

AMERICAN NATIONAL STANDARD

An attribute skip-lot sampling program



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AMERICAN NATIONAL STANDARD

An attribute skip-lot sampling program

Approved as an American National Standard by:
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An attribute skip-lot sampling program provides procedures for reducing the inspection effort on products that satisfy supplier and production qualification criteria. The standard is to be used only in conjunction with the latest version of ANSI/ASQ Z1.4.

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Foreword

This Foreword is not a part of the American National Standard ASQ/ANSI S1-2012, An attribute skip-lot sampling program.

The purpose of this publication is to provide procedures, for reducing the inspection effort on products submitted by those suppliers who have demonstrated their ability to control. In an effective manner, all facets of quality and who consistently produce lots which meet requirements. Inspection may take place at the supplier's or purchaser's locations or at an interface between operations of a production process. The skip-lot procedures are designed to be used with the attribute lot-by-lot plans described in ANSI/ASQ Z1.4.

The standard was designed to address four major issues:

- 1) The number of lots inspected prior to entering the skip-lot state;
- 2) The number of lots inspected in the skip-lot state between a shift in quality and the detection of the quality shift, with the result of detection being a switch to an interrupt state where lot-by-lot inspection is temporarily reinstated;
- 3) The characteristics of the interrupt state during which less stringent qualification requirements are used to reinstate full skip-lot inspection;
- 4) The management capabilities of the supplier. The last issue is important because a working skip-lot program requires confidence in the supplier's capabilities and integrity.

A series of enhancements to this standard (Annexes A, B, and C) augment the usability of the standard by outlining procedures for tailoring to the user's specific situation, by describing a simple method of random selection, and by providing criteria for deciding between skip-lot inspection and reduced inspection under ANSI/ASQ Z1.4.

Comments concerning this standard are welcome and will be considered in future standards development. Comments should be sent to the Standards Administrator, ASQ, 600 N. Plankinton Ave., P.O. Box 3005, Milwaukee, WI 53201-3005.

Writers and Editors:

In preparing the 1987 and 1996 versions of this standard, Chairman B. S. Liebesman was assisted by the members of the ASQ Statistics Division and the following major contributors: Sherman Babcock, Acheson Duncan, Dennis J. G. Farlie, A. Blanton Godfrey, Greg Gruska, Yoichi Kato, Bernard Saperstein, Poul Thyregod, Joe Troxell, Joe Tsiakals, Harrison M. Wadsworth, and Tsuneo Yokoh.

The 2012 version of this standard was prepared by the S1 Writing Group of the ASQ Statistics Division consisting of the following members: Aridaman Jain (chair), Jack Keyser, Ed Shecter, and Ken Stephens. We would like to acknowledge the assistance received from Burton S. Liebesman and Ed Schilling. We are also grateful to Jack West for providing constructive comments on a draft of the 2005 version that were addressed in the final version.

1.0 Introduction

This publication is intended to be used only in conjunction with the latest version of ANSI/ASQ Z1.4. There are two restrictions on the use of the ANSI/ASQ Z1.4¹ procedures in conjunction with this publication:

- a) Multiple sampling plans are not to be used during States 2 and 3 of this publication, and
- b) It is *strongly recommended* that sampling plans with acceptance numbers of zero not be used during States 2 and 3 of this publication.

1.1 Scope and purpose

This standard defines a generic attribute skip-lot sampling program. The purpose of this publication is to provide procedures, for reducing the inspection effort on products submitted by those suppliers who have demonstrated their ability to control, in an effective manner, all facets of quality and who consistently produce lots which meet requirements. Inspection may take place at the supplier's or purchaser's locations or at an interface between operations of a production process. The skip-lot procedures are designed to be used with the attribute lot-by-lot plans described in ANSI/ASQ Z1.4.

The skip-lot program described in this standard is based on papers by Liebesman shown in section 2.0. Skip-Lot sampling was originally developed by Dodge. For a discussion of the Dodge plans, see references Dodge (1955), Dodge and Perry (1971), Schilling (1982), and Stephens (2001) cited in the Bibliography.

1.2 Field of application

When specified by the purchaser, this standard may be referenced in a purchasing or specification contract, inspection instruction, or other contractual documents. The responsible authority may be the customer or the supplier's department responsible for inspection or, the cognizant government agency. The inspection authority may be the responsible authority or an organization delegated to conduct the inspection program.

This standard defines a generic attribute skip-lot sampling program. However, every product has its own environment and characteristics. Throughout this standard, options are provided in recognition of the fact that the supplier and responsible authority should select the appropriate options to meet the specific needs of the product and its environment. All choices as a result of this tailoring should be specified in a written document. The options are noted in the text with default values. Annex A contains a summary of these options.

The procedures designated in this publication are applicable to but not limited to, inspection of the following:

- a) End items such as complete units or sub-assemblies;
- b) Components and raw materials;

¹ Referred to as ANSI Z1.4 or Z1.4 in the remainder of this standard.

- c) Services;
- d) Materials in process;
- e) Supplies in storage;
- f) Data or records;
- g) Administrative procedures; and
- h) Software

These procedures are intended only for a continuing series of lots or batches and shall not be used for isolated lots. All lots in the series are expected to be of a similar quality and there should be reason to believe that the lots not inspected are of the same quality as the ones inspected.

This publication shall be used only for characteristics inspected by attributes as designated in Z1.4. Its application differs from that of reduced inspection in Z1.4. With respect to the inspection of multiple characteristics, the skip-lot procedures shall follow the same principles used in the associated Z1.4 program.

Reduced Inspection is a feature of Z1.4 permitting smaller sample sizes than used in normal inspection. It may be used while the product is in the lot-by-lot inspection state or skip-lot interrupt state, but shall not be used during the skip-lot inspection state (see Sections 5.4 and 5.5). Skip-lot sampling may be used in place of reduced inspection if it is more cost effective to do so (see Section 7.0).

2.0 References

Basic definitions may be found in the following standards:

ANSI/ISO/ASQ 3534-2, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

ANSI/ASQ Z1.4, *Sampling procedures and tables for inspection by attributes*

The statistical characteristics of the skip-lot program described in this standard are discussed in the following references:

Liebesman, Burton S. and Saperstein, Bernard, A Proposed Attribute Skip-Lot Sampling Program, *Journal of Quality Technology*, vol. 15, no. 3, July; 1983, pp. 130-140

Liebesman, Burton S., The Development of an Attribute Skip-Lot Sampling Standard *Frontiers in Statistical Quality Control*, vol. 3, 1987, pp. 3-23