

Technical datasheet MFSPM230212

Executive summary

Mechanically affixed single ply membranes are susceptible to Wind-induced suction which can repeatedly lift the membrane between the attachment points and cause membrane elongation and billowing. The forces generated when the membrane billows are high enough to move a D-marc base.

Research paper

Construction Technology Update No.55

“Dynamic Wind Testing of Commercial Roofing Systems” A. Baskaran. Institute for research in construction, National Research Council of Canada.

Key Findings

Wind passing over and around a building with a low-slope roof (Figure 1a) exerts positive pressure on the windward wall, negative pressure (suction) on the leeward wall and the walls parallel to the flow direction, and suction over most of the roof area. The suction generated at any particular roof location depends on the wind speed, wind direction, turbulence intensity or gusts, building topography, building geometry and architectural features, and varies with time. Commercial roofs, with their almost-flat profiles and low parapets, are likely to experience high local suction pressures along the roof perimeter.

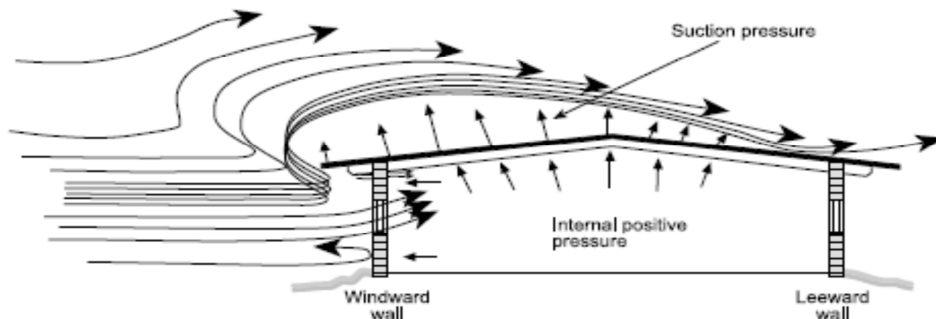


Figure 1a. Wind-induced suction over a roof

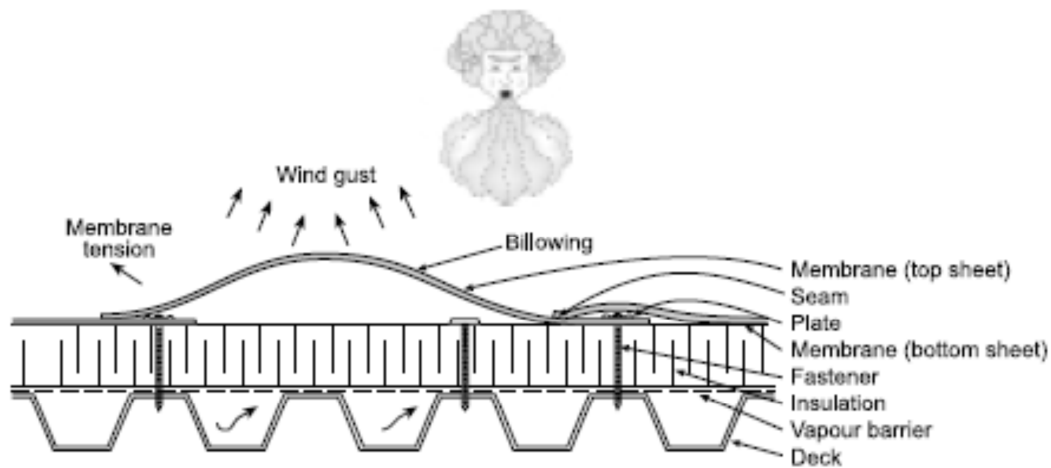


Figure 1b. Wind Effects on mechanically affixed single ply

Waterproof membranes are attached to the structural roof deck using fasteners (Figure 1b). The attachment locations are then overlapped with another membrane sheet and the upper and lower sheets seamed together. Wind-induced suction repeatedly lifts the membrane between the attachments and causes membrane elongation and billowing. The magnitude of the wind-induced suction and the membrane's elastic properties determine the extent of billowing.

It is this billowing effect that can cause products placed upon the roof surface to suffer from uplift. The billowing force can be of a magnitude far greater than that exerted by the mass of the D-marc base. Hence instability, leading to potential product failure can occur.

Conclusion

Roof covering manufacturer advice should be sought when considering the installation of D-marc on mechanically affixed single ply roofing systems in areas susceptible to high wind loads.