ZENROBOTICS®

SORTING
ROBOTS
FOR PLASTICS

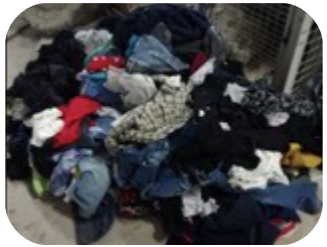
Right Robot for Every Application

Heavy Picker

Construction & Demolition Waste

Wood waste (A-, B-, C-, D-grade)

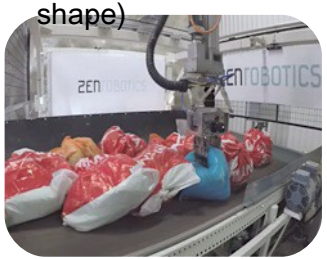
Rigid Plastics (By polymer, color, shape)



Textiles

Commercial & Industrial Waste

Scrap Metals

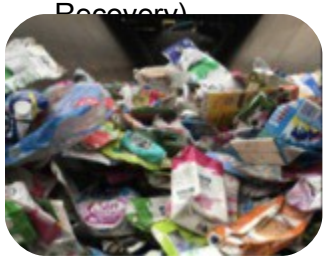


Sorting bags by color

Incinerator slag

Fast Picker

MSW (Quality Control, Reject Recovery)



LPW, DMR

Technical Specifications HP

Heavy Picker [HP]

Robot arms	1, 2 or 3 arms (HP1, HP2, HP3)
Sensor units	Sensor system, including NIR, VIS, Tactile, Metal Imaging & Laser
Manipulator type	Finger Gripper, Pneumatic power
Maximum speed / arm	2000 picks/h
Maximum sorting belt speed	0.5 m/s
Unit length & width	W 5 m, L 6 m – 14 m
Working area (1 robot)	2 m x 1.6 m
Discharge chutes	4 or 6 per robot arm
Maximum object weight	30 kg
Maximum object size	L 1500 mm, W 500 mm
No. of recognized fractions	Unlimited, trainable
Installed power (1 robot)	HP1 10 kW, HP2 12kW, HP3 14kW
System weight	6 to 10 tons
Noise level	< 80 dB(A)
Availability	> 90%

How does it work?

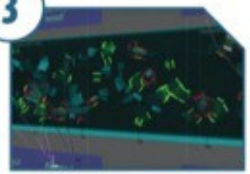
1

ZRR Sensor unit scans the waste stream.

2

ZenRobotics Brain control software analyses data and controls the robots.

3



ZenRobotics Brain identifies materials, objects and gripping points.

4

ZenRobotics Smart Gripper picks the desired objects.

5

Robots sort multiple fractions in one spot.

Rigid Plastics Sorting

PE

PP

PVC

- **PRE-SORT PLASTICS BEFORE SHREDDING**
- **SORT LARGE FRACTIONS WITH HIGH PURITY**
- **POSITIVE & NEGATIVE SORTING OF MULTIPLE POLYMERS**

- **Sorted fractions:**
  - Sort by polymer, color, shape
  - PE Mono, PE Bottles, PE Crates, HDPE Pipes, PP Mono,
  - PP Crates, PP Lawn Furniture, PP Mono Light,
  - PP Flowerpots, Black Plastics, PVC Mix
- **Key benefits:**
  - Simple, automated sorting process, possibility for 24/7 continuous high purity sorting
  - Capable to pick very heavy and large objects
  - Sort fractions invisible to human eye
- **References:**

Figure 2: PE Mono

Figure 3: PE Bottles

Figure 4: HDPE Pipes

Figure 5: PE Crates

Figure 6: PP Mono

Figure 7: PP Crates

Figure 8: PP Mono Light

Figure 9: PP Lawn Furniture

Figure 10: PP Flower Pots

Figure 11: Black plastic

ZenRobotics Heavy Picker sorting plastics

Technical Specifications FP

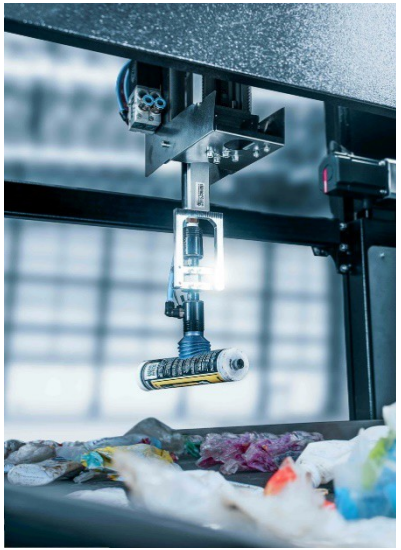
Fast Picker [FP]

Robot arms	1
Ejector units	1
Gripper type	Suction Gripper
Maximum speed	4000 picks/h
Maximum sorting belt speed	1 m/s
Unit length & width	1550 mm x 2660 mm
Unit height & height above sorting belt	2800 mm / 1800 mm
Unit weight	700 kg
Working area	1200 mm x 600 mm
Discharge chutes	2 (1 on each side)
Maximum object weight	1 kg
Maximum object size	400 mm x 400 mm
No. of recognized fractions	Unlimited
Installed power	9 kW
Air consumption	250 l/min at 8 bar
Noise level	< 80 dB(A)
Availability	> 90%

How does it work?

Waste scanner, that includes LED lamps and high resolution RGB camera, scans the waste stream.

AI Software looks at the waste and identifies objects based on recorded data.



Specially designed gripper picks up desired objects with the help of suction.

Applications

PE bottles
PET bottles

Reject

- Municipal Solid Waste (MSW)
- Light Packaging Waste (LPW)
- Dry Mixed Recyclables (DMR)

- **Sorted fractions:**
  - Sort by shape and color
  - Silicone tubes, HDPE bottles, PET bottles, Tetrapak, UBC, foils, reject, cardboard etc.
- **Key benefits:**
  - Simple, automated sorting process
  - Continuous fast speed sorting
  - Easy to retrofit to small spaces
  - Multiple robots can be fit on a single line for various tasks

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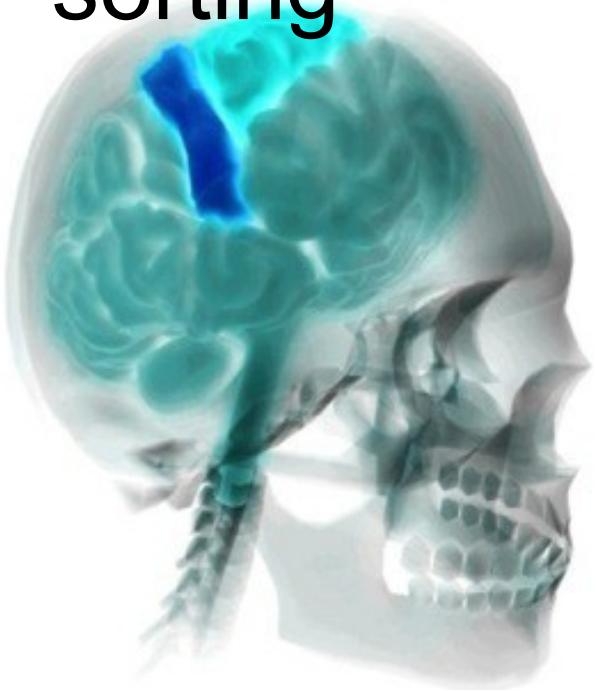
ZenRobotics Fast Picker sorting pla

First company to bring AI to waste sorting



ZenRobotics Brain - Artificial Intelligence (AI) for waste sorting

- Cutting edge deep learning
- Visual understanding of complex material flows
- Multilayered neural networks
- GPU powered real time machine vision
- Deep learning models with millions of parameters
- By design robust to changes in waste and environment

A decade of experience in waste has resulted in reliable and powerful AI technology that is proven on the field.

Next steps for robotic happiness?

1. Call sales hotline: +358 50 4363 803 or
   E-mail: sales@zenrobotics.com
2. See the robots LIVE at one of our reference sites
3. Let’s discuss how your operations could benefit from robotic waste sorting

For more information, visit www.zenrobotics.com

And check out our videos on www.youtube.com/zenrobotics

ZenRobotics Ltd.

- Founded in 2007, ZenRobotics is the leading supplier of robotic waste separation technology.
- 2009 – Focus in waste sorting
- 2018 – 45 employees, robots sold to over 10 countries.
- Ownership: Privately held company owned by management, employees, and long-term private equity investors

Thank you!
zenrobotic