Range of applications

Silicones

THE CHALLENGE.

When it comes to successfully manufacturing and compounding silicones, there are several decisive factors: achieving desired viscosities quickly, optimising dwell time control, taking advantage of reactive extrusion processes, and ensuring high-performance degassing.

THE SOLUTION: the ENTEX Planetary Roller Extruder.

More and more silicone manufacturers are turning to the principles embodied by the ENTEX Planetary Roller Extruder (PRE). Thanks to its modularity, the PRE can represent every step required for silicone manufacturing.

Everything is perfectly coordinated: by using a Planetary Roller Extruder to compound silicone, it is possible to implement a highly automated, continuous process while maintaining consistently high quality. In fact, this can be done to industrial scale, producing several tonnes an hour in a very safe working environment.

Typical areas of application

- Seals and gaskets (construction industry, automotive industry)
- Facade coating systems (construction industry)
- Tubes, catheters (medical technology)
- Labels, adhesive films (paper industry)
- Isolators (electrical industry)

SILICONES

Benefits of producing and compounding.

Achieving desired viscosities quickly

Among other things, silicone manufacturing requires mixing two or more basic components with sharply different viscosities. Here, the Planetary Roller Extruder is able to offer optimum results on account of the special geometry of its mixing chamber and its operating principle, which is based on a continuous rolling mill. Depending on the unit size, it is possible to have as many as 48 kneading gaps – this corresponds to approx. 50 individual steps in the conventional dual-roller mill that is traditionally used in the silicone sector.

Optimum dwell time control the key

The modular design is the key, as separate process zones, coupled with precise temperature control and monitoring, make it possible to optimise dwell time control to facilitate the reactions necessary to integrate large volumes of fillers. Fillers with low bulk densities can be mixed in without difficulty. Over 50% fumed silica with a bulk density of less than 20 grams per litre is feasible.

Customised solutions that are sure to impress

Depending on the customer's specific requirements, various additives can be fed into the ongoing process, including colourants via fluid injections or solid materials using gravimetric dosing systems with coupled side feeders. The Planetary Roller Extruder's modularity makes it extremely flexible and excellently suited to satisfying the individual requirements of the customer and their process. This ensures an attractive ROI.

HIGH THROUGHPUT

IMPROVED PRODUCT QUALITY

Reactive extrusion processes offer a tangible advantage unique

By offering as much as ten times the internal energy exchange surface area available in conventional mixing aggregates like twin-screw extruders, the Planetary Roller Extruder is ideal for chemical reactions. Reactants are able to complete their reactions even over a relatively short distance in the process. The key to this is the system's geometry with rotating planetary spindles.

The reactants often have a very low viscosity, for example of only 1–50 mPa·s.

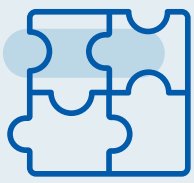
The Planetary Roller Extruder efficiently mixes these with the polymer and the filler, each of which have significantly higher viscosities.

High-performance degassing

By-products and other volatile substances created by the reaction can be efficiently evacuated. It is possible to create process zones with a vacuum of less than 1 mbar in the Planetary Roller Extruder to efficiently degas the extrudate. This also offers other benefits – for example, it allows the extrudate to be stored, because any by-products that might otherwise trigger undesirable reactions have been removed from the material.

Odours and possibly toxic gases are also removed, making a valuable contribution to quality control while increasing work safety.

The self-contained continuous manufacturing process inside the Planetary Roller Extruder makes this possible, eliminating the need for the batch processes that are otherwise common in silicone production.



SIMPLIFIED PROCESS CHANGES

A SECURE INVESTMENT

Precision extrusion

A system concept that delivers.

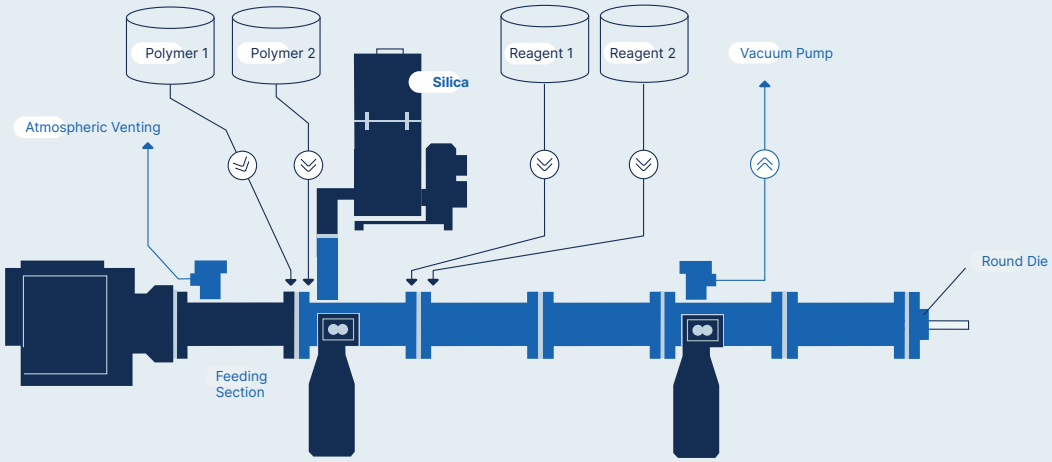
This system's combination of a targeted, process-oriented feed of various fluids and solid materials in defined process zones with mechanical configurability and efficient tempering allows it to conduct gentle, low-shear compounding to produce extrudates with outstanding homogeneity. Every single step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

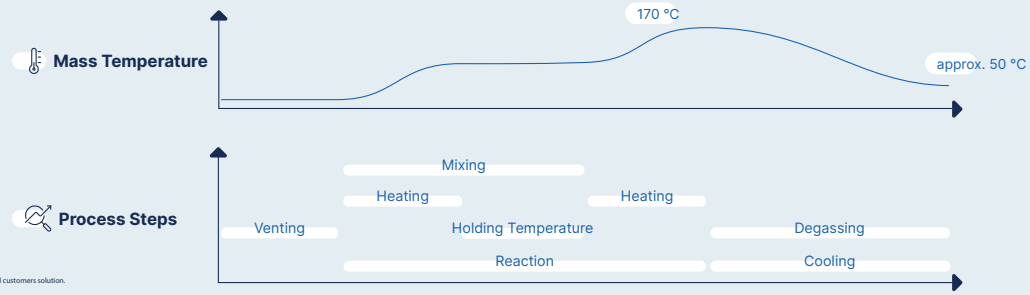
PRE-M5

The silicone compounding process.

PRE-M5

Silicone Processing





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