

Recycling Plants for Waste Tyres



Waste tyres consist of caoutchouc, textile fibres, steel and additives, and have a high recycling potential. The recycling method (energy or material recycling) depends on the value of the subsequent products and on the availability and price of the raw materials. Legal regulations such as the landfill ban in the EU states advance waste tyre recycling for the benefit of conservation of resources. In material recycling, the waste tyres are crushed and granulated.



The granulation process separates the textile and steel fraction from the rubber so that the desired particle shape, particle surface and particle size distribution of rubber crumb and rubber powder are obtained.

For more than 10 years, Amandus Kahl has been active in waste tyre treatment and has delivered plants from reception to packing worldwide.

The central part of the granulation unit is the flat die press.

In waste tyre recycling, the flat die press used in many applications as a pelleting press for the compaction of various bulk products is used as a crushing machine functioning according to the pan grinder roller principle. In this case, it is also called pan grinder mill.

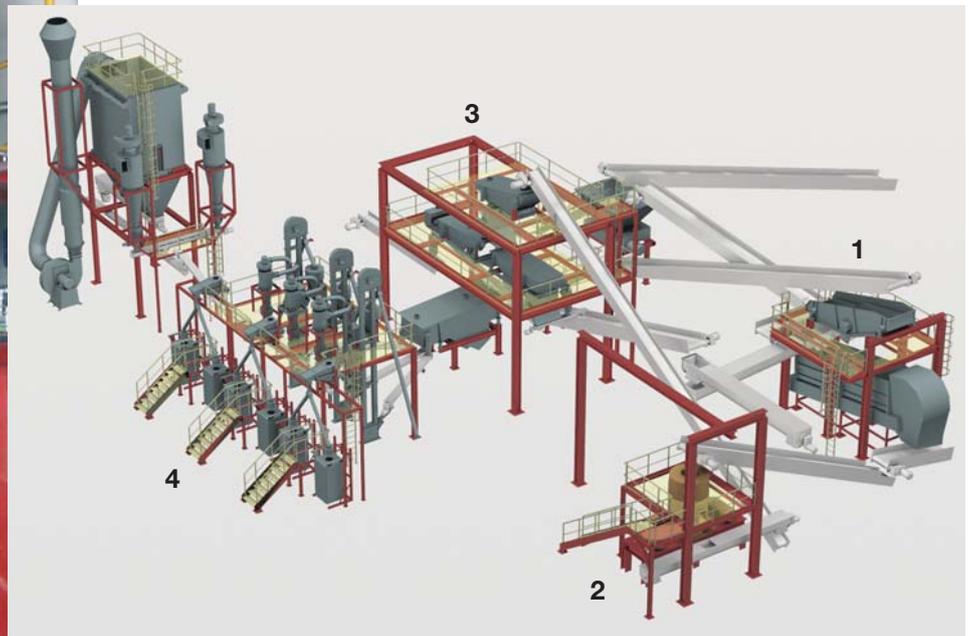
The pelleting elements such as pan grinder rollers and die exert a combined shearing and cutting impact on the product to be processed. The result is the desired separation of rubber, textile fibres and steel of the waste tyre.



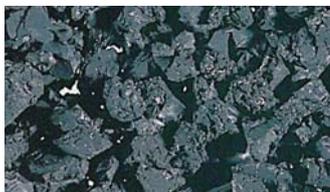


The plant design is subdivided basically into 4 process stages, with the waste tyre processing (e.g. 70 % car tyres and 30 % truck tyres) being designed for a standard input quantity of 2.5 t/h. In three-shift operation this amounts to a processing quantity of about 15,000 t/a.

The individual process groups and the layout of the plant components are in modular design. Thus, the machine groups can be modified and extended, depending on the throughput quantity and requirements on the quality of the final products (granulate size, purity etc.).



1. Precrushing of tyres for the production of tyre shreds or chips (about 50 x 50 mm).
2. Granulation using the flat die press/pan grinder mill for crushing the chips for further processing.
3. Iron separation and classification into different rubber fractions (e.g. 0.2 to 0.8 mm, 0.8 mm to 2 mm, 2 to 4 mm).
4. Cleaning of the granulate for separation of textile fibres and rubber.



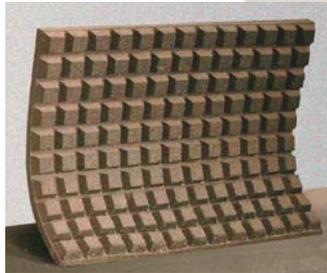
Waste tyre granulates with a high purity degree

After granulation using the flat die press/pan grinder mill and subsequent screening and separation, crumbs of different grain fractions and with a very high purity are produced. In the ambient process using the flat die press, crumbs with a large porous surface are produced which have optimum product properties for further processing.

After the compound material of the tyres has been crushed and the rubber fraction has been separated, further residual materials are separated, for example steel with a rubber content of < 3 %.

By using rubber crumbs, natural rubber can be substituted in the manufacture of rubber products. The degree of substitution depends on the quality of the crumbs. This saves raw materials and resources!

Rubber crumbs and rubber powder are used in rubber mixtures of new tyres, in other rubber products (sports grounds and floor coverings, rubber mats, noise insulation materials etc.), in asphalt for road construction (low-noise asphalt), in gardening and landscaping as well as in oil binding agents.



Advantages of the process with flat die press/pan grinder mill

- Reduced investment and operating costs in comparison to cryogenic processes
- Reduced machine expenditure and energy input
- Reduced operating costs
- Reduced noise emission
- Cutting granulators are not required
- Long service life of the granulation tools, about 5,000 t of waste tyre shreds
- Rapid change of wear parts
- Ease of maintenance of plant components
- No process waste due to optimum material recycling
- High content of fine rubber particles (optional)
- Large surface of the crumbs
- High purity (rubber/steel)
- High proceeds from final products



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