ALLPLASTICS
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multiwall

Multiwall System High Wind Load Installation Instructions

STEEL SUB-FRAME & ONE PIECE H-BAR.

1. Create a strong steel sub-frame from defect free steel having length-wise members to support H-Bars; cross-members for fixing through the Multiwall Sheet separated by not more than 1200mm.

2. Sub-frame system shall be assembled flush with the top surfaces of length-wise members and cross-members in the same plane.

3. Minimum fall of the sheets will be 5 degrees to the horizontal length-wise in the direction of the Multiwall Sheet flutes.

4. Fix One Piece H-Bar system with 14g x 42mm fixings consisting of Hexagon Washer Head and Seal to length-wise members at separations no greater than 600mm.

5. Drill 10mm oversize holes for fixings through Multiwall Sheets at equally spaced intervals centred on top of each cross-member.

6. Centrally fix through the sheet holes with 14g x 42mm fixings consisting of 25mm Aluminium Bonded Washer . Do not over-tighten fixing creating a depression in the sheet.

MWS Sheet gauge	MWS Sheet Width	Length-wise Member Centres	Max. Spacing of H-Bar fixings	Max. Cross-wise Member Centres	Sheet Oversize Hole Diameter	No. of MWS Fixings at each position
10mm	1050mm	1070mm	600mm	1200mm	10mm	4

7. Only use the fixings designated:

- 14g x 42mm fixing consisting of Hexagon Washer Head with Seal.
- 14g x 42mm fixing consisting of 25mm Aluminium Bonded Washer.

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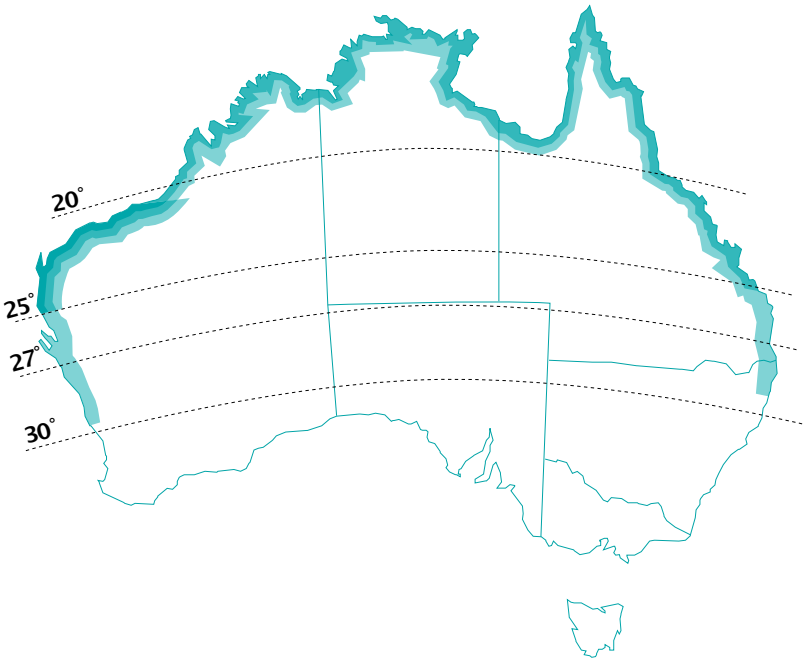
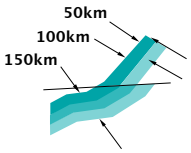
AS4055 Wind Loads For Housing

	Wind Load Selection Guide
1	Select Region
2	Select Terrain Category
3	Select Shielding Factor
4	Select Topography
5	Determine Wind Category

Region Selection



REGION A1-A5
REGION B
REGION C
REGION D



Rationalised Gust Wind Speed* Vz (m/s). Non-Cyclonic Region A1-A5, B and Clyclonic Region C

Region	Terrain Category	TOPOGRAPHY CLASSIFICATION								
		T1			T2			T3		
		SHIELDING FACTOR								
		FS	PS	NS	FS	PS	NS	FS	PS	NS
A1 - A5	3	W28	W28	W33	W33	W33	W36	W33	W33	W41
	2.5	W28	W33	W36	W33	W36	W41	W36	W36	W50
	2	W33	W36	W41	W36	W41	W50	W41	W41	W50
B	3	W33	W36	W41	W36	W41	W50	W41	W41	W50
	2.5	W36	W41	W50	W41	W50	W50	W50	W50	W55
	2	W41	W50	W50	W50	W50	W55	W50	W50	W60
C	3	W41	W50	W55	W50	W55	W60	W55	W55	N/A
	2.5	W50	W50	W55	W50	W60	N/A	W55	W55	N/A
	2	W50	W55	W60	W55	W60	N/A	W60	W60	N/A

FS : Full Shielding PS : Partial Shielding NS : No Shielding T : Topography

Design Factors

Wind speeds have been determined using the following factors, in accordance with AS1170.2-2002.

Terrain Categories ($M_{z,cat}$)

Terrain Category	Regions A1-A5 and B	Regions C and D
2	1	1
2.5	0.92	0.95
3	0.83	0.89

Shielding Factor (M_s)

Shielding Classification	Factor
Full Shielding (FS)	0.8
Partial Shielding (PS)	0.9
No Shielding (NS)	1

Topographic Effect (M_T)

Topographic Classification	Factor
T1	1
T2	1.15
T3	1.28

DIRECTION MULTIPLIER (M_D) - In All Cases a factor of 1.00

The method used for calculating the design gust wind speeds has been developed to comply with the requirements of AS1170.2.2002.
Mulford does not accept any loss or damage suffered as a result in any errors in the interpretation or application of this design guide.

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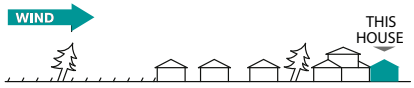
AS4055 Wind Loads For Housing

Rating Chart Region A

TERRAIN CATEGORY 3	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N1 500Pa 700Pa 150Pa	N1 500Pa 700Pa 150Pa	N2 700Pa 1000Pa 150Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N1 500Pa 700Pa 150Pa	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa

TERRAIN CATEGORY 2.5	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N1 500Pa 700Pa 150Pa	N2 700Pa 1000Pa 150Pa	N2 700Pa 1000Pa 150Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa

TERRAIN CATEGORY 2	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa

Note: Every care has been taken in supplying this information. It is offered as and should only be accepted as a general reference guide to the suitability of Makrolon Multiwall products to particular applications. It is not intended that it reflects in detail, nor should it be assumed that it does reflect in detail an interpretation of the Australian Standards. Mulford Building Products strongly recommends contacting Standards Australia, or Local Council Authorities for specific applications.

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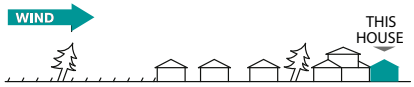
AS4055 Wind Loads For Housing

Rating Chart Region B

TERRAIN CATEGORY 3	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa

TERRAIN CATEGORY 2.5	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N2 700Pa 1000Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa	N4 1500Pa 2300Pa 200Pa

TERRAIN CATEGORY 2	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa	N4 1500Pa 2300Pa 200Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	N3 1000Pa 1500Pa 150Pa	N4 1500Pa 2300Pa 200Pa	N5 2200Pa 3300Pa 300Pa

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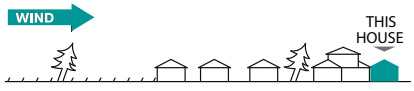
AS4055 Wind Loads For Housing

Rating Chart Region C

TERRAIN CATEGORY 3	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C1 1000Pa 1500Pa 150Pa	C2 1500Pa 2300Pa 200Pa	C2 1500Pa 2300Pa 200Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C1 1000Pa 1500Pa 150Pa	C2 1500Pa 2300Pa 200Pa	C2 1000Pa 1500Pa 150Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa

TERRAIN CATEGORY 2.5	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C1 1000Pa 1500Pa 150Pa	C2 1500Pa 2300Pa 200Pa	C2 1500Pa 2300Pa 200Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa	C3 2200Pa 3300Pa 300Pa

TERRAIN CATEGORY 2	WIND RATING	TOPOGRAPHY T1	T2	T3
FULL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa
PARTIAL SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa	C3 2200Pa 3300Pa 300Pa
NO SHIELDING 	Wind Classification Serviceability Design Wind Pressure Ultimate Limit State Wind Pressure Water Penetration	C2 1500Pa 2300Pa 200Pa	C3 2200Pa 3300Pa 300Pa	C4 3000Pa 4500Pa 450Pa

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Please note that at this stage there is no testing for 10x1050mm

Wind Load Test Results

The table below summarises the test results obtained. The estimates of ultimate loads, which are based on the assumption that ultimate loads are reached when the maximum principal stress reach the ultimate stress of the polycarbonate sheet (60 Mpa), are included in the table. Plots of the maximum principal stress v's load for each of the profiles tested follow the table.

Makrolon Multiwall Sheet	End span (mm)	Internal span (mm)	Factored Ultimate Load (kPa) From Testing	Failure Load (kPa) From Testing	Failure Load (kPa) From Analysis	Wind Category Rating
Multiwall Sheet 8mm Standard Installation	Width 700	N/A	0.31	0.56; 0.40; 0.45	0.55	N1
Multiwall Sheet 10mm Standard Installation	Width 980	N/A	0.30	0.40; 0.39; 0.40	0.45	N1
Multiwall Sheet 8mm High Wind* Installation	Width 700	1200	2.50	3.5; 3.5; 3.25	N/A	N2, N3 N4, N5
Multiwall Sheet 10mm High Wind* IInstallation	Width 980	1200	2.12	2.75; 3.25; 3.1	N/A	N2, N3 N4, N5

*To achieve these results special High Wind installation instructions for Makrolon ° Multiwall must be followed.