WL 320
Wet cooling tower

With interchangeable cooling columns the wet cooling tower WL 320 is used for basic experiments as well as comparative measurements in different types of cooling columns. Thus the key properties of the wet cooling tower can be traced in the experiment.

Cooling column type 1
medium surface (included in the scope of delivery of WL 320)

WL 320 Wet cooling tower

Additional cooling columns for comparative measurements

WL 320.01
Cooling column type 2
small surface

WL 320.02
Cooling column type 3
large surface

WL 320.03
Cooling column type 4
empty for wet deck surfaces of your own design

WL 320.04
Cooling column type 5
variable wet deck surfaces

Interchangeable cooling columns

Five different cooling columns are available

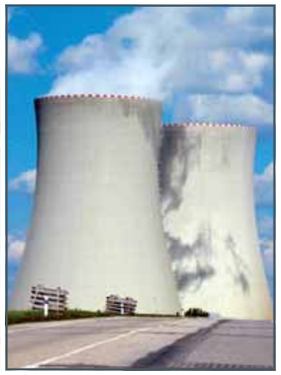
- three cooling columns with different wet deck surfaces
- one cooling column without wet deck surfaces for investigating the heat transfer in the free water drop or for own wet deck surfaces
- one cooling column with divided wet deck surfaces so that the surface of the wet deck surfaces can be varied and the distribution of the temperature and humidity within the cooling column is measured

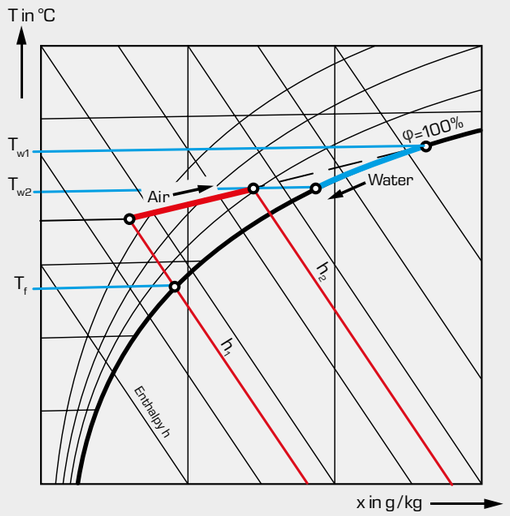
How does a cooling tower work?

Cooling towers are used to dissipate heat arising during thermal processes, e.g. in steam power plants, air conditioning systems and process chillers. A difference is made between dry and wet cooling towers. Wet cooling towers can be constructed more easily and smaller for the same capacity. However, they feature high water losses in the range of 1...2,5% of the cooling water volume.

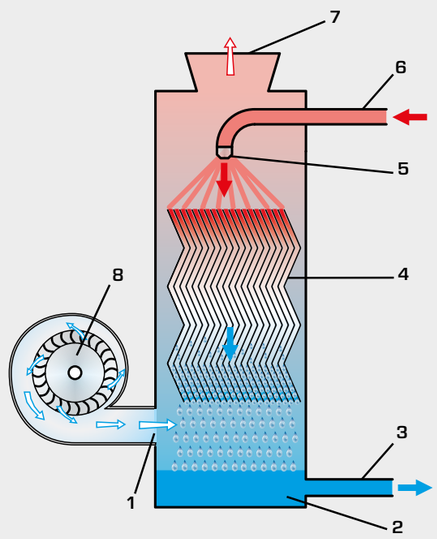
WL 320 is a wet cooling tower. The water to be cooled comes into direct contact with the air. The hot water is sprayed at the top of the cooling tower, trickles down the wet deck surface and is cooled in the process. The cooled water is removed at the bottom. The air enters the cooling tower from the bottom, flows upwards in a counterflow along the water trickling down, and exits at the top end.

A difference is made between cooling towers with atmospheric and forced ventilation. Very large cooling towers utilise the principle of atmospheric ventilation. Here the difference in density between the air inside and outside the cooling tower ensures the movement of the air. In small cooling towers the difference in density is insufficient for adequate air movement; they are forcefully ventilated by a fan.





Representation of the changes of state of air and water in the cooling tower in the h-x diagram



Principle of a wet cooling tower with forced ventilation

1 air inlet, **2** drip pan, **3** cold water outlet, **4** wet deck surface, **5** water distribution nozzle, **6** hot water inlet, **7** air outlet, **8** fan

There are two types of heat transfer in a wet cooling tower. First the heat is transferred by convection directly from the water to the air. In addition the water cools by partial evaporation. Decisive for the good operation of a wet cooling tower is that the air does not contain too much humidity. Therefore the water temperature T_{w2} must be clearly above the saturation temperature (wet bulb temperature) T_f of the air.