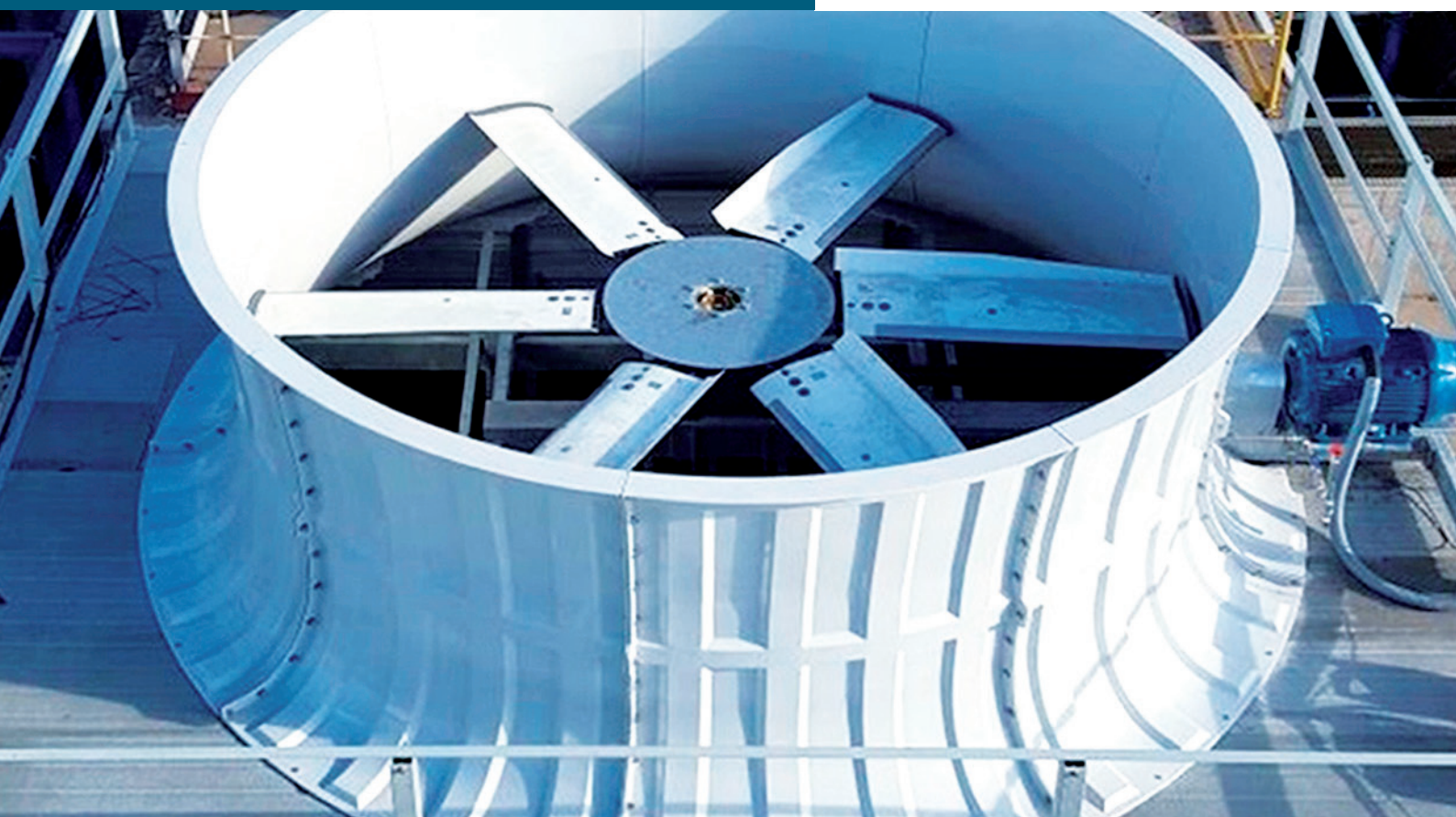




SUSTAINABILITY, RELIABILITY AND INNOVATION

Our added value for cooling

TORRAVAL
cooling



MANUFACTURERS OF COOLING TOWERS SINCE 1967



TORRAVAL Cooling designs, manufactures and commercializes:

- Both Open and closed circuit cooling towers
- Field-erected cooling towers for both industrial and civil usage
- Evaporative condensers
- Adiabatic and hybrid coolers
- Heat exchangers

MORE THAN 12.000 REFRIGERATION SYSTEMS IN MORE THAN 50 YEARS.

TORRAVAL offers tailor-made **solutions while continuously studying and designing technologically innovative models, focused on customer needs**, based on energy savings and respect for the environment.

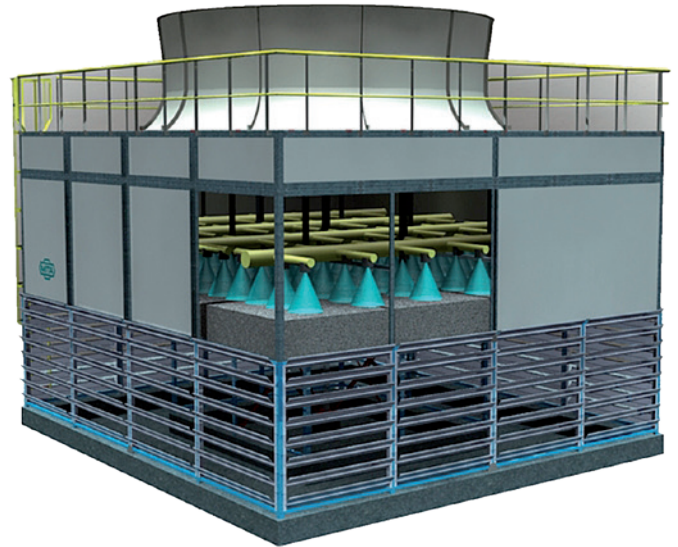
TORRAVAL Cooling is part of MITA, Italian Group with 60 years of experience in industrial refrigeration.

Other companies belonging to the Group are:

- MITA COOLING TECHNOLOGIES
- ECONOMAX
- MITA WATER TECHNOLOGIES



OPERATION OF EVAPORATIVE COOLING SYSTEMS



Exploiting a simple natural principle according to which the forced evaporation of a minimum quantity of water causes a lowering of the temperature of the main water mass, **evaporative cooling today still represents the most widely used cooling system in the civil and industrial field.**

The minimum temperature limit theoretically attainable by an evaporative cooler is represented by the wet bulb temperature of the atmospheric air measured in the installation area, which is usually much lower than that of the dry bulb.

In fact, due to the effect of efficiency factors linked to the saturation of the air, **a suitably sized machine manages to cool the water/air up to temperatures of just 2-3°C above the wet bulb temperature.**

On this basis, many system engineers and machine manufacturers size **the cooling circuits and heat exchangers, providing for the use of water right from the start and can, therefore, guarantee the optimum efficiency of the systems and extremely low energy consumption.**



WE OFFER SIMPLE AND RELIABLE SOLUTIONS, DESIGNED TOGETHER WITH OUR CUSTOMERS

We have always considered the retrieval of information to be of fundamental importance: for this we operate as consultants, working on each project in close contact with the technical design studios and their engineers.

Understanding the needs, and intercepting the expectations of the customers, is the basis for finding the ideal solution for a reliable and easy to manage project: aiming to this, our technicians provide daily preliminary support.

The outcome of this process leads to the selection of the most technologically suitable product, always focusing on energy saving and respect for the environment.

The **EUROVENT certification** is a key point in our technical approach. It means attention to performance, but also to the design and development of products with a focus on efficiency, energy saving and natural resources.



TORRAVAL Cooling is also a member of the **Cooling Tower Institute (CTI)**, a non-profit association that promotes the **technological development, design, performance and maintenance of Cooling Towers**.



ENERGY
SAVING



WATER
SAVING



NON CORRODING
AND LONG LASTING



EASY
MAINTENANCE



LIMITED
NOISE



RELIABILITY
AND QUALITY

A CONSULTANCY BASED APPROACH

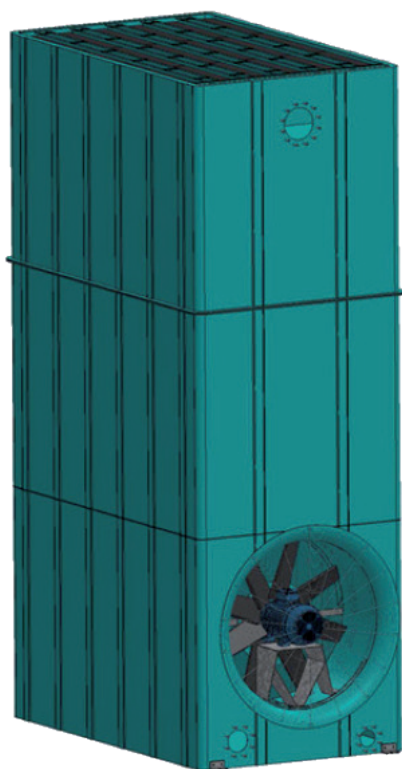


REQUIREMENTS:

- criticality of cooling temperatures
- variability of water quality
- operational continuity (24H/365 days)
- energy efficiency
- limited water consumption
- accessibility for maintenance operations.

SOLUTIONS:

- resistance to high and low temperatures
- multiplicity of heat exchange packs
- corrosion-free and long-lasting
- high-efficiency motors and fans
- hybrid and adiabatic solutions, free cooling
- extensive access to the internal components of the machines.



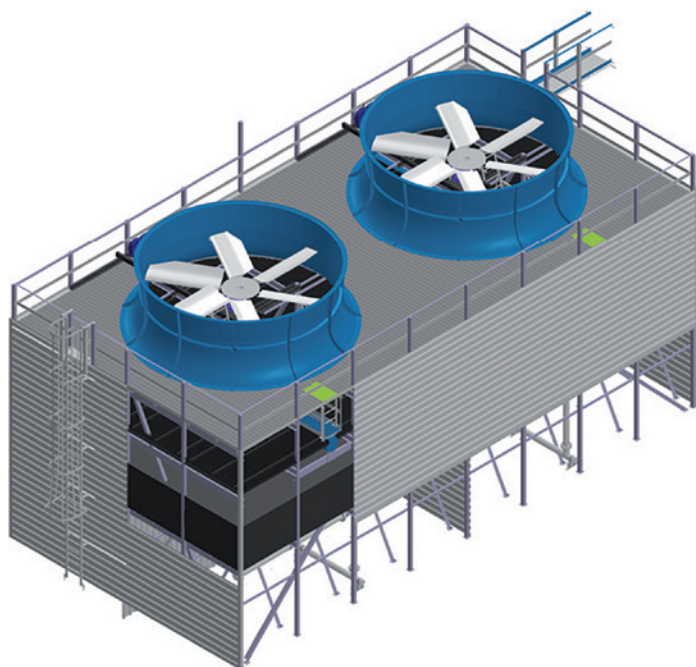
CTFP SERIES

Open circuit towers

The CTFP series is indicated for plants of medium or large size, specially designed for the most adverse conditions, that is, complex waters in plants of medium or large size.

- Counter current air. Wide water-air flow.
- The structure is monobloc in FRP, which gives it great longevity.
- Mechanical equipment: forced draft, direct coupling motor – fan.
- Easy access to the given mechanical components are at ground level.
- Site versatility. Especially suitable to be placed between walls when vacuuming the air from one side.
- Distribution system: FRP channels or PVC or PP pipes.
- Filling: laminar, mixed and splash (PVC or PP). The Torraval splash makes no obstruction. Typical in conventional fillings.
- Pool with sloping bottom and rounded corners which ease cleaning and complete drainage.
- Guarantee of constant performance over time.





PU / RM / OC SERIES

Field-erected open circuit cooling towers

Field-erected cooling towers are suggested for large and medium size plants. For this reason, this range of towers field erected, they are 100% taylor-made and are designed for high flow rates.

TORRAVAL offers three types of field-erected cooling towers:

- PU Series formed by pultruded FRP profiles,
- RM Series made of steel
- OC Series made of concrete.

Different types and configurations of heat exchange packs allow treating all types of water, regardless of their aggressiveness.

- Structure entirely made of pultruded FRP profiles (PU Series): calculated to support static and dynamic loads, seismic factors, wind thrust, snow load, etc.
- External covering system in corrugated panels of flame retardant fibreglass.
- Fibreglass diffusers (FRP).
- Each unit can be equipped with various accesses, for simple inspections and maintenance to: motor-fan group, plenum, water distribution system, drift eliminators, heat exchange pack.
- Axial motor-fan with gearbox reducer, low installed power, low noise levels



SPARE PARTS



SPARE PARTS

Cooling towers have other elements that can deteriorate either over time, by misuse or by an impact.

TORRAVAL guarantees the replacement of these components to ensure this performance and thus avoid the risk of premature breakdowns:

Mechanical Equipment. Recognized brands and variety of materials depending on the environmental conditions where the refrigeration equipment is installed:

- Fan
- Electric motor
- Reducer
- Transmission.

Filling material. It is the essential component, where the thermal exchange takes place. We own several types depending on the quality of the water:

- Laminar
- Mixed
- Splash.

Certified drift eliminator: high-efficiency component, which complies with UNE 10030: 2017 Norm. Made either of PVC or PP sheets and minimize water losses by drift below 0.002%.

Distribution System:

The water distribution system is composed of one main collector, secondary pipes and nozzles, which provide a perfect water distribution and an easy maintenance.

- FRP open channels: for easy maintenance.
- Tubes
- Nozzles.



HEAT EXCHANGERS



- High heat exchange efficiency.
- Wide range of nozzles and frames for different working pressures.
- Flexible design to cover future needs by varying the number of nozzles.
- Low maintenance.
- Easy opening for repair and cleaning.
- Excellent for heat exchange between sufficiently clean fluids and working conditions of up to 2.5 MPa and 150°C.
- All exchangers have PED, ASME, JIS type of approval and other pressure vessels codes upon request and they are tested before shipment, in our factory in Arbuio (Spain).



SERVICE AND AFTER-SALES



With more than 50 years of experience in refrigeration, TORRAVAL is able to offer the following services:

TECHNICAL AUDITS: TORRAVAL's technical audit consists of a global on-site inspection of the different refrigeration equipment. This enables us to make a good diagnosis of the current conditions, recommending our customers performance improvements.

PREVENTIVE MAINTENANCE: Performing maintenance by specialized technical personnel of TORRAVAL means an optimal performance guarantee, allowing to maintain the original design performance of the cooling equipment. It is essential to minimize the risk of breakdowns because otherwise it may stop production.

CLEANING AND DISINFECTION: Cleaning and disinfection of the internal components of the equipment: heat exchange surfaces, water distribution system and drift eliminators

SECURITY IN ACCESS: Implementation of collective protections and platforms for safe work in cooling towers.

Our Engineers analyze the characteristics of the existing tower and the current working parameters and they combine them looking for the best alternative. In this way we made modifications on the existing towers and proposed the attachment of new cells only if necessary and by necessity, in the event of a greater cooling capacity.



UPGRADING / RETROFITTING / UPDATES



The TORRAVAL Engineering Department is specialized in carrying out renovations, modifications and improvements in existing cooling towers with the objective of adapting the tower to the current working conditions (which can be very different from the original design conditions), always looking for the best performance over time and with the greatest efficiency.

RETROFITTING

Poor performance of your FECT?

Torraval pathway to improved cooling tower performance. Four steps:

- Assess existing tower thermal performance vs. design thermal performance.
- Model the response of the process to changes in thermal performance.
- Assess several repair-and- upgrade scenarios to develop an optimized solution.
- Calculate the savings (which can be enormous).

The technical options for restoring the tower - fill media replacement, water distribution system refurbishment, mechanical component upgrades such as silent motor or fans to reduce sound levels - must be identified and analyzed by Torraval Engineering team against the impact of a complete system replacement.

REVAMPING SERVICES

Torraval have gained immense expertise in rendering **Cooling Tower Revamping Services**. These services are executed by our proficient personnel, who ensure to utilize their deep knowledge and rich experience in these works.

The cooling tower revamping services are provided to comprehend and meet the emerging requirements of our clients.





www.torraval.com

TORRAVAL Cooling is part of:



Avda. Autonomía, 4-1ª Planta - Edificio Vega de Lamiako - 48940 LEIOA (Vizcaya), Spain

Ph.: +34 94 452 00 00 - Fax: +34 94 452 00 50 - info@torraval.com