Maximum flexibility,
high product quality,
optimum cost effectiveness
ZE twin-screw extruders ZE-UT

Engineering Value

KraussMaffei
Berstorff
Maximum flexibility combined with outstanding availability in plastics processing

Rely on the excellent plant engineering competence of KraussMaffei Berstorff in plastics processing: optimize your production and sharpen your competitive edge by complete system solutions, turnkey production lines and customized services.

Base your planning on extruder concepts that:
- easily provide the uncompromising flexibility required for state-of-the-art production of the most varied products
- ensure high availability throughout the entire service life
- convince by their unparalleled productivity and cost-effectiveness
1 Two versions one basis
- ZE-A – diameter ratio 1.46 D/d, torque density 12.4 Nm/cm³
- ZE-R – diameter ratio 1.74 D/d, torque density 10.5 Nm/cm³

5 Screw speed
- Up to 1,200 rpm
Our ZE extruders are characterized by above-average torque obtained by a special power branching system in the gear unit. Application of the latest in modern gearing technology has resulted in a very compact design and extremely low noise levels. A combined dip and pressure lubrication system protects the bearings and gears. If an overload occurs, a safety coupling instantaneously separates the drive from the extruder.
Process implementation with utmost precision
The most precise way to run your process. Two concepts – one basis: 6 sizes each in two versions

12 extruder types in ZE-UT version
Twin-screw extruders in two versions with 6 sizes each are available for performing the process steps involved in the manufacture of your products – efficiently and technically optimized. Both KraussMaffei Berstorff ZE-A and ZE-R extruder ranges present the same screw shaft center distance, making screws and barrels interchangeable when production conditions change.
**ZE-A version**
The ZE-A range, with an outer/inner screw diameter ratio of D/d = 1.46, offers an optimal relationship between free volume and torque, high screw torque and the highest throughput capacity. The ZE-A is thus especially suitable for high-performance compounding, alloying, filling and reinforcing, masterbatch production and the processing of powders or small-particle polymers.

**ZE-R version**
The ZE-R version has a big free volume. It features high residence times, high free volume with high torque, optimal melt surface renewal, low gas velocities and minimal shear energy input. Its strong points are the processing of extremely highly-filled materials, TPE compounding, reaction, concentrating and residual degassing. In this way, KraussMaffei Berstorff extruders are always the right choice when maximum flexibility is important. Because KraussMaffei Berstorff ZE twin-screw extruders are tailored to your specific products and process requirements.

**Operating principle of co-rotating twin-screw extruders**
Co-rotating twin-screw extruders provide helical material transport and continuous material transfer between the screws within the figure 8 shaped barrel bore. Closely intermeshing screw elements along the entire processing section ensure excellent self-wiping characteristics. In conjunction with the shear energy input, this operating principle guarantees optimum compounding results in terms of dispersion and distribution.
Perfect fine-tuning for any application
Do you know a more flexible building block system?

In the case of twin-screw extruders of the ZE UT series, wear protection for machine sizes ZE90 UT and larger is accomplished by using solid nitriding steel barrels, barrels with through-hardened CrMo liners or barrels made of composite materials. The selection of the type of wear protection depends on the application the extruder is used for and on the specific conditions of wear.

Barrel sections with an L/D ratio of 4 or 6 are available for the configuration of the modular processing section. These barrel sections are designed as
- open barrels for feed zones,
- open barrels equipped with inserts for degassing, metering, injection zones or with measuring elements,
- closed barrels,
- combined barrels for horizontal side feeding of additives and for vertical venting.

Two barrel section lengths for each screw diameter.
Barrel sections and screw elements are designed in strict accordance with the building block principle. With various types and different specifications that can all be combined with great versatility, there is virtually no limit to the barrel and screw configurations, which can be employed to meet your process requirements in the finest detail.
More than fifty screw element varieties for each extruder size.
KraussMaffei Berstorff screw element range:
- conveying elements with different lengths and pitches, multi-start, self-wiping, laterally sealing or with pushing flight profile with increased free screw volume
- mixing elements in different lengths
- kneading elements in different lengths, offsets and pitch angles
- barrier elements in the form of blister discs and back-pumping elements

KraussMaffei Berstorff ZE screw elements are designed in strict accordance with the building block principle. Different surface treatments and the various element varieties allow the screw configuration to be matched exactly to your process. And if this modular system is not sufficient to perfectly tailor the extruder to your product and process requirements – we are always open to special requests! After all, our focus is on your product!

Extract from the screw element range

Conveying elements
Mixing elements
Multi-process elements
Special elements
Kneading elements
Blister
Quality planning requires in-depth know-how
For your quality control – a wealth of experience
gathered from almost 2,500 applications

To ensure the future success of your company, KraussMaffei Berstorff twin-screw extruders are tailored to the specific requirements of your products and processes. Based on our in-depth know-how in all plastics compounding and extrusion applications and our design skills as experienced machine engineering company, we supply extrusion lines that are perfectly suited to your recipes and production processes.

Benefit from KraussMaffei Berstorff’s process know-how.
ZE twin-screw extruders are successfully used for a multitude of different applications:
- incorporation of reinforcing agents and fillers such as glass fiber, talc, carbon fibers, calcium carbonate, barium sulphate, etc.
- coloring, stabilizing
- production of different plastics and thermoplastic/elastomer alloys (e.g. TPEs)
- production of masterbatch such as pigments, flame retardants, blowing agents and filler concentrates
- homogenizing of polymers with different viscosities
- modification of plastics by mixing in additives
- melting, homogenizing and pelletizing of powders with low bulk density, small particle size and low internal friction
- continuous synthesis of TPU
- removal of volatile matter such as water, monomers, oligomers, solvents, etc. (degassing)
- concentration of polymer solutions and reclaiming of solvents
- polymerization and post-condensation
- re-pelletizing of millbase, agglomerates and sheet and fiber scrap

Compounding line in modular design
Twin-screw extruder ZE-UT-R for highly-filled compounds
Benefit from KraussMaffei Berstorff’s product knowledge
KraussMaffei Berstorff ZE twin-screw extruders successfully produce a wide range of polymers:

**Standard plastics**
- low density polyethylene (LDPE)
- linear low density polyethylene (LLDPE)
- high density polyethylene (HDPE)
- polypropylene (PP)
- polystyrene (PS)
- soft polyvinylchloride (PVC)

**Engineering plastics**
- styrene acrylnitrile (SAN)
- acrylonitrile butadene styrene (ABS)
- polyamide (PA 6, PAhyl 6 6, PA 12)
- linear polyester (PET, PBT)
- polycarbonate
- polymethylmethacrylate (PMMA)
- polyoxymethylene (POM)

**High performance plastics**
- polyetheretherketone
- polyphenylene oxide (PPO)
- polysulfone
- polyimide
- liquid crystal polymers (LCP)

**Other materials**
- polyvinylbutyral (PVB)
- elastomer-modified thermoplastics (TPEs)
- elastomers e.g. SBR, EPDM, silicone rubber
- duroplastics, hardenable molding compounds, e.g. UP
- flooring materials
- powder coatings and toners
- ceramic and catalyst compounds
- pharmaceuticals and foodstuffs

**Biopolymers**
- biobased polymers
- natural fiber compounds
- biodegradable materials
Process Control Advanced
Easy control and monitoring of processes and machine configurations

Central operation and visualization of the entire extrusion process
The intelligent process control system provides for cost-effective operation of the extrusion line. Peripheral systems and downstream equipment are integrated by standardized interfaces. All data can be accessed from the central control station and support the different functions of the visualization system.

The Process Control ADVANCED is a competitive alternative for simple machine configurations. More complex control systems are tailored to individual customer requirements and based on Siemens Simatic S7® and WinCC®. Control systems on different hardware platforms are available on request.

Operation and visualization
All line components and the relevant operating status are visualized on clearly structured screen pages.

Fault alarm system
The fault alarm system detects malfunctions at an early stage and thus avoids machine downtimes. Each alarm is displayed and archived with the corresponding status, time-stamp and plain text.

Trend data
Stored actual values can be displayed in any combination. The data can also easily be stored in an external data memory for quality documentation.

Recipe management
The recipe management comprises all process parameters. The values are loaded and stored during operation by means of the teach-in function of the recipe editor. Thanks to the download function, the values can be recalled at any time.
Configuring instead of programming
With the Process Control ADVANCED all control and visualization functions are integrated into a sophisticated process-control system that is flexible in scale and perfectly suited to the respective extruder.

The extended Process Control ADVANCED offers even more comfort:
- easy operation via touch screen and membrane keypad
- graphic and tabular display
- large display of selectable operating parameters
- trend display
- fault alarm system with optical display and logging
- language switching
- multi-stage log-in
- recipe management of all process parameters

Innovative and future-proof – the visualization software:
The process control system is tailored to the given process task and the extruder configuration. Functional groups of the machine are visually represented as automation objects. An internal database comprises all available configurations and options. This guarantees simple software adaptation and efficient maintenance when changing the configuration. Peripheral systems and downstream equipment can be integrated by standardized interfaces. KraussMaffei Berstorff offers extensive service and diagnostic support that can also be accessed via safe Internet connection.

Industry sets standards
Thanks to the innovative combination of touch screen and keypad, the terminal ensures clear and easy-to-understand operation with direct access to the process.

The flat machine panel without ventilator is designed to a high protection standard. Integrated USB service connections, e.g. for external keypads and memory sticks, are located at the rear side.

The panel is separated from the IPC and thus suitable for use in tough industrial environments. IPC and the control CPU to be located in a protected environment.
Implementing integrated concepts
Production at its best – with complete system solutions and turnkey production lines

Optimum coordination of all individual components
Based on the product to be manufactured, KraussMaffei Berstorff, as main contractor, offers all functions required to build a high-performance extrusion line: first-concept planning, materials procurement, basic and detail design, interface co-ordination with other suppliers, layout of laboratory and workshop, plant construction, training of operator personnel and commissioning. Along with all the economical benefits of complete solutions, you are guaranteed best possible matching of all individual components of the production line. Subsequent interface problems can thus be reliably avoided as early as in the initial project phase.

Extrusion – and more!
Benefit from KraussMaffei Berstorff’s comprehensive knowledge and many years of experience for your tailor-made system solution – for standard processes as well as specials. With perfectly matched ancillary equipment, made by KraussMaffei Berstorff or by selected suppliers, you obtain a one-stop solution in terms of design and control system.
System partnership
KraussMaffei Berstorff trusts in system partnership. Focus is on processes for which KraussMaffei Berstorff supplies the core machine and the entire know-how – from the raw material up to the final product. KraussMaffei Berstorff is ideally equipped to handle projects of any size and type from single machines up to complete turnkey plants. System partnership, ensures maximum machine reliability thanks to
- Innovative technical solutions for each individual application
- Adequate engineering resources
- Professional project management
- State-of-the-art project control instrumentation
- Qualified suppliers and partner companies

Service range
From advice on optimization of production processes, installation and commissioning of the plant, right through to start-up and fine-tuning.
KraussMaffei Berstorff is your system partner in all project stages.
- Plant engineering
- Plant logistics
- Basic building and infrastructure design
- Interface coordinating with third parties
- Project management
- Training, production supervision and maintenance
The KraussMaffei Berstorff modular concept
KraussMaffei Berstorff’s refined modular concept fulfils customers’ requirements at reasonable investment cost with a high degree of premanufacture and rapid commissioning.

The advantages:
- Significant reduction in project planning and execution with simultaneous engineering
- Better cost and quality control by extended pre-assembly
- Early recognition of possible weak points
- Comprehensive training of operators and maintenance personnel
- Simplified and safe transport: the steel frame serves as packing case
- Quicker on-site installation to no assembly of individual components
- Simply constructed production workshops – no mezzanine for additional steelwork required
- Substantially reduced total costs and closer control of cost and timing of the entire project

Scope of machinery
KraussMaffei Berstorff as your system partner, is not only a consultant, but also an engineer and manufacturer of all key components. Where else could you find this complete continuity from process solutions right through to design and manufacture of the machinery? One-stop shopping for in-line solutions – complex and complete. For pellet production:
- Raw material handling
- Feeding of the individual components
- Compounding
- Pelletizing
- Packaging and warehousing

- Or for film and sheet production
- Raw material handling
- Feeding of the individual components
- Compounding
- Sheet calibration by different smoothing roll technologies
- Winding
Feeding
Whether it is powder, fine particle, pellets or fibers, whether high-viscosity melt or low-viscosity wax or oil, feeding can be done gravimetrically or volumetrically. For the introduction of solids into the melt, KraussMaffei Berstorff offers a range of co-rotating twin-screw side-feeder units, matched to the ZE extruder range and used in a split-feed arrangement.

Melt filtering
Melt filtration is particularly important in today’s total process philosophy. In many process applications, the melt filter plays a decisive role in the determination of the final product quality, the security of the process and the plant availability. KraussMaffei Berstorff offers continuous and discontinuous systems for this purpose.

Pelletizing
For pelletizing, KraussMaffei Berstorff offers – according to the product and throughput rate – different systems such as strand, waterering, air-cooled and underwater pelletizers. All these units are designed for ease of operation and maintenance. Underwater pelletizers are usually employed for higher throughputs and for polymers with a tendency to smear and stick during pelletizing. The polymer melt is fed into the bores in the die plate, arranged in annular form and cut under water. The water cools the pellets and carries them away to the drying system. The spiral shape of the water stream on the pelletizer knives effectively avoids the formation of agglomerates.
Sheet manufacturing in perfection
High-performance extrusion lines up to any challenge
Further information
This might also be of interest to you

You can find additional information on KraussMaffei Berstorff extrusion solutions in the following brochures:
- Plastics technology
- Twin-screw extruders
- Foam extrusion lines
- Film and sheet extrusion lines
- Pipe and profile extrusion lines
- Plastics calenders

Rubber technology
- Extruders and extrusion lines
- Rubber calenders
- Rubber and TPE profile production lines
- Rubber sheet lines
- Roll covering machinery

You will find our brochures and flyers on other topics online at: www.kraussmaffeiberstorff.com.
On request, we will also be pleased to send you the information and technical specifications for our products free of charge.
OEE Plus – Boosting your cost efficiency

For more information about OEE Plus, visit: www.kraussmaffeiberstorff.com/oeeplus

Availability Performance Quality

High overall equipment efficiency (OEE) is a fundamental prerequisite for your company’s success. This is why KraussMaffei Berstorff’s product portfolio comprises tailored machines and lines along with perfectly matched services that increase the economic efficiency and sustainability of your production. Benefit from our profound process know-how and long-standing experience in extrusion for a wide range of different applications.

KraussMaffei Berstorff
A strong brand in a unique global group

Value-proven extrusion technology solutions

Around the world, KraussMaffei Berstorff stands for reliable and value-proven solutions in extrusion technology. These include individual extruders and complete extrusion lines for degassing in polymerization, compounding, pipe, profile, film and sheet extrusion, physical foaming and the manufacture of technical rubber products and semi-finished tire components. All machines and systems from KraussMaffei Berstorff are custom-configured, for example for the chemical, automotive, construction, packaging or pharmaceutical industries.

KraussMaffei Group
Comprehensive expertise

Technology – the unique selling point

The KraussMaffei Berstorff Group with its three distinct brands – KraussMaffei, KraussMaffei Berstorff and Netstal – is the only provider worldwide to unite under one roof the entire range of machine technologies for plastics and rubber processing, injection molding, automation, reaction processes and extrusion applications. The group is represented at international level by more than 30 subsidiaries and over ten production plants as well as about 570 commercial and service partners. This is what makes us your highly skilled and integrated partner. Use our comprehensive and unique expertise in this branch of industry.

For further details about KraussMaffei, please visit: www.kraussmaffeigroup.com

There for you around the world

KraussMaffei Berstorff is your partner – from the first planning meeting, the development of the ideal technical and cost-effective solution right through to commissioning, production and servicing of your line. We guarantee high-quality advice, solution expertise, reliable spare parts logistics and short service response times in all phases. We are strongly committed to increasing your success.

Individualized service

Benefit from KraussMaffei Berstorff’s reliable service. Our customer service team and experienced fitters, technicians and engineers are there for you as quickly as possible and even provide on-site help to optimize your systems and processes and to minimize downtime. Rely on our highly skilled repair and spare parts service.

The KraussMaffei Group has a global presence. Countries with subsidiaries are marked in light blue.
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Rely on the excellent plant engineering competence of KraussMaffei Berstorff in plastics processing: optimize your production and sharpen your competitive edge by complete system solutions, turnkey production lines and customized services. Benefit from extrusion concepts that easily provide the high flexibility needed for the manufacture of a multitude of products today. Base your planning on an extruder concept that guarantees high availability throughout the entire lifetime.

www.kraussmaffeiberstorff.com