

ECONOMIC PRODUCTION AND HIGHEST PRODUCT QUALITY

DISCOVER OUR PO PIPE PRODUCTION SOLUTIONS



Krauss Maffei
Pioneering Plastics

AREAS OF APPLICATION SINGLE-SCREW EXTRUDER PIPE SERIES



Pipe for transporting drinking water



Wastewater pipe



Sanitary and heating pipes



Pipes with special properties



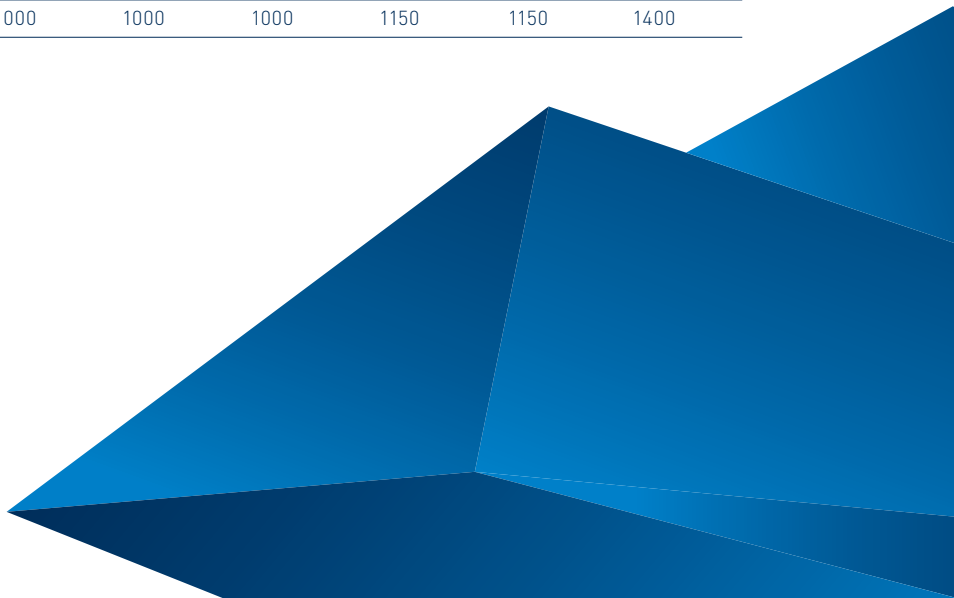
PP-R pipe with glass-fiber reinforcement



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

Technical data and measurements of the single-screw extruder pipe series

Technical data 36 L/D KME	45-36 B/R	60-36 B/R	75-36 B/R	90-36 B/R	105-36 B/R	125-36 B/R	150-36 B/R
Output rate, max. [kg/h] HDPE	270-300	450-500	640-700	850-950	1000-1200	1300-1500	1800-2000
Output rate, max. [kg/h] PP (PP-H; PP-B)	180-210	290-340	440-480	590-660	690-760	860-980	1050-1280
Number of heating/cooling zones	5/5	5/5	5/5	5/5	5/5	6/6	6/6
Screw length [L/D]	36	36	36	36	36	36	36
Screw diameter [mm]	45	60	75	90	105	125	150
Extrusion height [mm]	1000	1000	1000	1000	1150	1150	1400



WAY OUT IN FRONT SINGLE-SCREW EXTRUDERS FOR PIPE EXTRUSION

With two series that have process units of different lengths, KraussMaffei is perfectly placed to meet the market demands for cost-effective pipe production and high-performance extrusion.

The successful, well-proven 36D single-screw series combines extremely high levels of product quality with cost-effective production. The single-screw extruders with the 30 L/D process unit are made for special extrusion and coextrusion applications; in particular, they are used for processing special materials.

Your benefits:

- The right machine and system configuration for all pipe extrusion tasks
- Cost-effective production and an extremely high level of product quality
- System provider for customer-specific special solutions

FIRST ENCOUNTER

TOUR OF THE KME 125-36 B/R WITH 36D PROCESS UNIT

Eccentric feed

Avoids turbulence and maximizes throughput rates

Robust gearbox

Minimal maintenance costs as a result of long service life and low space requirement thanks to U-configuration of gearbox and motor



Deep-nitrided grooved bush

Outstanding cooling performance, minimum cooling water consumption, steady material feed – independent of counterpressure – and self-cleaning

Bimetal barrel

Extremely low rates of wear

Krauss Maffei

Barrier screw

For thermal and material homogeneity of melt and low melt temperatures

Ideally dimensioned drive concept

With AC or DC drive unit, air-cooled (standard) or water-cooled (optional)

THE YARDSTICK IN PIPE PRODUCTION

OPTIMUM HOMOGENEITY AT A CONSISTENTLY LOW MELT TEMPERATURE

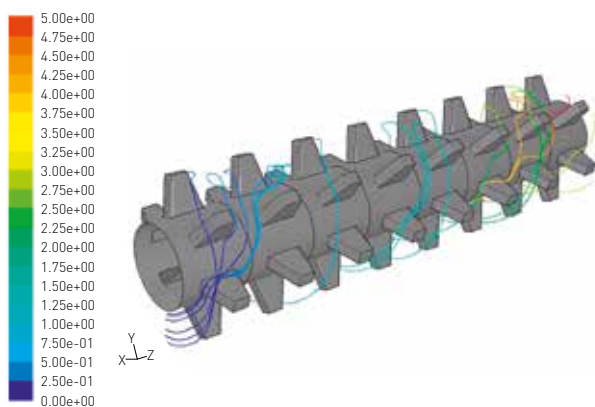
The process-engineering design of the 36D single-screw extruder series provides you with optimum conditions for successful pipe production.

Thermal homogeneity for excellent pipe quality

Pipe quality is significantly influenced by the thermal homogeneity of the materials that are to be processed. This thermal homogeneity can be clearly seen in the appearance of the inner surface of pipes: Thermal inhomogeneity leads to undesirable wavy surfaces. The functional principle of the 36D single-screw extruder series reliably eliminates any thermal inhomogeneities and ensures optimum homogeneity at a consistently low melt temperature.

Considerable benefits right down the line

The 36D single-screw extruder series is distinguished by a range of processing advantages that you can easily see for yourself in pipe production: an optimum mixing process in the shearing and mixing part of the screw; perfect line synchronization thanks to the output linearity and the material feed that is independent of the counter-pressure; an extremely high plasticization performance and distinct thermal homogeneity for perfect product quality; and maximum output performances at minimum investment costs. Furthermore, you can benefit from our



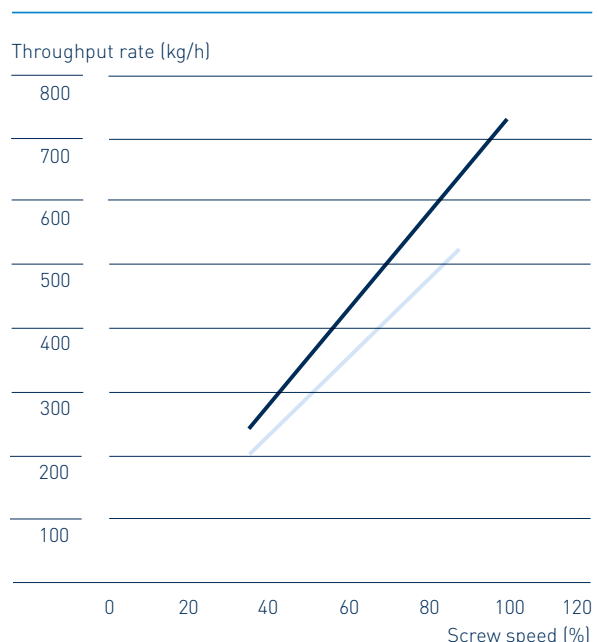
Optimum mixing in the shearing and mixing part of the screw

extensive experience gained from numerous successful practical applications. All machines up to model KME 125-36 B/R are equipped with synchronous AC motor technology as standard.

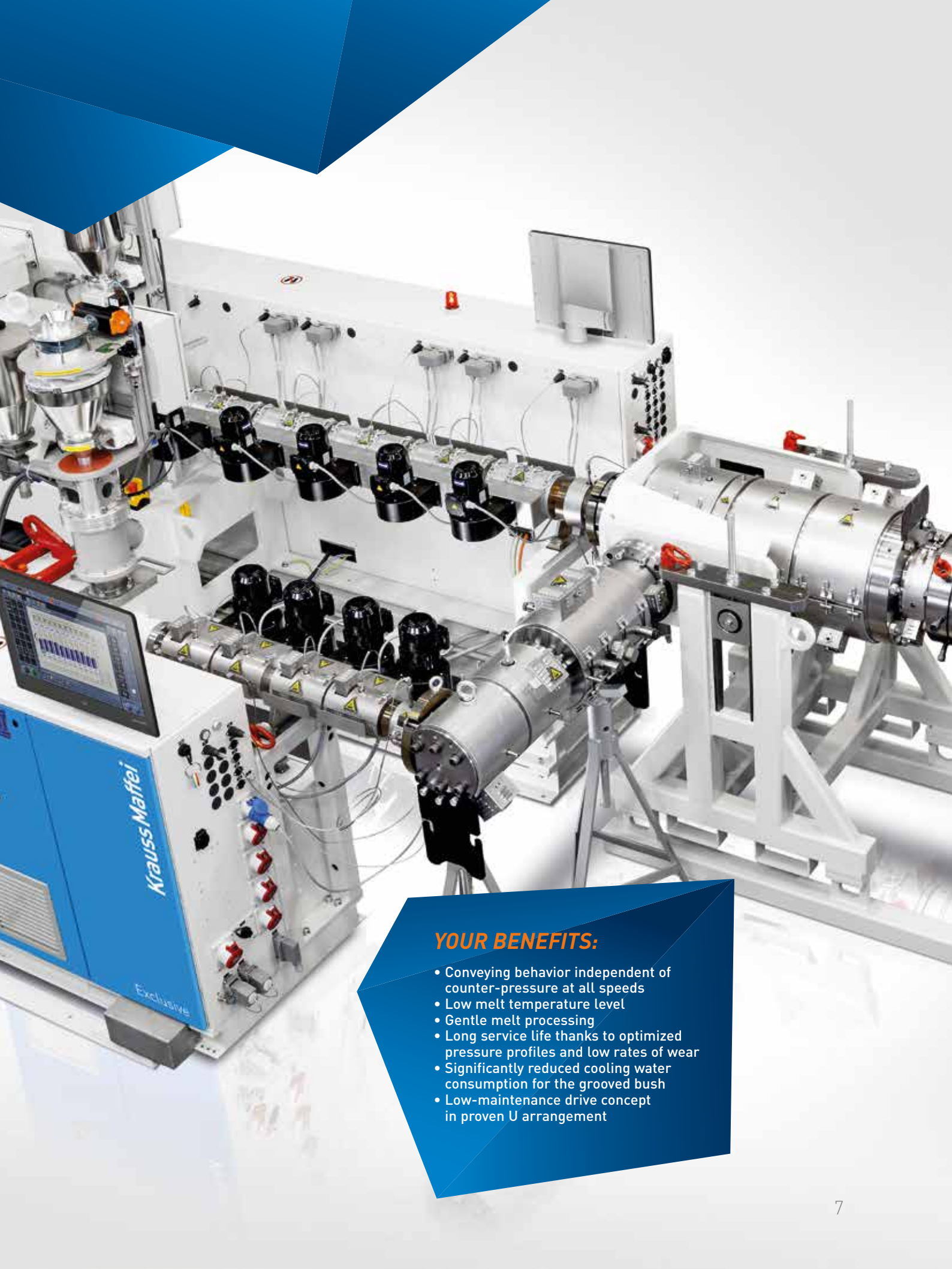
Broad range of applications

The 36D single-screw extruder series is the specialist for processing all common types of material from PE 80, PE 100 and PP. Moreover, of course, it is also suitable for processing a wide variety of other materials, such as LDPE, LLDPE, MDPE, PA 11, PA 12, PE-RT, PE-Xb, PE-Xc, PB, ABS.

Speed/throughput behavior KME 75-36 B/R

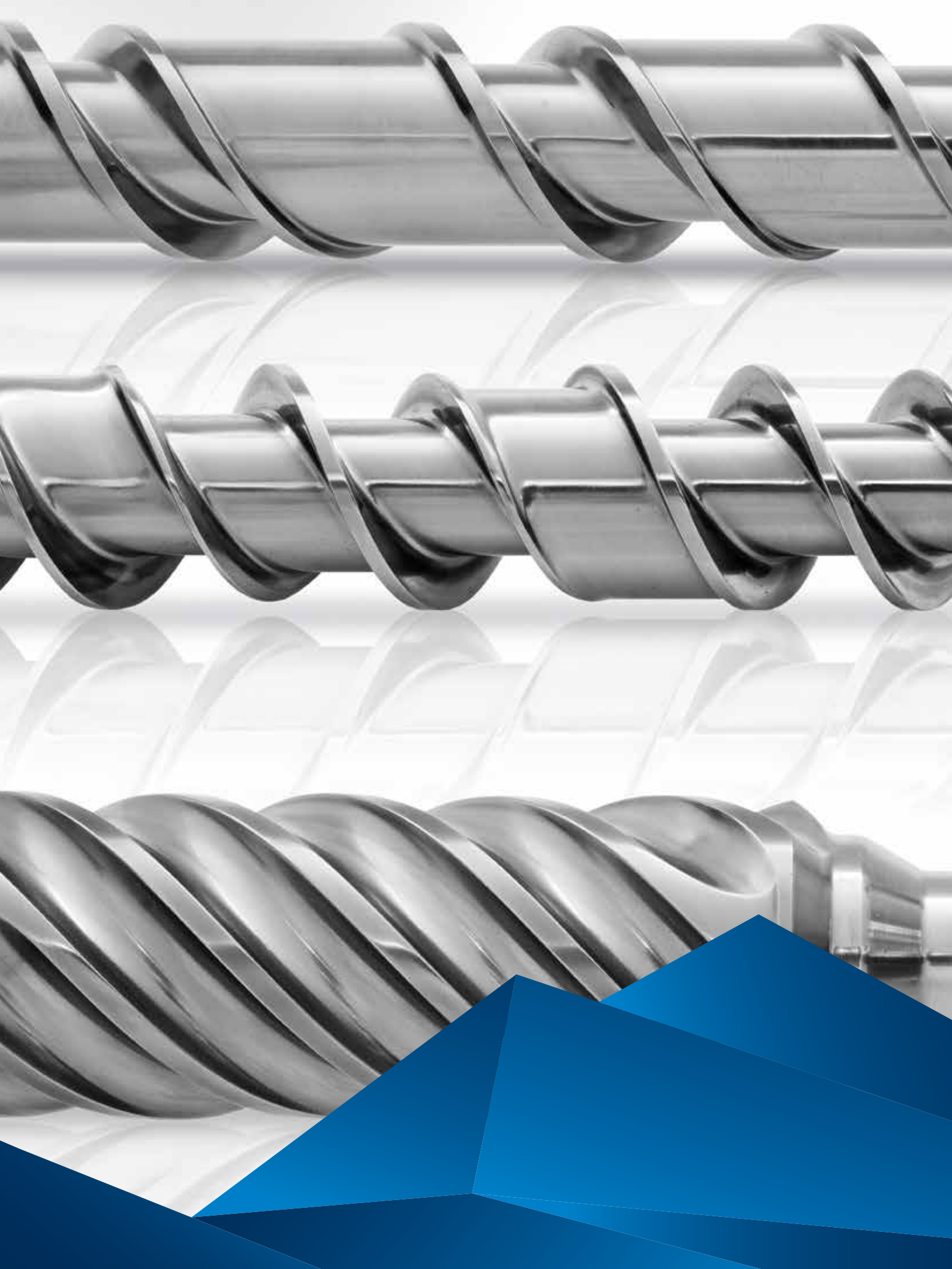


As the screw speed increases, the machine's output also increases linearly



YOUR BENEFITS:

- Conveying behavior independent of counter-pressure at all speeds
- Low melt temperature level
- Gentle melt processing
- Long service life thanks to optimized pressure profiles and low rates of wear
- Significantly reduced cooling water consumption for the grooved bush
- Low-maintenance drive concept in proven U arrangement





WHETHER EXTRUSION OR COEXTRUSION – CHOOSE THE BEST SOLUTION FOR EVERY TASK

Whatever the extrusion application, KraussMaffei has the right solution for it, including control: featuring impressive technology and excellent cost-efficiency.

Coextrusion for many tasks

The compact construction of the KraussMaffei coextruders guarantees their seamless integration into a complete production line – and the height and tilt settings integrated in the coextruders enable their simple connection to the required mold. Depending on the task, the coextruder's control system works either independently, speed-synchronized with the main extruder, or it is integrated seamlessly into the overall machine control system.

KraussMaffei coextruders are used in a wide-ranging spectrum of applications and special tasks; for example, for the extrusion of multi-layer pipes and for the coextrusion of color strips, bonding agent layers, thin inner and outer layers, oxygen barrier layers or sealing lips. Depending on the application and production requirement, the KraussMaffei extruders in the 36D series can also be used as coextruders.

Technical data and dimensions

	KME 20-25 D/C	KME 30-25 D/C	KME 30-30 B/C	KME 38-30 B/R	KME 45-30 B/C
Output rate, max. [kg/h] HDPE	4.5	16	50	120-130	200-240
Output rate, max. [kg/h] PP (PP-H; PP-B)	3.5	13	40	110	140-170
Number of heating/cooling zones	3/0	3/0	4	4/4	4/4
Screw length [L/D]	25	25	30	30	30
Grooved bush	No	No	Yes	Yes	Yes
Screw diameter [mm]	20	30	30	38	45
Extrusion height [mm]	920-1520	920-1510	1000	1000	1000

TAILOR-MADE COEXTRUSION SOLUTIONS FOR GREATER FLEXIBILITY IN YOUR PRODUCTION

**Piggyback version:
Single-screw extruder combination
of main extruder KME 75-36 B/R and
coextruder KME 45-30 B/R**

An intelligent machine configuration for manufacturing multi-layer pipes – with the same space requirement as a system that is used for manufacturing single-layer pipes. The machine is extremely user-friendly because the coextruder is fully integrated in the control system of the main extruder.

**Sheathing pipehead KM-2L-RKU 63 with two
coextruders KME 30-25 D/C for coating hot water
pipes with bonding agent and an oxygen barrier
layer in a post-coextrusion process**

A compact configuration for sheathing tasks, for example, for production of pipe made of PE-X, PE-RT and PB.



Piggyback model



Coextrusion system with sheathing pipehead



NEU WIE EINEN BLICK
FAHRT AN DER
FAKULTÄTSPATRIUM-LAGE

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)

AREAS OF APPLICATION FOR THE PO PIPEHEADS



PE pressure pipe



Two-layer PE pipe



Multi-layer PE pipe



PP pipe



PP-R pipe with glass-fiber reinforcement



Two-layer protective outer layer pipe



PE-X pipes



3- and 5-layer PE-RT pipes



PE large pipes up to 2500 mm



PIPEHEADS FOR POLYOLEFIN PROCESSING PRODUCTION OF MULTI- FUNCTIONAL SINGLE- AND MULTI-LAYER PIPES

KraussMaffei pipeheads are the optimal solution for the production of single- and multi-layer polyolefin pipes. The pipe molds rely on the throughput-optimized spiral distributors; multi-layer pipes are produced using a number of spiral distributors fitted coaxially one inside the other. As an alternative to these multi-layer molds, cost-competitive outer layer adapters are available for thin, functional layers.

The highlights at a glance:

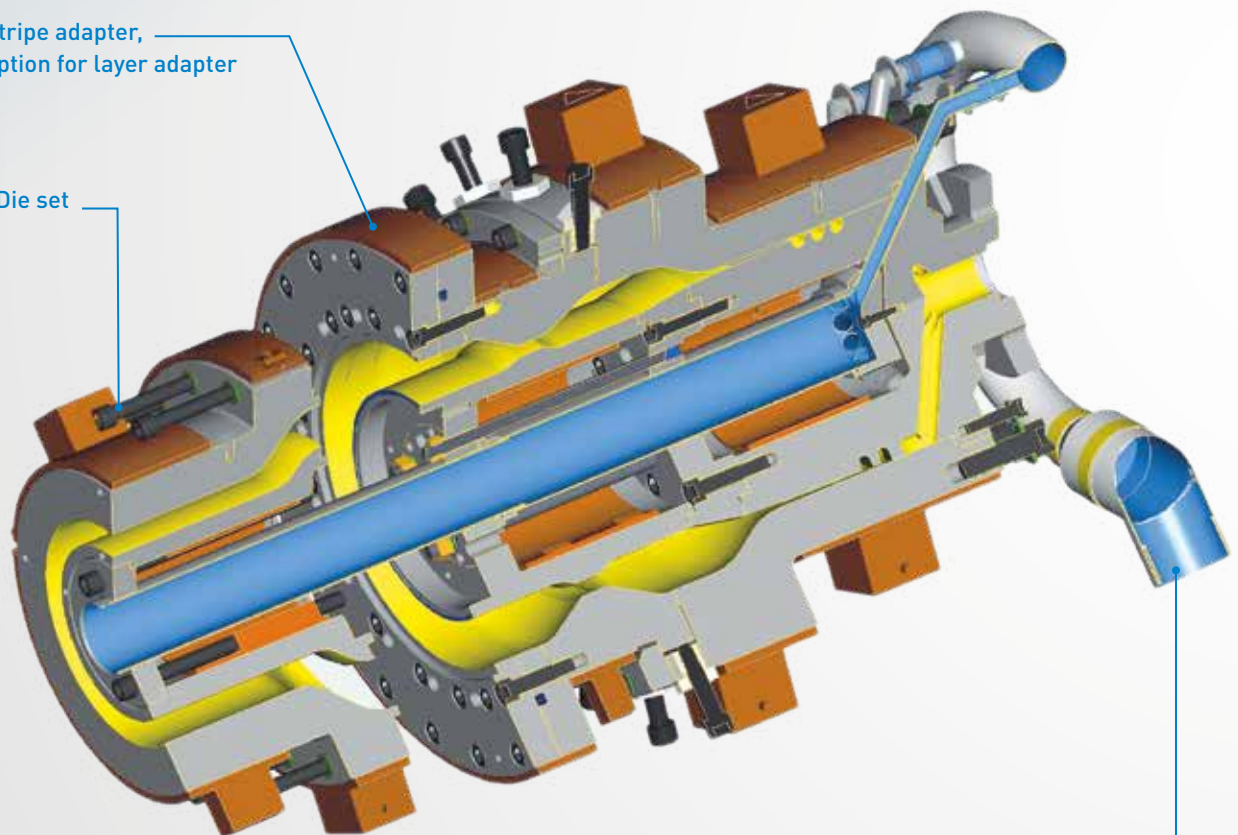
- Pipeheads for the entire dimension range, comprising diameters from 10 to 2500 mm and the standardized wall thicknesses
- Optimized melt flow thanks to the multi-dimensional, computer-assisted design of the spiral geometry and melt channels
- Short flushing and cleaning times
- High degree of flexibility in the layer thickness distribution of inner and outer layer
- Reduced cooling section and increased throughput thanks to internal pipe cooling (IPC) above diameters of 110 mm

IMPRESSIVE ENCOUNTERS

TAKE A LOOK INSIDE THE SINGLE-LAYER SPIRAL DISTRIBUTOR FOR POLYOLEFINS...

Stripe adapter,
option for layer adapter

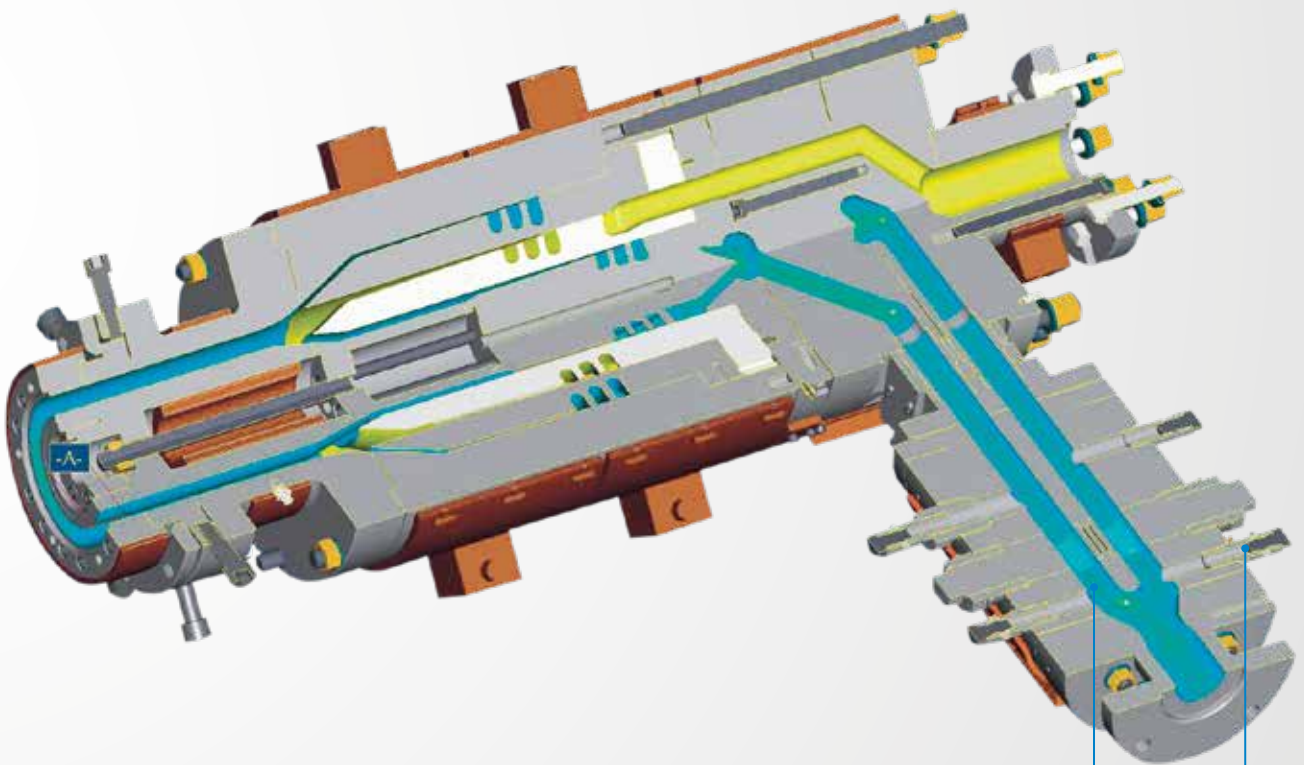
Die set



IPC air extraction system

KM-RKW 34-400 IPC

...AND INSIDE THE MULTI-LAYER SPIRAL DISTRIBUTOR FOR POLYOLEFINS



Layer volume flow _____
Can be continuously adjusted or stemmed

Coextruder feed _____
An extruder for inner and outer layer

KM-3L RKW 73-160 with
coextruder feed for inner and
outer layer

PRACTICAL INCREMENTS

12 PIPEHEAD SIZES

FOR DIAMETERS

OF 10 – 2500 MM

The dimension range of KraussMaffei spiral distributor pipeheads is optimally tailored to the requirements of the pipe manufacturer and includes all the conventional pipe dimensions covered by relevant standards and used in practical applications.

The use of reducing adapters allows all the pipe dimensions of the next pipe size down to be produced using the corresponding pipehead.

Short die extensions make setting up easier and reduce set-up times when changing from one pipe dimension to another, and pre-centered positions for the die gap can be maintained.

Diameter/wall thickness ratio (standard dimensional ratio)

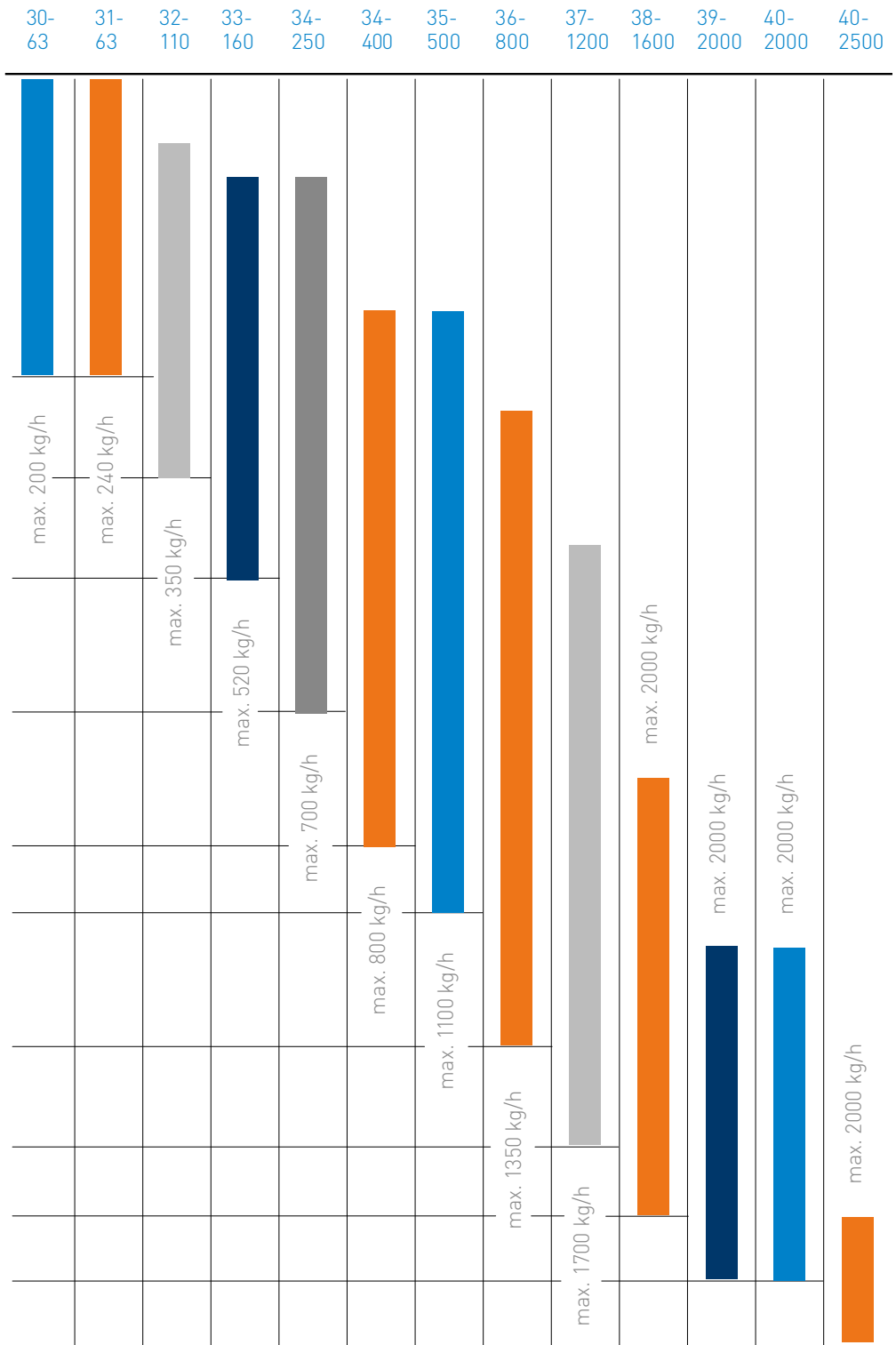
	51	41	33	26	22	21	17,6	17	13,
10									
12									
16									
20									
25									2.0
32							2.0	2.0	2.4
40				1.8	1.9	2.0	2.3	2.4	3.0
50			1.8	2.0	2.3	2.4	2.9	3.0	3.7
63		1.8	2.0	2.5	2.9	3.0	3.6	3.8	4.7
75	1.8	1.9	2.3	2.9	3.5	3.6	4.3	4.5	5.4
90	1.8	2.2	2.8	3.5	4.1	4.3	5.1	5.4	6.7
110	2.2	2.7	3.4	4.2	5.0	5.3	6.3	6.6	8.1
125	2.5	3.1	3.9	4.8	5.7	6.0	7.1	7.4	9.2
140	2.8	3.5	4.3	5.4	6.4	6.7	8.0	8.3	10.3
160	3.2	4.0	4.9	6.2	7.3	7.7	9.1	9.5	11.7
180	3.6	4.4	5.5	6.9	8.2	8.6	10.2	10.7	13.3
200	3.9	4.9	6.2	7.7	9.1	9.6	11.4	11.9	14.7
225	4.4	5.5	6.9	8.6	10.3	10.8	12.8	13.4	16.6
250	4.9	6.2	7.7	9.6	11.4	11.9	14.2	14.8	18.3
280	5.5	6.9	8.6	10.7	12.8	13.4	15.9	16.6	20.4
315	6.2	7.7	9.7	12.1	14.4	15.0	17.9	18.7	23.1
355	7.0	8.7	10.9	13.6	16.2	16.9	20.1	21.1	26.1
400	7.9	9.8	12.3	15.3	18.2	19.1	22.7	23.7	29.3
450	8.8	11.0	13.8	17.2	20.5	21.5	25.5	26.7	33.0
500	9.8	12.3	15.3	19.1	22.8	23.9	28.4	29.7	36.6
560	11.0	13.7	17.2	21.4	25.5	26.7	31.7	33.2	41.0
630	12.3	15.4	19.3	24.1	28.7	30.0	35.7	37.4	46.0
710	13.9	17.4	21.8	27.2	32.3	33.9	40.2	42.1	52.0
800	15.7	19.6	24.5	30.6	36.4	38.1	45.3	47.4	58.0
900	17.6	22.0	27.6	34.4	41.0	42.9	51.0	53.3	66.0
1000	19.6	24.5	30.6	38.2	45.5	47.7	56.7	59.3	73.0
1200	23.5	29.4	36.7	45.9	54.6	57.2	68.0	71.1	88.0
1400	27.4	34.4	42.9	53.5	63.7	66.7		83.0	102.0
1600	31.3	39.2	49.0	61.2	72.7	76.2		94.1	117.0
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			

Durchmesser und Wandstärken abweichend von den Normen auf Anfrage.

Pipehead type KM-RKW

DIN 8074 and 12201

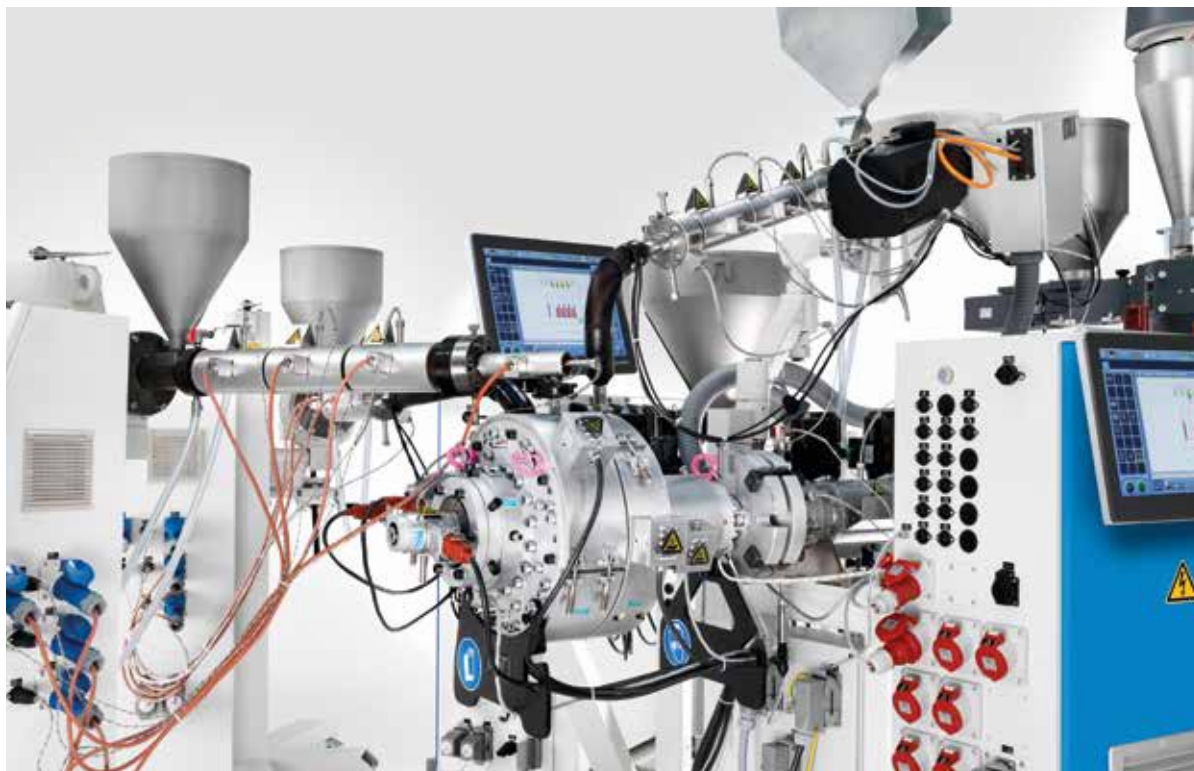
	6	11	9	7,4	6	5
					1.8	2.0
				1.8	2.0	2.4
			2.0	2.3	2.7	3.3
	2.0	2.3	3.0	3.4	4.1	
	2.3	3.0	3.5	4.2	5.1	
	3.0	3.6	4.4	5.4	6.5	
	3.7	4.5	5.5	6.7	8.1	
	4.6	5.6	6.9	8.3	10.1	
	5.8	7.1	8.6	10.5	12.7	
	6.8	8.4	10.3	12.5	15.1	
	8.2	10.1	12.3	15.0	18.1	
	10.0	12.3	15.1	18.3	22.1	
	11.4	14.0	17.1	20.8	25.1	
	12.7	15.7	19.2	23.3	28.1	
	14.6	17.9	21.9	26.6	32.1	
	16.4	20.1	24.6	29.9	36.1	
	18.2	22.4	27.4	33.2	40.1	
	20.5	25.2	30.8	37.4	45.1	
	22.7	27.9	34.2	41.6	50.1	
	25.4	31.3	38.3	46.5	56.2	
	28.6	35.2	43.1	52.3	63.2	
	32.2	39.7	48.5	59.0		
	36.3	44.7	54.7	66.5		
	40.9	50.3	61.5			
	45.4	55.8	68.3			
	50.8	62.5				
	57.2	70.3				
	64.5	79.3				
	72.6	89.3				
	81.7					
	90.8					



PIPEHEADS FOR SPECIAL AREAS OF APPLICATION MULTI-LAYER PIPES

Technical data for special pipeheads

	PEXb			ABS
	KM-RKW 31-63 PEXb	KM-3L RKW 31-63 PEXb	KM-5L RKW 31-40 PEXb/c	KM-RKW 33-160 ABS
Diameter (mm)	10 - 63	10 - 63	8 - 40	20 - 160
Wall thickness (mm)	1.8 - 5.8	1.8 - 5.8	1.8 - 3.7	1.8 - 19.2
Throughput, max. (kg/h)	300	300	300	300
Functional layers, min. (mm)	0.05	0.05	0.05	



All media connections are exactly where they are needed.

APPLICATION-SPECIFIC PRODUCTION SOLUTIONS REQUIRE MODULAR, MULTI-LAYER PIPEHEADS

The spiral distributor design offers a number of production and process advantages, which will pay dividends in many ways for your business. The right pipehead for every application – the modular design of KraussMaffei spiral distributor pipeheads opens up possibilities for many different combinations.

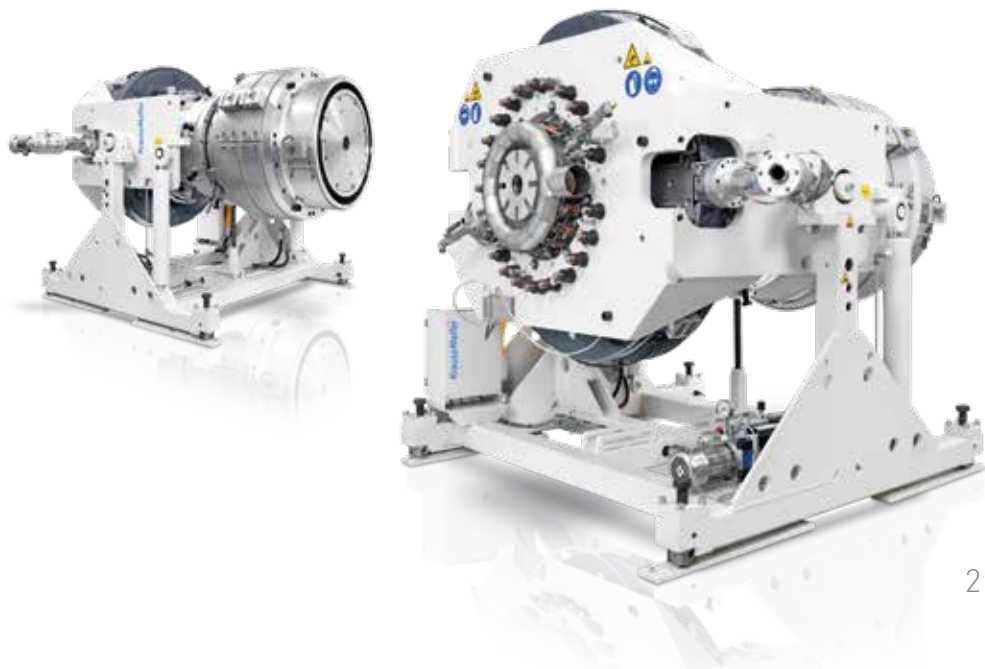
Two- and three-layer spiral distributors

Type	KM-2L ... KM-3L ...	RKW 51-63 RKW 71-63	RKW 52-110 RKW 72-110	RKW 53-160 RKW 73-160	RKW 54-250 RKW 74-250	RKW 55-500 RKW 75-500	RKW 56-630 RKW 76-630	RKW 57-1200 RKW 77-1200	RKW 58-1600 RKW 78-1600
Diameter range (mm)		10 - 63	16 - 110	20 - 160	50 - 250	90 - 500	160 - 630	355 - 1200	630 - 1600
Main layer throughput, max. (kg/h)		240	350	520	700	1050	1300	1700	1850
Main layer thickness (mm)		1.8 - 10.5	1.8 - 12.7	1.8 - 19.2	1.8 - 30.8	1.8 - 54.7	3.2 - 68.3	7.0 - 68.3	12.3 - 89.3
Thin layer throughput (kg/h)		10 - 100	10 - 100	20 - 200	25 - 250	25 - 250	35 - 350	42 - 425	50 - 500
Thin layer thickness (mm)		1 - 8	1 - 8	1 - 10	1 - 10	1 - 10	1 - 15	1 - 16.5	1 - 23

Outer layer adapter for spiral distributor pipehead

Type	RKW 31/51/71	RKW 32/52/72	RKW 33/53/73	RKW 34/54/74	RKW 35/55/75	RKW 36/56/76	RKW 37/57/77	No outer layer adapter
Diameter range (mm)	10 - 63	16 - 110	20 - 160	50 - 250	90 - 500	160 - 630	355 - 1200	
Throughput (kg/h)	50	50	50	100	100	100	100	
Layer thickness (mm)	0.5 - 2*	0.5 - 2*	0.5 - 2*	0.5 - 2*	0.5 - 2*	0.5 - 2*	0.5 - 2*	

*other wall thicknesses on request



INTERNAL PIPE COOLING FOR PO SYSTEMS SAVES ENERGY AND CUTS COSTS

The IPC system uses ambient air which is sucked through the center of the pipe against the haul-off direction with the help of a side channel compressor or a radial blower. Highly effective heat transfer is achieved by sucking the air through the pipe at high speed. This results in turbulent air flow at the inner wall of the pipe.

With the aid of IPC technology, you 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. The gains are especially striking in the production of thick-walled pipes, where standard cooling methods are remarkably inefficient at transporting heat away from the pipe.

The air is sucked centrally through the pipehead and then dissipated to the side (see diagram). This maintains the central infeed of the melt by the extruder.

The IPC technology can be used with all PO pipe extrusion lines from 110 to 2500 mm in diameter. The internal cooling system is well suited to use in SDR class 26 and below.



YOUR BENEFITS:

- Shortening the cooling section by up to 40% saves investment costs and space requirements or increased productivity through output increase up to 60%
- 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
- Continuously active IPC control maintains adequate air suction volume despite changing basic conditions to ensure consistently high product quality

MODULAR BUILD-UP FOR FLEXIBLE MANUFACTURING EFFICIENT MANUFACTURING OF MULTI-LAYER PIPES

Multi-layer adapters for thin outer layers

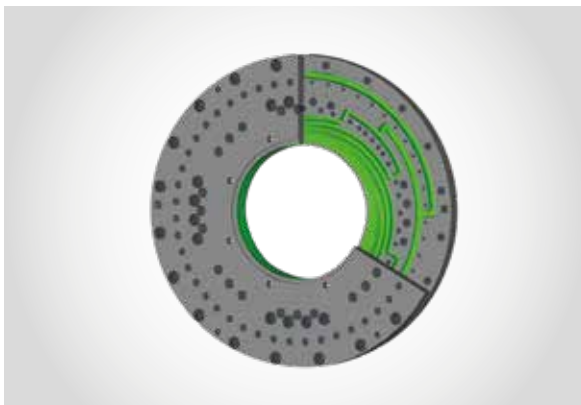
KraussMaffei has two different versions to offer for the manufacture of multi-layer pipes. If thicker inner and/or outer layers are required, two or three spiral distributors are fitted coaxially one inside the other, which is both compact and saves space. These spiral distributors are also designed for optimum flow and minimum pressure loss. The inner and outer layer can be fed with one or 2 extruders. When using an extruder, the special co-extruder feed enables the layer thicknesses to be varied quickly and easily. These multiple spiral distributor pipe-heads cover a diameter range from 10 to 1600 mm with the conventional SDR classes/wall thicknesses.

If thin, functional outer layers are required on a core pipe, special radial spiral distributors can be used as outer layer adapters. Depending on the material, these enable layer thicknesses of up to 2 mm. Two of the layer adapters can be installed, one right after the other, directly on the nozzle connection. Instead of the layer adapters or combined with these, color strip adapters

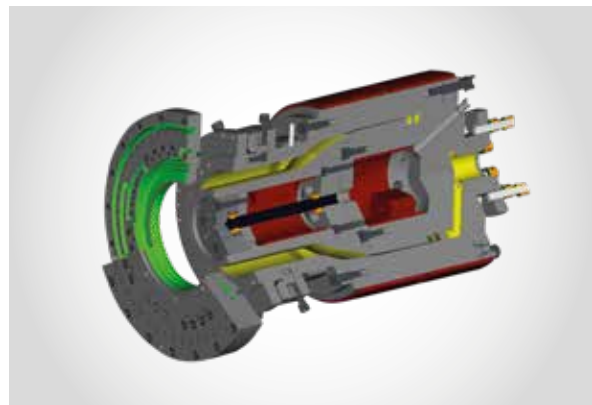
for pipe marking can be installed at the same location. Also available are double stripe adapters, which either produce different color stripes on the pipe or enable a very rapid color change from one pipe type to the next.

YOUR BENEFITS:

- Optimal pipe quality with high production reliability
- Produces pipes with minimal internal stress and low melt temperature
- No weld lines, smooth pipe inner surfaces
- Optimal melt flow through the spiral distributor
- Low pressure losses and low melt temperature
- Ideal melt distribution
- Prevents local stagnation zones
- Wide processing window
- Modular, compact design
- High level of production flexibility
- Easy to install and dismantle



Radial spiral distributor

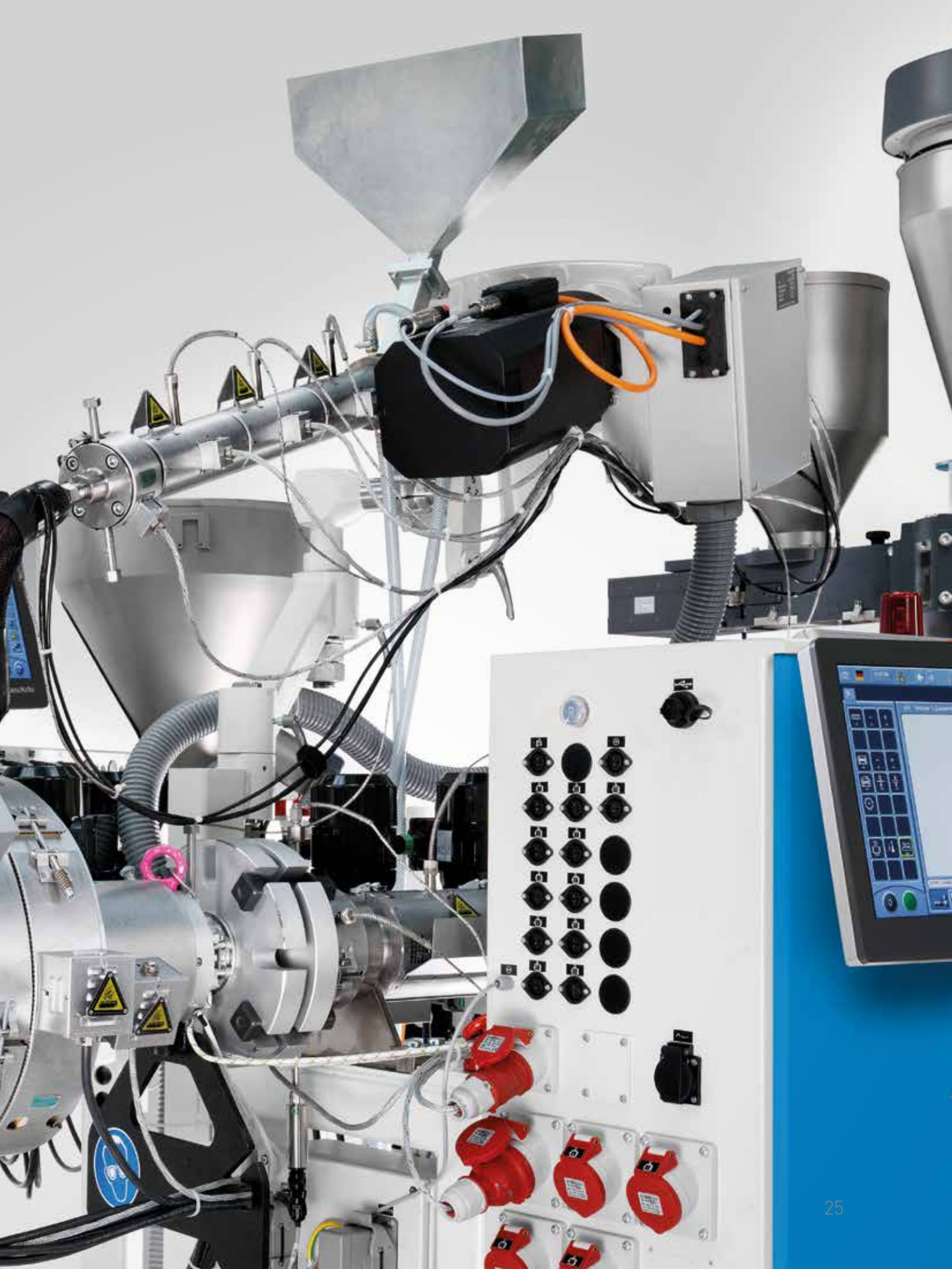


Combination radial and axial spiral distributor

IMPRESSIVE MACHINE COMBINATION

SINGLE-SCREW EXTRUDERS FOR MANUFACTURING MULTI-LAYERED PIPES





SOLUTIONS FOR COST-EFFECTIVE EXTRUSION OF TEMPERATURE-RESISTANT PIPES

The outstanding product properties of pipes made from modified polyolefins or cured polyethylene make them genuine all-rounders in heating applications in floors, walls, ceilings and other surfaces.

But they are also increasingly used as drinking and hot water supply pipes. Other areas of application include radiator heating, sanitary installations, climate-controlled floors, cooling systems, gas pipes, district heating systems, geothermic systems, biogas systems and swimming baths.

Whatever the application you decide on, KraussMaffei offers the right solution, specially tailored to your needs. All KraussMaffei extruders guarantee the highest outputs with optimum melt quality in conjunction with the highest production reliability and constant product quality.

All components are perfectly matched to one another in a cohesive overall system concept. Thanks to the flexible micro-processor control system, the entire system can be monitored and easily operated from the extruder.

The process unit of the extruders, the pipehead concept, and the cooling and calibration technology are optimally designed for the special production requirements of the respective pipe type.

A sophisticated design with spiral distributors ensures minimum tolerances for wall thickness and diameter, as well as precise layer and thickness distribution.

Outputs for the various extruder types

Single-screw extruder max., in kg/h for selected reference materials				
	KME 45-36 B/R	KME 60-36 B/R	KME 75-36 B/R	KME 90-36 B/R
PE-Xb single-stage process	100	150	210	280
PE-Xb dual-stage process	150	240	325	435
PE-Xc	200	295	400	510
PB/PB-R	135	200	270	345
PE-RT	225	330	450	575
PP-R	180	290	410	565



Single-screw extruder KME 60-36 B/R



KM 2L-RKW sheathing pipehead with coextruders for post-coextrusion of hot-water pipes with bonding agent and oxygen barrier layer

SANITARY PIPE AND HEATING PIPE TYPES PERFECTLY EXTRUDED ON KRAUSSMAFFEI SYSTEMS

Thanks to our many years of experience and continual technical optimization and further development, we guarantee production reliability irrespective of the materials used.

PB-H / PB-R pipes

- Specially matched process unit for 36D single-screw extruder
- Spiral-distributor-type pipehead with design-specific die
- Alternative design as a 3/5-layer pipe
- Entire production process adapted to the special requirements of the material polybutene

PP-R pipes

- 36D single-screw extruder with barrier screw
- Spiral-distributor-type pipehead
- Single-layer/3-layer pipe with fiberglass-filled middle layer to reduce linear expansion and increase pipe stiffness

Multi-layer composite pipes

Inner pipe layer made of PP-R

7-layer composite pipe:

- Inner pipe layer made of PP-R
- Glass fiber
- PP-R
- Bonding agent
- EVOH oxygen barrier
- Bonding agent
- Outer pipe layer made of PP-R

PE-RT pipes

- 36D single-screw extruder with barrier screw
- Pipehead concept based on the spiral distributor principle guarantees perfect layer thickness distribution at high linear speeds
- Die designed in accordance with the special requirements of PE-RT material

Multi-layer composite pipes

Inner pipe layer made of PE-X or PE-RT

3- or 5-layer composite pipe:

- Inner pipe layer made of PE-X or PE-RT
- Bonding agent
- EVOH oxygen barrier
- Bonding agent
- Outer layer made of PE, PE-X or PE-RT

PUR-insulated pipes

Overall concept for continuous production of insulated pipes consisting of 2 partial systems:

- Production of the inner pipe (of PE, PE-X or PE-RT)
- Encapsulation of inner pipe (in-line process) with polyurethane and polyethylene sleeve

YOUR BENEFITS:

- Minimum overweight thanks to low tolerances for wall thickness and diameter
- Significant material cost reduction thanks to exact layer and thickness distribution
- Intelligent complete solutions from a single source (pipes and fittings)
- Competitive advantages thanks to high production speeds paired with high product quality

EXAMPLES OF REAL-LIFE APPLICATIONS

SURFACE REGULATION

Surface regulation systems can be used in different installation systems: From exclusive residential buildings or commercial offices to highly frequented industrial buildings.

Thanks to the ongoing further development of materials and systems, energy-saving and efficient surface regulation systems are available today. Thanks to low supply temperatures, these systems can be optimally used with environment-friendly energy sources, thus contributing to reduced energy costs.

Great design flexibility and even heat distribution provide a pleasant, healthy room atmosphere. The most important component of all systems is the water-carrying pipe. The stringent requirements, for example a minimum service life of 50 years or the oxygen-tightness and corrosion-resistance coupled with high

stress fracture resistance, make the heating pipe a complex multi-layer pipe.

Systems designed for refurbishing with, for example, low installation heights or special solutions are available on the market.

The Bundesverband Flächenheizung und Flächenkühlung e.V. (Federal Association of Surface Heating and Surface Cooling) has compiled requirements and information for modernization in its Guideline Number 10. You will find all the information on installation here.

Technical data

	PE-RT	PE-Xb	PB
Density g/cm ³	0.94	0.938 - 0.945	0.914 - 0.92
Thermal conductivity W/(mK) at 60°C	0.38	0.36 - 0.45	0.22
Temperature, max. °C	90	95	95
Operating temperature, max. °C	70	70	70
Bending radius	5 x D	5 x D	5 x D



Underfloor heating with nubs



Wall or ceiling installation

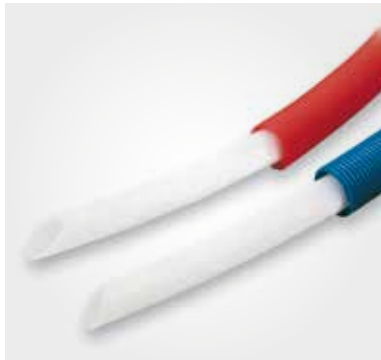


Refurbishing systems

EXAMPLES OF REAL-LIFE APPLICATIONS

WIDE VARIETY OF PIPE TYPES

The exceptional properties of pipes made of cross-linked PE or materials such as PE-RT, PP-R or PB-R make them impressive. They are more resistant to mechanical stressors, thermal influences and chemicals.



PE-Xc pipe with corrugated pipe jacket



PE-RT pipe



Glass fiber-filled 3-layer PP-R pipe



3- and 5-layer PE-RT pipes



PE-Xb pipes

Further practical examples

- Underfloor, wall, ceiling and space heating systems
- Drinking water and hot water supply pipes
- Radiator heating
- Sanitary installations, supply lines for heating and sanitary applications
- Air conditioning
- Cooling systems
- Gas supply lines
- Local and district heating systems
- Geothermal systems
- Biogas systems
- Swimming baths



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.

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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.

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