

## **How physical water conditioners work**

The cost-effective alternative to water softening chemicals is magnetic water treatment. Water passing through a powerful magnetic field changes the crystals pattern of growth. Instead of bonding to each other to form aggregated clumps, or to the walls of tubing and equipment, crystals remain discrete and separate, so are able to pass safely through and out of the system.

When correctly processed, magnetically treated water has no disadvantages. No chemicals are needed, so it retains its original quality, because nothing is added or subtracted. If the water was potable before magnetic treatment, it remains so afterwards.

There are many designs of equipment claiming to treat water magnetically. Some use permanent magnets, other use electromagnets. Not all will handle commercial or industrial water volumes. Also, permanent magnet and some electromagnet types require frequent attention to remove internal scale. Most are unable to handle mains water at a single pass. An exception is the patented Hydromag.

## **How the *Hydromag* works**

For an explanation of how magnetic water treatment works it helps to be aware of established laws such as Coulombs Law and Flemings Left Hand Rule. Hydromag physical water conditioner patents are based on a design incorporating these and other laws.

Law 1 states that in all pipework systems which contain water and which have not been manipulated, there will be a positive (+VE) charge. Normally this charge is minute but can theoretically reach a maximum of 1500 gauss. Therefore, Hydromag has to produce lines of force greater than this to overcome any theoretical force exerted by the pipework.

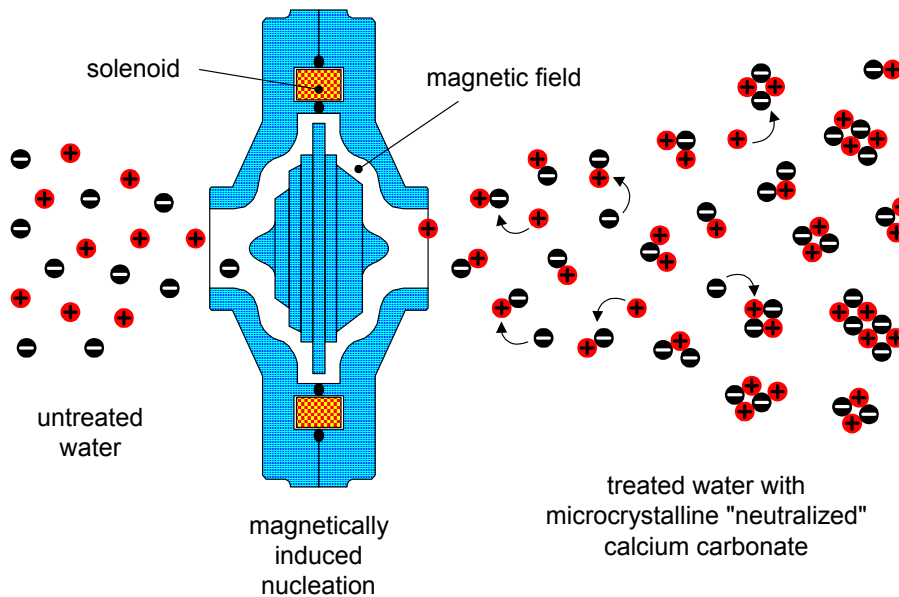
By experimentation, it was found that the most efficient conditioning effect was achieved by generating force or power lines of 2500 gauss. A magnetic field is required to produce these lines of force then concentrate the magnetic field into lines of force as described by Coulombs Law.

In Hydromag, the magnetic field strength of its embedded circular electrical coil is controlled by the voltage supplied by the control unit, and both are matched to ensure the lines of force produced are at the optimum level.

The law of magnetic dynamics states that a species of a known polarity will be attracted towards another species of the opposite polarity. And importantly, Coulombs Law states that for an action to take place, the species must cross the lines of force produced at an angle of 90 degrees more than once.

## HYDROMAG

### Magnetic Water Treatment



### CORRECT DESIGN

Hydromag's design not only ensures lines of force are concentrated in the correct direction, but also water flow is crossing these lines at the correct angle, and that the different pressures, flows and velocities experienced in pipework are catered for by the systems internal dynamics. Thus, water passing through the unit is subjected to a predetermined flow path, cutting the electromagnetic force lines of 2500 gauss 15 times in all. In this way, the magnetic conditioning effect is initiated.

The water is now exposed to lines of force much higher than any possible force from the pipework so that the hardness ions, instead of being attracted to the pipework, are attracted to other ions to produce a larger electrical neutral body. This larger electrical neutral body will not have the ability to adhere to the pipe walls or other water contact surfaces, nor to combine with other bodies, hence there is no incrustation or formation of hard scale.

### CONTROL UNIT

Hydromag's ability to treat water magnetically to prevent scale buildup is accepted and proven. But how does it prevent scale buildup inside itself? Quite simply, that is the vital second function of the control unit which has a polarity reversal switch operated by a variable timer, usually set to actuate every minute. This reversal of magnetic polarity cleverly ensures no scale can buildup inside the unit, making the entire system maintenance free.

Hydromags are supplied in a range of sizes and capacities that can be installed direct to mains, handling full flow at a single pass. Water treated magnetically by this system maintains its state for up to five days, unlike some others where the effect is measured in hours or even minutes. This is important in applications where water is magnetically treated at the mains and goes to storage for draw off prior to heating. In other installations it may be advisable to treat water immediately prior to dedicated processing, be it a heat exchanger, annealing line, evaporative condenser or direct fired boiler.

Running costs against water volumes treated are remarkably low. The DN20 handling up to 900 l/hr uses 0.14amp and even their largest DN100 treating up to 110,000 l/hr only needs 0.94amps.

Magnetic water treatment is more widely accepted in mainland Europe where Hydromags have been available longer, but their benefits are now being recognised in the UK.