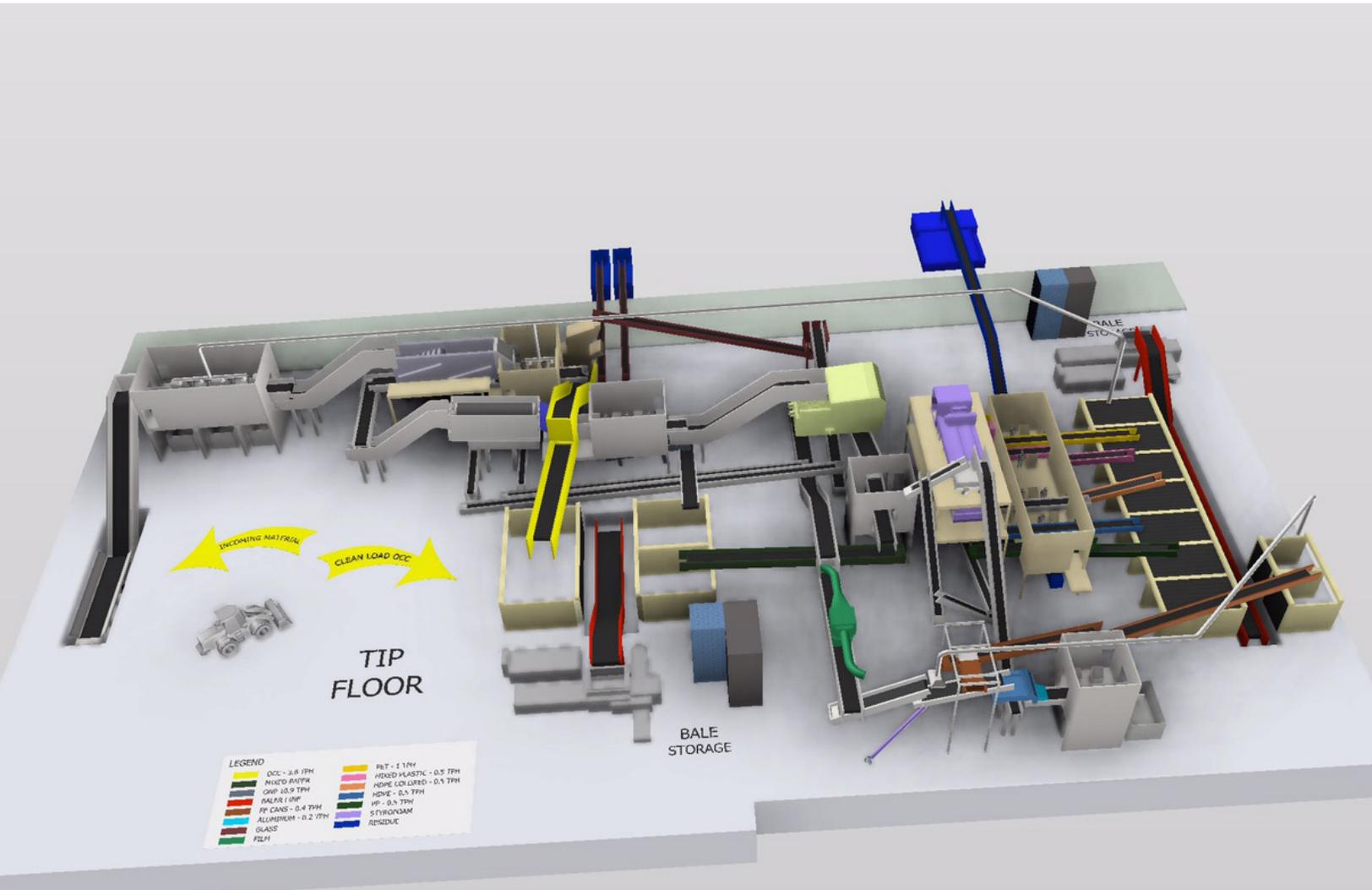


Recycling Solutions & Turnkey Systems

SYSTEMS AND SOLUTIONS FOR MSW, C&D, GREENWASTE, SINGLE STREAM, WASTE TO ENERGY, E-SCRAP AND SCRAP METAL



System integration and design provided in association with:

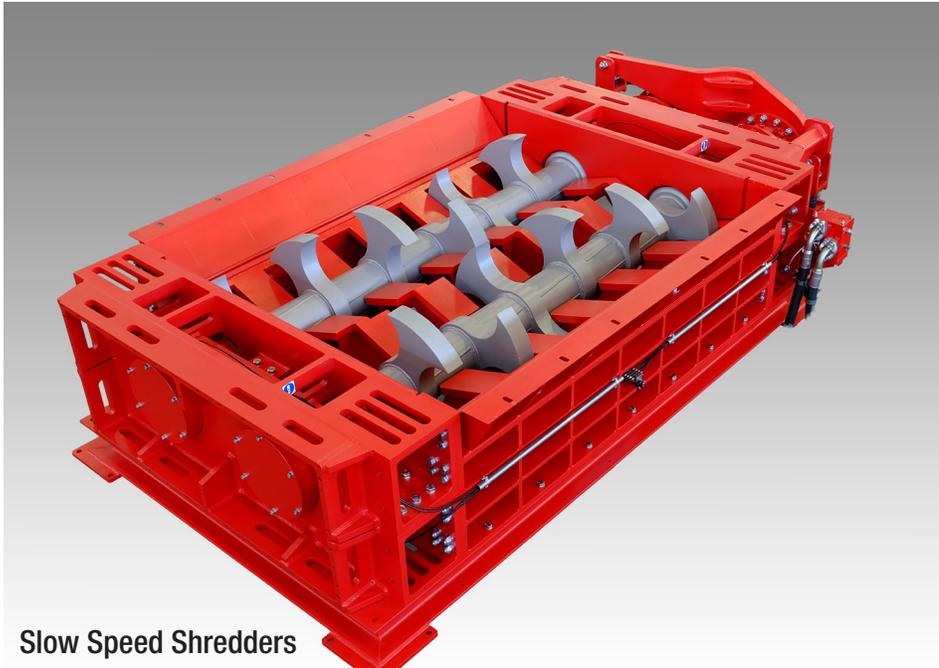


McLanahan

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VOLUME REDUCTION

McLanahan Volume Reduction
Equipment Powered by:



Slow Speed Shredders



LS Bag Openers/Bale Breakers



FX Metal Shredders

McLanahan's volume reduction equipment lines, powered by FORREC, process waste materials to decrease the space they occupy, reducing their physical and environmental footprint. This helps to prevent and eliminate solid waste generation and can be used in everything from industrial operations and scrap yards to state-of-the-art electronics recycling facilities. It is often used to reduce bulky waste too large for traditional collection methods.

Slow Speed Shredders

Slow Speed Shredders size material to each customer's specifications. This results in volume reduction and reduced trucking costs, as well as optimized efficiency and reduced wear for secondary equipment. Slow Speed Shredders can be used to process wood, green waste, e-scrap, construction and demolition materials, white goods steel, and municipal solid waste (MSW). To effectively size material, the teeth on the mill, or shaft, pull material into the shredding mill and comb assembly. McLanahan is able to custom engineer various tooth and comb configurations that allow these Slow Speed Shredders to meet the needs of each customer's specific application. Slow Speed Shredders also come equipped with a fully-automated PLC system for programming multiple settings to adjust for numerous shredding needs.

LS Series Bag Openers/Bale Breakers

LS Series Bag Openers/Bale Breakers are double-shaft crushers that are perfectly suited for applications that require product preparation for more processing or sorting. They are especially useful in applications where they can be used as an opening system for materials pressed in bales or as a bag breaker. Waste material is delivered to the opener/breaker and forced between the slow running blades, which hold and open the bags or bales. The opening between the blades and the rpm of the shafts can both be adjusted, making it possible to fully control operations.

FX Series Metal Shredders

FX Series Metal Shredder process metallic scraps. Combining a low rpm with high torque allows these metal shredders to cut even the hardest materials. Each shaft on the shredder is equipped with two gearboxes and two motors to guarantee high machine performance, while the interchangeable blades of specially alloy forged steel and the sturdy steel frame ensure high performance with reduced maintenance time. A stop and reverse system controlled by the PLC is included for when non-shreddable material enters the machine. Each FX Series Metal Shredder is custom engineered with interchangeable sector blades featuring adjustable thickness and number of teeth, as well as the ability to fit in a customized hopper and/or support structure.

AUTOMATED SORTING



Automated sorting involves using state of the art optical sorting technology, specifically utilizing NIR and/or Color technology to differentiate between different materials. Computers take the images from the camera to quickly and efficiently select which materials to positively or negatively sort.

Optical Sorters (Ecopack, Ecoglass, Ecoscrap)

McLanahan Optical Sorters, powered by PICVISA technology, can sort a wide variety of materials, including plastic, paper, glass, scrap, and more. Optical Sorters provide automated sorting for products based on composition and color. The system is capable of removing contaminants and color sorting plastics; PVC removal of RDF flow; separation of film; sorting glass based on color, heat resistance, etc.; separation of multilayer products; and sorting paper and cardboard.

A fully automated system, Optical Sorters are adjustable for a variety of different materials, including resorted, curbside, single stream or municipal solid waste flow; industrial residues; plastic bales for recycling; or even mining materials. Automation eliminates the need for any manual labor for recycling and sorting materials. Optical Sorters from McLanahan utilize proven MultiSpectral (NIR) Technology from PICVISA, which has been used in hundreds of machines around the world. This technology allows Optical Sorters to sort material between 0.8” and 15.7” at processing speeds of up to eight tons/hour depending on the material input and size. They were designed with a closer distance between the vision system and ejection unit to minimize material loss, as well as blowing nozzles every 0.2” for a more precise separation and less reject fraction.

Optical Sorters are available in several designs including the ECOPACK, ECOGLASS and ECOSCRAP.

How Optical Sorting Technology Works

NIR

The multispectral camera utilized by McLanahan uses Near Infra-Red wavelengths put off by different materials. Each material has a different NIR wavelength that the camera can detect and then differentiate from other materials. NIR technology can be utilized in sorting paper, plastics, metals, woods, etc.

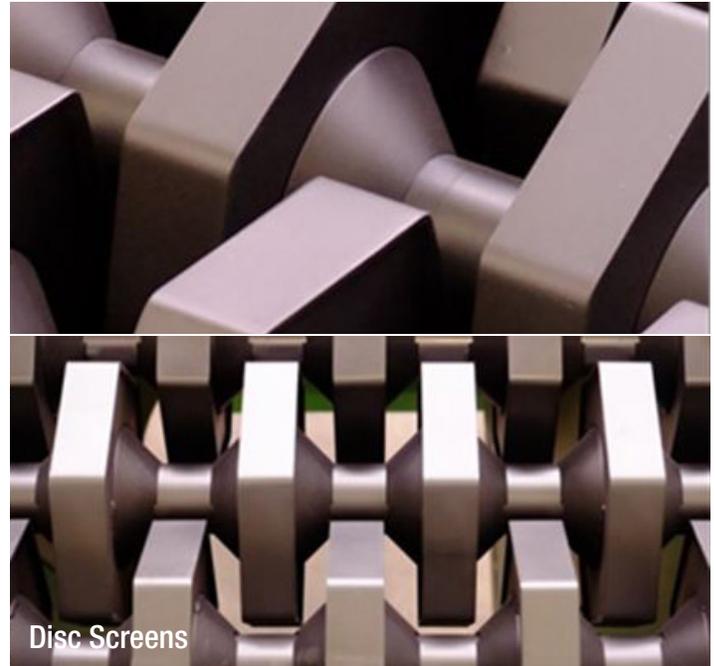
Color Camera Technology

The color camera technology is used to determine the colors of different materials. It can be utilized in sorting glass, colored PET or HDPE, or other different colored materials.

SIZE CLASSIFICATION



Ballistic Separators



Disc Screens

McLanahan has several different types of equipment that separates and classifies material based on size. Each application has its challenges, and McLanahan's line of size classification equipment allows for the selection of the best solution.

Ballistic Separators

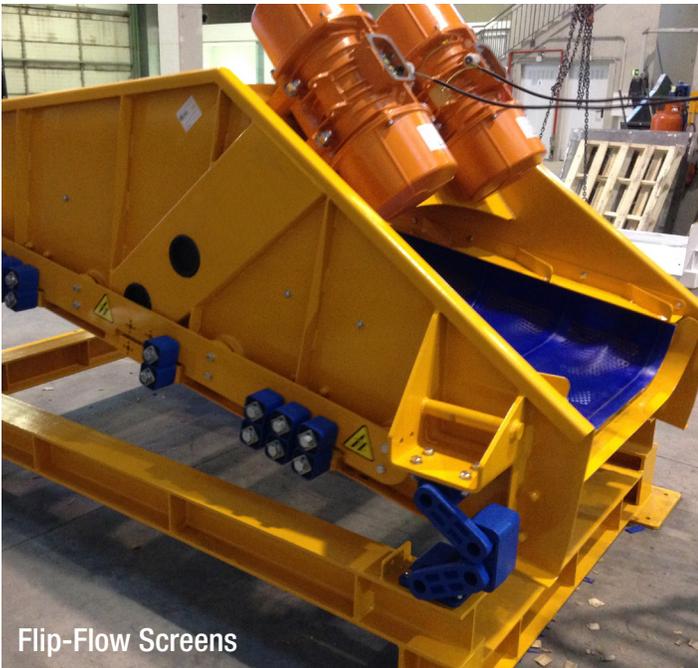
Ballistic Separators separate 2-D materials, such as paper, from 3-D materials, such as bottles, cans, etc. They are used in industries such as municipal solid waste, single stream recycling, commercial industrial waste, plastic sorting and RDF.

Capable of producing a three fraction split with one machine, Ballistic Separators achieve separation by feeding material onto a deck with a series of 4-16 paddles. Material is then separated by a "walking" motion. The flat 2-D materials, such as paper, film plastics and cardboard, walk on top of the deck while the round, rolling fraction of 3-D materials, such as aluminum cans and plastic bottles, move to the bottom of the deck. The third fraction of material, which is made of fine residues, falls through the holes in the paddles. Ballistic Separators are fully automated and feature simple, adjust-on-the-fly technology to change the speed and pitch of the ballistic deck for different materials.

Disc Screens

Disc Screens are built with a series of steel shafts complete with polygonal discs. Discs can differ in diameter and width, according to the size and required throughput capacity of the material to be treated. The rotation of the polygonal discs provides a strong shaking action that helps move the material forward to be screened and sorted. The space between the discs guarantees the screening size. A further refinement of this dimension is obtained by the shafts adjustable speed, made by a VFD installed on the electric control panel.

The CAD technology guarantees a perfect screening thanks to the metallic cones installed on the shafts, which divert long pieces of material to the shaft section cleaned by the next disc, avoiding their fall in the screened fraction (under screen).



Flip-Flow Screens



Trommel Screens

Flip-Flow Screens

Flip-Flow Vibrating Screens remove fines out of wet, sticky or generally difficult to handle materials. These screens are used in applications such as municipal solid waste, tire recycling, C&D recycling, glass recycling, biomass, metals, food recycling, drug recycling, used car recycling, slags from incineration, oil and sludge, etc.

Screens are made of high density polyurethane panels that are mounted in separate sections with screen sizes ranging from 0.1” to 15.7”, depending on the product and mesh opening needed. By amplifying the vibration of the main frame of the screen in the sub-resonant frame and due to the polyurethane panels being fixed to both frames, screen panels bump together creating the “flip-flow” motion. This ensures that screened material will not stick or get caught in the screen.

Trommel Screens

Trommel Screens utilize a continuous tumbling action to size and separate feed material in a wide variety of applications, including recovering metallics after incineration, reclaiming wood chips in sewage sludge composting, for accurate size separation of difficult to screen materials, and in municipal solids waste and resource recovery. As the cylindrical drum of a Trommel Screen rotates, material is lifted on shelves until it nears the top of the drum. Material then falls, tumbling onto itself and assisting with the separation of different types of materials. As the tumbling continues, smaller pieces filter through holes in the screen plating, while larger material continues along the length of the cylinder to discharge from the end.

To serve many industries and applications, McLanahan Trommel Screens are offered with various types of screen media that have a variety of perforation sizes. For units that are larger than 10’ in diameter, McLanahan creates a finite element analysis of a design prior to manufacturing to ensure the best design for a customer. McLanahan’s Trommel Screens have several design options to facilitate better screening, including bag breaking knives to open bags and a helical design to improve screening efficiency.

DENSITY SEPARATION



Air Separators



Densimetric Tables

Density separation is used when there is a difference in the Specific Gravity (SG) of the materials to be separated. McLanahan's line of density separation equipment puts the material in a state of fluidization. Fluidization of the material happens using either air or a liquid to allow the materials with differing SGs to naturally separate.

Air Separators

Air separators separate materials into two main streams (Heavy and light) through a controlled airflow. It can process various waste streams such as MSW, C&D, RDF and other waste materials. Air separators are custom designed and built and generally include a recirculation fan, a separation section with a rotary valve and a connecting expansion chamber.

The input material is fed by a speed –controlled belt conveyor, at the end of the conveyor the heavy fraction will fall down onto a discharge conveyor. The light fraction will be transported by a high-speed air stream and then separated from the airflow in the expansion chamber. Here the airspeed is reduced and the light fraction collected by the means of a rotary valve. The light fraction will be discharged onto another belt conveyor. The air volume will then return to the recirculation fan, closing the cycle of airflow. Right after the recirculation fan, part of this volume will be sent to a dust filter to collect and minimize the dust.

Densimetric Tables

Densimetric Tables are designed to separate materials based on material density and are typically used for dry product separation. To make a separation, Densimetric Tables use only air to separate fractions up to 80mm that have previously been classified through screen sizing panels. A mixture of material is fed directly onto a perforated inclined tray that operates in a vibrating elliptical motion and is crossed by a current of rising air.

This current of rising air, fluidizes material and separates it according to product densities. Heavy materials move to the bottom of the screen and into contact with the tray, being transported by the vibrating motion along the slope toward the highest outlet. Lighter material is pressurized, fluidized, suspended, and slid to the bottom of the tray aided by the distribution of air flow. Material sizes will vary based on the material characteristics (density, shape, etc.) of the products being separated. Materials of similar particle size that have different densities and other differentiating factors, such as form, humidity, etc., allow high efficiency separations.



Material Recycler

The Material Recycler separates solid waste materials such as mixtures of fines, wood, aggregate, plastic, stones, glass and other waste materials. Whether you are looking to separate materials based on density, clean heavy and light materials, reduce trucking by removing fines or produce sellable products, the Material Recycler can work for your application.

Utilizing a combination of screening, air separation and flotation systems, the Material Recycler is capable of separating multiple materials using one compact machine. Material is fed onto a feeder screen that handles the first separation by screening out overs and dry fines. In the next step, plastic, paper and lighter materials are separated using air with an electronic variable speed and flow control. The main waste material is then sent to a floatation system that separates and removes material based on five adjustment settings.

Fully automated, the Material Recycler requires no operator. It was built with three electronic frequency drives, one windshifter

and two floating systems. With all these features designed into one machine, sites are able to reduce their environmental footprint and promote site sustainability with low water and electrical consumption. Additionally, the Material Recycler can work in any kind of mobile or stationary installation following a conveyor belt, screen, trommel, impact crusher, jaw crusher or hopper.

