

Magnetic Water Treatment Devices

Paul D. Robillard, Associate Professor of Agricultural Engineering
W. E. Sharpe, Professor of Forest Hydrology
Bryan R. Swistock, Extension Associate

What is a magnetic water treatment device?

Typically, these devices are permanent magnets or electromagnets that attach to waterlines entering homes and businesses to “purify” or “condition” water supplies. Manufacturers adopt a variety of commercial names for their products from the complex—“patented directional controlled magnet,” “Perm-core,” and “Magnetizer”—to the simple—“metal bar” or “plug-in treatment device.”

Typically, the devices purportedly use electromagnetic fields to change the molecular makeup of various water constituents like calcium and iron to other more “inert” forms. The claimed result is a reduction or elimination of water contaminants. One manufacturer describes the magnetic treatment processes this way, “Water and minerals are subjected to violent intramolecular vibrations and shock at the same time magnetic energy is being added, the mineral’s crystallization is upset and cohesion broken.” Sales representatives often persuade potential customers that they can rely on magnetic treatment devices to provide lifetime, energy-free home water treatment.

How much water treatment do magnetic devices provide?

There is virtually no valid scientific data to support any water treatment benefit from magnetic devices. Despite this, companies, sales representatives, and product brochures for the devices may make any one of the following claims:

“Gives hard water properties of soft water”
“Prevents water from forming normal chemical

reactions that cause hard water scale, rust, and corrosion.”

“Stops buildup of scale and rust and eliminates or reduces existing rust.”

“Provides clean clothes, shiny fixtures, better health, and nice skin.”

“Makes washing machines, dishwashers, and coffee makers run more efficiently thus avoiding costly repairs.”

“Reduces hydrogen sulfide smells and iron buildups.”

Usually, printed testimonials from “hundreds of satisfied customers” support these claims.

Is there any scientific evidence supporting manufacturer claims?

The claims put forth by manufacturers and sales representatives of these devices are without validity. They do not refer to standard physical, chemical, or biological water treatment processes. Therefore, several researchers have conducted performance evaluations of the equipment.

As early as 1977, Duffy (1977) concluded in a doctoral thesis that permanent magnets have no effect on the hardness of water or the formation of scales on pipes. The South Dakota School of Mines and Technology performed tests on several magnetic treatment units. Researchers concluded that there was no change in the physical and chemical properties or the calcium ion concentration of water treated with the devices (Gruber and Carda, 1981).

A third study conducted in 1985 at Purdue University tested six units placed on water supplies for water heaters and tested their effectiveness against a controlled system. Water was tested for temperature, specific conductivity, surface tension, boiling

point of depression, pH, alkalinity, total hardness, calcium and scaling effect. The study concluded that no significant variation in the chemical water quality existed between the control and the “treated” systems. The units also produced no measurable effect on calcium deposits on metals (Alleman, 1985).

Supported by this evidence, the Canadian Water Quality Association issued a statement in March of 1987 that magnetic water treatment devices are ineffective in treating hard water or preventing scales.

Consumer fraud plaintiffs throughout the United States are finding sympathetic courts as judgements against the sellers of electromagnetic treatment devices who use false product claims. Minnesota’s Better Business Bureau issued a “consumer alert” warning people to beware of these questionable devices.

References:

Alleman J. E. 1985. A performance evaluation for magnetic water treatment. Fourth Domestic Water Quality Symposium. ASAE and Water Quality Association. 16 November.

Duffy E. A. 1977. Investigation of magnetic water treatment devices. Doctorate Thesis. Clemson University.

Gruber C. E. and D. D. Carda. 1981. Measurable parameters in water conditioning equipment as determined in laboratory simulations at Rapid City, South Dakota. Final report issued to the Water Quality Association. South Dakota School of Mines and Technology.

Iowa judgement on electromagnetic water conditioning device. Water Quality Association release.

Mitchell, H. 1987. Magnetic “Water Softener” found to be the stuff of legend, not fact. The Toronto Star. September 19.

Nowlin, D. D. 1983. Magnetic water treatment facts and fallacies. American Society of Agricultural Engineers, Winter Meetings, 1983.

Additional Resources

For more detailed information about magnetic water treatment devices visit: www.sfu.ca/chemcai/magscames/magscams.html

For more information on water quality, please access:

Website: <http://wqext.psu.edu>

Email: mxh16@psu.edu

Fax: (814) 863-1031

Phone: (814) 865-7685

For more information about other Outreach Publications and Resources from the Department of Agricultural and Biological Engineering:

Website: <http://www.age.psu.edu>

Email: aqm5@psu.edu

Address: Penn State

246 Agricultural Engineering Bldg.

University Park, PA 16802

Phone: (814) 865-7685

Fax: (814) 863-1031