

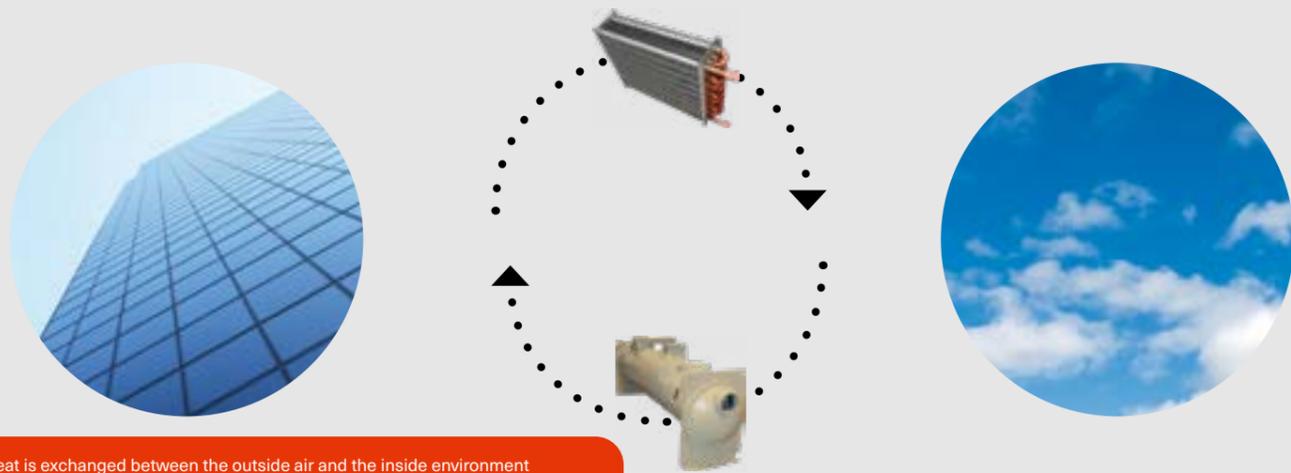
# Trane exchanger care

Optimize and protect your HVAC system

# Protecting your HVAC system

Businesses operate in an environment where system reliability and efficiency are essential. Your HVAC equipment maintains the comfort of your facility and safeguards your processes. Heat exchangers are the critical components that transfer energy between water, refrigerant and the outside air.

The characteristics of water and outside air are different at every site and this determines the lifetime and efficiency of HVAC exchangers.



Heat is exchanged between the outside air and the inside environment

## Water and system life expectancy

Water loops are complex systems which distribute the water that maintains the site at the desired temperature.

They comprise numerous components and many different materials which are sensitive to variations in water quality and velocity.

Such variations can determine the efficiency and lifetime of both the heat exchangers and the entire system.



Tube-in-shell exchanger



Water flow between the exchanger and the application

## The role of water in exchanger failure

Fouling will reduce performance and push up energy consumption, while leakage in the system will cause catastrophic failure.

### Mechanical failure

- Excessive water velocity can induce vibrations and cause metal stress.
- Suspended solids can attack the internal parts of the exchanger.
- Sudden interruptions in the flow can create a “water hammer” effect.
- Poor quality coolant can result in frozen and ruptured exchangers during cold periods.



Tube freeze rupture

### Chemical failure

- Water quality is highly variable. Careful monitoring and control of key parameters such as TAN (Total Acidity Number), oxygen or carbon dioxide concentrations is essential to protect exchangers.
- Chemicals in the water can cause corrosion in many components.



Exchanger scaling

### Fouling and scaling

- Scaling is the formation of a film on the heat transfer surface which acts as an insulator and limits heat exchange. As a result, the compressor will labor and consume excess energy.
- Suspended solids are very abrasive and can lead to perforated tubes.

## Consequences of a tube failure



### Mechanical failure

- Metal stress
- Internal parts of the exchanger
- “Water hammer” effect
- Frozen and ruptured exchangers



### Chemical failure

- Key parameters
- Corrosion in many components



### Fouling and scaling

- Excess energy
- Perforated tubes

## Tube failure

Any water entering the refrigerant circuit will cause catastrophic compressor failure. A high cost emergency replacement will be needed and production processes will be negatively impacted.



**The role of air in exchanger failure**

Air-cooled chillers or air-to-water heat pumps are installed in a variety of environments. They are designed to transfer energy between the indoors and the outdoors using a heat exchanger with fans. Trane exchangers are specially designed to maximize heat transfer, but polluted or corrosive conditions can impact the capacity of the exchanger and shorten its life.

Dirty or damaged heat transfer surfaces can reduce the narrow air passages and limit airflow. Chillers installed close to industrial sites or the seaside may operate in corrosive conditions which will attack the exchanger surfaces. Under these conditions, pressure and temperature will rise in the refrigerant circuit resulting in lost efficiency. Energy consumption and operating costs will increase.



Outdoor air pollution

Microchannel is the latest evolution in coil technology. These exchangers are considerably more robust than traditional tube-and-fin coils. Nevertheless, they require specific maintenance procedures to maintain peak reliability and efficiency. OEM qualified cleaners and approved methodology are essential as inappropriate cleaning can shorten the unit lifetime.



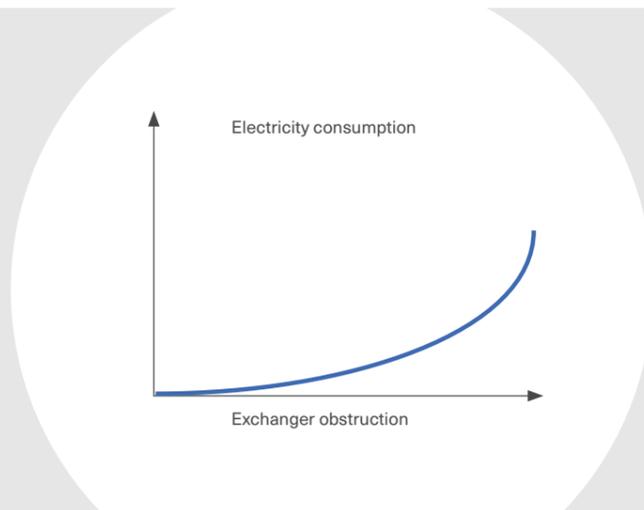
Obstructed coil

**Warning signs**

The most common failure mode is a coil leak which will shut down your HVAC system and possibly your site operation. But long before a leak develops, your system is likely to suffer a gradual loss of performance accompanied by a gradual increase in energy consumption.

**An obstructed exchanger can cost you as much as €3,500 in additional operating costs per year.\***

\* based on on a typical 650 kW capacity chiller, 4500 operating hours, 70 % load, 0,10€/kWh



Energy costs increase induced by exchanger scaling

Our improvement strategies are built on customized solutions designed to deliver outstanding performance in sustainability, reliability and energy consumption.

	Exchanger coating	Exchanger cleaning manual or automatic	Water analysis	Tube testing	Exchanger replacement	Tube replacement*
Reliability	✓		✓	✓	✓	✓
Efficiency/ Sustainability		✓	✓		✓	✓

\* For tube-in-shell exchangers only

**Benefits:**

- Avoid breakdowns
- Reduce unscheduled maintenance costs
- Restore HVAC performance to “as new” standards
- Regain system efficiency to cut energy costs.



## Trane Building Advantage solutions

### Know you can depend on your system

Buildings and their equipment are valuable assets. Trane Building Advantage aims to ensure that property managers have peace of mind, knowing their asset can be depended upon to perform day in, day out, whatever the season. A proactive maintenance plan will ensure that equipment life is maximized and that the risk of unscheduled business interruptions caused by breakdowns is minimized.

### Tube testing and tube replacement

Equipped with the latest technological tools, Trane can detect, locate and record internal and external corrosion, deposits, wear or cracking before they start to damage your installation. Trane can support you if tubes need to be changed.

### Water analysis

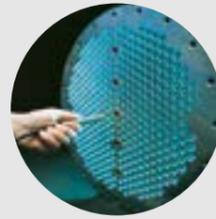
Trane can perform water analysis that will reveal if the water characteristics meet specifications. If necessary, we will advise on corrective action.

### Exchanger coating

- Tube in shell: By applying an internal coating of the water heat exchanger we can protect the cast iron components against corrosion.
- Coil exchangers may be coated to extend their lifetime in aggressive environments.

### Exchanger replacement

When heat exchangers need to be replaced, Trane can supply original or substitute parts to match your application and maintain "as new" performance.



Tube testing



Water analysis



Exchanger coating



Coil coating



MicroChannel Heat Exchanger

# Maintaining your HVAC system efficiency

## Trane Building Advantage solutions

### Unlocking your hidden cost savings

Trane Building Advantage will deliver significant cost savings whether it means fine-tuning your existing system or managing a replacement program.

### Exchanger cleaning

#### Manual tube cleaning

Trane can perform a manual cleaning of your shell and tube exchanger that will bring heat transfer performance back to original specifications.

#### Automatic tube cleaning

Trane automatic tube cleaning systems operate continuously to keep heat exchanger surfaces free from fouling. System capacity and efficiency are maintained at peak levels and energy consumption is minimized.

### Coil exchangers

Effective cleaning of an exchanger requires much more than simply blowing air through it. Trane experts use approved procedures to remove contamination from the fins and restore original performance.



Manual tube cleaning



Automatic tube cleaning



Coil cleaning

### Trane exchanger care solutions cycle

#### Detection solutions

- Tube testing
- Water analysis
- Failure analysis



#### Repair solutions

- Tube replacement
- Exchanger replacement



#### Preventive solutions

- Exchanger coating
- Coil cleaning
- Manual exchanger cleaning

## Next step

Whether your building is new, midlife or older, chances are it is not operating to its full potential. You may well have unsatisfactory performance that can be made world class or hidden savings that can be realized. The smart decision is to talk to your local Trane representative about Trane Building Advantage - and let us transform your asset.





# Trane Services

The real expertise of a manufacturer



- Systems approach
- Dependable installations
- Energy saving solutions
- Operating cost optimization
- Chiller plant management solutions
- Chilled water production solutions.

At Trane, we are committed to providing a comprehensive portfolio of HVAC solutions throughout your system lifecycle.



## Breakdown resolution

No one plans for breakdowns, but when they happen you need the right partner. Our expert Service Engineers use the latest diagnostic tools to guide you through your options to Repair, Renew, Replace or ReThink.



## Secure operations

At every point during the lifetime of your equipment - installation, commissioning, maintenance or breakdown - Trane can offer an effective solution with commissioning, first-aid kits and service agreements.



## System upgrade

Trane Building Advantage

Trane is committed to bringing the latest technological advantages to our customers through a wide portfolio of solutions which increase the Efficiency, Reliability and Sustainability of their HVAC plants. Our Service Engineers use their expertise together with the latest diagnostic tools to future-proof your system and make it "better than before".



## Equipment rental

For special events, exceptional needs or when you want to ReThink HVAC management, Trane Rental Services have the right solution. With our extensive fleet of equipment, we can perfectly match your temporary heating and cooling requirements.



## Contact us

With over 1000 of the best trained sales engineers and service technicians in the industry, Trane is in the best position to serve your needs. Just call us and we will help you configure the Trane Free Cooling solution for your HVAC system.



Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit [trane.eu](http://trane.eu) or [tranetechnologies.com](http://tranetechnologies.com).