DESCALER®

ELECTRONIC SCALE PROTECTION



Physical water treatment

DESCALER®

DESCALER®

- Inhibits a formation of waterscale in pipes and appliances
- Disintegrates old limescale deposits
- Prevents to decreasing of heat exchange efficiency due the limescale formation, optimizes energy costs
- Constrains an inner surface corrosion of ferrous parts
- Minimizes maintenance expenses and increases the service life of pipe-lines and appliances, retrenches the down time costs
- Decreases a consumption of detergents and agents for chemical softening of water



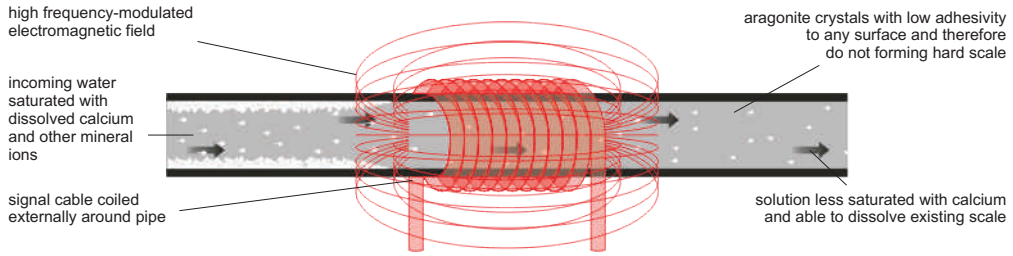
ADVANTAGES:

- Easy installation without participation of plumbers and electricians
- Equipment selectivity for industrial and home applications
- Mininization of flow cross section and head loss
- Unchanged chemical composition and constant calcium content of treated water
- Environmental-friendly operation without using any chemicals
- Long service life without any maintenance work
- Low power consumption, minimal costs of operation
- Fast return of investment

DESCALER®

HOW IT WORKS

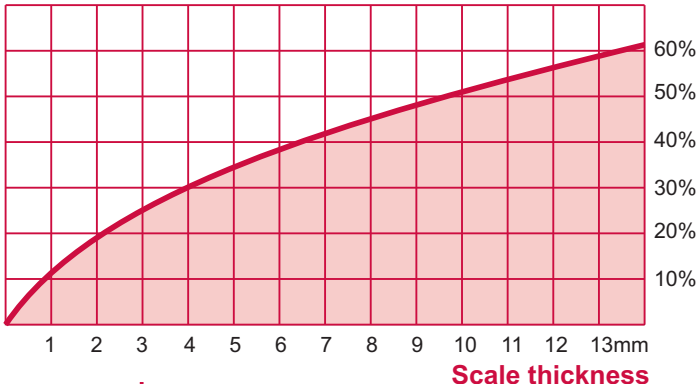
Our microprocessor based device DESCALER creates a frequency-modulated electromagnetic field inside the supply pipe. This field forces the dissolved calcium (magnesium) and bicarbonate ions to create the crystallizing nuclei of calcium (magnesium) carbonate in the bulk of the water. These microcrystals continuously grow (the snowball effect) and they flow with the water in the form of suspended particles. Their size and shape is much different to those formed in untreated water, they don`t stick at the piping walls, heating elements of boilers or washing machines and they remain in suspension until discharged to drain.
As the by-products of the precipitation of calcium carbonate (CaCO3) from the solution of calcium bicarbonate (Ca(HCO3)2) in the water, the carbon dioxide is released into the water. Carbon dioxide dissolved in unsaturated water (with much lesser amount of dissolved calcium ions) allows to dissolve and soften old scale layers in the pipes, heating elements, heat exchangers etc. Mechanical force of water flow accelerate this descaling process. The dissolving of old scale deposits requires the water flow through the pipes. If there is no flow, unsaturated water with carbon dioxide can not dissolve existing scale.
From this all results that after installation of DESCALER device in older water systems with scale deposits, the water from the tap may temporary contain even higher amount of calcium than untreated water. The time of descaling process depends on water usage (the higher usage, the faster scale removing). Usually this time is between one to three months.
DESCALER do not removes the minerals from the water. DESCALER only changes their structure in order to prevent scale formation.
PLEASE NOTE: Measuring of the water hardness by routine chemical titration method leads to the same result of treated as wel as untreated water.



HARD WATER AND WATERSCALE FORMATION

Unit	°N (°GH) 10 mg CaO/l	°F (°FH) 10 mg $CaCO_3$/l	ppm mg $CaCO_3$/l	mmol/l 100 mg/l $CaCO_3$
°N (°GH) german hardness 10 mg CaO/l	1	1,79	17,9	0,179
°F (°FH) french hardness 10 mg $CaCO_3$/l	0,56	1	10	0,1
ppm mg $CaCO_3$/l	0,056	0,1	1	0,01
mmol/l 100 mg/l $CaCO_3$	5,6	10	100	1

Increase of energy consumption



Rain water always contents carbon dioxide (Co_2) in small concentraitions, which is absorbed from air. Such water is then able to dissolve calcium carbonate ($CaCO_3$)while is in contact with rock material and calcium bicarbonate is formed:

$$CaCO_3 + H_2O + CO_2 \longrightarrow Ca^{2+} + 2\,HCO_3^-$$

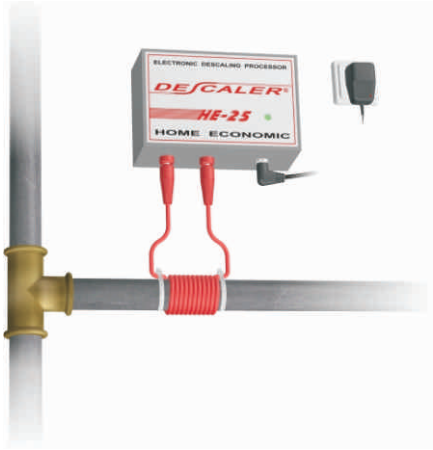
Water with higher content of alkali earth (Ca, Mg) (bi)carbonates is called as hard water. Using of hard water bring some technical problems indeed. Thus the calcium carbonate based waterscale formation is very hard complication of hard water using. The scale formation is caused by precipitation of calcium carbonate from solution. Calcium bicarbonate dissolved in water is decomposed to carbon dioxide and calcium carbonate by treatment of higher temperature or by water saturation with air. In these cases the calcium carbonate is for the most part precipitated in its calcite form. This modification is liable to deposit in form of scale on water contacted surfaces.

$$Ca(HCO_3)_2 \longrightarrow CaCO_3 + CO_2 + H_2O$$

These processes proceed usually on hot surfaces of water boilers, exchangers, pipes and fittings, but they are also in progress as a consequence of heat of friction. Scale growth worsen flow conditons and decrease a heat transfer. The hard deposits on the heating bodies of washing machines, boiler heat exchangers, etc. cause an increase in energetic demand (for a 4 mm thick layer up to 25%") and substantial reduction in working life of the appliances. Second problem of the hard water using is a decreasing of detergents efficiency due reaction of calcium ions with soap when the insoluble calcium salt of fatty acid is formed. Due its insolubility is such compound not able to serve as detergent. Using of untreated hard water lead to higher requirements of soaps, washing powders and technical detergents.

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DESCALER® HOME ECONOMIC



DESCALER HE blocks the formation of scale in household appliances such as washing machines, dishwashers, instantaneous water heaters etc.

It gradually dissolves already formed deposits in water pipes thus preventing them from corrosion.

Thanks to this device you will save money by drastically reducing maintenance and repairing costs and ensuring a longer life to your appliances.

WHAT CAUSES SCALE ?

The irreplaceable function of calcium in the human body is generally known. However, calcium that deposits in the form of scale in washing machines, dishwashers, instantaneous water heaters, boilers, mixer taps etc. is undesired. The hard deposits on the heating bodies of washing machines, boiler heat exchangers, etc. cause an increase in energetic demand (for a 4 mm thick layer up to 25%!) and substantial reduction in working life of the appliances.

SOLUTION - *DESCALER HOME ECONOMIC* !

DESCALER HE microprocessor based apparatus creates a frequency-modulated electromagnetic field in the supply pipes and forces calcium carbonate that is dissolved in the water to crystallize in the form of aragonite that does not form scale and is simply carried out of the system. Hard water treated this way acquires the properties of soft water and can dissolve already existing scale.

WHERE TO INSTALL THE APPARATUS ?

DESCALER HE can be installed on the supply pipe to a building, what provides complex protection of the water distribution, boiler, washing machine, dishwasher, mixer taps and other water appliances in the entire household. The apparatus can be installed on all types of pipes (steel, cupper, plastic pipes). Choose the appropriate type of apparatus based on the inner pipe diameter, e.g. DESCALER HE 25 can be used for maximum 1" pipe (inner diameter 25 mm).

BENEFITS FOR YOU !

· Simple installation
· Constant operation that does not require any service
· Negligible operational costs (power input less than 1W)
· Improvements in efficiency of your appliances and energy saving
· No need to use expensive chemical scale removers
· Easy removal of deposits in mixer taps and sanitary fittings
· Drinking water does not change its quality
· The content of precious mineral substances in water remains unchanged
· Fast return on investment
· Long-term life, a three-year guarantee

WHAT ELSE CAN THE TREATED WATER BRING ?

· It increases frothiness and reduces the consumption of detergents by 20 - 30 %
· It does not cause drying and irritation of complexion effected by calcium
· It favourably effects some dermic diseases and eczema

DESCALER® HOME ECONOMIC

HE 15



HE 25



HE 50



The DESCALER HE is used in residential buildings and consist of three different models, all with external mains adapter. The pipe diameter is a crucial parameter for choosing the right model of device. The descaler can be installed on all types of pipes (steel, copper, plastic). The enclosure is made of ABS plastic. All DESCALER HE models hold IP65 Code (protection provided against the intrusion of solid objects (including body parts like hands and fingers, dust, accidental contact, and water in electrical enclosures.

Model	Pipe I.D. [mm / in]	Flowrate [m^3/h]	Dimensions [mm]
DESCALER HE 15	15 / 1/2"	0.15 - 1.00	110 x 75 x 50
DESCALER HE 25	25 / 1"	0.45 - 2.70	110 x 75 x 50
DESCALER HE 50	50 / 2"	1.30 - 8.60	160 x 100 x 60

APPLICATIONS

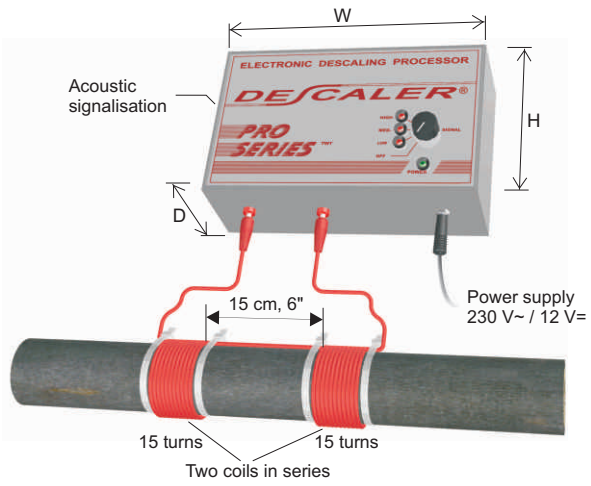
- family houses, flats
- residential buildings, weekend houses
- hotels, bars, restaurants
- laundries, bakeries
- protection of smaller technology units and process equipment

TECHNICAL SPECIFICATIONS

Power supply	Mains adapter 230 V AC / 12 V DC 100 mA, stabilised
Power input	Less than 3W
Capable of driving	2 coils in series
Enclosure material	Uninflammable ABS, dark grey
Maximum enclosure temperature	167°F, 75°C
Minimum enclosure temperature	-22°F, -30°C
Status LED indicator	Green light - run Red blinking - failure, disconnected coil circuit
Signal	Squarewave swept output signal with variable frequencies

DESCALER® PRO SERIES

New series of DESCALER PS with **Triangular Wave Technology** (TWT) uses a state-of-the-art integrated microprocessor circuit based on leadless SMD components. The unit generates **complex frequency** as well as an **amplitude-modulated triangular signal** that efficiently prevent formation of limescale, especially, for bigger diameters of piping.
DESCALER PS is designed for protection of hot water and heating systems against formation of undesired hard incrustations, and significantly reduces the time consumption and costs during their maintenance and prolongs their life.



TECHNICAL DESCRIPTION:

TWT signal generator in a self-extinguishing plastic case.
On the front panel there are sockets for induction coils and power supply. On the left there is a slot with an acoustic converter producing a beep when the coil circuit is broken or there is malfunction of the unit.
The top panel includes a 4-position switch for intensity of output signal - positions HIGH, MED., LOW for optimal impact of the unit and position OFF to turn the signal off (choose position HIGH for lower average water flows, MED. for medium water flows and LOW position for higher average water flows.
Three red LED lights indicate the intensity of the signal (a relevant LED is permanently on). In case the coil circuit is disconnected or there is malfunction, a relevant LED flashes. A green LED POWER indicates power supply.
Wire for winding coils on the pipe with banana connectors, plastic clamping bands for fixing coils.
Power supply - mains adapter 230 V~ / 12 V=, 900 mA.

COMPARISON OF TRIANGULAR AND RECTANGULAR SIGNAL

The induction of electric field in the pipe necessary for agitation of water molecules, Ca^{2+} and HCO^{-} ions can only occur with the change of the electric current in the induction coil of the unit. Classic generators of rectangular signals change the current only for a very short period of the time, whereas the generators of triangular signals change the current 100% of the time.
The amplitude modulation (change of the signal intensity during next times) improves the efficiency of the unit even more.
Rectangular Wave Generator (Descaler HE) generates rectangular (square) signal with constant amplitude. Frequency is continuously changeing (generator sweep the signal) from 1 kHz up to 10 kHz (frequency modulation), ten times per second.
Triangular Wave Generator (Descaler PS Triangular) generates complex triangular frequency and amplitude modulated signal with variable amplitude (amplitude modulation). Frequency is continuously changeing (generator sweep the signal) from 2 kHz up to 7 kHz (frequency modulation) three times per second.

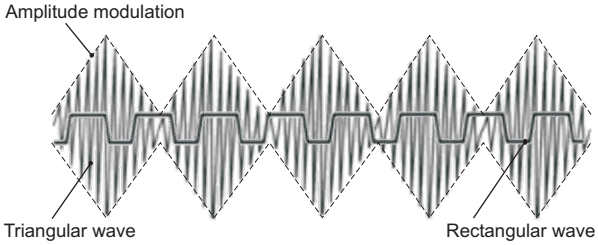
Descaler PS50, PS100



Descaler PS200, PS300



Amplitude modulation



DESCALER® PRO SERIES

PS 50, PS 100



PS 200, PS 300



Choose the appropriate type of apparatus based on the inner pipe diameter, e.g. DESCALER PS 50 can be used for maximum 2" pipe (inner diameter 50 mm). The descaler can be installed on all types of pipes (steel, copper, plastic).

Model	Pipe I.D. [mm / in]	Flowrate [m^3/h]	Dimensions WxHxD [mm]
DESCALER PS 50	50 / 2"	0.20 - 21.00	215 x 135 x 95
DESCALER PS 100	100 / 4"	0.80 - 85.00	215 x 135 x 95
DESCALER PS 200	200 / 8"	2.30 - 250.00	215 x 135 x 95
DESCALER PS 300	300 / 12"	4.00 - 400.00	215 x 135 x 95

APPLICATIONS

- hotels, bars, restaurants
- laundries, bakeries, buildings
- boilers, heat exchangers, exchanger stations, boiler-plants
- preparation of hot water for blocks of flats, circulation of hot water
- protecting cooling towers, chillers, compressor cooling, oil coolers
- steam boilers (water pre-treatment)
- commercial swimming pools, sauna
- factories, technological equipment

TECHNICAL PARAMETERS

Power supply	External mains adapter 230 V AC / 18 V DC 900 mA, stabilised
Alarm when out of order	Audible warning signal
Capable of driving	2 coils in series
Enclosure material	Uninflammable ABS, light grey
Maximum enclosure temperature	167°F, 75°C
Minimum enclosure temperature	-22°F, -30°C
Signal intensity control	Four level switch
Status LED indicator	Red light - run Red blinking - failure, disconnected coil circuit
Signal	Complex triangular frequency and amplitude modulated
Dust and water protection	IP65

IP PROTECTION CLASSIFICATION

IP standard according to IEC 60529

The first digit stands for impact sensitivity
The second digit stands for water sensitivity

IP 65 full dustproof and protection against jets of water

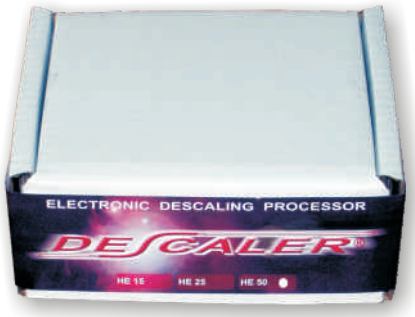
First digit:
6 means complete protection against entry of dust.

Second digit:
5 means jets of water

PACKAGING







Model	Shipping Weight [kg]	Package Dimensions [mm]
DESCALER HE 15	0.6	170 x 150 x 65
DESCALER HE 25	0.6	170 x 150 x 65
DESCALER HE 50	1.0	195 x 180 x 77
DESCALER PS 50	2.4	320 x 230 x 120
DESCALER PS 100	2.5	320 x 230 x 120
DESCALER PS 200	2.8	320 x 230 x 120
DESCALER PS 300	3.0	320 x 230 x 120