

## HYBRID COOLER CLOSED CIRCUIT

COMMERCIAL DOCUMENTATION



Water flow rate : from 10 to 250 m<sup>3</sup>/h  
Power : 50 to 3 000 kW

## CRIM-KSFIM series

# HYBRID COOLER, CLOSED CIRCUIT : CRIM-KSFIM Series

Since 1973, CRF and KSF closed cooling towers have originally been designed to fit with a plumeless coil. These ranges are then called CRIM and KSFIM series. The efficiency of the system is secured by a finned tube coil, along with a variable water flow valve on the spraying system over the packing. This regulation of the water flow rate is very unique on the market. Therefore, the combination of the air desaturation by air outlet warming up, and the reduction of the water spray on the packing, guaranties a complete plume suppression. Beyond the plume suppression itself, this system can provide water savings up to 80 % and is an ultimate obstacle to the drifts. This technology engineered by Jacir – Air Traitement has been implemented with Cetiat laboratory more than 30 years ago, and has led to several innovating patents.

The hybrid coolers can perfectly be operated in winter in freezing conditions without glycol. Their design secures a very good access for an easy cleaning and for performance lasting.

## Primary circuit (process) :

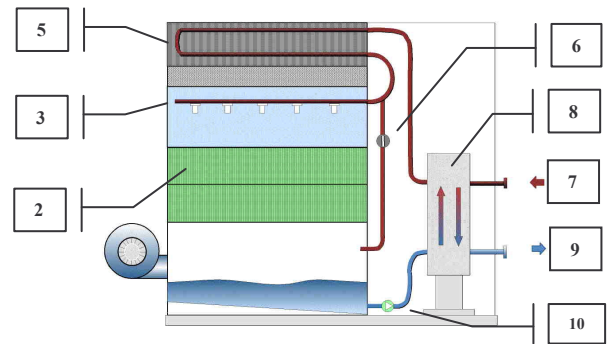
The water to be cooled enters (7) in the integrated plate heat exchanger (8) and goes back to the process (9) once cooled. The primary circuit is closed and is not in contact with the air.

## Secondary circuit (evaporation tower side) :

The water leaves the basin through a pump (10), runs through the plate heat exchanger (8) protected by 2 filters ; then it goes into the plume suppression coil (5); and, via a power-activated valve (6), goes either to the water spraying system (3), or directly to the basin if the ambient conditions are cold enough for a dry cooling.

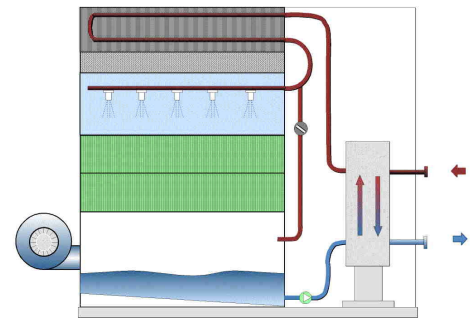
## Dry cooling : WINTER

The bypass power-activated valve is totally open (6) and the whole water flow goes into the basin : there is no water spray, no water evaporation, so no water consumption. The whole power can be dissipated through the plumeless coil.



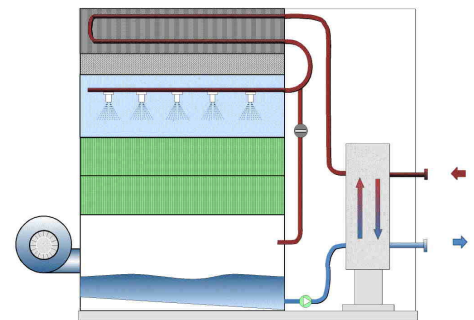
## Wet / dry operation : MID SEASON

When the dry cooling is no powerful enough, part of the spray is bypassed by the variable valve (6). A temperature probe (option) located on the water outlet, send the information to a regulator (option) to proportionally regulate the valve ; the minimum water quantity is sprayed on the packing (2). This operation mode can lower the Air/ water exchange, and higher the exchange in the tube coil, without any impact on the heat transfer inside the plate heat exchanger. According to the ambient condition, 30 to 70% of the power can be dissipated in dry mode.



## Wet operation : SUMMER

If necessary, the bypass valve is totally closed (6), the water of the secondary circuit leaving the plate heat exchanger (8) runs first to the plume suppression coil (5), then can be fully sprayed on the exchanger surface (2) through the spray nozzles (3). The water is first cooled by the tube coil (5) par by sensitive heat and then by latent heat (evaporation on the packing (2)). In wet mode, 5 to 10 % of the power will be dissipated through the finned tube coil.



NB : The power activated valve is part of the whole supply of the hybrid cooler.

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