

Honeywell Solstice 1234yf



CUSTOMER INSIGHT:
ASFRI

Cool Technology for a Greener Refrigeration Industry

Honeywell



“Following the main trends in the commercial refrigeration market, ASFRI’s technical collaboration with Honeywell and Cubigel Compressors is delivering product innovation in an era when the use of „green“ refrigerants is a must.”

(ASFRI, Manuel Calzada Forés)



Summary: Drinks Coolers That Cut Emissions

ASFRI is a significant player in the design and manufacture of bottle coolers used in bars, at exhibitions and at special events. The Food & Beverage sector is increasingly focused on reducing emissions associated with refrigerant technology and the company set off a project to assess the performance of a new refrigerant from Honeywell that promises to make a significant contribution to its internal environmental strategy as well as that of its customers.

Honeywell's Solstice 1234yf refrigerant has been developed as a replacement for R134a, and has already proven its effectiveness in several bench tests and field tests in terms of energy efficiency, environmental benefits, safety, performance and ease of adoption.

Solstice 1234yf is based on hydro-fluoro-olefins (HFO) and is a near drop-in replacement for the R134a refrigerant, but with a Global Warming

Potential of just 4 – a figure 99.7% lower than R134a. Moreover, Solstice 1234yf has an atmospheric lifetime of only 11 days, compared to 13 years for R134a and more than 500 years for carbon dioxide. And, unlike HFCs and CFCs, which take decades to decompose, Solstice 1234yf does not persist in the atmosphere.

Working with its compressor technology partner, Cubigel Compressors, ASFRI applied the new Honeywell refrigerant to a representative cooling cabinet to assess the advantages of the new Solstice 1234yf over R134a. The findings concluded that:

- Solstice 1234yf delivers direct emissions reductions of 99.7% over R134a
- Solstice 1234yf emissions performance would result in annual CO₂e reductions equating to 2,852 tonnes, based on a series of 10,000 units
- Solstice 1234yf offers 20% improved cooling capacity over R134a and up to a 33% reduction in power consumption
- HFO offers lower in situ service costs vs. hydrocarbon systems and improves the safety of the contractors during service.

Background: Minimizing Environmental Impact Through Innovation

ASFRI follows a robust strategy when it comes to minimizing its impact on the environment. The company focuses on high quality bottle refrigeration cases manufactured from fiber glass, while delivering a robust sustainability and energy efficiency program.

This business ethos is borne out by its commitment to sustainability through design and manufacture, which includes built-in product lon-

gevity to reduce disposal frequency; 30–40% more lightweight design (against industry standard) to ensure easier, lower cost transportation; fiber glass construction to reduce end-of-life contaminants; and ultra-low maintenance requirements and costs.

In its quest for environmentally-friendly solutions, ASFRI developed a bottle cooler that would use Honeywell's ultra-low GWP refrigerant,

Solstice 1234yf. Proving the validity of each step of the process was critical and so the company involved its compressor technology partner, Cubigel Compressors, to develop a compressor for a beverage chiller application using the new Honeywell material.

Test Results: A Cool Technology with Major Benefits

The studies undertaken by ASFRI tested the performance of Solstice 1234yf as a potential drop-in alternative to R134a. The results confirm the excellent performance of Honeywell Solstice 1234yf using the same refrigerant charge as with R134a, with no system re-design.

Conclusion:

- Solstice 1234yf delivers 20% improved cooling capacity over 134a and the Direct emissions are reduced by 99.7%, the equivalent of 2,852 tonnes of CO₂ annually per every 10,000 units, which is the same as removing almost 550 cars from the road every year¹, or planting 475 trees every year.

- With optimization of system design for Solstice 1234yf, power consumption could be reduced by 33%
- Servicing of units with Solstice 1234yf is cheaper (faster and in situ) than hydrocarbon systems (which legislation in some countries requires be repaired/maintained in a certified location because of risk of explosion).

¹ Factor recommended by EPA (Environmental Protection Agency from the US) for CO₂ only estimate for all passenger vehicles (<http://ec.europa.eu/clima/sites/campaign/pdf/ppt3-notes-en.pdf>), source for 6kg/year of CO₂ per tree planted.

Total Direct Emissions Reduction²

	GWP	Charge (kg)	Leak rate	Tonnes CO ₂ e/unit/year	10,000 units/year
134a	1430	0.2	20% per year	0.286	
Solstice 1234yf	4	0.2	20% per year	0.001	
Difference				0.285	2,852*
%				99.72%	570**

* Tonnes CO₂e bank reduction only for Asfri for the prototype model series

** Tonnes CO₂e direct emissions reduction only for Asfri for the prototype model series

² The CO₂ savings is equivalent to removing 547 cars from roads every year or planting 2,082 trees.

Total Estimated Market Emissions Reduction (annual tonnes CO₂e)³

	GWP	Charge (kg) (sector average)	Renewal rate (internal estimate)	Tonnes CO ₂ e	Bank ⁴ volume (units)	New/year
134a	1430	0.4	10%	0.572	1,898,000	189,800
Solstice 1234yf	4	0.4	10%	0.002	1,082,619*	
Difference				0.570	216,524**	10,826**
%				99.72%		

* Tonnes CO₂e bank reduction Europe

** Tonnes CO₂e direct emissions reduction Europe

³ The CO₂ savings is equivalent to removing 2,082 cars from the road or planting more than 1.8 million of trees.

⁴ internal estimate

Sector Perspective: The Eco-Friendly Solution for Compressor Systems

There is growing Food & Beverage market demand for the use of environmentally friendly solutions in commercial refrigeration applications – energy efficiency and low carbon emissions are already major drivers in this sector...and this trend is set to continue into the foreseeable future.

The ASFRI cooler certainly made a big impression when it debuted at the Chillventa exhibition in Germany in 2010 and at Climatización in Spain in

2011 – particularly as Honeywell used the cooler to prove the effectiveness of Solstice 1234yf by serving chilled drinks to visitors on its booth.

New regulations are on the horizon and manufacturers will increasingly look to solutions such as Honeywell's new Solstice 1234yf refrigerant, which is proving its credentials as a drop-in replacement for R134a in industrial and commercial settings. The new platform is a technology based on

hydro-fluoro-olefins (HFO), with a GWP of just 4 – a figure 99.7% lower than R134a and compliant with incoming emissions regulations.

Solstice 1234yf has an atmospheric lifetime of only 11 days, compared to 13 years for R134a and more than 500 years for carbon dioxide. And, unlike HFCs and CFCs, which take decades to decompose, Solstice 1234yf does not persist in the atmosphere.

For further information on Honeywell Solstice 1234yf visit www.1234facts.com

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