

Maximizing Profits with LIBS Sorting in Scrap Metal Recycling



Introduction

Integrating LIBS sorting technology into scrap metal processing offers significant and immediate advantages that directly impact profitability. With the rising demand for aluminum and the high cost of energy and carbon taxes, LIBS provides a pathway to enhanced profitability with an excellent return on investment (ROI).

Although the initial investment to upgrade the sorting system with LIBS sensors can be substantial, the technology enables scrap processors to generate higher purity products, thereby increasing profitability. In a competitive market, scrap recyclers must maximize profit to ensure a robust ROI. Continue reading to discover the benefits of adding LIBS technology to your scrap processing line and how it pays for itself by driving profitability through more precise sorting.

Benefits of LIBS for Scrap Sorting

LIBS sorting is an advanced technology that utilizes high-powered lasers to analyze the elemental composition of scrap metal with LIBS analysis being used to select sorting actions. By

precisely identifying and separating scrap, LIBS sorting allows recyclers to enhance the purity and quality of their products. This technology is particularly effective at sorting non-ferrous metals, which are challenging to distinguish using other methods, thus the initial focus on aluminum recycling.

LIBS offers numerous advantages for scrap metal sorting, driving profitability with excellent ROI. Below are some key benefits LIBS provides to the scrap recycling industry:

- **Increased Metal Purity:** LIBS provides precision sorting of metal alloys by composition, resulting in high-purity, melt-ready metal fractions. Cleaner output sells for higher prices and reduces energy costs associated with downstream refining.
- **Faster Throughput:** LIBS systems operate continuously at high speeds. Generally, the speed of the sort (e.g., 3–6 metric tons per hour) is limited by the material handling system. Using this technology eliminates labor-intensive manual sorting processes and increases overall plant productivity.
- **Reduced Contamination:** Through elemental analysis, LIBS minimizes contamination by accurately separating desired materials, ensuring compliance with quality requirements and reducing rejected products.

- **Lower Operational Costs:** Automation and efficiency improvements with LIBS reduce the total cost of metal sorting over time.
- **Better Market Position:** Recyclers using LIBS consistently deliver high-quality materials, building a reputation for reliability, gaining access to premium buyers and securing long-term supply contracts.
- **Environmental Benefits:** LIBS sorting reduces the energy required in secondary smelting by delivering melt-ready feedstocks, supporting circular economy goals and reducing carbon footprints.

Determining the ROI for Integrating LIBS Sorting

The selling price for recycled scrap is directly influenced by its purity. More precisely processed scrap yields a higher selling price. For instance, mixed car shredded scrap can range from \$550 per tonne for dirty contaminated aluminum to \$1580 per tonne for clean aluminum 6031 extrusions. Integrating LIBS into a recycling process line can offer substantial ROI by increasing material purity, improving sorting speed, and enhancing overall efficiency. The table below provides a detailed breakdown of key ROI factors:

ROI Factor	Description	Impact
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Increased Material Purity	LIBS provides precise composition differentiation (e.g., 6063 from 6082)	Increases product value
Melt ready products	LIBS provides melt ready products and therefore saves energy costs for smelters	Reduce energy costs
Higher Market Prices	Cleaner sorting yields higher-grade categories (e.g., Twitch over mixed aluminum)	Boosts revenue per tonne
Reduced Manual Sorting Costs	Automates or supplements labor-intensive processes	Reduces labor costs
Improved Throughput	Faster sorting than manual or handheld methods	Increases output volume
Reduced Contamination Risk	More accurate alloy separation lowers cross-contamination	Decreases rejections/rework
Regulatory and Compliance Benefits	No X-ray safety measures, monitoring or training.	Expands market eligibility
Lower Downstream Costs	Higher purity = lower melt loss, fewer smelter penalties	Lowers cost per processed tonne
Data and Traceability	Integration with quality and inventory tracking systems	Improves operational insights

To determine the ROI of integrating LIBS sorting into a scrap metal recycling process, recyclers should consider several key factors:

- **Initial Investment** - Initial cost varies based on the size, complexity, and capacity of the sorting system. The upfront investment must be weighed against long-term benefits and savings.
- **Operational Savings** - LIBS sorting reduces the need for manual sorting labor and diluting scrap stream with primary, and decreases the risk of contamination-related losses. These savings can significantly offset the initial investment and contribute to a positive ROI.
- **Increased Revenue** – Production of higher-purity metal fractions drives increased revenue. The potential increase in market prices for pure metals should be factored in the ROI analysis.
- **Payback Period** - A shorter payback period means a more attractive ROI. Recyclers should aim for a payback period that aligns with their financial goals and industry standards.

Implementing LIBS in a metal recycling line delivers ROI through increased alloy purity leading to higher resale prices, reduced manual sorting and faster throughput. Capital costs can be significant but the increase in product value, efficiency and potential energy savings often justify the investment within 1 to 3 years.

The ROI calculation strongly depends on the following parameters:

- Input material (e.g. Zorba vs. Twitch)
- Pre-process (e.g. XRT vs. DMS)
- Grain size distribution
- Desired composition of output material (e.g. specific composition like 6063 vs. group like 6xxx)

The Experts from Ocean are happy to help calculate the ROI for your specific metal stream and process.

Conclusion

Integrating LIBS sorting into a scrap metal process line offers significant benefits in terms of metal purity, efficiency and market positioning. By carefully analyzing the ROI and considering factors such as initial investment, operational savings, increased revenue, and payback period, scrap metal recyclers can make informed decisions that drive profitability and sustainable growth. Embracing LIBS sorting technology is not merely an investment in equipment; it is an investment in the future success of the scrap metal recycling industry.

References

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