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Aluminium and aluminium alloys – HF seam welded tubes – Part 2: Mechanical properties

The European Standard EN 1592-2:1997 has the status of a Swedish Standard. This document contains the official English version of EN 1592-2:1997.

Swedish Standards corresponding to documents referred to in this Standard are listed in ”Catalogue of Swedish Standards”, issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Aluminium och aluminiumlegeringar – Högfrekvenssvetsade rör – Del 2: Mekaniska egenskaper

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ICS 77.150.10

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English version

Aluminium and aluminium alloys – HF seam welded tubes – Part 2: Mechanical properties

Aluminium et alliages d'aluminium – Tubes électrosoudés HF – Partie 2: Caractéristiques méchaniques

Aluminium und Aluminiumlegierungen – HF-längsnahtgeschweißte Rohre – Teil 2: Mechanische Eigenschaften

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CEN

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

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Contents **Page**

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 132 "Aluminium and aluminium alloys ", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG 12 "HF Seam Welded tubes" to prepare the following standard :

EN 1592-2	Aluminium and aluminium alloys - HF seam welded tubes - Part 2 : Mechanical properties

This standard is part of a series of four standards. The other standards deal with :

EN 1592-1	Aluminium and aluminium alloys - HF seam welded tubes - Part 1 : Technical conditions for inspection and delivery
EN 1592-3	Aluminium and aluminium alloys - HF seam welded tubes - Part 3 : Tolerances on dimensions and form for circular tubes
EN 1592-4	Aluminium and aluminium alloys - HF seam welded tubes - Part 4 : Tolerances on dimensions and form for square, rectangular and shaped tubes

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

1 Scope

This Part of EN 1592 specifies the mechanical properties of wrought aluminium alloy HF seam welded tubes for general engineering applications.

It is not applicable to irrigation and heat exchanger tubes.

The chemical composition limits of these materials are given in EN 573-3.

Mechanical property limits are specified for all Class A alloys, as defined in EN 573-4. The definitions of temper designations are specified in EN 515.

2 Normative references

This European Standard incorporates by dated or undated references, 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 515	Aluminium and aluminium alloys - Wrought products - Temper designations
EN 573-3	Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3 - Chemical composition
EN 573-4	Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 4 : Forms of products
EN 1592-1	Aluminium and aluminium alloys - HF seam welded tubes - Part 1 : Technical conditions for inspection and delivery
EN 10002-1	Metallic materials - Tensile testing - Part 1 : Method of test (at ambient temperature)

NOTE : Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in a bibliography, see annex B.

3 Tensile test

3.1 Specimen and test piece

The selection, preparation and number of specimens and test pieces shall be in accordance with EN 1592-1.

3.2 Testing conditions

The tensile test shall be carried out in accordance with EN 10002-1 and the following :

- during testing to determine proof stress, the rate of stress application shall not exceed 12 MPa/s. After removal of the extensometer, the rate of straining may be increased but it shall not exceed 50 % of the length of the reduced section per minute ;

- elongation shall be measured using an original gauge length $L_0 = 5,65\sqrt{S_0}$;

- for determination of compliance, proof stress and tensile strength values shall be rounded to the nearest 1 MPa and elongation values to the nearest 1 % using the rounding rules set out in Annex A.

3.3 Mechanical properties for Class A alloys

The mechanical properties of all class A alloys are specified in table 1.

HF seam welded tubes may be produced in other tempers not specified in table 1. The corresponding mechanical properties shall be agreed between the producer and purchaser.

Table 1 : Mechanical properties for Class A alloys

Alloy designation		Temper [1]	R_m MPa	$R_{p0,2}$ MPa	A [2] %
Numerical	Chemical symbols		min.	min.	min.
EN AW-3004	EN AW-Al Mn1Mg1	Hx25 Hx45 Hx65 Hx85	190 220 240 250	145 180 200 220	8 6 4 3
EN AW-3005	EN AW-Al Mn1Mg0,5	Hx45 Hx65 Hx85	200 210 220	175 185 195	7 5 4
EN AW-3103	EN AW-Al Mn1	Hx65 Hx85	170 190	150 170	3 2
EN AW-5005	EN AW-Al Mg1(B)	Hx65 Hx85	170 190	140 180	4 3
EN AW-5040	EN AW-Al Mg1,5Mn	O Hx25 Hx45 Hx65 Hx85	170 190 210 230 250	90 130 160 190 220	14 12 10 7 5
EN AW-5049	EN AW-Al Mg2Mn0,8	Hx25 Hx45 Hx65 Hx85	220 235 250 270	170 200 230 250	10 7 5 3
EN AW-5251	EN AW-Al Mg2	Hx25 Hx45 Hx65	210 230 245	160 190 210	8 6 5
EN AW-5454	EN AW-Al Mg3Mn	Hx65 Hx85	290 310	260 280	4 3
EN AW-5754	EN AW-Al Mg3	O Hx25 Hx65	190 220 255	70 170 225	17 9 4
EN AW-5083	EN AW-Al Mg4,5Mn0,7	O Hx85	275 420	115 380	16 4
EN AW-5086	EN AW-Al Mg4	O Hx25 Hx45 Hx65 Hx85	240 270 300 320 350	100 170 220 260 320	15 9 7 5 3
EN AW-7075	EN AW-Al Zn5,5MgCu	O T6 T81	190 530 550	100 460 500	15 10 8

1) The letter x stands for digit 1, 2 or 3 depending on the final operation to which the tube is subjected i.e. :

- 1 if mechanical properties are obtained directly by tubing operation ;
- 2 when mechanical properties are obtained through a partial annealing after tubing operation ;
- 3 when mechanical properties are obtained through a partial annealing at lower temperature, for high Mg content 5000 series alloys (EN AW-5083, EN AW-5086).

2) Elongation values are not guaranteed for tubes with embossed surfaces. Testing conditions are specified in 3.2.