zehnder PUMPEN

Pressure drainage

for use in private, commercial and public sectors

Made in Germany

What means pressure drainage?

Pressure drainage is a combination of several objects on a common pressure pipe. The separate disposal of domestic sewage from a single-family house via a separate pipe is also called pressure drainage. These pipes are connected to a gravity drain via a pressure pipe end shaft or lead into a wastewater treatment plant.

Such systems require a detailed, technical inspection and precise planning. In this context, it is essential to comply with local regulations and specifications. By means of numerous, successful projects, ZEHNDER PUMPS has proven comprehensive expertise to realize these complex demands.

We execute EDP-based calculations of pressure pipes and support you when selecting the proper pipe cross-section. In most of the cases, pressure pipes with a diameter of 50 or 65 mm are used. In this way, distances of more than 2 kilometres can be covered easily in a very economical way.

To avoid odour nuisances the pressure pipe is led into the transfer shaft be-low the water surface. Thereby, the leakage and whirling up of hydrogen sulphide H_2S is prevented, which is responsible for the occurrence of unpleasant gases.

What about the sewage?

About 90% of all households in Germany are connected to the canalization. In urban agglomerations, up to 5 m deep laid gravity pipes lead to treatment plants. In rural areas it is not possible or very cost-intensive to use gravity pipes. The pressure drainage systems from ZEHNDER PUMPS are reliable and economical alternatives for sewage disposal in those areas. The usage of pumping stations enables a cost-effective connection to the communal-regulated sewage system.

Zehnder pressure drainage versatile and cost effective

The usage of pressure drainage stations from ZEHNDER PUMPS is recommendable for:

- faraway buildings
- groups of houses which are isolated from the canalization due to a river
- city districts which will be connected to a local treatment plant
- an alternative to cost-intensive gravity pipes

In the process, every connected house is equipped with a pumping station from ZEHNDER PUMPS. These stations pump the sewage to a common pressure pipe which is laid at the roadside. In this way, complex sewage systems arise. In the stage of planning new houses and districts, fresh water pipes and sewage pipes can be installed in the same pipe shaft.

Your decision for pressure drainage systems from ZEHNDER PUMPS saves you 50% of the investment and operating costs compared to conventional gravity pipes. For example, the energy costs of one ZEHNDER pumping station for a single-family house are only 8 Euro per year.

Zehnder pressure drainage proven a thousand times

FPS-polyethylene pumping stations are already used thousands of places to solve complex problems of sewage disposal. Easy installation - also for areas difficult to access, backyards, roadways and installation depths up to 350 cm - and fault-free functionality were decisive arguments for ZEHNDER PUMPS and against gravity pipes. The average lifespan of the installed pumps is approx. 4.000 hours. Pumping stations of single-family houses only work around 15 hours per year, so a long lifetime of the system is guaranteed.

Why Zehnder PE-pumping stations?

Polyethylene manholes off er a variety of benefits compared to conventional concrete manholes. They are used more and more frequently by municipalities, private households and the industry as an economic alternative.

Your advantages

Low weight:
The lightness of the material simplifies and subsidises the entire handling during transport and installation.

Durability:
High tightness, strong chemical resistance, best corrosion resistance and smooth plastic surfaces ensure reliable operation for many years.

Flexibility:
Easy height adjustment and insertion of further inlets - both could be pre-assembled or even customised subsequently.

Absolute tightness:
Manholes made of PE are 100% impermeable to water - especially ground water - and off er very high tear strength and breakage resistance.

Economic efficiency:
Unlikely maintenance costs, favourable installation and cost-effective transportation make our polyethylene pumping stations a very profitable decision.

Pumping stations

ZEHNDER polyethylene manholes are characterized by low weight, high stability, absolute tightness and easy installation. Supplied as complete systems with one or two pumps, they dispose waste water and sewage. Due to the built-in coupling system, high-efficient and powerful grinder, channel and vortex pumps can be placed inside the manhole. The coupling system as well as non-return valves and the entire stainless steel piping are pre-in-stalled. The manholes are protected against floating and accessible even for trucks.

Pumping station FPS Basic

Material	corrosion-resistant PE-LLD
Piping	DN 32, stainless steel, completely assembled
Inlet	1 x DN 150, additional inlets on request
Pressure outlet	PE-HD 63 x 5,8
Additional connections	2 x DN 100 for cable gland and air vent
Max. inlet depth	1.190 up to 1.270 mm
Total height*	1.365 up to 1.675 mm
Diameter	806 mm
Configuration	gate valve, ball non-return valve, guide rail, guide chain, coupling system

* incl. top section and BEGU-manhole cover

available BEGU-manhole covers: class A accessible, class B drivable (car), class D drivable (truck)

Pumping station FPS-KE/FPS-KD

Material	corrosion-resistant PE-LLD
Piping	DN 50, stainless steel, completely assembled
Inlet	1 x DN 150, additional inlets on request
Pressure outlet	PE-HD 63 x 5,8
Additional connections	2 x DN 100 for cable gland and air vent
Max. inlet depth	1360 up to 2940 mm
Total height*	1730 up to 3540 mm
Diameter	1.100 mm
Configuration	gate valves, ball non-return valves, guide rails, guide chains, coupling system

* incl. top section and BEGU-manhole cover

available BEGU-manhole covers: class A accessible, class B drivable (car), class D drivable (truck)

Submersible grinder pump ZFS 71 Ex

Material	cast-iron
Application	portable or stationary
Motor power	2,1 up to 3,9 kW
Voltage	mono-phase or three-phase
Max. flow rate	17 m^3/h
Max. head	39 m
Pressure outlet	DIN flange DN 50 PN 10
Protection grade	IP 68 - fully submersible
Speed	2800 min^{-1}

- robust, adjustable cutting system made of corrosion-resistant special alloy
- energy efficient submersible grinder pump with Ex-protection
- sealed with double, bidirectional mechanical seal within oil bath

Take a look at our high-performance cutting system in action.
Simply scan the QR code and start the video.

By means of a professional, technical consultancy we are at your disposal for orders and order management. We help you quick and easy with repairs and complaints. For us, high service orientation naturally includes on-site support by our sales representatives.

Submersible sewage pump ZPG 50

Material	cast-iron
Application	portable or stationary
Motor power	1,0 up to 2,05 kW
Voltage	mono-phase or three-phase
Max. flow rate	29 m^3/h
Max. head	16,1 m
Pressure outlet	special flange DN 50
Solids handling	IP 68 - fully submersible
Speed	2800 min^{-1}
Solids handling	41 - 45mm

- energy efficient submersible sewage pump
- coupling foot available as accessory
- double, bidirectional mechanical seal within oil bath

Submersible sewage pump ZPG 71

Material	cast-iron
Application	portable or stationary
Motor power	2,1 up to 3,9 kW
Voltage	mono-phase or three-phase
Max. flow rate	53 m^3/h
Max. head	31 m
Pressure outlet	DIN flange DN 50 PN 10
Protection grade	IP 68 - fully submersible
Speed	2800 min^{-1}
Solids handling	40 mm

- energy efficient submersible sewage pump
- coupling foot available as accessory
- double, bidirectional mechanical seal within oil bath

Overview about our waste water and sewage pumps

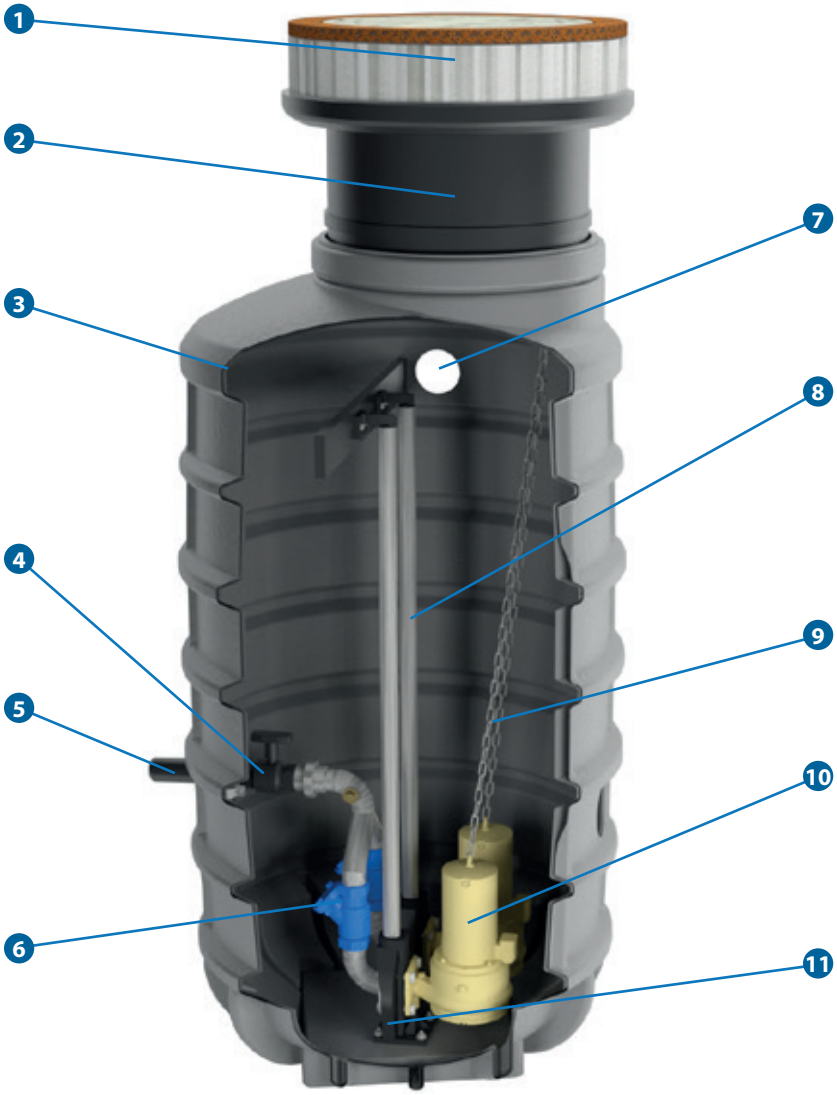
Type	Art.-no.	P_1 [W]	P_2 [W]	U [V]	I_n [A]	n [min^{-1}]	Qmax [m^3/h]	Hmax [m]	Weight [kg]
ZFS 71.1 W Ex	17381	2.200	1.600	230	10,5	2800	17,0	22,0	38
ZFS 71.1 D Ex	17382	2.100	1.700	400	3,7	2800	17,0	22,0	38
ZFS 71.2 D Ex	17383	2.100	1.700	400	3,7	2800	17,0	25,0	38
ZFS 71.3 D Ex	17384	3.900	3.200	400	6,5	2800	17,0	35,0	42
ZFS 71.4 D Ex	17385	3.900	3.200	400	6,5	2800	17,0	39,0	42
ZPG 50.1 W	13049	1.000	550	230	5,0	2800	20,0	9,6	22
ZPG 50.1 WA	13056	1.000	550	230	5,0	2800	20,0	9,6	22
ZPG 50.2 W	13060	1.250	750	230	6,0	2800	23,0	11,9	22
ZPG 50.2 WA	13065	1.250	750	230	6,0	2800	23,0	11,9	22
ZPG 50.3 W	13069	1.800	1.100	230	8,2	2800	25,0	13,9	22
ZPG 50.3 WA	13074	1.800	1.100	230	8,2	2800	25,0	13,9	22
ZPG 50.4 W	13078	1.800	1.100	230	8,2	2800	29,0	16,1	22
ZPG 50.4 WA	13083	1.800	1.100	230	8,2	2800	29,0	16,1	22
ZPG 50.1 D	16936	900	550	400	2,3	2800	20,0	9,6	22
ZPG 50.2 D	13066	1.100	750	400	2,8	2800	23,0	11,9	22
ZPG 50.3 D	13075	1.500	1.100	400	3,0	2800	25,0	13,9	22
ZPG 50.4 D	13084	2.050	1.500	400	3,5	2800	29,0	16,1	22
ZPG 71.1 W	17836	2.200	1.600	230	10,5	2800	43,0	19,0	38
ZPG 71.1 D	17835	2.100	1.700	400	3,7	2800	43,0	19,0	38
ZPG 71.2 D	17837	3.900	3.200	400	6,5	2800	53,0	26,0	38
ZPG 71.3 D	17838	3.900	3.200	400	6,5	2800	46,0	31,0	38

Did you know?

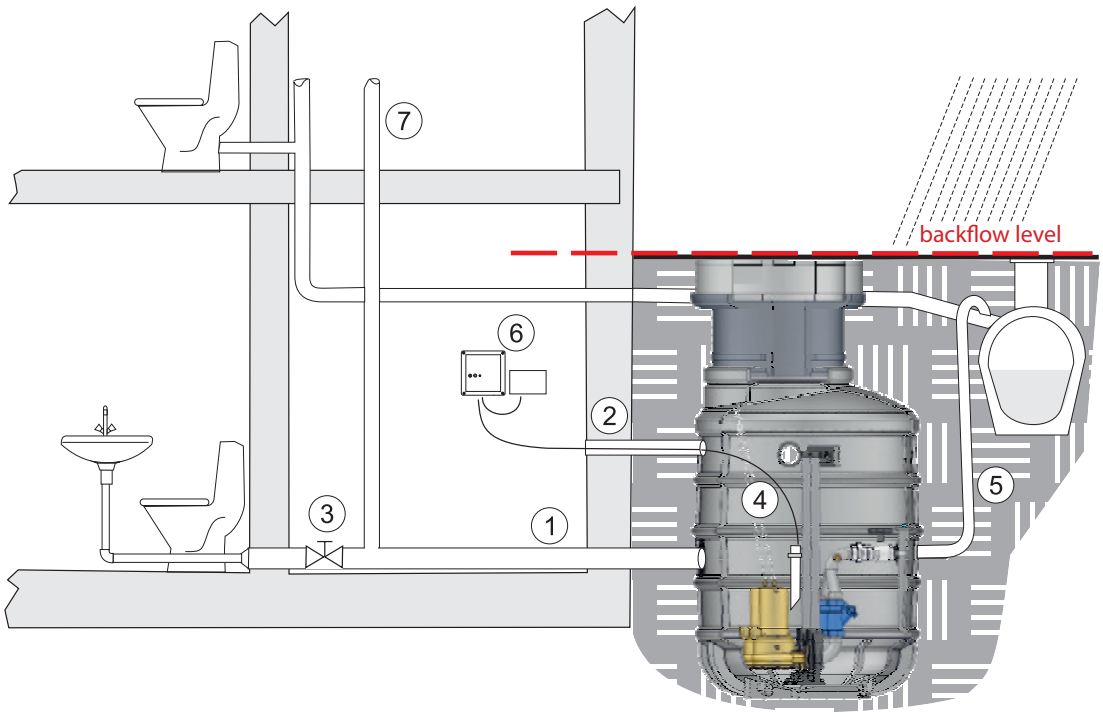
We do not only manufacture complete PE pumping stations. We also off er coupling systems with the entire piping and all valves. If you have an exsiting manhole made of polyethylene or concrete, you can easily install our pre-assembled pumping station equipment. In this case, there is no necessity to replace the whole pumping station. Our technicians are pleased to support you finding the best solution for your application.

Pumping stations type FPS-K in detail

1. **BEGU manhole cover**
   loadable up to 40 t (class D)
2. **Extension**
   height-adjustable 50 up to 280 mm
3. **Manhole**
   made of corrosion-resistant PE-LLD
   large inlet depth - up to max. 2.94 m
4. **Gate valve**
   for safe separation from the waste water pipe if required
5. **PE-HD Pressure outlet DN 50**
   for direct connection to the sewage pipe
6. **Non-return-valve(s)**
   for the prevention of reflux from the sewer
7. **Ventilation / cable conduit**
   connection size and position individually adjustable
8. **Guide rail**
   made of stainless steel
9. **Lowering chain**
   made of stainless steel
10. **Pumps**
    optionally with 1 or 2 vortex pumps or pumps with cutting system
11. **Quick coupling system**
    optimal connection and sealing to the pressure pipe



Installation example



1. inlet pipe
2. empty pipe for electric cable and pneumatic control line
3. gate valve in inlet line (optional)
4. control pipe in manhole
5. pressure pipe to channel
6. control and mains-independent alarm transmitter
7. ventilation over the roof

Our professional pump control unit ZPS does not only off er simple handling with numerous setting options, but is also very flexible. Standardly supplied for our pumping stations and sewage lifting units, ZPS can also be used for our sewage pumps, waste water pumps and analogical products of other manu-facturers.

Control unit ZPS

Controls are essential parts of the whole pump technology.

ZEHNDER-pump controls are robust, reliable and equipped with a LCD dis-play to monitor the operation data. Furthermore, the con-trol unit has an integrated audible and visible alarm.

It is installed in a dry room, e.g. the cellar. The installation in external cabinets outside the house is also possible. Even large distances are enabled by using a small compressor set.

ZPS 2.1 with small compressor set

ZPS 1.1

- polypropylene control box for wall-mounting
- monitoring of operation on clear text display with signal lights
- automatic operation of one mono-phase or three-phase pump
- programmable start delay and over-run time
- visible and audible alarm with potential-free terminals
- level controlled with dynamic pressure system, float switches or 4-20 mA interface
- monitoring of operation hours, pump starts, power consumption and maintenance intervals
- error memory for 64 errors
- phase monitoring for three-phase motors
- 12 languages available
- fill level indicator
- high water alarm
- 24h switch-on
- ATEX-mode
- service-mode
- keylock

ZPS 2.1 additional functions

- automatic operation of two mono-phase or three-phase pumps
- automatic alternating operation
- switch over to standby pump in case of malfunction

Coupling system KS

Our coupling system KS includes three pieces - coupling base, guide piece and rail retainer. All parts are made of hardened cast-iron which guarantees wear-protection, durability and resistance against liquids with solids. The secure maintenance of the pumps is ensured by these robust components.

Type	Inlet	Outlet	Pressure Nominal
KS 50	DN 50	DN 50	PN 10
KS 100	DN 100	DN 100	PN 10

The Zehnder-technology

The technical equipment includes one or two submersible cast-iron pumps with cutting system or channel/vortex impeller and the required valves, e.g. gate valves and non-return valves. The coupling system is a substantial feature of ZEHNDER-pumping stations. Thus, the pump can also be lifted and lowered if the manhole is filled, the coupling and sealing of the pump is automatically.

ZEHNDER-pumping stations are normally installed and connected by well-trained installers. The service is secured by qualified, local customer service points.

If you are searching for a replacement pump for your existing coupling system, we can help you. Just let us know the existing type of pump and we will produce an adaptor. In this way, every pump can be replaced cost-effective by a ZEHNDER pump.

Easy maintenance

For maintenance works on the pump, there is no need to demount it. It can be taken off the manhole via a guide rail system by pulling the guide chain. After service is completed, the pump is placed in the manhole via the guide rail. Due to its tare weight and the special coupling system, the pump is connected to the pressure pipe without further connection works. Enormous costs are saved because it is not necessary to empty and flush the manhole.

Economic efficiency

The low weight of our pumping stations does not only save delivery costs, but also costs for installation. Heavy machines are not required for the shaft installation. Both the polyethylene manholes and the pumps are characterized by very long durability. The used materials guarantee the stability and thereby low-maintenance operation.
The system (guide rail and coupling system) enables quick, easy and cost saving services.

Pump technology with satisfaction guarantee

Besides the manhole and the control unit, the appropriate pump is naturally part of our complete package. The pumps of Zehnder are made in Germany and thereby ideal for the usage in the area of pressure drainage. The motor housing, pump housing, seal carrier and impellers of our latest innovations ZFS 71 and ZPG 71 as well as of ZPG 50 are made of cast-iron. A double, bi-directional mechanical seal with intermediate oil chamber saves the motor from damages. All pumps are equipped with 10 m power cable with lateral cable gland, strain relief and bend protection as standard.

FAQ

10 frequently asked questions about our pumping stations

1. Why a pumping station instead of a lifting station?
Pump stations have a larger storage volume than lifting units, so more wastewater can be stored in case of a power failure. Furthermore, no noise can be heard in the building as the pumps work under water outside the building. Due to the coupling system installed in the manhole, the pump can simply be pulled out on the chain without loosening any screws. This saves maintenance costs.

2. What is the space requirement of the systems?
A pumping station does not take up any space in the building. The plastic manholes we offer have a diameter of 800 mm or 1.100 mm and are available in various installation depths. The inlet depth as well as the type and quantity of wastewater determines the manhole size.

3. What else do I need for the installation?
The pumping stations are supplied complete with manhole, manhole cover, pumps and control system. After the manhole has been installed in the ground, the supply line and the pressure line must be connected.
The pumps are lowered into the manhole at the chain and automatically connect to the pipe already installed in the manhole. After the electrical connection, the pumping station is ready for operation.

4 How is the system controlled?
The comfort control ZPS (see page 11) included in the scope of delivery offers, in addition to the complete performance monitoring, all necessary adjustment options for adaptation to the local conditions. The dynamic pressure measurement with centimetre-precise adjustable switching points as well as the integrated acoustic and visual alarm for additional safety are only two of the many advantages.

5. How difficult is maintenance?
In our pumping stations, the pumps are connected to the pipe in the manhole by a screwless coupling system. For maintenance, the pump can simply be pulled out of the manhole with the chain. It is not necessary to descend into the manhole to service the pump.

6. Is the system 100% tight?
Our manholes are made of high-quality plastic with high toughness, elongation at tear and chemical resistance. The special manhole design with many stiffening ribs prevents deformation of the manhole due to earth pressure and groundwater.

7. What happens in case of power failure?
Our ZPS control unit sends an alarm message in conjunction with a mains independent alarm switching device in case of a mains voltage failure. Depending on the type of use, the manhole is sufficiently dimensioned to be able to take up any waste water produced over a short period of time until the fault has been rectified.

8. Is a pumping station prone to clogging?
In our manholes, pumps with high-performance cutting units (cutting gap <0.05 mm) are used which crush solids contained in the waste water without any problems. The pumps used for faecal-free wastewater have a large solids handling.

9. Does the system offer enough storage volume?
The manhole is sufficiently dimensioned for the respective application. For special requirements customer-specific solutions with larger storage volumes are available on request.

10. How resilient is a pumping station?
The manhole can be equipped with a manhole cover from class A (accessible), class B (accessible by car) to class D (accessible by truck).

Checklist for the dimensioning of pumping stations

Which medium shall be pumped?

☐ Sewage

☐ Faecal-free waste water

Which amount shall be pumped?

Type of building .....

Number of Inhabitants .....

1. Waste water discharge

Drainage objects	Number
Washbasin, Bidet	.....
Shower without stopper	.....
Shower with stopper	.....
Single urinal with toilet tank	.....
Single urinal with flushing valve	.....
Urinal	.....
Bathtub	.....
Kitchen sink	.....
Dishwasher (household)	.....
Washing machine up to 6 kg	.....
Washing machine up to 12 kg	.....
WC with 4,0/4,5 litres toilet tank	.....
WC with 6,0 litres toilet tank	.....
WC with 7,5 litres toilet tank	.....
WC with 9,0 litres toilet tank	.....
Ground run DN 50	.....
Ground run DN 70	.....
Ground run DN 100	.....

2. Rain water discharge

Water-permable surfaces

Description ..... Surface ..... m^2

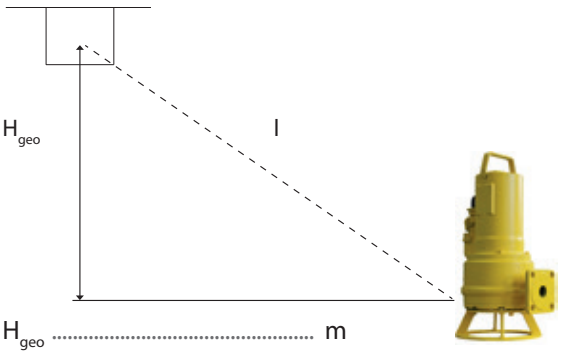
Partially permable and slight drainage surfaces

Description ..... Surface ..... m^2

Waterproof surfaces

Description ..... Surface ..... m^2

Where shall the medium be pumped



Transfer point

Is the transfer point of the pressure pipe above the installation level of the pump?

Yes ➔ Sketch required

no

Pressure pipe

Inner diameter of the pressure pipe in *mm* .....

Length of the pressure pipe in *m* .....

Material of the pressure pipe .....

How many pumps do you want to use?

☐ simplex pumping station

☐ duplex pumping

Manhole cover class

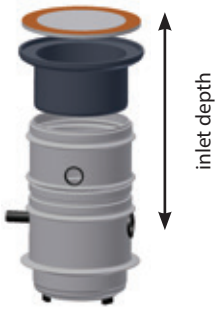
☐ **A** accessible

☐ **B** drivable (car)

☐ **D** drivable (truck)

inlet depth .....

* Distance between upper edge of terrain and lower edge of inlet



Installation location of the control unit

☐ inside the building

☐ outside the building

Notes

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Zehnder Pumpen GmbH
Zwönitzer Straße 19
08344 Grünhain-Beierfeld
Germany

Phone: +49 (0) 3774 52-100
info@zehnder-pumpen.de
www.zehnder-pumpen.de

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