



KEY MESSAGE

EAST COAST STORMS

The recent storms in Southern Queensland, New South Wales, Victoria and Tasmania have given us a good practical example of the wind loadings we commonly specify for windows. Windows require the specification of two wind loads: Serviceability Limit State (SLS) and Ultimate Limit State (ULS). SLS is a wind speed which may occur on average once in 25 years. The deflection of structural members is measured at the SLS wind pressure. The structural strength of the window is measured at the ULS wind pressure. The ULS wind speed has a return period of 500 years. That is, ULS wind speeds are expected to occur on average once in 500 years. The stronger the wind speed, the less frequent the expected occurrence.

Winds of over 135 k/h were measured during the storms. From **AS 1170.2 Wind Actions**, this equates to a return period of 27 years – slightly more than the SLS wind speeds, but far less than the expected 162 k/h ULS wind speed. A correctly specified window should have been able to survive the storm without any structural damage. While it is still early days, we are not aware of any reports of structural damage to windows.

However, there have been a number of complaints of water penetration through windows. Water penetration levels are specified in **AS 2047 Windows in buildings** and are set at pressures up to 30% of the SLS wind pressure. AS 2047 requires that windows undergo a water penetration resistance test where a large volume of water is sprayed on the test window under an applied test wind pressure. The window must withstand the test for 15 minutes, without leaking.

It should be understood that the test conditions do not reflect real life conditions. The test does not try to replicate a rain storm. The test pressure is held constant for the entire 15 minutes, whereas real wind fluctuates greatly. The 135 k/h measured in the storm was the gust (ie maximum) wind speed, not the average wind speed. Wind gusts are of short duration.

Setting water penetration resistance levels for windows is a difficult task. The water penetration levels set in AS 2047 have been in place for many years and have been shown to be adequate under most circumstances. The levels are comparable with other overseas standards. AS 1170.2 and AS 4055 give guidance on wind loads only and do not predict the likely occurrence of wind driven rain. There are areas where high winds may occur without high rainfall and vice-versa. This was recognised in the recent revision to AS 2047 where an additional “Exposed” category was introduced. Exposed sites which may be subjected to driving rain have the option of higher water penetration levels.

Window design is a balance between performance and affordability, and it is not feasible to produce windows that can withstand the most extreme weather events. While it is possible to design windows which are completely watertight at SLS wind pressures, it is unlikely that these windows, given the high cost to develop and sell versus the occasional strong wind events, would be accepted by the market at large.

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