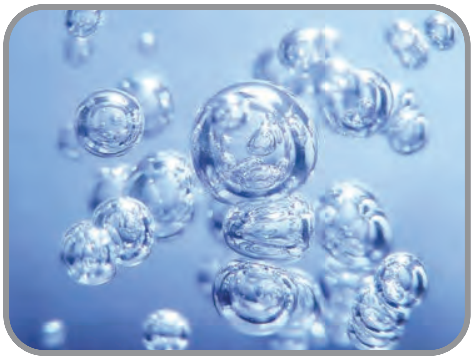
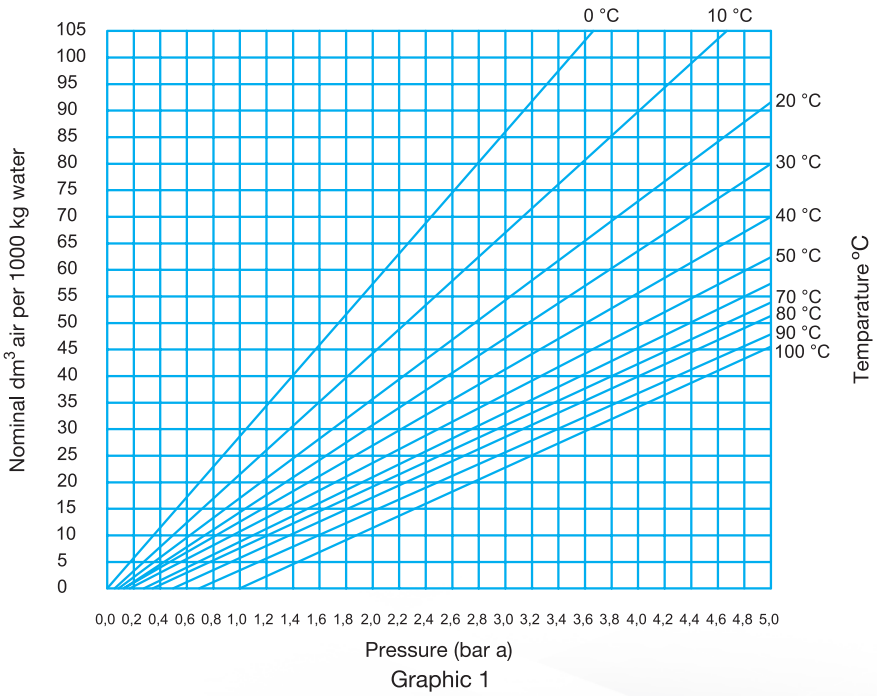
The Problems Caused by Air

Air in heating and cooling systems causes the following problems:

- Noise in radiators, heat exchangers, pipes and pumps,
- Rapid wear and tear of heat exchangers, controllers, shut-off valves and pumps,
- Insufficient heat emission or cooling efficiency, reduced heat transfer,
- Increased energy consumption,
- Needing to deaerate by hand,
- Higher maintenance costs,
- Corrosion,





Graphic 1

Occuring and Source of Air in System

- Air is present before filling the system and trapped in the system when filled.
- Air is entrained in mains water when filling the system.
- Air dissolved in water is released when the temperature rises or the pressure falls during system runs. (Graphic 1)

Air in Heating System

The amount of air which is dissolved in water, is dependent on both temperature and pressure. Air dissolved in water is released when the temperature rises or the pressure falls. (Graphic1) Releasing of micro bubbles takes place continuously in the boiler and in any device which operates under conditions of cavitation. When high temperatures occur at the combustion chamber wall of the boiler, small air bubbles are released from water containing air. (Figure1) Micro bubbles should be removed immediately upon leaving the boiler.

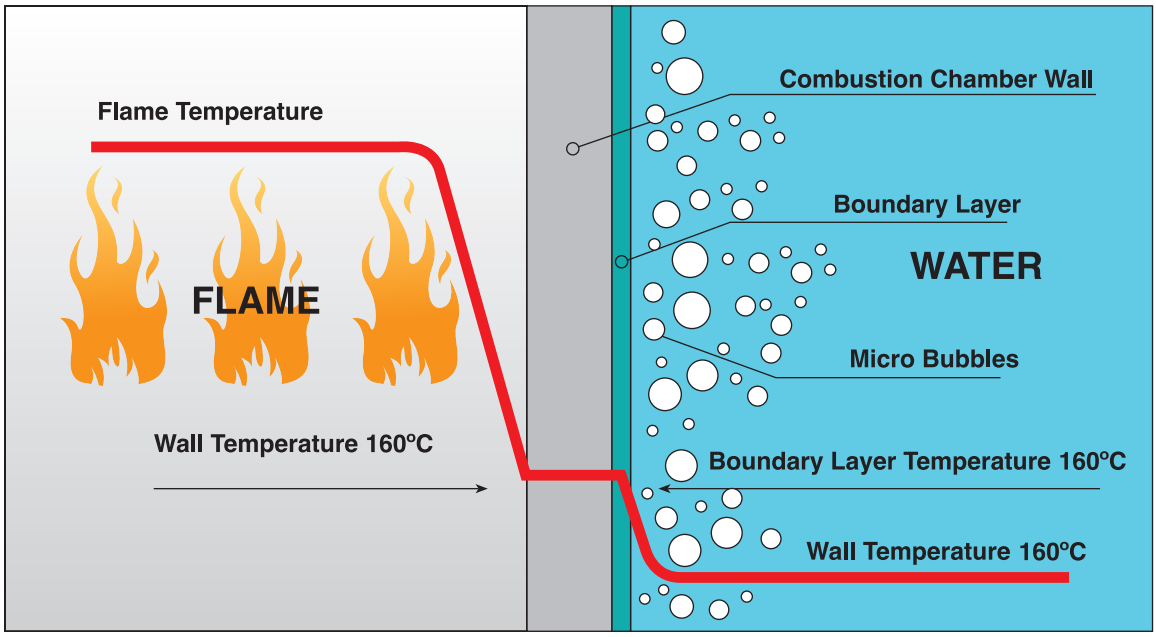


Figure 1

Air in Cooling System

In cooling systems part of the air is dissolved in water and some part is air bubbles. Pressure has the largest influence on the formation of air bubbles in a cooling system.

After decreasing the temperature of water in the coil, part of the air bubbles will again dissolve in the water
To prevent air bubbles causing pump damage due to cavitation, air bubbles should be released before the pump.

The Problems Caused by Dirt

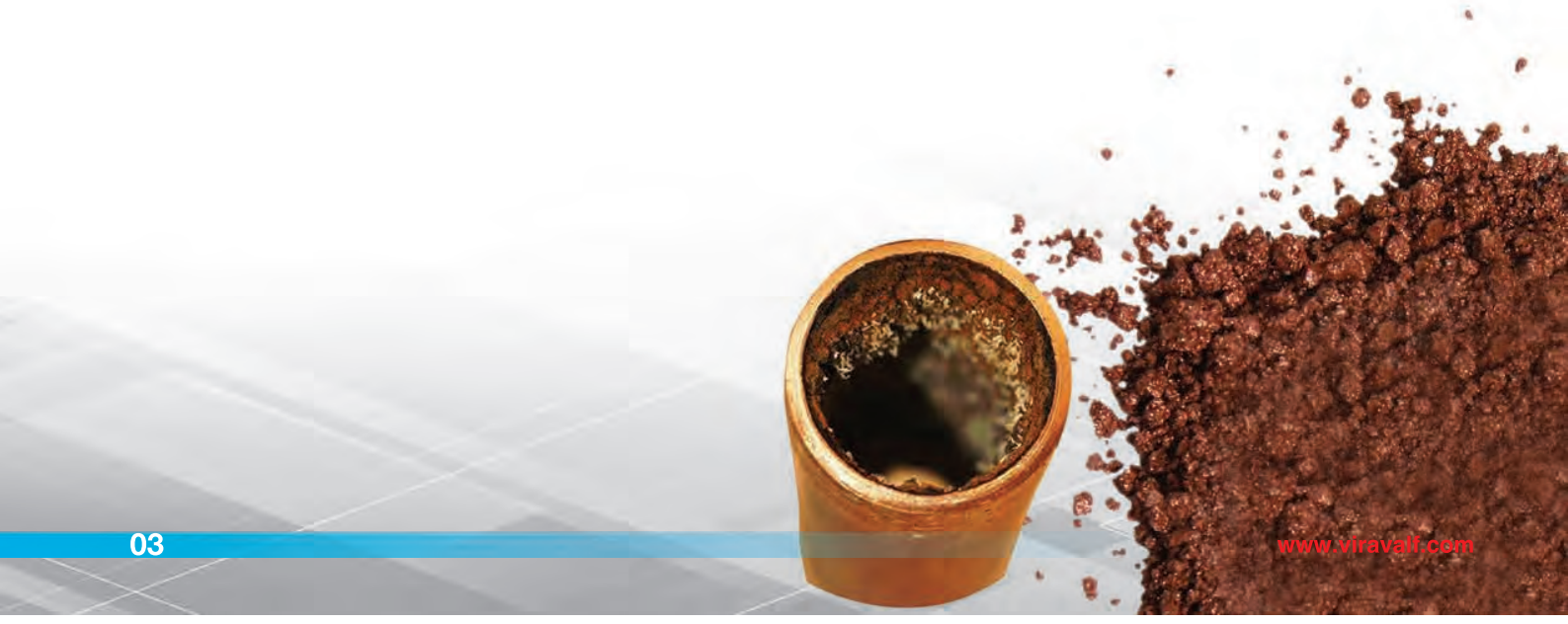
Dirt in heating and cooling systems causes the following problems:

- Increased system noise,
- Heat exchangers, boilers and radiators can become obstructed both impeding the flow of water and reducing the heat transfer,
- Strainers becoming blocked causing increased pressure drops hence additional pumping costs or loss of capacity,
- Pump seals will be exposed to the scouring effect of the particules in the water and will wear more quickly
- Low velocity pipework (such as underfloor heating) can accumulate debris so reducing the heat transfer surface,
- Higher maintenance costs,
- The build up of sludge and dirt in a system will reduce effective operation,

Accumulation and Source of Dirt in System

- Dirt will enter the system while it is being fabricated (eg, sand, fibres from cloths, swarf from pipe cutting and welding slag),
- Once in operation there will also be accumulation of scale and particles from corrosion – the dissolved oxygen causing the corrosion,

The reaction between iron, water and oxygen will form magnetite and if oxygen is then present, the magnetite is converted to the hematite.



SV

VIRAVENT — Deaerator

SD

SD-T

VIRACLEAN — Dirt Separator

SC

SC-T

VIRAPLUS — Deaerator and Dirt Separator

SCX

VIRAFIX — Deaerator, Dirt Separator and Hydraulic Balance Tank

SB

VIRABALANCE — Hydraulic Balance Tank

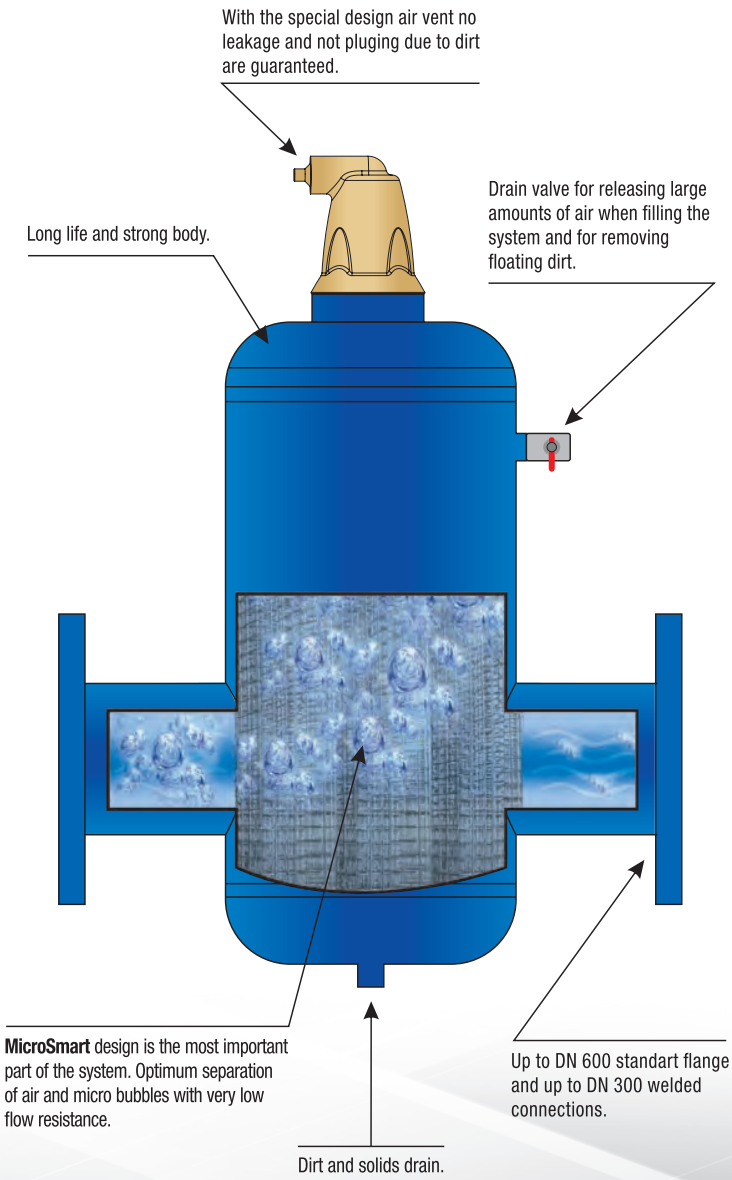
VIRAVENT
DEAERATOR

TYPE : SV

DN 50 - 600

Applications

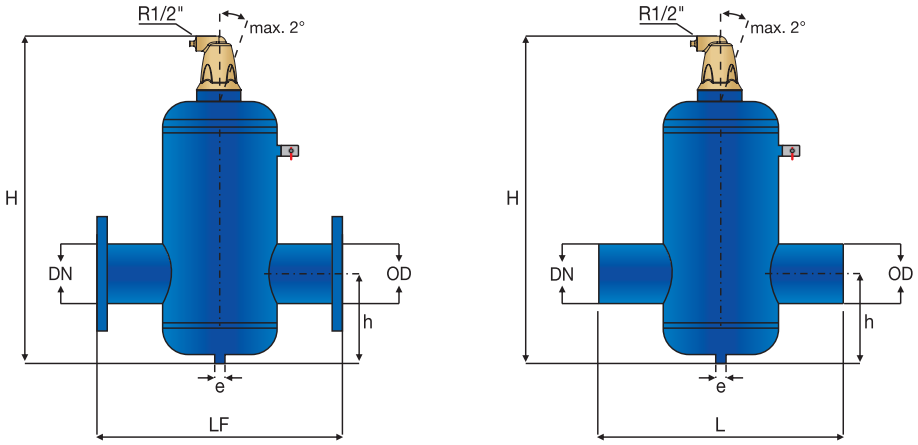
VIRAVENT Deaerators are used in pipelines for the high efficiency removal of air and micro bubbles from heating and cooling systems in buildings.



Features

Body	:	Carbon Steel - ST37
Connections	:	Flanged - Welded End - Grooved
Max. Working Temperature	:	110 °C
Max. Working Pressure	:	10 bar
Strainer Screen	:	Stainless Steel
Product Range	:	SV-F Flanged
		SV-K Welded End
		SV-V Grooved
Size	:	DN 50 - DN 600

Technical Features



TYPE	DN	OD	H	h	e	LF	L	Flanged Weight	Welded Weight	Flow*	Volume
		mm	mm	mm	inch	mm	mm	kg	kg	m³/h	lt
SV	50	60,3	482	138	1"	350	330	15	10	8	6
SV	65	76,1	482	138	1"	350	330	16,5	10	15	6
SV	80	88,9	607	177	1"	470	450	23	15	20	16
SV	100	114,3	607	177	1"	475	455	25	15	30	16
SV	125	139,7	797	267	1"	635	615	47	25	50	50
SV	150	168,3	797	267	1"	635	615	49	37	75	50
SV	200	219,1	996	297	1"	775	745	70	58	125	95
SV	250	273,0	1227	347	2"	890	860	140	120	200	190
SV	300	323,9	1557	385	2"	1005	975	215	190	275	275

* Flow rates when velocity is 1 m/s.

Note : Vira, reserves the right to modify dimensions, material and design without warning.

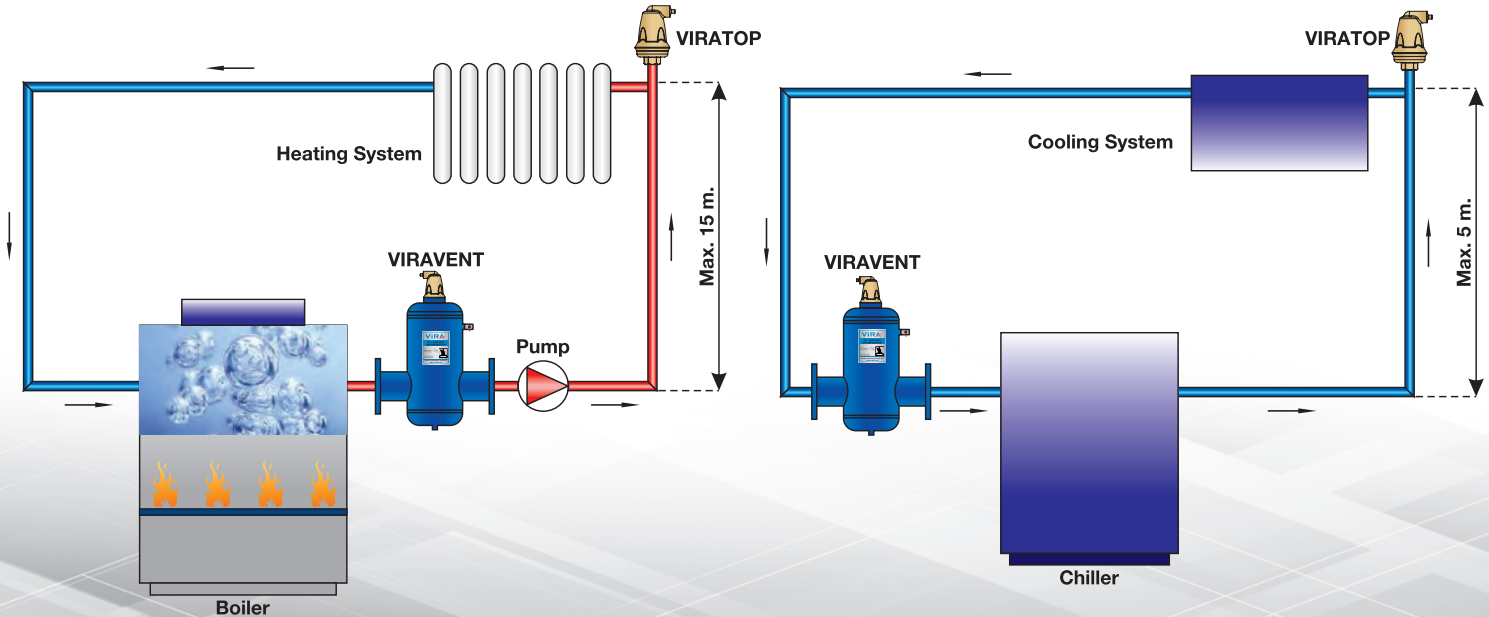
Installations

VIRAVENT unit must be installed at the hottest part of the system for optimum performance. The static head must not exceed 15m for heating system and 5m for cooling system.

The efficiency of the unit will be reduced if;

- The static head is exceeded.
- The maximum flow velocity of 3m/s is exceeded.

In heating systems the deaerator should be in the flow, preferably at the highest temperature (next to the heat source) and low pressure if possible. Viravent, Deaerator should be installed after the boiler and on the pump suction side, as these are the points where the formation of micro bubbles is greatest. In chilled water systems the unit must be located in the return close to the chiller.



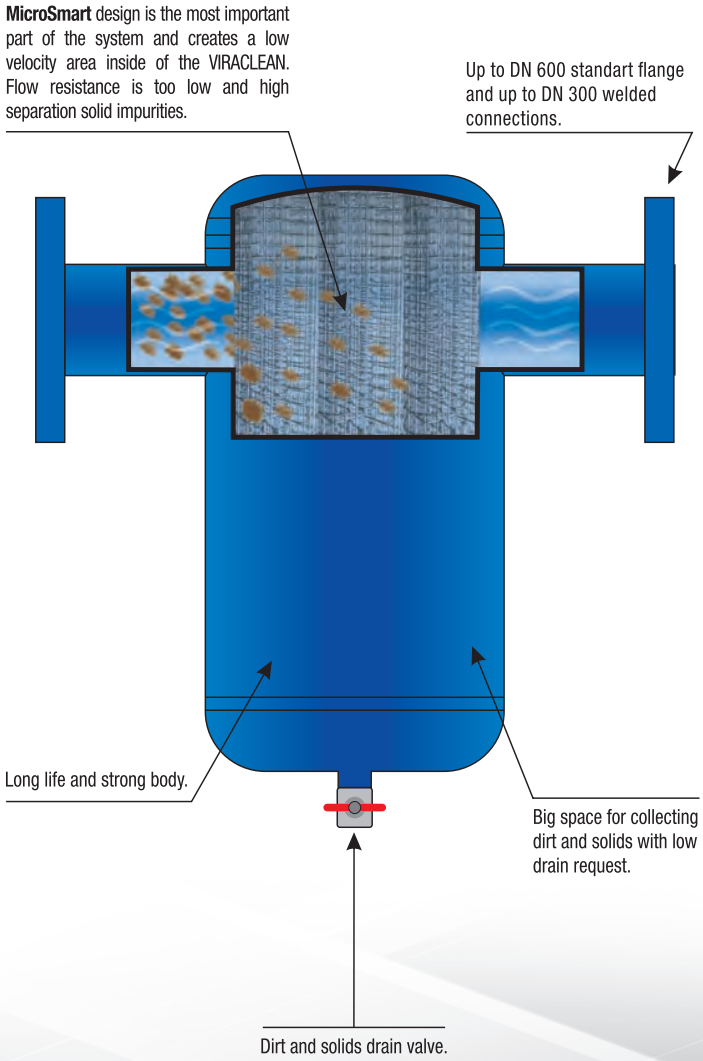
VIRACLEAN
DIRT SEPARATOR

TYPE : SD

DN 50 - 600

Applications

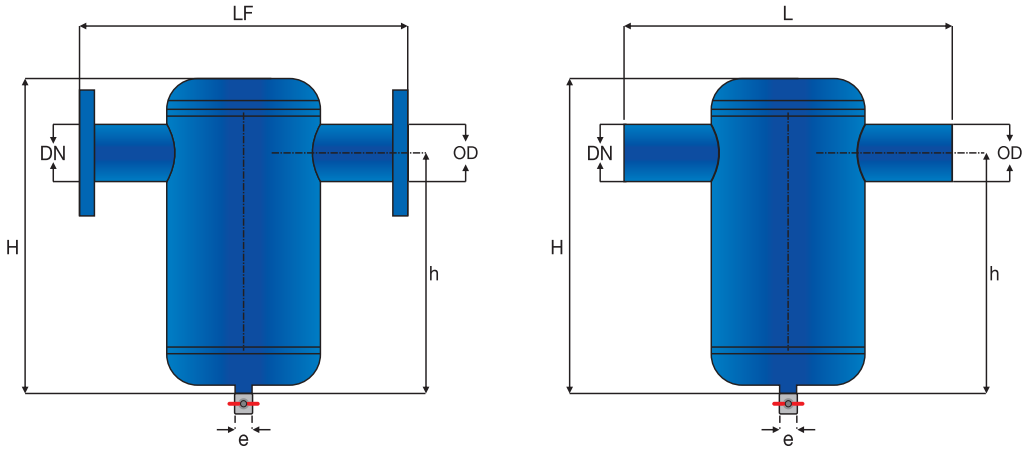
VIRACLEAN Dirt Separators are used in pipelines for the high efficiency removal of impurities from heating and cooling systems in buildings.



Features

Body	:	Carbon Steel - ST37
Connections	:	Flanged - Welded End - Grooved
Max. Working Temperature	:	110 °C
Max. Working Pressure	:	10 bar
Strainer Screen	:	Stainless Steel
Product Range	:	SD-F Flanged
		SD-K Welded End
		SD-V Grooved
		SD-F-T Flanged-Removable
		SD-K-T Welded End-Removable
		SD-V-T Grooved Removable
Size	:	DN 50 - DN 600

Technical Features



TYPE	DN	OD	H	h	e	LF	L	Flanged Weight	Welded Weight	Flow*	Volume
		mm	mm	mm	inch	mm	mm	kg	kg	m³/h	lt
SD	50	60,3	385	267	1"	350	330	15	10	8	6
SD	65	76,1	385	265	1"	350	330	17	10	15	6
SD	80	88,9	510	390	1"	470	450	23	14	20	16
SD	100	114,3	510	353	1"	475	455	26	17	30	16
SD	125	139,7	701	454	1"	635	615	44	34	50	50
SD	150	168,3	701	454	1"	635	615	48	37	75	50
SD	200	219,1	900	623	1"	775	745	68	56	125	95
SD	250	273,0	1130	840	2"	890	860	136	116	200	190
SD	300	323,9	1460	1095	2"	1005	975	205	180	275	275

* Flow rates when velocity is 1 m/s.

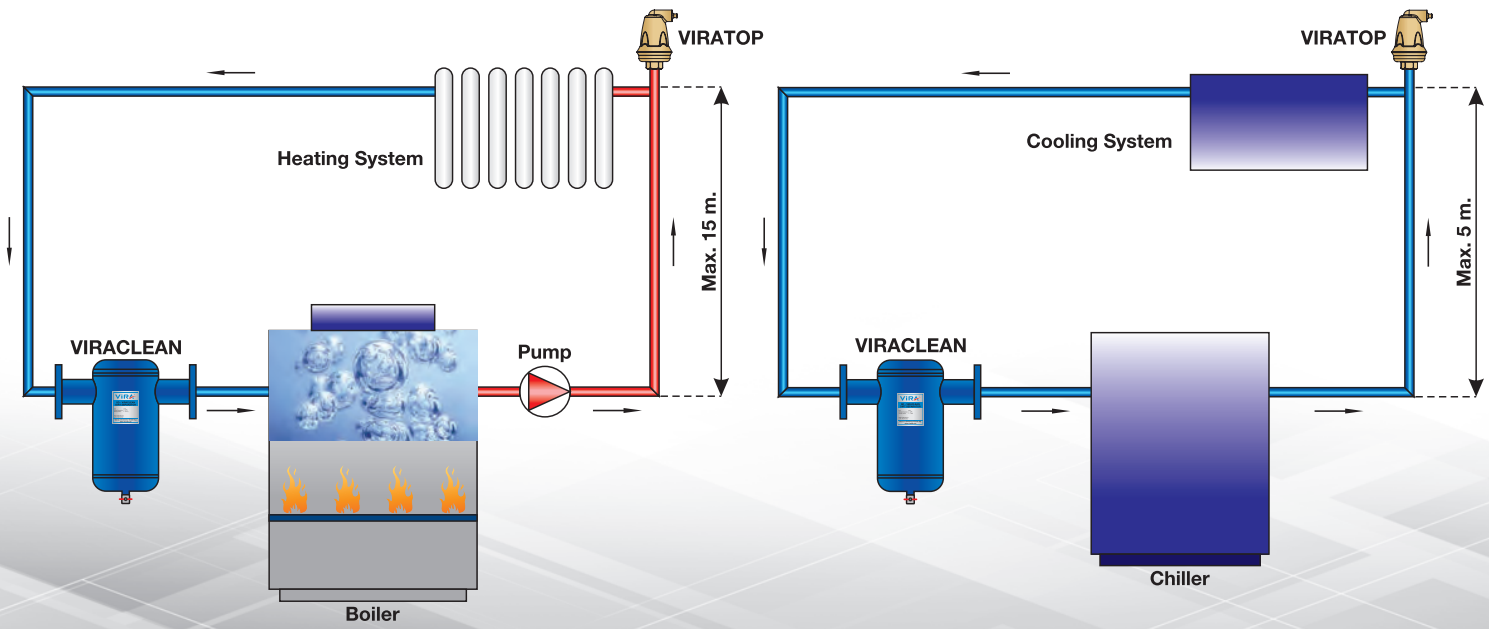
Note : Vira, reserves the right to modify dimensions, material and design without warning.

Installations

VIRACLEAN Dirt Separator should always be installed before equipment (ie. boilers, chillers, controll valves, pumps, etc.) That needs protection from dirt, sludge, etc.

In heating systems this should be in the return.

In chilled water systems the unit must be located in the return close to the chiller.



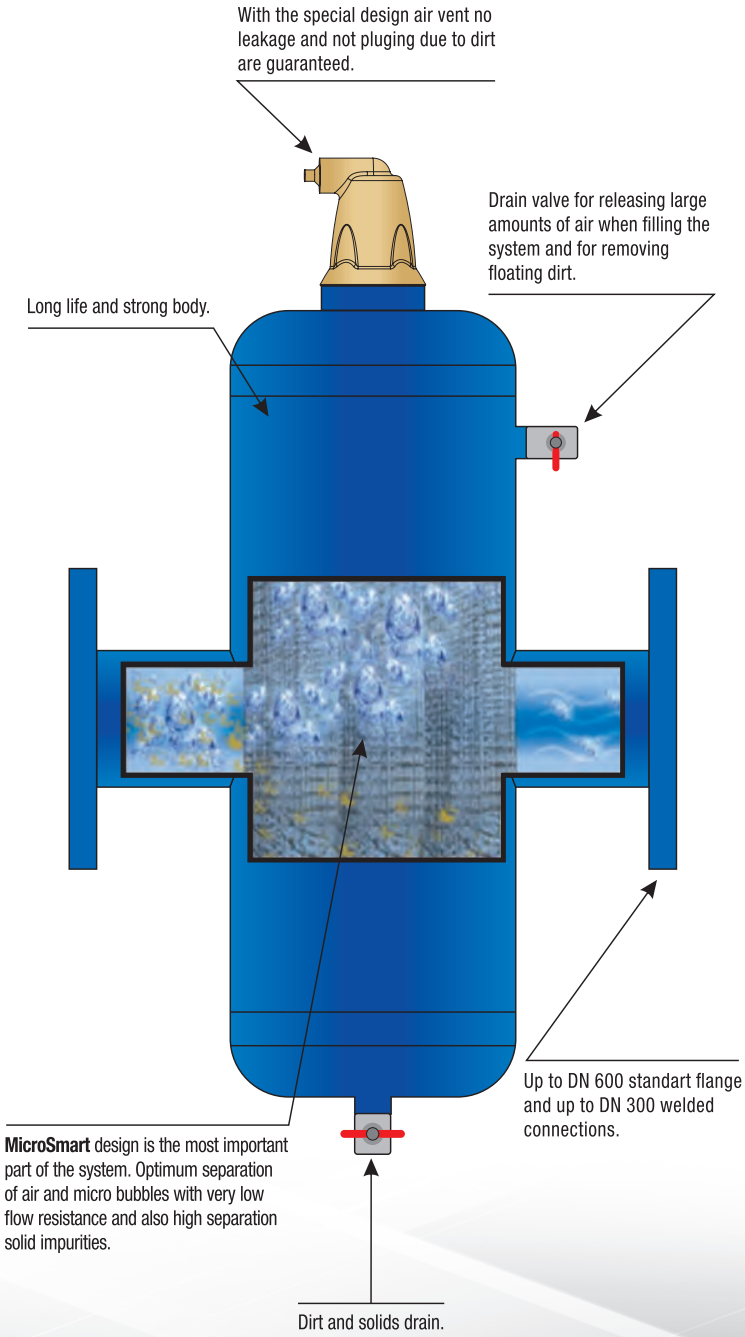
VIRAPLUS
DEAERATOR AND DIRT SEPARATOR

TYPE : SC

DN 50 - 600

Applications

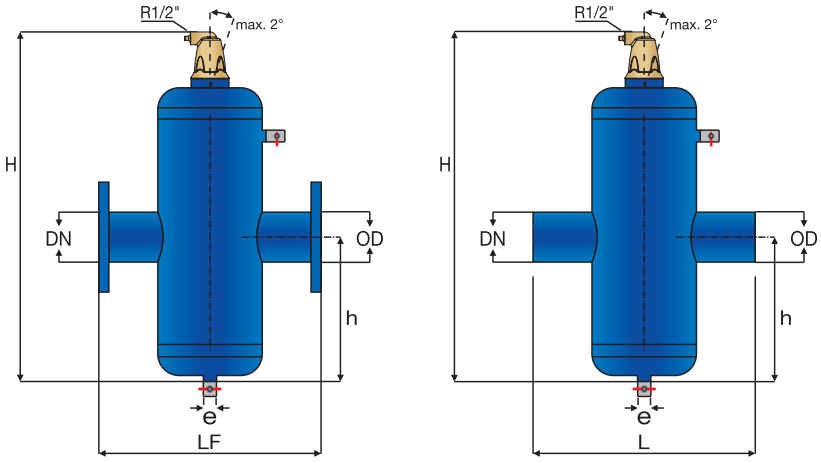
VIRAPLUS Deaerator and Dirt Separators are used in pipelines for the high efficiency removal of both dirt and air, micro bubbles from heating and cooling systems in buildings.



Features

Body	:	Carbon Steel - ST37
Connections	:	Flanged - Welded End - Grooved
Max. Working Temperature	:	110 °C
Max. Working Pressure	:	10 bar
Strainer Screen	:	Stainless Steel
Product Range	:	SC-F Flanged
		SC-K Welded End
		SC-V Grooved
		SC-F-T Flanged-Removable
		SC-K-T Welded End-Removable
		SC-V-T Grooved Removable
Size	:	DN 50 - DN 600

Technical Features



TYPE	DN	OD	H	h	e	LF	L	Flanged Weight	Welded Weight	Flow*	Volume
		mm	mm	mm	inch	mm	mm	kg	kg	m³/h	lt
SC	50	60,3	632	265	1"	350	330	17	13	8	10
SC	65	76,1	632	265	1"	350	330	21	13	15	10
SC	80	88,9	791	345	1"	470	450	27	22	20	24
SC	100	114,3	791	345	1"	475	455	30	23	30	24
SC	125	139,7	1064	480	1"	635	615	53	45	50	70
SC	150	168,3	1064	480	1"	635	615	81	67	75	70
SC	200	219,1	1307	615	1"	775	745	101	85	125	140
SC	250	273,0	1568	805	2"	890	860	150	130	200	265
SC	300	323,9	1892	1110	2"	1005	975	227	202	275	465

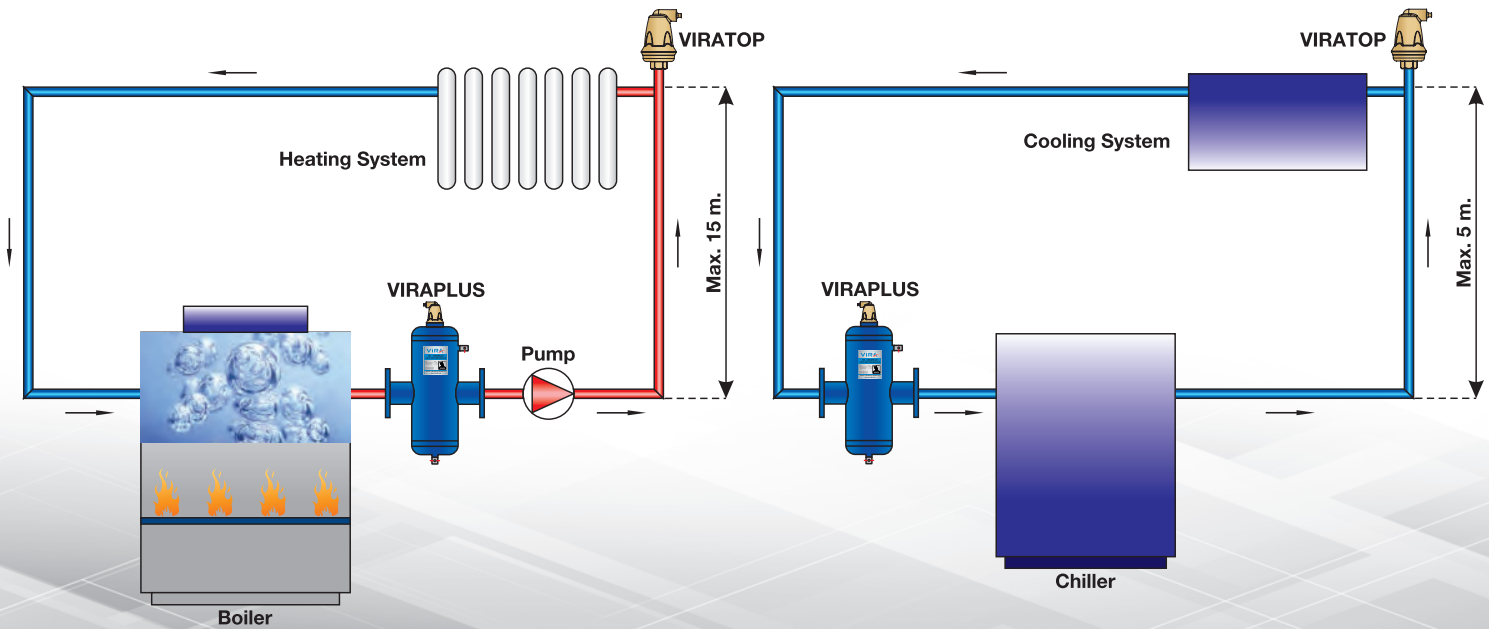
* Flow rates when velocity is 1 m/s.

Note : Vira, reserves the right to modify dimensions, material and design without warning.

Installations

VIRAPLUS is a combination of deaerator and dirt separator which removes circulating air and micro bubbles also dirt effectively. In heating systems the Viraplus should be in the flow and installed after the boiler

In chilled water systems the unit must be located in the return close to the chiller.



VIRAFIX

DEAERATOR, DIRT AND HYDRAULIC SEPARATOR

TYPE : SCX

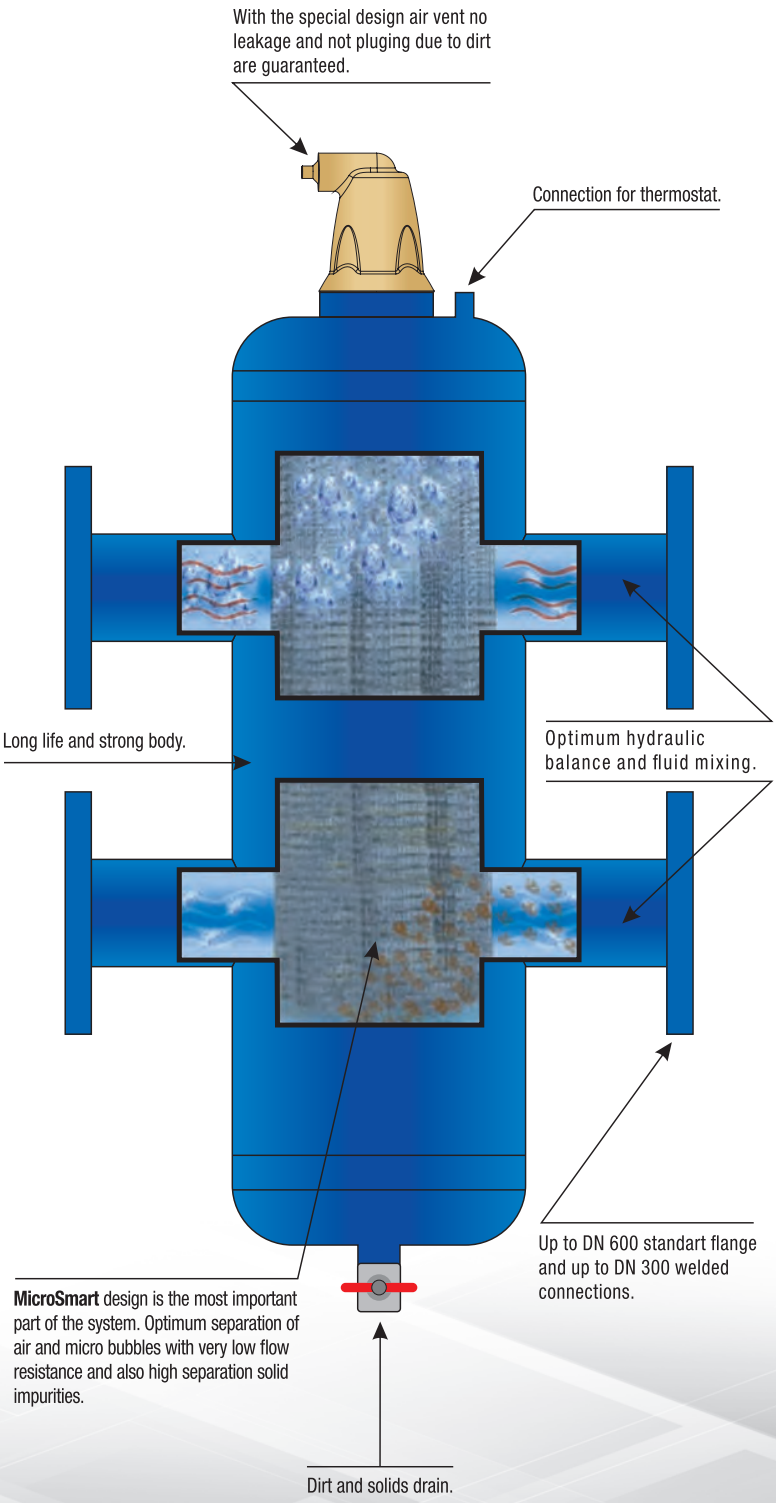
DN 50 - 600

Features

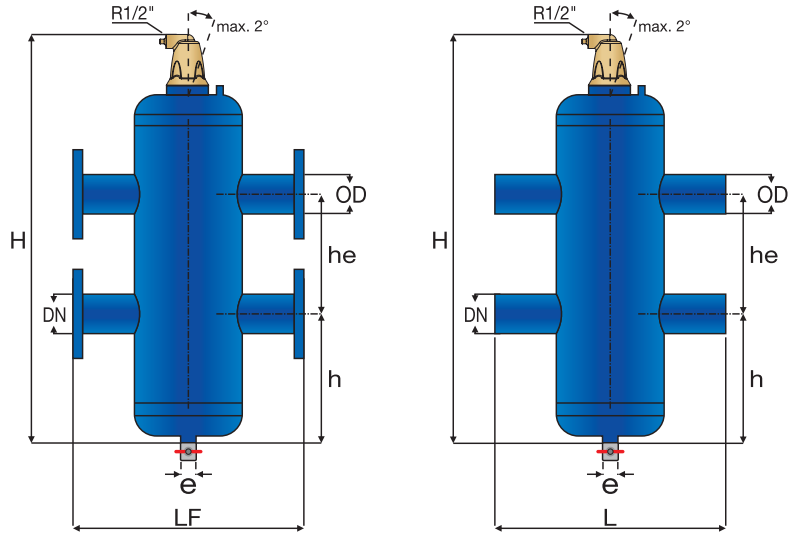
Body	:	Carbon Steel - ST37
Connections	:	Flanged - Welded End - Grooved
Max. Working Temperature	:	110 °C
Max. Working Pressure	:	10 bar
Strainer Screen	:	Stainless Steel
Product Range	:	SCX-F Flanged SCX-K Welded End SCX-V Grooved
Size	:	DN 50 - DN 600

Applications

VIRAFIX Deaerators and Dirt Separators are used in pipelines for the high efficiency removal of both dirt and air, micro bubbles from heating and cooling systems in buildings.



Technical Features



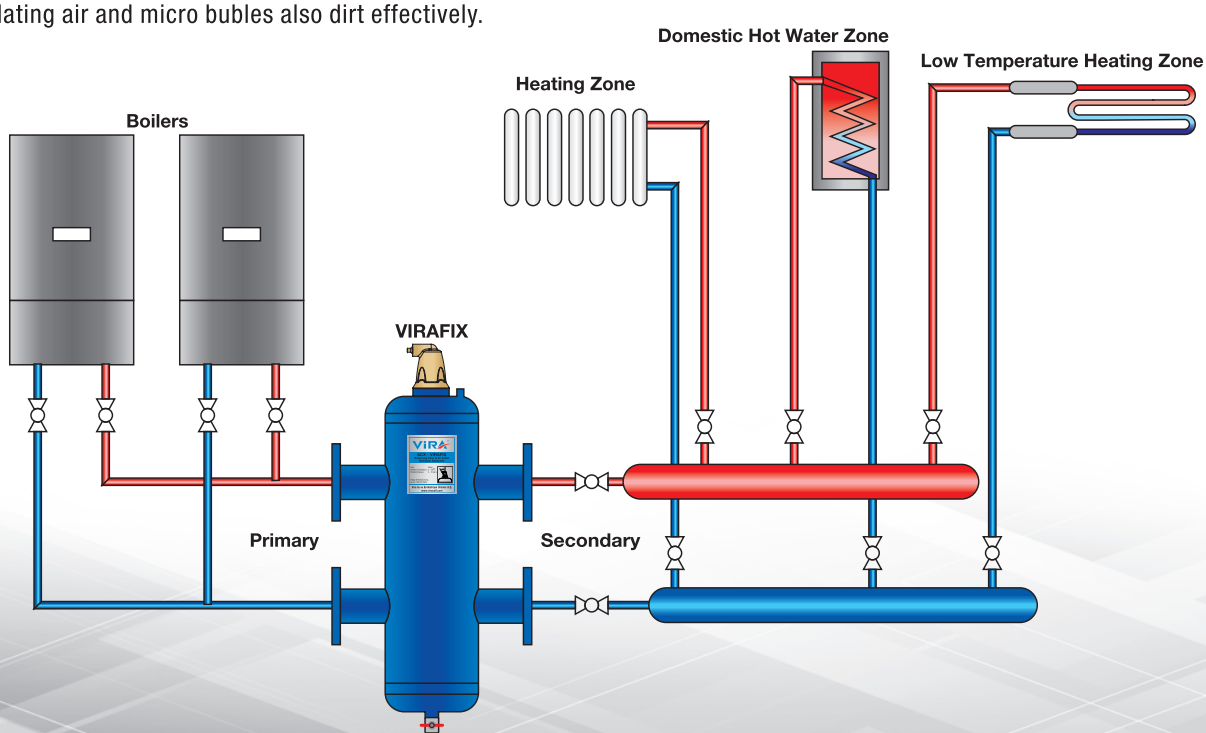
TYPE	DN	OD	H	h	he	e	LF	L	Capacity (ΔT=15°C)	Capacity (ΔT=6°C)	Flow*
		mm	mm	mm	mm	inch	mm	mm	kW	kW	m³/h
SCX	050/150	60,3	812	248	240	1"	350	330	218	87	12,5
SCX	065/150	76,1	927	273	305	1"	350	330	349	140	20
SCX	080/200	88,9	982	273	360	1"	470	450	471	188	27
SCX	100/200	114,3	1232	348	462	1"	475	455	820	328	47
SCX	125/300	139,7	1532	448	560	1"	635	615	1256	502	72
SCX	150/300	168,3	1832	543	670	1"	635	615	1884	753	108
SCX	200/400	219,1	2336	695	870	1"	775	745	3143	1256	180
SCX	250/500	273,0	2876	850	1100	2"	890	860	5023	2009	288
SCX	300/600	323,9	3392	1010	1295	2"	1005	975	7064	2826	405

* Flow rates when velocity is 1,5 m/s.

Note : Vira, reserves the right to modify dimensions, material and design without warning.

Installations

Installation of a hydrualic separator in a heating system provides proper mixing, when flow in the boiler circuit is different from flow in the distribution circuit. Also VIRAFIX is a combination of deaerator, dirt separator and hydrualic separator which removes circulating air and micro bubles also dirt effectively.



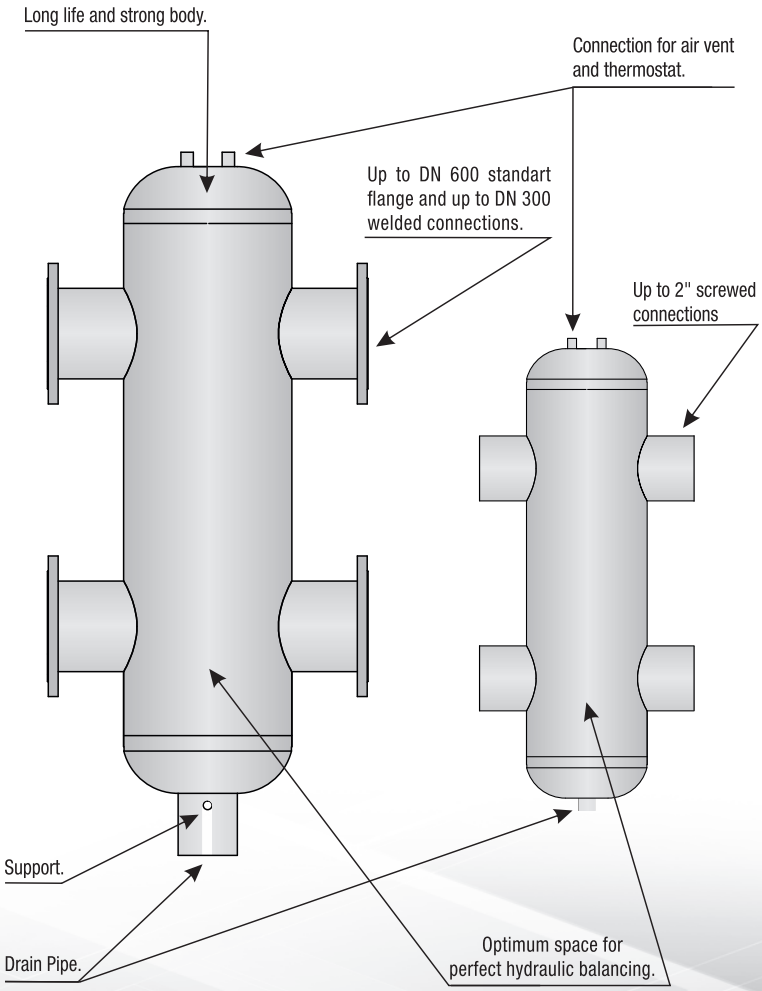
VIRABALANCE
HYDRAULIC BALANCE TANK

TYPE : SB

DN 32 - 600

Applications

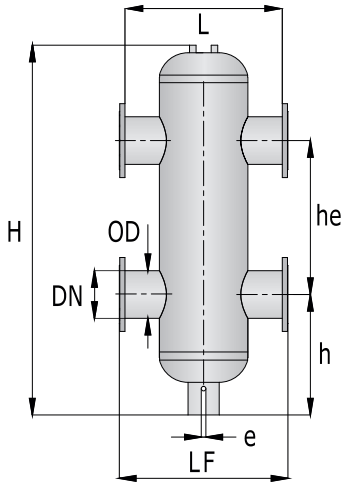
VIRABALANCE Hydraulic Balance Tank are compact economical units that allow fast and efficient installation of primary/secondary piping for many different boilers systems. When more then one boiler is used at primary loop, more then one pump will run and create abnormal variations in circuit flow rates and pressures. A Hydraulic Balance Tank installs between the primary and secondary loops and eliminates the need for an additional pump to circulate fluid through the primary loop. Thereby boilers and the heating circuits can have the proper flow rate independently.

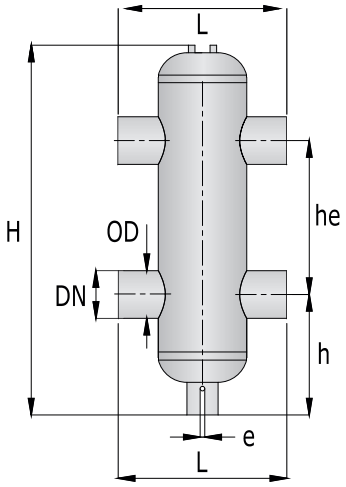


Features

Body	:	Carbon Steel - ST37
Connections	:	Flanged - Welded End - Screwed
Max. Working Temperature	:	110 °C
Max. Working Pressure	:	10 bar
Strainer Screen	:	Stainless Steel
Product Range	:	SB-F Flanged
		SB-K Welded End
		SB-D Screwed
Size	:	DN 50 - DN 600

Technical Features





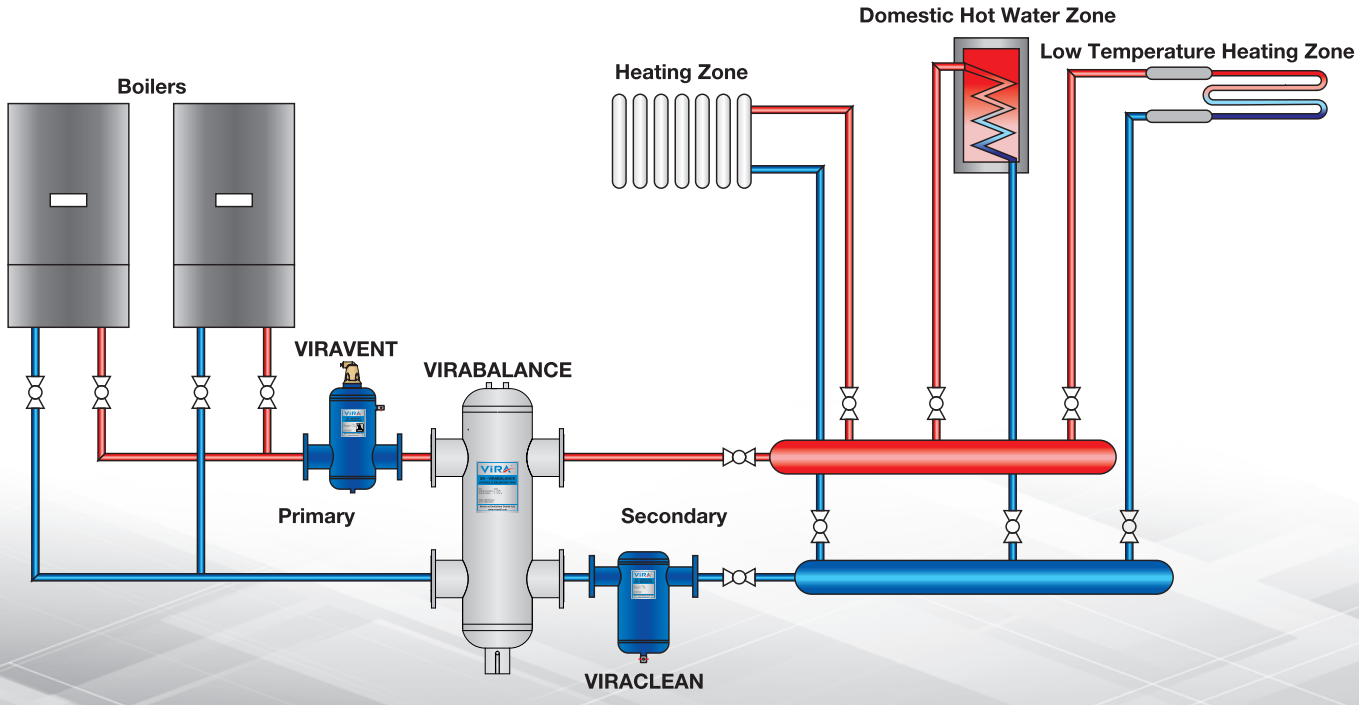
TYPE	DN	OD	H	h	he	e	LF	L	Capacity (ΔT=15°C)	Capacity (ΔT=6°C)	Flow*
		mm	mm	mm	mm	inch	mm	mm	kW	kW	m³/h
SB	032/065	42,4	389	80	228	1/2"	217	190	30	12	1,7
SB	040/080	48,3	453	93	267	3/4"	237	210	45	18	2,6
SB	050/100	60,3	562	109	343	3/4"	286	266	70	28	4,0
SB	065/125	76,1	685	133	419	3/4"	312	292	100	40	5,7
SB	065/150	76,1	862	178	505	1"	350	330	140	56	8,0
SB	080/200	88,9	1242	357	657	1"	470	450	210	84	12
SB	100/200	114,3	1242	357	657	1"	475	455	350	140	20
SB	125/250	139,7	1535	423	819	1 1/4"	584	564	550	220	32
SB	150/300	168,3	1793	476	972	1 1/4"	635	615	900	360	52
SB	150/350	168,3	2170	617	1067	1 1/2"	667	647	1300	520	75
SB	200/400	219,1	2197	554	1219	1 1/2"	775	745	1750	700	100

* Flow rates when velocity is 1 m/s.

Note : Vira, reserves the right to modify dimensions, material and design without warning.

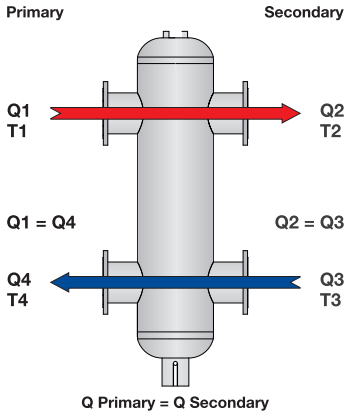
Installations

Installation of a hydrualic balance tank in a heating system provides proper mixing, when flow in the boilercircuit from flow in the distribution circuit.



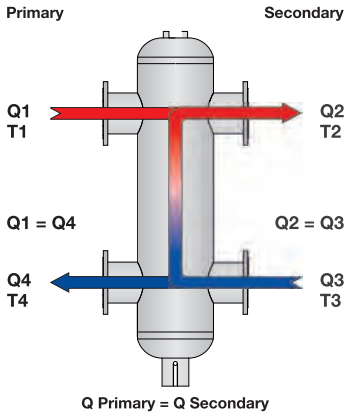
How Works Hydraulic Balance Tank

Three operating situation can occur if a hydraulic balance tank is installed in a heating system.



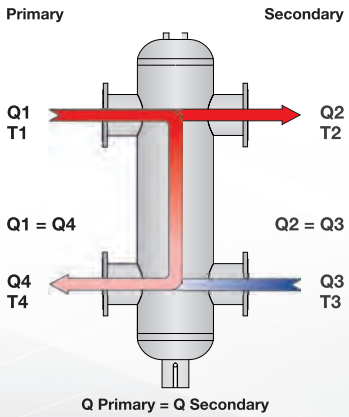
• Primary Flow Eqaul to Secondery Flow

When the system flow is equal to the secondary flow, all the primary water is directed to the zones and all the return water goes back to the heat source. The temperature of the zone water is the same as that supplied by the heat source and the return water temperature to the heat source equals the return water temperature from the zones.In this situation, supply and demand are equal. Q primary = Q secondary



• The Primary Flow Rate Less Then Secondary Flow Rate

When the primary flow rate is less than the secondary flow rate, the supply water temperature to the zones will be a mix of the supply water from the heat source and the return water from the zones. The return water to the heat source will always be the same as the return water from the zones.In this situation, the power of the boiler will be increased. Q primary < Q secondary



• The Primary Flow Rate Greater Then Secondary Flow Rate

When the primary flow rate is greater than the secondary flow rate, the supply temperature from the heat source will be the temperature of the water to the zone. The return water to the heat source will be a mix of the heat source water and zone return water. In this situation, the power of the boiler will be modulated downwards. Q primary > Q secondary