

Solstice® Liquid Blowing Agent



LOW GWP HYDROFLUOROOLEFINS (HFO)

Energy efficient insulation that is kinder to the planet

Honeywell



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Energy efficient insulation that is kinder to the planet

Afinox is one of the leading manufacturers of high quality professional catering equipment – frozen food storage and retail display cases. The company places environmental responsibility at the heart of its design and manufacturing process and is rigorous in the way it pursues a greener way of working.

It recently introduced Honeywell's fourth generation blowing agent – Solstice LBA – in their range of commercial cabinets in partnership with polyurethane insulation specialists Europoliuretani srl – and the results have proven the new blowing agent containing foam to offer both environmental and energy efficiency benefits.

Situation

The cold chain sector is increasingly demanding higher energy efficient commercial cabinets to reduce energy costs and CO₂ footprint. In order to help achieve this, cabinet producers are looking at Solstice Liquid Blowing Agent (LBA) to improve polyurethane insulation performance while meeting environmental regulations.

At the same time over the last 10 years, the focus for regulatory authorities and increasingly for customers is on the production of foams with zero Ozone Depletion Potential (ODP) and with ultra-low Global Warming Potential (GWP) blowing agents. Manufacturers face several challenges when considering alternative blowing agents to produce the insulating foam:

- Water-based foams provide less insulation since its initial thermal conductivity is higher and deteriorates at higher degree over time. Operations costs are higher since molds have to be heated in order to guarantee acceptable adhesion to the liner; mixing and processing is more difficult since the polyol has a higher viscosity.
- The transition to pentane needs to take into account the high costs associated with safety equipment to mitigate the flammability risk. A safety operation requires a constant monitoring of the working areas and use of specialized detection equipment and powerful ventilation systems.

- HFCs provide good insulation capabilities thanks to their low thermal conductivity. However, regulations in the European Union will limit their use in the future due to their high global warming potential (GWP).

So when Honeywell introduced its innovative low GWP HFO-based Solstice LBA into the market, it provided an opportunity for polyurethane foam producer Europoliuretani to offer a suitable alternative to reduce energy consumption and provide good environmental properties to its customer and cabinet producer Afinox.

As a first step, Europoliuretani compared the insulation performance of the foam systems made with three different blowing agents: water, HFC and Solstice LBA.

Outcomes

The test programme using Solstice LBA exhibited the following results:

- The insulation made with Solstice LBA used in Afinox equipment offered a 17% improvement in comparison with water based systems
- With Solstice LBA, Afinox equipment delivered 3% energy efficiency gain over HFC-blown foam



Putting Solstice® LBA to the test

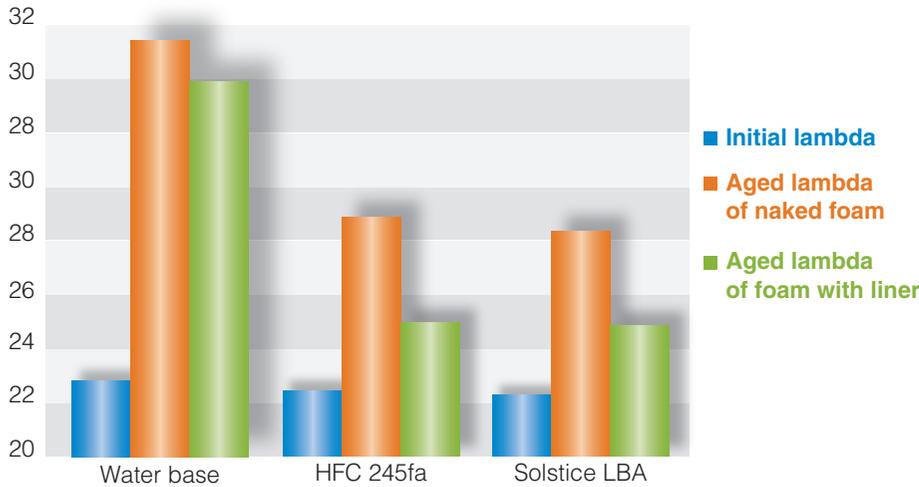
The trial conducted by Europoliuretani and Afinox compared the relative performances of manufacturing a polyurethane panel using a water-based system, an HFC 245fa blown system, and Solstice LBA.

The results of the test were as below:

The panel made with Solstice LBA showed a 17% improvement in lambda over a 180 day period compared to water based foam.

Immediately after obtaining these results, trials were conducted in Afinox to evaluate the actual energy efficiency. Mekano BT 700 cabinets produced with two type of foams were tested side by side.

Cabinets using Solstice LBA were able to maintain a lower temperature than those made with HFC-245fa.



“The use of Honeywell’s Solstice LBA in the foam is helping us improve the energy efficiency of our refrigerators, which is beneficial not only to customers and manufacturers, but to society as a whole.”

Civiero Karim,
R&D Manager, Afinox Srl.

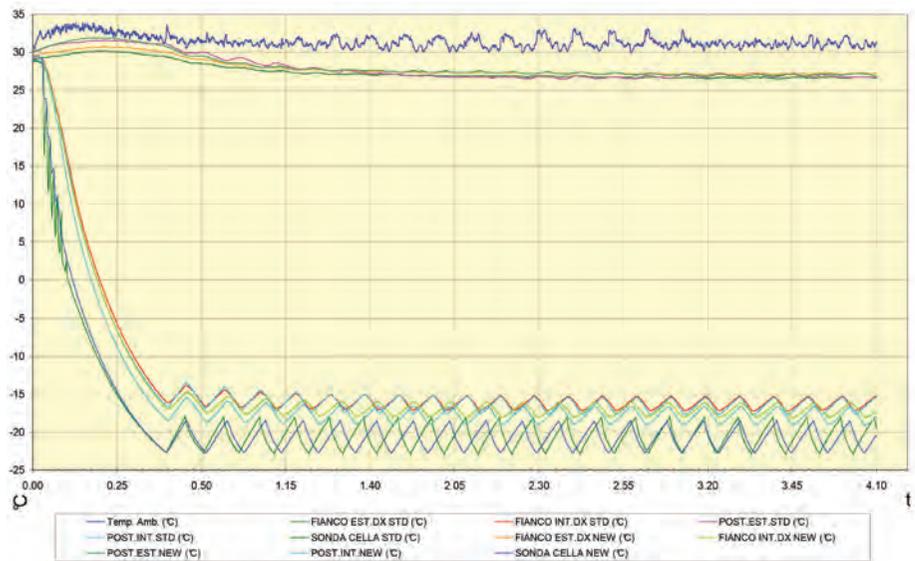


Fig. 1 Maintenance of temperatures in the two refrigerating cabinets

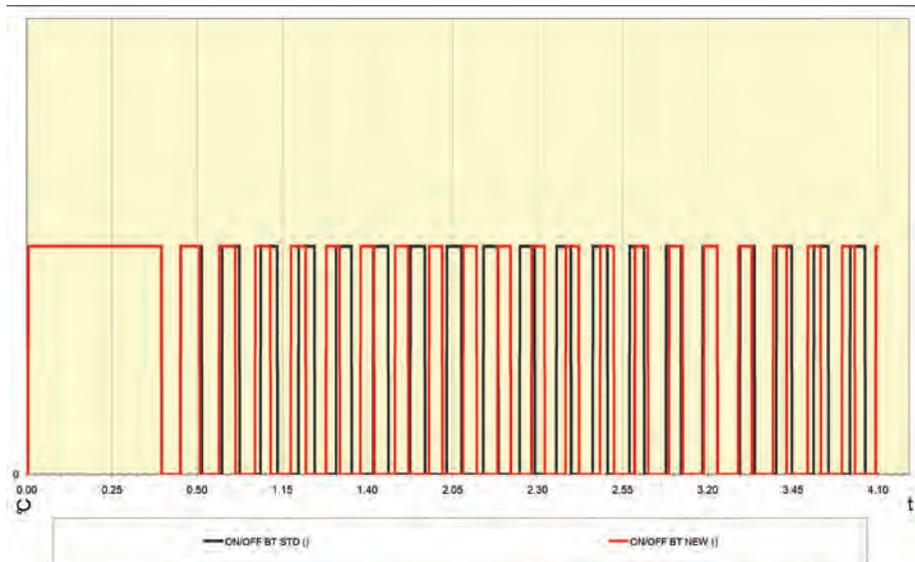


Fig. 2 On/off cycles of the 2 refrigerating cabinets

More than 3% energy efficiency improvement

Since the temperature in the cabinet made with Solstice LBA is always lower thanks to the improved insulation, the compressor needs to run with less frequency compared to the one made with HFC-245fa resulting in lower energy consumption. Further improvement in energy efficiency is expected compared to pentane and water based foams.

Industry-wide Application

Following the test results Afinox srl has substituted completely the HFC-245fa expanded polyurethane foam system with Solstice® LBA. Moreover Europoliuretani has started to promote Solstice LBA as an energy efficient and environmental compliant blowing agent to its customers.

Solstice LBA

Honeywell Solstice Liquid Blowing Agent is the latest advance in blowing agent technology. It has an ultra low global warming potential (GWP) of 1, it is non-flammable, energy-efficient blowing agent for chilled and freezer cabinet applications, and it does not require platform design changes or manufacturing equipment modifications.

It offers up to 10-12% better performance than cyclopentane; 3% better than HFC-245fa (unoptimized), while delivering better energy efficiency at low temperatures. With a GWP of less than 1,

its widespread adoption could save about 60 million metric tonnes per year of CO₂ equivalent, comparable to eliminating carbon dioxide emissions from more than 11.8 million cars every year.*

Solstice LBA will be more cost-effective than other solutions to meet ever-increasing energy standards globally. It is a near drop-in replacement for liquid HCFC, HFC, hydrocarbons and other non-fluorocarbon blowing agents. It does not require costly hydrocarbon storage and handling or risk mitigation equipment. Solstice LBA is non-flammable, unlike hydrocarbon alternatives, which require explosion-proof handling.



References

*(Source: GHG Equivalencies Calculator: <http://www.epa.gov/cleanenergy/energyresources/calculator.html>)

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RESPONSIBLE CARE

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The safety of our employees
The quality of our products
Being responsible stewards for the protection of the environment, the communities in which we operate and our customers

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