MATERIAL DATA SHEET

AA6016-T4 sheet, 1.5 mm, Swift and anisotropy parameters (CC BY reference)

Swift hardening and directional anisotropy parameters for exact AA6016-T4 1.5 mm sheet.

Field	Value
Material ID	springer-aa6016-t4-sheet-1p5mm-constitutive
Category	Metal
Condition	AA6016-T4 alloy sheet used for anisotropic plasticity and fracture calibration | sheet
Unit system	Common SI
Unit contract	Material properties stored in SI engineering units.
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Source and Validity

Field	Value
Quality	Unknown
Design release allowed	No
Source family	peer_reviewed_open_article
Confidence	Reference-grade
License	Open
Source note	Exact-grade condition-specific values from a CC BY 4.0 peer-reviewed article.
Citation	Toros Arda Aksen, Emre Esener, Umit Kocabicak, and Mehmet Firat, Numerical and analytical investigations into ductile fracture and anisotropic plasticity of AA6016-T4 alloy sheet, Archive of Applied Mechanics 95, 138 (2025), https://doi.org/10.1007/s00419-025-02850-3.
Valid temperature	The source tables do not state the test temperature; no temperature extrapolation is allowed.
Valid pressure	Pressure dependence is not represented.
Valid phase / condition	AA6016-T4 alloy sheet used for anisotropic plasticity and fracture calibration
Uncertainty	Reported/calibrated constitutive and anisotropy parameters for exact AA6016-T4 1.5 mm sheet. Tables 1-2 cite earlier experiments; the values are dimensionless ratios or model parameters, not absolute EN tensile minima, product allowables or a complete material card.
Last reviewed	2026-08-03
Reviewer	scripts/import_peer_reviewed_open_aluminum_public.py
Review status	Checked

Field	Value
Review scope	Checked explicit article CC BY 4.0 grant, DOI/source integrity, exact alloy identity, condition and geometry limits, value location, and measured/reported rather than specified-minimum semantics.
Notes	Reported/calibrated constitutive and anisotropy parameters for exact AA6016-T4 1.5 mm sheet. Tables 1-2 cite earlier experiments; the values are dimensionless ratios or model parameters, not absolute EN tensile minima, product allowables or a complete material card.
License ID	CC-BY-4.0
License URL	https://creativecommons.org/licenses/by/4.0/
Attribution	Toros Arda Aksen et al.

Material Condition

Field	Value
Condition	AA6016-T4 alloy sheet used for anisotropic plasticity and fracture calibration
Temper	T4
Heat treatment	T4 as identified by the article; detailed prior solution/natural-ageing schedule is not stated
Product form	sheet
Thickness / diameter range	1.5 mm tensile-specimen gauge thickness
Test direction	rolling direction reference with 0, 45 and 90 deg uniaxial and biaxial ratios
Processing route	wrought sheet; detailed manufacturing route not stated
Temperature range	The source tables do not state the test temperature; no temperature extrapolation is allowed.
Notes	Reported/calibrated constitutive and anisotropy parameters for exact AA6016-T4 1.5 mm sheet. Tables 1-2 cite earlier experiments; the values are dimensionless ratios or model parameters, not absolute EN tensile minima, product allowables or a complete material card.

Properties

Mechanical

Property	Value	Unit	Type	Applies to
Swift strength coefficient, C	539.7	MPa	Reported Constitutive Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Swift prestrain offset, epsilon0	0.011	-	Reported Constitutive Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Swift hardening exponent, p	0.2465	-	Reported Constitutive Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Normalized yield stress ratio, 0 deg	1.0	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Normalized yield stress ratio, 45 deg	0.979	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Normalized yield stress ratio, 90 deg	0.992	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2

Property	Value	Unit	Type	Applies to
Normalized biaxial yield stress ratio	1.003	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Lankford coefficient, RD	1.14	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Lankford coefficient, DD	0.34	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Lankford coefficient, TD	0.62	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2
Biaxial plastic strain ratio	0.61	-	Reported Anisotropy Parameter Screening	AA6016-T4 sheet; all tensile specimen geometries have 1.5 mm gauge thickness; rolling direction is the Swift hardening reference; test temperature and sample statistics are not stated in Tables 1-2

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