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Italy's largest hypermarket opts for CO₂ transcritical

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In April 2016, the largest hypermarket in Italy opened its doors in Milan. Italian supermarket giant Iper's brand new 10,000 m² hypermarket is pioneering a CO₂ transcritical refrigeration system using ejector technology to enhance efficiency in temperatures of up to 38°C, further demonstrating that CO₂ refrigeration is advancing across Southern Europe as an efficient and viable solution.

The Iper hypermarket is part of the new Arese shopping centre, which is the largest shopping centre in Italy and one of the largest in Europe. Sustainability is a key pillar of the building's design, which qualifies for U.S. Green Building Council (USGBC) LEED Gold certification, meaning that the hypermarket has been designed and constructed to use less water and energy and reduce greenhouse gas emissions.

"Using CO₂ to power the refrigeration system is a perfect match to the intentions of LEED. CO₂ is a low-GWP refrigerant and an excellent choice when it comes to reducing greenhouse gas emissions. At the same time, CO₂ provides high performance and exceptional properties for heat reclaim," says Gabriele De Bona, a Key Account Manager at Danfoss Italy.

The Iper hypermarket is one of the first stores to implement new ejector technology from Italian firm Arneg into a transcritical refrigeration system. Convinced by the results of numerous tests in recent years, Arneg decided to go for the new ejector technology in order to enhance the hypermarket's energy efficiency.

"Electricity for refrigeration makes up 50% of the total energy consumption of the hypermarket, and our customer Iper has an ambition to cut down this consumption year by year as part of their sustainability programme. Another ambition of the visionary retailer is to switch to natural refrigerants to cut the carbon footprint. In order to fulfill these goals, we proposed a transcritical CO₂ solution. It is a large installation with several hundred cabinets and cold rooms operating under ambient temperatures up to 38°C," says Enrico Zambotto, Technical Support Manager from Arneg, a world leader in the production of complete refrigeration solutions for the retail industry.

Since it was only commissioned in April 2016, it is still too early to provide figures for the actual energy savings of the Milan hypermarket. However, the experience of Danfoss (which took part in system design, testing of packs and commissioning) from similar installations with heat recovery, intelligent control and ejector technology points to energy savings of up to 50% compared to more conventional installations.

System specification:

The turnkey refrigeration solution supplied by Arneg contains the following main components:

147 MT cabinets
29 LT cabinets
25 MT Cold Rooms
1 LT cold room

Installed MT refrigeration power: 290kW
Installed LT refrigeration power LT: 38kW

The two compressor racks consist of:
Compressors: Dorin: 3 x CD4000 + 2XCD 4000 + 2xCD 750X
Condenser: LU-VE EHVD 1X 6226 4 fans EC

Rack controller: Danfoss AKPC 781
Parallel compressors controller: Danfoss AKPC 781
Ejector: Danfoss
Ejector controller: Danfoss

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