MATERIAL DATA SHEET

# AA7003 high-Si water-quenched T7 extruded profile (CC BY experimental)

Air SSRT tensile values and electrical conductivity for exact high-Si AA7003 T7 extruded profile.

| Field | Value |
|---|---|
| Material ID | mdpi-aa7003-high-si-wq-t7-extruded-profile |
| Category | Metal |
| Condition | AA7003 high-Si heat, water quenched and artificially aged to study condition T7 \| solid rectangular extruded profile |
| 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 | 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 | Adrian Lervik et al., Stress Corrosion Cracking in an Extruded Cu-Free Al-Zn-Mg Alloy, Metals 2020, 10, 1194, https://doi.org/10.3390/met10091194. |
| Valid temperature | SSRT and conductivity test temperatures are not stated; air is the retained environment. |
| Valid pressure | Pressure dependence is not represented. |
| Valid phase / condition | AA7003 high-Si heat, water quenched and artificially aged to study condition T7 |
| Uncertainty | Experimental values for one high-Si AA7003 heat and H-WQ-T7 profile condition. The air SSRT strength/ductility values are single-test results; conductivity is a five-measurement mean. The article designates the ageing condition as T7, but these are not EN extrusion minima. |
| Last reviewed | 2026-08-03 |
| Reviewer | scripts/import_mdpi_open_aluminum_public.py |
| 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. |

| Field | Value |
|---|---|
| Notes | Experimental values for one high-Si AA7003 heat and H-WQ-T7 profile condition. The air SSRT strength/ductility values are single-test results; conductivity is a five-measurement mean. The article designates the ageing condition as T7, but these are not EN extrusion minima. |
| License ID | CC-BY-4.0 |
| License URL | https://creativecommons.org/licenses/by/4.0/ |
| Attribution | Adrian Lervik et al. |

## Material Condition

| Field | Value |
|---|---|
| Condition | AA7003 high-Si heat, water quenched and artificially aged to study condition T7 |
| Temper | T7 as designated by the article |
| Heat treatment | solution heat treatment at 480 degC for 30 min; water quench to room temperature; artificial ageing at 170 degC for 6 h |
| Product form | solid rectangular extruded profile |
| Thickness / diameter range | 20 x 25 mm profile; SSRT geometry in article Figure 2 |
| Test direction | SSRT specimen axis relative to extrusion direction is not explicitly stated |
| Processing route | cast and homogenized; preheated to 480 degC; extruded at about 11 mm/s; solution treated, water quenched and artificially aged |
| Temperature range | SSRT and conductivity test temperatures are not stated; air is the retained environment. |
| Notes | Experimental values for one high-Si AA7003 heat and H-WQ-T7 profile condition. The air SSRT strength/ductility values are single-test results; conductivity is a five-measurement mean. The article designates the ageing condition as T7, but these are not EN extrusion minima. |

## Properties

### Physical

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Electrical conductivity | 27.15 | MS/m | Experimental Measured Screening | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |

## Mechanical

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Tensile yield strength | 322.0 | MPa | Experimental<br>Measured<br>Screening | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Ultimate tensile strength | 333.0 | MPa | Experimental<br>Measured<br>Screening | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Elongation | 15.9 | % | Experimental<br>Measured<br>Screening | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Reduction in area | 65.0 | % | Experimental<br>Measured<br>Screening | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |

## Composition

| Property | Value | Unit | Type | Applies to |
|---|---|---|---|---|
| Silicon mass fraction | 0.11 | % | Experimental Measured Composition Reference | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Zinc mass fraction | 5.56 | % | Experimental Measured Composition Reference | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Magnesium mass fraction | 0.68 | % | Experimental Measured Composition Reference | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |
| Zirconium mass fraction | 0.17 | % | Experimental Measured Composition Reference | AA7003 high-Si heat (Fe 0.20, Mg 0.68, Si 0.11, Zn 5.56, Cu 0.01, Zr 0.17, Ti 0.02 wt.%), 20 x 25 mm extruded profile; H-WQ-T7; one slow-strain-rate tensile test in air; initial rate reported as 1.2e-8 m/s; five electrical-conductivity measurements |

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