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Aluminij in aluminijeve zlitine - Hladno vlečene palice/drogovi in cevi - 2. del: Mehanske lastnosti

Aluminium and aluminium alloys - Cold drawn rod/bar and tube - Part 2: Mechanical properties

Aluminium und Aluminiumlegierungen - Gezogene Stangen und Rohre - Teil 2:
Mechanische Eigenschaften

Aluminium et alliages d'aluminium - Barres et tubes étirés - Partie 2: Caractéristiques
mécaniques

Ta slovenski standard je istoveten z: **EN 754-2:2024**

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étirés - Partie 2 : Caractéristiques mécaniques

Aluminium und Aluminiumlegierungen - Gezogene
Stangen und Rohre - Teil 2: Mechanische Eigenschaften

This European Standard was approved by CEN on 26 August 2024.

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EN 754-2:2016 (E)**European foreword**

This document (EN 754-2:2024) 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of an identical text or by endorsement, at the latest by May 2025, and conflicting national standards shall be withdrawn at the latest by May 2025.

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

This document supersedes EN 754-2:2016.

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG 5 “Extruded and drawn products” to revise EN 754-2:2016.

EN 754-2:2024 includes the following significant technical changes with respect to EN 754-2:2016:

- addition of EN AW-1070A, EN AW-1350A, EN AW-2618A, EN AW-2033, EN AW-2077, EN AW-4032, EN AW-6005, EN AW-6005A, EN AW-6005B, EN AW-6023, EN AW-6050, EN AW-6056 and EN AW-6061A alloys;
- addition of the terms required by the latest CCMC template;
- addition of Clause 3 compulsory from the latest CCMC template;
- deletion of former Clause 3.3 as part of the table of contents in this document.

EN 754 comprises the following parts under the general title “Aluminium and aluminium alloys — Cold drawn rod/bar and tube”:

- *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*

CEN/TC 132 affirms its policy that if a patentee refuses to grant licenses on standardized products under reasonable and not discriminatory conditions, this product will be removed from the corresponding document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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EN 754-2:2016 (E)**1 Scope**

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

Technical conditions for inspection and delivery, including product and testing requirements, are specified in EN 754-1. 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 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 754-1:2016, *Aluminium and aluminium alloys — Cold drawn rod/bar and tube — Part 1: Technical conditions for inspection and delivery*

3 Terms and definitions

No terms and definitions are listed in this document.

4 Mechanical property limits**4.1 General**

The mechanical properties shall be in conformity with those specified in Table 1 to Table 50 or those agreed upon between supplier and purchaser and stated in the order document.

Definitions of tempers are provided at Annex A of this document. For all alloys the condition F (as fabricated) can be used, but without guaranteed mechanical properties.

Table 1 to Table 50 contain limits of mechanical property values obtained by tensile testing according to EN ISO 6892-1. Test pieces sampling, location in the specimen and preparation shall be as given in EN 754-1.

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 document.

Brinell hardness values given in Table 1 to Table 50 expressed as HBW values are for information only.

4.2 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.

4.3 Detailed tables of mechanical properties

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

Drawn 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.	
O, H111	≤ 80	≤ 60	60	95	-	-	25	22	20
H14	≤ 40	≤ 10	100	135	70	-	6	5	30
H16	≤ 15	≤ 5	120	160	105	-	4	3	35
H18	≤ 10	≤ 3	145	-	125	-	3	3	43
Drawn 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.	
O, H111	≤ 20		60	95	-	-	25	22	20
H14	≤ 10		100	135	70	-	6	5	30
H16	≤ 5		120	160	105	-	4	3	35
H18	≤ 3		145	-	125	-	3	3	43
^a D = Diameter for round bar ^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar									

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

Drawn 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.	
O, H111 ^c	≤ 80	≤ 80	50	95	-	-	25	22	20
H14 ^c	≤ 80	≤ 80	90	135	70	-	6	5	30
^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 3 — Aluminium EN AW-1200 [Al 99,0]

Drawn 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.	
O, H111	≤ 80	≤ 60	70	105	-	-	20	16	23
H14	≤ 40	≤ 10	110	145	80	-	5	4	37
H16	≤ 15	≤ 5	135	170	115	-	3	3	45
H18	≤ 10	≤ 3	150	-	130	-	3	3	50
Drawn 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.	
O, H111	≤ 20		70	105	-	-	20	16	23
H14	≤ 10		110	145	80	-	5	4	37
H16	≤ 5		135	170	115	-	3	3	45
H18	≤ 3		150	-	130	-	3	3	50
^a D = Diameter for round bar ^b S = Width across flats for square and hexagonal bar, thickness for rectangular bar									

Table 4 — Aluminium EN AW-1350A [Al 99,5(A)]

Drawn 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.	
O, H111 ^c	≤ 80	≤ 80	60	95	-	-	25	22	20
H14 ^c	≤ 80	≤ 80	90	135	70	-	6	5	30
H18 ^c	≤ 80	≤ 80	145	-	125	-	3	3	40
^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 5 — Alloy EN AW-2007 [Al Cu4PbMgMn]

Drawn rod/bar									
Temper	Dimensions mm		R_m Mpa		$R_{p0,2}$ Mpa		A %	A_{50mm} %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
T3 c	≤ 30	≤ 30	370	-	240	-	7	5	95
	$30 < D \leq 80$	$30 < S \leq 80$	340	-	220	-	6	-	95
T351 c	≤ 80	≤ 80	370	-	240	-	5	3	95
Drawn tube									
Temper	Wall thickness t mm		R_m Mpa		$R_{p0,2}$ Mpa		A %	A_{50mm} %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
T3 c	≤ 20		370	-	250	-	7	5	95
T3510 c, T3511 c	≤ 20		370	-	240	-	5	3	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.									

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Table 6 — Alloy EN AW-2011 [Al Cu6BiPb]

Drawn rod/bar									
Temper	Dimensions mm		R_m Mpa		$R_{p0,2}$ Mpa		A %	A_{50mm} %	HBW Typical value
	D^a	S^b	min.	max.	min.	max.	min.	min.	
T3c	≤ 40	≤ 40	320	-	270	-	10	8	90
	$40 < D \leq 50$	$40 < S \leq 50$	300	-	250	-	10	-	90
	$50 < D \leq 80$	$50 < S \leq 80$	280	-	210	-	10	-	90
T8	≤ 80	≤ 80	370	-	270	-	8	6	110
Drawn tube									
Temper	Wall thickness t mm		R_m Mpa		$R_{p0,2}$ Mpa		A %	A_{50mm} %	HBW Typical value
			min.	max.	min.	max.	min.	min.	
T3 c	≤ 5		310	-	260	-	10	8	90
	$5 < t \leq 20$		290	-	240	-	8	6	90
T8	≤ 20		370	-	275	-	8	6	110
^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.								

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