



EFFICIENT HYDRO COOLING OF VEGETABLES BY INDIRECT COOLING WITH TEMPER -20

Zanemi S.L. installed an efficient and high technology energy solution for their new processing plant in Villena, Alicante. A plant, when in times of harvest is able to cool and process 10,000 kg of product per hour.

Vegetables Processing Plant in Villena

The design of this indirect refrigeration system (Hydro cooling system) was carried out by Instalaciones Frimavi S.L, in Villena and executed with R - 1234ze and Temper -20 as secondary fluid. The result of the installation exceeded all expectations both in terms of product quality and with significant energy savings.

Hydro Cooling System

Hydro cooling is a system where the maturity process of the vegetables is slowed down and controlled. On the same day as harvest, the vegetables enters the cooling system at +22 °C and becomes immersed in ice water. Generally, the water is kept at a temperature of +1°C, and is sprayed directly over the vegetables. The water must be as cold as possible without causing any damage to the vegetables. When the process is finished the vegetables leave the hydro cooling system at +1°C clean, cooled and ready for packing.

The hydro Cooling process prolongs product durability and quality of the vegetables and it is a highly appreciated technic.



Installation Facts:

Refrigeration Power Installed:
200 kW

Primary Refrigerant:
R - 1234ze GWP 0, ODP 0. (54 kg)

Heat Transfer Fluid:
Temper -20 (6.000 liter)

Operation Temperature: -6°C

Pipes Materials:
Stainless Steel and Plastic

Brine Defrost:
Temper -20

Advantages:

Reduced energy consumption and smaller system components compared to MPG USP

Low pressure system, with greater reliability.

Improved product quality due to more stable process and storage temperatures.

In accordance with the F-GAS regulations.

Defrost with the same secondary fluid, using the waste heat of the condensation.



Since the system was designed with an HFO refrigerant (R -1234ze) problems related to HFC refrigerants and DX ammonia installations could be avoided. Firstly, HFOs comply with the F - Gas regulation and have very low environmental tax rates in Spain. Secondly, Zanemi wanted to ensure a safe working environment and thus, ammonia was replaced by Temper as heat transfer fluid. A buffert tank stores 6 m³ of Temper -20 at -6°C, and serves refrigerated areas through a set of electronically controlled pumps.

Efficient Defrost with Temper -20

The secondary fluid Temper -20 also serves the general defrost system. It is designed to obtain heat through an exchanger in the condensation of the primary refrigerant: this system significantly reduces the energy consumption and CO₂ emissions compared to electrical defrosting systems.



Mr. José Luis Sanchez, owner of Instalaciones Frimavi, and Mr. Jose Luis Sanchez Ruiz, Technical Manager

Frimavi Facts

Instalaciones Frimavi S.L. has more than 30 years of experience in the sector.

Mr. José Luís Sánchez, and Instalaciones Frimavi, is seen as a specialist in refrigeration of fruits and vegetables, a pioneer in Hydro Cooling and Vacuum Cooling system in Spain.

Its scope of action is in the provinces of Alicante, Valencia, Albacete and Murcia.

Zanemi S.L Facts

Zanemi S.L., founded in 1995, but its roots goes all the way back to 1962 when Emilio Micó Tomás first started his business.

Zanemi S.L. is working with production, collection, treatment, classification, packaging and marketing of horticultural products for the fresh market. Traceability is key to ensure high quality throughout the production process hence Zanemi has developed a unique method for documenting the history, location and trajectory of each product being harvested.



Temper Facts

Since 1996 the Swedish company Temper Technology manufactures the green and energy efficient Heat Transfer Fluid; Temper. HTF Iberian Partners s.l., is the Official Distributor of Temper since 2014, for Spain and Portugal, being its Commercial Representative for Hispanoamerica.

Temper is mainly used in larger food industry applications and logistic centers. To ensure the high quality Temper is always delivered ready-to-use and can be used down to -60 °C.

Secondary fluid:

Heat Transfer Fluid: Temper -20
Freezing point (°C): -20
Operational temp. (°C): > -20
Density kg/m³: 1142*
Spec. Heat (kJ/kg. K): 3,315*

*@20 °C

ZANEMI S.L.
www.zanemi.es

INSTALACIONES FRIMAVI S.L.
comercial@frimavi.com

TEMPER TECHNOLOGY AB
info@temper.se
www.temper.se

HTF IBERIAN PARTNERS S.L.
federico.martinez@htf-ip.com
www.htf-ip.com

