



Tailor-made Rubber Extrusion





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Innovative ideas, systematic research and development are the key to success in this branch of industry with its wide variety of rubber products.

For customized solutions in the building of machines for rubber processing, with the advancement of technologies and in the development of recipes, **rubicon** can look back on 70 years of experience.

German and international manufacturers of technical rubber products, the tyre and the cable industry all belong to its content customers.

rubicon-laboratory equipment and **rubicon**-special machinery can be found in the laboratories of large rubber manufacturers around the world.



Rubber Technology and Turnkey Projects

rubicon stands for experience and innovative development in the interest of the customers.

In order to support the competitiveness of our customers, process analyses and project studies are carried out. Existing technologies are developed further and adapted to the constantly changing requirements of the market.

The aim of this work are machines and lines for the production of specialized technical rubber products. The following factors, as well complying with international standards, are the main focus of our work:

- Complete projects for the manufacturing of selected rubber products “from one source”
- Extrusion products of the highest quality
- Integration of the lines into firm structure and network
- Quality management
- Complete commissioning including test production of the finished product
- Optimal control of the processes
- Innovative and customized technologies as well as material and product specific expert knowledge for the following products:

Rubber profiles of the automobile and construction industry

Cooling water, turbocharger and manifold hoses

Fuel and air conditioning hoses

Rubber lined rolls for printing and other applications

Industry hoses

Fire fighting and high pressure hoses

Textile machine aprons and manchons

Hoses and profiles from silicone rubber



Extruders for the Processing of Rubber Mixtures

Specialized in extruders of small and middle sizes, rubicon supplies compact and reliable machines. These are equipped with modern controls as well as screw and barrel designs, which are characterized by high output, product quality and ease of service.

Fields of application

- Rubber profiles, strips and hoses of any kind
- Cable, wire and cord coating
- Textile machine aprons and roll coverings
- Tire and V-belt components
- Bicycle and car tubes
- Fire fighting hoses and fenders
- Silicone rubber products e.g. for medical applications
- Blanks for press feeding
- Calender feeding and straining

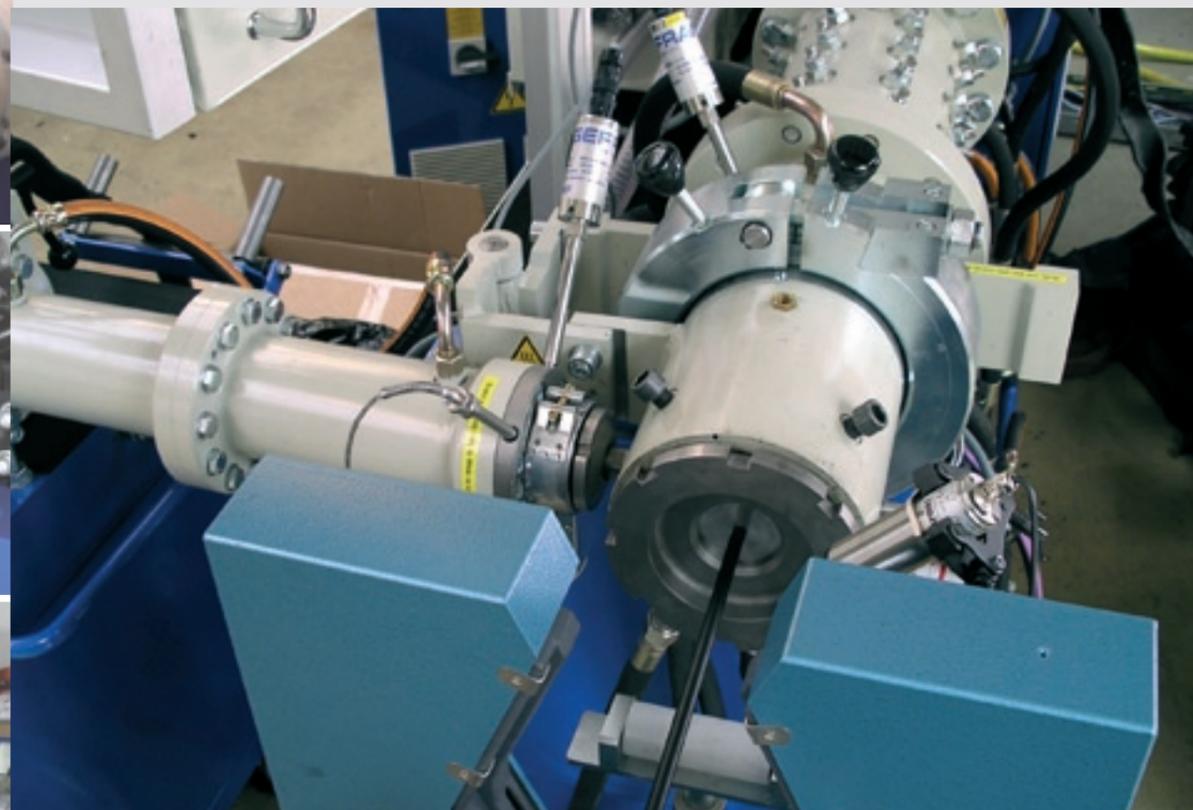
Types

- Standard extruder
- Pin barrel extruder
- Vent extruder
- Coextrusion lines

rubicon Standard Extruder

rubicon-standard extruders have proven their worth within the traditional extrusion range for many decades.

Along with their favourable price performance ratio they are also particularly suitable for the processing of well extrudable mixtures on the basis SBR and NBR.



Fuel hose coextrusion line



EEK 45.14 S for the manufacturing of hoses



EEK 63.14 S for the processing of fluorocarbon rubber



EEK 63.10 S for the manufacturing of blanks



EEK 90.12 S for butyl rubber

Technical data standard extruder

| type | | EEK 32.12 S | EEK 45.14 S | EEK 63.14 S | EEK 90.14 S | EEK 125.16 S | EEK 150.16 S |
|------------------|------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
| screw diameter | D (mm) | 32 | 45 | 63 | 90 | 125 | 150 |
| screw length | L/D | 12 | 14 | 14 | 14 | 16 | 16 |
| max. screw speed | n (min ⁻¹) | 90 | 70 | 85 | 60 | 45 | 45 |
| max. motor power | P (kW) | 4 | 11 | 37 | 64 | 108 | 178 |
| max. output | ṁ (kg/h) | 10-25 | 25-45 | 120-200 | 250-400 | 400-650 | 600-1000 |

Extruders for the Processing of Rubber Mixtures

rubicon Coextrusion Lines

Coextrusion lines are predominantly used as duplex or triplex systems for the production of sealing systems and hoses for the automobile and the construction industry.

Multi-component profiles can be provided with metal reinforcements. Movement and revolving mechanisms or air cushions make the flexible arrangement of the extruders possible.

rubicon Pin Barrel Extruder



EEK 125.14 M
for manufacturing of industry hoses

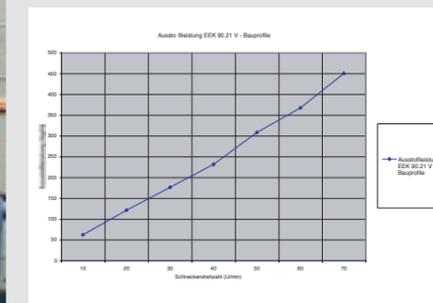
| Technical data pin barrel extruder | | | | | |
|------------------------------------|------------------------|-------------|-------------|--------------|--------------|
| type | | EEK 63.14 M | EEK 90.14 M | EEK 125.14 M | EEK 150.16 M |
| screw diameter | D (mm) | 63 | 90 | 125 | 150 |
| screw length | L/D | 14 | 14 | 14 | 16 |
| max. screw speed | n (min ⁻¹) | 75 | 60 | 45 | 45 |
| max. motor power | P (kW) | 37 | 64 | 108 | 178 |
| max. output | \dot{m} (kg/h) | 150-250 | 350-600 | 550-1200 | 950-1800 |

Pin barrel extruders combine all the characteristics of modern extrusion technology and permit the processing of most different rubber mixtures with outstanding homogeneity and extrudate quality.

The mixing pins extending into the volution cause a low temperature load of the rubber mixture in connection with high output and self purification of the machine.



Coextrusion line for manufacturing of profiles



rubicon Vent Extruder



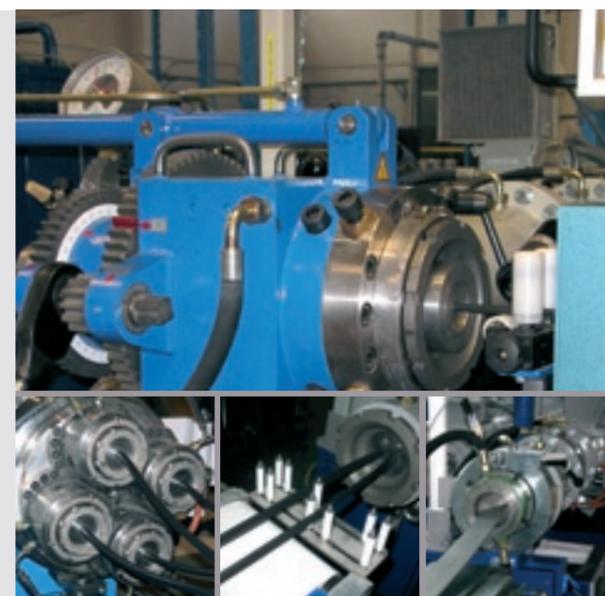
EEK 90.21 V
for manufacturing of automobile profiles

| Technical data vent extruder | | | | | | |
|------------------------------|------------------------|-------------|-------------|-------------|-------------|--------------|
| type | | EEK 32.16 V | EEK 45.16 V | EEK 63.18 V | EEK 90.21 V | EEK 125.22 V |
| screw diameter | D (mm) | 32 | 45 | 63 | 90 | 125 |
| screw length | L/D | 16 | 16 | 18 | 21 | 22 |
| max. screw speed | n (min ⁻¹) | 90 | 70 | 85 | 80 | 55 |
| max. motor power | P (kW) | 4 | 11 | 37 | 89 | 122 |
| max. output | \dot{m} (kg/h) | 10-12 | 15-35 | 60-120 | 150-480 | 320-650 |

Vacuum extruders were developed for the production of nonporous profiles and hoses. The easily volatile components of the rubber mixture are removed by using a custom-built screw and the degassing barrel with attached vacuum pump.

These machines are best used ahead of continuous, pressureless vulcanization lines. Low pulsation and high pressure build-up are the outstanding characteristics of these extruders.

rubicon Extrusion Heads



With the help of decades of experience rubicon also offers extrusion heads for profile, hose and cable production. Apart from straight, cross and coextrusion heads of different dimensions, special heads can also be developed and manufactured on customer request.

The innovative design of the extrusion heads enables the production of complex, extremely thin or thick-walled products made of difficult to process rubber mixtures.

The head design is distinguished by the optimal layout of the flow channels and that they are easy to clean and operate.

Continuous Vulcanization Lines, Material Feed and Downstream Equipment

rubicon Salt Bath Vulcanization Lines

The new generation of salt bath vulcanization lines for the production of profiles for automobile and construction industry is impressive because of high productivity combined with low specific energy consumption. Modular and compact design of lines, low salt discharge through effective preliminary purification of the profiles and an ultra-modern computerized process control including pressure control and long-distance data transmission are characteristics that stand out in these rubicon-lines. Due to the automatic salt water recycling system there is no environmental impact from contaminated waste water.

The complete lines include take-off conveyor belts, cooling and washing units, caterpillars, cutting and winding devices - made by rubicon.



LCM 20 RS/EL Salt bath vulcanization line



LCM 20 RS/EL Dipping roller section



LCM 26 RS/EL Salt bath vulcanization line



rubicon Microwave Vulcanization Lines

Microwave vulcanization lines are used preferentially for large volume rubber profiles together with subsequent hot-air tunnels. The microwave tunnel is constructed in such a way that the profile can be heated up evenly. The rubber surface is additionally warmed up by hot-air circulation. Variable power control and magnetron protection make the line flexible so that it can be used in a wide range of applications.



Microwave tunnel RC-MW 12/6



Microwave unit

rubicon Hot-air Vulcanization Lines

rubicon provides self-contained lines for hot air vulcanization particularly for profiles, insulating tubes and custom-made products. The hot-air circulation with high air speed enables good heat-up speed of the rubber extrudate. These vulcanization processes and its technology are developed and established by rubicon.



Hot-air tunnel with hose running-in



Hot-air tunnel RC-HLT 12 EL

Lines for the Processing of Silicone Rubber

rubicon produces complete lines for the manufacturing of profiles and hoses with infrared vulcanization particularly for silicone processing.

rubicon Extruders for Processing Silicone Rubbers

Characteristics

- Compact design
- Barrel and screw geometry suited to the processing of silicone rubbers
- Special feed roll design allowing easy cleaning during the change of material
- Water cooling with temperature control for screw, barrel and head

Fields of applications

Silicone extruders are suitable for the production of

- Hoses
- Profiles
- Cables

with high throughput for a wide range of applications in the industry and medical technology.



| Technical data silicone extruder | | | | | | |
|----------------------------------|------------------------|---------------|---------------|---------------|---------------|----------------|
| type | | EEK 32.12 SIR | EEK 45.12 SIR | EEK 63.12 SIR | EEK 90.12 SIR | EEK 125.12 SIR |
| screw diameter | D (mm) | 32 | 45 | 63 | 90 | 125 |
| screw length | L/D | 12 | 12 | 12 | 12 | 12 |
| max. screw speed | n (min ⁻¹) | 90 | 70 | 70 | 65 | 60 |
| max. motor power | P (kW) | 4 | 7 | 20 | 32 | 50 |
| max. output | ṁ (kg/h) | 15-35 | 45-70 | 60-110 | 150-250 | 180-400 |

EEK 63.12 SIR with H-IRT 8000

rubicon Infrared-Vulcanization Tunnel

rubicon offers high performance vertical and horizontal infrared vulcanization tunnels for the vulcanization of silicone rubbers. The penetration of the infrared radiation into the material leads to the internal heating of the extrudate. This results in the rapid stabilization of the product. Therefore consistent surfaces and accurate dimensional accuracy can be achieved even with low viscosity of the mixture.

Vulcanization tunnels are suitable for the vulcanization of peroxide and platinum crosslinked silicone hoses and profiles. Additionally they can be designed for cleanroom applications.



Vertical infrared tunnel V-IRT 28/08



Infrared shock tunnel

The shock tunnel for the pre-cure (prevulcanization) of profiles and hoses with emitter temperatures over 2000°C is extremely powerful. The tunnel is situated between extruder outlet and continuous vulcanization and causes the solidification of the material, a high form stability and an even profile surface. The system is also suitable for the shock vulcanization of rubber profiles and hoses. Furthermore, it can be combined with the microwave and hot-air vulcanization lines.

rubicon Combined Infrared-/Hot-air Vulcanization Tunnel



Combined infrared/hot-air tunnel H-IRT 24/8

The tunnel combines the advantages of an infrared shock zone regarding fast pre-curing in the hot-air section. High energy efficiency is reached by the circulation of the hot-air.



Laboratory Equipment and Mills

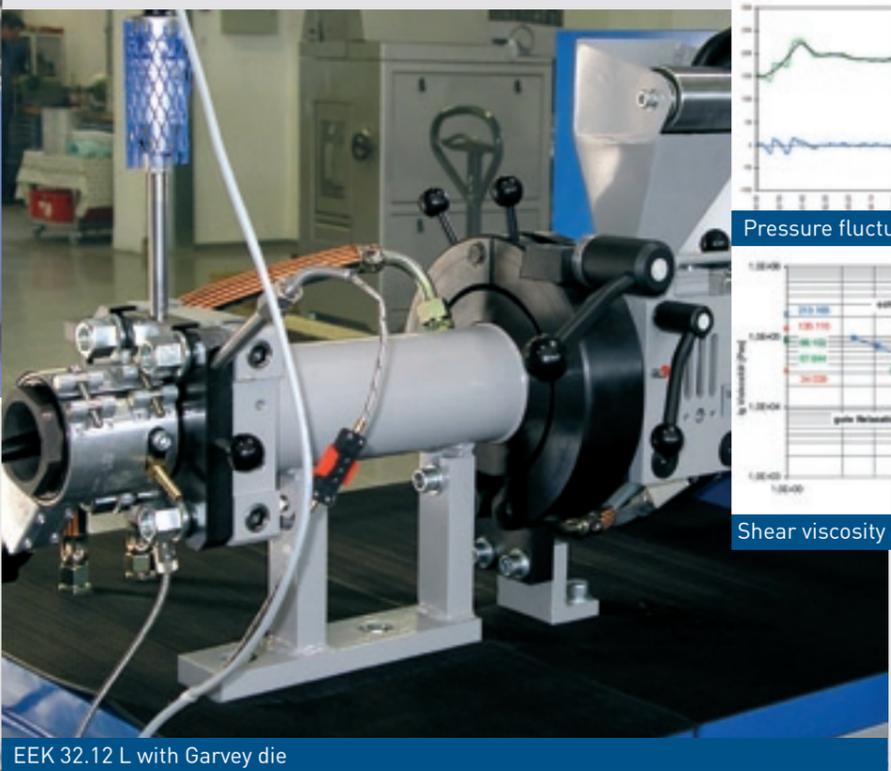
In the field of laboratory equipment for rubber processing, rubicon offers laboratory extruders and laboratory mills, which are equipped with all the technical characteristics of large production machines. The new laboratory extruder with its patented rheometer head enables production related testing during development of the recipe and quality control.

rubicon Laboratory Extruder

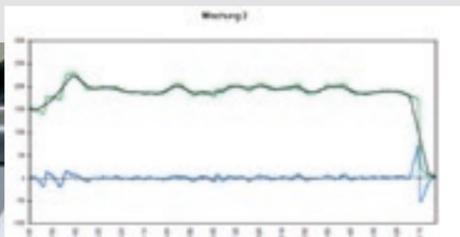
Characterised by the technical characteristics of large extruders, equipped with modern measuring and data evaluation technology and appropriate software, the rubicon laboratory extruder determines the extrusion behaviour and the viscosities of rubber mixtures. Batch and release testing with quality certification is made possible by the short testing periods.

Fields of application

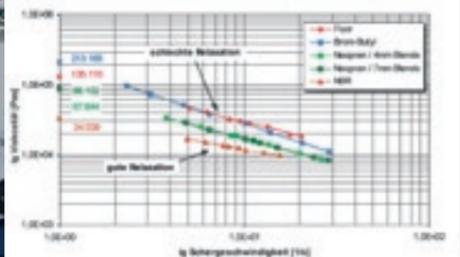
- Recipe development and release inspection in the rubber test laboratory
- Quality control for release inspection
- Definition of shear and extension viscosity of rubber mixtures with the rheometer head
- Production of precision foils and hoses
- Cord and metal wire coating of silicone products
- Production of blanks for compression forms



EEK 32.12 L with Garvey die



Pressure fluctuations chart



Shear viscosity chart

rubicon Laboratory and Mixing Mills

Compact and place saving construction, customized scope of design as well as a high safety standard are characteristics of the rubicon laboratory mills. In their design they fulfil all the requirements of a modern test laboratory.

With their solid design, strong drive, high strength and long durability of the mill frames, rolls and bearings the rubicon mixing mills have proven their worth in rubber compounding departments.



Laboratory mill MT 8" x 20"



Motor-driven roll nip adjustment



Strip cutting device

| | Laboratory mill | | Mixing mill | |
|---|-----------------|-------------|--------------|--------------|
| | MT 6" x 13" | MT 8" x 20" | ML 12" x 30" | ML 16" x 42" |
| roll diameter D (mm) | 150 / 6" | 200 / 8" | 300 / 12" | 400 / 16" |
| roll length L (mm) | 330 / 13" | 500 / 20" | 750 / 30" | 1050 / 42" |
| max. motor power P (kW) | 4 (5,5) | 7,5 | 22 | 56 |
| roll speed, front n1 (min ⁻¹) | 19,3 | 21 | 16,3 | 16,3 |
| roll speed, rear n2 (min ⁻¹) | 22,5 | 24 | 18,7 | 18,7 |
| capacity per batch ṁ (kg) | 0,5-1,0 | 1,0-2,0 | 5-10 | 15-25 |

A wide range of design options and accessories, e.g. fixed or infinitely variable roll speed drive, manual or motorized roll nip adjustment, bottle-neck type or periphery drilled and cooled rolls or a strip cutting device, makes them suitable for a wide range of applications with high safety standards.

Fields of application

- Recipe development and finish testing in the rubber test laboratory
- Quality control
- Preheating, mixing, plastic coating and sheeting during all experimental tasks
- Production of small quantities for production tasks
- Production of rubber mixture strips
- Taking up, cooling and rolling out of the mixture loads discharged by the rubber kneader



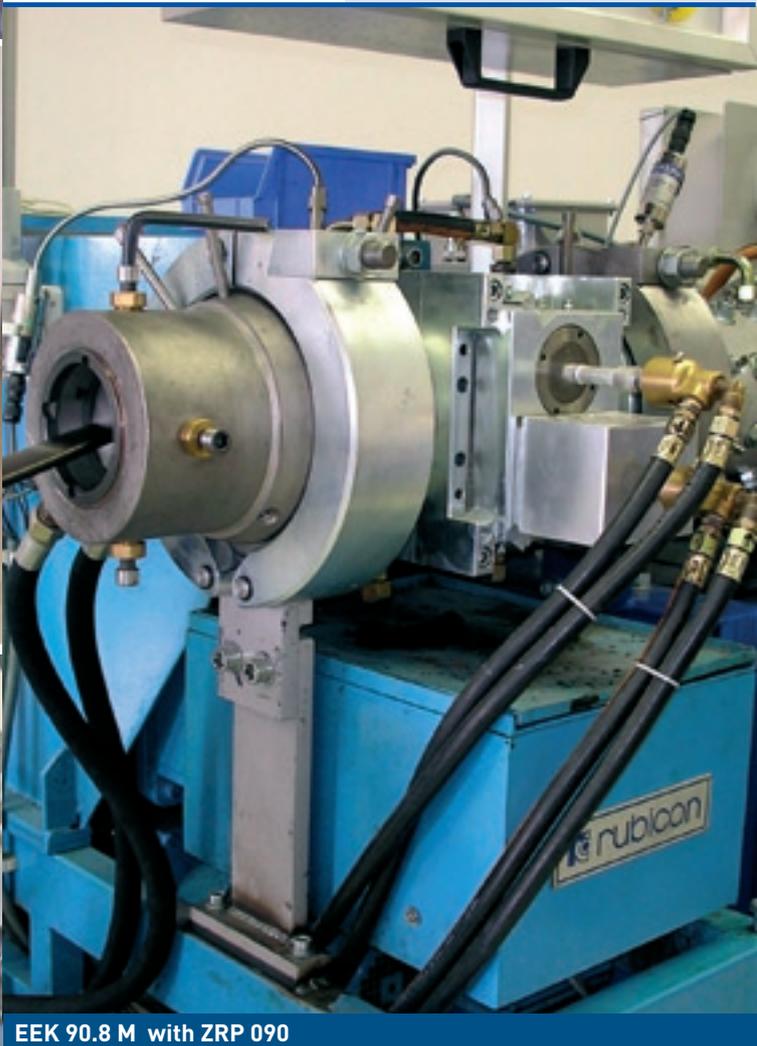
Extruder-Gear pump-Combination

The rubicon extruder-gear pump-combination is used for the production of extrudates with highest requirements of dimensional accuracy and extrusion stability.

The functions, normally combined in a conventional extruder are separated into different procedures allowing them to be individually optimised. The extruder performs "only" the task of feeding, plastification and if required the degassing of the mixture. The gear pump conveys the mixture to the head with a constant volume and provides the necessary pressure build-up.



| | | Technical data extruder-gear pump-combination | | |
|--------------------------|--|---|---------|---------|
| type | | ZRP 063 | ZRP 090 | ZRP 150 |
| capacity | \dot{m} (kg/h) | 10-120 | 25-500 | 80-1200 |
| max. pressure | p (bar) | 500 | 500 | 500 |
| max. pressure difference | p (bar) | 400 | 400 | 400 |
| gear speed, adjustable | n (min ⁻¹) | 6-50 | 3,5-60 | 3,5-60 |
| motor power | P (kW) | 12 | 22 | 27 |
| control | PLC control | | | |
| heating/cooling | water based heating/cooling system for gears and housing | | | |
| machine frame | all units are mounted on a common frame | | | |
| control unit | with touch screen, hinged | | | |



EEK 90.8 M with ZRP 090

Fields of application

- All compounds
- Profiles with highest demands on dimensional accuracy and stability
- Reinforced and non-reinforced hoses
- Roll coverings
- Straining and strip production
- Filling of big moulds and press forms

The pump is placed between the extruder and the extrusion head with the following results:

- Very low fluctuations with high dimensional accuracy of the products
- Significant throughput increase due to the high pressure
- Practically no overflowing of the vacuum part of the vent extruders
- Extrusion, straining and outforming in one process
- Universal use in all extruder lines



Innovative Partner for the Rubber Processing Industry



The quality and the effective production of the technical rubber products and goods of each customer take centre stage of the technology and machine development. This is made possible by the close connection between rubicon rubber technologists and technical designers. Both individual machines and turnkey projects are tailored to their special conditions and desires.

The **rubicon**-technical department plays an important part in the success of the company. Equipped with all necessary machines new materials, products and machine components of the customers are analysed in numerous tests. The results allow the optimization of the construction of the machines and lines.

rubicon-customers profit from the technical expertise, the innovation potential, the reliability and the customer-oriented service of the company. These characteristics, in connection with the longevity of the machines, prove its worth in the world-wide operation of the **rubicon**-plants.

rubicon is and remains a specialist for

- Extruders for rubber processing
- Continuous vulcanization lines, feeding and downstream equipment
- Rubber technology and turnkey projects
- Rubber laboratory equipment
- Mixing mills



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