Gear Pumps
Kreyenborg Gear Pumps -
An Addition to our Range

The best guarantee for continuous and economic machine performance is a closed loop system with well-matched units. The Kreyenborg system, right through to pelletizing, storage and packing, is almost unique world-wide, offering reliable operation, not least due to the fact that Kreyenborg supplies the complete system, including adapters and assembly of all the individual components.

The new generation of Kreyenborg gear pumps complement our product range. In our function as a supplier of complete systems, we not only offer state-of-the-art technology for individual components or complete lines, but on request we can execute trials with your material under real production conditions.

Just like all the other products of the Kreyenborg group, our gear pumps are tested meticulously on two industrial scale extrusion lines. You can see how your specific plastics material behaves - a special service rendered by Kreyenborg.

Two complete industrial size lines are used for the further development of the pumps.
Kreyenborg Gear Pumps: Advantages of a Complete System

Kreyenborg gear pumps are designed in such a way that they can either be manufactured as individual units or integrated into existing lines. Of course they can also be supplied in combination with a screen changer. Each individual unit is designed according to the international standard. It goes without saying that the pump has optimised flow paths and a compact design. Thermally sensitive polymers, e.g. PC, PMMA or PA, can be pumped in the same way as common plastics, such as PE, PP, PS etc.

Some of the special features are as follows. Installation of standard heating cartridges within the pump housing guarantees a high degree of safety, there are no live electrical cables lying direct on the pump. Kreyenborg pumps are IP54 protection rated. Pressure and melt temperature sensors are standard in the pump housing for easy handling and maintenance.

Three Systems from one Source

The Kreyenborg range of Gear Pumps consists of three product lines which can be fitted into existing or new complete lines, depending on the individual requirements. All three systems are designed for economic operation and constant process security. Whether your production process requires the conventional assembly of gear pump, adapters and screen changer, or directly-coupled gear pump and screen changer, or gear pump integral with the screen changer, Kreyenborg have the solution available.

When the equipment is supplied complete with Kreyenborg screen changers, upstream of the gear pump, complete protection is afforded to gear pump and downstream equipment, guaranteeing process security, consistency and high-quality production.
Composite design Kreyenborg Gear Pump and Screen Changer

Advanced polymers particularly require a process which is mainly characterised by constant pressure and temperature. The Kreyenborg research and development division has tackled this problem in developing a gear pump with integral screen changer that lives up to these extreme requirements. During development we particularly attached importance to compact design to keep melt channels as short as possible.

Directly-Coupled Kreyenborg Gear Pump and Screen Changer

The directly-coupled model of gear pump and screen changer is the precursor of the compact composite design. Here too the melt channels were reduced considerably to the standard dimension of this series.

The compact composite design Kreyenborg gear pump with screen changer in one unit lives up to the high technical standards, especially for the processing of advanced polymers, which cannot stand varying pressure and temperature.

Two matched components reduce variations in temperature and pressure to a minimum. Our know-how: complete solutions from flange to flange.

Advantages of composite design and direct coupling in brief:

- 100% continuity
- compact design
- minimal installation length
- short melt channels
- rheologically-optimised melt channels, suitable for the processing of thermally sensitive products
- favourable price

Typical applications:

- Extrusion of high-quality products, such as
  - foil and sheet
  - tube and profiles
  - foamed products
  - film
  - cable coatings
Standard Version of the Kreyenborg Gear Pump

Kreyenborg is able to install gear pumps - including or excluding screen changer - in existing lines. Our customers benefit from Kreyenborg’s long-standing experience in the development and production of specific adapter flanges, attaining optimal results in the individual process situation.

The Kreyenborg Gear Pump with Control System

By using gear pumps in extrusion a process separation can be achieved. The output pressure of the extruder can be adjusted to generate optimum melt conditions and the gear pump produces the necessary pressure at the die. For protection against foreign bodies, the best place to install the gear pump is between screen changer and die. A PLC control system performs the control and the supervision of the line. The pump usually runs with a constant speed and the extruder screw speed is varied. The outlet pressure at the pump is adjusted to an optimal operating point of the extruder.

Line construction and test run in one of the two Kreyenborg industrial size lab lines.

Data acquisition for production analysis can be supplied as part of the control system providing ongoing supervision, historic trends can be recorded and recipes programmed and saved.

Streamlined, compact design permits a wide range of uses.

| Polystyrene | e.g. PS, SAN, ABS |
| Acrylic resins | e.g. PMMA |
| Polyacetal | e.g. POM |
| Polycarbonate | e.g. PC |
| Polyester | e.g. PET, PBT, PEN |
| Polyamide | e.g. PA 6, PA 6.6, PA 11, PA 12 |
| Polyolefin | e.g. LLDPE, LDPE, HDPE, PP, EPDM |
| Polyvinyl chloride | e.g. PVC-P (soft PVC) |
| Styrene | e.g. PS, SAN, ABS |
| Acrylic resins | e.g. PMMA |
| Polyacetal | e.g. POM |
| Polycarbonate | e.g. PC |
| Polyester | e.g. PET, PBT, PEN |
| Polyamide | e.g. PA 6, PA 6.6, PA 11, PA 12 |
| Polymer blends |
| Thermoplastic elastomer | e.g. TPE-S, TPE-O, TPE-E, TPE-A |
| Polyurethane |
| Hot Melt adhesives | e.g. based on EVA, APAO, PA |
| Natural resins | e.g. chewing gum |
| Synthetic resins | e.g. epoxy resin |
Technical Specification

Gear pump GPE (GEAR PUMP EXTRUSION)

Materials:
- **Housing:** tempered steel
- **Gears:** tool steel
- **Slide bearing:** tool steel

Heating:
Electric cartridge heaters (IP54); hydraulically heated

Shaft seal:
visco seal on both sides

**Process data:**
- **Temperature:** max. 450°C
- **Viscosity:** 50 to 30,000 Pas
- **Pump inlet:** max. 120 bar
- **Pump outlet:** max. 350 bar
- **Differential pressure:** max. 250 bar

**Technical design of the pump**

- Flow-optimised inlet and outlet sections guarantee a gentle treatment of the material.
- Pump type suitable for the use of common plastics and thermally sensitive polymers
- Compact design of the pump
- Adapter flanges enable installation in existing lines. Thanks to the compact design of the pump, the existing connection lengths can be kept (individual installation dimensions).
- Standard heating cartridges
- Electric supply cables are integrated into the pump housing: no bare and live cables
- Wiring in a standard housing made of aluminium
- IP54
- Borings for pressure and temperature sensors are integrated into the pump housing.
- Temperature sensors with adapters in the housing

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**Gear pump Capacity Operation limits Typical throughputs**

<table>
<thead>
<tr>
<th>Gear pump</th>
<th>Capacity (cm³/U)</th>
<th>Operation limits plastics in general (kg/h)</th>
<th>HDPE pressure pipe (kg/h)</th>
<th>Typical throughputs PS deep-drawing film (kg/h)</th>
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</thead>
<tbody>
<tr>
<td>GPE22/22-01</td>
<td>4.7</td>
<td>23-36</td>
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<td>GPE28/28-01</td>
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<td>45-72</td>
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<td>GPE36/36-01</td>
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<td>105-168</td>
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<td>GPE45/45-01</td>
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<td>180-270</td>
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<td>GPE56/56-01</td>
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<td>300-490</td>
<td>250-300</td>
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<td>GPE70/70-01</td>
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<td>GPE180/180-01</td>
<td>3200</td>
<td>2000-15000</td>
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</tbody>
</table>

**These values were ascertained with a filter on the suction side of the pump. Mesh size 500 ym.**
Quotation Questionnaire for Gear Pumps

Customer: ____________________________________________
Contact: ______________________________________________
Address: ______________________________________________
Phone: __________________ Fax: ___________________ e-mail: ___________________

Material data:

Type:
(trade name, short name)

Kind:
- □ pellets
- □ reclaimed material
- □ others

Properties:
- □ corrosive
- □ film-formative
- □ abrasive
- □ particle size (in ym)

Fillers:
- □ % (percent by volume)

Viscosity:
- □ (Pas)
- □ (cP)
- □ MFI

Sp. gravity:
- □ (g/cm³)
- □ (kg/m³)
- □ ( )

Sp. heat capacity:
- □ (KJ/kg °K)

Process Data:

Capacity:
- □ (kg/h)
- □ (1/min)
- □ ( )

Inlet pressure:
- □ (bar)
- □ (psi)
- □ ( )

Outlet pressure:
- □ (bar)
- □ (psi)
- □ ( )

Ambient temp.:
- □ (°C)
- □ (°F)
- □ ( )

Operating temp.:
- □ (°C)
- □ (°F)
- □ ( )

Line configuration:

Extruder data:
- □ single screw
- □ twin screw
- □ screw diameter (mm)
- □ extrusion height (mm)

Pump:

Material:
- □ Housing: □ standard
- □ others
- □ Gears: □ standard
- □ others
- □ Slide bearing: □ standard
- □ others

Heating:
- □ electr., voltage of heating elements:
- □ 230 V
- □ 400 V
- □ others
- □ hyd.-heated
- □ thermo-oil
- □ steam

Shaft seal:
- □ visco seal (standard)
- □ others

Drive:

Current supply:
- □ Feed voltage (Volt):
- □ Power frequency Hz:

Control voltage (Volt):

Protection system:
- □ Ex protection system:
- □ IP: