

# DISCALDIRT® air & dirt separator



Air and dirt separators are used to continuously remove the air and debris contained in the hydronic circuits of heating and cooling systems. The air discharge capacity of these devices is very high. They are capable of automatically removing all of the air present in the system down to micro-bubble level. The DISCALDIRT® air and dirt separator also separates any solid impurities in the system. The impurities collect at the bottom of the device and can be removed through the drain shut-off cock. The circulation of fully de-aerated and cleaned water enables the equipment to operate under optimum conditions, free from noise, corrosion, localized or mechanical damage.

## Product range

- 546 series DISCALDIRT air and dirt separator in brass.....sizes 3/4" and 1" sweat union
- 546 series DISCALDIRT air and dirt separator in brass.....size 1" NPT male union
- 546 series DISCALDIRT air and dirt separator in brass.....size 1 1/4" sweat

## Technical specifications

### Materials:

- Body: brass
- Dirt separation chamber: brass
- Automatic air vent body: brass
- Internal element: PA66GF30
- Float: PP
- Float guide: brass
- Stem: brass
- Float lever: stainless steel
- Spring: stainless steel
- Seals: EPDM
- Drain shut-off valve: brass

Suitable fluids: water, 50% max. glycol solutions, 25% max. methanol solutions, 30% max. ethanol solutions, saline solutions

Max working pressure: 150 psi (10 bar)

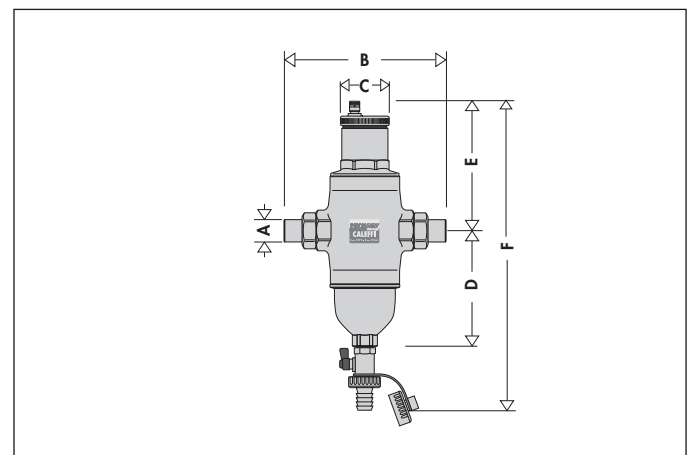
Temperature range: 32–230°F (0 –110°C)

Particle separation capacity: 5 µm (0.2 mil)

### Connections:

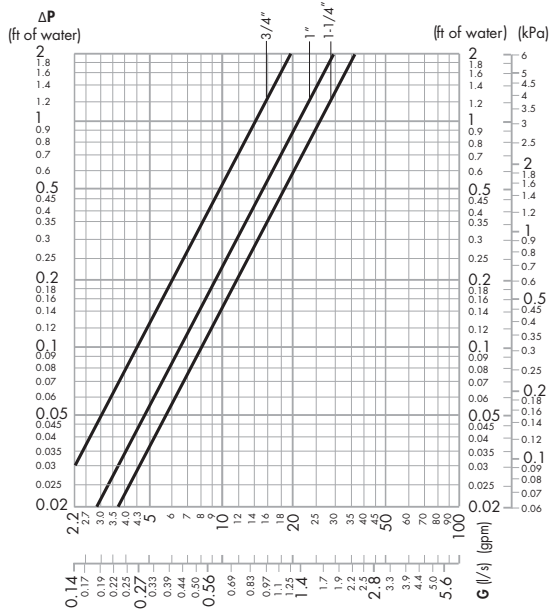
- Main: 3/4" and 1" sweat union  
1" NPT male union  
1 1/4" sweat
- Drain valve: hose connection

## Dimensions



| Code    | Connections | A      | B        | C       | D  | E       | F        | Weight (lb) |
|---------|-------------|--------|----------|---------|----|---------|----------|-------------|
| 546095A | Sweat union | 3/4"   | 7 -3/8"  | 2 -1/8" | 5" | 5 -1/2" | 12 -3/4" | 8.3         |
| 546096A | Sweat union | 1"     | 7 -3/8"  | 2 -1/8" | 5" | 5 -1/2" | 12 -3/4" | 8.3         |
| 546016A | NPT union   | 1"     | 7 -3/8"  | 2 -1/8" | 5" | 5 -1/2" | 12 -3/4" | 8.3         |
| 546097A | Sweat       | 1-1/4" | 6 -3/16" | 2 -1/8" | 5" | 5 -1/2" | 12 -3/4" | 8.3         |

## Hydraulic Characteristics



## Flow capacity

The fluid velocity at connections for DISCALDIRT 546 series air and dirt separators is recommended to not exceed 10.0 f/s. Above this speed, heavy internal turbulence and noise can occur and air and dirt elimination efficiency begins to fall measurably. Optimal air and dirt elimination performance occurs at fluid velocities of 4.0 f/s or less. See the flow capacity chart.

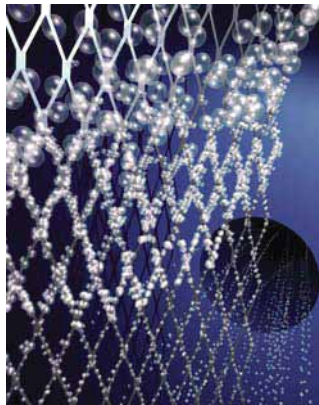
|                       |     | FLOW CAPACITY |      |      |        |
|-----------------------|-----|---------------|------|------|--------|
|                       |     | Size          | 3/4" | 1"   | 1-1/4" |
| Optimal<br>(≤4.0 f/s) | GPM | 8.0           | 9.3  | 10.0 |        |
|                       | l/s | 0.5           | 0.6  | 0.63 |        |
| Max.<br>(10.0 f/s)    | GPM | 19.0          | 22.1 | 25.0 |        |
|                       | l/s | 1.2           | 1.4  | 1.6  |        |
|                       | Cv  | 19.1          | 32.5 | 40.0 |        |

## Operating Principle

### Microbubble air separation

The DISCALDIRT's internal element (1) creates the whirling movement required to facilitate the release of microbubbles and their adhesion to the internal element surfaces.

The bubbles, fusing with each other, increase in size until the hydrostatic thrust overcomes the adhesion force to the mesh. They rise toward the top of the unit from which they are released through a float-operated automatic air vent.

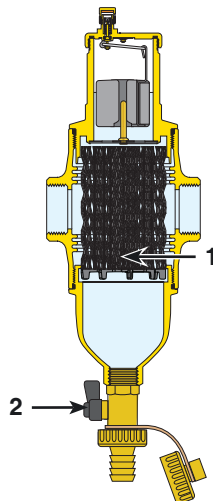


### Microparticle dirt separation

Impurities in the fluid upon striking the surfaces of the DISCALDIRT's internal element (1), get separated and drop to the bottom of the body where they collect.

In addition, the large internal volume of DISCALDIRT slows down the flow speed of the fluid thus helping, by gravity, to separate the particles it contains.

The collected impurities are discharged by opening the drain valve (2) with the handle, even with the system operating.



### The process of air formation

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, which says the amount of air released by the solution increases with temperature rise and pressure reduction. The comes in the form of micro-bubbles of diameters in the order of tenths of a millimeter. In heating and cooling systems there are specific points where this process of formation of micro-bubbles takes place continuously in the boiler and in any device which operates under conditions of cavitation.

### Dirt separation efficiency

The capacity for separating the impurities in the medium circulating in the closed circuits of hydronics systems and geothermal earthloop systems basically depends on three parameters:

- 1) It increases as the size and mass of the particle increase.  
The larger and heavier particles drop before the lighter ones.
- 2) It increases as the speed decreases. If the speed decreases, there is a calm zone inside the dirt separator and the particles separate more easily.
- 3) It increases as the number of recirculations increases.  
The medium in the circuit, flowing through the dirt separator a number of times during operation, is subjected to a progressive action of separation, until the impurities are completely removed.

The special design of the internal element in the Caleffi DISCALDIRT air and dirt separator is able to completely separate the impurities in the circuit down to a minimum particle size of 5 μm (0.2 mil).