

Choosing optimal belting solutions for recycling applications

Habasit's guide to choosing the right conveyor belt for your needs in recycling industry



The current situation in recycling

A close-up photograph of a person's hand holding a clear plastic bottle. The background is slightly blurred, showing a recycling bin with orange and white sections and some green foliage. The overall tone is bright and focused on the act of recycling.

To help achieve a cleaner and healthier environment, global efforts to recycle more waste have increased substantially.

Recycling saves energy, protects habitats, and plays a key role in reducing landfill and greenhouse gas emissions.

As we recycle more, these facilities must be able to cope with the growing number of plastics, paper, glass, metal, and other materials heading their way.

According to European Environment Agency, countries like the UK and Germany only recycle about 50 per cent of their waste, while in developing nations like Romania this number is even lower, at between 10 and 30 per cent. In the USA, the current recycling rate sits at approximately 32 per cent, according to the Environmental Protection Agency (EPA).

Under The EU Waste Framework Directive, all member states must increase their level of recycling of municipal waste to 55 per cent by 2025 and to 60 per cent by 2030. The UK has the same target for 2025 but is aiming for 65 per cent by 2030. The USA must achieve a rate of 50 per cent by 2030. These are very ambitious targets, which means countries will need more materials recycling facilities (MRFs) with faster, wider, and more complex sorting lines to cater for higher throughputs of waste.

Recycling companies are turning to specialist technology providers, including some of the most advanced optical sorters using Habasit's innovative conveyor belt solutions, to supply the high performing machinery needed to meet this increased demand.

Habasit has been working on industry-leading solutions that maximize TPU (thermoplastic polyurethane) and the properties of PVC (polyvinyl chloride) in belt designs. This means equipment manufacturers who work with Habasit can be reassured that they are using the material best suited to their recycling application. The right belting solution will support material recovery facilities, allowing for faster, wider, and more complex sorting lines.



Why do we recycle?

When we recycle, used materials are converted into new products, reducing the need to consume finite natural resources.

Without recycling, new products can only be made by extracting virgin material from our planet's resources, which is both damaging to natural habitats and requires a lot of energy.

What's more, waste accumulating in landfill sites leads to increased methane emissions.

Space that could be used for conserving wildlife is also taken up by our ever-growing waste — in the USA, the amount of landfill produced each year could fill 96,000 Olympic-sized swimming pools





75%
of material waste
can be recycled

Whether it's plastic, paper, or aluminum, used materials are far from obsolete and the USA's EPA estimates that **up to 75 per cent of material waste can be recycled**. How does this figure compare to the current recycling rates across Europe?

Paper and cardboard are the materials with the highest recycling rates in Europe, with metal coming in a close second. This is because paper recycling doesn't require much additional infrastructure and aluminum is infinitely recyclable.

In Europe, around 73 per cent of paper and cardboard is recycled. This is significantly higher than plastic recycling rates, which sits at between 10 and 30 per cent in most European countries. In Germany, 30 per cent of plastics are recycled and this is the highest plastic recycling rate on the continent. However, because not all plastics are recyclable, sorting and processing the different types are often costly and time-consuming.



25%
increase
of recycled plastic

Plastic pollution is a major environmental concern and it's clear that plastic must be the focus for recycling facilities in the immediate future. **The United Nations (UN) has placed strict expectations on countries to increase plastic recycling globally by 25 per cent by 2030.** For many years, developed countries were able to cope with a large portion of their plastic waste by selling it to China. However, following the introduction of the National Sword Policy in 2018, the country banned the import of most plastics and other materials. We now need more recycling plants that are capable of sorting millions of tons of waste every year. Is this achievable with the current processes in material recycling facilities?



PVC, TPU
support recycling
large quantities of waste

At the moment, no. However, **Habasit has been developing PVC and TPU conveyor belts to support the recycling of larger quantities of waste.** Differences in recycled materials and operating conditions may require different material properties, so let's look at how belts compare and where they are best used in a recycling plant.

Comparing belt materials

Durable and cost-effective thermoplastic polyurethane

Thermoplastic polyurethane (TPU) belts are more durable than PVC belts and, despite a higher initial cost of purchase, produce the lowest overall cost of ownership



TPU has good mechanical strength, meaning operators can place it under more strain without worrying about its performance. It can be used for transporting heavier, sharper materials like metal because it is abrasion and cut resistant.



It's super lightweight — almost half that of rubber — and will allow sorting lines to become faster, wider, and more energy efficient. With all the benefits of PVC, it also has excellent flexibility, even at low temperatures, and good resistance to greases and oils. This means cleaning procedures can be more efficient and there's little chance of the belt becoming damaged when exposed to extreme conditions.



In many ways, TPU is a more environmentally friendly belt choice. This is because it doesn't need to be replaced as often, reducing maintenance costs, and, when incinerated, it doesn't release harmful gases. Producing it also creates less environmental waste and the belts are much easier to recycle.

TPU

- Abrasion and cut resistant
- Lowest total cost of ownership
- Super lightweight
- Excellent chemical resistance
- Excellent performance on wide applications (up to four meters) and high speeds (four meters per second)
- Application example: Near infrared sorters, wind sifters



Robust and reliable polyvinyl chloride belts

Rubber belts have been the first choice in the recycling industry for decades because of their high mechanical strength, flexibility, and high abrasion resistance. However, their thickness and heavy weights puts strain on the belt, often leading to costly repairs and slower, inefficient sorting lines. This is why lightweight materials like polyvinyl chloride (PVC) are a good solution for applications like plastic palletizing, because they reduce manual handling difficulties, are faster to run, and require less energy to operate.



PVC is also a robust, more economical alternative to rubber. As well as having a better value to price ratio, PVC belts have lower maintenance costs because they are mostly used to transport lightweight materials like plastic and paper. The belt is placed under less mechanical strain, and therefore requires fewer replacements.



PVC belts can also run on smaller pulley diameters. This means they need less power to be driven and consume less energy. Coupled with the belt's light weights, this has a big impact on cost of ownership and maintenance requirements. Lightweight belts can generally be manufactured in greater widths, meaning sorting lines can grow wider and process higher throughputs of waste.



Hygiene is another big advantage of PVC belts. They are easier to clean and are resistant to detergents, hot water, and steam. Their lower adhesion properties mean that less residual soil is left behind on the belt surface, reducing the cleaning window and machine downtime. This is particularly important in environments where cleaning protocols may require machine downtime. Shorter cleaning windows also saves on resources and contributes a higher overall throughput and lower cost of ownership.

PVC

- Best price-to-value ratio
- Good chemical resistance
- Low energy consumption
- Hygienically designed
- Application example: Trommel separation, eddy current separators



Where can Habasit's belts be used?

High performing conveyor belts are needed for sorting, processing, and palletizing high throughputs of waste in material recycling facilities. Let's look at the machinery involved in these processes.

Metal separation

Non-ferrous metals, like aluminum, are removed using eddy current separators and ferrous metals are taken off using magnetic sorters. Chemical resistant belts are desired here because often domestic metal waste contains oils or solvent residues. Belts for separating metals must be the right thickness to allow the magnetic separation to occur. If they are too thick, magnetic currents won't penetrate through.

Belt solution: TPU or PVC

Recommended belt: ENB-15EHBT, NAB-12EEDV, NVT-741, NHB-10ESBV, NHM-10ESBV

Wind sifters

Wind sifters and air separators remove foil film and paper, leaving only plastics on the sorting line. Conveyor belts are exposed to a steady stream of air, which removes lightweight scrap off the sorting line. The belt surface must be adhesive for materials like plastic to remain in place, particularly on an incline. Cleats are sometimes used in conjunction with a high-grip surface to improve the grip. Belts used for wind sifters are also lightweight so that they can perform at higher speeds.

Belt solution: TPU or PVC

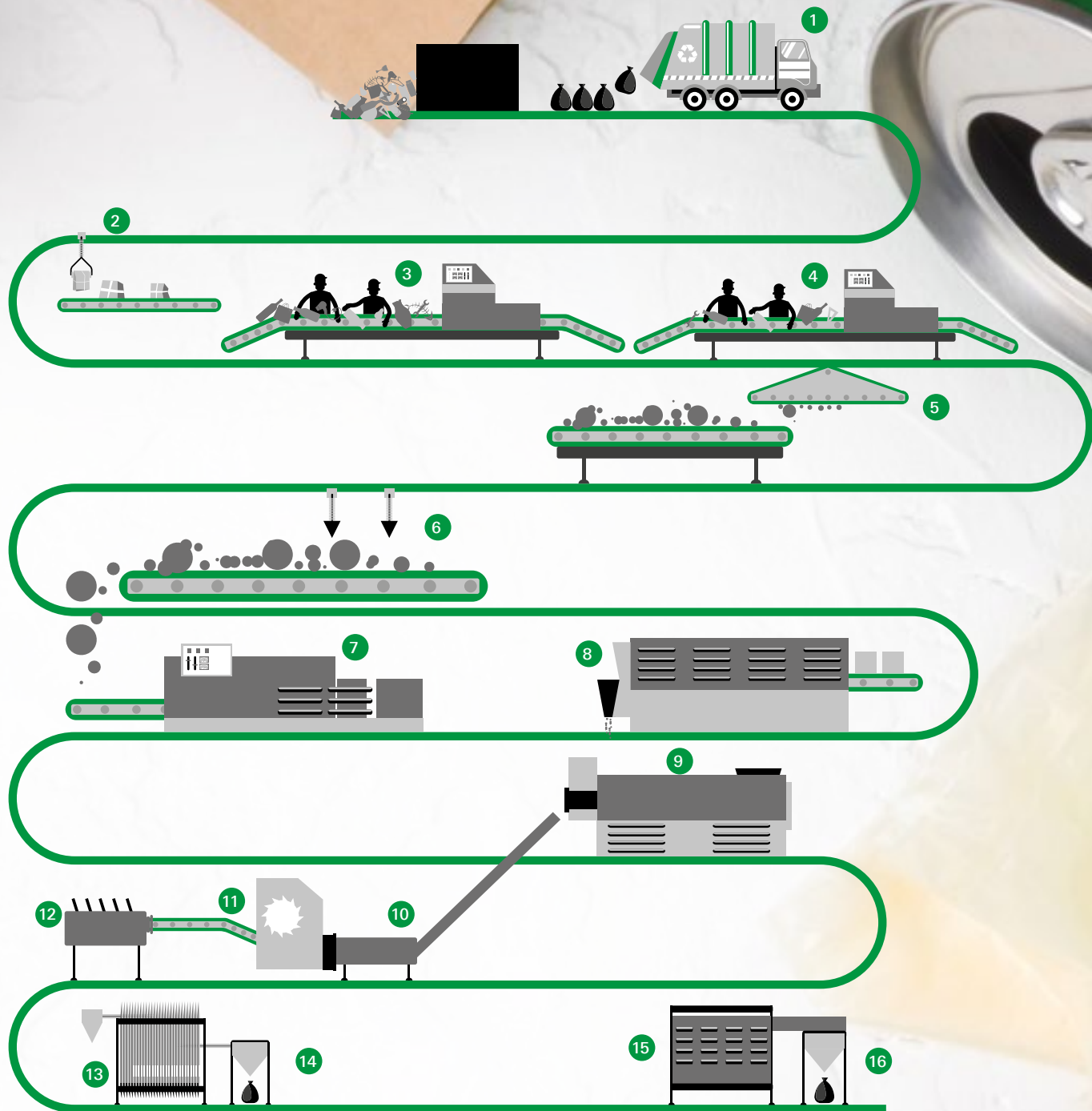
Recommended belt: ENQ-15EHBT, XVT-2348, NHB-10ESBV, NHM-10ESBV

Optical sorters

Optical sorters use infrared sensors to detect different polymers like HDPE and PET. Matte black belts will be used to limit light reflection, meaning it doesn't interfere with the infrared sensors. Habasit belts are suitable for operation with metal detectors, NIR scanners and X-ray machinery, all of which may be used to separate some materials.

Belt solution: TPU

Recommended belt: ENB-15EHBT, XVT-2348



- 01 Collection, delivery and bag opening at the municipal solid waste
- 02 Place onto sorting line
- 03 Initial manual sorting and large star screening process
- 04 Secondary manual sorting and large star screening process
- 05 Magnetic metal sorter and Eddy current separator
- 06 Sensor based sorters: NIR, laser, X-ray
- 07 Baler

- 08 Trommel sorting machine
- 09 Label separator
- 10 Hot wash
- 11 Shredder
- 12 Cleaning in float-sink tank
- 13 Thermal dryer
- 14 16 Bagging
- 15 Mechanical dryer

Plastic recycling



Trommel separation

This is the further segregation of PET plastics into color groups. Small parts of plastic and potential contaminants are stripped off and removed. The process uses hot water and steam, so the belt material should be able to withstand this.

Belt solution: PVC with accessories

Recommended belt: NAB-12EEDV, NVT-741, NHB-10ESBV, NHM-10ESBV

Label separators and hot washers

These are needed to remove packaging labels and sterilize plastic. Hot water and detergents are used here, so the belt needs to be chemical and heat resistant.

Belt solution: PVC with accessories

Recommended belt: NAB-12EEDV, NVT-741, NHB-10ESBV, NHM-10ESBV

Palletizing

Involves grinding, compressing, heating, and melting plastics into flakes or pellets so that they can be transferred to other plants and made into new objects. This application typically requires belts that are cut and abrasion resistant and can withstand high heat.

Belt solution: PVC with accessories

Recommended belt: NAB-12EEDV, NVT-741, NHB-10ESBV, NHM-10ESBV



Accessorize your belts

Reinforced cleats are often a must for recycling plants because they improve the belt's grip. For the transportation of heavy or sharp objects, the PSL flight type is used because it is reinforced by fabric and therefore is more rigid than the regular type.



For a two- or three-ply belt, cleats can be made from TPU or PVC. Guiding profiles can sometimes be welded as cleats on the running side of the belt. In low temperatures — for example, between minus five and minus ten degrees Celsius — TPU cleats are used on a PVC belt.



Helping a municipal solid waste plant

With two to five years of lifetime,
the ENB-15EHBT brings the lowest total cost of
ownership

Customer background

Municipal Solid Waste plant,
serving city and surrounding villages

Location

Poland

Application

The waste is spread on a running
belt and then optically sorted using NIR (Near
InfraRed) technology.
Belt size: 2800 x 14600 mm
Sorter manufacturer: Pellenc ST

Challenge

The customer faced difficulties with dirt
accumulation on the belt which reduced the sorting
efficiency and led to frequent downtimes.

To improve the application efficiency, a robust belt
with on-site joining and surface resistant to cutting
and other mechanical damages was needed. Since
the sorting happens at high speed (2–4 m/s), miss-
tracking issues needed to be avoided.

Habasit's solution

ENB-15EHBT is a thick > 4 mm TPU belt with excellent
resistance to cutting and mechanical damages.
It can be joined by Thermofix and is a must for bigger
sorters because the belt lifetime can reach two to five
years in tough conditions. The TPU compounds in matt
finish delay the dirt build-up and also prevent light
reflections. After joining on site, the belt runs smoothly
with 2-4m/s speed without any tracking issues.





Satisfied customer

The rubber belts that were installed in the past were much heavier, had higher energy consumption, faster dirt accumulation and a limited joining lifetime due to high speed operation. Another solution was the TPU belt with over 2 mm thickness, but a limited lifetime due to lower resistance to mechanical damages.

When considering the increased belt lifetime of two to five years of the ENB-15EHBT, the End User / customer was able to reduce the total costs of ownership over the entire period despite the initial high costs. The cost reductions could be achieved through on-site joinings, fewer breakdowns, improved sorting efficiency, and lower energy consumption.



To read more success stories visit the Habasit website: www.habasit.com



The future of the industry


It has become clear that to achieve our ambitious recycling targets by 2030, we will need faster and wider sorting lines to process higher throughputs of waste. What's more, plants will almost certainly need equipment that can process more complex technology for recycling. This may include, but is not limited to, solar panels, electric vehicle (EV) batteries, and other waste from electrical and electronic equipment (WEEE).

This adds another layer of complexity because plants will need to adapt with equipment that is even more robust. For example, to recycle EV batteries, operators must drain the hazardous liquid from the shell and shred the metal into smaller pieces. To cope with these expected changes, Habasit's research and development (R&D) team is constantly working with technology providers and equipment manufacturers to develop belts with higher chemical resistance and flame retardant properties.

With these solutions in place, plants can grow their recycling capacity and operate at the fast pace needed for us to achieve our global recycling goals. Robust, durable, and lightweight conveyor belt solutions might just be the beginning of a major shift in productivity for this industry.



Our services



Our commitment to our customers' success is what drives our continuous innovation and product and service improvements. We combine engineering expertise with dedication to reliability, to create lasting value for our customers.

Global leadership, local service

Habasit is your local partner with global reach. With 30 affiliated companies, each with its own inventory, fabrication, assembly, and service facilities, plus our worldwide network of partners, we react quickly and expertly to meet your most complex installation challenges.

Comprehensive technical support

From belt selection to design assistance. Extensive knowledge of our customers' processes lets us guide you from application analysis to selecting the optimal solution. We offer online calculation and belt selection tools, as well as on-site engineering assistance and equipment design, to make sure you get the best solution.

Process optimization and everyday efficiency

Innovation comes from understanding our customers' daily challenges. Habasit is more than a belting company. Our experts can provide belt condition monitoring, regular inspections, analysis and surveys at your sites, to keep your lines running smoothly and fully optimize your equipment and production processes.

Sharing knowledge and making business easy

Habasit offers training programs and support tools to ensure optimal use of our products, with training on fabrication, installation, assembly, maintenance and belt repair either at a Habasit site or your own location. Orders, shipping and tracking can be managed via our Customer Care team, or directly online.

Committed to innovation beyond the obvious

Because our customers' challenges and needs are always changing, we are constantly investing in the research and development of new products and solutions not only for today, but also for tomorrow.



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