Typical Magnesium Extrusion Alloys

Provided Courtesy of Materials Technology@TMS

The following is a summary of typical magnesium extrusion alloys, including links to supplier property data and links to articles and handbook information. *Designations in parentheses are British designations for the ASTM designations which precede them.*

For additional resources, visit http://www.materialstechnology.org

Alloy	Tempe	Description	Supplier	Article or Handbook	Link to Article or Handbook
AZ10A	F	Low cost, moderate strength Mg-Al-Zn alloy.		ASM Specialty Handbook: Magnesium and Magnesium Alloys, eds. M. M. Avedesian and H. Baker, ASM International, 1999.	Acquire the Book
AZ31B	F	Medium strength Mg-Al-Zn alloy. Good formability. Weldable.	Magnesium-Elektron	Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
			Alubin	Metallic Materials Properties Development and Standardization, U. S. Department of Transportation, 2003	Read the Full Article
			Timminco	H. J. McQueen, M. Myshlaev, M. Sauerborn, and A. Mwenbela, "Flow Stress Microstructures and Modeling in Hot Extrusion of Magnesium Alloys", Magnesium Technology 2000, TMS, pp. 355-362.	Read the Full Article
				S. R. Agnew, T. M. Lillo, J. Macheret, G. M. Stoica, L. Chen, Y. Lu, D. Fielden and P. K. Liaw, "Assesment of Equal Channel Angular Extrusion Processing of Magnesium Alloys", Magnesium Technology 2001, TMS, pp. 243-248.	Read the Full Article
				T. Mukai, H. Watanabe, K. Ishikawa and K. Higashi, "Improvement of Strength and Ductility of Commercial Magnesium Alloys Under Dynamic Loading by Controlling Grain Structures", Magnesium Technology 2002, TMS, pp. 137-140.	Read the Full Article
				K. Kondoh, T. Luangvaranunt, R. Tsuzuki and S. Kamado, "Microstructured Controlled Magnesium Alloys Via Cyclically Repeated Plastic Working", Magnesium Technology 2004, TMS, pp. 257-262.	Acquire the Article
				J. -F. Lass, F.-W. Bach, and M. Schaper, "Adapted Extrusion Technology for Magnesium Alloys", Magnesium Technology 2005, pp. 159-164.	Acquire the Article
				A. A. Luo, A. K. Sachdev, R. K. Mishra, and R. C. Kubic, "Bendability and Microstructure of Magnesium Alloy Tubes at Room and Elevated Temperatures", Magnesium Technology 2005, TMS, pp. 145148.	Acquire the Article
				D. Letzig, J. Swiostek, J. Bohlen, and K. U. Kainer, "Magnesium Wrought Alloy Properties of the AZ-Series", Magnesium Technology 2005, TMS, pp. 55-60.	Acquire the Article
				J. Bohlen, J. Swiostek, H.-G. Brokmeier, D. Letzig, and K. U. Kainer, "Low Temperature Hydrostatic Extrusion of Magnesium Alloys", Magnesium Technology 2006, TMS, pp. 213-218.	Acquire the Article
				For more articles, search Magnesium Article and Presentation Database, Eric Nyberg of Pacific Northwest National Laboratory, 2007.	Search Database

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AZ61A (AZM)	F	General purpose Mg-Al-Zn alloy. Gas and arc weldable.	Magnesium-Elektron	Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
			Alubin	Metallic Materials Properties Development and Standardization, U. S. Department of Transportation, 2003	Read the Full Article
			Timminco	D. Letzig, J. Swiostek, J. Bohlen, and K. U. Kainer, "Magnesium Wrought Alloy Properties of the AZ-Series", Magnesium Technology 2005, TMS, pp. 55-60.	Acquire the Article
				J. -F. Lass, F.-W. Bach, and M. Schaper, "Adapted Extrusion Technology for Magnesium Alloys", Magnesium Technology 2005, pp. 159-164.	Acquire the Article
				J. Bohlen, J. Swiostek, W. H. Sillekens, P.-J. Vet, D. Letzig, and K. U. Kainer, "Process and Alloy Development for Hydrostatic Extrusion of Magnesium: The European Community Research Project MAGNEXTRUSCO", Magnesium Technology 2005, TMS, pp. 241-246.	Acquire the Article
				For more articles, search Magnesium Article and Presentation Database, Eric Nyberg of Pacific Northwest National Laboratory, 2007.	Search Database
ZM21	F	Medium strength Mg-Zn-Mn alloy. Easily formed. Fully weldable by argon arc process.	Magnesium-Elektron	J. -F. Lass, F.-W. Bach, and M. Schaper, "Adapted Extrusion Technology for Magnesium Alloys", Magnesium Technology 2005, pp. 159-164.	Acquire the Article
			Alubin	J. Bohlen, J. Swiostek, W. H. Sillekens, P.-J. Vet, D. Letzig, and K. U. Kainer, "Process and Alloy Development for Hydrostatic Extrusion of Magnesium: The European Community Research Project MAGNEXTRUSCO", Magnesium Technology 2005, TMS, pp. 241-246.	Acquire the Article
M1A	F	Mg-Mn alloy with moderate mechanical properties. Has excellent weldability, corrosion resistance and hot formability.		ASM Specialty Handbook: Magnesium and Magnesium Alloys, eds. M. M. Avedesian and H. Baker, ASM International, 1999.	Acquire the Book
				Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
ZK31(ZW3)	T5	High strength Mg-Zn-Zr alloy. Weldable under good conditions.	Magnesium-Elektron		
ZK40A	T5			Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
				L. Yang, X. M. Yang, T. Liu, S. D. Wu, L. J. Chen, "Superplasticity of magnesium alloy ZK40 Processed by Equal Channel Angular Pressing", Materials Science Forum, Vols. 488-489, 2005, pp. 575-579.	Acquire the Article
				L. Li, C. Lijia, L. Zheng, "An Investigation of Low Temperature Superplasticity of ZK40 Magnesium Alloy Subjected fo Equal Channel Angular Pressing", Materials Science Forum Vols. 488-489, 2005, pp. 581-584.	Acquire the Article

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ZK60A	T5	High strength Mg-Zn-Zr alloy. Has best combination of strength and ductility at room temperature of the wrought Mg alloys.	Magnesium-Elektron	Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
			Alubin	Metallic Materials Properties Development and Standardization, U. S. Department of Transportation, 2003	Read the Full Article
				S. R. Agnew, T. M. Lillo, J. Macheret, G. M. Stoica, L. Chen, Y. Lu, D. Fielden and P. K. Liaw, "Assesment of Equal Channel Angular Extrusion Processing of Magnesium Alloys", Magnesium Technology 2001, TMS, pp. 243-248.	Read the Full Paper
				T. Mukai, H. Watanabe, K. Ishikawa and K. Higashi, "Improvement of Strength and Ductility of Commercial Magnesium Alloys Under Dynamic Loading by Controlling Grain Structures", Magnesium Technology 2002, TMS, pp. 137-140.	Read the Full Article
AZ80A	T5	High strength Mg-Al-Zn alloy.	Magnesium-Elektron	Handbook of Materials Selection, ed. Kutz, Myer, 2002 John Wiley & Sons	Read the Full Article
			Alubin	J. Wendt, M. Hilpert, J. Kiese and I. Wagner, "Surface and Environmental Effects on the Fatigue Behavior of Wrought and Cast Magnesium Alloys", Magnesium Technology 2001, TMS, pp. 281-285.	Read the Full Article
			Timminco	G. I. Rosen, G. Segal and A. Lubinsky, "Large Profile Magnesium Alloy Extrusions for Automotive Applications", Magnesium Technology 2005, TMS, pp. 61-66.	Acquire the Article
				J. Bohlen, J. Swiostek, H.-G. Brokmeier, D. Letzig, and K. U. Kainer, "Low Temperature Hydrostatic Extrusion of Magnesium Alloys", Magnesium Technology 2006, TMS, pp. 213-218.	Acquire the Article
WE43A	T6, T5 (for 200°C use)	Elevated temperature Mg-Y-RE alloy for use at temperatures up to 300°C. Stable for long times at 250°C. Properties are more isotropic than those in most wrought alloys.	Magnesium-Elektron	G. W. Lorimer, L. W. F. Mackenzie, F. J. Humphreys, T. Wilks, "The Recrystallization Behavior of AZ31 and WE43", Materials Science Forum, Vols. 488-489 (2005) pp. 99-102.	Acquire the Article
WE54A	T6, T5 (for 200°C use)	Elevated temperature Mg-Y-RE alloy for use at temperatures up to 300°C. Properties are more isotropic than those in most wrought alloys.	Magnesium-Elektron	For more articles, search Magnesium Article and Presentation Database, Eric Nyberg of Pacific Northwest National Laboratory, 2007.	Search Database