



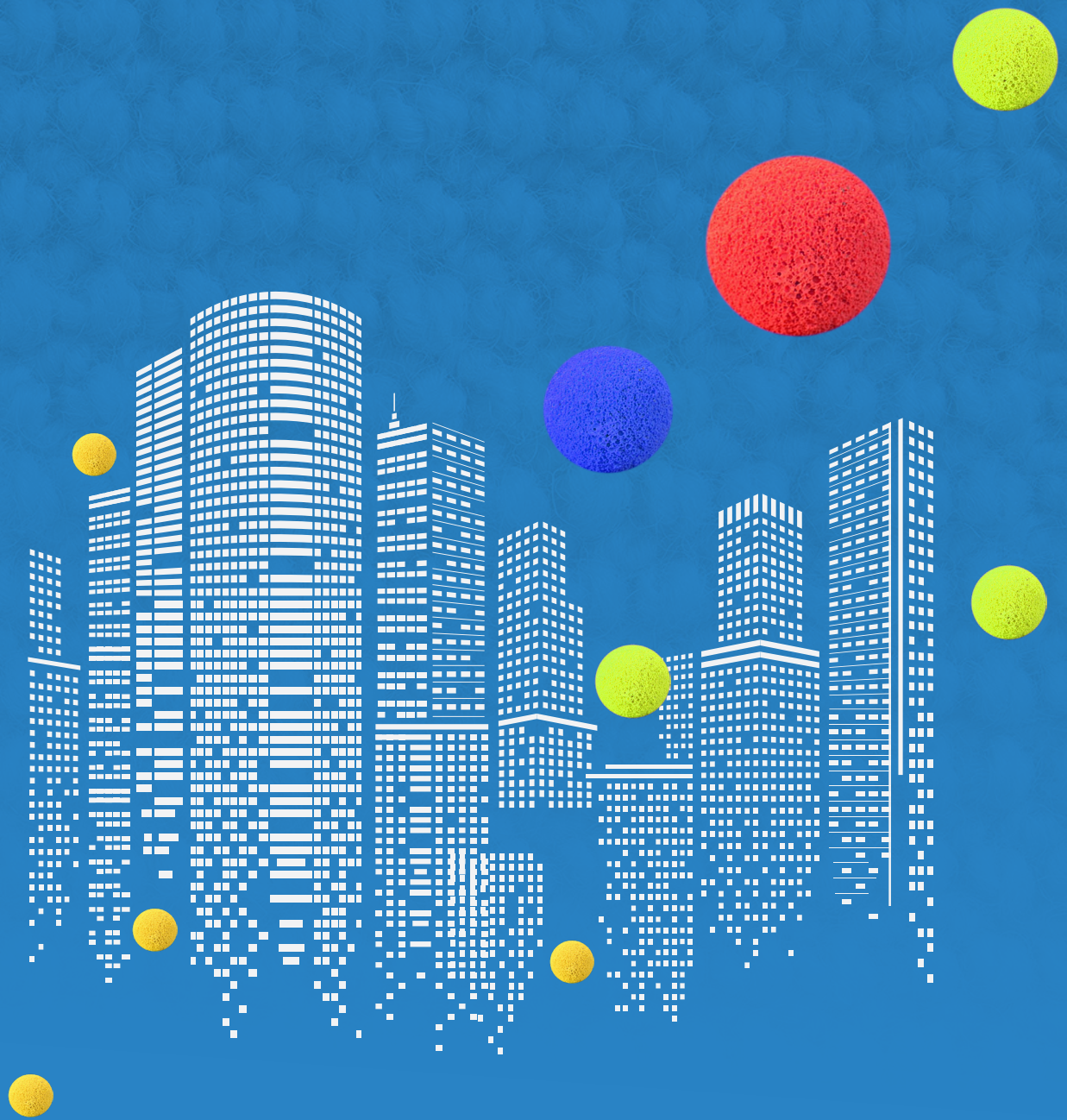
Energy • Environment • Sustainability



# AUTOMATIC **Tube Cleaning System**

SOLUTION FOR HEAT EXCHANGERS

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- | Pumps - HVAC, Plumbing & Fire
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- | Suspended Solids Filtration
- | Electrolytic Scale Remover
- | Chilled Water Thermal Storage
- | Customised Air Purification
- | HVAC Sensors & Transducers
- | Gas / Refrigerant Leak Detection



*Ensavor provides customized maintenance solutions for building owners while addressing concerns relating to operating performance, energy efficiency and environment. Automatic Tube Cleaning System is the key for heat exchangers to operate at peak efficiency.*

## Why ATCS ?

### Exchanger Cleaning

Puts your condenser tube cleaning on auto pilot ensuring worry free periodic tube cleaning.

### Fouling Elimination

Keep away the traces of debris, scale, and sludge from accumulating inside tubes resulting in no more fouling.

### Steady Heat Transfer

Continuous cleaning limits any increase in thermal resistance to heat transfer leading to best thermal conductivity.

### Efficient Cooling

With heat extraction source (condenser) at its best, efficient cooling is inevitable.

### System Longevity

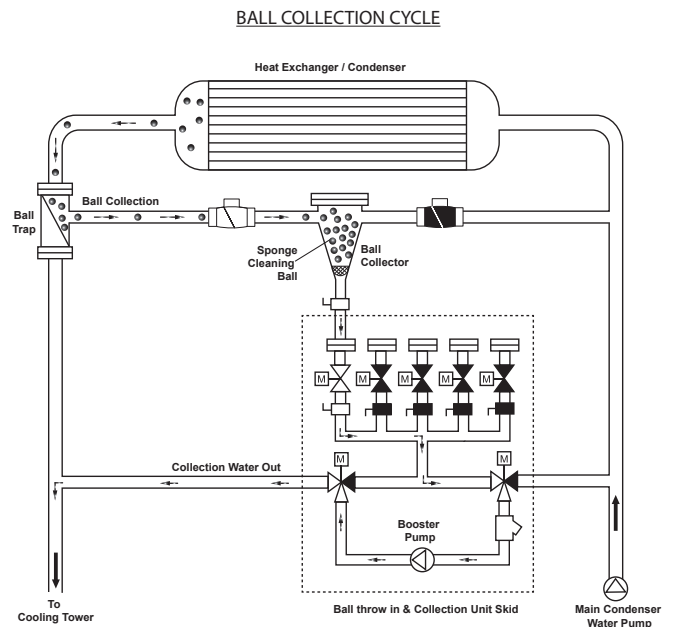
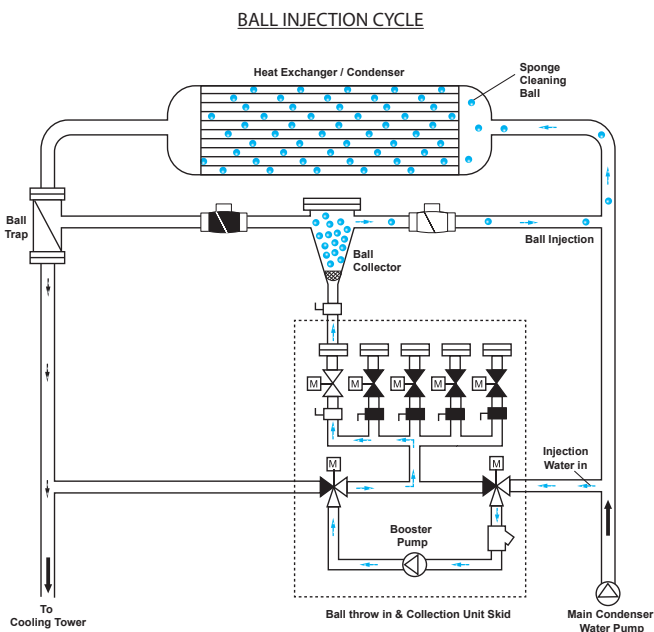
Clean, smooth, and efficient system operation enhances the life expectancy of overall system.










# How ATCS Works?

The Ensavior automatic tube cleaning system features specially developed sponge balls, which are injected into the chiller condenser water flow to provide continuous tube cleaning while the chiller is in operation.

**ATCS Working:-** Sponge balls resting in the Ball Collector are periodically injected to the condenser cooling water inlet pipe by the operation of a booster pump and control valves mounted on a Skid. These balls travel with normal condenser water flow in the condenser and pass through the tubes. While passing through the tubes ball carry away all the Soft Scales and deposits accumulated on the inner surface of the tubes and so keep the tubes continuously clean. The balls come out of the condenser and get trapped in the Ball Trap, while hot return water goes to the cooling tower. Ball trap is installed on the cooling water return pipe. Once all the balls are out of condenser and get trapped, these are pulled

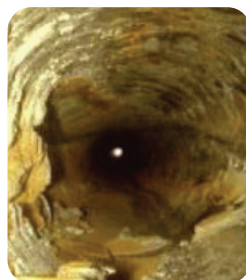
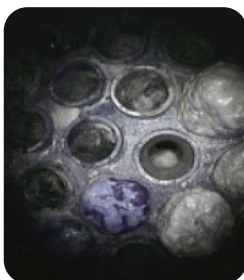
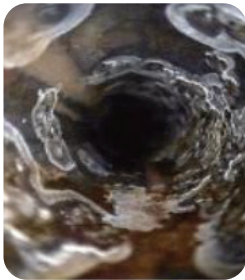
back and washed in the Ball Collector by operation of the same booster pump and control valves mounted on a Skid. The cycle is repeated every 10 to 30 minutes to ensure 100% tubes get cleaned. The operation is fully automatic and controlled through PLC with no human intervention.



-  NRV in Open Position
-  NRV in Closed Position
-  Pump Run Mode
-  Motorized valve OFF Mode
-  Motorized valve ON Mode
-  Motorized Three Way valve
-  Isolation Valve in Closed Position
-  Isolation Valve in Open Position
-  Y Stainer

# Facts

- 0.3 mm scale formation inside condenser tubes reduces heat transfer coefficient by 25%
- 0.6mm scale layer on condenser tubes reduces chiller heat transfer efficiency by 34% and increases energy consumption by 21%.
- 1 mm fouling will increase Power Consumption by 36%
- 1 °C increase in condenser approach is equivalent to 3.5% power loss.
- Despite Manual cleaning, COP is reduced over time which results in higher energy consumption and under performance of chillers.
- Fouling generally results in 30% increase in specific power consumption (IKW/TR) of water-cooled chillers.



# Additional Features

- All Components are from Global Manufacturers. Spares are available in any part of the world. No dependency for spares on us. Spares/Service can be sourced from open market.
- 100% Chemical Free System.
- Ball Collector and Ball Trap are Hot Dip Galvanised for much longer life.
- Tower Light with buzzer for annunciation from a distance in noisy atmosphere of Plant Room.
- Seven Inch Multi colour HMI Touch Screen.
- Complete System Graphics on HMI Screen for easy monitoring of system.
- Same P&I diagram for Steam Condensers, Ammonia Condensers, Chillers, VAM etc.
- Multiple Condensers (Maximum up to 5) can be cleaned by a single Skid.
- Maximum Safety for all the operational components. Apart from MPCB, MCB, protection for under/ over voltage, phase sequence is provided for Pump Motor protection.
- Can mostly be installed on standby condenser / chillers while those working can continue to be in operation with no water drainage from the circuit.
- Alert for balls needing replacement.
- Chiller Bypass Facility.
- Universally designed Ball Trap can be installed in horizontal / vertical pipeline or bend.
- Ball Trap comes with open-able cover for cleaning of mesh and Trap.
- Alert on Increase of Condenser Approach through parameters monitoring on SCADA / BMS (optional).
- Fully SCADA / BMS compatible via Modbus (optional).
- Remote monitored/controlled (optional).
- Ball Counter (optional).



# Our Offering

**SKID:-** This part comprises of booster pump and control valves controlled by a PLC to initiate mechanisms from injection of sponge balls to their collection. The complete system is so programmed to inject and collect the balls in set time interval.



Pump for Multiple Chillers

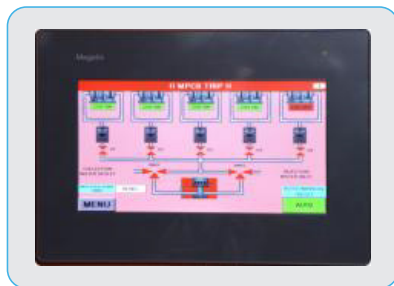


Pump for Individual Chillers



Pumpless For Individual Chiller

## CONTROL PANEL AVAILABLE IN TWO OPTIONS

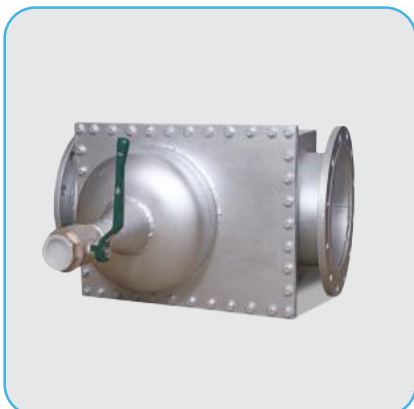


Multi Colour Touch Screen

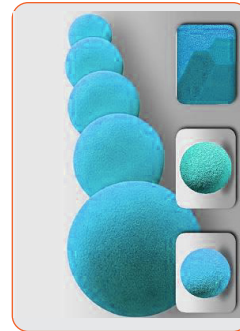


LCD Screen with Push Buttons

**BALL TRAP:-** This part of the system is installed on the line coming from condenser (to cooling tower). Balls coming out of the condenser are trapped here. It does not have any moving parts and ensures 100% recovery of balls. With compact design, these are hot dip galvanised for much longer life.



**BALL COLLECTOR WITH BALLS:-** In this part balls are collected, washed for next cleaning cycle, and pushed for injection into the condenser water stream. Sight Glass allows visual access to the physical condition of balls (whether replacement required).

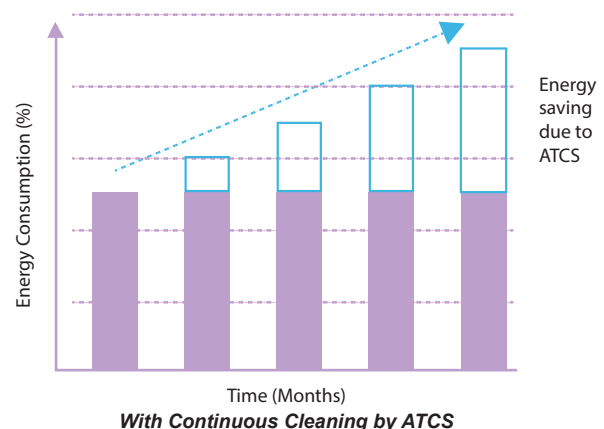
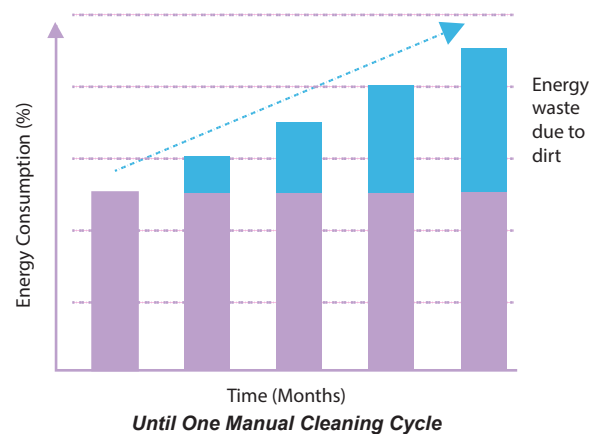


## Benefits of ATCS

- **Improved Chiller Efficiency:** The chillers continuously operate at optimum efficiency, leading to lower energy consumption and subsequent operating cost reduction.
- **Extended Chiller Life Cycle:** With condenser in perfect condition, compressor never operates beyond its design limits. This enhances the life of Chillers and yields higher ROI.
- **No Chiller Downtime:** The Automatic Tube Cleaning System keeps the condenser tubes forever clean without having to stop the chiller for maintenance.
- **Low Maintenance of Cleaning System:** The sponge balls used are the only consumables needing to be replaced in Automatic Tube Cleaning System. Better the water quality, lesser the frequency of balls' replacement.
- **Lower Water Treatment Cost:** Treatment of water present only in ancillary equipment is required for prevention of scaling. This results in nearly 50% cost savings on account of chemicals used for water treatment.
- **Environment friendly:** The Automatic Tube Cleaning System uses no chemicals.

## The Potential

The area bounded by the orange line represents the potential power conservation (up to 30%). This is a significant savings considering that HVAC accounts for approximately 60 % of the total electrical consumption of a large building





## **Ensavior Technologies Pvt. Ltd.**



+91 9658-373-373



info@ensavior.com  
www.ensavior.com



Plot No. 17A, Block A,  
Sector 19, Dwarka,  
New Delhi-110075, India



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Specifications and features can change without prior notice for developing a better and cost effective product.