International Standard ISO 3269

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Fasteners — Acceptance inspection

Éléments de fixation — Contrôle de réception

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Fasteners — Acceptance inspection

1 Scope and field of application

1.1 This International Standard specifies the procedure to be followed by the purchaser at his receiving inspection in order to decide whether a lot of fasteners may be accepted or rejected when no other acceptance procedure has been agreed with the supplier at the time of ordering the fasteners. Additional specific acceptability requirements may be included within a specific product standard (for example, prevailing torque lock nuts). The procedure is also to be applied when conformance to specification is disputed.

1.2 It applies to bolts, screws, studs, nuts, washers and other related fasteners not intended for high volume machine assembly, for special purpose applications or for specially engineered applications requiring greater in-process controls and lot traceability. Procedures for these products shall be agreed between supplier and user prior to confirmation of the order.

1.3 It applies to fully manufactured products only and neither implies, nor includes any particular in-process control procedure or inspection during production.

1.4 Accessories, services and partially fabricated parts, (for example, washers, nuts, plating, heat treatment, blanks, etc.) may be purchased by the supplier from other suppliers for use in production of fasteners. However, the supplier of the fully manufactured product shall be solely responsible for the quality of the final product.

Any plating or other process carried out by the user after receipt of the fasteners shall invalidate the requirements of this International Standard.

2 References

ISO 898/2, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values.*

ISO 2859, *Sampling procedures and tables for inspection by attributes.*

ISO 3506, *Corrosion-resistant stainless steel fasteners — Specifications.*

ISO 3534, *Statistics, vocabulary and symbols.*

ISO 4759/1, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters* > 1,6 *and* < 150 mm *and product grades A, B and C.*

ISO 6157/2, *Fasteners — Surface discontinuities — Part 2: Nuts with thread series* M5 *to* M39. [1]

3 General requirements

3.1 Although every fastener should meet all requirements of its standard specification, in mass production this is not always possible. Depending on the intended function and utilization, it is neither necessary nor economic always to separate fasteners which meet all requirements from those which do not.

3.2 For production control the manufacturer may use any inspection procedure, but due care shall be taken during all production stages that the fasteners will satisfy the respective standards.

The designation of an AQL shall not imply that the supplier has the right to supply knowingly any defective unit of product.

3.3 The user may test the fasteners delivered for function and utilization, as he judges necessary or economically justifiable, provided that this does not increase the risk of rejection for the supplier (5 % for dimensional and 12 % for mechanical requirements), unless prior agreement has been reached.

NOTE — Increase in the rejection risk means smaller AQL values and/or lower probability of acceptance.

3.4 It is important that, during acceptance inspection, stress is laid on the fitness of the product to perform its intended function. Objections should only be raised if the defects impair the intended function and utilization of the fasteners. The user shall give the supplier the opportunity of verifying defects discovered.

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

1) At present at the stage of draft.

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3.5 A rejected lot of fasteners may not be presented for re-inspection unless the defect has been rectified or the lot sorted (see 5.5).

NOTE — If such rectification could impair the intended function and utilization, it requires the consent of the user.

3.6 Gauges and measuring instruments used for inspection may not determine any fastener to be unacceptable if in fact the fastener dimensions and properties are within specification limits.

If disputes arise, direct measurements should be made for decision.

3.7 Also when the lot satisfies the acceptance conditions of this International Standard, it is possible to reject single fasteners which do not meet the agreed technical requirements.

4 Definitions

The following definitions apply for the purpose of this International Standard; they are based on ISO 3534.

4.1 acceptance inspection: All the procedures such as sampling, gauging, measuring, comparing and testing necessary to decide whether a lot of fasteners should be accepted.

4.2 supplier: The manufacturer of the fasteners, or a dealer or representative who supplies the fasteners.

4.3 purchaser: The receiver or his representative who receives the fasteners; this is not necessarily the final user of the fasteners.

4.4 lot/inspection lot: A definite quantity of fasteners of a single type, tolerance grade, property class and size manufactured under conditions which are presumed uniform and submitted by a supplier for inspection at one time.

4.5 lot size (N)**:** The number of fasteners contained in a lot.

4.6 sample: One or more fasteners drawn from a lot, taken at random so that all fasteners have an equal chance of selection.

4.7 sample size (n)**:** The number of fasteners in the sample.

4.8 characteristic: A dimensional element, mechanical property or other recognisable feature of a product for which limits are specified, for example, head height, body diameter, tensile strength or hardness.

4.9 major characteristic: A characteristic which, if defective, is likely to result in a failure or to reduce materially the usability of the fastener for its intended purpose.

4.10 minor characteristic: A characteristic that is not likely to reduce materially the usability of the fastener for its intended purpose, or that is a departure from established specifications having little bearing on the effective use or operation of the fastener.

4.11 defect: Any non-conformance of a characteristic of a fastener from the requirements of the specification or standard to which it should be produced.

4.12 defective(s): Fastener(s) with one or more defects.

4.13 acceptance number (Ac): The maximum number of defects in any given sample that still allows acceptance of the lot.

4.14 sampling plan: A plan according to which a sample is taken in order to obtain information and to reach a decision on the acceptance of the lot.

4.15 acceptable quality level (AQL): A quality level which in a sampling plan corresponds to a specified relatively high probability of acceptance.

4.16 limiting quality (LQ): In a sampling plan, a quality level which corresponds to a specified and relatively low probability of acceptance.

4.17 supplier's risk: The degree of probability that a lot does not satisfy the agreed technical requirements, the quality level of which does correspond to the respective AQL-value, when a sampling plan is used.

4.18 probability of acceptance (L): The probability that a lot which contains a certain number of defective parts cannot be rejected as a whole on the basis of a sampling plan.

5 Acceptance inspection procedure for dimensional and mechanical property characteristics of fasteners

5.1 Find the description of the fastener to be inspected for dimensional characteristics in table 1, note the appropriate characteristic to be inspected and the associated AQL value. For mechanical property characteristics, note the characteristic to be inspected from table 3.

5.2 Choose the appropriate ratio LQ_{10}/AQL in accordance with 3.3 (for examples, see table 2).

NOTES

1 Multiplying this ratio by the AQL value gives the LQ_{10}. The LQ_{10} shall correspond to the function and utilization of the fastener. For more important functions and utilizations of the fasteners the LQ value may be smaller, but this requires greater sample sizes and higher inspection costs. It may be possible to reduce the proportion of fasteners inspected from known sources with continuous production controls by choosing a greater ratio LQ_{10}/AQL, if the lots inspected so far have shown good quality. It may be necessary to increase the proportion inspected if the lot cannot be presumed to be uniform or is not from one manufacturer. The ratio LQ_{10}/AQL used shall be within the sole judgement of the purchaser.

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2 The sampling plans in table 2 are determined by the choice of AQL and of customer's risk (LQ_{10}). Once these two parameters have been chosen, the sample size, acceptance number, and producer's risk follow automatically. Hence the lot size/sample size relationship in table 1 of ISO 2859, which is intended to apply only in the case of production of a continuous series of lots, is not appropriate. Table 2 can be applied to such a case, but is also applicable to isolated lots by suitable choice of LQ_{10}. In case of dispute between purchaser and supplier a sampling plan shall be chosen according to which the producer's risk is not higher than that laid down in 3.3.

5.3 Knowing the AQL and the chosen ratio LQ_{10}/AQL, find the sample size and the acceptance number from table 2.

5.4 Select the sample in accordance with 4.6. For each characteristic, carry out the inspection, note the number of defects and accept the lot if the number of defects is equal to or lower than the acceptance number.

5.5 In the event of rejection, suitable disposal of the lot shall be agreed upon by purchaser and supplier (see 3.5).

5.6 The samples for the tensile test (see table 3) should where possible be those used for the hardness test, with the lowest and/or highest hardness figures. (The tensile test, being destructive, requires fewer samples than the non-destructive hardness test.)

The proof load test is regarded as a destructive test.

Examples:

1 Inspection of threads for hexagon grade A bolts lots of a supplier well known for his steady quality; therefore ratio LQ_{10}/AQL of 6,2 is applicable:

AQL 1,0 — Sample size 80 — Acceptance number Ac 2.

2 Inspection of the driving media for hexagon socket head screws of an unknown supplier; therefore the ratio LQ_{10}/AQL has to be lowered to 3,1:

AQL 1,0 — Sample size 500 — Acceptance number Ac 10.

3 Inspection of the mechanical property: stress under proof load for nuts (see footnote 2 of table 2):

AQL 1,5 — Sample size 8 — Acceptance number Ac 0.

Table 1 — Dimensional characteristics

Applicable dimensional characteristics[1]		Product group					
		Socket screws, bolts and screws of grades A and B[2], studs	Bolts and screws of grade C[2]	Nuts > class 8[3]	Nuts < class 8[3]	Machine screws	Self tapping screws, thread forming screws
		AQL[4]					
Major dimensions	width across flats	1,0	1,5	1,0	1,5	1,5	1,5
	width across corners	1,0	1,5	1,0	1,5		1,5
	width of slot or socket	1,0				1,5	1,5
	depth of slot or socket	1,0				1,5	1,5
	recess penetration depth					1,5	1,5
	radius under head	1,5					
	go thread gauge	1,0	1,5	1,5	1,5	1,5	
	no go thread gauge	1,0	1,5	2,5	2,5	1,5	
	major diameter						2,5
Minor dimensions	all others	2,5	4,0	2,5	4,0	4,0	4,0

1) *Characteristics shall be individually assessed.*

2) The product grades refer to the classification of the product with regard to fit and tolerances. Grade A is the most precise and grade C the least precise. (See ISO 4759/1.)

3) Product property class for nuts: see ISO 898/2.

4) For features left in the hot-forged condition use an AQL of 2,5. Hot-forged products shall be presented for inspection separately.

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