

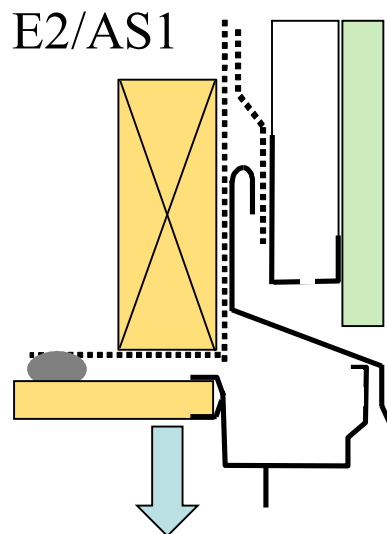
The background image shows a building under construction. The upper part of the building is a wooden frame with a gabled roof. The lower part is a concrete wall. A large red arrow points from the left towards the right, passing behind the title text.

Towards performance based joints

Mark Bassett, BRANZ



Joints beyond E2/AS1



Joint properties

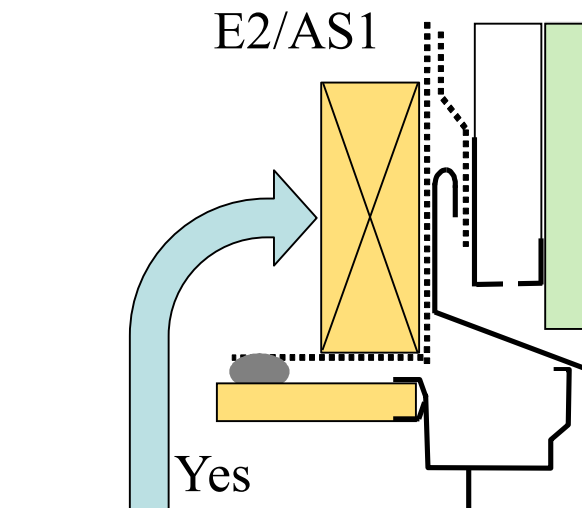
Weather data

Wind pressures
Rain load

Leakage rate

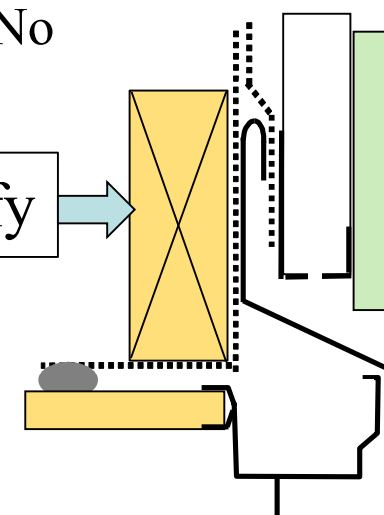
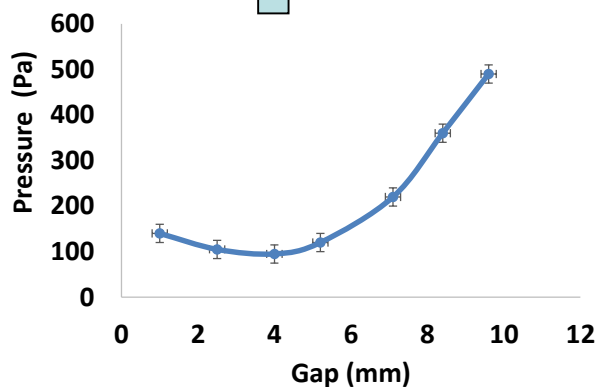
Runoff rate

Building design



Ok

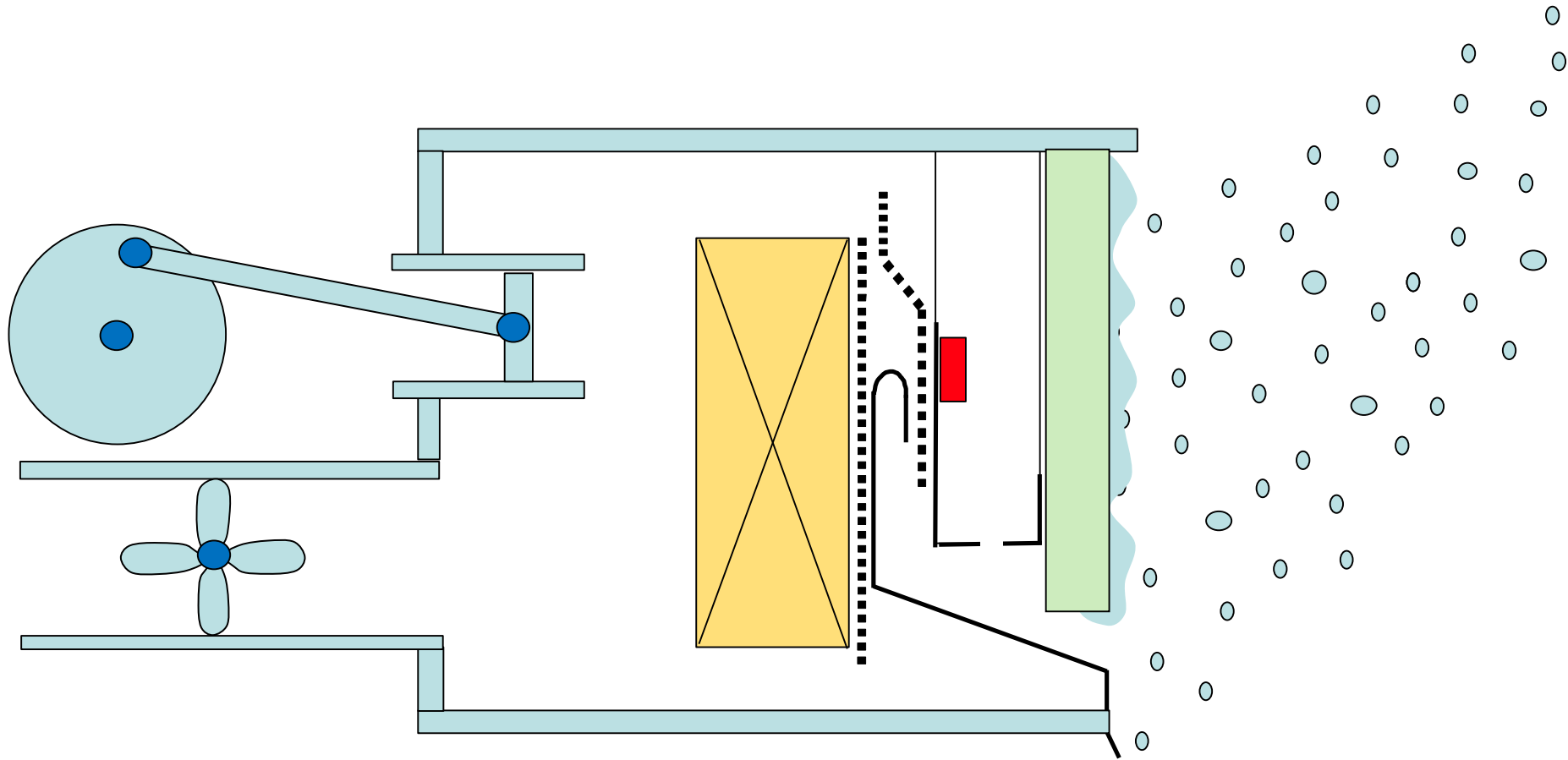
Modify



Textured façade sheds water



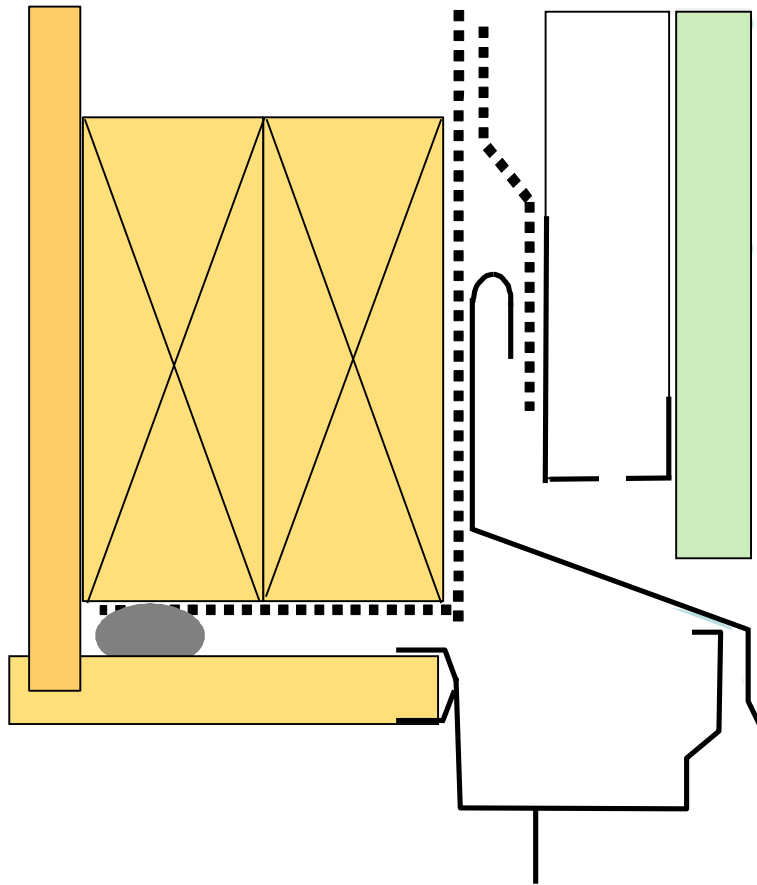
Weathertightness testing



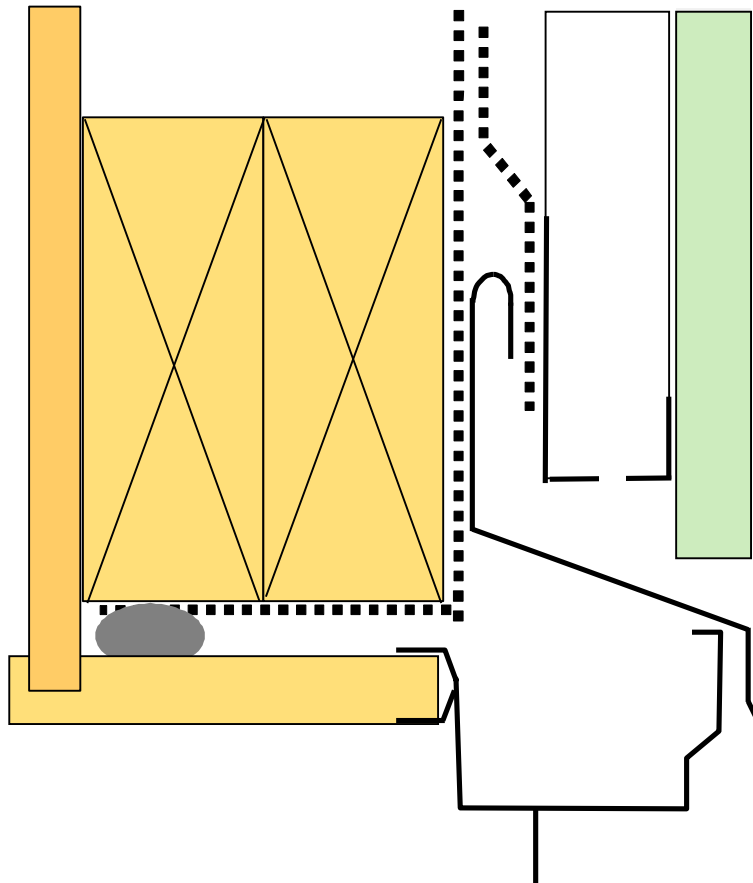
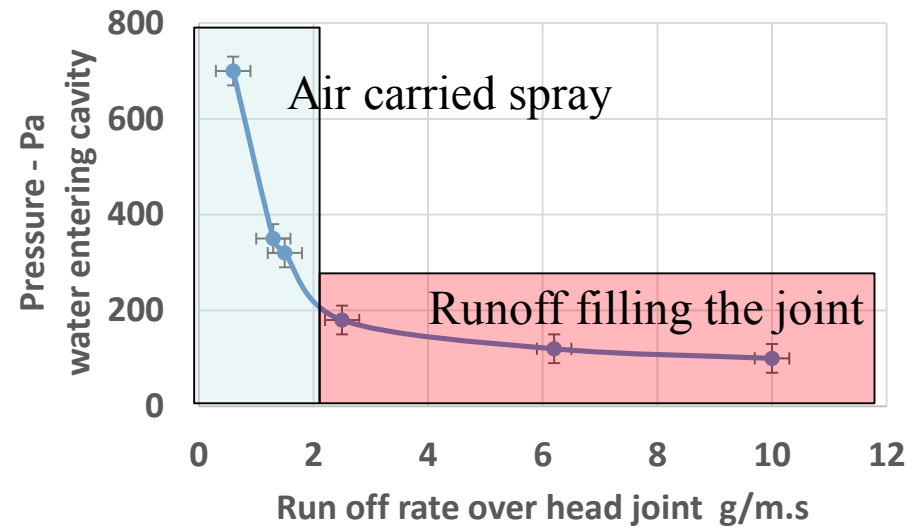
Wind driven rain on an apron flashing



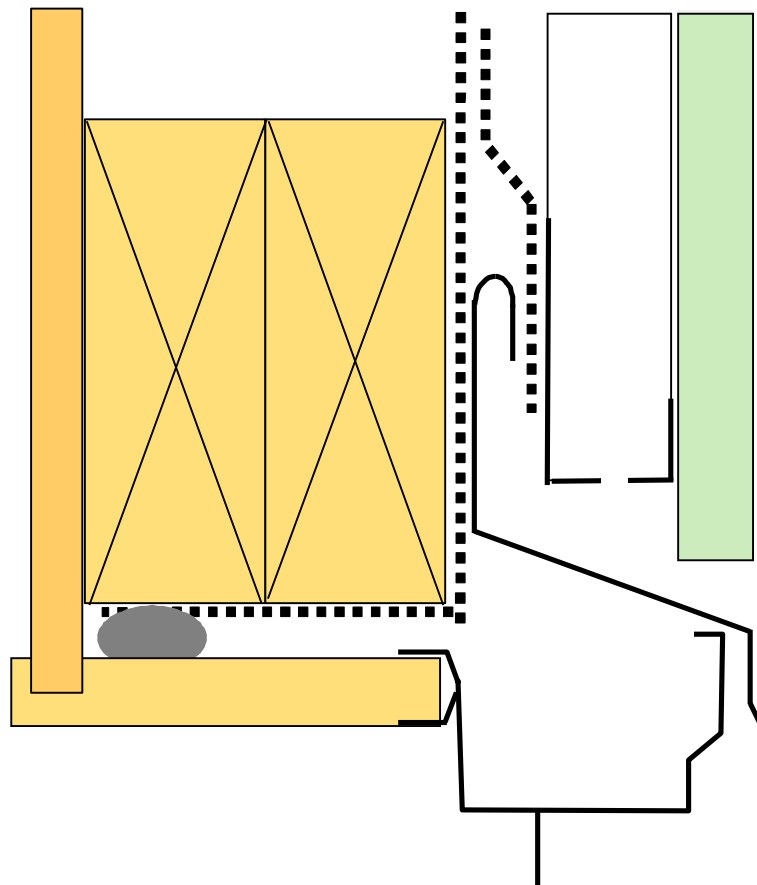
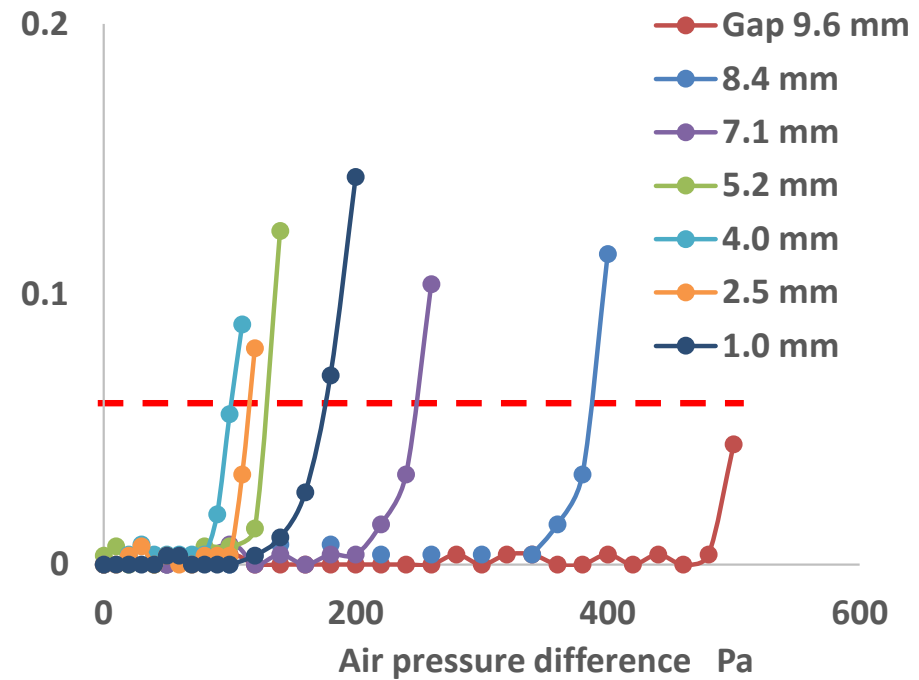
Window head joint



Window head joint - runoff

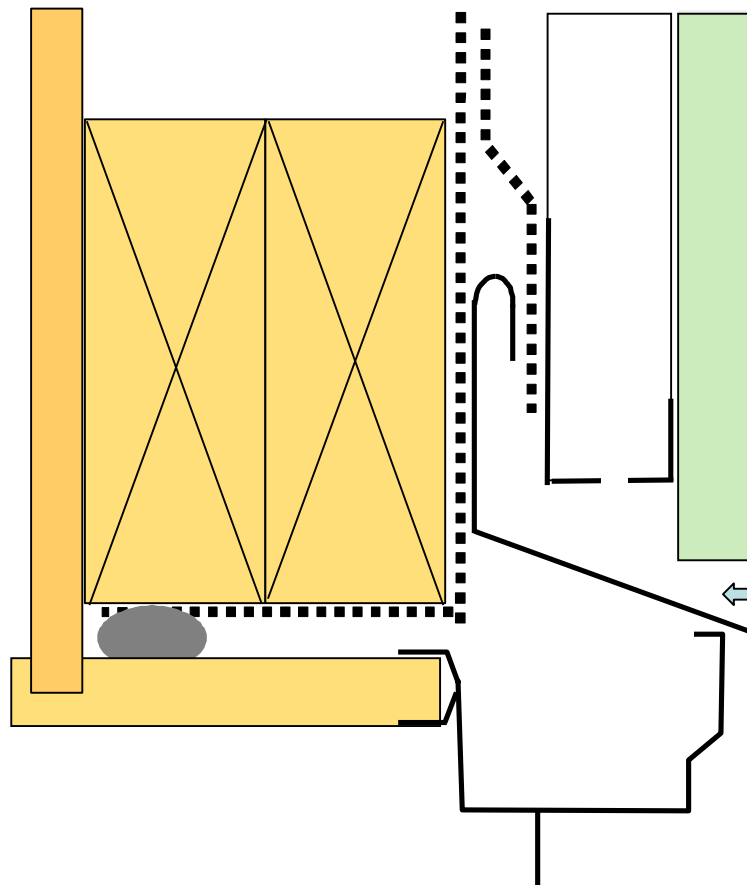
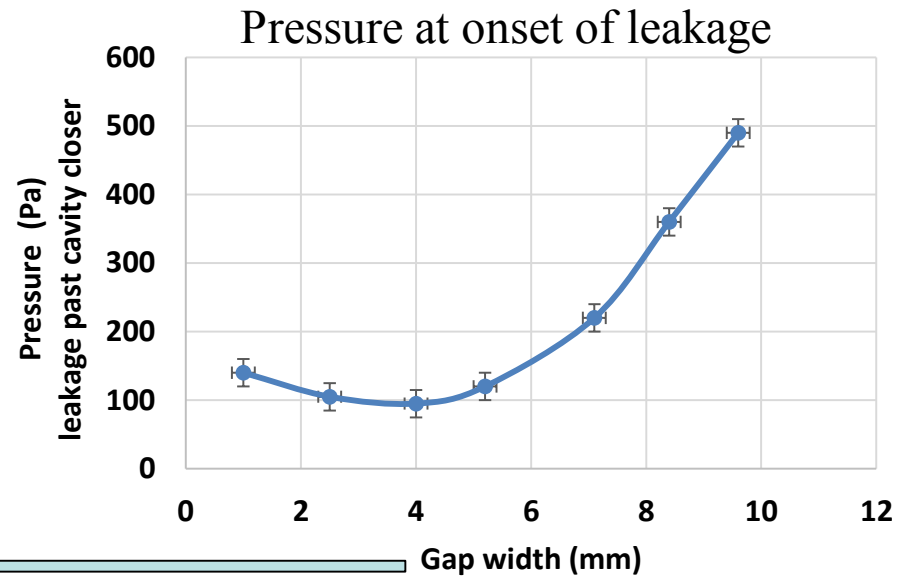


Leakage through cavity closer g/s.m



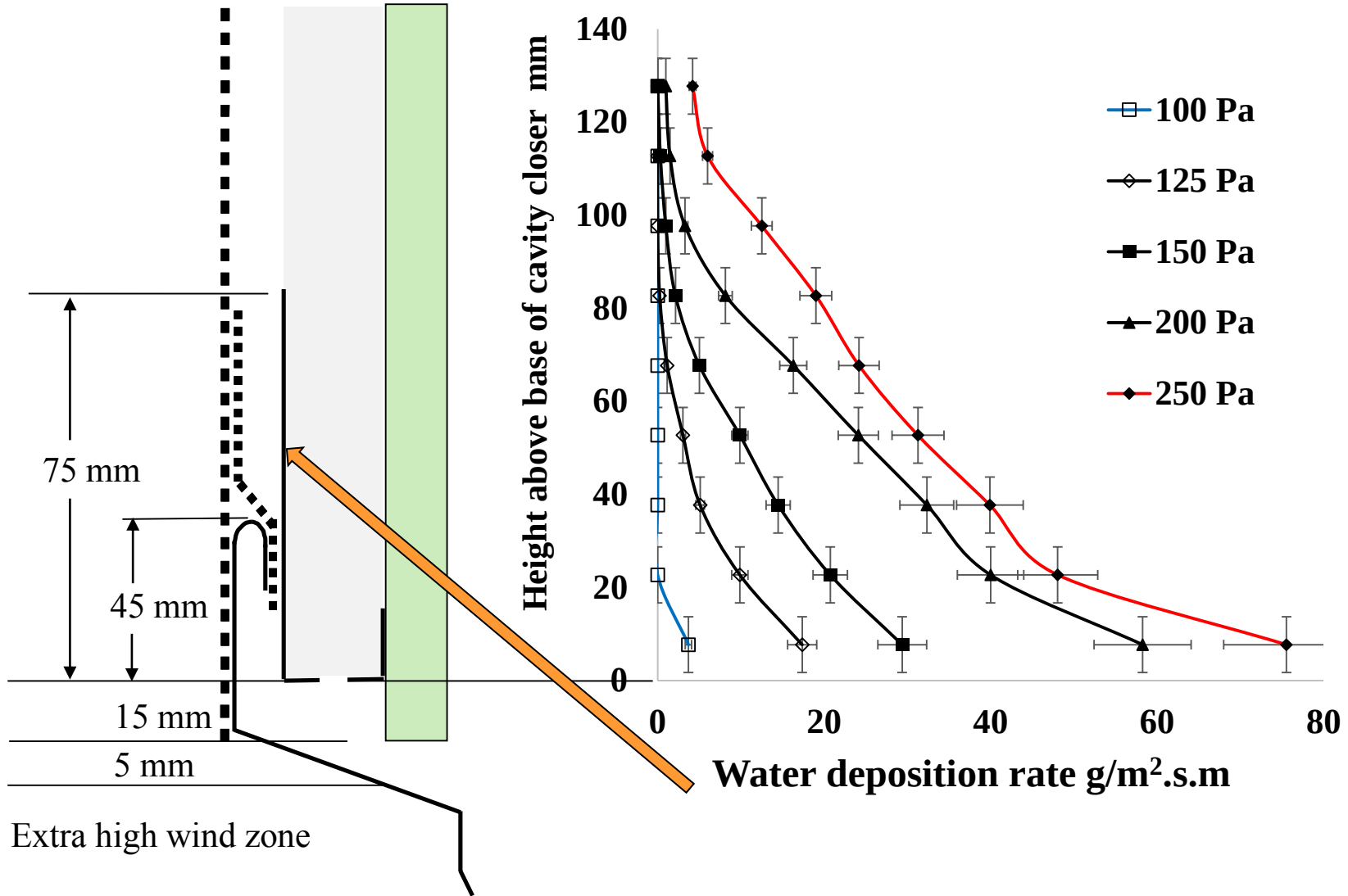
Window head joint

Runoff over joint 2 g/s.m



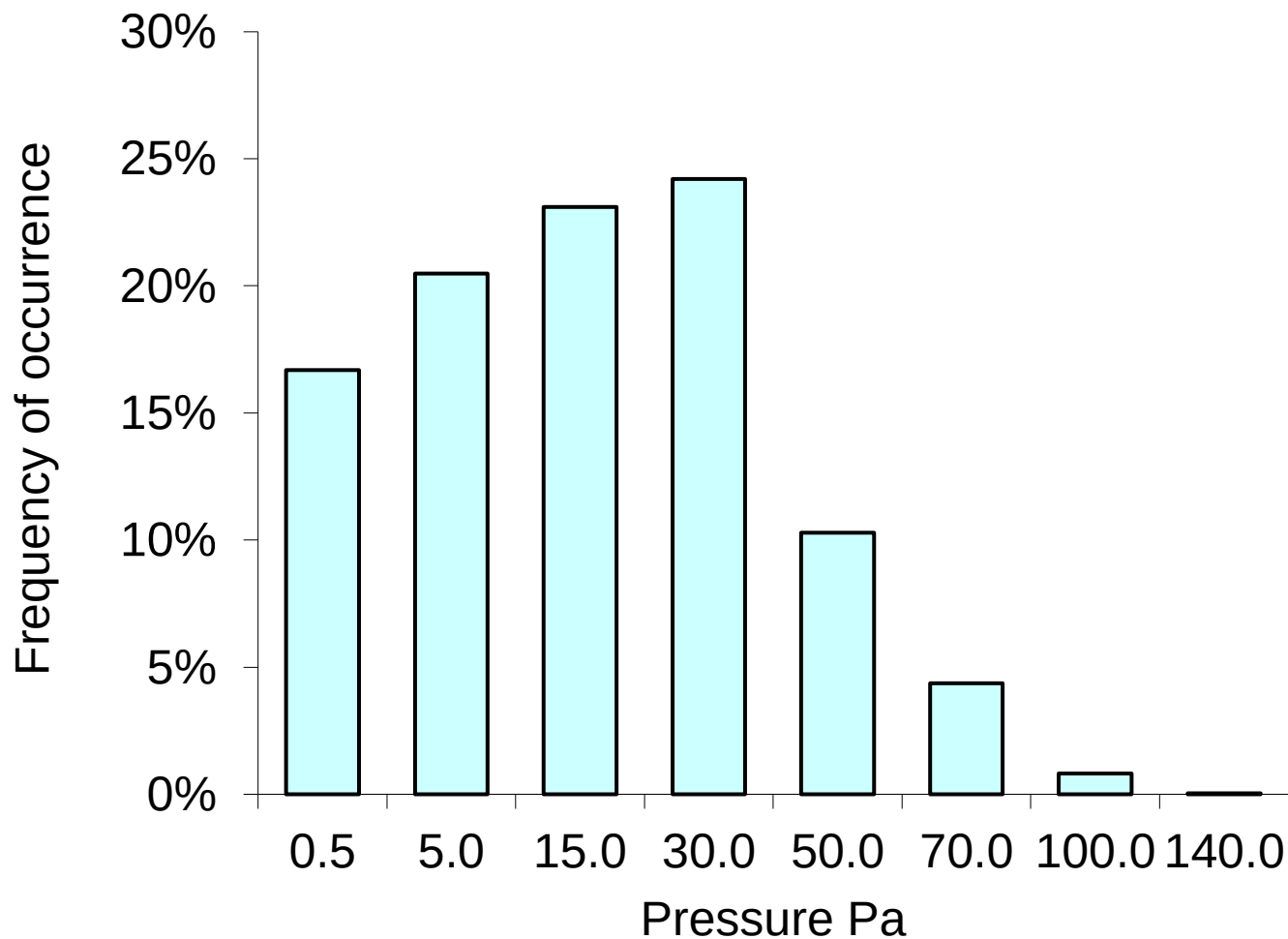
Window head joint

Runoff over joint 2 g/s.m

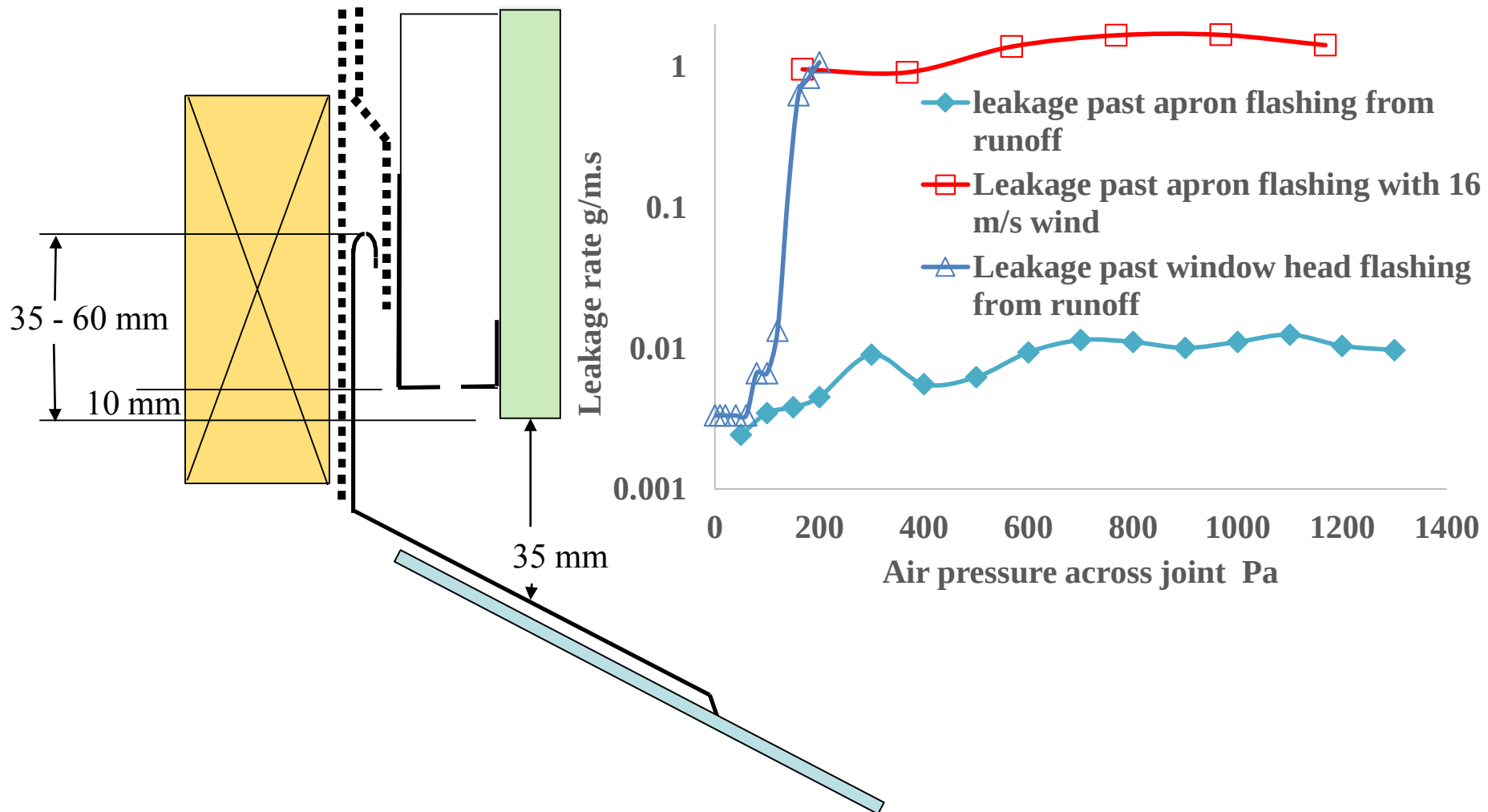


Wind pressures frequency

Auckland – semi-sheltered residential building



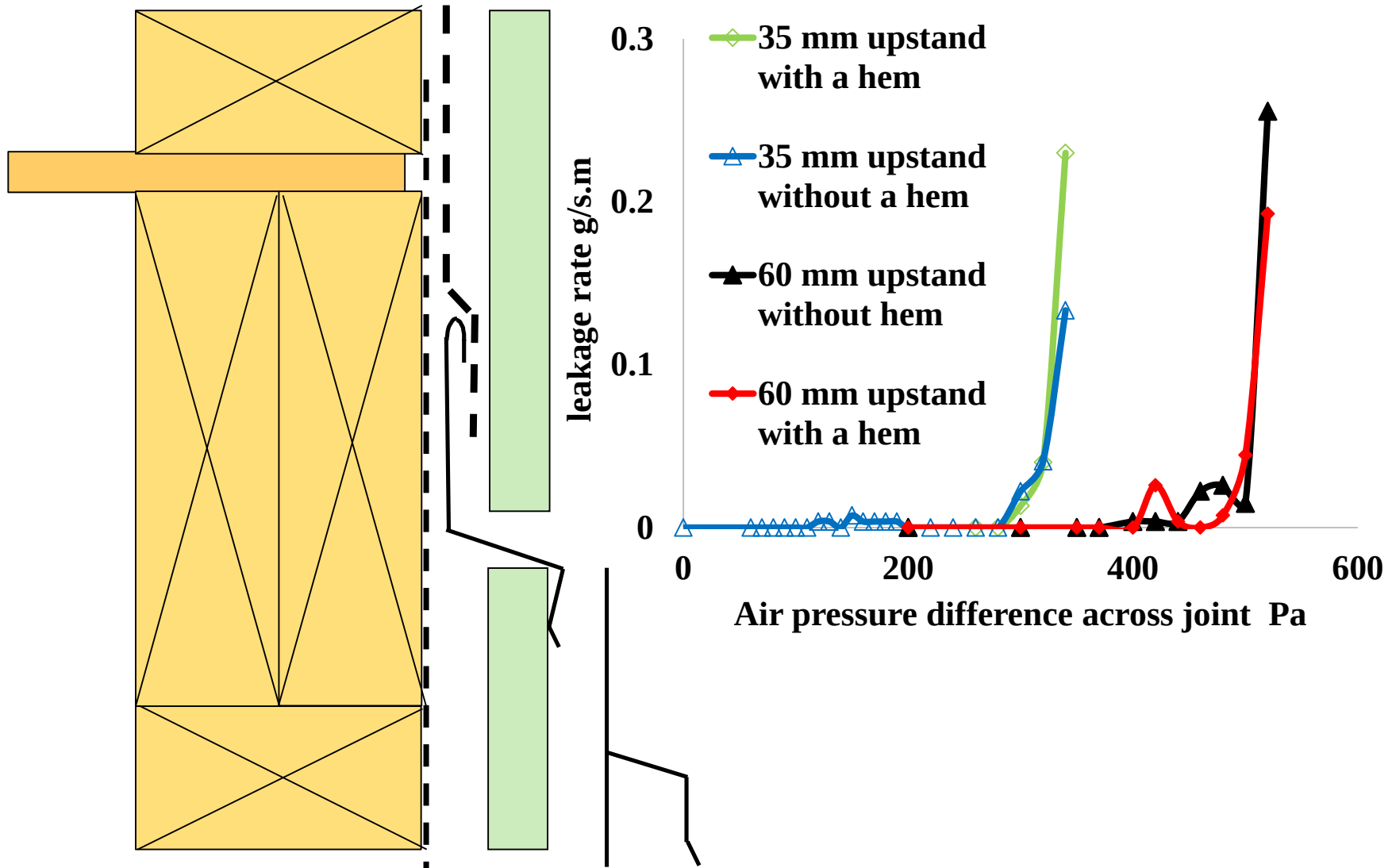
Apron flashing



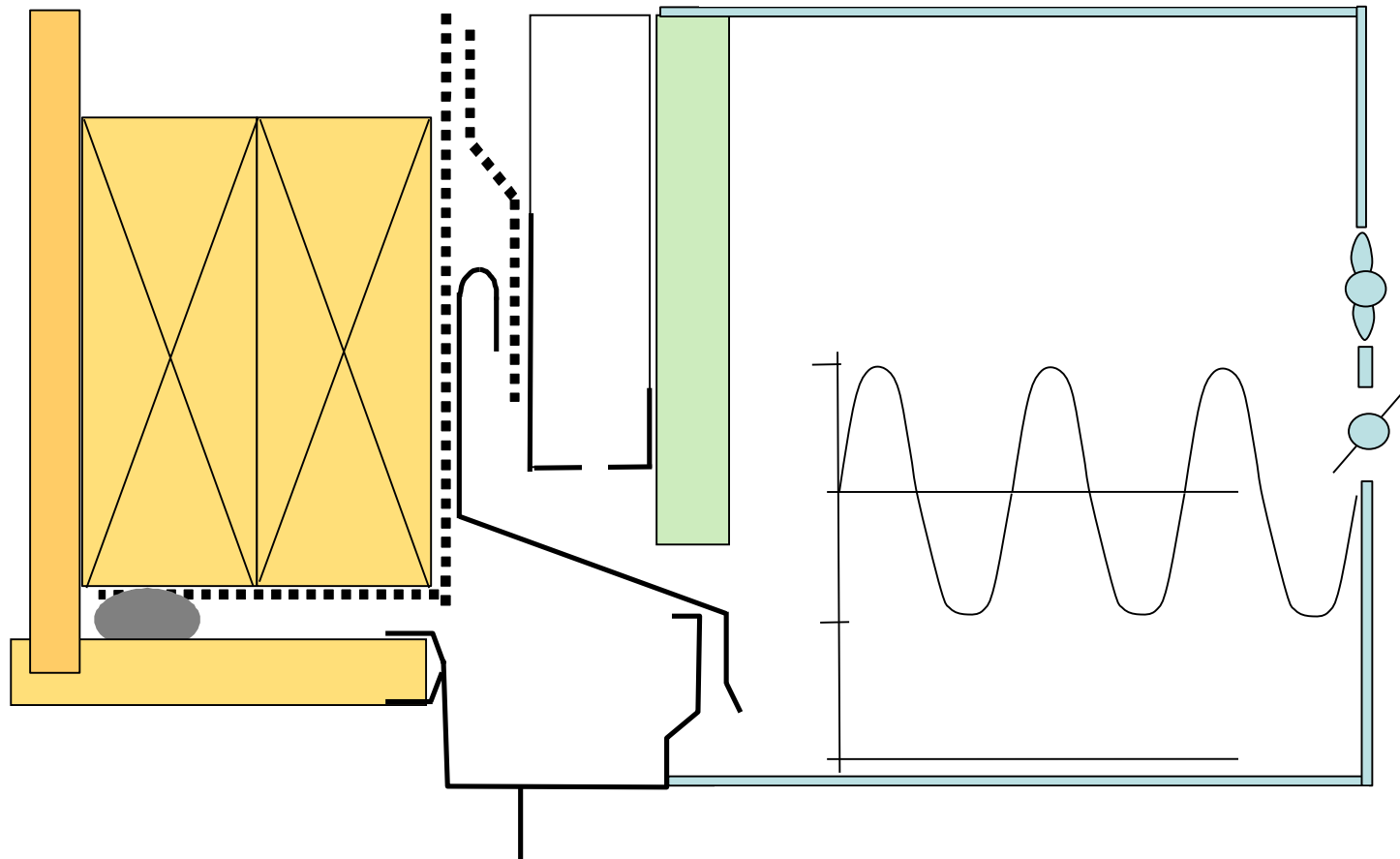
Momentum-carried rainwater entry



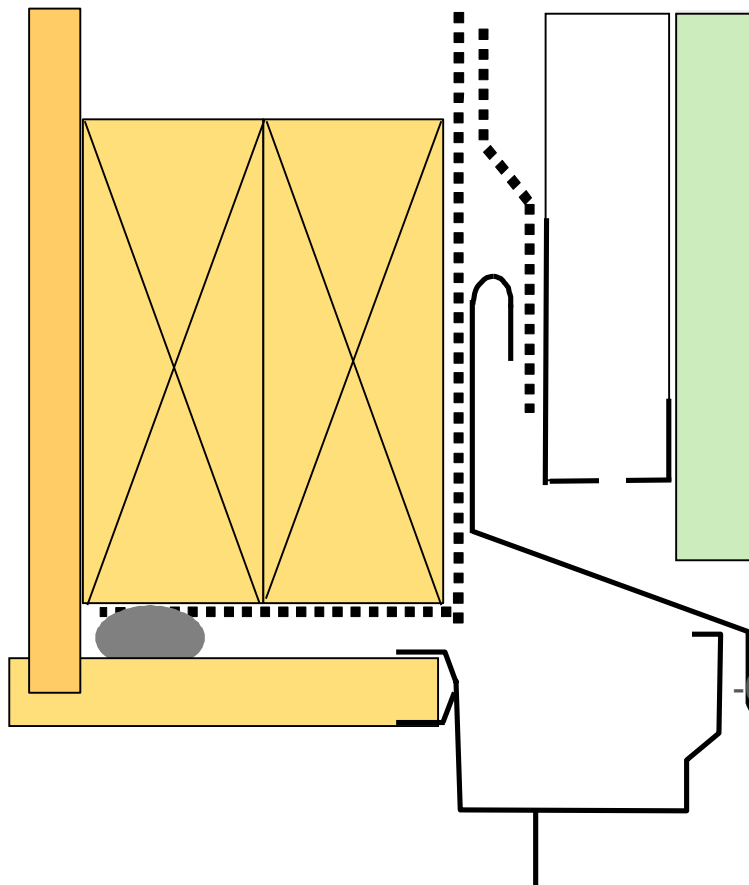
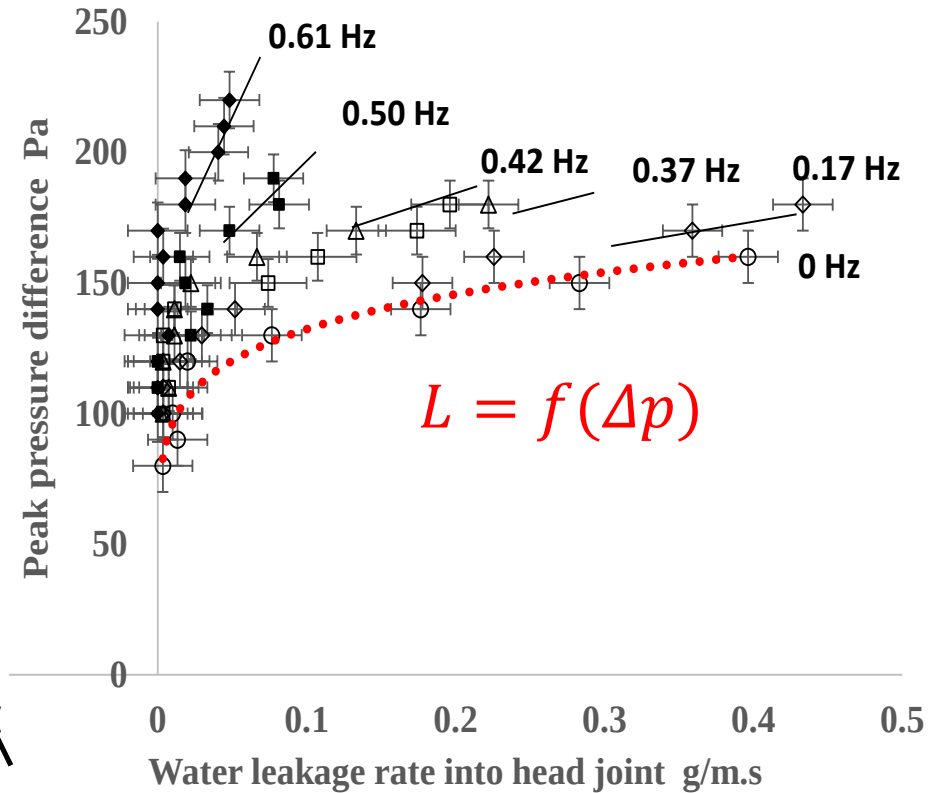
Control joint – direct fixed cladding



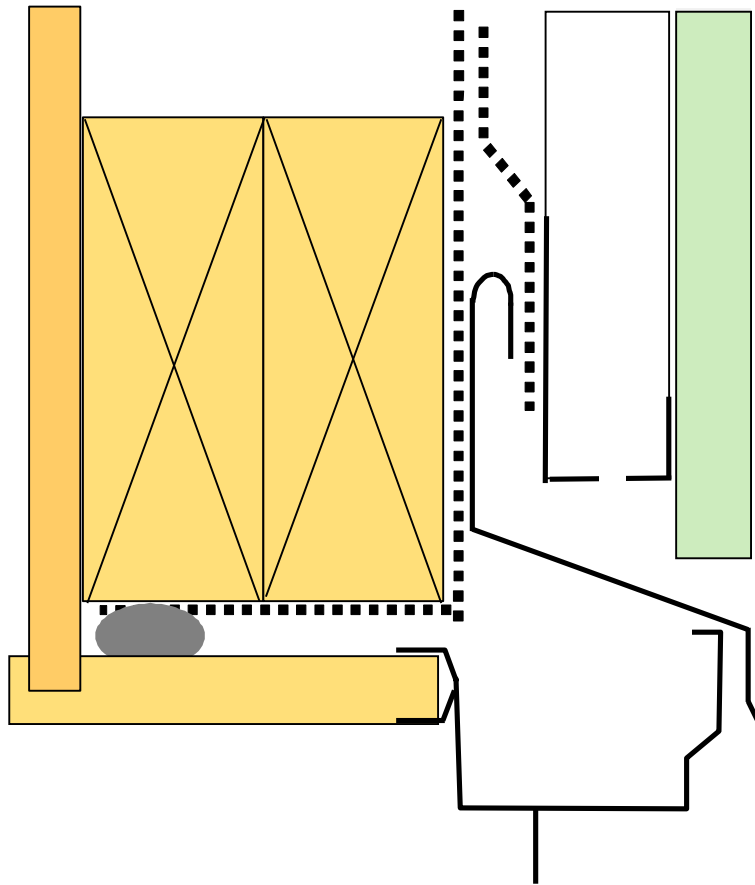
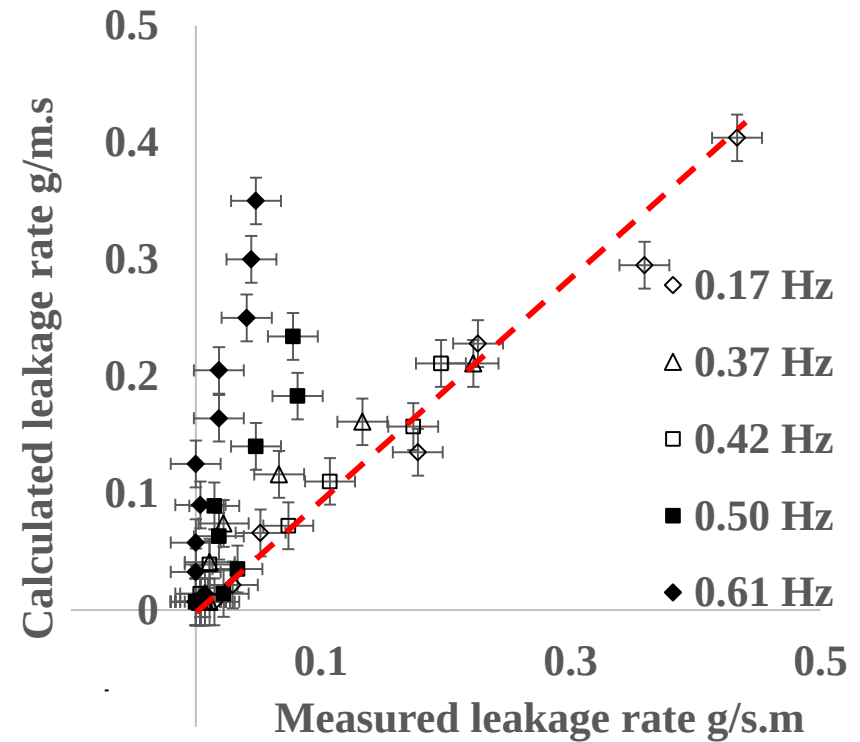
Window head joint



Dynamic leakage characteristics

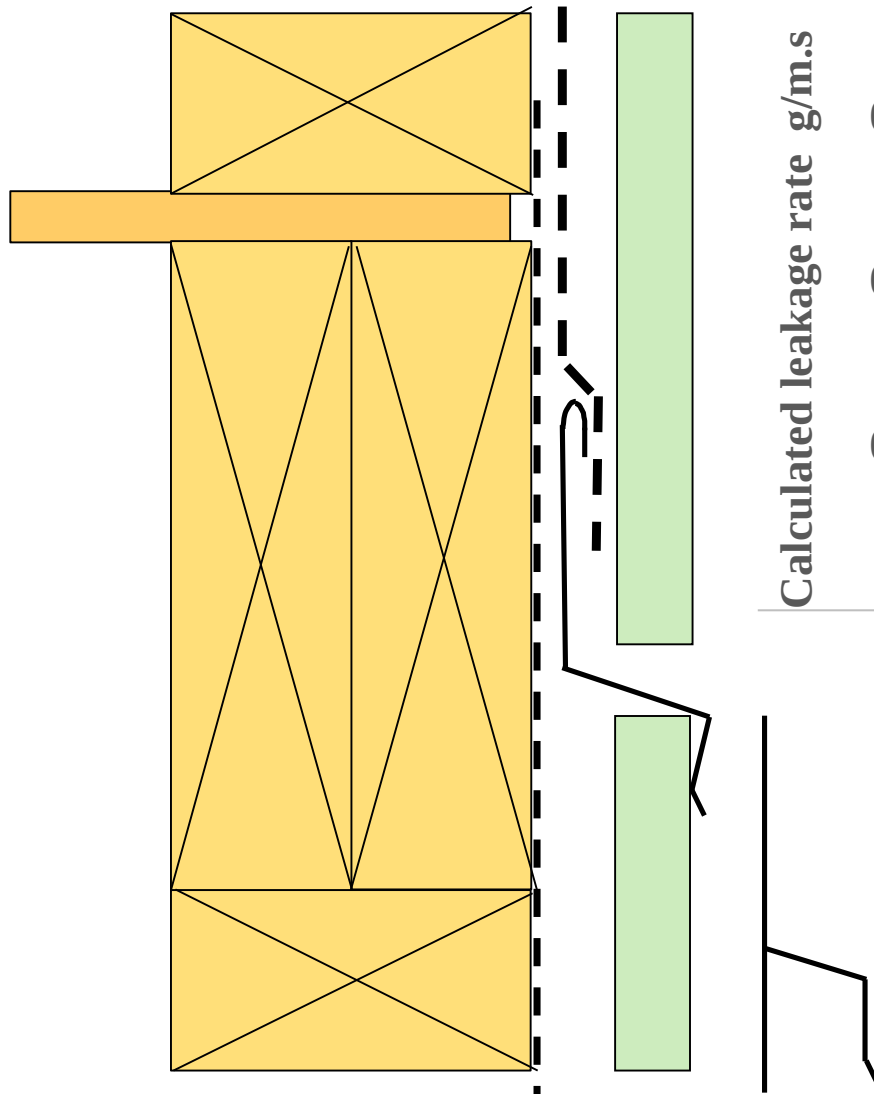
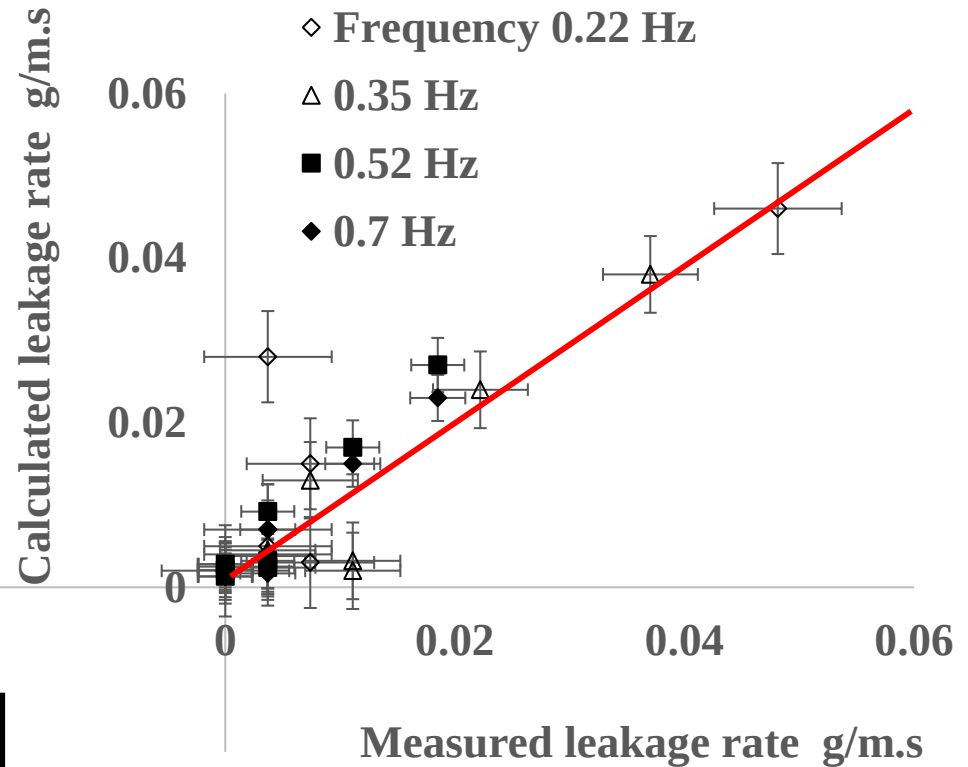


Dynamic leakage characteristics



$$L_{av} = \frac{\omega}{2\pi} \int_0^{2\pi/\omega} f(A + B \sin \omega t) dt$$

Control joint – direct fixed cladding



- **Factors in joint leakage – Wind pressure, runoff rate, airtightness of joint, rainscreen, upstand dimensions and joint volumes.**
- **High runoff rates can occlude ventilation and drainage openings, leading to air carried leakage but quantities are probably small.**
- **Hems have little effect unless they be spring loaded against the cladding or cavity closer to eliminate air leakage.**
- **Momentum driven water leaks can be much larger than air carried leaks and require effective rainscreens. There is sometimes a trade-off between a good rainscreen and coping with runoff.**
- **Evaluating the suitability of a joint using building, weather and lab data – still to do.**



Pressure functions of wall leakage

