MATERIAL DATA SHEET

EN AW-1080A cast hot-compression Hensel-Spittel model (CC BY experimental)

Full fitted Hensel-Spittel coefficient set for exact cast EN AW-1080A hot-compression data.

Field	Value
Material ID	frontiers-en-aw-1080a-cast-hensel-spittel
Category	Metal
Condition	cast EN AW-1080A as hot-compression tested | cast stock; machined cylindrical compression specimen
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	Exact-grade condition-specific values from a CC BY 4.0 peer-reviewed article.
Citation	Stefan Kuhnke, Vidal Sanabria, Felix Gensch, Rene Nitschke, and Soeren Mueller, Numerical Investigations on Material Flow During Indirect Extrusion of Copper-Clad Aluminum Rods, Frontiers in Materials 7, 157 (2020), https://doi.org/10.3389/fmats.2020.00157.
Valid temperature	20 ... 500 degC (Tests were run at 50 degC intervals; interpolate only within the fitted model's demonstrated scope.)
Valid pressure	Pressure dependence is not represented as a general material function.
Valid phase / condition	cast EN AW-1080A as hot-compression tested
Uncertainty	The complete Hensel-Spittel coefficient set and Equation 1 convention are retained for cast EN AW-1080A over the stated hot-compression grid. A is represented in MPa and the empirical a_i values must be used together with the paper's equation and temperature convention. The article does not report replicate count, fit uncertainty or raw tabular flow curves. This is a forming-model reference, not a room-temperature tensile minimum or design allowable.
Last reviewed	2026-08-03
Reviewer	scripts/import_additional_open_aluminum_public.py

Field	Value
Review status	Checked
Review scope	Checked the article-level CC BY 4.0 grant, DOI and pinned-file hash, exact alloy identity, condition/form/geometry, source value location, and measured or fitted property semantics.
Notes	The complete Hensel-Spittel coefficient set and Equation 1 convention are retained for cast EN AW-1080A over the stated hot-compression grid. A is represented in MPa and the empirical a_i values must be used together with the paper's equation and temperature convention. The article does not report replicate count, fit uncertainty or raw tabular flow curves. This is a forming-model reference, not a room-temperature tensile minimum or design allowable.
License ID	CC-BY-4.0
License URL	https://creativecommons.org/licenses/by/4.0/
Attribution	Stefan Kuhnke et al.

Material Condition

Field	Value
Condition	cast EN AW-1080A as hot-compression tested
Temper	cast condition; no wrought temper applies
Heat treatment	not stated beyond the thermal cycle imposed during each compression test
Product form	cast stock; machined cylindrical compression specimen
Thickness / diameter range	10 mm specimen diameter x 15 mm length
Test direction	compression direction relative to casting geometry not stated
Processing route	cast aluminum, machined cylinder, resistance-heated Gleeble 3800 compression
Temperature range	20 ... 500 degC
Notes	The complete Hensel-Spittel coefficient set and Equation 1 convention are retained for cast EN AW-1080A over the stated hot-compression grid. A is represented in MPa and the empirical a_i values must be used together with the paper's equation and temperature convention. The article does not report replicate count, fit uncertainty or raw tabular flow curves. This is a forming-model reference, not a room-temperature tensile minimum or design allowable.

Properties

Mechanical

Property	Value	Unit	Type	Applies to
Hensel-Spittel coefficient A	285.0	MPa	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a1	-0.003	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a2	0.15	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a3	0.015	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a4	0.0	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a5	0.0	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a6	0.0	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1

Property	Value	Unit	Type	Applies to
Hensel-Spittel coefficient a7	0.0	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1
Hensel-Spittel coefficient a8	0.0	-	Experimental Fitted Constitutive Parameter Screening	cast EN AW-1080A, 10 mm diameter x 15 mm hot-compression cylinder; Gleeble 3800; 20-500 degC in 50 degC intervals; strain rates 0.01, 0.1, 1 and 10 1/s; maximum true strain 1

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