

General information**Designation**

7075, wrought	
Condition	T6 (Solution heat-treated and artificially aged)
UNS number	A97075
EN name	ENAW-7075 (EN AW-Al Zn5,5MgCu)
EN number	3.4365

Typical uses

Aircraft structures & other components, weapons, bolts, sporting goods.

Composition overview**Compositional summary**

Al87-91 / Zn5.1-6.1 / Mg2.1-2.9 / Cu1.2-2 / Cr0.18-0.28 (impurities: Fe<0.5, Si<0.4, Mn<0.3, Ti<0.2, Other<0.15)

Material family	Metal (non-ferrous)
Base material	Al (Aluminum)

Composition detail (metals, ceramics and glasses)

Al (aluminum)	* 87,2	-	91,4	%
Cr (chromium)	0,18	-	0,28	%
Cu (copper)	1,2	-	2	%
Fe (iron)	0	-	0,5	%
Mg (magnesium)	2,1	-	2,9	%
Mn (manganese)	0	-	0,3	%
Si (silicon)	0	-	0,4	%
Ti (titanium)	0	-	0,2	%
Zn (zinc)	5,1	-	6,1	%
Other	0	-	0,15	%

Price

Price	* 3,78	-	4,44	EUR/kg
Price per unit volume	* 10,4e3	-	12,6e3	EUR/m^3

Physical properties

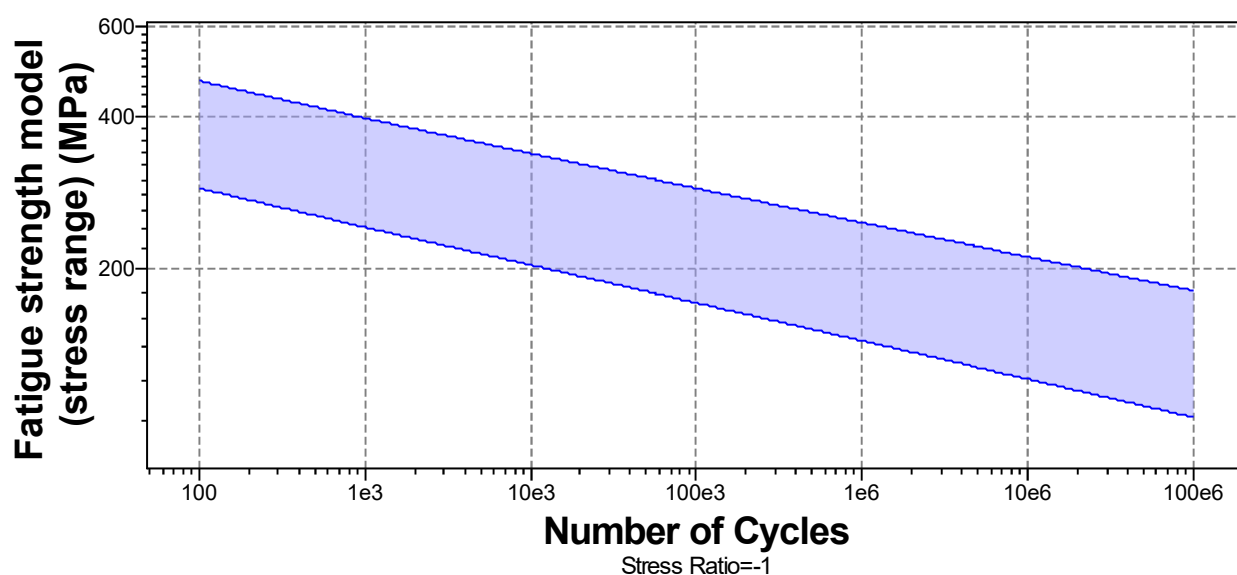
Density	2,77e3	-	2,83e3	kg/m^3
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Mechanical properties

Young's modulus	69	-	76	GPa
Specific stiffness	24,6	-	27,2	MN.m/kg
Yield strength (elastic limit)	359	-	530	MPa
Tensile strength	434	-	580	MPa
Specific strength	128	-	189	kN.m/kg
Elongation	2	-	10	% strain
Compressive strength	* 393	-	530	MPa

Flexural modulus	* 69	-	76	GPa
Flexural strength (modulus of rupture)	359	-	530	MPa
Shear modulus	26	-	28	GPa
Bulk modulus	67	-	74	GPa
Poisson's ratio	0,325	-	0,335	
Shape factor	16			
Hardness - Vickers	152	-	168	HV
Hardness - Brinell	145	-	165	HB
Elastic stored energy (springs)	917	-	1,88e3	kJ/m ³
Fatigue strength at 10 ⁷ cycles	152	-	168	MPa
Fatigue strength model (stress range)	121	-	211	MPa

[Parameters:](#) Stress Ratio = -1, Number of Cycles = 10e6cycles



Impact & fracture properties

Fracture toughness	26,6	-	26,8	MPa.m ^{0.5}
Toughness (G)	9,38	-	10,3	kJ/m ²

Thermal properties

Melting point	475	-	635	°C
Maximum service temperature	80	-	100	°C
Minimum service temperature	-273			°C
Thermal conductivity	131	-	137	W/m.°C
Specific heat capacity	913	-	979	J/kg.°C
Thermal expansion coefficient	22,9	-	24,1	μstrain/°C
Thermal shock resistance	210	-	313	°C
Thermal distortion resistance	5,51	-	5,9	MW/m
Latent heat of fusion	384	-	393	kJ/kg

Electrical properties

Electrical resistivity	5,1	-	5,3	μohm.cm
Electrical conductivity	32,5	-	33,8	%IACS
Galvanic potential	* -0,78	-	-0,7	V

Magnetic properties

Magnetic type	Non-magnetic
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Optical, aesthetic and acoustic properties

Transparency	Opaque
Acoustic velocity	4,96e3 - 5,21e3 m/s
Mechanical loss coefficient (tan delta)	* 100e-6 - 2e-3

Critical materials risk

Contains >5wt% critical elements?	Yes
Notes	Al (aluminum) added to the 2018 US critical minerals list

Processing properties

Metal casting	Unsuitable
Metal cold forming	Acceptable
Metal hot forming	Excellent
Metal press forming	Acceptable
Metal deep drawing	Acceptable
Machining speed	76,2 m/min
Weldability	Unsuitable

Durability

Water (fresh)	Excellent
Water (salt)	Acceptable
Weak acids	Excellent
Strong acids	Excellent
Weak alkalis	Acceptable
Strong alkalis	Unacceptable
Organic solvents	Excellent
Oxidation at 500C	Unacceptable
UV radiation (sunlight)	Excellent
Galling resistance (adhesive wear)	Limited use

Notes

Aluminum alloys perform poorly when self-mated but can be processed without galling when mated with steels.

Flammability	Non-flammable
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Corrosion resistance of metals

Stress corrosion cracking	Highly susceptible
Notes	Rated in chloride; Other susceptible environments: Halide, water

Primary production energy, CO2 and water

Embodied energy, primary production	* 184 - 203 MJ/kg
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CO2 footprint, primary production	* 12,5	-	13,8	kg/kg
Water usage	* 1,08e3	-	1,19e3	l/kg

Processing energy, CO2 footprint & water

Roll forming, forging energy	* 10,6	-	11,7	MJ/kg
Roll forming, forging CO2	* 0,796	-	0,879	kg/kg
Roll forming, forging water	* 6,09	-	9,13	l/kg
Extrusion, foil rolling energy	* 20,9	-	23,1	MJ/kg
Extrusion, foil rolling CO2	* 1,57	-	1,74	kg/kg
Extrusion, foil rolling water	* 10,5	-	15,8	l/kg
Wire drawing energy	* 77,7	-	85,9	MJ/kg
Wire drawing CO2	* 5,83	-	6,44	kg/kg
Wire drawing water	* 29,3	-	43,9	l/kg
Metal powder forming energy	* 20,7	-	22,9	MJ/kg
Metal powder forming CO2	* 1,66	-	1,83	kg/kg
Metal powder forming water	* 22,6	-	33,9	l/kg
Vaporization energy	* 15,5e3	-	17,1e3	MJ/kg
Vaporization CO2	* 1,16e3	-	1,28e3	kg/kg
Vaporization water	* 6,46e3	-	9,69e3	l/kg
Coarse machining energy (per unit wt removed)	* 2,02	-	2,24	MJ/kg
Coarse machining CO2 (per unit wt removed)	* 0,152	-	0,168	kg/kg
Fine machining energy (per unit wt removed)	* 16	-	17,6	MJ/kg
Fine machining CO2 (per unit wt removed)	* 1,2	-	1,32	kg/kg
Grinding energy (per unit wt removed)	* 31,4	-	34,8	MJ/kg
Grinding CO2 (per unit wt removed)	* 2,36	-	2,61	kg/kg
Non-conventional machining energy (per unit wt removed)	* 155	-	171	MJ/kg
Non-conventional machining CO2 (per unit wt removed)	* 11,6	-	12,8	kg/kg

Recycling and end of life

Recycle	✓			
Embodied energy, recycling	* 31,6	-	34,9	MJ/kg
CO2 footprint, recycling	* 2,48	-	2,74	kg/kg
Recycle fraction in current supply	40,5	-	44,7	%
Downcycle	✓			
Combust for energy recovery	✗			
Landfill	✓			
Biodegrade	✗			

Notes

Other notes

Prices of Aluminum alloys fluctuate greatly and are dependent on batch size, unit size, forming methods, etc.

Standards with similar compositions

- Australia:
7075 to AS 1865, 7075 to AS 2848.1
- Austria:
AlZnMgCu1.5 to ONORM M3430
- Canada:
0.7075 to CSA HA.4, 0.7075 to CSA HA.5, 0.7075 to CSA HA.7, 0.7075 to CSA HA.8, 7075Alclad to CSA HA.4
- Europe:
EN AW-7075 to CEN EN 573-3
- France:
7075 to NFA50-411, 7075 to NF A50-451
- Germany:
3.4365/AlZnMgCu1.5 to DIN 1725-1
- India:
76528 to IS
- International:
AlZn5.5MgCu to ISO 209-1
- Japan:
A7075BD to JIS H4040, A7075BE to JIS H4040, A7075FD to JIS H4140, A7075FH to JIS H4140, A7075P to JIS H4000, A7075S to JIS H4100, A7075TD to JIS H4080, A7075TE to JIS H4080
- Norway:
17411 to NS 17411
- UK:
2L.88 to BS 2L.88
- USA:
7075, 7075 to ASTM B209M, 7075 to ASTM B210M, 7075 to ASTM B211M, 7075 to ASTM B22 1M, 7075 to ASTM B241M, 7075 to ASTM B247M, 7075 to ASTM B316/B316M, UNS A97075
- Venezuela:
7075 to COPANT 862
- Yugoslavia:
3.7553.00/AlZn5MgCu1.5 to JUS C.C2.100
- Tradenames:
7175, ALCOA 7075, BAW 7075, PERUNAL-215

Links

ProcessUniverse

Producers

Reference

Shape
