



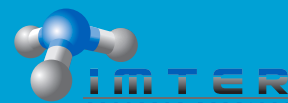
AVANT GARDE ENERGY SOLUTION FOR LOW TEMPERATURE STORAGE WITH SECONDARY SYSTEM AND TEMPER -40

In 2008, MERCASALAMANCA installed an efficient and avant-garde energy solution for the new Central Market, which serves the province of Salamanca. An indirect cooling system was designed and executed with Ammonia (R - 717), with food graded glycol and Temper -40 as a secondary fluids and defrost brine.

One of the major advantages is that the indirect cooling system require less ammonia in comparison to a direct system, resulting in a safer installation. The installation also result in savings in terms of energy consumption and components such as pumps and heat exchanges, when comparing to propylene glycol in low temperature.

Centralized system with Mycom compressors

The design and execution of the refrigeration system was carried out by Ramon Vizcaino Refrigeración, via its delegate in Castilla y León, Mr Julio Domínguez, current operator of the installation through his company Imter S.L. The installation is a centralized system with Mycom compressors, the glycol circuit has a cooling capacity of 1.8MW and 0.8MW for the Temper -40 circuit. The secondary fluid is distributed through the installation by an electronically controlled Grundfoss pumping system.



Installation Facts:

Refrigeration Power Installed:
2,6 MW

Primary Refrigerant:
R-717

Heat Transfer Fluid:
Temper -40 (15.000 liter)

Operation Temperature: 10 to -35°C

Pipes Materials:
Stainless Steel

Brine Defrost:
Temper -40



Advantages:

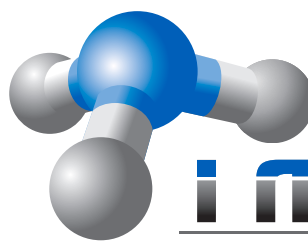
Reduced energy consumption and smaller system components compared to MPG USP

Low pressure system, with greater reliability.

Safe choice due to a reduction of ammonia volume.

In accordance with the F-GAS regulations.

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



IMTER
PROCESOS TÉRMICOS

The freezing circuit, of $-35^{\circ}\text{C}/-10^{\circ}\text{C}$, works exclusively with Temper as secondary fluid, cooled through a Thermowave exchange system. The secondary system with Temper -40 serves all low temperature storage chambers used for meat and fish.

Efficient Defrost with Temper -40

Temper -40 is also used as defrost brine for the general defrosting system. The system is designed to obtain heat through an exchanger in the condensation of the primary coolant: this system significantly reduces energy consumption and CO_2 emissions compared to electrical defrosting systems and glycol defrost, due to Temper's excellent thermal properties and viscosity.



One of Mercasalamanca's pavilions where retailers rate and compare the offered products.

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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 -40
Freezing point ($^{\circ}\text{C}$): -40
Operational temp. ($^{\circ}\text{C}$): > -40
Density kg/m^3 : 1207*
Spec. Heat ($\text{kJ}/\text{kg. K}$): 3,008*



*@ 20°C

Mercasalamanca S.A. Facts

Mercasalamanca is the most modern wholesale market in Spain with self-tipping docks, refrigerated booths with customized cold control, warehouses for fruit packaging etc.

It serves more than 1,700 users and approximately 400,000 inhabitants. The complex is $253,000 \text{ m}^3$, including pavilions for the Wholesale market: Fruits, Vegetables, Meats, Fish and Multipurpose.



MERCASALAMANCA

Iinter S.L. Facts

Iinter S.L. is specialized in design and execution of Industrial Refrigeration projects, specifically for big meat industries with Ammonia and Secondary Fluids

They have long experience of developing programs of automation and control of the facilities through PLC, in order to provide maximum product quality, energy efficiency and high consideration for the environment through the whole installation.