# DIRTMAG® dirt separator with magnet, adjustable for vertical or horizontal pipe

## NA5453 series

01240/23 NA
Replaces 01240/16 NA

### Function

In heating and chilled water systems, the circulation of water containing impurities may result in rapid wear and damage to components such as pumps and control valves. It also causes blockages in heat exchangers, heating elements and pipes, resulting in lower thermal efficiency within the system.

The dirt separator separates off these dirt particles, circulating within the closed circuit system. These particles are collected in a large chamber, requiring infrequent cleaning, which requires simply removing the magnet ring and opening the large drain valve while the system is running. This device is capable of efficiently removing particles to a very small size, with very low pressure head loss.

The DIRTMAG® magnetic dirt separator removes both ferrous and non-ferrous impurities continuously, featuring a powerful removable external magnet around the body that removes up to 100% of the ferrous impurities, including magnetite, that can form in a hydronic system. The DIRTMAG® has 2½ times the removal performance of a standard dirt separator. The body of the NA5453 series separator is made of glass reinforced nylon specifically designed for use in heating and cooling systems. It also is especially versatile as it can be installed on either horizontal or vertical piping with the rotating brass base mount.

The NA5453 series is available with conventional union NPT and union sweat connections and press copper tail-piece with union nut that makes installation and maintenance fast, easy and efficient. Also, models are available with isolation inlet and outlet shutoff valves, which can be used as a dosing point to inject chemical additives into the hydronic circuit.

### Product range

| | |
|---|---|
| NA54530x series | DIRTMAG dirt separator with magnet for horizontal and vertical pipes.....connections ¾" & 1" NPT male union |
| NA54535 series | DIRTMAG dirt separator with magnet for horizontal and vertical pipes with isolation shut off valves..... connections ¾" & 1" NPT female |
| NA54539 series | DIRTMAG dirt separator with magnet for horizontal and vertical pipes .....connections ¾" & 1" sweat union |
| NA54536 series | DIRTMAG dirt separator with magnet for horizontal and vertical pipes .....connections ¾" & 1" press union |
| code NA54537 | DIRTMAG dirt separator with magnet for horizontal and vertical pipes with isolation shut off valves..... connections 1" press union |

### Technical specifications

**Materials:**

| | |
|---|---|
| Body: | glass reinforced nylon PA66G30 |
| Dirt separator cover: | glass reinforced nylon PA66G30 |
| Top dosing point port plug: | brass EN 12164 CW614N |
| Drain screw: | brass EN 12164 CW614N |
| Tee pipe fitting: | brass EN 1982 CB 753S |
| Locking nut for tee pipe fitting: | brass EN 12420 CW617N |
| Internal element: | HDPE |
| Hydraulic seals: | peroxide-cured EPDM |
| Drain valve: | brass EN 12165 CW617N |

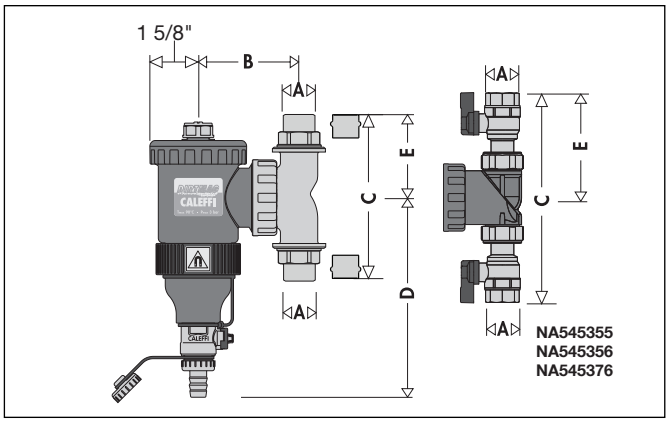
**Performance:**

| | |
|---|---|
| Suitable Fluids: | water, glycol solutions |
| Max. percentage of glycol: | 30% |
| Max. working pressure: | 45 psi (3 bar) |
| Working temperature range: | 32–195°F (0-90°C) |
| Magnets: | neodymium rare earth |
| Paricle separation capacity: | to 5µm ( 0.2 mil) |
| Ferrous impurities separation efficiency: | up to 100% removal |
| Dosing capacity: | 12 fluid oz |

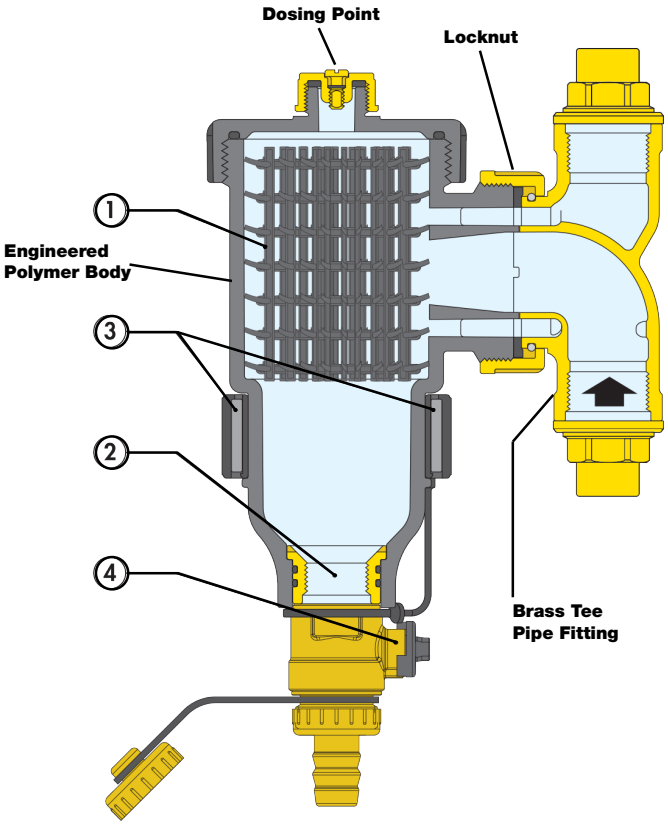
**Connections:**

| | |
|---|---|
| Main connections: | ¾" and 1" NPT male union<br>¾" and 1" NPT female<br>¾" and 1" sweat union<br>¾" and 1" press union |
| Lay length (press connection): | size ¾": 4 ½"<br>size 1": 4 7/8" |
| Drain valve: | hose connection |

## Dimensions




| Code | A | B | C | D | E | WT (lb/kg) |
|---|---|---|---|---|---|---|
| **NA5453**05 | ¾" M NPT | 3 7/16" | 6 1/8" | 7" | 3" | 4.5 /2.0 |
| **NA5453**95 | ¾" sweat | 3 7/16" | 6 5/8" | 7" | 3 5/16" | 4.5/2.0 |
| **NA5453**65 | ¾"press | 3 7/16" | 6 1/2" | 7" | 3 1/8" | 4.5/2.0 |
| **NA5453**06 | 1" M NPT | 3 7/16" | 6 3/4" | 7" | 3 1/2" | 4.5/2.0 |
| **NA5453**96 | 1" sweat | 3 7/16" | 7 3/4" | 7" | 4" | 4.5/2.0 |
| **NA5453**66 | 1" press | 3 7/16" | 6 3/4" | 7" | 3 1/2" | 4.7/2.1 |
| **NA5453**55 | ¾" F NPT | 3 7/16" | 8 1/2" | 7" | 4 1/4" | 5.5/2.5 |
| **NA5453**56 | 1" F NPT | 3 7/16" | 8 3/4" | 7" | 4 3/8" | 5.5/2.5 |
| **NA5453**76 | 1" press | 3 7/16" | 9 1/8" | 7" | 4 9/16" | 5.5/2.5 |




## Operating principle

The operating principle of the magnetic dirt separator is based on the combined action of a number of physical phenomena.
The internal element (1) consists of a set of radial reticular surfaces. As the water or glycol solution strikes these surfaces, the impurities are separated, dropping into the bottom of the body (2) where they are collected.
Ferrous impurities, including magnetite, are trapped inside the dirt separator body, attracted by powerful magnets (3) inserted into a special removable outer ring. The large internal volume of the DIRTMAG® slows down the velocity of the medium and with the help of gravity, separates the contained particles. The collected dirt can then be discharged by removing the magnetic ring and opening the drain valve (4); this procedure can be performed while the system is in operation.

## Construction details

### Engineered polymer

The dirt separator is constructed of a polymer specifically selected for heating and cooling system applications. The main features of the composite polymer are:

- high strength to strain, while maintaining good ultimate elongation
- good resistance to crack propagation
- very low humidity absorption, for consistent mechanical performance
- With continuous medium flow, the polymer has a high resistance to abrasion
- Continuous performance over wide temperature variations
- Compatible with glycols and additives used in circuits.

These basic material characteristics, combined with the optimal body design in the most highly stressed areas, provides operating performance equivelant to metals typically used in the construction of dirt separators.

### Low pressure losses and performance maintained over time

The dirt separating action performed by the dirt separator is based on using the internal element with radial reticular surfaces instead of an ordinary filter. The element offers little resistance to the medium flow while ensuring dirt separation. This occurs due to the particles colliding with the radial reticular surfaces and then settling to the bottom, and not by filtration; which, over time, gets progressively clogged. By contrast, the DIRTMAG low velocity- zone dirt separator with magnet efficiently removes the particles to a very small size with very low pressure head loss.

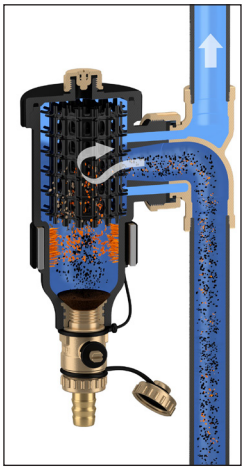
## Geometric structure and large dirt collection chamber

The geometrical structure of DIRTMAG® reduces the flow media velocity to help separate dirt particles. The dirt collection chamber has the following features:

- It is located at the bottom of the device at such a distance from the connections that the collected dirt is not affected by the swirl of the flow through the mesh element.
- It has enough capacity to increase the amount of dirt stored and therefore decreases the frequency of emptying it compared to filters that need to be cleaned frequently.
- It is easily inspected, by unscrewing it from the dirt separator body for servicing the internal mesh element when large debris are trapped in it.

### Separation of ferrous impurities

This series of dirt separators, complete with a magnet, offer greater efficiency in the separation and collection of ferrous impurities, including magnetite. The impurities are trapped inside the dirt separator body by a strong magnetic field created by a removable rare-earth magnet around the body below the flow line for fast and effective capture of ferrous impurities.

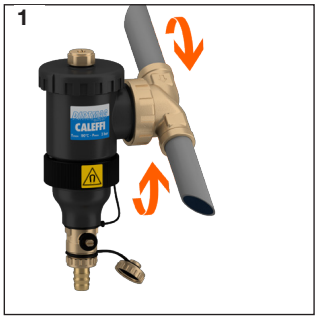


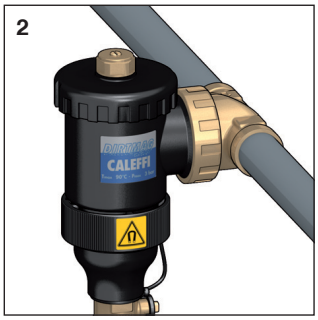
The magnetic ring can also be removed from the body for discharge of impurities while the system is still running. Since the magnetic ring is positioned outside the dirt separator body and causes no added system pressure drop, high performance hydraulic characteristics are maintained.

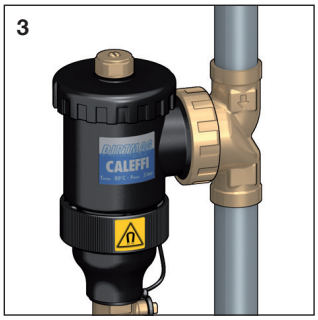
Ferrous impurities, including magnetite, form in hydronic systems when iron or steel corrodes. The abrasive, extremely fine sediment is difficult to remove and can deposit onto heat exchange surfaces and accumulate in pump cavities causing reduced efficiency and premature wear. The DIRTMAG® accomplishes 2 1/2 times the ferrous impurities removal performance of standard dirt separators, delivering up to 100% elimination efficiency. Captured impurities are easily flushed by unclamping the ring and purging - even with the system still operating.

### Adjusting the body to horizontal and vertical pipes

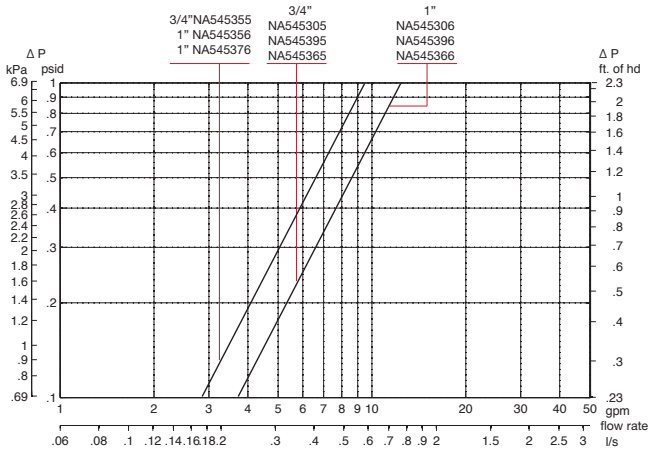
Featuring a special coupling between the locking nut and the tee pipe fitting, the DIRTMAG® dirt separator can be adjusted (1) for installation to either horizontal (2) and vertical (3) pipes, while maintaining the same operating performance.




## Hydraulic characteristics

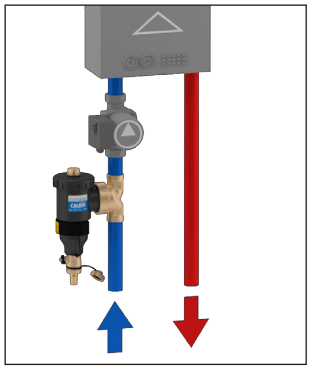


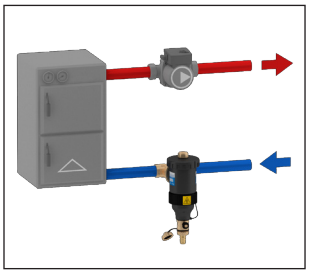

| | MAX. FLOW RATE | | | |
|---|---|---|---|---|
| Size | ¾" | ¾" * | 1" | 1"* |
| GPM | 6 | 6 | 10 | 10 |
| Cv | 12 | 9 | 12 | 9 |

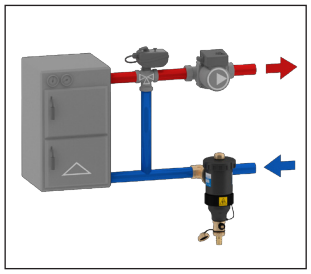
*unit with isolation shutoff valves

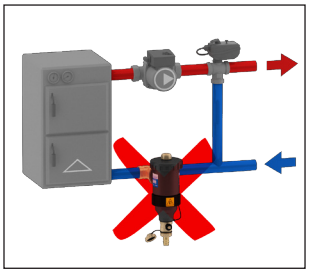
## Installation

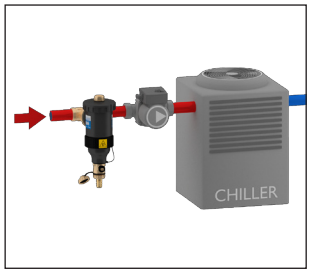
The magnetic dirt separator should be installed in accordance with the flow direction indicated by the arrow on the tee fitting and the return circuit upstream of the boiler. The magnetic dirt separator should always be installed upstream of the pump and always with its body in vertical position.





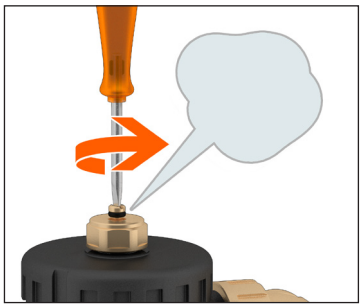






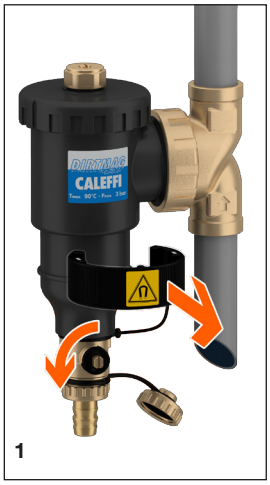

## Air vent

Eliminate air collected in the to of the body by loosening the to plug screw.



## Draining off dirt and ferrous impurities

Remove the magnetic ring (1) and drain the collected dirt and ferrous impurities. This can be done while the system is running, using the key provided (2).



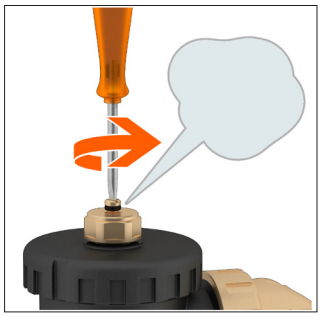
1


2

## Dosing

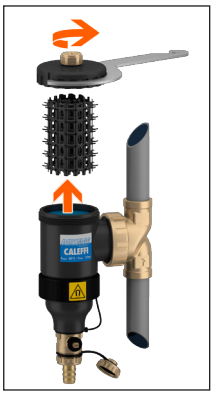
This multifunction device can also be used as a dosing point to inject chemical additives into the circuit. Codes NA545355, NA545356 and NA545376 offer integral isolation check valves making for a more convenient dosing vessal, providing an easy access point for routine system water treatment in hydronic systems.

Use a screwdriver to undo the screw on the top plug in order to purge any air that has collected at the top of the body.

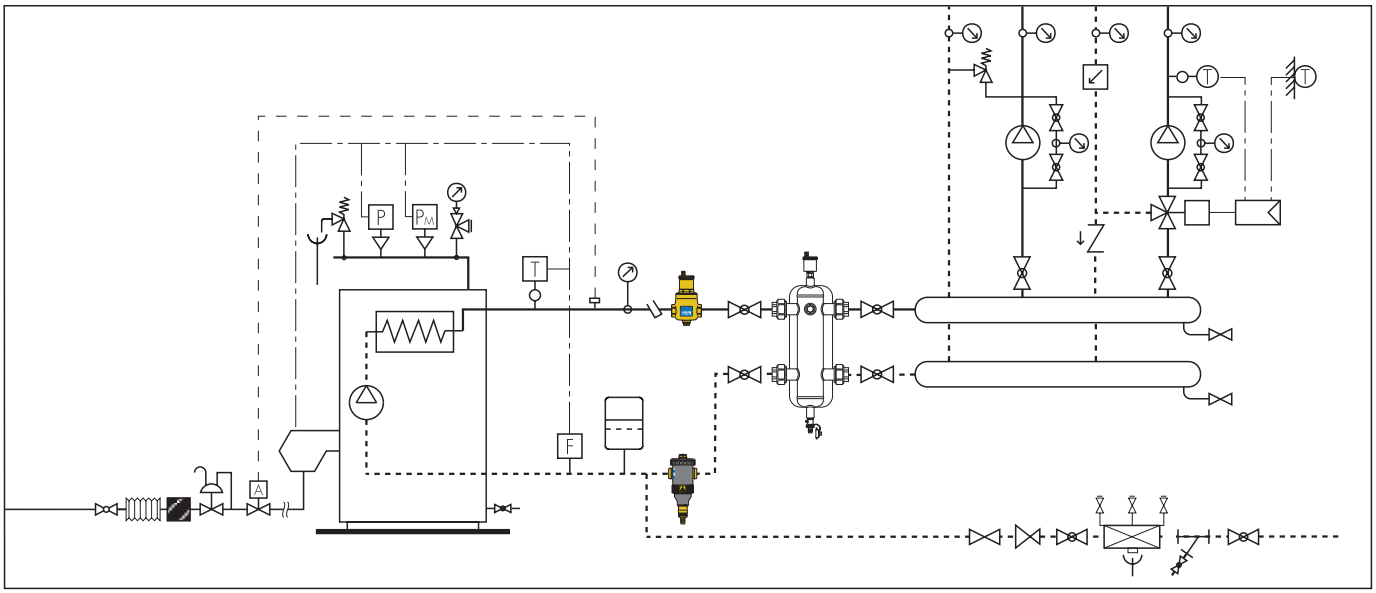



## Maintenance

To perform maintenance after isolating the separator, simply unscrew the top cover using the provided key and remove the attached internal element inside the collection chamber.



## Application diagram




- Shut-off valve
- Ball valve
- Check Valve
- Temperature gauge
- Differential by-pass valve
- Flow switch
- Zone valve
- Pump
- FlowCal™
- Hydraulic separator
- Temperature probe
- Safety thermostat
- Regulator
- Expansion vessel
- 3-way cock
- Pressure switch
- Low pressure switch
- Test pocket
- Gas filter
- Gas regulator
- Y-strainer
- Fuel shut-off valve
- Discal™
- Anti-vibration joint
- Pocket
- Safety relief valve
- Backflow preventer
- Automatic charging unit

Find us in

**MasterSpec®**

Powered by Deltek Specpoint®

https://get.caleffi.info/specpoint

find BIM Revit files and system templates at
https://bim.caleffi.com/en-us

## SPECIFICATION SUMMARY

**DIRTMAG NA5453 Series**

Dirt separator with magnet in engineered polymer. NPT male threaded union and sweat union connections ¾" and 1", press union connections ¾" and 1". Adjustable for either vertical or horizontal piping. Brass drain valve with hose connection. Brass tee pipe fitting. Engineered polymer PA66G30 body with an external removable magnetic ring, neodymium rare-earth. Engineered polymer PA66G30 cover. HDPE internal element removable for cleaning. Peroxide-cured EPDM hydraulic seals. Suitable fluids: water or 30% maximum glycol solution. Maximum working pressure 45 psi (3 bar). Working temperature range 32 to 195°F (0 to 90°C). Particle separation capacity: to 5µm (0.2 mil). Ferrous impurities separation efficiency: up to 100% removal. Provide with optional integral inlet and outlet shut off ball valves for ¾" and 1" with NPT female threaded connections, or 1" with press union connections.



Caleffi North America, Inc.
3883 W. Milwaukee Road
Milwaukee, WI 53208
Tel: 414-238-2360 · Fax: 414-238-2366
sales@caleffi.com · www.caleffi.com