

CYCLONIC AREA MANUAL

FOR DESIGN AND INSTALLATION PROFESSIONALS

CYCLONIC

LYSAGHT



INSPIRATION TO BUILD BETTER

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Lysaght has been a long time supporter of the Cyclone Testing Station at James Cook University. Through our involvement with this important research facility, we have contributed to safer building practices in cyclone prone areas.

CYCLONIC AREA

1.0 USING THIS MANUAL

This manual has been prepared to assist architects, engineers and builders in the correct specification and installation of TOPSPAN® profiles and roofing and walling claddings in cyclonic areas.

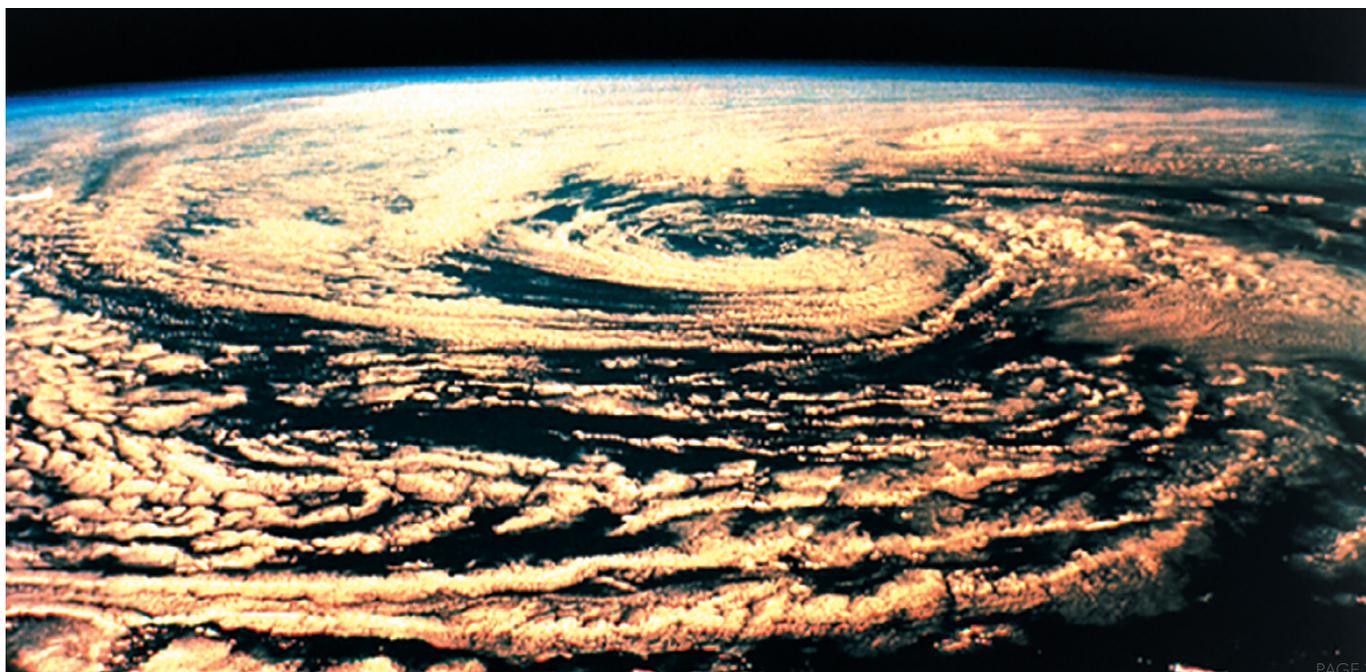
It is a supplement to the LYSAGHT® Roofing & Walling Installation Manual and individual product brochures, and should be used in conjunction with those publications. All information in this manual should be read in conjunction with the relevant Australian Standards and Amendments: AS/NZS 1170.2 and AS 4055.

The Wind Pressure Capacity tables are determined by full scale tests conducted at Lysaght's NATA-accredited testing laboratory, using the direct pressure-testing rig. This offers the full benefits of the latest methods for modelling wind pressures. Testing was conducted in accordance with the low-high-low requirements of the National Construction Code (NCC). Appropriate reduction factors have been applied to capacities as tested to generate the design capacities presented in this manual.

Fasteners, cyclonic washers and fastening pattern all form an integrated roofing/walling system prescribed in this manual.

This manual contains the following technical information:

- Ultimate Limit State design capacity tables are provided to allow engineers designing larger non-residential structures to perform the necessary calculations based on their specific designs in accordance with AS/NZS 1170.2.
- Residential tables are supplied to provide quick and easy look up of the suitability of products in residential roofing and walling, according to AS 4055. For certain high pressure zones (e.g. corners) the designer needs to refer to capacity tables.
- Data is supplied in Ultimate Limit State design capacity tables for a range of TOPSPAN® steel sections.
- Specific technical information such as material specifications, section properties and recommended fasteners and connection details are provided.
- General technical information such as Wind Classifications and Topographic Classifications are provided in appendices.



2.0 L-H-L TESTING PROCEDURES USED FOR THIS DESIGN MANUAL

The information in this document includes cyclonic capacities for a range of LYSAGHT® claddings and TOPSPAN® profiles.

These capacities are derived from extensive full scale cyclonic tests conducted at Lysaght's NATA-accredited materials science testing laboratory.

LOW-HIGH-LOW PRESSURE SEQUENCE IN CYCLONIC AREAS

The National Construction Code (NCC) currently requires all roof claddings, fixing connections and immediate supporting members to withstand a low-high-low (LHL) cyclonic testing regime.

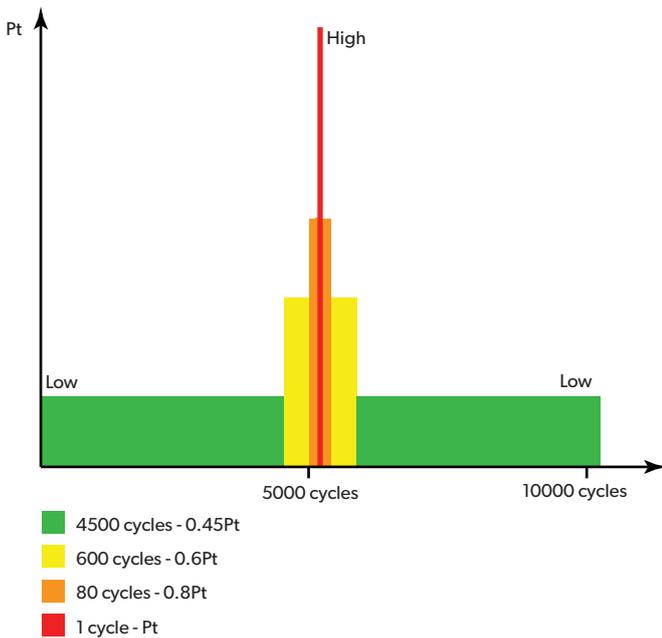
TOPSPAN® profiles are immediate supporting members according to the (NCC) definition, and as such, must be tested using the LHL cyclonic testing methodology to determine the outward capacity.

LYSAGHT® Research & Technology has performed comprehensive full scale tests of the entire range of claddings and TOPSPAN® profiles. These tests were conducted on our direct air pressure rig in our testing laboratory.

FIGURE 2.1:

Low-high-low testing.

L-H-L Loading regime from BCA



The sequence L-H-L loading regime is shown in the graph above where Pt is the ultimate limit state wind pressure.

TYPES OF FAILURES

Our extensive testing has revealed that battens can be subject to fatigue failure. When design is based on values within the published capacity tables, failure due to fatigue will not occur, as our tests are performed according to the L-H-L regime.

Non-Lysaght products cannot be substituted using these test values. Because our products have been subjected to full scale L-H-L testing, you can rely on the performance data we supply for genuine LYSAGHT® products. Substituting non-Lysaght products using these test values could cause failure due to fatigue.

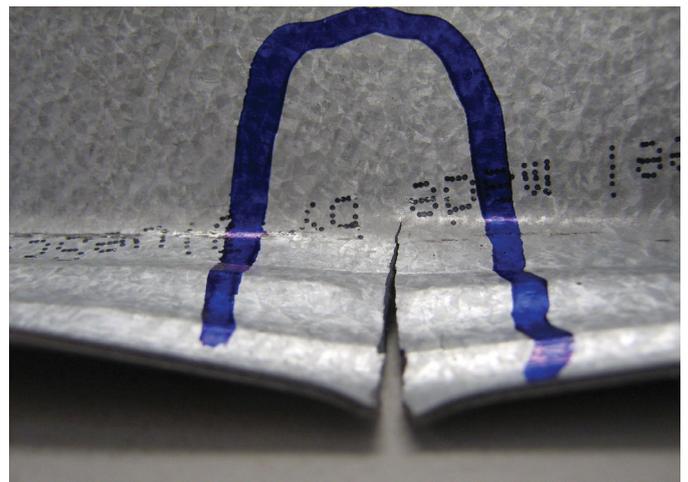
FIGURE 2.2:

Direct Air Pressure test rig showing cladding failure.



FIGURE 2.3:

TOPSPAN® steel section (batten) fatigue crack.



3.0 RESIDENTIAL & NON-RESIDENTIAL DESIGN CAPACITY TABLES

KLIP-LOK 700 HI-STRENGTH®

KLIP-LOK 700 HI-STRENGTH® CLIP

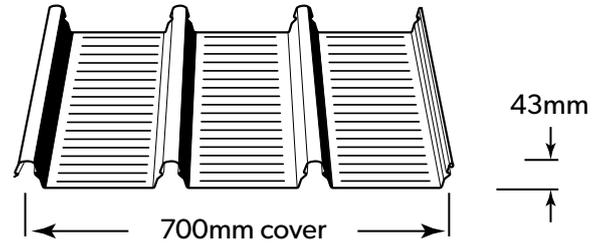
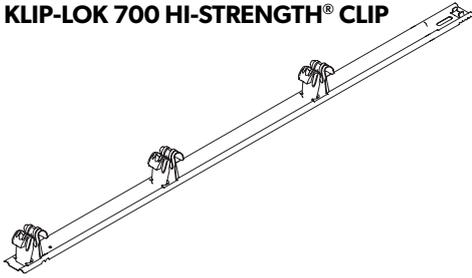


TABLE 3.1:

KLIP-LOK 700 HI-STRENGTH® 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | |
|-----------|--------------------|------|----------|
| | Clip Fastened | | |
| | Single | End | Internal |
| 600 | 11.25 | 8.55 | 8.10 |
| 900 | 11.25 | 6.31 | 6.40 |
| 1200 | 8.46 | 4.50 | 4.86 |
| 1500 | 6.14 | 3.13 | 3.95 |
| 1800 | 4.30 | 2.85 | 3.13 |
| 2100 | 2.93 | 2.56 | 2.75 |
| 2400 | 2.04 | 2.28 | 2.29 |
| 2700 | 1.62 | 2.00 | 2.20 |

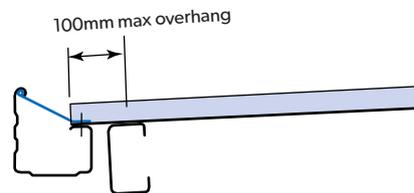
TABLE 3.2:

KLIP-LOK 700 HI-STRENGTH® 0.48 BMT
Ultimate Limit State Wind Pressure (kPa).

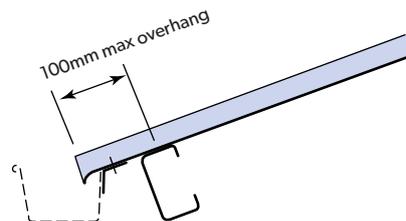
| Span (mm) | Roofing or Walling | | |
|-----------|--------------------|------|----------|
| | Clip Fastened | | |
| | Single | End | Internal |
| 600 | 11.25 | 9.45 | 9.45 |
| 900 | 11.25 | 6.90 | 7.42 |
| 1200 | 8.46 | 4.86 | 5.58 |
| 1500 | 6.16 | 3.32 | 4.47 |
| 1800 | 4.36 | 3.04 | 3.46 |
| 2100 | 3.04 | 2.76 | 2.97 |
| 2400 | 2.22 | 2.48 | 2.37 |
| 2700 | 1.89 | 2.21 | 2.20 |

Gutter can be fixed through the return lip to the underside of the roof sheeting at mid-span between the ribs, and this will provide the required stiffening.

Alternatively, fix a 50 x 50 x 1.2mm steel angle approximately 50mm from the end of the KLIP-LOK® sheet and at mid-span between ribs. The gutter may then be fixed to the angle, if required.



Gutter fixed to underside of roofing (at mid-span between ribs).

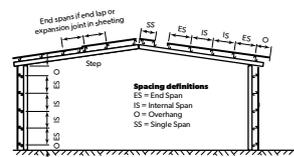


Steel angle 50 x 50 x 1.2 mm fixed to underside of roofing (200 mm centres).
Gutter may be fixed to angle.

Notes:

- i. More detailed information is available in the individual product brochures, and/or the current LYSAGHT® Roofing & Walling Manual which are available at: www.lysaght.com. We also refer you to the relevant Australian Standards.
- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel.
- iii. The design tables in this manual are valid for KLIP-LOK 700 HI-STRENGTH® overhang lengths not exceeding 100mm. Longer overhangs are possible subject to additional testing.
- iv. KLIP-LOK 700 HI-STRENGTH® overhangs shall be stiffened as shown on the figure above when pressure exceeds 4.0 kPa for 0.42 BMT and 6.6 kPa for 0.48 BMT

Roofing & Walling Profiles



Walling Profiles Only

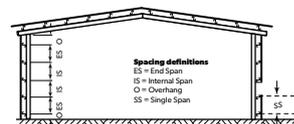




TABLE 3.3:

CUSTOM ORB® 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | 8.64 | 6.47 | 8.09 | 8.64 | 8.10 | 10.13 | 10.80 | 8.10 | 8.09 |
| 900 | 6.19 | 4.37 | 5.57 | 6.19 | 5.18 | 7.34 | 7.00 | 5.18 | 6.17 |
| 1200 | 4.05 | 2.74 | 3.71 | 4.05 | 3.01 | 5.05 | 4.05 | 3.01 | 4.52 |
| 1500 | 2.23 | 1.58 | 2.52 | 2.23 | 1.58 | 3.27 | 1.96 | 1.58 | 3.12 |
| 1800 | 0.72 | 0.90 | 1.99 | 0.72 | 0.90 | 1.99 | 0.72 | 0.90 | 1.99 |

TABLE 3.4:

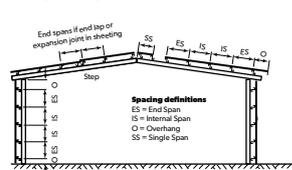
CUSTOM ORB® 0.48 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|-------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 450 | - | - | - | - | 13.05 | 13.05 | - | - | - |
| 600 | 10.80 | 8.10 | 10.13 | 10.80 | 11.70 | 11.70 | 10.80 | 8.10 | 10.13 |
| 900 | 6.98 | 5.56 | 7.14 | 6.98 | 6.54 | 8.65 | 6.98 | 5.56 | 7.38 |
| 1200 | 4.05 | 3.57 | 4.81 | 4.05 | 5.05 | 6.68 | 4.05 | 3.57 | 5.18 |
| 1500 | 2.02 | 2.12 | 3.15 | 2.02 | 3.69 | 4.88 | 2.02 | 2.12 | 3.51 |
| 1800 | 0.88 | 1.22 | 2.14 | 0.88 | 2.46 | 3.25 | 0.88 | 1.22 | 2.39 |
| 2100 | | 0.86 | 1.80 | 0.00 | 1.36 | 1.80 | 0.00 | 0.86 | 1.80 |

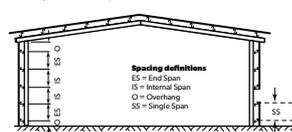
Notes:

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- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
- iii. The design tables in this manual are valid for overhang lengths not exceeding the “unstiffened eaves overhang” lengths given in the current individual product Design & Installation Guide and/or current LYSAGHT® Roofing & Walling Design & Installation Guide. Furthermore, the sidelap shall be stitched at the end of the overhang when greater than 200mm.

Roofing & Walling Profiles



Walling Profiles Only



CUSTOM BLUE ORB®



TABLE 3.5:

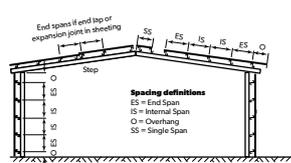
CUSTOM BLUE ORB® 0.60 BMT
 Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-------------|---|-------|----------|--------------------------------------|-------|----------|-----------------|-------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | 10.80 | 10.80 | 10.80 | 10.80 | 10.80 | 10.80 | 10.80 | 10.80 | 10.80 |
| 900 | 6.30 | 8.04 | 8.62 | 7.45 | 8.52 | 9.82 | 6.30 | 8.04 | 8.62 |
| 1200 | 3.38 | 5.88 | 6.64 | 5.28 | 6.68 | 8.62 | 3.38 | 5.88 | 6.64 |
| 1500 | 2.81 | 4.32 | 4.86 | 4.88 | 5.27 | 7.20 | 2.81 | 4.32 | 4.86 |
| 1800 | 2.25 | 3.36 | 3.28 | 4.47 | 4.28 | 5.56 | 2.25 | 3.36 | 3.28 |
| 2100 | | 3.00 | 1.90 | | 3.73 | 3.70 | | 3.00 | 1.90 |

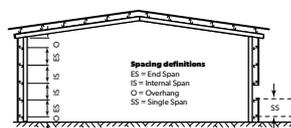
Notes:

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- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
- iii. The design tables in this manual are valid for overhang lengths not exceeding the “unstiffened eaves overhang” lengths given in the current individual product Design & Installation Guide and/or current LYSAGHT® Roofing & Walling Design & Installation Guide. Furthermore, the sidelap shall be stitched at the end of the overhang when greater than 200mm.

Roofing & Walling Profiles



Walling Profiles Only



CUSTOM ORB ACCENT® 35

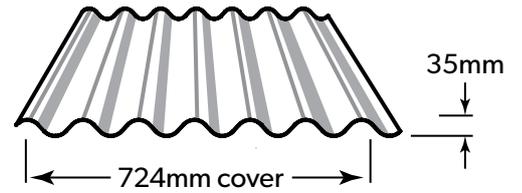


TABLE 3.6:

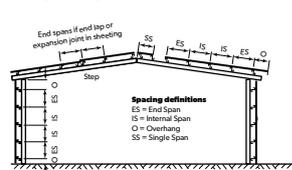
CUSTOM ORB ACCENT® 35 0.48 BMT
 Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|-----|----------|--------------------------------------|------|----------|-----------------|-----|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | - | - | - | 10.00 | 8.33 | 10.00 | - | - | - |
| 900 | - | - | - | 8.75 | 7.50 | 7.50 | - | - | - |
| 1200 | - | - | - | 7.50 | 5.00 | 4.79 | - | - | - |
| 1500 | - | - | - | 6.04 | 3.33 | 3.12 | - | - | - |
| 1800 | - | - | - | 4.37 | 2.50 | 2.50 | - | - | - |

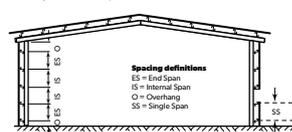
Notes:

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- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel.
- iii. The design tables in this manual are valid for overhang lengths not exceeding the “unstiffened eaves overhang” lengths given in the current individual product Design & Installation Guide and/or current LYSAGHT® Roofing & Walling Design & Installation Guide. Furthermore, the sidelap shall be stitched at the end of the overhang when greater than 200mm.

Roofing & Walling Profiles



Walling Profiles Only



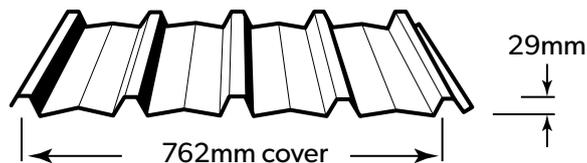


TABLE 3.7:

TRIMDEK® 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|-------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | 5.94 | 5.94 | 5.04 | 10.80 | 10.80 | 10.80 | 10.80 | 5.94 | 7.43 |
| 900 | 4.30 | 4.31 | 3.59 | 7.03 | 7.23 | 8.02 | 6.25 | 4.31 | 5.49 |
| 1200 | 2.97 | 2.96 | 2.51 | 4.15 | 4.43 | 5.70 | 2.97 | 2.96 | 3.93 |
| 1500 | 1.94 | 1.91 | 1.80 | 2.14 | 2.40 | 3.83 | 0.96 | 1.91 | 2.75 |
| 1800 | 1.20 | 1.15 | 1.64 | 1.02 | 1.15 | 2.43 | 0.87 | 1.15 | 1.93 |
| 2100 | 0.77 | 0.68 | 1.49 | 0.77 | 0.68 | 1.49 | 0.77 | 0.68 | 1.49 |

TABLE 3.8:

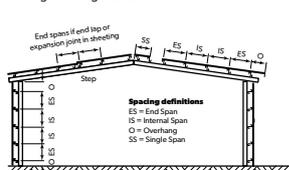
TRIMDEK® 0.48 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|-------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 450 | - | - | - | - | 16.05 | 16.05 | - | - | - |
| 600 | 6.91 | 6.21 | 6.48 | 10.80 | 15.00 | 15.00 | 10.80 | 6.21 | 10.80 |
| 900 | 5.22 | 4.74 | 5.28 | 7.88 | 7.65 | 8.61 | 6.84 | 4.74 | 7.68 |
| 1200 | 3.80 | 3.50 | 4.25 | 5.47 | 5.15 | 6.69 | 3.80 | 3.50 | 5.21 |
| 1500 | 2.65 | 2.48 | 3.38 | 3.56 | 3.29 | 5.05 | 3.06 | 2.48 | 4.34 |
| 1800 | 1.78 | 1.70 | 2.67 | 2.16 | 2.09 | 3.68 | 2.33 | 1.70 | 3.48 |
| 2100 | 1.18 | 1.14 | 2.13 | 1.25 | 1.85 | 2.58 | 1.59 | 1.14 | 2.62 |
| 2400 | 0.86 | 0.81 | 1.76 | 0.86 | 1.62 | 1.76 | 0.86 | 0.81 | 1.76 |

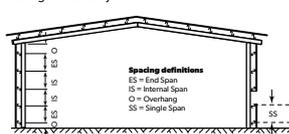
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- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
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Roofing & Walling Profiles



Walling Profiles Only



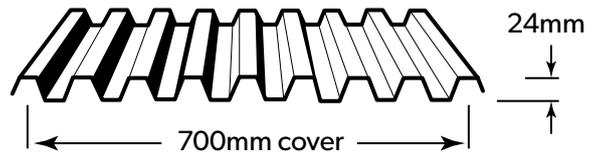


TABLE 3.9:

SPANDEK® 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|-------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | 6.56 | 4.05 | 5.07 | 10.80 | 10.80 | 10.80 | 8.10 | 4.05 | 5.07 |
| 900 | 3.89 | 3.01 | 3.95 | 7.48 | 7.52 | 8.14 | 4.51 | 3.01 | 3.95 |
| 1200 | 2.03 | 2.20 | 3.03 | 4.86 | 4.97 | 5.98 | 2.03 | 2.20 | 3.03 |
| 1500 | 1.76 | 1.62 | 2.30 | 2.95 | 3.13 | 4.30 | 1.76 | 1.62 | 2.30 |
| 1800 | 1.50 | 1.26 | 1.78 | 1.74 | 2.02 | 3.12 | 1.50 | 1.26 | 1.78 |
| 2100 | 1.24 | 1.13 | 1.45 | 1.24 | 1.62 | 2.43 | 1.24 | 1.13 | 1.45 |

TABLE 3.10:

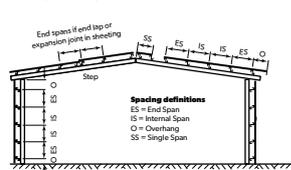
SPANDEK® 0.48 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | | | | | Walling Only | | |
|-----------|---|------|----------|--------------------------------------|-------|----------|-----------------|------|----------|
| | Crest fastened without cyclonic washers | | | Crest fastened with cyclonic washers | | | Valley fastened | | |
| | Single | End | Internal | Single | End | Internal | Single | End | Internal |
| 600 | 8.64 | 6.21 | 6.98 | 10.80 | 10.80 | 10.80 | 10.80 | 6.21 | 7.76 |
| 900 | 5.47 | 4.74 | 5.38 | 8.04 | 7.56 | 8.74 | 6.37 | 4.74 | 5.81 |
| 1200 | 3.11 | 3.49 | 4.08 | 5.77 | 5.00 | 6.92 | 3.11 | 3.49 | 4.26 |
| 1500 | 2.73 | 2.48 | 3.11 | 3.99 | 3.13 | 5.34 | 2.73 | 2.48 | 3.11 |
| 1800 | 2.36 | 1.71 | 2.44 | 2.71 | 2.63 | 4.00 | 2.36 | 1.71 | 2.75 |
| 2100 | 1.99 | 1.16 | 2.09 | 1.92 | 2.12 | 2.91 | 1.99 | 1.16 | 2.40 |
| 2400 | 1.62 | 0.86 | 2.05 | 1.62 | 1.62 | 2.05 | 1.62 | 0.86 | 2.05 |

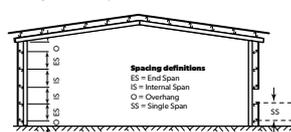
Notes:

- i. More detailed information is available in the individual product brochures, and/or the current LYSAGHT® Roofing & Walling Manual which are available at: www.lysaght.com. We also refer you to the relevant Australian Standards.
- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
- iii. The design tables in this manual are valid for overhang lengths not exceeding the “unstiffened eaves overhang” lengths given in the current individual product Design & Installation Guide and/or current LYSAGHT® Roofing & Walling Design & Installation Guide. Furthermore, the sidelap shall be stitched at the end of the overhang when greater than 200mm.

Roofing & Walling Profiles



Walling Profiles Only



KLIP-LOK® 406 HIGH WIND (N.T. ONLY)

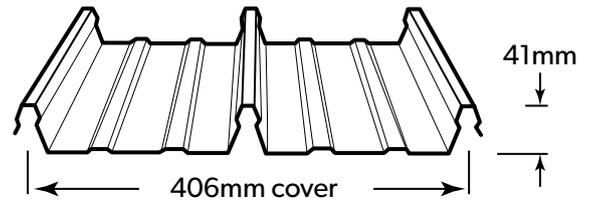


TABLE 3.11:

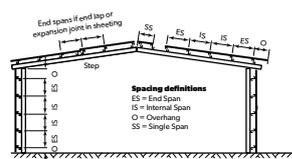
KLIP-LOK® 406 High Wind 0.55 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | |
|-----------|--------------------------------------|----------|
| | Crest fastened with cyclonic washers | |
| | End | Internal |
| 600 | 12.00 | 12.00 |
| 900 | 9.27 | 10.60 |
| 1200 | 6.98 | 7.91 |
| 1500 | 4.93 | 6.27 |
| 1800 | 3.88 | 5.07 |
| 1900 | 3.58 | 4.78 |

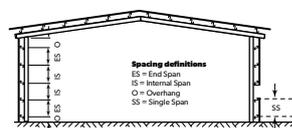
Notes:

- i. Refer to the current LYSAGHT® Roofing & Walling Manual which is available on our website: www.lysaght.com. We also refer you to the relevant Australian Standards.
- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel.
- iii. The design tables in this manual are valid for KLIP-LOK® 406 High Wind overhang lengths not exceeding 100mm. Longer overhangs are possible subject to additional testing.
- iv. For KLIP-LOK® 406 High Wind detailed information, refer to Northern Territory "Deemed to comply" documentation. This data is also available on our website: www.lysaght.com.

Roofing & Walling Profiles



Walling Profiles Only



KLIP-LOK CLASSIC® 700

In cyclonic applications, KLIP-LOK CLASSIC® 700 is pierce fixed through the ribs using fasteners with cyclonic washers.

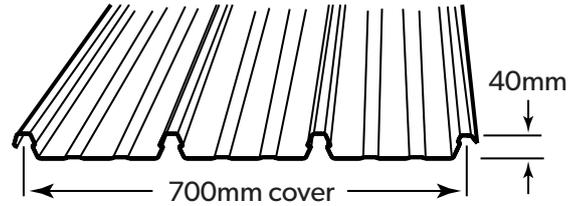


TABLE 3.12:

KLIP-LOK CLASSIC® 700 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | |
|-----------|--------------------------------------|------|----------|
| | Crest fastened with cyclonic washers | | |
| | Single | End | Internal |
| 600 | 8.26 | 7.85 | 7.85 |
| 900 | 6.61 | 5.79 | 6.20 |
| 1200 | 4.55 | 3.72 | 4.96 |
| 1500 | 2.89 | 2.89 | 3.72 |
| 1800 | 2.07 | 2.07 | 2.48 |
| 2100 | 1.65 | 1.65 | 1.65 |

TABLE 3.13:

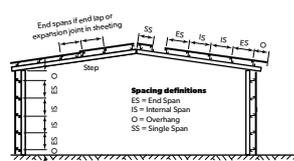
KLIP-LOK CLASSIC® 700 0.48 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Roofing or Walling | | |
|-----------|--------------------------------------|------|----------|
| | Crest fastened with cyclonic washers | | |
| | Single | End | Internal |
| 600 | 9.09 | 8.26 | 8.26 |
| 900 | 7.44 | 6.61 | 7.02 |
| 1200 | 5.37 | 4.55 | 5.79 |
| 1500 | 4.55 | 3.72 | 4.55 |
| 1800 | 3.31 | 2.89 | 3.31 |
| 2100 | 2.07 | 2.48 | 2.89 |

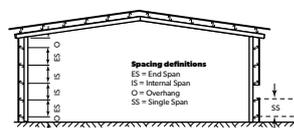
Notes:

- i. More detailed information is available in the individual product brochures, and/or the current LYSAGHT® Roofing & Walling Manual which are available at: www.lysaght.com. We also refer you to the relevant Australian Standards.
- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel.
- iii. The design tables in this manual are valid for KLIP-LOK CLASSIC® 700 overhang lengths not exceeding 100mm. Longer overhangs are possible subject to additional testing.

Roofing & Walling Profiles

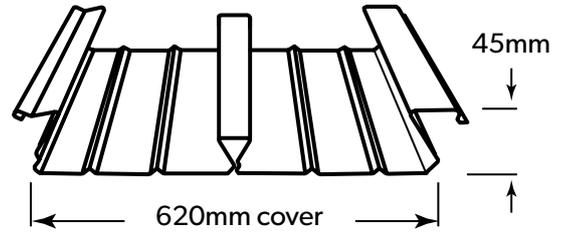


Walling Profiles Only

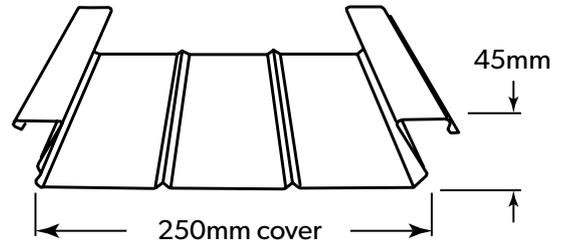


FLATDEK® II & FLATDEK® (HOME IMPROVEMENTS ROOF PROFILE)

FLATDEK® differs from other roofing products because it is fixed to supports through the pans. It is coloured both sides and is recommended for applications such as carports and patios and is not recommended for residential roofs.



FLATDEK® II



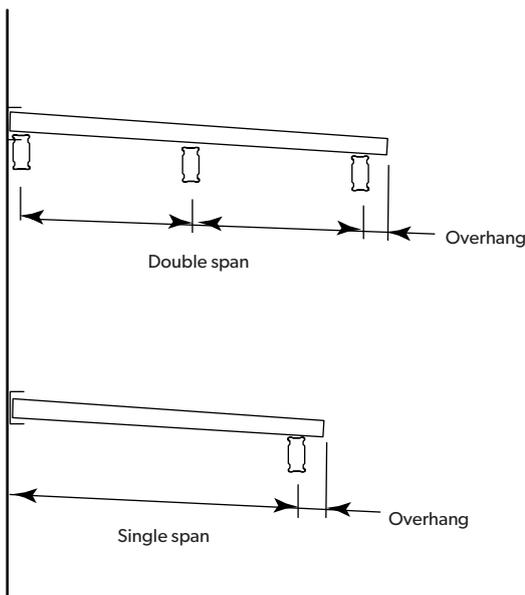
FLATDEK®

TABLE 3.14:

FLATDEK® 0.42 BMT & FLATDEK® 0.42 BMT
Ultimate Limit State Wind Pressure (kPa).

| Span (mm) | Single Span | Double Span |
|-----------|-------------|-------------|
| 1500 | 5.26 | 4.64 |
| 1800 | 4.76 | 4.21 |
| 2100 | 4.32 | 3.82 |
| 2400 | 3.84 | 3.68 |
| 2700 | 3.38 | 3.44 |
| 3000 | 3.08 | 3.14 |
| 3300 | 2.80 | 2.80 |
| 3600 | 2.51 | 2.46 |
| 4000 | 2.25 | 2.04 |

SPAN DEFINITIONS



Notes:

- i. More detailed information is available in the individual product brochures, and/or the current LYSAGHT® Roofing & Walling Manual which are available at: www.lysaght.com. We also refer you to the relevant Australian Standards.
- ii. The pressures supplied are applicable when the cladding is fixed to a minimum of two thicknesses of 0.75mm (total 1.50mm) G450 steel or a single thickness of 1.50mm G450.
- iii. The design tables in the manual are valid for FLATDEK® II overhang lengths not exceeding 100mm.

4.0 RESIDENTIAL SELECTION TABLES - ROOFING

CUSTOM ORB®/CUSTOM BLUE ORB®

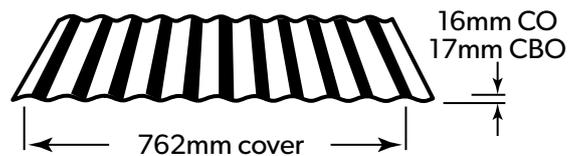


TABLE 4.1:

CUSTOM ORB® 0.42mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | X | X |
| 600 | OK | OK | X | X |
| 750 | OK | OK | X | X |
| 900 | OK | X | X | X |
| 1200 | X | X | X | X |

TABLE 4.2:

CUSTOM ORB® 0.42mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | X |
| 600 | OK | OK | OK | X |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | X | X |
| 1200 | OK | X | X | X |

TABLE 4.3:

CUSTOM ORB® 0.48mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | X |
| 600 | OK | OK | OK | X |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | X | X |
| 1200 | OK | X | X | X |

TABLE 4.4:

CUSTOM ORB® 0.48mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

TABLE 4.5:

CUSTOM BLUE ORB® 0.60mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

TABLE 4.6:

CUSTOM BLUE ORB® 0.60mm BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | OK | X |

Notes:

1. The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
2. End span length should be 0.8 times the values given in these continuous span tables, in the case where a maximum possible roof span is chosen.
3. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm BMT G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
4. An 'OK' means this product can be used, a cross (X) means it is not suitable.

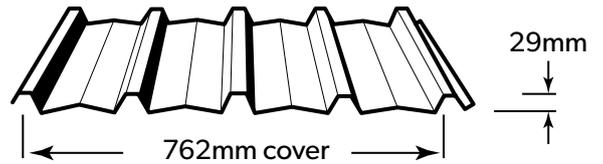


TABLE 4.7:

TRIMDEK® 0.42 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | X | X |
| 600 | OK | OK | X | X |
| 750 | OK | X | X | X |
| 900 | OK | X | X | X |
| 1200 | X | X | X | X |

TABLE 4.8:

TRIMDEK® 0.42 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | X | X |
| 1200 | OK | OK | X | X |

TABLE 4.9:

TRIMDEK® 0.48 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | X | X |
| 600 | OK | OK | X | X |
| 750 | OK | OK | X | X |
| 900 | OK | X | X | X |
| 1200 | OK | X | X | X |

TABLE 4.10:

TRIMDEK® 0.48 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

Notes:

1. The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
2. End span length should be 0.8 times the values given in these continuous span tables, in the case where a maximum possible roof span is chosen.
3. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm BMT G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
4. An 'OK' means this product can be used, a cross (X) means it is not suitable.

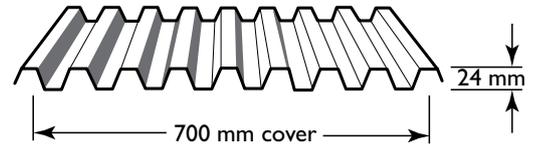


TABLE 4.11:

SPANDEK® 0.42 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | X | X | X |
| 600 | OK | X | X | X |
| 750 | OK | X | X | X |
| 900 | OK | X | X | X |
| 1200 | X | X | X | X |

TABLE 4.12:

SPANDEK® 0.42 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | X | X |
| 1200 | OK | OK | X | X |

TABLE 4.13:

SPANDEK® 0.48 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|---------------------|---------|---------|
| | Crest fixed | No cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | X | X |
| 600 | OK | OK | X | X |
| 750 | OK | OK | X | X |
| 900 | OK | X | X | X |
| 1200 | OK | X | X | X |

TABLE 4.14:

SPANDEK® 0.48 BMT.

| Span (mm) | Roof | | | |
|-----------|-------------|-----------------------|---------|---------|
| | Crest fixed | With cyclonic washers | | |
| | 3.75kPa | 5.58kPa | 8.21kPa | 10.8kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

Notes:

1. The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
2. End span length should be 0.8 times the values given in these continuous span tables, in the case where a maximum possible roof span is chosen.
3. The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm BMT G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
4. An 'OK' means this product can be used, a cross (X) means it is not suitable.

5.0 RESIDENTIAL SELECTION TABLES - WALLING

CUSTOM ORB®/CUSTOM BLUE ORB®

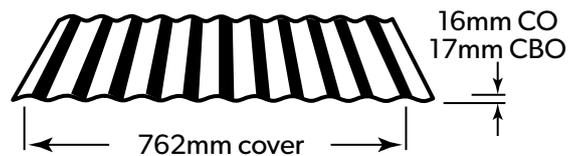


TABLE 5.1:

CUSTOM ORB® 0.42 BMT.

| Span (mm) | Wall | | | |
|-----------|--------------|---------------------|---------|---------|
| | Valley fixed | No cyclonic washers | | |
| | 3.00kPa | 4.47kPa | 6.57kPa | 8.88kPa |
| 450 | OK | OK | OK | X |
| 600 | OK | OK | OK | X |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | X | X |
| 1200 | OK | OK | X | X |

TABLE 5.2:

CUSTOM ORB® 0.48 BMT.

| Span (mm) | Wall | | | |
|-----------|--------------|---------------------|---------|---------|
| | Valley fixed | No cyclonic washers | | |
| | 3.00kPa | 4.47kPa | 6.57kPa | 8.88kPa |
| 450 | OK | OK | OK | OK |
| 600 | OK | OK | OK | OK |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

TRIMDEK®

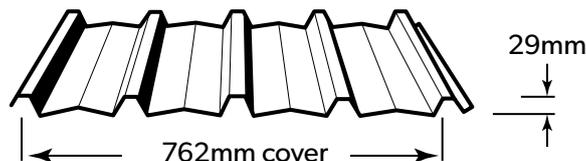


TABLE 5.3:

TRIMDEK® 0.42 BMT.

| Span (mm) | Wall | | | |
|-----------|--------------|---------------------|---------|---------|
| | Valley fixed | No cyclonic washers | | |
| | 3.00kPa | 4.47kPa | 6.57kPa | 8.88kPa |
| 450 | OK | OK | OK | X |
| 600 | OK | OK | OK | X |
| 750 | OK | OK | X | X |
| 900 | OK | OK | X | X |
| 1200 | OK | X | X | X |

TABLE 5.4:

TRIMDEK® 0.48 BMT.

| Span (mm) | Wall | | | |
|-----------|--------------|---------------------|---------|---------|
| | Valley fixed | No cyclonic washers | | |
| | 3.00kPa | 4.47kPa | 6.57kPa | 8.88kPa |
| 450 | OK | OK | OK | X |
| 600 | OK | OK | OK | X |
| 750 | OK | OK | OK | X |
| 900 | OK | OK | OK | X |
| 1200 | OK | OK | X | X |

Notes:

- The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
- End span length should be 0.8 times the values given in these continuous span tables, in the case where a maximum possible roof span is chosen.
- The pressures supplied are applicable when the cladding is fixed to a minimum of 1.5mm BMT G450 steel. Refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.
- An 'OK' means this product can be used, a cross (X) means it is not suitable.

6.0 CLADDING SPAN SELECTION TABLES

TABLE 6.1:

Maximum cladding span tables (mm) for various LYSAGHT® claddings and cyclonic winds **WITHOUT** cyclonic washers.

| Roof Cladding | BMT (mm) | Span Type | Ultimate Limit State Strength Pressures (kPa) | | | | |
|----------------------------------|----------|-----------|---|----------|----------|----------|----------|
| | | | 2.40 kPa | 3.75 kPa | 5.58 kPa | 8.21 kPa | 10.8 kPa |
| CUSTOM ORB® | 0.42 | End | 1280 | 1010 | 720 | - | - |
| | | Internal | 1560 | 1190 | 890 | - | - |
| | 0.48 | End | 1440 | 1170 | 890 | - | - |
| | | Internal | 1720 | 1390 | 1100 | 790 | - |
| CUSTOM BLUE ORB® | 0.60 | End | 2100 | 1670 | 1250 | 880 | 600 |
| | | Internal | 1990 | 1710 | 1370 | 960 | 600 |
| TRIMDEK® | 0.42 | End | 1350 | 1020 | 660 | - | - |
| | | Internal | 1350 | 1020 | 660 | - | - |
| | 0.48 | End | 1530 | 1130 | 720 | - | - |
| | | Internal | 1950 | 1370 | 820 | - | - |
| SPANDEK® | 0.42 | End | 1120 | 680 | - | - | - |
| | | Internal | 1460 | 960 | - | - | - |
| | 0.48 | End | 1530 | 1130 | 720 | - | - |
| | | Internal | 1830 | 1300 | 860 | - | - |
| KLIP-LOK 700 HI-STRENGTH® | 0.42 | End | 2270 | 1360 | 1020 | 640 | - |
| | | Internal | 2320 | 1570 | 1050 | - | - |
| | 0.48 | End | 2490 | 1410 | 1090 | 740 | - |
| | | Internal | 2380 | 1710 | 1200 | 780 | - |

Notes:

1. Fastening shall comply with Sections 12 & 13 of this manual.
2. Fixing to steel supports with thickness between 0.75 and 1.5mm may also result in reduced maximum spans due to reduced screw pull-out capacity.
3. The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
4. No washers are required for KLIP-LOK®-700 Hi-Strength since it is used as a concealed fixed cladding.
5. The spans supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. For CUSTOM ORB®, CUSTOM BLUE ORB®, TRIMDEK® and SPANDEK® refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.

TABLE 6.2:

Maximum cladding span tables (mm) for various LYSAGHT® claddings and cyclonic winds **WITH** cyclonic washers.

| Roof Cladding | BMT (mm) | Span Type | Ultimate Limit State Strength Pressures (kPa) | | | | |
|----------------------------------|----------|-----------|---|----------|----------|----------|----------|
| | | | 2.40 kPa | 3.75 kPa | 5.58 kPa | 8.21 kPa | 10.8 kPa |
| CUSTOM ORB® | 0.42 | End | 1320 | 1090 | 850 | - | - |
| | | Internal | 1700 | 1410 | 1130 | 800 | - |
| | 0.48 | End | 1810 | 1480 | 1090 | - | - |
| | | Internal | 1970 | 1700 | 1380 | 960 | 600 |
| CUSTOM BLUE ORB® | 0.60 | End | 2100 | 2080 | 1430 | 950 | 600 |
| | | Internal | 2100 | 2090 | 1790 | 1280 | 600 |
| TRIMDEK® | 0.42 | End | 1500 | 1300 | 1070 | 810 | 600 |
| | | Internal | 1800 | 1510 | 1210 | 870 | 600 |
| | 0.48 | End | 1720 | 1420 | 1140 | 840 | 600 |
| | | Internal | 2160 | 1780 | 1400 | 960 | 600 |
| SPANDEK® | 0.42 | End | 1690 | 1390 | 1120 | 830 | 600 |
| | | Internal | 2100 | 1640 | 1270 | 890 | 600 |
| | 0.48 | End | 1930 | 1400 | 1130 | 830 | 600 |
| | | Internal | 2270 | 1860 | 1450 | 980 | 600 |
| KLIP-LOK 700 HI-STRENGTH® | 0.42 | End | 2270 | 1360 | 1020 | 640 | - |
| | | Internal | 2320 | 1570 | 1050 | - | - |
| | 0.48 | End | 2490 | 1410 | 1090 | 740 | - |
| | | Internal | 2380 | 1710 | 1200 | 780 | - |
| KLIP-LOK® CLASSIC 700 | 0.42 | End | 1670 | 1190 | 920 | - | - |
| | | Internal | 1820 | 1490 | 1040 | - | - |
| | 0.48 | End | 2030 | 1480 | 1040 | 600 | - |
| | | Internal | 1740 | 1690 | 1240 | 610 | - |

Notes:

1. Fastening shall comply with Sections 12 & 13 of this manual.
2. Fixing to steel supports with thickness between 0.75 and 1.5mm may also result in reduced maximum spans due to reduced screw pull-out capacity.
3. The designer needs to refer to the ultimate strength pressures in Appendix 1 to determine the Limit State Strength pressures of the relevant cyclonic (c) classification.
4. No washers are required for KLIP-LOK 700 HI-STRENGTH® since it is used as a concealed fixed cladding.
5. The spans supplied are applicable when the cladding is fixed to a minimum of 1.5mm G450 steel. For CUSTOM ORB®, CUSTOM BLUE ORB®, TRIMDEK® and SPANDEK® refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.

7.0 TOPSPAN® PROFILES

FIGURE 7.1:

TOPSPAN® sections.

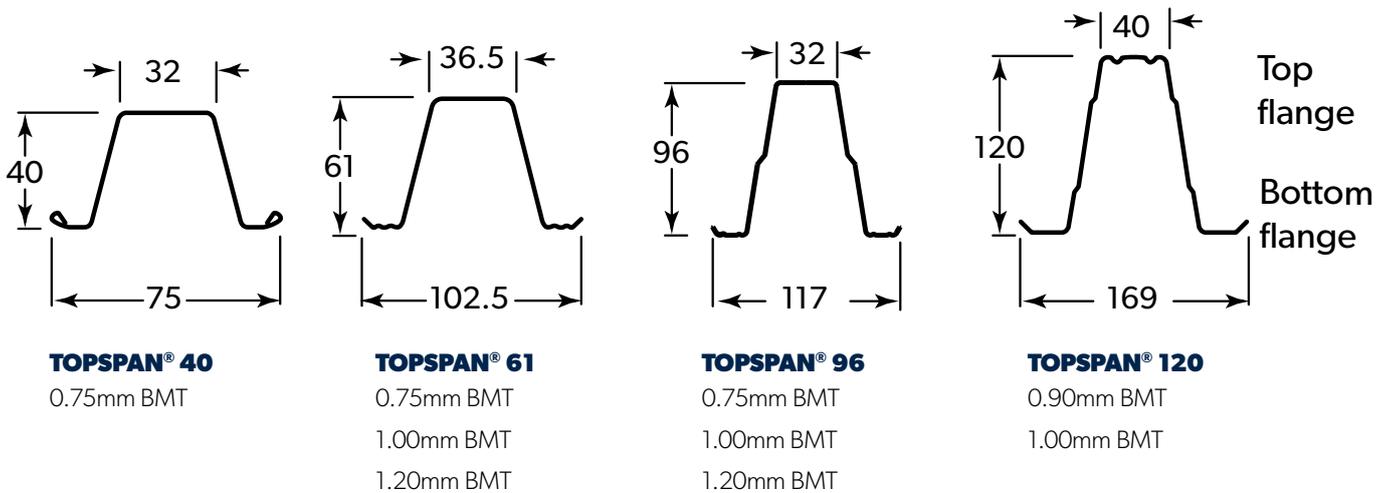


FIGURE 2.1:

Key to product codes.

| Product Codes | Available | Product Codes | Available |
|----------------------------------|-------------|------------------------------------|-------------|
| TS2242 = TOPSPAN® 22, 0.42mm BMT | All states | TS9675 = TOPSPAN® 96, 0.75mm BMT | Queensland |
| TS4055 = TOPSPAN® 40, 0.55mm BMT | All states | TS9610 = TOPSPAN® 96, 1.0mm BMT | Queensland |
| TS4075 = TOPSPAN® 40, 0.75mm BMT | All states | TS9612 = TOPSPAN® 96, 1.2mm BMT | Queensland |
| TS6160 = TOPSPAN® 61, 0.60mm BMT | Queensland# | TS12070 = TOPSPAN® 120, 0.70mm BMT | All states |
| TS6175 = TOPSPAN® 61, 0.75mm BMT | All states | TS12090 = TOPSPAN® 120, 0.90mm BMT | All states |
| TS6110 = TOPSPAN® 61, 1.0mm BMT | All states | TS12010 = TOPSPAN® 120, 1.0mm BMT | All states# |
| TS6112 = TOPSPAN® 61, 1.2mm BMT | Queensland | | |

Availability subject to enquiry.

8.0 TOPSPAN® CAPACITY TABLES

TOPSPAN® 40

FIGURE 8.1:

TOPSPAN® 40 - Continuous Span - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | 2 Screw Connection Capacity (kN/m) | | | | 4 Screw Connection Capacity (kN/m) | | | |
|-----------|------------------------|------------------------------------|-------|-------|--------|------------------------------------|-------|-------|--------|
| | | Support Thickness | | | | Support Thickness | | | |
| | TS4075 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 600 | 7.98 | 5.51 | 7.19 | 8.99 | 11.93 | 7.75 | 10.41 | 13.09 | 15.69 |
| 900 | 4.72 | 3.68 | 4.79 | 5.99 | 7.95 | 5.16 | 6.94 | 8.73 | 10.46 |
| 1200 | 2.41 | 2.76 | 3.59 | 4.49 | 5.96 | 3.87 | 5.21 | 6.54 | 7.84 |
| 1500 | 1.83 | 2.21 | 2.88 | 3.60 | 4.77 | 3.10 | 4.16 | 5.24 | 6.27 |
| 1800 | 1.25 | 1.84 | 2.40 | 3.00 | 3.98 | 2.58 | 3.47 | 4.36 | 5.23 |
| 2000 | 0.87 | 1.65 | 2.16 | 2.70 | 3.58 | 2.32 | 3.12 | 3.93 | 4.71 |

Notes:

- Support members: 1.0mm BMT: G550; 1.2mm BMT: G500; 1.5 & 1.9mm BMT: G450
- Outward capacity is limited by the minimum value between member strength and screw capacity.
- Interpolation of capacity values in the table is permitted.
- Laps are 40mm long. Refer Figure 11.5 and 11.6 in this manual.

- Design capacity tables can be used to design TOPSPAN® with timber supports:
 - 2 fastener connections with M5.5-11x40 BattenZips - 1.5mm BMT steel support is equivalent to softwood timber, 1.9mm BMT steel support is equivalent to hardwood timber.
 - 4 fastener connections with M5.5-11x40 BattenZips - 1.9mm BMT steel support is equivalent to both hardwood and softwood timber supports.

Capacities for softwood

Capacities for hardwood

Capacities for softwood and hardwood

TOPSPAN® 61

FIGURE 8.2:

TOPSPAN® 61 - 2 Span Lapped - Outward Ultimate Limit State Connection Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS6175 | TS6110 | TS6112 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 1500 | 4.45 | 6.48 | | 1.90 | 2.48 | 3.1 | 4.12 | 2.67 | 3.59 | 4.52 | 5.41 |
| 2000 | 2.98 | 3.79 | 3.85 | 1.43 | 1.86 | 2.33 | 3.09 | 2.01 | 2.69 | 3.39 | 4.06 |
| 2500 | 1.87 | 2.52 | 2.97 | 1.14 | 1.49 | 1.86 | 2.47 | 1.6 | 2.16 | 2.71 | 3.25 |
| 3000 | 1.45 | 1.95 | 2.22 | 0.95 | 1.24 | 1.55 | 2.06 | 1.34 | 1.80 | 2.26 | 2.71 |
| 3500 | 1.17 | 1.57 | 1.62 | 0.82 | 1.06 | 1.33 | 1.76 | 1.15 | 1.54 | 1.94 | 2.32 |
| 4000 | 0.88 | 1.10 | 1.16 | 0.71 | 0.93 | 1.16 | 1.54 | 1.00 | 1.35 | 1.69 | 2.03 |
| 4500 | | | 1.05 | 0.63 | 0.83 | 1.03 | 1.37 | 0.89 | 1.20 | 1.51 | 1.80 |
| 5000 | | | 0.94 | 0.57 | 0.74 | 0.93 | 1.23 | 0.80 | 1.08 | 1.36 | 1.62 |
| 5500 | | | 0.83 | 0.52 | 0.68 | 0.85 | 1.12 | 0.73 | 0.98 | 1.23 | 1.48 |
| 6000 | | | 0.72 | 0.48 | 0.62 | 0.78 | 1.03 | 0.67 | 0.90 | 1.13 | 1.35 |

FIGURE 8.3:

TOPSPAN® 61 - 3 Span Lapped - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS6175 | TS6110 | TS6112 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 1500 | 4.31 | 5.88 | | 2.19 | 2.86 | 3.57 | 4.74 | 3.08 | 4.14 | 5.20 | 6.24 |
| 2000 | 2.68 | 2.91 | 3.05 | 1.64 | 2.14 | 2.68 | 3.56 | 2.31 | 3.10 | 3.90 | 4.68 |
| 2500 | 1.48 | 2.17 | 2.37 | 1.31 | 1.71 | 2.14 | 2.84 | 1.85 | 2.48 | 3.12 | 3.74 |
| 3000 | 1.13 | 1.66 | 1.79 | 1.1 | 1.43 | 1.79 | 2.37 | 1.54 | 2.07 | 2.60 | 3.12 |
| 3500 | 0.94 | 1.20 | 1.32 | 0.94 | 1.22 | 1.53 | 2.03 | 1.32 | 1.77 | 2.23 | 2.67 |
| 4000 | 0.74 | 0.94 | 0.96 | 0.82 | 1.07 | 1.34 | 1.78 | 1.15 | 1.55 | 1.95 | 2.34 |
| 4500 | | | 0.87 | 0.73 | 0.95 | 1.19 | 1.58 | 1.03 | 1.38 | 1.73 | 2.08 |
| 5000 | | | 0.77 | 0.66 | 0.86 | 1.07 | 1.42 | 0.92 | 1.24 | 1.56 | 1.87 |
| 5500 | | | 0.68 | 0.6 | 0.78 | 0.97 | 1.29 | 0.84 | 1.13 | 1.42 | 1.70 |
| 6000 | | | 0.58 | 0.55 | 0.71 | 0.89 | 1.19 | 0.77 | 1.03 | 1.30 | 1.56 |

FIGURE 8.4:

TOPSPAN® 61 - 2 Span Continuous - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS6175 | TS6110 | TS6112 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 1500 | 3.84 | 5.33 | | 1.94 | 2.53 | 3.16 | 4.20 | 2.73 | 3.67 | 4.61 | 5.52 |
| 2000 | 2.51 | 3.37 | 3.48 | 1.46 | 1.90 | 2.37 | 3.15 | 2.05 | 2.75 | 3.46 | 4.14 |
| 2500 | 1.51 | 1.91 | 2.41 | 1.16 | 1.52 | 1.90 | 2.52 | 1.64 | 2.20 | 2.76 | 3.31 |
| 3000 | 1.17 | 1.44 | 1.78 | 0.97 | 1.27 | 1.58 | 2.10 | 1.36 | 1.83 | 2.30 | 2.76 |
| 3500 | 0.94 | 1.14 | 1.38 | 0.83 | 1.08 | 1.36 | 1.80 | 1.17 | 1.57 | 1.97 | 2.37 |
| 4000 | 0.72 | 0.84 | 1.11 | 0.73 | 0.95 | 1.19 | 1.57 | 1.02 | 1.37 | 1.73 | 2.07 |

FIGURE 8.5:

TOPSPAN® 61 - Single Span - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS6175 | TS6110 | TS6112 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 1500 | 2.32 | 3.26 | | 4.85 | 6.33 | 7.91 | 10.50 | 6.82 | 9.16 | 11.52 | 13.80 |
| 2000 | 1.73 | 1.99 | 2.03 | 3.64 | 4.74 | 5.93 | 7.87 | 5.11 | 6.87 | 8.64 | 10.35 |
| 2500 | 1.24 | 1.38 | 1.65 | 2.91 | 3.80 | 4.75 | 6.30 | 4.09 | 5.50 | 6.91 | 8.28 |
| 3000 | 0.87 | 1.11 | 1.31 | 2.43 | 3.16 | 3.95 | 5.25 | 3.41 | 4.58 | 5.76 | 6.90 |
| 3500 | 0.60 | 0.95 | 1.03 | 2.08 | 2.71 | 3.39 | 4.50 | 2.92 | 3.93 | 4.94 | 5.92 |
| 4000 | 0.44 | 0.78 | 0.80 | 1.82 | 2.37 | 2.97 | 3.94 | 2.56 | 3.44 | 4.32 | 5.18 |
| 4500 | | | 0.62 | 1.62 | 2.11 | 2.64 | 3.50 | 2.27 | 3.05 | 3.84 | 4.60 |
| 5000 | | | 0.49 | 1.46 | 1.90 | 2.37 | 3.15 | 2.05 | 2.75 | 3.46 | 4.14 |

Notes:

1. Support members: 1.0mm BMT: G550; 1.2mm BMT: G500; 1.5 & 1.9mm BMT: G450
2. Outward capacity is limited by the minimum value between member strength and screw capacity.
3. Interpolation of capacity values in the table is permitted.
4. Laps 15% of the span. (Refer to Figure 11.6)

5. Design capacity tables can be used to design TOPSPAN® with timber supports: 2 fastener connections with M5.5-11x40 BattenZips - 1.5mm BMT steel support is equivalent to softwood timber, 1.9mm BMT steel support is equivalent to hardwood timber. 4 fastener connections with M5.5-11x40 BattenZips - 1.9mm BMT steel support is equivalent to both hardwood and softwood timber supports.

TOPSPAN® 96

FIGURE 8.5:

TOPSPAN® 96 - 2 Span Lapped - Outward Ultimate Limit State Connection Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS9675 | TS9610 | TS9612 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 1.78 | 3.13 | 3.77 | 0.95 | 1.24 | 1.55 | 2.06 | 1.34 | 1.80 | 2.26 | 2.71 |
| 3500 | 1.47 | 2.51 | 3.06 | 0.82 | 1.06 | 1.33 | 1.76 | 1.15 | 1.54 | 1.94 | 2.32 |
| 4000 | 1.19 | 1.98 | 2.45 | 0.71 | 0.93 | 1.16 | 1.54 | 1.00 | 1.35 | 1.69 | 2.03 |
| 4500 | 0.96 | 1.53 | 1.92 | 0.63 | 0.83 | 1.03 | 1.37 | 0.89 | 1.20 | 1.51 | 1.80 |
| 5000 | 0.78 | 1.16 | 1.49 | 0.57 | 0.74 | 0.93 | 1.23 | 0.80 | 1.08 | 1.36 | 1.62 |
| 5500 | 0.68 | 0.98 | 1.25 | 0.52 | 0.68 | 0.85 | 1.12 | 0.73 | 0.98 | 1.23 | 1.48 |
| 6000 | 0.62 | 0.88 | 1.11 | 0.48 | 0.62 | 0.78 | 1.03 | 0.67 | 0.90 | 1.13 | 1.35 |
| 6500 | 0.57 | 0.78 | 0.97 | 0.44 | 0.57 | 0.72 | 0.95 | 0.62 | 0.83 | 1.04 | 1.25 |
| 7000 | 0.51 | 0.68 | 0.82 | 0.41 | 0.53 | 0.66 | 0.88 | 0.57 | 0.77 | 0.97 | 1.16 |
| 7500 | 0.45 | 0.58 | 0.68 | 0.38 | 0.50 | 0.62 | 0.82 | 0.53 | 0.72 | 0.90 | 1.08 |

FIGURE 8.6:

TOPSPAN® 96 - 3 Span Lapped - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS9675 | TS9610 | TS9612 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 1.60 | 2.62 | 3.22 | 1.10 | 1.43 | 1.79 | 2.37 | 1.54 | 2.07 | 2.60 | 3.12 |
| 3500 | 1.32 | 2.16 | 2.61 | 0.94 | 1.22 | 1.53 | 2.03 | 1.32 | 1.77 | 2.23 | 2.67 |
| 4000 | 1.08 | 1.75 | 2.08 | 0.82 | 1.07 | 1.34 | 1.78 | 1.15 | 1.55 | 1.95 | 2.34 |
| 4500 | 0.87 | 1.40 | 1.63 | 0.73 | 0.95 | 1.19 | 1.58 | 1.03 | 1.38 | 1.73 | 2.08 |
| 5000 | 0.70 | 1.11 | 1.26 | 0.66 | 0.86 | 1.07 | 1.42 | 0.92 | 1.24 | 1.56 | 1.87 |
| 5500 | 0.61 | 0.88 | 1.06 | 0.60 | 0.78 | 0.97 | 1.29 | 0.84 | 1.13 | 1.42 | 1.70 |
| 6000 | 0.56 | 0.70 | 0.95 | 0.55 | 0.71 | 0.89 | 1.19 | 0.77 | 1.03 | 1.30 | 1.56 |
| 6500 | 0.50 | 0.58 | 0.83 | 0.51 | 0.66 | 0.82 | 1.09 | 0.71 | 0.96 | 1.20 | 1.44 |
| 7000 | 0.45 | 0.52 | 0.72 | 0.47 | 0.61 | 0.77 | 1.02 | 0.66 | 0.89 | 1.11 | 1.34 |
| 7500 | 0.40 | 0.51 | 0.60 | 0.44 | 0.57 | 0.71 | 0.95 | 0.62 | 0.83 | 1.04 | 1.25 |

FIGURE 8.7:

TOPSPAN® 96 - 2 Span Continuous - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS9675 | TS9610 | TS9612 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 1.62 | 2.8 | 3.15 | 0.97 | 1.27 | 1.58 | 2.1 | 1.36 | 1.83 | 2.3 | 2.76 |
| 3500 | 1.21 | 1.98 | 2.31 | 0.83 | 1.08 | 1.36 | 1.88 | 1.17 | 1.57 | 1.97 | 2.37 |
| 4000 | 0.95 | 1.46 | 1.77 | 0.73 | 0.95 | 1.19 | 1.57 | 1.02 | 1.37 | 1.73 | 2.07 |
| 4500 | 0.76 | 1.12 | 1.40 | 0.65 | 0.84 | 1.05 | 1.40 | 0.91 | 1.22 | 1.54 | 1.84 |

FIGURE 8.8:

TOPSPAN® 96 - Single Span - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|--------|--------|--|-------|-------|--------|--|-------|-------|--------|
| | TS9675 | TS9610 | TS9612 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 0.96 | 1.76 | 1.89 | 2.43 | 3.16 | 3.95 | 5.25 | 3.41 | 4.58 | 5.76 | 6.90 |
| 3500 | 0.82 | 1.40 | 1.54 | 2.08 | 2.71 | 3.39 | 4.50 | 2.92 | 3.93 | 4.94 | 5.92 |
| 4000 | 0.69 | 1.09 | 1.23 | 1.82 | 2.37 | 2.97 | 3.94 | 2.56 | 3.44 | 4.32 | 5.18 |
| 4500 | 0.58 | 0.82 | 0.97 | 1.62 | 2.11 | 2.64 | 3.50 | 2.27 | 3.05 | 3.84 | 4.60 |
| 5000 | 0.48 | 0.61 | 0.76 | 1.46 | 1.90 | 2.37 | 3.15 | 2.05 | 2.75 | 3.46 | 4.14 |
| 5500 | 0.40 | 0.50 | 0.65 | 1.32 | 1.73 | 2.16 | 2.86 | 1.86 | 2.50 | 3.14 | 3.76 |
| 6000 | 0.34 | 0.45 | 0.58 | 1.21 | 1.58 | 1.98 | 2.62 | 1.70 | 2.29 | 2.88 | 3.45 |
| 6500 | 0.28 | 0.39 | 0.52 | 1.12 | 1.46 | 1.83 | 2.42 | 1.57 | 2.11 | 2.66 | 3.19 |

Notes:

- Support members: 1.0mm BMT: G550; 1.2mm BMT: G500; 1.5 & 1.9mm BMT: G450
- Outward capacity is limited by the minimum value between member strength and screw capacity.
- Interpolation of capacity values in the table is permitted.
- Laps 15% of the span. (Refer to Figures 11.6 & 11.7)

- Design capacity tables can be used to design TOPSPAN® with timber supports: 2 fastener connections with M5.5-11x40 BattenZips - 1.5mm BMT steel support is equivalent to softwood timber, 1.9mm BMT steel support is equivalent to hardwood timber. 4 fastener connections with M5.5-11x40 BattenZips - 1.9mm BMT steel support is equivalent to both hardwood and softwood timber supports

Capacities for softwood

Capacities for hardwood

Capacities for softwood and hardwood

TOPSPAN® 120

FIGURE 8.9:

TOPSPAN® 120 - 2 Span Lapped - Outward Ultimate Limit State Connection Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|---------|---|-------|-------|--------|---|-------|-------|--------|
| | TS12090 | TS12010 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 4.24 | 5.03 | 0.95 | 1.24 | 1.55 | 2.06 | 1.34 | 1.80 | 2.26 | 2.71 |
| 3500 | 3.38 | 3.97 | 0.82 | 1.06 | 1.33 | 1.76 | 1.15 | 1.54 | 1.94 | 2.32 |
| 4000 | 2.64 | 3.07 | 0.71 | 0.93 | 1.16 | 1.54 | 1.00 | 1.35 | 1.69 | 2.03 |
| 4500 | 2.02 | 2.31 | 0.63 | 0.83 | 1.03 | 1.37 | 0.89 | 1.20 | 1.51 | 1.80 |
| 5000 | 1.52 | 1.71 | 0.57 | 0.74 | 0.93 | 1.23 | 0.80 | 1.08 | 1.36 | 1.62 |
| 5500 | 1.28 | 1.44 | 0.52 | 0.68 | 0.85 | 1.12 | 0.73 | 0.98 | 1.23 | 1.48 |
| 6000 | 1.17 | 1.31 | 0.48 | 0.62 | 0.78 | 1.03 | 0.67 | 0.90 | 1.13 | 1.35 |
| 6500 | 1.05 | 1.19 | 0.44 | 0.57 | 0.72 | 0.95 | 0.62 | 0.83 | 1.04 | 1.25 |
| 7000 | 0.93 | 1.07 | 0.41 | 0.53 | 0.66 | 0.88 | 0.57 | 0.77 | 0.97 | 1.16 |
| 7500 | 0.82 | 0.95 | 0.38 | 0.50 | 0.62 | 0.82 | 0.53 | 0.72 | 0.90 | 1.08 |

FIGURE 8.10:

TOPSPAN® 120 - 3 Span Lapped - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|---------|---|-------|-------|--------|---|-------|-------|--------|
| | TS12090 | TS12010 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 4.09 | 4.32 | 1.10 | 1.43 | 1.79 | 2.37 | 1.54 | 2.07 | 2.60 | 3.12 |
| 3500 | 3.27 | 3.47 | 0.94 | 1.22 | 1.53 | 2.03 | 1.32 | 1.77 | 2.23 | 2.67 |
| 4000 | 2.57 | 2.73 | 0.82 | 1.07 | 1.34 | 1.78 | 1.15 | 1.55 | 1.95 | 2.34 |
| 4500 | 1.97 | 2.11 | 0.73 | 0.95 | 1.19 | 1.58 | 1.03 | 1.38 | 1.73 | 2.08 |
| 5000 | 1.49 | 1.61 | 0.66 | 0.86 | 1.07 | 1.42 | 0.92 | 1.24 | 1.56 | 1.87 |
| 5500 | 1.24 | 1.36 | 0.60 | 0.78 | 0.97 | 1.29 | 0.84 | 1.13 | 1.42 | 1.70 |
| 6000 | 1.11 | 1.23 | 0.55 | 0.71 | 0.89 | 1.19 | 0.77 | 1.03 | 1.30 | 1.56 |
| 6500 | 0.98 | 1.09 | 0.51 | 0.66 | 0.82 | 1.09 | 0.71 | 0.96 | 1.20 | 1.44 |
| 7000 | 0.85 | 0.96 | 0.47 | 0.61 | 0.77 | 1.02 | 0.66 | 0.89 | 1.11 | 1.34 |
| 7500 | 0.71 | 0.83 | 0.44 | 0.57 | 0.71 | 0.95 | 0.62 | 0.83 | 1.04 | 1.25 |

FIGURE 8.11:

TOPSPAN® 120 - 2 Span Continuous - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|---------|---|-------|-------|--------|---|-------|-------|--------|
| | TS12090 | TS12010 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 3.91 | 4.75 | 0.97 | 1.27 | 1.58 | 2.10 | 1.36 | 1.83 | 2.30 | 2.76 |
| 3500 | 2.73 | 3.37 | 0.83 | 1.08 | 1.36 | 1.80 | 1.17 | 1.57 | 1.97 | 2.37 |
| 4000 | 2.00 | 2.51 | 0.73 | 0.95 | 1.19 | 1.57 | 1.02 | 1.37 | 1.73 | 2.07 |
| 4500 | 1.52 | 1.93 | 0.65 | 0.84 | 1.05 | 1.40 | 0.91 | 1.22 | 1.54 | 1.84 |
| 5000 | 1.19 | 1.53 | 0.58 | 0.76 | 0.95 | 1.26 | 0.82 | 1.10 | 1.38 | 1.66 |

FIGURE 8.12:

TOPSPAN® 120 - Single Span - Outward Ultimate Limit State Capacity (kN/m).

| Span (mm) | Member Strength (kN/m) | | 2 Screw Connection Capacity (kN/m) Support Thickness | | | | 4 Screw Connection Capacity (kN/m) Support Thickness | | | |
|-----------|------------------------|---------|---|-------|-------|--------|---|-------|-------|--------|
| | TS12090 | TS12010 | 1.0mm | 1.2mm | 1.5mm | 1.9 mm | 1.0mm | 1.2mm | 1.5mm | 1.9 mm |
| 3000 | 2.44 | 2.91 | 2.43 | 3.16 | 3.95 | 5.25 | 3.41 | 4.58 | 5.76 | 6.90 |
| 3500 | 1.93 | 2.30 | 2.08 | 2.71 | 3.39 | 4.50 | 2.92 | 3.93 | 4.94 | 5.92 |
| 4000 | 1.50 | 1.78 | 1.82 | 2.37 | 2.97 | 3.94 | 2.56 | 3.44 | 4.32 | 5.18 |
| 4500 | 1.14 | 1.35 | 1.62 | 2.11 | 2.64 | 3.50 | 2.27 | 3.05 | 3.84 | 4.60 |
| 5000 | 0.85 | 1.00 | 1.46 | 1.90 | 2.37 | 3.15 | 2.05 | 2.75 | 3.46 | 4.14 |
| 5500 | 0.72 | 0.85 | 1.32 | 1.73 | 2.16 | 2.86 | 1.86 | 2.50 | 3.14 | 3.76 |
| 6000 | 0.66 | 0.78 | 1.21 | 1.58 | 1.98 | 2.62 | 1.70 | 2.29 | 2.88 | 3.45 |
| 6500 | 0.60 | 0.71 | 1.12 | 1.46 | 1.83 | 2.42 | 1.57 | 2.11 | 2.66 | 3.19 |
| 7000 | 0.55 | 0.64 | 1.04 | 1.36 | 1.69 | 2.25 | 1.46 | 1.96 | 2.47 | 2.96 |
| 7500 | 0.49 | 0.57 | 0.97 | 1.27 | 1.58 | 2.10 | 1.36 | 1.83 | 2.30 | 2.76 |

Notes:

- Support members: 1.0mm BMT: G550; 1.2mm BMT: G500; 1.5 & 1.9mm BMT: G450
- Outward capacity is limited by the minimum value between member strength and screw capacity.
- Interpolation of capacity values in the table is permitted.
- Laps 15% of the span. (Refer to Figures 11.6 & 11.7)
- Design capacity tables can be used to design TOPSPAN® with timber supports: 2 fastener connections with M5.5-11x40 BattenZips - 1.5mm BMT steel support is equivalent to softwood timber, 1.9mm BMT steel support is equivalent to hardwood timber. 4 fastener connections with M5.5-11x40 BattenZips - 1.9mm BMT steel support is equivalent to both hardwood and softwood timber supports.

Capacities for softwood

Capacities for hardwood

Capacities for softwood and hardwood

9.0 TOPSPAN® SECTION PROPERTIES

FIGURE 9.1:

TOPSPAN® 40.

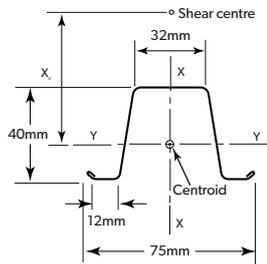


FIGURE 9.2:

TOPSPAN® 61.

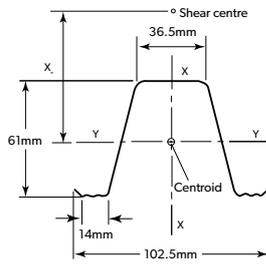


FIGURE 9.3:

TOPSPAN® 96.

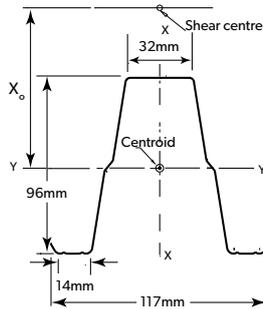


FIGURE 9.4:

TOPSPAN® 120.

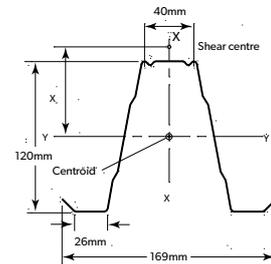


TABLE 9.1:

TOPSPAN® 40 Section Properties.

| Product | Base Metal Thickness (BMT) | Area | Mass per Unit Length | Second Moment of Area (Full) | | Shear centre to centroid distance | Section Modulus (Full) | | Radius of Gyration | | Torsion Constant | Warping Constant | Monosymmetry Constant |
|---------|----------------------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|--------------------|-----------|-----------------------|-------------------------------------|-----------------------------|
| | | | | I_x | I_y | | Z_x | Z_y | r_x | r_y | | | |
| | t | mm² | kg/m | 10^6mm^4 | 10^6mm^4 | X_o | 10^3mm^3 | 10^3mm^3 | mm | mm | J | 10^6mm^6 | β_y |
| | mm | | | | | mm | | | | | mm⁴ | | mm |
| TS4075 | 0.75 | 113 | 0.91 | 0.054 | 0.028 | 31.84 | 1.475 | 1.322 | 21.84 | 15.72 | 21.23 | 4.661 | 80.43 |

TABLE 9.2:

TOPSPAN® 61 Section Properties.

| Product | Base Metal Thickness (BMT) | Area | Mass per Unit Length | Second Moment of Area (Full) | | Shear centre to centroid distance | Section Modulus (Full) | | Radius of Gyration | | Torsion Constant | Warping Constant | Monosymmetry Constant |
|---------|----------------------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|--------------------|-----------|-----------------------|-------------------------------------|-----------------------------|
| | | | | I_x | I_y | | Z_x | Z_y | r_x | r_y | | | |
| | t | mm² | kg/m | 10^6mm^4 | 10^6mm^4 | X_o | 10^3mm^3 | 10^3mm^3 | mm | mm | J | 10^6mm^6 | β_y |
| | mm | | | | | mm | | | | | mm⁴ | | mm |
| TS6175 | 0.75 | 146 | 1.18 | 0.117 | 0.074 | 46.49 | 2.312 | 2.437 | 28.39 | 22.63 | 27.42 | 13.468 | 115.9 |
| TS6110 | 1.00 | 195 | 1.56 | 0.157 | 0.099 | 46.49 | 3.083 | 3.239 | 28.37 | 22.62 | 65.00 | 17.957 | 115.9 |
| TS6112 | 1.20 | 234 | 1.87 | 0.188 | 0.119 | 46.49 | 3.698 | 3.951 | 28.32 | 22.58 | 112.70 | 21.500 | 115.9 |

TABLE 9.3:

TOPSPAN® 96 Section Properties.

| Product | Base Metal Thickness (BMT) | Area | Mass per Unit Length | Second Moment of Area (Full) | | Shear centre to centroid distance | Section Modulus (Full) | | Radius of Gyration | | Torsion Constant | Warping Constant | Monosymmetry Constant |
|---------|----------------------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|--------------------|-----------|-----------------------|-------------------------------------|-----------------------------|
| | | | | I_x | I_y | | Z_x | Z_y | r_x | r_y | | | |
| | t | mm² | kg/m | 10^6mm^4 | 10^6mm^4 | X_o | 10^3mm^3 | 10^3mm^3 | mm | mm | J | 10^6mm^6 | β_y |
| | mm | | | | | mm | | | | | mm⁴ | | mm |
| TS9675 | 0.75 | 207 | 1.68 | 0.205 | 0.242 | 71.76 | 3.533 | 4.922 | 31.43 | 34.19 | 38.91 | 55.08 | 160.6 |
| TS9610 | 1.00 | 277 | 2.22 | 0.723 | 0.323 | 71.76 | 4.711 | 6.563 | 31.43 | 34.19 | 92.22 | 73.44 | 160.6 |
| TS9612 | 1.20 | 322 | 2.65 | 0.328 | 0.388 | 71.76 | 5.653 | 7.875 | 31.93 | 34.73 | 159.4 | 88.12 | 160.6 |

TABLE 9.4:

TOPSPAN® 120 Section Properties.

| Product | Base Metal Thickness (BMT) | Area | Mass per Unit Length | Second Moment of Area (Full) | | Shear centre to centroid distance | Section Modulus (Full) | | Radius of Gyration | | Torsion Constant | Warping Constant | Monosymmetry Constant |
|---------|----------------------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|--------------------|-----------|-----------------------|-------------------------------------|-----------------------------|
| | | | | I_x | I_y | | Z_x | Z_y | r_x | r_y | | | |
| | t | mm² | kg/m | 10^6mm^4 | 10^6mm^4 | X_o | 10^3mm^3 | 10^3mm^3 | mm | mm | J | 10^6mm^6 | β_y |
| | mm | | | | | mm | | | | | mm⁴ | | mm |
| TS12090 | 0.90 | 329 | 2.64 | 0.630 | 0.638 | 80.87 | 7.48 | 9.81 | 43.8 | 44.1 | 88.7 | 422.1 | 187.4 |
| TS12010 | 1.00 | 369 | 2.93 | 0.694 | 0.701 | 80.87 | 8.25 | 10.92 | 43.6 | 43.3 | 123.2 | 457.0 | 187.2 |

10.0 MATERIAL SPECIFICATIONS

MATERIAL SPECIFICATIONS - CLADDING

The availability of material for each product is limited and it is subject to enquiry.

- Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel complies with AS 1397 AM125 (125 g/m² minimum coating mass).
- ZINCALUME® aluminium/zinc alloy coated steel complies with AS 1397 AZ150 (150 g/m² minimum coating mass).
- Next generation COLORBOND® is pre-painted steel for exterior roofing and walling. It is the most widely used. The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc/ magnesium alloy-coated steel complying with AS 1397.
- COLORBOND® is pre-painted steel for exterior roofing and walling. The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397.
- COLORBOND® Metallic is pre-painted steel for superior aesthetic qualities displaying a metallic sheen.
- COLORBOND® Ultra is pre-painted steel for severe coastal or industrial environments (generally within about 100-200 metres of the source). The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc/ magnesium alloy-coated steel complying with AS 1397. Minimum coating mass is AM150 (150g/m²).

SUPERDURA® Stainless steel is available in a limited range of colours, and is available subject to enquiry. The availability of design data on stainless steel material is subject to additional testing.

- Stainless steel standard grade designation is AISI/ASTM Type 430; UNS No. S43000.

MATERIAL SPECIFICATIONS - TOPSPAN®

- ZINCALUME® steel with Activate™ technology. Aluminium/zinc/ magnesium alloy coated steel strip (Type AM as per AS 1397 AM125 (125 g/m² minimum coating mass) – Coatings of zinc and zinc alloyed with aluminium and magnesium).

TOPSPAN® 40

0.75mm BMT Yield Strength (MPa) 550

TOPSPAN® 61

0.75mm BMT Yield Strength (MPa) 550

1.00mm BMT Yield Strength (MPa) 550

1.20mm BMT Yield Strength (MPa) 500

TOPSPAN® 96

0.75mm BMT Yield Strength (MPa) 550

1.00mm BMT Yield Strength (MPa) 550

1.20mm BMT Yield Strength (MPa) 500

TOPSPAN® 120

0.90mm BMT Yield Strength (MPa) 550

1.00mm BMT Yield Strength (MPa) 550

CUSTOM ORB®

0.42mm BMT Yield Strength (MPa) 550

0.48mm BMT Yield Strength (MPa) 550

CUSTOM BLUE ORB®

0.60mm BMT Yield Strength (MPa) 300

CUSTOM ORB ACCENT® 35

0.48mm BMT Yield Strength (MPa) 550

ZINCALUME® or COLORBOND® steel.

FLATDEK® II

0.42mm BMT Yield Strength (MPa) 550

KLIP-LOK® 406 HIGH WIND

0.55mm BMT Yield Strength (MPa) 300

KLIP-LOK 700 HI-STRENGTH®

0.42mm BMT Yield Strength (MPa) 550

0.48mm BMT Yield Strength (MPa) 550

KLIP-LOK CLASSIC® 700

0.42mm BMT Yield Strength (MPa) 550

0.48mm BMT Yield Strength (MPa) 550

SPANDEK®

0.42mm BMT Yield Strength (MPa) 550

0.48mm BMT Yield Strength (MPa) 550

TRIMDEK®

0.42mm BMT Yield Strength (MPa) 550

0.48mm BMT Yield Strength (MPa) 550

All claddings are Next Generation ZINCALUME® steel or Next Generation COLORBOND® steel except as noted.

11.0 RECOMMENDED FASTENER LOCATIONS AND LAP DETAILS

FIGURE 11.1:

Two screw connection.

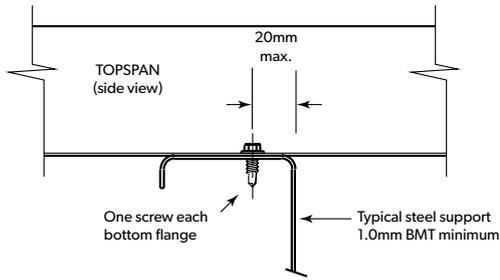


FIGURE 11.2:

Four screw connection.

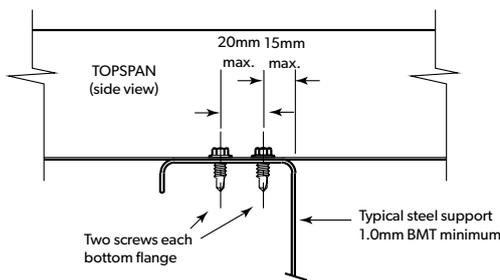
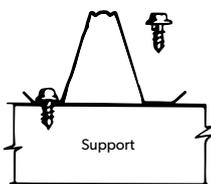


FIGURE 11.3:

Fastener location.



Fastener location - the screws must be located in the mid-region of the flat portion of the bottom flanges

FIGURE 11.4:

End support.

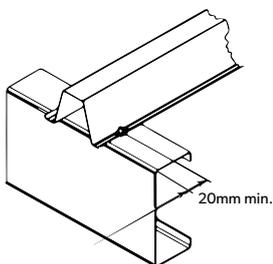
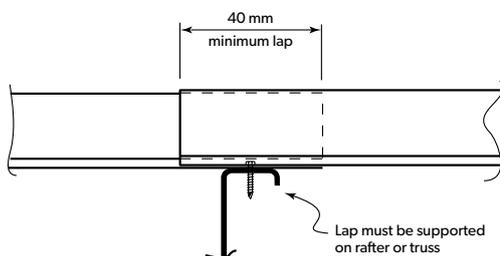


FIGURE 11.5:

Typical non-structural lap for TOPSPAN® 40.



Typical non-structural lap
CYCLONIC AREA MANUAL

FIGURE 11.6:

Typical connections to support (all TOPSPAN® profiles) and structural laps for TOPSPAN® 61.

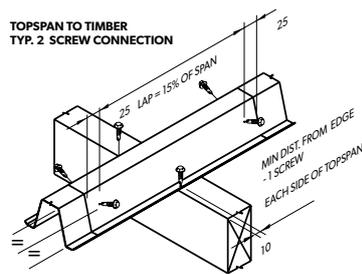
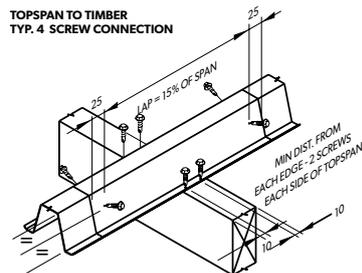
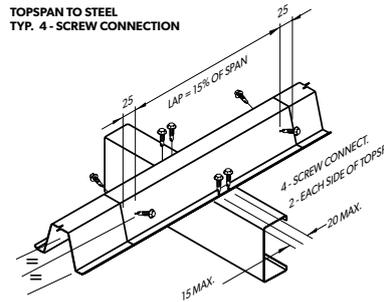
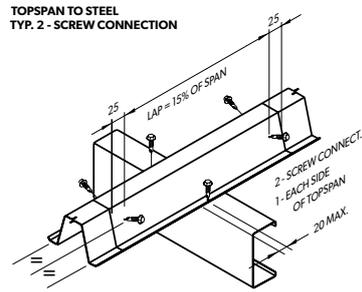
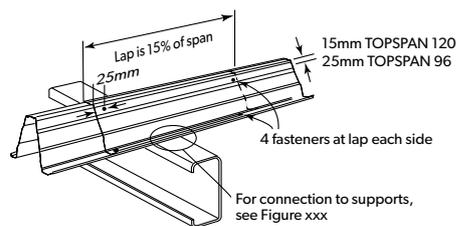


Figure 11.7

Typical structural lap TOPSPAN® 96/120.



12.0 FASTENER SELECTION

TABLE 12.1:

Fastener Selection - Cladding to supports.

| Profile | | Fixing to Steel Single & lapped (Total 2.0mm) ≥0.75 up to 1.0mm BMT | Fixing to Steel Single ≥1.0mm up to 3.0mm BMT | Fixing to Steel Lapped (Total 3.8mm) ≥1.00 up to 1.9mm BMT | Fixing to Timber Hardwood J1-J3 | Fix to Timber Softwood J4 |
|-----------------------------------|----------------------|--|--|--|---|---|
| CUSTOM ORB® | Crest fixed on roof | #14-12x55 CyclonicZIPS | #14-10x42 HH | #14-10x42 HH | #12-11x50 T17 HG/TG HH | M6-11x50 ROOFZIPS #14-10x50 T17 HH |
| CUSTOM BLUE ORB® | Crest fixed on roof | #14-12x55 CyclonicZIPS | #14-10x42 HH | #14-10x42 HH | #12-11x50 T17 HG/TG HH | M6-11x50 ROOFZIPS #14-10x50 T17 HH |
| CUSTOM ORB ACCENT® 35 | Crest fixed on roof | | #14-10x65 HH | #14-10x65 HH | | |
| TRIMDEK® | Crest fixed on roof | #14-12x55 CyclonicZIPS | #14-10x50 HH | #14-10x50 HH | #12-11x65 T17 HG/TG HH | M6-11x65 ROOFZIPS #14-10x65 T17 HH |
| SPANDEK® | Crest fixed on roof | #14-12x55 CyclonicZIPS | #14-10x50 HH | #14-10x50 HH | #12-11x65 T17 HG/TG HH | M6-11x65 ROOFZIPS #14-10x65 T17 HH |
| KLIP-LOK® 406 HW | Crest fixed on roof | | #14-10x65 HH | #14-10x65 HH | #12-11x75 T17 HH | #14-10x75 T17 HH |
| KLIP-LOK® CLASSIC 700 | Crest fixed on roof | | #14-10x65 HH | #14-10x65 HH | #12-11x75 T17 HH | #14-10x75 T17 HH |
| KLIP-LOK 700 HI-STRENGTH® | Clip fixed on roof | #12-14x20 HH | #12-14x20 HH | #12-14x20 HH | #12-11x45 T17 HH M5.5-11x40 BATTENZIPS | #12-11x45 T17 HH M5.5-11x40 BATTENZIPS |
| FLATDEK® II & FLATDEK® | Pan fixed on roof | M5.5-14x25 AutoTek or M5.5-14x39 AutoTek with 14g 25mm x 1.2mm EPDM Seal bonded aluminium washer | M5.5-14x25 AutoTek or M5.5-14x35 AutoTek with 14g 25mm x 1.2mm EPDM Seal bonded aluminium washer | M5.5-14x25 AutoTek or M5.5-14x35 AutoTek with 14g 25mm x 1.2mm EPDM Seal bonded aluminium washer | #12-11x45 T17 HH or M5.5-11x40 BATTENZIPS with 14g 25mm x 1.2mm EPDM Seal bonded aluminium washer | #12-11x45 T17 HH or M5.5-11x40 BATTENZIPS with 14g 25mm x 1.2mm EPDM Seal bonded aluminium washer |
| CUSTOM ORB® | Valley fixed on wall | #14-12x30 CYCZIPS | #14-10x25 HH | #14-10x25 HH | #12-11x25 T17 HH | #14-10x50 T17 HH |
| CUSTOM BLUE ORB® | Valley fixed on wall | #14-12x30 CYCZIPS | #14-10x25 HH | #14-10x25 HH | #12-11x25 T17 HH | #14-10x50 T17 HH |
| TRIMDEK® | Valley fixed on wall | #14-12x30 CYCZIPS | #14-10x25 HH | #14-10x25 HH | #12-11x25 T17 HH | #14-10x50 T17 HH |
| SPANDEK® | Valley fixed on wall | #14-12x30 CYCZIPS | #14-10x25 HH | #14-10x25 HH | #12-11x25 T17 HH | #14-10x50 T17 HH |

Notes:

- HH = Hex Head, HG = High Grip, TG = Top Grip, T17 = Type 17 Timber Screw.
- All fasteners to steel supports are to be self drilling self tapping screws.
- All fasteners to timber supports are to be self drilling screws.
- All fasteners exposed directly to the weather should be fitted with sealing washers.
- For cyclonic washer requirements, see 'Selection Tables' and Cladding Capacity Tables.
- Side lap screws (as specified in the product brochures) should always be located over supports as a minimum, for valley/pan fixed with additional side lap screws positioned as specified in Section 8.5 of Lysaght Roofing and Walling Installation manual.
- No pre-bored holes permitted.
- For strength groups of timber, refer to AS/NZS 1170.2
- Increase screw length if fixing over insulation to maintain minimum 3 screw threads protruding far side of support.
- For FLATDEK® II, the 25mm Tek is used to fix to steel beams where the sheeting is flat against the beam e.g. a purlin. The 35mm Tek is used to fix to steel where the sheeting is at a slope against the beam, usually a rail in a pitched structure. This length is satisfactory for pitched roof with a slope up to 23 degrees. The Tek length should be checked where the roof slope is higher than 23 degrees.
- Screw specification as above or equivalent fasteners.
- All screws with EPDM washer.
- The pressures supplied in the capacity tables are applicable when cladding is fixed to a minimum of 1.5mm BMT G450 steel. For CUSTOM ORB®, CUSTOM BLUE ORB®, TRIMDEK® and SPANDEK® refer to the TOPSPAN® Quick Selection Guide for support thickness less than 1.5mm BMT, or seek advice from our information line.

TOPSPAN® FASTENER SELECTION

STEEL SUPPORTS:

1.0mm thick M6.5-12 x 30mm Hex Head self-drilling screws
≥1.0mm-1.9mm No.14-10 x 25mm Hex Head self-drilling screws

TIMBER SUPPORTS:

M5.5-11x40mm BattenZips®

STRUCTURAL LAPS:

No.14-10 x 25mm Hex Head self-drilling screws

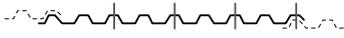
13.0 FASTENING TO SUPPORTS (PIERCE FIXED)

FIGURE 13.1:

Fastening to Supports: Cyclonic Areas.

SPANDEK®

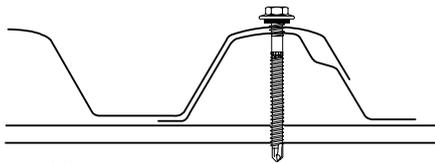
Crest: 4 fasteners †



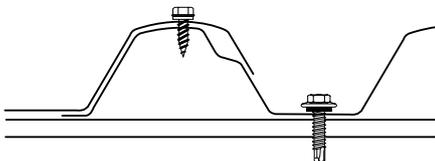
Valley: 4 fasteners †



† Fasteners per sheet per support. Most common practice is: 3 fasteners for internal spans and 4 fasteners for single and end spans.

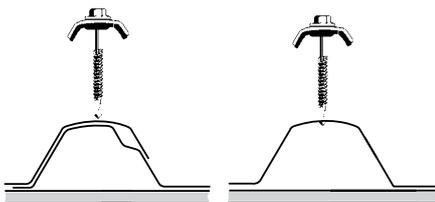


Crest fixing for roof or walls



Valley fixing for walls only

Cyclonic washer Class 4
Buildex Square-Lok or equivalent.



Crest fixing with cyclonic washer at lap

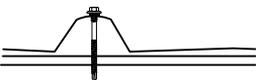
Crest fixing with cyclonic washer

TRIMDEK®

Crest fixing: 4 fasteners per sheet per support.



Pan fixing: 4 fasteners per sheet per support.

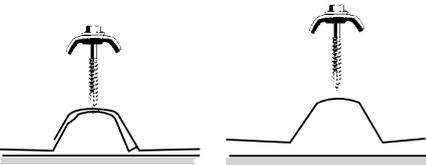


Crest fixing for roofs or walls.



Pan fixing for walls only.

Cyclonic washer Class 4
Buildex Square-Lok or equivalent.



Crest fixing with cyclonic washer at lap

Crest fixing with cyclonic washer

CUSTOM ORB®, CUSTOM BLUE ORB®

Crest: 5 fasteners †



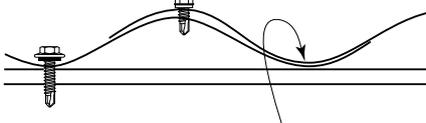
Pan/Valley: 5 fasteners †



† Fasteners per sheet per support. Most common practice is: 3 fasteners for internal spans and 5 fasteners for single and end spans.



Crest fixing for roof or walls



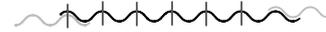
Pan/Valley fixing for walls only

CUSTOM ORB ACCENT® 35

Crest: 3 fasteners per sheet for internal supports

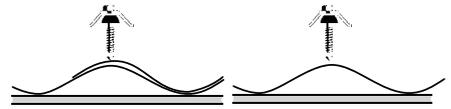


Crest: 6 fasteners per sheet for end supports (including single spans)



CUSTOM ORB®, CUSTOM BLUE ORB® & CUSTOM ORB ACCENT® 35

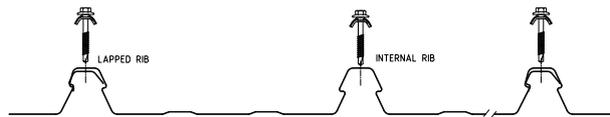
Cyclonic washer Class 4
Buildex Corri-Lok or equivalent.



Crest fixing with cyclonic washer at lap

Crest fixing with cyclonic washer

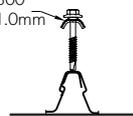
KLIP-LOK® 406 HIGH WIND & KLIP-LOK CLASSIC® 700



Cyclonic Washer
Class-4 G300
25 x 33 x 1.0mm
'Buildex'.

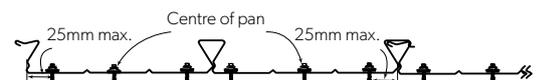
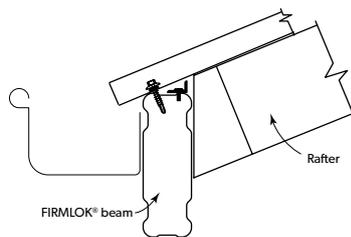


Crest fixing with Cyclonic washer



Crest fixing with Cyclonic washer at lap

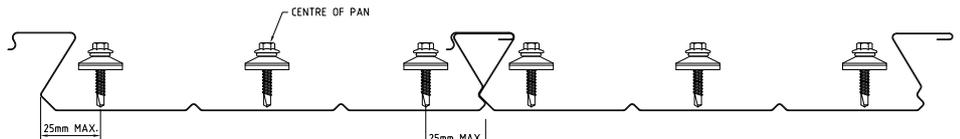
FLATDEK® II



Supports: 6 fasteners per sheet

Typical FLATDEK® II connection:
A longer Tek would be used on the rail of a pitched structure.

FLATDEK®



SUPPORTS: 3 FASTENERS PER SHEET

14.0 IMPACT LOADING BY WIND-BORNE DEBRIS



Typical debris impact test photographs

Parts of a building envelope (cladding, doors, windows) may be required to resist windborne debris according to AS/NZS 1170.2.

According to AS/NZS 1170.2, where wind borne debris loading is required for impact resistance, the debris impact loads should be:

- a. A timber test member of 4kg mass, of a density of at least 600kg/m^3 with a nominal cross section of 100mm x 50 mm
- b. A spherical steel ball 8mm in diameter (approximately 2 gms mass)

SPANDEK® 0.48 BMT has been tested and passed for the following impact speed:

- Timber members = 8.5 m/sec
- Spherical balls = 25.5 m/sec

Corrugated profile 0.48 BMT has been tested and passed for the following impact speed:

- Timber members = 25.5 m/sec
- Spherical balls = 34.0 m/sec

TRIMDEK® 0.48 BMT has been tested and passed for the following impact speed

- Timber members = 7.9 m/sec
- Spherical balls = 31.6 m/sec

For higher impact speeds further testing would be required.

The above information is based on specific span configurations.

APPENDIX 1: ULTIMATE STRENGTH PRESSURES (KPA) FOR CYCLONIC WIND CLASSIFIATORS (EXTRACT FROM TABLE 3.3 AS4055)

| Wind Class | Walls | | | Roofs | | | |
|------------|--------------|-------------------|--------------------------|--------------|-------------------------|------------------------|--|
| | Any position | Away from corners | Within 1200mm of corners | Any position | General away from edges | Within 1200mm of edges | At corners (within 1200mm of both edges) |
| C1 | +1.80 | -1.8 | -2.7 | +1.43 | -2.16 | -3.38 | -4.59 |
| C2 | +2.68 | -2.68 | -4.02 | +2.12 | -3.21 | -5.02 | -6.83 |
| C3 | +3.94 | -3.94 | -5.91 | +3.12 | -4.73 | -7.39 | -10.05 |
| C4 | +5.33 | -5.33 | -7.99 | +4.22 | -6.39 | -9.98 | -13.58 |

APPENDIX 2: TROPICAL CYCLONES AND WIND FORCES ON BUILDINGS

TROPICAL CYCLONES

Tropical cyclones are warm cored wind systems which affect the coastal regions of Northern Australia. They are formed over warm tropical waters, where the temperature must be $>27^{\circ}\text{C}$ when severe barometric depressions occur. High speed winds blow spirally inward from all sides to form a roughly circular core or eye which can range in size up to about 50km in diameter. Overall, a cyclonic wind system can have a diameter as large as 650km.

The spiralling action is caused by the earth's rotation and is clockwise in the southern hemisphere, anti-clockwise in the northern hemisphere.

Air drawn into the eye of a cyclone is carried vertically by convection and a pumping action generated by high altitude winds. This core activity extends up to 12km above the sea. The air rising in the core of the cyclone carries with it substantial amounts of water vapour which condenses to form heavy cloud and rain in the area of maximum wind force around the core.

The condensing water vapour releases vast amounts of heat energy which is expended enlarging the system. As cyclones extract their energy from the warm water, they dissipate fairly quickly on reaching land, but often not before doing tremendous damage.

Cyclones usually move at speeds of between 2 and 15 m/sec and because of their size, high wind speeds can last for many hours. These winds are of a cyclic nature, causing significant dynamic forces on building components.

These cyclic forces can induce fatigue in roofing materials, their supports and fixings; fatigue which often limits the performance of a component or system. In addition, because of the rotation of the wind system, the wind direction at a particular point can change 180° as the cyclone passes. This requires that building designs should not take shielding into account unless it is roughly equal on all sides.

WIND FORCES ON BUILDINGS

Wind creates a number of forces on both internal and external surfaces of a building; forces which must be considered when designing or selecting cladding materials, their fasteners and supports. These forces produce both positive pressure and negative pressure (suction) and their magnitude is affected by the velocity of the wind and the building's degree of exposure and configuration. The resultant pressures are calculated using AS/NZS 1170.2.

In cyclonic areas, particular note should be taken of the effects of internal pressures on roof and wall cladding and the importance of local pressure areas.

Flying debris is a significant problem in tropical cyclones and there are numerous instances of buildings appearing to stand up to the wind forces until debris broke windows or penetrated wall cladding, thus allowing pressure from the wind to build up inside. The internal pressure, acting with suction on the outside of the roof, was then sufficient to cause failure of the roof system - a sort of "explosion".

Failure of the roofing can be due to inadequate fastening of roof sheeting, in which case the fixings pull out or the sheeting cracks around the fasteners. It can be equally due to inadequate fixing of the roof framing, either the connection between the battens and rafters or the connection of the rafters to the building frame.

Irrespective of the reason for the loss of roof, the result is usually catastrophic. Water damage commonly results in the destruction of furniture and furnishings. In addition, framed buildings lose the bracing effect cause by the roof membrane, resulting in the collapse of some external walls.

DESIGN WIND SPEEDS

The various conditions which affect the design wind speeds, such as geographic location, terrain category, local pressure factor, etc., are to be taken from the AS/NZS 1170.2.

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AUSTRALIAN STANDARDS

| Australian Standard | Definition |
|---------------------|---|
| AS/NZS 1170.2:2021 | Structural design actions, Part 2: Wind actions |
| AS 4055:2021 | Wind loads for housing |
| AS 1397:2021 | Continuous hot-dip metallic coated steel sheet and strip — Coatings of zinc and zinc alloyed with aluminium and magnesium |
| AS/NZS 2728:2013 | Prefinished/ pre-painted sheet metal products for interior/ exterior building applications – Performance requirements |

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