

SUSTAINABLE INNOVATION: DATA CENTRES THAT DEFINE TOMORROW

In today's digital era, Data Centres are the core of technological infrastructures. It is with this in mind that HiRef launched a strategic partnership in 2021 with a leading company in the field of Hyperscale Data Centres.

This partnership has led to the [construction of two innovative Data Centres](#) near Milan, marking a new chapter in our commitment to environmental and economic sustainability.

The project required a unique synergy between HiRef, the design studios with which the customer collaborates and the company's technical department that contributed to the project, resulting in a co-design aimed at meeting the specific needs of the end user.

CHILLERS

Among the innovative solutions provided are the [TVA series chillers of 1200kW each](#), with [Low Noise](#) execution, designed for silent operation, thus reducing noise impact in the surrounding environment.

These units, in [energy class A](#), are equipped with environmentally low-impact R1234ze refrigerant (GWP=6) with inverter screw compressors, shell and tube heat exchangers and EC axial fans for maximum efficiency.



We also installed [three 750kW, high-efficiency TAL series units](#) with Scroll technology and R454B refrigerant (GWP=466)

Both ranges supplied were designed with [indirect free cooling](#) and equipped with a [glycol free kit](#).

The glycol free kit represents an innovative solution that eliminates the need for glycol throughout the cooling system.

Glycol, commonly added to water to prevent freezing and increase its viscosity, can cause an increase in pressure drop, negatively affecting pumping and maintenance costs.

This addition becomes essential in free cooling units, where water, exposed to low winter temperatures, is at risk of freezing. The glycol free kit, through the use of a dedicated heat exchanger, two pumps and a three-way valve, makes it possible to confine the use of glycol water exclusively to the free cooling section of the chiller, thereby optimising efficiency and reducing energy waste.

To ensure service continuity and efficiency, we have implemented dual power supply systems, electronic ventilation and dual inverter compressors. The fast restart option incorporated in the units allows the rated power to be reached quickly, while the enlarged exchange surfaces further optimise the efficiency of free cooling.

For offices, we have implemented [two chillers from the TPS range](#). These units, operating exclusively in cooling mode, are equipped with a tandem two-compressor system on a single circuit, ensuring superior energy efficiency during partial load operation.

Considering the office environment, we chose the Low Noise configuration. This was achieved through a series of measures such as the precise regulation of the fan speed, the use of anti-vibration devices in the refrigeration circuit, and the acoustic insulation of the compressors and pumping kit within a specially designed box with sound-absorbing inner linings, to ensure a quieter and more comfortable working environment.

CCACs

For CCAC units, we also installed [80 FanWall HBCV](#), chilled water air conditioners designed for technological environments that require a small footprint without compromising cooling capacity.

These units are equipped with automatic air flow control and pressure-independent valves (PICV), which ensure automatic flow balancing and maintain a constant water flow.

In addition to the FanWall HBCVs, we supplied [twelve air-conditioners of the TRF CW series](#). These chilled water cooling units were selected for IT rooms, where it is essential to [maintain constant control over both temperature and airflow](#). Their advanced features ensure optimal effectiveness in cooling Data Centres, offering precise management of environmental conditions and adaptable versatility to various operating scenarios.



For the technical rooms, **eight TREF DX A air-conditioning units** were implemented, **varying in power between 40 and 85 kW**, combined with remote condensers.

These solutions, designed for perimeter installation, operate via direct expansion and are equipped with on/off Scroll compressors.

In both the TRF and TREF series, the displacement air flow system has been adopted, with air distribution above the floor, as there is no floating floor in these rooms.

MANAGEMENT AND MONITORING

Finally, to ensure effective plant management, we installed **two HiNode control systems, one in redundancy to the other**.

The HiNodes are **custom-designed** to meet the customer's specific needs and are crucial in maintaining the reliability of the entire plant; in the event of power system interruptions or malfunctions, electromechanical control mechanisms come into operation to ensure business continuity.

Furthermore, in emergency situations, such as the loss of the network connection, HiNode automatically activates an emergency mode. This mode provides for the forced opening of dampers, the activation of fans and the opening of valves, measures that are essential to ensure that optimal cooling conditions are maintained within the room, thus preserving the integrity and functionality of the system even under critical circumstances.



In both projects, the Factory Acceptance Test (FAT) was carried out to test the operation of the machine before installation. This was an essential moment of verification of compliance with the working conditions defined in the project.

With these projects, HiRef has set new standards of innovation and sustainability in the Hyperscale Data Centre sector. Through state-of-the-art technical solutions and a commitment to energy efficiency, we have shown that it is possible to combine technological progress and environmental responsibility.

These Hyperscale Data Centres are not only examples of engineering excellence, but also symbols of our commitment to a more sustainable technological future.