



A WHOLE NEW DIMENSION IN QUALITY AND OUTPUT

Extrusion lines for extra-large PO pipe

IN PARTNERSHIP WITH INDUSTRY

KraussMaffei is a premium partner for the plastics and rubber processing industries worldwide



Automotive



White Goods



Construction



Life Sciences



Electrical/Electronics

Whatever you aim to achieve in plastics or rubber processing, KraussMaffei is your partner. We are the only company with intensive expertise across the three main engineering fields. And we have a strong track record in integrating this expertise to develop new processes and systems.

Ready for any challenge

Our **Injection Molding Machinery Division** supplies machinery and systems from 35 to 4,000 tonnes for standard applications and for all processing variants, together with fully automated solutions. We have a strong customer base in all the relevant industries worldwide.

Our **Reaction Process Machinery Division** supplies machines and complete systems for processing polyurethanes and other reactive materials.

Completing our product portfolio, **Automotive Component Systems** supplies foam molds, cutters and routers. Our customer base is wide, with a focus on the automotive, construction and white appliances industries.

Our **Extrusion Technology Division** supplies machinery and systems for compounding, for pipe, profile and sheet extrusion, physical foaming, and the production of technical rubbers and intermediates for tire production. Machinery from the company's range – from single extruders to

complete extrusion lines – is used in many industries, including chemicals, pharmaceuticals, automotive, construction, furniture and packaging.

People for Plastics

We are the “people for plastics”. We are your partners from the first exploratory discussion, through development to commissioning, servicing and operating your system, and final disposal. At all times, you are assured of outstanding competence in planning and engineering, as well as reliable and fast spare parts, service and support.

Adding value for customers

We put our expertise to work for your success. With machine ranges engineered for modularity, we can deliver application-specific solutions based on our wide range of standard modules and specially engineered solutions. This strategy offers customers technical and cost advantages.

Close to customers around the world

As an international company, KraussMaffei has a presence in all the major markets for the plastics and rubber processing industries and employs around 3,000 people worldwide. Our sales and service network keeps us close to all our customers around the world.

Integrated extrusion line concepts from a world market leader for cost-effective production of large-diameter pipe



Packaging

KraussMaffei Berstorff's intensive engineering and market know-how is making a big difference, especially in pipe extrusion. We are your system partner for complete, integrated extrusion lines. By driving innovation in this field, we have become world market leaders.

Especially in developing economies, demand for very large plastic pipe is growing rapidly. Lines and components for the production of very large pipe are our top-of-the-range systems. They are engineered to produce PO pipe up to 2500 mm diameter, with wall thicknesses up to 100 mm in a reliable and cost-effective process.

TRANSPARENT TECHNOLOGY

Meet the machine: take a tour of the main components of an extrusion line for large-diameter pipe



**Start-up winch
KM-AFH 150/100**

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



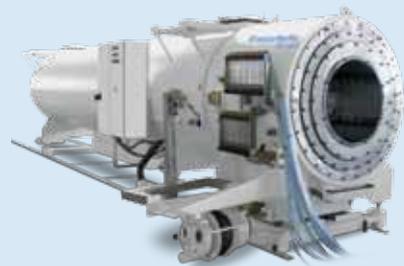
**Cutter
KM-TRK/C/E 1600**
Automatic planetary cutter capable of cutting very thick pipe walls, with electric carriage and universal clamping system



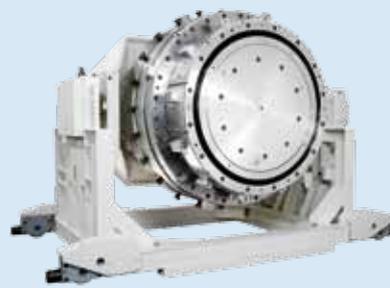
Haul-off KM-RR-12-1600
12-track caterpillar haul-off, 6 tracks float-mounted for optimal contact with the pipe, servo motor drives



Spray bath KM-SB 1600/9
With sliding side panels for easier access, adjustable spray pipe for easier downsizing to smaller diameters



Vacuum tank KM-VT 1600/2/13
2-chamber vacuum tank with cable-driven feed for easier line start-up, axial position change (electro-hydraulic) and adjustable spray pipe



Pipehead KM-RKW 38-1600
Large pipehead for production of PO pipe up to 1600 mm diameter, mounting carriage with electro-motor tilt function for easy die-set change



Single-screw extruder KME 150-36 B/R
Single-screw extruder for PO pipe, output rate 1500 – 1850 kg/h

DESIGN BASICS

Spiral distributor system – proven, successful and continuously optimized

Pipeheads for large pipe are engineered to a tried-and-tested spiral distributor design.

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. Hole cross-sections without edges, corners or dead spots ensure that absolutely no material accumulates here. This pipehead design completely eliminates the risk of thermal degradation due to material being trapped in dead spots. So that there is no risk of

damage to the extruded pipe due to thermally degraded material peeling off. Fast purging is another advantage. Changeover to a different material or color is fast and easy. The spiral distributor channels are designed for minimal pressure loss, so that there's no risk of leakages.

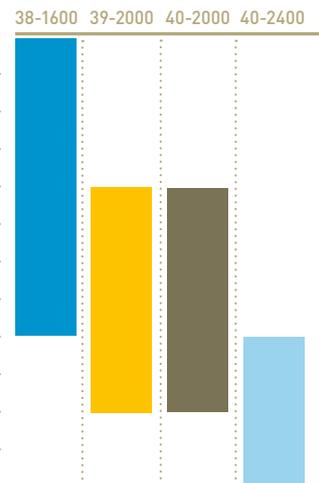
Technical data

Diameter/wall thickness ratio (standard dimension ratio)

	51	41	33	26	22	21	17,6	17	13,6	11	9	7,4	6	5
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	72.5	90.2	-	-	-	-
1200	23.5	29.4	36.7	45.9	54.6	57.2	68.0	67.9	88.2	-	-	-	-	-
1400	27.4	34.4	42.9	53.5	63.7	66.7	-	82.4	102.9	-	-	-	-	-
1600	31.3	39.2	49.0	61.2	-	76.2	-	94.1	117.6	-	-	-	-	-
1800	-	43.8	54.5	69.1	-	85.7	-	105.9	-	-	-	-	-	-
2000	-	48.8	60.6	76.9	-	95.2	-	117.6	-	-	-	-	-	-
2200*	43.1	53.7	66.7	84.6	-	-	-	-	-	-	-	-	-	-
2400*	47.1	58.5	72.7	92.3	-	-	-	-	-	-	-	-	-	-

PE-HD DIN 8074 and ISO4427

Pipehead type KM-RKW



2500 mm on request

Non-standard diameters and wall thicknesses on request

* Calculated wall thicknesses





Calibrating sleeve with water connections for PO pipe
with 1600 mm outer diameter



DETAILED PRODUCT INFORMATION

Boost output and cut material costs with KraussMaffei Berstorff extrusion lines for large-diameter pipe

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

Cost-competitive and reliable

With our extensive process engineering expertise, KraussMaffei Berstorff supplies production solutions for high output and low manufacturing costs. Our range of 36D single-screw extruders, with their very high output rates, is the ideal match for our large pipeheads. They produce an outstandingly homogenous melt at very low melt temperatures. The KM-RKW 40-2500 extra-large pipehead is the top-of-the-range model in our range of spiral distributor pipeheads for PO extrusion. It is capable of producing diameters up to 2500 mm and wall thicknesses up to 100 mm.

Thermal centering for the spiral distributor, the mandrel and the die connecting piece ensure that wall thicknesses tolerances are kept within tight limits for lowest material consumption. Each thermal centering system has four circuits that can be separately regulated. A reducing adapter makes it possible to produce pipe down to 1000 mm diameter.

Large-diameter pipe is used mainly in networks carrying drinking water, waste water or sewage over long distances or to supply large consumers, where using smaller pipes would result in unacceptably high pressure losses. Extra-large pipes are also used in desalination plants and to transport cooling water for power stations.



KM-RKW 39-1600 extra-large pipehead on a mounting carriage (moved aside hydraulically)

- Pipe diameter range: 1000 - 1600 mm
- Extrusion height: 1650 - 1750 mm
- Dimensions (LxBxH): 2.5 m x 5.3 m x 2.9 m
- Weight: 39 tonnes

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 Berstorff 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. In this way, they are engineered to allow processors to work as closely as possible to the minimum dimensions specified in the relevant standards so as to keep weight per meter to

a minimum. Considering that, for some types of pipe, material accounts for up to 90% of total manufacturing cost, keeping weight per meter to a minimum can deliver huge material savings. Depending on system output, the type of material and the relevant standard, the savings potential between the minimum and maximum pipe dimensions can be around a million euros a year.

An extra benefit of producing pipe with precision dimensions and minimal ovality on KraussMaffei Berstorff lines is that the resulting pipe is easier to lay on site, because the perfect fit makes for easier welding.

CUSTOMER BENEFITS

Economic and process advantages are built in – it's over to you to exploit them

The combination of a 36D single-screw extruder and a spiral distributor pipehead is the ideal solution for extrusion of extra-large pipe. KraussMaffei Berstorff engineering and process know-how, embodied in these two innovative systems, deliver big customer benefits.

Your benefits at a glance:

- High output and very homogenous melt with 36D process technology
- A more stable and reliable process and lower wear on screws and barrels
- Excellent pipe quality, minimal stoppages, high productivity
- Optimal melt flow through the spiral distributor
- Low pressure losses
- Fast and easy die-set changes, with the pipehead suspended in the mounting carriage, tiltable for easier access
- Significantly reduced material waste during dimension and color changes
- Produces pipe with minimal wall thickness variation
- Wide processing window
- Increases your ability to respond flexibly to market demands
- Easy to install and dismantle
- Outstanding price/performance ratio

Spiral distributor for a KM-RKW 40-2500 pipehead
manufactured at KraussMaffei Berstorff Munich







DETAILED PRODUCT INFORMATION

The C5 control – one of the most advanced control and monitoring systems in the industry

Centralized control of the extrusion line

Meeting tough specifications for product quality and output demands a stable, reliable production process. This is where the C5 control system scores. As one of the most advanced systems in the industry, it offers dependable technology and intelligent functions for centralized control and monitoring of extrusion lines. For the operator, the C5 ensures optimal set-up and start-up, and a clear, consistent overview of the production process. Monitoring and control is facilitated by efficient visualization of the status of different extrusion line components on a series of screen pages. Central synchronization of the whole line, including

multiple extruders, is fast and simple. The operator panel allows direct intervention in the operation of all key elements in the extrusion line. The current operating status of the whole line is always displayed, together with a customizable selection of seven actual parameters. Prompts and alarm messages flash up in your chosen language. The C5 offers extensive documentation options and easy connection to a host computer. The standard design features an integrated operator panel; swivel-mounted or mobile panels are offered as options. The swivel-mounted panel, for example, enables the operator to run the whole line from a position near the die.



KraussMaffei Berstorff standard operator panel: integrated in the control cabinet



Swivel-mounted operator panel (option)



Mobile operator panel (option)

PRODUCTS AND APPLICATIONS

Many types of extra-large pipe for a growing range of applications: smooth, corrugated, wound and steel-reinforced

Large diameter pipe is used mainly in networks carrying large volumes of drinking water, waste water or sewage over long distances or to supply large consumers. Other uses include stormwater drainage, land drainage, natural gas transport and district heating systems (insulated pipe). KraussMaffei Berstorff's extra-large pipeheads are designed to process different polyolefins at throughput rates of 1850 kg/h. As a rule, low sagging POs are used; by countering the tendency of the melt to sag under its own weight, they result in a constant wall thickness around the whole pipe diameter.

1 Smooth pipe

PE or PP smooth pipe. Melt distribution via the spiral distributor.

2 Corrugated pipe

The extruded tube of melt is shaped as it is drawn continuously through a corrugator. Even large-diameter corrugated pipe is relatively light and easy to handle. This makes it extremely cost competitive for applications where it is suitable. The system supplied by KraussMaffei Berstorff can produce corrugated pipe up to 2500 mm diameter.

3 Spirally wound pipe

The first stage in manufacturing spirally wound pipe is to produce a plastic profile, for example, with an omega cross-section. The plastic profile strip is stabilized with a support tube and wound inside a steel drum to form the pipe. Once the melt has hardened, the steel support is removed. Diameters can be up to 4000 mm.

4 Steel reinforced pipe

Steel reinforced pipe (SRP) is produced in a two-stage process. An endless profile is first extruded and reinforced with steel strips, then wound to a pipe on a special winding cage. Features of SRP pipe are high stiffness and low weight. The production system can be reset quickly and simply to produce a different pipe diameter.



1



2



3



4



SERVICE WORLDWIDE

Service, support and spare parts – when you need them, where you need them

Rely on us for a fast and competent response to all your service needs anywhere in the world. Whatever you need – from troubleshooting and training to spares or repairs – we're on the job.

We're dedicated to supplying service quality on a par with the outstanding quality of our machines and systems. We offer far more than spare parts and hotlines. We'll work with you to choose the best and most cost-effective solution for your operation. We'll help you test new applications and we'll plan customized service packages.

All-round service

Our service offering is broad. We'll configure your system, install and commission it, train your staff, plan measures to minimize your downtime risk and maximize productivity, and carry out maintenance, repairs and upgrades. You'll find us fast, reliable and competent. Our hotline is manned by highly-trained and experienced service technicians. If necessary, we'll get a technician to you quickly. Remote diagnosis, interfacing directly with your machine's control system, can be a practical alternative. Spares for all important wear parts are available at short notice. We're continuously expanding our service network to speed up spare parts shipment. Talk to us about the right service solution for your business.

Customer trials and prototyping in our test lab

The Extrusion Division operates a test lab fitted with the latest machinery and equipment. We can run trials, produce prototype parts and fine-tune processes on your behalf. We can work with you to test and evaluate processes, machines and equipment in order to identify the best approach for a particular project. Our highly-qualified application engineers are there to help you.

Training with high hands-on content

Courses are held in our lab and training centre, or, optionally, on your premises. We offer clearly-structured basic and advanced training in operation, process control and maintenance for KraussMaffei extrusion systems. On request, we'll plan and hold special courses on topics of your choice. All participants spend a high proportion of their training working hands-on with original KraussMaffei machines. A well-structured training program produces skilled operators and technicians, which will positively impact your up-time and productivity.



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KraussMaffei is a premium partner for the plastics and rubber processing industries worldwide. KraussMaffei machines and systems are used wherever plastics and rubber are converted into products. As a knowledge-driven technology company, we build on many decades of experience and a strong commitment to research and development.

Extrusion lines for extra-large pipe are an area of expertise for KraussMaffei Berstorff. Our systems deliver highest output and help you to cut material costs. Top-of-the-range systems are engineered to produce PO pipe up to 2500 mm diameter, with wall thicknesses up to 100 mm in a reliable and cost-effective process. KraussMaffei Berstorff is your system partner, supplying complete, integrated extrusion lines. By driving innovation in this field, we have become world market leaders.

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