SciAps ApNotes

The Turbocharged X-300 and the SciAps Aluminum App

FAST Aluminum Sorting with Handheld X-ray...Yes, X-ray!

The X-300 is now available with a "turbocharged" option and an optimized aluminum alloy sorting app. SciAps' latest X-ray tube technology operates at a beam current of 500 uA in the low voltage setting. Other brand's are limited to 100 uA - 200 uA. The highly energized X-ray tube, combined with the optimized geometry of source/detector, yields 5x-10x more X-rays from magnesium (Mg) and silicon (Si). These elements are critical for fast, reliable analysis of the complex range of aluminum alloys.

The SciAps Aluminum App

The SciAps Aluminum App is a high-speed, high precision approach to aluminum alloy sorting never before possible with X-ray gun technology. The majority of aluminum alloys require concentrations of Mg and/or Si to be measured, along with transition metals V, Mn, Fe, Cr, Ni, Cu, Zn, Zr. The combination of turbocharged X-300 and Al App measure Mg, Si low concentrations in 2 seconds, in addition to the other metals. For example aluminum alloys with low Mg concentrations like 6063 and 3005 are separated from similar alloys (1100, 3003 respectively) in 2 second tests. The 6063/1100 mix-up is a well-known occurrence with traditional XRF technology.

How it Works

The Al App performs a 2 second test in an optimized setting (10 kV, turbocharged 500 uA current) to measure Mg, Si and typical transition metals. This setting, combined with the highly efficient tube and detector design, produces 5X-10X higher Mg and Si rates compared to other X-ray analyzers. The limit of detection for Mg is 0.3% and for Si is 0.1% in a 2 second test. For an aluminum alloy that requires higher atomic number elements such as Zr, Pb, Bi, Sn or Ag to be measured, the Al App automatically switches to a higher voltage setting for an additional 2 second test for these elements. The results is that the majority of both wrought and cast aluminum alloys can be reliably sorted in 2 second tests, and all aluminum alloys can be sorted in a maximum of 4 sec.

XRF TECHNOLOGY

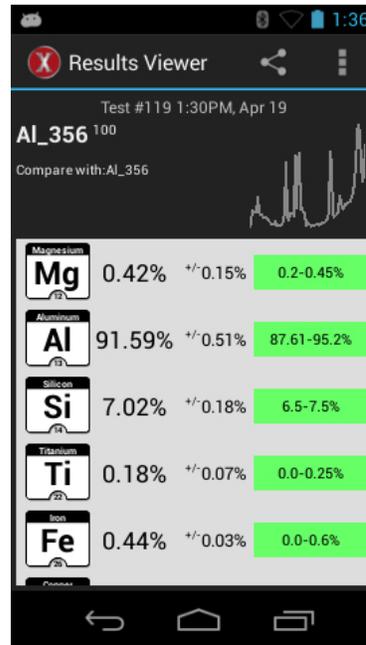**SciAps**

Performance Data

Some performance data is shown in Table 1 below. The Mg limit of detection is 0.3% with a 2 second test. The Mg detection can be reduced to 0.2% by extending the test time to 5 seconds. Repeat data on a 6063 (0.53% Mg) with 2 second tests is shown. Even at 2 seconds, the precision on Mg is quite good at +/- 0.07%. This easily allows, for example, a 6063 to be separated from 1100 which is virtually identical to 6063 except for Mg content. The 6063/1100 is a well known mix-up that occurs with traditional X-ray sorting.

Test Time	2 sec.
Limit of Detection (Mg), 2 sec. tests	0.30%
Typical Results on a 6063, 0.53% Mg, 2 sec. tests	
Test #	**Mg%**
1	0.56
2	0.55
3	0.62
4	0.54
5	0.64
6	0.44
7	0.50
8	0.41
9	0.51
10	0.62
Average	**0.54**
Std. Deviation	**0.076**

Table 1. Performance data

Here's what our customers are saying

"The new SciAps Al App sorts 99% of my 2000's, 7000's, 3000's, MLCs and cast alloys in 2 seconds. This rivals the speed of handheld LIBS or OES."

Summary

The combination of the SciAps X-300 and Al App offers a major breakthrough for aluminum alloy sorting. Nearly all Al alloys including those that require measurement of low Mg concentrations can be sorted in 2 second tests. This rivals the speed of LIBS and OES, while also yielding the exception performance on stainless, high-temp alloys and turnings for which X-ray is so well known.

Sort mountains of aluminum with 2 Second tests

Need more Information? Call us at 339-927-9455, or visit our web site www.sciaps.com to see our full library of applications notes and watch demo videos.