

The End of the Stone Age
Scale & Rust



Company Profile

For any farther information feel free to contact us:

15 Shnitzler St., Tel Aviv, 68165, Israel | Tel: (+972) -3-7175408 | Fax: (+972) -3-6825318 |
Email: hop@hop-pth.co.il | Web: www.hop-pth.co.il

Hop Engineering LTD. was established in 1994 and is one of the leading Israeli companies in water improvement technologies, as a result of hard work and a constant striving for improvement.

Hop Engineering LTD. manufactures the PTH - Water Improver to control limescale and rust formations in hot and cold water systems, for domestic, industrial and agricultural uses. The company exports the PTH Water Improver to approximately 40

countries worldwide, and participates in international exhibitions and professional seminars in Israel and abroad.

We at **Hop Engineering LTD** are committed to give all of our customers and distributors around the world an efficient, advanced & environmental friendly PTH water improver devices which are suitable to their water systems needs. Furthermore, we are dedicated to provide comprehensive and professional service.



Mini



1/2"



2"



Our Products



4"



8"



PTF



PTL

PTH Water improver device is available in various sizes from 1/4" to 12"

The Device is adjusted to each application according to the flow rate of the system.

**Test Report no. 9112203317**

In accordance with Clause 12 of the Standards Law, 1953

Official
certificates

Details of order:

Name of customer : Hop Engineering Ltd.
Address : 24 Shnitzler, Tel-Aviv 20692, ISRAEL
Date of order: : 13/01/2011

Description of product:

Device for reduction of scale in water.
Supplier and manufacturer: Hop Engineering Ltd. **Country of manufacture:** Israel
Commercial name: P.T.H.
Classification to exposure ratio group for the test: Fittings
Exposure ratio 15,000 mm²/L

Sampling details:

The sample was taken on 04/01/2011 (according to the customer's declaration) by a **representative of the customer** Sampling location: Manufacturer's site (according to the customer's declaration) and received at SII on: 18/01/2011
Description and quantity of items: 6 units of the product.

Nature of test:

Full test for compliance with the requirements in Israel Standard SI 5452 (2008) "Testing of products for use in contact with drinking water", at the request of the customer.

This document contains 6 pages
and may be used only in full.

The test results in this document
refer only to the item tested.

Test conclusions:

The product tested complies with the requirements in Israel Standard SI 5452 (2008) at temperatures up to 40 °C, and at the abovementioned exposure ratio conditions only.
Full details of the test results are given on the following pages of this document.

Name of inspector : Assaf Amram
Position : Test engineer
Date and signature: 25/10/11

Name of superior: Yaniv Shamai
Position: Acting Head of Polymers and Water Systems Section
Date and signature: 25/10/11

Date of printing of document: 25/09/11

This is an abridged translation of the Hebrew original. In any case of discrepancy between the original Hebrew text and the English translation, the Hebrew version shall prevail.

This document is not approval for marking the product with the Standards Mark

8.10.2015

To whom it may concern :

We hereby confirm that Hop Engineering LTD. is a member of the Israeli Export & International Cooperation Institute.

The Israel Export and International Cooperation Institute (IEICI) is as a non-profit organization by the government of Israel and the private sector. IEICI promotes Israeli goods and services exports, and trade relations, cooperation and strategic alliances with overseas companies. IEICI provides services to thousands of Israeli exporters.

Hop Engineering LTD. takes part in various activities of our organization.

Hop Engineering has been established in 1994 in order to lead developing, manufacturing and marketing water improvement systems.

Gilad Peled
Director, Agro-Technology, Water & Cleantech Department

G. Peled



The Simple Solution to Hard Water Problems

Uses: Domestic, Industry, Central Installation, Agriculture, Swimming pools etc...
For prevention and elimination of scale & rust damages in hot and cold water systems.



Thrifty and cost-effective

You Can Expect Years Of Effective Free Performance



no electricity



no chemicals & salt



no maintenance



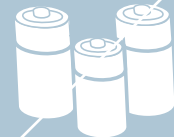
no moving parts

The P.T.H. devise eliminats the need for chemicals and salts, thus preventing environmental and underground water pollution and financial expenditures.

A great advantage...
don't you agree?



no service



no cartridges



The P.T.H. Water Improvement device as the name suggests, a "water improver" but not a softener or a filter.

The P.T.H. Water Improver is made of two parts, a cylinder made from stainless steel and an inner core made from an alloy of noble and semi-noble metals. The P.T.H. device is installed on your water line immediately after the water-meter, and is connected to the earth grounding.

Our P.T.F. and P.T.L. device are combinations of micronic disk cartridge and P.T.H.

When water flows through the P.T.H., weak electric fields are produced by electric potential difference between the unique alloy core and the metallic cylinder. These field and the venturic effects stemming from the unique configuration of the core prevent the adhesion and cohesion of the waterborne mineral particles (mainly carbonic salts, calcium and magnesium). These electro and hydrodynamic forces



Operating principle of the Water Improvement Devices

separate the molecules (especially aluminum and silica) which bind mineral particles.

Thus the mineral particles flow through the water system without being precipitated and with no interference.

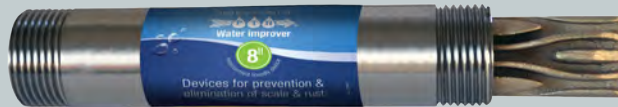
The P.T.H. Water Improver core alloy is nonferrous, highly resistant to rusting and corrosion, non toxic and ecologically safe.

Advantages of the P.T.H. Water Improver

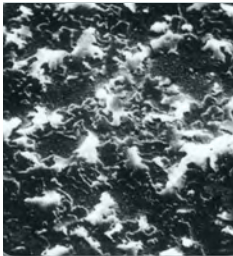
- Prevents the formation of limescale and rust
- Gradually dissolves and removes existing scale and rust.
- Cleans water with fewer suspended solids by means of micronic filters (In P.T.L. and P.T.F)
- The device does not release any metals into the water and requires no energy for its operation.
- The device functions indefinitely without the need for replacement of parts
- In some applications we witness the decrease of algae, fungus and mildew growth.



P.T.H Water Improvement Process



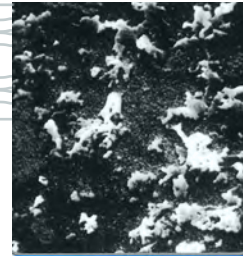
Before



Venturi Effect
No loss of water pressure

- Water inlet: adhesive components around mineral particles.
- View, via electronic microscope, of mineral particles, precipitated from a hard water sample.
- Note how the minerals and salts are bound together in a cohesive mass.

After



- Water outlet: mineral particles free of adhesive Components.
- View of the mineral particles, precipitated from the same hard water sample, after P.T.H. treatment.
- Note the separation into "individual" mineral and salt particles.

How water dissolves carbonate rocks

Rain water combines with gases in the air and becomes slightly acidic



The slightly acidic water dissolves stone lime rock and forms soluble hardness



Due to the "separation" that takes place during conditioning, the minerals and salts do not adhere to the same degree and most of the adverse effects of hard water are eliminated.



Limescale & Rust damages

1 mm of scale equals 10% more energy consumption (electricity, gas, fuel, etc.)

Why do we need the P.T.H device in our application?

To prevent limescale and rust in:

Pipes: Prolonged life, increased water pressure and water flow.

Electric boilers: More hot water (water instead of limescale)

Solar Systems: More hot water, better utilization of solar energy and greater electricity saving.

Heating elements: In quick water heaters by gas or electricity, and coffee machines: Increased lifetime and less consumptions of electricity.

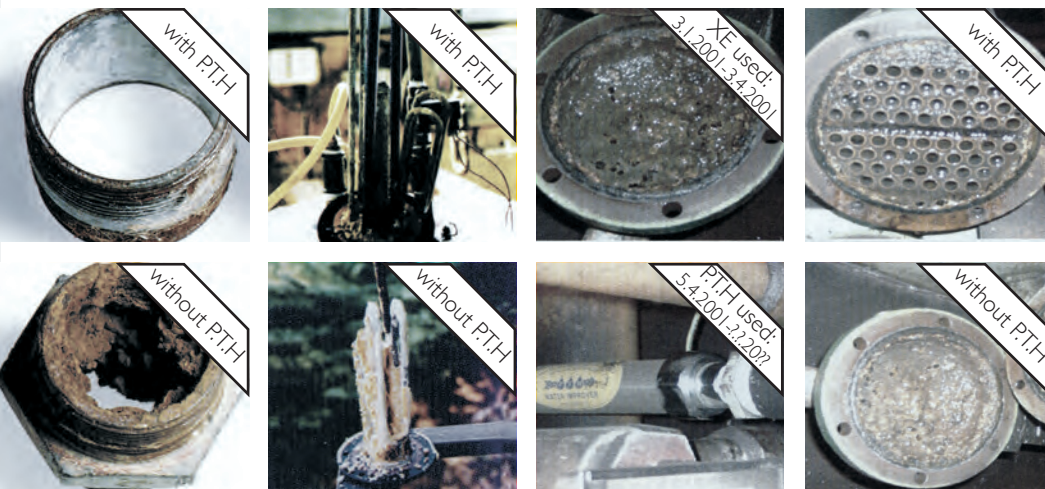
Washing machines: Increased lifetime for heating elements, pumps, electric valves, seals, as well as better foaming of liquids and power detergent.

Agricultural:

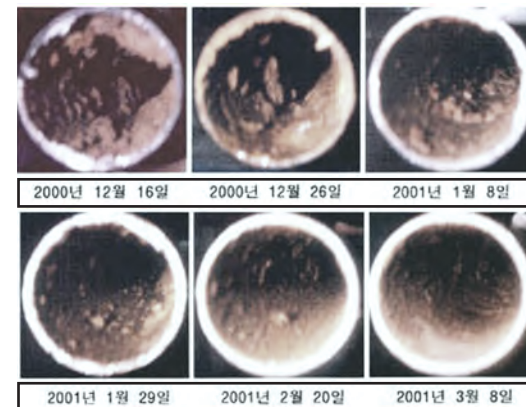
Poultry houses: Prevents limescale and leaks in drinkers (drip, goblet and bell).

Cowsheds: Prevents the formation of algae in troughs, limescale and rust in the hot water system (boilers, heat pumps, electric valves etc.)

Hothouses/ nurseries: Prevents limescale and clogging of drippers, sprinklers, wet pads and heating systems.



Removal Existing Scale



Abstract

Five 30-liter electric water boilers were operated versus five boilers connected to "PTH" Water Improver units. All boilers were operated simultaneously under identical conditions.

Program of boilers operation

Operation of the entire system was conducted and controlled automatically by a programmer. At a water temperature of 60 C in the boiler, emptying and filling taps are opened for 4 minutes, during which the heating stops and the boilers cool.

Water flow to boilers was up to 10L/min.

*Heating elements (1500wm 10.5w/cm)

Total hardness: 140mg/l.

Results

Table 1 summarizes the results of the system operation over 650 hours.

Table 1: summary of results

	P.T.H Treated boilers	Controls
Water consumption (liters)	52,625	54,933
Electricity consumption (kw)	908.5	1022.64
Kw\m3 Water	17.26	18.62
Limescale weight (gram)	19.5-80.8	184.4-353.3
Efficiency range (%)	72-92	

$$\text{Electricity range (\%)} = \frac{M_2 - M_1}{M_2} \times 100$$

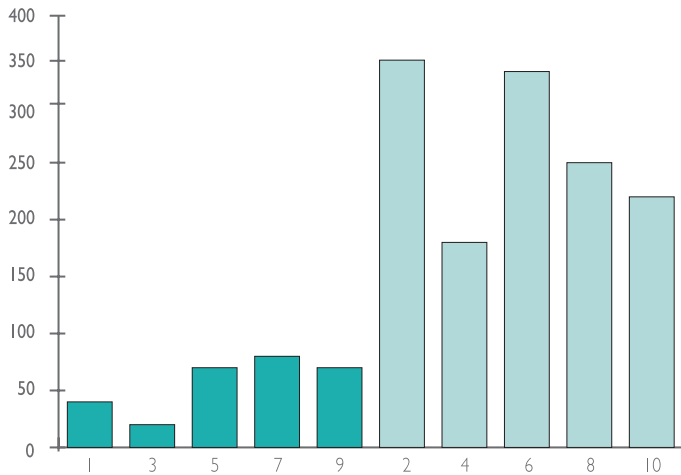
M₁ = Limescale and precipitate dry weight of the P.T.H treated boiler.

M₂ = Limescale and precipitate dry weight of the control boiler.



Prevention of scale formation by P.T.H Water Improver
Controlled efficiency test

Figure 2: Limescale formation over 650 hours of operation



A 1mm crust of lime scale on a heating element is equal to a 10% increase in energy consumption.

Upon Heating soluble hardness reverts to limit limescale



Conclusion:
 "P.T.H" Water Improver reduces scale formation in boilers with an efficiency range of 72-92% and electricity saving of 5-20%





International



France

Domestic use



Belgium

Domestic use



South Korea

Industrial



South Africa

Domestic & Agricultural use + Mining Industry



Mexico

Domestic use



China

Industrial use



Spain

Domestic use



India

Industrial



Iceland

Domestic use



U.S.A

Domestic use



Netherlands

Domestic & Agricultural uses



Thailand

Industrial use



Serbia

Industrial use



Botswana

Domestic use



Greece

Domestic use



Cyprus

Domestic & Agricultural uses



Slovenia

Domestic & Industrial use



Germany

Domestic use



Mongolia

Domestic use + Mining Industry + Water Distribution Centers



Azerbaijan

Oil & gas Industry



Slovakia

Domestic use



Singapore

Domestic use



Indonesia

Industrial use + Oil & gas Industry



Colombia

Industrial use



Uruguay

Agricultural use



Nigeria

Domestic & Industrial uses



The P.T.H. Water Improver prevents limescale, rust and algae in hot and cold water systems, heat exchangers, injection machines, cooling towers condensers, compressors, softeners, pressure hosing machines, pumps, vacuum pumps, electric valves, photography laboratories, fountains, cooling systems, casting ovens, solar systems, etc.

P.T.H. Water Improver in industrial use will ensure:

1. No need to shut down the systems for cleaning purposes as with chemical cleaning.
2. Saving money, water, chemicals, salts, electricity, and maintenance time.
3. Reduction of system wear.

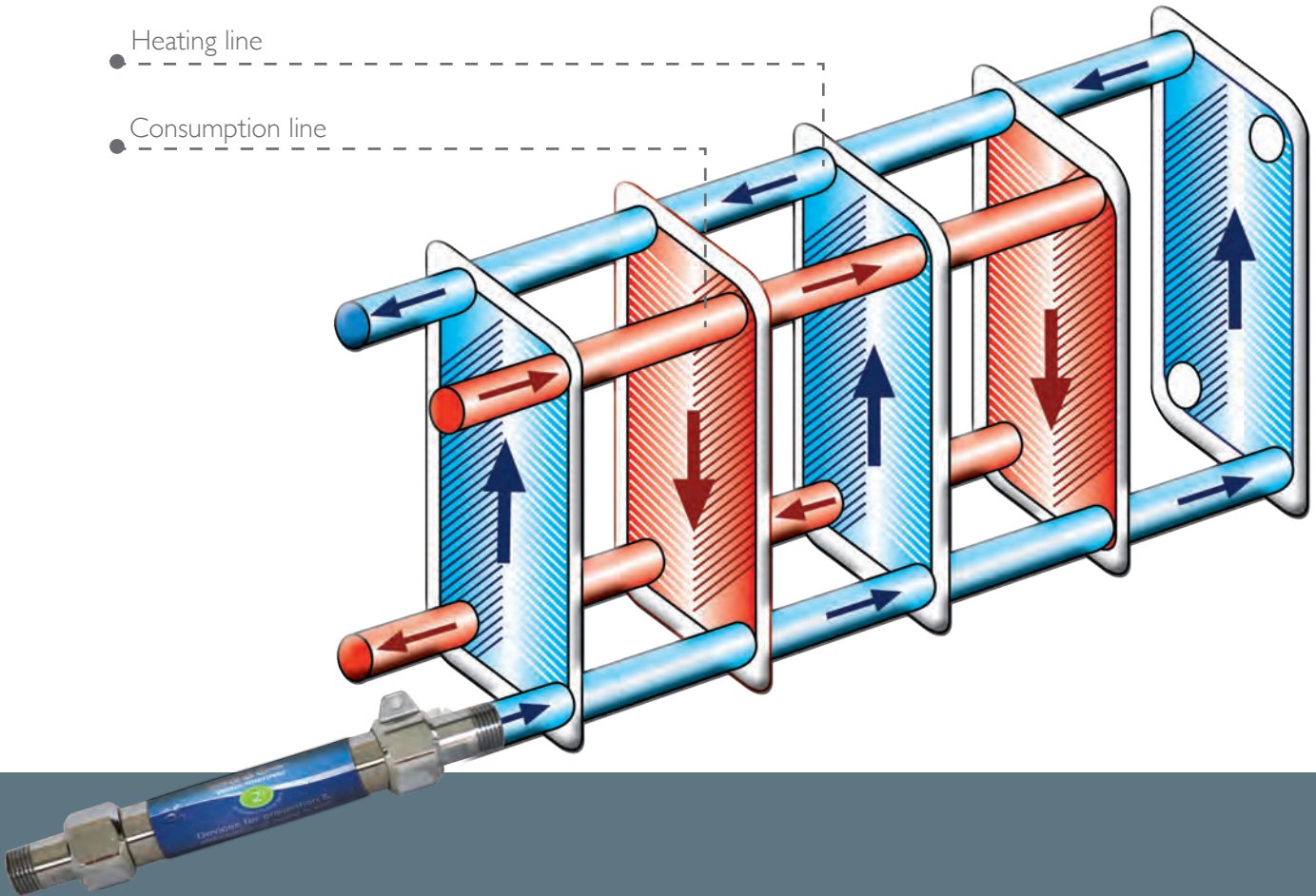


Industrial Use

P.T.H. devices eliminate the need for chemicals and salts, thus preventing environmental and underground water pollution and financial expenditures.

● Heating line

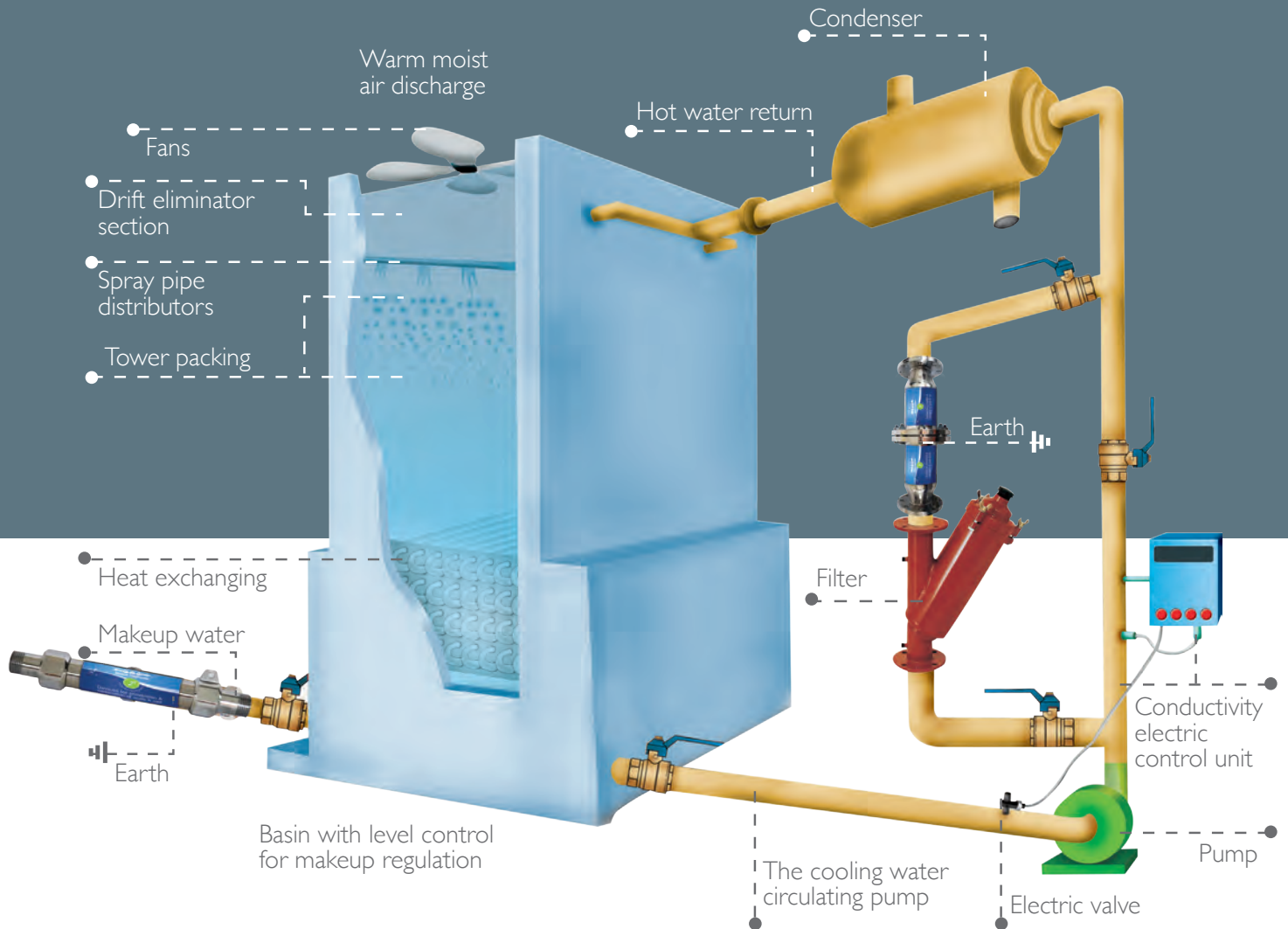
● Consumption line

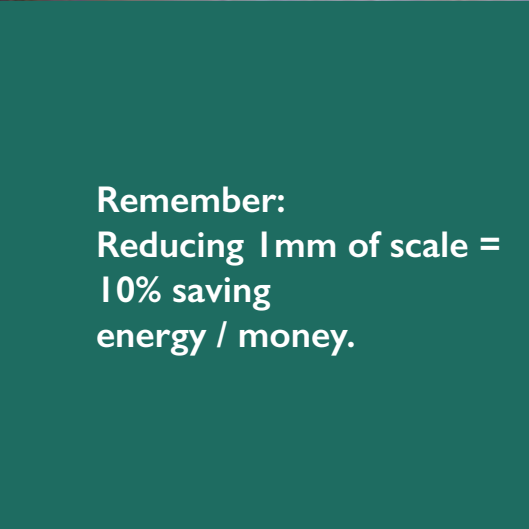


Heat exchangers



P.T.H treatment for cooling towers





The Water Improver prevents the formation of limescale and rust and gradually dissolves initial formations in piping, boilers, solar panels, quick water heating with gas or electricity, washing machines, dish washers, coffee machines etc...

By using the P.T.H. Water Improver we will ensure:

- The prevention of clogged pipes and taps = Higher water pressure and supply level.
- Reduction of limescale of boilers = Higher temperature. of water.
- Greater efficiency of solar energy system.
- Saving money, electricity, gas and maintenance time.



Agriculture Uses

P.T.H Water Improver in greenhouses, nurseries and open fields

- Prevents limescale in drippers, sprayers and sprinklers, thus enabling consistent supply of water and uniform growth.
- Prevents limescale and algae in Cooling Pads; eliminates the need for cleaning chemicals; and allows maximum utilization.
- Improves growth of plants.

P.T.H Water Improver in Cooling-Pads (humidity mattress)

- Reduces the formation of limescale on the pad
- Improves ventilation
- Improves humidity and temperature control
- Improves "Micro Climate" for the plants.

P.T.H Water Improver chicken coops

- Prevention of limescale with PTH in water carrier sealers (cups, bells and drippers) will prevent leaks, wetness, flooding and the spread of disease.



Sports Club, Spa & Swimming Pools

How the PTH increases the efficiency destruction of microorganisms and algae in water chlorination treatments.

When chlorine is added to water, some of it evaporates into the air, causing the familiar odor, and the rest is present in water in the following forms: chlorine (Cl_2), hypochlorous acid (HClO), Hydrochloric acid (HCl), hypochlorous anion (ClO^-) and chloride (Cl^-).

Atomic oxygen, which is produced from ClO^- , is a powerful destructive oxidant of microorganisms and algae.

Increased efficiency of the disinfectant agents (Cl_2 , HClO , O) is translated in practical terms into smaller quantities of chlorine being required for water chlorination treatments.

The "PTH" core is an alloy made from a unique composition of several metallic elements which differs from that of the "PTH" metallic cylinder. Consequently, when aqueous solutions containing electrolytes flow through the "PTH" unit, electrical potentials and fields are produced and imposed on the solution constituents. These fields interact with the polar sites of membrane macromolecules of living cells (microorganisms and algae). These interactions can

activate the macromolecules and thereby enhance the destructive reactions between the oxidative agents of the hypochlorous acid and the living cell membranes. Another physical factor which participates in the process of the destruction of the macromolecule membrane emerges from the specific configuration of the "PTH" water improver.

Elimination of adhesions and size reduction of the water particles after passing the "PTH" core minimize the adherence of living cells on the particles, thereby increasing the exposure of these cells to the destructive oxidation of hypochlorous acid. These mechanisms of living cells' destruction are investigated by our R&D scientists.

In heated swimming pools it is recommended to install the PTH device on the inlet line before the heat exchangers in order to prevent scale damages.

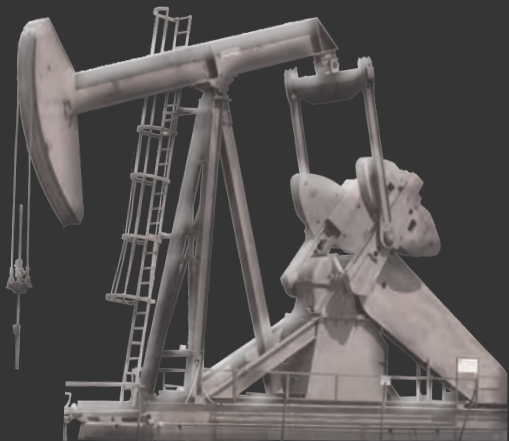




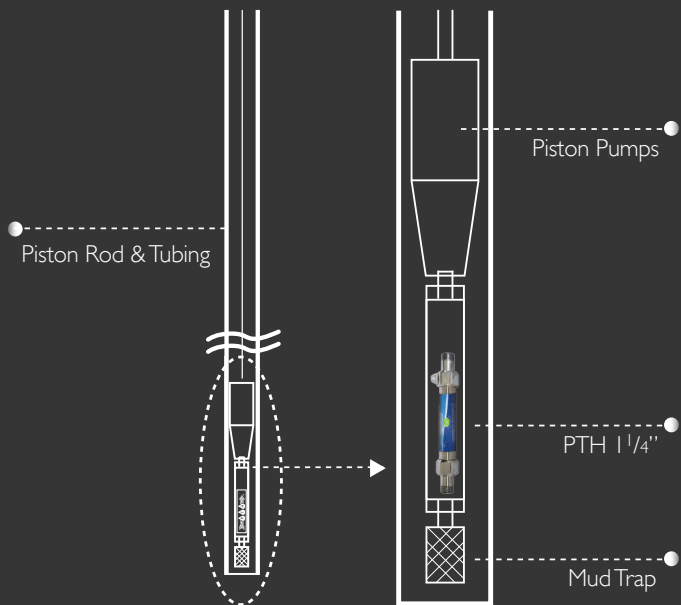

Oil & Gas

PTH Water Improver prevents limescale damage and sediment in the pumping equipment and pipes during the oil extraction process. The PTH device can be installed at the bottom of the well (down hall) before the pump, to protect it from damage of limescale and sediment. In another application the PTH device is installed on the pipeline leading oil from the well to the collection and storage tanks, to protect the pipeline from limescale and sediment damages.

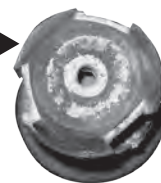
The simple solution to hard water Damages in Oil & Gas wells



Oil Well 900 meters



PTH Water improver
for scale prevention
in Piston pumps



Using the PTH device saves maintenance costs in the wells, reduces the use of chemicals, protects equipment over time and prolongs the period of use.

- PTH - prolongs oil production by reducing the maintenance cycles
- PTH - saves labor cost
- PTH - attractive price compared with other systems.





Instructions for Installation & Grounding

It is essential to provide grounding to ensure that the P.T.H device operates properly.

The P.T.H has to be well grounded by direct contact with the earth in a grounding metal pipe or a grounding copper rod.

Attention: Do not use a plastic pipe for grounding.
For best results the water velocity of 1-3m/sec. should be provided.



Technical specification

Code	size (inch)	connection	weight (kg)	length (mm)	Recommended Flow Rates (Lit/min)		
					Minimum	Nominal	Maximum
Boiler inner core	3/4" (Domestic)	B.S.P Thread	0.28	150	6	12	18
P.T.H. MINI*	3/4" (Domestic)	B.S.P Thread	0.28	119	5	10	15
P.T.H. 6	1/4"	B.S.P Thread	0.19	164	2.5	5	7.5
P.T.H. 10	3/8"	B.S.P Thread	0.37	190	5	10	15
P.T.H. 15	1/2"	B.S.P Thread	0.63	212	7	14	21
P.T.H. 20	3/4" A (Domestic)	B.S.P Thread	1.05	231	10	20	30
P.T.F.	3/4-1" (Domestic)	B.S.P Thread	1.6	134	8	16	24
P.T.L.	3/4 (Domestic) + filter	B.S.P Thread	2.1	308	10	20	30
P.T.H. 20	3/4" B (Domestic)	B.S.P Thread	1.78	271	22	45	68
P.T.H. 25	1" (Industrial)	B.S.P Thread	2.5	318	30	60	90
P.T.H. 32	1 1/4" (industrial)	B.S.P Thread	4.2	374	55	110	165
P.T.H. 40	1 1/2" (industrial)	B.S.P Thread	6.5	423	76.0	153	230
P.T.H. 50	2" (Industrial)	B.S.P Thread	10.3	471	125.0	251	377
P.T.H. 65	2 1/2" (industrial)	B.S.P Thread	24.5	483	132.0	265	398
P.T.H. 75	3" (industrial)	Flange	43.5	611	225	450	675
P.T.H. 100	4" (Industrial)	Flange	62	635	372.0	745	1118
P.T.H. 150	6" (Industrial)	Flange	119	815	782.0	1565	2348
P.T.H. 200	8" (Industrial)	Flange	263	1014	1400	2800	4183

*For dishwashers and washing machines.

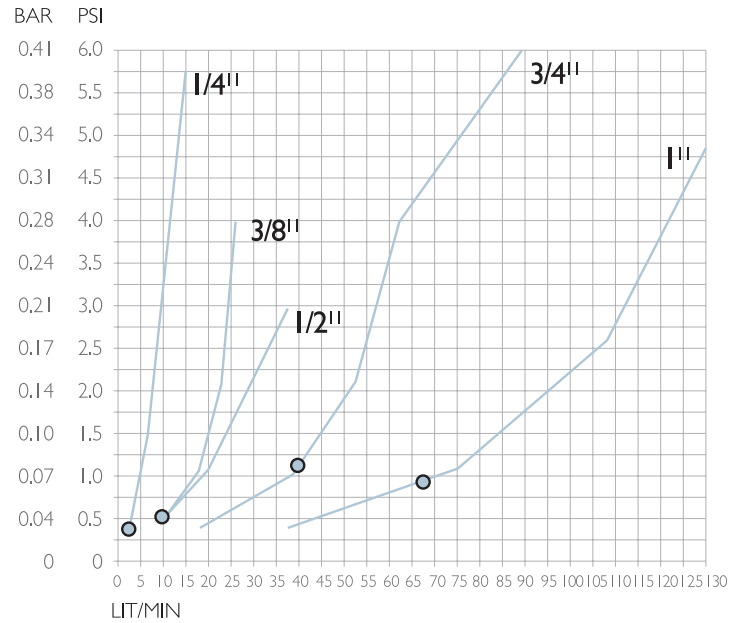
10", 12", Devices are available upon special order. All specifications and technical data in this catalog are for information only. And are subject to change without notice.



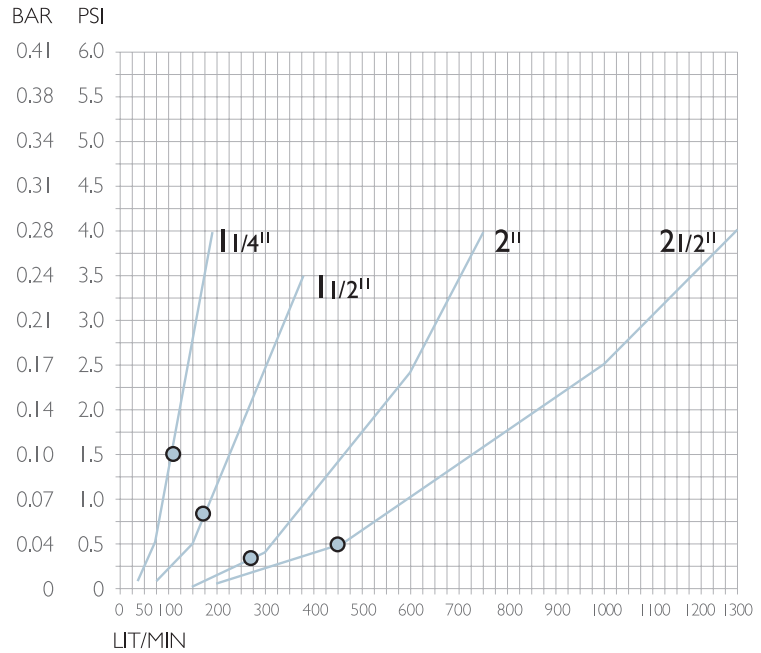
Pressure Drop

Nominal LIT/MIN & Pressure Drop

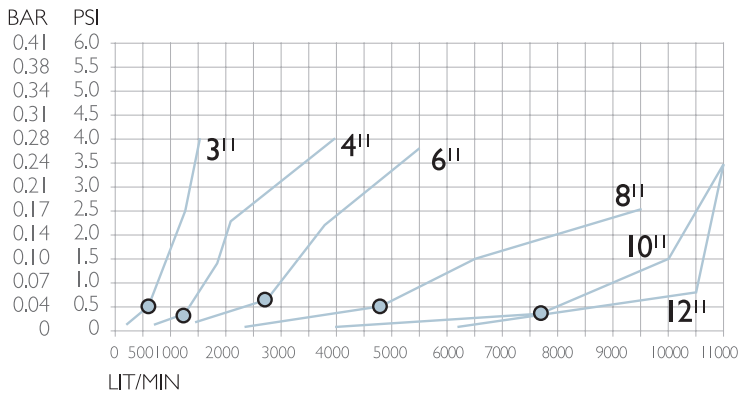
1/4" - 1"



1 1/4" - 2 1/2"



3" - 12"





HYUNDAI MOTOR COMPANY

336-830, 123 Kumsong Bu Asan ChungNam, Asan Environment Department Hyun-Sik, Bask.
Tel : 041-530-0218 Fax : 041-530-0288

No : TNAD-200106
To : Bluewater Co., Ltd
CC : Dylan Park

The Result of P.T.H Operation

Our company is a manufacturer of automobile and there are evaporators in wastewater recycling system. Due to scale occurred in two of concentrators, condenser and pipeline, we take pain to eliminate the scale with equipment and human power at least one time per month. Even though we tried using other devices and chemical, we could hardly be satisfied. Nevertheless, after having installation of P.T.H that is the device for preventing and eliminating rust and scale, the scale build-up in evaporator, condenser and pipeline were broken up remarkably, the amount of treatment-water was increasing about 30 % in comparison with before.

With this result, we decided to install another P.T.H to a boarding house and apartment for staff. It is for eliminating the blue rust in copper pipeline and is in full operation now.

Manager
Hyun-Sik Bask

www.pthkorea.com



NAEM FOOD INDUSTRY (PTY) LTD.
REG. NO. 79074917
TA

KOOGAN'S PLASTICS

P.O. BOX 48, LENASIA 1820, TEL: (011) 857-1545 / 2504, FAX: (011) 857-2503

TO WHOM IT MAY CONCERN

JURIMICAL FREE WATER TREATMENT

At Kogon's Plastics in Lenasia, South Africa, we believe in creating high quality plastic products; and we pride ourselves in offering the best service to our clients. That's why we don't take chances with when it comes to water treatment.

Our chillers form a critical component to our water treatment plant. We manufacture plastic bags and containers of all description and for every possible application. We cannot afford to lose time on faulty water treatment works, or money on costly man-hours, materials and equipment. That's why we opted for the in-line Israeli PTH catalytic water softener. We have hard borehole water, and we have discovered that conventional resin operated water softeners do not work at all, therefore we have discarded that system altogether and run our plant ONLY on the chemical, free, Israeli PTH device. We have had two PTH units since mid-1997, and we can categorically testify that this is the best way to treat our chiller water. The PTH units which treat the chiller water, are installed in a circulation loop and save us thousands of Rands annually on expensive chemicals, while there is absolutely no ongoing expense since nothing in the PTH needs to be replaced. The maintenance is also negligible. Our chillers stay absolutely clean and no fouling, either through scaling or rust build-up takes place, in fact PTH cleans up already affected areas.

We have just purchased a new chiller, and we are not prepared to risk such an expensive piece of equipment on untreated water. That is why we have now ordered our third PTH unit. We have complete faith in this product since we know it works and are proud to be associated with the environmentally friendly PTH Water Improver.

We can recommend the Israeli PTH to any user of cooling towers, boilers, or chillers, or any concern in the plastic mouldings industry. It is indeed a world class product. We would not have used it if it wasn't, since at Kogon's we only use the best.

SIGNED

M SHIRAZ

MANAGING DIRECTOR

G.M. ISMAIL (B.Sc. Ind Chem), A. ISMAIL (B.Sc. Ind Chem)
A.R. ISMAIL (B.Sc. Mech. Eng), A.S. ISMAIL, & VALU (B. Dip. PLASTIC TECH)

Nir Etzion
Hotel
Reason
& Events



מלון
ניר עציון
מטבח
ואירועים

TO:
HOP ENGINEERING LTD
FAX: 03-6810068

22.5.05

THE MATTER AT HAND DEVICE P.T.H

IN CONTINUANCE TO YOUR RECOMMENDATION INSTRUMENT FOR P.T.H I AGREED TO ACCEPT FOR PERIOD OF YEAR OF EXPERIENCE IN THE HOTEL. THE DEVICE - P.T.H WAS ATTACHED TO THE HEAT AND AS USUAL I OPENED IT IN ORDER TO CLEAN THE SCALE. TO MY SURPRISE IT WAS CLEAN OF SCALE.

IT SHOULD BE NOTED THAT WITHOUT THE DEVICE P.T.H I NEEDED TO CLEAN THE STON AND DO A SEAL REPLACEMENT EVERY YEAR.

WITH THE DEVICE I CAN DO THAT EVERY 3 YEARS INSTEAD OF EVERY YEAR. A THING WHICH SAVES ME MONEY AND ENERGY.

IN CONCLUSION, I STRONGLY RECOMMEND THE DEVICE. I'D BE HAPPY TO ADD DETAILS TO ANYONE WHO'S HAVING SECOND THOUGHT.

SINCERELY,
OREN YAHLOM
MAINTENANCE MANAGER IN NIR EZION HOTEL
050-5860906

ניר עציון, דב ורף סניבל 30808 ס"ט 9845555 04-9845500
Nir Etzion, Mobile Post Hof Haacamel 30808 Tel 972-4-9845555 Fax 972-4-9845500
hotel@nir-etzion.co.il www.nir-etzion.co.il



Hop Engineering LTD

manufacturing and marketing of
water improver devices

15 Shnitzler St., Tel Aviv, 68165, Israel

Tel: (+972) -3-7175408 **Fax:** (+972) -3-6825318

Email: hop@hop-pth.co.il **Web:** www.hop-pth.co.il