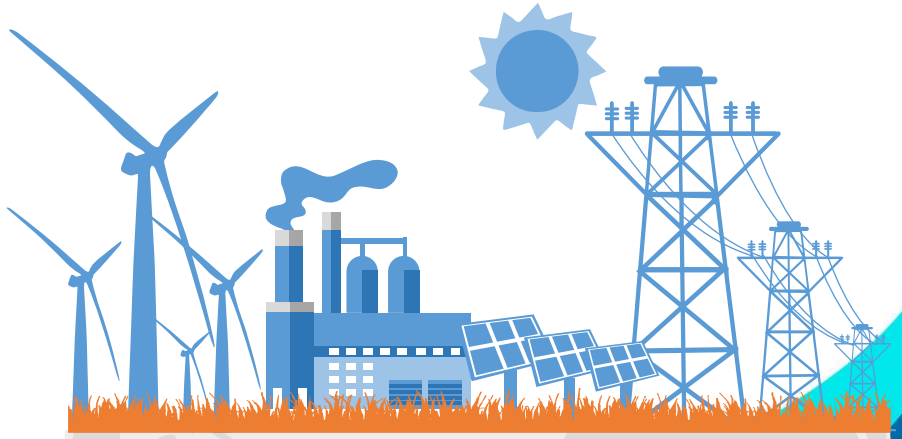
NxNano

HTF COMPACT®
Nanotech Energy Savings Fluid

Nordic Reseller of HTF Compact

# ENERGY SAVINGS NANOFLUID



HTF COMPACT®
Nanotech Energy Savings Fluid

TCT NANOTECH

NANOTECHNOLOGY FOR A BETTER FUTURE

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# HTF COMPACT®

## HIGH-PERFORMANCE HEAT TRANSFER NANOFLUID

HTF Compact is a breakthrough nanofluid which improves the heat transfer within hydronic systems. It rearranges the molecular structure of the fluid improving the heat transfer rate by leveraging metallic oxide nanoparticles suspended in solution.

The presence of nanoparticles enhances the thermal conductivity of the nanofluid primarily due to a better interaction within the heat transfer regions through a micro convection mechanism (Brownian motion) of nanoparticles in the coolant.

Because of the increase in heat transfer, HTF Compact enables the heat to be transferred faster and more efficiently improving energy efficiency by up to 40%* in broad applications such as HVAC or boiler systems

HTF Compact is the only nanofluid on the market commercialized as a compact solution. “Compact” means that our product requires only a 5% (v/v) replacement of an existing system volume. That is materialized in a simply and straight forward application procedure which normally is executed in less than one working day.


*Depending on the system characteristics.

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# WHY HTF COMPACT ?

The energy market is driven by fossil fuels. The efficiency created by HTF Compact has a direct impact generating not only costs savings but as well reduction in gas emissions. The addition of HTF Compact to a hydronic system impacts positively the CO2 footprint and reduces the waste of the energy generation.

Currently, restrictive operating costs are shifting the market towards energy efficient solutions with the aim of improving operational expenditure. HTF Compact will help the reduction of operating costs through its enhanced thermal efficiency.

Increasing space and layout limitations at existing systems require to move into optimized process solutions reducing equipment sizing. The efficiency generated by HTF Compact allows system optimization.

# HTF COMPACT® STRIKING FACTS

HTF COMPACT®
Nanotech Energy Savings Fluid

- Reduced carbon emissions
- Up to 40% savings vs. water or water + glycol
- No modification on equipment needed
- Increased lifetime and reduced maintenance costs
- Fast return on investment
- Non corrosive

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# How to Apply
# HTF Compact®

## 01 COMMISSIONING

Easy product introduction to running systems:
**HTF Compact** can be applied to systems in service (without taking them out of operation)
It is pumped into the system by means of a manual/electrical dosing pump. It is only required that a connection point/nozzle with a manual valve is available.

## 02 DECOMMISSIONING

**HTF Compact** in solution with water can be disposed as regular coolant. Neither impact nor special consideration adding cost to disposal of the base coolant is foreseen.

## 03 OPERATION

**HTF Compact** does not alter the normal operation philosophy/procedures at a site. TCT Nanotech provides guidelines on what process variables to monitor in order to assure the product is properly monitored by simple means of water chemistry control.

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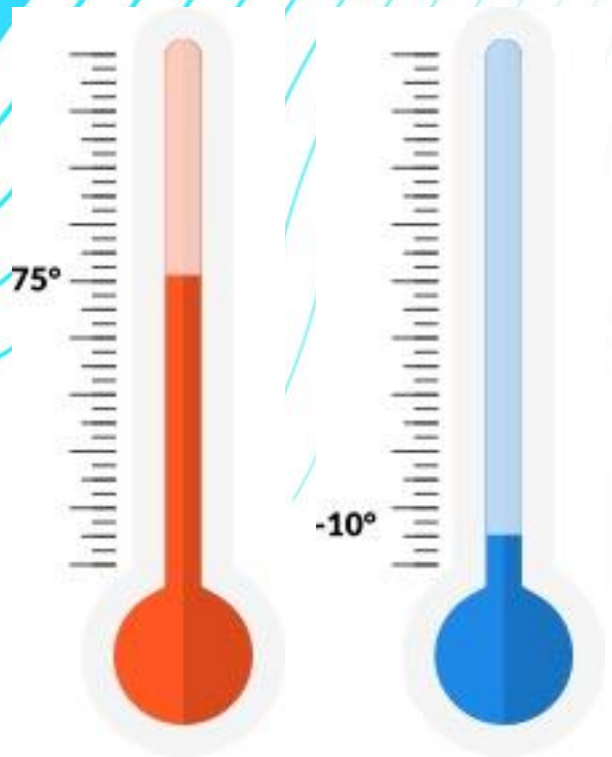
# **BENEFITS** HTF Compact

- **HTF Compact** reduces the approach temperature in heat exchangers whether they are water-to-water, water-to-air or refrigerant-to-water.
- Through a more efficient heat transfer, the energy consumers (e.g. boiler, heat pump or chiller) run more efficiently and need to run less to reach the required temperature set points.
- Our nanofluid is proven to be stable when circulated in final systems
- The nanoparticles contained in HTF Compact do not cause electrolysis, as they are oxides. HTF Compact will not cause erosion or corrosion in piping systems nor in equipment.
- The main active component of HTF Compact is inert and non-carcinogenic.
- HTF Compact concentration of 5% in the final system does not require change in operations, provides high flexibility to reach desired set points and it is easy to be installed.

# HTF COMPACT

## BENEFITS IN THERMAL HYDRONIC SYSTEMS




HTF Compact enhances heat transfer resulting in higher and faster heat loads being transferred between fluids.

Energy savings up to 40% (kWh consumed at a defined installation).

HTF Compact operation results in an increase in compressor direct efficiency in cooling applications and it decreases as well the compressor runtime.

Heat Exchanger Effectiveness is increased by means of an optimized HX approach temperature

Greenfield projects can benefit from streamlined equipment sizing and therefore, lower investment costs.

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# WHERE CAN HTF COMPACT BE APPLIED TO?

**HTF COMPACT** is set to disrupt the traditional way of dealing with heat transfer due to enhanced thermal properties which introduce new applications by dramatically increasing performance with cost effective and easy-to-install products

**DATA CENTER**

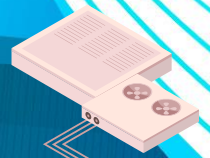
Cooling systems for electronics require to manage high amounts of heat loads in compact layouts. HTF Compact allows to optimize the heat transfer and to deliver savings from day one

**PROCESS COOLING**

Some process industries comprise heat transfer operations that require high amount of cooling or heating. As an example, the plastics industry require to evacuate high amount of heat as fast as possible to ensure efficiency in the molding processes. In that sense, HTF Compact provides the drive to create this efficiency resulting in faster heat transfer and lower electrical consumption.

**HVAC SYSTEM**

Either heating or cooling systems manage high amounts of heat that consume high amount of energy. HTF Compact helps overall system efficiency by making heat transfer efficient and hence minimizing the utilities consumption, either natural gas or electrical supply.



**Where can I find HVAC systems?**

HVAC systems are broadly utilized in civil applications such as in commercial buildings, malls, supermarkets, hotels & resorts, and real estate buildings as well as in industries comprising closed loop cooling systems (i.e. chemical and Oil & Gas industries, Food & Beverage, etc).

# WHICH APPLICATIONS ARE THE FUTURE OF HTF COMPACT?

**HTF COMPACT** is already disrupting the traditional design and operations of heat transfer systems. We expect further applications will benefit from the utilization of our product

**WIND POWER**

Wind power generation turbines produces substantial amount of heat that is normally evacuated from the nacelle by traditional closed loop cooling system. Utilization of HTF Compact can reduce the demand for cooling and hence improve the operational costs both in maintenance requirements and energy consumption.

**SOLAR PANELS**

Hybrid Photovoltaic/Thermal (PV/T) solar system is one of the most popular methods for cooling the PV panels nowadays. Provided that the cooling agent is water, it can be easily mixed with HTF Compact to ensure a higher thermal conductivity of the cooling media and hence, remove heat faster avoiding overheating due to excessive solar radiation and high ambient temperatures.

**AUTOMOTIVE ENGINE COOLERS**

One main element playing a role in efficiency at the automotive industry is the weight of the vehicle overall. One large contributor to the overall weight is the engine cooling systems. HTF Compact will influence the design of the cooling systems by minimizing the heat transfer area (smaller heat exchangers) and less need for fluid circulation (smaller tubing and accessories)

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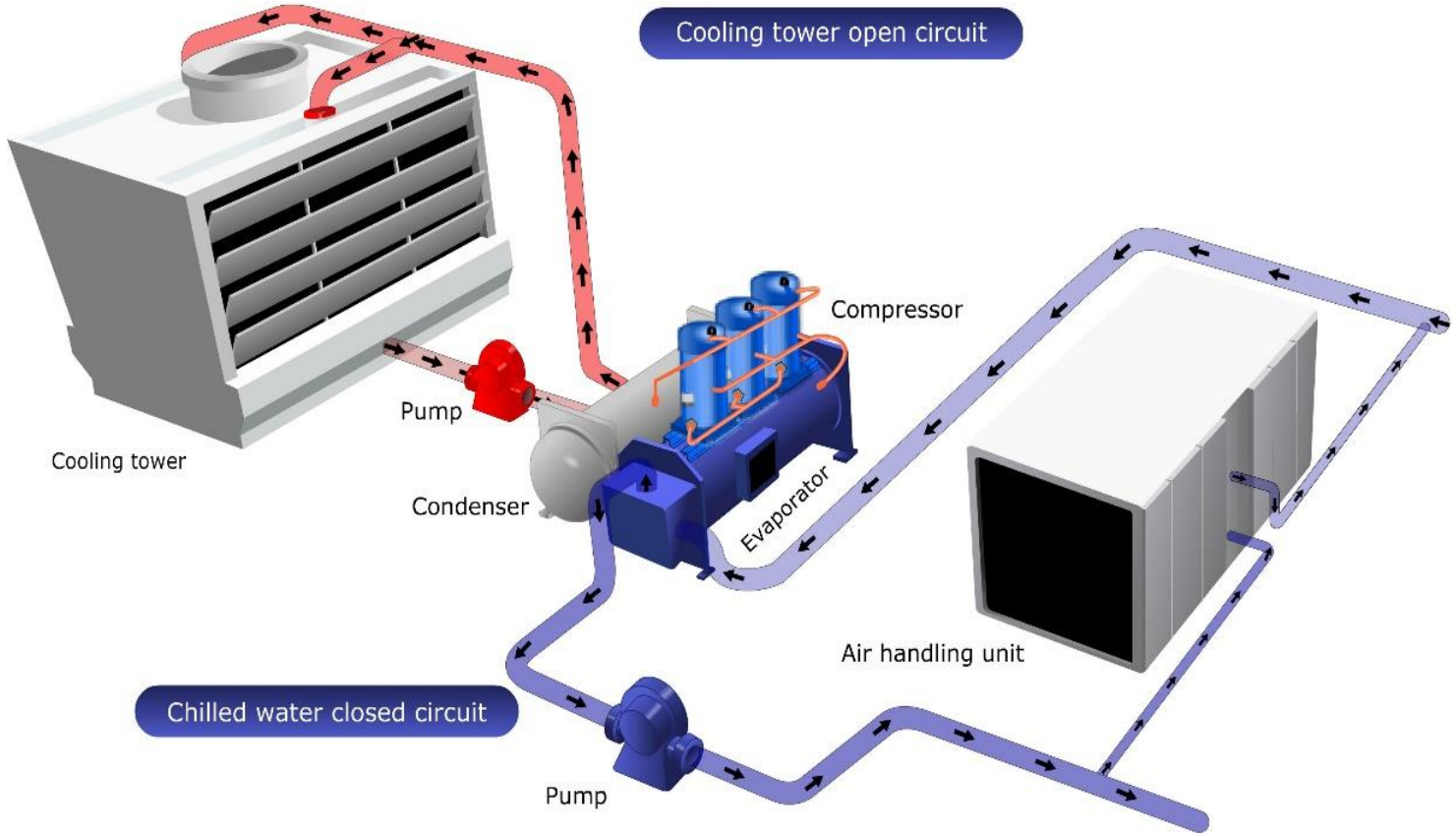
# WATER COOLED CHILLER SYSTEMS

**HTF Compact** can be applied to cooling systems (e.g. chilled water closed systems)

No modification to existing systems is needed. **HTF Compact** can be introduced without stopping operations.

Immediate increase in efficiency after product is introduced to system.



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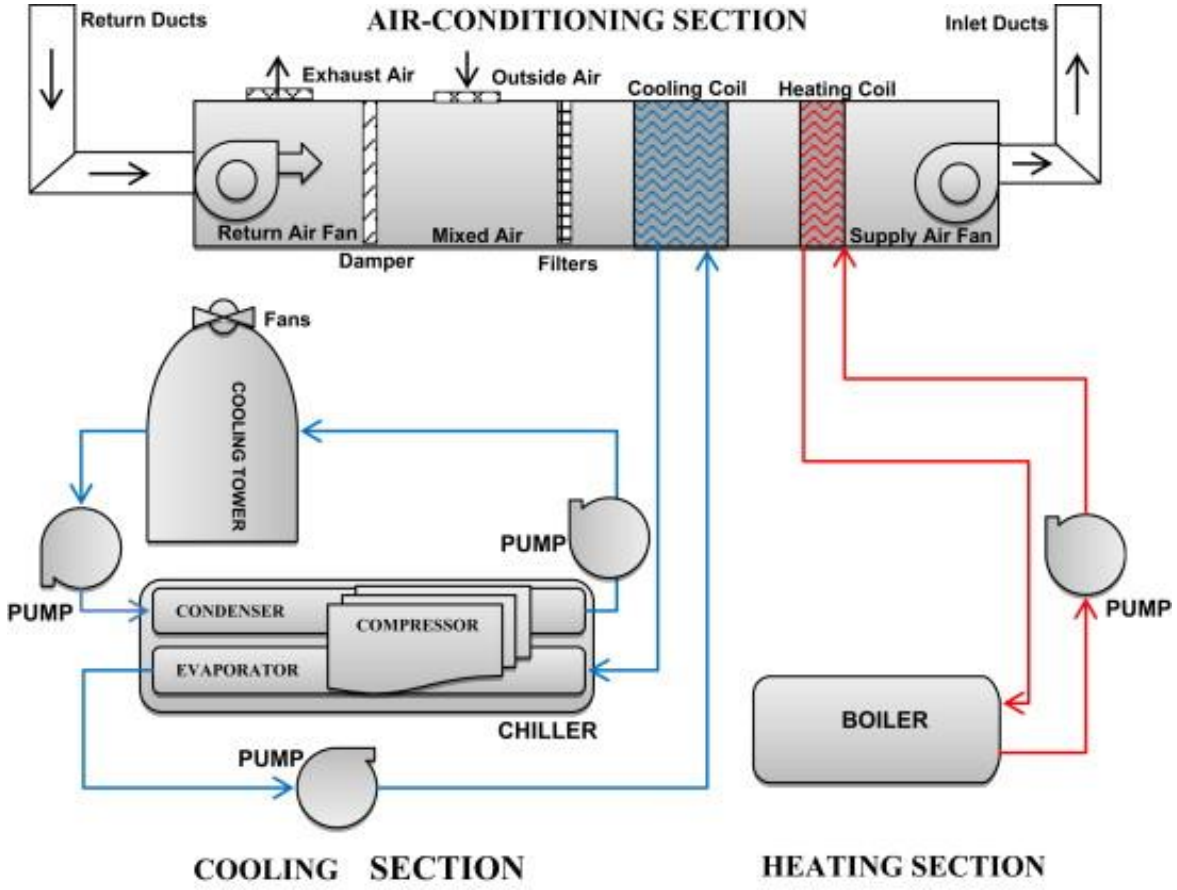
# INTEGRATED HVAC SYSTEM

**HTF Compact** can be applied to HVAC integrated systems (e.g. chilled water closed system + boiler system)

It is engineered for enhanced heat transfer operations including both cooling and heating systems. No modification to existing equipment is needed

**HTF Compact** can be introduced without stopping operations.

Immediate increase in efficiency at both systems after product is introduced.



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# QUALITY, HEALTH, SAFETY & ENVIRONMENTAL

**HTF Compact** significantly reduces the carbon footprint of a defined installation by directly influencing the $CO_2$ emissions. Higher efficiencies result in less energy being consumed and hence, lower $CO_2$ emissions released to the atmosphere.

**TCT**
is certified under ISO 9001:2008.

**HTF Compact** special formulation, based on lower carbon source content and anti-corrosion agent presence, does not contribute to the occurrence of pseudomonas and legionella bacteria.

ISO 9001

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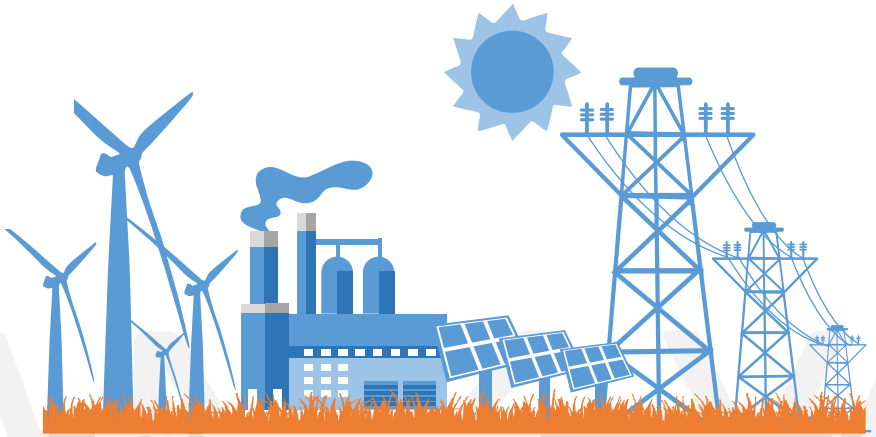
# CORROSION **PROTECTION**

## ASTM D-1384

HTF Compact has been tested and passed corrosion test and material compatibility on copper, aluminum, steel and brass.



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NxANO AB, Nordic Distributor of HTF Compact
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