# X-RAY TECHNOLOGY

# X-RAY SORTER
# Model XRF-BS

The X-Ray Back Scattering is a well-known underlying phenomenon to the X-Ray Fluorescence. The combined analysis of the two phenomena is at the basis of the SGM proprietary XRF-BS sorter and offers a more accurate and extended analysis for sorting different metals from each other including aluminum alloys.

## FLUORESCENCE

The Fluorescence is the physical phenomenon by which an atom emits a photon when struck by a high energy photon provided by a specific X-Ray source. The emitted photon is called fluorescence photon and its energy level is specific to every chemical element and can be seen as its chemical signature.

The X-Ray Fluorescence separation technology consists in the spectrographic analysis (intensity/energy) of the distribution of the fluorescence photons emitted by a material and captured by some XRF sensors called SDD (Silicon Drift Detectors) during a certain time frame called acquisition time (3-5 milli-seconds).

Traditional XRF sorters work only on the identification of heavy metals as those chemical elements are characterized by fluorescence photons with levels of energy that are high enough to be sensed by the SDD. This is not the case with light metals (Al, Si,...) for which the energy of the fluorescence photons is too low to be

## BACK SCATTERING

The X-Ray Back Scattering phenomenon is an underlying phenomenon to the fluorescence and is generally considered a fallasy in the XRF spectrographic sorting analysis as, instead of being represented by a few high intensity peaks of specific energies, it is characterized by a continuous distribution of low intensity photons.

Standard XRF spectrographic sorting analysis filters Back Scattering information by disregarding signals below a certain intensity.

XRF Back Scattering signals are also specific to the chemical composition of the material analyzed and, the combination of the peak analysis provided by the XRF together with the specific profiles of the continuous low energy signals provided by the Back Scattering, allow for a more accurate identification of heavy metals from each other but also for the sorting of the different aluminum alloys series from each other.

## PRODUCT HIGHLIGHTS

Sorting of Scrap Aluminum in different alloy series including 5000 from 6000.

Well performing in case of critical material surfaces (painting, dirt, ...).

Good accuracy as XRF-BS performs a continuous analysis. The continuity of the analysis and the absence of focal length constraint make it independent of the shape of the piece.

Capacity on aluminum scrap:
fraction 30 mm – 120 mm/1 ¼" – 5": > 2 ton per hour and per module.

| MODEL | ANALYZERS AND TRACKS | MATERIAL EJECTION STATIONS | BELT SPEED | CAPACITY (*) | LENGTH | WIDTH | HEIGHT |
|---|---|---|---|---|---|---|---|
| XRF-BS | No. 2 | No. 4 | 3,0 m/s - 9,8 ft/sec | 2-t/h/module | 13000 mm - 512" | 5000 mm - 197" | 4500 mm - 177" |

(*) fraction 30 mm – 120 mm/1 ¼" – 5"

# X-RAY SORTER - Model XRF-BS

**TYPICAL APPLICATIONS**

Sorting of aluminum scrap
in different alloy series
(2000, 3000, 4000, 5000, 6000 and 7000)