

Chateau de Bourscheid, An Historic Setting for Spray Foam Innovation

“Synthesia believes in innovation that helps us develop sustainable products. Our new spray foam, using the environmentally-friendly Solstice® Liquid Blowing Agent, means we are one of the first companies in Europe to embrace this technology, and the market is very enthusiastic about it.”

*Sergio Balcells Sanahuja, General Manager
Synthesia International*

Case Study



The performance benefits of Honeywell's Solstice® Liquid Blowing Agent (LBA) were proven during an insulation project at the historic Chateau de Bourscheid in Luxembourg. The chateau, which dates from medieval times, is situated majestically some 150 m above the River Sûre, enclosed by a circular wall with 11 watchtowers. Over the years, the chateau has been extended but to prevent it falling into disrepair it was acquired by the State in 1972, when it was the subject of a restoration program prior to opening to visitors.

The latest development involved conversion of an annex for public events, such as wedding receptions, which, in contrast to the chateau's considerable age, required a very modern solution for insulating the floor, in line with strict environmental regulations in place in Luxembourg. Hydrofluorocarbons (HFCs) have been banned in the country since 2017, six years ahead of the mandated prohibition under F-Gas Regulations. Following close collaboration with Honeywell, Synthesia International, a leading manufacturer of chemicals, polyesters and polyurethane systems for thermal insulation, soundproofing, and various industrial applications, selected the 4th generation Solstice LBA, a hydrofluoroolefin (HFO), for its new F-Gas compliant Poliuretano Spray S-383-HFO system.

This new technology was put to the test when Thermilux, a Synthesia contractor, was commissioned to undertake the insulation work at the chateau.

The Needs

Synthesia is strongly committed to in-house research and development, and successfully marketed its own closed-cell thermal insulation spray foam system for a number of years. However, when the F-Gas regulation mandated a ban on HFC blowing agents from 2023 onwards – along with an interim quota reduction system – Synthesia started work to develop a regulatory compliant alternative.

- Synthesia required a replacement for the 245fa and 365/227 HFC blowing agent blend used in its previous polyurethane closed-cell spray foam (ccSPF) system to maintain its competitive position in advance of new F-Gas Regulation in 2023
- The replacement blowing agent would need to be F-Gas compliant with ultra-low global warming potential (GWP) while delivering equivalent thermal and application performance to HFC blown systems
- The new ccSPF system should also contribute to Synthesia's mission, notably to help the company to meet its published corporate commitments regarding sustainability and environmental impact

The Solution

Honeywell worked closely with Synthesia to develop the new ultra-low GWP polyurethane spray system, particularly in formulating with the right catalysts in the polyol for different applications like walls, roofs and floors. Solstice LBA, when combined with the right catalysts, demonstrated excellent results across key metrics such as lambda value, compression set, surface flatness, dimensional stability, density distribution, reaction time and ease of use.

Satisfying these criteria positioned Solstice LBA as a long-term solution without any need for additional capital investment in equipment by contractors using the Synthesia system.

The Benefits

- Synthesia's new ccSPF system benefits from Solstice LBA's ultra-low GWP and non-ODP while providing thermal insulation performance, dimensional stability, and compression resistance equivalent to the previous HFC system, all without any need for spray equipment adaptation.
- Enabled Synthesia to bring to market an ultra-low GWP HFO closed-cell spray foam insulation system
 - Has a GWP of 1, which is 99.9 % lower than the HFC blowing agents it replaces (typically HFC-245fa and HFC-365mfc blends)
 - Non-ozone-depleting
 - Is non-flammable
 - Possesses excellent process capabilities, narrow density variation, and good adhesion capability
 - In combination with the right catalysts, demonstrated excellent performance against key criteria
 - Has a comparable total cost of ownership to previous systems

Thermilux Completes Historic Assignment using Synthesia's Solstice LBA system

Thermilux, a contractor based in Bastogne in Belgium, sprayed the Synthesia system.

The project required a 130 mm thick insulation layer to be sprayed on the concrete floor of the space in the medieval castle, followed by a layer of mortar and a final covering of tiles or wood parquet. The room will be used for public events, such as wedding receptions.

In all, 600 m² of foam was applied. The two components – polyol and isocyanate – were preheated to 30 °C at a mix pressure of 80–100 bar and sprayed at a density of 40kgm³ to achieve a compression value of 230kpa.

Project Outcomes:

- The core technical criteria covering compression set, surface flatness and dimensional stability were met
- Performance of the HFO spray foam was equivalent to HFC for reaction time, density distribution and lambda values
- The HFO-based foam delivered the same performance in the field as in controlled factory conditions
- Solstice LBA in combination with the right catalysts, was shown to be a suitable replacement for HFC blowing agents, with no equipment modification required

Thermilux has gained a reputation for technical excellence and exceptional customer service through its expertise in thermal and acoustic insulation, and has completed a number of high profile projects in public buildings and residential developments in Belgium and Luxembourg.

The company offers its customers with latest industry innovations in materials and processes, providing its experienced technicians with state-of-the-art equipment to deliver results guaranteed to align with regulatory standards.



“In this instance, the use of the Honeywell Solstice Liquid Blowing Agent ensured our spray foam technology not only satisfied the strict regulatory environment in Luxembourg, but also delivered thermal performance for our contractor partners Thermilux that was equivalent to our predecessor HFC-based system.”

*Frederic Chiffolleau,
Sales Manager North France, Belgium and
Luxembourg
Synthesia Internacional sl*

“This successful test underlines the potential for the Synthesia product in flooring insulation and in external, internal and cavity walls for both new and renovation projects. Thermilux will shortly start work on insulating 2000 m² of low budget housing in Luxembourg using the HFO Synthesia system.”

*Pol Beaujean,
Administrateur Délégué
Thermilux SA*



The Solstice LBA Advantage

- Honeywell Solstice Liquid Blowing Agent is the latest advance in blowing agent technology. It is an ultra-low GWP, energy-efficient blowing agent ideally suited to spray foam systems without any need for equipment modification.
- Solstice LBA is non-flammable, exhibits no flashpoint or vapor flame limits, and has no limitation on hazards classification. It does not require expensive hydrocarbon storage and handling or risk mitigation equipment.
- When substituted for HFC-245fa and HFC-365mfc, the use of Solstice LBA can yield substantial improvements in the environmental impact of foam blowing agents. With a GWP equal to 1, its widespread adoption could save about 60 million metric tons per year of CO₂ equivalent, comparable to eliminating carbon dioxide emissions from more than 11.8 million cars every year*.

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



Solstice Liquid Blowing Agent (LBA)

For more information

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