

# Komatsu and HiRef: a long-lasting partnership

Komatsu is a historic Japanese company that designs and builds construction machinery and equipment such as excavators and skid-steer loaders; it is recognized worldwide for its constant pursuit of innovation and ever-increasing focus on sustainability.

**The collaboration between Komatsu and HiRef began in 2020**, with a request for two specially designed cooling units for the production line at the Este plant (Padua), and **has continued over the years** with the installation of another cooling unit and a reversible heat pump.

## THE PLANTS

In 2020, HiRef designed and installed two high-efficiency (EER 3.27) TVA721CL chillers with heat recovery using the eco-friendly refrigerant R1234ze (GWP 6).

The two chillers, positioned on the ground in the Este plant, cool the production line environment through 6 air handling units placed in succession. Independent flow valves were installed in the plant, which is more than 250m long, and are essential for regulating air delivery and optimizing machine performance.

A few months later Komatsu, chose HiRef to create a custom unit, capable of making workers' job in the painting booth healthier and more comfortable.

Before the installation of the new unit, workers were forced to stop the production process several times during the day in the summer months due to the high temperature.

**A TVA661CL was chosen: a high-efficiency (EER 3.26) cooling-only double screw compressor chiller with heat recovery and R1234ze refrigerant.**

Finally, in 2022, the Japanese multinational turned to HiRef for the cooling of its new warehouse in Noventa Vicentina (Vicenza). The right temperature of this new room is ensured thanks to a **high-efficiency (EER 3.30) reversible scroll heat pump** serving the new aerothermal circuit.

## THE WINNING SOLUTIONS

**What choices made the difference?**

**The R1234ze refrigerant and desuperheater in all units supplied by HiRef.**

Sustainability guides HiRef in its everyday choices, which is why, in full agreement with the design, it has proposed customized solutions involving the use of R1234ze refrigerant, which has a very low environmental impact, with a GWP of 6. A choice also welcomed by the client and Massimo Cavallaro's PROGIMP design studio, demonstrating a forward-looking and modern vision.

Finally, thanks to the proposal of desuperheaters HiRef was able to offer a complete and green solution, able to meet the precise needs of the customer; in fact, with this sustainable solution, Komatsu is able to recover waste heat and use it to heat sanitary water and the one used by pressure washers, with significant energy and economic savings.

**What have been the keys to a successful and lasting partnership?**

**The people!** Throughout each phase of the project there has never been a lack of constant collaboration and assistance, because only dialogue, combined with expertise and attention to needs can open the door to a trusting relationship that lasts.



## AIR CONDITIONING SYSTEM FOR THE PRODUCTION LINE

In the first plant, two TVA chillers were installed to cool the production line environment through 6 air handling units placed in succession.

In the second phase, however, a high-efficiency TVA double screw compressor chiller was required for air conditioning of the painting department.

**TVA is the new range of energy efficient and sustainable air-cooled chillers.**

**Low environmental impact is achieved by using the new HFO R1234ze refrigerant with GWP=6 (Global Warming Potential).**

The highest efficiency to footprint ratios are reached thanks to the special configuration of the modular V-shaped coils, which allow high exchange surfaces and thus high levels of thermal efficiency in relation to the unit footprint.

This range is equipped with inverter-driven screw compressors that allow ample capacity for load modulation and high efficiency at partial loads.

**The free-cooling version** has heat exchangers sized with heat exchange surfaces that are double the market average, this **allows high performance to be achieved in this mode of operation.**

**The single-pass shell and tube evaporator** allows excellent thermodynamic efficiency values to be achieved with a low Total Equivalent Warming Impact (TEWI), thanks to the complete heat exchange counter-flow.

In addition, compressor hoods drastically reduce noise thanks to the use of special sound-absorbing materials.

Particular attention is paid to machine maintainability, which is easier and faster thanks to the innovative HiRail removable module that provides quick access to the compressors.

## AIR CONDITIONING SYSTEM FOR NEW WAREHOUSE

Finally, in 2022, the Japanese multinational turned to HiRef a third time for the cooling of its new warehouse in Noventa Vicentina (Vicenza).

The right temperature of this new room is ensured thanks to a high-efficiency (EER 3.30) reversible TAL556HL scroll heat pump serving the new aerothermal circuit.

**The new chillers and heat pumps in the TAL range are air/water units in energy efficiency class A**, in both cooling-only and heat pump versions.

Efficiency is guaranteed thanks to the careful selection of internal components, including the **adoption of innovative high-efficiency scroll compressors** with direct start permanent magnet motor technology.

The high modulation range guaranteed by the multi-scroll technology allows the cooling/heating requirements to be met at any time, minimizing energy waste and increasing seasonal efficiency.



The TAL range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. This particular configuration makes it possible to reach high exchange efficiencies, while maintaining drops low on the water side and thus reducing pumping costs, both at full and partial load.

To ensure proper and easy maintenance, the TAL range is integrated with a removable HiRail sliding guide, which allows the control panel to be easily removed, obtaining additional space for unscheduled maintenance.

