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Tuesday, 30 April 2024

Delta Panels Pty Ltd
731 Boundary Road,
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QLD 4077

Dear Mr Guy

WEATHER TIGHTNESS CERTIFICATION FOR
DeltaOrb DPP1110 – 17.5mm Ribs 1000mm Cover, and
DeltaTrim DPP1150 – 32.8mm Ribs 1000mm Cover.

We, Summermore Pty Ltd, being Registered Structural and Civil Engineers, hereby certify

1. That the products described as DeltaOrb DPP1110 – 17.5mm Ribs 1000mm Cover when installed at a roof pitch of five degrees or more, complies with the requirements of ***AS1562.1:2018- Design and Installation of Metal Roof and Wall Cladding Metal.***
2. That the products described as DeltaTrim DPP1150 – 32.8mm Ribs 1000mm Cover when installed at a roof pitch of two degrees or more, complies with the requirements of ***AS1562.1:2018- Design and Installation of Metal Roof and Wall Cladding Metal.***

It follows that the compliance with AS1562.1:2018 then satisfies the requirements of the Building Code of Australia 2022 Volume One deemed to satisfy provision F3D2(b) – Roof Covering and Volume Two deemed to satisfy provision H2D6(4) – Roof Cladding.

This compliance is pertinent to Class 2—9 buildings relating to BCA-2022 Volume One and Class 1 and Class 10a buildings relating to BCA-2022 Volume Two.

The attached report details the methods that deemed to satisfy compliance has been reached.

Referenced Codes of Practice and Manuals

Part F3D2(b) of NCC 2022 Volume One
Part H2D6(4) of NCC 2022 Volume Two
Part H1D7 Sheet Roofing of NCC 2022 Volume Two
AS1562.1: 2018 Design and installation of sheet roof and wall cladding Part 1: Metal

Summermore Pty Ltd accepts no responsibility for information that has not been expressly identified as part of this certification.

If we can be of any further assistance in this matter, please do not hesitate to contact this office.

Yours Faithfully

Ronald Bell
FIEAust (891940), CPEng, NER, APEC Engineer, IntPE(Aus), RPEQ (6715), Registered Engineer Structural NSW (BDC04601), RPE(Vic) (PE0002564).
Director
Summermore Pty Ltd

Report on:

Determining Delta Roof Sheeting Drainage Capacity to AS1562.1:2018

Prepared for Delta Panels Pty Ltd by the
AHSCA Research Foundation

August 2020

Contents

Disclaimer: The maximum allowable roof sheeting lengths provided in this report are based on calculations of theoretical hydraulic drainage capacity only. The designer and installer must provide allowances for thermal expansion according to AS1562.1:2018 and other relevant design codes. These may significantly reduce the allowable roof sheeting lengths provided in this report. The AHSCA does not guarantee the accuracy or validity of the calculation procedures given in AS1562.1: 2018.

1. Purpose

The purpose of this report was to determine the roof drainage capacities of two different Delta Panels Roof Sheeting profiles (*DeltaOrb and DeltaTrim*) according to calculation procedures outlined in Section 3.3 of AS1562.1:2018 – Design and Installation of sheet roof and wall cladding.

2. Methods

Calculation procedures outlined in Section 3.3 of AS1562.1:2018 were followed to determine the drainage capacities of the two Delta Panels Roof Sheeting profiles. These procedures are:

3.3.1 General:

The cladding system shall provide water resistance and drainage when subjected to a rainfall resulting from a storm having an average recurrence interval of 100 years as determined by AS3500.3 (i.e. 100year, 5-minute duration storm).

3.3.2 Roof Pitch

Minimum roof pitch shall be the greater of:

a) The value given in Table 3.1: and
b) The value calculated in accordance with Appendix D (see appendix).

TABLE 3.1

MINIMUM ROOF CLADDING PITCH FOR PLANAR ROOFS

Roof cladding	Minimum pitch degree
Closely spaced sheeting ribs with depth less than 20 mm	5
Corrugated closely spaced sheeting ribs with depth between 20 mm and 30 mm	3
Corrugated closely spaced sheeting ribs over 30 mm depth	2
Closely spaced trapezoidal sheeting ribs with depth between 20 mm and 35 mm	3
Trapezoidal sheeting ribs between 20 mm and 35 mm	2
Trapezoidal sheeting ribs over 35 mm depth	1
Secret fastened sheeting ribs up to 30 mm depth	2
Secret fastened sheeting ribs over 30 mm depth	1
Long run metal tile	10
Metal tiles < 25 mm upstand	15
Metal tiles > 25 mm upstand	12

The drainage capacity calculation results presented in this report were obtained using the procedures outlined in Appendix D of AS1562.1:2018. Maximum allowable roof lengths* for the 100 year, 5-minute storm rainfall intensities are presented for roof pitch values equal to and greater than the minimum values given in Table 3.1.

**The designer and installer must provide allowances for thermal expansion according to AS1562.1:2018 and other relevant design codes.*

3. Results

3.1 DeltaOrb DPP1110 - 17.5 mm Ribs 1000mm Cover

DeltaOrb roof sheeting (Figure 1) is classified as closely spaced sheeting ribs with depths less than 20mm in Table 3.1 (AS1562.1). Therefore, the minimum allowable pitch for this roof profile is 5.0º. Maximum roof lengths are shown in Table 2 and Figure 2.

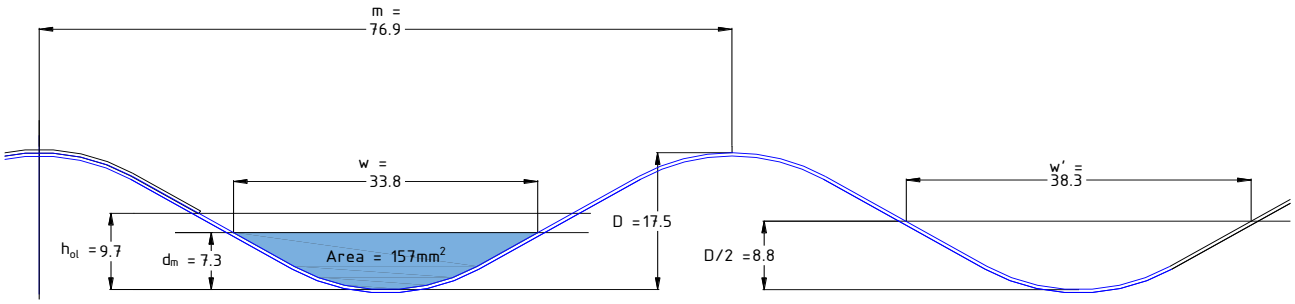

Figure 1 – DeltaOrb DPP1110 Roof Sheeting

Table 1 - DeltaOrb DPP1110 roofing profile variables used for calculations

m	D	h_{ol}	w'	w'/D > 2.5?	Use Eqn. D1 or D2?	d_m ($0.75*h_{ol}$)	w	a'
76.9mm	17.5mm	9.7mm	38.3mm	2.19	D1	7.3mm	33.8mm	157mm²

Table 2 - DeltaOrb DPP1110 Maximum Roof Lengths for Rainfall Intensities

Maximum Roof Length (m)*				
$^{100}I_5$ ARI (mm/h)	Pitch 5°	Pitch 7.5°	Pitch 10°	Pitch 15°
100	24	27	30	36
150	16	18	20	24
200	12	14	15	18
250	9	11	12	14
300	8	9	10	12
350	7	8	9	10
400	6	7	8	9
450	5	6	7	8
500	5	5	6	7

**The designer and installer must provide allowances for thermal expansion according to AS1562.1:2018 and other relevant design codes.*

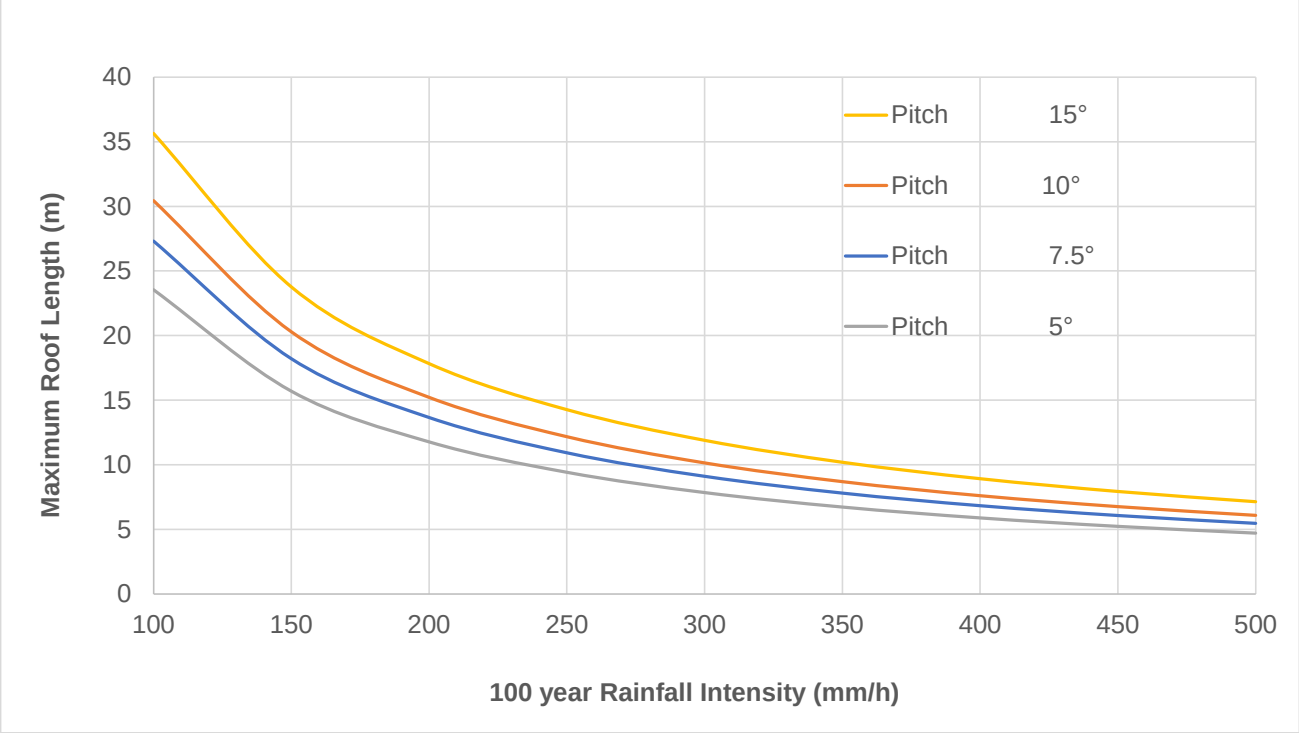

Figure 2 - DeltaOrb DPP1110 Maximum Roof Lengths for Rainfall Intensities

3.2 DeltaTrim DPP1150 - 32.8 mm Ribs 1000mm Cover

DeltaTrim DPP1150 roof sheeting (Figure 3) is classified as trapezoidal sheeting with ribs between 20 and 35mm in Table 3.1 (AS1562.1). Therefore, the minimum allowable pitch for this roof profile is 2.0º. Maximum roof lengths are shown in Table 4 and Figure 4.

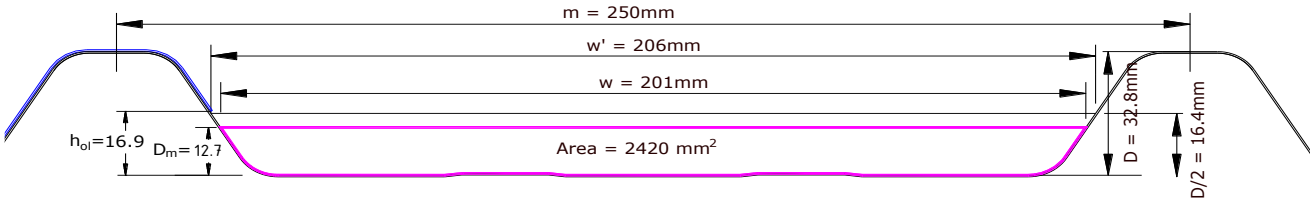

Figure 3 – DeltaTrim DPP1150 Roof Sheeting

Table 3 - DeltaTrim DPP1150 roofing profile variables used for calculations

m	**D**	**h_{ol}**	**w'**	**w'/D > 2.5?**	Use Eqn. **D1 or D2?**	**d_m** ($0.75*h_{ol}$)	**w**	**a'**
250mm	32.8mm	16.9mm	206mm	12.2	D2	12.7mm	201mm	2420mm^2

Table 4 - DeltaTrim DPP1150 Maximum Roof Lengths for Rainfall Intensities

Maximum Roof Length (m)*						
$^{100}I_5$ **ARI** (mm/h)	**Pitch 2°**	**Pitch 3°**	**Pitch 4°**	**Pitch 5°**	**Pitch 7.5°**	**Pitch 10°**
100	126	146	164	180	214	244
150	84	98	109	120	143	163
200	63	73	82	90	107	122
250	50	59	66	72	86	98
300	42	49	55	60	71	81
350	36	42	47	51	61	70
400	32	37	41	45	54	61
450	28	33	36	40	48	54
500	25	29	33	36	43	49

**The designer and installer must provide allowances for thermal expansion according to AS1562.1:2018 and other relevant design codes.*

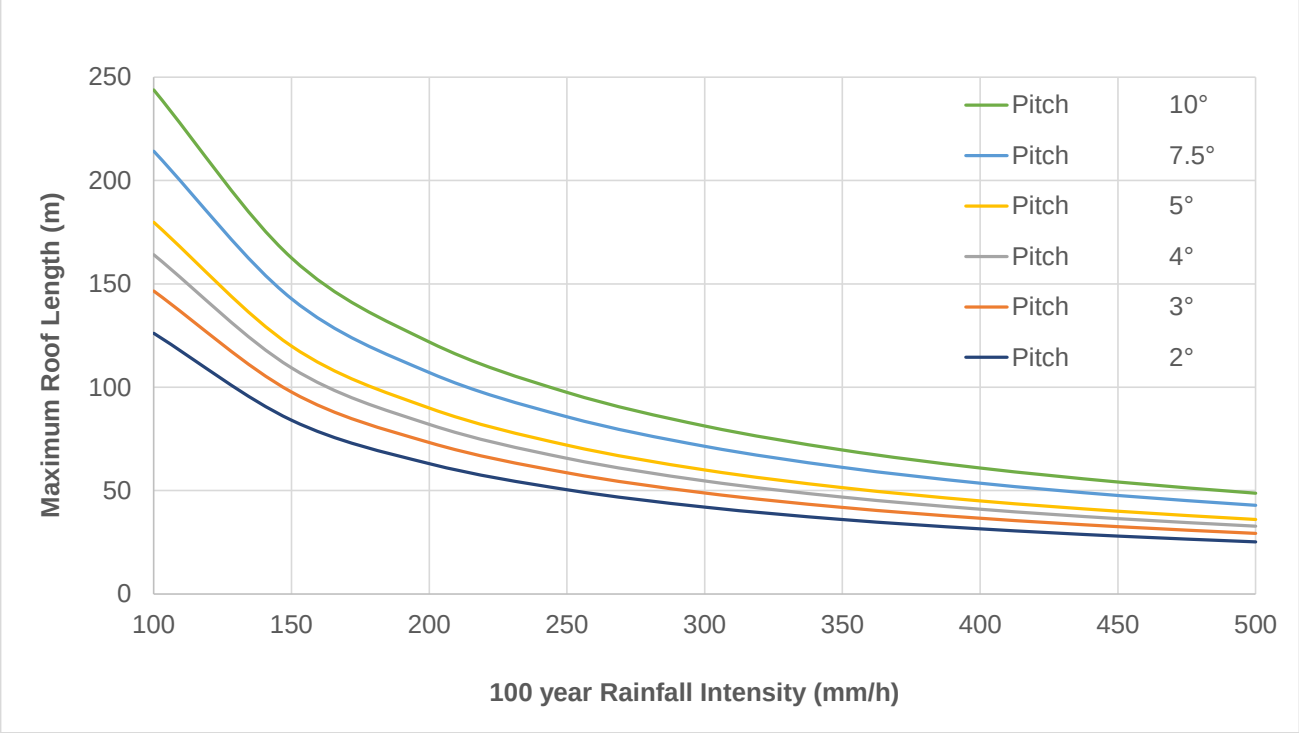

Figure 4 - DeltaTrim DPP1150 Maximum Roof Lengths for Rainfall Intensities

4. Certification

I hereby certify that the roof drainage capacity calculation results presented in this report was carried out in accordance with AS1562.1:2018 and AHSCA Research Foundation protocols.

	
A/Professor Terry Lucke - Research Corodinator PhD, FIEAust CPEng EngExec NER APEC Engineer IntPE(Aus)	Mark Alexander, AHSCA Foundation Chairman:
Date: 20th August 2020	Date: 20th August 2020

*Disclaimer:

- Calculations were performed using dimensions obtained from AutoCAD drawings provided to the AHSCA by Delta Panels Pty Ltd for this purpose. No measurements of actual roof sheeting products were performed for this report.
- The maximum allowable roof sheeting lengths provided in this report are based on calculations of theoretical hydraulic drainage capacity only. The designer and installer must provide allowances for thermal expansion according to AS1562.1:2018 and other relevant design codes. These may significantly reduce the allowable roof sheeting lengths provided in this report. The AHSCA does not guarantee the accuracy or validity of the calculation procedures given in AS1562.1: 2018.

5. Copy of Appendix D from AS1562.1: 2018

APPENDIX D

ROOF PITCH CALCULATION FOR WATER DRAINAGE

(Normative)

For closely spaced rib roofing profiles, the minimum required pitch angle (θ) shall be determined from the following equations:

$$na' = (10.44\,AR)^{0.8}\ \text{mm}^2 \quad \ldots \text{D1}$$

Roofing profiles shall be treated as closely spaced rib profiles if ratio w'/D does not exceed 2.5 as shown in Figure D1, where w' is trough or valley width as measured at profile middepth $D/2$ as shown in Figure D1.

D = rib depth

For all other roofing profiles, the minimum required pitch angle (θ) shall be determined from the following equation:

$$na' = 2 \times \left[2.88\,A\,R\,w^{0.5}\right]^{0.667}\ \text{mm}^2 \quad \ldots \text{D2}$$

where

$$n = 0.5 + 3.507\sqrt{\sin(\theta)} + \sqrt{0.25 + 3.507\sqrt{\sin(\theta)}}\ ; \text{ or} \quad \ldots \text{D3}$$

$$\sin(\theta) = \left(\frac{n - \sqrt{n}}{3.507}\right)^2 \quad \ldots \text{D4}$$

w = width of the top surface of water in valley or trough, in millimetres (see Figure D1)

A = catchment area, in metres square

= $l \times m$

R = rainfall intensity, in millimetres per hour

l = length of catchment area

= total roof pitch length, in metres

m = width of roofing module, in metres (see Figure D1)

= centre to centre spacing of ribs in sheeting

a' = cross-sectional area of water in roofing module (valley or trough), in millimetres square (see Figure D1)

n = pitch factor within limits 1 and 4

NOTE: Where $n < 1$ use minimum pitch for the roofing profile from Table 3.1 or if $n > 4$, roof pitch is higher than 20° and would require other means of verification such as testing.

θ = roof pitch angle, in degrees

The depth of water (d_m) in a valley or trough of a profile shall be taken as follows:

(a) Where an anti-capillary feature is provided (see Figure D2):

$d_m = 0.6h_u$ for closely spaced rib profiles

$d_m = 0.75h_u$ for all other profiles

where

d_m = maximum depth of water, in millimetres (see Figure D1)

h_u = distance from the bottom surface of a profile to the top of a capillary feature, millimetres (see Figure D2)

(b) Where the anti-capillary feature is not provided (see Figure D1):

$d_m = 0.75h_{ol}$

where

h_{ol} = distance from the bottom surface of a profile to the overlap lip, in millimetres (see Figure D1)

The anti-capillary feature shall meet the following requirements:

(i) The anti-capillary feature shall be positioned on the overlap lip side of the roofing side lap.

(ii) The anti-capillary feature shall be between the mating surfaces of the lapping ribs.

(iii) The anti-capillary feature shall provide a minimum separation of 1 mm.

(iv) The anti-capillary feature shall not be compromised by installation practices such as over-tightening of crest fasteners.

If any one parameter (i) to (iv) above is not met, the profile shall be deemed as not having an anti-capillary feature.

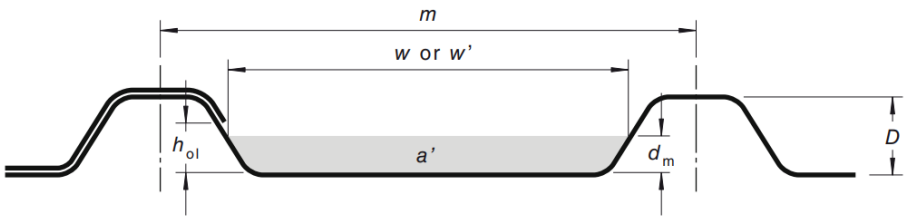

FIGURE D1 ROOFING PROFILE WITH NO ANTI-CAPILLARY FEATURE

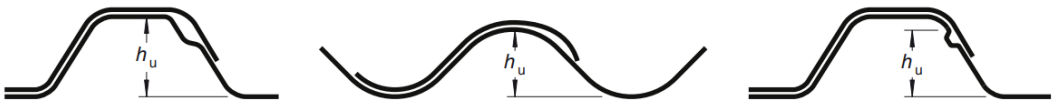

FIGURE D2 ROOFING PROFILES WITH ANTI-CAPILLARY FEATURE