# Vanta™ XRF 분석기를 사용하여 저마그네슘 알루미늄 합금을 신속하고 정확하게 분류

Aluminum alloy is the metal of choice for many industries, and aluminum production and recycling continues to grow worldwide. From weight savings to cost per component, when compared with other alloy classes, aluminum is often the material of choice. Aluminum gains its lightweight strength from magnesium, a critical alloying element frequently specified in the composition.

The ability to quickly detect small amounts of magnesium (<1%) in an aluminum alloy has been challenging for handheld X-ray fluorescence (XRF) because of the lengthy test times required to accurately identify specific amounts of magnesium. With hardware advancements and leading-edge Axon Technology™, the Olympus Vanta™ handheld XRF analyzer has greatly reduced the test time needed to display accurate, low-level magnesium (Mg) in aluminum (Al) alloys.

Vanta analyzers excel at producing rapid and accurate Mg results for Al alloy sorting. Tests fewer than 10-seconds long are often sufficient to resolve Mg values in various Al alloys. With previous handheld XRF instruments, these same tests often exceeded 20 seconds.

The graph below shows average results from 10 tests per sample for rapid test times, with the error bars denoting the +/- average of one sigma reported errors from the 10 tests. For Mg > 0.4%, the test times were 3 seconds at 40 kV and only 5 seconds at 13 kV to quantify the shown Mg values. For a Mg level of 0.21%, the testing time in the 13 kV beam increased to 20 seconds. To report the trace level found in AL1100 of 0.03%, the 13 kV beam testing times increased to 60 seconds.

Vanta Model VMR Low-Mg Detection in Al Alloys

$y = 0.9591x + 0.0062$
$R^2 = 0.9979$
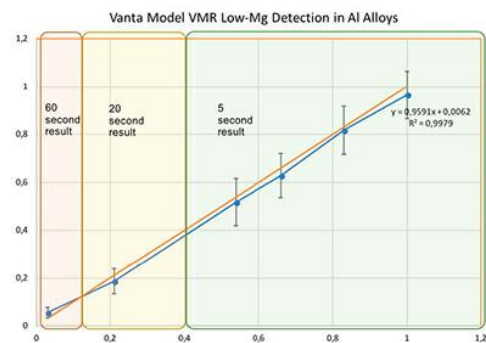
The same extended time results from the graph are presented in the tables below.

Results from 380 aluminum grade testing using 3 seconds of a 40 kV beam and 20 seconds of a 13 kV beam.

	Mg Concentration	Mg Error 1s	Al Concentration	Al Error 1s
1	0.131	0.052	85.452	0.076
2	0.211	0.053	85.373	0.076
3	0.246	0.053	85.378	0.076
4	0.235	0.053	85.373	0.075
5	0.182	0.052	85.404	0.076
6	0.131	0.052	85.344	0.077
7	0.186	0.052	85.378	0.076
8	0.164	0.052	85.441	0.075
9	0.211	0.052	85.330	0.076
10	0.162	0.052	85.446	0.075
Average	0.186	0.052	85.392	0.076
Assay	0.21			

Results from 1100 aluminum grade testing using 3 seconds of a 40 kV beam and 60 seconds of a 13 kV beam.

	Mg Concentration	Mg Error 1s	Al Concentration	Al Error 1s
1	0.058	0.023	99.067	0.033
2	0.044	0.023	99.120	0.027
3	0.060	0.023	99.113	0.028
4	0.046	0.023	99.082	0.033
5	0.051	0.023	99.148	0.027
6	0.060	0.023	99.051	0.032
7	0.046	0.023	99.109	0.027
8	0.071	0.023	99.049	0.032
9	0.050	0.022	99.088	0.027
10	0.072	0.022	99.037	0.033
Average	0.056	0.023	99.086	0.030
Assay	0.03			

A majority of aluminum grades have magnesium content at or above 0.4%. These samples can be accurately sorted with Mg levels quantified in just 5 seconds of testing with the low-energy beam (beam is on a total of 6 seconds). These results demonstrate that relatively short tests are all that are needed to accurately determine grade variants of low-Mg aluminum.
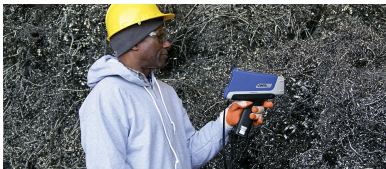
Related Product

Vanta

Vanta™ 휴대용 XRF 분석기 시리즈는 최신의 가장 강력한 휴대용 XRF 장치로서 현장에서 실험실 품질의 결과를 요구하는 고객을 위해 신속하고 정확한 요소 분석을 제공합니다. 분석기는 IP55 또는 IP54 등급으로 견고하게 제작됐으며, 가동 시간 향상과 소유 비용 절감을 위해 낙하 시험을 거쳤습니다.

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금속 스크랩 재활용을 위한 Vanta

재활용 및 스크랩 분류용 Vanta 휴대용 XRF 기기는 모델에 따라 비, 흙, 먼지를 견딜 수 있는 IP55 또는 54 등급이며, 아주 거친 환경의 고철 처리장에서 파손을 방지하고 가동 시간을 극대화할 수 있도록 미국 국방부 검사법(MIL-STD-810G)을 통해 낙하 시험을 거쳤습니다.

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