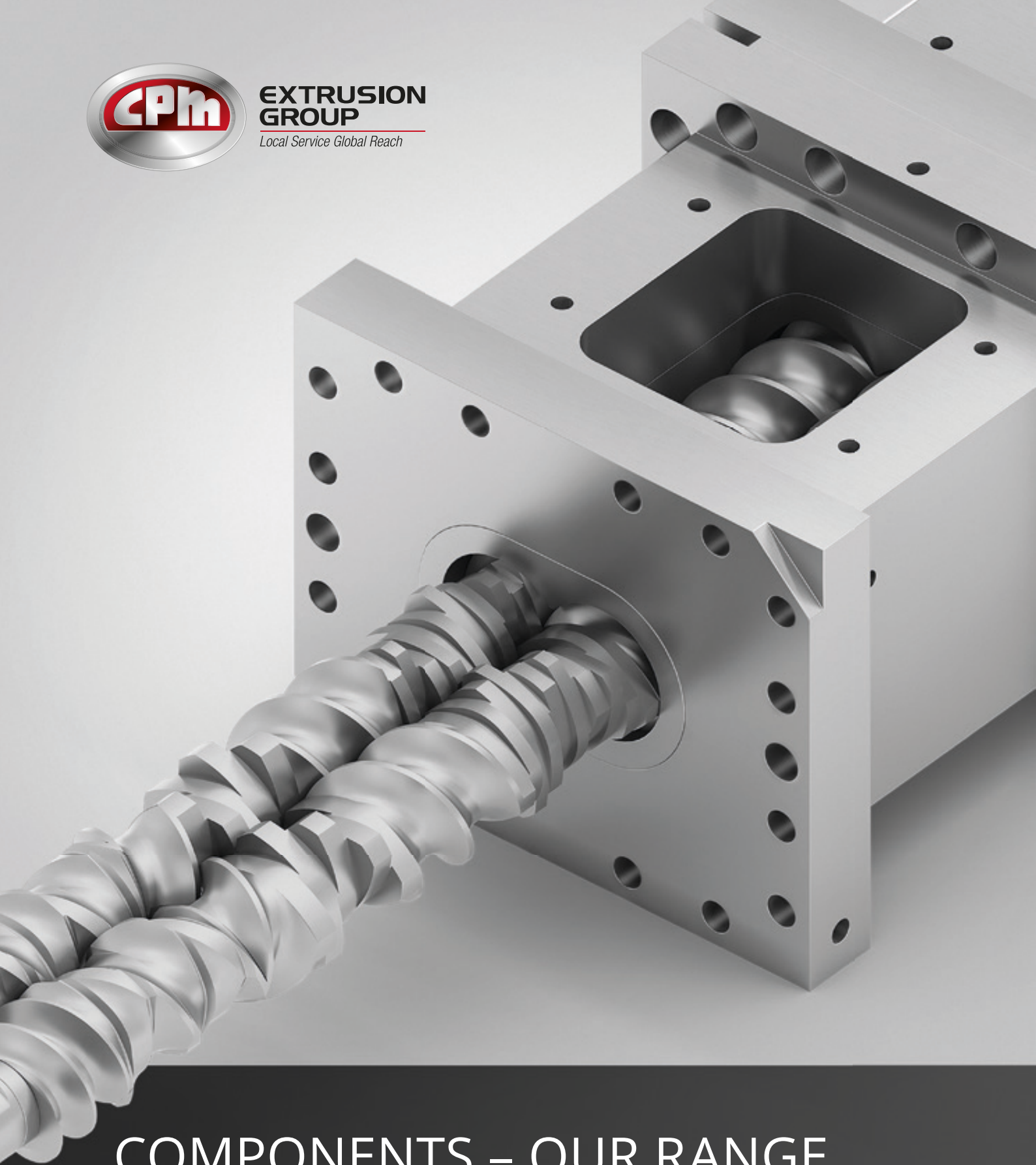




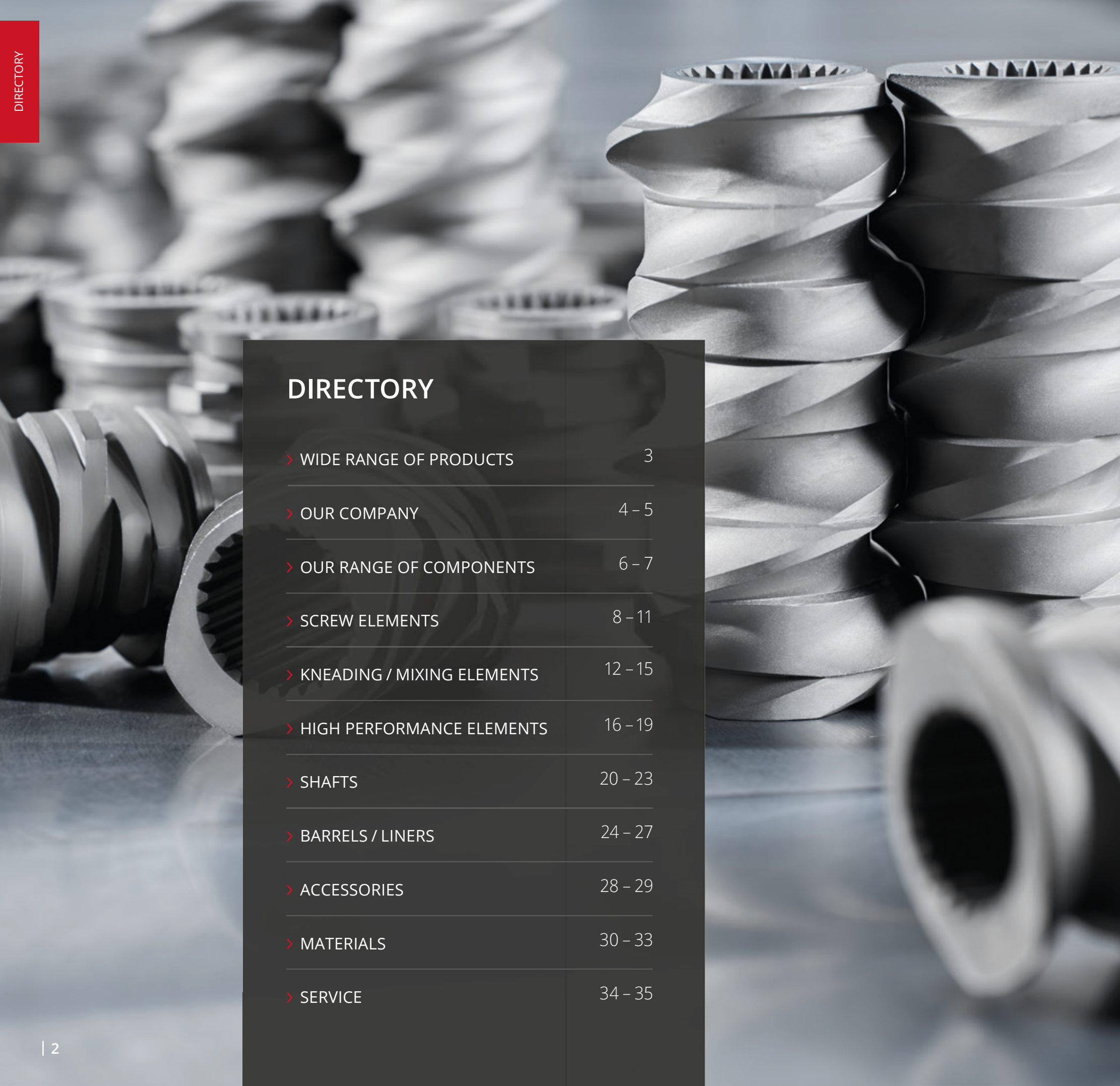
**EXTRUSION  
GROUP**

*Local Service Global Reach*



# COMPONENTS – OUR RANGE OF PRODUCTS AND SERVICES

Improve Extrusion from CPM Extrusion Group: Spare and wear parts as well as high performance components for twin screw extruders and ring extruders



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®
- Twin screw replacement parts
- High Performance Elements
- Auxiliary equipment
- Services (trainings, engineering service, supporting services)

LOCAL SERVICE GLOBAL REACH

CPM Extrusion Group offers a wide range of products to support the global compounding market. For several decades we have been developing and working diligently to develop 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 and ring extruders, regardless of the brand and across all markets. We offer many new possibilities with regards to geometry, material selection and technical design to provide you customized solutions.

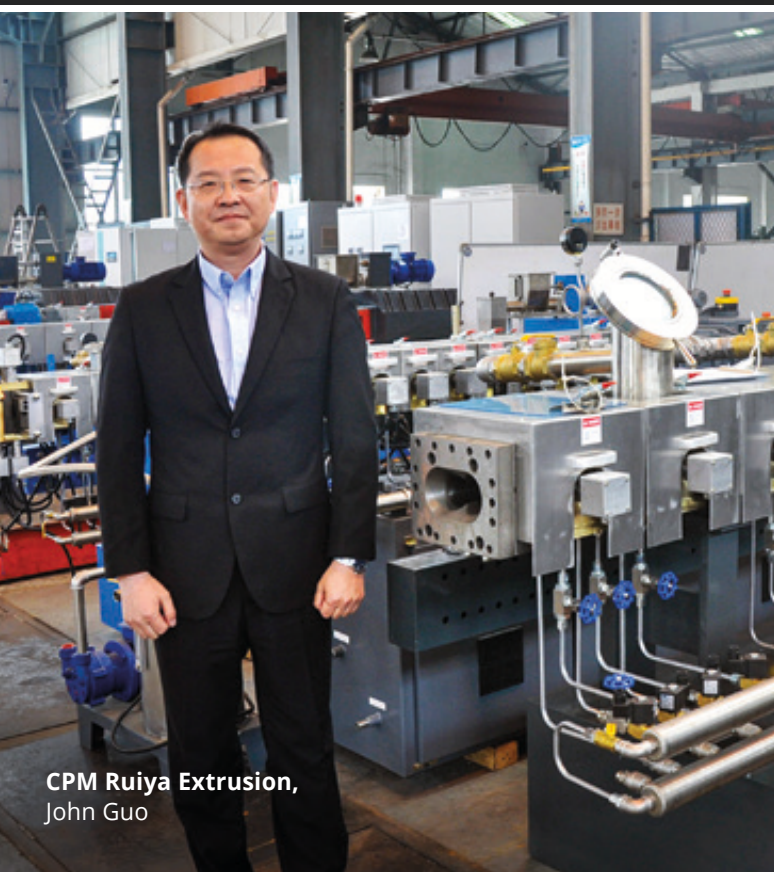
Our broad range of twin screw and ring extruders allows us to meet the needs of every customer. We use our experience and creativity for continuous improvement of your plant’s output, both in terms of quality and throughput. We always focus on a long service life of our machinery and broad range of components resulting in low maintenance and repair costs.





President CPM Extrusion Group,  
Bob Urtel

CPM Century Extrusion,  
Charles Spearing



CPM Ruiya Extrusion,  
John Guo



CPM Extricom Extrusion,  
Thomas Bauer

# THE HISTORY OF CPM EXTRUSION GROUP

## COMPANY

CPM Extrusion Group is a group of extrusion companies identified with one vision: **Providing the Best Overall Value to Our Customers World-wide.**

CPM Extrusion Group belongs to the worldwide **CPM Group** with facilities all around the globe. CPM is the parent to world-leading process equipment and systems companies around the world. CPM companies represent broad product portfolios and serve diverse end markets.

CPM units are experts in large-scale commodity and value-added processing and are aligned with a common value proposition and committed to delivering enduring value to their customers, employees, shareholders and communities.

## CORPORATE HISTORY

The first extrusion company which was acquired by the CPM Holdings was **Century Extrusion** in 2006. Century Extrusion, with its headquarters in Traverse City(MI) in the US, has decades of experience in the development of highly engineered twin screw extrusion systems as well as high performance process section components.

Through the development of an impressive list of global customers spanning across all aspects of compounding, Century Extrusion has acquired valuable experience in process application and system design.

In 2007 **Ruiya Extrusion**, established in 1993, was acquired by the CPM Holdings. Ruiya Extrusion is one of China's leading providers of twin screw extruders covering all kinds of applications, compounding systems and supporting technologies.

Ruiya has achieved its position in the Chinese market place by providing industry leading equip-

ment technology, process engineering and after sales support. Today, Ruiya Extrusion has one of the largest installed bases of machines in Asia, covering different levels of extruders, from entry level to high level European standard specifications for various customer requirements.

Through this experience, Ruiya Extrusion has gained industry leading application experience bringing confidence to its customers not only in Asia but also in the rest of the world.

In 2017 **Extricom GmbH** was acquired as another CPM Extrusion Group member. Extricom is a supplier of compounding lines, replacement parts, and services.

With over 40 years of expertise in extrusion systems and spare parts, Extricom provides innovative development and manufacturing of corotating twin screw and ring extruders through the integration of production, assembly, service, laboratory research from their headquarters in Germany.

## CPM EXTRUSION GROUP TODAY

Today CPM Extrusion Group is globally established with headquarters in the US, Europe and Asia. World-wide we have sold more than 4100 extruders. We offer the world our combined knowledge, our agility, extrusion passion and leadership.

Whether it is an expanded scope compounding system or a spare part for an existing machinery we strive for a close collaboration with our customers to provide best overall value.

As a customer-centric organization we offer unmatched service and products at each of our customer's locations. Our theme is truly: **Local Service, Global Reach.**



# OUR RANGE OF COMPONENTS

## SCREW ELEMENTS

PAGE 8 – 11



Screw elements for feeding solids, melt or viscous medium with single, 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 12 – 15



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 16 – 19



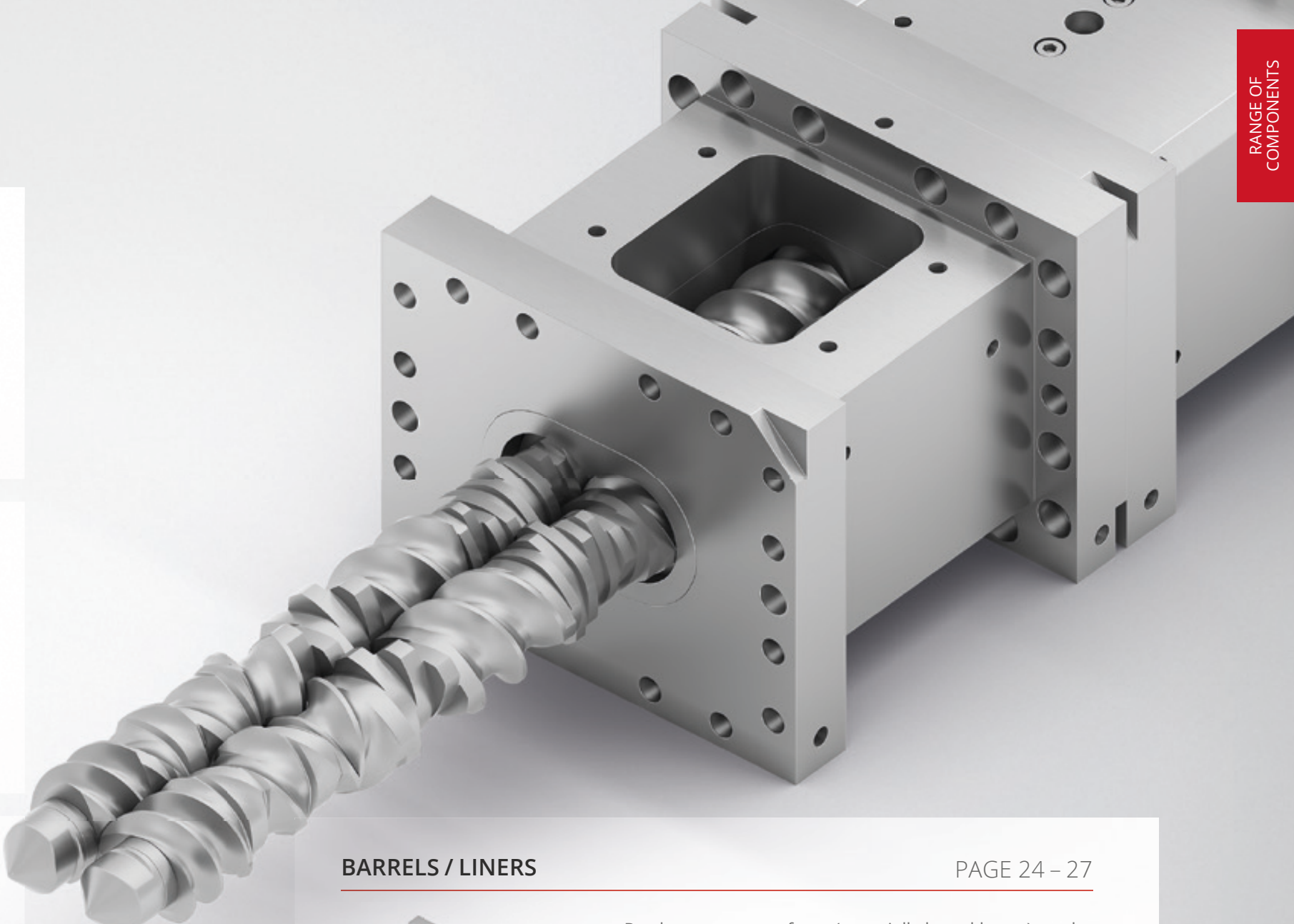
The High Performance Elements from CPM Extrusion Group – some of them patented – can lower the energy input into the product and this with very high distributive and dispersive mixing action. We offer a wide range of HP Elements.

## SHAFTS

PAGE 20 – 23

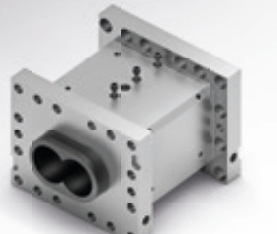


CPM Extrusion Group offers a wide range of screw shafts which are made to machine and process requirements to prevent overengineering or premature failure.



## BARRELS / LINERS

PAGE 24 – 27



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 28 – 29



CPM Extrusion Groups 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 410 mm. We have screw elements for feeding solids, melt and viscous mediums with single, twin and triple flight design.

Screw elements constitute the basic geometry for draw-in and feeding solids. The screw elements also serve to transport melt and build up pressure. In our range our reverse elements have a flow restriction effect. We design our screw elements with tightly intermeshing screw profiles according to the fundamental design principles as per the original patents of Dr. Erdmenger. With our unmatched portfolio we supply elements which exceed your expectations in terms of precision, appearance, durability, process requirements and ultimately price-performance-ratio.



## SCREW ELEMENTS

1

### CONVEYING ELEMENT, THREE-LOBED

The three-lobed conveying element is not commonly used in new extrusion lines. This screw element has a different ratio of outside diameter to core diameter.



2

### CONVEYING ELEMENT, BI-LOBED

Bi-lobed conveying elements are used in current twin screw extruders as standard element for feeding solids. Additionally they melt when pressure is build up before flow restricted zones and the discharge. The volume conveying capacity and the pressure build-up depend on the pitch of the screw.



3

### CONVEYING ELEMENT, SINGLE-LOBE

Single-lobe conveying elements, because of the wide tip, exhibit a better forced feeding behaviour compared to two-lobed elements. These elements build up pressure with less energy input and often exercise a sealing-off function toward the gearbox at the beginning of the screw.



4

### CONVEYING ELEMENT SE YY

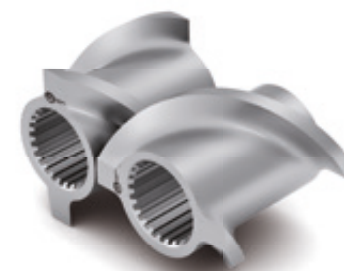
Conveying element with single-lobe design where YY represents the tip width preferably reduced to the width of the bi-lobed screws. Is usually employed for relative large pitches in zones where much free conveying volume is required, that is, in the intake area or the area of sidefeeders and degassing openings.



5

### CONVEYING ELEMENT SKK

Two-lobed conveying element with two-sided pushing flight at relatively large pitch. This creates a large free conveying volume at simultaneously quite favourable flank angles. These elements can also pull in large volume particles with low density.



6

### REVERSE ELEMENT

Screw elements with reverse pitch direction are used to generate flow restrictions in the melting or mixing zones. They normally have a length of half the outside diameter. Note: also available in custom forms (refer to HPE element "single-piece element" on this)



7

### CONVEYING ELEMENT, BI-LOBED WITH HIGH SCREW PITCH

Tightly intermeshing conveying elements with large pitch are used to pull in and convey also adhering materials. The pitch can be optimised to maximum conveying rate, where the optimum typically lies between 1.3 and 2-times the diameter.



8

### TRANSITION ELEMENT, SINGLE-LOBE TO BI-LOBED

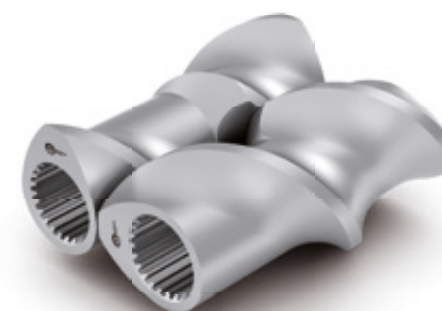
These transition pieces of the type S12 create a transition between single and two-lobed sealing profile elements without "dead spots". They are needed in pairs since the elements for the left and right shaft must be dimensioned differently.



9

### TRANSITION ELEMENT SE12

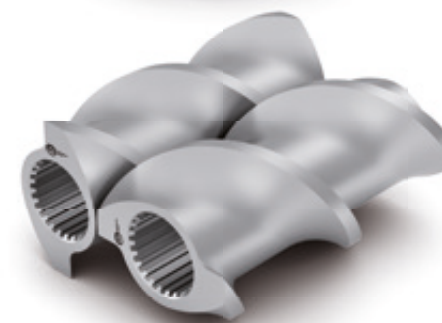
These transition pieces create a continuous transition between single-lobe elements of the type SE YY to two-lobed sealing profile elements without dead spots in which product may become deposited.



10

### PUSHING FLIGHT ELEMENT, BI-LOBED

Conveying elements in bi-lobed design of the type SK with relatively large pitch, where the active, that is, the pushing flight, features a pushing edge. These elements exhibit a relatively large free volume where the passive flights are cleaned by the neighbouring elements. The fitting transition pieces have the designation SKN.







## KNEADING / MIXING ELEMENTS

CPM Extrusion Group offers an unmatched portfolio of kneading and mixing elements which easily exceeds any other OEM standards. Kneading and mixing are critical process tasks in an extruder where either high shear energy is introduced with kneading blocks to melt and/or mix components of the compound or simply mixing elements support the blending process.

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 materials of construction and decades of metallurgical experience leads to an excellent durability and high service life time.



## KNEADING / MIXING ELEMENTS

1

### GEAR MIXER, TYPE ZME

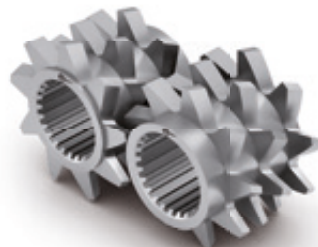
Gear mixers are created from a single-lobe intermeshing screw profile with reverse design by introducing grooves in the conveying direction of the pitch. This produces a filled up element which mixes intensively distributive through frequent flow divisions.



2

### GEAR MIXER BLOCK, TYPE ZB

Gear mixer blocks of the type ZB are created through alternating gear rims on the left and right shaft. It consists with a large degree of variability in terms of dimensioning. The teeth can be designed, both as forward conveying – this produces a partially filled element in the process – and reverse conveying, in which case it constitutes a pressure consumer. Neutral gear shapes with variable numbers are also possible.



3

### KNEADING BLOCK, NEUTRAL

Standard kneading block in bi-lobed design with tightly intermeshing profile. The discs are offset by 90 degree so that this kneading block exhibits conveying-neutral behaviour. In a sequence of neutral kneading blocks the degree of filling can thus be influenced well through the process conditions.



4

### KNEADING BLOCK, REVERSE

Reverse kneading blocks create pressure in order to cause a backup before the element. These kneading blocks lead to a high energy introduction. They are usually designed at lengths smaller than the diameter to prevent the pressure peaks and shear strain in the material from becoming too large.



5

### ECCENTRIC TRANSITION KNEADING BLOCK

If a dispersion or melting zone is designed with three-lobed, "eccentric" kneading blocks of the type KBX a pair of transition blocks, type KBX-A or KBX-B must be installed both upstream and downstream. These elements through the two-lobed starting disk form a fitting transition to the two-lobed standard elements.



6

### SCREW MIXING ELEMENT SME

The screw mixing element is a two-lobed standard profile screw with reverse-conveying milled recesses in gear format. This element allows for gentle distributive mixing. Very well suited for products that do not tend to form deposits.



7

### „IGEL“ ELEMENT

The „Igel“ element is created from a right-handed and left-handed screw cutting above each other. Mixed diamond-shaped spikes are the result. It behaves neutral in regard to conveying and is used for distributive mixing.



8

### SHOULDER KNEADING BLOCK KBS

The shoulder kneading block, type KBS, is a proprietary development from CPM Extrusion Group and has proven beneficial as a standard element in many applications. Through a reduction of the width of the disc in favor of wider overflow areas shearing peaks are reduced and more homogeneous melting results are produced.



9

### KNEADING BLOCK CONVEYING

The standard kneading block with conveying design can be constructed both with narrow and relatively wide discs. It exhibits a certain conveying capacity and is partially filled without upstream flow restriction element. The preferred offset angle is 45 degree; however, versions with 30 or 60 degree offset angle between the discs are also available.



10

### ECCENTRIC KNEADING BLOCK

In extruders with the currently popular outside to inside diameter ratios three-lobed kneading blocks are only possible with a special profile. High-performance extruders often provide very high driving power. In addition, the eccentric kneading block KBX provides very high melting capacity through high energy input at favorable geometric conditions.





## HIGH PERFORMANCE ELEMENTS

What can our High Performance (HP) Elements mean for you? The right carefully selected High Performance Element introduced into the process at the right point can increase throughput and product quality in many different levels.

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 disruptive and distributive mixing action. The High Performance Elements prevent local overload by shear peaks and boost the mixing action by creating elongational flow based on geometric changes in the screw profile. Furthermore the basic T-Profile Element geometry keeps the well-known self-cleaning effect of tightly intermeshing screw profiles.

Our process specialists team will figure out the improvement potential together with our customer and will make recommendations for an improved screw configuration or process set-up.

### > THE ADVANTAGES

- Higher mixing effect with lower energy input
- Higher degassing effect by higher surface regeneration
- Further advantages

Our team of process specialists is highly skilled in identifying potential improvements through process analysis and screw design.



# HIGH PERFORMANCE ELEMENTS

1

## ONE PIECE COMBINATION-ELEMENT

High-performance extruders can sometimes transmit very large energies over short lengths of screw shaft through high rotational speeds and torques. CPM Extrusion Group designed the combination element (part conveying and part kneading or restriction element) as a means of distributing high energy over a longer section of shaft.



2

## SEGMENT SCREW CONVEYING

With the segment screw, type SG, short consecutive screw sections are turned against each other by an offset angle. The conveying arrangement produces an intensive distributive mixing effect which, with partial filling of the element, is very gentle on the product. Due to its design, the segment screw has a mechanically very stable geometry.



3

## SEGMENT SCREW WITH REVERSE PITCH

The basic shape of the segment screw is varied in that both forward conveying and reverse conveying segments are arranged in alternating order. In this form, short pressure zones are created in which intensive mixing takes place. In food extrusion, a cooking zone with the typically combination of very short conveying/reverse elements, can be realised in one component.



4

## T-PROFILE SCREW T6

The T-profile technology is based on a non-symmetrically intermeshing profile. With this profile, only one tip scrapes the barrel with close clearance. The profile is turned by 180 degree in short sections so that a continuous tip is created. In summary, screws with T6 profile provide positive conveying effect with less energy input and gentle product handling.



5

## T-PROFILE SCREW T3

With the T-profile screw with T3 profile the gap to the barrel is markedly larger compared to the T6 profile. This produces a higher degree of filling, and thereby an improved mixing capability on a lower conveying effect.



6

## BARRIER SCREW BS

With the barrier screws the primary feature is the frequent re-direction of the product. Intensive mixing at a high degree of filling occurs from the barriers between the conveying section acting as flow restriction. Alternating shear and elongation flow support the dispersion process.



7

## BARRIER KNEADING SCREW BKS

With the barrier kneading screw the tightly intermeshing profile has a very large pitch to reinforce the kneading effect against the conveying effect. Retaining rings are installed between the segments to allow optimal utilization of the kneading chambers with a high degree of filling. They prevent a fast flow of the material in the screw root area.



8

## BARRIER KNEADING BLOCK BKB

The barrier kneading block features retaining rings between the kneading discs that interrupt the product flow in the kneading block root area. This increases the degree of filling also in a conveying kneading block, and the product portions that experience relatively little shearing in the root area of the kneading block are reduced.



9

## T-PROFILE KNEADING BLOCK T6KB

With the T6 kneading profile, the same asymmetric profile is assumed as with the T6 screw, resulting in uniform loads for machine and product. The T-profile kneading block is especially distinguished by low shearing peaks and, depending on the design, intensive kneading work. As all T-profile elements, this kneading block is also geometrically self-cleaning.



10

## T-PROFILE KNEADING BLOCK T3KB

The T3 kneading profile is based, analogously, on the profile of the T3 screw. With the T3 profile type, the differences in the outside diameter and core diameter are significantly larger than with the T6 kneading block. This produces a stronger distributive mixing effects coupled with a larger gap. More product flows here through the gap but with reduced shearing stresses.







## SHAFTS

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

Since the trend to high torque and high speed extrusion equipment started, the CPM Extrusion Group was ahead of the development and is a leader in high torque, rolled shaft technology producing shafts that can withstand significant increases in load, torque, and temperature. The special choice of material and heat treatment coupled with careful machining produces a top quality component. Also, the type of stress must be taken into account.



# SHAFTS

1



**ROUND SHAFT WITH FEATHER KEY**  
Used only rarely now because of the limited permissible torque.

2



**ROUND SHAFT WITH HALF-ROUND SLOTS**  
Up to four round keys transfer the force. The key can be integrated in the screw element.

3



**HEXAGON SHAFT**  
The shaft with hexagon geometry is also used only in a few extruders.

4



**SHAFT WITH INVOLUTE SPLINES**  
Wider standard, partially according to DIN; however, more powerful geometrically optimised types are available.

5



**DESIGN AS SINGLE-PIECE SHAFT**  
Both, the traversing range and the stop collar for screws and drive gearing, are manufactured from a single piece.

6



**THREE-PIECE DESIGN**  
The gearing of the traversing range is continuous where the dual-gear drive element as well as the stop and sealing element is pushed in place in sleeve-fashion and secured with a bolt from the drive side.

7



**CPM EXTRUSION GROUP DESIGN**  
The CPM Extrusion Group technology connects the stop element permanently and securely with the carrier shaft without weakening the shaft.

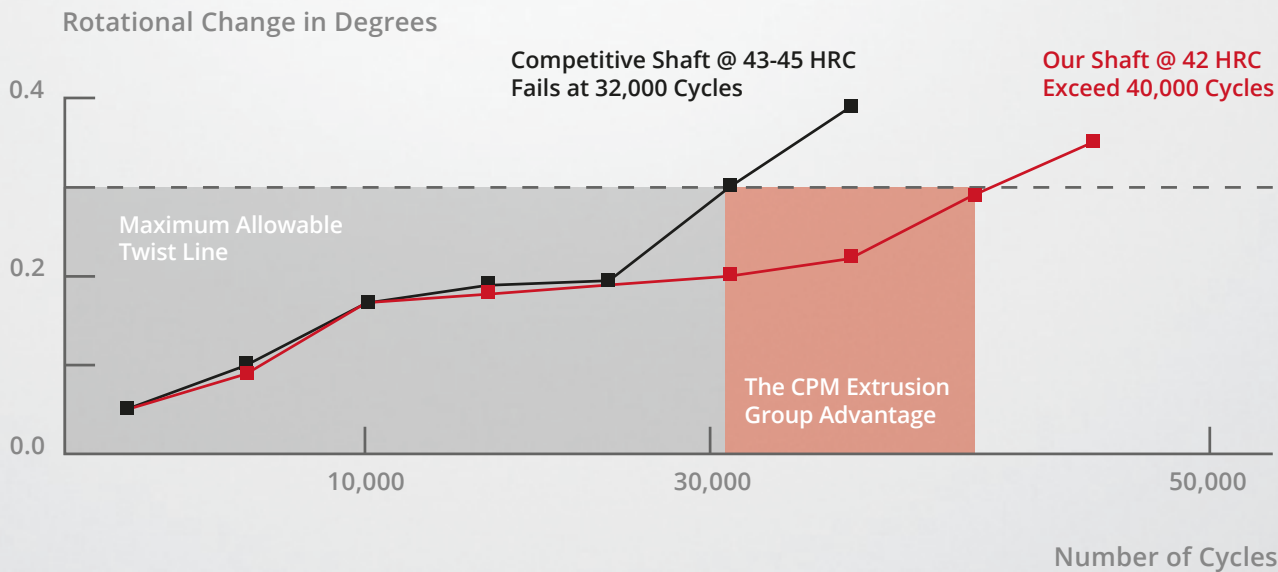
8



**DESIGN WITH INTEGRATED COUPLING**  
With continuous gearing, the coupling toward the gearbox serves as axial stop and sealing element at the same time.

## > 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.
- We rolled shafts outperformed the highest-rated shaft on the market by 25%. See these outstanding results in the plot below.







## BARRELS

CPM Extrusion Group offers the industry's widest portfolio of multi screw barrels. For 28 years, we have been providing standard and special designs for nearly every OEM brand on the market. No other supplier can match our experience in parts design, wear and process application.

Especially with the barrels the material used suitable to wear protection is key. Both, abrasive and corrosive material removal must be considered. The interaction with the screw plays a major role at this. Our **High Performance barrels** are extremely successful in our barrels product range. Our High Performance barrels take 2 key points into account:

### > ADVANCED WEAR SOLUTIONS:

CPM Extrusion Group places a very high priority on the development of advanced materials of construction and the continuous improvement of our manufacturing processes.

### > SELECTION AND EXPERIENCE:

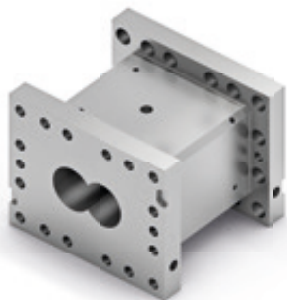
CPM Extrusion Group offers a high value of selection and experience in barrels. We manufacture barrels ranging from 18 mm to 180 mm in diameter for most major brands of twin screw extruders in the market worldwide. Our offering includes parts for all configuration including: round, rectangular, flanged, non-flanged, clamshell and designs for any special application.



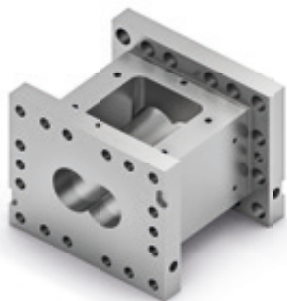
# BARRELS

## BARREL TYPES CHARACTERIZED BY THEIR FUNCTION

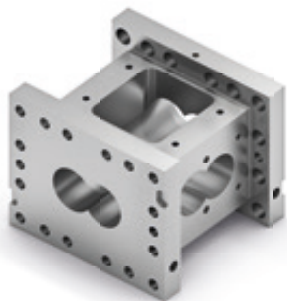
**1** **CLOSED BARREL**  
The closed barrel is the basic geometry of the barrel modules. It is commonly heated electrically and cooled with water through pulsed cooling.



**2** **OPEN BARREL**  
Supplied with a round or square opening on the top, there is both a feed barrel for the main feed and a barrel for top-head degassing.



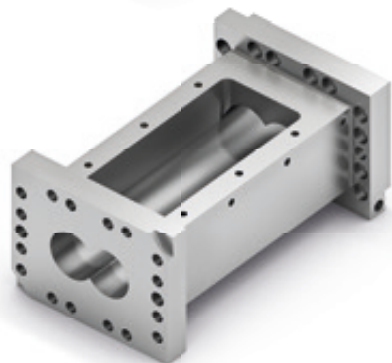
**3** **COMBI BARREL**  
Combi barrels feature both an opening at the top and on the side. A sidefeeder or lateral degassing unit can be connected on the side; the upper opening is for venting purposes. Available alternatives are the block type or with lateral opening only.



**4** **ADAPTER PLATE**  
Relatively short adapter plates that are normally not temperature-controlled are used to support the process section and for measuring purposes. It is also possible to provide a port for injection valves in the adapter plate openings.



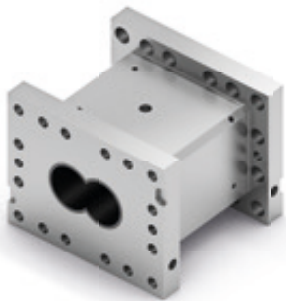
**5** **DEGASSING BARREL - LONG**  
Degassing barrels with enlarged openings can be used for degassing tasks with especially high volatile content.



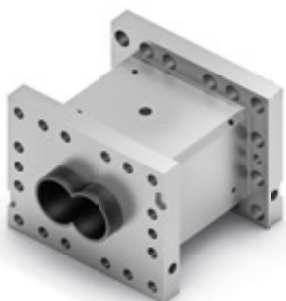
# BARRELS

## BARREL TYPES CHARACTERIZED BY THE WEAR PROTECTION AND OUTER GEOMETRY

**6** **SOLID BARREL WITH PERMANENTLY JOINED WEAR PROTECTION COAT**  
In addition to the nitrided steel version solid barrels can be coated with various wear protection surfaces. They can be applied through hot-isostatic pressing, flame spraying or other coating processes.



**7** **BARREL HOUSING WITH EXCHANGEABLE THINLINER®**  
Relatively thin-walled wear protection liners are installed in a housing using a special process. These so-called Thinliners® can be exchanged. The advantage of this construction compared to liners is the possibility of arranging the cooling channels very close to the process room.



**8** **BARREL HOUSING WITH INLINER**  
Standard solution for high wear protection. The liner is exchangeable and can be manufactured from a large bandwidth of materials. For example, hard chromium steel casting but also materials produced through powder-metallurgical processes are used.



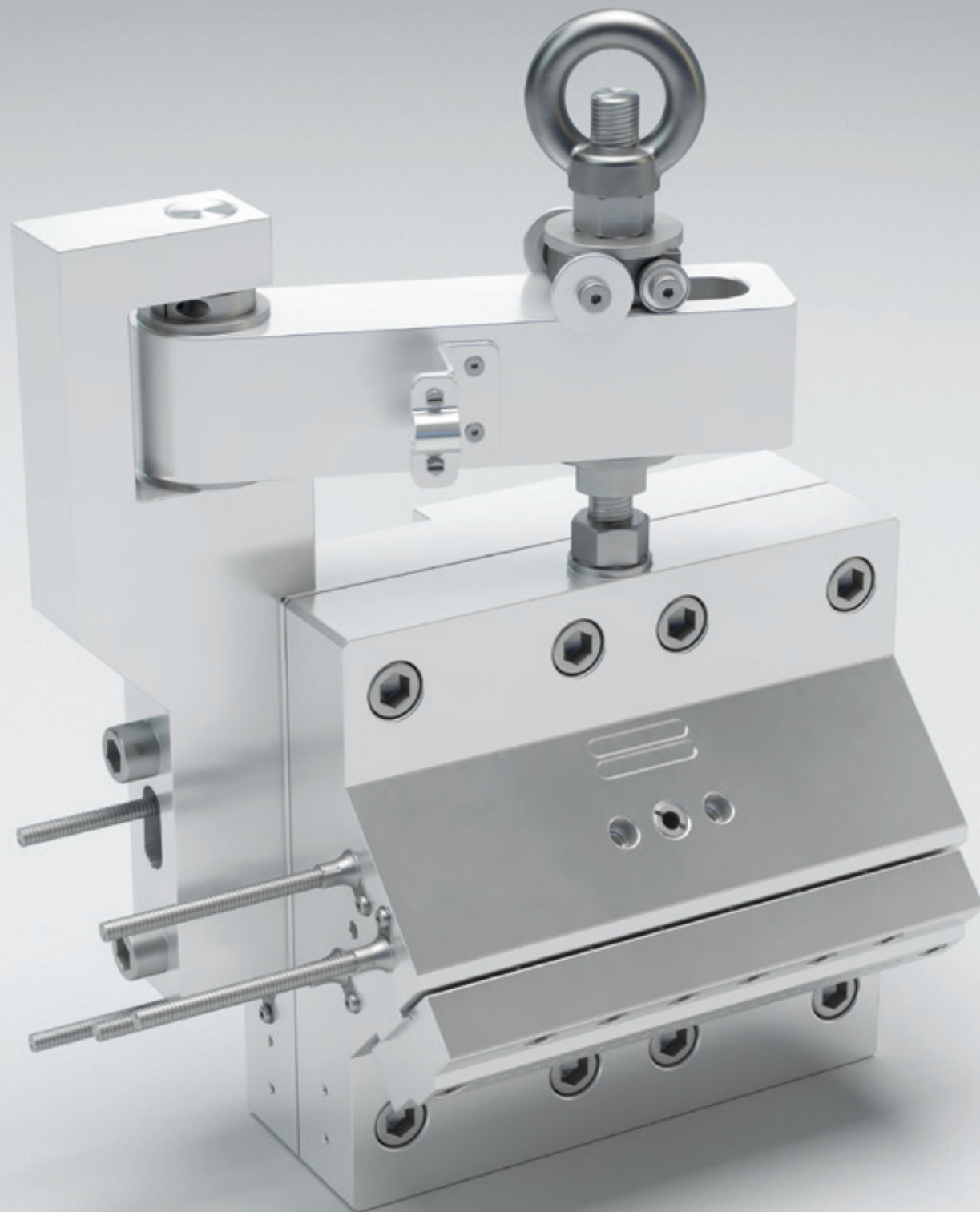
**9** **BLOCK BARREL WITH TIE-ROD DESIGN**  
Square flange barrels, as shown by way of example for the wearing protection varieties but also the processing tasks, represent only one of the available designs. Likewise, barrels are also braced with tie-rods or clamping flanges.



**10** **CLOSED BARREL - ROUND, WITH ROUND LINER**  
As another version, the design of a round housing with removable liner is also available. Round barrels in solid design can often also 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.



MATERIALS

> ELEMENTS

Material number	Description	Hardness	Abrasion	Corrosion
000	hardened and tempered nitrided steel, nitrided	>950 HV	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
005	through hardened chromium-steel	47-50 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
112	through hardened chromium-steel	54-58 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
225	through hardened chromium-steel	55-57 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
068	through hardened tool-steel	55-59 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
179	through hardened tool-steel	54-60 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
4PH	hardened and tempered stainless steel	35-38 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V10	PM bonded HIP-composite material	59-64 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V15	PM bonded HIP-composite material	60-65 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V18	PM bonded HIP-composite material	57-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V35	PM bonded HIP-composite material	60-63 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V25	PM bonded HIP-composite material	55-60 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
V60	PM bonded HIP-composite material	60-65 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
S06	non-ferrous alloy on a cobalt-chromium base	36-45 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
48P	hardened and tempered stainless steel with a crest welding on a cobalt-chromium base	45-51 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
85C	nitrided steel with a nickel based crest welding with chromium-borides	50-55 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
K28	hardened and tempered stainless steel a nickel based crest welding with chromium-borides	50-55 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
W12	hardened and tempered stainless steel with a crest welding on a cobalt-chromium base	38-42 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
334	High speed tool steel	58-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>

> SHAFTS

Material number	Description	Torque	Corrosion
125-01	heat treatable steel	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
143-01	hot working tool steel	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
143-33	hot working tool steel and nickel-plated	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
4PH	hardened and tempered chromium-nickel steel	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
300	an age hardenable (maraging) iron nickel stainless steel with exceptional strength, toughness and crack resistance	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
166	Alloy steel	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
144	Hot working tool steel	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>

> BARRELS AND LINERS

Material number	Description	Version	Hardness	Abrasion	Corrosion
119	hardened and tempered nitrided steel, nitrided	M	>900 HV	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
005	through hardened chromium-steel	INL, THL	47-50 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
112	through hardened chromium-steel	INL, THL	54-58 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
179	through hardened tool-steel	INL, THL	54-60 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
225	through hardened chromium-steel	INL, THL	55-57 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
I43	PM bonded HIP-composite material	INL, HIP	55-60 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
777	65% tungsten carbide in a nickel matrix and an average thickness of app. 4.5 mm	INL	62-68 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
65X	pm-bonded NiCrBSi based alloy with carbides	HIP	58-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
α101	PM bonded molybdenum and vanadium material	INL	58-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
RX101	PM bonded HIP molybdenum and vanadium material	INL, HIP	60-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
RX201	PM bonded HIP nickel base material	INL, HIP	58-62 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>
RX301	50% tungsten carbide in a nickel matrix	INL, HIP	62-68 HRC	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>

M : massive, INL: liner, THL: Thinliner, HIP: directly pm-bonded in barrel



## 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

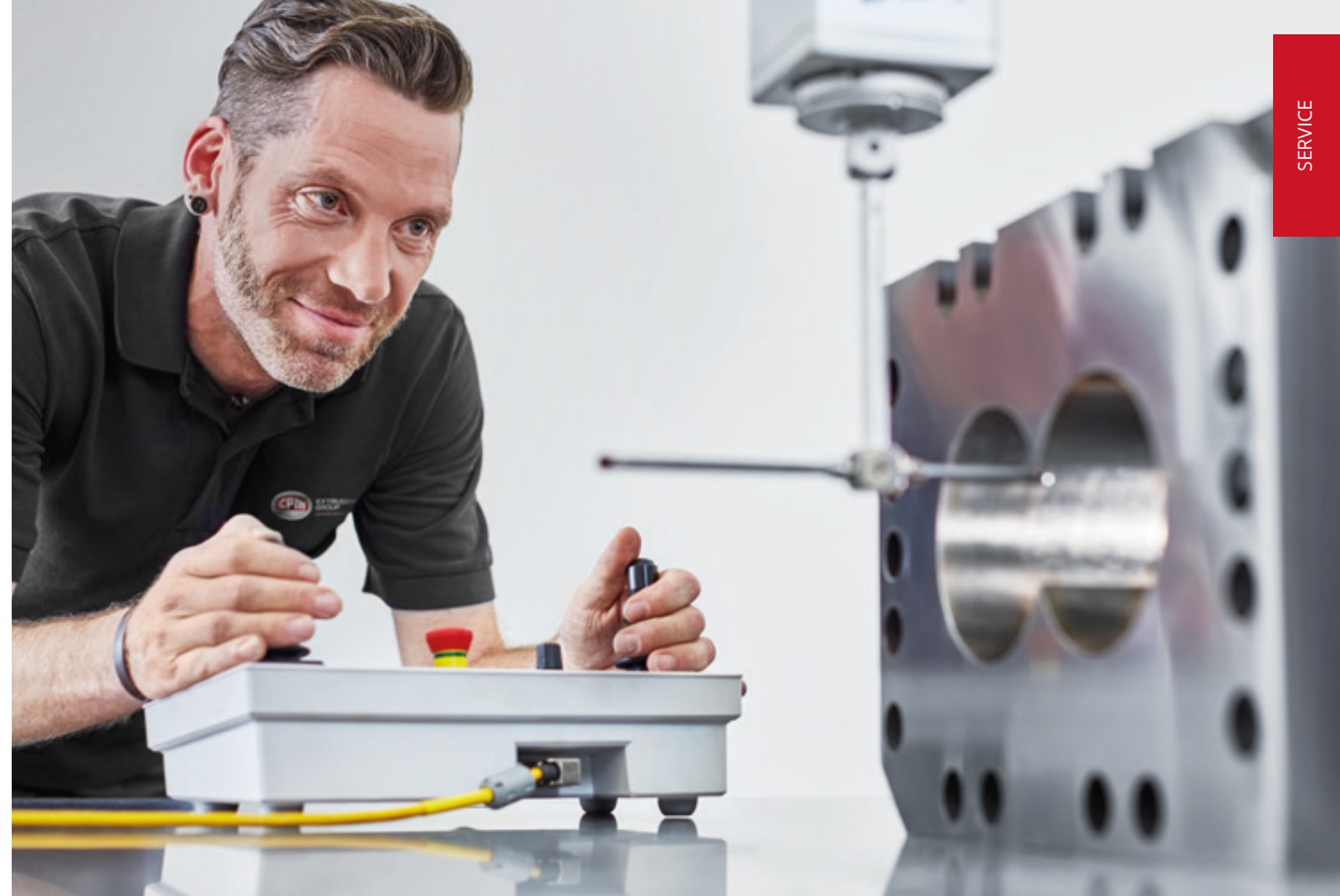
In addition to our frequent online webinars, seminars, and workshops we also offer on-site training specific to your installed equipment.

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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