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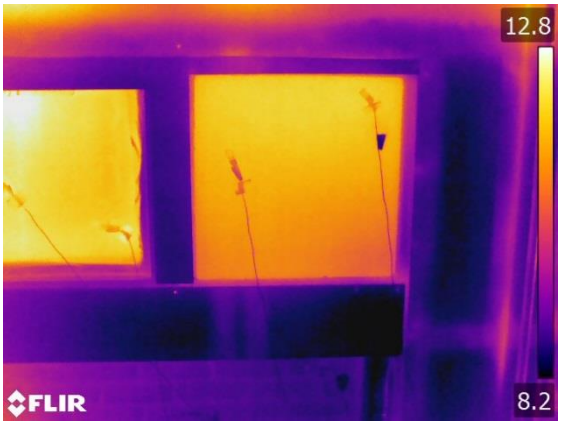
Climate chamber: application examples

Infrared thermography on test samples within a base panel

The opening between the indoor and outdoor climate room of the climate chamber, measures 1,7 by 1,7m. During several research and student projects, smaller test samples were used. An insulated base panel was thus constructed to be placed between outdoor and indoor climate room (cfr. left picture), which can hold three smaller samples: one of 60 x 100cm; two of 50 x 50 cm.

The base panel was first used in the context of a master thesis. The students investigated the influence of weather parameters on the accuracy of infrared thermography for building envelopes (cfr. right picture). By controlling the climate chamber installations, infrared thermography as a technique for assessing surface temperatures, could be evaluated under the worst-case-scenario weather conditions.



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Air tightness assessment in the climate chamber

The climate chamber is equipped with a pressure blower device, which can create an air pressure difference between the indoor and outdoor climate room of maximum 100 Pa. The standard pressure difference for air infiltration rate tests in buildings (which equals 50 Pa) can thus be simulated.

Students at the Faculty of Applied Engineering of the University of Antwerp, used this equipment to test the air tightness of construction details. The construction details were built within boxes of 50 x 50 cm. These boxes are part of a base panel (cfr. left picture) which is placed inside the movable intermediate part.
Three construction set-ups are tested: a plain wall section, a window-to-wall connection and a pitched roof cornice (cfr. right picture). For all setups, an insulated as well as uninsulated version were built.
The air tightness is tested under pressure pulses generated by the pressure blower device. Air leakages are revealed by using a fog generator and complemented by manual air velocity measurements with a hot-wire anemometer.

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Using weather data as test conditions

The climate chamber installations are controlled via dedicated lab software. In this software, it is possible to design dynamic profiles of test conditions which can then be programmed to run overnight, in cycles, etc.

Using weather data as input for the test conditions, can illustrate this principle. The indoor climate room is kept stable at a temperature of 20°C and a relative humidity of 60%. The temperature and relative humidity in the outdoor climate chamber are subjected to variations to simulate a cold winter day and a warm summer day. The input is based on weather data for Uccle, Brussels. The graph shows the (limited) difference between input data and measured conditions.