

Compact rubber extruder
Degassing screw design
– our DeSO System solution



Change compounds without changing the degassing screw

The DeSO System of the degassing extruder for production of technical rubber goods allows the user to set the necessary processing pressure directly at the barrier dam and to adjust the pressure during operation.

Optimum process parameters for various compounds can be stored in a recipe file.



Degassing screws – our solution

One of the essential pre-requisites for pressureless vulcanization is the complete degassing of the rubber compound to be processed. The extraction of water, air and other volatile components from the material takes place in the extruder itself. This prevents the formation of blisters, bubbles, porosity, and related extrudate surface defects, and maintains dimensional stability of the finished product. Special degassing extruders are therefore used extensively in the production of technical rubber goods.

Evaporation and removal of water, air and other volatile components from the rubber compound takes place in the degassing unit of the screw before it passes through the extrusion die.

To achieve effective degassing the degassing screw is fitted with a barrier dam. The barrier dam, functioning as a pressure resistance, is installed at the end of the homogenization zone and enables the build-up of compound pressure in front of the barrier dam, as shown in the diagram below. The pressure build-up is dependent on the gap between the throttle ring, its external diameter and the cylinder's internal diameter as well as the compound

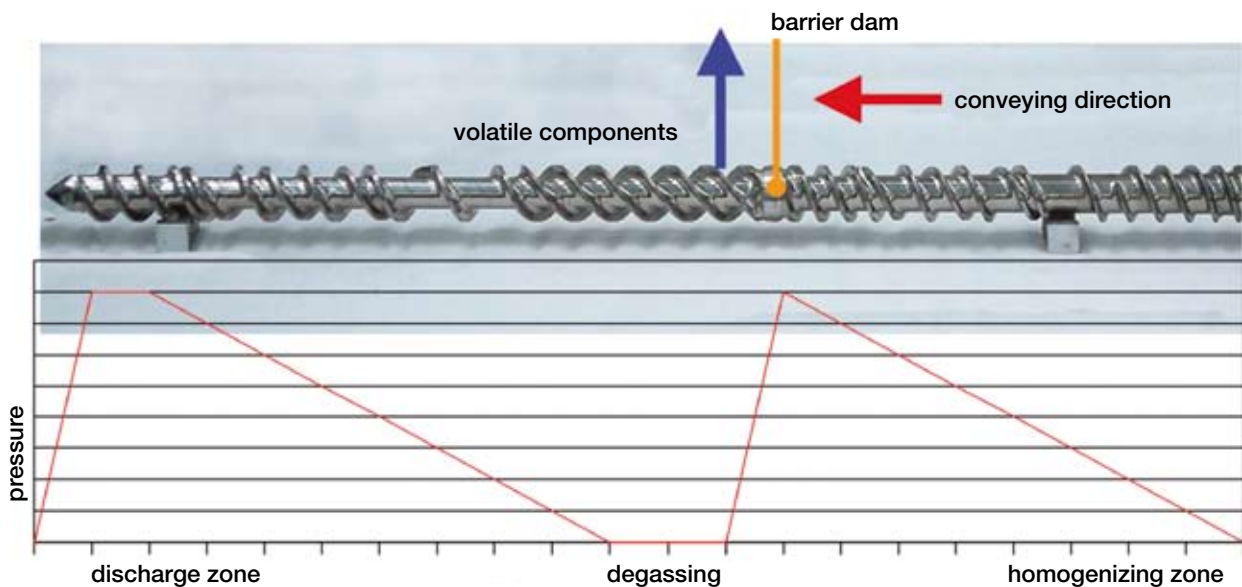
properties. The actual degassing zone is positioned immediately behind the throttle ring. The pressure drop in the throttle ring and the vacuum generated by the vacuum pump results in the vaporization of the volatile components which are drawn off to the degassing zone.

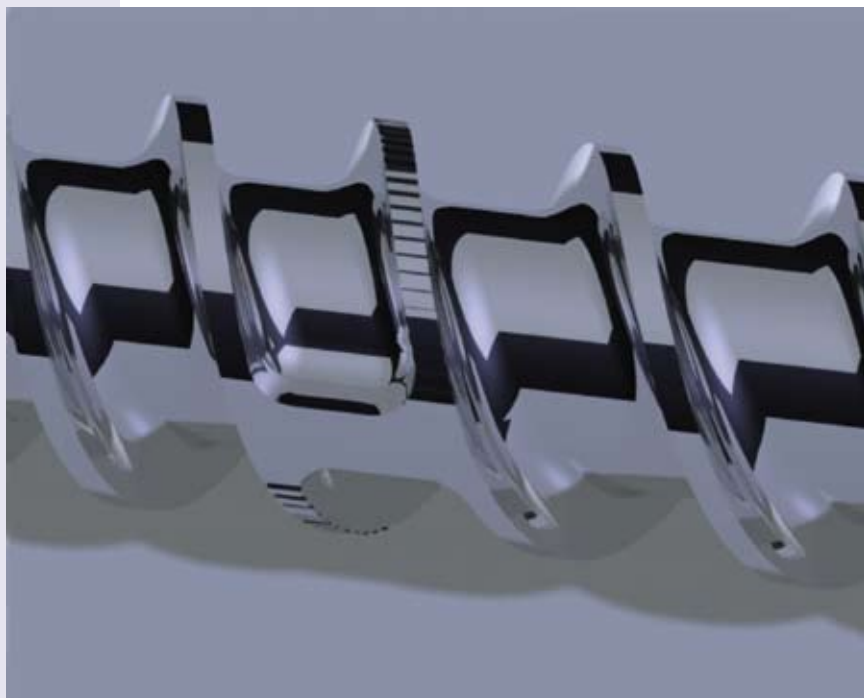
All gases and volatiles likely to later cause blisters in the profile curing line are therefore removed by this degassing process.

The pressure required for creating the profile shape is generated downstream in the discharge portion of the extruder.

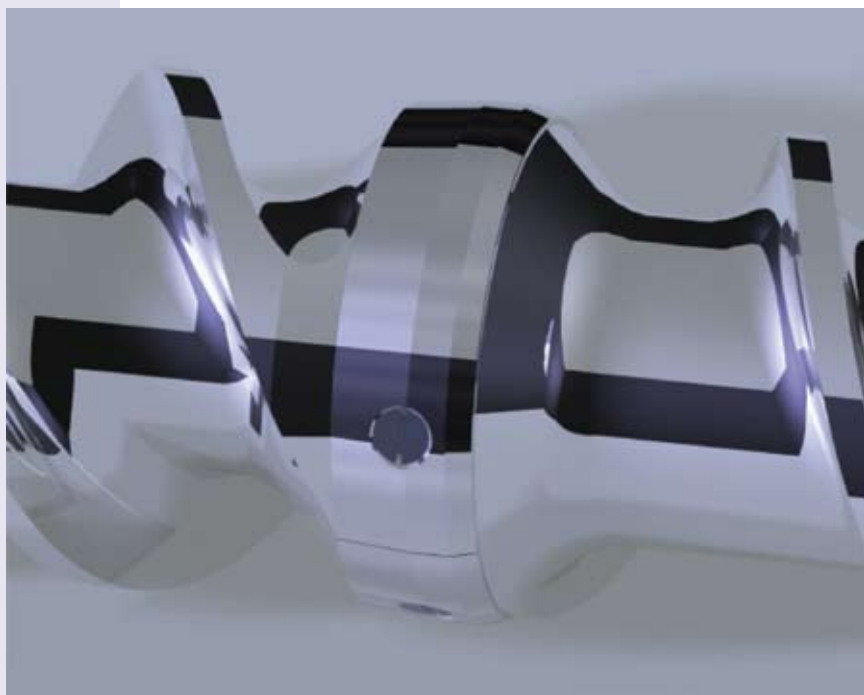
Degassing screw

Functional principle





Barrier dam as part of the screw



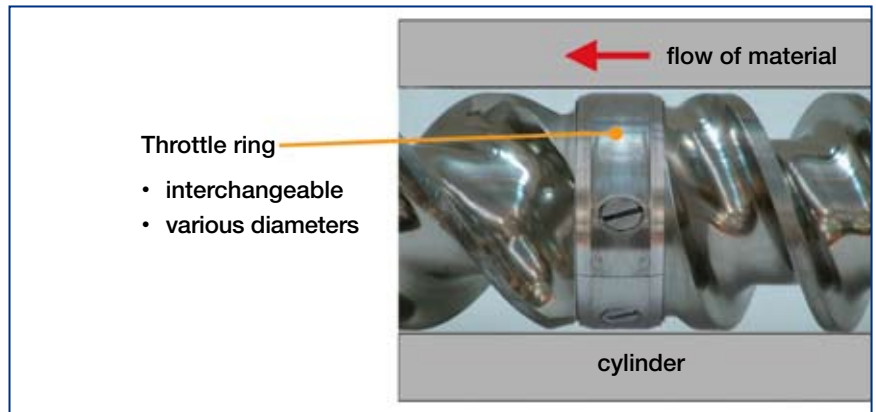
Barrier dam combined with throttle ring

Barrier dam

Different profiles and different rubber compounds take on different flow characteristics during the flow through the barrier dam. It is therefore necessary to adjust the gap between the barrier dam and the extruder cylinder to achieve the optimum processing conditions for each profile or compound. If this adjustment is not carried out correctly, a „pumping“ effect can be created on the screw, resulting in variations of the profile size. If the throttle gap is too large, an excessive amount of the compound can pass through the throttle gap into the discharge zone, perhaps even resulting in an overflow of compound into the degassing port/ vacuum pump.

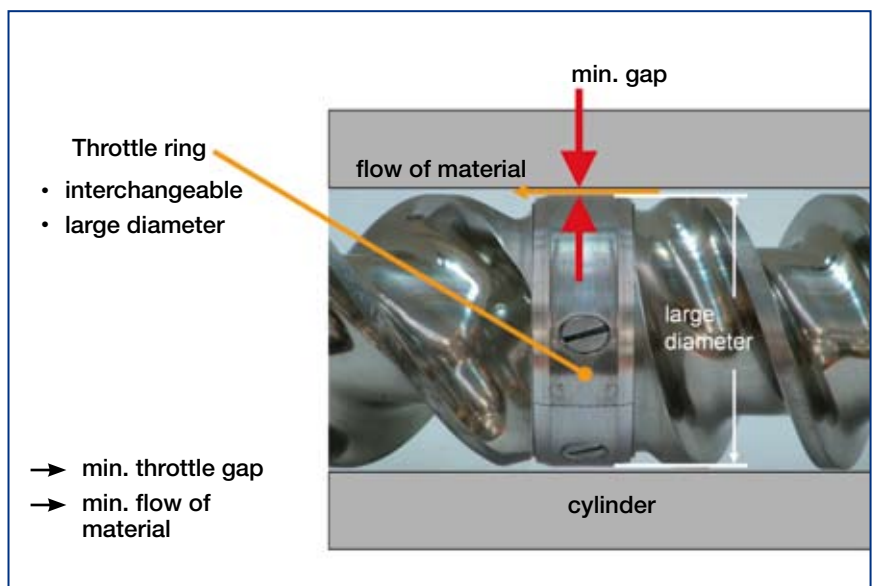
One possible solution is to have different screws with varying throttle gaps for different profiles or rubber compounds. This means, however, changing the screw each time the profile or compound is changed.

Our standard design for the KGE degassing extruder is the use of an interchangeable throttle ring system mounted on the screw in front of the degassing zone. The design incorporates throttle rings of various diameters, which can be changed out as required.



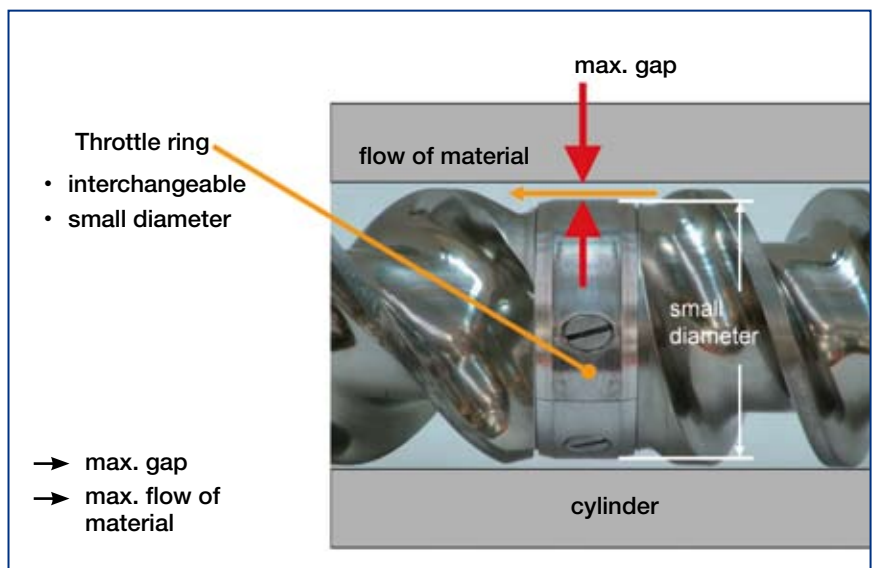
Throttle rings with different diameters are used to adjust the gaps between the throttle ring and the extruder cylinder. Therefore only the throttle ring needs to be exchanged when changing profile size or compound.

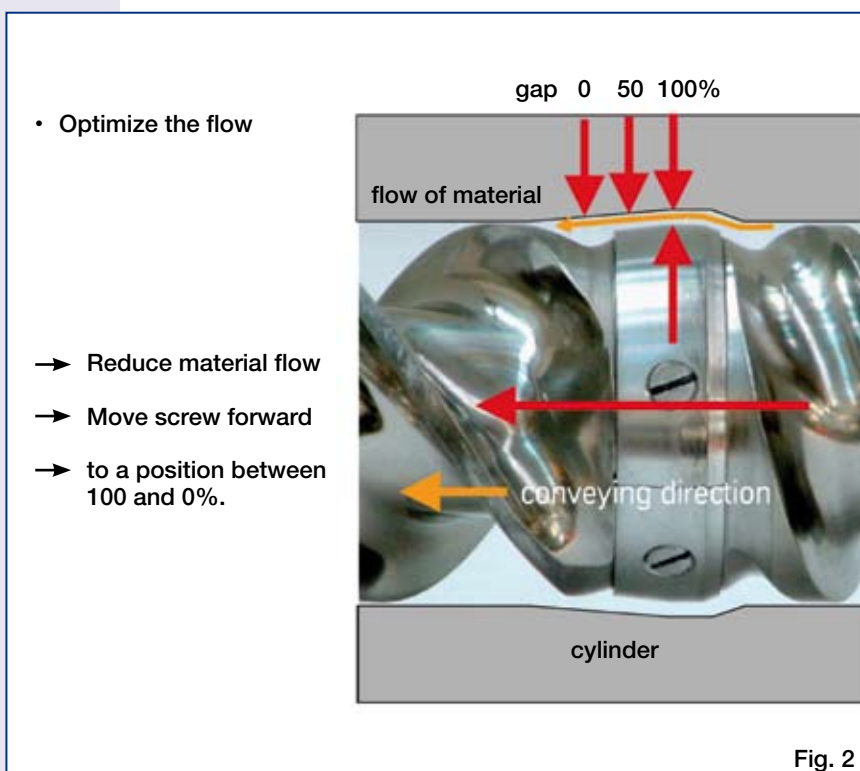
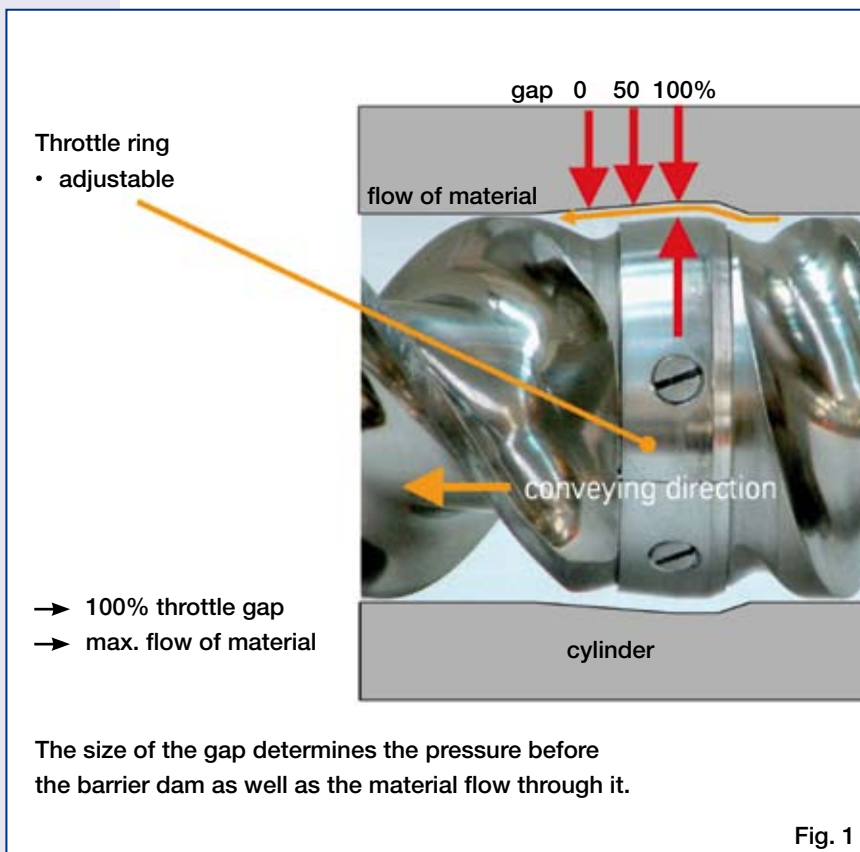
Special areas of application:
Used for production of small profiles with low compound throughputs or for low viscosity compounds.



The time required to change a screw may be between one to two hours; to change a throttle ring, between 30 and 60 minutes. During this time, the extruder is not available for production.

Special areas of application:
Used for large profiles with high compound throughputs or for high viscosity compounds.





The New development DeSO System - Degassing Screw Optimizing System

DeSO is a recent development from Harburg-Freudenberger, which minimizes time and production losses when changing the profile or compound by allowing for adjustment of the gap between the barrier dam and the extruder cylinder on the fly, while processing.

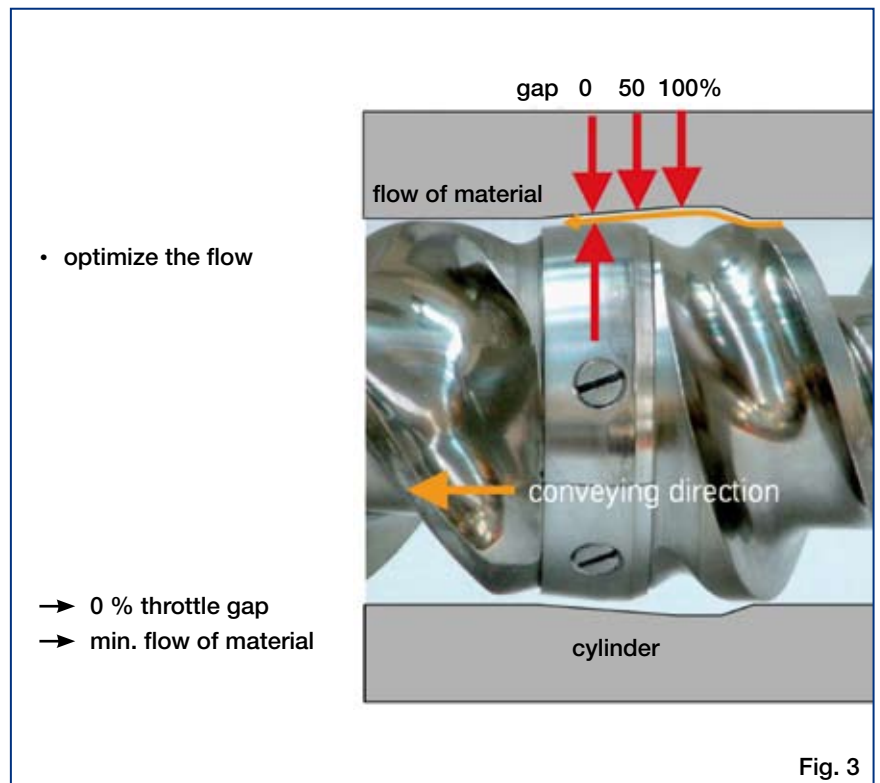
The unique DeSO System allows the user to adjust the throttle gap when the machine is actually in operation. In this way, the optimum settings can be dialed in for each individual profile size and compound being processed. Thus the most effective conditions for degassing and maximum throughput are maintained.

The DeSO System provides continuously variable adjustment of the gap between the throttle ring and the cylinder by moving the screw through a range of approximately 10 mm, creating maximum to minimum gap settings.

The control program allows the gap to be set between 0 and 100 %.

Fig. 1 shows a gap setting of 100 %. To reduce the gap the screw is moved forward, by push button control, to a position between 100 and 0 %, as in Fig. 2.

Fig. 3 shows a gap setting of 0 %. To increase the gap the screw is moved backward, by push button control, to a position between 0 and 100 %.



The DeSO System is an efficient and economical system allowing the user to minimize profile or compound set-up time, to quickly optimize extruder set-up parameters, and to maximize extruder throughput rates.



Extruder type KGE 90 / 20 with DeSO System

Harburg-Freudenberger

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Rubber mixing technology

We provide the most comprehensive range of machines for the rubber and caoutchouc industry including all major preparation and processing stages.

- Complete mixing room systems
- Internal mixer
- Mixing mills
- Dump extruder

Caoutchouc technology

Production machines and lines for the manufacture of tires and technical rubbergoods from raw material feeding to vulcanisation:

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- Extrusion lines
- Tire building machines
- Curing presses

Edible Oil Technology

Machines for processing oilseed, crude oils of vegetable origin and animal raw materials as well as screw presses for the dewatering of synthetic caoutchouc and similar products:

- Screw presses
- Extraction lines
- Refining lines
- Process engineering

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Harburg-Freudenberger Maschinenbau GmbH
Gummimischtechnik
Asdorfer Straße 60 • 57258 Freudenberg • Germany
Postfach 11 80 • 57251 Freudenberg • Germany
Tel.: +49 2734 491 - 0 • Fax: +49 2734 491 - 150

Harburg-Freudenberger Maschinenbau GmbH
Kautschuktechnik • Speiseöltechnik
Seevestraße 1 • 21079 Hamburg • Germany
Postfach 90 05 52 • 21045 Hamburg • Germany
Tel.: +49 40 771 79 - 0 • Fax: +49 40 771 79 - 325

Hamburg-Harburg Freudenberg Belišće Topeka Akron Paris Teheran Moskau

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