Storm water treatment
Waste water technology
Electrical engineering
Urban hydrology

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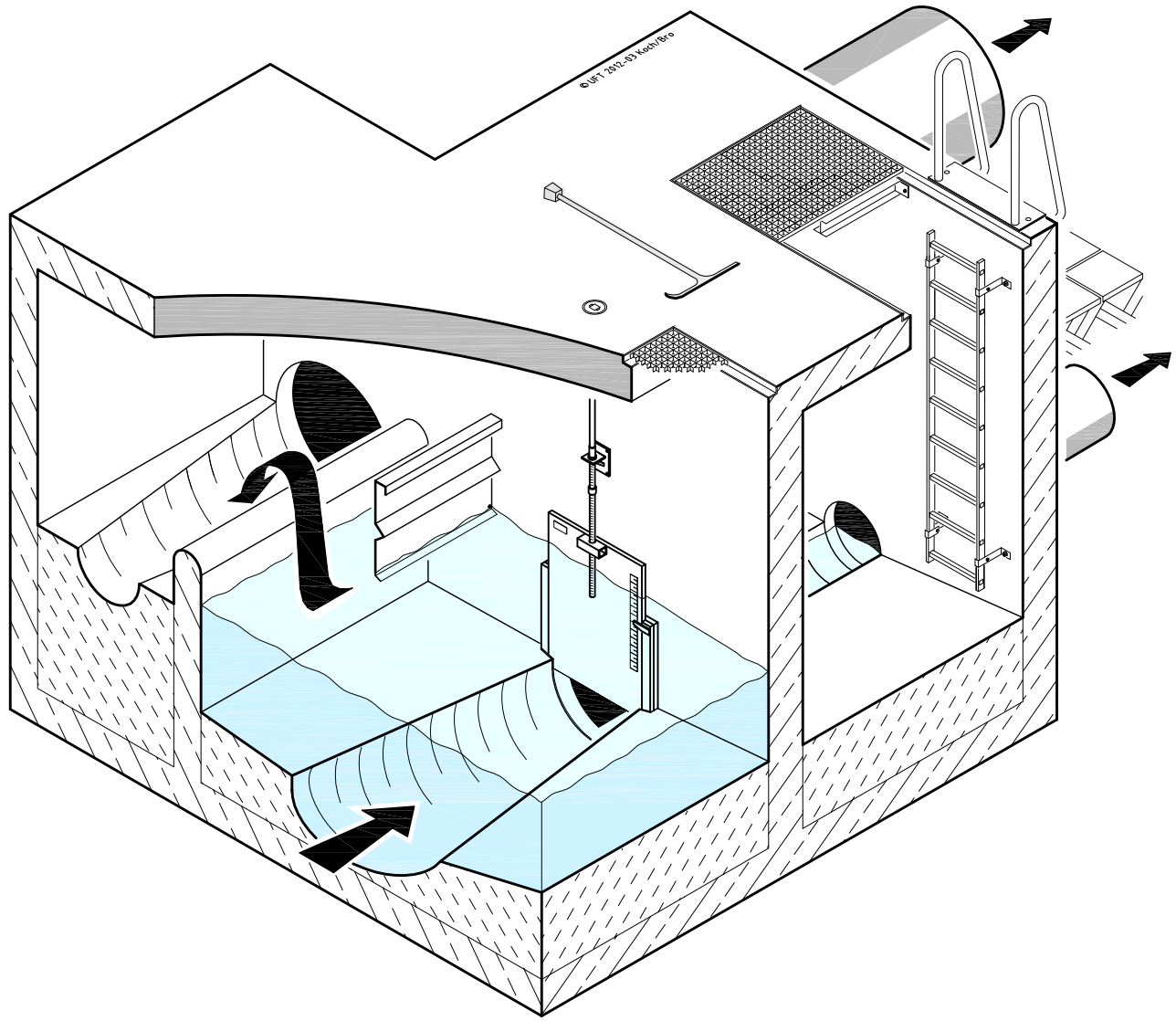
Product Information

Control Valve
UFT-*FluidGate*

S
0112



1 Application

The flow regulation at storm overflows or retention facilities is usually performed with by a flow regulating valve or a calibrated orifice. These methods, unfortunately, do not represent optimal solutions, either from a technical or economic point of view. These flow-regulating systems are not precise and depend mostly on the pipe roughness characteristics, which can vary over time. Such installation can drift of ±15% of the set flow rate over time, see DWA (2010) and Brombach (1982)

Based on this limitation, the UFT-*FluidGate* Control Valve is particularly well adapted for medium and large flows in CSO's or storm drains, surface pound reservoirs and retention tanks.

Advantages of the UFT-*FluidGate* Control Valve

The UFT-*FluidGate* Control Valve is made mostly of PVC, with the exception of the operating rod made of stainless steel and even with its low weight represents a very high mechanical resistance. Its compact design reduces required installation space and facilitates handling. The principal characteristics of the UFT-*FluidGate* Control Valve are as follows:

- upstream implementation (water pressure presses the unit on the wall)
- directly fixed by anchoring on a vertical wall
- precise and progressive adjustment of flow
- indication of height of opening by arrows on a graduated scale
- compactness
- low height loss
- rectangular gate section creating a flow opening favoring large flows at low head (risks of overflow reduced compared to a circular gate)
- installation flush to the invert of the chamber reducing accumulations
- constructed in non-corrosive materials: PVC and stainless steel
- operation from ground level by operating rod (with, for example, valve key box)
- when working in shallow depth, opening can be regulated with a wedge insert

2 Operation

The principal of operation is based on the limit of flow by reducing the bypass section and the phenomena of current referred to it. The UFT-*FluidGate* Control Valve could also be called adjustable diaphragm, specially adapted to wastewater.

Usually, the UFT-*FluidGate* Control Valve is fixed by anchors on a straight wall and implemented upstream (in other words, the fluid pushes the valve against the wall).

The bypass section of the open valve is circular. The gate has a sharp edge on the outer part. The regulation opening corresponds to the shape « a » in the technical specifications DWA-A111 (2010). We fix the gate to a pre-calculated « s » height, which gives a more or less large flow area based on a circular shape.

In low flow conditions, the flow is not modified by the valve and simply passes under the gate. As soon as the level rises, the outlet spray is throttled by the horizontal section of the gate, strongly accelerated and « pushed » downwards. From this is created, behind the regulated opening, a

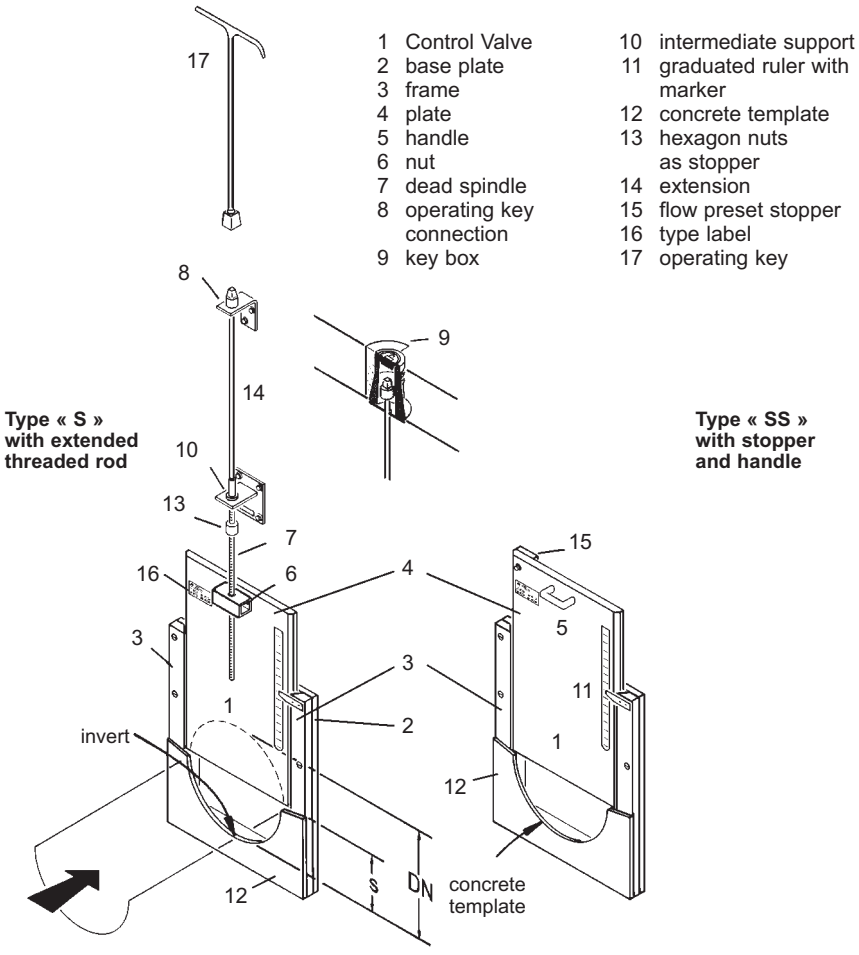


Fig. 1: UFT-*FluidGate* Control Valve with extended threaded rod for sufficiently deep chambers type « S », version for low heads with flow preset stopper type « SS »

hydraulic jump that makes the flow independant on backflow.

In normal service, the UFT-*FluidGate* Control Valve is partially open. It can also be closed to create retention, or opened for inspection. This valve is by no means watertight, but rather of the « drop by drop » type or leaking type.

3 Models available

There are two versions of the UFT-*FluidGate* Control Valve.

Standard version is type « S » with operating rod at a key connection or in a key box above maximum water level. The opening can be adjusted by means of an operating key.

The special version type « SS » with flow preset stopper is designed for structures with low ceiling heigths. The plate has to be moved manually at the handle (5). The flow preset stopper ensures the correct position of the plate.

4 Perfomances

When the valve open area is not filled with water and there is a very important slope upstream, the water jet can « flush » under the gate and higher flows than normal can pass. Based on this slope, we can calculate a flow curve with a point of rinsing (i.e. an uncontrolled peak flow larger than the throttled flow). In general, an upstream pipe slope higher than 5 % should be avoided in order to avoid this phenomenon. The characteristic curve of the UFT-*FluidGate* Control Valve is determined exclusively, for a given slope, by the bypass section.

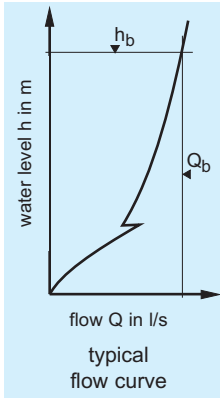
Nominal Diameter DN	Discharge Q_{min} in l/s	Discharge Q_{max} in l/s
250	65	119
300	97	173
350	135	244
400	174	309
500	265	477
600	385	688
700	520	938
800	684	1226
900	862	1551
1000	1063	1915

Table 1: Possible flows of UFT-*FluidGate* for a head of 1.5 m

The most common diameters in sewer works goes from DN 250 to DN 800. Other diameters can also be supplied upon request.

For the best choice of model for the UFT-*FluidGate* Control Valve, we have a hydraulic base of calculation. In the table 1, as an example and to help designers, we show the flow characteristics for an upstream head of 1.5 m. The exact adjustment of the design flow Q_b is done by the setting of the opening dimension « s » (Figure 1).

We select the valve in order that, for minimal flows Q_{min}, the opening of the gate valve « s » is higher than half the nominal diameter. Unless for particular exceptions, flow regulators installed in wastewater networks are always of a nominal diameter larger or equal than 300 mm, see german DWA-Arbeitsblatt A 128 (1992), clause 10.2.4.



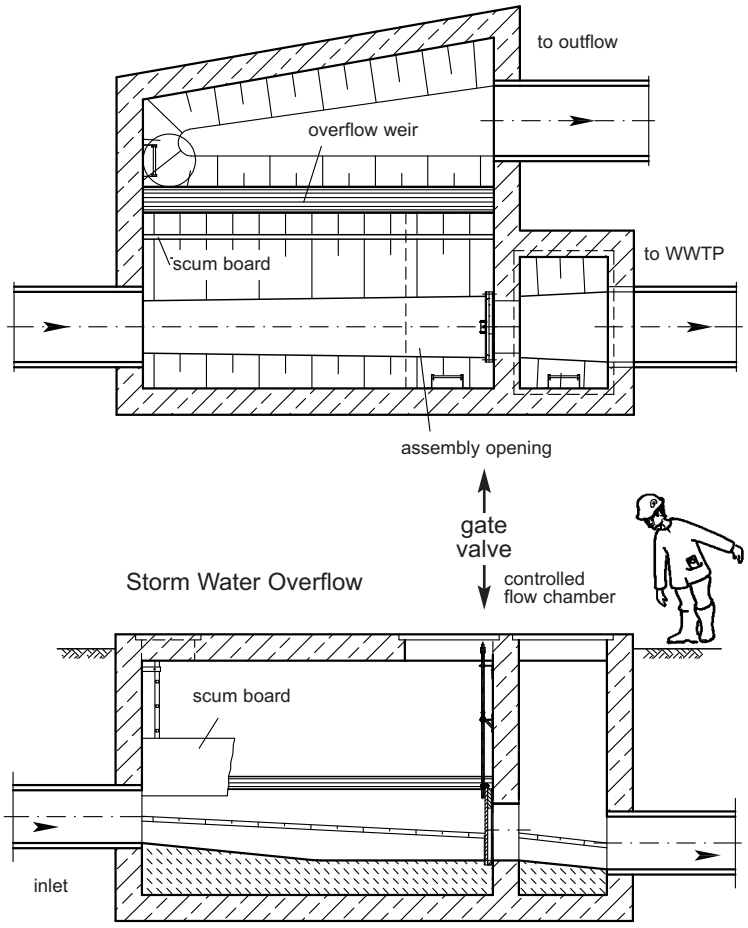


Fig. 2: UFT-*FluidGate* Control Calve implemented in a double chamber (overflow + drainage)

5 Material

Based on the particularly corrosive environment these valves are installed in, we paid particular attention to the choice of materials used in the construction of the valves. The parts coming in direct contact with wastewater are made of PVC or stainless steel.

All other mechanical parts, like the threaded rod, nuts and bolts, are made of stainless steel and bronze.

6 Installation

The UFT-*FluidGate* Control Valves are delivered ready for installation. In general we recommend a chamber with two compartments, one accommodating the valve, the other allowing downstream flow drainage (see Figure 2). The first compartment will have a rectangular box with dimensions corresponding to the valve, which will be anchored against the wall. The wall shall be vertical and flat.

For installations in circular shafts we provide the Control Valves with curved base plates

For a well-prepared building site, the assembly is quick and takes only a few hours. Once the valve is installed, careful shaping of the drain and culvert is done in the two compartments. The front part of the valve can be used as a template.

A test run or function control is not necessary as long as the correct opening « s » is verified. We do ensure an accuracy of the discharge of 10 %.

7 Maintenance

As the valve is directly subjected to the severe conditions of wastewater networks, a periodic visit is recommended. We recommend lubricating the threaded rod twice a year and checking the operation of the valve. Please remove the deposits in front of and behind the valve. Please verify the correct adjustment of the opening dimension « s ».

Bibliography

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Typical Specification Text

Pos.	Number	Article
1	x	Control Valve UFT-*FluidGate* Adjustable diaphragm, specially adapted to wastewater with circular bypass section of the open valve, sharp edge gate section creating a flow opening favoring large flows at low head. To be anchored on flat vertical wall. Plate, base plate, frame, concrete template from PVC, graduated ruler with marker, with operating rod extension, support bearing, cap, key hole, operation key, stainless steel operating rod and bronze nut; with additional bearing support for T > 2 m. All metal parts from stainless steal 1.4301 or brass, stainless steel nuts and bolts. **Model UFT-*FluidGate*** **type S** Design pressure head hb: ... m Design flow Qb: ... l/s Dry weather flow Qtx: ... l/s Nominal diameter: DN ... Total length T (key box to invert): ... mm Apparatus ready for installation, selected for design flow including hydraulic dimensioning; The concrete form is to be completed at time of installation (gauge on valve to be used as model). Datum for pressure head is the invert.
2	x	Control Valve Model UFT-*FluidGate* Adjustable diaphragm, specially adapted to wastewater with circular bypass section of the open valve, sharp edge gate section creating a flow opening favoring large flows at low head. To be anchored on flat vertical wall. Plate, base plate, frame, concrete template and flow preset stopper from PVC, graduated ruler with marker. All metal parts from stainless steal 1.4301 or brass, stainless steel nuts and bolts. **Model UFT-*FluidGate*** **type SS** Design pressure head hb: ... m Design flow Qb: ... l/s Dry weather flow Qtx: ... l/s Nominal diameter: DN ... Apparatus ready for installation, selected for design flow including hydraulic dimensioning; The concrete form is to be completed at time of installation (gauge on valve to be used as model). Datum for pressure head is the invert.