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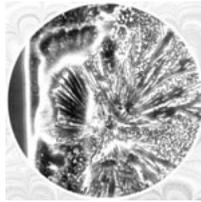
Technical Information

The effect of Magnets on fluids

Observe the Physical Changes in GMX Water

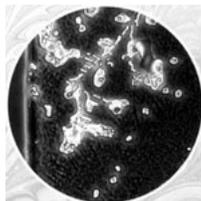
Untreated Water:

Microscopic photo of untreated water with hardness of 140 ppm, magnified 400x



Treated with Model 800 System:

Same water after treatment with GMX Model 800, magnified 400x.





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The principle purpose of using **GMX** Magnetic Fluid Conditioners is to prevent and/or achieve descaling of the plumbing, pipes, and process equipment for homes, business, and industry. Also, **GMX** magnetic condition hydrocarbon based fuels to improve combustion and prevent unwanted varnish and scum build-up in fuel systems. Certain conditions that may impact performance of **GMX** Magnetic Fluid Conditioners are listed below and should be addressed.

Steel Tubing, Iron or Galvanized Pipes

The penetration of a magnetic field through steel tubing / pipe (except for stainless steel) or iron pipe is minimal. If the **GMX** magnetics stick to the tubing or pipe, they won't work. The accepted method of treatment in this case is to remove and replace a 24" section with either copper, plastic, PVC, rubber, aluminum, or stainless steel tubing or pipe.

Water Clarity

After installing the **GMX** System, an increase in water turbidity (cloudiness) may be noted. This relates to a stabilization period of a few weeks during which calcium deposits are being removed from the system while the **GMX** System is descaling. It is important to monitor filters, tanks, and sumps weekly/monthly and drain or clean them as needed. **Pumps, Filters, or**

Turbulence

For best results, always install **GMX** units a **MINIMUM** of 24" downstream of any pump, 12" downstream of your water meter, 6" downstream of any filters and 3" from any elbow or T. Ideally, magnetic treatment requires a laminar (smooth) flow of the fluid through the magnetic field for maximum effectiveness.



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Underground Pipe

In some situations, underground piping of magnetically treated water may adversely affect the treatment. Treatment of long or extensive (100 feet or more) underground water lines or sprinkler systems may require additional units. Careful monitoring should be done for the first 30 to 60 days.

As a rule of thumb we like to see no more than 100 feet of pipe from the point of treatment to the point of use. Most homes have 50 feet or less of pipe from the point of water entry to the final point of use. Even if you install your GMX units just after your water meter you should be within these guide lines.

Electrical Equipment

The magnetic treatment of the **GMX** System may be decreased if electrical equipment capable of generating a strong electrical field, i.e. a welder or large electrical motor, is too close to a water line on which the units are placed. Similarly, an electric power line running next to the pipe for over 12" (in parallel) within 6" may decrease the effectiveness of the treatment. Electrical lines crossing a pipe have no effect.

Car and Truck Diagnostic Computers and Sensors

The magnetic field surrounding the **GMX** units can interfere with certain functions of diagnostic computers standard on most late model cars and trucks. Maintain a minimum 12" separation between the units and any such equipment.

Fuel M.P.G. and Emissions

After installing the **GMX** System, a temporary decrease in mileage or increase in emissions may be noted. This is temporary as accumulated deposits are being removed from the fuel system and combustion chamber.



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Water is one of the world's best solvents. In fact, we refer to it as the "universal solvent." Given enough time, it will dissolve any organic material. It surrounds foreign particles, such as minerals, entrapping them in what scientists refer to as "complexes." That's why water usually has a high mineral content. These dissolved minerals are not a part of the water itself. They are "captives" that the water has surrounded and is carrying along with it. The number of mineral complexes in water determines how "hard" the water is. The more minerals it carries, the harder it is considered to be.

When water is stored, heated, or evaporates, the complexes it carries are broken up and the dissolved minerals are set free. These liberated minerals (most of which is calcium carbonate or magnesium) conglomerate in sediments that line the insides of pipes, appliances, water heaters, and other surfaces with which the water comes in contact. Over time, more and more minerals build up on the sediment layer, causing it to grow progressively thicker. There is a name for these caked-on mineral deposits: scale. The limestone that forms the Swiss Alps and Mexico's Yucatan Peninsula is basically scale. Lime scale is a very hard substance, and removing it from plumbing fixtures and appliances is a difficult task.

Most of the water that is piped into homes and other buildings in North America and many other countries contain a significant amount of hardness minerals. This is both good and bad. It's good because the right amount of minerals has healthful benefits and makes the water taste better. It's bad because some of these dissolved minerals are converted to scale when the water goes into a home or building and is stored, heated, or evaporates. It's a well-known fact that letting hard lime scale build up in the plumbing fixtures and appliances in your home is like pouring money down the drain.

The solution? There are several, but only one that makes sense.

To date, the most common solution is the traditional water softener, which takes a portion of the hardness minerals out of the water and replaces them with sodium. Water thus treated is not recommended for drinking because of the high sodium content. Water softeners are also expensive to buy and operate, and can cause environmental problems. Also, they do not stop scale build up, nor do they remove scale that has already built up. They simply reduce scale. These are just a few of the reasons why water softeners are not an acceptable solution to scale build up problems.

Other scale build up remedies, such as acid washes and chemical additives have even greater drawbacks, including the risk of contamination and the fact that they wear out the surfaces they contact.

What, then, is the acceptable way to combat scale build up? The answer lies in a complex word for a fairly simple physical phenomenon:

Magnetohydrodynamics. Simply stated, magnetohydrodynamics is what happens when water passes through a properly focused magnetic field. The magnetic field breaks up some of the complexes that are carried in the water, freeing the captive mineral particles. Once free, these particles act as crystallization centers, giving the surrounding mineral molecules in the water something to "stick" to, rather than forming new layers of scale on the inside of plumbing appliance surfaces. Crystallization centers attract mineral molecules, they form circular platelets, which remain in the water rather than attaching themselves to surfaces and causing scale build-up.

The net effect of all this is that the hardening minerals are changed from a scale like an ice cube to a powder, like a snowflake.

This process of keeping minerals in the water rather than letting them precipitate out in the form of scale when heating or evaporation takes place, is known as magnetic fluid conditioning.

It is not a new process. Nor is it unproven. Patents for treating water with magnetics appeared back in the 1950s. Even back then, when magnets were far weaker than they are today, the effects were remarkable. The treated water behaved as if it were "softer," with less mineral content, and scale build up was significantly reduced.

Magnetic fluid conditioning caught on first in the eastern world, where other water softening methods and equipment were not commonly available. Highly favorable reports soon began filtering back from China, Russia, Poland, Bulgaria, and other eastern countries. Good reports came back about water that was being treated with magnetics not only for residential use, but also for agricultural, commercial, and industrial use.

In the developed countries of the western world, where chemical and other water softening systems were well entrenched, magnetic fluid conditioning took longer to gain acceptance. But its benefits were too dramatic to remain obscure for long. Systematic research from respected institutions began to be conducted, quantitative methods were developed to evaluate the effectiveness of magnetic water conditioning devices, and the findings revealed overwhelmingly positive effects.

In 1973, for example, the United States Government confirmed that magnetic fluid conditioning is an effective means of controlling scale. A study by National Technical Information Services for the United States Air Force revealed that magnetized water will not form scale on heated surfaces; that properly designed and installed magnetic units will prevent the formation of costly scale build up.

A good thing got even better with the development and availability of a new generation of extremely powerful, permanent magnets. These ceramic magnets are a hundred times more powerful than the old-fashioned steel magnets. They are also more durable and are permanent. In fact, once a ceramic magnet is magnetized, it never needs recharging. Nor does it require an energy source to keep it magnetized. These magnets maintain their strength so completely that they are used in nuclear submarines to ensure accuracy in sub polar navigation. This is one reason why **GMX** can offer its customers a lifetime warranty.

Whether it's water for your home, office, or swimming pool, magnetohydrodynamics makes a positive difference. Magnetic fluid conditioning is a Federal accepted technology in the United States.

**A PDF file document is available titled “Federal Technology Alerts”
Produced by the US Department of Energy – Non Chemical
Technologies for Scale & Hardness Control –*Technology for improving
energy efficiency through the removal or prevention of scale.***