PART 3.10.1 HIGH WIND AREAS

Appropriate Performance Requirements:

Where an alternative method of constructing in *high wind areas* is proposed as an *Alternative Solution* to that described in **Part 3.10.1**, that proposal must comply with—

(a) *Performance Requirement* **P2.1**; and

(b) the relevant *Performance Requirements* determined in accordance with **1.0.10**.

Acceptable construction manual

3.10.1.0

Performance Requirement **P2.1** is satisfied for a building constructed in a *high wind area* if it complies with one or more of the following manuals:

(a) Masonry — AS 3700 Masonry structures.

(b) The Northern Territory Deemed-to-Comply Standards Manual.

(c) Timber—

(i) * * * * *

(ii) * * * * *

(iii) AS 1684.2 — Residential timber-framed construction — Non-cyclonic areas.

(iv) AS 1684.3 — Residential timber-framed construction — Cyclonic areas.

(d) Steel—

(i) * * * * *

(ii) AS 4100 — Steel framing.

(iii) AS 4600 — Cold-formed steel structures.

(iv) NASH — Residential and low-rise steel framing — Part 1 Design criteria.

(e) Glazed assemblies:

(i) AS 2047 for the following glazed assemblies in an *external wall*:

(A) *Windows* excluding those listed in **(ii)**.

(B) Sliding doors with a frame.

(C) Adjustable louvres.

(D) Window walls with one piece framing.

(ii) AS 1288 for all glazed assemblies not covered by **(i)** and the following glazed assemblies:

(A) All glazed assemblies not in an *external wall*.

(B) Hinged doors, including French doors and bi-fold doors.

(C) Revolving doors.

(D) Fixed louvres.

(E) Skylights, roof lights and *windows* in other than the vertical plane.

(F) Sliding doors without a frame.

(G) *Windows* constructed on site and architectural one-off *windows*, which are not design tested in accordance with AS 2047.

(H) Second-hand *windows*, re-used *windows*, recycled *windows* and replacement *windows*.

(I) Heritage *windows*.

(J) Timber *windows* in wind classification N3 or C1.

(K) Glazing used in balustrades and sloping overhead glazing.

(f) In cyclonic areas, metal roof assemblies, their connections and immediate supporting members must be capable of remaining in position notwithstanding any permanent distortion, fracture or damage that might occur in the sheet or fastenings under the pressure sequences A to G defined in **Table 3.10.1**.

Table 3.10.1 Low-High-Low pressure sequence

Sequence	Number of cycles	Load
A	4500	0 to 0.45 Pt
B	600	0 to 0.6 Pt
C	80	0 to 0.8 Pt
D	1	0 to 1.0 Pt
E	80	0 to 0.8 Pt
F	600	0 to 0.6 Pt
G	4500	0 to 0.45 Pt

Note:

1. Pt is the ultimate limit state wind pressure on internal and external surfaces as determined in accordance with AS/NZS 1170.2, modified by an appropriate factor for variability, as determined in accordance with Table B1 of AS/NZS 1170.0.
2. The rate of load cycling must be less than 3Hz.
3. The single load cycle (sequence D) must be held for a minimum of 10 seconds.

(g) For the purposes of **(f)**, cyclonic areas are those determined as being located in wind regions C and D in accordance with **Figure 3.10.1.4**.

Explanatory information:

The requirements of **3.10.1.0 (f)** must be read in conjunction with the provisions of AS/NZS 1170.2 or AS 1170.2. The ABCB commissioned research to establish a national consistent testing regime for metal roof cladding assemblies in cyclonic areas. The results of this research are contained in **3.10.1.0 (f)**.

Low cycle fatigue cracking of metal roof cladding elements during tropical cyclones is a complex process where small changes in load, geometry or material properties can significantly affect the fatigue performance of the cladding system (includes immediate supports, fixings and cladding). The consequences of failure of an element can quickly lead to more elements progressively failing. These failed elements become wind driven debris and so pose a threat to people and other structures as potential missiles.

The fatigue loading sequence defined in **Table 3.10.1** is to simulate the wind load induced by a cyclonic event. In order to have a repeatable standard test that can be performed by different testing laboratories within a reasonable time frame on different types of test equipment, the loading sequence is a simplification of the dynamic wind loading environment. In the formulation of the fatigue loading sequence assumptions such as cyclone counts, load range, cyclone duration, wind direction change, building orientation and building geometry have been made.

If a system does not successfully resist the fatigue loading sequence in **Table 3.10.1**, it does not comply.

The test section consists of cladding elements, fastenings and immediate supporting members assembled together in a manner identical to those parts of the particular roof which the test section is intended to replicate.

STATE AND TERRITORY VARIATIONS

Add 3.10.1.0(h) in the Northern Territory.

(h) Masonry veneer — Masonry veneer construction must be designed so that the structural framing to which the masonry veneer is tied will ensure the stability of the masonry veneer.

3.10.1.0(e)(i) is replaced by the following clause in Queensland:

(i) AS 2047 for the following glazed assemblies in an *external wall*, with the exception that Tables 2.1 and 2.5 of AS 2047 are omitted and the following Tables are inserted:

(A) *Windows* excluding those listed in (ii).
(B) Sliding doors with a frame.
(C) Adjustable louvres.
(D) Window walls with one piece framing.

TABLE 2.1 WINDOW RATINGS FOR HOUSING

Window rating	Serviceability design wind pressure, Pa
N1	500
N2	700
N3, C1	1000
N4, C2	1500
N5, C3	2200
N6, C4	3000

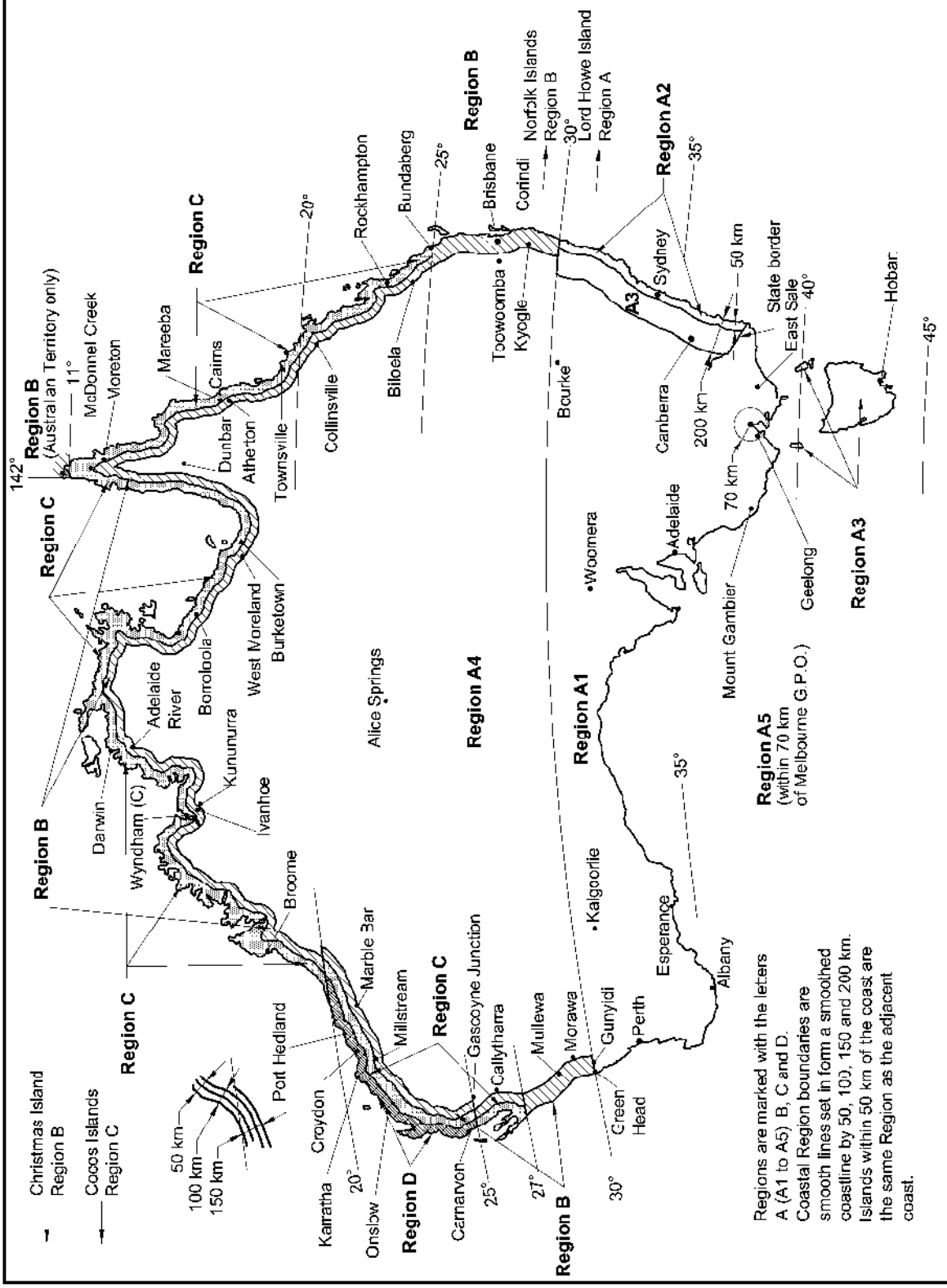
TABLE 2.5 ULTIMATE STRENGTH TEST PRESSURES

Window rating	Ultimate strength test pressure, Pa
N1	700
N2	1000
N3, C1	1500
N4, C2	2300
N5, C3	3300
N6, C4	4500

Figure 3.10.1.4

WIND REGIONS

Note: *High wind areas* exist outside the wind regions indicated on this map.



Explanatory information:

Construction in *high wind areas*

The intent of building construction in *high wind areas* is to ensure the structure has sufficient strength to transfer wind forces to the ground with an adequate safety margin to prevent the collapse of the building and the building being lifted, or slid off its foundations.

To resist these forces it is necessary to have—

(a) an anchorage system, where the roof is connected by the walls to the footings by a chain of connections; and

(b) a bracing system to prevent horizontal collapse due to wind forces; and

(c) continuity of the system where each structural element is interlocked to its adjoining structural element throughout the building.

Anchorage

Anchorage of the system is achieved by using a variety of proprietary connectors. Each connector must be capable of carrying the uplift force, because the ability of the building to resist the wind forces is directly related to its weakest link.

Acceptable construction manuals to achieve these requirements are described in this Part.