DESIGN
GUIDE

Determining Wind Speed

STRATCO

SELECTION PROCEDURE

To identify a Wind Classification for a proposed domestic site there are four variables you must first identify. They are Region (figure 1), Terrain Category, Shielding Factor and Topographic Classification. The Wind Classification can then determined using table 2.

If the permissible gust wind speed is required, refer to table 1 following assessment of wind classification.

*This is an approximate method for estimating wind speeds for residential structures only. For full analysis refer to Australian Standard AS/NZS1170.2:2011.

WIND CLASSIFICATION CONVERSION TABLE

WIND CLASSIFICATION		Gust Wind Speed meters per second
Regions A and B	Regions C and D	
N1 (Non-Cyclonic)	N/A	W28
N2 (Non-Cyclonic)	N/A	W33
N3 (Non-Cyclonic)	C1 (Cyclonic)	W41
N4 (Non-Cyclonic)	C2 (Cyclonic)	W50
N5 (Non-Cyclonic)	C3 (Cyclonic)	W60
N6 (Non-Cyclonic)	C4 (Cyclonic)	W70

Table 1

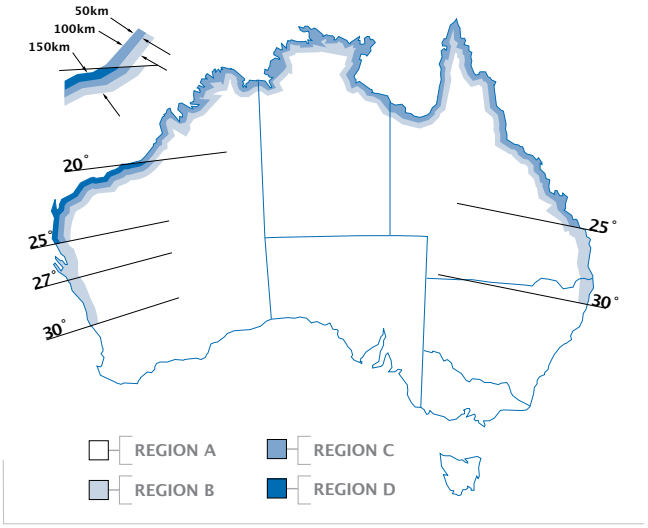


Figure 1

WIND CLASSIFICATION, NON-CYCLONIC REGION A AND B AND CYCLONIC REGION C AND D

Region	Terrain Category	TOPOGRAPHIC CLASSIFICATION T0			T1			T2			T3		
		FS	PS	NS	FS	PS	NS	FS	PS	NS	FS	PS	NS
A	1	N2	N3	N3	N3	N3	N3	N3	N4	N4	N3	N4	N4
	1.5	N2	N2	N3	N2	N3	N3	N3	N3	N4	N3	N4	N4
	2	N1	N2	N2	N2	N3	N3	N2	N3	N3	N3	N3	N4
	2.5	N1	N2	N2	N2	N2	N3	N2	N3	N3	N3	N3	N3
	3	N1	N1	N2	N1	N2	N2	N2	N3	N3	N2	N3	N3
B	1	N3	N4	N4	N4	N4	N5	N4	N5	N5	N5	N5	N5
	1.5	N3	N4	N4	N3	N4	N4	N4	N4	N5	N4	N5	N5
	2	N3	N3	N3	N3	N4	N4	N4	N4	N4	N4	N4	N5
	2.5	N3	N3	N3	N3	N3	N4	N3	N4	N4	N4	N4	N5
	3	N2	N3	N3	N3	N3	N3	N3	N4	N4	N3	N4	N4
C	1	C2	C3	C3	C3	C3	C4	C3	C4	C4	C4	C4	NA
	1.5	C2	C3	C3	C2	C3	C3	C3	C3	C4	C3	C4	C4
	2	C2	C2	C2	C2	C3	C3	C3	C3	C3	C3	C3	C4
	2.5	C1	C2	C2	C2	C2	C3	C2	C3	C3	C3	C3	C4
	3	C1	C2	C2	C2	C2	C2	C2	C3	C3	C2	C3	C3
D	1	C4	C4	NA	C4	NA	NA	NA	NA	NA	NA	NA	NA
	1.5	C3	C4	C4	C4	C4	NA	C4	NA	NA	NA	NA	NA
	2	C3	C3	C4	C3	C4	C4	C4	NA	NA	C4	NA	NA
	2.5	C3	C3	C3	C3	C4	C4	C4	C4	NA	C4	NA	NA
	3	C2	C3	C3	C3	C3	C4	C3	C4	C4	C4	C4	NA

Table 2

TERRAIN CATEGORY

The wind speed at a structure is influenced by the terrain it flows over as it approaches the structure. The terrain category classifications can be described as follows:

Category 1
Exposed open terrain with few or no obstructions and enclosed water surfaces. For example, flat, treeless, poorly grassed plains; rivers, canals and lakes; and enclosed bays less than 10km in the wind direction.

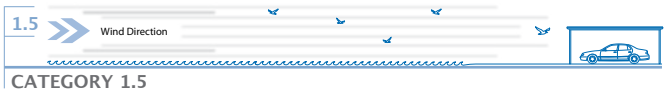
Category 1.5
Open water surfaces for example coastal waters, large open bays on seas and oceans, lakes and enclosed bays extending greater than 10km in wind direction.

Category 2
Open terrain, including grassland, with well scattered obstructions having heights typically from 1.5-5m with no more than two obstructions per hectare.

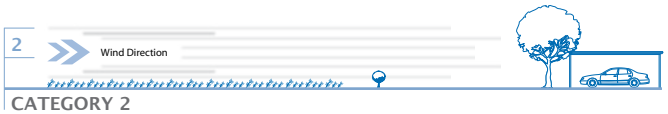
Category 2.5
Terrain with a few trees or isolated obstructions, for example terrain in developing outer urban areas with scattered houses.

Category 3
Terrain with numerous closely spaced obstructions with heights typically between 3-10m, for example suburban housing.

CATEGORY 1



CATEGORY 1.5



CATEGORY 2

CATEGORY 2.5

CATEGORY 3

TOPOGRAPHIC EFFECT

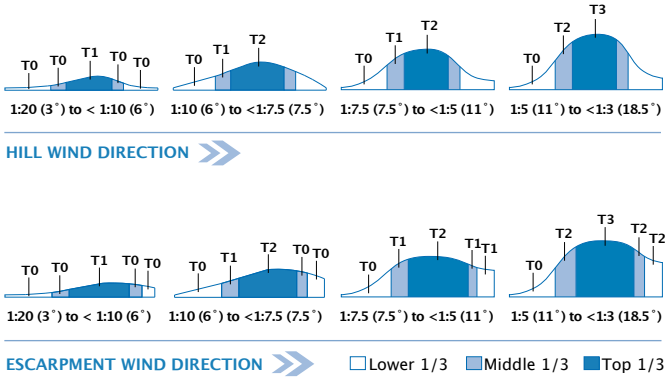
The topographic classification determines the effect of wind on a structure due to its location on a hill, ridge or escarpment and the height and slope of the hill, ridge or escarpment.

The bottom of a hill, ridge or escarpment is the area at the base of which the average ground slope is less than 1 in 20 or approximately 3°. The maximum slope of a hill, ridge or escarpment (regardless of structure site) is measured as the steepest slope through the top half of the hill, ridge or escarpment. With the maximum slope known, the adjacent diagrams may be used to determine the topographic classification based on which third of the hill or escarpment the site is located.

In areas where the maximum slope does not exceed 1 in 20 (approximately 3°) the topographic classification shall be T0.

Note: Diagrams suitable for hill or escarpment heights not exceeding 30m. Refer AS4055:2011 for details if outside of these requirements.

MAXIMUM SLOPE



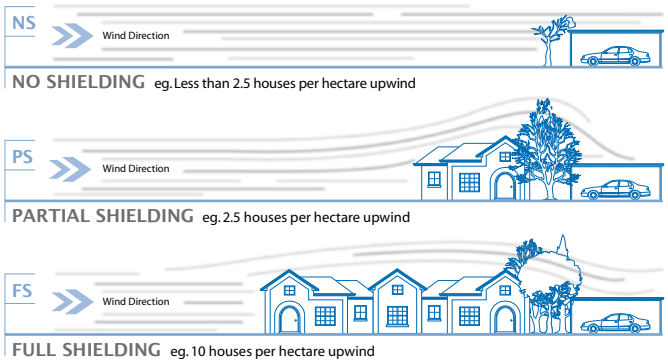
SHIELDING FACTOR

Shielding classification is required because the wind speed at a structure is influenced by any upwind obstructions of similar size to the structure that are close to the building. in region C and D, trees and vegetation shall not be considered as shielding elements. The three shielding classifications are defined as follows:

FS – Represents Full Shielding
Full Shielding is where at least two rows of houses or similar sized permanent obstructions surround the building being considered. In regions A and B, heavily vegetated areas within 100m of the site can provide Full Shielding. The application of Full Shielding is considered appropriate for typical suburban development, equal to or greater than 10 houses and/or similar sized obstructions per hectare.

PS – Represents Partial Shielding
Partial Shielding applies to intermediate situations where there are at least 2.5 houses or sheds per hectare upwind of the structure. e.g. Typical "acreage" type suburban development or wooded parklands. The second row of houses abutting open water or parklands may be classified as having partial shielding.

NS – Represents No Shielding
No Shielding occurs where there are no (or less than 2.5 obstructions per hectare) permanent obstructions upwind. e.g. The first row of houses or single houses abutting open water, airfields and open parklands.



DESIGN FACTORS

Wind speeds have been determined using the following factors, in accordance with AS/NZS1170.2:2011 500 year design return period and an average five metre structure height.

Note: A 5% allowance has been used when allocating the wind classification.

TERRAIN CATEGORIES ($M_{z,cat}$)

Terrain Category	Regions A, B, C and D
1	1.05
1.5	0.98
2	0.91
2.5	0.87
3	0.83

SHIELDING FACTOR (M_S)

Shielding Classification	Factor
Full Shielding (FS)	0.85
Partial Shielding (PS)	0.95
No Shielding (NS)	1.00

TOPOGRAPHIC EFFECT (M_T)

Topographic Classification	Factor
T0	1.00
T1	1.10
T2	1.20
T3	1.30

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

NOTE

The method used for calculating the design gust wind speeds has been developed by Stratco with the assistance of suitably qualified engineers in order to comply with the requirements of AS/NZS1170.2:2011 and classified in accordance with the wind classifications allocated in AS4055:2012.

Stratco does not accept liability for any loss or damage suffered as a result of any errors in the interpretation or application of this design guide. Any person wishing to check any calculations made by them pursuant to this method may wish to seek independent engineering advice.

WIND SPEED EXAMPLES

The examples below show typical applications of the rationalised gust wind speeds. For a full analysis refer to AS/NZS1170.2:2011.

REGION A - N1 (W28), REGION B - N2 (W33) AND REGION C - C1 (W41)

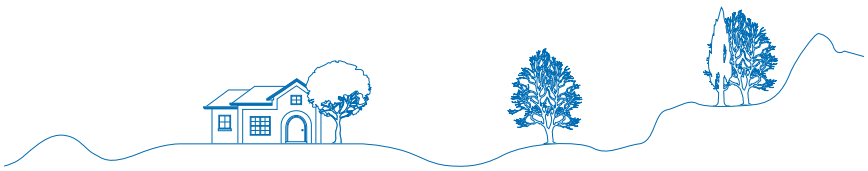
Flat Suburbia

REGION A - N2 (W33), REGION B - N3 (W41) AND REGION C - C2 (W50)

Structures built adjacent to an oval or large vacant lot subject to prevailing winds.

REGION A - N2 (W33), REGION B - N3 (W41) AND REGION C - C2 (W50)

Structures on undulating terrain in suburbia



REGION A - N3 (W41), REGION B - N4 (W50) AND REGION C - C3 (W60)

Structure sited in undulating sparsely populated terrain

REGION A - N3 (W41) REGION B - N4 (W50) AND REGION C - C3 (W60)

The first row of buildings adjacent to the sea front

REGION A - N4 (W50) REGION B - N5 (W60) AND REGION C - C4 (W70)

Extremely severe - Isolated building on the crest of a hill

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