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Double sampling plans by attributes with minimal sample sizes, indexed by producer's risk quality (PRQ) and consumer's risk quality (CRQ)

Plans d'échantillonnage double par attributs, avec taille d'échantillon minimale, indexés par la qualité du risque du fournisseur (QRF) et la qualité du risque du client (QRC)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 69, *Applications of statistical methods*, Subcommittee SC 5, *Acceptance sampling*.

This first edition of ISO 28592 cancels and replaces ISO 28801:2011, of which it constitutes a minor revision to change the reference number from 28801 to 28592.

With the view to achieve a more consistent portfolio, TC 69/SC 5 has simultaneously renumbered the following standards, by means of minor revisions:

Old reference	New reference	Title
ISO 2859-10:2006	ISO 28590:2017	Sampling procedures for inspection by attributes — Introduction to the ISO 2859 series of standards for sampling for inspection by attributes
ISO 8422:2006	ISO 28591:2017	Sequential sampling plans for inspection by attributes
ISO 28801:2011	ISO 28592:2017	Double sampling plans by attributes with minimal sample sizes, indexed by producer's risk quality (PRQ) and consumer's risk quality (CRQ)
ISO 18414:2006	ISO 28593:2017	Acceptance sampling procedures by attributes — Accept-zero sampling system based on credit principle for controlling outgoing quality
ISO 21247:2005	ISO 28594:2017	Combined accept-zero sampling systems and process control procedures for product acceptance
ISO 14560:2004	ISO 28597:2017	Acceptance sampling procedures by attributes — Specified quality levels in nonconforming items per million
ISO 13448-1:2005	ISO 28598-1:2017	Acceptance sampling procedures based on the allocation of priorities principle (APP) — Part 1: Guidelines for the APP approach
ISO 13448-2:2004	ISO 28598-2:2017	Acceptance sampling procedures based on the allocation of priorities principle (APP) — Part 2: Coordinated single sampling plans for acceptance sampling by attributes

Cross references between the above listed documents have been corrected in the minor revisions.

A list of all documents in the new ISO 28590 - ISO 28599 series of International Standards can be found on the ISO website.

Introduction

ISO 2859-1 provides double sampling plans for sampling by attributes. Those plans are indexed by acceptance quality limit (AQL) and are thus designed for a continuing series of lots. For each preferred range of lot sizes, i.e. for each sample size code letter, the first and second sample sizes of the double sampling plans in ISO 2859-1 are constant and equal across AQLs, while the acceptance numbers increase with the AQL.

As production processes and quality levels have improved during the latter half of the twentieth century, there has been a shift of interest towards sampling plans with smaller acceptance and rejection numbers than most of the plans in ISO 2859-1.

Moreover, in some industries, in an effort to focus on customers' more specific requirements, there has also been a trend towards shorter production runs. Sometimes these production runs are too short for the switching rules of AQL-indexed plans (such as those of ISO 2859-1) to operate effectively.

In order to address an evolving market need, this International Standard has been developed to provide double sampling plans by attributes indexed by producer's risk quality (PRQ) and consumer's risk quality (CRQ) and having the smallest possible acceptance and rejection numbers. No constraint has been placed on the relative sizes of the first and second sample sizes; instead, the first and second sample sizes have been derived to minimize the expected total amount of sampling subject to the nominal producer's risk, α, and consumer's risk, β, not being exceeded. The combinations (α, β) of nominal risks provided in this International Standard are (5 %, 5 %), (5 %, 10 %) and (10 %, 10 %).

Thus, the double sampling plans provided in this International Standard are of the following kind. In the case of sampling for nonconforming items, a lot is acceptable if no nonconforming items are found in the first random sample, and not acceptable if the sample contains two or more nonconforming items. If the first random sample contains precisely one nonconforming item, a second, smaller random sample is taken; if no nonconforming items are found in the second sample, then the lot is acceptable, otherwise it is not acceptable. For each pair of nominal producer's and consumer's risk, up to 17 preferred nominal values of CRQ and up to 17 preferred nominal values of PRQ are provided.

Similar plans are provided for nonconformities.

The double sampling sample sizes are minimal among sampling plans for acceptance inspection of isolated lots or for short series of lots. However, because the ISO 28592 plans do not rely on the protection of switching rules, the sample sizes are necessarily larger than those used for lot-by-lot inspection, such as those of ISO 2859-1, for similar producer's and consumer's quality levels, where these exist. This is illustrated by the following two examples, both for nonconforming items with nominal maximum producer's and consumer's risks or 5 % and 10 % respectively.

EXAMPLE 1

Source	Realized producer's risk	Realized consumer's risk	Producer's risk quality (PRQ)	Consumer's risk quality (CRQ)	Sample sizes
ISO 2859-1, code letter E, AQL = 1 %	5 %	10 %	0,394 %	20,6 %	8,8
ISO 28592, Tables 2 and 14	0,266 %	9,639 %	0,4 %	20 %	12,9

EXAMPLE 2

Source	Realized producer's risk	Realized consumer's risk	Producer's risk quality (PRQ)	Consumer's risk quality (CRQ)	Sample sizes
ISO 2859-1, code letter F, AQL = 0,65 %	5 %	10 %	0,256 %	10,9 %	13,13
ISO 28592, Tables 2 and 14	0,435 %	9,920 %	0,25 %	10 %	26,16

A compensating feature of the ISO 28592 plans is that many of the realized producer's risks are much smaller than their nominal values.