



## ENVIRONMENTAL FOCUSED SLAUGHTERHOUSE WITH STATE-OF- THE-ART INDIRECT COOLING WITH TEMPER -55

Finding the optimal solution is not always an easy task. In 2004, Friselva S.A. started to expand its Slaughterhouse and Cutting Room in Girona and was searching for an energy efficient solution to serve its operations.

An indirect cooling system with Ammonia (R - 717) and Temper - 55 as secondary fluid was chosen by Friselva S.A. The innovative and environmental focused solution, designed by Itisa S.L., delivers even storage temperatures, which in turn result in high quality products. In addition, by using Temper as a secondary fluid Friselva S.A.'s overall energy consumption has been reduced. The indirect cooling system surpassed all of Friselva's expectation.

### BOOSTER Centralized System

It is a BOOSTER Centralized System of Mycom compressors, with two refrigeration circuits, one with 1.6 MW at -10°C/+35°C and the other with 180 kW at -35°C/-10°C. The secondary fluid is distributed through the installations by electronically controlled pumps from Grundfoss.



### Installation Facts:

**Refrigeration Power Installed:**  
2 MW

**Primary Refrigerant:**  
R-717 (2.800kg)

**Heat Transfer Fluid:**  
Temper -55 (10.000 liter)

**Operation Temperature:** 10 to -35°C

**Pipes Materials:**  
Stainless Steel

**Brine Defrost:**  
Temper -55



### Advantages:

Reduced energy consumption and smaller system components compared to MPG USP

Low pressure system, with greater reliability.

Improved product quality due to a 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.





The medium temperature circuit of  $-10^{\circ}\text{C}/+35^{\circ}\text{C}$  works with Temper and Glycol as secondary fluids. The secondary fluid Temper is cooled through an ALFA LAVAL 400 KW heat exchanger. This circuit serves:

- Expedition chamber at  $1^{\circ}\text{C}$ , with  $991.2\text{ m}^3$
- Storage of Hams at  $1^{\circ}\text{C}$ , with  $1,819\text{ m}^3$
- Hams dryer at  $1^{\circ}\text{C}$ , with  $1.674\text{ m}^3$

The freezing circuit, of  $-35^{\circ}\text{C}/-10^{\circ}\text{C}$ , works exclusively with Temper as secondary fluid, being cooled through an ALFA LAVAL exchanger of 180 Kw and serves:

- Frozen chamber at  $-20^{\circ}\text{C}$ , with  $5,657\text{ m}^3$

### Defrost with Temper -55

The secondary fluid Temper -55 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 energy consumption and  $\text{CO}_2$  emissions compared to electrical defrosting systems.

### Itisa S.L. Facts

Itisa S.L. is specialized in the design and execution of projects for thermal and acoustic insulation, industrial refrigeration and air conditioning.

They have a department consisting of engineers and technicians with high technological knowledge who design and coordinate the projects.

Moreover, Itisa S.L. develop programs for automation and control of the facilities through PLC in order to obtain and secure maximum product quality, energy efficiency and a minimal environmental impact. Itisa S.L. is ISO 1400:2004 certified and in the process of implementing ISO 9001:2000 and becoming a part of prestigious AENOR brand.

### 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  $-60^{\circ}\text{C}$ .

### Secondary fluid:

Heat Transfer Fluid: Temper -55  
 Freezing point ( $^{\circ}\text{C}$ ):  $-55$   
 Operational temp. ( $^{\circ}\text{C}$ ):  $> -55$   
 Density  $\text{kg}/\text{m}^3$ :  $1240^*$   
 Spec. Heat ( $\text{kJ}/\text{kg. K}$ ):  $2,817^*$



\*@ $20^{\circ}\text{C}$

### Friselva S.A. Facts

Friselva S.A. is a part of the Alimentari Carni Group and has a long tradition within slaughterhouse and cutting room for pork and meat products. It was the first slaughterhouse in Spain to implement the environmental standard ISO 14001, having the BRC, IFS and FSS quality certifications.

The company group is active within the meat sector: feed production, pig production and fattening, agricultural farms, slaughterhouse and cutting plant etc.

Friselva S.A. is expanding and internationalizing with exports to 30 countries and they continuously scan the market for new opportunities, focusing on commitment to quality, service focused on loyalty to the clients as well as corporate social responsibility.

**FRISELVA S.A.**

FRISELVA S.A.  
 Tel. +34 972 478 250

ITISA S.L.  
 Tel. +34 972 47 60 71  
 www.itisa.net

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

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