STRUCTURAL DESIGN CERTIFICATION ALUMINIUM TOP HAT

For: FVA Group Pty Limited

18-20 Donald Street

Lithgow, NSW, 2790

Job No: 24138

May 2024

RICKARD
ENGINEERING

SYDNEY Suite 5, 121 Military Road, Neutral Bay, Sydney, Australia NSW 2089 Tel: (+61) 2 9904 5610
LONDON 3000 Cathedral Hill, Guildford, GU2 7YB, UK Tel: (+44) 01483 243 523
DUBAI Standard Chartered Tower, Lvl 5, Emmar Square, Downtown Burj Khalifa, Dubai UAE Tel: (+971) 4 313 2494
www.rickardengineering.com
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DOCUMENT CONTROL

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24138_CAL01	01	For Approval	29/05/2024	NT	SF	SF

Contents

1 Introduction

This report is to confirm that the design span tables of the 6063-T5 Aluminium Tophat sections listed below have been developed to comply with the requirements of the National Construction Code (NCC 2022) for structural adequacy.

- Tophat 50 mm x 24 mm x 2.5 mm - Solid Wall (P-26954)
- Tophat 50 mm x 24 mm x 2.5 mm - Perforated Wall (P-26954)
- Tophat 50 mm x 35 mm x 2.5 mm - Solid Wall (P-26955)
- Tophat 50 mm x 35 mm x 2.5 mm - Perforated Wall (P-26955)

The applicable codes, standards, and documents are as follows:

• General		NCC Volume One Part B1
• Loading	General principles	AS/NZS 1170.0:2002
	Wind loads	AS/NZS 1170.2:2021 AS 4055:2012
• Aluminium structures		AS/NZS 1664.1:1997
• Cold-formed steel structures		AS 4600:2018

2 Design wind loads

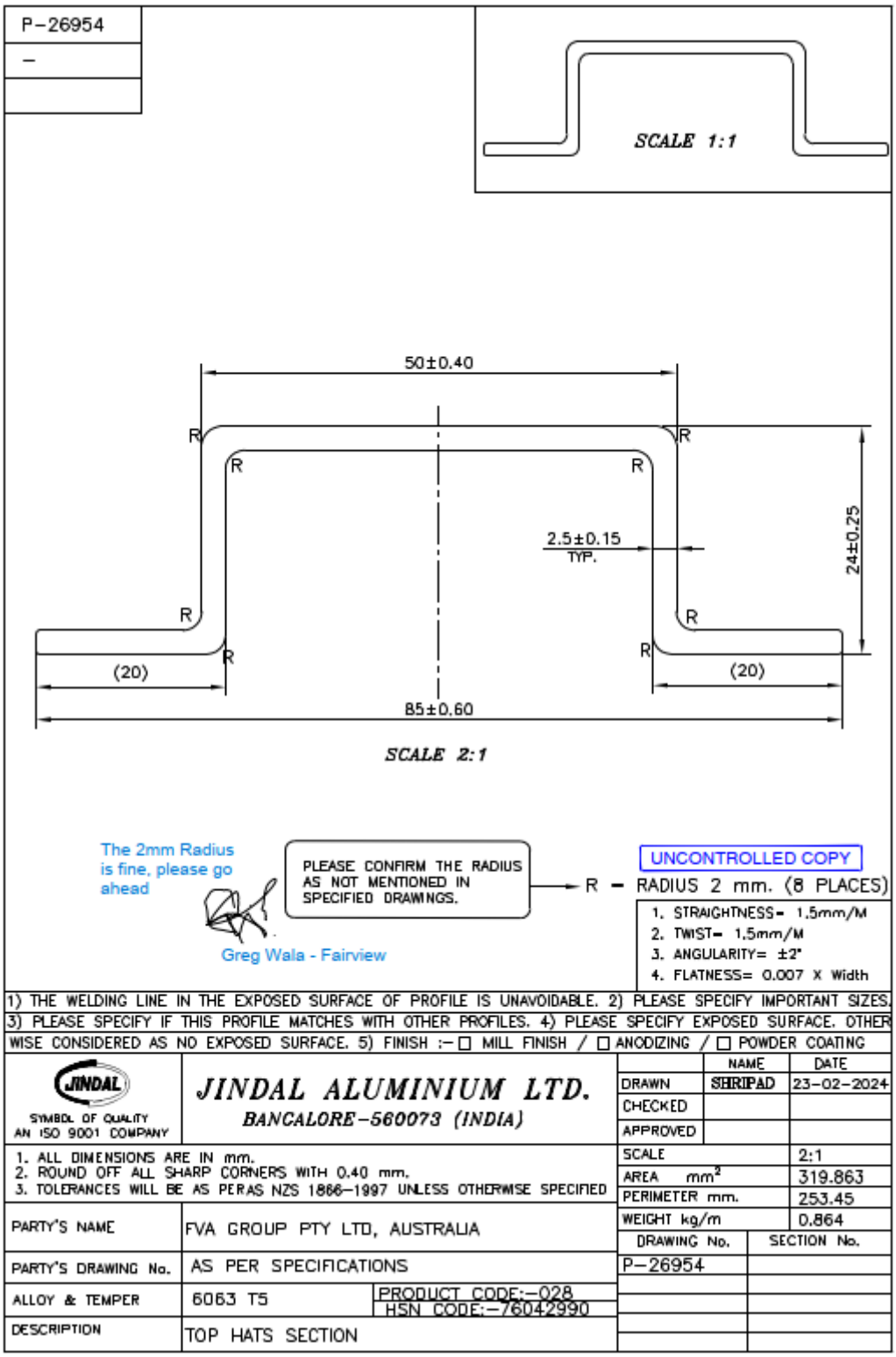
The design wind pressure is determined as per AS/NZS 1170.2:2021. The interval recurrence of 1000 years is used for ULS, and 25 years is used for SLS.

3 Aluminium material properties

Aluminium material properties in accordance to AS 1664.1:1997 Table 3.3(A):

Alloy	6063
Temper Designation	T5
Type	Extrusion
Modulus of Elasticity	$E_s = 70000\ MPa$
Poisson's Ratio	$\nu = 0.334$
Density	$\rho_{al} = 2700\ kgm^{-3}$
Thermal Expansion	$\alpha_s = 2.34 \times\ 10^{-5}\ /°C$
Yield Stress	$F_{ty} = 110\ MPa$
Tensile Ultimate Strength	$F_{tu} = 152\ MPa$
Shear Stress	$F_{sy} = 62\ MPa$
Bearing Ultimate Stress	$F_{bu} = 434\ MPa$

4 Reference drawings



P–26955
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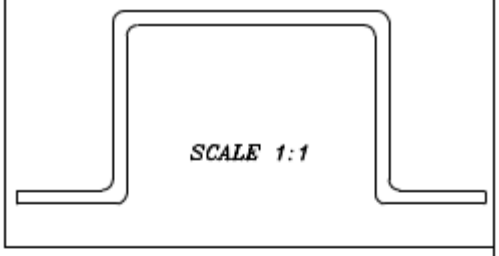
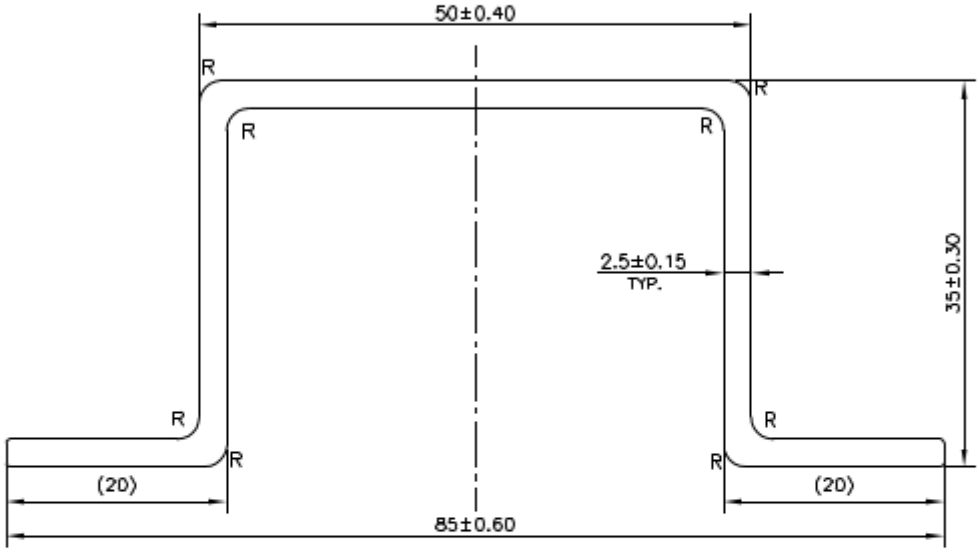




SCALE 2:1

UNCONTROLLED COPY

The 2mm Radius is fine, please go ahead

Greg Wala - Fairview

PLEASE CONFIRM THE RADIUS AS NOT MENTIONED IN SPECIFIED DRAWINGS.

R = RADIUS 2 mm. (8 PLACES)

1. STRAIGHTNESS= 1.5mm/M
2. TWIST= 1.5mm/M
3. ANGULARITY= ±2°
4. FLATNESS= 0.007 X Width

1) THE WELDING LINE IN THE EXPOSED SURFACE OF PROFILE IS UNAVOIDABLE. 2) PLEASE SPECIFY IMPORTANT SIZES. 3) PLEASE SPECIFY IF THIS PROFILE MATCHES WITH OTHER PROFILES. 4) PLEASE SPECIFY EXPOSED SURFACE. OTHERWISE CONSIDERED AS NO EXPOSED SURFACE. 5) FINISH :– ☐ MILL FINISH / ☐ ANODIZING / ☐ POWDER COATING

JINDAL
SYMBOL OF QUALITY
AN ISO 9001 COMPANY

JINDAL ALUMINIUM LTD.
BANCALORE–560073 (INDIA)

	NAME	DATE
DRAWN	SHRIPAD	23–02–2024
CHECKED		
APPROVED		

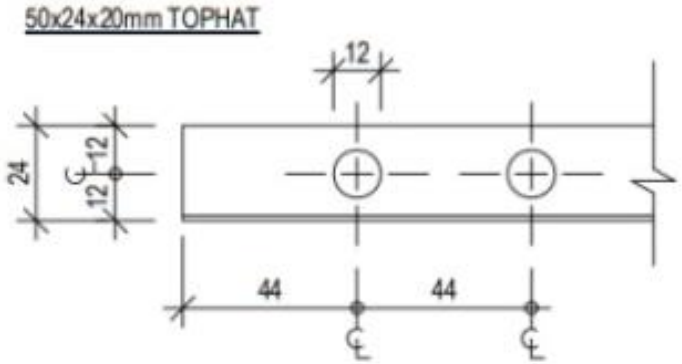
1. ALL DIMENSIONS ARE IN mm.
2. ROUND OFF ALL SHARP CORNERS WITH 0.40 mm.
3. TOLERANCES WILL BE AS PER AS NZS 1866–1997 UNLESS OTHERWISE SPECIFIED

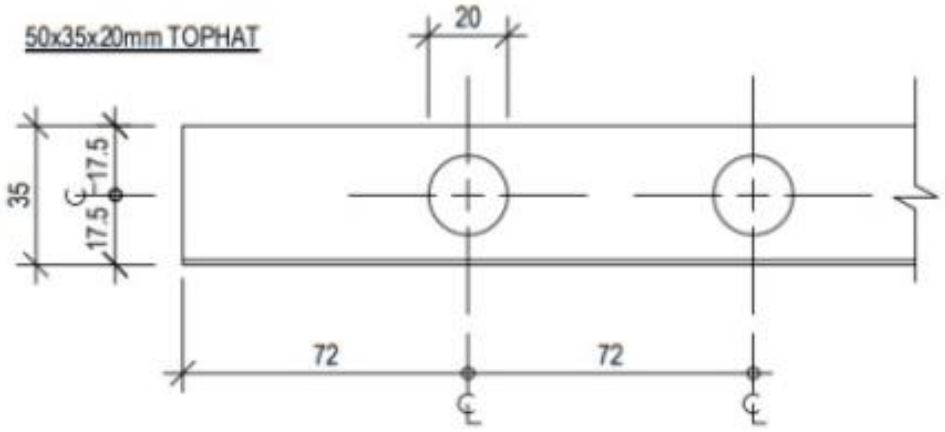
SCALE	2:1
AREA mm^2	374.863
PERIMETER mm.	297.45
WEIGHT kg/m	1.012

PARTY'S NAME	FVA GROUP PTY LTD, AUSTRALIA
PARTY'S DRAWING No.	AS PER SPECIFICATIONS
ALLOY & TEMPER	6063 T5
PRODUCT CODE:–028	
HSN CODE:–76042990	
DESCRIPTION	TOP HATS SECTION

DRAWING No.	SECTION No.
P–26955	

The location of the holes on the web of the perforated tophats are shown as follows.





5 Design span table

5.1 Tophat 50 mm x 24 mm x 2.5 mm - Solid Wall (P-26954)

50x24x2.5 solid										
Design Wind Pressure		Geometry								
ULS	SLS	Tophat Span								
W_U	W_S	[mm]								
[kPa]	[kPa]	300	400	450	600	900	1200	1500	1800	2100
1.00	0.65	2000	2000	2000	2000	1300	600	300	200	N/A
1.50	0.97	2000	2000	2000	2000	900	400	200	N/A	N/A
2.00	1.29	2000	2000	2000	2000	600	300	N/A	N/A	N/A
2.50	1.61	2000	2000	2000	1700	500	200	N/A	N/A	N/A
3.00	1.94	2000	2000	2000	1400	400	200	N/A	N/A	N/A
3.50	2.26	2000	2000	2000	1200	300	N/A	N/A	N/A	N/A
4.00	2.58	2000	2000	2000	1000	300	N/A	N/A	N/A	N/A
4.50	2.90	2000	2000	1700	900	300	N/A	N/A	N/A	N/A
5.00	3.23	2000	1800	1600	800	200	N/A	N/A	N/A	N/A
5.50	3.55	2000	1600	1400	700	200	N/A	N/A	N/A	N/A
6.00	3.87	2000	1500	1300	700	200	N/A	N/A	N/A	N/A
6.50	4.19	1800	1300	1200	600	200	N/A	N/A	N/A	N/A
7.00	4.52	1700	1200	1100	600	N/A	N/A	N/A	N/A	N/A
7.50	4.84	1600	1200	1000	500	N/A	N/A	N/A	N/A	N/A
8.00	5.16	1500	1100	1000	500	N/A	N/A	N/A	N/A	N/A
8.50	5.48	1400	1000	900	500	N/A	N/A	N/A	N/A	N/A
9.00	5.81	1300	1000	800	400	N/A	N/A	N/A	N/A	N/A

Screw fixing key: 2x #10 | 2x #12 | 2x #14 | 4x #12 | 4x #14

Notes:

1. Tophat has a nominal thickness of 2.50 BMT 6063-T5.
2. Self-drilling hex head screws shall be in accordance with AS 3566 Parts 1 and 2.
3. The design capacity of the screwed connection in tension is determined as per AS/NZS 1664.1:1997 (Pull-over) and AS/NZS 4600:2018 (Pull-out).
4. The substrate shall be cold-formed steel G2 f_y = 270 MPa with a thickness of 1.15 mm BMT minimum.
5. Minimum distance of centreline of screw to edge of Tophat shall be e = 1.5df as follows:

   No. 10 – e = 7.2 mm

   No. 12 – e = 8.3 mm

   No. 14 – e = 9.5 mm
6. The allowable cladding span may govern over the specifications in this table and must be taken into consideration.

5.2 Tophat 50 mm x 24 mm x 2.5 mm - Perforated Wall (P-26954)

50x24x2.5 perforated										
Design Wind Pressure		Geometry								
ULS	SLS	Tophat Span								
W_U	W_S	[mm]								
[kPa]	[kPa]	300	400	450	600	900	1200	1500	1800	2100
1.00	0.65	2000	2000	2000	2000	1200	600	300	200	N/A
1.50	0.97	2000	2000	2000	2000	800	400	200	N/A	N/A
2.00	1.29	2000	2000	2000	2000	600	300	N/A	N/A	N/A
2.50	1.61	2000	2000	2000	1600	500	200	N/A	N/A	N/A
3.00	1.94	2000	2000	2000	1300	400	200	N/A	N/A	N/A
3.50	2.26	2000	2000	2000	1100	300	N/A	N/A	N/A	N/A
4.00	2.58	2000	2000	2000	1000	300	N/A	N/A	N/A	N/A
4.50	2.90	2000	2000	1700	900	200	N/A	N/A	N/A	N/A
5.00	3.23	2000	1800	1600	800	200	N/A	N/A	N/A	N/A
5.50	3.55	2000	1600	1400	700	200	N/A	N/A	N/A	N/A
6.00	3.87	2000	1500	1300	600	200	N/A	N/A	N/A	N/A
6.50	4.19	1800	1300	1200	600	N/A	N/A	N/A	N/A	N/A
7.00	4.52	1700	1200	1100	500	N/A	N/A	N/A	N/A	N/A
7.50	4.84	1600	1200	1000	500	N/A	N/A	N/A	N/A	N/A
8.00	5.16	1500	1100	1000	500	N/A	N/A	N/A	N/A	N/A
8.50	5.48	1400	1000	900	400	N/A	N/A	N/A	N/A	N/A
9.00	5.81	1300	1000	800	400	N/A	N/A	N/A	N/A	N/A

Screw fixing key: 2x #10 | 2x #12 | 2x #14 | 4x #12 | 4x #14

Notes:

1. Tophat has a nominal thickness of 2.50 BMT 6063-T5.
2. Self-drilling hex head screws shall be in accordance with AS 3566 Parts 1 and 2.
3. The design capacity of the screwed connection in tension is determined as per AS/NZS 1664.1:1997 (Pull-over) and AS/NZS 4600:2018 (Pull-out).
4. The substrate shall be cold-formed steel G2 f_y = 270 MPa with a thickness of 1.15 mm BMT minimum.
5. Minimum distance of centreline of screw to edge of Tophat shall be e = 1.5df as follows:

   No. 10 – e = 7.2 mm

   No. 12 – e = 8.3 mm

   No. 14 – e = 9.5 mm
6. The allowable cladding span may govern over the specifications in this table and must be taken into consideration.

5.3 Tophat 50 mm x 35 mm x 2.5 mm - Solid Wall (P-26955)

50x35x2.5 solid										
Design Wind Pressure		Geometry								
ULS	SLS	Tophat Span								
W_U	W_S	[mm]								
[kPa]	[kPa]	300	400	450	600	900	1200	1500	1800	2100
1.00	0.65	2000	2000	2000	2000	1700	700	400	200	N/A
1.50	0.97	2000	2000	2000	2000	1100	500	200	N/A	N/A
2.00	1.29	2000	2000	2000	2000	800	300	200	N/A	N/A
2.50	1.61	2000	2000	2000	2000	700	300	N/A	N/A	N/A
3.00	1.94	2000	2000	2000	2000	500	200	N/A	N/A	N/A
3.50	2.26	2000	2000	2000	1700	500	200	N/A	N/A	N/A
4.00	2.58	2000	2000	2000	1500	400	N/A	N/A	N/A	N/A
4.50	2.90	2000	2000	1700	1300	300	N/A	N/A	N/A	N/A
5.00	3.23	2000	1800	1600	1200	300	N/A	N/A	N/A	N/A
5.50	3.55	2000	1600	1400	1000	300	N/A	N/A	N/A	N/A
6.00	3.87	2000	1500	1300	1000	200	N/A	N/A	N/A	N/A
6.50	4.19	1800	1300	1200	900	200	N/A	N/A	N/A	N/A
7.00	4.52	1700	1200	1100	800	200	N/A	N/A	N/A	N/A
7.50	4.84	1600	1200	1000	800	200	N/A	N/A	N/A	N/A
8.00	5.16	1500	1100	1000	700	200	N/A	N/A	N/A	N/A
8.50	5.48	1400	1000	900	700	200	N/A	N/A	N/A	N/A
9.00	5.81	1300	1000	800	600	N/A	N/A	N/A	N/A	N/A

Screw fixing key: 2x #10 | 2x #12 | 2x #14 | 4x #12 | 4x #14

Notes:

1. Tophat has a nominal thickness of 2.50 BMT 6063-T5.
2. Self-drilling hex head screws shall be in accordance with AS 3566 Parts 1 and 2.
3. The design capacity of the screwed connection in tension is determined as per AS/NZS 1664.1:1997 (Pull-over) and AS/NZS 4600:2018 (Pull-out).
4. The substrate shall be cold-formed steel G2 f_y = 270 MPa with a thickness of 1.15 mm BMT minimum.
5. Minimum distance of centreline of screw to edge of Tophat shall be e = 1.5df as follows:

   No. 10 – e = 7.2 mm

   No. 12 – e = 8.3 mm

   No. 14 – e = 9.5 mm
6. The allowable cladding span may govern over the specifications in this table and must be taken into consideration.

5.4 Tophat 50 mm x 35 mm x 2.5 mm - Perforated Wall (P-26955)

50x35x2.5 perforated										
Design Wind Pressure		Geometry								
ULS	SLS	Tophat Span								
W_U	W_S	[mm]								
[kPa]	[kPa]	300	400	450	600	900	1200	1500	1800	2100
1.00	0.65	2000	2000	2000	2000	1700	700	300	200	N/A
1.50	0.97	2000	2000	2000	2000	1100	400	200	N/A	N/A
2.00	1.29	2000	2000	2000	2000	800	300	N/A	N/A	N/A
2.50	1.61	2000	2000	2000	2000	600	200	N/A	N/A	N/A
3.00	1.94	2000	2000	2000	2000	500	200	N/A	N/A	N/A
3.50	2.26	2000	2000	2000	1700	400	200	N/A	N/A	N/A
4.00	2.58	2000	2000	2000	1500	400	N/A	N/A	N/A	N/A
4.50	2.90	2000	2000	1700	1300	300	N/A	N/A	N/A	N/A
5.00	3.23	2000	1800	1600	1200	300	N/A	N/A	N/A	N/A
5.50	3.55	2000	1600	1400	1000	300	N/A	N/A	N/A	N/A
6.00	3.87	2000	1500	1300	1000	200	N/A	N/A	N/A	N/A
6.50	4.19	1800	1300	1200	900	200	N/A	N/A	N/A	N/A
7.00	4.52	1700	1200	1100	800	200	N/A	N/A	N/A	N/A
7.50	4.84	1600	1200	1000	800	200	N/A	N/A	N/A	N/A
8.00	5.16	1500	1100	1000	700	200	N/A	N/A	N/A	N/A
8.50	5.48	1400	1000	900	700	200	N/A	N/A	N/A	N/A
9.00	5.81	1300	1000	800	600	N/A	N/A	N/A	N/A	N/A

Screw fixing key: 2x #10 | 2x #12 | 2x #14 | 4x #12 | 4x #14

Notes:

1. Tophat has a nominal thickness of 2.50 BMT 6063-T5.
2. Self-drilling hex head screws shall be in accordance with AS 3566 Parts 1 and 2.
3. The design capacity of the screwed connection in tension is determined as per AS/NZS 1664.1:1997 (Pull-over) and AS/NZS 4600:2018 (Pull-out).
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5. Minimum distance of centreline of screw to edge of Tophat shall be e = 1.5df as follows:

   No. 10 – e = 7.2 mm

   No. 12 – e = 8.3 mm

   No. 14 – e = 9.5 mm
6. The allowable cladding span may govern over the specifications in this table and must be taken into consideration.