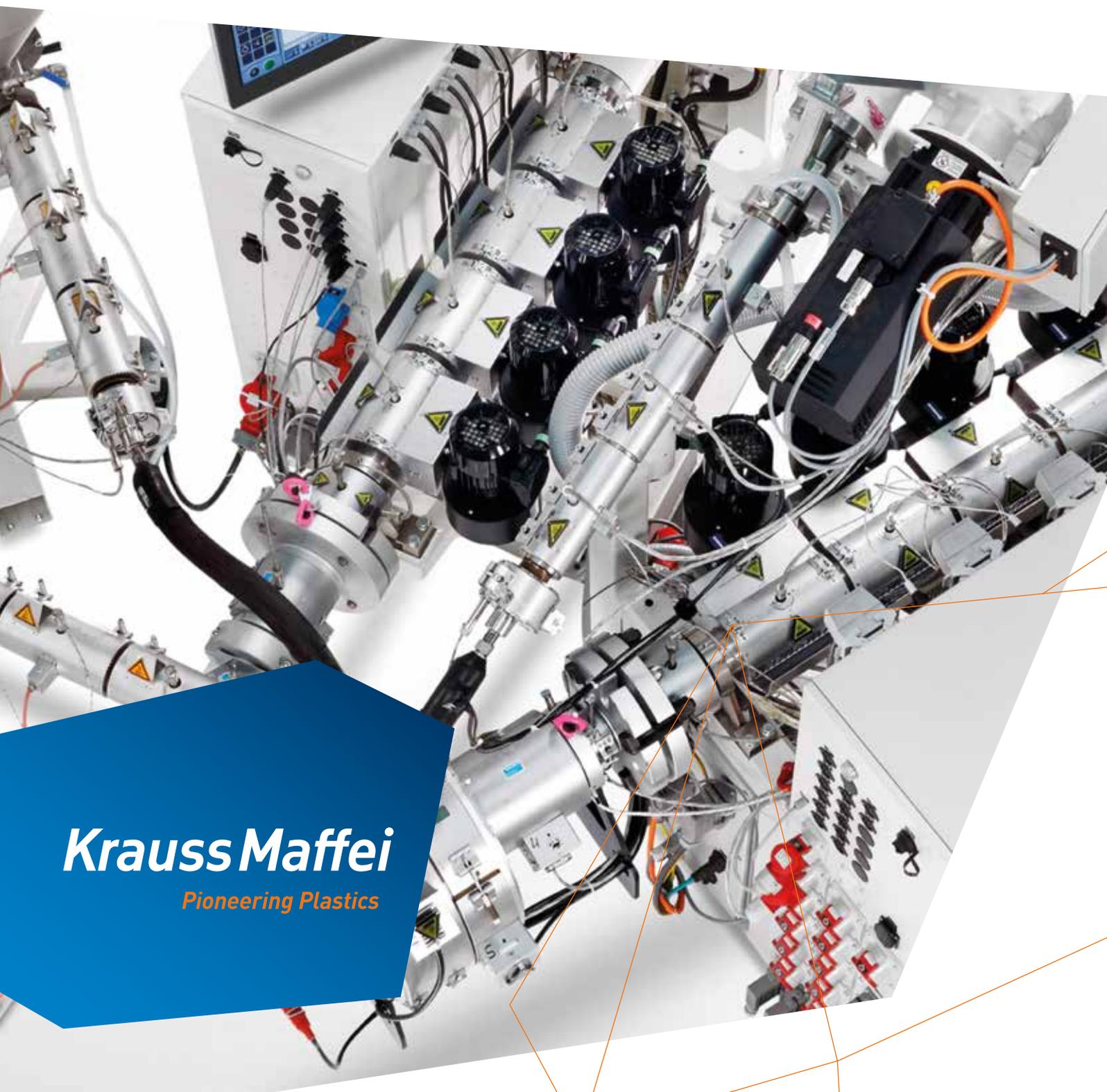


COMPLETE PIPE EXTRUSION LINES

HIGHLY SKILLED SYSTEM PROVIDER



Krauss Maffei

Pioneering Plastics

FACTS AND FIGURES FOR PIPE EXTRUSION



Direct-extruded, highly filled, three-layer pipe



3- and 5-layer PE-RT pipes for wall temperature control and underfloor heating



Two-layer, corrugated PP pipe



Multi-layer PE pipe



PP-R pipe with fiberglass reinforcement



PE-X pipes



PE pipe for transporting drinking water



Extra-large PE pipes up to 2500 mm in diameter



PP-R pipe with fiberglass reinforcement in the intermediate layer



C PVC pipes for chemical applications



Socketed PVC pipe



PVC foam core pipes

For every pipe application, we offer systems tailored to your wishes from a single source. No matter what kind of pipe you are making – whether smooth or corrugated, made from PVC or PO – KraussMaffei pipe extrusion systems keep all your options open:

- Drinking water pipes
- Sewage pipes
- Irrigation pipes
- Drainage pipes
- Hot water and heating pipes
- Cable conduits
- Gas pipes
- Multi-layer pipes
- PE-X pipes
- RTP pipes
- Coextruded pipes with different combinations of materials, e.g. PVC foam core pipes
- Highly filled pipes
- PUR foam-insulated pipes
- Sheathing for steel pipe
- Extra-large pipes up to 2500 mm in diameter

HIGHLY SKILLED SYSTEM PROVIDER COMPLETE PIPE EXTRUSION LINES

Whether you are processing PVC or PO, KraussMaffei has everything you need for producing plastic pipes from 5 mm to 2500 mm in diameter – including automation components for maximizing material savings.

Our product portfolio covers single-screw extruders, counter-rotating and corotating twin-screw extruders with corresponding pipeheads and downstream components through to fully automated pipe lines. All our components and automation systems are consistently engineered to maximize savings on materials, energy and costs, without compromising on product quality. We are your expert partner for any type of pipe extrusion line.

Your benefits:

- First-class system and process solutions from a single source
- System solutions for efficient and effective production
- Expert partner for customer-specific special solutions

FIRST ENCOUNTER THE HIGH-PERFORMANCE EXTRUSION SYSTEM FOR PIPE PRODUCTION

Socket-forming machine

For bonded, O-ring and pressure pipes in standard and high-performance versions for PVC and PP pipes

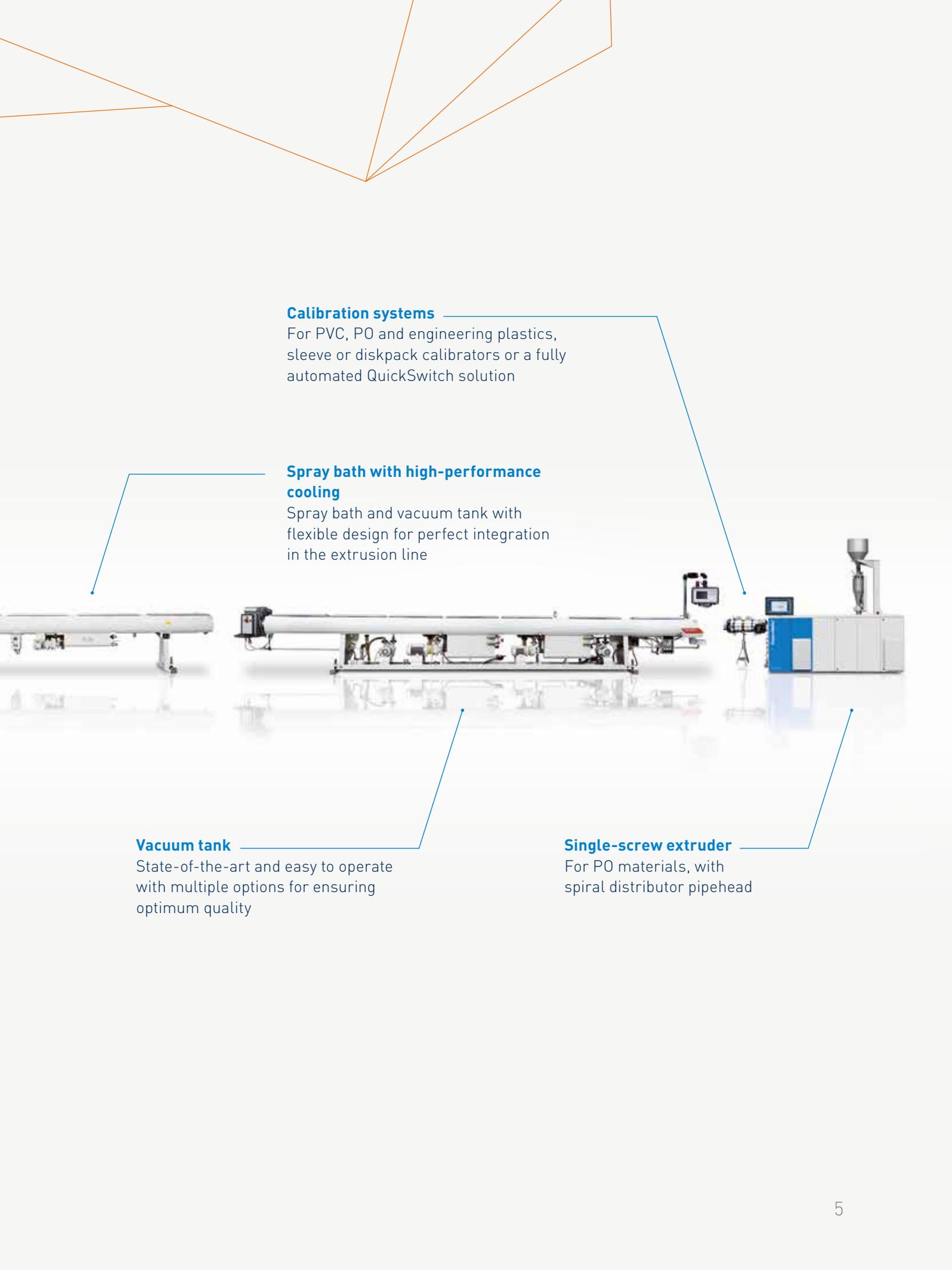
Cutting unit

Cross-cut saw, planetary saws and swarf-free cutters for cutting all thermoplastic pipes to length

Haul-off

Belt haul-offs, double caterpillar haul-offs, multiple caterpillar haul-offs





Calibration systems

For PVC, PO and engineering plastics, sleeve or diskpack calibrators or a fully automated QuickSwitch solution

Spray bath with high-performance cooling

Spray bath and vacuum tank with flexible design for perfect integration in the extrusion line

Vacuum tank

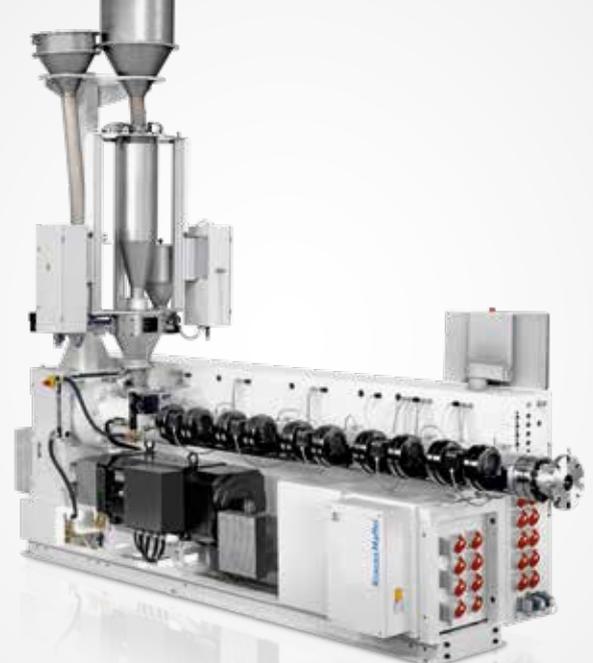
State-of-the-art and easy to operate with multiple options for ensuring optimum quality

Single-screw extruder

For PO materials, with spiral distributor pipehead



*Twin-screw extruder
KMD 75-36 E2/R*



*Single-screw extruder
KME 90-36 B/R*

Success in pipe extrusion From the extruder to all peripheral equipment

KraussMaffei develops and provides complete conventional and fully automated extrusion lines, ranging from extruders to pipe molds, downstream and automation components, to all peripheral equipment.

Application-specific, proven line components

Our extruders, molds, calibration systems and downstream components are tailored to your individual requirements and have already been tested multiple times. All downstream components such as vacuum tanks, spray tanks, haul-offs, cutting units, socket forming machines and additional equipment are engineered for optimum interoperability; the automation components are designed for maximum operational safety and ease of use and servicing. All functions for control and monitoring are fully integrated into the modular extrusion line control system. The result: With KraussMaffei systems, you achieve the highest output with the greatest possible flexibility and maximum material savings. We also supply a range of optional add-ons for our complete extrusion systems:

Fully automated additional equipment

- Seal ring insertion robots
- Pipe hoist and pipe rotating units

- Bundlers
- Palletizers

Winding systems

We supply single and twin winders for polyolefin pipes up to 160 mm in diameter.

Additional equipment

- Mixers
- Material feeding systems, as well as weighing and metering units
- Screen changers
- Melt pumps
- Wall thickness and diameter gages
- Marking devices
- Winches as start-up aid
- Pipe bending machines
- Thread-cutting machines
- Shredding and grinding systems

Coextrusion solution for production of PVC foam core pipes



Direct extrusion system

The core of your pipe extrusion system – the KraussMaffei extruder

Twin-screw and single-screw extruders are the powerful heart of your pipe extrusion line. Thanks to their modular design with integrated control cabinet and control panel, our extruders are tailored to every application and can meet any market requirement.

36D twin-screw extruder series

The 36D twin-screw extruders with their HPG (High Performance Geometry) screw concept are ideal in every way for producing U-PVC and M-PVC pipe, foam core PVC pipe and PVC-O pipe as well as pipes with a high filler content. The HPG screw design incorporates an effective preheating length with an extended output and mixing zone. The whole length of 36 L/D can be used for processing the PVC compound. This is very advantageous for processors because it allows considerable flexibility when processing many different formulations – with maximum output and a perfectly homogeneous melt every time. The HPG screw concept reduces process fluctuations to an absolute minimum for all types of PVC pipe formulation.

36D single-screw extruder series

Our 36D single-screw extruders are specially designed to produce polyolefin pipes in an extremely cost-effective way by combining very high output with premium pipe quality. The processing unit is engineered for flexibility and has high-performance screws that are matched to the raw material. All extruders are fitted with a high-performance U-shaped gear system and have a flexible drive concept (AC or DC motor) for maximum versatility.

Compact, space-saving coextrusion solutions

We offer customer-specific coextrusion versions of both our single-screw and twin-screw extruders for processing different substances such as recycled materials or highly filled formulations. Compact machine designs save space and technically mature solutions guarantee economical production.

Optimum systems for maximum machine availability

Controlling costs is a top priority in pipe extrusion. Competition is fierce and the prices that can be charged for extruded pipes are sometimes not much higher than the cost of their raw materials. Keeping your material consumption as low as possible is therefore decisive in reducing costs and increasing profitability.

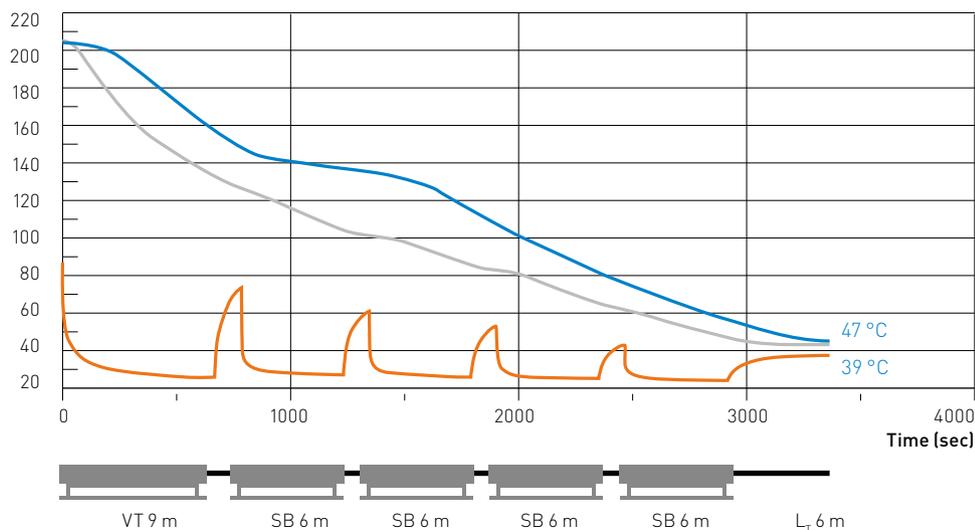
KraussMaffei extruder systems are unrivaled in their ability to get the most pipe out of the least material while maintaining consistent quality. Large quantities of raw materials can be saved by keeping pipe diameter and wall thickness within tight tolerances. This can be achieved only by employing a sophisticated control system capable of measuring and regulating the entire extrusion line. All components and automation systems in our pipe extrusion lines are consistently engineered to maximize savings on materials without compromising on product quality.

YOUR BENEFITS:

- High-performance, robust drive system of single-screw and twin-screw extruder
- The extruders are particularly durable and low-maintenance
- Consistently high output rates at low screw speeds
- Outstanding and consistent product quality
- Cost-effective and flexible production
- Outstanding price/performance ratio

Design of the cooling zone (vacuum tanks and spray baths)*

Temperature [°C]



Pipe diameter/wall thickness 225 x 20.5 mm
Line speed: 0.8 m/min
Distance VT-SB 1.5 m
Distance SB-SB 1.5 m
Total cooling length: 45 m

Inner pipe layer
Core layer of pipe
Outer pipe layer

*Tailored to individual production requirements



YOUR BENEFITS:

- Reducing the cooling zone by up to 40% reduces initial investment and production space requirements
- Alternatively, productivity can be increased by up to 60% thanks to higher output
- Low cooling water consumption and use of ambient air make for energy-efficient production
- Space-saving central melt feed with no risk of increased pressure build-up

Increasing productivity with innovative IPC technology

The technology developed by KraussMaffei for internal pipe cooling (IPC) is the answer to the constantly increasing demands of pipe producers for an extrusion system that takes into account efficient production, minimum space requirements, reduced investment costs and increased output, which are the most important criteria in making a decision. With the aid of IPC technology, you can not only cool the outside of the pipe with water in vacuum tanks and cooling baths, but also cool the inside of the pipe using air. This has a particularly positive effect on thick-walled pipes, from which heat can be removed only very inefficiently using standard cooling technology.

The IPC system can be used with all PO pipe extrusion lines from 110-2500 mm in diameter (producing SDR 26 pipes and below). The processor benefits from considerable advantages – for example, shortening the cooling section by up to 40 percent reduces both investment costs and space requirements.

FACTS AND FIGURES FOR QUICKSWITCH TECHNOLOGY



Single-layer HDPE pipes with marking strips



Single-layer HDPE pipes for drinking water use



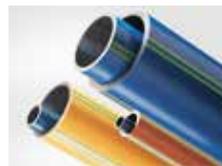
Double-layer HDPE gas pipes



Double-layer PE pipes with color strips



Wastewater pipes with a bright internal layer for inspection



Multi-layer HDPE pipes with color strips

QuickSwitch technology for a wide processing range of materials and diameters:

The QuickSwitch system for in-line dimension changes can be used for the following materials and diameter ranges: all current polyolefins such as PE-HD and PE-MD.

External diameters of pipes:

25 – 63 mm
 75 – 160 mm (optional: 63 – 140 mm)
 160 – 250 mm
 250 – 450 mm
 280 – 500 mm
 Wall thickness (SDR range): 11 – 33

Special dimensions possible on request

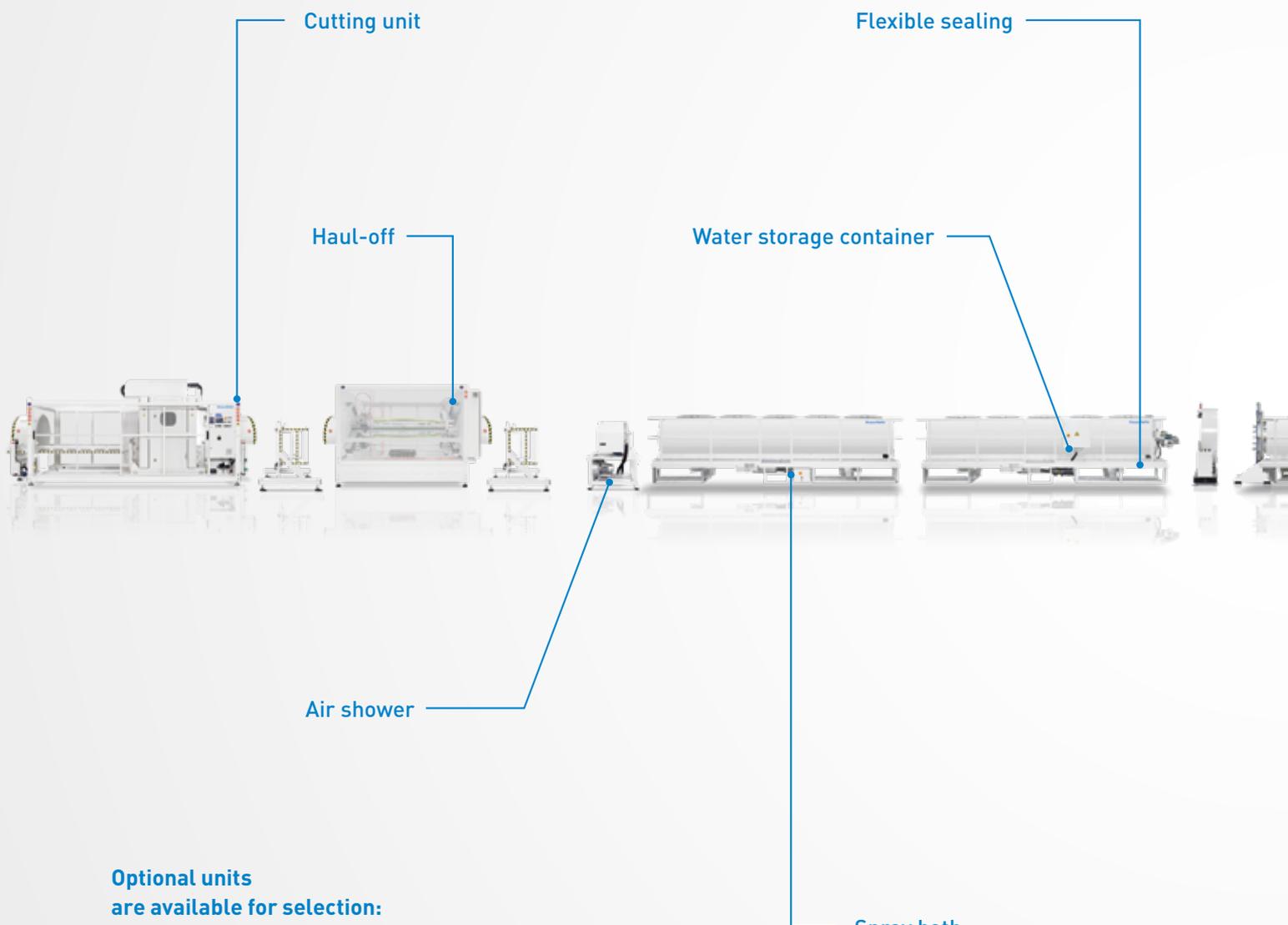
QUICKSWITCH TECHNOLOGY FOR IN-LINE DIMENSION CHANGES PIPE EXTRUSION WITH MAXIMUM FLEXIBILITY AND MINIMUM COST

While conventional pipe extrusion lines have to be stopped, converted and restarted with every change of dimension, the efficient QuickSwitch technology from KraussMaffei can be used to change the pipe dimensions during continuous production – simply at the push of a button. This effective and intelligent technology generates potentially enormous savings.

Your advantages at a glance:

- Greater flexibility thanks to dimension changes at the push of a button
- More productivity by reducing standstill and changeover times
- Lower material cost through reduced scrap
- Lower labor costs by saving time and personnel
- Low capital lock-up due to low warehouse stocks
- High delivery availability thanks to small batch sizes

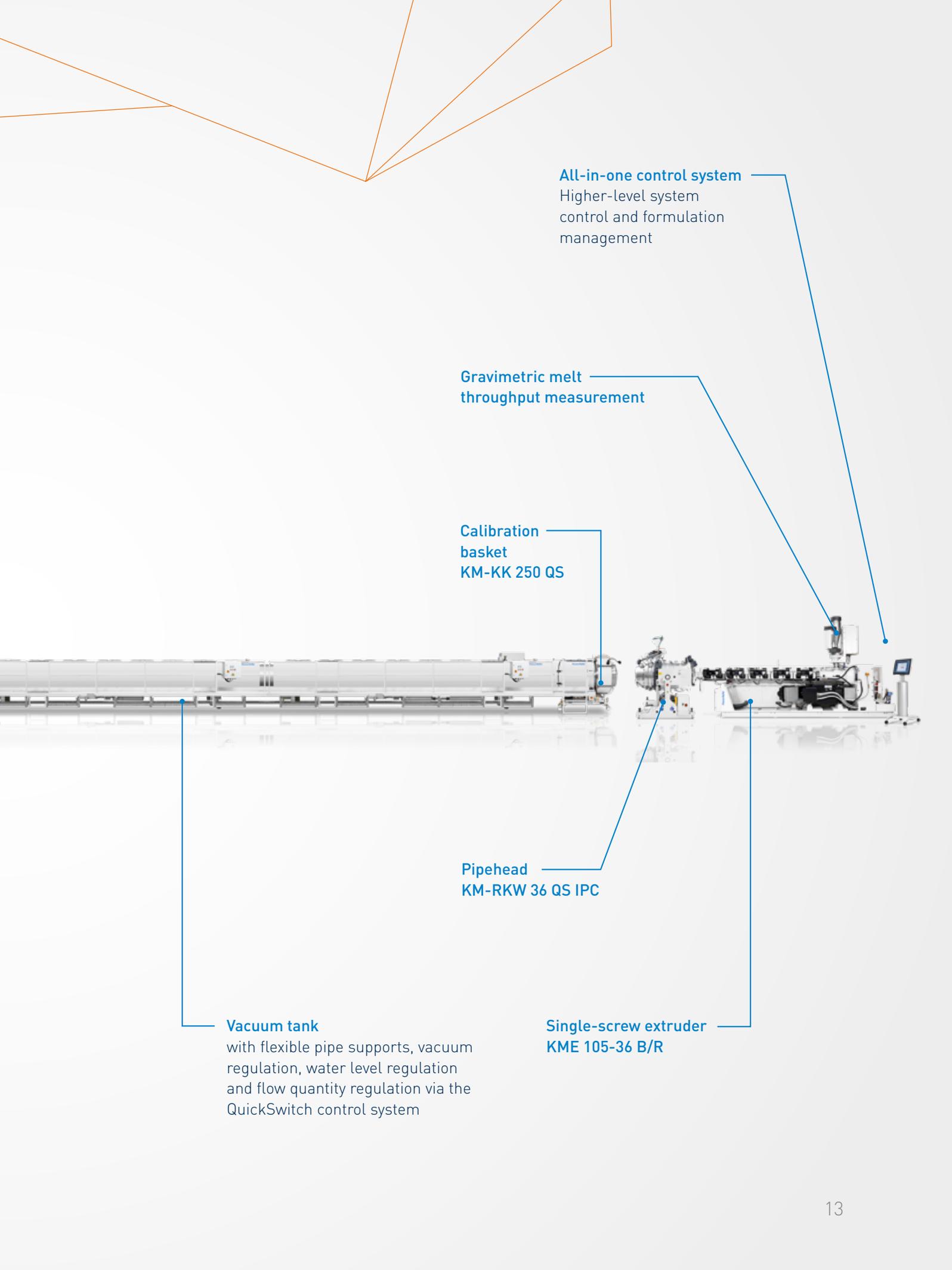
IMPRESSIVE ENCOUNTER THE QUICKSWITCH HYBRID LINE FOR PO PIPES FROM 160-250 MM OUTER DIAMETER



Optional units are available for selection:

- Marking device with QuickSwitch design
- Ultrasound measuring devices
- Multi-layer pipeheads with QuickSwitch design
- Screen changers
- Strip and outer layer adapter
- Winder with quick adjustment

Spray bath
with flexible pipe
supports and flexible seals
KM-SB 63/6 QS



All-in-one control system

Higher-level system control and formulation management

Gravimetric melt throughput measurement

**Calibration basket
KM-KK 250 QS**

**Pipehead
KM-RKW 36 QS IPC**

Vacuum tank

with flexible pipe supports, vacuum regulation, water level regulation and flow quantity regulation via the QuickSwitch control system

**Single-screw extruder
KME 105-36 B/R**

QuickSwitch satisfies market demands: High cost-effectiveness and flexibility

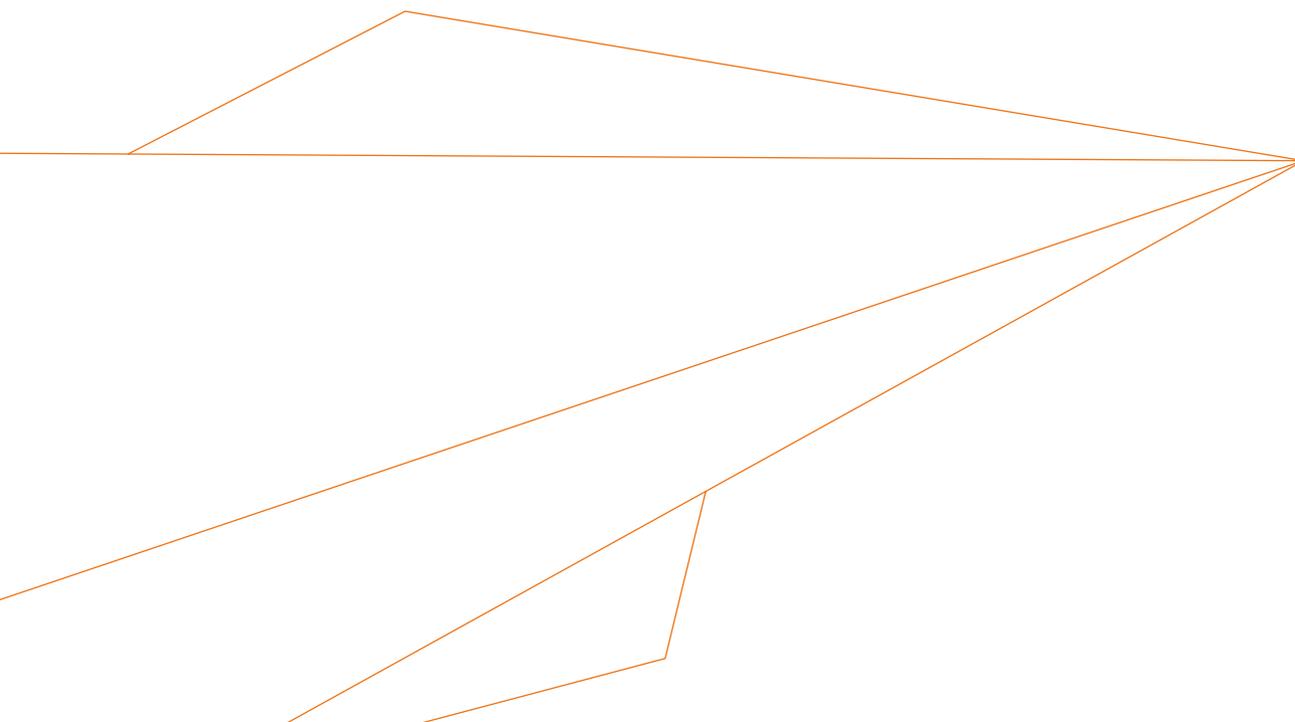
In the market for plastic pipes, there is increasing demand for extremely short delivery times and small batch sizes with different dimensions. The patented QuickSwitch technology (patents EP 1 115 550 B1 and EP 1 249 331 B1) enables you – within certain ranges – to supply all conceivable pipe dimensions (single-layer and multi-layer) as quickly as possible and without having to build up large stocks.

QuickSwitch pipehead: individually adjustable

Through the use of a conically designed and axially adjustable die and/or a pin in the melt outlet area, the width of the outlet gap can be changed to produce different pipe wall thicknesses. This prevents shrinkage problems, which may occur due to excessive draw-down of the melt tube. Surface flaws on the pipe, which are caused by excessive stretching of melts, can also be prevented. The wide dimension ranges possible with a QuickSwitch system can only be achieved with an adjustable pipehead of this type.

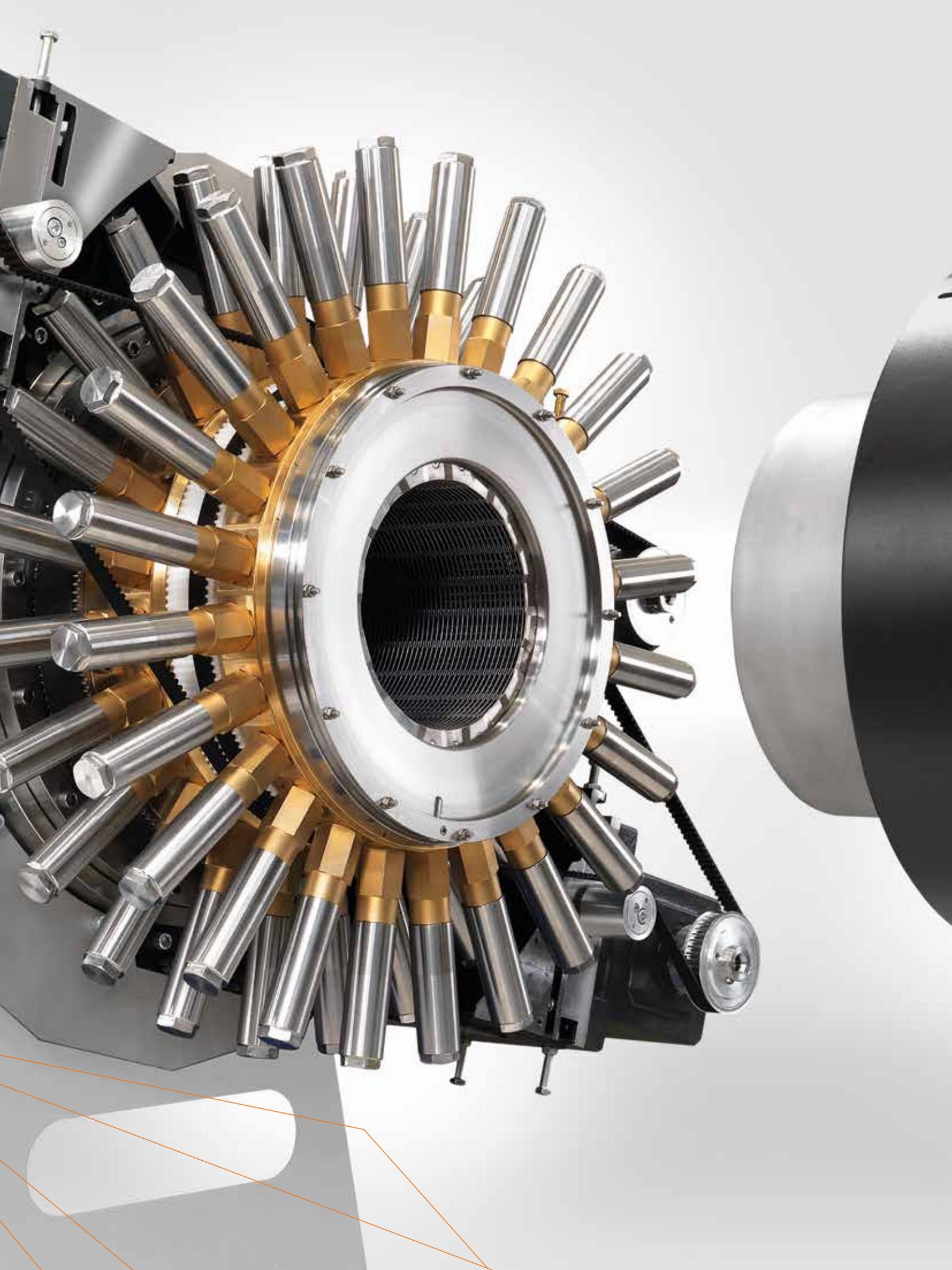
QuickSwitch suction bell: high-precision action

The suction bell is located between the pipehead and calibration unit, and is sealed on both sides. It is used to expand the flexible melt tube coming out of the pipehead to the required calibration diameter if the required diameter of the melt tube is larger than the diameter of the die on the pipehead.





QuickSwitch adjustable die mounted on the multi-layer pipehead KM-3L RKW 74 for the production of multi-layer PO pipes. The adjustable die makes the innovative QuickSwitch system even more flexible.



QuickSwitch calibrating basket: continuously adjustable

The adjustable calibration basket is a key component of every QuickSwitch extrusion line. Although it performs the forming function of a standard calibration unit, it can still be infinitely adjusted right across the entire diameter range of the extrusion line. Moving segments, with their surfaces, form a cylindrical area with near-circular geometry.

QuickSwitch end seal: reliable and adjustable

The vacuum tank must be sealed to build up the required underpressure on the adapter and outlet sides. In the adapter area, this task is performed by the calibration basket described above together with the plastic melt tube. A special end seal is required at the end of the vacuum tank for this purpose. Conventional pipe extrusion lines are equipped with seals which are

suitable for only one single pipe diameter. In a QuickSwitch line, the end seal consists of a number of movable segments. This segmented construction, in combination with air pressure, ensures that the vacuum tank is completely sealed off against ambient pressure over the whole diameter range of the QuickSwitch system. If changes are made, this seal is automatically adjusted to the new pipe diameter.

QuickSwitch roll guides: exact centric guidance

In order to prevent ovality due to uneven cooling, the extruded pipe must be exactly centered in the spray baths, and especially in the vacuum tank. In conventional extrusion lines, this is achieved by means of support discs or V-shaped rollers in the tanks. Combined rollers are used in QuickSwitch extrusion lines since they ensure that the tube is centrally aligned and safely supported as it is formed.

QuickSwitch haul-off: for a steady pull

The caterpillar haul-off must draw the melt tuber through the extrusion line at constant speed. The top caterpillars are compression molded to the pipe with pneumatic cylinders, but the bottom caterpillars are positioned by electric motors. To ensure that the pipe always runs centrally through the haul-off, sensors measure the actual pipe diameter and make adjustments if necessary. This means that the required haul-off force is constantly transmitted. The haul-off is automatically adapted to the new pipe diameter. During dimension changes the haul-off also ensures that the pipe always passes through it centrally and is drawn with the appropriate force and speed without jerking.



Cone piece of a PO pipe produced on a QuickSwitch machine: the only scrap is the piece produced during the change of dimension.

**QuickSwitch cutting unit:
no need for retooling work**

The cutting unit also has its own diameter detection and adjustment system. In conjunction with a variable clamping system, no changeover work whatsoever is required when changing dimensions.

**All-in-one control system:
Higher-level system control**

A vital component of a fully automated QuickSwitch line is the higher-level system control. All QuickSwitch functions are integrated in an overriding C6 system control unit. Here, for example, the following parameters of the extrusion lines are stored once for every individual pipe dimension:

- Raw material
- Output rate of the extruder
- Pipe dimension

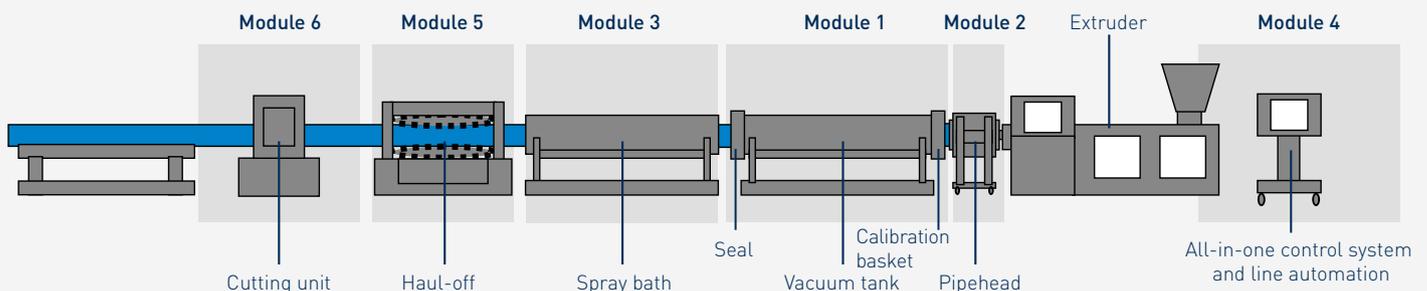
- Pipehead adjustment
- Underpressure in the suction bell
- Diameter in the calibration basket
- Position of the vacuum tank
- Underpressure level in the vacuum tank
- Haul-off speed
- Contact pressure of the haul-off pads on the produced pipe

If required, a stored dataset can easily be selected and activated at the push of a button. The complete QuickSwitch machine starts at the required pipe dimension, fully automatically and within a few minutes, and produces a high-quality pipe again from the first meter after the change. The higher-level system control features numerous advantages such as a standard operating philosophy, standard hardware or flexible extendibility and simple updates.

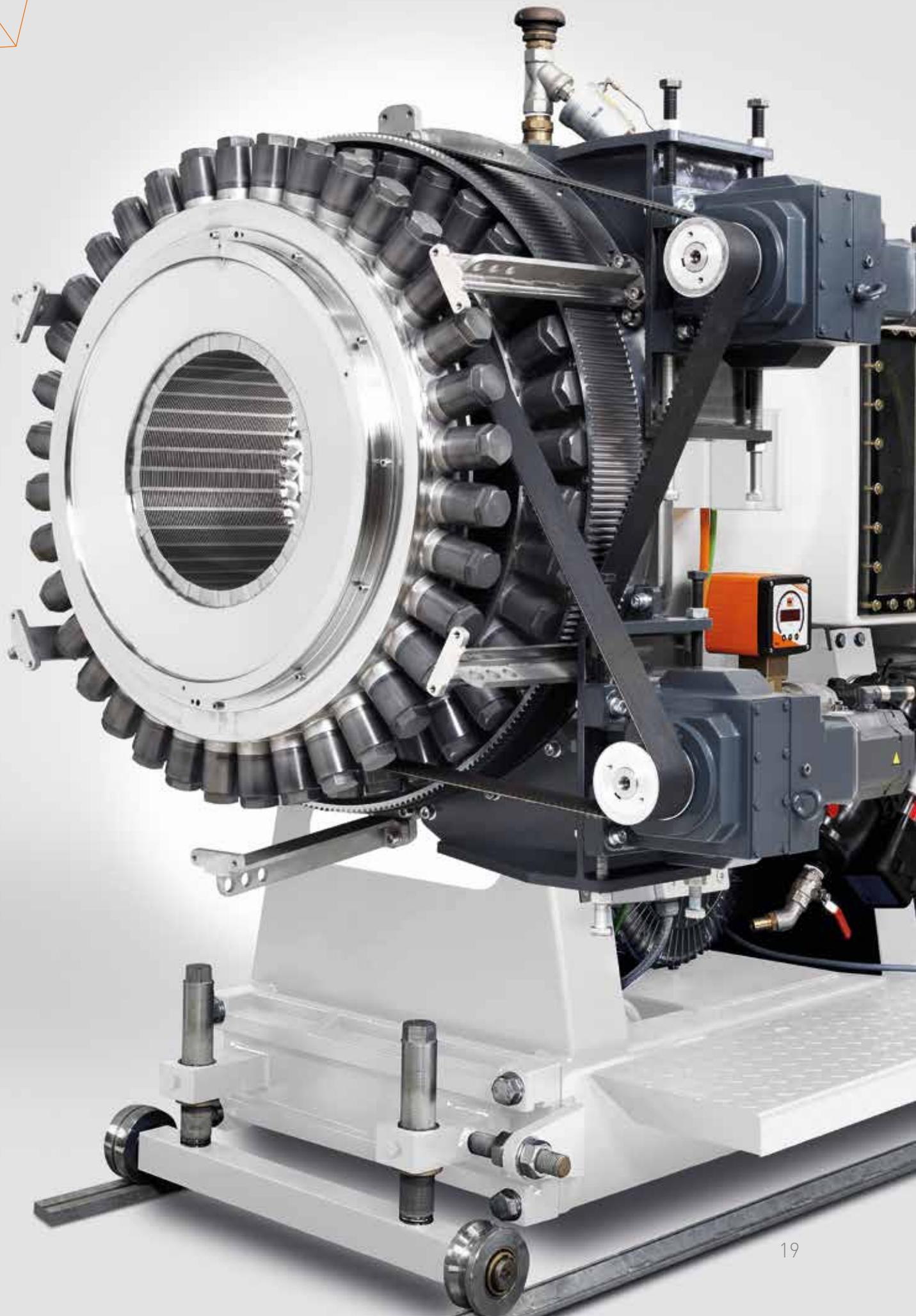
In addition to investment in a complete machine, the existing line can be changed over one step at a time by adding individual modules and extended into a fully automatic machine using the manual version of QuickSwitch.

Modules for step-by-step changeover

- Module 1: Calibration basket and vacuum tank with QuickSwitch design (with manual diameter adjustment)
- Module 2: QuickSwitch pipehead with manually adjustable pin or adjustable die for existing conventional pipehead and suction bell
- Module 3: QuickSwitch conversion kit for spray baths, seals and pipe supports
- Module 4: QuickSwitch all-in-one control system and automation of modules 1 and 2
- Module 5: QuickSwitch haul-off
- Module 6: QuickSwitch cutting unit

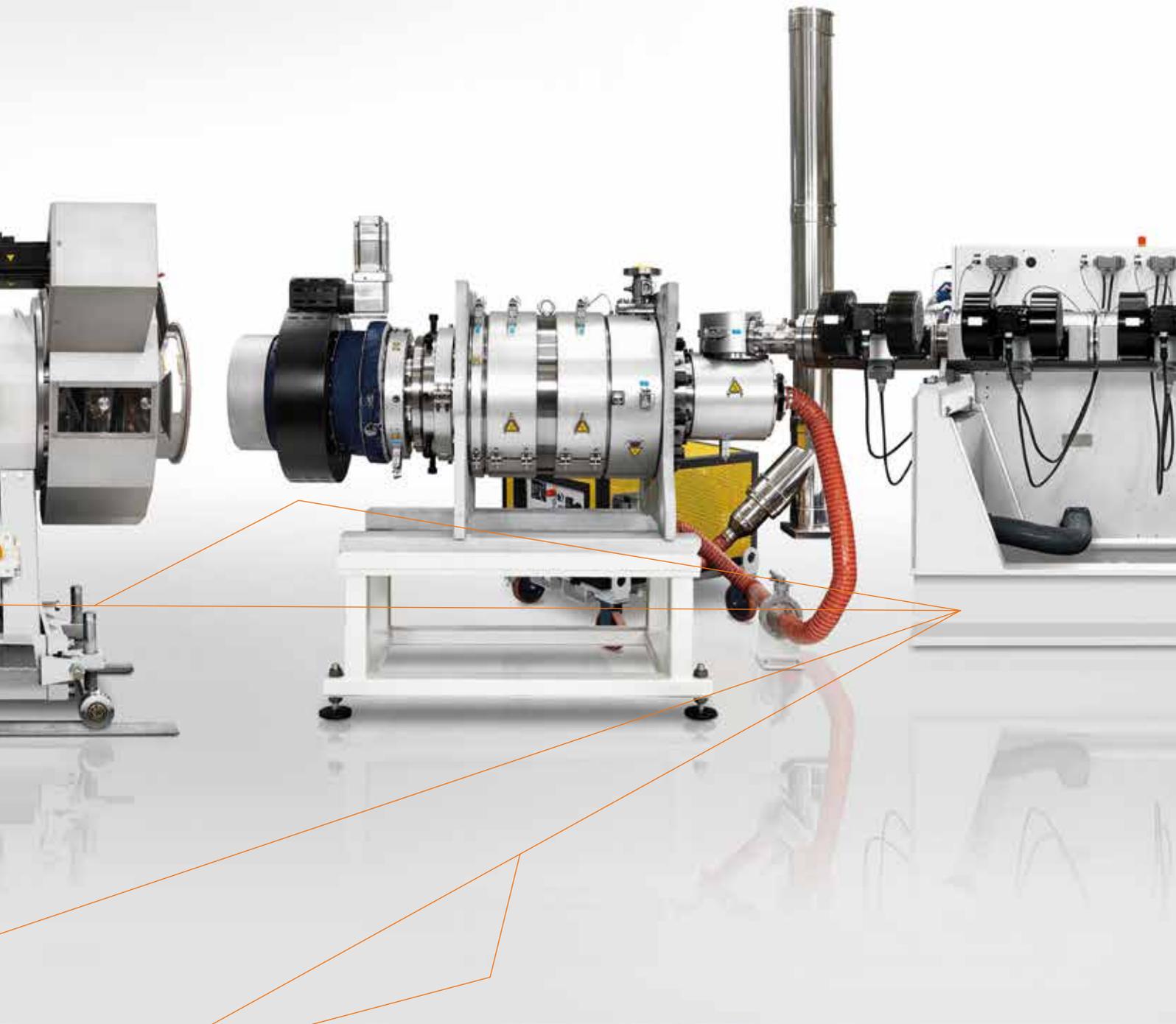


Optional extras, such as a QuickSwitch marking device, are available on request.



IPC technology integrated in the QuickSwitch system: **Productivity in duplicate**

The QuickSwitch machine can also be optionally equipped with the innovative Internal Pipe Cooling (IPC) system. This gives manufacturers a clear competitive advantage because the highly efficient internal pipe cooling system offers even better cost efficiency.





QuickSwitch in conjunction with IPC technology is available for diameter ranges of 160 – 250 mm, 250 – 450 mm and 280 – 500 mm

FACTS AND FIGURES OF EXTRUSION SYSTEMS FOR LARGE-DIAMETER PIPES



Applications: drinking water supplies, desalination plants, petrochemical systems and in mining, for example, for water outlet channels.

Smooth pipes

Smooth pipes are used in drinking water supplies and for conveying materials overland.



Corrugated pipe

Even large-diameter corrugated pipes are relatively lightweight and easy to handle. This makes them extremely cost competitive for applications where they are suitable. Pipes can be produced with diameters of up to approx. 2500 mm.



Wound pipe

Winding the profile around a steel drum enables pipes to be manufactured with diameters of up to approx. 4000 mm.

HIGH QUALITY AND OUTPUT PO EXTRUSION SYSTEMS FOR LARGE-DIAMETER PIPES

The technological expertise in extrusion technology at KraussMaffei is particularly evident in pipe extrusion. As a system provider, we supply complete, integrated system concepts that have enabled us to maintain our position as a global market leader for many years by systematically driving development of our innovative products.

Your advantages at a glance:

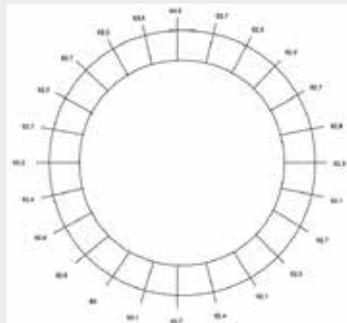
- Manufacture of large-diameter pipes with diameters of up to 2500 mm and wall thicknesses of up to 150 mm (practicable)
- Optimized melt flow thanks to the multi-dimensional, computer-assisted design of the spiral geometry and melt channels
- Short flushing and cleaning times
- Internal pipe cooling (IPC) with central supply

FIRST ENCOUNTER IMPRESSIVE LARGE- DIAMETER PIPE SYSTEM



Pipehead

Large pipehead for production of PO pipes up to 2500 mm in diameter. Mounting carriage with electromotor tilt function for easy die set change



PE 100



Vacuum tank

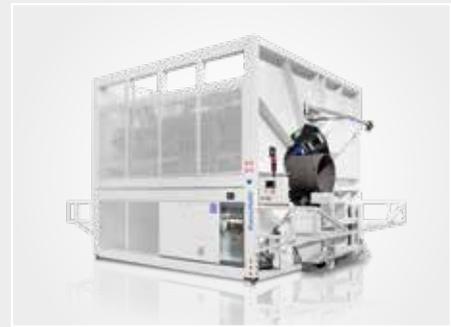
Two-chamber vacuum tank with cable-driven feed for easier pipe production start-up; electro-hydraulic length adjustment and spray pipe adjustment





KME single-screw extruder with higher-level C6 control system

Materials: large-diameter pipes are made from long-lasting, low-sagging PE 100 materials that have been specially developed for this application



Haul-off

Twelve-track caterpillar haul-off, six tracks float-mounted for optimal contact with the pipe, servo motor drive for haul-off tracks



Cutting unit

Automatic planetary cutter – capable of cutting even thick pipe walls – with electric carriage and universal clamping system



Start-up winch

For easier line start-up, with remote control and linked to the cable-driven feed on the vacuum tank

The image shows several large, black, cylindrical pipes stacked on a red train car. The pipes are arranged in a way that shows their circular ends. The background is a clear blue sky and a body of water, suggesting an outdoor industrial or shipping yard setting. A blue callout box is overlaid on the lower left side of the image, containing text and a list of benefits.

YOUR BENEFITS:

- High output and good melt homogeneity thanks to the KraussMaffei process technology
- Increased process reliability and minimized screw and barrel wear
- Innovative IPC technology for internal pipe cooling for improved productivity
- Outstanding price/performance ratio

Boost output while cutting material costs – with the extrusion systems for large-diameter pipes

The top priority in pipe extrusion is to boost output performance. Almost as important is tight control of meter-weight to reduce material costs.

Cost-effective and reliable solution

For pipe extrusion to be successful, it must be both cost-effective and reliable. With its vast process engineering expertise, KraussMaffei supplies production solutions that meet both these demands. Our range of 36D single-screw extruders, with their very high output rates, is optimally designed for use in production with our large-diameter pipeheads. They produce an exceptionally homogenous melt at very low melt temperatures. The KM-RKW 40-2500 large-diameter pipehead is the top-of-the-range model in our range of spiral distributor pipeheads for polyolefin pipe extrusion.

This pipehead is capable of producing PO pipes with diameters of up to 2500 mm and wall thicknesses of up to 150 mm (practicable). In order to keep the wall-thickness tolerances within the tightest possible limits, the pin and the pin connection piece have segmented heating pads, which enable each segment to be controlled manually. The heating pads for the pipehead and the dies are also segmented and thus individually controllable, and can be used for thermal centering. Pipes in the dimension ranges of KraussMaffei large-diameter pipeheads are used mainly in networks carrying drinking water, wastewater or sewage over long distances or to supply large consumers. Other fields of application are salt water desalination plants and cooling water lines for power plants.

Mature pipehead technology for optimized production, compliance with standards and maximum material savings

The larger the pipe diameter and the thicker the pipe walls, the more it could pay to look at the potential for material savings. The maximum and minimum diameters and wall thicknesses for each pipe size are specified in the relevant standards, and pipe must be produced in compliance with them. KraussMaffei pipe extrusion systems make it easy to achieve this compliance. They combine the extruder's mature process engineering with the rheologically optimized design of the die, and optimized calibration and cooling systems.

This combination helps the processor to work as closely as possible to the minimum dimensions specified in the relevant standards and thus to keep meter-weight to a minimum.

Considering that, for some types of pipe, the cost of material accounts for up to 90% of total manufacturing costs, keeping weight per meter to a minimum can deliver huge material savings. Depending on the system throughput, the type of material and the relevant standard, the annual savings potential between the minimum and maximum permissible pipes dimensions can reach six figures (euros). An extra benefit of producing pipe with precision dimensions and minimal ovality on KraussMaffei lines is that the resulting piping is easier to lay on site because the perfect quality makes for easier welding.



KM-RKW 39-1600 large-diameter pipehead on a mounting carriage (pivots hydraulically)

- Pipe diameter range: 1000 – 1600 mm
- Extrusion height: 1650 – 1750 mm
- Dimensions (L x W x H): 2.5 m x 5.3 m x 2.9 m
- Weight: 39 tons (without die set)
- IPC technology for internal pipe cooling

The spiral distributor system Proven over many years of use and continuously optimized

Pipeheads for large pipes are engineered using the tried-and-tested spiral distributor design and used successfully.

No thermal degradation or leakage

As it enters the pipehead, the melt stream is split by passing through a pattern of holes on its way to the spiral channels. When designing this process, we placed particular importance on creating a flow channel with optimum melt stream.

The aim is to prevent thermal degradation of the material. There is therefore no risk of damage to the extruded pipe through the separation of thermally decomposed material. An additional advantage of the spiral distributor is the short flushing time. Change-over to a different material or color is fast and easy. The spiral distributor channels are designed for minimal pressure loss so that there is no risk of leakages.

YOUR BENEFITS:

- Optimum inflow of the spiral distributor
- Low pressure loss
- Easy die-set changes because the pipehead is suspended in the mounting carriage so that it can pivot
- Significant material savings during dimension and color changes
- Significant material savings thanks to minimal wall thickness tolerances

Technical data

Dimensions based on DIN 8074; DIN 12201

Diameter/wall thickness ratio (standard dimension ratio)

	51	41	33	26	22	21	17,6	17	13,6	11	9	7,4
630	12.3	15.4	19.3	24.1	28.7	30.0	35.7	37.4	46.3	57.2	70.3	
710	13.9	17.4	21.8	27.2	32.3	33.9	40.2	42.1	52.2	64.5	79.3	
800	15.7	19.6	24.5	30.6	36.4	38.1	45.3	47.4	58.8	72.6	89.3	
900	17.6	22.0	27.6	34.4	41.0	42.9	51.0	53.3	66.1	81.7		
1000	19.6	24.5	30.6	38.2	45.5	47.7	56.7	59.3	73.5	90.8		
1200	23.5	29.4	36.7	45.9	54.6	57.2	68.0	71.1	88.2			
1400	27.4	34.4	42.9	53.5	63.7	66.7		83.0	102.8			
1600	31.3	39.2	49.0	61.2	72.7	76.2		94.1	117.6			
1800	35.3	44.0	55.1	68.8	81.8	85.8		106.6				
2000	39.2	48.9	61.2	76.4	90.9	95.3		118.5				
2250	44.1	55.0	68.9	86.0	102.3	107.2						
2500	49.1	61.2	76.5	95.5	113.0	119.1						

Pipehead type KM-RKW

38-1600	39-2000	40-2000	40-2500
			

Non-standard diameters and wall thicknesses on request.
Throughput range 2000 kg/h, higher throughput on request.



SYSTEMS FOR MANUFACTURING C-PVC PIPES

Process expertise

When it comes to making products from C-PVC, many years of experience in extrusion technology are a major success factor. KraussMaffei machines are engineered for optimal processing of all C-PVC compounds on the market today (with an increased chlorine content of 62-69% and a density of 1.50 to 1.55 g/cm³). In particular, the machines are engineered specifically for these materials. The screw geometry is matched to the material and all flow channels – even in the tools (e.g. pipeheads and flat sheet dies) – are chrome-plated.

A screw geometry conceived specifically for C-PVC processing guarantees control of optimum mass temperature and shear rates. The twin-screw extruders for pipe production are equipped with maintenance-free internal temperature conditioning for the screws. KraussMaffei offers a product portfolio featuring seven twin-screw extruders delivering outputs of up to 800 kg/h. With our pipeheads and downstream units, it is possible to

produce pipes ranging from 12 mm to 500 mm in diameter; pipes at the lower end of the diameter range can also be produced by means of the economical twin-strand approach.

Premium-quality wear resistance

As early as the C-PVC processing stage, particular attention must be paid to achieving perfect wear resistance. This is why all KraussMaffei machines are equipped with fully chrome-plated screws and adapters. We also use fully chrome-plated die sets and tools as well as hardened polishing stack rollers with a high-gloss chrome-plated finish. Screws are molybdenum-welded as standard; barrels are deep-nitrided for strong hardness and excellent hardness depth. To ensure even greater wear resistance, we can optionally provide tungsten-carbide-armored screws and bi-metal barrels for the parallel twin-screw extruders. These processing units boast a service life many times longer than that of the standard equipment specification.



Conical twin-screw extruder for manufacturing C-PVC pipes



Pipes made of C-PVC

C-PVC PIPES

PRACTICAL EXAMPLES OF APPLICATION

C-PVC pipes and moldings are generally used where products must combine high mechanical strength with excellent resistance to high temperatures.

Because of their greater chemical resistance to acids and bases, C-PVC products are also used to build systems and equipment for the chemical and semiconductor industries.

YOUR BENEFITS:

- Highly automated, cost-effective production
- Special screw geometries – adapted to the wide variety of C-PVC materials
- Maximum output with homogeneous melt
- Perfect wear resistance

Other applications:

- Pipes and fittings for sprinkler systems
- Pipes for hot and cold water applications
- Pipes for industrial applications (hot galvanizing in the electroplating industry, bleaching in the paper industry, fertilizer production)
- Pipes for heating and wastewater systems and for the solar energy industry
- Pipes for ventilation ducts and smoke extractors
- Cleanroom equipment
- Semiconductor manufacturing systems
- Pharmaceutical manufacturing systems and equipment

Usual pipe dimensions:

Cut-to-length approx. 5 – 6 m long
External diameters of 12 – 500 mm
Pressure classes: PN 2.5 (SDR 81) /
PN 4 (SDR 51) / PN 6 (SDR 34.4) /
PN 10 (SDR 21) / PN 16 (SDR 13.6) /
PN 25 (SDR 9)



Installation of C-PVC pipes



C-PVC pipes and moldings in the chemical industry



Installed piping for the transport of chemical substances



NEU WIE EINEN BLICK
FAKTE FÜR DIE FACHLEITUNG

C7 CONTROL SYSTEM – SUCCESS MOVING TO THE NEXT ROUND

The functions of both of the proven KraussMaffei “BPC Touch” (compounders) and “C6” (PO and PVC lines) control systems are now combined in the new C7 extruder control system. As part of this fusion, the user-friendly interface has additionally been upgraded and updated to a more modern appearance.

One Extrusion – One Control

The blending of the two control systems creates tremendous potential in terms of new flexible system configurations and groundbreaking plastics applications. Using the C7 control system, the machine operator keeps complete control over the entire extrusion line with direct and fast access to the individual units in the higher-level systems network. The numerous monitoring, control and automation functions create the basis for optimum product quality and high process reliability.

One look at the essentials

With the redesign of the user interface, we have succeeded in enhancing the focus on the essentials with the same clear information content. The familiar clear screen layout paired with a pleasing and intuitive color scheme provides a comprehensive process overview for the user at all times, as well as the foundation for fast intervention options.

With the C7 control system, KraussMaffei is also placing particular focus on continuing the ongoing, proven and trusted operating principle and functionality.

Connection to the digital future

With its many interfaces, the C7 control system is ideally equipped for the data world of tomorrow. Alongside the proven conventional paths (USB, PDF export), there are various network-based data interfaces (e.g. OPC-UA, Euromap84) available for accessing machine and operating data. Internal and external data recorders provide support in analyzing and optimizing processes.

The possibility to carry out remote diagnostics via the Internet, as well as to gain secure access to the machine control system through non-contact identification by use of a RFID reader, rounds off the digital portfolio.

YOUR BENEFITS:

- One control system – diverse applications
- State-of-the-art, attractive design
- Proven, intuitive operating philosophy
- Versatile data handling for the digital factory
- Flexible solution for total system concepts and individual machines

Various operating versions



Swivel-mounted on switching cabinet (standard)



Boom-mounted version (option)



Mounted on switching cabinet door (option)



Mobile version (option)



OUR WORLDWIDE EXPERTISE IS YOUR ADVANTAGE DIGITAL & SERVICE SOLUTIONS

With your KraussMaffei machine, you have chosen a product that delivers the highest levels of productivity and reliability. In addition to our range of machinery, KraussMaffei focuses on comprehensive and future-oriented solutions, innovative business models and an innovative portfolio of digital products.

Customer service at the touch of a button

The process of digital transformation is becoming faster and easier than ever for the customer. Our Digital & Service Solutions unit makes your production chain even more flexible and efficient with future-oriented solutions. KraussMaffei thus globally provides an all-inclusive customer service package and networks machines and processes with each other. Our global support offers a sound basis for your local long-term success.

Individual challenges in mechanical engineering call for intelligent solutions

With our services portfolio, we support you throughout your machine's lifecycle with a strong focus on your specific needs. In order to satisfy your wishes, we offer you a wide range of solutions in order to ensure maximum availability and optimum productivity of your machines.

Technology³ as a unique selling proposition

KraussMaffei is the only supplier in the world with a product range comprising the most important machine technologies for plastic and rubber processing: injection molding machinery, automation, reaction process machinery and extrusion technology. KraussMaffei is represented worldwide with more than 30 subsidiaries and over 10 production plants as well as about 570 commercial and service partners. Working together with our customers and partners, we are thus in a position to offer vast and unique expertise in the industry.

You can find further information at:
www.kraussmaffei.com

KRAUSSMAFFEI – PIONEERING PLASTICS



Extensive expertise from a single supplier

KraussMaffei is one of the world's leading manufacturers of machinery and systems for producing and processing plastics and rubber. Our brand has been synonymous with cutting-edge technology for over 180 years. Our product range includes all technologies in injection molding, extrusion and reaction process machinery. KraussMaffei has a unique selling proposition in the industry as a result. By drawing on our proven innovative capacity, we can guarantee our customers sustained additional value over their entire value-adding chain through our standardized and individual product, process, digital and service solutions. The range of our products and services allows us to serve customers in

many sectors including the automotive, packaging, medical and construction industries. We also supply manufacturers of electrical and electronic products and household appliances.

At your service all over the world

KraussMaffei is represented all over the world. Subsidiaries provide you with support in the countries shown in light blue. Our sales and service partners take care of you in the regions shown in white.

You can find all contact information at
www.kraussmaffei.com

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HIGHLY SKILLED SYSTEM PROVIDER



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