

New technology creates novel opportunities for handheld XRF



A new generation of advances in engineering has changed how metal alloys industries do business, and has increased the utility of handheld XRF for other industries as well. Today's updated instrument platform permits all XRF operators to easily collect and interpret more diverse and better quality data, and to make critical decisions faster.

A long-time weakness of handheld XRF had been analyzing many aluminum alloys that only differed by small amounts of magnesium, requiring 20 seconds or more to separate them. When SciAps introduced a more powerful X-ray tube, better geometric design and patented algorithms, users could measure magnesium as low as .25 percent in aluminum alloys in 2 seconds and separate similar alloys such as 2024/2014, 3003/3004/3005 and others in just a few seconds. Measuring magnesium and silicon at these levels and speeds now makes aluminum alloy sorting economical with handheld XRF.

These advancements in speed and accuracy benefitted fabricators, inspection companies, pipeline manu-

facturers, scrap recyclers and others who need metals analysis. They also enjoyed performance improvements associated with the weight reduction, slim design, and software upgrades.

The timing of these engineering innovations coincided with the availability of intuitive operating systems built on Android. Complete connectivity, test



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data management and reporting now provide fast, reliable analysis for the full range of compliance testing applications, including RoHS, Halogen Free, CPSIA, and lead paint in children's playgrounds, for one example.

More recently, SciAps introduced the world's first 55 kV tube in a handheld XRF, providing superior limits of detection. XRF users testing soils for hazardous substances or engaged in elemental exploration, production, and recycling are seeing measurable improvement in their ability to deliver high-performing results from handheld analysis.

With the steady march toward vehicle electrification and the green economy, for example, a 55 kV XRF holds a strategic position in meeting demand for both light and heavy rare earth elements, from exploration and analysis through processing and compliance. Operating the X-ray tube up to 55 kV means 10 times more X-ray energy is available, producing emissions from

the light REEs and the first two heavy REEs, gadolinium and europium, as well as highly sensitive yttrium analysis.

In the environmental soils industry, the 55kV advancement offers two times better cadmium detection, and generally yields superior limits of detection and precision for the subset of RCRA and EPA Priority Pollutant Metals,

including cadmium, silver, tin, antimony, and barium found in soils.

Novel applications continue to emerge. In a new bioscience application initially related to reducing the spread of COVID-19 on airplanes, a handheld XRF analyzer was used to verify the quality of a new surface coating that provides continuous protection against viruses and bacteria. The XRF could measure the depth or layers of material and chemicals in the sample, and the collected XRF data could be shared on a cloud-based management system for real-time monitoring, including test results to determine when re-application was necessary.

In summary, the past couple of years have marked a new era for handheld XRF. Advancements in technology and improvements to the design have increased productivity in established industries, and applications for high-demand and expanding industries are presenting newfound opportunities.