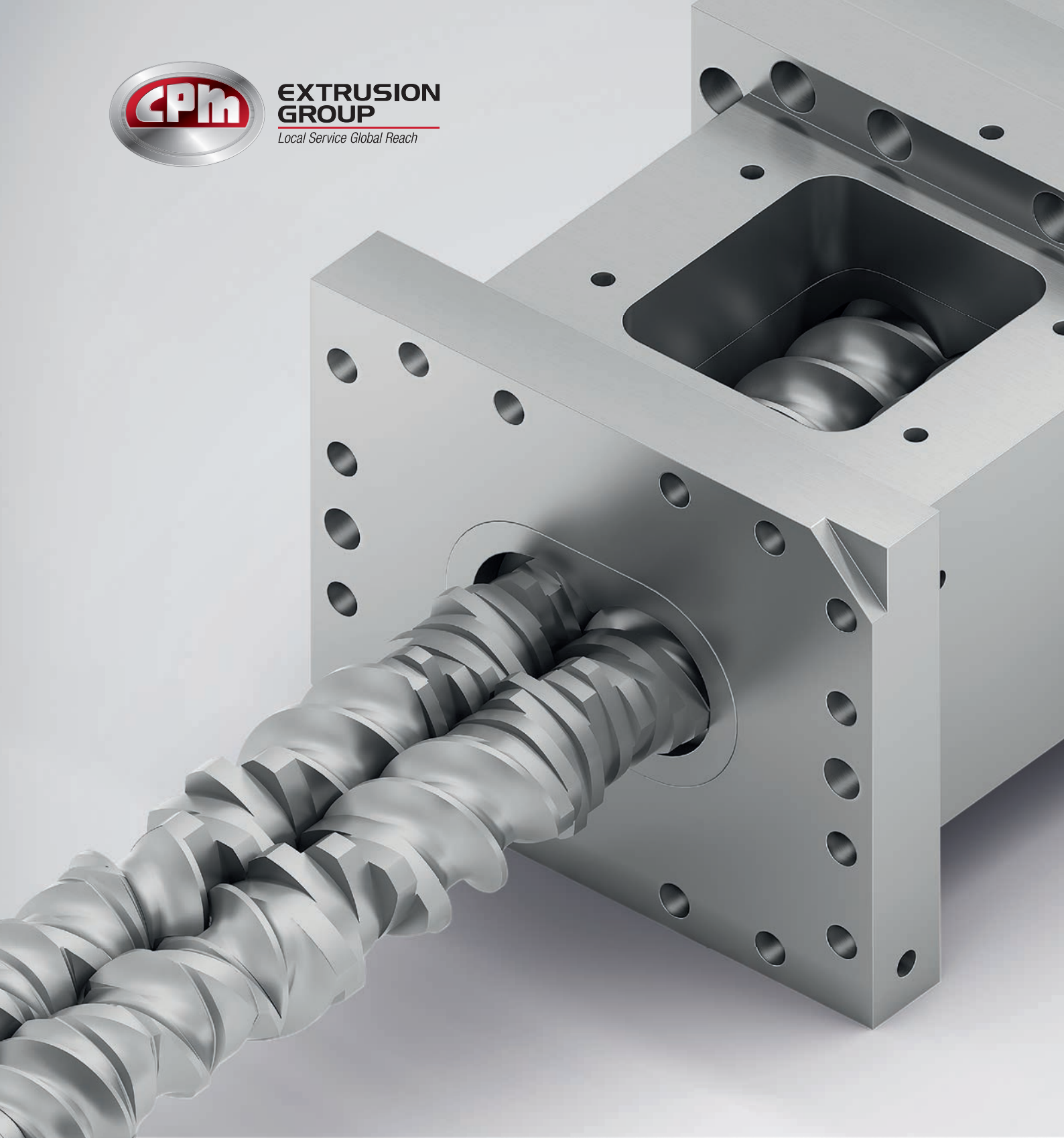




**EXTRUSION  
GROUP**

*Local Service Global Reach*



# **COMPONENTS** – OUR RANGE OF PRODUCTS AND SERVICES

Improve Extrusion through the CPM Extrusion Group: High Performance replacement parts for twin screw extruders and RingExtruders.

## DIRECTORY

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## WIDE RANGE OF PRODUCTS

Through many years of experience and utilizing the strength of each of our business units, the CPM Extrusion Group is a global leading supplier of:

- Compounding Systems
- Twin Screw Extruders
- *RingExtruder* RE®
- High Performance Elements
- Twin Screw Replacement Parts
- Auxiliary Equipment
- Services (training, engineering service, supporting services)

### LOCAL SERVICE GLOBAL REACH

CPM Extrusion Group offers a wide range of products to support the global extrusion market. For several decades we have been developing a broad range of extrusion machines and components which meet our customer's requirements and demands.

Our offering of turn-key compounding systems is proof that we are capable of supplying our customers at the highest level. As a leading global supplier, we pay close attention to our high-quality standards and our facilities are ISO 9001 certified.

We offer matching wear parts and specific optimizations for all current Twin Screw Extruders and RingExtruders, regardless of the brand. We offer many new possibilities with regards to geometry, material selection and technical design to provide you customized solutions.

Our broad range of Twin Screw Extruders, Ring-Extruders and auxiliary devices allows us to meet the needs of every customer.

We use our experience and creativity for continuous improvement of your plant's output, both in terms of quality and throughput. We always focus on a long service life of our machinery and broad range of components resulting in low maintenance and repair costs.

# OUR RANGE OF COMPONENTS

## SCREW ELEMENTS

PAGE 6-7



Screw elements for feeding solids, melt or viscous medium with single, double and triple flight design. Tightly intermeshing profile with Erdmenger design and therefore self-cleaning screws. CPM Extrusion Group is the supplier of more than 30 OEM brands ranging from 10mm through 410 mm.

## KNEADING AND MIXING ELEMENTS

PAGE 8-9



CPM Extrusion Group offers an unlimited portfolio of kneading and mixing elements above and beyond the standard offerings of any other OEM standard.

## HIGH PERFORMANCE ELEMENTS

PAGE 10-11



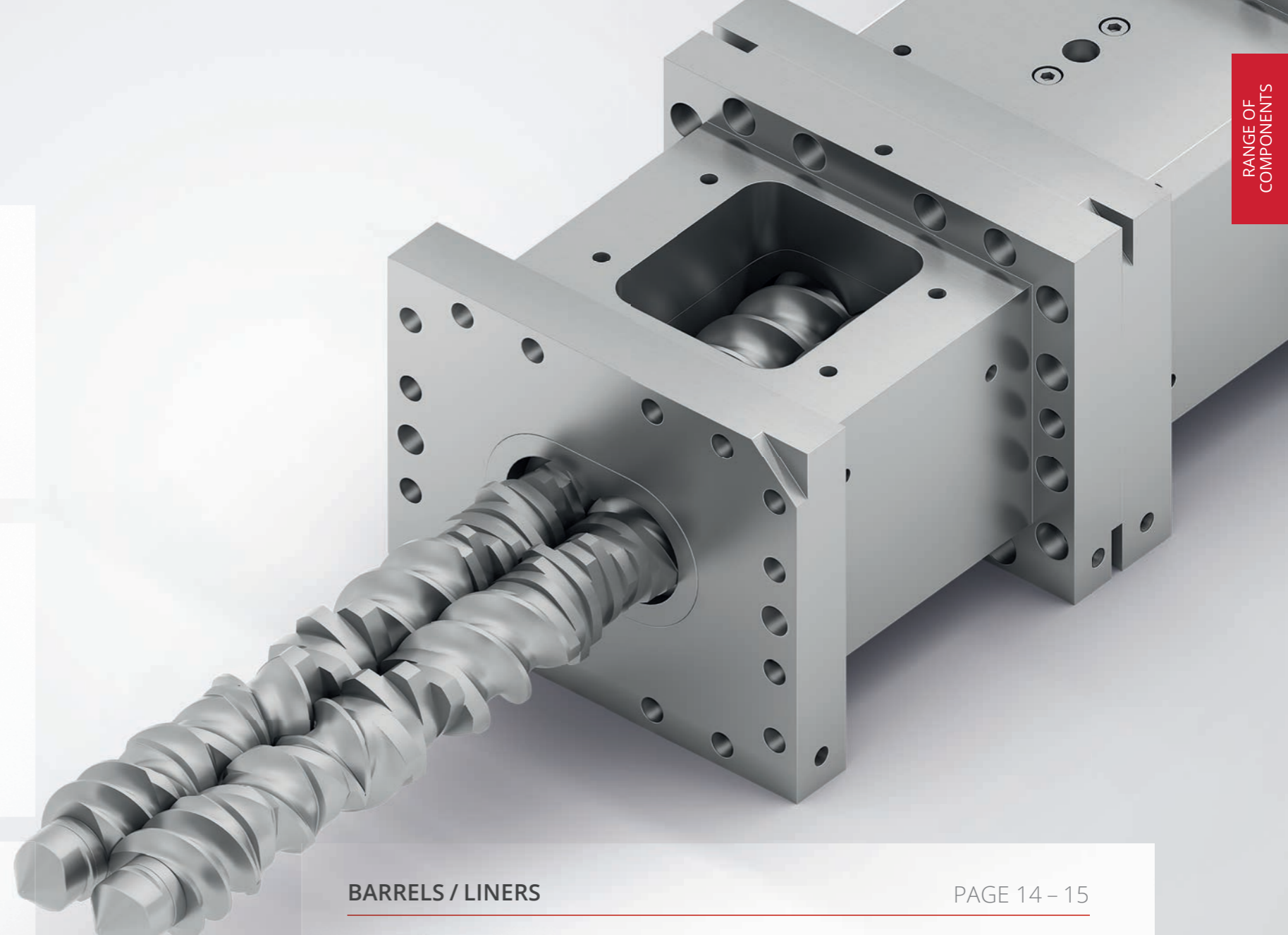
The High Performance Elements from CPM Extrusion Group - some of them patented - can lower the energy input into the product and this with very high distributive and dispersive mixing action. We offer a wide range of HP Elements.

## SHAFTS

PAGE 12-13

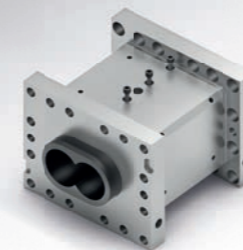


CPM Extrusion Group offers a wide range of screw shafts which are made to machine and process requirements to prevent overengineering or premature failure.



## BARRELS / LINERS

PAGE 14-15



Product contact surfaces (especially barrel bores) can be subjected to quite significant wear. We offer a wide range of barrels with long standing proven technology and innovative developments in this area.

## ACCESSORIES

PAGE 16



CPM Extrusion Group also offers you a wide range of accessories.

# SCREW ELEMENTS

CPM Extrusion Group is the supplier of more than 30 OEM brands ranging from 10mm through 410mm. We have screw elements for feeding solids, melt and viscous mediums with single, twin and triple flight design. With our unmatched portfolio, we supply elements which exceed your expectations in terms of precision, appearance, durability, process requirements and ultimately price-performance-ratio.



1



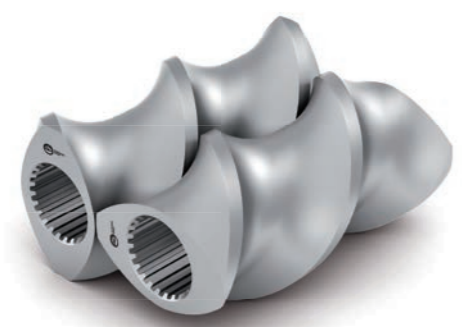
**CONVEYING ELEMENT, SINGLE-FLIGHT**  
Improved feeding behavior compared to two-flight elements | Improved pressure build-up with less energy input compared to two-flight element

2



**CONVEYING ELEMENT, TWO-FLIGHT**  
Standard element for feeding, melt conveying on two-flight extruders

3



**CONVEYING ELEMENT, TWO-FLIGHT WITH HIGH PITCH**  
Pitch can be optimized to maximize conveying rate | Reduced degree-of-fill for feeding, venting

4



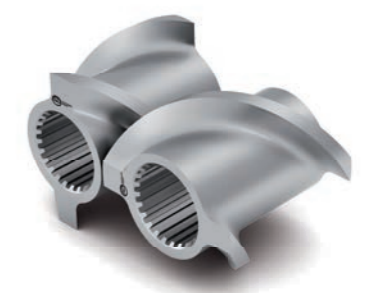
**CONVEYING ELEMENT, THREE-FLIGHT**  
Exclusively for three-flight extruders | Shallow channel depth due to low do/di

5



**CONVEYING ELEMENT, TYPE SE YY**  
Single-flight design with reduced tip width | Not self-wiping | Dramatic increase in free volume for feeding low bulk density solids

6



**UNDERCUT CONVEYING ELEMENT, TYPE SKK**  
Two-flight geometry | Increased free volume for feeding low bulk density solids | Undercut on both leading and trailing flight | Undercut areas not self-wiping

7



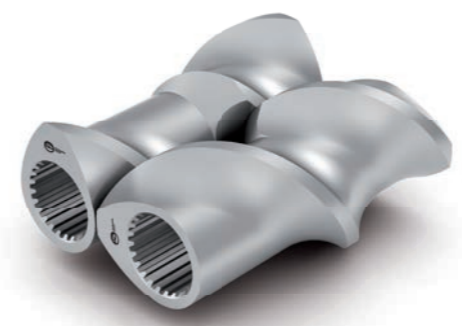
**REVERSE CONVEYING ELEMENT**  
Generates flow restriction in melting or mixing zone | Available as single-flight or twin-flight

8



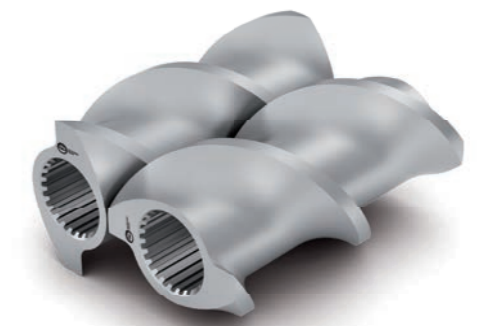
**TRANSITION ELEMENT, TYPE SFN**  
Creates transition between single-flight and two-flight (or three flight) elements while maintaining self-wiping characteristics | Requires unique element for left and right shaft

9



**TRANSITION ELEMENT, TYPE SE12**  
Creates continuous transition between single-flight element with reduced tip width (type SE YY) and standard two-flight elements

10



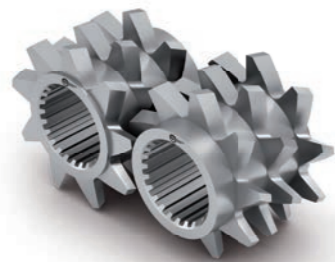
**UNDERCUT CONVEYING ELEMENT, TYPE SK**  
Leading flight undercut with relatively large pitch | Available for two-flight and three-flight extruders | Increased free volume where passive flights are cleaned by neighboring elements (transition elements have the designation SKN)

## KNEADING AND MIXING ELEMENTS

CPM Extrusion Group offers an unmatched portfolio of kneading and mixing elements which easily exceeds any other OEM standards. By our wide selection of kneading and mixing elements, we enable our customers to maximize flexibility and productivity of their extruder. Additionally, our wide variety of construction materials and decades of metallurgical experience leads to an excellent durability and high service life time.



1



### GEAR MIXER, TYPE ZB

Alternating gear rings on the left and right shaft | Variations available: number of gear rings, number of teeth, conveying direction (forward, neutral, reverse), gear tooth angle

2



### GEAR MIXER, TYPE ZME

Single-flight intermeshing screw profile with reverse pitch | Intensive distributive mixing through frequent flow divisions

3



### NEUTRAL KNEADING ELEMENT

Two-flight or three-flight designs available with tightly intermeshing kneading discs | Non-conveying behavior (e.g. flow restrictor)

4



### REVERSE KNEADING ELEMENT

Flow restriction element creates local pressure upstream | Leads to a high energy input | Variations available: offset angle, number of discs and disc width

5



### ECCENTRIC TRANSITION KNEADING ELEMENT

Forms a continuous transition for installation of eccentric three-flight kneading elements on two-flight extruders | Requires unique element for left and right shaft

6



### SCREW MIXING ELEMENT, TYPE SME

Provides gentle distributive mixing | Requires downstream pressure to promote flow through slotted flights | Available for two-flight and three-flight extruders | Variations available: pitch, number of slots per revolution, slot pitch angle, conveying direction

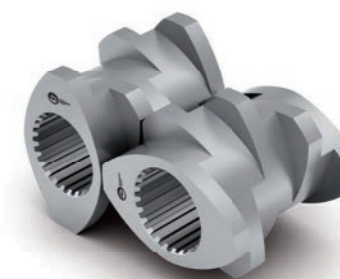
7



### „JIGEL“ ELEMENT

Two-flight right-hand and left-hand conveying elements superimposed | Neutral conveying behavior | High degree of distributive mixing, although not 100% self-wiping

8



### SHOULDER-KNEADING ELEMENT, TYPE KBS

A proprietary development from CPM Extrusion Group | Reduced disc width compared to standard kneading elements | Creates more homogeneous melting with reduced energy input

9



### CONVEYING KNEADING ELEMENT

Standard element for mixing and/or melting | Variations available: offset angle, number of discs, disc width, number of flights

10



### ECCENTRIC THREE-FLIGHT KNEADING ELEMENT, TYPE KBX

Efficient melting and dispersive mixing for two-flight extruders due to reduced channel depth | Requires transition elements upstream and downstream

## HIGH PERFORMANCE ELEMENTS

### How can our High Performance (HP) Elements benefit you?

High levels of energy input and the resulting strong rise of local temperature are usually unwanted side effects of using kneading elements. Our HP Elements can lower the energy input into the product and this with very high dispersive and distributive mixing action. Throughput and product quality can be increased many different levels. Through process analysis and screw design, our highly skilled process specialist team will figure out the improvement potential together with our customer and will make recommendations in terms of screw configuration or process set-up.

1



#### ONE PIECE COMBINATION-ELEMENT

Combination element (part conveying, part kneading or restriction element) | Distributes energy over a longer section of shaft resulting in improved mechanical integrity

2



#### SEGMENT SCREW CONVEYING, TYPE SG

Forward conveying screw segments offset at predetermined angles | Intensive distributive mixing while maintaining conveying efficiency | Mechanically stable geometry (versus offset individual elements) | Elimination of pressure/shear peaks associated with kneading elements | Promotes elongational flow

3



#### SEGMENT SCREW WITH REVERSE PITCH

Forward and reverse conveying segments offset at predetermined angles arranged in alternating order | Intensive mixing through open channels, reduction in shear stress from offsetting of reverse conveying screw segments | Restriction element creates 100% fill

4



#### T-PROFILE SCREW, TYPE T6

Alternating channel depth and tip clearance with each revolution | Only one flight tip scrapes the barrel and adjacent screw with close clearance through asymmetric profile | High degree of distributive mixing while maintaining conveying efficiency

5



#### T-PROFILE SCREW, TYPE T3

Increased screw/barrel tip clearance and channel depth compared to the T6 profile | Improved mixing capability while maintaining conveying efficiency | Potential benefits for degassing via surface renewal

6



#### BARRIER SCREW, TYPE BS

Primary feature is the frequent redirection of the product | Barrier discs between screw segments increases the degree-of-fill without use of restriction elements | Dispersive mixing as material is forced across barrier discs

7



#### BARRIER KNEADING SCREW, TYPE BKS

Kneading discs with large pitch angle offset in a forward conveying direction with barrier rings between discs to increase degree-of-fill | High degree of dispersive mixing

8



#### BARRIER KNEADING BLOCK, TYPE BKB

Standard two-flight kneading element with barrier rings between kneading discs | Increased degree-fill while maintaining forward conveying effect

9



#### T-PROFILE KNEADING ELEMENT, TYPE T6KB

Alternating channel depth and tip clearance with each revolution, same as T6 screw element | Geometrically self-cleaning, with asymmetric profile | Elimination of pressure/shear peaks associated with standard kneading elements

10



#### T-PROFILE KNEADING ELEMENT, TYPE T3KB

Larger channel depth and tip clearance variation than T6 kneading element | Provides high melting capacity and dispersive mixing while eliminating pressure/shear peaks associated with standard kneading elements - leading towards lower energy input and reduced melt temperature

# SHAFTS

1



### SINGLE KEY DESIGN

Round shaft with feather key | Rarely used due to low permissible torque

2



### MULTI-KEY DESIGN

Round shaft with half-round slots | 2, 4 and 6 key designs to transfer torque | 6 key design utilizes integrated keys with screw element

7



### CPM EXTRUSION GROUP DESIGN

Connects the seal bushing permanently with the screw shaft without weakening the shaft

8



### INTEGRATED COUPLING DESIGN

Coupling toward the gearbox serves as axial stop and sealing element at the same time

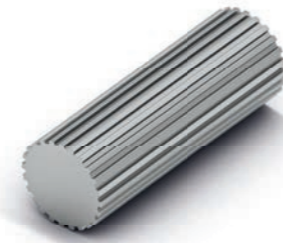
3



### HEXAGON SHAFT

Utilized in lower torque applications | Available in "double hex" design to increase flexibility of screw orientation

4



### INVOLUTE SPLINE DESIGN

Utilize teeth which mesh with screw element internal spline | Current standard in shaft technology | Highest torque bearing liability

5



### ONE PIECE SHAFT DESIGN

Drive end (including shoulder) machined from same piece of material as screw shaft

6

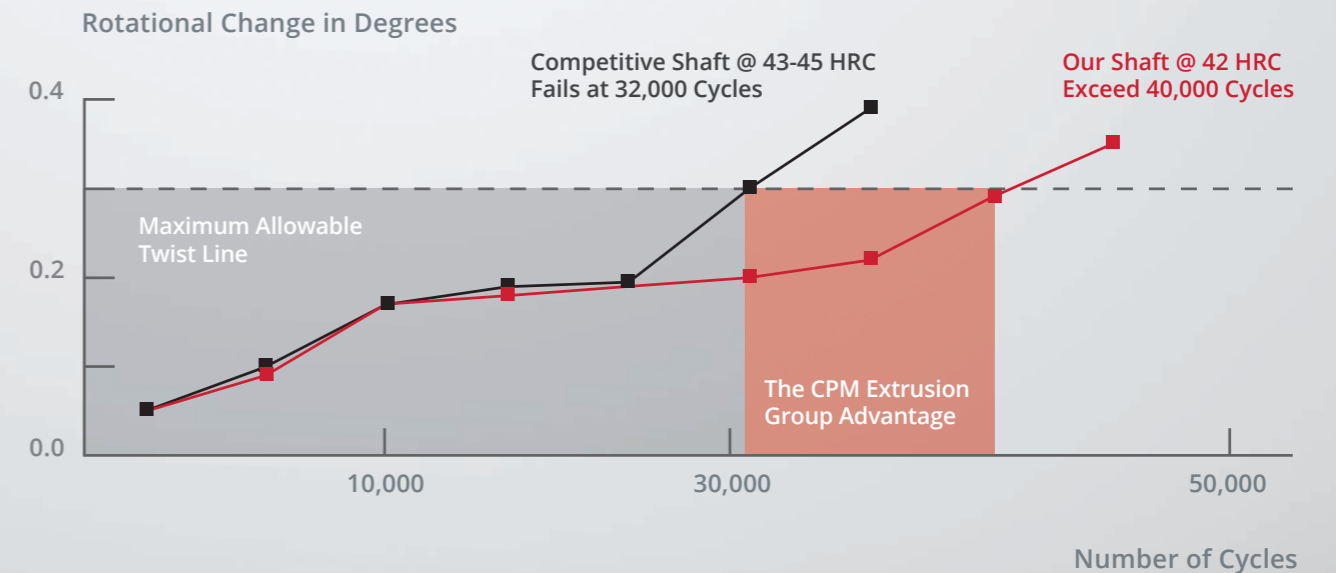


### THREE PIECE SHAFT DESIGN

Drive end consists of separately machined pieces (including drive end & drive nut/ screw)

## > SHAFTS TESTING AND RESULTS

- In a controlled environment, we conducted comparative tests of the cold-formed shaft and the competitive shaft on the market.
- Subjecting both shafts to uniform unidirectional torsion load cycles, these tests measured the fatigue life of each shaft at elevated temperatures.
- Our rolled shafts outperformed the highest-rated shaft on the market by 25%. See these outstanding results in the plot below.



## BARRELS / LINERS

CPM Extrusion Group offers the industry's widest portfolio of multi-screw barrels. We provide standard and special designs for nearly every OEM brand on the market. Our High Performance barrels are extremely successful in our barrel range. They take 2 key points into account: advanced wear solutions and selection and experience.

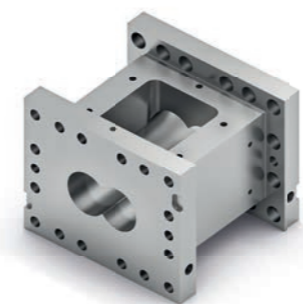
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### CLOSED BARREL

Commonly heated electrically and cooled with water through pulsed cooling

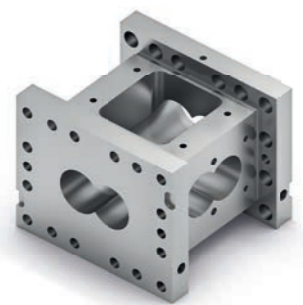
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### OPEN BARREL

Round or square opening on the top | Used for either feeding or venting

3



### COMBI BARREL

Both top and side opening | Available alternatives are block type or with lateral opening only

4



### ADAPTER PLATE

Used to support process section and for measuring purposes | Possibility to provide a port for injection valves in adapter plate openings

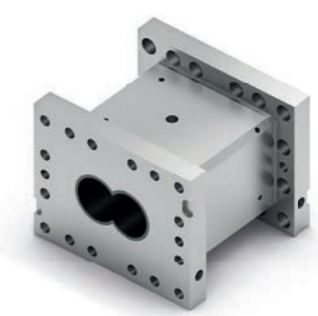
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### LONG DEGASSING BARREL

Used for degassing tasks with especially high volatile content

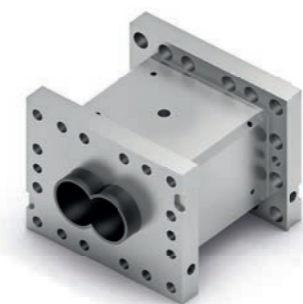
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### SOLID BARREL WITH PERMANENTLY JOINED WEAR PROTECTION COAT

Applicable through hot-isostatic pressing, flame spraying or other coating processes

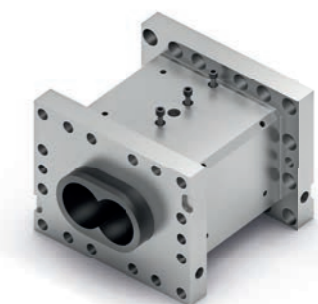
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### BARREL HOUSING WITH EXCHANGEABLE THINLINER®

Thin-walled wear protection liners called Thinliner® | Liner is exchangeable | Possibility of arranging cooling channels very close to the process room

8



### BARREL HOUSING WITH INLINER

Standard solution for high wear protection | Liner is exchangeable and can be manufactured from a large bandwidth of materials

9



### BLOCK BARREL WITH TIE-ROD DESIGN

Various available designs, e.g. square flange barrels | Likewise braced with tie-rods or clamping flanges

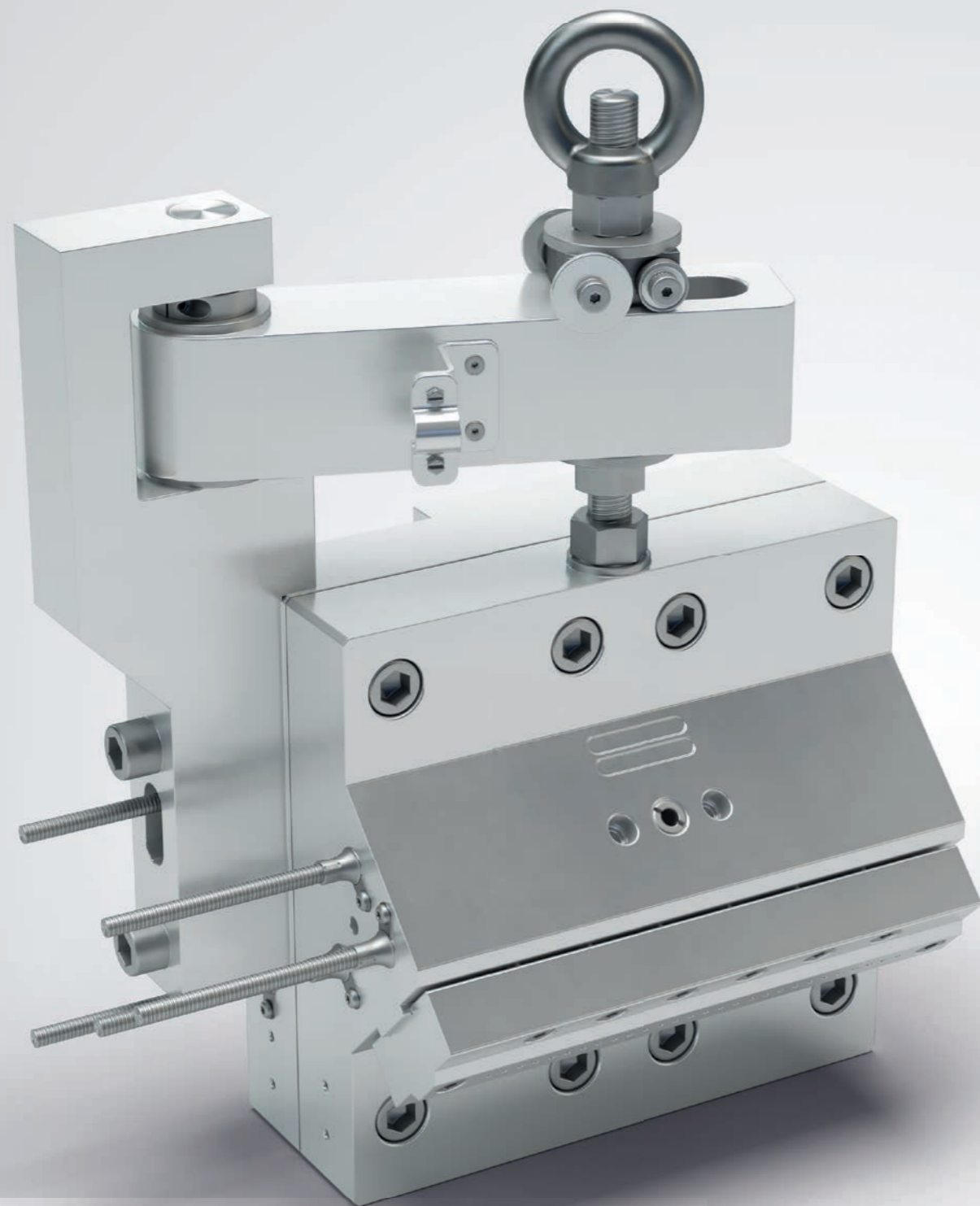
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### ROUND, CLOSED BARREL WITH ROUND LINER

Removable liner | Can often be supplied with Thinliner® wear protection inserts





## ACCESSORIES

CPM Extrusion Groups also offers you a wide range of accessories. Including:

- Screw couplings
- Screw tips
- Vent ports
- Vent plugs
- Barrel nuts and bolts
- 8-0 transition pieces
- Barrel spacers
- Liquid injection port adaptors
- Liquid injection port plugs
- Side feed plugs
- Open barrel top plugs
- Vent stacks



## MATERIALS

The extruder features a so-called tribological system, built on the structure, that is, screw, barrel and material processes as well as the load combination such as stress, motion, pressure and temperature. All these parameters affect the choice of a suitable material. Our team of specialists will not leave you to your own wits in assessing these questions but contributes decades of experience with twin screw extruders to the problem solution.

We use our technical knowledge in the field of materials and processing technology to help you select a suitable material for your process – for screw elements, kneading blocks, high performance elements, mixing elements, barrels as well as support shafts. CPM Extrusion Group processes over 430 different material types in various heat treatment versions, optionally also with additional surface coating.

## EXCEPTIONAL SERVICE OFFERINGS

The CPM Extrusion Group currently supports and serves multi screw lines around the world. We have the global and regional capacity to help our customers specify, operate and maintain their compounding systems both near-term and long-term.

Through decades of industry experience, we have developed a comprehensive offering of services to help compounders stay up and running and to achieve their goals.

### > TWIN SCREW AND RING EXTRUSION TECHNOLOGY TRAINING PROGRAMS

By request we can offer training programs in both twin screw and ring extrusion fields. Training topics range from extruder troubleshooting to in-depth tailored process support.

We deliver this service in many ways:

- On-site
- Public seminars
- Customized workshops
- Via webinars

### > ENGINEERING SERVICES

When developing machinery specifications, we carry out an analysis which examines process parameters like rotational speed, temperature profile, torque, pressure and specific energy input in connection with screw and barrel design.

Upscaling and downscaling the processes and geometry of different sizes and types of extruders help our customers achieve the required results with their processing technology.

### > SUPPORTING SERVICES

We offer a 24 hour emergency hotline through every CPM Extrusion Group location. For urgent inquiries you can call our hotline or contact us by email. Additionally, our extensive spare parts in-

ventories and expediting capabilities in the U.S., Germany and China allow us to serve customer needs in the timeliest fashion possible. You will benefit from our extended stock program for elements, liners and barrels.

### > INSTALLATION

Our service technicians are available for the supervision of extrusion equipment installations in every corner of the world. Our installation team will guide and assist the customer throughout each step of the start-up process.

The specific requirements of design, layout, assembly, electrical, and other utilities are addressed prior to the on-site start of the installation. We offer operation and service manuals for all the equipment we supply.

### > TRAINING

In addition to our frequent online webinars, seminars, and workshops we also offer on-site training specific to your installed equipment.

After completion of an installation, our skilled technicians and process specialists begin the commissioning process. Each individual component of the installation is configured and tested for optimal performance. Once the machine performance has met your desired characteristics, the start-up of the extrusion line is accomplished.

### > MAINTENANCE

As with any industry utilizing industrial equipment, it is important to practice regular maintenance. We support our customers through a range of services such as barrel bore measurement and reporting, screw shaft disassembly and inspection, and remote and on-site troubleshooting.

Strong maintenance knowledge may be gained through the viewing and attending of our training seminars and online webinars.





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