

KraussMaffei



HIGH PRECISION AND HIGH PRODUCTIVITY IN LSR PROCESSING

SilcoSet injection moulding machines

IN PARTNERSHIP WITH INDUSTRY

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



Automotive



White goods



Construction



Life Sciences



Electrical/electronics

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

Ready for any challenge

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

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

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

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

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

People for Plastics

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

Adding value for customers

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

Close to customers around the world

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

A special process for a special material – SilcoSet injection moulding machines for liquid silicone rubber LSR



Packaging

The special properties of liquid silicone rubber (LSR) make it the material of choice in many demanding applications. KraussMaffei's SilcoSet machines deliver the necessary precision and productivity.

The machines are specially adapted for the SilcoSet process, where the two liquid components are mixed immediately prior to injection moulding. Liquid silicone rubber parts – as diverse as gaskets, catheters and teats for babies' feeding bottles – are used in many sectors, including automotive, aerospace, electrical, electronics, packaging and medical.

TRANSPARENT TECHNOLOGY

Meet the machine: take a tour of a SilcoSet injection moulding machine

Mould heating
Up to 7 kW as standard
Heat-flow monitoring



Silicone package
Mould vacuum control
Pneumatic cascade control

Clamp
Wear-protected, Viton strippers for tiebars
and all linear guides



Metering and mixing unit
For 20 l and 200 l units
Mechanical and electrical interfaces

Injection unit
Application-specific screw geometry, special
check valve, cooled needle seal nozzle, linear
holding pressure fine adjustment

Barrel
Liquid temperature control for the barrel keeps
LSR at an optimal temperature

SILCOSET DESIGN BASICS

High product quality and a stable process – for a good return on your investment

SilcoSet injection moulding machines are engineered to take account of the processing characteristics of LSR. Your investment will pay off in a very short time.

LSR components feed directly into the process

The two ready-to-use components are fed into the process without a lot of preparation effort. Individually, the components are non-reactive. Only when the two components are mixed in the mixing unit prior to injection is a reactive compound produced. Curing in the heated mould at above 170°C is very fast.

Perfect for processing LSR

The two pasty LSR components are pumped separately from their transport containers into the mixing unit by scoop piston pumps operating at pressures of up to 300 bar. The two components are intensively mixed in the static mixer. Pigment can be added. The specially-engineered static mixing line guarantees intensive mixing. A special screw configuration and a non-return valve are designed to process the low-viscosity LSR efficiently to ensure precise and repeatable shot weights.

Based on CX or EX series machines

Both CX and EX machines can be adapted with a SilcoSet package for LSR injection moulding. Both the CX and EX are fast cycling machines that score on outstanding repeatability and reliability. Screws, barrels and nozzles have been selected to cope with the special processing characteristics of LSR.

The 2-platen clamp unit of the CX series machines gives the machines a small footprint. Access from three sides makes for easy parts removal and simple cleaning. Absolutely uniform clamp force application to the mould via the four tiebars ensures high precision and minimal mould wear.

KraussMaffei's EX machines are electric machines operating with the new, patented Z-toggle clamp. Fewer moving parts – the Z-toggle has with only eight pivot points – means fewer lubrication points. All joints are encapsulated with circulating lubrication to avoid product contamination. The injection unit with the coupled direct drives for injection and plasticizing is also encapsulated. On an all-electric machine, with no hydraulic oil, there is no risk of leaks or spills.



A thermoplastic part with an LSR seal, like this housing, can be produced in one fully automated work process.

DETAILED PRODUCT INFORMATION

SilcoSet machines open up new prospects for cleanroom production and multicomponent moulding

What makes an injection moulding machine right for high productivity and profitable processing of LSR?

Engineered for cleanroom production

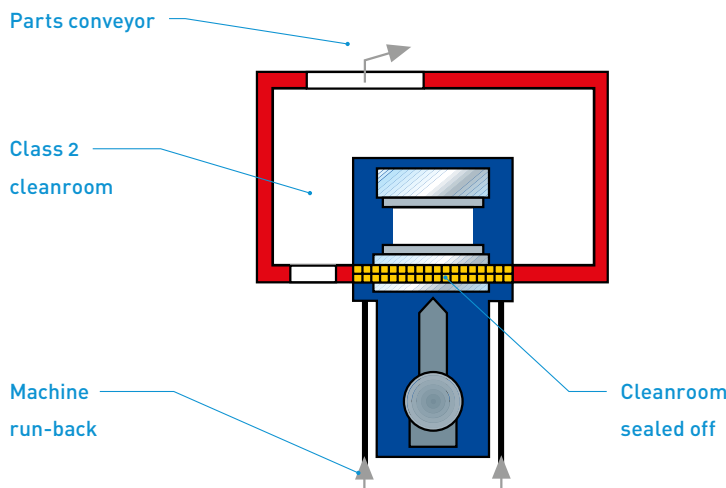
To be cost-effective, cleanroom machines need to be compact, with a small footprint, and designed end-to-end for cleanroom production. The advantages of SilcoSet machines show up most clearly under tough production conditions. The water-cooled drives of EX-based SilcoSet machines cause no air turbulence and emit no particles. Efficiently cooled machines contribute to stable conditions in air-conditioned areas. The CX machines are also ideally suited for cleanroom processing. Only the compact clamp unit – beyond the fixed platen – protrudes into the clean zone. The injection unit and material conveyors stand in the grey room.

Multicomponent capability – thermoplastic + LSR

For maximum cost-effectiveness, it's important that both the thermoplastic substrate and the LSR machine can be handled in an integrated multi-component process. This is the way to achieve maximum value-added. Multicomponent moulding has a number of advantages, from greater design freedom and improved product quality to eliminating cost-intensive process steps and assembly effort.

Operator-friendly, quality-oriented control system

Two hallmarks of the MC 5 microprocessor control are high performance and ease-of-operation. Clear graphics and a user-friendly operator interface make for close and accurate control of all quality-critical parameters. Comprehensive diagnostics and documentation meet all requirements for optimal quality assurance.



A compact injection moulding machine, ideal for cleanroom operation

SilcoSet – your benefits:

- Very fast cycles
- High-precision, high-quality products
- Outstanding repeatability
- Absolutely reliable engineering
- Optimal for cleanroom production
- Huge innovation potential for future developments

Functional and design specifications for injection moulded parts are on a steep upward curve. At the same time, materials and formulations are becoming ever more sophisticated. It takes high-precision injection moulding machines – the more modular the better – and innovative mould design to respond flexibly to the growing challenges. CX multinject machines meet all these requirements. To maximize their potential for fast cycles, high productivity and low unit costs, these multicomponent machines can be integrated in work cells with modules such as indexing platens, plasma pretreatment, turntables or spin platens. The right automation also has a positive impact on product quality and costs, eg, in a multicomponent solution with automated parts transfer.

See results faster

Fast-curing liquid silicone rubbers offer outstanding properties including excellent mechanical stability and elasticity over a very wide temperature range. The SilcoSet process makes it easy for you to use LSR and its desirable properties in your application.

See the benefits, earn the profits

The two chief benefits of the SilcoSet process, which have a positive impact on your bottom line, are precision and high productivity. This translates into very competitive unit costs.

The benefits are inherent in the SilcoSet injection moulding machines and their outstanding technology – very fast cycles, outstanding repeatability and reliability. Quality is a hallmark of parts produced in a SilcoSet process. In addition, the SilcoSet process offers immense potential for future innovations in parts design and materials.

Technical data: LSR plasticizing unit

Type	SP55	SP100	SP180	SP380	SP750
Diameter (mm)	18	22	30	40	50
Stroke volume (cm ³)	20	38	85	201	393
Injection pressure (bar)	2500	2500	2025	1860	1892

Machine configurations

Type	Clamp force (kN)							
	350	500	650	800	1100	1300	1600	2000
SP55	■							
SP100	■							
SP180	■							
SP380	■							
SP750	■							

Complete technical data can be found in the CX/EX catalogue and data sheets.

Applications across industry



Automotive

SilcoSet injection moulding machines have the versatility to meet the diverse requirements of the automotive components industry – seals and gaskets are typical examples.



Aviation

The aviation industry would find it very hard to do without silicone parts made in outstanding quality on SilcoSet injection moulding machines – O-rings are just one example.



Electrical/electronics

Silicone parts are also indispensable in the electrical and electronics industries; they can be mass produced for a low unit price on SilcoSet injection moulding machines – for example, wire-end ferrules.



Medical

The medical sector has long relied on silicone for many applications; the parts are produced on SilcoSet machines under cleanroom conditions if necessary – for example, components for baby oxygen masks.

And much, much more

Whatever sector you produce for and whatever injection moulding projects you're planning, if you talk to KraussMaffei you're talking to the right people. Our know-how is at your service.



SERVICE WORLDWIDE

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

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

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

All-round service

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

Customer trials and prototyping in our test lab

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

Training with high hands-on content

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



At your service worldwide



How to contact us

Apart from email you can contact us on the service hotline or by post at this address:

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Injection Moulding Service

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

SilcoSet injection moulding machines are specially adapted for processing LSR liquid silicone rubber. They are engineered for highest precision, high productivity and competitive costs. The two LSR components are mixed immediately before injection moulding. Both CX and EX machines can be adapted with a SilcoSet package. A perfect match to the special requirements of processing LSR, these machines operate at very fast cycles with outstanding repeatability. Ideal for cleanroom production, they also offer tremendous scope for new products and part designs.

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