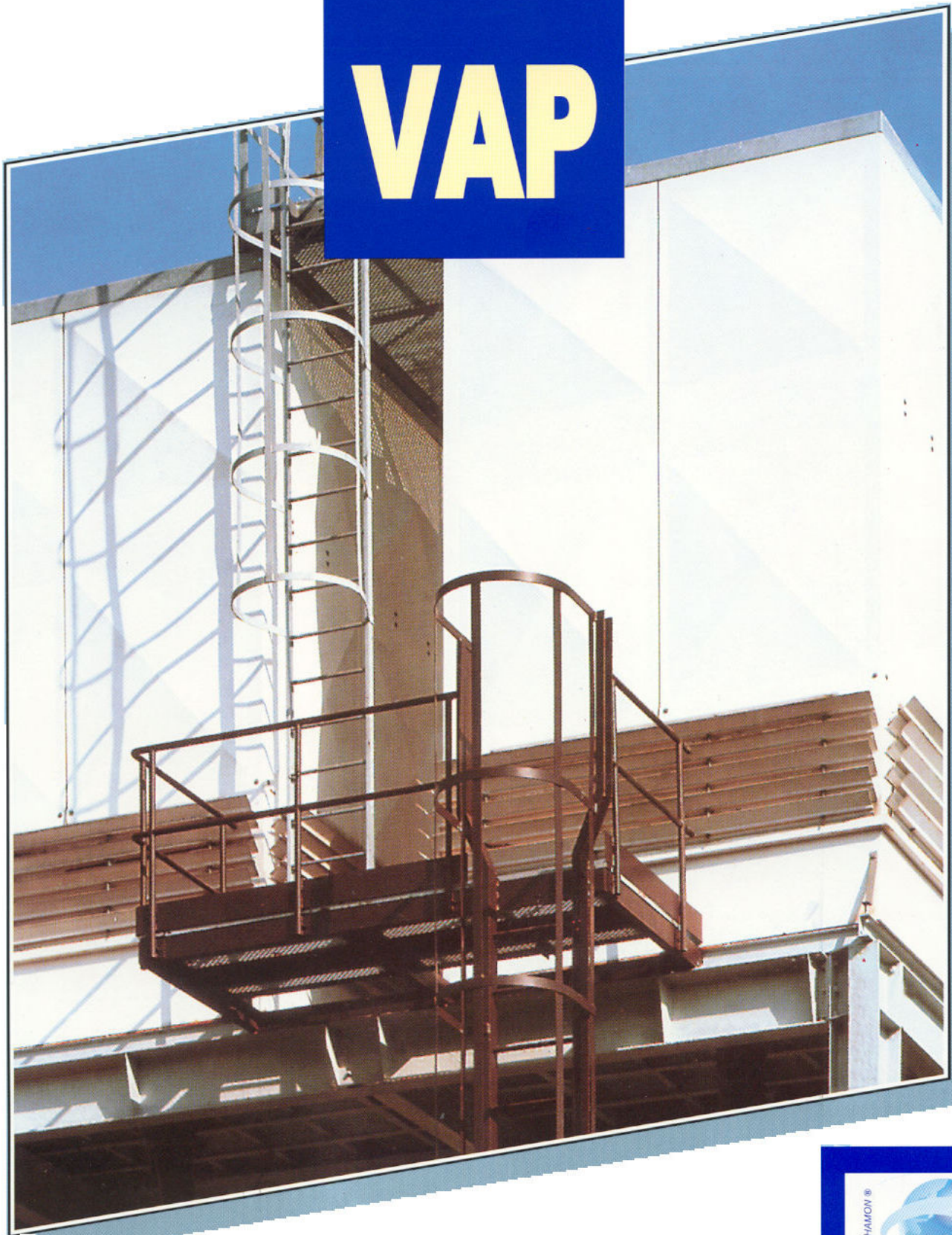


# VAP

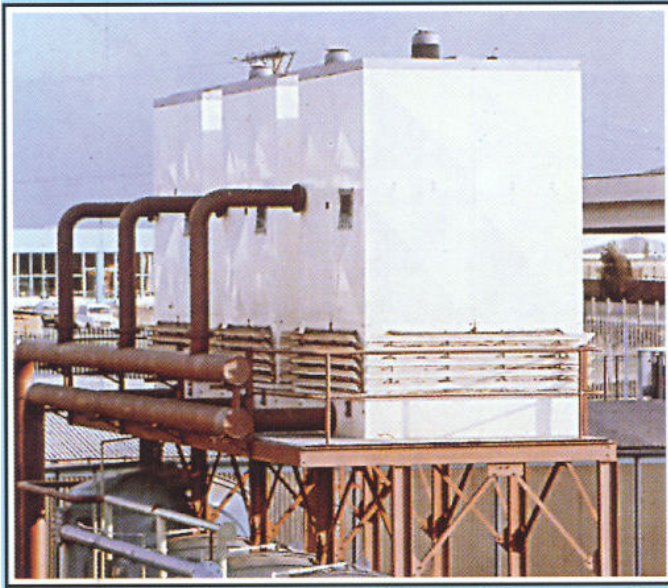


**MODULAR PLASTIC COOLING TOWERS**

Process HAMON®



**JACIR**  
AIR TRAITEMENT



## OPERATING PRINCIPLE

The cooling tower is a "water to air" heat exchanger in which the water to be cooled is in direct contact with the air. The air, as it is travelling through the cooling tower, is heated and saturated with water. The main part of the cooling process in a cooling tower is achieved through evaporation. The efficiency of the evaporation process is directly linked to the concept of the heat exchange surface, also called the fill pack. The hot water is evenly distributed in the cooling tower above the fill pack. The pump head required at the water inlet is very low. In the fill pack, the water is thoroughly mixed with the air. Fresh air is continuously drawn into the bottom of the tower. The air moves in counterflow with the water through the tower and is ejected into the atmosphere at high speed.

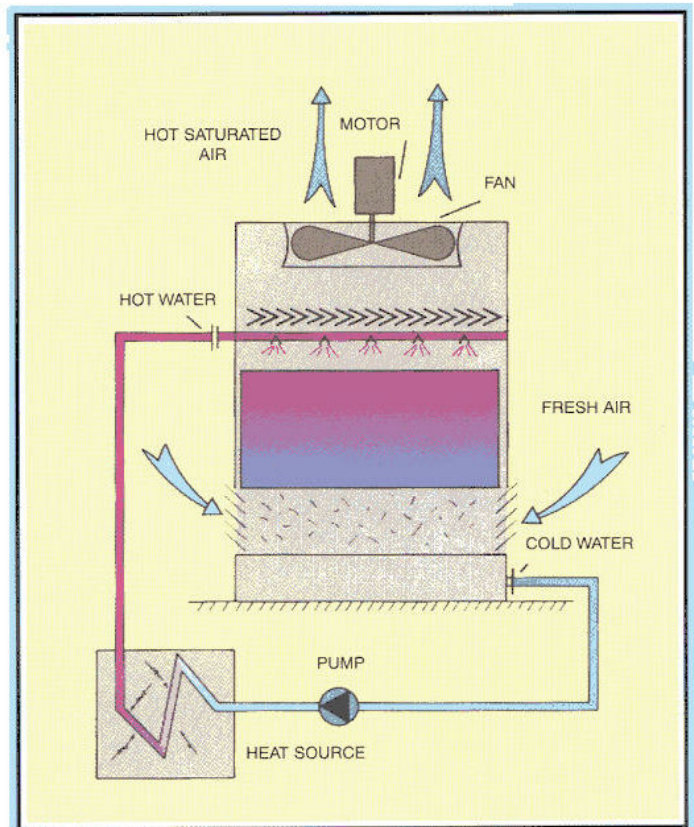
The amount of water evaporated is approximately 1 to 3% of the circulating waterflow, depending on the operating conditions. Each litre of water evaporated eliminates 2500 kJ of heat from the system.

## WHY A COOLING TOWER ?

Water is the most universally used fluid to evacuate heat generated in machines and production processes. But the warm water must be disposed off. This can be done in different ways : it can be drained into a river or a sewer. This is very expensive due to the cost of fresh water, the sewage cost and the cost of the water treatment necessary to bring the water quality within the limits for sewage water.

One could try to recuperate heat from the water through heat exchangers, but this is usually not an economically feasible installation due to the generally low temperature differences. Recycling of the water, after a cooling process, is certainly the most efficient way to treat cooling water. The equipment used therefore is the

## COOLING TOWER



## JACIR COOLING TOWERS - TYPE VAP

The combination of water which is fully saturated with oxygen and in which dissolved salts are concentrated, together with warm and moist air, make the operating conditions in the cooling tower aggressive and even corrosive. Hamon, the world leader in evaporative cooling technology, has developed an FRP cooling tower range that can handle these harsh conditions.

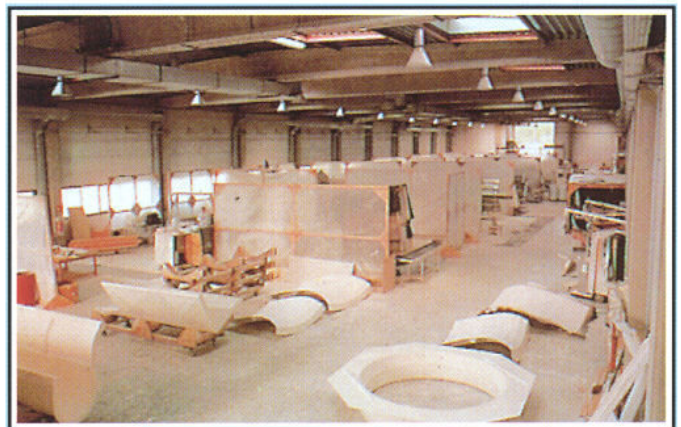
The VAP cooling tower presents the following unique customer benefits :

- extremely long lifetime
- minimal investment
- solid and simple design
- minimal running and maintenance costs
- guaranteed thermal performance



## MANUFACTURING VAP COOLING TOWERS

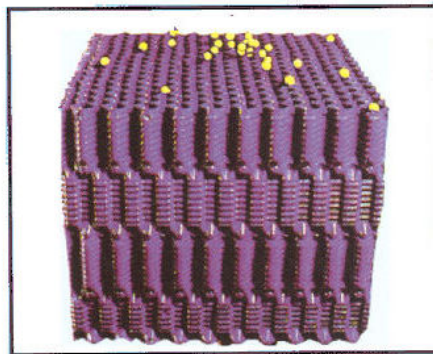
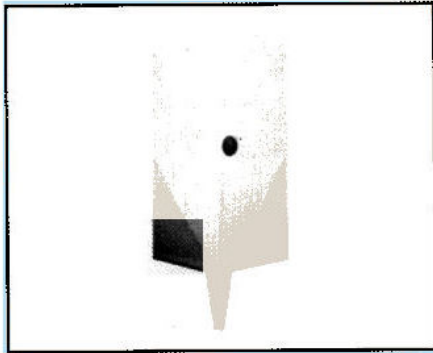
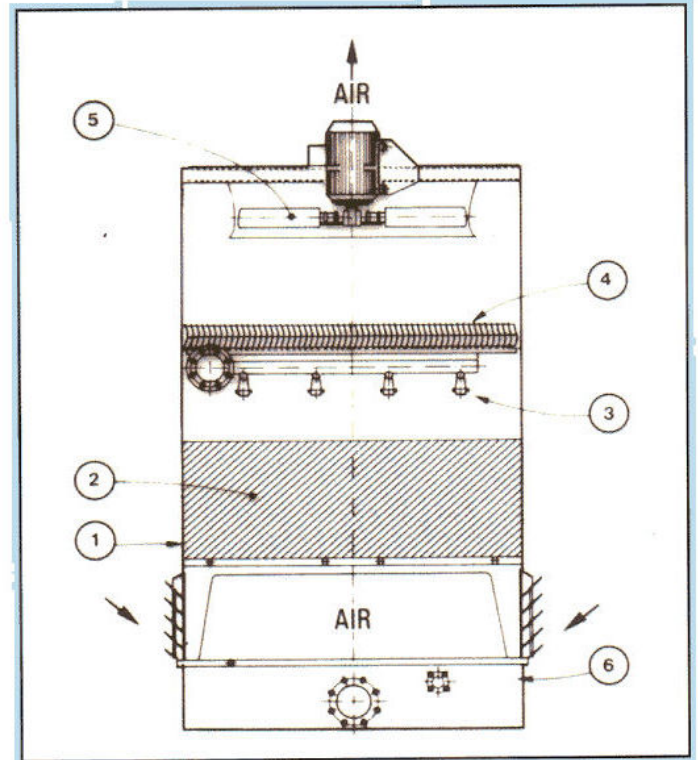
The production area of composite materials covers 3200 m<sup>2</sup> of which 1600 m<sup>2</sup> are in a fully controlled and air conditioned atmosphere. A giant 80 m<sup>3</sup> furnace is used to allow product polymerisation under strictly quality controlled conditions. The quality control at all levels of the production assures the reliability of these products.



## DESCRIPTION

The VAP is an induced draft counterflow cooling tower with an axial fan. It's a very compact cooling tower offering remarkable thermal performance. The overall use of plastic materials gives to these cooling towers an exceptional resistance to corrosion and reduces significantly all maintenance costs. The low specific weight of FRP also allows to use simple supporting structures and makes hoisting manoeuvres less difficult.

VAP cooling towers can be very well integrated into the overall architectural lines of buildings, independent of whether they are installed on the roof or at ground level. The VAP cooling tower consists mainly of the following components :

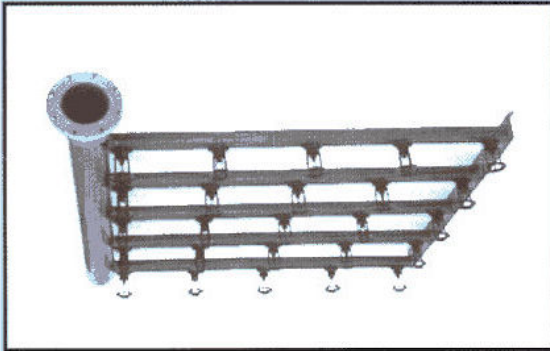


### 1. Casing

The casing is formed by FRP self-supporting panels. The normal colour is white, but other colours are available on request. Between the panels, a polyethylene seal and stainless steel bolts and nuts form a watertight joint.

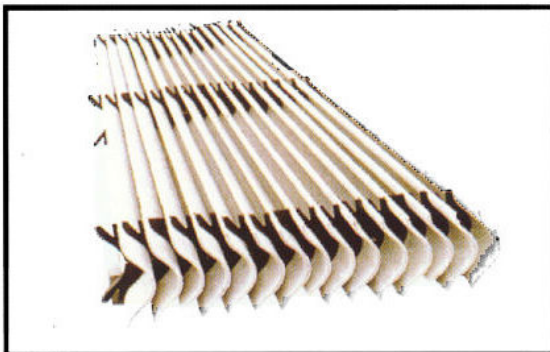
### 2. The fill pack

PVC thermoformed sheets are assembled in solid undeformable blocks which form the heat exchange surface. The patented specific form of these sheets is designed by JACIR to combine a high thermal performance with a low air side pressure drop, and to avoid premature fill pack clogging by providing a wide passage for solids in suspension.



### 3. The water distribution

Good water distribution is essential for the optimal operation of the cooling tower. A PVC collector and PVC tubes equipped with large orifice, non-clogging spray nozzles, made of polypropylene and polyamide, distribute the water evenly over the surface area. Only a small head ( + / - 8 kPa) is required at the cooling tower inlet flange.



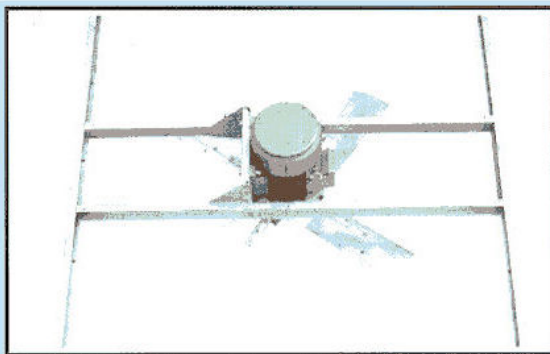
### 4. The drift eliminators

In order to eliminate water loss by drift, the cooling tower is equipped with drift eliminators. These consist of PVC extruded sheets, assembled with stainless steel pins to form light-weight easily handeable sections. The standard eliminators reduce water loss by drift to less than 0.1% of the circulating waterflow.

### 5. The fan-motor assembly

The fan-motor assembly is installed on a hot dip galvanised steel frame on top of the cooling tower. An aluminium alloy axial fan with variable pitch at stand-still, is directly coupled to a squirrel cage low speed (600 to 1000 tr/min) motor. The motor is standard class F, IP 55, with special impregnation on the windings against moisture.

The direct coupling forms a maintenance-free transmission system.



### 6. The basin

The VAP is mounted on an FRP basin. Only the model VAP 303 requires site assembly of the basin which is shipped in two pieces. The basin has all necessary connections such as the water outlet connections with strainer, the overflow and the make-up connection.

FRP louvers are installed to avoid water loss through the air inlet section of the VAP cooling tower. The VAP cooling tower can be installed on a concrete site-constructed basin. In that case, JACIR furnishes the necessary interface information to design and construct this basin.

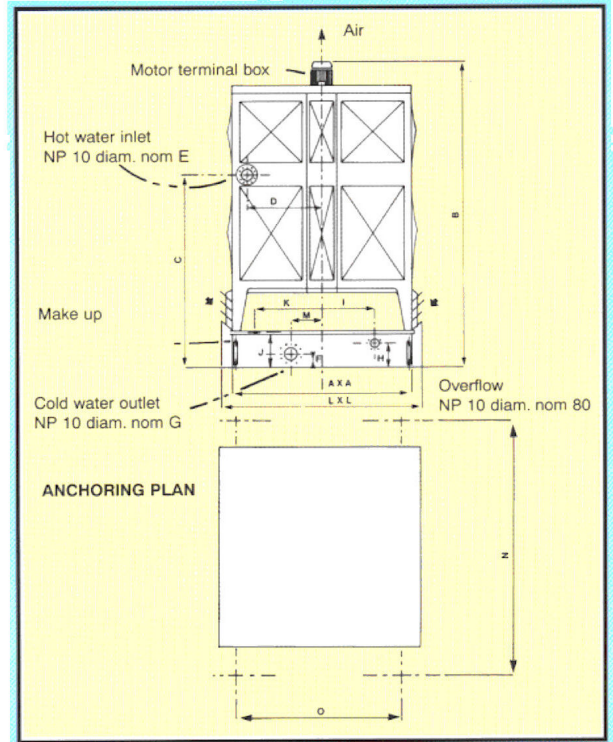
### 7. Options

For specific operating conditions, the following options are available as a standard

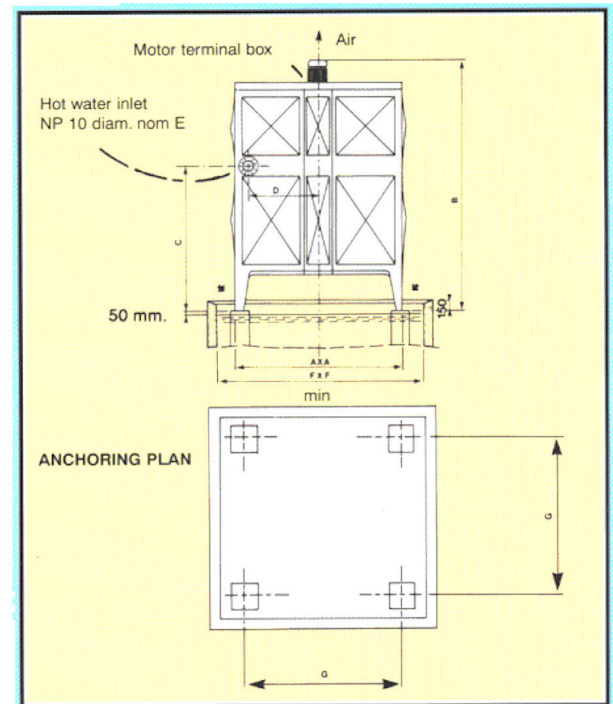
- High temperature fill pack for water inlet temperatures up to 70°C.
- Two-speed motors for energy saving.
- Electric pan heaters to avoid freezing of pan water.

## DIMENSIONS

	with FRP basin					
	VAP	VAP	VAP	VAP	VAP	VAP
	162	202	252	273	303	323
	163	203	253			
A (m)	1.6	2.0	2.5	2.5x3.0	3.0	3.25
B (m)	4.100	4.165	4.720	4.720	4.780	4.991
C (m)	2.530	2.595	2.770	2.770	2.828	2.828
D (mm)	645	810	1 050	1 275	1 275	1 400
E (mm)	125	150	200	250	250	250
F (mm)	160	180	210	210	210	210
G (mm)	150	200	250	250	250	250
H (mm)	275	320	360	360	400	400
I (mm)	420	500	625	625	500	1 000
J (mm)	425	390	390	390	430	430
K (mm)	600	700	900	900	1 000	1 000
L (m)	1.9	2.3	2.8	2.8x3.3	3.3	3.55
M (mm)	0	0	0	400	500	0
N (m)	1.82	2.20	2.72	2.92	3.22	3.47
O (m)	1.52	1.92	2.42	2.72	2.92	3.17
Shipping weight (kg)	710	1 000	1 450	1 800	2 100	2 580
Operational weight (kg)	1 980	2 800	5 050	6 160	7 450	8 690



	without FRP basin					
	VAP	VAP	VAP	VAP	VAP	VAP
	162	202	252	273	303	323
	163	203	253			
A (m)	1.6	2.0	2.5	2.5x3.0	3.0	3.25
B (m)	3.700	3.800	4.230	4.230	4.230	4.443
C (m)	2.130	2.130	2.280	2.280	2.280	2.280
D (mm)	645	810	1 050	1 275	1 275	1 400
E (mm)	125	150	200	250	250	250
F (m)	2.2	2.6	3.1	3.1x3.6	3.6	3.85
G (m)	1.51	1.91	2.41	2.4x2.9	2.91	3.10
Shipping weight (kg)	620	880	1 250	1 580	1 780	2 280
Operational weight (kg)	780	1 080	1 550	1 940	2 130	2 790



**Note :** All data are given as an indication.  
They can be changed without prior notice. Reter to the documents of the offer.



## TECHNICAL DATA

	VAP162	VAP163	VAP202	VAP203	VAP252	VAP253	VAP273	VAP303	VAP323
<b>Motor</b>									
Installed power (kW)	5.5	11.0	5.5	15.0	9.0	15.0	18.5	18.5	22.0
RPM	1 000	1 000	750	750	600	600	600	600	500
<b>Fan</b>									
Diameter (mm)	1 250	1 250	1 400	1 400	1 700	2 000	2 000	2 000	2 220
Sound pressure level at 5 m ± 2 dB(A) (*)	73.0	73.5	71.0	70.5	72.5	75.0	74.5	74.5	74.5

(\*) Remark: Low noise VAP 'S' Type Cooling Towers are available upon request.

## VAP COOLING TOWER INSTALLATION

### Delivery

VAP cooling towers are delivered fully assembled with basin, ready for installation. For models 303 and 323, the FRP basin must be assembled at site. For installation in locations with difficult access, the cooling tower can be delivered in bulk for site assembly. In any case, detailed assembly instructions are supplied with the unit.

### Installation

VAP cooling towers can be installed on a concrete slab or on a steel structure. The low weight of the VAP allows a light supporting structure. In case of bulk supply, the customer can easily assemble the VAP when bolting all elements together.

### Hydraulic and electrical connections

After erection of the cooling tower, all piping must be connected. Hot water inlet, cold water outlet, make-up and overflow connecting piping must be supported separately from the cooling tower without inducing stresses to the cooling tower structure. The electrical connections must be executed according to national and local rules.

### Make-up water

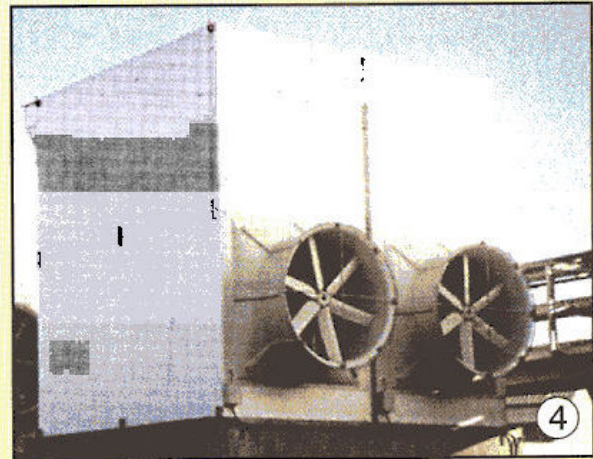
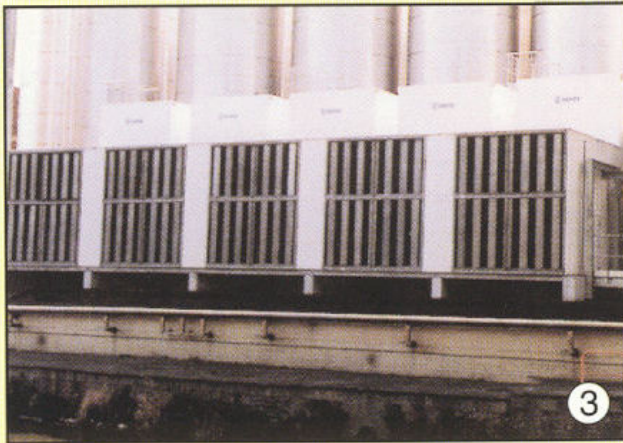
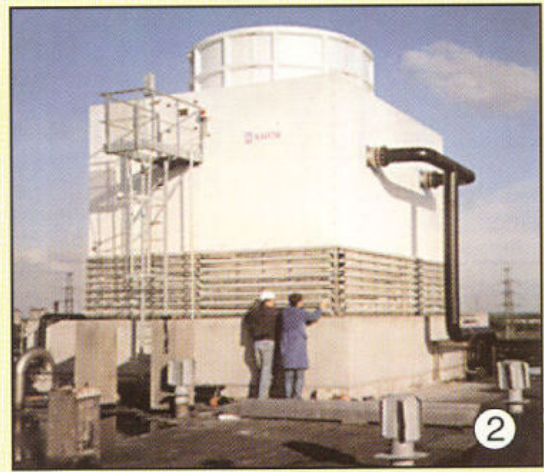
On recirculation circuits, the salts content increases due to the evaporation of pure water in the cooling tower. A regular drain, or blow-down, is needed to keep the salts concentration in the circuit within acceptable values, hence avoiding clogging. Make-up water flow equals blow-down plus evaporation flows.

When blow-down is determined equals to the evaporative flow, the salt concentration in the circulating water will be twice the salts concentration in the make-up water. Concentration factor depends from make-up water quality and water treatment of the circuit.

### Cold weather operation

During cold weather, provisions will be made to avoid freezing in the fill pack or the water basin. Partial or total by-pass of the cooling tower, two-speed motors and electrical heaters are the most commonly used. In any case, it is not recommended to allow outlet cold water temperatures to fall below 5°C. JACIR's cooling tower specialists will advise you when needed.

Note : The values in this table are for budgetary purposes.



2. RCM-AF - unit for flow up to 900 m<sup>3</sup>/h per cell.

3. RCM unit for installations with critical noise requirements.

4. RCM-SGB - unit with splash-type fill for dirty applications.

## JACIR - AIR TRAITEMENT

11, rue Jean Moulin - 77348 PONTAULT COMBAULT Cedex - France

Tel.: +33 1 64 43 53 20 - Fax: +33 1 64 43 53 21

[www.jacir.fr](http://www.jacir.fr) - e-mail: [at@cofinair.fr](mailto:at@cofinair.fr)