

Open type PLUME ABATEMENT Cooling Tower

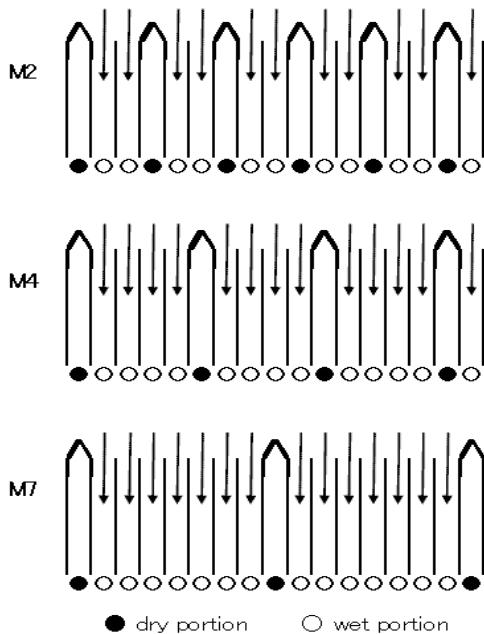
SKB RM/SM Model

PLUME can be abated to a larger extent by mixing wet and dry air inside the tower. You can choose either Low Noise or Extra Low Noise type along with the PLUME ABATEMENT function.

Maintenance work is simple since PLUME can be curbed under the simple structure. (No controller or moving part needed!).

Circulation water does not flow in some portion by covering PVC Caps on the top of some fillings.

Depending on the extent of plume abatement requirement, three types of PLUME ABATEMENT type cooling towers are offered as follows:



M2, M4, M7

The better performance of plume abatement CT is needed, the larger CT size will be selected under the same cooling capacity.

M2 is largest, followed by M4, M7 and standard CT.

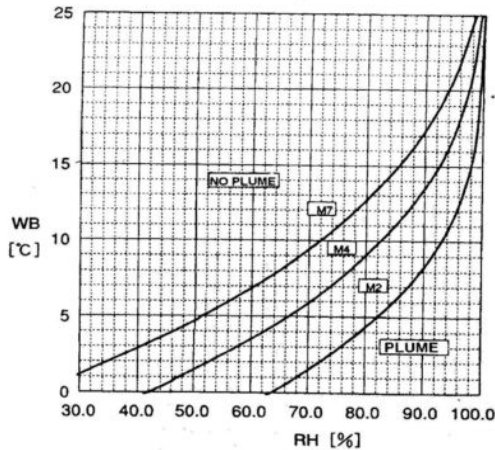
M2 do not block "2" water flow space of each three. As shown on the left illustration, same as M4 not block 4, M7 not block 7 respectively.

Design example:

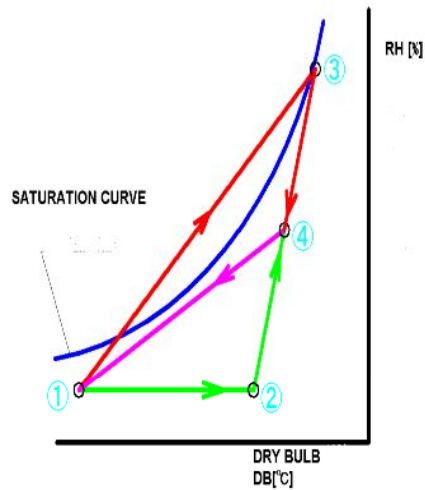
Design condition: circulation water volume 1300l/m $t_{w1}=37.0^{\circ}\text{C}$, $t_{w2}=32.0^{\circ}\text{C}$, $\text{WB}=27^{\circ}\text{C}$

Type	SKB-100S M7	SKB-100S M4	SKB-100S M2
Measurement	30L16W27H	32L18W27H	32L18W27H
Fan	$\phi 1400 \times 3.7\text{kw}$	$\phi 1600 \times 3.7\text{kw}$	$\phi 1600 \times 5.5\text{kw}$

Especially when CT operates on a cold day, the air ① (inlet air) is heated and is over-humidified by contacting circulation water, then it turns to outlet air ③. The air is exhausted and scattered in the atmosphere by using fan, then cooled down. As a result, the outside air condition goes back to the air ①.



Graph 1



Graph 2

As shown in the graph 2, when ①→③ line crosses or contacts Saturation Curve, water vapor turns to steam plume over the Fan on the altering process from the condition ③ to ①.

On the other hand, the outside air, which flows the dry portion of the fillings, keeps constant Relative Humidity. Only Dry Bulb rises through the sensible heat exchange. When ② and ③ are mixed, the air condition turns to ④. This air ④ is exhausted outside the tower.

Even if ④ goes back to the condition ①, the air does not contact or cross Saturation Curve and plume phenomenon does not occur.

PLUME ABATEMENT type is designed to adjust the air volume ② and ③, then to optimise the condition ④ by taking the following into consideration;

1. Cooling capacity
2. Outside air condition
3. Plume abatement performance

● Standard CT operation on a cold day

The air ① contacts circulation water directly and conduct the heat exchange, then it turns to the exhaust air ②.(Shown in the illustration below)

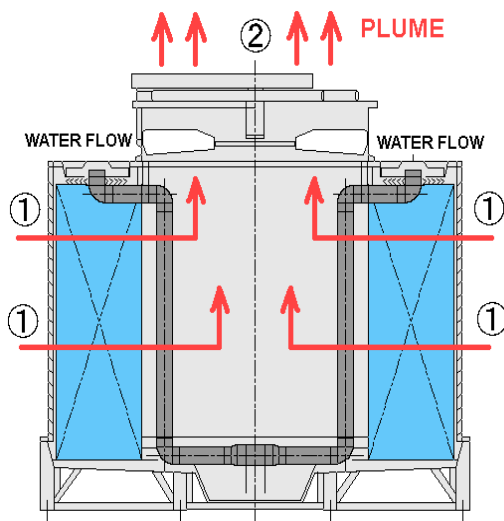
If the condition of the exhaust air ② is under the same condition as ② in the Saturation Curve graph 2, PLUME phenomenon occurs.

● PLUME ABATEMENT type CT operation on a cold day

Some inlet air ①, which passes wet portion of fillings (un-capped portion), turns to ② air. Other inlet air ①, which passes dry portion of fillings (capped portion), turns to ③ air. These ② and ③ air are mixed and exhausted as outlet air ④.

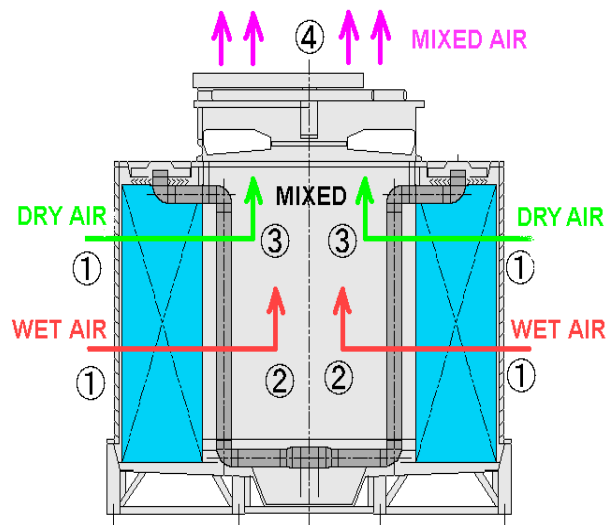
If the air ④ does not contact or cross saturation Curve, plume can be prevented.
(As shown in the Graph 2)

Basic Concept
(Standard CT operation on a cold day)



Air condition change
①→②→①

Basic Concept
(PLUME ABATEMENT CT Operation on a cold day)



Air condition change
①→②③→④→①

Please make sure to check the following:

The accidental removal of PVC caps would affect the abating performance negatively.
When the filling cleaning is conducted, make sure not to accidentally remove the caps.