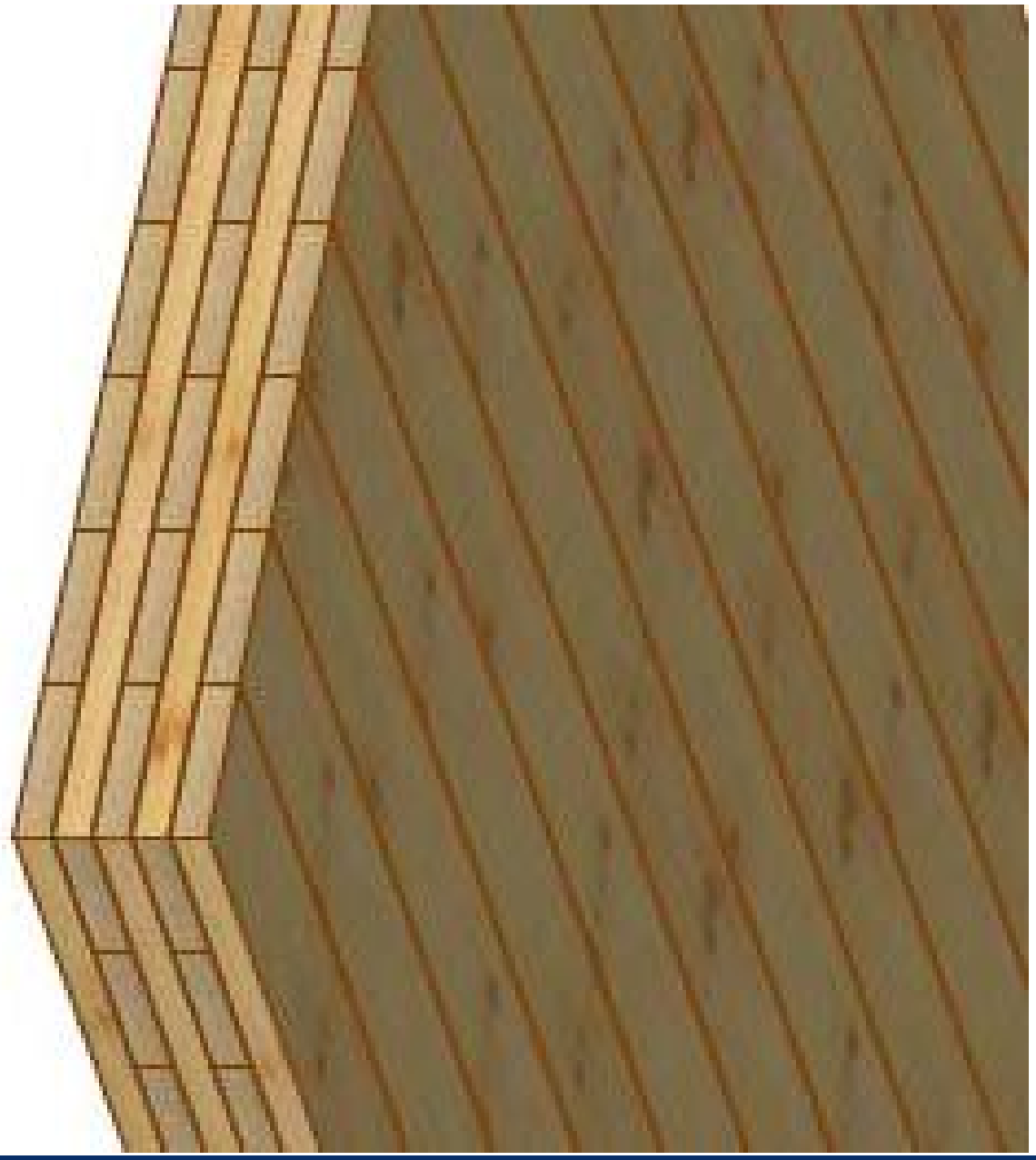
Air leakages through cross laminated timber (CLT) constructions

Hans Boye Skogstad, M. Sc. 1
Lars Gullbrekken, M.Sc. 1
Kristine Nore, Ph.D. 2
1 SINTEF Building and Infrastructure, Norway
2 Moelven MassivTre AS, Norway

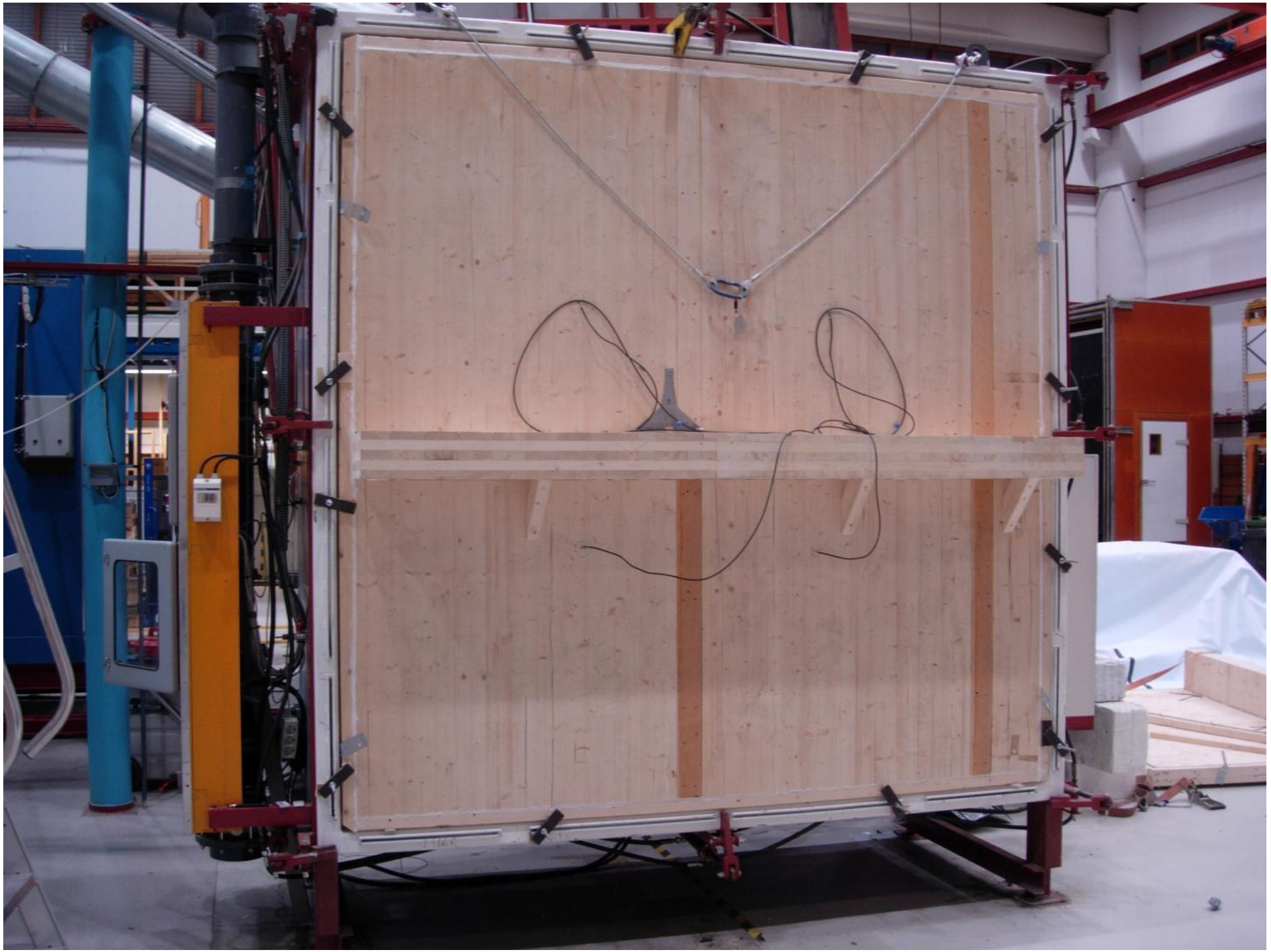


Intro

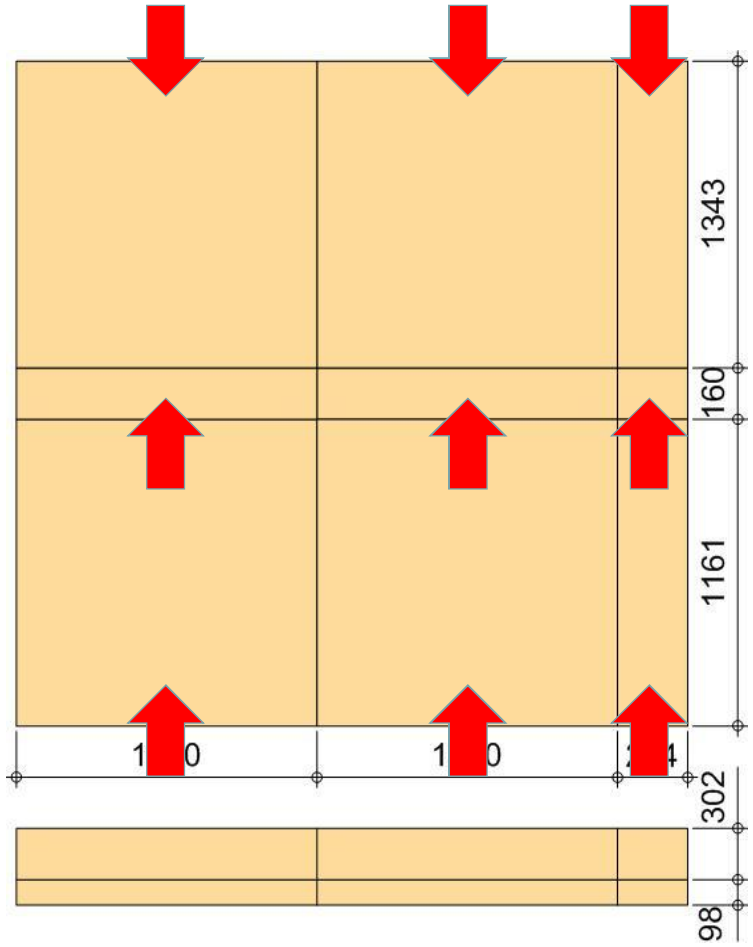
- Laboratory measurements
- Objective: Measure the airtightness of a cross laminated timber construction with both wall and floor elements.
- Measurements are conducted to evaluate the need of separate wind- and/or vapour barrier in cross laminated timber constructions.
- Test results are used to evaluate the need of a separate air barrier in cross laminated timber constructions in order to fulfil the Norwegian requirements regarding air tightness (n_{50}).

Method

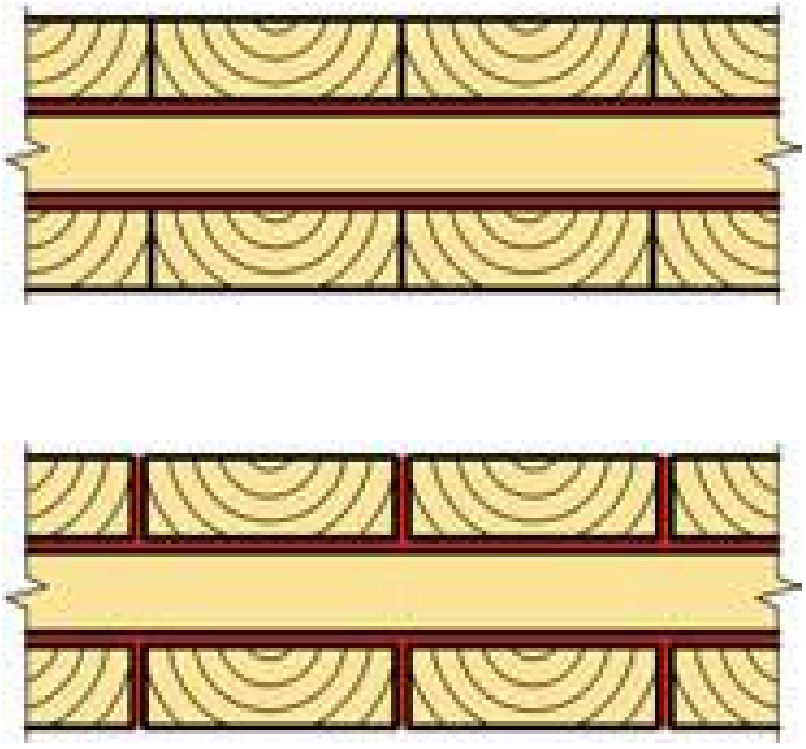
- The resistance to penetration of air through the CLT wall-floor-wall construction is measured according to NS-EN 12114 Thermal performance of buildings. Air permeability of building components and building elements. Laboratory test methods.
- The air leakages are measured at 50 Pa pressure difference over the test section.
- Airtightness measurements performed at delivery moisture content of 14 kg/kg and after drying to <10 kg/kg.
- The measurements are performed in the air permeability chamber located at SINTEF Building and Infrastructure in Trondheim.



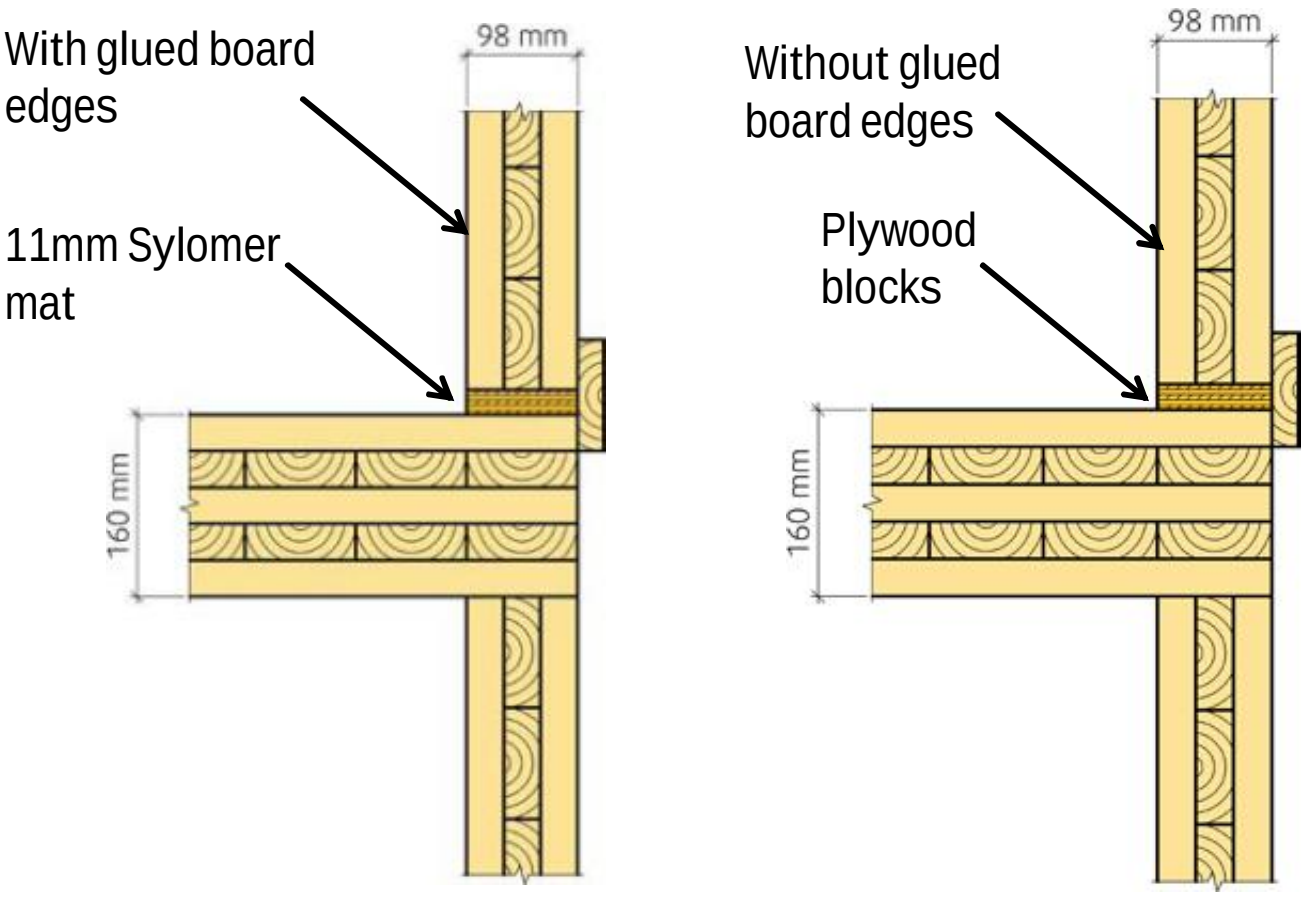
Test sections



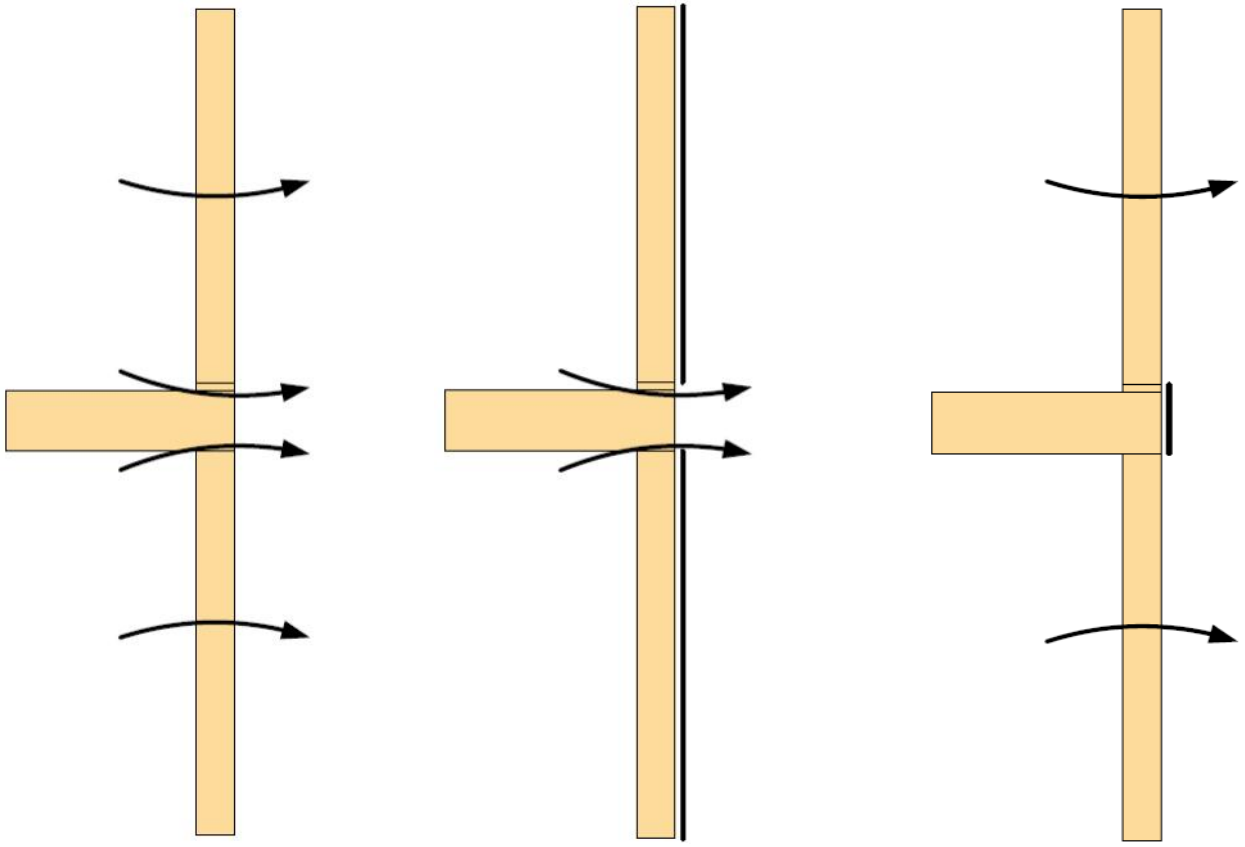
Two different wall elements with and without gluing of the board edges



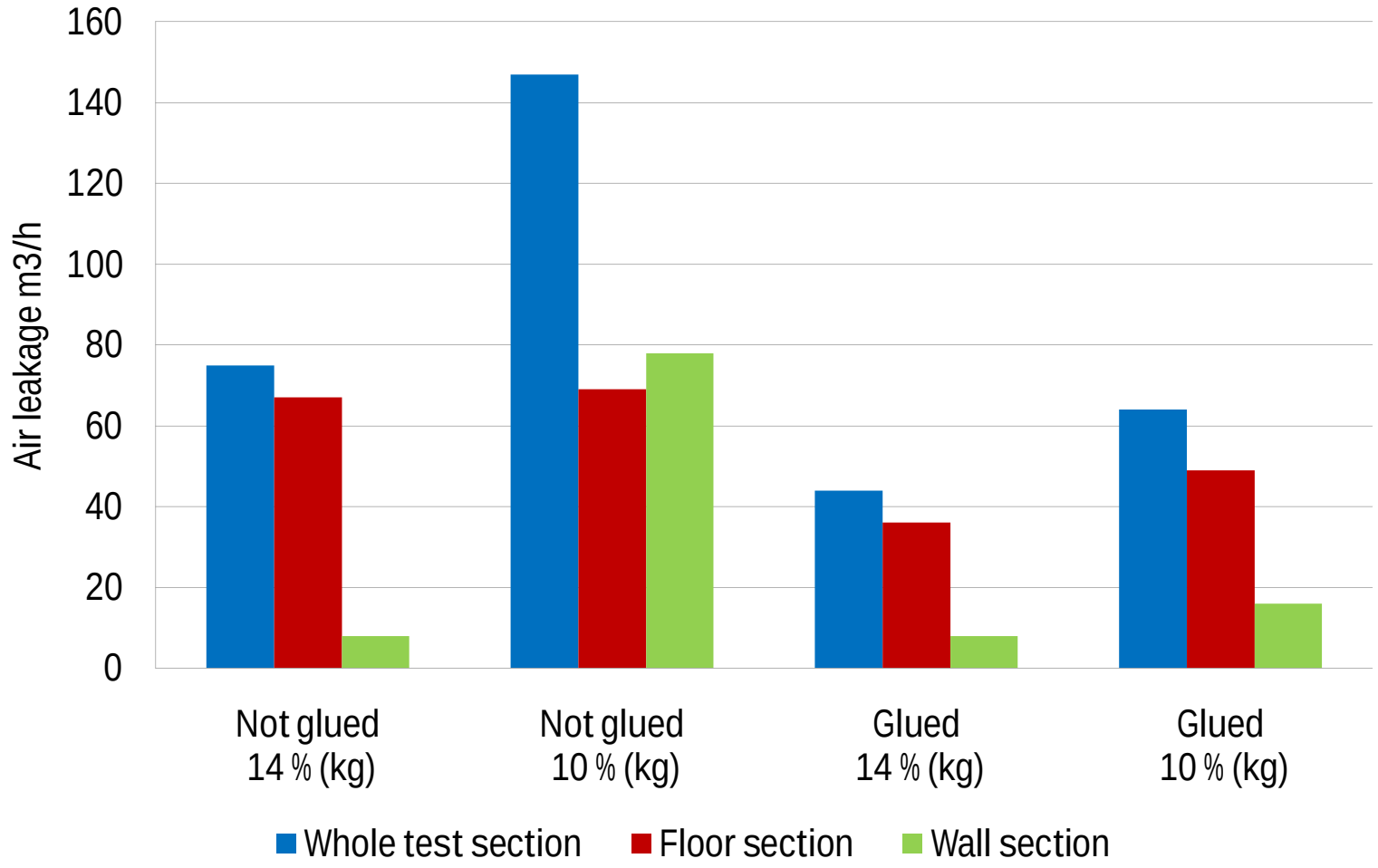
Two different test sections



Test performance



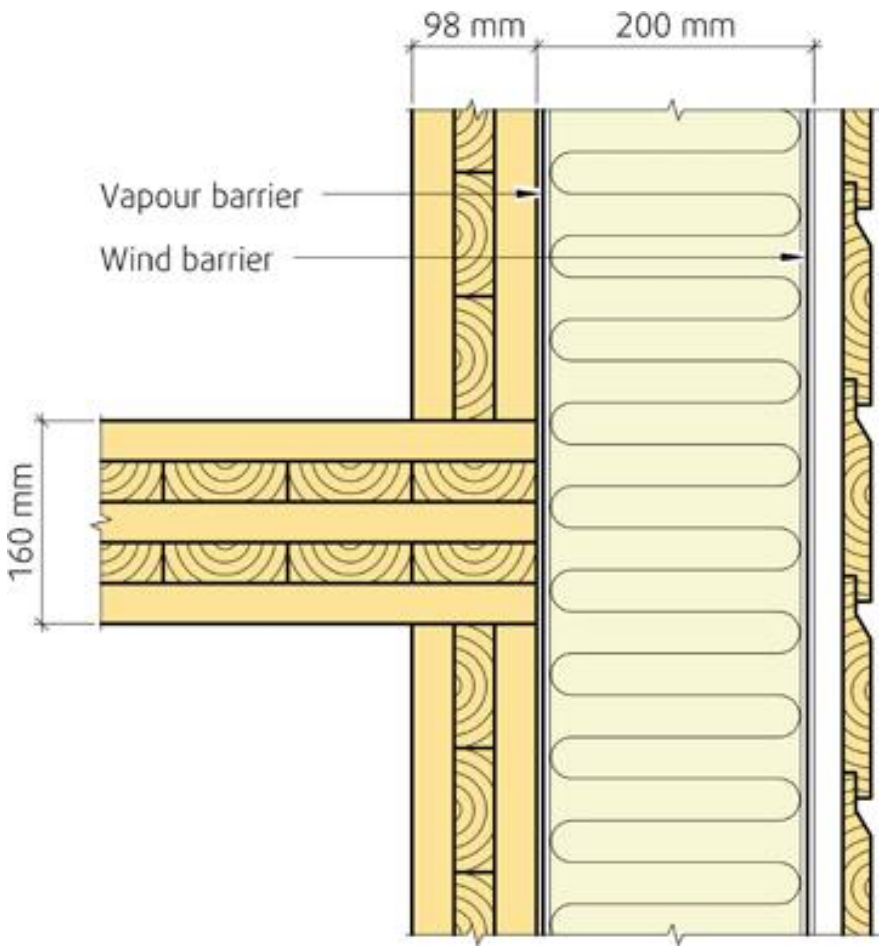
Test results

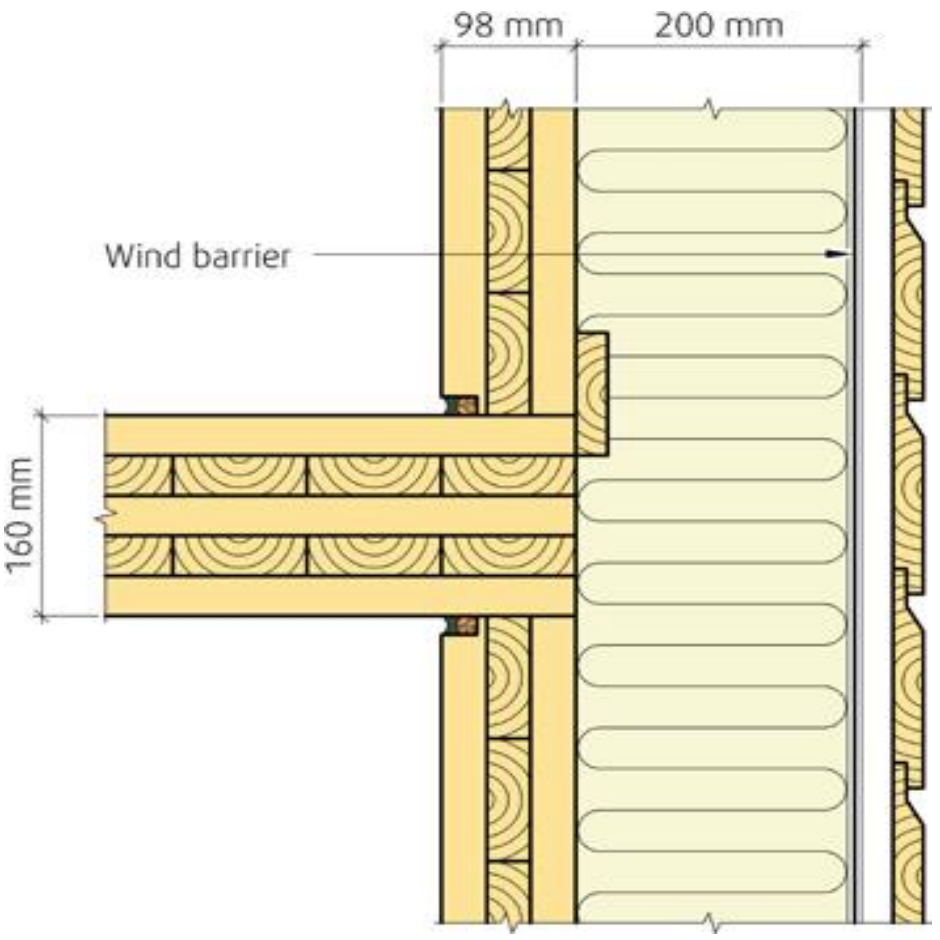


Test section	Moisture content kg/kg	Influence on the buildings air change rate h^{-1}
Board edges not glued	~ 0.14	2.9
	< 0.10	7.7
Board edges glued	~ 0.14	1.8
	< 0.10	2.8

Discussion

- Air leakage through the CLT construction can vary depending on the moisture content.
- The measurements support the recommendation that CLT constructions need to be designed with airtight joints.


98 mm
200 mm
Vapour barrier
Wind barrier
160 mm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