



Solutions for tire recycling

Recycling of tires with ZERMA



Waste tires pose a significant ecological challenge, often ending up in landfills where they cause environmental harm. As a result, tire recycling is becoming increasingly important.

Tires are frequently used as a fuel source in cement production or power plants, but they can also be recycled and repurposed into a variety of new products.

Around 70% of a tire is made of rubber, which can be reused in many ways—such as playground surfaces, carpet underlays, or as filler material in the construction industry.



Rubber chips used in energetic recycling



Rubber mats made from recycled rubber granules

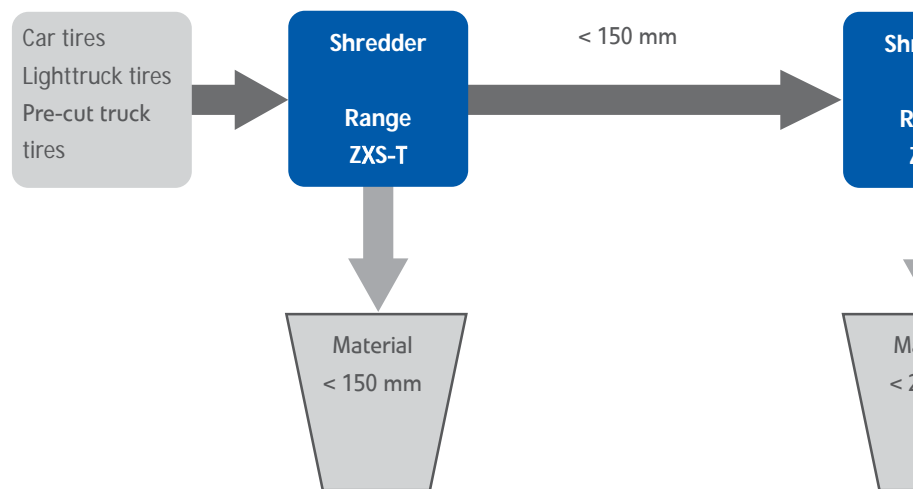
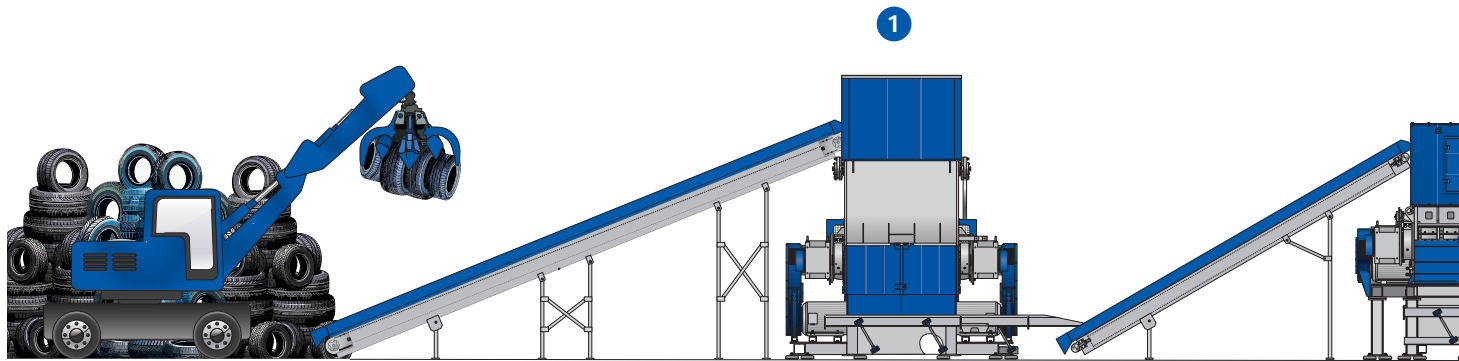


RDF Tire recycling system consisting of ZXS-T and ZTTS shredders

- Complete system solutions from a single source
- All components are perfectly matched
- Designed for processing large quantities of waste tires
- Built for continuous, long-term operation
- Achieves maximum throughput efficiency
- End products can be repurposed for further use
- Ensures a high return on investment

Customized systems from one source

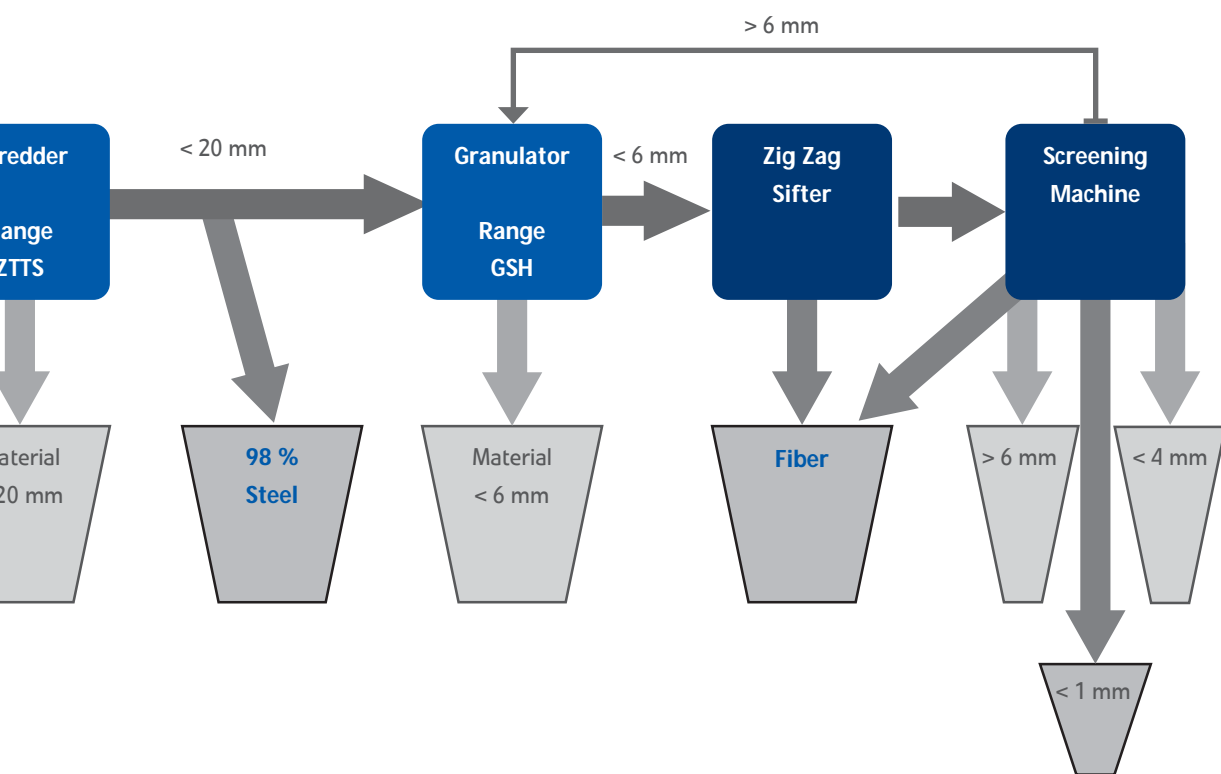
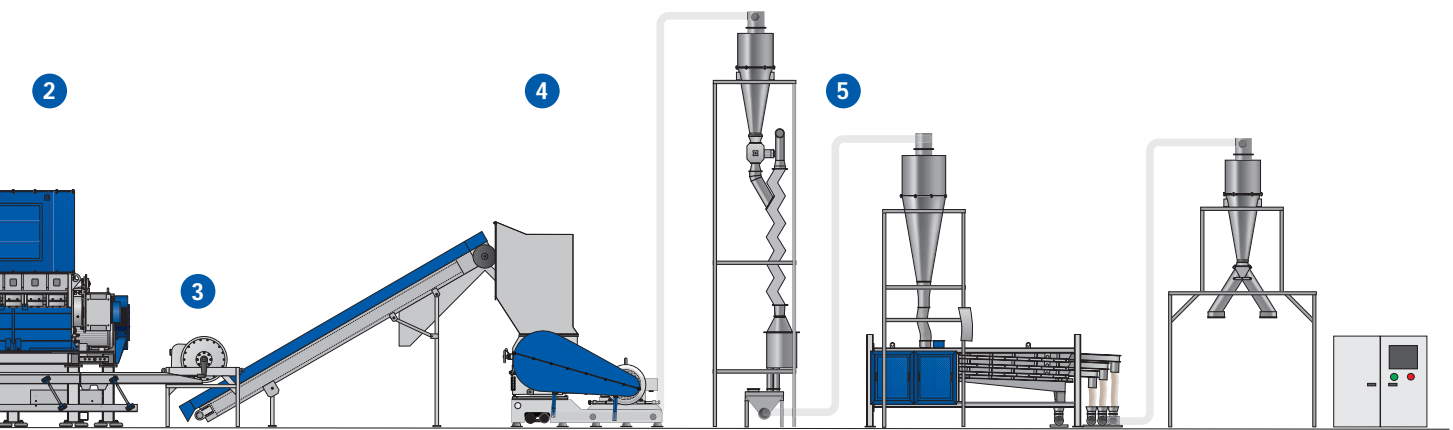
Working principle of tire recycling



ZERMA tire recycling systems consist of 5 main components:

- 1 The ZXS-T Pre-Shredder shreds the complete tires down to a size of approx. 150 mm
- 2 The ZTTS re-shredder cuts the tires down to a size of < 20 mm
- 3 Parts of steel wire are separated from the rubber in this step of the process
- 4 In the GSH Granulator the tires are granulated to a size of approx. 4 mm
- 5 After granulation, separation systems are used to remove metal and fibers in order to obtain a high quality result in the final product

Finally, the material can be filled into different fractions.



Reliable technology – Dependable output

Machinery used for tire recycling

ZXS-T – Pre-Shredder

The ZXS-T series shredders feature a rotor diameter of 750 mm, robust gearboxes, and full wear protection. The rotor and stator knives, along with their holders, are bolted and easily replaceable, simplifying maintenance significantly. The shredder is equipped with tungsten carbide knives, ensuring long service life. Its 11 kW two-stage hydraulic system prevents power surges and potential rotor blockages.



- Large diameter rotor of 750 mm
- Rotor is equipped with protective armor
- Two slow-running, high-torque gearboxes
- Powerful two-stage hydraulic system
- Durable steel-welded construction
- Spacious cutting chamber for high material intake
- Full wear protection

ZTTS – Fine shredder

The ZTTS series single-shaft shredders are specifically designed for shredding pre-shredded tires. These shredders feature a large rotor diameter of 750 mm and working widths ranging from 1500 to 3000 mm. Equipped with oversized external bearings and dual drives, the ZTTS shredders ensure high performance. The tangential infeed design guarantees optimal material feeding without the need for an additional hydraulic pusher. All key areas of the machine are protected with special wear-resistant coatings.



- Large diameter rotor of 750 mm
- Rotor equipped with protective armor
- Patented knife design
- Adjustable knife gap for optimized separation of steel and rubber
- Compact, heavy-duty construction
- High throughput capacity
- Quick and easy knife replacement

High throughput without breaking a sweat

Machinery used for tire recycling

Compact solution for small capacities (~ 1 t/h)

For compact systems with lower throughput requirements, the first two shredding stages can be combined into a single machine. The ZHS-T series shredders are designed to process car and motorcycle tires in one step, reducing them to a final size of approximately 20 mm.

The single-shaft ZHS-T shredders feature a large 600 mm rotor diameter and working widths from 1500 to 2000 mm. They are equipped with a load-dependent hydraulic pusher that feeds material horizontally into the rotor at an inclined angle. Whole tires are shredded between rotor and stator knives until the material passes through a screen beneath the rotor, which defines the final particle size.

All critical machine areas, including the armored rotor and high-wear contact surfaces, are protected with wear-resistant materials.



- Roller-mounted hydraulic pusher with horizontal movement
- Bolted knives and knife holders
- Segment bottom for processing thin-walled tires

GSH granulators to achieve crumb rubber

At this granulation stage, pre-shredded tires are reduced to a final crumb size of less than 4 mm. By this point, the material is virtually metal-free and ready for further use in various applications. GSH granulators are equipped with special wear-resistant components to handle this task efficiently. The wear protection includes high-durability wear plates, screens made from highly wear-resistant steel, and hardened linings in critical areas.



- Easy knife adjustment outside the machine using a setting jig
- Thoughtful housing design for easy maintenance
- Robust, externally mounted bearings
- Heavy-duty, steel-welded construction

Well thought out machines – optimal results

Separation and classification



Separation and bagging station of a tire recycling line



Separation

Material separation is a critical aspect of tire recycling. Throughout the process, materials are continuously divided into different fractions of rubber, steel, and fibers, then classified and packaged.

Steel

Steel is separated using various magnetic systems, including magnetic drums, rolls, and tubes. By Stage 3, up to 99% of the steel has been removed.

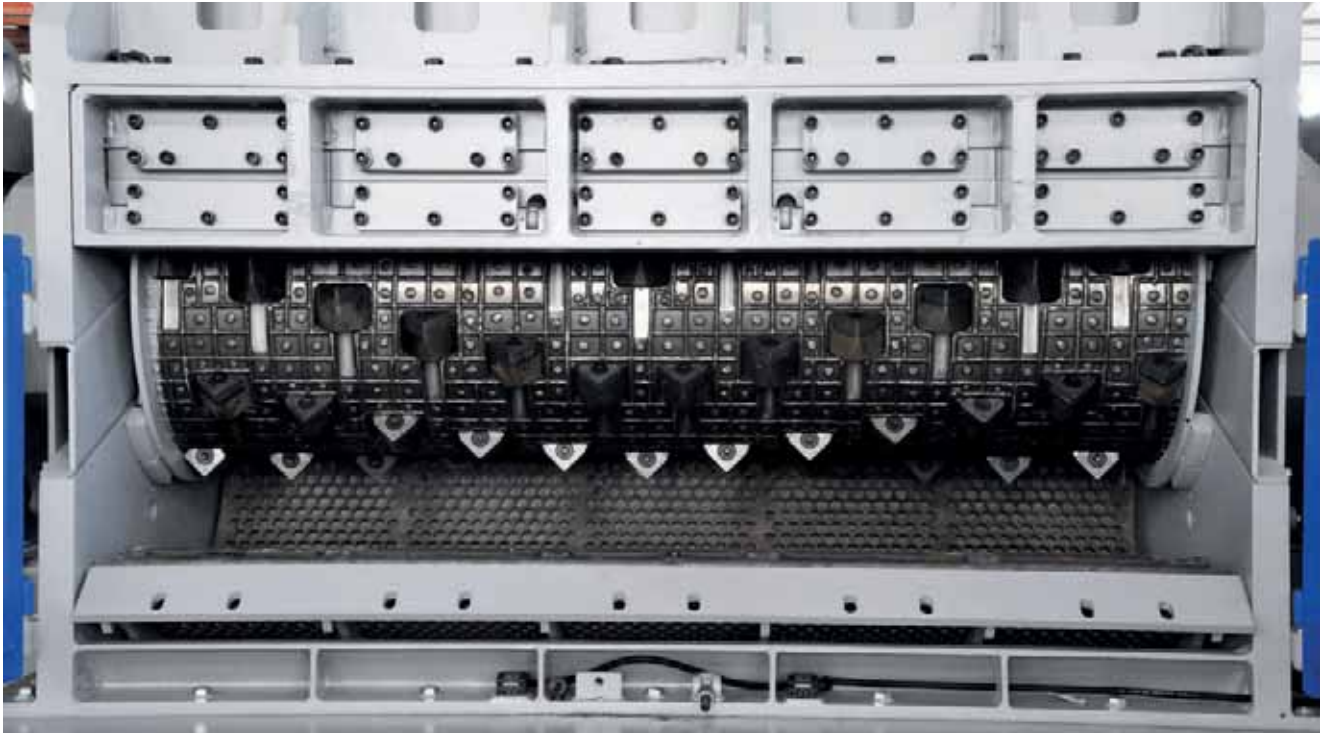
Fibers

During the granulation process, fibers are separated from the rubber. This is done using screening machines, air separation units, and specialized fiber separators, ensuring the rubber particles are fiber-free.

Classification

The final product, now free of metal and fibers, is classified into the desired fractions and packaged for further use.

Rotors – the heart of the recycling process



To handle the high steel content and contamination in end-of-life tires, **ZERMA** shredders feature fully hard-faced rotors paired with specially designed tungsten carbide blades. This combination ensures a long service life and extended intervals between maintenance.



The tungsten carbide rotor and stator blades are specifically engineered to withstand the rigors of tire recycling, providing exceptional durability and performance.



Rotor shafts and knife holders are bolted into the rotor to ensure easy reparability in case of accidents as well as acting as a safety breaking point to prevent further damage to the machine.

Technical details – well thought out and efficient



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The global ZERMA network of branches and distributors



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