



13 March 2019

Reference: 2019-8667

Aussi Rossrock Import Pty Ltd
c/- Mr Peter Guang
40 Lipson St
Port Adelaide SA 5015
Email: guang-xing51@hotmail.com

Dear Mr. Guang,

Re: Fixing ARMGO cladding panels to timber and steel stud wall frames

MLEI Consulting Engineers have undertaken structural calculations for fixing ARMGO cladding panels to timber and steel stud wall frames. This is achieved by fixing the ARMGO panels to steel top hat sections which are then fixed to the wall frames. Two top hat sections Lysaght - TOPSPAN22 (0.42BMT) & TOPSPAN40 (0.55BMT) were considered. Our calculations were based on the following design criteria:

| | |
|------------------------|--|
| Wind Classifications:: | N1 , N2 , N3 |
| Design Wind Speed: | 34 , 40 , 50 m/s (Ultimate) 26 , 26 , 32 m/s (Serviceability) |
| Design Heights: | 3m (Ground Floor) 5.7m (First Storey) 8.4m (Second Storey) |
| ARMGO Panel Dimension: | 2.7 x 0.9 x 0.10 m |
| ARMGO Panel Weight: | 70kg per panel |

The fixing details are given in the attached drawings together with the fixing tables. They are in compliance with the National Construction Code of Australia and the following Australian Standards and guides.

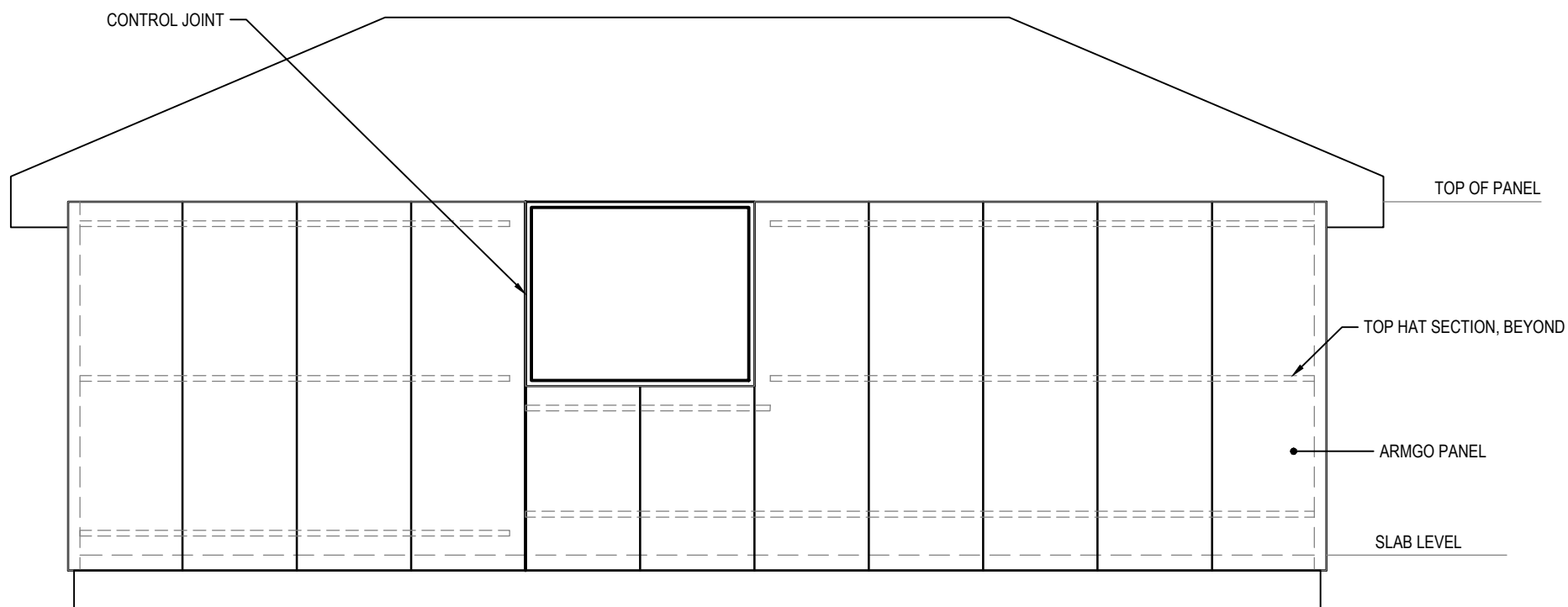
- AS/NZS 1170.0 – Structural Design Actions – General Principles
- AS/NZS 1170.1 – Structural Design Actions – Permanent and Imposed loads
- AS 4055 – Wind Loads for Housing
- AS/NZS 4600 – Cold-Formed Steel Structures
- Lysaght - TOPSPAN Design and Installation Guide

It should be noted that the above is applied to structural fixings of the ARMGO panels only. For material compliance, please consult the manufacturer's specifications and product compliance certificates.

Should you require further information, please do not hesitate to contact the undersigned on 8231 2832.

For and on behalf of MLEI Consulting Engineers

Thomas Ha B.E (Civil/Structural) MIEAust
Director/Principal Structural Engineer
Encl. Drawings



SINGLE STOREY CONSTRUCTION - HIP ROOF ELEVATION

NOTE: REFER TO S05 AND S06 FOR DESIGN TABLES

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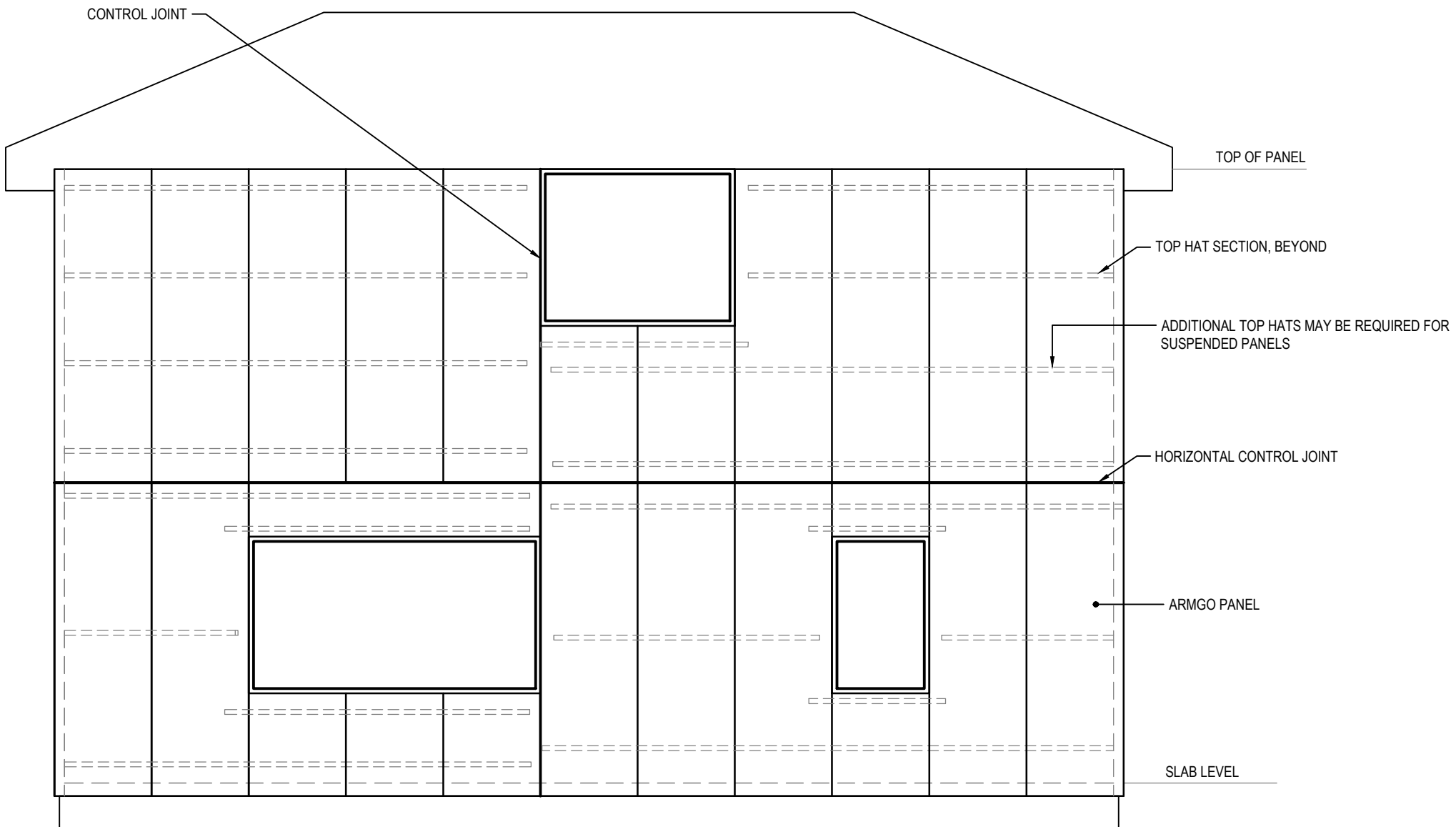
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| PROJECT ARMGO CLADDING PANEL FIXINGS |
| CLIENT AUSSI ROSSROCK IMPORT PTY LTD |

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| DRAWING TITLE STOREY CONSTRUCTION OF ARMGO CLADDING PANELS |
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| DRAWING NUMBER S01 | SHEET SIZE A3 | REV P1 |



**TWO STOREY STOREY CONSTRUCTION -
HIP ROOF ELEVATION**

NOTE: REFER TO S05 AND S06 FOR DESIGN TABLES

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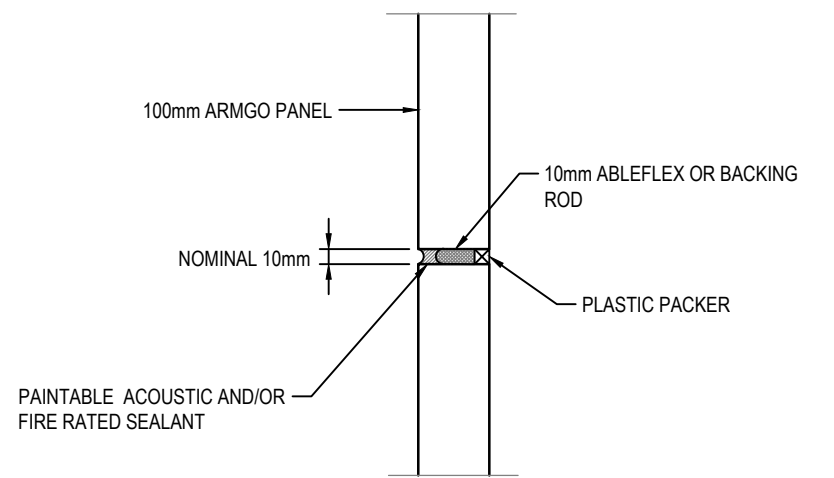
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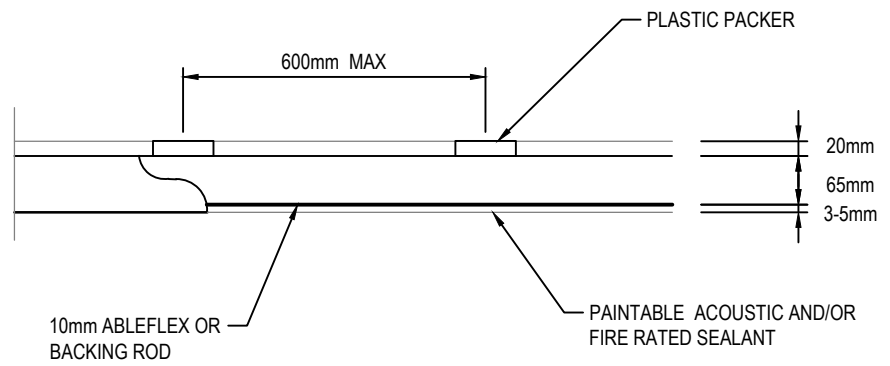
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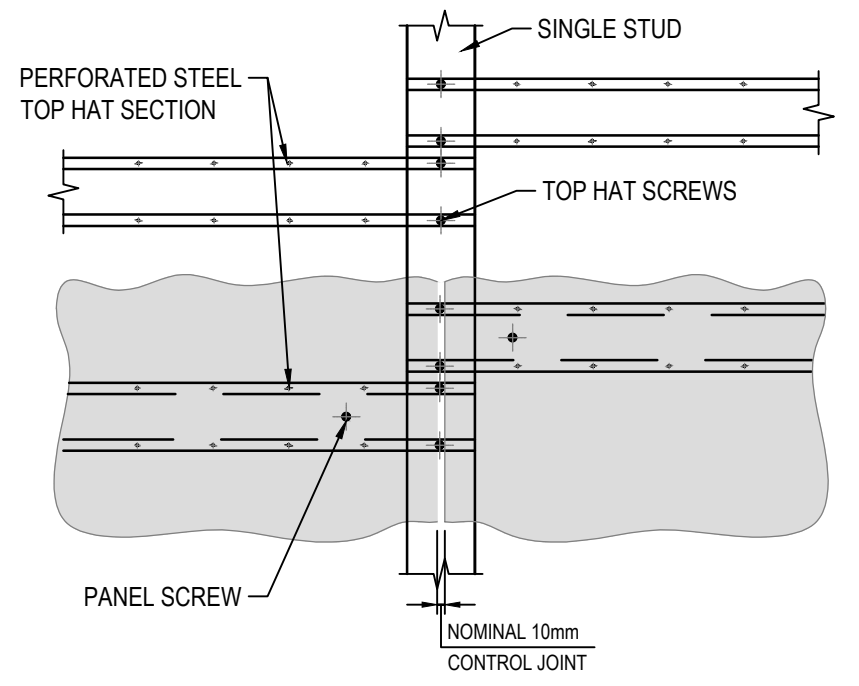
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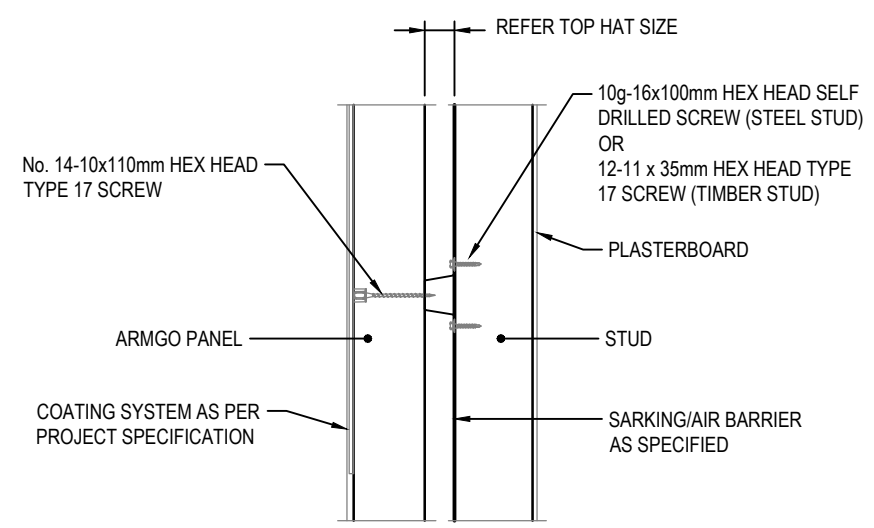
SIDE VIEW - HORIZONTAL CONTROL JOINT



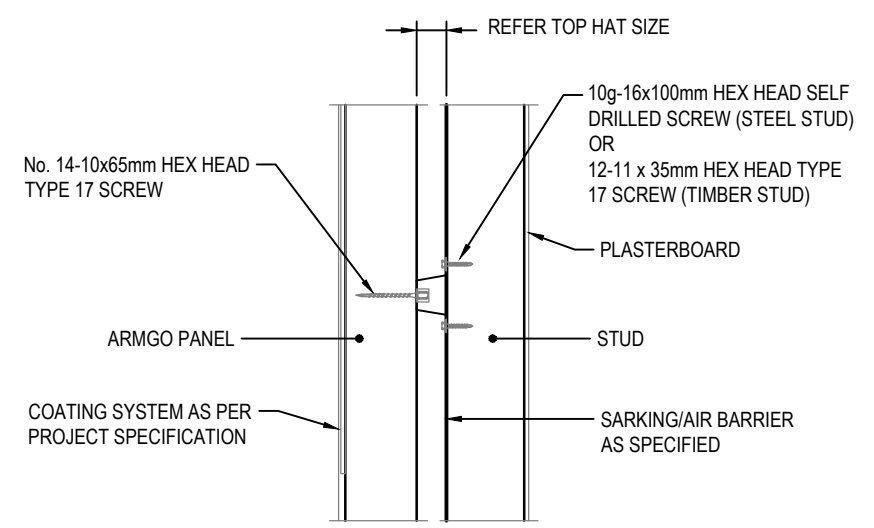
STOP VIEW - HORIZONTAL CONTROL JOINT



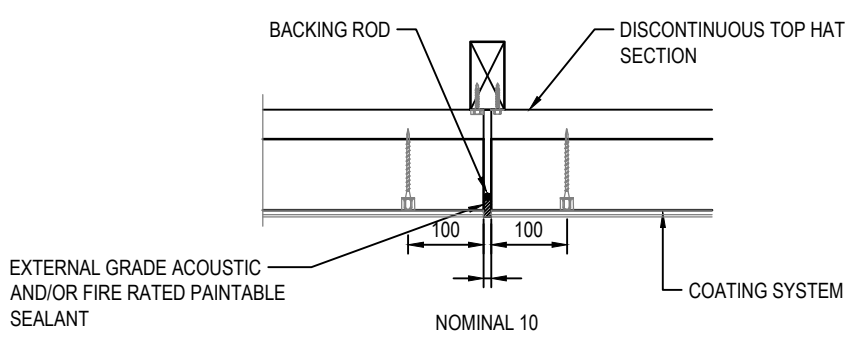
CONTROL JOINT - DISCONTINUOUS TOP HATS ON SINGLE STUD



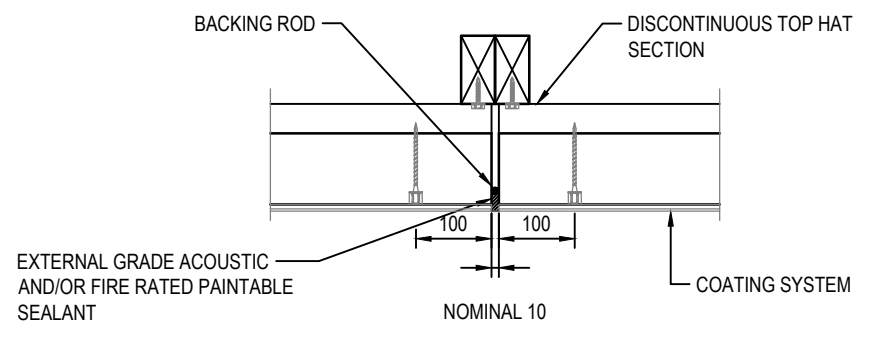
ARMGO PANEL EXTERNAL WALL SYSTEM FIXING DETAIL



ARMGO PANEL BOUNDARY WALL SYSTEM FIXING DETAIL



TYPICAL VERTICAL CONTROL JOINT



TYPICAL VERTICAL CONTROL JOINT WITH DOUBLE STUD

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PROJECT
ARMGO CLADDING PANEL FIXINGS

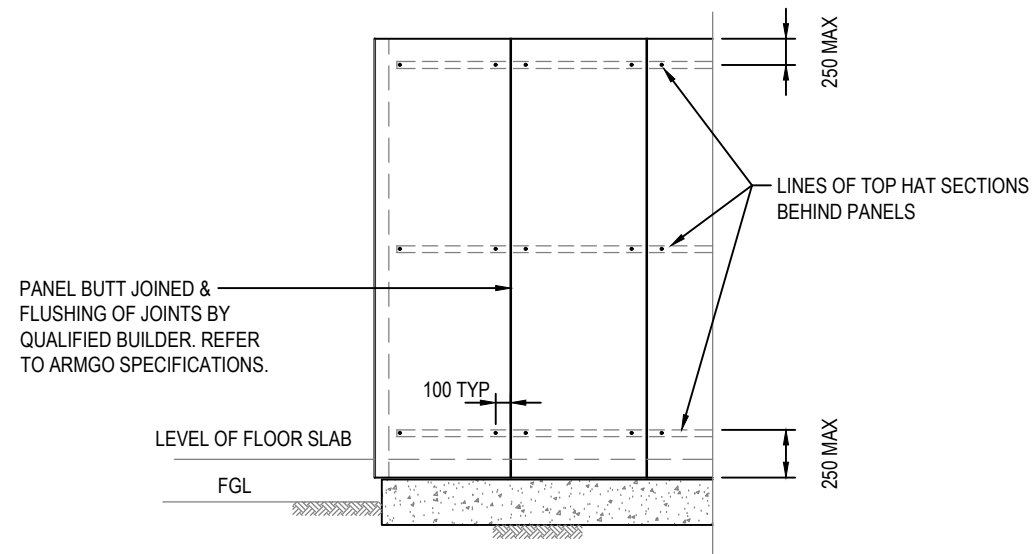
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DRAWING TITLE
ARMGO CLADDING PANELS CONNECTION DETAILS

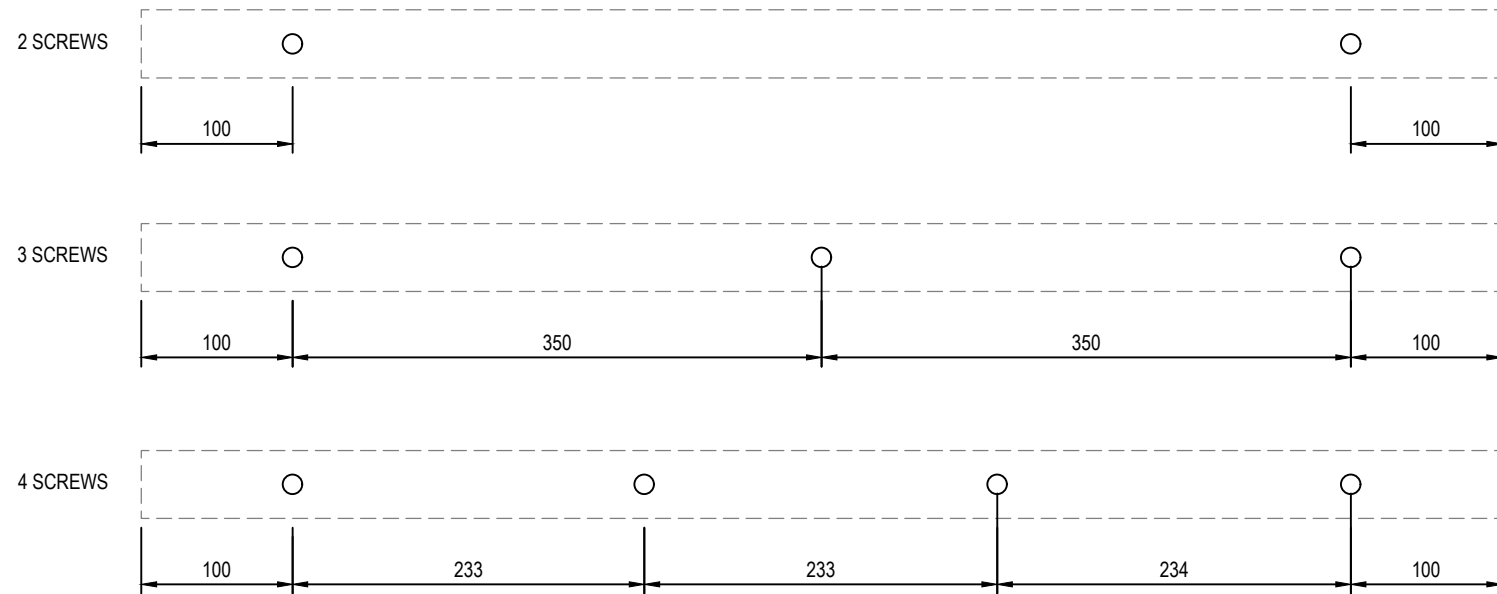
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| DRAWING NUMBER S03 | SHEET SIZE A3 | REV P1 |

SCREW LAYOUT DRAWING



ARMGO PANEL SETOUT - ELEVATION VIEW



**** SCREWS ARE TO BE EVENLY SPACED THROUGHOUT PANEL**

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| DRAWING NUMBER S04 | SHEET SIZE A3 | REV P1 |

TABLE 1 - No. OF TOPHATS PER 2.7m PANEL (GROUND FLOOR CONSTRUCTION)

| WIND CAT. | ULT CAPACITY (GROUND) (kPa) | | No. TOPSPAN22 REQUIRED (2.7m PANEL) | | | | No. TOPSPAN40 REQUIRED (2.7m PANEL) | | | |
|-----------|-----------------------------|--------------------|-------------------------------------|--------|---------|--------|-------------------------------------|--------|---------|--------|
| | AWAY FROM FRAME | > 1200mm OF CORNER | STUD SPACING (mm) | | | | STUD SPACING (mm) | | | |
| | | | PANEL LOCATION | | | | PANEL LOCATION | | | |
| | | | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER |
| N1 | 0.36/-0.3 | -0.54 | 450 | 600 | 450 | 600 | 450 | 600 | 450 | 600 |
| N2 | 0.68/-0.59 | -1.03 | 3 | 3 | 3 | 3 | - | 3 | - | 3 |
| N3 | 1.68/-1.44 | -2.52 | 3 | 3 | 3 | 3 | - | 3 | - | 3 |

TABLE 2 - No. OF TOPHATS PER 2.7m PANEL (FIRST STOREY CONSTRUCTION)


| WIND CAT. | ULT CAPACITY (FIRST) (kPa) | | No. TOPSPAN22 REQUIRED (2.7m PANEL) | | | | No. TOPSPAN40 REQUIRED (2.7m PANEL) | | | |
|-----------|----------------------------|--------------------|-------------------------------------|--------|---------|--------|-------------------------------------|--------|---------|--------|
| | AWAY FROM FRAME | > 1200mm OF CORNER | STUD SPACING (mm) | | | | STUD SPACING (mm) | | | |
| | | | PANEL LOCATION | | | | PANEL LOCATION | | | |
| | | | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER |
| N1 | 0.37/-0.31 | -0.55 | 450 | 600 | 450 | 600 | 450 | 600 | 450 | 600 |
| N2 | 0.7/-0.6 | -1.06 | 4 | 4 | 4 | 4 | - | 4 | - | 4 |
| N3 | 1.72/-1.48 | -2.59 | 4 | 4 | 4 | 4 | - | 4 | - | 4 |

TABLE 3 - No. OF TOPHATS PER 2.7m PANEL (SECOND STOREY CONSTRUCTION)

| WIND CAT. | ULT CAPACITY (SECOND) (kPa) | | No. TOPSPAN22 REQUIRED (2.7m PANEL) | | | | No. TOPSPAN40 REQUIRED (2.7m PANEL) | | | |
|-----------|-----------------------------|--------------------|-------------------------------------|--------|---------|--------|-------------------------------------|--------|---------|--------|
| | AWAY FROM FRAME | > 1200mm OF CORNER | STUD SPACING (mm) | | | | STUD SPACING (mm) | | | |
| | | | PANEL LOCATION | | | | PANEL LOCATION | | | |
| | | | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER | TYPICAL | CORNER |
| N1 | 0.41/-0.35 | -0.61 | 450 | 600 | 450 | 600 | 450 | 600 | 450 | 600 |
| N2 | 0.78/-0.67 | -1.18 | 4 | 4 | 4 | 4 | - | 4 | - | 4 |
| N3 | 1.91/-1.64 | -2.87 | 4 | 4 | 4 | 4 | - | 4 | - | 4 |

NOTES:

1. TOPSPAN40 DESIGNED BASED ON TS055
2. MINIMUM OF THREE PANELS REQUIRED PER 2.7m PANEL
3. TOPHATS TO BE INSTALLED A MAX 250mm FROM PANEL ENDS
4. ADDITIONAL TOPHATS REQUIRED BELOW AND ABOVE WINDOW OPENINGS
5. TOPHATS DESIGNED AS THREE-SPAN CONTINUOUS
6. DESIGN FOR PANEL WIDTH OF 0.9m

| <table border="1"> <thead> <tr> <th colspan="4">REVISION</th> </tr> <tr> <th>ISSUE</th> <th>DATE</th> <th>DESCRIPTION</th> <th>INITIAL</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>13.03.19</td> <td>PRELIMINARY ISSUE</td> <td>BT</td> </tr> </tbody> </table> | | | | REVISION | | | | ISSUE | DATE | DESCRIPTION | INITIAL | P1 | 13.03.19 | PRELIMINARY ISSUE | BT | <p style="text-align: center;">ISSUED FOR INFORMATION & ILLUSTRATION ONLY NOT FOR CONSTRUCTION</p> |  <p>452 Pulteney Street, Adelaide SA 5000 Telephone (08) 8231 2832 Facsimile (08) 8311 1742 www.mlei.com.au</p> | PROJECT ARMGO CLADDING PANEL FIXINGS | DRAWING TITLE DESIGN TABLES - SHEET 1 | DRAFTER BT | ENGINEER PK | MANAGER TH |
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TABLE 4 - No. OF SCREWS PER 2.7m PANEL PER TOPHAT (GROUND FLOOR CONSTRUCTION)

| GROUND. | TOPSPAN22 | | | | TOPSPAN40 (TS055) | | | |
|-----------|------------------|-----|---------------------|-----|-------------------|-----|---------------------|-----|
| | AWAY FROM CORNER | | <1200mm FROM CORNER | | AWAY FROM CORNER | | <1200mm FROM CORNER | |
| | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | |
| WIN CLASS | END | MUD | END | MID | END | MID | END | MID |
| N1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N3 | 3 | 5 | 4 | 8 | 3 | 3 | 3 | 5 |

TABLE 5 - No. OF SCREWS PER 2.7m PANEL PER TOPHAT (FIRST STOREY CONSTRUCTION)

| GROUND. | TOPSPAN22 | | | | TOPSPAN40 (TS055) | | | |
|-----------|------------------|-----|---------------------|-----|-------------------|-----|---------------------|-----|
| | AWAY FROM CORNER | | <1200mm FROM CORNER | | AWAY FROM CORNER | | <1200mm FROM CORNER | |
| | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | |
| WIN CLASS | END | MUD | END | MID | END | MID | END | MID |
| N1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N3 | 3 | 5 | 4 | 8 | 3 | 3 | 3 | 5 |

TABLE 6 - No. OF SCREWS PER 2.7m PANEL PER TOPHAT (SECOND STOREY CONSTRUCTION)

| GROUND. | TOPSPAN22 | | | | TOPSPAN40 (TS055) | | | |
|-----------|------------------|-----|---------------------|-----|-------------------|-----|---------------------|-----|
| | AWAY FROM CORNER | | <1200mm FROM CORNER | | AWAY FROM CORNER | | <1200mm FROM CORNER | |
| | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | | TOP-HAT LOCATION | |
| WIN CLASS | END | MUD | END | MID | END | MID | END | MID |
| N1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| N3 | 3 | 4 | 4 | 6 | 3 | 3 | 3 | 4 |

NOTES:

- SCREW USED FOR PANEL TO TOP-HAT IS 14g-10x110mm HEX HEAD TYPE 17 SCREW
- MINIMUM OF 3-SCREWS PER PANEL i.e. 2 AT ENDS AND 1 AT MID-SPAN OF PANEL
- END PANEL SCREWS TO BE 100mm FROM EDGE

TABLE 7 - SCREW AND SOCKET TYPES

| TYPE OF SCREW | APPLICATION | SOCKET TYPE |
|--|--|-----------------------------|
| 12g-11x25mm HEX HEAD TYPE 17 SCREW | FIX TOP HAT TO TIMBER FRAME/STUD | 5/16" HEX MAG. SOCKET |
| 10g-16x16mm HEX HEAD SELF DRILLING SCREW | FIX TOP HAT TO STEEL FRAME/STUD | 5/16" HEX MAG. SOCKET |
| 14g-10x110mm HEX HEAD TYPE 17 SCREW | FIX ARMGO PANEL TO TOP HAT FROM OTSIDE OF BUILDING | 5mm HEX DRIVE BIT 50mm LONG |

NOTES:

- PROVIDE 2 SCREWS PER TOP-HAT TO STUD CONNECTION
- TIMBER FRAME CONNECTION DESIGNED BASED ON F7 (PINE) TIMBER STUD

CONTROL JOINTS

| SITE CLASSIFICATION | BUILDING DIFFERENTIAL MOVEMENT | NO. OF VERTICAL CONTROL JOINTS |
|---------------------|--------------------------------|--------------------------------|
| S | $d \leq 15\text{mm}$ | CJ @ 10m CTS MAX |
| M - D | $15 < d \leq 45\text{mm}$ | CJ @ 7.5m CTS MAX |
| H1 - D | $30 < d \leq 45\text{mm}$ | CJ @ 6m CTS MAX |
| H2 - D | $45 < d \leq 55\text{mm}$ | CJ @ 6m CTS MAX |
| E | $d > 55\text{mm}$ | CJ @ 5m CTS MAX |

NOTE:

- VERTICAL CONTROL JOINTS REQUIRED AT EXTERNAL AND INTERNAL CORNERS
- VERTICAL CONTROL JOINTS REQUIRED ABOVE AND BELOW ALL DOORS, INCLUDING SLIDING AND GARAGE DOORS
- HORIZONTAL CONTROL JOINTS REQUIRED AT EVERY HORIZONTAL FLOOR JUNCTION (REQUIRED AT MAX HEIGHT OF 3.9m)
- ENSURE TOP-HATS ARE DISCONTINUOUS AT CONTROL JOINT LOCATIONS

| OPENINGS (O) | VERTICAL CONTROL JOINTS |
|-------------------------------------|--|
| $O < 2450\text{mm}$ IN WIDTH | CONTROL JOINT NOT REQUIRED. IF THE STRAIGHT JOINT THAT EXTENDS ABOVE OR BELOW THE WINDOW JAMB < 600mm, A CONTROL JOINT IS RQUIRED. |
| $2450 < O < 3600\text{mm}$ IN WIDTH | CONTROL JOINT REQUIRED AT ONE SIDE OF THE OPENING ABOVE AND BELOW. IF THE STRAIGHT JOINT THAT EXTENDS ABOVE OR BELOW THE WINDOW JAMB < 600mm LONG A CONTROL JOINT IS REQUIRED TO THE OPPOSITE SIDE OF THE OPENING. |
| $O > 3600\text{mm}$ IN WIDTH | CONTROL JOINT REQUIRED BOTH SIDES OF OPENING ABOVE AND BELOW. |

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