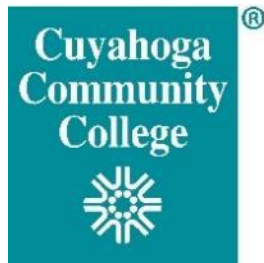


○

# What happens to mixed recycling collected from Cuyahoga Community College?



# Mixed Recycling Collection on Campus

It all starts when mixed recycling is collected in the blue bins (like this) around Tri-C's campuses.

To make recycling as easy as possible, all recyclable items can be mixed together in blue bins for later sorting. This includes bottles, cans, and other containers, printer paper, newspaper, magazines, and cardboard.

If you have any questions about what can and cannot be recycled, please review [Tri-C's mixed recycling guidelines](#) to help us divert more waste through recycling.



# From Blue Bins to Dumpsters



Custodial and Plant Operations staff empty recycling bins and transport recyclables to a recycling-only dumpster like this one.

Cardboard boxes and other recyclable items go in these dumpsters as well.

# Pickup and Hauling

A truck from Tri-C's contracted hauler, Kimble Companies, picks up the contents of the recycling dumpster on a regular route.

Once the truck has completed its route or is full, it goes to Kimble's Materials Recovery Facility, or MRF, to be sorted.



Photos courtesy of Kimble Companies

# Weighing and Dumping

When the truck arrives at the MRF, it is weighed on a scale.



Photos courtesy of Kimble Companies

Inside the MRF, the truck empties its contents on the tipping floor, and the truck is then weighed again on the way out so the weight of the materials dumped is known.





The mixed recyclable material is then loaded into a machine that rips open any bags and evenly meters the flow of materials onto a conveyor which takes the recyclables up to the start of the sort line.



Photo courtesy of Kimble Companies

# Pre-Sort Quality Control

Before automated sorting starts, people working on the pre-sort quality control line pull out contaminants that could harm the machinery, such as large materials (hoses, large rigid plastics like lawn chairs or buckets) and plastic bags\*, which get tangled in sorting equipment. Non-recyclable contaminants are collected separately to go to the landfill.



Photo courtesy of Kimble Companies

\*Plastic bags *can* be recycled at retailers that collect them for recycling, but not through mixed (or “single-stream”) recycling collection. Bags get tangled in machinery and cause problems in the process.

Tri-C collects recycling in plastic bags to keep the bins clean and to feasibly transport the materials to the dumpsters, but these bags are mechanically opened at the start of the recycling sorting process.

# Mechanical Sorting Begins

At the start of the mechanical sorting process, a series of rotating and upward-sloping disks sort cardboard, newspaper, and other mixed paper by carrying these larger materials upward while containers and smaller items fall down to separate conveyors.



Photo courtesy of Kimble Companies

[This video](#) shows footage of this type of system in action along with some animation demonstrating how larger items like cardboard and paper “surf up” on the disks while smaller materials fall down and are separated. Note that “OCC” is an abbreviation for “old corrugated cardboard.”



After being separated from containers, cardboard (OCC), newspaper (ONP), and other mixed paper fall to separate conveyors for each material type.

These materials then go through more quality control before falling into storage bunkers for each material type.



Photos courtesy of Kimble Companies

While cardboard and paper are being separated from containers at the start of mechanical sorting, glass and other items less than 2" in diameter fall through the bottom of the sorting process.

Glass then goes through vibration sorting to isolate pieces of glass from shredded paper, dirt, debris, and other small items.



Once separated as best as possible, broken glass falls into a bunker, from which it can be loaded into a container to be hauled to a glass recycling plant.

Photos courtesy of Kimble Companies

Metal, plastic, and aluminum containers that were separated from cardboard and paper move down a conveyor for sorting. A rotating magnet pulls metal cans (sometimes referred to as tin cans) and other metal containers off the belt to a storage bunker.



Conveyor leading up to the magnet (inside the green cage behind the worker).

## Magnet Above the Conveyor



Seen up close, the magnet is strong enough to pull metals up off the conveyor to a belt rotating perpendicularly to the conveyor, which then throws the metal cans off to the right in the above photo and into a storage bunker.

Photos courtesy of Kimble Companies


Since aluminum is not magnetic, an “eddy current” uses a magnetic field to repel aluminum forward to separate it into its own storage bunker.



Other materials (mostly plastic containers at this point) fall onto another conveyor to go through optical sorting.

[Link here to see a short video](#) showing an eddy current separating aluminum from other materials.



Eddy Current 


 Magnetic field that repels ALUMINUM forward while other material drops down.

Photo courtesy of Kimble Companies

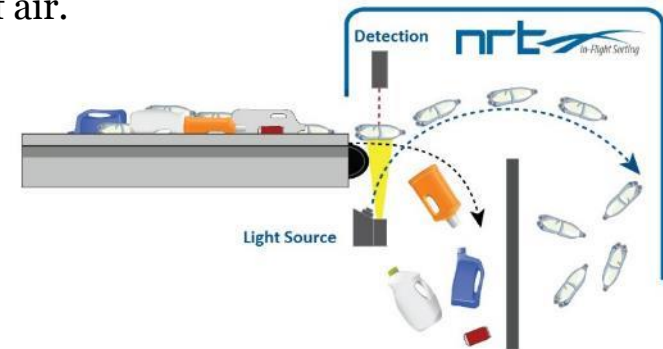
An optical sorter uses infrared beams to measure the density of plastics, then uses bursts of air to separate each piece of plastic by type. Once the plastics have been separated by type, they each go to a storage bunker for that type.



Photo courtesy of Kimble Companies

Plastics entering Kimble's optical sorter.

A graphic of how plastics are sorted by bursts of air.



[This slow-motion video](#) of an optical sorter in action shows plastics being separated by bursts of air.

# Baling of Materials

When bunkers of each individual material reach capacity, they are opened up so the material can be sent to a baler.

The baler compacts each individual material into a bale which can then be sent to a recycling facility for that material to be made back into a new product.



A series of cardboard bales coming out of Kimble's baler.

Photo courtesy of Kimble Companies

# Finished Bales



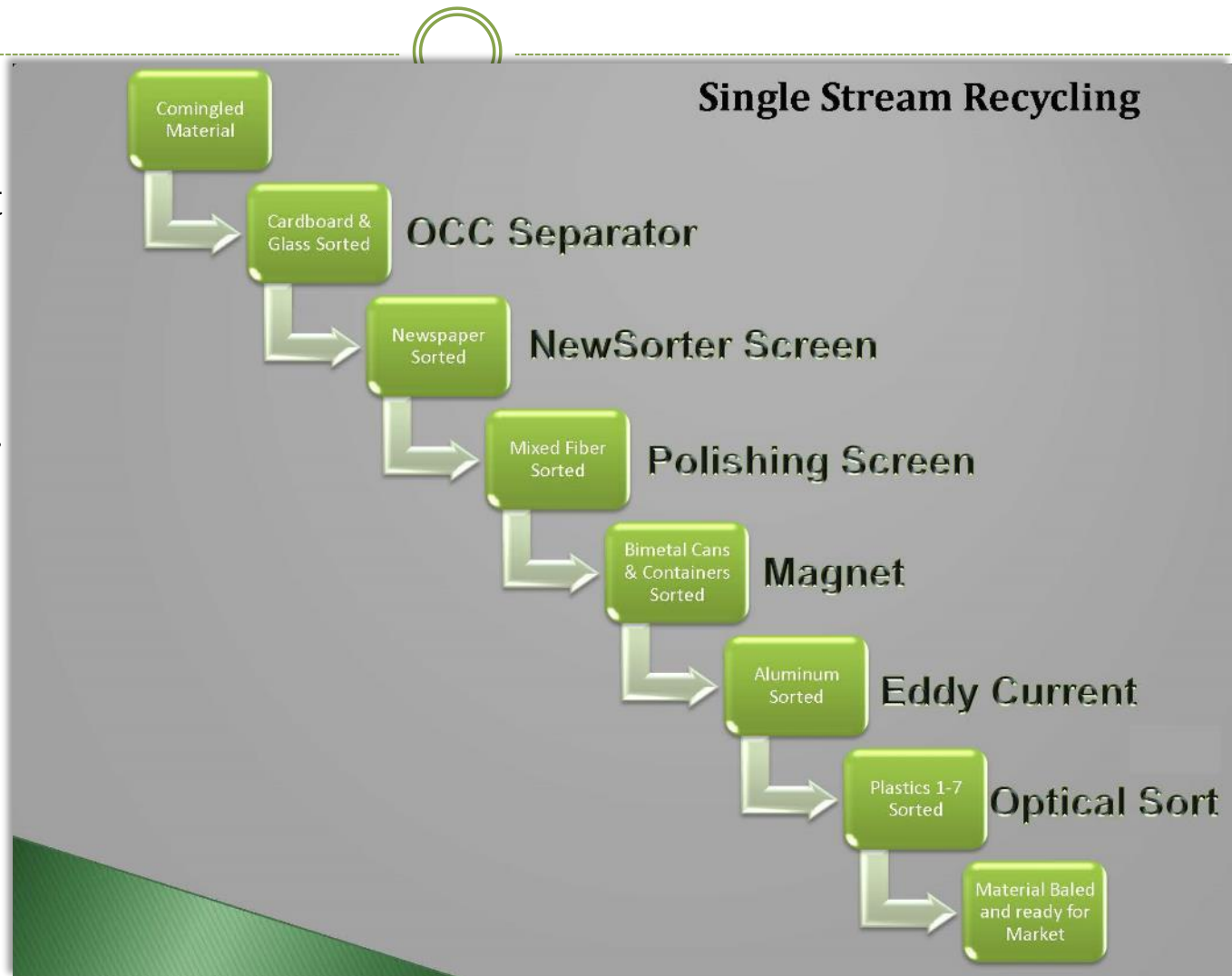
Photos courtesy of Kimble Companies

Finished bales are either stacked and stored until enough of that material is ready to be shipped, or loaded directly into a truck's trailer if a large capacity is generated regularly (cardboard, for example).

Bales eventually go to a facility that will use the material as an input to make a new product.

The chart at right shows the process flow of sorting materials in Kimble's MRF.

On average, Kimble's MRF processes about 25 tons of materials per hour.



Flow chart courtesy of Kimble Companies



# Summary



- Recycling works by separating each individual type of material so it can be processed and made back into that same material or something else.
- Proper and effective sorting is critical to making recycling work. *Materials Recovery Facilities* like Kimble's allow the sorting to happen after the recyclables have been collected, making recycling easier for individuals by allowing recyclables to be mixed when originally collected.

## What happens to each of the materials when they are recycled?

- **Cardboard and paper products** are converted into pulp and made back into cardboard or paper. Paper products can be recycled an average of 7 times before their fibers become too short to recycle again.
- **Glass** is melted down and made into glass products such as bottles or jars, or something different like fiberglass for insulation. Glass can be recycled over and over again without any loss of quality.
- **Metal (steel) cans** are melted down and made back into metal. Steel cans can be recycled over and over again without any loss of quality. Recycling steel cans saves significant amounts of energy compared to making new cans from raw materials.
- **Aluminum cans** are melted down and are often made back into cans. Recycling an aluminum can uses 95% less energy than it takes to make a new aluminum can from raw materials, and recycled aluminum can be back on the shelf as a new can in as little as 60 days. Aluminum can be recycled over and over again without any loss of quality.
- **Plastics** are chipped down into flakes and can be made back into plastic bottles, into fabric for clothing, winter jacket insulation, plastic lumber, or a number of other products.