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. |
| Generated | 2026-11-15 23:15 |

## 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.