KNAPS
TECHFAB INDIA LLP®
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ELECTRONIC WATER SOFTENER DEVICE

VARIABLE-FREQUENCY IMPULSE TECHNOLOGY



ES100 / ES200 / ES300 / ES400 / ES600 / ES800

IMPULSE FIELD

VARIABLE FREQUENCY

THE SMARTER WAY TO MANAGE SCALE.

Designed to address scale deposition before it becomes a daily operating cost — helping reduce maintenance, improve efficiency and extend equipment life.

● NO MAINTENANCE	○ SALT FREE	○ LOW ELECTRICITY	○ NO WASTAGE

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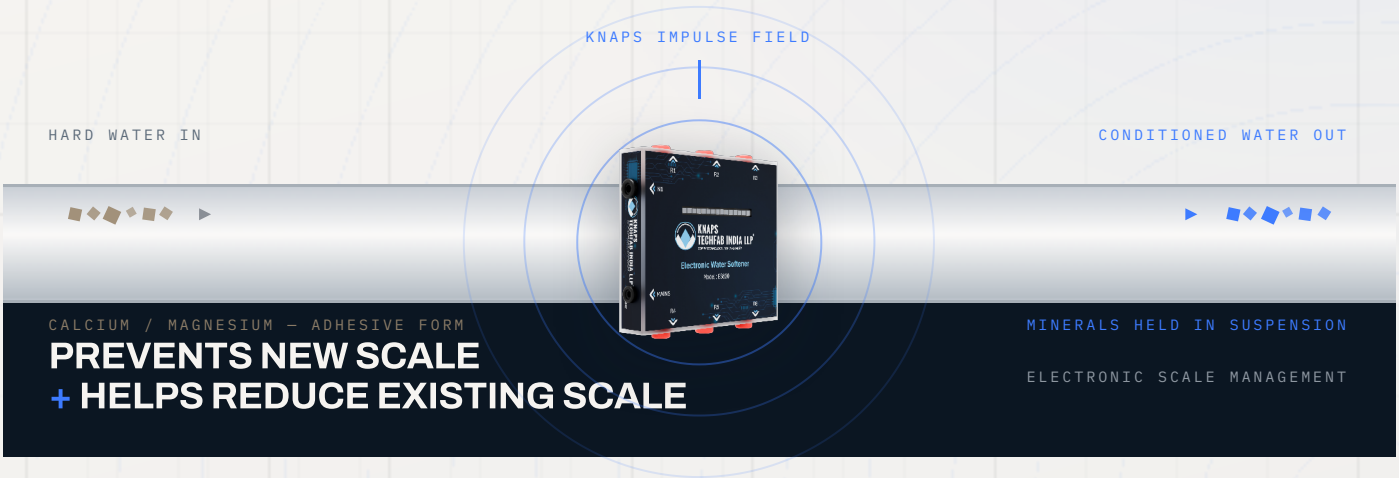
HOW KNAPS WORKS

KNAPS creates a controlled electromagnetic field around the water line. As hard water passes through this field, the behaviour of calcium and magnesium minerals is influenced — instead of easily attaching to pipe walls, heat exchangers and equipment surfaces as hard crystalline scale, the minerals are encouraged to remain in the flowing water in a less adhesive form.

NO SALT.
NO RESIN.
NO REGENERATION.

SCALE MANAGEMENT WITHOUT CONSUMABLES



01
IMPULSE / ELECTROMAGNETIC CONDITIONING
A controlled field is applied across the water line.

02
MINERAL BEHAVIOUR CHANGES
Calcium and magnesium take a less adhesive form.

03
NEW SCALE FORMATION IS REDUCED
Conditioned minerals have a lower tendency to stick.

04
EXISTING SCALE GRADUALLY LOOSENS
The environment around old deposits changes over time.

05
LOOSENED MINERALS MOVE WITH FLOW
Particles stay suspended and travel through the system.

06
CLEANER SYSTEM OVER TIME
Less deposition helps reduce maintenance and efficiency loss.



SCALE BUILD-UP VS CLEANER FLOW PATH

- Deposits narrow the bore and restrict flow
- Loosened minerals are carried downstream
- A cleaner surface supports heat transfer

Illustrative representation of scale buildup versus a cleaner flow path.

SALT-FREE **LOW INTERVENTION** **NO REGENERATION** **WATER SAVING**

Performance depends on water chemistry, flow conditions, temperature, system design and existing scale characteristics.

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ENGINEERED FOR INDUSTRIAL WATER SYSTEMS

WaveSoft is designed for scale-management applications across industrial, commercial and process-water systems.

PRIMARY APPLICATION / 01

COOLING TOWERS

Helps manage scale-related challenges in circulating cooling-water



COOLING TOWER INSTALLATION

THE STORY OF A COOLING TOWER

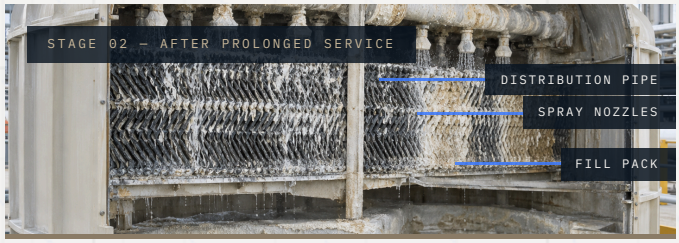
ILLUSTRATIVE LIFECYCLE



STAGE 01 — AS COMMISSIONED

IT STARTS CLEAN.
EFFICIENT. READY TO PERFORM.

A newly commissioned cooling tower begins with clean fills, open spray nozzles, unrestricted water distribution and clear heat-transfer surfaces. At this stage, water flows freely and the system is able to operate close to its intended design condition.



STAGE 02 — AFTER PROLONGED SERVICE

DISTRIBUTION PIPE
SPRAY NOZZLES
FILL PACK

BUT HARD WATER DOESN'T STAY INVISIBLE FOREVER.

As circulating water repeatedly evaporates and concentrates dissolved minerals, calcium and magnesium can begin depositing on fills, nozzles, pipes and basin surfaces. Without effective scale-control measures, these deposits can gradually accumulate over time.

FROM CLEAN SYSTEM TO HIDDEN COST

OPERATIONAL IMPACT

01
RESTRICTED WATER FLOW
Deposits interfere with uniform water distribution.

02
REDUCED HEAT TRANSFER
Scale acts as an insulating layer on heat-transfer surfaces.

03
HIGHER ENERGY DEMAND
Associated equipment may need to work harder to maintain performance.

04
MORE CLEANING & DOWNTIME
Frequent descaling and shutdowns can increase maintenance burden.

05
MORE WATER & CHEMICAL USE
Higher blowdown and chemical treatment may be required.

06
EQUIPMENT LIFE
Persistent scale can contribute to wear, corrosion and premature equipment issues.

THE REAL PROBLEM ISN'T THE SCALE YOU SEE. IT'S THE COST THAT FOLLOWS.

A cooling tower that starts clean can gradually become more expensive to operate if scale is allowed to accumulate unchecked.

THE WAVESOFT APPROACH

PREVENTION IS LESS EXPENSIVE THAN RECOVERY.

WaveSoft is designed to help manage scale formation continuously, without conventional salt regeneration or routine resin maintenance — helping reduce scale-related intervention over time.

Images are illustrative representations of clean and scale-affected cooling-tower conditions. Actual results depend on water chemistry, operating conditions, system design and maintenance practices.

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WHERE KNAPS - FITS

From process plants and cooling systems to hotels, hospitals and high-rise buildings, KNAPS is designed for scale-management applications across a wide range of water systems.



02

BOILERS

Helps address scale-related heat-transfer losses and maintenance concerns.



03

CHILLERS

Supports cleaner condenser and evaporator surfaces for efficient heat exchange.



04

COLD STORAGES

Increases Chilling in Cold Storage plants and helps prevent scale in Chiller Line.

SECTOR MATRIX

POTENTIAL APPLICATION ENVIRONMENTS

05 INDUSTRIAL & MANUFACTURING

- **Sugar Factories**
- **Textile & Dyeing Plants**
- **Food & Beverage Plants**
- Dairy Plants
- **Pharmaceutical Plants**
- Chemical & Process Industries
- Paper & Pulp, Steel, Foundries
- Automotive, Cement, Fertilizer

06 HVAC & THERMAL SYSTEMS

- **Cooling Towers**
- **Boilers**
- **Chillers**
- Heat Exchangers
- Condensers & Evaporators
- Closed-Loop Cooling Systems
- Hot-Water Systems
- Process-Water Loops

07 COMMERCIAL & INSTITUTIONAL

- **Hotels**
- **Resorts**
- **Hospitals**
- Malls & Office Towers
- Residential Towers
- Housing Societies
- Educational Campuses
- Airports & Railway Facilities

08 SPECIALIZED APPLICATIONS

- Cold Storages
- Ice Plants
- Commercial Laundries
- Breweries & Bottling Plants
- **Data Centres**
- Industrial Washing Lines
- RO Pretreatment Lines
- Solar Hot-Water & Machine Cooling

SUGAR / TEXTILE / FOOD & BEVERAGE / PHARMA / HOTELS & RESORTS / HOSPITALS / DATA CENTRES / COOLING TOWERS / BOILERS / CHILLERS

AND MANY MORE APPLICATIONS WHERE HARD-WATER SCALE AFFECTS SYSTEM PERFORMANCE.

Application suitability depends on water chemistry, operating conditions, flow, temperature and system design.

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1 MM SCALE LAYER PIPELINE CROSS-SECTION

1 MM OF SCALE HAS A MEASURABLE COST.

- HEAT TRANSFER
- ENERGY
- WATER
- CHEMICALS
- MAINTENANCE
- EQUIPMENT LIFE

COOLING TOWER

IMPACT OF SCALE — INDICATIVE RANGES

HEAT TRANSFER
10–15%
Drop in cooling efficiency for 1 mm scale

ENERGY
5–15%
Higher electricity bills

CHEMICAL COST
20–30%
Rise in chemical expenses

WATER
10–20%
Increase in water usage

MAINTENANCE
₹20K–₹1L
Per cleaning session

EQUIPMENT LIFE
30–40%
Potential reduction in lifespan

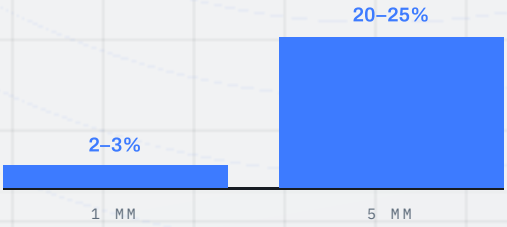
BOILER SYSTEM

HIDDEN COST OF SCALE

Scale layer forms	1 MM
Thermal resistance rises	10–30% heat-transfer drop
More fuel required	2–3%
Heavier deposits	5 mm = up to 20–25%
Higher cost and emissions	+3–5% CO_2 / mm

CLEANING CYCLE	BOILER LIFE	WATER & CHEMICALS
₹10K–₹50K	30–50%	10–15%

SCALE THICKNESS VS FUEL IMPACT



Increase in fuel use. Supplied endpoints only; intermediate values not plotted.

SCALE COSTS MORE THAN CLEANING.

₹1–5L / year
OPERATING IMPACT

30–50%
EQUIPMENT LIFE IMPACT

NO MAINTENANCE
WITH WAVESOFT

THE PROBLEM

SCALE + COST + MAINTENANCE

THE WAVESOFT APPROACH

ELECTRONIC SCALE MANAGEMENT

- NO SALT
- NO REGENERATION
- NO RESIN
- NO MAINTENANCE
- LOW ELECTRICITY
- CONTINUOUS OPERATION

WAVESOFT	VS	SALT SOFTENER
✓ No Salt		× Salt Required
✓ No Regeneration		× Regeneration Required
✓ No Brine Discharge		× Brine Discharge
✓ No Resin		× Resin System
✓ Minimal Maintenance		× Regular Attention
✓ No Regen. Water Loss		× Water Used to Regen.

APPLICATIONS

COOLING TOWER · BOILER · CHILLER · HEAT EXCH. · HVAC · PROCESS WATER · MFG.

Figures are indicative industry ranges for scaled industrial systems, not measured WaveSoft results, and vary with water chemistry, operating conditions and system design. WaveSoft is an electronic conditioning system designed for scale management; conventional ion-exchange softeners physically remove hardness ions. Selection should be based on application requirements.

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ENGINEERED TO FIT EVERY PIPELINE.



ES100
1"



ES200
2"



ES300
3"



ES400
4"



ES600
6"



ES800
8"

TECHNICAL SPECIFICATIONS

MODEL RANGE

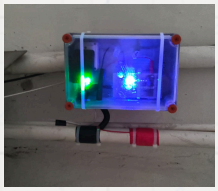
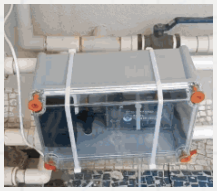
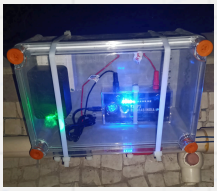
MODEL	ES50	ES100	ES200	ES300	ES400	ES600	ES800
Pipe Diameter	12 – 25 mm	20 – 40 mm	50 – 75 mm	75 – 125 mm	100 – 150 mm	150 – 200 mm	200 – 300 mm
Max. Capacity	4 m^3/hr	8 m^3/hr	30 m^3/hr	50 m^3/hr	80 m^3/hr	120 m^3/hr	180 m^3/hr
Input Voltage	190 – 240 VAC	190 – 240 VAC	190 – 240 VAC	190 – 240 VAC	190 – 240 VAC	190 – 240 VAC	190 – 240 VAC
Operating Voltage	12 VDC	12 VDC	12 VDC	12 VDC	12 VDC	12 VDC	12 VDC
Frequency Range	3 – 50 kHz	3 – 50 kHz	3 – 50 kHz	3 – 50 kHz	3 – 50 kHz	3 – 50 kHz	3 – 50 kHz
Impulse Bands	2 × 1.5 Mtr.	2 × 1.5 Mtr.	3 × 2.5 Mtr.	4 × 4 Mtr.	5 × 4.5 Mtr.	7 × 8 Mtr.	9 × 10 Mtr.
Measurements	130×65×35 mm	130×65×35 mm	115×130×35 mm	150×135×35 mm	185×130×35 mm	150×135×40 mm	185×135×40 mm
Required Space	500 mm	500 mm	600 mm	900 mm	1200 mm	1500 mm	1800 mm
Application Scale	Small	Small	Small–medium	Medium	Medium–large	Large	Large
Typical Use	Residential	Compact commercial / process line	Commercial / industrial line	Industrial water line	Industrial process / HVAC line	Larger industrial / cooling water	High-capacity industrial pipeline

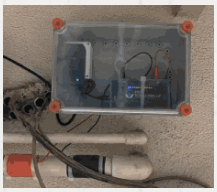
Final model selection should be based on pipeline size, water quality, operating conditions and application requirements.

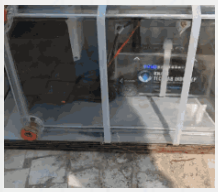
INSTALLATIONS

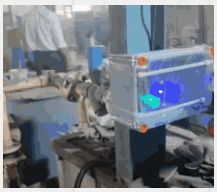
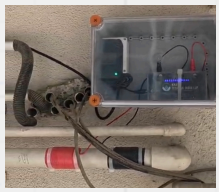
SITE PHOTOGRAPHS







Site photographs of installed WaveSoft systems. Some devices carry earlier packaging and may look visually different from the current product. The product and its technology are the same.

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