



MAGNETIC + SENSOR **SORTING SOLUTIONS**

STEINERT GmbH

Overview for

UniSort Technology

Customer Presentation

May 2019 / Update

01

Company overview



STEINERT provides innovative solutions for the separation of valuable materials, increasing customer profitability through higher recovery & reducing operational costs.

Secondary resource sector

Resource Recovery

Scrap

- Electronic Scrap
- Shredder Scrap



Waste

- Municipal Solid Waste
- Waste to Energy (WfE)
- Substitute Fuels



Other

- Incineration Slag
- Waste wood
- Demolition Waste



Primary resource sector

Mining

Industrial Minerals

- Silica, Feldspar, Limestone



Ores

- Iron ore
- Base metals (e.g. Nickel, Copper)
- Precious metals (Gold, Silver, Platinum)



Coal



Precious Gemstones

- Diamonds



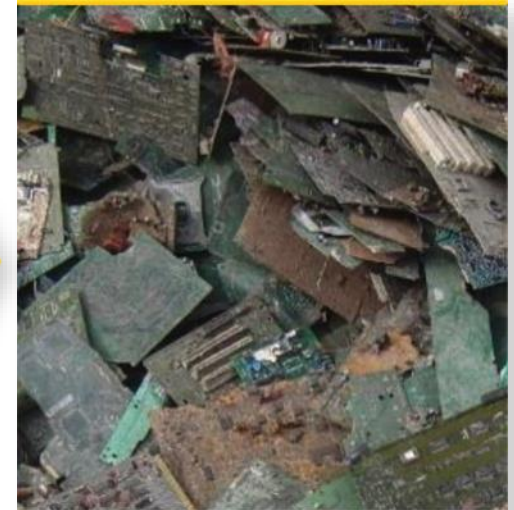
Test Center in Germany, US, Africa and Australia



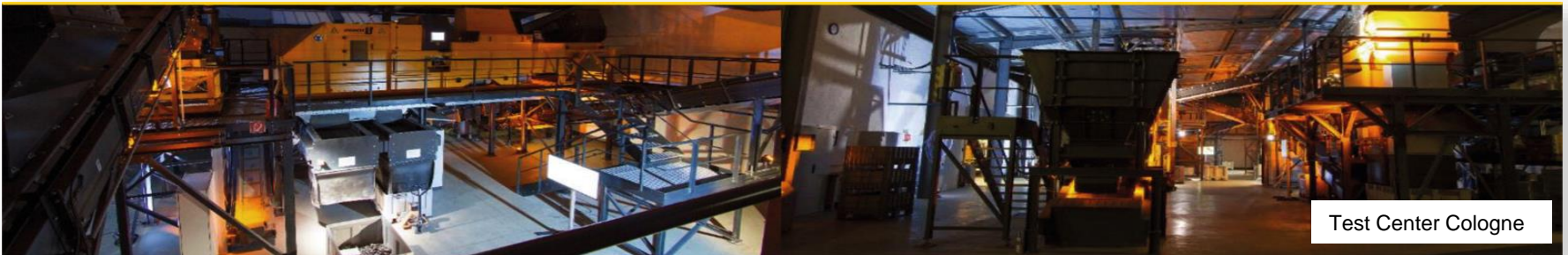
Customer material is sorted.



The team of STEINERT experts works directly with the samples of the customer's materials in order to come up with the most profitable solution.

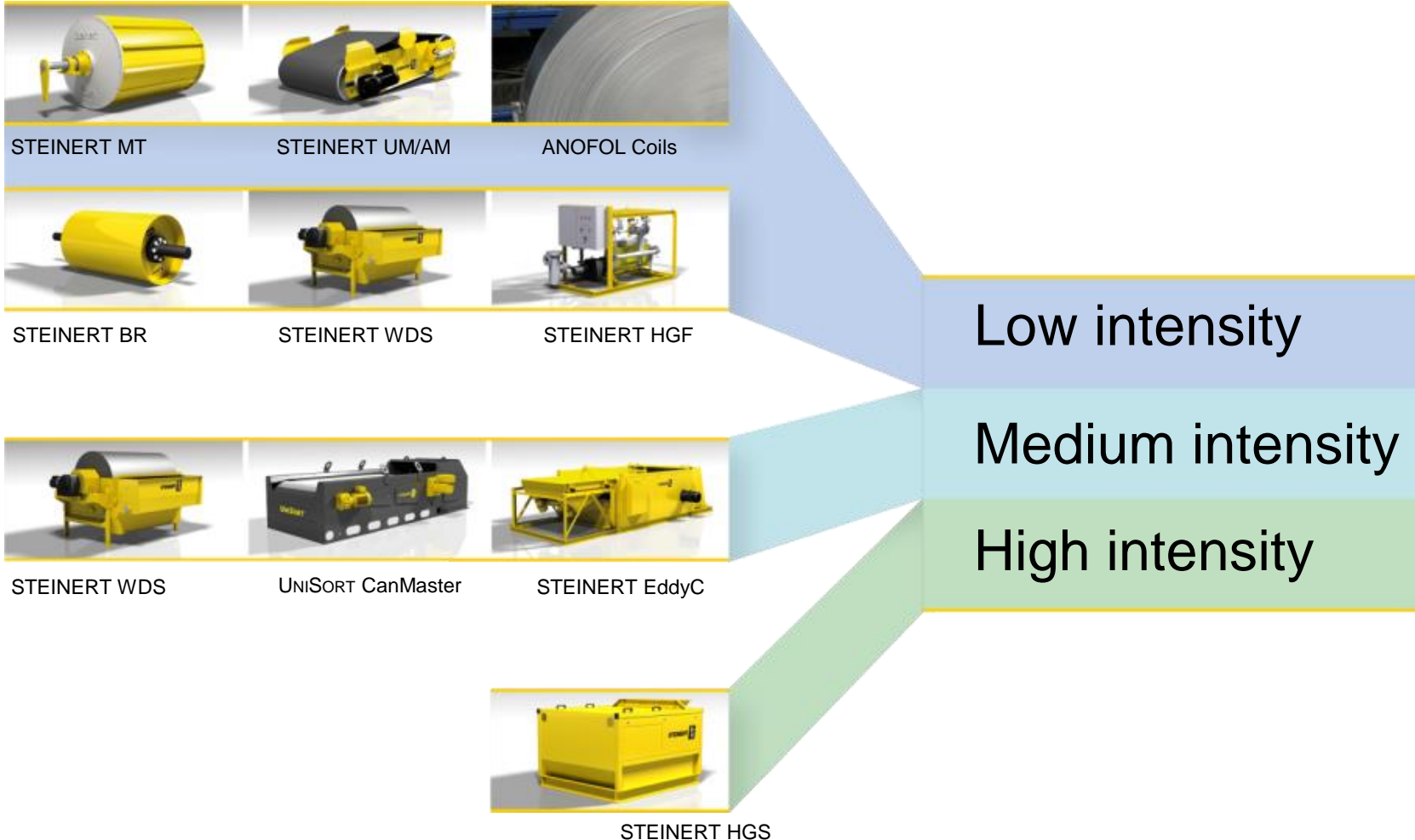


Through various tests and different technologies, the most efficient sorting result is achieved.

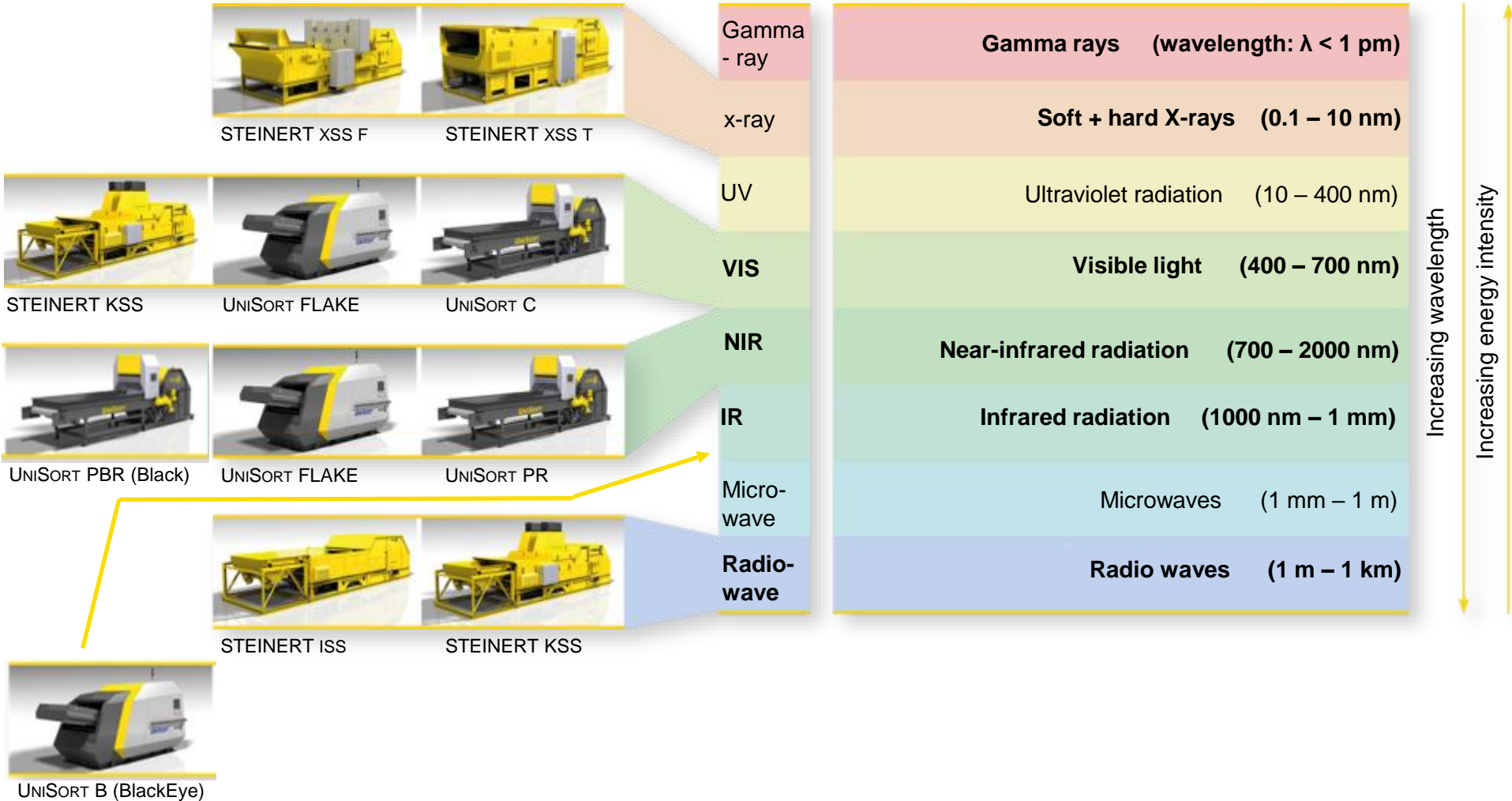


Test Center Cologne

Differentiation using magnetic field intensity



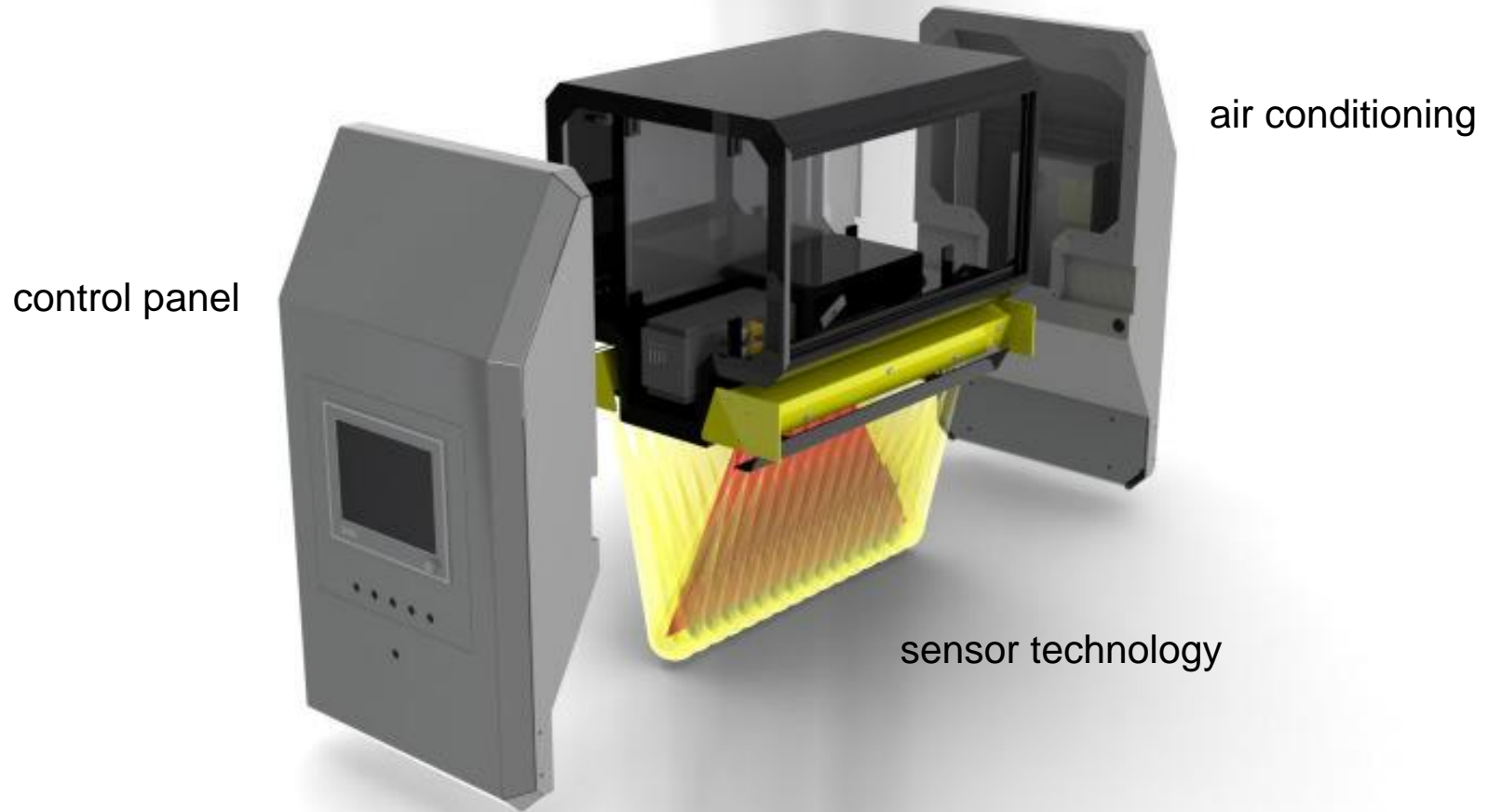
Differentiation using the electromagnetic spectrum for separation material by shape, colour and density, elements



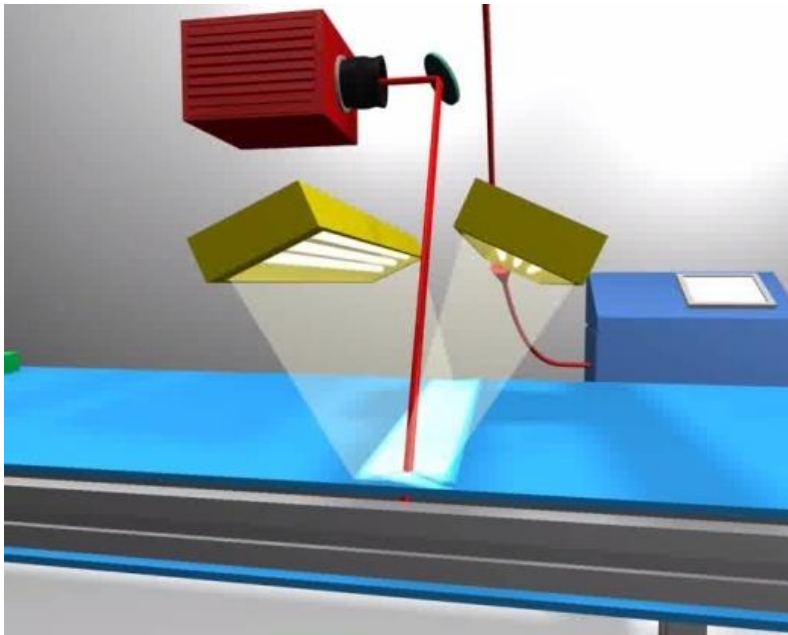
02

UniSort Technology

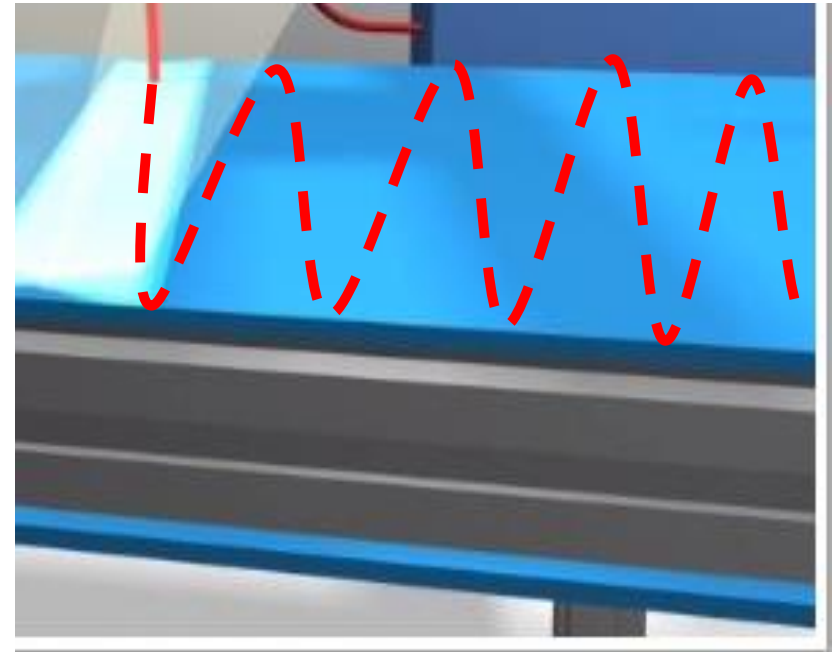
latest NIR camera technology – Hyper Spectral Imaging HSI



Point by point scanning process

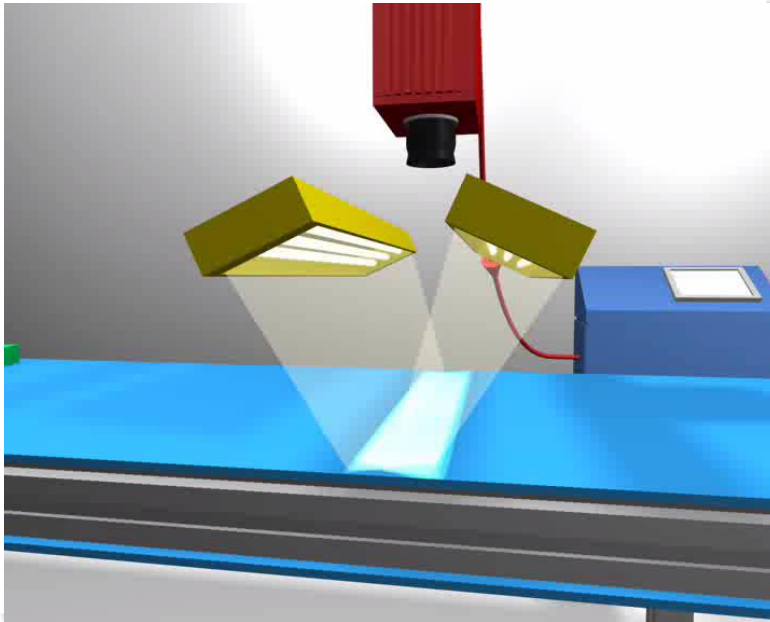


© I.A.R.

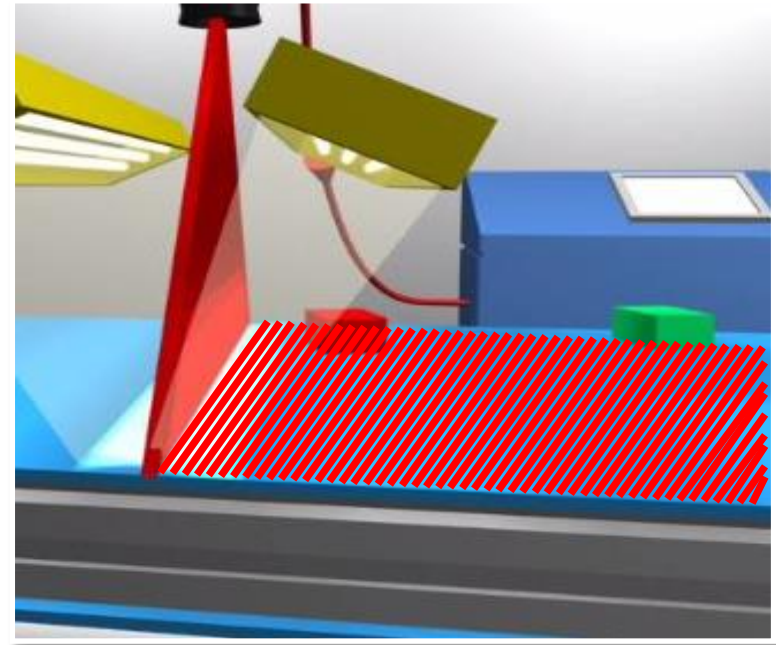


- Loosing time by looking only on one secret point
- Short time for checking the reflected spectra at the spectrometer
- Losses of light due to use of lens and optical fibres
- Relatively low optical resolution

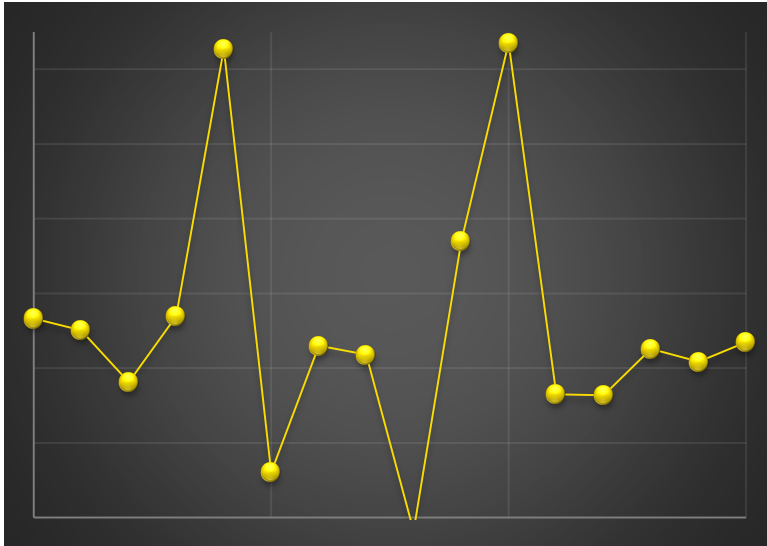
UniSort / Hyper Spectral Imaging



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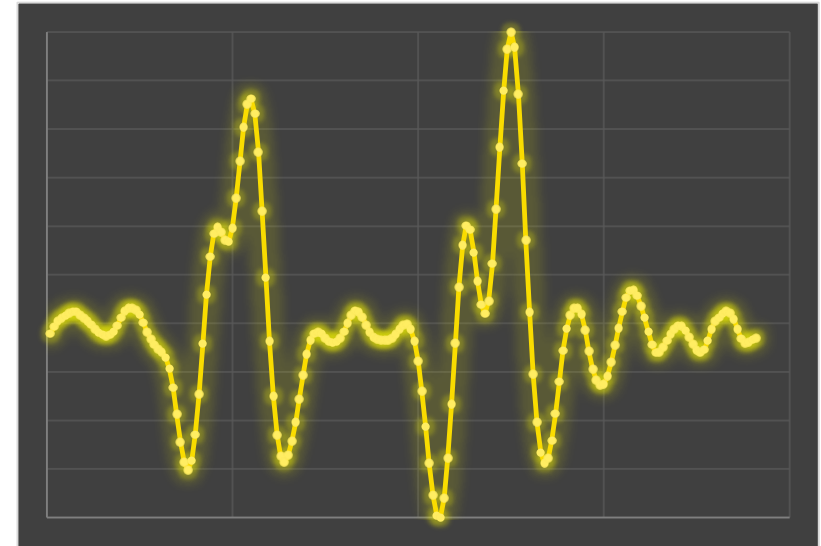


- Very high spectral resolution for NIR detection (with 256 measuring points)
- High optical resolution with 320 measuring points over complete belt



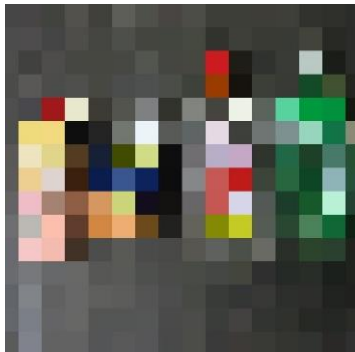
Standard Technology (spectral resolution)

- only **16** measuring points



UNISORT Technology (spectral resolution)

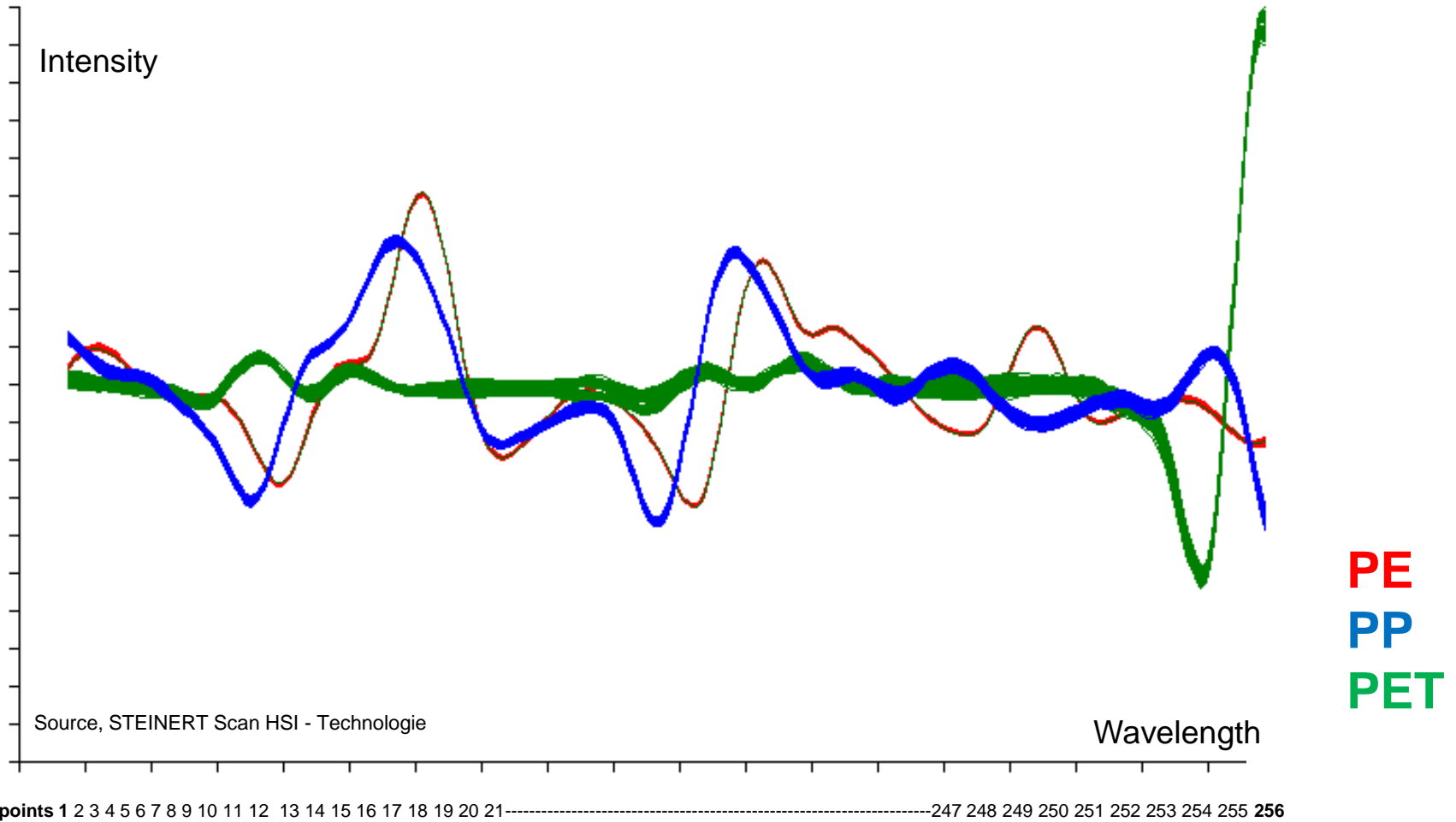
- **256** measuring points
- more information



Optical resolution

320 measuring points Messpunkte across the complete belt width
(each coloured block will provide the material info)



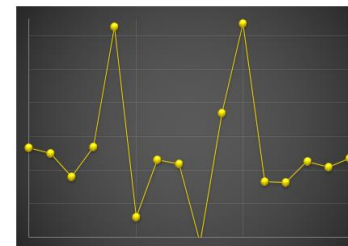


Advantages of HSI – Technology:

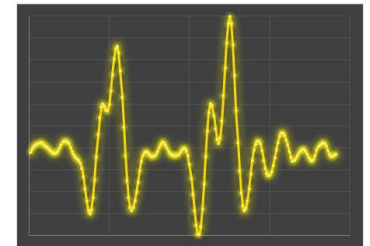
- Detection of whole belt width completely (line scan)
- The material is scanned and analysed in one area / scan level at same time
- Extremely high spectral resolution (NIR)
- Very high optical / spacial resolution
- Identification of mixed spectra and mixed material compositions
- No extra / additional control cabinet or steel works required
- No rotating or moving parts / optical elements
- Effective use of reflected light
- Compact design

→ **Excellent sorting performance**

Others



UniSort





application

- UniSort P Flake 4 ... 30 mm
- UniSort P 10 ... 300 mm

- UniSort B Flake 10 ... 40 mm
- UniSort PB 10 ... 300 mm





UniSort PR

Sensor:

NIR Sensor (HSI)
 CCD Sensor (Colour)
 Induction (Metal)

Function:

Separation of plastic material (e.g. PET, HDPE), Paper and Wood

- Technology:
 - Hyper Spectral Imaging (HSI) / NIR detection
 - Colour detection by CCD camera
 - Special designed software evaluates target
- Feeding material: RDF, mixed plastics, packaging waste, paper, wood, WEEE, etc.
- Resolution local: 3 - 6 mm
- Resolution spectral: < 3 nm
- Nozzle gap: 12,5 mm ... 25,0 mm ... 31,0 mm available
- Fraction size: from 10 mm up to 300 mm
- Light source: Halogen
- Sorting width: 1000 mm, 1400 mm, 2000 mm and 2800 mm





UniSort PBR (Black)

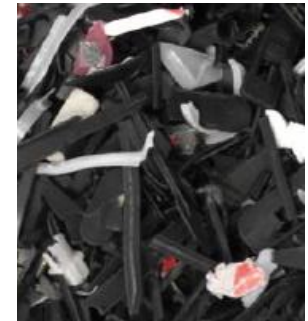
Sensor:
 NIR Sensor (HSI)
 CCD Sensor (Colour)
 Induction (Metal)

Function:
 Separation of plastic material
 (e.g. PET, HDPE), Paper and
 Wood

and additionally

BLACK and DARK COLORED
 Plastics and Material

- Technology:
 - Hyper Spectral Imaging (HSI) / NIR detection
 - Colour detection by CCD camera
 - Special designed software evaluates target
- Feeding material: RDF, mixed plastics, packaging waste, paper, wood, WEEE, etc.
- Resolution local: 3 - 6 mm
- Resolution spectral: < 3 nm
- Nozzle gap: 12,5 mm ... 25,0 mm ... 31,0 mm available
- Fraction size: from 10 mm up to 300 mm
- Light source: Halogen
- Sorting width: 1000 mm, 1400 mm, 2000 mm and 2800 mm





UniSort P/C Flake

Sensor:

NIR Sensor (HSI)
 CCD Sensor (Colour)
 Induction (Metal)

Function:

UniSort P Flake
 Separation of plastic material
 (e.g. PET, HDPE) and
 Flakes by type

UniSort C Flake

Separation of plastic material
 and Flakes by colour



- Technology:
 - Hyper Spectral Imaging (HSI) / NIR detection
 - Colour detection by CCD camera
- Feeding material: plastic flakes, coloured metals, e-scrap, etc.
- Special Development: Active Object Control (AOC)
- Resolution local: 2 mm (NIR), 5 mm (colour)
- Resolution spectral: 3 nm (NIR)
- Nozzle gap: 6,25 mm (top shoot valve bar, 120 high speed valves)
- Fraction size: 3 –30 mm for colour sorting, 5 –30 mm for NIR sorting
- Light source: Halogen (NIR) / LED (colour)
- Sorting width: 750 mm



UniSort B Flake

Sensor:

MIR Sensor

Function:

Separation of plastic material and Flakes by type particularly black and dark coloured plastics e. g. PP, PE, PS/ABS, PVC, PET

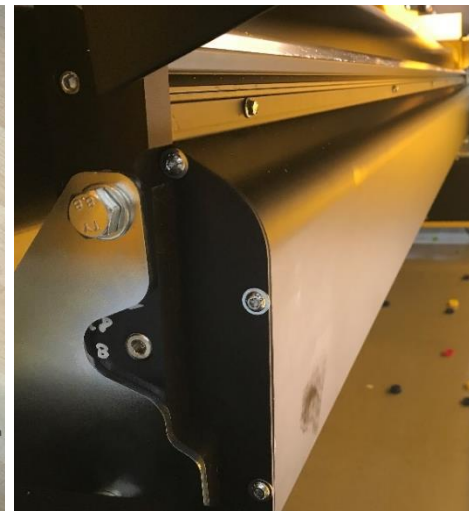
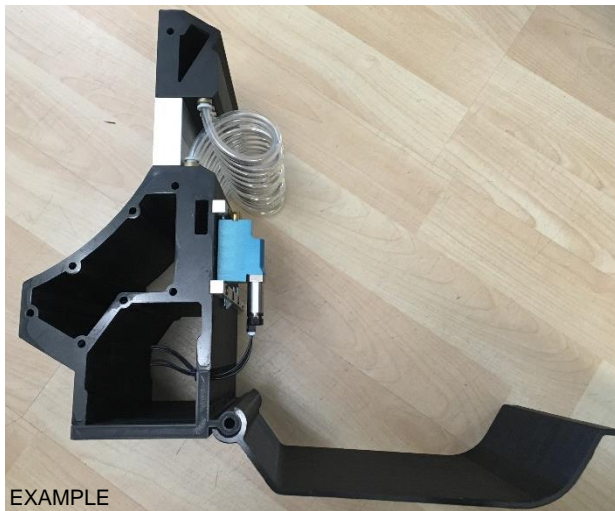
Technology:

- Special developed sensor and detection unit
- Feeding material: plastic flakes, mix of polyolefin, plastic mixtures, etc.
- Nozzle gap: 6,25 mm (top shoot valve bar, 120 high speed valves)
- Fraction size: 10 – 40 mm
- Sorting width: 750 mm



UNISORT – developments and latest state of the art

- Design of valve bar
 - New valve bar design optimised for maintenance
 - Proven syphon tubing
 - Plug-in valve interface
 - Nozzle grid on lee side of valve bar



UNISORT – developments and latest state of the art

- Design of light bar



- New light bar design optimised for maintenance
- Snap locks for easy access to bulbs
- No loosen parts



UNISORT – developments and latest state of the art

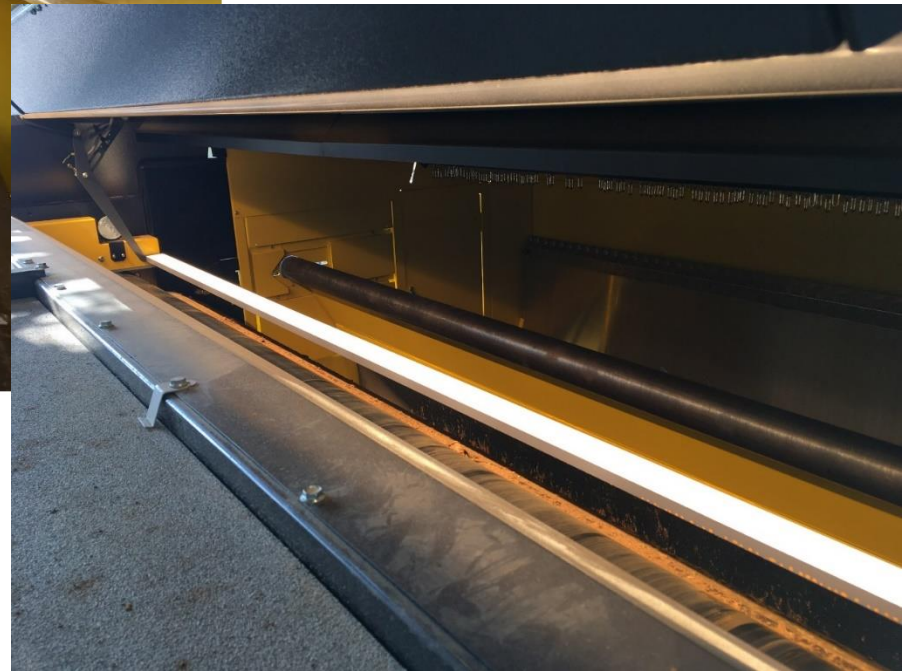
- Automatic white balance calibration



- New automated design optimised for maintenance
- No loosen parts
- Less time required for white balance calibration
- Different units can run the calibration simultaneous
- Automatic white balance calibration keeps the units running on high level sorting performance with high availability

UNISORT – developments and latest state of the art

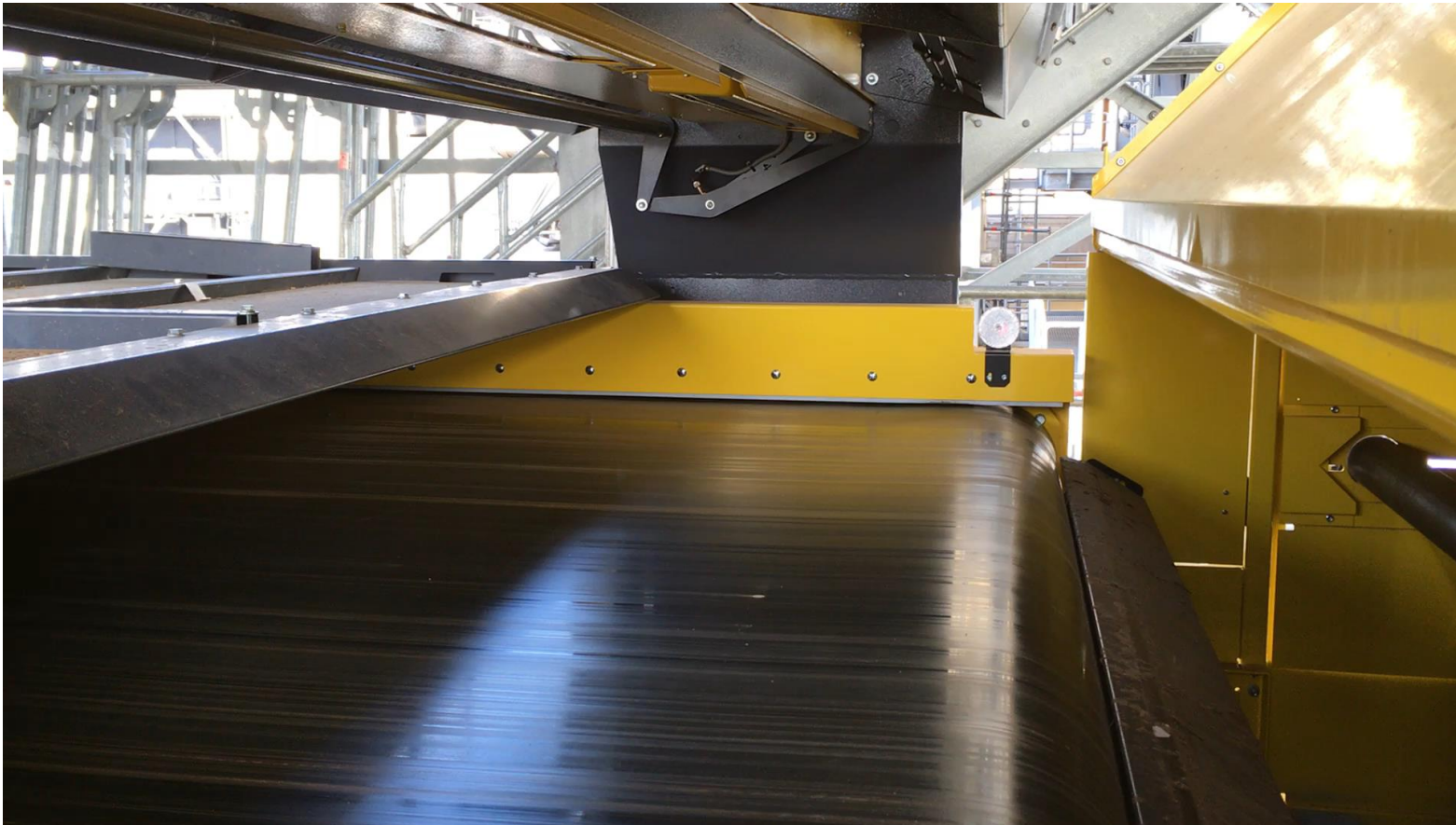
- Automatic white balance calibration



UNISORT – developments and latest state of the art

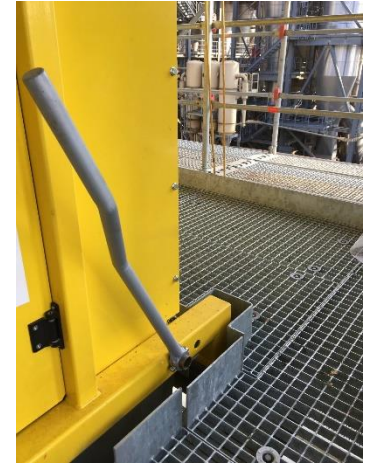
- Automatic white balance calibration

(click into the picture to start the movie)



UNISORT – developments and latest state of the art

- Maintenance flap inside discharge hood



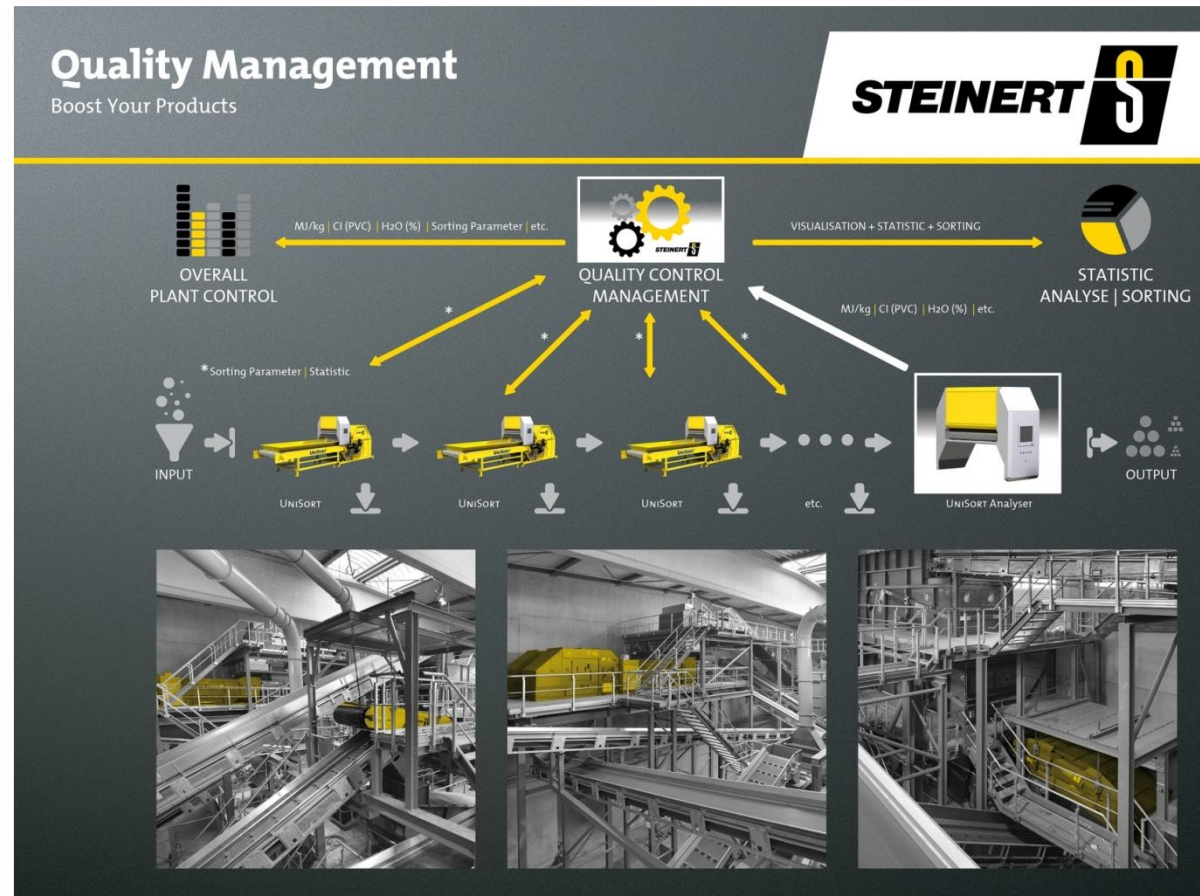
UNISORT – developments and latest state of the art

- Dust extraction unit on top of discharge hood



UNISORT – developments and latest state of the art

- Live data transmission
- Live process analysis
- Central data base



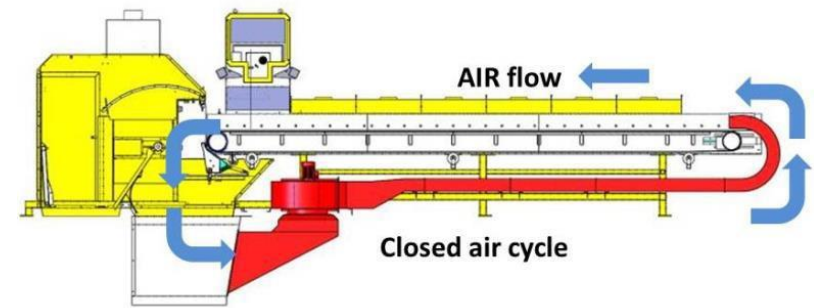
UNISORT Film – Efficient Light Material Sorting

On account of its light weight and high space occupancy, plastic film sorted on a standard sorting machine is hampered by restrictions and reduced conveyor speeds.

The AOC system applied to the UniSort Film facilitates considerably higher throughput rates combined with optimal sorting quality. This is the only way of sorting light and floating objects such as film on feasible lines at all.



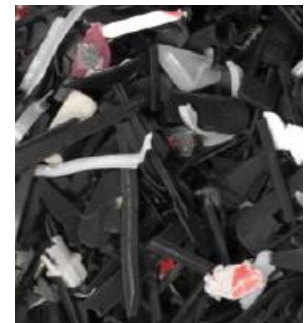
- AOC with special developed ventilation system and airflow
- evens very light material stays in stable position on fast running conveyor belts during transportation, detection and ejection procedure



UNISORT Black – Efficient Black Plastic Sorting as additional product

Black and dark colored plastics are usually not detectable with standard NIR technology.

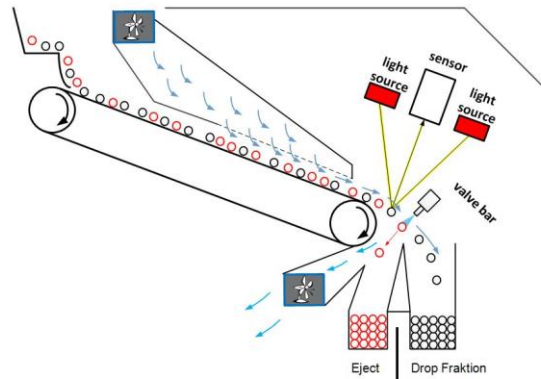
The UniSort PB (Black) is able to detect and sort black and dark colored plastics as a separate product from a material stream due to use of HIS-Technology.



UNISORT Black EYE – Efficient Black Plastic Sorting by type into specific groups

Black and dark colored plastics cannot be sorted into their specific groups / types with standard NIR technology.

The UniSort B Flake (Black EYE) is able to detect black and dark colored plastics and sorts these items by type into the specific groups (PE, PP, PS/ABS, PVC, PET) beside the NIR-detectable ones.



UNISORT PR – Efficient PET bottle / PET tray sorting

PET trays influence the quality of PET bottle products in a negative way as they have different smelting points. As the PET trays causes problems during extruding process of PET bottle granules and flakes they need to be removed from the PET product first.

The UniSort P (Standard unit) is able to distinguish between PET bottles and PET trays and sorts these items by type into different groups.



UNISORT PR – Efficient Silicon Cartridge Sorting

Already low values of silicon contaminates other plastic products. Often the silicone cartridges need to be removed by hand pickers from a plastic product during quality control.

The UniSort P (Standard unit) is able to detect silicone cartridges by spectral analysis and removes these “impurities” from a plastic product or leaves the “impurities” in the rest product.



UNISORT – Analyser

Particularly SRF material streams need to be analysed continuously as they need to reach specific quality values in regard of moisture, calorific value and CI content (PVC).



- Online analysis of material
- Data transmission to overall plant control simultaneous to detection procedure





Thank you very much for your attention