

Custom Cooling Towers

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About YWCT

YWCT has been designing and manufacturing cooling towers made of FRP, cement, and steel for almost 50 years. During this period, YWCT has established its reputation as a credible professional cooling tower supplier for the industrial market.

YWCT is more than an equipment supplier. Its project-wide orientation makes it the perfect partner for leading EPCMs and turnkey contractors. In YWCT, such companies have a long-term partner on which they can rely and with whom they can consult; a partner who meets the high standards of their end users; and that takes into account not only the obvious considerations of price and capacity, but also the operational aspects and usability of its products. At YWCT, we meet or surpass the highest standards of the industry.

It's All About Approach

YWCT's operations are project-oriented. From the initial RFQ till the cooling tower is installed on site, we approach each project individually, no matter how big or small. We offer our customers a complete service package, including:

- Full thermal rating of the specific design conditions of the project, including "what-if" scenarios and water loss calculations
- Assistance in choosing the optimal configuration for the specific project in terms of cooling tower type, materials selection, and subsystems suppliers
- Taking responsibility for associated systems such as pumps, filtering system, water treatment system, electric and control panels, and heat exchangers
- Depicting the cooling tower and all other components in 3D
- Providing a detailed P&ID for the designed systems
- Manufacturing the cooling tower (or system) as per a customer-approved drawing
- Designing piping streamline
- Designing (if needed) concrete cement structure
- Running finite element analyses for the specific cooling tower as per the regulation in the destination country
- Sending our field team to assist or lead installation on site

Custom vs Standard

YWCT specializes in customizing cooling towers and degasifiers to meet project needs, tailoring the right solution to meet the specific requirements of our customers. In the next few pages, you'll find the series of models being used as the bases for required changes.



CING series

Features

- Concrete cement counterflow cooling towers
- Longest service life in harsh environment
- Erected on site
- Pultruded FRP fill support

Type:	Counterflow
Fabrication:	Field-assembled
Material:	Concrete cement
Air flow:	Induced draft
Capacity:	2,000,000 - 20,000,000 kcal/hr per cell
Water flow	400 - 4,000 m ³ /hr per cell
Industries	Oil and Gas, Pharmaceutical, Power Plants, Refineries



General

Concrete cement cooling towers designed for heavy industrial applications such as power plants; petrochemical and chemicals plants; and refineries of various kinds. YWCT provides its customers with scale drawings of the concrete cement structure, including locations and production drawings of all pipe fittings in 2D or 3D. The size of a single cell ranges from 6m x 6m to 15m x 15m.

In most cases, our customers (who are familiar with the local market and regulations) choose to take responsibility for the civil engineering and the concrete work. Our engineering department guides the concrete construction process from beginning to completion, ensuring that on-site work meets all requirements. While construction is taking place, all relevant parts of the cooling tower are purchased or manufactured and sent to the job site. When the structure is ready, our assembly team flies to the job site to install and furnish the cooling towers with fill, louvers, fan, motor unit, and fan stack until the cooling tower is operational. Operations are conducted by an experienced team of foremen and laborers, who can be assisted by local labor to reduce costs.

Choosing a concrete structure ensures the end user the longest product life for the cooling tower, and may be the least costly solution for certain customers who already work with a concrete contractor, particularly in locations where labor is less costly.

Options

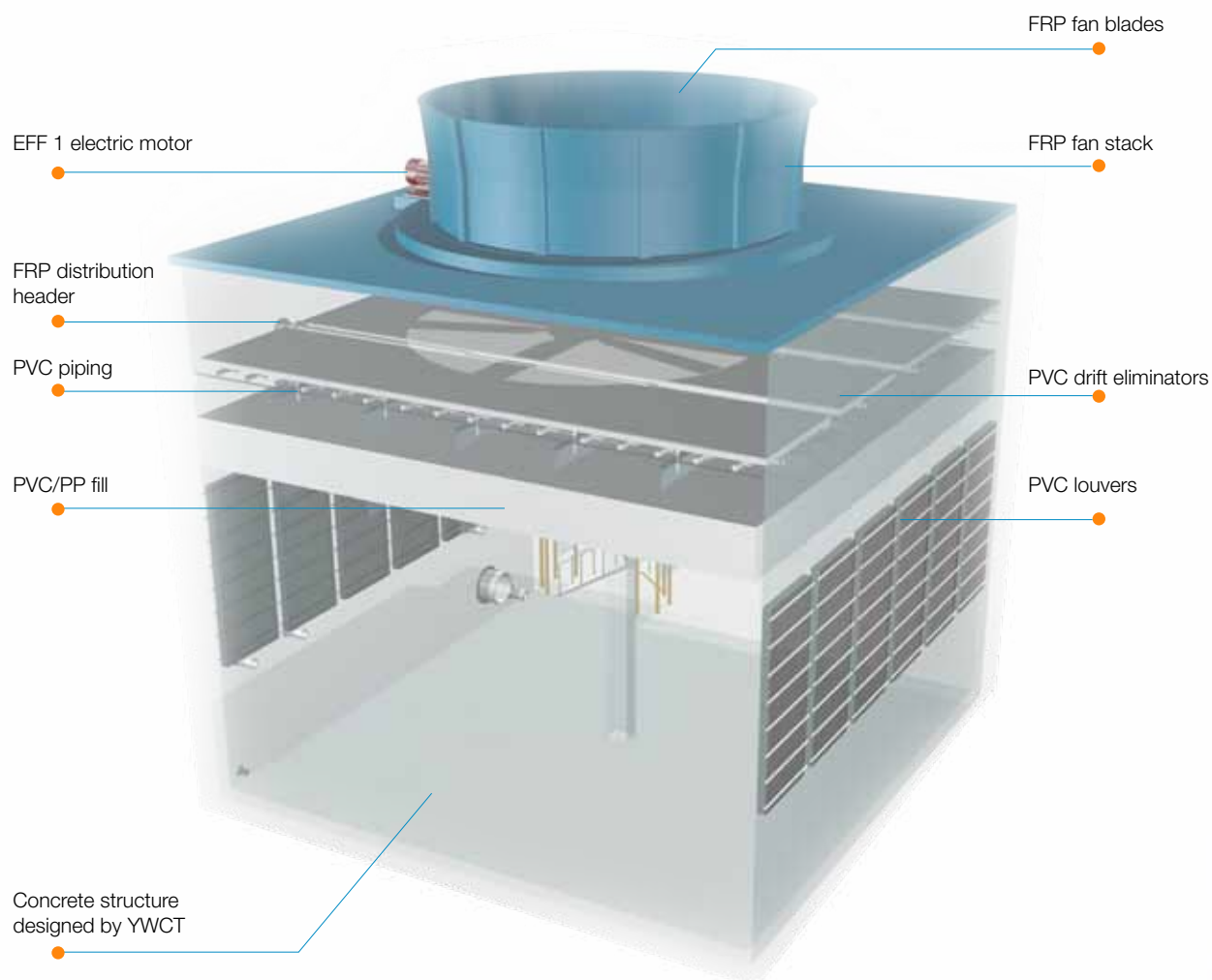
- Polypropylene fill for high-temperature water
- Turbo-Splash fill for poor quality water
- Forced-draft appearance
- Low-noise fans
- Complementary subsystems: filtration system, water treatment system, heat exchangers, VFD
- Wooden infrastructure and insulated rubber
- Nickel alloy connectors (e.g., Hastelloy C-22)
- Atmospheric distribution system
- Elevated basin for optimal use of space

Basic CING models

Model	Single cell dimensions [cm]			Cooling capacity [Kcal/hr]*	Hydraulic water flow capacity per single cell [m ³ /hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
CING-1000-1	600	600	600	3,500,000	1,000	350	50
CING-1800-1	800	800	850	6,500,000	1,800	650	100
CING-2800-1	1,000	1,000	1,100	10,000,000	2,800	1,000	125
CING-4000-1	1,200	1,200	1,300	14,500,000	4,000	1,450	200
CING-5500-1	1,400	1,400	1,550	20,000,000	5,600	2,000	250

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

CING cooling tower – single cell



FRPP series

Features

- Pultruded fiberglass polyester field-erected cooling towers
- Heavy-duty cooling towers designed for industrial applications
- Optimal thermal performance design
- Highly resistant to corrosive environments

Type:	Counterflow
Fabrication:	Field-assembled
Material:	Pultruded and hand-laid FRP
Air flow:	Induced draft
Capacity:	2,000,000-20,000,000 kcal/hr per cell
Water flow:	400 - 4,000 m ³ /hr per cell
Industries:	Oil and Gas, Pharmaceutical, Power plants, Refineries, large-scale HVAC systems.

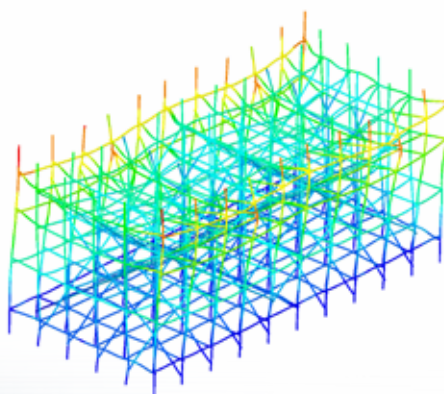
General

YWCT's FRPPs are induced-draft cooling towers made of FRP. The structure of our FRPP series (support beams and columns) is made of composite continuous fiberglass pultruded sections that comply with CTI's STD 37 and conform to ASTM E84D with a flame spread rating of below 25. FRPP cooling towers are positioned over a concrete basin. Just as for our CING series, YWCT provides its customers with scale drawings of the concrete cement, including locations and production drawings of all pipe fittings in 2D or 3D. Also, as in our CING series, the size of a single cell ranges from 6m X 6m to 15m X 15m. When the concrete basin is ready on site, YWCT sends its assembly teams to the job site, where one team sets the pultruded FRP structure, and the other furnishes the cell once the first team has erected it. Pultruded FRP cooling towers have become an alternative solution to traditional concrete cooling towers, since in many cases they cost less and their erection time is much shorter than that of cooling towers made entirely of concrete. In addition, pultruded FRP towers in many cases offer superior corrosion resistance.

Options

- Additional veil layers to increase corrosion resistance
- Pultruded FRP hand rails, walkways, and ladders
- Low-noise fans
- Complementary subsystems: filtration system, water treatment system, heat exchangers, VFD
- Nickel alloy connectors (e.g., Hastelloy C-22)
- Elevated basin for optimal use of space

Finite Element Analysis:

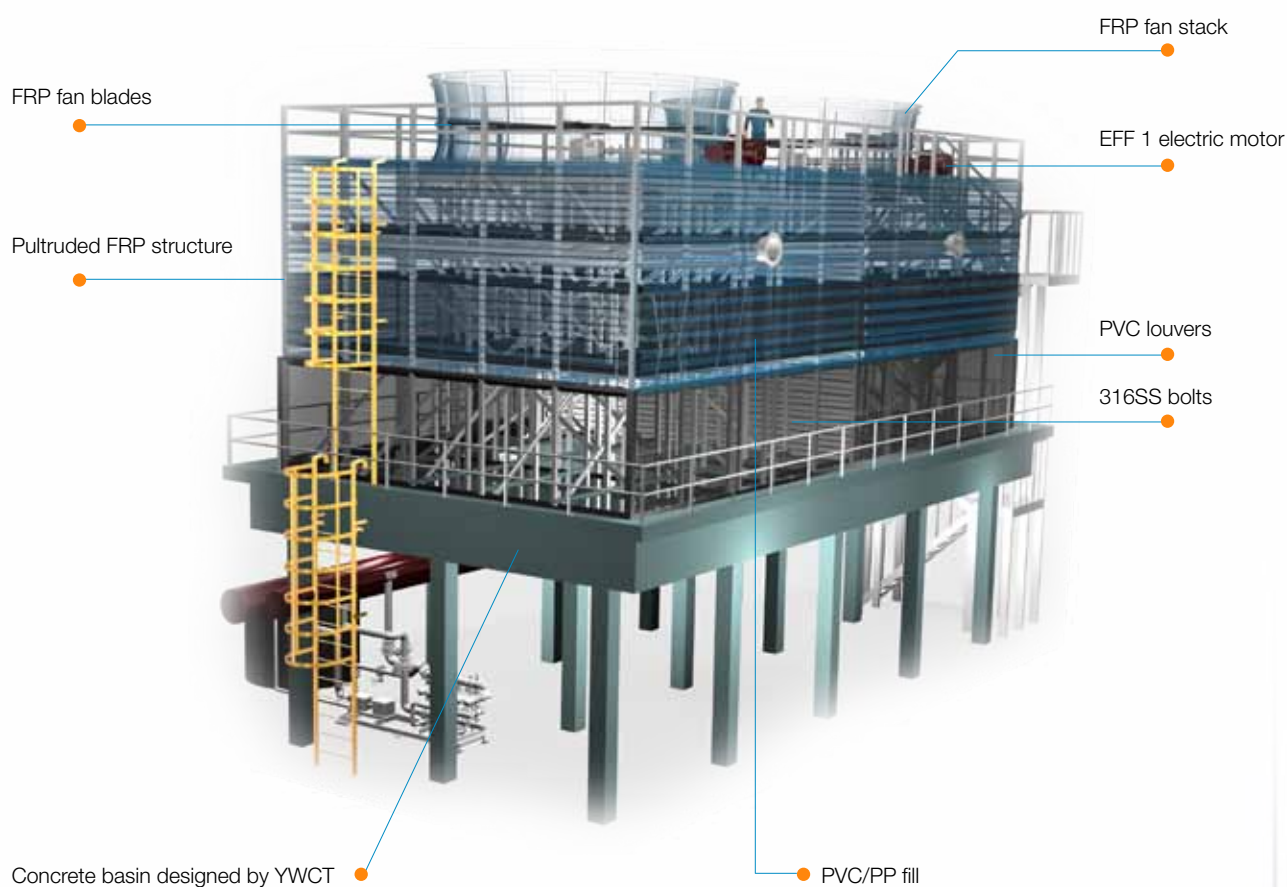


Basic FRPP models

Model	Single cell dimensions [cm]			Cooling capacity [Kcal/hr]*	Hydraulic water flow capacity per single cell [m ³ /hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
FRPP-1000-1	600	600	600	3,500,000	1,000	350	50
FRPP-1800-1	800	800	850	6,500,000	1,800	650	100
FRPP-2800-1	1,000	1,000	1,100	10,000,000	2,800	1,000	125
FRPP-4000-1	1,200	1,200	1,300	14,500,000	4,000	1,450	200
FRPP-5500-1	1,400	1,400	1,550	20,000,000	5,600	2,000	250

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

FRPP cooling tower - Two cells module / Dual-cell model



P series

Features

- Packaged counterflow cooling towers made of FRP
- Heavy-duty design withstands corrosive environments
- Serves industrial and small-scale HVAC applications

Type:	Counterflow
Fabrication:	Factory-made
Material:	Hand-laid FRP
Air flow:	Induced-draft and forced-draft
Capacity:	30,000-500,000 kcal
Water flow:	6-100 m ³ /hr per cell
Industries:	Aviation, Chemicals, Food, Pharmaceutical, Rubber



General

YWCT's P series is FRP factory-made cooling towers. This built-to-last series suits all industrial applications. Its unique tower design gives this steel-less structure its strength. In our P towers, the fan is mounted directly on the motor for easy maintenance. The P series is shipped to the job site in a single container, and comes with a variety of add-ons (see PlugN'Play cooling systems). The tower can be provided with either PVC film or polypropylene fill for high-temperature inlet water.

Options

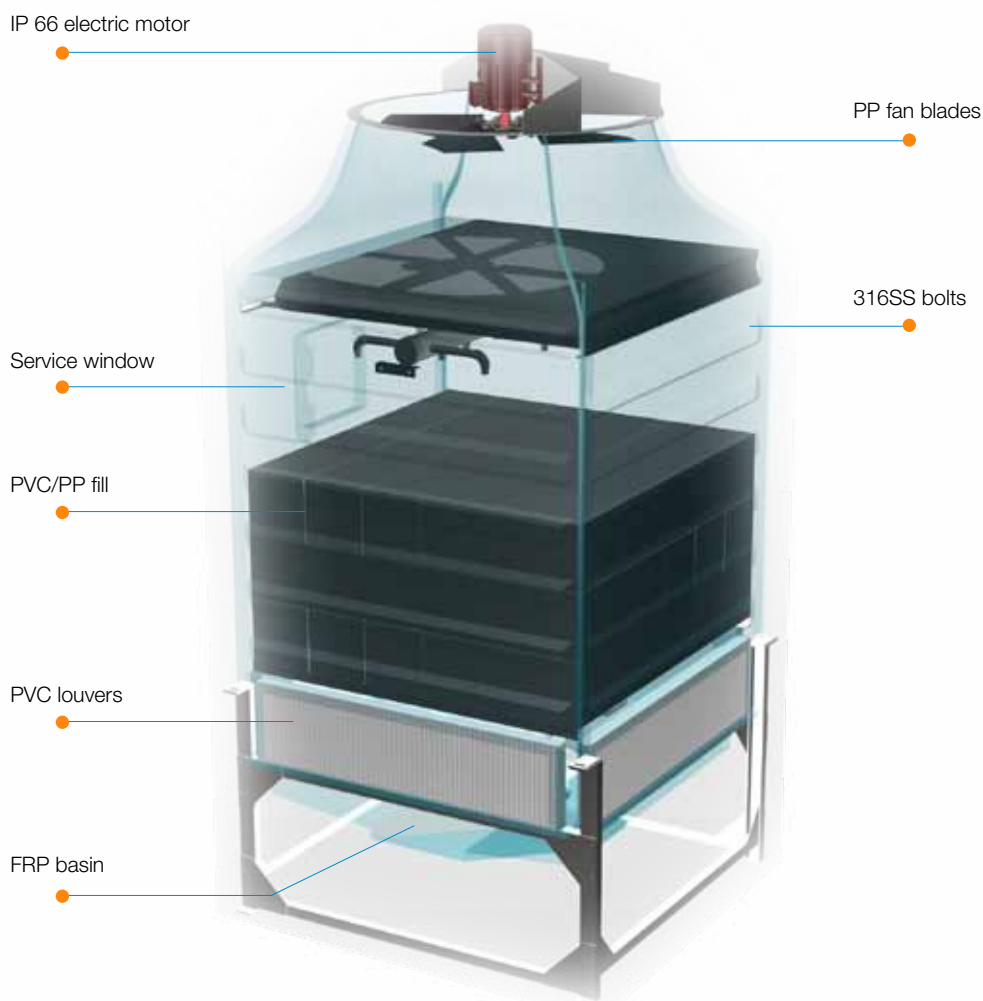
- Increased basin capacity
- Polypropylene fill for high-temperature inlet water
- FRP approved by FDA for drinking water
- Low-noise fans
- Vinyl Ester resin
- Cooling tower designed to shape
- Hand rail and ladder

Basic P models

Model	Dimensions [cm]			Cooling capacity [Kcal/hr]*	Hydraulic water flow capacity [m³/hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
PIND-025-1-w	120	120	250	90,000	25	10	2
PIND-035-1-w	120	120	370	120,000	25	10	3
PFND-050-1-w	190	150	300	220,000	60	20	4
PIND-075-1-w	180	180	410	270,000	75	25	5.5
PFND-100-1-w	310	150	300	400,000	90	30	7.5
PIND-110-1-w	220	220	480	440,000	100	35	7.5
PFND-120-1-w	150	380	300	480,000	110	45	7.5

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

PIND cooling tower



SING series

Features

- Modular cooling towers made of steel
- Highest thermal efficiency design
- Minimal footprint

Type:	Counterflow
Fabrication:	Factory-made / Field-erected
Material:	Galvanized steel
Air flow:	Counterflow
Capacity:	500,000-5,000,000 kcal/hr per cell
Water flow:	80 - 1,000 m ³ /hr per cell
Industries:	Food, Pulp and Paper, Machinery, HVAC

General

Modular cooling towers made of galvanized steel. Designed to minimize costs and maximize cooling performance through quick, easy installation and low-maintenance operation. The SING's small footprint is ideal for installations wherein space is limited. SING towers are the right solution for extra-hot water temperature.

These cooling towers are manufactured both as packaged and field-erected cooling towers, according to technical specifications and requirements.

Options

- Polypropylene fill for high-temperature inlet water
- Stainless steel appearance
- Low-noise fans
- Complement sub-systems: filters, water treatment systems, heat exchangers
- Direct drive

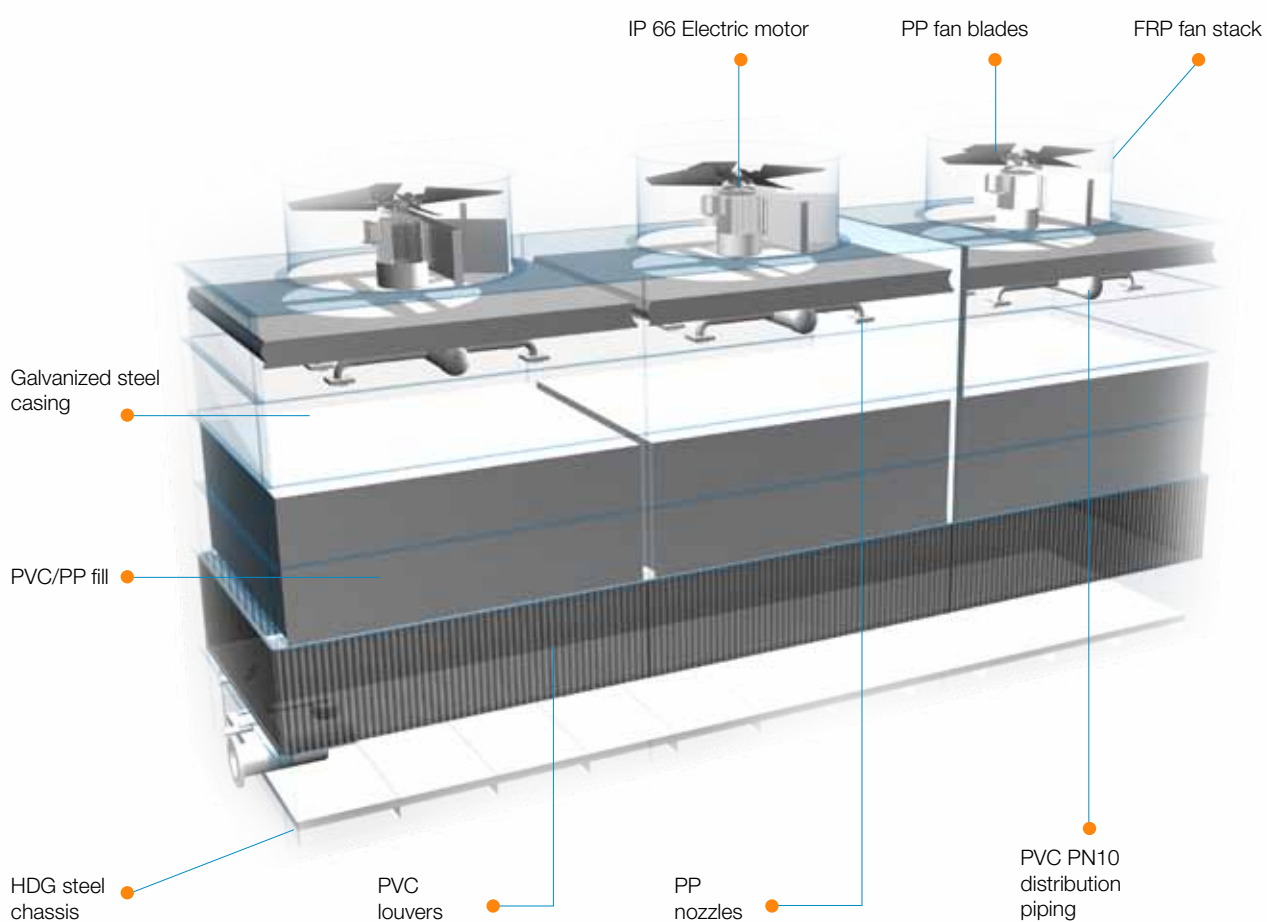


Basic SING models

Model	Single cell dimensions [cm]			Cooling capacity [Kcal\hr]*	Hydraulic water flow capacity per single cell [m ³ /hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
SING-300-1	350	350	500	1,225,000	350	120	15
SING-500-1	420	420	530	1,750,000	500	175	25
SING-700-1	500	500	600	2,500,000	700	250	50
SING-1000-1	600	600	600	3,600,000	1,000	350	50
SING-1400-1	700	700	630	5,000,000	1,400	500	75

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

SING cooling towers



PIRG series

Features

- Packaged crossflow cooling towers made of FRP
- Heavy-duty; designed for corrosive environments
- Serves industrial and large-scale HVAC applications
- Light footprint

Type:	Crossflow
Fabrication:	Factory-made
Material:	Pultruded and hand-laid FRP
Air flow:	Induced-draft and forced-draft
Capacity:	400,000-5,000,000 kcal/hr per cell
Water flow:	80-1000 m ³ /hr per cell
Industries:	Chemical, HVAC, Wastewater and Air treatment



General

PIRG cooling towers are made of hand-laid FRP, pultruded FRP, and stainless steel. This unique design ensures years of operation in any environment. The inlet louvers and drift eliminators are integrated into the fill section, together providing an efficient, high-performance, crossflow media system. Transmission system is based on gearbox, with the motor located outside the air stream. Crossflow towers are appropriate for cases wherein variations in water flow are expected, since the effect on the water distribution pattern is limited. Since crossflow towers require lower pumping head, they save money on both initial investment and lower annual energy cost. PIRG towers are built for easy maintenance at low cost, making these heavy-duty cooling towers the preferred choice for the industrial market. In addition, the PIRG's forced-draft appearance makes it a low-profile cooling tower, perfect for height-limited installations.

Options

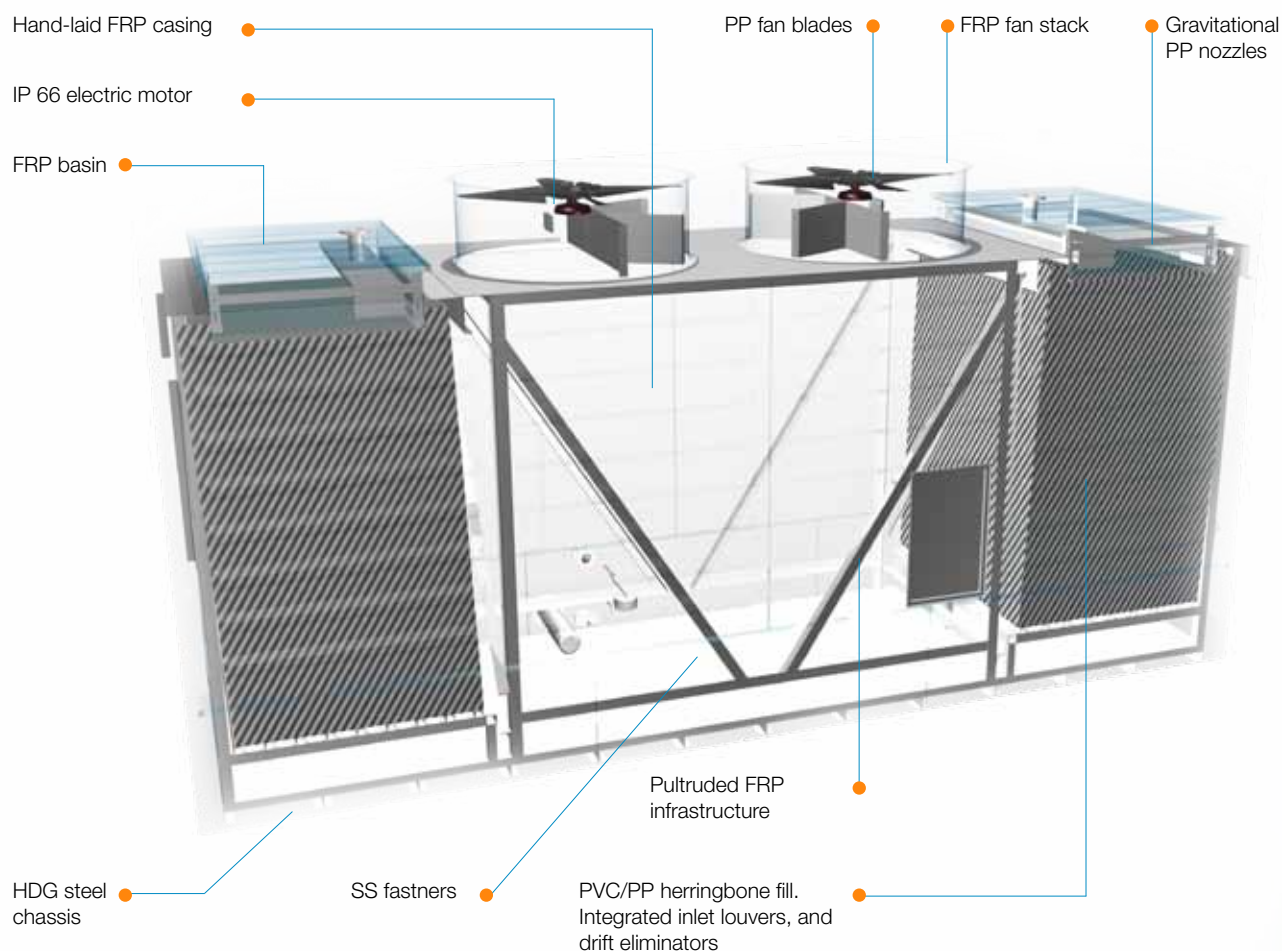
- Polypropylene fill for high-temperature inlet water
- FRP approved by FDA for drinking water
- Low-noise fans
- Vinyl Ester resin
- Full coverage against sunlight
- Hand rail and ladder
- Designed-to-fit concrete basin
- Basinless Unit Construction
- Direct drive

Basic PIRG models

Model	Single cell dimensions [cm]			Cooling capacity [Kcal/hr]*	Hydraulic water flow capacity per single cell [m³/Hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
PIRG-100-2	480	200	260	720,000	250	100	10
PIRG-150-2	760	200	400	1,080,000	250	100	20
PIRG-225-2	720	200	500	1,620,000	250	100	30
PIRG-300-2	820	280	640	2,160,000	400	150	40
PIRG-450-2	980	390	640	3,240,000	600	200	50

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

PIRG cooling towers



PING Series

Features

- FRP factory-made counterflow cooling towers
- Heavy-duty FRP structure
- Designed for highest thermal efficiency
- Minimal footprint

Type:	Counterflow
Fabrication:	Factory-made
Material:	Pultruded FRP, hand-laid FRP, stainless steel
Air flow:	Induced draft
Capacity:	500,000-5,000,000 kcal/hr per cell
Water flow:	80 - 1,000 m ³ /hr per cell
Industries:	Machinery, Metalworking, Pharmaceutical, Refrigeration and Cooling, HVAC



General

YWCT's PING series are FRP factory-made cooling towers. This heavy-duty series suits various industrial applications, especially where conditions are harsh. PING towers are made of hand-laid FRP, pultruded FRP, and stainless steel. Design is based on counterflow configuration, gearbox transmission system, and motor located outside the air stream. This unique combination ensures the product's maximum performance and long life.

Our PING towers are shipped to the job site in two or three modules to be assembled on site. The tower can be provided with either PVC film or polypropylene fill for high-temperature inlet water.

Options

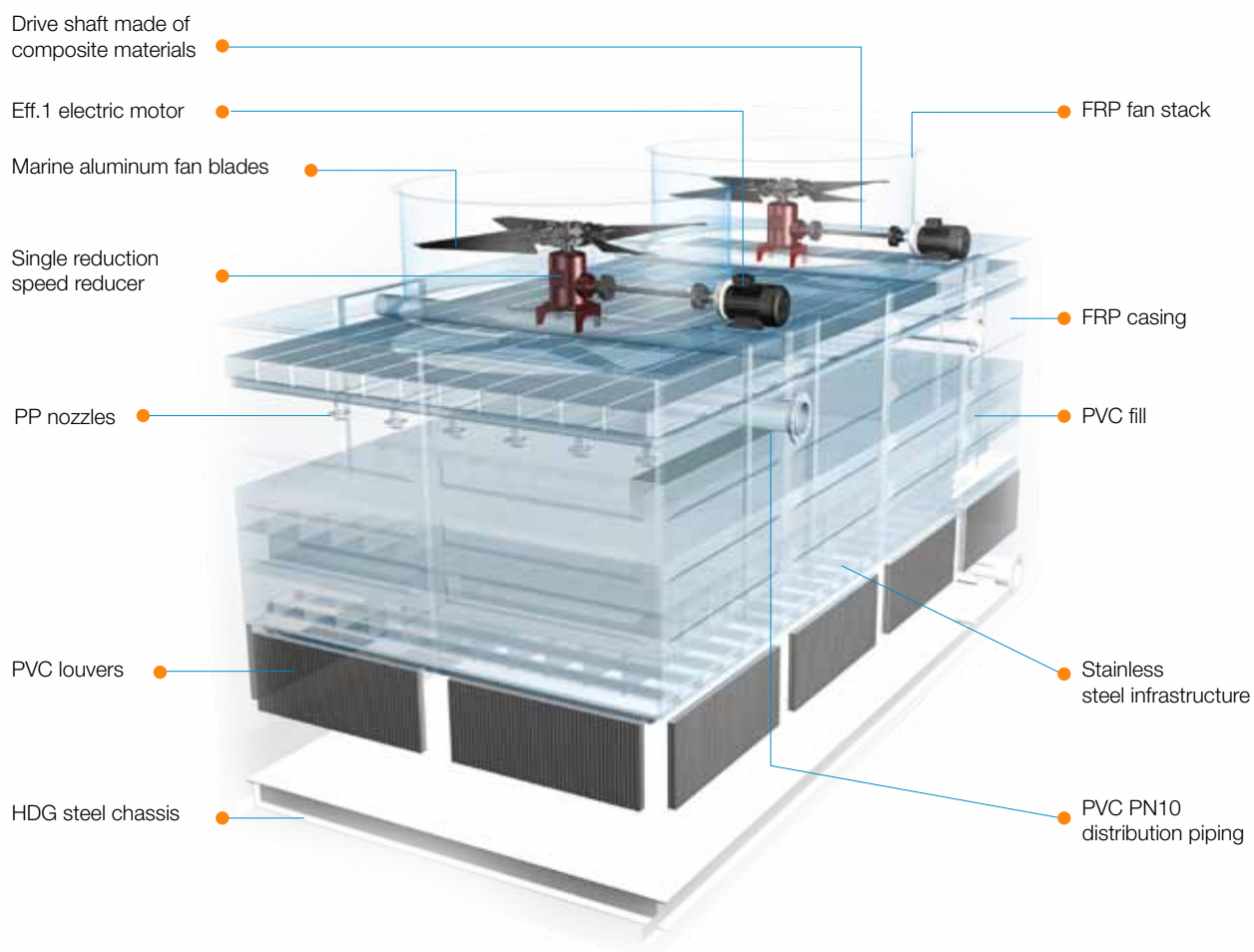
- Increased basin capacity
- Polypropylene fill for high-temperature inlet water
- Low-noise fans
- Vinyl Ester resin
- Cooling tower designed to shape
- Designed-to-fit concrete basin
- Hand rails and ladders
- Basinless Unit Construction

Basic PING models

Model	Single cell dimensions [cm]			Cooling capacity [Kcal/hr]*	Hydraulic water flow capacity per single cell [m³/hr]		Motor [HP]
	L	W	H		Maximum	Minimum	
PING-300-1	350	350	500	1,225,000	350	120	15
PING-500-1	420	420	530	1,750,000	500	175	25
PING-700-1	500	500	600	2,500,000	700	250	50
PING-1000-1	600	600	600	3,600,000	1,000	350	50
PING-1400-1	700	700	630	5,000,000	1,400	500	75

* Cooling capacity refers to standard design conditions: Range = 5.5°C and Approach = 4°C (25°C WB temp)

PING cooling tower - two cells module



PlugN'Play cooling systems

Features

- Packaged cooling towers integrated with complementary sub-systems
- Customer-ready for immediate turnkey operation
- Tailor-made to customer's needs and requirements

Type:	Counterflow
Fabrication:	Factory-made
Material:	Hand-laid FRP
Air flow:	Induced draft
Capacity:	30,000-1,000,000 kcal/hr per system
Water flow:	10 - 240 m ³ /hr per system
Industries:	Aviation, Chemicals, Food, Plastic, Rubber

General

In many cases, integrating a cooling tower with its complementary subsystems requires more planning and attention than does the specification of the cooling tower itself. Thus YWCT has devised an end-to-end solution to this problem: a skid-mounted PlugN'Play system that includes — in addition to cooling towers — complementary subsystems such as:

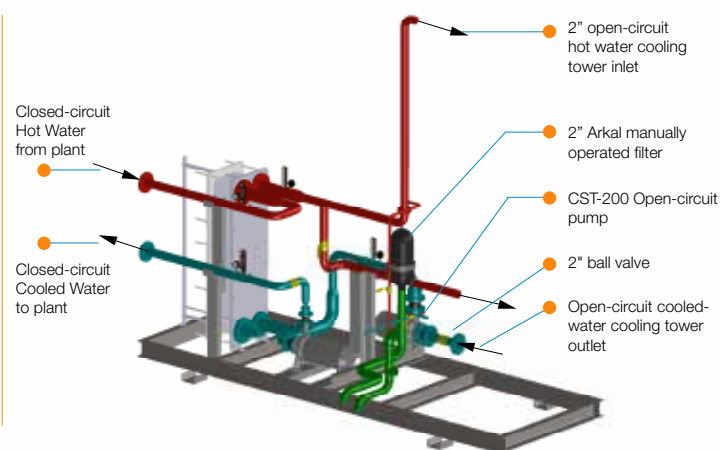
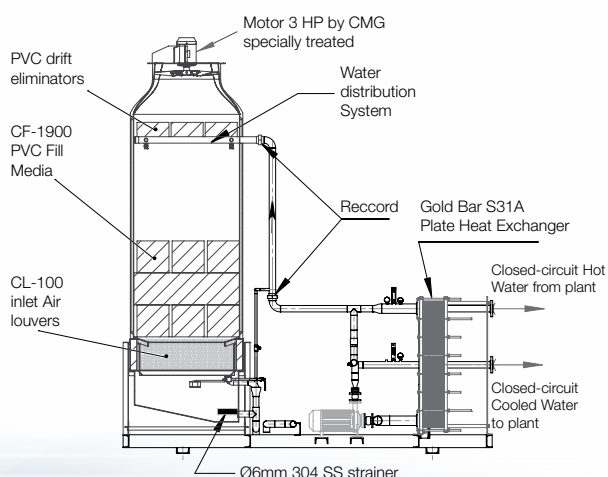
- Automatic/Manual filter
- Circulation pumps for open and closed water circuits
- Heat exchanger integration
- Water treatment and bleeding system
- Electrical and control panels
- VFD

The components are rack mounted on a chassis made of hot galvanized profiles coated with protective paint. The solution includes piping connecting all components, including non-return valves, pressure meters, and thermometers. The skid is designed to fit standard containers. Detailed P&ID is provided for every system.

Options

- Full redundancy for every component
- Separate chassis with subsystems for larger cooling towers

PlugN'Play cooling system

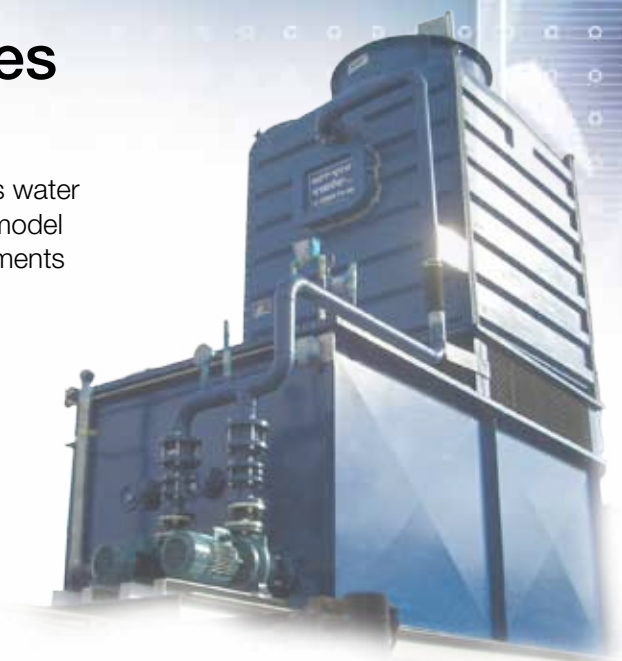


Cooling towers for Autoclaves

Features

- Packaged cooling towers designed for cooling autoclave process water
- PlugN'Play systems ready for integration with a given autoclave model
- Tailor-made to comply with a specific autoclave's cooling requirements
- Separation between hot and cold water

Type:	Counterflow
Fabrication:	Factory-made
Material:	Hand-laid FRP
Air flow:	Induced draft
Capacity:	30,000 - 500,000 kcal/hr per cell
Water flow:	6 - 100 m ³ /hr per cell
Industries:	Aviation, Food, Glass, Pharmaceutical



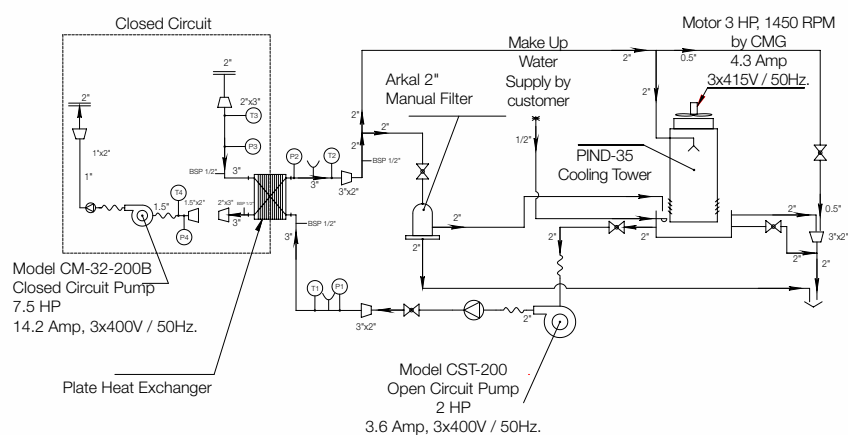
General

Cooling towers for autoclaves are characterized by their cyclic operation mode wherein hot steamed water is cooled gradually to the right temperature. YWCT offers special solutions for autoclaves used by the aerospace and food industries, as well as glass and rubber manufacturers. All components of the cooling system — e.g., cooling towers, storage tanks, pumps, filters, and water treatment systems — are installed on a single skid designed to fit standard containers. Hot water and cold water are separated to maximize efficiency. In case of need, the design point of the system is modified using a bypass for the circulating water. Storage tanks are used when needed. Detailed P&ID is provided for every system.

Options

- Increased basin volume
- Bypass for modifying design point
- Adding chillers for the final stages of process

Piping & Instrumentation Diagram



Degasifiers

Features

- Degasifiers made of concrete cement cylinder tanks
- Typical gases to be removed: SO_2 , H_2S , SO_3 , and CO_2
- Custom designed up to 14 m diameter

Air flow: Counterflow
Water flow: up to 10,000 m³/hr per degasifier
Fill: PVC

General

For large-scale projects (e.g., desalination plants), air strippers made of concrete cement are the best solution, as their atmospheric distribution systems minimize the required head pump and energy cost, while the effective PVC fill reduces the size of the required tank. Forced-draft centrifugal fans blow air into the degasifier. YWCT provides its customers with scale drawings of the concrete cement structure, including locations and production drawings of all pipe fittings in 2- or 3-D. While construction is taking place, all relevant parts are being purchased or manufactured and sent to the job site. When the structure is ready, YWCT's assembly teams install the degasifier or air stripper on site, furnishing it with fill, fan, and motor unit until it is operational.

Options

- Pultruded FRP hand rails and ladders
- Up to 99.8% gas removal
- Turnkey project mode

Field-assembled degasifier



Degasifiers

Features

- Factory-made cylinder FRP degasifiers
- Typical gases to be removed: SO_2 , H_2S , SO_3 , and CO_2
- Custom designed up to 7 m diameter

Type:	Counterflow
Fabrication:	Factory-made
Material:	FRP using filament winding technique
Air flow:	Forced draft
Water flow:	100 m ³ /hr to 3,000 m ³ /hr per unit
Industries:	Chemical, Desalination, Food, Pharma

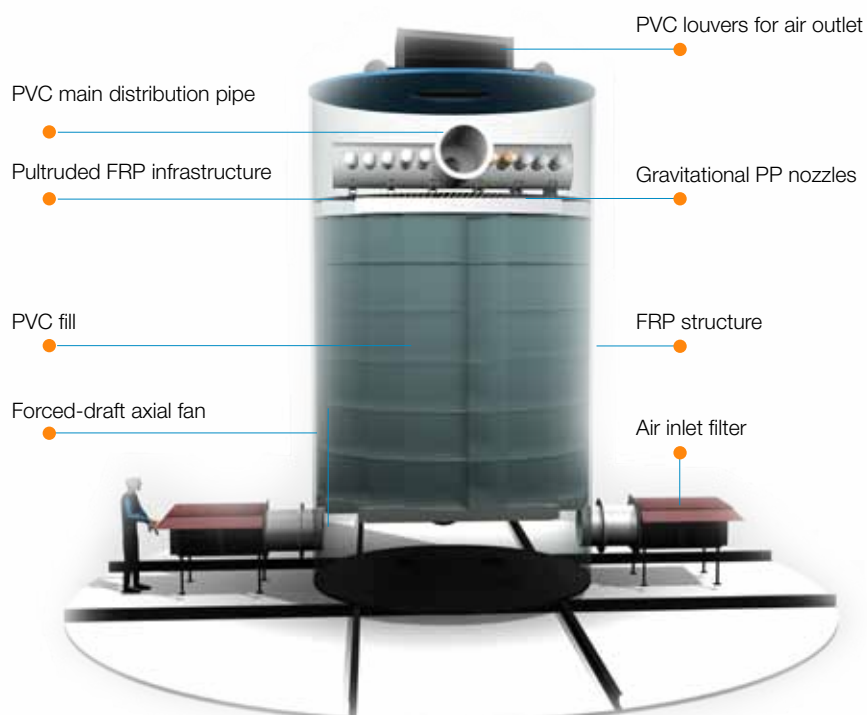
General

For projects of up to 3,000 m³/hr, cylinder FRP degasifiers are a perfect fit. The vessel in most cases is made of fiberglass reinforced with orthophthalic, isophthalic, vinylester, or epoxy resins. Fire-retardant and UV-resistant supplements are standard. The vessels comply with British standard (BS 4994) and the American ASTM D 3299-81. Water distribution is carried out using an array of pipes and gravitational nozzles. Air is forced into the vessel by two axial fans in order to minimize energy cost. The PVC fill, fans, motor units, and distribution system are installed at YWCT's premises and the system is sent to the job site as a PlugN'Play assembly.

Options

- Pultruded FRP hand rails and ladders
- Transport to customer's location
- Installation at project site by YWCT's assembly teams
- Up to 97% gas removal

Factory-made degasifier



Projects



➤ Steel processing plant

Industry: Metalworking

Series: PIND

Water flow: 1,250 m³/hr

Project story: Danieli Engineering, which specializes in the engineering of industrial plants and acts as a general contractor for turnkey projects, asked for a ten-cell cooling tower for a water treatment facility in one of its metal working plants in the Dominican Republic. Specifications were clear: an FRP cooling tower over an existing concrete basin with a splash PP fill. Design was according to field conditions and the cooling tower was supplied – as requested.



➤ Odor control system for a wastewater facility

Industry: wastewater and air treatment

Series: Special solutions

Project story: YWCT was asked by Siemens Water Technologies Corp. USA to manufacture an FRP biofilter vessel based on Siemens' own design. YWCT designed and created the set of molds required for the work and delivered the vessel on spec, on time.

➤ Olefins processing plant

Industry: Petrochemical

Series: CING

Water flow: 7,500 m³/hr

Project story: As part of Carmel Olefin's expansion, YWCT was asked to increase the cooling capacity of both its ethylene and polyethylene plants. A three-cell structure measuring 12m X 12m per cell was designed for the former, and a two-cell measuring 12m X 12m per cell was designed for the latter.



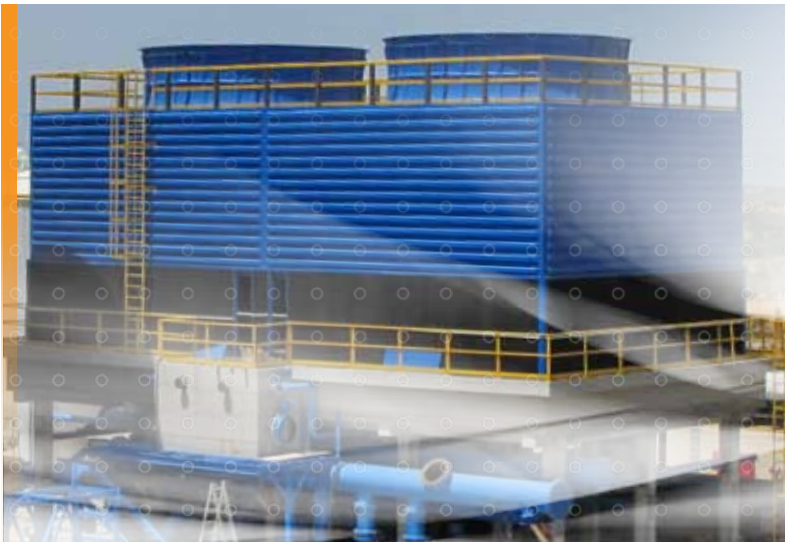
➤ Air separation unit at an air products plant

Industry: Air & Gas products

Series: FRPP

Water flow: 3,000 m³/hr

Project story: Maxima, a leading producer and supplier of industrial and medical gases, has asked YWCT to design and supply a cooling tower for its new air separation unit (ASU) that was built to produce liquid gases as well as compressed gases.



As per strict space requirements, YWCT designed and supplied a two-cell 9m X 9m cooling tower that was positioned over a 6m' high concrete basin. This unique design created operational space under the water basin, enabling the client to install needed water pumps and filtration systems.

For this project, YWCT also supplied the water filtration system that was skid mounted in our plant, equipped with pipes, valves, and pump; then integrated into the water-piping layout on site.

Projects



➤ Wastewater treatment facility

Industry: wastewater and air treatment

Series: PlugN'Play Cooling systems

Water Flow: 120 m³/hr

Project story: Ludan Engineering needed a system to cool a Shell-N-Tube heat exchanger as part of a water treatment plant. YWCT provided a complete skid-mounted system that included two packaged cooling towers, redundant pumps, an automatic filter, and a chemical dosing and bleeding system, with all piping and gauges required, as a PlugN'Play system.



➤ Plastic manufacturing factory

Industry: Plastic

Series: PlugN'Play Cooling systems

Water flow: 140 m³/hr

Project story: To answer the customer's need, closed-circuit system based on an SS316 heat exchanger and cooling towers was designed. Two rack-mounted systems were designed and built at YWCT's facility. The system was thoroughly documented, dismantled, and shipped to site, where it was easily installed by the customer using YWCT remote technical support.

➤ Gas pumping facility

Industry: Oil and gas

Series: SING

Water flow: 2,400 m³/hr

Project story:

YWCT was asked by Bateman Engineering to design and manufacture a cooling tower for a large gas pumps project in Turkmenistan. YWCT provided the scale drawings of the concrete basin and the piping accessories. A four-cell HDG tower was designed and built at YWCT's facility in Ashkelon. The tower was dismantled and shipped to the job site, where a YWCT team was sent to re-erect it. In three weeks' time, the tower was up and running.



➤ Oil refinery

Industry: Oil refining

Series: CING

Water flow: 12,000 m³/hr

Project story: The task was to replace a 70-year-old atmospheric cooling tower with a new, more efficient tower. A two-cell 14m X 14m tower was designed. As part of its deliverables, YWCT provided the refineries with a scale drawing of the concrete cement structure, and detailed drawings of the relevant piping.



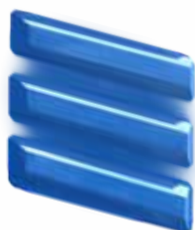
Materials and Subsystems

YWCT's solutions are based on a best-of-breed concept, ensuring our customers the highest quality product. YWCT uses the finest subsystems and components available. Among our suppliers (for more than 20 years) are leading manufacturers in the cooling tower industry such as Amarillo Gear Company, Brentwood Industries, Howden, Reichhold, Siemens, and Strongwell.



Pultruded FRP

All support beams and columns used in our FRPP series (as well as our other series) are made of composite, continuous fiberglass, with pultruded sections purchased from leading reliable suppliers in the USA. The standard materials we use are isophthalic polyester and chopped Strand E glass complying with CTI STD 37 (88) Grade 1. The pultruded sections conform to ASTM E84D with a flame spread rating of less than 25. In special cases (e.g., hot water), we may use vinyl ester resin or add extra layers of synthetic surfacing veil for extra protection against a corrosive environment.



Hand-Laid FRP

One of YWCT's advantages is our ability to manufacture our own hand-laid FRP products. We design and manufacture our molds, enabling us to customize production to fit the specific requirements of the project. To that end, we use isophthalic polyester resin with superb hydrolytic stability and chemical resistance. Our resin is both non-accelerated and highly thixotropic, and is especially designed for relining applications. The resin we use is of Type 1140 as per DIN 16946/2, and is classified in Group 3 as per DIN 18820/1.

Fill

Fill is the heart of every cooling tower, and has the most significant effect on system performance.



PVC

PVC packs with 19 mm flute-size openings are standard for our counterflow cooling towers, a flute size of 19 mm being larger than the industry standard of 12 mm, and thus appropriate to the harsh conditions that our heavy-duty cooling towers are expected to withstand.

For our crossflow cooling towers, we use innovative herringbone fill. The inlet louvers and drift eliminators are integrated into the fill part, and together provide an efficient, high-performance, crossflow media system.

All of the PVC fill sheets we use conform to ASTM E84D with a flame spread rating of less than 20, and our fill packs meet and exceed CTI-136, the most stringent industry standard.



PP

When water temperature rises, YWCT uses polypropylene (PP) fill, which can take the form of sheets, bars, or panels. Furthermore, PP can operate continuously at temperatures of 80°C - 90°C, depending on the exact fill model, which is chosen based on on-site water quality and required temperature.



Drift Eliminators

Our standard drift eliminators are cellular multipass type, with a wave sheet between each corrugated sheet to impart extra structural integrity for beam strength and durability. Our drift eliminator modules are designed to remove entrained water droplets from the exiting air stream at minimum pressure loss, ensuring a drift loss of less than 0.001%. The modules are made of rigid PVC that meets CTI STD-136 with UV protection, and are assembled with neither adhesives nor solvents. They have a flame spread rating of 15 or less as per ASTM E- 84.



Speed Reducers

The speed reducers we use are spiral bevel (single or double reduction type), which meets and exceeds CTI STD-111. Design features and ratings of the speed reducer are set as per the minimum requirements of American Gear Manufacturers Association (AGMA) standards. Our speed reducers are fitted with an integral sight glass for checking the oil level. A dedicated oil level indicator is installed outside the air stream for easy access. The air breather is also located outside the air stream in order to prevent moisture infiltration.



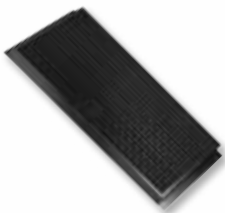
Drive Shafts

In cooling towers equipped with speed reducers, one will find our drive shafts, which are made of composite materials, the natural dampening of which reduces the vibration transmission throughout the power train, resulting in less wear and tear on mechanical equipment. The flange hubs are made of 316 stainless steel for both motor and speed reduction. All of our drive shafts are dynamically balanced to AGMA 9000-C90, Class 9 specifications, and every unit is tested at quadruple the continuous operating torque prior to shipment.



Fans

Fan has a significant impact on the cooling tower's power usage and noise level. In our cooling towers, we use either axial fans made of anticorrosive cast aluminum wherein each blade is air foiled, variable pitch; or similar axial fans made of FRP. In the wide range of fans we offer, customers can either minimize operational expenditures by choosing the most efficient product, reduce noise to minimum, or reduce capital expenditure if required. In applications wherein extremely quiet conditions are a must (dba < 70 in 1 m distance), YWCT offers FRP impellers specially shaped for ultra-quiet applications. In many cases such a solution can replace costly sound attenuators.



Louvers

As standard, all of YWCT's cooling towers are equipped with PVC louvers, installed in FRP or SS frame. These louvers reduce by far the need for anti-biocide chemicals to overcome the biocide and algae problem created by the sun; the louvers serve as a filter to prevent any particles (e.g., birds or plastic bags) from entering the tower, as well as reducing noise by three decibels.



Motors

As standard, all of YWCT's motors are designed and built for arduous environments, and designed as per EFF 1. The standard level of enclosure protection for YWCT's motors is IP66 for both motor and terminal box. All castings and steel parts are primed with a 2-pack epoxy coating, followed by an additional top coat of 2-pack epoxy. YWCT's motors are fitted with one set of (3) PTC thermistors, selected for a trapping temperature of 145°C.

Services

Consulting

Our door is always open to provide you with advice. We will help you to:

- Choose the right configuration for your tower: (e.g., counterflow or crossflow; single- or multi-cell; forced- or induced-draft; closed circuit or open loop, etc).
- Decide on construction materials that meet your needs — FRP, concrete, wood, or steel — and verify that they correlate with the process water, climate, and other conditions on site.
- Choose the right design point for your application, thereby optimizing thermal efficiency, increasing energy savings and sustainability, and working within space constraints and budget considerations.
- Solve operational problems such as fan noise level, clogging, dust and sun effects, poor water quality, and composition.



In many cases, consulting us precedes any commercial or technical decision; in any case, any inquiry is answered rapidly and taken seriously, because we believe a professional and honest answer is highly appreciated by our customers.

Design and Engineering

YWCT's experienced engineering team brings you the highest value solution for any cooling tower application. Every solution is custom designed fresh: We make sure our cooling towers meet all required technical specifications, and do so in the most cost-efficient and easy-to-operate fashion. We will:

- Provide you with CAD drawings in 2- or 3-D models for every project.
- Offer you P&ID whenever complexity of the cooling system(s) so requires.
- Run computerized thermal ratings and performance tests with your figures, including "What If?" scenarios.
- Adjust our solution to existing conditions on site, such as existing concrete water basin, space constraints, and existing equipment (e.g., pumps, piping, motors).

YWCT's engineering team will work with you closely throughout the process of designing, budgeting, and planning your cooling tower until the right solution is targeted.

Manufacturing

YWCT's production facility is built to accommodate diverse and complex projects. We assemble our packaged cooling towers, PlugN'Play cooling systems, and factory-made degasifiers on our premises, where production is project-oriented and each solution is tailored to the customer's needs. This flexibility is achieved due to YWCT's organizational structure, working procedures, and expertise:

- Our production teams manufacture every product according to a specific drawing provided by Engineering.
- We manufacture our hand-laid FRP parts in-house, as well as the molds therefor.
- Our diverse production floor consists of the following teams: carpenters, FRP layers, welders, electricians, machine operators, and constructors.

Under inspection of our quality control team, we offer our customers nearly any required configuration of cooling tower required industry-wide.

Refurbishment

Along with manufacturing new cooling towers, due to our flexible, project-oriented production, YWCT has developed expertise in cooling tower refurbishment. Small packaged cooling towers are often brought to our facility and undergo a thorough makeover, while field-erected cooling towers are revamped on site by our experienced field teams. The results:

- Each refurbishment is planned fresh from the start, providing a refitted cooling tower with CAD 2D drawings and 3D models
- Upgrades, improved performance and efficiency of operating cooling towers
- Replacing and upgrade of all cooling tower components
- Execution plans, timetables, and full scope of operation

In any refurbishment process, field surveys, thermal rating calculations, and engineering evaluations are conducted. A detailed proposal is provided to the cooling tower owner, explaining operational, thermal, and budgetary aspects, allowing him or her to make the right decision.

Installation

One of YWCT's proven advantages lies in our installation services. Whether a packaged cooling tower or a field-erected one is supplied, the customer can be sure s/he will be provided with our full attention and care throughout the process of integrating the cooling tower into the industrial process. This includes, yet is not limited to:

- Complete installation and commissioning of field-erected cooling towers
- Positioning and installation of packaged cooling towers and cooling systems
- Trained field assembly teams led by experienced team leaders
- Technical support and engineering guidance for PlugN'Play systems and packaged cooling towers

Installation is executed as per detailed installation drawings, strict timetables, and operation plans. These enable us to update, modify, and constantly improve execution, and also ensure that we supply the cooling tower on time as committed to our customer.

Maintenance

After a cooling tower is up and running, the important (yet sometimes neglected) day-to-day maintenance begins. YWCT provides its customers with ongoing maintenance services, among them:

- Preventative maintenance
- Leakage resolution
- Clogged fill replacement
- FRP, steel, wood, and concrete alterations (casing, infrastructure, water basins)
- Mechanical systems maintenance (lubrication, blade balancing, gear-motor alignment)

Along with the services YWCT provides, we stand by our customers and cooling tower owners by consulting and supporting them technically in overcoming problems they face during day-to-day maintenance.





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