

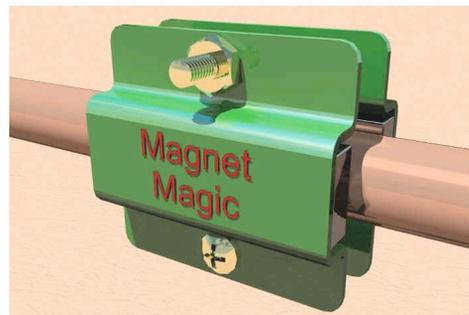
Magnetic Water “Treatment”

Research has uncovered no treatment effect.

Magnet vendors claim their gadgets improve blood circulation, increase gas mileage, soften water, strengthen concrete. This paper focuses on claims relating to magnetic water “treatment”.

Magnetic water treatment devices are not offered by national suppliers or advertised in respected trade journals and catalogs. Lack of availability via traditional avenues has deservedly given magnetic water treatment a fringe-science status.

Magnets and Magnetism Magnets are a complete mystery to many people. Vendors of magnet-based scams often use such ignorance to their advantage. Familiarity with magnetism can aid detecting dubious claims.



Magnetic fields are produced by the motion of charged particles. Electrons flowing in a wire produce a magnetic field surrounding the wire. Such magnetic fields are used in household appliances, automobiles, and industrial machines.

An **electromagnet** is composed of many coils of wire wrapped around a central iron core. A magnetic field is generated when current passes through the coils. The magnetic field of a **permanent magnet** results from the mutual alignment of the very small magnetic fields produced by each of the atoms in the magnet. All permanent magnets are composed of ferromagnetic materials - iron, cobalt, and nickel. Magnets sold for water treatment are ordinary electromagnets or ferromagnets.

The Device Magnetic water treatment devices consist of one or more magnets clamped onto or installed inside a water line. An alternative approach is to use electrical current flowing through coils of wire wrapped around the water pipe to generate the magnetic field. As water flows through the pipe between the magnets, it is exposed to the magnetic field.

Claimes All manufacturers claim that magnetic treatment will eliminate lime scale in pipes and heating elements. There is apparently no consensus among magnet vendors regarding the mechanisms by which magnetic water treatment occurs. A variety of explanations is offered, most of which involve plenty of jargon but little substance. Instead, they rely on numerous testimonials, lists of corporations and municipalities that purportedly use the devices, and scientific-sounding explanations of magnetic water treatment.

But, Do They Work? Magnetic water “treatment” has received attention from the scientific community. A search for relevant scientific and engineering journal articles produces more than one hundred relevant articles. Many objective, peer-reviewed reports are available in the open literature. In all cases researchers report finding no magnetic treatment effect. A few examples:

Duffy (1977) - tested a commercial device with an internal magnet and found that it had no significant effect on the precipitation of calcium carbonate scale in a heat exchanger.

Hasson and Bramson (1985) - 300 ppm hardness water was pumped through a heated cast-iron pipe. Magnetic exposure had no effect on either the rate of scale accumulation or the nature of the scale.

Consumer Reports magazine (1996) - two identical water heaters received 200 ppm hardness water, one with and one without magnetic treatment. The heaters were cut open after 10,000 gallons of water was heated by each. The tanks were found to contain the same quantity and texture of scale.



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