

## DIN EN 4700-006



ICS 49.025.10

Einsprüche bis 2024-06-19  
Vorgesehen als Ersatz für  
DIN EN 4700-006:2011-05

**Entwurf**

**Luft- und Raumfahrt –  
Stahl und hochwarmfeste Legierungen –  
Umgeformte Erzeugnisse – Technische Lieferbedingungen –  
Teil 006: Ausfallmuster und Serienschmiedestücke;  
Englische Fassung prEN 4700-006:2024**

Aerospace series –  
Steel and heat-resisting alloys –  
Wrought products – Technical specification –  
Part 006: Pre-production and production forgings;  
English version prEN 4700-006:2024

Série aérospatiale –  
Aciers et alliages résistant à chaud –  
Produits corroyés – Spécification technique –  
Partie 006: Pièces types et pièces de série;  
Version anglaise prEN 4700-006:2024

**Anwendungswarnvermerk**

Dieser Entwurf mit Erscheinungsdatum 2024-04-19 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil das beabsichtigte Dokument von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs besonders zu vereinbaren.

Stellungnahmen werden erbeten

- vorzugsweise online im Norm-Entwurfs-Portal von DIN unter [www.din.de/go/entwuerfe](http://www.din.de/go/entwuerfe) bzw. für Norm-Entwürfe der DKE auch im Norm-Entwurfs-Portal der DKE unter [www.entwuerfe.normenbibliothek.de](http://www.entwuerfe.normenbibliothek.de), sofern dort wiedergegeben;
- oder als Datei per E-Mail an [nl@din.de](mailto:nl@din.de) möglichst in Form einer Tabelle. Die Vorlage dieser Tabelle kann im Internet unter [www.din.de/go/stellungnahmen-norm-entwuerfe](http://www.din.de/go/stellungnahmen-norm-entwuerfe) oder für Stellungnahmen zu Norm-Entwürfen der DKE unter [www.dke.de/stellungnahme](http://www.dke.de/stellungnahme) abgerufen werden;
- oder in Papierform an den DIN-Normenausschuss Luft- und Raumfahrt (NL), 10772 Berlin oder Am DIN-Platz, Burggrafenstr. 6, 10787 Berlin.

Es wird gebeten, mit den Kommentaren zu diesem Entwurf jegliche relevanten Patentrechte, die bekannt sind, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Gesamtumfang 34 Seiten

DIN-Normenausschuss Luft- und Raumfahrt (NL)

## Nationales Vorwort

Der Verband der Europäischen Luft-, Raumfahrt- und Verteidigungsindustrie – Normung (ASD-STAN) ist vom Europäischen Komitee für Normung (CEN) für zuständig erklärt worden, Europäische Normen (EN) für das Gebiet der Luft- und Raumfahrt auszuarbeiten. Durch die Vereinbarung vom 3. Oktober 1986 wurde ASD Assoziierte Organisation (ASB) des CEN.

Das vorliegende Dokument (prEN 4700-006:2024) wurde von ASD-STAN, Fachbereich Werkstoffe, unter Mitwirkung deutscher Experten des DIN-Normenausschusses Luft- und Raumfahrt (NL) erarbeitet.

Das zuständige deutsche Normungsgremium ist der Arbeitsausschuss NA 131-02-05 AA „Metallische Werkstoffe“ im DIN-Normenausschuss Luft- und Raumfahrt (NL).

Der vorliegende Norm-Entwurf enthält zur technischen Kommentierung einen Europäischen Norm-Entwurf (prEN) ausschließlich in Englischer Fassung aus der CEN-Umfrage.

Ein zweiter Norm-Entwurf wird nur die Deutsche Fassung der veröffentlichten ASD-STAN prEN enthalten. Es wird darauf hingewiesen, dass auf Grund der Verfahrensweise zur Normenerstellung bei ASD-STAN der zweite Norm-Entwurf ausschließlich der redaktionellen Prüfung der deutschen Sprachfassung dienen wird.

Entsprechend Beschluss 57/9 des Technischen Ausschusses des Beirats des DIN-Normenausschusses Luft- und Raumfahrt (NL) sind die europäischen Luft- und Raumfahrt-Normungsergebnisse zweisprachig, in Deutsch und Englisch, in das Deutsche Normenwerk zu überführen. Aus diesem Grund wird die Norm beide Sprachfassungen enthalten.

Aktuelle Informationen zu diesem Dokument können über die Internetseiten von DIN ([www.din.de](http://www.din.de)) durch eine Suche nach der Dokumentennummer aufgerufen werden.

## Änderungen

Gegenüber DIN EN 4700-006:2011-05 wurden folgende Änderungen vorgenommen:

- a) normative Verweisungen aktualisiert;
- b) in Tabelle 1, Anmerkung zu Zeile 17 hinzugefügt;
- c) in Tabelle 1, Prüfverfahren nach ASTM E340 und ASTM E381 für Stähle in Zeile 51 hinzugefügt;
- d) Dokument redaktionell überarbeitet.

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 4700-006**

March 2024

ICS 49.025.10

Will supersede EN 4700-006:2010

English Version

**Aerospace series - Steel and heat-resisting alloys -  
Wrought products - Technical specification - Part 006: Pre-  
production and production forgings**

Série aérospatiale - Aciers et alliages résistant à chaud -  
Produits corroyés - Spécification technique - Partie 006  
: Pièces types et pièces de série

Luft- und Raumfahrt - Stahl und Hochwarmfesten  
Legierungen - Umgeformte Erzeugnisse - Technische  
Lieferbedingungen - Teil 006: Ausfallmuster und  
Serienschmiedestücke

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (prEN 4700-006:2024) has been prepared by ASD-STAN.

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

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 4700-006:2010.

The main changes with respect to the previous edition are as follows:

- update of Clause 2 “Normative references”;
- Table 2: addition of a note in line 17 and addition of ASTM E340 and ASTM E381 for steels in line 51.

## Introduction

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

## 1 Scope

This document specifies the requirements for the ordering, manufacture, testing, inspection and delivery of pre-production and production forgings in steel and heat-resisting alloys.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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,<sup>1</sup> *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*

EN 2003-002, *Aerospace series — Steels — Test methods — Part 002: Izod impact test*

EN 2032-001, *Aerospace series — Metallic materials — Part 001: 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 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 — Micrographic determination of content of non-metallic inclusions*

EN 3874,<sup>1</sup> *Aerospace series — Test methods for metallic materials — Constant amplitude force-controlled low cycle fatigue testing*

EN 3987, *Aerospace series — Test methods for metallic materials — Constant amplitude force-controlled high cycle fatigue testing*

EN 3988,<sup>1</sup> *Aerospace series — Test methods for metallic materials — Constant amplitude strain-controlled low cycle fatigue testing*

EN 4050-1, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 1: General requirements*

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<sup>1</sup> Published as ASD-STAN Standard at the date of publication of this document by ASD-STAN, <https://www.asd-stan.org/>.

EN 4050-4, *Aerospace series — Test method for metallic materials — Ultrasonic inspection of bars, plates, forging stock and forgings — Part 4: Acceptance criteria*

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

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

EN 10079, *Definition of steel products*

TR 2410,<sup>2</sup> *Aerospace series — Metallic materials — Relationship between dimensional standards and material standards*

EN ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

EN ISO 643, *Steels — Micrographic determination of the apparent grain size (ISO 643:2019, Corrected version 2023-11)*

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 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1:2023)*

EN ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (ISO 6508-1:2023)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature (ISO 6892-2:2018)*

AMS 2315,<sup>3</sup> *Determination of Delta Ferrite Content*

AMS 2750,<sup>3</sup> *Pyrometry*

ASTM E709,<sup>4</sup> *Standard Guide for Magnetic Particle Testing*

ASTM E1444,<sup>4</sup> *Standard Practice for Magnetic Particle Testing*

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<sup>2</sup> Published as ASD-STAN Technical Report at the date of publication of this document by ASD-STAN, <https://www.asd-stan.org/>.

<sup>3</sup> Published by: SAE International (US) <https://www.sae.org/>.

<sup>4</sup> Published by: ASTM International (US) <https://www.astm.org/>.

### 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 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.

### 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 satisfy the requirements of the order, drawing inspection schedule or material standard: see Table 2, line 5.

The order, drawing or inspection schedule shall specify the tests to be performed upon (i) pre-forgings for qualification and/or requalification (ii) serial production forgings for process control testing (Procedure X: see 6.4) and (iii) batch release when cut-up testing or forgings is required. Unless otherwise specified on the order, drawing or inspection schedule, acceptance criteria for the tests are stated in the material standard, the requirements for each line of which are detailed in Table 2 and Table 3 of this technical specification. Table 2 related to lines 1 to 29 (inclusive) of the material standard and Table 3 relates to lines 30 onwards in which the subline format is also used. If a particular test is needed but not shown in a specific line in Table 2 and Table 3, the requirement shall be specified on the order, drawing, inspection schedule or material standard.

### 6.2 Qualification requirements

See line 100 in Table 3 of this document.

Qualification shall normally comprise assessment of pre-production forgings. See Table 2, sub-line 4.2.

### 6.3 Re-qualification requirements

Re-qualification of serial production forgings may be required, in the following cases:

- modification of the drawing;
- use of forging stock from a different source;
- modifications to the forging stock form and/or manufacturer route;
- modifications to an existing die;
- use of a new (replacement) die;
- modifications to the forging manufacturing route;
- when a significant time interval (usually several years) had elapsed between forging campaigns for a specific part number;
- when required by the purchaser for any other reason.

Re-qualification testing requirements, especially location of test pieces, shall be identical to those used for the initial qualification of the pre-production forgings unless otherwise specified on the order, drawing or inspection schedule.

## 6.4 Release requirements

Release testing shall be the responsibility of the manufacturer. The sampling procedure for release testing shall be one of the following, as specified on the order, drawing or inspection schedule. Where no procedure is specified, procedure A shall be used:

- procedure A: separate forged test samples shall be produced from the same batch of forging stock as that used to make the serial production forgings. Procedure A may be used alone unless denoted AX on the drawing, order or inspection schedule in which case it shall be applied only in conjunction with procedure X (see subclause 6.5);
- procedure B: separate forged heat treatment control test samples shall be prepared which conform to the same material standard as the production forgings, but from a different batch of forging stock. Procedure B shall only be used when full heat treatment of the serial production forgings is carried out by the manufacturer and only in conjunction with procedure X (see subclause 6.5);
- procedure C: integral test samples shall be removed from each forgings. The order, drawing or inspection schedule shall specify how many test samples shall be tested per batch. Procedure C may be used alone unless denoted CX on the drawing, order or inspection schedule in which case it shall be applied only in conjunction with procedure X (see subclause 6.5);
- procedure D: test samples shall be machined from forging(s) selected from each production batch and at locations specified on the order, drawing or inspection schedule.

When required, 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.

## 6.5 Process control testing (procedure X)

Procedure X is process control procedure consisting of periodic “cut-up” testing to ensure that the serial production forgings continued to conform to the specified requirements.

If procedure X is invoked by the order, drawing or inspection/manufacturing schedule and/or if procedures B, AX or CX are used for release tests (see subclause 6.4), forgings shall be selected from series production at the frequency stated therein. It is recommended that the maximum number of forgings manufactured between repeat “cut-up” testing conforming to procedure X shall be as stated in the following Table 1:

**Table 1 — Number of forgings**

| Mass of forging           | Number of forgings                                   |
|---------------------------|------------------------------------------------------|
| kg                        |                                                      |
| $\leq 1$                  | $\leq 2\ 000$                                        |
| $1 < \text{mass} \leq 2$  | $\leq 1\ 000$                                        |
| $2 < \text{mass} \leq 5$  | $\leq 400$                                           |
| $5 < \text{mass} \leq 25$ | $\leq 200$                                           |
| $> 25$                    | As stated on the order, drawing, inspection schedule |

The testing requirements, including the location, type and size of test pieces shall be identical to those used for qualification of the pre-production.