



CREATING  
VALUES







(Picture; from left to right:)

Hubert Armbruster (Managing Director, KUHNE Maschinenbau GmbH)

Peter Kuhne (Proprietor and Managing Director, KUHNE Group)

Jürgen Schiffmann (Managing Director, KUHNE Anlagenbau GmbH)

Axel Werner (Managing Director, K-tool GmbH)

**Dear present and future customers,**

As the executive manager of the KUHNE Group, I welcome your interest in our new corporate brochure.

The roots of the KUHNE Group date back to the middle of the last century. Even though our world has been accelerating on its path towards globalization, some important factors have remained unchanged: our continuous search for solutions to your challenges, the constant improvement of our machines and systems, a wide and incessantly evolving product range, and an innovative, service-oriented KUHNE team both in Sankt Augustin and at your machines throughout the world. All of this is set against the backdrop of a plastic market that is steadily expanding and reinventing itself.

The KUHNE Group will continue to stand for just the right blend of tradition, innovation, service, and flexibility.

Give us a try!

Yours, Peter Kuhne

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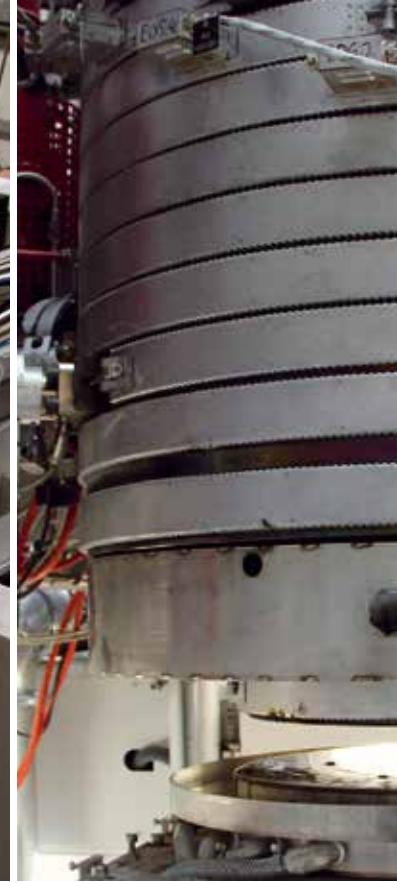






**KUHNE Group:  
High-quality machine technology.  
Sophisticated products.  
Optimized processes.**

First established in 1949, the KUHNE Group has become one of the foremost European engineering companies in the field of film and sheet extrusion. Three autonomous companies – KUHNE Maschinenbau GmbH, KUHNE Anlagenbau GmbH, and K-tool GmbH – are united under the roof of the KUHNE Group to meet all the criteria required for a modern manufacturer of extrusion systems. We provide tailor-made machine solutions in accordance with customer specifications and take full advantage of our extensive expertise in raw materials and their processing. Many decades of experience in the design, engineering, and manufacturing of our special machine technology have allowed us to optimize the final product to meet specific requirements, ranging from processing new and improved raw materials to meeting customer-specific products and processes. We develop these in collaboration with our customers and research institutes and protect their uniqueness by means of patents and registered designs.



## Innovative engineering under one roof: Made in Germany.

Our greatest advantage is our ability to consistently fulfill: all orders under one roof. From planning to design, from manufacturing to on-site installation. Worldwide. Made in Germany. This is more than just talk, we make it happen. What sets us apart from our competitors is that even tasks that are easy to outsource are kept in-house, such as electrical cabinet assembly or surface finishing. From subcomponents to complete systems – we do it all ourselves.

This guarantees the consistently high quality our customers have come to expect, for high volumes as well as for client-specific, special-purpose machines alike.

What makes this possible is the smooth interplay between our three autonomous divisions: KUHNE Maschinenbau GmbH, responsible for the development and production of extruders and flat film and sheet lines, KUHNE Anlagenbau GmbH for the development of special blown film technologies, and K-tool GmbH as a manufacturer of key components required in the plastics machinery industry.

Around 230 highly qualified, specialized, and experienced employees take care of our customers' needs across all three divisions. Some of our staff have been working for our company for decades. They are supported by approximately 20 highly motivated trainees in the following training professions:

- Industrial clerk
- Industrial mechanic
- Line electrician
- Metal cutting mechanic
- Technical product designer
- Mechatronics engineer

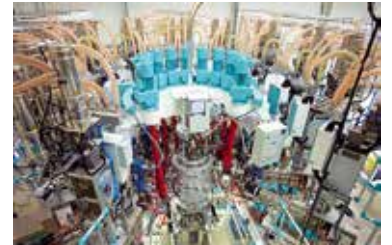
Our young colleagues are an asset to our company. They possess the latest professional knowledge and contribute to secure the high quality of our machines and systems in the future.



We focus as much on innovation, new developments, and tailor-made, customized solutions as we do on solid, reliable, and outstanding service standards. Our offering has long since expanded beyond pure engineering. We also provide turnkey plant solutions ranging from the structural calculation, planning, construction, and clarification of on-site conditions to the construction of production halls, laboratories, and warehouses. We organize energy sources and suppliers, manage logistics, carry out test runs, and develop our own formulations. And we always remain in close collaboration with our customers and the responsible local authorities. Our long-standing, reliable systems suppliers support us in our work. Worldwide.

**Made in Germany. Made by KUHNE.**

- Close collaboration with local suppliers
- Strict, internal controls prior to shipment
- Optional preliminary acceptance at the factory
- In-house production of key components by K-tool









## Our benchmarks: Quality. Safety. Sustainability. Service.

All of our extrusion systems comply with international CE or national standards, which we develop in cooperation with the responsible safety authorities. This includes detailed documentation and user manuals composed in the local language or preliminary acceptance at our factory. This is particularly significant for industries with high safety standards and regulations, such as the food, medical, or pharmaceutical industries. The same applies to “clean-room lines” with their particular hygiene, environmental, and security aspects and standards, which we also fulfill as part of our range of services.

The quality of our lines and machines affects more than just economic factors. In international competition, factors such as energy efficiency, occupational safety, operability, and emission and noise protection set KUHNE machines apart from merely good machines.

Fig. left:  
Executive Management of the  
KUHNE Group



## We know your machine: Tools service. Repairs service. Spare parts service.

We may not know all the screws in our machines like the backs of our hands; but almost all of them. For all inquiries, our customers have access to competent, multilingual consultants and service technicians who are experienced with our machines. They provide assistance with commissioning and training, modifications and maintenance, troubleshooting and spare parts. Personally. Worldwide.

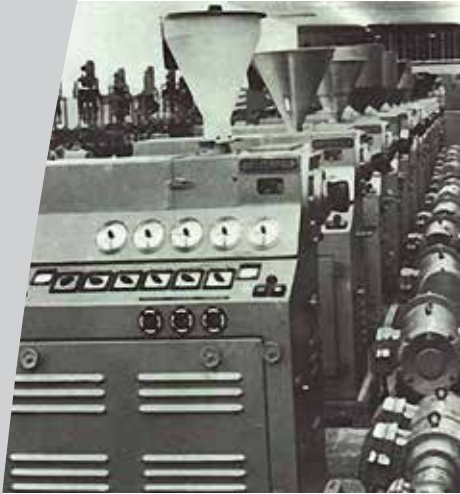
- |                                     |   |
|-------------------------------------|---|
| <b>Our assembly service:</b>        | Development of detailed flow charts, commissioning, and test runs   |
| <b>Our tools service:</b>           | <ul style="list-style-type: none"><li>– Replacement and cleaning machine parts directly on site</li><li>– On-site inspection and evaluation of machines and their components</li><li>– Complete cleaning and refurbishment of flat dies and blown film dies</li></ul> |
| <b>Our maintenance service:</b>     | Tailor-made maintenance concepts and contracts for complete lines and components  |
| <b>Our repairs service:</b>         | Repair of all installed components, including externally manufactured parts   |
| <b>Our spare parts service:</b>     | Shipment of original spare parts (on the same day if ordered by 1 PM)   |
| <b>Our troubleshooting service:</b> | 24-hour support hotline, remote diagnostics via teleservice, deployment of technicians within 24 hours  |
| <b>Our refurbishment service:</b>   | Modernization of lines to optimize performance and quality  |



## Our products: Experience, competence, quality, and service.

Be it biaxially oriented high-barrier film for fresh meat or extremely thin HD-PE masking film, EVA film for medical applications or bubble wrap, PET sheet or a Styrofoam board for the construction industry: the development of complex technologies for sophisticated film and sheet requirements has always been the specialty of our company. But our range of products and services extends far beyond the design, manufacture, installation, repair, and maintenance of state-of-the-art extrusion lines for the production of sheets, flat film, and blown film. Our experience and technical and professional competence in the field of extrusion machinery, raw materials, finished products, and production processes allows us to plan and build complete production facilities in close collaboration with our customers. And our machines are at the heart of their facilities.





First extruder HKS 60



First patented flat sheet die



KUHNE site 1970

## Our history: Competence in engineering. Since 1934.

- 1934: Establishment of the Heinrich Koch machine factory
- 1949: Development of the first HKS 80/60 extruder
- 1957: Acquisition of the Heinrich Koch machine factory by Werner Battenfeld
- 1959: Walter Kuhne takes over the management of the Battenfeld extruder factory in Siegburg
- 1970: Walter Kuhne acquires the Battenfeld extruder factory in Siegburg
- 1975: Relocation of the company from Siegburg to Sankt Augustin; completion of the extruder program with lengths of 24, 30, and 33 D
- 1979: Establishment of KUHNE Anlagenbau GmbH
- 2011: Establishment of K-tool GmbH
- Today: Turnover: EUR 70 million per annum; target markets: Europe, North and Central America, North Africa, Turkey, Russia, Saudi-Arabia, Oman, Qatar, UAE; KUHNE Group staff numbers: 242 (KUHNE Maschinenbau GmbH: 116; KUHNE Anlagenbau GmbH: 96; K-tool GmbH: 30)



# Throughout time: sophisticated technology for challenging film requirements.

- 1962: Supply of an industrial film line with a working width of 2,000 mm to a German customer
- 1965: Presentation of the first sheet line for the production of PS drinking cups
- 1966: Presentation of the first sheet line for ABS suitcases
- 1970: First line for the production of Lucobit (bitumen) for roof sheeting
- 1972: First line for the production of HMW-HD-PE and PP sheets
- 1980: Installation of turnkey factories with extrusion systems;  
first IBC blown film line with spiral mandrel distributors
- 1982: First pure HD-PE blown film line for 6- $\mu$ m film
- 1983: First sheet line for in-line thermoforming
- 1987: First flat film line for landfills with a width of 3,600 mm
- 1994: First 5-layer blown film line for barrier film
- 1995: First bubble wrap line with a width of 3,300 mm
- 1996: First Triple Bubble<sup>®</sup> blown film line
- 1997: First 5-layer Triple Bubble<sup>®</sup> blown film line;  
first aluminium composite sheet line
- 2000: First "high-speed" Triple Bubble<sup>®</sup> blown film line (production speed: > 200 m/min)
- 2002: KHS 60 and 70 high-speed extruders
- 2003: First 7-layer Triple Bubble<sup>®</sup> line (700 mm double layflat);  
first in-line extrusion/laminating line for PET/PE composite sheets;  
first 5-layer PMMA/PC sheet line with a width of 2,200 mm;  
first 7-layer Triple Bubble<sup>®</sup> blown film line;  
first Triple Bubble<sup>®</sup> blown film line for the production of shrink bags  
(700 mm double layflat)
- 2004: First PMMA sheet line for the production of displays
- 2005: First Cool Bubble<sup>®</sup> blown film line;  
first gasoline tank sheet line
- 2006: New generation of "high-speed" Triple Bubble<sup>®</sup> blown film technology  
(production speed: > 300 m/min)
- 2007: 50<sup>th</sup> Triple Bubble<sup>®</sup> blown film line
- 2008: First 9-layer Triple Bubble<sup>®</sup> blown film line
- 2009: First large Triple Bubble<sup>®</sup> blown film line, up to 1,500 mm double layflat;  
development of a protective surface film concept in cooperation with Lanxess
- 2010: First large Cool Bubble<sup>®</sup> blown film line, up to 1,500 mm double layflat and an  
output capacity of up to 1,100 kg/h
- 2012: Delivery of another 9-layer Smart Bubble<sup>®</sup> blown film line for the production of  
barrier film
- 2013: First 11-layer Smart Bubble<sup>®</sup> blown film line, equipped with melt pumps;  
delivery of the 7<sup>th</sup> twin-screw turnkey line for the production of A-PET sheet
- 2014: First large 9-layer Cool Bubble<sup>®</sup> blown film line;  
delivery of a 2.2 ton/h flat film coextrusion line for the production of PE geomem-  
branes to Saudi-Arabia, net width: 8,000 mm, with automatic thickness control
- 2015: 100<sup>th</sup> Triple Bubble<sup>®</sup> blown film line
- 2016: First 13-layer Triple Bubble<sup>®</sup> blown film line



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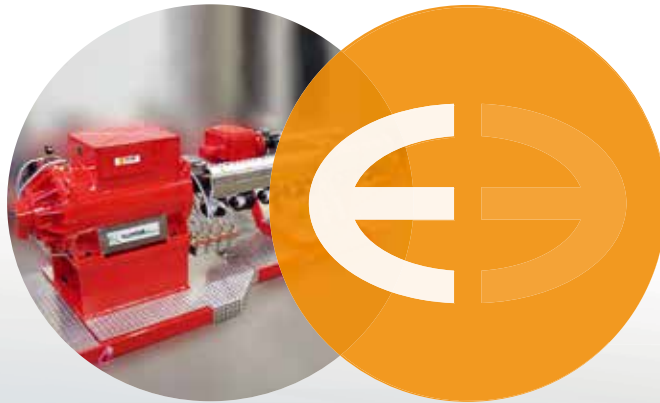
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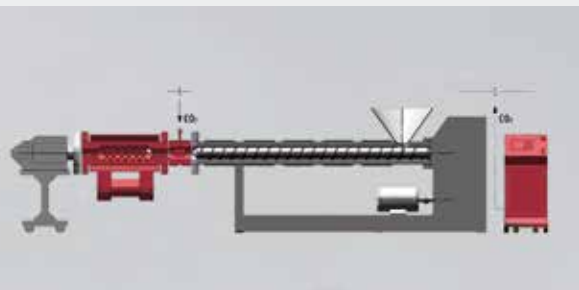


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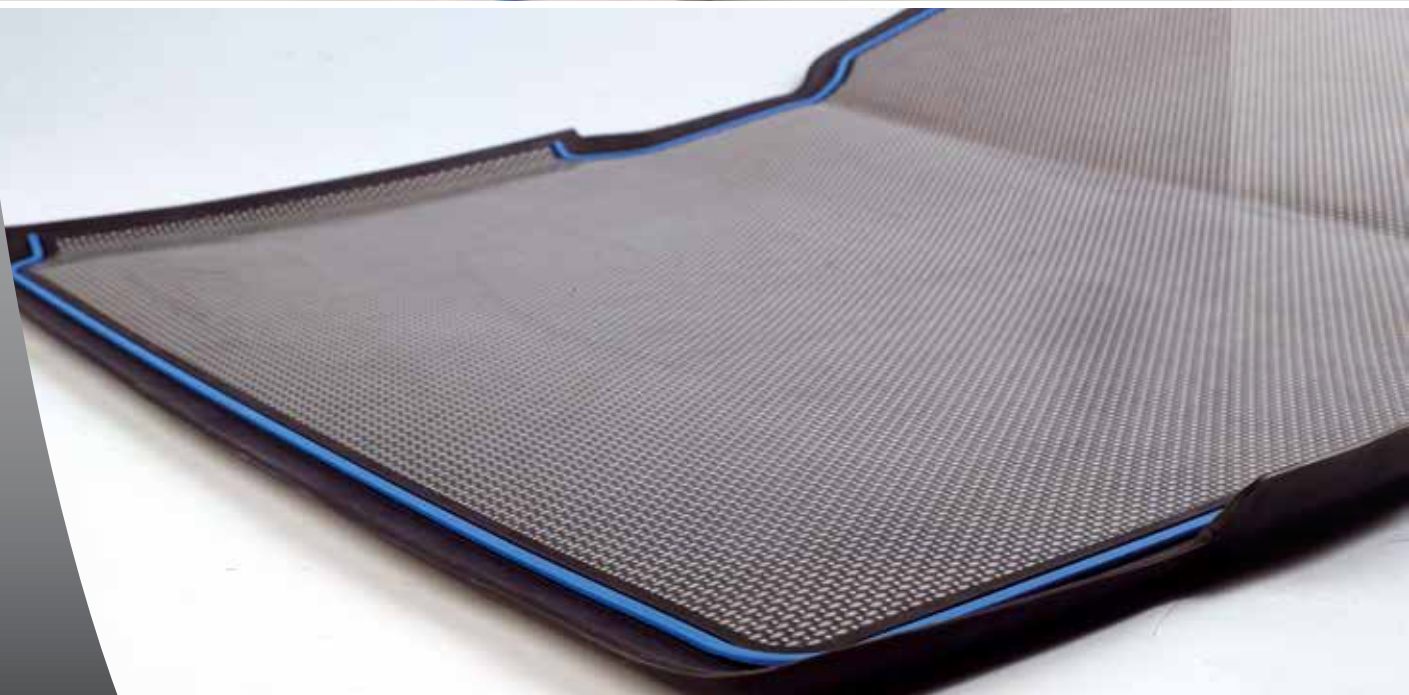
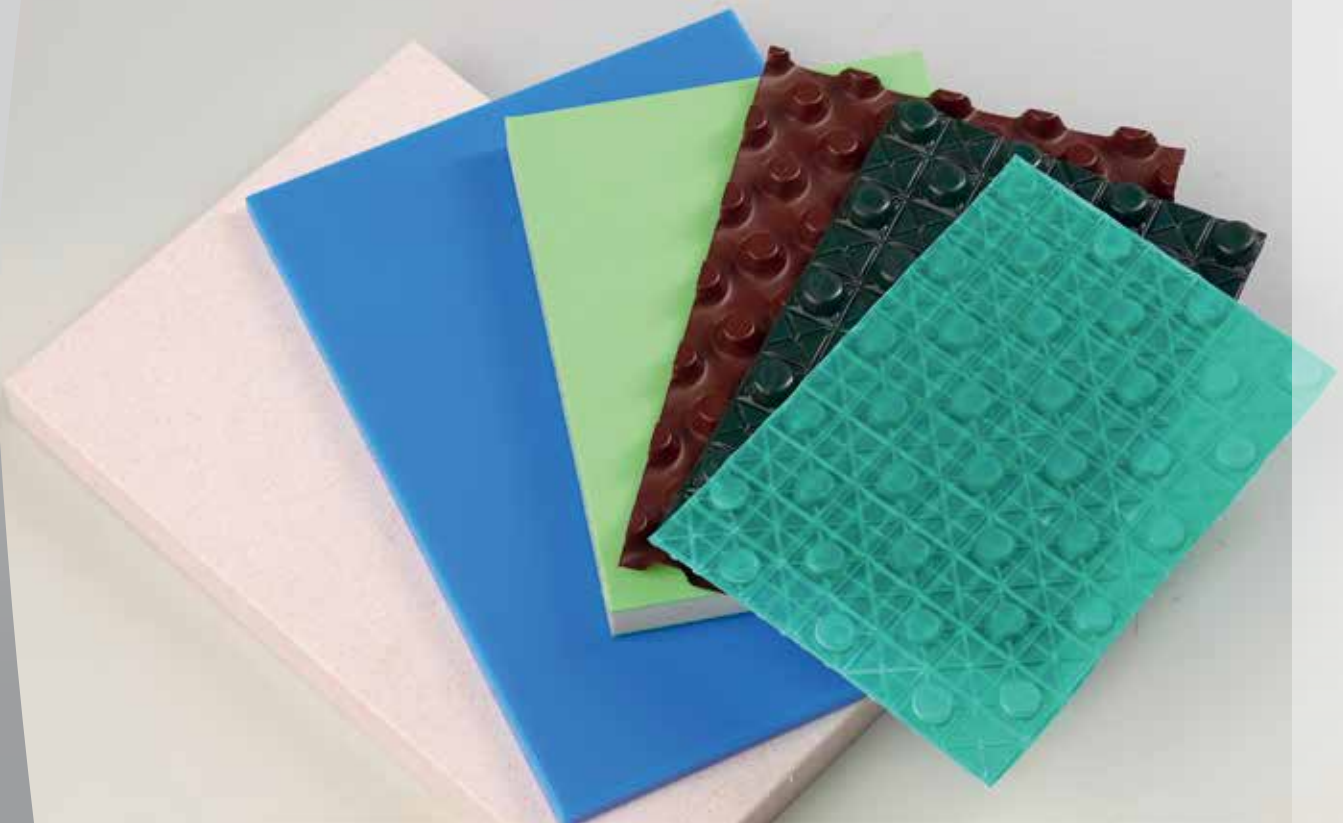
# KUHNE Maschinenbau: Engineering that makes a difference.



Historically, the engineering division – i.e., today's KUHNE Maschinenbau GmbH – is the original nucleus of the KUHNE Group.

It started in 1949 with the development of the first extruder for melting plastics based on a simple lathe for the production of PVC profiles and pipes. Soon, the first true extruders followed, along with lines for the production of sheets, flat films, and blown films. Different materials were used – from PE to PS, PP, PET, PVC, and HD-PE – and thermoforming and coextrusion solutions were developed alongside large-scale sheet lines with working widths of up to six meters and thicknesses of up to 50 millimeters, large coextrusion lines for blown film, and patented feedblocks for flat film lines. Accompanying the progress in our customers' industries, all our products were characterized by a steady improvement in performance and tolerances as well as a reduction the layer thicknesses. Our developments and machines always incorporate the latest innovations, inspired by the ever-changing requirements of our customers. By generating opportunities that are tailored towards the production processes and products of our customers, we are making a considerable contribution to the developments and changes in their own industries. This is not limited to the packaging industry – from milk cartons to coffee capsules. It has long become apparent in the medical, pharmaceutical, biotechnological, energy, construction, and automotive industries. In the latter, for instance, the fuel tanks of several renowned manufacturers were extruded from plastic sheets and welded. Our lines influence the development of increasingly lighter, more powerful, and long lasting solutions in key industries.

Fig. left:  
Turn-key line for PE geomembranes  
up to 7,000 mm net width with  
automatic thickness control (Algeria)



## Our customers' products: make everyday life normal.

We may demonize them as environmental hazards and often do not even notice how essential they are for our everyday lives: plastic films and sheets. Like it or not, they are everywhere: in the packaging of our favorite sausages, in milk cartons, coffee capsules ... no aspect of modern life can do without them. In every area of application, plastics are characterized by their versatility and flexibility.

Thanks to their low weight, they require minimum energy for storage and transport, and their production is similarly energy efficient. They have outstanding insulation properties and are suitable for material, chemical, and thermal recycling. This constitutes a real contribution to the protection of our environment.

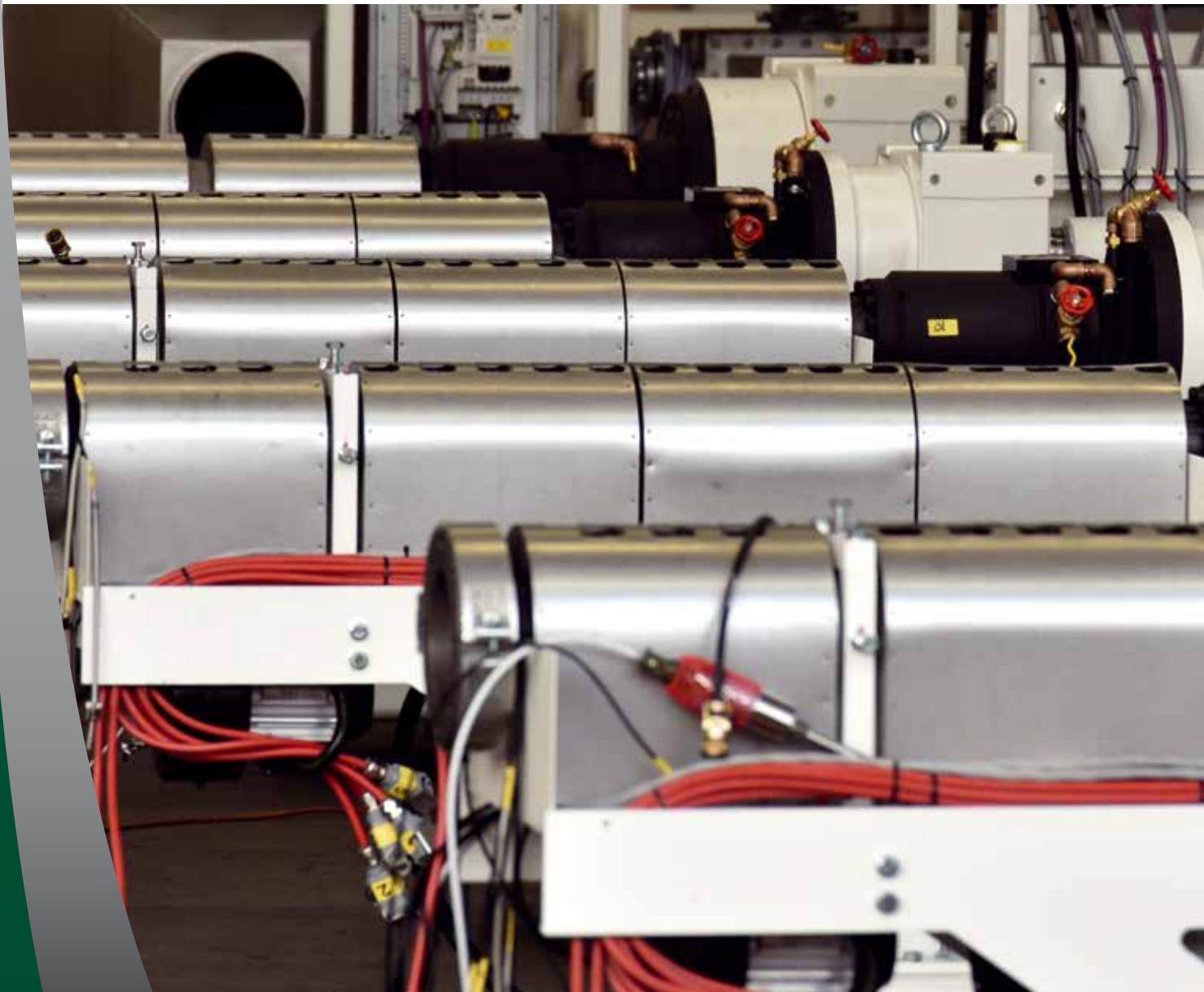
The application specialists of our in-house technical center are continuously working on the development and improvement of materials and applications. They focus on the improvement of thickness tolerances and on saving raw materials by continuously reducing film thickness and increasing regrind contents.



# High-tech machines for high-tech applications:

No matter whether they need to be tear-proof, printable, environmentally friendly, or have particularly good barrier properties: our modern, customer-specific extrusion lines produce flat films and sheets for a wide range of applications:

- Thermoplastics (PS, PP, HD-PE, ABS, PC, PMMA, PET)
- Thermoformed packaging
- Coating for carrier materials
- Sheets and semi-finished products  
(e.g. barrier sheet for automotive fuel tanks)
- Fiber-reinforced sheets
- Embossed film (office film)
- Geomembranes
- Printed ABS and PP edgbanding material (for the furniture industry)
- Wood dust filled sheets
- Highly transparent sheets (PC, PMMA, PET)
- In-line or off-line processes



# What distinguishes our lines?

- Complete in-house development and manufacturing
- Extruders with diameters between 25 and 250 mm, 24 to 39D length, with/without venting
- Special models of cylinders, screws, and grooved barrels available (insert, coated)
- DC, AC, and direct drives up to 440 kW, air-cooled and water-cooled
- Thickness range: 120  $\mu\text{m}$  to 50 mm
- Proprietary feedback system (patented for up to 11 layers, can be adjusted to individual film structures)
- Flat sheet dies from our own production (including models with automatic thickness control)
- Special roll stack models available – electric and hydraulic (width of 300–10,000 mm, quick-change systems for rolls, electro-mechanic roll adjustment, rigid KUBI rolls)
- Roll diameter: 200 mm–1,000 mm
- Single drives with AC technology for the smoothing rolls





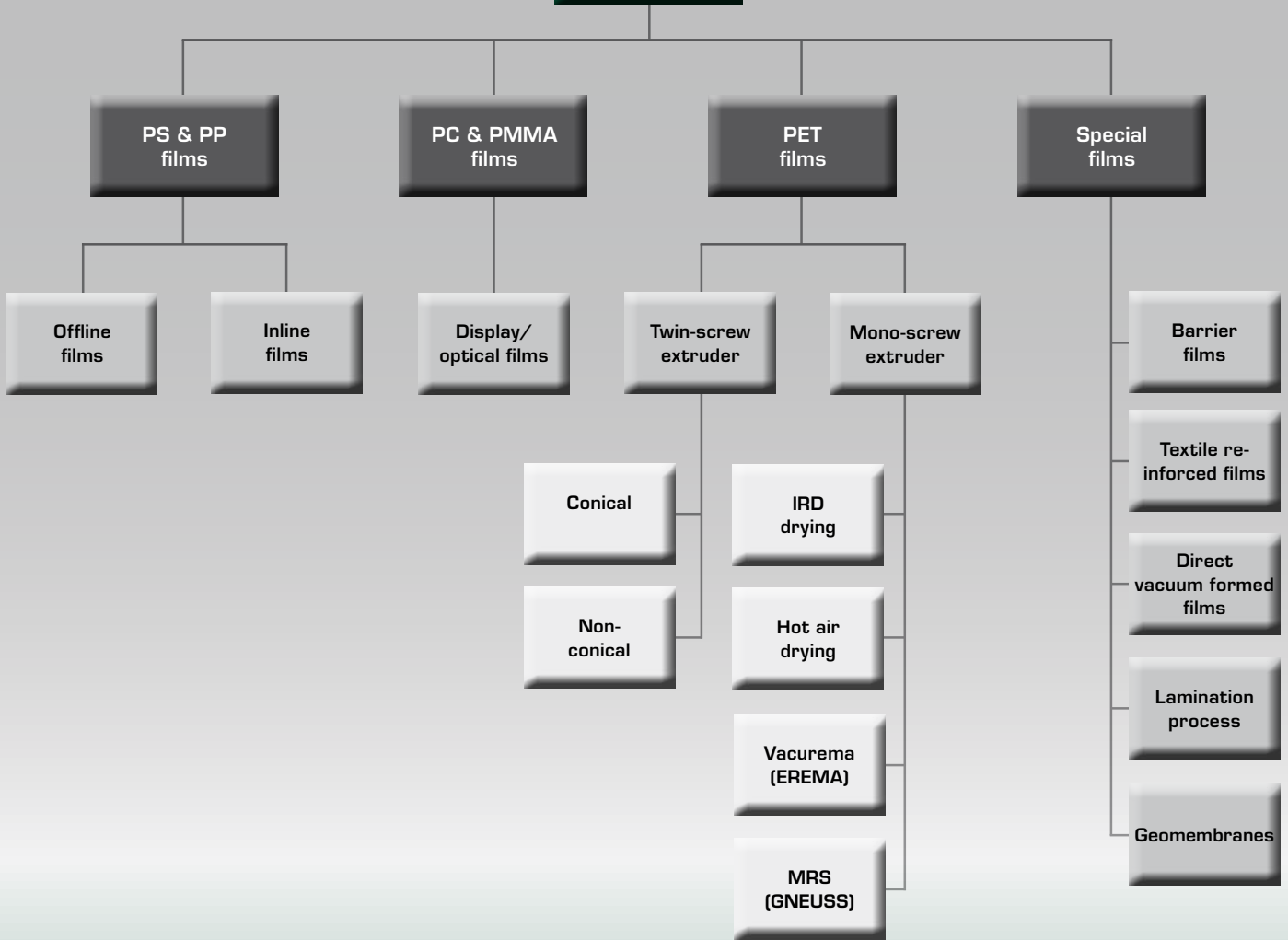
## A sophisticated engineering solution for any film or sheet:

- High speed extrusion lines
  - Flat film lines
  - Thermoforming sheet lines
  - In-line/off-line systems
- PET extrusion lines of different concepts
- Geomembrane lines
- Special film lines
  - (e.g. vacuum formed or fabric reinforced membranes)
- Thick sheet lines
- Cast film lines

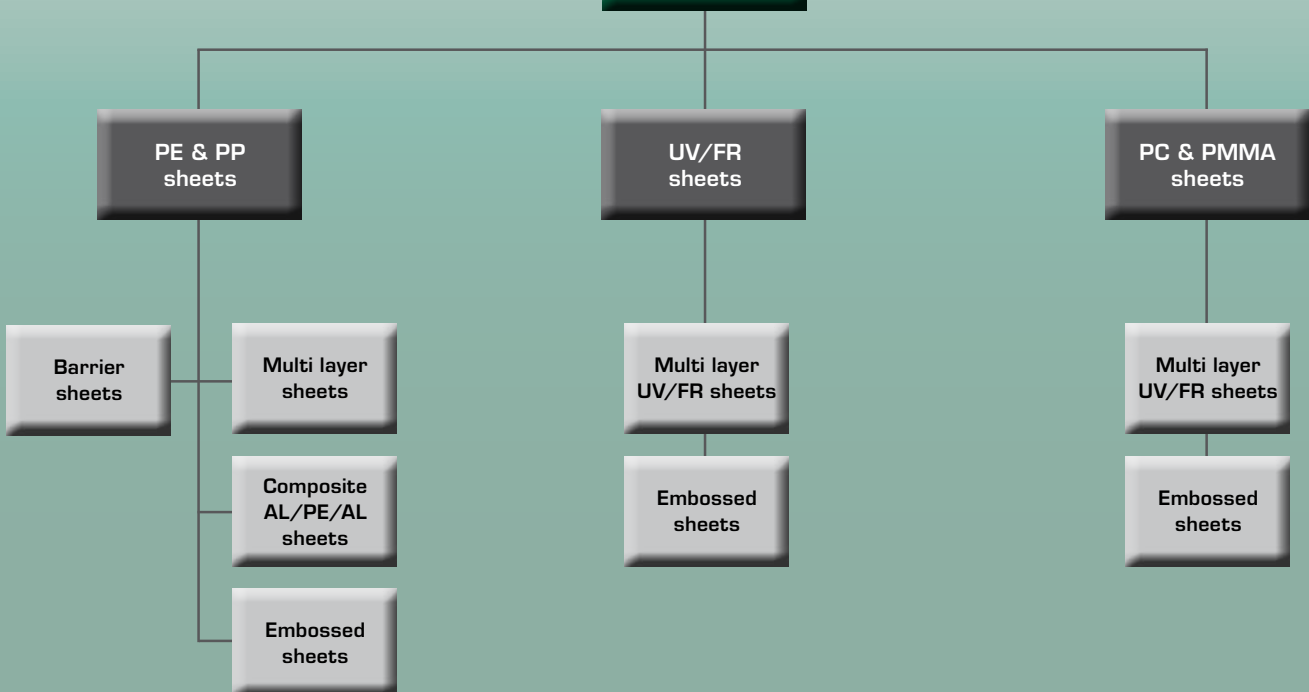
We process all types of thermoplastic materials, including (HI-)PS, PP, A-PET, PET-G, HD-PE, LD-PE, MD-PE, PC, PMMA, ABS, PVC, TPE, TPU, filler reinforced mixtures such as PP with wood dust, recycled plastic, biopolymers, high-temperature materials.



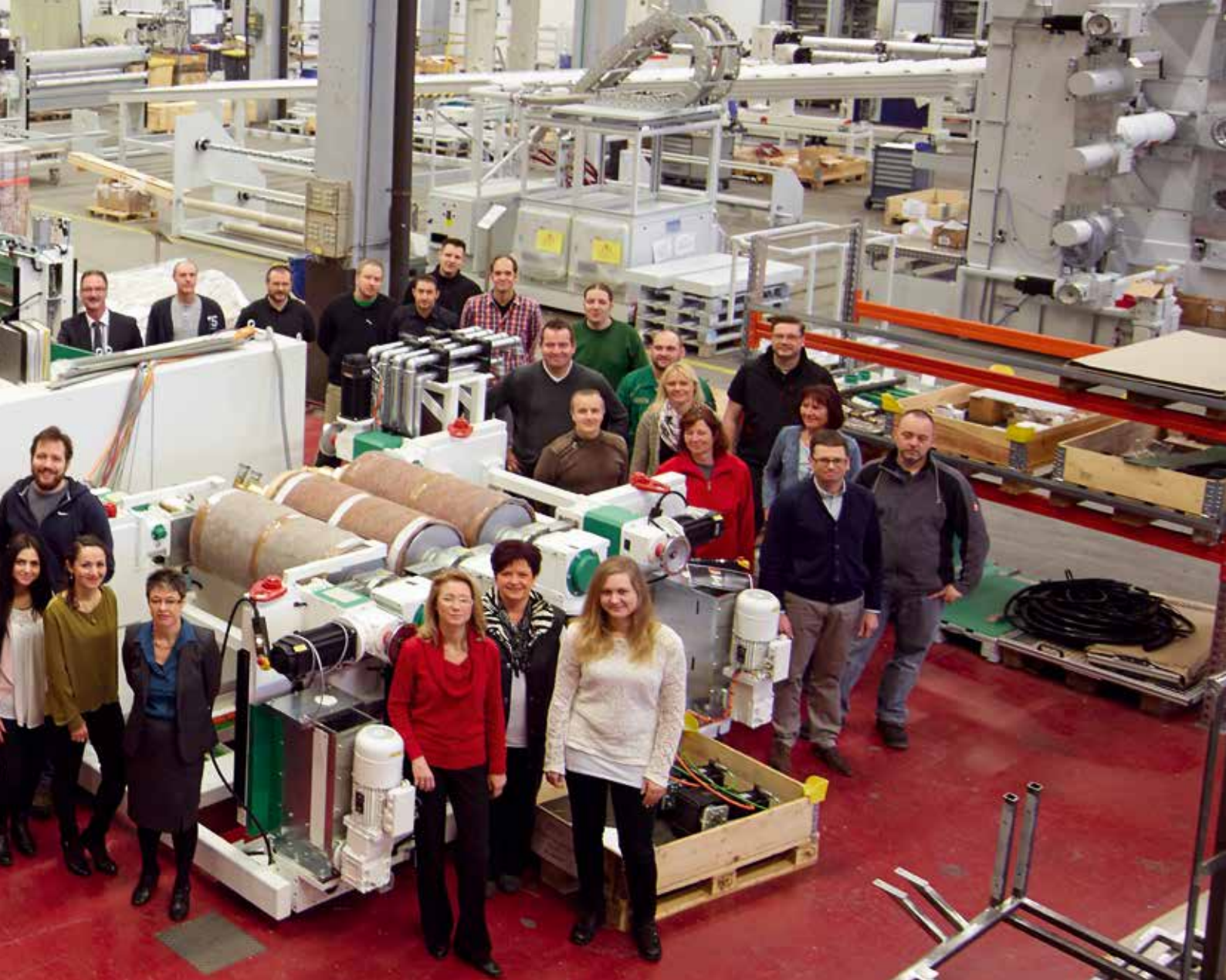
# Flat Films



# Sheets







Team KUHNE Maschinenbau GmbH

## Innovations: nothing is impossible for us.

Besides the fundamental standards for each of our machines – efficiency, sustainability, flexibility – we always take the specific requirements and production targets of our customers into account. Nothing is impossible for us! We make everything possible, regardless of the system or the machine: from tests with new raw materials to the integration of components from different manufacturers.

### **We listen to our customers**

The development of efficient, sustainable concepts is becoming increasingly important. We derive much of our inspiration directly from our customers. At KUHNE listening is often the first step along a path leading from an idea to its understanding and the realization of a final, individual machine solution. Not only do our responses lead to an increase in economical and qualitative factors, they also entail a considerable increase in operability and thus improve the workplace layout for the operators on site. For our customers, we continuously reinvent ourselves.



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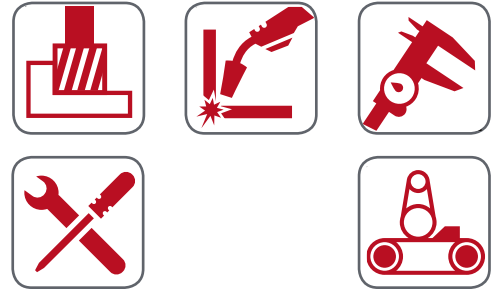
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# KUHNE Anlagenbau: Unique engineering solutions for special requirements.

Founded in 1979 as an independent company of the KUHNE Group, KUHNE Anlagenbau GmbH is a specialist in the construction of blown film systems. Not only are more than 50 years of extrusion experience incorporated into the entire group of companies, but so too is our innovative engineering and knowledge of raw materials and process technologies.

In the seventies and eighties, we made a name for ourselves with many large turnkey projects in the plastics industry. In the nineties, we added a production program in the area of plastics recycling, which quickly made us a leading supplier of complete systems. With the elimination of government subsidies, however, this market collapsed almost entirely so we moved our focus on a new business segment. Based on the blown film expertise that KUHNE Maschinenbau GmbH had acquired over decades, we developed our first Triple Bubble® blown film system in 1996 for the production of biaxially oriented films, predominantly for sausage casings. We relentlessly continued developing this systems technology. As a result, today we are the leading system manufacturer of blown film lines for biaxially oriented films.

In addition to numerous machine versions, the development of multi-layer systems for up to 17 layers, which can process virtually all thermoplastics, is today one of our core competencies.

We are the only manufacturer that offers all processes for the production of blown film from a single source.

**We distinguish between the following three machine types:**



Cool Bubble®  
Water-quenched  
blown film

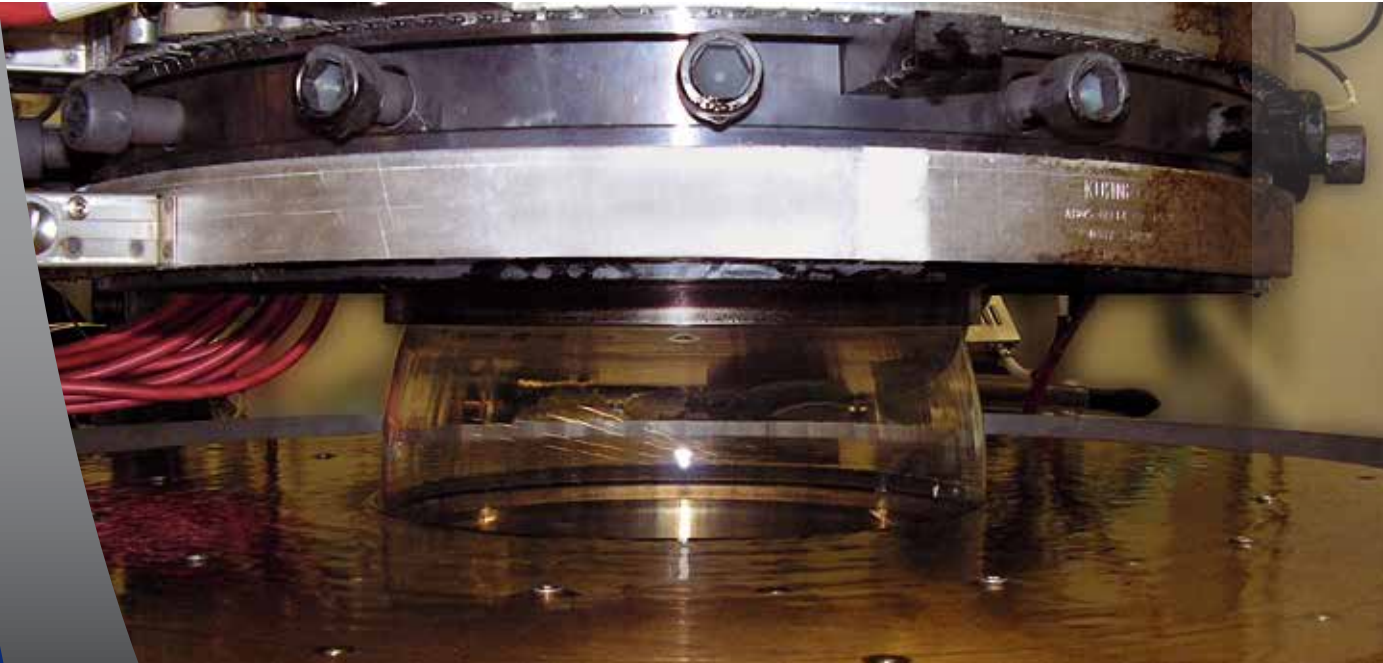
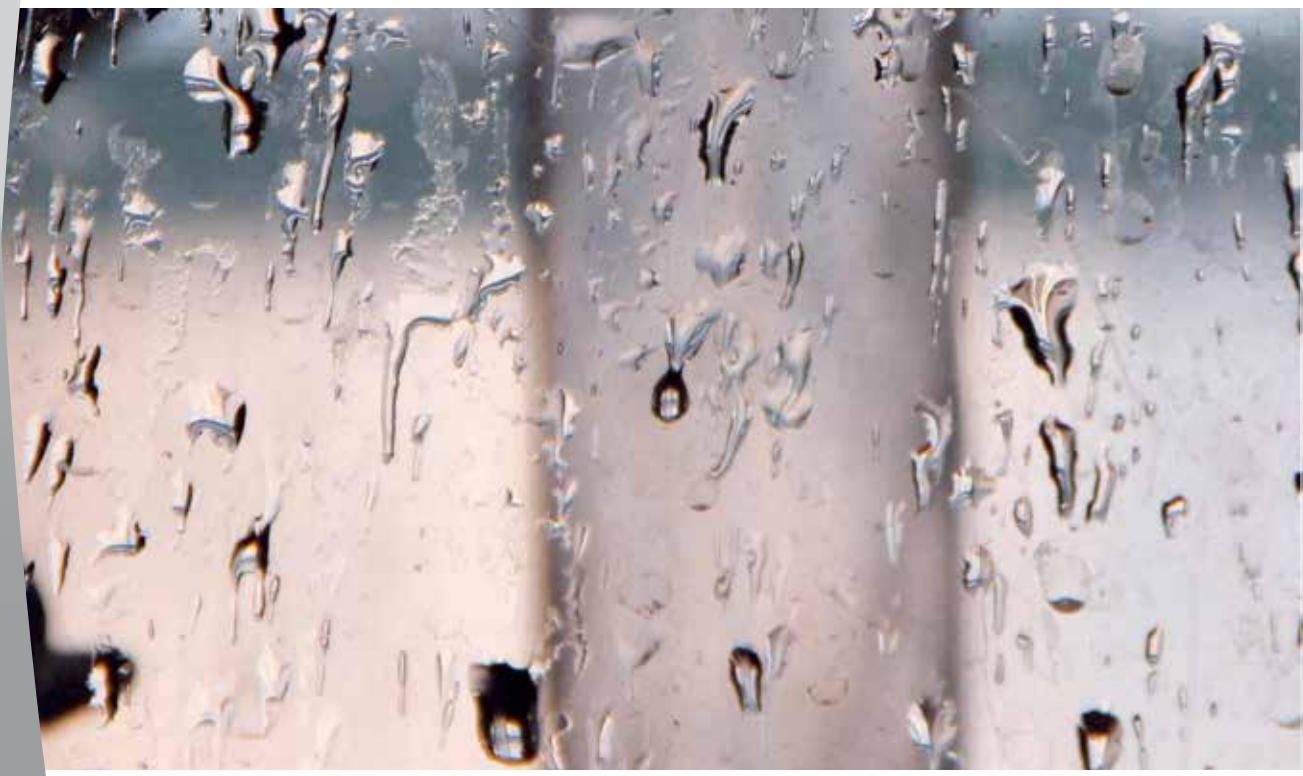


Triple Bubble®  
Biaxially oriented  
blown film



Smart Bubble®  
Air-cooled  
blown film







## Cool Bubble® blown film: The all-rounder among films.

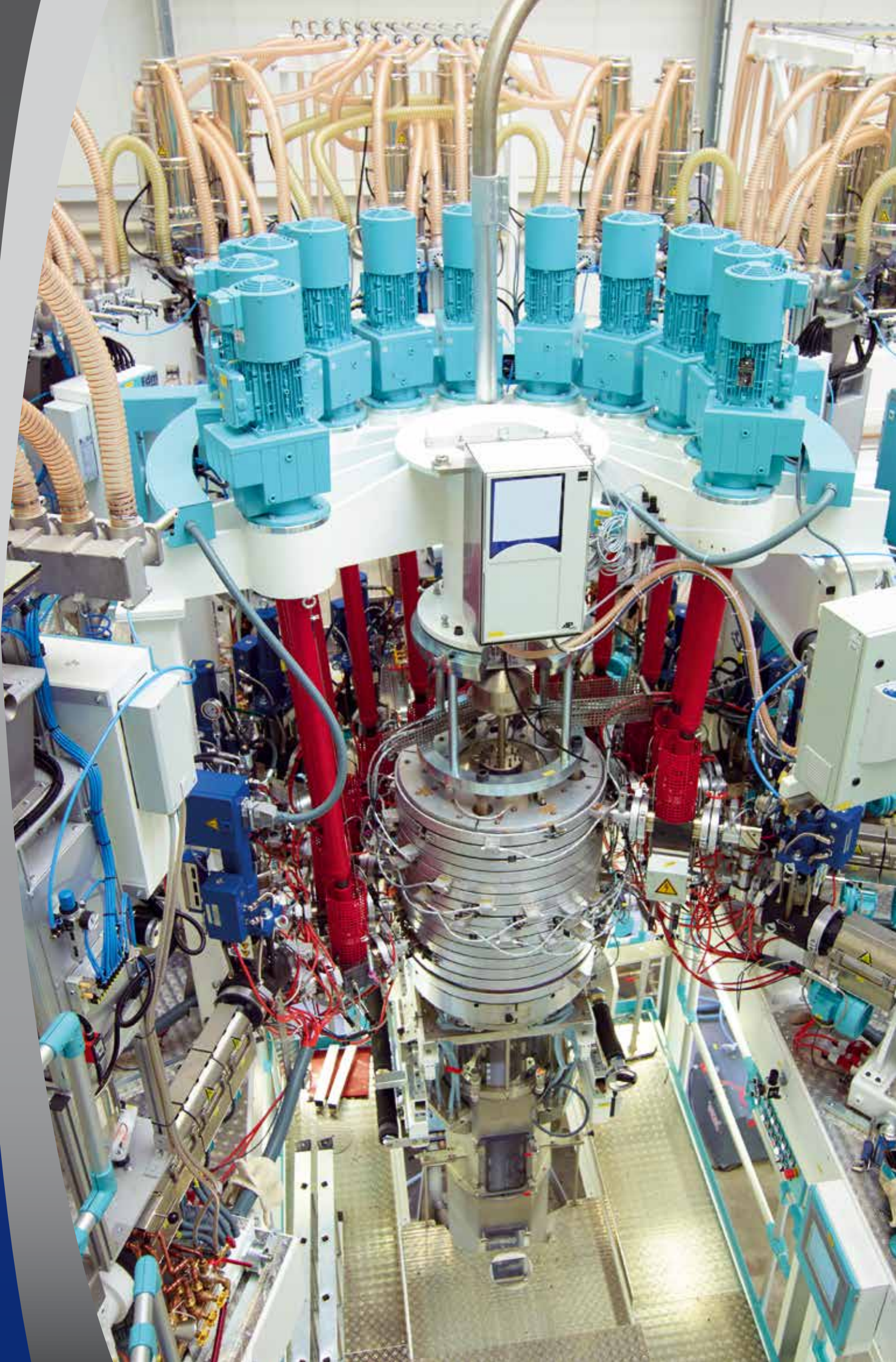
As a pioneer in the development and manufacturing of water-quenched blown film systems (Cool Bubble®), our many years of experience in this sector have made it possible for us to develop systems with up to 11 or even 13 layers. This special feature - the shock quenching of hot melting film – creates an amorphous polymer structure, which has a positive effect on the elasticity, transparency, and the puncture and tear resistance of the film.

These special water-quenched blown films are used primarily in the medical field (infusion and dialysis bags) and in the food industry (vacuum bags, thermoformed products, and meat and cheese packaging).

Water-quenched blown films by Cool Bubble® technology convince through:

Structures:	1 / 3 / 5 / 7 / 9 / 11 up to 13 layers
Raw materials:	PE, PP, PS, PET, PA, EVOH, PVOH, COC, EVA, EMA, Ionomers and others
Film thicknesses:	40 µ to 1,000 µ
Film widths:	700 mm to 2,400 mm double flat
Output:	25 kg/h to 2,500 kg/h
Production speed:	30 m/min to 100 m/min







# Triple Bubble® blown film: The barrier master.

Our Triple Bubble® blown film technology enables the production of biaxially oriented flat films for high barrier packaging as well as biaxially oriented tubular films for shrink bags and sausage casings.

## Triple Bubble® blown film systems convince through the following specifications:

Triple Bubble® blown film lines for the production of biaxially oriented flat films for high barrier packaging.

- Film layers: 3 / 5 / 7 / 9 / 11 / 13 up to 17 layers
- Film thicknesses: 15  $\mu$  to 80  $\mu$
- Film widths: 900 mm to 2,400 mm double flat
- Output: 150 kg/h to 1,500 kg/h
- Production speed: 30 m/min to 300 m/min
- Film properties: outstanding oxygen and moisture barrier, excellent optical properties, good sealability

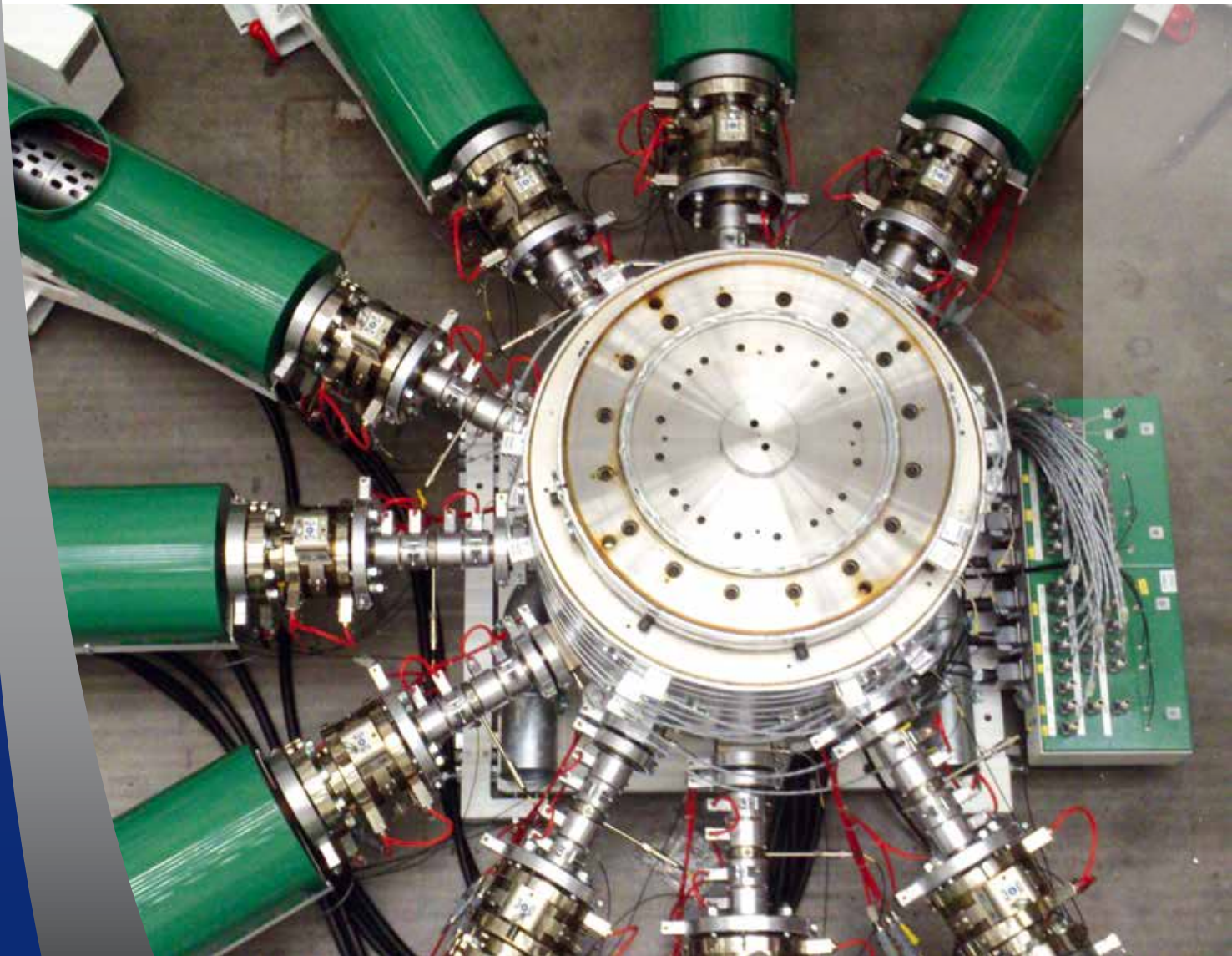
Triple Bubble® blown film systems for the production of biaxially oriented tubular films for sausage casings.

- Structures: 3 / 5 / 7 up to 9 layers
- Raw materials: PE, PP, PS, PET, PA, MXD6, EVOH, PVOH, COC, EVA, EMA
- Film thicknesses: 20  $\mu$  to 80  $\mu$
- Film widths: 30 mm to 350 mm double flat
- Output: 20 kg/h to 150 kg/h
- Production speed: 50 m/min to 300 m/min
- Film properties: outstanding oxygen and moisture barrier
- Extremely high puncture resistance
- Excellent optical properties, such as transparency and gloss

Triple Bubble® blown film systems for the production of biaxially oriented tubular films for shrink bags and high barrier packaging.

- Structures: 3 / 5 / 7 / 9 / 11 up to 13 layers
- Raw materials: PE, PP, PS, PET, PA, EVOH, PVOH, COC, EVA, EMA, Ionomers and others
- Film thicknesses: 20  $\mu$  to 150  $\mu$
- Film widths: 100 mm to 900 mm double flat
- Output: 50 kg/h to 250 kg/h
- Production speed: 30 m/min to 100 m/min







# Smart Bubble<sup>®</sup> blown film: Air-cooled efficiency.

Smart Bubble<sup>®</sup> blown film systems are available from 1 to 13 layers. Through the use of our universal screw, almost all thermoplastic raw materials, such as PE, PP, PS, PET, PA, EVOH and many more, can be processed. Our Smart Bubble<sup>®</sup> blown film systems achieve film thicknesses from 5  $\mu$  up to 250  $\mu$ , film widths from 250 mm up to 3,600 mm double layflat and outputs up to 1,200 kg/h.

## **Extruder**

- Extruder sizes: 25 mm, 35 mm, 45 mm, 60 mm, 70 mm, 90 mm, 105 mm, 125 mm up to 150 mm
- Through the use of our universal screw, almost all thermoplastic materials can be processed

## **Melt pumps**

- Provide a constant conveyance and safe pressure build-up for the die

## **Blown film dies**

- Mono blown film dies for diameters of 50–600 mm
- 3-layer blown film dies for diameters of 100–900 mm
- 5, 7, 9, 11, up to 13-layer films blown film dies for diameters of 50–850 mm

## **Smart Lip Maximizer**

- Variable height adjustable cooling ring to increase throughput rate as well as film strength

## **Cooling systems**

- Highly efficient internal and external bubble cooling systems in various designs

## **Film haul-offs**

- Reversing film haul-offs up to a lay-flat width of 3,300 mm
- Stationary film haul-offs up to a lay-flat width of 3,000 mm

## **Film winders**

- Central / contact / gap winder for film widths of up to 3,300 mm
- Contact winder for film widths of up to 3,300 mm

## **KUHNE Extrusion Control „KEC“**

Our central automation is very user-friendly and ensures a smooth monitoring of production







## Our blown film systems: The synthesis of experience, technology and innovation.

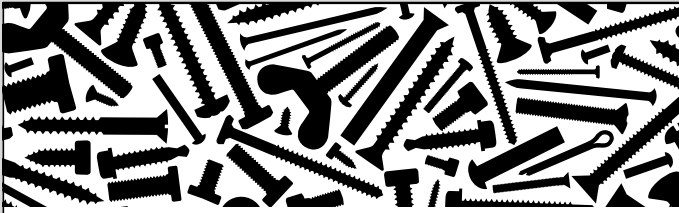
In addition to the strong focus on innovation regarding the technologies our systems use, but above all concerning their economic efficiency, we offer extensive procedural consultation for each customized product followed by the total line solution – from design to the installation, from material feeding and dosing to film winding and slitting. This includes close cooperation with customers as well as the in-house production of many machine components directly at our Sankt Augustin plant, the constant availability of a pilot line for testing and, of course, the assembly of every customer system at the site for preliminary acceptance. We are also distinguished as the only provider of systems for all types of blown film processes:

Cool Bubble® (water-quenched blown film)

Triple Bubble® (biaxially oriented blown film)

Smart Bubble® (air-cooled blown film)





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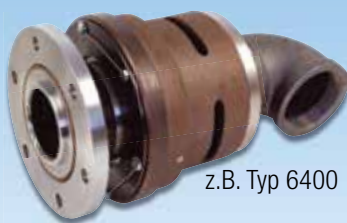
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## K-tool: Highest quality and best technical expertise.



Regardless of all development potential and knowledge of materials, products, and production processes, not even the most sophisticated thought out lines could operate properly without the proper components, such as flat dies with a width of up to six meters, multi-layer feedblocks for up to 11 layers, blown film die heads for up to 13 layers, extrusion screws, barrels, and many more.

We have accumulated our knowledge and technical expertise over the course of decades. To use and realize it even more efficiently, we consolidated it in the form of K-tool GmbH in 2011. Approximately 30 staff are turning the great distinguishing characteristics of KUHNE extrusion lines into reality using a state-of-the-art machinery fleet. Of course, we are lending our professional competence to other companies in the plastic-machine industry as well.









## Our machine tool fleet: high-quality technology for high-quality performance.

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- CNC lathes and milling machines
- 3D programmable CAD/CAM; Mastercam
- Conventional lathe
- 100 tons straightening press
- Precision honing machine
- Deep-hole boring
- Screw-polishing machine
- Cylindrical grinding machine, horizontal
- Cylindrical grinding machine, vertical
- Crane system for up to 16 tons
- Assembly department
- Surface finish
- Blown film and flat film die service
- Retrofit

We take advantage of the knowledge we have accumulated over the course of 60 years of manufacturing. It allows us to realize even the most complicated requirements with technically sophisticated, economical solutions. The 3D design of all our production parts contributes to this, as it guarantees highest levels of precision without input inaccuracies, even when using customer-created construction plans.



This long-standing wealth of technical experience in film and sheet extrusion has enabled us to meet all requirements – standardized as well as customized – and all specific requests with new designs and adjusted calculations.

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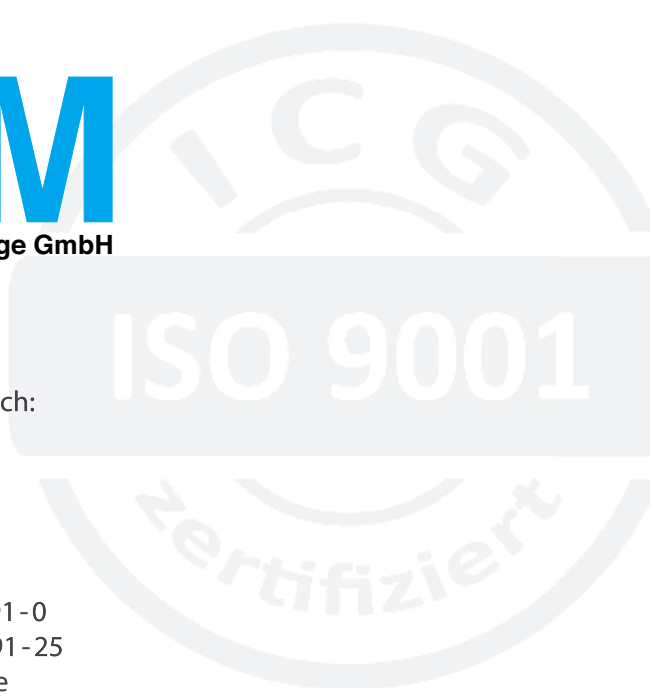
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