PRESS RELEASE

14-01-53

dated 15 January 2014

Vacuum Insulation Panels (VIP) – “stress test” passed

Research report demonstrates the suitability of use of VIPs

Since the subjects of energy conservation and reducing CO_2 emissions are gaining in importance, ift Rosenheim has been examining and analysing the durability of energy-conserving Vacuum Insulation Panels (VIP). The “stress test” of the VIPs turned out to be favourable overall; however, the impact of alkaline moisture or thermal stresses may cause damage to the heat-sealed joints. The research project has been conducted with FIW Munich and sponsored by the German Institute for Building Technology (DIBt). The industry partners va-Q-tec AG and Variotec GmbH & Co. KG supported the project.

Apart from the popular insulating materials, so-called vacuum insulation panels have been developed in the last few years. Compared to conventional insulating materials, they have better values of thermal conductivity by a factor of 6-10. The impact of adjacent materials on the durability of VIPs has not yet been analysed. In particular, the chemical stresses resulting from adhesives, plasters and materials containing concrete may cause reduction in the gas leakage rate of the film. Hence, the aim of the research project was to assess the durability of the film sheathing as well as the thermal impact of bonded top layers.

ift research report "Durability of Vacuum Insulation Panels"

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To begin with, the films and adhesives used with the VIPs, the materials possibly coming into contact with them as well as other stresses and boundary conditions were analysed. The focus of the tests was on the observation of the gas permeation rates as well as the mechanical tests on the films, with the help of which the vacuum is maintained. For the purpose of analysis, the impact of cured or uncured adhesives, of washed-out salts from the substrate as well as of stresses caused by thermal expansion of the substrate was observed, just as they also occur in customary building applications. The assessment determined the impact on changes of the “gas leakage rate”.

With a storage period of 21 weeks at a temperature of 70 °C, test specimens with adhesives applied were aged artificially. There was no significant influence of cured adhesive layers on the sheathing film of the VIPs.

The contact of the VIPs with uncured adhesives was analysed in another test, since alkaline adhesives allow the aluminium coating to corrode and may lead to gas-permeability of the film sheathing. No signs of damage to the film sheathing could be established in short-term tests by moist alkaline adhesives; however, damage to the heat-sealed joint cannot be ruled out in the case of long-term impact. Hence, it is advisable to avoid long-term exposure of alkaline moisture to the heat-sealed joints.

Another test analysed the effect caused by alkaline solutions, which come into contact with the VIPs at the time of washing out salts from the masonry. For this purpose, test specimens moistened with diluted soda lye were inspected visually and tensile strength tests were conducted on the heat-sealed joints. Here, too, damage to the heat-sealed joints by alkaline moisture cannot be ruled out, and hence, long-term effect must be avoided.

Finally, the impact of alternating thermal and mechanical stresses on the panels was analysed. To simulate thermal

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expansion of the substrate, the VIPs were exposed to the stress of cyclic temperature change. In the process, there was no significant impact of the temperature-related alternating mechanical stresses on the VIPs.

The final report of the research project “Durability of Vacuum Insulation Panels” contains numerous graphical displays and tables spread across 74 pages, and may be ordered online from our **ift** Rosenheim website (Literature Shop; German only)

(3.676 characters incl. spaces, lead 553 characters)

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Selected graphics (are available in our graphics archive. To download, please visit www.ift-rosenheim.de/presse_bildarchiv.php)

No.	Legend and file name	Image
1	**ift** Research report "Durability of Vacuum Insulation Panels" *File name:* PI140153_Fig_01_Cover_ift_Research_report_VIP.jpg Source: **ift** Rosenheim	

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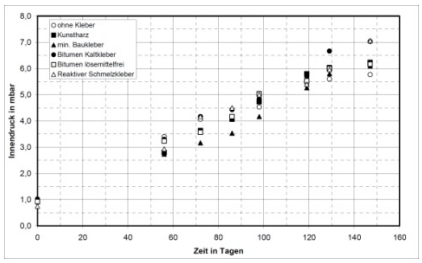
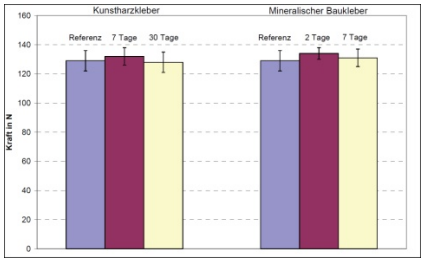
No.	Legend and file name	Image
2	Coated panel before testing *File name:* PI140153_Fig_02_Coated_panel_before_testing.jpg Source: **ift** Rosenheim	
3	Time-dependent internal gas pressure after coating with different adhesives, test specimen 200 mm x 200 mm x 10 mm *File name:* PI140153_Fig_03_time_dependent_internal_gas_pressure.jpg Source: **ift** Rosenheim	
4	Tensile strength of the seal edge after the impact of moist adhesives *File name:* PI140153_Fig_04_Tensile_strength_of_seal_edge.jpg Source: **ift** Rosenheim	

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