

SPECTRAL IMAGING MADE EASY

...IN RECYCLING

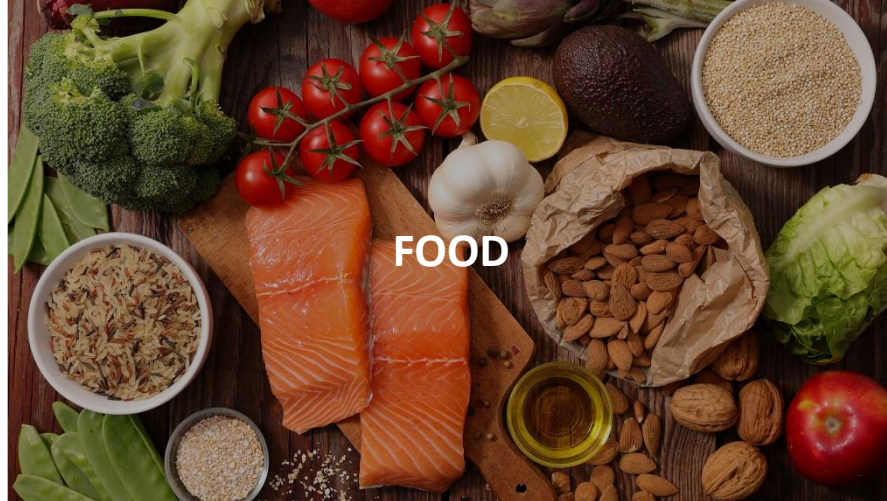


Gerhard Stanzel – SPECIM product specialist @ Konica Minolta Sensing Europe

2022 EPIC Online Technology Meeting on
Plastic Sorting, Recycling and Waste Management



AGRICULTURE & VEGETATION



FOOD



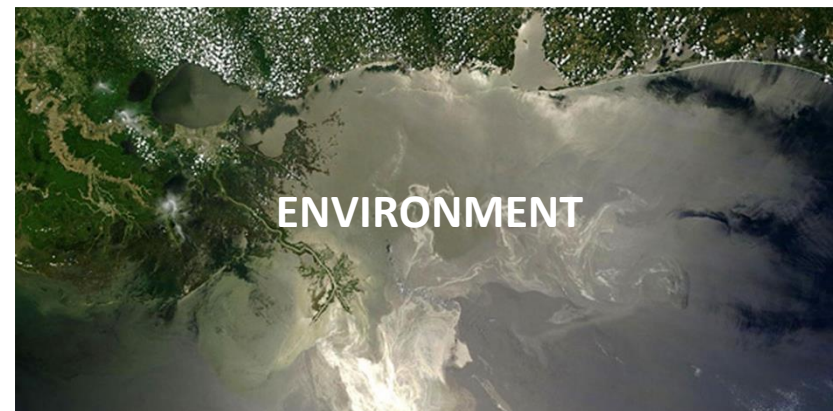
WASTE & RECYCLING



GEOLOGY

SPECIM

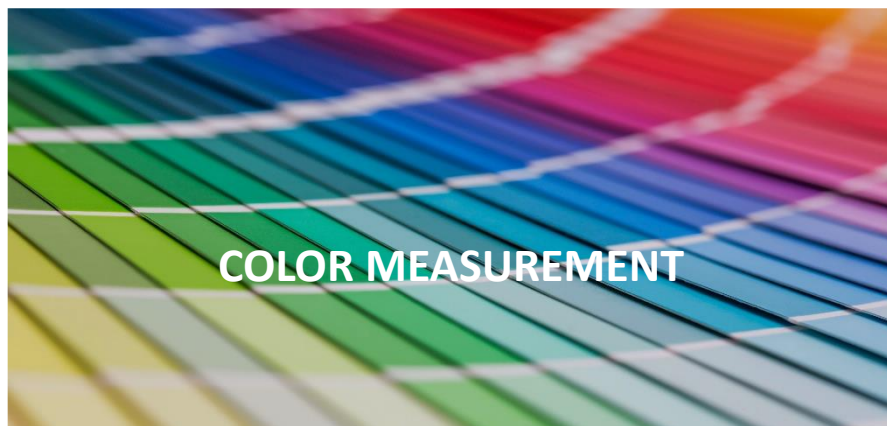
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ENVIRONMENT



HEALTHCARE & PHARMA



COLOR MEASUREMENT

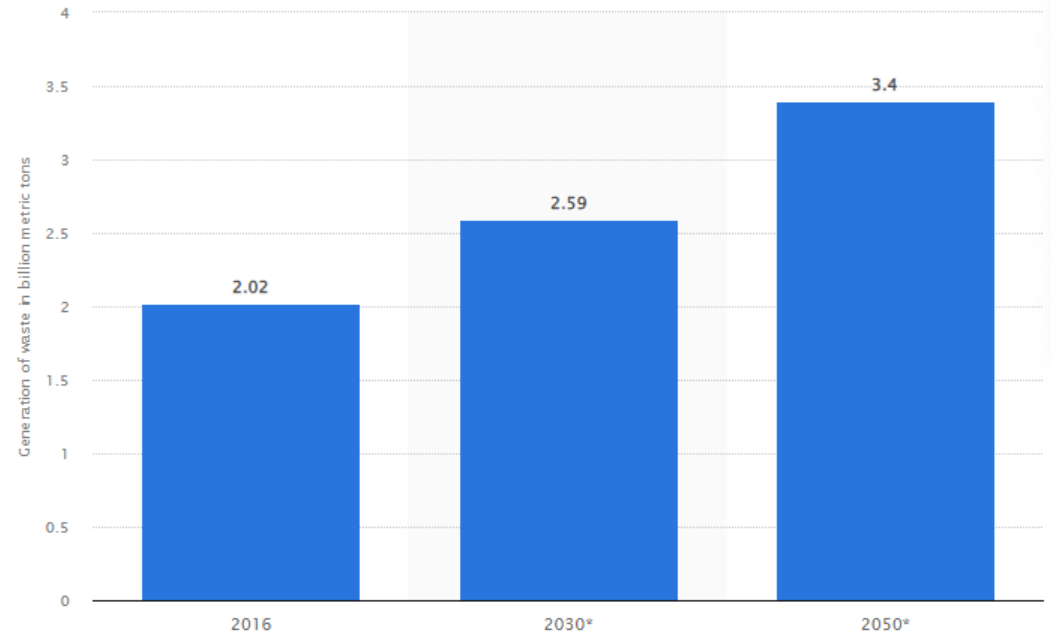


DEFENCE & SECURITY

WASTE IS A GLOBAL PROBLEM

“Humans generated over 2 000 000 000 000 kg of solid waste in 2016.”

“The United Nations says the world produces around 300 million tons of plastic waste every year. That's equivalent to the weight of the entire human population.”



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Projected generation of municipal solid waste worldwide from 2016 to 2050 (in billion metric tons)

MUNICIPAL WASTE MATERIALS

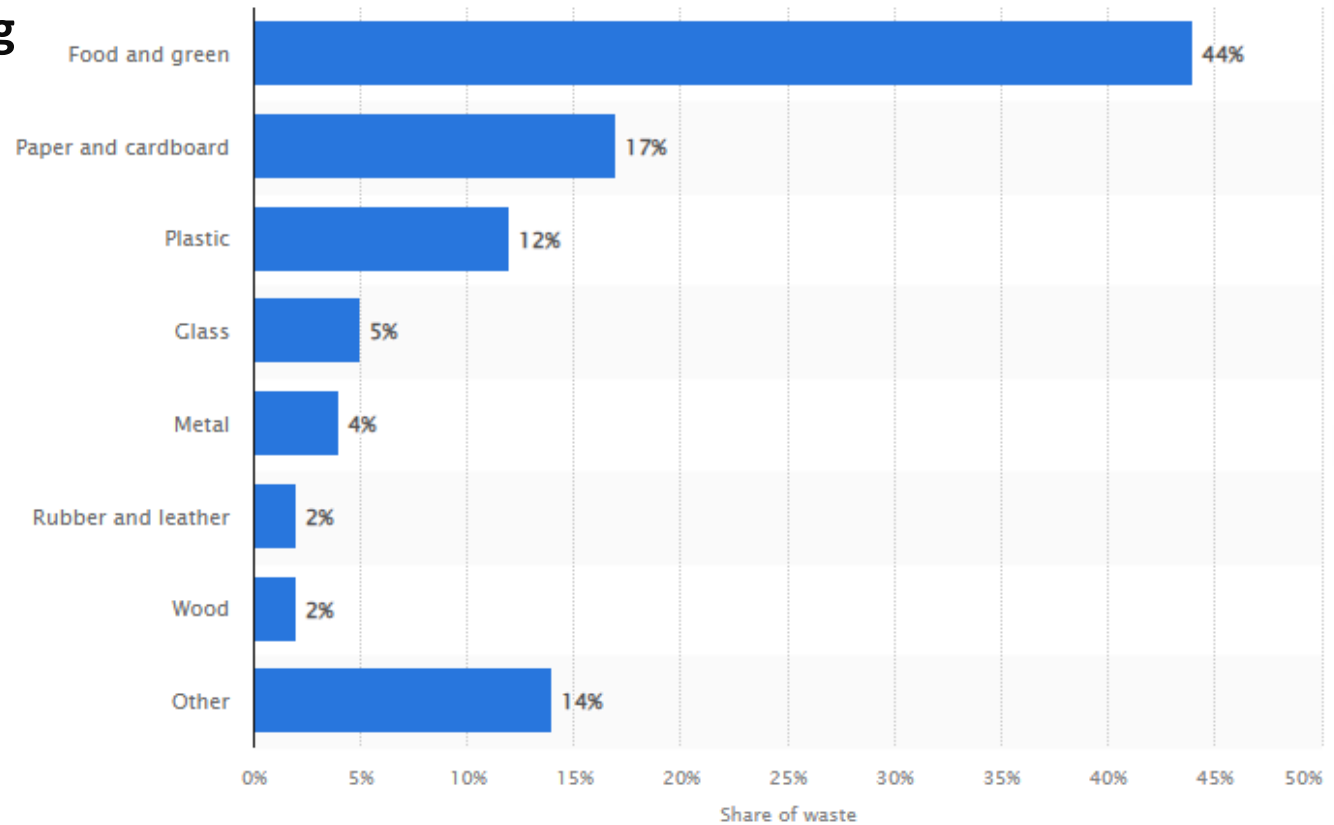
Distribution of municipal solid waste generated worldwide in 2016, by material type

Hyperspectral Imaging is an important sensor technology in recycling delivering chemical material information in the major waste areas.

SPECIM FX cameras can be used for

- Plastic
- Paper and Cardboard
- Food and Green
- Metal
- Wood
- Textiles, Leather

- Construction and Demolition waste

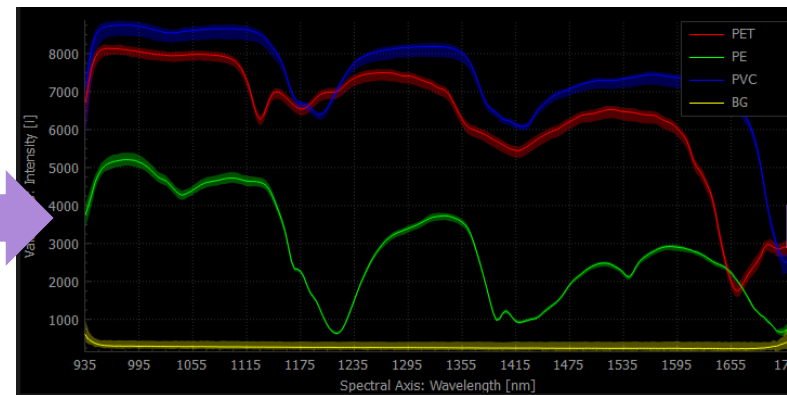
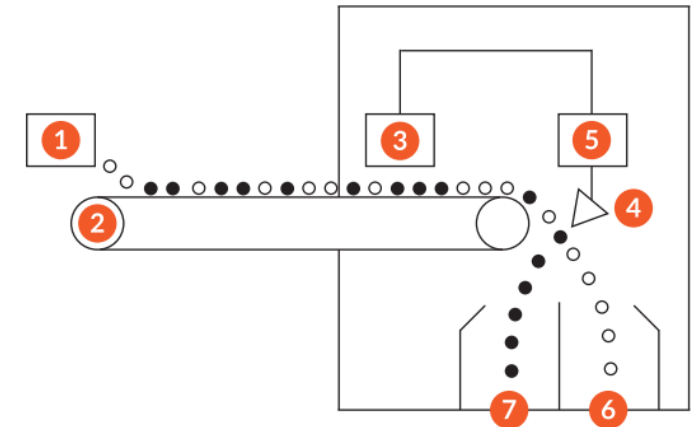
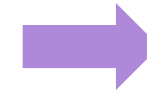
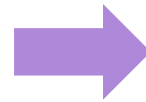


Different chemical compounds → Distinct spectra in near infrared (NIR)

Spectral imaging:
The most powerful camera technique to
chemically identify and sort materials

Operating principal

- 1 Feeder
- 2 Conveyor belt
- 3 FX17 camera
- 4 Valves/nozzles
- 5 Computing unit
- 6 Qualified
- 7 Disqualified



ALSO FOR BLACK PLASTICS

SPECIMONE

BREAKTHROUGH IN BLACK PLASTIC SORTING



Specim FX50 is the only hyperspectral camera available on the market covering the full MWIR spectral range 2.7 - 5.3 μm that is required with black plastics. This allows fast and reliable sorting of:

- Black plastics such as PS, PE, PP, ABS and PVC
- Certain additives, like flame retardants
- Rubbers
- Non-black plastics and rubbers

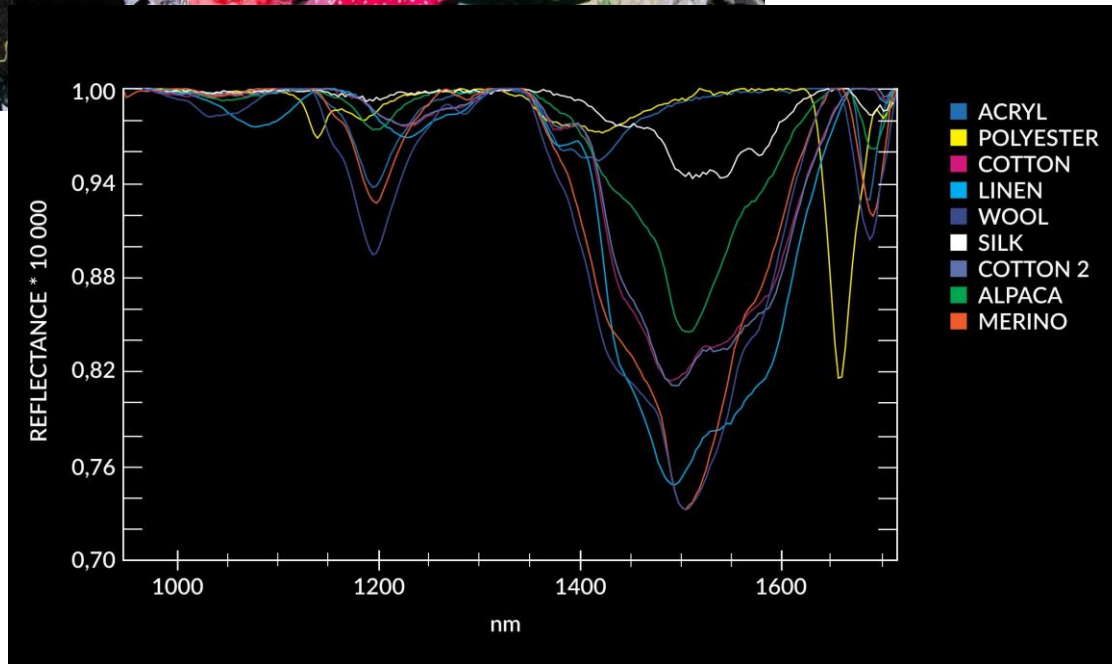
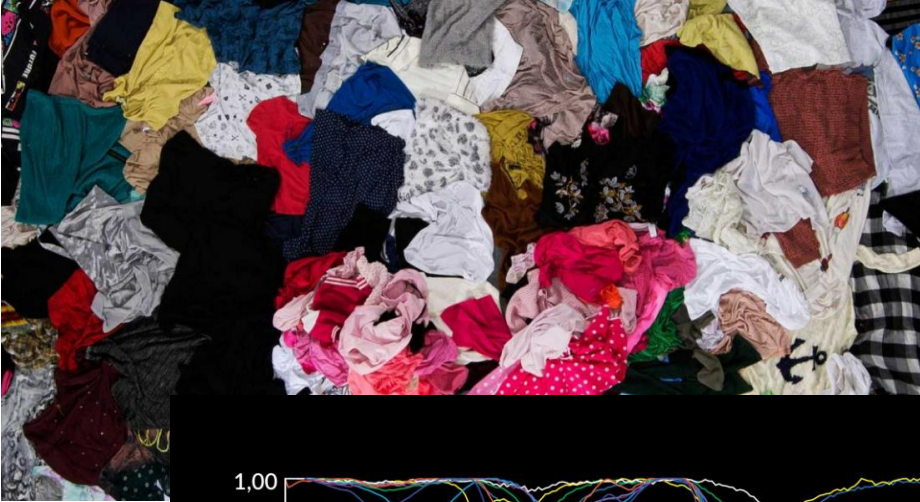
The fast frame rate of the Specim FX50 combined with its high spatial resolution allows 300 kg of 2x2 cm plastic flakes to be sorted per minute (a 1-meter wide conveyor belt running 2 m/s). This high throughput makes the Specim FX50 a competitive option for the recycling industry where cost is a major concern.



SPECIM FX50:

- Full spectral range - for sorting most of the plastics
- Temperature stabilized casing - to keep accurate results within a harsh industrial environment
- Small - Flexible and easy installation
- High frame rate - for high sorting throughput
- Easy integration - communicates with commercial analysis softwares through standard interfaces

TEXTILE RECYCLING



New EU guidelines for the recycling of fabrics and textiles have been in force since 2018.

The aim of this very important project for the environment is to **reuse all textiles worldwide from 2025.**

Hyperspectral Imaging solutions from SPECIM offer the technical requirements for successfully achieving this ambitious goal.

CONSTRUCTION WASTE RECYCLING



Construction and Demolition waste recycling is another area in which SPECIM hyperspectral cameras are used. Several companies provide systems able to **handle very big and heavy materials**.

Sensor Fusion is typically used to **combine RGB, 3D and hyperspectral** data which is classified using an **AI engine**.

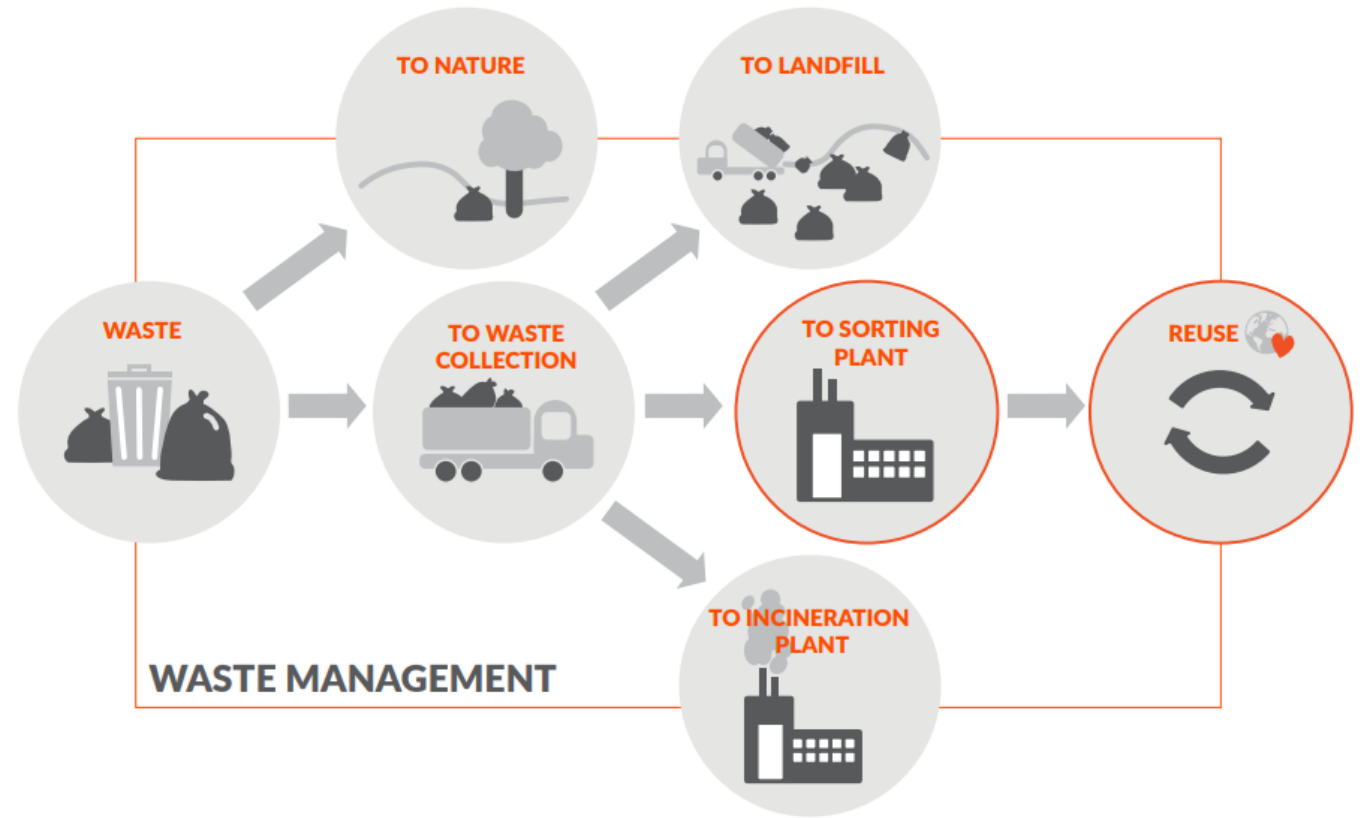
Metals, Plastic, Wood, Inert are examples of what the robotic sorting system can handle.



www.specim.fi/robotics-revolution-in-waste-separation/

ADDED VALUE IN WASTE SORTING STREAMS

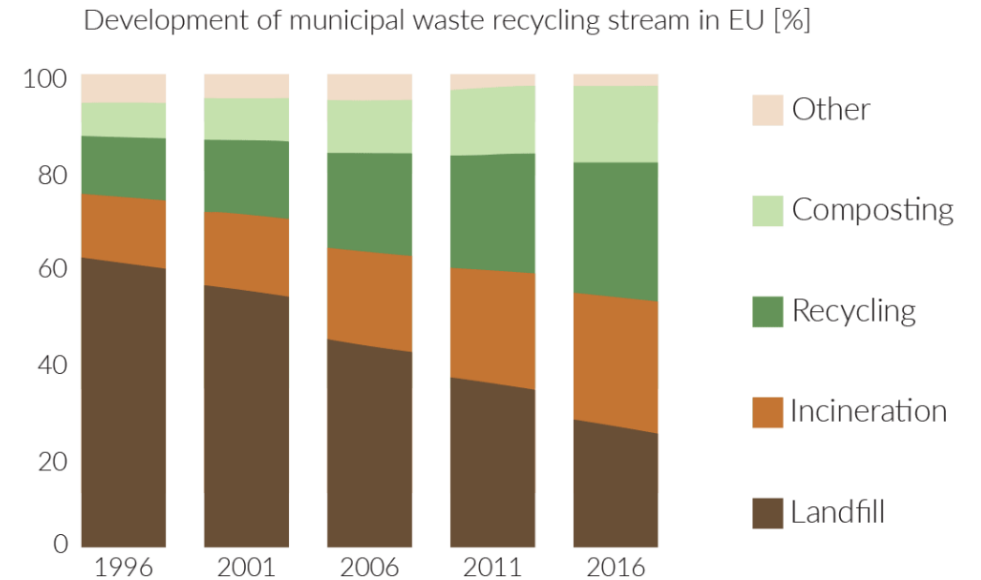
Added value by spectral imaging in sorting waste streams		
Waste	Capability	Benefits
Municipality waste	Simultaneous identification of materials in the mixed waste stream	Separation and valorization for plastics, textiles, metals, glass, paper, cardboard
Construction waste	Simultaneous identification of materials in the mixed waste stream	Separation of combustible materials, valorization of wood, glass, metal
Industrial waste	Simultaneous identification of materials in the mixed waste stream	Separation of combustible materials, valorization
Plastics	Simultaneous reliable identification of multiple plastics (polymers)	Improved (near 100%) purity and higher value of recycled fragments
Textiles	Identifications and classification to natural and synthetic fibers.	Both qualitative and quantitative analysis (mixed textiles)
Waste for incineration	Composition of the material stream. Classification for calorific value.	Optimization of the incineration process



WHITE PAPER – WASTE NO MORE



- 01. There is more to recycle
- 02. Recycling can be more efficient
- 03. How a spectral camera improves recycling?
- 04. Example applications and benefits
- 05. Conclusion



Development of municipal waste recycling stream in EU (%) - Eurostat

Get the whitepaper:

www.specim.fi/waste-no-more

SPECIM



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THANK YOU!

WHAT CAN WE DO FOR EACH OTHER?

What SPECIM can do for you?

- Be your **Technology Partner** in HSI
- **Discuss** your **application**
- Make **Feasibility studies**
- Provide **out-of-the-box classification solution “SpecimONE”** to reduce your time-to-market

What can you do for SPECIM?

- **Be open for HSI** and let others know about the possibilities of the technology
- **Contact us** about your application and needs
- **Use our cameras** and sorting solution to build recycling machines
- **Do research** in new recycling areas – e.g. pharmaceuticals, food
- **Make products** out of recycled material to close the cycle – e.g. black plastics
- **Produce SWIR LED lighting** (to avoid power consuming Halogen lights)

