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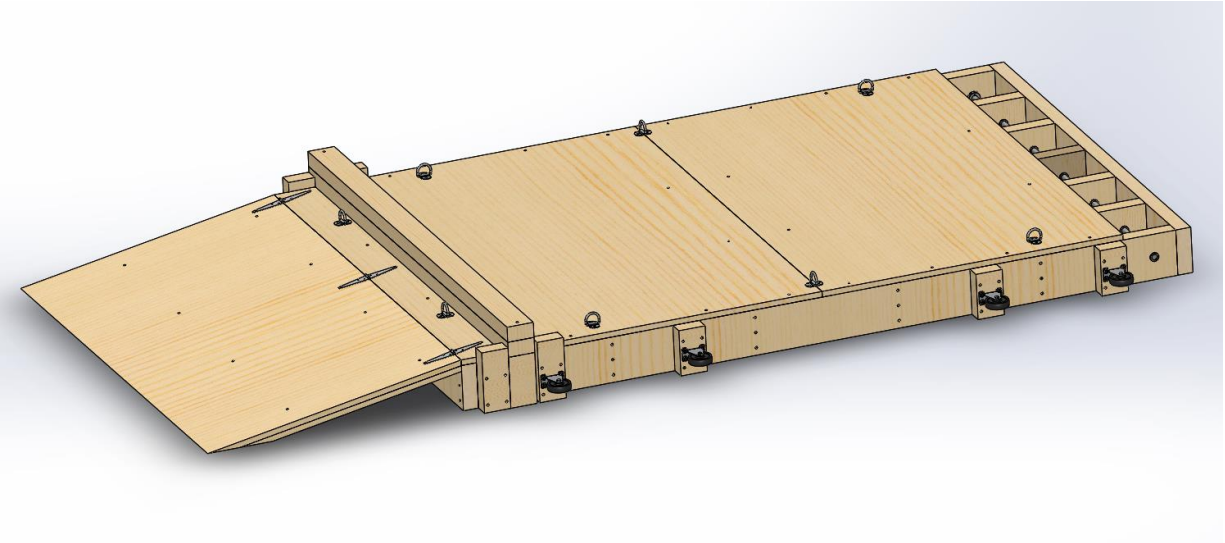
ISWP Static Stability Test

Assembly Instructions



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Please read the following document in its entirety before purchasing materials and assembling.

Design of an ISWP Standards Static Stability

University of Pittsburgh scientists are working with the U.S. Agency for International Development (USAID) under a multi-year sub-award to develop the International Society of Wheelchair Professionals, a global network to ensure a level of standardization, certification and oversight, to teach and professionalize wheelchair services, and to build affiliations to put better equipment in the right hands. Since 2002, USAID has granted more than $45 million to improve wheelchairs and wheelchair services worldwide. This sub-award – Agreement No. APC-GM-0068 – was presented by Advancing Partners & Communities, a cooperative agreement funded through USAID under Agreement No. AIDOAA-A-12-00047, beginning Oct. 1, 2012.

For further information on use of the ISWP Static Stability assembly instructions, contact the University of Pittsburgh's Innovation Institute at 412-383-7670 or the International Society of Wheelchair Professionals at intlsocietywheelchairprof@gmail.com.

Table of Contents

Notes:

These instructions are to be paired with the dimensioned and assembly drawings for part names and details about each part or assembly.
Assembly instructions may only dictate about one part, but drilling and placement directions apply to all parts of the same name.
All hardware used in this assembly are in ANSI Inch, however ANSI Metric are acceptable alternatives.
All screws used to put lumber together are #8 x3in Screws unless otherwise specified in the Bill of materials.
All dimensions within this set of instructions is given in inches and millimeters.
A part guide has been included at the end of this document.
File down all exposed edges and corners to avoid any nicks or scratches.

Cutting Notes:

All parts should be cut, and holes drilled before the assembly is started.

Assembly Notes:

The full assembly is broken down into four subassemblies to simplify explanation, as shown in Figure 1.

Make sure to have all the materials and hardware before assembling.

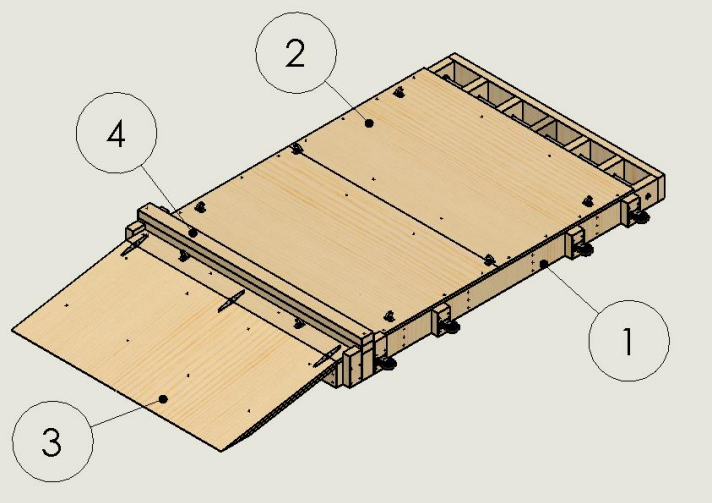


Figure 1. Four subassemblies. 1. Frame, 2. Sheet, 3. Ramp, 4. Stop bar

For further detail, please see *Frame-Bill of Materials* and *Frame Hardware-Bill of Materials.*

Tools Required

Hammer
Philips Screwdriver
Drill
Allen (M8 and M10)
Lumber cutting saw machine

List of drawings

Frame

Part A-Outer Left
Part A-Outer Right
Part A-Inner Left and Inner Right
Part B-Back
Part B-Front
Part C-With rib
Part C
Part D
Part E
Part F
Part G-With mount wheel
Part G-Without mount wheel

Sheet

Part H
Part I

Ramp

Part J
Part K

Stop bar

Part L
Part M

Building the Frame

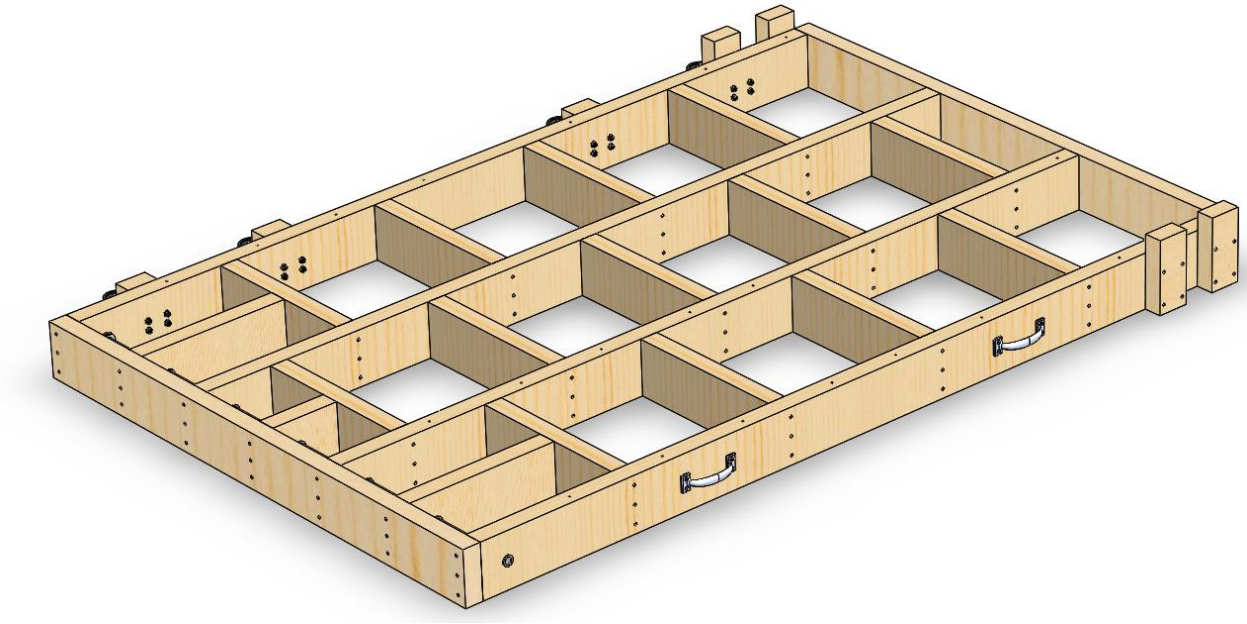


Figure 2. Frame

See *Frame-Bill of Materials* and *Frame Hardware-Bill of Materials*, review each drawing for dimensions before proceeding.

Pay attention to the orientation of the p
arts in Figure 3 when building the external part of the frame.

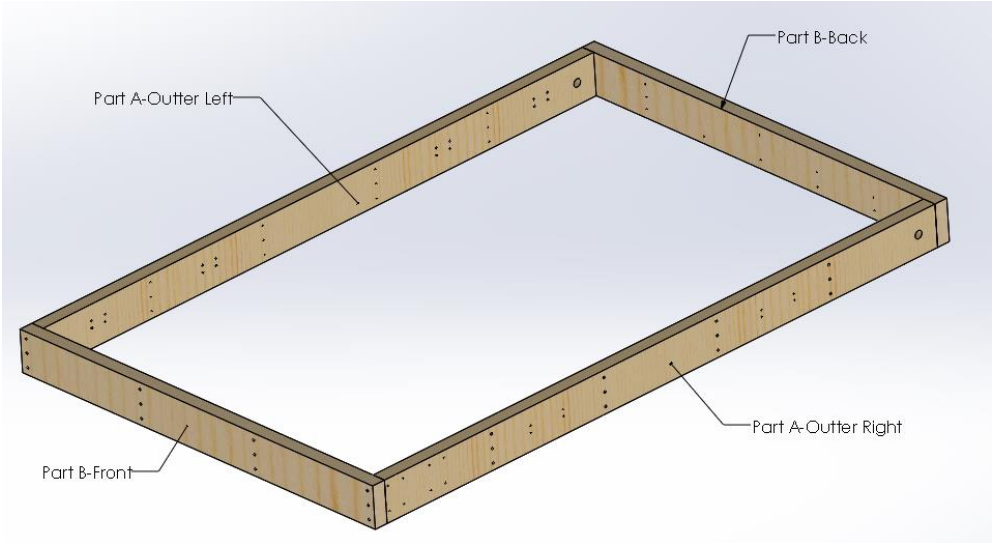


Figure 3. External parts. Frame

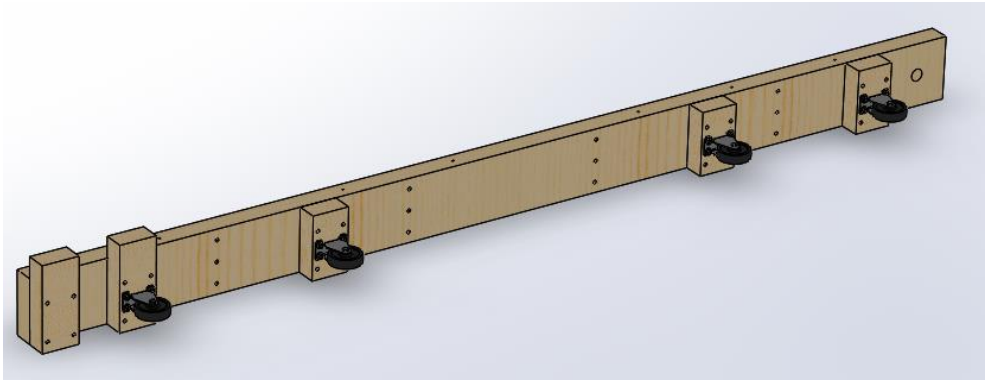
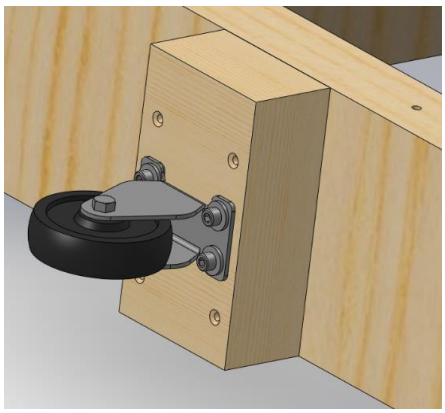


Figure 4.Left Side of the Frame

Start by putting together *Part A-Outer Left* and *Part G-Without wheel mount* by screwing them together (Part number 3GCS10BK) on the opposite end of the hole.



Screw *Part G* and three *Parts F* to the 3 in casters.

Proceed with screwing *Part G* and all *Parts F* to *Part A-outer Left*, see Figure 4.

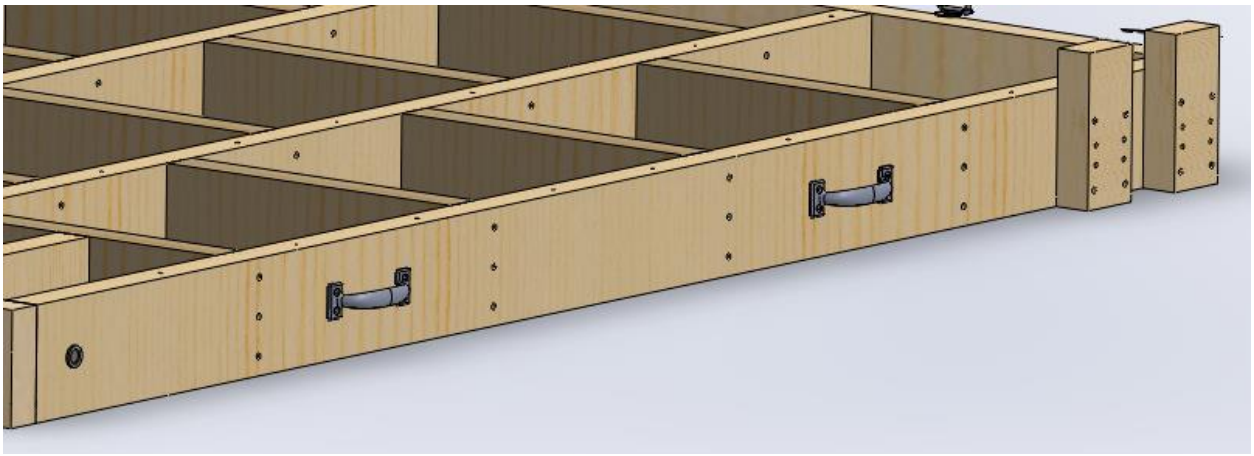


Figure 5. Part A- Outer Right

Two *Parts G-without wheel mount* have to be attached to *Part A-Outer Right* on the opposite end of the hole, see Figure 5.

To add the pull handles, use 10-24 x 2.25in Hex Head Screw, 10-24 Locknut, #10 Washers and add them to *Part A-Outer Right* (Figure 5).

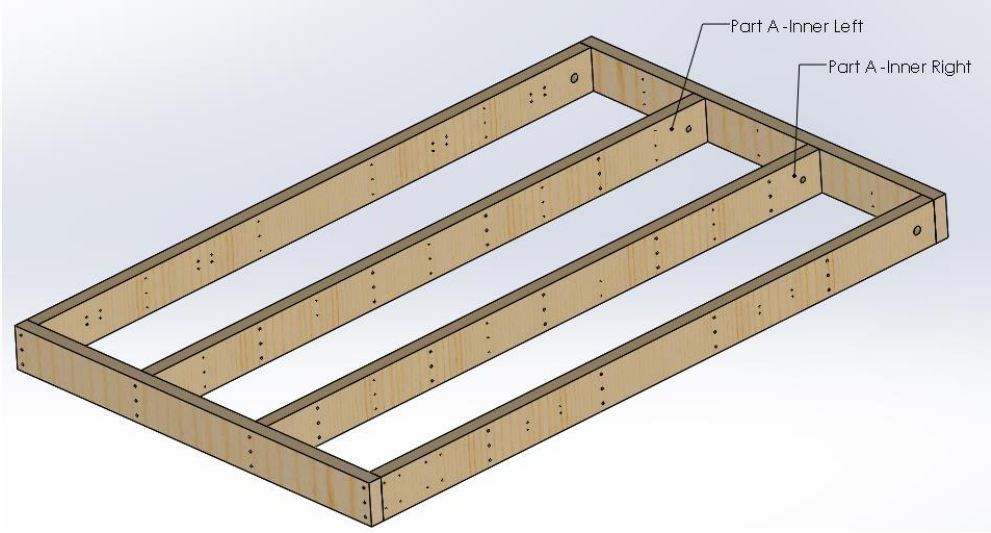


Figure 6. Inner ends. Frame

Put *Part B-Front* and *Part B-Back* together with *Part A-Outer Left* and *Part A-Outer Right.*

Make sure to put *Part B-Back* at the end where the hole of *Part A-Outer Left* is.

Add *Part A-Inner Left and Right* to the frame, see figure 6.

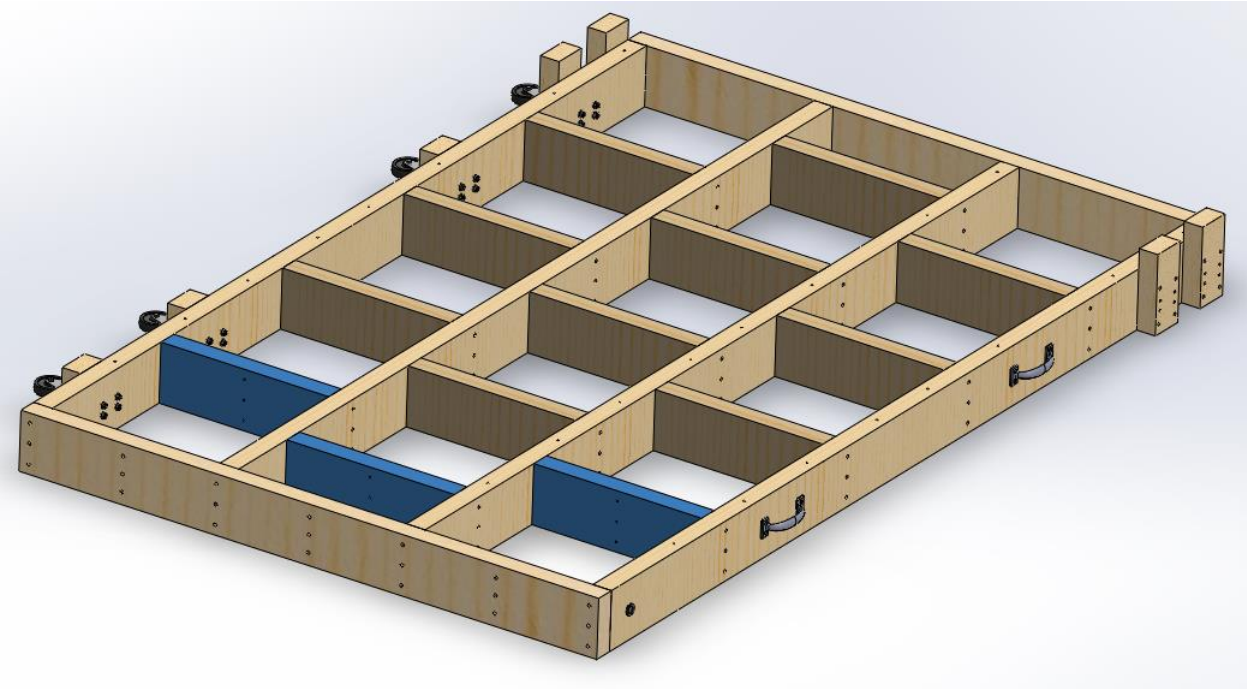


Figure 7. Internal supports. Frame

Add all internal supports (*Parts C*) that go between *Parts A*. Those highlighted in blue are *Parts C-With rib*, see Figure 7.

Finally, add *Parts D* and *Part E*, highlighted in blue in Figure 8. Keep the hole drilled in these parts aligned for the steel rod.

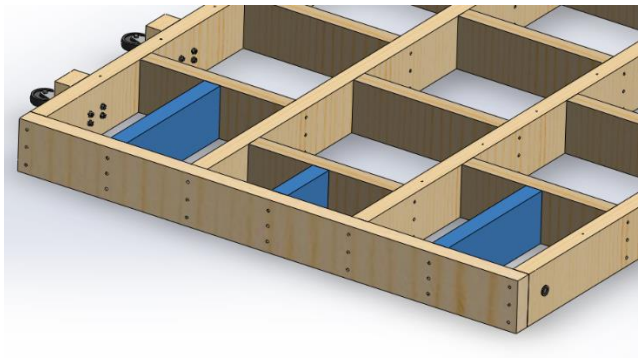


Figure 8. Parts D and Part E. Frame

Add the steel rod and place each shaft collar in the inner edge of the frame (Figure 9).

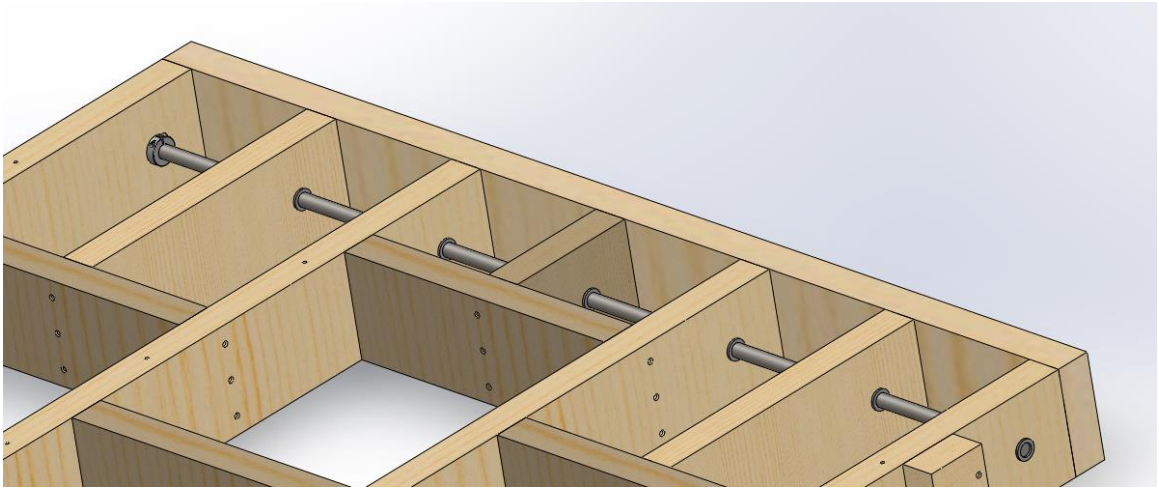


Figure 9. Steel rod and shaft collars

Building the Top Sheet

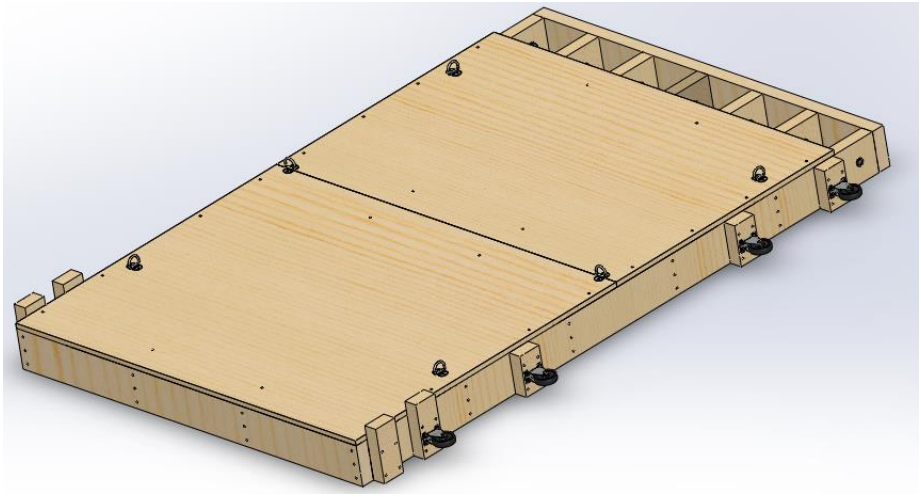


Figure 10. Top sheet

See BOM Sheet Assembly before proceeding.

Place *Part H* over the frame and on the opposite end where the steel rod is, using screws (Part number 3GCS10BK).

Similarly, place *Part I* next to *Part H*.

Add 3 tiedowns on the long sides of the top sheet and secure them.

Building the Ramp

Figure 11. Ramp

See BOM Ramp Assembly before proceeding.

Make sure to cut *Parts J* and *K* before putting them together using screws (Part number 3GCS10BK).

Finally, add three hinges to hold the ramp and the top sheet together, highlited in Figure 12.

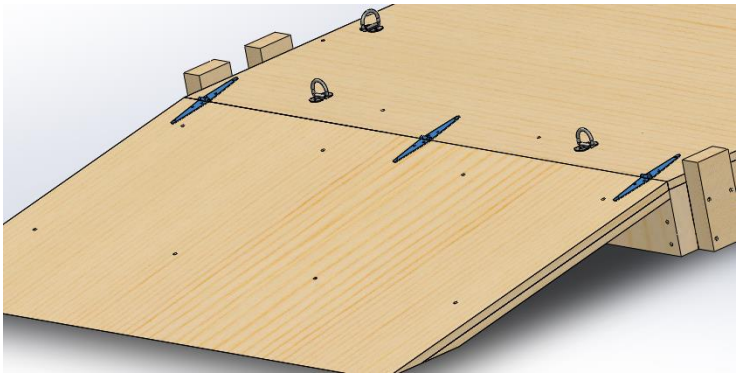


Figure 12. Hinges. Ramp

Building the Stop Bar

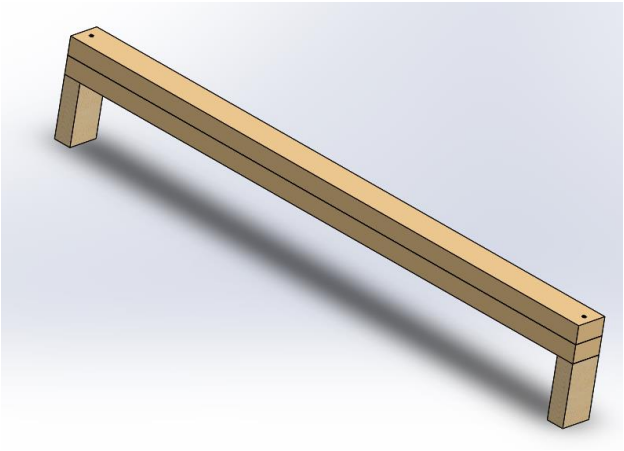


Figure 13. Stop bar

See BOM Stop bar Assembly before proceeding, note this time you need 5 in screws (Part number: 91253A468).

Align *Parts M* and add *Parts L* on each end. Put them together using screws (Part number: 91253A468).

Place the stop bar over the top sheet, see Figure 14.

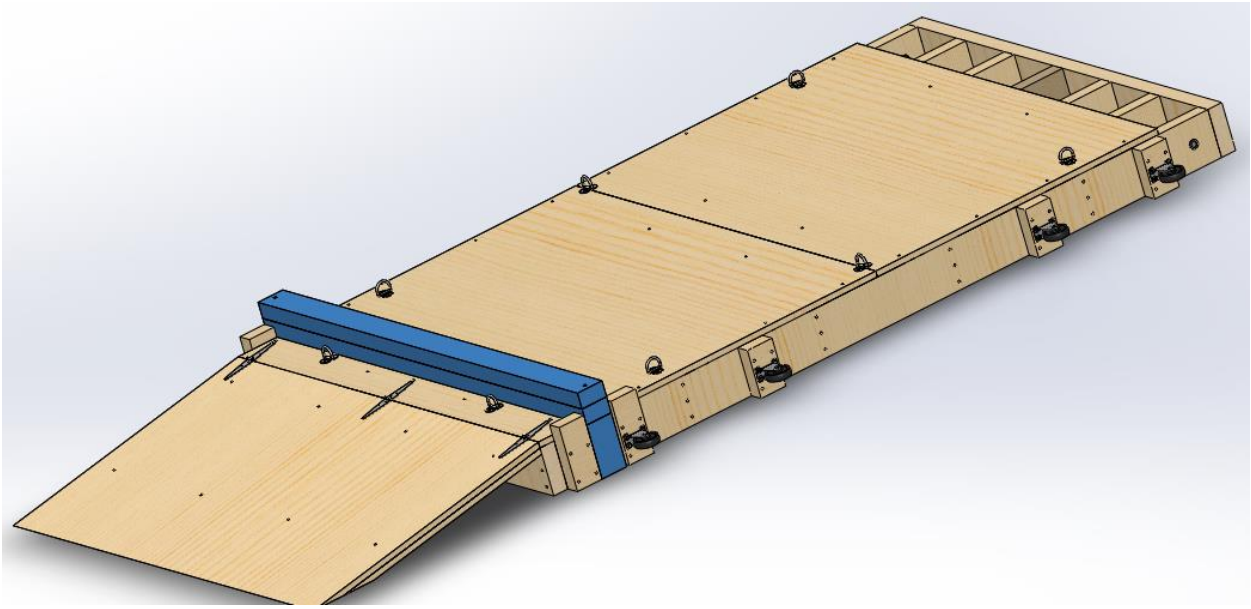


Figure 14. Stop bar in place

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Bill of Materials

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Hardware	Qty. Needed	Source		Pkg. Size	Pkgs. To Order	Cost Per Unit	Total Cost	Parts for which Hardware is used	Finish
0.75in Steel Rod	1	McMaster Carr	1346K350	1	1	$ 57.99	$ 57.99		Steel
0.75in Sleeve Bearing	14	McMaster Carr	2938T540	1	14	$ 1.39	$ 19.46	Steel Rod	Bronze
0.75in Clamping Shaft Collar	2	McMaster Carr	6435K160	1	2	$ 2.89	$ 5.78	Steel Rod	Black-Oxide
3in Caster	4	McMaster Carr	2406T340	1	4	$ 7.30	$ 29.20		
5.50in Oval Grip Handle	2	McMaster Carr	1646A220	1	2	$ 2.74	$ 5.48		Dull Black
10-24 x 2.25in Hex Head Screw	8	McMaster Carr	91253A256	25	1	$ 9.82	$ 9.82	Handles	Black-Oxide
10-24 Locknut	8	McMaster Carr	90631A011	100	1	$ 3.31	$ 3.31	Handles	Zinc-Plated Steel
#10 Washers	8	McMaster Carr	98023A114	100	1	$ 7.86	$ 7.86	Handles	Zinc Yellow-Chromate Plated Steel
1/4-20 x 3.75in Hex Head Screw	16	McMaster Carr	91251A087	10	2	$ 11.42	$ 22.84	Casters	Black-Oxide
1/4-20 Locknut	16	McMaster Carr	90640A129	100	1	$ 4.27	$ 4.27	Casters	Zinc-Plated Steel
1/4in Washer	32	McMaster Carr	98023A029	100	1	$ 7.70	$ 7.70	Casters	Zinc Yellow-Chromate Plated Steel
400lb Tie-Down Ring	6	McMaster Carr	3076T340	1	6	$ 1.50	$ 9.00		Zinc-Plated Steel
#14 x 2in Wood Screw	12	McMaster Carr	90031A319	100	1	$ 11.56	$ 11.56	Tie-Down Rings	Zinc-Plated Steel

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Strap Hinge	3	McMaster Carr	1530A530	1	3	$ 5.41	$ 16.23		Dull Steel
#12 x 0.75in Wood Screw	24	McMaster Carr	90031A294	100	1	$ 8.04	$ 8.04	Hinges	Zinc-Plated Steel
10-24 x 5" Screw	2	McMaster Carr	91253A468	10	1	$ 11.32	$ 11.32	Stop bar	
#8 x 3in Construction Screw 10lb Box	200	Home Depot	3GCS10BK	722	1	$ 32.47	$ 32.47	Frame	Gold

McMaster Carr Total	$ 229.86
Home Depot Total	$ 32.47
Total Hardware Cost	$ 262.33

Lumber	Qty. Needed	Source		Pkg. Size	Pkgs. To Order	Cost Per Unit	Total Cost	Parts for which Hardware is used	Finish
2in x 6in x 12ft Lumber	10	Home Depot	161756	1	10	$ 8.10	$ 81.00	Frames	
4in x 6in x 8ft Lumber	1	Home Depot	259270	1	1	$ 14.76	$ 14.76	Frames	
0.75in x 4ft x 4ft Plywood	3	Home Depot	454559	1	3	$ 45.98	$ 137.94	Ramp and Top Sheet	Sande

Home Depot Total	$ 233.70
Total Lumber Cost	$ 233.70
Total Cost	$ 496.03

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Drawings

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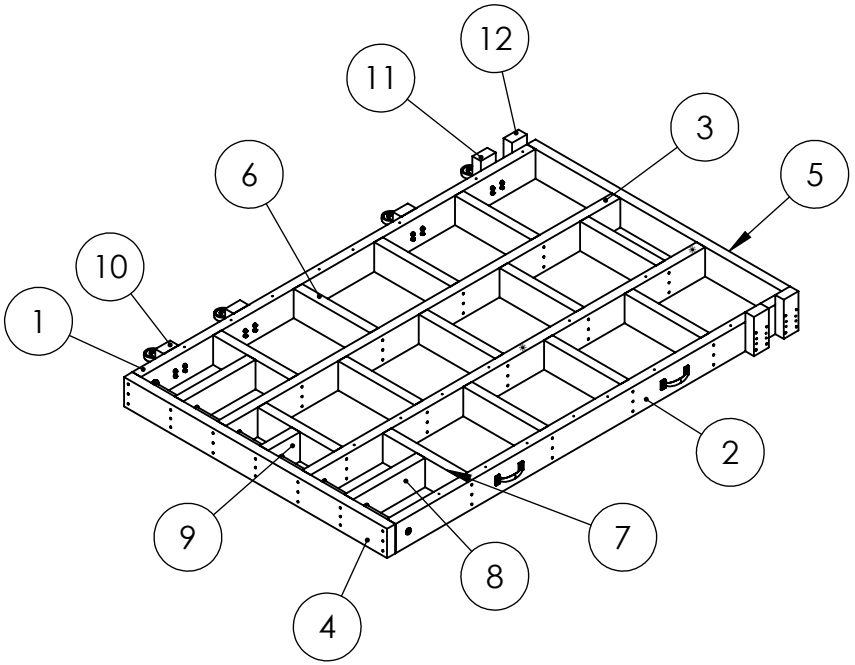
ITEM NO.	PART NUMBER	QTY.
1	Part A-Outside Left	1
2	Part A-Outside Right	1
3	Part A-Inner	2
4	Part B-Front	1
5	Part B-Back	1
6	Part C	10
7	Part C-With rib	3
8	Part D	2
9	Part E	1
10	Part F	3
11	Part G	3
12	Part G-Without wheel mount	1



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TITLE:

Frame- Bill of Materials

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

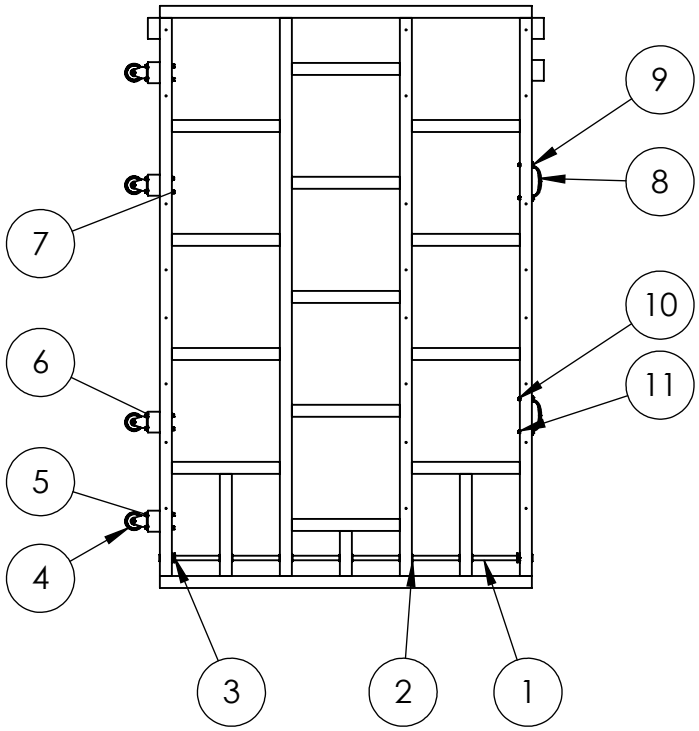
TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:32	A	12/13/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1

ITEM NO.	DESCRIPTION	PART NUMBER	QTY.
1	3/4" Steel rod	1346K350	1
2	3/4" Sleeeve bearing	2938T540	14
3	3/4" Shaft collar	6435K160	2
4	3" caster	2406T340	4
5	1/4"-20x 3-3/4" Screw	91251A087	16
6	1/4" Washer	98023A029	32
7	1/4"-20 Locknut	90640A129	16
8	Pull handle	1646A220	2
9	10-24 x 2-1/4" Screw	91253A256	8
10	10-24 Locknut	90631A011	8
11	10# Washers	98023A114	8

All screws used to put lumber together are #8 x3in Screws unless otherwise specified in the Bill of materials.



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TITLE:

Frame Hardware-Bill of Materials

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
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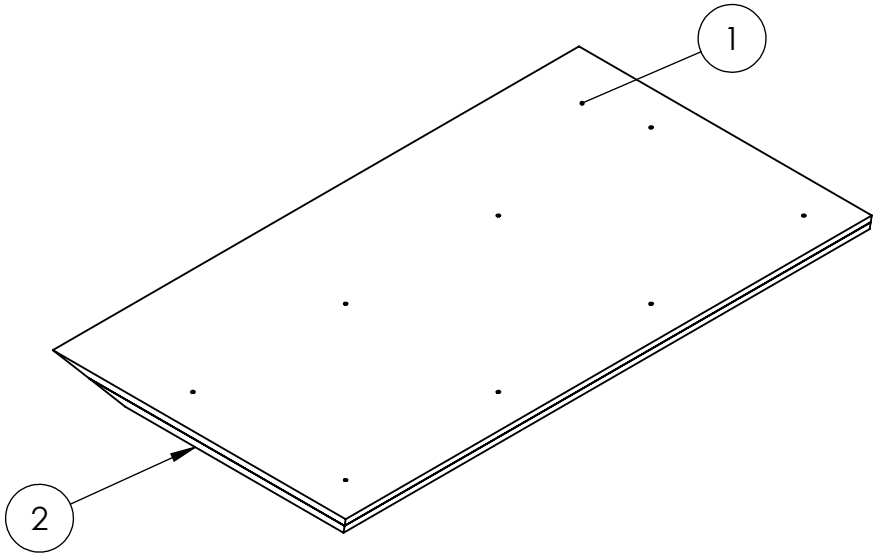
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1

ITEM NO.	PART NUMBER	QTY.
1	Part J	1
2	Part K	1



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TITLE:

Ramp- Bill of Materials

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

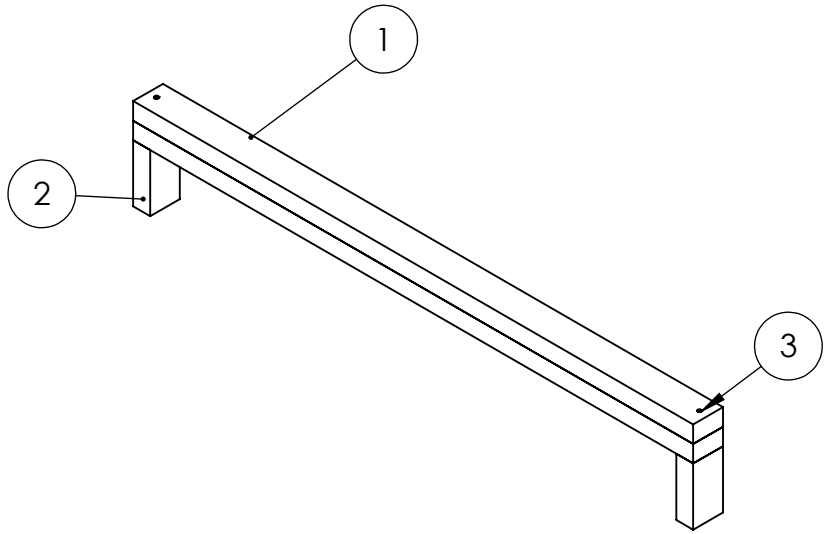
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:16	A	12/13/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1

ITEM NO.	PART NUMBER	QTY.
1	Part L	2
2	Part M	2
3	10-24 x 5" Screw. Part Number:91253A468	2



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TITLE:

Stop bar- Bill of Materials

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

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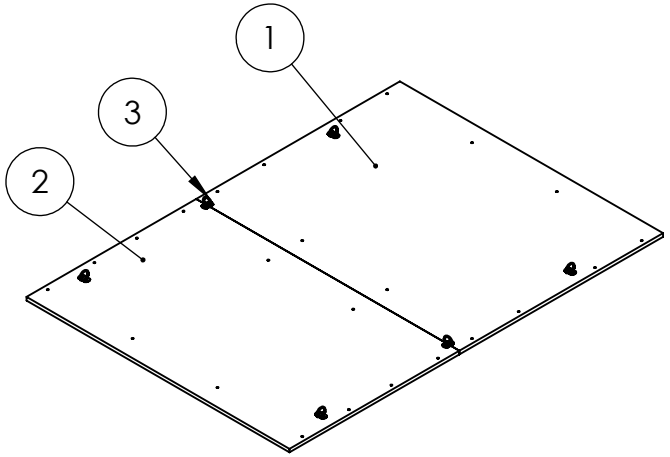
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1

ITEM NO.	PART NUMBER	QTY.
1	Part H	1
2	Part I	1
3	3076T340_TIE-DOWN RING	6



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TITLE:

Sheet- Bill of Materials

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

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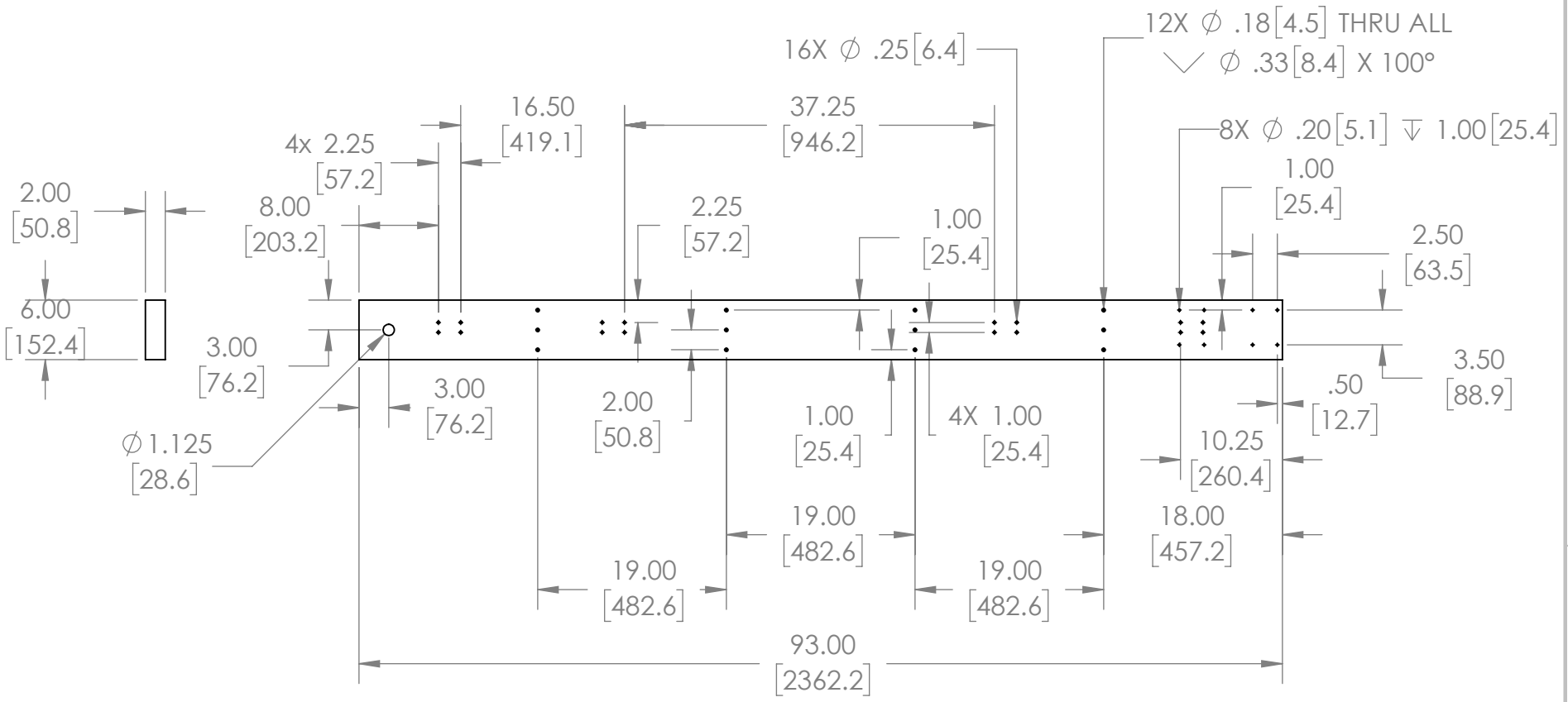

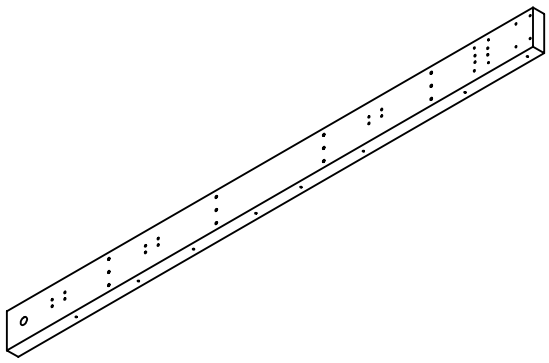

TITLE:

Part A-Outer Left

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

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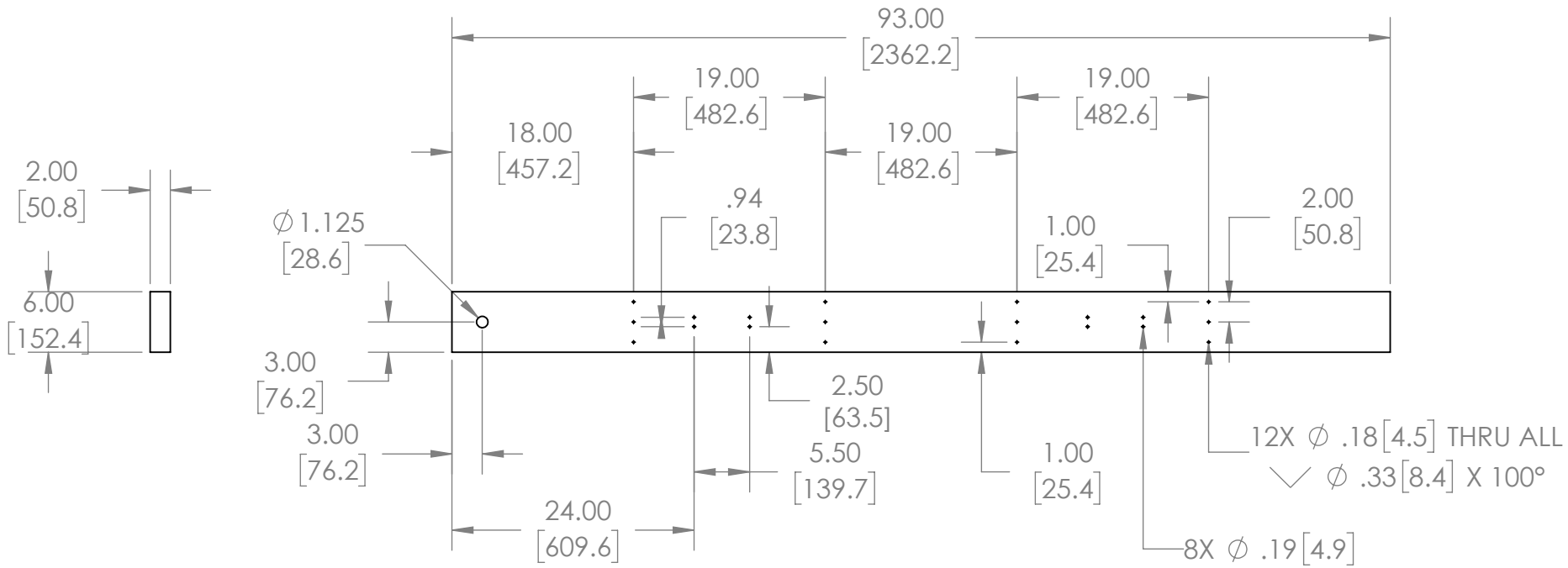

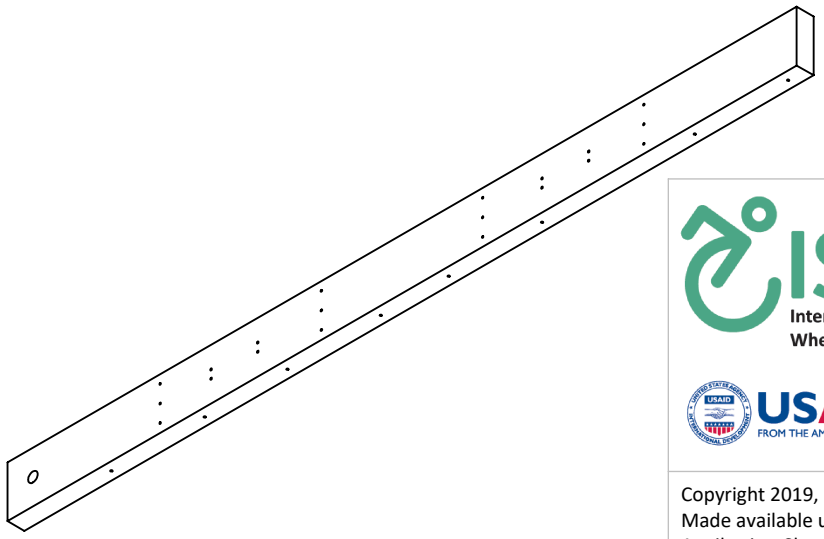

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TITLE:

Part A-Outer Right

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

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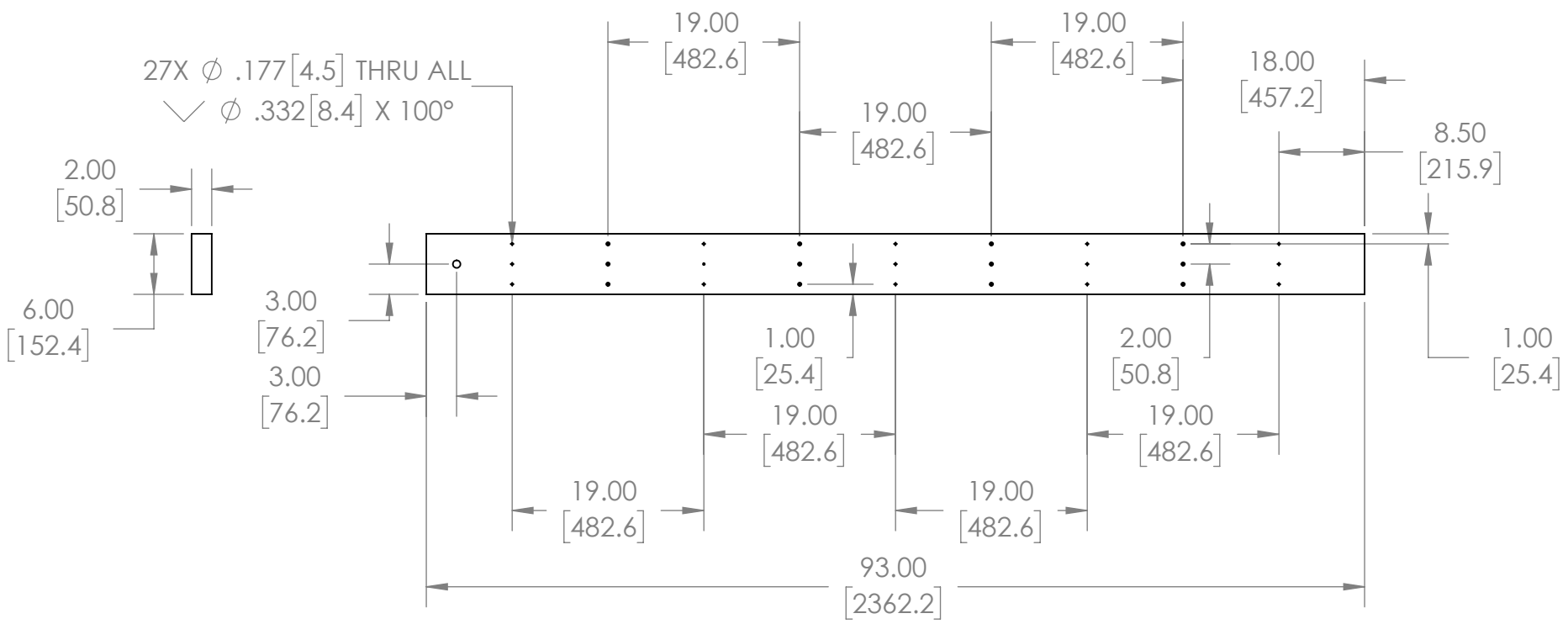
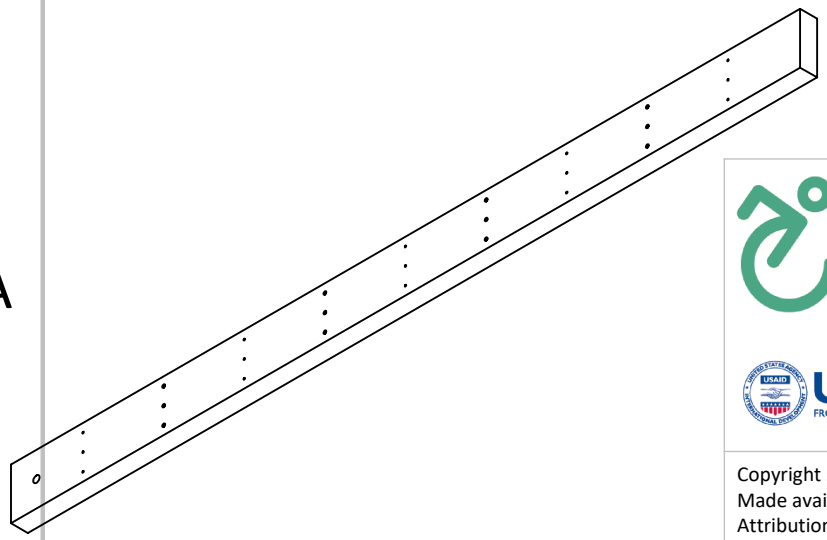
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE:

Part A-Inner Left and Inner Right

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
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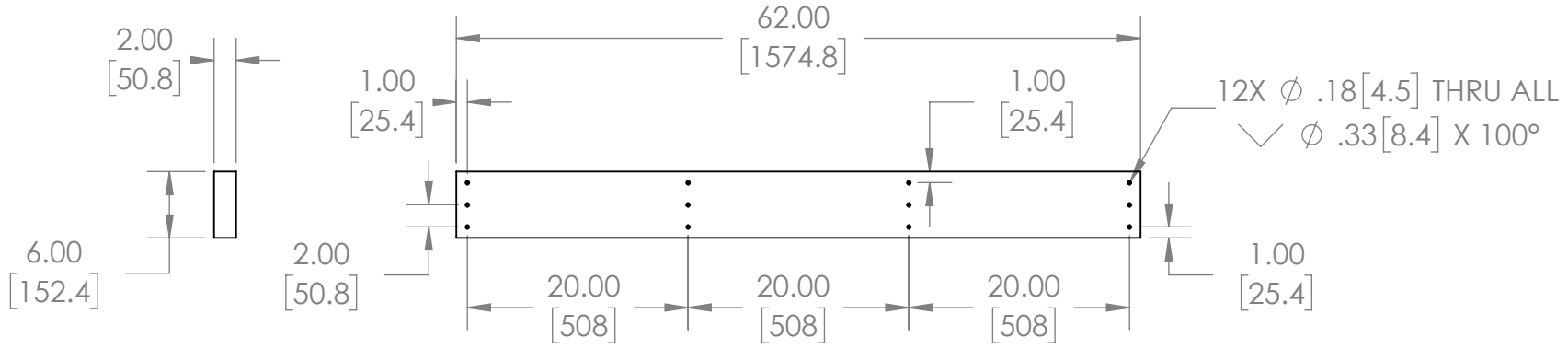
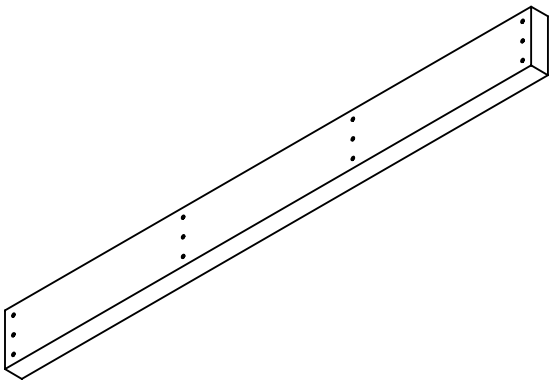
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part B-Front

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
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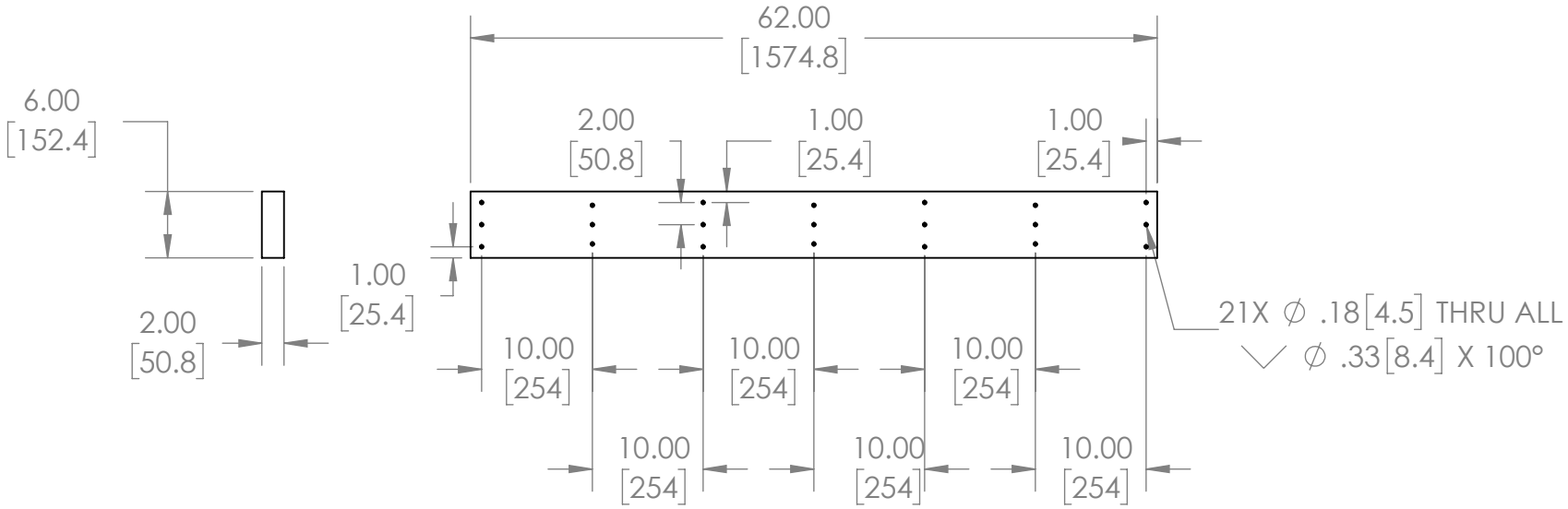
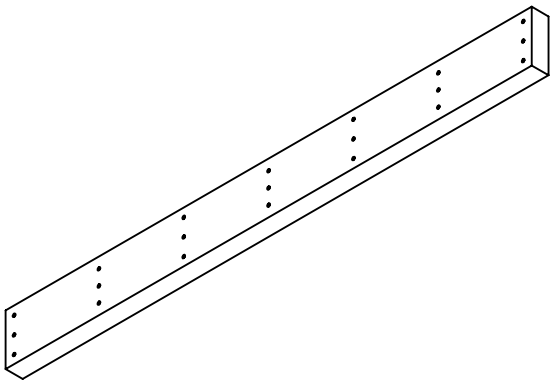
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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ADVANCING PARTNERS & COMMUNITIES

TITLE: Part B-Back

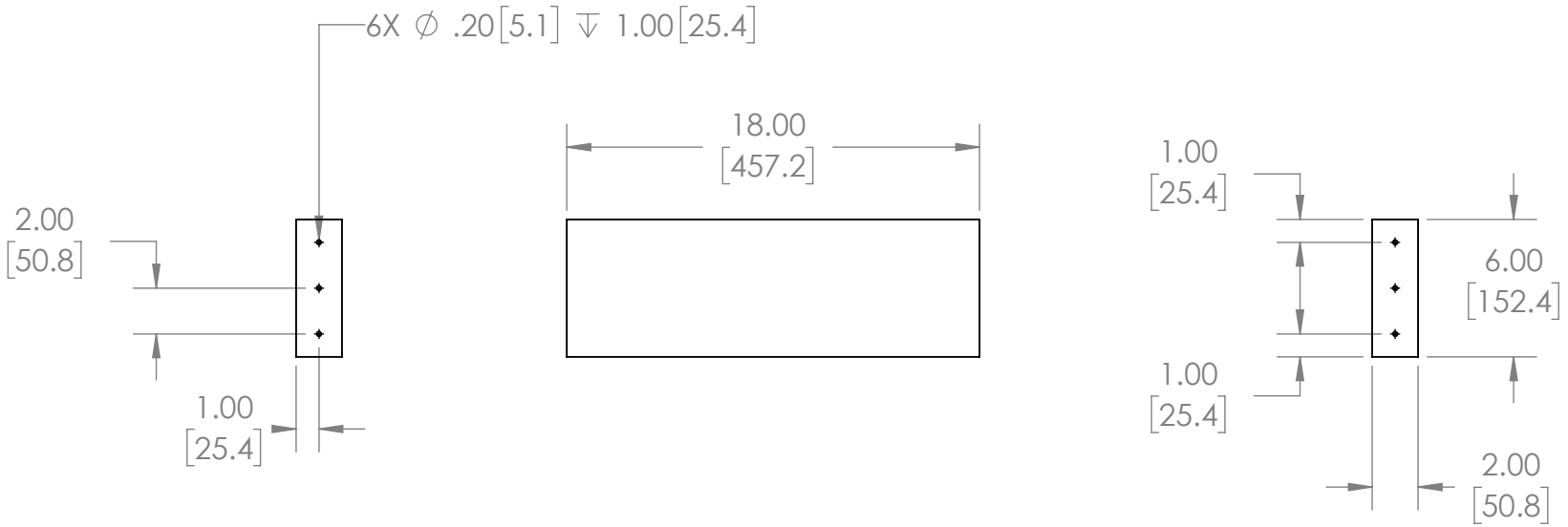
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

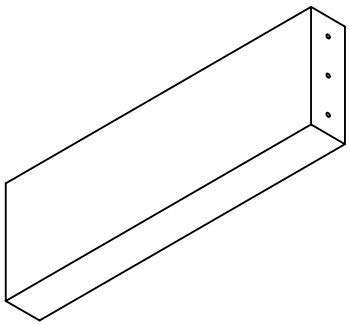
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:16	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part C

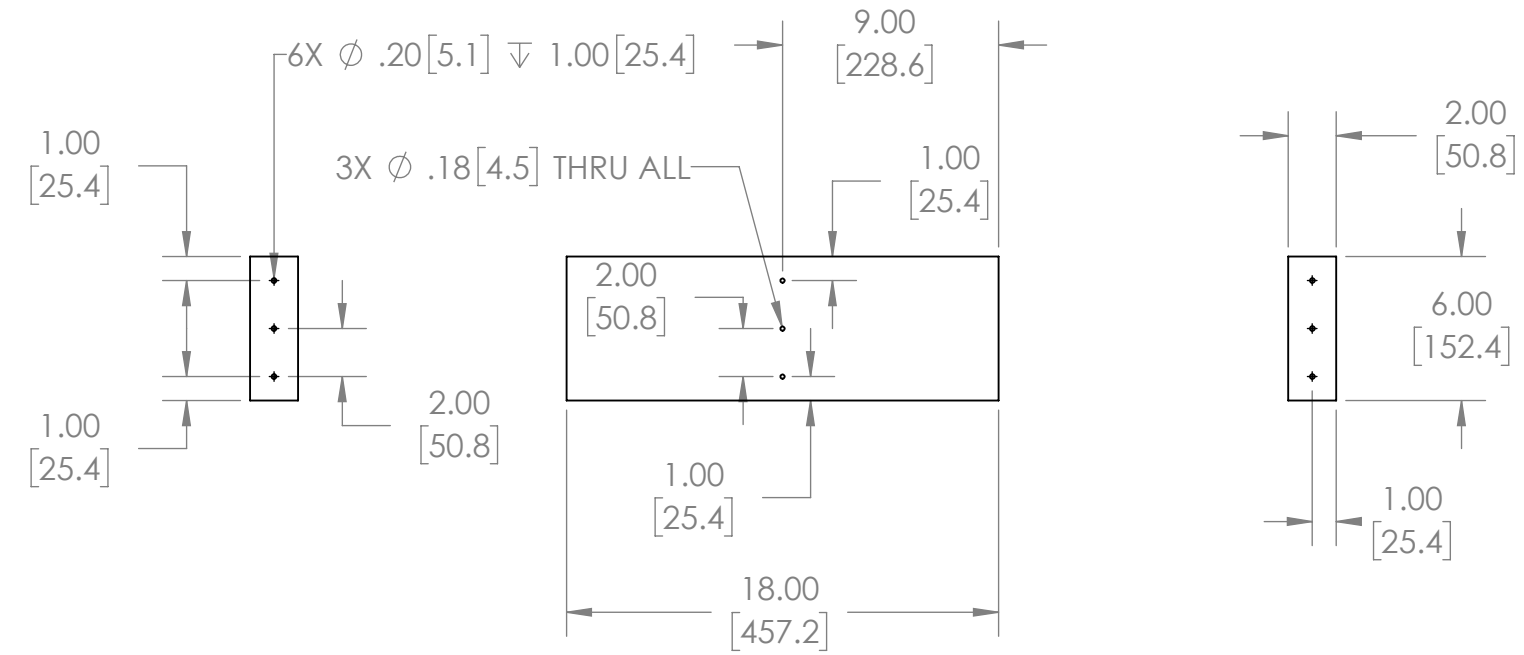
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

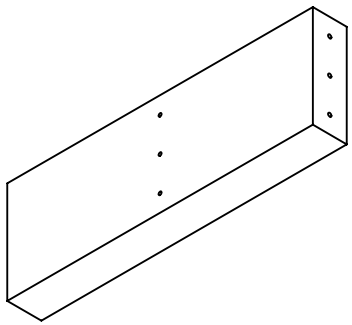
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:8	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE:

Part C- With rib

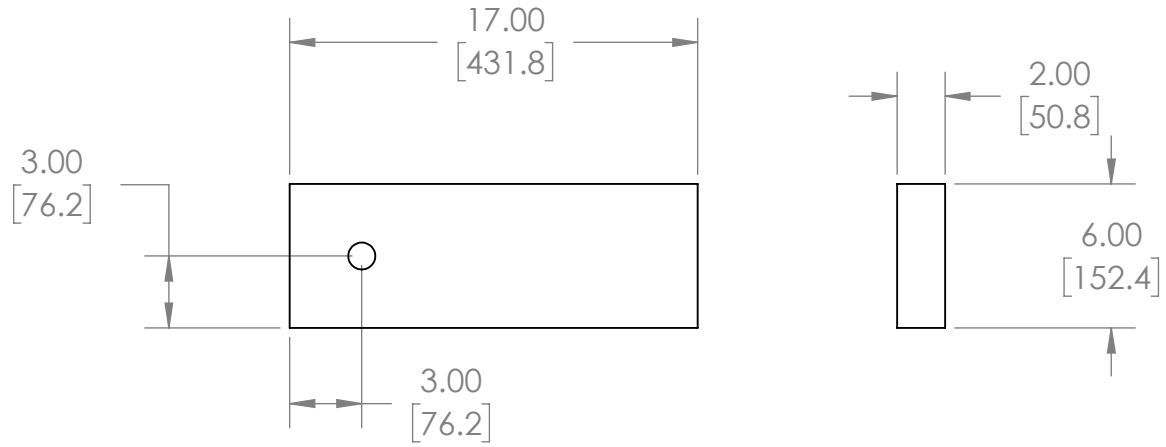
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

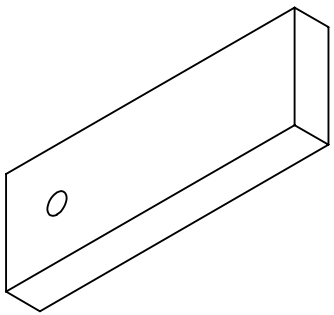
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:8	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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DDI ADVANCING PARTNERS & COMMUNITIES

TITLE: Part D

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
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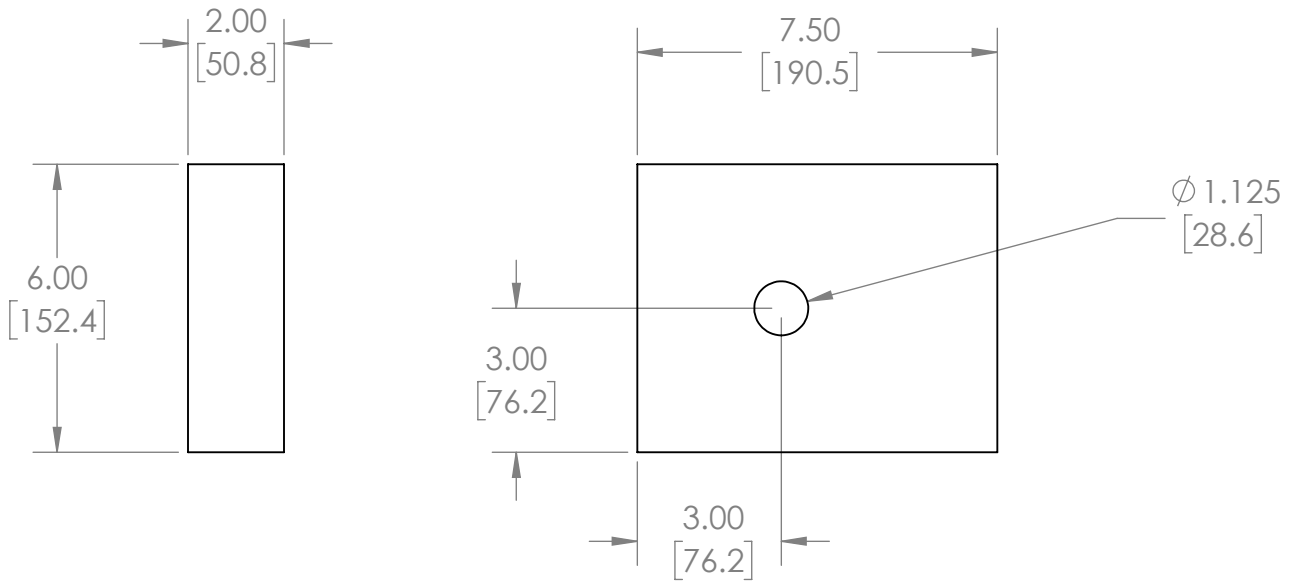
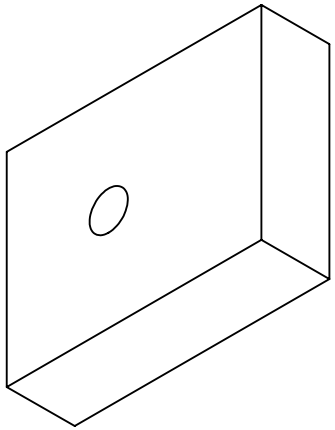
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part E

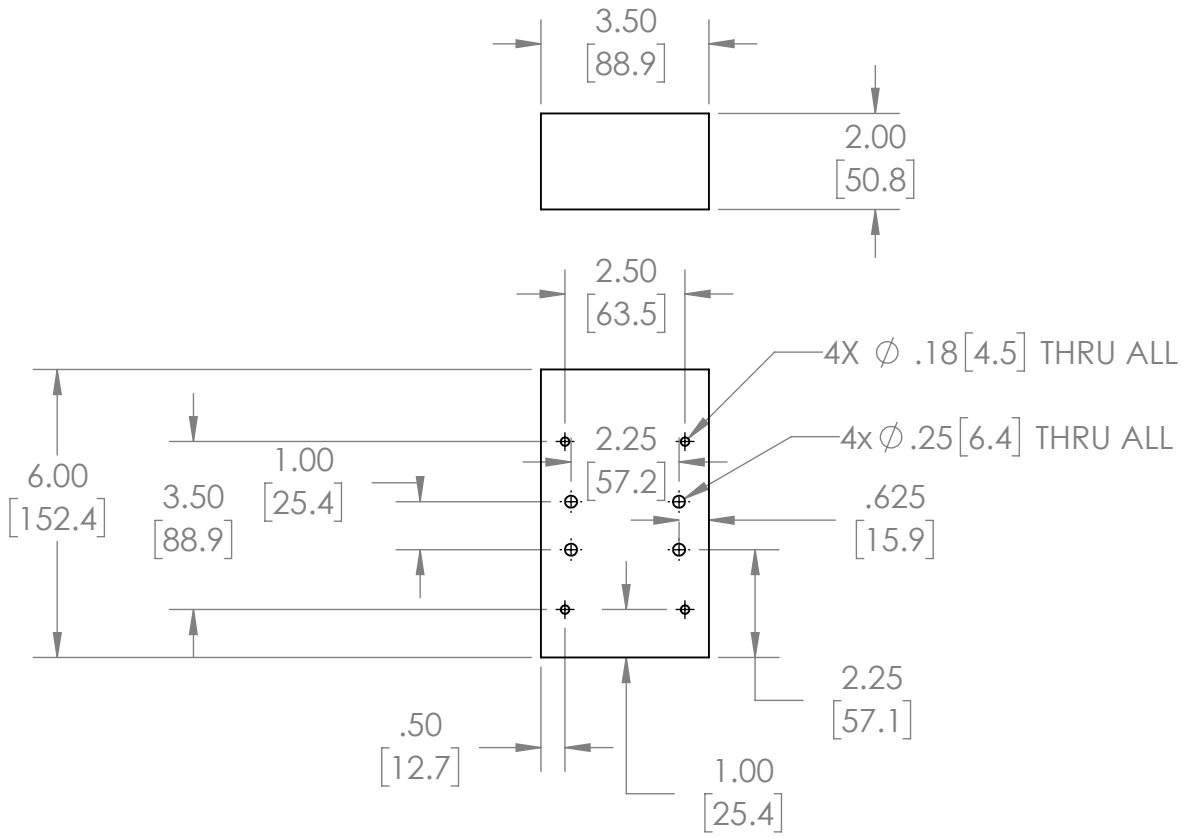
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

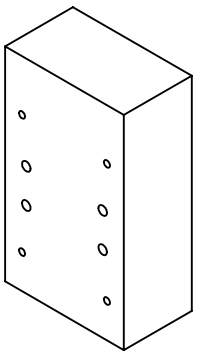
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:4	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part F

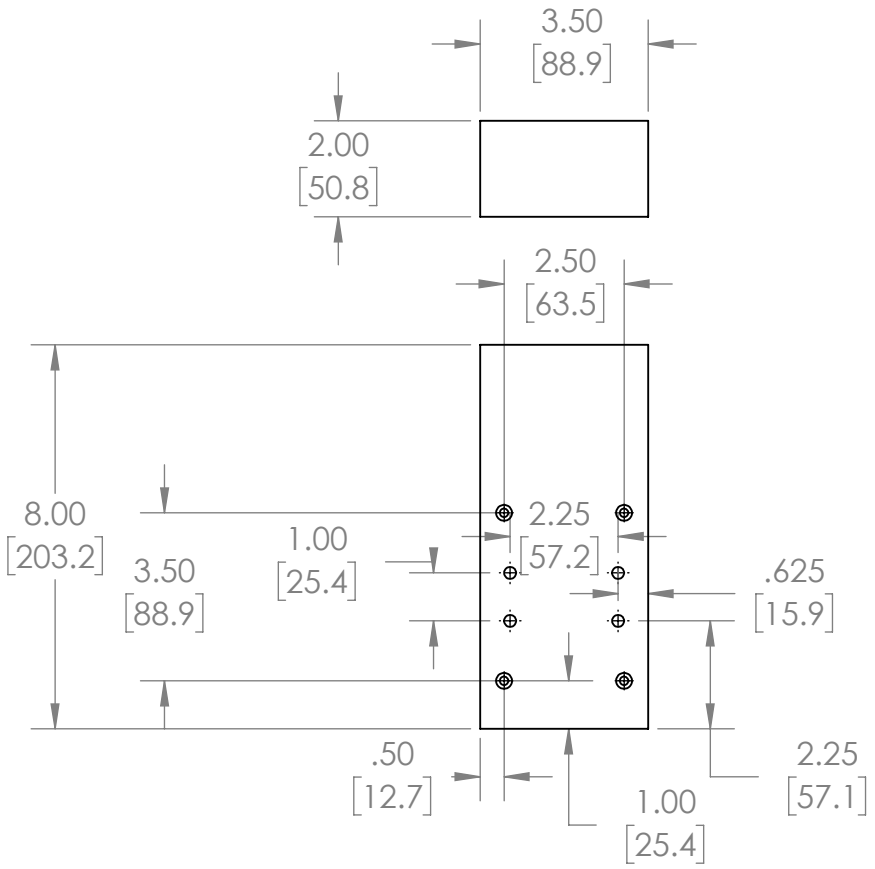
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

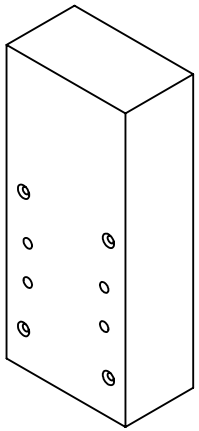
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:2	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part G

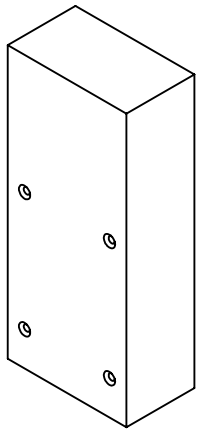
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

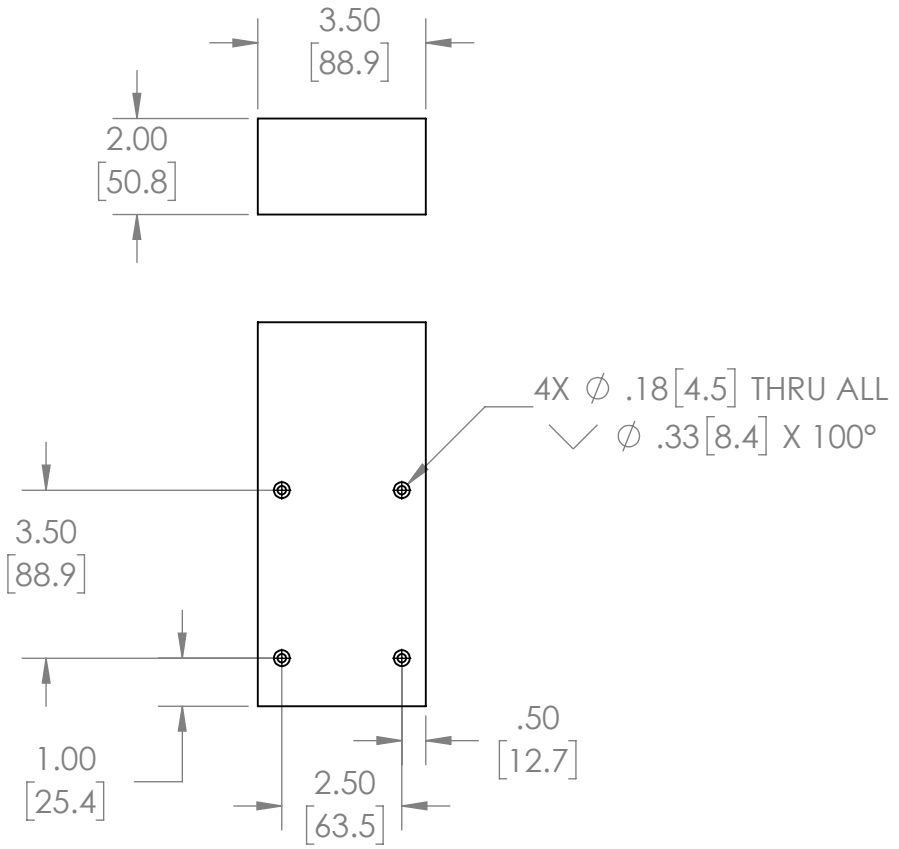
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:4	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE:

Part G-Without wheel mount

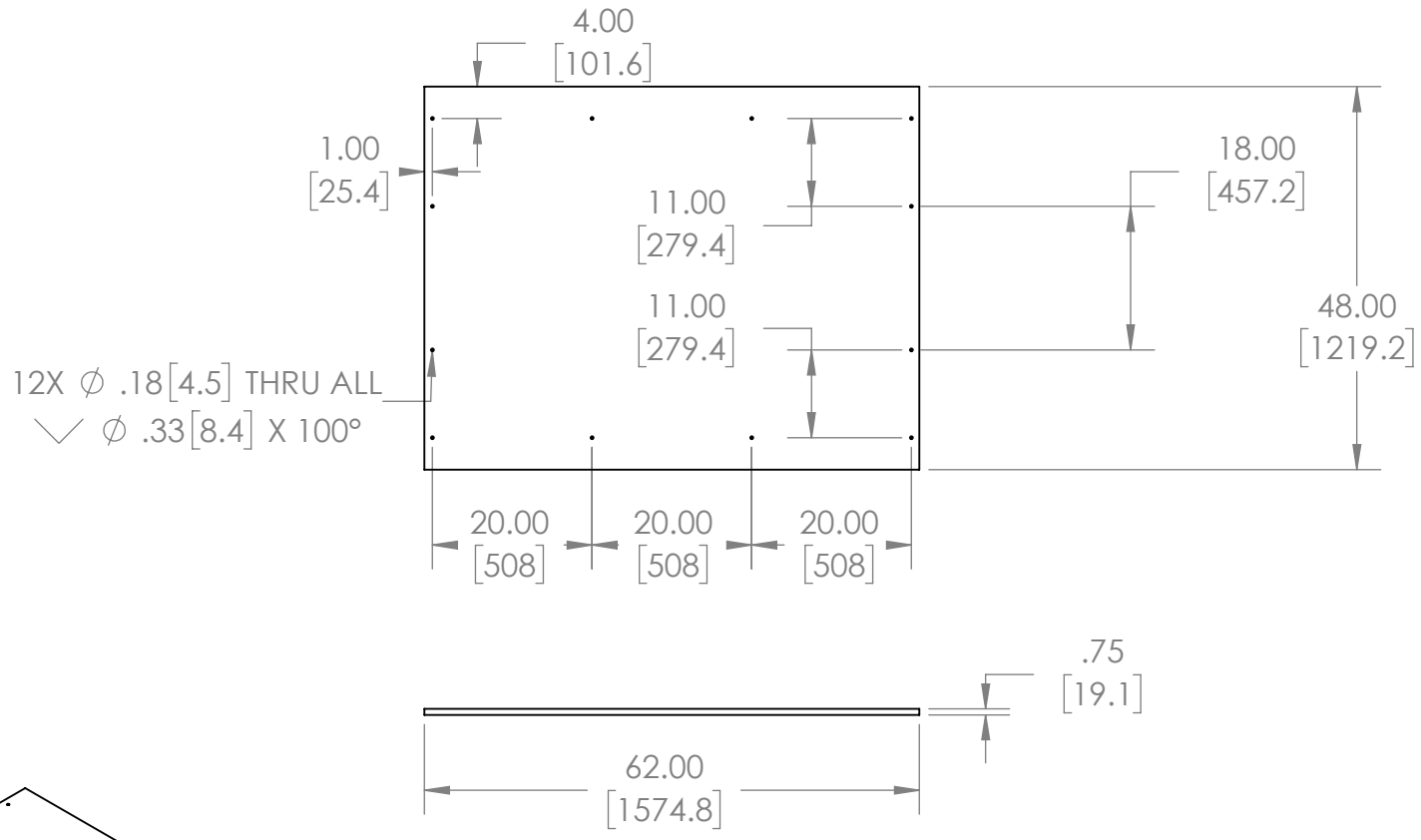
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

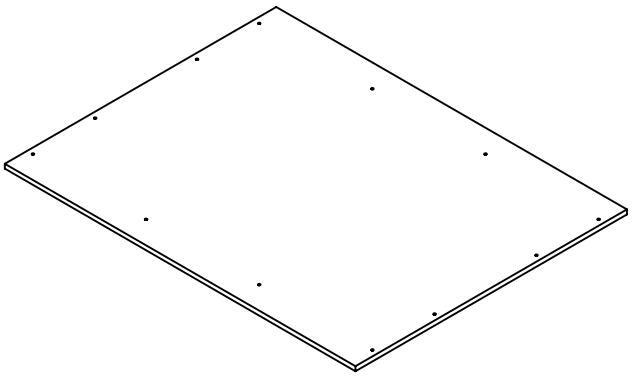
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:4	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE:

Part H

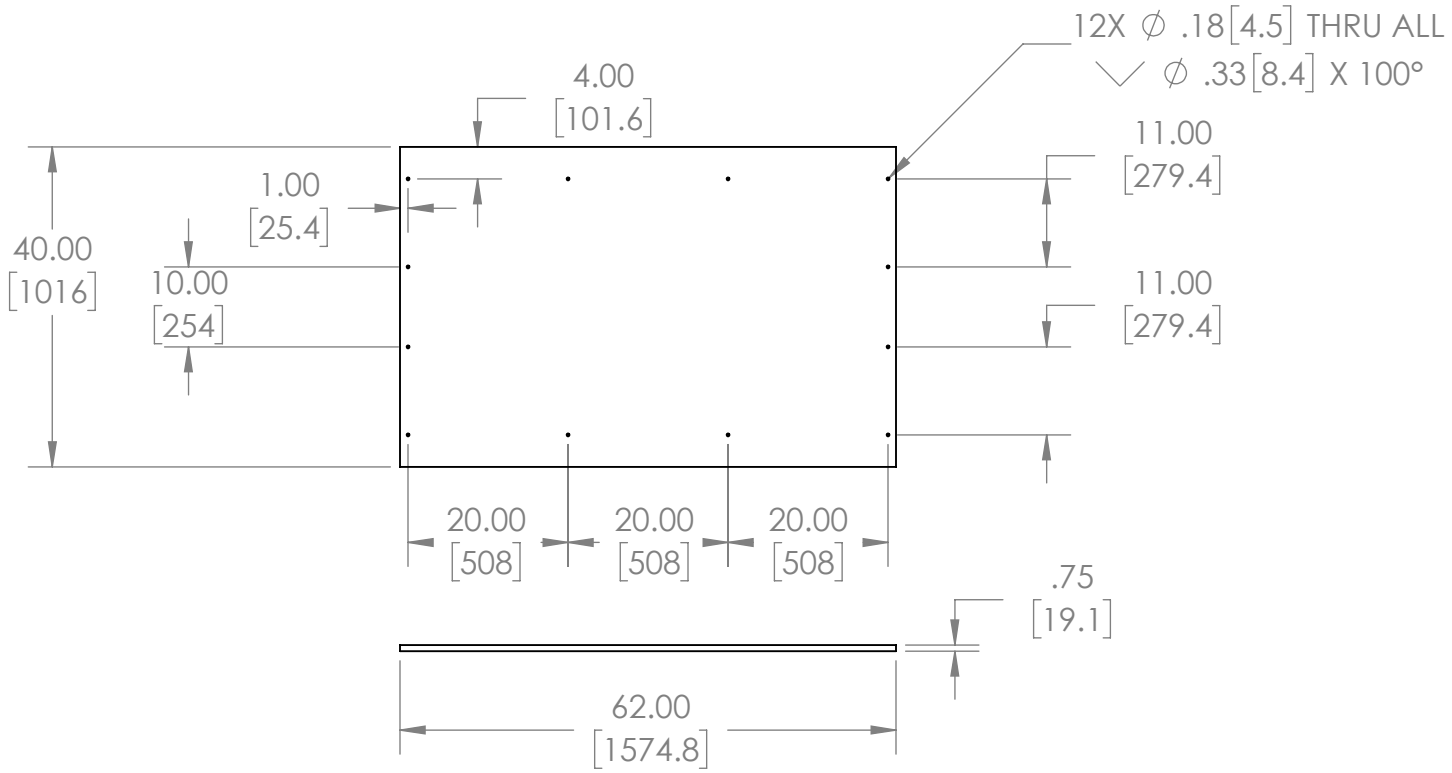
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

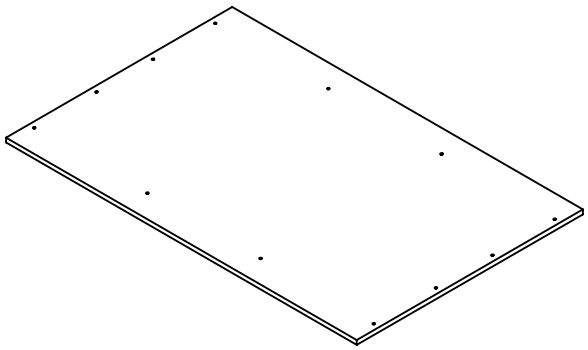
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:24	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE:

Part I

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
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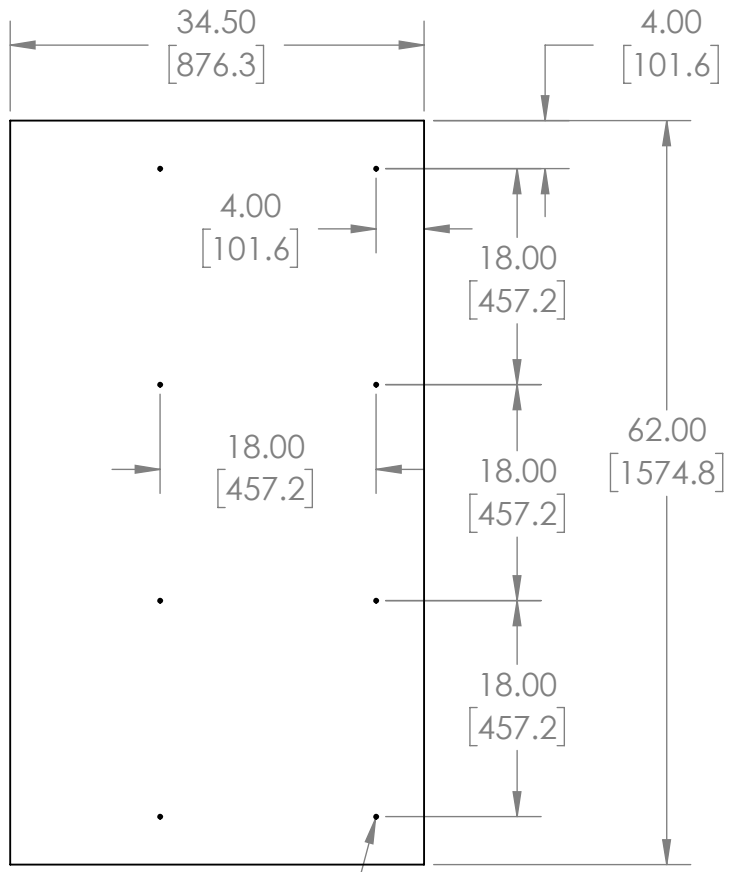
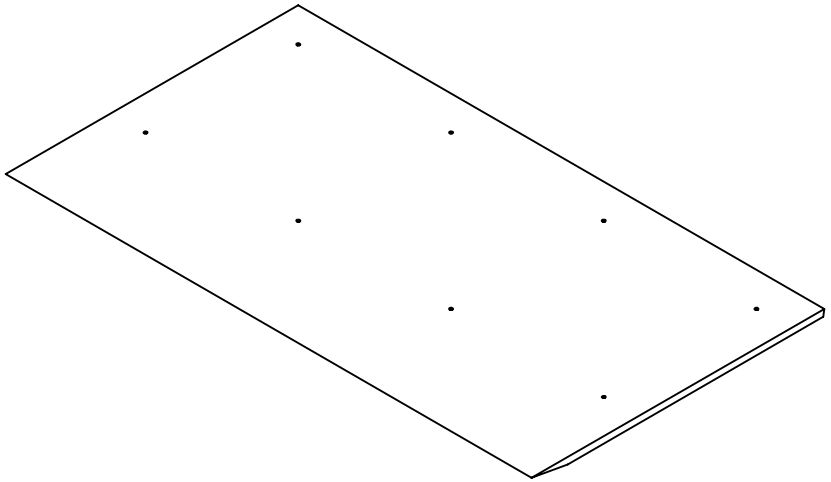
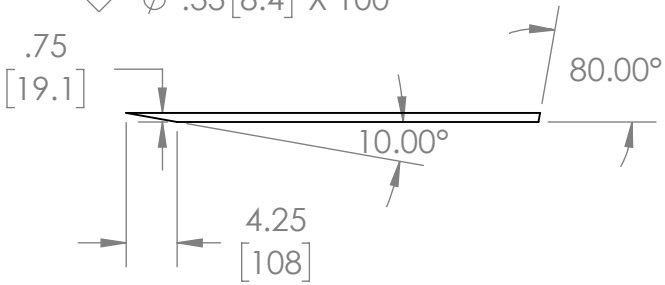
DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1







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TITLE:

Part J

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: Pine

FINISH:

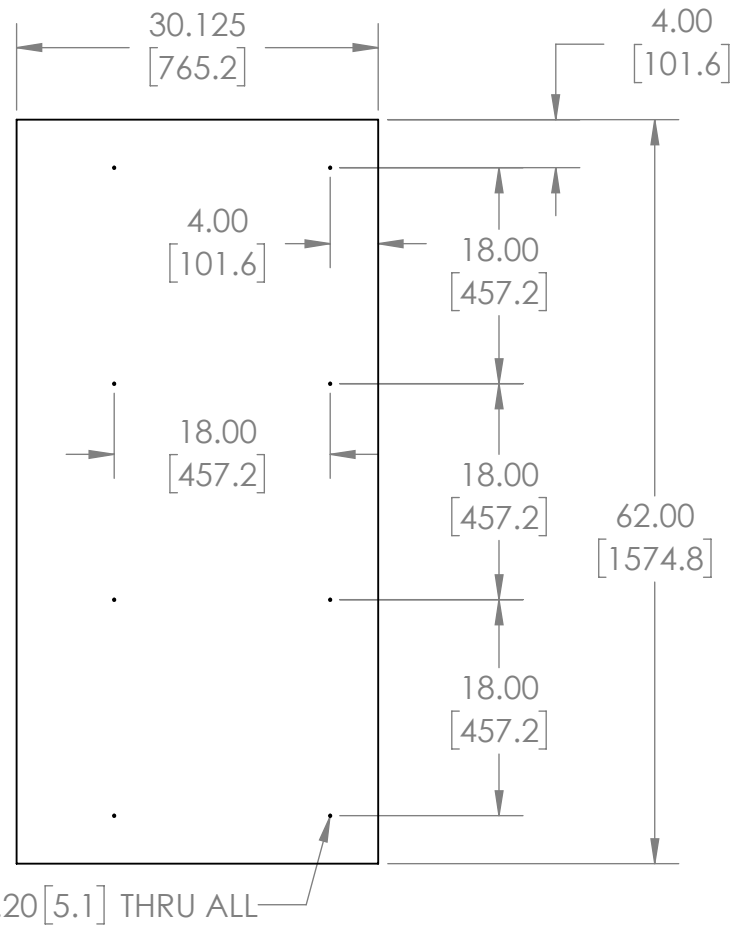
TOLERANCES: + -

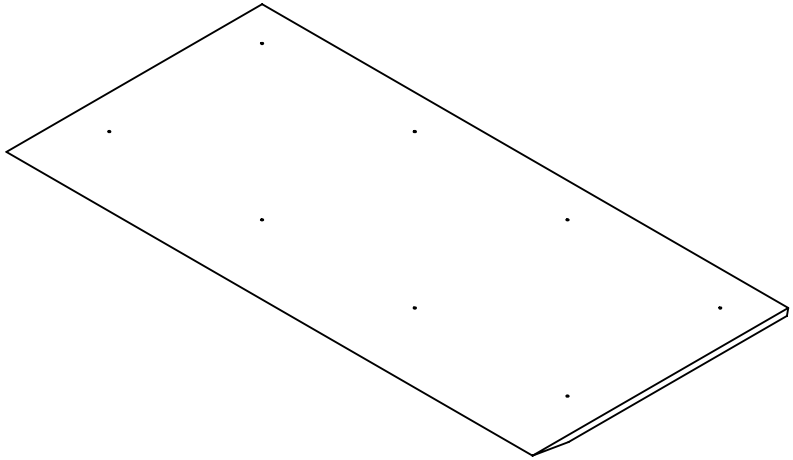
SCALE:	SIZE:	DATE:	REV:
1:16	A	12/18/2019	

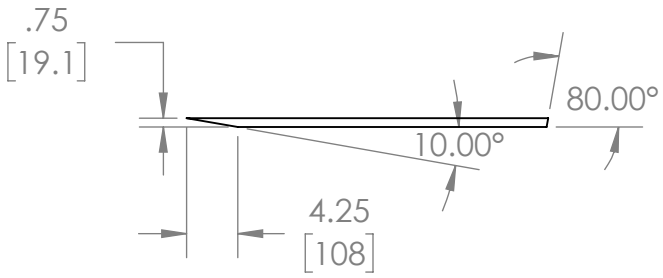
DO NOT SCALE DRAWING

WEIGHT (LBS): 18.45

SHEET 1 OF 1







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TITLE: Part K

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

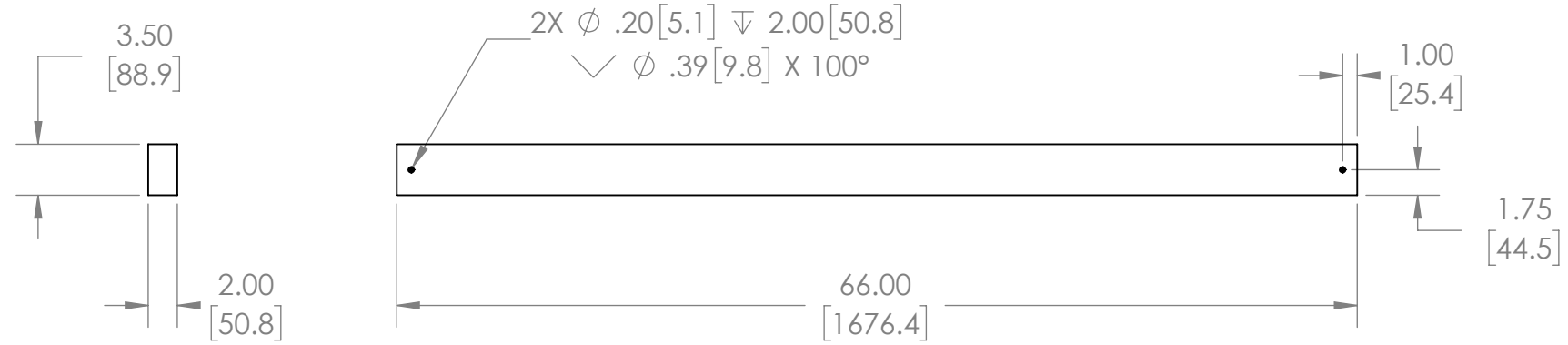
MATERIAL: Pine

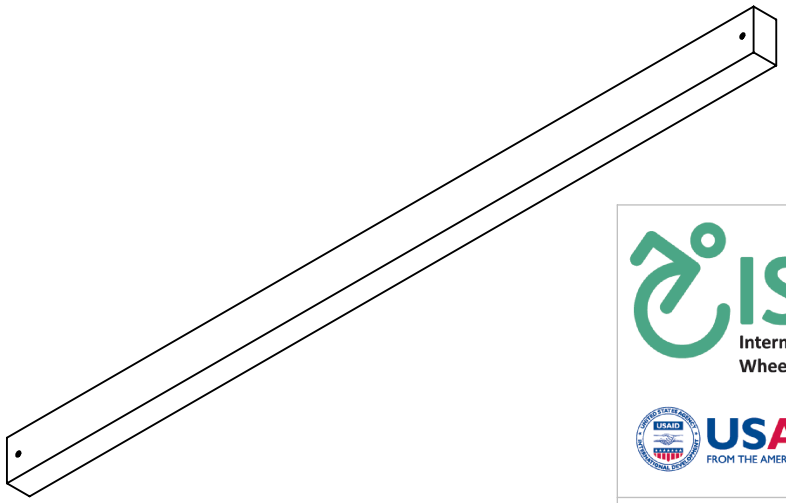
FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:16	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): 15.95 | SHEET 1 OF 1





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TITLE: Part L

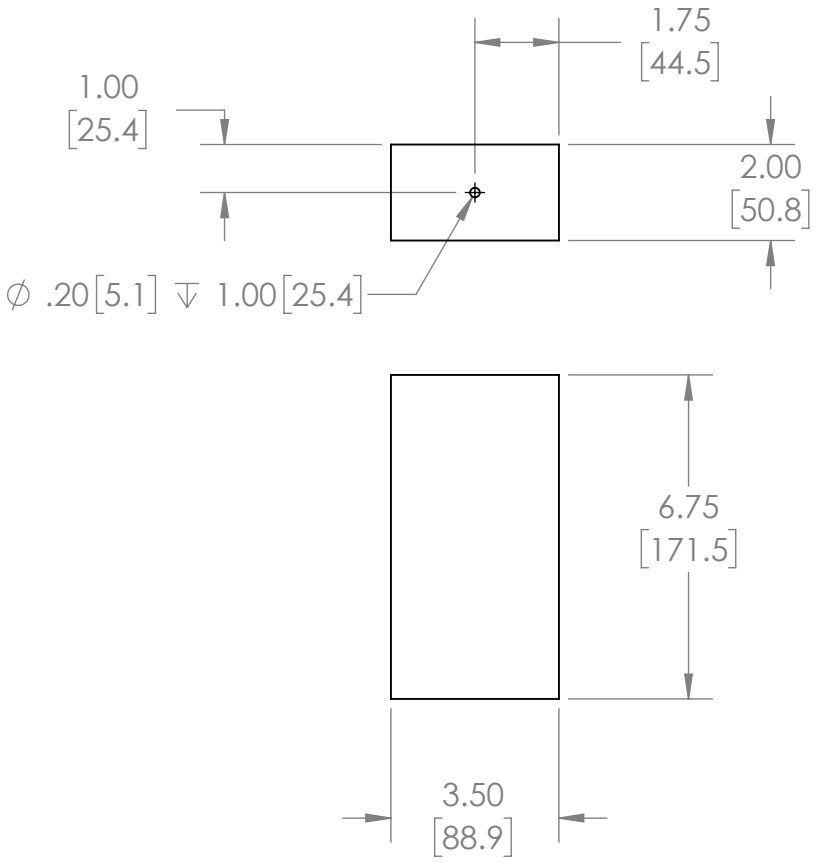
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

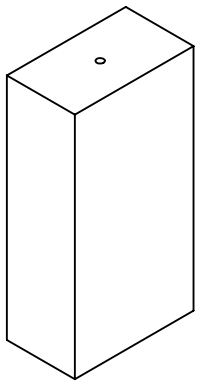
MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:12	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1





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TITLE: Part M

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: FINISH:

TOLERANCES: + -

SCALE:	SIZE:	DATE:	REV:
1:2	A	12/18/2019	

DO NOT SCALE DRAWING | WEIGHT (LBS): | SHEET 1 OF 1