546 discal

dirt and air separators

altecnic

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Application

Automatic dirt and air separators are used to continuously remove the debris and air contained in the hydraulic circuits of heating and cooling systems.

They are capable of automatically removing all the air present in the system down to micro-bubble level, with very low head losses.

The large air collection chamber is able to accommodate a large volume of air before being released automatically.

At the same time they separate debris and impurities contained in the system which collect in the lower part of the collection chamber from which they may be expelled via the blowdown valve.

The circulation of fully de-aerated water enables equipment to operate under optimum conditions, free from any noise, corrosion, localised overheating or mechanical damage, important for reducing energy demands and on going running costs.

Design

The Discal dirt and air separator is manufactured from epoxy coated steel with a stainless steel internal element.

Suitable for installation in horizontal pipework.

Supplied with PN16 flanges to BS EN 1092 -1 or weld ends.

Low pressure loss.

Supplied with a 1" hose union ball blow down valve.

Supplied with hot preformed shell for thermal insulation.

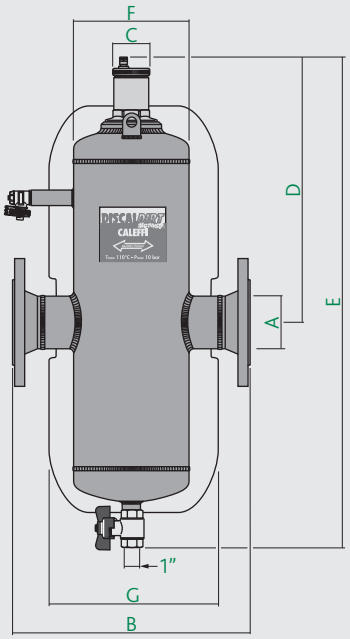
Construction Details

Component	Material	Grade
Body	Steel - epoxy coated	
Automatic air vent body	Brass	BS EN 12165 CW617N
Internal element	Stainless Steel	
Float	Poly propylene	
Float guide	Brass	BS EN 12165 CW614N
Stem	Brass	BS EN 12165 CW614N
Float lever	Stainless steel	
Spring	Stainless steel	
Seals	EPDM	
Drain valve	Brass	BS EN 12165 CW617N

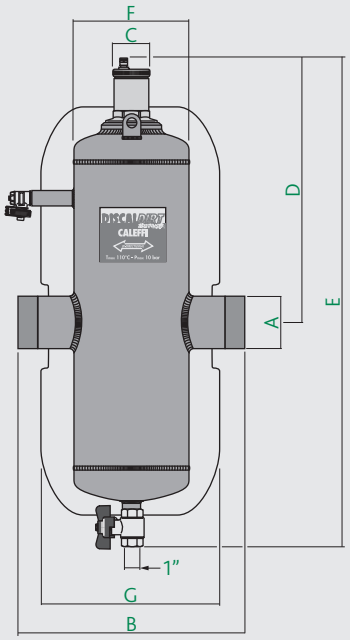
Technical Data

Medium:	water glycol solution
Max. percentage of glycol:	50%
Max. working pressure:	10 bar
Temperature range:	0 to 110°C
Particle separation rating:	up to 5µm

Dimensions



Prod Code	A	B	C	D	E	F	G	kg
546052	50	350	55	374	775	169	300	18
546062	65	350	55	374	775	169	300	19
546082	80	466	55	436	912	219	370	33
546102	100	470	55	436	912	219	370	35
546122	125	635	55	541	1245	324	480	82
546152	150	635	55	541	1245	324	480	85



Prod Code	A	B	C	D	E	F	G	kg
546053	50	260	55	374	775	169	300	13
546063	65	260	55	374	775	169	300	13
546083	80	366	55	436	912	219	370	25
546103	100	366	55	436	912	219	370	25
546123	125	525	55	541	1245	324	480	70
546153	150	525	55	541	1245	324	480	70

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Solubility of Air in Water

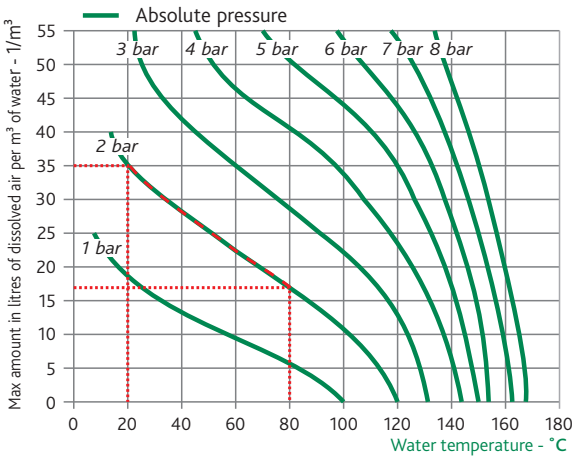
The amount of air which can remain dissolved in a water solution is a function of pressure and temperature.

This relationship is governed by Henry's Law and the graph shows the physical phenomenon of the volume of air released by the fluid to be quantified.

As an example, at a constant absolute pressure of 2 bar, if the water is heated from 20°C to 80°C, the amount of air released by the solution is equal to 18 l per m^3 of water.

According to this law it can be seen that the amount of air released increases with temperature rise and pressure reduction.

The air comes in the form of micro-bubbles, a fraction of a millimetre in diameter.



Operating Principles

Dirt and air separator use the combined action of several physical principles.

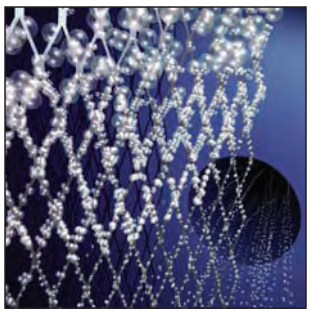
The active part consists of an assembly of concentrics stainless steel mesh surfaces. These elements create the whirling movement required to facilitate the release of micro-bubbles and their adhesion to these surfaces.

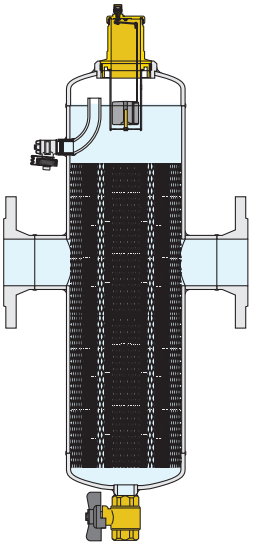
The bubbles, fusing with each other, increase in volume until the hydrostatic thrust is such as to overcome the adhesion force to the structure.

They rise towards the top of the unit from which they are released through a float-operated automatic air release valve.

It is designed in such a way that the direction in which the medium is flowing inside it makes no difference.

Debris in the water, colliding with the internal element are separated out and fall to the bottom of the valve body.





Construction Details

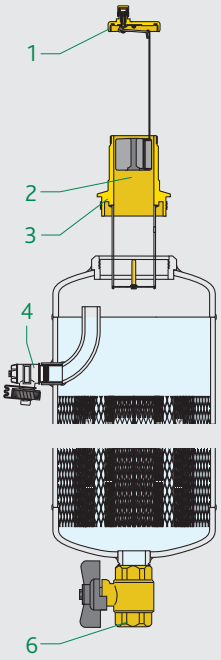
The construction of the discal dirt and air separator allows it to be maintained and cleaned without removing it from the system.

The components that control the air venting are accessed by removing the cover (1).

The automatic air vent, located at the top of the dirt and air separator, is equipped with a long chamber for float movement (2). This feature prevents impurities in the water from reaching the seat.

When cleaning simply unscrew that part of the body containing the automatic air vent (3) to clean the entire air venting system.

Steel dirt and air separators are equipped with a an air release valve (4) that has the dual function of releasing large quantities of air when the system is being filled and for removing the debris that float on the surface of the water.



Discal dirt and air separators have a collection chamber equipped with a ball shut-off valve (6) this means impurities can even be expelled while the system is in operation.

Dirt Separation Efficiency

The effectiveness of any device to separate and collect particles of debris from a flowing liquid depends upon:-

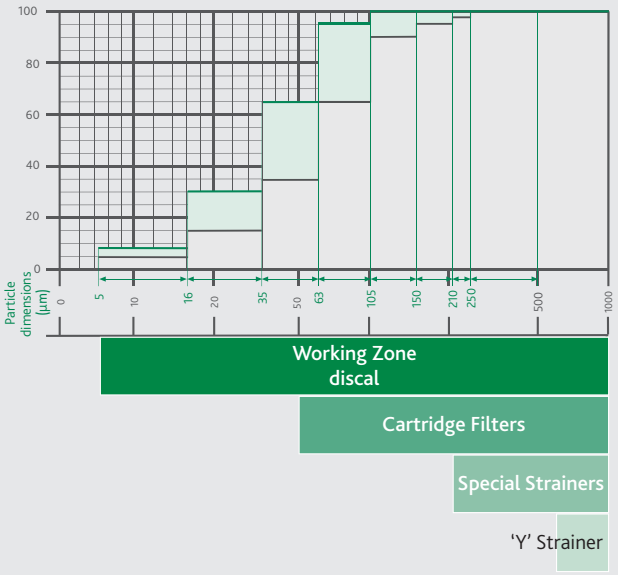
1 The larger the particles the more effective the device.

2 If the flow velocity reduces the particles separate and fall more easily.

3 The number of times the liquid re-circulates through the device.

The design of the discal dirt and air separator enables it to collect particles down to a minimum size of 5 µm = 0.005 mm.

The chart summarises tests conducted to illustrate how quickly particles are collected.



Tests conducts by TNO - Science and Industry Laboratory (NL)

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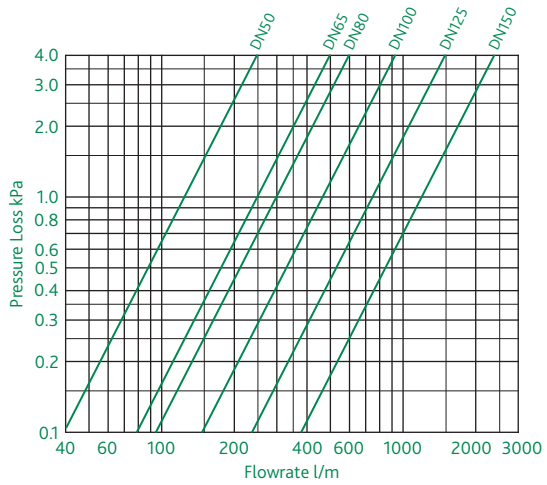
Dirt Separation Efficiency

After only 50 circulations, approximately one day of operation, 100% of particles 100 µm = 0.1mm in size and approximately 80% of all particles had been collected.

Continued circulation gradually leads to the virtual removal of all particles.

Pressure Loss Chart



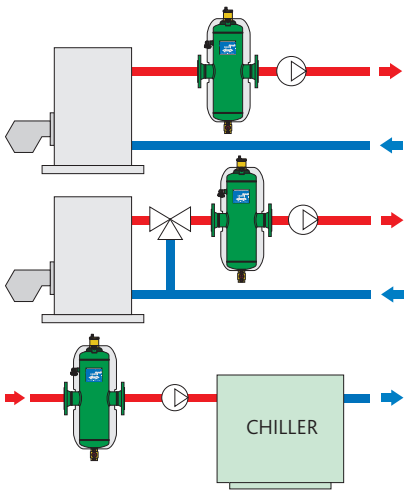
Size - DN	50	65	80	100	125	150
Kv - m^3/h	75	150	180	280	450	720

The maximum recommended flow velocity inside the pipe is 1.2 m/s. The following shows the maximum flow rates to meet this requirement.

Size - DN	50	65	80	100	125	150
l/m	159	267	369	624	951	1362

Based on BS EN 10255 steel pipe.

Installation



Installation

Discal dirt and air separators may be used in both heating and cooling systems, to ensure the progressive removal of air which is continuously formed.

The units should preferably be installed after the boiler and on the pump suction side, as these are the points where the formation of micro-bubbles is greatest.

Discal dirt and air separators must be installed in a vertical position, and preferably upstream of the pump where, due to the high speed of the medium and the ensuing drop in pressure, in this position air micro-bubbles develop more easily.

The flow direction of the medium is not important.

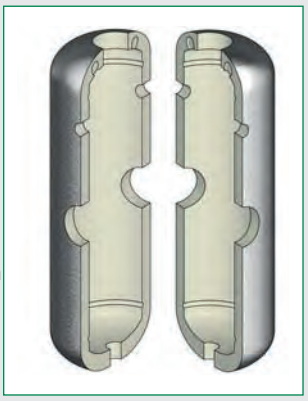
It is recommended that the vent cap is replaced with an Altecnic hydroscopic safety cap if the device is installed in a location that cannot be inspected.

Insulation

Discal dirt and air separators are supplied complete with hot pre-formed shell insulation.

This system ensures not only perfect thermal insulation, but also the tightness required to prevent atmospheric water vapour from entering the unit.

For this reason, this type of insulation may also be used in cooling water circuits as it prevents condensation from forming on the surface of the valve body.



Technical Specification of Insulation Shell

Material:		Closed cell expanded PE-X
Thickness:	DN50 to DN100	60mm
	DN125 & DN150	50mm
Density:	- inner part	30 kg/m^3
	- outer part	80 kg/m^3
Thermal conductivity (ISO 2581):	at 0˚C	0.038W/(m.K)
	at 40˚C	0.045W/(m.K)
Coefficient of resistance to water vapour (DIN 52615):		> 1.300
Working temperature range:		0 to 100˚C
Resistance to fire (DIN 4102):		class B2

External Layer - all sizes

Material:	embossed unfinished aluminium
Thickness:	0.7mm
Resistance to fire (DIN 4102)	class 1

E & O.E

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