



Rev. 05/2017

MAGNETIC ANTI-SCALE DEVICE

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- +** It prevents limescale from forming in the system
- It does not require maintenance
- Fitted with permanent magnets



PRODUCTION RANGE

Code	Size	Thread	Connections	Kv [m ³ /h]
304.04.00	1/2"	UNI-EN-ISO 228	MM	10,20
304.05.00	3/4"	UNI-EN-ISO 228	MM	14,80
304.06.00	1"	UNI-EN-ISO 228	MM	26,00
304.07.00	1"1/4	UNI-EN-ISO 228	MM	30,40
304.08.00	1"1/2	UNI-EN-ISO 228	MM	63,00
304.09.00	2"	UNI-EN-ISO 228	MM	74,00
304.10.00	2"1/2	UNI-EN-ISO 228	FF	125,00
304.11.00	3"	UNI-EN-ISO 228	FF	160,00
304.13.00	4"	UNI-EN-ISO 228	FF	252,00

Code	Description
304.00.02	Water hardness control test kit

DESCRIPTION

The **RBM Magnetic anti-scale device** is designed for the physical treatment of water;

It prevents the formation of limestone by "stopping" it when water passes, thanks to a simple chemical stabilisation process that does not alter drinkability and does not reduce or alter the presence of alkaline elements, leaving all the minerals featured in the water.

FOR FURTHER INFORMATION

As water is heated (starting at about 40°C), the salts dissolved in it, in the form of Calcium and Carbonate ions, aggregate, thereby forming Calcium Carbonate. The latter crystallizes in Calcite, generates crystals whose romboedric shape favours the stratification and formation of particularly hard and stubborn limestone incrustations.

OPERATING PRINCIPLE

Through the action of the magnetic field, the **RBM Magnetic anti-scale device** modifies the crystalline aggregation of Calcium Carbonate, thereby resulting in a crystalline form called Aragonite.

Aragonite crystals, which differ from Calcite ones due to their needle-like shape, struggle to aggregate. **Therefore, the magnetisation treatment does not reduce the water hardness value, but only modifies the ability of limescale to settle inside the water system, making it easier to remove it.**

MAINTENANCE

The magnetic anti-scale device does not require any special maintenance.

WARNINGS

The water hardness, for the type of diameter, is 40°F. For higher hardness values apply more than one anti-scale devices in series or parallel.

Where there is uncertainty about the hardness of the water, it is advisable to apply an anti-scale device with a diameter greater than the pipe diameter to which it is to be installed (e.g. 1" anti-scale device for a 3/4" pipe).

The flow rate of the anti-scale device is the same as the flow rate of the line.

The **RBM anti-scale device** contains a powerful magnet and there are strong magnetic fields inside the product. We recommend the holders of pacemaker devices to keep at a safe distance from the anti-scale device.

COMPLIANCE

The **RBM Magnetic anti-scale device** complies with articles 3 and 4 of MD no. 443 of 21/12/1990 "regulation setting out technical provisions relating to equipment appliances for the domestic processing drinking water".

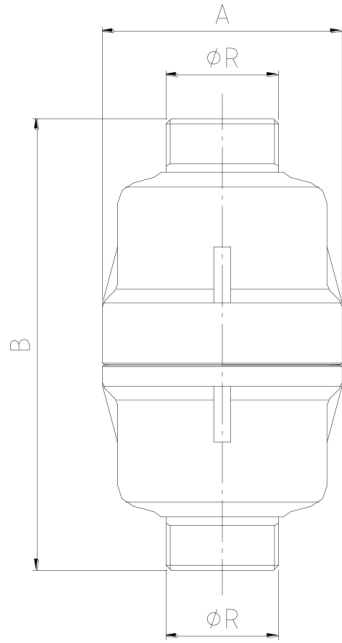
CONSTRUCTION FEATURES

Body	Nickel-plated brass CW 617N UNI EN 12165
Magnet Container	Food-grade Plastic Polymer
Magnet	Sintered Rings, Ferrite-Strontium mix
Seals	NBR
Connections: (1/2" ÷ 2")	Threaded MM UNI-EN-ISO 228
Connections: (2"1/2 ÷ 4")	Threaded FF UNI-EN-ISO 228

TECHNICAL FEATURES

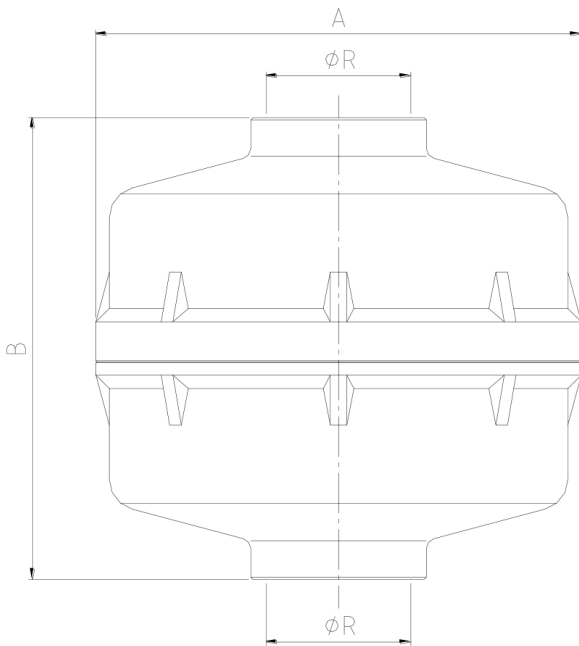
Max. operating pressure	16 Bar (1600 Kpa)
Max. operating temperature	80 °C (water)
Magnetic field	700 Gaus (average weighted value)
Coercive field	2800 ÷ 3200 Orsted
Energy product	2.4 ÷ 3.0 M Gaus-Orsted
Residual induction	from 2300 ÷ 3700 Gaus
Equivalent treatment capacity	30°F every 0.10 sec. of permanence in the magnetic field
Max reference speed of the fluid	2.0 m/sec.

DIMENSIONAL FEATURES



MM CONNECTION

Code	Connection	Size R	A [mm]	B [mm]
304.04.00	MM	1/2"	56	104
304.05.00	MM	3/4"	56	106
304.06.00	MM	1"	65	128
304.07.00	MM	1"1/4	79	141
304.08.00	MM	1"1/2	110	203
304.09.00	MM	2"	110	203

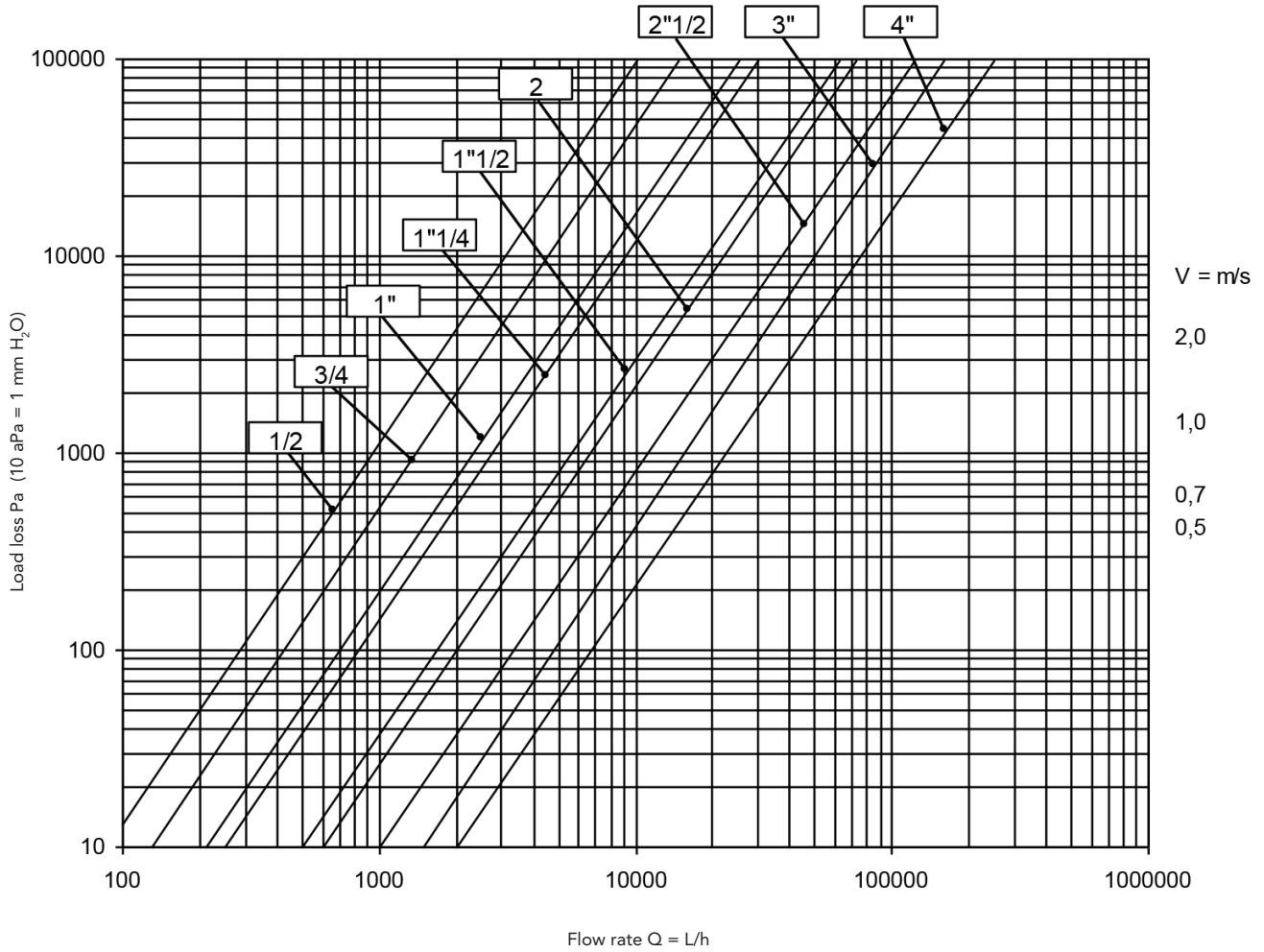


FF CONNECTION

Code	Connection	Size R	A [mm]	B [mm]
304.10.00	FF	2"1/2	235	225
304.11.00	FF	3"	235	239
304.13.00	FF	4"	235	251

FLUID DYNAMICS FEATURES

LOAD LOSSES DIAGRAM



d	K _v [m³/h]
1/2"	10,20
3/4"	14,80
1"	26,00
1"1/4	30,40
1"1/2	63,00
2"	74,00
2"1/2	125,00
3"	160,00
4"	252,00

$$dp = (Q / 1000K_v)^m \times 100.000$$

$$Q = 1000K_v \times (dp / 100.000)^{1/m}$$

m = 1,9 dp = Pa Q = L/h

EQUIVALENT TREATMENT CAPACITY

“Equivalent Treatment” refers to the intrinsic capacity of the magnetic anti-scale device to prevent, through a physical process, the formation of limescale inside the circuit.

The result is expressed as an equivalence on the reduction of the degree of hardness, which can be obtained through a classic softening process.

Dimension	Average flow rate Q (l/h) *	Equivalent Treatment (°F)	Max flow rate Q (l/h) **	Equivalent Treatment (°F)
1/2" (DN 15)	763	16	1.272	10
3/4" (DN 20)	1.357	16	2.262	10
1" (DN 25)	2.121	21	3.534	12
1"1/4 (DN 32)	3.474	21	5.791	12
1"1/2 (DN 40)	5.429	32	9.048	20
2" (DN 50)	8.432	32	14.137	20
2"1/2 (DN 65)	14.335	32	23.892	20
3" (DN 80)	21.715	32	36.191	20
4" (DN 100)	33.929	32	56.549	20

* Calculated at a fluid speed of 1.2 m/s

** Calculated at a fluid speed of 2 m/s

NOTES: If there is a need to process water with a higher value compared to the one shown in the table (Equivalent Treatment °F), provide for the application of two or more Magnetic Anti-scale Devices in series.

This ensures the flow remains unchanged, but doubles the processing potential (°F)

For water potential values other than those reported in the table (Q l/h), the Equivalent Treatment can be determined with the following formula:

$$\text{°F} = (\text{Q table} \times \text{°F table}) / \text{actual Q}$$

WATER HARDNESS CLASSIFICATION

Water is generally classified according to its hardness as follows:

very soft	hardness between 0 and 4 °F
soft	hardness between 4 and 8 °F
medium hard	hardness between 8 and 12 °F
fairly hard	hardness between 12 and 18 °F
hard	hardness between 18 and 30 °F
very hard	hardness greater than 30 °F

NOTE: 1°F represents 10 mg of CaCO_3 (calcium carbonate) for every litre of water. 1°F = 10 mg/l = 10 ppm (parts per million) of CaCO_3

OPERATION



- 1 Calcium ion ++
- 2 Neutralised calcium (no formation of limescale)

The **RBM Magnetic anti-scale device** is designed for the physical treatment of water.

It consists of permanent annular magnets, with setups for polarities and magnetic fields, which are particularly effective for the designated purposes.

Permanent magnets are protected and isolated from water, as they are encapsulated in a suitable food-grade plastic polymer.

ASSEMBLY PRECAUTIONS

Always provide for the application of an RBM self-cleaning filter upstream of the system, at the outlet of heat exchangers or boiler, on return pipes in the closed-circuit systems.

- Provide for routine maintenance on the filters (replace the cartridges if necessary).
- Before every application, check the hardness of the water using the

RBM Kit (code 304.00.02), the results obtained will determine the choice of the most suitable model.

- Avoid the presence of "stray electric currents" by using "dielectric union attenuators".
- Avoid installation near power lines and electrical equipment.
- Perfectly balanced hydraulic system.

WARNINGS

Special chemicals featured in some dishwasher or washing machines detergents can come into contact with the magnetism provided to Calcium and other alkaline elements, thereby reducing the effect of the RBM magnetic anti-scale device.

In this case, it is necessary to change the quality of the detergent in order to obtain maximum performance.

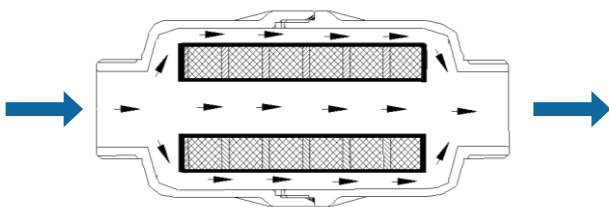


Diagram showing the passage of the fluid through the magnetic anti-scale device

USE – EFFICIENCY CONDITIONS

Use	Efficiency	Limitations
Storage boiler	Excellent	None
Thermal units with boiler	Excellent	None
Thermal units with instantaneous heating and the following type of exchanger:		
• Water/water with coil	Good	• If in continuous flow max. 16 W/cm ²
• Water/water with plates		• Alternating flow with emission
• Superheated air/water		• Case-by-case assessment experimentally
Hot water recirculation	Excellent	If suitable deaeration is applied (Vasa).
Superheated air/water instantaneous water boilers	Good	Max specific power 16 W/cm ²
Electric water boilers	Good	Max specific power 16 W/cm ²
Washing machine	Good	Diluted biodegradable detergents
Dishwasher	Good	Max specific power 16 W/cm ²
Industrial dishwashers	Negative	Highly concentrated detergents are used
Industrial dishwashers	Negative	Highly concentrated detergents are used
Espresso coffee machine	Good	No negative feedback
Vending machines	Good	No negative feedback
Cooling systems on industrial closed and open-circuit systems	Good	For specific cases, request further information from the RBM information desk
Bactericide systems with quarts lamps (UV)	Excellent	No limitation

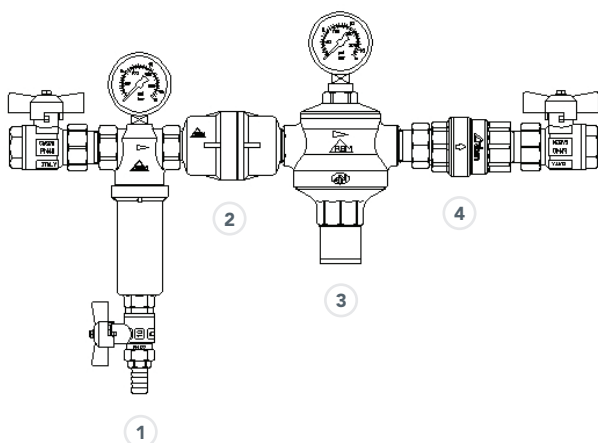
SOME POSSIBLE APPLICATIONS

The **magnetic anti-scale device** is used in water feeding applications:

- Civil field (houses, residential in general);
- Industrial field (manufacturing).

It is generally applied **upstream of the mains water supply** to protect the system components.

The application diagrams are reported here below:



Correct application of the magnetic anti-scale device:

- 1 Self-cleaning filter
- 2 Magnetic anti-scale device
- 3 Pressure reducing valve
- 4 Check valve

Provide for shut-off valves to allow any maintenance work.

Figure 1
Independent system for a single family

Application of the anti-scale device on the mains power supply.

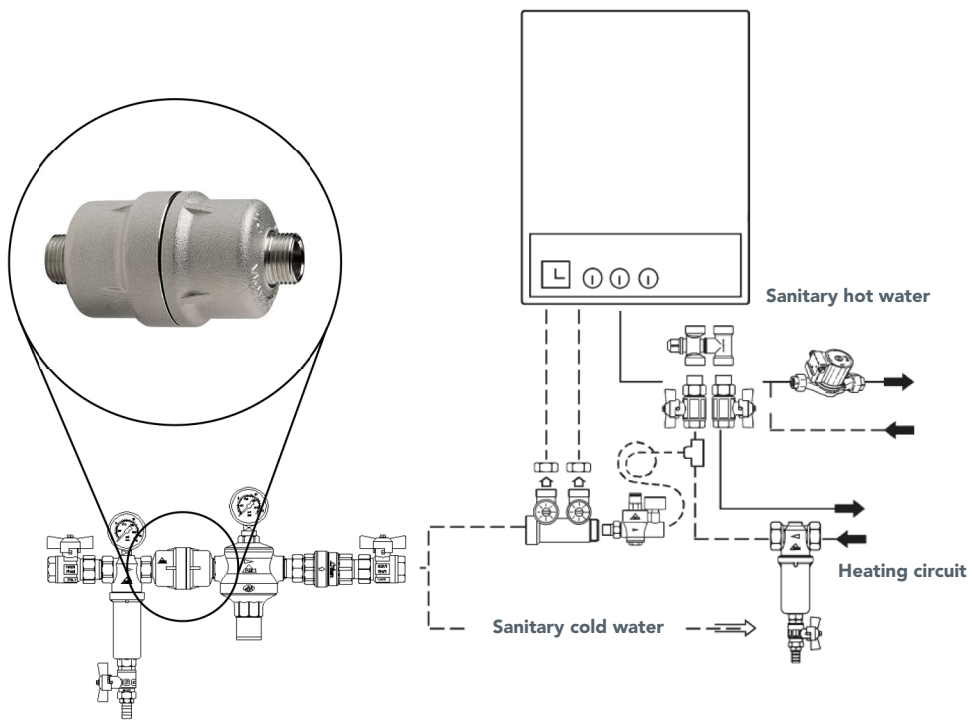


Figure 2
Installation in series

This ensures the flow remains unchanged, but doubles the processing potential (°F).

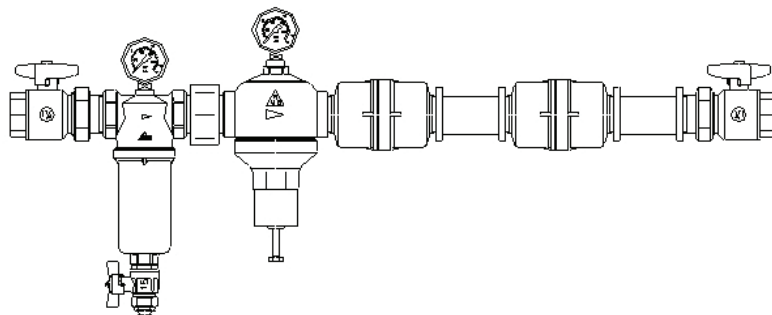
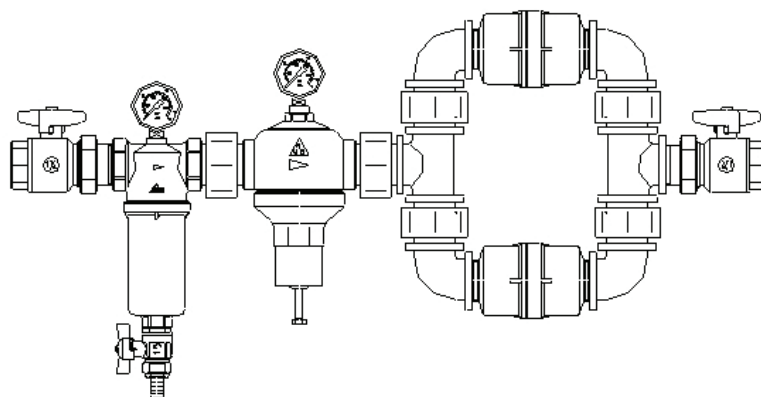


Figure 3
Installation in parallel

This doubles the processing flow rate, whilst ensuring the treatment potential remains unchanged (°F).



SPECIFICATION ITEMS

304 SERIES

Magnetic anti-scale device for physical treatment of water. Permanent annular magnets encapsulated in food-grade plastic polymer. External nickel-plated brass body. Permanent magnets in sintered rings consisting of a mix of Ferrite-Strontium. NBR seals. Threaded connections FF UNI-EN-ISO 228 (for sizes 1/2" ÷ 2") - Threaded connections MM UNI-EN-ISO 228 (for sizes 2"1/2 ÷ 4"). Magnetic field 700 Gaus. Residual induction from 2300 to 3700 Gaus. Max operating pressure 16 Bar. Max operating temperature 80 °C. Available sizes 1/2" ÷ 4".

RBM spa reserves the right to improve and change the described products and related technical data at any moment and without prior notice: always refer to the instructions attached with the supplied components; this sheet is an aid, should the instructions be extremely schematic. Our technical office is always at your disposal for any doubt, problem or explanation.