coperion

Engineering Plastics.

Raising your throughput and efficiency with our top quality compounding lines.

Benefit from longtime experience and know-how.
With the world’s most widely used compounding systems ZSK and STS.

The properties of engineering plastics make them indispensable nowadays in the construction of vehicles and machinery, power and electrical engineering, domestic installation and for sport and leisure articles. The processing ranges from coloring and alloying of base polymers right through to incorporating organic and inorganic fillers and reinforcing materials. Our individually configurable ZSK and STS twin screw compounding systems and plants offer the optimum solution for all types of processing.

→ Twin screw extruder ZSK 70 Mc18

Countless applications
from a single source

Manufacturing highly filled and reinforced compounds

Raw material addition
- → Metered into the feed barrel:
  - ▪ Polymers, additives and/or fillers
- → Downstream feeding of components into the polymer melt:
  - ▪ Fillers, additives via the first ZS-B twin screw side feeder
  - ▪ Chopped glass and reinforcing fibers, hollow glass beads, fillers via the second ZS-B
- → Direct feed of glass fiber/carbon fiber rovings
- → Injection of liquids

Process stages in the ZSK
- → Melting and homogenization of the polymers and additives
- → Incorporation, homogenization and dispersion of the fillers/reinforcing fibers in the polymer melt
- → Venting and degassing of volatile components
- → Pressure build-up for discharge

Recipe components

→ Base polymers: PE, PP, PS, ABS, POM, PBT, PET and PA	
→ Additives and pigments	0.5-60 %
→ Polymer alloys: PP + elastomer, PC + PBT, PC + ABS, PPE + PES	
→ Reinforcing fibers:	
▪ Chopped glass/carbon	> 60 %
▪ Glass/carbon rovings	max. 50 %

Powdered additives

→ Talc	max. 75 %
→ $CaCO_3$, $BaSO_4$, wollastonite	max. 85 %
→ Hollow glass beads	max. 50 %
→ Flame retardants	max. 60 %
→ Sb_2O_3	max. 90 %
→ SiO_2	max. 50 %
→ Metal compounds	max. 95 %
→ Wood dust	max. 70 %

Alloying, coloring, incorporating powdered additives

Raw material addition
- → Metered into the feed barrel:
  - ▪ Single components and/or premixed feed

Process stages in the ZSK
- → Melting, homogenization and dispersion of the components
- → Degassing of volatile components
- → Pressure build-up for discharge

Recipe components

→ Base polymers: PE, PP, PS, ABS, POM, PBT, PET, PA and fluoropolymers	
→ Polymer alloys: PP + elastomer, PC + PET, ABS + PC, etc.	
→ Additives and pigments	0.5-5 %
→ Flame retardants	max. 25 %

TPV

Raw material addition
- → Metered into the feed barrel:
  - ▪ Downstream feeding of components

Process stages in the ZSK
- → Melting and homogenization
- → Incorporation of components
- → Reactive extrusion, cross-linking
- → Venting and degassing
- → Pressure build-up for discharge

Recipe components

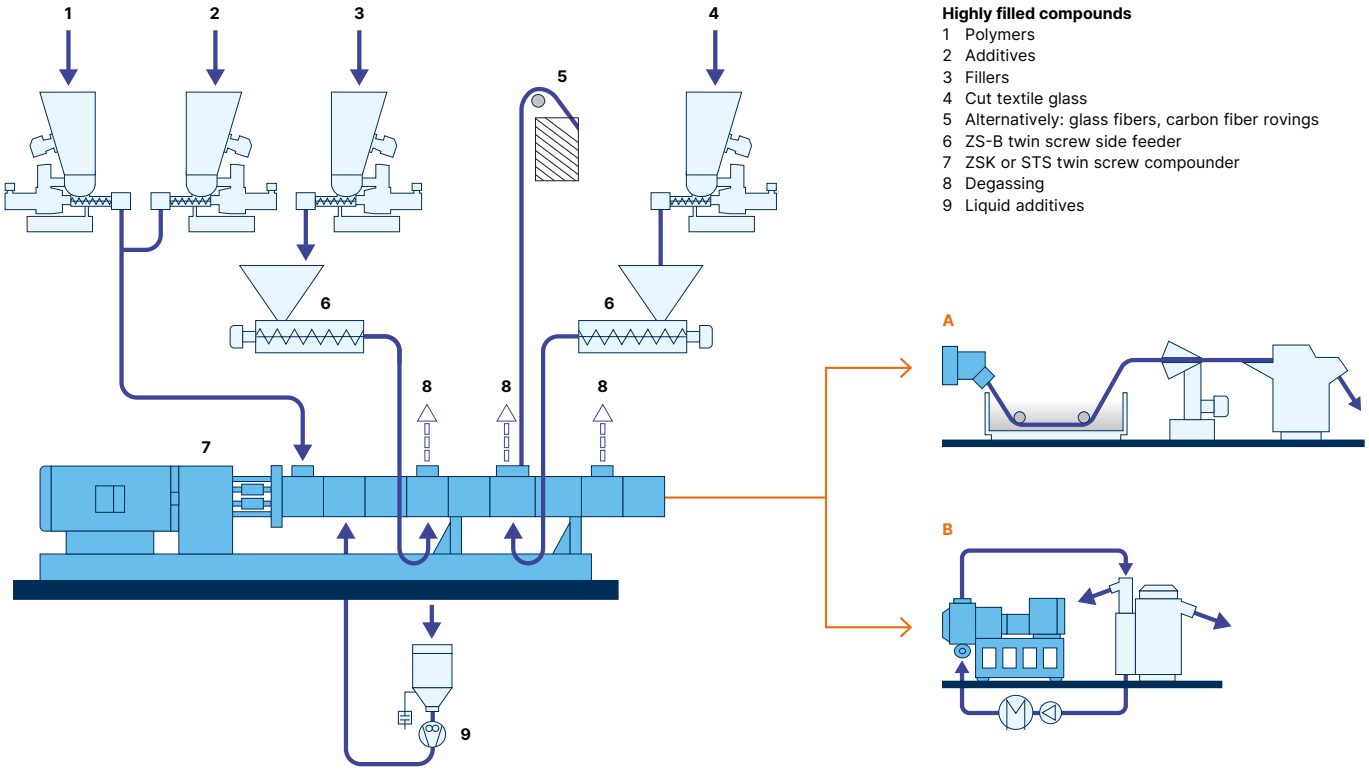
→ PP, EPDM (also bales)	
→ Fillers	5-20 %
→ Plasticizers	5-20 %
→ Additives	0.5-5 %

Further applications for engineering plastics

- ↗ Gentle incorporation of micro hollow glass microspheres into PP, PA, etc.
- ↗ Manufacture of long glass fiber compounds
- ↗ Mixing wood fibers into thermoplastics
- ↗ Removing moisture from bulk materials with max. 40 % humidity
- ↗ Degassing polymer solutions with up to 80 % solvent
- ↗ Bioplastics
- ↗ Mechanical plastics recycling and upcycling
- ↗ Recycling PET bottles and PA carpet fiber waste, etc.
- ↗ Compounding of high-temperature polymers such as PEEK
- ↗ Filtration of PC melts for optical applications
- ↗ Grafting

It’s all about
maximizing your production

Enter the future of highly efficient engineering plastics compounding and experience our solutions for all processes. We use our comprehensive technology and system expertise to implement systems covering all requirements. This includes the full added value chain of the production process from consultation and planning, through engineering, process optimization, manufacturing, delivery, installation and commissioning to our worldwide service network.

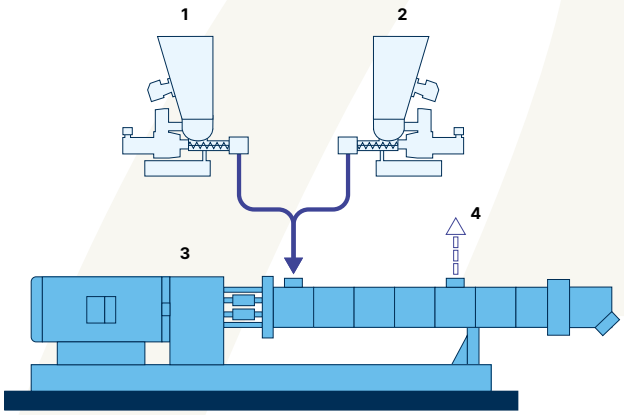


Highly filled compounds
1 Polymers
2 Additives
3 Fillers
4 Cut textile glass
5 Alternatively: glass fibers, carbon fiber rovings
6 ZS-B twin screw side feeder
7 ZSK or STS twin screw compounder
8 Degassing
9 Liquid additives

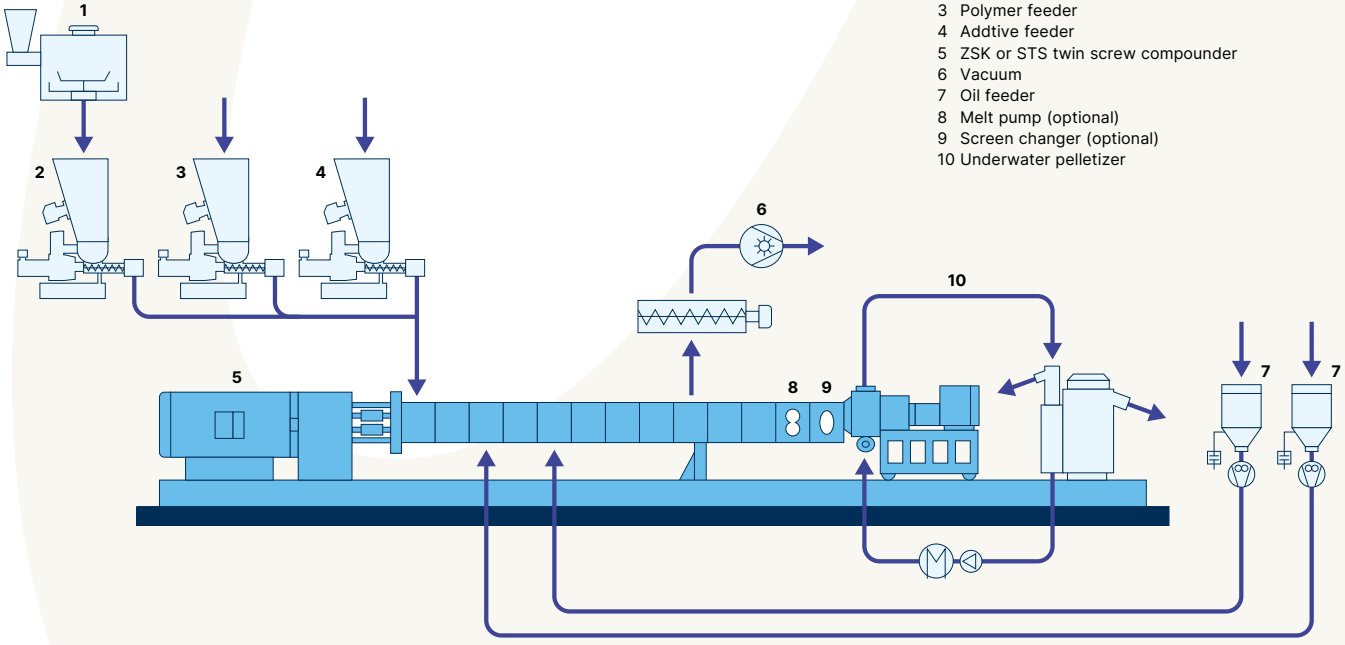
Discharge options

A Strand Pelletizer
The polymer strands are solidified in the water bath, and then are surface-dried in the air-knife before being cut into pellets in the pelletizer.

B Underwater Pelletizer UG
The polymer is extruded through a die plate and cut into pellets by the rotating knives. The cutting area is completely surrounded by water, allowing pelletizing of polymers which tend to be sticky. Alternatively Water Ring Pelletizers WRG are available.

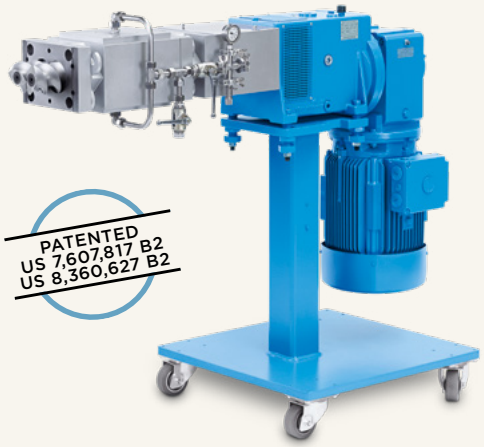


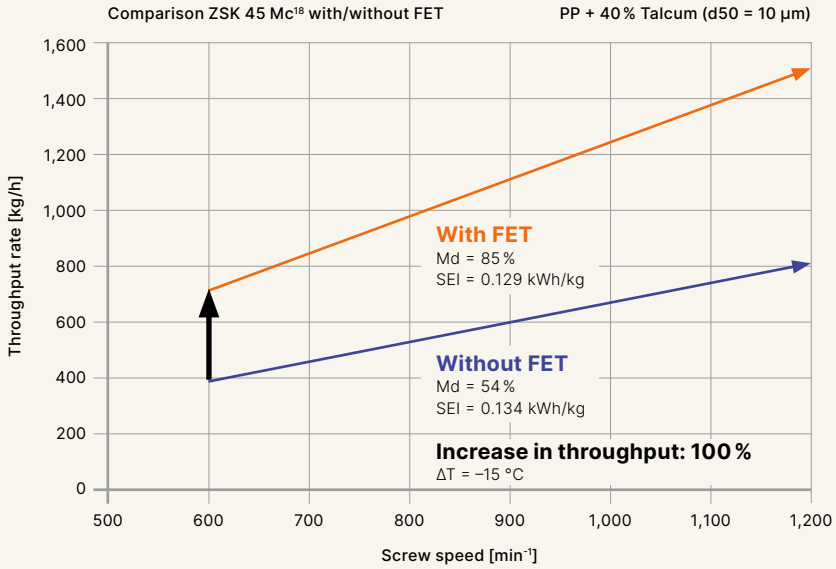
Alloying, coloring
1 Polymer A
2 Polymer B or pigment mastermix
3 ZSK or STS twin screw compounder
4 Degassing



TPV
1 Rubber bale grinding or direct feeding of rubber bales
2 Rubber feeder
3 Polymer feeder
4 Addtive feeder
5 ZSK or STS twin screw compounder
6 Vacuum
7 Oil feeder
8 Melt pump (optional)
9 Screen changer (optional)
10 Underwater pelletizer

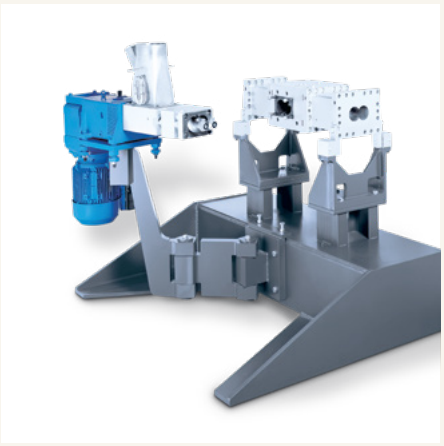
Boosting your performance
with top notch components





Feed Enhancement Technology (FET)
In the Feed Enhancement Technology (FET) the feeding zone of the ZSK is equipped with a porous, gas permeable wall and a vacuum is applied externally. The results of the FET equipment are considerably improved feed and throughput rates in the processing of feed limited products.

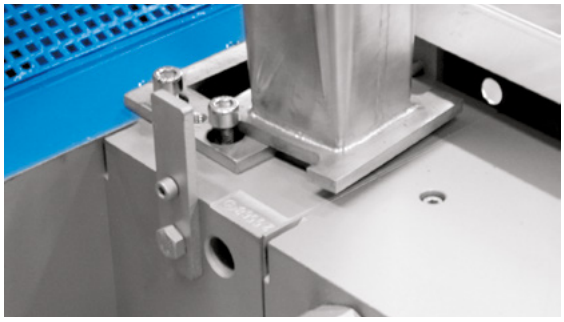
Twin screw side feeder ZS-B (mobile)
The ZS-B enables side feeding of powdered and pelletized fillers and additives or cut glass fibers. It can be installed at each extruder barrel position by a special connection barrel. Captive C-washers on the barrels allow rapid fitting and removal of the ZS-B. The ZS-B standard version is mounted on a base frame with castors.

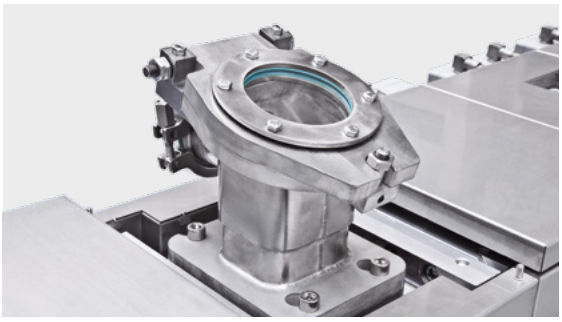


Twin screw side feeder (pivoting)
The ZS-B can be mounted on an optional pivoting base frame. This is screwed directly onto the ZSK machine base and features extremely simple handling.

Twin screw side degassing ZS-EG
The ZS-EG enables extremely effective degassing of volatile substances from polymer melts. The modular construction with quick fasteners enables simple cleaning and rapid change-over as well as quick assembly/disassembly aided by captive C-washers. It is fitted to the side of the extruder either with mobile base frame on castors or with pivot-mounted arm. The increased process safety with the ZS-EG achieves 10-15 % higher throughput rates.

ZS-B easy and ZS-EG easy
In easy design the ZS-B and the ZS-EG permit much faster dismantling from the ZSK process section and the twin screws can be changed very simple. Time for cleaning decreases obviously.





→ Various quick-change solutions, e.g. for the feed hopper and for the degassing dome

Quick-release clamps at feed hopper, degassing dome and atmospheric venting

The ZSK feed hopper is only clamped to the process section with bolts. It can be removed very quickly by simply loosening these bolts. Then the quick-release insert which protects the barrel wall from contamination can very easily be changed.

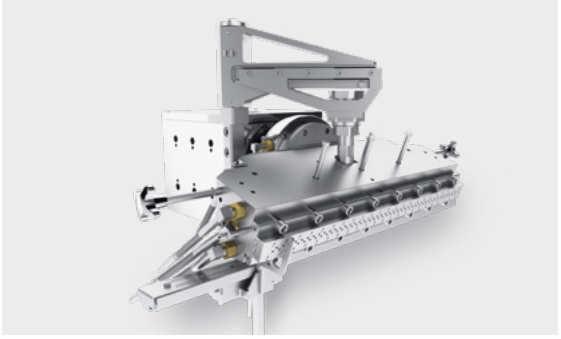
For quick and easy cleaning, the degassing dome and the atmospheric venting are also equipped with quick-release clamps. The units can be removed by loosening just four bolts. In addition, the connection of the vacuum line on the degassing dome is equipped with a quick-release C-clamp.

Coperion ServiceBox

The Coperion ServiceBox is an integrated system for the online monitoring of your plant and components, ensuring trouble-free compounding with stable product quality. Our active start-up assistance and rapid expert support are the ideal solution for efficient production with reliable quality control.

Pluggable cartridge heaters

ZSK extruders up to size ZSK 92 Mc[18] are equipped with pluggable cartridge heaters enabling efficient individual tempering within the interior of each barrel. They are individually connected using IP67 plugs and can be removed for maintenance in no time, no electrician needed.



Die heads

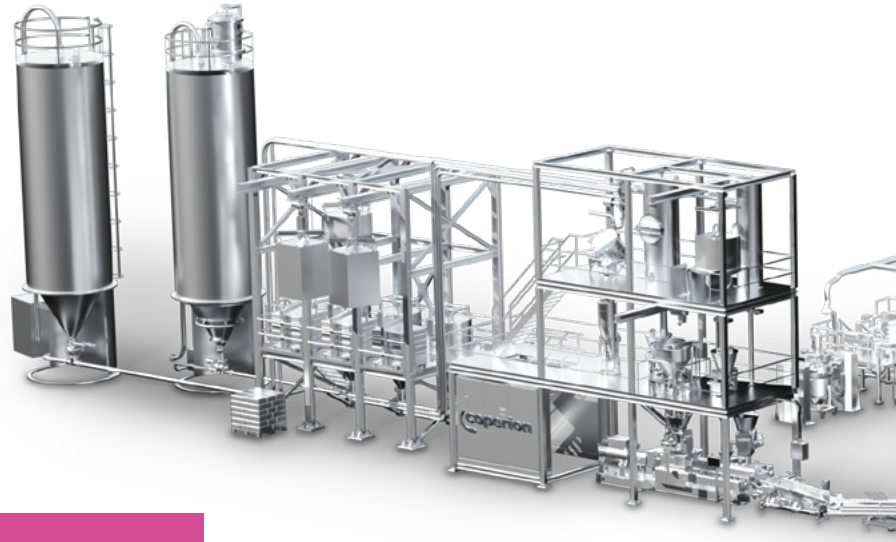
Coperion die heads have proven a winner in practical applications by:

- → Simple and rapid handling thanks to significant weight reduction and rapid assembly/disassembly fixtures
- → Constant flow velocity across discharge section
- → Flow geometry optimized by FEM calculations
- → Peripheral zone heating for selective impact on edge area for larger die heads
- → Minimal “dead space” upstream of ZSK screw tip

The optimized flow geometry and the easy and rapid handling are becoming more important in view of increasing batch/color changes and reduce production costs.

Single components to complete systems

Coperion's compounding systems have been successfully in the market for many years. The provision of these complete solutions – either using a conventional or modular turnkey design – allows you to benefit from our unique expertise in the entire compounding process chain.
All key components for the main process steps are developed and produced in-house – from raw material handling, feeding, extrusion, pelletizing, sifting, drying and cooling, right through to gentle conveying and bagging of the finished products. We provide single components, or you will receive a complete, ready-to-use system, in which all sub-processes have been optimally combined into an overall process – in no time at all and at fixed conditions. We will send a team of experienced experts to your premises to install and commission the system on site. Once the system has been handed over ready for production, our experienced and motivated service team provides worldwide support and assistance.



Your advantages

- ↗ One contact and supplier – from engineering and production of key components to commissioning of the plant
- ↗ Optimum design of the plant to meet your individual product requirements
- ↗ Efficient, professional project execution and maximum security in costs, schedule and product quality
- ↗ Short project schedules
- ↗ Optimum linking of all process steps
- ↗ Fast assembly and commissioning on site, supported by Coperion's worldwide service network
- ↗ Easy plant control by a uniform operating philosophy
- ↗ Numerous solutions for fast product changes in production
- ↗ High operating safety
- ↗ Digital solutions for optimum compounding system operation
- ↗ Service for the entire compounding system from one supplier

Compounding plants in modular design – additional advantages

- ↗ Commissioning of the plants at Coperion prior to delivery
- ↗ Sampling prior to delivery
- ↗ Training of the operating personnel already before delivery
- ↗ Fast assembly and disassembly due to modular design
- ↗ Easy transport

Bulk material handling
Pneumatic and hydraulic conveying processes together with all associated steps, such as cooling, heating, degassing, discharge, blending, separating and cleaning

Components
Coperion components are designed for a wide variety of applications to transfer liquid and dry ingredients, such as additive powders, resin pellets, stabilizers or colors

Feeding
Wide range of feeding solutions, from screw feeders to vibratory feeders, bulk solids pumps, weigh belts, liquid feeders to flow meters

Twin scew extruders
Superior extrusion and compounding equipment at the highest technical level which reliably transfers all ingredients into a homogeneous melt. Beside the ZSK and STS, Coperion offers further extruder series, including clam shell extruders.

Pelletizers
First-class equipment to process the melt into high-quality, uniform pellets – at maximum throughput rates and with the greatest possible cost-effectiveness

→ Coperion compounding system

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