

Case study
AB Vassilopoulos Greece



Optimizing Supermarket Refrigeration Efficiency with Evaporative Precooling



Enhancing Refrigeration Efficiency

AB Vassilopoulos, often simply referred to as “AB,” is one of the largest supermarket chains in Greece and has a long history dating back to 1939. Over the years, AB Vassilopoulos has expanded its presence across Greece, becoming a prominent name in the country’s retail sector with over 600 supermarkets. The supermarket chain offers a wide range of products, including fresh produce, groceries, dairy products and frozen foods. When they faced problems with operational efficiency of the refrigeration system, adiabatic precooling through Munters EC Cool system was found to be the best solution.

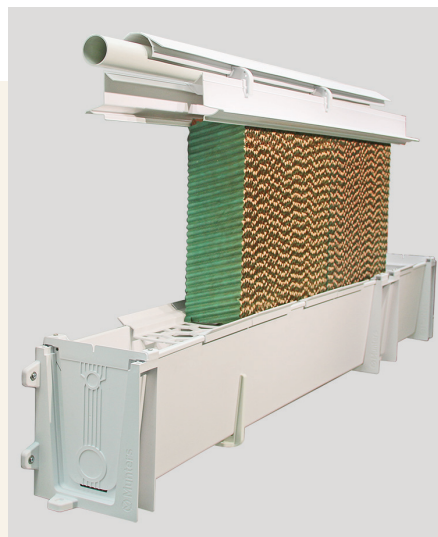
Refrigeration systems play a pivotal role across diverse sectors, from ensuring food safety to supporting industrial processes and maintaining comfortable indoor environments. However, their efficiency profoundly influences energy consumption, operational costs, and environmental sustainability. A critical component of refrigeration systems, the condenser unit, is responsible for releasing heat from the refrigerant into the surroundings.

In many regions, particularly in warmer climates, the effectiveness of condenser cooling is compromised by high ambient temperatures. This scenario leads to decreased heat rejection efficiency and, consequently, reduced overall system performance. As a result, higher energy inputs are required to achieve desired cooling effects, escalating operational expenses and environmental impact.

Case study: AB Vassilopoulos

Advantages Munters EC Cool:

- Reliable cooling installation
- No high-pressure alarms due to outside conditions
- No corrosion or mineral deposits on the condenser
- More energy-efficient cooling installation (COP)
- Higher cooling capacity
- Easy cleaning and pad replacement
- Easy and quick installation
- Retrofit, flexible, and modular system





Confronting extreme temperatures and pressures

In a medium-sized AB supermarket spanning 1430m² in Athens, Greece, the refrigeration system was integral. The system consisted of a multi-rack configuration featuring three compressors for medium temperature load (MT) and two compressors for low-temperature load (LT), utilizing R449A refrigerant. Both MT and LT were served by a shared condenser. It was engineered for a -35°C evaporation temperature for LT and -10°C for MT, operating within a 40°C ambient temperature. Control was managed by a unit, with a condensing temperature setpoint of 30°C. Throughout the observation period, condenser fans ran continuously as the setpoint temperature was unattainable, leading to no reduction in energy consumption from condenser fan operation without adiabatic precooling.

Partnering with Munters through Dry Hellas, an exclusive representative of Munters in Greece, and the local contractor General Refrigeration S.A., AB opted to implement the Munters EC Cool evaporative cooling system on the condenser to mitigate extreme temperatures and pressures.



Mr. Dimitrios Dalavouras, Co-owner of General Refrigeration SA.

“We have collaborated on projects involving pre-cooling through the Munters EC Cool system. Munters offers an all around solution that delivers what is promised.”

Mr. Dimitrios Dalavouras, Co-owner of General Refrigeration SA.



Easy and quick installation of the pads which are also easy to clean and replace.

The Advantages of Evaporative Precooling

Evaporative precooling emerges as a promising solution to enhance condenser performance. This technique involves cooling the incoming air before it reaches the condenser through water evaporation. The underlying principle is straightforward: as water evaporates, it absorbs heat from the surrounding air, thereby lowering its temperature. By introducing pre-cooled air into the condenser, the system can facilitate more efficient heat dissipation.

The advantages of evaporative precooling are manifold:

Increased Capacity: By lowering the condensing temperature, the system can enhance its cooling capacity, allowing for more effective refrigeration.

Enhanced Efficiency: Lower air temperatures enable the condenser to reject heat more efficiently, thus improving the overall refrigeration cycle's efficiency.

Energy Savings: The heightened efficiency translates into reduced electricity consumption, as the refrigeration system operates more effectively to achieve desired cooling outcomes.

Extended Equipment Lifespan: Operating under cooler conditions can mitigate wear and tear on system components, potentially prolonging the system's operational lifespan.

Utilizing evaporative cooling pads, Munters EC Cool reduces the rooftop condenser's inlet temperature. Ambient air passes through wetted CELdek® evaporative media, effectively lowering its temperature before reaching the condenser coil. Munters EC Cool offers modularity and flexibility, accommodating condensers of various sizes, including those up to 2 meters in height. Constructed from high-quality UV-stabilized PVC and PP materials, the system boasts durability and resilience. Its glue-free design ensures resistance to thermal expansion or contraction, safeguarding against cracks or water leakage. Maintenance and inspection procedures are straightforward, facilitated by a smart clip function allowing easy access to water pipes and pad replacements. Notably, the system operates on recirculated water, minimizing water consumption.

Benefits Extended Beyond Cost Savings

Dry Hellas decided to conduct a comprehensive assessment of the impact of evaporative cooling and focused on key performance indicators across two distinct periods. The first comparison involved intermittent usage, while the second examined two full days of operation in the supermarket.

The results clearly demonstrated the effectiveness of adiabatic precooling solutions in enhancing energy efficiency. When the ambient temperature hovered around 32°C, energy savings reached nearly 20%. Anticipated energy gains were even greater in hotter conditions or lower humidity levels. Notably, the savings percentage escalated with higher energy consumption due to elevated ambient temperatures. Furthermore, this solution aided in reducing peak electricity consumption during crucial midday hours, benefiting the grid. Energy savings translated directly into cost savings, especially in regions with high electricity prices, and also contributed to reducing greenhouse gas emissions. For every kWh of electricity saved, the emission of 285 grams of CO₂ equivalent was prevented.

“However, the benefits extended beyond cost savings. Munters EC Cool’s capability to operate at lower condensing temperatures promoted compressor longevity and minimized the frequency of malfunctions requiring technician intervention. Moreover, it ensured more stable system operation, leading to consistent temperatures within cabinets and cold rooms, which in turn improved product quality and reduced spoilage rates.”

Ms. Penny Sitaridou, owner of Dry Hellas.



A Sustainable Solution for Hot Summers

In summary, the introduction of the Munters EC Cool evaporative precooling system on the condenser has significantly enhanced the operational efficiency of the refrigeration system. By mitigating extreme temperatures and pressures, it has facilitated smoother operation, resulting in substantial energy savings and reduced greenhouse gas emissions. Additionally, its versatility allows for retrofitting into existing systems, promising favorable returns on investment through energy savings and improved performance. Notably, the simplicity of retrofitting and the absence of water treatment requirements make it a practical and sustainable choice for enhancing refrigeration systems.

“The implementation of this system has helped to achieve significant energy savings and reduce the high pressure of the cooling circuit in order to avoid frequently compressor switch off. I recommend this system as a sustainable solution for adapting to and mitigating climate change in refrigeration systems, especially during hot summer periods.”

Mr. Georgios Karampatos, Energy & New Technologies Supervisor AB Vassilopoulos Single Member S.A.

→ Would you like to find out if Munters has a solution for your company too?
If so, please visit our website, www.munters.com