate use of this standard, they shall comply with the requirements of this standard and reference appropriate parts as necessary.

6.2 *Nonconformance*—The extent of nonconformance of product shall be expressed either in terms of percent defective or in terms of defects per hundred units.

6.3 *Formation and Identification of Lots or Batches*—The product shall be assembled into identifiable lots, sublots, batches, or in such other manner as may be prescribed. Each lot or batch shall, as far as is practicable, consist of units of product of a single type, grade, class, size, and composition, manufactured under essentially the same conditions, and at essentially the same time. The lots or batches shall be identified by the contractor and shall be kept intact in adequate and suitable storage space.

6.4 *AQL:*

6.4.1 *AQL Use*—The AQL, together with the Sample Size Code Letter, is used for indexing the sampling plans provided herein.

6.4.2 *Limitation*—The selection or use of an AQL shall not imply that the contractor has the right to supply any defective unit of product.

6.4.3 *Choosing AQLs*—Different AQLs may be chosen for groups of defects considered collectively, or for individual defects. An AQL for a group of defects may be chosen in addition to AQLs for individual defects, or subgroups, within that group. AQL values of 10.0 or less may be expressed either in percent defective or in defects per hundred units; those over 10.0 shall be expressed in defects per hundred units only.

6.5 *Sampling.*

6.5.1 *Representative (Stratified) Sampling*—When appropriate, the number of units in the sample shall be selected in proportion to the size of sublots or sub-batches, or parts of the lot or batch, identified by some rational criterion. When representative sampling is used, the units from each sublot, sub-batch or part of the lot or batch shall be selected at random.

6.5.2 *Time of Sampling*—A sample may be drawn after all the units comprising the lot or batch have been assembled, or sample units may be drawn during assembly of the lot or batch, in which case the size of the lot or batch will be determined before any sample units are drawn. If the sample units are drawn during assembly of the lot or batch, and if the rejection number is reached before the lot is completed, that portion of the lot already completed shall be rejected. The cause of the defective product shall be determined and corrective action taken, after which a new lot or batch shall be begun.

6.5.3 *Double or Multiple Sampling*—When double or multiple sampling is to be used, each sample shall be selected over the entire lot or batch.

6.6 *Inspection Procedures*—Normal inspection will be used at the start of inspection. Normal, tightened or reduced inspection shall continue unchanged for each class of defects or defectives on successive lots or batches except where the switching procedures given below require change. The switching procedures shall be applied to each class of defects or defectives independently.

6.7 *Switching Procedures:*

6.7.1 *Normal to Tightened*—When normal inspection is in effect, tightened inspection shall be instituted when 2 out of 2, 3, 4, or 5 consecutive lots or batches have been rejected on original inspection (that is, ignoring resubmitted lots or batches for this procedure).

6.7.2 *Tightened to Normal*—When tightened inspection is in effect, normal inspection shall be instituted when 5 consecutive lots or batches have been considered acceptable on original inspection.

6.7.3 *Normal to Reduced*—When normal inspection is in effect, reduced inspection shall be instituted provided that all of the following conditions are satisfied:

6.7.3.1 The preceding 10 lots or batches (or more, as indicated by the note to Table VIII) have been on normal inspection and all have been accepted on original inspection; and

6.7.3.2 The total number of defectives (or defects) in the samples from the preceding 10 lots or batches (or such other number as was used for condition "a" above) is equal to or less than the applicable number given in Table VIII. If double or multiple sampling is in use, all samples inspected should be included, not "first" samples only; and

6.7.3.3 Production is at a steady rate; and

6.7.3.4 Reduced inspection is considered desirable.

6.7.4 *Reduced to Normal*—When reduced inspection is in effect, normal inspection shall be instituted if any of the following occur on original inspection:

6.7.4.1 A lot or batch is rejected; or

6.7.4.2 A lot or batch is considered acceptable under the procedures of 6.10.1.4, or

6.7.4.3 Production becomes irregular or delayed; or

6.7.4.4 Other conditions warrant that normal inspection shall be instituted.

6.8 *Discontinuation of Inspection*—If the cumulative number of lots not accepted in a sequence of consecutive lots on original tightened inspection reaches five, the acceptance procedures of this standard shall be discontinued. Inspection under the provisions of this standard shall not be resumed until corrective action has been taken. Tightened inspection shall then be used as if 6.7.1 had been invoked.

6.9 *Sampling Plans:*

6.9.1 *Inspection Level*—The inspection level determines the relationship between the lot or batch size and the sample size. The inspection level to be used for any particular requirement will be as prescribed by the contractor's written procedures. Three inspection levels: I, II, and III, are given in Table I for general use (see 6.1). Normally, Inspection Level II is used. However, Inspection Level I may be used when less discrimination is needed, or Level III may be used for greater discrimination. Four additional special levels: S-1, S-2, S-3, and S-4, are given in the same table and may be used where relatively small sample sizes are necessary and large sampling risks can or must be tolerated.

6.9.1.1 In the selection of inspection levels S-1 to S-4, care must be exercised to avoid AQLs inconsistent with these inspection levels. In other words, the purpose of the special inspection levels is to keep samples sma11 when necessary. For instance, the code letters under S-1 go no further than D, equivalent to a single sample of size 8, but it is of no use to choose S-1 if the AQL is 0.10 percent for which the minimum sample is 125.

6.9.2 *Code Letters.* Sample sizes are designated by code letters. Table I shall be used to find the applicable code letter for the particular lot or batch size and the prescribed inspection level.

6.9.3 *Obtaining Sampling Plan*—The AQL and the code letter shall be used to obtain the sampling plan from Tables II, III, or IV. When no sampling plan is available for a given combination of AQL and code letter, the tables direct the user to a different letter. The sample size to be used is given by the new code letter, not by the original letter. If this procedure leads to different sample sizes for different classes of defects, the code letter corresponding to the largest sample size derived may be used for all classes of defects. As an alternative to a single sampling plan with an acceptance number of 0, the plan with an acceptance number of 1 with its correspondingly larger sample size for a designated AQL (where available), may be used.

6.9.4 *Types of Sampling Plans*—Three types of sampling plans; Single, Double, and Multiple, are given in Tables II, III, and IV, respectively. When several types of plans are available for a given AQL and code letter, any one may be used. A decision as to type 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 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 (see Table IX). Usually the administrative difficulty for single sampling and the cost per unit of the sample are less than for double or multiple.

6.10 *Determination of Acceptability:*

6.10.1 *Percent Defective Inspection*—To determine acceptability of a lot or batch under percent defective inspection, the applicable sampling plan shall be used in accordance with 6.10.1.1 – 6.10.1.4.

6.10.1.1 *Single Sampling Plan*—The number of sample units inspected shall be equal to the sample size given by the plan. If the number of defectives found in the sample is equal to or less than the acceptance number, the lot or batch shall be considered acceptable. If the number of defectives is equal to or greater than the rejection number, the lot or batch shall be rejected.

6.10.1.2 *Double Sampling Plan*—A number of sample units equal to the first sample size given by the plan shall be inspected. If the number of defectives found in the first sample is equal to or less than the first acceptance number, the lot or batch shall be considered acceptable. If the number of defectives found in the first sample is equal to or greater than the first rejection number, the lot or batch shall be rejected. If the number of defectives found in the first sample is between the first acceptance and rejection numbers, a second sample of the same size shall be inspected. The number of defectives found in the first and second samples shall be accumulated. If the cumulative number of defectives is equal to or less than the second acceptance number, the lot or batch shall be considered acceptable. If the cumulative number of defectives is equal to or greater than the second rejection number, the lot or batch shall be rejected.

6.10.1.3 *Multiple Sample Plan*—Under multiple sampling, the procedure shall be similar to that specified in 6.10.1.2, except that the number of successive samples required to reach a decision may be as many as seven.

6.10.1.4 *Special Procedure for Reduced Inspection*—Under reduced inspection, the sampling procedure may terminate without either acceptance or rejection criteria having been met. In these circumstances, the lot or batch will be considered acceptable, but normal inspection will be reinstated starting with the next lot or batch (see 6.7.4.2).

6.10.2 *Defects per Hundred Units Inspection*—To determine the acceptability of a lot or batch under defects per hundred units inspection, the procedure specified for percent defective inspection above shall be used, except that the word "defects" shall be substituted for "defectives".

6.11 *Limiting Quality Protection*—The sampling plans and associated procedures given in this publication were designed for use where the units of product are produced in a continuing series of lots or batches over a period of time. However, if the lot or batch is of an isolated nature, it is desirable to limit the selection of sampling plans to those, associated with a designated AQL value, that provide not less than a specified limiting quality protection. Sampling plans for this purpose can be selected by choosing a Limiting Quality (LQ) and a consumer's risk to be associated with it. Tables VI and VII give values of LQ for the commonly used consumer's risks of 10 percent and 5 percent respectively. If a different value of consumer's

risk is required, the O.C. curves and their tabulated values may be used. The concept of LQ may also be useful in specifying the AQL and Inspection Levels for a series of lots or batches, thus fixing minimum sample size where there is some reason for avoiding (with more than a given consumer's risk) more than a limiting proportion of defectives (or defects) in any single lot or batch.

6.12 *Curves:*

6.12.1 *Operating Characteristic Curves*—The operating characteristic curves for normal inspection, shown in Table X, indicate the percentage of lots or batches which may be expected to be accepted under the various sampling plans for a given process quality. The curves shown are for single sampling; curves for double and multiple sampling are matched as closely as practicable. The O.C. curves shown for AQLs greater than 10.0 are based on the Poisson distribution and are applicable for defects per hundred units inspection; those for AQLs of 10.0 or less and sample sizes of 80 or less are based on the binomial distribution and are applicable for percent defective inspection; those for AQLs of 10.0 or less and sample sizes larger than 80 are based the Poisson distribution and are applicable either for defects per hundred units inspection, or for percent defective inspection (the Poisson distribution being an adequate approximation to the binomial distribution under these conditions). Tabulated values, corresponding to selected values or probabilities of acceptance (Pa, in percent) are given for each of the curves shown, and, in addition, for tightened inspection, and for defects per hundred units for AQLs of 10.0 or less and sample sizes of 80 or less.

6.12.2 *Average Sample Size Curves*—Average sample size curves for double and multiple sampling are in Table IX. These show the average sample sizes which may be expected to occur under the various sampling plans for given levels of process quality. The curves assume no curtailment of inspection and are approximate to the extent that they are based upon the Poisson distribution, and that the sample sizes for double and multiple sampling are assumed to be 0. 631n and 0.25n respectively, where n is the equivalent sample size.

7. Operating Procedure for Use in Sampling Inspection

7.1 Sections 4 – 6 of this practice preserve the structure of MIL-STD-105E for use in applications in which that standard is prescribed, or where its use is desirable, for example, where it is called out as part of the procedure contained in another standard. This section provides additional instruction on use of MIL-STD-105E in sampling inspection.

7.2 This standard is a sampling system primarily intended for use with a stream of lots where an upper limit on the process fraction defective is specified. This is the Acceptance Quality Limit (AQL). Protection against the process levels greater than the AQL is accomplished by switching among prescribed plans so that the rate of rejection of lots becomes more and more intolerable as the process average increases beyond the AQL. It is important to note that a relatively large proportion of lots will be accepted when the process average is less than or equal to the AQL.

7.3 When sampling a stream of lots, the standard is employed as follows:

7.3.1 Determine the lot size and set the AQL (see 6.4).

7.3.2 Determine the inspection level (see 6.9.1). Use Inspection Level II if none is specified.

7.3.3 Decide if single, double, or multiple sampling is to be used (see 6.10).

7.3.4 Enter Table I to determine the sample size code letter (see 6.9.2).

7.3.5 Enter Table II (single), Table III (double), or Table IV (multiple) with the lot size and code letter to determine a set of normal, tightened or reduced sampling plans which will be used in applying this sampling scheme.

7.3.6 Apply the switching rules to determine which of the three plans to apply to the next lot (see 6.6 – 6.8).

7.3.7 The switching rules must be used in application of the procedure to a stream of lots.

7.4 When an isolated lot, apart from a stream, the standard may be applied as follows:

7.4.1 Determine the AQL as above. A single lot of AQL quality will have a high probability of acceptance very often around 95 % (see 6.4).

7.4.2 Set a limiting quality level (LQ) that will have a low consumer's risk (risk of acceptance) of 10 % or 5 % as desired (see 6.11).

7.4.3 Enter Table VI or Table VII as appropriate to the consumer's risk and defect type. For a particular AQL, go down the column until a value of LQ less than or equal to the desired LQ is found. Read the corresponding code letter and AQL. Using the Normal sampling tables (Tables IIA, IIIA, or IVA) determine the sampling plan for this code letter and AQL.

7.4.4 Apply the sampling plan to the isolated lot.

7.5 Parameters of the sampling plans

7.5.1 The operating characteristic curves for individual plans are given in Table X (see 6.12).

7.5.2 The AOQL values for individual plans are given in Table V (see 5.2 and 5.3).

7.5.3 ASN curves for the double and multiple plans are given in Table IX (see 6.12.2).

7.5.4 Limit Numbers for Reduced Inspection used in the switching rules are given in Table VIII (see 6.10.1.4)

8. Keywords

8.1 acceptance quality level (AQL); average outgoing quality (AOQ); average outgoing quality limit (AOQL); classification of defects; critical defect; critical defective; defect; defective; defects per hundred units; inspection; inspection by attributes; lot or batch; lot or batch size; major defect; major defective; minor defect; minor defective; percent defective; process average; sample; sample size code letter; sampling plan; unit of product

ANNEX

(Mandatory Information)

A1. MASTER TABLES

See Figs. A1.1-A1.10

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	A	B
9	to 15	A	A	A	A	A	B	C
16	to 25	A	A	B	B	B	C	D
26	to 50	A	B	B	C	C	D	E
51	to 90	B	B	C	C	C	E	F
91	to 150	B	B	C	D	D	F	G
151	to 280	B	C	D	E	E	G	H
281	to 500	B	C	D	E	F	H	J
501	to 1200	C	C	E	F	G	J	K
1201	to 3200	C	D	E	G	H	K	L
3201	to 10000	C	D	F	G	J	L	M
10001	to 35000	C	D	F	H	K	M	N
35001	to 150000	D	E	G	J	L	N	P
150001	to 500000	D	E	G	J	M	P	Q
500001	and over	D	E	H	K	N	Q	R

FIG. A1.1 Table I Sample Size Code Letters

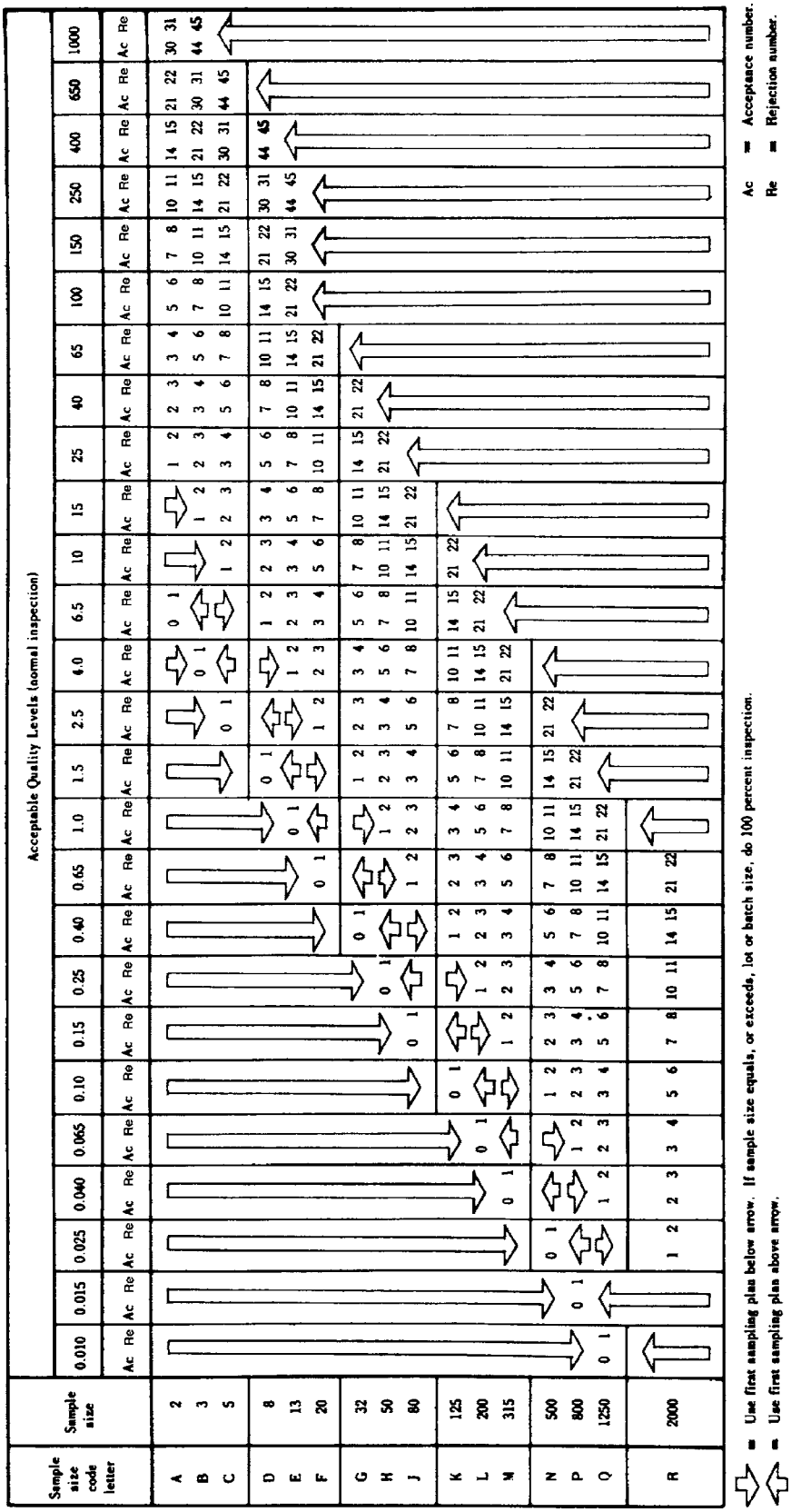


FIG. A1.2 Table II-A Single Sampling Plans for Normal Inspection

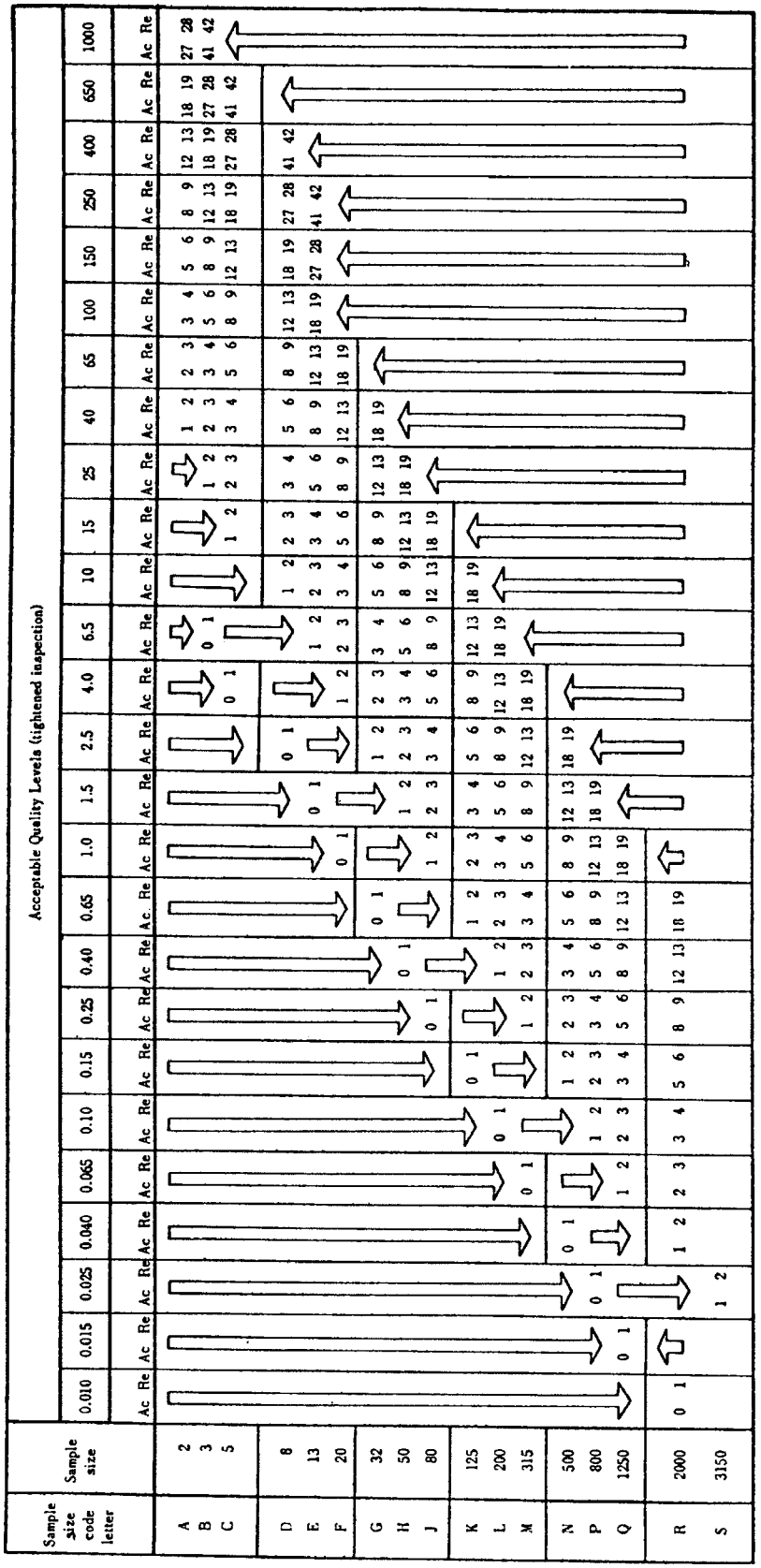


FIG. A1.3 Table II-B Single Sampling Plans for Tightened Inspection

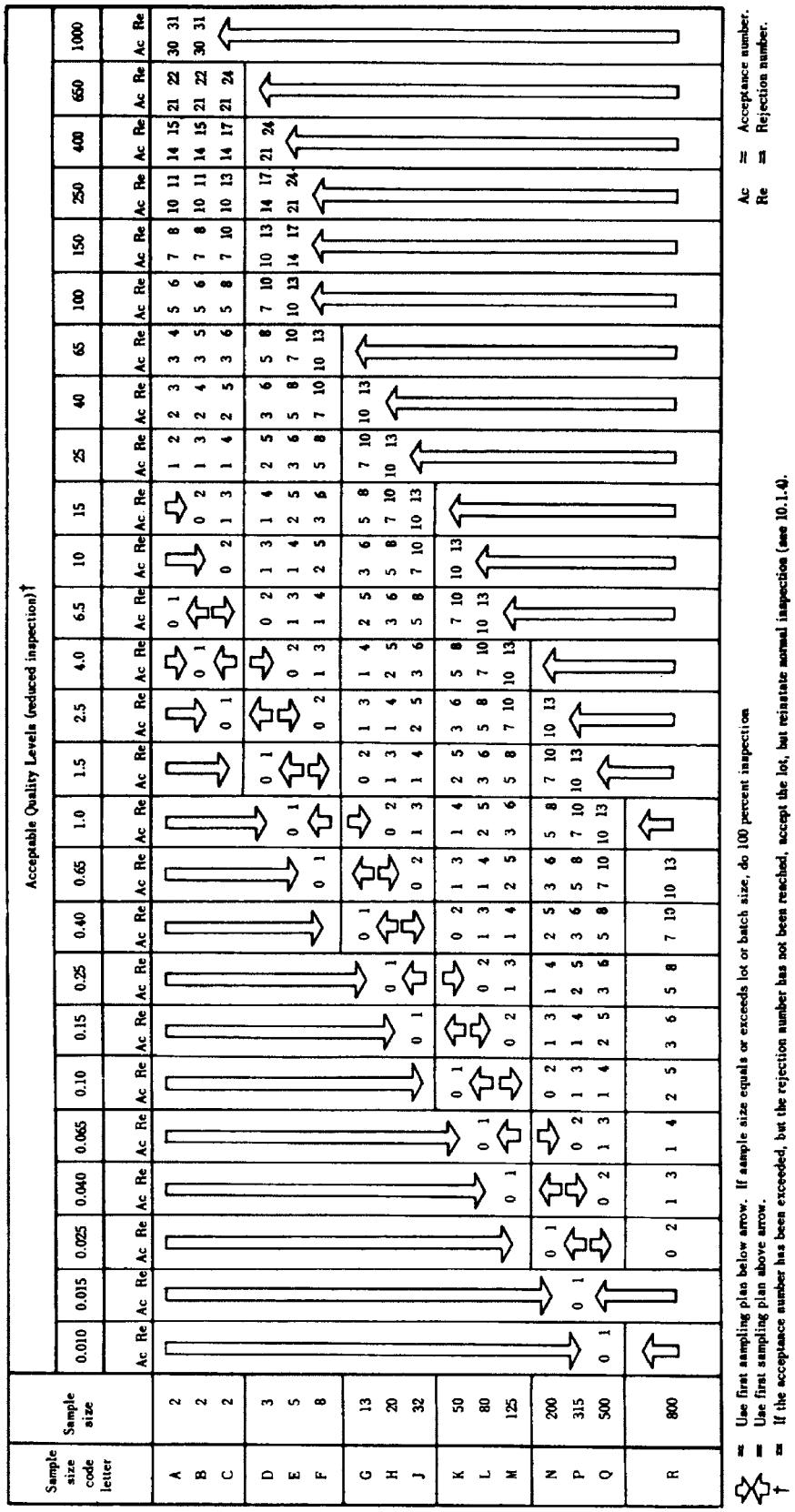


FIG. A1.4 Table II-C Single Sampling Plans for Reduced Inspection

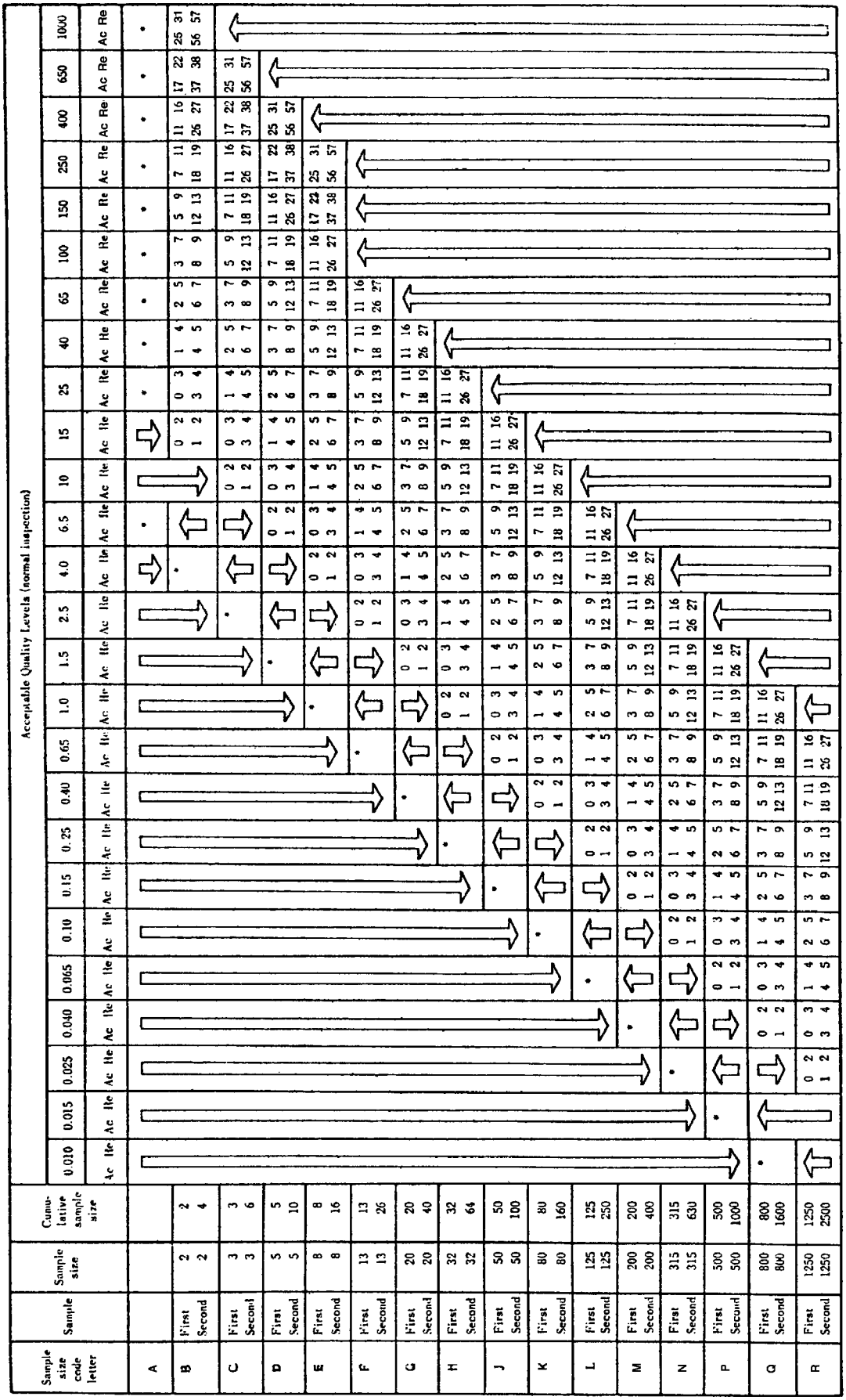


FIG. A1.5 Table III-A Double Sampling Plans for Normal Inspection

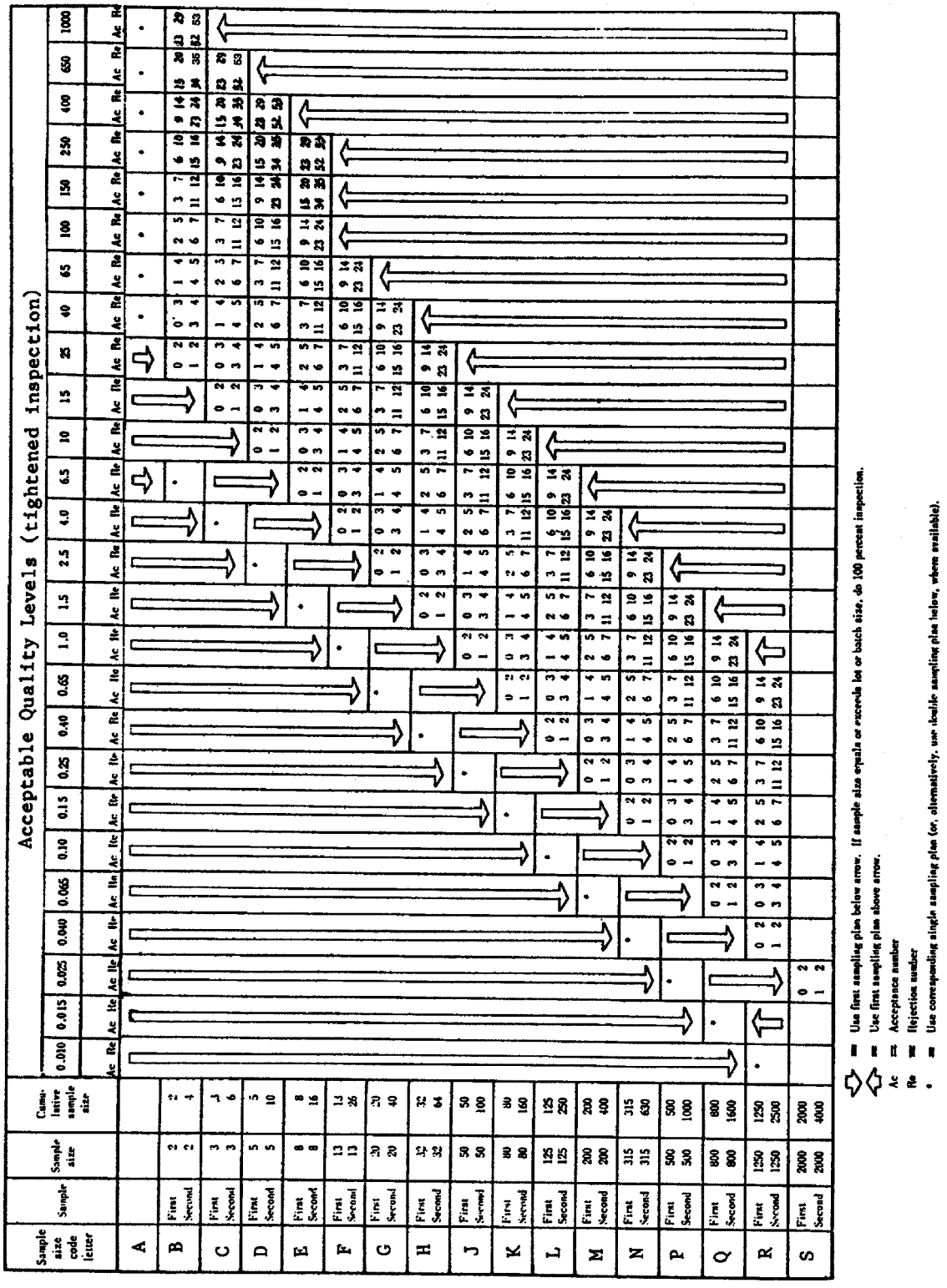


FIG. A1.6 Table III-B Double Sampling Plans for Tightened Inspection

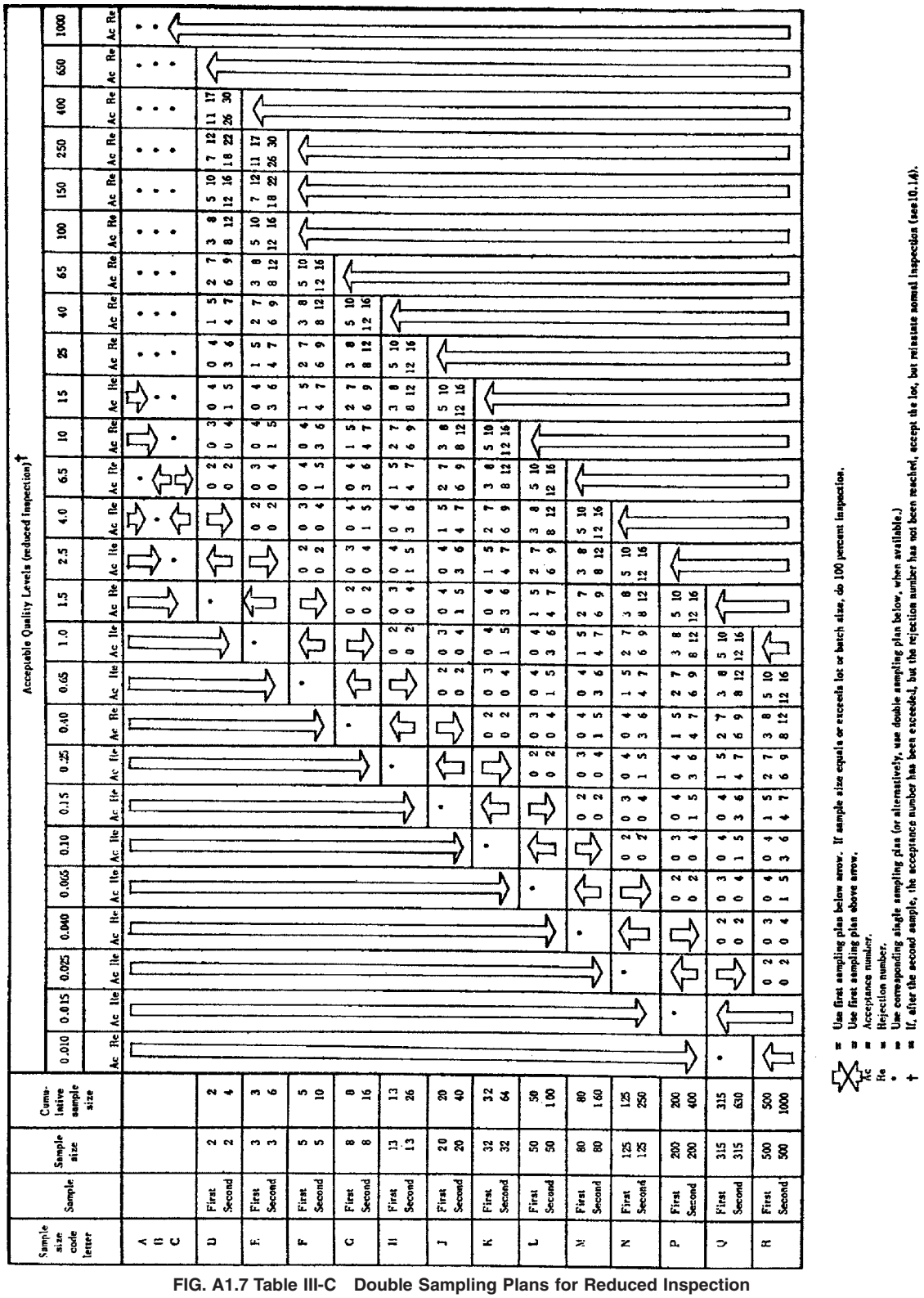


FIG. A1.7 Table III-C Double Sampling Plans for Reduced Inspection

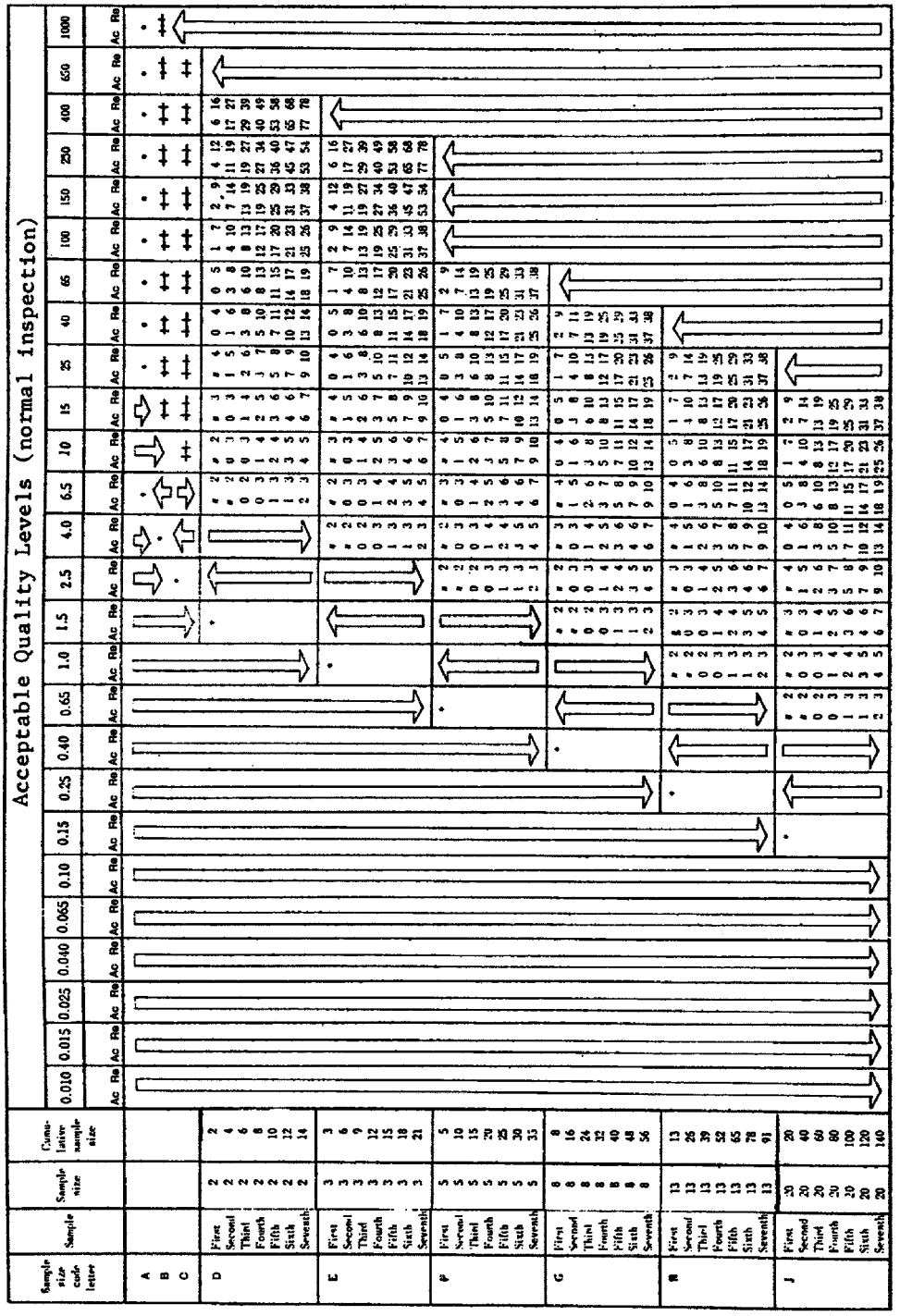


FIG. A1.8 Table IV-A Multiple Sampling Plans for Normal Inspection

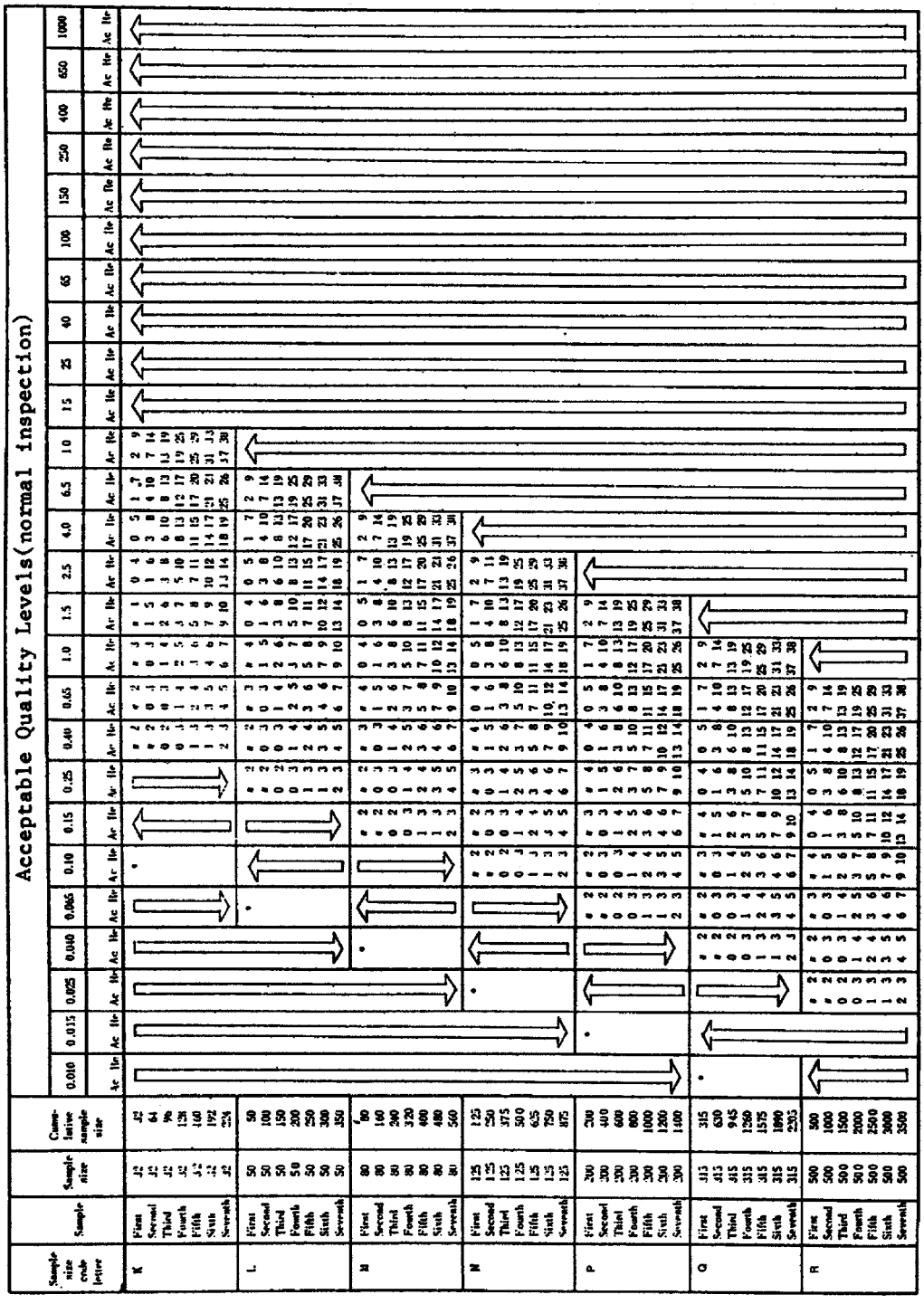


FIG. A1.8 Table IV-A Multiple Sampling Plans for Normal Inspection *(continued)*

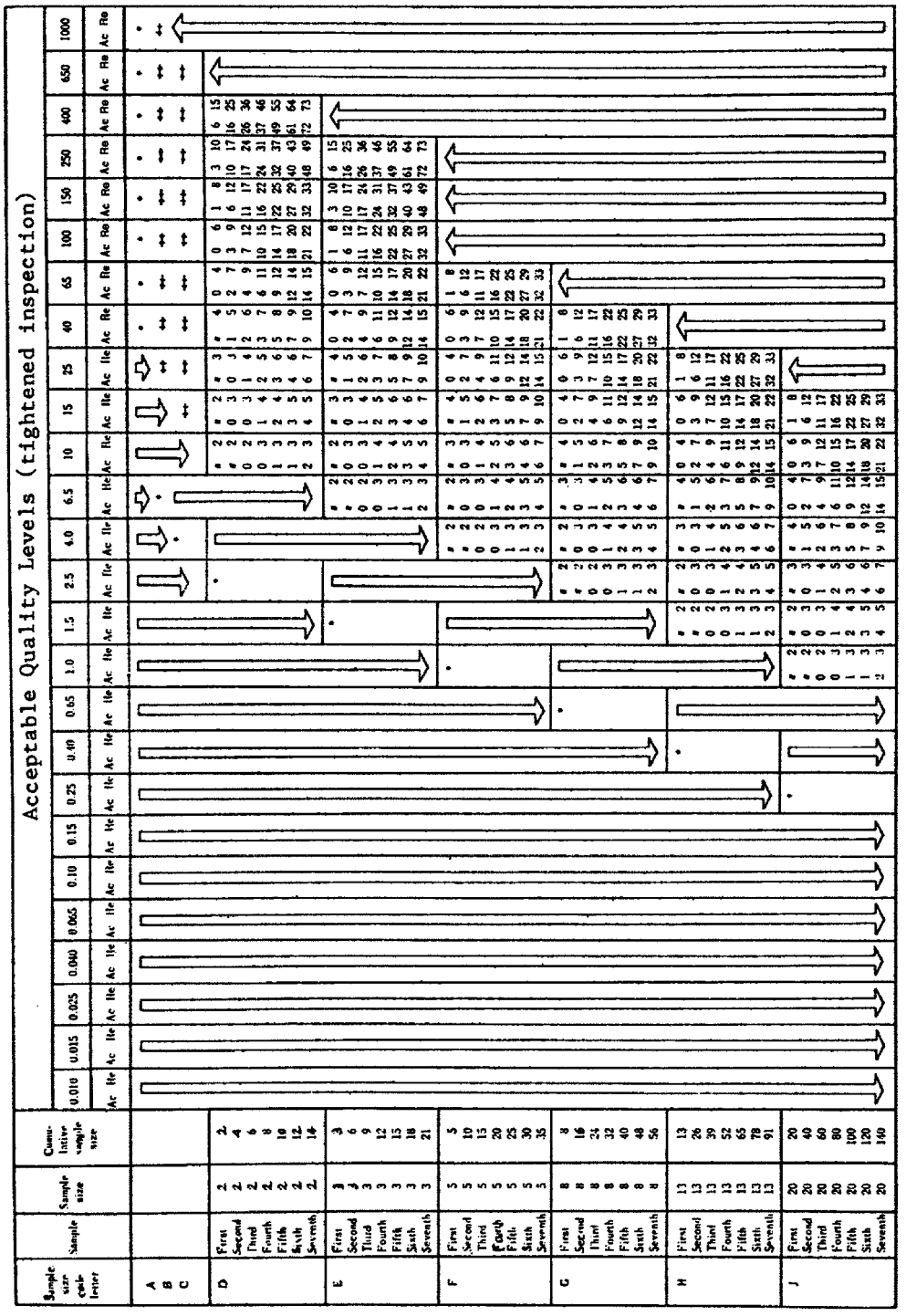


FIG. A1.9 Table IV-B Multiple Sampling Plans for Tightened Inspection

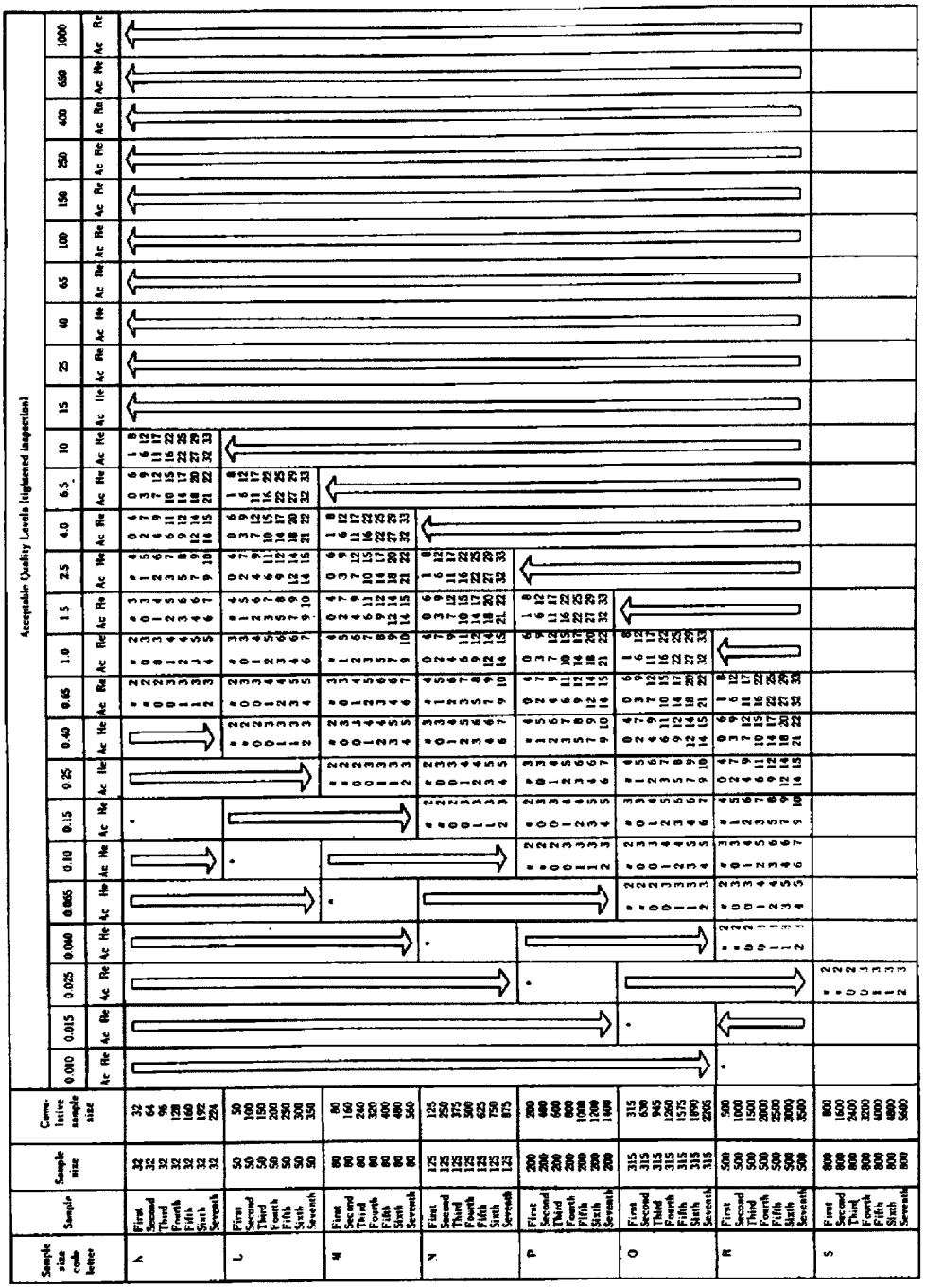


FIG. A1.9 Table IV-B Multiple Sampling Plans for Tightened Inspection *(continued)*

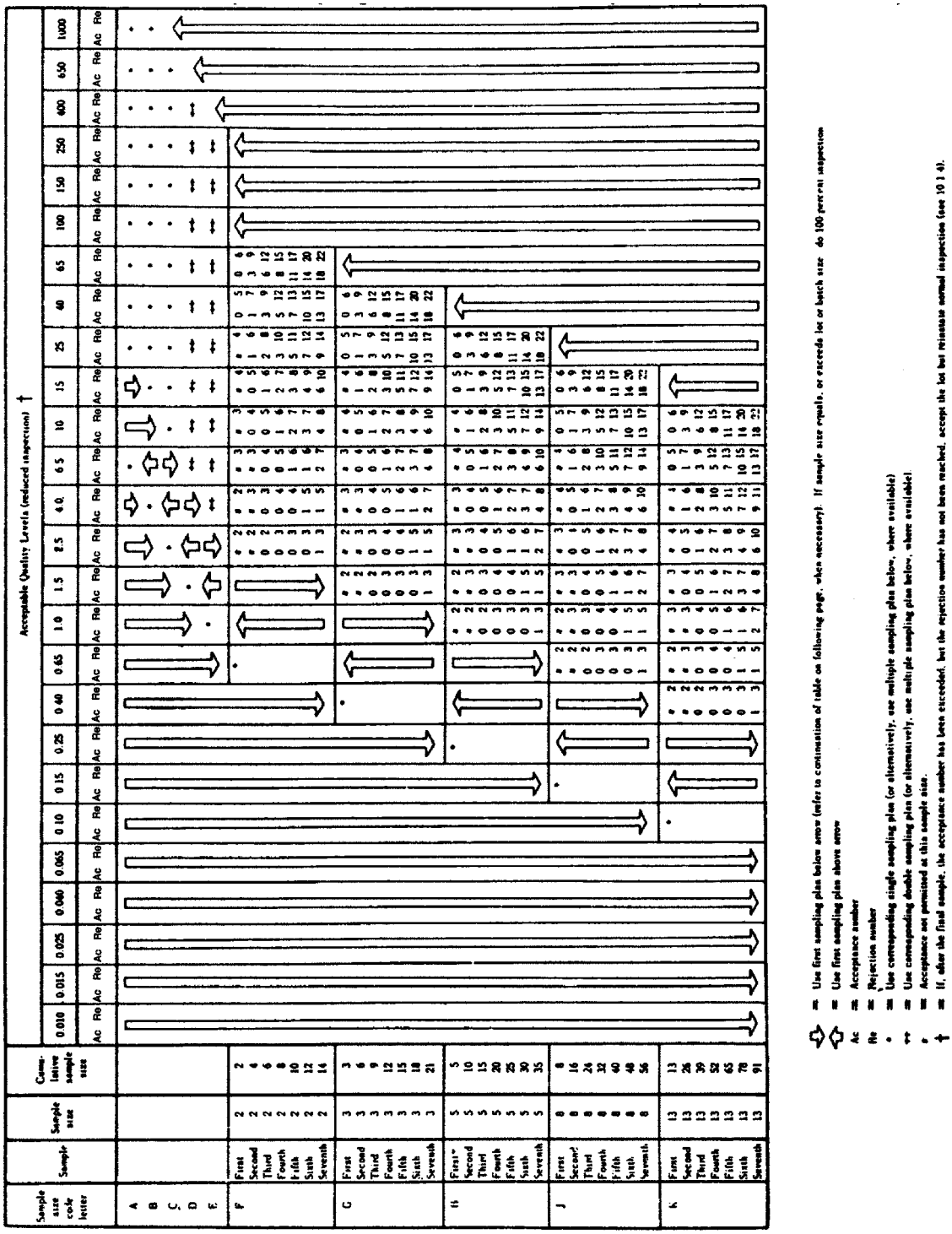


FIG. A1.10 Table IV-C Multiple Sampling Plans for Reduced Inspection

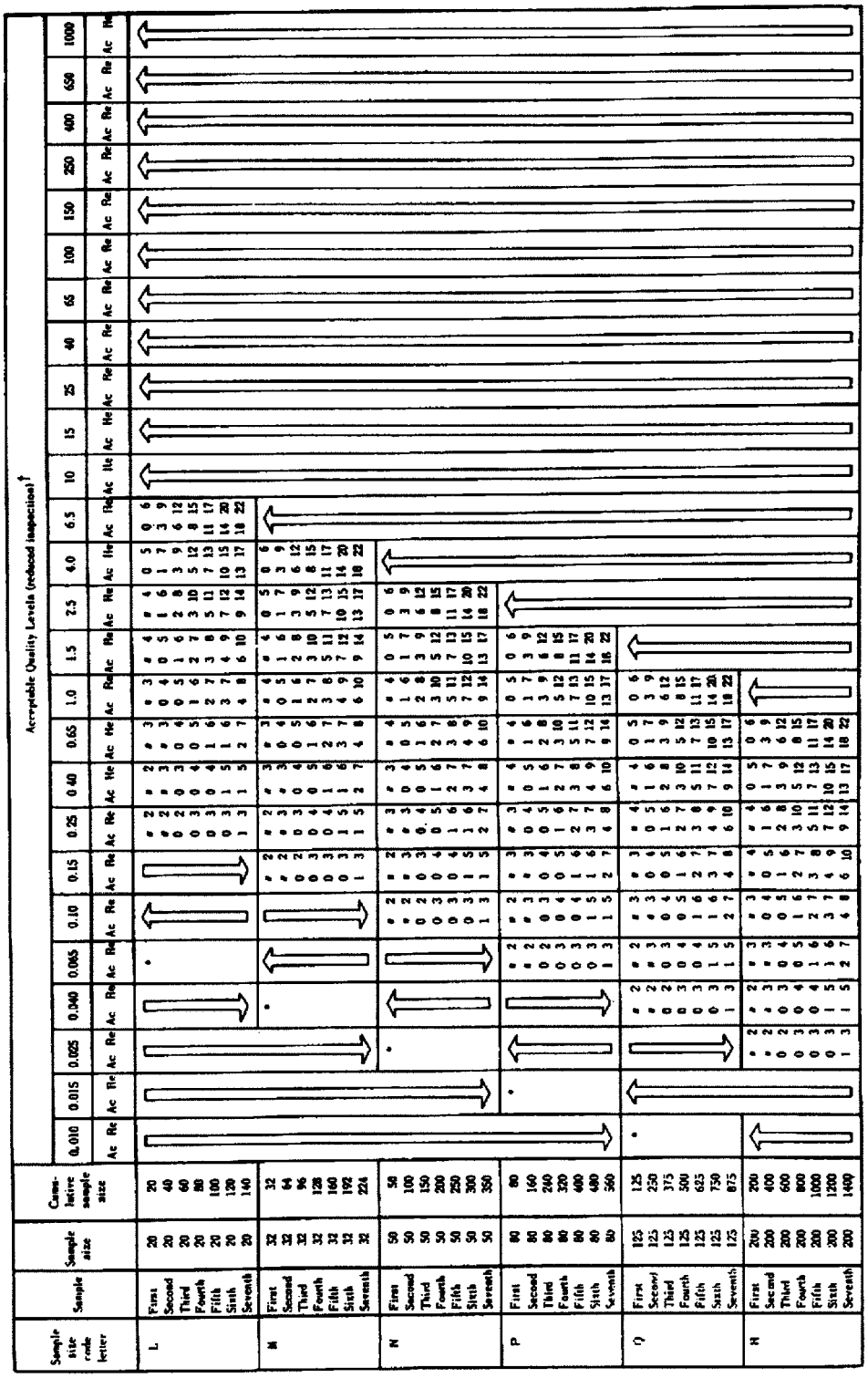


FIG. A1.10 Table IV-C Multiple Sampling Plans for Reduced Inspection *(continued)*

APPENDIX

(Nonmandatory Information)

X1. SUPPORTING TABLES

X1.1 Average Outgoing Quality Limit Factors

X1.1.1 Table V-A (Fig. X1.1), Average Outgoing Quality Limit Factors for Normal Inspection (Single Sampling) (see 3.1.12)

X1.1.2 Table V-B (Fig. X1.2), Average Outgoing Quality Limit Factors for Tightened Inspection (Single Sampling) (see 3.1.12)

X1.2 Limiting Quality

X1.2.1 Table VI-AFig. X1.3 Limiting Quality (in percent nonconforming) for which P_a = 10 Percent (for Normal Inspection, Single Sampling) (see 6.7)

X1.2.2 Table VI-B (Fig. X1.4), Limiting Quality (in nonconformities per hundred units) for which P_a = 10 Percent (for Normal Inspection, Single Sampling) (see 6.7)

X1.2.3 Table VII-A (Fig. X1.5), Limiting Quality (in percent nonconforming) for which P_a = 5 Percent (for Normal Inspection, Single Sampling) (see 6.7)

X1.2.4 Table VII-B (Fig. X1.6), Limiting Quality (in nonconformities per hundred units) for which Pa = 5 Percent (For Normal Inspection, Single Sampling) (see 6.7)

X1.2.5 Table VIII (Fig. X1.7), Limit Numbers for Reduced Inspection (see 5.14)

X1.2.6 Table IX (Fig. X1.8), Average Sample Size Curves for Double and Multiple Sampling (normal and tightened inspection) (see 6.7.3)

X1.3 Sampling Plans and Operating Characteristic Curves (and Data)

X1.3.1 See Figs. X1.9-X1.25

X1.3.2 Table X-A, Sample Size Code Letter A (Fig. X1.9)

X1.3.3 Table X-B, Sample Size Code Letter B (Fig. X1.10)

X1.3.4 Table X-C, Sample Size Code Letter C (Fig. X1.11)

X1.3.5 Table X-D, Sample Size Code Letter D (Fig. X1.12)

X1.3.6 Table X-E, Sample Size Code Letter E (Fig. X1.13)

X1.3.7 Table X-F, Sample Size Code Letter F (Fig. X1.14)

X1.3.8 Table X-G, Sample Size Code Letter G (Fig. X1.15)

X1.3.9 Table X-H, Sample Size Code Letter H (Fig. X1.16)

X1.3.10 Table X-J, Sample Size Code Letter J (Fig. X1.17)

X1.3.11 Table X-K, Sample Size Code Letter K (Fig. X1.18)

X1.3.12 Table X-L, Sample Size Code Letter L (Fig. X1.19)

X1.3.13 Table X-M, Sample Size Code Letter M (Fig. X1.20)

X1.3.14 Table X-N, Sample Size Code Letter N (Fig. X1.21)

X1.3.15 Table X-P, Sample Size Code Letter P (Fig. X1.22)

X1.3.16 Table X-Q, Sample Size Code Letter Q (Fig. X1.23)

X1.3.17 Table X-R, Sample Size Code Letter R (Fig. X1.24)

X1.3.18 Table X-S, Sample Size Code Letter S (Fig. X1.25)

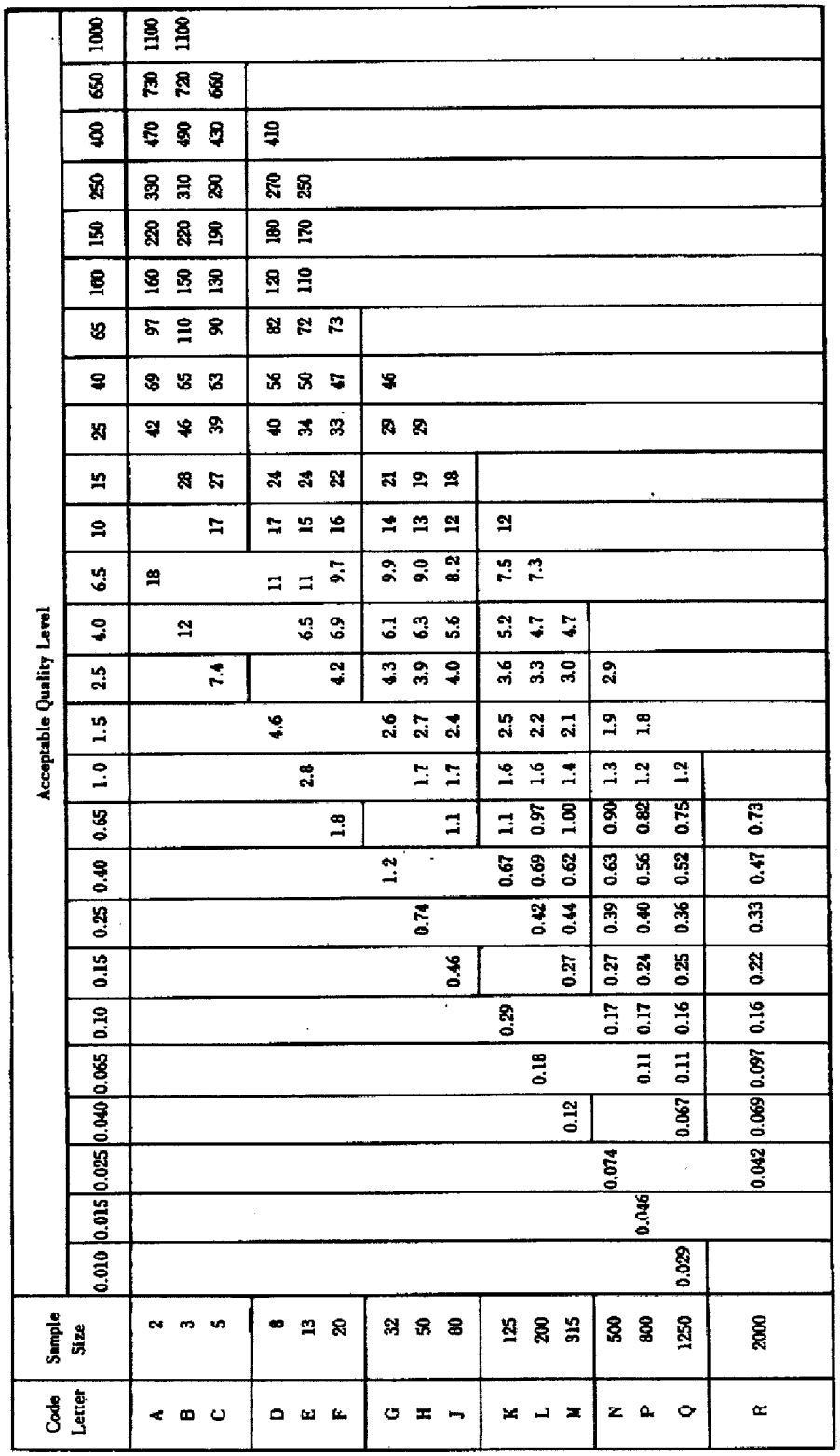
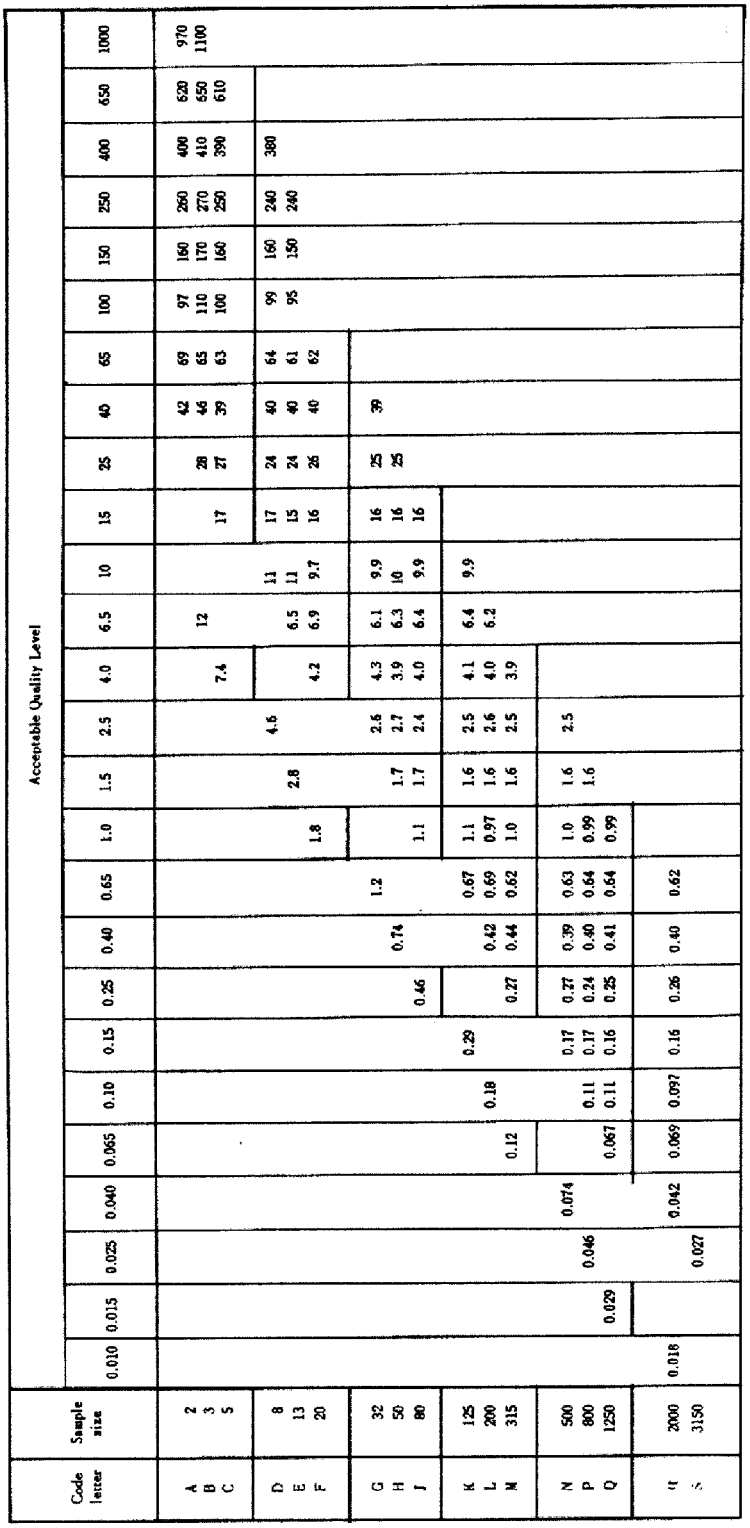


FIG. X1.1 Table V-A Average Outgoing Quality Limit Factors for Normal Inspection (Single Sampling)



Note: For the exact AOQL, the above values must be multiplied by $\left(1 - \frac{\text{Sample size}}{\text{Lot or Batch size}}\right)$

AOQL
TIGHTENED

FIG. X1.2 Table V-B Average Outgoing Limit Factors for Tightened Inspection (Single Sampling)

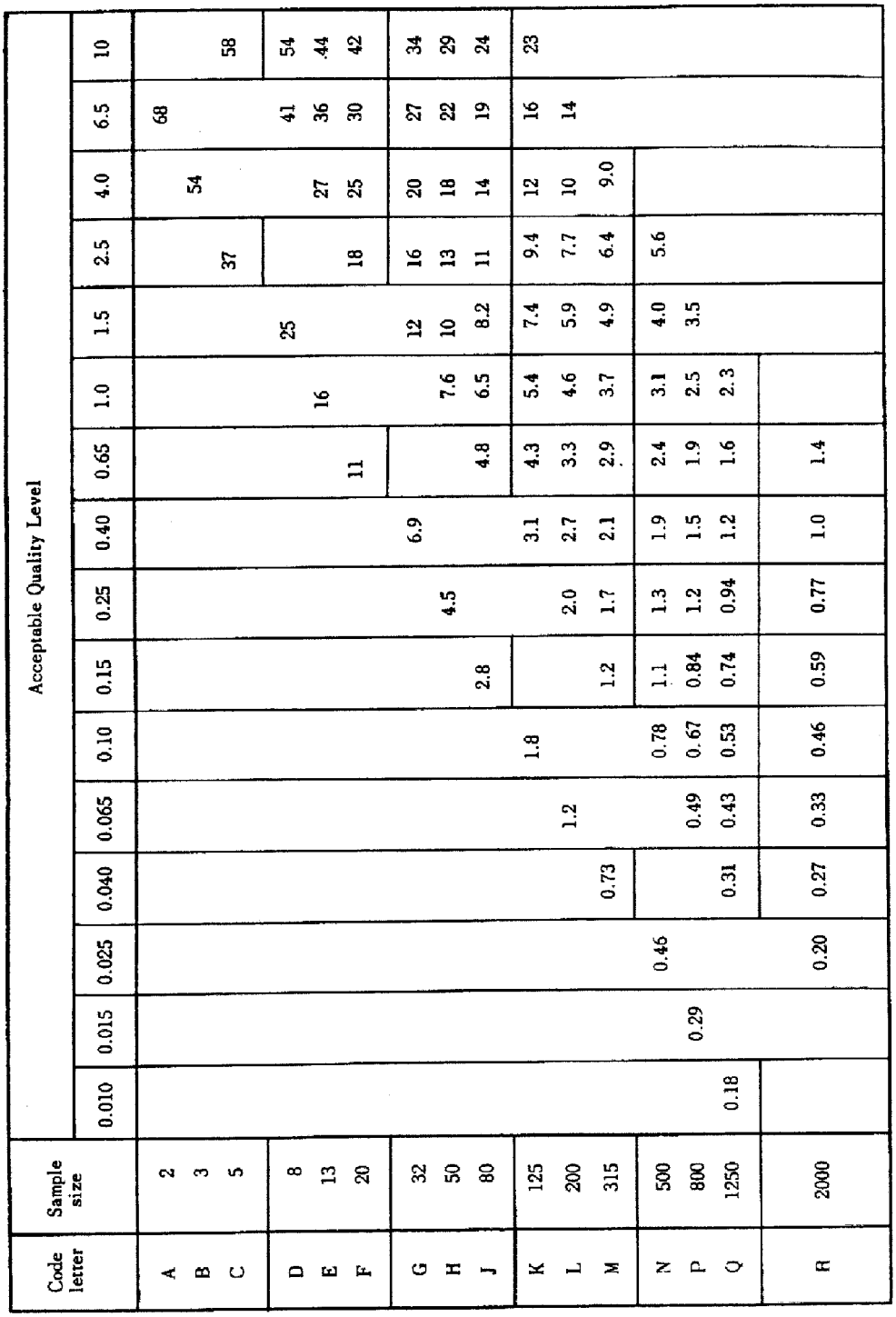


FIG. X1.3 Table VI-A Limiting Quality (In percent defective) for which P_a = 10 Percent (for Normal Inspection, Single Sampling)

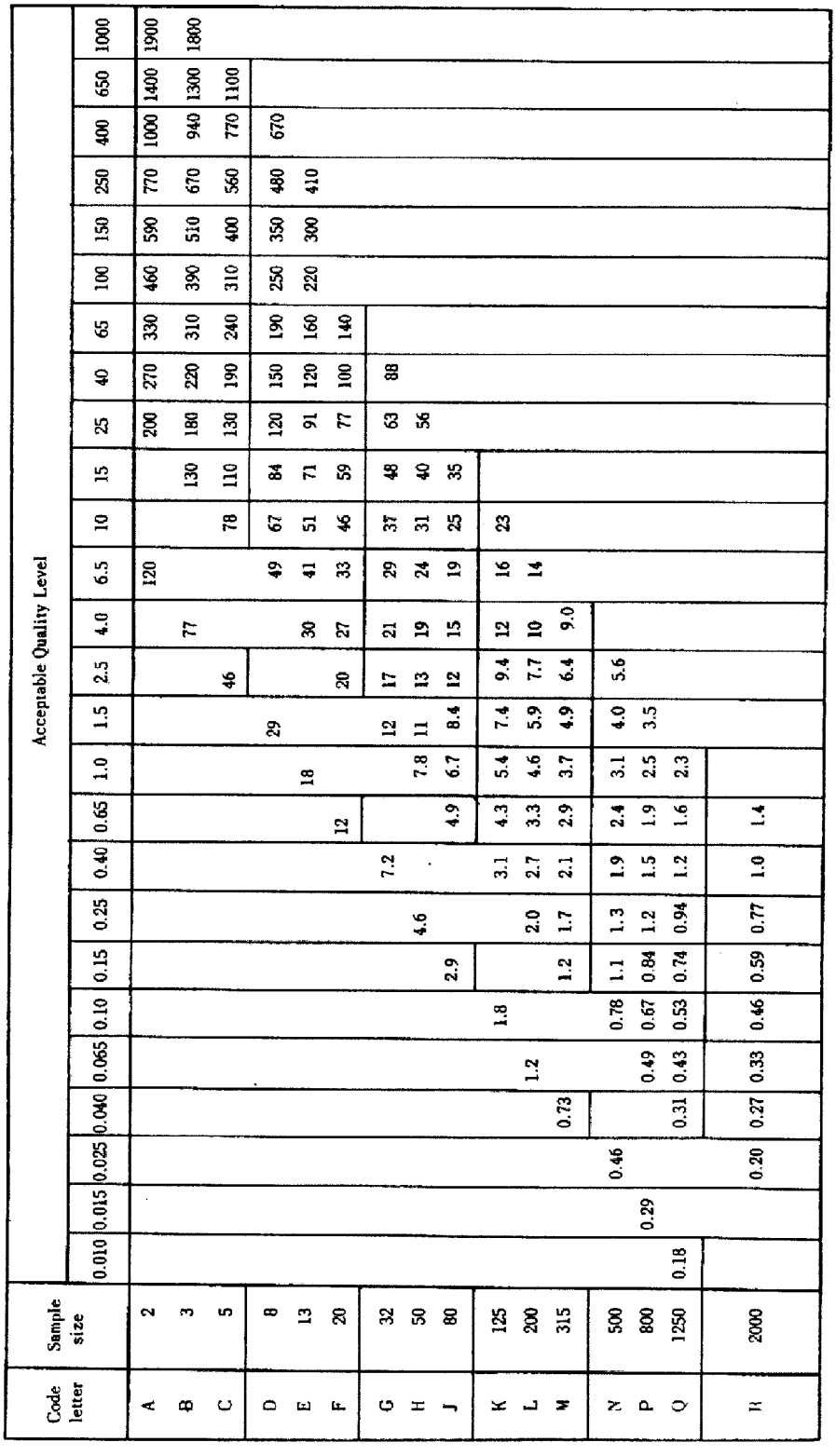


FIG. X1.4 Table VI-B Limiting Quality (In defects per hundred units) for which P_a = 10 Percent (for Normal Inspection, Single Sampling)

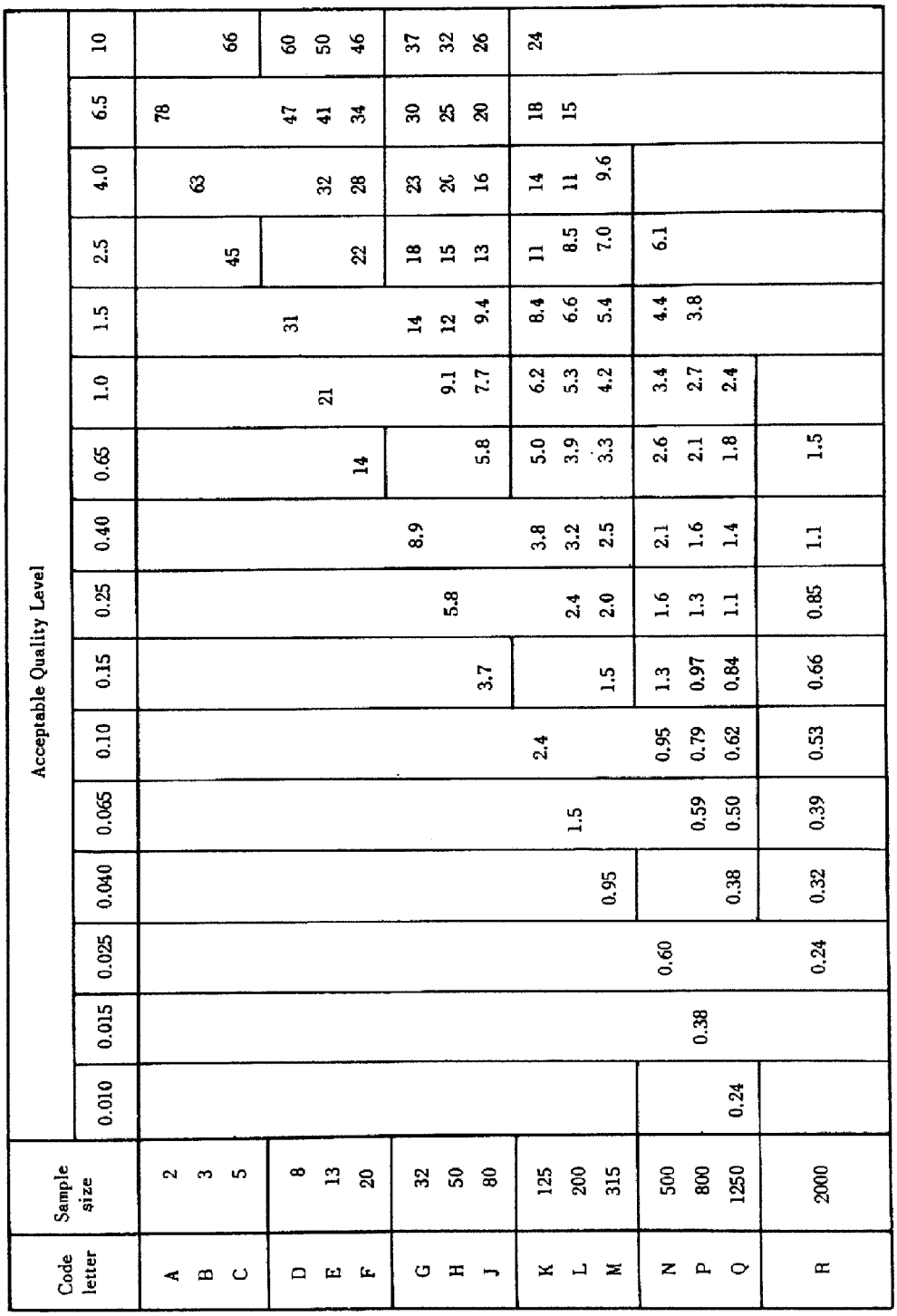


FIG. X1.5 Table VII-A Limiting Quality (in percent defective) for which P_a = 5 Percent (for Normal Inspection, Single Sampling)

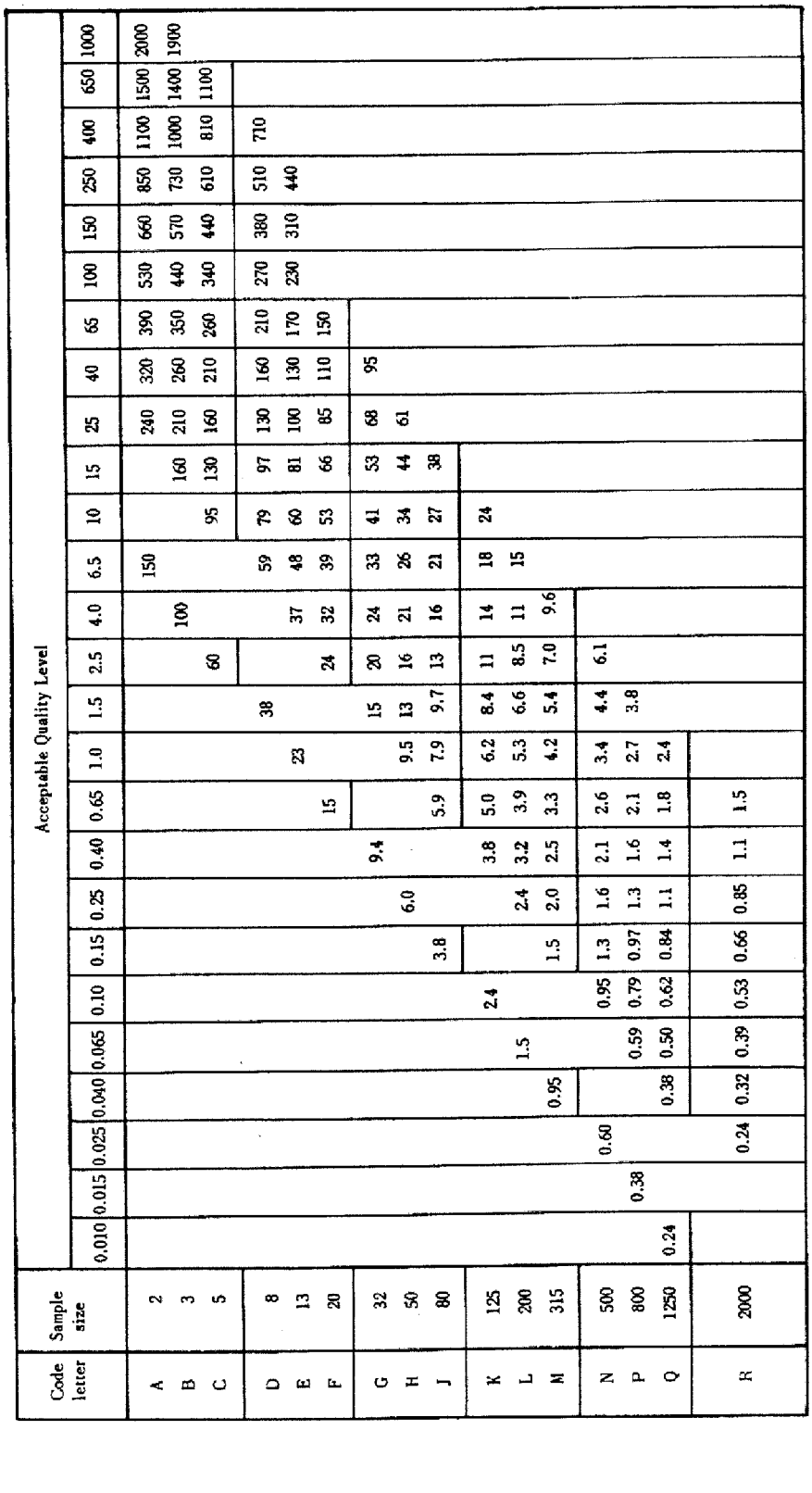
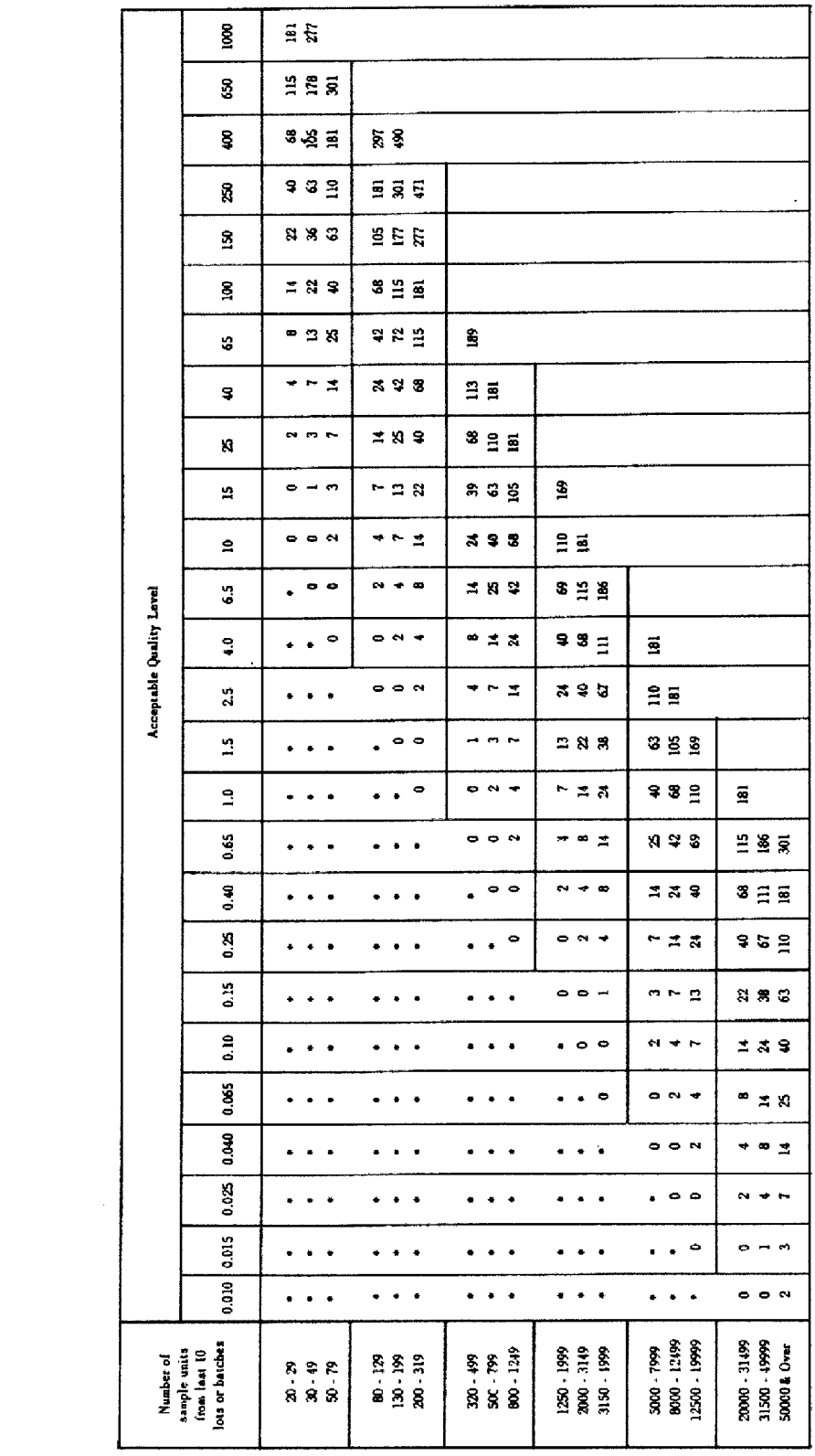


FIG. X1.6 Table VII-B Limiting Quality (in percent per hundred units) for which P_a = 5 Percent (for Normal Inspection, Single Sampling)



Number of sample units from last 10 lots or batches	Acceptable Quality Level																									
	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
20 - 29	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	2	4	8	14	22	40	68	115	181
30 - 49	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	1	3	7	13	22	36	63	105	178	277
50 - 79	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0	2	3	7	14	25	40	63	110	181	301	
80 - 129	*	*	*	*	*	*	*	*	*	*	*	*	0	0	2	4	7	14	24	42	68	105	181	297		
130 - 199	*	*	*	*	*	*	*	*	*	*	*	0	0	2	4	7	13	25	42	72	115	177	301	490		
200 - 319	*	*	*	*	*	*	*	*	*	*	0	0	2	4	8	14	22	40	68	115	181	277	471			
320 - 499	*	*	*	*	*	*	*	*	*	0	0	1	4	8	14	24	39	68	113	189						
500 - 799	*	*	*	*	*	*	*	*	*	0	2	3	7	14	25	40	63	110	181							
800 - 1249	*	*	*	*	*	*	*	0	0	2	4	7	14	24	42	68	105	181								
1250 - 1999	*	*	*	*	*	*	0	0	2	4	7	13	24	40	69	110	169									
2000 - 3149	*	*	*	*	*	0	0	2	4	8	14	22	40	68	115	181										
3150 - 1999	*	*	*	*	0	0	1	4	8	14	24	38	67	111	186											
5000 - 7999	*	*	*	0	0	2	3	7	14	25	40	63	110	181												
8000 - 12499	*	*	0	0	2	4	7	14	24	42	68	105	181													
12500 - 19999	*	0	0	2	4	7	13	24	40	69	110	169														
20000 - 31499	0	0	2	4	8	14	22	40	68	115	181															
31500 - 49999	0	1	4	8	14	24	38	67	111	186																
50000 & Over	2	3	7	14	25	40	63	110	181	301																

LIMIT NUMBERS

* Denotes that the number of sample units from the last ten lots or batches is not sufficient for reduced inspection for this AQL. In this instance more than ten lots or batches may be used for the calculation, provided that the lots or batches used are the most recent ones in sequence, that they have all been on normal inspection, and that none has been rejected while on original inspection.

FIG. X1.7 Table VIII Limit Numbers for Reduced Inspection

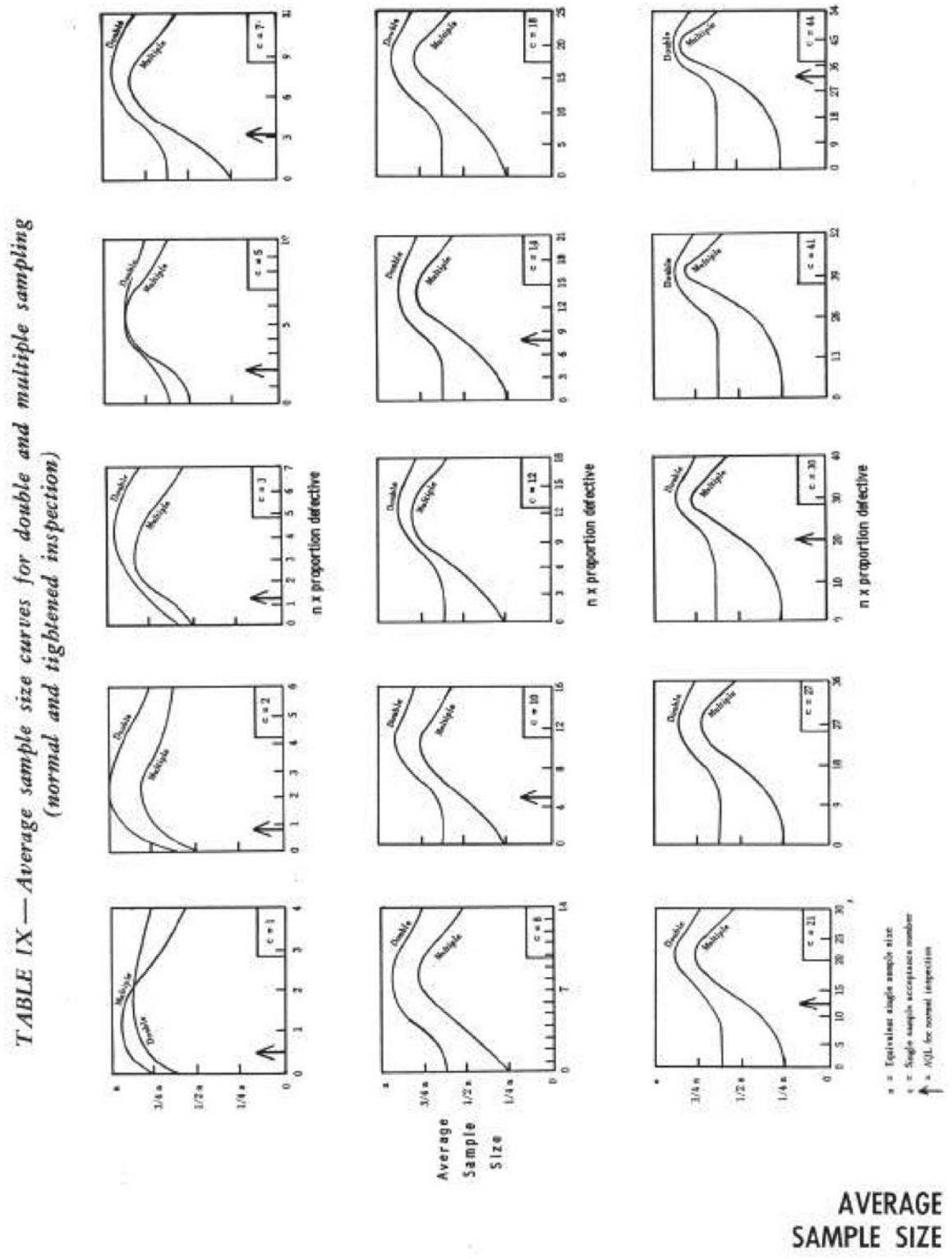


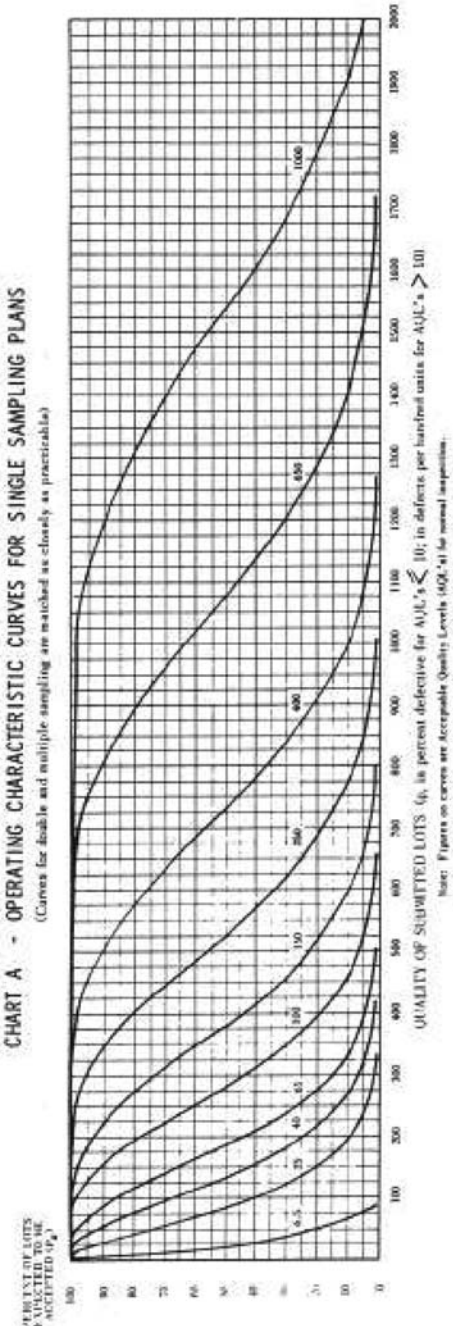
FIG. X1.8 Table IX Average Sample Size Curves for Double and Multiple Sampling (Normal and Tightened Inspection) (See6.7.3)

A

TABLE X-A—Tables for sample size code letter: A

CHART A - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)



Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-A-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																
	6.5	25	40	65	100	150	X	250	X	400	X	650	X	1000
	p (in percent defective)	p (in defects per hundred units)															
99.0	0.501	7.45	21.8	41.2	89.2	145	175	239	305	374	517	629	859	977
95.0	2.53	17.8	40.9	68.3	131	199	235	308	385	462	622	745	995	1122
90.0	5.13	26.6	55.1	87.3	158	233	272	351	432	515	684	812	1073	1206
75.0	13.4	48.1	86.8	127	211	298	342	431	521	612	795	934	1314	1354
50.0	29.3	83.9	134	184	284	383	433	533	633	733	933	1083	1383	1533
25.0	50.0	135	196	256	371	484	540	651	761	870	1087	1248	1568	1728
10.0	68.4	195	266	334	464	589	650	770	889	1006	1236	1409	1748	1916
5.0	77.6	237	315	388	526	657	722	848	972	1094	1334	1512	1862	2035
1.0	90.0	332	430	502	655	800	870	1007	1141	1272	1529	1716	2088	2270
	X	X	40	65	100	150	X	250	X	400	X	650	X	1000	X
	Acceptable Quality Levels (tightened inspection)																

Note: Binomial distribution used for percent defective computations; Poisson for defects per hundred units.

FIG. X1.9 Sample Size Code Letter A

TABLE X-A-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: A

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		Less than 6.5		6.5		X		10		15		25		40		65		100		150		X		250		X		400		X		650		X		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	Ac	Re	Ac	Re	
Single	2	▽		0	1		Use		Use		Use																										2
												1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18	19	21	22	27	28	30	31		
Double		▽		*		Letter		Letter		Letter		(*)		(*)		(*)		(*)		(*)		(*)		(*)		(*)		(*)		(*)		(*)		(*)		
						D		C		B																										
Multiple		▽		*								•		•		•		•		•		•		•		•		•		•		•		•		
		Less than 10		X		10		15		25		40		65		100		150		X		250		X		400		X		650		X		1000		
		Acceptable Quality Levels (tightened inspection)																																		

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter D).
(*) = Use single sampling (or alternatively use letter B).

A

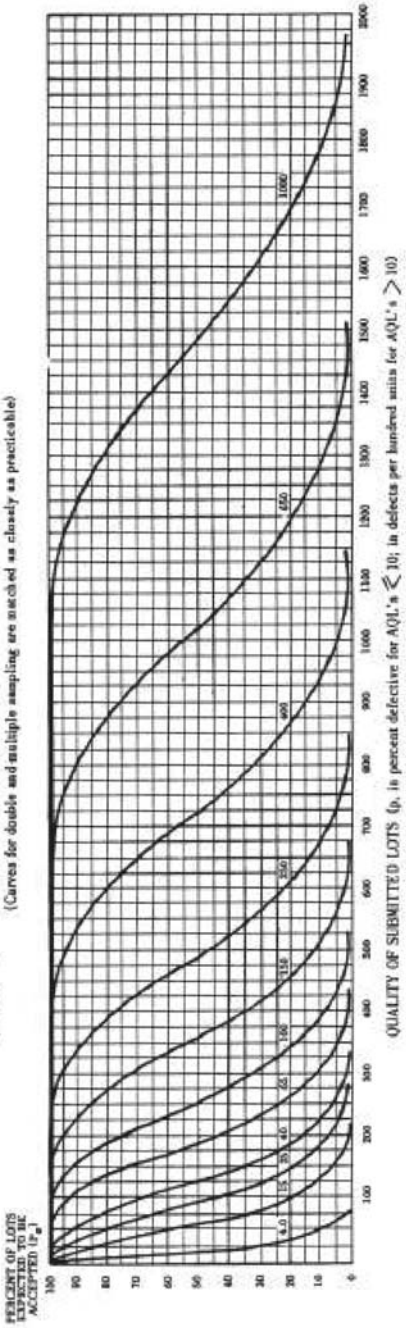
FIG. X1.9 Sample Size Code Letter A *(continued)*

TABLE X-B—Tables for sample size code letter: B

B

CHART B - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)



Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-B-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																		
	4.0	4.0	15	25	40	65	100	X	150	X	250	X	400	X	650	X	1000		
	p (in percent defective)	p (in defects per hundred units)																	
99.0	0.33	0.34	4.97	14.5	27.4	59.5	96.9	117	159	203	249	345	419	573	651	947	1029		
95.0	1.70	1.71	11.8	27.3	45.5	87.1	133	157	206	256	308	415	496	663	748	1065	1152		
90.0	3.45	3.50	17.7	36.7	58.2	105	155	181	234	288	343	456	541	716	804	1131	1222		
75.0	9.14	9.60	32.0	57.6	84.5	141	199	228	287	347	408	530	623	809	903	1249	1344		
50.0	20.6	23.1	55.9	89.1	122	189	256	289	356	422	489	622	722	922	1022	1389	1489		
25.0	37.0	46.2	89.8	131	170	247	323	360	434	507	580	724	832	1046	1152	1539	1644		
10.0	53.6	76.8	130	177	223	309	392	433	514	593	671	825	939	1165	1277	1683	1793		
5.0	63.2	99.9	158	210	258	350	438	481	565	648	730	890	1008	1241	1356	1773	1886		
1.0	78.4	154	221	280	335	437	533	580	672	761	848	1019	1145	1392	1513	1951	2069		
	6.5	6.5	25	40	65	100	X	150	X	250	X	400	X	650	X	1000	X		
	Acceptable Quality Levels (tightened inspection)																		

Note: Binomial distribution used for percent defective computations; Poisson for defects per hundred units.

FIG. X1.10 Sample Size Code Letter B

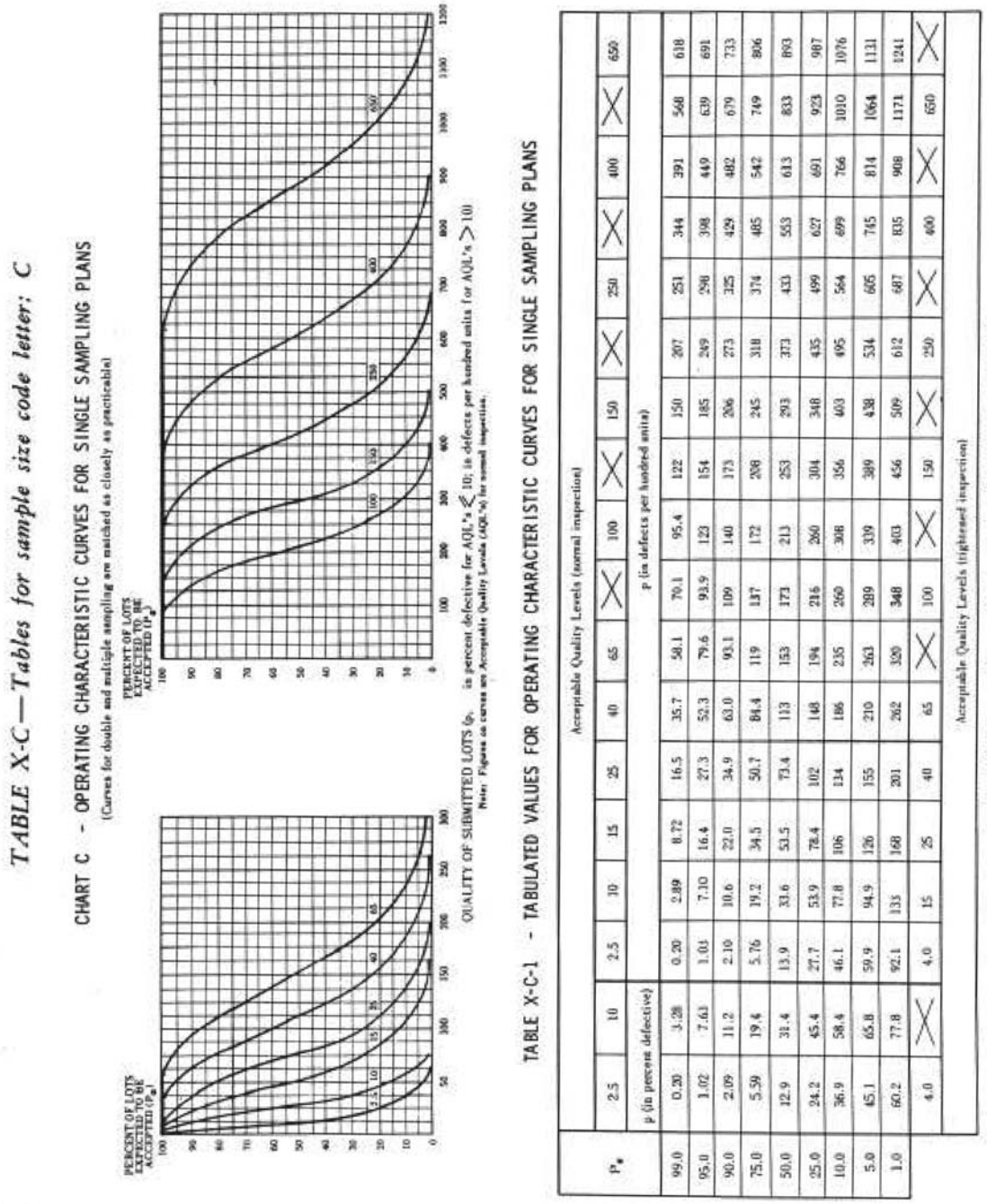
TABLE X-B-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: B

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																										Cumulative sample size
		Less than 4.0		4.0		6.5		X		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	
Single	3	▽		0	1	Use Letter		Use Letter		Use Letter																				3
Double	2	▽		*								1	2	0	2	1	3	2	5	3	7	5	9	7	11	9	14	11	16	2
	4											0	2	1	3	3	4	4	6	7	8	10	12	11	15	14	19	17	22	23	29	25	31	4
Multiple		▽		*		A		D		C		++		++		++		++		++		++		++		++		++		++		
		Less than 6.5		6.5		X		10		15		25		40		65		100		150		250		400		650		1000		X	
		Acceptable Quality Levels (tightened inspection)																												

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter E).
++ = Use double sampling plan above (or alternatively use letter D).

B

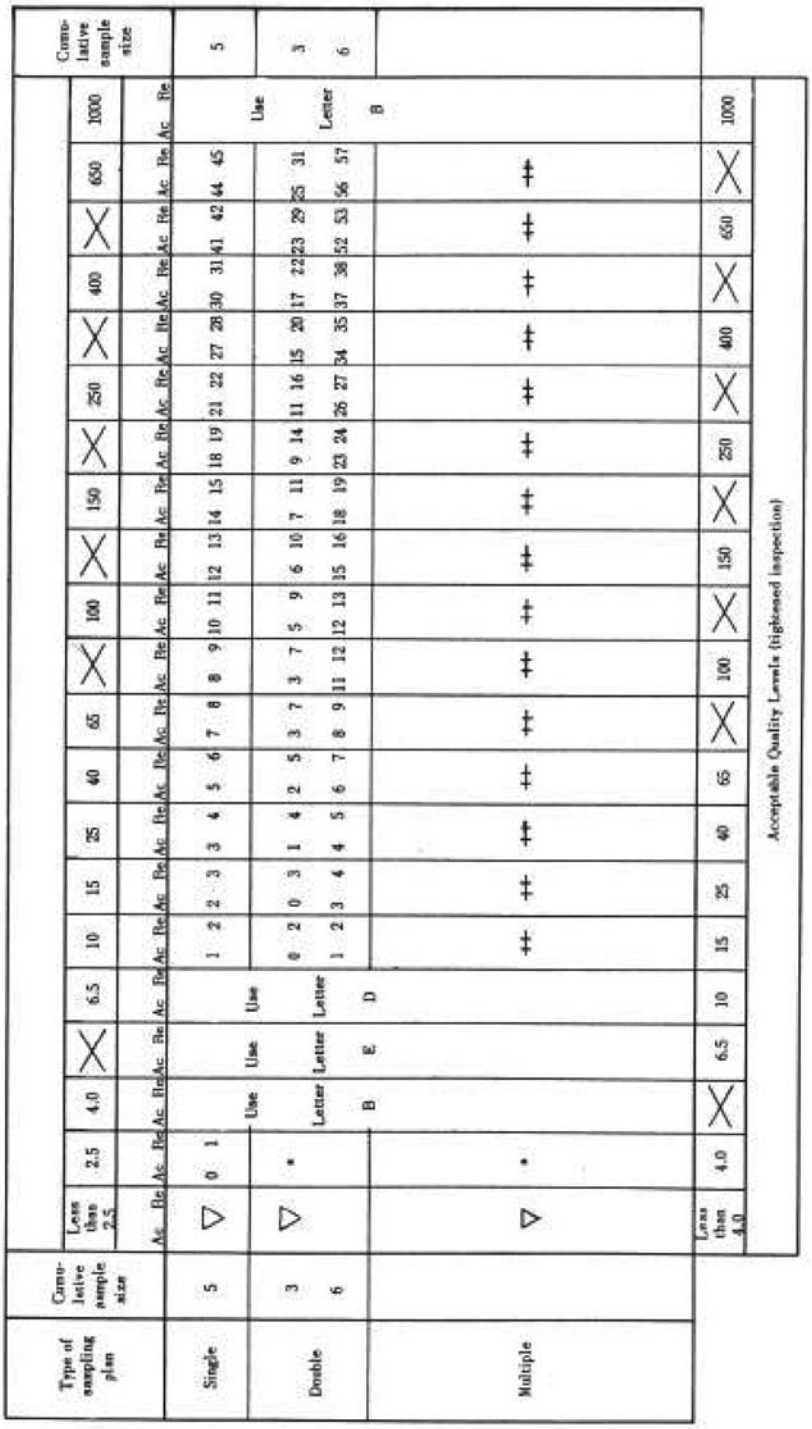
FIG. X1.10 Sample Size Code Letter B *(continued)*



C

FIG. X1.11 Sample Size Code Letter C

TABLE X-C-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: C



Type of sampling plan	Cumulative sample size	Less than 2.5 Ac	Re	2.5 Ac	Re	4.0 Ac	Re	6.5 Ac	Re	10 Ac	Re	15 Ac	Re	25 Ac	Re	40 Ac	Re	65 Ac	Re	100 Ac	Re	150 Ac	Re	250 Ac	Re	400 Ac	Re	650 Ac	Re	1000 Ac	Re	Cumulative sample size
Single	5	▽		0	1	Use Letter B				1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	21	22	30	31	5
Double	3	▽		*				Use Letter E		0	2	0	3	1	4	2	5	3	7	3	7	5	9	6	10	7	11	14	15	23	24	3
	6									1	2	3	4	4	5	6	7	8	9	11	12	12	13	15	16	18	19	24	26	37	38	6
Multiple		▽		*				Use Letter D		++		++		++		++		++		++		++		++		++		++		++		
		Less than 4.0		4.0		6.5		10		15		25		40		65		100		150		250		400		650		1000				

Acceptable Quality Levels (tightened inspection)

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number.
Re = Rejection number.
* = Use single sampling plan above (or alternatively use letter F).
++ = Use double sampling plan above (or alternatively use letter D).

C

FIG. X1.11 Sample Size Code Letter C *(continued)*

D

TABLE X-D — Tables for sample size code letter: D

CHART D - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

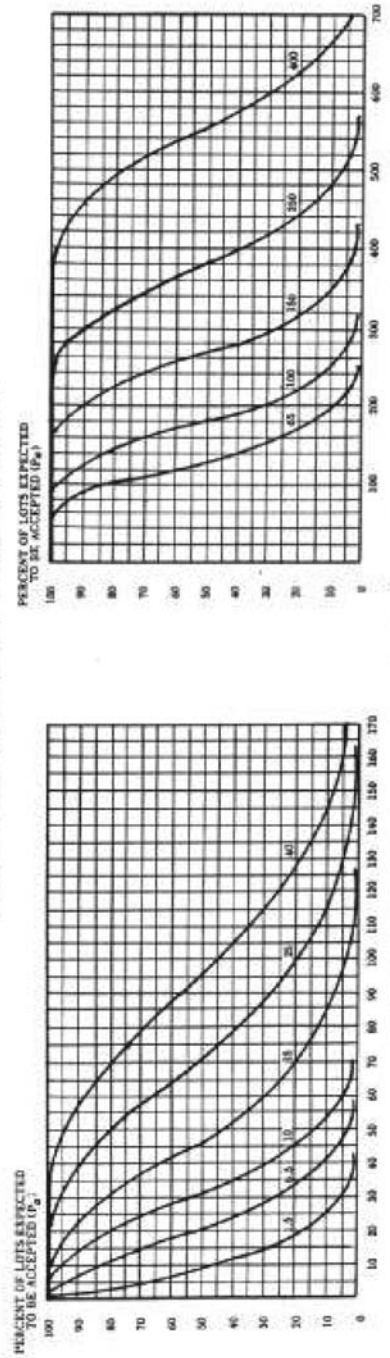


TABLE X-D-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																			
	1.5	6.5	10	1.5	6.5	10	15	25	40	65	100	150	250	400
	p (in percent defective)			p (in defects per hundred units)										
99.0	0.13	2.00	6.00	0.13	1.86	5.45	10.3	22.3	36.3	43.8	59.6	76.2	93.5	129	157	215	244	355	386
95.0	0.64	4.64	11.1	0.64	4.44	10.2	17.1	32.7	49.8	58.7	77.1	96.1	116	156	186	249	281	399	432
90.0	1.31	6.88	14.7	1.31	6.65	13.8	21.8	39.4	58.2	67.9	87.8	108	129	171	203	268	301	424	458
75.0	3.53	12.1	22.1	3.60	12.0	21.6	31.7	52.7	74.5	85.5	108	130	153	199	234	303	339	468	504
50.0	8.30	20.1	32.1	8.66	21.0	33.4	45.9	70.9	95.9	108	133	158	183	233	271	346	383	521	558
25.0	15.9	30.3	43.3	17.3	33.7	49.0	63.9	92.8	121	135	163	190	218	272	312	392	432	577	617
10.0	25.0	40.6	53.9	28.8	48.6	66.5	83.5	116	147	162	193	222	252	309	352	437	478	631	672
5.0	31.2	47.1	59.9	37.5	59.3	78.7	96.9	131	164	180	212	243	274	334	378	465	509	665	707
1.0	43.8	58.8	70.7	57.6	83.0	105	126	164	200	218	252	285	318	382	429	522	568	732	776
	2.5	10	X	2.5	10	15	25	40	X	65	X	100	X	150	X	250	X	400	X
	Acceptable Quality Levels (tightened inspection)																		

FIG. X1.12 Sample Size Code Letter D

TABLE X-D-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: D

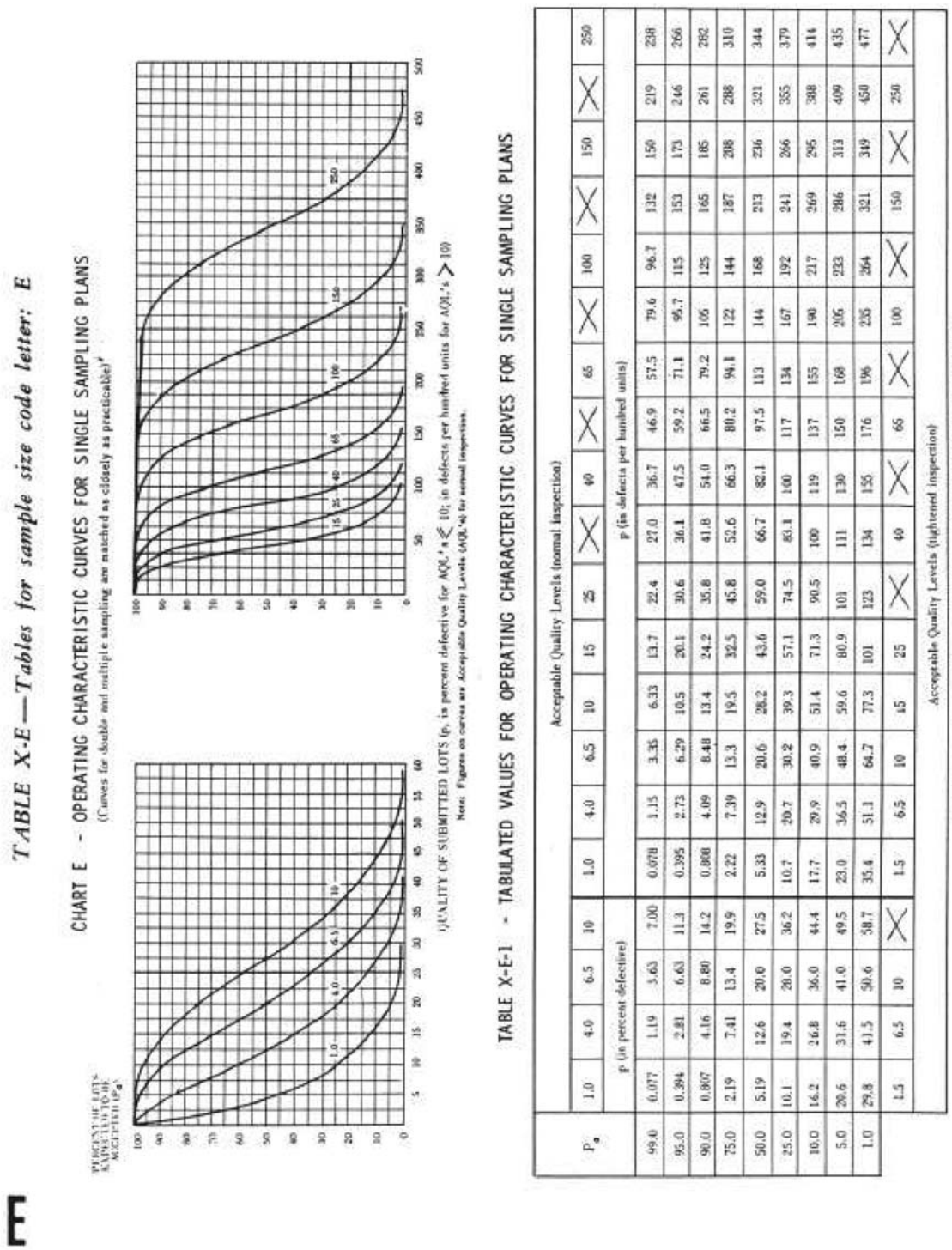
Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																																		Cumulative sample size
		Less than 1.5		1.5		2.5		X		4.0		6.5		10		15		25		40		65		100		150		250		X		400		Higher than 400		
		Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	
Single	8	▽		0	1	Use Letter		Use Letter		Use Letter				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18	19	21	22	30	31	41	42	44	45	△		8
Double	5	▽		*										0	2	0	3	1	4	2	5	3	7	5	9	6	10	7	11	9	14	11	16	15	20	17	22	23	29	25	31	△		5
	10													1	2	3	4	4	5	6	7	8	9	12	13	15	16	18	19	23	24	26	27	34	35	37	38	52	53	56	57			10
Multiple	2	▽		*				C		F		G		#	2	#	2	#	3	#	4	0	4	0	5	0	6	1	7	1	8	2	9	3	10	4	12	6	15	6	16	△		2
	4													#	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12	7	14	10	17	11	19	16	25	17	27			4
	6													0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19	17	24	19	27	26	36	29	39			6
	8													0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25	24	31	27	34	37	46	40	49			8
	10													1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29	32	37	36	40	49	55	53	58			10
	12													1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33	40	43	45	47	61	64	65	68			12
	14													2	3	4	5	6	7	9	10	13	14	15	18	19	21	22	25	26	32	33	37	38	48	49	53	54	72	73	77	78			14
		Less than 2.5		2.5		X		4.0		6.5		10		15		25		40		X		100		150		X		400		X		Higher than 400				

Acceptable Quality Levels (tightened inspection)

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter G).
# = Acceptance not permitted at this sample size.

D

FIG. X1.12 Sample Size Code Letter D *(continued)*



P_a	Acceptable Quality Levels (normal inspection)																							
	1.0	4.0	6.5	10	1.0	4.0	6.5	10	15	25	40	65	100	150	250	1.0	4.0	6.5	10	15	25	40	65	100	150	250
	p (in percent defective)				p (in defects per hundred units)																					
99.0	0.077	1.19	3.63	7.00	0.078	1.15	3.35	6.33	13.7	22.4	27.0	36.7	46.9	57.5	79.6	96.7	132	150	219	238						
95.0	0.394	2.81	6.63	11.3	0.395	2.73	6.29	10.5	20.1	30.6	36.1	47.5	59.2	71.1	95.7	115	153	173	246	266						
90.0	0.807	4.16	8.80	14.2	0.808	4.09	8.48	13.4	24.2	35.8	41.8	54.0	66.5	79.2	105	125	165	185	261	282						
75.0	2.19	7.41	13.4	19.9	2.22	7.39	13.3	19.5	32.5	45.8	52.6	66.3	80.2	94.1	122	144	187	208	288	310						
50.0	5.19	12.6	20.0	27.5	5.33	12.9	20.6	28.2	43.6	59.0	66.7	82.1	97.5	113	144	168	213	236	321	344						
25.0	10.1	19.4	28.0	36.2	10.7	20.7	30.2	39.3	57.1	74.5	83.1	100	117	134	167	192	243	266	355	379						
10.0	16.2	26.8	36.0	44.4	17.7	29.9	40.9	51.4	71.3	90.5	100	119	137	155	190	217	269	295	388	414						
5.0	20.6	31.6	41.0	49.5	23.0	36.5	48.4	59.6	80.9	101	111	130	150	168	205	233	286	313	409	435						
1.0	29.8	41.5	50.6	58.7	35.4	51.1	64.7	77.3	101	123	134	155	176	196	235	264	321	349	450	477						
	1.5	6.5	10	X	1.5	6.5	10	15	25	X	40	65	X	100	X	150	150	X	250	X						
	Acceptable Quality Levels (tightened inspection)																									

Note: Binomial distribution used for percent defective computations; Poisson for defects per hundred units.

FIG. X1.13 Sample Size Code Letter E

TABLE X-E-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: E

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		Less than 1.0		1.0		1.5		X		2.5		4.0		6.5		10		15		25		X		40		65		100		150		250		Higher than 250	
		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
Single	13	▽		0	1	Use		Use		Use		1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	18	19	21	22	27	28	30	31	41	42	44	45	△		13
Double	8	▽		*		Letter		Letter		Letter		0	2	0	3	1	4	2	5	3	7	3	7	5	9	6	10	7	11	9	14	11	16	15	20	17	22	23	29	25	31	△		8
	16											1	2	3	4	4	5	6	7	8	9	11	12	13	15	16	18	19	23	24	26	27	34	35	37	38	52	53	56	57			16
Multiple	3	▽		*		D		G		F		*	2	*	2	*	3	4	5	4	7	4	7	5	9	6	10	6	11	7	14	11	16	15	20	17	22	23	29	25	31	△		3
	6											*	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12	7	14	10	17	11	19	16	25	17	27			6
	9											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19	17	24	19	27	26	36	29	39			9
	12											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25	24	31	27	34	37	46	40	49			12
	15											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29	32	37	36	40	49	55	53	58			15
	18											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33	40	43	45	47	61	64	65	68			18
	21											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38	48	49	53	54	72	73	77	78			21
	Less than 1.5																																							Higher than 250	
		Acceptable Quality Levels (tightened inspection)																																							

△ = Use next preceding sample size-code letter for which acceptance and rejection numbers are available.

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.

Ac = Acceptance number.

Re = Rejection number.

* = Use single sampling plan above (or alternatively use letter H).

= Acceptance not permitted at this sample size.

E

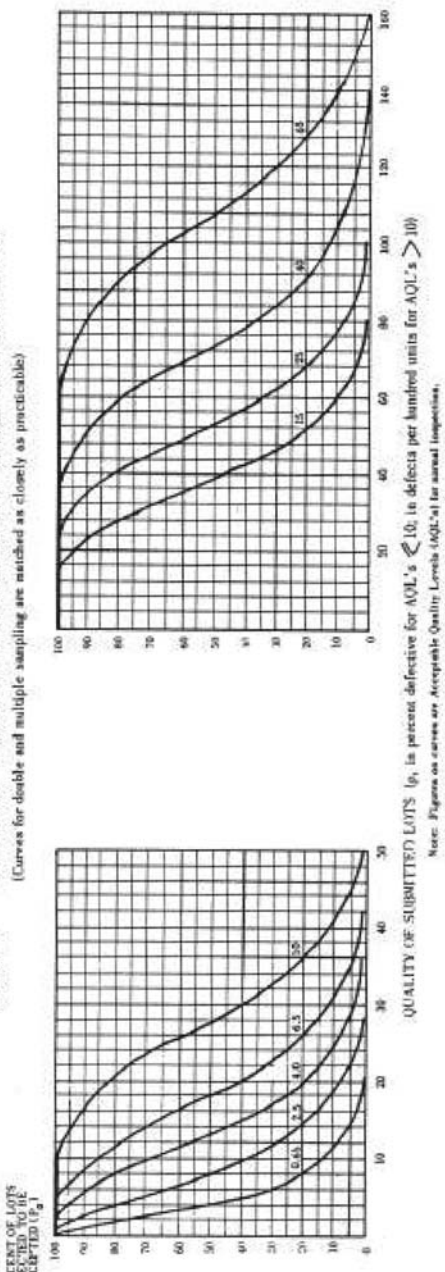
FIG. X1.13 Sample Size Code Letter E *(continued)*

F

TABLE X-F—Tables for sample size code letter: F

CHART F - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)



Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-F-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																			
	0.65	2.5	4.0	6.5	10	0.65	2.5	4.0	6.5	10	15	X	25	X	40	X	65			
	p (in percent defective)					p (in defects per hundred units)														
99.0	0.050	0.75	2.25	4.31	9.75	0.051	0.75	2.18	4.12	8.92	14.5	17.5	23.9	30.5	37.4	51.7	62.9			
95.0	0.256	1.80	4.22	7.13	14.0	0.257	1.78	4.09	6.83	13.1	19.9	23.5	30.8	38.5	46.2	62.2	74.5			
90.0	0.525	2.69	5.64	9.03	16.6	0.527	2.66	5.51	8.73	15.8	23.3	27.2	35.1	43.2	51.5	68.4	81.2			
75.0	1.43	4.81	8.70	12.8	21.6	1.44	4.81	8.68	12.7	21.1	29.8	34.2	43.1	52.1	61.2	79.5	93.4			
50.0	3.41	8.25	13.1	18.1	27.9	3.47	8.39	13.4	18.4	28.4	38.3	43.3	53.3	63.3	73.3	93.3	108			
25.0	6.70	12.9	18.7	24.2	34.8	6.93	13.5	19.6	25.5	37.1	48.4	54.0	65.1	76.1	87.0	109	125			
10.0	10.9	18.1	24.5	30.4	41.5	11.5	19.5	26.6	33.4	46.4	58.9	65.0	77.0	88.9	101	124	141			
5.0	13.9	21.6	28.3	34.4	45.6	15.0	23.7	31.5	38.8	52.6	65.7	72.2	84.8	97.2	109	133	151			
1.0	20.6	28.9	35.6	42.0	53.4	23.0	33.2	42.0	50.2	65.5	80.0	87.0	101	114	127	153	172			
	1.0	4.0	6.5	10	X	1.0	4.0	6.5	10	15	X	25	X	40	X	65	X			
	Acceptable Quality Levels (tightened inspection)																			

Note: Binomial distribution used for percent defective comparisons; Poisson for defects per hundred units.

FIG. X1.14 Sample Size Code Letter F

TABLE X-F-2 – SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: F

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																										Cumulative sample size
		Less than 0.65		0.65		1.0		X		1.5		2.5		4.0		6.5		10		15		25		40		X		65		Higher than 65	
		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	
Single	20	▽		0	1	Use Letter E		Use Letter H		Use Letter G		1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	18	19	21	22	△		20
Double	13	▽		*								0	2	0	3	1	4	2	5	3	6	3	7	5	9	6	10	7	11	9	14	11	16	△		13
	26											1	2	3	4	4	5	6	7	8	9	11	12	12	13	15	16	18	19	23	24	26	27			26
Multiple	5	▽		*								*	2	*	2	*	3	#	4	0	4	0	5	0	6	1	7	1	8	2	9	△		5
	10											*	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	7	14			10
	15											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19			15
	20											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25			20
	25											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29			25
	30											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33			30
	35											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38			35
		Less than 1.0		1.0		X		1.5		2.5		4.0		6.5		10		15		X		25		X		40		65		X		Higher than 65	

Acceptable Quality Levels (tightened inspection)

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter J).
# = Acceptance not permitted at this sample size.

F

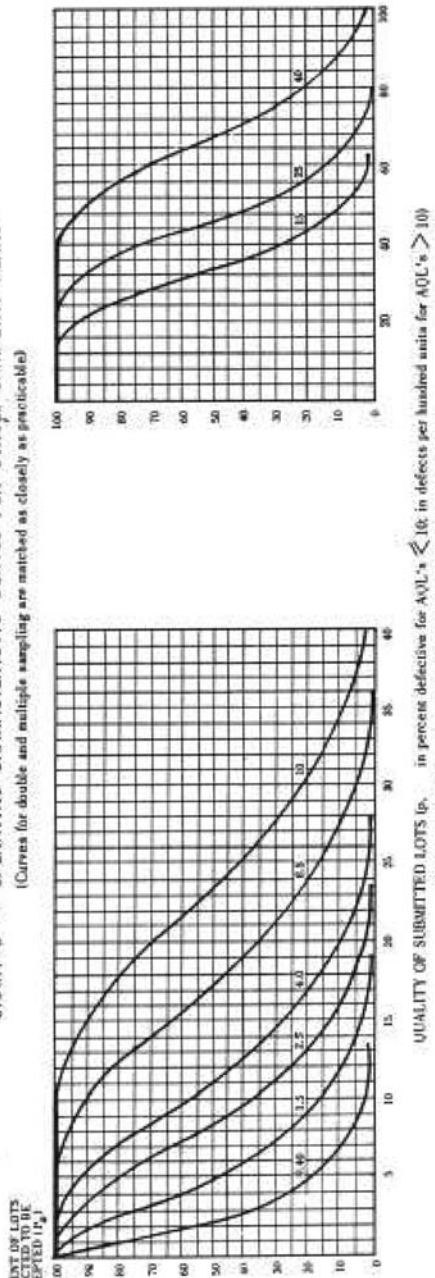
FIG. X1.14 Sample Size Code Letter F *(continued)*

G

TABLE X-G—Tables for sample size code letter: G

CHART G - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)



QUALITY OF SUBMITTED LOTS $(p_t$, in percent defective for AQL's ≤ 10; in defects per hundred units for AQL's $> 10)$

Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-G-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																				
	0.40	1.5	2.5	4.0	6.5	10	0.40	1.5	2.5	4.0	6.5	10	15	25	40
	p (in percent defective)						p (in defects per hundred units)								
99.0	0.032	0.475	1.38	2.63	5.94	9.75	0.032	0.466	1.36	2.57	5.57	9.08	11.0	14.9	19.1	23.4	32.3	39.3
95.0	0.161	1.33	2.59	4.39	8.50	13.1	0.160	1.10	2.55	4.26	8.16	12.4	14.7	19.3	24.0	28.9	38.9	46.5
90.0	0.329	1.67	3.50	5.56	10.2	15.1	0.328	1.66	3.44	5.45	9.85	14.6	17.0	21.9	27.0	32.2	42.7	50.8
75.0	0.895	3.01	5.42	7.98	13.4	19.0	0.900	3.00	5.39	7.92	13.2	18.6	21.4	26.9	32.6	38.2	49.7	58.4
50.0	2.14	5.19	8.27	11.4	17.5	23.7	2.16	5.24	8.35	11.5	17.7	24.0	27.1	33.3	39.6	45.8	58.3	67.7
25.0	4.23	8.19	11.9	15.4	22.3	29.0	4.33	8.41	12.3	16.0	23.2	30.3	33.8	40.7	47.6	54.4	67.9	78.0
10.0	6.94	11.6	15.0	19.7	27.1	34.1	7.19	12.2	16.6	20.9	29.0	36.8	40.6	48.1	55.6	62.9	77.4	88.1
5.0	8.94	14.0	18.4	22.5	30.1	37.2	9.36	14.8	19.7	24.2	32.9	41.1	45.1	53.0	60.8	68.4	83.4	94.5
1.0	13.5	19.0	23.7	28.0	35.9	43.3	14.4	20.7	26.3	31.4	41.0	50.0	54.4	63.0	71.3	79.5	95.6	107
	0.65	2.5	4.0	6.5	10	X	0.65	2.5	4.0	6.5	10	X	15	X	25	X	40	X
	Acceptable Quality Levels (tightened inspection)																	

Note: Binomial distribution used for percent defective computations; Poisson for defects per hundred units.

FIG. X1.15 Sample Size Code Letter G

TABLE X-G-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: G

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																														Cumulative sample size
		Less than 0.40		0.40		0.65		1.0		1.5		2.5		4.0		6.5		10		15		25		40		Higher than 40		
		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	
Single	32	▽		0	1	Use		Use		1	2	2	3	3	4	5	6	7	8	8	9	12	13	18	19	26	27	△		32
Double	20	▽		*						0	2	0	3	1	4	2	5	3	7	5	9	7	11	11	15	19	22	△		20
	40					Letter	Letter	Letter	Letter	1	2	3	4	4	5	6	7	8	9	11	12	15	16	23	24					40
Multiple	8	▽		*		F		J		#	2	#	2	#	3	#	4	0	4	0	5	1	7	2	9	5	12	△		8
	16									#	2	0	3	0	3	1	5	1	6	2	7	3	9	6	12	9	14			16
	24									0	2	0	3	1	4	2	6	3	8	4	9	6	10	11	17	13	19			24
	32									0	3	1	4	2	5	3	7	5	10	6	11	8	13	16	22	19	25			32
	40									1	3	2	4	3	6	5	8	7	11	9	12	11	15	20	25	25	29			40
	48									1	3	3	5	4	6	7	9	10	12	12	14	14	17	23	27	31	33			48
	56									2	3	4	5	6	7	9	10	13	14	14	15	18	19	26	32	37	38			56
		Less than 0.65		0.65		X		1.0		1.5		2.5		4.0		6.5		10		X		X		X		X		Higher than 40	
		Acceptable Quality Levels (tightened inspection)																											

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.

Ac = Acceptance number.

Re = Rejection number.

* = Use single sampling plan above (or alternatively use letter E).

= Acceptance not permitted at this sample size.

G

FIG. X1.15 Sample Size Code Letter G *(continued)*

H

TABLE X-H—Tables for sample size code letter: H

CHART H - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

TABLE X-H-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)																							
	0.25	1.0	1.5	2.5	4.0	6.5	X	10	0.25	1.0	1.5	2.5	4.0	6.5	X	10	X	15	X	25
	p (in percent defective)								p (in defects per hundred units)											
99.0	0.020	0.306	0.888	1.69	3.66	6.06	7.41	11.1	0.020	0.298	0.872	1.65	3.57	5.81	7.01	9.54	12.2	15.0	20.7	25.1
95.0	0.103	0.712	1.66	2.77	5.34	8.29	9.74	12.9	0.103	0.710	1.64	2.73	5.23	7.96	9.39	12.3	15.4	18.5	24.9	29.8
90.0	0.210	1.07	2.23	3.54	6.42	9.53	11.2	14.5	0.210	1.06	2.20	3.49	6.30	9.31	10.9	14.0	17.3	20.6	27.3	32.5
75.0	0.574	1.92	3.46	5.09	8.51	12.0	13.8	17.5	0.576	1.92	3.45	5.07	8.44	11.9	13.7	17.2	20.8	24.5	31.8	37.4
50.0	1.38	3.33	5.31	7.30	11.3	15.2	17.2	21.2	1.39	3.36	5.35	7.34	11.3	15.3	17.3	21.6	25.3	29.3	37.3	43.3
25.0	2.74	5.30	7.70	10.0	14.5	18.8	21.0	25.2	2.77	5.39	7.84	10.2	14.8	19.4	21.6	26.0	30.4	34.8	43.5	49.9
10.0	4.50	7.56	10.3	12.9	17.8	22.4	24.7	29.1	4.61	7.78	10.6	13.4	18.6	23.5	26.0	30.8	35.6	40.3	49.5	56.4
5.0	5.82	9.13	12.1	14.8	19.9	24.7	27.0	31.6	5.99	9.49	12.6	15.5	21.0	26.3	28.9	33.9	38.9	43.8	53.4	60.5
1.0	8.80	12.5	15.9	18.8	24.3	29.2	31.7	36.3	9.21	13.3	16.8	20.1	26.2	32.0	34.8	40.3	45.6	50.9	61.1	68.7
	0.40	1.5	2.5	4.0	6.5	X	10	X	0.40	1.5	2.5	4.0	6.5	X	10	X	15	X	25	X
	Acceptable Quality Levels (tightened inspection)																			

Note: Binomial distribution used for percent defective computations; Poisson for defects per hundred units.

FIG. X1.16 Sample Size Code Letter H

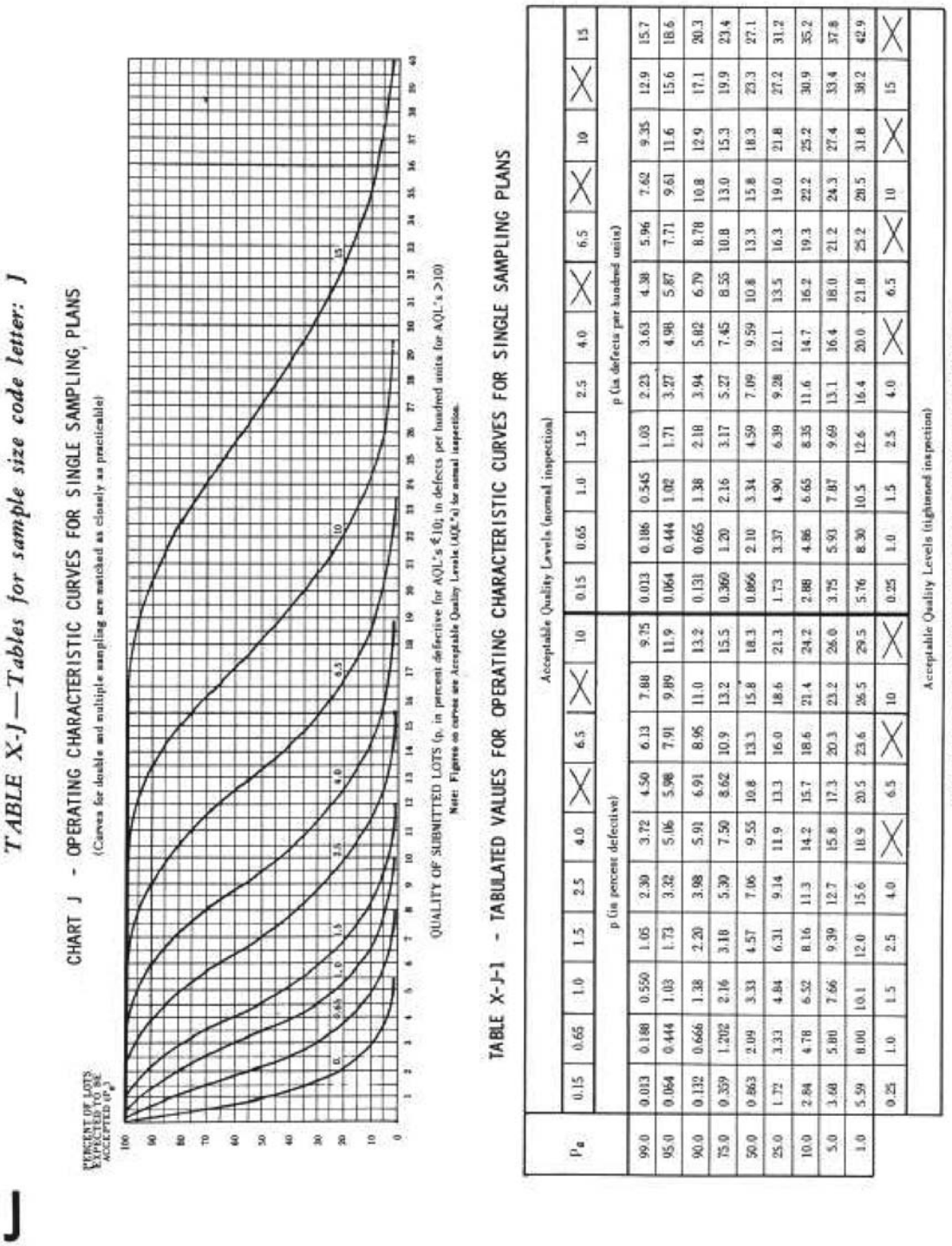
TABLE X-H-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: H

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																														Cumulative sample size
		Less than 0.25		0.25		0.40		X		0.65		1.0		1.5		2.5		4.0		6.5		10		15		25		Higher than 25		
		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	
Single	50	▽		0	1	Use Letter G		Use Letter K		Use Letter J		1	2	3	4	4	5	5	6	7	8	8	9	12	13	14	15	△		50
Double	32	▽		•								0	2	0	3	1	4	2	5	3	7	7	9	11	16	18	19	△		32
	64											1	3	3	4	4	5	6	7	8	9	11	12	15	16	23	24			64
Multiple	13	▽		•								*	2	*	3	*	3	4	5	6	7	8	9	12	13	16	17	△		13
	26											*	2	0	3	0	3	5	6	7	8	10	11	14	15	20	21			26
	39											0	3	0	3	1	4	6	7	9	10	12	13	17	18	23	24			39
	52											0	3	1	4	2	5	7	8	10	11	13	14	18	19	25	26			52
	65											1	3	2	4	3	6	8	9	11	12	15	16	20	21	27	28			65
	78											1	3	3	5	4	6	9	10	12	13	17	18	23	24	31	32			78
	91											2	3	4	5	6	7	10	11	13	14	18	19	24	25	32	33			91
		Less than 0.40		0.40		X		0.65		1.0		1.5		2.5		4.0		6.5		X		15		X		25		Higher than 25		
		Acceptable Quality Levels (tightened inspection)																												

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
• = Use single sampling plan above (or alternatively use letter L).
* = Acceptance not permitted at this sample size.

H

FIG. X1.16 Sample Size Code Letter H *(continued)*



P_a	0.15	0.65	1.0	1.5	2.5	4.0	X	6.5	X	10
99.0	0.013	0.180	0.550	1.05	2.30	3.72	4.50	6.13	7.88	9.75
95.0	0.064	0.444	1.03	1.73	3.32	5.06	5.98	7.91	9.89	11.9
90.0	0.132	0.666	1.38	2.20	3.98	5.91	6.91	8.95	11.0	13.2
75.0	0.359	1.202	2.16	3.18	5.30	7.50	8.62	10.9	13.2	15.5
50.0	0.863	2.09	3.33	4.57	7.06	9.55	10.8	13.3	15.8	18.3
25.0	1.72	3.33	4.84	6.31	9.14	11.9	13.3	16.0	18.6	21.3
10.0	2.84	4.78	6.52	8.16	11.3	14.2	15.7	18.6	21.4	24.2
5.0	3.68	5.80	7.66	9.39	12.7	15.8	17.3	20.3	23.2	26.0
1.0	5.59	8.00	10.1	12.0	15.6	18.9	20.5	23.6	26.5	29.5
0.25	1.0	1.5	2.5	4.0	X	6.5	X	10	X	15

P_a	0.15	0.65	1.0	1.5	2.5	4.0	X	6.5	X	10	X	15
99.0	0.013	0.186	0.545	1.03	2.23	3.63	4.38	5.96	7.62	9.35	12.9	15.7
95.0	0.064	0.444	1.02	1.71	3.27	4.98	5.87	7.71	9.61	11.6	15.6	18.6
90.0	0.132	0.665	1.38	2.18	3.94	5.82	6.79	8.78	10.8	12.9	17.1	20.3
75.0	0.359	1.20	2.16	3.17	5.27	7.45	8.55	10.8	13.0	15.3	19.9	23.4
50.0	0.866	2.10	3.34	4.59	7.09	9.59	10.8	13.3	15.8	18.3	23.3	27.1
25.0	1.73	3.37	4.90	6.39	9.28	12.1	13.5	16.3	19.0	21.8	27.2	31.2
10.0	2.88	4.86	6.65	8.35	11.6	14.7	16.2	19.3	22.2	25.2	30.9	35.2
5.0	3.75	5.93	7.87	9.69	13.1	16.4	18.0	21.2	24.3	27.4	33.4	37.8
1.0	5.76	8.30	10.5	12.6	16.4	20.0	21.8	25.2	28.5	31.8	38.2	42.9
0.25	1.0	1.5	2.5	4.0	X	6.5	X	10	X	15	X	

FIG. X1.17 Sample Size Code Letter J

TABLE X-J-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: J

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																																		Cumulative sample size
		Less than 0.15		0.15		0.25		X		0.40		0.65		1.0		1.5		2.5		4.0		X		6.5		X		10		X		15		Higher than 15		
		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	
Single	80	▽		0	1			Use Letter H		Use Letter L		Use Letter K		1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	18	19	21	22	△		80
Double	50	▽		*										0	2	0	3	1	4	2	5	3	6	4	7	5	9	6	10	7	11	10	15	11	16	△		50
	100													1	2	3	4	4	5	6	7	8	9	9	11	12	13	15	16	18	19	23	24	26	27			100
Multiple	20	▽		*										*	2	*	2	*	3	4	5	5	7	6	8	7	9	8	10	9	12	11	14	12	16	△		20
	40													*	2	0	3	0	3	1	5	2	6	3	8	4	9	5	10	6	12	7	14	8	17			40
	60													0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19			60
	80													0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25			80
	100													1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29			100
	120													1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33			120
	140													2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38			140
		Less than 0.25		0.25		X		0.40		0.65		1.0		1.5		2.5		4.0		X		6.5		X		10		X		15		Higher than 15		

Acceptable Quality Levels (tightened inspection)

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.

Ac = Acceptance number

Re = Rejection number

* = Use single sampling plan above (or alternatively use letter M)

\# = Acceptance not permitted at this sample size.

FIG. X1.17 Sample Size Code Letter J *(continued)*

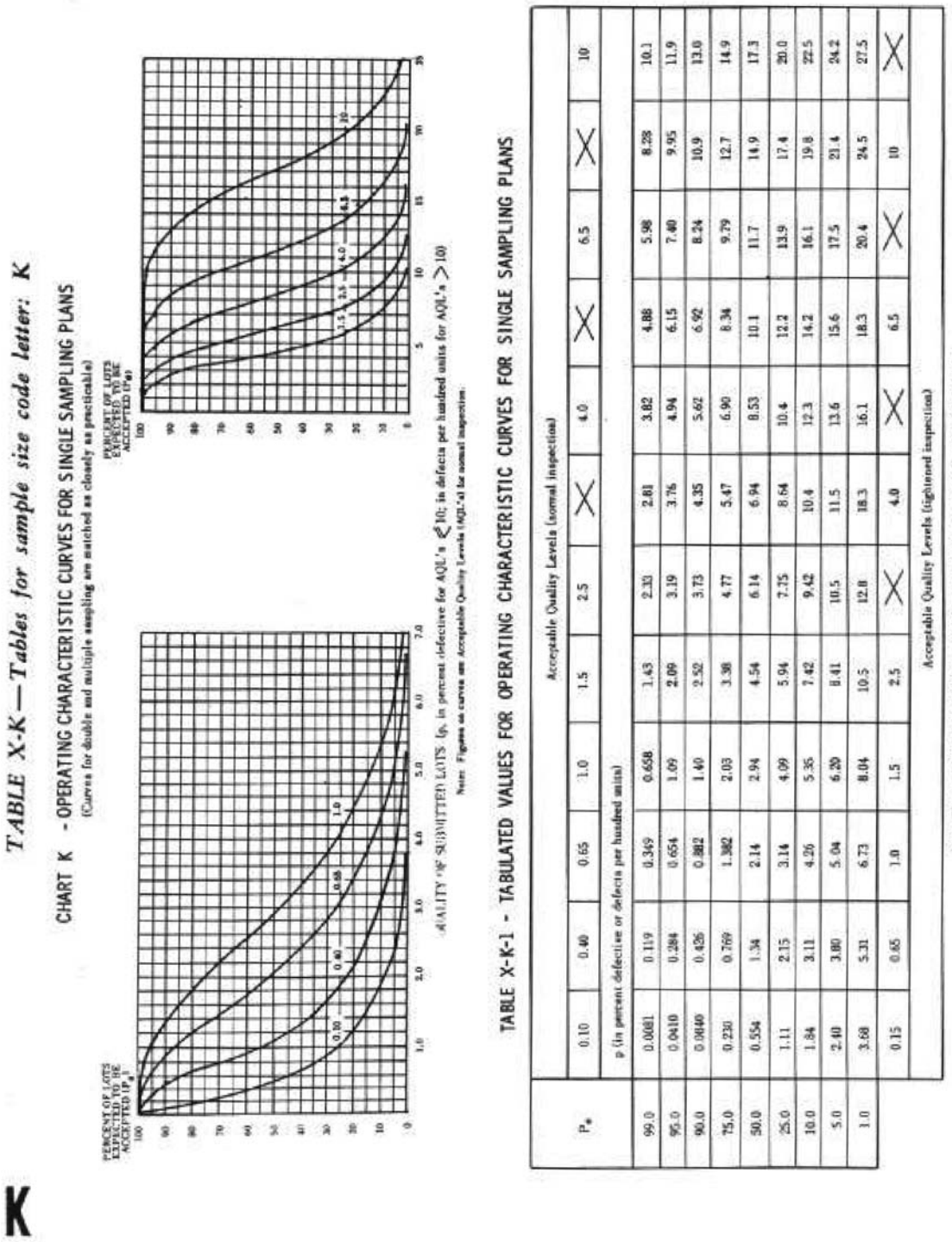


FIG. X1.18 Sample Size Code Letter K

TABLE X-K-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: K

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		Less than 0.10		0.10		0.15				0.25		0.40		0.65		1.0		1.5		2.5		4.0		6.5		10		Higher than 10		
		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	
Single	125	▽		0	1	Use Letter J		Use Letter M		Use Letter L		1	2	2	3	3	4	5	6	7	8	8	9	12	13	19	20	△		125
Double	80	▽		*								0	2	0	3	1	4	2	5	3	7	3	7	5	9	11	12	△		80
	160											-1	2	3	4	4	5	6	7	8	9	11	12	12	13	26	27			160
Multiple	32	▽		*								#	2	#	2	#	3	#	4	0	4	0	4	0	5	1	7	△		32
	64											#	2	0	3	0	3	1	5	1	6	2	7	3	8	4	10			64
	96											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12			96
	128											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15			128
	160											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17			160
	192											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20			192
	224											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22			224
		Less than 0.15		0.15		X		0.25		0.40		0.65		1.0		1.5		2.5		X		4.0		X		6.5		X		Higher than 10
		Acceptable Quality Levels (tightened inspection)																												

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.

Ac = Acceptance number

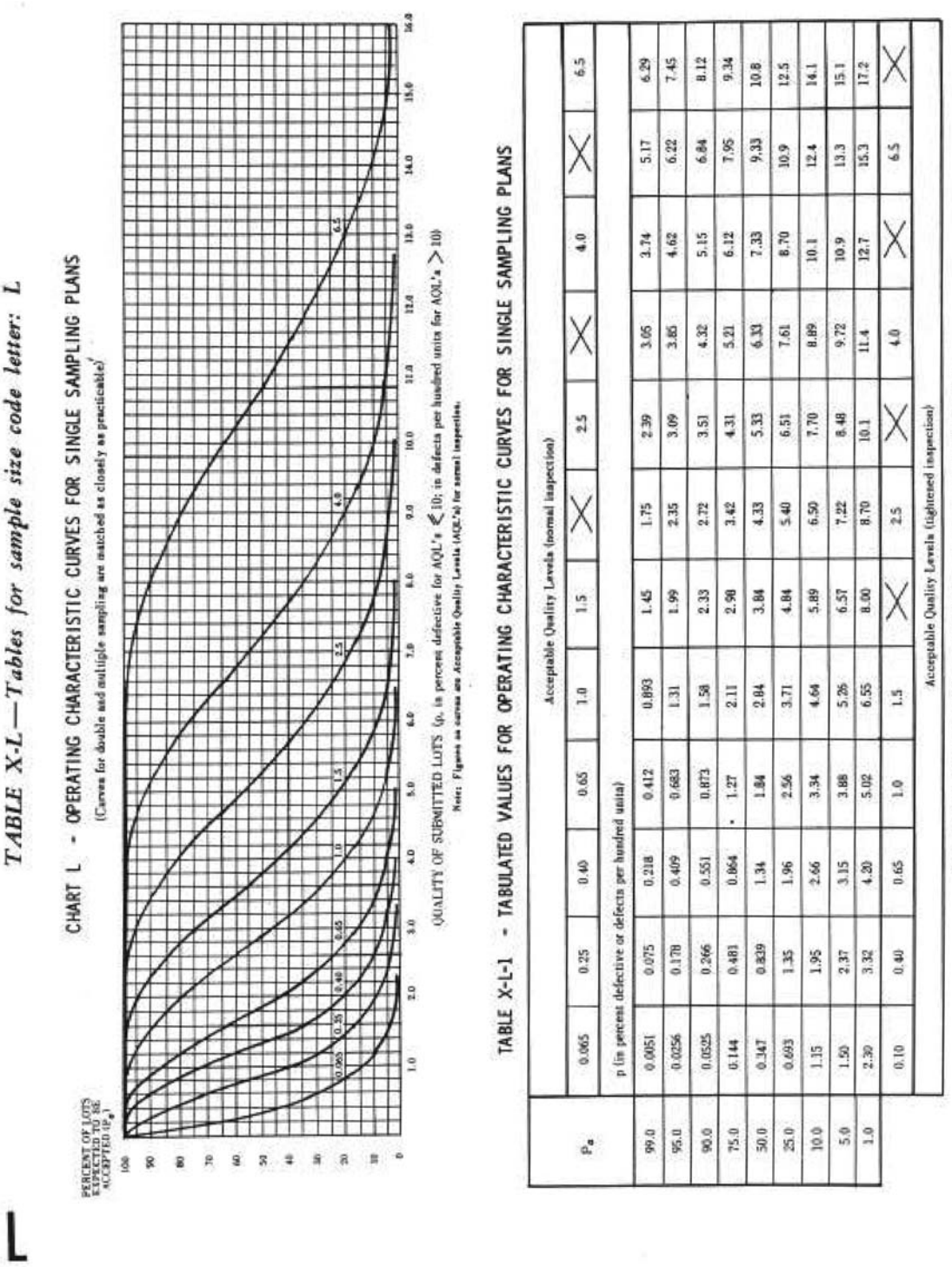
Re = Rejection number

* = Use single sampling plan above (or alternatively use letter N).

= Acceptance not permitted at this sample size.

K

FIG. X1.18 Sample Size Code Letter K *(continued)*



P_a	0.065	0.25	0.40	0.65	1.0	1.5	X	2.5	X	4.0	X	6.5
	p (in percent defective or defects per hundred units)											
99.0	0.0051	0.075	0.218	0.412	0.893	1.45	1.75	2.39	3.05	3.74	5.17	6.29
95.0	0.0256	0.178	0.409	0.683	1.31	1.99	2.35	3.09	3.85	4.62	6.22	7.45
90.0	0.0525	0.266	0.551	0.873	1.58	2.33	2.72	3.51	4.32	5.15	6.84	8.12
75.0	0.144	0.483	0.864	1.27	2.11	2.90	3.42	4.31	5.21	6.12	7.95	9.34
50.0	0.347	0.839	1.34	1.84	2.84	3.84	4.33	5.33	6.33	7.33	9.33	10.8
25.0	0.693	1.35	1.96	2.56	3.71	4.84	5.40	6.51	7.61	8.70	10.9	12.5
10.0	1.15	1.95	2.66	3.34	4.64	5.89	6.50	7.70	8.89	10.1	12.4	14.1
5.0	1.50	2.37	3.15	3.88	5.26	6.57	7.22	8.48	9.72	10.9	13.3	15.1
1.0	2.30	3.32	4.30	5.02	6.55	8.00	8.70	10.1	11.4	12.7	15.3	17.2
	0.10	0.40	0.65	1.0	1.5	X	2.5	X	4.0	X	6.5	X

FIG. X1.19 Sample Size Code Letter L

TABLE X-L-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: L

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		Less than 0.065		0.065		0.10		X		0.15		0.25		0.40		0.65		1.0		1.5		X		2.5		X		4.0		X		Higher than 6.5	
		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		
Single	200	▽		0	1	Use Letter K		Use Letter N		Use Letter M		1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	18	19	△		200
Double	125	▽		*								0	2	0	3	1	4	2	5	3	7	3	7	5	9	6	10	7	11	9	14	△		125
	250											1	2	3	4	4	5	6	7	8	9	11	12	12	13	15	16	18	19	23	24			250
Multiple	50	▽		*								*	2	*	2	*	3	*	4	0	4	0	4	0	5	0	6	1	7	1	8	△		50
	100											*	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12			100
	150											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17			150
	200											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22			200
	250											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25			250
	300											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29			300
	350											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33			350
		Less than 0.10		0.10		X		0.15		0.25		0.40		0.65		1.0		1.5		X		2.5		X		4.0		X		6.5		Higher than 6.5	
		Acceptable Quality Levels (tightened inspection)																															

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter P).
# = Acceptance not permitted at this sample size.

L

FIG. X1.19 Sample Size Code Letter L *(continued)*

TABLE X-M— Tables for sample size code letter: M

CHART M - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

QUALITY OF SUBMITTED LOTS (p_t, in percent defective for AQL's ≤ 10; in defects per hundred units for AQL's > 10)

Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-M-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)													
	0.040	0.15	0.25	0.40	0.65	1.0	X	1.5	X	2.5	X	4.0		
	p_t (in percent defective or in defects per hundred units)													
99.0	0.0032	0.047	0.138	0.261	0.566	0.922	1.11	1.51	1.94	2.38	3.28	3.99		
95.0	0.0163	0.112	0.259	0.433	0.829	1.26	1.49	1.96	2.44	2.94	3.95	4.73		
90.0	0.0333	0.168	0.349	0.533	1.00	1.48	1.72	2.23	2.75	3.27	4.34	5.16		
75.0	0.0914	0.305	0.548	0.804	1.34	1.89	2.17	2.74	3.31	3.89	5.05	5.93		
50.0	0.220	0.532	0.848	1.17	1.80	2.43	2.75	3.39	4.02	4.66	5.93	6.88		
25.0	0.440	0.864	1.24	1.62	2.36	3.07	3.43	4.13	4.83	5.52	6.90	7.92		
10.0	0.731	1.23	1.69	2.12	2.94	3.74	4.13	4.89	5.65	6.39	7.86	8.95		
5.0	0.951	1.51	2.00	2.46	3.34	4.17	4.58	5.38	6.17	6.95	8.47	9.60		
1.0	1.46	2.11	2.67	3.19	4.16	5.08	5.53	6.40	7.25	8.08	9.71	10.9		
	0.065	0.25	0.40	0.65	1.0	X	1.5	X	2.5	X	4.0	X		
	Acceptable Quality Levels (tightened inspection)													

Note: All values given in above table based on Poisson distribution as an approximation to the Binomial

M

FIG. X1.20 Sample Size Code Letter M

TABLE X-M-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: M

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																														Cumulative sample size
		Less than 0.040		0.040		0.065			0.10		0.15		0.25		0.40		0.65		1.0		1.5		2.5		4.0		Higher than 4.0		
		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	
Single	315	▽		0	1	Use Letter		Use Letter	Use Letter																		△		315
Double	200	▽		*																							△		200
	400																												400
Multiple	80	▽		*		L		P		N			*	2	*	3	4	0	4	0	4	0	5	0	6	1	7	1	8	2	9	△		80
	160												*	2	0	3	0	3	1	5	1	6	2	7	3	8	4	9	6	12	7	14			160
	240												0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19			240
	320												0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25			320
	400												1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29			400
	480												1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33			480
	560												2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38			560
		Less than 0.065		0.065		X			0.10		0.15		0.25		0.40		0.65		1.0		1.5		2.5		4.0		Higher than 4.0		
		Acceptable Quality Levels (tightened inspection)																														

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number.
Re = Rejection number.
* = Use single sampling plan above (or alternatively use letter Q).
# = Acceptance not permitted at this sample size.

M

FIG. X1.20 Sample Size Code Letter M *(continued)*

N

TABLE X-N—Tables for sample size code letter: N

CHART N - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-N-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)												
	0.025	0.10	0.15	0.25	0.40	0.65	X	1.0	X	1.5	X	2.5	
	p_t (in percent defective or in defects per hundred units)												
99.0	0.0020	0.030	0.007	0.165	0.357	0.581	0.701	0.954	1.22	1.50	2.07	2.51	
95.0	0.0103	0.071	0.164	0.273	0.523	0.796	0.939	1.23	1.54	1.85	2.49	2.98	
90.0	0.0210	0.106	0.220	0.349	0.630	0.931	1.09	1.40	1.73	2.06	2.73	3.25	
75.0	0.0576	0.192	0.345	0.507	0.844	1.19	1.37	1.72	2.08	2.45	3.18	3.74	
50.0	0.139	0.336	0.535	0.734	1.13	1.53	1.73	2.13	2.53	2.93	3.73	4.33	
25.0	0.277	0.539	0.784	1.02	1.48	1.94	2.16	2.60	3.04	3.48	4.35	4.99	
10.0	0.461	0.778	1.06	1.34	1.86	2.35	2.60	3.08	3.56	4.03	4.95	5.64	
5.0	0.599	0.949	1.26	1.55	2.10	2.63	2.89	3.39	3.89	4.38	5.34	6.05	
1.0	0.921	1.328	1.68	2.01	2.62	3.20	3.48	4.03	4.56	5.09	6.12	6.87	
	0.040	0.15	0.25	0.40	0.65	X	1.0	X	1.5	X	2.5	X	
	Acceptable Quality Levels (tightened inspection)												

Note: All values given in above table based on Poisson distribution as an approximation to the Binomial

FIG. X1.21 Sample Size Code Letter N

TABLE X-N-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: N

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		Less than 0.025		0.025		0.040		X		0.065		0.10		0.15		0.25		0.40		0.65		X		1.0		X		1.5		X		2.5		Higher than 2.5		
		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	
Single	500	▽		0	1	Use Letter N				Use Letter Q		Use Letter P		1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	10	11	12	13	14	15	△		500
Double	315	▽		*										0	2	0	3	1	4	2	5	3	6	4	7	3	7	3	7	5	9	6	10	7	11	9	14	11	16	△		315
	630													1	2	3	4	4	5	5	6	6	7	8	9	8	11	9	12	12	13	15	16	18	19	23	24	26	27			630
Multiple	125	▽		*								#	2	#	2	#	3	#	4	0	4	0	4	0	5	0	6	1	7	1	8	2	9	△			125
	250											#	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12	7	14				250
	375											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19				375
	500											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25				500
	625											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29				625
	750											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33				750
	875											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38				875
		Less than 0.040		0.040		X		0.065		0.10		0.15		0.25		0.40		0.65		X		1.0		X		1.5		X		2.5		X		Higher than 2.5		

Acceptable Quality Levels (tightened inspection)

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above (or alternatively use letter R).
# = Acceptance not permitted at this sample size.

N

FIG. X1.21 Sample Size Code Letter N *(continued)*

P

TABLE X-P—Tables for sample size code letter: P

CHART P - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

TABLE X-P-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)													
	0.015	0.065	0.10	0.15	0.25	0.40	X	0.65	X	1.0	X	1.5		
	p(in percent defective or defects per hundred units)													
99.0	0.0013	0.0186	0.055	0.103	0.223	0.363	0.438	0.596	0.762	0.935	1.29	1.57		
95.0	0.0064	0.0844	0.102	0.171	0.327	0.498	0.587	0.771	0.961	1.16	1.56	1.86		
90.0	0.0131	0.0665	0.138	0.218	0.394	0.582	0.679	0.878	1.08	1.29	1.71	2.03		
75.0	0.0360	0.120	0.216	0.317	0.527	0.745	0.855	1.08	1.30	1.53	1.99	2.34		
50.0	0.0866	0.210	0.334	0.459	0.709	0.959	1.08	1.33	1.58	1.83	2.33	2.71		
25.0	0.173	0.337	0.490	0.639	0.928	1.21	1.35	1.63	1.90	2.18	2.72	3.12		
10.0	0.288	0.486	0.665	0.835	1.16	1.47	1.62	1.93	2.22	2.52	3.09	3.52		
5.0	0.375	0.593	0.787	0.969	1.31	1.64	1.80	2.12	2.43	2.74	3.34	3.78		
1.0	0.576	0.830	1.05	1.26	1.64	2.00	2.18	2.52	2.85	3.18	3.82	4.29		
	0.025	0.10	0.15	0.25	0.40	X	0.65	X	1.0	X	1.5	X		
	Acceptable Quality Levels (tightened inspection)													

Note: All values given in above table based on Poisson distribution as an approximation to the Binomial

FIG. X1.22 Sample Size Code Letter P

TABLE X-P-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: P

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																												Cumulative sample size
		0.010		0.015		0.025		X		0.040		0.065		0.10		0.15		0.25		0.40		0.65		1.0		X		1.5		Higher than 1.5	
		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	
Single	800	▽		0	1	Use		Use		Use		1	2	0	3	1	4	2	5	3	7	3	7	5	9	7	11	9	14	Δ		800
						Letter		Letter		Letter		0	2	0	3	1	4	2	5	3	7	3	7	5	9	7	11	9	14			
Double	500	▽		•		N		R		Q		1	2	1	4	2	5	3	7	3	7	5	9	7	11	9	14	Δ		500
	1000											1	2	1	4	2	5	3	7	3	7	5	9	7	11	9	14			1000
Multiple	200	▽		•								#	2	#	3	#	4	0	4	0	4	0	5	1	7	1	8	2	9	Δ		200
	400											#	2	0	3	0	3	1	5	1	6	2	7	3	8	6	12	7	14			400
	600											0	2	0	3	1	4	2	6	3	8	4	9	6	10	11	17	13	19			600
	800											0	3	1	4	2	5	3	7	5	10	6	11	8	13	16	22	19	25			800
	1000											1	3	2	4	3	6	5	8	7	11	9	12	11	15	22	25	25	29			1000
	1200											1	3	3	5	4	6	7	9	10	12	12	14	14	17	27	29	31	33			1200
	1400											2	3	4	5	6	7	9	10	13	14	14	15	18	19	32	33	37	38			1400
		Less than 0.025		0.025		X		0.040		0.065		0.10		0.15		0.25		0.40		X		0.65		1.0		X		1.5		Higher than 1.5	
		Acceptable Quality Levels (tightened inspection)																													

Δ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.

▽ = Use next subsequent sample size code letter for which acceptance and rejection numbers are available.

Ac = Acceptance number.

Re = Rejection number.

• = Use single sampling plan above.

= Acceptance not permitted at this sample size.

P

FIG. X1.22 Sample Size Code Letter P *(continued)*

TABLE X-Q—Tables for sample size code letter: Q

Q

CHART Q - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

QUALITY OF SUBMITTED LOTS (p, in percent defective for AQL's ≤ 10; in defects per hundred units for AQL's > 10)

Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection

TABLE X-Q-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)												
	0.010	0.040	0.065	0.10	0.15	0.25	X	0.40	X	0.65	X	1.0	
	p (in percent defective or defects per hundred units												
99.0	0.00081	0.0119	0.0349	0.0656	0.143	0.232	0.281	0.382	0.488	0.598	0.828	1.01	
95.0	0.00410	0.0284	0.0654	0.109	0.209	0.318	0.376	0.494	0.615	0.740	0.995	1.19	
90.0	0.00840	0.0426	0.0882	0.140	0.252	0.372	0.435	0.562	0.692	0.824	1.09	1.30	
75.0	0.0230	0.0769	0.138	0.203	0.338	0.476	0.547	0.690	0.834	0.979	1.27	1.49	
50.0	0.0554	0.134	0.214	0.294	0.454	0.614	0.694	0.853	1.01	1.17	1.49	1.73	
25.0	0.111	0.215	0.314	0.409	0.594	0.775	0.864	1.04	1.22	1.39	1.74	2.00	
10.0	0.184	0.310	0.426	0.534	0.742	0.942	1.04	1.23	1.42	1.61	1.98	2.25	
5.0	0.240	0.380	0.504	0.620	0.841	1.05	1.15	1.36	1.56	1.75	2.14	2.42	
1.0	0.368	0.531	0.672	0.804	1.05	1.28	1.83	1.61	1.83	2.04	2.45	2.75	
	0.015	0.065	0.10	0.15	0.25	X	0.40	X	0.65	X	1.0	X	
	Acceptable Quality Levels (tightened inspection)												

Note: All values given in above table based on Poisson distribution as an approximation to the Binomial

FIG. X1.23 Sample Size Code Letter Q

TABLE X-Q-2 – SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: Q

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																														Cumulative sample size
		Ac	Re	0.010		0.015		X		0.025		0.040		0.065		0.10		0.15		0.25		0.40		X		0.65		1.0		X		Higher than 1.0	
				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	
Single	1250	Use letter R		0	1	Use letter P		Use letter S		Use letter R		1	2	2	3	3	4	4	5	7	8	8	9	10	11	12	13	14	15	18	19	21	22	Δ		1250
Double	800			*								0	2	0	3	1	4	2	5	3	7	3	7	5	9	6	10	7	11	9	14	11	16	Δ		800
	1600											1	2	3	4	4	5	6	7	8	9	11	12	12	13	15	16	16	19	23	24	26	27			1600
Multiple	315			*								#	2	#	2	#	3	#	4	0	4	0	4	0	5	0	6	1	7	1	8	2	9	Δ		315
	630											#	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12	7	14			630
	945											0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19			945
	1260											0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25			1260
	1575											1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29			1575
	1890											1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33			1890
	2205											2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38			2205
				0.010		0.015		X		0.025		0.040		0.065		0.10		0.15		0.25		0.40		X		0.65		1.0		X		Higher than 1.0	
		Acceptable Quality Levels (tightened inspection)																															

Δ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number
Re = Rejection number
* = Use single sampling plan above.
# = Acceptance not permitted at this sample size.

Q

FIG. X1.23 Sample Size Code Letter Q *(continued)*

R

TABLE X-R—Tables for sample size code letter: R

CHART R - OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

(Curves for double and multiple sampling are matched as closely as practicable)

QUALITY OF SUBMITTED LOTS (p_t, in percent defective for AQL's ≤ 10; in defects per hundred units for AQL's > 10)

Note: Figures on curves are Acceptable Quality Levels (AQL's) for normal inspection.

TABLE X-R-1 - TABULATED VALUES FOR OPERATING CHARACTERISTIC CURVES FOR SINGLE SAMPLING PLANS

P_a	Acceptable Quality Levels (normal inspection)												
	0.025	0.040	0.065	0.10	0.15	X	0.25	X	0.40	X	0.65
	p_t (in percent defective or defects per hundred units)												
99.0	0.0074	0.0218	0.0412	0.0892	0.145	0.175	0.239	0.305	0.374	0.517	0.629
95.0	0.0178	0.0409	0.0683	0.131	0.199	0.235	0.309	0.385	0.462	0.622	0.745
90.0	0.0266	0.0551	0.0873	0.158	0.233	0.272	0.351	0.432	0.515	0.684	0.812
75.0	0.0481	0.0868	0.127	0.211	0.298	0.342	0.431	0.521	0.612	0.795	0.934
50.0	0.0839	0.134	0.184	0.284	0.384	0.433	0.533	0.633	0.733	0.933	1.08
25.0	0.135	0.196	0.256	0.371	0.484	0.540	0.651	0.761	0.870	1.09	1.25
10.0	0.195	0.266	0.334	0.464	0.589	0.650	0.770	0.889	1.01	1.24	1.41
5.0	0.237	0.315	0.388	0.526	0.657	0.722	0.848	0.972	1.09	1.33	1.51
1.0	0.332	0.420	0.502	0.655	0.800	0.870	1.02	1.14	1.27	1.53	1.72
	0.040	0.065	0.10	0.15	X	0.25	X	0.40	X	0.65	X
	Acceptable Quality Levels (tightened inspection)										

Note: All values given in above table based on Poisson distribution as an approximation to the Binomial

FIG. X1.24 Sample Size Code Letter R

TABLE X-R-2 - SAMPLING PLANS FOR SAMPLE SIZE CODE LETTER: R

Type of sampling plan	Cumulative sample size	Acceptable Quality Levels (normal inspection)																								Cumulative sample size
		X		0.010		0.015		X		0.025		0.040		0.065		0.10		0.15		X		0.25		0.40		X		0.65		Higher than 0.65	
		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	
Single	2000	0	1	Use Letter Q		Use Letter P		Use Letter S		1	2	2	3	3	4	5	6	7	8	8	9	10	11	12	13	14	15	18	19	21	22	△		2000
Double	1250	*								0	2	0	3	1	4	2	5	3	7	3	7	5	9	6	10	7	11	9	14	11	16	△		1250
	2500									1	2	3	4	4	5	6	7	8	9	11	12	12	13	15	16	18	19	23	24	26	27			2500
Multiple	500	*								#	2	#	2	#	3	#	4	0	4	0	4	0	5	0	6	1	7	1	8	2	9	△		500
	1000									#	2	0	3	0	3	1	5	1	6	2	7	3	8	3	9	4	10	6	12	7	14			1000
	1500									0	2	0	3	1	4	2	6	3	8	4	9	6	10	7	12	8	13	11	17	13	19			1500
	2000									0	3	1	4	2	5	3	7	5	10	6	11	8	13	10	15	12	17	16	22	19	25			2000
	2500									1	3	2	4	3	6	5	8	7	11	9	12	11	15	14	17	17	20	22	25	25	29			2500
	3000									1	3	3	5	4	6	7	9	10	12	12	14	14	17	18	20	21	23	27	29	31	33			3000
	3500									2	3	4	5	6	7	9	10	13	14	14	15	18	19	21	22	25	26	32	33	37	38			3500
		0.010		0.015		X		0.025		0.040		0.065		0.10		0.15		X		0.25		X		0.40		X		0.65		Higher than 0.65	
		Acceptable Quality Levels (tightened inspection)																													

△ = Use next preceding sample size code letter for which acceptance and rejection numbers are available.
Ac = Acceptance number.
Re = Rejection number.
* = Use single sampling plan above.
# = Acceptance not permitted at this sample size.

R

FIG. X1.24 Sample Size Code Letter R *(continued)*

TABLE X-S—Tables for sample size code letter: S

Type of sampling plan	Cumulative sample size	Acceptable Quality Level (normal inspection) X	Ac	Re
Single	3150		1	2
Double	2000		0	2
	4000		1	2
Multiple	800		#	2
	1600		#	2
	2400		0	2
	3200		0	3
	4000		1	3
	4800		1	3
	5600		2	3
		0.025		
		Acceptable Quality Level (tightened inspection)		

Ac = Acceptance number
Re = Rejection number
\# = Acceptance not permitted at this sample size.

S

FIG. X1.25 Sample Size Code Letter S