

**SPIROCOMBI®**



**DEAERATOR & DIRT  
SEPARATORS FOR HEATING,  
COOLING AND PROCESS  
SYSTEMS**



**DOMESTIC | COMMERCIAL | INDUSTRY**

**SPIRO TECH**  
FOR BETTER PERFORMANCE

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## Air and dirt prevent systems from achieving optimum levels of performance

**Air and dirt in system water are causes of disruption. They can cause excessive wear, damage to expensive system components, process disruptions or even total failure. In short, they are things which users often complain about and often require immediate action. Install a SpiroCombi deaerator & dirt separator and these problems will become a thing of the past.**

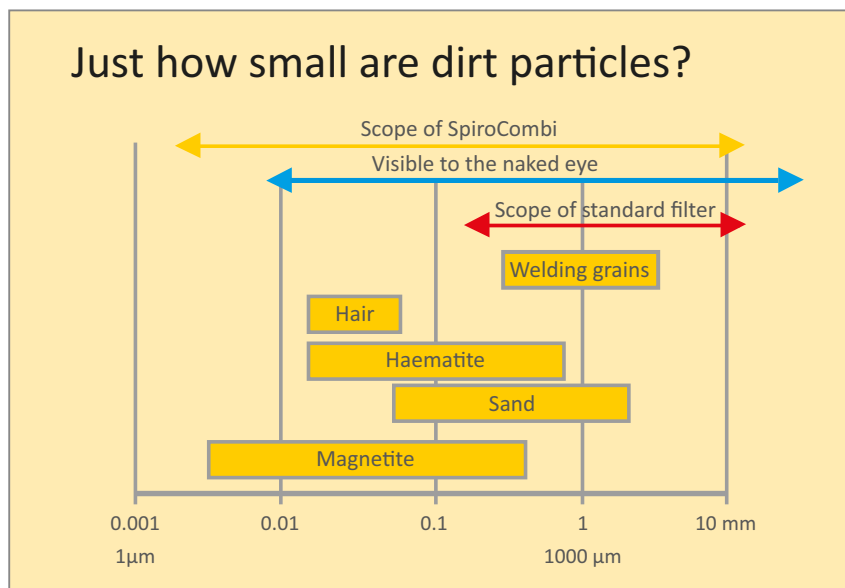
A SpiroCombi separates gases and dirt from the system water and removes them from the system. Independent tests have shown that even microscopic dirt particles and tiny micro bubbles are removed from the water flow. Often it is these which cause the most damage. The operation of the SpiroCombi is

not affected by the accumulated dirt. The SpiroCombi is virtually maintenance-free and - unlike a filter - has a very low and constant flow resistance. An additional benefit of a system free of air and dirt is the saving made on energy costs.

### Total solutions

Spirotech offers an extensive range of total solutions for HVAC and process systems: accessories, additives and advice to ensure optimum efficiency and guarantee the quality of the system fluid. These products and services reduce faults, wear and maintenance as well as improve system performance and lower energy consumption. And what is more, these total solutions provide major benefits and save time during the design, installation, start-up and commissioning of systems.

### Just how small are dirt particles?



Especially the smallest dirt particles (5-10 µm) cause problems.

“The presence of air can also cause dirt-related problems.”



## How can air get into a system?

There are a number of ways in which air can get into a system.

The main ones are listed below:

- (re)filling of the system, alterations and maintenance;
- micro leaks and diffusion through glands, gaskets and plastic pipes;
- open expansion systems and cooling towers;
- incorrect expansion volume, incorrect or poor maintenance of pre-set air charge of vessels;
- capacity of water to absorb gases following physical laws, especially Henry's Law.\*

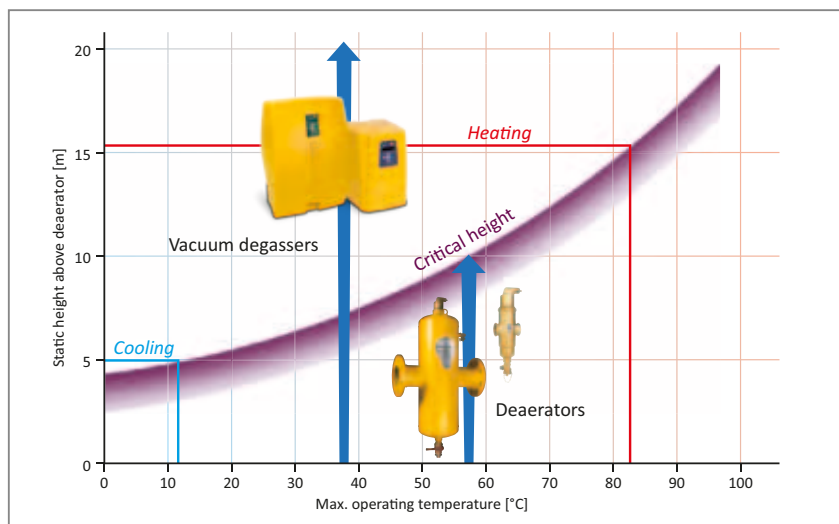
\* Henry's Law: "Gas will dissolve in a liquid until there is a balance between the partial pressure of the gas and the pressure in the liquid". That means that as the temperature rises or the pressure drops, the mass of gases that dissolves in a liquid will be reduced. Therefore at certain points within a system, the amount of gas absorbed or dissolved gas emitted will depend on the pressure and temperature.



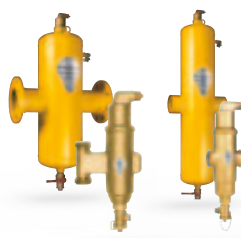
William Henry

## Static height and temperature

In case of an excessive static head (pressure) above a deaerator, dissolved air cannot be released from the fluid. In these circumstances it is very hard to predict where in the system air bubbles will emerge from the fluid. Apart from that, the point where micro bubbles emerge can change depending fluid temperature and hydrostatic pressure (Henry's Law). Rule of thumb for maximal static height: heating  $\leq 15$  m, cooling  $\leq 5$  m. Above the critical height, a vacuum degasser generally is a more effective solution. For custom made advice please contact us.



SpiroVent Superior vacuum degassers



SpiroCombi deaerator & dirt separators

## Removing gases from a system

There are two ways to release gases from fluids and remove them from a system.

### Thermal degassing: by means of temperature differences

By increasing the temperature in a system, dissolved gases will release themselves. A SpiroVent micro bubble deaerator can then remove these separated gases from the fluid.

### Vacuum degassing: by means of forced underpressure

With vacuum degassing, part of the system fluid is temporarily put in an underpressure (vacuum) condition. The gases dissolved in the fluid are released, separated and removed from the system. By reintroducing the degassed fluid into the system it can absorb further free air pockets from the circuit.

## When should a vacuum degasser be used?

1. For systems with many branches and a low flow velocity. In such systems, the free accumulated air is often not circulated with the volume flow but will disappear by itself following the installation of a vacuum degasser thanks to the fluid being made absorptive.
2. When there are slight differences in temperature. In these situations, dissolved gases will be released insufficiently. A vacuum degasser is not dependent on the fluid temperature.
3. When an inline degasser cannot be mounted on the system due to practical reasons. A vacuum degasser can be connected to virtually any point within a system.
4. When the static height above the hottest point exceeds the critical height.



Separate brochures are available on SpiroVent deaerators and SpiroVent Superior vacuum degassers.

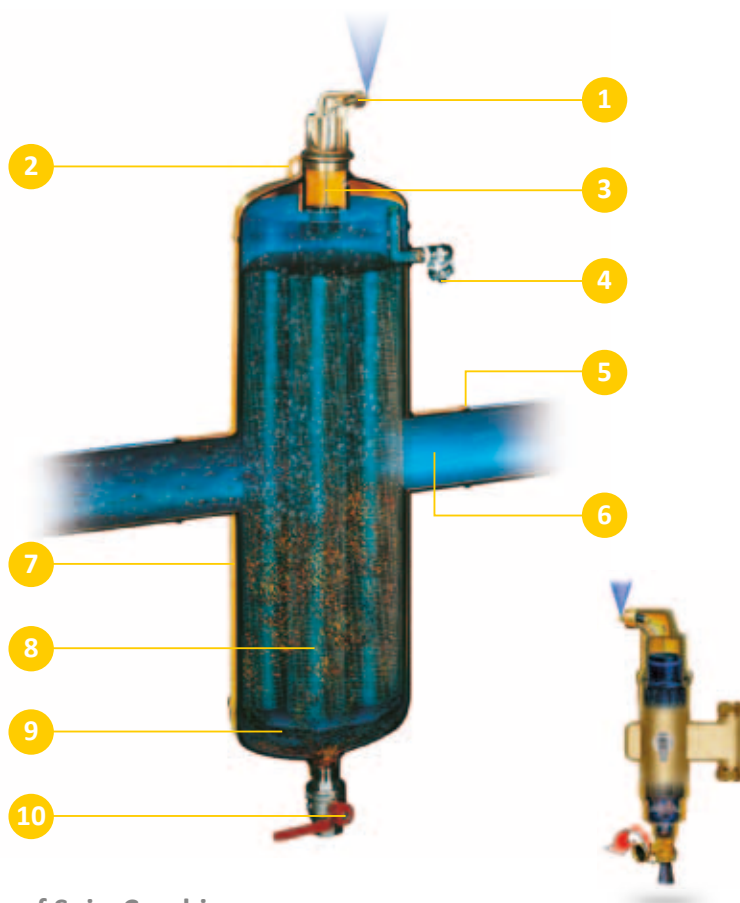
# SpiroCombi deaerator & dirt separators: time-saving and effective

At the heart of the SpiroCombi is a spiral structure through which the fluid flows. This is the “Spirotube”, which ensures that micro bubbles rise automatically and dirt particles sink automatically. Although the Spirotube can trap the smallest micro bubbles and dirt particles, it has a very open structure which means that the SpiroCombi does not clog up. The flow and the low pressure drop are not affected by the accumulated dirt, since it is collected outside the main flow.

Trapped dirt can be discharged while the system is in operation. This saves a great deal of time and represents a major advantage over filters, as with standard filters the system would need to be switched off to enable cleaning to be carried out. If no additional shut-off valves are installed, the

system will have to be partially drained before the filter can be cleaned or replaced.

When the drain valve is opened, the collected dirt is discharged quickly and effectively. This action - opening and closing the valve - only takes a few seconds.



1. The automatic air vent will not leak and cannot be closed. Many models come with thread for connecting a vent pipe as standard.
2. Lifting eyes make installation of bigger units very easy.
3. Specially constructed air chamber prevents floating dirt from reaching the valve and provides sufficient volume to absorb pressure fluctuations.
4. Drain plug on steel units for admitting or releasing large amounts of air (when filling or emptying the system) and for removing floating dirt.
5. Many different connection options. Brass with compression fittings or female thread, horizontal and vertical. Steel with welded ends or flanges.
6. The flow is not obstructed by the collected dirt.
7. Solid construction which guarantees an extremely long life.
8. The unique Spirotube is the heart. This component has been specially designed for optimum separation of air and dirt and has a very low flow resistance.
9. Large capacity dirt collection chamber reduces the need for frequent draining.
10. Drain valve for removing accumulated dirt.

## Benefits of SpiroCombi

- Removes circulating air and micro bubbles effectively.
- Very small particles, from 5  $\mu\text{m}$  (= 0.005 mm), are separated and removed.
- Dirt can be discharged while the system is in operation.
- No shut-off valves or bypass required.
- Minimal constant pressure drop.
- Maintenance only takes a few seconds.
- No unnecessary shutdown.
- Connection diameters from  $\frac{3}{4}$ " to DN 600 and above.
- A complete range, suitable for various pressures and temperatures.
- Exceptional guarantee.

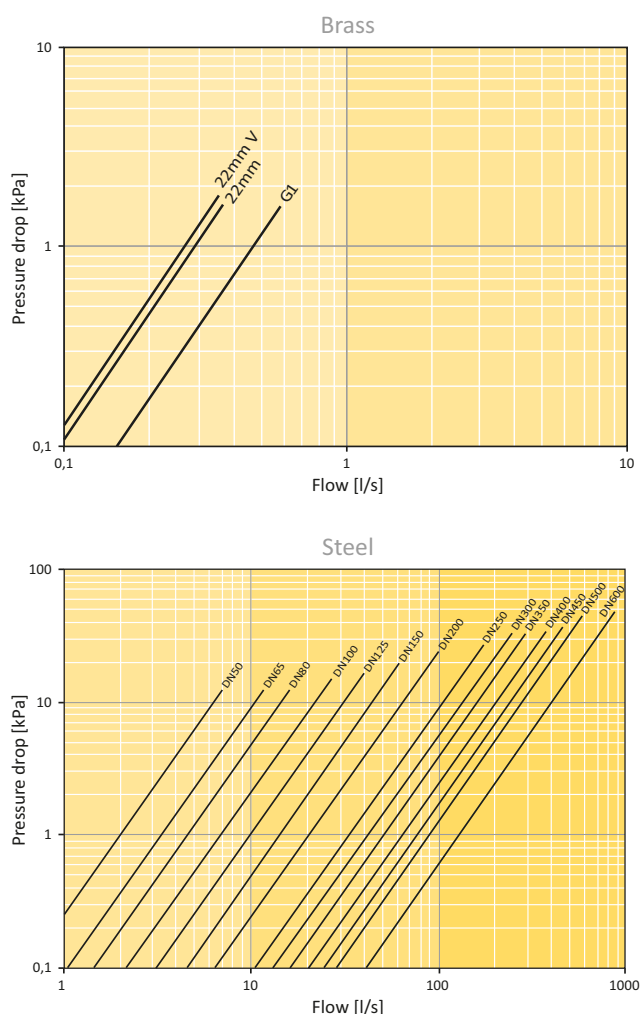


## Installing SpiroCombi

A SpiroCombi deaerator & dirt separator is preferably to be installed at the hottest point within a system. In the case of a heating system, this is the point where the water exits the boiler. In the case of a cooling system, it is in the return before the chiller unit.

## Flow resistance graph for SpiroCombi

Unlike filters, SpiroCombi deaerator & dirt separators have a minimal constant pressure drop.



Measured values according to Spirotech standard. Values shown are maximum values. Please contact us for further information.

SpiroCombi deaerator & dirt separators are suitable for water and water/glycol mixtures (max. 50%). They can be used in combination with locally approved chemical additives and inhibitors that are compatible with the materials applied within the system. Not suitable for drinking water.

The standard SpiroCombi is suitable for a temperature range of 0 to 110 °C and for an operating pressure of 0 to 10 bar. The SpiroCombi housing (from DN 050) is made of unalloyed steel. The flange connection is PN 16. The housing of the SpiroCombi 22 mm compression and the 1" is made of brass. Other sizes, materials, pressures and temperatures are available on request.

## Custom-made solutions and OEM applications

Spirotech offers not only standard products. If necessary, we work with customers to produce custom-made solutions. These are based on users' specific requirements. If desired, these can also be supplied as OEM products.



## Digital support

Product data sheets, standard specification texts, line drawings, CAD symbols, project descriptions, etc. are available via our website.

Separate literature is available that contains detailed product information. You can also find this information on our website.



## SpiroPlus

Protect and optimize the system and its efficiency with SpiroPlus flushing agents and additives..



## An extensive range of SpiroCombi deaerator & dirt separators

**Optimum system and process water quality is achieved when air and dirt is kept to a minimum. If air and dirt is not removed, or is not removed sufficiently, numerous complaints and problems can arise such as annoying noises, frequent manual venting, deteriorating pump performance, an imbalance in the system, unnecessary disturbance and excessive wear. All these things result in higher energy consumption, complaints and failure and often require immediate action.**

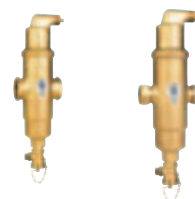
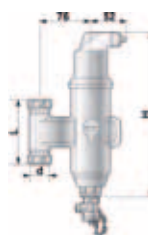
Spirotech offers a extensive range of SpiroCombi deaerator & dirt separators specially designed for the simultaneous removal of air and dirt. All products can be used for both new build projects and for renovating heating, cooling and process systems. SpiroCombi deaerator & dirt

separators are available in brass and in (stainless) steel. The brass separators, suitable for a flow velocity of up to 1 m/s, can be installed in horizontal and vertical pipes. The steel models are available in standard and hi-flow designs.

Connection	H [mm]	L [mm]	Max. flow [m³/h]	Max. flow [l/s]	Δp at max. flow [kPa]	Article number
22 mm. comp.	257	106	1,3	0,35	1,3	AC022
22 mm. comp. V	246	97	1,3	0,35	1,7	AC022V
G1	257	88	2,0	0,55	1,3	AC100

V= Vertical connection  
Operating pressure 0 - 10 bar  
Other sizes, materials, pressures and temperatures are available on request.

Flow velocity ≤ 1m/s  
Fluid temperature 0 - 110°C



Brass, horizontal: 22 mm and 1"



Brass, vertical: 22 mm

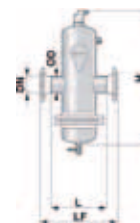
## Standard vs. Hi-flow

Standard steel SpiroCombi products are designed for a nominal flow velocity up to 1.5 m/s. At higher velocities the increased turbulence will not always leave sufficient separation zone in a standard unit for optimal separation. Exceeding the nominal flow will also lead to a substantially increased pressure drop. For structural higher flow velocities (up to 3 m/s) a Hi-flow type is recommended.

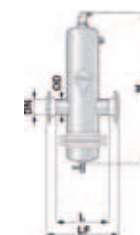
				Standaard; nom. 1,5 m/s								Hi-flow; nom. 3 m/s							
				H [mm]	nom. = 1,5 m/s			max. = 3 m/s			Article number*	Article number demountable*					Article number*	Article number demountable*	
Connection DN	Connection OD [mm]	L [mm]	LF [mm]		Max. flow [l/s]	Max. flow [m³/h]	Δp at max. flow [kPa]	Max. flow [l/s]	Max. flow [m³/h]	Δp at max. flow [kPa]			H [mm]	Max. flow [l/s]	Max. flow [m³/h]	Δp at max. flow [kPa]			
050	60	260	350	630	3,5	12,5	3,0	7	25	11,8	BC050	BD050	910	7	25	11,8	HC050	HD050	
065	76	260	350	630	5,5	20	2,7	11	40	11,6	BC065	BD065	910	11	40	11,6	HC065	HD065	
080	89	370	470	785	7,5	27	2,9	15	54	12,4	BC080	BD080	1145	15	54	12,4	HC080	HD080	
100	114	370	475	785	13	47	3,7	26	94	14,6	BC100	BD100	1145	26	94	14,6	HC100	HD100	
125	140	525	635	1045	20	72	4,2	40	144	16,8	BC125	BD125	1570	40	144	16,8	HC125	HD125	
150	168	525	635	1045	30	108	4,9	60	215	19,4	BC150	BD150	1570	60	215	19,4	HC150	HD150	
200	219	650	775	1315	50	180	5,8	100	360	23,1	BC200	BD200	1995	100	360	23,1	HC200	HD200	
250	273	750	890	1715	80	288	6,9	160	575	27,7	BC250	BD250	2680	160	575	27,7	HC250	HD250	
300	324	850	1005	2025	113	405	7,7	225	810	31,0	BC300	BD300	3190	225	810	31,0	HC300	HD300	
350	356	n.v.t.	1128	2560	140	500	7,8	280	1000	31,0	BC350	BD350	3530	280	1000	31,0	HC350	HD350	
400	406	n.v.t.	1226	2860	180	650	8,4	360	1300	34,0	BC400	BD400	3970	360	1300	34,0	HC400	HD400	
450	457	n.v.t.	1330	3150	235	850	10,0	470	1700	39,0	BC450	BD450	4410	470	1700	39,0	HC450	HD450	
500	508	n.v.t.	1430	3460	295	1060	11,0	590	2120	43,0	BC500	BD500	4860	590	2120	43,0	HC500	HD500	
600	610	n.v.t.	1630	4070	425	1530	12,0	835	3000	47,0	BC600	BD600	5760	835	3000	47,0	HC600	HD600	

Operating pressure 0 - 10 bar Fluid temperature 0 - 110°C  
Other sizes, materials, pressures and temperatures are available on request.

\* for weld ends add L (e.g. BC200L)  
for flanges add F (e.g. BC200F)



Standard



Hi-flow

## Select the correct SpiroCombi

1. Determine the pipe diameter.
2. Determine the flow.
3. Determine the correct model using the table.

		Max. flow m³/h & l/s																Applicable SpiroCombi	
m³/h	l/s	12,5	20	25	27	40	47	54	72	94	108	144	180	215	288	360	405	Standard	Hi-flow
		3,5	5,5	7	7,5	11	13	15	20	26	30	40	50	60	80	100	113		
DN050																		BC/BD050	HC/HD050
DN065																		BC/BD065	HC/HD065
DN080																		BC/BD080	HC/HD080
DN100																		BC/BD100	HC/HD100
DN125																		BC/BD125	HC/HD125
DN150																		BC/BD150	HC/HD150
DN200																		BC/BD200	HC/HD200
DN250																		BC/BD250	HC/HD250
DN300																		BC/BD300	HC/HD300
DN350																		BC/BD350	HC/HD350
DN400																		BC/BD400	HC/HD400
DN450																		BC/BD450	HC/HD450
DN500																		BC/BD500	HC/HD500
DN600																		BC/BD600	HC/HD600

Standard model at nominal flow Standard model at maximum flow, hi-flow recommended Choose bigger Ø or lower the flow

Other sizes, materials, pressures and temperatures are available on request.

By choosing a larger connection size the same flow rate will be achieved but with a lower flow velocity resulting in better separation efficiency and a lower pressure drop (less energy consumption).

## Demountable

If the level of contamination is such that it needs to be possible to replace or clean the separation element (Spirotube assembly), the demountable model can be chosen.



Standard: DN 50 to DN 600



Hi-flow: DN 50 to DN 600



Demountable: DN50 to DN600

Hi-flow demountable: DN50 to DN600



## SPIROLIFE Guarantee of a lifetime

Spirotech's Exceptional Guarantee Terms!

**20** Brass Products  $\leq 110^{\circ}\text{C}$ :  
20 years

**5** Steel Products and  
Brass Products  $> 110^{\circ}\text{C}$ :  
5 years

**2** Vacuum Degassers:  
2 years

### Conditions:

Correct selection, installation, maintenance and use of the products, in accordance with our regulations, data sheets and user manuals. Our guarantee does not cover normal wear and tear. Please also see our general terms and conditions.

## Spirotech: accessories, additives and advice

Spirotech designs and produces innovative total solutions for conditioning fluids in HVAC and process systems. Our products and services reduce faults and wear, less maintenance is required, performance is improved and energy consumption is reduced.

Spirotech is deservedly regarded as the only real specialist in the world. Leading manufacturers of system components recommend Spirotech products on account of their high standard of quality and the company's vision on product development and process improvement.

Thanks to a very extensive international network of suppliers, users all over the world enjoy the benefits of our products and services every day.

Spirotech is a Spiro Enterprises company



Spirotech bv  
PO Box 207  
5700 AE Helmond, NL  
T +31 (0)492 578 989  
F +31 (0)492 541 245  
info@spirotech.nl  
www.spirotech.com

Spirotech UK Ltd  
One Cranmore Drive Shirley  
Solihull, B90 4RZ  
T +44 (0)208 451 3344  
F +44 (0)208 451 3366  
info@spirotech.co.uk  
www.spirotech.co.uk

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