
**Aeronavtika - Jeklo in zlitine, odporne proti vročini - Gneteni izdelki - Tehnična
specifikacija - 004. del: Žice**

Aerospace series - Steel and heat resisting alloys - Wrought products - Technical
specification - Part 004: Wire

Luft- und Raumfahrt - Stahl und Hochwarmfesten Legierungen - Umgeformte
Erzeugnisse - Technische Lieferbedingungen - Teil 004: Drähte

Série aérospatiale - Aciers et alliages résistant à chaud - Produits corroyés -
Spécification technique - Partie 004: Fils

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Ta slovenski standard je istoveten z: EN 4700-004:2010

ICS:

49.025.10	Jekla	Steels
77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains

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Aerospace series - Steel and heat resisting alloys - Wrought products - Technical specification - Part 004: Wire

Série aérospatiale - Aciers et alliages résistant à chaud -
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This European Standard was approved by CEN on 20 February 2010.

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 CEN Management Centre or to any CEN member.

This European Standard exists 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Wording of order	7
5 Health and safety	7
6 Technical requirements	7

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SIST EN 4700-004:2011

<https://standards.iteh.ai/catalog/standards/sist/08dd9f62-d027-4a01-a4a5-f7656c29c331/sist-en-4700-004-2011>

Foreword

This document (EN 4700-004:2010) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

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

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 April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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SIST EN 4700-004:2011

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EN 4700-004:2010 (E)

Introduction

This standard is part of the series of EN metallic material standards for aerospace applications. The general organization of this series is described in EN 4258.

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1 Scope

This standard defines the requirements for the ordering, manufacture, testing, inspection and delivery of steel and heat resisting alloy wire. It shall be applied when referred to and in conjunction with the EN material standard unless otherwise specified on the drawing, order or inspection schedule.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 2002-001, *Aerospace series — Metallic materials — Test methods — Part 001: Tensile testing at ambient temperature*

EN 2002-002, *Aerospace series — Metallic materials — Test methods — Part 002: Tensile testing at elevated temperature*

EN 2002-005, *Aerospace series — Test methods for metallic materials — Part 005: Uninterrupted creep and stress-rupture testing*

EN 2002-16, *Aerospace series — Metallic materials — Test methods — Part 16: Non-destructive testing — Penetrant testing*¹⁾

EN 2032-1, *Aerospace series — Metallic materials — Part 1: Conventional designation*

EN 2032-2, *Aerospace series — Metallic materials — Part 2: Coding of metallurgical condition in delivery condition*

EN 2078, *Aerospace series — Metallic materials — Manufacturing schedule, inspection schedule, inspection and test report — Definition, general principles, preparation and approval*

EN 2857-1, *Aerospace series — Metallic materials — Test methods for ferromagnetic materials — Non-destructive testing — Magnetic particle inspection — Part 1: General requirements*²⁾

EN 2857-2, *Aerospace series — Metallic materials — Test methods for ferromagnetic materials — Non-destructive testing — Magnetic particle inspection — Part 2: Inspection requirements*²⁾

EN 2950, *Aerospace series — Test method — Wrought heat resisting alloys — Semi-finished products and parts — Conditions for macrographic and micrographic examination — Atlas of structures and defects*

EN 2951, *Aerospace series — Metallic materials — Test method — Micrographic determination of content of non-metallic inclusions*¹⁾

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use*

EN 4259, *Aerospace series — Metallic materials — Definition of general terms*¹⁾

EN 9100, *Quality Management Systems — Requirements for Aviation, Space and Defense Organizations*

EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

EN 10027-1, *Designation systems for steels — Part 1: Steel names*

1) Published as ASD-STAN Prestandard at the date of publication of this standard.

2) In preparation at the date of publication of this standard.

EN 4700-004:2010 (E)

EN 10079, *Definition of steel products*

EN ISO 643, *Steels — Micrographic determination of the apparent grain size (ISO 643:2003)*

EN ISO 3651-1, *Determination of resistance to intergranular corrosion of stainless steels — Part 1: Austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in nitric acid medium by measurement of loss in mass (Huey test) (ISO 3651-1:1998)*

EN ISO 3651-2, *Determination of resistance to intergranular corrosion of stainless steels — Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in media containing sulfuric acid (ISO 3651-2:1998)*

EN ISO 3887, *Steels — Determination of depth of decarburization (ISO 3887:2003)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1:2005)*

EN ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:2005)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2009)*

prEN ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature (ISO/DIS 6892-2:2009)*

ISO 7800, *Metallic materials — Wire — Simple torsion test*

ISO 7801, *Metallic materials — Wire — Reverse bend test*

ISO 7802, *Metallic materials — Wire — Wrapping test*

ISO 9649, *Metallic materials — Wire — Reverse torsion test*

TR 2410, *Aerospace series — Metallic materials — Relationship between dimensional standards and material standards*³⁾

AMS 2315, *Determination of Delta Ferrite Content*

AMS 2750, *Pyrometry*⁴⁾

ASTM A604, *Standard Test Method for Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 4259 apply. For definitions specific to steel, see EN 10079.

3) Published as ASD-STAN Technical Report at the date of publication of this standard.

4) Published by: SAE International, SAE World Headquarters 400 Commonwealth Drive Warrendale, PA 15096-0001 USA.

3.1

batch

As defined in EN 4259 with the following addition:

- for heat treatment using a continuous furnace, a continuous run of less than or equal to 8 h may be considered as the same heat treatment charge. Continuous heat treatment can be an option.

4 Wording of order

The order shall clearly indicate:

- quantities to be supplied;
- dates of delivery;
- material standard number;
- delivery condition and metallurgical code of products;
- dimensions and tolerances or reference to an appropriate dimensional standard;
- product designation, when required;
- forwarding address;
- nature and type of packing, if required;
- surface protection, if appropriate;
- definition and frequency of any special tests and their retest procedures, if required.

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SIST EN 4700-004:2011

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5 Health and safety

The products in the delivery condition shall fulfil the current health and safety laws of the area of the country where it is to be delivered.

A product safety data sheet shall be available.

6 Technical requirements

6.1 General

The product shall be manufactured in accordance with the requirements of the relevant material standard and the applicable requirements of this specification. A manufacturing schedule shall be established and applied in accordance with EN 2078.

Product shall satisfy the requirements of the material standard and/or order and shall be free from irregularities prejudicial to the subsequent manufacture or use of this product.

Notwithstanding previous acceptance complying with this material standard, any product that is found, at a later stage, to contain such defects shall be rejected.

Unless otherwise specified, the requirements in Tables 1 and 2 shall apply in conjunction with those of the relevant material standard. Table 1 relates to lines 1 to 29 (inclusive) of the material standard and Table 2

EN 4700-004:2010 (E)

relates to lines 30 onwards in which the sub-line format is also used. Lines 2 to 98 may also be opened in line 100 if the material standard details specific qualification requirements. If a specific line number is not shown in Tables 1 and 2, the requirement is stated in the material standard and/or order.

6.2 Qualification requirements

Qualification requirements when invoked by the material standard and/or order are detailed in Tables 1 and 2. Unless otherwise agreed between the manufacturer and purchaser the qualification phase shall be run on the first three batches, coming from at least two casts.

6.3 Release requirements**6.3.1 Release tests**

Release testing shall be the responsibility of the manufacturer.

The purchaser reserves the right to perform any of the inspections and/or tests required by the material standard and/or order.

The test samples shall be representative of the product.

When required by the order, the manufacturer shall inform the purchaser of the planned dates for extraction of samples and release testing in order that these operations may be witnessed.

Tables 1 and 2 detail the requirements for each line of the material standard. Unless otherwise specifically requested by the purchaser, a particular inspection and/or test for release shall be carried out if corresponding acceptance criteria and/or values are stated in the applicable material standard, but see also in 6.3.5.

6.3.2 Retests

SIST EN 4700-004:2011

<https://standards.iteh.ai/catalog/standards/sist/08dd9f62-d027-4a01-a4a5-17650c29c531/sist-en-4700-004-2011>

If any requirement is not met, retests shall be carried out under the following conditions unless otherwise stated in the material standard or order.

If the test procedure or test piece preparation is faulty, testing shall be re-applied at the original frequency after rectification of the original cause of failure, on a test sample located near the first one.

For wire with hardness results below the minimum or above the maximum value, the softest or hardest wire, as appropriate, shall be submitted to a tensile test. If the results comply with the specified tensile requirements, all wire shall be accepted.

When failure cannot be attributed to faulty testing, or test piece preparation, further test samples shall be selected at twice the original frequency from the product, one of which shall be that on which the original results were obtained unless already withdrawn by the manufacturer after suitable identification of the cause of failure. If all retest results are satisfactory, the batch shall be accepted. If one or more tests are unsatisfactory, the batch shall be:

- rejected; or
- 100 % retested and the conforming products accepted; or
- partially or fully re-heat treated if heat treatment can rectify the cause of the failure and tested as a completely new batch except for chemical composition and cleanness inspection. The reheat treatment shall be stated on the release test certificate.

For cleanness inspection, if the material fails the requirement the product may be cut back before retesting.

6.3.3 Rejection

Any failure to meet the requirements of the material standard shall be cause for rejection.

6.3.4 Special tests

Special tests may be required by the purchaser. In such cases, the nature of the test, method, frequency and technical requirements shall be specified on the order or inspection schedule and shall be mutually agreed by the manufacturer and purchaser.

6.3.5 Capability clause

Where the capability clause is invoked and where sufficient statistical evidence exists, the test need not be carried out (unless specifically requested by the purchaser).

However, this in no way reduces the obligations of the manufacturer to fulfil the requirements. If subsequent testing indicates that the product does not comply with the requirements, the batch shall be rejected.

If sufficient statistical evidence does not exist, the test shall be carried out at a frequency agreed between the manufacturer and purchaser.

6.3.6 Statistical process control

Reduction in the extent of release testing, other than that defined in 6.3.5 above, may be negotiated with the purchaser on the basis of appropriate statistical process control and/or statistical data.

6.3.7 Inspection and test report (standards.iteh.ai)

The manufacturer shall furnish, with each delivery, a report conforming to the requirements of EN 2078 stating the following:

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- manufacturer's name and address and, if appropriate, identification of the plant;
- order number;
- material standard number;
- method of melting;
- delivery condition and metallurgical code of the product;
- quantity and dimensions;
- manufacturing and inspection schedule reference;
- cast and batch number;
- all heat treatment, including re-heat treatment and, where appropriate, straightening and stress relieving parameters, applied to the batch;
- test sample heat treatment;
- results of the tests and retests if any.

EN 4700-004:2010 (E)**6.4 Traceability**

Each product shall be traceable to the cast, production batch and/or heat treatment batch at all stages of manufacture, testing and delivery.

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