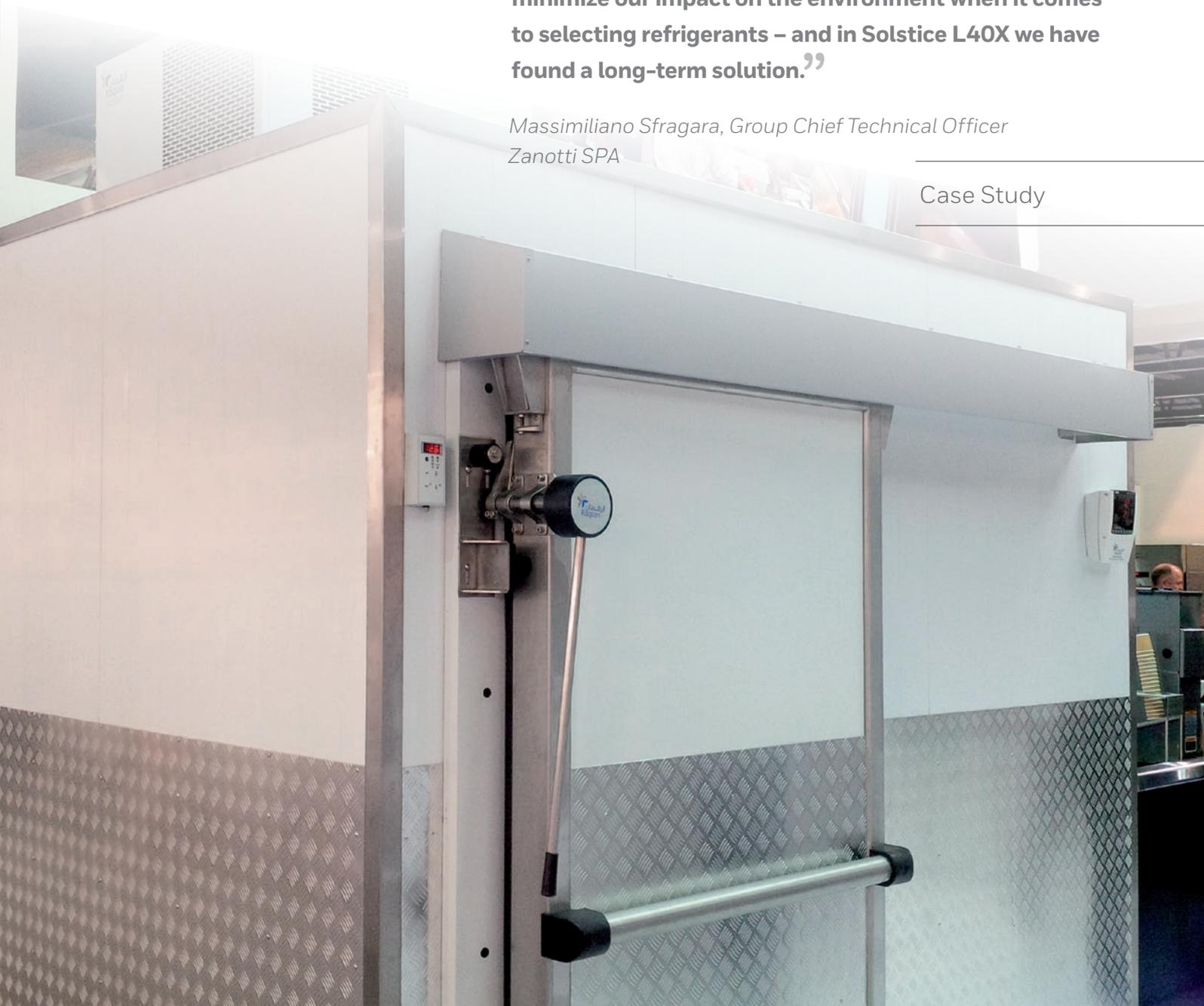


Zanotti Confirms Solstice® L40X (R-455A) Ideal for Monoblock Cooling Systems

“Zanotti has a proud tradition of technical innovation and research, and we set ourselves the highest quality standards in meeting the needs of our customers around the world. Increasingly, this means making choices that minimize our impact on the environment when it comes to selecting refrigerants – and in Solstice L40X we have found a long-term solution.”

*Massimiliano Sfragara, Group Chief Technical Officer
Zanotti SPA*

Case Study



Zanotti is a leading manufacturer of refrigeration systems for commercial, industrial and transport applications. The company is headquartered in northern Italy, with production facilities in the UK and Spain, and is committed to minimising its impact on the environment through low global warming potential (GWP) solutions. As a result, Zanotti works with CO₂, propane and ammonia, but is aware that these are not suitable for every application. The company is constantly looking for innovations in low GWP refrigerants, particularly with the scheduled phaseout of R-404A, as required by the F-Gas regulation. So when Honeywell's Solstice® L40X (R-455A) came to its attention, Zanotti embarked on a test programme to assess the refrigerant as a potential replacement for R-404A in its range of monoblock cooling systems.

Zanotti's 'plug and play' monoblock range is ideally suited to any kind of cold room for low- and medium-temperature, and is particularly effective in controlling temperature and humidity in wine cellars. Mindful of the necessity to further develop their systems for use with refrigerants showing lowest-possible GWP, Zanotti found in Solstice L40X (R-455A) an optimal solution for these applications.

The Needs

In considering the replacement for R-404A, Zanotti established the following key criteria:

- Identify a low GWP refrigerant to replace R-404A in support of its corporate values focused on minimising environmental impact
- Find a solution compatible with current compressor technology
- Fully assess the flammability and safety risks associated with 'worst case' component failures or incorrect handling
- Ensure equivalent system capacity, energy efficiency and performance without the need for any fundamental design change
- Confirm the replacement refrigerant as a long-term, F-Gas-compliant solution, with the potential to extend into other temperature ranges and applications



Zanotti GM series

The Test Programme

Zanotti undertook some initial research and then launched a series of carefully controlled tests to assess the viability of Solstice L40X as a low GWP solution for the monoblock range.

First, Zanotti benchmarked the performance of the monoblock running R-404A to enable detailed comparison. Then, following minor optimisation, they conducted a series of tests focused on safety and performance.

Test 1: No Evidence of Fractionation

- The first test assessed the impact of leakage on refrigerant performance. Zanotti induced a 50% refrigerant leakage during the 'standstill' phase and then recharged the system with Solstice L40X to check for any change in performance. The change in cooling capacity was negligible.

Test 2: No Evidence of Ignition

- This test assessed risk of flammability. They deliberately created a 'triple failure' scenario, replicating the effect of broken fans, faulty safety switch and a refrigerant leak. Once the surface temperature of the unit's heating elements had reached 370 °C, they induced a deliberate Solstice L40X leak. There was no evidence of ignition.

Test 3: Comparable Performance

- Zanotti ran a series of operational tests in controlled conditions (ambient temperature +35 °C, cold room +5 °C). The outcomes showed comparable cooling capacity and EER between Solstice L40X and R-404A, with the exact same refrigerant charge (460g).



Zanotti's monoblock designed for wine cellars

The Benefits

The tests demonstrated equivalent performance between Solstice L40X and R-404A, with only minor, low cost adjustments.

Solstice L40X:

- Presents a very low flammability risk
- Is a long-term refrigerant solution for Zanotti's monoblock range
- Is compatible with current compressor technology
- Matches the cooling capacity and COP of R-404A with the same refrigerant charge
- Provides Zanotti with an F-Gas-compliant (GWP<150) solution and the potential for a significantly decreased Total Equivalent Warming Impact (TEWI) in line with the company's environmental values

Zanotti – Looking to the future

As a result of successful testing of L40X, Zanotti is considering the introduction of the refrigerant into their medium temperature monoblock systems and investigating opportunities in low-temperature applications as well as in transportation refrigeration.

The Solstice L40X advantage

Solstice L40X (R-455A) is a zeotropic blend refrigerant which is designed for low-, medium- and high-temperature applications in new systems. Its low GWP of only 146 makes it an F-Gas-ready solution. It also provides a close capacity match to R-404A and, compared to a propane (R-290) refrigerant, extends the capacity by 20 %, improves energy efficiency and offers a similar COP. It also presents a lower flammability risk than R-290 (A3).

Solstice L40X delivers excellent cooling performance in low-temperature applications and can be used across many segments of the HVACR industry. These include plug-in type cabinets, condensing units, waterloop systems and monoblocks for cold rooms and freezer rooms, heat pumps, and chillers.



Solstice L40X (R-455A)



Example of installation of Zanotti's monoblocks (rental cold rooms)

For more information

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