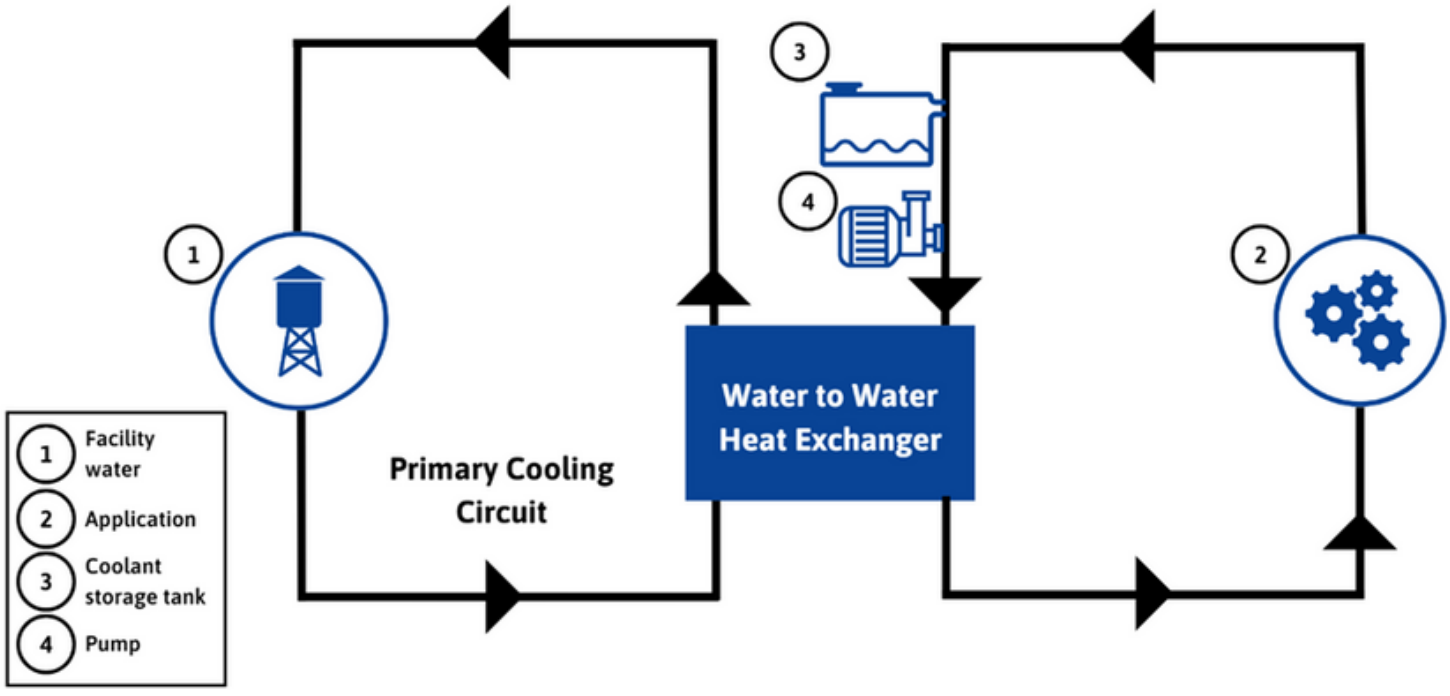
PRODUCT SERIES
- XR SERIES

The XR-Series is a range of 19” rack mountable water-to-water heat exchangers, designed for use with primary water circuits, providing cooling to applications for which the facilities water may be unsuitable.

Due to the 19” rack mountable design, the XR-Series is ideal for utilising wasted space, allowing cooling systems to be mounted within electrical racking, as other components become smaller, and systems are modernised.

How do rack-mounted water-to-water heat exchangers work?



How do rack-mounted water-to-water heat exchangers work?

As demonstrated in the diagram on the previous page, water-to-water heat exchangers are able to address facility water concerns, overcoming issues associated with insufficient pressure, fluctuating flow, or very cold water, by providing a stable supply of coolant to the process, regardless of the facility water condition, ensuring that processes remain at optimum performance.

Sitting between the application and the primary water circuit, the water-to water heat exchanger is able to modulate the flow rate of facility water to achieve temperature stability, without the need for a refrigeration circuit. It is also able to provide a layer of protection against microbial contamination for more sensitive equipment.

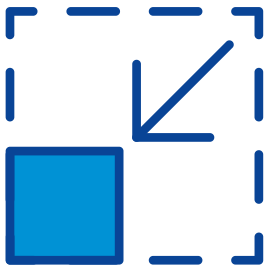
Plate heat exchangers are utilised in the design of the XR-Series by Applied Thermal Control, allowing for efficient heat transfer to occur in a small space.

For further information on plate heat exchangers and how they work, please see Appendix 1 and 2.

What are the benefits of a rack mounted water-to-water heat exchanger?

Ideal for a reduced system footprint

·Rack mounted water-to-water heat exchangers can be mounted within existing racking. This allows space to be utilised effectively following refurbishment and modernisation of systems.



Easy to install

·The compact size of rack mounted water to water heat exchangers also makes them easier to install and integrate into existing systems.

What are the benefits of a rack mounted water-to-water heat exchanger?

Plate heat exchangers are quick and easy to clean

·Periodic, onsite cleaning will flush out any contaminants, preventing fouling and eventual reduction in heat transfer.

Adjusting the cooling capacity of a plate heat exchanger is simple.

·If the requirements of the application increase or decrease, it may be possible to exchange the plate heat exchanger for one with more or fewer plates. A reduction in the number of plates will result in a reduction in cooling capacity.

Heat exchangers are responsive.

·Because fluids are flowing through a narrow channel, only a small volume of fluid is contained by the plate heat exchanger at any one time. This makes it possible to control temperatures with minimal lag times.

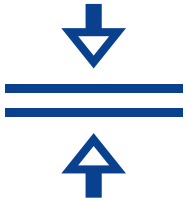
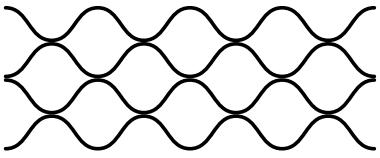


Plate heat exchangers are efficient



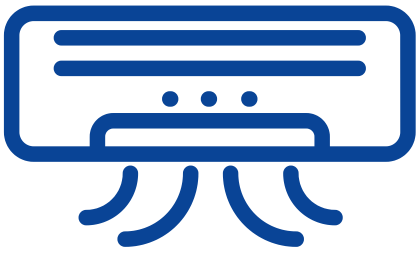
·The structure of the plate heat exchangers make it possible to recover up to 90% of the heat from process fluids.

What are the benefits of a rack mounted water-to-water heat exchanger?

Heat exchangers operate quietly.

·Because unwanted heat is transferred into the primary cooling circuit, fans are not required in the design of a water-to-water heat exchanger. A fan ejecting unwanted heat is usually the noisiest part of process cooling equipment.

Upgrades to air conditioning/ventilation are unnecessary.



·Unwanted heat is contained within the primary cooling circuit, rather than being ejected into the surrounding air by fans. This means that upgrades to air conditioning or ventilations within the building are not needed, resulting in lower energy costs and a reduced carbon footprint.

Heat Transfer Fluids

In scenarios where water alone is insufficient as a heat transfer fluid, due to its low boiling point, freezing point, or corrosiveness, glycol-based fluids may be used.

Ethylene Glycol (Hexid) and Propylene Glycol (CoolFlow) mixtures have lower freezing points than water and are also non-corrosive and can help to prevent the build-up of scale and other deposits, such as microbial contamination, when a biocide is present.

When selecting a heat transfer fluid, it is important to consider factors such as temperature range, viscosity, and chemical compatibility with the materials used in the heat exchanger. It is also important to follow the manufacturer's recommendations for the use and handling of the heat transfer fluid.

The XR-Series from Applied Thermal Control

The XR-Series is a self-contained system, comprised of a modulated primary supply, the water-to-water heat exchanger, and the coolant storage tank. A wide range of non-ferrous/stainless steel pumps are available, both positive displacement and centrifugal, with varying flows and pressures to suit a multitude of requirements. All pumps have fan-cooled electric motors and are supplied in 304 & 316 stainless steel as standard.

The XR-Series is suitable for use with a wide range of fluids including:

- Water
- Glycols
- Oils

Features of the XR-Series:

- Supplied complete with circuit breakers and on/off switches.
- Coolant pump starting contactors
- Pump motor protection
- IP54 protection
- 24V control circuit available
- Temperature gauge
- Pressure gauge
- Coolant safety bypass
- Visual tank level indicator

The XR-Series

XR04

The XR04 helps you to utilise otherwise wasted space within 19” electrical rack enclosures. It is designed to provide 4kW of cooling at 10°C above the temperature of the primary water circuit.

XR04

RACK MOUNTED WATER-TO-WATER HEAT EXCHANGER

HEIGHT OF UNIT
5U High

PUMP OPTIONS
Positive Displacement Pump

POWER SUPPLY OPTIONS
Single-phase

COOLING CAPACITY
4kW Cooling Capacity at 10°C
+/- 1 °C Temperature Stability

TEMPERATURE RANGE
+4°C to +70°C

Commonly requested options:

- High temperature pack, available to +75°C
- Non-return solenoid valves
- In-line deionising cartridge and fittings
- Castors to replace rubber feet
- CPC quick release connectors
- Installation kit
- Particulate filter
- Fan speed control (on/off)

The XR-Series

XR08

The XR08 allows space within existing 19” electrical rack enclosures to be utilised, reducing system footprint. It is able to provide 8kW of cooling at 10°C above the temperature of the primary water circuit.

XR08

RACK MOUNTED WATER-TO-WATER HEAT EXCHANGER

HEIGHT OF UNIT
5U High

PUMP OPTIONS
Positive Displacement Pump

POWER SUPPLY OPTIONS
Single-phase

COOLING CAPACITY
8kW Cooling Capacity at 10°C
+/- 1 °C Temperature Stability

TEMPERATURE RANGE
+4°C to +70°C

Commonly requested options:

- High temperature pack, available to +75°C
- Non-return solenoid valves
- In-line deionising cartridge and fittings
- Castors to replace rubber feet
- CPC quick release connectors
- Installation kit
- Particulate filter
- Fan speed control (on/off)

The XR-Series

XR15

The XR15 is designed to be mounted within 19” electrical racking, minimising system footprints and utilising otherwise wasted space. It provides 15kW of cooling at 10°C above the temperature of the primary water circuit.

XR15

RACK MOUNTED WATER-TO-WATER HEAT EXCHANGER

HEIGHT OF UNIT
5U High

PUMP OPTIONS
Positive Displacement Pump

POWER SUPPLY OPTIONS
Single-phase

COOLING CAPACITY
15kW Cooling Capacity at 10°C
+/- 1 °C Temperature Stability

TEMPERATURE RANGE
+4°C to +70°C

Commonly requested options:

- High temperature pack, available to +75°C
- Non-return solenoid valves
- In-line deionising cartridge and fittings
- Castors to replace rubber feet
- CPC quick release connectors
- Installation kit
- Particulate filter
- Fan speed control (on/off)
- Onboard RS485 data protocol

The XR-Series

Common Applications

Common Applications include:

- Laser systems
- X-ray sources
- Resistance welding machines
- High frequency generators
- Furnaces
- General process cooling

APPENDIX 1

HOW IS A PLATE HEAT EXCHANGER CONSTRUCTED?

A heat exchange transfers heat between heat transfer fluid from a primary cooling circuit and fluid from the application to regulate process temperatures, without fluids ever mixing.
Heat exchangers in both the XF and XR series from Applied Thermal Control use plate heat exchangers in their design.

The design of a plate heat exchanger exposes fluid to a considerably larger surface area than other designs of heat exchanger, maximising the area available for thermal exchange to take place whilst keeping pressure drop to a minimum.

Front and Back Cover

These are the end plates of the heat exchanger. They are very strong, usually made from a mild steel. The purpose of the front and back cover is to hold the plate heat exchanger together.

Inlets and Outlets

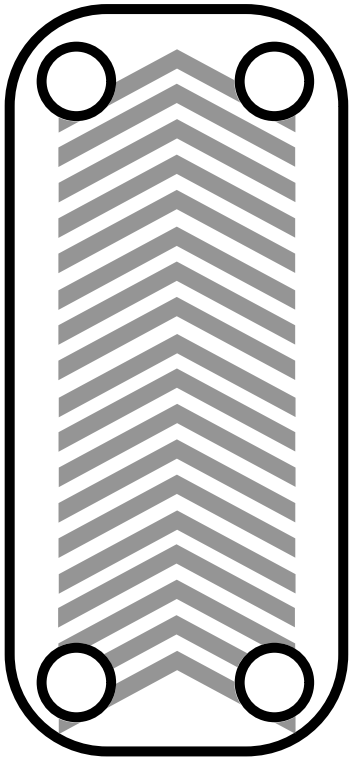
Here, the plate heat exchanger is connected to the primary cooling circuit and the process cooling circuit from the application, allowing fluids to enter and exit the heat exchanger.

APPENDIX 1

HOW IS A PLATE HEAT EXCHANGER CONSTRUCTED?

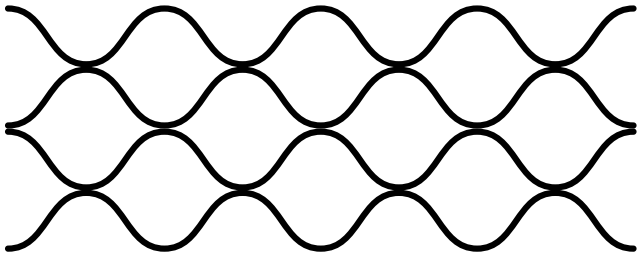
Heat Exchanger Plate

The size of the heat exchanger plate can vary from a few square centimetres to a few square meters. They are mostly constructed from stainless steel, titanium, or aluminium. Heat exchanger plates are generally corrugated.



This corrugation increases the heat exchange surface area, the rate of heat exchange, and the rigidity of the plates. The corrugations also create turbulence within the fluid, distributing heat evenly throughout. A smoother flow may allow heat to build in certain areas.

Holes in each corner of the plate behave as inlets, allowing fluid to flow through the plates.

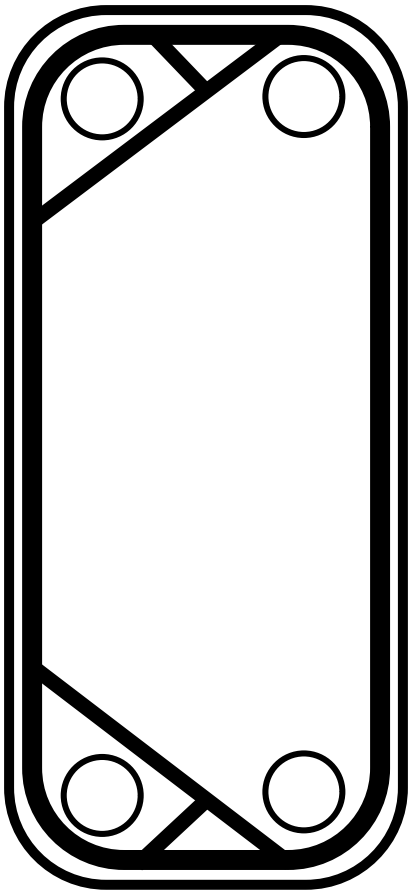


Corrugations in plate heat exchanger

APPENDIX 1

HOW IS A PLATE HEAT EXCHANGER CONSTRUCTED?

Gaskets

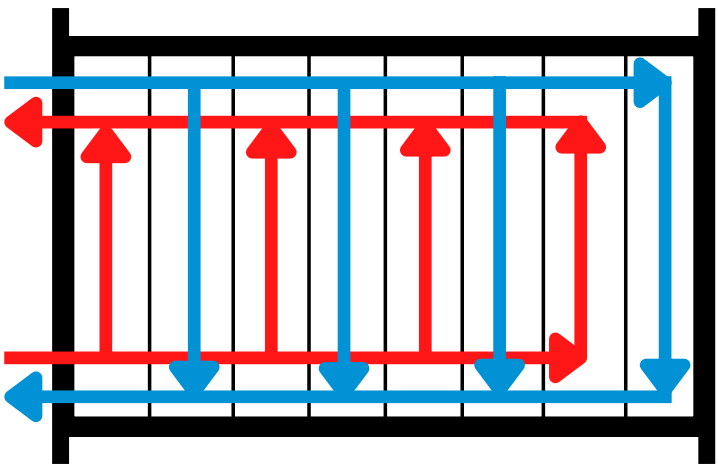


Gaskets are rubber seals attached to the front of the plate to ensure a tight seal is formed between the plates of the heat exchanger, preventing leaks or the two fluids from mixing.

The gasket is able to allow or prevent the flow of fluid into the cavities between two plates by using a diagonal seal to direct fluid as shown on the left. The gasket seals the holes on the left side of the plate, blocking fluid from entering the plate here. The holes on the right side of the plate are not sealed, allowing fluid to flow in and out of channels created between the plates.

Plates can then be stacked together, allowing fluid from the primary cooling circuit to flow through channels 2, 4 and 6, and leave the heat exchanger at a higher temperature. Fluid from the application will flow through channels 1, 3 and 5 and so on, and exit the heat exchanger at a cooler temperature.

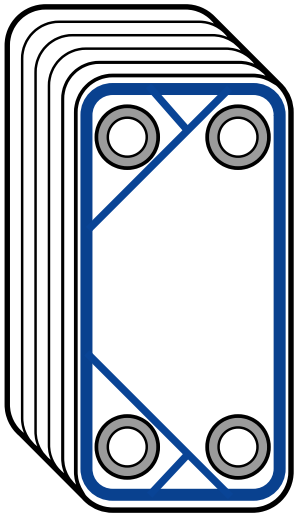
Heat exchangers from Applied Thermal Control are arranged in a single-pass configuration. Fluids are then able to then flow around the heat exchanger as shown below:



APPENDIX 2

HOW A PLATE HEAT EXCHANGER WORKS

By stacking multiple plates together and rotating the gasket to block either the left or right side, a channel is formed. This allows fluid to flow through alternating plates without mixing.

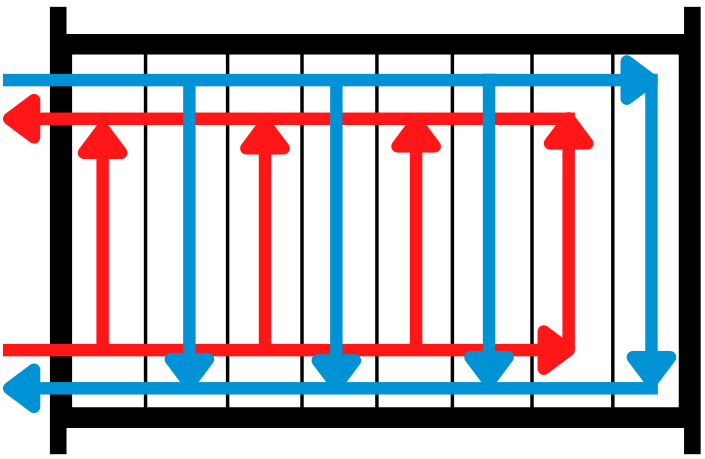


Gaskets shown in blue

Fluid from the primary circuit will flow through channels 2, 4 and 6, and leave the heat exchanger at a higher temperature. Hot fluid from the application will flow through channels 1, 3 and 5, and exit the heat exchange at a cooler temperature. The hotter fluid is able to transfer some of its thermal energy across the plate into the cooler fluid.

The plates are pressed together, allowing the gaskets to form a seal. The corrugations of the adjacent plates create a tortuous path in which fluid is driven.

Heat exchangers from Applied Thermal Control are arranged in a single-pass configuration. Fluids are then able to then flow around the heat exchanger as shown below:



Fluid passes through the plates in counter-flow. This means that the heat transfer fluid from the primary circuit and hot fluid from the application flow in opposite directions. Counter-flow offers a higher thermal efficiency than parallel-flow.

SINGLE-PASS CONFIGURATION WITHIN A PLATE HEAT EXCHANGER