STEBATEC®
driven by water

Technical information

Stationary flow measurement for wastewater

Special solutions for measuring wastewater, raw sewage and rainwater under the most difficult conditions

Imprint

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List of changes

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1 Introduction

Attention

This technical information is not a substitute for the operating instructions. In particular, the warning and safety instructions required by DIN EN 82079-1 (Preparation of information for use (instructions for use) for products), which are necessary for installation, maintenance and troubleshooting on site, are missing.

Table 1: Labelling of notices

This technical information is an abridged version of the operating instructions for the stationary flow meter for wastewater. Please contact STEBATEC if you would like to obtain the detailed operating instructions, which contain the necessary warnings and safety instructions as well as further information.

2 Product description

The magnetic-inductive flow measurement method (MID) for “Stationary” is central and provides the required reliability. It measures the flow velocity over the entire flow profile without any solids or deposits affecting the measurements. This proven measuring method is therefore extremely reliable.

Each product is calibrated in our own certified hydraulic laboratory and supplied with a test certificate. This guarantees measurement accuracy for the customer.

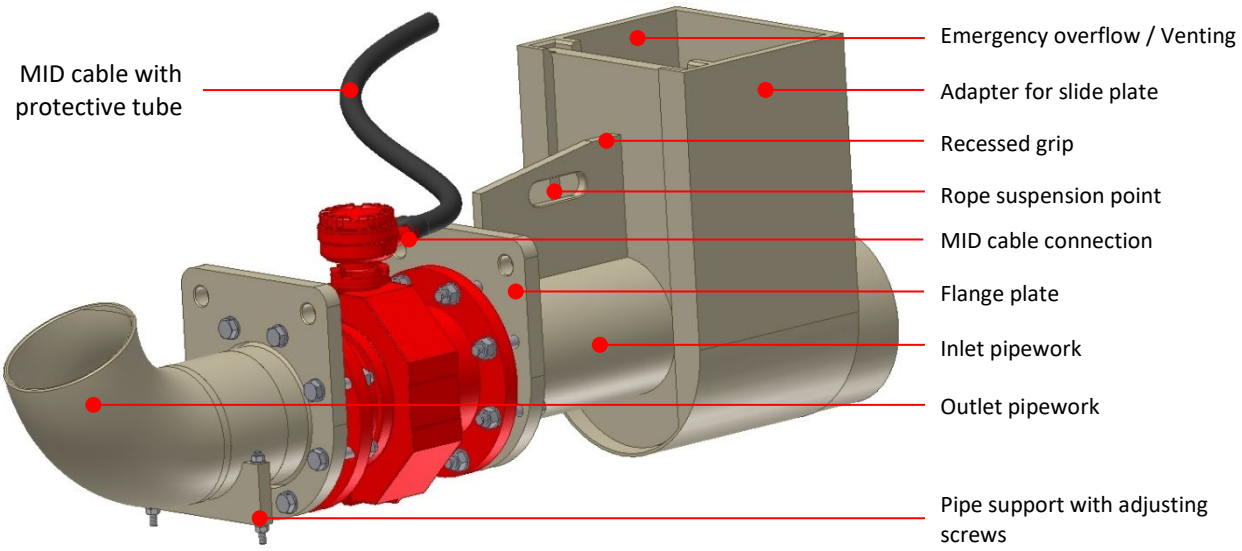


Illustration 1: Stationary flow measurement fully filled

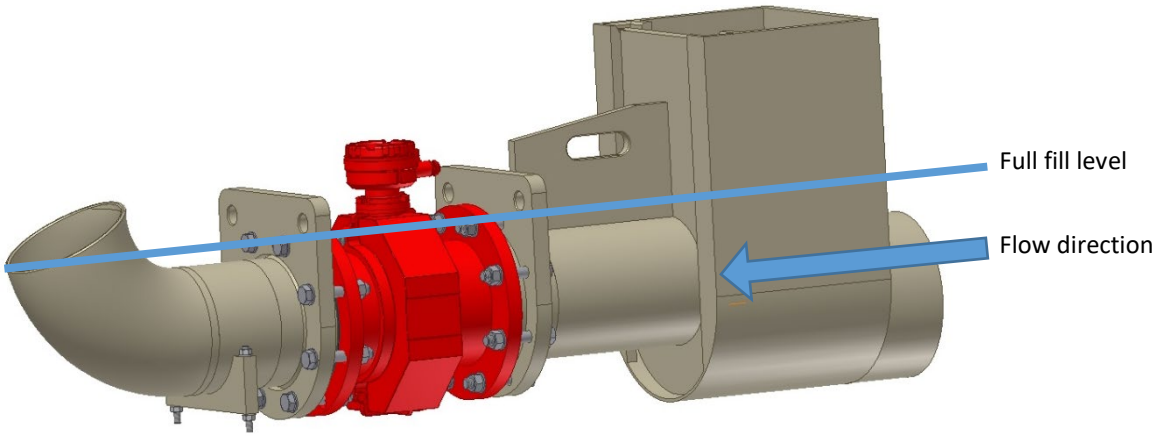


Illustration 2: Stationary flow measurement fully filled - flow direction

2.1 Short description

The fully filled stationary flow measurement has advantages in operation as well as in project planning and installation.

- Guaranteed and controllable measuring accuracy - inherently calibrated system
- Reliable, very difficult to manipulate and influence by solids, deposits or external influences
- Works even when flooded
- Maintenance-friendly: maintenance possible from outside the chamber
- Backflow-proof, emergency overflow
- Long service life - no wearing parts
- Fits into most existing structures - no conversion necessary
- Installation possible without water diversion
- Installation in just one day

2.2 Areas of application

The need for cost accounting based on the polluter-pays principle is also increasing in the wastewater sector. The STEBATEC “Stationary” measuring system offers significant advantages, particularly in view of the increasing requirements for precise measuring and control systems:

- Quantity recording in municipal wastewater associations
- Wastewater discharge monitoring for industrial plants
- Measurement of drainage water
- Mining and process water measurements in mining and tunnelling
- Cost accounting measurement
- Extraneous water measurement
- Rainwater measurement

2.3 Functionality

The channel is sealed using suitable means (see below) to channel the medium through the measuring system via the inlet opening. The outlet bend creates a backflow that causes the sensor to fill completely.

The devices are dimensioned during project planning based on the key hydraulic data. The greater the backwater upstream of the system, the more water is forced through the system. This means that a smaller system can be selected if there is a large backwater, or a correspondingly larger system must be used if there is a small backwater.

The nominal system width is designed according to the maximum measured volume - the channel size is irrelevant. Water volumes that exceed the measuring range are discharged via the emergency overflow. The size of the emergency overflow normally corresponds to the cross-section of the inlet pipe.

Note

To achieve full filling, the water is dammed up in the sewer when using the “Stationary”. With larger volumes of water, a higher pressure is required to force the water through the pipes. This increases the water level and the backwater in front of the measuring point. It is very important to pay particular attention to these points to prevent a possible accident.

3 Types

Customised mounting is essential for successful installation due to the different installation locations. Our variable mounting adapters offer an optimal solution for this. By using a construction plan of the shaft or pictures taken on site, the measuring point can be designed in such a way that it can be installed in almost any case.

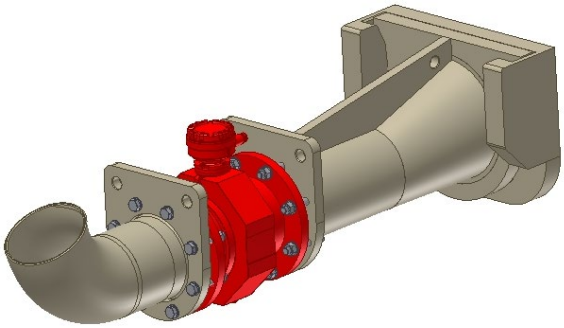


Illustration 3: Variant with suspension adapter

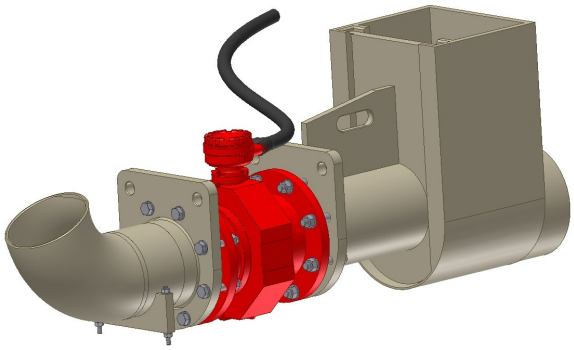


Illustration 4: Variant with suspension adapter and accumulation chamber

3.1 «Tandem» version

For large discharge volumes, the use of correspondingly large measuring devices may be necessary. As an MID must be operated fully filled to achieve accurate measurement results, this would result in a basic accumulation which, depending on the specific situation, would affect the sewer network over a large area. To minimise the required basic backwater, several systems can be operated in parallel in tandem.

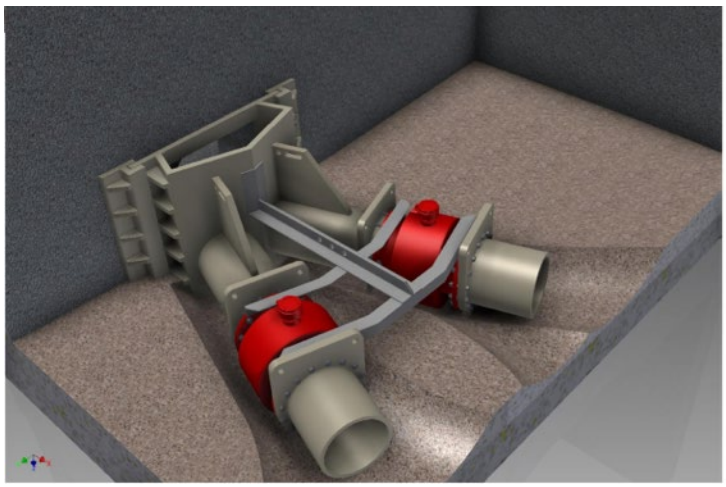


Illustration 5: Stationary flow measurement as tandem

A further tandem variant is available if very small quantities are to be measured. A device with a small nominal diameter is installed parallel to the “normal” size, which can measure even the smallest flow rates during dry weather periods.

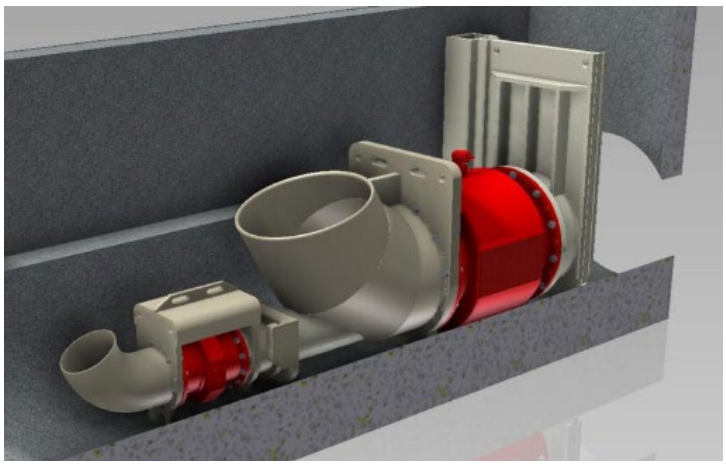


Illustration 6: Stationary flow measurement as a tandem for very small quantities

3.2 Lowered construction method

Depending on the structure, the pipe bend that guarantees full filling can also be omitted. The inlet and outlet of the manhole are designed in such a way that the measuring point is guaranteed to be full and there is no base build-up.

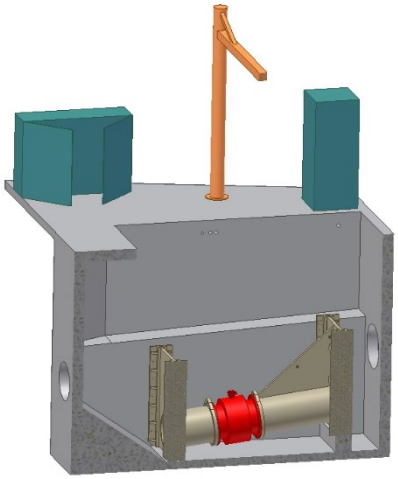


Illustration 7: Location of the measuring point

Illustration 8: View from above

The MID with DN 600 is installed in a “measuring pit”. The entire installation can be lifted and cleaned using the guide rails.

4 Scope of delivery

- MID measuring unit
- Inlet pipework with mounting adapter
- Cable in the protective hose between the EMF measuring unit and transmitter
- Transmitter

4.1 Optional

- Various sensors placed in the pipe bend (temperature, pH value, etc.)
- Pipe bend for full filling

5 Technical data

Tube wall material	Polypropylene (PP)
Protection class	IP 68
Ex-certification	ATEX ll 2GD EEX de, wired EEx e
Sealing material	EPDM
Temperature range	0 ... +80°C
MID lining	Hard rubber
Interface	Analogue signal, 4...20mA

6 Possible dimensions

The following table provides an overview of the most common dimensions.

Accumulation from top edge Outlet	Stationary DN 100mm	Stationary DN 150mm	Stationary DN 200mm	Stationary DN 250mm	Stationary DN 300mm	Stationary DN 350mm	Stationary DN 500mm
200 mm	8 l/s	22 l/s	40 l/s	60 l/s	90 l/s	120 l/s	250 l/s
500 mm	15 l/s	32 l/s	60 l/s	95 l/s	140 l/s	190 l/s	350 l/s
800 mm	18 l/s	40 l/s	79 l/s	120 l/s	175 l/s	240 l/s	530 l/s
1000 mm	20 l/s	45 l/s	85 l/s	135 l/s	195 l/s	285 l/s	600 l/s

Table 2: Example dimensions

7 Installation and initial operation

The installation and commissioning of STEBATEC products is carried out exclusively by STEBATEC fitters or by a partner qualified by STEBATEC.

7.1 Initial operation

Initial operation takes place after the STEBATEC installation team has completed and prepared the installation. The agreed system services are checked and approved with the operator and the engineering office in accordance with the checklist. This is followed by training for the persons to be instructed.

7.2 Configuration

The factory settings are largely parameterised during initial commissioning and testing in STEBATEC's hydraulics laboratory. Other parameters are defined and set together with the customer on site.

8 Maintenance

STEBATEC products are designed in such a way that they do not require special tools for installation and removal during maintenance work.

For maintenance, the measuring point can be lifted out of the shaft using simple lifting equipment.

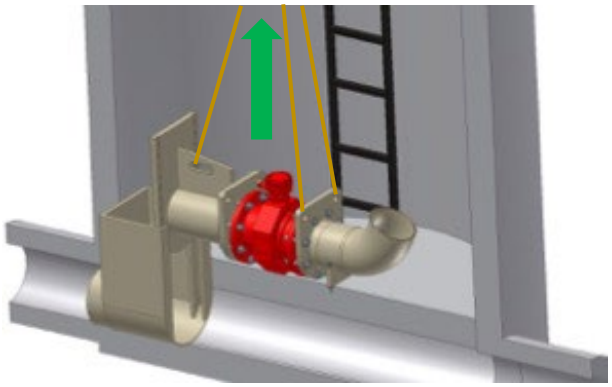


Illustration 9: Lifting the measuring device for maintenance purposes

Caution

The measurement should be switched off before removal to avoid incorrect measurements due to air bubbles.

8.1 Cleaning

The use of cleaning products must be tested on non-visible test surfaces or on equivalent sample materials. STEBATEC accepts no liability for “test cleaning” carried out.

Depending on the degree of soiling, the appliance must be removed and cleaned at least twice a year, if possible.

8.1.1 Cleaning recommendation

It should only be cleaned with clean water. If the soiling is increased, small amounts of neutral cleaning products can be added. Manual help can be provided with sponges or cloths, but never use abrasive or scouring agents. If cleaning agents have been used, rinse with clean water in any case.

The following products should be avoided in any case:

- Solvents
- Abrasive liquids
- Strongly acidic or alkaline products
- Cleaning products which have an unknown composition

8.2 Removal and installation

Attention

Protect the entire measuring and control device from damage by applying a protective coating.

The following points must be observed to ensure that the removal and reinstallation of the stationary flow measurement works smoothly:

- A lifting device (e.g. cable winch, pulley block or crane) is recommended for safe installation in shafts and ducts. This enables the operating personnel to manoeuvre the device safely in the duct or shaft.
- Avoid placing the appliance on or bumping it too hard, as this will damage the protective coating and the system. Cables and hoses must be secured against pulling or kinking.
- In the event of visible damage, it is strongly recommended to take photos of the damage and inform STEBATEC immediately. Sharp edges or other pointed objects that protrude into the duct must be removed beforehand.
- When using a suspension adaptation, the device is precisely aligned during initial installation. Any further maintenance-related installation and removal can be carried out without tools. Re-alignment is not normally necessary, but the alignment must be checked.

8.2.1 Installation procedure with suspension adaptation

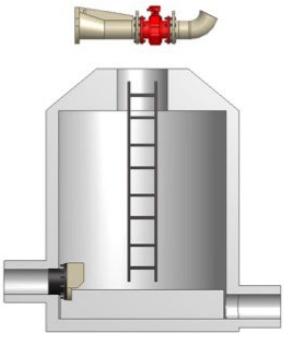
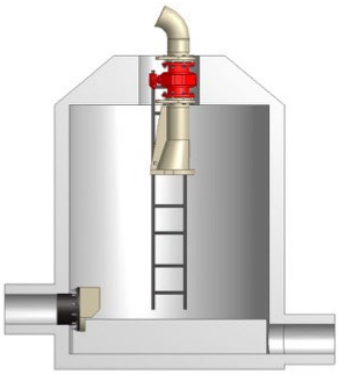
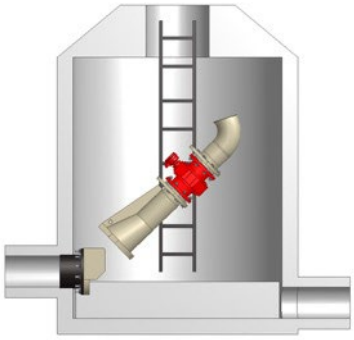
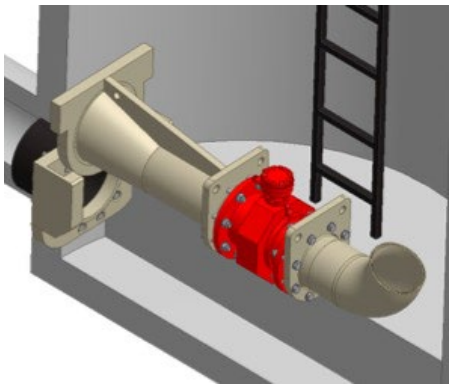
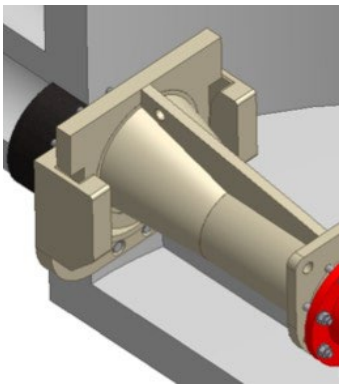
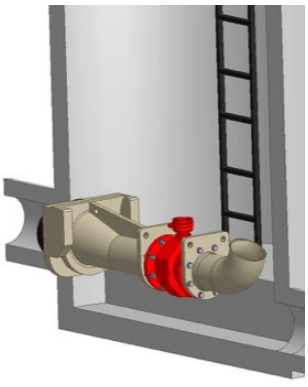
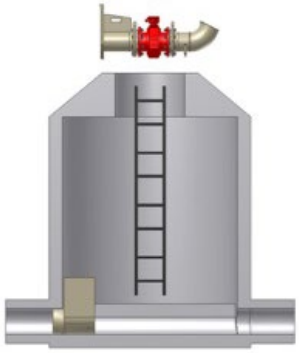
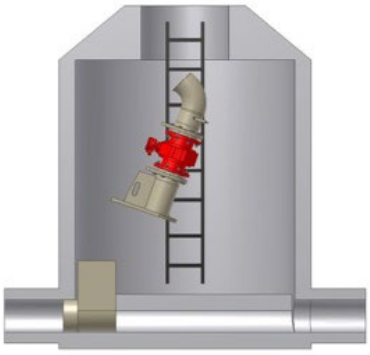
	
The stationary flow measurement must be positioned above the manhole entrance and secured accordingly.	The unit must be set up vertically and slowly inserted through the shaft opening using the safety ropes.
	
The ropes are used to bring the unit into a horizontal position in the shaft.	Now carefully insert the unit into the mounting adapter.
	
The unit centres and positions itself thanks to the precisely fitting adapter.	The weight of the unit automatically seals it to the adapter.

Table 3: Installation of the measuring unit in a shaft

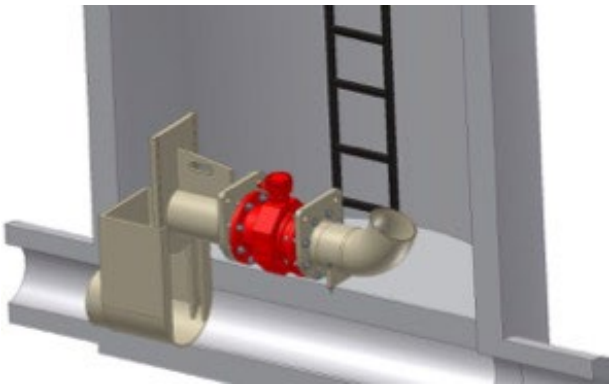
8.2.2 Installation sequence with sliding plate adaptation



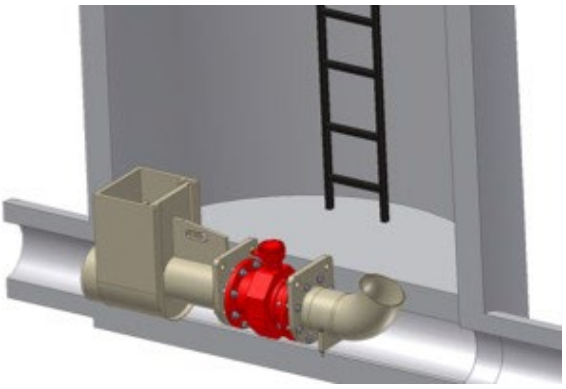
The stationary flow measurement must be positioned above the manhole entrance and secured accordingly.



The unit must be set up vertically and slowly inserted through the shaft opening using the safety ropes.



The ropes are used to bring the unit into a horizontal position in the shaft and insert it into the guide rails of the mounting adapter.



Now carefully bring the unit into its final position. It will seal itself due to its own weight.

Example photo of an assembled unit with safety cable still in place.

9 Glossary

Abbreviation / Term	
ATEX	French term “Atmosphères Explosibles” and refers to two guidelines for products and their operation in explosive atmospheres.
DN	Abbreviation for the French term “Diamètre Nominal” with the meaning of the inner diameter of a pipe or hose
ESD	Electrostatic discharge Avoid charges and rapid discharges → Equip the workplace accordingly
H	Filling level
HMI	Human-Machine Interface
I/O	Input / Output
IP	International Protection The degree of protection indicates the suitability of electrical equipment for various environmental conditions, as well as the protection of people against potential hazards when using it.
MID	MID is the abbreviation for "magnetic-inductive flow measurement", which is based on the electromagnetic law of induction.
Modbus	Data transmission standard (protocol) for data transmission in industry and technology.
Modbus TCP	Modbus operating mode in which the data is transmitted via TCP (standard for transmitting data on the Internet).
PE	Protective Earth
PN	Pressure Nominal Here, “PN 1” means that the maximum permissible pressure of a fluid in a pipe must not exceed 1 bar, provided the temperature of the fluid is 20°C.
Q	Flow rate [m^3/s]
VF	VF is the abbreviation for "vollgefüllt or “Vollfüllung” → fully filled. This means that the entire inside of the measuring tube of the flow measurement is filled with liquid. It should be noted that the MID (see above for explanation) requires a fully filled measuring tube for optimum measurement.
webUI	Integrated web visualisation, which can be opened using a web browser.

Table 4: Glossary

10 List of illustrations

11 List of tables