MAGNETIC ANTI-SCALE DEVICE

CT0304.0_03
EN
May 2017

- 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"		MM	14.80
304.06.00	1"		MM	26.00
304.07.00	1"1/4		MM	30.40
304.08.00	1"1/2		MM	63.00
304.09.00	2"		MM	74.00
304.10.00	2"1/2		FF	125.00
304.11.00	3"		FF	160.00
304.13.00	4"		FF	252.00
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

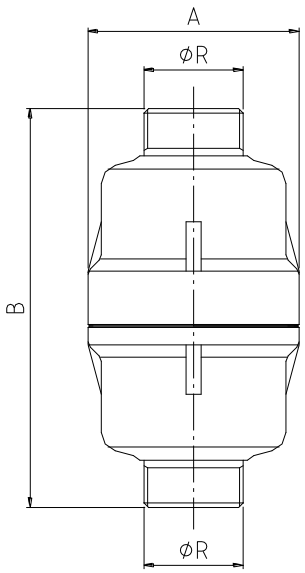
• Body:	Nickel-plated brass CW 617N UNI EN 12165
• Magnet Container:	Food-grade Plastic Polymer
• Magnet:	Sintered Rings, Ferrite-Strontium mix
• Seals:	NBR
• Connections: (1/2” ÷ 2”)	Threaded MM UNI-EN-ISO 228
• Connections: (2”1/2 ÷ 4”)	Threaded FF UNI-EN-ISO 228

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.**

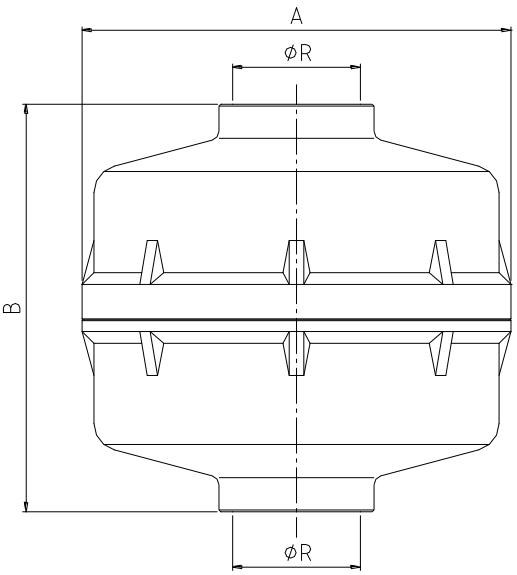
DIMENSIONAL FEATURES

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

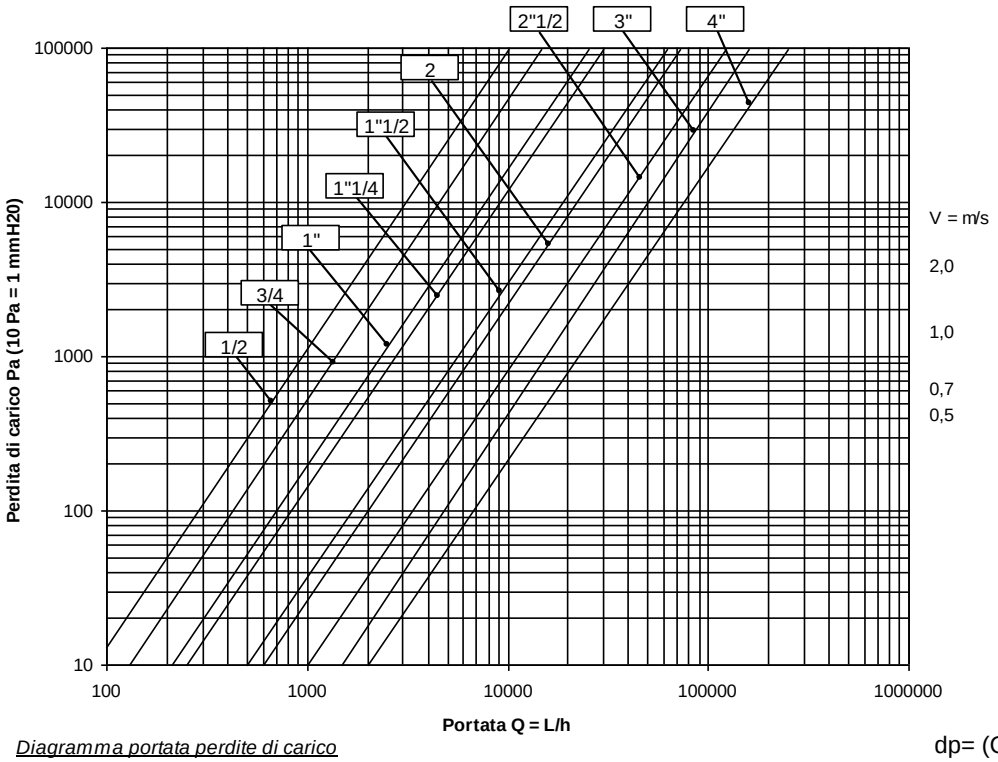
FF CONNECTION



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	Kv m^3/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

Diagramma portata perdite di carico

$$dp = (Q / 1000Kvs)^{m} \times 100{,}000$$

$$Q = 1000Kvs \times (dp / 100{,}000)^{1/m}$$

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 a 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:

°F = (Q table x °F table) / 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

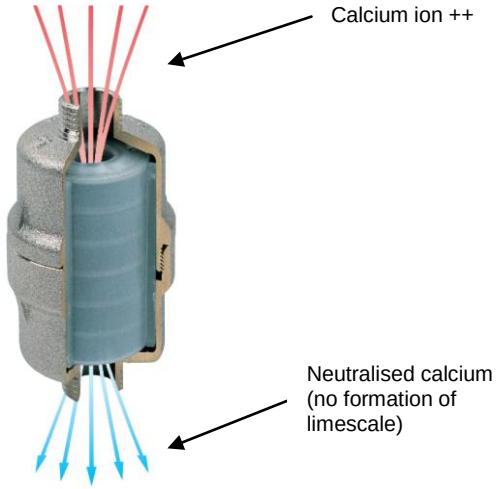
NOTE: 1°F represents 10 mg of C_aCO_3 (calcium carbonate) for every litre of water. 1°F = 10 mg/l = 10 ppm (parts per million) of C_aCO_3

OPERATION

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.



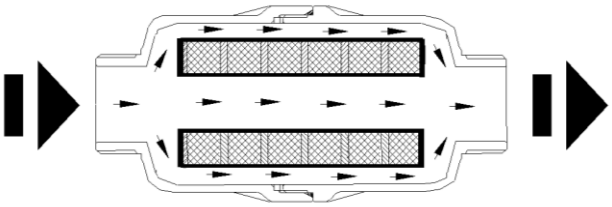


Diagram showing the passage of the fluid through the magnetic anti-scale device

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 - Water/water with plates - Superheated air/water	Good	- If in continuous flow max. 16 W/cm^2 - Alternating flow with emission - 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

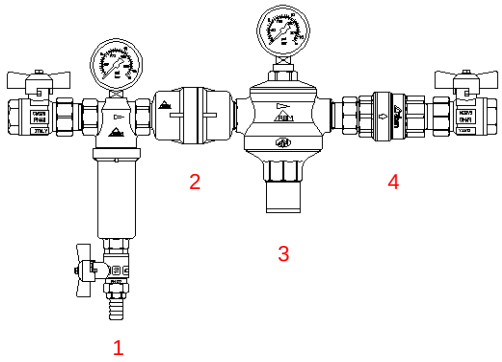
SOME POSSIBLE APPLICATIONS

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.

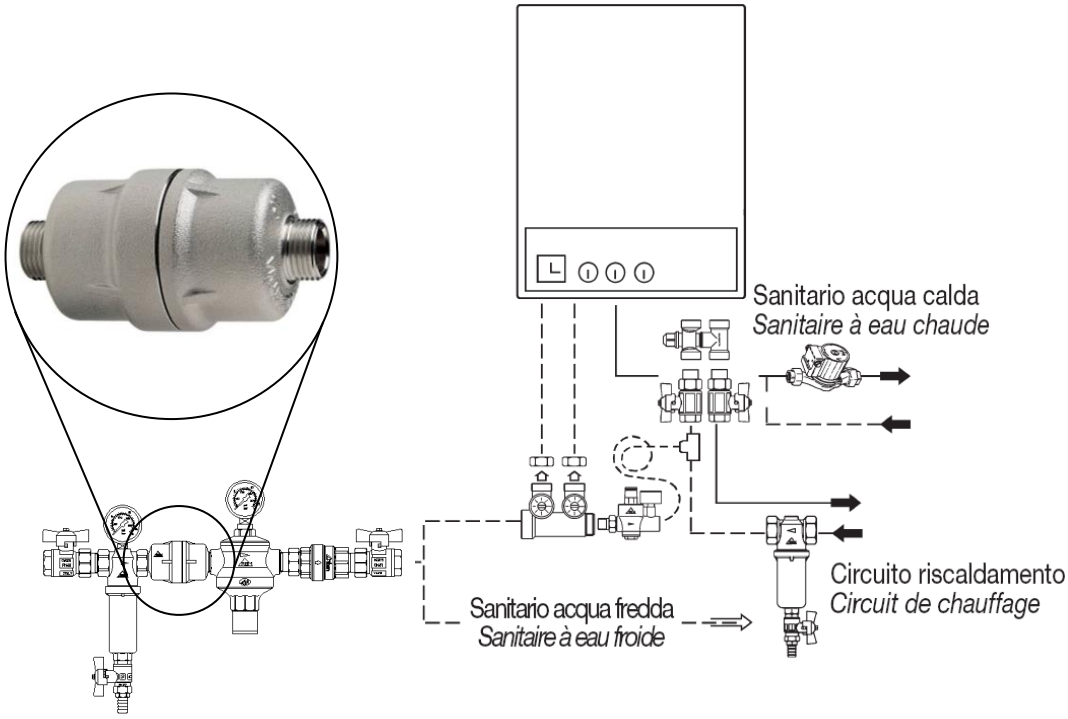


Figure 2: Installation in series:
This ensures the flow remains unchanged, but doubles the processing potential (°F)

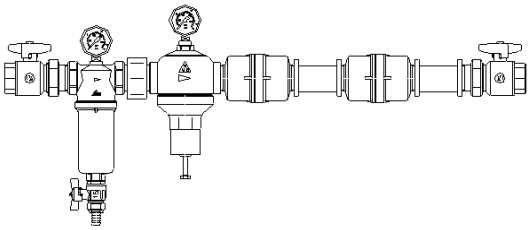
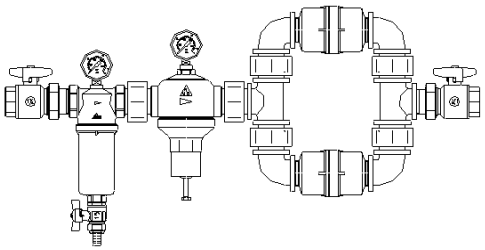


Figure 3: Installation in parallel:
This doubles the processing flow rate, whilst ensuring the treatment potential remains unchanged (°F).



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".

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