

Range of applications **Recycling**



THE CHALLENGE.

When it comes to successfully producing and processing recycled materials, there are several decisive factors: outstanding homogenisation, targeted and precise temperature control, systematic process

reactions, effective degassing, a material-friendly compounding process and effective cooling – all while dispensing with discontinuous intermediate work processes.

THE SOLUTION: the ENTEX Planetary Roller Extruder.

ENTEX goes green. ENTEX has over 35 years of experience in plastic extrusion technology for compounding a wide range of materials.

offered by the individually configurable modular construction of the ENTEX extruder system.

In recent years we have been working with our partner companies, institutes and universities to develop a range of recycling processes that include sewage sludge treatment, waste tyre devulcanisation, film edge trim recycling as well as different depolymerisation and other plastic recycling processes. Complex recycling processes that are increasingly important today have come into being thanks to the wide-ranging possibilities



Typical areas of application

- Recycling plastic
- Devulcanising waste tyre rubber
- Producing biologically degradable plastics
- Recycling film edge trim
- Treating recycled paper with additives
- Treating sewage sludge



RECYCLING

Benefits of processing and compounding.

Outstanding homogenisation

Solids with different bulk densities and liquids with different viscosities can be compounded very well with the planetary roller extruder over a short distance without premixing processes. The unique operating principle

is particularly suitable for the gentle mixing and homogeneous processing of different materials due to the permanent rolling and the large number of kneading gaps.

Targeted and precise temperature control

Precise temperature control is a key factor for many demanding recycling processes. From a process engineering point of view, the temperature control technology of the planetary roller extruder (PRE) plays a central role for all processes. With an internal energy exchange surface up to 10 times larger than conventional processing units, the PRE is

ideally suited for complex extrusion processes. Full-surface temperature control enables rapid temperature changes to initiate or terminate chemical reactions. The internal geometries of the process section and the thin walls between the temperature control medium and the extrudate are crucial for this.

Effective cooling

Effective cooling of the extrudate to the required target temperature/viscosity during the extrusion process enables direct further processing without additional tempering processes. The individual properties of the supplied materials can also be taken into

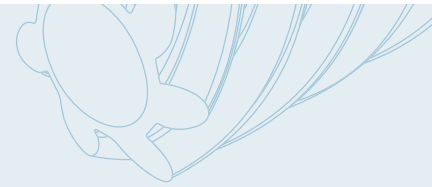
account. Cooling processes of this quality are not possible with other extrusion systems due to their much smaller internal surfaces, sluggish temperature control and less gentle material handling due to the high mechanical shear stress.



**HIGH
THROUGHPUT**



**IMPROVED
PRODUCT QUALITY**



Precisely controlled process reactions

The planetary roller extruder (PRE) is the ideal processing unit for precisely controlled reaction processes. The modular design with mechanically configurable process zones and individual temperature control zones enables targeted and efficient control in the individual phases of reaction processes. It is possible to react chemicals under pressure or to induce, control and interrupt reactions in individual

process zones in a planned manner. A chemical reaction can extend over several process zones and pass through different pressure and temperature conditions. The ability to specifically influence process reactions and control reactions makes the PRE particularly suitable for reactive processes.

Effective degassing

Entrained air, gases, vapours, fission products, odours and other volatile substances can be efficiently evacuated from the process. In order to efficiently degas the extrudate, the planetary roller extruder (PRE) can be used to create process zones with a vacuum of less than 1 mbar. This e.g.

achieves a better storage life, because fission products which can lead to undesirable reactions do not remain in the material. In addition, odours and possible toxic gases are removed, thus making a valuable contribution to quality assurance and increasing occupational safety.

Material-friendly compounding process the key

By separating the mechanical and thermal energy input, particularly gentle, low-shear processing is possible, which means that the properties of already pre-stressed

recycling materials are not further impaired. The principle of constantly repeating rolling out the material with very little shear stress results in only minimal additional stress.



**SIMPLIFIED
PROCESS CHANGES**



**A SECURE
INVESTMENT**

Precision extrusion

A system concept that delivers.

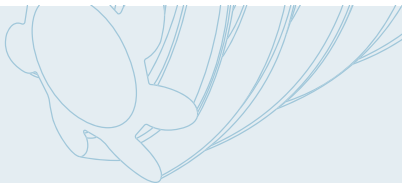
This system’s combination of a targeted, process-oriented feed of various fluids and solid materials in defined process zones with mechanical configurability and efficient

tempering allows to conduct gentle, low-shear processing to produce extrudates with outstanding homogeneity. Every single step in the process can be controlled individually.



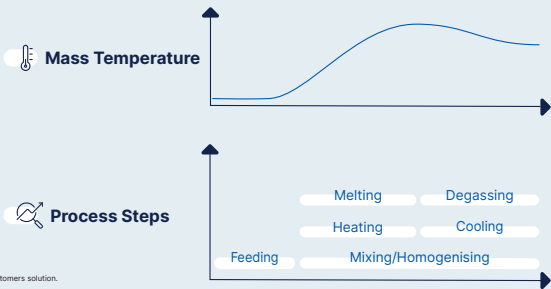
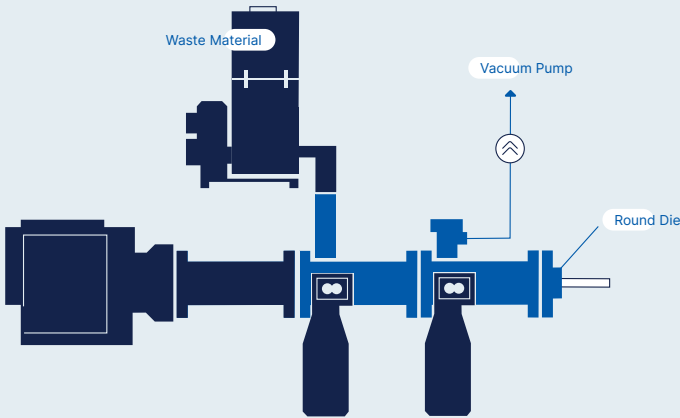
PRE-M2

The recycling process.



PRE-M2

Recycling Process



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Displayed process scheme may differ from the final and individual customers solution.