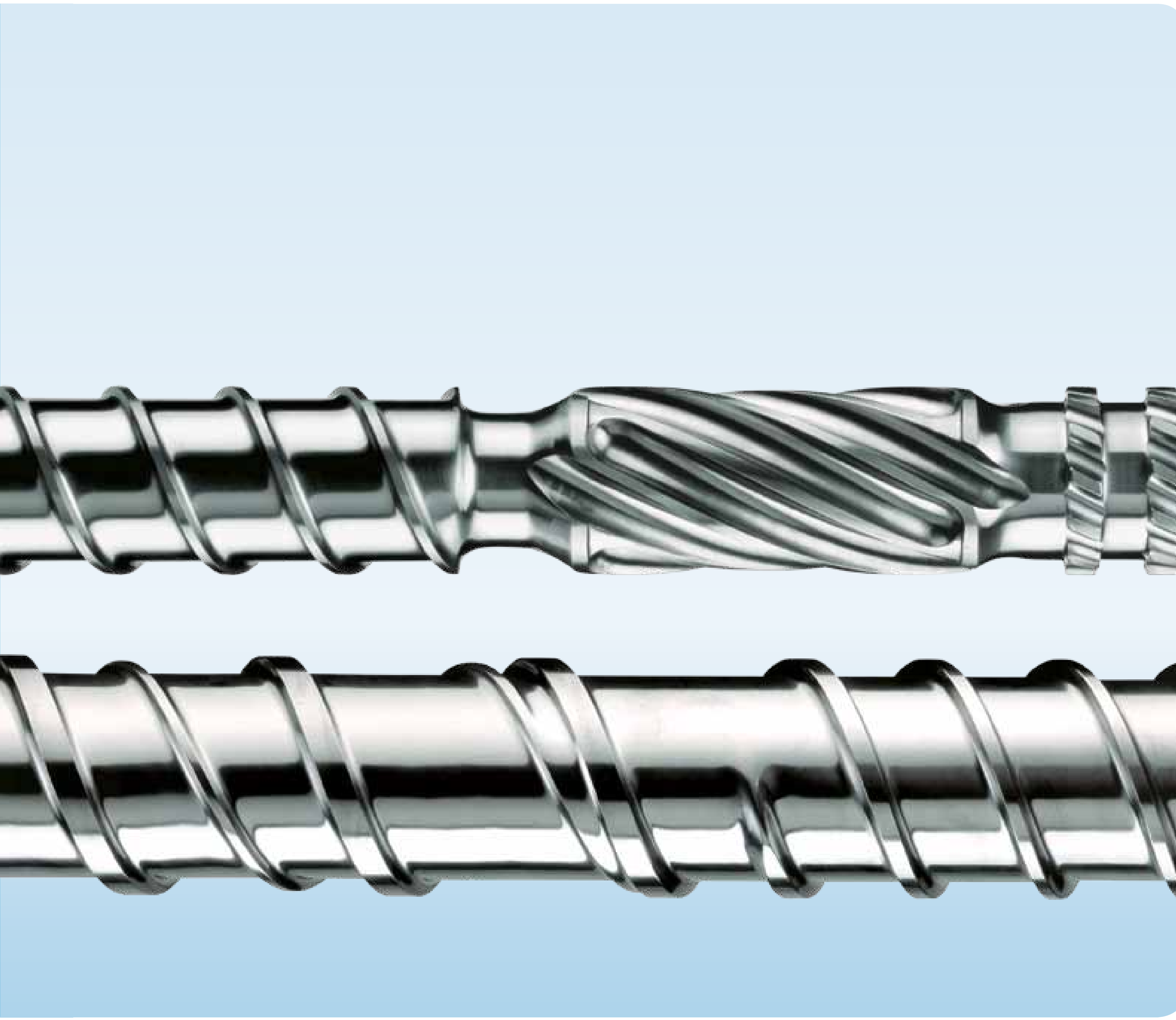
KraussMaffei



MEETING COMPLEX SPECIFICATIONS

The perfect plasticizing system

IN PARTNERSHIP WITH INDUSTRY

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

Automotive

White goods

Construction

Medical/pharmaceutical

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 Technology Division** supplies machines and systems for standard and special applications, very large machines and fully automated solutions. Our main markets are in the automotive, packaging, electrical, electronics, medical technology and consumer goods industries.
Our **Reaction Process Machinery Division** supplies machines and complete systems for processing polyurethanes and other reactive materials. Completing our product portfolio, Tooling Technologies 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.

Packaging

The right plasticizing system for the product, the material and the production conditions

Productivity is the challenge. In injection moulding, the chief influences on productivity are repeatable processes and speed. This makes them the major criteria for the choice of plasticizing system. Another factor is the bandwidth of materials the system is capable of processing.

At KraussMaffei Technologies, ongoing development makes sure our systems are engineered for highest productivity, even for new materials with special processing requirements. Achieving these results takes a profound understanding of the complex processes that occur during plasticizing. Applying our expertise, we advise on and configure application-specific injection moulding machines that deliver the quality and cost-efficiency our customers require.

How the plasticizing system impacts the process

From the process engineering point of view, a plasticizing system must meet specific criteria for a number of factors. Chief among them are:

- Swept volume
- Plasticizing rate
- Screw torque
- Cycle time
- Melt temperature
- Melt homogeneity
- Residence time

Together, these parameters produce a performance profile for the plasticizing unit, which is the basis for choosing the right system for your application.

Screw size and geometry are decisive

Swept volume, injection pressure, injection rate, plasticizing rate and residence time as specified will determine the size of screw required. Decisions on screw geometry are guided by the processing properties of the resin being used. The screw size and geometry determine what can be achieved in dimensional stability and surface aesthetics of the product and in repeatability and cycle time for the process. They also influence the mechanical properties of the product, insofar as these depend on gentle plasticizing.

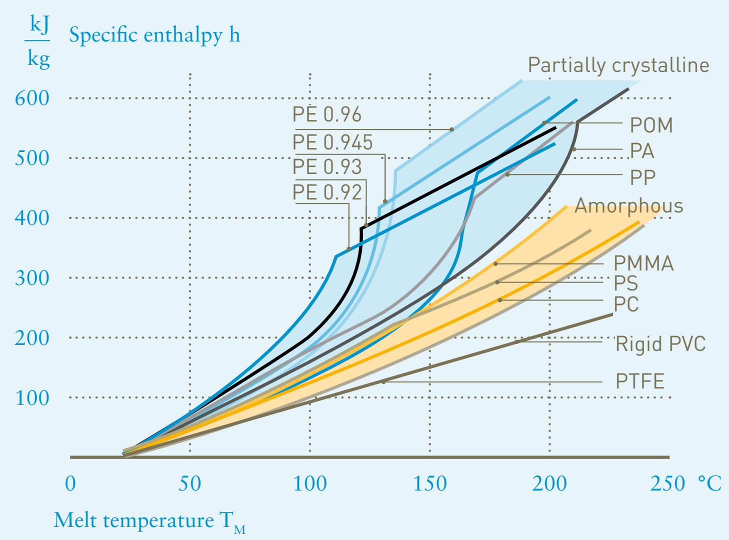
Even with optimally engineered machines, wear can cause changes in the geometry of plasticizing unit components which will decrease productivity. We recommend appropriate wear protection to increase the service life of these components.

What can you expect of the right plasticizing system?

These are the hallmarks of the right plasticizing system:

- The melt is homogenous – temperature, optical and mechanical homogeneity
- The material is plasticized intensively, but gently, so as to cause the minimum degradation
- Precisely repeatable processes
- High plasticizing rate
- Minimal wear
- Widest possible application bandwidth

Fig. 1: Specific enthalpy of different polymers



Influence of material and process parameters

The aim is to produce zero-defect products. The ease with this can be achieved depends on the material being processed and on the operating conditions. One problem is in the plasticizing performance needed to process different amorphous and partially crystalline materials. Looking at the widely differing homogenization enthalpies across these material groups, it's obvious that processing partially crystalline thermoplastics with high throughput and short cycle times (metering and residence time) is going to pose challenges. The specific enthalpy of polyolefins, for example, is higher by a factor of 1.3 to 1.7 than that of amorphous materials (Fig. 1).

High throughput rates also cause a significant reduction in the energy that can be supplied to the melt by thermal conductivity. The plasticizing speed of a screw depends on two energy sources – heat supplied by the barrel heating system (thermal conductivity) and mechanical energy (converted into heat by shearing action) – and on the enthalpy of the material being processed. The thermal conductivity of the material is also important (Fig. 2). The combined effect of these factors explains the different plasticizing times (Fig. 3).

Fig. 2: Thermal conductivity as a function of temperature for HDPE and PP

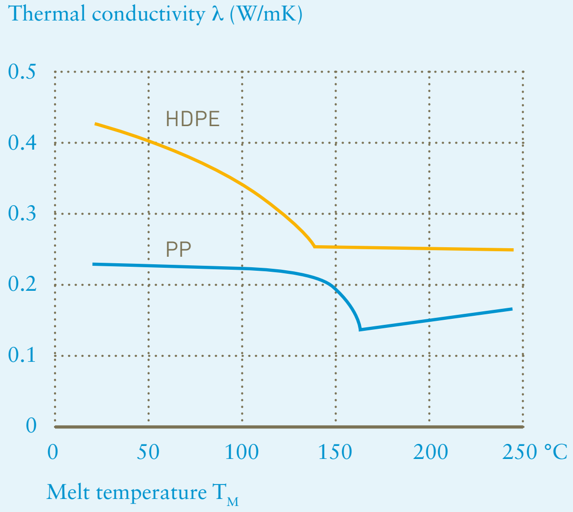
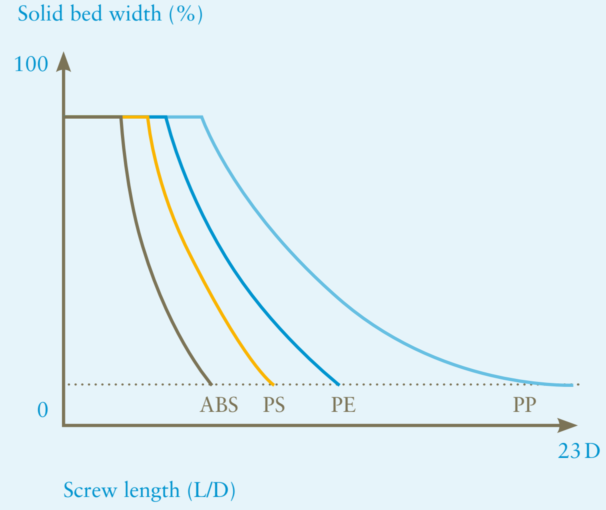


Fig. 3: Melt process for different polymers



Calculating the effective swept volume

The length of the metering stroke directly influences end-product quality

The lower limit of the effective swept volume results from the response speed of the non-return valve and the thermal stability of the melt. The upper limit is determined by the minimum residence time. Operating too close to the upper limits can result in surface defects on the product caused by air pockets in the melt. An axial temperature gradient exists along the screw's metering stroke because of the decrease in the screw channel length. This means that temperature inhomogeneities will occur within the melt (Fig. 4).

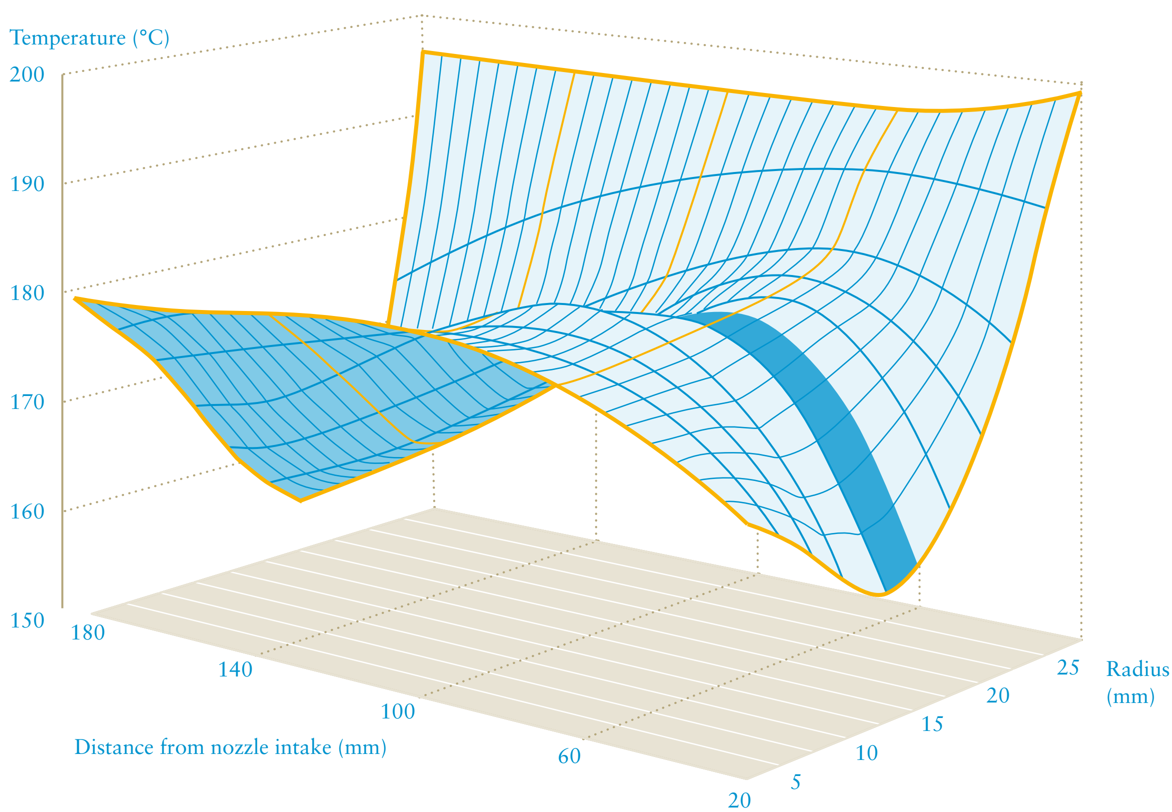
Proven values for perfect quality

Experience has shown that the following recommended values are the basis for defect-free quality:

- Standard applications:
  1.0 D < metering stroke < 3.0 D
- Fast cycling applications:
  0.5 D < metering stroke < 1.5 D

Only in exceptional cases, and after checking the residence time, should utilization of less than 0.5 D or more than 3.0 D be chosen.

Fig 4.: Temperature profile upstream of the nozzle



Output factors and shot weight

The shot weight can be calculated using a simple formula: Output factor x swept volume = shot weight. The output factor takes account of the changes in volume, ie, the difference between the density of the melt and the density of the solid material, as well as the shut-off behaviour of the non-return valve.

Output factors (empirical values) for the most common materials are shown in the table on the right.

Output factors

Material	A_F
PE	0.71 g/cm³
PP	0.73 g/cm³
PS^	0.91 g/cm³
SB	0.88 g/cm³
ABS	0.88 g/cm³
SAN	0.88 g/cm³
PA	0.91 g/cm³
PC	0.97 g/cm³
PMMA	0.94 g/cm³
POM	1.15 g/cm³
Thermoset	1.08 g/cm³
Elastomer	1.00 g/cm³
CA	1.02 g/cm³
CAB	0.97 g/cm³
PVC-W	1.02 g/cm³
PVC-H	1.12 g/cm³
PPO/PA mineral filled	1.06 g/cm³
PP + 20% talcum	0.85 g/cm³
PP + 40% talcum	0.98 g/cm³
PP + 20% GF	0.85 g/cm³

Residence time

With thermoplastics, the time the material spends in the plasticizing unit (residence time) is important in determining the stresses that the material is exposed to during processing. To guarantee that a polymer retains its characteristic property profile, upper limits for residence time and melt temperature must not be exceeded. In some cases, it's advisable to calculate the residence time based on the shot weight and the cycle conditions. Materials where residence time is critical include:

- Thermally sensitive materials (POM, PBT)
- Polymer blends such as PC/ABS, especially with elastomer-modified thermoplastics, based on linear polyesters (PBT and PET) and polycarbonate (PC)
- High-temperature-resistant thermoplastics

When cycle time is very short, for instance in packaging applications, the minimum residence time also plays an important role. Especially with polypropylenes, working with a residence time shorter than the permissible minimum risks unmelted particles in the space ahead of the screw

$$t_v = \frac{0.75 \cdot \rho_S \cdot V_{Sch}}{G_S} \cdot t_z$$

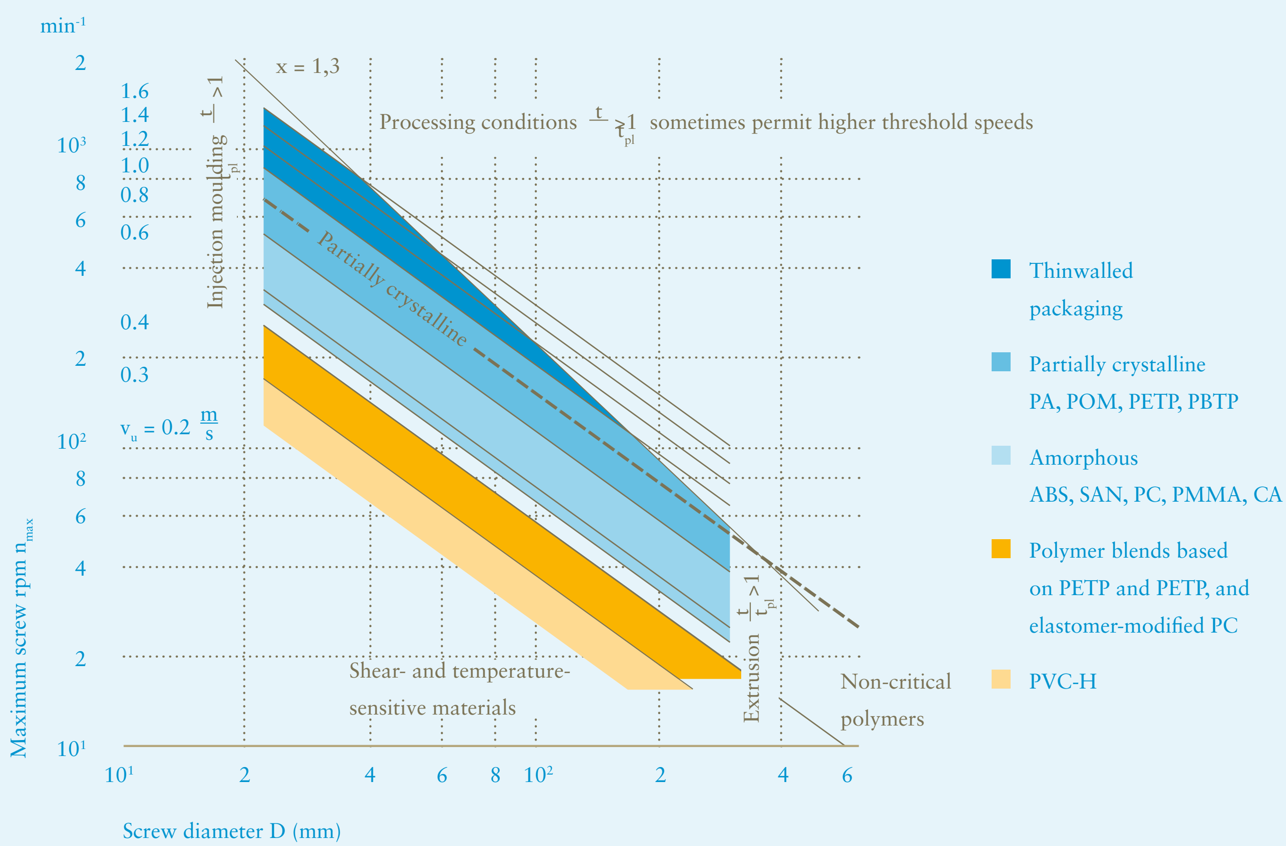
t_v = Residence time
ρ_s = Solids density
V_{Sch} = Screw channel volume
G_S = Shot weight
t_z = Cycle time

Another application where the lower limit of the residence time is critical is in precision moulding of polycarbonate optical components where tolerances are only a few micrometers.

Plasticizing rate

Values for the plasticizing rate given in our brochures relate to a specific material and a defined operating point at maximum installed screw rpm. A realistic processing window can be defined by deriving guide values for permissible screw rpm for a particular screw diameter based on the screw peripheral speeds (shear limits) for specific materials (Fig. 5). Whether the fastest speeds in a screw's rpm range can in fact be fully utilized depends on the sensitivity to shear or temperature instability of additives, such as colour pigments, flame-retardants, or fibres.

Fig. 5: Threshold values for screw speed (typical values)



Manufacturing screws in-house

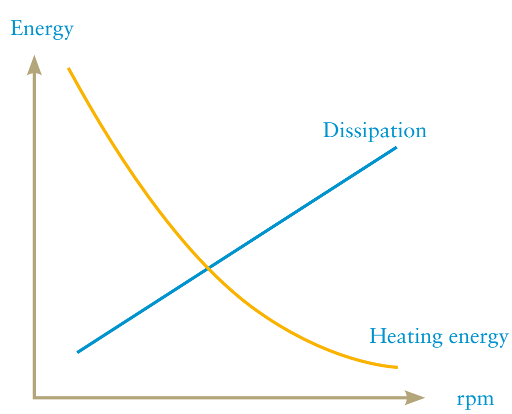
Energy input
(thermal conductivity, dissipation)

The machine's current operating point may have a limiting effect on the potential maximum plasticizing rate. As a rule, the operating point is described by the operating characteristic:

$$\frac{\text{Cycle time } t_z}{\text{Plasticizing time } t_{pl}}$$

For instance, an operating characteristic close to 1 in conjunction with a high output rate can result in the material's residence time in the plasticizing unit being drastically reduced. The proportion of energy input to the material by thermal convection and conductivity decreases, because the shorter melt zone and the short residence time sharply reduce the effect of the barrel heating. This requires a significant increase in the proportion of dissipation, ie, screw torque. In some cases, this can even be so high as to reach the limit of the installed drive capacity (PA ~ Md n) (Fig. 6). In these borderline cases it becomes impossible to achieve the maximum possible screw rpm and therefore the maximum plasticizing rate. The solution therefore is to increase the drive capacity.

Fig. 6: Qualitative curve of the proportion of thermal conductivity and dissipation



Product specifications and operating conditions determine the optimal screw design

Standard or general-purpose screws cover the available range of thermoplastics materials relatively well. In some cases, however, especially for higher output rates, general-purpose screws will not achieve the required melt quality. In other words, standard screw geometries inevitably reach their output limits and there is only a small margin for improvement by process engineering, for instance, altering back pressure or barrel temperature (Fig. 8).

Influencing the process via back pressure

- Higher back pressure results in a better quality mix, but it reduces the plasticizing rate.
- Higher back pressure also increases melt temperature – in worst cases, the cooling time has to be extended.
- Higher back pressure affects not only the area ahead of the screw, but also increases pressure along the whole length of the screw channel.

This can increase wear on the screw and barrel and reduce service life.

Influencing the process via the barrel temperature

- Temperature differences in the melt can be minimized by changing the temperature in small increments from zone to zone.
- With high melt throughput rates and high stroke utilization, the temperature profile chosen should have the temperature declining (slightly) from the material hopper along the barrel.
- However, the temperature at the feedthroat (flange temperature balancing) is decisive for the feed performance and the conveying stability. This means the temperature in this area must be matched to the operating conditions and the friction of the material (which is material-specific).

If these measures prove unsuccessful, the only remedy is to choose a different screw geometry.

Fig. 7: Influence of back pressure, screw rpm and plasticizing rate on mixing quality

Material: PP
Screw D = 45 mm

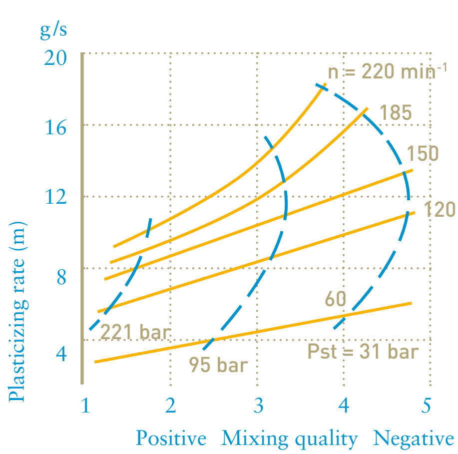
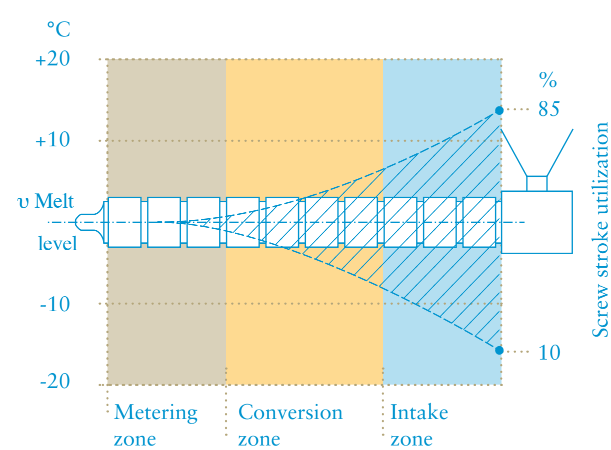


Fig. 8: Setting barrel temperature to match the metering stroke

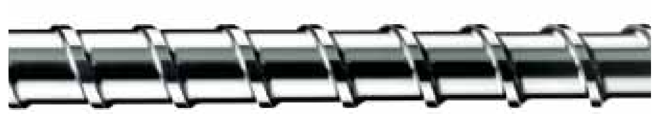


Matching the screw to the product

Basic applications

Table 1 shows the different screw geometries and the main applications for each.

General-purpose screw:
- Universal
- Wide processing window



HPS UN screw:
- Mainly for excellent homogenization performance
- Outstanding melt quality even at very high throughput rates

HPS AT screw:
- Mainly for automotive applications
- Especially good for processing polymer blends
- Minimizes stress on the melt

HPS barrier screw:
- Mainly for high shot weights on big machines
- Very high throughput rates and good homogenization

Special applications

In addition to this basic range of screws, KraussMaffei offers a number of screw variants for special applications using thermoplastics and non-thermoplastics:

- High-temperature
- Polycarbonate
- Long glassfibres
- POM
- Degassing
- MuCell foaming
- Rigid PVC
- Thermosets
- Elastomers
- Polyester
- Customer-specific geometries

The use of stack moulds requires the plasticizing unit to achieve twice the plasticizing performance in the same time. For these applications, Krauss-Maffei offers a combination of barrier technology and grooved barrels. Compared with conventional smooth-bore barrels, the combined effect of the two technologies is to increase throughput by 30% and more – without any drop in melt quality. Because the results will depend on the material used, KraussMaffei will, on request, analyse the potential of the HPX screw for your specific application.

Screw for processing polyester dough moulding compound

Fig. 9: Barrel insulation with KraussMaffei Ecopac barrel sleeves can reduce energy consumption for heating by 20 to 40%.

SELECTION CRITERIA

Options for increasing energy efficiency

Electricity charges have been rising steeply for years. This makes energy consumption a major consideration.

Insulating the barrel of an injection moulding machine with KraussMaffei Ecopac sleeves is a simple way of increasing energy efficiency (Fig. 9). The sleeves consist of several layers of bonded non-woven glass fibre in a dirt-resistant, wear-proof fabric cover. The sleeves can be used with existing ceramic heating pads. Energy savings are around 20 to 40%. On the other hand, depending on melt viscosity, screw geometry and operating point, it is possible that reducing heat radiation in this way could lead to the target barrel temperatures being exceeded. This makes it essential to check the in-process energy balance, especially the heat inputs.

Non-return valves

The design of the non-return valve is just as important as the screw geometry. Two designs are commonly used:

- Check-ring valve
- Centre-ball valve

Both of them do the same job – hold the required shotweight in readiness at high reproducibility. In general, good response- and shut-off-performances are demanded even under difficult operating conditions (low injection speed, high back pressure and low material viscosity), as well as a long service life. Because of their longer service life, centre-ball valves (Fig. 10) are used chiefly with large screw diameters (D > 100 mm).

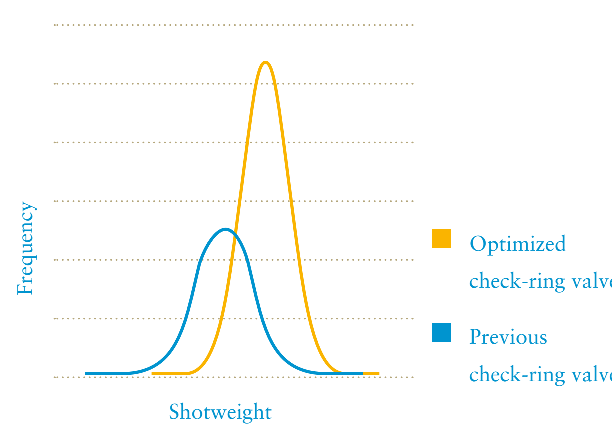
Check-ring valves for very tight shotweight spread

Check-ring valves are used chiefly with small to medium screw diameters (Fig. 11). The newest generation of these valves – the three-vaned check-ring valves – has been systematically optimized for very tightly scaled shotweight spread even at very low injection speeds (Fig. 12). The special geometry ensures that the screw tip and the check-ring have no direct contact. This is important for service life, shut-off speed and repeatability. In special cases it will be necessary to adapt the non-return valve to the application, eg, for highly-filled materials or for longfibre-reinforced polymers that need careful handling.

Fig. 10: Centre-ball non-return valve

Fig. 11: Check-ring non-return valve

Fig. 12: Qualitative comparison of shotweight distribution



High-tech materials: processing and wear protection

Experience has shown that injection moulding high-tech materials, eg, engineering polymers, is in principle no more difficult than processing other materials, especially if the machine and the process are planned from the start for these materials. The same applies to wear protection.

Wear and wear protection

Improvements that increase melt throughput must be accompanied by better wear protection, because standard grade steels are not hard enough. Basically, wear is caused by three mechanisms:

- abrasion
- corrosion
- adhesion

In injection moulding machines, abrasion and corrosion are the dominant wear factors.

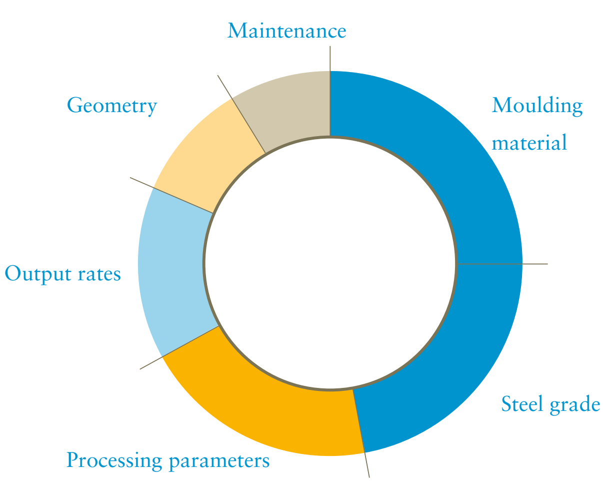


Fig. 13: Factors influencing the service life of plasticizing unit components

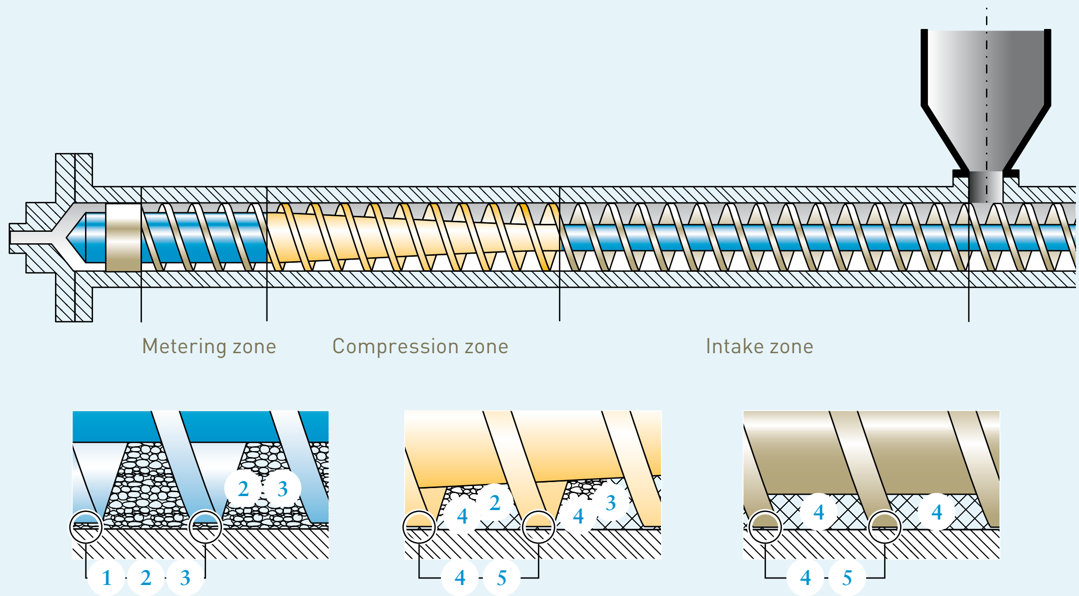
Corrosion wear

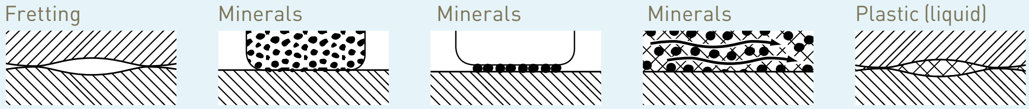
Wear caused by corrosion, which occurs primarily in the melt zone, is becoming increasingly important. Corrosion is a chemical attack by the resin itself, by substances produced when the resin breaks down, or by additives which turn corrosive during processing. These include flame retardants, chlorine gases, residual acids, UV stabilizers, antistatic agents and special pigments. An interesting study comparing wear caused by polyether sulphone (PES + GF) and polyamide (PA66 + GF) showed that the combination of corrosion and abrasion wear resulted in a mean wear rate for PA66 + GF that was higher by a factor of 7 than that of PES + GF.

Other factors influencing wear

Other factors also exert a strong influence on the machine's service life (Fig. 13). These include machine settings (screw rpm, back pressure, temperature), output rates and maintenance or the lack of it (eg, whether, when processing PA, the plasticizing unit is purged with PP or HDPE before the machine is stopped). If the recommendations and instructions of the raw materials manufacturers are adhered to and if the machine elements are given a universal protection against corrosion and abrasion wear, then there should be no problems in processing high-tech plastics. Wear protection that has proved effective in practice includes:

- powder metallurgical materials
- hard metal (carbide)
- plating with hard metals





	1	2	3	4	5
Wear pairing	Fretting Metal	Plastic (solid) Minerals Metal	Plastic (solid) Minerals Metal	Plastic (liquid) Minerals Metal	Metal Plastic (liquid) Metal
Type	Dry wear	Grain sliding wear	Grain sliding wear	Erosion (corrosion)	Wet sliding wear
Mechanism	Adhesion + abrasion	Abrasion	Abrasion	Abrasion (corrosion)	Adhesion + abrasion
Appearance	Scoring Draglines	Draglines Chipping Embedding Smoothing	Draglines Embedding Rolling marks	Waves Dishing (holes)	Scoring Draglines

Fig. 15: Wear mechanisms on the screw and barrel (source: Bayer)

Abrasion wear

Abrasion results chiefly from using compounds with additives such as glass fibre, glass pearls, carbon fibre, minerals and certain pigments (Fig. 14). Different additives will cause different amounts of wear.

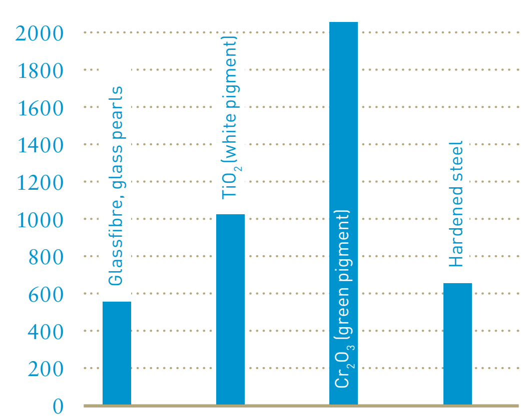


Fig. 14: Comparing additive hardness

Powder metallurgical (PM) materials

PM materials made of comparable alloys but processed on hot isostatic presses (HIP) are more wear resistant by a factor of 3 and also slightly stronger and harder than conventional steels, thanks to their much finer structure.

Hard metal (carbide)

Hard metal has an entirely different composition to conventional steel and to PM HIP steel. The high proportion of very finely distributed carbide (up to 90% depending on the grade) gives it its extreme hardness. Because it is also extremely brittle and difficult to work, carbide can be used only in certain very limited applications in the plasticizing unit.

Plating with hard metals

Plating a standard steel component (eg, a screw) with a layer of hard metal combines the benefits of conventional steel (workable, tough) with those of hard metals (wear-resistant).

Plating to suit the application

The wear-resistant layer can be chosen to suit the application. They all have a high proportion of metal carbides incorporated in a metallic binder. This makes the coating layer highly wear resistant, but ductile enough not to crack or flake when exposed to forces under operating conditions.

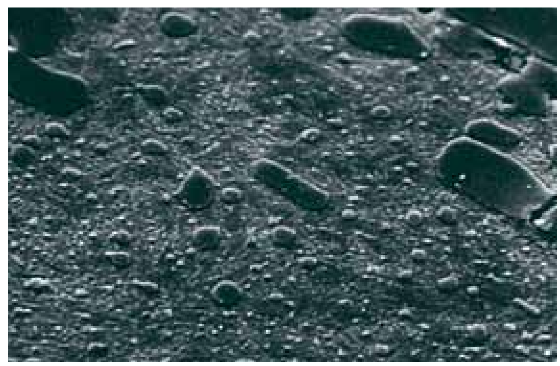


Fig. 16: Structure of a hardened material 1.2379

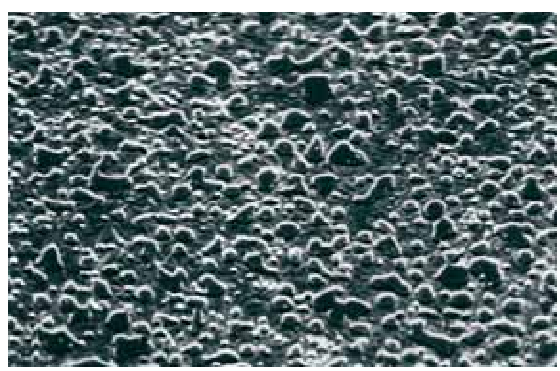


Fig. 17: Structure of a hardened PM HIP material 1.2380

Fig. 18: Cross-section through part of a screw with thin hard-coating layer, coating thickness 0.3 mm

Processing high-temperature-resistant thermoplastics

Most high-temperature-resistant (HT) thermoplastics are processed at temperatures between 350 and 430 °C (some at up to 450 °C). Plasticizing unit components need to be stable at these temperatures, so that thermal stability, heat resistance and high temperature hardness are all important. Classic nitrided steels, such as 1.8550 or 1.8519, fall short here. Another important issue is whether the bolts and other connectors (eg, cylinderhead bolts) are suitable for these high temperatures. In order to avoid pre-stressing forces relaxing at these temperatures, heat-resistant steels must be used here too.

In general, HT thermoplastics are sensitive to residence time, so it's also important to ensure a sensible relation between screw size and shotweight. Too long a residence in the plasticizing unit causes the material to deteriorate and impacts on product quality. Decomposition products are generated, which cause corrosion wear on areas of the plasticizing unit in contact with the melt.

These problems can be avoided by ensuring that the metering stroke's lower limit is not less than 1D. The guide value for the maximum permissible residence time in screw and barrel is five minutes. This is especially important if the processing temperature is near the material's upper limit as recommended by the manufacturer. In other situations also, the recommendations of the raw-material suppliers should be adhered to whenever possible.

Processing transparent plastics

Manufacturing high-clarity, highly transparent products from PC, PA or PMMA is a special challenge. The plasticizing unit, the material, and the screw geometry are all quality-critical.

Take polycarbonate for example. It is very adhesive, so that burnt material tends to collect on the screw surfaces. In addition, when the melt hardens, PC's high affinity to nitrided surfaces and the strong shrinkage generate forces that can sometimes be enough to separate the nitrided layer on the screw from the basic material. This results in carbonized particles and metal particles in the finished product. Various measures can be taken to counteract these problems. Multilayer coatings have been used successfully to counteract PC's tendency to adhere to metallic surfaces. These coatings are applied as several very thin (only a few micrometers), very hard coating layers, one on top of the other in PVD (physical vapour deposition) processes. The materials have no affinity for plastics and successfully prevent direct contact between the metal and the melt.

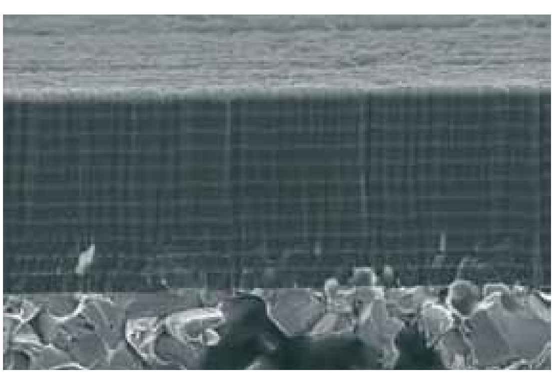


Fig. 19: Cross-section through a multilayer coating

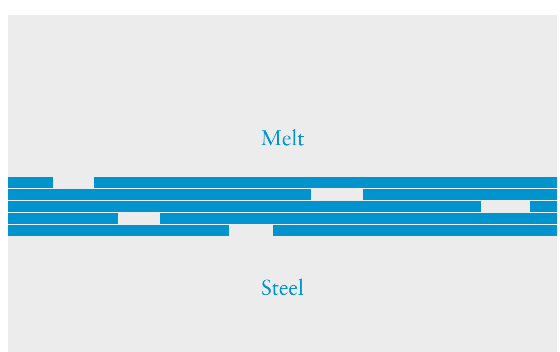


Fig. 20: Preventing contact between the melt and the steel

SELECTION CRITERIA

The plasticizing unit is at the heart of the machine

In injection moulding, the plasticizing unit is inevitably the module with the most direct responsibility for product quality. The choice of plasticizing unit and process parameters is always important, but it becomes critical with applications involving high-spec products and very short cycle times.

The right system for complex, challenging production

The plasticizing unit must do justice to the material, the operating conditions and product quality specifications. Even under challenging conditions, it is expected to deliver outstanding results over long production runs. This is only possible if all the components, materials and dimensions of your plasticizing unit are carefully selected and right for the job. If this is the case, you'll get the consistently high product quality and maximum performance that can give your business a competitive edge.

Future-oriented production analysis for a future-proof investment

Planning and configuring an injection moulding machine requires a long view. Decisions have to be made about applications, processing window and productivity – all of which will affect the return on your investment. We recommend making a long-term production analysis in order to be sure that the machine you're planning to invest in will meet your needs for many years to come.

KraussMaffei works closely with raw material suppliers, universities, mould makers and tooling steel suppliers to push ahead with innovation in plastics processing. In our lab we can make sure all the components of your plasticizing system work perfectly together. Our expertise is available to support your decision-making process.

Your ideal partner with wide experience and intensive expertise

With over 50 years' experience in injection moulding applications across different industry sectors, KraussMaffei have the detailed expertise in production and processes. Our practical experience flows into new developments and new technologies – including ongoing improvements to our plasticizing systems. Our engineering ability combined with our knowledge of your markets makes us your ideal partner for plasticizing solutions. We're there to help you.

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 or 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 Injection Moulding 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.

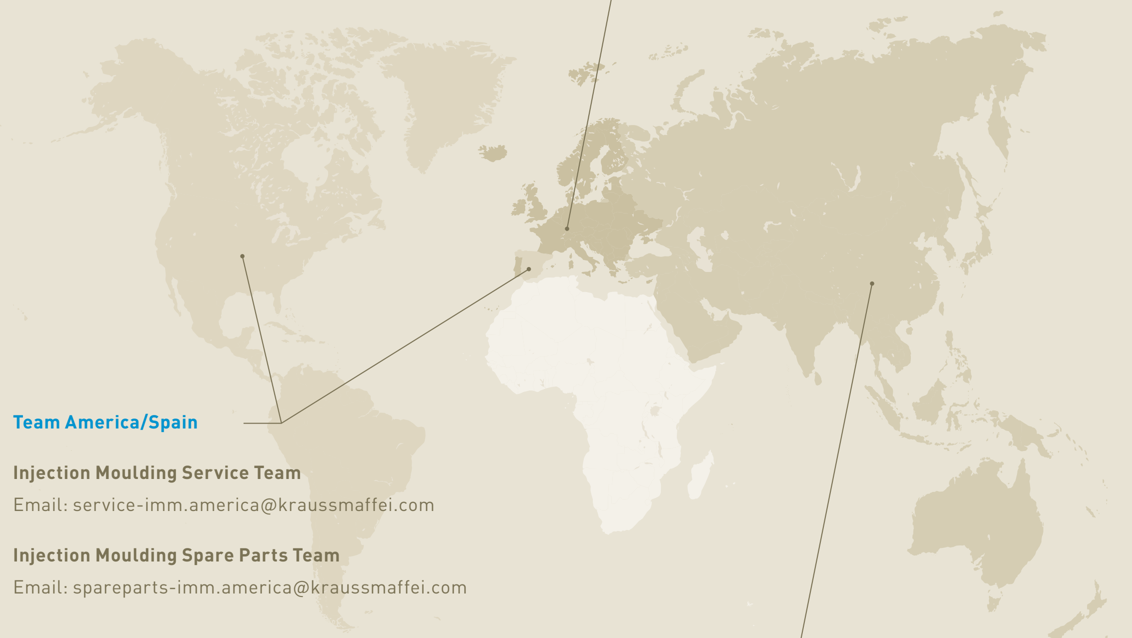
Training with high hands-on content

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 injection moulding machines. 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.

Contact for training:

Rupert Gruber
Phone: +49 89 8899 - 3613
Fax: +49 89 8899 - 4173
rupert.gruber@kraussmaffei.com

At your service worldwide



Team Europe

Injection Moulding Service Team
Email: service-imm.europe@kraussmaffei.com

Injection Moulding Spare Parts Team
Email: spareparts-imm.europe@kraussmaffei.com

Team America/Spain

Injection Moulding Service Team
Email: service-imm.america@kraussmaffei.com

Injection Moulding Spare Parts Team
Email: spareparts-imm.america@kraussmaffei.com

Team Asia/ Near East

Injection Moulding Service Team
Email: service-imm.asia@kraussmaffei.com

Injection Moulding Spare Parts Team
Email: spareparts-imm.asia@kraussmaffei.com

How to contact us

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

Hotline
Phone: +49 89 8899-3300
Fax: +49 89 8899-153300

Injection Moulding Service
Krauss Maffei GmbH
Krauss-Maffei-Str. 2
80997 Munich
Germany

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.

Solid experience and engineering excellence make KraussMaffei the ideal partner in your drive for the right plasticizing system. We know that the success factors for your business are high output, repeatable processes and a wide processing window. Ongoing development makes sure our systems are engineered for highest productivity, even for new materials with special processing requirements. Planning a machine for outstanding product quality takes a clear understanding of the complex processes that occur during plasticizing. We advise on and configure application-specific injection moulding machines that deliver the quality and cost-efficiency our customers require.

1.0 WE . 1st edition 01/08. SGM 100 A PRO 01/2008 GB ··· KraussMaffei reserves the right to make technical changes.

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