



## **R1 42 01 03      Technical Directive**

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

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### Information on

Contents of document  
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R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Contents:**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.1. ROTATING COUPLINGS FOR PUMP UNITS..... 44

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.2. SUCTION BELLOWS .....

57

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.2.1. *Suction bellows for pumps*..... 60

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.3. VIBRATION DAMPERS (SILENT BLOCKS).....89

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.3.1. *Scope and application* ..... 90

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.3.2. *Light model* .....94

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.3.3. *Heavy model*..... 108

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4. AXIAL PISTONPUMP WITH CONSTANT STROKE ..... 119

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4.1. *General*..... 120

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4.2. *Symbol*..... 123

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4.3. Selection scheme..... 128

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.5. AXIAL PISTONPUMPS WITH VARIABLE STROKE ..... 147

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.1. *General*..... 148

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.2. *Symbols* ..... 153

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.3. *Technical data* ..... 157

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.4. *Selection scheme* ..... 165

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.4.art.a. Pumps with constant pressure regulation for “open” systems (Rexroth) ..... 169

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

3.5.4.art.b. Pumps with proportional regulation for "open" or "closed" systems (Rexroth) .....186

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.6. SINGLE VANE PUMPS ..... 193

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps



3.6.1. General..... 194

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.6.2. *Symbol* ..... 196

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.6.3. *Selection scheme* ..... 199

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.7. DOUBLE VANE PUMPS ..... 214

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.7.1. *General*.....215

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.7.2. *Symbol* ..... 217

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.7.3. *Selection scheme* ..... 220

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.8.1. *General*.....240

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.8.2. *Symbol* ..... 242

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.8.3. *Selection scheme* .....245

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.9. SCREW SPINDLE PUMPS ..... 255

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

3.9.1. *General*.....256

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.9.2. *Symbol* ..... 259

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.9.3. *Selection scheme* .....262

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.10. REFERENCES ..... 277

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.11. STATEMENT .....285

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

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R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.1. Rotating couplings for pump units**

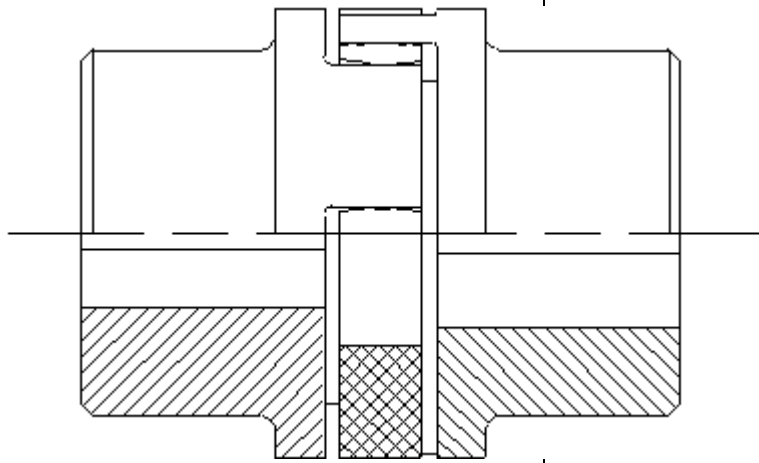
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.1**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps





R1 42 01 03  
rective for suppliers, erection  
ies, managers and users  
: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer:

Rotex or equal.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

Material coupling:

G.G.G. 40 or C 45

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Material rim of gear wheel: Vulkolan 92°, shore

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Drills according to ISO-fitting H7; wedge track according to DIN 6885 part 1, fitting J9.  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.2. Suction bellows**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Suction bellows are mainly used for connection of a flexible mounted pump with the fixed

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

suction line. Tolerances are critical. Max. deviations of Figure 3.1 must be respected.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.2.1. Suction bellows for pumps**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Connection : flanges drilled according DIN 2501 PN 16  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Working pressure : PN 16

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Material

: Perbunan N (NBR)

colourcode red/blue, electrically  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

conducting, oil resistant.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Working temperatur : max. 90°, min. -20°

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer : Stenflex type AS-1 no limiters or equal.

R1 42 01 03

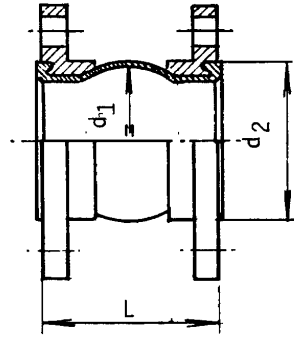
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.2**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
directive for suppliers, erection  
nies, managers and users  
3: Selection of pumps



**Scheme 3.1**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Sizes in mm

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Maximum deviations (50 °C)

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

DN	L	Compression	Expansion	Misalignment		d <sub>2</sub>	d <sub>1</sub>	Mass
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R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

$\alpha$   
R1 42 01 03

in kg.

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

| 32 | 125 | 30 | 10 |

10 | 25 | 73 | 74 | 3.6

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

| 40 | 125 | 30 | 10 |

10 | 25 | 73 | 74 | 4.4

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



| 50 | 125 | 30 | 10 |

10 | 25 | 85 | 88 | 5.2

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

| 65 | 125 | 30 | 10 |

10 | 25 | 104 | 112 | 6.2

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

80	150	40	10	10	20	117	139	8.2
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RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

100	150	40	10	10	15	136	148	9.6
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RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

150	150	40	10	10	12	190	202	15.0
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RI 42 01 03

Hydraulics-directive for suppliers, erection  
 companies, managers and users  
 Part 3: Selection of pumps

200	175	45	15	15	8	266	264	17.6
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RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Note:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Sizes are critical! Tolerances have to be respected.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.3. Vibration dampers (silent blocks)**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.3.1. *Scope and application***

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Vibration dampers have been selected by Corus in order to assemble pump-motor  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

combinations in hydraulic systems flexibly and free of vibrations.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

These dampers have been divided into light and heavy models.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.3.2. *Light model*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Manufacturer: Trelleborg (Metalastik) or equal.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Double-U-Shear, types:

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/1479 - 1MN40

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

17/1480 - 1MN50

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/1480 - 1MN40

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

17/1481 - 1MN50

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/1482 - 1MN50

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

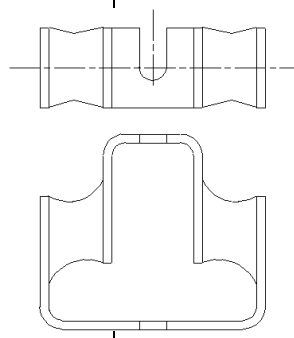


R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.3**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
directive for suppliers, erection  
panies, managers and users  
t 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.3.3. *Heavy model*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer: Trelleborg (Metalastik) or equal.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Cushyfoot types:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/290 - A3

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/290 - A2

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

17/290 - A1

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

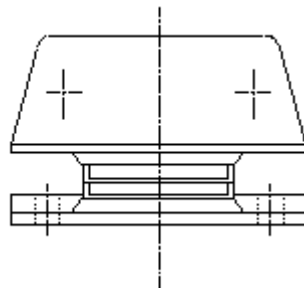
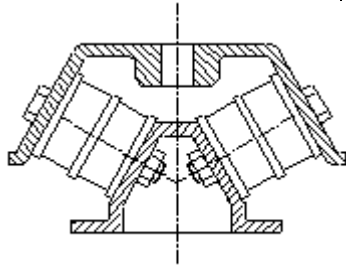
17/290 - A0

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.4**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



iers, erection  
d users  
mps



**3.4. Axial pistonpump with constant stroke**

R1 42 01 03

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companies, managers and users  
Part 3: Selection of pumps

3.4.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

These pumps are used for general application in smaller (open) systems with a maximum  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

working pressure of 250 bar.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4.2. *Symbol*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

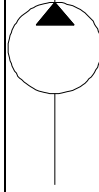
**Figure 3.5**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps





R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.4.3. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer Rexroth

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Scheme 3.2**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type

Capacity in  $\text{dm}^3/\text{min}$ .  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

1000 rpm.  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Drive pumps with 1000 rpm.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



- Case flushing can be used. For this purpose, use both drain connections.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

- Under certain conditions, up to 107 cm<sup>3</sup>/r pumps 1500 rpm is allowed.  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.5. Axial pistonpumps with variable stroke**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Suitable for so called open- and half-open systems with a maximum working pressure of  
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

250 bar.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



The choice of a type of pump other than mentioned in this chapter only in consultation  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

with the involved hydraulic engineer.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.2. *Symbols*

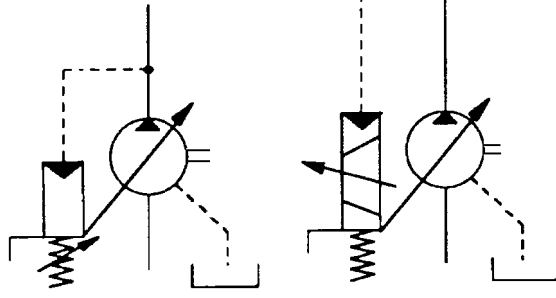
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.6**

**Figure 3.7**  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



01 03  
for suppliers, erection  
engineers and users  
of pumps

3.5.3. *Technical data*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Arrangement**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

The pump shall be installed in such a way that the absolute value of the pressure at the

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

suction port is at least 1 bar.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

The back pressure in the drain line of pumps shall not exceed 1 bar (overpressure).

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.5.4. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

The choice of a type of pump other than mentioned in this chapter only in consultation with  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



the involved hydraulic engineer.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.5.4.art.a. Pumps with constant pressure regulation for “open” systems (Rexroth)**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**For symbol see figure 3.6**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Scheme 3.3**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufactured: Rexroth

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type

Capacity in l/min  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

1000 rpm

R1 42 01 03

1500 rpm

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

A4VSO 180 DR/30R-PPB13N00

180

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

\* Note:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Under certain conditions, up to 125 cm<sup>3</sup>/r pumps 1500 rpm. is permitted.  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.5.4.art.b. Pumps with proportional regulation for "open" or "closed" systems (Rexroth)**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

**For symbol see figure 3.7**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

The pump shall be fitted with an inductive position transducer.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Selection of type and controlling in consultation with the involved hydraulic engineer.  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.6. Single vane pumps**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.6.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

For general use in open systems up to 160 bar.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.6.2. *Symbol*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

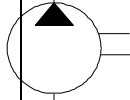
**Figure 3.8**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps





3.6.3. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Scheme 3.4**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer Vickers

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type	Flow in dm <sup>3</sup> /min
	<p data-bbox="1086 120 1315 159">R1 42 01 03</p> <p data-bbox="890 174 1449 286">Hydraulics-directive for suppliers, erection companies, managers and users Part 3: Selection of pumps</p>

at 1000 rpm and 140 bar

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Note: The volumetric efficiency of these pumps varies with pressure and rpm.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Under certain conditions 1500 rpm is permitted.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.7. Double vane pumps**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.7.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

For general use in open systems up to 160 bar, usually in accumulator circuit.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

3.7.2. *Symbol*

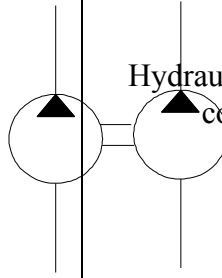
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.9**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.7.3. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Scheme 3.5**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer Vickers

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type

Flow in dm<sup>3</sup>/min

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

at 950 rpm and 140 bar  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3520VQ 30 A 8 1 BB 22R

76 + 22 = 98

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

4520VQ 60 A 5 1 BB 22R

150 + 14 = 164

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



4535VQ 60 A 38 1 BB 22R

150 + 92 = 242

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Speed of pumps 1000 rpm.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Under certain conditions, 1500 rpm is allowed.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

In that case, approval have to be obtained by the hydraulic engineer involved.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



**3.8. Gear pumps**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.8.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

For use in low pressure systems up to 50 bar, commonly in bypass circuits.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.8.2. *Symbol*

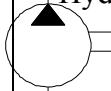
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.10**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.8.3. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Scheme 3.6**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Manufacturer John Barnes

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type	Yield in dm <sup>3</sup> /min at 50 bar
	<p data-bbox="1086 141 1249 170">R1 42 01 03</p> <p data-bbox="890 176 1449 286">Hydraulics-directive for suppliers, erection companies, managers and users Part 3: Selection of pumps</p>

1000 rpm

1500 rpm

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

RI 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



**3.9. Screw spindle pumps**

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.9.1. *General*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

For use in low pressure systems (bypass circuit, boost circuit). Also used in lubrication  
R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

systems.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

3.9.2. *Symbol*

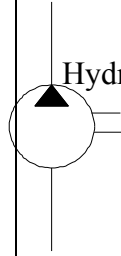
R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**Figure 3.11**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



3.9.3. *Selection scheme*

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



**Scheme 3.7**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Manufacturer Allweiler

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Flow in  $\text{dm}^3/\text{min}$   
R1420103

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Type	1500 rpm R1420103
	<p data-bbox="890 174 1449 286">Hydraulics-directive for suppliers, erection companies, managers and users Part 3: Selection of pumps</p>

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

If necessary, pumps may be equipped with a mounted, spring-loaded pressure relief valve

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

type DS-C or DT-C (Allweiler). A separate return line is required.

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.10. References**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

In this Technical Directive reference is made to

R1 42 01 03

Hydraulics-directive for suppliers, erection  
companies, managers and users

Part 3: Selection of pumps



R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

DIN

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

2501

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

6885, part I, fitting J9

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

**3.11. Statement**

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Version 1.0:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps



none.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Version 1.1:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

logo has changed.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Version 2.0:

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps

Document completely reviewed.

R1 42 01 03  
Hydraulics-directive for suppliers, erection  
companies, managers and users  
Part 3: Selection of pumps