IZZAT
CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

Different thinking.
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FORMIT SERVIES PTY LTD

ADU DISABLED TOILET

20 August 2019

Rev No. 0

IZZAT CONSULTING ENGINEERS PTY LTD
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fax +61 2 4940 0091 | email mail@izzat.com.au | www.izzat.com.au | abn 60 110 255 582

Revision	Issue Date	Revision Details
0	20/08/2019	Issued for Certification

Author:	Zane Rendell BE(Civil)(Hons) MIEAust Structural / Civil Engineer	Signed:	
Reviewed By:	Nicholas Diemar BE(Civil)(Hons) MIEAust CPEng NER RPEQ Lead Structural / Civil Engineer	Signed:	

TABLE OF CONTENTS

1. INTRODUCTION

In accordance with your request to provide lifting certification, and tie down requirement of ADU Disabled Toilet, we submit the following information.

2. ENGINEER

Zane Rendell
Bachelor of Engineering in Civil Engineering (Honours), The University of Newcastle, 2013
Member of the Institution of Engineers Australia

3. SUPERVISING ENGINEER

Nicholas Diemar
Bachelor of Engineering, Civil Engineering (Honours), The University of Newcastle, 1998
Member of the Institution of Engineers Australia
Chartered Professional Engineer
Member of the Colleges of Structural Engineers with NER-3 registration
Registered Professional Engineer Queensland

4. GENERAL

This document should be read in conjunction with drawings listed below in Table 1, provided by .

Table 1: Engineering Drawings

Drawing Number	Revision	Title
n/a	30/10/2017	Formit Extrusion Layout Extrusion Layout
DWG280319	28/03/2019	Formit ADU- Corner Tiedown Assembly ADU-Corner Tiedown
n/a	16/10/2019	ADL M10 x 1.5 Tie Rod
n/a	27/11/2017	Formit Formit Disabled Portable Toilet Formit Disabled Toilet Base
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Long with Holes
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Short with Holes
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Door Upright
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Door Cross Brace
n/a	19/10/2019	Formit

Drawing Number	Revision	Title
		Extrusion Profiles Cut Lengths and Holes F-MAP Door Jamb
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Front Floor Long
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-MAP Front Floor Short
n/a		Formit F-MAP Centre Upright
n/a	19/10/2019	Formit Extrusion Profiles Cut Lengths and Holes F-CEP
n/a	12/09/2017	Formit Disabled Toilet Vacuum Pump Sheet 1
n/a	12/09/2017	Formit Disabled Toilet Vacuum Pump Sheet 2
FS0120	A	Formit Services P/L FS0120 (LIFTING LUGS PRES PB28)
DWG160819	REV160819	Formit ADU Corner Stiffener DWG Sheet 1

5. DESIGN BASIS

Our office was engaged to provide a lifting certification and tie down requirements for the ADU disabled toilet.

An 8 foot (2.4m) long spreader lifting beam is required to be used when lifting using the top mounted lifting lugs. Slings are required to be attached to all 4 corners during lifting. **The waste and freshwater tanks are required to be fully empties prior to lifting of the ADU disabled toilet**. A stamp is to be places in a visible position adjacent to the lift lugs outlining that the tanks are to be fully empties prior to lifting.

The ADU disabled toilet is required to be stabilised with tiedowns. The capacity of the tiedown is dependent on the wind region location is in which the ADU disabled toilet has been installed. Tie down capacity requirements are specified in Section 7. A Wind Region reference map is attached in Appendix A. The method and adequacy of the tiedowns is considered the responsibility of others.

All design loads are as determined by Australian Standards and information provided by Formit.

All design work was carried out in accordance with the following standards;

- AS/NZS 1170.0 General principles
- AS/NZS 1170.1 Permanent, imposed and other actions
- AS/NZS 1170.2 Wind loads
- AS 1418.1 Cranes, Hoists and Winches
- AS 4100 Steel structures
- AS/NZS 1664.1 Aluminium Structures Part 1: Limit State Design

Ultimate limit states design factors used in design are as follows:

- Dead load factor of 1.2
- Live load factor of 1.5
- Dynamic factor of 1.23 (maximum lifting speed 0.5 m/s)

6. DEFINED CRITERIA

Rational engineering judgement has been used to decide which components require checking with design certification calculations.

Most suitable design check methods are as determined by Izzat Consulting Engineers.

7. DESIGN LOADINGS

The following design loads as provided by Formit were considered, in addition to other loading criteria as required by the Australian Standards;

The ADU Disabled Toilet has been designed for the following;
- Dry Self Weight = 300 kg (3 kN)

Ultimate factored lifting loads for the purpose of lifting devices is as follows:
- Total Lifting Load = 445 kg (4.35 kN)

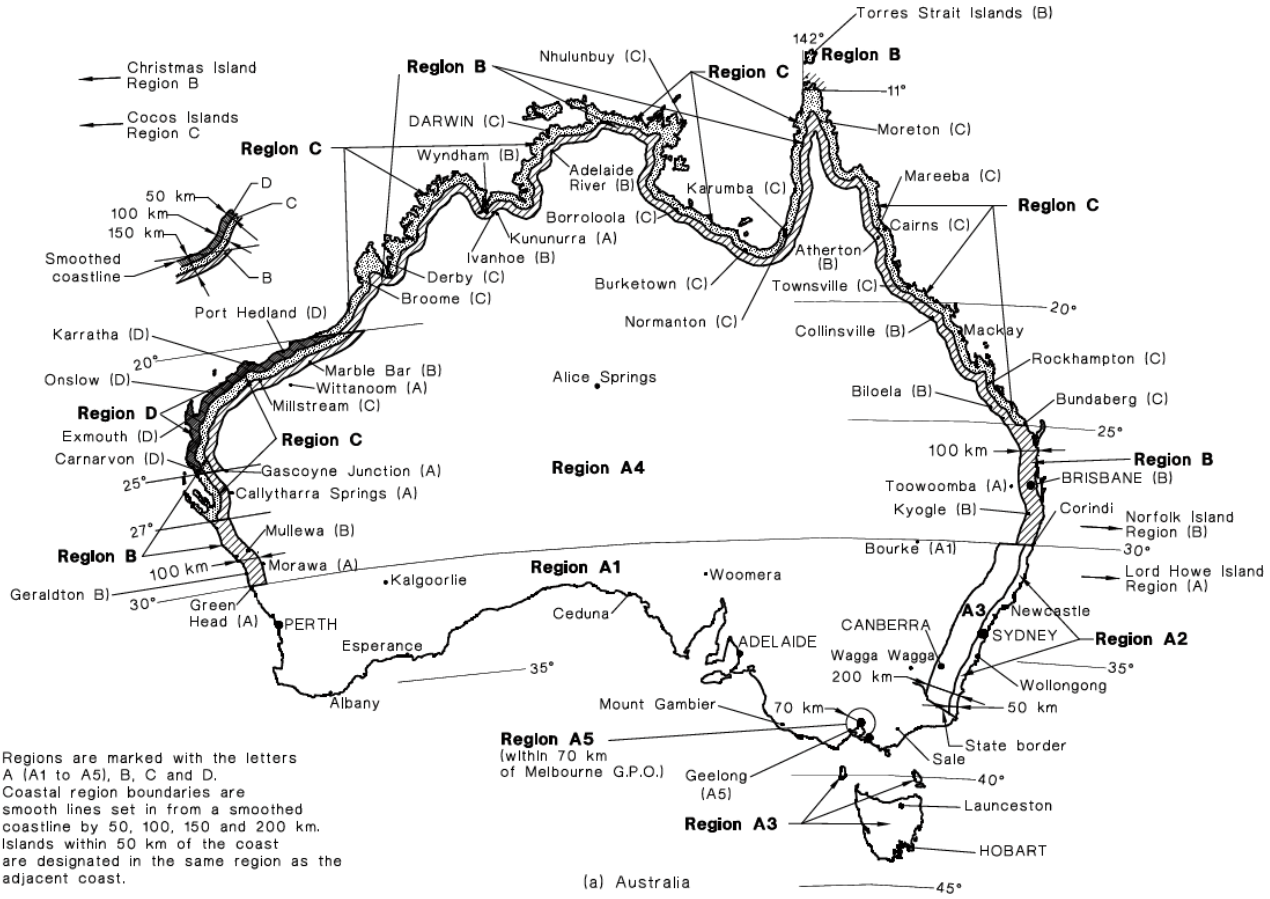
The tie down capacity requirements for the wind region in which the ADU is installed is as follows:
- Wind Region C = 200 kg (1.96 kN) Total at each corner. The tiedown load is to be evenly distributed between both tiedown D-ring hold down point at each corner
- Wind Region B = 80 kg (0.79 kN) at each corner
- Wind region A = 40kg (0.39 kN) at each corner

Refer to Appendix A for Wind Region reference map.

8. STATEMENTS & DISCLAIMERS

We confirm that the Formit ADU portable disabled toilet as detailed in the drawings noted in Table 1 (above), is structurally satisfactory for the Load Limits noted in Section 7 above, provided the following are adhered to;
- The waste and freshwater tanks are required to be fully empties prior to lifting of the ADU disabled toilet.
- A stamp is to be places in a visible position adjacent to the lift lugs outlining that the tanks are to be fully empties prior to lifting.
- An 8 foot (2.4m) long spreader lifting beam is required to be used when lifting using the top mounted lifting lugs.
- The spreader beam is to offset vertically from the top of the ADU disabled toilet by 1.2 m ± 0.2m.
- Slings are required to be attached to all 4 corners during lifting.
- The ADU disabled toilet is stabilised with tiedowns as per the requirements set out in Section 7.
- The structure is inspected every 12 months (maximum), or as otherwise required to ensure no structural damage is evident.
- The certificate is applicable only if the structures are not affected by heat, adverse chemicals, excessive vibrations or other external factors unknown and not noted to the certifying engineer.
- All items constructed are in accordance with the drawings & specifications as referenced by this certificate.
- All construction and materials is in accordance with Australian Standards, particularly AS4100 Clause 2.2.
- All welding is a minimum of 6mm SP continuous fillet welds all around, UNO.
- No modifications shall be made, which would significantly increase the mass, alter the stability or affect the design strength of the structure.

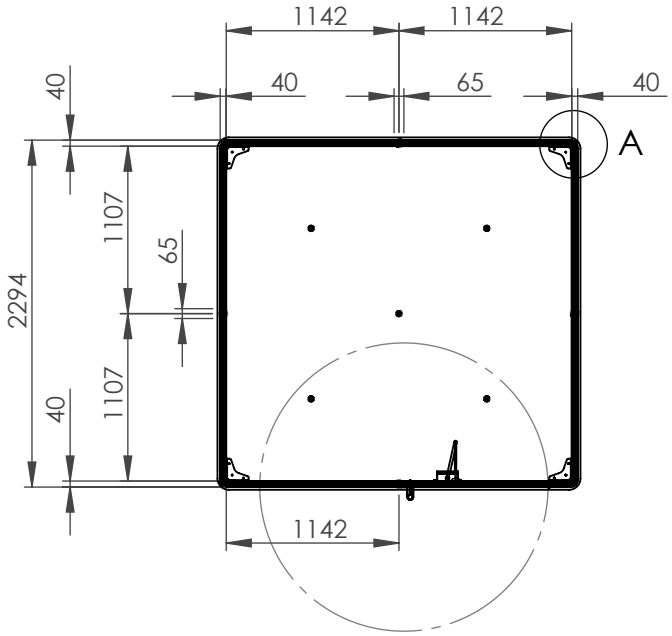
APPENDIX A WIND REGION MAP

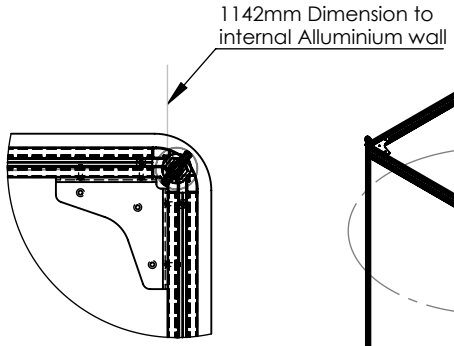


Regions are marked with the letters A (A1 to A5), B, C and D. Coastal region boundaries are smooth lines set in from a smoothed coastline by 50, 100, 150 and 200 km. Islands within 50 km of the coast are designated in the same region as the adjacent coast.

(a) Australia

APPENDIX B DRAWINGS





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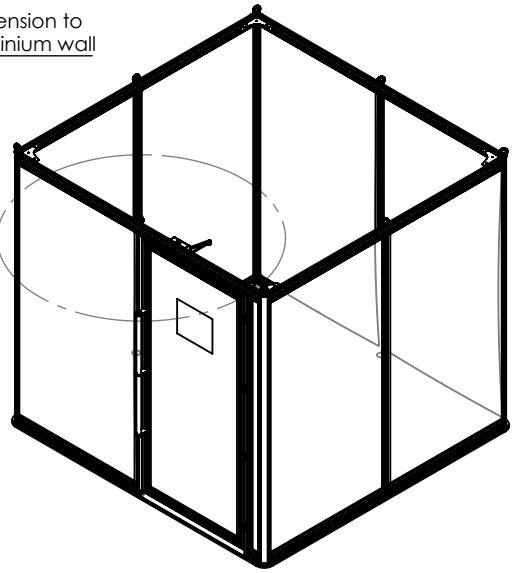

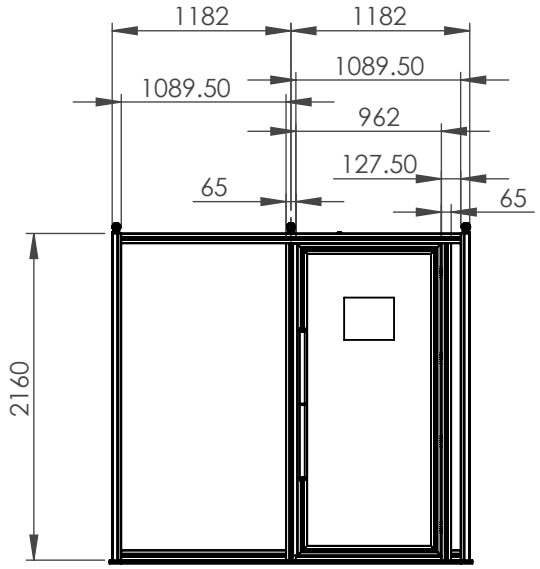

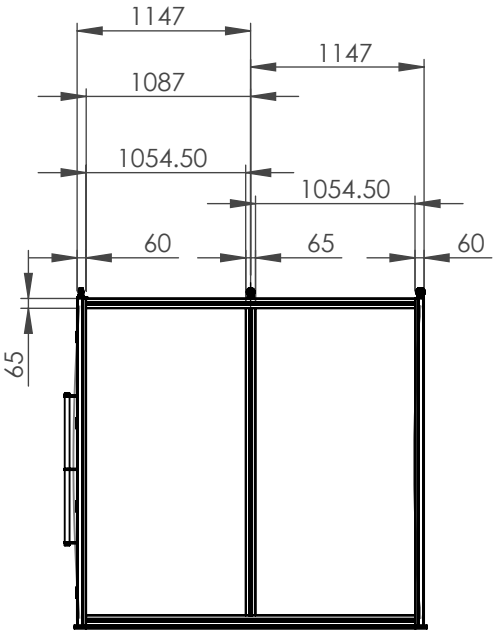

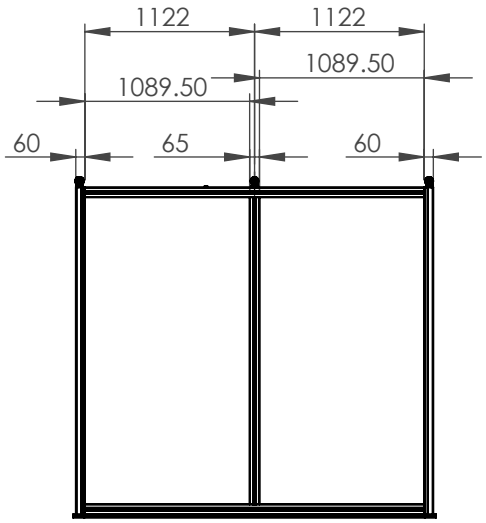

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A4

Third Andle Projection

Unless otherwise specified:
Dimensions are in Millimeters
Debur and break sharp edges
Fillets and Rounds = 0.5mm

Injection Moulded Tolereances
Unless Specified:

0 to10mm	±0.20
11 to 25mm	±0.3
26 to 80mm	±0.4
81 to 120mm	±0.6
121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
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Project No:	n/a
Drawing Title	Extrusion Layout
Drawing No:	n/a
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Colour	As Specified
Finish	As Specified
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Qty:	As Specified
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Scale	1:50 DO NOT SCALE DRAWING
Revision	As Specified
Date	30/10/2017
Drawn	DES NJD REV
Checked	DES PM

E:\ADL Project\ADL Client A-Z\Formit\Disabled Toilet\Current CAD\

Note: All blind threads to be cut to CAD and bottom tapped

Note: Over all Machine tolerance to CAD = ±0.05 UNO

Note: Over all Machine Surface Finish N7 UNO

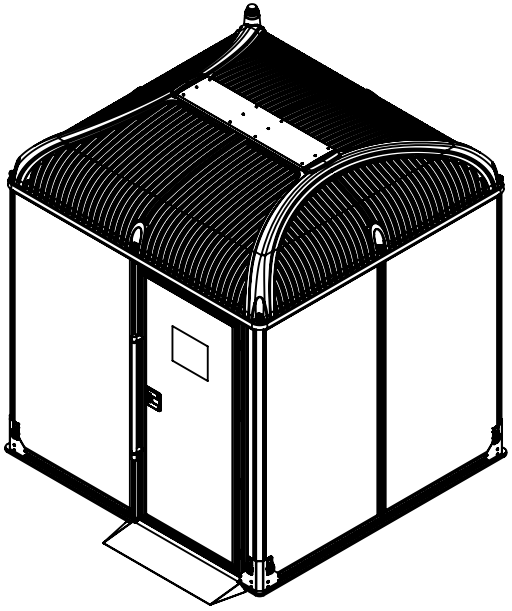
O-ring surfaces are " NOT" to be Sandblasted

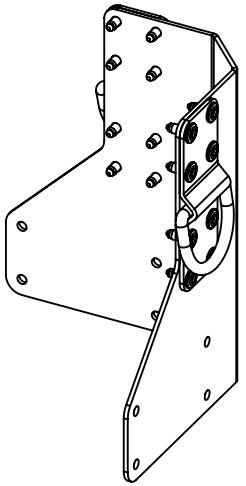
Surface Scratches "NOT" acceptable

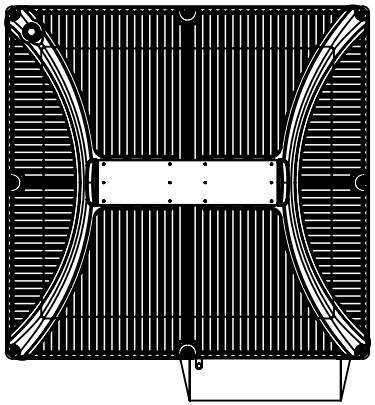
All Cylindrical faces to be turned where possible

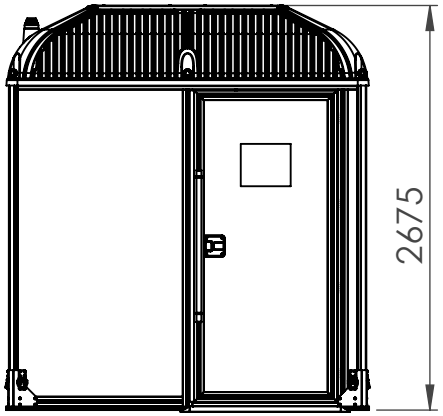
All O-ring surfaces to be turned where possible

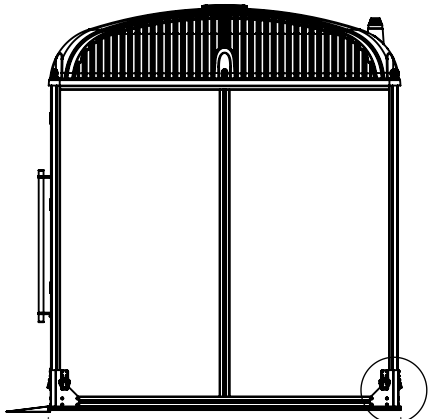
All Parts to be to Machined Flat- bowed parts not acceptable











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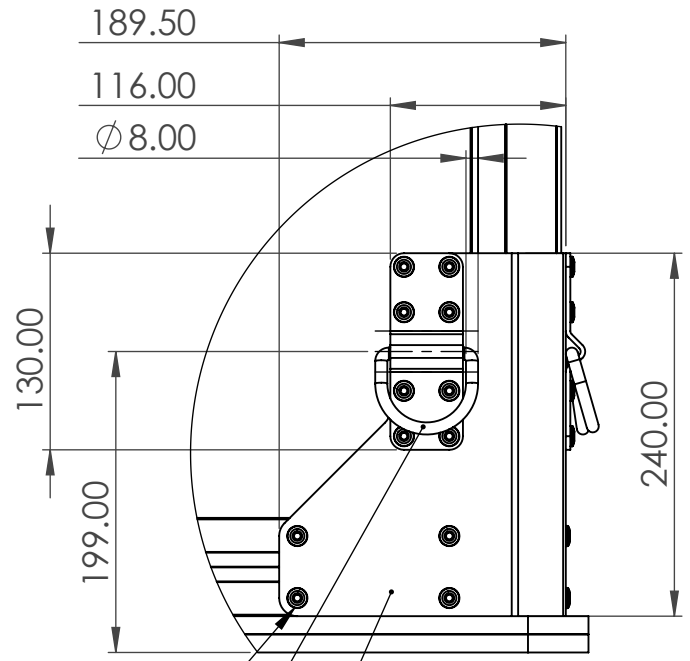

ID15 Hemlock

50mm D-Ring 316SS

3.0mm Gal

DETAIL A
SCALE 1 : 5

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251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

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Revision	As Specified
Date	28/03/2019
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Checked	DES PM

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Note: All blind threads to be cut to CAD and bottom tapped

Note: Over all Machine tolerance to CAD = ±0.05 UNO

Note: Over all Machine Surface Finish N7 UNO

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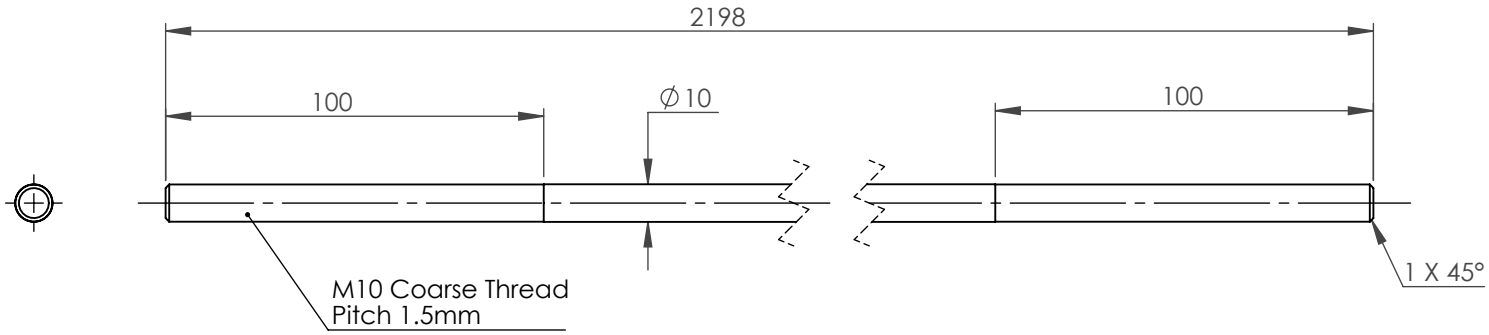

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401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

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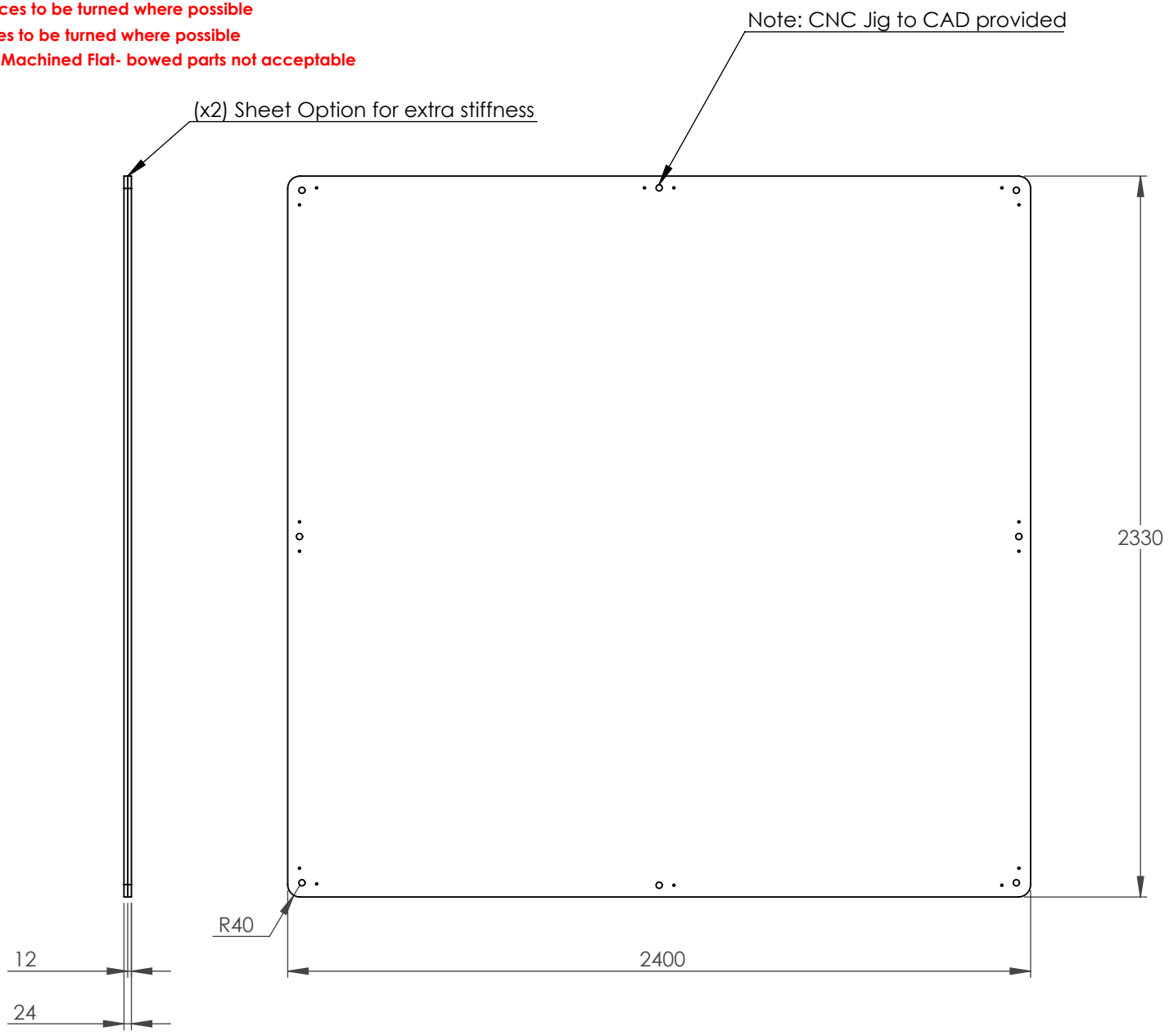

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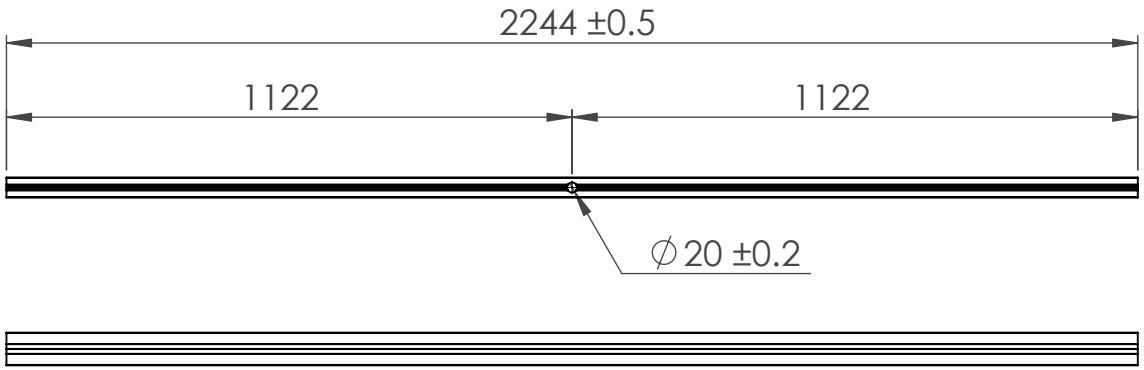

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251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

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Drawing No:	n/a
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Colour	n/a
Finish	Anodised Silver
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Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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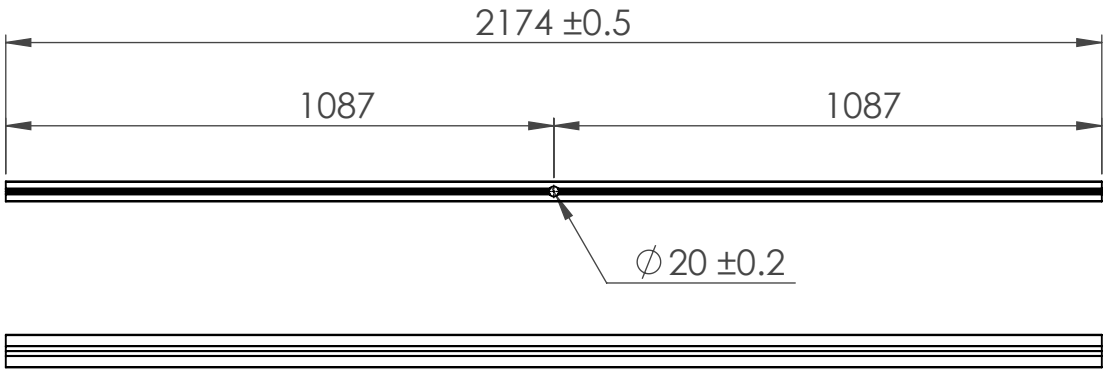

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501mm and over	±0.35%
Angular	±0°30'

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Revision	Rev 191017
Date	19/10/2017
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Checked	DES PM

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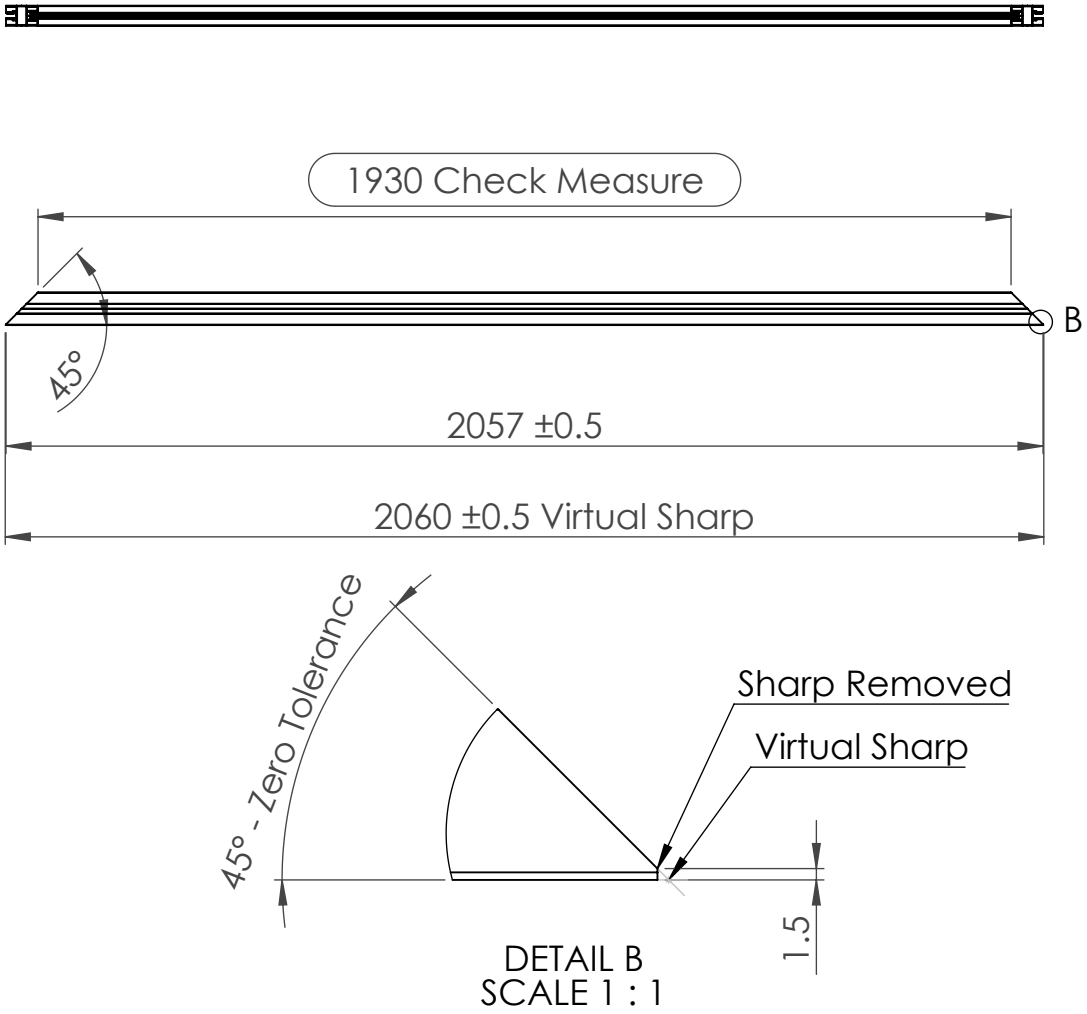

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121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
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Revision	Rev 191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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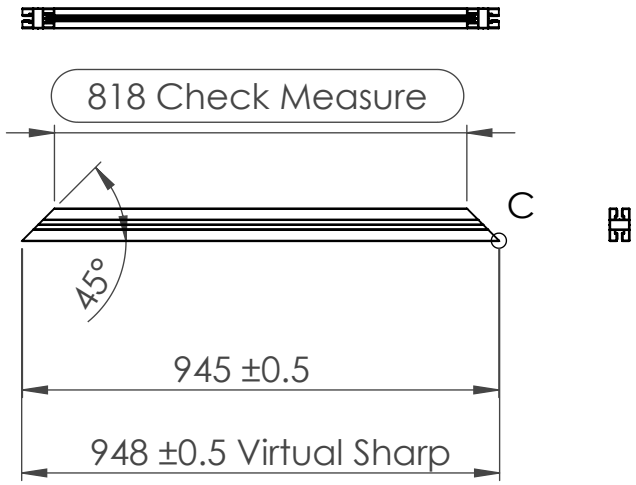

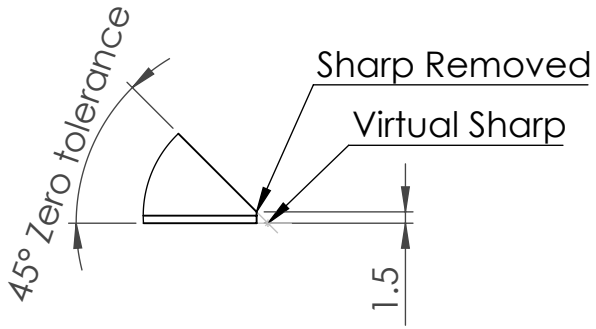

DETAIL C
SCALE 1 : 1

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251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-MAP Door Cross Brace
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	AnodisedSilver
Weight	As Specified
Qty:	2/Unit
Sheet	4 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	Rev 191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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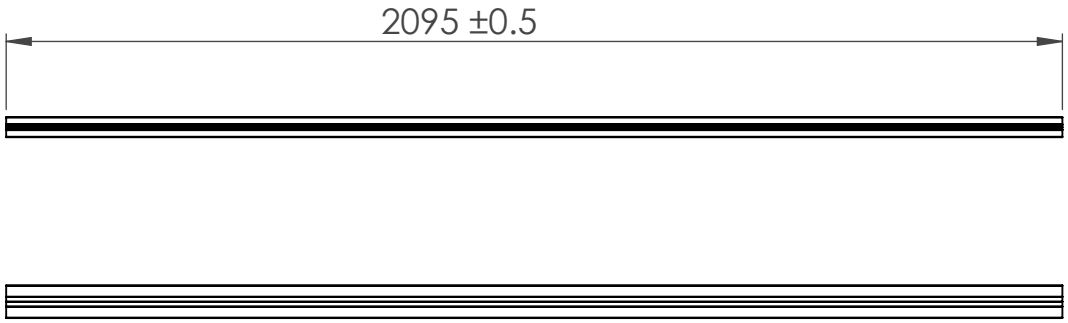

REFERENCE ONLY

Australian Design Lab Pty Ltd
9 Kinsale Crescent
Mont Albert North 3129
Ph: +61 3 9849 1444
www.australiandesignlab.com.au

A4

Third Andle Projection

Unless otherwise specified:
Dimensions are in Millimeters
Debur and break sharp edges
Fillets and Rounds = 0.5mm

Injection Moulded Tolereances Unless Specified:

0 to10mm	±0.20
11 to 25mm	±0.3
26 to 80mm	±0.4
81 to 120mm	±0.6
121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-MAP Door Jamb
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	Anodised Silver
Weight	As Specified
Qty:	2/unit
Sheet	5 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	Rev191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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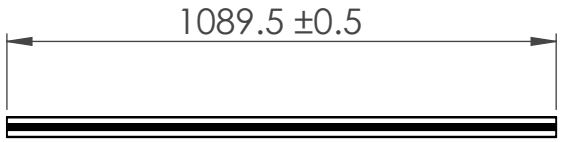

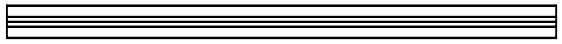

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251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-MAP Front Floor Long
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	Anodise Silver
Weight	As Specified
Qty:	1/unit
Sheet	6 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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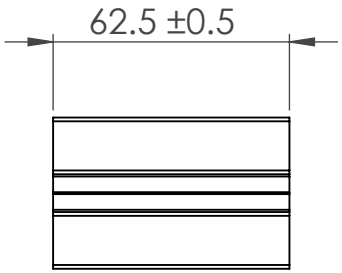

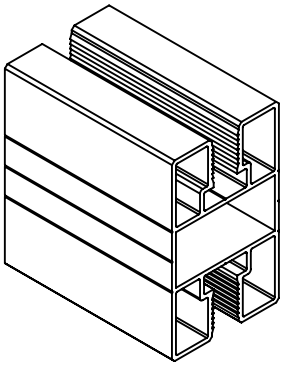

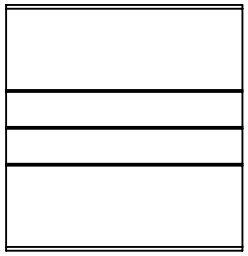

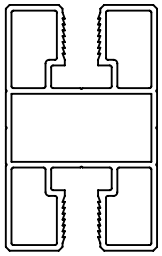

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Unless Specified:

0 to10mm	±0.20
11 to 25mm	±0.3
26 to 80mm	±0.4
81 to 120mm	±0.6
121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-MAP Front Floor Short
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	Anodised Silver
Weight	As Specified
Qty:	1/Unit
Sheet	7 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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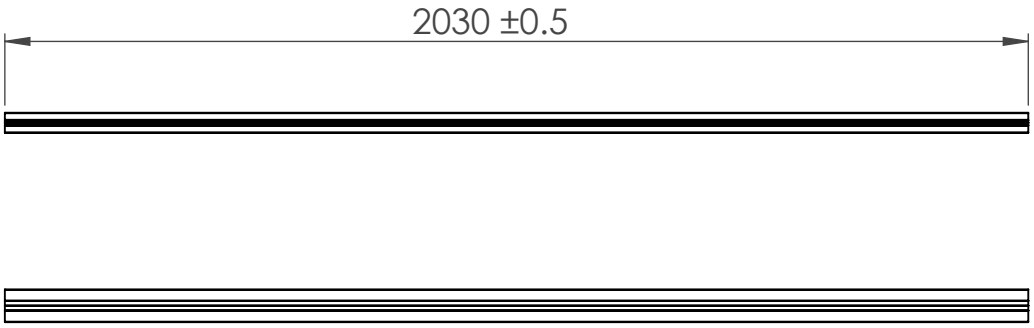

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81 to 120mm	±0.6
121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-MAP Centre Upright
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	Anodise Silver
Weight	As Specified
Qty:	4/Unit
Sheet	8 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	Rev 191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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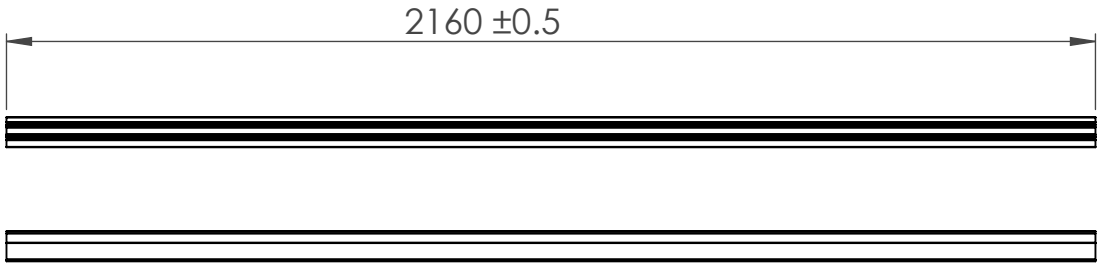

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121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	Extrusion Profiles Cut lengths and holes
Project No:	n/a
Drawing Title	F-CEP
Drawing No:	n/a
Material	6063-T5
Colour	n/a
Finish	Anodised Silver
Weight	As Specified
Qty:	4/Unit
Sheet	9 of 9
Scale	1:15 DO NOT SCALE DRAWING
Revision	Rev191017
Date	19/10/2017
Drawn	DES NJD REV
Checked	DES PM

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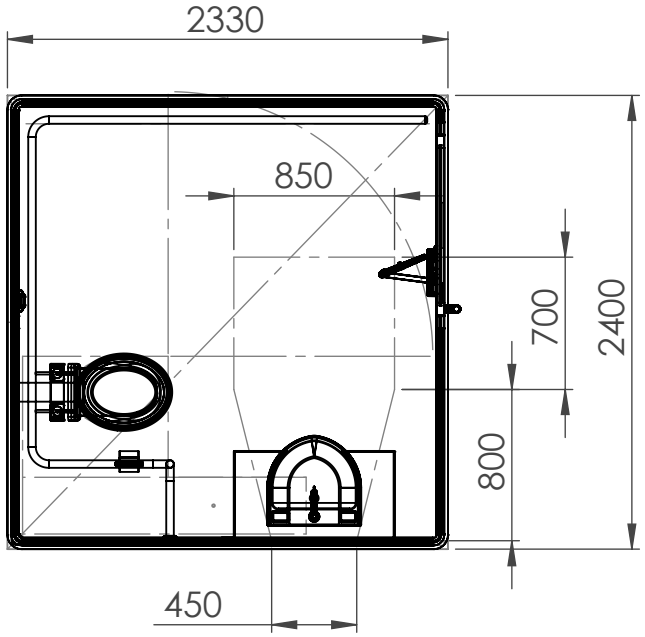

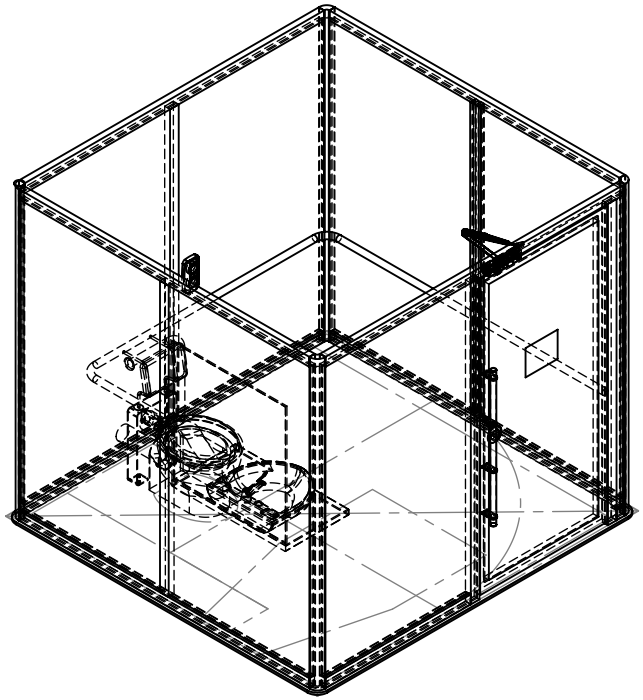

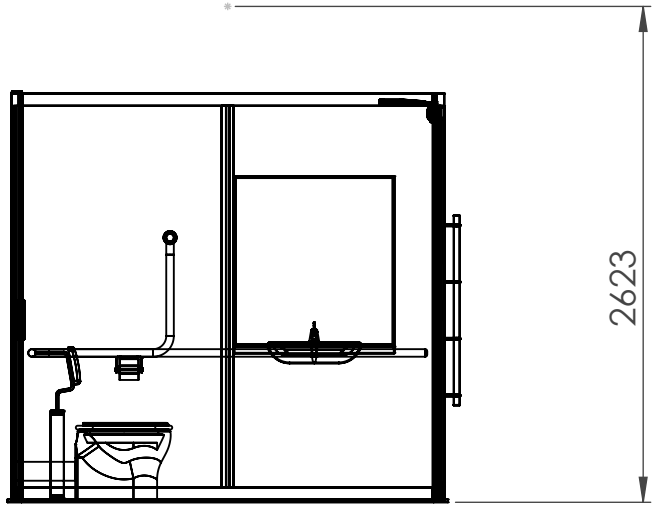

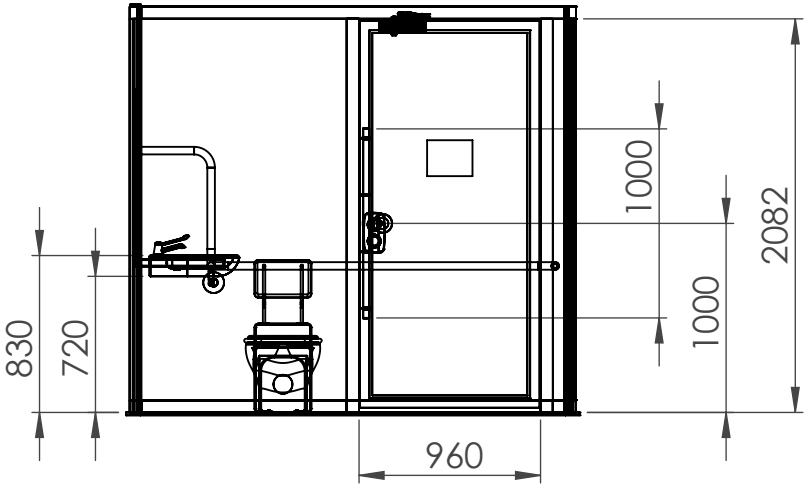

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81 to 120mm	±0.6
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251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Fomit
Project	Disabled Toilet Vacuum Pump
Project No:	n/a
Drawing Title	Sheet1
Drawing No:	n/a
Material	As Specified
Colour	As Specified
Finish	As Specified
Weight	As Specified
Qty:	As Specified
Sheet	1 of 2
Scale	1:40 DO NOT SCALE DRAWING
Revision	
Date	12/09/2017
Drawn	DES NJD REV
Checked	DES PM

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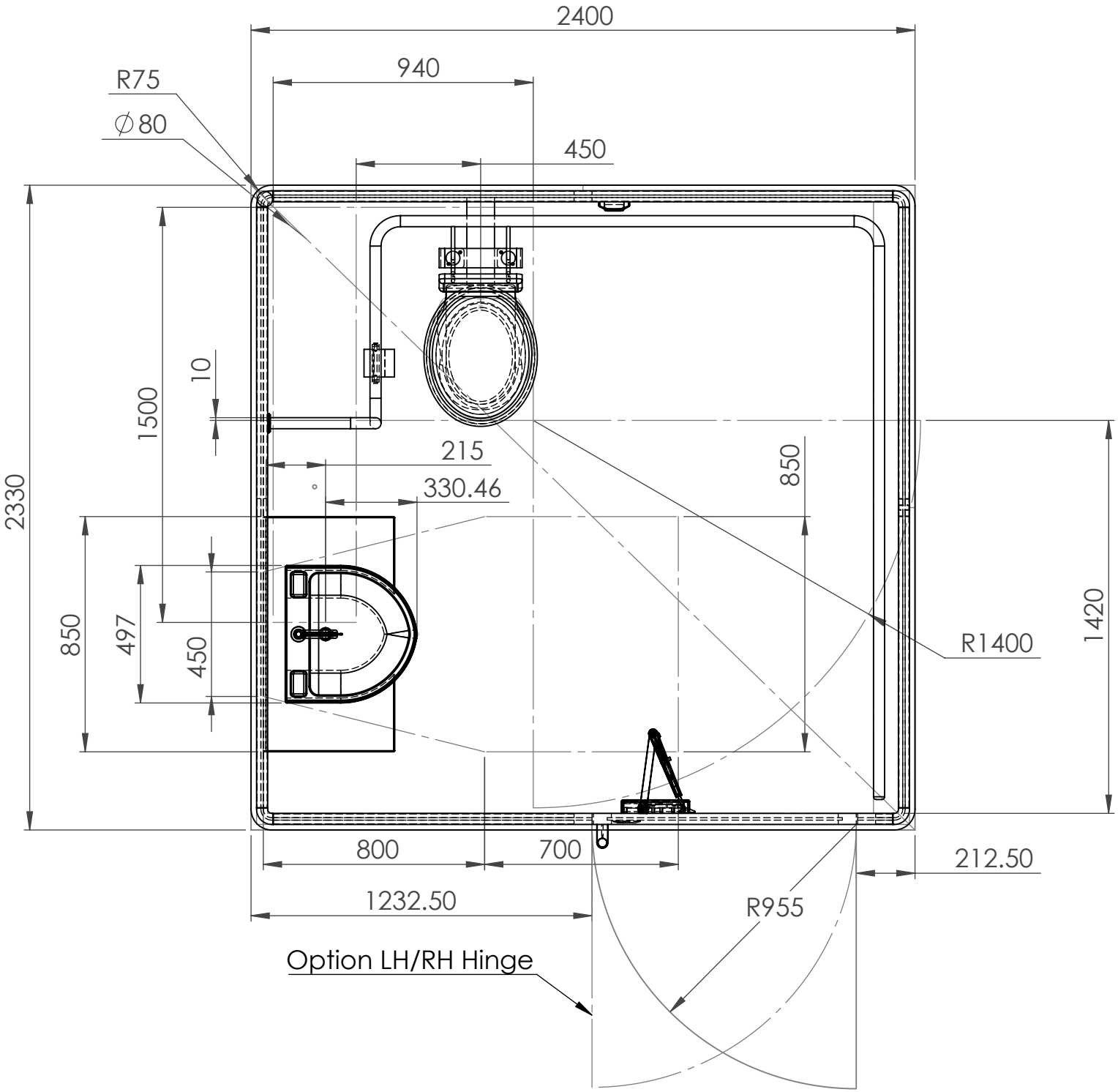

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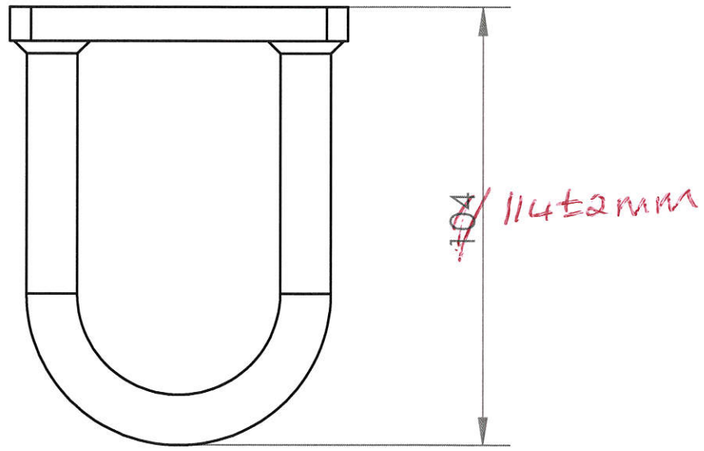
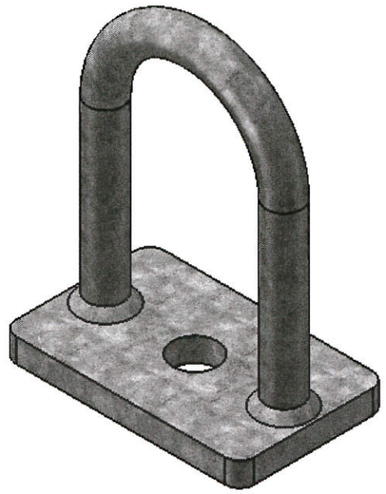
81 to 120mm	±0.6
121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

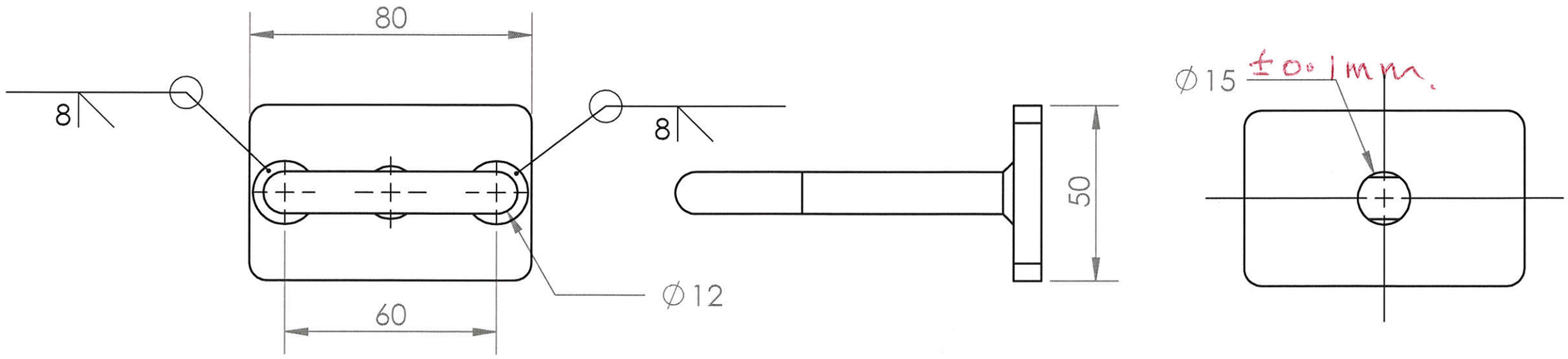
Approval	
Client	Formit
Project	Disabled Toilet Vacuum Pump
Project No:	n/a
Drawing Title	Sheet2
Drawing No:	n/a
Material	As Specified
Colour	As Specified
Finish	As Specified
Weight	As Specified
Qty:	As Specified
Sheet	2 of 2
Scale	1:20 DO NOT SCALE DRAWING
Revision	
Date	12/09/2017
Drawn	DES NJD REV
Checked	DES PM

E:\ADL Project\ADL Client A-Z\Formit\Disabled Toilet\Current CAD\

FS0120 (LIFTING LUGS PRES PB28)







MADE FROM: Galvanized Steel

WEIGHT: 433.17g

Number off - 1. per Assembly

Reg
PDF
Dxf

DO NOT SCALE DRAWING
DIMENSIONS IN MILLIMETERS
UNLESS OTHERWISE SPECIFIED

A4 Drawing
Third Angle
Projection

Issue	DATE	ISSUE DESCRIPTION	BY	CHECKED
A	4/08/2010	SPECIFICATION SHEET	P.C.	

FORMIT SERVICES

FORMIT SERVICES P/L

Description: FS0120 (LIFTING LUGS PRES PB28)

Scale: 1:2

Part No: FS0120

A

Note: All blind threads to be cut to CAD and bottom tapped

Note: Over all Machine tolerance to CAD = ±0.05 UNO

Note: Over all Machine Surface Finish N7 UNO

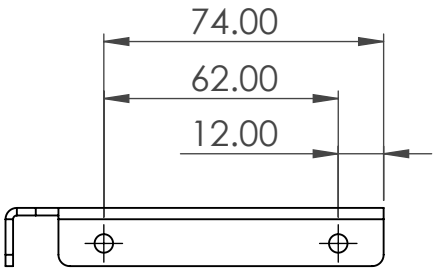
O-ring surfaces are " NOT" to be Sandblasted

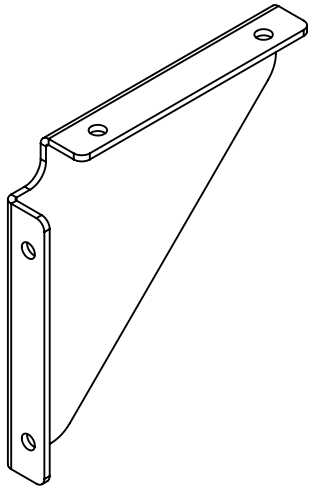
Surface Scratches "NOT" acceptable

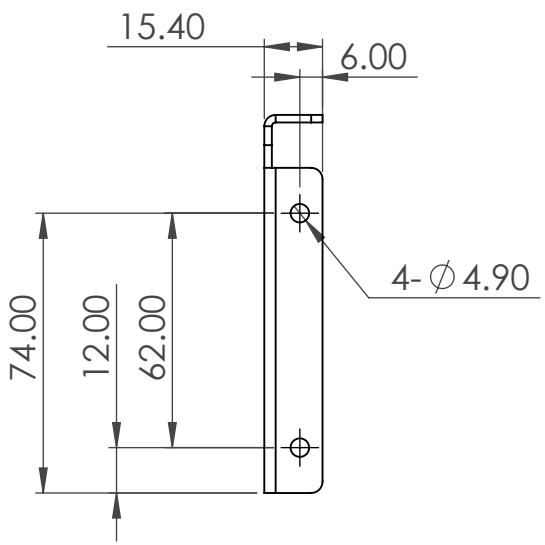
All Cylindrical faces to be turned where possible

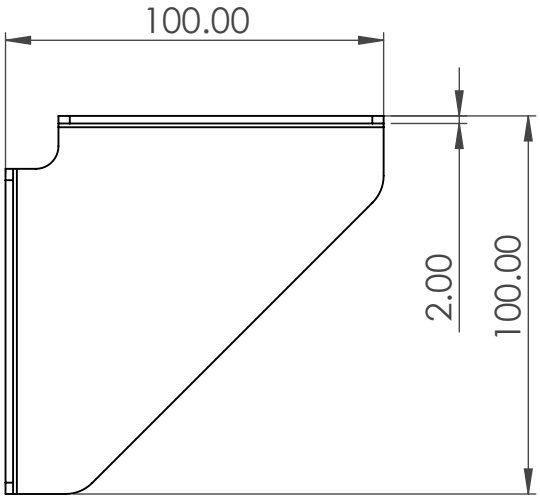
All O-ring surfaces to be turned where possible

All Parts to be to Machined Flat- bowed parts not acceptable









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Injection Moulded Tolereances
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0 to10mm	±0.20
11 to 25mm	±0.3
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121 to 250mm	±1.0
251 to 400mm	±1.3
401 to 500mm	±1.6
501mm and over	±0.35%
Angular	±0°30'

Approval	
Client	Formit
Project	ADU Corner Stiffener DWG
Project No:	n/a
Drawing Title	Sheet1
Drawing No:	DWG160819
Material	2.0 Sheet Metal
Colour	n/a
Finish	As Specified
Weight	As Specified
Qty:	As Specified
Sheet	1 of 1
Scale	1:1 DO NOT SCALE DRAWING
Revision	REV160819
Date	16/08/2019
Drawn	DES NJD REV
Checked	DES PM