



**Bollegraaf  
Solutions for  
Municipal Solid  
Waste Processing.**

Sorting your business



**Bollegraaf**  
RECYCLING SOLUTIONS



## Bollegraaf Sorting your business.

**At Bollegraaf, we appreciate the fact that, like any other profit-driven operation, the recycling industry is subject to economic changes. We help you sort your business and make it as profitable as possible.**

Although domestic recycling initiatives continue to gain momentum and consumer demand for recycled goods is increasing, commodity prices for recycled materials tend to fluctuate. In this respect, you are always looking for the best possible return on your investment. Sorting waste is our specialty. Keeping your operation profitable is our ultimate goal. We believe that the key

to a profitable recycling installation is creating the highest possible value for your recyclables. In order to do this, your aim should be to maximize separation quality while keeping your operational costs to a minimum. With a track record of 50+ years in the industry, we can help you achieve just that.

Bollegraaf's extensive experience in the recycling industry makes us the ideal partner for finding the best solution for your business model. Your business inspires our engineers and technicians to build machines, systems, and installations tailored to your needs. It is the very reason we keep innovating and improving our machines.

Our technological advancement offers you maximum flexibility, efficiency, and the highest throughput. Choose Bollegraaf and make the most out of waste.

We invite you to see it with your own eyes. Join us for a visit to one of our reference projects or take a tour around our production facility in the Netherlands. I hope to see you there.

Sincerely,  
Heiman Bollegraaf, CEO



Create value out of Municipal Solid Waste.

Optimizing output in terms of economic value against the lowest possible costs per tonne. This is the short-term goal for every installation that Bollegraaf provides. The long-term goal is to ensure permanently low operating costs and achieve an optimal return on investment.

As one of the world's leading system integrators, we know what it takes to separate municipal solid waste into valuable recyclables on the one hand and high-quality RDF on the other. With the spread of legal limits on landfilling untreated household waste and the active search for alternative energy sources, energy from waste has become an important topic. At Bollegraaf, we build and provide high-end turnkey installations that focus on recovering both valuable recyclables and energy from MSW.

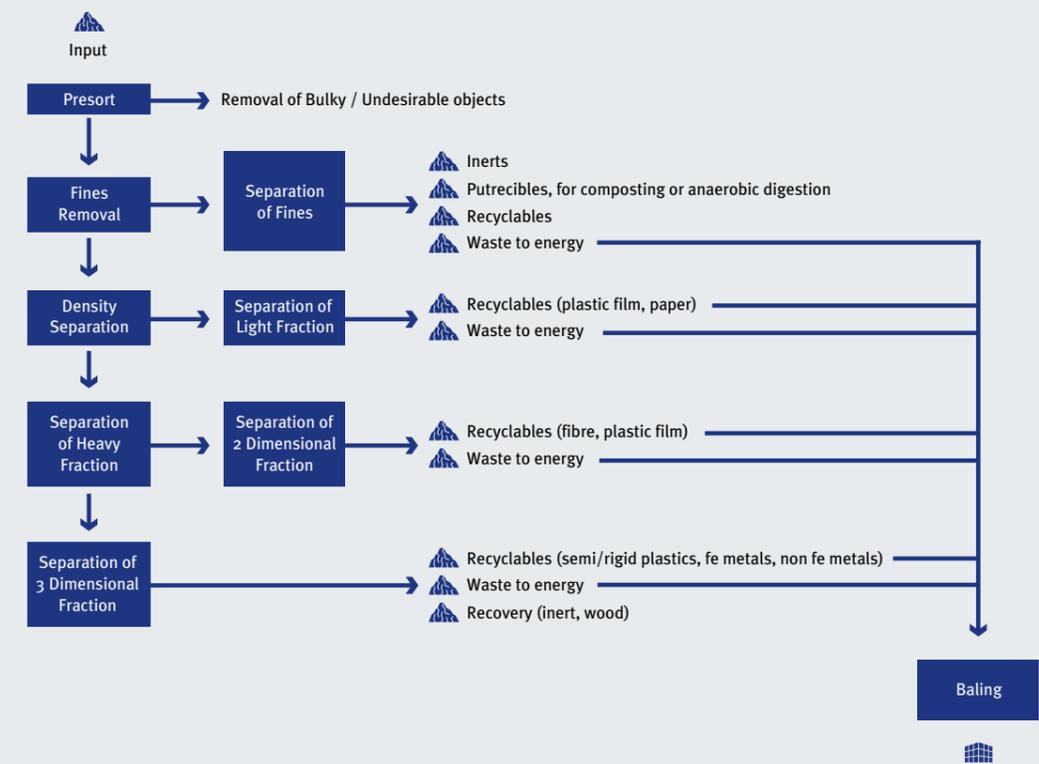
Bollegraaf Municipal Solid Waste Process.

The figure below shows an example of a typical MSW process.

### Advantages of working with Bollegraaf

With more than 50 years of experience worldwide, Bollegraaf is one of the most knowledgeable suppliers on the planet. We know there is no single specification for the composition of your waste; it can vary per country, per region, or per city. The requirements for the output of the separation system may also vary, depending on the available markets for recycled products. This is why we believe versatility is key. It inspires us to engineer, build and deliver tailor-made solutions that are easy to use, have a low cost of ownership, perform to your specifications, and offer an excellent return on investment.

- **Versatility:** our installations can be easily adjusted to fluctuations in input streams and/or output requirements. Even daily variations in waste streams can be handled by the adjustability/fine-tuning possibilities of most of our machines. This ensures that a Bollegraaf installation will last for many years and remain up-to-date. Even if the market changes, our installations have the ability to change with it.
- **Quality:** we believe in putting quality above all else. That's why we only use name brand components from experienced suppliers. This ensures our installation will provide the durability you require so you get efficient performance every day with as little downtime as possible. We guarantee your installation will be trouble-free for many years to come.
- **Customization:** we always put our customers first. Our worldwide delivery program consists of complete sorting systems for the waste paper industry and plastics recycling, collectors of industrial waste and household waste, municipalities, and companies that produce voluminous waste. We also feature R&D backup for custom-built products so we can always offer our customers a one-stop shopping experience that meets their exact requirements, whatever they may be.
- **Eco-friendly:** we are not just active in an industry that's rapidly going green. At Bollegraaf we are also very aware of our own corporate responsibilities towards the environment. From our water-based green paint to investments in the latest innovations for reducing energy and oil consumption to the use of recycled materials for all our communication and promotional activities, we are making a conscious effort to help protect our planet.
- **Experience:** 50+ years of worldwide experience in all areas of recycling. We know the local market characteristics and requirements as well as local laws and regulations, and we anticipate market changes in collaboration with our clients. We know recycling!



## Example lay-out of a municipal solid waste processing installation

The purpose of the installation is to separate, sort, and process valuable commodities, such as RDF, plastic containers, PET, Tetra Pak, and glass. And to minimize the waste fraction that is sent to landfills.

**1 2** MSW waste material is fed into the material recovery facility (MRF) via a size reducing shredder / bag opener or in loose form using a separate feed hopper.

**3 4** The Lubo 'anti-wrapping' screen (AWS) prepares the material by removing the 'organic rich' fines which is then further processed (e.g. RDF, anaerobic digestion, composting) in the fines clean-up line.

**5** The over-size fraction from the AWS continues to the air-separation units to be segregated into three specific output fractions:

- Heavy
- Medium
- Light

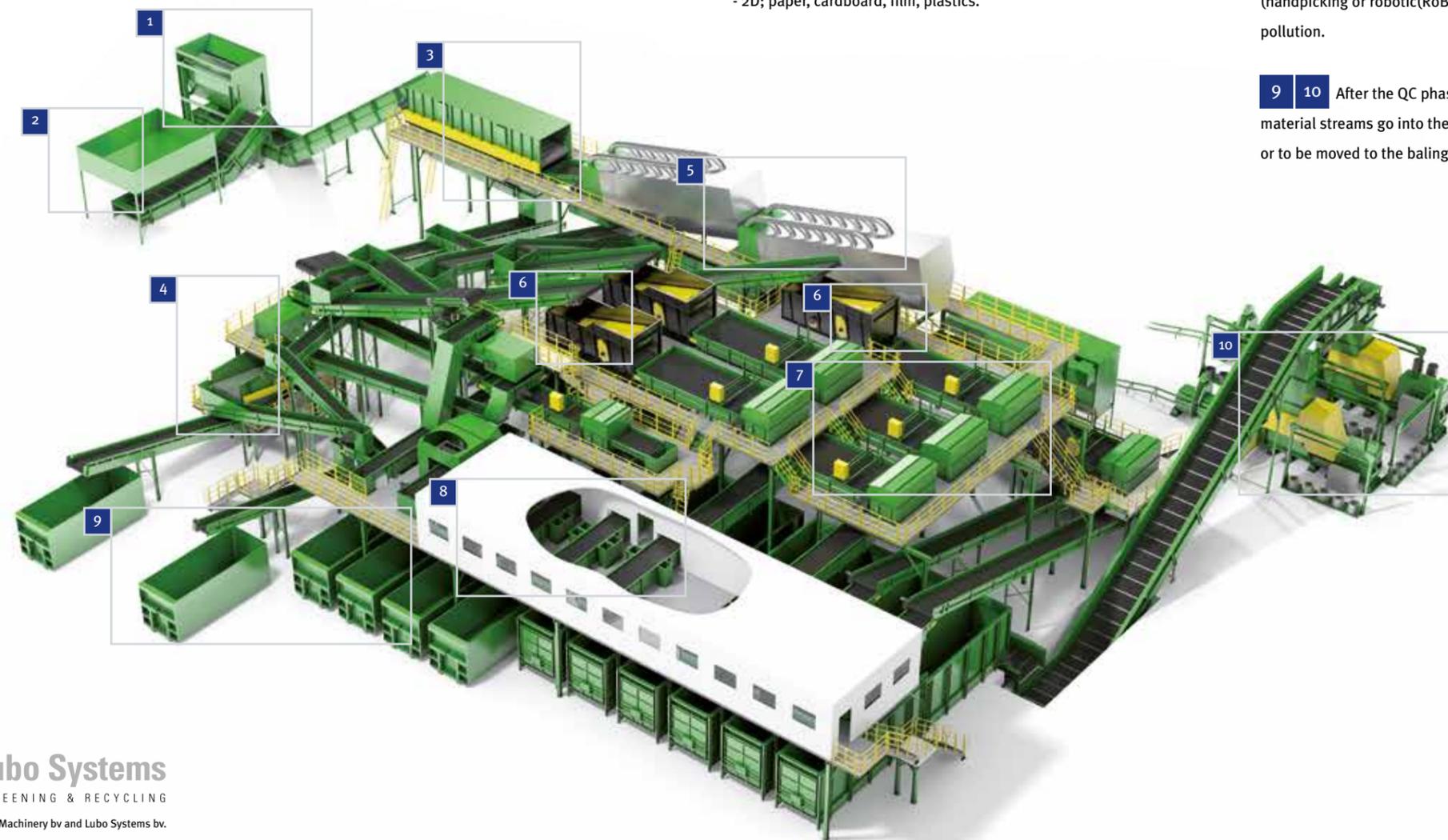
**6** The heavy and medium fractions from the air-separators are passed to the Lubo Ballistic / Elliptical separators to achieve a split between three-dimensional (3D) and two-dimensional (2D) materials:

- 3D; ferro metals, non-ferro metals, rigid plastics.
- 2D; paper, cardboard, film, plastics.

**7** Optical sorters are used to target valuable recyclable materials on both the 3D and 2D lines.

**8** The material streams then go to the quality control center (handpicking or robotic(RoBB)) to further reduce contamination/pollution.

**9 10** After the QC phase, the various materials from the material streams go into the material bunkers for further processing or to be moved to the baling press.



Dedicated technology for strong solutions



**Bollegraaf**  
RECYCLING MACHINERY



**Lubo Systems**  
SCREENING & RECYCLING

Bollegraaf Recycling Solutions is the trading name of Bollegraaf Recycling Machinery bv and Lubo Systems bv.

See also [www.bollegraaf.com/used](http://www.bollegraaf.com/used) for our daily updates on in-stock used machinery



**3** Lubo AWS StarScreen®

The patented 'anti-wrapping' screen deck does not wrap, but does have high output and aggressive agitation, preventing the smaller parts from sticking to the larger parts. Additionally, the larger parts are not being rotated ('sausage' forming), which results in better performance of the subsequent steps in the sorting process.



**4** Lubo Fines StarScreen®

Our patented StarScreen technology has been developed for efficient screening of different-size fractions from a large variety of input, e.g.: C&D, OCC, ONP, and commingled. We also offer a unique anti-wrapping StarScreen® that combines the advantages of the StarScreen® and a drum separator in one model.



**6** Lubo Elliptical

The Lubo Elliptical is used to separate 2D materials from 3D. The grids on the paddles can be easily adjusted for variable screening on size. The Lubo Elliptical offers various advantages over traditional ballistic screens.



**8** Bollegraaf RoBB QC Sorting Robot

RoBB can drastically reduce your OPEX in the quality control phase of your sorting line. RoBB delivers optimum purity and separation quality of various materials (different types of plastics, paper, and other materials), resulting in a significantly higher value for your output.



**10** Bollegraaf HBC Baler

The world-renowned Bollegraaf fully automated HBC balers turn large quantities of various types of waste into homogenous bales. The capacity and pressure force of the HBC balers ranges from 25 to 180 tonnes. Besides the HBC range, Bollegraaf also offers a full range of sheer balers (HBK series) and small, semi-automatic balers (SA series).

## Waste To Energy

Producing alternative fuels from waste is becoming increasingly profitable. The statutory requirements for the disposal and processing of untreated waste are becoming increasingly strict, which is leading to mounting operational costs. Together with constantly rising energy prices, many MRFs value the production of e.g. high-calorie RDF (refuse derived fuel) as an attractive option.



Bollegraaf Recycling Solutions is the trading name of Bollegraaf Recycling Machinery bv and Lubo Systems bv.

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