

MBH 65X MGA16 – Mg/Al/Zn Cast

SUMMARY

The application note summarizes the digestion of MBH 65X MGA16, a Magnesium-Aluminum-Zinc cast alloy Certified Reference Material using ColdBlock™ Digestion Pro Series Technology.

Instrument:	ColdBlock CBM sample digester, chiller, HF inserts, ICP-OES
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Digestion Time:	25 minutes
Acid Used:	HNO ₃ , HF, H ₃ BO ₃
Average ColdBlock Recovery vs. CRM:	<ul style="list-style-type: none"> • 99% Aluminum • 102% Tin • 104% Zinc

METHODOLOGY

1. The chiller temperature was set to -5 °C.
2. Approximately 0.250 g of each sample was accurately weighed and transferred into a ColdBlock digestion vessel.
3. A reagent mixture of 20 mL 1:1 HNO₃ and 1mL HF was added to each vessel.
4. Samples were digested at 100 % power for 5 minutes, followed by 50% power for 15 minutes.
5. 25mL of 4% H₃BO₃_{v/v} was introduced to each vessel.
6. Samples were further digested at 100 % power for 5 minutes.
7. Digestates were allowed to cool, then quantitatively diluted to a final volume of 50mL using a solution of 2 % HNO₃ _{v/v}.

DISCUSSION

- The addition of boric acid facilitates the re-solubilization of insoluble fluoride species and complexes residual HF in solution.
- Complete dissolution was achieved within 20 minutes for this high-strength nickel-based alloy



RESULTS

65X MGA16 (Magnesium/Aluminum/Zinc (Cast))									
Element	Certified Value (wt.%)	+/-	Sample A	Sample B	Sample C	Average (ppm)	Stdev	RSD	Recovery
Ag	0.0035	0.0002	0.0036	0.0036	0.0036	0.0036	0.00002	0.4%	103%
Al	6.78	0.08	6.71	6.65	6.71	6.69	0.03	0.4%	99%
Be	0.0011	0.0001	0.0011	0.0011	0.0011	0.0011	0.000001	0.1%	100%
Ca	0.0024	0.0002	0.0019	0.0028	0.0032	0.003	0.001	20.6%	110%
Ce	0.0017	0.0003	0.0018	0.0018	0.0018	0.0018	0.00004	2.1%	106%
Cd	0.0066	0.0002	0.0072	0.0073	0.0072	0.0072	0.0001	0.7%	110%
Cu	0.099	0.004	0.099	0.098	0.097	0.098	0.001	1.3%	99%
Fe	0.0073	0.0008	0.0080	0.0082	0.0080	0.0081	0.0001	1.2%	111%
La	0.0012	0.0003	0.0012	0.0012	0.0013	0.0012	0.00005	3.8%	103%
Mg	N/A	N/A	90.92	92.91	92.04	91.96	0.8	0.9%	N/A
Mn	0.271	0.007	0.284	0.286	0.286	0.285	0.001	0.3%	105%
Ni	0.0057	0.0004	0.0059	0.0059	0.0046	0.0055	0.001	11.2%	96%
Pb	0.050	0.003	0.056	0.057	0.056	0.056	0.001	1.0%	112%
Si	0.023	0.002	0.030	0.024	0.021	0.025	0.004	14.8%	107%
Sn	0.028	0.002	0.028	0.029	0.028	0.028	0.0004	0.016	102%
Zn	4.03	0.06	4.15	4.18	4.20	4.18	0.02	0.5%	104%

MBH Analytical Ltd. (2007). *65X MGA16 Magnesium–Aluminum–Zinc Cast Alloy Certified Reference Material, Certificate of Analysis*. United Kingdom.