

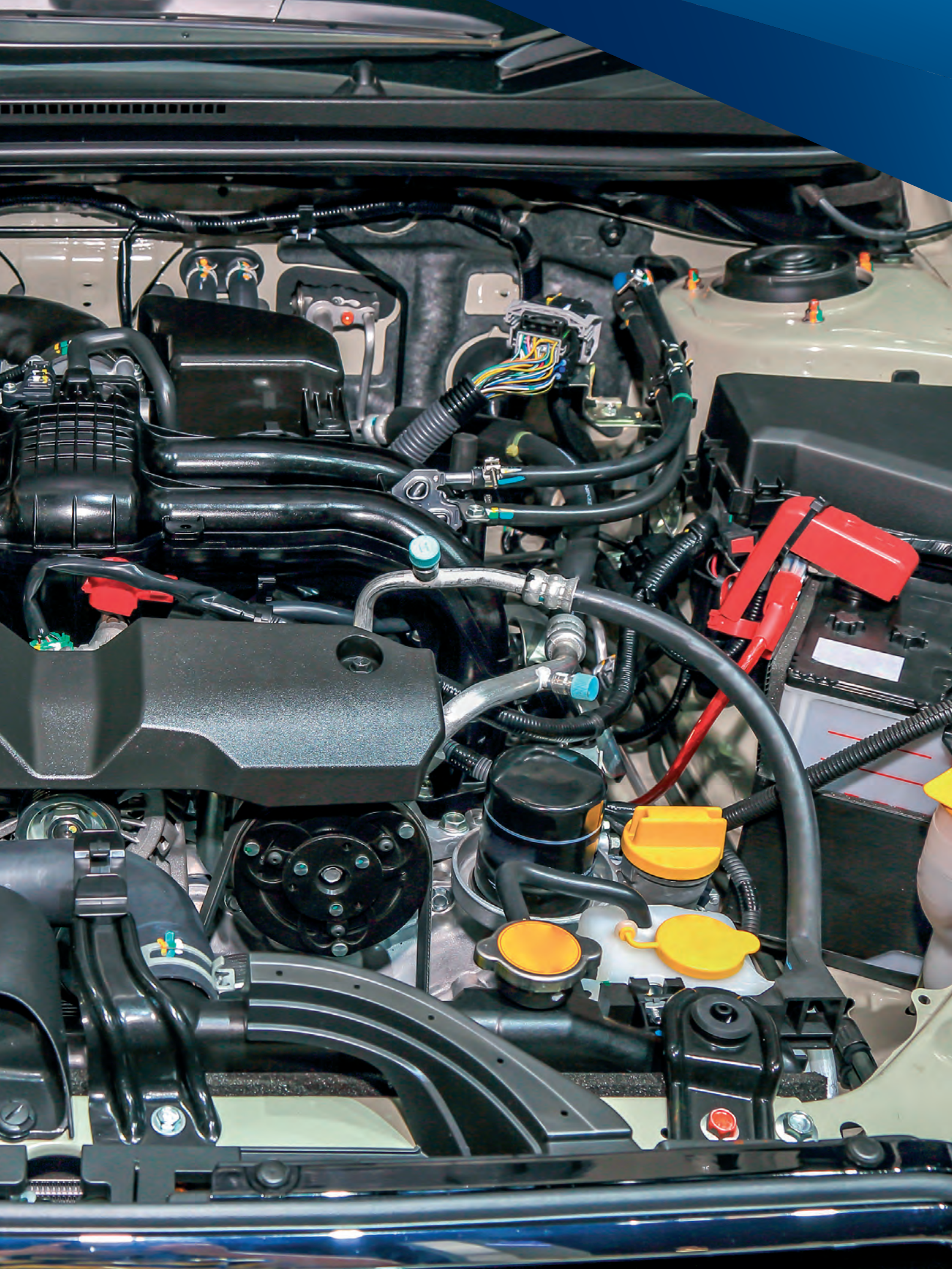
# HOSE EXTRUSION LINES

TIME-TESTED TECHNOLOGY  
FOR THE HIGHEST STANDARDS



***Krauss Maffei***

*Pioneering Plastics*





# SINGLE-SOURCE EXPERTISE HOSE EXTRUSION LINES

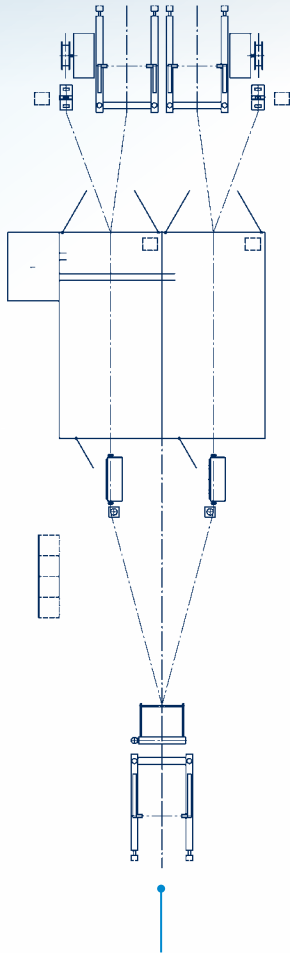
KraussMaffei offers customized hose extrusion lines for the production a wide variety of high-pressure, automotive and industrial hoses and tubes. Cost-effective, reliable and sturdy!

Benefit from the unparalleled expertise of a single-source solution provider: from extrusion technology right through to final product winding.

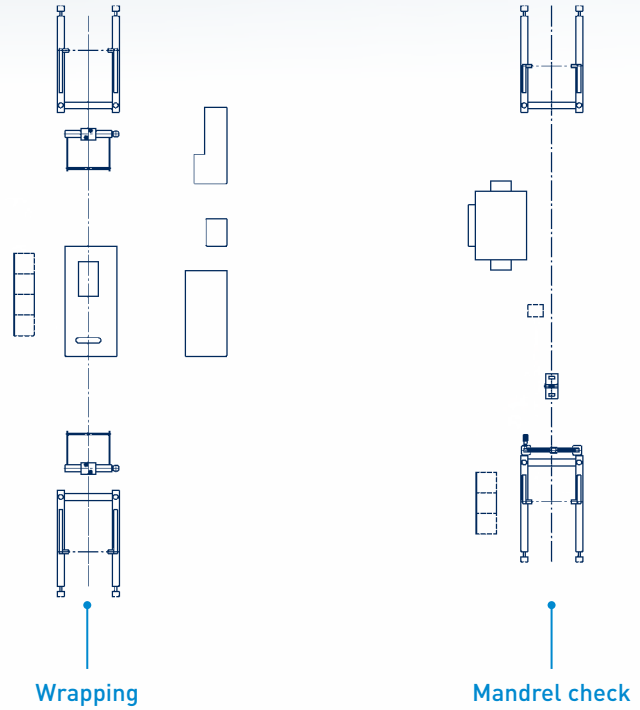
**As a general contractor, KraussMaffei provides all services involved in the manufacture of high-performance extrusion lines:**

- Production line design, machine engineering, manufacture and assembly, operator training, set-up and start-up
- Process-engineering advice and process development support
- Optimum technical coordination of all individual components
- Profound project know-how

# IMPRESSIVE ENCOUNTER: TAKE A CLOSER LOOK AT OUR EXTRUSION LINE FOR HIGH- PRESSURE HYDRAULIC HOSES

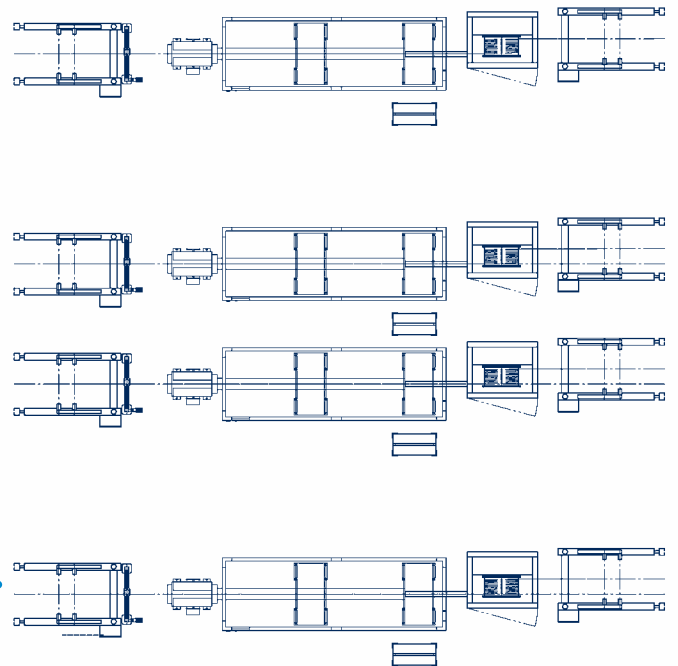


Mandrel removal, pressure test,  
packaging

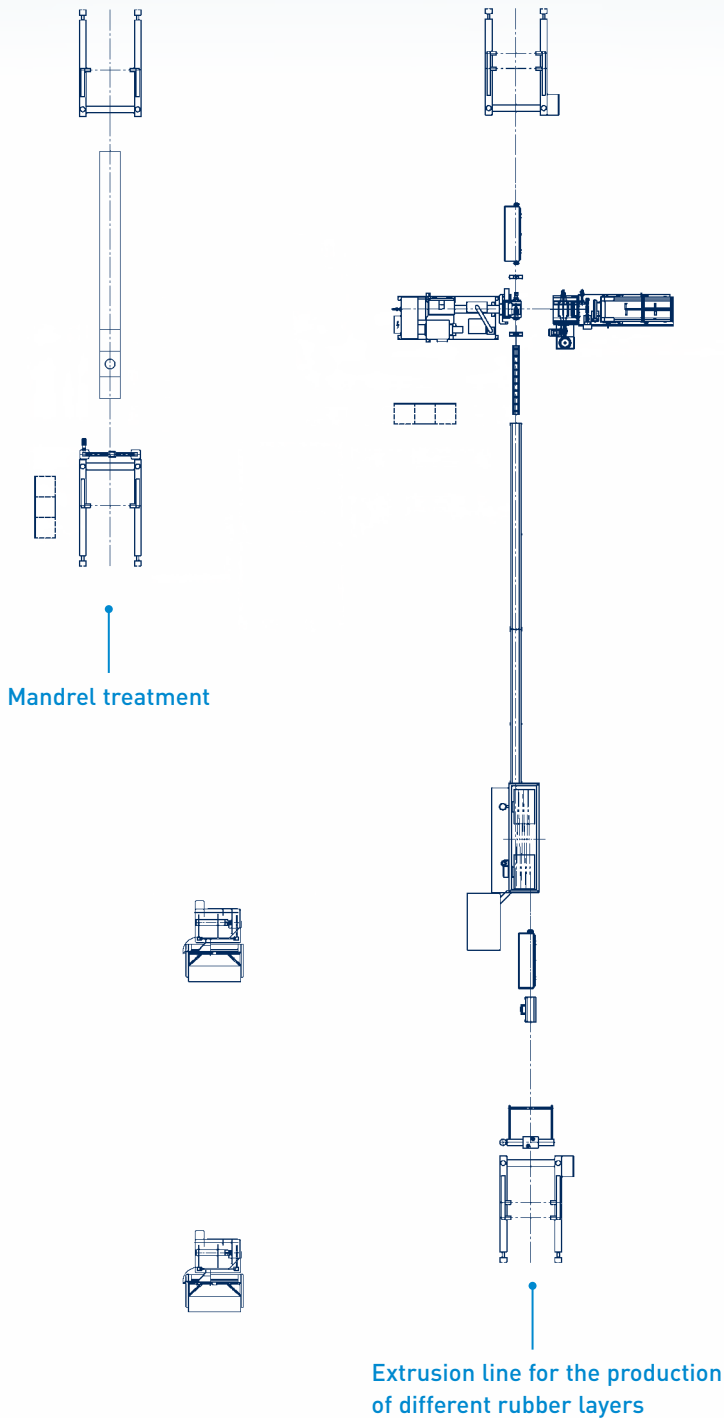


Wrapping

Mandrel check



Braiding machines



Krauss-Maffei extrusion lines for the production of high-pressure hydraulic hoses are designed to meet the most varied customer specifications.

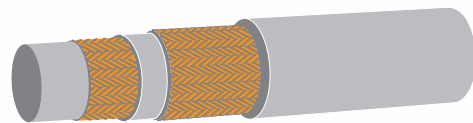
Combining highly innovative extrusion technology with state-of-the-art downstream equipment, our leading-edge hose and tube extrusion lines are perfectly suited for the ever-increasing market challenges. KraussMaffei hydraulic hose production lines are tailored for specific customer and process-engineering requirements. They produce a wide variety of hoses and tubes with several braided steel mesh layers for operating pressures ranging between 70 and 420 bar and bursting strengths of over 1000 bar – depending on the hose diameter.

**Typical materials:**

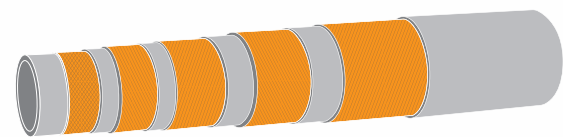
EPDM, NBR, SBR, reinforcement made of special steel and textile filaments

**Typical products:**

1SN, 2SN and 4SH high-pressure hydraulic hoses



*2SN hydraulic hose to DIN EN 853*



*4SH hydraulic hose to DIN EN 856*

# IMPRESSIVE ENCOUNTER: TAKE A CLOSER LOOK AT OUR EXTRUSION LINE FOR AUTOMOTIVE HOSES

Innovative ideas are combined with sophisticated technology to achieve maximum efficiency and reliability. When it comes to performance, quality and productivity in the production of automotive hoses and hose bends, KraussMaffei hose extrusion lines are a class of their own. These lines meet the most exacting requirements in terms of ease of operation, set-up times for material changes and machine availability – starting with the preparation of the rubber compound right through to the winding of the final product.

Thanks to outstanding flexibility in the design and engineering of customized solutions, KraussMaffei is in a position to satisfy the most diverse product and process-specific requirements.

The comprehensive in-depth process know-how makes KraussMaffei a reliable partner for the production of automotive hoses.

Depending on the individual application, these lines can be designed for different extrusion processes with fully integrated reinforcement production and PLC system.

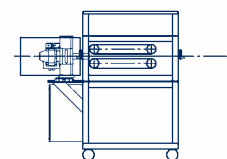
Our lines thus fulfil almost all requirements of state-of-the-art production plants. No matter what type of automotive hoses you want to produce – KraussMaffei hose extrusion lines raise the bar in all areas - today and in the future.

#### **Typical materials:**

EPDM, NBR, SBR, reinforcement made of special steel and textile filaments

#### **Typical products:**

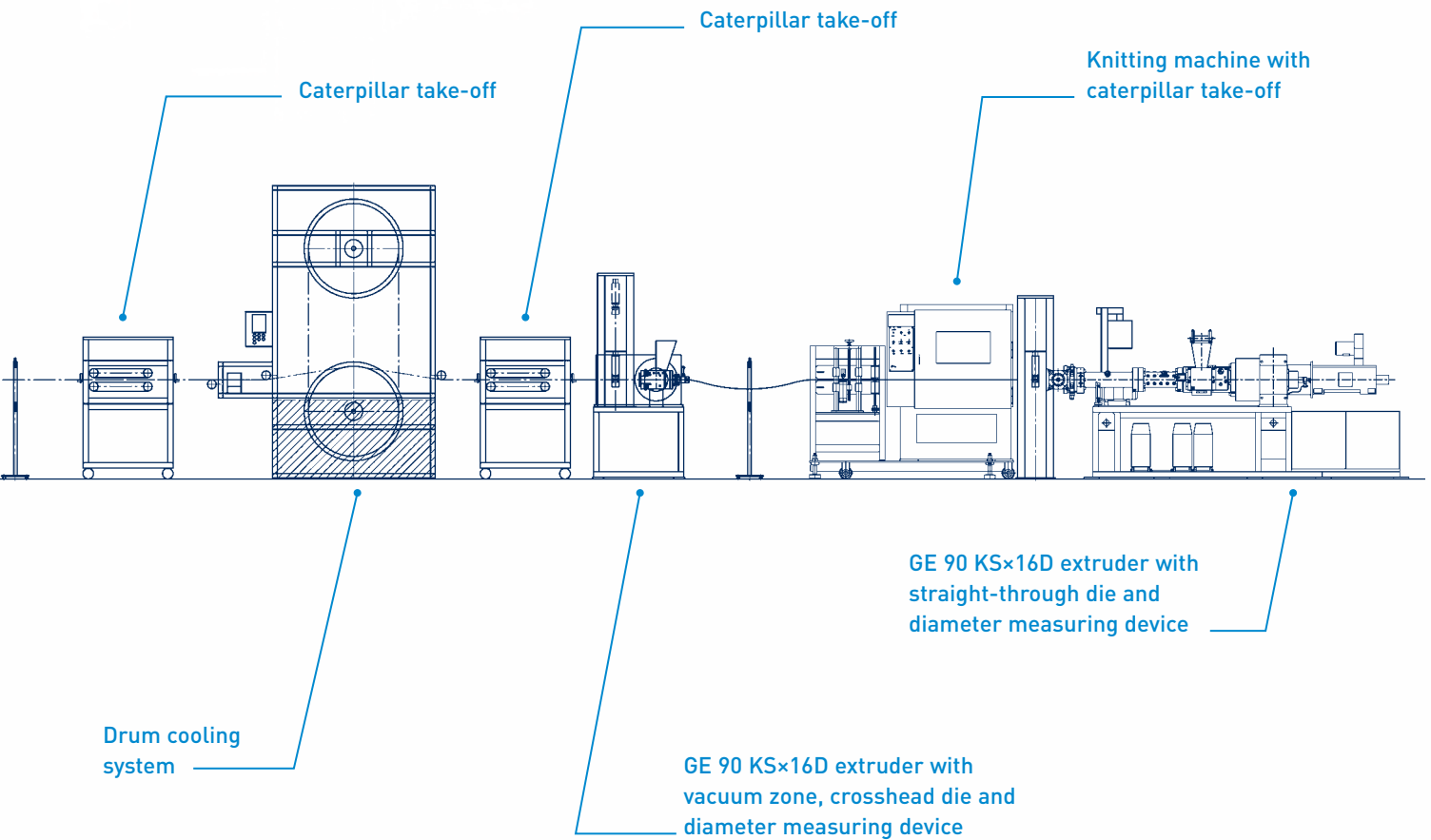
Automotive hoses for exhaust systems, power trains, oil cooling, clutches, brakes, air-conditioning systems, fuel supply, steering gears, active body control, air-flow routing and suction systems



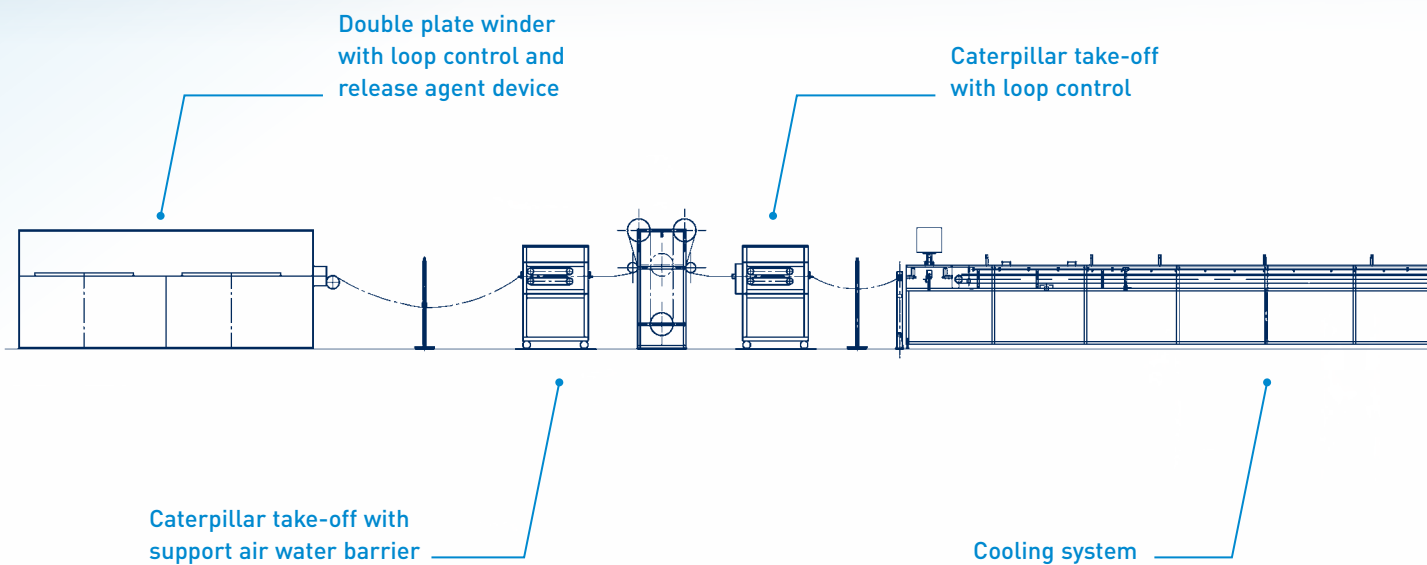
Caterpillar take-off with cutter and discharge systems



Various hoses and tubes for automotive applications.



# IMPRESSIVE ENCOUNTER: TAKE A CLOSER LOOK AT OUR EXTRUSION LINE FOR INDUSTRIAL HOSES



KraussMaffei's comprehensive range of hose extrusion lines offers highly cost-effective solutions for any specific hose production.

These lines have stood the test of time in day-to-day production of a wide variety of fabric-reinforced hoses used for various industrial applications. Depending on the hose type, they provide maximum performance at minimum manpower requirements thus setting new standards in the production of industrial hoses.

Further highlights are short set-up times and outstanding reliability. The perfect interplay of the individual machine components ensures maximum precision and excellent product quality.

Thanks to the extensive extruder portfolio and the different machines for producing the reinforcing material, these systems can be perfectly tailored to any application.

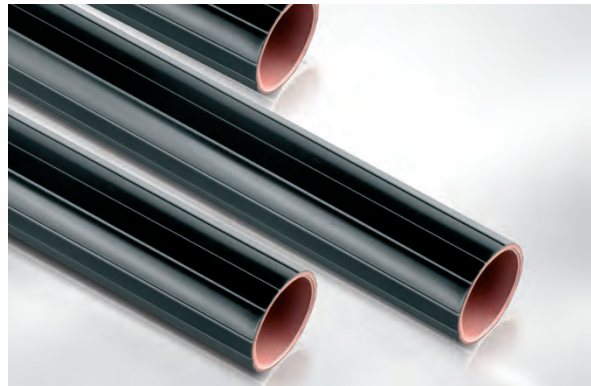
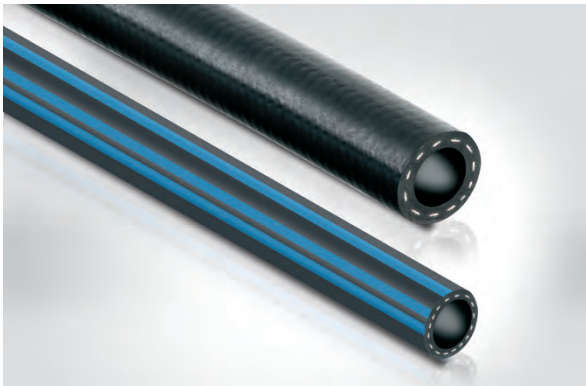
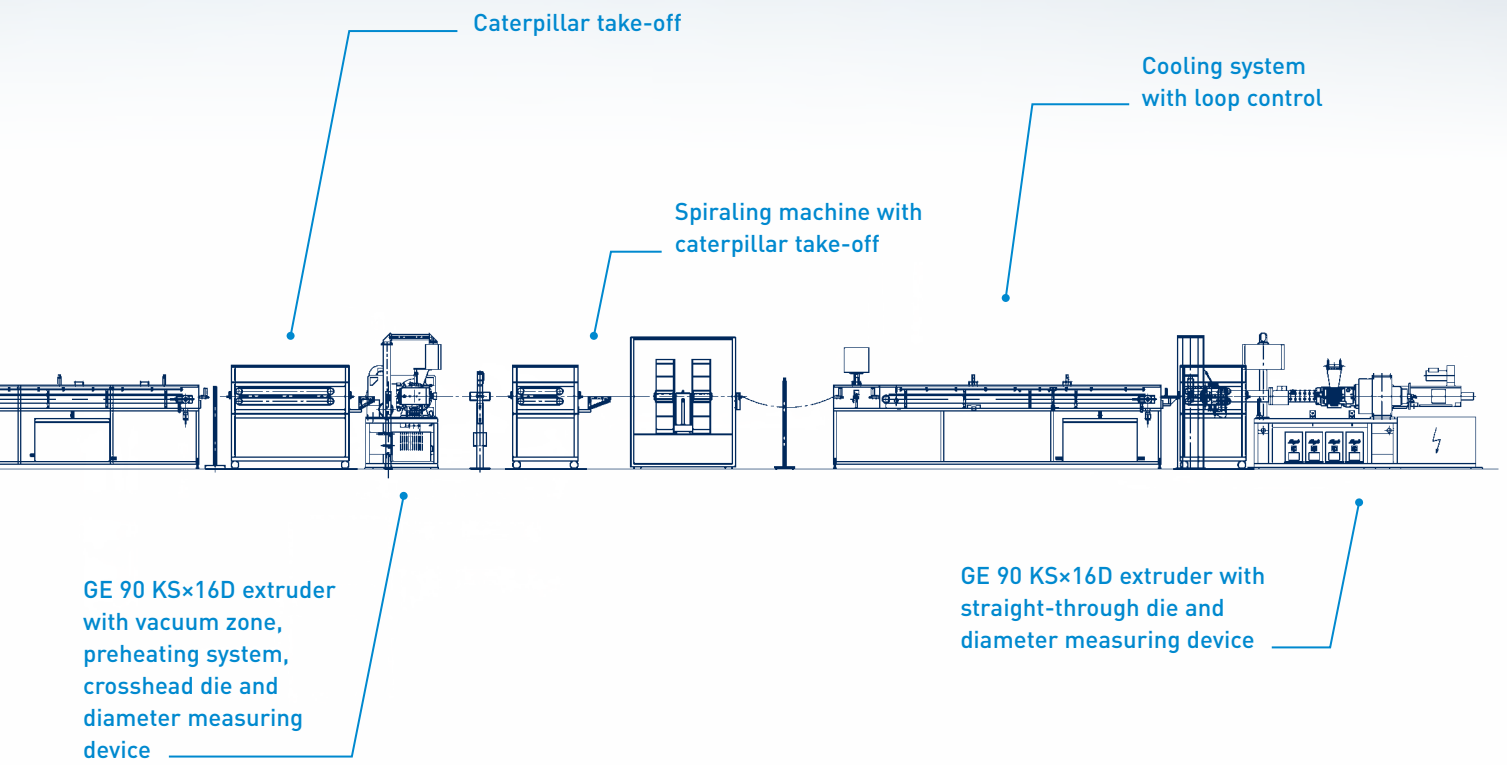
#### **Typical materials:**

EPDM, NBR, SBR, reinforcement made of special steel and textile filaments

#### **Typical products:**

Water hoses, hoses used in the food, beverage, cosmetics and pharmaceutical industries as well as autogenous, construction, suction, chemical and fueling hoses





*Industrial hoses are characterized by their high resistance to pressure, temperature and media.*

# EXTRUSION TECHNOLOGY PRODUCTION BASE FOR UNPARALLELED PRODUCT QUALITY

KraussMaffei's extensive extruder portfolio comprises tailored solutions for any specific hose production providing efficient homogenization of the rubber compound and thus uncompromising product quality along with outstanding cost-effectiveness.

## **Optimum adaptation to your specific product and process requirements**

Make sure to select the perfect extruder for your specific product and production process. The cold-feed rubber processing extruders of the GE-K series or the Vac GE-K degassing extruders offer ideal conditions for maximum cost-effectiveness in hose production. The simple and yet sturdy machine design, low maintenance requirements, unparalleled output rates and minimum operating cost are the highlights of these rubber extruder series. KraussMaffei tunes the extrusion technology to your specific requirements adapting even the last process detail to the desired finished product – from high-pressure and automotive hoses up to industrial hoses. Base your planning on an extruder concept that guarantees high availability throughout the entire life cycle.



*GE-K extruder for rubber hose production*

## **Cost benefits and technical highlights of the GE-K series**

- Low-wear conveying screws and barrels for long-term machine availability
- Powerful and long-lasting drives
- Easy access to all machine components for rapid servicing and maintenance
- Compact design – extruder, gear unit, drive, temperature control system and electrical equipment are all mounted on a common base frame

## **Unparalleled efficiency in processing standard rubber compounds**

The GE-K extruder series stands for time-tested technology and outstanding production reliability – extruders you can bank on! Thanks to their compact design, these extruders require only little space to develop their full potential. This highly automated machine type is easy to operate without any excessive requirements in terms of process engineering. With its uncompromising productivity and cost-effectiveness, the GE-K extruder is an investment that pays off within an extremely short time.

## **An option for more ...**

The high degassing capacity of cold-feed Vac GE-K vacuum extruders guarantees excellent material quality, in particular when processing compounds containing volatile matter. Thanks to the special screw and barrel configuration, volatile matter and trapped moisture are reliably removed from the rubber compound. The barrel length, screw geometry, drive power and screw speed are perfectly adapted to the specific process.

### Cost benefits and technical highlights of the Vac GE-K series

- Low-wear conveying screws and barrels for long-term machine availability
- Conveying screws with special surface treatment for abrasive compounds
- Powerful and long-lasting drives
- Special screw geometry for intensive material degassing
- Easy access to all machine components for rapid servicing and maintenance
- Compact design – extruder with gear unit, drive, vacuum pump, temperature control system and electrical equipment are all mounted on a common base frame

### YOUR BENEFITS:

- Sturdy machine design
- Low maintenance requirements
- Long service life

### State-of-the-art extrusion dies for all diameter ranges

The straight-through and crosshead dies used in hose production and hose sheathing give high-quality products at outstanding output rates and unparalleled reliability combined with low maintenance requirements and short set-up times. KraussMaffei uses flange connections and clamp or bayonet joints to link the extrusion die with the processing section. To ensure easy and rapid cleaning as well as quick extrusion tool replacement, the connections are designed for manual or hydraulic operation.



*Extrusion die for sheathing the reinforcement*



*Vac GE-K degassing extruder*

# LOWER COSTS AND INCREASED ECONOMIC EFFICIENCY

## AUTOMATIC HOSE CENTERING HEADS

KraussMaffei's hose centering heads are the result of a continuous development strictly geared to customer needs.

The wall thickness, eccentricity and the outside diameter of the rubber hose profiles are permanently measured by an X-ray system. Using digital controllers, the measuring system automatically adjusts the hydraulic centering heads with an accuracy of a hundredth of a millimeter. Centering heads designed as straight-through or cross-head dies are suited for a wide range of applications in the automotive, medical and construction sectors.

### Optimum quality for large production batches

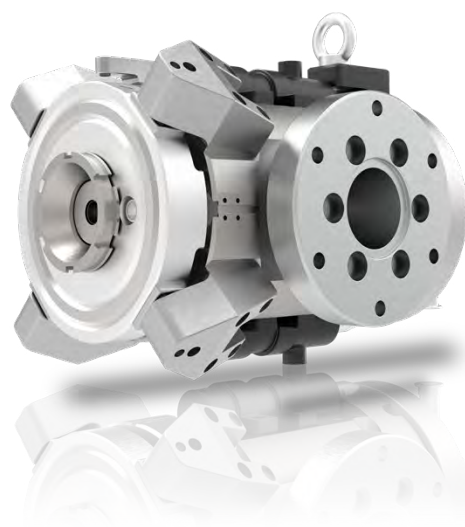
The centering heads are ideally suited for manufacturers striving to produce hose profiles with a uniform wall thickness reliably, economically and in premium quality over a longer period of time. The flow channels of these extrusion heads are extremely precise and optimally matched to the product to be manufactured. Short heating times, rapid set-up and minimum cleaning efforts ensure unparalleled productivity.

### Low tolerances for material-saving extrusion

KraussMaffei's centering heads offer substantial benefits in terms of quality assurance and machine operation. Thanks to continuous automatic production monitoring, manufacturers are in a position to substantially reduce the time required to adjust the equipment. This boosts system utilization and cuts personnel costs. Moreover, the reduced wall thickness tolerance also brings noticeable material savings. This means that – at identical quality – considerable sums can be saved on material costs year after year and the investment in the system pays off in almost no time.

### YOUR BENEFITS:

- On-line eccentricity control and documentation
- Short-term eccentricity < 0.05 mm, permanent eccentricity < 0.02 mm
- Low material consumption
- Possible reduction of the hose wall thickness



*Crosshead die*



*Rubber processing extruder with straight-through die and X-ray measuring system*

### Technical description

#### Straight-through die

Maximum permissible extrusion pressure: 350 bar  
 Outside product diameter: 3 – 100 mm  
 Extruder connection: 45 – 120 mm

#### Crosshead die

Maximum permissible extrusion pressure: 500 bar  
 Outside product diameter: 5 – 110 mm  
 Extruder connection: 45 – 120 mm

The heads are optionally available in a manual version without X-ray measuring system.

### Test our equipment under realistic production conditions

The process engineers in our R&D center will support you in continuously optimizing your products and processes. They will cooperate with you to develop individual solution concepts and specialize in finding the most efficient alternative for manufacturing your products. Take advantage of the economic benefits by having our extrusion technology precisely adapted to your specific requirements and production conditions.

### Additional highlights!

Are you looking for the ideal hose extrusion line for high-pressure, automotive or industrial hoses? We offer the perfect solution for any given process task. In addition, our wide product portfolio comprises various extruders, special tools and an extensive range of accessories you can select from.

# HIGH-PERFORMANCE SOLUTIONS FOR SUSTAINABLE OPTIMIZATION OF THE ENTIRE HOSE PRODUCTION PROCESS DOWNSTREAM EQUIPMENT

The multi-stage rubber hose production process is characterized by closely linked work steps. All machine components of the downstream equipment are optimally tuned to each other – sophisticated technology along with sturdy design, unparalleled reliability and maximum output rates.

To enhance the compression strength, the extruded hoses are provided with one or several reinforcement layers. The reinforcing material is generally composed of textile or metallic filaments that are converted into a braided, knitted or spiral-type fabric, depending on the required compression strength and the intended application.

KraussMaffei offers customized solutions for this purpose: computer-controlled knitting, spiraling or braiding machines for sheathing hoses within a diameter range of 5 to 110 mm. These fully automatic machines process filaments of different materials and thickness.

Thanks to their short retooling times, they ensure uncompromising cost-effectiveness in particular for small and medium production batches and meet the most exacting standards in terms of quality, productivity and durability.

## Wrapping machines

Wrapping machines are designed for providing the hoses with a tape to prepare them for vulcanization in an autoclave. This highly cost-effective solution ensures short set-up times and reliable production of a wide variety of hose sizes.

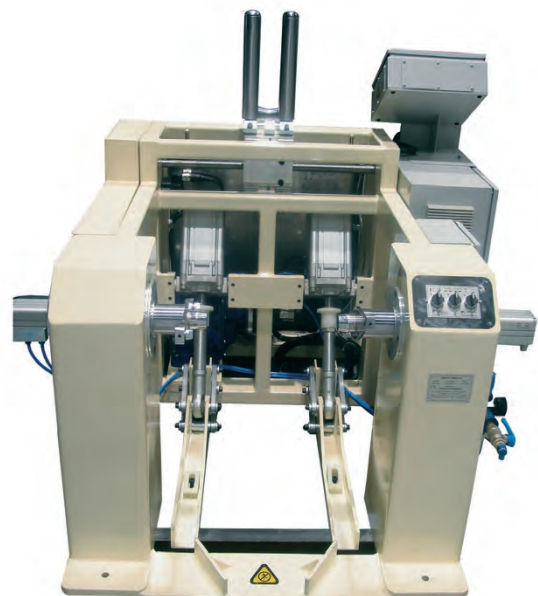
## Vulcanization technology

Vulcanizing in an autoclave converts the visco-elastic rubber into an elastomer. During this process, the hose properties like mechanical stress, permanent flexibility, high tear strength, chemical and ageing resistance are determined.

Autoclaves of horizontal or vertical design are specifically tailored to customer requirements.



Plate winder – plate diameter of up to 3500 mm



Winding station



*Spiraling machine / knitting machine*

#### **Measuring and testing equipment**

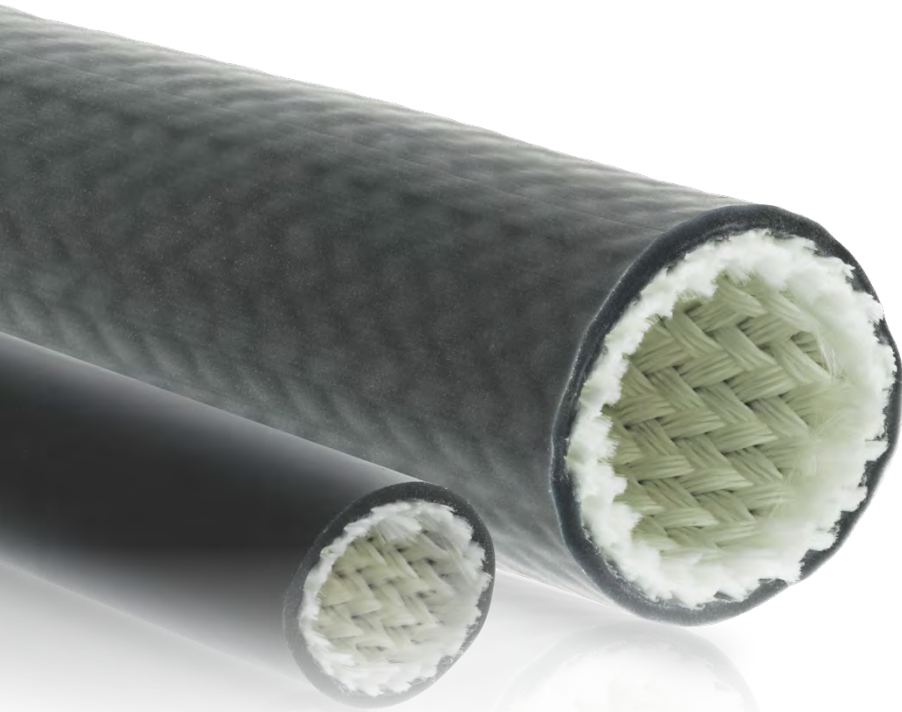
Hose extrusion lines are equipped with non-contact measuring devices that reliably control the production process in order to ensure strict compliance with tolerances and standards. These non-contact measuring systems are designed for non-destructive testing of the hose quality under almost authentic operating conditions. In addition, this check can also be performed in-line.

KraussMaffei production lines enable rubber hose manufacturers to exploit the full value-added potential and operate profitably. KraussMaffei solutions are your key to success!

#### **YOUR BENEFITS**

- Customized downstream equipment
- Reliable state-of-the-art technology
- Excellent product quality

# HIGHLY PROFESSIONAL AND RELIABLE PRODUCTION SILICONE HOSE EXTRUSION LINES



KraussMaffei has tailored its silicone hose lines for the highly efficient processing of this unique material. These lines convince by unparalleled processing quality, short set-up times, maximum ease of use and are designed for hose diameters ranging between 5 and 110 mm provided with reinforcement or not. Thanks to the product-specific design and perfectly adapted profile guidance, any deformation of the extruded material is avoided and the production of uniformly shaped hoses is ensured.

*Silicone hoses of  $\varnothing$  5 – 110 mm with or without reinforcement, additional hose sizes are available upon request.*

## **Optimum extrusion technology**

Depending on profile dimensions, compound properties and specific process parameters, extruder sizes ranging from GE 30 to GE 150 are available for this application. In terms of processing section length and temperature control, these extruders are specifically designed for the extrusion of silicone rubber.

*Compact profile extrusion lines for the production of silicone hoses with vertically arranged shock module.*





### Profile extrusion lines

Profile extrusion lines can be of horizontal or vertical design. The shock module arrangement is mainly determined by the profile geometry.

As a systems supplier, KraussMaffei offers all components of the extrusion line – starting with feeder and extruder via shock modules, hot-air channels, cooling sections, take-off systems right through to final assembly.





# 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 a selected 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 make 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 that ensure maximum availability and optimum productivity of your machines.

## Technology<sup>3</sup> 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](http://www.kraussmaffei.com)



**HIGH COST-EFFECTIVENESS.  
MAXIMUM RELIABILITY.  
LONG SERVICE LIFE.**  
HOSE EXTRUSION LINES



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