



SLOVENSKI STANDARD
SIST EN 2157-1:2001
01-januar-2001

Aerospace series - Steel - Forging stock and forgings - Technical specification - Part 1: General requirements

Aerospace series - Steel - Forging stock and forgings - Technical specification - Part 1: General requirements

Luft- und Raumfahrt - Stahl - Schmiedevormaterial und Schmiedestücke - Technische Lieferbedingungen - Teil 1: Allgemeine Anforderungen

Série aérospatiale - Acier - Produits destinés à la forge - Pièces forgées et pièces matricées - Spécification technique - Partie 1: Exigences générales

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Ta slovenski standard je istoveten z: EN 2157-1:1993

ICS:

49.025.10 Jekla Steels

SIST EN 2157-1:2001 **en**

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EUROPEAN STANDARD

EN 2157-1:1993

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1993

UDC 669.14-4:621:73:620.1:62-777:629.7

Descriptors: Aircraft industry, forgings, die forgings, steels, specifications, generalities

English version

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forgings - Technical specifications - Part 1:
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This European Standard was approved by CEN on 1993-08-19. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

This standard was submitted for Formal Vote, and the result was positive.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1994, and conflicting national standards shall be withdrawn at the latest by February 1994.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 Scope

This standard defines the general requirements for the manufacture, inspection and testing of forging stock, hand forgings ¹⁾ including forged blocks and rings ¹⁾, die forgings and rolled rings ¹⁾ in steel.

The specific requirements are defined in EN 2157-2 and EN 2157-3.

The three standards EN 2157-1, EN 2157-2 and EN 2157-3 define the inspection level and the sampling frequency to be applied unless otherwise specified on the drawing, order or inspection schedule.

For aerospace purposes this standard shall be applied in conjunction with EN material standards unless otherwise specified on the drawing, order or inspection schedule.

By agreement between the manufacturer and the purchaser, this standard can also be applied to other materials and conditions of supply not covered by EN material standards. This agreement shall be formalized by reference to this standard on the drawing, order or inspection schedule.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2000	Aerospace series - Quality assurance - EN aerospace products - Approval of the quality system of manufacturers
EN 2078	Aerospace series - Metallic materials - Manufacturing schedule - Inspection schedule - Inspection and test report - Description and rules for use
EN 2157-2	Aerospace series - Steel - Forging stock and forgings - Technical specification - Part 2 - Forging stock
EN 2157-3	Aerospace series - Steel - Forging stock and forgings - Technical specification - Part 3 - Pre-production and production forgings

¹⁾ Hereafter described as "forgings".

3 Definitions

3.1 Purchaser

Body which purchases the products from a manufacturer or a stockist in accordance with the requirements of the user.

NOTE : The purchaser may also be the user.

3.2 User

See EN 2000.

3.3 Cast

Metal from the same final melting operation.

3.4 Campaign

A continuous production sequence using the same equipment without alteration to the operating conditions.

3.5 Batch

A batch consists of forging stock or forgings :

- of the same form and nominal dimensions or having the same drawing or part number;
- from the same cast; [SIST EN 2157-1:2001](https://standards.iteh.ai/catalog/standards/sist/5ac690e4-9741-4f8e-98df-9e9266639/sist-en-2157-1-2001)
- from the same campaign; <https://standards.iteh.ai/catalog/standards/sist/5ac690e4-9741-4f8e-98df-9e9266639/sist-en-2157-1-2001>
- in the same heat treatment condition;
- from the same heat treatment charge or from the same heat treatment campaign which shall be specified in the manufacturing schedule.

3.6 Pre-production forgings

Forgings produced to a particular design which qualify the method of manufacture, equipment configuration and, if appropriate, the forging stock source, which demonstrate that the requirements of the purchaser can be met.

3.7 Inspection schedule

See EN 2078.

3.8 Manufacturing schedule

See EN 2078.

3.9 Inspection and test report

See EN 2078.

3.10 "Capability clause"

Reference to "capability clause" signifies that sufficient evidence of statistical nature with respect to the properties under consideration can be submitted to show that the requirements of the relevant standard may be met on the basis of a reduced amount of testing. Such action in no way reduces the obligations of the manufacturer to fulfil all requirements. If subsequent testing indicates that a product does not comply with the requirements the batch shall be rejected.

4 Quality assurance

4.1 Approval of quality system of manufacturers

See EN 2000.

4.2 Product qualification

See material standard.

5 Manufacture

5.1 Forgings shall be made from forging stock complying with the relevant EN material standard and with EN 2157-2.

5.2 Compliance with the requirements of the purchaser shall be demonstrated by the manufacture and inspection and testing of pre-production forgings as required by EN 2157-3.

5.3 Unless otherwise specified, the forging stock and forgings shall be supplied in the heat treatment condition specified in the material standard. If there is more than one heat treatment condition contained in the material standard, the delivery condition shall be specified on the order or on the drawing.

If a specific temperature (value and tolerance) is stated, that temperature shall be mandatory.

If a temperature range is stated, a temperature within that range reduced by the furnace tolerances shall be selected to give the required properties.

Unless otherwise specified, the charge shall be maintained at the temperature subject to the following tolerances (see table 1), for the period stated.

Table 1

Selected temperature °C	Tolerances °C
< 750	± 5
$750 \leq \theta \leq 1250$	± 10

6 Traceability

Each product shall be identifiable to its batch at all stages of manufacture and delivery.

7 Freedom from defects

All products shall be free from irregularities not complying with the requirements of the material standard or the order, or prejudicial to the subsequent manufacture or use of the product. Notwithstanding previous acceptance of products complying with this standard, any product that is found, at a later stage, to contain such defects, may be rejected.

8 Testing

The tests required by the material standard or the order shall be made in accordance with the requirements of the appropriate test standard. If a test standard does not exist, the method shall be agreed between the manufacturer and the purchaser.

Unless otherwise specified on the order, the frequency of testing shall be as specified in EN 2157-2 EN 2157-3. Where necessary, the location and the direction of the test samples shall be specified on the order.

8.1 Chemical composition

It shall comply with the requirements of the relevant material standard and shall be determined on each cast.

The samples taken for analysis shall be representative of the cast. The method of analysis shall be selected by the manufacturer, but in case of dispute, the method set out in the relevant ISO standard shall be used. If no ISO standard exists, a fundamental method of chemical analysis shall be used.

8.2 Preparation of the test samples and test pieces

8.2.1 Test samples for forgings for the tests required by the material standard shall be obtained by one or more of the following methods as agreed between the manufacturer and the purchaser and indicated on the drawing or the inspection schedule :

- a) test samples cut from forgings;
- b) test samples forged integrally with the forgings;
- c) test samples forged separately from the same batch of forging stock as the forgings they represent.

8.2.2 Dimensions of test samples and associated test pieces representing forgings are to be agreed between the manufacturer and the purchaser and shall be stated on the drawing or inspection schedule.

8.2.3 The test samples and associated test pieces shall be marked in such a manner that their identity and orientation with respect to the product and the batch is maintained.

8.2.4 Test samples removed from finished forgings shall not be further worked.

8.2.5 Should the test samples be cut from forgings, the purchaser shall specify in the drawing or inspection schedule the number of forgings to be cut up and the location from which the samples are to be taken.

8.3 Heat treatment of test samples

8.3.1 Test samples representing forgings to be supplied in any heat treated condition shall be heat treated with the batch of forgings they represent.

Unless otherwise agreed between the manufacturer and the purchaser, samples shall not be cut from forgings before heat treatment.

8.3.2 Test samples cut from forgings in the finally heat treated condition shall not be further heat treated.

8.3.3 Test samples representing forgings supplied in other than the finally heat treated condition, shall be additionally heat treated in accordance with the requirements of the material standard.

8.4 Re-tests

If any requirement is not met, re-tests shall be carried out under the following conditions.

8.4.1 Mechanical tests (tensile test, beam impact test, fracture toughness (K_{1C}))

If the test procedure or the test piece preparation is faulty, testing shall be re-applied at the original frequency after identification of the cause of failure.

When failure cannot be attributed to a faulty test procedure or to test piece preparation, additional identical test samples shall be selected at twice the original frequency.

At least one of the samples shall be taken from the forging stock or forgings on which the incorrect result was obtained (unless already rejected by the manufacturer after suitable identification of the cause of the failure).

If all results are satisfactory, the batch shall be accepted.

If one or more results are unsatisfactory, the batch shall be either :

- rejected, or
- partially or fully re-heat treated and tested as a completely new batch except for chemical composition and inclusion content.