



SIKA AT WORK

FRUIT PACKAGING HOUSE FOR FRUTINTER COMPANY, ONDA, CASTELLÓN, SPAIN

SUSTAINABLE ROOFING SOLUTION

BUILDING TRUST



SIKA ROOFING SOLUTIONS

Sustainable solutions measured by Life Cycle Assessment (LCA)

PROJECT DESCRIPTION

A newly built fruit packing house in Onda (Castellón), Spain, required a roof waterproofing system to protect its 11,000 m² roof. The owner, Frutinter Company, was looking for a long lasting and high quality roofing system.

PROJECT REQUIREMENT

A guarantee of good performance was required, as well as a system that could accommodate the installation of a photovoltaic system for self-consumption. The designers, Grupotec, needed a reliable, complete system and a trusted roofing partner. Sika convinced the customer to choose a high performance thermoplastic roofing solution to fulfil the customer's requirements from a technical, economic and environmental point of view.

SIKA'S SUSTAINABLE APPROACH

The specified Sika Roofing system includes a beige coloured waterproofing membrane and was approved by the customer for its proven high technical performance, as well as being a solution that fulfilled their price expectations. In warm climates like Spain it is known that white, highly reflective roofing membranes are able to reduce heat absorption and reduce both the cooling energy consumption of buildings and the energy costs. Therefore, Sika proposed an alternative cost-effective solution not only considering the initial construction costs, but also taking into account the potential savings in terms of Energy and Carbon Footprint that the installation of a high reflective roofing membrane provides. To differentiate from black coloured bituminous solutions, which are typically applied in Spain, and to convince the customer about the additional benefits of highly reflective thermoplastic cool roofs, Sika's Global Product Sustainability Group performed a Life Cycle Assessment (LCA) of three roofing solutions with similar performance:

- Specified Sika system build-up with beige membrane (SRI: 78%) = specified solution
- Same system build-up with black membrane (e.g. bituminous solution) = benchmark
- Same system build-up with highly reflective membrane (SRI: 111%) = potential solution

TECHNICAL SOLUTION

Substrate: Trapezoidal steel deck
Waterproofing: Sarnafil® TS 77-18 SR White
Insulation: PIR 40 mm (Rd = 2.2 (m²*K/W)), two panels
Fasteners: Sarnafast® SF 4.8 x 80 and Washer Sarnafast® KT 82 x 40

RESULTS OF THE LCA FOR THE PROJECT

Using light coloured reflective membranes can help reduce energy consumption by avoiding the need to heat or cool a building. Taking this into account, the estimated potential energy and CO₂ savings as a result of the installation of the white and beige membrane over a black roof are calculated to determine the energy and carbon break-even point of the roofing system.



¹ Cradle to Grave: potential environmental impacts from raw material extraction, manufacturing, application and use to final disposal at the end-of-life (incineration of all components).

Thus, for the total surface area of the project, 11,000 m², the results for a beige Sarnafil® TS 77-18 and white Sarnafil® TS 77-18 SR roofing system demonstrate that both thermo-plastic membranes bring significant savings compared to a system with a black roof membrane. The estimated potential savings surpass the energy and carbon impacts related to cradle to grave of the roofing system in less than five years¹. In addition, it is estimated that with the white membrane almost 8000 GJ of cooling/heating energy could additionally be saved compared with the beige membrane in a period of 20 years. On average this represents an estimation of potential savings of 110 MWh/year, which could be translated into a potential reduction of cooling and heating costs depending on the local energy costs.

Comparing the results of the Sika membranes in terms of GWP, an additional reduction potential of 595 tonnes CO₂-eq from the white membrane could be estimated when compared with the beige membrane over a period of 20 years. On average this represents a reduction of 30 tonnes kg CO₂- eq/year (based on Spanish electricity grid mix).

CONCLUSIONS

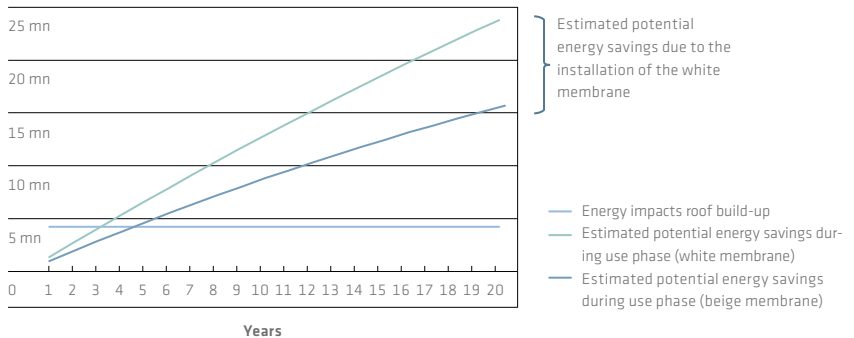
Thanks to an LCA it is possible to evaluate the systems' potential environmental impacts over the entire life cycle and thus select a cost-effective solution not only considering the initial construction costs, but also taking into account the potential savings in terms of Energy and Carbon Footprint that the installation of a white membrane provides.

And so the results of the evaluation were decisive for the customer, who chose to install the high solar reflective white membrane over the beige one, based on the reduction of the overall environmental performance, and therefore the reduced costs (economic and environmental) in the long run.

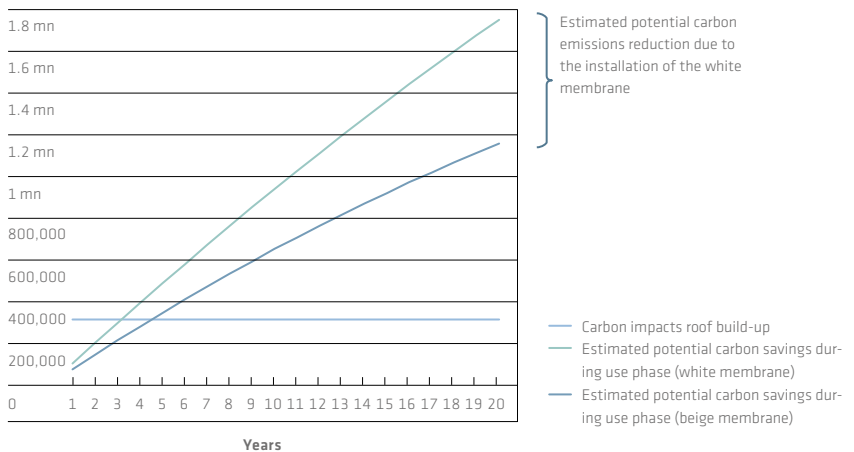
The project allowed Sika to demonstrate its competence and expertise in sustainability, including all relevant quantitative contributions to a sustainable high performance tailor-made roofing solution to fulfill the customer requirements from a technical, economic and environmental point of view.



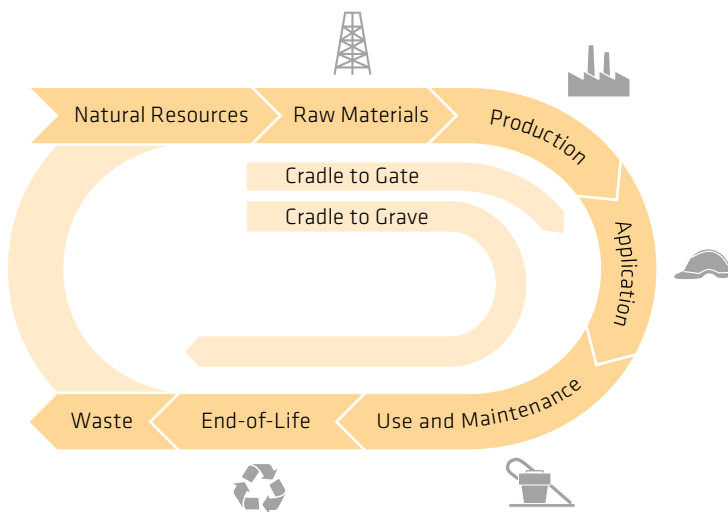
Break even energy impacts Frutinter Roof System: Cumulative Energy Demand (CED) [MJ/11,000 m²]



Break even carbon impacts Frutinter Roof System: Global Warming Potential (GWP) [kg CO₂-eq./11,000m²]



THE SIKA LIFE CYCLE ASSESSMENT (LCA) APPROACH



LCA is a standardized method to assess and compare the inputs, outputs and potential environmental impacts of products and services over their life cycle. LCA's are increasingly recognized as the best way to evaluate the sustainability performance of products and systems.

The LCA can greatly assist our customers in evaluating Sika's products and systems namely by providing quantitative data on their environmental profile. This enables the differentiation of products that may have similar performance, but greater differences concerning their environmental impact – where obviously the lower, the better.

Sika carries out LCA's according to the ISO 14040 series and the Standard EN 15804. The impact assessment methodology used is CML 2001. The LCA results are shown for the following two relevant impact categories deemed as most relevant for roofing systems:

- Global Warming Potential (GWP) [kg CO₂-eq.] ("Carbon Footprint") – is the potential contribution to climate change due to greenhouse gases emissions
- Primary energy [MJ] ("Energy Footprint") – is the total amount of primary energy from renewable and non-renewable resources

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



SIKA SERVICES AG
Tueffenwies 16
CH-8048 Zurich
Switzerland

Contact
Phone +41 58 436 75 78
www.sika.com

