

Gamcorp (Melbourne) Pty Ltd A.C.N 141 076 904 A.B.N 73 015 060 240
www.gamcorp.com.au Email: melbourne@gamcorp.com.au
Suite 4, 346 Ferntree Gully Rd, Notting Hill VIC 3149. Tel: 03 9543 2211 Fax: 03 9543 4046

Our Ref: 8517-Rev3/BL

14 July 2020

Energus Pty Ltd
153 Walker St
North Sydney, NSW 2060

PV Array Frame Engineering Certification

RE: Installation of eArche™ PV System using Tonsan 1527 high strength structural silicone adhesive

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of eArche™ PV System installation using Tonsan 1527 structural silicone adhesive within Australia.

The design has been based on the information of the eArche™ PV System Installation Manual, Tonsan 1527 Technical Data Sheet dated 12/2013 and ARL test report (MWMAL-101-004-LT draft, dated 22/06/2017) of the structural silicon adhesive provided by Energus Pty Ltd.

Refer to Appendix A for assembly paste diagram

We find the Installation of eArche™ PV System for Australian use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZ1170.2:2011 Admt 4:2016
- Wind region A, B, C & D
- Terrain category 2 & 3
- Wind average recurrence interval of 200 years
- Maximum building height 20m
- Aerodynamic shape factor (C_{fig}) to be -1.7
- Maximum solar panel dimensions 1979mm x 1019mm
- Installation of PV array to be done in accordance with the PV installation manual
- Tonsan 1527 high strength structural silicone adhesive is assessed for bonding eArche™ PV System atop Zinalume® roof sheet
- Minimum width of Tonsan 1527 to be
 - (1) 15mm on Kliplik 700 roof with a maximum spacing 466mm
 - (2) 9mm on Kliplik 406 roof with a maximum spacing of 406mm
 - (3) 10mm on general case roof with a maximum spacing of 380mm
- Tonsan 1527 to be applied the full length at the interfaces
- Tonsan 1527 to be applied in accordance with the application method on its technical data sheet
- The certification **excludes** assessment of roof structure and PV panels

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NOTES:

- **The PV system installation is assessed based on the capacity of Tonsan 1527 high strength structural silicone adhesive, not the roof structure and PV panel.**
- **The tensile strength of Tonsan 1527 is referenced from the document named "MEPL-101-001-LT.PDF" (ARL report No.: MWMAL-101-004-LT draft, dated 22 June 2020). The tests were carried out on the samples with a thickness of around 0.5mm at room temperature. It is assumed that Tonsan 1527 will be applied with similar conditions.**
- **It has been advised by ARL, that the curvature at the top of roof rib does not reduce the strength of Tonsan 1527. Therefore the minimum width of Tonsan 1527 was proposed on general case roof.**
- **If any of the above conditions cannot be met, the structural engineer must be notified immediately.**

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Bianca Liu** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd



Jianzeng Geng

Principal Engineer

FIEAust CPEng NER 3108316

NT Registration: 239858ES

QLD Registration: 18455

VIC Registration: EC 39483

TAS Registration: CC7263

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Re: Unistrut Mounting for eArche™ Panel Installation

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural assessment of using Unistrut as the mounting rails for eArche™ PV System within Australia.

The design has been based on the information of the eArche™ PV System Installation Manual, Tonsan 1527 Technical Data Sheet dated 12/2013 and ARL test report (MWMAL-101-004-LT draft, dated 22/06/2017) provided by Energen Pty Ltd.

Refer to Appendix A for assembly paste diagram Refer to Appendix B for Unistrut & sketch showing mounting profile

The mounting system for eArche™ PV system includes quick bonding between panel and Unistrut, and quick bonding between the Unistrut and roof sheet. The assessment has been based on the following conditions:

- Wind loads to AS/NZ1170.2:2011 (R2016)
- Wind region B
- Terrain category 2 & 3
- Wind average recurrence interval of 200 years
- Building height 20m
- Aerodynamic shape factor to be -1.7
- Maximum solar panel dimensions 1979mm x 1019mm
- Installation of PV array to be done in accordance with the PV installation manual
- Unistrut to be TA2-81906 (40mm x 40mm), as shown in Appendix
- Material of Unistrut to be Aluminium alloy 6106 T6
- Tonsan 1527 high strength structural silicone adhesive is assessed for bonding between eArche™ panel and Unistrut, and bonding between Unistrut and roof sheet.
- Tonsan 1527 to be applied in accordance with the application method on its technical data sheet
- Minimum width of Tonsan 1527 to be
 - (1) 10mm at the interface between eArche™ panel and Unistrut with a maximum spacing of 380mm
 - (2) 10mm at the interface between roof sheet and Unistrut with a maximum spacing of 380mm
- Tonsan 1527 to be applied the full length at the interfaces
- Lines of Tonsan 1527 to be symmetrically distributed on the Unistrut and spacing between lines of glue to be approximately equal
- The certification **excludes** assessment of roof structure and PV panels

NOTES:

- **The tensile strength of Tonsan 1527 is referenced from the document named "MEPL-101-001-LT.PDF" (ARL report No: MWMAL-101-004-LT draft, dated 22**

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June 2020). The tests were carried out on the samples with a thickness of around 0.5mm at room temperature. It is assumed that Tonsan 1527 will be applied with similar conditions.

- **It has been advised by ARL, that the curvature at the top of roof rib does not reduce the strength of Tonsan 1527. Therefore the minimum width of Tonsan 1527 was proposed on general case roof.**
- **The Unistrut is assessed based on the capacity of Unistrut itself, not the roof structure and PV panel.**
- **If any of the above conditions cannot be met, the structural engineer must be notified immediately.**

Construction is to be carried out strictly in accordance with the manufacturers instructions. This work was designed by **Bianca Liu** in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd



Jianzeng Geng

Principal Engineer

FIEAust CPEng NER 3108316

NT Registration: 239858ES

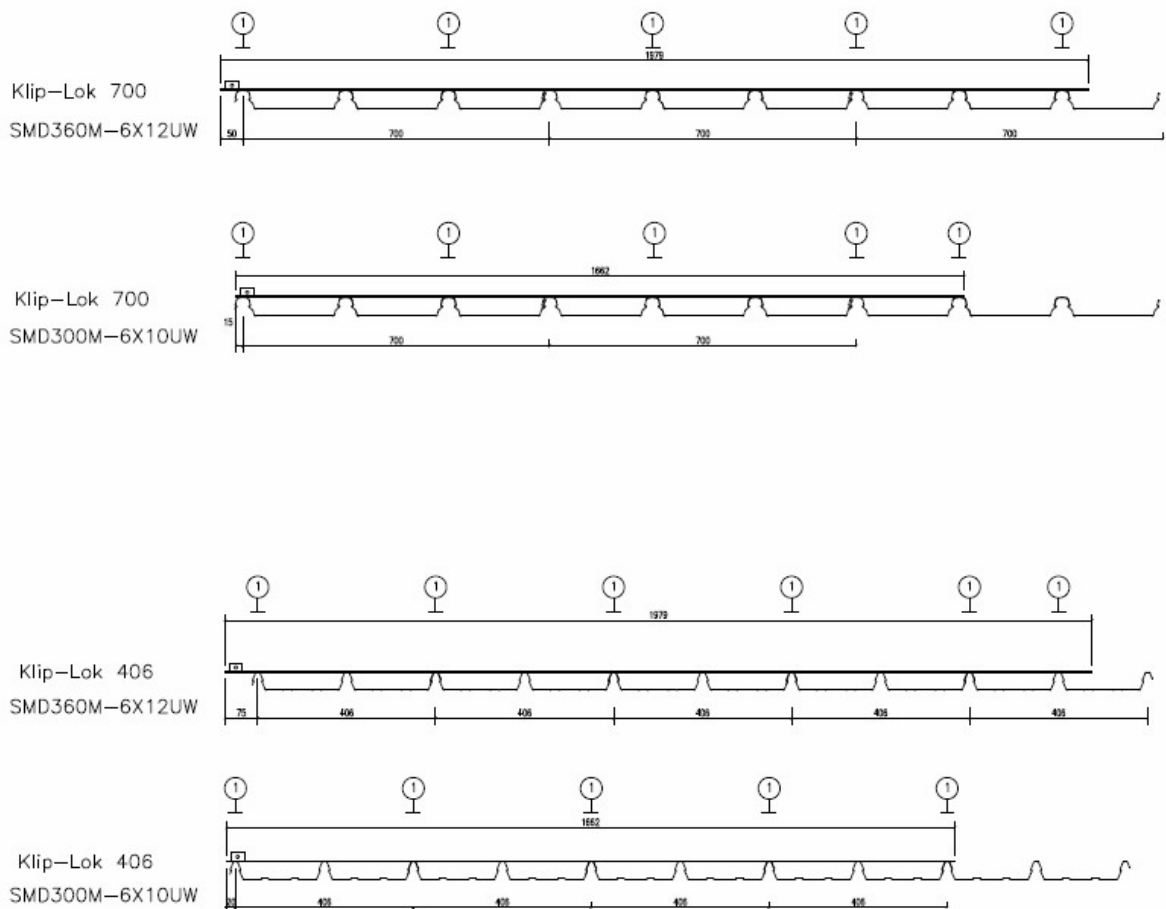
QLD Registration: 18455


VIC Registration: EC 39483

TAS Registration: CC7263

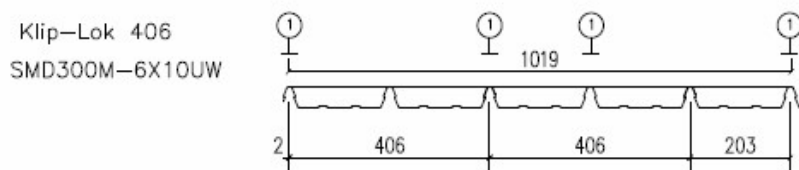
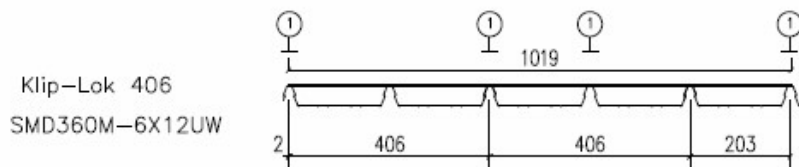
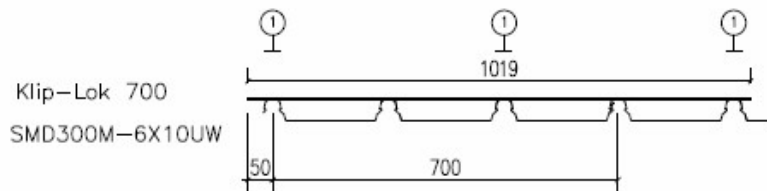
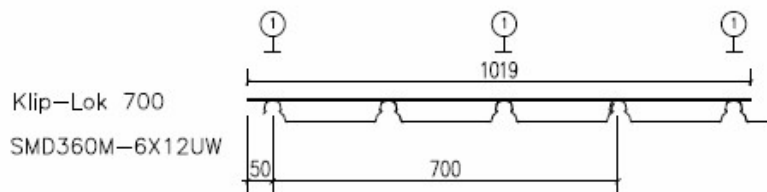
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Appendix A



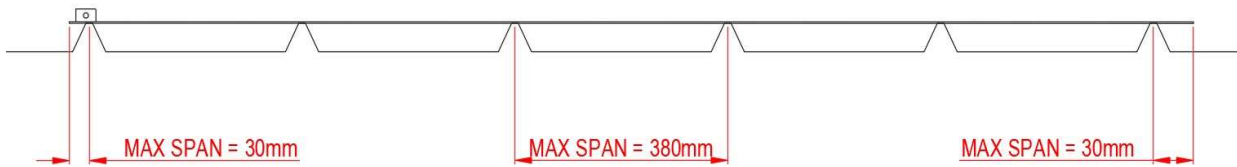
 Silicone paste surface

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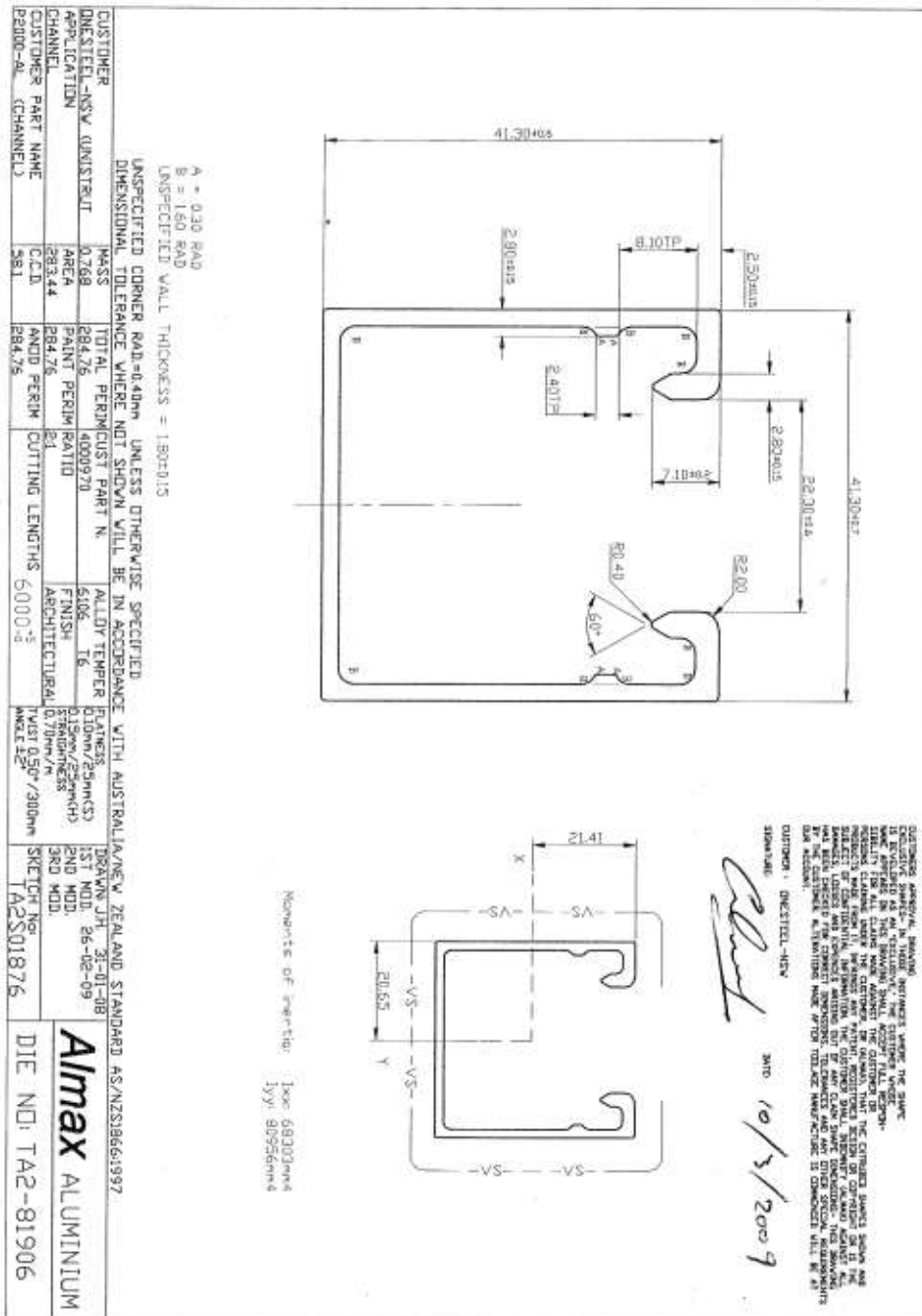
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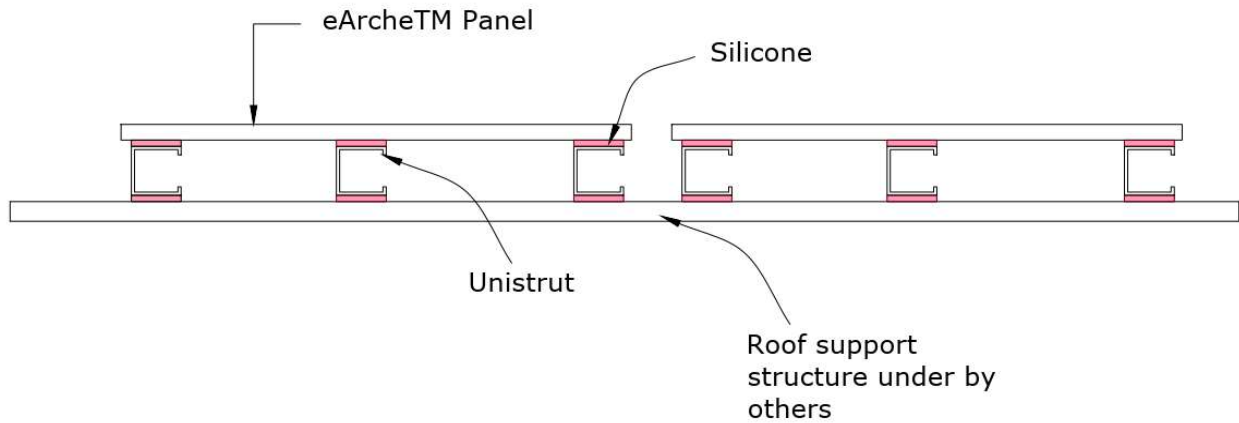


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Appendix B



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Mounting profile