

Elmich Pte Ltd

**Green Wall - Wind
Wind Tunnel Test**



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1. Introduction

Vipac Engineers & Scientists Ltd was commissioned by Elmich Pte Ltd to test the effects of the winds on the wall mounted planter baskets in the wind tunnel.

2. Sample for Test

The sample is constituted of a wall frame (1200mm×1200mm wood board), three pilasters (1200mm high), four planter baskets (480mm×560mm×150mm) and 16 mounting brackets and 6 anti lift arms. The basket was held by the mounting brackets at the four corners and hung on the pilasters. The pilasters are mounted on the wall frame. **Figure 1** shows the test sample mounted on the turntable in the wind tunnel.



Figure 1 Test sample mounted on the wind tunnel turntable.

The detail component pictures of the test sample are attached in Appendix A of the report.

3. Test Procedure

The test of the wind effects on the green wall planter basket was conducted for the 3 different wind angles (0, 45 and 90 degrees, with x axis) and three different speeds (10, 20 and 30 m/s). The wind direction angle is defined relate to the x and y axes of the test sample and is shown in **figure 2**. The pictures of the test set up for the three wind angles are shown in **Figure 3**.

Each test run lasts 10 minutes. A video was taken for the duration of each run.

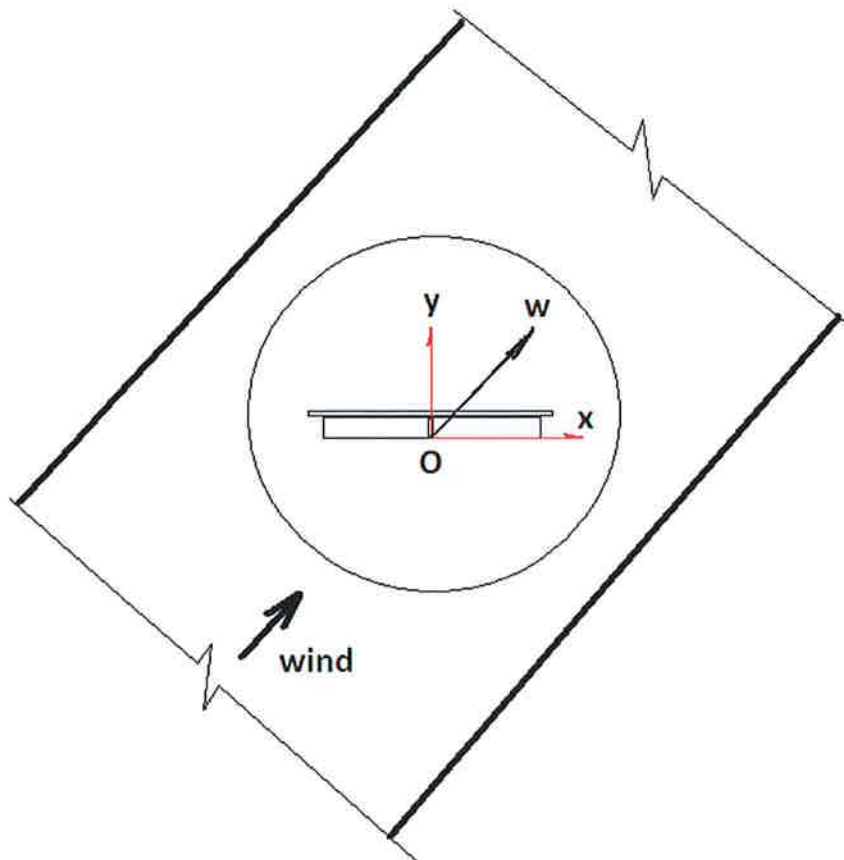


Figure 2 Plan view showing the coordinate of test sample and wind direction.



Figure 3a Wind angle of 0 degree (with x axis) set up.



Figure 3b Wind angle of 45 degree (with x axis) set up



Figure 3c Wind angle of 90 degree (with x axis) set up.

4. Results

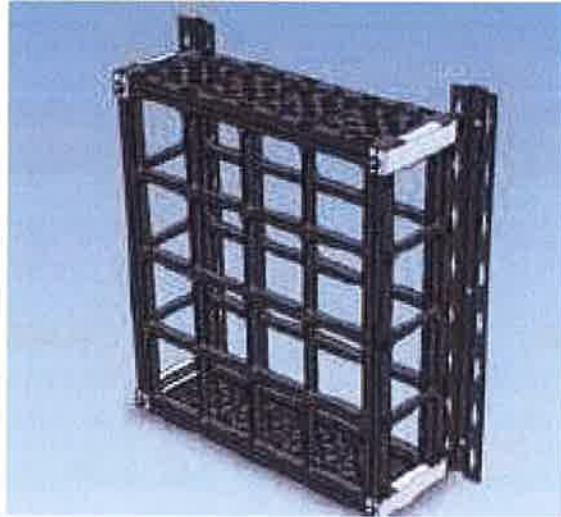
The test results were recorded using a video camera (the movie files are listed in Appendix B) and the results indicated that for the all three directions the sample could survive to the 30m/s (108 km/hr) wind speed. Nothing was blown off during these tests (see Table 1).

The green wall design was evaluated to be aptly designed to withstand against vertical uplift (z axis) from the horizontally blowing winds, and there is no noticeable damage observed for the tested wind speeds and directions.

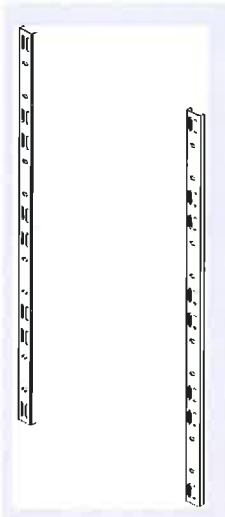
Table 1 Test results for the 3 wind angles and 3 wind speeds

Wind Speed \ angle	0 degree (with x axis)	45 degree (with x axis)	90 degree (with x axis)
	90 degree (with y axis)	45 degree (with y axis)	0 degree (with y axis)
10.5 m/s	No damage	No damage	No damage
21.0 m/s	No damage	No damage	No damage
30.0 m/s	No damage	No damage	No damage

APPENDIX A TEST SAMPLE COMPONENTS



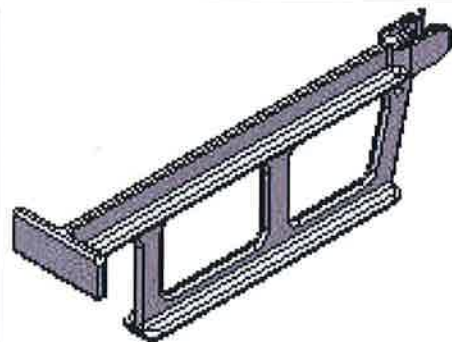
Planter Baskets



Pilasters



Mounting Brackets



Anti-lift arm

APPENDIX B TEST VIDEO FILE LIST

File name	Test angle (with x axis, degree)	Wind speed (m/s)
0deg10mspeed.mvm	0	10.5
45deg10mspeed.mvm	45	10.5
90deg10mspeed.mvm	90	10.5
0deg20mspeed.mvm	0	21.0
45deg20mspeed.mvm	45	21.0
90deg20mspeed.mvm	90	21.0
0deg30mspeed.mvm	0	30.0
45deg30mspeed.mvm	45	30.0
90deg30mspeed.mvm	90	30.0