VapoChill

Modular component system for open-circuit cooling towers

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Cooling energy for all industrial sectors

Whether in the production of beverages or food, the processes in the chemicals or pharmaceuticals industry or in the operation of data centres: Almost every industrial sector needs cooling energy. And this is exactly what the Krones VapoChill cooling tower provides.
It combines the Krones know-how from plant engineering for the beverage industry with the knowledge of thermal processes. The result: a modular series which sets new standards in the efficiency of process water cooling. And compared to conventionally operated cooling towers, the VapoChill series saves a large amount of process water.

At a glance

- Scalable design capable of covering cooling requirements from 50 to 2,000 kW
- Design based on customer-specific cooling requirements and local climate data
- Fast "plug and play" installation
- Stainless steel housing and components with a long service life

The VapoChill series at a glance

Method of operation: open-circuit cooling tower

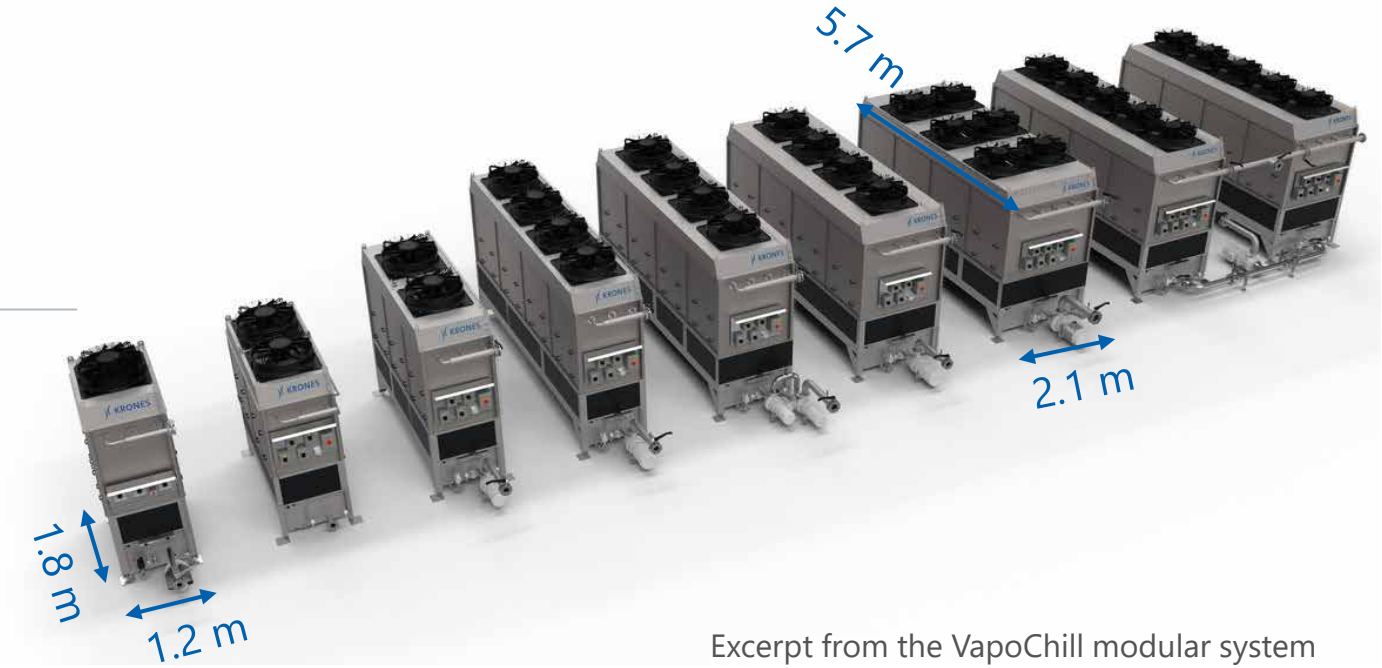
The process water is cooled using ambient air: when the air and water come into contact with one another, a part of the water evaporates. This process takes energy from the rest of the water and cools it down.

- High energy output in a small footprint
- Low electric power

Eight different variants

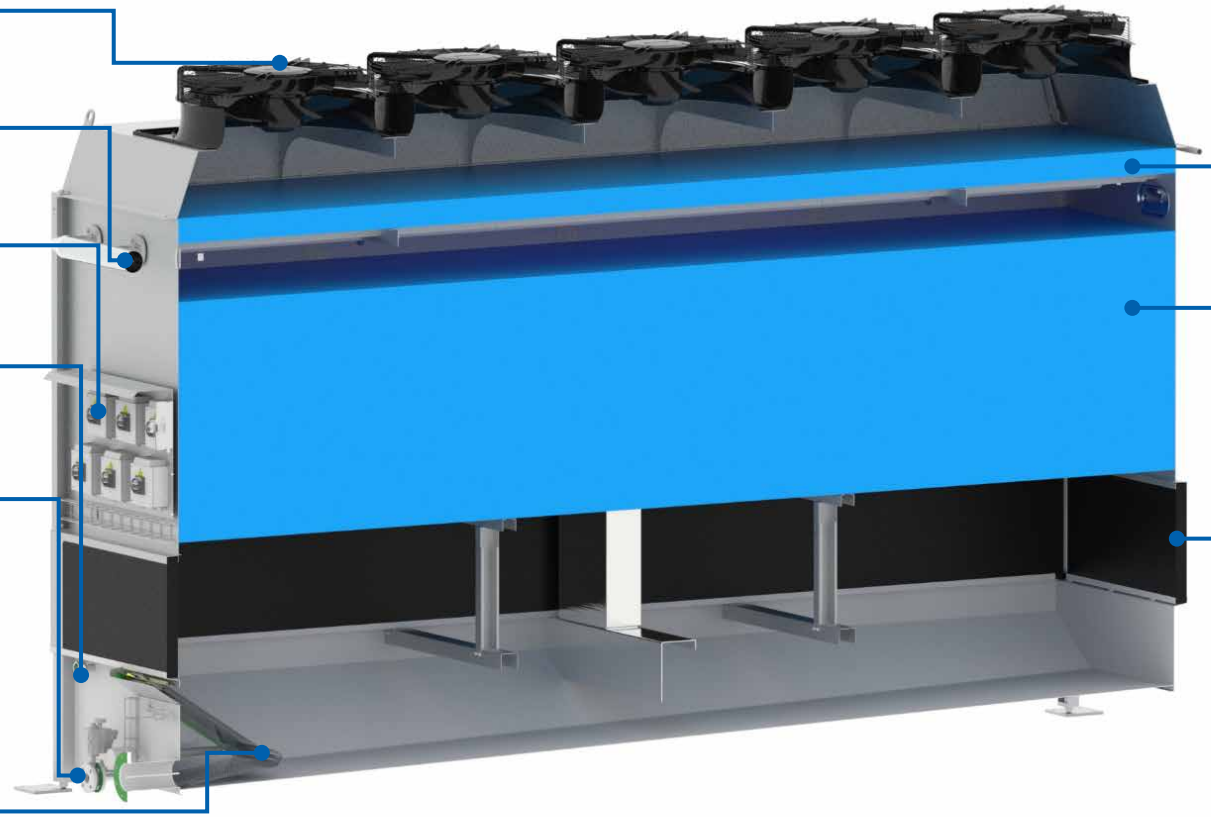
- Cover cooling capacities of between 50 and 2,000 kW
- Dimensions:
  - Width: 1.2 to 2.1 metres
  - Length: 1.8 to 5.7 metres

The VapoChill benefits from Krones accumulated expertise in the field of engineering. Even though the method of operation is designed to precisely meet the requirements of the beverage industry, it can be easily transferred to other industries.



Excerpt from the VapoChill modular system

In detail
Structure of the cooling tower



- Fans
- Spraying system
- Maintenance switch
- Filling connection and overflow device
- Drain connection piece (flap optional)
- Intake stub (customer-specific)
- Detachable sieve for pump protection
- Droplet separators
- cross-fluted fills
- Inlet louvres

Structure of the cooling tower
The standard components

Fans

- Axial EC fans with up to 30 percent lower energy consumption in full-load operation
- Infinitely adjustable speed control possible
- Specifically designed for use in cooling towers

Detachable sieves for pump protection

Accessible from the outside: cleaning is possible during operation

Control/sensors

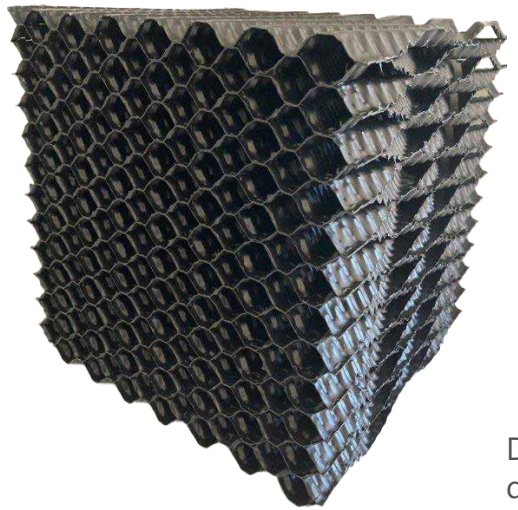
- Optional: different control variants and complete sensors available
- Optional: adding of biocides and descaler

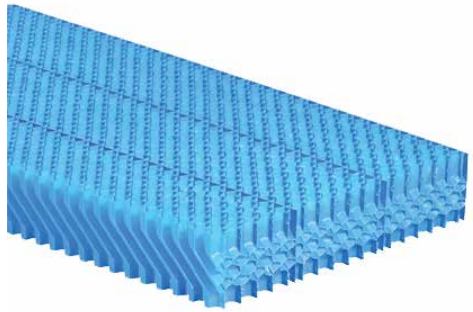
Spraying system

- Variable arrangements for the optimum spraying of the cross-fluted fills with only a low pre-pressure at the nozzles (max. 0.6 bar)
- 5 to 25 m^3/m^2 per hour possible

Cross-fluted fills and droplet separators

- Continually resistant at up to 70 °C (briefly even up to 80 °C)
- Droplet separators: certified by EUROVENT
- Cross-fluted fills:
  - Variable heights available
  - High efficiency (240 m^2 exchange surface per m^3)
  - Optional: Cross-fluted fills and droplet separators with biocide





Detailed view of the cross-fluted fills and droplet separators

Flexible modular design

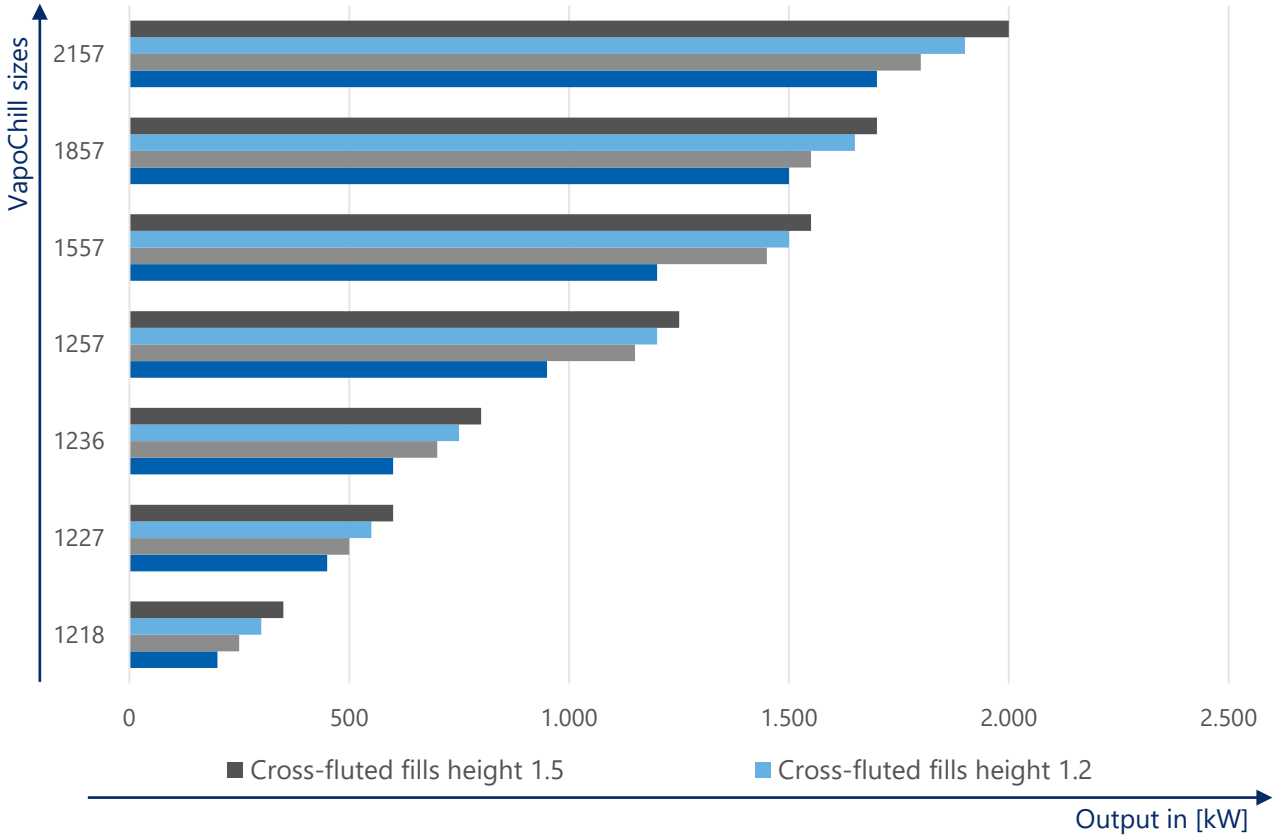
All sizes

- Are possible in AISI 304 or optionally in AISI 316L, stainless steel
- Can be combined as multi-cell cooling towers, to also reach high outputs for example.
- Are available in four different cross-fluted fill heights (0.6, 0.9, 1.2 and 1.5 metres)
- Can be flexibly adapted through component selection
  - Nozzle selection
  - Number of fans
  - ...

The cooling capacity can also be increased within one cooling tower series size by changing the cross-fluted fill height. This fine scaling method is a simple way of increasing the output without having to directly choose the next size up. This also makes it possible to simply retrofit cooling towers that are already in operation.

* Regensburg: wet bulb 20 °C, cold water 24 °C, warm water 36 °C installation height 376 m

VapoChill output [kW] for the various sizes*



Design details
Hygienic design

Design features

- Asymmetric edges: the basin is drained at the lowest point
- Cooling tower basin and fan module fully welded and immersion pickled
- No dead pipe ends
- Slanted surfaces: fewer surfaces where water can collect
- Cut-outs in carriers and profiles for flow optimisation
- Double pump protection
- Pre-installed cable guides

Long-life materials

- Housing completely manufactured from AISI 304 stainless steel
- Optional: can be designed in AISI 316L which improves the chemical resistance even further
- Plastic nozzles, air inlets, cross-fluted fills and droplet separators
  - Resistant to biocides and water stabilisers
  - Resistant to temperatures of up to 70 °C (briefly even up to 80 °C)

Design details
Good accessibility

- Easy-to-remove guard panels
- Inspection openings for checking the spray pattern and the condition of the inner components
- Removable jetting unit spray pipes
- Maintenance-free fans
  - The pump guard can be cleaned during operation
  - Quick and easy cleaning and maintenance

Design details
Dispatch and installation

Dispatch

Each cooling tower is made up of four individual modules that are arranged so that they can be dispatched in a standard container.
→ Minimised transportation and low transportation costs

Four single modules: on the left: fans, air inlet and basin stacked; right: cross-fluted fills

Installation

- "Plug and play": quick and easy assembly and connection of the four modules at the construction site
- Spindles to compensate slight gradients
- Fastening with heavy-duty dowels or screws
- Concentrated loads
  - Short installation time
  - Assembly possible without a crane (for floor assembly)
  - Lower amount of work required for supporting constructions/foundations

Quick assembly of the VapoChill

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More than just a cooling tower
Peripherals

You get more than just a cooling tower from Krones. Just as you can expect from a supplier with turnkey expertise, we will naturally also supply you with the entire peripheral equipment if required:

- Pump connections
- Jetting unit manifold
- Two lines for automatically and manually draining the water (mechanical overflow device)
- Optional: cooling tower controller
- Optional: noise protection

On the Krones website you can find blueprints of selected model sizes for downloading. They already include all of the site requirements and interfaces, as well as information on loads for the supporting construction.

Connection to production

Inflow of the process water into the cooling tower

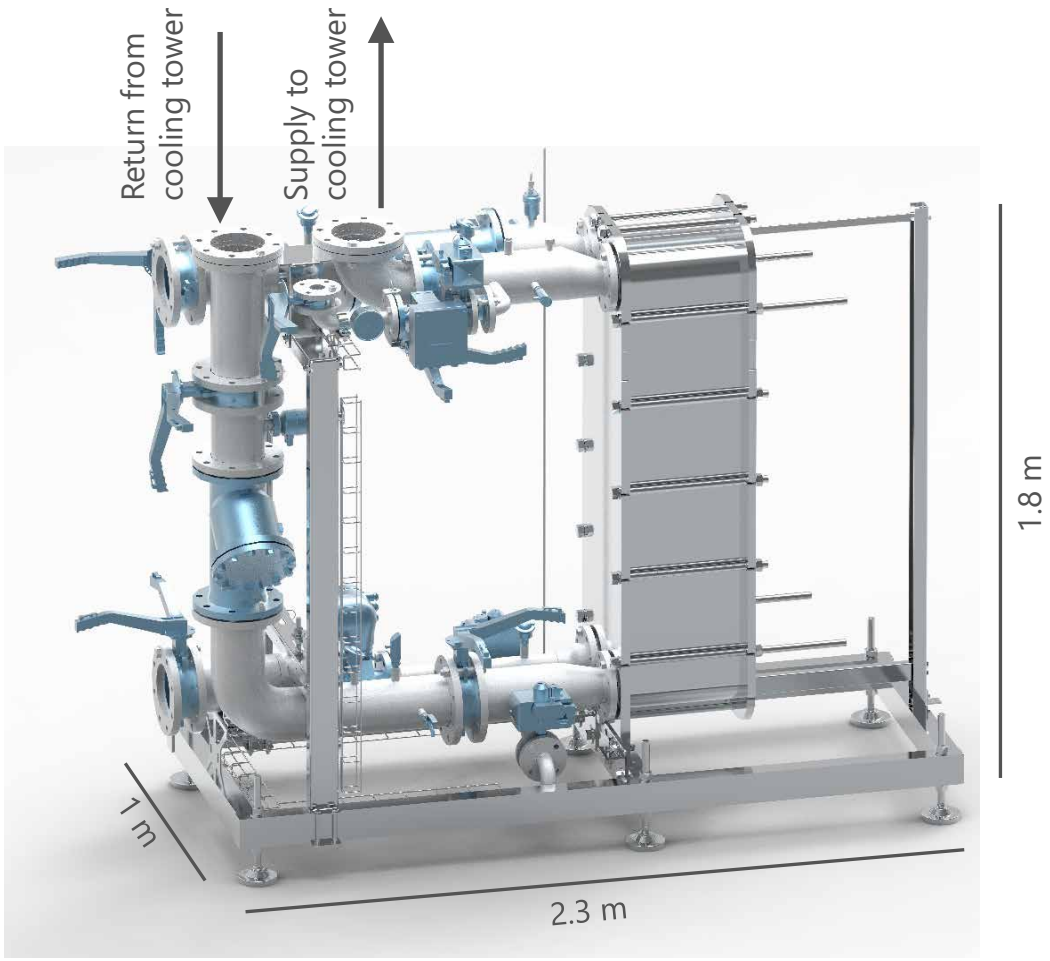
The cooling tower is connected to your production process using a system specifically designed for this purpose. All of the necessary components are assembled on a skid.

Standard configuration

- Heat exchanger with dirt trap
- Two sensors for digitally monitoring the pressure of the heat exchanger and the dirt trap
- Automatic valve for draining (with valve check-back signal)
- Automatic valve for automatic desalination (with valve check-back signal)

Optional

- Sensor for conductivity meter: makes it possible to save water during desalination
- The cooling tower is filled through an automatic valve (with valve check-back signal)
- Flow meter (for process water monitoring)



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Connection to production

Outflow of the cooling water from the cooling tower

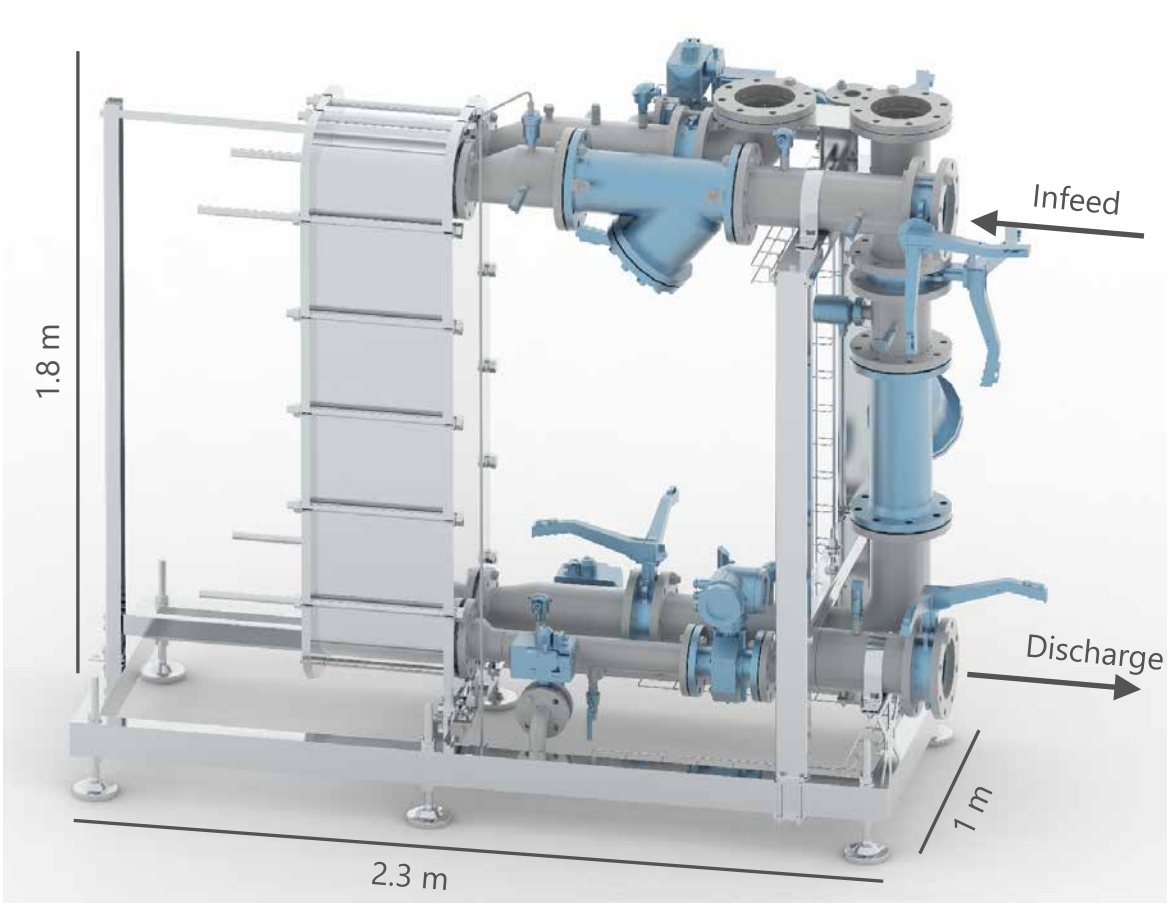
Standard configuration

- Plate heat exchanger (e.g. from Krones, but also available from other manufacturers)
- Heat exchanger guard with dirt trap
- Automatic valve for automatic draining (with valve check-back signal)

Optional

Flow meter for heat consumption monitoring

- All pipes manufactured from AISI 304 stainless steel
- Optional: can be designed in AISI 316L which improves the chemical resistance even further
- Quick installation thanks to the skid design



Individual design entirely in line with your requirements

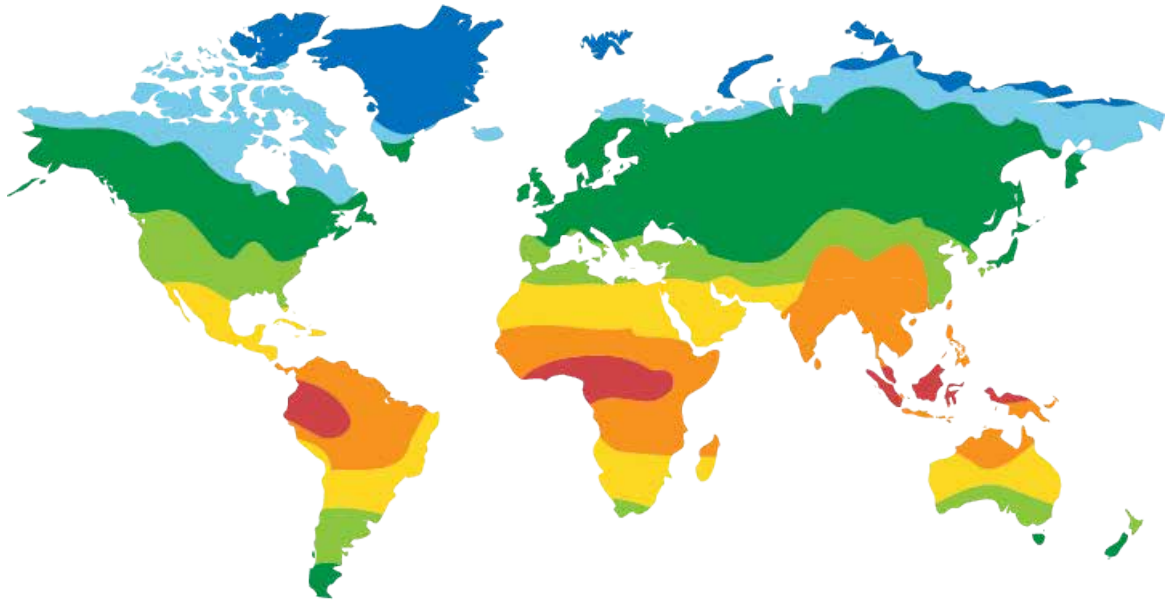
When designing your system, it goes without saying that we take your individual process requirements, as well as the climatic and geographical data of the cooling tower's future place of installation, into account – and thus adjust the VapoChill to precisely fulfil your needs.

Individual process and system parameters

- Cooling capacity
- Cold and warm-water temperature
- Installation surface footprint and weight of the cooling tower
- Energy consumption
- Noise emissions
- Consideration of the investment costs and TCO

Climatic and geographical data

- Air pressure/altitude
- Ambient air temperature
- Wet bulb temperature (from databases, from the system operator and Krones internal data)



Different climate zones in the world

Benefits to you

Low use of biocides

If cross-fluted fills with biocide are chosen, then the largest surface in the cooling tower will be protected against fouling because of microorganisms This option is also particularly characterised by its long operating times and lower biocide dosing quantities.

Many-years of experience and turnkey expertise

As a systems supplier for the beverage industry, Krones has decades of experience in systems construction – and has now adapted it for its VapoChill series. From Krones you will receive a customised complete package that, in addition to the cooling tower, can also include all of the other components and connections with quick availability.

Flexible during output adjustments

There are four different cross-fluted fill heights for each size. Benefits to you: If you wish to increase the cooling capacity, it may suffice to start by exchanging the cross-fluted fills instead of the entire cooling tower. This keeps the footprint and costs low while increasing the cooling capacity.

Efficient, reliable dispatch and prompt commissioning

No matter which size you choose: Krones cooling towers are always split up into four modules and fit into a standard container for dispatch. This not only saves on transport costs, its modular construction also saves on the time needed for commissioning.

Benefits to you

Best hygiene conditions

The unit is designed in accordance with “hygienic design” principles to achieve the best possible cleaning result with minimum staff requirements. The immersion pickled stainless steel housing also ensures that the cooling towers can be ideally installed outdoors. The AISI 316L variant can even be installed in coastal areas without further thought.

High resource efficiency

Speed-controllable fans with optimised efficiency (η > 50 %) are already included in the standard scope of supply. These make it possible to achieve energy savings of up to 85 percent during operation.*

Requesting a new machine
You can easily send a request for a non-binding quotation in our Krones.shop.

* Compared to conventionally operated cooling towers with asynchronous drives at changing cooling capacities

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