NEW ZEALAND STANDARD NZS 4211:1985

Pr AA

Specification for
PERFORMANCE OF WINDOWS

AMENDMENT No. 3

February 1994

EXPLANATORY NOTE – The loads specified as part of the performance criteria in NZS 4211:1985 have been derived from design wind pressures (DWP) which were determined in accordance with the principles of working stress design (WSD). The 1992 edition of the New Zealand Loadings Standard (NZS 4203:1992) defines load levels for both ultimate limit state and serviceability limit state conditions. Wind loads are specified for both limit states. The wind zones nominated within the 1990 edition of the light timber framing code (NZS 3604) were determined from the ultimate limit state wind speeds as outlined in NZS 4203:1992.

This amendment redefines window performance criteria in limit state terms. Windows tested in accordance with this amendment are required to satisfy three distinct requirements, namely, ultimate limit state criteria (strength and stability when subjected to wind pressures associated with limit state wind speeds), and two serviceability criteria (the first for stiffness when subjected to wind pressures associated with serviceability limit state wind speeds; and the second for water leakage when subjected to a lesser nominal wind pressure). Window ratings are to be determined from the least equivalent ultimate wind speed which satisfies all the above criteria. For windows which are required to satisfy specific design, the window rating is to be the equivalent ultimate design wind pressure (UWP). For windows to be used in non-specific design situations, the window rating is to be the wind zone with the lowest associated design wind speed for each of which the above criteria is satisfied. The wind zones nominated within the amendment are consistent with those specified within NZS 3604. Windows rated as suitable for use within a non-specific design wind zone are suitable for use within that wind zone specified in NZS 3604.

The test criteria for the original three wind zones specified within NZS 4211:1985 are slightly more stringent than those within this amendment and accordingly continue to meet the requirements of the equivalent wind zones (i.e. Low, Medium and High). The Very High zone introduced into the 1990 edition of NZS 3604 is an additional zone added to cater for buildings erected on particularly exposed sites. There was no equivalent zone either in the earlier edition of NZS 3604, or within NZS 4211:1985.

APPROVAL

Amendment No. 3 was approved on 7 February 1994 by the Standards Council to be an amendment to NZS 4211:1985 pursuant to the provisions of section 10 of the Standards Act 1988.

RELATED DOCUMENTS

Delete the references to NZS 1900 and MP 3801:1972.

Delete "NZS 4203:1984" and **substitute** "NZS 4203:1992".

Delete "NZS 4223:1985 Code of practice for glazing in buildings" and **substitute:**

"NZS 4223:- - - -	Code of practice for glazing in buildings
Part 1:1985	The selection and installation of glass in buildings
Part 2:1985	The selection and installation of manufactured sealed insulating glass units
Part 3:1993	Human impact safety requirements"

Add:

"NZS 3604:1990	Code of practice for light timber frame buildings not requiring specific design
NZS 4229:1986	Code of practice for concrete masonry buildings not requiring specific design".

(Amendment No. 3, February, 1994)

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Foreword
Delete the first paragraph.

(Amendment No. 3, February, 1994)

2.2
Delete the clause.

(Amendment No. 3, February, 1994)

3.4
In line 8 **delete** the word "three" and **substitute** "four".

(Amendment No. 3, February, 1994)

4.1
Delete the clause and **substitute:**

"**4.1**
In this Standard the following performance properties of a window are related to the wind pressure to which they may be exposed:

(a) Deflection of structural elements (section 10);

(b) Water leakage (section 12);

(c) Overall strength of window and fixings (section 10)."

(Amendment No. 3, February, 1994)

4.2
In line 3 **delete** the word "design".

(Amendment No. 3, February, 1994)

4.3
In line 1 **delete** the word "design".

(Amendment No. 3, February, 1994)

4.4
In line 1 **delete** the word "design".

(Amendment No. 3, February, 1994)

5.1
Delete item (b) and **substitute:**

"(b) The window rating shall be determined as the least demanding wind zone achieved by the test window for:

(i) Deflection in accordance with 10.2,

(ii) Water leakage in accordance with section 12, and

(iii) Ultimate strength in accordance with 10.3."

Add a new item (e) as follows:

"(e) Any window, or range of windows which has been shown by tests, prior to the issue of Amendment No. 3, to be rated as suitable for use within a given non-specific design wind zone defined by this Standard, shall be deemed to continue to be suitable for use within the same wind zone as defined in NZS 3604:1990, without the need for retesting.

(Amendment No. 3, February, 1994)

6.2
Delete the clause and **substitute:**

"**6.2**
Each window to be installed in buildings not requiring specific design (NZS 3604:1990) and claimed by the manufacturer (on the basis of prototype tests) to comply with this Standard, shall be marked on the frame in letters not less than 2 mm high with:

(a) The manufacturer's name or brand name;

(b) The number of this Standard, "NZS 4211:1985";

(c) The rating expressed as the appropriate wind zone (i.e. Low, Medium, High and Very High) for example "Zone M";

(d) The air leakage level, for example "Level 2".

The marking label does not need to be affixed during the test."

(Amendment No. 3, February, 1994)

6.2.1
In line 3 **delete** the words "design wind pressure" and **substitute** "wind zone".

(Amendment No. 3, February, 1994)

6.2.2
Delete the clause and **substitute**:

"6.2.2
For windows in buildings requiring specific design, the test certificate alone shall satisfy the requirements of this clause. The rating shall be in terms of both Ultimate Wind Pressure (UWP) and the Serviceability Wind Pressure (SWP) e.g. UWP – 2000 Pa; SWP – 750 Pa."

(Amendment No. 3, February, 1994)

6.9
In item (c) line 1 **delete** the word "design".

Delete item (d) and **substitute**:

"(d) Either rated Wind Zone for windows in building not requiring specific design, or rated Ultimate Wind Pressure and Serviceability Wind Pressure for windows in buildings requiring specific design."

(Amendment No. 3, February, 1994)

7.1
Delete the clause, including table 1, and **substitute**:

"7.1
For any building not requiring specific design as defined in NZS 3604 and NZS 4229, the window rating shall be not less than the wind zone of the installation site."

(Amendment No. 3, February, 1994)

7.2
Delete the clause.

(Amendment No. 3, February, 1994)

Table 2
Delete the table.

(Amendment No. 3, February, 1994)

Figure 1
Delete the figure.

(Amendment No. 3, February, 1994)

9.8
Delete the clause.

(Amendment No. 3, February, 1994)

10.2
Delete the clause and **substitute**:

"10.2
Unless a smaller value is separately specified for windows in buildings requiring specific design, the maximum deflection due to bending of any structural member, including the outer window frame, measured relative to the end of the member at the Serviceability Wind Pressure (SWP) shall not exceed 1/360 of the span".

(Amendment No. 3, February, 1994)

10.3
Delete the clause and **substitute**:

"10.3
A window shall withstand positive and negative test pressure equal to the Ultimate Wind Pressure (UWP) without loss of integrity, breakage or instability."

(Amendment No. 3, February, 1994)

Add a new clause:

"10.4
For windows in buildings not subjected to specific design, the Serviceability Wind Pressure and Ultimate Wind Pressure corresponding to the wind zones of NZS 3604 are shown in Table 5".

Table 5 TEST PRESSURES FOR WINDOWS NOT REQUIRING SPECIFIC DESIGN

Wind Zone as specified in NZS 3604:1990	*Serviceability Wind Pressure (SWP) Pa*	*Ultimate Wind Pressure (UWP) Pa*
Low	250	650
Medium	325	850
High	460	1200
Very High	600	1550

(Amendment No. 3, February, 1994)

Add a new clause:

"10.5
For any building requiring specific design, the Ultimate Wind Pressure and the Serviceability Wind Pressure together with any variation to the above performance criteria, shall be supplied in writing to the testing agency by the design engineer".

(Amendment No. 3, February, 1994)

12.2
Delete the clause and **substitute**:

"12.2
For windows in buildings not requiring specific design, the maximum water leakage test pressure shall be:

For windows to be used in wind zones L and M ..... 225 Pa
For windows to be used in wind zones H and VH ..... 330 Pa

For windows in buildings requiring specific design, the maximum water leakage test pressure shall be 0.40 times the Serviceability Wind Pressure plus 120 Pa".

(Amendment No. 3, February, 1994)

APPENDIX A

A1
Delete the clause and **substitute** the following:

"A1
Design Wind Pressures

A1.1
Ultimate Wind Pressures

The differential wind pressures resulting from wind speeds shall be derived in accordance with the calculation procedures prescribed in NZS 4203:1992 for ultimate limit state conditions (M_{ls} = 0.93). Windows are required to demonstrate adequate strength and stability to endure the resulting pressures (both as positive and as suction pressures). In specific design examples these positive and suction pressures may be different and should be prescribed accordingly by the design engineer in accordance with the requirements of 10.5. For non-specific design situations the UWP has been derived by considering the ultimate design wind speeds for the various wind zones defined in NZS 3604, with an external pressure coefficient, C_{pe}, of ±0.7 and an internal pressure coefficient, C_{pi}, of ±0.5. Positive and suction pressure are considered to be equal.

Table A1 Ultimate Limit State - strength, stability, integrity

	Basic wind speed *m/s*	*Ultimate design wind speed* *m/s*	*Dynamic pressure (Ultimate)* *Pa*	*Ultimate wind pressure (UWP)*	*Rounded UWP* *Pa*
Low	32	30	531	638	650
Medium	37	34	710	853	850
High	44	41	1005	1206	1200
Very High	50	47	1297	1557	1550

A1.2
Serviceability Wind Pressures (SWP)

The differential wind pressures resulting from wind speeds shall be derived in accordance with the calculation procedures prescribed in NZS 4203:1992 for serviceability limit state conditions (M_{ls} = 0.75). Windows are required to demonstrate adequate stiffness to withstand the resulting pressures (both as positive and suction pressures) by meeting the deflection criteria prescribed in 10.2. In specific design examples these positive and suction pressures may be different and should be prescribed accordingly by the design engineer in accordance with the requirements of 10.5. For non specific design situations the SWP has been derived by considering the serviceability design wind speeds for the various wind zones defined in NZS 3604 with an external pressure coefficient C_{pe} = ±0.7 and an internal pressure coefficient, C_{pi} of zero. Positive and suction pressures are considered equal."

Table A2 Serviceability Limit State - deflection

	Basic wind speed	*Serviceability design wind speed*	*Dynamic pressure (Serviceability)*	*Serviceability wind pressure (SWP)*	*Rounded SWP*
	m/s	*m/s*	*Pa*		*Pa*
Low	32	24	346	242	250
Medium	37	28	462	323	325
High	44	33	653	457	460
Very High	50	38	844	591	600

(Amendment No. 3, February, 1994)

APPENDIX B

B7.2
Delete the clause and **substitute**:

"B7.2
Tests shall be carried out in the following sequences:

(a) Deflection tests – positive pressure;

(b) Deflection tests – negative pressure;

(c) Air leakage – positive pressure;

(d) Air leakage – negative pressure (if required);

(e) Water leakage test;

(f) Ultimate Wind Pressure test – positive;

(g) Ultimate Wind Pressure test – negative.

(Amendment No. 3, February, 1994)

B8.5
Delete the first sentence and **substitute**:

"The test pressure shall then be applied in steps up to the maximum appropriate to the test being carried out".

(Amendment No. 3, February, 1994)

B8.6
In line 2 **delete** "10.3" and **substitute** "10.2".

(Amendment No. 3, February, 1994)