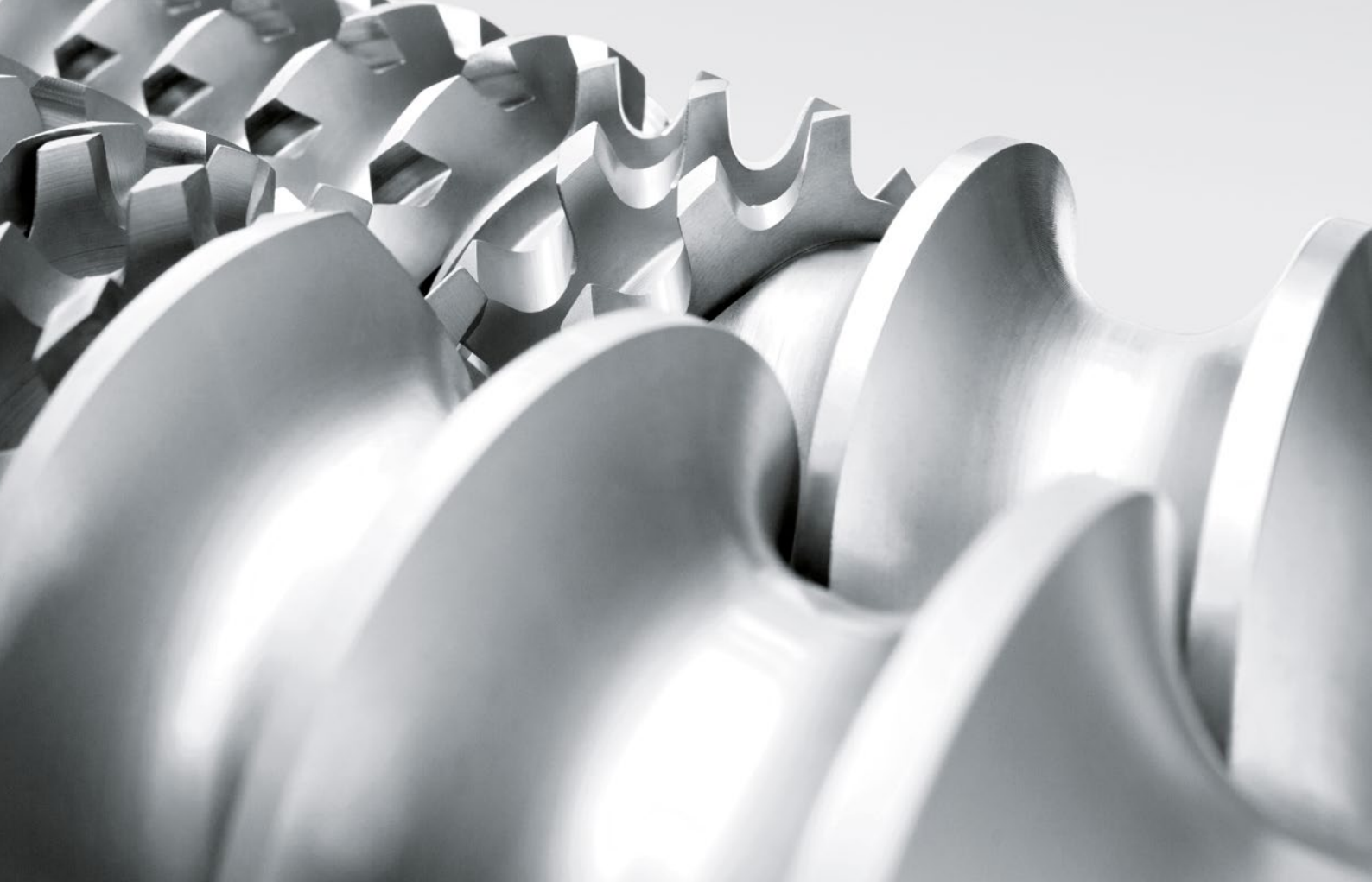


ZSK twin screw extruders. The benchmark for maximum throughput and highest product quality in modern processing technology.

Continuous Success Story

Mc18

›compounding & extrusion ›materials handling ›service

coperion

confidence through partnership

Why three letters define the market. Every single component of the ZSK twin screw extruder is an example of top class high technology. With the know-how and experience of the pioneers in the development of the co-rotating twin screw extruder we design every single process step of the extrusion system to meet your individual product requirements. As a result, you benefit from maximum throughput rates and highest product quality. More than 14,000 twin screw extrusion systems installed worldwide provide the daily proof.

The continuous research and development work of Coperion, formerly Werner & Pfleiderer, has made the ZSK co-rotating twin screw extruder into what it is today: A top-quality product at the highest technical level. It is the high-end, high-tech heart of our processing plants and is continuously setting new standards in the plastics, chemical, pharmaceutical and food industries.

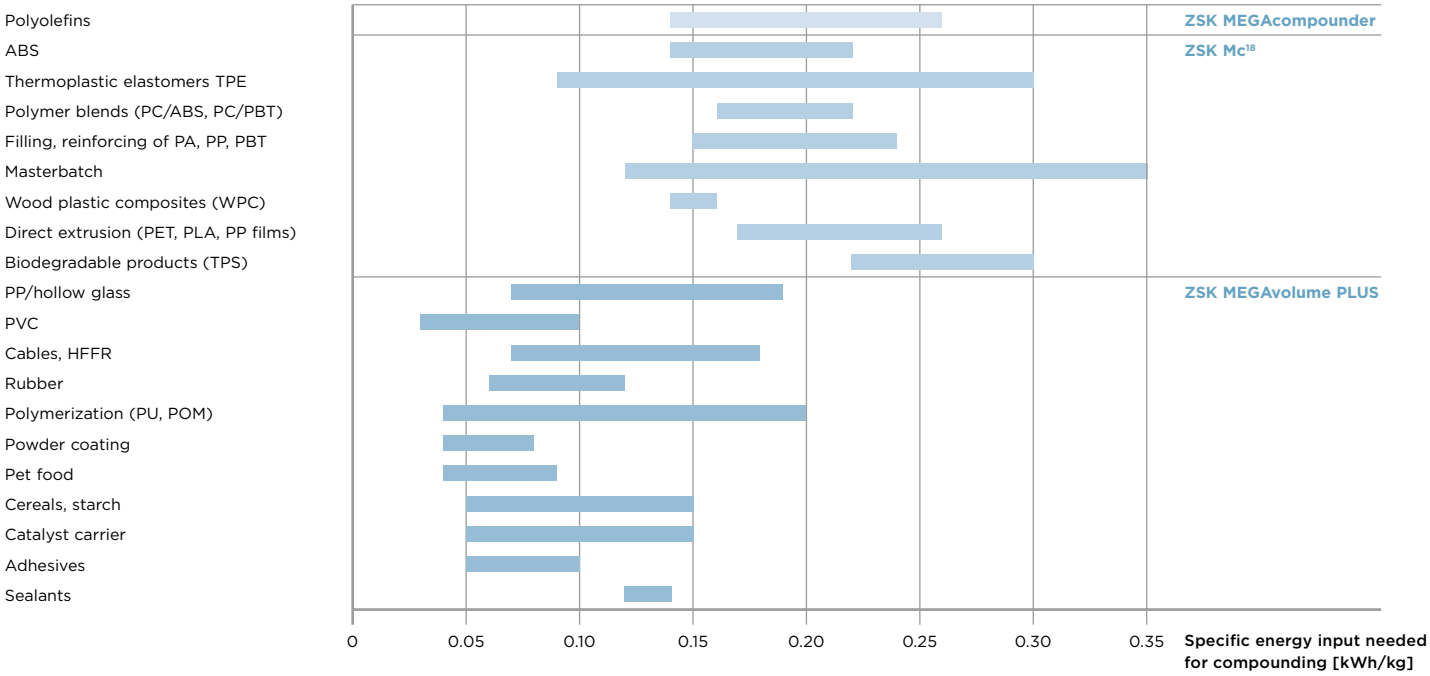
The quality of the end product is the decisive factor in complex processes such as the processing of viscous materials. From raw materials feeding through conveying, melting, dispersing, homogenizing, devolatilizing, pressure build-up, filtering and pelletizing, we use our decades of experience and extensive know-how to adapt every process step exactly to your application.

The ZSK twin screw extruder gives you a processing plant featuring maximum throughput rates, gentle handling of the product, optimum economy and highest reliability. **That's what we mean when we say "confidence through partnership".**

The right ZSK twin screw extruder for every application

ZSK Mc[18]	Extruder for products with high torque requirement such as engineering plastics
ZSK Mv PLUS	Extruder for processes with high volume requirement such as products from the chemical and food industries
ZSK MEGAcompounder	High capacity extruder for homogenization and pelletizing of polyolefins downstream of the polymerization reactor
Kombiplast	ZSK with a single screw discharge for gently building up pressure for temperature and shear sensitive products such as PVC
ZSK MEGAlab	Laboratory extruder for recipe development and basic scientific research
Modular and turnkey plants	Turnkey compounding systems with all components from raw material feeding to downstream periphery

The areas of application of the ZSK twin screw extruder

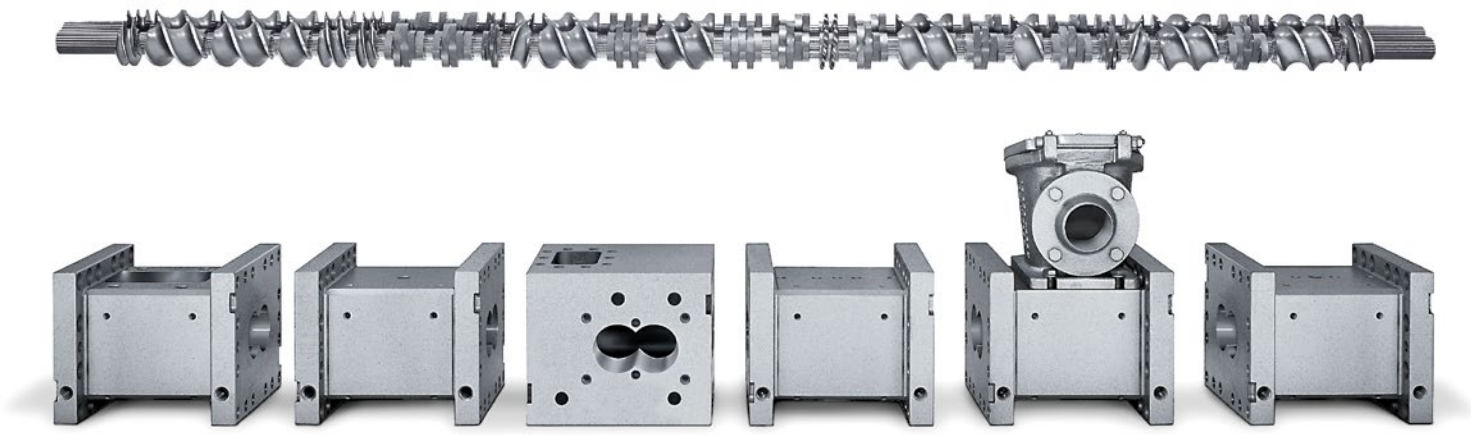


Minor details with a major effect. With the extensive knowledge of the technology leader for the design of processing plants, we continuously develop and optimize every single detail of the ZSK. It is demonstrated by countless technical achievements and innovations which are all perfectly adapted to each other. They make the ZSK the ideal compounder for maximum flexibility, reliability and economy at maximum quality and throughput requirements.

Modular design

The process section of all ZSK series is designed as a modular system. It consists of several barrels in which the co-rotating screws operate. The advantage of this modular principle is its maximum flexibility in compounding and extrusion.
Our process engineers configure the barrels and screw elements individually to your applications. Different process zones are created alternately as required for conveying, plasticizing, mixing and shearing, homogenizing, devolatilizing and pressure build-up to benefit from highest product quality and maximum throughput rates.

The temperature of every barrel can be controlled separately. The heating is usually electric by means of heater cartridges and heater shells, the cooling is achieved by water. In addition, barrels can also be tempered with liquid or steam heating.
Standard barrels and screw elements are made of nitrided steel or in the enhanced wear and corrosion protected version of appropriate materials.



MODULAR DESIGN OF THE PROCESS SECTION

The advantages of the ZSK twin screw extruder at a glance

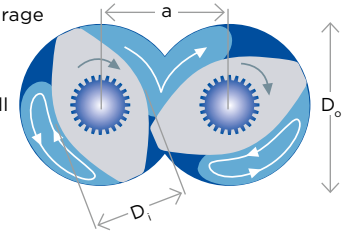
Maximum power density	Reliable scale-up
Gentle product handling for maximum quality	Very wide range of wear protection solutions
Maximum screw speed	Comprehensive process engineering support
Maximum productivity	Flexible solutions for control system
Maximum conservation of resources by high efficiency	High reliability and proven technology of the machines
Maximum flexibility in product changes and machine modifications	Comprehensive after-sales services by worldwide Coperion service network
Optimum graduation of the machine sizes	Large number of application-specific solutions to increase throughput and productivity, e.g. quick-release features, side devolatilization ZS-EG, Feed Enhancement Technology (FET)
Excellent mixing behaviour	

Optimum diameter ratio

The diameter ratio D_o/D_i, which determines the free volume of the twin screws in the process section is constant over all sizes of the respective ZSK series. In this way we guarantee the reliable scale-up from the knowledge gained in the laboratory to full-scale production plants. Important parameters such as screw configurations or product recipe contents can therefore be transferred from small to large ZSK sizes.

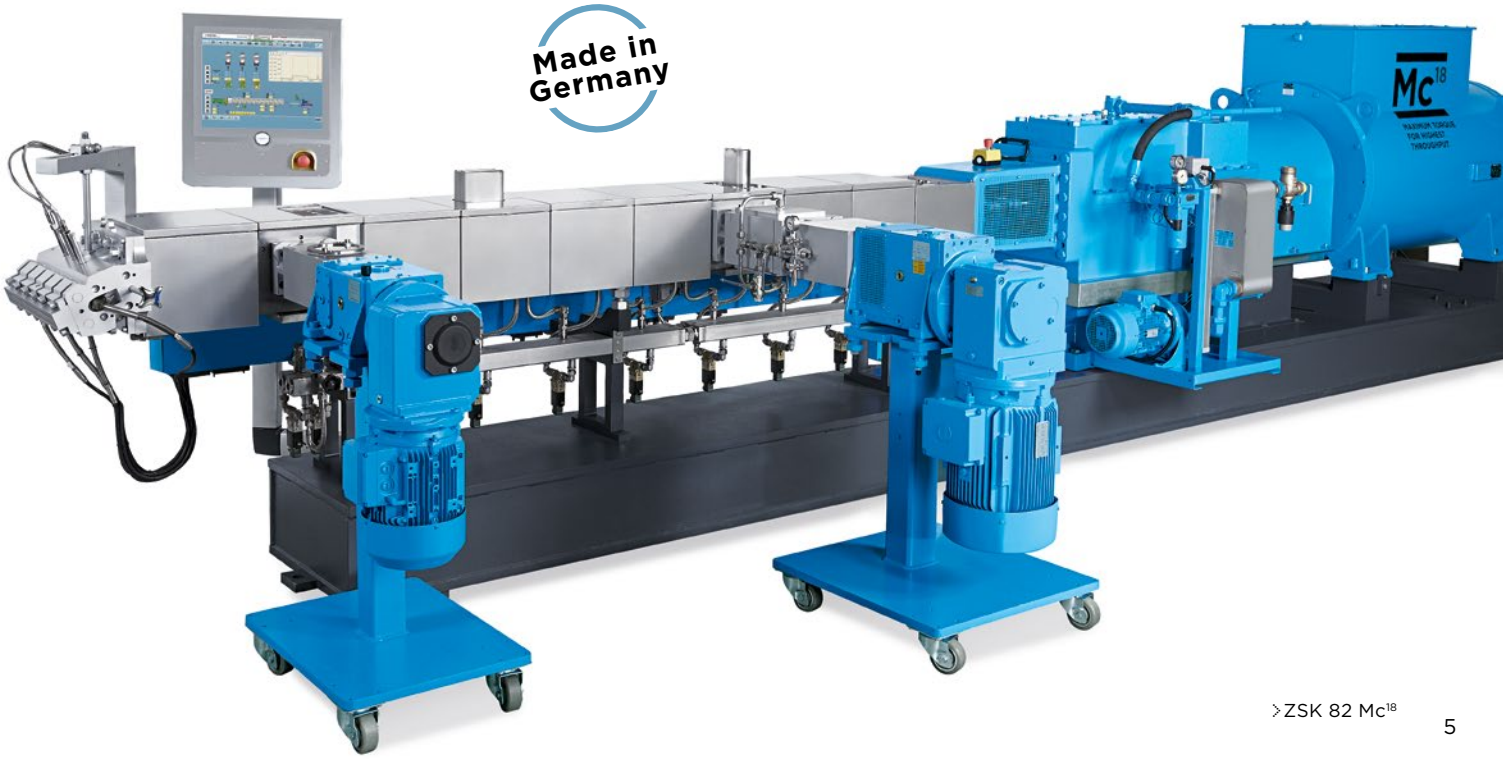
Cross-section of the two co-rotating screws

D_o/D_i = diameter ratio, determines average shearing, devolatilization and powder intake
Md/a^3 = specific torque, determines power density and degree of fill
n = screw speed, determines shearing and mixing
D_o = outer diameter
D_i = inner diameter
a = centerline distance



Self-cleaning screw profile

The closely intermeshing twin screws of the ZSK series eliminate with their tight, self-wiping profile stagnant zones over the whole length of the process section. The effect is a constantly high degree of process reliability and optimum self-cleaning in the process section.



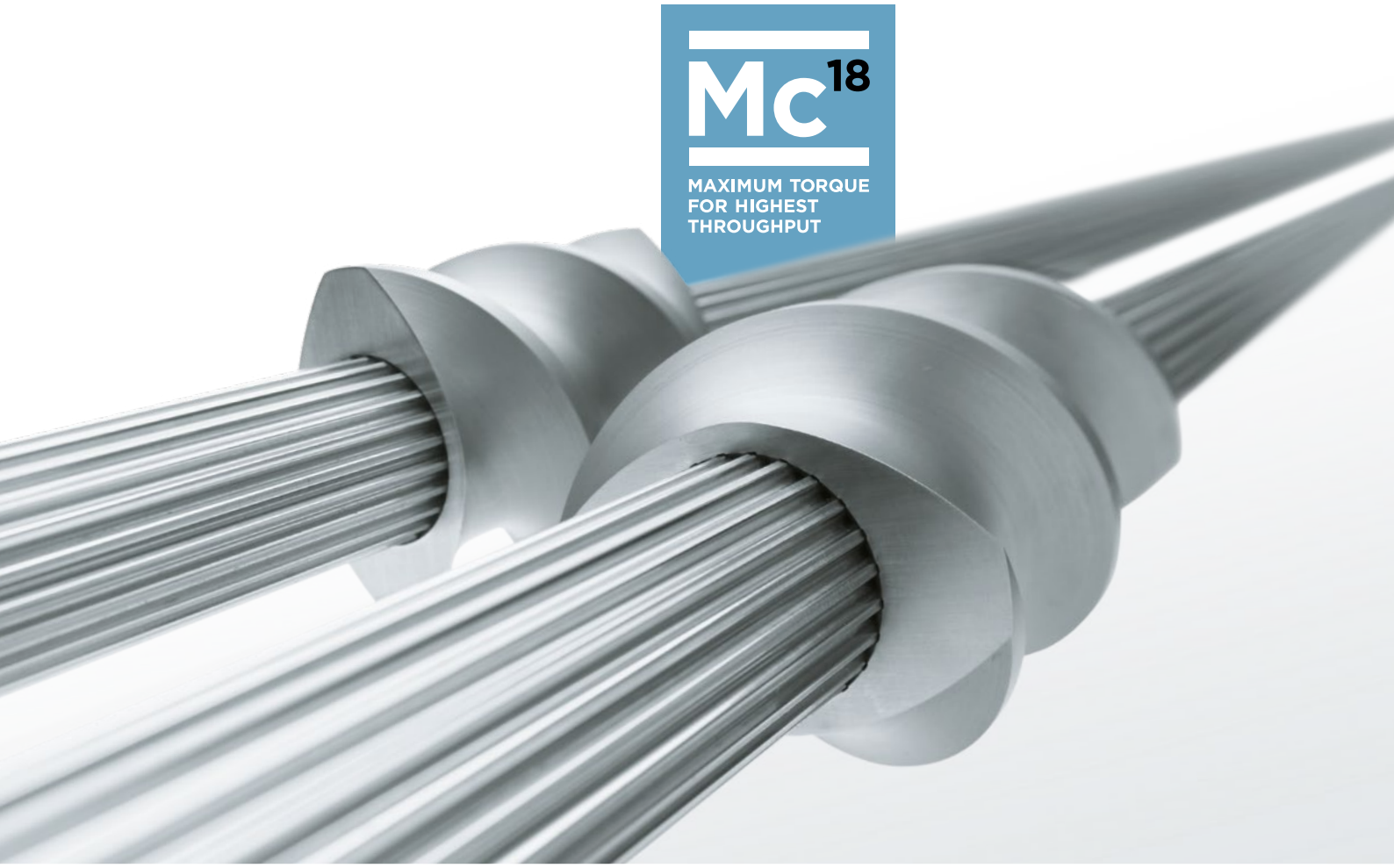
ZSK 82 Mc^{18}

The ZSK Mc^{18} is a success story. With its specific torque of 18 Nm/cm^3, it is the most powerful ZSK ever. It impresses with its extremely high throughput rates, optimum product quality and maximum economic efficiency.

The ZSK Mc^{18} high performance extruder is a superlative product. With its torque of 18 Nm/cm^3, it has made a name for itself on the market as a throughput champion. The 30 % increase in torque compared to the predecessor model ZSK Mc PLUS leads to increases in throughput of up to 100 %. Therefore the ZSK Mc^{18} ensures production with maximum economic efficiency. The optimum price/performance ratio, the extremely energy-efficient operation, the reliability, the wide range of applications, and the associated high level of flexibility of the machine are additional advantages of the ZSK Mc^{18}. With its D_o/D_i of 1.55, the ZSK Mc^{18} strikes just the right balance. It has proven itself in the processing of products with high torque requirements and enables reliable scale-up within the entire Mc^{18} series. In addition, it is possible to scale-up and modernize the ZSK Mc PLUS series to the Mc^{18} series. Together with a range of application-specific special solutions such as the Feed Enhancement Technology (FET) or the ZS-EG side devolatilization, the ZSK Mc^{18} fulfills its promise in guaranteeing the highest levels of productivity.

Typical areas of application of the ZSK Mc^{18}

- Continuous processes with high energy consumption
- Processing of all previously torque-limited products such as polyamide with glass, PBT with glass, glass fiber-reinforced polypropylene
- Mixing and dispersing of pigments and additives
- Reinforcement with glass, carbon and other fiber materials
- Degassing of volatile components
- Filling with talcum, calcium carbonate, sawdust or other fillers
- Alloying
- Reactive extrusion
- Chemical reactions such as polymerization, polycondensation and polyaddition
- Direct extrusion

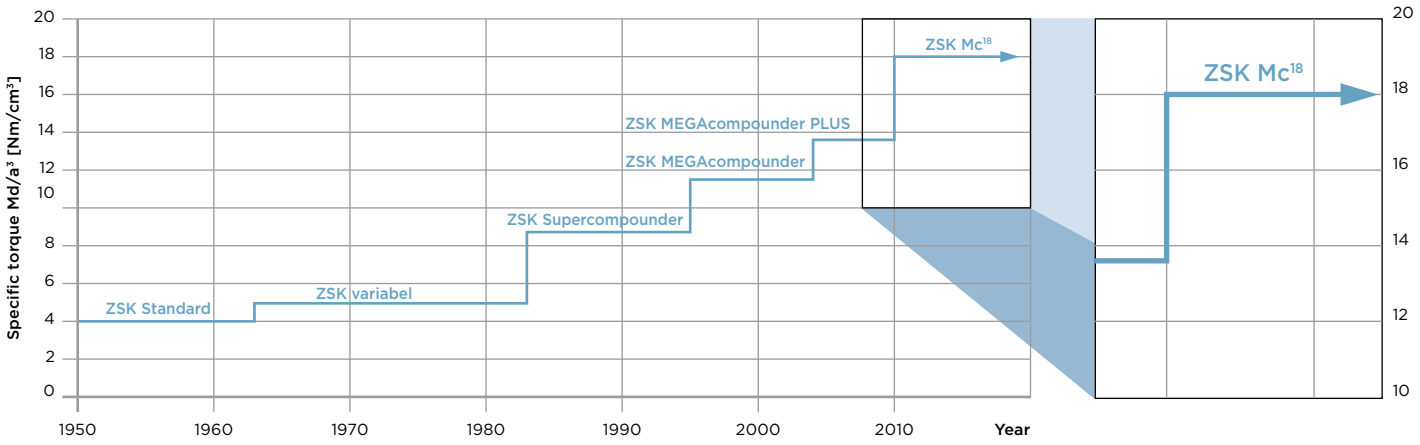


Advantages of the ZSK Mc^{18} at a glance*

More than 30 % increase of specific torque	Improved compounding quality by gentle processing with a higher filling degree
Up to 100 % increase in the throughput rate	Reduced compound temperature at much greater throughput rates
Increased energy efficiency by reduced specific energy input	Flexible, wide area of applications
Greatly improved productivity	Proven high ZSK safety enabled by new designs and developments

* in comparison with the predecessor model ZSK Mc PLUS

Development of the ZSK series



Why is the ZSK Mc^{18} such a success? The ZSK Mc^{18} represents the interaction of numerous innovative developments that all serve a collective requirement: achieving the highest throughput rates with optimum product quality and maximum economic efficiency. From the gearbox and the process section through to the discharge, each individual detail of the machine is in line with this demand. This enables you to fully profit from the guiding technological principle of the ZSK Mc^{18}.

Technical data

ZSK	Max. torque per shaft [Nm]	Spec. torque Md/a³ [Nm/cm³]	Max. screw speed [min⁻¹]	Max. drive power N [kW]	Screw diameter [mm]
18 MEGAlab*	38	11.3	1,200	10	18
26 Mc^{18}	140	15	1,200	37	25
32 Mc^{18}	315	18	1,200	83	32
45 Mc^{18}	930	18	1,200	245	45
58 Mc^{18}	2,000	18	1,200	528	58
70 Mc^{18}	3,500	18	1,200	924	70
82 Mc^{18}	5,700	18	1,200	1,504	83
92 Mc^{18}	7,500	17	1,000	1,649	92
106 Mc^{18}	11,900	18	1,000	2,617	106
119 Mc^{18}	15,300	17	1,000	3,364	118
133 Mc PLUS	20,000	15	1,000	4,398	133

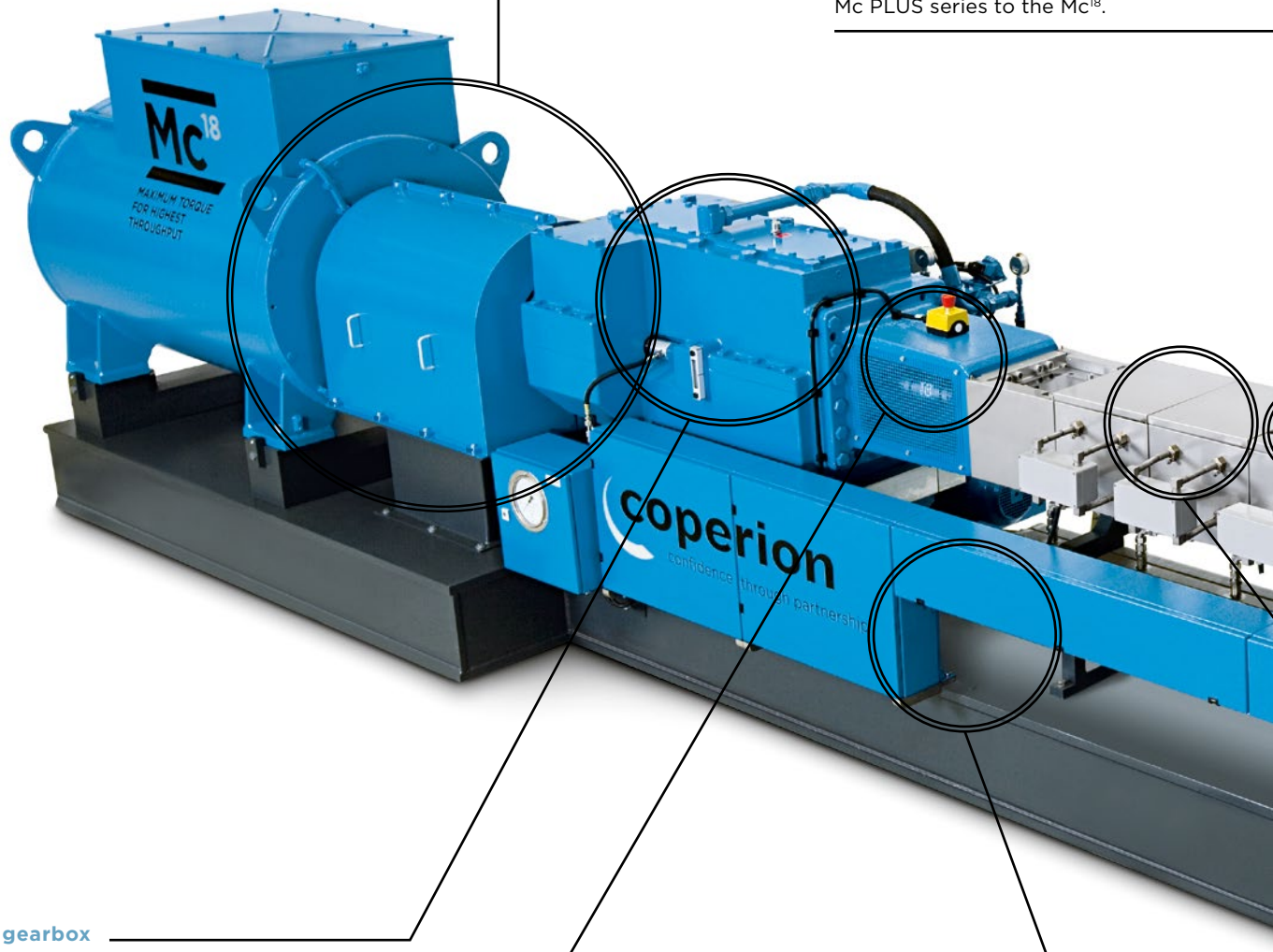
* Laboratory extruder.
ZSK 32 - ZSK 82 available in compact version.

Specific torque of 18 Nm/cm³

With the 30 % torque increase compared to the predecessor model ZSK Mc PLUS, the ZSK Mc¹⁸ is the most powerful ZSK ever. Increases in throughput of up to 100 % are possible.

Optimum D_o/D_i of 1.55 for compounding products with a high torque requirement

With a D_o/D_i of 1.55, the ZSK Mc¹⁸ provides optimum free volume and low shearing stresses. It achieves exceptionally high throughputs with maximum product quality. The shafts reliably withstand the high mechanical stress and the screw elements feature high wear-resistance. Additional advantages: The D_o/D_i of 1.55 ensures the scale-up and the modernization of the Mc PLUS series to the Mc¹⁸.



Extruder gearbox

Together with the manufacturer, Coperion has developed gearboxes that are specially designed for the requirements of the ZSK Mc¹⁸ high performance compounder.

Screw shaft coupling

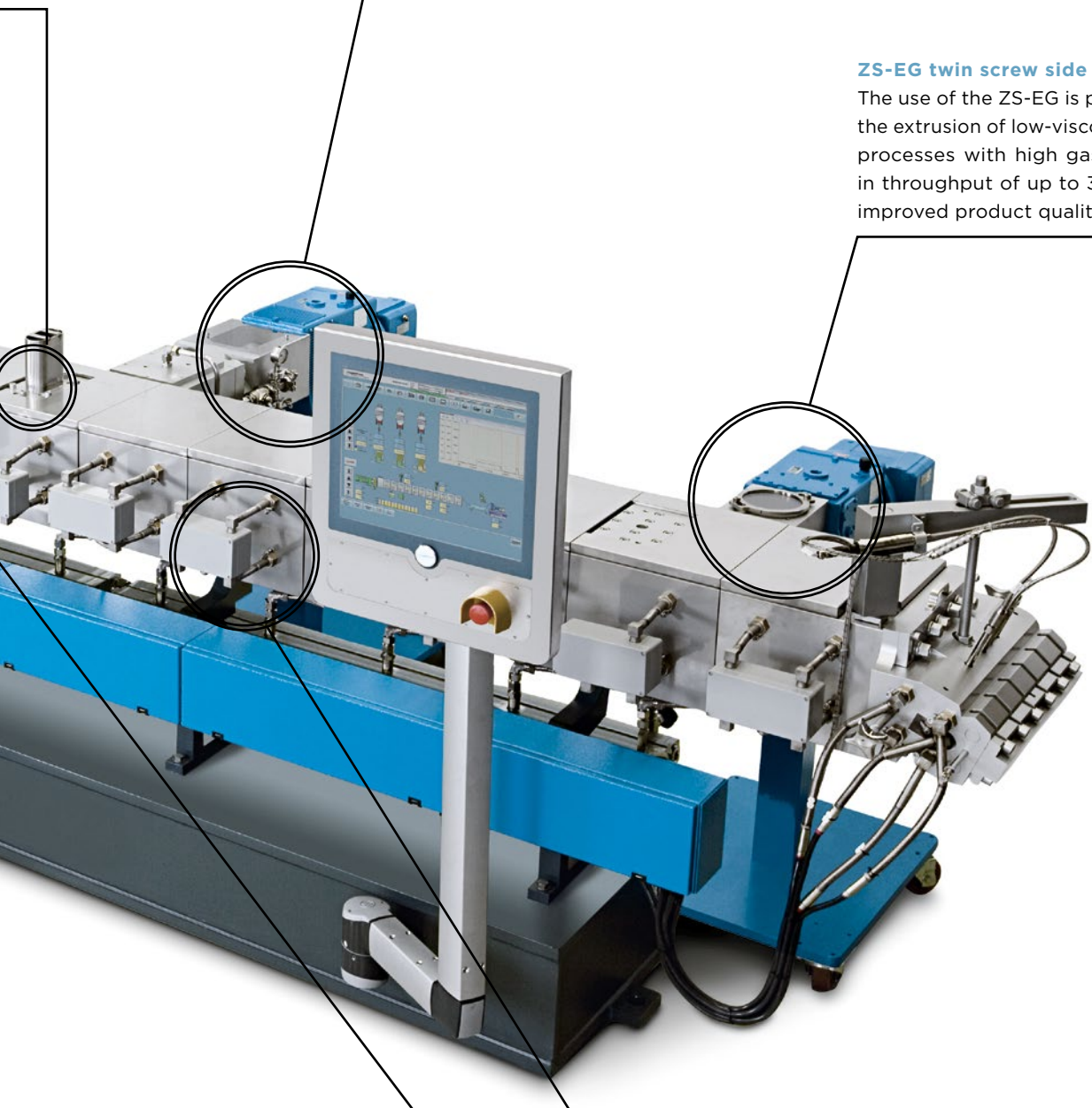
The screw shaft coupling is specifically designed for high mechanical stresses. High performance materials even withstand the stresses when the compounder is operating at maximum productivity.

Machine design

The accessibility and numerous quick-change features make it easy to clean the ZSK in the shortest possible time. Together with its easy operation, this ensures maximum productivity of the extruder.

Feed Enhancement Technology (FET)
With the patented FET equipment, it is possible to optimize the product feed such that you benefit from the full available drive power of the ZSK Mc[18] even when processing powder bulk materials. The result: increase in throughput of 200 to 300 % at maximum productivity, highest level of operating safety and energy efficiency, and increased flexibility of the processing system.

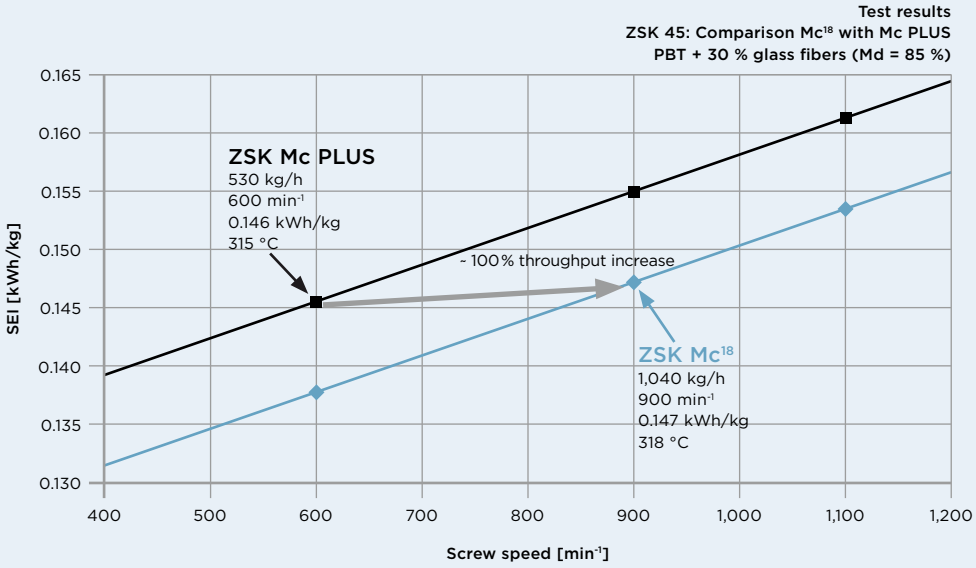
ZS-EG twin screw side devolatilization
The use of the ZS-EG is particularly beneficial in the extrusion of low-viscous melts and extrusion processes with high gas quantities. Increases in throughput of up to 30 % are achieved with improved product quality.



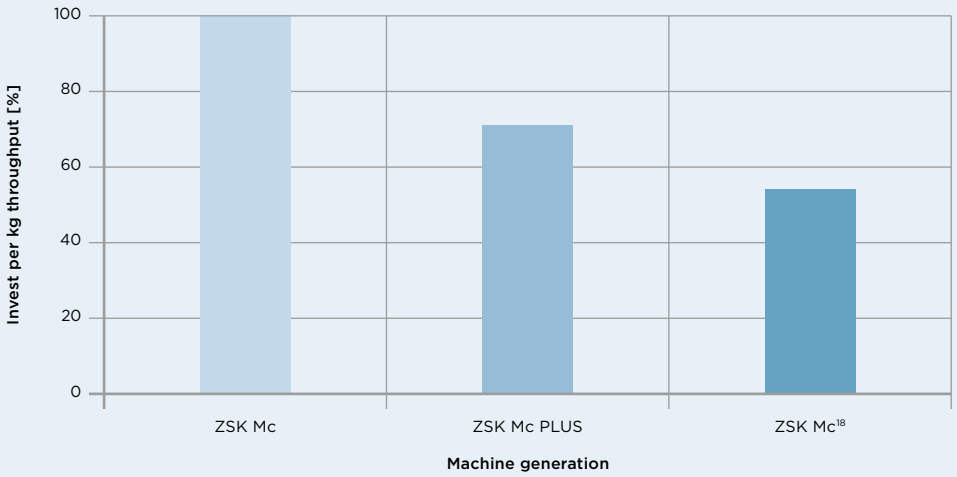
Screw shafts made from high performance materials
The latest material solutions in aeronautic and aerospace technology ensure full power transmission of the torque into the process section – enabling you to benefit from maximum throughput.

Temperature control for maximum energy efficiency
Shrink-fit barrel liners ensure optimum heat transfer and cartridge heaters enable efficient energy utilization. The user-friendly barrel covers fully insulate the process section allowing you to profit from the maximum energy efficiency of the ZSK Mc[18] in addition to the throughputs.

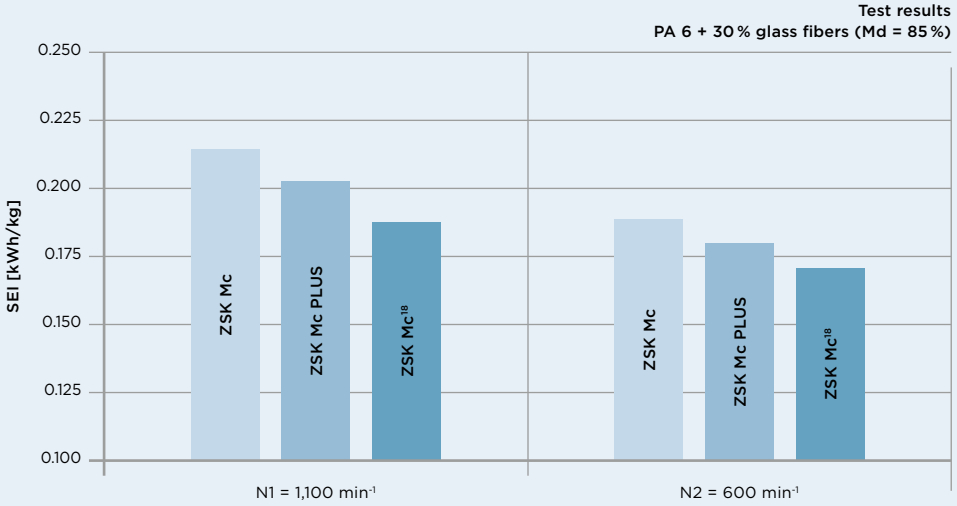
Up to 100 % increase in throughput rate



Optimum price-performance ratio



Considerably reduced energy consumption with increased throughput



The ZSK Mv PLUS. With its ratio of very high drive power to large screw volume this series ensures you maximum throughputs especially in processes with high volume requirement.

Coperion sets standards with the ZSK Mv PLUS: This extruder series unites an optimally adapted large free screw volume with high screw speeds and a high specific torque. This particularly allows production of products with a specific energy requirement <0.13 kWh/kg with very high throughput rates. The system excels maximum recipe flexibility and maximum productivity.

Typical areas of application of the ZSK Mv PLUS

- Processes with a high volume requirement, e.g. for products with a low bulk density, poor intake properties or high filler content
- Devolatilization processes, e.g. in substances containing solvents
- Processes with low energy consumption
- Shear sensitive products
- Carbon black masterbatch
- PET masterbatch
- HFFR (ATH, Mg(OH)2)
- PVC
- Effect-pigment masterbatch
- Rubber
- Polymerization (PU, POM)
- Powder Coating
- Catalyst carrier
- Adhesives, sealants
- PP/hollow glass
- Food
- Pet food
- Cereals, starch

ZSK 54 Mv PLUS IN COMPACT VERSION

Special features of the ZSK Mv PLUS

Screw volume The deeply cut screw flights with a diameter ratio D_o/D_i of 1.8 result in a very large free screw volume.	**The advantages** › Improved feed intake of additives with a low bulk density such as flours, starches, pigments, fillers, additives › Lower shearing › Reduced thermal stress on the raw materials › Longer residence time for reaction processes › Safe devolatilization
Screw speed The ZSK Mv PLUS series is designed for speeds up to 1,800 min^{-1}.	**The advantages** › Increase in the throughput by up to 3 or 4 times in comparison to the predecessor model ZSK Mv › Lower investment and operating costs due to smaller machine sizes at the given throughput rate › Favorable price-performance ratio
Torque The specific torque of the ZSK Mv PLUS is 11.3 Nm/cm^3. It has been increased by 30 % in comparison to the predecessor model ZSK Mv.	**The advantages** › Another increase in throughput of up to 40 % in comparison to the predecessor series › Extended operating window › Greater recipe flexibility

Technical data

ZSK	Max. torque per shaft [Nm]	Spec. torque Md/a³ [Nm/cm³]	Max. screw speed [min⁻¹]	Max. drive power N [kW]	Screw diameter [mm]
18 MEGAlab*	38	11.3	1,200	10	18
27 Mv PLUS	100	10.6	1,800	40	27
34 Mv PLUS	205	11.3	1,800	81	34
43 Mv PLUS	420	11.3	1,800	166	43
54 Mv PLUS	815	11.3	1,800	323	54
62 Mv PLUS	1,250	11.3	1,800	495	62
76 Mv PLUS	2,275	11.3	1,800	900	76
98 Mv PLUS	5,000	11.3	1,500	1,649	98
125 Mv PLUS	10,300	11.3	1,500	3,397	125
248 Mv PLUS	44,000	6.0	300**	2,800	248

* Laboratory extruder with D_o/D_i 1.55.
** Higher screw speeds upon request.

ZSK 34-ZSK 76 available in compact version.

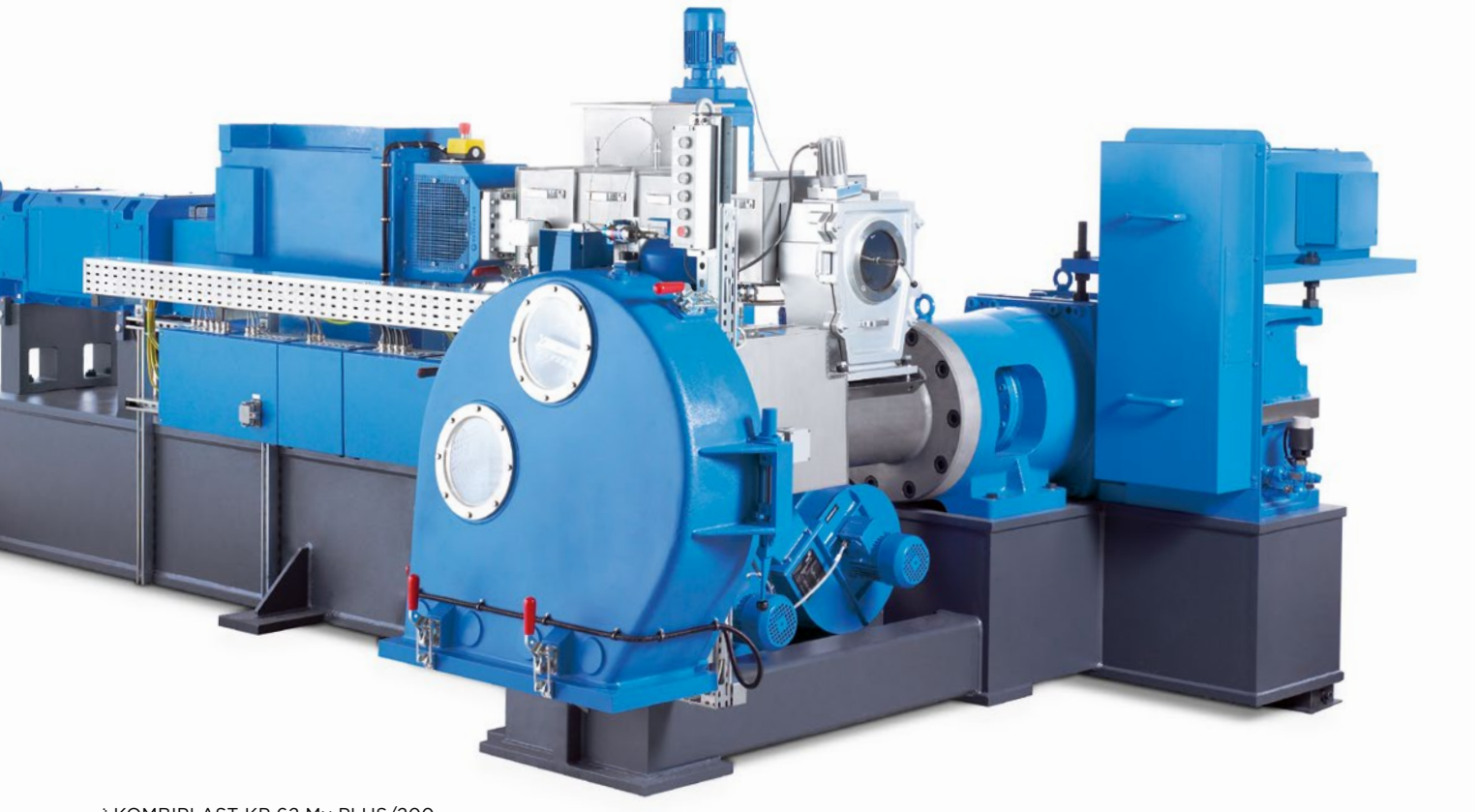
The Kombiplast. This two-stage processing system with the ZSK twin screw extruder and the ES-A single screw discharge ensures optimum product quality and maximum economy in the processing of PVC, cables and special compounds.

PVC, cables and special compounds can only be processed in top quality and at the same time economically with reliable compounding and pelletizing technology. Our Kombiplast two-stage processing system fully meets this requirement.

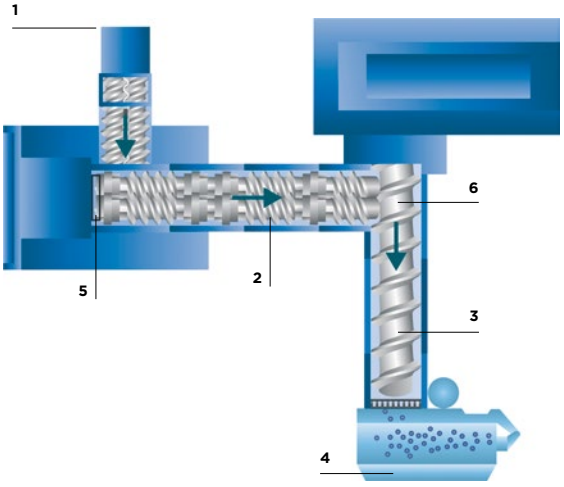
Coperion has designed the compounding system especially for the production of temperature and shear sensitive plastics – so that you benefit from maximum product quality, maximum economy and flexibility.

Typical areas of application of the Kombiplast

Soft PVC	**Rigid PVC**	**Special compounds**
› PVC cables: insulation material, sheathing and bedding compounds › Materials for shoes and shoe soles (also PVC-P with foaming agent) › Materials for the extrusion of profiles and hoses (including medical applications) › Injection molding compounds › Films and sheets for flooring	› Materials for the extrusion of profiles for interior and exterior uses › Injection molding grades for fittings, etc. › Blow molding grades for bottles, containers, etc. › Alloys and blends › Films (calender feeding)	› Halogen-free, self-extinguishing formulations for cables (HFFR) › Elastomer-based compounds for low, medium and high voltage cables › Cross-linkable PE (incorporating peroxide)



› KOMBIPLAST KP 62 Mv PLUS/200



The raw materials are fed to the process section of the ZSK twin screw extruder by the ZS-B twin screw side feeder. They are conveyed, plasticized, mixed and homogenized in the process section. The product is discharged through the ES-A single screw discharge, which gently builds up sufficient pressure for the eccentric pelletizing.

Principle of the two-stage Kombiplast (ZS-B + ZSK + ES-A + EGR)

1 ZS-B twin screw side feeder
2 ZSK twin screw extruder
3 ES-A single screw discharge
4 EGR eccentric pelletizer
5 Atmospheric degassing
6 Vacuum degassing

Advantages of the Kombiplast

Excellent feeding properties, even for powders that are difficult to feed and hot premixes	Gentle materials handling, especially in the pressure build-up zone before the die plate
Short, defined residence time	Uniform product flow through the die plate
Precise temperature control	Low, specific energy input
Effective devolatilization of volatile ingredients	Easily adaptable to new requirements
Fast, convenient cleaning	Wide range of application

Technical data of the Kombiplast with ZSK Mv PLUS

Kombiplast ZSK/ES-A	Max. torque per shaft [Nm]	Spec. torque Md/a³ [Nm/cm³]	Max. screw speed [min⁻¹]	Max. drive power N [kW]	Screw diameter [mm]
27 Mv PLUS/60	100/400	10.6	600/115	13/4	27/60
34 Mv PLUS/100	205/1,200	11.3	600/100	27/15	34/100
43 Mv PLUS/150	420/4,050	11.3	600/75	55/45	43/150
54 Mv PLUS/150	815/4,050	11.3	600/75	108/45	54/150
62 Mv PLUS/200	1,250/9,600	11.3	600/75	165/80	62/200
76 Mv PLUS/250	2,275/18,750	11.3	600/50	300/125	76/250
98 Mv PLUS/300	5,000/32,400	11.3	400/50	440/180	98/300
125 Mv PLUS/350	10,300/51,450	11.3	400/50	906/285	125/350

Technical data of the Kombiplast with ZSK Mc¹⁸

Kombiplast ZSK/ES-A	Max. torque per shaft [Nm]	Spec. torque Md/a³ [Nm/cm³]	Max. screw speed [min⁻¹]	Max. drive power N [kW]	Screw diameter [mm]
26 Mc¹⁸/60	140/400	15	600/115	18/4	25/60
32 Mc¹⁸/100	315/1,300	18	600/100	42/15	32/100
45 Mc¹⁸/100	930/1,300	18	600/100	123/15	45/100
58 Mc¹⁸/150	2,000/8,000	18	600/75	264/45	58/150
70 Mc¹⁸/200	3,500/15,000	18	600/75	462/66	70/200
92 Mc¹⁸/250	7,500/30,000	17	600/50	990/100	92/250
92 Mc¹⁸/300	7,500/55,000	17	600/50	990/150	92/300
119 Mc¹⁸/300	15,300/55,000	17	400/50	1,346/150	118/300
133 Mc PLUS/350	20,000/80,000	15	400/50	1,759/170	133/350

The ZSK 18 MEGAlab. This laboratory extruder offers high performances even for smallest batch sizes.

ZSK 18 MEGAlab IN HYGIENIC DESIGN

The ZSK 18 MEGAlab laboratory extruder is also based on the successful ZSK technology. It was developed especially for the processing of smallest batch sizes. The reliable scale-up to larger ZSK extruders makes it the ideal compounding system for the recipe development and basic scientific research.

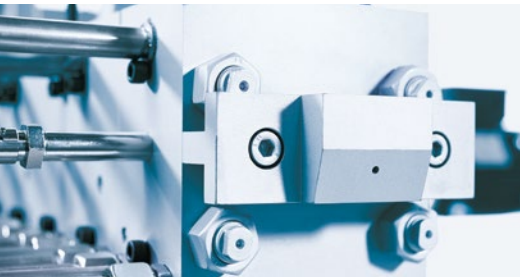
Special features

- Throughput rates of up to 40 kg/h
- Small batches from 200 g
- Fast plug & play commissioning
- Reliable, low noise drive concept
- Modular structure with exchangeable 4D barrels and all standard screw elements
- Easy to operate by PLC and touch screen
- Easy handling and fast product change by using quick-release connections
- Compact design – mobile baseframe with integrated controls, water cooling and vacuum unit
- Reliable scale-up due to ZSK features

Technical data

Centerline distance [mm]	15
D_o/D_i	1.55
Outer screw diameter D_o [mm]	18
Barrel length [mm]	72
Centerline height [mm]	1,100
Nm/shaft [Nm]	38
Specific torque Md/a^3 [Nm/cm^3]	11.3
Max. output speed [min^{-1}]	1,200
Drive power [kW]	11.7
Heating capacity/barrel [W]	800
Overall dimensions (L x W x H) [mm]	1,660 x 600 x 1,850

DIE HEAD OF THE ZSK MEGAlab



TWIN SCREW SIDE FEEDER ZS-B

ZSK MEGAlab IN GMP-DESIGN

The ZSK MEGAcompounder. This processing system is a milestone in the development of high capacity compounding systems.

Because of its exceedingly high productivity, this twin screw extruder is ideal for high capacity processing of polyolefins. It constantly achieves the maximum product quality especially in continuous processes with high energy requirements.

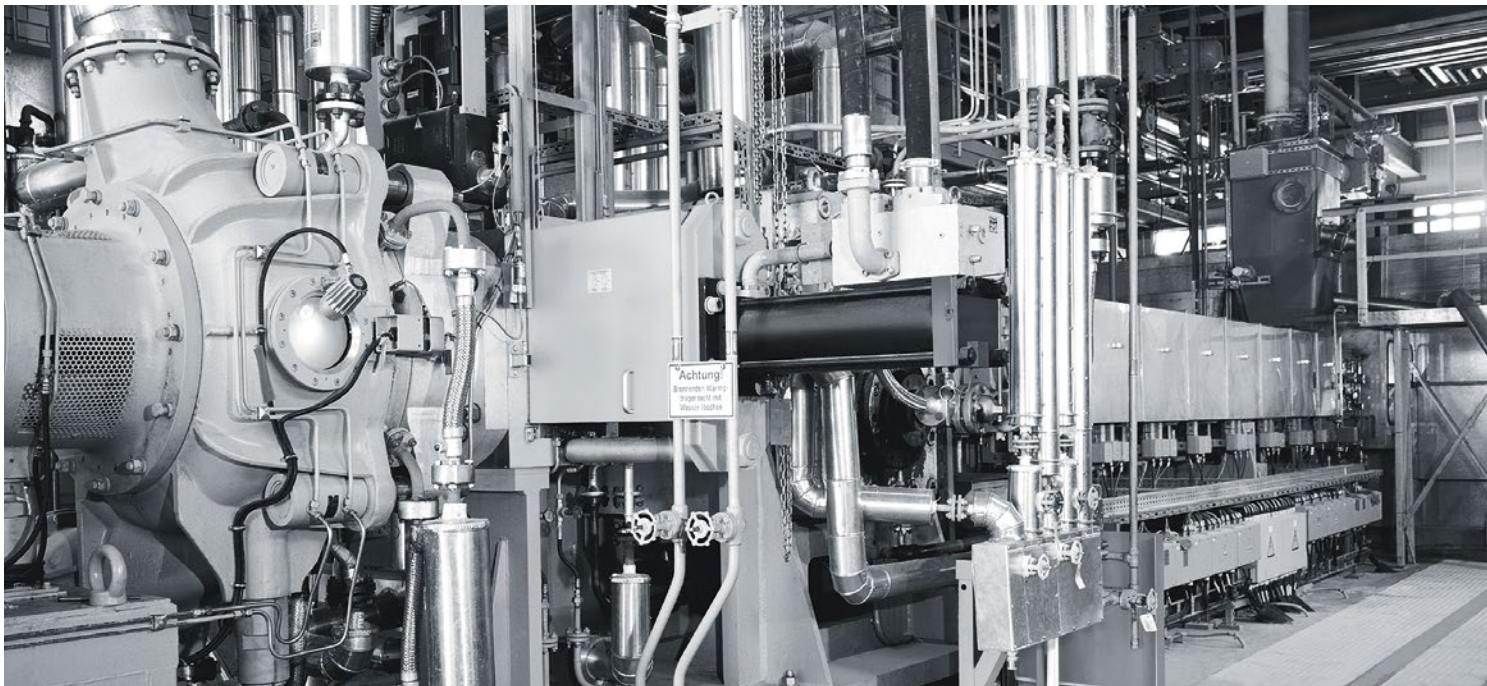
The current series features a specific torque of 12.5 Nm/cm³. This brings polyolefin processing to the throughput rate of 100 t/h and beyond.

Technical data of the ZSK MEGAcompounder

ZSK	Max. torque per shaft [Nm]	Spec. torque Md/a³ [Nm/cm³]	Max. screw speed [min⁻¹]	Max. drive power N [kW]	Screw diameter [mm]
177 Mc	39,000	12.5	550	4,500	177
250 Mc	107,000	12.5	500	11,200	248
320 Mc	222,000	12.5	400	18,600	315
350 Mc	311,000	12.5	350	22,800	352
380 Mc	394,000	12.5	320	26,400	380
420 Mc	394,000		Increased drive power upon request		420

Combination possibilities of process section and gearbox

ZSK process section	Possible gearboxes [max. Nm]				
177 Mc	39,000				
250 Mc	39,000	107,000			
320 Mc		107,000	222,000		
350 Mc		107,000	222,000	311,000	
380 Mc			222,000	311,000	394,000
420 Mc					394,000



Complete compounding systems. Coperion provides total solutions from a single source.

Coperion's compounding systems have proved successful 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. You will receive a complete, ready-to-use system from a single source, 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	Fast assembly and commissioning on site, supported by the worldwide service network of Coperion
Optimum design of the plant to meet your individual product requirements	Easy plant control by a uniform operating philosophy
Efficient, professional project execution and maximum security in costs, schedule and product quality	Numerous solutions for fast product changes in production
Short project schedules	High operating safety
Optimum linking of all process steps	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 by modular design
Easy transport by road and ship

> RAW MATERIAL CONVEYING

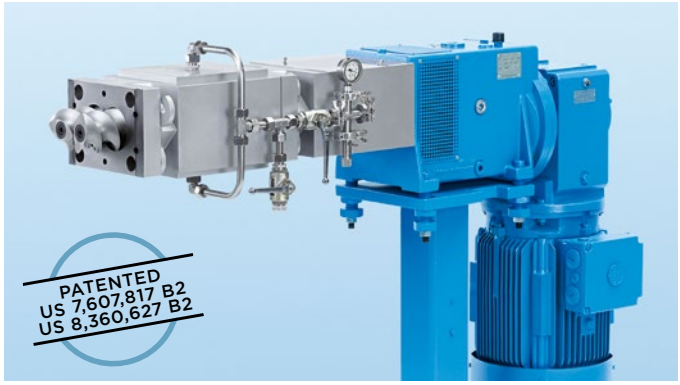
> HIGH-PRECISION GRAVIMETRIC FEEDERS

> IBP 250 FFS BAGGING AND PALLETIZING SYSTEM

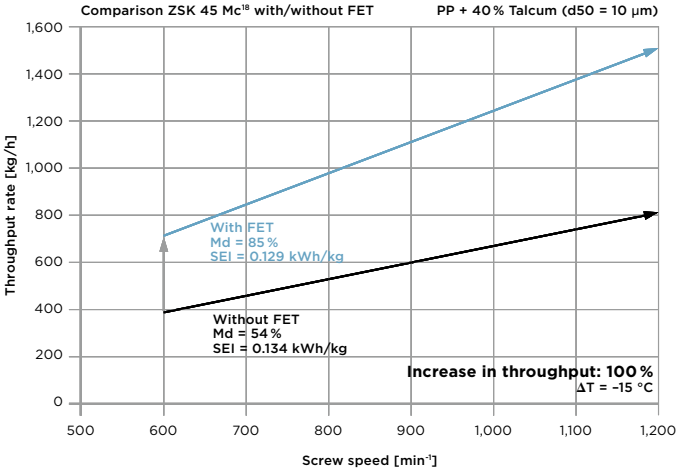

coperion

The knowledge from our continuous research flows directly into the development of new parts.

That's the way our customers' processes can be efficiently improved over the long-term. Only then we can simplify the operation of our machines and systems increasingly.



ZS-B WITH FEED ENHANCEMENT TECHNOLOGY (FET)



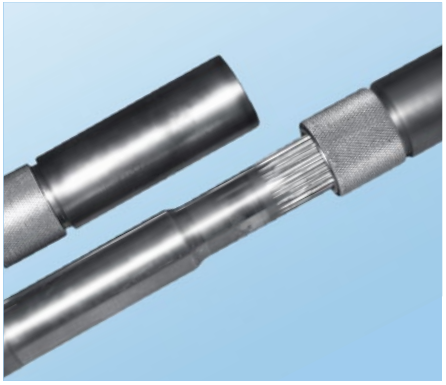
Feed Enhancement Technology (FET)

In the Feed Enhancement Technology (FET) developed by Coperion 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.

ZS-EG SIDE DEVOLATILIZATION

ZS-EG side devolatilization

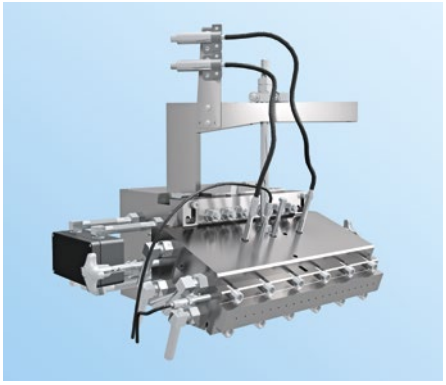
With its large free cross section for the devolatilization, our ZS-EG side devolatilization unit keeps the melt reliably in the process section during operation without product leakage even at maximum specific torque of the ZSK. Throughput increases of up to 30 % with, at the same time, considerably improved product quality are possible.



QUICK-RELEASE SCREW SHAFT COUPLING

Quick-release screw shaft coupling

For ZSK laboratory extruders Coperion has developed a quick-release screw shaft coupling that enables screw changes to be performed as quickly as possible. Cleaning times are reduced to a minimum when changing colors and recipes.

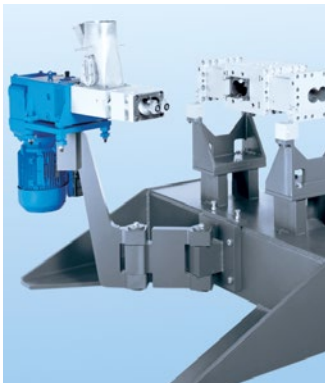


DIE HEAD

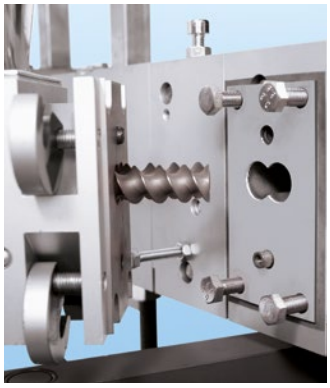
Die head

The die head for ZSK systems features optimum flow geometry. It ensures highest throughputs with gentle product handling and maximum heat transfer.

>ZS-B SIDE FEEDER, MOBILE



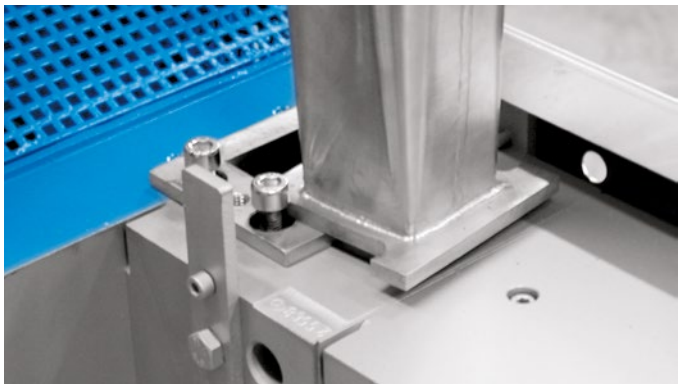
>ZS-B SIDE FEEDER, PIVOTING



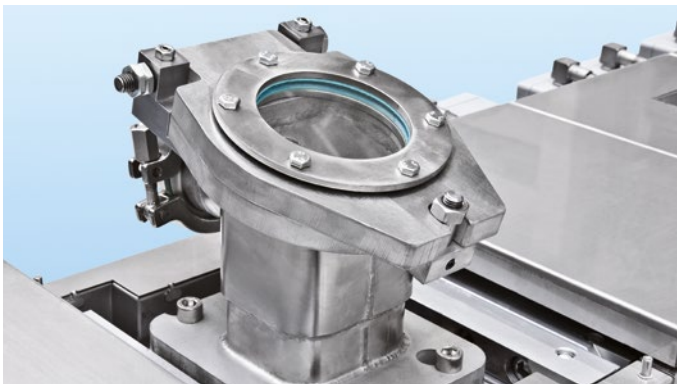
>QUICK-RELEASE OF THE ZS-B FROM THE PROCESS SECTION OF THE ZSK

ZS-B side feeder

Our ZS-B twin screw side feeder enables the feeding of powder or pellet fillers and additives or cut glass fibers into the process section of the twin screw extruder. It features the self-wiping profile of the twin screws and eliminates stagnant zones in the screw flights of the extruder. It requires very little space due to its compact design. It can be mounted anywhere on the extruder's process section with a side feed or combi barrel. Swivel connections on the barrels allow fast assembly and disassembly.



>FEED HOPPER WITH QUICK-RELEASE INSERT FOR ZSK



>QUICK CLOSURES ON 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 in the ZSK Mc^{18} series. 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.

Control systems. User-friendly solutions – custom-made for your requirements.

We provide control solutions for the ZSK twin screw extruder systems adapted individually to your requirements. This begins with standard control systems in the compact version and ranges to customized, open control systems for turnkey plants. The control systems can be easily integrated into our customers' Industry 4.0 environments and offer a large number of basic functions as standard, such as the full recording of production data or informative reports. The clear, user-friendly display helps you to further increase the operational availability of your processing plant. All ZSK machines from size 32 to 76 can be delivered in compact version, i.e. with integrated control system. This design enables you to commission your processing plants easily and quickly.

CSpro – standard control system with various comprehensive function ranges

The CSpro control system is based on the latest Siemens control components and is available in two versions with individual scopes, in accordance with user requirements. The CSpro basic covers basic standard functions, such as for machines for the processing of powder coatings or masterbatch or for laboratory systems. It is displayed on a 15" touchscreen panel PC. The CSpro medium performs additional tasks – the fully integrated dosing data enables application management and comprehensive recipe management. The display is shown on a 21" touchscreen panel with a separate high performance industrial PC. Both the basic and the medium version of the CSpro can be adjusted to the respective control requirements by means of basic configuration of the software. Via web access, the display from either version of the CSpro can also be displayed on external devices such as tablet PCs, smartphones and office PCs. The control system and control cabinet of the CSpro can be installed directly on the twin screw extruder or set up separately.

EpcNT – control system with flexible deployment options for complex machines and plants

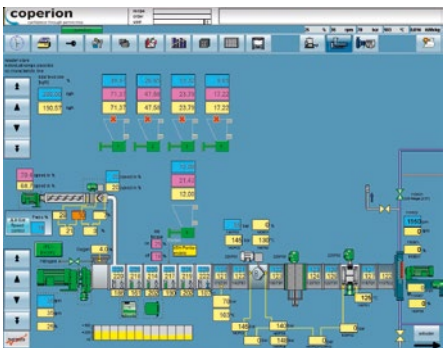
The EpcNT is particularly suitable for customer-specific machine and plant configurations and for controlling entire extrusion and compounding lines from raw material feeding through to finish product discharge. The EpcNT is based on Siemens control components. It makes an impression with its easy to read graphic visualization on a 19" touchscreen panel. Diverse software functions that optimize the production mode ensure that the plant is extremely user-friendly. These functions include recipe management, order management, along with trend display, reproducibility, and traceability of the production parameters.

EPCS7 – control system for high capacity machines

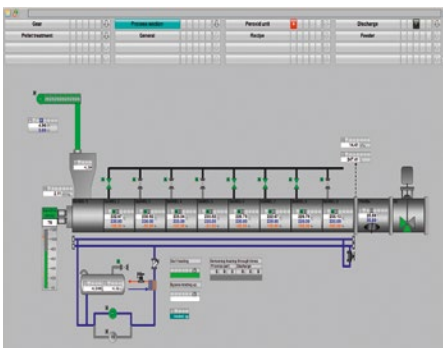
The EPCS7 is the optimum control system for all high capacity extruders. It can be individually geared to meet any requirement. It is based on the fully integrated PCS7 software system and on control components from Siemens. The PLC hardware S7-400HF ensures maximum performance and the control of safety functions. The easy to read graphic visualization of the EPCS7 on a 24" touchscreen panel simplifies operation, enables signal monitoring down to an individual sensor and enables problems to be localized quickly. Further advantages include the quick start-up and high level of availability of large extruders.

CSpro CONTROL SYSTEM

EpcNT CONTROL SYSTEM



EPCS7 CONTROL SYSTEM



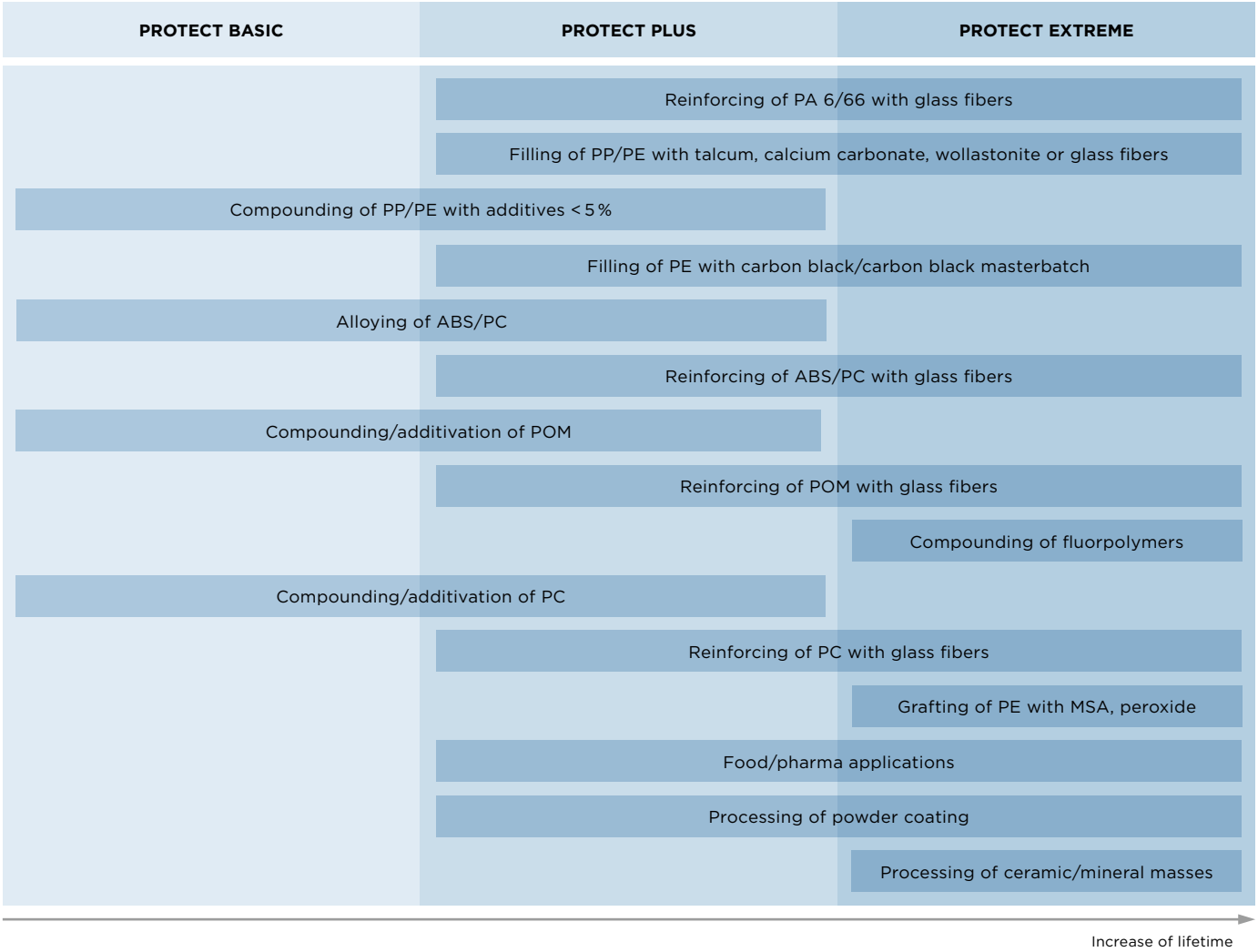

coperion
confidence through partnership
2013-4-5 11:55:27
recipe
order
user
operation
04/04/13
14:18:32
warning feeder 2
master-slave
individual ramps possible
no characteristic line
total feed rate
[kg/h]
3500.00
3500.00
kg/h
2450.00
2450.00
455.00
455.00
595.00
595.00
Material_5
Material_2
Material_333
Fast trace
tracer: melt pressure 1
bar
210 rpm
130 rpm
300 rpm
300 rpm
19 %
60 bar
239 °C
Override
Heating
Auto
Start-cond
running mode
feeder mode
feeder ramping running
coperion

Individual wear and corrosion resistant material solutions. From standard materials to extremely wear and corrosion resistant materials, Coperion offers the full range.

ZSK twin screw extruders can be highly productive even in difficult applications with aggressive products. We provide the proof of our extensive experience in the development and application of extremely wear and corrosion resistant material solutions: Considering your individual requirements, our experts help you to determine the exact combination out of more than 150 materials to ensure highest durability and reliability of the wear parts especially with economical considerations. This applies to all parts when purchasing a new ZSK extruder as well as to our comprehensive spare parts service.

For the selection of suitable material solutions our first step is to have a look at the technical aspects of your application. The wear stress is determined depending on the product and application so that we can select suitable materials in the appropriate version. These range from PROTECT BASIC solutions for applications less susceptible to wear and corrosion to PROTECT EXTREME materials for maximum lifetime. In a second step we choose the most efficient material combination with you.

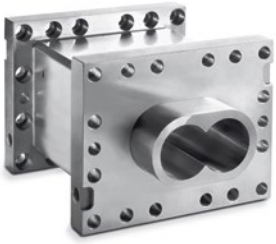
Abstract of the material solutions for extruder barrels and screw elements – individually adapted to every area of application



› WEAR AND CORROSION RESISTANT SCREW ELEMENTS

› DIRECT COATED BARREL

› BARREL WITH OVAL LINER



Material portfolio of extruder barrels*

Barrels	Material code	Werkstoff	Material	Hardness (HRC)	Area of application** Wear	Corrosion
PROTECT BASIC	WP 015-001	Nitriding steel (standard), nitrided	Solid	Surface > 700 HV	••	•
PROTECT PLUS	WP 095	Fe-based PM material (10V)	Oval liner	60+5	••••	•
PROTECT PLUS	WP 030	Martensitic (Cr-Mo) stainless steel	Oval liner	47+3	••	•••
PROTECT PLUS	WP 043	Cr hard cast alloy	Oval liner	57+5	•••	••
PROTECT PLUS	WP 043+	Fe-Cr-based PM material	Oval liner	55+5	•••	•••
PROTECT PLUS	WP 005-043+	Barrel: martensitic stainless steel, liner: Fe-Cr-based PM material	Oval liner	55+5	•••	•••
PROTECT PLUS	WP 098	Ni-based PM material	Oval liner	52+4	••	••••
PROTECT PLUS	WP 099.6	Ni-based PM material (S65)	Oval liner	58+4	•••	••••
PROTECT PLUS	WP 072-99.6	Barrel: Ni-based, liner: Ni-based PM material	Oval liner	60+4	•••	•••
PROTECT PLUS	WP 015-016 (WPR29)	Barrel: standard, coating: WC braze cladding	Direct coating of the 8-bore	62+5	•••••	•••
PROTECT PLUS	WP 015-022	Barrel: standard, coating: Co-based PM material	Direct coating of the 8-bore	40+5	••	••••
PROTECT PLUS	WP 007-022	Barrel: stainless steel, coating: Co-based PM material	Direct coating of the 8-bore	40+5	••	••••
PROTECT PLUS	WP 015-023	Barrel: standard, coating: Co-based PM material	Direct coating of the 8-bore	30+5	••	••••
PROTECT EXTREME	WP 099.3	Ni-WC-based PM material (S60+)	Oval liner	63+3	•••••	•••
PROTECT EXTREME	WP 015-99.8	Barrel: standard, liner: WC-Ni-based PM material	Oval liner	62+4	••••••	••••
PROTECT EXTREME	WP 015-29.2	Barrel: standard, coating: WC-Ni-based PM material	Direct coating of the 8-bore	62+4	••••••	••••

Material portfolio of scew elements*

Screw elements	Material code	Werkstoff	Material	Hardness (HRC)	Area of application** Wear	Corrosion
PROTECT BASIC	WP 00	Nitriding steel (standard), nitrided	Solid	Surface > 700 HV	••	•
PROTECT BASIC	WP 40	Standard	Ni-based crest welding	40+5	•••	••
PROTECT PLUS	WP 05	Martensitic (Cr-Mo) stainless steel	Solid	47+3	••	•••
PROTECT PLUS	WP 15	Fe-based PM material	Composite material	60+5	••••	•
PROTECT PLUS	WP 25	Fe-Cr-based PM material	Composite material	55+5	•••	•••
PROTECT PLUS	WP 28	Cr-Ni stainless steel	Ni-based crest welding	40+5	•	••••
PROTECT EXTREME	E 60	High speed tool steel PM material	Composite material	62+3	•••••	•
PROTECT EXTREME	E 12	High speed tool steel PM material	Composite material with CVD coating	62+3	••••••	•
PROTECT EXTREME	WP 16	Ni-based material	Ni-based crest welding	40+5	•	•••••

* Further material upon request.

** • = Low, •••••• = High

B-600304-en 2016-09 Subject to changes.

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