

FRP is key to Parto Abgardan cooling towers

The cooling-tower market is already growing, and the leading international climate specialists are all predicting higher average temperatures in future, a trend that should be even more to the advantage of that industry. To make its cooling towers, the Parto Abgardan Company chose composites.

Parto Abgardan is a pioneer in the air-conditioning and refrigeration industries and holds about 80% of the market, with more than 3,800 units installed. Starting out in 1994 with a single bottle-type model, the company is now the largest Iranian (and Middle Eastern) cooling-tower manufacturer and has successfully designed four different cooling-tower models – bottle type, square type, modular type (open circuit and square type) and closed circuit, which it manufactures in 50 different capacities from 8 to 2,800 refrigeration tons. This innovative company operates locally and globally from a central office in Tehran, with a sister factory in the USA, which operates under specific standards.

Parto Abgardan's products are used in the following fields of application: air conditioning, industrial refrigeration, power plants, air compressors, moulding machinery for plastics, welding systems, food processing, chemical processing, and foundry processing, among others.



A lightweight, corrosion-resistant material
Cooling towers are reducing temperature by evacuating heat

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Parto Abgardan recently manufactured specially designed cooling towers for the National Iranian Lead & Zinc Company plant (the largest plant in Iran). The three towers are used to cool down lead and zinc sulphates, which are highly corrosive. Designed to work under extreme conditions, the towers are 12 m long, 5 m wide and 10 m high. The whole project took six months, including design, manufacturing, installation and startup.

from circulating water, and to cool down heat loads. To this end, an air flow moves against a water flow, causing evaporation. To avoid rusting, corrosion, decay and weathering problems, the body of the cooling towers are entirely made of FRP.

The innovative MB Series, the company's main product range, benefits from a “total quality” production concept and establishes a new standard for cooling towers.

Technical, weight and corrosion-resistance requirements prompted Parto Abgardan to choose composite materials for several key components of the cooling towers:

- The casing and cold-water basin are constructed from non-ferrous, high-strength fibreglass reinforced polyester (FRP) with ultraviolet (UV) stabilizer and exterior gelcoat for long life and durability. The tower design allows quick removal of the individual casing sections for full access to all tower components for maintenance and service. All the standard accessories in the cold-water basin are made from non-ferrous materials such as PVC, FRP, ABS stainless steel and brass.

- The inlet louvers are made of FRP. Their design minimizes inlet air resistance, prevents water splash-out during operation and high-wind conditions, prevents bacterial growth by keeping



Cooling towers are usually installed on structures that already exist, so they need to be as lightweight as possible.

entry of direct sunlight to a minimum, and damps the noise from water splashing into the rain zone below the fill. The

design also allows quick removal of the inlet section for full access to the cold water basin.

- The axial-flow fan is heavy-duty and features wide blades in lightweight aluminium alloy, with single-sheet design or hollow blade FRP, with air-foil design. The fan revolves in a uniquely designed FRP cylinder for maximum efficiency at low rpm with ultra-low noise levels, providing optimum nominal air flow. Models MB-60 and up are equipped with an adjustable-pitch fan to further minimize power consumption.

The MB Series offers many advantages, including low energy consumption, natural draft, no risk of legionnaire's disease, a choice of colours, no vibrations, low noise, low piping costs, installation flexibility, and low weight.

Composite materials help reduce weight significantly. FRPs are also appreciated for their wide choice of colours, with a dozen different tints available. This is very important, because cooling towers are installed outdoors, and their design and colours contribute to the architectural needs of projects.

Cooling towers have a variety of applications in both air conditioning (high rises, residential complexes, public service facilities, governmental buildings, etc.) and industrial projects (steel, glass, chemical, automotive, oil and petroleum, petrochemical, food and agricultural by-products, etc.). ■

More information: www.abgardan.net



AN INTERVIEW WITH
MAHMOUD LAZEMIZADEH,
PRESIDENT,
PARTO ABGARDAN

JEC Composites Magazine: What is Parto Abgardan's scope today?

Mahmoud Lazemizadeh: Our production capacity has been growing steadily, from 423 units in 2004 to 517 units in 2005 and 647 units in 2006. We have two offices in Tehran, our headquarters and our service centre. Our main factory (25,000 square metres) is located 25 km south of Tehran and we operate two smaller facilities (11,000 square metres overall) 140 km west of Tehran. We have 204 employees, around 150 of them working at production lines.

JCM: Do you work exclusively for the domestic market?

M. L.: No, our cooling towers have been exported and installed in Azerbaijan, Syria, Iraq, Tajikistan and Afghanistan. In addition to many projects in Iran, we have been co-supplier for EU countries, India, South Africa and China. We started in Iran in 1994, but our sister company (Aqua-Loop) has been active in California since the mid 80's.

JCM: Why did you become interested in composite materials?

M. L.: We use FRP mostly because it can withstand harsh conditions and corrosion; it is lightweight (our FRP cooling towers are at least four times lighter than steel cooling towers), easy to work with when making complex geometrical shapes and, unlike metals, it doesn't create a proper environment for

sludge, algae and bacteria growth. This material also offers the mechanical properties required by engineering design. In terms of processing technologies, we use spray-up for gelcoat application, a combination of spray-up and hand lay-up to reach the required mechanical properties for laminates, filament winding for cooling tower internal pipes, and press moulding and RTM for airfoil-section fan blades.

Our subsidiaries use FRP for decorative components, waterproof doors and automotive parts. Also, in now-and-then contracts, we have manufactured anti-acid cooling towers and launders (collection troughs) for all zinc and lead producers in Iran (five factories) and, as a subcontractor for German firm GEA, huge FRP fan stacks (720 pieces, 10 metres in diameter) for a fossil power plant. ■