INTERNATIONAL STANDARD

ISO 3269

Third edition
2000-06-01

Fasteners — Acceptance inspection

Élément de fixation — Contrôle de réception

Reference number
ISO 3269:2000(E)

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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 3269 was prepared by Technical Committee ISO/TC 2, *Fasteners*.

This third edition cancels and replaces the second edition (ISO 3269:1988), which has been technically revised.

Annexes A and B of this International Standard are for information only.

Introduction

Although every fastener should meet all the requirements of the standard to which it is specified, in mass production this is not always possible. The manufacturer is expected to take due care during all stages of production so that the risk of parts that do not satisfy requirements is minimized. Nevertheless, the control processes used for that purpose are not the subject of this International Standard.

The purchaser may wish to confirm whether, considering the limitations of inspection by attributes of a fastener lot, it is reasonable to assume that the delivered fasteners were made to specification. In any case, it must be recognised that quality assessment of this sort cannot provide complete confidence that nonconforming fasteners do not exist within a production lot.

It is desirable that both supplier and purchaser possess a clear understanding of the quality-assessment processes to be used by the purchaser. Consequently, this International Standard defines those requirements to be applied by the purchaser where no other prior agreement exists. However, specification of acceptable quality level (AQL) values does not imply the supplier's right to knowingly supply a nonconforming unit.

NOTE A new ISO International Standard is to be developed to take into account fasteners produced under in-process control and a certified quality assurance system operated by the manufacturer. The new standard will also cover special agreements for selected characteristics.

Fasteners — Acceptance inspection

1 Scope

1.1 This International Standard specifies the acceptance inspection procedure that the purchaser of fasteners must follow in order to determine whether a lot of fasteners will be accepted or rejected in cases where no other such procedure was agreed with the supplier at the time the fasteners were ordered. Additional requirements for acceptance may be included in a specific product standard (for example, one on prevailing torque-type nuts). The same procedure is also to be applied in cases where conformance to specification is disputed.

1.2 This International Standard is applicable to bolts, screws, studs, nuts, pins, washers, blind rivets and other related fasteners not intended for high volume machine assembly, special-purpose applications or specially engineered applications requiring greater in-process control and lot traceability (see the note in the introduction). The procedure for these products shall be agreed upon by the supplier and the purchaser prior to the confirmation of the order.

1.3 This International Standard is applicable only to fully manufactured products; it neither implies nor includes any particular in-process control procedure or inspection during production.

1.4 The production of accessories, services and partially fabricated parts (for example, washers, nuts, plating, heat treatment and blanks) for use in the manufacture of fasteners may be subcontracted to other suppliers by the fastener supplier. Nevertheless, the supplier of the final, finished product shall be solely responsible for the fastener's quality.

The requirements of this International Standard apply only to the condition of fasteners at the time of delivery. Any process carried out after receipt (for example, plating) will invalidate the requirements of this International Standard.

1.5 Annex B (informative) offers guidance to, and an explanation of, the principles upon which this International Standard is based.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 898-1:1999, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs.*

ISO 898-2:1992, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread.*

ISO 898-5:1998, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 5: Set screws and similar threaded fasteners not under tensile stresses.*

ISO 898-6:1994, *Mechanical properties of fasteners — Part 6: Nuts with specified proof load values — Fine pitch thread.*

ISO 1478:1999, *Tapping screws thread.*

ISO 1502:1996, *ISO general-purpose metric screw threads — Gauges and gauging.*

ISO 2320:1997, *Prevailing torque type steel hexagon nuts — Mechanical and performance properties.*

ISO 2702:1992, *Heat-treated steel tapping screws — Mechanical properties.*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

ISO 3506-1:1997, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs.*

ISO 3506-2:1997, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 2: Nuts.*

ISO 3506-3:1997, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 3: Set screws and similar fasteners not under tensile stress.*

ISO 4042:1999, *Fasteners — Electroplated coatings.*

ISO 4759-1:—[1)], *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C.*

ISO 4759-3:2000, *Tolerances for fasteners — Part 3: Plain washers for bolts, screws and nuts — Product grades A and C.*

ISO 6157-1:1988, *Fasteners — Surface discontinuities — Part 1: Bolts, screws and studs for general requirements.*

ISO 6157-2:1995, *Fasteners — Surface discontinuities — Part 2: Nuts.*

ISO 6157-3:1988, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements.*

ISO 7085:1999, *Mechanical and performance requirements of case hardened and tempered metric thread rolling screws.*

ISO 8839:1986, *Mechanical properties of fasteners — Bolts, screws, studs and nuts made of non-ferrous metals.*

ISO 10683:—[2)], *Fasteners — Non-electrolytically applied zinc flake coatings.*

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1) To be published. (Revision of ISO 4759-1:1978)

2) To be published.

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply. They are based on the terms and definitions given in ISO 3534-2 and ISO 8402.

3.1
acceptance inspection
procedures such as sampling, gauging, measuring, comparing and testing to determine acceptance or rejection of a lot of fasteners

3.2
supplier
manufacturer, dealer or representative who supplies fasteners

3.3
purchaser
recipient or recipient's representative who receives fasteners

NOTE The purchaser is not necessarily the user of the fasteners.

3.4
inspection lot
definite quantity of fasteners of the same designation, received from the same supplier at the one time

3.5
lot size
N
number of fasteners contained in a lot

3.6
sample
one or more fasteners drawn at random from an inspection lot in such a way that all fasteners in the lot have an equal chance of being drawn

3.7
sample size
n
number of fasteners in a sample

3.8
characteristic
dimensional element, mechanical property or other recognizable product feature for which limits are specified

EXAMPLES Head height, body diameter, tensile strength or hardness.

3.9
nonconformity
deviation of a characteristic from a particular requirement

3.10
nonconforming fastener
fastener with one or more nonconformities

3.11
acceptance number
Ac
maximum number of nonconformities of the same characteristic in any given sample which, when exceeded, causes the lot to be rejected

3.12
sampling plan
plan under which a sample is taken in order to obtain information and determine a lot's acceptability

3.13
acceptable quality level
AQL
quality level in a sampling plan corresponding to a high probability of acceptance

NOTE In this International Standard, the probability is greater than or equal to 95 %.

3.14
limiting quality
LQ
quality level in a sampling plan corresponding to a low probability of acceptance

NOTE 1 In this International Standard, the probability is less than or equal to 10 %.

NOTE 2 LQ_{10} is the percentage of fasteners that do not conform in respect of product characteristic, having one chance in ten of being accepted under the sampling plan; often referred to as the consumer's risk.

3.15
supplier's risk
probability that a lot may be rejected regardless of the fact that its quality level corresponds to the respective AQL values in a sampling plan

3.16
probability of acceptance
P_a
probability that a lot of a given quality will be accepted in a given sampling plan

4 General principles and requirements

4.1 The purchaser may test the delivered fasteners for function and usability, when judged by the purchaser to be necessary or economically justifiable, provided the supplier's risk is no greater than 5 % and where no prior agreement has been reached.

4.2 The ability of the product to perform its intended function is an important consideration to be stressed during the acceptance inspection. Objections shall be raised only if non-conformities impair the fastener's intended function or use. Therefore it is not always necessary to carry out all tests specified in the standards.

The purchaser shall give the supplier the opportunity to verify any perceived nonconformity.

If, at the time of inspection, the subsequent function is uncertain (for example, in the case of stock parts), any deviation from the specified tolerances shall be regarded as impairing function or use.

4.3 A rejected lot of fasteners shall not be presented for reinspection unless the nonconformity has been rectified or the lot sorted (see 5.6).

NOTE Any rectification that might impair intended function and use will require the consent of the purchaser.

4.4 Gauges and measuring instruments used for inspection shall not determine any fastener to be unacceptable if the fastener dimensions and properties are within the limits of specification. If a dispute arises, direct measurements shall be made in order that a decision can be taken.

This does not apply to threads for which the checking with gauges is always decisive; see also ISO 1502.

4.5 Even when the lot satisfies the acceptance conditions of this International Standard, it is possible to reject individual fasteners that do not meet the agreed technical requirements.

5 Acceptance inspection procedure for fastener characteristics[3)]

5.1 Each characteristic shall be individually assessed.

5.2 Find the description of the fastener to be inspected for dimensional characteristics in Tables 1 to 4. Note all characteristics appropriate for inspection and the AQL value associated with each. For characteristics other than dimensional ones, note all those to be inspected, as well as the associated AQL values, covered in Tables 6 to 9.

5.3 Choose the appropriate LQ_{10} value in accordance with 4.1 (see the examples in Table 5).

NOTE 1 The LQ_{10} shall correspond to the fastener's function or use or to both. For more important fastener functions or uses, the LQ_{10} value may be smaller, but this will require greater sample sizes and higher inspection costs. It may be possible to reduce the proportion of fasteners inspected if the lot is from known sources with continuous production controls. In this case, if the lots inspected up to that point have shown good quality, choose a greater LQ_{10} value. Conversely, if the lot cannot be presumed to be uniform or is supplied by more than one manufacturer it may be necessary to increase the proportion of fasteners inspected. The choice of the LQ_{10} value shall be left solely to the discretion of the purchaser.

NOTE 2 The sampling plans in Table 5 are determined by the choice of AQL and by the consumer's risk (LQ_{10}). Once these two parameters have been determined, the sample size and acceptance number follow automatically. The lot/sample size relationship shown in Table 1 of ISO 2859-1:1999 is not applicable, as it is intended to apply only in the case of the production of a continuous series of lots. However, Table 5 can be applied in such a case, as well as to isolated lots if a suitable choice of LQ_{10} is made.

5.4 Knowing the AQL and with the LQ_{10} value chosen, find the sample size and the acceptance number, for example in Table 5.

5.5 Select the sample in accordance with 3.6. For each characteristic, carry out the inspection, note the number of nonconforming fasteners and accept the lot if their number is less than or equal to the acceptance number. If, in the case of non-destructive testing, the lot size is less than that of the required sample, 100 % inspection shall be carried out.

5.6 In the event of rejection, suitable disposal of the lot shall be agreed upon by purchaser and supplier (see 4.3).

5.7 Wherever possible, the samples for tensile tests should be those used for non-destructive hardness tests, with the lowest hardness figures applicable to testing tensile strength and the highest to elongation. The tensile test being destructive, it requires fewer samples than would a non-destructive hardness test.

NOTE The above is not applicable in cases of destructive hardness tests, for example case-hardness tests, hardness tests to detect carburization or decarburization and other such tests made on sections of the specimen.

The proof load test is regarded as a destructive test.

EXAMPLE 1 Inspection of threads for grade-A hexagon bolts from a supplier known for consistent quality. In this case, LQ_{10} = 6,5 (for AQL 1,0) is applicable:

AQL 1 - Sample size 80 - Acceptance number Ac 2

EXAMPLE 2 Inspection of the driving feature for hexagon-socket head-cap screws from an unknown supplier. In this case the LQ_{10} must be taken down to 3,0:

AQL 1 - Sample size 400 - Acceptance number Ac 7

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3) Recommendations for acceptance inspection procedures are given in annex A (informative).

EXAMPLE 3 Inspection of the mechanical property: stress under proof load for nuts:

AQL 1,5 - Sample size 3 - Acceptance number Ac 0

5.8 Non-destructive (visual) tests for detecting surface discontinuities cannot always give results of the type and dimension of the discontinuity, which can only be verified by destructive tests. Greater sample sizes are thus necessary for non-destructive testing for surface discontinuities in order to identify those fasteners that should subsequently be subjected to destructive testing (see also footnote “a” in Table 6).

5.9 Acceptance testing on the basis of AQL values is only possible for systematic nonconformities able to be statistically evaluated.

For non-systematic nonconformities for which no limits can be specified, for example “missing heat treatment”, “missing marking”, “missing thread”, the means of evaluation is left to the purchaser’s discretion.

Table 1 — Dimensional characteristics of threaded fasteners

Dimensional characteristics	Product group					
	1	2	3	4	5	6
	Bolts, screws and studs of grades A and B[a]	Bolts, screws and studs of grade C[a]	Nuts of grades A and B[a]	Nuts of grade C[a]	Self-tapping screws[b] and wood screws	All thread-forming screws not covered in column 5, self-drilling screws and chip-board screws
	AQL					
Width across flats	1	1,5	1	1,5	1,5	1
Width across corners	1	1,5	1	1,5	1,5	1
Nut height	—	—	1	1,5	—	—
Width of slot	1	—	—	—	1,5	1
Depth of slot	1	—	—	—	1,5	1
Recess penetration	1	—	—	—	1,5	1
Socket, GO gauge	1	—	—	—	—	—
Socket, NOT GO gauge	1	—	—	—	—	—
Configuration under head	1	—	—	—	—	1
GO thread gauge	1	1,5	1	1,5	—	1[c]
NOT GO thread gauge	1	1,5	1	1,5	—	1[c]
Major diameter	—	—	—	—	2,5	1
Geometric tolerances[d]	1	1,5	1	1,5	2,5	1
All others	1,5	2,5	1,5	2,5	2,5	1,5
Nonconforming fasteners	2,5	4	2,5	4	4	2,5

a The product grades refer to the classification of the product with regard to fit and tolerances (see ISO 4759-1).

b Screws with threads to ISO 1478.

c For certain products (for example, thread-rolling screws) this characteristic is assessed on the basis of the thread produced in the mating component.

d Each geometric tolerance shall be individually assessed.

Table 2 — Dimensional characteristics of plain washers

Dimensional characteristics	Product grade A[a]	Product grade C[a]
	AQL	
Hole diameter	1	1,5
Outside diameter	1,5	2,5
Others	2,5	4

[a] The product grade refers to the classification of the product in respect of fit and tolerances (see ISO 4759-3)

Table 3 — Dimensional characteristics of pins

Dimensional characteristics	Product group				
	Parallel pins	Taper pins	Clevis pins	Spring pins	Split pins
	AQL				
Pin diameter	1	1	1	1	1,5
Surface roughness	1	1	1	—	—
Taper	—	1	—	—	—
Others	2,5	2,5	2,5	2,5	2,5

Table 4 — Dimensional characteristics of blind rivets

Dimensional characteristics	AQL
Shank diameter	1,5
Shank length	1,5
Head diameter	1,5
Mandrel protrusion	1,5
Others	2,5

Table 5 — Examples of sampling plans[a]

Ac	AQL				
	0,65	1,0	1,5	2,5	4,0
	n[b] LQ_{10}				
0	**8** 25	**5** 37	**3** 54	—	—
1	**50** 7,6	**32** 12	**20** 18	**13** 27	**8** 42
2	**125** 4,3	**80** 6,5	**50** 10	**32** 17	**20** 25
3	**200** 3,3	**125** 5,4	**100** 6,6	**50** 13	**32** 20
4	**315** 2,6	**200** 3,9	**125** 6,2	**80** 9,6	**50** 15
5	**400** 2,4	**250** 3,7	**160** 5,8	**100** 9,3	—
6	—	**315** 3,4	**200** 5,2	**125** 8,4	**80** 13
7	—	**400** 3,0	**250** 4,7	**160** 7,3	**100** 11,5
8	—	—	**315** 4,2	**200** 6,6	**125** 10
10	—	—	**400** 3,9	**250** 6,0	**160** 9,5
12	—	—	—	**315** 5,6	**200** 8,8
14	—	—	—	**400** 5,0	**250** 8,0
18	—	—	—	—	**315** 7,8
22	—	—	—	—	**400** 7,3

NOTE For all sampling plans the supplier's risk is less than or equal to 5 %.

[a] Sampling plans are derived from ISO 2859-1:1999, either directly or, in some cases, by interpolation.

[b] In the case of non-destructive testing, if the lot size is less than the required sample size, 100 % inspection shall be carried out.

Table 6 — Characteristics of threaded fasteners, excepting dimensional characteristics

Characteristics		AQL	Reference standards
Mechanical characteristics and surface integrity	Non-destructive tests[a]	0,65	ISO 898[c] ISO 2320 ISO 2702 ISO 3506[c] ISO 6157[c] ISO 7085 ISO 8839 etc.
	Destructive tests	1,5	
Chemical composition		1,5	
Metallurgical characteristics		1,5	
Functional (performance) characteristics		1,5	
Coating		1,5	ISO 4042 ISO 10683
Others[b]		1,5	

[a] If non-permitted surface discontinuities (for example, quench cracks) are found during surface discontinuity inspection (non-destructive test), regardless of their size, the inspection lot shall be rejected.

[b] Other characteristics may be required according to applicable specifications.

[c] See the applicable parts of these standards.

Table 7 — Mechanical characteristics of plain washers

Mechanical characteristics[a]	Carbon or alloy steel	Stainless steel	Non-ferrous metal
	AQL		
Hardness	0,65	0,65	—

[a] Specified in product standards. Other characteristics may be required according to the application specification.

Table 8 — Mechanical characteristics of pins

Mechanical characteristics[a]	Product group	
	Parallel, taper and clivis pins	Spring pins Grooved pins
	AQL	
Sheer strength	—	1,5
Hardness	0,65	0,65

[a] Specified in product standards. Other characteristics may be required according to the application specification.

Table 9 — Mechanical characteristics of blind rivets

Mechanical characteristics[a]	AQL
Ultimate tensile strength	1,5
Ultimate shear strength	1,5
Mandrel break load	1,5
Mandrel push-out resistance	4,0
Mandrel head retention capability	4,0

[a] Specified in product standards.

Annex A
(informative)

Recommendations for acceptance-inspection procedures (for example, for dimensional characteristics)

Option 1

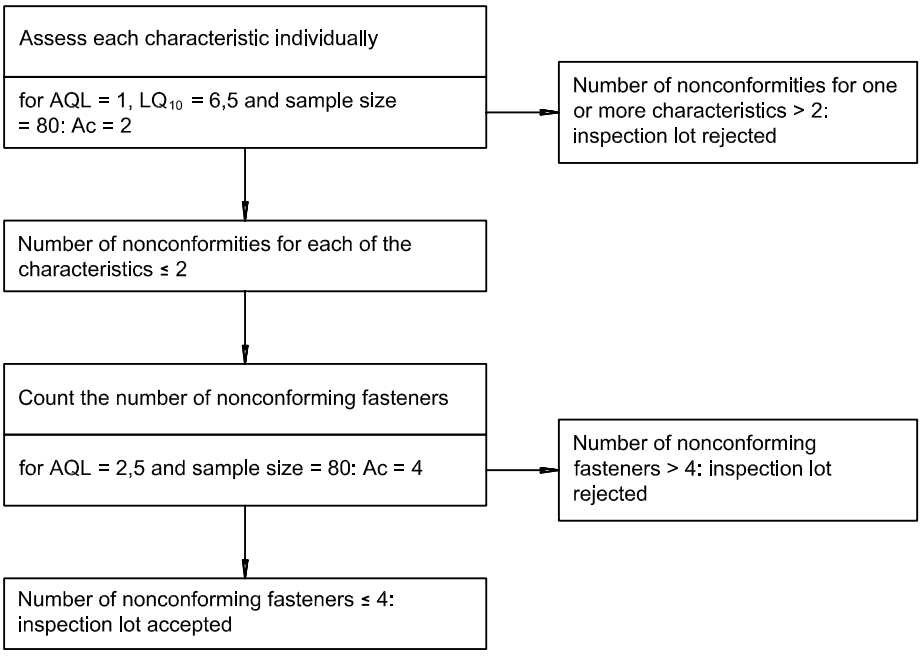
One sample size (n) chosen according to Table 5 shall be taken to test all the dimensional characteristics. Each characteristic shall be individually assessed (see Tables 1, 2, 3 and 4).

When the inspection lot passes the tests for individual characteristics, nonconforming fasteners are to be assessed as follows:

— count the nonconforming fasteners found for all the characteristics tested (a fastener with one or more nonconformities is to be considered a single nonconforming fastener, see 3.10);

— compare the number of nonconforming fasteners with the Ac value corresponding to the sample size (n) and to the AQL value given in Tables 1, 2, 3 or 4 for nonconforming fasteners, in order to determine whether to accept or reject the inspection lot.

Procedure 1



Option 2

One sample size (n_1) chosen according to Table 5 shall be taken to test all the dimensional characteristics.

First, the procedure specified in option 1 shall be carried out with the sample size n_1. When the inspection lot has passed the test, the purchaser can decide to increase the sample size for characteristics judged to be particularly important, which, according to Table 5, also implies an increase in the acceptance number for these characteristics.

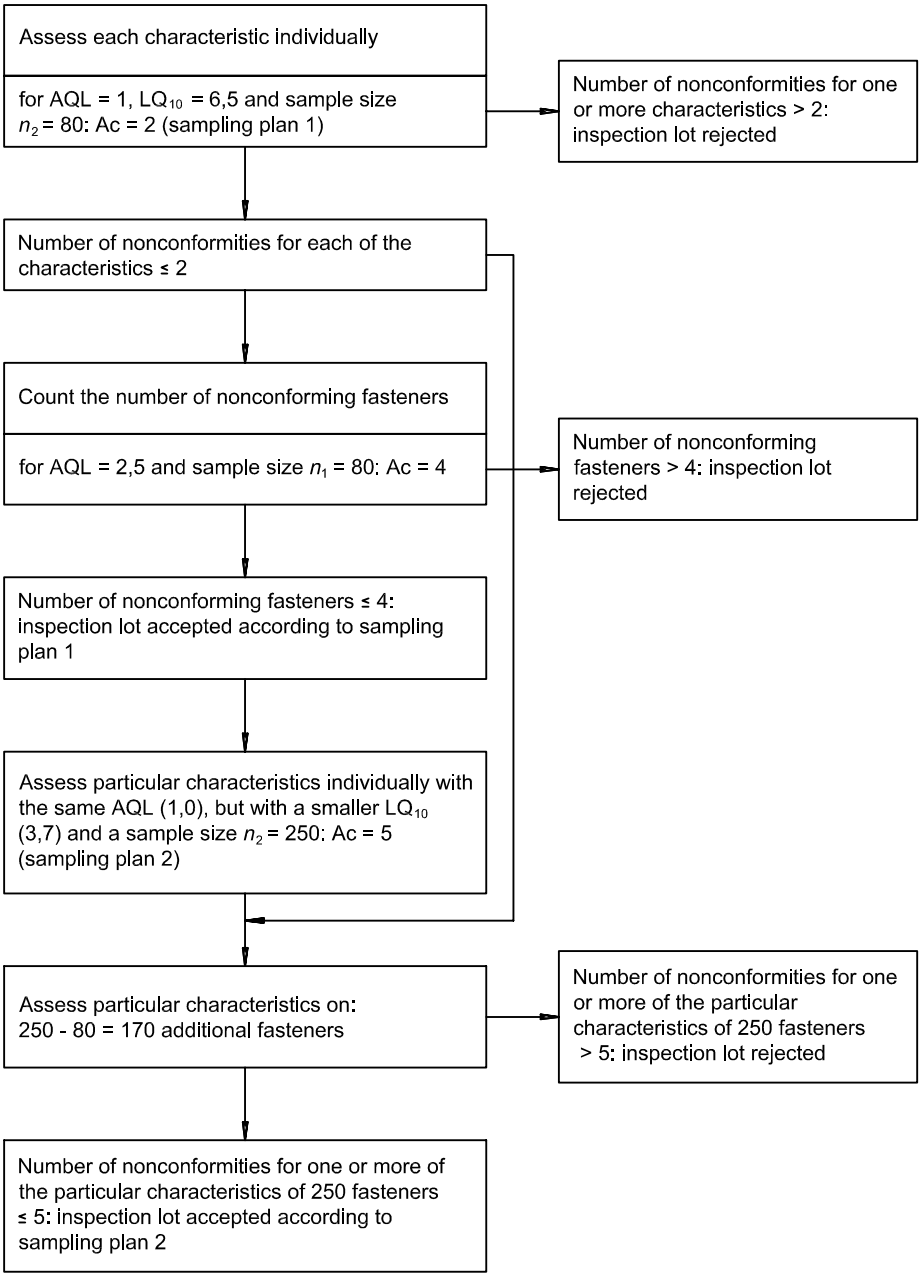
Then:

— choose a larger sample size (n_2) according to Table 5;

— carry out tests for particularly important characteristics on the supplementary parts ($n_2 - n_1$);

— the decision for acceptance or rejection of the inspection lot is made according to the Ac value resulting from the sample size (n_2) and the AQL value given in Table 5.

Procedure 2



Annex B
(informative)

Guidance and explanation concerning the principles of this International Standard

B.1 General

It is not always possible to prevent nonconforming fasteners from occurring in mass production. Large lots in particular may occasionally contain some nonconforming fasteners. Technical requirements do not generally demand that these nonconforming fasteners be sorted out, which is in any case a difficult and uneconomic procedure.

Each nonconforming fastener whose nonconformity may have a more-than-negligible adverse affect on the intended use can be cause for complaint.

The purchaser who tests each fastener and consequently the total delivery will sort out the nonconforming fasteners and, if necessary, make a complaint. The procedures and AQL values specified in this International Standard are not to be used in such a case.

Large lots are usually subjected only to random sampling by the purchaser. The results of random inspection permit the deduction of the actual number of nonconforming fasteners present in the inspection lot with a more or less high degree of probability. The probability depends on the sample size (extent of testing).

B.2 Purpose

The purpose of this International Standard is the specification of objective criteria for determining the circumstances under which a complaint related to an entire lot may be made, without knowledge of the precise proportion of nonconforming fasteners in the lot. It's aim is to protect the supplier, as far as possible, against complaints related to inspection lots in which the proportion of nonconforming fasteners is small (smaller than the AQL value) but where, as the result of an unsuitable sampling inspection (for example, because sample sizes were too small), it has been incorrectly indicated as being excessive.

B.3 Background to clause 1

This International Standard defines quality limits (AQL values) and sampling plans whereby the supplier’s risk does not exceed 5 % for the rejection of lots and the percentage of nonconformance is equal to the AQL value.

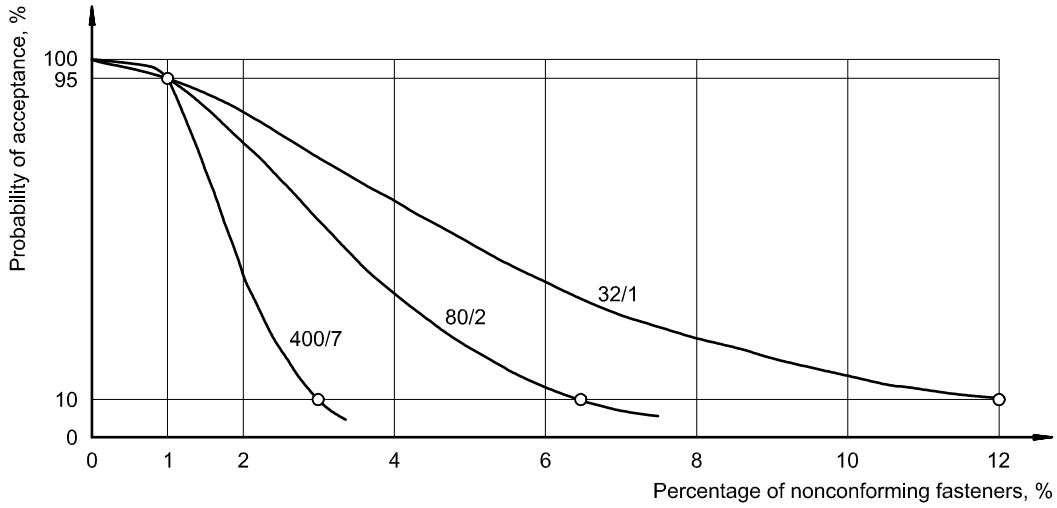
On the one hand, this specification protects the supplier; on the other hand, it leaves the purchaser the necessary freedom to choose the sampling plan needed for technical reasons.

The purchaser can therefore match the extent of inspection with functional requirements and with experience gained from previous lots received from the same supplier (quality history). The greater the sample size (i.e. the nearer the sampling plan's LQ value to the AQL) the greater the probability of recognizing lots in which the percentage of nonconforming fasteners appreciably exceeds the AQL value; the greater, too, the effort and expense involved. By using this system the purchaser can select the optimal technical and economic parameters for the particular situation.

B.4 Background to clause 4

The following presents the relationship existing between the sampling plan (sample size, acceptance number) and the AQL and LQ values.

Each sampling plan is described by its operating characteristic curve OC (see Figure B.1). This curve shows the probability of acceptance in a sampling inspection as a function of the actual percentage of nonconforming fasteners in the inspection lot. The points on the operating characteristic curve indicating a 95 % and a 10 % probability of acceptance have been selected for the determination of suitable sampling. The 95 % point of the OC is required to be greater than or equal to the AQL value specified. Selection of the 10 % point on the OC (LQ_{10} value) is at the purchaser's discretion. The LQ_{10} value corresponds to the percentage of nonconforming fasteners in inspection lots that are highly likely (90 % probability) to give rise to complaints.



EXAMPLE AQL = 1, Sampling plans 32/1, 80/2 and 400/7

Figure B.1 — Operating characteristic curves for sampling plans

This International Standard includes Table 5 for those users who do not have their own sampling system.

Sampling inspection is used only in determining acceptance or rejection of an entire lot. Complaints about individual nonconforming fasteners are not affected, and are possible even if the lot has been accepted without complaint.

During discussions of the AQL values, it was generally recognized that a complaint rate of 5 % for entire deliveries was, as a rule, uneconomic for the supply of fasteners. The AQL values and the supplier's risk specified in this International Standard are therefore to be viewed merely as characteristic values for the determination of suitable sampling plans. The quality of fasteners manufactured is usually superior to that implied by the AQL value.

B.5 Information additional to clause 4

Manufacturers test their products at their own discretion, using the means and methods which seem appropriate to them, and according to their knowledge of the correlations between manufacturing processes, materials, types of fasteners and the frequency of nonconformities. Manufacturers are not obliged to use the processes and tests described in this International Standard, either in manufacture or in final inspection, if they can produce the same result using different means and methods.

Purchasers also have the possibility of using any test which appears suitable to them. However, a more severe test (lower AQL values for a lower probability of acceptance) may only be used as the basis for decisions pertaining to complaints in respect of inspection lots if such a deviation from this International Standard was expressly agreed at the time of ordering.

Some deviations from specified tolerances or limits will have no adverse effects either on the function or use of fasteners and, in accordance with 4.2, no complaints should be made about these. For example, the ISO thread tolerances provided for some clearances allow electroplating to be applied without adverse effect on the functioning of the threads. If the upper limit of the effective bolt thread diameter is slightly exceeded, and it is known that this thread will not be coated, this deviation can have no adverse effect on the function or use of the screws, and no complaint shall be made.

Regardless of their nature or the use of gauges and measuring instruments, the different measurement and inspection procedures shall not qualify any part as nonconforming if the actual values lie within the specified limits. However, this does not apply to threads where gauging is decisive. The standards dealing with inspection and measurement procedures specify how this principle is to be realized in individual methods and items of test equipment. In a case of arbitration, the effect of the uncertainty of inspection methods and measuring equipment shall be included in the assessment of the results of inspection and measurement.

B.6 Background to clause 5

Properties for which no limits are specified in International Standards covering mechanical properties, for example in ISO 898-1, ISO 898-2 or ISO 898-6, or in dimensional standards, may be important in particular cases. In order to avoid misunderstandings, permissible limiting values or limit specimens or both shall be exchanged at the time of ordering.

Limiting values have been specified for the greater part of the properties to be assessed. In an individual case where nonconformities are found, and depending on the function of the part and the deviation from the limits determined, agreement may have to be reached between the supplier and the purchaser on acceptance, rejection or further machining or processing, possibly involving reinspection.

The recording of test results obtained from various lots supplied by the same supplier gives a statistically representative picture of that supplier's quality level over a particular period. It is therefore recommended that the results of non-destructive and destructive tests be continuous and regularly recorded, in order to obtain statistically based, representative documentation for the assessment of each supplier's quality level.

Bibliography

[1] ISO 3534-2:1993, *Statistics — Vocabulary and symbols — Part 2: Statistical quality control.*

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