



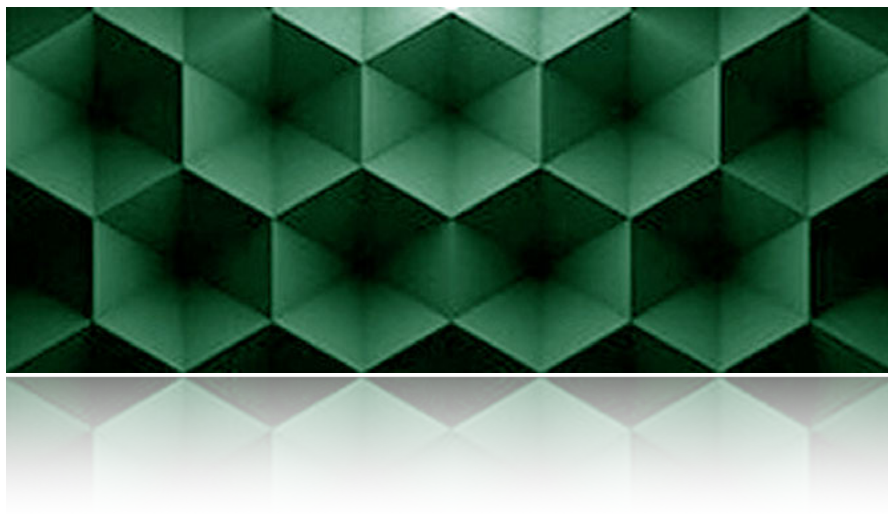
Galaxy Magnesium

Catalog of Precision Magnesium Alloys and Pure Magnesium

available now for international order fulfillment

email: business@galaxymagnesium.com

Headquarters Office, Honolulu: +1 808-282-6196





1. Standard Magnesium Alloys

Available from Galaxy Magnesium

Technical and Functional Specifications

Magnesium-AE42

Magnesium-AM50A

Magnesium-AM60B

Magnesium-AS21

Magnesium-AS41B

Magnesium-AZ31B

Magnesium-AZ61A

Magnesium-AZ63

Magnesium-AZ80

Magnesium-AZ91C

Magnesium-AZ91D

Magnesium-EZ33

Magnesium-M1A

Magnesium-ZE41

Magnesium-ZK61

Details: <https://galaxymagnesium.com/catalog/>

2. Pure Magnesium:

selection of formats:
Ingot, Plate, Billet, Powder

and selection of pure magnesium grades:

Mg9995A: 99.95% pure
Mg9990: 99.90% pure
Mg9980: 99.80% pure
Mg99999: 99.999% pure
Mg999: 99.9% pure

All the above pure magnesium products follow
ISO Standard 8287:2021

<https://www.iso.org/standard/75101.html>



Details: <https://galaxymagnesium.com/catalog/magnesium-ingot/>

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Alloy: Magnesium- AE42

other name: AE42-F



General Description: a die cast magnesium alloy with good strength, and creep resistance of up to 150°C. Creep-resistant materials are used in machines and facilities operated at high temperatures. They must be able to withstand the highest possible operating loads at elevated temperatures and also be sufficiently resistant to high-temperature corrosion.

Common Applications: power engineering equipment, the making of die-casts, automotive and aerospace, where high tensile strength, compressive yield strength and corrosion resistance are required

Chemical Composition

Magnesium, Mg	93.4%
Aluminum, Al	4%
Rare earth metals	2.5%
Manganese, Mn	≥ 0.10

Physical Properties

	Metric	Imperial
Density	1.80 g/cm	0.0650 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	234 MPa	34000 psi
Yield strength	145 MPa	21000 psi
Compressive yield strength	145 MPa	21000 psi
Shear modulus	17 GPa	2470 ksi
Elastic modulus	45 Gpa	6526 ksi
Poisson's ratio	0.35	0.35
Elongation at break (in 50 mm)	11%	11%
Hardness, Brinell (500 kg load, 10 mm ball)	60	60

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

Delivery Format: Billet, bar or plate; other formats, dimension, thickness to customer requirement.

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Alloy: Magnesium- AM50A



General Description: a magnesium alloy that offers excellent ductility, superior energy absorbing properties, and good strength and castability.

Common Applications: chiefly used in components in the automobile sector, including: Brackets, Seat frames, Steering wheels & Instrument panels.

Chemical Composition

Magnesium, Mg	93.644 -94.984%
Aluminum, Al	4.4 -5.4%
Manganese, Mn	0.26 - 0.6%
Zinc, Zn	0.22%
Silicon, Si	0.1%
Copper, Cu	0.01%
Nickel, Ni	0.002%
Iron, Fe	0.004%
Others, each max	0.02%

Physical Properties

	Metric	Imperial
Density	1.77 g/cm ³	0.0630 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	210-230 MPa	30.4-33 ksi
Yield strength	125 MPa	18.12 ksi
Elastic modulus	45 Gpa	6526 ksi
Elongation at break	10-15%	10-15%
Hardness, Brinell	60	60

Thermal Properties

Thermal expansion coefficient

Metric	Imperial
26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

Thermal conductivity 65 W/mK 450 BTU in/hr.ft².°F

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Alloy: Magnesium- AM60B



General Description: a cast alloy with excellent ductility, superior energy absorbing properties, and good strength and castability.

Common Applications: chiefly used in several components in the automobile sector, including: Brackets, Seat frames, Instrument panels, & Steering wheels.

Chemical Composition

Magnesium, Mg	92.543 - 93.95%
Aluminum, Al	5.5 - 6.5%
Manganese, Mn	0.24 - 0.6%
Zinc, Zn	0.22%
Silicon, Si	0.1%
Copper, Cu	0.01%
Iron, Fe	0.005%
Nickel, Ni	0.002%
Others, each max	0.02%

Physical Properties

	Metric	Imperial
Density	1.80 g/cm ³	0.0650 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	234 MPa	34000 psi
Yield strength	145 MPa	21000 psi
Poisson's ratio	0.35	0.35
Elastic modulus	45 Gpa	6526 ksi
Elongation at break	11%	11%
Hardness, Brinell	60	60

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 µm/m°C	14.4 µin/in°F

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Alloy: Magnesium- AS21-F



General Description: a die cast alloy typically used in making die castings due to its high strength; creep resistance to 150°C.

Common Applications: automobile mag wheels and other components, construction material, fixtures inside the house, mobile phones, wireless communication devices & cameras.

Chemical Composition

Magnesium, Mg	96.7%
Aluminum, Al	2.2%
Silicon, Si	1%
Manganese, Mn	≥ 0.10%

Physical Properties

	Metric	Imperial
Density	1.78 g/cm ³	0.0643 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	221 MPa	32000 psi
Yield strength	117 MPa	17000 psi
Poisson's ratio	0.35	0.35
Elastic modulus	45 Gpa	6530 ksi
Elongation at break (in 50 mm)	13%	13%
Hardness, Brinell (500 kg load, 10 mm ball)	55	55

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

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Alloy: Magnesium- AS41B-F



General Description: a die cast alloy with excellent saltwater corrosion resistance coupled with creep resistance that is superior to magnesium grades AM60A, AZ91A, AZ91B, and AZ91D. This alloy also possesses tensile strength, yield strength, and elongation.

Common Applications: primarily used in automotive structural die casting parts in operating temperatures of up to 177°C (350°F).

Chemical Composition

Magnesium, Mg 94.6
Aluminum, Al 3.5 5
Silicon, Si 0.50 1.5
Manganese, Mn ≥ 0.35
Zinc, Zn ≤ 0.12
Copper, Cu ≤ 0.020
Iron, Fe ≤ 0.0035
Nickel, Ni ≤ 0.0020
Other, per element ≤ 0.20

Physical Properties

Metric

Imperial

Density	1.776 g/cm ³	0.06416 lb/in ³
Melting point	570 - 615°C	1060 - 1140°F

Mechanical Properties

	Metric	Imperial
Tensile strength	234 MPa	34000 psi
Yield strength	145 MPa	21000 psi
Poisson's ratio	0.35	0.35
Elastic modulus	45 Gpa	6526 ksi
Elongation at break	11%	11%
Hardness, Brinell	60	60

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20100°C/68212°F)	26.1 µm/m°C	14.5 µin/in°F
Thermal conductivity	68 W/mK	472 BTU in/hr.ft ² .°F

Delivery Format: Billet, bar or plate; other formats, dimensions, thickness to customer requirement.

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Alloy: Magnesium- AZ31B-F



General Description: a medium-strength magnesium alloy.

Common Applications: aircraft fuselages, cell phone and laptop cases, speaker cones and concrete tools. Can be superformed at elevated temperatures to produce a wide variety of intricate components for automotive uses.

Chemical Composition

Magnesium, Mg	97%
Aluminum, Al	2.5 - 3.5%
Zinc, Zn	0.60 - 1.4%
Manganese, Mn	≥ 0.20%
Silicon, Si	≤ 0.10%
Copper, Cu	≤ 0.050%
Calcium, Ca	≤ 0.040%
Iron, Fe	≤ 0.0050%
Nickel, Ni	≤ 0.0050%

Physical Properties

	Metric	Imperial
Density	1.77 g/cm ³	0.0639 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	260 MPa	37700 psi
Yield strength	200 MPa	29000 psi
Poisson's ratio	0.35	0.35
Elastic modulus	45 GPa	6526 ksi
Shear strength	130MPa	18ksi
Elongation at break	15%	15%
Hardness, Brinell	49	49

Thermal Properties

Thermal expansion co-efficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

Thermal conductivity 96 W/mK 666 BTU in/hr.ft².°F

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Alloy: Magnesium- AZ61A



General Description: a general-purpose magnesium alloy which is both gas and arc weldable. AZ61A has a higher tensile strength and superior corrosion resistance compared to AZ31B, and it is possible to perform various finishing on its surface.

Common Applications: Hollow shape extrusions, Solid extrusions, Bearing caps, Bearing housings, Fitting Rocker arm supports, Screw machine components.

Chemical Composition

Magnesium, Mg	92%
Aluminum, Al	5.80-7.20%
Zinc, Zn	0.40-1.50%
Manganese, Mn	0.15%
Silicon, Si	0.10%
Copper, Cu	0.050%
Nickel, Ni	0.0050%
Iron, Fe	0.0050%

Physical Properties

	Metric	Imperial
Density	1.80 g/cm ³	0.0650 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	310 MPa	4000 psi
Yield strength (at strain 0.200%)	230 MPa	33400 psi
Compressive Yield strength (at 0.2% offset)	130 MPa	18900 psi
Ultimate bearing strength	470 MPa	68200 psi
Bearing yield strength	285 MPa	41300 psi
Shear strength	140 MPa	20300 psi
Shear modulus	17 GPa	2470 ksi
Elastic modulus	44.8 Gpa	6498 ksi
Poisson's ratio	0.35	0.35
Elongation at break (in 50mm)	16%	16%
Hardness, Brinell (500 kg load, 10 mm ball)	60	60
Hardness, Knoop (estimated from Brinell)	80	80
Hardness, Vickers (converted from Brinell hardness)	68	68
Machinability (relative rating, 100 = best)	100	100
Charpy impact	4.10 J	3.02 ft-lb

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@0-100°C/32-212°F)	26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

Thermal conductivity 70 W/mK 468BTU in/hr.ft².°F

Delivery Format: Billet, bar or plate; other formats, dimensions, thickness to customer requirement

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Alloy: Magnesium- AZ80A

Variations: AZ80A-F Forged, AZ80A-T4 Wrought, AZ80A-T5 Forged/Extruded; T6 Forged/Extruded



General Description: Performs well for extrusions and formings that resist creep and demand high fatigue strength. Stronger than AZ61A-F, the AZ80A alloy possesses an excellent machinability rating and can be readily heat-treated.

Machinability requires moderate feed, high cutting speed, modest cut depth, and plenty of chip clearance. Workability requires hot working from 260°-288°C (500°-550°F). It is recommended that hammer forging be avoided. AZ80A has to be pressed to forge into shape.

Common Applications: High-strength parts for satellites, missile frames & interstage fairings, aircraft engines, landing gear struts, helicopter gearboxes & rotor hubs, supercharger components, hydraulic cylinders, bicycle frames, roadwheels, brake housings, screw machine components.

Chemical Composition (AZ80A)

Magnesium, Mg	90.85%
Aluminum, Al	8.50%
Zinc, Zn	0.50%
Manganese, Mn	0.15%

Physical Properties (AZ80A)

	Metric	Imperial
Density	1.80 g/cm ³	0.0650 lb/in ³

Mechanical Properties (AZ80A)

	Metric	Imperial
Tensile strength	290 MPa	42060 psi
Yield strength	200 MPa	29007 psi
Compressive yield strength	145 MPa	21000 psi
Shear modulus	17 GPa	2470 ksi
Elastic modulus	45 Gpa	6530 ksi
Poisson's ratio	0.35	0.35
Elongation at break (in 50 mm)	6%	6%
Hardness, Brinell (AZ80A-T5 Extruded)	82	82

Thermal Properties (AZ80A)

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 µm/m°C	14.4 µin/in°F

Delivery Format: Billet, bar or plate; other formats, dimension, thickness to customer requirement.

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Alloy: Magnesium- AZ63-T1



General Description: a cast alloy composed of aluminum, silicon and magnesium.

Common Applications: Magnesium AZ63-T1 alloy is used in the making of different types of casts.

Chemical Composition

Magnesium, Mg	90.7%
Aluminum, Al	6%
Silicon, Si	0.3%

Physical Properties

	Metric	Imperial
Density	1.83 g/cm ³	0.0661 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	200 MPa	29000 psi

Yield strength	97 MPa	14100 psi
Poisson's ratio	0.35	0.35
Elastic modulus	45 Gpa	6526 ksi
Elongation at break	6%	6%
Hardness, Brinell	50	50

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26.1 $\mu\text{m}/\text{m}^\circ\text{C}$	14.5 $\mu\text{in}/\text{in}^\circ\text{F}$

Thermal conductivity 77 W/mK 534 BTU in/hr.ft².°F

Delivery Format: Billet, bar or plate; other formats, dimensions, thickness to customer requirement

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Alloy: Magnesium- AZ91C-T6



General Description: Magnesium AZxx alloy series are known to possess good ductility, toughness, and moderate strength. They can be cast, formed, and forged. These alloys are more frequently used than others.

Note: AZ91A, B, C, D, and E have the same nominal composition but differ in ranges and/or specified impurity limits.

Common Applications: used in sand cast and permanent-mold castings when maximum corrosion resistance is not required. General purpose alloy; high strength.

Chemical Composition

Magnesium, Mg	90.47%
Aluminum, Al	8.70%
Zinc, Zi	0.70%
Manganese, Mn	0.13%

Physical Properties

	Metric	Imperial
Density	1.81 g/cm ³	0.0654 lb/in ³
Melting Point	≥ 421 °C	≥ 790 °F

Mechanical Properties

	Metric	Imperial
Tensile strength	275 MPa	39900 psi
Yield strength	145 MPa	21000 psi
Poisson's ratio	0.35	0.35
Elastic modulus	44.8 Gpa	6500 ksi
Elongation at break	6%	6%
Hardness, Brinell	60	60

Thermal Properties

Thermal expansion coefficient (@20-100°C/68-212°F)	Metric 26 µm/m°C	Imperial 14.4 µin/in°F
	T (°C)	Treatment
Thermal conductivity 71.13 W/mK	0	T6
Thermal expansion 26 x 10 ⁻⁶ /°C	20-100	T6

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Alloy: Magnesium- AZ91D



General Description: the most widely used magnesium die cast alloy, it has excellent mechanical properties, corrosion resistance, and castability.

Common Applications: often used for structural applications.

Note: Magnesium AZ91A, B, C, D, and E have the same nominal composition but differ in ranges and/or specified impurity limits.

Chemical Composition

Magnesium, Mg	89.292 – 91.042%
Aluminum, Al	8.3 - 9.7%
Manganese, Mn	0.15 - 0.50%
Zinc, Zn	0.351%
Silicon, Si	0.1%
Copper, Cu	0.03%
Iron, Fe	0.005%
Nickel, Ni	0.002%
Others, each max	0.02%

Physical Properties

	Metric	Imperial
Density	1.81 g/cm ³	1.046 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	240-250 MPa	35-36 ksi
Yield strength	160 MPa	23.20 ksi
Elastic modulus	45 Gpa	6526 ksi
Elongation	3-7%	3-7%
Hardness, Brinell	63	63

Thermal Properties

Thermal expansion coefficient

	Metric	Imperial
(@20-100°C/68-212°F)	26 µm/m°C	14.4 µin/in°F
Thermal conductivity	72.7 W/mK	504 BTU in/hr.ft ² .°F

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Alloy: Magnesium- EZ33A-T5



General Description: an alloy with pressure tightness, good castability and damping capacity, and creep resistant at 245°C (473°F).

Common Applications: The main application of magnesium EZ33AT5 alloy is in commercial and military pressure-tight sand and permanent-mold castings that are relatively free from microporosity, and used in T5 condition for applications requiring good strength properties up to 260°C.

Chemical Composition

Magnesium, Mg	93%
Neodymium, Nd	2.54%
Zinc, Zn	23.1%
Zirconium, Zr	0.501%
Copper, Cu	≤ 0.10%
Nickel, Ni	≤ 0.010%

Physical Properties

	Metric	Imperial
Density	1.80 g/cm ³	0.0650 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	160 MPa	23200 psi
Yield strength (@strain 0.200%)	145 MPa	21000 psi
Poisson's ratio	0.32	0.32
Elastic modulus	45 Gpa	6530 ksi
Elongation at break	2%	2%
Hardness, Brinell	50	50
Hardness, Rockwell E	59	59
Machinability	100	100

Thermal Properties

Thermal expansion co-efficient

	Metric	Imperial
(@0.000-100°C/32-212°F)	26.4 $\mu\text{m}/\text{m}^\circ\text{C}$	14.7 $\mu\text{in}/\text{in}^\circ\text{F}$

Thermal conductivity 99.5 W/mK 691BTU in/hr.ft².°F

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Alloy: Magnesium- M1A-F



General Description: a white metal that is principally used as an alloy element for aluminum, lead, zinc, and other nonferrous alloys. It is ductile and the most machinable of all the metals.

Magnesium M1A-F has low to medium strength and good corrosion resistance. It has the highest electrical conductivity among magnesium alloys. In addition, it has the highest thermal conductivity and a very high melting temperature.

Common Applications: Can be hammer-forged.

Chemical Composition

Magnesium, Mg	94%
Manganese, Mn	4.80 - 6.20%
Calcium, Ca	≥ 0.45%
Silicon, Si	≤ 0.10%
Copper, Cu	≤ 0.050%
Nickel, Ni	≤ 0.010%
Others	≤ 0.30%

Physical Properties

	Metric	Imperial
Density	1.77 g/cm ³	0.0639 lb/in ³

Mechanical Properties

	Metric	Imperial
Tensile strength	255 MPa	37000 psi
Yield strength	180 MPa	26100 psi
Compressive yield strength (at 0.2% offset)	83 MPa	12000 psi
Ultimate bearing strength	350 MPa	50800 psi
Bearing yield strength	195 MPa	28300 psi
Shear strength	125 MPa	18100 psi
Shear modulus	17 GPa	2470 ksi
Elastic modulus	45 Gpa	6526 ksi
Poisson's ratio	0.35	0.35
Elongation at break (in 50mm)	12%	12%
Hardness, Brinell (500 kg load, 10 mm ball)	44	44

Thermal Properties

Thermal expansion coefficient

(@0-100°C/32-212°F)	Metric	Imperial
	26 $\mu\text{m}/\text{m}^\circ\text{C}$	14.4 $\mu\text{in}/\text{in}^\circ\text{F}$

Delivery Format: Billet, bar or plate; other formats, dimensions, thickness to customer requirement

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Alloy: Magnesium- ZE41



General Description: a magnesium casting alloy containing zirconium, rare-earths and zinc. This alloy is well-suited for high integrity castings that are operated at ambient temperatures or up to 149°C (300°F). It is easily weldable and pressure-tight.

Common Applications: major applications include: Aircraft components, Military equipment, Video cameras, Vibration testing equipment, Motorcycle wheels, Power tools, & Helicopter gearboxes.

Chemical Composition

Magnesium, Mg	94.34 - 95.23%
Zinc, Zn	3.55%
Rare earths	0.81 - 1.7%
Zirconium, Zr	0.41%

Physical Properties

	Metric	Imperial
Density	1.84 g/cm ³	0.0665 lb/in ³

Melting Point 532 - 638°C 990 -1180°

Mechanical Properties

	Metric	Imperial
Tensile strength	218 MPa	34000 psi
Yield strength	140 MPa	20300 psi
Poisson's ratio	0.35	0.35
Elastic modulus	44.12 Gpa	6400 ksi
Elongation at break	4.5%	4.5%
Hardness, Brinell	55 - 70	55 - 70

Thermal Properties

Thermal expansion coefficient		
(@20-100°C/68-212°F)	Metric	Imperial
	15.1 µm/m°C	15.1 µin/in°F
Thermal conductivity	24 W/mK	6 3 BTU in/hr.ft².°F

Delivery Format: Billet, bar or plate; other formats, dimensions, thickness to customer requirement

Available for immediate delivery from Galaxy Magnesium
email business@galaxymagnesium.com
or call 1 212-608-2020 (New York)

External Reference: <https://www.azom.com/article.aspx?ArticleID=9966>

<http://www.galaxymagnesium.com> #MagnesiumRevolution



Standard Magnesium Alloys from
Galaxy Magnesium
Technical and Functional Specifications
<http://www.galaxymagnesium.com>

Alloy: Magnesium- ZK61

Variants: ZK61A, ZK61A-T5, ZK61A-T6



General Description: a Mg-Zn-Zr alloy with high creep resistance and good tensile properties at both room and elevated temperatures.

Common Applications: Typically used for simple, highly-stressed aerospace and military castings of uniform cross section. Also used in T-5 and T6 tempers. Note that intricate castings can be susceptible to microporosity. It is not weldable, and hence its applications are more restricted.

Chemical Composition (ZK-61)

Magnesium, Mg	94.46%
Zinc, Zn	5.19%
Zirconium, Zr	0.33%
Manganese, Mn	0.0055%
Iron, Fe	0.0035%
Nickel, Ni	0.003%
Copper, Cu	0.001%
Silicon, Si	0.0007%
Aluminum, Al	0.0006%

Physical Properties

Depends on Variant; details here:

<http://matweb.com/search/DataSheet.aspx?MatGUID=1d599876cfcf468a95ea0fded85aa503&ckck=1>

Mechanical Properties

	Metric	Imperial
Tensile strength	271 MPa	39305 psi
Elongation at break (in 50 mm)	3.5%	3.5%

Thermal Properties

Depends on Variant; details here:

<http://matweb.com/search/DataSheet.aspx?MatGUID=1d599876cfcf468a95ea0fded85aa503&ckck=1>

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