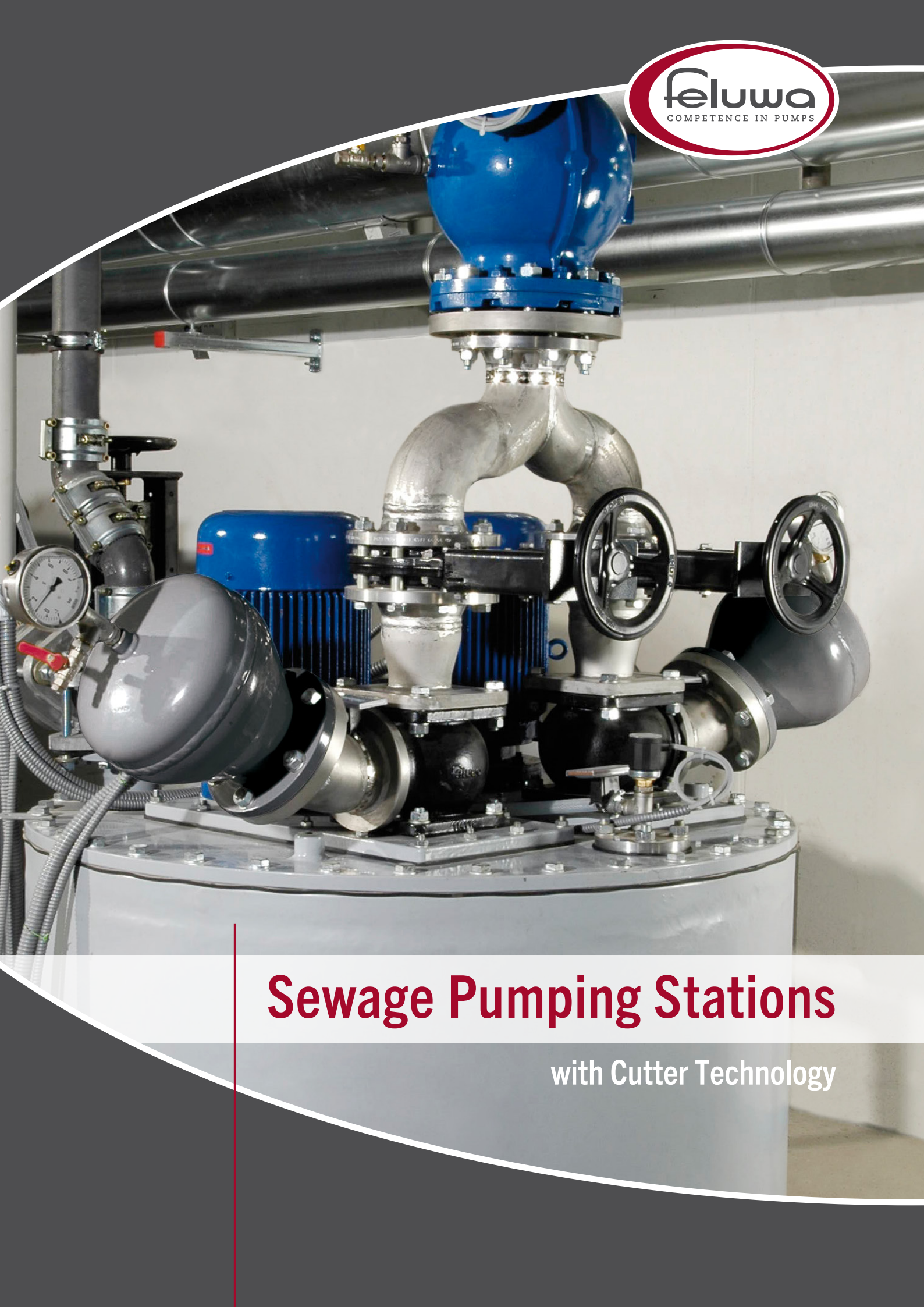


Sewage Pumping Stations

with Cutter Technology

our technology – your advantages

The FELUWA Cutter Technology

1. **Cutter:**
   Stationary and radially acting single-shear cutting unit made of wear-proof, hardened stainless steel 1.4122.
2. **Heavy-duty impeller:**
   Rotating, 6-shear blade cutting impeller.
3. **Carrier:**
   Rotating rough-cut blade, made of durable 1.4122, combined with the impeller

Characteristics:

- High efficiency
- Protection against ragging ➤➤➤ high operational safety.
- No excessive cutting: Coarse cutting for the reliable pumping of solids, handling of solids without blocking ➤➤➤ higher service life of cutting unit due to optimised cutting technology.

1.

2.

3.

- Reduction of finely cut up waste materials in the sewer and at the sewage works ➤➤➤ avoidance of surface scums ➤➤➤ reduction of sewage works running costs.

The FELUWA Mechanical Seal

Double shaft sealing with axial mechanical seal and oil chamber, independent of direction of rotation.

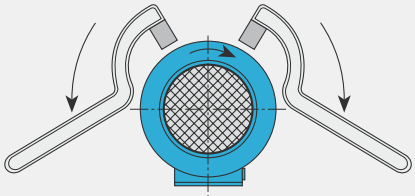
Characteristic:

- High operational efficiency and service life

The FELUWA Bayonet Locking

Characteristic:

- Separation of pump rotor from spiral casing by means of ¼ turn clockwise rotation using the hooked spanner ➤➤➤ Easy access for maintenance, cleaning and inspection of cutter, impeller and mechanical seal.



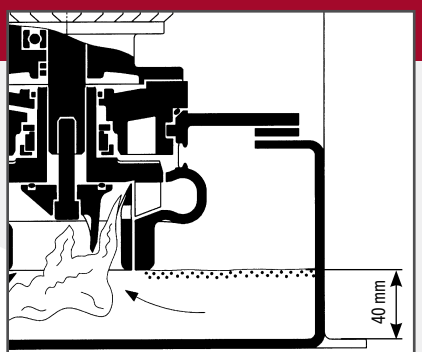
Separation of pump rotor by means of hooked spanner.

The FELUWA Suction Head

Evacuation of the sewage sludge to minimum tank level, dependent on level and time control, down to approx. 40 mm above flat tank bottom.

Characteristic:

- High velocities at cutter inlet. Taking off of floating layers of fat ➤➤➤ Minimum sedimentation of sludge and fat ➤➤➤ No additional cleaning of the collecting tank required.



Optimum sludge evacuation head

The special combined FELUWA ball check valves with fast-action sluice valve, locked in place.

Characteristics:

- Non-return ball valve and sluice valve combined as one unit
- Quick opening and closing of the sluice valve
- Easy and reliable locking of the open slide
- Inspection cover with bayonet locking to check and replace valve balls without removal of pipework

Cast iron

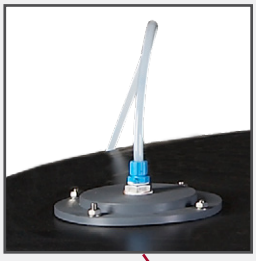
Reinforced POM

The FELUWA three-phase current motors when choosing water-proof protection class IP 66/67

Characteristics:

- Two additional shaft seals
- Thermal control via electronic PTC-resistor
- High safety against thermal influences and flooding from the surrounding area

The FELUWA dynamic pressure measuring system



Characteristics:

- Self ventilating and pre-adjusted at the factory
- Hygienic adjustment from the outside (compared to float controls)
- Easy to operate and to maintain

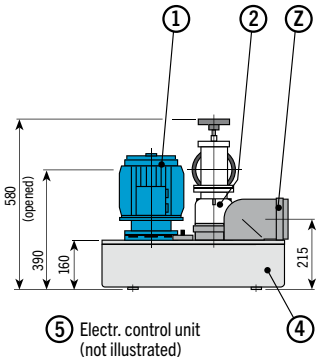
The customised FELUWA control unit

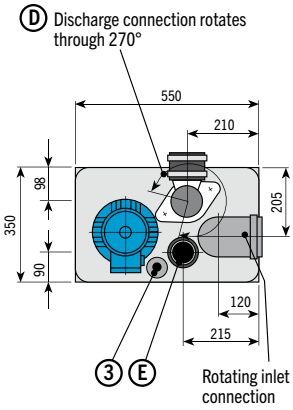
Characteristics:

- Different programs in one control unit
- EEx ia level inlets
- Modular expansion
- Self-contained, integrated alarm
- Protection class IP 65
- Design to IP 54 upon request

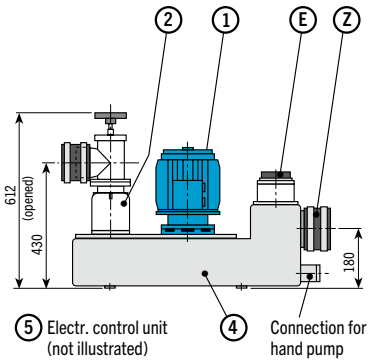
arrangement drawings

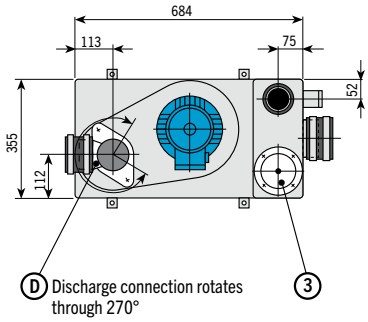
Mini Piccolo 90 (Reg. No. 53.2-102)



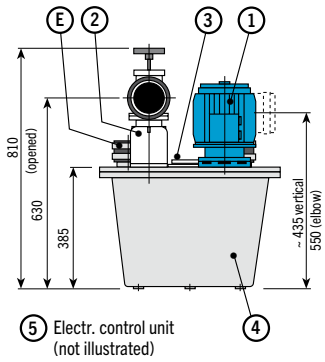


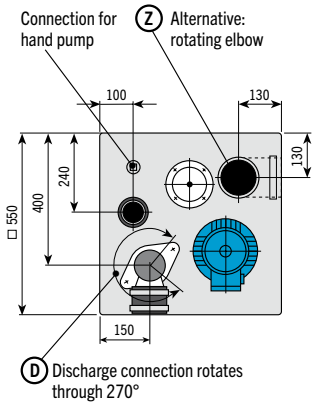
Mini Piccolo 180 (Reg. No. 53.2-102)





Piccolo (Reg. No. 53.2-317)





1. *Pump rotor with cutter*
2. *Combined special ball check valve with fast-action sluice valve, locked in place*
3. *Level control*
4. *Collecting tank, standard: PE-HD (alternative standards available)*
5. *Electr. control unit (not illustrated) Standard supply: Loose for wall mounting*

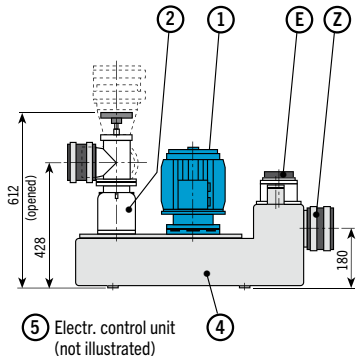
technical data

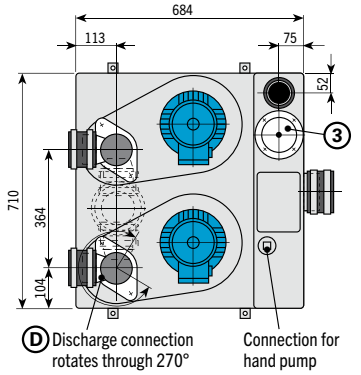
Type	No. of pumps	Tank volume (litre)	Capacity max. m^3/h	Delivery pressure max. bar	Motor(s) 400V / 50 Hz kW	rpm	A	Weight approx. kg
Mini Piccolo 90	1	20	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	45
Mini Piccolo 180	1	40	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	53
Piccolo	1	80	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	70
Mini Piccolo DUO	2	80	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	95
Piccolo Zi DUO	2	250	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	125 - 170
Mini Z DUO	2	180	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	170 - 306
Volks Zi	2	250	120	1,4	2,2 - 4,0	1400	5,4 - 9,2	230 - 290
Volks Zi DUO	2	400 - 500	120	1,4	2,2 - 4,0	1400	5,4 - 9,2	400 - 695
Piccolo Z DUO	2	600 - 2200	38	1,7	1,5 - 4,0	1420, 2865	3,45 - 8,6	580 - 980
Fäkalex Z DUO	2	600 - 2200	150*	2,7 - 7,2**	2,2 - 18,5	1400	5,4 - 36	620 - 1030

**: for two separate discharge pipes*
***: acc. to advice*

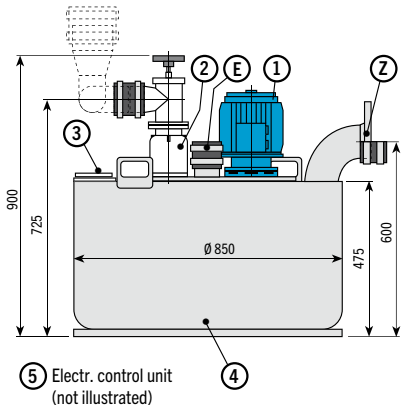
Technical documents on individual pump types upon request.

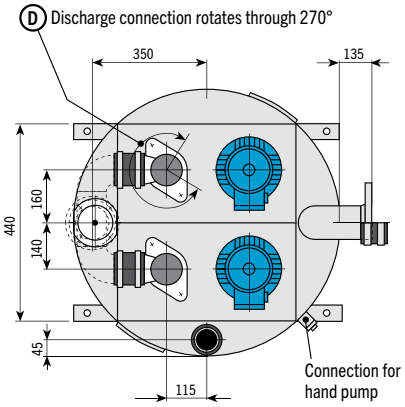
Mini Piccolo DUO (Reg. No. 53.2-102)



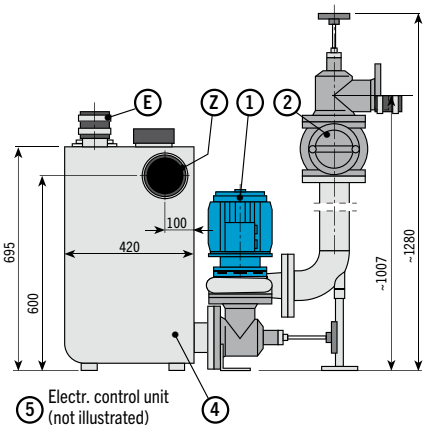


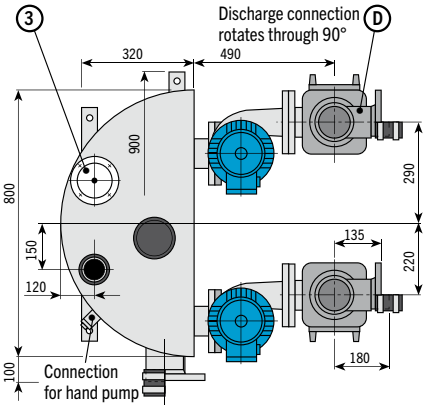
Piccolo Zi DUO (Reg. No. 53.2-317)





Mini Z DUO (Reg. No. 53.2-317)





D Discharge connection
E Ventilating connection
Z Inlet connection

Accessories:
Y-type pieces
Reduction pieces

Note:
For servicing, it is recommended to install an inlet isolating valve.

connections

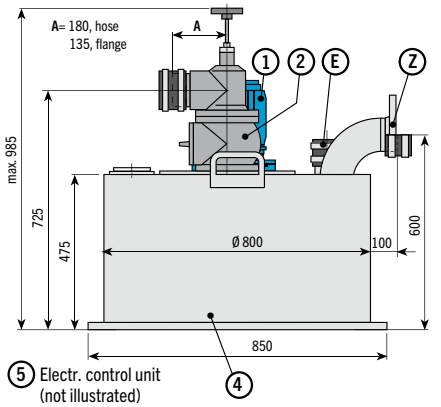
Type	Inlet head (standard) in mm	Inlet connection (Standard) DN	Discharge conn. (Standard) DN	Ventilating conn. (Standard) DN
Mini Piccolo 90	215, horizontal	100	80, 100 alternative	70
Mini Piccolo 180	180, horizontal	100	80, 100 alternative	70
Piccolo	435, vertical / 550, horziontal	100	80, 100 alternative	70
Mini Piccolo DUO	180, horizontal	100	80, 100 alternative	70
Piccolo Zi DUO*	600, horizontal	100	80, 100 alternative	70
Mini Z DUO*	350 - 600, horizontal	100	80, 100 alternative	70
Volks Zi*	600, horizontal	100	100	min. 70
Volks Zi DUO*	600, horizontal	100	100	min. 70
Piccolo Z DUO*	850 - 1450, horizontal	150	80	min. 70
Fäkalex Z DUO*	850 - 1450, horizontal	150	100	min. 70

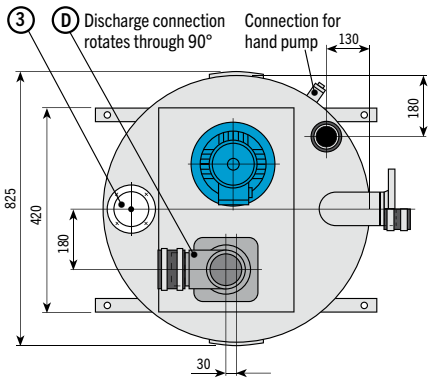
*(*variable diameters and positions)*

Standard design of inlet, discharge and ventilating connection: hose connection (to reduce vibrations). Flange connections upon request.

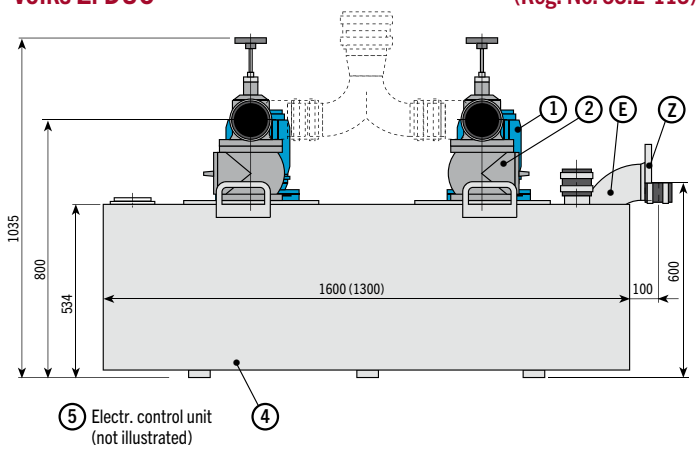
arrangement drawings

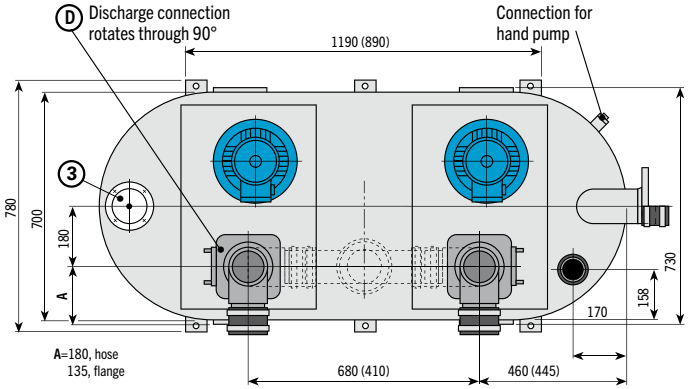
Volks Zi (Reg. No. 53.2-113)





Volks Zi DUO (Reg. No. 53.2-113)





Technical data and connections see pages 4-5

All fig.: Standard design. We reserve the rights to modify designs without prior notice.

Design Features

- Units are delivered ready for a quick installation and connection.
- High efficiency, Low energy consumption
- Sturdy cast iron parts
- Motors conforming to standards
- High adaptability to site conditions
- Low inlet head
- Inlet socket can be fitted at various positions and is available in several nominal diameters
- Discharge connection rotating: Plastic fitting infinitely by 270° Cast iron fitting through 90°
- Replacement of valve balls without removal of pipework
- Replaceable wear parts
- Pneumatic, self-ventilating pressure switch control outside the fluid
- All pumps are provided with alarm unit and fault indication

Material Options:

Spiral casing:	Cast iron GG 25
Impeller:	Cast Iron GG 25 / 1.4581
Pump cover:	Cast Iron GG 25 / POM / 1.4581
Shaft:	Chromium nickel steel, ground and polished
Bearings:	Anti-friction bearings, grease packed for life
Mechanical seal:	Chromium steel / chilled casting alloy / SIC
Counter ring:	Chromium steel / SIC
Elastomers:	NBR / FPM

Tank material:

PE-HD (thick-walled), steel RSt 37-2 (with coating), glass fibre reinforced plastic, galvanized or plastic-laminated steel, PP (thick-walled), 1.4301 or austenitic stainless steel 1.4571.

Motors:

Enclosure:	Standard IP 54
	Alternative IP 66/67
Operation mode:	
IP 54:	S1 100 % running time
IP 66/67:	S3 30 % running time

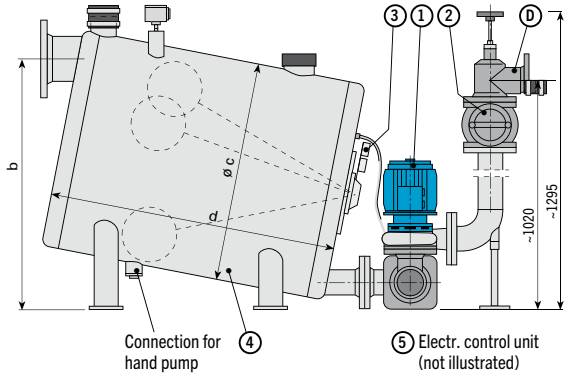
Application Limits: pH-range 6-9

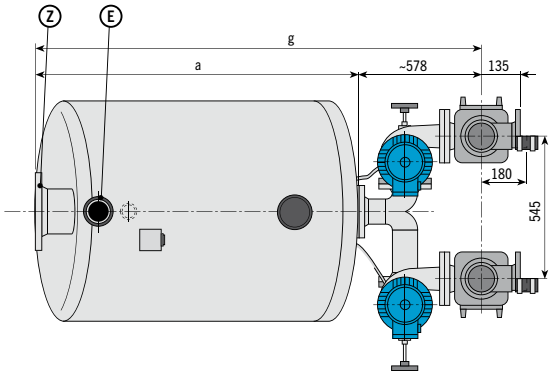
Tank material	Admissible temperature	
	Continuously	For short intervals only (for 3 min.)
HD-PE	60° C	85° C
PP	80° C*	85° C
Steel Stainless steel	80° C*	85° C

**requires adaptation of unit elastomeres.*
For other operational conditions, contact manufacturer.

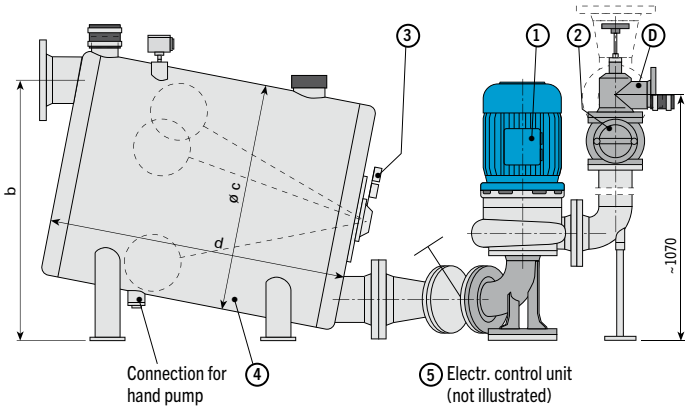
Special suitability for fatty wastewater.
Continuously changing surface geometry avoids fat incrustation and sedimentation.

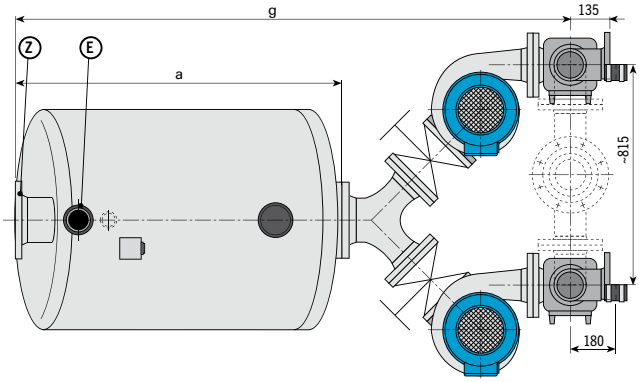
Piccolo Z DUO, DN 80 (Reg. No. 53.2-116)





Fäkalex Z DUO, DN 100 (Reg. No. 53.2-118)

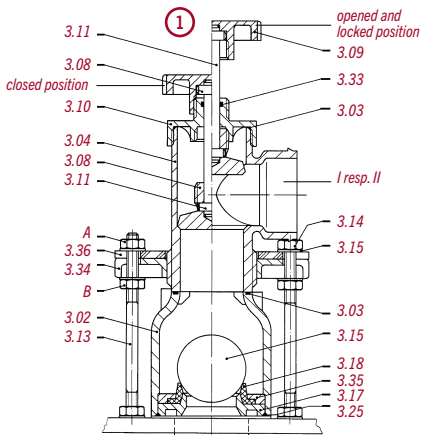


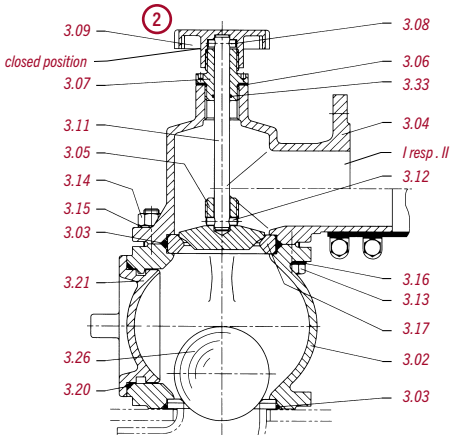


Technical data and connections see page 4-5

Piccolo Z DUO (all dimensions in mm)						
Type	a	b	ø c	d	g	Tank volume
Z1 DUO	1200	850 - 960	800	1050	1780	600 litres
Z2 DUO	1400	950 - 1100	950	1250	1980	900 litres
Z3 DUO	1750	970 - 1170	950	1550	2330	1100 litres
Z4 DUO	1400	1140 - 1280	1200	1250	1980	1200 litres
Z5 DUO	1750	1140 - 1300	1200	1550	2330	1500 litres
Z6 DUO	2050	1200 - 1450	1200	1850	2630	2200 litres
Weight: 580 - 980 kg (dependent on tank volume and rotors), flange connections acc. to DIN 2633, PN 16 Standard connections: Z = DN 150 flange, D = DN 80 hose, E = DN 70 hose						

Fäkalex Z DUO (all dimensions in mm)						
Type	a	b	ø c	d	g	Tank volume
Z1 DUO	1200	850 - 960	800	1050	2030	600 litres
Z2 DUO	1400	950 - 1100	950	1250	2230	900 litres
Z3 DUO	1750	970 - 1170	950	1550	2580	1100 litres
Z4 DUO	1400	1140 - 1280	1200	1250	2230	1200 litres
Z5 DUO	1750	1140 - 1300	1200	1550	2580	1500 litres
Z6 DUO	2050	1200 - 1450	1200	1850	2880	2200 litres
Weight: 620 – 1030 kg (dependent on tank volume and rotors), flange connections acc. to DIN 2633, PN 16 Standard connections: Z = DN 150 flange, D = DN 100 hose, E = DN 70 hose						





1. **Combined special ball check valve with lockable fast-action sluice valve, made of reinforced polyoxymethylene.**
2. **Combined special ball check valve with inspection opening and lockable fast-action sluice valve, made of cast iron.**

3.02 Valve casing
3.03 O-ring
3.04 Fast-action sluice valve casing (I DN 80, II DN 100)
3.05 Valve disk with locking thread
3.06 Gasket
3.07 Insert
3.08 Pin
3.09 Handwheel
3.10 Casing cover
3.11 Valve spindle (stainless steel)
3.12 Pin
3.13 Bolt
3.14 Hexagon nut
3.15 Washer
3.16 Washer
3.17 Valve seat
3.18 Valve seat reinforcement
3.20 O-Ring
3.21 Inspection cover with bayonet locking
3.25 O-Ring
3.26 Valve ball
3.33 O-Ring
3.34 Flange
3.35 Retaining ring
3.36 Flange reinforcement (with yellow chromizing)

perfomance data

Mini Piccolo 90, Mini Piccolo 180, Piccolo, Mini Piccolo DUO, Piccolo Zi DUO, Mini Z DUO, Piccolo Z DUO

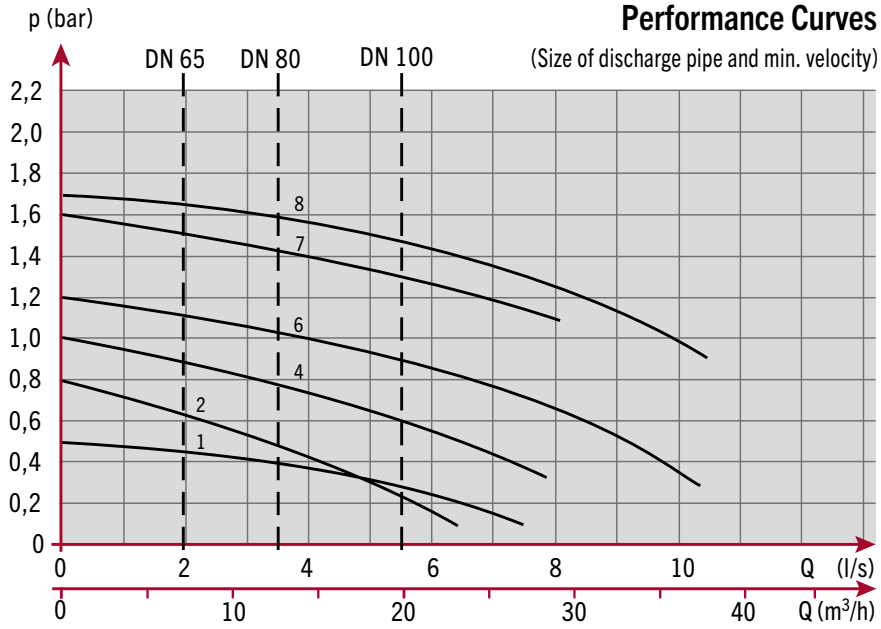
Type Chart Piccolo Rotors

No.	Type	kW	A	rpm
1	V 76/1,5-14.6-I	1,5	3,45	1420
2	V 89/1,5-28.6-I	1,5	3,45	2800
4	V 89/1,5-28.6-II	1,5	3,45	2800
6	V 89/2,2-28.6-III	2,2	4,9	2820
7	V 89/3,0-28.6-IV	3,0	6,3	2820
8	V 89/4,0-28.6-V	4,0	8,6	2865

Text curves are based on fluid temperatures of 20° C.
Curves according to ISO 2548 C. Other types upon request.

Performance Curves

(Size of discharge pipe and min. velocity)



Volks Zi, Volks Zi DUO (Maxi 70 only)
Fäkalex Z DUO (Maxi 70 + 74)

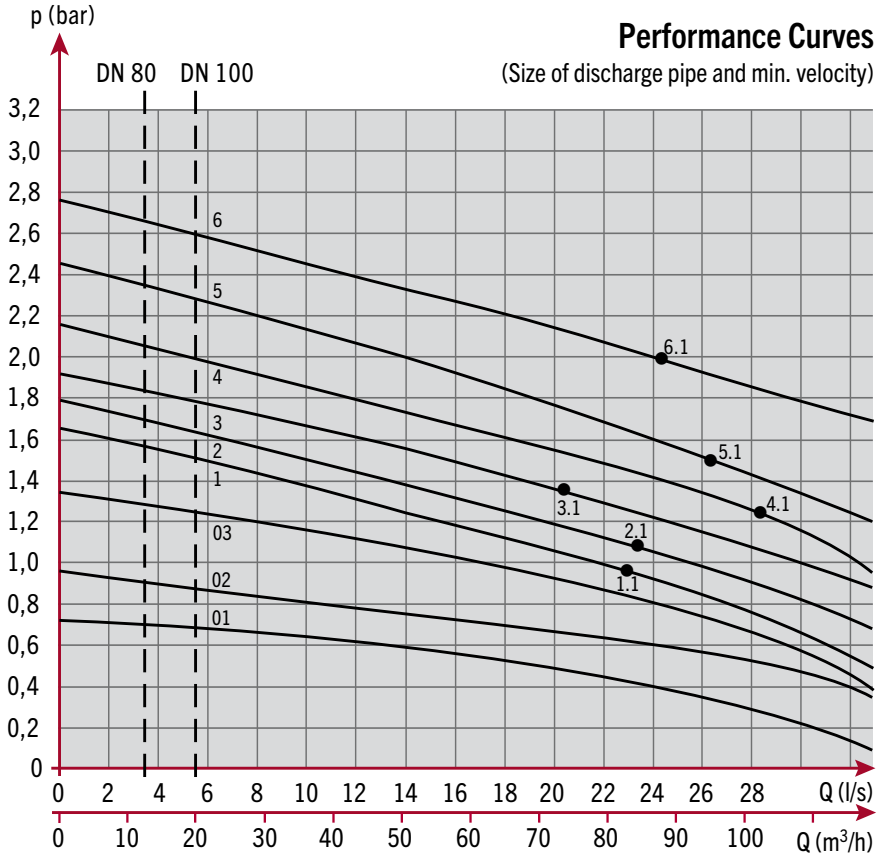
Type Chart

No.	Type Maxi 70	kW	A	rpm
01	DN 100/2,2-170	2,2	5,4	1400
02	DN 100/3,0-180	3,0	7,1	1400
03	DN 100/4,0-200	4,0	9,2	1400

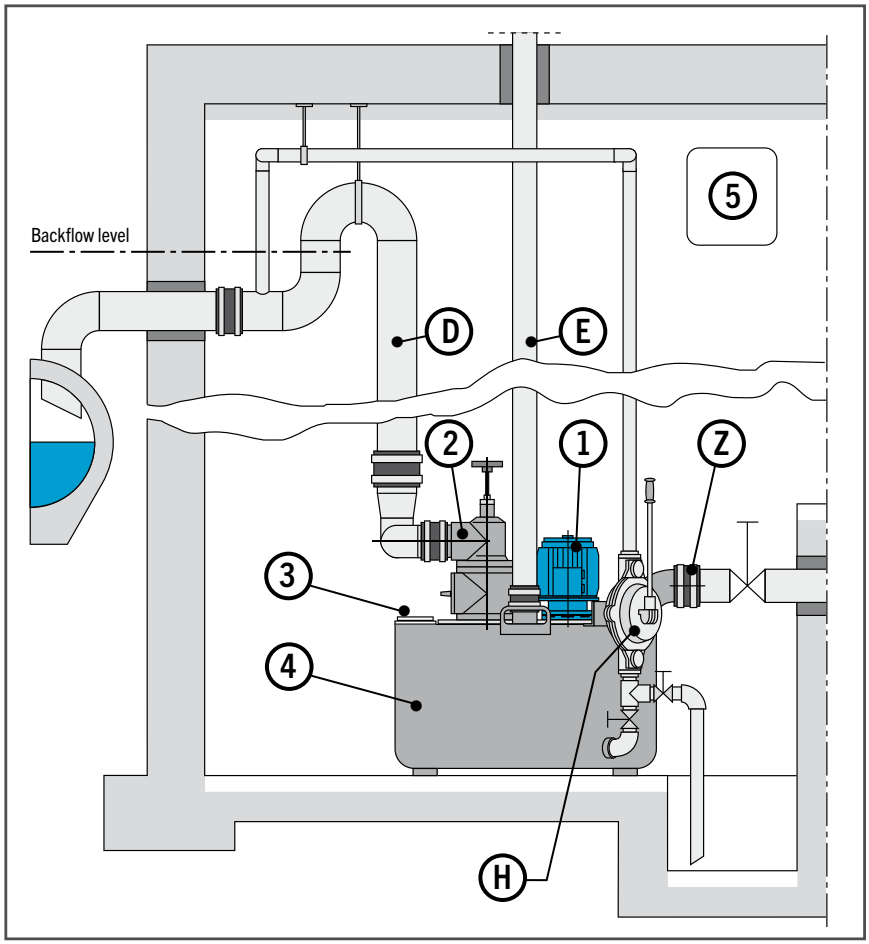
No.	Type Maxi 74	kW	A	rpm
1	DN 100/5,5-220	5,5	12,5	1400
1.1	DN 100/7,5-220	7,5	16	1400
2	DN 100/7,5-230	7,5	16	1400
2.1	DN 100/11-230	11	23	1400
3	DN 100/7,5-240	7,5	16	1400
3.1	DN 100/11-240	11	23	1400
4	DN 100/11-250	11	23	1400
4.1	DN 100/11-250	11	23	1400
5	DN 100/11-260	11	23	1400
5.1	DN 100/15-260	15	36	1400
6	DN 100/15-270	15	36	1400
6.1	DN 100/18,5-270	18,5	36	1400

Performance Curves

(Size of discharge pipe and min. velocity)



installation example



1 Maxirotor with cutter technology
2 Combined special ball check valve with fast-action sluice valve, lockable in place, made of plastic or cast iron
3 Controls with pressure switch
4 Collecting tank
5 Control unit
D Discharge pipe
E Ventilation
Z Inlet
H Hand pump (accessory)

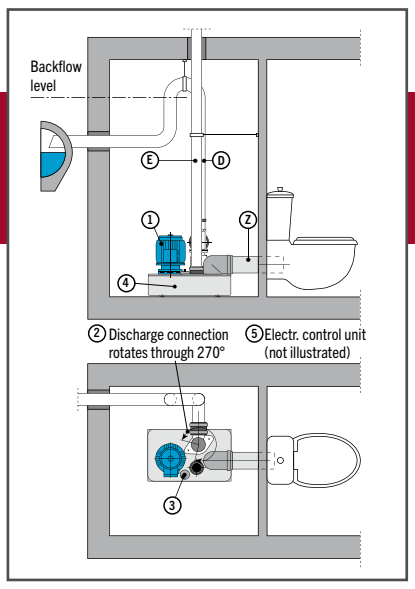
FELUWA sewage pumping stations are completely assembled and supplied ready for connection. Installation must be carried out so that the unit is protected from buoyancy and safe against rotation.

With double units, pumps are alternated, in order to protect the pumps and to ensure double safety. On site, discharge pipes must be positioned above the backflow level (in most cases street level). In case of double units the discharge pipes can either be positioned separately or combined by means of a Y-tube (accessory).
On site, the ventilation is to be positioned over the roof. For Installation the rules of DIN 1986 + DIN EN 12056 and the local wastewater regulations respectively apply.

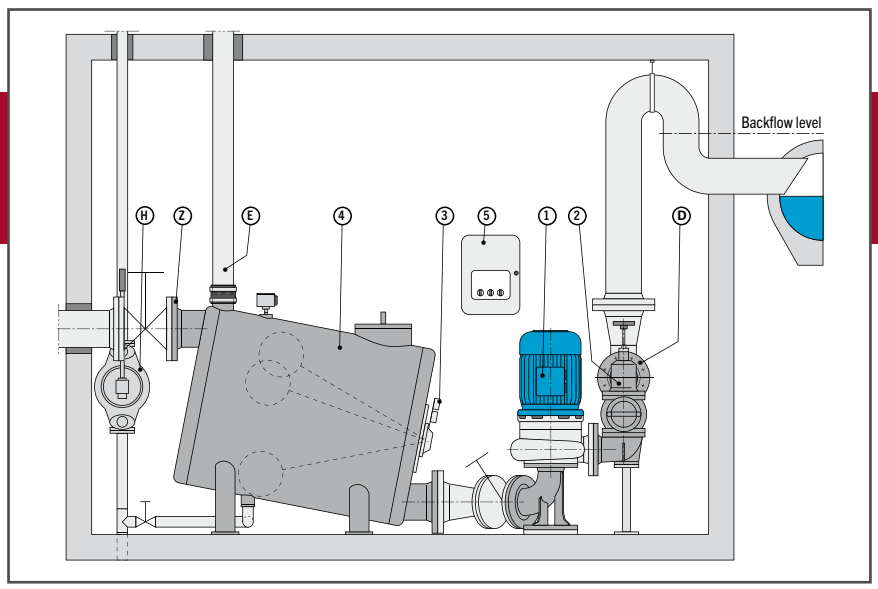
Standard design of Z, E and D = sleeve connection

FELUWA sewage pumping stations are characterized by their high level of adoptability!

Mini Piccolo 90



Fäkalex Z DUO



submersible pumps FTP 1-9

FELUWA wastewater submersible pumps, type FTP, convey domestic waste water (with faeces), sewage and rainwater and are characterized by their robust design made of cast iron.

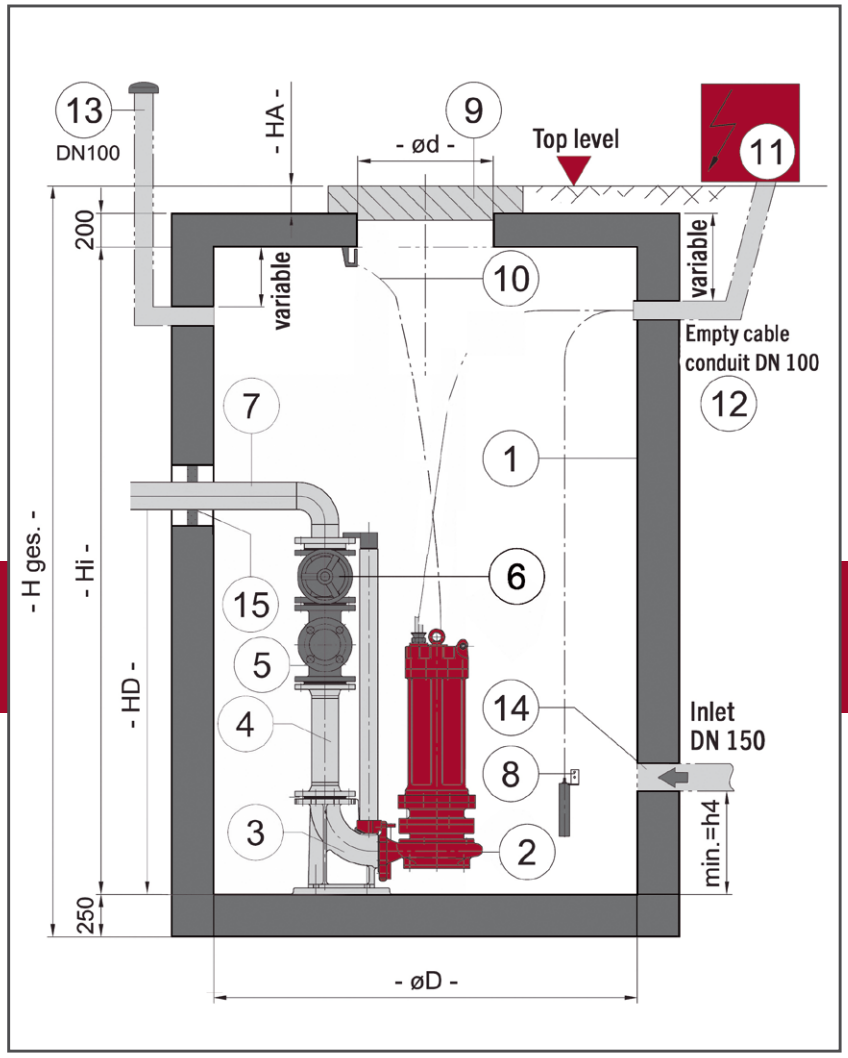
Three shaft seals and largely dimensioned, permanently lubricated bearings ensure reliable operation and long lifetime of the pump. The largely dimensioned oil chambers guarantee necessary cooling and lubrication of the shaft seals. Optionally the operation is possible either with foot elbows and winding system or with floor support ring and lifting chain.

Further characteristics:

- ✓ Various performance curves
- ✓ With or without explosion protection
- ✓ Motor three-phase asynchronous motor with cage rotors

Submersible pump with winding system. DN 80: Free-flow impeller with cutter for shredding fibrous solid matter

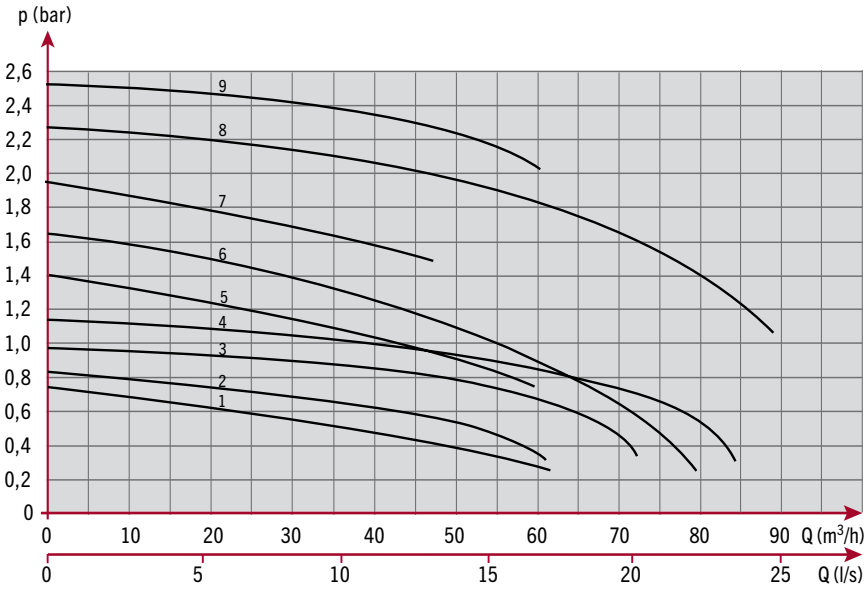
Pump shaft with submersible pump



FELUWA pump shaft made of PE with submersible pump (Exhibit with insight into the interior)

1 Pump shaft made of concrete or PE
2 Pump
3 Coupling elbow for lifting device in order to automatically disengage the pump, alternatively ground support ring
4 Discharge pipe
5 FELUWA non-return ball valve type DKU
6 FELUWA emergency stop valve
7 Discharge pipe
8 Level measurements by means of pressure sensor, float
9 Shaft cover class A, B or D
10 Chain with shackle for pump extraction
11 Control unit
12 Cable conduit
13 Ventilation
14 Supply
15 Peripheal seal
HA Cover height class A 80, B 125, D 160 mm

Performance Curves



Type Chart

Type	Material number		Motordaten				Weight (kg)*
	Without explosion protection	EX ATEX II2G EExd IIB T4	(P2) kw	Voltage N	Rated current A	Motor speed rpm	
FTP 1	1128488	1128489	2,2	400	5,4	1370	80/74
FTP 2	1128490	1128491	2,2	400	5,4	1370	81/75
FTP 3	1128492	1128493	3,0	400	6,3	1425	109/79
FTP 4	1128494	1128495	4,0	400	8,6	1425	111/102
FTP 5	1128496	1128497	4,0	400	8,6	2880	105/99
FTP 6	1128498	1128499	5,5	400	11,6	2880	111/106
FTP 7	---	---	5,5	400	11,6	2880	112/107
FTP 8	---	---	7,5	400	17	2880	117
FTP 9	---	---	7,5	400	17	2880	118

**without explosion protection / with explosion protection*

Dimensioning

Measures (mm)	a	b	c	d	r	x	h1	h2	h3	h4	DN (PN 16)
FTP 1-5	385	300	375	650	155	455	123	300	70	710	80
FTP 6-9	"	"	"	"	"	"	"	"	"	830	"

Available coupling elbows:
DN 80/80, alternatively ground support ring

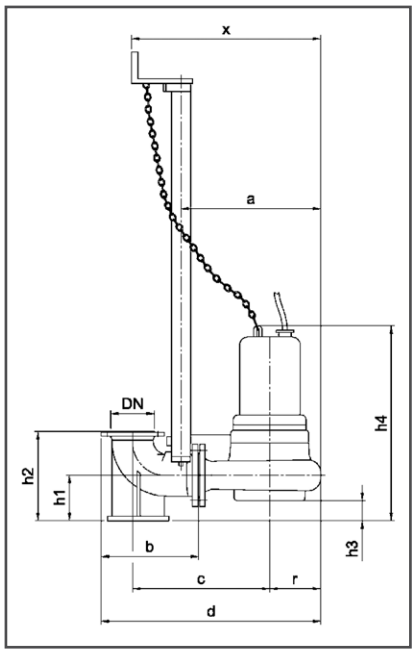
Design / Material

Casing:	Cast iron GG
Impeller:	Free-flow impeller made of cast iron GG with cutter
Shaft:	Stainless steel
Motor protection:	2 temperature sensors in series (explosion protection only)

GOTEK coating for improved waste water resistance!

Technical Data

Seal:	Triple shaft seal
Medium temp.:	max. 50 °C
Protection class:	IP 68
Insulation class:	F
Cable:	10 m, Cable sheath H07RN8-F Cable NSSHÖU-J
Free ball passage:	Cutter
Guide tube:	2" (1 piece) per pump



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Application Spectrum

Application of FELUWA sewage pumping stations is not restricted to building service.
The following examples will give you an idea of the great variety of use:

- **Disposal of hospital wastewater, contaminated by radiation.**
- **Sewage disposal in underground stations**
- **Units made of cryogenic steels with heating system for extreme ambient temperatures**
- **Disposal of wastewater in combination with fat separating units**
- **Units for civil defence facilities**
- **Special designs for strategic air-raid shelters**
- **Handling of condensed wastewater, such as flue gas condensed water**

All pumps and systems are available in various materials and designs and can be adapted to almost any technical requirements.
Furthermore, we supply custom-built control units and pipework.

Engineered and Made in Germany

Ref. Nr.: E 11000.1013