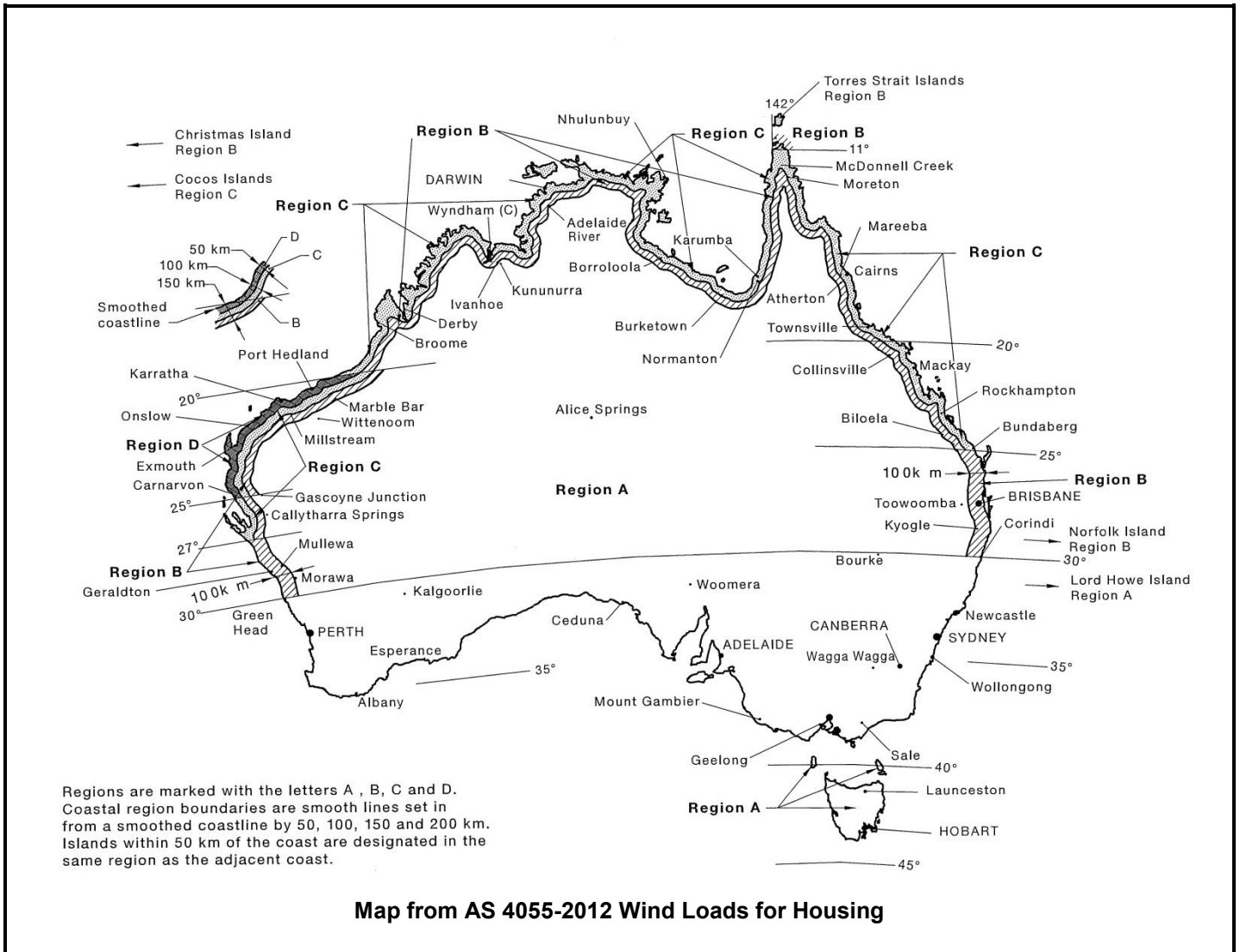


Windlocked Manual & Motorised Steel Roller Shutters Wind Regions, Wind Classifications and Shutter Ultimate Wind Pressure Ratings

1. Australia's Wind Speed Regions



2. Wind Classification

Australia has 10 classes of wind loads, 6 non-cyclonic wind classifications (designated by 'N') and 4 cyclonic wind classifications (designated by 'C'). Regions A & B are non-cyclonic regions and the wind classifications N1 to N6 apply to these regions. Regions C & D are cyclonic regions and the wind classifications C1 to C4 apply to these regions.

The table below is from AS/NZS 4505-2012 Garage Doors and Other Large Access Doors and shows the ultimate wind pressure ratings for doors applicable under this standard. While AS/NZS 4505 is limited to 3m in opening height and doors over this height AS/NZS 1170.2 – 2011 Structural Design Actions Part 2 Wind Actions applies, the ratings are generally compatible between the two standards.

**PRESSURES FOR ULTIMATE WIND PRESSURE RATINGS
DERIVED FROM AS 4055 (AUSTRALIA ONLY)**

| Wind classification | Door width | | | |
|---------------------|-----------------------------|---------|--------|---------|
| | <4 m | | ≥4 m | |
| | Ultimate wind pressure, kPa | | | |
| | Inward | Outward | Inward | Outward |
| N1 | 0.69 | -0.73 | 0.69 | -0.63 |
| N2 | 0.95 | -1.02 | 0.95 | -0.87 |
| N3 | 1.49 | -1.59 | 1.49 | -1.37 |
| N4 | 2.22 | -2.36 | 2.22 | -2.03 |
| N5 | 3.27 | -3.47 | 3.27 | -2.99 |
| N6 | 4.41 | -4.69 | 4.41 | -4.04 |
| C1 | 1.96 | -2.26 | 1.96 | -2.04 |
| C2 | 2.92 | -3.37 | 2.92 | -3.04 |
| C3 | 4.30 | -4.95 | 4.30 | -4.47 |
| C4 | 5.81 | -6.69 | 5.81 | -6.04 |

NOTES:

- 1 Ultimate wind pressures in this table incorporate appropriate local pressure factors.

The site conditions, where the building/s containing the prospective steel shutter/s are located, are used to determine the wind classification. Site conditions are determined by the following:

- i). Wind speed region (refer map above).
- ii). The terrain category (TC) that surrounds the site. Categories TC1, TC 1.5, TC 2, TC2.5 or TC3 are defined in AS 4055 – 2012.
- iii). The topographic class of the site, i.e. where building is located in relation to the topography of the site. Classes T0, T1, T2, T3, T4 or T5 are defined in AS 4055 – 2012.
- iv). The shielding class of the building, i.e. other buildings or obstructions that may be upwind of the prevailing wind direction. Classes FS, PS or NS are defined in AS 4055 – 2012.

The following chart from AS 4055 – 2012 shows wind classification based on the factors above:

WIND CLASSIFICATION FROM WIND REGION AND SITE CONDITIONS

| Wind region | TC | Topographic class | | | | | | | | | | | | |
|-------------|-----|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| | | T0 | | | T1 | | | T2 | | | T3 | | T4 | T5 |
| | | FS | PS | NS | FS | PS | NS | FS | PS | NS | PS | NS | NS | NS |
| A | 3 | N1 | N1 | N1 | N1 | N2 | N2 | N2 | N2 | N2 | N3 | N3 | N3 | N4 |
| | 2.5 | N1 | N1 | N2 | N1 | N2 | N2 | N2 | N3 | N3 | N3 | N3 | N4 | N4 |
| | 2 | N1 | N2 | N2 | N2 | N2 | N3 | N2 | N3 | N3 | N3 | N3 | N4 | N4 |
| | 1.5 | N2 | N2 | N2 | N2 | N3 | N3 | N3 | N3 | N3 | N3 | N4 | N4 | N5 |
| | 1 | N2 | N3 | N3 | N2 | N3 | N3 | N3 | N3 | N4 | N4 | N4 | N4 | N5 |
| B | 3 | N2 | N2 | N3 | N2 | N3 | N3 | N3 | N3 | N4 | N4 | N4 | N4 | N5 |
| | 2.5 | N2 | N3 | N3 | N3 | N3 | N3 | N3 | N4 | N4 | N4 | N4 | N5 | N5 |
| | 2 | N2 | N3 | N3 | N3 | N3 | N4 | N3 | N4 | N4 | N4 | N5 | N5 | N6 |
| | 1.5 | N3 | N3 | N4 | N3 | N4 | N4 | N4 | N4 | N4 | N5 | N5 | N5 | N6 |
| | 1 | N3 | N4 | N4 | N4 | N4 | N4 | N4 | N5 | N5 | N5 | N5 | N6 | N6 |
| C | 3 | C1 | C1 | C2 | C1 | C2 | C2 | C2 | C2 | C3 | C3 | C3 | C3 | C4 |
| | 2.5 | C1 | C2 | C2 | C2 | C2 | C2 | C2 | C3 | C3 | C3 | C3 | C4 | NA |
| | 2 | C1 | C2 | C2 | C2 | C2 | C3 | C2 | C3 | C3 | C3 | C4 | C4 | NA |
| | 1.5 | C2 | C2 | C3 | C2 | C3 | C3 | C3 | C3 | C4 | C4 | C4 | NA | NA |
| | 1 | C2 | C3 | C3 | C3 | C3 | C3 | C3 | C4 | C4 | C4 | NA | NA | NA |
| D | 3 | C2 | C3 | C3 | C2 | C3 | C3 | C3 | C4 | C4 | C4 | C4 | NA | NA |
| | 2.5 | C2 | C3 | C3 | C3 | C3 | C4 | C3 | C4 | C4 | C4 | NA | NA | NA |
| | 2 | C3 | C3 | C4 | C3 | C4 | C4 | C4 | C4 | NA | NA | NA | NA | NA |
| | 1.5 | C3 | C4 | C4 | C4 | C4 | NA | C4 | NA | NA | NA | NA | NA | NA |
| | 1 | C3 | C4 | C4 | C4 | NA | NA | NA | NA | NA | NA | NA | NA | NA |

LEGEND:

- FS = Full shielding
 PS = Partial shielding
 NS = No shielding
 N = Non-cyclonic
 C = Cyclonic
 N/A = Not applicable, that is, beyond the scope of this Standard (use AS/NZS 1170.2)
 TC = Terrain category

3. S100 Steel Shutter Ultimate Wind Pressure Ratings

The information above provides some background into how an appropriately qualified person will determine a site’s design wind pressure, which should be provided before determining whether a S100 steel shutter can satisfy the site requirements.

The table below is from Mirage’s Deemed To Comply M/423 approval obtained from the Northern Territory Building Advisory Council. It provides the ultimate design wind pressure that can be achieved for different widths and windlock spacing for 1.0mm S100 Steel Roller Shutter.

If the site design wind pressure provided is less than, or equal to, the ultimate design wind pressure shown in table for a particular width shutter, then it can be used in the building on that site.

The table also provides the reaction forces in kilo-Newtons per metre length of opening height, at the ultimate design wind pressure, that the door will exert on the opening in the building. It is up to appropriately qualified personnel to determine if the building design is strong enough to resist the stated forces. It should be noted that if the site design wind pressure is lower than the table value of ultimate design wind pressure of the chosen shutter, the reaction force may be reduced proportionally to the difference in wind pressures. For example, if the site design wind pressure is 3.0kPa and a 4.0m wide shutter with windlock every 4th slat is the desired shutter for the building opening then the reaction forces can be reduced to the fraction $\frac{3.0}{3.45}$ of the reaction force values in table.

No Wind Locks

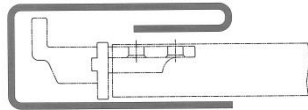
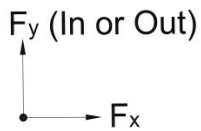
| Door Width | Ultimate Design Pressure (kPa) | Ultimate Reactions (kN/m) |
|------------|--------------------------------|---------------------------|
| 1500 | 8.50 | $F_X = 0; F_Y = 6.4$ |
| 2000 | 4.80 | $F_X = 0; F_Y = 4.8$ |
| 2500 | 3.10 | $F_X = 0; F_Y = 3.9$ |
| 3000 | 2.10 | $F_X = 0; F_Y = 3.2$ |

Windlocks Every 4th Slat

| Door Width | Ultimate Design Pressure (kPa) | Ultimate Reactions (kN/m) |
|------------|--------------------------------|---------------------------|
| 1500 | 10.60 | $F_X = 28.0; F_Y = 8.1$ |
| 2000 | 7.00 | $F_X = 28.3; F_Y = 7.1$ |
| 2500 | 6.00 | $F_X = 28.2; F_Y = 7.6$ |
| 3000 | 4.60 | $F_X = 28.3; F_Y = 7.0$ |
| 3500 | 3.70 | $F_X = 28.6; F_Y = 6.5$ |
| 4000 | 3.45 | $F_X = 28.3; F_Y = 7.0$ |
| 5000 | 3.20 | $F_X = 28.9; F_Y = 8.3$ |

Windlocks Every 2nd Slat

| Door Width | Ultimate Design Pressure (kPa) | Ultimate Reactions (kN/m) |
|------------|--------------------------------|---------------------------|
| 2000 | 13.10 | $F_x = 53.2; F_y = 13.3$ |
| 2500 | 11.00 | $F_x = 51.7; F_y = 13.9$ |
| 3000 | 8.60 | $F_x = 52.9; F_y = 13.1$ |
| 3500 | 7.10 | $F_x = 54.9; F_y = 12.5$ |
| 4000 | 6.50 | $F_x = 53.3; F_y = 13.1$ |
| 5000 | 5.40 | $F_x = 53.3; F_y = 13.7$ |
| 6000 | 5.10 | $F_x = 55.9; F_y = 15.4$ |
| 7000 | 4.50 | $F_x = 55.2; F_y = 15.9$ |
| 8000 | 3.70 | $F_x = 55.8; F_y = 14.9$ |



F_x = Horizontal Reaction in plane of door.

F_y = Perpendicular Reaction to plane of door.

Notes: Guides can be 100mm rolled windlock or 100mm welded windlock. However Type 3 versions of both guides and Type 4 guides can also be used.

Please refer to DTC M/423 for all other details on the use of these shutters.

The S100 steel shutter also passes the debris impact test as prescribed in AS/NZS 1170.2-2011. Refer to Vipac Cyclonic Windborne Debris Test Summary.

Doors that are outside the specifications shown can be referred to Engineering to confirm if other alternative options are available.