

HiMelt screws



The HiMelt screw is the right choice whenever high demands are made on the quality of the melt and the plasticizing capacity. By virtue of its special geometry this screw combines high plasticizing capacities with gentle processing of the material. Apart from the increased rate of plasticizing, the screw's salient characteristics are the reduced shearing action to which the material is subjected and the good mixing effect. These benefits are guaranteed right up to maximum throughputs.

Basic situation

An ever greater pressure of costs and higher requirements as regards the quality of the moulded articles demand the use of an injection moulding machine which suits the product in optimal manner. It is very important also that the right screw is selected, whereby one has to differentiate between various requirements:

- low shear load on materials which are sensitive to shearing
- increase of the plasticizing capacity
- improvement of the thermal and material homogeneity

A varying degree of importance is attached to these requirements depending on the material. When processing PC/ABS blends, for instance, the exposure to shear is in the foreground in order to achieve the highest possible impact resistance which one expects

particularly in thin-walled housings. The production of closures and packaging products relies on extremely high plasticizing capacities and a homogeneous melt. Standard three-zone type screws come to their limits in these cases. The answer here is the application of a HiMelt screw.

HiMelt

The HiMelt screw is a twin-flight barrier screw which is designed especially for high plasticizing capacities while keeping the amount of shear at a low level. Experiences gained over many years in the processing of both polyolefines and technical plastics confirm this impressively.

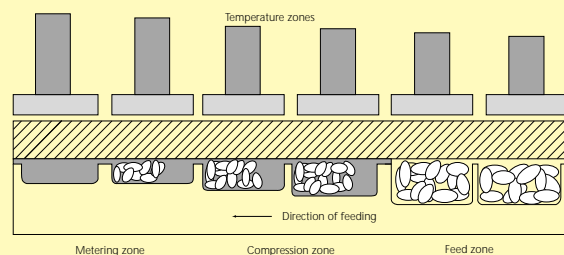
Functioning principle

The conventional three-zone screw (illustration 1) takes up the granulate in the feed zone and compresses it in the compression

Functioning principle

Standard

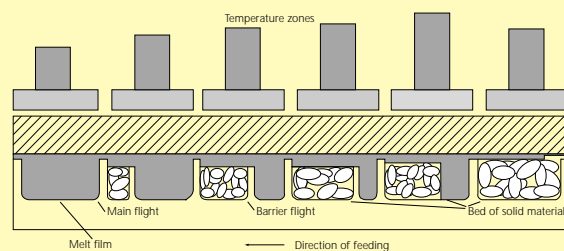
1



Functioning principle

HiMelt

2



zone. The granulate melts on account of friction and the heat of the barrel wall. In the metering zone the melt is only homogenized, which means that unmolten particles can reach the front end of the screw in case of high throughputs. At the same time the melt is sheared to a considerable extent in the metering zone.

This is different with the twin-flight "HiMelt" barrier screw which conveys the bed of solid material and the melt individually, separated by a barrier flight. The film of melt created along the hot barrel wall is continuously scooped off by the barrier flight and passed into the second screw channel. The uncompromising separation of melt and granulate ensures that no unmolten particles reach the chamber in front of the screw. To guarantee optimal contact between barrel wall and material

at all times, the channel for the solid material decreases as melting down progresses, while the melt channel increases in size. The shear load and thereby the amount of friction is reduced because the screw displays a clearly lower compression ratio, which means that a lower drive capacity is required at the same time.

To support the functioning of the HiMelt screw in optimal manner, the temperature management varies from that applied with standard screws. While a progressive temperature profile is used in the case of the standard screw, a degressive temperature profile is more appropriate with the HiMelt screw (illustration 2). This ensures that a film of melt exists already at the beginning of the barrier flight.

Since the screw guarantees an excellent homogenization of the

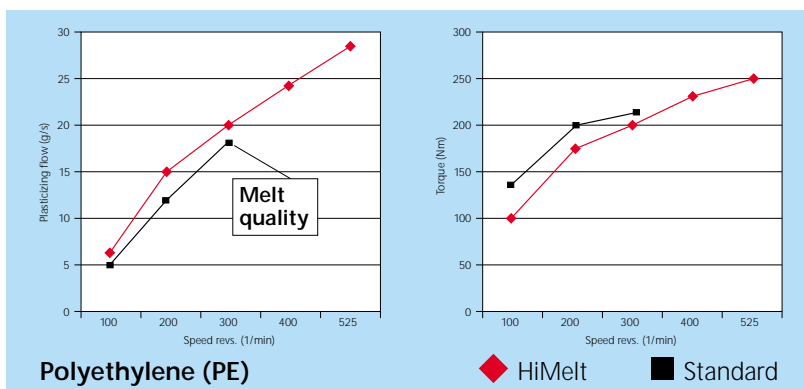
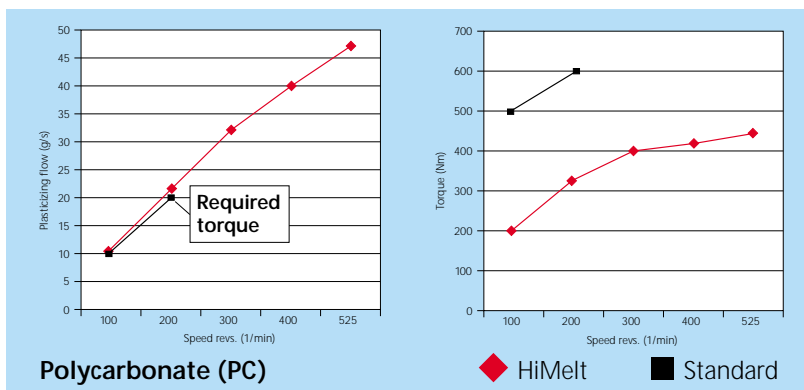
material already on the basis of its concept, one can operate with lower back pressures. This contributes also towards reducing the load to which the material is subjected.

Advantages of the HiMelt screw

- increase of the plasticizing capacity
- reduced material friction
- lower shear load
- improved melt quality
- reduced melt temperature

The benefits

Preparation and processing of the melt are improved considerably by the HiMelt screw. This enables shorter cycle times in the case of packaging products and a better product quality in the case of technical mouldings.



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