Range of applications

Rubber and elastomers

THE CHALLENGE.

The Planetary Roller Extruder (PRE) offers various features that are decisive for successful producing and compounding rubber and elastomers. It is able to process all formulation components in a single step in a continuous process thanks to optimised tempering – eliminating the need for discontinuous steps. It also delivers excellent material quality, reduces the volume of raw material required, presents a wide range of processing possibilities, and offers excellent degassing performance and blister-free results.

THE SOLUTION: the ENTEX Planetary Roller Extruder.

Thanks to their modularity and flexibility, ENTEX Planetary Roller Extruders can perform all the process steps required for the production of rubber and elastomers. All formulation components can be processed in a single step as part of a continuous process. As the materials are only heated once, the mass is subjected to significantly less stress and has a generally shorter temperature history compared to the conventional processes. There is no need to cool the material for intermediate storage. With the excellent temperature control offered by the Planetary Roller Extruder, the melt can simply be cooled to the required processing temperature so that the vulcanising agents can be added. EPDM (ethylene propylene diene monomers), TPE (thermoplastic elastomers), SBR (styrene-butadiene rubber) and BR (polybutadiene) formulations are but a few examples of substances that can be processed in a single step using a Planetary Roller Extruder.

Typical areas of application

- Roof membranes (construction industry)
- Tires (automotive industry)
- Conveyor belts (mining, processing industry)
- Seals and gaskets (engineering)
- Shoe soles (sporting goods)
- Synthetic playing surfaces for sports and leisure activities, including in sports halls, playgrounds, etc.

RUBBER AND ELASTOMERS

Benefits of producing and compounding.

Process all formulation components in a single step revolutionary

The Planetary Roller Extruder's ability to process rubber and elastomers in a single step is revolutionary. All formulation components – including the vulcanising agents – can be fed into the Planetary Roller Extruder in the required sequence. This is made possible by the efficient tempering and the permanently repeating thin-layer rolling process. The minor friction heat that is generated can be removed from the process. The maximum melt temperature required for processing and adding the vulcanising agent can be precisely set. This eliminates the multi-step manufacturing process that is required for the conventional technique – significantly lowering expenditures for intermediate storage and transport.

Continuous – instead of discontinuous – processing

The Planetary Roller Extruder continuously processes rubber and elastomers. This makes it possible to maintain consistently high product quality. There is no need to cool the material by placing it in intermediate storage, something that would be necessary using the conventional technique with kneaders. Continuous operation also allows operational costs overall to be reduced.

Optimised degassing and bubble-free results

The raw materials used often make it necessary to remove air or bound water (e.g. from carbon black) from the melt. Without this step, completing the vulcanisation of the final product would result in porous structures and the creation of bubbles, each of which would have negative effects, including a deterioration in the properties of the materials produced. Porous structures can also lead to reduced functionality.

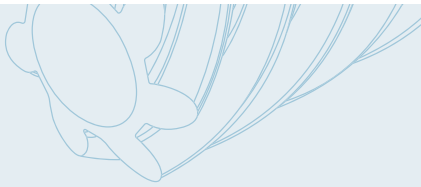
When processing rubber and elastomers with a Planetary Roller Extruder (PRE), degassing is performed directly in the PRE. Thanks to the excellent continuous thin-rolling and surface renewal, as well as the ability to operate a PRE even when it is only partially filled, air and bound water can be removed from the melt very effectively. In addition degassing can also be realised in a single-screw extruder coupled with the final roller cylinder via a vacuum transfer shaft.


HIGH THROUGHPUT


IMPROVED PRODUCT QUALITY


SIMPLIFIED PROCESS CHANGES


A SECURE INVESTMENT



Excellent material quality

Using a Planetary Roller Extruder (PRE) to process rubber and elastomers offers material-friendly processing for all formulation components. For some compounds, higher, specific kneading and dispersion energies are required. These can be precisely set for each process using suitable machine elements such as planetary spindles and dispersion rings. The PRE's continuous thin-rolling of the material ensures excellent material tempering.

This avoids the formation of hot-spots and delivers homogeneous product quality. Since the PRE allows all recipe components to be processed in one continuous process, the materials are only heated once. The result: materials are subjected to lower levels of temperature stress and have a lower temperature history, reducing the proportion of stabilisers that must be added to the process.

Wide range of processing possibilities

Flexible in every sense of the word

Thanks to their modularity and flexible adaptability in structure and configuration, the Planetary Roller Extruder (PRE) can process different kinds of rubber and elastomer compounds. Among other things, these include natural rubber, synthetic rubbers, fillers such as chalk / talcum / carbon black / silica, additives, UV stabilisers, antioxidants, processing agents, process oils, vulcanising agents and colourants. Soft formulations – such as when processing bitumen – and dry formulations without a process oil can also be processed. It is even possible to conduct chemical reactions like the silanisation reaction in the PRE. In this case, the PRE's process configuration is adapted to provide the dwell time, energy exchange surface and reaction temperature necessary for the silanisation reaction.

Reduced raw material requirements – reduced costs

efficient

As a result of the outstanding mixing, homogenisation and dispersion achieved when processing rubber and elastomers in a Planetary Roller Extruder, the use of process additives and vulcanising agents can be reduced, while producing finished materials of the same or even better quality.

Precision extrusion

A system concept that delivers.

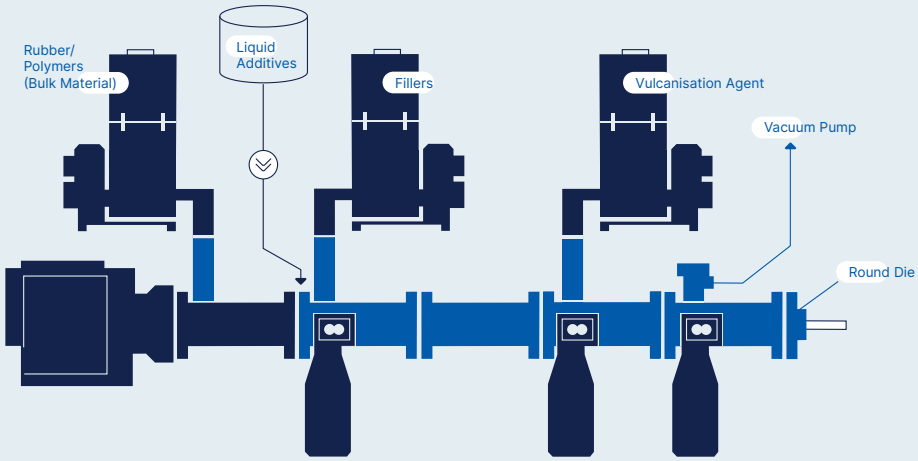
This system's combination of a targeted, process-oriented feed of various fluids and solid materials in defined process zones with mechanical configurability and efficient tempering allows to conduct gentle, low-shear processing to produce extrudates with outstanding homogeneity. Every single step in the process can be controlled individually.

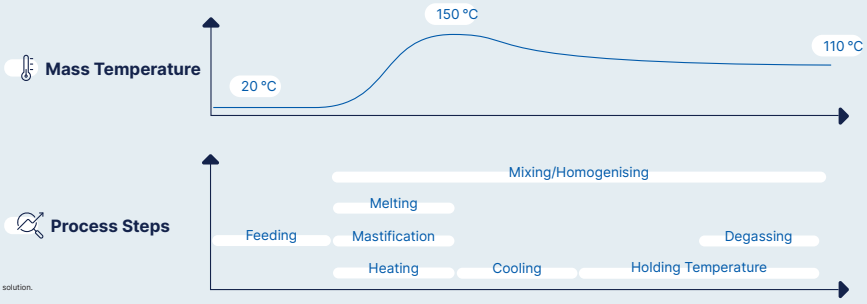
PRE-M4

Rubber compounding.

PRE-M4

Rubber Processing





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