MATERIAL DATA SHEET

EN AW-6012 four-pass ECAP plus artificial ageing tensile and hardness reference (CC BY experimental)

Room-temperature tensile, modulus and HV10 values for exact EN AW-6012 in the four-pass ECAP plus artificial ageing state.

Field	Value
Material ID	acta-en-aw-6012-ecap-aged-round-tensile
Category	Metal
Condition	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing | 10 mm diameter x 80 mm cylindrical ECAP billet; machined round tensile specimen
Unit system	Common SI
Unit contract	Material properties stored in SI engineering units.
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Source and Validity

Field	Value
Quality	Experimental screening
Design release allowed	No
Source family	Experimental screening dataset
Confidence	Reference-grade
License	Open
Source note	Exact-grade condition-specific values from a CC BY 4.0 peer-reviewed article.
Citation	Anna Liskova, Petra Lackova, Maria Mihalikova, and Robert Kocisko, Impact of Plastic Deformation on the Properties of a Selected Aluminium Alloy, Acta Polytechnica 56(5), 353-359 (2016), https://doi.org/10.14311/AP.2016.56.0353.
Valid temperature	20 ... 20 degC (The paper states room temperature; 20 degC is a catalog nominal, not a reported chamber setpoint.)
Valid pressure	Pressure dependence is not represented as a general material function.
Valid phase / condition	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing
Uncertainty	The complete laboratory ECAP and post-ageing route, investigated-heat composition, six-measurement tensile means and ten-position hardness method are retained. This laboratory state is not assigned a registered temper; direction relative to the ECAP shear plane and dispersion are not reported. Values are experimental means, not product-standard minima or design allowables.
Last reviewed	2026-08-03
Reviewer	scripts/import_additional_open_aluminum_public.py
Review status	Checked

Field	Value
Review scope	Checked the article-level CC BY 4.0 grant, DOI and pinned-file hash, exact alloy identity, condition/form/geometry, source value location, and measured or fitted property semantics.
Notes	The complete laboratory ECAP and post-ageing route, investigated-heat composition, six-measurement tensile means and ten-position hardness method are retained. This laboratory state is not assigned a registered temper; direction relative to the ECAP shear plane and dispersion are not reported. Values are experimental means, not product-standard minima or design allowables.
License ID	CC-BY-4.0
License URL	https://creativecommons.org/licenses/by/4.0/
Attribution	Anna Liskova et al.

Material Condition

Field	Value
Condition	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing
Temper	experimental ECAP-plus-ageing state; no registered temper claimed
Heat treatment	solution anneal 1.5 h at 550 degC; four ECAP passes at room temperature; artificial age 30 h at 100 degC
Product form	10 mm diameter x 80 mm cylindrical ECAP billet; machined round tensile specimen
Thickness / diameter range	ECAP billet 10 mm diameter x 80 mm; tensile specimen 8 mm diameter
Test direction	tension along specimen long axis; relation to ECAP shear plane not stated
Processing route	90 deg channel intersection, 37 deg curvature, four room-temperature route-BC passes with 90 deg rotation, then 100 degC artificial ageing
Temperature range	20 ... 20 degC
Notes	The complete laboratory ECAP and post-ageing route, investigated-heat composition, six-measurement tensile means and ten-position hardness method are retained. This laboratory state is not assigned a registered temper; direction relative to the ECAP shear plane and dispersion are not reported. Values are experimental means, not product-standard minima or design allowables.

Properties

Mechanical

Property	Value	Unit	Type	Applies to
Tensile yield strength	355.0	MPa	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; room-temperature uniaxial tensile test on 8 mm diameter round specimens at initial strain rate 2.5e-4 1/s; tensile values are six-measurement means
Ultimate tensile strength	372.0	MPa	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; room-temperature uniaxial tensile test on 8 mm diameter round specimens at initial strain rate 2.5e-4 1/s; tensile values are six-measurement means
Elongation	10.0	%	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; room-temperature uniaxial tensile test on 8 mm diameter round specimens at initial strain rate 2.5e-4 1/s; tensile values are six-measurement means
Reduction of area	8.0	%	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; room-temperature uniaxial tensile test on 8 mm diameter round specimens at initial strain rate 2.5e-4 1/s; tensile values are six-measurement means
Young's modulus	70.0	GPa	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; room-temperature uniaxial tensile test on 8 mm diameter round specimens at initial strain rate 2.5e-4 1/s; tensile values are six-measurement means
Vickers hardness HV10	125.0	HV10	Experimental Measured Screening	EN AW-6012 AlMgSiPb, four-pass ECAP plus artificial ageing; cross-section HV10, 10 s dwell

Chemical

Property	Value	Unit	Type	Applies to
Silicon mass fraction	1.13	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Iron mass fraction	0.37	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Manganese mass fraction	0.53	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Magnesium mass fraction	0.83	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Chromium mass fraction	0.2	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Bismuth mass fraction	0.51	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance
Lead mass fraction	0.83	%	Reported Material Composition Screening	investigated EN AW-6012 heat; aluminum reported as balance

Engineering note: seed solid-material values are reference values only. Verify against the project material specification or supplier data sheet before release.