



MÖLLERING

TRADITION AND INNOVATION



ONE FAMILY – TWO BUSINESSES – ONE CONCEPT: INDIVIDUALITY



Möllering Rubber and Plastic Technology GmbH | Norderstedt | www.moellering.de



Thenhausen Injection Molding and Mold Making GmbH | Leopoldshöhe | www.thenhausen.com

WELCOME TO MÖLLERING AND TSW



Reaching quality and innovation with competence and creativity comprises the core of our long-term corporate strategy. As a family business since 1932, we can draw on long-time production expertise in the area of rubber and plastic processing. Our corporate objective is reaching the highest quality of products and services, to build and hold excellent customer relationships in harmony with pleased employees and careful interaction with nature.

Considering our moral values, humans play the key role - as customers, as employees, as suppliers or as part of our environment. Our employees constitute the greatest good of our company. On the basis of a good coexistence, we intend to show our employees, that high motivation and assumption of responsibility are profitable. As a family business and a part of the Thenhausen Corporate Group, we face this responsibility together with our sister company TSW in Leopoldshöhe near Bielefeld.

The complex problems of our customers depict our challenges. Together with our highly motivated and qualified employees as well as advanced production technology we develop creative solutions specifically for our customers. Thereby we are driven by our passion for innovative and high quality products.

We offer our customers a wide spectrum of materials as well as an outstandingly diversified product range. With our advanced production facilities, our technical competence and our excellent standard of quality, we pursue our target, to meet our customer's requirements to their highest satisfaction.

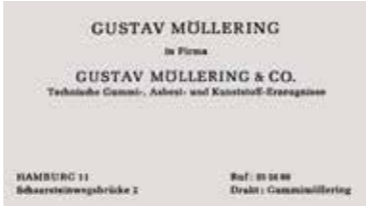
CEO | Dipl.-Ing. oec. Jörg Thenhausen

TRADITION UND INNOVATION

WHAT HAPPENED SO FAR...

The merchant Gustav Möllering established a shop specialized on technical rubber products on July 4th 1932 at Rumpfweg in Hamburg.

1932



On June 1st followed the official restart at Hofweg 60 in Hamburg.

1943

In July all premises have been destroyed by bomb attacks.

On January 2nd Alfred Thenhausen joins the company as a partner. Gustav Möllering retires from the business.

1949

25th company anniversary

1979 Since January 1st Alfred Thenhausen becomes sole holder of the Möllering GmbH.

1957



On January 1st Alfred Thenhausen absorbs the traditional Company Hiri, Hildebrand, Richter & Co. in Kirchgellersen near Lüneburg, where the production starts after a complete refurbishment.

1960

1982 Since first of June 1986 the company headquarter is temporarily shifted to Hamburg-Sasel.

1979

50th company anniversary



1986 The dipl. business engineer Jörg Thenhausen becomes an equal partner and CEO of Möllering on 1/1/1988. His wife Susanne (dipl. economist) accedes the payroll and financial accounting.

1980



Möllering moves to Hans-Böckler-Ring in Norderstedt near Hamburg.

1982

1986

1988



1990



75th company anniversary on July 4th 2007. The number of employees in both companies runs up to 70.

2002

Foundation of the company TSW Thenhausen Injection Molding + Mold Making GmbH in Leopoldshöhe near Bielefeld

Supplier Award in the field of logistics awarded by the global leader of flexographic printing plants

2007



2007

Patent MPRS lamellar wheel

Planning-kickoff for an extension of the plant in Norderstedt

2008

Supplier Award awarded by of the world's largest producer of forklift trucks

2011

80th company anniversary

2012



2013

Winner of the Innovation Award vth

Supplier Award in the field of total quality awarded by the global leader of flexographic printing plants

2013

Möllering wins a tripple. The world's largest producer of forklift trucks awards Möllering three times for outstanding performances

2014

After she finished her Bachelor of Science Degree in Business and Engineering Amelie Thenhausen joins the company on Oktober 1st and starts her extra-occupational master program.

2015



2015

Möllering moves into the new building in Norderstedt.

2016

85th company anniversary on July 4th with meanwhile 90 employees.

2017



PRODUCTION EXPERTISE

FREEHAND PRODUCTION

Process to mechanically produce molded likely parts and prototypes without use of a mold

“EVERY DEVELOPMENT STARTS WITH AN IDEA.”

To realize this idea from prototype to series is one of our tasks in the mechanical processing. Our understanding of mechanical processing comprises the drilling, lathing, milling, grinding, punching etc. of rubber and plastic pre-products. Therefore we also use special plates from our own production.

When it comes to producing complicated products from technical drawings without using molds in a very short time, our specialists are in demand. Every single one is an experienced artist in his segment.

Möllering – your partner right from the start.





PRODUCTION EXPERTISE

RUBBER MOLDED PARTS

Molded parts consisting of rubber, which are produced by pressing into a mold

The perfect assistance, when it comes to sealing, steaming and storing, represent rubber molded parts. They are produced by standard processes like compression molding, transfer molding and injection molding using specific molds. We use standard compounds like **EPDM, NBR, NR, SBR, silicone**, but we also produce and use special compounds like e.g. **Viton® (FKM), Urethane (AU/EU) and hydrated NBR (HNBR)**. Furthermore, we offer special hardnesses according to customer requirements.

When choosing suitable materials we consider, which situation like e.g. **temperatures, media, influences of the surrounding, mechanical attrition** etc. the products has to face. We also use compound materials, so called **2-component-materials**. For example rubber materials are reinforced with metal or to improve sliding characteristics with Teflon or Graphite. We also use **unplasticized** elastomers.

Viton® is a registered trademark of DuPont Performance Elastomers, USA



PRODUCTION EXPERTISE

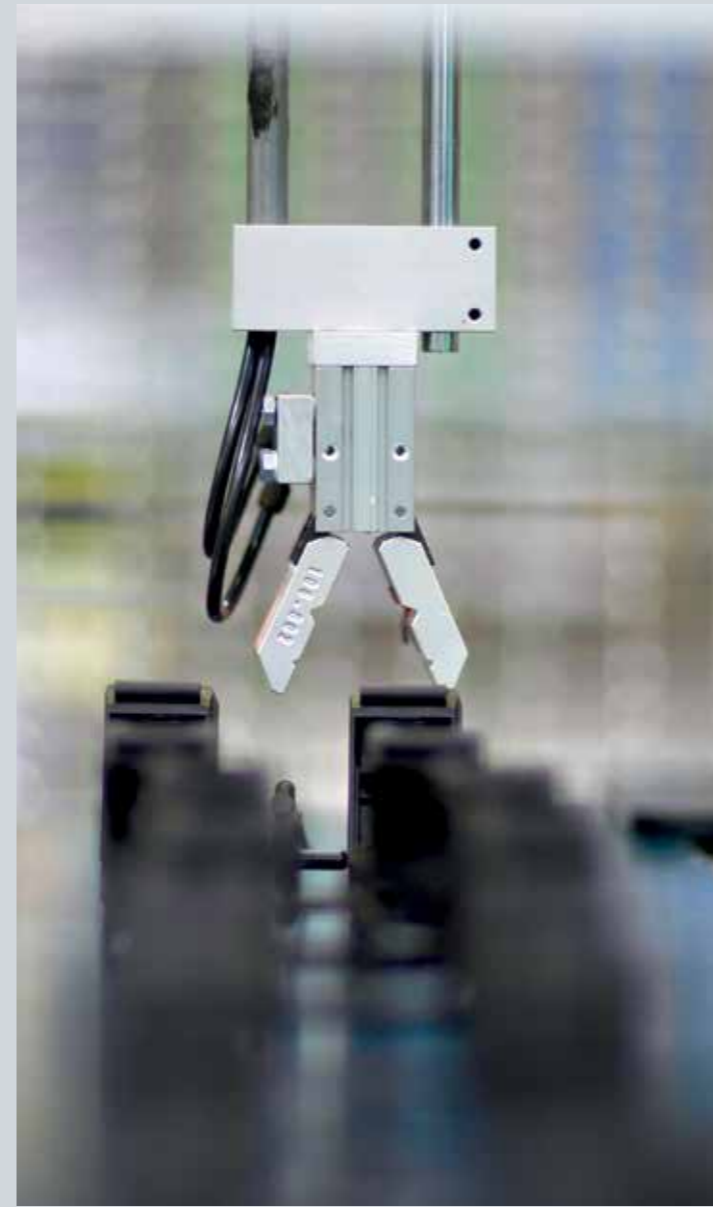
PLASTIC MOLDED PARTS

Thermoplastic parts that are produced by injection and cooling in a mold

Plastics already found their way into our daily use, not only as an inexpensive replacement of metal parts, but also due to their outstanding moldability, weight reduction, recyclability and various technological characteristics like e.g. elasticity, E-modulus and electrical behavior.

Well-known thermoplastic materials are PA, TPE, TPU, PVC, ABS, PP, PC, PS, PEEK, PET amongst others. We can process these materials in pure or modified form, e.g. reinforced by fiberglass or glass globes. Furthermore, the 2-component injection molding is the perfect technology to realize combination options of different materials.

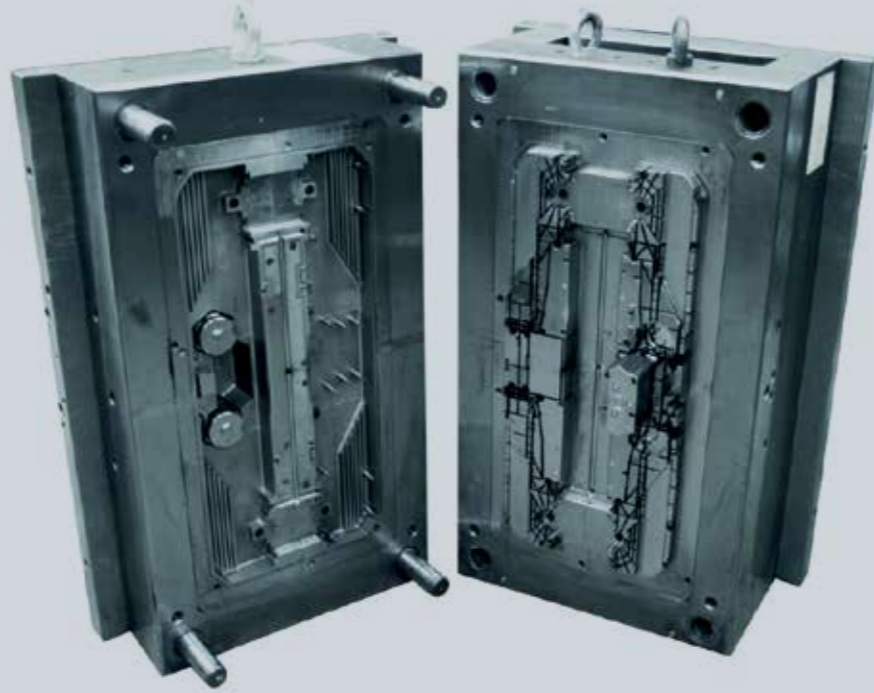
We are also offering the assembly of complete component groups



PRODUCTION EXPERTISE

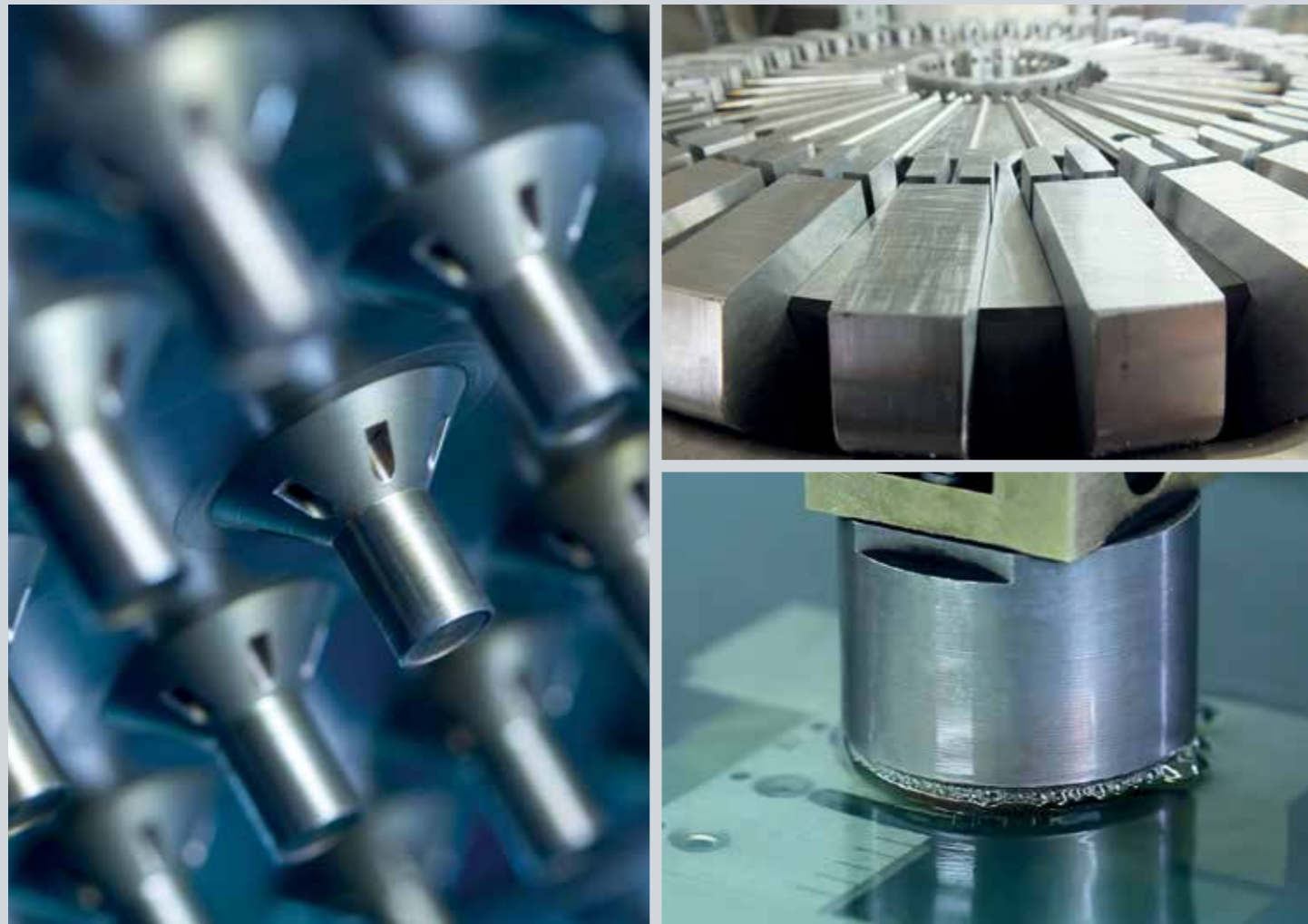
MOLD MAKING

Production of molds and devices for production of molded parts



Constantly growing demand on molded products made of elastomers and thermoplastics, which are used in all segments of the industry, brought our own mold manufacture to today's standard. Starting with product specific consulting of our customers, the construction, up to the processing on modern CNC-driven mold using machines, we offer you the entire problem solution.

You define your requirements – we realize the best technological and economical way.



PRODUCTION EXPERTISE

3D-PRINTING FOR MOLD MAKING

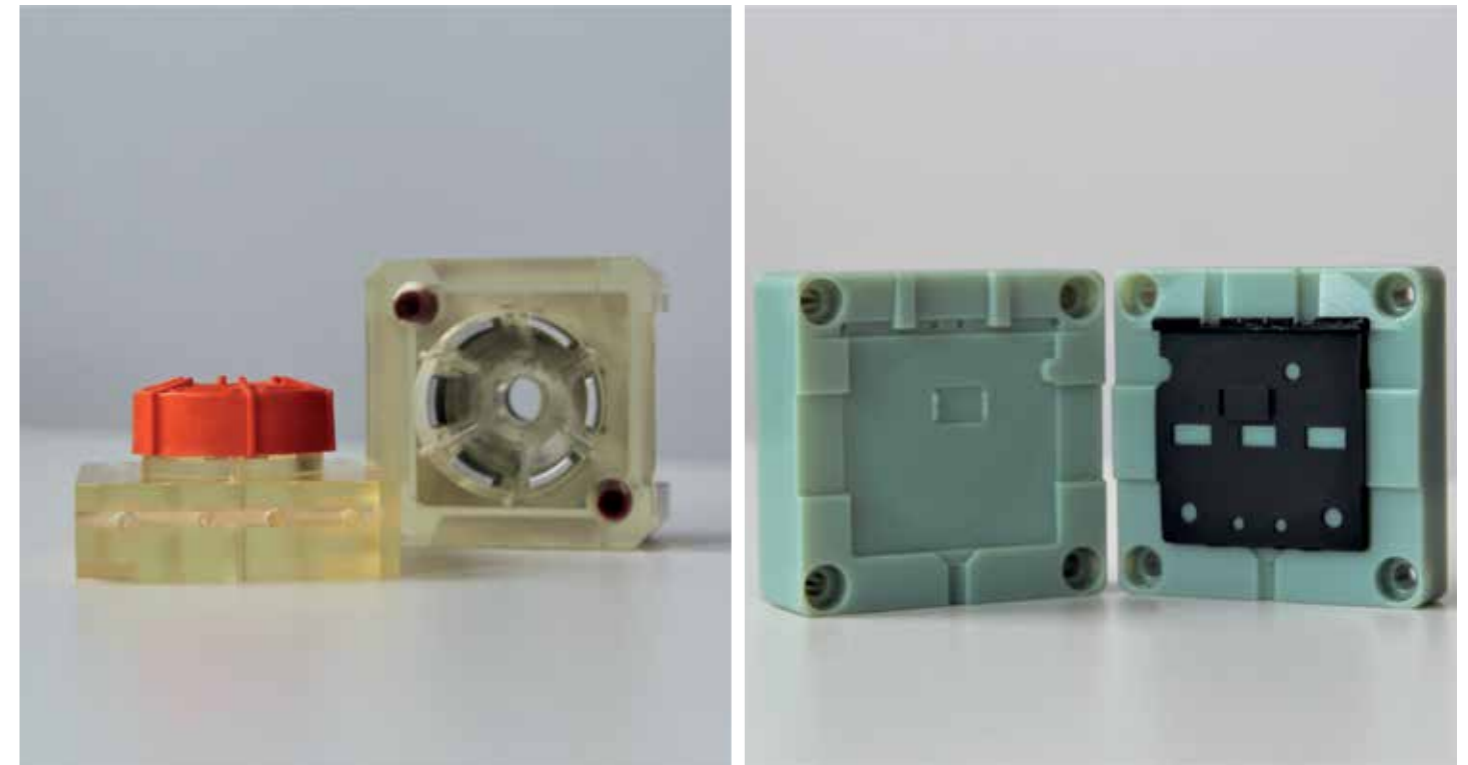
Producing Mold Inserts



Concerning our forward-looking competence, 3D-printing now forms a part of our production process. Using the polyjet technology, we produce mold inserts for injection molding of products with a component weight of approximately 100g and primarily small quantities.

The production of injection molded products using polyjet mold inserts constitutes a new challenge for us. In the process of polyjet printing, liquid photopolymer is cured by the use of UV light and layering techniques. The production of complex geometries and slight wall thicknesses can be realized with this method. With various materials specifications like outstanding form stability up to elastic characteristics can be achieved. The maximum dimensional limits are 255x252x200 mm.

Our customers benefit from 3D-printed mould inserts in the production process, due to the fact that no expensive steel tool insert needs to be purchased and products with high precision and low quantities can be produced efficiently.



PRODUCTION EXPERTISE

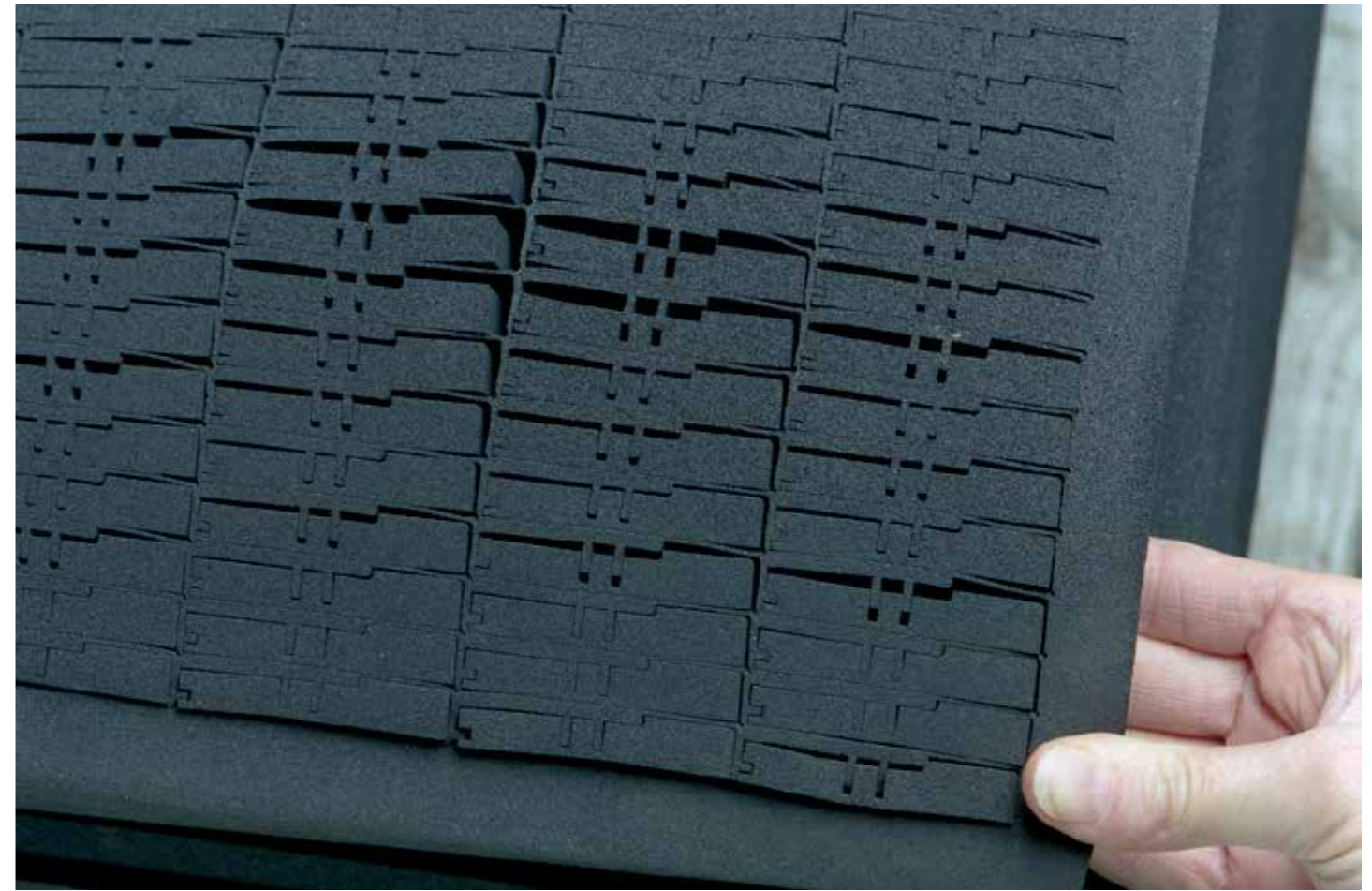
WATER JET TECHNOLOGY

Process for cutting materials using a high pressure water jet



You need products based on drawings made of cellular or massiv elastomer or plastic? With a water pressure up to 5.000 bar we precisely cut even strongest materials.

Also the processing of fine geometries is possible with this method. Due to the fact that no molds are needed, we can efficiently realize low as well as high quantities.



CASTING TECHNOLOGY

Process to produce molded parts of fluid materials that cure in a mold without use of pressure



In addition to our homogenous elastomers of freehand production and molded product processing we offer our customers our casting technology with so called cast elastomers. Cast elastomers are defined as Polyurethane and Vulkollan®, which we process in shore hardnesses from 20° to 98° ShoreA. Typical applications are e.g. roll and core lamination, wear parts, slat wheels (no-crush-rolls) and pulling rings for the corrugated board industry and other finished products.

We also use the casting technology for processing of plate ware with special hardnesses unter 70° ShoreA for special products, which are not available by default. Due to the use of inexpensive cast molds, we can produce almost all geometries for our customers.

Vulkollan® is a registered trademark of the Covestro-Group





PRODUCTION EXPERTISE

HOSE TECHNOLOGY

Flexible tubes to deliver solid, fluid or gaseous substances

High quality hoses with or without intubation are indispensable in our technical everyday life. No matter which media, no matter if made of elastomers, plastics, or a combination of both – we offer you the perfect solution for every purpose.

And if there does not exist a product for your specific application yet, we develop it for you - using our various available materials and production processes. Therefore we draw on our production techniques like extrusion with or without mandrel, hand manufacturing, weaving or wrapping.



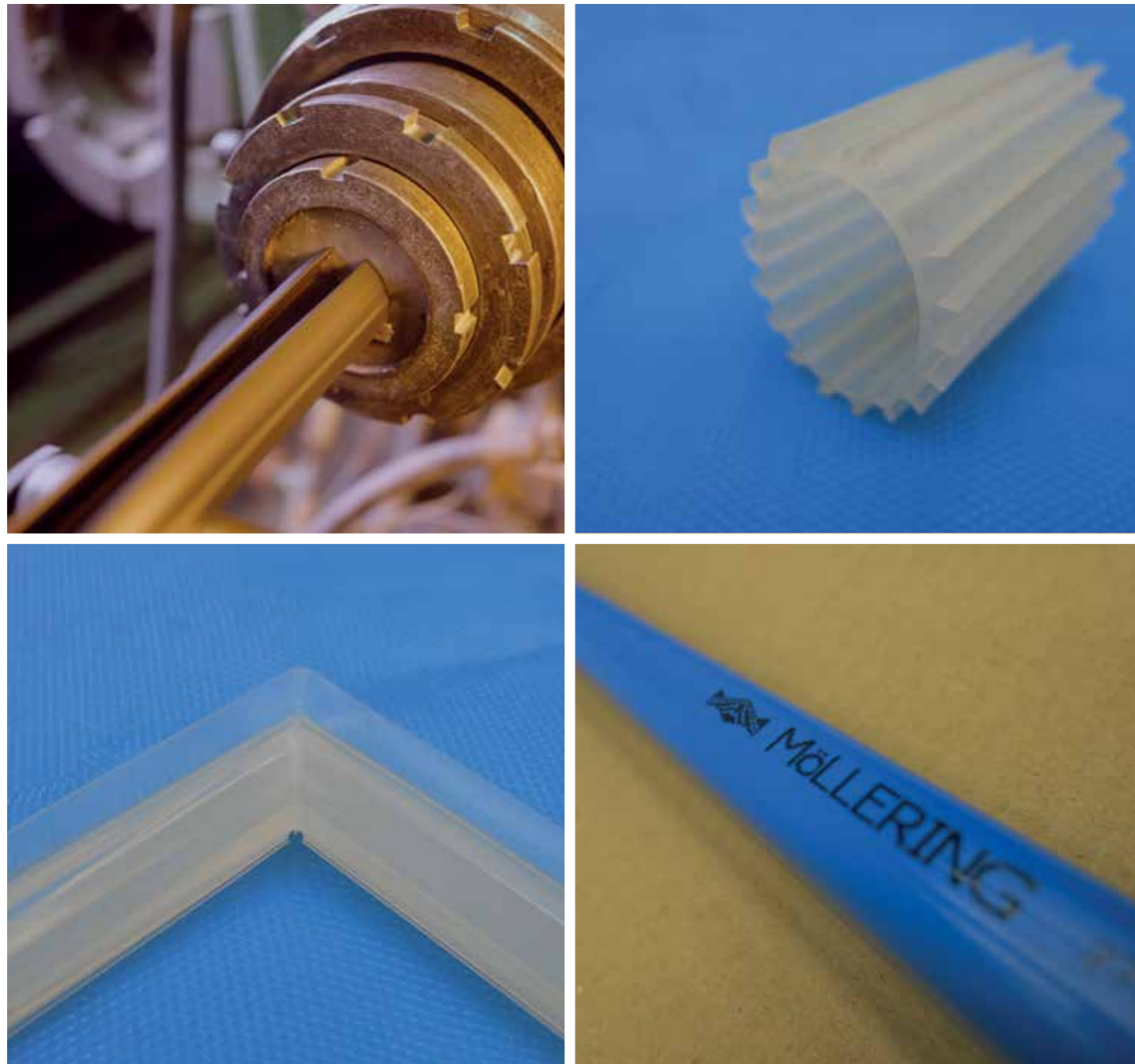
PRODUCTION EXPERTISE

EXTRUSION

Process to produce rubber and plastic hoses and profiles

Whether profile or round cord, whether machine hose or hollow-chamber profile – our diverse compound stock guarantees the right solution for your problem and all geometries. We use elastomers and plastics, both massive and cellular form of all common plastics, elastomers and TPEs.

Furthermore, the 2-component-technology is part of our processing spectrum, which allows the combination of different materials.



PRODUCTION EXPERTISE

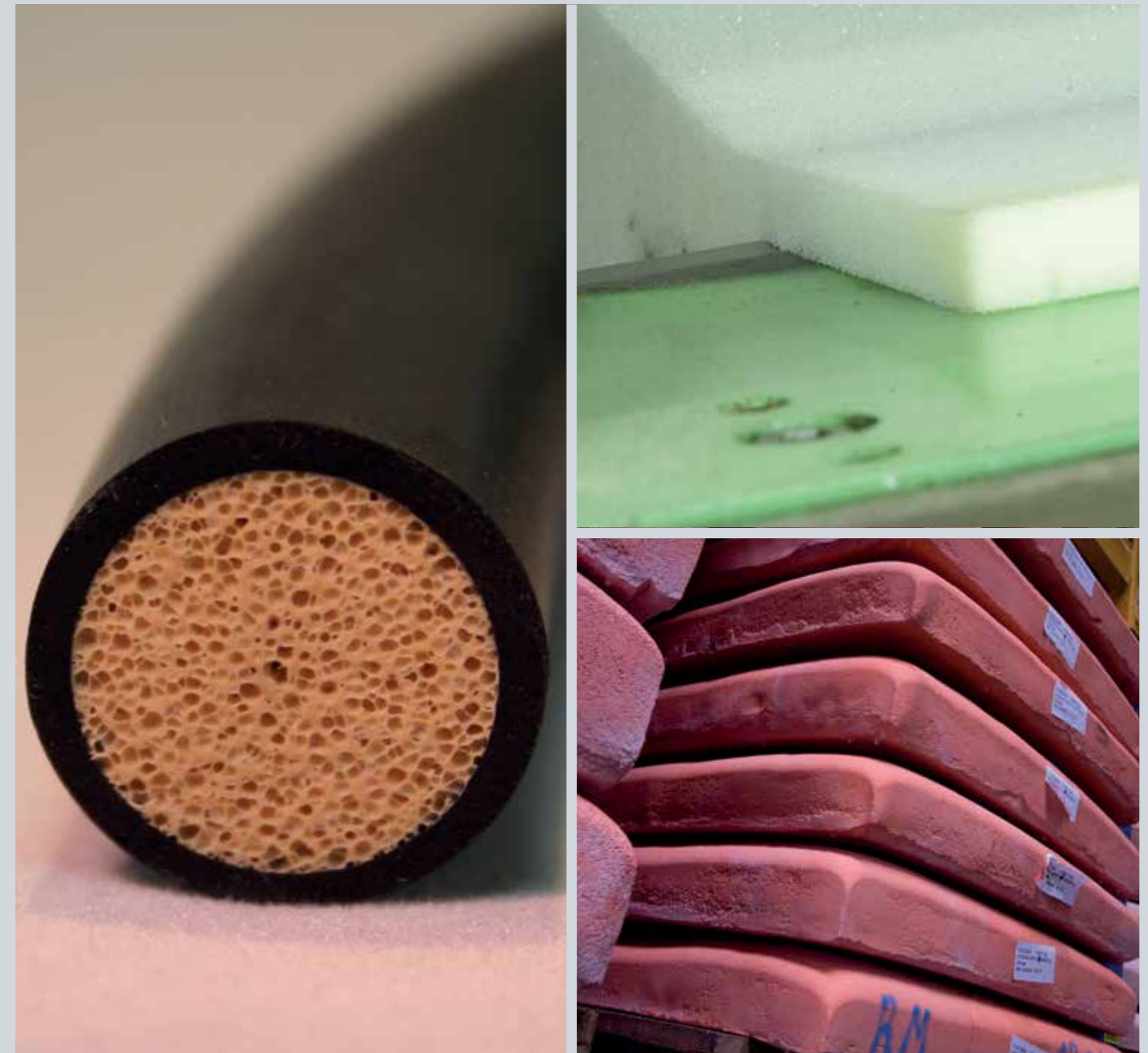
FOAM TECHNOLOGY

Gaseous bubbles enclosed in solid, elastic or fluid walls

Molded parts of cellular elastomers and plastics are attractive for their low weight, good rebound resilience and outstanding heat insulation. Foam technology comprises the processing, editing and refining of different foams.

Therefore we use our CNC-driven water jet cutting plant or splitting plant as well as the mechanical work of our specialists. Cellular rubber, moss foam rubber, sponge rubber, silicone foam, PE and PU foams.

These materials are processed for seals, for core and roll lamination as well as for finished and semi-finished products in many industrial segments. We cut, punch, laminate, coat and glue together foams and on request we finish the foam with for your application suitable self-adhesive tape.



INDUSTRIES

Our products are being used in the following industry sectors:



Medical technology



Electrical industry



filling Machines



Packaging machines



Chemical industry



Vehicle construction



Appliance industry



Printing machines



Ship building



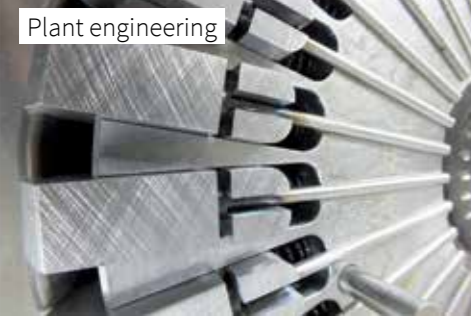
Food industry



Wood and furniture industry



Corrugated board industry



Plant engineering



Aviation industry



Construction industry

QUALITY

Reaching highest quality in products and services is what we are aiming at. Because in a long-term perspective, quality outlines a crucial factor for success – concerning products, employees or relationships. But John Ruskin (1819-1900) already posed, you should not save quality in order to save costs.

“There is hardly anything in the world that someone cannot make a little worse and sell a little cheaper, and the people who consider price alone are person’s lawful prey. It is unwise to pay too much, but it is also unwise to pay too little. When you pay too much, you lose a little money, that is all. When you pay too little, you sometimes lose everything because the thing you bought is incapable of doing the thing you bought it to do. The common law of business balance prohibits paying a little and getting a lot... It can’t be done. If you deal with the lowest bidder it is well to add something for the risk you run. And if you do that you will have enough to pay for something better.”

John Ruskin (1819-1900)

To achieve our objective of highest quality in products and services, a careful quality management is required. All our processes are monitored by our quality management system, which is certified by ISO 9001:2008.



LOGISTICS

In regards to Kanban, Just-in-time, EDI and other modern logistical concepts we provide stock in our logistics chain, which we deliver on a daily basis, in order to fit into your production cycle.

Thus we realize liquidity and security of supply for you in addition to low unit costs due to higher production lots. We are proud to mention at this point to be winner of several Quality-Awards in the field of on-time delivery.



COMPOUNDS

Often we can improve the required functionality of our molded parts by using special compounds with optimized characteristics. In addition to our proven standard compounds, our special compounds with special material characteristics are gaining more attention.

Meanwhile we can access a wide range of special compounds for various tasks. For new challenges we improve and develop new compounds, according to your requirements.

EXAMPLES FOR OUR AVAILABLE COMPOUNDS AND THEIR CHARACTERISTICS ARE:

- Natural rubber, synthetic rubbers like SBR, NBR, EPDM, CR, urethane rubber, FKM and HTV silicone
- Hardnesses from 10 to 95° Shore A
- BfR and FDA standards for applications in the food industry
- Black and colors according to RAL standards, customer specifications or samples
- Compounds with special slide characteristics
- Compounds with optimized abrasion behavior
- Compounds with optimized temperature resistance
- Conductive compounds
- Nonconductive Compounds
- Special adjustments for silicone compounds in order to minimize surface tack
- Silicone compounds with optimized thermal conductivity



WERKSTOFFE

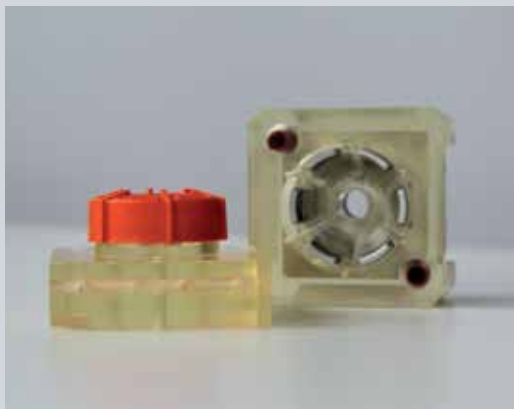
OVERVIEW ELASTOMERS

	NR	IR	SBR	BR	IIR	EPDM	NBR	ECO	CR	CSM	AU	T	SI	FSI	FKM	ACM	PUR
Tear resistance unreinforced	1	2	5	6	4	5	5	5	3	5	2	6	6	6	5	6	1
Tear resistance reinforced	1	2	2	4	3	3	2	3	2	3	1	5	4	4	3	3	/
Ultimate elongation	1	1	2	3	2	3	2	3	2	3	2	4	4	4	3	3	2
Rebound elasticity	2	2	3	1	6	3	3	2	3	4	3	4	3	3	5	5	2
Abrasion resistance	2	2	2	1	3	3	2	3	2	3	1	5	5	5	4	4	1
Tear growth resistance	2	2	3	5	3	3	3	3	2	4	3	4	6	6	3	4	1
Electrical resistance	1	1	2	2	2	2	4	5	3	4	3	3	1	1	4	4	2
Temperature range hot air	90	90	100	100	130	150	120	145	120	120	120	140	200	200	200	160	80
Temperature range cold air	-40	-40	-50	-60	-40	-50	-50	-40	-40	-20	-20	-30	-70	-80	-20	-20	-25
Aging resistance	3	3	3	3	2	1	3	2	2	2	2	3	1	1	1	2	1
Ozone resistance	4	4	4	3	2	1	3	2	2	2	2	2	1	1	1	2	1
Gasoline resistance	6	6	6	5	6	5	1	1	2	2	1	1	5	1	1	1	2
Oil and fat resistance	6	6	6	6	6	4	1	1	2	2	1	1	1	1	1	1	2
Acid resistance	3	3	3	3	2	1	4	5	2	2	5	4	5	4	1	5	6
Alkalies resistance	3	3	3	3	2	2	3	5	2	2	5	3	5	4	1	5	6
Hot water	3	3	3	3	1	2	3	4	3	3	5	3	5	4	2	5	6

1 = excellent, 2 = very good, 3 = Good, 4 = moderate, 5 = low, 6 = insufficient, X = no comparison with elastomers

OVERVIEW PLASTICS

Description	Density	Absorption of water until saturation	MECHANICAL DATA							THERMAL DATA		
			Mechanical stress	Elongation of break	E modulus Tensile test	Ball indentation hardness	Impact resistance	Coefficient of sliding friction	Melting temperature	Heat distortion temperature	Operating temperature, permanent	Operating temperature, temporary
acc. to DIN	g/cm ³	%	MPa	%	MPa	MPa	kJ m ⁻²	-	°C	°C	°C	°C
PA 6	1,14	6,5-7,5	100 110	10 20	3500	190	n. Br.	0,34-0,42	295	110	100	180
PA 6.6	1,14	8,5	70 90	40- 150	2000 3300	100-170	n. Br.	0,35-0,42	255	100	100	200
PA 6.6 GF 30	1,37	5,5		3,5 5	7500 9700	200-270	13-17	0,45-0,5	255	250	110	200
PC	1,2	0,35	65	60-100	2200	100	n. Br.	0,52-0,58		135	120	140
PEEK	1,32	0,5	92	50	3600		n. Br.	0,3-0,38	334	140	250	300
PEEK GF 30	1,47	0,1		3	10000			0,11	334	271	250	300
PE 300	0,95	<0,05	24-31	400-800	1000- 1400	45-60	n. Br.	0,29	128-133	42-49	90	120
PE 500	0,95	<0,05	25	>500	800	45	n. Br.	0,29	130-135	44	90	120
PE 1000	0,93	<0,05	20	>350	600	38	n. Br.	0,29	130-135	42	100	125
PET	1,37	0,5	80	70	2800	145	n. Br.	0,25	255	75	110	180
PMMA	1,18	2	60	3-10	3000	180	18			60	100	100
POM	1,41	0,5	65	40	3100	155	n. Br.	0,32	165	110	100	140
PP	0,91	0,03	35	650	1300	80	n. Br.	0,3	165	65	100	130
PS	1,05		45	3	3200	150	20			70	70	80
ABS	1,05	1	25	5	2600	98	n. Br.		235	80	85	100
PTFE	2,18	<0,05	25	500	700	30	n. Br.	0,08-0,1	327	55	260	260
PVC-U (hard)	1,4		50	10	1700	100	n. Br.			70	65	100



MÖLLERING

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————— Rubber and Plastic Technology GmbH —————