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Scrap tyres reduced to crumb rubber with help of

**30 million (13%)** scrap tyres are recycled into ground rubber in US

According to the US Environmental Protection Agency, approximately 290 million scrap tyres are generated in the United States each year. As recently as 1990, most of these scrap tyres took up space in landfills or were dumped illegally. Today, many of them are recycled by companies such as Edge Rubber into various grades of ground rubber, also known as fine mesh crumb rubber.

Markets now exist for 233 million (80%) of all scrap tyres. Some 130 million (56%) of these scrap tyres are burned as fuel. Another 56 million (24%) are used in civil engineering projects such as artificial reefs, while 30 million (13%) are recycled into ground rubber. Another 16.5 million (7%) scrap tyres are retreaded.

Of the 30 million scrap tyres in the United States recycled into ground rubber, some 6 million (20%) find their way to the Edge Rubber plant in Chambersburg, Pennsylvania, the oldest and most successful facility producing fine mesh crumb rubber in the United States. One of the most efficient scrap rubber plants in the country, much of its efficiency is attributable to its bulk raw material handling system using six Flexicon bulk bag dischargers.

“When we receive the scrap tyres, we first shred them into approximately 1.3cm particles, which are gravity fed into 907kg bulk bags,” said Sam Kauffman, vice president and chief operating officer of Edge Rubber. “These rough ground particles make up 80% of the raw material that we process into fine mesh crumb rubber.”

The other 20% arrives in small bags from tyre retreaders that grind a portion of the tread from used tyres prior to applying new tread to the carcasses, generating ‘buffings’ that measure approximately 0.5cm.

**Bulk bag dischargers improve process flow**

Because Edge Rubber has eliminated manual dumping of small bags from its production process, it first transfers the contents of small bags into bulk bags which are stored, or discharged to feed ground rubber particles, along with rough shredded particles, to a cracker milling process to further reduce particle size.

Moving the rubber particles from the bulk bags to the cracker mills are six automated Bulk-Out™ BFC Bulk Bag discharger systems with integral flexible screw conveyors from Flexicon.

Due to the nature of the rubber particles, material flow from the bag can be inconsistent. To ensure continuous and efficient operation, Flow Flexer™ bag activation devices positioned on the frame continually compress and release opposite sides of the bulk bag to promote flow through the bag spout into the floor hopper.

The rubber particles flow from the discharge port of the floor hopper and charging adapter into the 4.57m long model 1460 flexible screw conveyor, designed to handle difficult materials and consisting of a flexible steel screw rotating inside a 11.4 cm diameter carbon steel outer tube. The screw is driven by an electric motor located at the discharge end of the conveyor, which feeds the rubber particles through a transition adapter into the cracker mill.

High and low level sensors in the floor hopper signal a PLC to activate the conveyor on reaching high level, and turn off the conveyor on reaching low level.

“Before we acquired the bulk bag dischargers,
we manually emptied the small bags of material from tyre retreaders into the cracker mills. If our tyre shredder was down for maintenance or repair, the volume of retread buffings we were feeding the cracker mills was not enough to maintain full production speed, which slowed the entire ambient grinding process. Manually emptying the bags was also a very slow operation,” Kauffman said.

**Ambient grinding produces high quality powder**

A typical tyre shredded by Edge Rubber contains, by weight, approximately 70% recoverable rubber, 15% steel, 3% fibre and 12% extraneous material such as inert fillers. On average, one passenger tyre yields 4.5 to 5.4kg of crumb rubber.

The rough shredded particles and retread buffings are first ground in the cracker mills (ambient grinding) – the first of two size reduction processes that produce nine particle sizes ranging from 10 mesh (2mm) to as fine as 200 mesh (0.074mm). The cracker mills produce particles from 10 mesh (2mm) to 30 mesh (0.80mm).

**Micro milling produces the smallest, cleanest particles**

Wet grinding, or micro milling, produces cleaner, finer mesh particles. “While it produces particles as coarse as 40 mesh (0.40mm), the majority of the particles are 60 mesh (0.25mm) and finer. A percentage of the overall throughput, in fact, is finer than 200 mesh (0.074mm),” said Kauffman.

Most of Edge Rubber’s wet milled particles are packaged in pre-measured batch-inclusion bags that are placed directly into the customer’s moulding process and then disintegrate by melting at a low temperature. The rest of the wet milled particles, along with the larger particles produced by the cracker mills, are shipped in various size bags to customers in the United States and internationally.

“Thanks in large part to our bulk bag discharging equipment, we are one of the most efficient scrap rubber recycling plants in the United States,” added Kauffman.

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[www.flexicon.co.za](http://www.flexicon.co.za)  [www.edgerubber.com](http://www.edgerubber.com)

*Edge Rubber’s micro-milled, cleanest and finest particles have a unique shape for maximum surface area, yielding performance advantages in applications requiring strong bonding or high tensile strength.*

*Micro-milled particles are packaged in pre-measured batch inclusion bags to be placed directly into the customer’s process.*

*Finished powder is shipped to customers.*