Aluminum, 7075, wrought, O

General information

Designation

7075

Condition	O (Annealed)
UNS number	A97075
EN name	EN AW-7075 (EN AW-Al Zn5,5MgCu)
EN number	3.4365

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	*	1.01	-	1.12	USD/lb

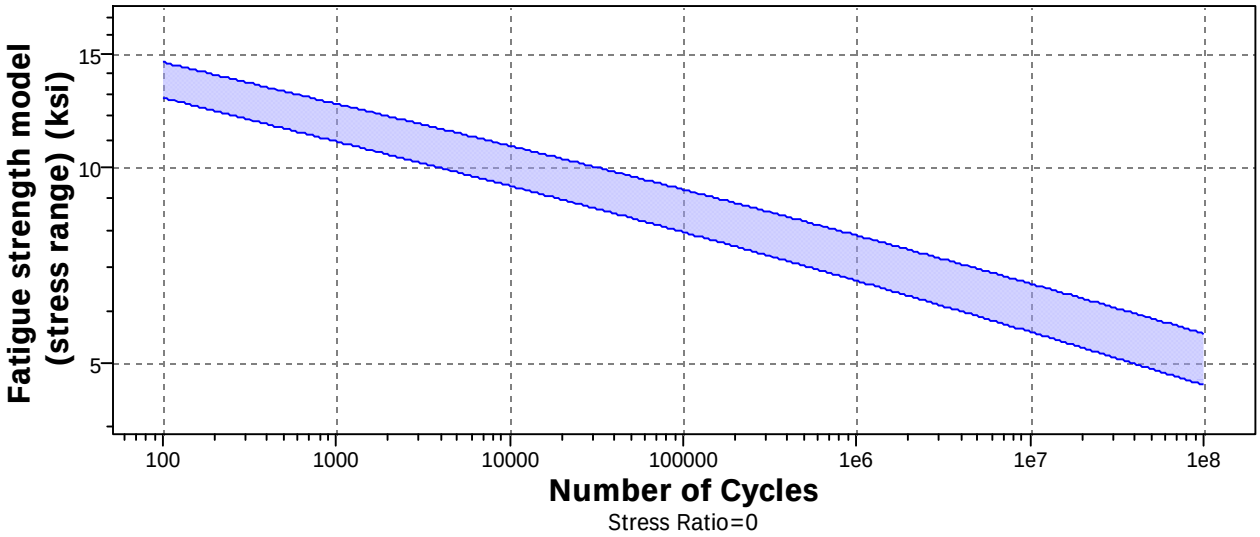
Physical properties

Density		0.1	-	0.102	lb/in^3

Mechanical properties

Young's modulus		10.4	-	11	10^6 psi
Yield strength (elastic limit)		14.5	-	16	ksi
Tensile strength		31	-	34.2	ksi
Elongation		13.9	-	16.1	% strain
Compressive strength	*	14.5	-	16	ksi
Flexural modulus	*	10.4	-	11	10^6 psi
Flexural strength (modulus of rupture)		14.5	-	16	ksi
Shear modulus		3.77	-	4.06	10^6 psi
Bulk modulus		9.72	-	10.7	10^6 psi
Poisson's ratio		0.325	-	0.335	
Shape factor		40			
Hardness - Vickers	*	31.4	-	34.7	HV
Fatigue strength at 10^7 cycles	*	7.28	-	7.69	ksi
Fatigue strength model (stress range)	*	5.58	-	6.63	ksi

Parameters: Stress Ratio = 0, Number of Cycles = 1e7cycles



Mechanical loss coefficient (tan delta)	* 1e-4	-	0.002	

Impact & fracture properties

Fracture toughness	* 31.9	-	35.5	ksi.in^0.5

Thermal properties

Melting point	887	-	1.18e3	°F
Maximum service temperature	176	-	212	°F
Minimum service temperature	-459			°F
Thermal conductivity	75.7	-	79.2	BTU.ft/hr.ft^2.°F
Specific heat capacity	0.225	-	0.234	BTU/lb.°F
Thermal expansion coefficient	12.7	-	13.4	µstrain/°F
Latent heat of fusion	165	-	169	BTU/lb

Electrical properties

Electrical resistivity	5	-	5.2	µohm.cm
Galvanic potential	* -0.78	-	-0.7	V

Optical properties

Transparency	Opaque

Magnetic properties

Magnetic type	Non-magnetic

Bio-data

RoHS (EU) compliant grades?	✓
Food contact	Yes

Notes

Not valid for use in France and Italy, as material composition fails both French and Italian law on Aluminum for food contact applications.

Processing properties

Metal casting	Unsuitable
Metal cold forming	Acceptable
Metal hot forming	Excellent
Metal press forming	Acceptable
Metal deep drawing	Acceptable

Durability

Water (fresh)	Excellent
Water (salt)	Acceptable
Weak acids	Excellent
Strong acids	Excellent
Weak alkalis	Acceptable
Strong alkalis	Limited use
Organic solvents	Excellent
Oxidation at 500C	Unacceptable
UV radiation (sunlight)	Excellent
Flammability	Non-flammable

Primary production energy, CO2 and water

Embodied energy, primary production	* 7.91e4	-	8.73e4	BTU/lb
CO2 footprint, primary production	* 12.5	-	13.8	lb/lb
NOx creation	* 0.0748	-	0.0827	lb/lb
SOx creation	* 0.128	-	0.141	lb/lb
Water usage	* 2.96e4	-	3.29e4	in^3/lb

Processing energy, CO2 footprint & water

Rough rolling, forging energy	* 1.14e3	-	1.26e3	BTU/lb
Rough rolling, forging CO2	* 0.199	-	0.22	lb/lb
Rough rolling, forging water	* 74.5	-	112	in^3/lb
Extrusion, foil rolling energy	* 2.16e3	-	2.39e3	BTU/lb
Extrusion, foil rolling CO2	* 0.377	-	0.417	lb/lb
Extrusion, foil rolling water	* 102	-	154	in^3/lb
Wire drawing energy	* 7.77e3	-	8.59e3	BTU/lb
Wire drawing CO2	* 1.36	-	1.5	lb/lb
Wire drawing water	* 189	-	283	in^3/lb
Metal powder forming energy	* 8.98e3	-	9.93e3	BTU/lb
Metal powder forming CO2	* 1.67	-	1.85	lb/lb
Metal powder forming water	* 631	-	946	in^3/lb
Vaporization energy	* 6.66e6	-	7.37e6	BTU/lb
Vaporization CO2	* 1.16e3	-	1.28e3	lb/lb
Vaporization water	* 1.79e5	-	2.68e5	in^3/lb
Coarse machining energy (per unit wt removed)	* 357	-	395	BTU/lb
Coarse machining CO2 (per unit wt removed)	* 0.0623	-	0.0689	lb/lb
Fine machining energy (per unit wt removed)	* 1.73e3	-	1.92e3	BTU/lb
Fine machining CO2 (per unit wt removed)	* 0.303	-	0.334	lb/lb
Grinding energy (per unit wt removed)	* 3.26e3	-	3.61e3	BTU/lb
Grinding CO2 (per unit wt removed)	* 0.569	-	0.629	lb/lb
Non-conventional machining energy (per unit wt removed)	* 6.66e4	-	7.37e4	BTU/lb
Non-conventional machining CO2 (per unit wt removed)	* 11.6	-	12.8	lb/lb

Recycling and end of life

Recycle	✓			
Embodied energy, recycling	* 1.36e4	-	1.5e4	BTU/lb
CO2 footprint, recycling	* 2.48	-	2.74	lb/lb
Recycle fraction in current supply	40.5	-	44.7	%
Downcycle	✓			
Combust for energy recovery	✗			
Landfill	✓			
Biodegrade	✗			

Possible substitutes for principal component

Copper can replace aluminum in electrical applications; magnesium, titanium, and steel can substitute for aluminum in structural and ground transportation uses. Composites, wood, and steel can substitute for aluminum in construction. Glass, plastics, paper, and steel can substitute for aluminum in packaging.

Geo-economic data for principal component

Principal component	Aluminum			
Typical exploited ore grade	30.4	-	33.6	%
Minimum economic ore grade	25	-	39	%
Abundance in Earth's crust	8.2e4			ppm
Abundance in seawater	5e-4	-	0.005	ppm
Annual world production	4.34e7			ton/yr
Reserves	4.67e10	-	5.16e10	l. ton

Main mining areas (metric tonnes per year)

Argentina, 460e3
Australia, 1.75e6
Bahrain, 900e3
Brazil, 1.33e6
Canada, 2.9e6
China, 21.5e6
Germany, 400e3
Iceland, 825e3
India, 1.7e6
Mozambique, 560e3
Norway, 1.2e6
Qatar, 600e3
Russia, 3.95e6
South Africa, 820e3
United Arab Emirates, 1.8e6
United States, 1.95e6
Other countries, 4.65e6

Eco-indicators for principal component

Eco-indicator 95	354	millipoints/lb
Eco-indicator 99	322	millipoints/lb

Notes

Other notes

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

Keywords

AZ 84, Otto Fuchs Metallwerke (GERMANY); AZ 83, Otto Fuchs Metallwerke (GERMANY); PERUNAL, Aluminium Walzwerke Singen GmbH (GERMANY); PERUNAL 215, Aluminium Walzwerke Singen GmbH (GERMANY); AZ 79, Otto Fuchs Metallwerke (GERMANY); AZ 62, Otto Fuchs Metallwerke (GERMANY); AZ 63, Otto Fuchs Metallwerke (GERMANY); AZ 67, Otto Fuchs Metallwerke (GERMANY);

Standards with similar compositions

The following information is taken from ASM AlloyFinder 3 - see link to References table for further information.
CSA HA.4 0.7075 (ON Canada)
CSA HA.4 7075Alclad (ON Canada)
CSA HA.5 0.7075 (ON Canada)
CSA HA.7 0.7075 (ON Canada)
CSA HA.8 0.7075 (ON Canada)
ISO: Al-Zn5.5MgCu
UK (BS Pre-1980): n/a
USA (UNS): A97075
Germany (W.-Nr): 3.4365
Germany (DIN): AlZnMgCu1.5
France: A-Z5GU
Italy (UNI): 9007/2

Links

ProcessUniverse

Producers

Reference

Shape