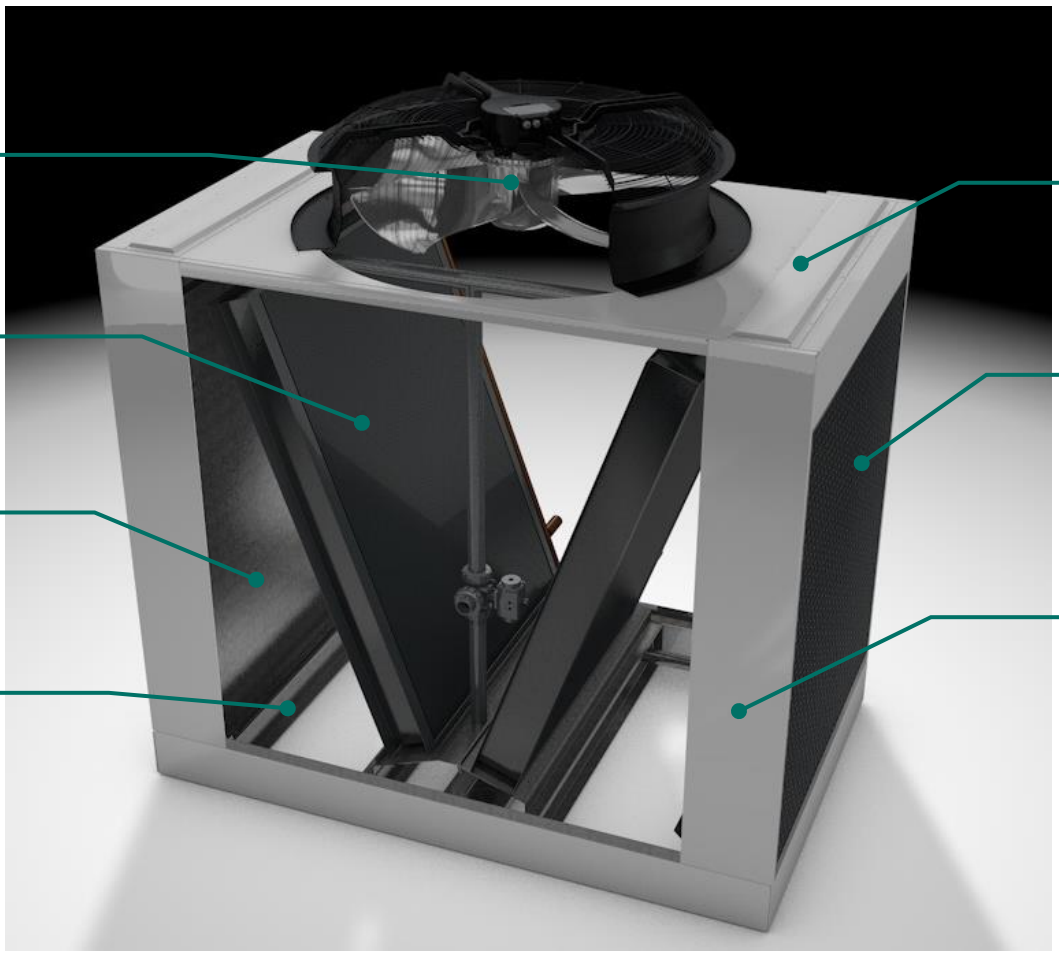
ADIABATIC COOLER
Design Features

PAD-V Series

ENERGY SAVING

RELIABILITY AND QUALITY



Axial Fan Heavy Duty Adiabatic Cooler	
Factory Assembled - Modular V-configuration Design	
1	EC Motor(s) directly coupled with fan
2	Gravity water distribution
3	Heat exchange coils
4	PVC air inlet grids
5	Flocked PVC humidifier pack
6	Support structure
7	Water collection basin and recirculation circuit
8	Control Panel

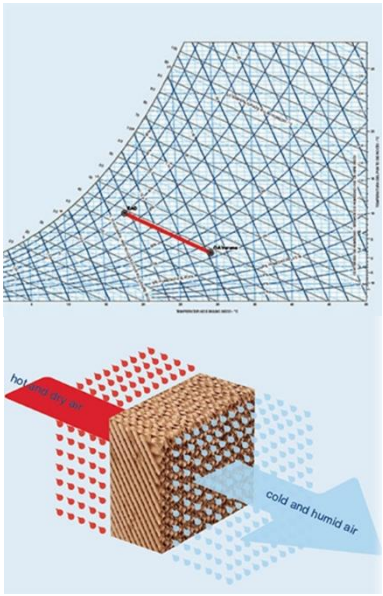
MITA Cooling Technologies S.r.l.
Via del Benessere, 13 27010 Siziano (PV) – Italy
Ph. +39 0382 67599 - Fax +39 0382 617640
info@mitact.it
https://www.mitacoolingtechnologies.com/

THEORY AND OPERATION OF ADIABATIC COOLING

The **adiabatic process** is a thermodynamic transformation that occurs with no heat exchange between bodies or fluids.

The cooling capacity of an adiabatic systems lies in sensible heat exchange between a pre-cooled air flow and the fluid inside coils. Adiabatic cooling mechanism is based on **mass transfer**, between water stored in the adiabatic pack and the air flow. Relative humidity of air increases and its temperature correspondently decreases, because of latent heat absorbed by water during evaporation.

The heat exchange itself occurs between adiabatically cooled air and a process fluid, flowing inside the heat exchange coils.



REGULATION STRATEGY AND ACCURATE SIZING

A sophisticated regulation strategy is the core feature of PAD-V adiabatic cooler, with automatic and tuneable switch between two operating modes:

Dry operation: provided during cold periods. External air is drawn in and conveyed into the finned coils. The humidification process is deactivated, the system operates as a dry cooler, with no water consumption.

Adiabatic operation: provided during hot periods. External air is drawn in and forced through the humidifier pack (protected inside the machine), where decreases its temperature. Short wetting cycles, with homogeneous distribution of water in the pack, ensure the maximum air humidifying efficiency.

The adiabatically cooled air is subsequently conveyed to the finned coils. This wet mode significantly increases the heat exchange efficiency of the cooler in the hottest period of the year. Wetting cycles consist of a large quantity of water falling on the humidifier pack. The excess water is recovered by means of a recirculation circuit, in order to minimize water consumption.

The **switch between the operating modes is automatic and customizable**, as operating conditions are constantly controlled. Probes also measure **process water temperature and regulate fan RPM** in order to ensure optimized operating costs.

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1. EC AXIAL FAN

Axial fan with electronic control is positioned centrally with respect to the two V-shaped coils, for homogeneous air distribution. Its rotation speed decreases automatically during the wetting cycle, to avoid dragging or aerosol.

ErP 2015 energy efficiency requirements compliant.

2. GRAVITY WATER DISTRIBUTION

Water distribution channel running on top of the flocked pack is manufactured in stainless steel AISI 304. The wetting cycles are not operated with spraying nozzles but by means of gravity distribution, with easy access for cleaning.

Connecting and equalizing piping in PVC.

3. HEAT EXCHANGE COILS

Heat exchange coils arranged in a V layout inside the cooler are made of copper pipes and aluminium fins. Angle between coils, diameter of pipes, thickness and pitch of fins are designed to ensure the best heat exchange performance with suitable fluid and airflow pressure drops.

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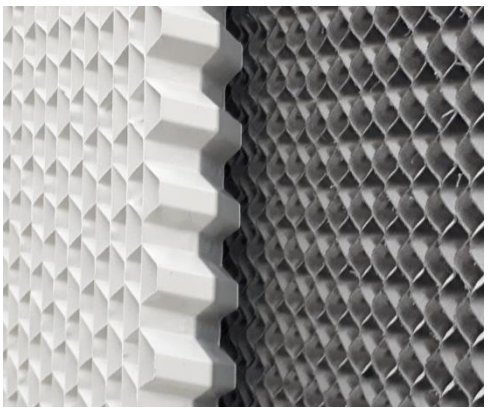
4. PVC AIR INLET GRIDS

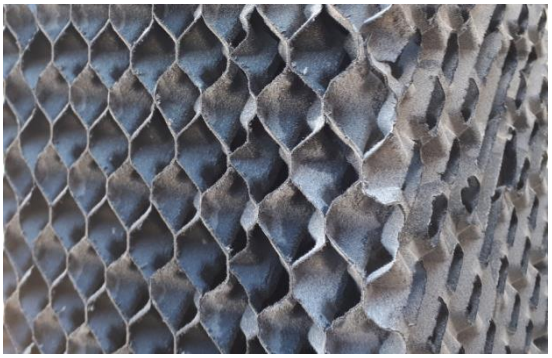
PVC air Inlet grilles, for flocked pack protection: this element avoids direct exposure to sunlight and penetration of impurities. It can be removed to allow access to the adiabatic packs and water collection gutters**.**



5. FLOCKED PVC HUMIDIFIER PACK

Flocked PVC humidifier pack is designed to allow operation with untreated water.

The flocked pack is made of synthetic material. As opposed to other types of adiabatic packs, it is characterized by longer life and superior shape resistance. This element requires short wetting cycles, spaced with long time intervals (a few seconds every 15 minutes): pump power and water consumption are optimized. At the same time, any dragging or aerosol phenomenon outside the cooler is avoided. The adiabatic pack is easily accessible and removable for cleaning and maintenance operations.



6. SUPPORT STRUCTURE

Support structure made of press-folded galvanized metal sheets and subsequently protected by a RAL 7032 epoxy paint cycle. The structure is designed to properly support the heat exchange coils.

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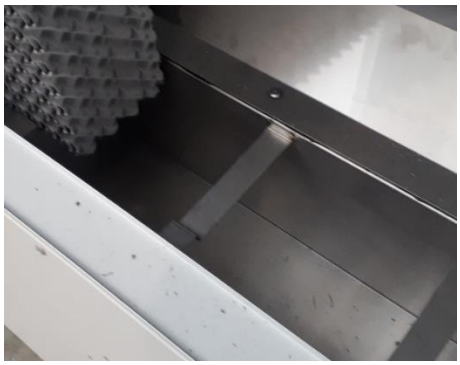
7. WATER COLLECTION GUTTERS AND WATER MAKE UP

Water collection gutters made of stainless steel AISI 304. Water flows from the collection gutters to a **central tank**, where submersible pump and hydraulic connections (makeup, blowdown, overflow, drain plug) are positioned.

Submersible pump is used for wetting water recirculation, providing significant water savings.

Capacitive level sensors are adopted to control water level in the gutters. When water goes below the minimum limit level, the solenoid valve opens to prevent pump cavitation.

Solenoid valve for the automatic water makeup and blowdown.



8. CONTROL PANEL

Control Panel is connected to a HMI that allows simple monitoring and setting of cooler's parameter. The communication with other devices is possible with **Modbus protocol**.

Supply of the cooler is limited to the parts listed above. Building and electrical works, pumps, collectors external to the cooler, valves, hoisting gear and any scaffolding and labour are therefore excluded. Accessories and/or constructional variants are available on request.
MITA Cooling Technologies S.r.l.. may carry out constructional improvements without notice.
Images for illustration purposes only.

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