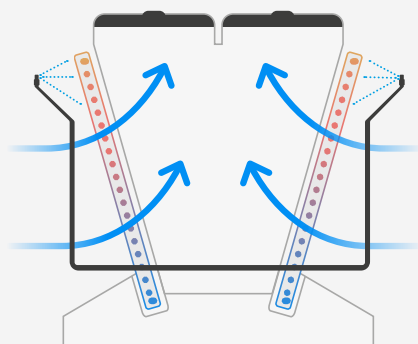


DESCRIPTION OF OPERATION OF GÜNTNER UNITS WITH hydroSPRAY™

The accessory option Güntner hydroSPRAY™ combines the simplicity of a dry cooler with the performance advantage of a spray system. The functional principle of spraying uses the effect of evaporative cooling to increase the driving temperature difference compared to dry operation.



FUNCTIONAL PRINCIPLE OF GÜNTNER UNITS WITH hydroSPRAY™

FUNDAMENTAL PRINCIPLE

The unit operates either in dry or in wet mode, switching between these two (intended) operating modes takes place automatically via the control device of the condenser/fluid cooler. In dry mode, the air flow is used to cool a liquid fluid (e.g. water, glycol, refrigerant) flowing through the coils of a finned heat exchanger.

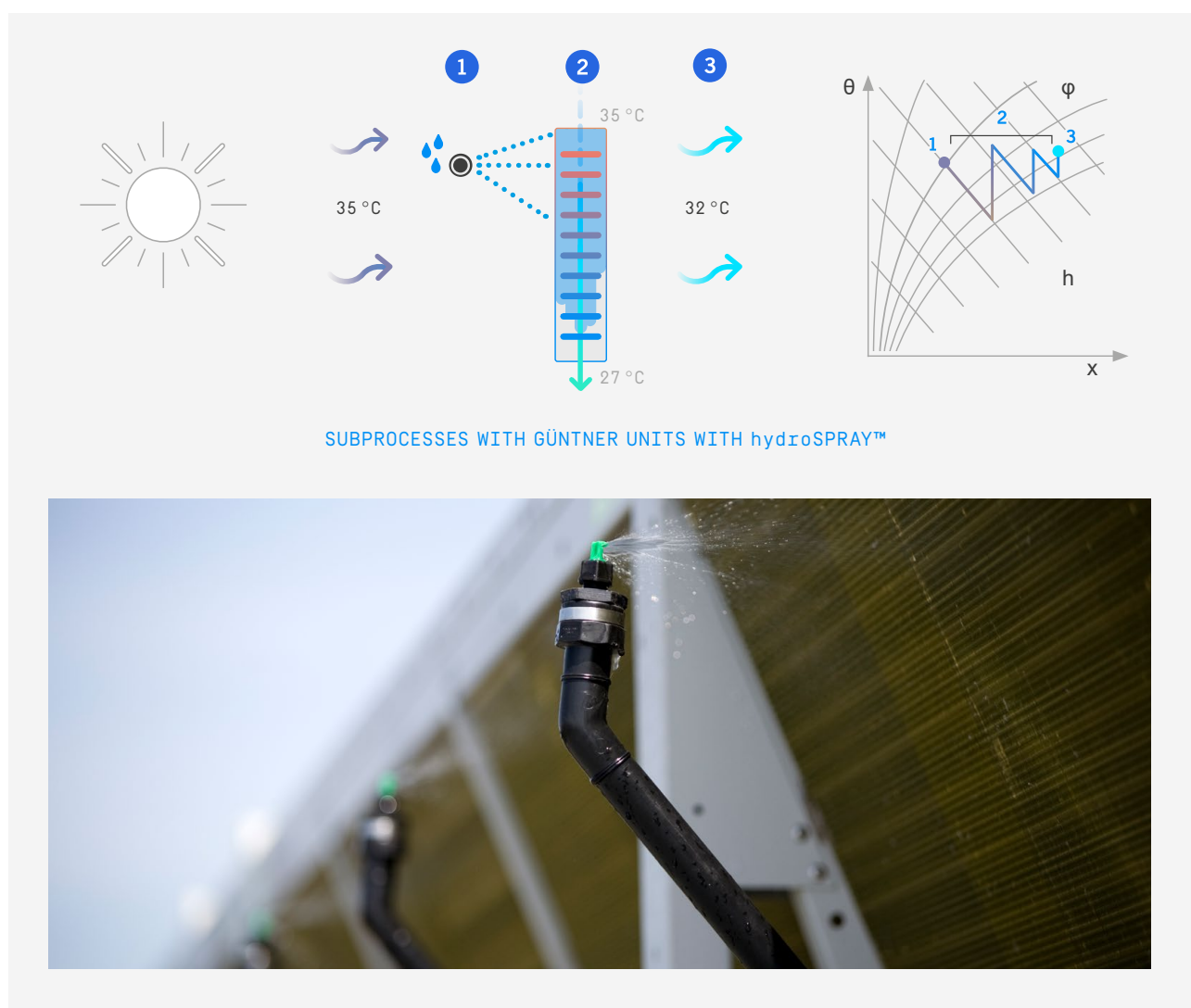
In spray mode, the effect of evaporative cooling is used by spraying the finned heat exchanger to cool down the intake air and thus increase the driving temperature difference. The increase in performance due to the spraying or the effect of evaporative cooling allows for the cooling of the fluid below the ambient temperature. The theoretical cooling limit is the wet bulb temperature. This means that low fluid temperatures can be ensured even at high ambient temperatures, thus guaranteeing energy-efficient operation of the entire system.

For most of the operating time, the unit operates in dry mode, i.e. evaporative cooling is not required during this period. Heat is dissipated purely convectively to the ambient air drawn in. Only when necessary (e.g. to cover peak loads at particularly high ambient temperatures) is the spraying switched on.

COOLING PROCESS

The hydroSPRAY™ system consists of a central distribution tube and a branch with one flat nozzle per fan chamber. By using a flat nozzle, a limited, powerful jet is produced. The water is applied exclusively in the upper area of the unit. The water quantity can be dosed by using different nozzle sizes and inlet pressures (2 – 5 bar). There is no water circulation; standing water is avoided (no basin).

To prevent frost damage to the system, the system drains itself starting at an adjustable outdoor temperature (standard: 6 °C). The so-called Legionella drain empties the tube system after an adjustable time (standard: 24 h) without active spraying. With the hydroSPRAY™ Professional variant*, the entire supply line is flushed with fresh water. Spraying therefore is always done with fresh water.



CONTROL

The automatic control of the V-shape VARIO is based on the following principle: The fans compensate for quick and small capacity fluctuations via speed control. As soon as the capacity is no longer sufficient over a defined period of time (rise of setpoint of the fluid outlet temperature), spraying starts. When spraying starts, the control system integrated in the V-shape VARIO (GMM/GHM – water management) opens the control valve installed on the inlet side and directs the water connected on site (limit values according to the installation instructions or V-shape VARIO water specification) to the spray nozzles.

Water consumption is minimised by Güntner's own demand-controlled, sectional spraying. Each fan chamber forms a section. In the Professional* version, each nozzle can be controlled individually. The controller logs the number of hours each section has been sprayed and always sprays the fan chamber with the fewest operating hours. This so-called section cycling minimises water consumption and protects the coil from corrosion and deposits.

CLEANING

All components of the spraying system, including the nozzles, are easily accessible for inspection and cleaning. The nozzles are insensitive to clogging; the system is therefore low-maintenance and fail-safe. Should the need to change the nozzles arise, this can be done easily, quickly and without tools.

*There are two variants of the hydroSPRAY™ system: hydroSPRAY™ Basic with up to 300 h/a spraying and hydroSPRAY™ Professional with up to 1,000 h/a spraying and additional control functions. The main difference between the two systems lies in the required water quality and thus in the water treatment. While the Basic variant will get by with a softening system in most cases, the Professional variant additionally requires a desalination system.