INTERNATIONAL STANDARD

ISO 3269

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Fasteners — Acceptance inspection

Élément de fixation — Contrôle de réception

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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).