SLOVENSKI STANDARD
SIST EN 755-2:2016

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Nadomešča:
SIST EN 755-2:2014

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

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

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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 January 2016.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 755-2:2016) 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of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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.

This document supersedes EN 755-2:2013.

CEN/TC 132 decided to revise EN 755-2:2013 as follows:

— reorganization of the list of the tables of mechanical properties of the relevant aluminium and aluminium alloys;

— addition of the alloy EN AW-2618A [AlCu2Mg1,5Ni] in a new Table 9;

— correction of the alloy EN AW-6026 [Al MgSiBi] in a new Table 36;

— addition of the alloy EN AW-6056 [Al Si1MgCuMn] in a new Table 38.

— Modification of the Alloy EN AW-6060 [Al MgSi] in Table 39: Extruded profile T6 and T66 wall thickness-border from 3 mm to 5 mm;

— Modification of the Alloy EN AW-6063 [Al Mg0,7Si] in Table 45: Extruded profile T5 wall thickness-border from 3 mm to 10 mm;

— The former Table 26 was moved, and is now Table 48.

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

— *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*

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

3 Mechanical property limits

3.1 General

The mechanical properties shall be in conformity with those specified in Table 1 to Table 61 or those agreed upon between supplier and purchaser and stated in the order document.

Table 1 to Table 61 contain limits of mechanical property values obtained by tensile testing according to EN ISO 6892-1 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 Table 1 to Table 61 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_{50mm}. Consequently, values for the A_{50mm} are included in the following tables.

The A_{50mm} 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.

3.3 Reference list of the tables of mechanical properties of the relevant aluminium and aluminium alloys

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 %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
	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 %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
			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 %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
			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 %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
	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									

[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 3 — Aluminium EN AW-1200 [Al 99,0]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			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.

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

Extruded rod/bar [d]									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
F [c], H112	all		60	-	-	-	25	23	20
Extruded profile [d]									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			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.

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

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	D [a]	S [b]	min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 [c]	≤ 80	≤ 80	370	-	250	-	8	6	95
	80 < D ≤ 200	80 < S ≤ 200	340	-	220	-	8	-	
	200 < D ≤ 250	200 < S ≤ 250	330	-	210	-	7	-	
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	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 %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
T6 [c]	≤ 25		310	-	230	-	6	4	110
Extruded profile Not specified									

[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 7 — Alloy EN AW-2014 [Al Cu4SiMg] and Alloy EN AW-2014A [Al Cu4SiMg(A)]

Drawn rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	D [a]	S [b]	min.	max.	min.	max.	min.	min.	
O, H111	≤ 200	≤ 200	-	250	-	135	12	10	45
T4, T4510, T4511	≤ 25	≤ 25	370	-	230	-	13	11	110
	25 < D ≤ 75	25 < S ≤ 75	410	-	270	-	12	-	110
	75 < D ≤ 150	75 < S ≤ 150	390	-	250	-	10	-	110
	150 < D ≤ 200	150 < S ≤ 200	350	-	230	-	8	-	110
T6, T6510, T6511	≤ 25	≤ 25	415	-	370	-	6	5	140
	25 < D ≤ 75	25 < S ≤ 75	460	-	415	-	7	-	140
	75 < D ≤ 150	75 < S ≤ 150	465	-	420	-	7	-	140
	150 < D ≤ 200	150 < S ≤ 200	430	-	350	-	6	-	140
	200 < D ≤ 250	200 < S ≤ 250	420	-	320	-	5	-	140
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max	min.	max.	min.	min.	
O, H111	≤ 20		-	250	-	135	12	10	45
T4, T4510, T4511	≤ 20		370	-	230	-	11	10	110
T6, T6510, T6511	≤ 10		415	-	370	-	7	5	140
	10 < t ≤ 40		450	-	400	-	6	4	140
Extruded profile [c]									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
O, H111	all		-	250	-	135	12	10	45
T4, T4510, T4511	≤ 25		370	-	230	-	11	10	110
	25 < t ≤ 75		410	-	270	-	10	-	110
T6, T6510, T6511	≤ 25		415	-	370	-	7	5	140
	25 < t ≤ 75		460	-	415	-	7	-	

[a] D = Diameter for round bar.

[b] S = Width across flats for square and hexagonal bar, thickness for rectangular bar.

[c] If a profile cross section comprises different thicknesses which fall in more than one set of specified mechanical property values, the lowest specified value shall be considered as valid for the whole profile cross section.

Table 8 — Alloy EN AW-2017A [Al Cu4MgSi(A)]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
	D [a]	S [b]	min.	max.	min.	max.	min.	min.	
O, H111	≤ 200	≤ 200	-	250	-	135	12	10	45
T4,T4510, T4511 [c]	≤ 25	≤ 25	380	-	260	-	12	10	105
	25 < D ≤ 75	25 < S ≤ 75	400	-	270	-	10	-	105
	75 < D ≤ 150	75 < S ≤ 150	390	-	260	-	9	-	105
	150 < D ≤ 200	150 < S ≤ 200	370	-	240	-	8	-	105
	200 < D ≤ 250	200 < S ≤ 250	360	-	220	-	7	-	105

Extruded tube								
Temper	Wall thickness t mm	R_m MPa		$R_{p0.2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
		min.	max.	min.	max.	min.	min.	
O, H111	≤ 20	-	250	-	135	12	10	45
T4, T4510, T4511 [c]	≤ 10	380	-	260	-	12	10	105
	10 < t ≤ 75	400	-	270	-	10	8	105

Extruded profile								
Temper	Wall thickness t mm	R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
		min.	max.	min.	max.	min.	min.	
T4, T4510, T4511 [c]	≤ 30	380	-	260	-	10	8	105

[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 9 — Alloy EN AW-2618A [Al Cu2Mg1.5Ni]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
	D [a]	S [b]	min.	max.	min.	max.	min.	min.	
T6, T6511	$D \leq 10$	$S \leq 10$	410	-	330	-	6	4	140
T6, T6511	$10 < D \leq 100$	$10 < S \leq 100$	420	-	360	-	7	5	145
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
T6, T6511	≤ 10		410	-	330	-	6	4	140
T6, T6511	$10 < t \leq 100$		420	-	360	-	7	5	145
Extruded profile [c]									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\,mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
T6, T6511	≤ 10		410	-	330	-	6	4	140
T6, T6511	$10 < t \leq 100$		420	-	360	-	7	5	145

[a] D = Diameter for round bar.

[b] Width across flats for square and hexagonal bar, thickness for rectangular bar.

[c] If a profile cross section comprises different thickness which fall in more than one set of specified mechanical property values, the lowest specified value shall be considered as valid for the whole profile cross section.

Table 10 — Alloy EN AW-2024 [Al Cu4Mg1]

Extruded rod/bar									
Temper	Dimensions mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
	D [a]	S [b]	min.	max.	min.	max.	min.	min.	
O, H111	≤ 200	≤ 200	-	250	-	150	12	10	47
T3, T3510, T3511	≤ 50	≤ 50	450	-	310	-	8	6	120
	50 < D ≤ 100	50 < S ≤ 100	440	-	300	-	8	-	120
	100 < D ≤ 200	100 < S ≤ 200	420	-	280	-	8	-	120
	200 < D ≤ 250	200 < S ≤ 250	400	-	270	-	8	-	120
T8, T8510, T8511	≤ 150	≤ 150	455	-	380	-	5	4	130
Extruded tube									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
O, H111	≤ 30		-	250	-	150	12	10	47
T3, T3510, T3511	≤ 30		420	-	290	-	8	6	120
T8, T8510, T8511	≤ 30		455	-	380	-	5	4	130
Extruded profile [c]									
Temper	Wall thickness t mm		R_m MPa		$R_{p0,2}$ MPa		A %	$A_{50\ mm}$ %	**Hardness** Typical value HBW
			min.	max.	min.	max.	min.	min.	
O, H111	all		-	250	-	150	12	10	47
T3, T3510, T3511	≤ 15		395	-	290	-	8	6	120
	15 < t ≤ 50		420	-	290	-	8	-	120
T8, T8510, T8511	≤ 50		455	-	380	-	5	4	130

[a] D = Diameter for round bar.

[b] S = Width across flats for square and hexagonal bar, thickness for rectangular bar.

[c] If a profile cross section comprises different thickness which fall in more than one set of specified mechanical property values, the lowest specified value shall be considered as valid for the whole profile cross section.