

Pellenc ST dry sorting processes

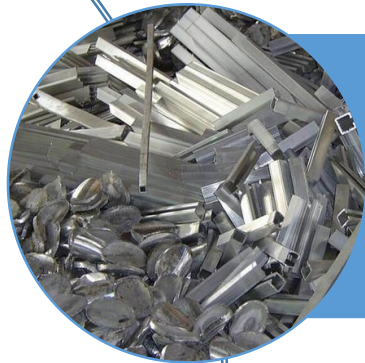
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1 | Company Snapshot





2 | Dry sorting applications



Aluminium sorting with XRT
and LIBS



Plastics sorting with XRT, NIR
and MIR

3 | Aluminium Sorting



Xpert



Applications

Zorba sorting (Aluminium vs Heavy Metals)

Light vs Heavy Aluminium Alloys

Brominated Plastics Sorting

Advantages

Dual-energy superposed for better detection

Auto-calibration Software integrated

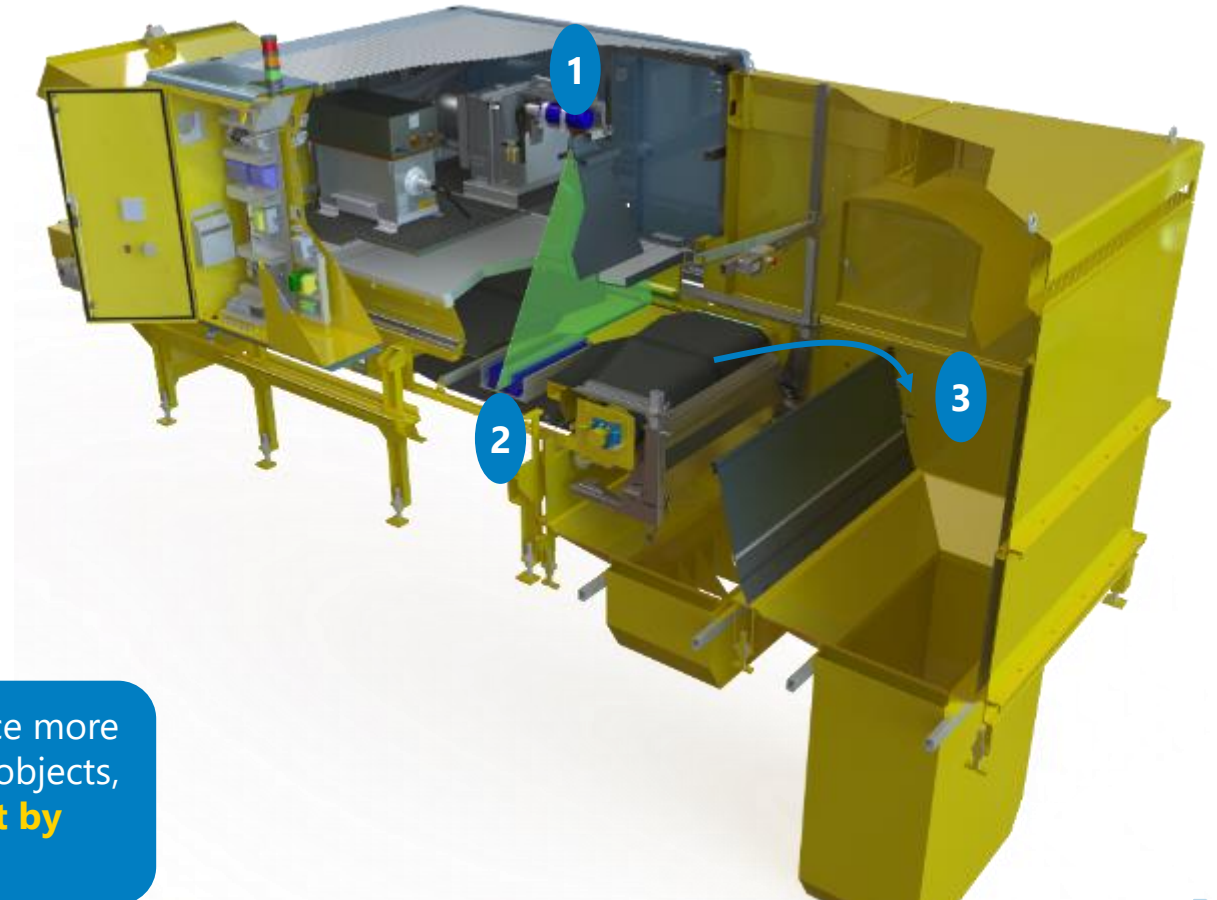
Continuous calibration in sorting

Working Principle

1 **X-Ray tube** located above the conveyor generating a beam penetrating each element

2 A **X-Ray sensor** located underneath the conveyor measures the X-Ray stream going through the elements.

3 Denser objects reduce more the X-Ray than light objects, this allows to **sort by density**



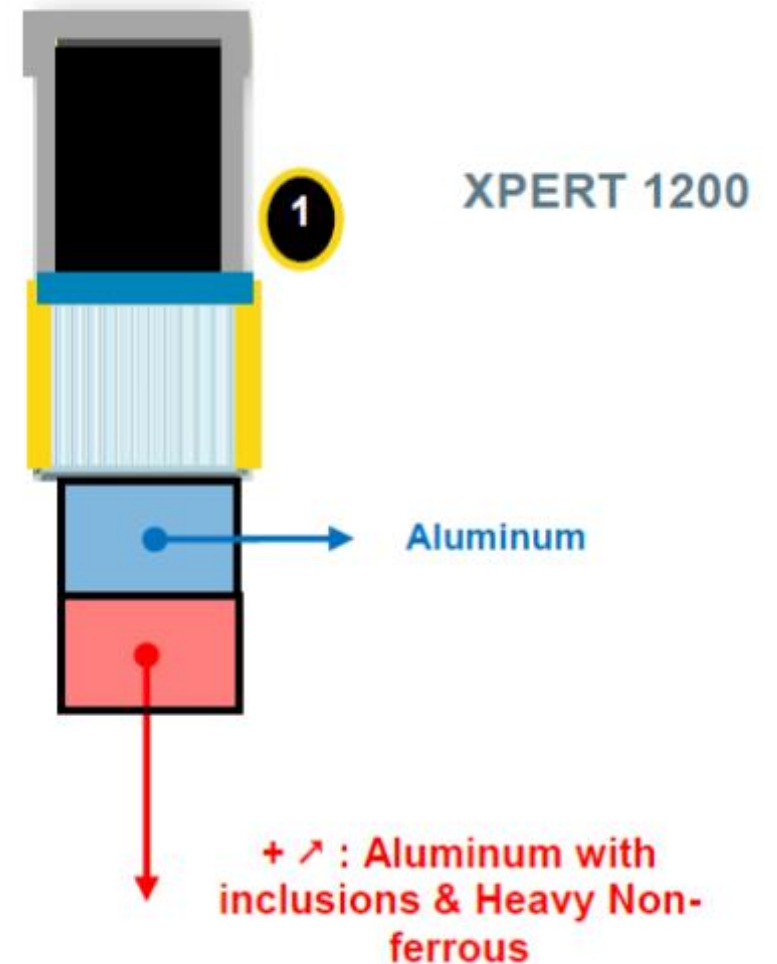
Sorting Scheme

Pass 1 – Aluminum concentration from a ZORBA Mix

Goal: Eject non-ferrous contaminants, including aluminum pieces with inclusions that could affect purity.

This pass is aggressive in order to:

- Eject aluminum with inclusions such as screws, internal pipe, etc... in order to avoid contamination
- Guarantee high purity of the aluminum fraction

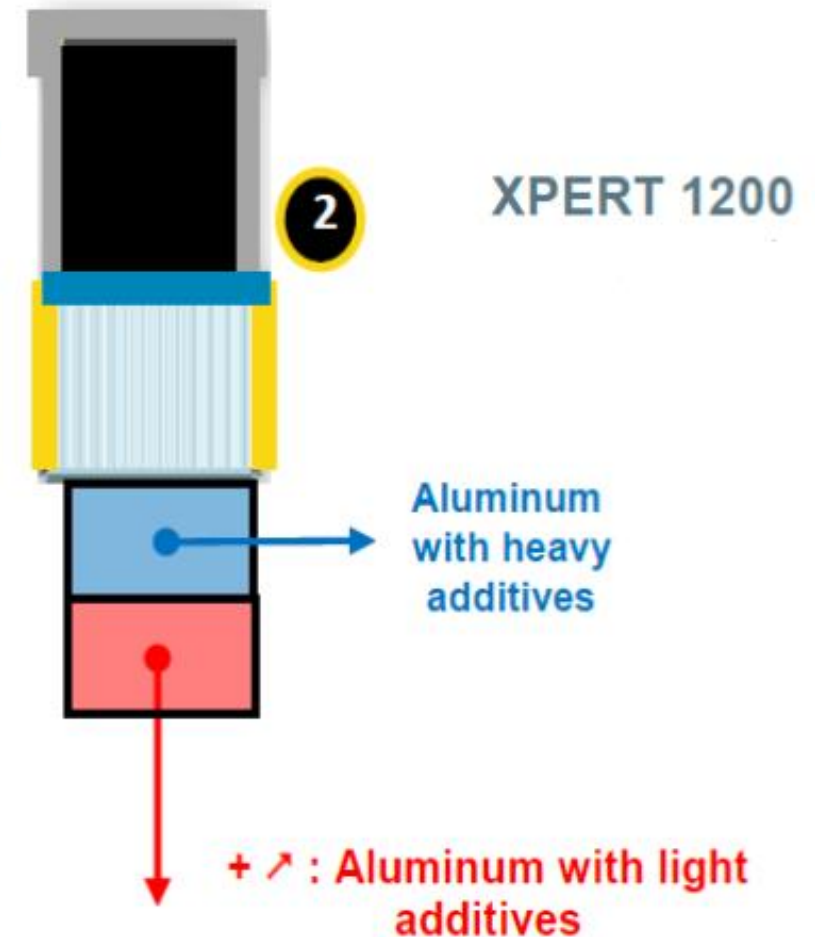


Pass 2 – Aluminum alloys separation

Goal: Separate Aluminum alloys based on the content of heavy additives (Cu, Zn, Mn)

For this pass we made the following choices:

- Eject light aluminum in order to avoid contamination with non-ejected contaminants during the 1st and 2nd pass.
- Non-ejection of the aluminum left with inclusions
- Reduce capacity to maximize purity





Pass 2 – Positive Output
Light aluminum alloys



Pass 2 – Negative Output
Heavy aluminum alloys

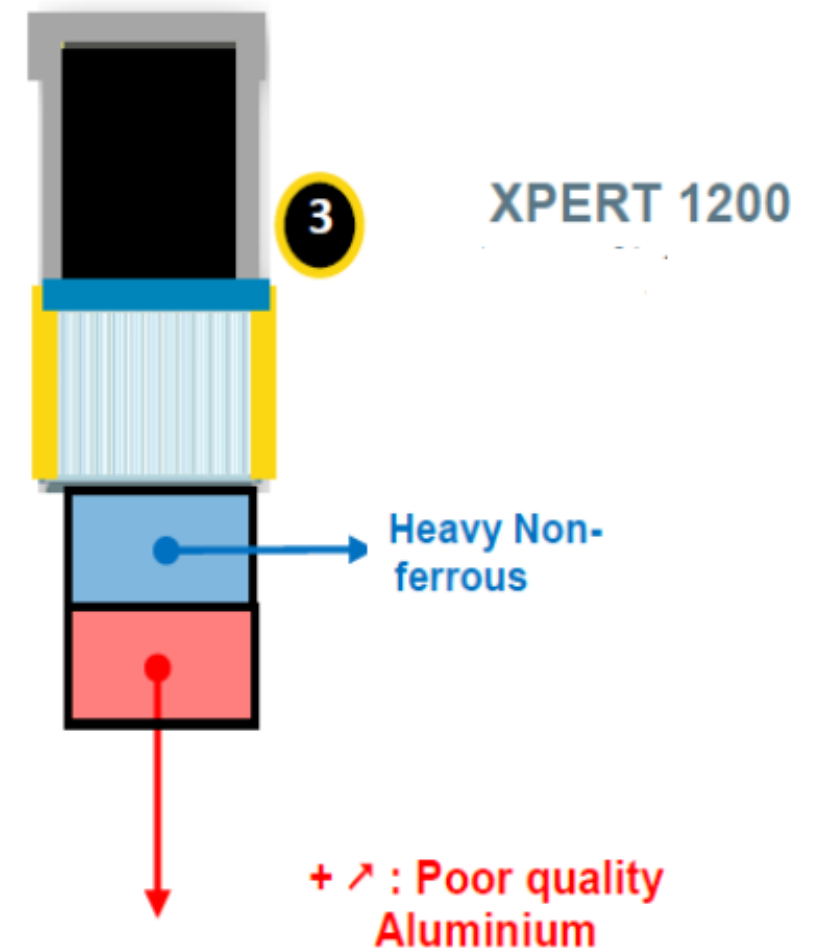
Our main focus is to have a pure (>99.5%) light aluminum fraction

Pass 3 – Aluminum recovery

Goal: Recover the Aluminum, including Aluminum with inclusions, which has been ejected during Pass 1.

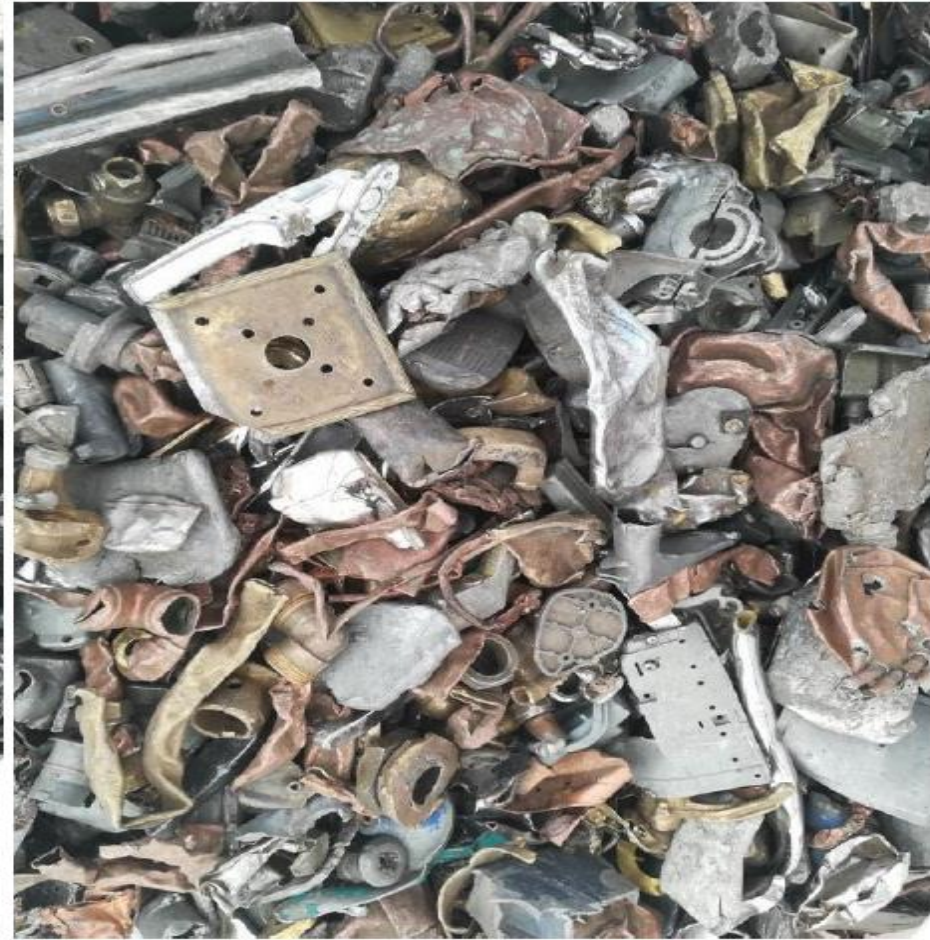
For this pass we made the following choices:

- **Accept inclusions in Aluminum that represent less than 10% of the object surface**





Pass 3 – Positive Output
Low quality aluminium (with inclusion)



Pass 3 – Negative Output
Heavy non-ferrous mix (Cu, Zn, Mn, Sn, SS)

Sanko Hamamatsu reference plant

- Customer processes mixed Aluminium scrap with a Kubota vertical mill
- The sorting plant consists in 1 ECS, 1 Magnet Pulley and 2 Xpert XRT machines
- Customer runs daily melt tests to check the purity of the material before shipment
- Plant capacity: 2.5ton/hr of Light Aluminium alloys

6063 Aluminum alloy standard quality													
	Standardd	Alloy	C u	F e	S i	M n	M g	Z n	N i	S n	T i	P b	C r
AL	ISO	6063	0.1↓	0.35↓	0.2-0.6	0.1↓	0.45-0.9	0.1↓	0.01	0.01	0.1↓	0.01	0.1↓
Melt-Analyzing test result(メルトテスト41-B)								Xpert Efficiency 91.2%					
Date	Lot No.	Input 20 mins	C u	F e	S i	M n	M g	Z n	N i	S n	T i	P b	C r
22/June	41-B	1002kg	0.015	0.185	0.444	0.01	0.36	0.007	0.004	0.001	0.01	0.001	0.004



LIBS - available in 2020

Applications

Aluminium Alloys sorting by Series

Sorting each heavy metal from Zorba fraction

Sorting of Magnesium and Silicium from mixed light Aluminium Alloys

Advantages

Better reading performance than XRF

Possibility of binary or multiple sorting

Fully integrated feeding system



4 | Plastics sorting

Stream n°1 – Screen plastics

Non-ejected



Ejected (approx. 30%)



Ejected plastics are highly brominated (>90.000ppm)

Minimal losses of Calcium Carbonate and Titanium Dioxide charged plastics

Non-ejected fraction did not contain any brominated plastics (100 pieces tested)



Stream n°2 – Electrical appliances plastics

Non-ejected



Ejected (approx. 25%)



75% of the ejected plastics are highly brominated (>70.000ppm)

Plastic losses are: Calcium Carbonate and Titanium Dioxide charged plastics and PVC

Ejected fraction also contained a small percentage of PCB and plastics with metal inclusions

Mistral+



Applications

Polymers sorting by type and colour

Purification of plastics from metals

Sorting of metals by colour

Advantages

Disruptive sorting performance

Versatile and future proof

Industry 4.0 compatible

Black Plastic Sorter



Applications

Sorting of Black Polymers from ASR LF-HF

Sorting of Black Technical Plastics

Advantages

First machine on the market to sort Black Polymers

Sorting of Black Technical Plastics, enabling circular economy for Black Polyolefins, styrenics and PET

Prototypes will be installed and tested in Q1-Q2 2019 for proof of concept and performance validation. Product introduction will be decided in Q3 2019 for a pilot production in Q4 2019.





Thanks for your attention

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