



SLOVENSKI STANDARD

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Aluminij in aluminijeve zlitine - Iztiskane palice/drogovi, cevi in profili - 2. del: Mehanske lastnosti

Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2:
Mechanical properties

Aluminium und Aluminiumlegierungen - Stranggepresste Stangen, Rohre und Profile -
Teil 2: Mechanische Eigenschaften

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Aluminium et alliages d'aluminium - Barres, tubes et profilés filés - Partie 2 :
Caractéristiques mécaniques

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English Version

Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties

Aluminium et alliages d'aluminium - Barres, tubes et profilés filés - Partie 2: Caractéristiques mécaniques

Aluminium und Aluminiumlegierungen - Stranggepresste Stangen, Rohre und Profile - Teil 2: Mechanische Eigenschaften

This European Standard was approved by CEN on 10 February 2008.

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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.

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Foreword

This document (EN 755-2:2008) 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of an identical text or by endorsement, at the latest by September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

This document supersedes EN 755-2:1997.

Within its programme of work, Technical committee CEN/TC 132 entrusted CEN/TC 132/WG 5 "*Extruded and drawn products*" to revise EN 755-2:1997.

The following technical modifications have been introduced during the revision:

- General: Typical Brinell hardness values are introduced in the tables for mechanical properties for information only
The following new alloys are included; EN AW-3102, EN AW-5049, EN AW-6008, EN AW-6110A, EN AW-6014, EN AW-6023, EN AW-6360, EN AW-6262A and EN AW-6065, EN AW-6182, EN AW-7108, EN AW-7108A, EN AW-7021
For Alloy EN AW-5005 and EN AW-5005A new temper H111 is added
- Subclause 3.2: A value should be used for elongation if not otherwise agreed, with exception of certain products
- Annex A: Informative Annex A added explaining temper designation used in all tables
- Former annexes A and B are deleted (content moved to Part 1)

EN 755 comprises the following parts under the general title "*Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles*":

- *Part 1: Technical conditions for inspection and delivery*
- *Part 2: Mechanical properties*
- *Part 3: Round bars, tolerances on dimensions and form*
- *Part 4: Square bars, tolerances on dimensions and form*
- *Part 5: Rectangular bars, tolerances on dimensions and form*
- *Part 6: Hexagonal bars, tolerances on dimensions and form*
- *Part 7: Seamless tubes, tolerances on dimensions and form*
- *Part 8: Porthole tubes, tolerances on dimensions and form*
- *Part 9: Profiles, tolerances on dimensions and form*

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.

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CEN/TC 132 affirms it is its policy that in the case when a patentee refuses to grant licenses on standardized standards products under reasonable and not discriminatory conditions then this product shall be removed from the corresponding standard.

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, 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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1 Scope

This document specifies the mechanical property limits resulting from tensile testing applicable to aluminium and aluminium alloy extruded rod/bar, tube and profile.

Technical conditions for inspection and delivery, including product and testing requirements, are specified in EN 755-1. Temper designations are defined in EN 515. The chemical composition limits for these materials are given in EN 573-3.

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 755-1, *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Part 1: Technical conditions for inspection and delivery*

EN 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test at ambient temperature*

3 Mechanical property limits

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3.1 General

The mechanical properties shall be in conformity with those specified in Tables 1 to 57 or those agreed upon between supplier and purchaser and stated in the order document.

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Tables 1 to 57 contain limits of mechanical property values obtained by tensile testing according to EN 10002-1 after sampling and test piece preparation according to EN 755-1.

NOTE The mechanical properties refer to test pieces taken in the longitudinal direction. Mechanical properties of test pieces taken in other directions can differ from those for the longitudinal direction quoted in this standard.

Brinell hardness values given in Tables 1 to 57 expressed as *HBW* values are for information only.

3.2 Elongation

If not otherwise agreed, the *A* value shall be used.

The *A* value for elongation is the % elongation measured over a gauge length of $5,65\sqrt{S_0}$ (where S_0 is the initial cross-sectional area of the test-piece), and expressed in percent.

For certain products the supplier may choose (if not otherwise specified in the order documents) to use the elongation based on $A_{50\text{mm}}$. Consequently values for the $A_{50\text{mm}}$ are included in the following tables.

The $A_{50\text{mm}}$ value is the elongation measured over a gauge length of 50 mm and expressed in percent.

Test pieces and their location in the specimen are given in EN 755-1.

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3.4 Tables of mechanical properties

Table 1 — Aluminium EN AW-1050A [Al 99,5]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	60	-	20	-	25	23	20
O, H111	all	all	60	95	20	-	25	23	20
Extruded tube									
Temper	Wall thickness t mm	R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value	
		min.	max.	min.	max.	min.	min.		
F ^c , H112	all	60	-	20	-	25	23	20	
O, H111	all	60	95	20	-	25	23	20	
Extruded profile									
Temper	Wall thickness t mm	R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value	
		min.	max.	min.	max.	min.	min.		
F ^c , H112	all	60	-	20	-	25	23	20	

^a D = Diameter for round bar.
^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar.
^c F Temper: property values are for information only.

Table 2 — Aluminium EN AW-1070A [Al 99,7]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	60	-	23		25	23	18
Extruded tube Not specified									
Extruded profile Not specified									
<p>^a D = Diameter for round bar.</p> <p>^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar.</p> <p>^c F Temper: property values are for information only.</p>									

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Table 3 — Aluminium EN AW-1200 [Al 99,0]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	75	-	25	-	20	18	23
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	75	-	25		20	18	23
Extruded profile									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
F ^c , H112	all		75	-	25		20	18	23
^a D = Diameter for round bar. ^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar. ^c F Temper: property values are for information only.									

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Table 4 — Aluminium EN AW-1350 [EAI 99,5]

Extruded rod/bar ^d									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	60	-	-	-	25	23	20
Extruded tube ^d									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
F ^c , H112	all	all	60	-	-	-	25	23	20
Extruded profile ^d									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
F ^c , H112	all		60	-	-	-	25	23	20
^a D = Diameter for round bar. ^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar. ^c F Temper: property values are for information only. ^d Electrical conductivity $\gamma \geq 35,4$ MS/m.									

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Table 5 — Alloy EN AW-2007 [Al Cu4PbMgMn]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 ^c	≤ 80	≤ 80	370	-	250	-	8	6	95
	$80 < D \leq 200$	$80 < S \leq 200$	340	-	220	-	8	-	
	$200 < D \leq 250$	$200 < S \leq 250$	330	-	210	-	7	-	
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 ^c	≤ 25		370	-	250	-	8	6	95
Extruded profile									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 ^c	≤ 30		370	-	250	-	8	6	95

^a D = Diameter for round bar.
^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar.
^c Properties may be obtained by press quenching.

Table 6 — Alloy EN AW-2011 [Al Cu6BiPb] and Alloy EN AW-2011A [Al Cu6BiPb(A)]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50 \text{ mm}}$ %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
T4 ^c	≤ 200	≤ 60	275	-	125	-	14	12	95
T6 ^c	≤ 75	≤ 60	310	-	230	-	8	6	110
	75 < D ≤ 200	-	295	-	195	-	6	-	110
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50 \text{ mm}}$ %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
T6 ^c	≤ 25		310	-	230	-	6	4	110
Extruded profile Not specified									
<p>^a D = Diameter for round bar.</p> <p>^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar.</p> <p>^c Properties may be obtained by press quenching.</p>									

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