Parto ABGARDAN

The Ultimate Cooling System

FRP Cooling Towers
Closed Circuit

Member

XC Series
2016 Catalogue
1st Edition

Parto
ABGARDAN

INTRODUCTORY

For more than 22 years Parto ABGARDAN has served thousands of customers for their need of Air-conditioning, Industrial Cooling & FRP products.

Our well equipped facilities & resourceful network, aside our well trained personnel have enabled us to simply provide our customers, the best products & services in the market.

Parto ABGARDAN serves the most complicated and precise industrial heat transfer processes as well as comforting residential and commercial air-conditioning projects. Thousands of our cooling towers are working nonstop at the moment to provide cooling for a hospital O.R., a classroom, an airport terminal, a petrochemical process or a line of steel production.

Our prime goal and objective is to meet the highest standards to fulfill our customers' most special requests. Years of experience ,huge spending on quality assurance and customer service, has empowered us to enhance our products , improve our services to its best and continuously expand our network of satisfied customers.
We in Parto ABGARDAN are trying our hardest everyday to make sure you get the best you deserve.

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General — Technical — Services

WHAT'S A CLOSED CIRCUIT COOLING TOWER?

A Closed Cooling Tower is a machine designed to cool down isolated and quality controlled circulating liquid. In closed type Cooling Towers unlike open type, air doesn't mix with hot liquid. Heat rejection takes place just through thin tube wall. In our closed cooling tower an open cycle pump feeds a network of nozzles to spray closed circuit coil with a very thin layer of water. This layer evaporates by air-stream and cools down the coil.

A Closed type Cooling Tower at least includes the following sections:

- Casing or Body
- Cold Water Basin
- Water Distribution System
- Air Moving System
- Closed Cycle Coil
- Open Cycle Pump

ADVANTAGES

You may buy a Parto ABGARDAN Closed Cooling Tower to fulfill your heat transfer need, but it will provide you many advantages, way more than expected, and it will save you lots of money!

- Attractive Design & Color Choice
- Energy Efficient
- Corrosion Free (Body, Structure & ...)
- Simplified Foundation, Piping & Wiring
- Quiet Operation
- Easy Access to Inspect & Service
- Long Lasting Quality & The Best Guarantees
- Permanent Technical Back up

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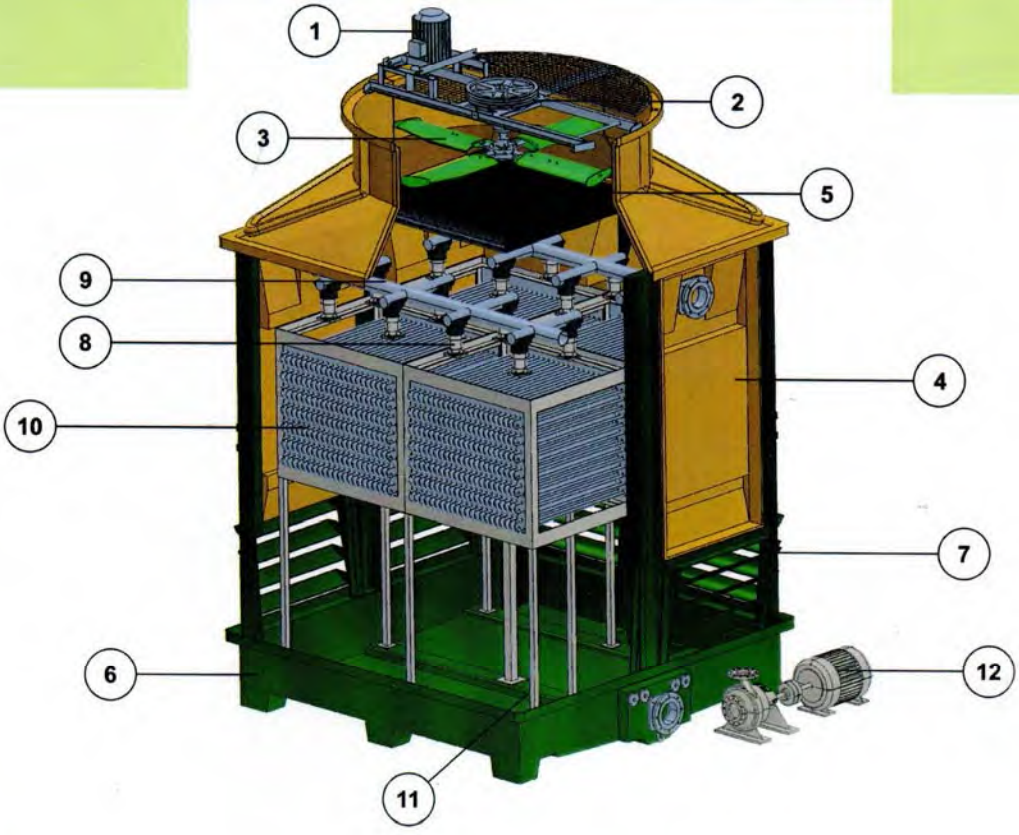
CONSTRUCTIONAL DETAIL

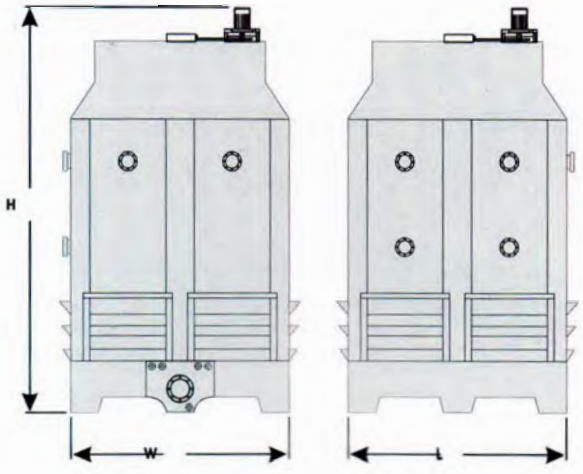
	XC Model	1200 5200
1	Motor	3ph / 50Hz / 400V / IP55
2	Fan Drive	Belt Driven / Gear Box
3	Fan Blade	Air Foil
4	Casing	FRP
5	Eliminator	PVC
6	Basin	FRP
7	Louver	FRP
8	Nozzle	ABS/PP
9	Internal Piping	High Pressure PVC
10	Coil Tube	Copper
11	Frame Assembly	H.D.G Steel
12	Pump	3ph / 50Hz / 400V / IP55 - Centrifugal Type



TOWERS' SPECIFICATIONS

MODEL	DIMENSIONS [M]			WEIGHT* [KG]	
	LENGTH	WIDTH	HIGHT	DRY	OPER.
XC - 1200	1.7	1.7	3.8	950	2950
XC - 1400	1.7	1.7	3.8	1100	3100
XC - 1800	2.8	2.8	4.6	2400	4600
XC - 2300	2.8	2.8	4.6	2500	4700
XC - 2600	3.9	3.9	5	3200	7500
XC - 3200	4.2	4.2	5	4100	9200
XC - 5200	5.2	5.2	5.5	7200	15500

MODEL	FAN			OPEN CYCLE			CLOSED CYCLE
	MOTOR POWER	DIAMETER	NOMINAL AIR FLOW	PUMP		NOMINAL FLOW	NORMAL RANGE OF WATER FLOW
	[KW]	[M]	[CFM]	MODEL	[KW]	[M^3/H]	[M^3/H]
XC - 1200	2.2	1.2	20000	65-200	3	20	5 - 15
XC - 1400	2.2	1.2	24000	65-200	3	40	15 - 30
XC - 1800	4	1.8	40000	80-200	4	50	30 - 40
XC - 2300	5.5	1.8	55000	80-200	4	90	40 - 80
XC - 2600	7.5	2.4	75000	100-200	7.5	130	60 - 120
XC - 3200	11	3	120000	100-200	7.5	160	90 - 150
XC - 5200	15	3.3	160000	125-250	18.5	220	100 - 180



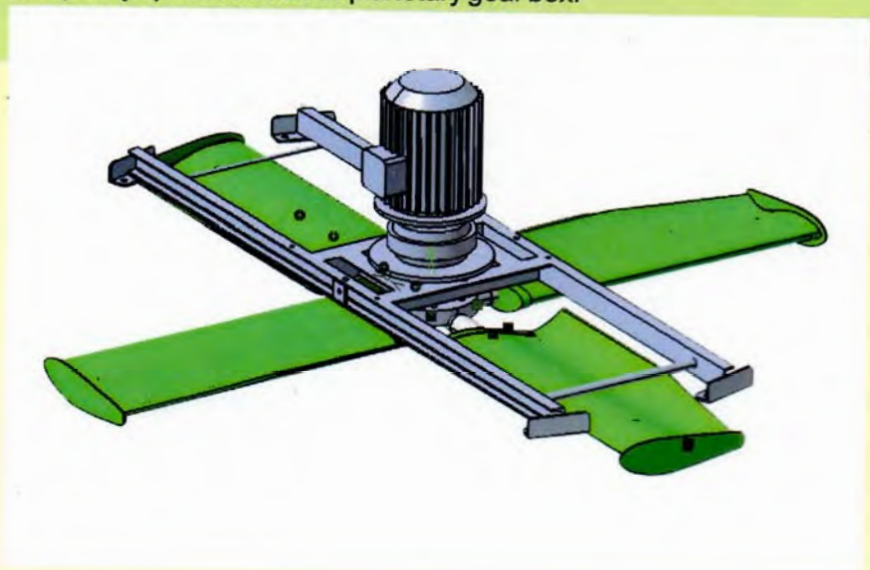
AIR & WATER SYSTEMS

Water Distribution System (Open Cycle)
Parto ABGARDAN's XC Series employ stationary water distribution system in their open cycles to spray water flow over closed cycles cooling coils. This system includes:

- A set of internal piping
- A network of nozzles
- Drift eliminators

Open cycle's water flow enters to internal main header which feeds branches and nozzles evenly. Nozzles spray water on closed cycles cooling coils.

Air moving system
All XC Series are induced draught type so they have utilized by an axial propeller fan at discharge. These fans are very light weight and designed to work quiet and efficient because their "Air Foil" shapes allow them to produce more airflow in lower speed. Blade's adjustable pitch angle feature enables these fans to be adjusted for cooling towers best performance. In all models an electromotor provides driving force for the fan, via a belt & pulley speed reducer or planetary gear box.



CASING & COILS

Casing or Body

The body and cold water basin of Parto ABGARDAN's cooling towers are made of composite material called FRP (Fiberglass Reinforced Polyester). This composite has excellent chemical and mechanical properties. It is corrosion free and stabilized against sun light's ultra violet radiation.
FRP has no effect on circulating water's chemical balance. This material also is not an environment for algae to live or grow. Composites used in casing and cold water basin's production are self colored (not painted). Body parts are designed and manufactured from high quality materials so they will last for 30 years.

Cooling Coils (Closed Cycle)

Cooling coils are the heart of a closed circuit cooling tower. In Parto ABGARDAN closed circuit cooling towers each coil is made of number of tubes supported by tube sheets and precisely arranged to maximize heat rejection. Closed cycle flow enters from an external header and accessories to coils' input collectors. Hot entering flow while dropping temperature, takes the path of tubes towards output collectors and leaves the cooling tower. Each Coil is separately packed in a steel frame to assure easy and safe shipping, handling and installation. Simplicity of the coil design enables users and servicemen to perform inspection, services and repairs hassle free. If water flows are being treated properly, coils will last for more than 15 years.

TOWER SELECTION

To select a Parto ABGARDAN cooling tower for your project you may go through the following steps or you can always contact our sales office asking for a professional selection.

Step 1) Collect the necessary data
a)quantity of circulating water flow (Q)
b)water temp. leaving your system (entering cooling tower) or "hot water temp." (Th)
c)water temp. your system needs to work properly or "cold water temp." (Tc)
d)ambient wet bulb temp. (Twb)

- If your cooling tower is serving a chiller unit, you may get necessary data from chiller's manufacturer
- If you have other machinery or devices to cool down ask their manufacturer to provide the data
- If you need a cooling tower to supply cold water for a process, seek engineering consultation for data calculation
- If you have an existing system you may measure the above data yourself
- For design wet bulb temp. (Twb) which is a climate characteristic, you may find data in meteorological references or through experienced engineering consultants

Important notice:
Always make sure Twb < Tc, otherwise contact Parto ABGARDAN sales office.

Step 2) Do the calculations
Determine Twb and ΔT (= Th - Tc)

Step 3) Select your cooling tower:
e)Use quick reference
If your data matches with quick reference, use Twb and ΔT to find the model that covers your circulating water flow (Q) in the quick reference table
f)Send your data to our sales office and let them do it for you professionally

Since we preserve the right of modifications to improve our products without any prior notice and also the fact that selection of a proper model may involve other consideration such as piping, installation or any other engineering limitations and considerations, we strongly suggest you to confirm your selection result with our sales dept. otherwise it will produce no obligation for Parto ABGARDAN whatsoever.

QUICK REFERENCE

ΔT	~7.5 °C	~15 °F	~12 °C	~25 °F	~10.5 °C	~20 °F
Tc / Th	~29.5 /37	85 / 100	~33 /~45	90 / 115	~29.5 /40	85 / 105
W.B. Temp.	72 (~22)	75 (~24)	72 (~22)	75 (~24)	72 (~22)	75 (~24)
XC - 1200	**90**	**80**	**105**	**100**	**75**	**55**
XC - 1400	**100**	**90**	**120**	**110**	**85**	**65**
XC - 1800	**190**	**170**	**260**	**255**	**140**	**130**
XC - 2300	**250**	**220**	**300**	**270**	**210**	**150**
XC - 2600	**350**	**320**	**400**	**380**	**310**	**290**
XC - 3200	**400**	**370**	**450**	**430**	**360**	**340**
XC - 5200	**500**	**470**	**600**	**560**	**460**	**440**

Water flows in GPM

Example: **Th=100 °F**
Tc= 85 °F
Twb= 75 °F
Q= 200 GPM

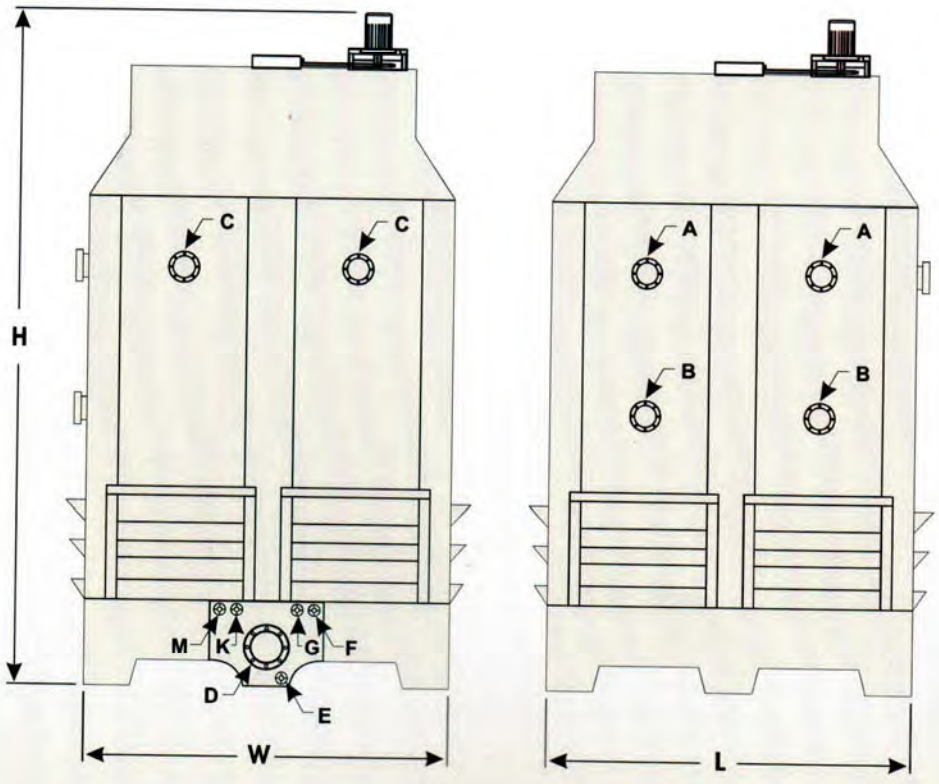
(220 GPM ≥ 200 GPM)

Selected Model: XC - 2300

CONNECT YOUR PIPING

Your cooling tower will serve your system via your piping. It is important to properly set up and connect your piping to your cooling tower(s). Parto ABGARDAN's closed circuit cooling towers designed to provide easy and inexpensive pipe connections. It's easy to connect your cooling tower to the pipelines; here are some guidelines to do so:

- All connecting pipes should be supported separately. Non of pipes and valves should be supported by cooling tower's flanges
- Before connecting pipelines to cooling tower, you should make sure they are clean and there is no object to block the water flow
- If two or more similar cooling towers will be in service, make sure piping set up will supplies them with the same flow and head
- All connecting pipes to every single cooling tower have to have a proper On/Off valve close to cooling tower flanges (except over flow)
- We strongly recommend use of expansion joints wherever a 4" or higher pipeline connects to cooling tower
- Ask our sales engineers for detail drawings of pipe connections to your cooling tower(s)



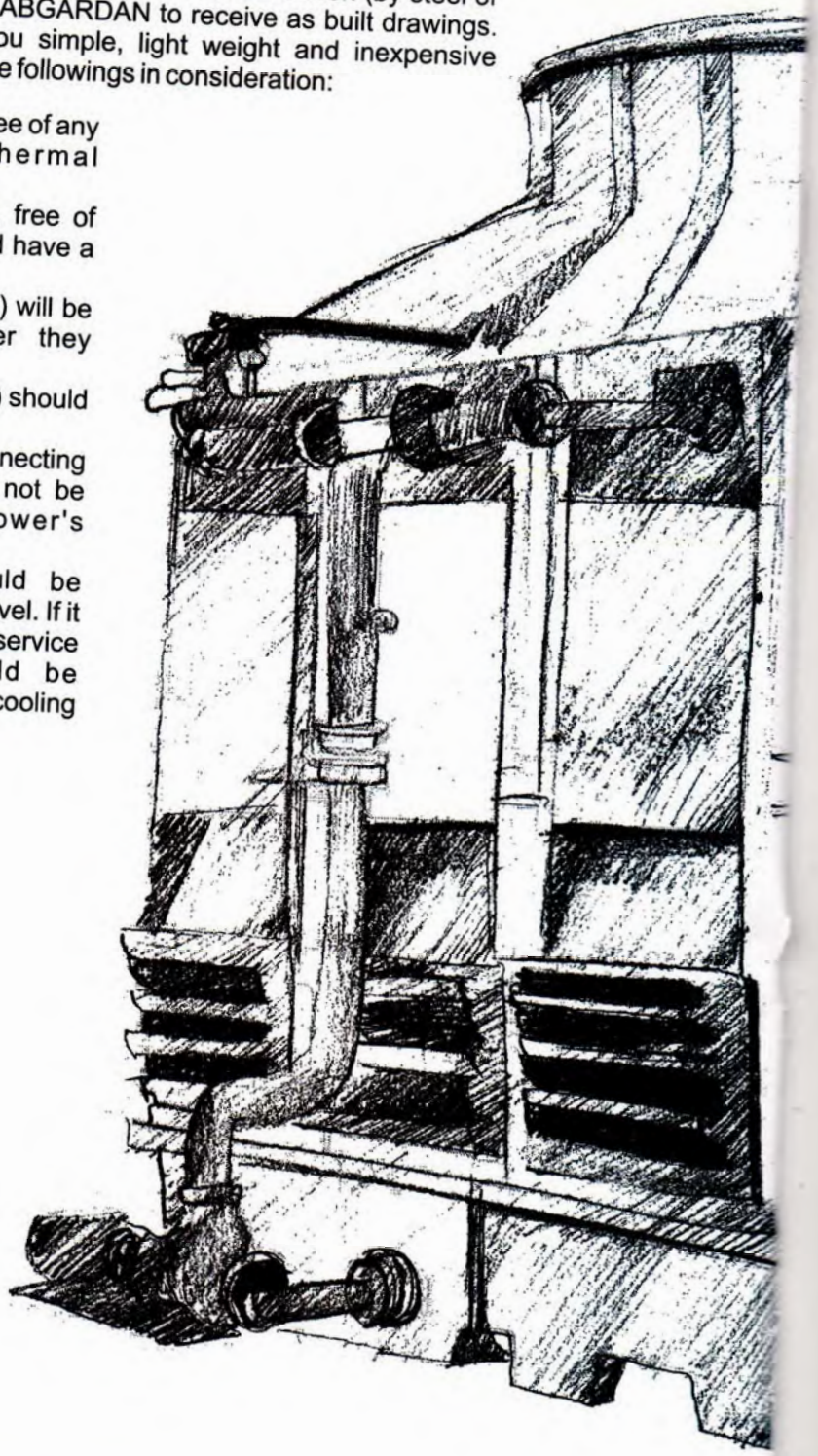
Model	Closed Cycle				Open Cycle			
	No. of Inlets	Inlet Size in	No. of Outlets	Outlet Size in	No. of Inlets	Inlet Size in	No. of Outlets	Outlet Size in
	A		B		C		D	
XC - 1200	1	2	1	2	1	4	1	4
XC - 1400	1	2	1	2	1	4	1	4
XC - 1800	2	3	2	3	2	4	1	5
XC - 2300	2	3	2	3	2	4	1	5
XC - 2600	3	3	3	3	3	4	1	6
XC - 3200	3	3	3	3	3	4	1	6
XC - 5200	4	4	4	4	4	4	1	8

Model	Overflow Size in	Drain Size in	Float Valve Size in	Quick Fill Size in	Open Cycle Bypass Size in
	F	E	K	M	G
XC - 1200	1½	1½	1	3/4	1/2
XC - 1400	1½	1½	1	3/4	1/2
XC - 1800	1½	1½	1½	1	3/4
XC - 2300	1½	1½	1½	1	3/4
XC - 2600	2	3	2	1½	3/4
XC - 3200	2	3	2	1½	7/8
XC - 5200	4	3	4	2	1

PREPARE YOUR FOUNDATION

To install your Parto ABGARDAN cooling tower you need to build a foundation. If you have selected a model, you can find foundation's dimensions here to make sure it will fit your location. To construct tower's foundation (by steel or concrete), you must contact Parto ABGARDAN to receive as built drawings. Parto ABGARDAN will provide you simple, light weight and inexpensive foundation drawings. Please take the followings in consideration:

- The location itself should be free of any obstacle preventing thermal performance of cooling tower
- The location should be safe, free of pipelines or other devices and have a proper drain
- If two or more cooling tower(s) will be installed and work together they should be leveled
- 1m, all around cooling tower(s) should be considered for services
- All Collectors, Risers and Connecting pipes 12" and higher should not be supported by cooling tower's foundation
- The foundation level should be minimum 300mm above floor level. If it will be above 1m, a 1m wide service deck with handrail should be considered all around the cooling tower(s).

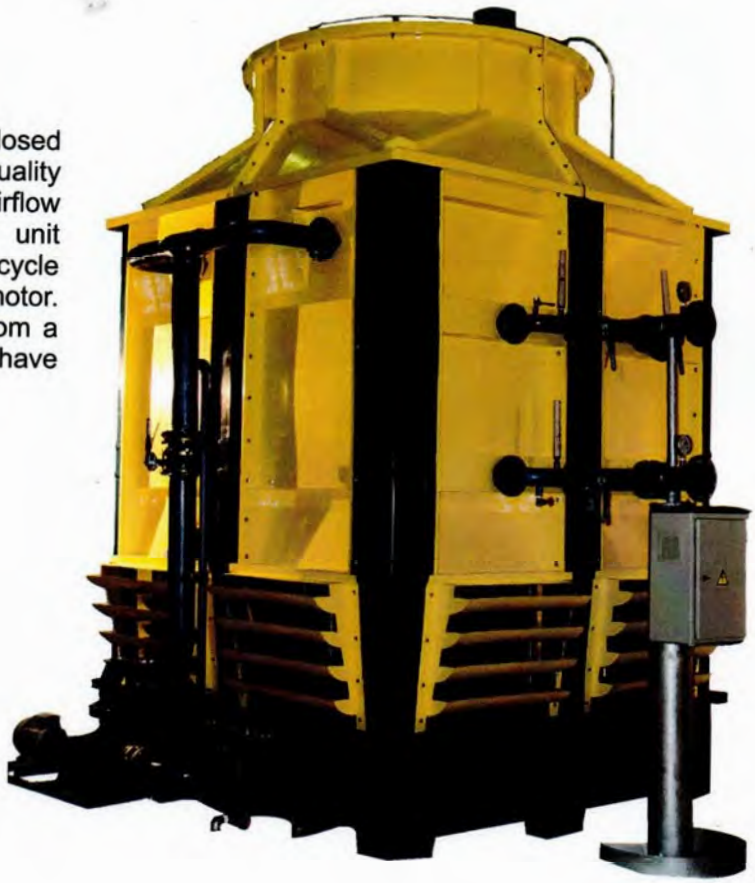


ELECTRICAL EQUIPMENTS

Electromotor

All Parto ABGARDAN's XC Series closed circuit cooling towers use one quality electromotor to induce necessary airflow through cooling coils. Also each unit includes a centrifugal pump on open cycle which runs by same quality electromotor. These electromotors are selected from a group of well known brands. They all have the following required specification:

- IP55 Protection Class
- Flanged Vertical Mount
- 3ph / 400V / 50 Hz
- Temp. Class F
- Single Speed
- Self Ventilated



Optional Equipments

In order to get the best out of your cooling towers and have it work safer and more energy efficient, you may order:

- Basic Control Box that protects cooling tower's electromotor from electrical surge, working 2 phase, overload, shortcuts or power line problems
- Full Control Box that covers whatever Basic version offers plus Variable Frequency Drive (inverter). VFD, intelligently senses the heat load and by changing speed of rotation accordingly saves energy. Also VFD starts and stops the electromotor smoothly so it will last longer
- Anti Freezing Heating Elements that automatically protects cooling tower's basin from freezing wherever it is set to operate all 4 seasons.

AFTER SALES SERVICES

Parto ABGARDAN offers a wide range of services for its customers. End users of cooling towers can enjoy our expertise after sales program. This program includes:

- Guaranties and Warranties that come with contract
- Supply of high quality original parts
- Repairs and services by trained and experienced servicemen
- Technical support of our cooling tower experts
- Nationwide network of agents and service centers
- Services available every day, even holidays
- Annual commissioning and start up (upon request)
- Performance upgrade upon request (availability limited)
- Extended modification and improvement plan

As our sole agent,"Tochal Tahvieh Iranian Co" (established 2007) is ready to take on your request for parts services and maintenance 24/7.
professional and experienced team of "Tochal Tahvieh Iranian co" will be at your service till earn satisfaction of Parto ABGARDAN's Customers and end users.

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