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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)

Reference number
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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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.

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

1 Scope

This International Standard provides double sampling plans by attributes for the acceptance inspection of lots of discrete items. The plans are indexed by the producer's risk quality (PRQ) and the consumer's risk quality (CRQ) where the nominal producer's and consumer's risks are respectively either (5 %, 5 %), (5 %, 10 %) or (10 %, 10 %). Plans are provided for inspection for percent nonconforming and for inspection for nonconformities per 100 items. The lot is accepted if there are no nonconforming items (nonconformities) in the first random sample, and rejected if it contains two or more nonconforming items (nonconformities). If precisely one nonconforming item is found in the first sample, a second random sample is drawn; the lot is then accepted if the second sample contains no nonconforming items (nonconformities) and rejected otherwise.

The objective of this International Standard is to provide procedures that enable lot disposition to be determined quickly and economically if quality is particularly good or bad. For intermediate quality, a second sample is drawn in order to be able to discriminate more reliably between acceptable and unacceptable lots. The two sample sizes are chosen to minimize the maximum expected sample size with respect to incoming quality subject to the nominal risks not being exceeded.

Similarly, the plans may be used to test the hypothesis that a lot or process quality level is equal to the PRQ (i.e. acceptable) against the alternative hypothesis that the quality level is equal to the CRQ (i.e. unacceptable).

The plans are preferable to single sampling plans where the cost of inspection is high, where the delay and uncertainty caused by the possible requirement for second samples is inconsequential and where a relatively large ratio of the consumer's risk quality to the producer's risk quality can be tolerated.

The plans are suitable for isolated lots or for short series of lots, where the sum of the two sample sizes is no larger than about 10 % of the size of the lot. The plans are also suitable for continuing series of lots when lots that fail to satisfy the acceptance criteria are 100 % inspected and all nonconforming items replaced by conforming items; however, for continuing series of lots, consideration should also be given to using double sampling plans from ISO 2859-1.

The statistical theory underlying the plans, tables and figures is provided in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

There are no normative references in this document.

3 Terms, definitions, abbreviations and symbols

3.1 Terms, definitions and abbreviations

The words “accept”, “accepted”, “acceptable”, etc., refer only to the use of the sampling plans contained in this International Standard and do not imply an agreement to accept any product. Determination of acceptability by the customer shall be as described in contractual documents.

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
consumer's risk
CR
⟨acceptance sampling⟩ probability of acceptance when the *quality level* (3.1.5) of the process has a value stated by the acceptance sampling plan as unsatisfactory

[SOURCE: ISO 3534-2:2006; 4.6.2]

3.1.2
consumer's risk quality
CRQ
⟨acceptance sampling⟩ *quality level* (3.1.5) of a lot or process which, in the acceptance sampling plan, corresponds to a specified *consumer's risk* (3.1.1)

[SOURCE: ISO 3534-2:2006; 4.6.9]

3.1.3
producer's risk
PR
⟨acceptance sampling⟩ probability of non-acceptance when the *quality level* (3.1.5) of the process has a value stated by the plan as acceptable

[SOURCE: ISO 3534-2:2006; 4.6.4]

3.1.4
producer's risk quality
PRQ
⟨acceptance sampling⟩ *quality level* (3.1.5) of a lot or process which, in the acceptance sampling plan, corresponds to a specified *producer's risk* (3.1.3)

[SOURCE: ISO 3534-2:2006; 4.6.10]

3.1.5
quality level
⟨acceptance sampling⟩ quality expressed as a rate of nonconforming units or rate of number of *nonconformities* (3.1.9)

[SOURCE: ISO 3534-2:2006; 4.6.16]

Note 1 to entry: Rate (or fraction) can be expressed in the unit 1 or in percentage. Rate of nonconforming units can be read as a numerical value or a percentage of nonconforming units. Rate of number of nonconformities can be read as a number of nonconformities per unit or per 100 units.

3.1.6
average sample size
ASSI
⟨acceptance sampling⟩ average number of units in sample inspected per lot in reaching decisions to accept or not to accept when using a given acceptance sampling plan

Note 1 to entry: ASSI is dependent on the actual *quality level* (3.1.5) of the submitted lots.

[SOURCE: ISO 3534-2:2006; 4.7.3]

3.1.7
average outgoing quality
AOQ
⟨acceptance sampling⟩ expected average *quality level* (3.1.5) of outgoing product for a given value of incoming product quality

[SOURCE: ISO 3534-2:2006; 4.7.1]

3.1.8
average outgoing quality limit
AOQL
⟨acceptance sampling⟩ maximum *AOQ* (3.1.7) over all possible values of incoming product *quality level* (3.1.5) for a given acceptance sampling plan and rectification of all non-accepted lots unless specified otherwise

[SOURCE: ISO 3534-2:2006; 4.7.2]

3.1.9
nonconformity
non-fulfilment of a requirement

[SOURCE: ISO 9000:2015; 3.6.9; ISO 3534-2:2006; 3.1.11]

Note 1 to entry: See notes to *defect* (3.1.11).

3.1.10
nonconforming item
item with one or more *nonconformities* (3.1.9)

[SOURCE: ISO 3534-2:2006; 1.2.12]

3.1.11
defect
non-fulfilment of a requirement related to an intended or specified use

[SOURCE: ISO 3534-2:2006; 3.1.12]

Note 1 to entry: The distinction between the concepts defect and *nonconformity* (3.1.9) is important as it has legal connotations, particularly those associated with product liability issues. Consequently, the term “defect” should be used with extreme caution.

Note 2 to entry: The intended use by the customer can be affected by the nature of the information, such as operating or maintenance instructions, provided by the customer.

3.2 Symbols

α producer's risk

β consumer's risk

m size of the second sample in a double sampling plan

n size of the first sample in a double sampling plan

4 Choosing and operating a sampling plan

4.1 Choosing a plan

The appropriate table from among Tables 1 to 6 shall be selected in accordance with whether inspection is for nonconforming items or nonconformities and the values of the nominal producer's and consumer's

risks. The selected table shall be entered with the PRQ and CRQ to obtain the sample sizes *n* and *m* of the double sampling plan.

When the table indicates by asterisks that no double sampling plan with the prescribed acceptance and rejection numbers is available with the required properties, consideration should be given to decreasing the PRQ or increasing the CRQ, or both.

4.2 Operating a plan for nonconforming items

4.2.1 Acceptance sampling

A random sample of size *n* shall be drawn and inspected, where *n* is the first sample size given by the plan. If no nonconforming items are found in this first sample, the lot shall be accepted. If the number of nonconforming items found in this first sample is greater than or equal to two, the lot shall not be accepted.

If one nonconforming item is found in the first random sample, a second random sample of size *m* shall be drawn and inspected, where *m* is the second sample size given by the plan. If no further nonconforming items are found in this second sample, the lot shall be accepted. If one or more nonconforming items are found in this second sample, the lot shall not be accepted.

4.2.2 Hypothesis testing

The double sampling plan may alternatively be used for hypothesis testing when it is required to test the null hypothesis that the quality level is less than or equal to the PRQ against the alternative hypothesis that the quality level is greater than or equal to the CRQ. A first random sample of size *n* shall be drawn and inspected, where *n* is the first sample size given by the plan. If no nonconforming items are found in this first sample, the null hypothesis shall be accepted. If the number of nonconforming items found in this first sample is greater than or equal to two, the alternative hypothesis shall be accepted.

If one nonconforming item is found in the first random sample, a second random sample of size *m* shall be drawn and inspected, where *m* is the second sample size given by the plan. If no further nonconforming items are found in this second sample, the null hypothesis shall be accepted. If one or more nonconforming items are found in this second sample, the alternative hypothesis shall be accepted.

4.3 Operating a plan for nonconformities

4.3.1 Acceptance sampling

In order to determine the acceptability of a lot in a nonconformities-per-hundred-items inspection, the procedure specified in 4.2.1 for nonconforming inspection shall be used, except that the term “nonconforming items” shall be replaced by “nonconformities”.

4.3.2 Hypothesis testing

In order to carry out a hypothesis test in a nonconformities-per-hundred-items inspection, the procedure specified in 4.2.2 for nonconforming inspection shall be used, except that the term “nonconforming items” shall be replaced by “nonconformities”.

4.4 Notation

A notation used to describe such plans is (*n*, 0, 2; *m*, 1, 2). This indicates that the acceptance and rejection numbers for the first sample of size *n* are 0 and 2, and that the acceptance and rejection numbers for the first and second samples combined are 1 and 2, where the second sample is of size *m*.

5 Operating characteristics

The operating characteristic curves, shown in Figures 1 to 6, indicate the probability that a lot will be accepted under the various sampling plans for a range of quality levels.

The curves are based on the assumption that the sum of the two sample sizes is no more than about 10 % of the lot size. If the sum of the two sample sizes exceeds 10 % of the lot size, then the probabilities of accepting the lot are higher than those shown by the curves at all quality levels, so the producer's risk is reduced and the consumer's risk is increased.

NOTE A formula for the operating characteristic curves is provided in A.1.3 for nonconforming items and in A.2.3 for nonconformities.

6 Average sample sizes

6.1 Curtailed inspection

Under curtailed inspection, inspection is stopped as soon as the inspection results are sufficient to establish whether or not the lot is acceptable or, in the case of hypothesis testing, as soon as it is clear which hypothesis will be accepted. In the case of the double sampling plans in this International Standard, inspection would cease as soon as two nonconforming items (nonconformities) were found in the first sample or as soon as one nonconforming item (nonconformity) was found in the second sample. The operating characteristic curves are unaffected by curtailment, but the average sample size is reduced. The reduction is small at good quality levels but substantial at very poor quality levels. The disadvantage of curtailment is that it results in less precise estimates of the lot or process quality level; this matters more in the case of a continuing series of lots.

6.2 Average sample size (ASSI) for uncurtailed inspection

Average sample size curves for uncurtailed inspection for the double sampling plans of this International Standard are shown in Figures 7 to 12. These curves show the average sample sizes that may be expected to occur under the various sampling plans for a range of levels of process quality. For all the plans, the ASSI

— begins at the value n for perfect quality (because only the whole of the first sample is inspected),

— rises to a maximum where the process quality level p is equal to $1/n$, i.e. $100/n$ % nonconforming or $100/n$ nonconformities per 100 items,

— falls more gradually to the value n as the process quality level p worsens beyond $1/n$ (again because ultimately only the whole of the first sample is inspected).

NOTE A formula for the average sample size for uncurtailed inspection is provided in A.1.4.1 for nonconforming items and in A.2.4.1 for nonconformities. Formulae for the corresponding maximum ASSI are given in A.1.5 and A.2.5.

The average sample sizes of the double sampling plans at the PRQ and CRQ for uncurtailed inspection are given in Tables 7 to 12. Also given are the maximum average sample sizes.

EXAMPLE Suppose that it is required to carry out a test of whether the quality level in a large lot is no more than 0,25 % nonconforming. It has been agreed that the probability of acceptance should be at least 95 % if the lot has a quality level of 0,25 % nonconforming, but no more than 5 % if the quality is as bad as 5 % nonconforming.

Thus the PRQ is 0,25 % and the CRQ is 5 %, with producer's and consumer's risks both equal to 5 %. Table 1 shows that the appropriate plan has an initial sample of size n = 66 and a second sample size, if required, of m = 39. Table 7 shows for this sampling plan that the ASSI is 71,5 at the PRQ and 70,6 at the CRQ, with a maximum of 80,5.

6.3 Average sample size (ASSI) for curtailed inspection

Average sample size curves for curtailed inspection for the double sampling plans of this International Standard are shown in Figures 19 to 24. As in the case of uncurtailed inspection, for all the plans the ASSI begins at the value n for perfect quality and rises to a maximum. For plans for nonconforming items the ASSI then falls to the value 2 as quality worsens, because at least two nonconforming items are required for non-acceptance; for plans for nonconformities the ASSI falls to the value 1 as quality worsens because, at a quality level of an infinite number of nonconformities per 100 items, the first item will be certain to have more than one nonconformity.

NOTE Formulae for the average sample sizes under curtailed inspection are provided in A.1.4.2 for nonconforming items and in A.2.4.2 for nonconformities.

The average sample sizes of the double sampling plans at the PRQ and CRQ for curtailed inspection are given in Tables 25 to 30. Also given are the maximum average sample sizes.

EXAMPLE Consider again the plan for the example in 6.2, but suppose that this time it is used with curtailment. The relevant ASSIs are then given in Table 25. It can be seen that effect of curtailment is to reduce the ASSI at the PRQ from 71,5 to 69,1, at the CRQ from 70,6 to 38,2 and at the maximum from 80,5 to 73,7.

It is typical of curtailment that it leads to increasing reductions in the ASSI as the quality level worsens.

7 Actual producer's and consumer's risks

Because the sample sizes m and n are necessarily integers, the actual producer's and consumer's risks will in general be less than their nominal values. These actual risks are presented in Tables 13 to 18. Note that, whereas the consumer's risks are typically close to their nominal values, the producer's risks are in some cases much smaller.

EXAMPLE For the data in the example of 6.2, Table 13 shows that the actual producer's risk is 2,510 % (i.e. about half of its nominal value) and the actual consumer's risk is 4,978 % (i.e. just below its nominal value).

8 Average outgoing quality (AOQ)

For a continuing series of lots with rectification of all lots that fail to meet the acceptance criteria, it is of interest to know the long-term AOQ at different levels of incoming quality. Tables 19 to 24 present the values of the AOQ at the PRQ and at the CRQ, together with the maximum over all levels of incoming quality. This maximum is called the average outgoing quality limit (AOQL). AOQ curves for the plans of this International Standard are presented in Figures 13 to 18.

NOTE It is only by means of high (and generally uneconomical) average levels of inspection that good average outgoing quality levels are achieved at poor incoming quality levels.

EXAMPLE For the data in the example of 6.2, Table 19 shows that the average outgoing quality is 0,244 % at the PRQ and 0,249 % at the CRQ with a maximum of 0,869 %. The AOQ curve for this example is shown in Figure 13.

9 Examples

9.1 Example of sampling plan for nonconforming items

A retailer intends to purchase a single production lot of ten thousand low-energy light bulbs from an accredited supplier. The supplier demonstrates by in-house records that only one bulb in 1 000 will fail on first use. The retailer customarily audits such supplies by means of a product sampling plan agreed with the supplier on the basis that

a) the cost of sampling is factored into the contract price, and

b) if the lot is not accepted, the supplier pays for the 100 % test and the associated cost of replacing the nonconforming light bulbs.

The agreed sampling plan is a double sampling plan with nominal producer's and consumer's risks of 5 %, a PRQ of 0,1 % and a CRQ of 2,5 %. Entering Table 1 with these parameters yields the sample sizes n = 133 and m = 80. A random sample of 133 light bulbs is drawn from the lot and tested. One light bulb in the sample immediately fails, so a second random sample of 80 bulbs is drawn from the lot and tested. None of these light bulbs fail, so the lot is accepted.

9.2 Example of sampling plan for nonconformities

2 000 metres of 17 cm wide weatherboarding is to be supplied to a builder for use in a prestigious barn conversion. The owner of the barn has specifically requested that the weatherboarding be knot-free. From past experience the builder decides that, on the basis of the lengths required, he can manage to comply with this if the supplied weatherboarding contains knots at a rate of no more than 4 per 100 metres length on average. The supplier claims that his premium weatherboarding is virtually knot-free and so he is prepared to use a PRQ of 1 knot per 500 metres. Both supplier and builder decide to limit their risk to 5 %.

Table 4 is therefore used, and entered with a PRQ of 0,2 % and a CRQ of 4 %, yielding a double sampling plan with first sample size n equal to 84 and second sample size m equal to 51. 84 one-metre lengths of weatherboarding are selected at random from the consignment and checked for knots. Two are found, so the consignment is rejected without a second sample being necessary, and the supplier agrees to carry out 100 % inspection on-site, replacing any lengths of weatherboarding found to have knots.

10 Tables and figures

The numbering scheme and location of the tables and figures of this International Standard are given below:

Contents	Nonconforming items			Nonconformities		
	$\alpha \leq 5$ %, $\beta \leq 5$ %	$\alpha \leq 5$ %, $\beta \leq 10$ %	$\alpha \leq 10$ %, $\beta \leq 10$ %	$\alpha \leq 5$ %, $\beta \leq 5$ %	$\alpha \leq 5$ %, $\beta \leq 10$ %	$\alpha \leq 10$ %, $\beta \leq 10$ %
Sample sizes of the plans	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Average sample sizes at the PRQ, maximum and CRQ, uncurtailed inspection	Table 7	Table 8	Table 9	Table 10	Table 11	Table 12
Actual risks	Table 13	Table 14	Table 15	Table 16	Table 17	Table 18
Average outgoing qualities	Table 19	Table 20	Table 21	Table 22	Table 23	Table 24
Average sample sizes at the PRQ, maximum and CRQ, curtailed inspection	Table 25	Table 26	Table 27	Table 28	Table 29	Table 30
Operating characteristic curves	Figure 1	Figure 2	Figure 3	Figure 4	Figure 5	Figure 6
Average sample size curves for uncurtailed inspection	Figure 7	Figure 8	Figure 9	Figure 10	Figure 11	Figure 12
Average outgoing quality curves	Figure 13	Figure 14	Figure 15	Figure 16	Figure 17	Figure 18
Average sample size curves for curtailed inspection	Figure 19	Figure 20	Figure 21	Figure 22	Figure 23	Figure 24

Table 1 — Sample sizes *n* and *m* for double sampling plans of the form (*n*, 0, 2; *m*, 1, 2) for nonconforming items: $\alpha \leq 5$ % and $\beta \leq 5$ %

PRQ (%)	Sample sizes	Consumer's risk quality (%)													
		1,6	2,0	2,5	3,15	4,0	5,0	6,3	8,0	10,0	12,5	16,0	20,0	25,0	31,5
0,1	*n*	210	169	133	105	84	66	52	41	33	26	20	15	12	9
	m	122	94	80	64	46	39	31	23	17	14	11	10	7	6
0,125	*n*	*	169	133	105	84	66	52	41	33	26	20	15	12	9
	m	*	94	80	64	46	39	31	23	17	14	11	10	7	6
0,16	*n*	*	*	133	105	84	66	52	41	33	26	20	15	12	9
	m	*	*	80	64	46	39	31	23	17	14	11	10	7	6
0,2	*n*	*	*	*	105	84	66	52	41	33	26	20	15	12	9
	m	*	*	*	64	46	39	31	23	17	14	11	10	7	6
0,25	*n*	*	*	*	*	84	66	52	41	33	26	20	15	12	9
	m	*	*	*	*	46	39	31	23	17	14	11	10	7	6
0,315	*n*	*	*	*	*	*	66	52	41	33	26	20	15	12	9
	m	*	*	*	*	*	39	31	23	17	14	11	10	7	6
0,4	*n*	*	*	*	*	*	*	52	41	33	26	20	15	12	9
	m	*	*	*	*	*	*	31	23	17	14	11	10	7	6
0,5	*n*	*	*	*	*	*	*	*	41	33	26	20	15	12	9
	m	*	*	*	*	*	*	*	23	17	14	11	10	7	6
0,63	*n*	*	*	*	*	*	*	*	*	33	26	20	15	12	9
	m	*	*	*	*	*	*	*	*	17	14	11	10	7	6
0,8	*n*	*	*	*	*	*	*	*	*	*	26	20	15	12	9
	m	*	*	*	*	*	*	*	*	*	14	11	10	7	6
1,0	*n*	*	*	*	*	*	*	*	*	*	*	20	15	12	9
	m	*	*	*	*	*	*	*	*	*	*	11	10	7	6
1,25	*n*	*	*	*	*	*	*	*	*	*	*	21	15	12	9
	m	*	*	*	*	*	*	*	*	*	*	9	10	7	6
1,6	*n*	*	*	*	*	*	*	*	*	*	*	*	17	12	9
	m	*	*	*	*	*	*	*	*	*	*	*	6	7	6
2,0	*n*	*	*	*	*	*	*	*	*	*	*	*	*	12	9
	m	*	*	*	*	*	*	*	*	*	*	*	*	7	6
2,5	*n*	*	*	*	*	*	*	*	*	*	*	*	*	*	9
	m	*	*	*	*	*	*	*	*	*	*	*	*	*	6

NOTE Cells containing asterisks indicate that no double sampling plan of the form (*n*, 0, 2; *m*, 1, 2) for nonconforming items exists with $\alpha \leq 5$ % and $\beta \leq 5$ % for that combination of producer's risk quality and consumer's risk quality; consider decreasing the PRQ or increasing the CRQ, or both.

Table 2 — Sample sizes *n* and *m* for double sampling plans of the form (*n*, 0, 2; *m*, 1, 2) for nonconforming items: $\alpha \leq 5$ % and $\beta \leq 10$ %

PRQ (%)	Sample sizes	Consumer's risk quality (%)																
		0,8	1,0	1,25	1,6	2,0	2,5	3,15	4,0	5,0	6,3	8,0	10,0	12,5	16,0	20,0	25,0	31,5
0,1	*n*	336	269	216	168	133	106	84	66	53	42	33	26	20	15	12	9	7
	m	214	170	133	105	87	70	55	43	33	26	20	16	14	12	9	8	6
0,125	*n*	*	269	216	168	133	106	84	66	53	42	33	26	20	15	12	9	7
	m	*	170	133	105	87	70	55	43	33	26	20	16	14	12	9	8	6
0,160	*n*	*	*	216	168	133	106	84	66	53	42	33	26	20	15	12	9	7
	m	*	*	133	105	87	70	55	43	33	26	20	16	14	12	9	8	6
0,2	*n*	*	*	*	168	133	106	84	66	53	42	33	26	20	15	12	9	7
	m	*	*	*	105	87	70	55	43	33	26	20	16	14	12	9	8	6
0,25	*n*	*	*	*	*	133	106	84	66	53	42	33	26	20	15	12	9	7
	m	*	*	*	*	87	70	55	43	33	26	20	16	14	12	9	8	6
0,315	*n*	*	*	*	*	*	106	84	66	53	42	33	26	20	15	12	9	7
	m	*	*	*	*	*	70	55	43	33	26	20	16	14	12	9	8	6
0,4	*n*	*	*	*	*	*	*	84	66	53	42	33	26	20	15	12	9	7
	m	*	*	*	*	*	*	55	43	33	26	20	16	14	12	9	8	6
0,5	*n*	*	*	*	*	*	*	*	66	53	42	33	26	20	15	12	9	7
	m	*	*	*	*	*	*	*	43	33	26	20	16	14	12	9	8	6
0,63	*n*	*	*	*	*	*	*	*	*	53	42	33	26	20	15	12	9	7
	m	*	*	*	*	*	*	*	*	33	26	20	16	14	12	9	8	6
0,8	*n*	*	*	*	*	*	*	*	*	*	42	33	26	20	15	12	9	7
	m	*	*	*	*	*	*	*	*	*	26	20	16	14	12	9	8	6
1,0	*n*	*	*	*	*	*	*	*	*	*	*	33	26	20	15	12	9	7
	m	*	*	*	*	*	*	*	*	*	*	20	16	14	12	9	8	6
1,25	*n*	*	*	*	*	*	*	*	*	*	*	*	26	20	15	12	9	7
	m	*	*	*	*	*	*	*	*	*	*	*	16	14	12	9	8	6
1,6	*n*	*	*	*	*	*	*	*	*	*	*	*	*	20	15	12	9	7
	m	*	*	*	*	*	*	*	*	*	*	*	*	14	12	9	8	6
2,0	*n*	*	*	*	*	*	*	*	*	*	*	*	*	*	15	12	9	7
	m	*	*	*	*	*	*	*	*	*	*	*	*	*	12	9	8	6
2,5	*n*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	12	9	7
	m	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9	8	6
3,15	*n*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9	7
	m	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	8	6

NOTE Cells containing asterisks indicate that no double sampling plan of the form (*n*, 0, 2; *m*, 1, 2) for nonconforming items exists with $\alpha \leq 5$ % and $\beta \leq 10$ % for that combination of producer's risk quality and consumer's risk quality; consider decreasing the PRQ or increasing the CRQ, or both.