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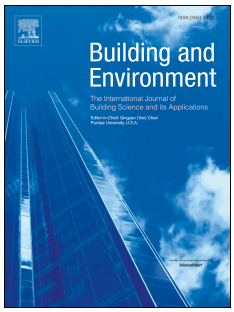

Airtightness and watertightness of window frames: Comparison of performance and requirements

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Airtightness and watertightness of window frames: comparison of performance and requirements.

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ABSTRACT:
Airtight buildings require airtight windows. To date little information is available on the typical airtightness of window frames, and the aptitude of current regulatory performance levels for windows in respect to very airtight buildings is highly uncertain. Between 1997 and 2012, 437 windows were tested in laboratory conditions for certification; the most important results in respect to airtightness and watertightness are reported here. For both parameters, vinyl frames yield slightly lower performance than aluminum or wooden windows. Single windows perform best, followed by double, composed and sliding windows. Window airtightness performance levels were calculated based on various building geometries and airtightness targets. Reducing the impact of windows on the overall building airtightness to 5% is realistic and feasible, even for very airtight buildings. The test results clearly demonstrate that airtightness, watertightness and resistance to wind loads are partially correlated. A comparison of guidelines and standards on watertightness of windows shows large discrepancies and little uniformity. Most turn-and-tilt windows show good watertightness and can be applied to very exposed conditions, whereas sliding windows have a limited scope.