



**Pipeheads for polyolefin processing**  
**Production of multi-functional**  
**single- and multi-layer pipes**

*Engineering Value*

***Krauss Maffei***  
***Berstorff***

# Facts and figures regarding PO pipeheads

## Application examples



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



Extra-large PE pipe up to 2500 mm  
diameter

## Pipeheads for polyolefin processing Production of multi-functional single- and multi-layer pipes

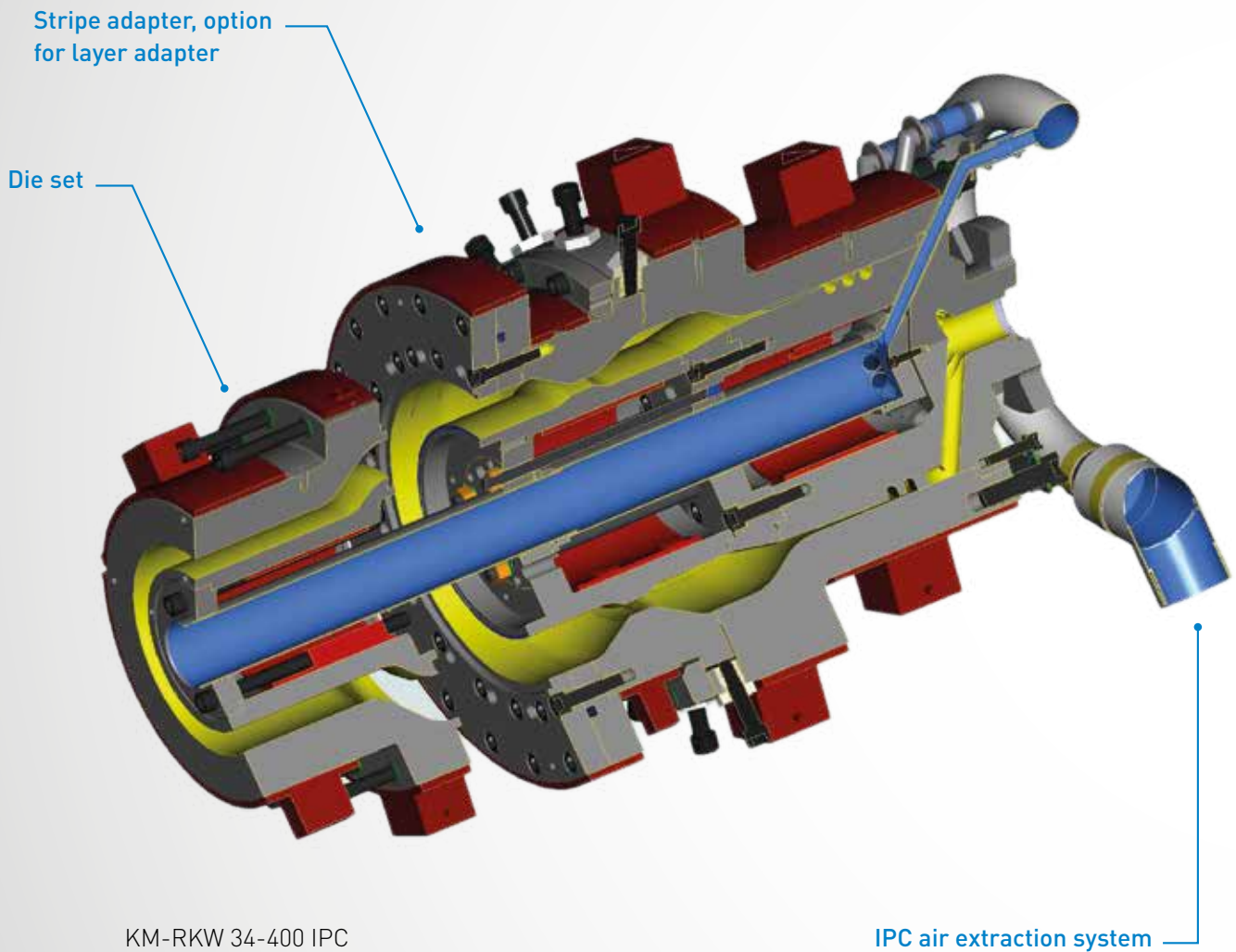
KraussMaffei Berstorff pipeheads are the optimal solution for the production of single- and multi-layer polyolefin pipes. The pipe molds rely on the throughput-optimized spiral distributors; multi-layer pipes are produced using a number of spiral distributors fitted coaxially one inside the other. As 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 5 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

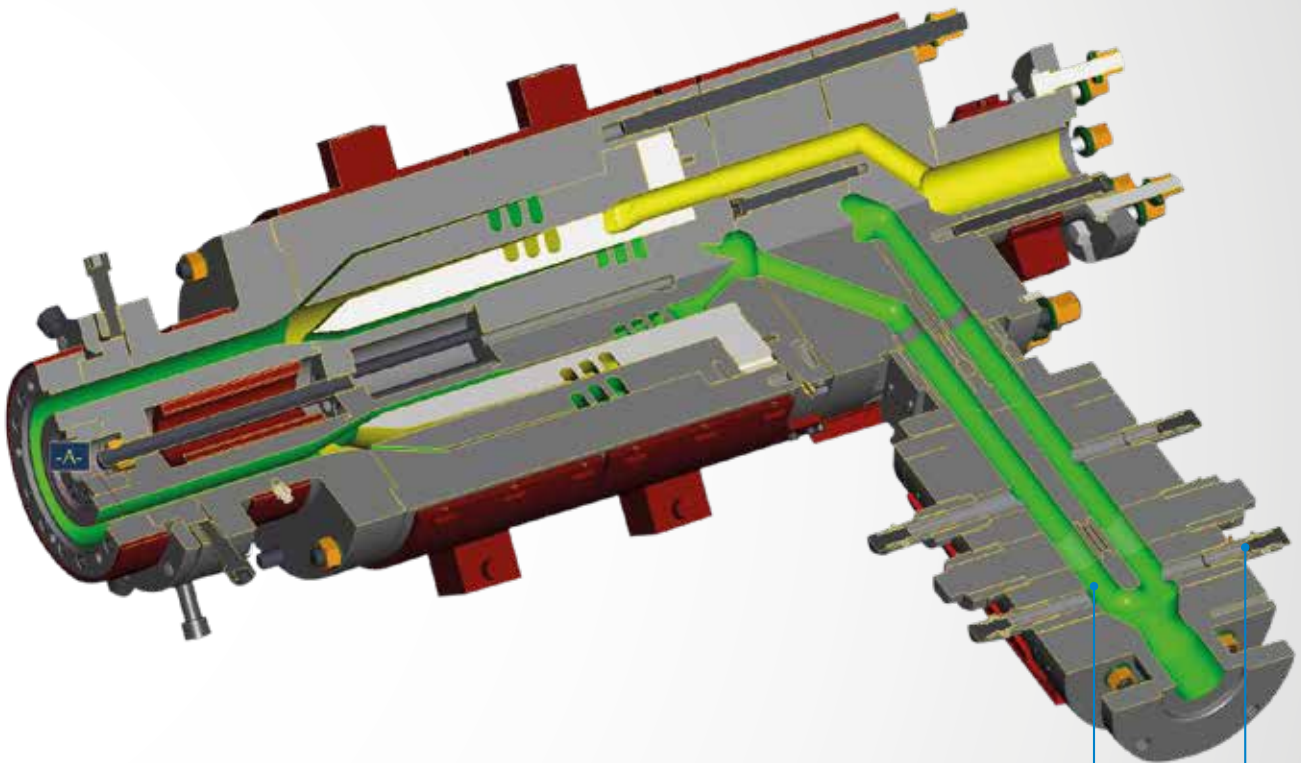
# Impressive encounters

## Take a look inside the single-layer spiral distributor for polyolefins...





## ...and inside the multi-layer spiral distributor for polyolefins



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

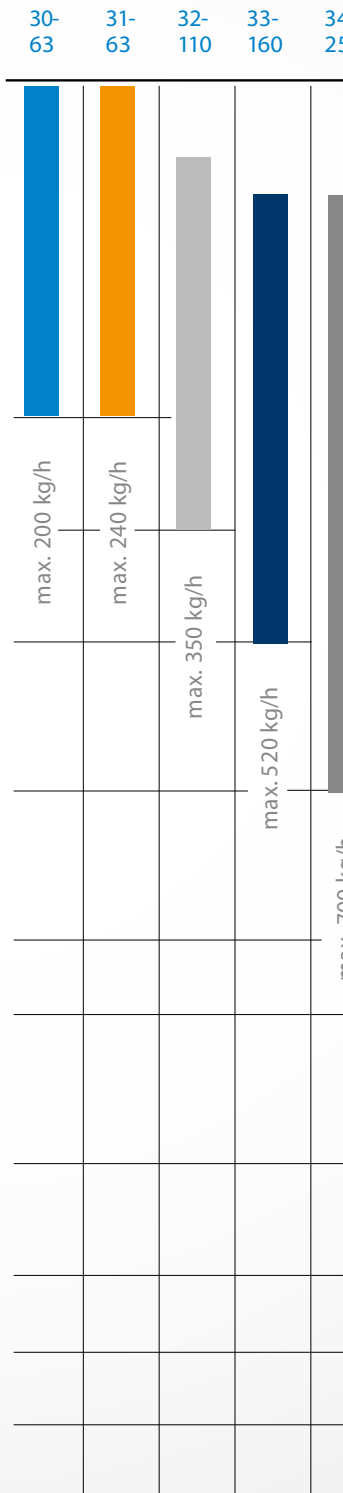
**Layer volume flow**  
Can be continuously  
adjusted or stemmed

**Coextruder feed**  
An extruder for inner and  
outer layer

Diameter/wall thickness ratio (standard dimensional ratio)

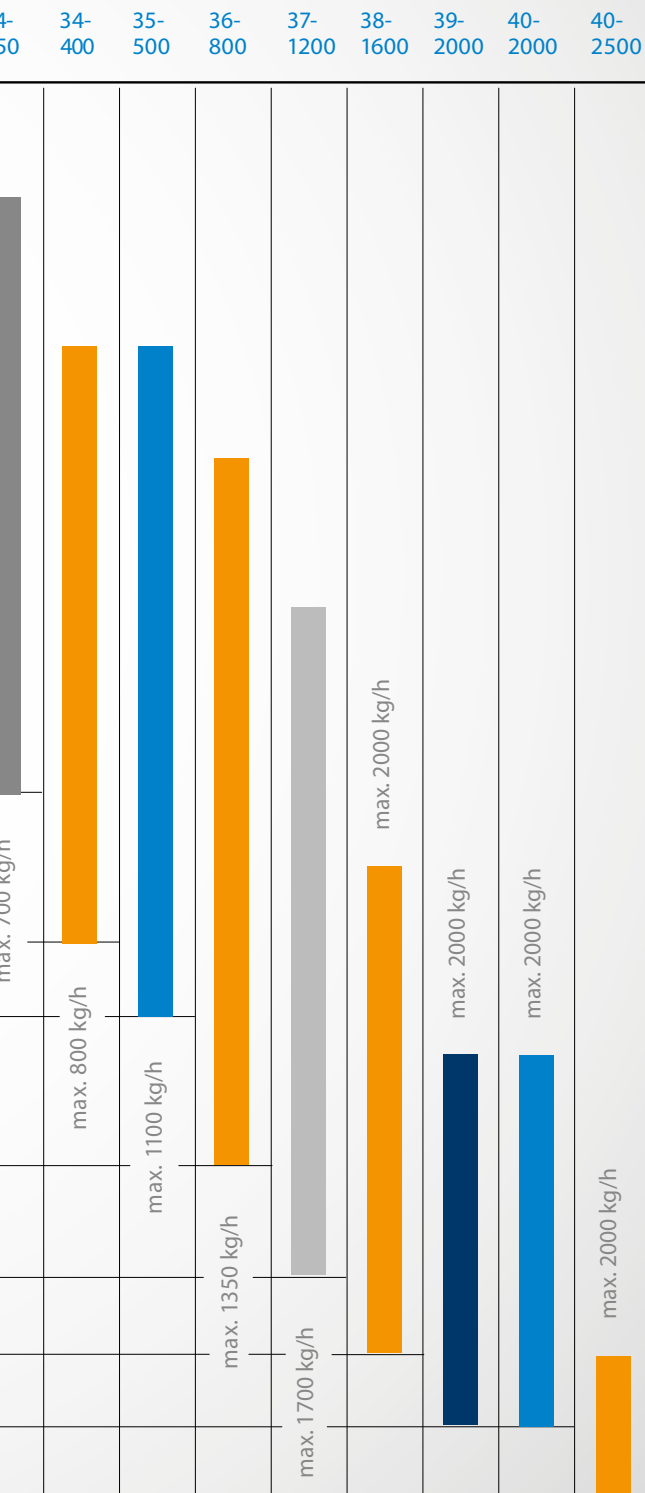
Pipehead type  
KM-RKW

	51	41	33	26	22	21	17.6	17	13.6	11	9	7.4	6	5	
10													1.8	2.0	
12													1.8	2.0	2.4
16												2.0	2.3	2.7	3.3
20										2.0	2.3	3.0	3.4	4.1	
25								2.0	2.0	2.4	3.0	3.6	4.4	5.4	6.5
32				1.8	1.9	2.0	2.3	2.4	3.0	3.7	4.5	5.5	6.7	8.1	
40			1.8	2.0	2.3	2.4	2.9	3.0	3.7	4.6	5.6	6.9	8.3	10.1	
50		1.8	2.0	2.5	2.9	3.0	3.6	3.8	4.7	5.8	7.1	8.6	10.5	12.7	
63	1.8	1.9	2.3	2.9	3.5	3.6	4.3	4.5	5.6	6.8	8.4	10.3	12.5	15.1	
75	1.8	2.2	2.8	3.5	4.1	4.3	5.1	5.4	6.7	8.2	10.1	12.3	15.0	18.1	
90	2.2	2.7	3.4	4.2	5.0	5.3	6.3	6.6	8.1	10.0	12.3	15.1	18.3	22.1	
110	2.5	3.1	3.9	4.8	5.7	6.0	7.1	7.4	9.2	11.4	14.0	17.1	20.8	25.1	
125	2.8	3.5	4.3	5.4	6.4	6.7	8.0	8.3	10.3	12.7	15.7	19.2	23.3	28.1	
140	3.2	4.0	4.9	6.2	7.3	7.7	9.1	9.5	11.8	14.6	17.9	21.9	26.6	32.1	
160	3.6	4.4	5.5	6.9	8.2	8.6	10.2	10.7	13.3	16.4	20.1	24.6	29.9	36.1	
180	3.9	4.9	6.2	7.7	9.1	9.6	11.4	11.9	14.7	18.2	22.4	27.4	33.2	40.1	
200	4.4	5.5	6.9	8.6	10.3	10.8	12.8	13.4	16.6	20.5	25.2	30.8	37.4	45.1	
225	4.9	6.2	7.7	9.6	11.4	11.9	14.2	14.8	18.4	22.7	27.9	34.2	41.6	50.1	
250	5.5	6.9	8.6	10.7	12.8	13.4	15.9	16.6	20.6	25.4	31.3	38.3	46.5	56.2	
280	6.2	7.7	9.7	12.1	14.4	15.0	17.9	18.7	23.2	28.6	35.2	43.1	52.3	63.2	
315	7.0	8.7	10.9	13.6	16.2	16.9	20.1	21.1	26.1	32.2	39.7	48.5	59.0		
355	7.9	9.8	12.3	15.3	18.2	19.1	22.7	23.7	29.4	36.3	44.7	54.7	66.5		
400	8.8	11.0	13.8	17.2	20.5	21.5	25.5	26.7	33.1	40.9	50.3	61.5			
450	9.8	12.3	15.3	19.1	22.8	23.9	28.4	29.7	36.8	45.4	55.8	68.3			
500	11.0	13.7	17.2	21.4	25.5	26.7	31.7	33.2	41.2	50.8	62.5				
560	12.3	15.4	19.3	24.1	28.7	30.0	35.7	37.4	46.3	57.2	70.3				
630	13.9	17.4	21.8	27.2	32.3	33.9	40.2	42.1	52.2	64.5	79.3				
710	15.7	19.6	24.5	30.6	36.4	38.1	45.3	47.4	58.8	72.6	89.3				
800	17.6	22.0	27.6	34.4	41.0	42.9	51.0	53.3	66.1	81.7					
900	19.6	24.5	30.6	38.2	45.5	47.7	56.7	59.3	73.5	90.8					
1000	23.5	29.4	36.7	45.9	54.6	57.2	68.0	71.1	88.2						
1200	27.4	34.4	42.9	53.5	63.7	66.7	83.0	102.8							
1400	31.3	39.2	49.0	61.2	72.7	76.2	94.1	117.6							
1600	35.3	44.0	55.1	68.8	81.8	85.8	106.6								
1800	39.2	48.9	61.2	76.4	90.9	95.3	118.5								
2000	44.1	55.0	68.9	86.0	102.3	107.2									
2250	49.1	61.2	76.5	95.5	113.0	119.1									



Non-standard diameters and wall thicknesses on request.

DIN 8074 and 12201

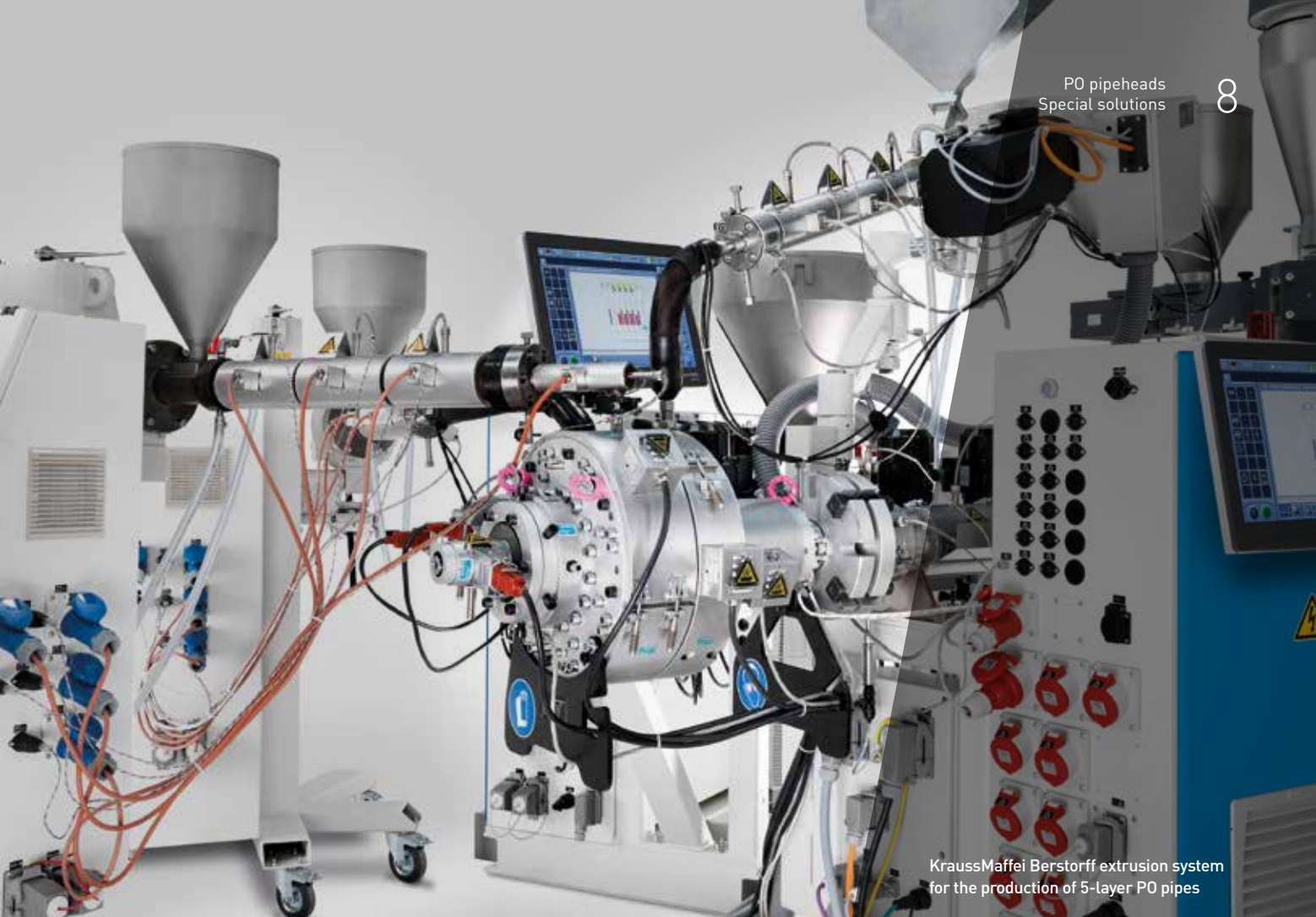


## Practical increments: 12 pipehead sizes for diameters from 10 mm to 2500 mm

The dimension range of KraussMaffei Berstorff 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 sets 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.



KraussMaffei Berstorff extrusion system  
for the production of 5-layer PO pipes

## Special pipeheads for sheathing applications and for pipes made of PE-Xa, PE-Xb and ABS

### 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-RWK 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	



## Application-specific production solutions call for 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 Berstorff's 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
<b>Diameter range (mm)</b>		10 - 63	16 - 110	20 - 160	50 - 250	90 - 500	160 - 630	355 - 1200	630 - 1600
<b>Main layer throughput, max. (kg/h)</b>		240	350	520	700	1050	1300	1700	1850
<b>Main layer thickness (mm)</b>		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
<b>Thin layer throughput (kg/h)</b>		10 - 100	10 - 100	20 - 200	25 - 250	25 - 250	35 - 350	42 - 425	50 - 500
<b>Thin layer thickness (mm)</b>		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
<b>Diameter range (mm)</b>	10 - 63	16 - 110	20 - 160	50 - 250	90 - 500	160 - 630	355 - 1200	
<b>Throughput (kg/h)</b>	50	50	50	100	100	100	100	
<b>Layer thickness (mm)</b>	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

### This innovative concept saves energy and lowers 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 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. The gains are especially striking in the production of thick-walled pipes, where standard cooling methods do a remarkably inefficient job of transporting heat away from the pipe.

The air is sucked centrally through the pipehead and then dissipated to the side (see diagram). This engineering concept means that the melt is fed centrally to the extruder, avoiding all the drawbacks of melt feed from the side. For the production process, this means that a pipe extrusion line fitted with IPC technology is therefore indistinguishable from a standard line when it comes to melt pressure build-up and space requirements.

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.




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#### Your advantages:

- Shortening the cooling section by up to 40% reduces investment costs and saves space
  - Productivity gains thanks to output increases of up to 60%
  - 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
  - Continuously active IPC control maintains adequate air suction volume despite changing basic conditions to ensure consistently high product quality
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# Modular design for flexible production

## Efficient manufacture of multi-layer pipes using the KraussMaffei Berstorff multi-layer pipeheads

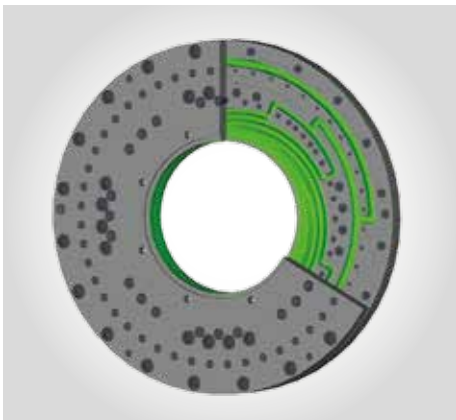
### Multi-layer adapters for thin outer layers

KraussMaffei Berstorff 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. Both inner and outer layers can be fed with either one (see page 5) or two extruders if these layers are to be produced from different materials or colors. When using an extruder, the special coextruder feed enables the layer thicknesses to be varied quickly and easily. These multiple spiral distributors produce pipes over a diameter range of from 10 to 1600 mm with the conventional SDR classes/wall thicknesses.

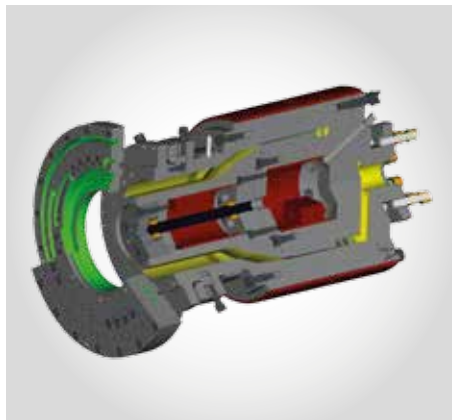
If thin, functional outer layers are required on a thick-walled core pipe, special radial spiral distributors can be used as outer layer adapters. Depending on the material used, these enable layers up to 2 mm thick to be produced. It is also possible to fit two of these layer adapters one behind the other, directly on the die connector, enabling the application of two thin layers to the base pipe. The outer layer adapters are available up to pipe diameters of 1200 mm. Instead of the layer adapter, or in combination with it, color stripe adapters can be fitted at the same place to mark the pipes with the required number of stripes and the necessary width. 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.

### Process engineering benefits

The many process-engineering benefits combine optimally with production benefits to make KraussMaffei Berstorff polyolefin pipeheads extremely cost-effective. The spiral distributor thus boasts a host of important features that are crucial to making your production highly efficient: optimum discharge coupled with low pressure loss and low melt temperature.



Radial spiral distributor



Combination radial and axial spiral distributor

### Your production advantages:

- Optimum pipe quality coupled 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
- Perfect melt distribution
- Prevents local stagnation zones
- Wide processing window
- Modular, compact design
- High production flexibility
- Easy to install and dismantle

## 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.



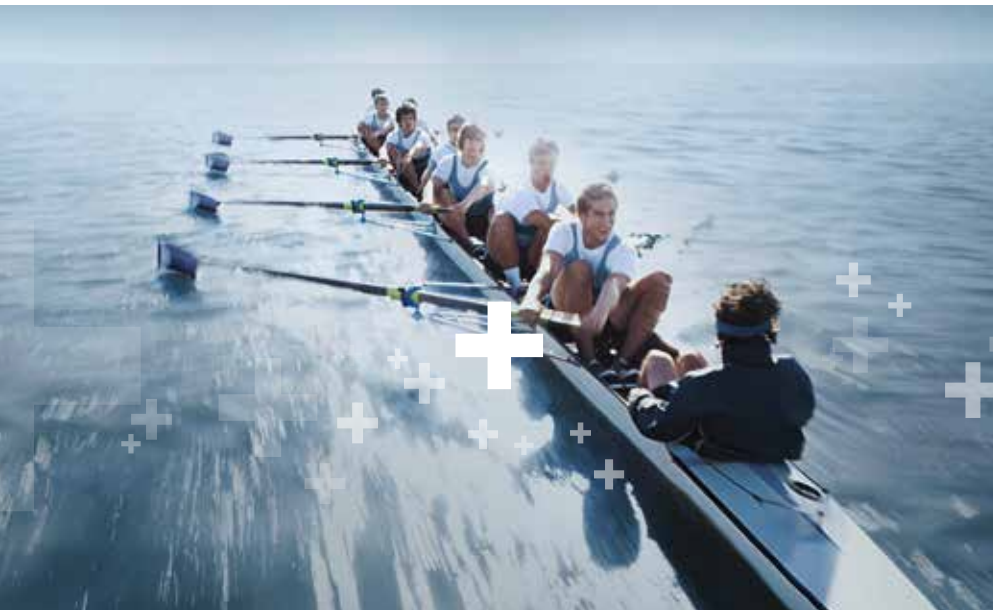
Availability



Performance



Quality



For more information about OEE Plus, visit:  
[www.kraussmaffeiberstorff.com/oeplus](http://www.kraussmaffeiberstorff.com/oeplus)



## KraussMaffei Berstorff

### A strong brand in a unique global group

#### Value-proven Extrusion Technology solutions

Around the world, KraussMaffei Berstorff stands for reliable and value-proven solutions in Extrusion Technology. These range from using individual extruders for degassing in polymerization, compounding, pipe, profile, film and sheet extrusion, physical foaming and the manufacture of technical rubber articles and intermediates for tire production up to complete extrusion lines. All machines and systems from KraussMaffei Berstorff are custom-configured, for example for the chemical, automotive, construction, packaging or pharmaceutical industry.

#### There for you around the world

KraussMaffei Berstorff is your partner – from the first planning meeting through development of the best possible technical and business solution up through commissioning, servicing and production of your system. We guarantee high-quality advice, solution expertise, reliable spare parts logistics and fast-reacting service during each phase. Our goal is increasing your success.

#### Individualized service

Benefit from KraussMaffei Berstorff's reliable service. Our customer service team and experienced fitters, technicians and engineers are there for you as quickly as possible and even help on location to optimize your systems and processes and to minimize downtime as much as possible. Rely on our highly skilled repair and spare parts service.

You can find additional information about KraussMaffei Berstorff at:  
[www.kraussmaffeiberstorff.com](http://www.kraussmaffeiberstorff.com)

## KraussMaffei Group

### Comprehensive expertise

#### Unique selling proposition Technology<sup>3</sup>

The KraussMaffei Group is the only provider in the world to possess the essential machine technologies for plastics and rubber processing with its KraussMaffei, KraussMaffei Berstorff and Netstal brands: Injection Molding Machinery, Automation, Reaction Process Machinery and Extrusion Technology.

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:  
[www.kraussmaffeigroup.com](http://www.kraussmaffeigroup.com)



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.

## Pipeheads for polyolefin processing

### Flexible single- and multi-layer pipe production

KraussMaffei Berstorff pipeheads for polyolefins are the optimal solution for the flexible production of single- and multi-layer pipes. With their output adapted to meet the high output of the KraussMaffei Berstorff single-screw extruder, and a design which incorporates the spiral distributor concept, they cover a broad range of wall thicknesses and diameters: The 12 pipehead sizes enable pipes to be produced with diameters between 5 mm and 2500 mm.

KraussMaffei Berstorff also offers the complete system concept and the corresponding multi-layer pipeheads for the manufacture of multi-layer pipes.

