

SIKA CONTRIBUTION TO SUSTAINABLE CONSTRUCTION

SEALING SUSTAINABILITY IN THE BUILDING ENVELOPE

THE IMPORTANCE OF JOINT SEALANTS

Even though sealants represent a small part of a construction, they are of the uttermost importance for the function and durability of the building envelope. Thanks to joint sealing, the passage of media can be prevented (like air, water, chemicals or smoke). It also provides thermal and sound insulation, and helps enhance the visual appearance of the whole construction. The tightness of buildings is of great significance in order to achieve low energy ratings.

Without proper joint sealing it would be impossible to insulate a building sufficiently. Sika's range of elastic joint sealants can accommodate thermal and structural movements without breaking or losing the adhesion to the adjacent building elements. SikaHyflex®, Sikaflex® and Sikasil® elastic joint sealants are high-performance products that provide the necessary tightness under any environmental and load conditions.

CASE STUDY

To illustrate and to prove how important sealants are to tight-en building envelopes, measurements were performed on a real case study. Calculations were conducted by the University of Applied Science for Architecture Wood and Construction in Biel, Switzerland to determine the contribution of Sika's sealant and adhesive technologies to the energy saving potential of the building.

The case study is based on a single family house near Biel, Switzerland, 1020 meter above sea level. The construction of the basement is made of concrete and the floors above are a wood frame construction. The entire building envelope is insulated with exterior isolation and the window area is 32 m².

To compare the environmental impacts with the benefits these products bring in the use phase of the building, the Cumulative Energy Demand (CED) and the Global Warming Potential (GWP) were analysed:

- CED accounts for the consumption of energy resources, namely the primary energy from renewable and non-renewable resources [MJ].
- GWP measures the potential contribution to Climate Change, focusing on emissions of greenhouse gases, such as carbon dioxide [kg CO₂ -eg.].



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CARBON AND ENERGY IMPACTS FROM SEALING

A Life Cycle Assessment (LCA) was made of the Sika products applied, to quantify their environmental impacts. The LCA is from cradle to gate, which means it investigates the potential environmental impacts from raw material acquisition and processing to manufacturing of the product, including packaging. The environmental impacts of the total amount of products used in the case study were for connection joints: 31 kg and for window manufacturing: 4 kg. For the 35 kg of products used, the environmental impacts are as follows:

- Cumulative Energy Demand (average) = 2.3 GJ
- Global Warming Potential (average) = 91 kg CO₂-eg.

CARBON AND ENERGY SAVINGS FROM SEALING

The Calculations by the University determined manifold contribution of Sika's sealant and adhesive technologies to the energy saving potential of the building.

- Larger Windows: Due to innovative bonding technologies for window manufacturing, larger windows (allowing more daylight) with smaller frames and better insulation properties are possible. This yields 2.4 GJ savings per year.

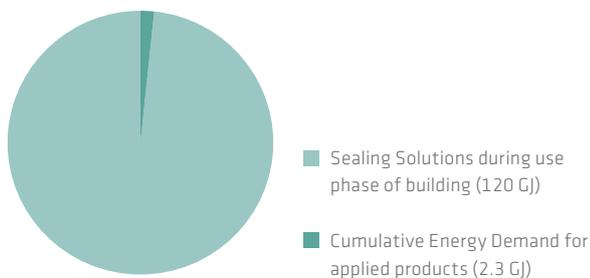
- No Air Exchange: Sealants ensure a tight building envelope and prevent energy loss through air exchange. This yields 2.6 GJ savings per year.
- No Wet Insulation: Sealants ensure a tight building envelope and prevent energy loss through wet insulation. This yields 1 GJ savings per year.

For the building in question, the energy saving potential through Sika solutions per year amounts to 6 GJ/year. Considering a life expectancy of 20 years for the window and the installation materials, the use phase gains amount to 120 GJ. This means savings of about **3,300 liters heating oil** and nearly **9 tons CO₂**.

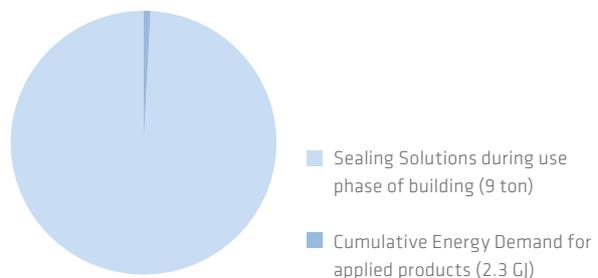
ONE SMALL DROP OF SEALANT, ONE LARGE DROP IN THE ENERGY BILL

The gains of the applied products are obvious, showing the impacts of the products are negligible compared to the energy saving for a 20 year lifespan.

Energy savings through Sika



Carbon savings through Sika



THE OVERALL NET SAVINGS ARE 50 TIMES (ENERGY) AND 96 TIMES (CO₂) THE IMPACT VALUES.

CONCLUSIONS

Tight building envelope saves resources and increases the quality of living. Sika is dedicated to sustainable development and takes responsibility to provide sustainable solutions in order to improve material, water and energy efficiency in construction and industry.

The project allows Sika to demonstrate its competence and expertise in sustainability, including all relevant quantitative contributions to a sustainable construction. The value created by far outweighs the impacts associated with production, dis-

tribution and use. Sika is committed to measure, improve and communicate sustainable value creation. "More Value - Less Impact" refers to the company's life cycle approach and commitment to maximize the value of its solutions to all stakeholders while reducing resource consumption and impacts on the environment.

To learn more about Sika's Sustainable Solutions, please consult www.sika.com/sustainability

For further information please contact:

Mark Schneider, Head Global Product Sustainability, product.sustainability@ch.sika.com