

Pipe extrusion with maximum flexibility and minimum cost
QuickSwitch technology for in-line dimension changes

Engineering Value

Krauss Maffei
Berstorff

Facts and figures regarding QuickSwitch technology

Applications



Single-layer HDPE pipes
with marking strips



Single-layer HDPE pipes
for drinking water use



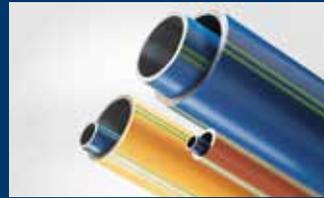
Double-layer HDPE gas pipes



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 processing a wide spectrum 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

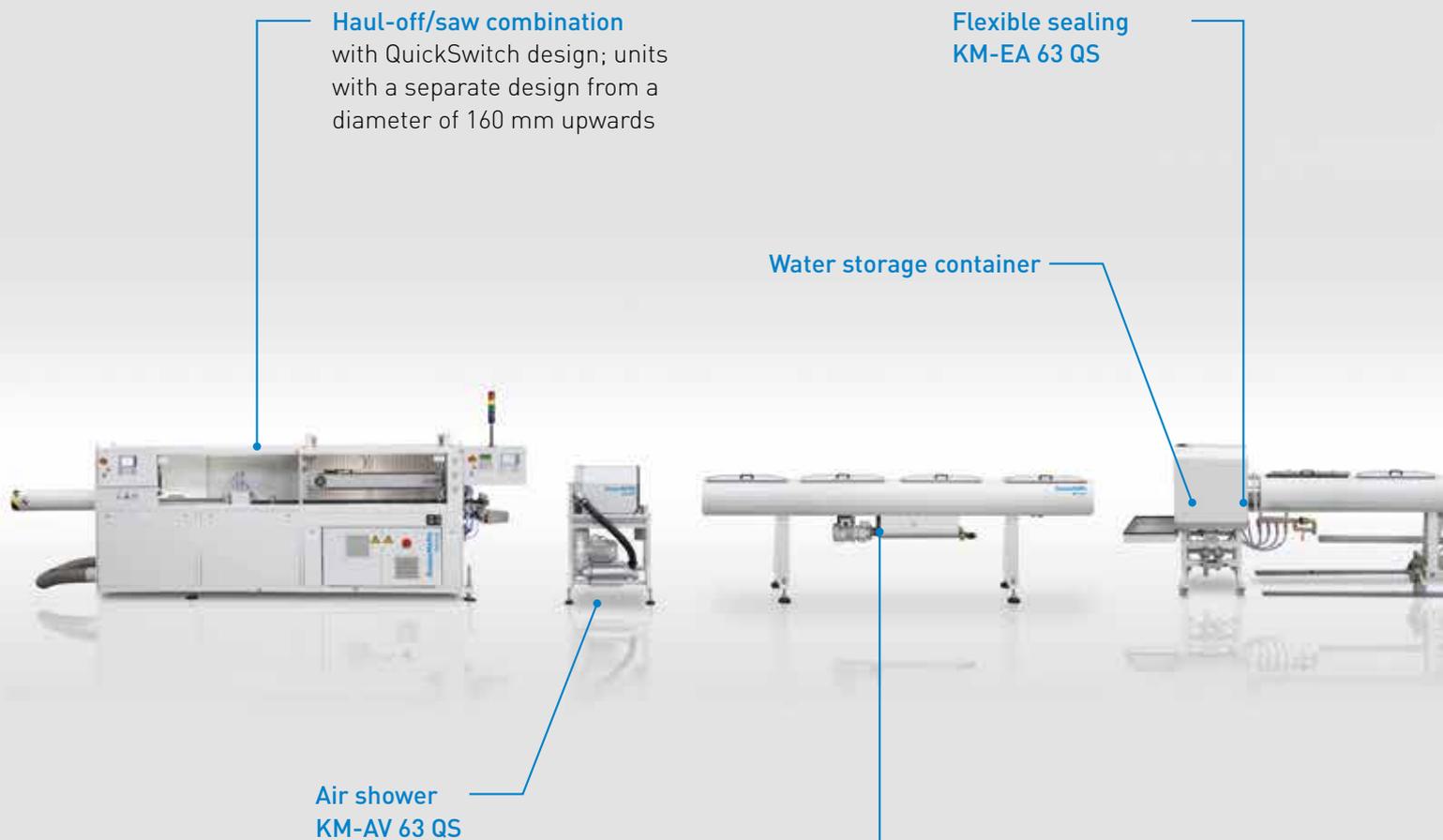
Whereas conventional pipe extrusion lines have to be stopped, converted and restarted with every change of dimension, the efficient QuickSwitch technology from KraussMaffei Berstorff can be used to change the pipe dimensions during continuous production - simply at the push of a button. This effective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

Your advantages at a glance:

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

Impressive encounter

Take a tour of the QuickSwitch line for PO pipes with external diameters from 25 to 63 mm



Haul-off/saw combination
with QuickSwitch design; units
with a separate design from a
diameter of 160 mm upwards

Flexible sealing
KM-EA 63 QS

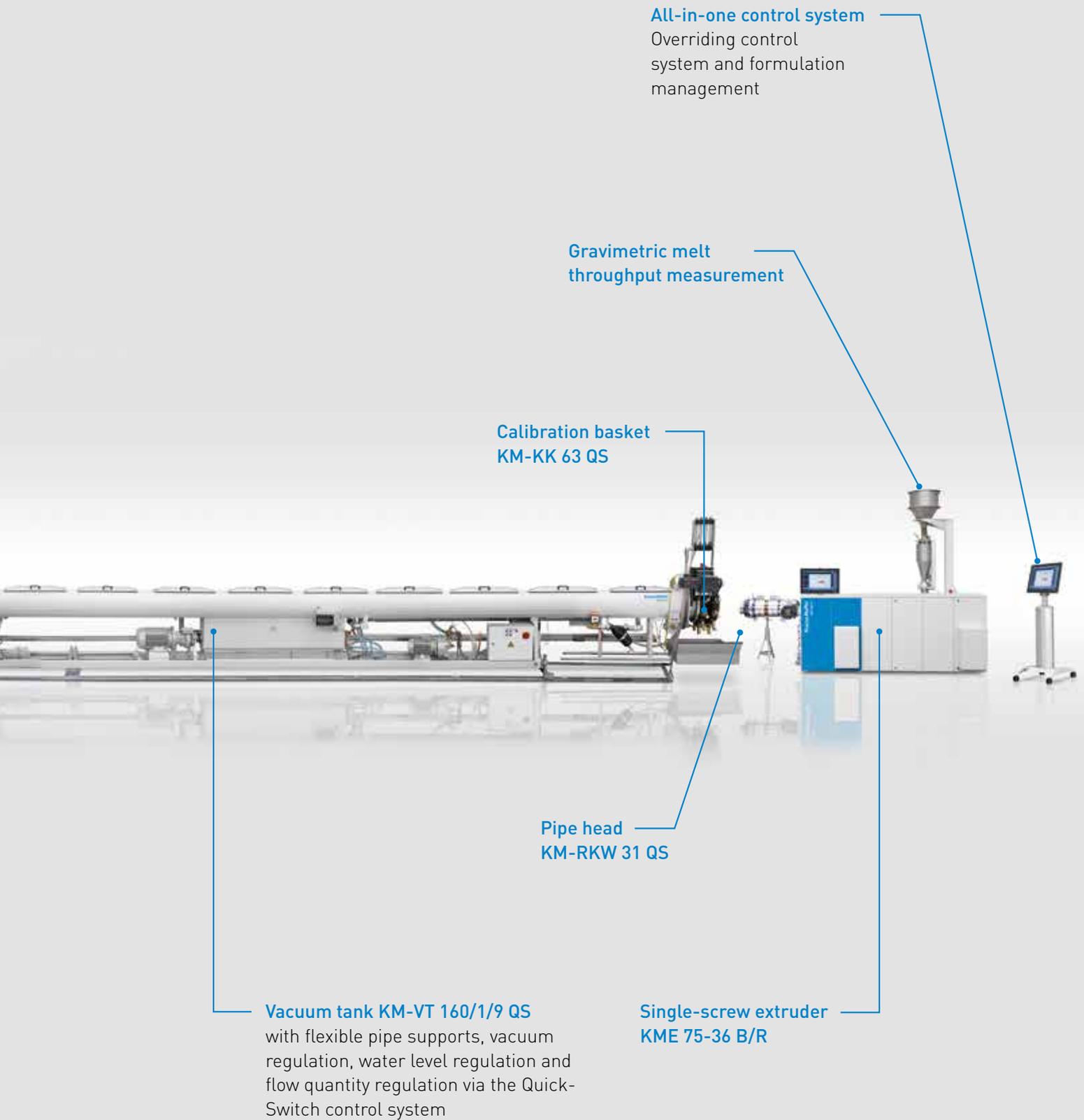
Water storage container

Air shower
KM-AV 63 QS

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

Optional units are available for selection:

- Marking device with QuickSwitch design
- Ultrasound measuring devices
- Multi-layer pipe heads with QuickSwitch design
- Screen changer
- Strip and outer layer adapter
- Winder with quick adjustment
- Socket forming machine with quick-change device



QuickSwitch satisfies market demands: High cost-efficiency and flexibility

On 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 some segments - to supply all conceivable pipe dimensions (single-layer and multi-layer) as quickly as possible and without having to build up large stocks.





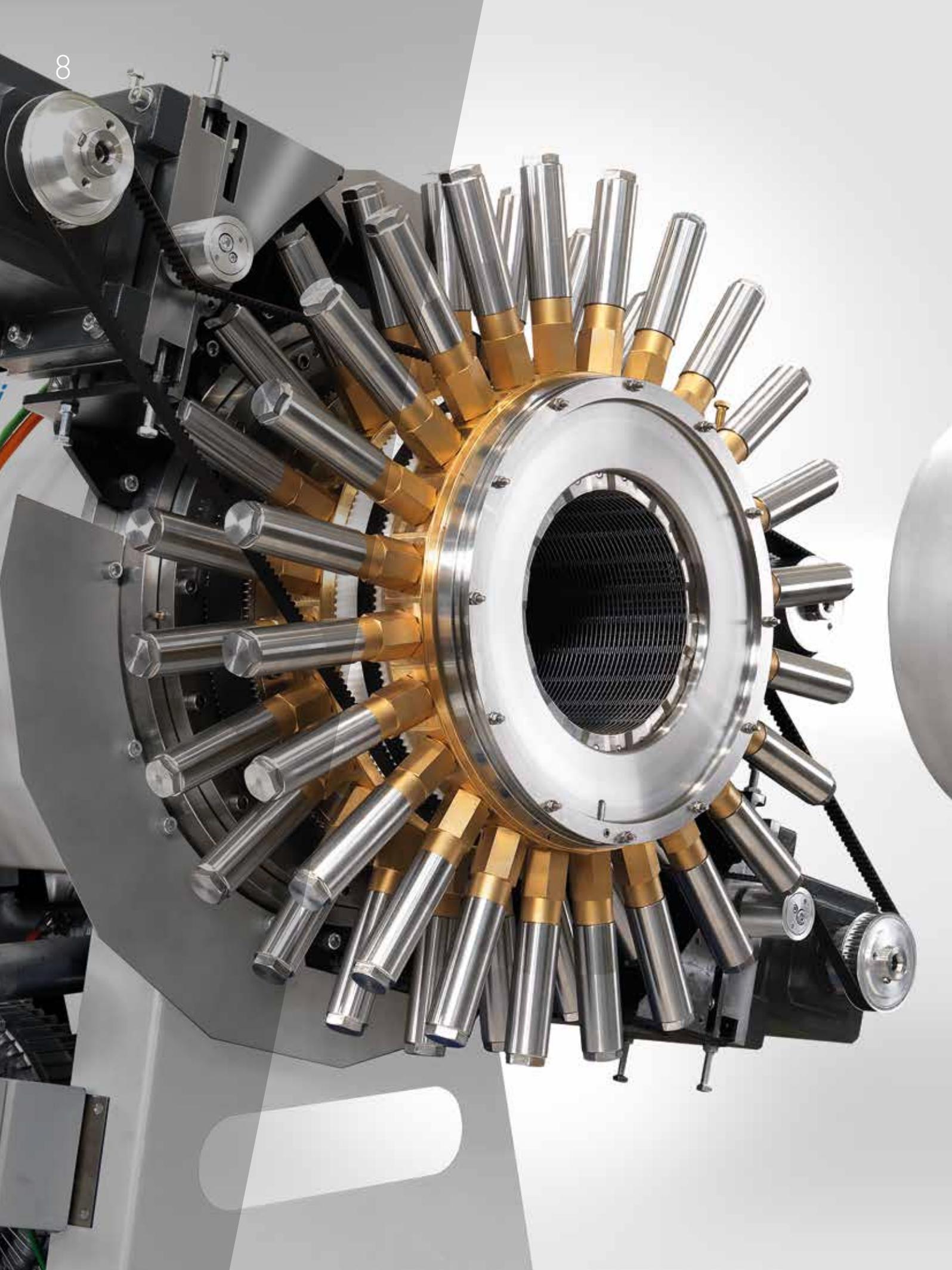
**QuickSwitch pipe head:
Individually adjustable**

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 large dimension ranges covered by the Quick-Switch system can only be attained using a flexible pipe head such as this.

**QuickSwitch suction bell:
Exact expansion**

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

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





QuickSwitch calibration basket: Infinitely 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: Secure sealing

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 above-mentioned calibration basket 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. A modular design comprising several moving segments in conjunction with air pressure ensures that the vacuum tank is sealed against the ambient pressure across the entire diameter range. 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: Constant haul-off force

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.

QuickSwitch cutting unit Changeover work superfluous

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.



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

All-in-one control system: Overriding control system

The overriding control system is a key element of a fully automatic QuickSwitch line. All QuickSwitch functions are integrated in an overriding C6 control system. Here, for example, the following parameters of the extrusion lines are stored once for every individual pipe dimension:

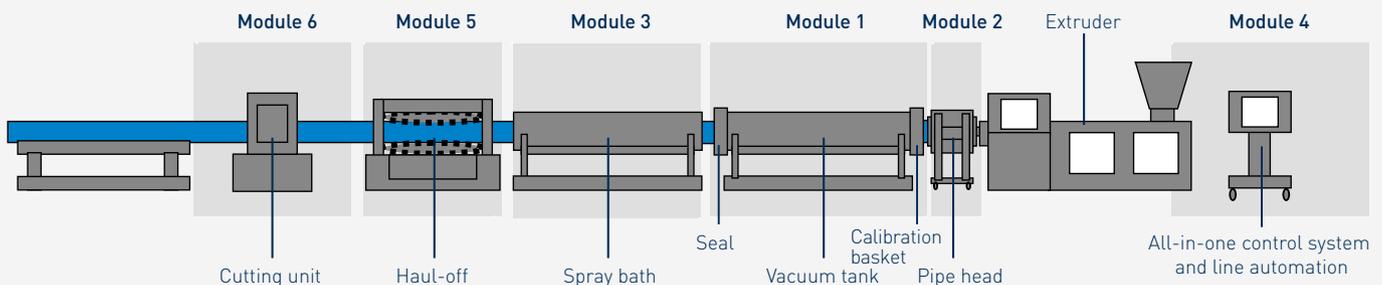
- Raw material
- Output rate of the extruder
- Pipe dimension
- Pipe head adjustment
- Underpressure in the suction bell
- Diameter in the calibration basket
- Position of the vacuum tank
- Underpressure level in the vacuum tank
- Haul-off speed
- Contact pressure of the haul-off caterpillars on the 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 overriding control system features numerous advantages such as a standard operating philosophy, standard hardware or flexible extendibility and simple updates.

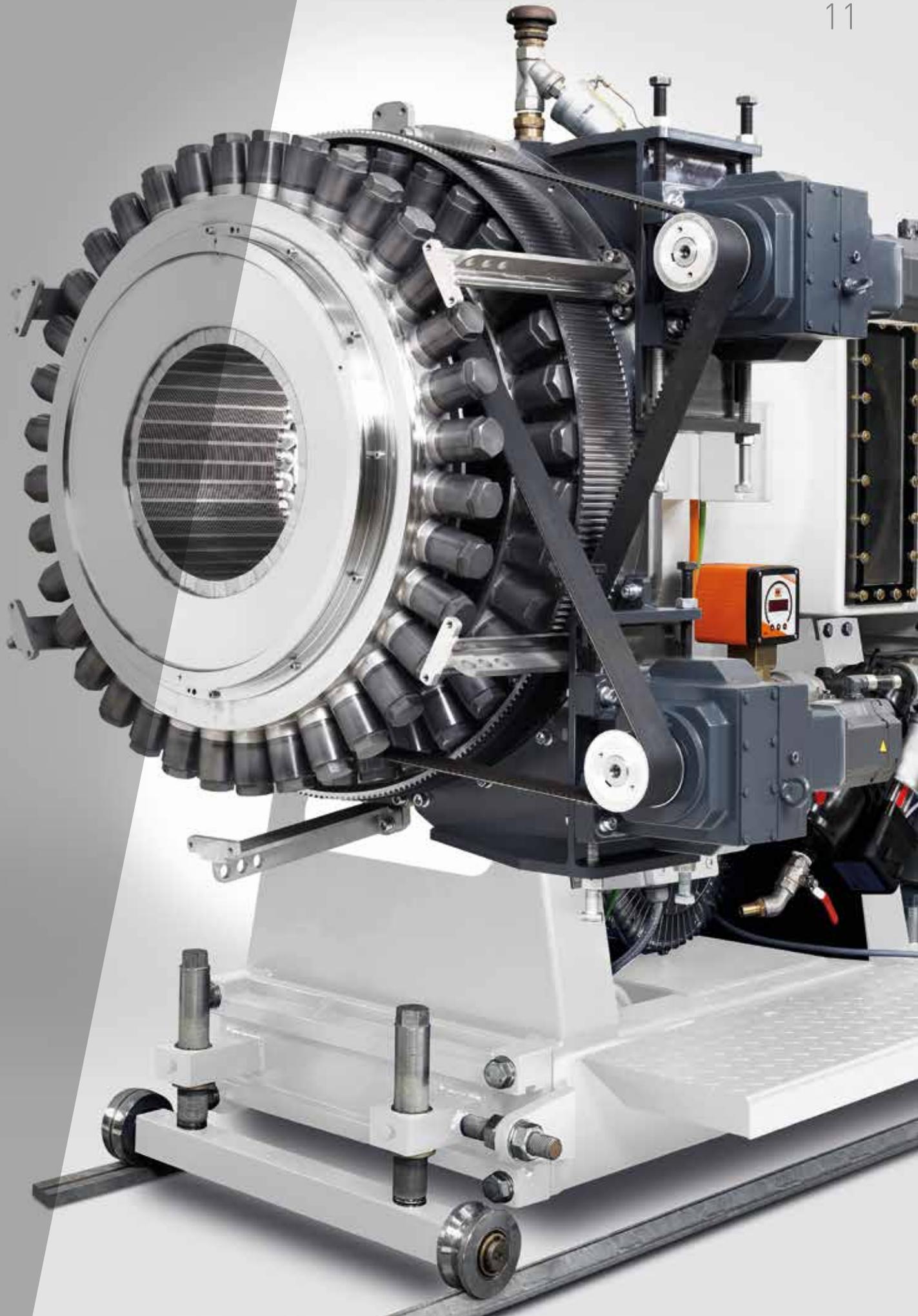
In addition to investment in a complete machine, the existing line can be changed over one step at a time by adding individual modules and extended into a fully automatic machine using the manual version of QuickSwitch.

Modules for step-by-step changeover

- Module 1: calibration basket and vacuum tank with QuickSwitch design (with manual diameter adjustment)
- Module 2: QuickSwitch pipe head with manually adjustable pin or adjustable die for existing conventional pipe head and suction bell
- Module 3: packages for changeover to QuickSwitch 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



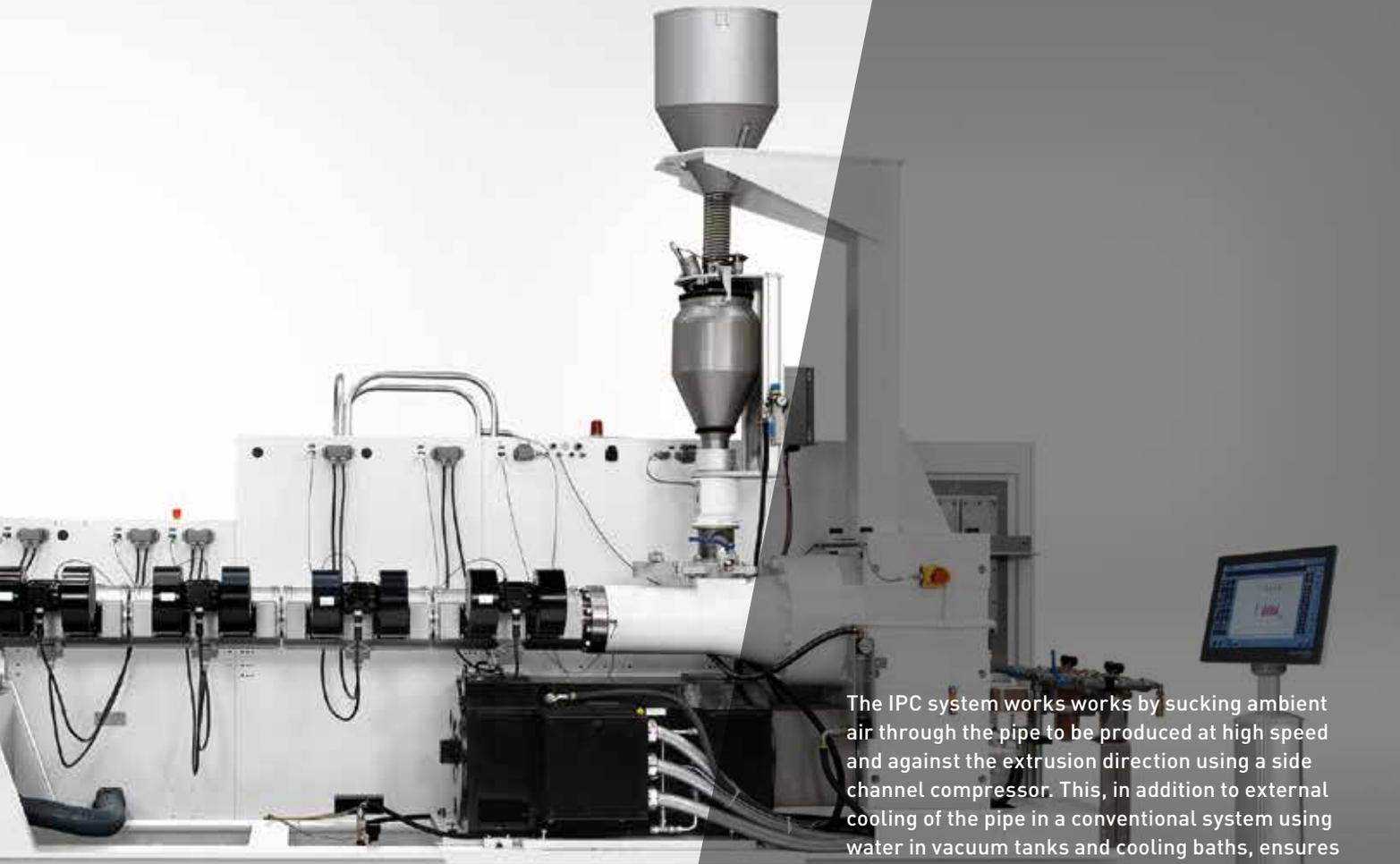
Optional extras, such as a QuickSwitch marking device, are available on request.



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 big competitive edge because the highly efficient internal pipe cooling system offers even better cost efficiency.





The IPC system works by sucking ambient air through the pipe to be produced at high speed and against the extrusion direction using a side channel compressor. This, in addition to external cooling of the pipe in a conventional system using water in vacuum tanks and cooling baths, ensures gentle air cooling of the pipe.

The advantages are plain to see:

- Shortening the cooling section by up to 40% reduces investment costs and saves space
- 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 prevents high pressures from building up
- Permanently active IPC control system maintains an adequate air suction volume under changing operating conditions and so ensures premium quality products

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

OEE Plus Boosting cost-efficiency for you



High overall equipment efficiency (OEE) is a fundamental prerequisite for your company's success. KraussMaffei Berstorff's product portfolio comprises tailored machines and lines along with perfectly matched services that increase the economic efficiency and the sustainability of your production. Benefit from our proven know-how of extrusion technology in any application.



Availability



Performance



Quality



For more information about OEE Plus, visit:
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The group is represented internationally with more than 30 subsidiaries and over ten production plants as well as about 570 commercial and service partners. This is what makes us your highly skilled and integrated partner. Use our comprehensive and unique expertise in the industry.

You can find additional information at:
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The KraussMaffei Group has a global presence. Countries with subsidiaries are marked in light blue. In the white-colored regions, the Group is represented by over 570 sales and service partners.

Our answer to future challenges in pipe production

Flexible and efficient QuickSwitch technology

The requirements relating to pipe extrusion are already very high nowadays: small order batches, high flexibility, long production times and cost-efficient production are imperative. These trends will also shape the future of pipe extrusion.

KraussMaffei Berstorff has the answer with its intelligent QuickSwitch technology. Manufacturers can alter dimensions at the push of a button, thus saving time and material when changing over to different dimensions. The bigger the pipe, the bigger the potential savings and, thus, the bigger the competitive advantage.

In addition to investment in a complete machine, existing lines 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.

