

Petima Pty Ltd
Trading as Structural Panels Australia and Tridek Roofing
Factory 52B, 37-39 East Street
Daylesford VIC 3460

Manufacturers of Structural Insulated Panels “SIPs” building panels
Structural Assessment and Certification

July 1, 2023

This is to CERTIFY that this firm was engaged to evaluate the range of products manufactured by Petima Pty. Ltd., trading as Structural Panels Australia and Tridek Roofing, for structural compliance with the building code of Australia, regulations and all relevant Australian standards.

The assessment included the use of the SIPs Panels for load bearing and non-load bearing walls, roofs, floors and ceilings as flat surface panels and as box beams on edge as lintels and beams.

The building products manufactured by Structural Panels Australia and Tridek Roofing consist of a sandwich of polystyrene/or polyurethane foam with hard faced skins on both sides. The skins are either Oriented Strand Board (OSB) or profiled Colorbond (CBD) steel sheets or combinations of both depending on the final use or application.

The section properties, span tables, load ratings included in this product manual have been calculated and assessed in accordance with engineering principles. Material properties of the various component parts are as published by the individual manufacturer/suppliers. The material properties of the foam core are variable and are not critical in the strength and stiffness calculations for the whole composite panel. Published generic values for strength and stiffness parameters have been used in the calculations.

The information contained in this manual has been prepared for the exclusive use of Petima Pty Ltd. Trading as Structural Panels Australia and Tridek Roofing and can only be used in connection with the use and application of these products.

Date of activation of the span tables 1st July 2023

Yours Faithfully



Ross Proud
FIEAust 76086, CPEng, Chartered Engineer
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Director



RE: SPA SIPs and Tridek SIPs

Appendix A

Assessment criteria

The following criteria has been adopted for the assessment structural performance assessment of

SPA SIPs panels for walls, floors and ceilings and Tridek SIPs roofing panels.

Structural Roof cladding:	Roofs	Tridek SIPs (EPS/XPS/PUR cores)	
		Core density	15 – 20 kg. /m3
		Profiled steel sheet	5.0 kg. /m2
		Total Tridek	0.20 kPa
Structural OSB SIPs panels for the following applications			
		• Floor Panels applications - with or without box or timber splines	
		• Wall Panels applications – without splines	
		• Ceiling panel applications – with or without splines	
		• Beam/Lintel Panel applications – with embedded top and bottom plates	
Dead Loads G	Floors	OSB	600kg/m3
		Total OSB	0.20 kPa
	Ceilings	Plaster	0.01 kPa /mm thickness
Applied Dead Load	ceilings	services/ducting	0.40 kPa
		Total Ceilings	0.60 kPa
Applied Dead loads	Floors	Finishes etc.	0.40 kPa
		Total floors	0.60 kPa
Live Loads Q		Roofs	
0.25 kPa		Floors	1.5, 2.0, 3.0, 4.0, 5.0 kPa
		Ceilings	0.25
Wind forces (Ultimate)			As per table

Wind classification	Regional Wind Velocity m/s	Design pressure kPa
N1	34	0.69
N2	40	0.96
N3	50	1.50
N4	61	2.23
N5	74	3.29
N6	86	4.44
C1	50	1.50
C2	61	2.23
C3	74	3.29
C4	86	4.44

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Wind loads calculated in accordance with AS1170.2 or AS4055 for cyclonic and non-cyclonic areas for the designated wind region.

Tables are included for region "C" Cyclonic. For areas where Region "D" is applicable the building should be subjected to custom design check.

The Designated wind region for a particular site is to be evaluated by the design engineer or as stated in the geotechnical report for the particular site or in the absence of either of the above as required by the building regulatory body appointed to issue building approval.

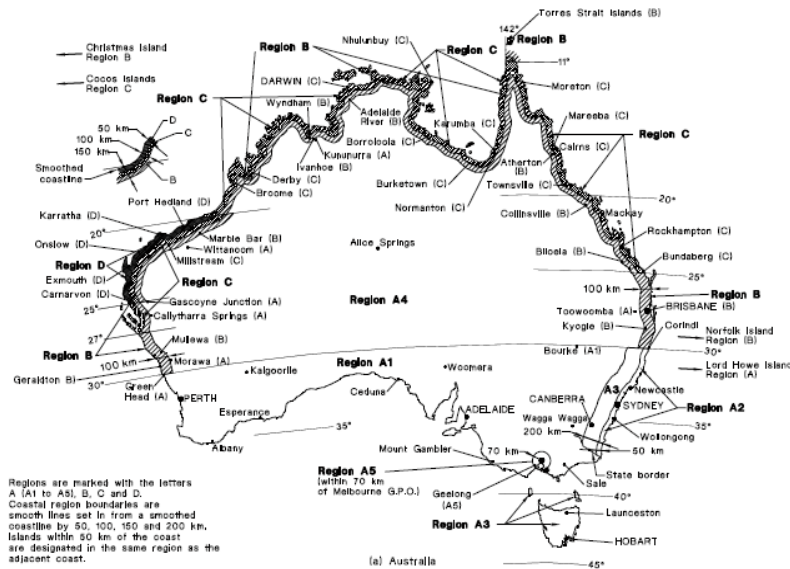


FIGURE 3.1(A) WIND REGIONS

FIGURE 3.1(A) REPRODUCED FROM AS/NZS 1170.2:2011

SERVICEABILITY REQUIREMENTS AND LIMITS

This manual makes recommendations on serviceability limits in accordance with recognized and acceptable practice to minimize the harmful effects of both short- and long-term deflections.

The instantaneous (short term) deflections are calculated on the section properties of the composite section and the elastic modulus of the skin materials. This applies to the design live loads "Q."

Deflection limits for floor live loads – the lesser of	Span/300 or 12mm
Deflection limits for walls under wind forces	Span/240
Deflection limits for roofs subject to wind forces	Span/180

Creep deflection Characteristics

SIPs like all EPS/XPS/PUR products will creep under the action of long-term or permanent loads. It is recommended that long term permanent gravity load deflections should be estimated using a factor of 2.5 times the instantaneous deflections for the SPA SIPs Panel and considers the long-term creep of the skin material and the shear deflection of the panel core.

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OSB SIPS PANELS - PROPERTIES FOR DESIGNING

OSB SIPS - NO SPLINES	ϕM_b (kNm)	1.66	2.93	3.98	7.30	11.62	16.94
	Elxx	3.039E+10	7.145E+10	1.131E+11	2.810E+11	5.646E+11	9.939E+11
OSB SIPS - 90MM BOX SPLINES	ϕM_b (kNm)	2.57	1.63	2.04	3.26	4.77	6.57
	Elxx	4.344E+10	1.046E+11	1.559E+11	3.538E+11	6.752E+11	1.150E+12
OSB SIPS - 150MM BOX SPLINES	ϕM_b (kNm)	0.74	1.18	1.35	1.75	2.16	2.57
	Elxx	5.213E+10	1.266E+11	1.845E+11	4.024E+11	7.489E+11	1.254E+12
OSB SIPS - MGP SPLINES	ϕM_b (kNm)	0.50	0.89	1.21	2.22	3.53	5.15
	Elxx	5.394E+10	1.268E+11	2.007E+11	4.988E+11	1.002E+12	1.764E+12
OSB SIPS - LVL SPLINES	ϕM_b (kNm)	1.65	2.92	3.97	7.28	11.60	16.91
	Elxx	6.101E+10	1.434E+11	2.269E+11	5.641E+11	1.133E+12	1.995E+12
OSB SIPS - DOUBLE MGP SPLINES	ϕM_b (kNm)	1.01	1.78	2.42	4.43	7.06	10.29
	Elxx	7.749E+10	1.822E+11	2.883E+11	7.165E+11	1.439E+12	2.534E+12
OSB SIPS - DOUBLE LVL SPLINES	ϕM_b (kNm)	3.31	5.85	7.94	14.57	23.19	33.81
	Elxx	9.162E+10	2.154E+11	3.408E+11	8.472E+11	1.702E+12	2.996E+12

TRIDEK SIPS PANELS - PROPERTIES FOR DESIGNING

PROFILE	Panel Thickness			115	145	165	215	265	315
	Modulus of elasticity		"E"	200,000	200,000	200,000	200,000	200,000	200,000
CLASSIC	Top	Bottom	lxx/m	2.67E+06	3.86E+06	4.67E+06	6.22E+06	8.75E+06	1.31E+07
	CORODEK	CORODEK	Zxx/m	44147	52859	58115	66905	79254	96946
			AREA/m	1071	1071	1071	1071	1071	1071
			ϕM_b /m	21.85	26.17	28.77	33.12	39.23	47.99
PRO	Top	Bottom	lxx/m	2.53E+06	3.65E+06	4.42E+06	5.87E+06	8.26E+06	1.24E+07
	TRIMCLAD	CORODEK	Zxx/m	4.39E+04	5.21E+04	5.71E+04	6.56E+04	7.75E+04	9.46E+04
			AREA/m	1048	1048	1048	1048	1048	1048
			ϕM_b /m	21.73	25.80	28.28	32.45	38.34	46.83
SMART	Top	Bottom	lxx/m	2.56E+06	3.76E+06	4.59E+06	6.16E+06	8.74E+06	1.32E+07
	METROSPAN	METROSPAN	Zxx/m	4.40E+04	5.32E+04	5.87E+04	6.79E+04	8.08E+04	9.93E+04
			AREA/m	1114	1114	1114	1114	1114	1114
			ϕM_b /m	21.79	26.32	29.04	33.59	39.98	49.13
ICON	Top	Bottom	lxx/m	1.52E+06	2.42E+06	3.21E+06	4.52E+06	6.79E+06	9.53E+06
	METLOK	METROSPAN	Zxx/m	3.08E+04	3.82E+04	4.37E+04	5.16E+04	6.29E+04	7.43E+04
			AREA/m	936	936	936	936	936	936
			ϕM_b /m	15.24	18.90	21.64	25.53	31.14	36.79

Building Code of Australia Compliance

The Loading Capacity and Span Tables complies with the following provisions of Building Code of Australia and the enabling state enacted building acts and regulations and published by the Australian Building codes board "ABCB" as the "National Construction Code" NCC 2022

- NCC 2022 Volume One - Class 2 – 9 Buildings
 - Part B1 Resistance to Actions class
 - B1.1 Structural reliability
 - (a), (b)
 - B1.2 Determination of Individual actions
 - (a) Permanent actions
 - (b) Imposed actions
 - (c) Wind, snow and ice and earthquake action
 - (d) Actions not covered in (a), (b), (c) above.

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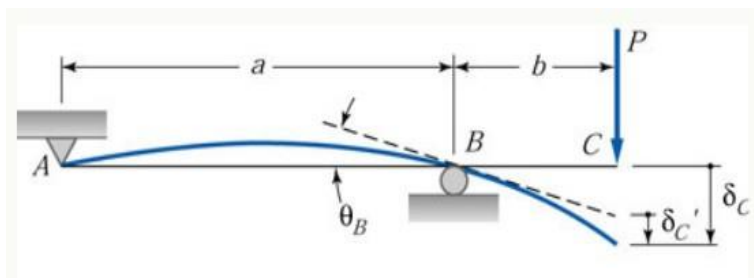
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- Table B1.2a Importance levels of buildings and structures
 - Table B1.2b Design events for safety
- NCC 2022 Volumes Two - Class 1, 10a Buildings
 - Part 2.1 Structure
 - 2.1.1 Structural Stability and Resistance (a), (b), (c)
 - Part 3.1 Structural Provisions
 - 3.0.2 Resistance to Actions (a)&(b)
 - 3.0.3 Determinations of individual actions
 - (a) Permanent actions
 - (b) Imposed actions
 - © wind, snow and ice and earthquake actions
 - Table 3.0.3a Importance Level of buildings and structures
 - Table 3.0.3b Design events for safety
 - 3.0.4 Determination of structural resistance of materials and forms of construction
 - Relevant Australian Standards
 - AS/NZS 1170.0-2002 Structural design actions Part 0: General principles
 - AS/NZS 1170.1-2002 Structural design actions Part 1: Permanent, imposed and other actions
 - AS/NZS 1170.2-2011 Structural design actions Part 2: Wind for non-cyclonic areas only
 - AS1170.4-2007 Structural design action Part 4: Earthquake actions in Australia
 - AS4055-2012 Wind loads for housing.
 - AS1720.1-2010 Timber structures Part 1: Design methods
 - AS 4600 COLD FORMED STEEL STRUCTURES CODE
 - AS 4100 STEEL STRUCTURES CODE

Other structural considerations Cantilevers:

The above values are assessed under the strength capacity of the panels only, assuming deflection criteria is not critical.

Deflections of a cantilevered beam is complicated as illustrated below:



The load resisting width of the panel would need to be checked case by case depending on the layout and location of the load.

Where the deflection criteria is applicable, it should be checked by a competent structural engineer.

For a roof cantilevered eave, canopy, the wind pressure could be much higher than the overall roof area, which could be 3 times higher, depending on the high, chape, location of the cantilever, all cantilevered should be checked by a competent structural engineer.

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Maximum Roof Cantilever (strength only) along the Width

SPA SIPs: 25% of the internal bay (back span) under uniformly distributed loads only. Tridek SIPs: generally, half a panel width (Classic Series & Pro Series 381mm, Smart Series & Icon Series 350mm).

Maximum Roof Cantilever (strength only) along the Pitch

SPA SIPs: 25% of the back span under uniformly distributed loads only. Tridek SIPs: 25% of the back span under uniformly distributed loads only.

Point loads and deflections of the cantilever must be converted to equivalent UDL effects and checked by a competent structural engineer.

Penetrations**SPA SIPs**

For full width opening in a single panel a reduction to 80% of the max span is appropriate

Tridek SIPs

For full width opening in a single panel a reduction to 80% of the max span is appropriate

For opening widths between 2 panels a reduction to 60% of the span is appropriate.

Flashing details.

Matching the panel thickness folded from 1.9mm Galv sheet up to one panel wide opening and 2.4mm Galv sheet for upto 2 panels wide opening (Welded frame).

Top flange overlap one rib

The bottom flange min. width 75mm

COMBUSTIBLE EXTERNAL WALL CLADDING***Minister's declaration***

With effect from 1 February 2021, the Minister for Planning has declared under section 192B(1) of the Building Act 1993 (the Act), that certain high risk external wall cladding products are prohibited from use by any person in the course of carrying out any building work in Victoria in connection with a Type A or Type B construction building1.

PROHIBITION of HIGH-RISK CLADDING PRODUCTS

Buildings affected by the prohibition The prohibition applies to Class 2 to 9 buildings required to be of Type A or Type B construction by the Deemed-to Satisfy (DtS) Provisions of Part C1 of the Building Code of Australia Volume One (BCA), where an application for a building permit has been made to the relevant building surveyor on and after 1 February 2021. The intent of the prohibition is that it applies irrespective of whether a Performance Solution is proposed to meet the Performance Requirements of the BCA. The prohibition does not apply to buildings of Type C Construction or to buildings that are classified as Class 1 and 10 in accordance with

Buildings affected by the prohibition.

The declaration prohibits the use of the following external wall cladding products: • aluminum composite panels (ACPs) with a core of less than 93 per cent inert mineral filler (inert content) by mass in an external cladding as part of a wall system; and • expanded polystyrene (EPS) products used in an external insulation and finish (rendered) wall system.

Cladding products are not affected by the prohibition.

The Minister's declaration does not affect the use of other external wall cladding products in buildings required to be of Type A or B Construction. This includes products such as insulated sandwich panels, EPS concrete (Conpolcrete™), which are not considered to be included in the definition of prohibited cladding products. the Building Code of Australia.

The critical statements relevant to EPS claddings are very specific.

- 1. EPS products are used in an external insulation and finish (rendered) wall system.*
- 2. Cladding products not prohibited include EPS sandwich Panel, EPS concrete.*

The use of Tridek as a wall cladding is not prohibited under these definitions, however this should be raised with the regulatory authority prior to specifying these products on any class 2 – 9 buildings where Type A and B construction is required.

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