

THERMAL PROTECTOR TORS



ECEPLAST
SUSTAINABLE
PACKAGING INNOVATIONS

Pallet Covers

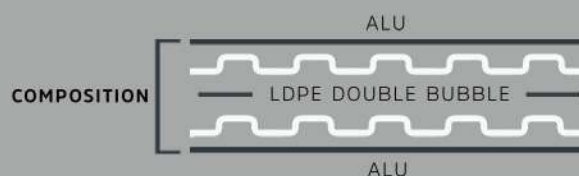
customer



Nando's

TEST REPORT

Thermal Pallet Cover by Eceplast is the easiest way to protect and ship your temperature-sensitive cargo. Designed to lower costs and minimize CO² footprint



THERMAL
CONDUCTANCE

0.615

(λ) W / (m².K)
UNI EN 12667:2002

TEMPERATURE
RANGE

-30° +80°

°C

HEAT
RESISTANCE

1,63

(R) m² K/W
UNI EN 12667:2002

PALLET COVER IN COLD ATMOSPHERE

UPDATED: 10 sep 2019



Preamble

Following the customer's request, while providing information about the functionality of Eceplast's Thermal Protectors in a cold environment, a conditioning test of pallets in a cold room at -20°C was agreed. The customer currently ships sauces to Canada using reefer containers. Instead, he would like to use standard containers, properly protecting the products transported to avoid getting frozen.

Target

The test main goal is to understand if, the thermal protection offered by our TP PP0014, is enough not to freeze the sauces delivered to Canada which remain still for 6-7 days awaiting customs clearance at temperatures reaching up -20°C .

Preparation

The customer products are water-based sauces, for this reason, we decided to run a simulation using 500 ml water bottles, similar to the bottles used by the customer to transport his goods. As usual, we used a pallet without any protection to have a comparison to the other insulated pallets monitored during the test. Furthermore, all the pallets involved were conditioned for a week in the same room, so all the goods started from the same initial temperature conditions. The same attention was also applied to the dataloggers used for the test, which were kept for a couple of days in the same environment to reveal any differences in temperature probe readings.

The choice

The pallet cover that we have chosen to use during the test is the model with the double bubble layer inside and the single alu layer outside.

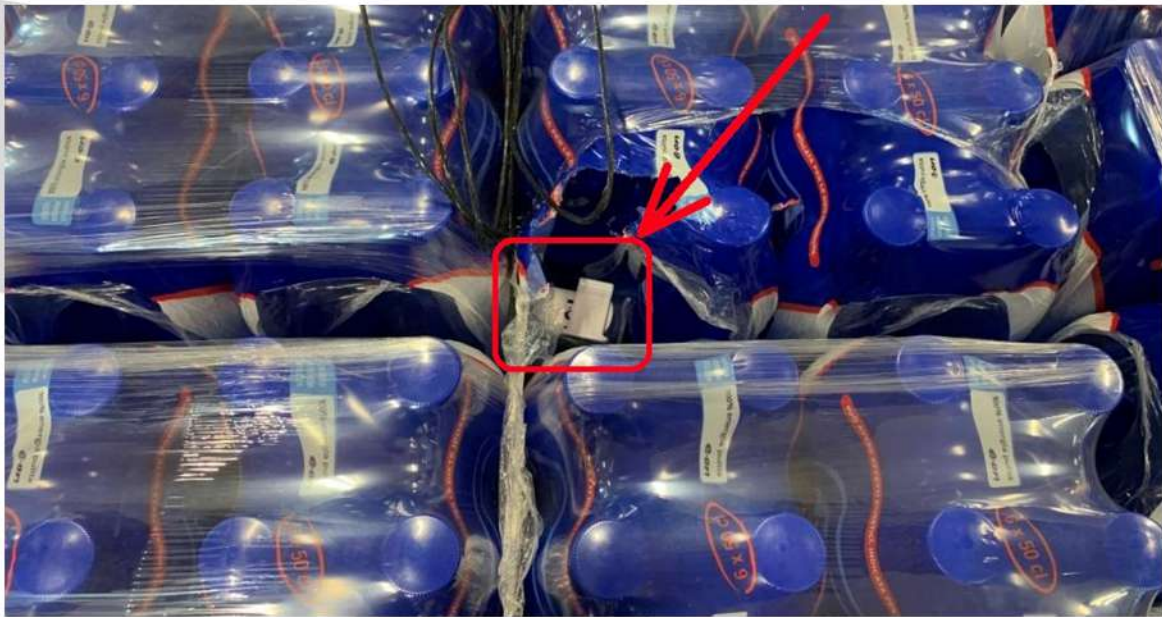
PALLET COVER IN COLD ATMOSPHERE

UPDATED: 10 sep 2019

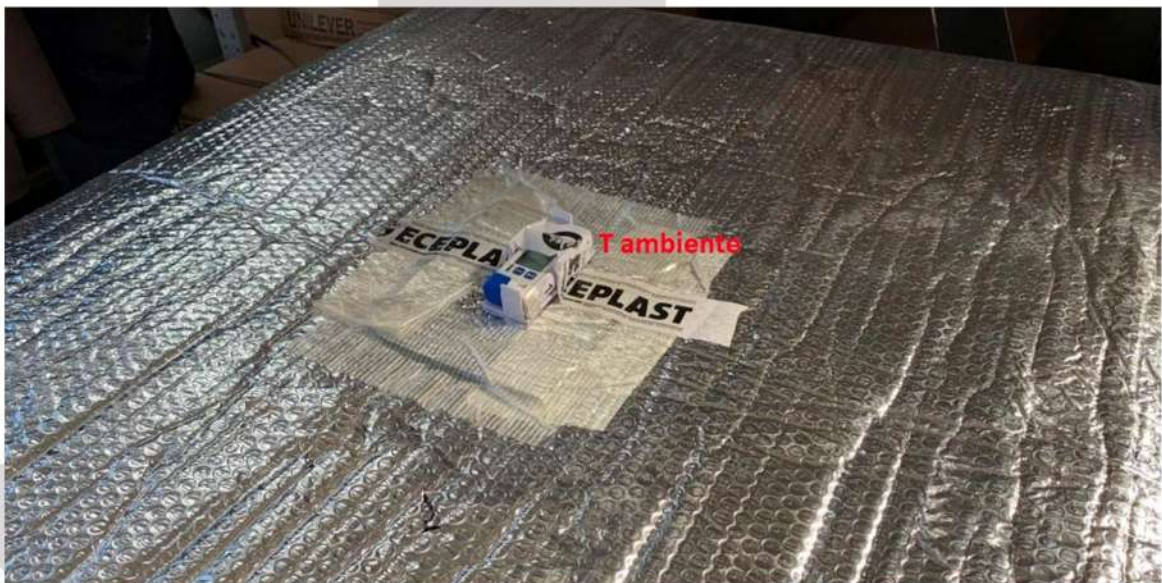


Test run

Once the three conditioned pallets have been removed from the warehouse, a datalogger has been inserted in each of them in the middle of the upper row.



After positioning the data logger, the pallets were covered with thermal covers. Finally, another datalogger has been placed outside the pallet cover.



PALLET COVER IN COLD ATMOSPHERE

UPDATED: 10 sep 2019



Timeline



TEST START:
06 Sep 2019
h 5:00 PM



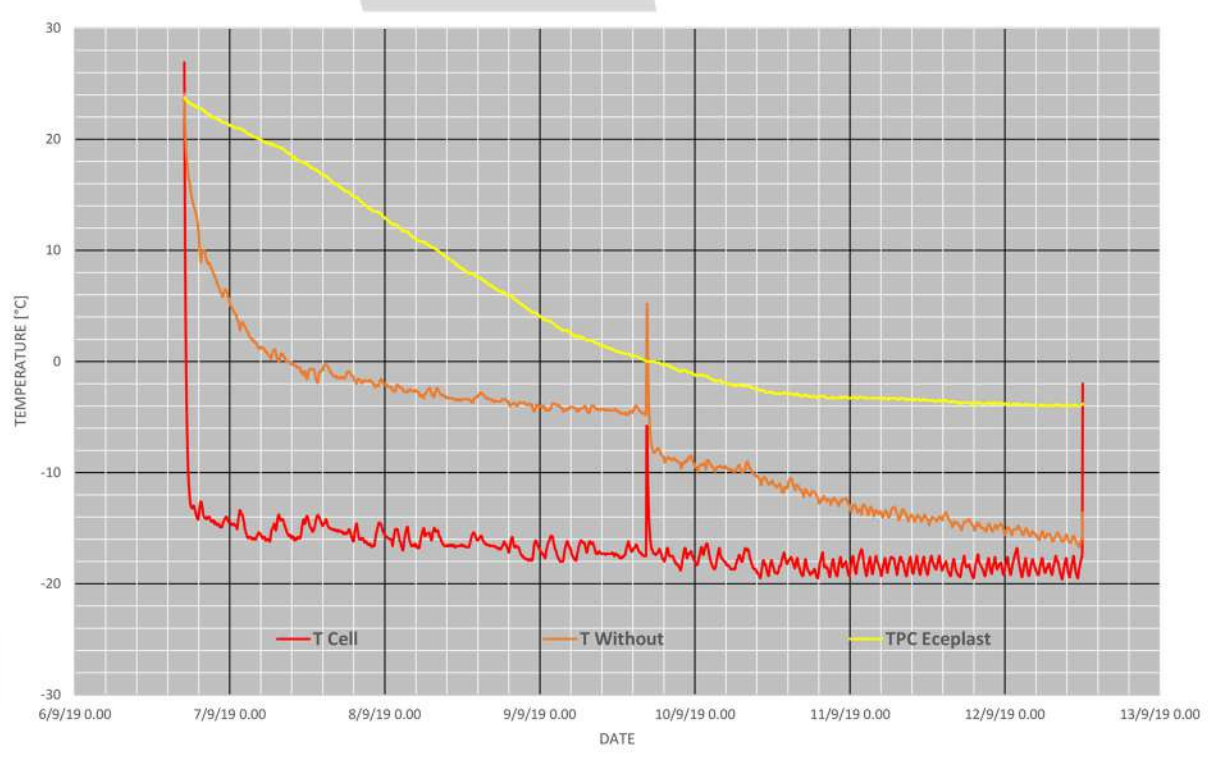
INSPECTION:
09 Sep 2019
h 11:00 AM



TEST END:
12 Sep 2019
h 12:00

Results

The results obtained from the recordings performed with the data loggers are summarized in the following graph:



PALLET COVER IN COLD ATMOSPHERE

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The yellow line represents temperatures measured inside the covered pallets. It should be noted that at the end of the approximately 6 days of testing, only two of the three liquid freezing phases were recorded. The first phase, that of lowering the temperature, lasts even 4 days instead of just one day of the reference curve. Then the second part of the curve begins, that is the horizontal part which is representative of the change of state.

Conclusions

The use of these pallet covers is very effective and is able, in extreme conditions, to lengthen the period of time that precedes the freezing principle by 4 times compared to the same product transported without any protection;

Recommendations

To further improve performance, we recommend that the customer seals the bottom of the pallets with an insulating material (slip-sheets). If possible using the same bubble wrap with which the cover is made;



We also recommend to never put the pallets, even when protected with covers, in contact with the walls of the container! Protection against cold is effective when you can create an air cushion between products and surrounding atmosphere.



Troia, IT 20 Sep 2019
Eceplast R&D Team

PALLET COVER IN COLD ATMOSPHERE

UPDATED: 31 Oct 2019

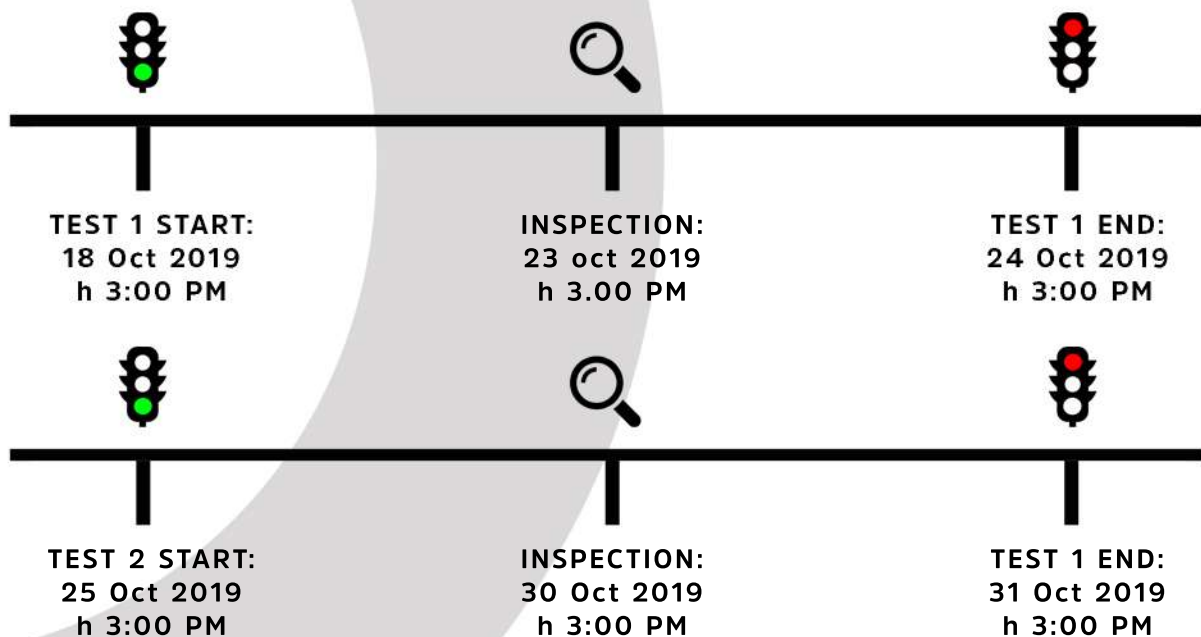


Preamble

After the first test with water bottles, we received the palletized goods from the customer, sauces in plastic and glass bottles. We took the chance to make further tests on the pallet cover efficiency.



Timeline



PALLET COVER IN COLD ATMOSPHERE

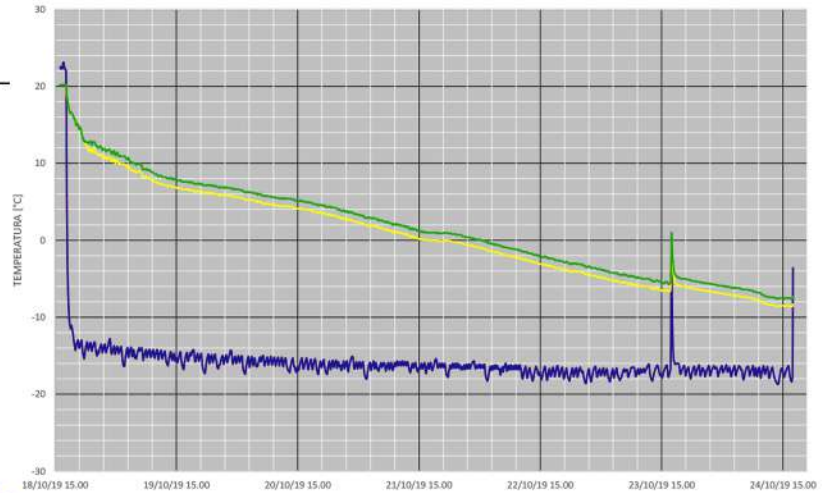
UPDATED: 31 oct 2019



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Test n.1: half protection on the base

Inner rows
Outside rows
Environmental temperature



KEY FACTS

BOTTLE
BREAKAGE



0%

SAUCES
STATE

>90% <10%

OPTIMAL PRINCIPLE
OF FREEZING

PLASTIC/GLASS BOTTLE
AVERAGE DIFFERENCE

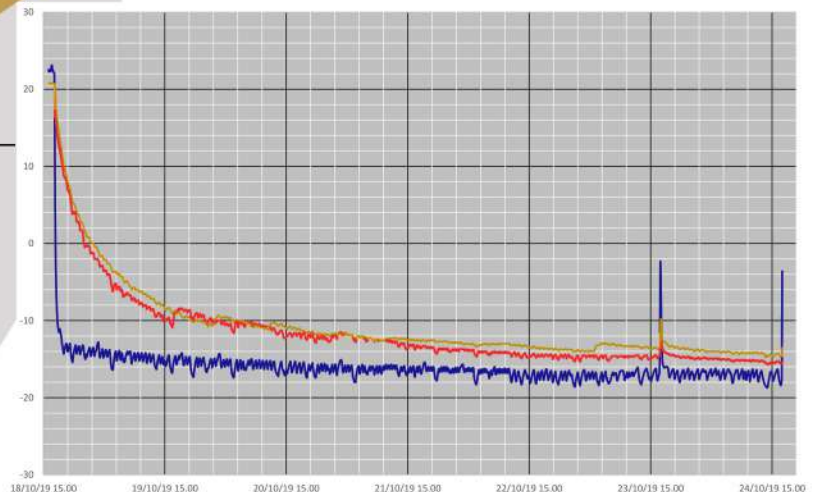
2°C

TEMPERATURE

Bottom rows shielded with
thermal sleepsheets
Bottom rows shielded with
cardboard



We simulated different conditions with
a thermal slipsheet on half base and a
simple cardboard on the other half

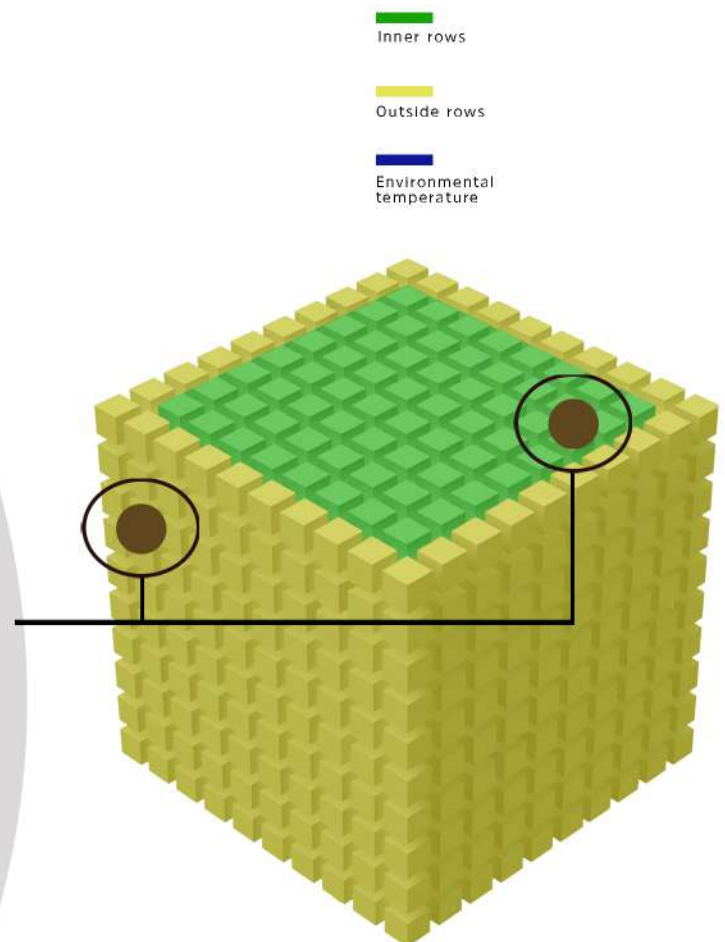
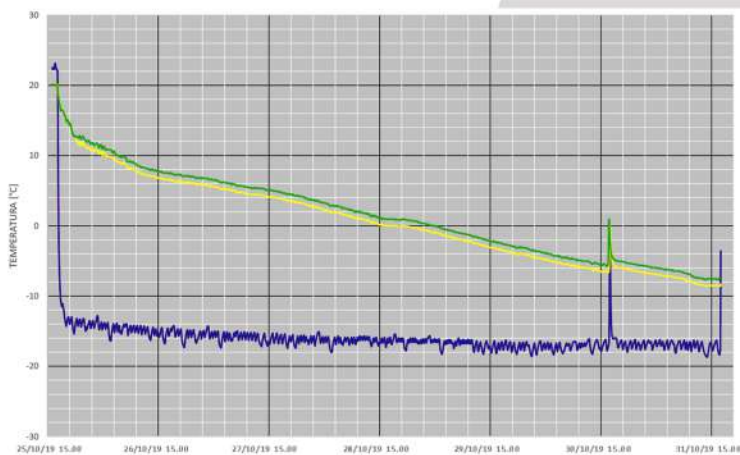
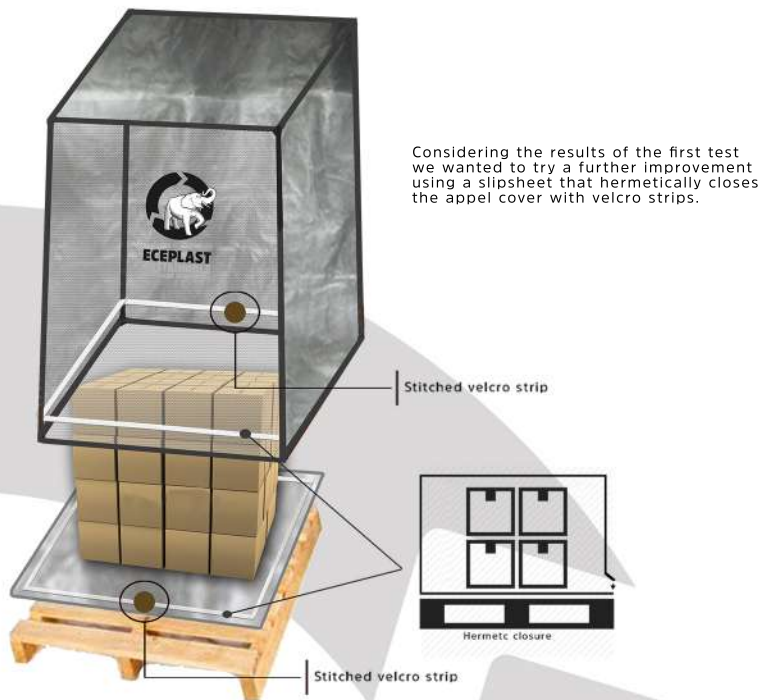


PALLET COVER IN COLD ATMOSPHERE

UPDATED: 31 oct 2019



Test n.2: hermetic closure



Conclusions

As per previous recommendations, we confirm that the slipsheet significantly improves the performance of the pallet cover.

Furthermore, to achieve the goal of not having any frozen bottles, we used a slipsheet that hermetically closes the pallet covers. This condition allows the temperature distribution even more uniform protecting the critical rows of the bottom and eliminating any doubts.

PALLET COVER IN COLD ATMOSPHERE

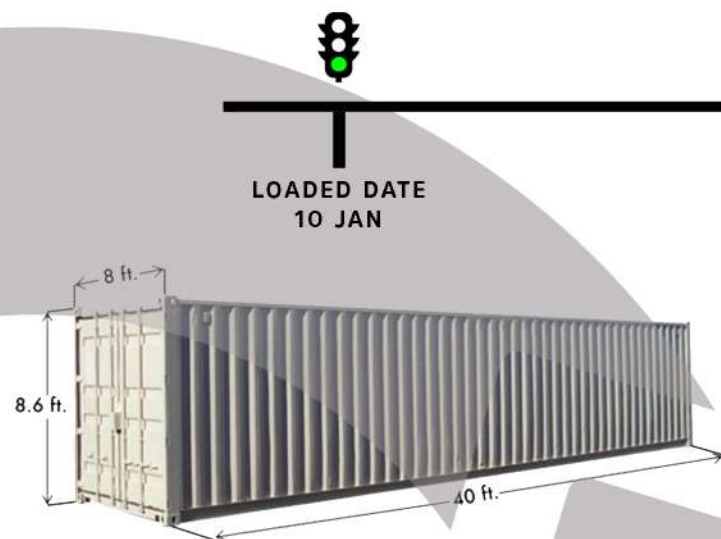
UPDATED: 03 April 2020



Preamble

Let's analyze the detected temperatures of the goods in transit.

The container has left the Netherlands on January 10, 2020 and was unloaded from the vessel in Canada on January 27 2020 with the final delivery of the goods to the local distributor in Laval (near Montreal) three days later (January 30, 2020). Unfortunately only one container has a complete data set but we are pretty sure this is a significant and reliable sample.



Container number: CMAU7657645

KEY FACTS

BOTTLE
DAMAGE



0%

SAUCES
STATE

>99%

OPTIMAL

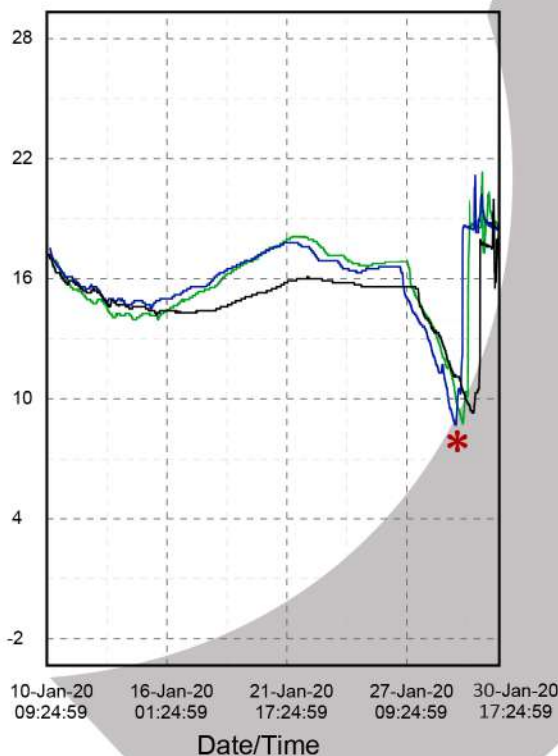
<1%

GOOD

GOODS AVERAGE
TEMPERATURE

17,4°

Temperature[°C]



Logging Summary no. 14

Highest Temperature: 26.5 °C
Lowest Temperature: -1.5 °C
Average Temperature: 17.4 °C
MKT: 18.2 °C

Record Mode: Stop when full
Stop Mode: Temporary
Data Points: 8161
Alarm At: N/A

Start Time: 10-Jan-20 09:24:59
Stop Time: 07-Mar-20 01:34:59
Elapsed Time: 56D 16H 00M 00S

Logging Summary no. 15

Highest Temperature: 25.2 °C
Lowest Temperature: -2.2 °C
Average Temperature: 17.3 °C
MKT: 18.1 °C

Record Mode: Stop when full
Stop Mode: Temporary
Data Points: 8505
Alarm At: N/A

Start Time: 10-Jan-20 09:27:40
Stop Time: 09-Mar-20 10:47:40
Elapsed Time: 59D 01H 20M 00S

Logging Summary no. 16

Highest Temperature: 25.4 °C
Lowest Temperature: -1.5 °C
Average Temperature: 17.4 °C
MKT: 18.1 °C

Record Mode: Stop when full
Stop Mode: Temporary
Data Points: 8507
Alarm At: N/A

Start Time: 10-Jan-20 09:26:11
Stop Time: 09-Mar-20 11:06:11
Elapsed Time: 59D 01H 40M 00S

*** NOTE:** Compared to the whole transit period (10-31 January), the thermal protection effectiveness of our packaging is evident especially between 27 and 30 of January 2020 where the container was discharged from the vessel and temporarily placed at the port. In these three days, the goods temperature drop was of 8°C (from 16°C to 8°C). This is really significant compared to an external storage temperature which, based on the simulations conducted in a conditioned cell, can be estimated around -5°C. If the pallets had not been protected, after 12 hours an immediate drop in temperature would certainly have occurred until reaching the same environmental temperature with consequent damages to the packaging and to the sauces.



ECEPLAST
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ISO 22000:2018

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