Storm water treatment
Waste water technology
Electrical engineering
Urban hydrology

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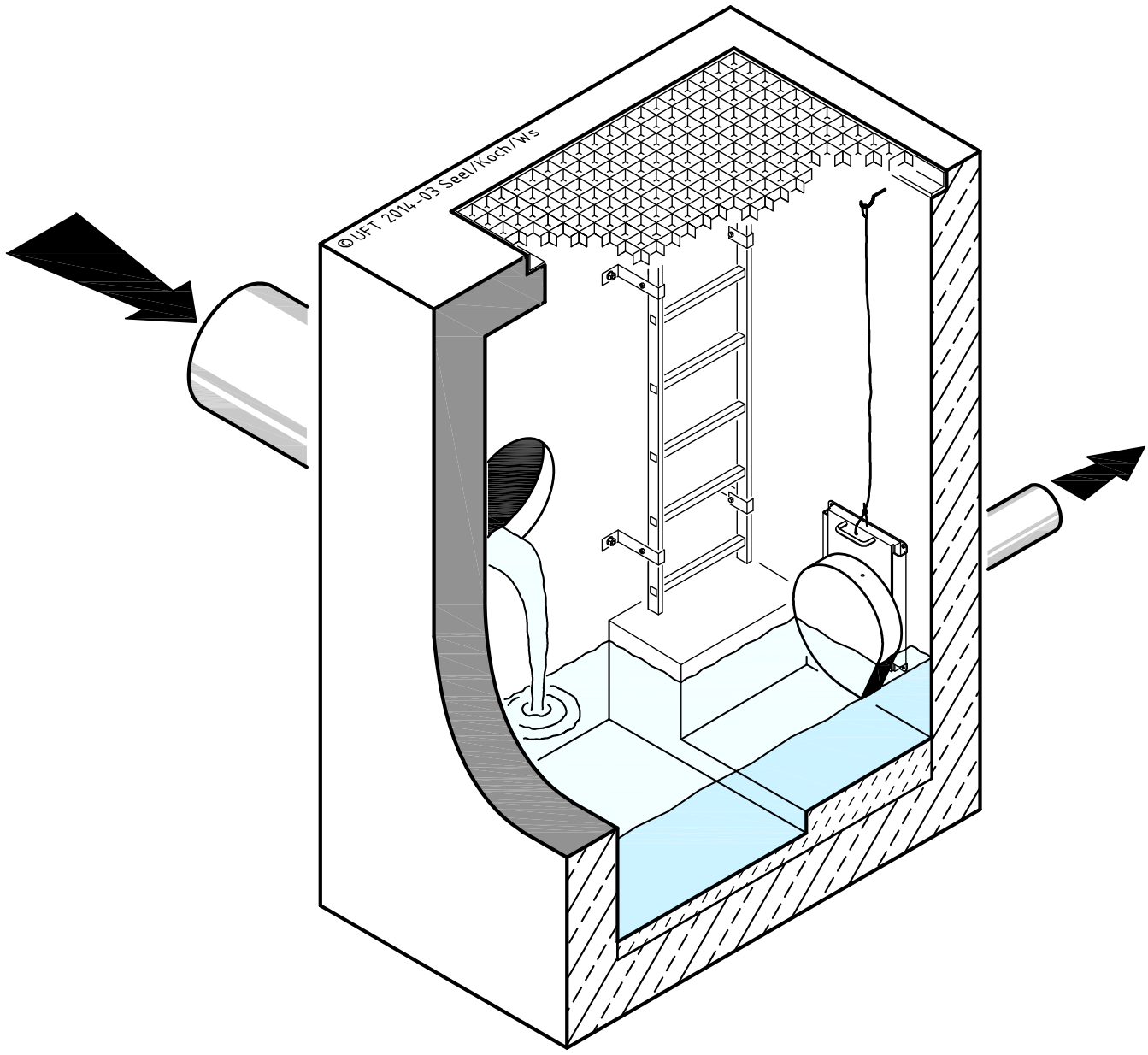
Product Information

Vertical Vortex Valve
UFT-*FluidVertic*

VSU/VLS
0122



1 Application

The Vertical Vortex Valves UFT-*FluidVertic* is a special form of the previously tried and tested vortex flow regulators. They operate without any moving parts and do not require any auxiliary power. The throttling effect is produced solely by fluid dynamics. For such large open cross sectional areas, vortex valves develop very high flow resistances.

The Vertical Vortex Valves are especially applicable in Stormwater and Storm Drain flow control. Some examples of applications are: control of street and car park drainage, control of fluid flow in Stormwater retention basins, etc.

2 Construction and operation

The vortex chamber (a) is positioned vertically (see Figure 1). The inlet pipe (b) is arranged tangentially to the vortex chamber. The outlet (c) is positioned horizontally in the center of the vortex chamber. An interchangeable outlet orifice allows some alteration of the specified flowrate.

The Vertical Vortex Valves are installed in a "wet" chamber, (i.e. they are permanently immersed in water during operation) and can be mounted onto the inner wall of the water tank. The valve inlet of the Vertical Vortex Valve is permanently submerged because the liquid level never falls below the lower edge of the orifice (c). As a consequence, the valve also acts as a trap, catching low-density fluids such as gas and oil.

As the water level rises in the valve chamber, the air escapes through the venting hole (d), allowing the chamber to become partially filled. At this point, the flow resistance is low and the flowrate high. However, if the water level rises above the apex of the vortex chamber, the flow forms a vortex with an air-filled vortex core. The valve is now in throttle mode, where the flow resistance is large and the flowrate comparatively small.

There are currently two types of Vertical Vortex Valves UFT-*FluidVertic*: Type VSU und Type VLS.

Model VSU, shaped like a doughnut, has a large flow resistance and is especially applicable when extremely small flowrates are desired and there is a certain risk of obstructions clogging the inlet or outlet (see Figure 1).

Advantages of Vertical Vortex Valves UFT-*FluidVertic*

- large open cross sections
- no moving parts
- no wear
- no auxiliary power required
- high operational reliability
- corrosion free construction
- accurate flow control
- simple variation of flowrate
- simple and quick installation
- no adjustment necessary

The chamber of model VLS has level sides and is in the shape of a logarithmic spiral with a square inlet.

As a rule, the valves are supplied with a wall-mounting bracket, which interlocks with another plate on the back of the valve. The valve can easily be slid out of the wall-mounting bracket and winched up for inspection or removal of blockages. The orifice in the wall becomes an emergency opening.

3 Flow characteristics

Vortex valves have s-shaped flow curves (see Figure 2). The lower leg indicates the flow regime when the vortex chamber is partially filled. The upper section shows the increased hydraulic resistance caused by the vortex flow. The valve discharge can be regulated in the ratio 1:1.8 by changing the outlet orifice.

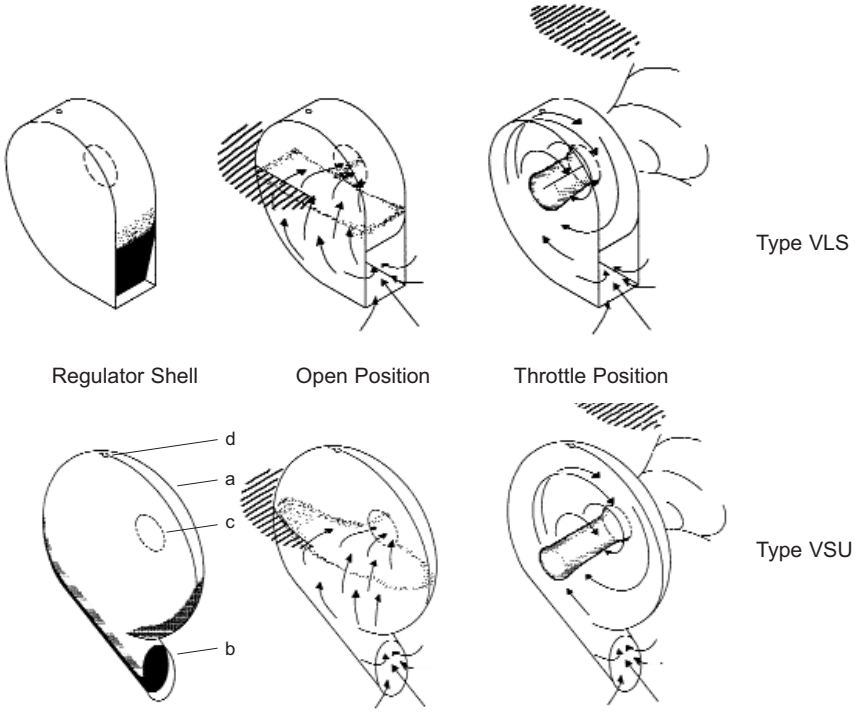


Fig. 1: Vertical Vortex Valve and flow patterns (Orientation: clockwise)

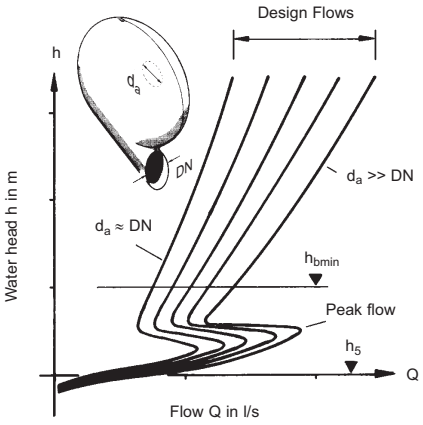


Fig. 2: Typical flow curves of Vertical Vortex Valves type VSU

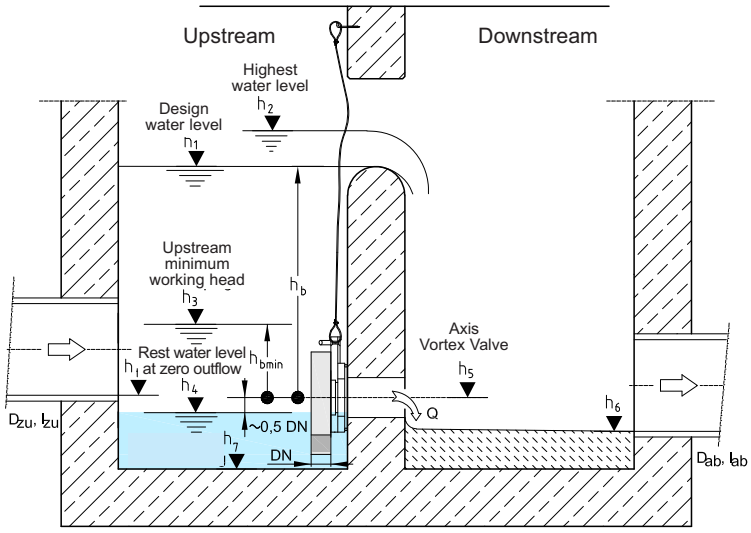


Fig. 3: Dimensioning elements of the Vertical Vortex Valves UFT-*FluidVertic*

4 Hydraulic dimensioning

There is a sophisticated hydraulic dimensioning software at our disposal for the final specification of the Vortex Valves.

For preliminary design purposes the preselection diagram in Figure 4 leads to the possible nominal diameters.

The design pressure head h_b is defined as the water level difference between the high liquid level, (ex: the upper edge of the tank overflow weir) and the axis of the vortex valve.

The design pressure head should be greater than $h_{b,min}$ in order to obtain an optimum throttle action.

The valves are delivered ready to be installed. We guarantee an accuracy of ± 5 % of the design flow for the corresponding design pressure head.

Installation adjustments are not necessary.

5 Dimensions and material

Table 1 contains the most important dimensions for all models and nominal bore. It is standard for the valve housing to be manufactured in stainless steel. The back plate is made of PE-HD. The wall-mounting bracket is made of stainless steel.

6 Installation and maintenance

Installation of the Vertical Vortex Valves UFT-*FluidVertic* is very simple. The appliance is delivered ready for operation with all seals and fastenings. The wall bracket must be bolted into the vertical tank wall, such that it is aligned both vertically and horizontally with the axis of the outlet.

Vertical vortex valves operate without any moving parts and require little or no maintenance, as they have no wear. Nevertheless, we recommend that a visual inspection be carried out to ensure that the inlet is not blocked. We also recommend that, from time to time, the housing should be winched off its wall bracket and the inner chamber be inspected.

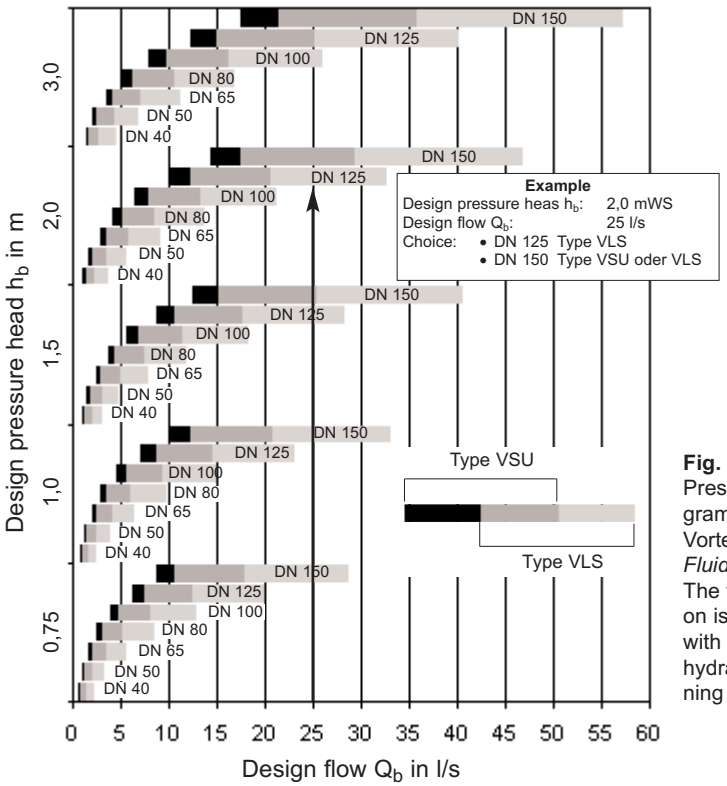
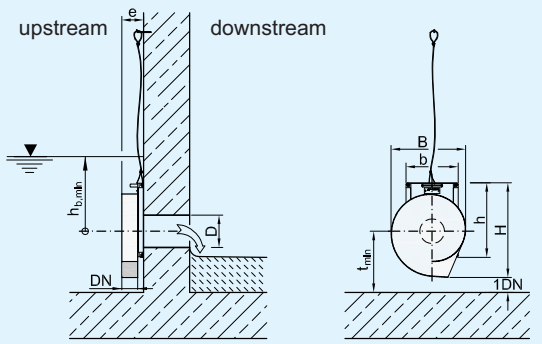


Fig. 4: Preselection diagram für Vertical Vortex Valves UFT-*FluidVertic*. The final specification is done by UFT with the help of a hydraulic dimensioning software.



With steel dissassembling rope

type VLS4-A									
DN	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**
H	240	268	315	382	453	540	668	782	1028
B	182	182	212	242	274	350	409	452	591
e	80	85	95	109	125	144	170	195	245
t_{min}	103	128	159	206	253	315	393	472	628
D	100	100	125	150	200	250	300	300	400
h	240	260	315	380	430	500	650	760	1000
b	182	182	212	242	272	350	390	390	500
$h_{b,min}$	128	160	200	260	320	400	500	600	800

type VLS6-A									
DN	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**
H	257	306	356	443	528	635	787	923	1217
B	182	203	253	327	401	499	623	746	993
e	80	85	95	109	125	144	170	195	245
t_{min}	133	166	206	267	328	410	512	613	817
D	100	100	125	150	200	250	300	300	400
h	240	260	315	380	430	500	650	760	1000
b	182	182	212	242	272	350	390	390	500
$h_{b,min}$	160	200	250	325	400	500	625	750	1000

type VSU4-A									
DN	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**
H	295	338	404	493	595	697	868	1023	1360
B	182	182	218	267	323	400	500	600	800
e	86	107	125	153	176	210	249	289	368
t_{min}	138	173	223	277	340	422	528	633	850
D	100	100	125	150	200	250	300	300	400
h	260	285	340	420	485	550	715	840	1110
b	182	182	212	242	272	350	390	390	500
$h_{b,min}$	128	160	200	260	320	400	500	600	800

type VSU6-A									
DN	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**
H	310	373	431	553	674	788	978	1155	1536
B	194	245	300	400	500	600	750	900	1200
e	112	133	153	192	230	267	323	380	490
t_{min}	166	208	256	337	419	513	638	765	1026
D	100	100	125	150	200	250	300	300	400
h	260	285	340	420	485	550	715	840	1110
b	182	182	212	242	272	350	390	390	500
$h_{b,min}$	160	200	250	325	400	500	625	750	1000

Table 1: Most important dimensions of Vertical Vortex Valves UFT-*FluidVertic* (all in mm)

Typical Specification Text

Pos. Number Article

1 x Vertical Vortex Valve

UFT-*FluidVertic*

Flow regulation with no moving parts, very high flow resistances and large open cross sectional areas. Throttling effect produced solely by fluid dynamics. Wet well installation, fixed to a flat (or circular) and vertical wall with anchors.
Doghnut-like shaped 304 stainless steel body construction with submerged circular inlet pipe, wall-mounting plates of stainless steel and PE-HD, remote dissassembling rope of stainless steel, anchors and seals included.

Model UFT-*FluidVertic*	**type VSU 4-A (VSU 6-A)**
Design pressure head hb:	... mWS
Design flow Qb:	... l/s
Orientation:	cw (ccw)
Nominal diameter:	DN ...

Unit ready to be mounted, regulated with required flow rate, includes hydraulic dimensions and technical specifications. The head is measured starting from the horizontal axis of the vortex valve.

Pos. Number Article

2 x Vertical Vortex Valve

UFT-*FluidVertic*

Flow regulation with no moving parts, very high flow resistances and large open cross sectional areas. Throttling effect produced solely by fluid dynamics. Wet well installation, fixed to a flat (or circular) and vertical wall with anchors.
Logarithmic spiral shaped 304 stainless steel body construction with submerged square inlet pipe, wall-mounting plates of stainless steel and PE-HD, remote dissassembling rope of stainless steel, anchors and seals included.

Model UFT-*FluidVertic*	**type VLS 4-A (VLS 6-A)**
Design pressure head hb: :	... mWS
Design flow Qb:	... l/s
Orientation:	cw (ccw)
Nominal diameter:	DN ...

Unit ready to be mounted, regulated with required flow rate, includes hydraulic dimensions and technical specifications. The head is measured starting from the horizontal axis of the vortex valve.

Bibliography

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