MATERIAL DATA SHEET

EN AW-6014-T4 sheet, 2.0 mm, elasticity and flow model (CC BY experimental)

Measured rolling-direction modulus and experimentally fitted/verified plastic-flow parameters for exact EN AW-6014-T4 sheet.

Field	Value
Material ID	mdpi-en-aw-6014-t4-sheet-2mm-forming-model
Category	Metal
Condition	EN AW-6014 automotive aluminium sheet in T4 temper used for multi-stress-state forming tests | sheet
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	Condition-specific base-material values from a CC BY 4.0 peer-reviewed article.
Citation	Johannes Friedlein, Max Bohnke, Malte Schlichter, Mathias Bobbert, Gerson Meschut, Julia Mergheim, and Paul Steinmann, Material Parameter Identification for a Stress-State-Dependent Ductile Damage and Failure Model Applied to Clinch Joining, Journal of Manufacturing and Materials Processing 2024, 8, 157, https://doi.org/10.3390/jmmp8040157.
Valid temperature	Test temperature is not stated; no temperature extrapolation is allowed.
Valid pressure	Pressure dependence is not represented.
Valid phase / condition	EN AW-6014 automotive aluminium sheet in T4 temper used for multi-stress-state forming tests
Uncertainty	Exact EN AW-6014-T4 2 mm sheet and experiment geometry are retained. The modulus is measured in RD; Poisson's ratio is explicitly assumed; plasticity parameters are fitted to an extrapolated experimental flow curve and verified across twelve experiments. Failure parameters and manufacturer-datasheet minima are excluded.
Last reviewed	2026-08-03
Reviewer	scripts/import_mdpi_open_aluminum_public.py

Field	Value
Review status	Checked
Review scope	Checked article CC BY notice, DOI and PDF hash, exact alloy/temper, source geometry, table values, and reported or measured rather than specified-minimum semantics.
Notes	Exact EN AW-6014-T4 2 mm sheet and experiment geometry are retained. The modulus is measured in RD; Poisson's ratio is explicitly assumed; plasticity parameters are fitted to an extrapolated experimental flow curve and verified across twelve experiments. Failure parameters and manufacturer-datasheet minima are excluded.
License ID	CC-BY-4.0
License URL	https://creativecommons.org/licenses/by/4.0/
Attribution	Johannes Friedlein

Material Condition

Field	Value
Condition	EN AW-6014 automotive aluminium sheet in T4 temper used for multi-stress-state forming tests
Temper	T4
Heat treatment	T4 as supplied; detailed solution-treatment and natural-ageing schedule not stated
Product form	sheet
Thickness / diameter range	2.0 mm
Test direction	rolling direction for tensile tests and measured Young's modulus; aligned rolling directions in layer-compression stacks
Processing route	commercial automotive sheet; wire-eroded tensile specimens and stacked circular blanks
Temperature range	Test temperature is not stated; no temperature extrapolation is allowed.
Notes	Exact EN AW-6014-T4 2 mm sheet and experiment geometry are retained. The modulus is measured in RD; Poisson's ratio is explicitly assumed; plasticity parameters are fitted to an extrapolated experimental flow curve and verified across twelve experiments. Failure parameters and manufacturer-datasheet minima are excluded.

Properties

Mechanical

Property	Value	Unit	Type	Applies to
Young's modulus, RD	70.4	GPa	Experimental Measured Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Poisson's ratio	0.34	-	Assumed Model Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Calibrated initial yield stress	130.4	MPa	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Flow stress power coefficient K	4.17	MPa	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Flow stress power exponent np,K	0.351	-	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated

Property	Value	Unit	Type	Applies to
Flow stress saturation increment	237.5	MPa	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Flow stress saturation rate omega	2.39	-	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated
Flow stress saturation exponent np,omega	0.573	-	Reported Constitutive Parameter Screening	EN AW-6014-T4 automotive sheet, 2.0 mm thick; tensile specimens aligned to rolling direction and layer-compression stacks with aligned rolling directions; strain rate 0.001 1/s; test temperature and replicate counts not stated

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