MATERIAL DATA SHEET

# Aluminum 2024-T4 bar/rod, 3.175-138 mm (MIL-HDBK-5H)

Historical public-release S-basis T4 bar/rod reference conservatively combined through 138 mm.

| Field | Value |
|---|---|
| Material ID | milhdbk-2024-t4-bar-rod-3-175-138-mm |
| Category | Metal |
| Condition | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm \| rolled, drawn or cold-finished bar or rod |
| 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 | Catalog record |
| Design release allowed | No |
| Source family | Government materials handbook |
| Confidence | Reference-grade |
| License | Open |
| Source note | Independent transcription from an official public-release U.S. government handbook. |
| Citation | U.S. Department of Defense, MIL-HDBK-5H, Metallic Materials and Elements for Aerospace Vehicle Structures, 1 December 1998, Table 3.2.3.0(i2), PDF page(s) 378 (handbook page(s) 3-82); official DLA document record https://quicksearch.dla.mil/qsDocDetails.aspx?ident_number=53876. The official PDF carries Distribution Statement A: Approved for public release; distribution is unlimited. |
| Valid temperature | 21 ... 21 degC (Room-temperature historical handbook values. Applicability is limited to the exact alloy, temper/condition, product form, size band, material axis, statistical basis, and specification identified by the cited table.) |
| Valid pressure | Pressure dependence is not represented by these solid-material reference values. |
| Valid phase / condition | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm |
| Uncertainty | Values are historical handbook table transcriptions with explicit SI conversion. They are not a substitute for a current material specification, supplier certificate, drawing allowable, or project approval. |
| Last reviewed | 2026-08-02 |
| Reviewer | scripts/import_milhdbk5h_public_metals.py |
| Review status | Checked |

| Field | Value |
|---|---|
| Review scope | Checked official DLA document identity, Distribution Statement A, PDF hash, table/page location, alloy/condition/form/size scope, basis semantics, and SI conversions. |
| Notes | Historical reference only; design release is explicitly disabled. |
| License ID | US-DOD-DISTRIBUTION-STATEMENT-A |
| License URL | https://www.dodcui.mil/Distribution-Statements/ |
| Attribution | U.S. Department of Defense |

## Material Condition

| Field | Value |
|---|---|
| Condition | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm |
| Temper | T4 |
| Heat treatment | solution heat treated and naturally aged; source warns T4 is obsolete for new design |
| Product form | rolled, drawn or cold-finished bar or rod |
| Thickness / diameter range | 0.125-5.433 in (3.175-138 mm), within the 0.125-6.000 in table bands |
| Test direction | L and LT where available; lower listed value across applicable size bands |
| Processing route | wrought heat-treatable aluminum bar or rod |
| Temperature range | 21 ... 21 degC |
| Notes | Room-temperature historical handbook values. Applicability is limited to the exact alloy, temper/condition, product form, size band, material axis, statistical basis, and specification identified by the cited table. Historical reference only; confirm the current procurement specification and material test report. |

## Properties

### Physical

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Density | 2768 | kg/m^3 | Historical Nominal | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |

## Mechanical

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Ultimate tensile strength, L | 427.475 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction |
| Tensile yield strength, L | 275.79 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction |
| Ultimate tensile strength, LT | 358.527 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; LT direction |
| Tensile yield strength, LT | 248.211 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; LT direction |
| Compressive yield strength, L | 220.632 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction |
| Ultimate shear strength | 255.106 | MPa | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |
| Elongation, L | 10 | % | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction |

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Ramberg-Osgood exponent, tension L | 50 | - | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction; typical room-temperature curve; rolled bar/rod/shape thickness <=5.500 in |
| Ramberg-Osgood exponent, compression L | 10 | - | Historical Public Release Table Value | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs.; L direction; typical room-temperature curve; rolled bar/rod/shape thickness <=5.500 in |
| Young's modulus | 72.395 | GPa | Historical Nominal | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |
| Compression modulus | 73.774 | GPa | Historical Nominal | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |
| Shear modulus | 27.579 | GPa | Historical Nominal | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |
| Poisson's ratio | 0.33 | - | Historical Nominal | 2024-T4; rolled, drawn or cold-finished bar/rod; 3.175-138 mm; Historical T4 temper; the handbook explicitly says it is obsolete and should not be specified for new designs. |

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