

Data detectives in double-glazed windows



Double-glazed windows have to withstand everything from baking sunlight to icy winds and biting cold. And it's not just the temperature fluctuations themselves they have to cope with, but also the resulting changes in pressure between the two panes of glass. The glass panels bow outwards or inwards as temperatures rise and fall, and this exerts forces that can lead to tiny cracks forming at the edge of the panes. Such cracks are barely visible to the naked eye, but are large enough for the insulating gas to escape, which results in the windows losing their insulating properties.



Now window manufacturers will be able to use special measuring instruments called data loggers to measure the temperatures and pressures within the windows, thereby helping them to optimize their production processes and product designs. Developed by researchers from the Fraunhofer Institute for Microelectronic Circuits and Systems IMS in Duisburg, these sensors are only a few millimeters wide, meaning they fit in the narrow space between the panes of glass. Staff at Technische Universität Darmstadt's testing facility fitted the data loggers inside 40 different double-glazed windows and placed these in a climate chamber. Over a period of 12 weeks, the windows are subjected to temperatures ranging from -18 and +53 degrees Celsius. The sensors take pressure and temperature readings throughout this period of time, transmitting the data to an outside receiver as well as storing it in their own integrated memory. In this way the sensors are helping to make double-glazed windows that are even more airtight.

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