

This document has been compiled thru the efforts and input of many AWT Technical Committee members as well as a great deal of information compiled from previously published sources. It is a living document and is not meant to be construed as totally inclusive either at the time of publication or in the future, it is meant to be an ongoing living document. This listing of Non-Chemical Water Treatment methods whose performance is justified mostly by personal testimonials. The AWT Technical Committee-Cooling Water Sub-Committee will be periodically reviewing and updating this listing to add technologies as they evolve.

NON-CHEMICAL DEVICES

The various types and forms of a Non-Chemical Device,(NCD) and descriptions of their operating parameters may be easily located with simple internet searches. These searches will lead to many individual companies producing operating equipment. Usually a Wikipedia description of the process or available equipment will also be displayed.

There are many descriptions of presumed or assumed scientific principles which are offered to explain claimed operations and performance. However, consistent reproducible rules for operation and resultant, verifiable performance results are not offered or demonstrated.

Below are terms and processes which separate the Non-Chemical Devices. First, a listing of the processes and functions described.

- Magnetic
- Electromagnetic
- Electrostatic
- Catalytic
- Mechanical
- Mixed Systems

Magnetic

Magnets have been used in one form or another since as early as the 1200s. The properties of magnetic fields have been studied since the early 1800s where fields were demonstrated using fine iron filings and bar magnets. One measurement of the strength of a magnet is expressed in Gauss. A permanent magnet applied around a pipe might exert up to 5 Tesla (50,000 gauss). NCD manufacturers will usually not share the strength of their magnets. This generally precludes duplicating observed results.

The workings of a magnetic NCD is often compared to Nuclear Magnetic Resonance spectroscopy (NMR) or Magnetic Resonance Imaging (MRI). NMR uses electromagnets which produce 60,000 gauss, or greater (6 Tesla) and MRI's operate at 0.3 to 2 Tesla (3,000 to 20,000 Gauss) and have permanent magnets.

Non-Chemical Devices

Claims are made for corrosion control, scale control, and microbiological control, depending on the supplier. Magnets may be arranged around the outside of a tube or pipe, on internally directly in contact with the water to be treated.

Access to many diverse suppliers may be had by searching the internet with the terms Magnetic Water Treatment.

Electromagnetic

Exactly the same functions and process abilities may be ascribed to an electrically generated magnetic field as to a permanent magnet. However, higher strengths may be generated if desired. Again NCD manufacturers have not published the strength of their offerings. However, these devices commonly have a low power, low voltage power supply providing alternating current, or DC in some cases, to one, or more, coils wound around the outside of the pipe through which the water to be treated flows. This precludes high energy magnetic strengths. Electronic circuits which provide intermittent electrical current are described as "pulse power" as well as radio frequency, however it is electromagnetic regardless of specific claims.

Access to many diverse suppliers may be had by searching the internet with the terms Magnetic Water Treatment. Pulse power provides further cites for examination.

Electrostatic

Generally these units consist of a low amperage, high voltage DC, or AC, power supply and a capacitor like cell where the water to be treated flows between two insulated plates which are typically charged to 10,000 to 30,000 volts.

This is another configuration of plates and current application which generates electrical magnetic currents.

Access to many diverse suppliers may be had by searching the internet with the terms Electrostatic Water Treatment. This search also yields two informative references,



**US Army Corps
of Engineers.**
Engineer Research and
Development Center

Demonstration and Evaluation of Magnetic Descalers

Kent W. Smothers, Charles D. Curtiss, Brian T. Gard, Robert H. Strauss, and Vincent F. Hock,
September 2001

The conclusions of this study and the list of literature references contained are particularly informative.

Non-Chemical Devices

The second reference is:

Magnetic water treatment pseudoscience.

Catalytic

Passage by, or exposure to, of the water to be treated to catalytic shapes of various materials affects the constituents of the water to control/prevent scale, corrosion, deposition, and/or biofouling. These devices appear to be sealed metal containers filled with “powdered metal”, or metal shapes of varied composition which are inserted into either a tank or pipe in the water system to be treated. Chemical composition of the catalyst is reported to vary widely, but is often claimed to include transition and precious metals. In the industrial use of catalysts, intimate contact of the reacting species with the catalyst is imperative. This does not seem to be the case with water treatment NCDs.

Access to many diverse suppliers may be had by searching the internet with the terms Catalytic Water Treatment. There appears to be no Wikipedia description. However, in this case, besides a few treatment companies being listed, cautioning admonitions are shown such as:

Catalytic water treatment pseudoscience and
Drinking Water and Water Treatment Scams.

Mechanical

Passage of the water through a device which mechanically processes the water to affect the constituents of the water to control/prevent scale, corrosion, deposition, and/or biofouling. The majority of the mechanical devices appear to be based on either a modified centrifugal pumps or pumping through a type of eductor or venturi.

Access on the internet using the terms "Mechanical Water Treatment" yields only a few references and opinions of the properties of mechanical treatments. No Wikipedia description is available. One needs to access the specific mechanical action suggested by the device manufacturer to obtain information.

Mixed System

This classification was devised for cases where a device is combined with proven chemical technology such as iodine for bio control or sacrificial anodes for corrosion control. Many times conductivity blowdown controls and sidestream filters are also incorporated into the such a system. We are using this classification for those systems where the device is NOT the primary part of the package. Please note that the many of the devices are being marketed as the primary part of “equipment packages”, which can include many proven physical and physical-chemical technologies.

Internet access will require looking at the specific system name, or the non-chemical action expressed by the manufacturer.

Non-Chemical Device Supplier Listing

Category 1. Magnetic

Product name	Aqua-Flo
Manufacturer	Aqua-Flo Inc. 6244Franklin Ave. Baltimore, MD 21206-4902
Phone/FAX	410-485-7600/410-488-2030
WEB Site	None Known
Equipment Package	Packaged with other water preparation devices such as RO.
Claims	Cleans scaled systems and changes scale crystallization habit for calcium carbonate.

Product name	Bon Aqua
Manufacturer	Bon Aqua International, Inc. PO Box 19047 Greensboro, NC 27419-9047
Phone/FAX	336-662-0020 F 336-662-0385
WEB Site	www.bonaqua.com
Equipment Package	Ring installed around pipe which contains several permanent magnets.
Claims	Eliminates scale buildup, non-biological corrosion problems, and controls new scale and algae growth. Cooling towers appear to be full flow installations while boilers are on the makeup or feedwater line.

Product name	Commercial Water Instrument
Manufacturer	QMS Technologies, Inc 12496 York Road, Unit B North Royalton, OH 44133
Phone/FAX	440-877-9840 F 440-877-9834
WEB Site	www.qmstech.com
Equipment Package	Permanent magnet assembly typically sold with a hydrocyclone and copper-silver ionization unit for side stream cooling tower use. Pipe section with permanent ceramic magnets installed in makeup water line used for boiler treatment.
Claims	In cooling towers, claims control of scale, corrosion, and biological problems. Prevents hard water scale in boilers.

Non-Chemical Devices

Product name	Descal-A-Matic
Manufacturer	Descal-A-Matic 1516 Springmedow Blvd. Norfolk, VA 23518
Phone/FAX	757-858-5593/757-853-3321
WEB Site	descal-a-matic.com
Equipment Package	Flow through pipe sections containing magnets
Claims	Will remove existing scale and prevent future scaling. Makes tower effluent suitable for irrigation purposes on site.

Product name	Environmentalist/Zero Bleed (SF Models Boilers)
Manufacturer	Superior Water Conditioners Div of Magnatech Corporation 2015 South Calhoun Street PO Box 13343 Fort Wayne, IN 46868-3343
Phone/FAX	800-692-1123 260-456-3596/260-456-3598
WEB Site	SuperiorWaterConditioners.com
Equipment Package	Environmentalist/Zero Bleed, Environmentalist
Claims	Controls the formation of scale and corrosion deposits. Discharge water is pollution free.

Product name	ESF Water Conditioner (Was EnviroScaleFree)
Manufacturer	(Dual Names) Dime WATER Virgin Pacific Water Inc. 2575 Fortune Way Suite J Vista, CA 92081
Phone/FAX	Dime Water 760-734-5787 Virgin Water 414-241-8808/760-734-5798
WEB Site	dimewater.com virginpacificwater.com
Equipment Package	Flow through pipe sections with catalytic/magnetic prevention device. Dime has brass colored end fittings, Virgin has black colored end fittings.
Claims	Hardness is rendered harmless. Uses no chemical or salt.

Non-Chemical Devices

Product name	GMX
Manufacturer	GMX International 13771 Roswell Ave., Suite A Chino, CA 91710
Phone/FAX	909-627-5700/909-627-4411 800-373-4469
WEB Site	gmxinternational.com
Equipment Package	Strap-on magnet packages, not for iron pipe. Needs non magnetic pipe for installation.
Claims	"Ideally, magnetic treatment requires a laminar (Smooth) flow of the fluid through the magnetic field for maximum effectiveness." Disrupts "captive" hardness packages and increases carrying power of water. Dissolves existing scales. Improves hydrocarbon combustion.

Product name	Hydrolator
Manufacturer	Hydrolator 12150 South Piney Point Road Bishopville, MD 21813
Phone/FAX	410-352-5524
WEB Site	www.hydrolator.com
Equipment Package	Permanent ceramic magnet device for scale and corrosion control. Chlorine and bromine recommended for biological control as needed.
Claims	Controls scale and corrosion.

Product name	Magnetizer
Manufacturer	Magnetizer 6191 Kellers Church Road Pipersville, PA 18947
Phone/FAX	215-766-9150 F 215-766-9156
WEB Site	www.magnetizer.com
Equipment Package	Ring installed around pipe which contains several permanent magnets. Full flow installation on most applications.
Claims	Elimination and prevention of scale, reduces biocide use,

Category 2. Electromagnetic

Product name	Advatech
Manufacturer	Advanced Inductive Technologies 20147 NE 15 th Court North Miami Beach, FL 33179
Phone/FAX	305-654-7879 F 305-654-7889
WEB Site	www.advatech@icanect.net
Equipment Package	Wire coil around pipe, low output power supply.
Claims	Controls scale by converting calcite to aragonite.

Product name	AFT-200
Manufacturer	Earth Friendly Solutions, LLC. 96 Silbani Lane Florissant, CO 80816.
Phone/FAX	888-603-6301 F
WEB Site	www.saltfreewaterconditioner.net
Equipment Package	Electromagnetic device that appears to be a power supply with two coils of wire wrapped around the water pipe. Typically installed as a full flow unit.
Claims	Controls scale.

Product name	Dolphin
Manufacturer	Clearwater Systems, LLC 145 Dennison Road, PO Box 463 Essex, CT 06426
Phone/FAX	860-767-0850 F 860-767-8972
WEB Site	www.clearwater-dolphin.com
Equipment Package	Wire coil around pipe, low output power supply. Typically installed on full flow in cooling towers, feedwater line on boilers.
Claims	Controls scale, corrosion, and biological growth.

Non-Chemical Devices

Product name	Hydropath
Manufacturer	Hydropath Holdings Limited Unit F, Acorn park, Redfield Road Nottingham, NG7 2 TR, UK
Phone/FAX	44 0 1159 869 966 F 44 0 1159 869 944
WEB Site	www.hydropath.com
Equipment Package	Electromagnetic transducer clamped to outside of pipe with radio frequency power supply. Typically installed on main piping of cooling towers and feedwater piping of boilers.
Claims	Controls scale formation and removes old scale. Kills algae and bacteria. .

Product name	Linear Kinetic Cell
Manufacturer	Ener-Tec, Inc. PO Box 85 Union City, MI 49094
Phone/FAX	517-741-5015/517-741-3474
WEB Site	ener-tec.com
Equipment Package	Wire coil around pipe, low output power supply. Full flow installation on cooling towers, boiler installations are on feedwater line.
Claims	Prevents formation of scale and removes existing scale deposits.

Product name	Pulse-Pure
Manufacturer	EVAPCO PO Box 1300 Westminister, MD 21158
Phone/FAX	410-756-2600 F 410-756-6450
WEB Site	www.evapco.com
Equipment Package	Wire coil around pipe with low output power supply, sold with service package and blowdown control, often as part of a new cooling tower installation. Full flow installations are typical.
Claims	Device controls scale, corrosion, and biological growth.

Non-Chemical Devices

Product name	SBC
Manufacturer	Griswold Filtration 2801 Barranca Parkway Irvine, CA 92606
Phone/FAX	949-559-0671 F 949-559-1431
WEB Site	www.griswoldfiltration.com
Equipment Package	Wire coil around pipe with low output power supply, sold as a package with hydrocyclone.
Claims	Physical water treatment device that controls scale, bacteria, and corrosion via a modulated signal applied to the water via the coil.

Product name	Scalewatcher Commercial
Manufacturer	Scalewatcher North America, Inc. 345 Lincoln Street Oxford, PA 19363
Phone/FAX	610-932-6888 F 610-932-7559
WEB Site	www.scalewatcher.com
Equipment Package	Wire coil around pipe, low output power supply. Typically installed on full flow cooling water pipes, boiler feedwater pipes.
Claims	Controls scale.

Product name	Scalewatcher Enigma
Manufacturer	Environmental Treatment Concepts, LTD. 4 North Park Business Center, Knowle Fareham, Hampshire, PO175LJ UK
Phone/FAX	440 1329 836960 F 440 1329 835406
WEB Site	www.electronicdescaler.com
Equipment Package	Wire coil around outside of pipe, low output power supply. Cooling tower installations typically on full flow, boilers on feedwater pipe.
Claims	Prevents scale and descales existing systems.

Non-Chemical Devices

Product name	Tri-Tron
Manufacturer	eH ₂ O, LLC 381 North Reese Street South Lyon, MI 48178
Phone/FAX	248-437-4232 F 248-437-1241
WEB Site	www.eh2o.com
Equipment Package	Wire coil device on water line with low output power supply. Often supplied with a UV lamp assembly for additional biological control, filtration, and conductivity blowdown control. Installed on cooling water sidestream.
Claims	Controls scale, corrosion, and biological problems.

Product name	WAVE
Manufacturer	Griswold Water Systems 1597 Industrial Drive New Smyrna Beach, FL 32168
Phone/FAX	386-663-3370 F 386-663-3371
WEB Site	www.griswoldwatersystems.com
Equipment Package	Four wire coils in device located on makeup water line. Power supply provides both AC and DC signals and pulses to water. Currently sold as stand alone water treatment by various distributors and at least one CT manufacturer.
Claims	Controls scale, corrosion, and biological problems.

Category 3. Electrostatic

Product name	DS Water Treater
Manufacturer (?)	Dotson Solutions, LLC 986 Bridgewater Drive Prescott, AZ 86301 Note: Believed to be manufactured by Electrostatic Technologies, Inc./Fluid Treatment Solutions, Inc./ Fluid Treatment Services, Inc. 402 Osage Avenue Kansas City, KS 66105
Phone/FAX	928-778-1901 F 602-828-0147
WEB Site	www.DSwatertreatment.com
Equipment Package	Insulated flat plate assemblies installed in cooling tower basins. Low output (10 watts), high voltage, 30 KV, power supply.
Claims	No scale at pH near 9.0, high pH controls biological problems. Corrosion of steel < 3 or 5 mil/yr and copper < 1 or 2 mil/yr dependent upon sales literature checked.

Product name	ELECTROchem Electrostatic Treatment Electrode
Manufacturer	ELECTROchem Water Systems Division Chemfree Water Systems, Inc. 3320 Nazareth Road Easton, PA 18045
Phone/FAX	800-949-3445 F 610-438-4472
WEB Site	www.electrochemwatersystems.com
Equipment Package	Insulated electrode assembly that is inserted into the water system to be treated. Power applied is 10,000 to 20,000 vdc. Power consumption is listed at 7 watts. Typically installed in full flow locations.
Claims	Controls scale, charge particles and keep them in suspension, water surface tension is reduced and thermo transfer is increased, also disrupts laminar boundary layers, existing scale formed in boundary layers is eventually removed.

Non-Chemical Devices

Product name	Electro-Static Rod
Manufacturer	Chemfree Water Systems, Inc. 299 Industrial Park Drive Nazareth, PA 18064
Phone/FAX	800-949-3445 F 610-746-3567
WEB Site	chemfreews@ aol.com
Equipment Package	Low output power supply with insulated rod assembly for insertion into water, rod installed in system piping or tanks.
Claims	Controls scale, corrosion, and bacteria; also descales.

Product name	Fluidtron
Manufacturer	Electrostatic Technologies, Inc./Fluid Treatment Solutions, Inc./ Fluid Treatment Services, Inc. 402 Osage Avenue Kansas City, KS 66105
Phone/FAX	913-342-0110 F 913-342-0999
WEB Site	www.estatusa.com
Equipment Package	Either insulated tubular electrodes or insulated flat plate assemblies, both installed in cooling tower basins. Low output power supply. Installed inline or in cooling tower basins.
Claims	Controls scale and biological problems.

Product name	HydroCare
Manufacturer	HQ HomeTek – HydroCare distributor 3670-3 West Oceanside Road Oceanside, NY 11572
Phone/FAX	866-486-4339 F
WEB Site	www.hydrocareusa.com
Equipment Package	Electrical device that claims to transmit radio frequency signal through water systems. Typically installed as a full flow unit on system piping.
Claims	Transmitted signal breaks up limescale. “Also reduces algae and bacteria in the water.”

Non-Chemical Devices

Product name	ION Scalebuster Note: Believed to be the same as the Electrostatic Device sold by evantec (Formerly EnviroTower)
Manufacturer	ION Enterprises, LTD Arena C 15, 9 Nimrod Way Ferndown, Dorset BH21 7SH United Kingdom
Phone/FAX	
WEB Site	www.scalebuster.com
Equipment Package	Non powered static rod device with zinc electrode. Sold as stand alone scale control device and part of a package by such firms as EnviroTower. Typically installed as a sidestream unit.
Claims	Controls scale.

Product name	Ion Stick
Manufacturer	York Energy Conservation 55 West Beaver Creek Road, Unit 2 Richmond Hill, Ontario, Canada L4B1K5
Phone/FAX	905-764-3232 F 905-764-8325
WEB Site	
Equipment Package	Low output power supply with insulated rod assembly for insertion into water. Rod installed in cooling tower basin or boiler feedwater line.
Claims	Helps reduce water side problems.

Product name	Progressive Electronic Water Treater
Manufacturer	Progressive Equipment Corporation 413 East 9 th Street Erie, PA 16503
Phone/FAX	814-452-4363 F 814-459-3094
WEB Site	
Equipment Package	High voltage power supply with insulated electrode assembly, often sold with hydrocyclone, side stream bag filters, and blowdown controller. Cooling tower installations are full flow, boiler installations are on feedwater line.
Claims	Prevents new scale and removes old scale.

Non-Chemical Devices

Product name	Silver Bullet
Manufacturer	The Silver Bullet Corporation 1869 South Jackson Street Denver, CO 80210
Phone/FAX	303-881-6010
WEB Site	www.silverbulletcorp.com
Equipment Package	Pipe device with internal electrodes that generates monoatomic oxygen via electrostatic field. Sidestream device on cooling towers and is supplied with a sidestream glass bead filter.
Claims	Clean system with a minimal amount of bacteria without any formation of scale or calcium deposits. Can improve system operation by two cycles under most conditions.

Product name	SUPRION
Manufacturer	Sunward Co. Ltd. 2-4-9 Iwamoto-cho, Chiyoda-Ku Tokyo, 101-0032, Japan
Phone/FAX	81-3-3865-7391 F 81-3-3865-7392
WEB Site	www.e-sunward.co.jp
Equipment Package	Pipe device with internal electrodes and liner, self generates electrostatic field by friction between water and liner. No external power. Full flow device on cooling towers.
Claims	Prevents formation of scale.

Product name	Zeta Rod
Manufacturer	Zeta Corporation 2045 North Forbes Blvd., Suite 101 Tucson, AZ 85745
Phone/FAX	520-903-9904 F 520-903-9910
WEB Site	www.zetarod.com www.zetacorp.com
Equipment Package	Insulated rod assembly and low output power supply. Rod inserted into tank or piping
Claims	Controls scale, corrosion, and biofouling.

Category 4. Catalytic

Product name	Ecology Cell
Manufacturer	RSI International 235 Country Trace Court Taylorsville, KY 40071
Phone/FAX	502-231-9839 F 502-231-2331
WEB Site	www.ecologycell.com
Equipment Package	“Cells”, copper tubes packed with mixed mineral compound, are installed in system tanks and sumps.
Claims	Control scale, corrosion, and bacteria in any water system; cooling towers and boilers. Algae control requires supplemental chlorine feed.

Product name	OneFlow Anti-Scale System
Manufacturer	Watts 815 Chestnut Street North Andover, MA 01845-6089
Phone/FAX	800-659-8400 F
WEB Site	www.watts.com
Equipment Package	Fiberglass pressure tank filled with unidentified media. Units sized on peak flow, maximum hardness of 1300 mg/l CaCO ₃ , pH of 6.5 to 8.5.
Claims	Prevents scale by transforming dissolved hardness minerals into harmless, inactive microscopic crystal particles as water travels through the media filled tank. Typical hardness problems, especially build-up of scale in pipes, water heaters, boilers, and on fixtures are no longer a concern. Not a water softener or a chemical additive.

Product name	Water Energizers
Manufacturer	Water Energizers 3008 Middle Road, Suite A Jeffersonville, IN 47130
Phone/FAX	812-288-6900 F 812-288-2142
WEB Site	www.waterenergizers.com
Equipment Package	“Cells”, metal tubes packed with some material are installed in system tanks and sumps in both boilers and cooling towers. Typically installed in full flow locations.
Claims	Controls scale, corrosion, and biological growth.

Category 5. Mechanical

Product name	Sonoxide
Manufacturer	Ashland Hercules Water Technologies Hercules Plaza 1313 North Market Street Wilmington, DE 19894-0001
Phone/FAX	302-594-5000 F 302-594-5400
WEB Site	www.ashland.com
Equipment Package	Unit has a pump and ultrasonic sound generator chamber with associated electronics. Operates as a sidestream unit with cooling water passing through the sound generator chamber..
Claims	Claims to control microbiological growth and biological fouling, “controlling total bacteria, algae, and biofilm”.

Product name	VRTX Treatment Chamber
Manufacturer	VRTX Technologies 5850 Corridor Parkway Schertz, TX 78154
Phone/FAX	210-651-7402 F 210-579-6926
WEB Site	www.vrtxtech.com
Equipment Package	Unit has a pump where the output is split into two streams and then brought back together in a “chamber”. Typically packed with a blowdown controller, hydrocyclone, corrosion coupon rack, and sidestream filter. Operates as a sidestream unit. Original device developed by Chesterton in 2000 and also sold as the “Moltek Water Stabilizer”.
Claims	Claims to control scale, bacteria, and corrosion.

Category 6. Mixed Systems

Product name	ECO Tower System
Manufacturer	Universal Water Technologies 2443 Oceancrest Blvd Far Rockaway, NY 11691
Phone/FAX	888-838-4914 F
WEB Site	www.uwatertech.com
Equipment Package	Electromagnetic device is combined with filtration and copper-silver ionization. Typically installed as a sidestream unit on cooling towers.
Claims	The device controls mineral fouling and corrosion, while the microbiological is controlled by copper-silver ionization.

Product name	Electrostatic Device component of EnviroTower Note: Device sold as Scalebuster in Europe and Asia)
Manufacturer	evandtec (formerly EnviroTower, Inc.) 355 Adelaide Street West Toronto, Ontario, M5V 1S2, Canada
Phone/FAX	416-977-1105 F 416-913-2176
WEB Site	www.evandtec.com
Equipment Package	Package includes an electrostatic device, hydrocyclone, and addition of zinc and iodine to the cooling water. Sidestream filter system for cooling towers.
Claims	Controls scale, fouling, corrosion, and microbiological problems in cooling towers.

Product name	QED (Quantum ElectroDynamic)
Manufacturer	Flozone Services, Inc. 30 South Maple Street Adamsville, TN
Phone/FAX	888-463-5696
WEB Site	www.flozone.com
Equipment Package	Package includes an electromagnetic device, “QED”, an ozone generator, and remote monitoring and control system. Sidestream system for cooling towers.
Claims	Controls scale, fouling, corrosion, and microbiological problems in cooling towers. Allows safe operation at increased cycles.

Non-Chemical Devices

Product name	TowerMate
Manufacturer	Water Management Systems, LLC 16051 Tonkawood Center Hopkins, MN 55345.
Phone/FAX	952-933-0886
WEB Site	www.towermate.com
Equipment Package	Supplied package includes a copper-silver ionization unit for biological control, a magnetic unit for control of scale and corrosion, and a hydrocyclone. Typically installed as a sidestream unit on cooling towers.
Claims	Controls scale, corrosion, and biological problems.

Product name	
Manufacturer	
Phone/FAX	
WEB Site	
Equipment Package	
Claims	