Construction

**Basic construction of BT** (rear bearing cover removed)

- Housing
- Driving shaft
- Shaft sealing by packed gland / Mechanical seal
- Stuffing-box cover
- Gearing with journals
- Transferring medium inlet or outlet

**Basic construction of BTH** (rear bearing cover removed)

- Housing
- Heating chamber
- Pumping chamber
- Heating liquid outlet
- Driving shaft
- Shaft sealing by packed gland
- Stuffing-box cover
- Gearing with journals
- Transferring medium inlet or outlet
- Heating liquid inlet (left or right optional)
Pumps series BT and BTH are low speed gear pumps for transferring medium and high viscosity fluids, provided they have certain minimum amount of lubricating property, do not contain any solids and are chemically compatible with the materials of construction.

The standard material of construction for housing, bearing cover and stuffing box cover is grey cast iron. The shafts and gears are manufactured from case hardening steel, hardened and ground.

The shafts are carried in plain bearings manufactured in bronze, with an option of sintered iron.

The rotary shaft seal is a packed gland consisting of PTFE filled aramid yarn, and the static sealing between mating parts is by means of either, liquid sealant or gaskets. All sealing materials are asbestos free.

External axial loads are not permissible, restricted radial loads can be absorbed, dependant on their magnitude and direction.

Driving by flexible shaft coupling is preferred.

In the case of fluids which require elevated temperatures to flow i.e. bitumen, wax etc. the BTH series pump should be used. In this model the housing is double walled to provide a heating jacket.

The pump transfer chamber is heated by circulating heat transfer fluid or steam through the jacket.

The standard range of models is complimented by a range of a special models described below.

The pump size BT 2 can be supplied in a corrosion and acid - resistant construction (stainless steel body and gear) with carbone plain bearings bushes; the operating pressure of this pump is limited to 5 bars.

BT1 up to BT 4 pumps can be manufactured with bronze housing and with further combinations of stainless steel gears and shafts or bronze gears and stainless steel shafts.

For use on liquids with an abrasive nature and high corrosive effects like resins, certain paints and varnishes as well as glues a special construction, Code No. / 04, is recommended, which is available for pump sizes BT 1 up to BT 7.

In this model all pump parts which are in contact with the transferring fluid are protected from wear and corrosion by a chemically deposited Ni/SiC- dispersion layer. This treatment substantially extends the service life compared with that of a standard model when used in these types of fluid.
General Characteristics

Fixing type
Foot mounting

Pipe connection
BT: Whitworth-Pipe thread
BTH: Whitworth-Pipe thread flange, flange with counterflange

Direction of rotation
BT = clockwise and anticlockwise
BTH = clockwise or anticlockwise

Weight
see page 11...15

Fitting position
horizontal

Ambient temperature
\[ \theta_{u_{\text{min}}} = -10 \, ^{\circ}\text{C} \]
\[ \theta_{u_{\text{max}}} = 60 \, ^{\circ}\text{C} \]

Operating Characteristics

Operating pressure

Outlet port *
\[ p_{e_{\text{min}}} = -0.4 \text{ bar} \]
\[ p_{\text{N}} = 8 \text{ bar} \]
1 bar to BT0
5 bar to BT2 stainless steel

max. pressure in the heating jacket
\[ p_{H} = 10 \text{ bar} \]

Temperature range
\[ \theta_{m_{\text{min}}} = -10 \, ^{\circ}\text{C} \]
\[ \theta_{m_{\text{max}}} = 220 \, ^{\circ}\text{C} \]

Viscosity range
\[ \nu_{\text{min}} = 76 \text{ mm}^2/\text{s} \]
\[ \nu_{\text{max}} = 30000 \text{ mm}^2/\text{s} \]
Viscosities other than within this range on request

Discharge flow
see table page 9, 10

Power input speeds
\[ n_{\text{min}} = 100 \text{ 1/min} \]
\[ n_{\text{max}} = 750 \text{ 1/min} \]

Suitable Fluids

Lubricating-, Cutting oils
Waste oils
Adhesives, Plastics
Cellulose

Soluble-, Steel hardening-, Binding agents
Rolling-, Drawing oils
Paints
Resins

Diesel oils
Greases
Glue, Glue liquors

Fuel oil S
Synthetic resin varnishes
Molasses

Engine oils
Nitrocellulose lacquers
Waxes

Other Types

Pump with electric motor, coupling and coupling guard mounted on a common base plate.

Accessories

Flexible coupling

* higher operating pressure on request
### Type Key

<table>
<thead>
<tr>
<th>Series</th>
<th>Code-No. for special construction</th>
<th>Kind of sealing (Packing)</th>
<th>Construction of gear unit</th>
<th>Construction of housing and friction bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT</td>
<td>0</td>
<td>51 Arolan</td>
<td>C Steel shafts and gear unhardened</td>
<td>A Cast iron without bearing bush</td>
</tr>
<tr>
<td>BT</td>
<td>2</td>
<td></td>
<td>K Steel shafts and gear hardened</td>
<td>B Cast iron with Bz bearing bush</td>
</tr>
<tr>
<td>BT</td>
<td>1...4</td>
<td></td>
<td>F Steel shafts and gear hardened</td>
<td>C Iron bearing bush</td>
</tr>
<tr>
<td>BT</td>
<td>1...7</td>
<td></td>
<td>S Stainless steel shaft (Material No. 1.4057)</td>
<td>U Bronze without bearing bush</td>
</tr>
<tr>
<td>BT</td>
<td>1...7</td>
<td></td>
<td>T Stainless steel shafts and gear heat treated (Material No. 1.4057)</td>
<td>R Stainless steel with carbon-bearing bush (Mat. No. 1.4308)</td>
</tr>
<tr>
<td>BTH</td>
<td>1+2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTH</td>
<td>3</td>
<td></td>
<td></td>
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</tbody>
</table>

#### Kind of Sealing (Packing)
- **51**: Arolan

#### Construction of Gear Unit
- **C**: Steel shafts and gear unhardened
- **K**: Steel shafts and gear hardened
- **F**: Steel shafts and gear hardened
- **S**: Stainless steel shaft (Material No. 1.4057) bronze gear
- **T**: Stainless steel shafts and gear heat treated (Material No. 1.4057)

#### Construction of Housing and Friction Bearing
- **A**: Cast iron without bearing bush
- **B**: Cast iron with Bz bearing bush
- **C**: Iron bearing bush
- **U**: Bronze without bearing bush
- **R**: Stainless steel with carbon-bearing bush (Mat. No. 1.4308)

#### Design Code
- **0**: (specified by KRACHT)

#### Pipe Connection
- **Z**: Whitworth pipe thread
- **F**: Flange
- **G**: Flange with counter flange

#### Direction of Rotation
- **R**: Clockwise
- **L**: Anticlockwise
- **B**: Clockwise and anticlockwise

#### Series
- **BT**: without heating jacket (Cylindrical shaft end without step bearing, with packing and threaded pipe connection)
- **BTH**: with heating jacket (Cylindrical shaft end without step bearing, with packing, threaded pipe- or flange connection)
Gear Pumps BT – ATEX

Pumps of the series BT are also available in ATEX design.

The pumps can be used as follows:

a. In Zone 2 (Gas- –, Category 3G)
   in explosion groups IIA and IIB and IIC
b. In Zone 1 (Gas- –, Category 2G)
   in explosion groups IIA and IIB and IIC

Qualification with regard to surface temperature is T4. For all gases, vapours, mists with an ignition temperature > 135 °C, the pumps are not an ignition source.

The permissible temperature range extends from -20 °C to 60 °C.

Construction BT – ATEX

![Diagram of Gear Pumps BT – ATEX]

Identification in accordance with EC Directive RL 94/9/EG

Manufacturer: Kracht GmbH
   58791 Werdohl, Germany

Type designation: BT ...

Job No., Production Date: xxxxxxx/xx-xxx xx.xx

Tech. File Ref.: TFR: 07.01X

Ignition protection designation: IIC 2 G ck T4

The ATEX design BT pumps are equipped with a mechanical seal with a fluid receiver. In the area of the fluid receiver the BT-ATEX has a connection for a container for filling the receiver fluid. An overflow serves to monitor the amount which leaks from mechanical seal.
Gear Pumps BT – ATEX

General Characteristics

Design | External gear pump
Pipe connection | Whitworth-Pipe thread
Mounting position | Horizontal
Fixing type | Foot mounting
Direction of rotation | clockwise and anticlockwise
Ambient temperature | $\vartheta_{\text{min}}$ = -10 °C
| $\vartheta_{\text{max}}$ = 40 °C

Operating Characteristics

Temperature range | $\vartheta_{\text{min}}$ = -10 °C
| $\vartheta_{\text{max}}$ = 40 °C
Speed | $n_{\text{min}}$ = 100 1/min
| $n_{\text{max}}$ = 750 1/min
Viscosity | $\nu_{\text{min}}$ = 76 mm²/s
| $\nu_{\text{max}}$ = 20000 mm²/s
Operating pressure
| Inlet port | $p_{e_{\text{min}}}$ = 0.4 bar
| $p_{e_{\text{max}}}$ = 8 bar
| Outlet port | $p_{n_{\text{max}}}$ = 8 bar
Axial and centrifugal forces on shaft end | Not allowed

Filtering
Filter fineness | 60 µm
(If required, install a suction filter to prevent the pump from being jammed by foreign particles).

Permissible media
Inflammable and non-inflammable liquids without abrasive ingredients which are compatible with the materials of which the pump is made. The liquid must not be static charged. Flame point and minimum ignition temperature must be observed by the operator. Media-specific characteristics must be taken into consideration. The fluid must have a minimum amount of lubricity.

For certain operating conditions, the stated minimum and maximum values are not valid! Thus, for example, the maximum operating pressure is not permissible in conjunction with low rpm and minimum viscosity.

Media-specific characteristics must be observed, e.g. in the case of emulsions and solutions containing water, the maximum operating temperature is 50 °C, the pump must be located underneath the level of the liquid.

Materials

| Housing, bearings, gears | see type key* |
| Mechanical sealing | SiC-SiC, FFKM, Stainless steel |
| Other media-side seals | Loctite 510, FEP with FKM-core |
| Uni-oiler | Ms, Plexiglas |
| Type plate | Stainless steel |
| Notched nail | Al (Mg portion < 7.5 %) |
| Gasket ring screw-plugs | Cu |
| Other parts | St |

* see type label at pump: BT...
Type Key ATEX

BT 3...7 B Z 0 B K 59/ - ATEX

Seals
59 Mechanical seal with liquid seal
Shaft seal: FKM
76 Mechanical seal with liquid seal
Shaft seal: PTFE
97 Double-acting mechanical seal
with sealing liquid (available from size 4)

Construction of gear unit
K Steel shafts and gear hardened

Construction of housing and friction bearing
B Cast iron with Bz bearing bush

Design code
0 (specified by KRACHT)

Pipe connection
Z Whitworth pipe thread

Direction of rotation
B Clockwise and anticlockwise

Series

Product code
BT (without heating jacket)
Power Consumption

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Vg (cm³/r)</th>
<th>p (bar)</th>
<th>n = 100 l/min</th>
<th>n = 200 l/min</th>
<th>n = 300 l/min</th>
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<tbody>
<tr>
<td></td>
<td>Q (l/min)</td>
<td>Viscosity ν (mm²/s)</td>
<td>required power input P (kW)</td>
<td>Q (l/min)</td>
<td>Viscosity ν (mm²/s)</td>
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</tbody>
</table>

Power input required at high viscosities

Viscosities above values specified in the table require a higher power input. In such cases the power input of the pump \( P_{1Pu} \) can be determined by means of the viscosity factor \( f_v \) (see table page 10) as follows:

\[
P_{1Pu} = P_{tab} \cdot f_v \cdot Q_{tab}
\]

Example:

\( BT4 \) n = 200 l/min; \( \nu = 10000 \text{ mm}^2/\text{s} \); \( p = 8 \text{ bar} \)

\( P_{tab} = 0.6 \text{ kW} \), table data at \( \nu = 76 \text{ mm}^2/\text{s} \)

\( f_v = 27 \times 10^{-3} \text{ kW min/l} \)

\( Q_{tab} = 32 \text{ l/min} \)

gives power input \( P_{1Pu} = 1.46 \text{ kW} \)
### Power Consumption

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Vg (cm³/r)</th>
<th>p (bar)</th>
<th>Q (l/min)</th>
<th>Viscosity v (mm²/s)</th>
<th>Freq. power input P (kW)</th>
</tr>
</thead>
<tbody>
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<td>1056</td>
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</tbody>
</table>

Spread of output:
± 5% of table values Q. Viscosities below 76 mm²/s effect a decrease of output flow values, Q.

The power output of driving motor must exceed the table values P by about 20%.

Important: When determining the power input required always consider the max. operating viscosity (e.g. in the starting situation)!

---

**Dimensions in mm**

---

**Kin. viscosity v < mm²/s**

<table>
<thead>
<tr>
<th>1000</th>
<th>2000</th>
<th>3000</th>
<th>6000</th>
<th>10000</th>
<th>20000</th>
<th>30000</th>
</tr>
</thead>
</table>

**Max. speed n_max 1/min**

<table>
<thead>
<tr>
<th>750</th>
<th>600</th>
<th>500</th>
<th>400</th>
<th>300</th>
<th>200</th>
<th>100</th>
</tr>
</thead>
</table>

**Viscosity factor f_v 10⁻³ kW min/l**

| 9.5 | 14 | 17 | 22.5 | 27 | 34 | 38 |
## Dimensions

### BT0 BZ 0AC 51

![Diagram](image)

### BT 1...7 BZ 0.. 51

![Diagram](image)

### BT 1...7 BZ 0CK 51/04

![Diagram](image)

<table>
<thead>
<tr>
<th>Pump type</th>
<th>R</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Ø E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>O</th>
<th>J</th>
<th>K</th>
<th>P</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT 0</td>
<td>G 3/4</td>
<td>30</td>
<td>60</td>
<td>45</td>
<td>65</td>
<td>11</td>
<td>15</td>
<td>65</td>
<td>60</td>
<td>47</td>
<td>38</td>
<td>95</td>
<td>88</td>
<td>13</td>
</tr>
<tr>
<td>BT 1</td>
<td>G 1/2</td>
<td>--</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>9</td>
<td>12</td>
<td>85</td>
<td>69</td>
<td>54</td>
<td>48</td>
<td>150</td>
<td>100</td>
<td>13</td>
</tr>
<tr>
<td>BT 2</td>
<td>G 3/4</td>
<td>35</td>
<td>55</td>
<td>65</td>
<td>90</td>
<td>10</td>
<td>12</td>
<td>90</td>
<td>88.5</td>
<td>71</td>
<td>65</td>
<td>165</td>
<td>125</td>
<td>15</td>
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<tr>
<td>BT 3</td>
<td>G 1</td>
<td>40</td>
<td>65</td>
<td>85</td>
<td>105</td>
<td>10</td>
<td>12</td>
<td>100</td>
<td>111</td>
<td>88.5</td>
<td>70</td>
<td>190</td>
<td>155</td>
<td>18</td>
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<tr>
<td>BT 4</td>
<td>G 1 1/2</td>
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<td>80</td>
<td>95</td>
<td>135</td>
<td>10</td>
<td>12</td>
<td>130</td>
<td>131,5</td>
<td>100</td>
<td>102</td>
<td>245</td>
<td>189</td>
<td>25</td>
</tr>
<tr>
<td>BT 5</td>
<td>G 1 1/2</td>
<td>35</td>
<td>75</td>
<td>140</td>
<td>180</td>
<td>14</td>
<td>20</td>
<td>150</td>
<td>145</td>
<td>103</td>
<td>98</td>
<td>250</td>
<td>213</td>
<td>25</td>
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<tr>
<td>BT 6</td>
<td>G 2</td>
<td>25</td>
<td>75</td>
<td>180</td>
<td>225</td>
<td>14</td>
<td>28</td>
<td>175</td>
<td>175</td>
<td>126</td>
<td>106</td>
<td>245</td>
<td>252</td>
<td>25</td>
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<tr>
<td>BT 7</td>
<td>G 2</td>
<td>60</td>
<td>100</td>
<td>185</td>
<td>225</td>
<td>14</td>
<td>28</td>
<td>240</td>
<td>175</td>
<td>126</td>
<td>123</td>
<td>260</td>
<td>252</td>
<td>25</td>
</tr>
</tbody>
</table>

Inlet and outlet ports equally sized.
### Dimensions

**BTH 1 / 55 • Z 0 • K 51**

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

**BTH 1 / 105 • F 0 • K 51**

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

**BTH 1 / 105 • G 0 • K 51**

Outlet port for heating liquids **

Counterflange: Flange C 15 x 21.3 DIN 2633

approx. Weight (kg)

- BTH 1/105 Z; F = 46 kg
- BTH 1/105 G = 49 kg

** Clockwise or anticlockwise by choice unused connection is to be sealed **

Counterflange: Welding flange acc. to B. 009695.0002

Blank flange B 15 ND 16 DIN 2527 (finished)

Counterflange: Flange C 15 x 21.3 DIN 2633 (finished) clockwise or anticlockwise by choice unused connection is to be sealed

Dimensions in mm
Dimensions

BTH 2 / 100 130  •  Z0  •  K51

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

BTH 2 / 130 130  •  F0  •  K51

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

BTH 2 / 130 130  •  G0  •  K51

Outlet port for heating liquids **

Counterflange: Flange C 20 x 26.9 DIN 2633

approx. Weight (kg)

BTH 2/100 Z; F = 84 kg   
2/130 Z; F = 85 kg

BTH 2/100 G = 93 kg   
2/130 G = 94 kg

** Dimensions correspond to mounting surface of inlet port for heating liquids

Parallel key acc. to DIN 6885

Counterflange: Flange C 50 x 60.3 DIN 2633 (finished)

Inlet port for heating liquids

Counterflange: Flange C 20 x 26.9 DIN 2633 (finished) clockwise or anticlockwise by choice unused connection is to be sealed

Dimensions in mm

Blank flange B 20 ND 16 DIN 2527 (finished)
Gear Pumps

Dimensions

BTH 3 / 150 • Z 0 • F 51

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

BTH 3 / 150 • F 0 • F 51

Outlet port for heating liquids **

Parallel key acc. to DIN 6885

Inlet port for heating liquids

Clockwise or anticlockwise by choice unused connection is to be sealed

BTH 3 / 150 • G 0 • F 51

Outlet port for heating liquids **

Counterflange: Flange C 25 x 33.7 DIN 2633

approx. Weight (kg)

BTH 3/150 Z; F = 142 kg

BTH 3/150 G = 155 kg

** Dimensions correspond to mounting surface of inlet port for heating liquids

Parallel key acc. to DIN 6885

Counterflange: Flange C 80 x 88.9 DIN 2633 (finished)

Blank flange B 25 ND 16 DIN 2527 (finished)

Inlet port for heating liquids

Counterflange: Flange C 25 x 33.7 DIN 2633 (finished) clockwise or anticlockwise by choice unused connection is to be sealed

Dimensions in mm
Dimensions

BT1...7 BZ 0CK 59

| Pump type | R | A | B | C | D | ØE | F | G | H | O | J | K | P | Ød | l | m | n | u | t | d₁ | h₁ | kg |
|-----------|---|---|---|---|---|----|---|---|---|---|---|---|---|---|----|---|---|---|---|---|----|---|---|
| BT4       | G2 | 40 | 80 | 95 | 135 | 10 | 12 | 130 | 100 | 102 | 245 | 189 | 24 | 50 | 40 | 5 | 8 | 27 | M8 | 19 | 18.5 |
| BT 6      | G2 | 35 | 75 | 185 | 225 | 14 | 28 | 175 | 126 | 106 | 245 | 252 | 24 | 50 | 40 | 5 | 8 | 27 | M8 | 19 | 33.0 |

Inlet and outlet ports equally sized.

Dimensions in mm
### Gear Pumps

Low and high-pressure gear pumps for lubricating oil, hydraulic, process and test bench applications, fuel and metering systems.

### Flow Measurement

Gear, turbine and screw type flow meters and electronics for volume and flow, metering and consumption in the chemical industry, hydraulic, process and test bench technology.

### Hydraulics

Single and multistage high-pressure gear pumps, gear motors and valves for construction machinery, municipal vehicles, agricultural vehicles, special vehicles and truck bodies.

### Valves

Cetop valves for all requirements stationary and mobile applications. Pressure, switching and stop valves with pipe connection for high flow rates. Special valves.