

QXR SERIES

Automated, High Volume
Sorting & Extracting Systems



COST EFFECTIVE RECYCLING WITH ADVANCED XRF TECHNOLOGY

- > Metal/Alloys
- > Glass
- > Plastics
- > Wood
- > Electronics
- > Waste-to-Energy



Recycling Solutions for Regulatory Compliance with:

ELV

RoHS

WEEE

ISRI Standards

Sustainable Resources

Recycling with Automated XRF

The QXR Series

Metal Recycling

Glass Recycling

Wood Recycling

Plastics Recycling

Electronic Waste Recycling

Waste-to-Energy Recycling

Why Innov-X / Products

USEPA

EU Landfill

RECYCLING WITH AUTOMATED XRF

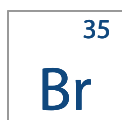
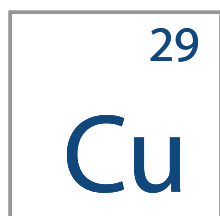
Good for the Environment. Good for the Bottom Line.

THE DESIRE TO PROTECT and preserve our environment is stronger than ever. We all know that recycling saves resources, reduces pollution and conserves energy in manufacturing industries. Innov-X also knows that the ultimate success of recycling requires cost-effective technology to meet demanding markets and customers, while complying with stringent government directives, such as ROHS, WEEE, and ELV.

Innov-X handheld X-ray Fluorescence (XRF) analyzers have been successfully employed for many years as a tool to assist recycling operations. These devices are good screening tools that are portable, accurate and measure material manually, one at a time, and take only few seconds per measurement. They provide a chemical composition analysis - the most accurate ID of valuable materials, as well as hazardous contaminants.

Innov-X now brings new life to your recycling process with the high volume QXR Series sorting and separating systems. Developed by Austin AI, Inc., an innovator of recycling technology, and licensed by Innov-X Systems, this EDXRF technology can perform nearly 100% of the applications that these hand-held devices can do, yet it is totally automatic (feeding, analyzing and sorting by material class); can process tons of material per hour, with individual measurement times under 100 milliseconds!

The QXR Series is the only high volume technology available on the market today that rapidly and accurately sorts via highly specific material chemistry, providing the fastest, most cost-effective solution to improve asset recovery and reduce waste for most processors of recycled goods.



THE QXR SERIES

System Overview

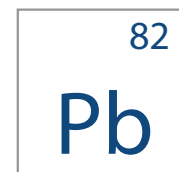
THE QXR SERIES is based upon a spectrometric technique known as Energy Dispersive X-ray Fluorescence (EDXRF). The technique employs X-rays to stimulate fluorescence, which provides elemental composition information. The energy of the fluorescence identifies the element(s) present, while the intensity indicates the concentration. The technique is ideal for real-time measurements of moving materials – being fast, non-contacting, and, in most cases, equally accurate on clean, wet, dry, dirty or coated material. EDXRF technology also offers the most advanced, elemental selective technology available. It can analyze multiple elements simultaneously and make decisions on multiple elements. EDXRF offers the flexibility to easily re-run material with new programs selected to separate based on different elements and/or criteria.

A typical QXR system is composed of a conveyor-mounted XRF spectrometer with an integrated material position sensing technology infrared (IR) camera. The camera determines the presence of material, while the XRF device determines the elemental composition. The data, through customer defined parameters, actuates one of a variety of downstream diverter mechanisms – all precisely synchronized via high performance PLC technology. The material is accurately directed to the appropriate collection bin or take-away conveyor.

*Sample QXR-M configuration
equipped with integrated feeder,
conveyor and separation mechanics*



Engineered with flexibility in mind, the QXR series operates in batch or continuous mode and allows quick, on-site software modifications by the customer to meet changing criteria and new market demands.



QXR Advantages

Focus on Flexibility

- Change sorting/analysis criteria to meet market demands

- Volumes from 1 to over 100 TPH; upgrade capacity on site

Ultra-rugged engineering

Low cost of ownership

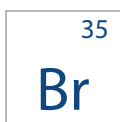
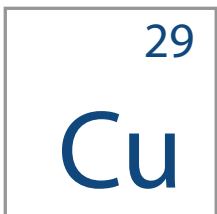
Superior local and factory service/support

Recycling Industry Firsts

Leading the Way in New Product Development

- 2000** First automated EDXRF, multi-decision alloy sorting system*
- 2003** First EDXRF stainless steel extractor*
- 2004** First automated wheel contaminant inspection system
(House of Metals, Canada)
- 2005** First system for sorting Aluminum scrap by grade*
- 2005** First glass ceramic extractor system for automatically identifying and extracting glass ceramic contaminants from cullet (Reiling Glas, Germany)
- 2006** First multi-channel system for extracting a wide variety of alloys from Zorba*
- 2007** First automated meatball (free Copper) extraction system for ferrous shred (Omnisource, Ohio)
- 2007** First automated EDXRF system for identifying and separating CCA (chromated copper arsenate) treated wood from clean wood (U. of Miami, Florida)

*customer available upon request





METAL RECYCLING

Increasing Asset Recovery for Shredder Operations

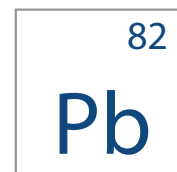
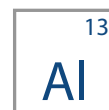
THE MAIN INTEREST for shredder facilities is in improving recoveries of high valued metals. Existing technology has been used for some time to separate light non-ferrous alloys from heavier non-ferrous alloys; however, over the past several years, there is a significant added value in performing additional separations to recover specific high value alloys. Examples of such are separating pure copper from copper alloys (brass and bronze) or wrought from cast aluminum.

The QXR-M is capable of processing economically viable quantities (many tons per hour) of NFR (non-ferrous residue) metals. It can accurately separate mixed metals with high accuracy by very specific alloy chemistry. Saleable product can be achieved in one pass – no reprocessing.

This same proprietary technology can also be used on the fluff line to clean up induction system output, by increasing the total metal content, removing copper from the stainless steel, and even grading the recovered stainless steel.

It integrates nicely with your eddy current and magnetic separation technologies, and can integrate or replace your induction systems, heavy media separators, flotation devices, hand sorting, etc. With capacities from <1 TPH to >100 TPH, and typical accuracies of 95% and above (material dependent), the QXR Series is the ideal solution for many applications within a high volume shredder facility:

- » Extract Cu (or Cu alloys) or SS from your heavies
- » Sort your Al product by alloy content
- » Clean and grade your induction sorter metals (SS and Cu)
- » Meatball extraction
- » Coin and precious metal extraction
- » Plastics, glass and more



GLASS RECYCLING

Identifying Contaminants in Recycled Glass

IDENTIFICATION AND REMOVAL of contaminants from cullet (furnace ready, recycled glass) is a growing concern for glass processors and manufacturers. One of the most common contaminants is glass ceramic – a combination of glass and ceramic that forms a heat resistant material found in many stovetops and special cookware. This material, along with other contaminants - leaded crystal, metals, and commingled colored glass – have significantly different physical properties than container glass cullet, melting at much higher temperatures to create inclusions (faults) in the final product, affecting glass stability and increasing breakage.

While metals and color contaminants can be removed via magnetic separators, eddy current systems and optical inspection equipment; glass ceramic and leaded crystal are problematic. The rate of contamination from these products has grown proportionally with market demand, increasing the quality assurance risk for glass manufacturers using recyclable materials.

The QXR-G, with the ability to detect glass ceramic and leaded crystal contaminants in the cullet processing line, selectively targets these difficult contaminants for removal. Installed systems have proven to be an efficient quality assurance tool in guarding against glass ceramic and leaded crystal contamination.

The QXR-G is placed before or after the crusher for optimal detection capabilities, before the contaminants are mixed and diluted by subsequent processing. It employs an automated spectrometer to scan a monolayer of cullet in free fall, moving over a slide-way or traveling on a conveyor belt. When unworthy materials are detected by the instrument, a diverter is activated to redirect the contaminants away from the processing line.

The system is not designed to replace existing separation technologies, but rather another safe guard to enhance cullet quality, to minimize rejected product and wear and tear on furnaces created by glass ceramic and leaded crystal contaminants.



29

Cu

35

Br

79

Au

17

Cl

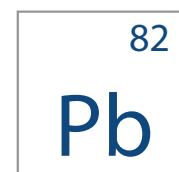
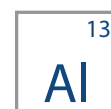
WOOD RECYCLING

Identifying Hazardous CCA

A KEY REQUIREMENT for wood recyclers is to quickly screen incoming wood product to identify Chromated Copper Arsenate (CCA) pressure treated wood – recently banned in the USA and Europe. Fast screening then allows these products to be removed. For the recycler, the economic benefit is the ability to sell the non-CCA wood product to incinerators as fuel, to be used in mulch or to be remanufactured into panel/particle board.

The QXR-W is the only technology currently available that is economically feasible to ensure all incoming material is screened to ensure acceptable finished product. That is achieved by rapidly and automatically screening ALL incoming material, one piece at a time, with powerful analytical XRF technology, engineered to perform very fast analyses with low levels of detection of all the elements listed as contaminants.

The QXR-W is a viable tool for minimizing the amount of hazardous waste (contaminated wood) and coincidentally maximizing the amount of legally recyclable material – a true liability/asset management tool. And, at 3 to 5 tons/hour of accurately screened product, ROI can be realized in 6-12 months.

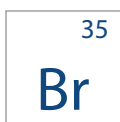
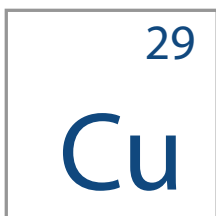


PLASTICS RECYCLING

Recovering Value and Minimizing Waste

MORE AND MORE automobile shredders are interested in recovering key industrial plastics found in eddy current separator waste streams. The value of these plastics is high – if they can be shown to contain low levels of RoHS bearing materials - fire retardants and heavy metals. The QXR-P is ideally suited to sort viable quantities of these plastics from eddy current waste. Recovering value, rather than paying for disposal, is an advantage for any shredder operation.

Additionally, the QXR-P is ideal for sorting post consumer plastics. It integrates easily over conveyor bottle chute to rapidly identify and remove PVC from PET recyclable material stream. Though XRF technology has been used for several decades in this regard, the Innov-X QXR technology provides significant improvement upon speed and accuracy of analysis. The power and versatility of the QXR-P is such that it can be installed in-line, downstream of the shredder to aide in production of a PVC-free material stream.



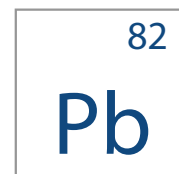
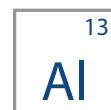
ELECTRONIC WASTE RECYCLING

Making It Profitable

THOUGH THE RECYCLING of electronic waste is becoming a hot industry, historically, this business has not been economically viable. Despite recent laws (WEEE, ELV, etc.), and general popular mandates, the key barrier to success for totally independent entities is the high cost associated with recycling e-waste.

E-waste is a mixture of engineered plastics, some ferrous and non-ferrous material, glass and some waste material that can either be land-filled or needs to be further treated (HazMat). Once reduced to processable piece size range, the QXR Series can be extremely useful to e-waste processors:

- » QXR-P sorts engineered plastics into RoHS and high value asset categories
- » QXR-M classifies non-ferrous metals into Al and Cu groups and/or more specific alloy types
- » QXR-G sorts CRT glass pieces by OEM chemistry specification



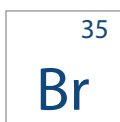
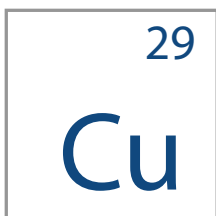
WASTE-TO-ENERGY RECYCLING

Reducing Landfill Waste & Improving Operating Costs

ALTHOUGH MANY Waste-To-Energy (WTE) facilities primary goal is to reduce the volume of Municipal Solid Waste (MSW) headed for landfill, there is significant value in refuse.

Facilities using pre-furnace processing equipment generate a revenue stream via material recovery. Plastics, metals and glass materials, when adequately separated can be resold to recycling organizations for sizeable profit. The identification and removal of these items also reduce furnace wear, emissions and landfill requirements for overall improvement in operating costs.

Austin AI's QXR-WTE was designed with WTE requirements in mind. The system comes embedded with programs for metal, glass and plastics separations; and is scaleable to fit the processing capacities of both small and large WTE facilities.



WHY INNOV-X

Commitment to Innovation

When you buy an Innov-X XRF system, you also buy a company dedicated to providing the most innovative, cost effective XRF solutions.

Customer Respect & Worldwide Service

Innov-X maintains a total commitment to customer service everyday. We never take your business for granted.

Manufacturing Excellence

Innov-X embraces a total commitment to manufacturing excellence. Innov-X will always provide a product to you that is of utmost quality and performance.

THE INNOV-X XRF FAMILY



Handheld: The world's first and most portable tube-based XRF analyzer



X-50 Mobile XRF Analysis



High Volume Sorting & Separating System



FOX-IQ Factory On-line XRF Analyzers



SEA-Mate Oil Analyzer