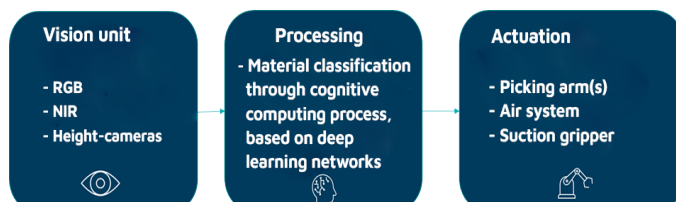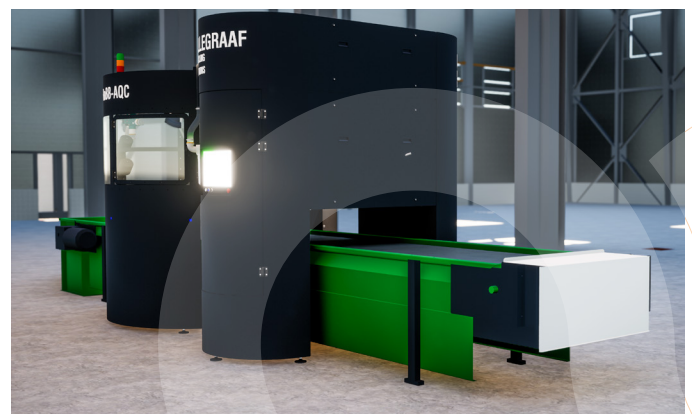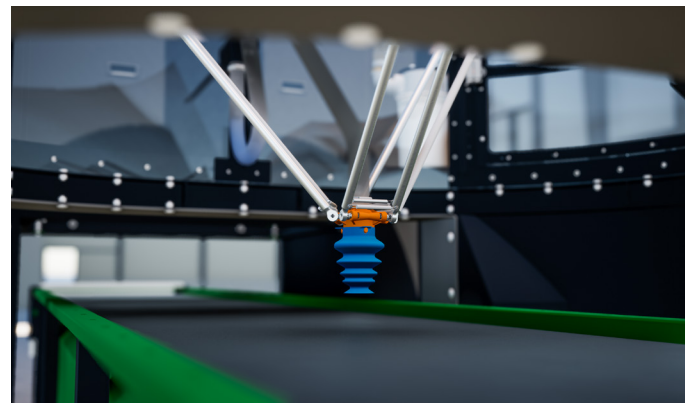# RoBB - Robotic sorter by Bollegraaf

RoBB is an intelligent and fully automated sorting robot, developed in-house by Bollegraaf. It can fulfill different roles in the waste stream, especially in the later stages of the waste sorting process.

RoBB is able to consistently outperform human capability when charged with quality control tasks, which results in an increased purity of your recovered material. It can also improve the recovery rate of valuable materials when added to your 'rescue' line. This prevents the loss of targeted valuables and maximizes the performance of your material recovery facility.

RoBB is powered by the latest technologies in the field of artificial intelligence (AI) and automation, giving way to ever-expanding capabilities. It is built around three key elements: a vision unit, processing and actuation units, all perfectly integrated in an extremely robust and thought-out modular design, in line with the renowned Bollegraaf quality.

Vision unit
- RGB
- NIR
- Height-cameras

Processing
- Material classification through cognitive computing process, based on deep learning networks

Actuation
- Picking arm(s)
- Air system
- Suction gripper

CREATING A WORLD OF DIFFERENCE

FUNCTIONAL DESCRIPTION

∞ The vision system is built around an array of optical sensors, such as NIR (near infrared), RGB, and height cameras powered by artificial intelligence (AI). These enable the identification and classification of items based on the composition of materials, shapes, color and other attributes that a human eye could easily recognize.

∞ The RoBB cognitive computing process is based on deep learning networks, which enables the RoBB to self-learn and recognize patterns in the same way the human brain can.

∞ Based on real-time object classification, the strong and sturdy robotic arm(s) pick(s) up the selected material(s) from the conveyor belt through a vacuum created in the gripper at the end of the arm(s). The robot arm will then move the picked up material next to the conveyor belt. There, the material is then thrown out with the help of an overpressure in the gripper. The material will fall into a chute next to the conveyor belt.

∞ The Human Machine Interface (HMI) is designed in a customer friendly way, allowing you to change the assignment of RoBB easily and intuitively, according to your wishes or requirements and monitor performance in real time. The control screen also allows calibration to be carried out and any malfunctions to be displayed. RoBB is tailor-made to your unique sorting challenge by being trained and fine-tuned with samples of your waste stream, which, complemented by continuous machine learning, creates an ever-expanding database customized to your needs.

∞ RoBB has a robust and elegant modular design and can be easily placed on (existing) conveyor belts with a width of 600 to 2000 mm with a minimum of modifications. For the latter, a tandem arm will be required.

∞ RoBB's latest design provides easy access to the air filter from the outside, allowing easy maintenance and maximizing uptime.

∞ The newly patent pending gripper of the robotic arm enables unique efficient picking performance. It can grab awkward and irregularly shaped objects, it is extremely flexible yet sturdy and strong to hold hard-to-carry items to the targeted bin.
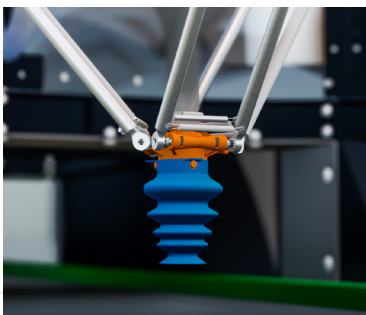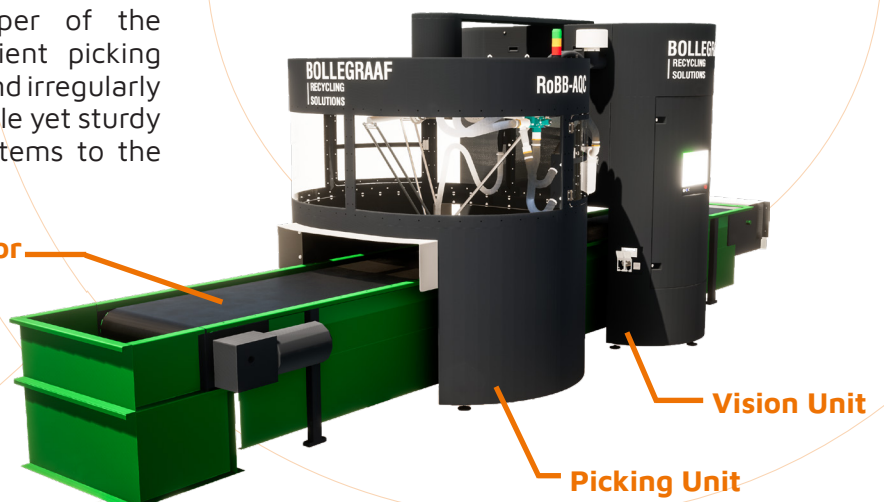
+ THE ADVANTAGES

∞ **Minimal retrofit**

Designed with modularity in mind, the RoBB can easily be installed in pre-existing sorting lines and is suitable for various belt widths.

∞ **Highest flexibility**

The RoBB keeps evolving in line with your specific context and challenges, thanks to the AI-model based on your own data and continuous learning.

∞ **Future-proof**

Based on deep learning technology, the RoBB keeps improving itself over time and can be further customized as your conditions change.

∞ **Integrated and patented solution**

From hardware to software, the RoBB is fully developed in-house and integrates the latest innovations of our R&D team. We possess all the knowledge and capabilities for your technical support to maximize your performance.

∞ **Operational efficiency**

Your OPEX will reduce significantly through an automated solution that is easy to operate and to maintain and that minimizes the need for human intervention.

∞ **High performance numbers**

Based on effective picks, the RoBB is one of the fastest, most accurate, and most reliable robotic sorters, which will maximize the quality and consistency of your sorting process.

Conveyor

Vision Unit

Picking Unit

CREATING A WORLD OF DIFFERENCE Bollegraaf Recycling Solutions | Lubo Recycling Solutions

TECHNICAL SPECIFICATIONS

RoBB performance	
Material classes	Paper, corrugated and grey cardboard, Tetra, plastics (PET, HDPE, LDPE, PP), PVC, ferro and non-ferro metal
Object Shapes	Bottle, tray, flexible, rigid, can, container, jug, aerosol
Food non-food	Depending on the material class
Color	RGB range. Dark depending on conditions
Maximum number of picks	Up to 70 picks/min/arm
Effective picks	≥ 45 effective picks/min depending on waste stream conditions and object weight
Minimum object size	35 x 35 mm
Maximum object size	350 x 350 mm
Maximum object weight	2 kg

RoBB scalability	
Number of picking units per vision unit	Up to 2
Tandem robotic arm	For belt width of 2.000 mm
Number of sorts	Up to 6 separate sorts per robot module

RoBB power, air and energy supply	
Air consumption	<0,1 m³/min @ 7,0 BAR
Required air supply	Filtered and dry air, Pressure: 7,0 BAR, ISO 8573.1 Class
Main circuit breaker	16-25A (depending on version)
Full Load Amperage (FLA)	10A (depending on version)
Power consumption @ FLA	6 kW (depending on version)
Suitable operating environment	Indoors; 2 - 37 °C (35.6 - 98.6 °F)

Sorting conveyor specifications and material feeding	
Sorting conveyor speed	Up to 1 m/s
Belt width	600 - 2000 mm
Length	5900 mm minimum
Motor classification	IP-54
Frequency regulation	Needed
Single material layer	Avoid excessive overlapping
Material spreading	Evenly spread over the conveyor width

CREATING A WORLD OF DIFFERENCE   Bollegraaf Recycling Solutions | Lubo Recycling Solutions