

Aluminium and aluminium alloys — Wrought products — Temper designations

The European Standard EN 515:1993 has the status of a
British Standard

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This British Standard, having been prepared under the direction of the Non-ferrous Metals Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 October 1993

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National foreword

This British Standard has been prepared under the direction of the Non-ferrous Metals Standards Policy Committee and is the English language version of EN 515:1993 *Aluminium and aluminium alloys — Wrought products — Temper designations* published by the European Committee for Standardization (CEN). This standard replaces information on temper designation in BS 1470:1987.

The other standards in the series on aluminium and aluminium alloys for sheet, strip and plate are as follows.

BS EN 485, *Aluminium and aluminium alloys — Sheet, strip and plate.*

BS EN 485-1, *Technical conditions for inspection and delivery.*

BS EN 485-2, *Mechanical properties.*

BS EN 485-3, *Tolerances on dimensions and form for hot-rolled products.*

BS EN 485-4, *Tolerances on dimensions and form for cold-rolled products.*

BS EN 573, *Aluminium and aluminium alloys — Chemical composition and form of wrought products.*

BS EN 573-3, *Chemical composition.*

BS EN 573-4, *Forms of products.*

BS EN 515 together with BS EN 485-1–BS EN 485-4 and BS EN 573-3 and BS EN 573-4 will collectively supersede BS 1470:1987 which will be withdrawn on publication of these standards.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Aluminium, aluminium alloys, rolled products, steel strips, wire rod, delivery condition, designation

English version

Aluminium and aluminium alloys — Wrought products — Temper designations

Aluminium et alliages d'aluminium — Produits
corroyés — Désignation des états
métallurgiques

Aluminium und Aluminiumlegierungen —
Halbzeug — Bezeichnungen der
Werkstoffzustände

This European Standard was approved by CEN on 1993-08-10. 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.

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 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

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Foreword

This European Standard has been drawn up by CEN/TC 132 "Aluminium and aluminium alloys" whose Secretariat is held by the Association Française de Normalization (AFNOR), in liaison with AECMA (Association Européenne des Constructeurs de Matériel Aérospatial) Committee C5 "Metallic materials".

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG 7 "Sheets, strips and plates" to prepare the following standard:

EN 515 Aluminium and aluminium alloys — Wrought products — Temper designations.

CEN/TC 132 met on 19 and 20 March 1992 in Paris and agreed on the text to be submitted to CEN members for formal vote.

The result of the formal vote 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 and United Kingdom.

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1 Scope

This European Standard establishes temper designations for all forms of wrought aluminium and aluminium alloys and for continuously cast aluminium and aluminium alloy drawing stock and strip intended to be wrought.

NOTE Some of these temper designations may be the subject of patent or patent applications, and their listing herein is not to be construed in any way as the granting of a license under such patent right.

Additional temper designations, conforming to this standard, may be standardized with CEN/TC132 and AECMA/C5 provided:

- the temper is used or is available for use by more than one user;
- mechanical property limits are defined;
- the characteristics of the temper are significantly different from those of all other tempers which have the same sequence of basic treatments and for which designations already have been assigned for the same alloy and product;
- the following are also defined if characteristics other than mechanical properties are considered significant:
 - test methods and limits for the characteristics; or
 - the specific practices used to produce the temper.

2 Definitions

For the purpose of this standard the following definitions apply.

2.1

cold working

plastic deformation of metal at such temperature and rate that strain-hardening occurs

2.2

strain-hardening

modification of a metal structure by cold working resulting in an increase in strength and hardness with loss of ductility

2.3

solution heat-treating

a thermal treatment which consists of heating the products to a suitable temperature, holding at that temperature long enough to allow constituents to enter into solid solution and cooling rapidly enough to hold the constituents in solution

2.4

ageing

precipitation from supersaturated solid solution resulting in a change in properties of an alloy, usually occurring slowly at room temperature (natural ageing) and more rapidly at elevated temperatures (artificial ageing)

2.5

annealing

a thermal treatment to soften metal by removal of strain-hardening or by coalescing precipitates from solid solution

3 Basis of codification

3.1 The temper designations are based on the sequences of basic treatments used to produce the various tempers. Property (mechanical or physical) limits apply to individual alloy-temper-product combinations.

3.2 The temper designation follows the alloy designation; these are separated by a hyphen.

3.3 Basic temper designations consist of letters. If subdivisions of the basic tempers are required, these are indicated by one or more digits following the letter of the basic temper. These digits relate to a specific sequence of basic treatments, but only those treatments or operations recognized as significantly influencing the product characteristics are indicated.

Should some other variation of the same sequence of basic operations be applied to the same alloy, resulting in different characteristics, then additional digits are added to the designation.

4 Basic temper designations

4.1 F — As fabricated

This designation applies to the products of shaping processes in which no special control over thermal conditions or strain-hardening is employed. For this temper, there are no mechanical property limits specified.

4.2 O — Annealed

This designation applies to products which are annealed to obtain the lowest strength temper. The O may be followed by a digit other than zero.¹⁾

¹⁾ Products achieving the required annealed properties after hot forming processes may be designated as O temper.