

# RC

## Cooling tower – Heavy duty water Centrifugal fans

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# Open circuit cooling tower RC

## JACIR

With more than 60 years' experience, our company:

- ∞ Has invested in detailed research and development in order to propose technical solutions in accordance with environmental protection through unequalled realizations and patents.
- ∞ Is today the European leader thanks to its technology beyond market requirements.

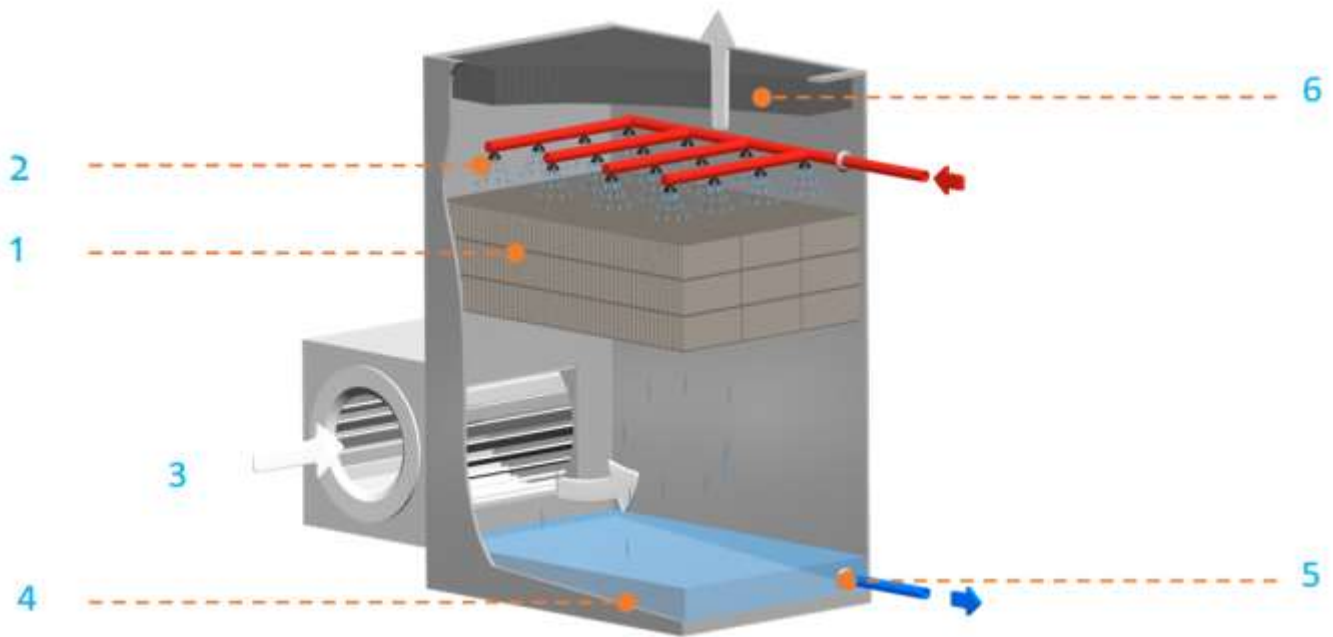
## BENEFITS OF RC

- ∞ **EXCHANGE SURFACE** High efficiency, with low fouling and low pressure drop characteristics, especially designed for water with high suspended solids content. It can be used up to 100°C as standard.
- ∞ **SILENCE** Very low sound towers in standard, can be improved according to the requirement.
- ∞ **ANTICORROSION COATING** Casing of tower is constructed in seamless galvanized steel, stainless 304L or 316L in option.
- ∞ **EASY MAINTENANCE** Large access doors, fan outside of the tower and at man chest, inclined and plane basin for a complete drain.
- ∞ **FLEXIBILITY** Possible delivery in parts to assemble directly on site.
- ∞ **DELIVERY IN MODULES** Easy handling and transport.

## Open circuit cooling tower principle RC

A cooling tower is a heat exchanger, which enables water to be cooled through direct contact with air. The heat transfer from the water to the air is carried out partly by sensible heat transfer, but mainly by latent heat transfer (evaporation of part of the water into the air), which makes it possible to reach cooling temperatures lower than ambient temperatures.

### Operation:



The hot water to be cooled is pumped to the top of the tower through pipes. This water is divided and distributed over the heat exchange surface (1) by low pressure water distribution nozzles (2).

Blown by the fan (3), the fresh air enters into the lower section of the unit and escapes through the upper section after being heated and saturated by passing through the wetted heat exchange surface.

As a result of surface tension, due to the exchange surface, the water spreads in uniformly, falling down the whole height. The exchange surface is then increased.

The water, cooled thanks to forced ventilation, falls into the inclined basin (4) at the bottom of the tower to be sucked through the strainer (5). Drift eliminators (6) located at air outlet reduces drifts losses.

## Benefits of cooling towers compared with dry coolers:

### Energy savings

- ∞ Chillers, condensers associated to a cooling tower will be cooled at a lower temperature and then will have a better cooling capacity. Their efficiency is higher.
- ∞ Seven to ten times more air must be blown in a dry cooler, which means a lot of fans and electric motors. So, the electrical consumption is about 40% higher.
- ∞ A tower costs 30 to 50% of the price of a dry cooler for a same evacuated power.
- ∞ A 1°C increase of the ambient air has direct effect on the performance of dry air cooler, while the efficiency of a cooling tower will not be as much affected as the wet bulb has not fluctuated in the same way

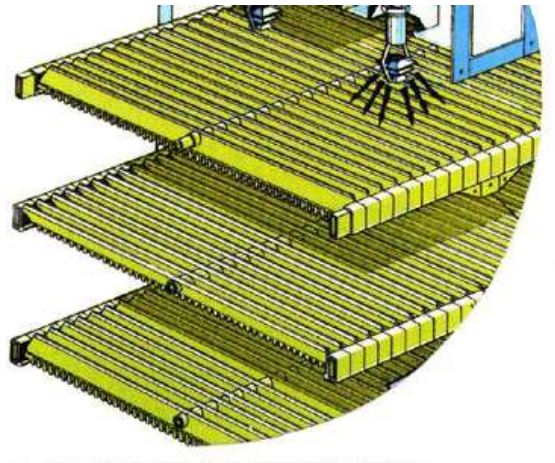
### Noise reduction

JACIR can supply much quieter tower than a dry cooler.

## Manufacturing details RC

### Exchange surface: X-STREAM

It is made of PP blades. They equally spread the water along the blades, into drops down to the lower blades' layers. The cooling occurs during the drops fall between the layers; therefore, this exchange surface is highly resistant to clogging. It can be used for water with solids content up to 400 ppm. In the case of waters with high salts content, the X-STREAM is self-cleaning by thermal expansion.



### Tower casing

Self-supporting rigid panels, with 2 or 4 folds on the four sides, (designed by Jacir) allows sound absorption casing.

Thanks to this technology, we can offer cooling towers with an extremely low sound level.

Towers are assembled with waterproof stainless-steel rivets (uniform and high-capacity locking). There is no welding during assembly; a high covering seal ensures the close fit between the panels.

As standard model, the panels are in galvanised steel mm2 thick ZENDZIMIR process 275gr/m<sup>2</sup> (galvanised plates are protected by the zinc oxidation on the surface).

Stainless steel is optional, 304L (1.4301) or 316L (1.4404): **RXC** series.

### Inclined and plane basin

It has a high-water capacity in order to offer a high thermal inertia. For example, the maximum volume of a RC 2950 is 6 m<sup>3</sup> minimum. The inclined basin allows an easy and complete drain. No welding and no screws for panel assembly on surfaces in contact with the water.

On the utility panel of the basin are installed:

- ∞ An overflow connection,
- ∞ A drain connection,
- ∞ A float valve or electrical solenoid make up water system as an option,
- ∞ A water outlet through a removable strainer (in stainless-steel) with a flange, oversized to eliminate cavitations, with a perforated steel plate,
- ∞ A large access door for nozzles for basin (540 mm x 540 mm),
- ∞ Options: electrical heater of V 230 or V 400 and waterproof thermostat with separate bulb.

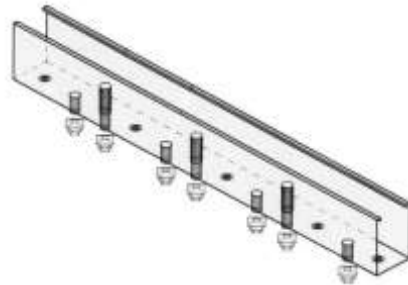
For automatic control of resistance, suitable contactors must be provided.

### Accessibility

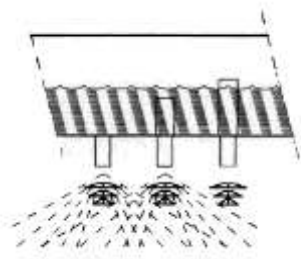
If there are sound baffles, plumeless tube coil or outlet air duct, large access doors (540 x 540mm) are provided. These access doors are used to remove easily the drift eliminators, nozzles, exchange surface and water distribution pipes. An additional middle casing water is supplied as an option, fitted with access doors (540 x 540mm); it is located between the tube coil and the drift eliminators.

## Water distribution

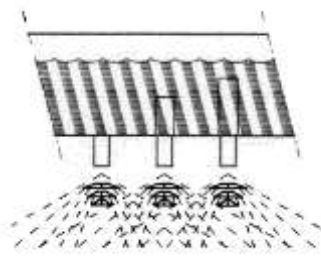
Water distribution is made of PP pipes (10 series) or of open-air steel channels (20 and above series). They are installed with PP nozzles especially designed to achieve an optimal distribution through the whole air section, and with large water nozzle to avoid clogging even in the case of high suspended content. These nozzles operate under low pressure (0 to 0.3mWC), in order to low pumping head and to distribute large size drops, which prevents the drift from getting out of the cooling tower. In the case of distribution channels, Jacir has engineered a design to combine original high performance with major flow rate fluctuations: nozzles are fed by different water inlets in the channels.



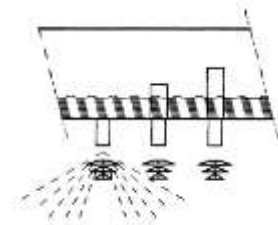
Variable flow gravity water distribution



Minimum flow rate operating



Half flow rate operating



Full flow rate operating

## Drift eliminators

Highly efficient, they prevent the water from being sprayed out of the tower. Ultraviolet resistant, they are easy to remove from the top in order to access to the distributors and to the exchange surface. They are made of PVC or PP blades, special type in the case of the plume suppression coil option is selected.

## Fans

The centrifugal fans are specially designed and manufactured by JACIR. The impeller is a double side air inlet type. The air inlet ducts are removable to access to the impeller, and are made of polyester. Their shape noticeably improves the performances of the fans.

The bearings are self-aligning, lubricated in our factory and to be regularly lubricated thanks to a copper deposited line lubrication as a standard for a simple and quick maintenance without any removal. Each shaft is supported by two bearings. There is one motor per fan. The volutes side-plates are used to fix the motor support. This design prevents the belts from producing a slapping effect.

Trapezoidal pulleys and V-belts transmission are used. Tension is applied to the belts by tipping the motor seat, for easy adjustment. The impeller is treated and protected by a baked EPOXY coating. The volute is made of stainless steel.

Complete stainless-steel impeller design can be selected as an option.

## Standard motor

- ∞ Asynchronous three-phases motor,
- ∞ 1500 rpm,
- ∞ 230 / 400 V up to 5,5 kW,
- ∞ 400 / 690 V above 5,5 kW,
- ∞ Hz 50,
- ∞ IP55 (possible open sky operating),
- ∞ direct connection to terminal box;

## Sound attenuation (2 options):

### IB sound attenuation

The air inlet sound attenuators consist in a fan housing by self-supporting stiff panels, double folded on the 4 sides, internally coated with sound attenuating material. Complete front opening inspection doors for maintenance are provided. Air outlet, sound attenuator includes a cone, coated with acoustic foam.

### Special NR 30 sound attenuation

As IB sound attenuation. In addition are installed easily removable high density rock wool sound baffles at both air inlet and outlet.

At the air inlet, the rock wool is coated by a fibre glass layer. At the air outlet, is added a stainless-steel grid. An extra rock wool double coating of the casing is available to reach the required sound level.

## OPTIONS

- ∞ Plume suppression system,
- ∞ Stainless steel 304L or 316L,
- ∞ Electric heater with thermostat,
- ∞ Two - speed motor (Dahlander type –1500/750 rpm, separate wiring or PAM –1500/1000 rpm),
- ∞ Frequency controller,
- ∞ Water level control with solenoid valve (with electric-valve and input filter),
- ∞ Automatic Inductive deconcentration (see AiD documentation),
- ∞ Fired polyester powder protection for all parts that are not in contact with the water,
- ∞ All stainless-steel fittings (fan casing, wheel, plumeless battery, etc.),
- ∞ Discharge cone (increase of air outlet speed),
- ∞ Air filtration (fan covering + filters),
- ∞ Air pressure available for connection to the duct,
- ∞ Control panel,
- ∞ Equipment delivered in parts, ready to be assembled,
- ∞ Assembly on site by experimented technicians from our factory,
- ∞ Anti-vibrations supports,
- ∞ Fan bearing lubrication line (Rilsan), extended on the fan stack.

# Technical characteristics RC

## TOWER WITHOUT SOUND ATTENUATION

RC serie

10 SERIES

20 AND + SERIES

Distribution	Dimensions (mm)			Weight (kg)		Heater power (m)	Fan diameter (m)	Qty	Motor				Fan speed (rpm)	Sound level at 20m	
	L	I	H	Empty	Full				Installed power (kW)		Absorbed power (kW)				
									1 speed	2 speeds	1 speed	2 speeds			
PIPES	1395	1100	2600	310	650	2	0,315	1	2,2		2		994	49	
			4200	450	760										
			4200	640	1190										
	1795	1100	4200	785	1335	2	0,5	1	3		2,7		507	51	
			5500												
	2062	1100	4200	730	1348	2	0,5	1	3				507	51	
			4200	730	1348										
			5500	1070	1688										
	3070	1100	4200	1060	2090	3	0,63	1	4				379	55	
			4200	1060	2090										
			5500	1290	2320										
	3470	1100	4200	1350	2600	3	0,63	1	5,5		4,9		379	55	
			4200	1350	2600					7,5	7,5 / 2,5	6,8	6,8 / 2		406
			5500	1600	2850					9	10 / 3	8,3	8,3 / 2,5		426 / 280
										5,5		4,9			379
										7,5	7,5 / 2,5	6,8	6,8 / 2		406
					9					10 / 3	8,3	8,3 / 2,5	426 / 280		
					7,5					7,5 / 2,5	6,8	6,8 / 2	403 / 269		
					9					10 / 3	8,3	8,3 / 2,5	426 / 280		
					11					11 / 4,8	9,3	9,3 / 2,8	454 / 303		
					7,5					7,5 / 2,5	6,8	6,8 / 2	403 / 269		
4090	1100	4700	1450	2950	3	0,71	1	7,5		4,9		379	55		
		4700	1450	2950					7,5	7,5 / 2,5	6,8	6,8 / 2		403 / 269	
		6000	1750	3250					9	10 / 3	8,3	8,3 / 2,5		426 / 280	
									11	11 / 4,8	9,3	9,3 / 2,8		454 / 303	
									7,5	7,5 / 2,5	6,8	6,8 / 2		403 / 269	
									9	10 / 3	8,3	8,3 / 2,5		426 / 280	
									11	11 / 4,8	9,3	9,3 / 2,8		454 / 303	
									7,5	7,5 / 2,5	6,8	6,8 / 2		363 / 242	
									9	10 / 3	8,3	8,3 / 2,5		388 / 259	
									11	11 / 4,8	9,3	9,3 / 2,8		417 / 278	
2940	2450	5200	1950	3760	6	0,71	1	7,5		4,9		379	55		
		5200	1950	3760					7,5	7,5 / 2,5	6,8	6,8 / 2		403 / 269	
		6500	2300	4110					9	10 / 3	8,3	8,3 / 2,5		426 / 280	
									11	11 / 4,8	9,3	9,3 / 2,8		454 / 303	
									7,5	7,5 / 2,5	6,8	6,8 / 2		363 / 242	
									9	10 / 3	8,3	8,3 / 2,5		388 / 259	
									11	11 / 4,8	9,3	9,3 / 2,8		417 / 278	
									7,5	7,5 / 2,5	6,8	6,8 / 2		363 / 242	
									9	10 / 3	8,3	8,3 / 2,5		388 / 259	
									11	11 / 4,8	9,3	9,3 / 2,8		417 / 278	
3935	2450	5200	2480	5550	10	0,9	1	11		4,9		379	56		
		5200	2480	5550					15	16 / 5,3	12,7	12,7 / 3,8		327 / 218	
		6500	2850	6700					18,5	18,5 / 6	15,5	15,5 / 4,6		348 / 232	
									11	11 / 4,8	9,3	9,3 / 2,8		290 / 193	
									15	16 / 5,3	12,7	12,7 / 3,8		327 / 218	
									18,5	18,5 / 6	15,5	15,5 / 4,6		348 / 232	
									18,5	18,5 / 6	15,5	15,5 / 4,6		348 / 232	
									22	24 / 7,5	18,7	18,7 / 5,6		307 / 205	
									30	30 / 9	25,5	25,5 / 7,6		349 / 233	
									18,5	18,5 / 6	15,5	15,5 / 4,6		291 / 192	
4694	2500	5200	3400	7200	10	1	1	22		4,9		379	57		
		5200	3400	7200					30	30 / 9	25,5	25,5 / 7,6		349 / 233	
		6500	3500	9200					18,5	18,5 / 6	15,5	15,5 / 4,6		291 / 192	
									22	24 / 7,5	18,7	18,7 / 5,6		307 / 205	
									30	30 / 9	25,5	25,5 / 7,6		319 / 233	
									22	24 / 7,5	18,7	18,7 / 5,6		307 / 205	
									30	30 / 9	25,5	25,5 / 7,6		319 / 233	
									22	24 / 7,5	18,7	18,7 / 5,6		307 / 205	
									30	30 / 9	25,5	25,5 / 7,6		319 / 233	
									22	24 / 7,5	18,7	18,7 / 5,6		307 / 205	
3935	4450	5200	4200	11450	10	2 x 0,9	2	2 x 11		4,9		379	59		
		5200	4200	11450					2 x 15	2 x (16 / 5,3)	2 x 12,7	2 x (12,7 / 3,8)		327 / 218	
		6500	4850	12100					2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		348 / 232	
									2 x 11	2 x (11 / 4,8)	2 x 9,3	2 x (9,3 / 2,8)		290 / 193	
									2 x 15	2 x (16 / 5,3)	2 x 12,7	2 x (12,7 / 3,8)		327 / 218	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		348 / 232	
									2 x 11	2 x (11 / 4,8)	2 x 9,3	2 x (9,3 / 2,8)		290 / 193	
									2 x 15	2 x (16 / 5,3)	2 x 12,7	2 x (12,7 / 3,8)		327 / 218	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		348 / 232	
									2 x 11	2 x (11 / 4,8)	2 x 9,3	2 x (9,3 / 2,8)		290 / 193	
4594	5450	6200	6300	17100	10	2 x 1	2	2 x 18,5		4,9		379	60		
		6200	6300	17100					2 x 22	2 x (24 / 7,5)	2 x 18,7	2 x (18,7 / 5,6)		307 / 205	
		7600	7200	18000					2 x 30	2 x (30 / 9)	2 x 25,5	2 x (25,5 / 7,6)		349 / 233	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		291 / 192	
									2 x 22	2 x (24 / 7,5)	2 x 18,7	2 x (18,7 / 5,6)		307 / 205	
									2 x 30	2 x (30 / 9)	2 x 25,5	2 x (25,5 / 7,6)		319 / 233	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		291 / 192	
									2 x 22	2 x (24 / 7,5)	2 x 18,7	2 x (18,7 / 5,6)		307 / 205	
									2 x 30	2 x (30 / 9)	2 x 25,5	2 x (25,5 / 7,6)		319 / 233	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)		291 / 192	



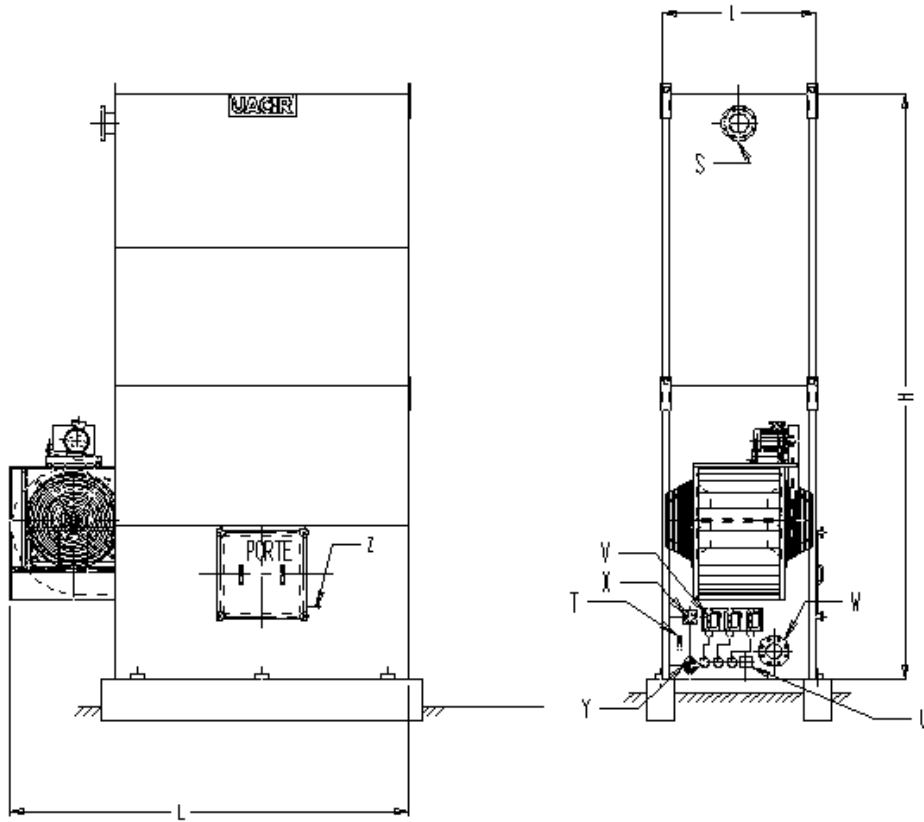
# Technical characteristics RC IB soundproofing

## TOWER WITH IB SOUND ATTENUATION

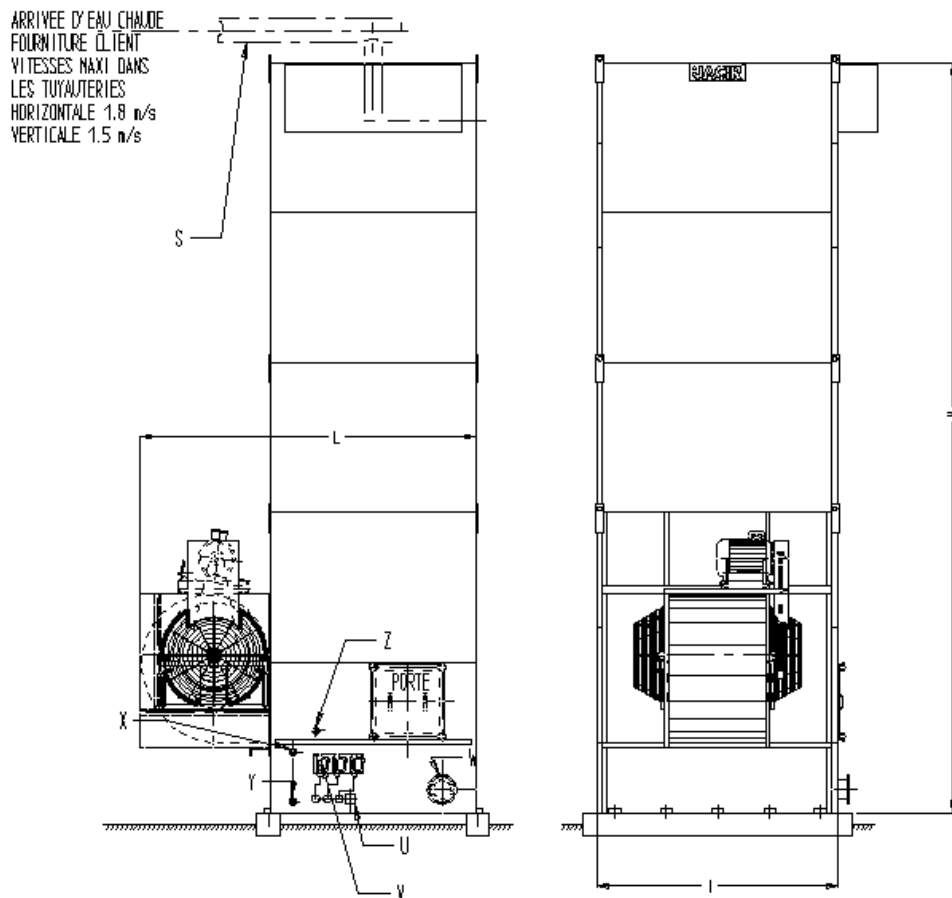
RC serie

Distribution	Dimensions (mm)			Weight (kg)		Heater power (m)	Fan diameter (m)	Motor				Fan speed (rpm)	Sound level at 20m	
	L	I	H	Empty	Full			Qty	Installed power (kW)		Absorbed power (kW)			
									1 speed	Empty	Full			2V
RC 3024-47J1000-185 RC 3024-47J1000-220 RC 3024-47J1000-300 RC 3024-60N-1000-185 RC 3024-60N-1000-220 RC 3024-60N-1000-300	1300	2500	6400	4200	8000	10	1	1	18,5	18,5 / 6	15,5	15,5 / 4,6	291 / 193	51
									22	24 / 7,5	18,7	18,7 / 5,6	307 / 205	
									30	30 / 9	25,5	25,5 / 7,6	349 / 233	
			18,5	18,5 / 6	15,5				15,5 / 4,6	291 / 192	53			
			22	24 / 7,5	18,7				18,7 / 5,6	307 / 205				
			30	30 / 9	25,5				25,5 / 7,6	319 / 233				
RC 2440-47I900-110D RC 2440-47I900-150D RC 2440-47I900-185D RC 2440-60L900-110D RC 2440-60L900-150D RC 2440-60L900-185D	5000	4450	6400	5300	12550	10	2 x 0,9	2	2 x 11	2 x (11 / 4,8)	2 x 9,3	2 x (9,3 / 2,8)	290 / 193	53
									2 x 15	2 x (16 / 5,3)	2 x 12,7	2 x (12,7 / 3,8)	327 / 218	
									2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)	348 / 232	
			2 x 11	2 x (11 / 4,8)	2 x 9,3				2 x (9,3 / 2,8)	290 / 193	54			
			2 x 15	2 x (16 / 5,3)	2 x 12,7				2 x (12,7 / 3,8)	327 / 218				
			2 x 18,5	2 x (18,5 / 6)	2 x 15,5				2 x (15,5 / 4,6)	348 / 232				
RC 2950-56J1000-185D RC 2950-56J1000-220D RC 2950-56J1000-300D RC 2950-70M1000-185D RC 2950-70M1000-220D RC 2950-70M1000-300D	5500	5450	7400	7600	18400	10	2 x 1	2	2 x 18,5	2 x (18,5 / 6)	2 x 15,5	2 x (15,5 / 4,6)	291 / 193	54
									2 x 22	2 x (24 / 7,5)	2 x 18,7	2 x (18,7 / 5,6)	307 / 205	
									2 x 30	2 x (30 / 9)	2 x 25,5	2 x (25,5 / 7,6)	349 / 233	
			2 x 18,5	2 x (18,5 / 6)	2 x 15,5				2 x (15,5 / 4,6)	291 / 192	54			
			2 x 22	2 x (24 / 7,5)	2 x 18,7				2 x (18,7 / 5,6)	307 / 205				
			2 x 30	2 x (30 / 9)	2 x 25,5				2 x (25,5 / 7,6)	319 / 233				

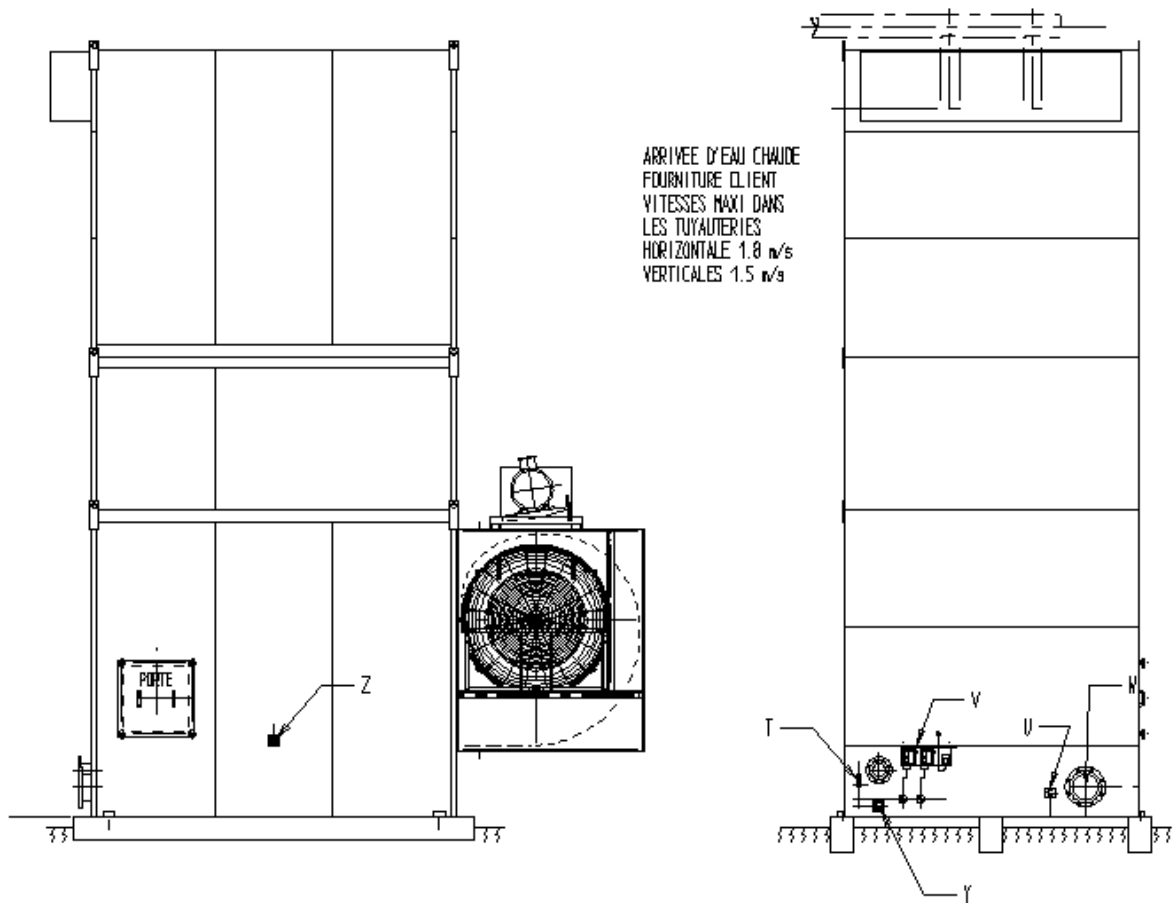
## Plans RC 510-910-1210-2010-2410-2910



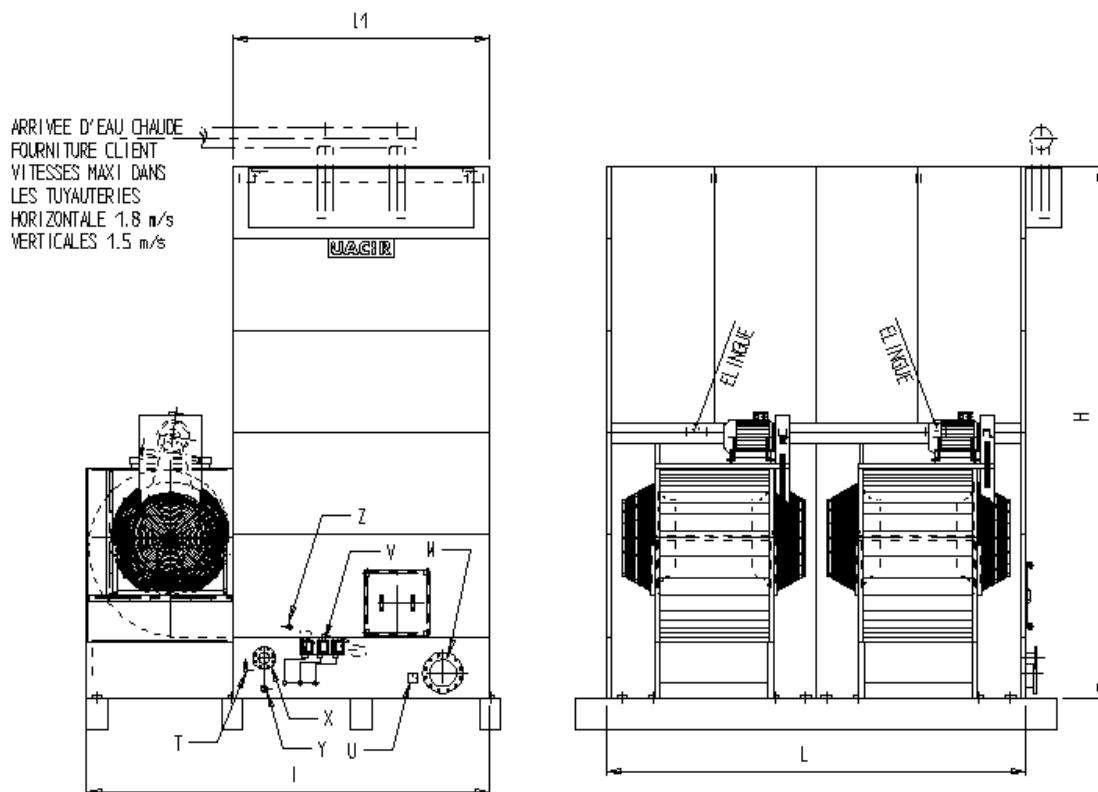
## Plans RC 1720-2420



## Plans RC 3024



## Plans RC 2440-2950



## Dimensions RC

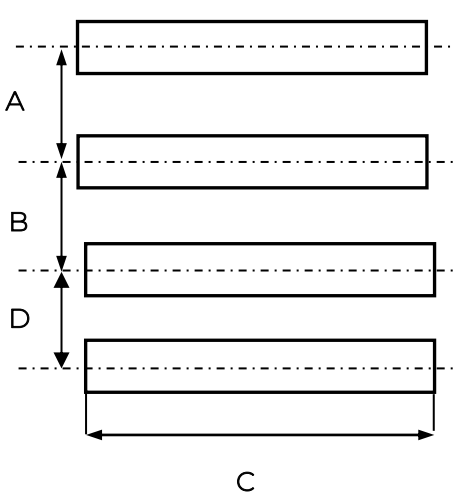
	L	I	H	Z	X	U	Y	W	S	Water level balance (option)	
				Float valve (male)	Overflow *	Electrical heater	Drain (female)	Water outlet*	Water inlet*		
				DN	DN	(option)	DN	DN	DN		
RC 510-21F315-22B	1395	1100	2600	15	50		50	50	50	50	
RC 510-37I315-22B			4200	15	50		50	50	50	50	
RC 910-37H500-30B	1795	1100	4200	20	50		50	100	100	100	
RC 910-50L500-30B			5500	20	50		50	100	100	100	100
RC 1210-37H500-30B	2062	1100	4200	20	50		50	100	100	100	
RC 1210-37H500-40B				20	50		50	100	100	100	100
RC 1210-50L500-30B			5500	20	50		50	100	100	100	100
RC 1210-50L500-40B				20	50		50	100	100	100	100
RC 2010-37H630-40B	3070	1100	4200	20	50		50	100	100	100	
RC 2010-37H630-55B				20	50		50	100	100	100	100
RC 2010-50L630-40B			5500	20	50		50	100	100	100	100
RC 2010-50L630-55B				20	50		50	100	100	100	100
RC 2410-37H630-55B	3470	1100	4200	20	50		50	150	125	150	
RC 2410-37H630-75B				20	50		50	150	125	150	150
RC 2410-37H630-90B				20	50		50	150	125	150	150
RC 2410-50L630-55B			5500	20	50		50	150	125	150	150
RC 2410-50L630-75B				20	50		50	150	125	150	150
RC 2410-50L630-90B				20	50		50	150	125	150	150
RC 2910-43H710-75B	4090	1100	4700	20	50		50	150	125	150	
RC 2910-43H710-90B				20	50		50	150	125	150	150
RC 2910-43H710-110B				20	50		50	150	125	150	150
RC 2910-56L710-75B			6000	20	50		50	150	125	150	150
RC 2910-56L710-90B				20	50		50	150	125	150	150
RC 2910-56L710-110B				20	50		50	150	125	150	150
RC 1720-47I710-75	2940	2450	5200	20	50		50	150		150	
RC 1720-47I710-90				20	50		50	150		150	150
RC 1720-47I710-110				20	50		50	150		150	150
RC 1720-60L710-75			6500	20	50		50	150		150	150
RC 1720-60L710-90				20	50		50	150		150	150
RC 1720-60L710-110				20	50		50	150		150	150
RC 2420-47I900-110	3935	2450	5200	32	100		50	200		200	
RC 2420-47I900-150				32	100		50	200		200	200
RC 2420-47I900-185				32	100		50	200		200	200
RC 2420-60L900-110			6500	32	100		50	200		200	200
RC 2420-60L900-150				32	100		50	200		200	200
RC 2420-60L900-185				32	100		50	200		200	200
RC 3024-47J1000-185	4694	2500	5200	40	50		50	200		200	
RC 3024-47J1000-220				40	50		50	200		200	200
RC 3024-47J1000-300				40	50		50	200		200	200
RC 3024-60N-1000-185			6500	40	50		50	200		200	200
RC 3024-60N-1000-220				40	50		50	200		200	200
RC 3024-60N-1000-300				40	50		50	200		200	200
RC 2440-47I900-110D	3935	4450	5200	32	100		50	250		250	
RC 2440-47I900-150D				32	100		50	250		250	250
RC 2440-47I900-185D				32	100		50	250		250	250
RC 2440-60L900-110D			6500	32	100		50	250		250	250
RC 2440-60L900-150D				32	100		50	250		250	250
RC 2440-60L900-185D				32	100		50	250		250	250
RC 2950-56J1000-185D	4594	5450	6200	40	100		50	300		300	
RC 2950-56J1000-220D				40	100		50	300		300	300
RC 2950-56J1000-300D				40	100		50	300		300	300
RC 2950-70M1000-185D			7600	40	100		50	300		300	300
RC 2950-70M1000-220D				40	100		50	300		300	300
RC 2950-70M1000-300D				40	100		50	300		300	300

(\*) Les connexions de diamètre inférieur ou égal à DN 50 : femelle ; au-delà : raccordement par bride.

# Support RC

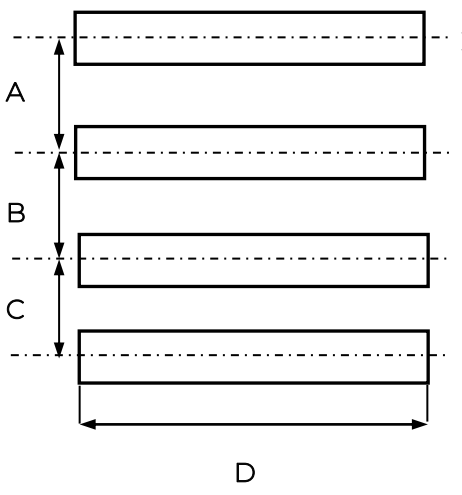
Our cooling towers can stand on the ground or on a concrete ground, but we recommend to install them on concrete or steel longitudinal beams. Check that the ground can stand the operating load, and that the surface or supports are flat.

## Quantity and position of supports (customer supply) without sound attenuation



Qty	Distance between supports under basin A [mm]	Distance between supports under basin B [mm]	Length C [mm]	Distance between supports under basin D [mm]
2	RC 510	1130	1300	1320
	RC 910		1200	
	RC 1210		1500	
	RC 2010		2300	
	RC 2410		2700	
	RC 2910		3200	
	RC 1720		1830	
3	RC 2420	1265	2300	1480
	RC 3024	1265	3300	
4	RC 2440	1265	4300	1480
	RC 2950	1515	5300	

## Quantity and position of (customer supply) with IB sound attenuation



Qty	Distance between supports under basin A [mm]	Distance between supports under basin B [mm]	Length C [mm]	Distance between supports under basin D [mm]
4	RC 510	1250	2506	5300
	RC 910			
	RC 1210			
	RC 2010			
	RC 2410			
	RC 2910			
	RC 1720			
4	RC 3024	1256	2506	3300
	RC 2440	1656	850	4300
	RC 2950	1956	1050	5300

## Layout RC

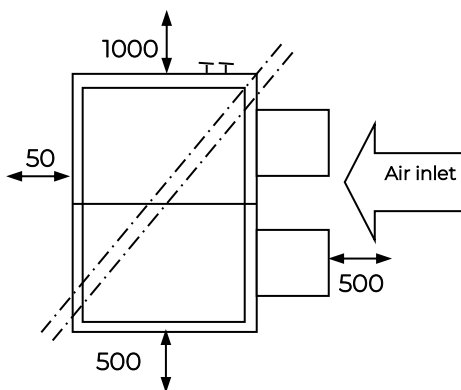
Walls, higher or equal to the tower must not surround on all sides a cooling tower, furthermore without any openings. This could create a risk of a « re-circulation »; the air discharged (hot and saturated) may be recycled into the unit and significantly reduces the thermal efficiency of the tower.

In any case, the free access on the four sides of the tower must be secured to ensure that the fans are supplied correctly with air and that there is proper access for installation and maintenance.

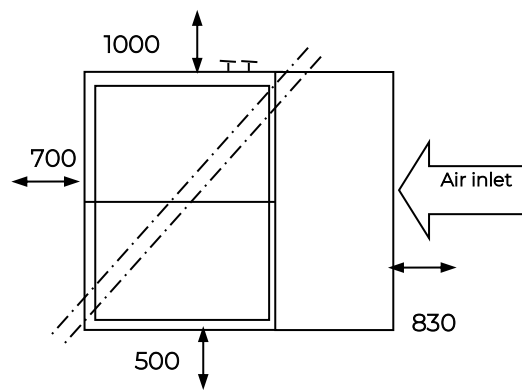
If these rules are not applied, it is inevitable that the cooling tower will not operate properly.

### Recommended minimum free access (mm) for standard cooling towers: Top view

Tower without sound attenuation



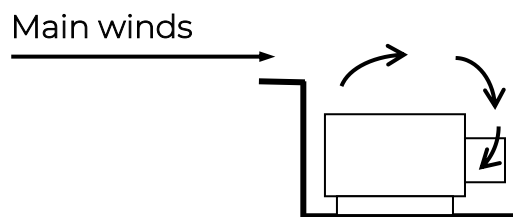
Tower with IB or special sound attenuation



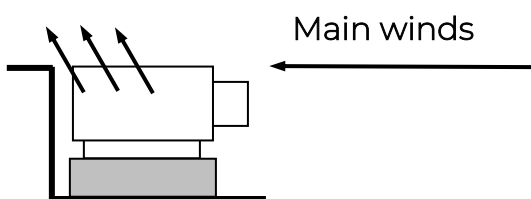
Do not hesitate to contact us for any advice

### Layout examples:

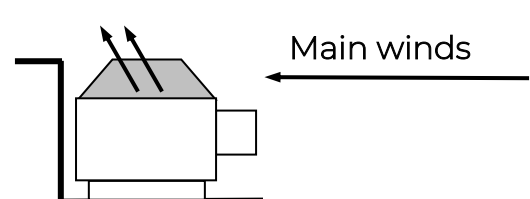
#### NOT TO DO:



#### TO DO:



Install a base in order to up the cooling tower



Install a cone in order to up the air outlet of the cooling tower

## Water treatment RC

### WATER EVAPORATION

Consumption by evaporation is approximately 1.7kg/h per 1 000kcal/h.

### DECONCENTRATION

Due to the evaporation and to the water recycling, impurities or salts in the water are concentrated. To make sure that this concentration is not too high, drain must be carried out.

If not, concentration rates of 10, 100 or even 1,000 would occur over time.

In order to pre-determine the installation requirements, consider drain value twice the evaporation level. In operation, with an efficient water treatment, this figure may decrease, especially in the case of a stainless-steel cooling tower (concentration rate of 3 to 5 possible).

There are three possibilities to choose according to the case:

#### 1- Continuous blow down

Connection piece to be installed at the pump discharge just before the tower, if possible, at the level of the water distribution pipes so that the purge only takes place when the circulation pump is operating.

The blow down flow rate can be calculated using the formula:  $[100 S / (M - S)]$  % of the make-up water in which:

S: Salinity of the make-up water compensating for evaporation.

M: Maximum acceptable salinity level of water in circuits.

#### Example:

Salinity of make-up water = HT 20 ° F

Maximum acceptable salinity = HT 40 ° F

$100 \times 20 / (40 - 20) = 100$  % make-up water flow rate

Therefore, the continuous blow down must be equal to the evaporated make-up water flow rate (rate=2).

Consequently, the real water consumption is twice the theoretical evaporated water flow.

#### 2- Discontinuous blow down

The conductivity of the water in the circuit is controlled and the device is purged while not exceeding the TH value.

#### 3- JACIR Automated Inductive Blow down

Once water conductivity level has been reached, a motorised valve can be activated to drain the required quantity of water to maintain the right concentration level. See separate documentation.

### WATER TREATMENT

It is essential that good quality water is available to ensure that the closed-circuit cooling network operates correctly. If the water contains a significant amount of impurities, it is recommended that a filtration device to be installed in parallel for 5 to 10% of the recycled water flow.

If the water contains salts that form deposits, iron or corrosive chemical elements, a make-up water treatment system must be installed to obtain purer water, which is close to being chemically neutral, and which can supply the cooling devices without causing damage.

In some cases, algae, moss, fungus or permanent shells can tend to grow in cooling towers. There are products that can be added periodically to the water circuit to prevent these organisms from developing.

Water treatment should be undertaken by a specialized Company.

PREVENTS THE RISK OF LEGIONNAIRES' DISEASE: see separate documentation

# Prescription RC

Evaporative cooling tower, high efficiency open circuit with forced centrifugal fans, RC .....  
JACIR type,

## Thermal characteristics

The dissipated power will be.... kW, with a temperature range from .....°C to .....°C, an ambient air temperature of ...°C, and a wet bulb temperature of..... °C.

## Sound level characteristics

The sound pressure level will not exceed... dB (A) at .... meters in free field over 4 directions. To ensure this, the tower is equipped with one of the following types of soundproofing devices:

- ∞ **IB** sound attenuation without baffles at air inlet, and with outlet cone coated with acoustic foam. Fan housing.
- ∞ **Special** sound attenuation with parallel baffles both at air inlet and outlet, and with 50mm thick high density rock wool double casing, covered by 1.2 mm thick steel sheet.

## Infill: X – STREAM

It will be made of 2mm thick PP toothed blades, with 66 mm high. They will equally spread the water along the blades, into drops down to the lower blades' layers. The cooling occurs during the drops fall between the layers; therefore, this exchange surface will be highly resistant to clogging. It can be used for water with solids content up to 400 ppm. In the case of waters with high salts content, the X-STREAM will be self-cleaning by thermal expansion.

## Tower casing and inclined plane basin

These will be made of single, self-supporting sheet steel panels twice or 4 times folded on the 4 sides.

Side panels will be designed to be able to receive a double casing if necessary.

Stainless steel rivets with a high locking capacity will be used for assembly. Elastomer gaskets are used, without any mastic sealing.

The basin will be fitted with an inspection door (540 X 540 mm), floating valve that can easily be adjusted, a drain, an overflow and an anti-cavitations strainer.

The tank is inclined and plane so that all the water can be replaced easily and the cleaning is simple: the drain hole bottom is lower than the lowest part of the basin in order to secure 100 % drain. Height between basin bottom and the infill is 920mm for easy access.

## Accessibility

In case of sound baffles, plumeless tube coil or outlet air duct, large inspection doors (540 x 540mm) to nozzles and basin will be installed in order to remove easily pipes, nozzles and packing. For maintenance, an additional casing will be provided, located between the plume suppression coil and the drift eliminators, with an access door.

## Water distribution

Water will be distributed by PP pipes (10 series) or by steel open air channels (20 series). They will be installed with PP nozzles especially designed to achieve an optimal distribution through the whole air section, and with large water nozzle to avoid clogging even in the case of high suspended content. These nozzles will operate under low



## Fans

The low-pressure centrifugal fan(s) with forward inclined blades and double air inlet will be placed in the dry air flow, outside the basin and at man's height for easier access for disassembly and maintenance.

The polyester volute shall be profiled to optimise air intake and removable to simplify maintenance.

The impeller will be coated by baked-on EPOXY. The volute is made of X-STEEL stainless steel. Optional stainless steel impeller construction is available.

Each fan will be coupled to its own motor.

## Electric motor(s) and coupling

The IE3 three-phase asynchronous motor(s) shall be of the enclosed ventilated type with a maximum power of ..... kW, ..... rpm, IP55 protection, class F/B. The transmission will be ensured by V-belts sized up to 150% of the nominal power.

## Steel structure

The tower will be made of:

- ∞ Zenzimir process galvanised metal (2 mm thick) at 275 gr/m<sup>2</sup> with finishing ZINCALU paint applied to the external sides after assembly,
- ∞ Stainless-steel 304 L (1.4301) or 316 L (1.4404) metal for long life, water savings and high-pressure machine cleaning,
- ∞ Galvanized steel 275 gr/m<sup>2</sup> with baked EPOXY paint for all tower parts not in contact with water.