

case study



Whirlpool Corporation is committed to delivering energy efficient refrigeration products that embrace innovative solutions focused on eco-friendly technologies and sustainable performance.

“We are investing significantly in our R&D and working globally with our partners to create a sustainable future. HFOs have shown real promise both in terms of environmental impact and in helping us provide end consumers with a strong value and payback proposition.”

David Klein, Vice President – Global Refrigeration

Honeywell



Whirlpool Corporation

Around 55% of Whirlpool's global refrigeration portfolio utilises hydrocarbon-based insulation and refrigerants. That commitment led Whirlpool, one of the world's leaders in refrigeration, to seek out a more eco-friendly replacement for current blowing agents that would improve the energy efficiency and environmental performance of Whirlpool's products. That search led to hydro-fluoro-olefins (HFOs) and Honeywell.

HFOs have the potential to significantly enhance the system energy efficiency of refrigerators while greatly reducing their environmental impact. Working with Honeywell, Whirlpool is developing a new HFO-based Fourth-Generation foam that combines a low GWP (Global Warming Potential) with superior insulating performance (lambda).

Not only will this approach improve Whirlpool's products, but it will also contribute to a lower overall TEWI (Total Effective Warming Impact) at a country level thereby reducing the residential load on current power infrastructure and the associated CO₂ emissions.

HFOs Benefit For Refrigeration

Fourth-Generation HFOs, such as Honeywell's Solstice[®] Liquid Blowing Agent, have the potential to deliver significant environmental and energy-efficiency benefits in the refrigeration sector while maintaining excellent appliance lambda performance (see fig 1).



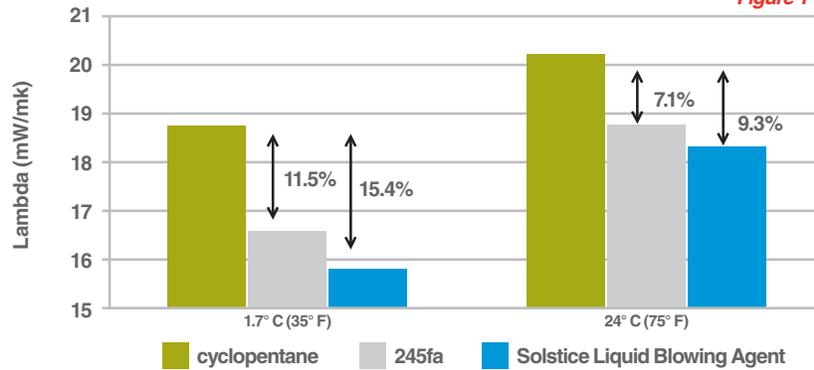
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Lambda Comparison Appliance

Figure 1



In a recent trial undertaken by Whirlpool, household refrigerators and freezers having an internal volume of around 600lt, manufactured using an optimized Solstice Liquid Blowing Agent were shown to have a superior energy performance by an average of 2% vs 245fa and 8-10% vs cyclopentane that provides Whirlpool with another potential solution to meet the global trend of stringent future energy targets while providing the end consumer with the best value proposition possible.

% Energy Efficiency Improvement (refrigerator power consumption)

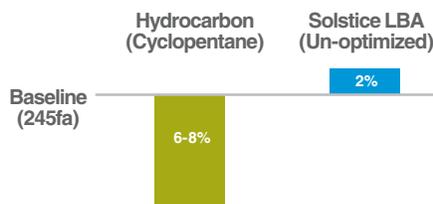


Figure 2

In this time when the need to protect the environment has become a critical mandate, Solstice Liquid Blowing Agent can make an extremely positive impact.

It has a much shorter atmospheric lifetime than HFCs, delivering a GWP of less than 1 resulting in no negative impact on the ozone layer. Toxicity is low, plus it has no flashpoint, no vapour flame limits, is non-flammable (ASTM E-681 test method), and is VOC-exempt.

Solstice Liquid Blowing Agent is also cost-efficient. It offers a near drop-in replacement for liquid HCFC and HFC blowing agents without the need for costly hydrocarbon storage and handling or risk-mitigation equipment.

"Fourth-Generation HFOs enable manufacturers such as Whirlpool Corporation to develop products that deliver superior energy efficiency while meeting consumer demand for performance. These innovations ensure that stringent global energy regulations can be satisfied, based on value-driven solutions that exceed end-user expectations and remain wholly consistent with a low carbon future," says *Warwick Stirling, Senior Director – Global Sustainability, Whirlpool Corporation.*

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December 2013
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