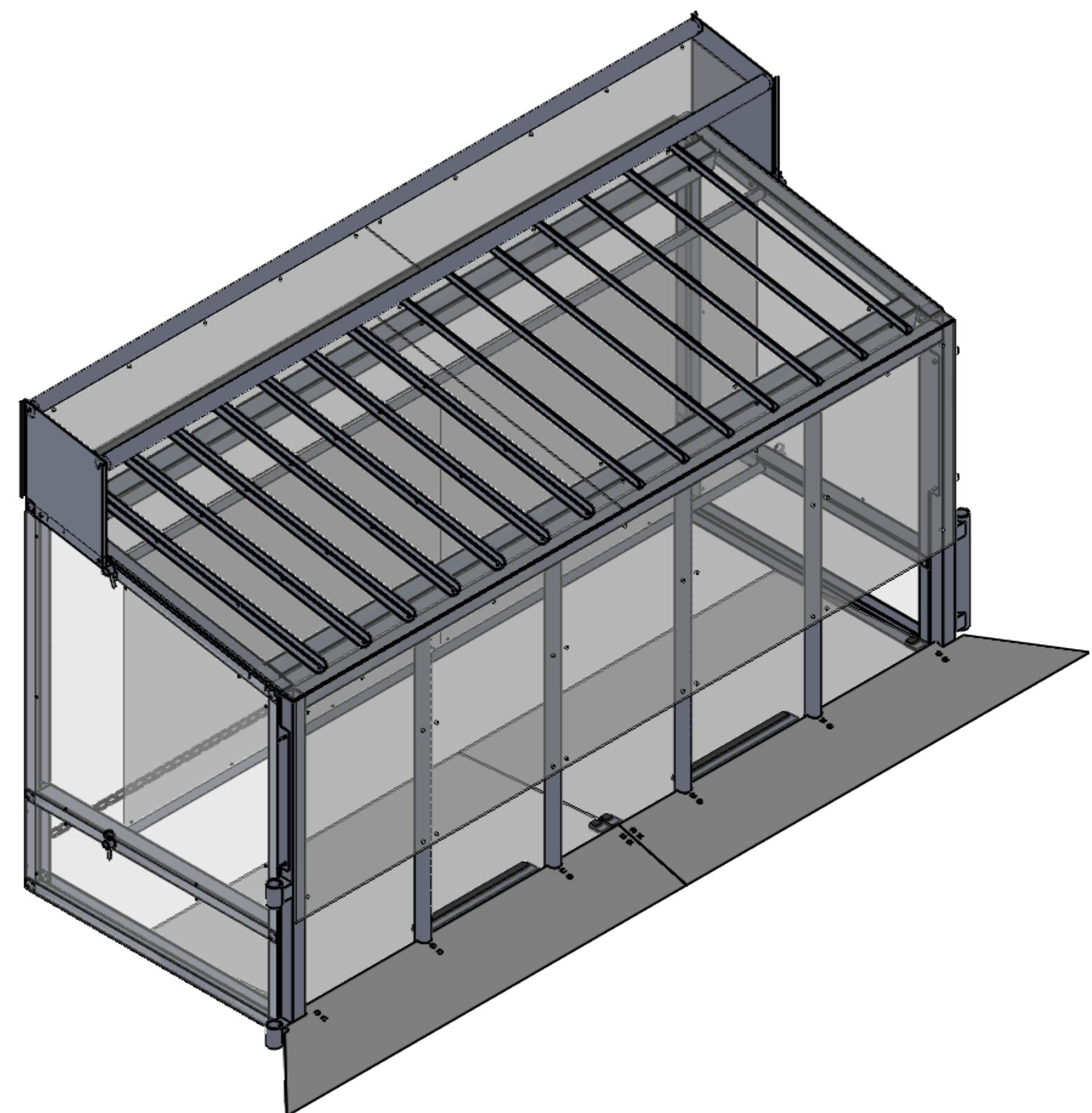


D



C

B

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22001	Side Frame, Terminal	2
2	GE-22002	Front Frame, Terminal	1
3	GE-22003	Horizontal Support, Terminal	2
4	GE-22004	Chute Assembly, Terminal	2
5	GE-22007	Conduit, Terminal	2
6	GE-22008	Plastic, Purple Plane	2
7	GE-22009	Guard Assembly, Terminal	1
8	GE-22013	Side Plastic, Terminal	2
9	GE-22014	Front Plastic, Terminal	1
10	GE-22016	Outer Ramp Assembly, Left	1
11	GE-22017	Outer Ramp Assembly, Right	1
12	GE-22022	Inner Ramp	2
13	GE-22024	Edge Protector 46"	4
14	GE-22026	Terminal Chain	1
15	GE-22027	Roof	2
16	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	4
17	pin_quick_ring_.25_2.3125	Pin, Ring-Grip Quick-Release with SS Ring, 1/4" Diameter, 2.3125" Usable Length	8

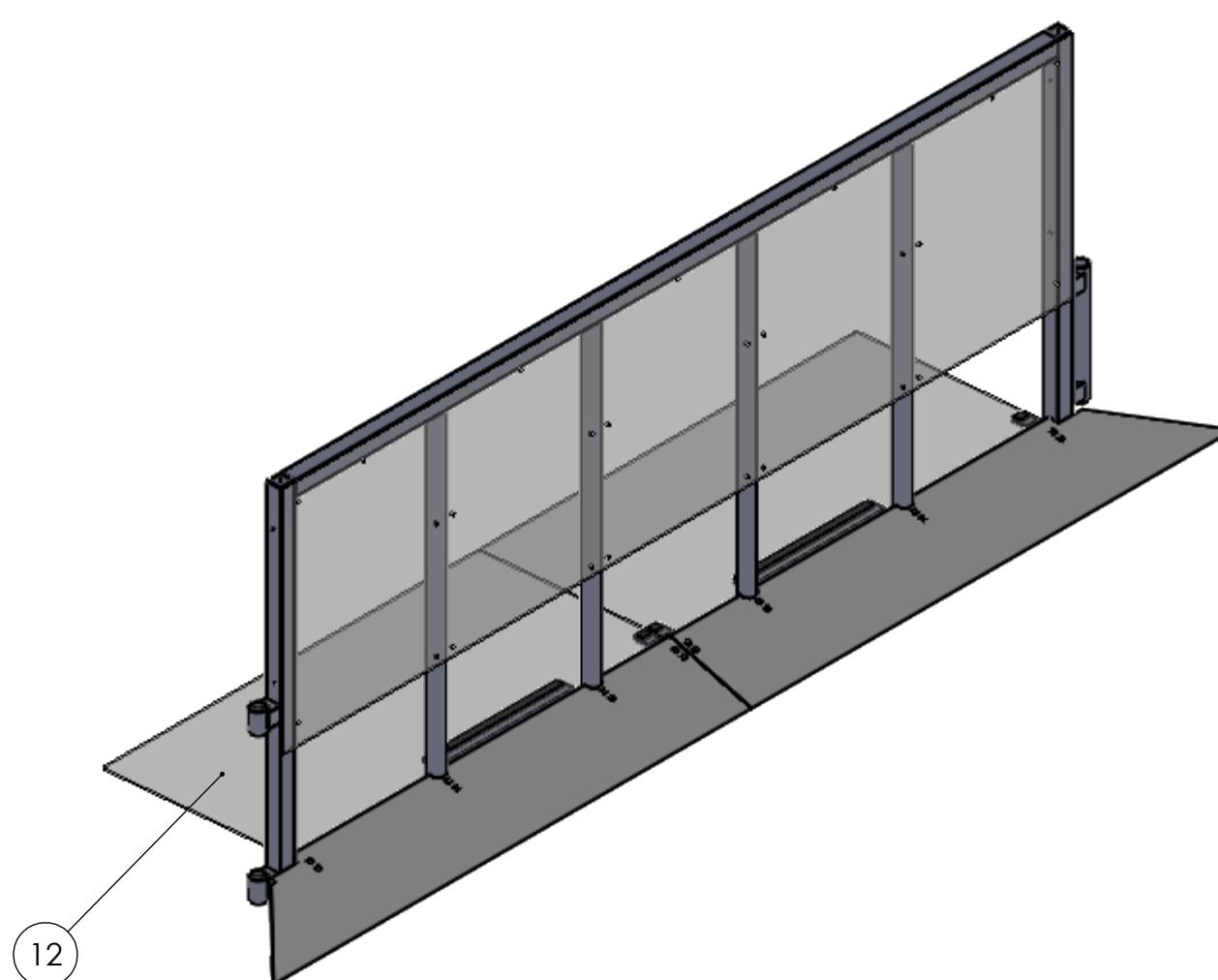
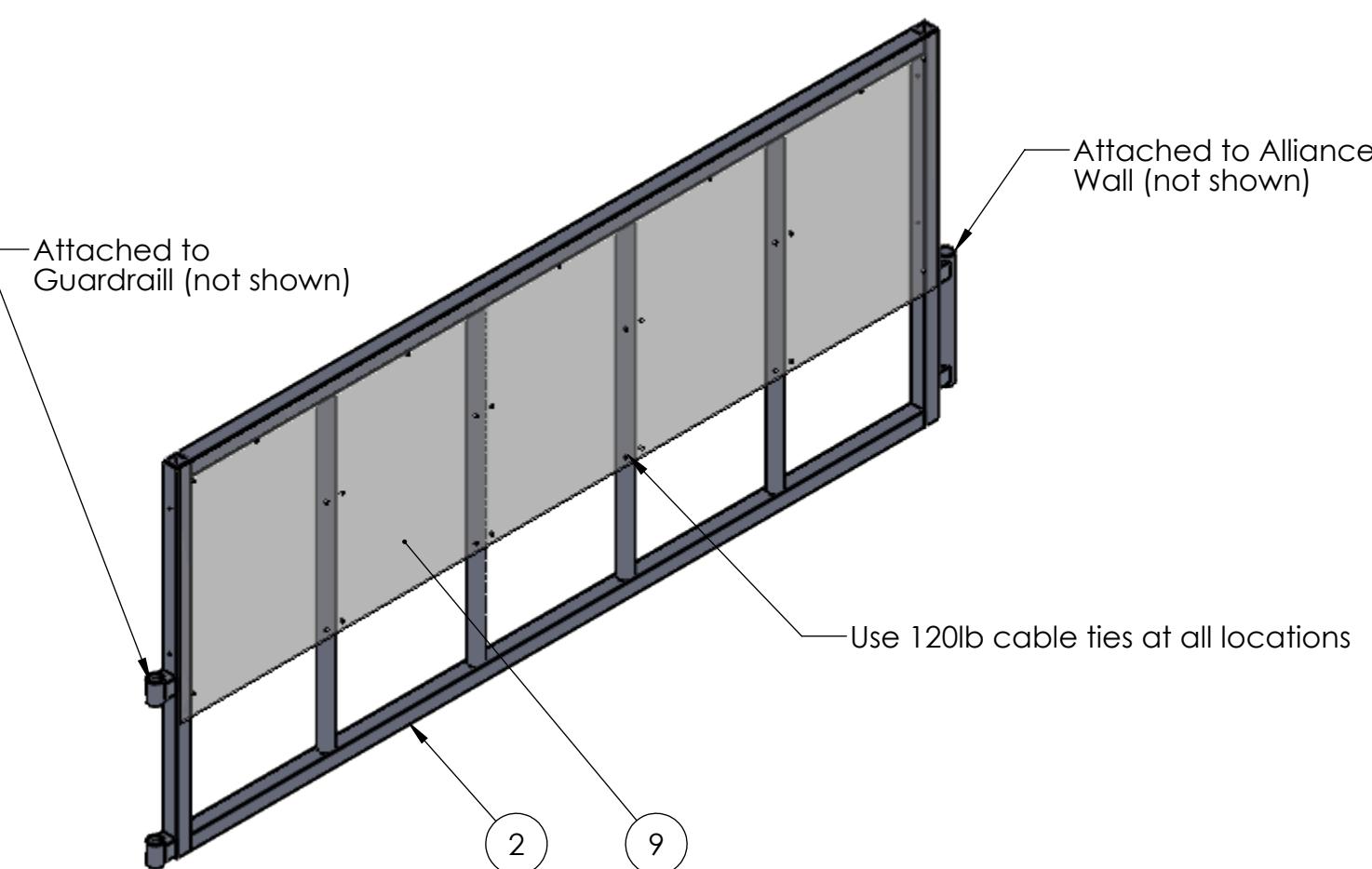
UNLESS OTHERWISE SPECIFIED:			FIELD	NAME	DATE
			DRAWN	DF	1/2/2022
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$			PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:			COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			TITLE: Terminal Assembly		
SIZE	DWG. NO.	REV	C	GE-22000	
SCALE: 1:12			SHEET 1 OF 5		

4

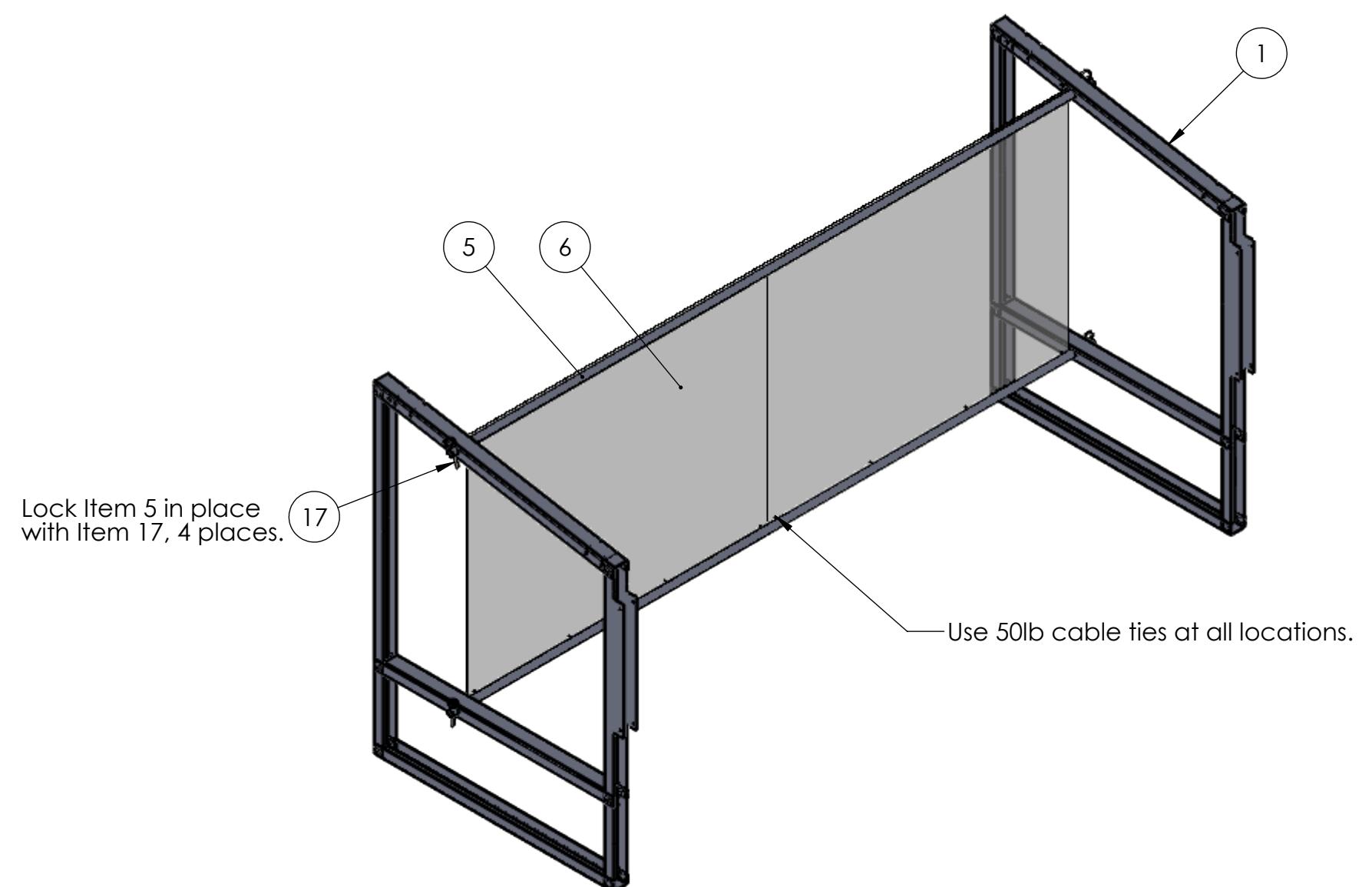
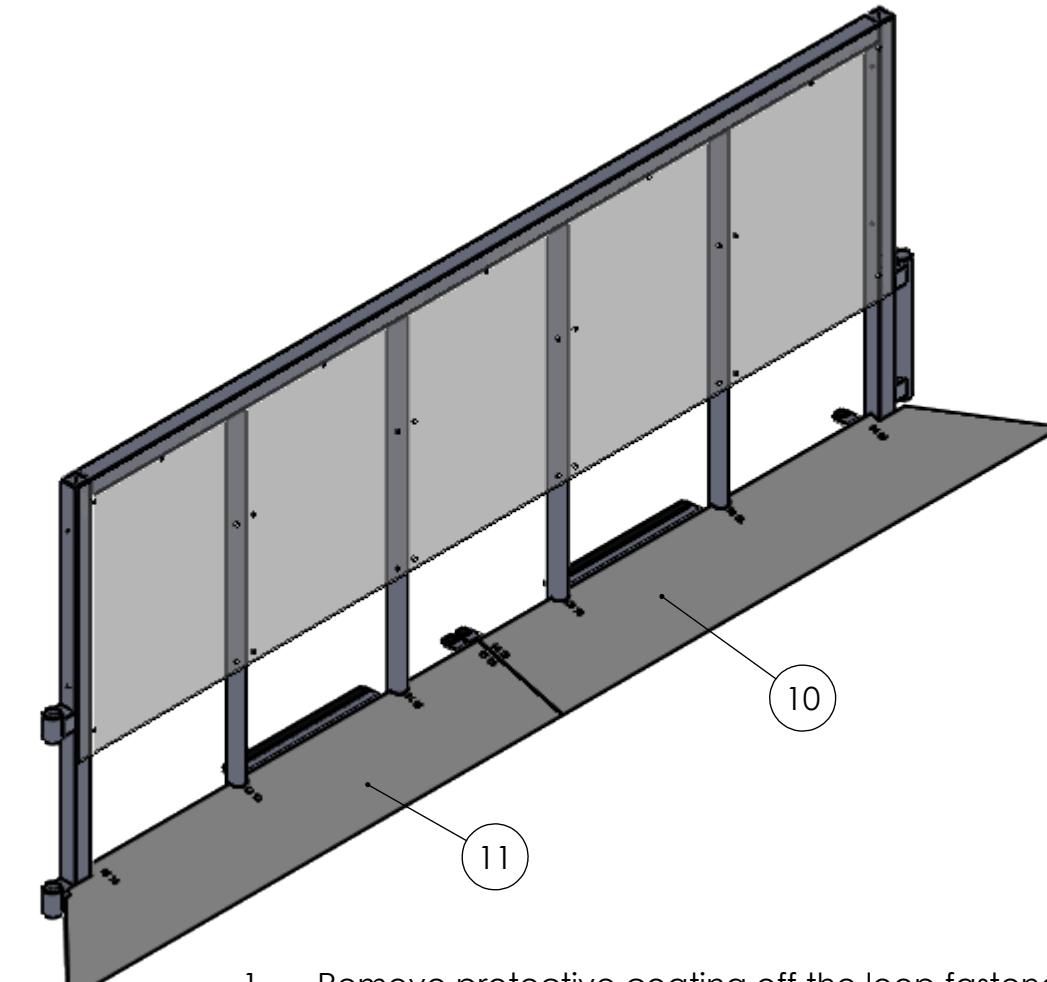
3

2

1



Press Item 12 (x2) to Items 10 and 11 as shown to ensure loop fastener adheres to Item 12.



UNLESS OTHERWISE SPECIFIED:			FIELD	NAME	DATE	
DRAWN	DF	1/2/2022				
PROPRIETARY AND CONFIDENTIAL						TITLE:
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.						
MATERIAL/FINISH:	FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$					
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING						

4

3

2

1

4 3 2 1

D

D

C

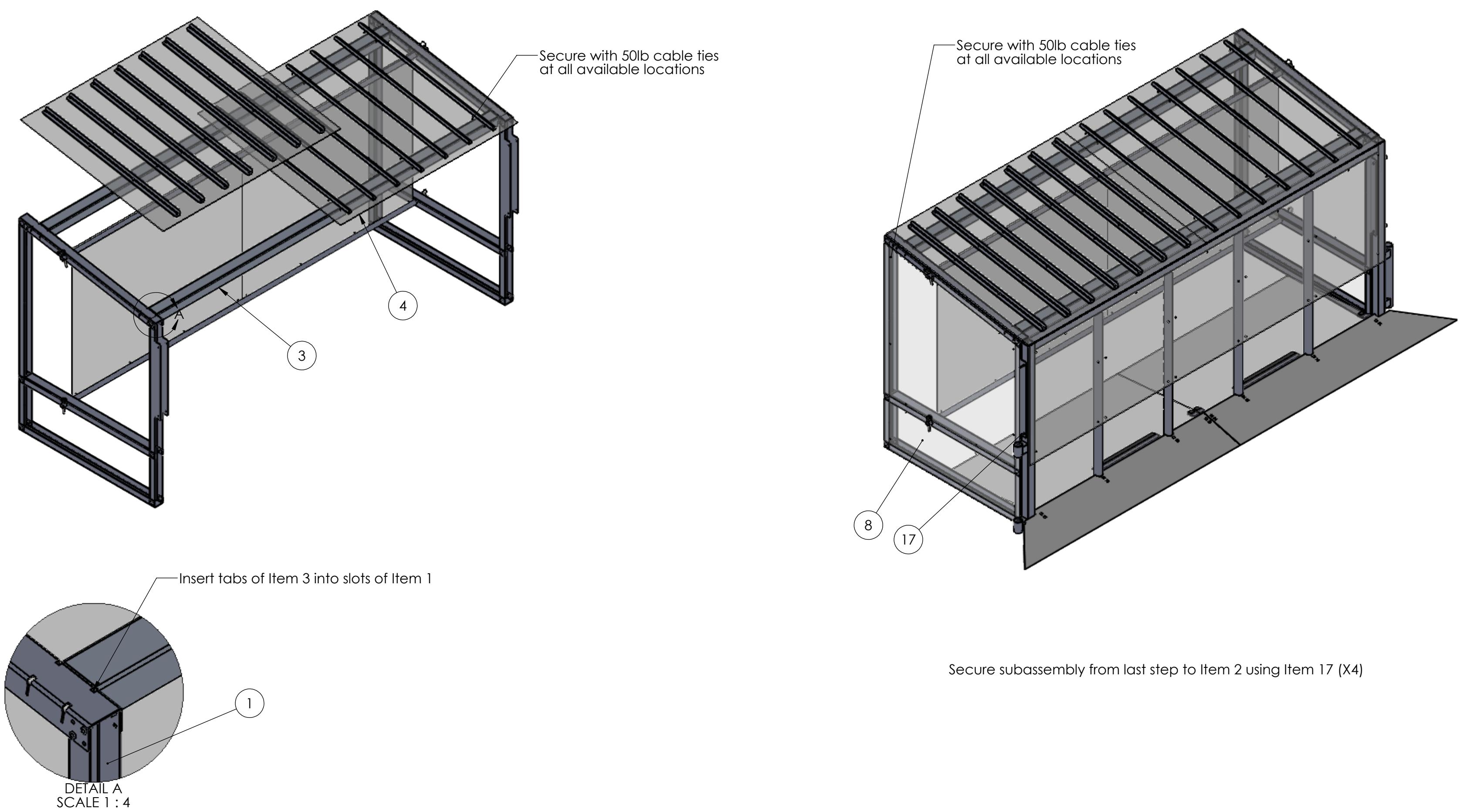
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE	
DRAWN	DF	1/2/2022		
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:	SIZE	DWG. NO.	REV	TITLE:
	C	GE-22000		Terminal Assembly
DO NOT SCALE DRAWING	SCALE: 1:16	SHEET 3 OF 5		

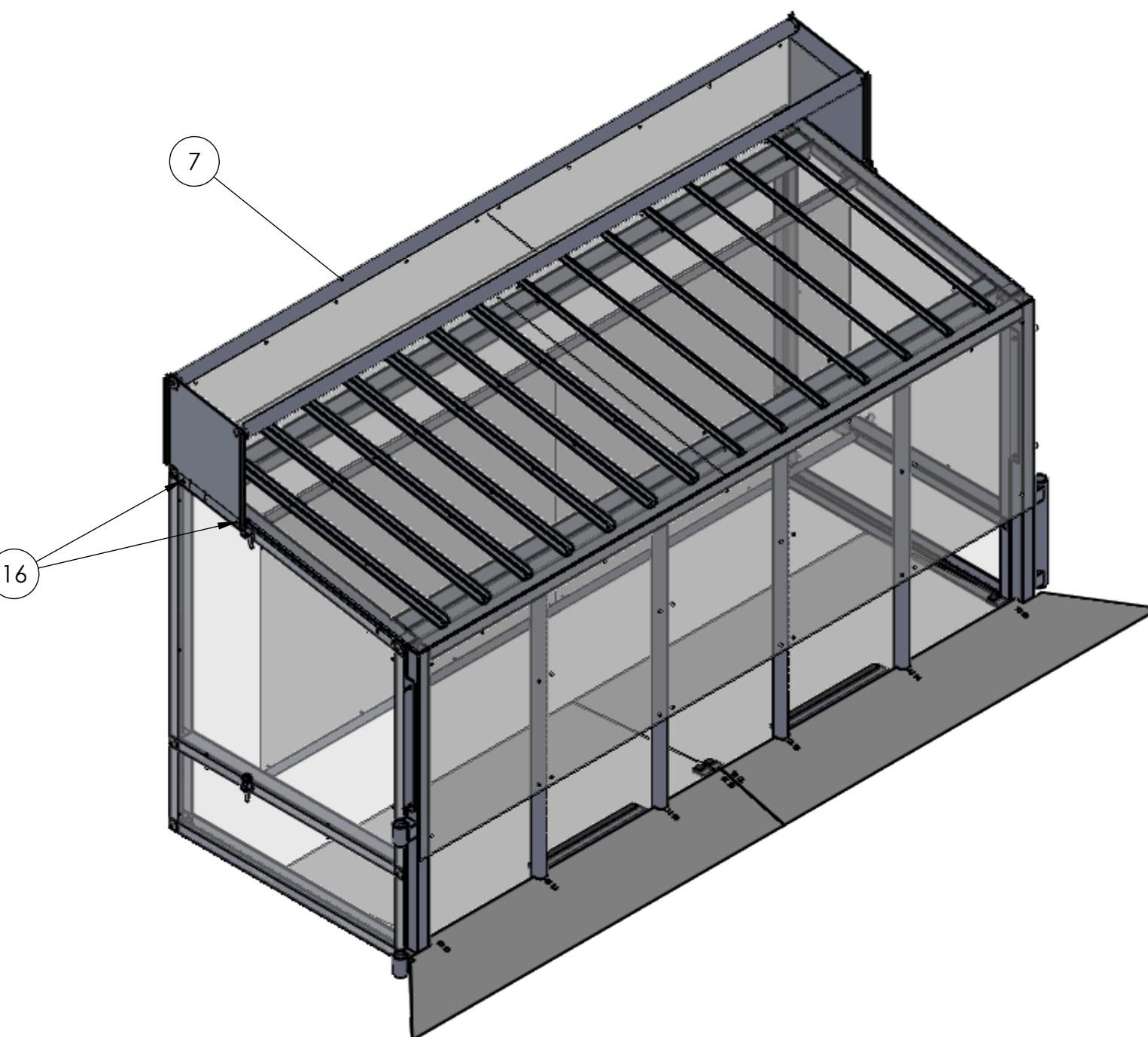
4

3

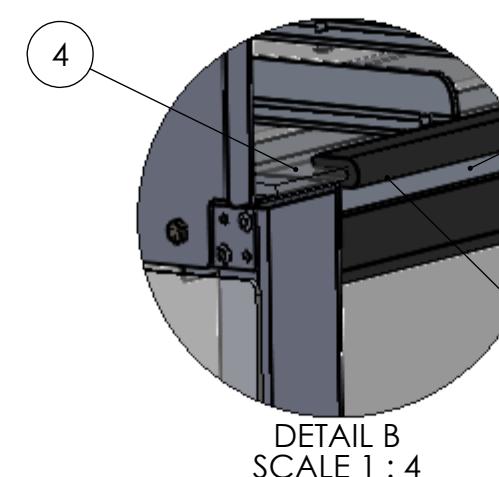
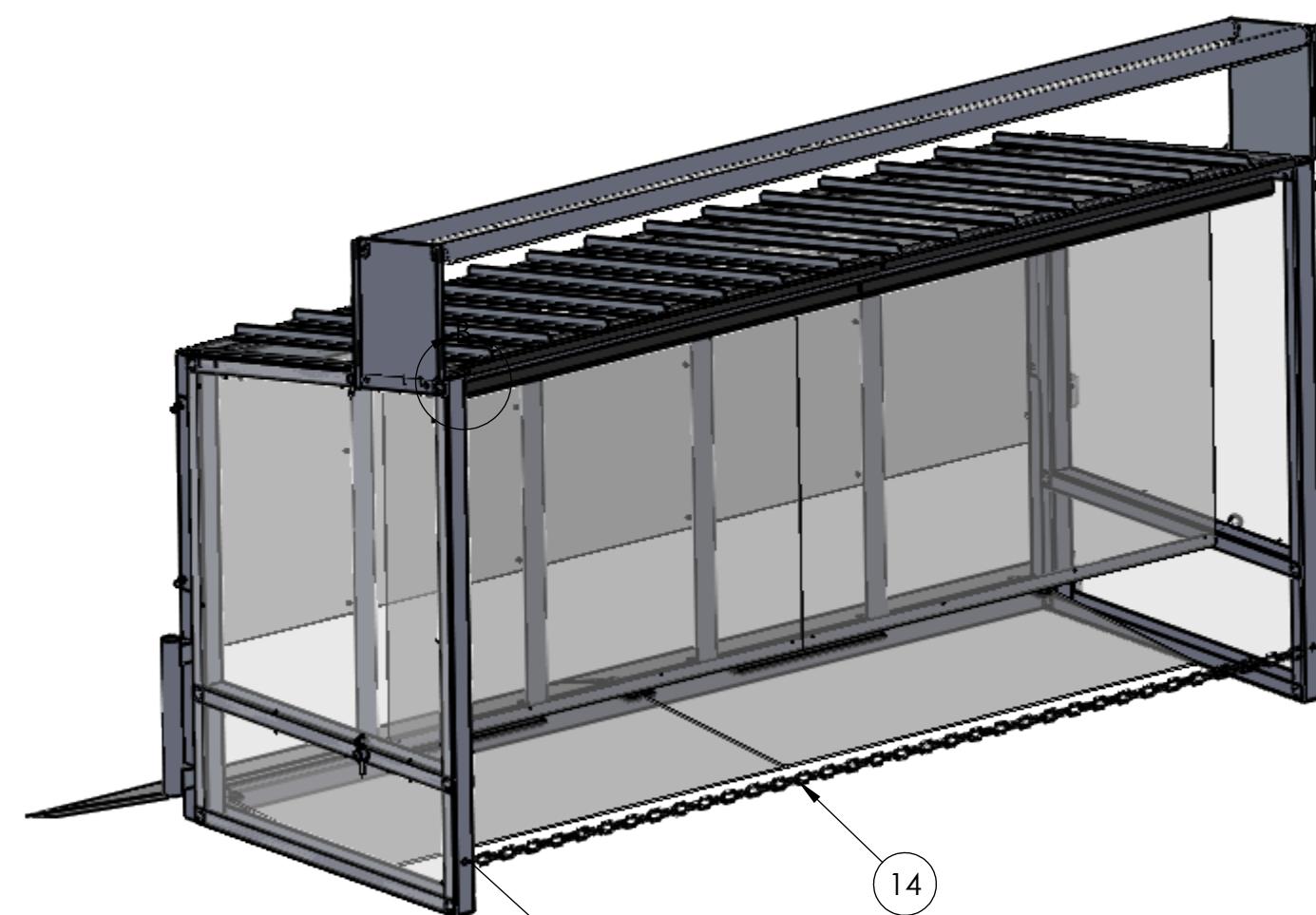
2

1

D



Attach Item 7 using Item 16



DETAIL B
SCALE 1 : 4

Secure using 50lb cable ties

13 Attach Item 13 to the edges of Item 3 and 4 that are closest to the human player.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE	
DRAWN	DF	1/2/2022		
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:	SIZE	DWG. NO.	REV	
	C	GE-22000		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:16	SHEET 4 OF 5		

4

3

2

1

D

C

B

A

D

D

C

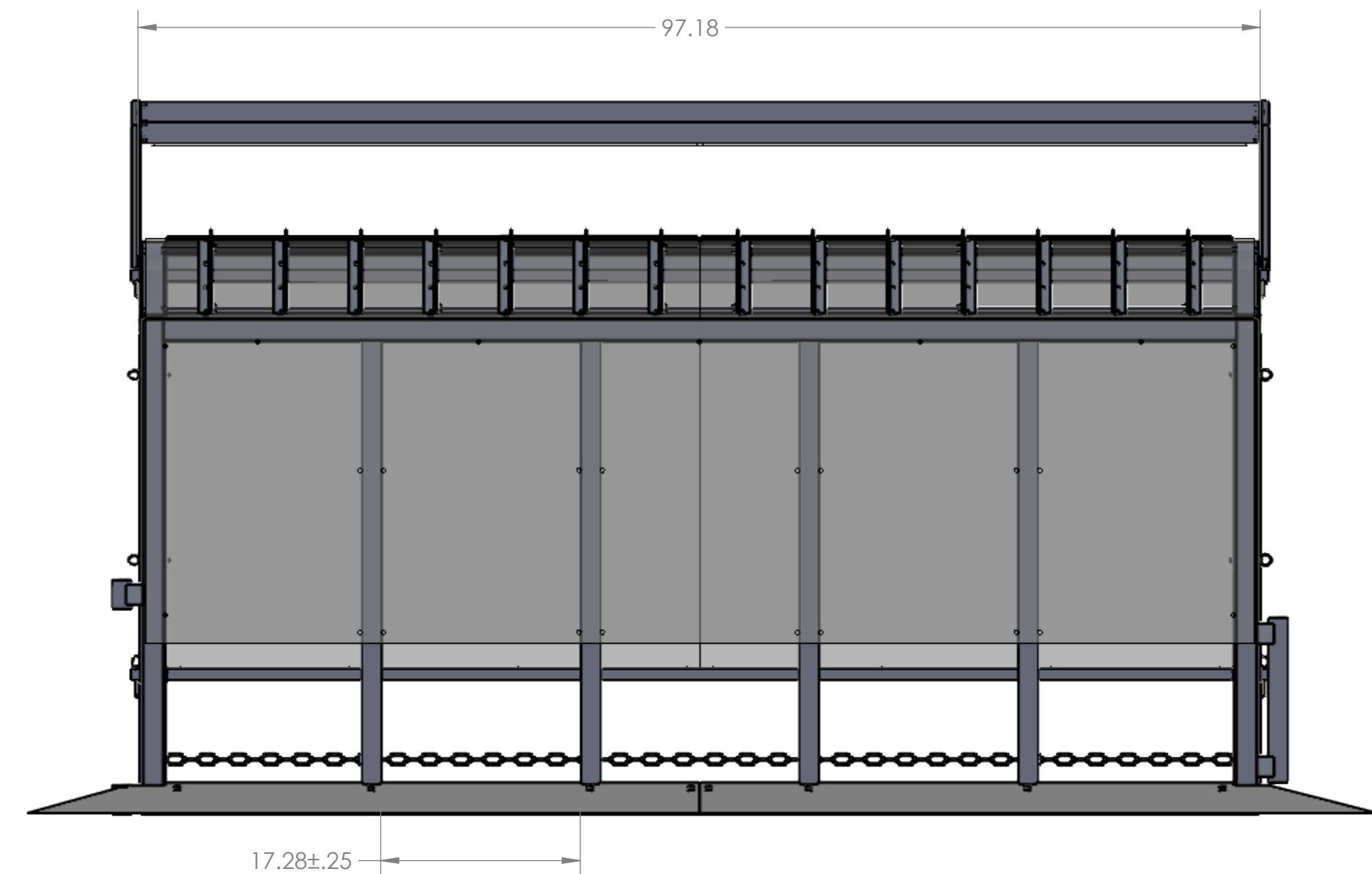
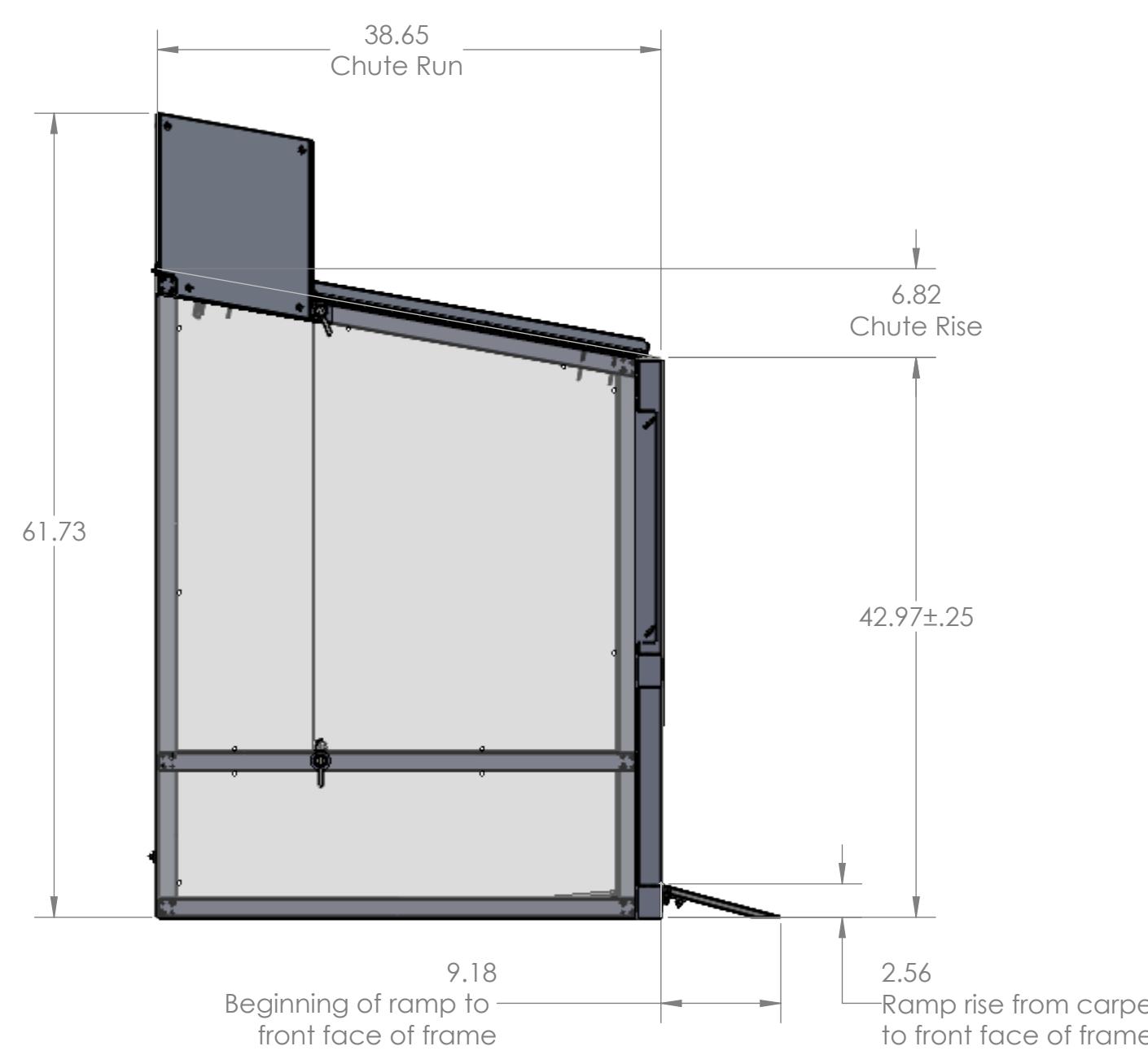
C

B

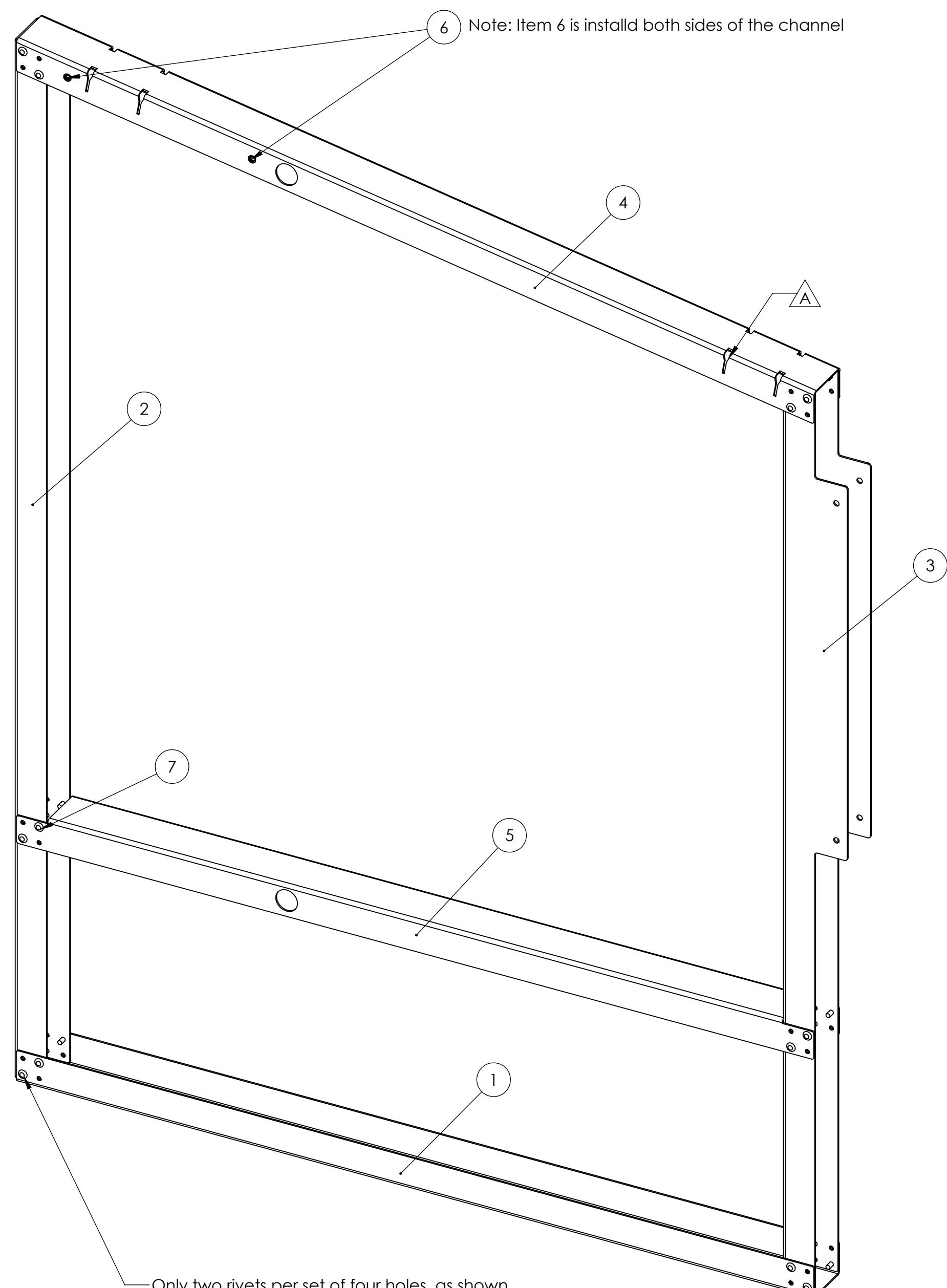
B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE		
DRAWN	DF	1/2/2022			
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:	SIZE	DWG. NO.	REV		
DO NOT SCALE DRAWING	C	GE-22000			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
SCALE: 1:24		SHEET 5 OF 5			



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
C3	A	Redesigned slot shape.	8/27/2021	DAF

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22001-01	14 GA Steel, Preplated	1
2	GE-22001-02	14 GA. Steel, Preplated	1
3	GE-22001-03	14 GA. Steel, Preplated	1
4	GE-22001-04	14 GA. Steel, Preplated	1
5	GE-22001-05	14 GA Steel, Preplated	1
6	pem_clinchnut_.25_20_.054	1/4-20 self-clinching nut, .054 shank	4
7	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	24

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
	DRAWN	DF	3/30/2021
DIMENSIONS ARE IN INCHES			
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			
TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$			
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 FIRST
ROBOTICS
COMPETITION  SOLIDWORKS
Modeling Solutions Partner

TITLE: Side Frame,
Terminal

SIZE DWG. NO. REV
C GE-22001 **A**

SCALE: 1:8 SHEET 1 OF 3

4

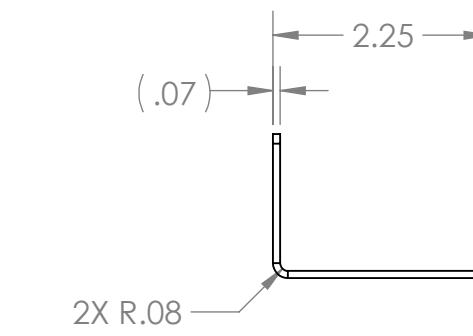
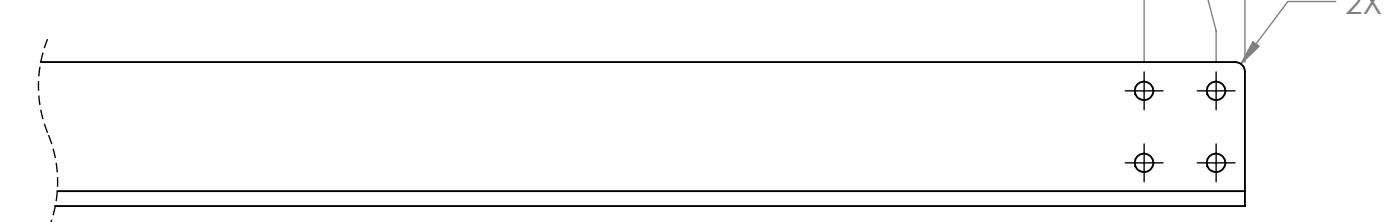
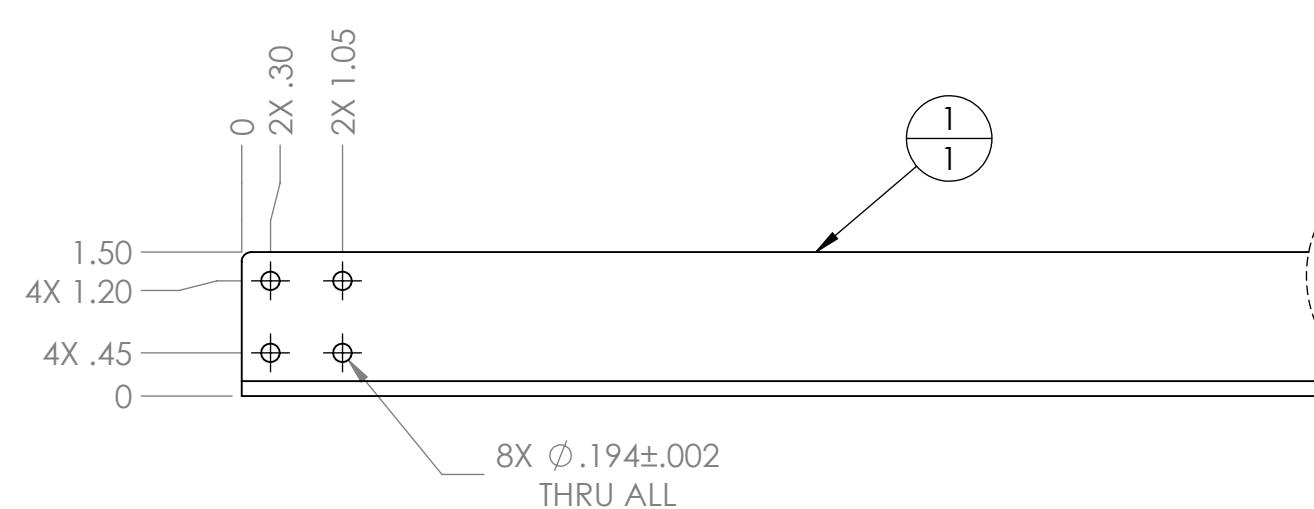
3

2

1

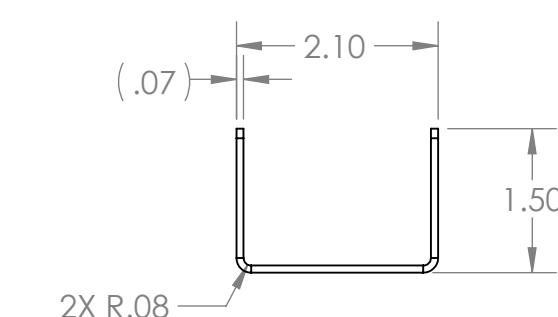
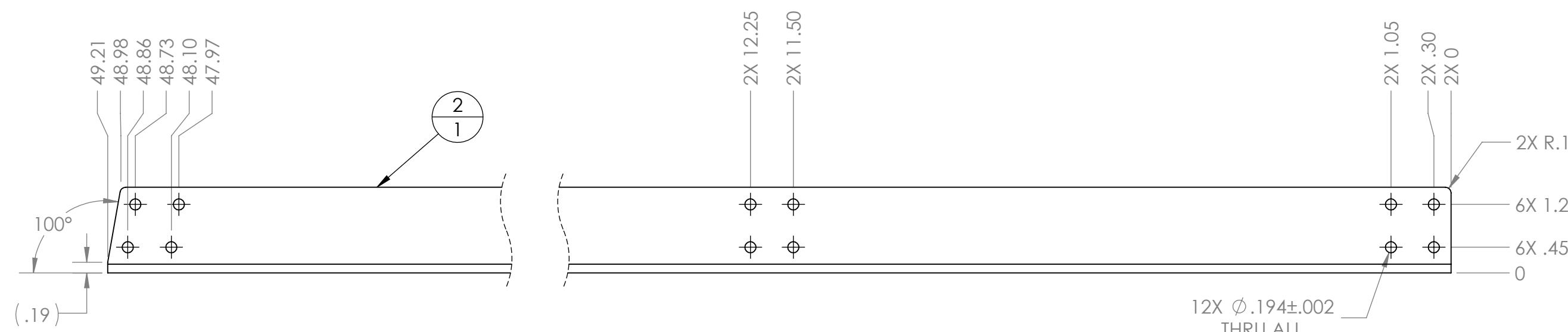
D

D



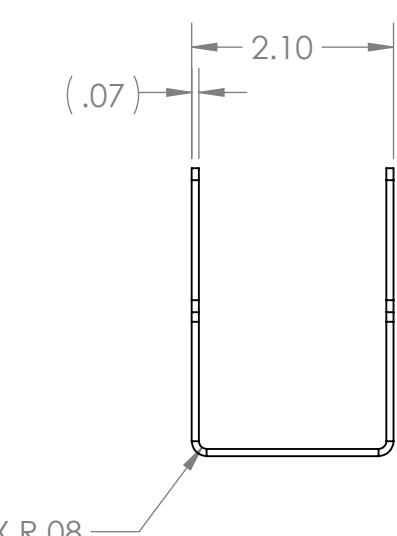
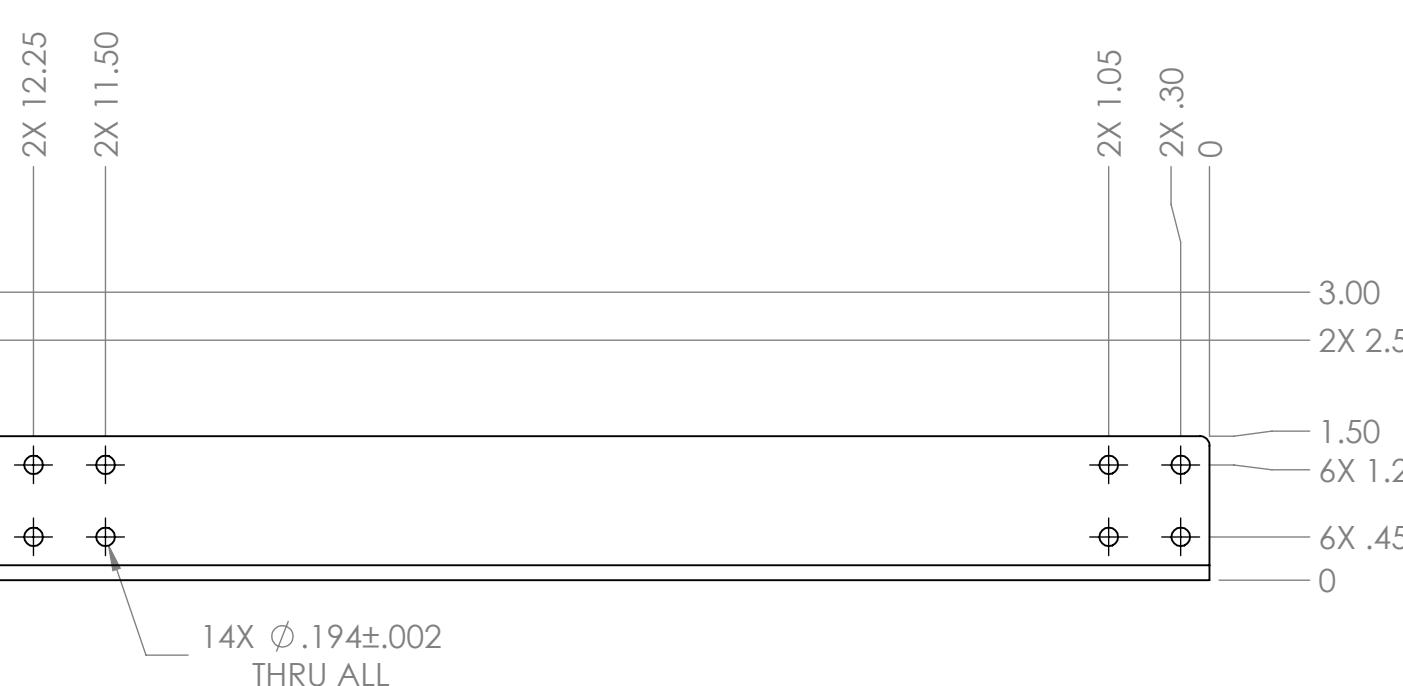
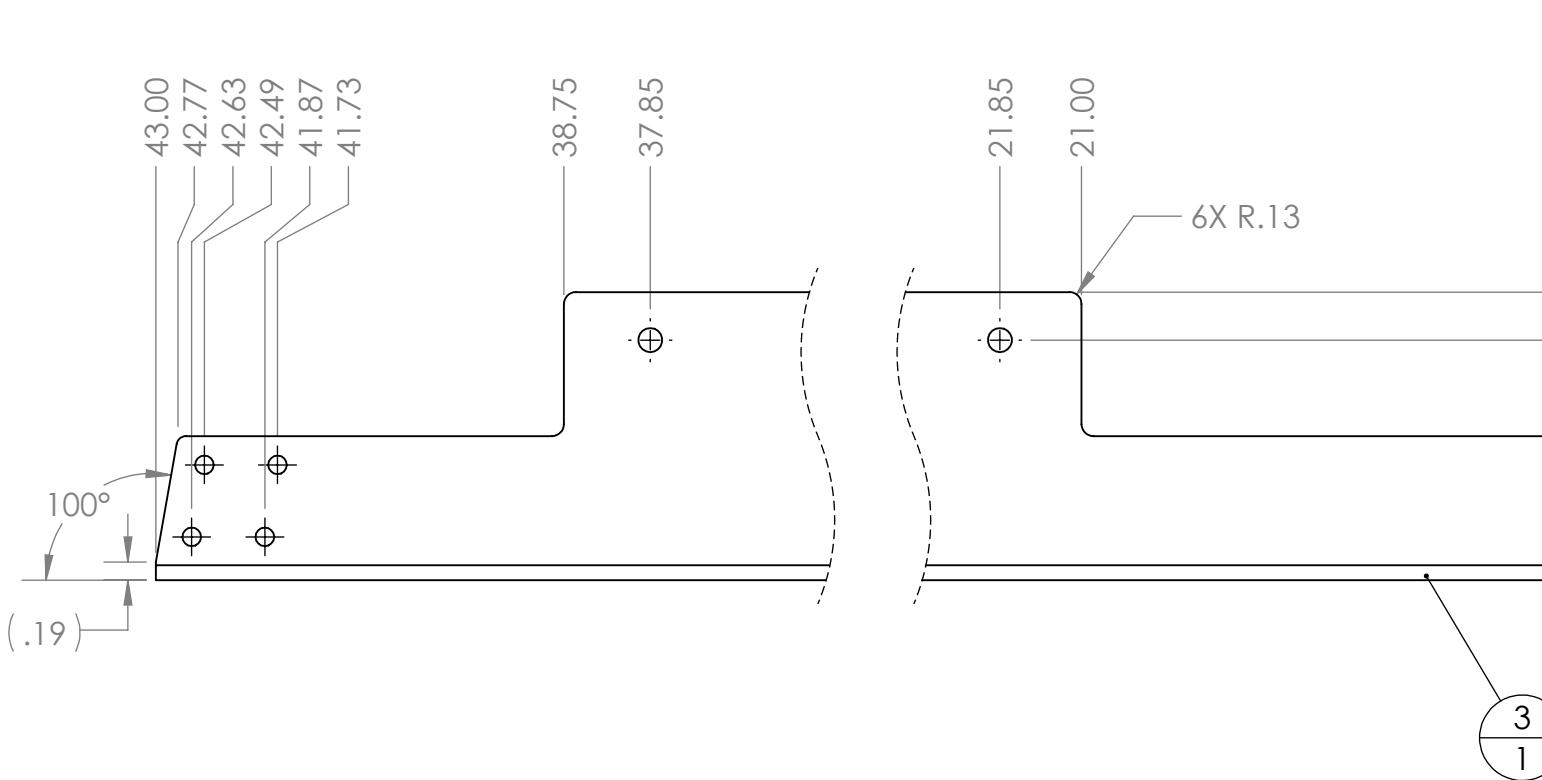
C

C



B

B



A

A

UNLESS OTHERWISE SPECIFIED: BEND NAME DATE
DRAWN DF 3/30/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

DO NOT SCALE DRAWING

TITLE: Side Frame,
Terminal

SIZE DWG. NO. REV
C GE-22001 **A**

SCALE: 1:8 SHEET 2 OF 3

4

3

2

1

4

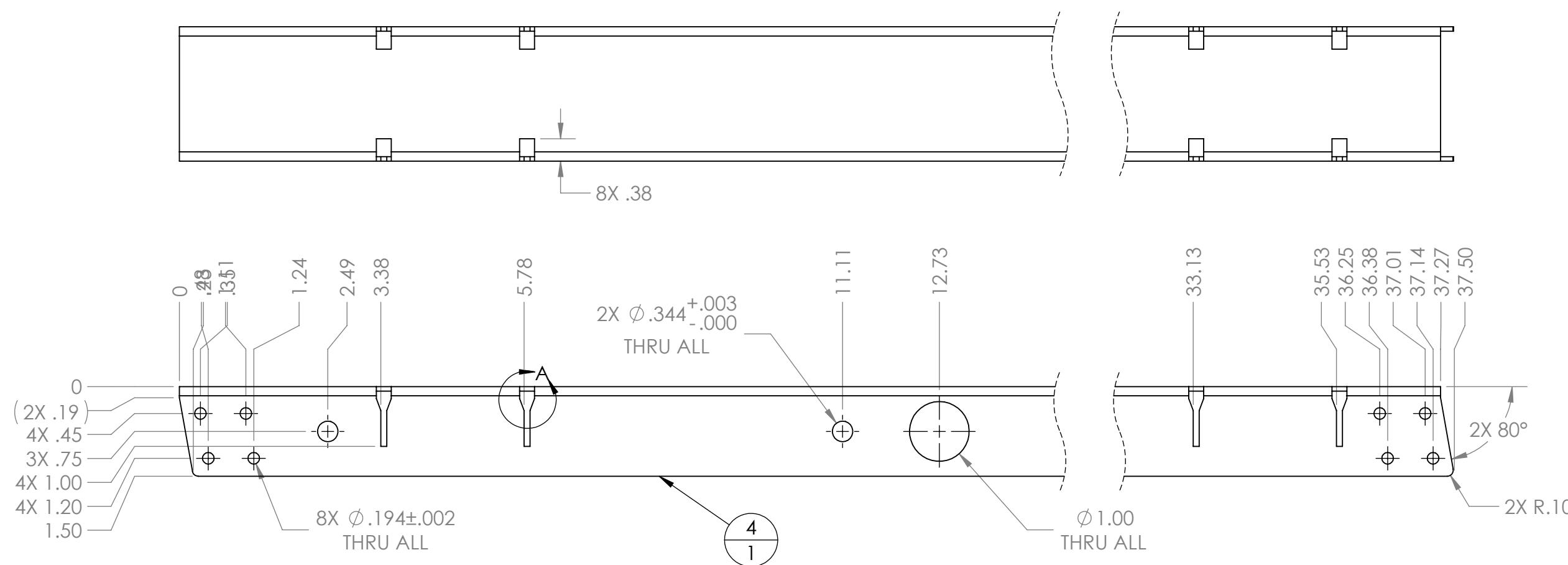
3

2

1

D

D



D

D

C

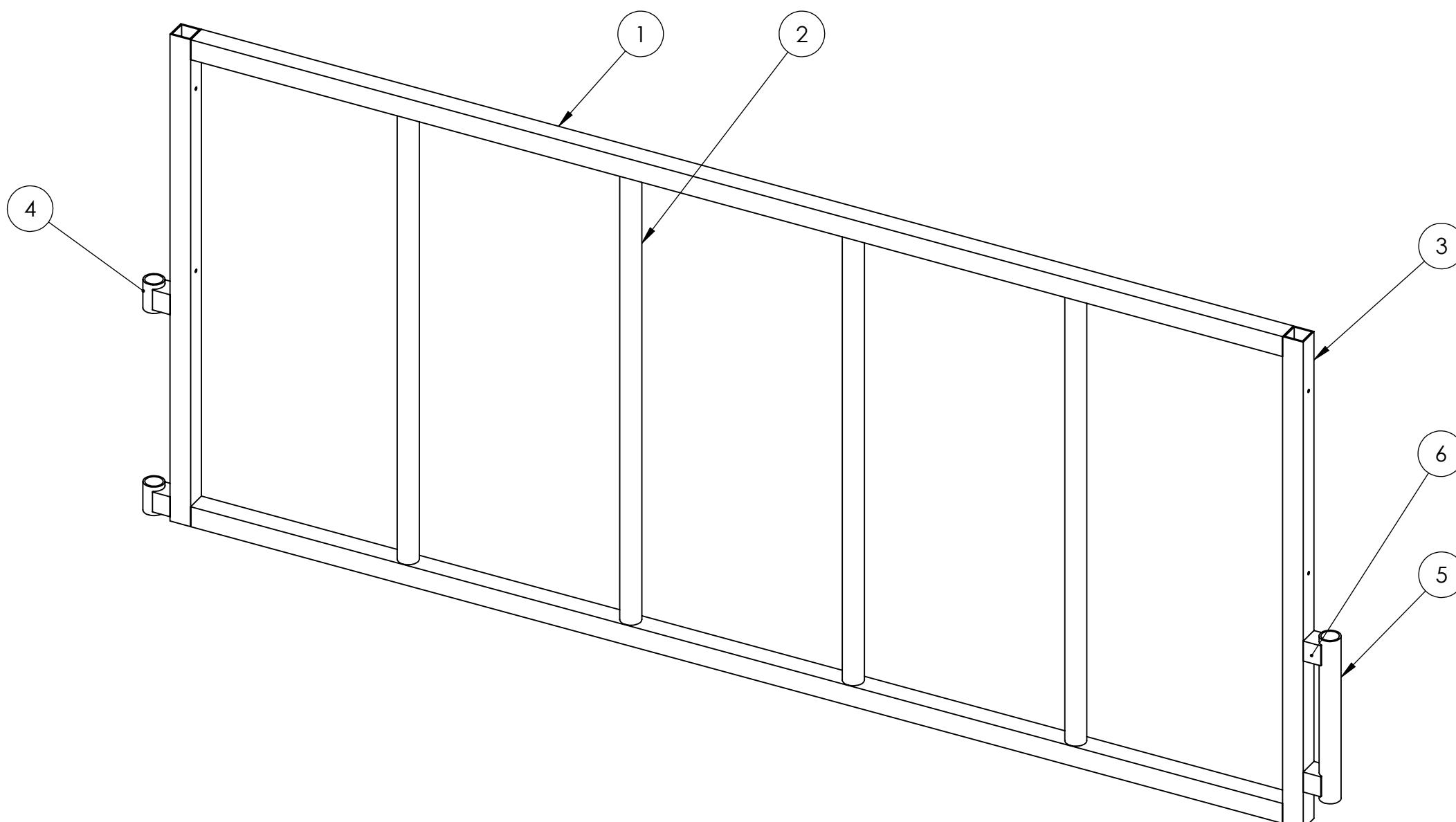
C

B

B

A

A



Notes:

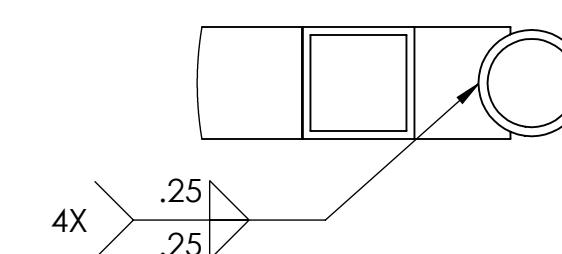
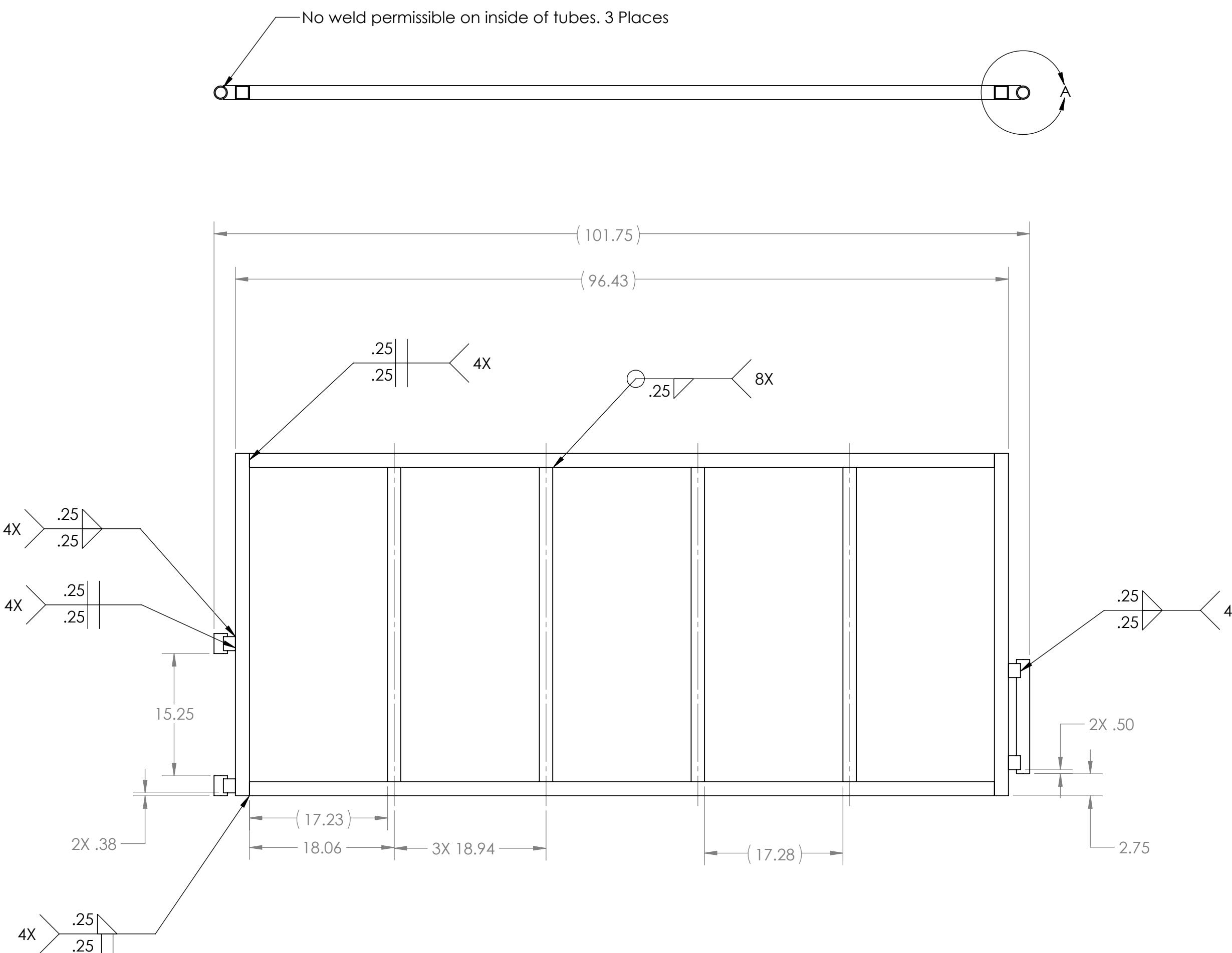
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION			QTY.
1	GE-22002-01	1.75" x .125" thk. Square Tube, 6061 Aluminum			2
2	GE-22002-02	1-1/4" Schedule 40 Pipe, 6061 Aluminum			4
3	GE-22002-03	1.75" x .125" thk. Square Tube, 6061 Aluminum			2
4	GE-22002-04	1-1/4" Schedule 40 Pipe, 6061 Aluminum			2
5	GE-22002-05	1-1/4" Schedule 40 Pipe, 6061 Aluminum			1
6	GE-22002-06	1.75" x .125" thk. Square Tube, 6061 Aluminum			4

UNLESS OTHERWISE SPECIFIED:			WELD	NAME	DATE
			DRAWN	DF	5/21/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .015$					
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:					
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					
SIZE	DWG. NO.	REV	TITLE: Front Frame, Terminal		
C	GE-22002		DWG. NO. REV		
SCALE: 1:10			SHEET 1 OF 4		

D

D



UNLESS OTHERWISE SPECIFIED:		WELD	NAME	DATE
		DRAWN	DF	5/21/2021
DIMENSIONS ARE IN INCHES				
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .015$				
MATERIAL/FINISH:		THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
COMMENTS:		REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING				

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Front Frame,
Terminal

SIZE DWG. NO. REV

C GE-22002

SCALE: 1:12 SHEET 2 OF 4

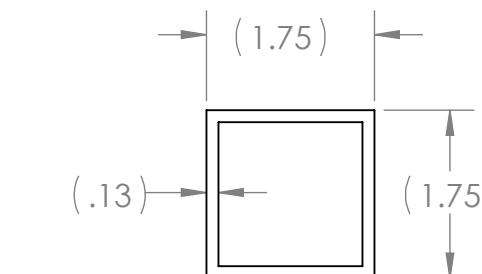
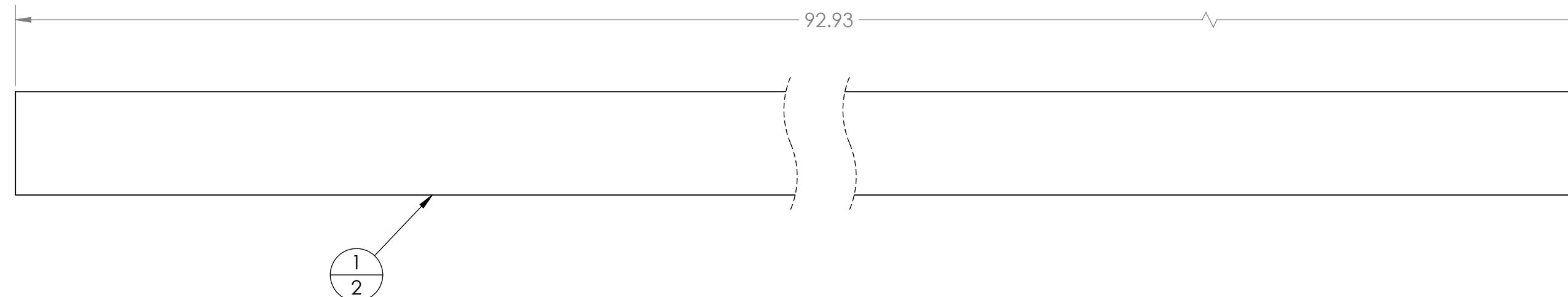
4

3

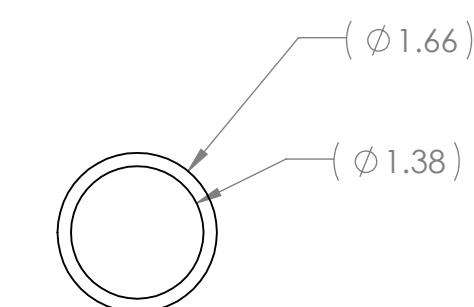
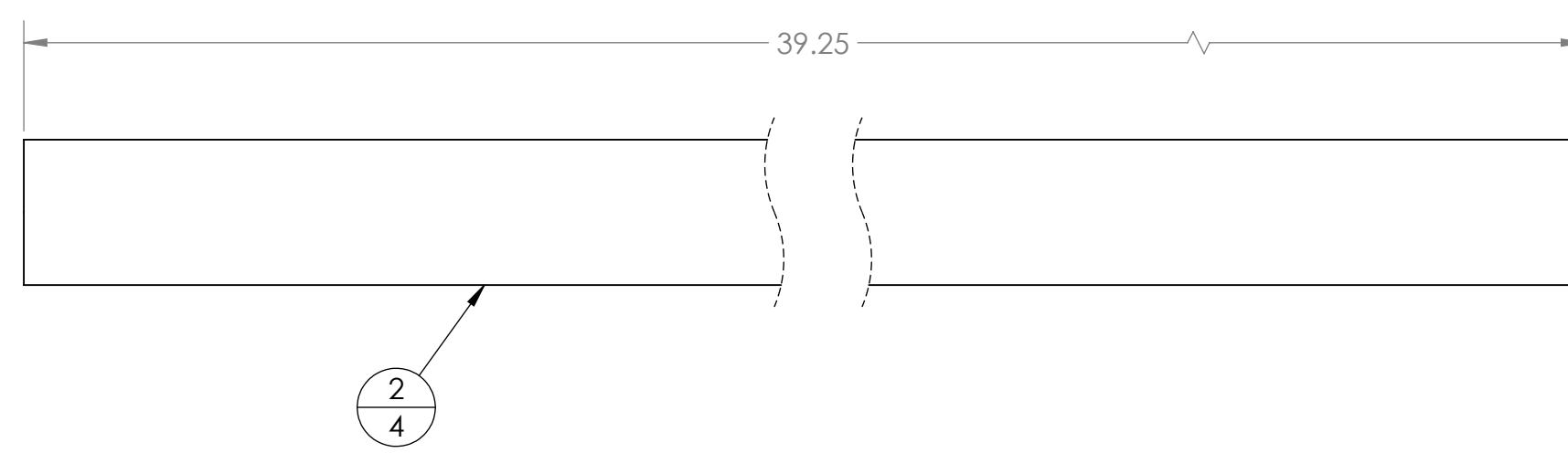
2

1

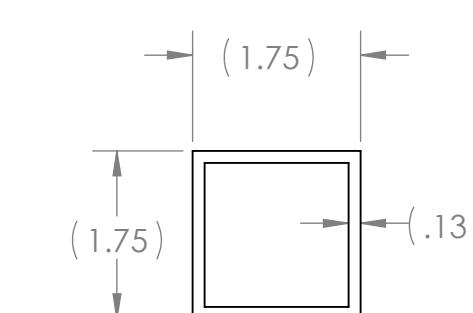
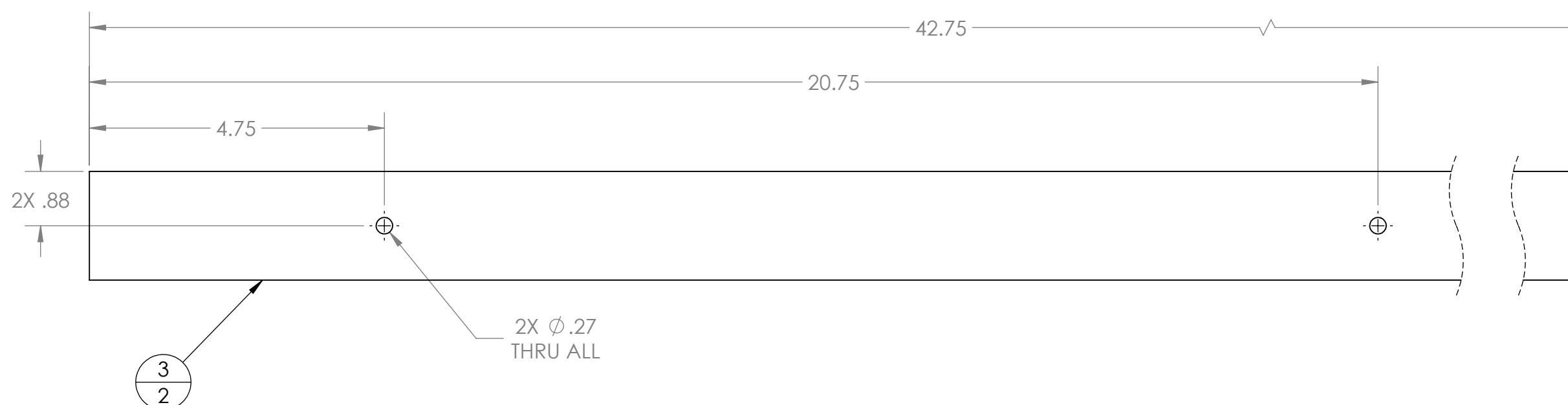
D



C



B



A

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	DF	5/21/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Front Frame,
Terminal

SIZE DWG. NO. REV

C GE-22002

SCALE: 1:12 SHEET 3 OF 4

4

3

2

1

D

D

C

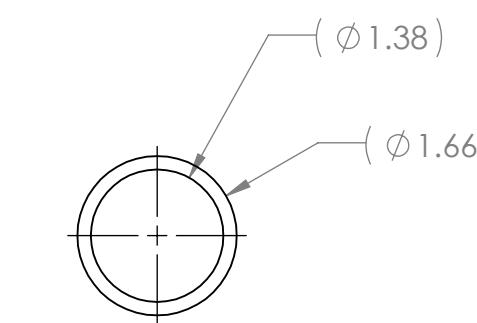
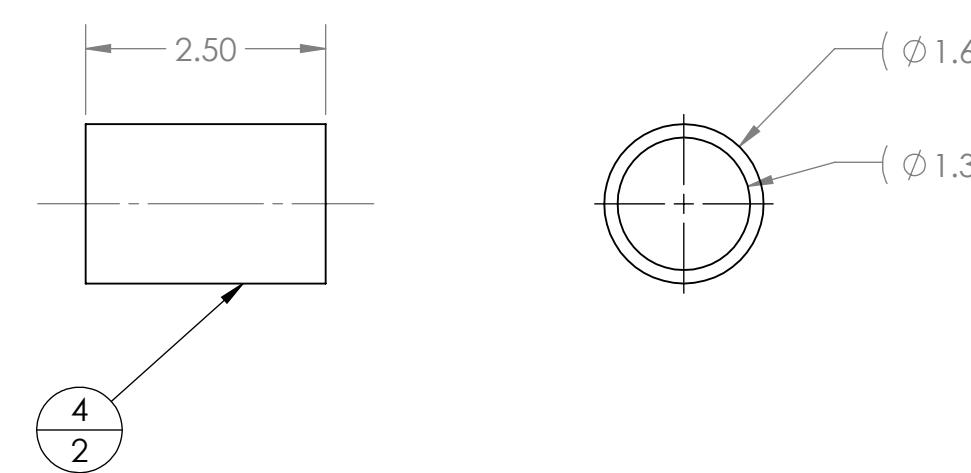
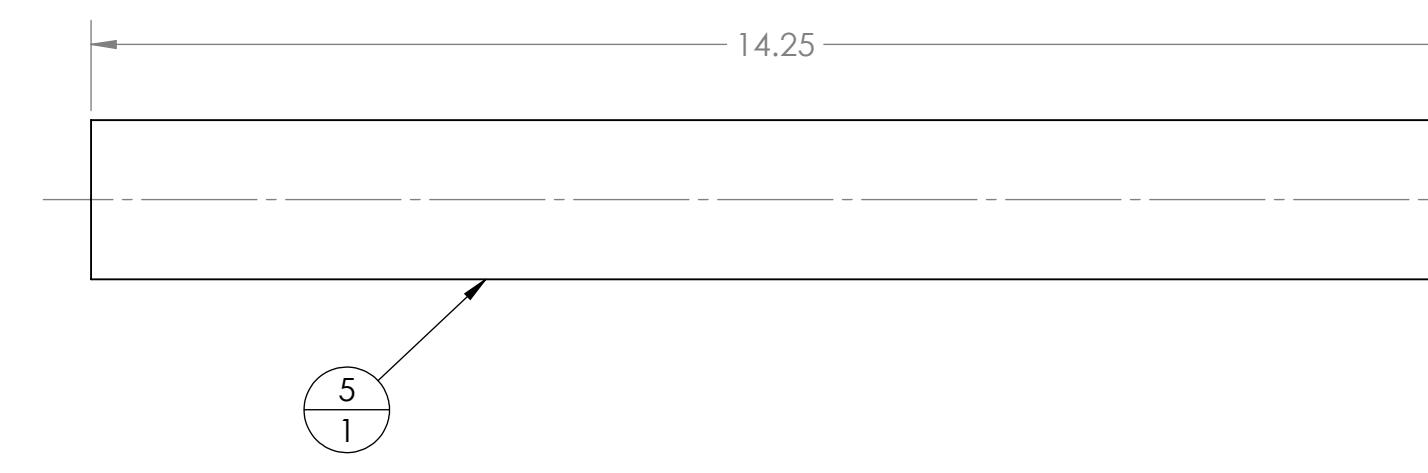
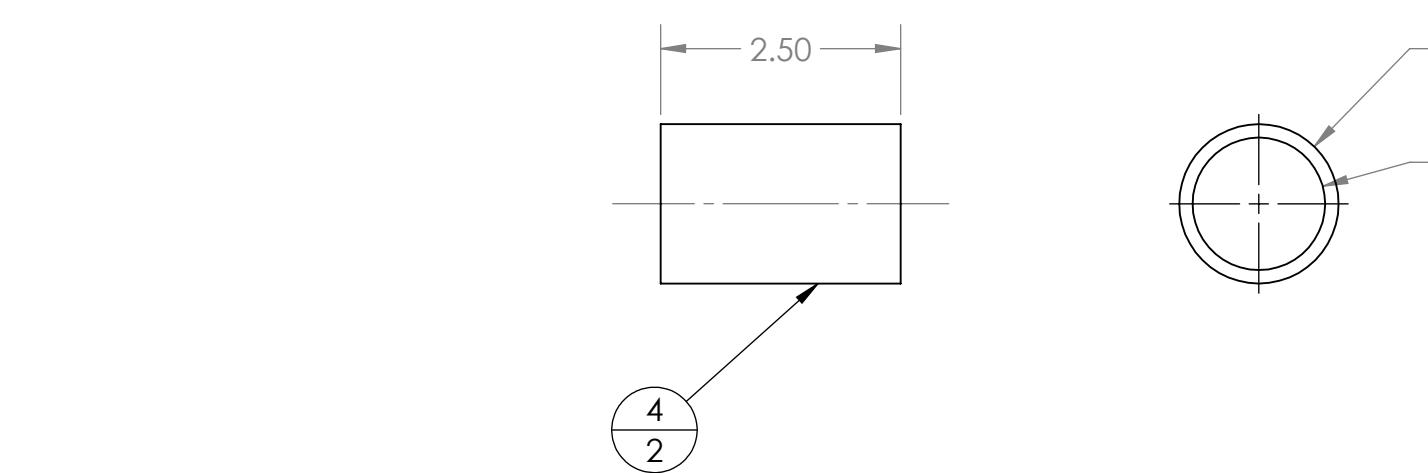
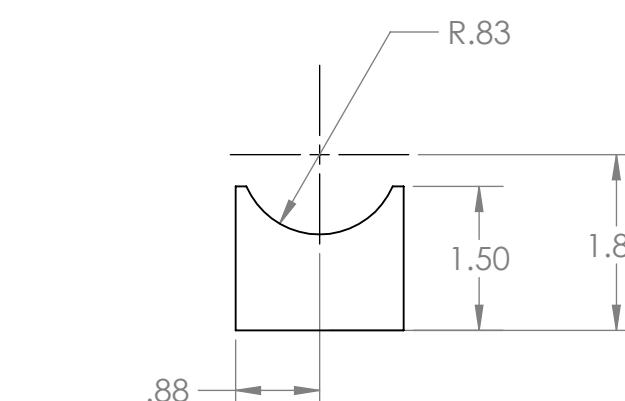
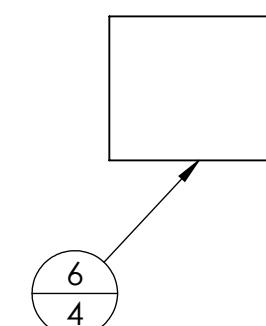
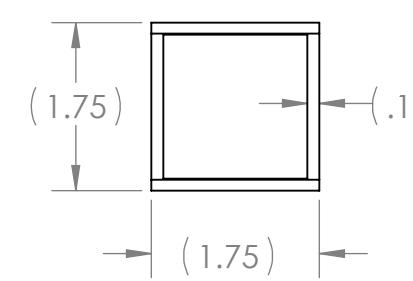
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	DF	5/21/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

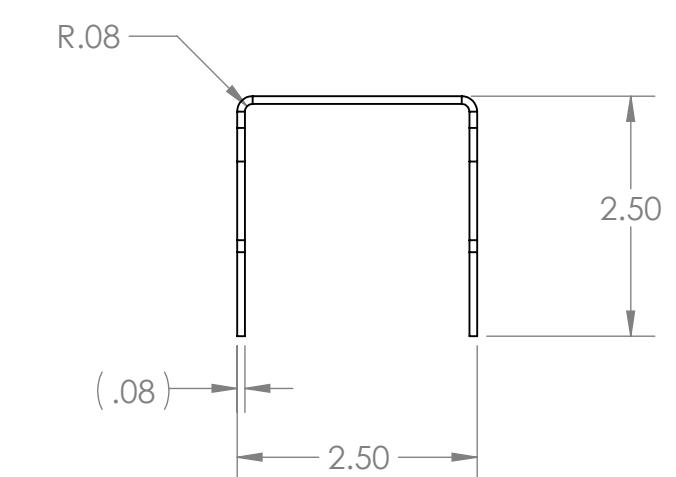
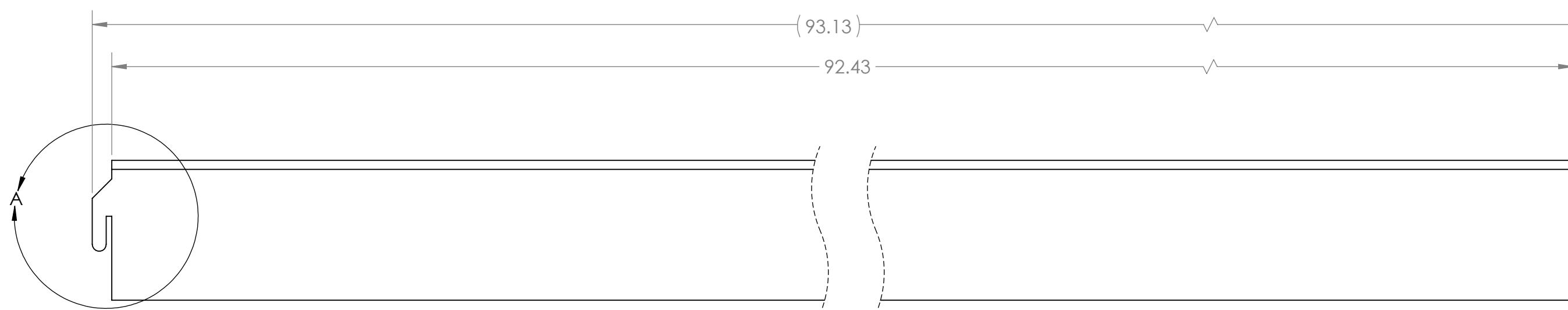
SOLIDWORKS
Modeling Solutions Partner

TITLE:
Front Frame,
Terminal

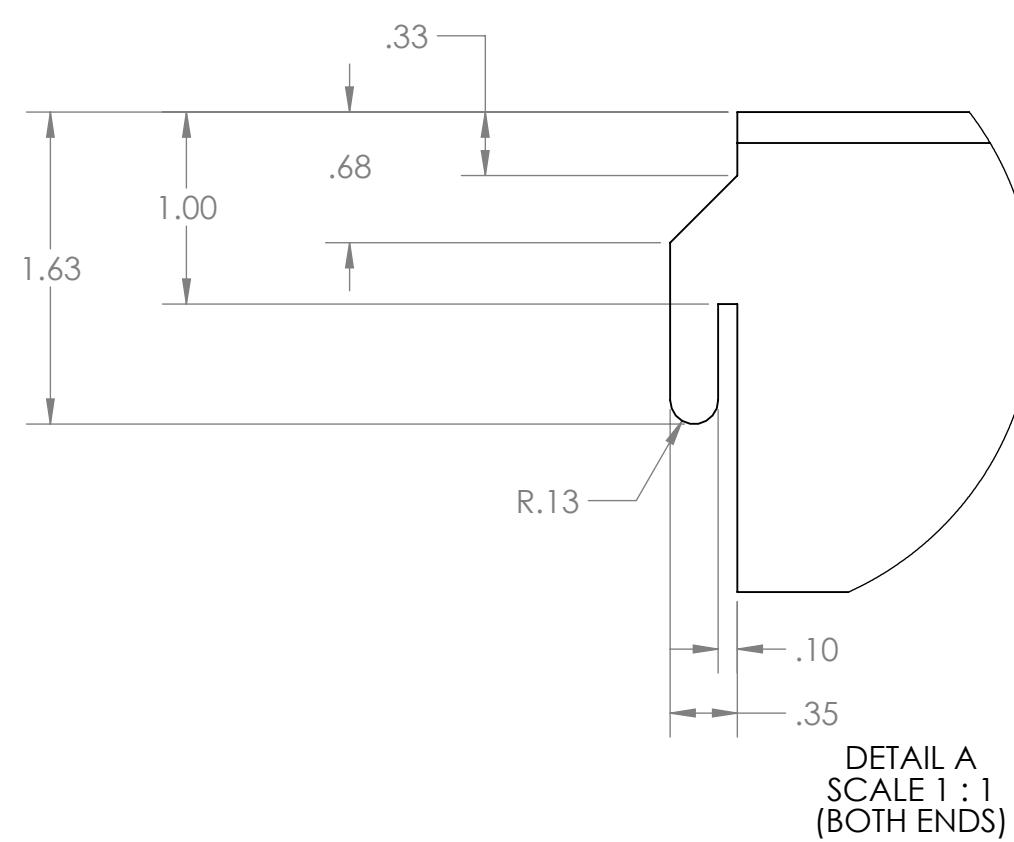
SIZE DWG. NO. REV
C GE-22002

SCALE: 1:12 SHEET 4 OF 4

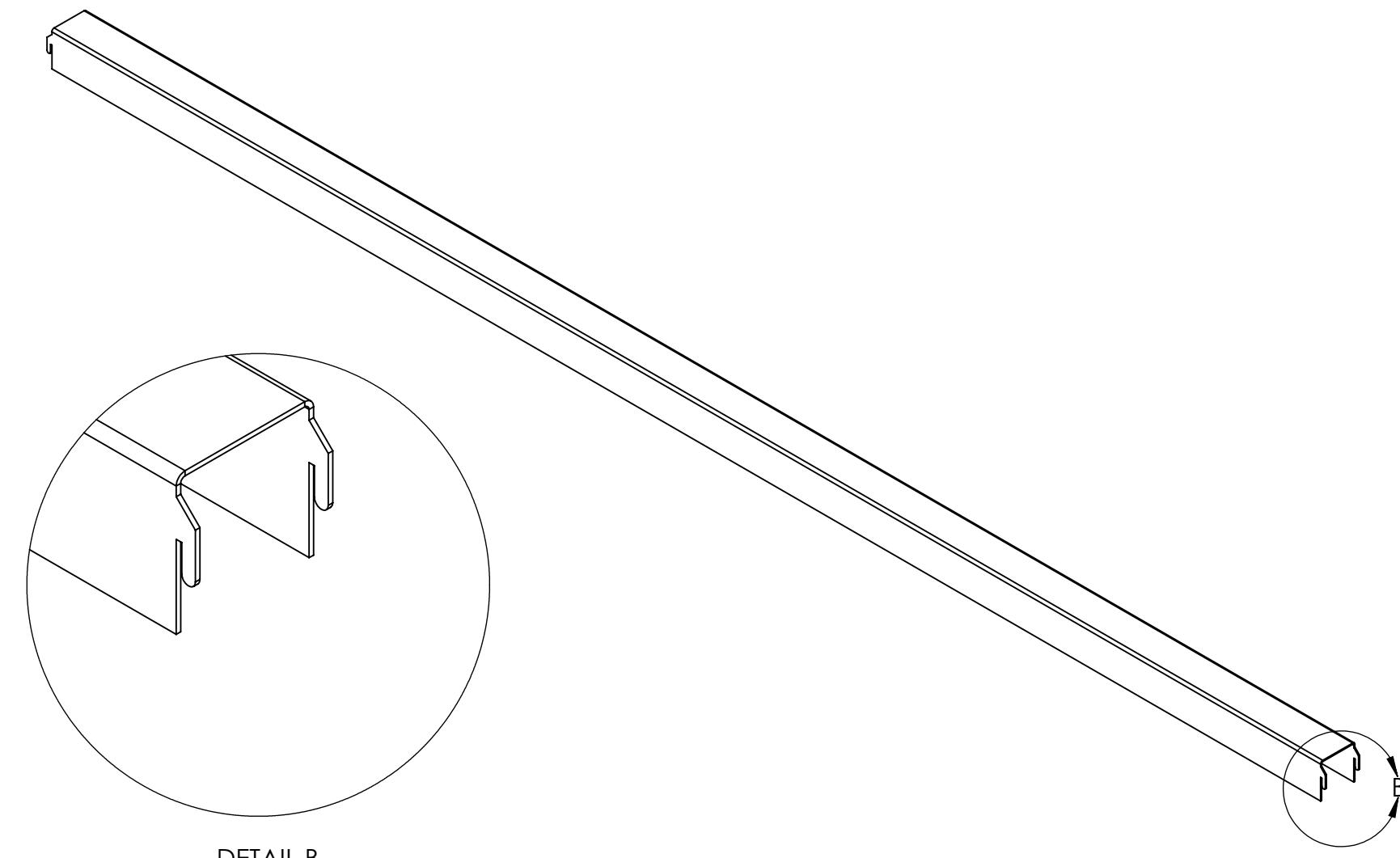
D



C



B

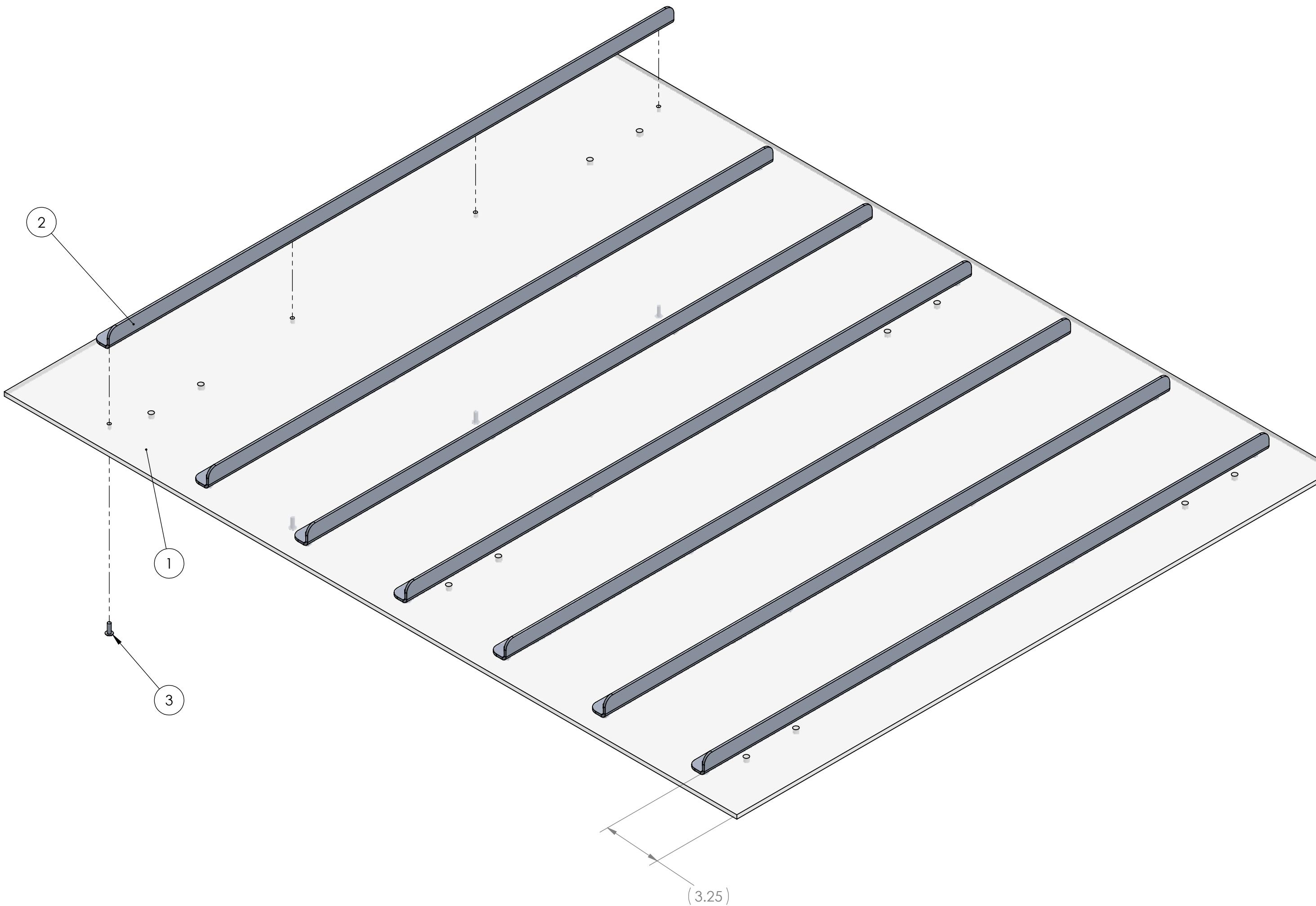


A

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	DF	4/2/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 12 ga. 5052 Aluminum			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner	
TITLE: Horizontal Support, Terminal		
SIZE	DWG. NO.	REV
C	GE-22003	
SCALE: 1:2		SHEET 1 OF 1

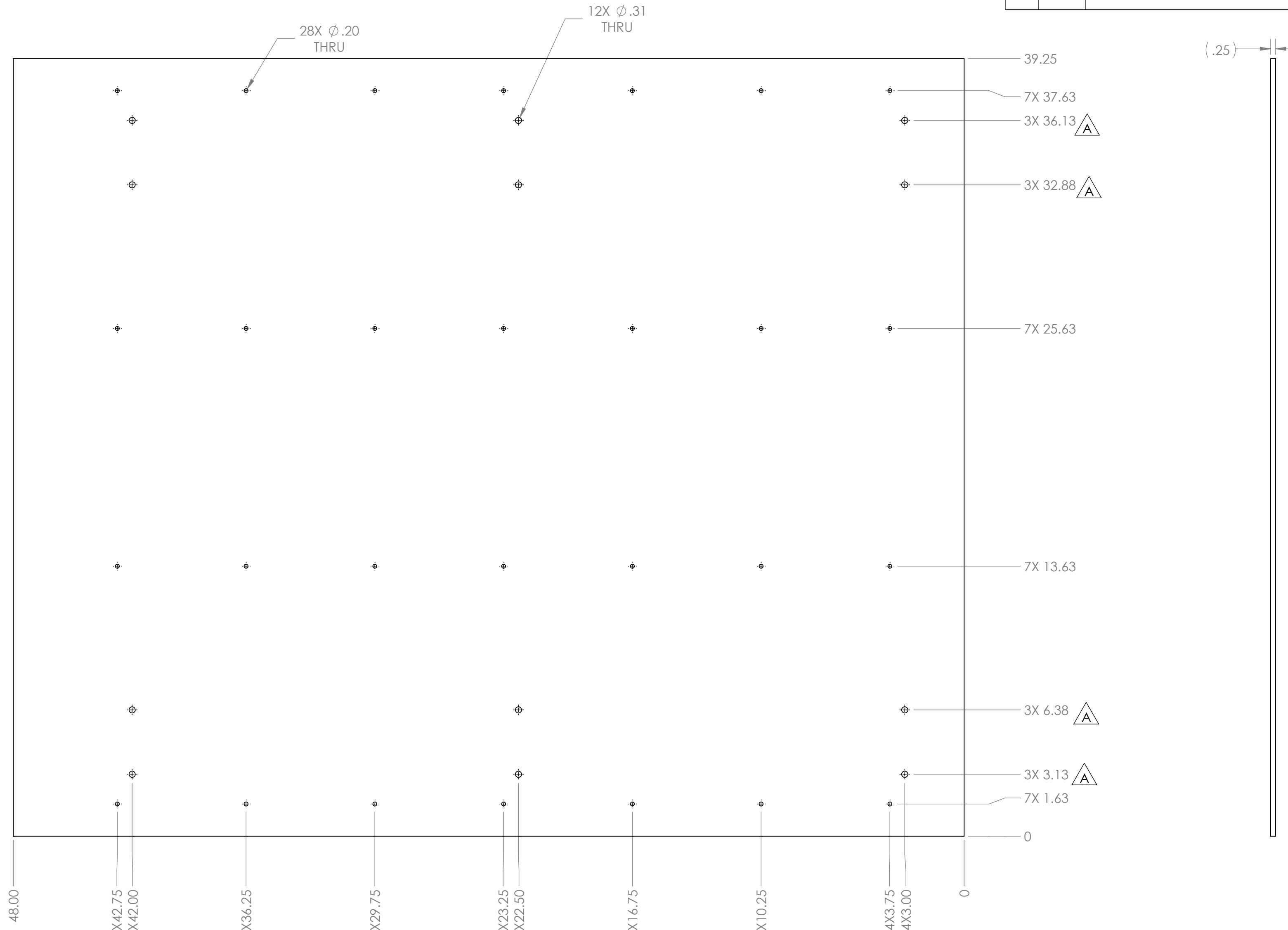


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22005	Bed, Chute Assembly	1
2	GE-22006	Angle, Chute Assembly	7
3	rivet_.1875_.251-.375	3/16" Aluminum Rivet, .251-.375 Grip Range	28

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
	DRAWN	DF	8/13/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.	TITLE: Chute Assembly, Terminal	FIRST ROBOTICS COMPETITION <small>SOLIDWORKS Modeling Solutions Partner</small>
MATERIAL/FINISH: Tag or Label with Part Number		SIZE DWG. NO. REV	C GE-22004
DO NOT SCALE DRAWING		SCALE: 1:4	SHEET 1 OF 1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B2, D2	A	36.13 was 35.63, 32.88 was 32.38, 6.38 was 6.88, 3.13 was 3.63	8/27/2021	DAF



Notes:
1. Label or tag with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	5/21/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/4" Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

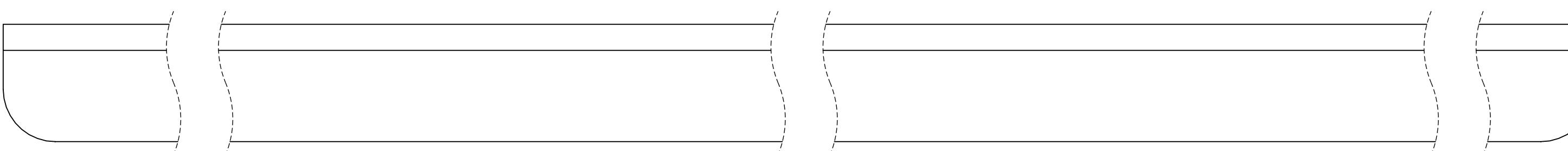


TITLE: Bed, Chute Assembly

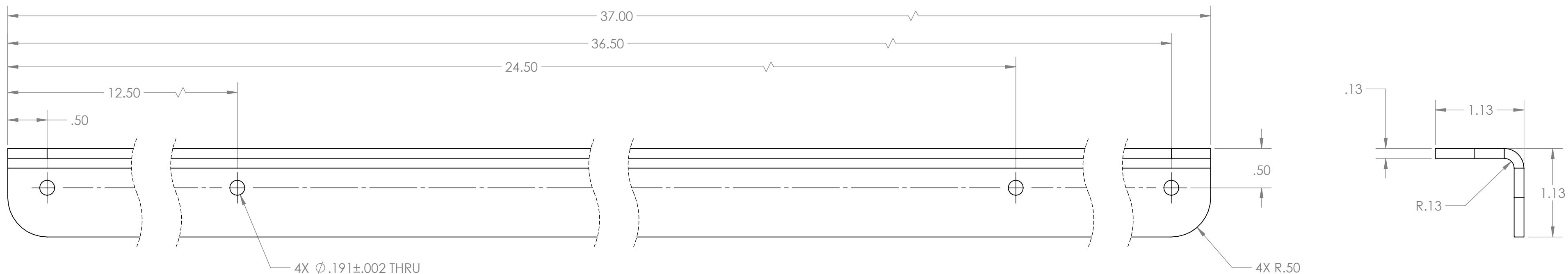
SIZE DWG. NO. REV
C GE-22005 **A**

SCALE: 1:4 SHEET 1 OF 1

D



C



B

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	DF	4/9/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
12 ga. 5052 Aluminum	C	GE-22006	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

D

C

B

A

D

D

C

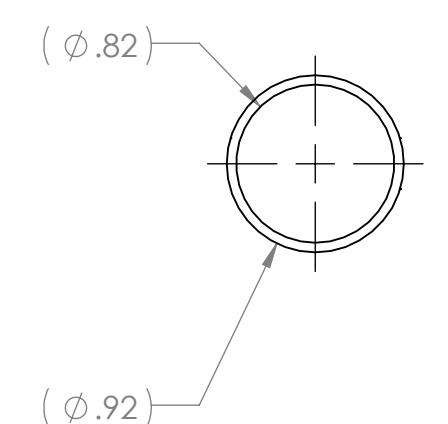
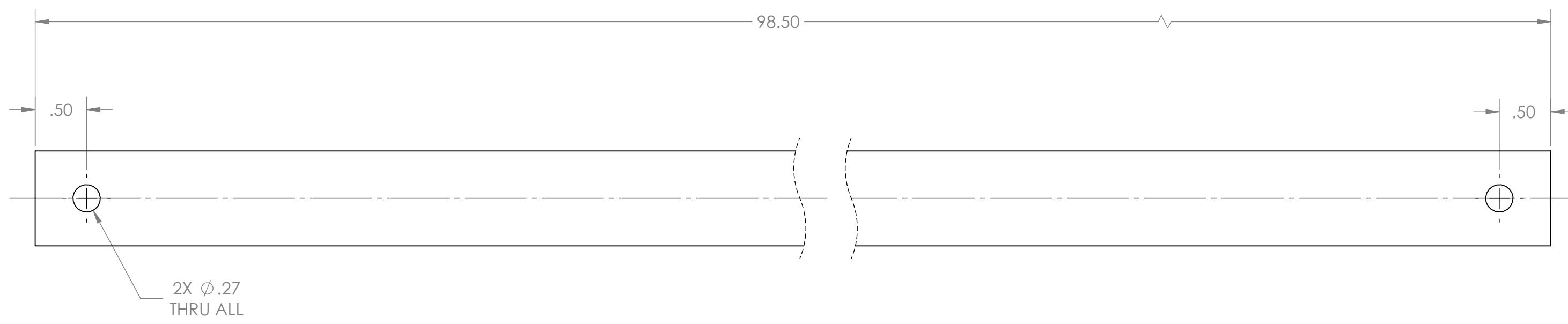
C

B

B

A

A



Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DF	5/21/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
3/4" Galvanized Steel EMT	C	GE-22007	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:12	SHEET 1 OF 1	

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

**Conduit,
Terminal**

4

3

2

1

D

D

C

C

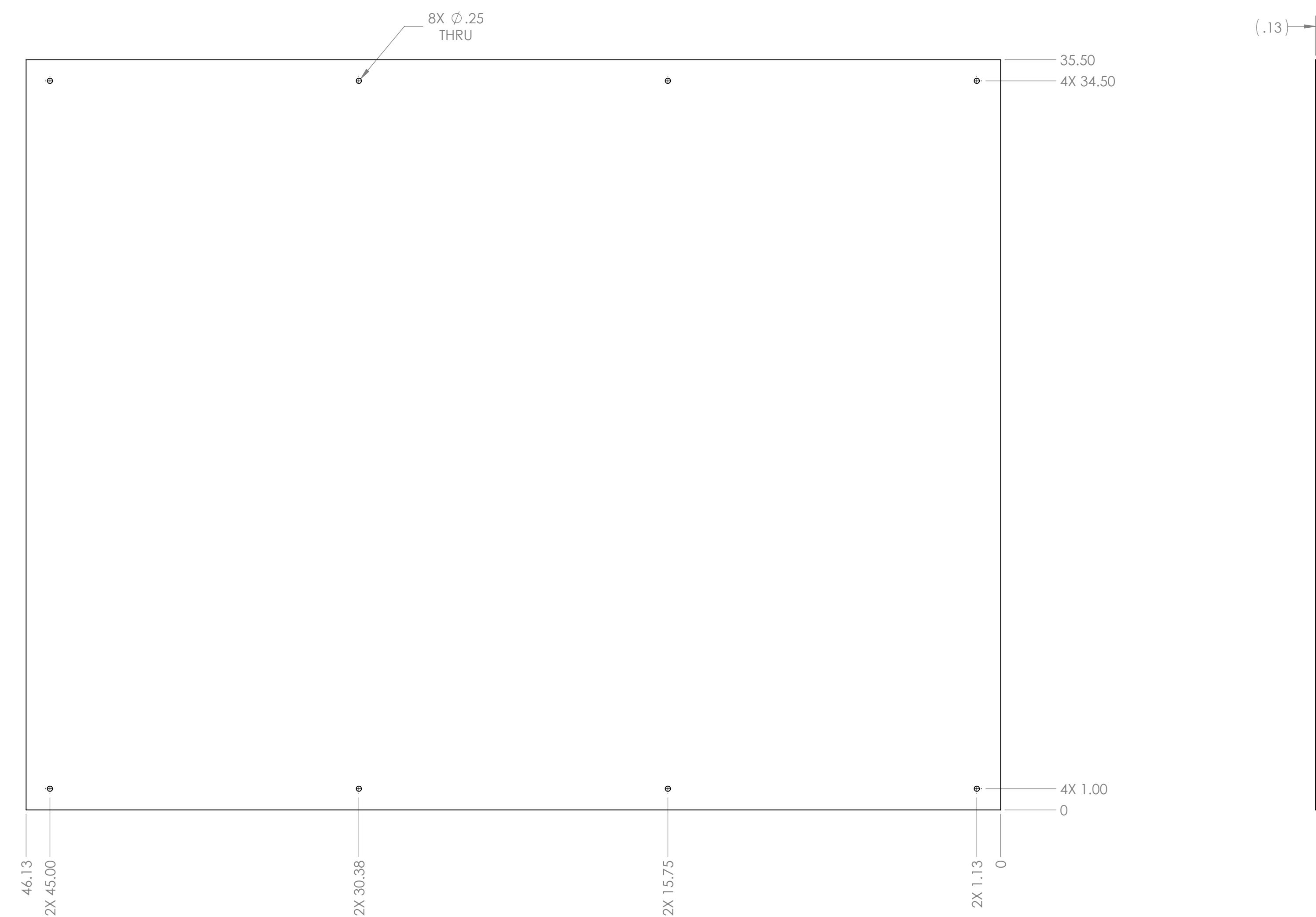
B

B

A

A

Label or tag with part number



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	5/21/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

SOLIDWORKS
Modeling Solutions Partner

4

3

2

1

4

3

2

1

D

D

C

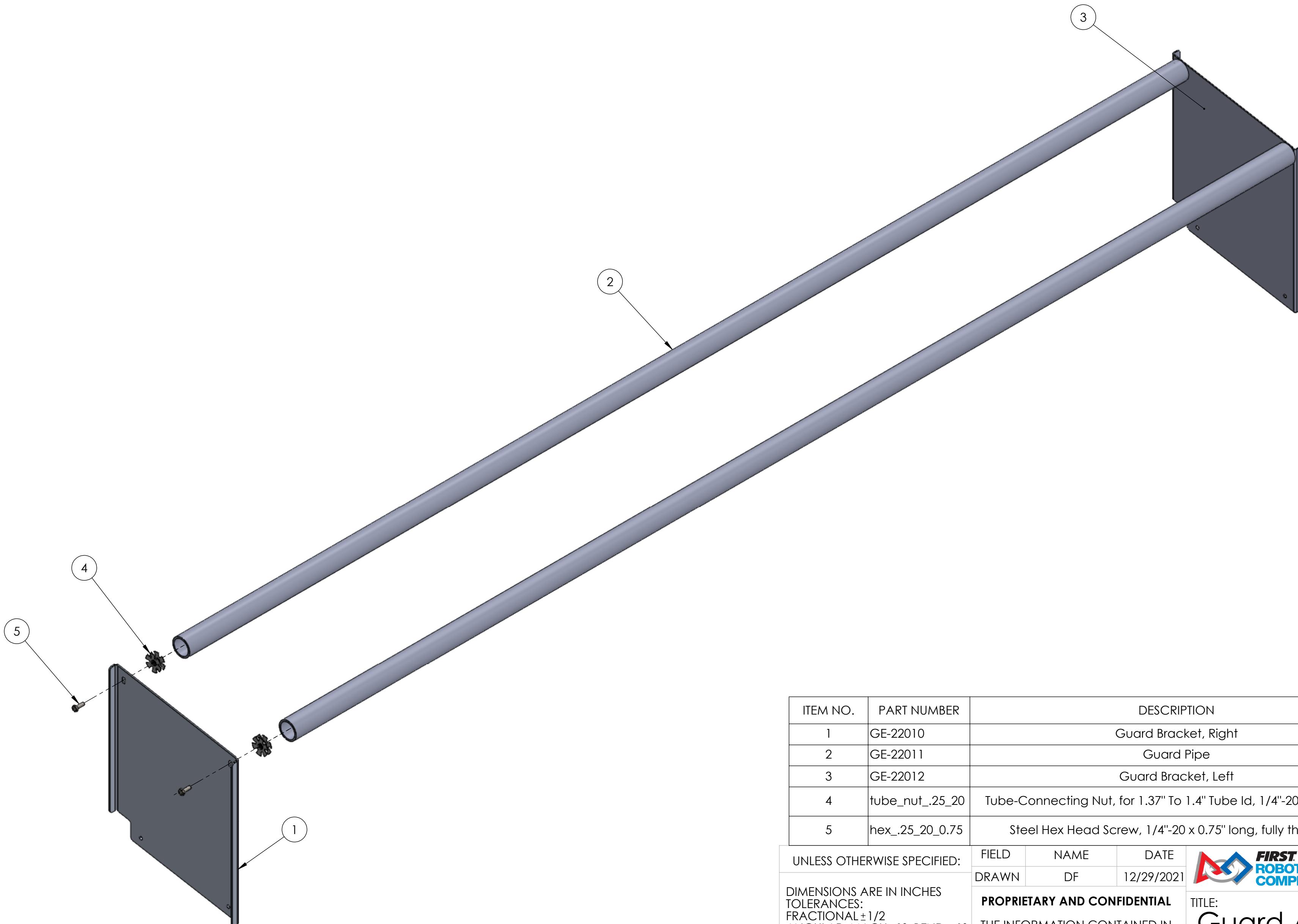
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22010	Guard Bracket, Right	1
2	GE-22011	Guard Pipe	2
3	GE-22012	Guard Bracket, Left	1
4	tube_nut_25_20	Tube-Connecting Nut, for 1.37" To 1.4" Tube Id, 1/4"-20 Thread Size	4
5	hex_25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	4

UNLESS OTHERWISE SPECIFIED:

FIELD

NAME

DATE

DRAWN

DF

12/29/2021



TITLE: Guard Assembly, Terminal

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

MATERIAL/FINISH:

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

SIZE DWG. NO. REV

C GE-22009

SCALE: 1:5 SHEET 1 OF 1

4

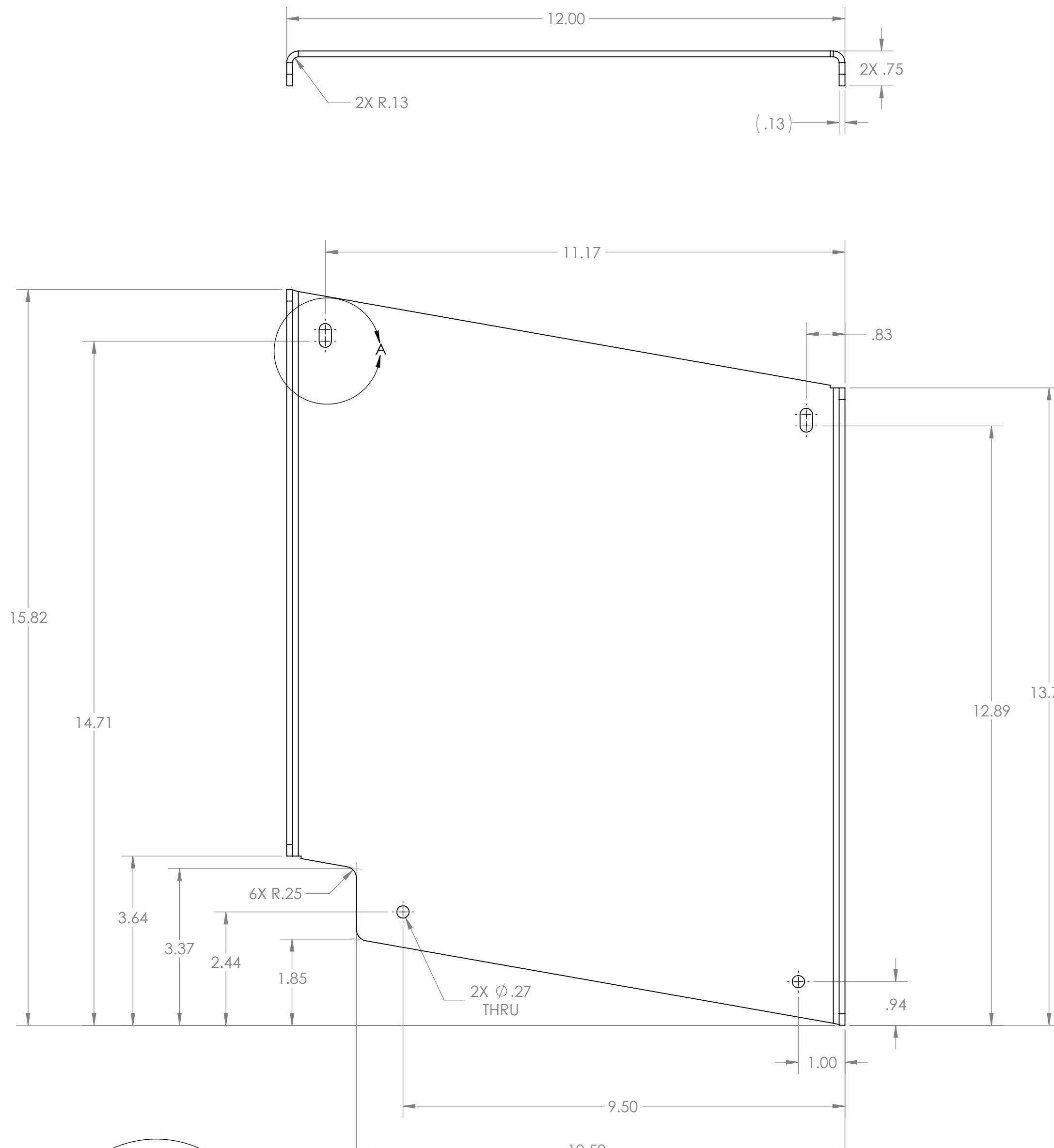
3

2

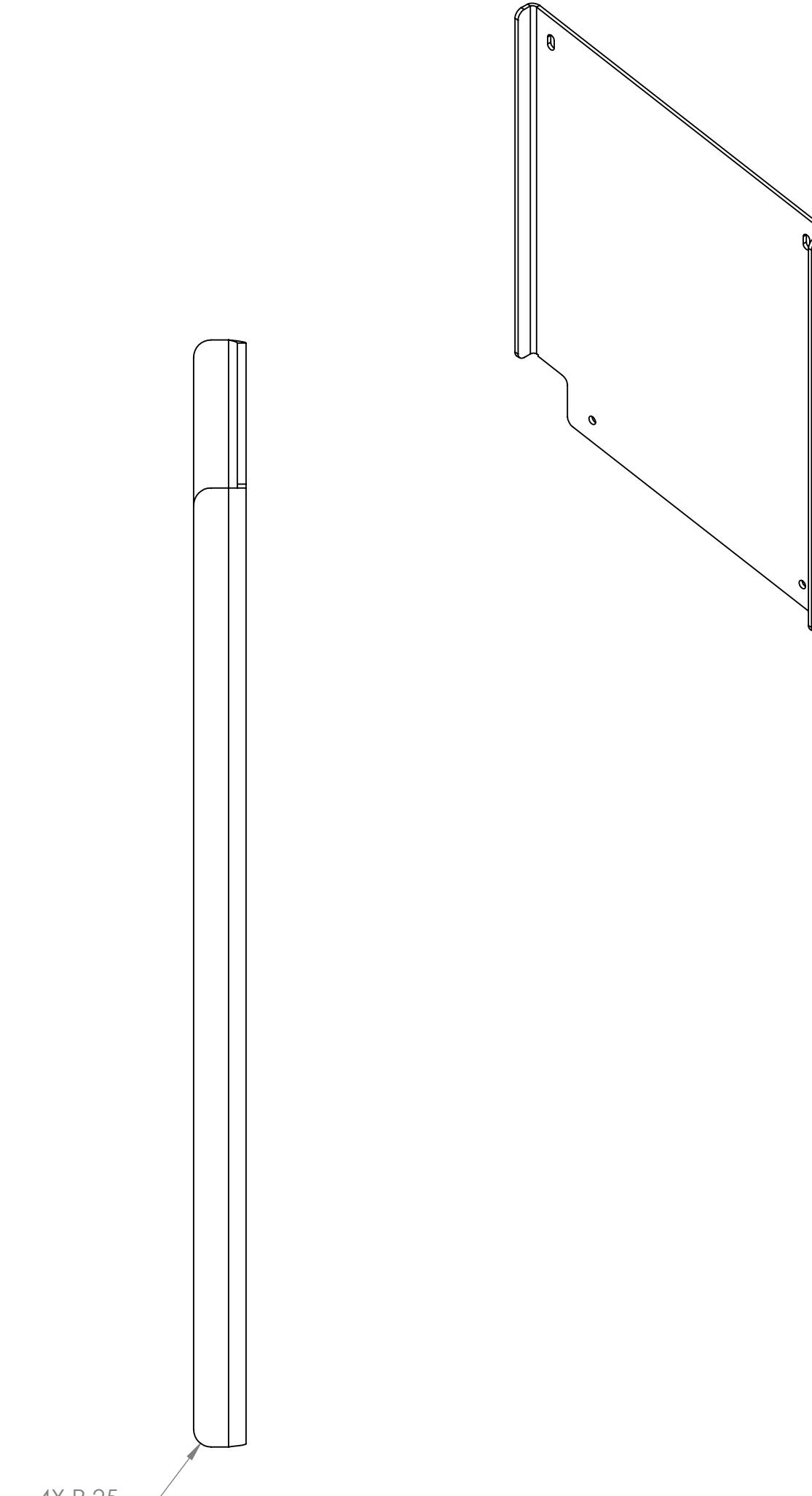
1

D

1



Label or tag with part number.

DETAIL A
SCALE 1:1

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:
14 ga. Pre-plated Steel

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

BEND NAME DATE
DRAWN DF 4/7/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.

FIRST[®] ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE: Guard Bracket,
Right

SIZE DWG. NO. REV
C GE-22010

SCALE: 1:2 SHEET 1 OF 1

D

C

B

A

4

3

2

1

D

D

C

C

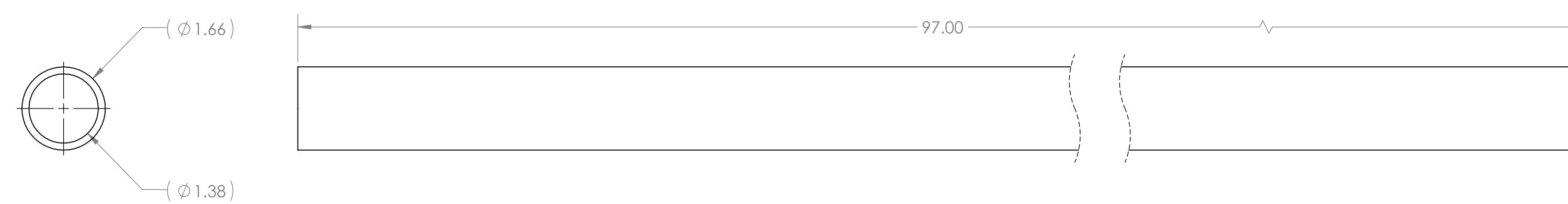
B

B

A

A

Tag or label with part number.



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	8/13/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1-1/4" Schedule 40 Pipe, 6061 Aluminum	C	GE-22011	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:2	SHEET 1 OF 1	

4

3

2

1

4

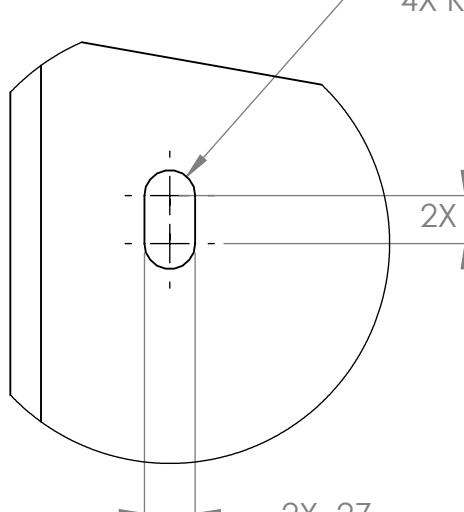
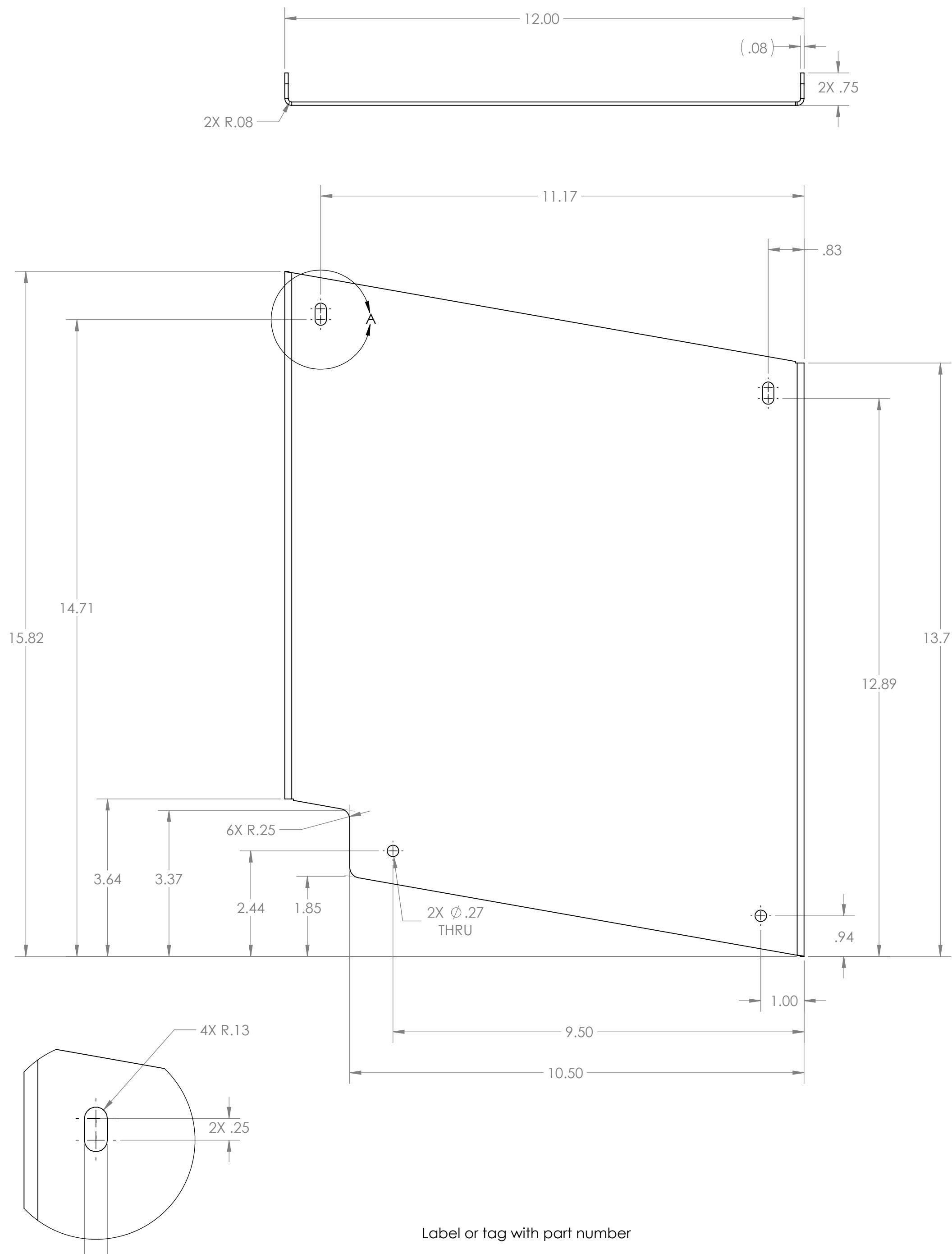
3

2

1

D

D



Label or tag with part number

DETAIL A
SCALE 1 : 1

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$	DRAWN	DF	5/20/2021
PROPRIETARY AND CONFIDENTIAL		THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.	
MATERIAL/FINISH: 14 ga. Pre-Plated Steel		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	
DO NOT SCALE DRAWING			SOLIDWORKS Modeling Solutions Partner
 FIRST ROBOTICS COMPETITION		TITLE: Guard Bracket, Left	
SIZE		DWG. NO.	REV
C		GE-22012	
SCALE: 1:2		SHEET 1 OF 1	

4

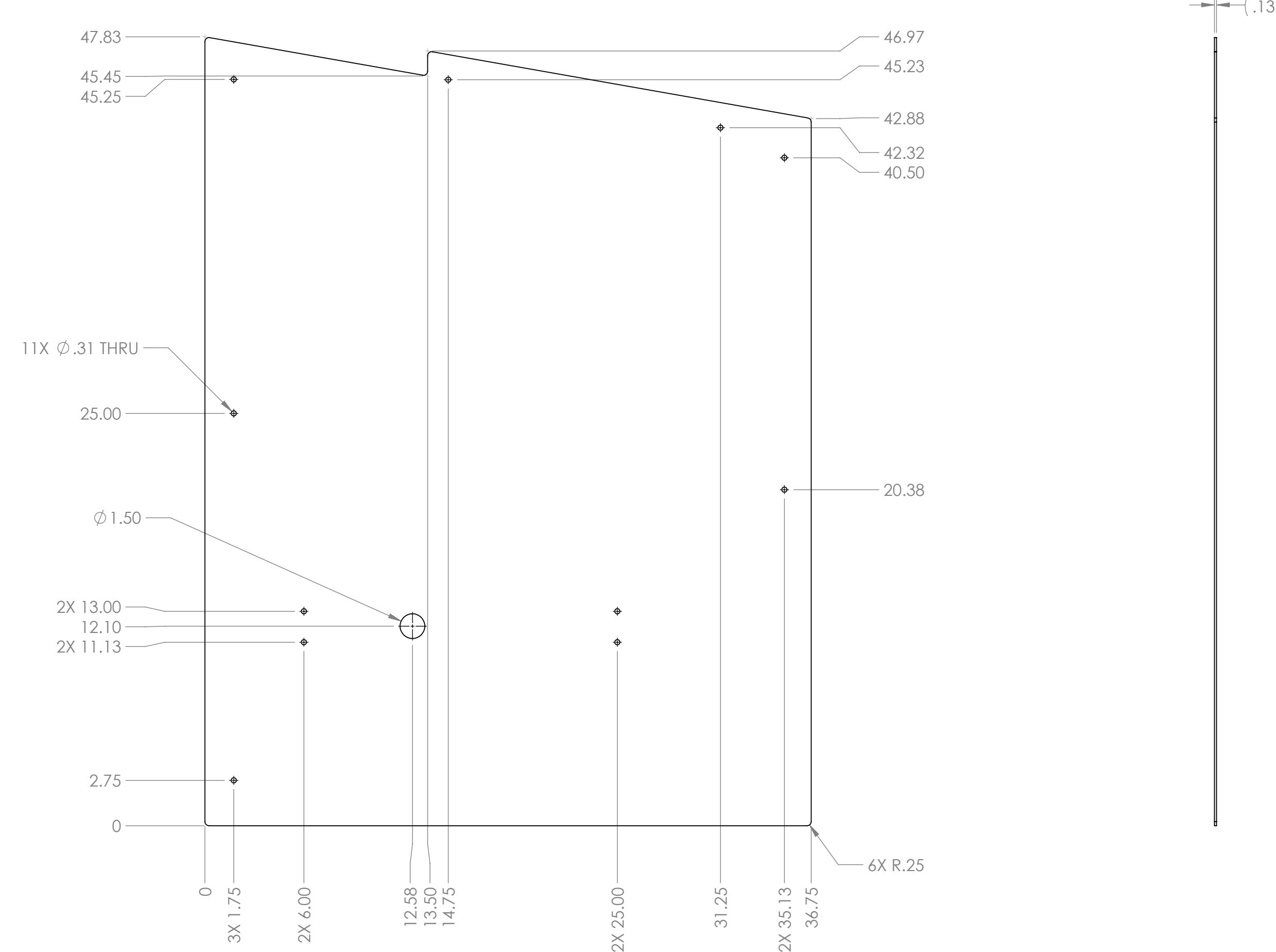
3

2

1

D

D



Tag or label with part number

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
		DRAWN	DF	8/13/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$		PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH: 1/8" Polycarbonate, Clear		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING		TITLE: Side Plastic, Terminal		
		SIZE	DWG. NO.	REV
		C	GE-22013	
		SCALE: 1:6		SHEET 1 OF 1

4

3

2

1

D

D

C

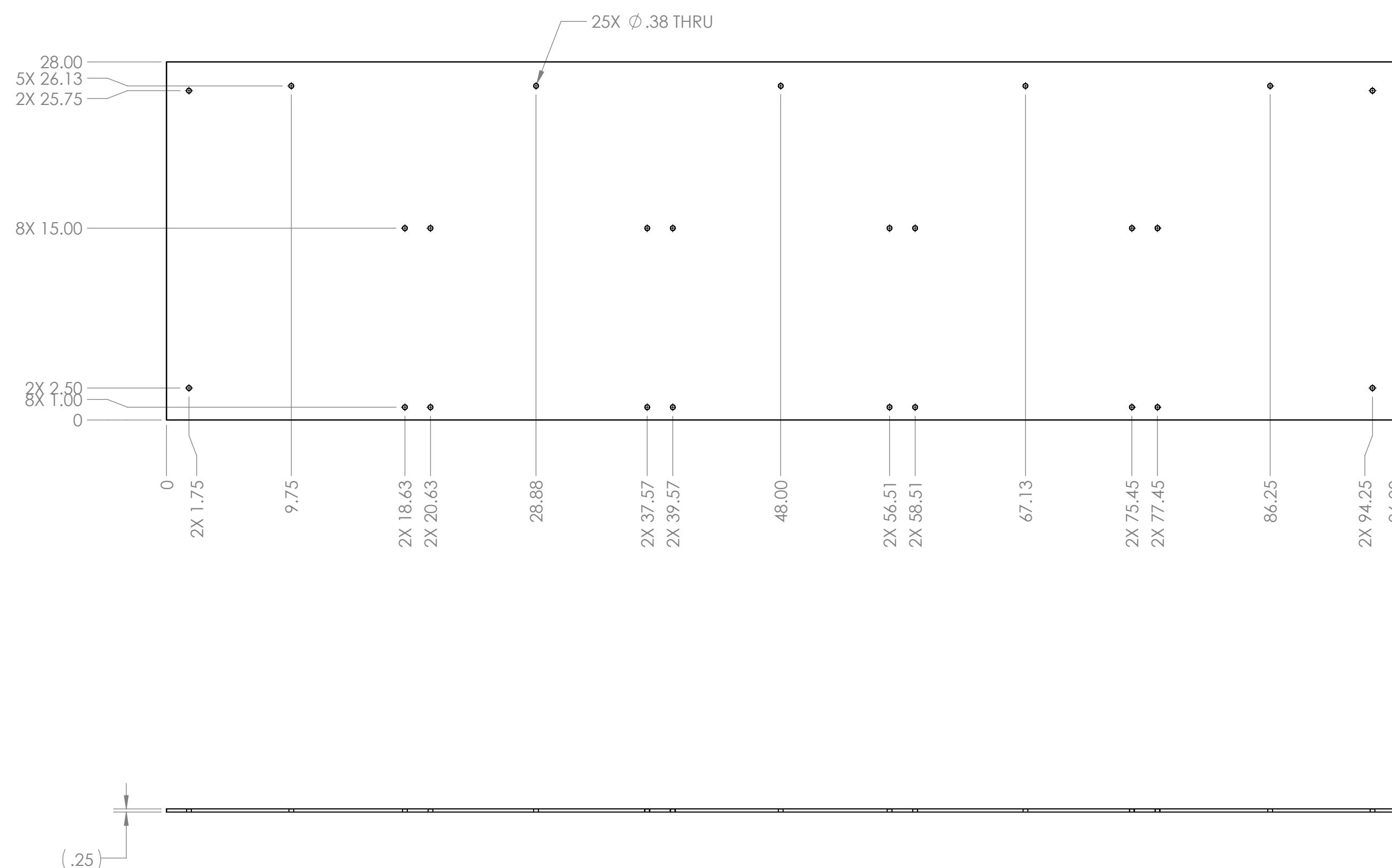
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	8/13/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/4" Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Front Plastic,
Terminal

SIZE DWG. NO. REV
C GE-22014

SCALE: 1:8 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

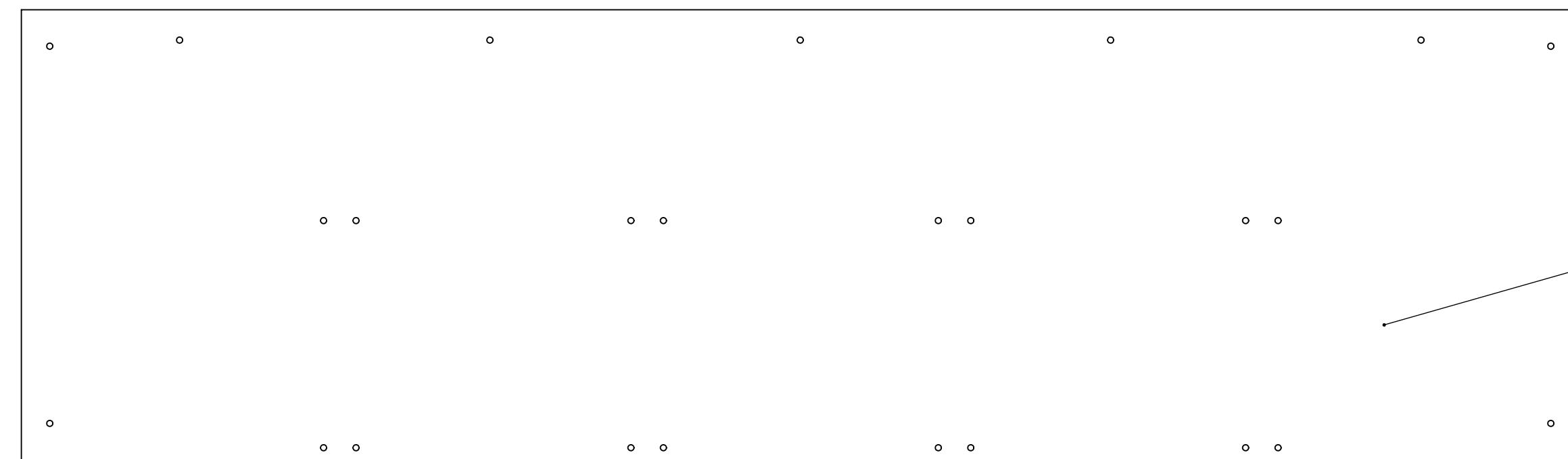
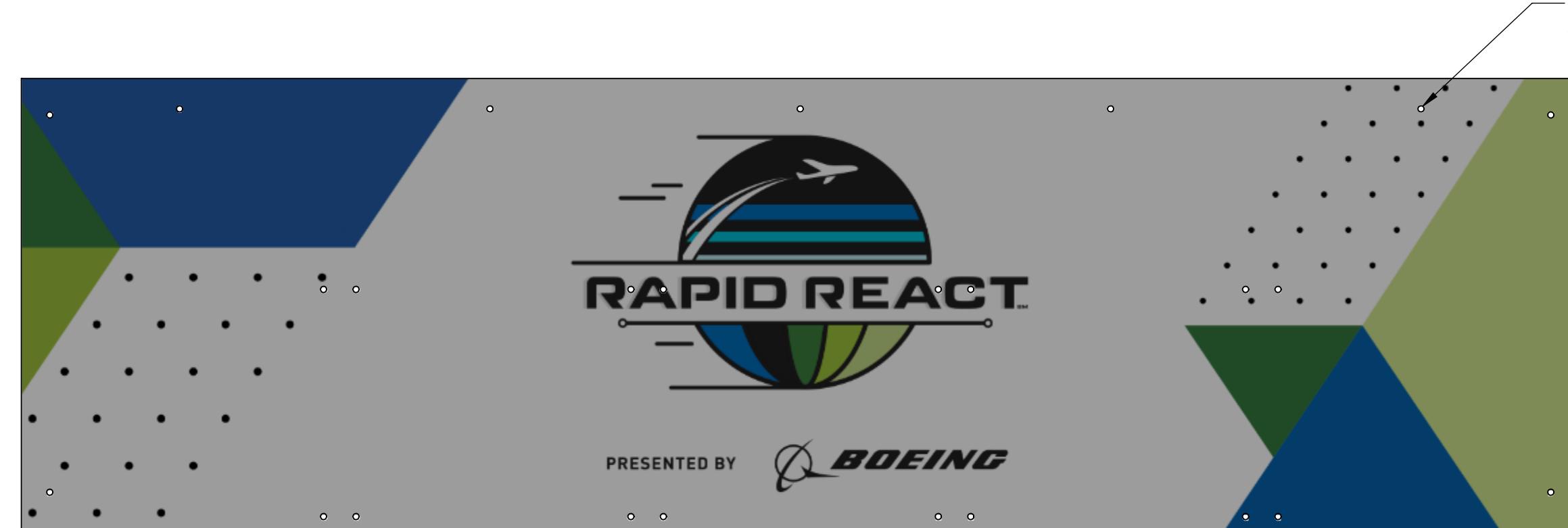
C

B

B

A

A



- Notes:
 1. Tag or label with part number
 2. Vinyl: 50/50 Mesh with clear protective coating.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DF	9/28/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION** 

TITLE:
**Front Plastic
with Vinyl**

SIZE DWG. NO. REV
C GE-22015

SCALE: 1:8 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

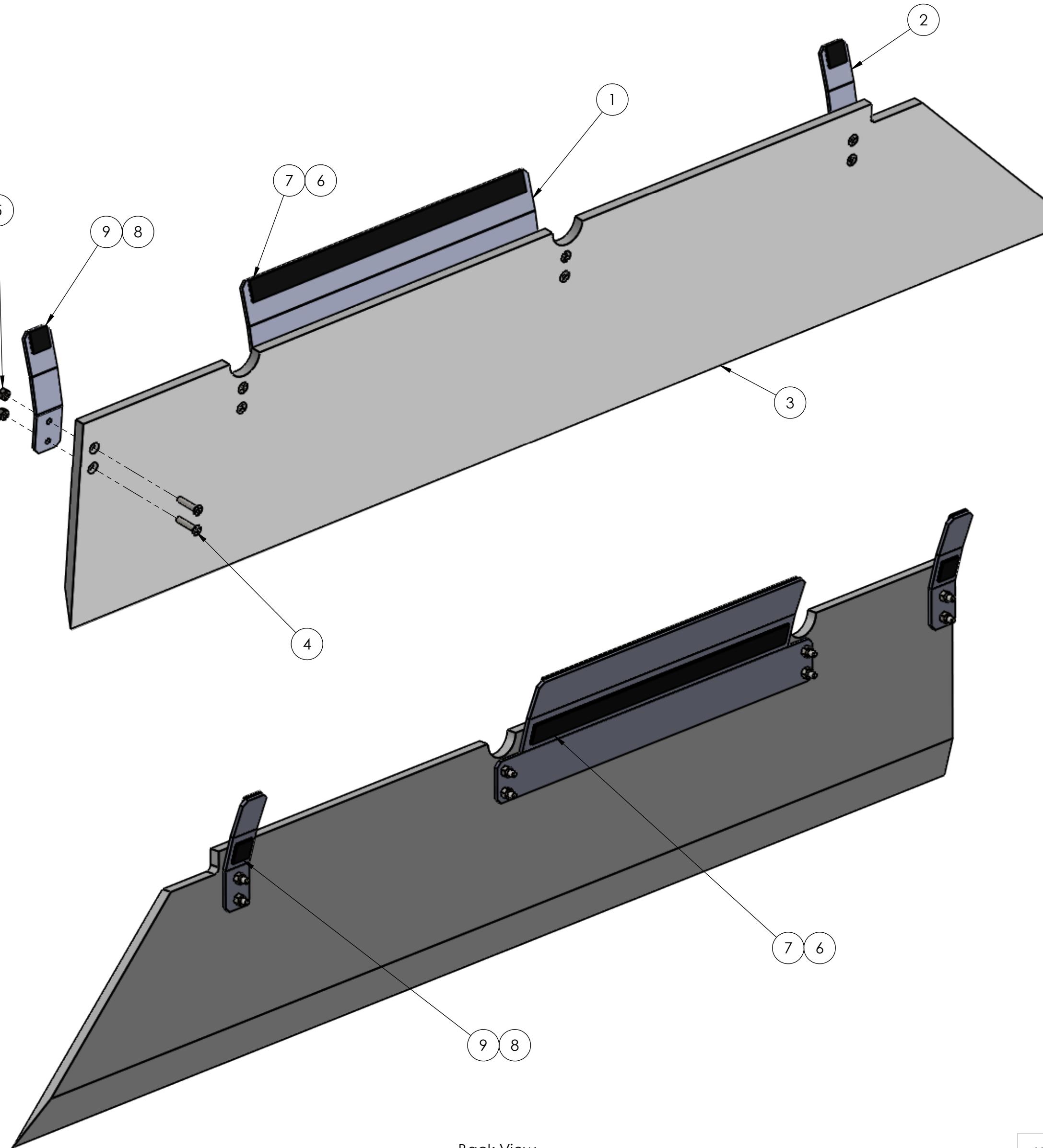
C

B

B

A

A



Back View

Notes:

1. Attach hook fastener to the ramp brackets.
2. Attach loop fastener to the hook fastener, but leave the protective plastic backing on until final assembly of the TERMINAL.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$

MATERIAL/FINISH:

DO NOT SCALE DRAWING

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22018	Ramp Bracket, Mid	1
2	GE-22019	Ramp Bracket, Edge	2
3	GE-22020	Outer Ramp, Left	1
4	flat_phil_.25_20_1.25	Steel Phillips Flat Head Screw, 1/4"x20 x 1.25" long, fully threaded	8
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	8
6	Hook_1_16	1" x 16" Hook, Adhesive Backed	2
7	Loop_1_16	1" x 16" Loop, Adhesive Backed	2
8	Hook_1_1	1" x 1" Hook, Adhesive Backed	4
9	Loop_1_1	1" x 1" Loop, Adhesive Backed	4

 FIRST
ROBOTICS
COMPETITION

 SOLIDWORKS

Modeling Solutions Partner

TITLE: Outer Ramp Assembly, Left

SIZE DWG. NO. REV

C GE-22016

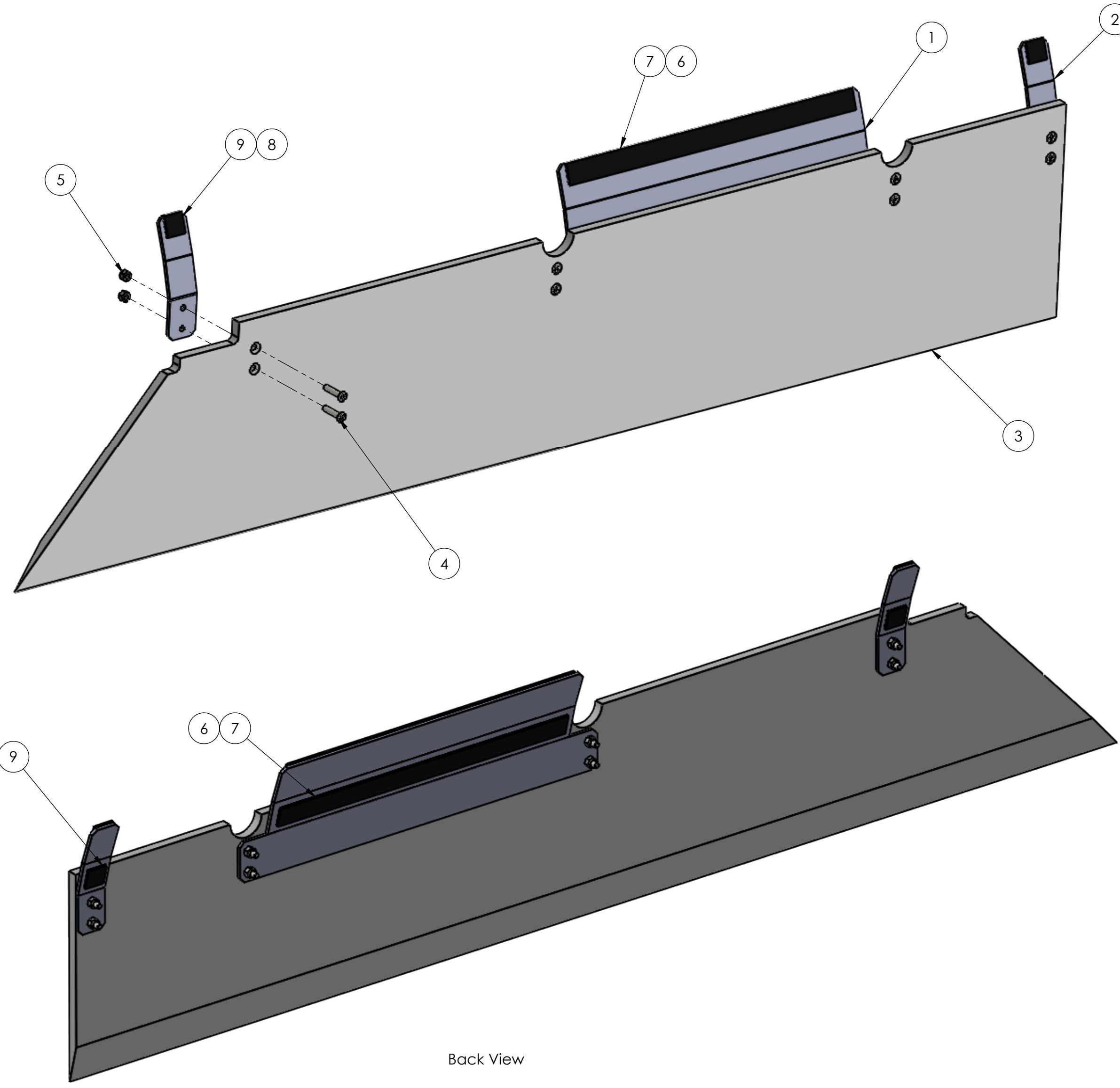
SCALE: 1:4 SHEET 1 OF 1

4

3

2

1



Back View

- Notes:
1. Attach hook fastener to the ramp brackets.
 2. Attach loop fastener to the hook fastener, but leave the protective backing on until final assembly of the TERMINAL.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22018	Ramp Bracket, Mid	1
2	GE-22019	Ramp Bracket, Edge	2
3	GE-22021	Outer Ramp, Right	1
4	flat_phil_.25_20_1.25	Steel Phillips Flat Head Screw, 1/4"x20 x 1.25" long, fully threaded	8
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	8
6	Hook_1_16	1" x 16" Hook, Adhesive Backed	2
7	Loop_1_16	1" x 16" Loop, Adhesive Backed	2
8	Hook_1_1	1" x 1" Hook, Adhesive Backed	4
9	Loop_1_1	1" x 1" Loop, Adhesive Backed	4

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm\frac{1}{2}$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .50$

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

FIRST
ROBOTICS
COMPETITION

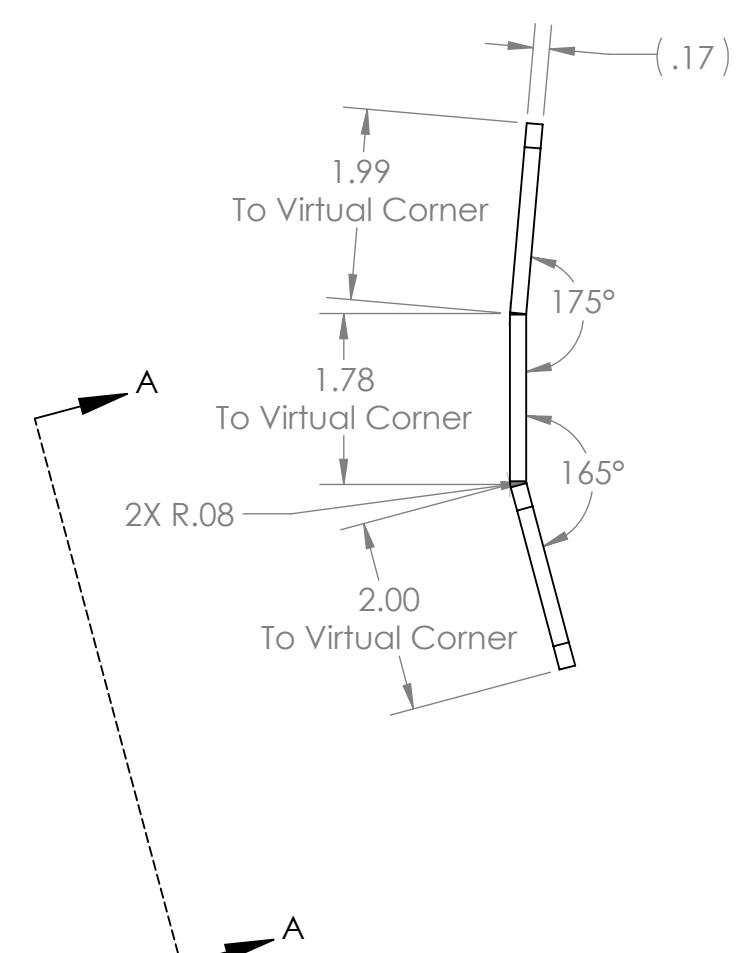
SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Outer Ramp
Assembly, Right**

SIZE DWG. NO. REV
C GE-22017

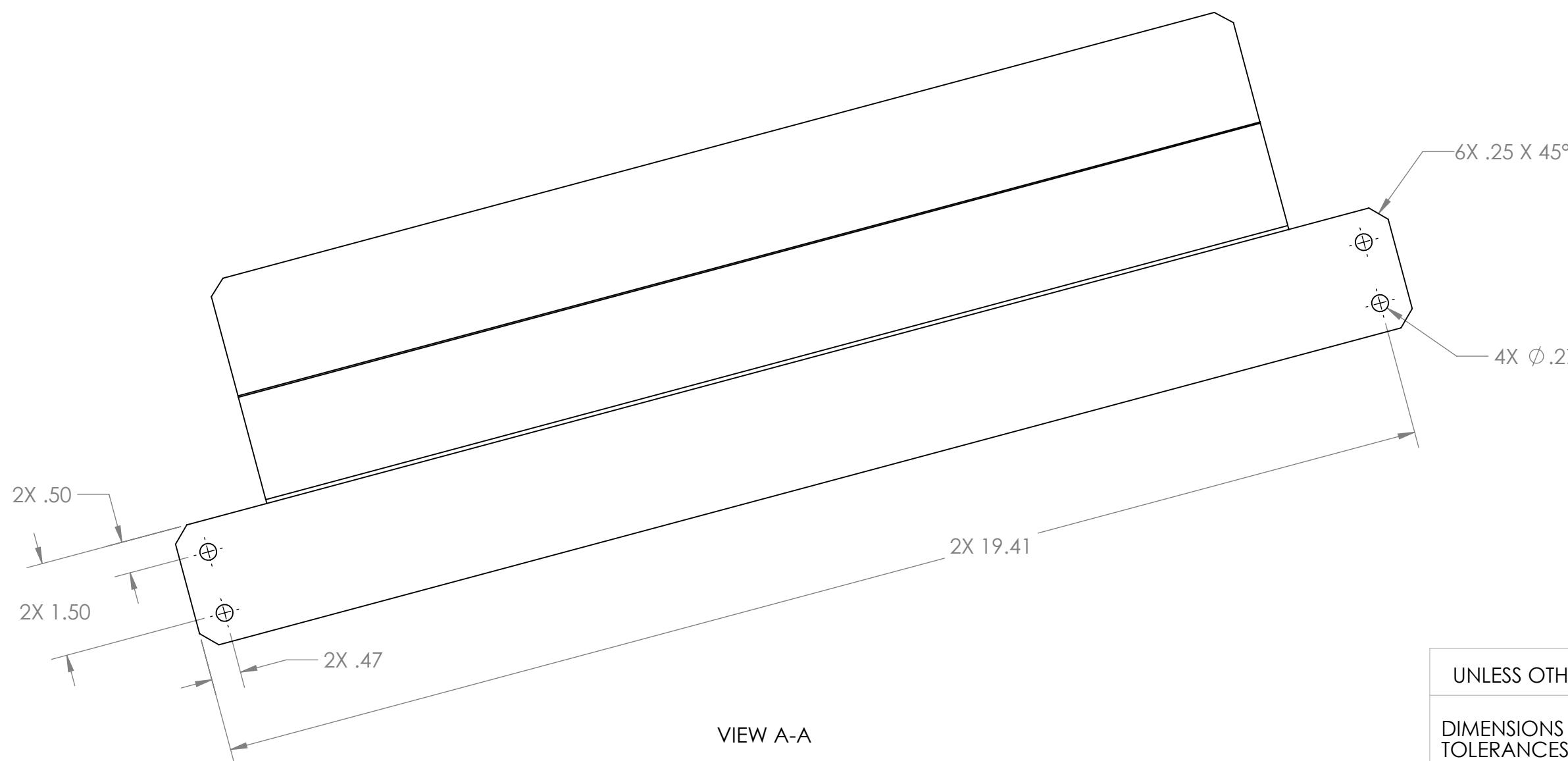
SCALE: 1:4 SHEET 1 OF 1

D



C

B



VIEW A-A

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:

8 ga, Pre-plated Steel

DO NOT SCALE DRAWING

BEND

NAME

DATE

DRAWN

DF

4/9/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN

THIS DRAWING IS THE SOLE

PROPERTY OF FIRST®. ANY

REPRODUCTION IN PART OR AS A

WHOLE WITHOUT THE WRITTEN

PERMISSION OF FIRST® IS

PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP
EDGES.

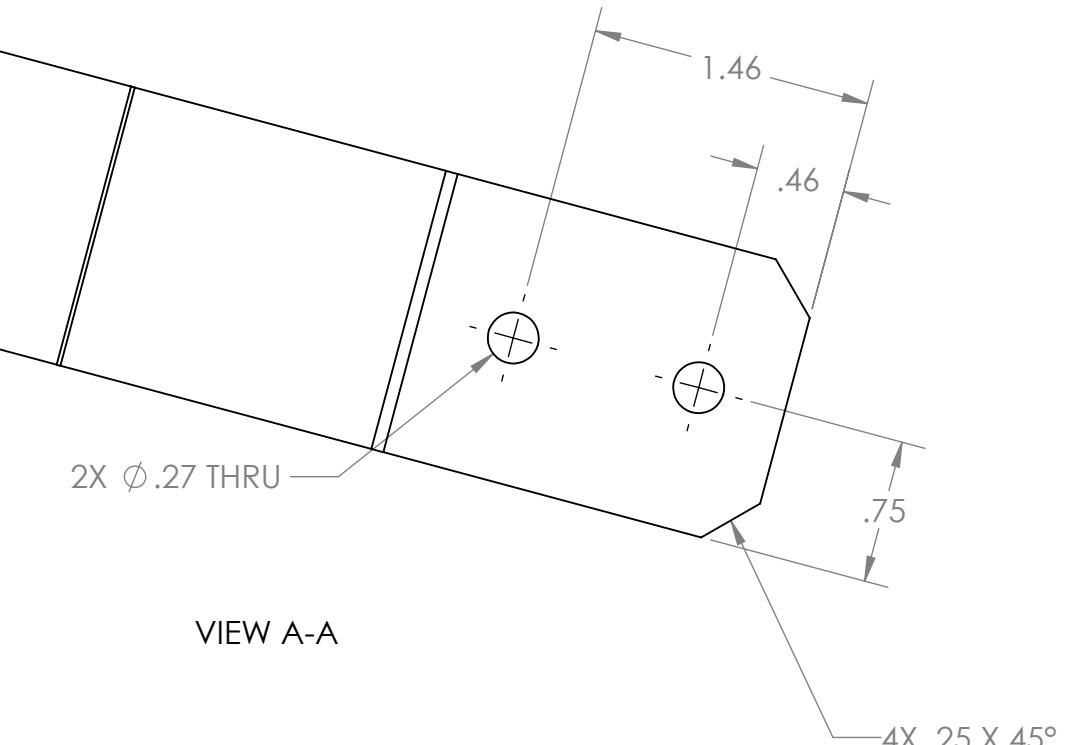
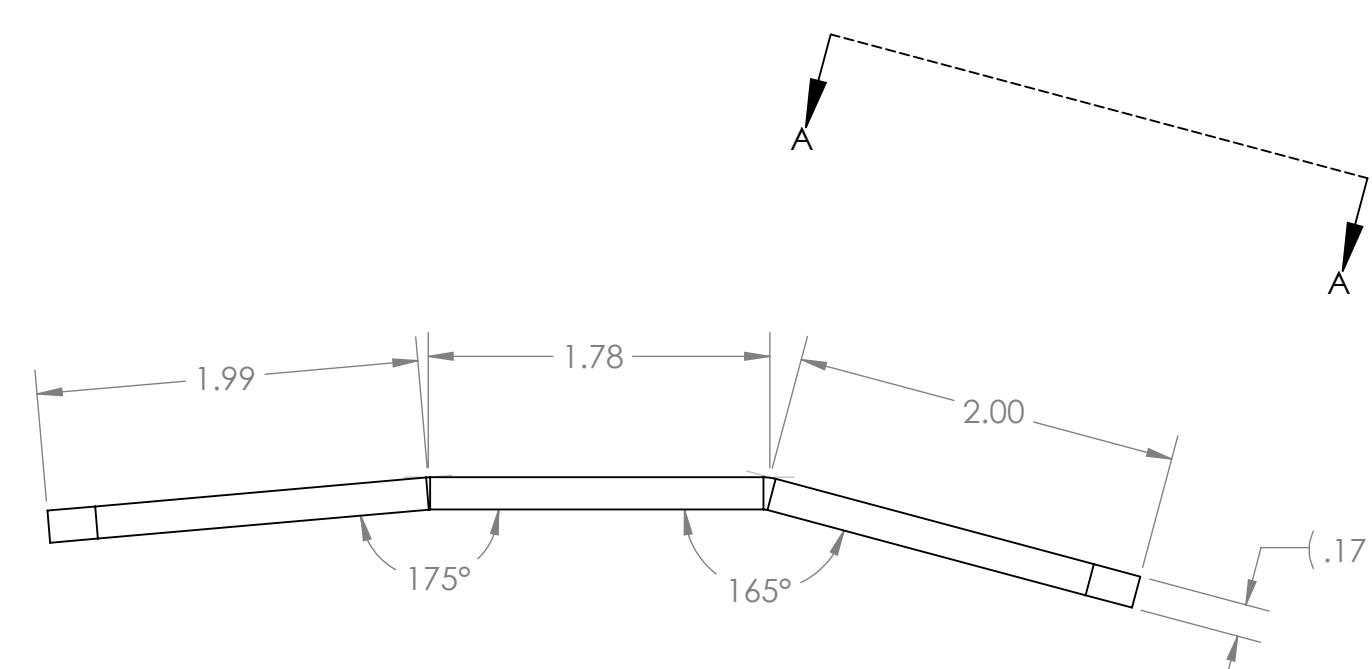
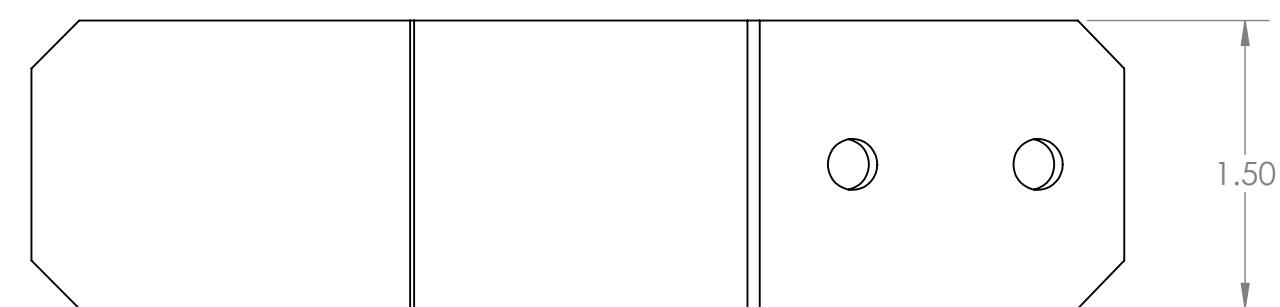
TITLE: Ramp Bracket, Mid

SIZE DWG. NO. REV
C GE-22018

SCALE: 1:2 SHEET 1 OF 1

D

D



VIEW A-A

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:

8 ga. Pre-plated Steel

DO NOT SCALE DRAWING

BEND

NAME

DATE

DRAWN

DF

4/9/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST[®]. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST[®] IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



TITLE:

Ramp Bracket,
Edge

SIZE DWG. NO. REV

C GE-22019

SCALE: 1:1 SHEET 1 OF 1

A

C

B

A

4

3

2

1

D

D

C

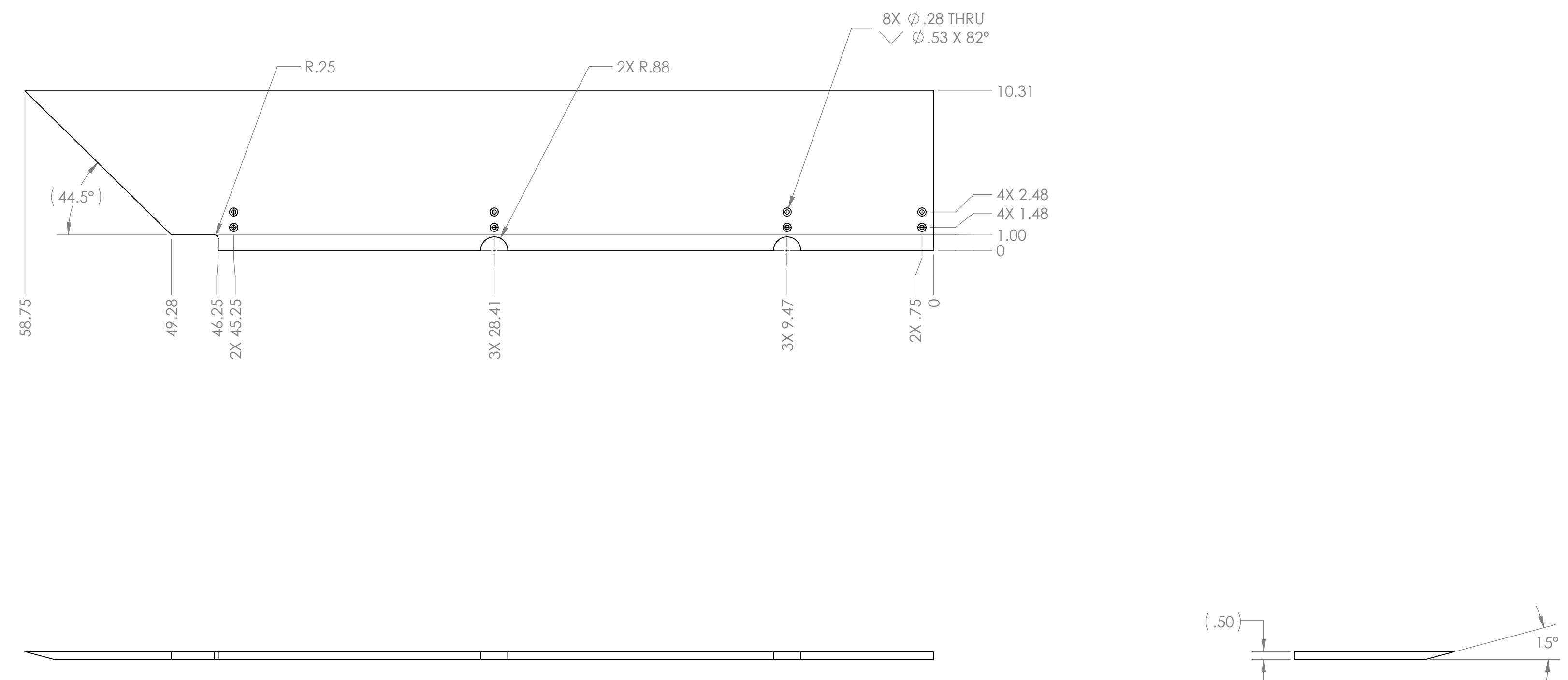
C

B

B

A

A



Notes:
1. Tag or Label with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	8/16/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/2" HDPE, Natural			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Outer Ramp,
Left**

SIZE DWG. NO. REV
C GE-22020

SCALE: 1:6 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

C

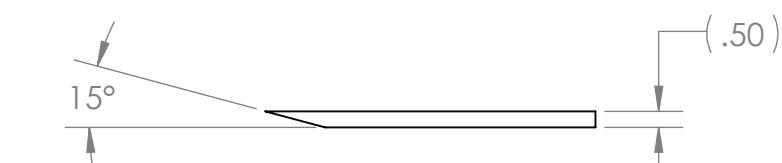
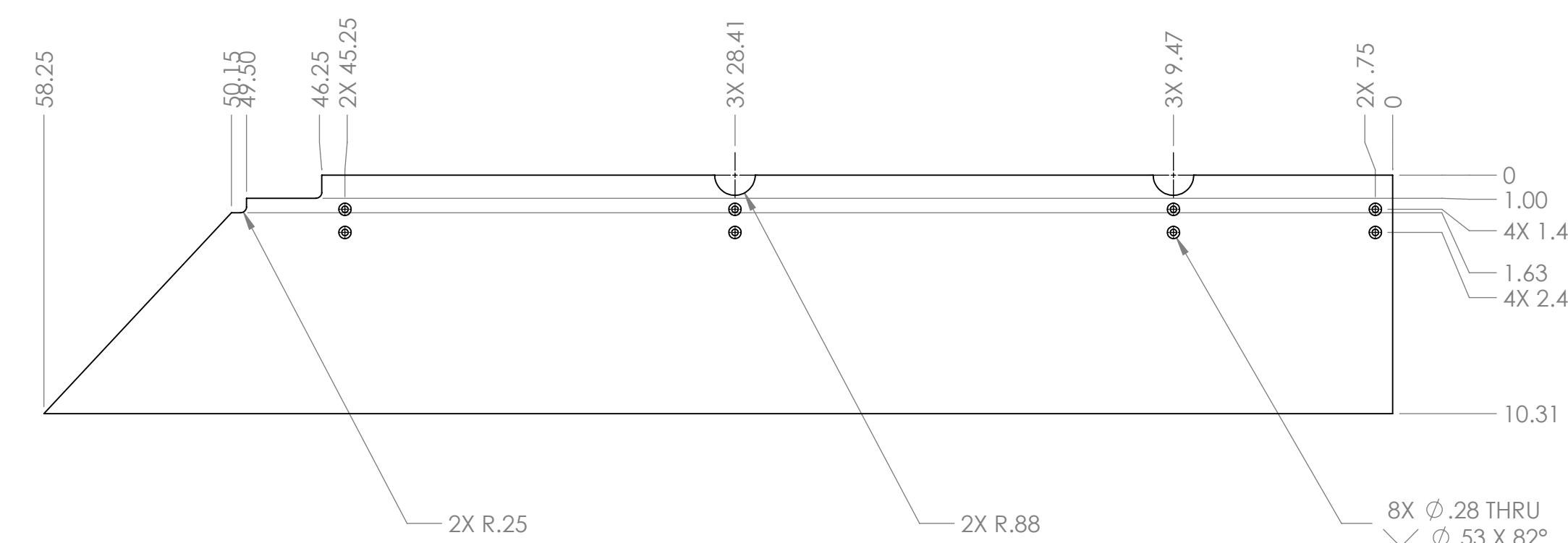
B

B

A

A

Notes:
1. Tag or label with part number.



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

1/2" HDPE, Natural

DO NOT SCALE DRAWING

VEND NAME DATE

DRAWN DF 8/16/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

TITLE:
**Outer Ramp,
Right**

SIZE DWG. NO. REV
C GE-22021

SCALE: 1:6 SHEET 1 OF 1

4

3

2

1

D

D

C

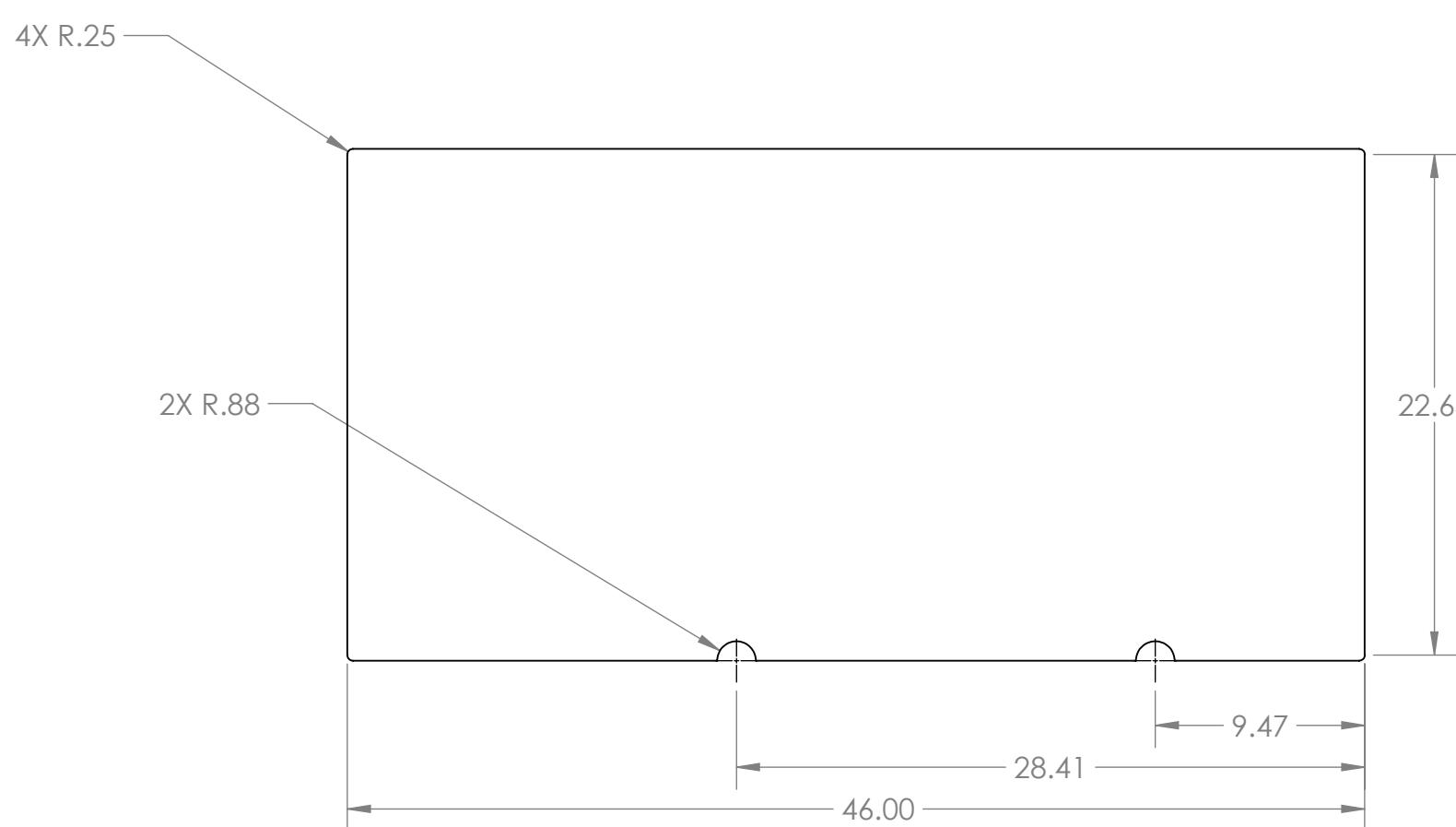
C

B

B

A

A



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DF	8/16/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/4" Polycarbonate, Clear	C	GE-22022	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:8	SHEET 1 OF 1	

4

3

2

1

D

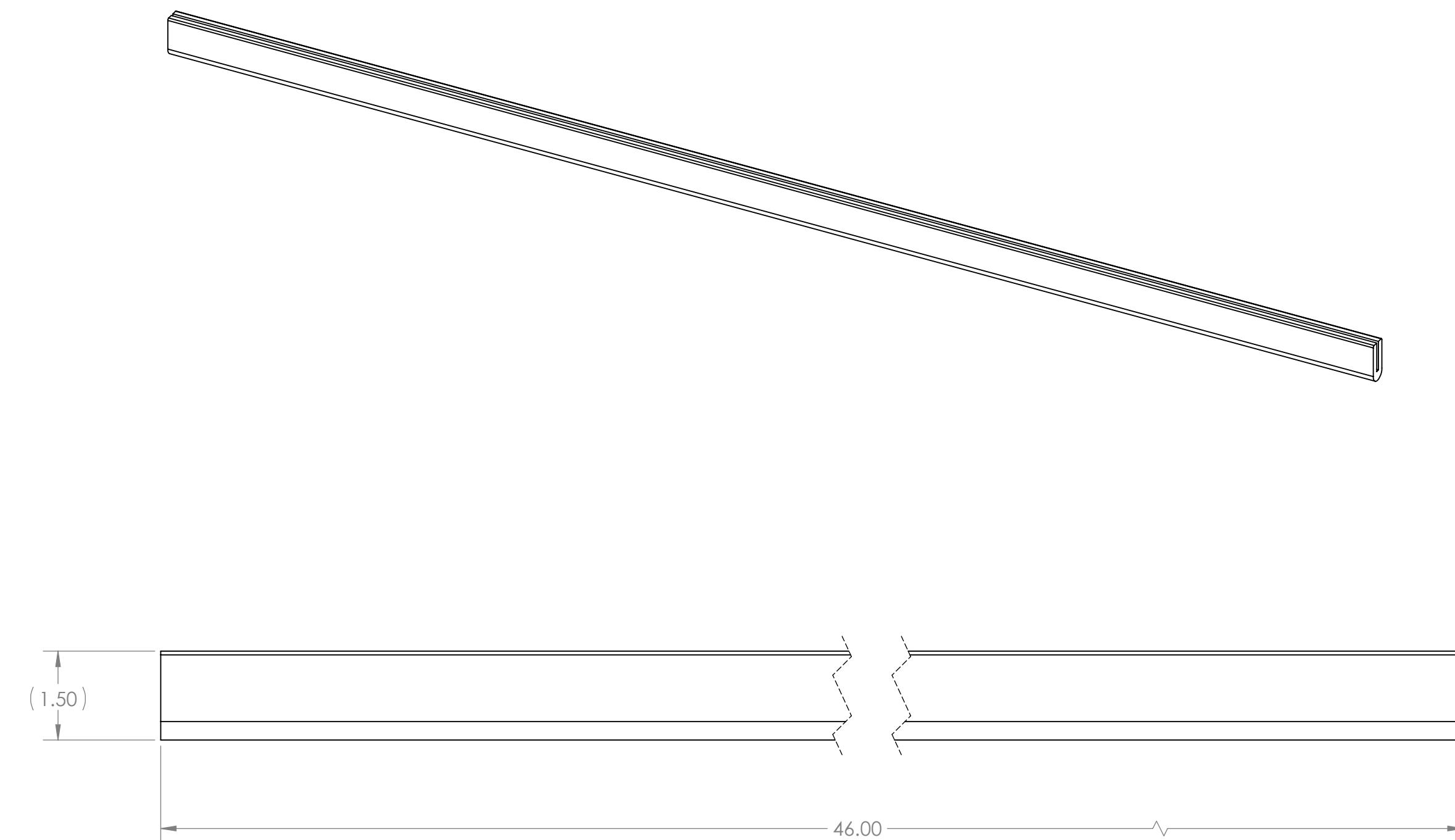
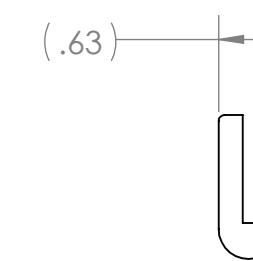
D

C

C

B

B



DESCRIPTION: U SHAPE EDGE PROTECTORS

VENDOR: M2CBRIDGE VIA AMAZON

COLOR: BLACK

PACKAGE QUANTITY: 1 - 6.5 FEET

NOTES:

1. SUBSTITUTIONS ALLOWED
2. CUT TO LENGTH

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$

ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$

TWO PLACE DECIMAL $\pm .01$

THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

DO NOT SCALE DRAWING

VEND NAME DATE

DRAWN DF 12/29/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



TITLE:

Edge Protector
46"

SIZE DWG. NO. REV

C GE-22024

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

A

A

D

D

C

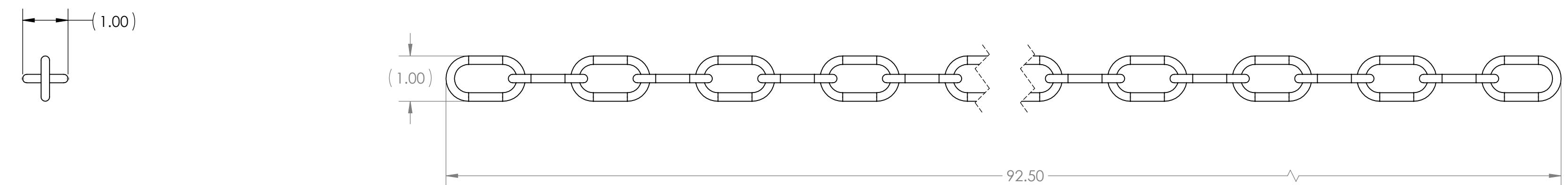
C

B

B

A

A



Description: CHAINBOSS Plastic Chain: US Weight 2 in., Black

Vendor: The Home Depot

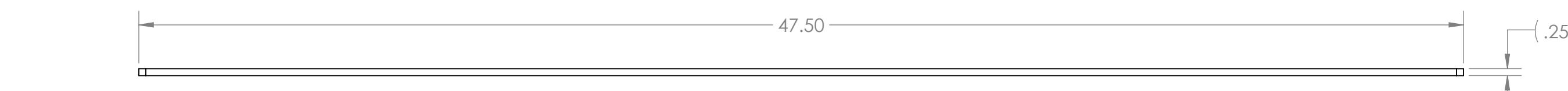
Part Number: [internet] 315968945

Substitutions allowed with permission from FIRST HQ.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	DF	12/29/2021	 FIRST ROBOTICS COMPETITION
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
Black	C	GE-22026	
COMMENTS:		SCALE: 1:2	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 1 OF 1	
DO NOT SCALE DRAWING			

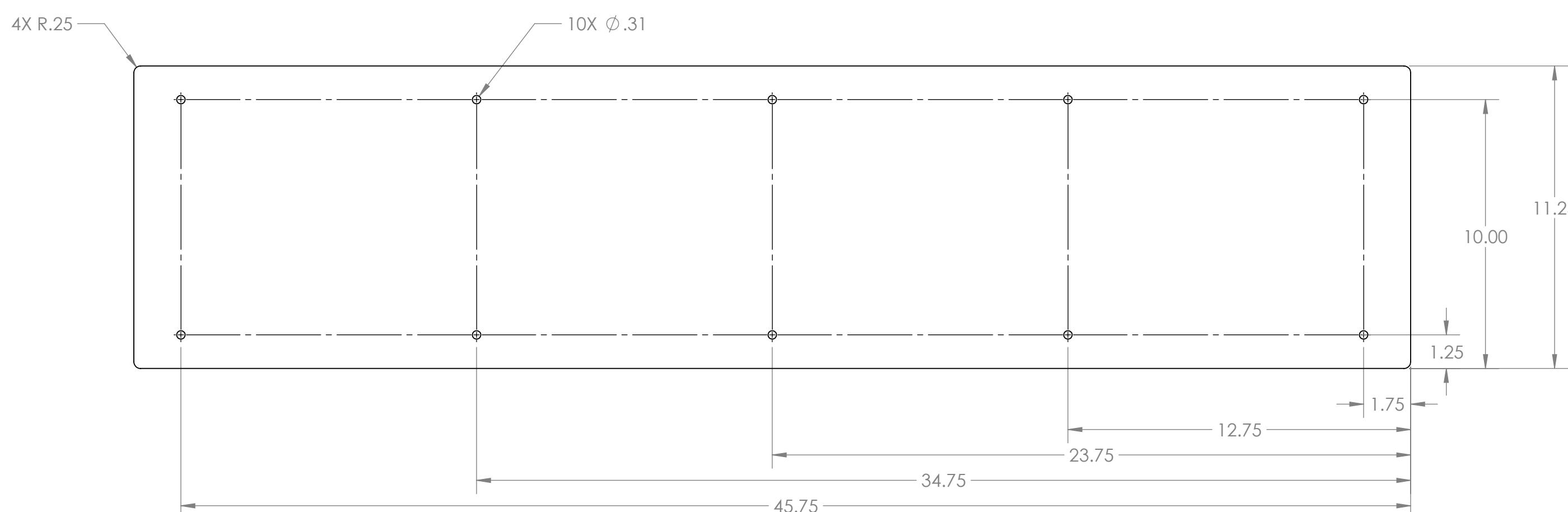
D

D



C

C



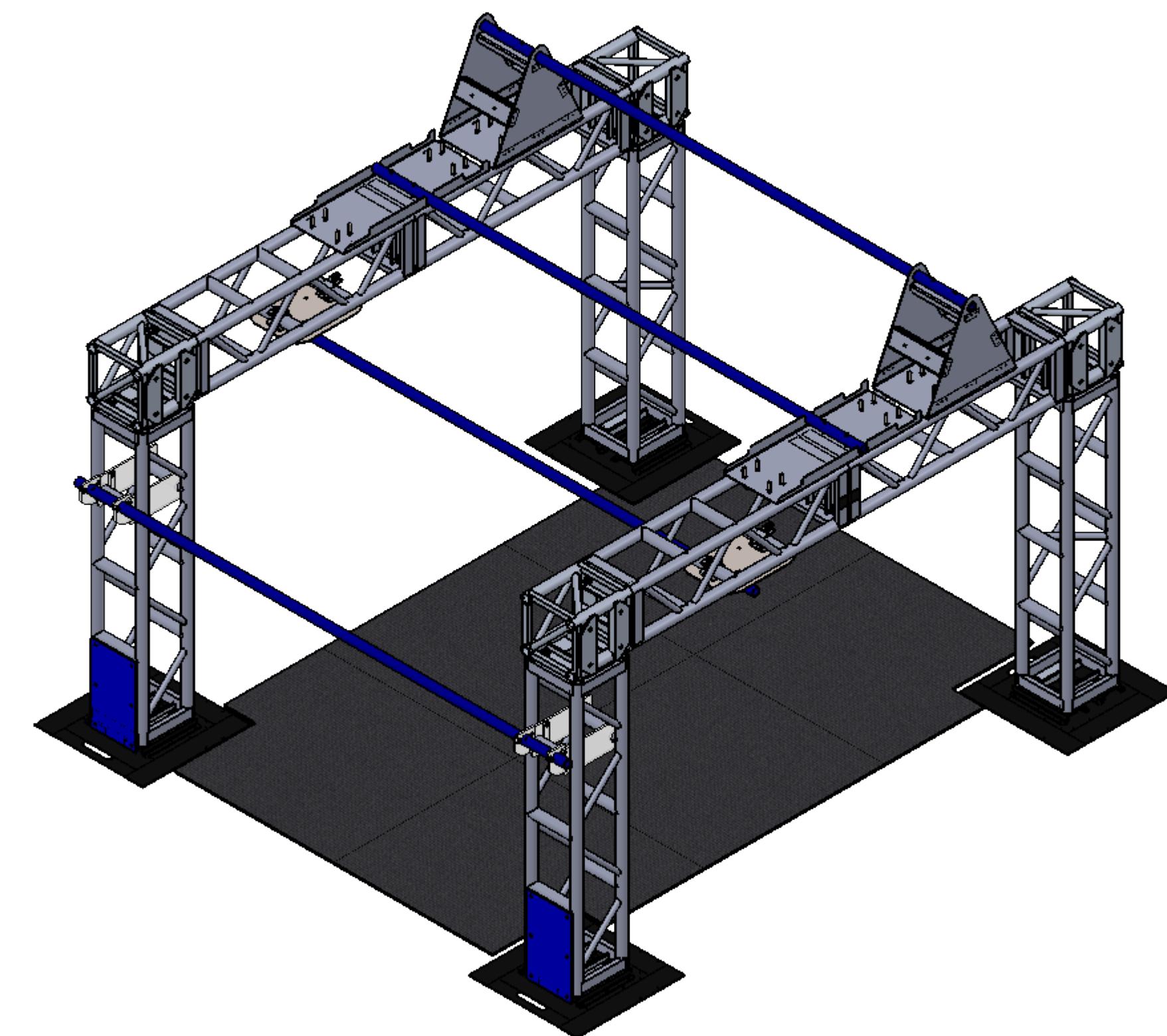
B

B

Notes:
1. Bag or tag with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DF	8/16/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/4" Polycarbonate, Clear	C	GE-22027	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 1 OF 1	

ITEM NO.	PART NUMBER	DESCRIPTION	
1	FE-01002	4' x 1' x 1' Square Truss	4
2	FE-01003	5' x 1' x 1' Square Truss	4
3	FE-01012	3 Way Corner Block	4
4	GE-22101	Floor Protection Assembly	1
5	GE-22107	Launch pad blue	2
6	GE-22111	Low bar holder	4
7	GE-22112	Low bar clamp	4
8	GE-22120	under hung assembly	2
9	GE-22130	Upper transition bar holder	2
10	GE-22140	mid transition bar holder	2
11	GE-22150	Rung	4
12	GE-22170	Truss Base - Sheet Metal Assembly	4
13	hex_.25_20_1.25	Steel Hex Head Screw, 1/4"-20 x 1.25" long, fully threaded	16
14	hex_.375_16_3_partial	Steel Hex Head Screw, 3/8"-16, 3" long	13
15	hex_.625_11_2.00	Hex Head Bolt, 5/8"-11 Thread, 2" length	56
16	hexnut_.625_11	5/8"-11 hex nut	40
17	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	16
18	nylock_.375_16	Steel Nylon-Insert Locknut, 3/8"-16	12
19	tipeline_HANGARheight	2" Gaffers Tape, Black	2
20	Ubolt_.375_2.4375_4.4375	U-Bolt 3/8-16 x 2-7/16 ID x 4-7/16 height	16
21	washer_flat_.25	Flat Washer for 1/4" Screw	32
22	washer_flat_.625	Flat washer for 5/8" screw	96



Notes:
1. Assembly exists in Red and Blue configurations.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	NW	9/29/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
TITLE: Hangar			
SIZE	DWG. NO.	REV	
C	GE-22100		
SCALE: 1:20		SHEET 1 OF 5	

4

3

2

1

D

D

C

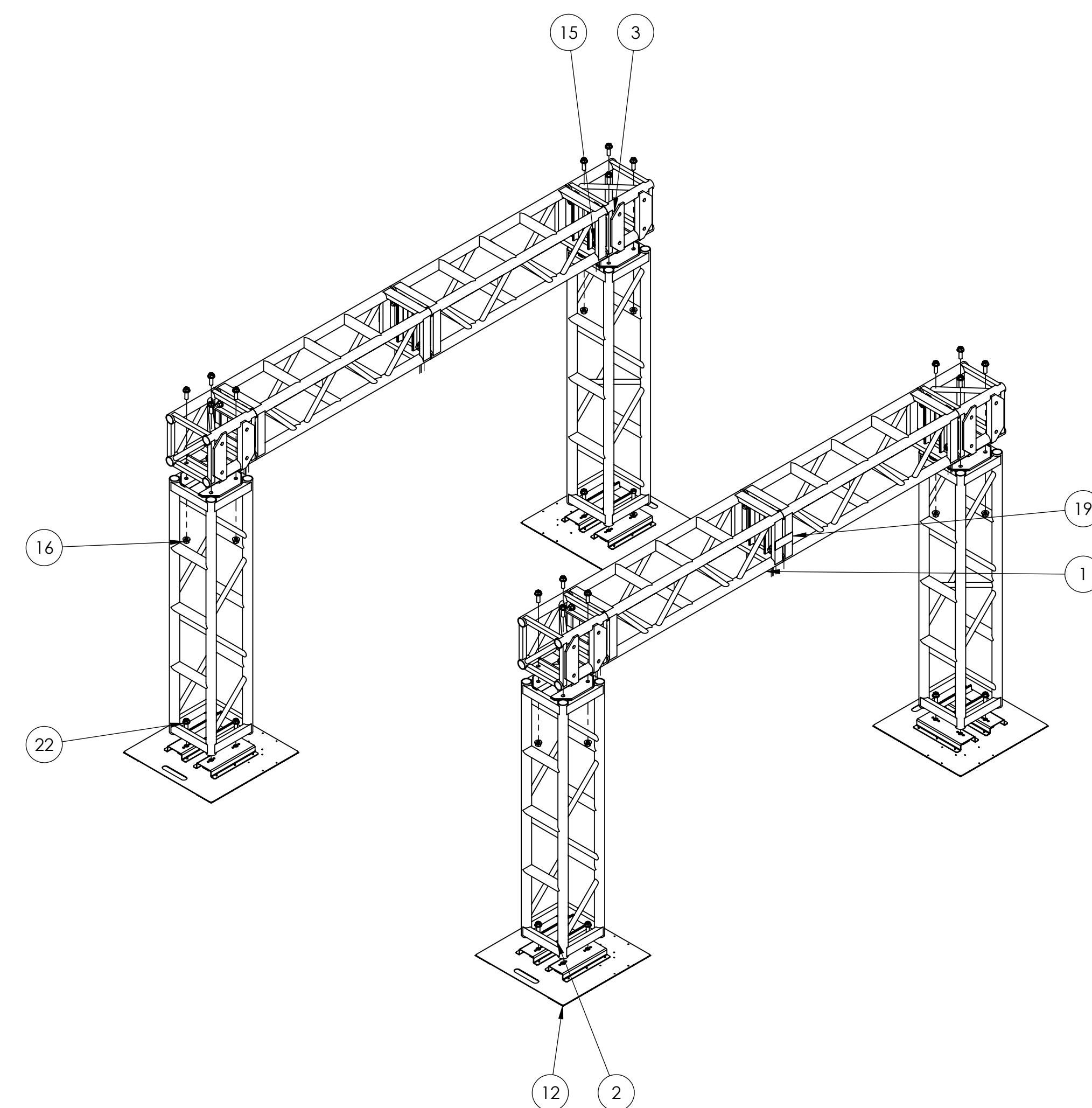
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	NW	9/29/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE: **Hangar**

SIZE DWG. NO. REV
C GE-22100

SCALE: 1:20 SHEET 2 OF 5

4

3

2

1

4

3

2

1

D

D

C

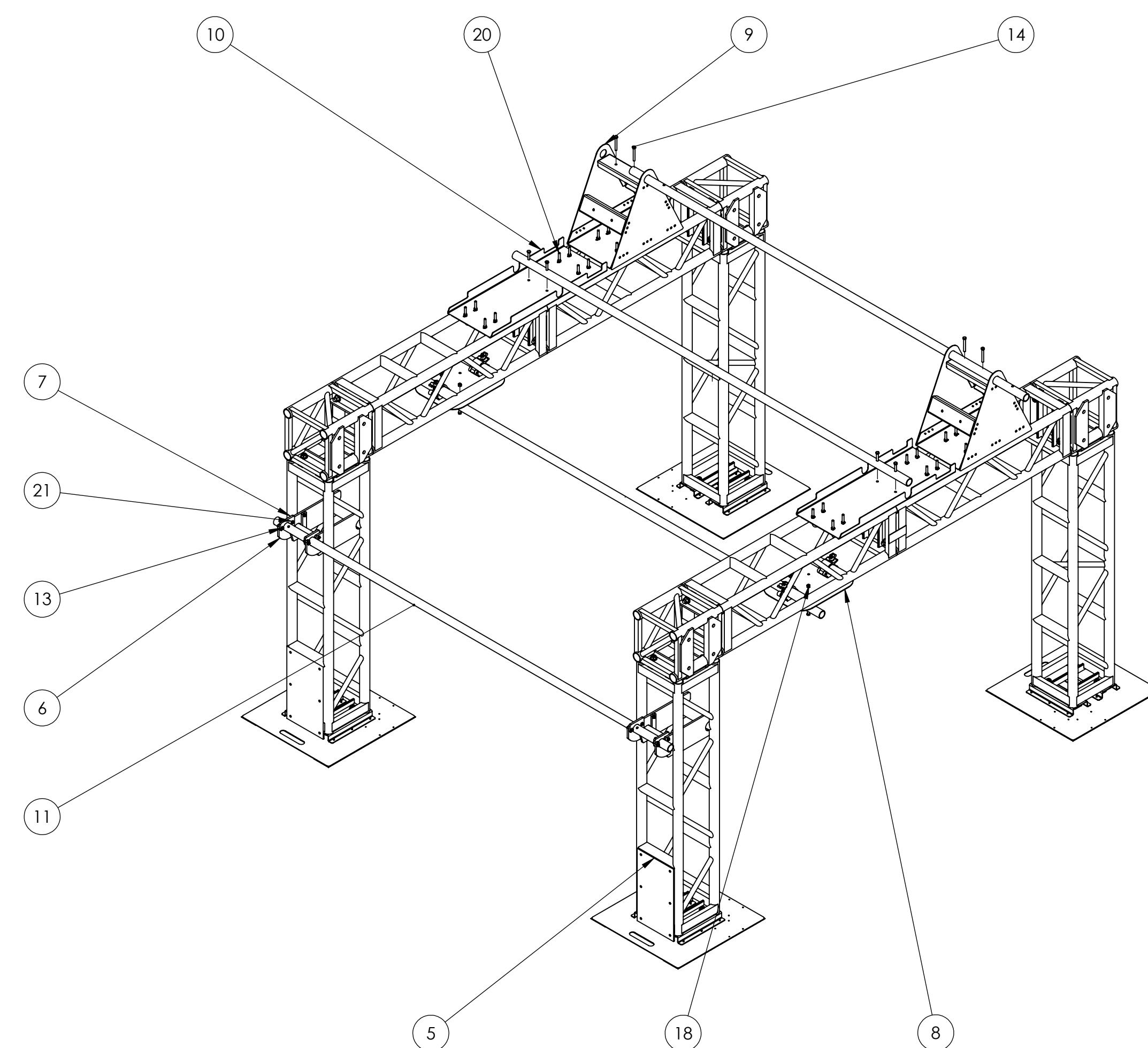
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	NW	9/29/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE:
Hangar

SIZE DWG. NO. REV
C GE-22100

SCALE: 1:20 SHEET 3 OF 5

4

3

2

1

4

3

2

1

D

D

C

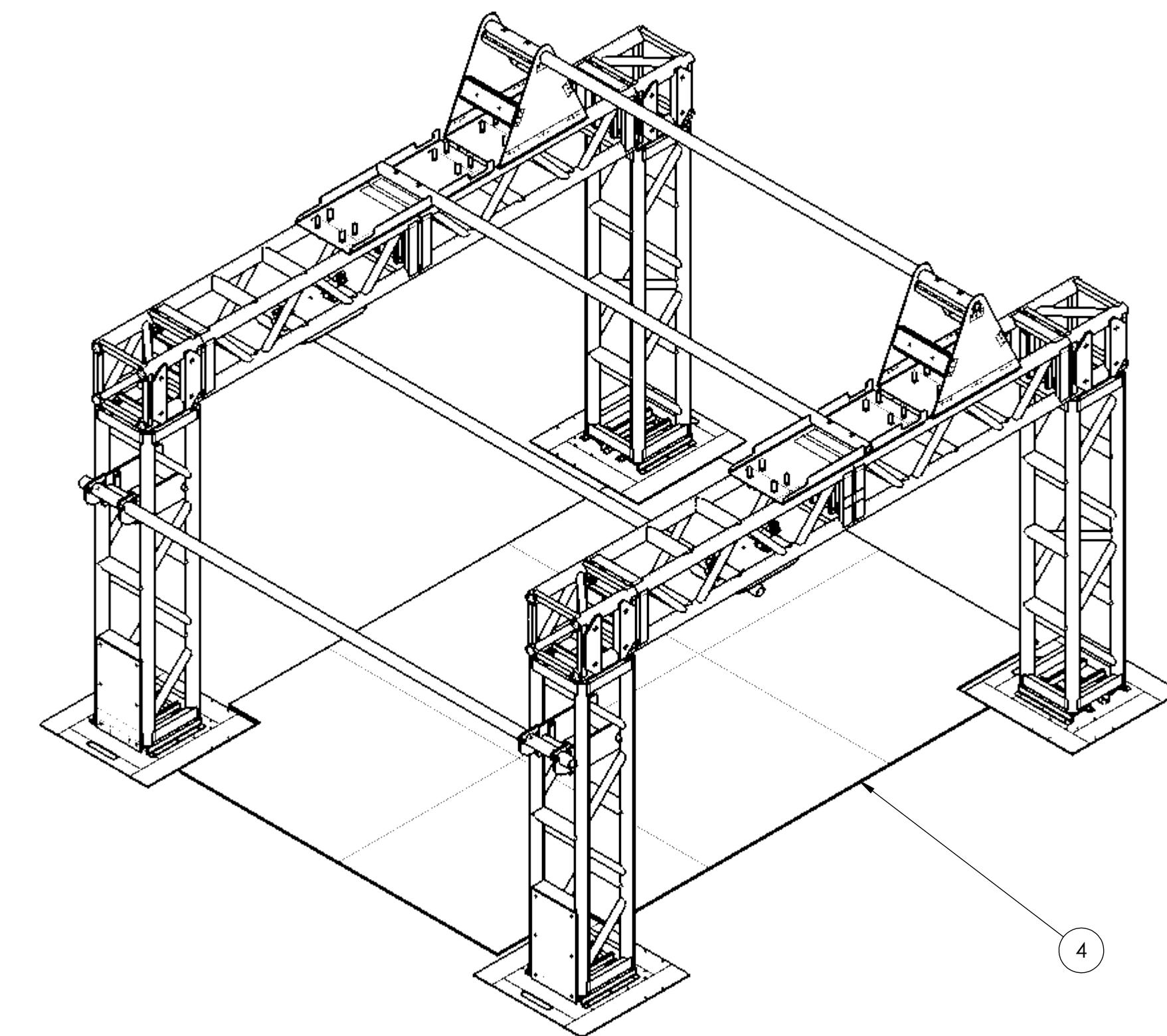
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	DRAWN	NW	9/29/2020
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
DO NOT SCALE DRAWING	C	GE-22100	
SCALE: 1:20		SHEET 4 OF 5	

SOLIDWORKS
Modeling Solutions Partner

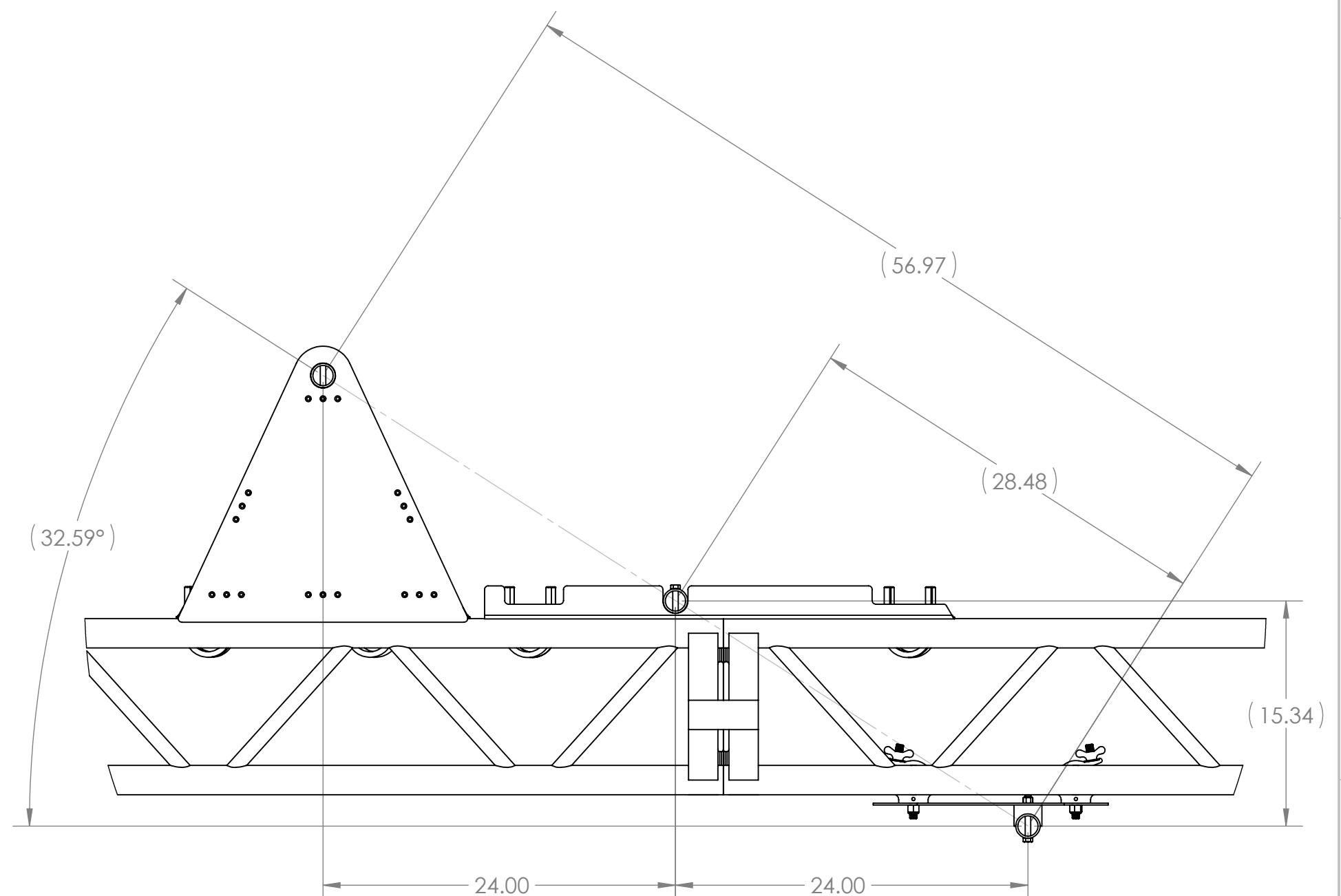
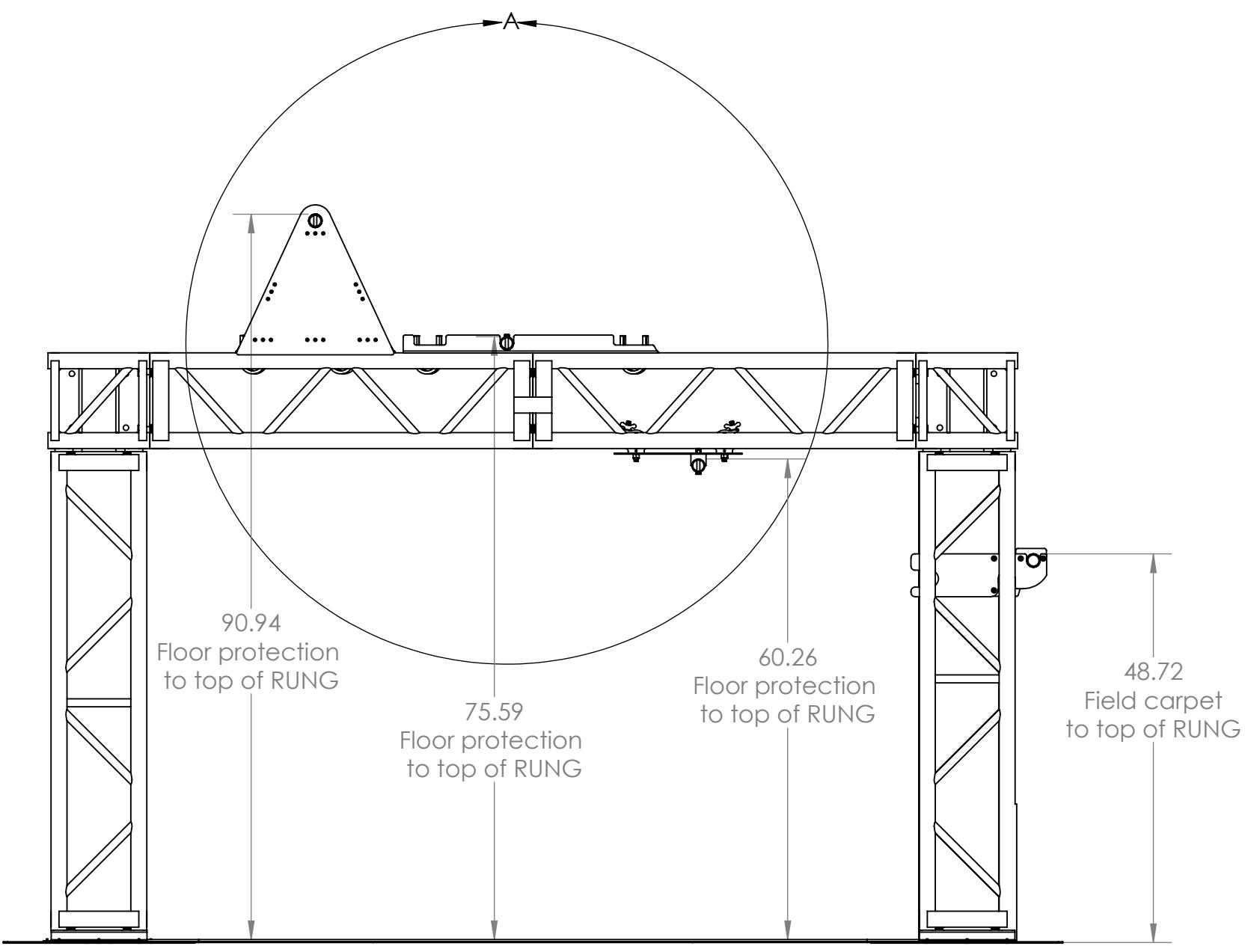
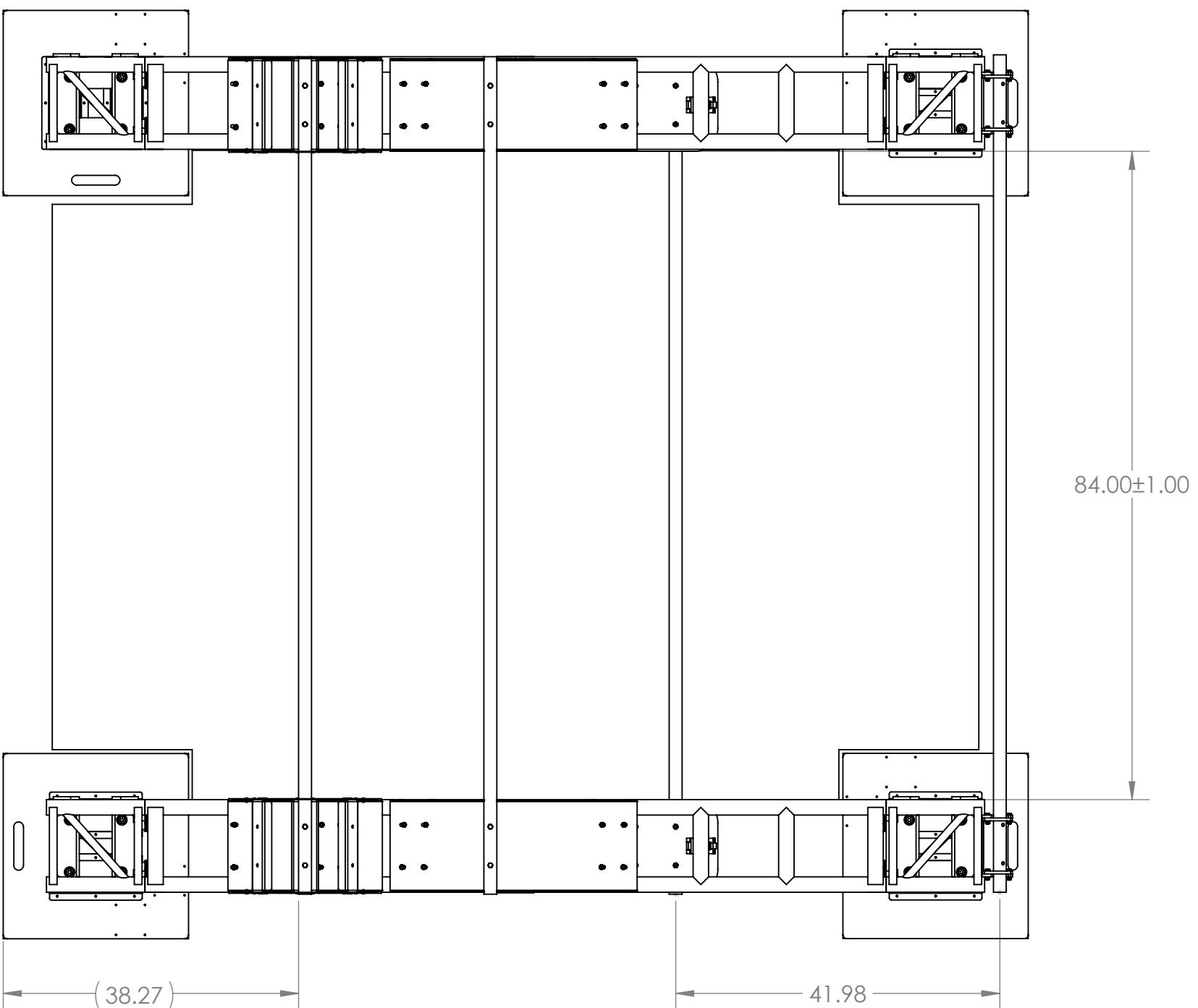
Hangar

4

3

2

1



Notes:
1. Dimensions in parentheses are for reference only.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	9/29/2020
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

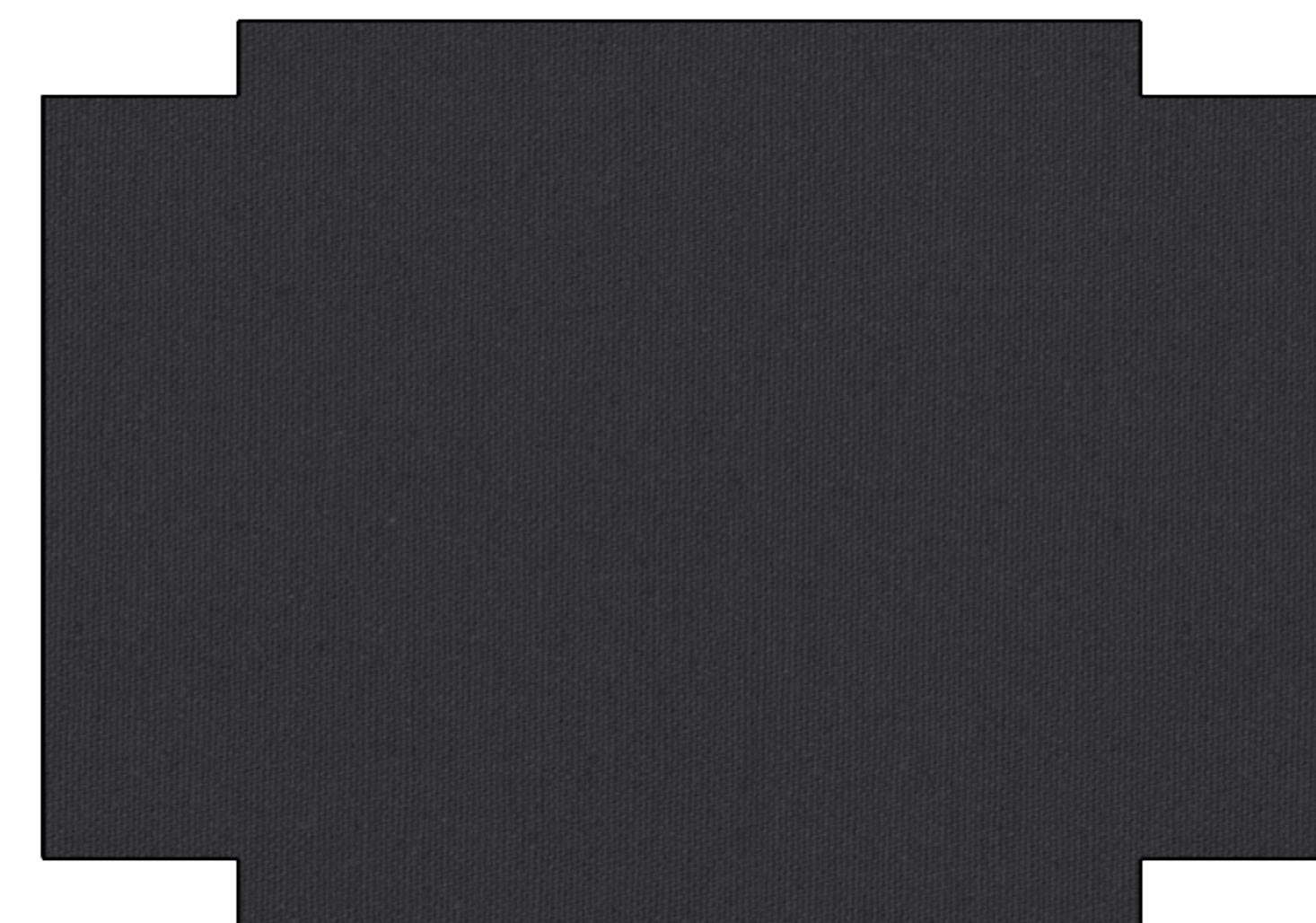
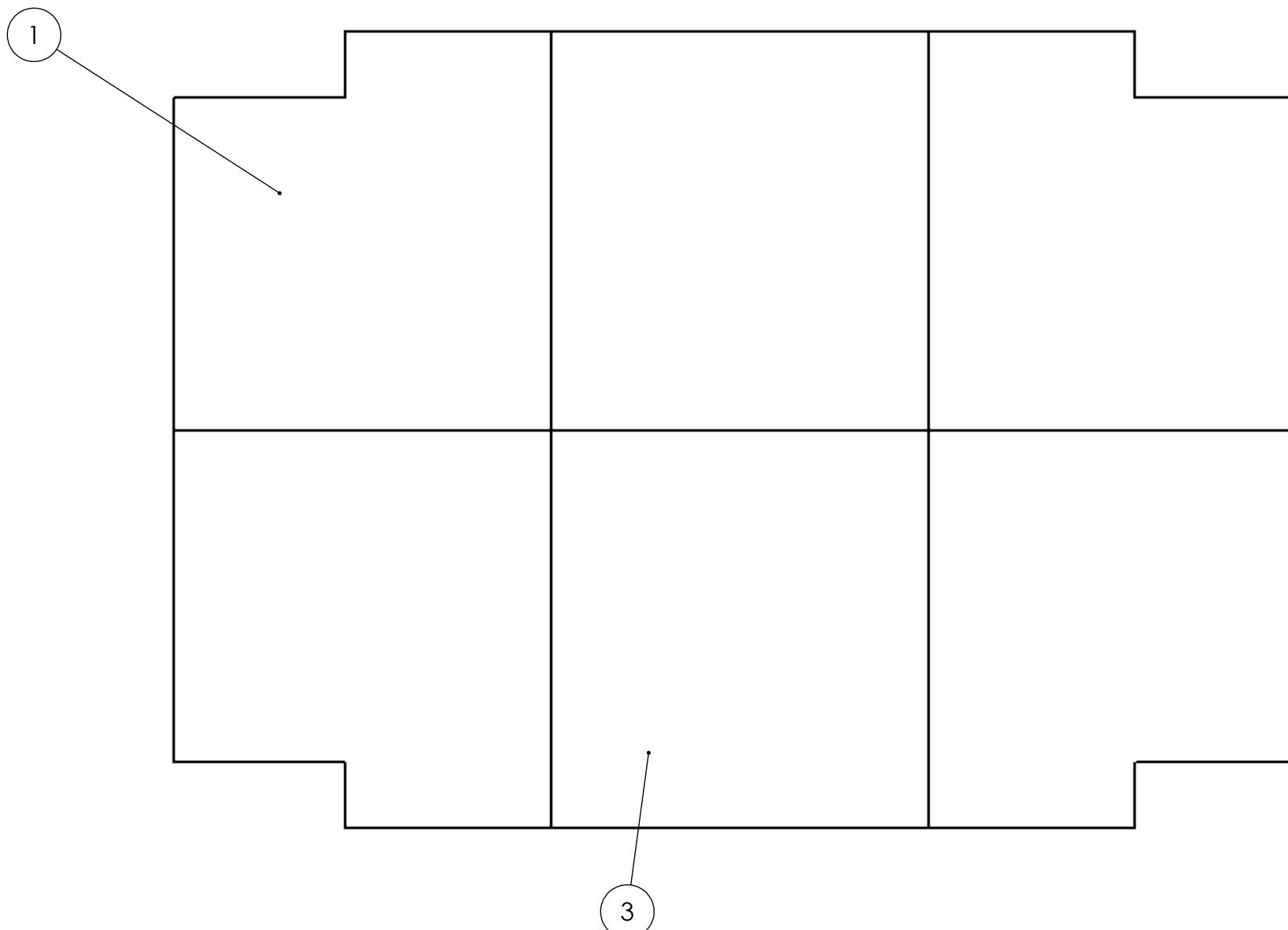
TITLE: Hangar

SIZE DWG. NO. REV

C GE-22100

SCALE: 1:18 SHEET 5 OF 5

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22102	notched floor protection section	4
2	GE-22105	floor protection carpet	1
3	GE-22104	Floor protection full	2



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	6/8/2020
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

Title: Floor Protection Assembly

Size: DWG. NO. **Rev:**

C GE-22101

Scale: 1:48 **Sheet:** 1 OF 1

4

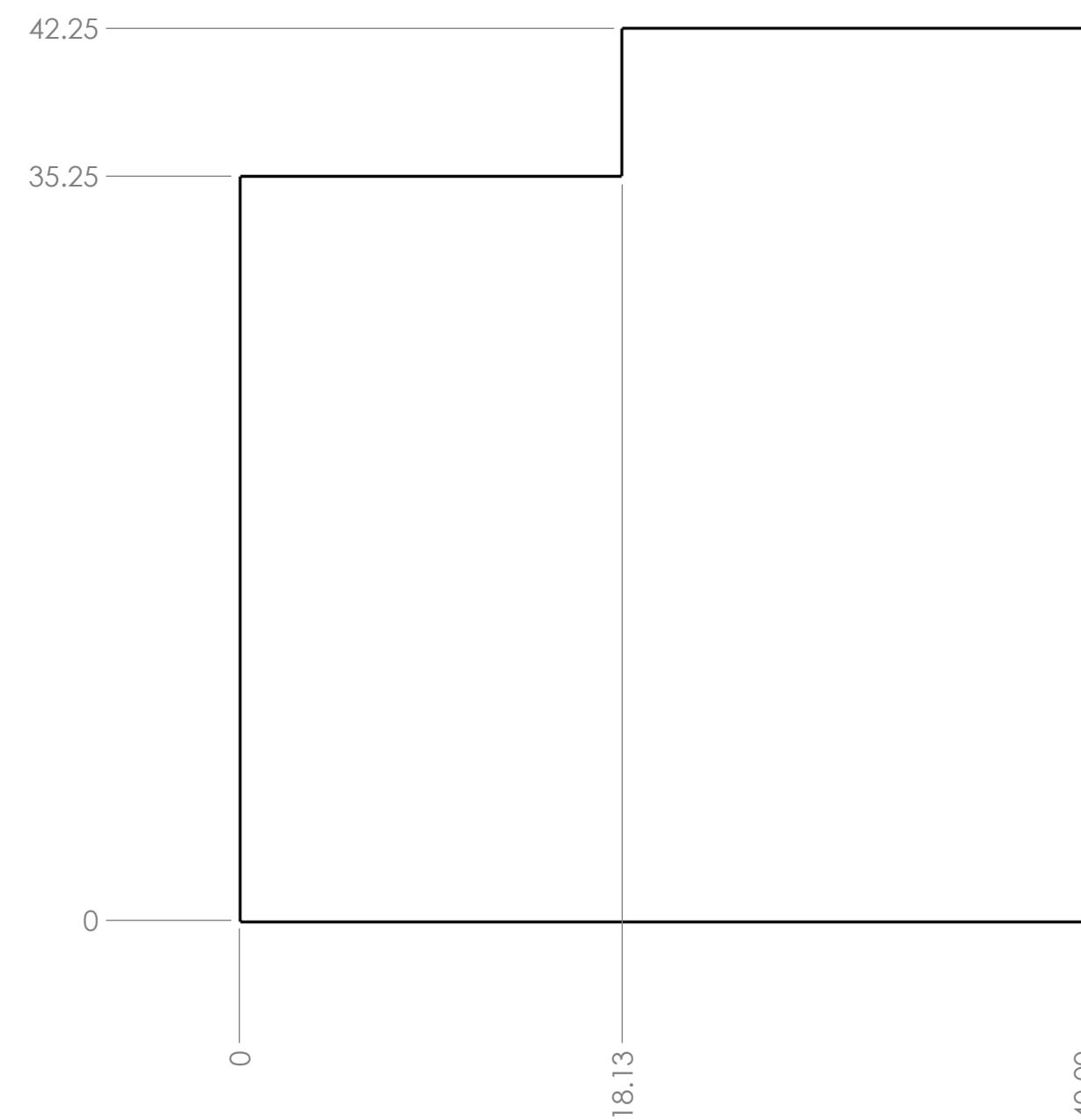
3

2

1

D

D

**Notes:**

1. Label or tag part.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	NW	6/3/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
0.125" Hardboard/ Masonite	C	GE-22102	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:16	SHEET 1 OF 1	

4

3

2

1

A

4

3

2

1

D

D

C

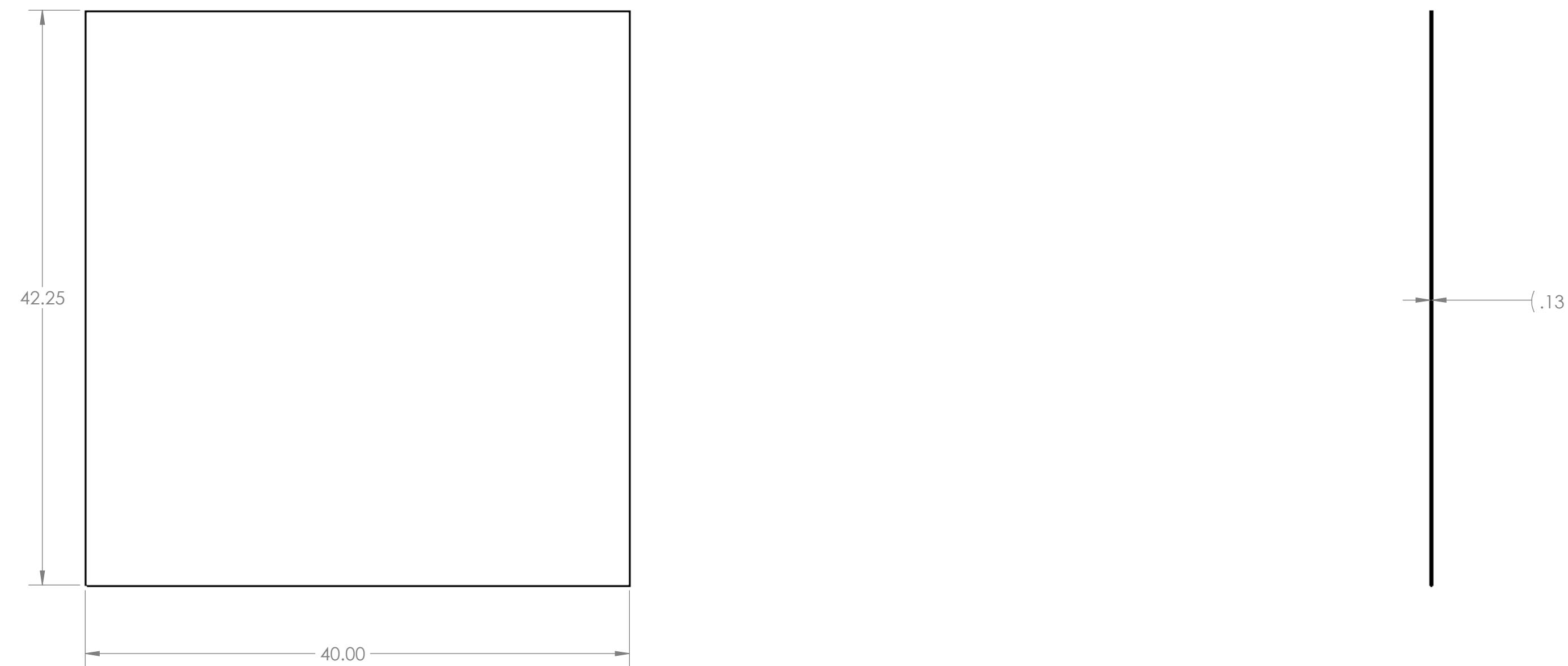
C

B

B

A

A



Notes:

1. Label or tag part.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	6/3/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
0.125" hardboard/ masonite	C	GE-22104	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:16	SHEET 1 OF 1	

4

3

2

1

4

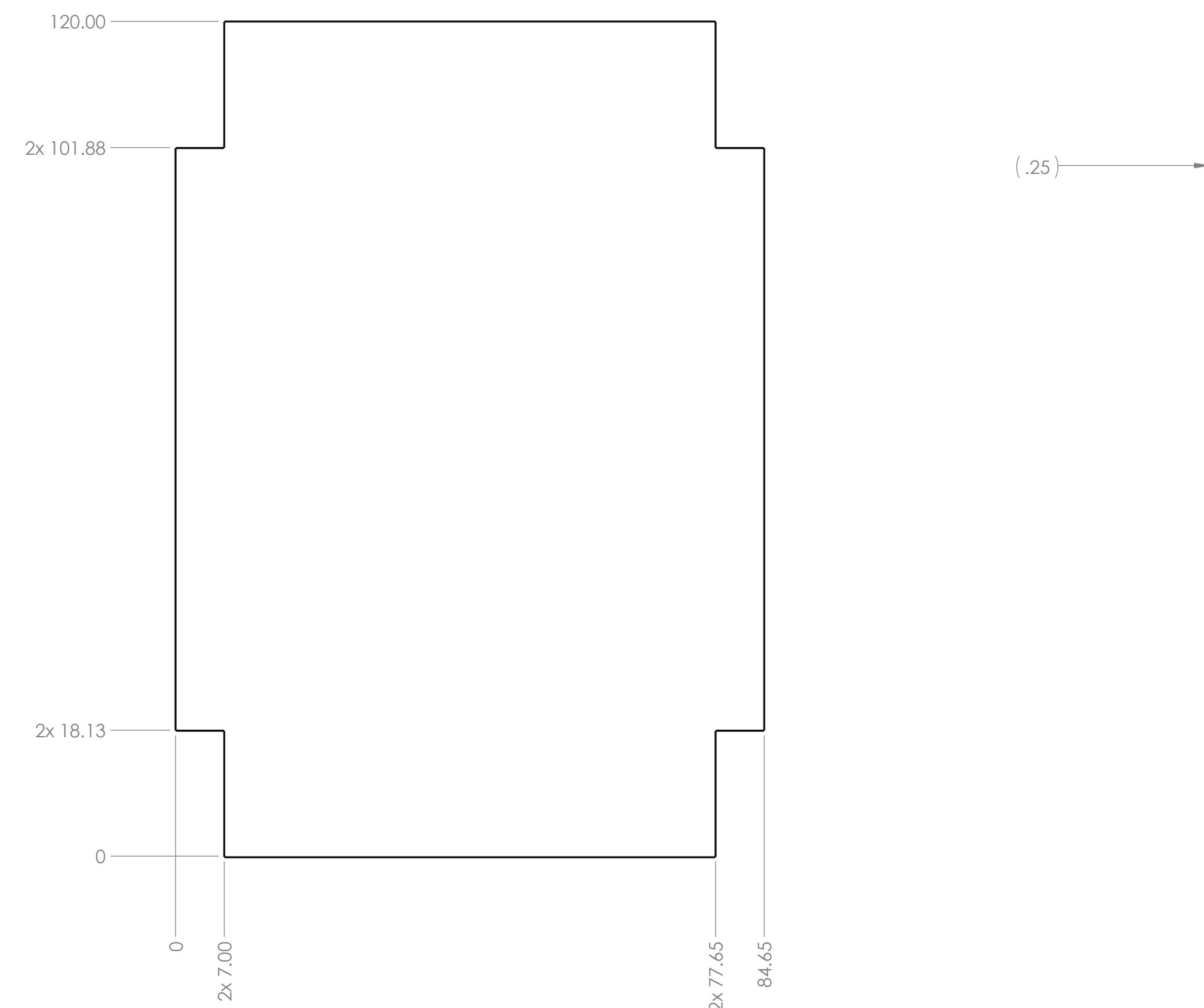
3

2

1

D

D



C

C

B

B

A

A

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	NW	6/8/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
Shaw Neyland II	C	GE-22105	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:32	SHEET 1 OF 1	



SOLIDWORKS
Modeling Solutions Partner

TITLE:
floor protection
carpet

SIZE DWG. NO. REV
C GE-22105

SCALE: 1:32 SHEET 1 OF 1

4

3

2

1

4

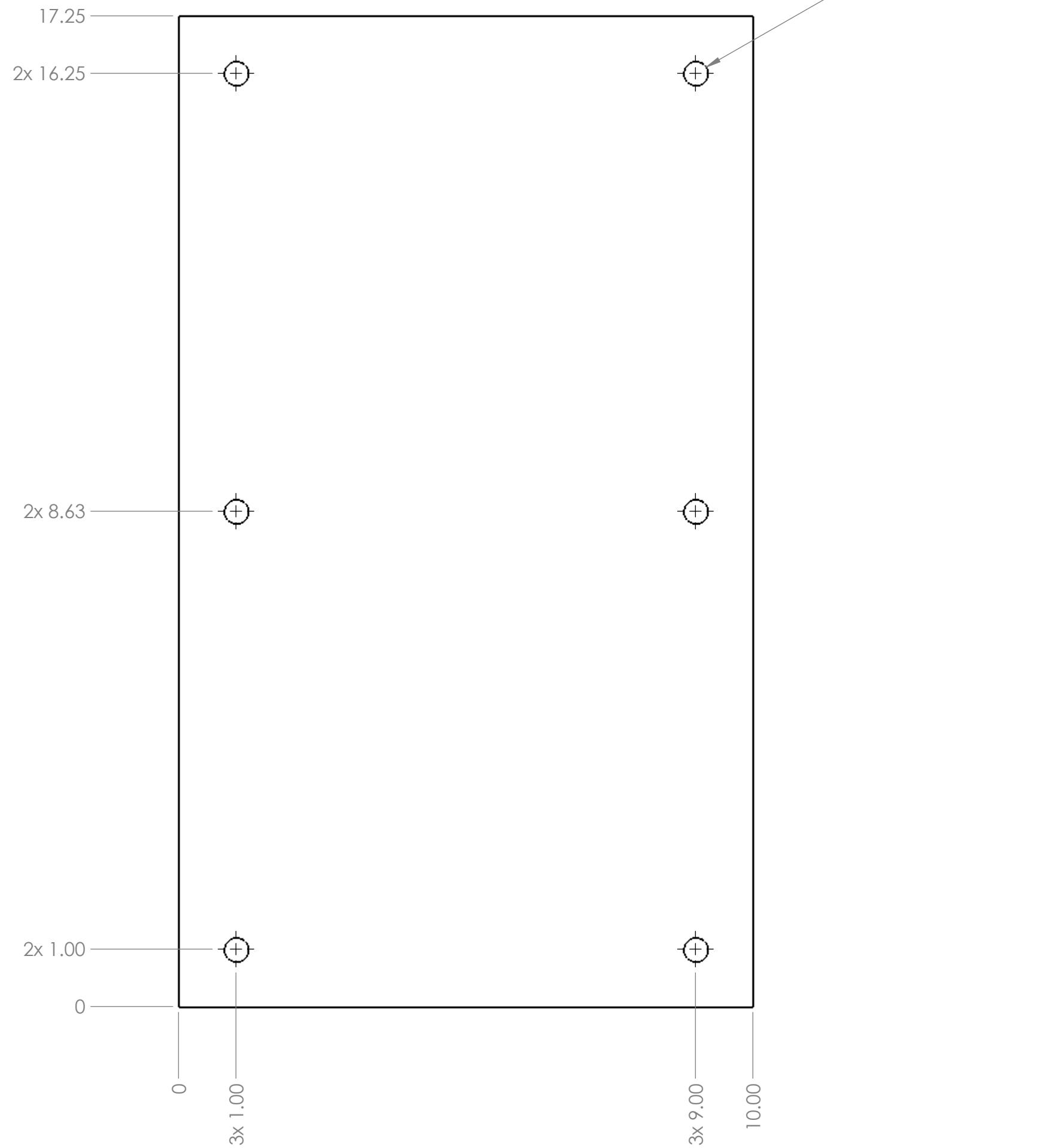
3

2

1

D

D

**Notes:**

1. Label or mark with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	7/1/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: .25" Red HDPE, smooth			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner			
TITLE: Launch Pad Red			
SIZE DWG. NO. REV			
C GE-22106			
SCALE: 1:2 SHEET 1 OF 1			

4

3

2

1

D

C

B

A

4

3

2

1

D

D

C

C

B

B

2x 1.00

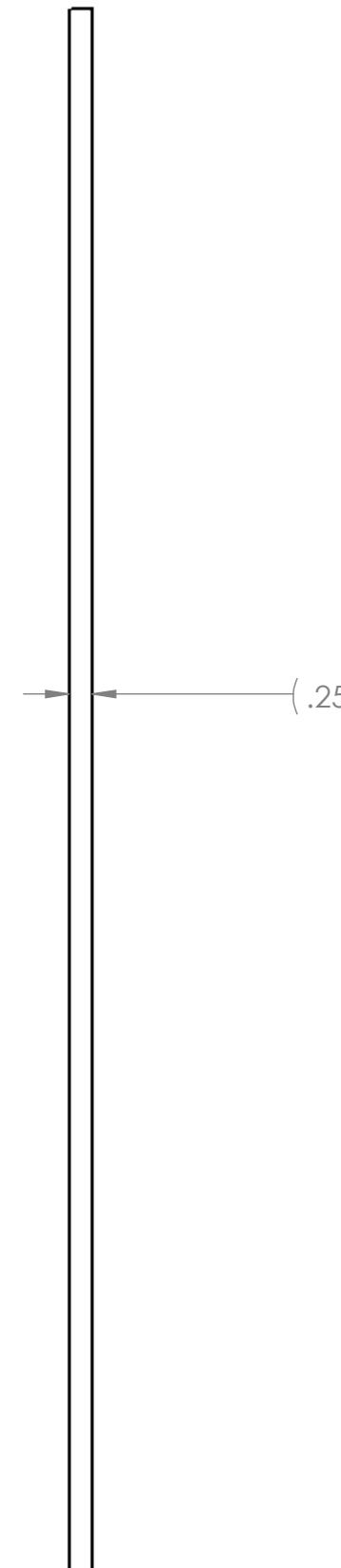
3x 1.00

2x 8.63

3x 9.00

10.00

2x 16.25

6X ϕ .42 THRU ALL**Notes:**

1. Label or mark with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	7/1/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
.25" Blue HDPE, smooth	C	GE-22107	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:2	SHEET 1 OF 1	

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Launch pad
blue**

4

3

2

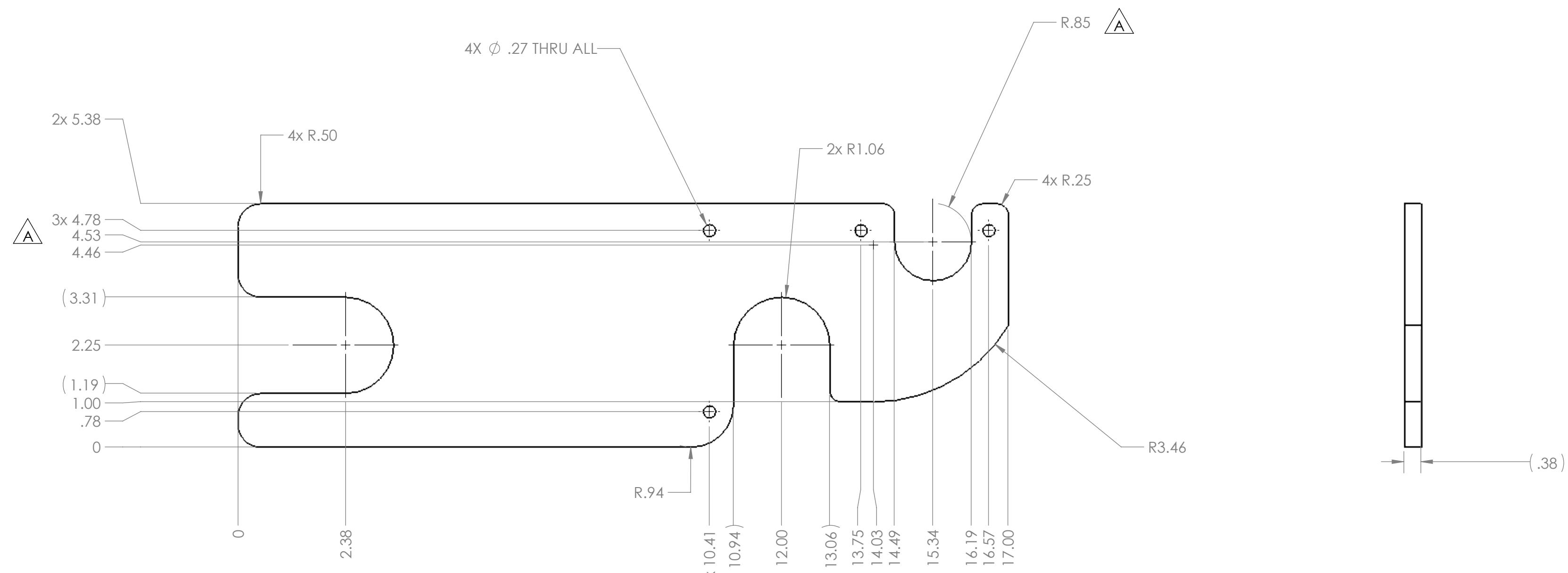
1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
C4, D2	A	R .85 was R.83 4.53 was 4.55	11/18/2021	NTW

D

D



Notes:

1. Label or tag with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
	DRAWN	NW	6/5/2020
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 3/8" Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



TITLE:
Low bar holder

SIZE DWG. NO. REV
C GE-22111 A

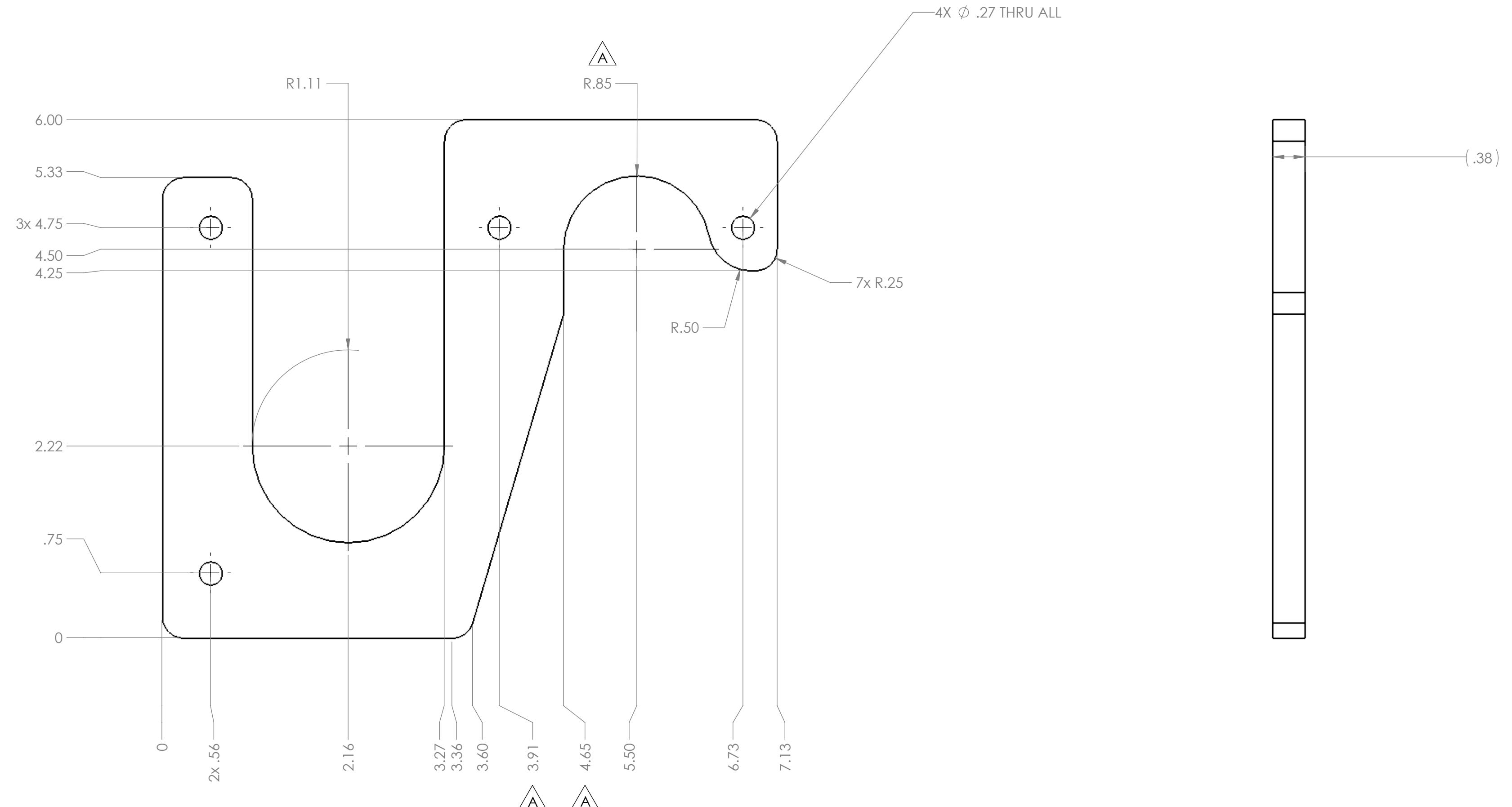
SCALE: 1:4 SHEET 1 OF 1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3, D3	A	R .85 was R .83, 3.91 was 3.93, 4.65 was 4.67	11/18/2021	NTW

D

D



Notes:

1. Label or tag with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	6/5/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 3/8" Polycarbonate, clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



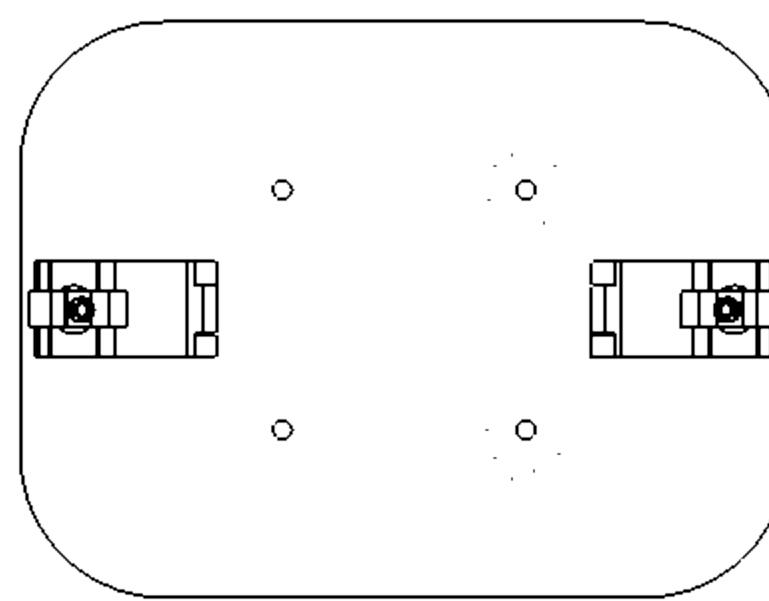
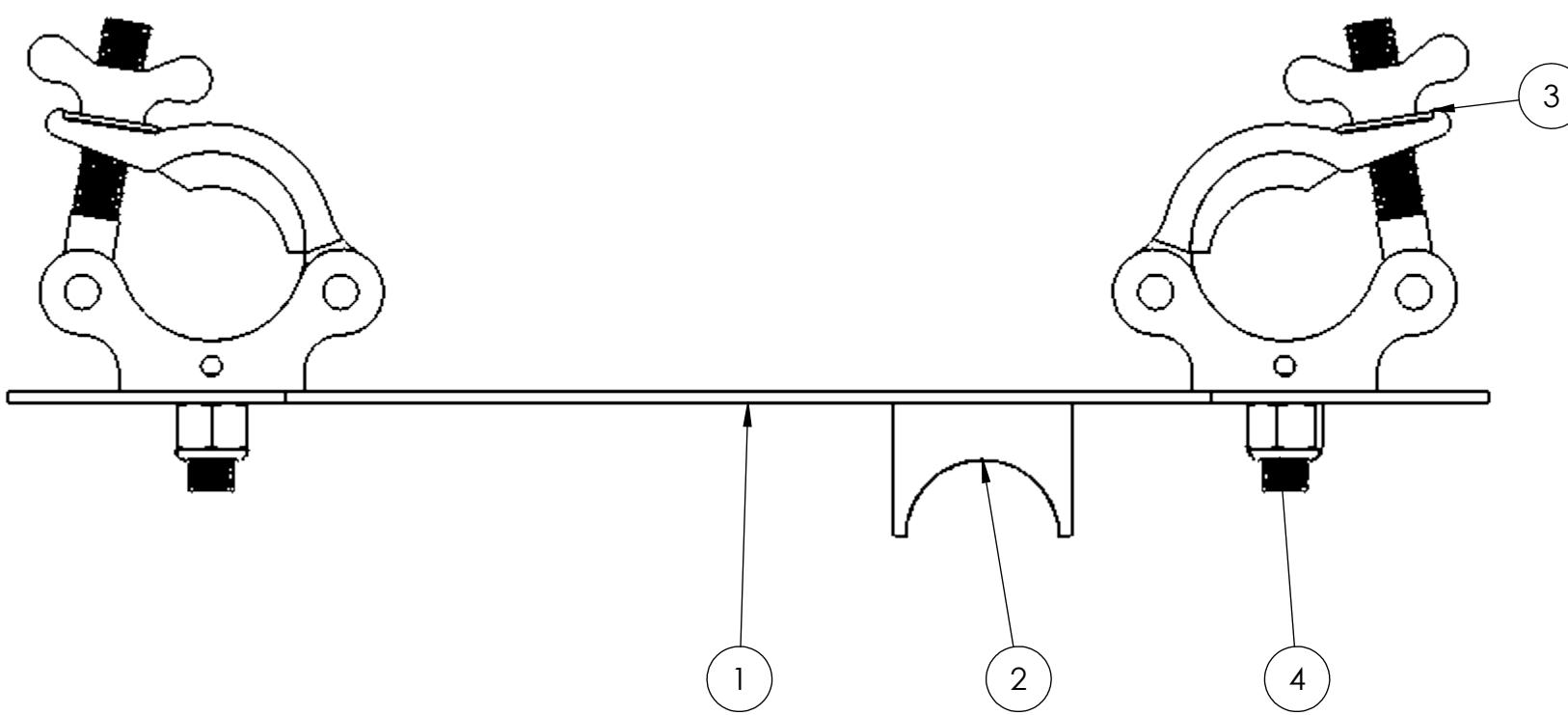
TITLE:
Low bar clamp

SIZE DWG. NO. REV
C GE-22112 A

SCALE: 1:4 SHEET 1 OF 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22121	Under hung plate	1
2	GE-22123	Pipe Saddle	2
3	FE-01016	Cheeseborough for Truss _ Single	2
4	nylock_.5_13	steel nylon-insert locknut, 1/2" - 13	2

D



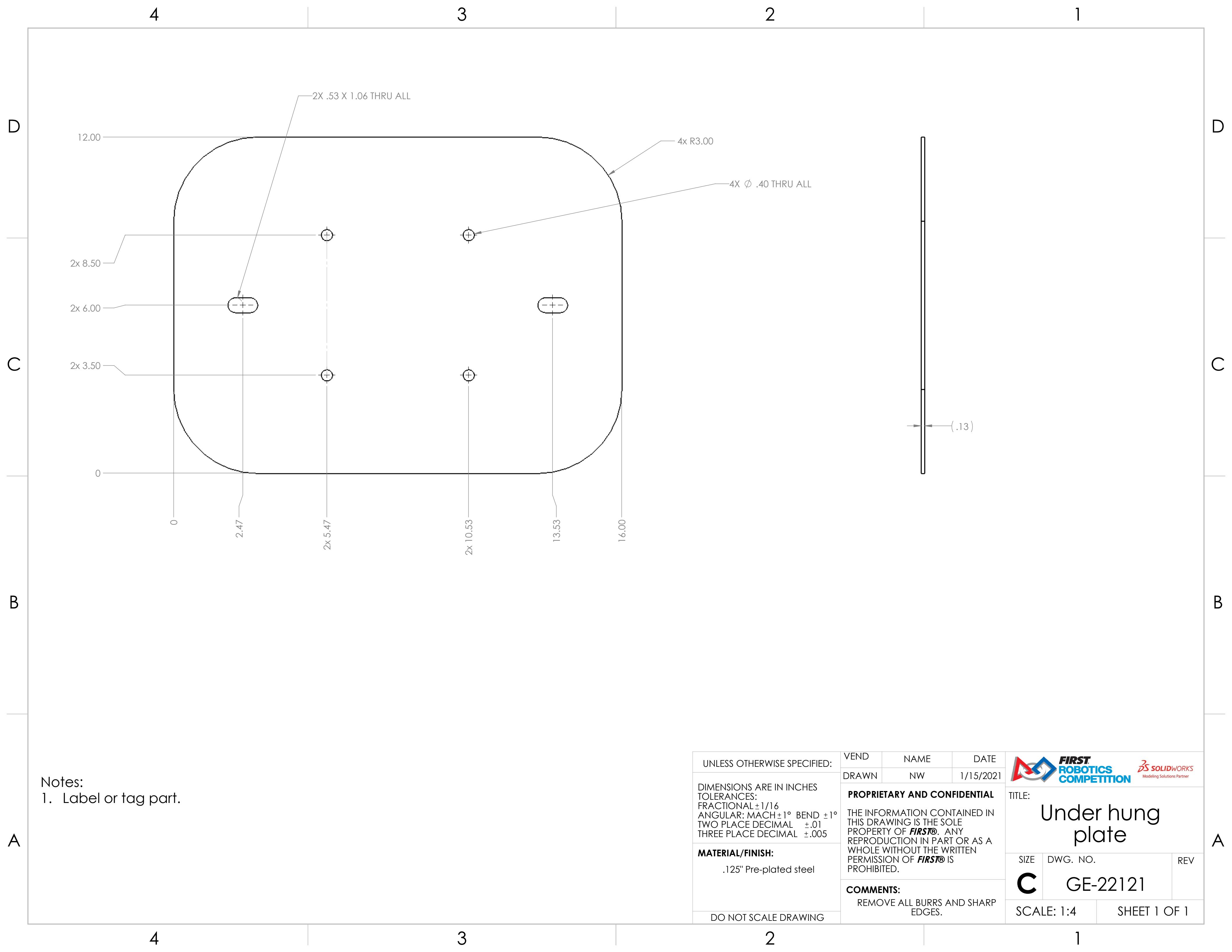
UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	3/4/2021
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

under hung assembly

SIZE DWG. NO. REV
C GE-22120

SCALE: 1:4 SHEET 1 OF 1



4

3

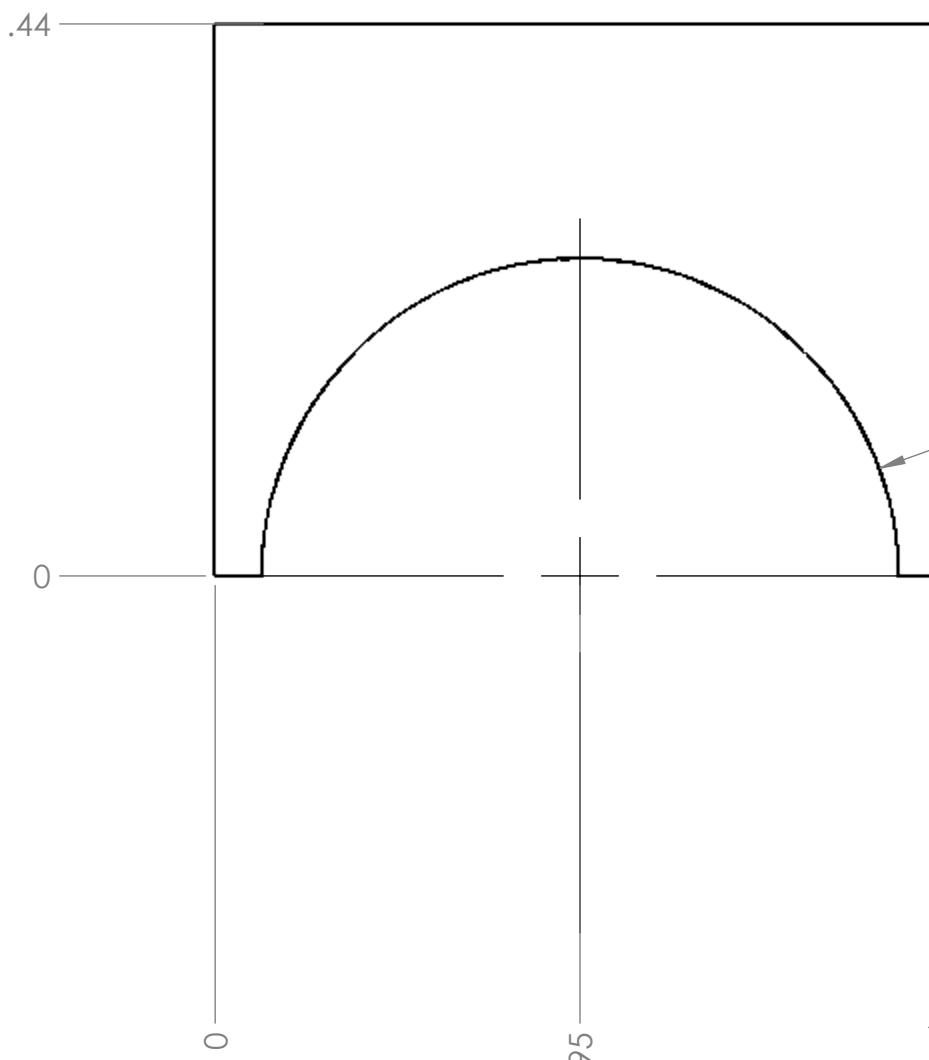
2

1

D

D

1.44



C

C

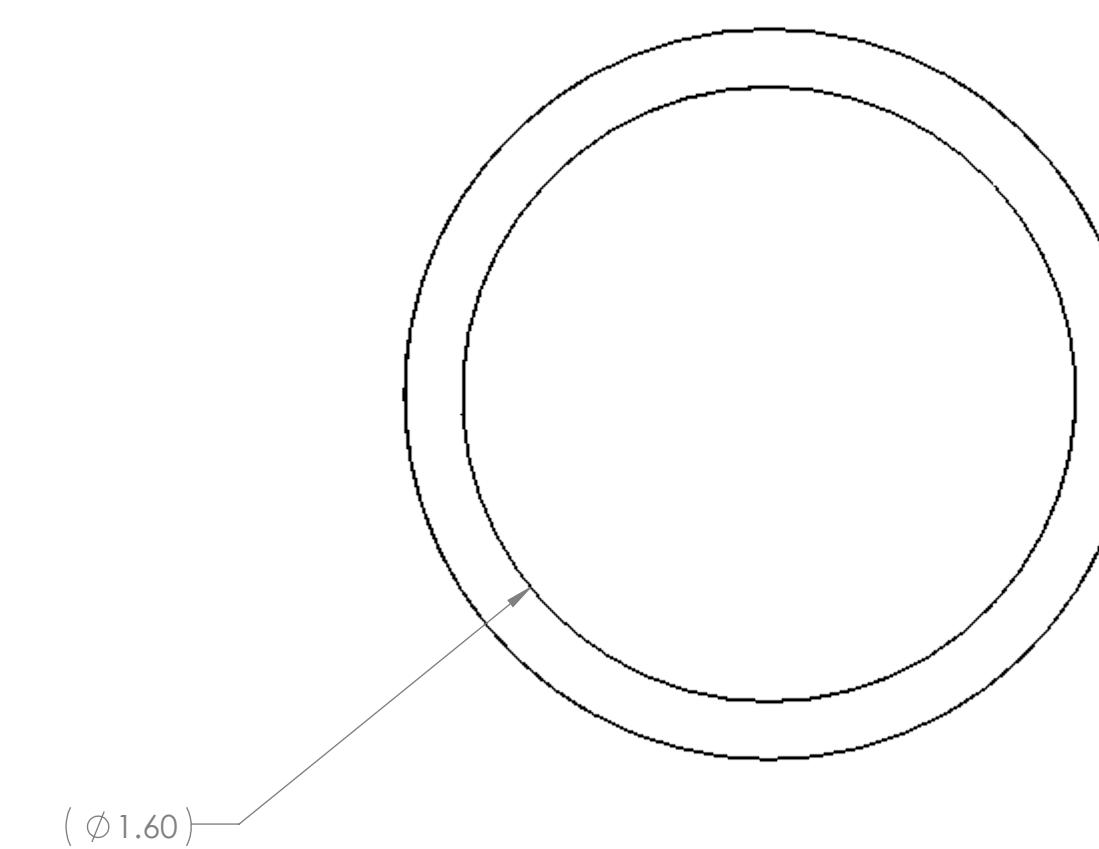
0

.95

(1.90)

B

B



(1.60)

Notes:

1. Label or tag with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	2/18/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1.5" sch 40 aluminum	C	GE-22123	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Pipe Saddle

SIZE DWG. NO. REV
C GE-22123

4

3

2

1

A

A

4

3

2

1

D

D

C

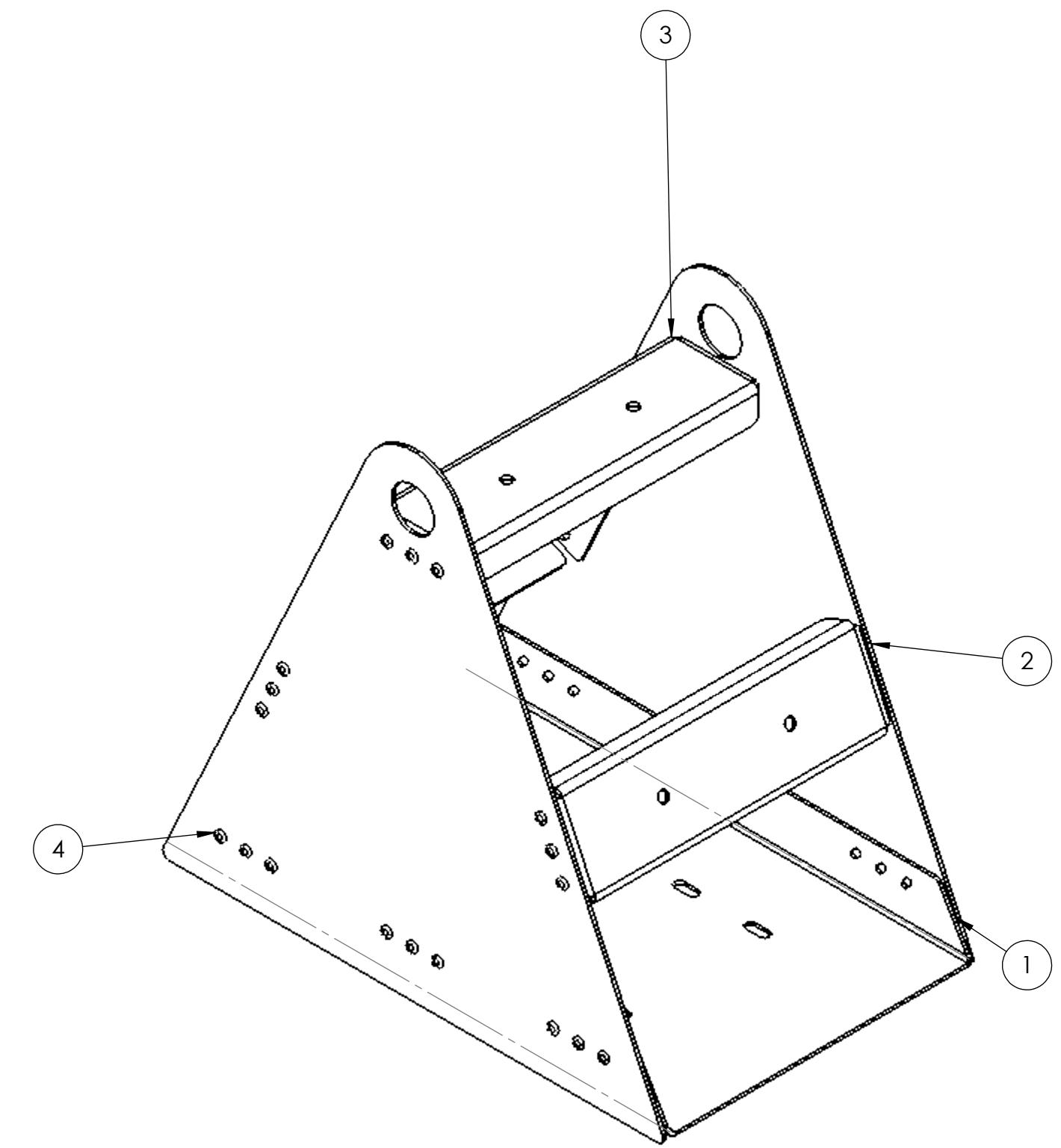
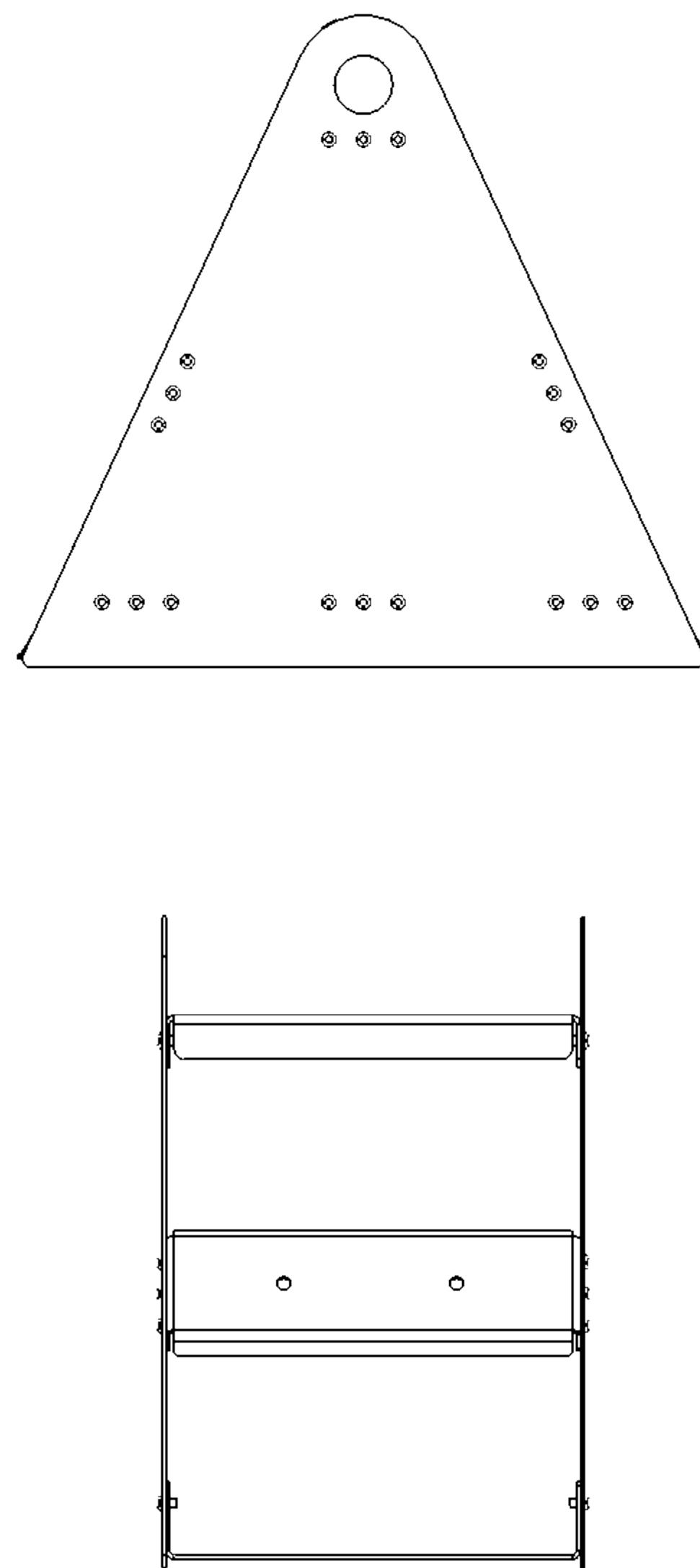
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22131	upper bar base	1
2	GE-22132	High bar side plate	2
3	GE-22133	Upper holder cross	3
4	rivet_1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	36

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
			DRAWN	NW	1/15/2021
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
COMMENTS:					
REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					

FIRST ROBOTICS COMPETITION Modeling Solutions Partner

Upper transition bar holder

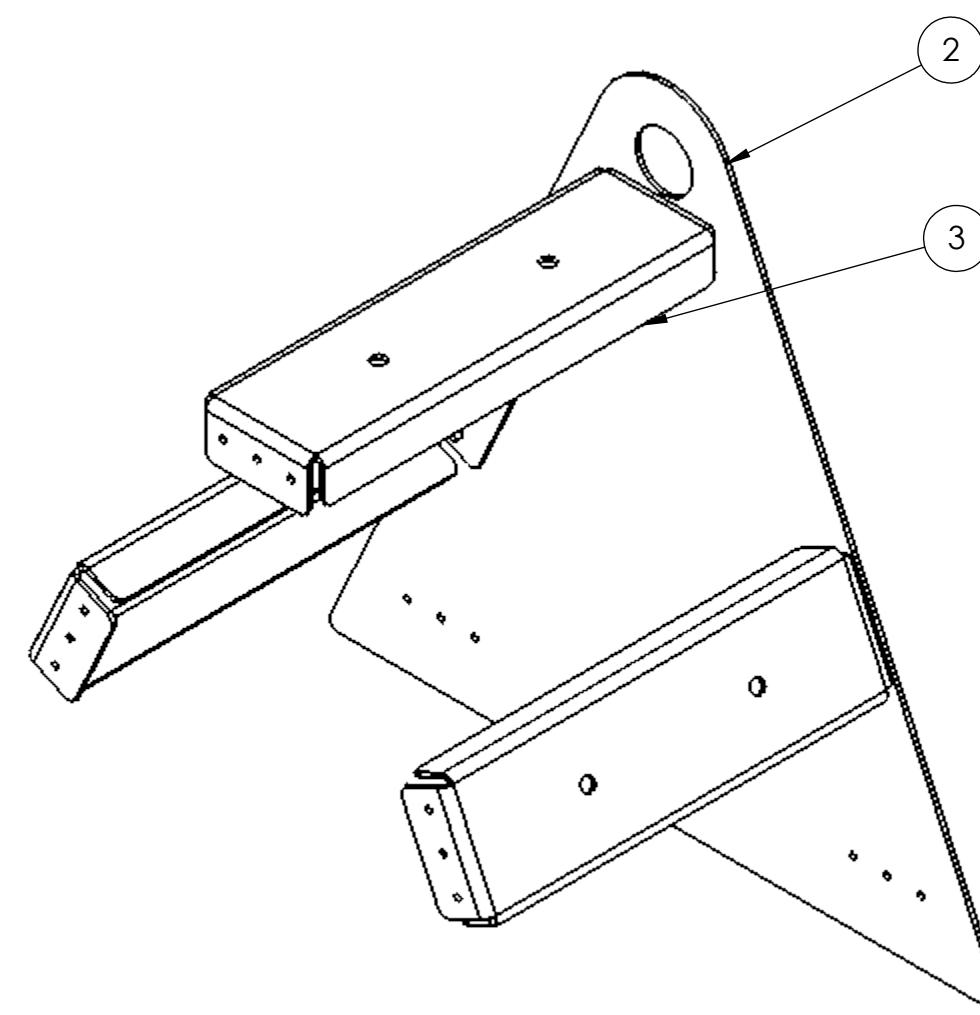
SIZE	DWG. NO.	REV
C	GE-22130	

SCALE: 1:8 SHEET 1 OF 3

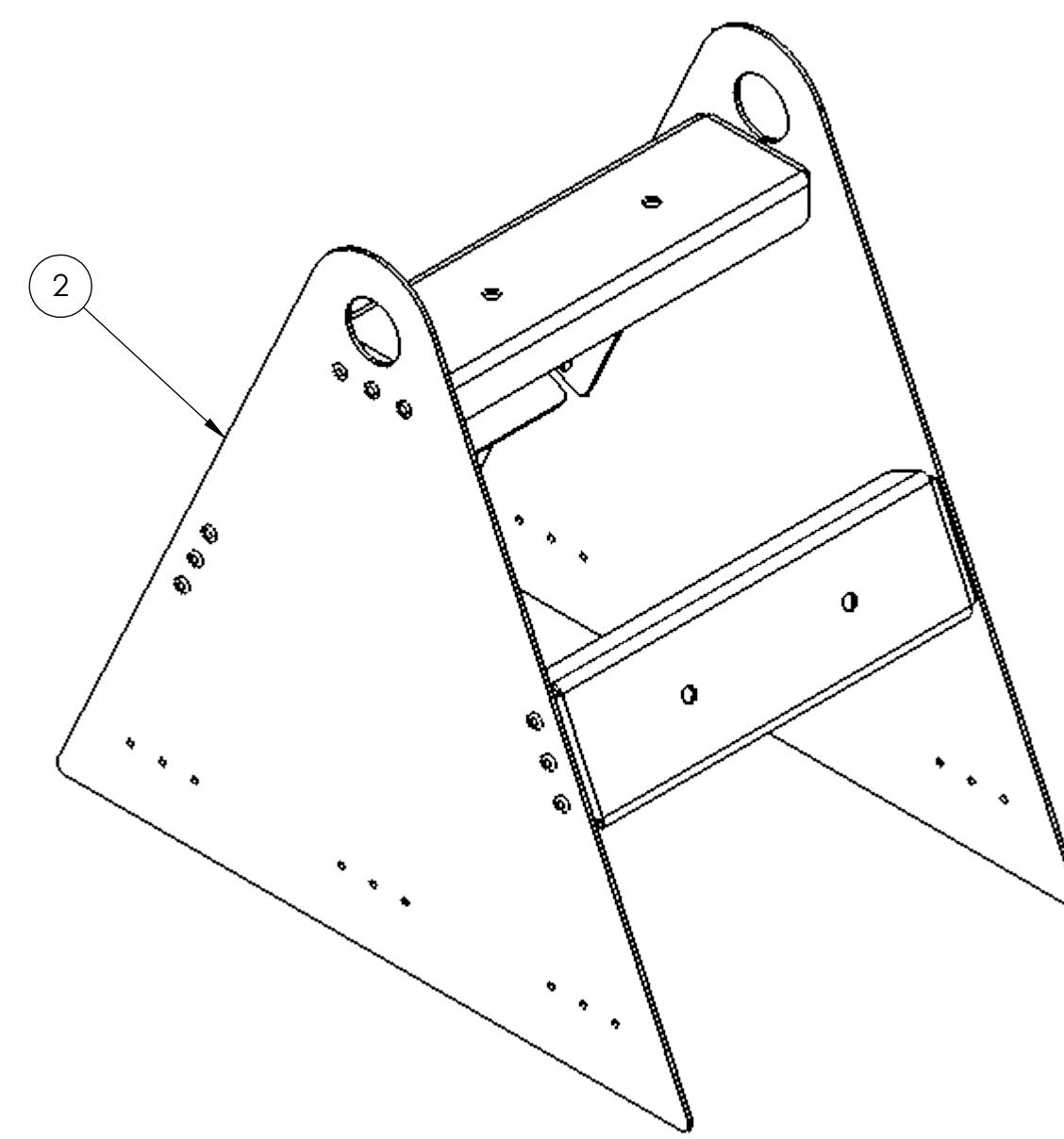
D

D

Step 1



Step 2



Notes:

- Rivet (3) to (2) with 3/16" steel rivets in three locations.

Notes:

- Rivet (2) to step 1 with 3/16" steel rivets.

B

B

A

A

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	1/15/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22130	
COMMENTS:		REMOVE ALL BURRS AND SHARP EDGES.	
DO NOT SCALE DRAWING		SCALE: 1:8	SHEET 2 OF 3

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Upper transition
bar holder**

4

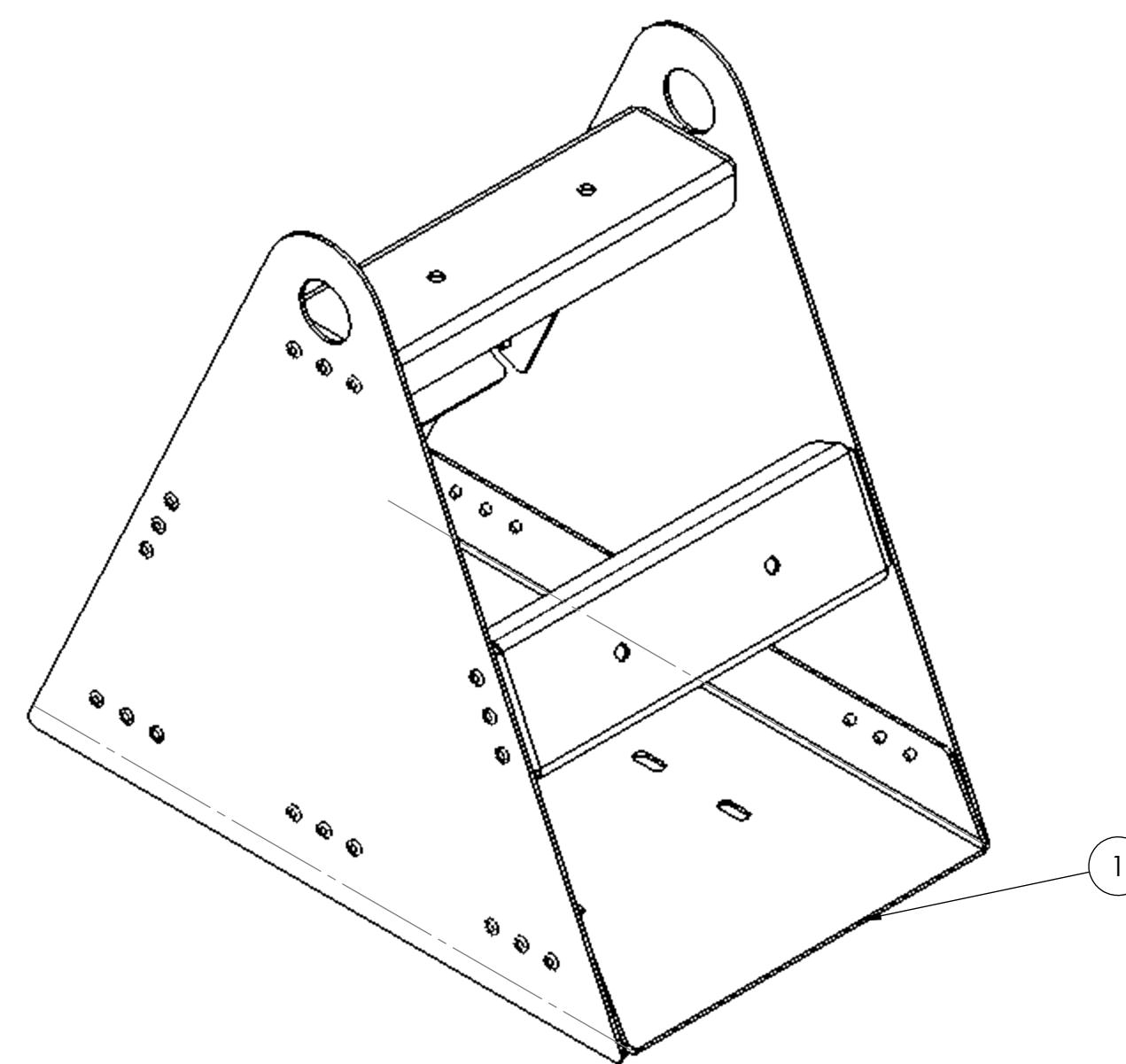
3

2

1

D

Step 3:



C

B

Notes:

- Rivet 1 to step 2 with 3/16 steel rivets.

A

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	1/15/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
TITLE: Upper transition bar holder			
SIZE DWG. NO. REV			
C GE-22130			
SCALE: 1:8 SHEET 3 OF 3			

4

3

2

1

D

C

B

A

4

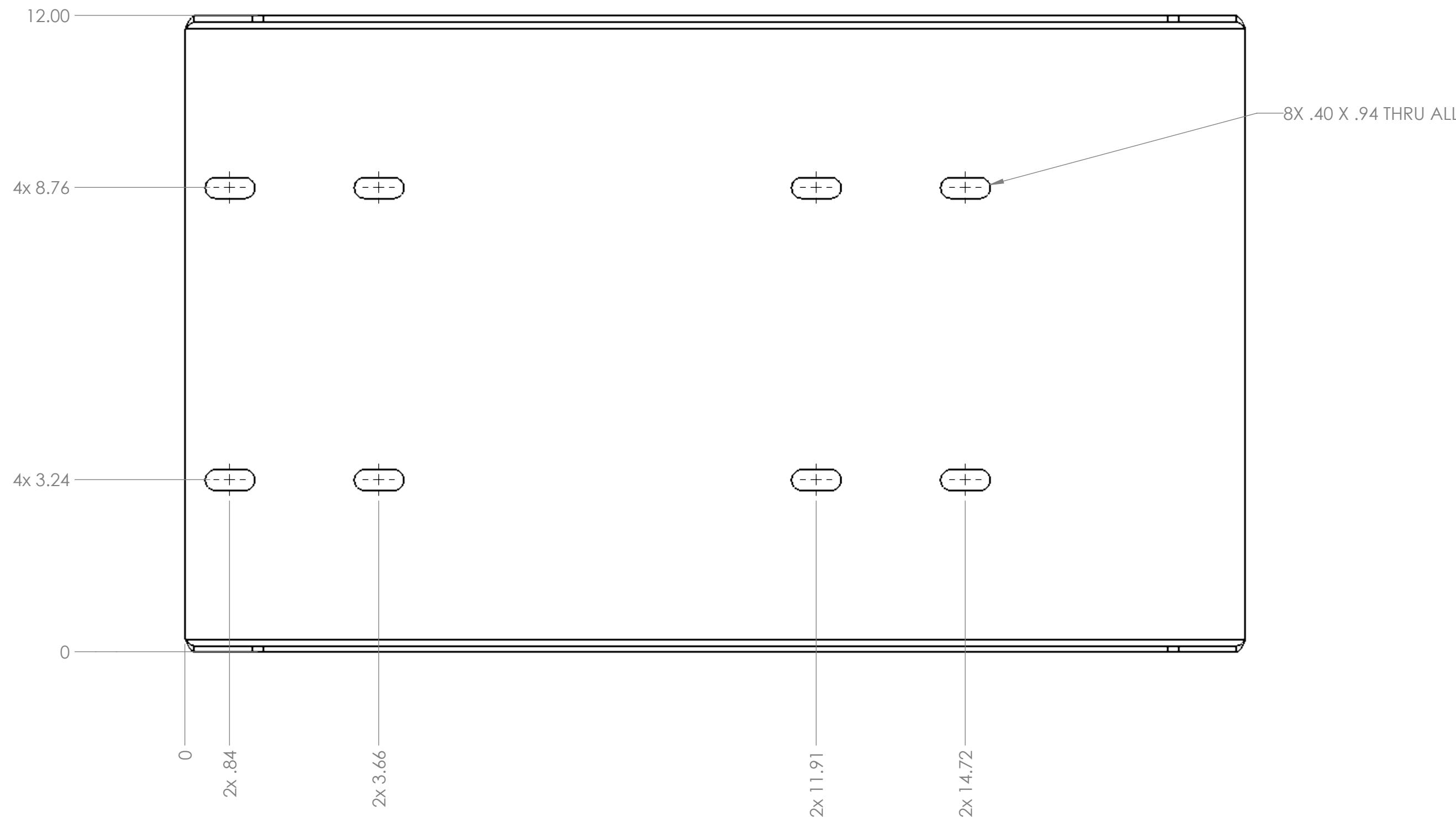
3

2

1

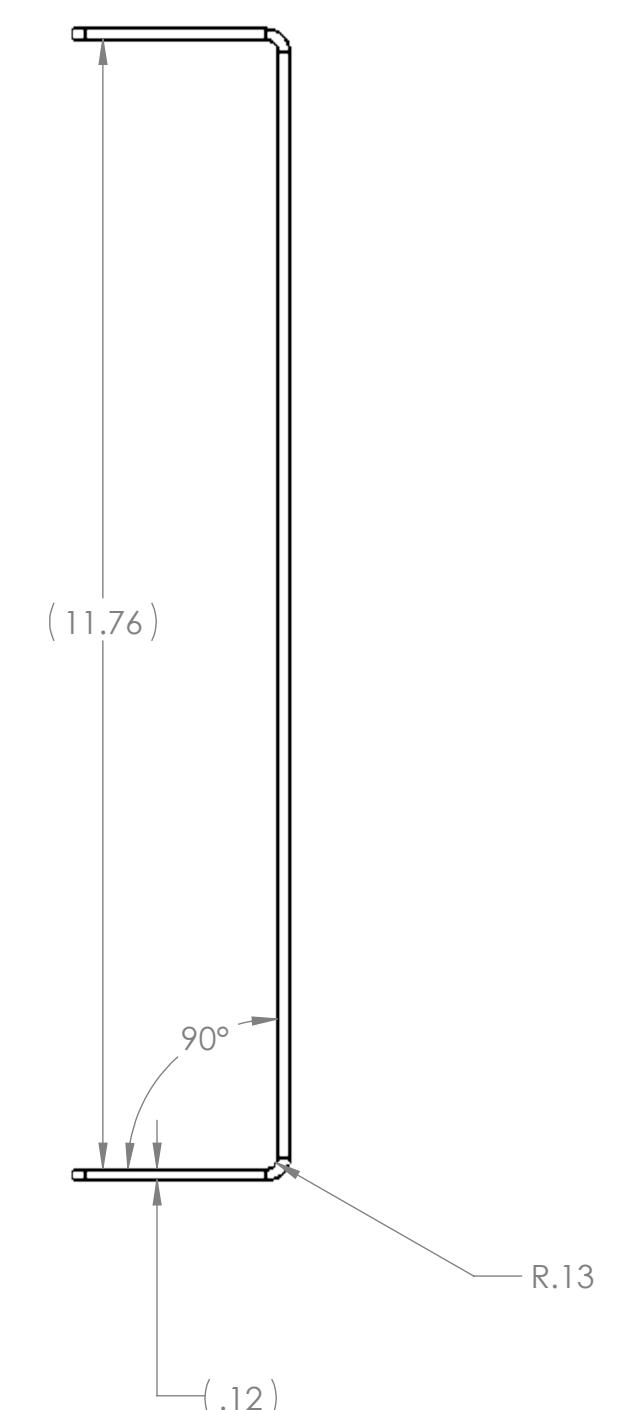
D

D



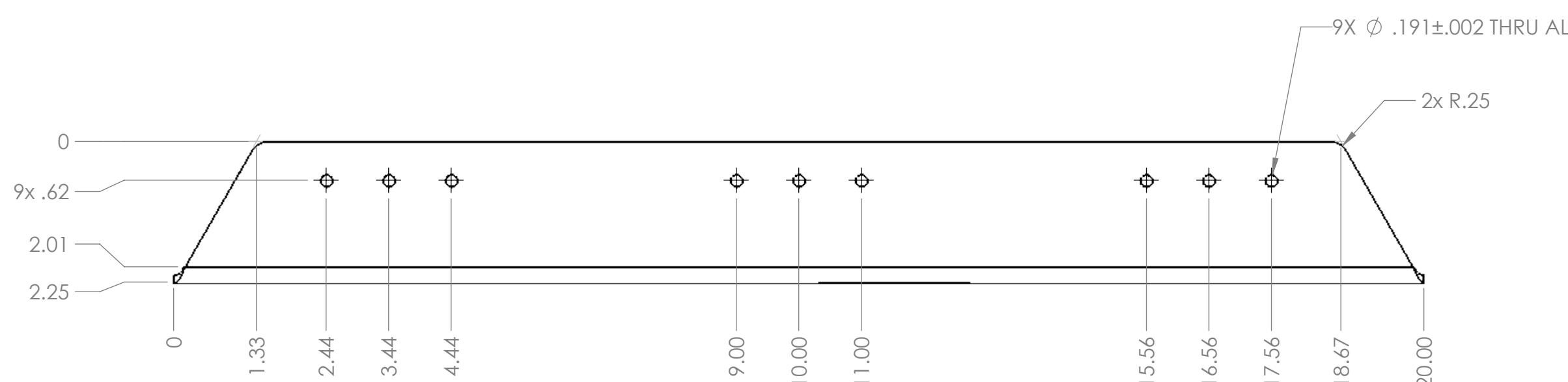
C

C



B

B

**Notes:**

1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	NW	10/1/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 11 ga. pre-plated steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE: **upper bar base**

SIZE DWG. NO. REV
C GE-22131

SCALE: 1:2 SHEET 1 OF 1

4

3

2

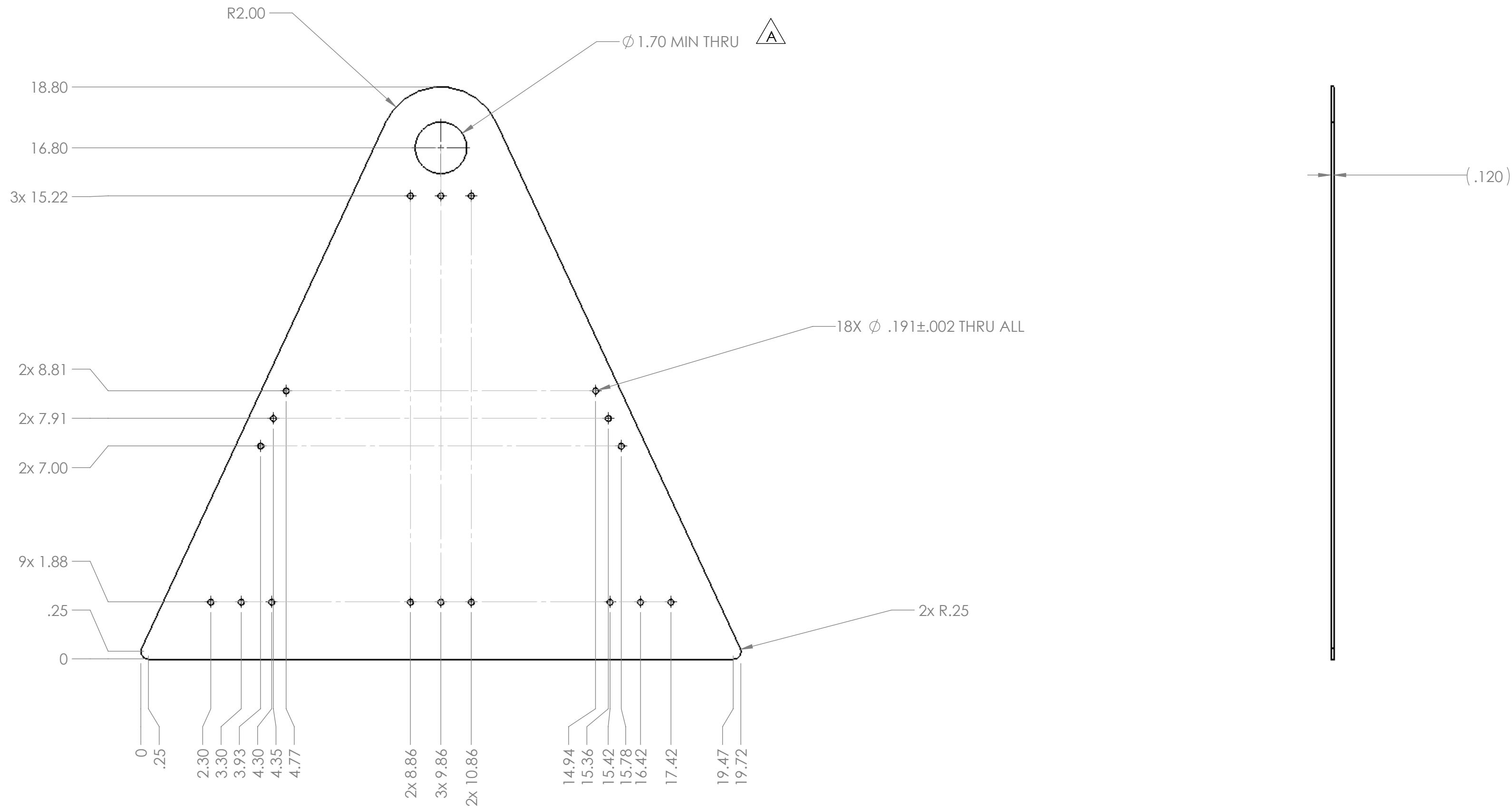
1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
D3	A	1.7" was 1.68"	11/18/2021	NTW

D

D



A

A

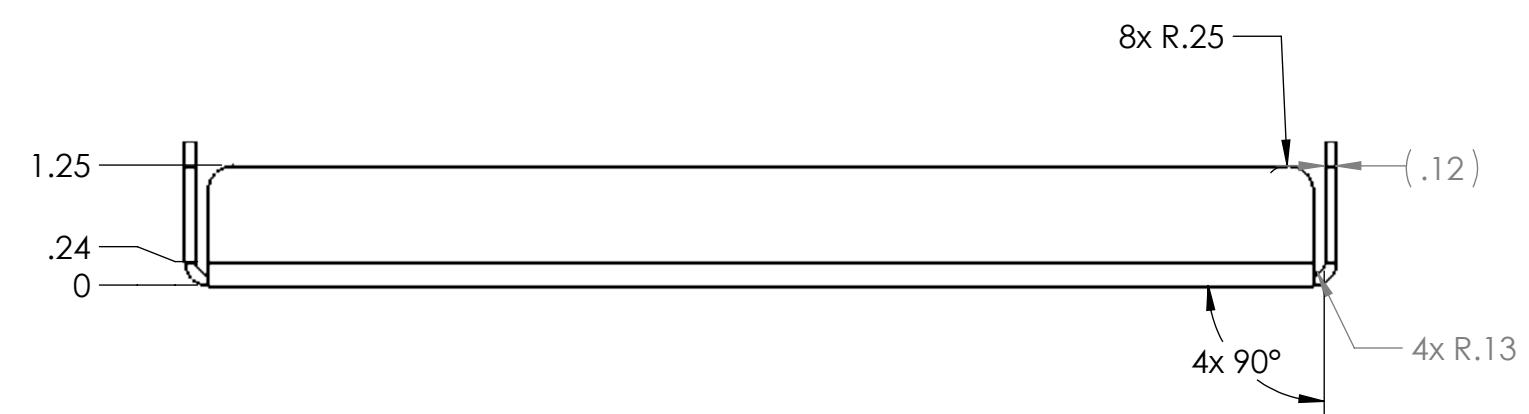
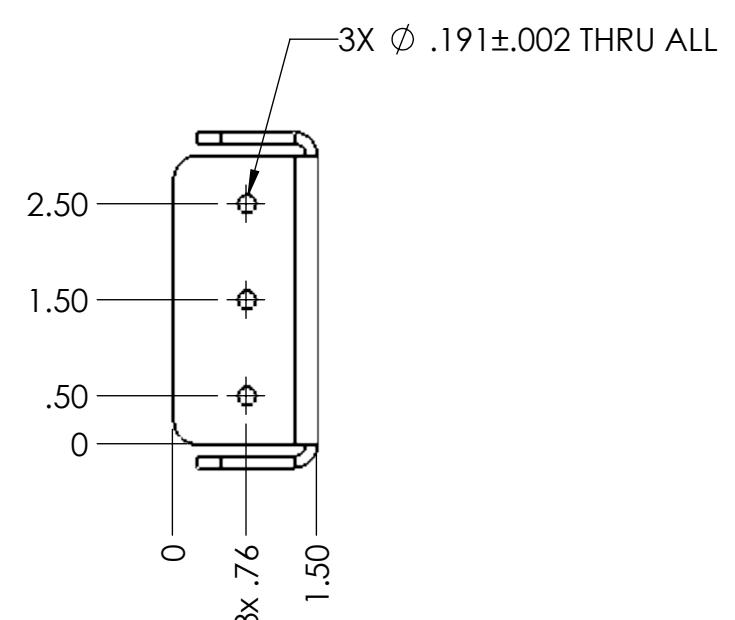
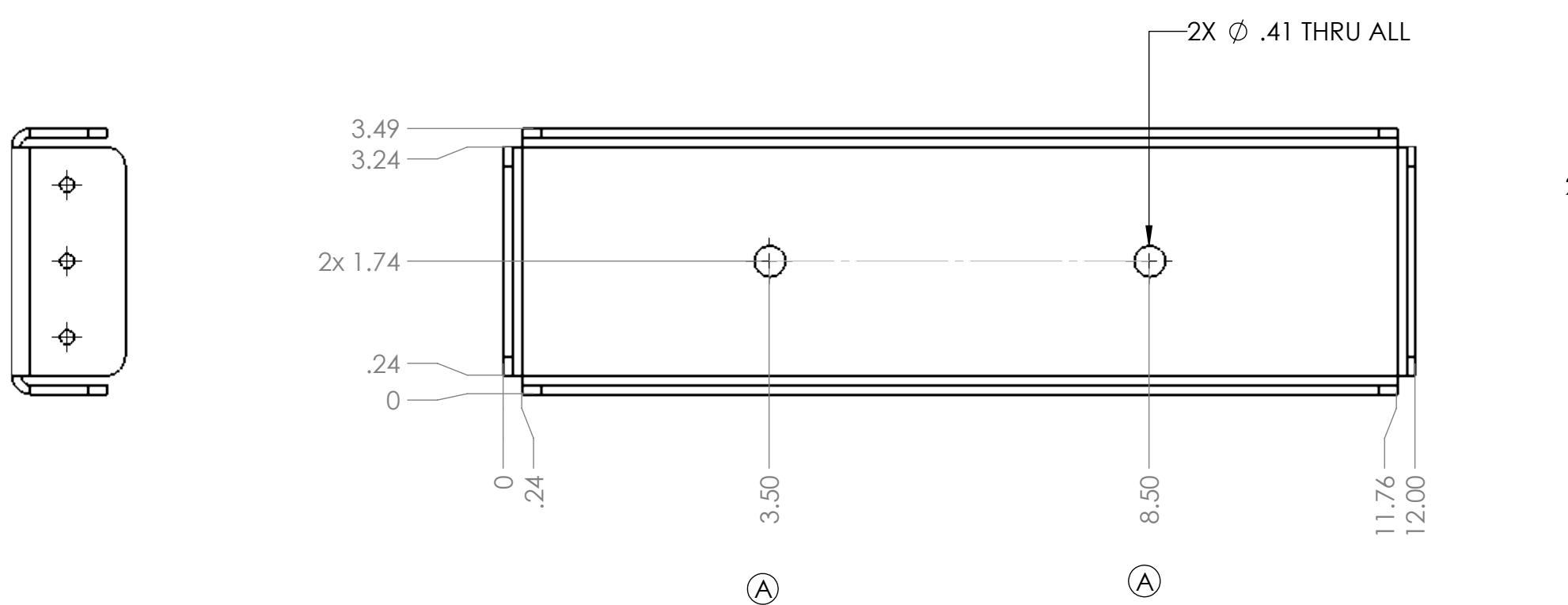
Notes:
1. Tag or label part with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	9/30/2020
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
11 ga., Pre-plated steel sheet	C	GE-22132	A
DO NOT SCALE DRAWING	SCALE: 1:8	SHEET 1 OF 1	



TITLE:
High bar side plate

ZONE	REV.	DESCRIPTION	DATE	APPROVED
C3	A	3.50 was 3.41 and 8.50 was 8.41	10/27/2021	NTW



Notes
1. Tag or label part with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	NW	10/1/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 11 ga. pre-plated steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



TITLE:
Upper holder cross

SIZE DWG. NO. REV
C GE-22133 A

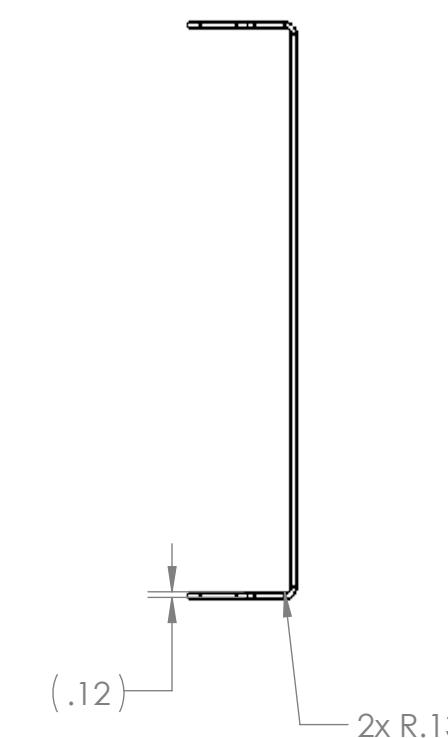
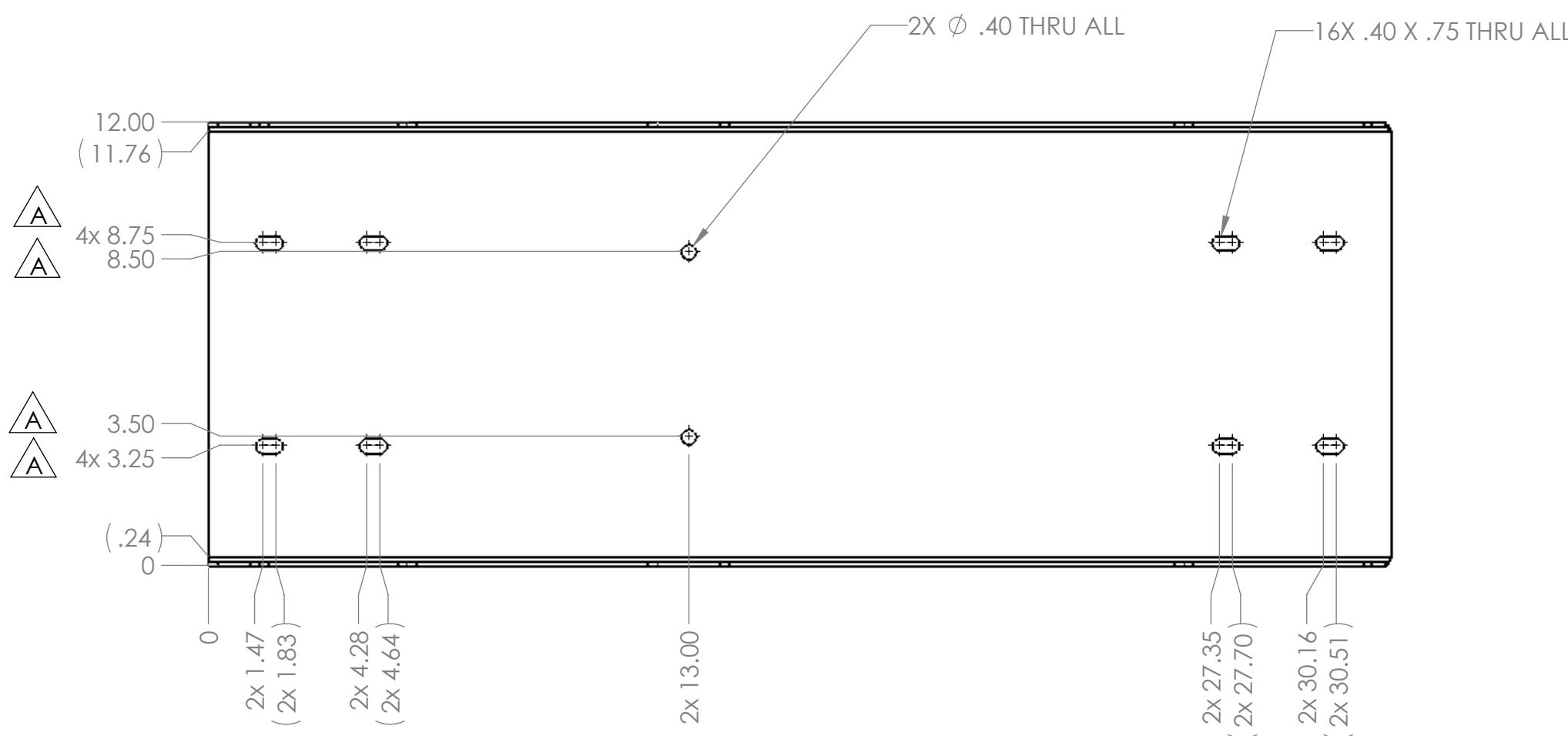
SCALE: 1:2 SHEET 1 OF 1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
C4, D4	A	3.25 was 3.24, 3.5 was 3.37, 8.5 was 8.37, 8.75 was 8.74	10/29/2021	NTW

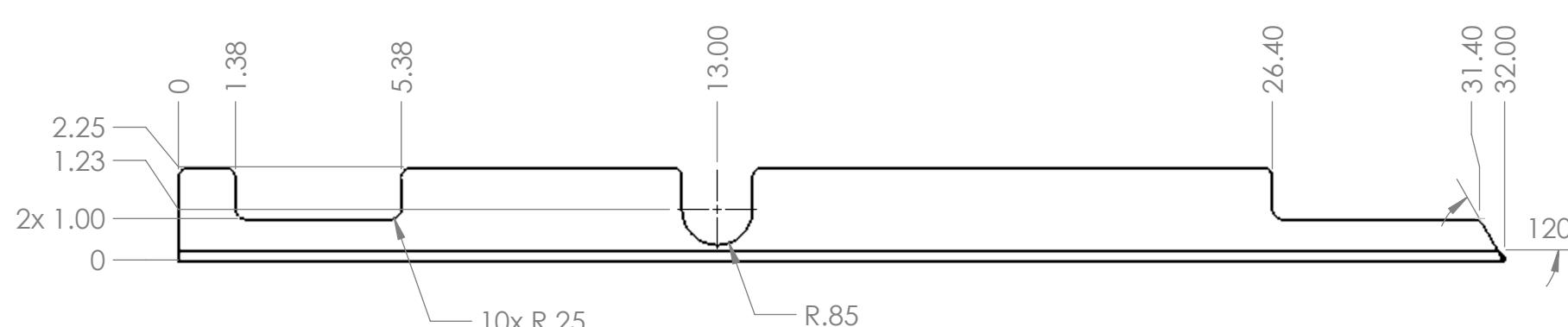
D

D



C

C

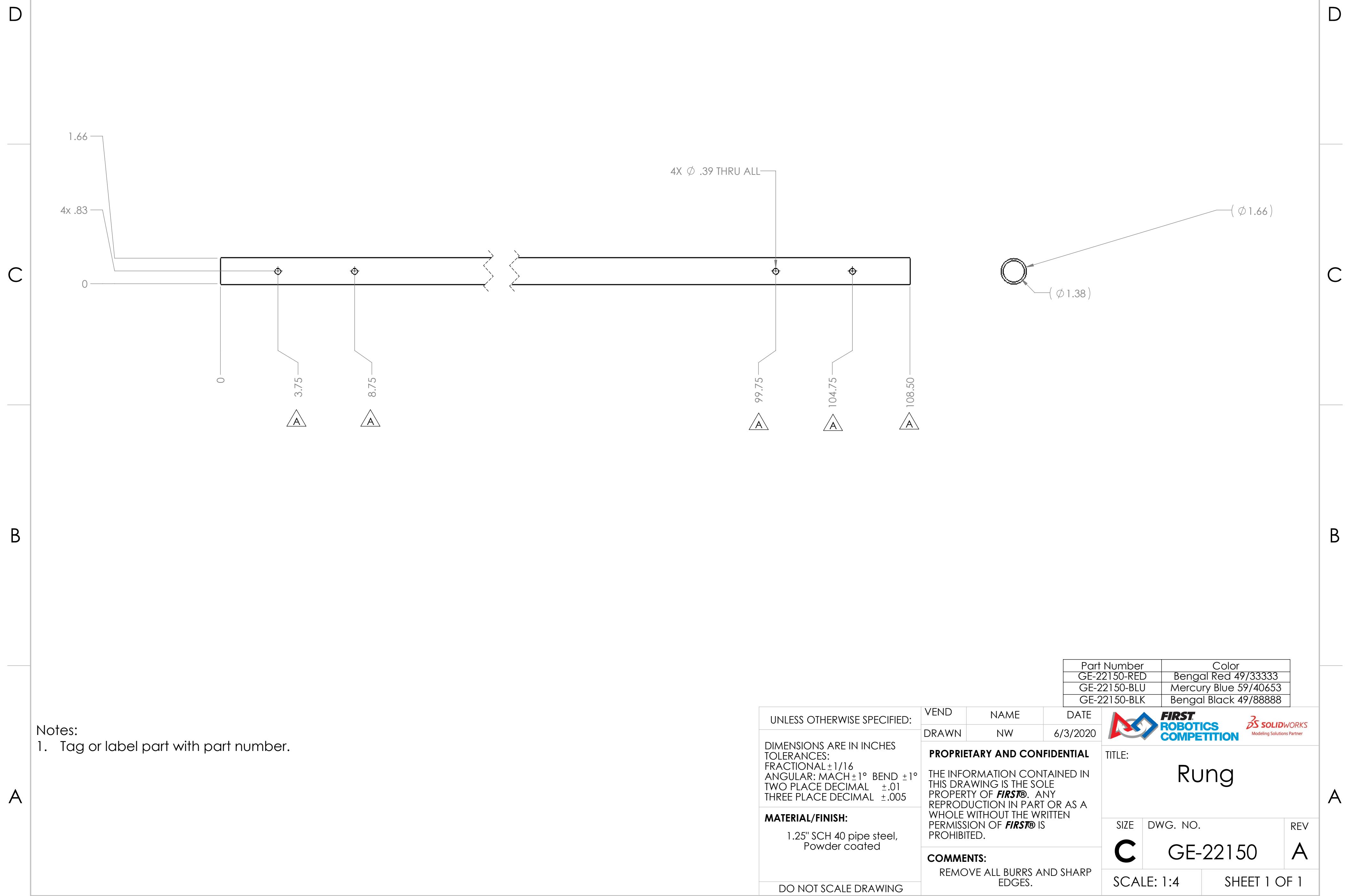


Notes:
1. Tag or label part with part number.

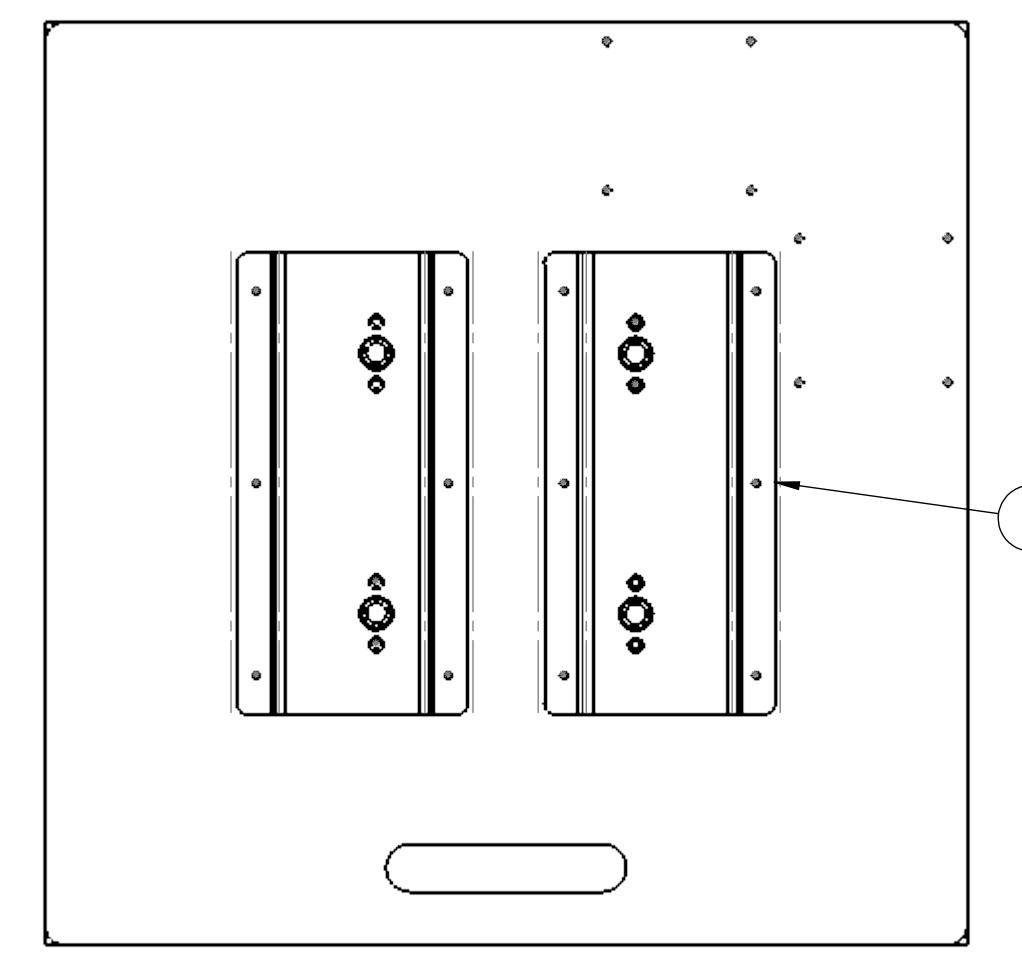
UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
	DRAWN	NW	10/1/2020
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
11 gau, Pre-plated steel			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION	SOLIDWORKS	Modeling Solutions Partner	
TITLE: mid transition bar holder			
SIZE	DWG. NO.	REV	
C	GE-22140	A	
SCALE: 1:4	SHEET 1 OF 1		

REVISIONS

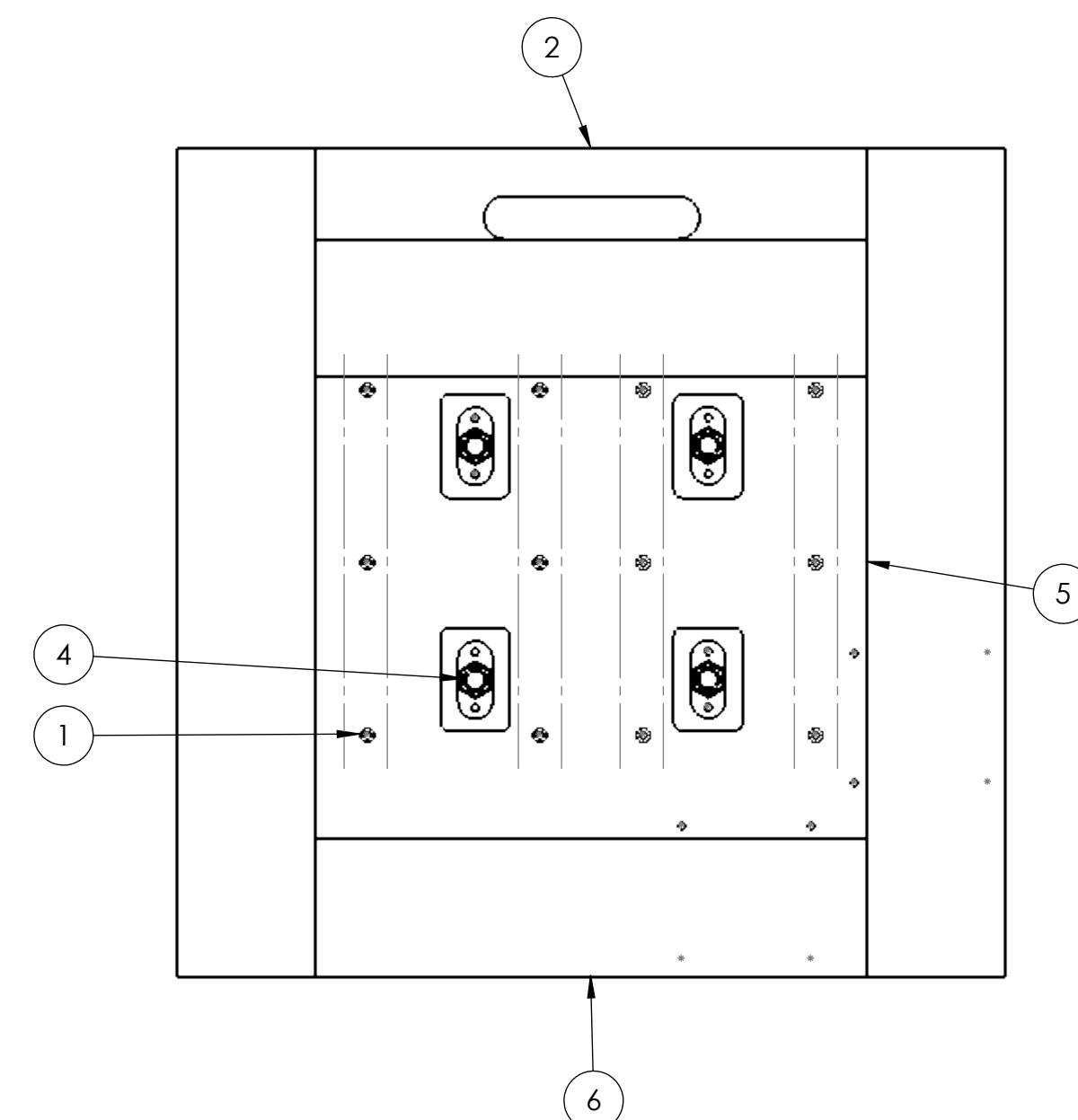
ZONE	REV.	DESCRIPTION	DATE	APPROVED
B2, B3, B4	A	Addition 0.5" added to overall length. Holes moved to center new length.	9/2/2021	NTW



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	12
2	GE-20030 - 01	Truss Base - Sheet Metal Assembly, Base Plate	1
3	GE-20030 - 02	Truss Base - Sheet Metal Assembly, Truss Feet	2
4	nut_chassis_.625_11	Nut, Chassis, 5/8-11	4
5	Hook_4_24	4" x 24" Hook, Adhesive Backed	2
6	Hook_4_16	4" x 16" Hook, Adhesive Backed	2



Top



Bottom

- Notes:
- Made from part GE-20030.
 - Remove parts GE-20030-03 from assembly.
 - Attach (4).
 - Place (6) and (5) or replace missing.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	1/4/2022
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

Truss Base - Sheet Metal Assembly

C **GE-22170**

SCALE: 1:5 **SHEET 1 OF 1**

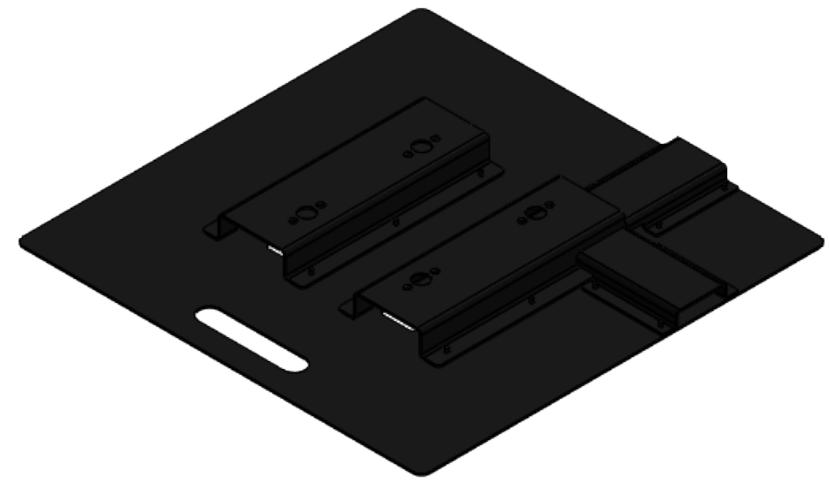
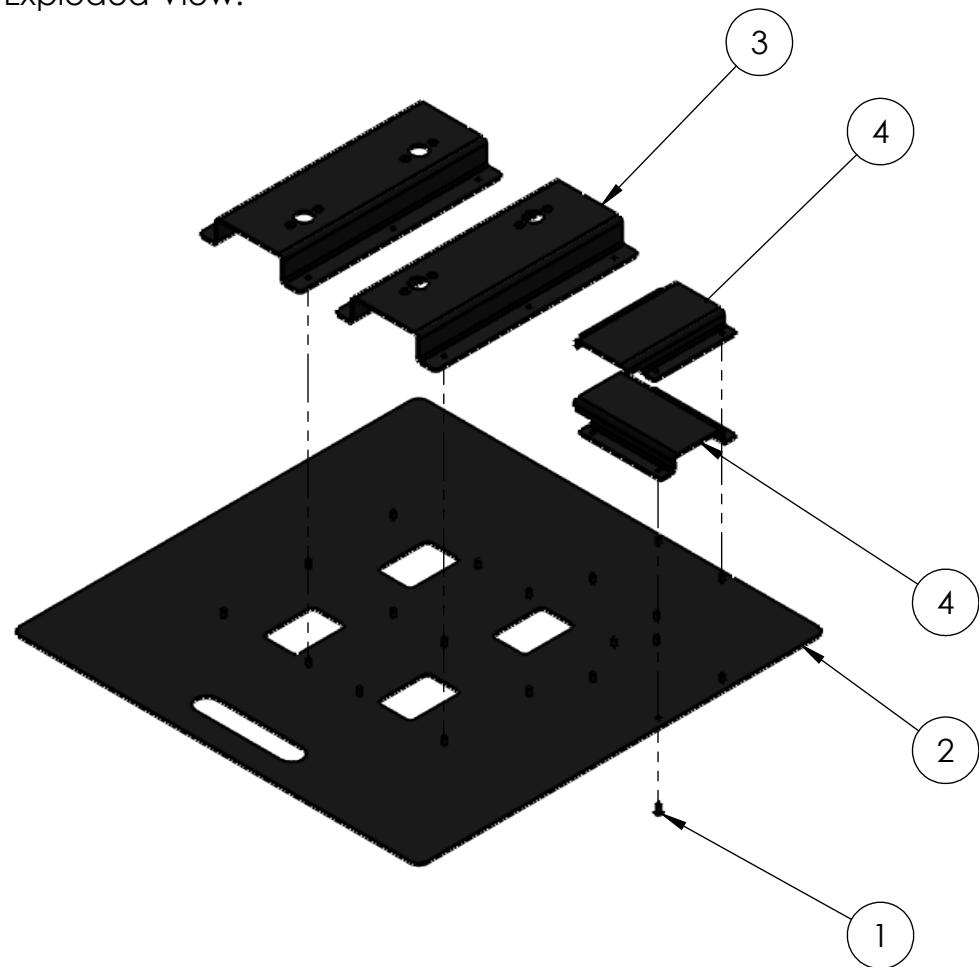
4

3

2

1

Exploded View:



- Notes:
1. Rivets should be plated or stainless steel
 2. Tag or label with part number.
 3. Powder Coated Black (Full Assembly).

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST®. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST®** IS PROHIBITED.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	20
2	GE-20030 - 01	Truss Base - Sheet Metal Assembly, Base Plate	1
3	GE-20030 - 02	Truss Base - Sheet Metal Assembly, Truss Feet	2
4	GE-20030 - 03	Truss Base - Sheet Metal Assembly, Berm - Red	2

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME KAMC	DATE 9/9/19
	DRAWN CHECKED ENG APPR. MFG APPR.		
	INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL	Q.A. COMMENTS:	
NEXT ASSY	USED ON	WEIGHT: 24.93 LBS	
	FINISH POWDER COAT BLACK	REV 0	
APPLICATION		SCALE: 1:8	WEIGHT: SHEET 1 OF 2

4

3

2

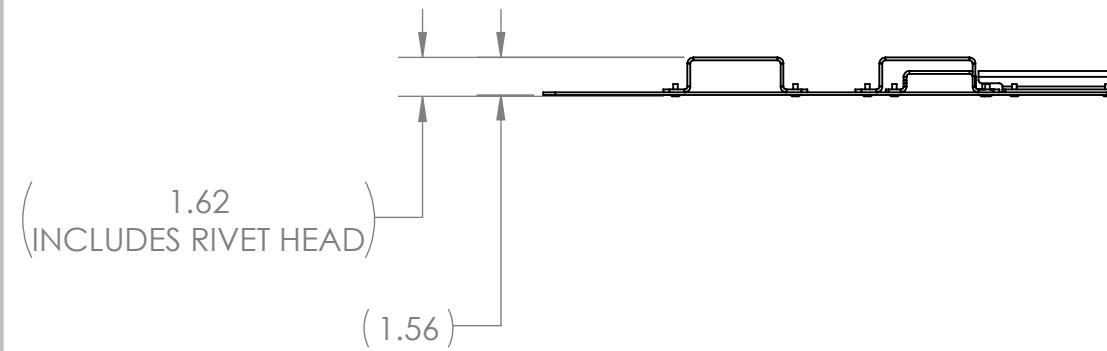
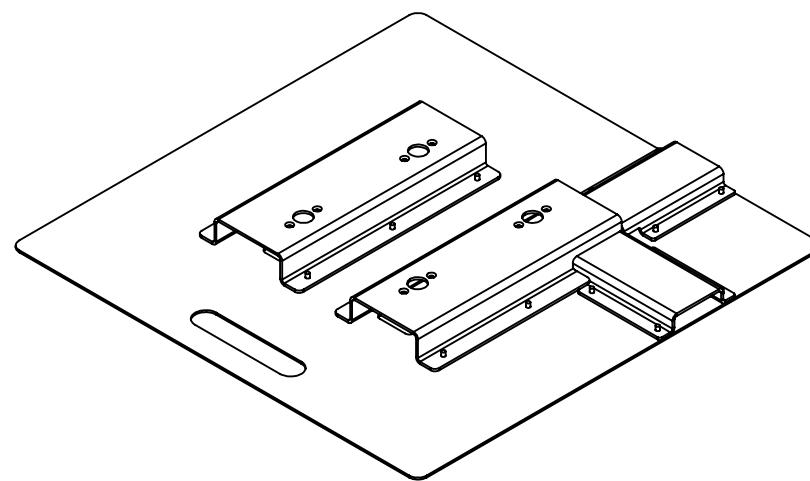
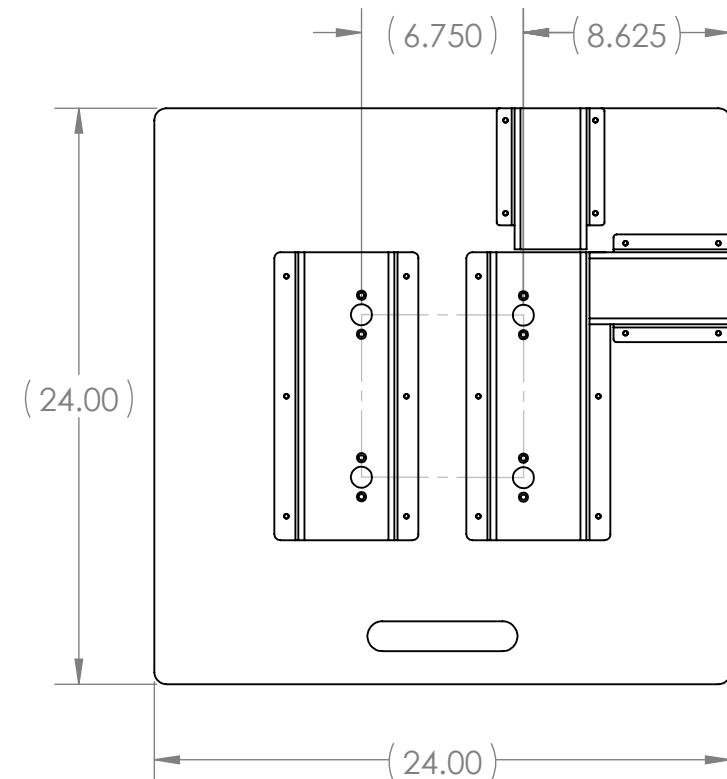
1

4

3

2

1



DIMENSIONS SHOWN FOR REFERENCE

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST[®]. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST[®]** IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME KAMC	DATE 9/2/19
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
	NEXT ASSY	USED ON	FINISH POWDER COAT BLACK	
		APPLICATION	DO NOT SCALE DRAWING	
			WEIGHT: 24.93 LBS	
			SIZE B DWG. NO. GE-20030 REV 0	
			SCALE: 1:8 WEIGHT: SHEET 2 OF 2	

FIRST[®] ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

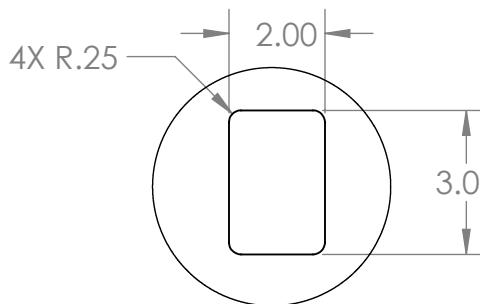
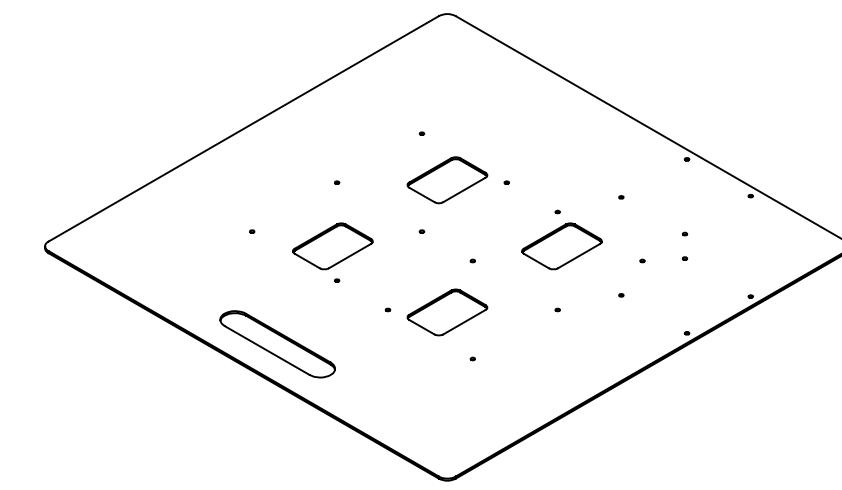
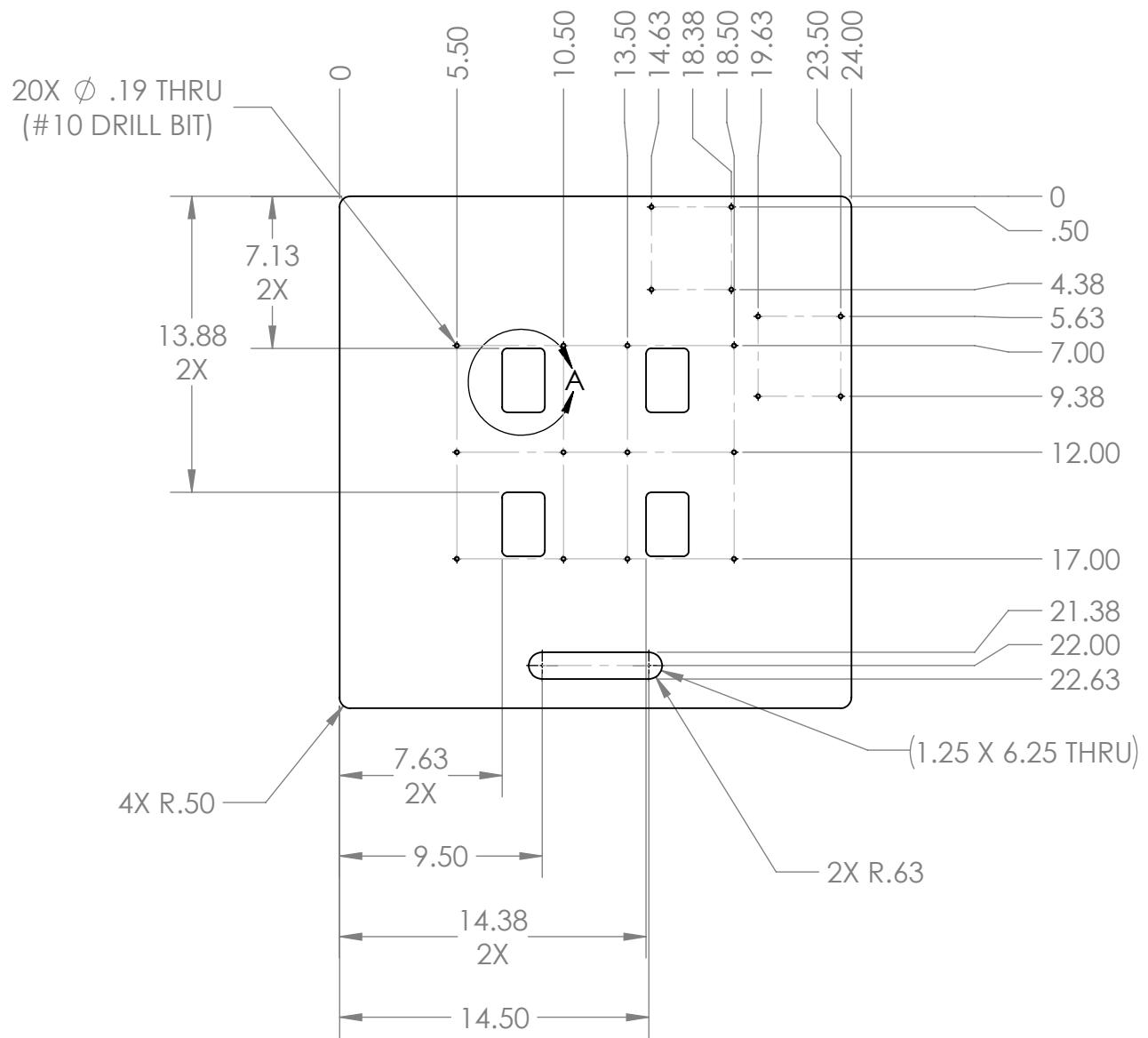
Truss Base - Sheet Metal Assembly

4

3

2

1



DETAIL A
SCALE 1 : 4
4X

Notes:

1. Material: 12 Ga. (0.105") Mild Steel Sheet A366/1008 Cold Roll
2. Remove all burrs and sharp edges.

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST®. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST®** IS PROHIBITED.

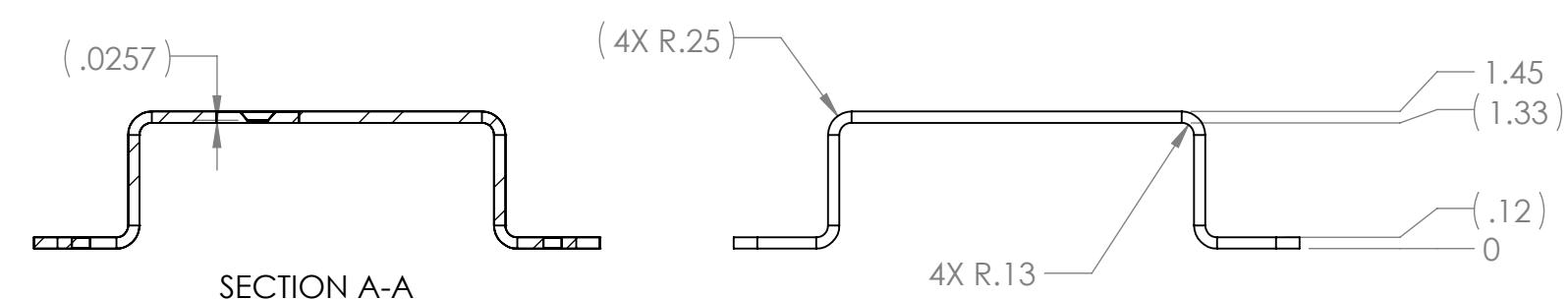
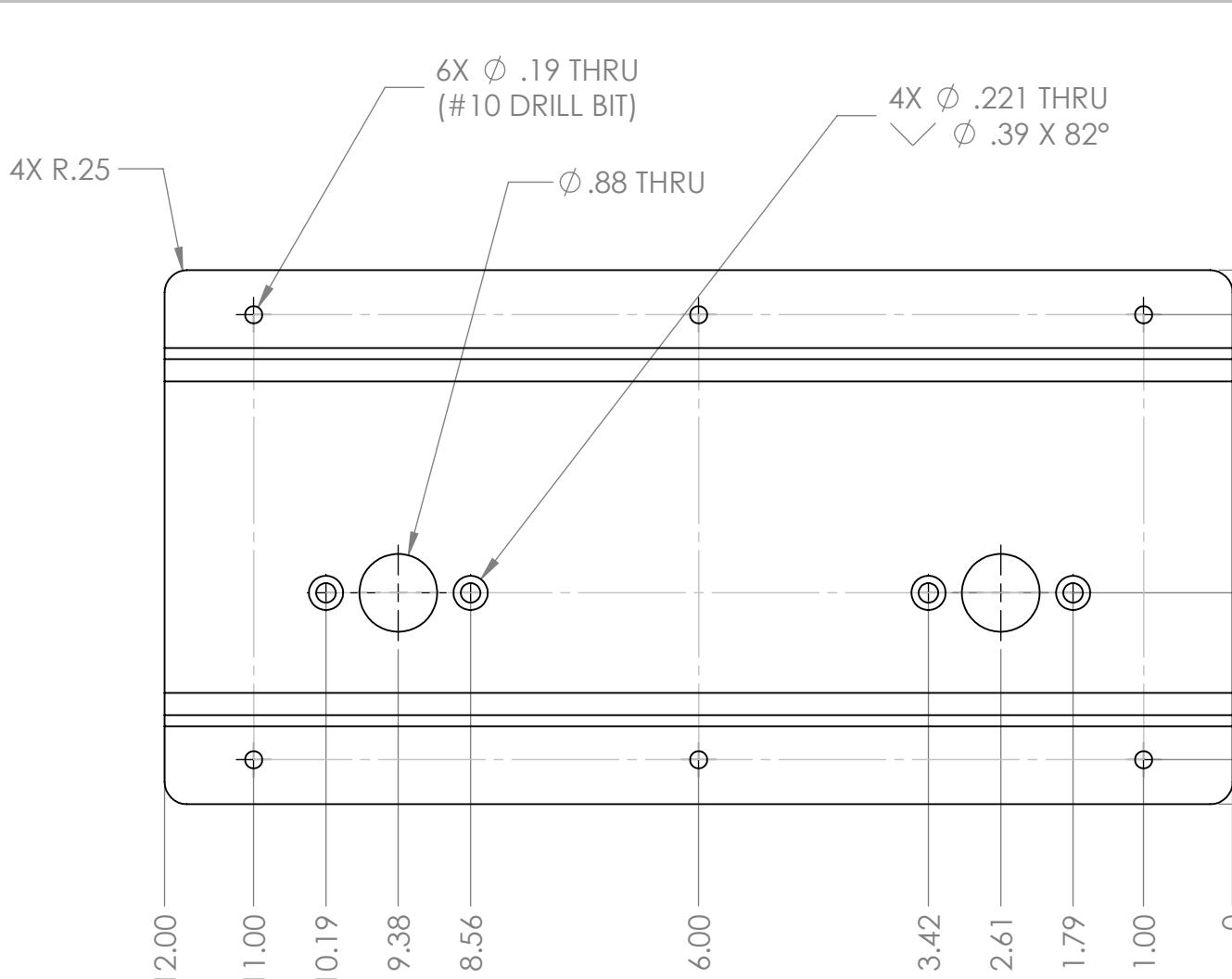
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 FIRST ROBOTICS COMPETITION 
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN	KAMC	9/2/19	
			CHECKED			
			ENG APPR.			
			MFG APPR.			
			Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:			
GE-20030		MATERIAL STEEL SHEET				SIZE B DWG. NO. GE-20030 - 01 REV 0
NEXT ASSY	USED ON	FINISH BARE				
APPLICATION		DO NOT SCALE DRAWING		SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

4

3

2

1



- Notes:
1. Material: 0.125" Mild Steel Sheet A366/1008 Cold Roll
 2. Remove all burrs and sharp edges.

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

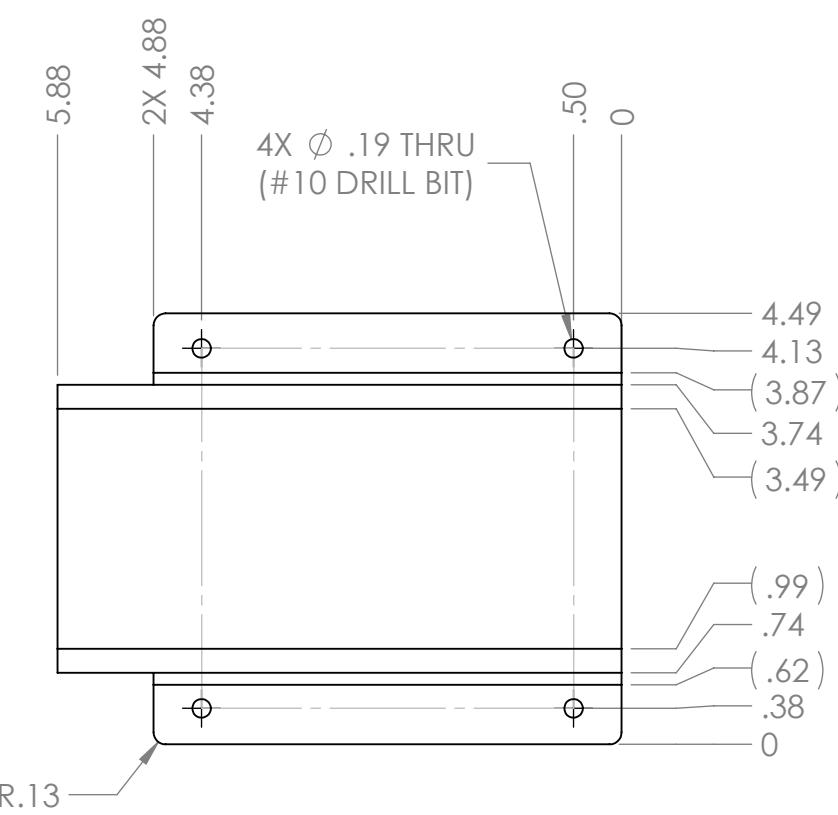
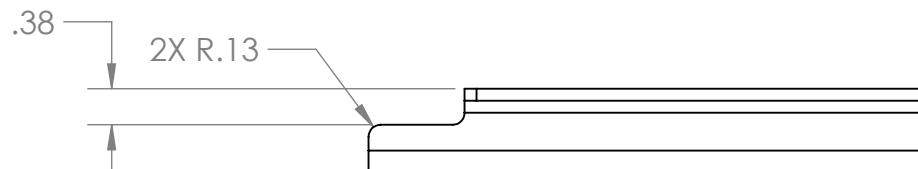
		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME DRAWN KAMC DATE 9/2/19
		INTERPRET GEOMETRIC TOLERANCING PER:	CHECKED
		MATERIAL	ENG APPR.
	GE-20030	STEEL SHEET	MFG APPR.
	NEXT ASSY	USED ON	Q.A.
		FINISH	COMMENTS:
		BARE	
	APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV	
B	GE-20030 - 02	0	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1	

4

3

2

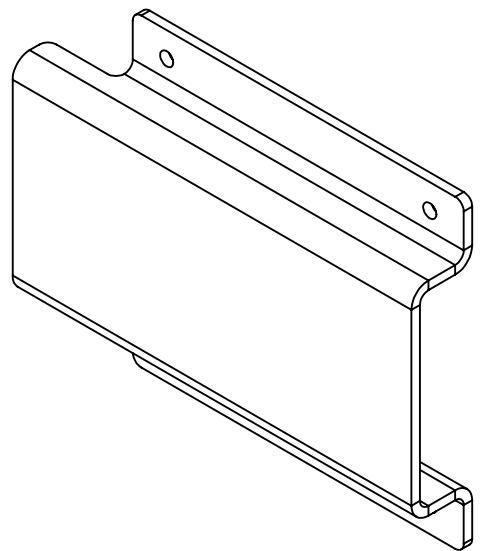
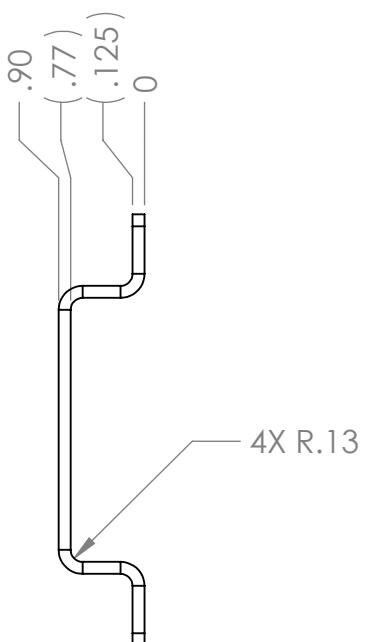
1



- Notes:
1. Material: 0.125" Mild Steel Sheet A366/1008 Cold Roll
 2. Remove all burrs and sharp edges.

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN	KAMC	9/2/19
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
GE-20030		MATERIAL	SHEET STEEL	
NEXT ASSY	USED ON	FINISH	BARE	
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:2		WEIGHT:	SHEET 1 OF 1	



FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
Truss Base - Sheet Metal Assembly, Berm

SIZE **B** DWG. NO. **GE-20030 - 03** REV **0**

SCALE: 1:2 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

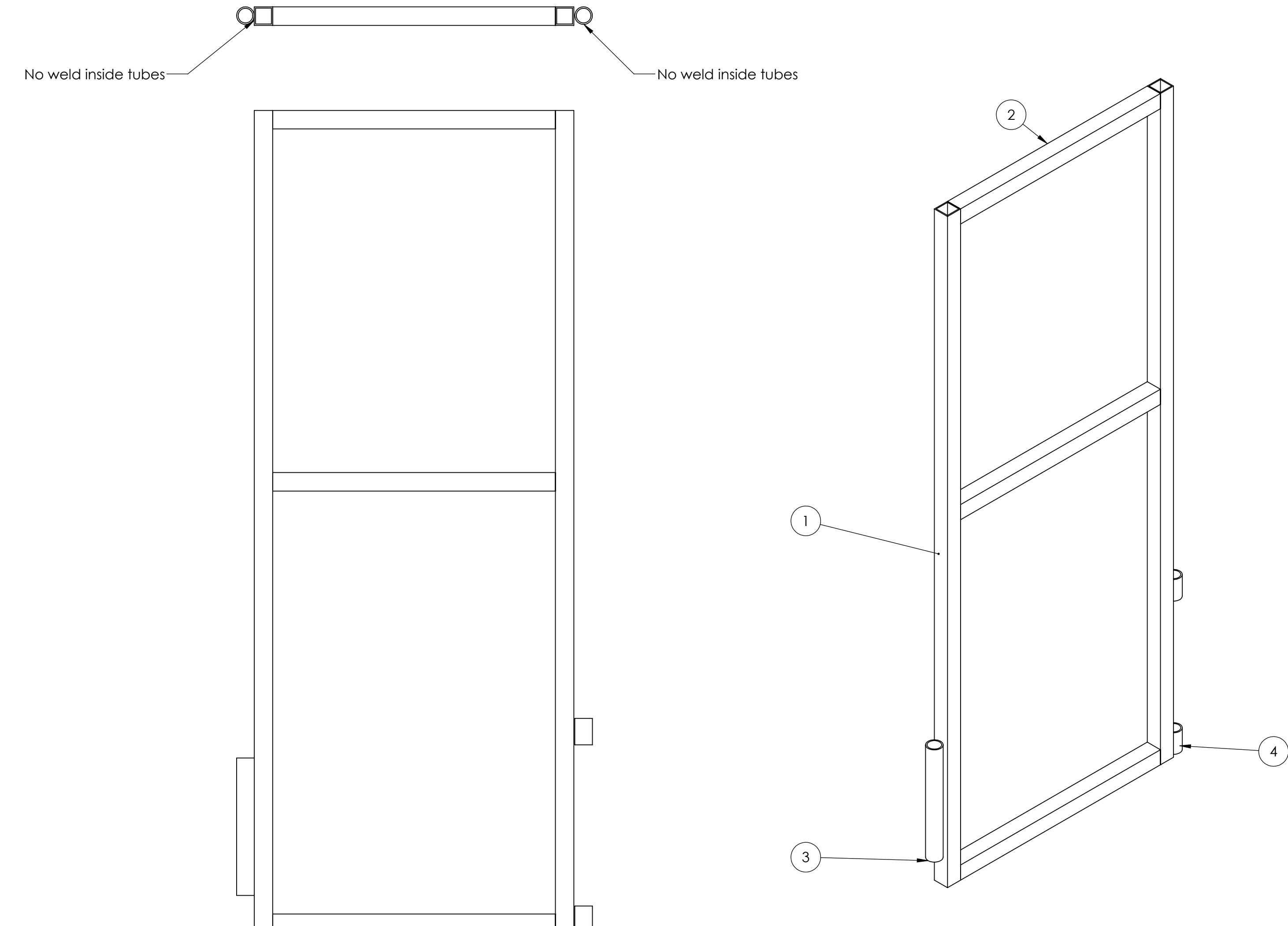
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22200-01	1.75 x 1.75 x 77.75 6061 Aluminum Tube	2
2	GE-22200-02	1.75 x 1.75 x 26.75 6061 Aluminum Tube	3
3	GE-22200-03	1.25 6061 Schedule 40 Allumium Pipe	1
4	GE-22200-04	1.25 6061 Schedule 40 Allumimum Pipe	2

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .015$

MATERIAL/FINISH:
Tag or label with part number

DO NOT SCALE DRAWING

WELD NAME DATE
DRAWN MS 5/19/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

FIRST
ROBOTICS
COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Alliance Station
Panel**

SIZE DWG. NO. REV
C GE-22200

SCALE: 1:10 SHEET 1 OF 3

4

3

2

1

D

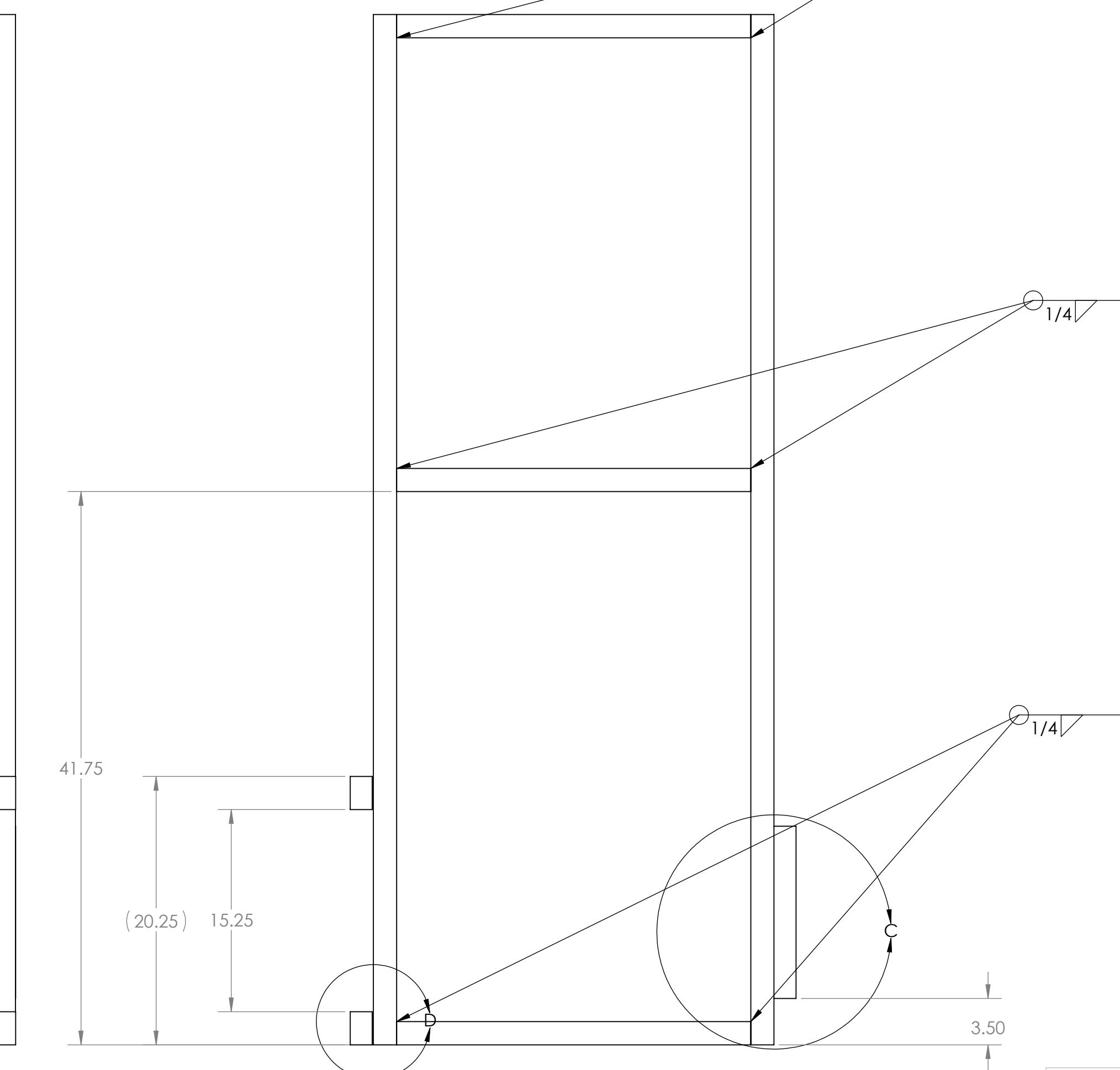
D

4

41.75

(20.25)

15.25



UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	MS	5/19/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Tag or label with part number			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Alliance Station
Panel**

SIZE DWG. NO. REV
C GE-22200

SCALE: 1:24 SHEET 2 OF 3

4

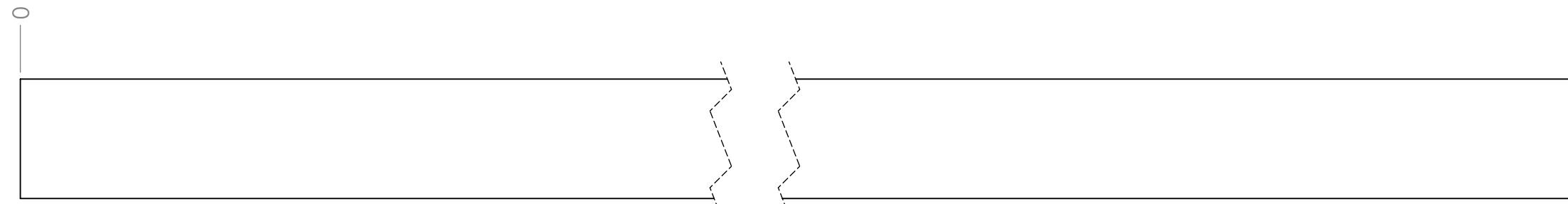
3

2

1

D

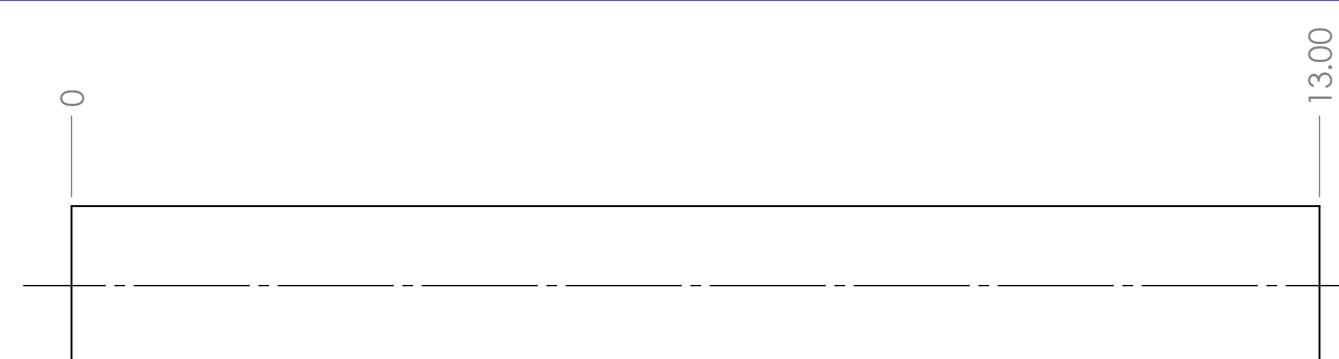
D



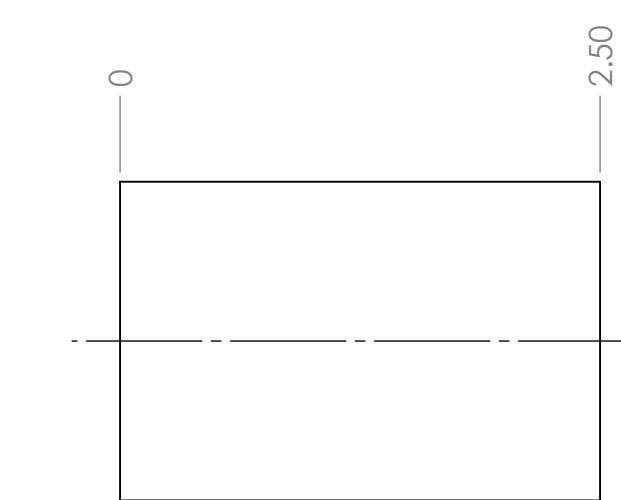
Note:
Item Number: GE-22200-01
QTY:2



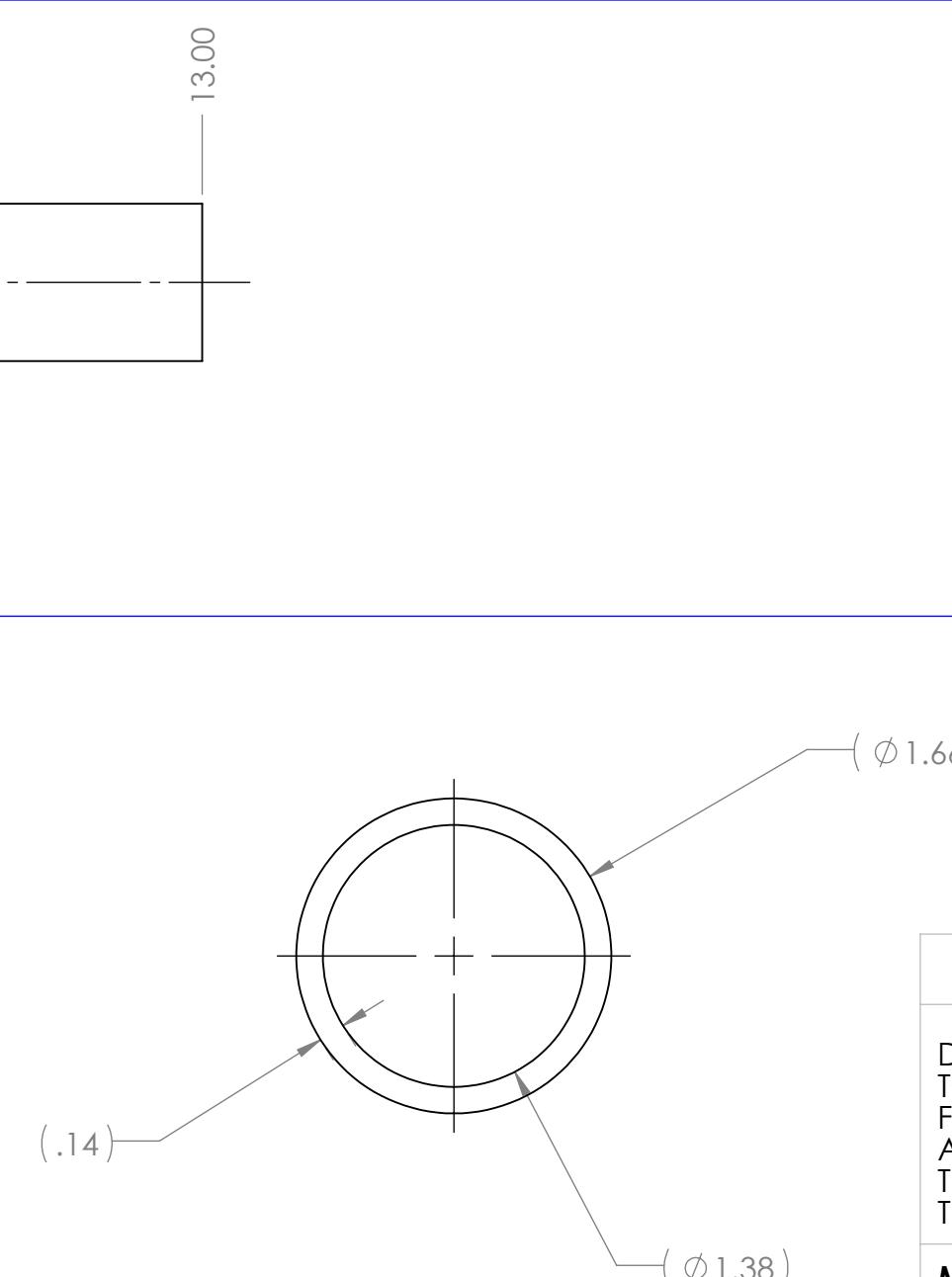
Note:
Item Number: GE-22200-02
QTY:3



Note:
Item Number: GE-22200-03
QTY:1



Note:
Item Number: GE-22200-04
QTY:2



UNLESS OTHERWISE SPECIFIED: WELD NAME DATE
DRAWN MS 5/19/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .015$

MATERIAL/FINISH:
Tag or label with part number

DO NOT SCALE DRAWING

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

FIRST[®] ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE: Alliance Station Panel
SIZE DWG. NO. REV
C GE-22200

SCALE: 1:8 SHEET 3 OF 3

4

3

2

1

4

3

2

1

D

D

C

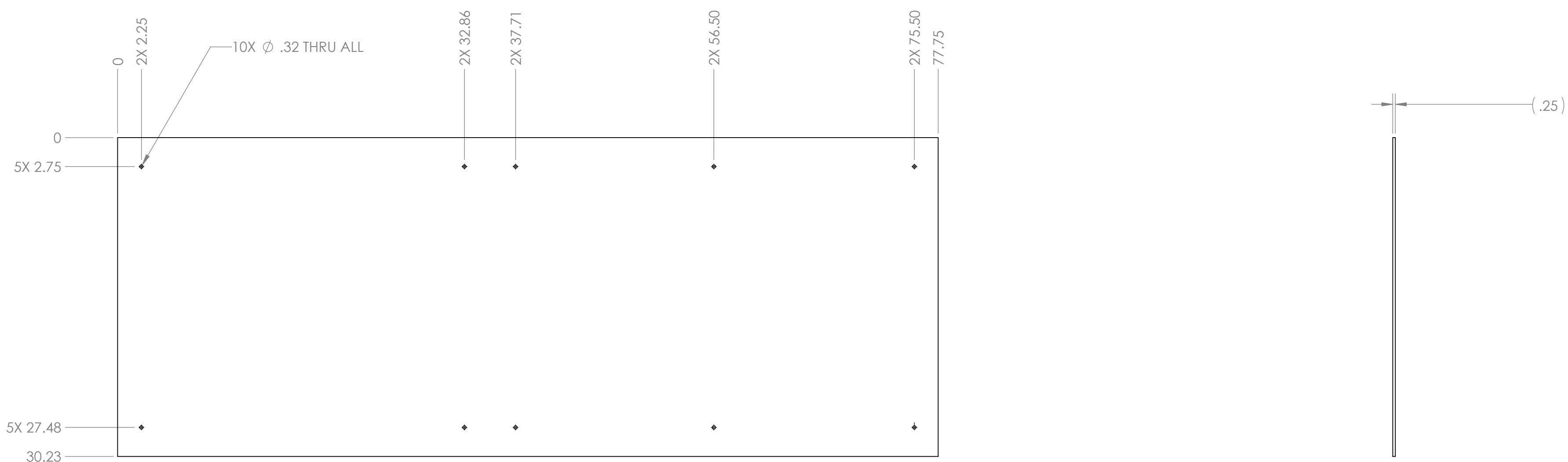
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	MS	8/3/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: .25 Inch Thick Polycarbonate Clear Sheet Tag or label with part number	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	GE-22201	
DO NOT SCALE DRAWING	SCALE: 1:12	SHEET 1 OF 1	

4

3

2

1

4

3

2

1

D

D

C

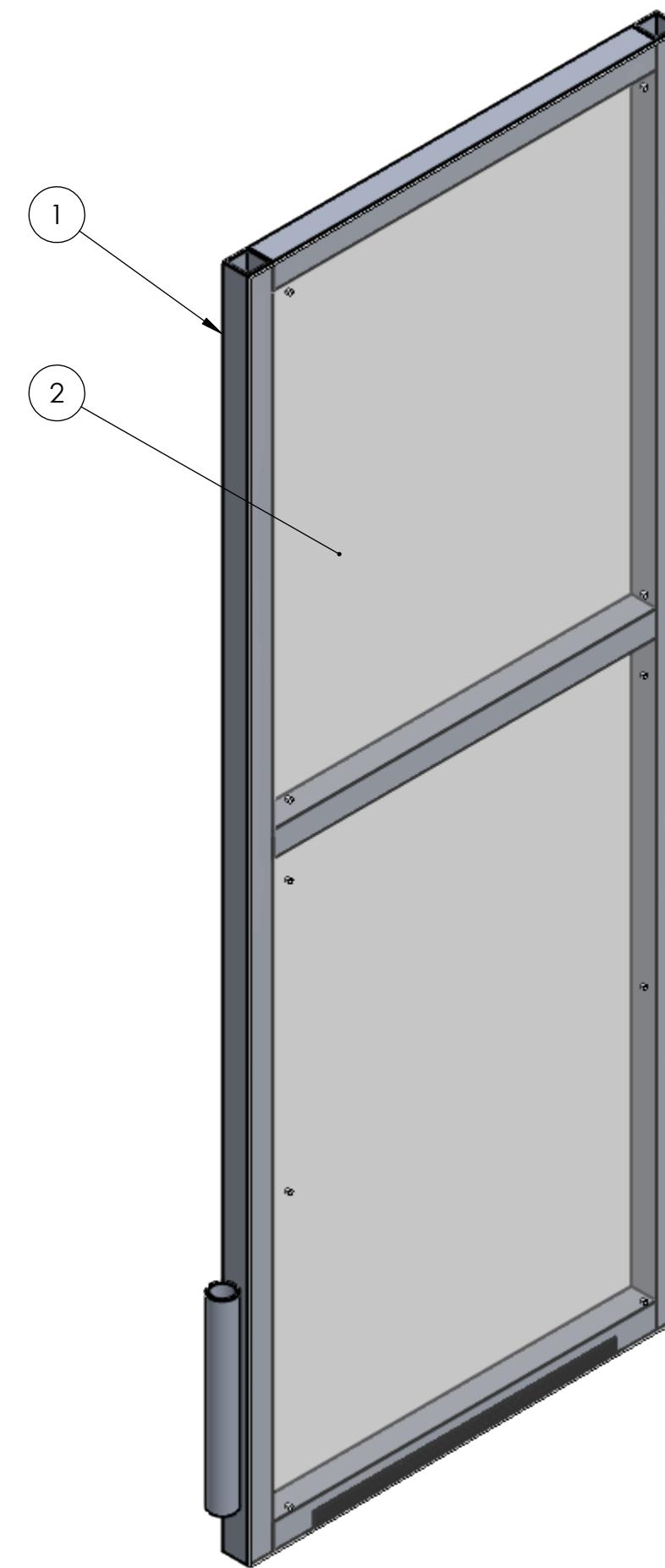
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22200	GE-22200	1
2	GE-22201	Alliance Polycarbonate Face	1
3	Hook_2_22	2" x 22" Hook, Adhesive Backed	1
4	Hook_1_21	1" x 21" Hook, Adhesive Backed	1
5	Loop_1_21	1" x 21" Loop, Adhesive Backed	1

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
	DRAWN	DF	1/5/2022

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE:
Alliance Station Panel

SIZE DWG. NO. REV
C GE-22202

SCALE: 1:8 SHEET 1 OF 2

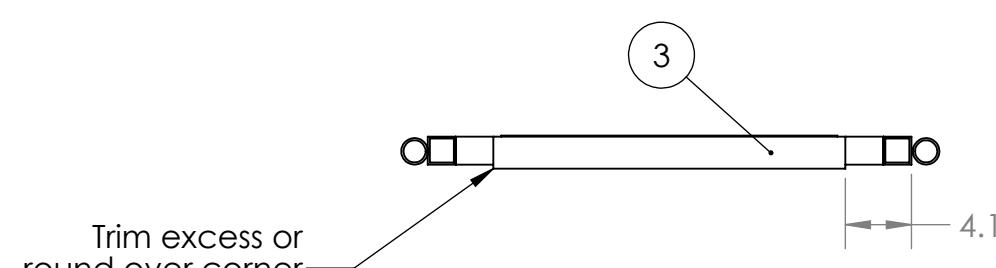
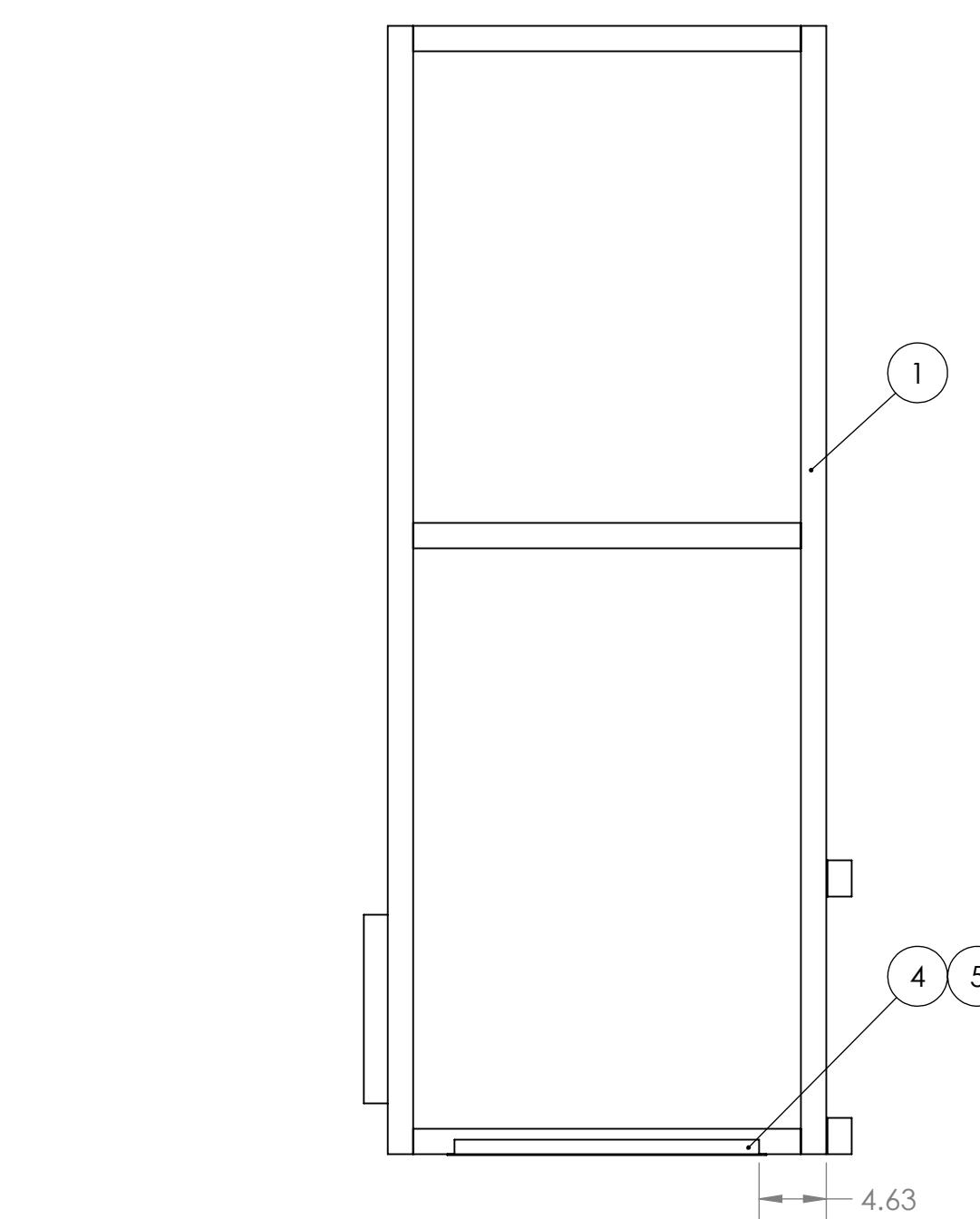
4

3

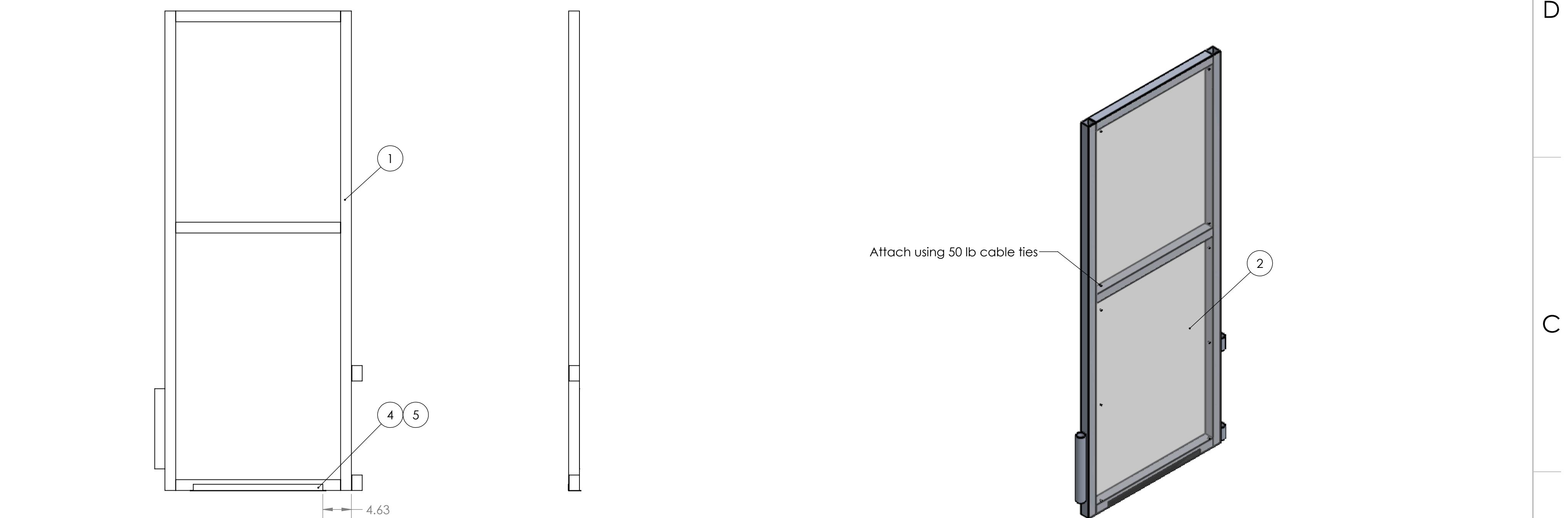
2

1

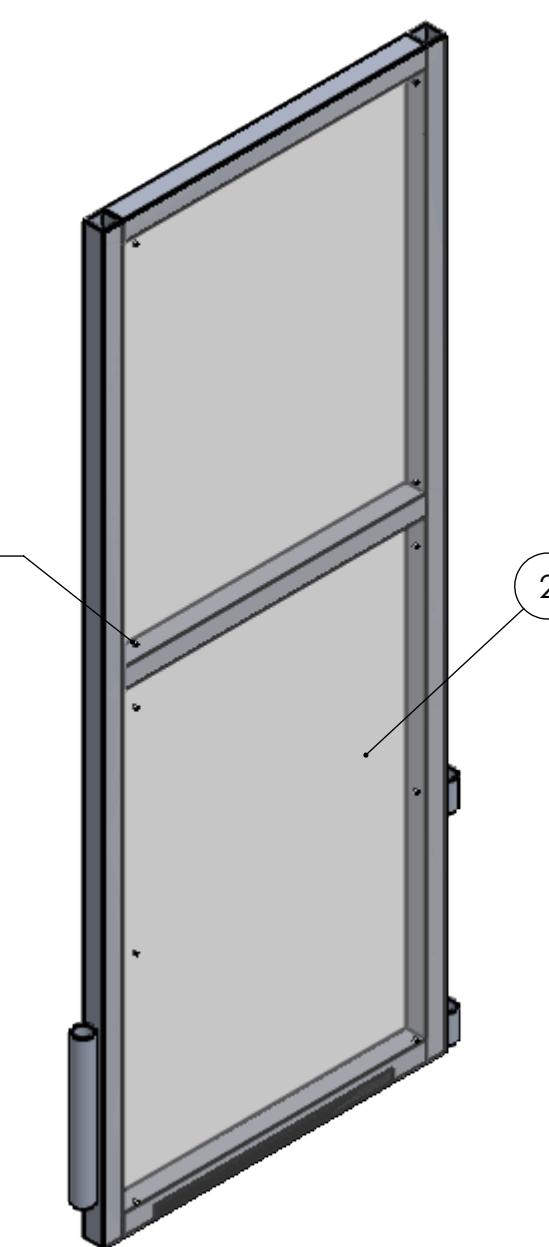
D

**Assembly Steps:**

1. Apply Item 4 to Item 1 as shown.
2. Apply Item 5 to Item 4, but keep the protective backing on the adhesive.
3. Apply Item 3 to Item 1 as shown, trim excess material or round over the edge.



Attach using 50 lb cable ties

**Assembly Steps:**

1. Remove protective backing from the loop adhesive.
2. Place Item 2 in place and press against the loop.
3. Secure Item 2 with 50 lb. cable ties.

UNLESS OTHERWISE SPECIFIED:			FIELD	NAME	DATE
			DRAWN	DF	1/5/2022
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:	Tag or label with part number				
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING			SIZE	DWG. NO.	REV
			C	GE-22202	
			SCALE: 1:12	SHEET 2 OF 2	

FIRST ROBOTICS COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Alliance Station Panel

SIZE DWG. NO. REV

C GE-22202

SCALE: 1:12 SHEET 2 OF 2

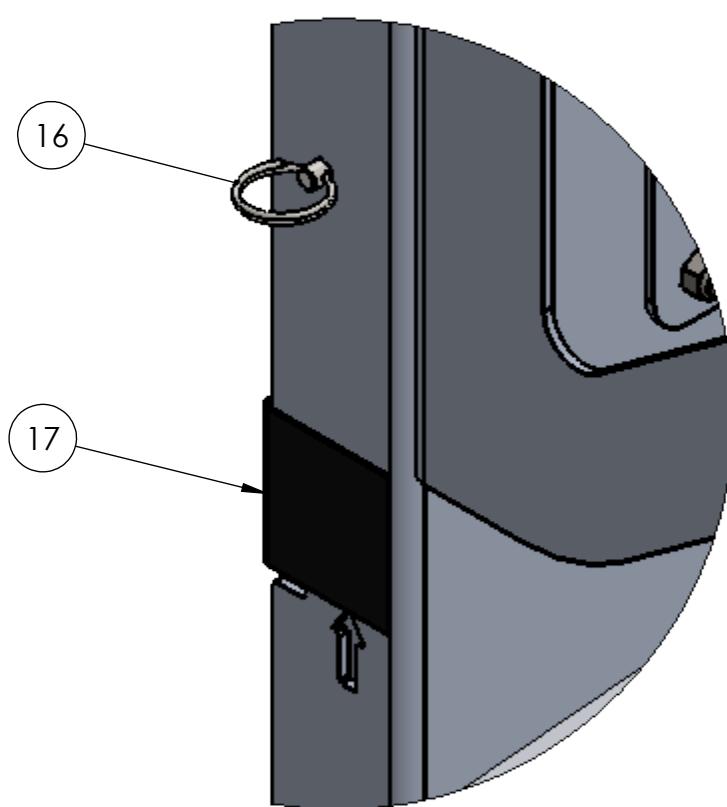
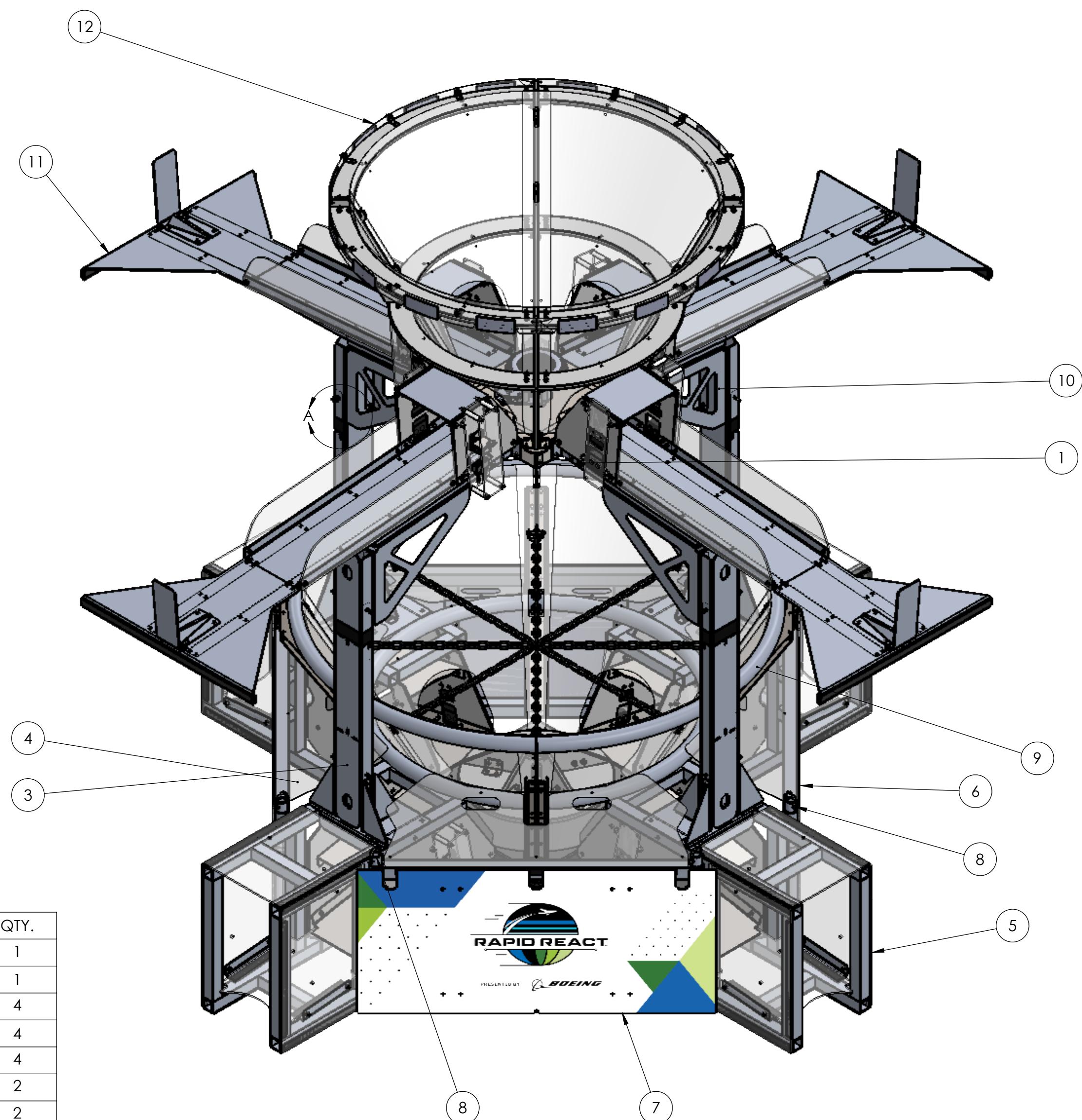
4

3

2

1

D

DETAIL A
SCALE 1 : 2

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22302	Leg to Upper Hub Box	1
2	GE-22303	Hub Base with Hook	1
3	GE-22305	Leg Vertical Channel Cover	4
4	GE-22306	Hub Fender Skirt	4
5	GE-22311	Lower Exit Assembly	4
6	GE-22341-Clear	Fender Assembly - Clear	2
7	GE-22341-Vinyl	Fender Assembly - Vinyl	2
8	GE-22346	Fender Pipe Assembly	8
9	GE-22351	Lower Hub	1
10	GE-22371	Hub Leg Assembly	4
11	GE-22391	Upper Exit Assembly	4
12	GE-22411	Upper Hub	1
13	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	36
14	hex_.25_20_2.5_partial	Steel Hex Head Screw, 1/4"-20 x 2-1/2" long, partially threaded	16
15	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	24
16	pin_quick_ring_.25_0.375	Pin, Ring-Grip Quick-Release with SS Ring, 1/4" Diameter, 0.375" Usable Length	16
17	tapeline_HUBLEGROBOHEIGHT	2" Gaffers Tape, Black	5

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/17/2021
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	TITLE: Hub		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	SIZE	DWG. NO.	REV
C GE-22300			
SCALE: 1:12		SHEET 1 OF 7	

DO NOT SCALE DRAWING

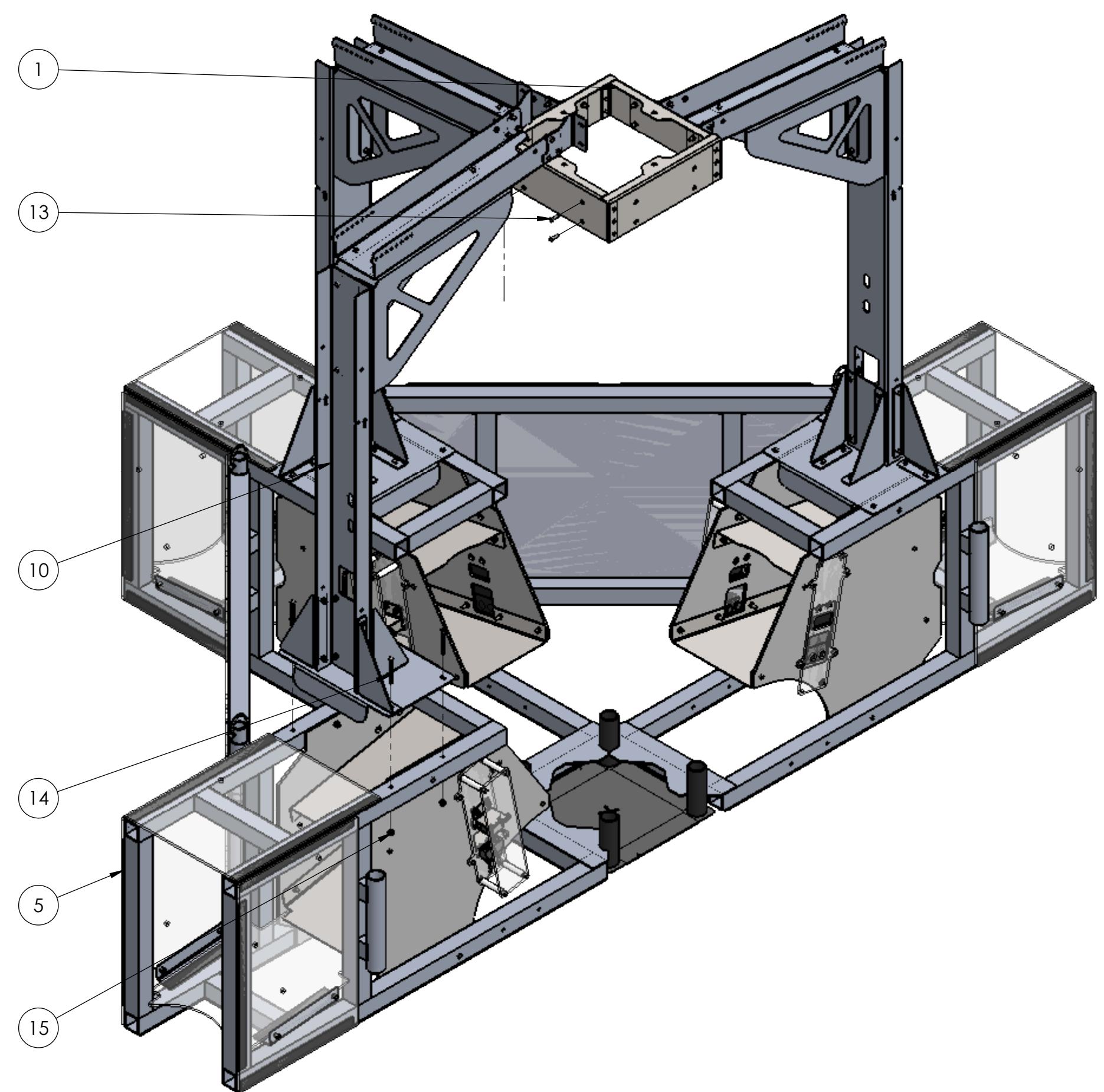
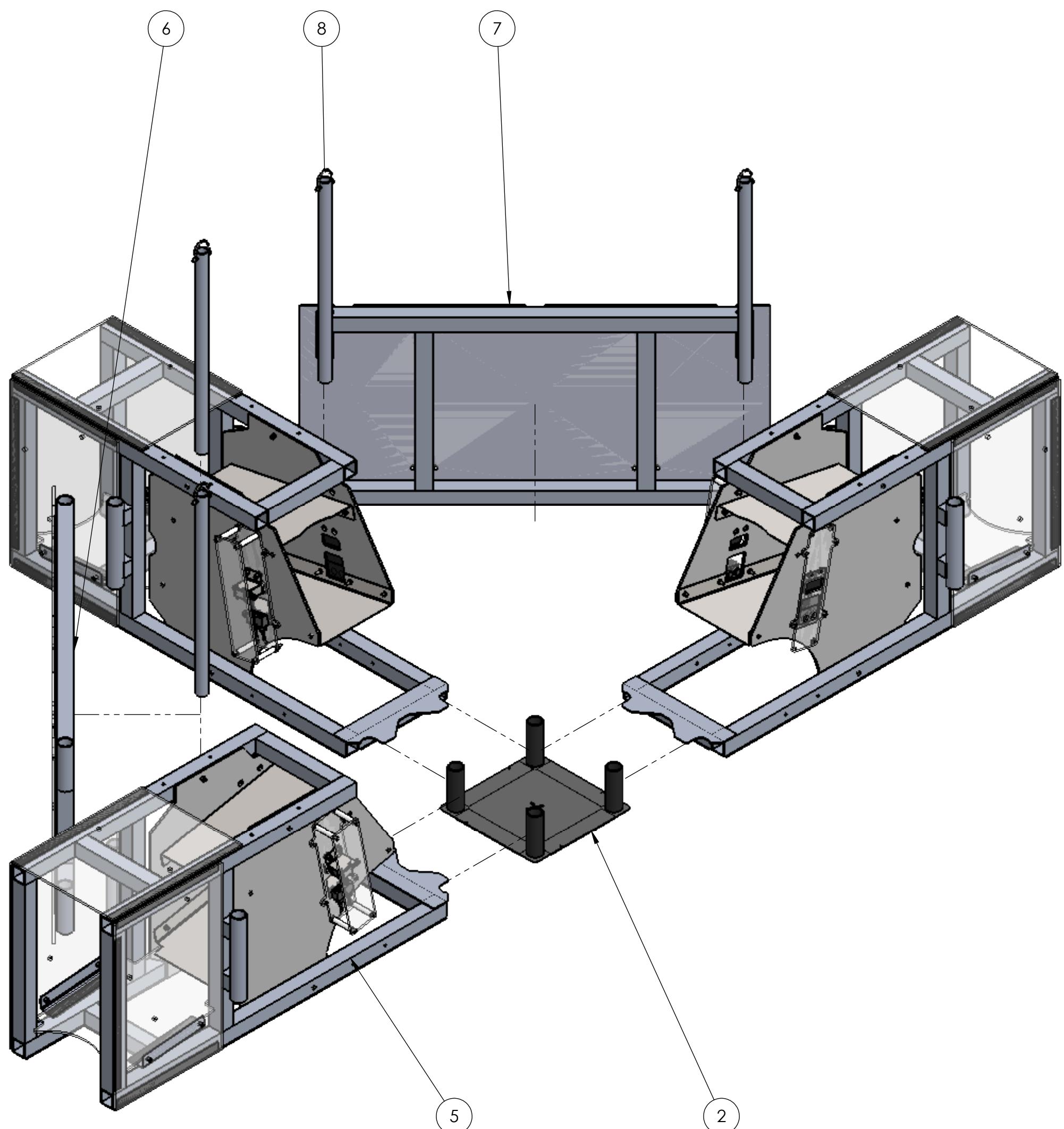
4

3

2

1

D

**Notes:**

1. Attach (10) to (15) using (14) and (15).
2. Attach (10) to (1) using (13).

UNLESS OTHERWISE SPECIFIED:			FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	12/17/2021
TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$					
PROPRIETARY AND CONFIDENTIAL					TITLE:
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:					SIZE DWG. NO. REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					

4

3

2

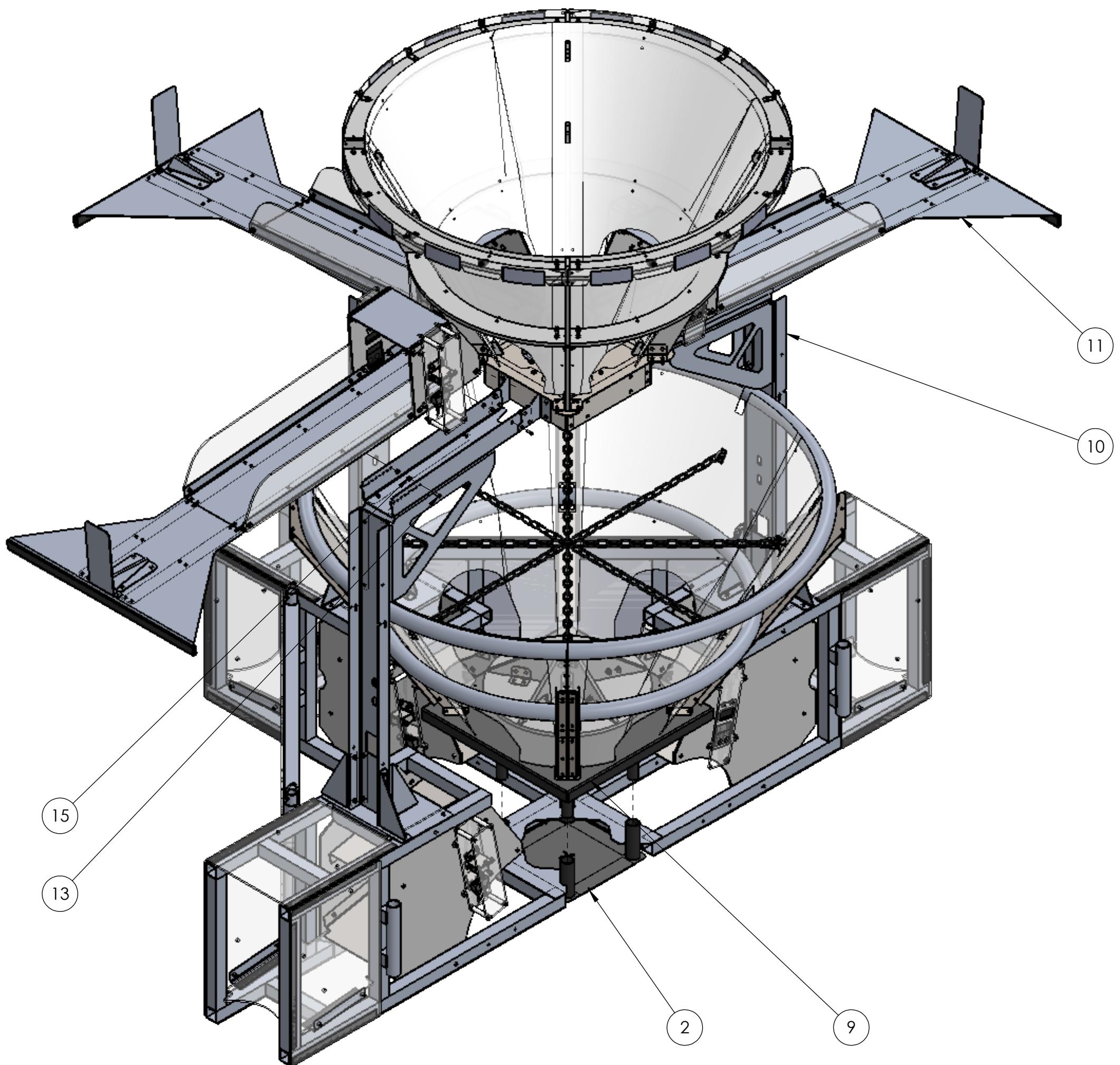
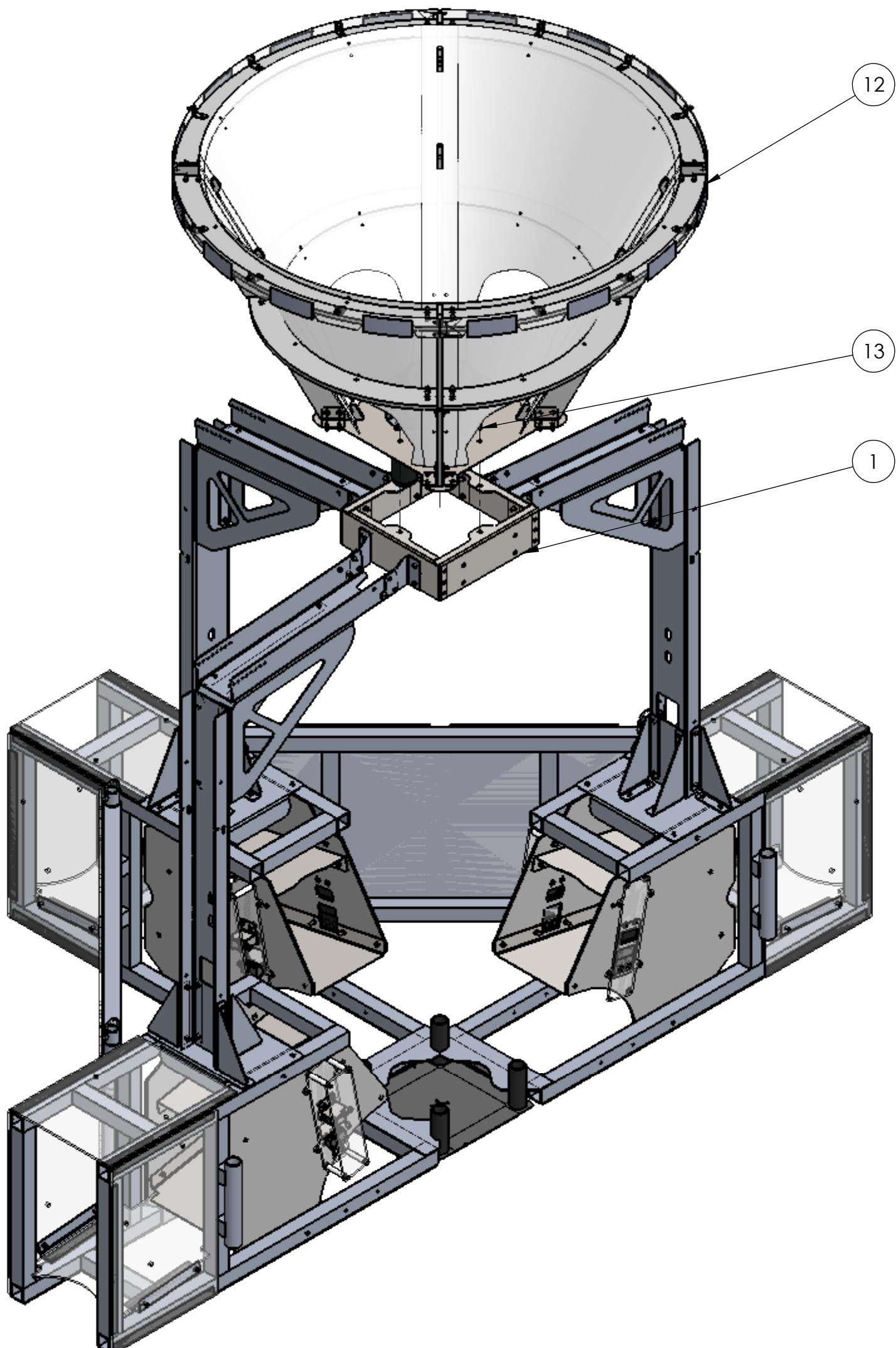
1

D

C

B

A



Notes:

1. Attach 12 to 1 using 13.

Notes:

1. Attach 11 to 10 using 13 and 15.
2. Insert 9 into receiving tubes of 2.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	DRAWN	CO	12/17/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	GE-22300	
DO NOT SCALE DRAWING	SCALE: 1:12	SHEET 3 OF 7	

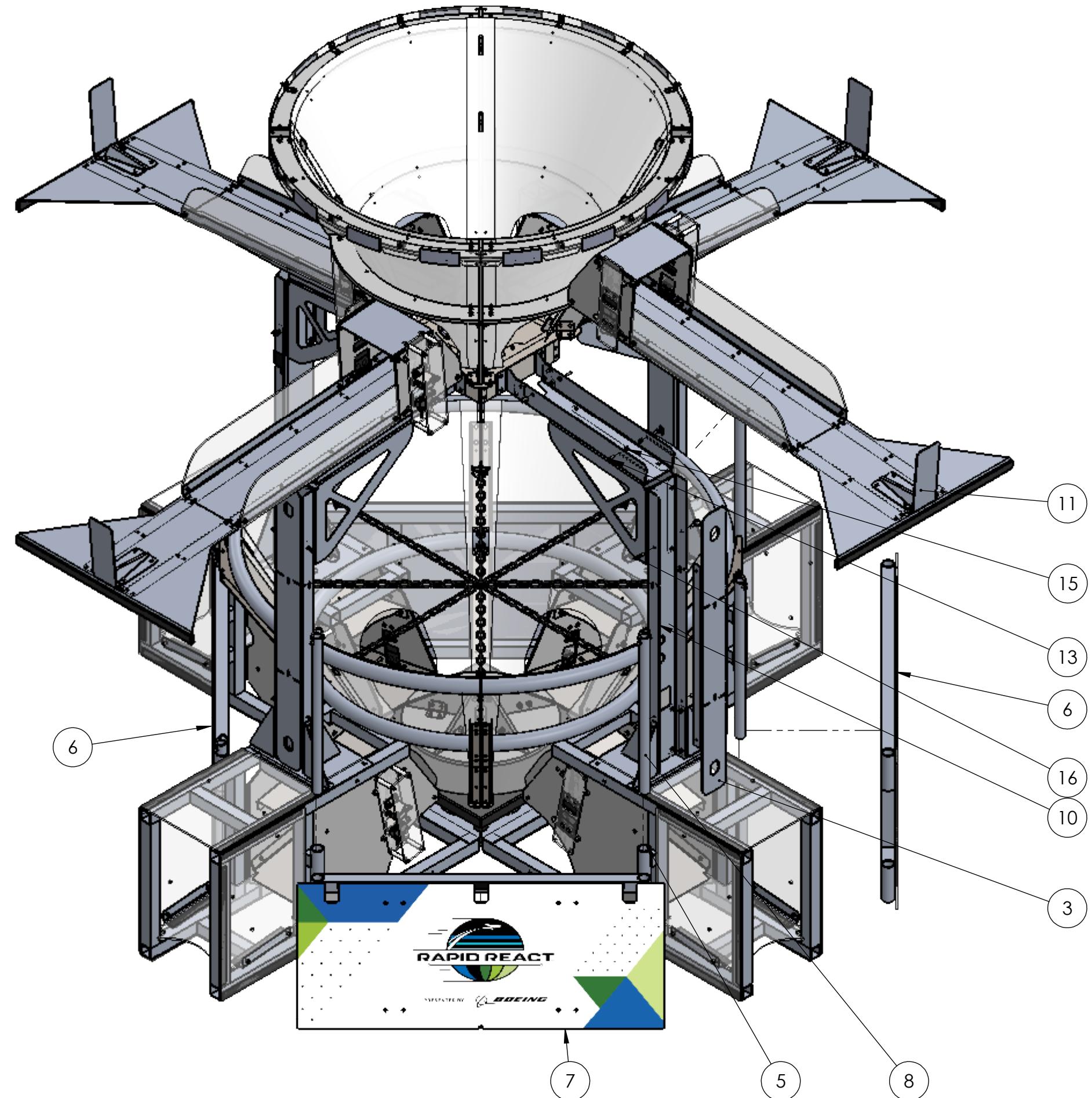
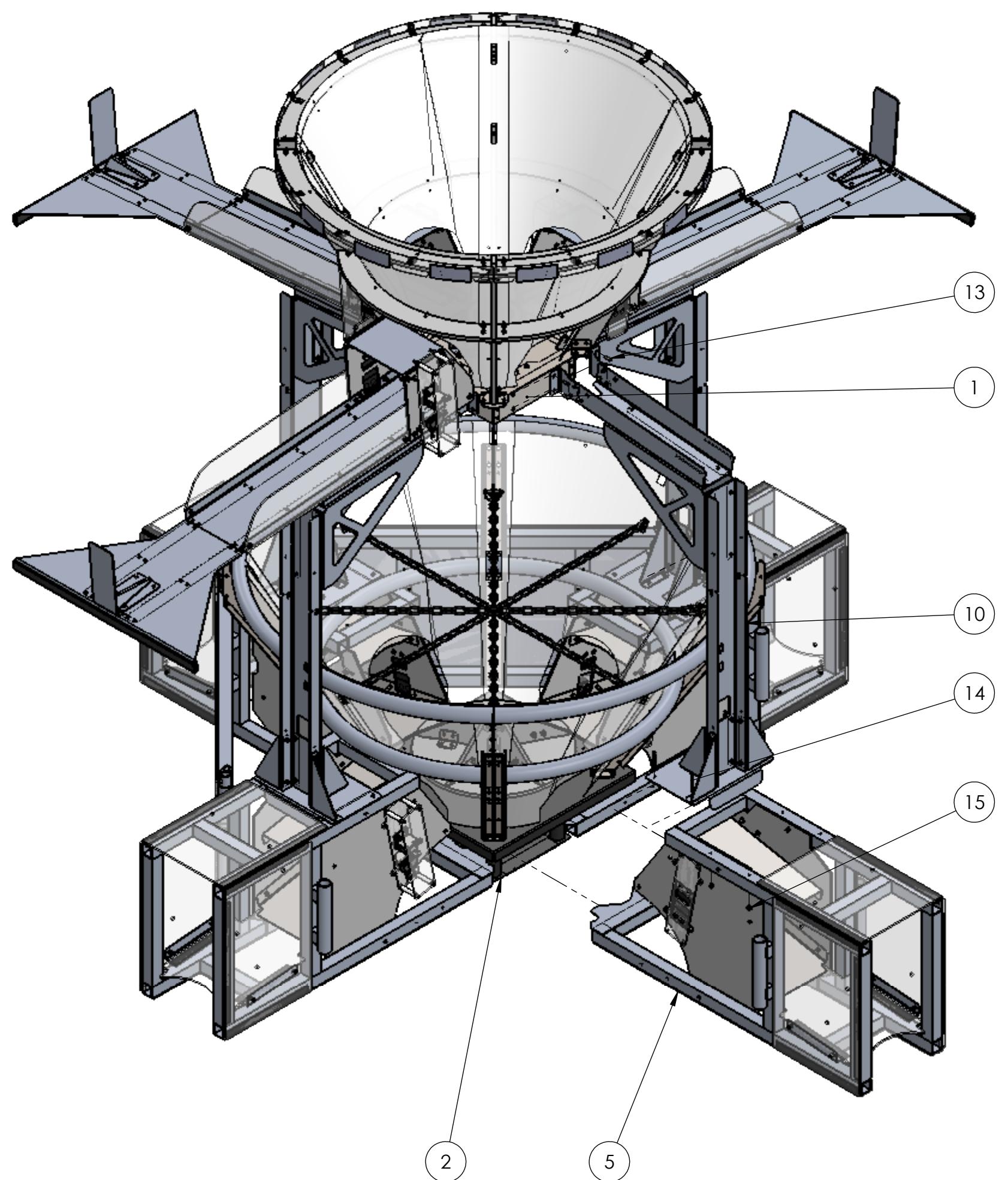
4

3

2

1

D



Notes:

1. Attach 6 and 7 to assembly using 8 to connect to 5. 7 should oppose other 7, and 6 should oppose other 6.
2. Attach 3 to 10 using 16.
3. Attach 11 to 10 using 13 and 15.

Notes:

1. Slide 5 into place flush against 2.
2. Attach 10 to 5 using 14 and 15.
3. Attach 10 to 1 using 13.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/17/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			
C	GE-22300		
SCALE: 1:14	SHEET 4 OF 7		

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE: Hub

SIZE DWG. NO. REV

4

3

2

1

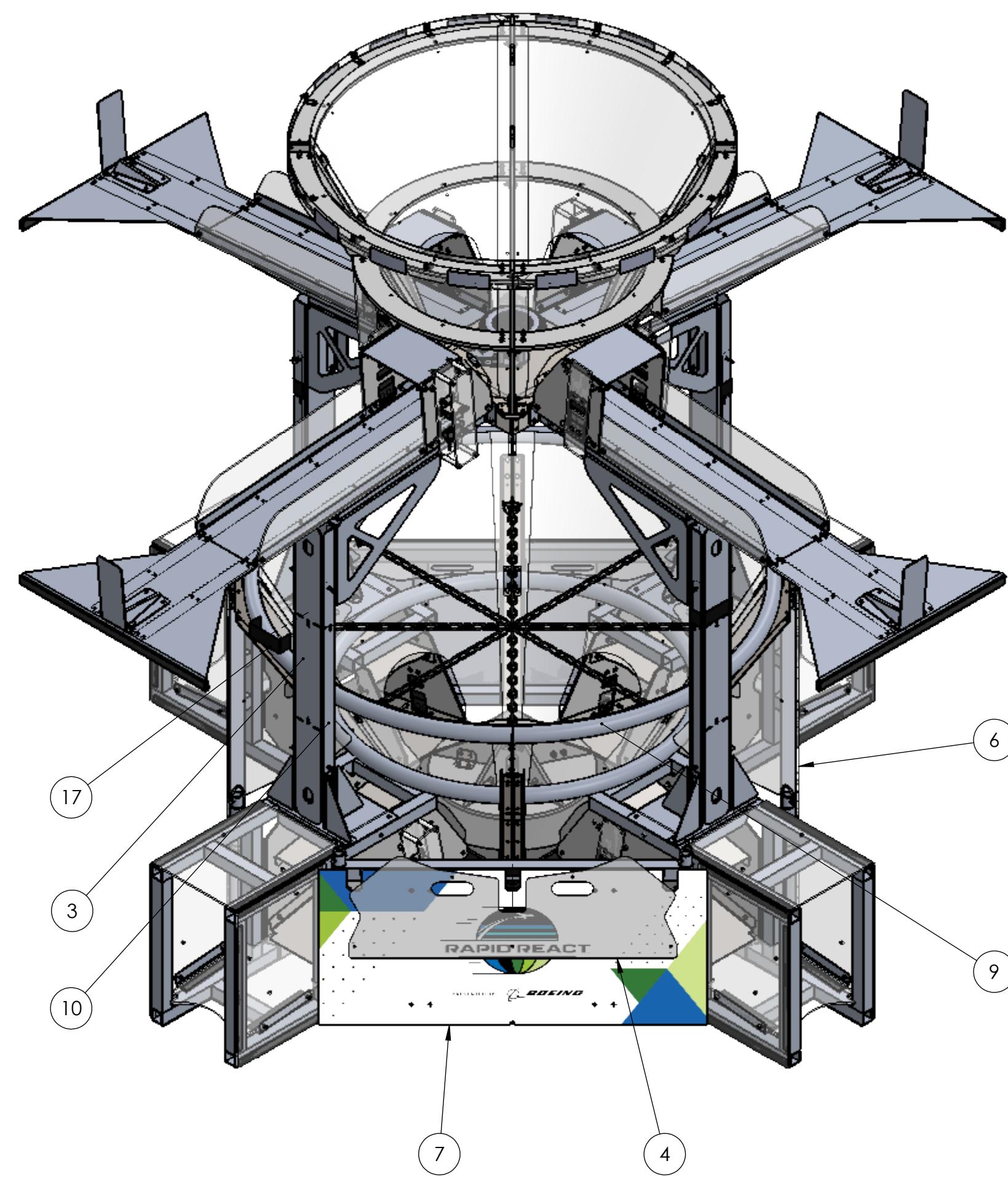
4

3

2

1

D



C

B

A

D

C

B

A

Notes:

1. Attach (4) to assembly, using cable ties to connect to (9) and either (6) or (7).
2. Attach (17) to (3) and (10), aligning bottom of (17) to notches on (3) and (10).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/17/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22300	
DO NOT SCALE DRAWING		SCALE: 1:14	SHEET 5 OF 7

4

3

2

1

4

3

2

1

D

D

C

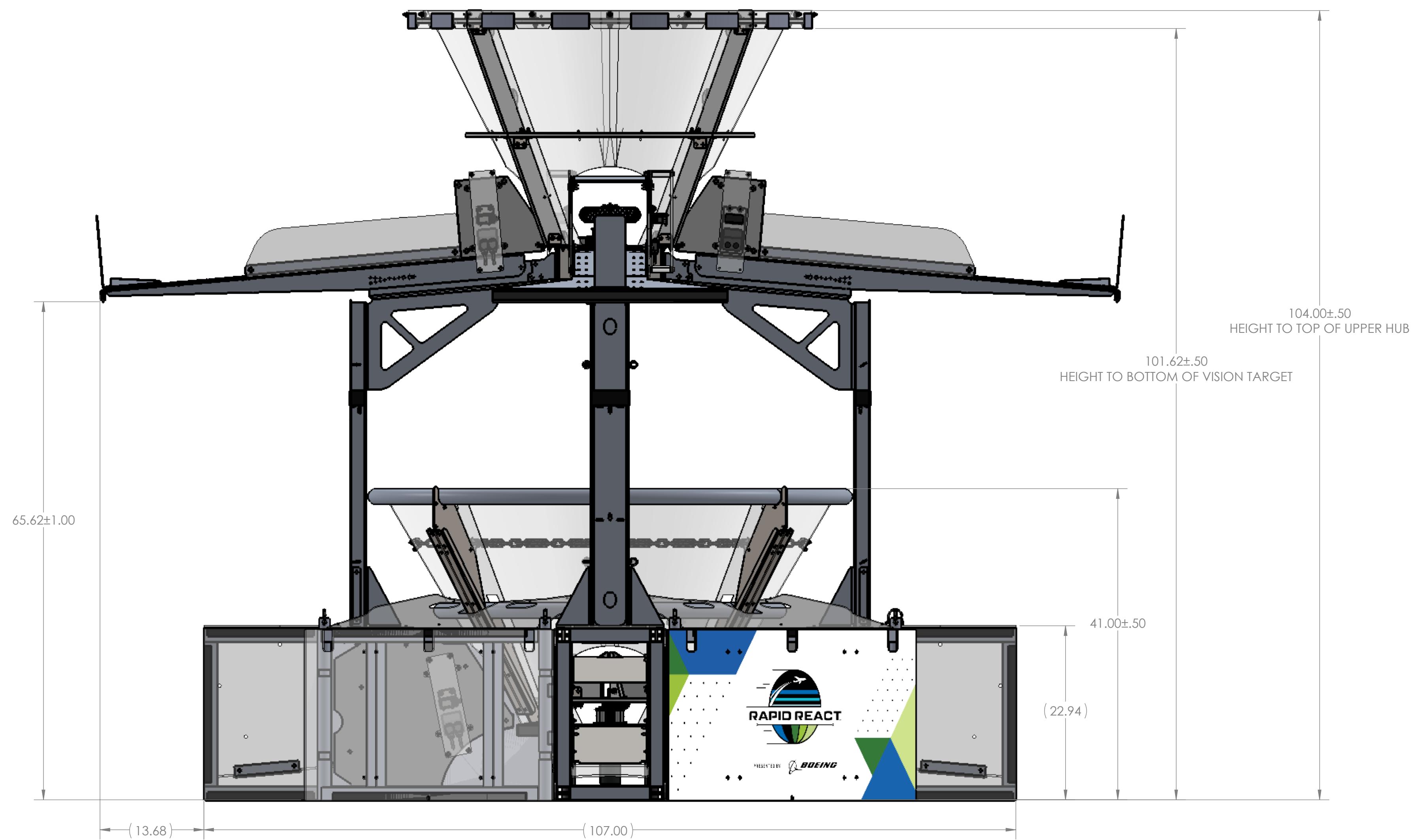
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL ± 1/2

ANGULAR: MACH ± 1° BEND ± 1°

TWO PLACE DECIMAL ± .50

MATERIAL/FINISH:

DO NOT SCALE DRAWING

FIELD NAME DATE

DRAWN CO 12/17/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

**FIRST
ROBOTICS
COMPETITION**
 DS SOLIDWORKS
Modeling Solutions Partner

TITLE: Hub

SIZE DWG. NO. REV

C GE-22300

SCALE: 1:10 SHEET 6 OF 7

4

3

2

1

4

3

2

1

D

D

C

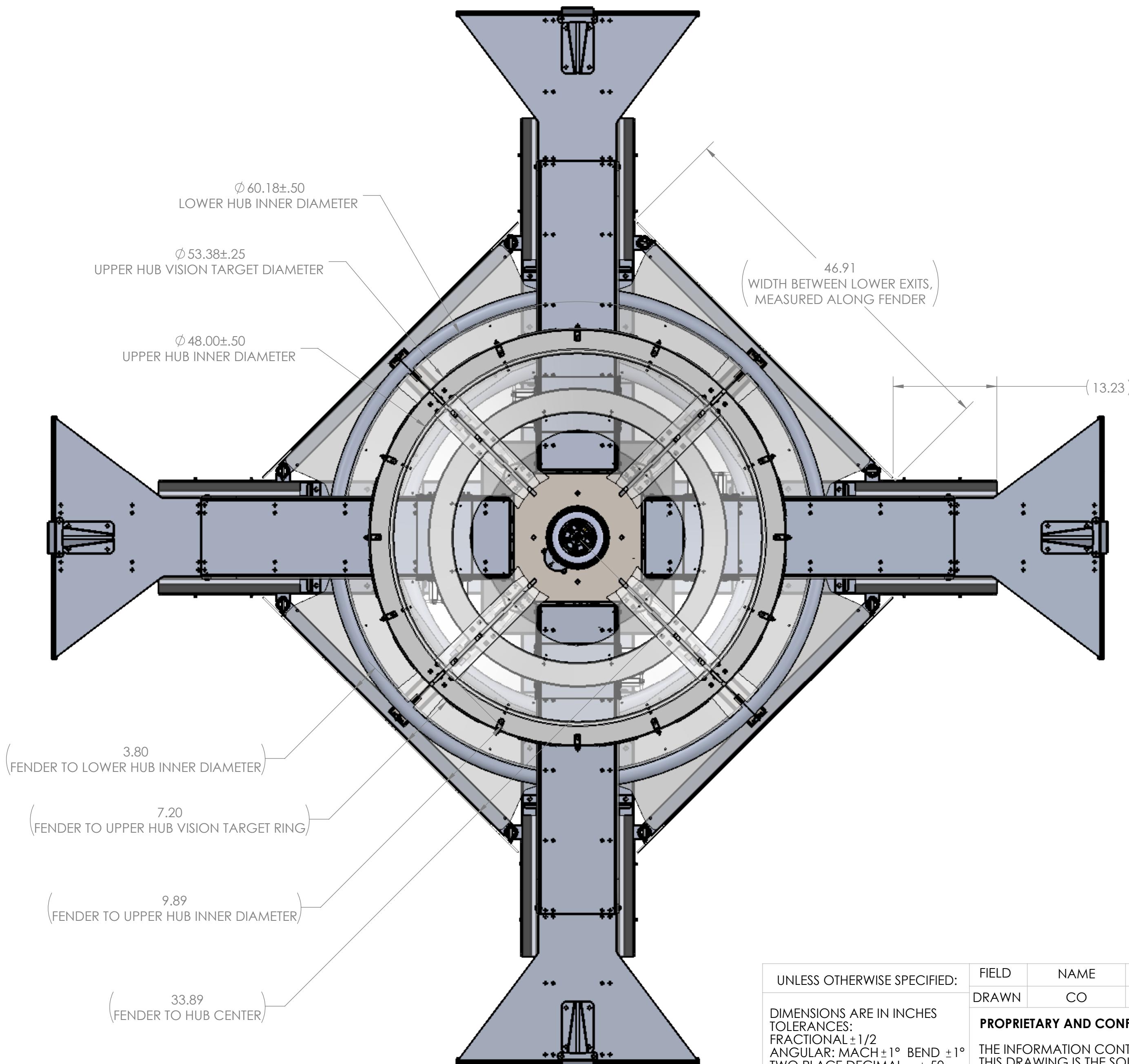
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/17/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner
TITLE: Hub	
SIZE	DWG. NO.
C	GE-22300
REV	
SCALE: 1:10	SHEET 7 OF 7

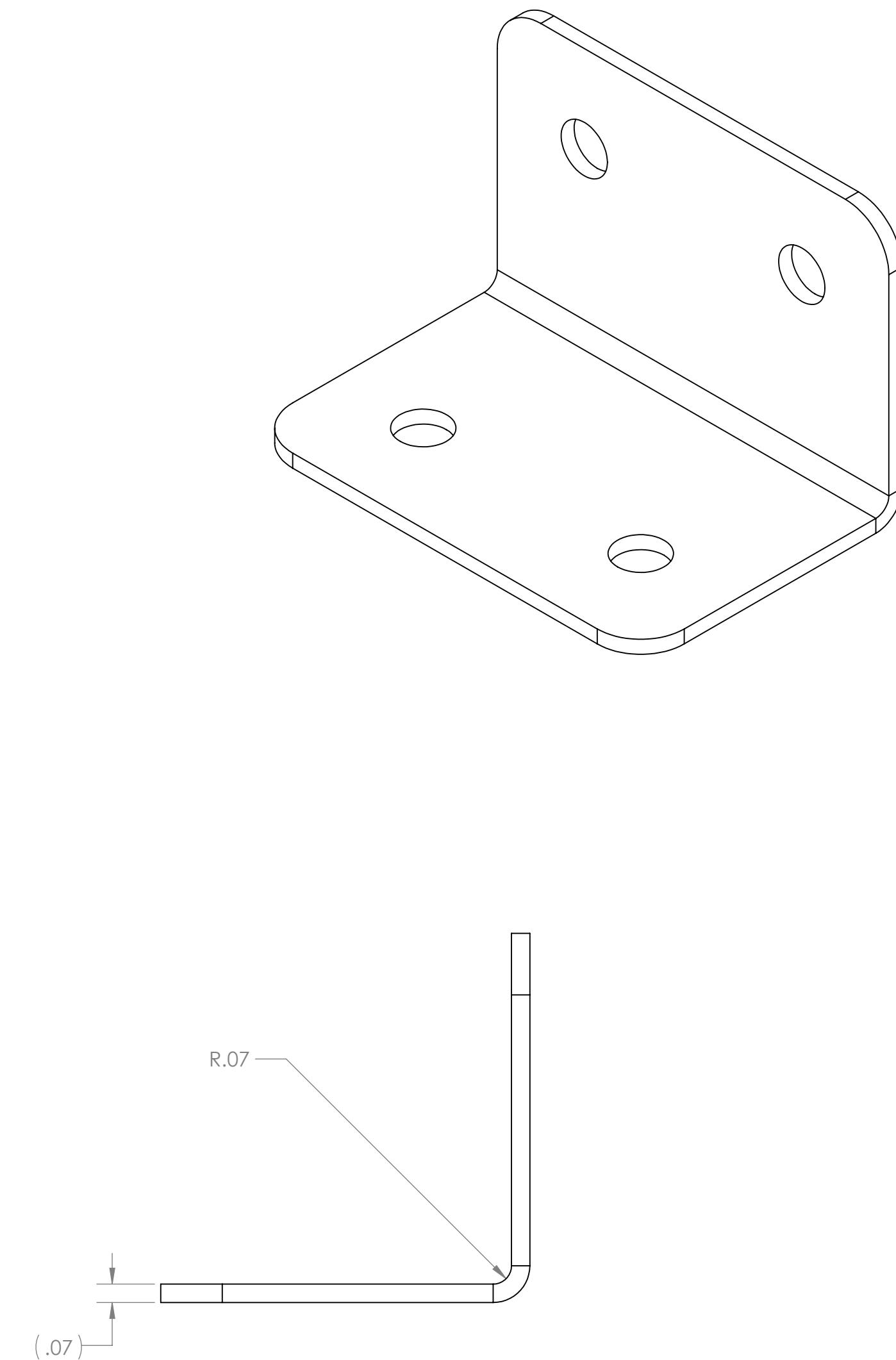
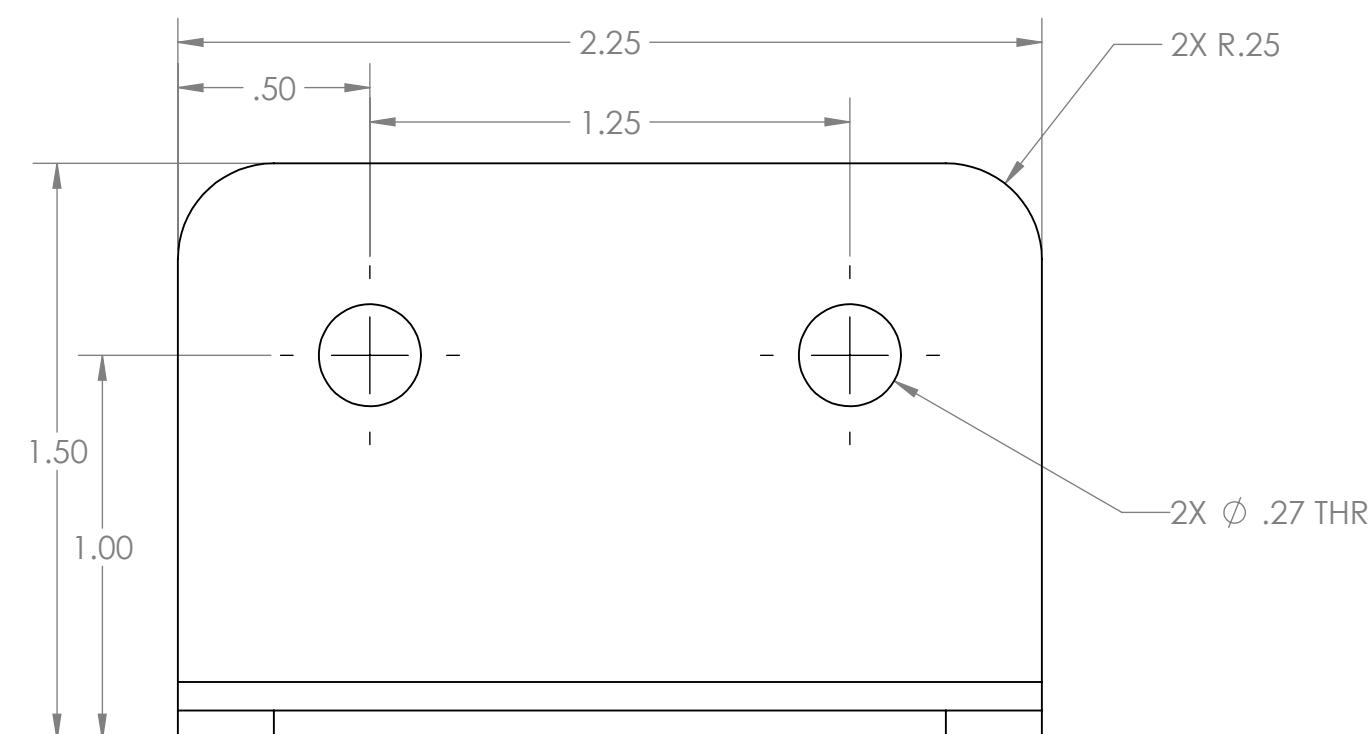
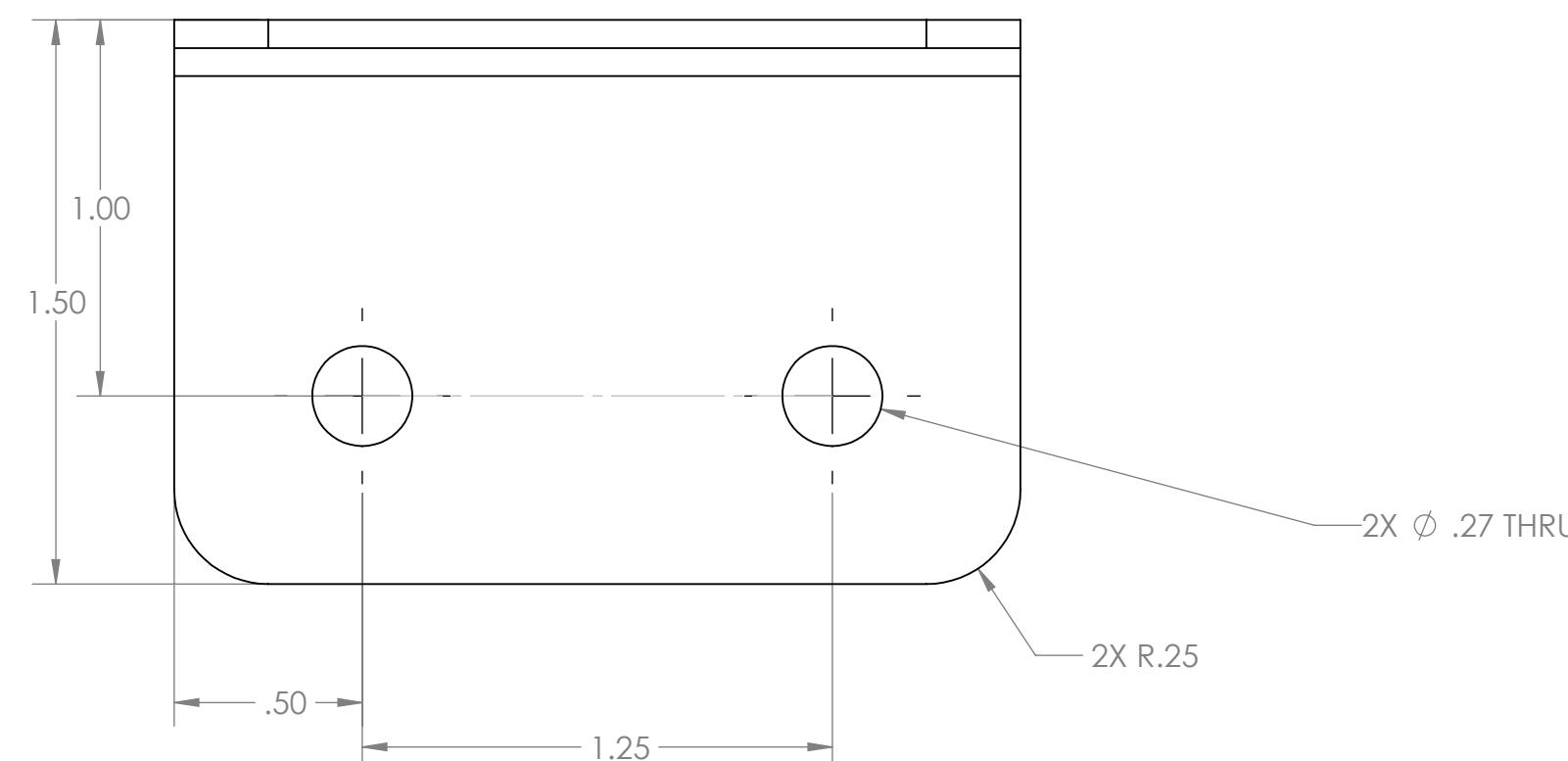
4

3

2

1

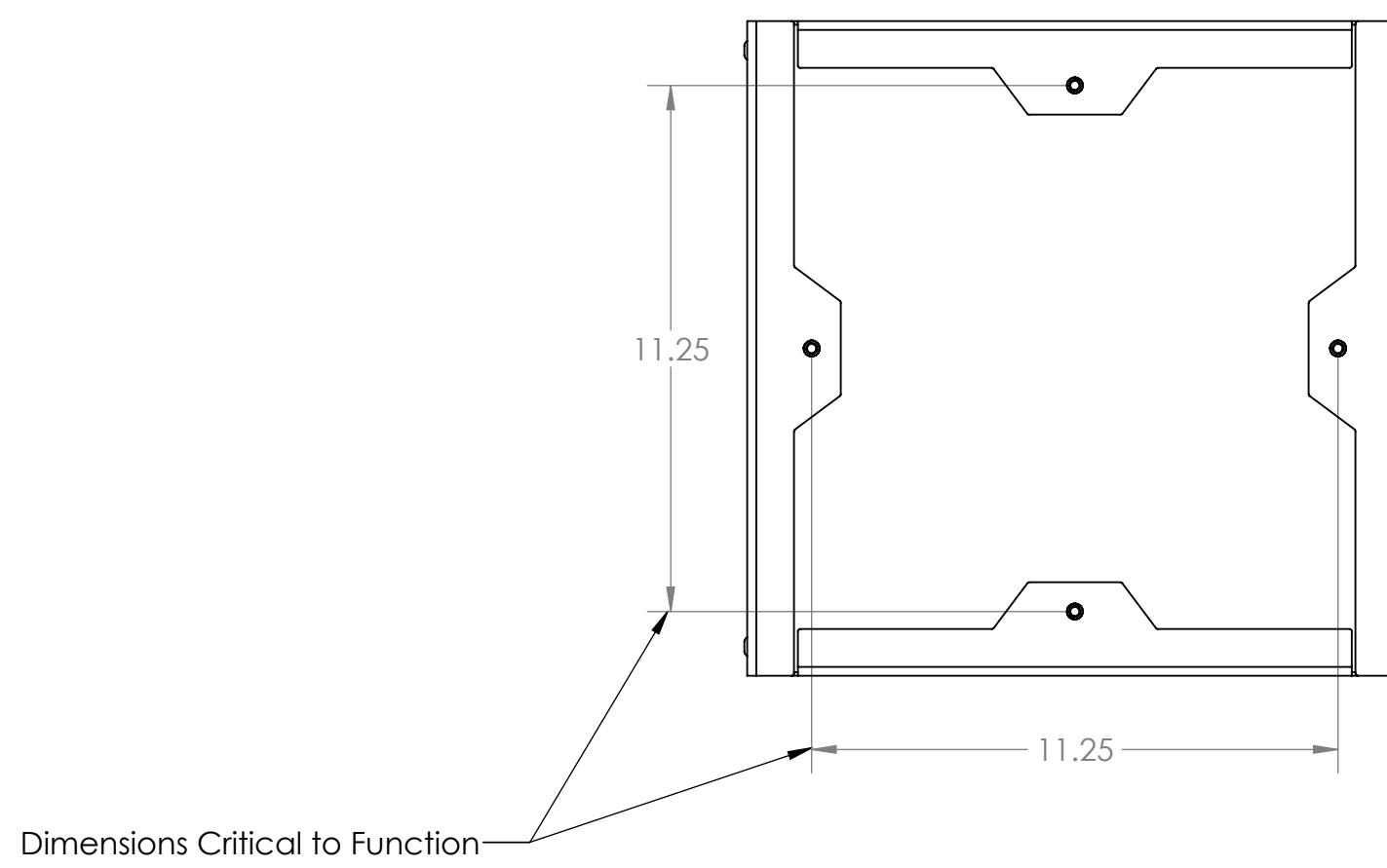
D



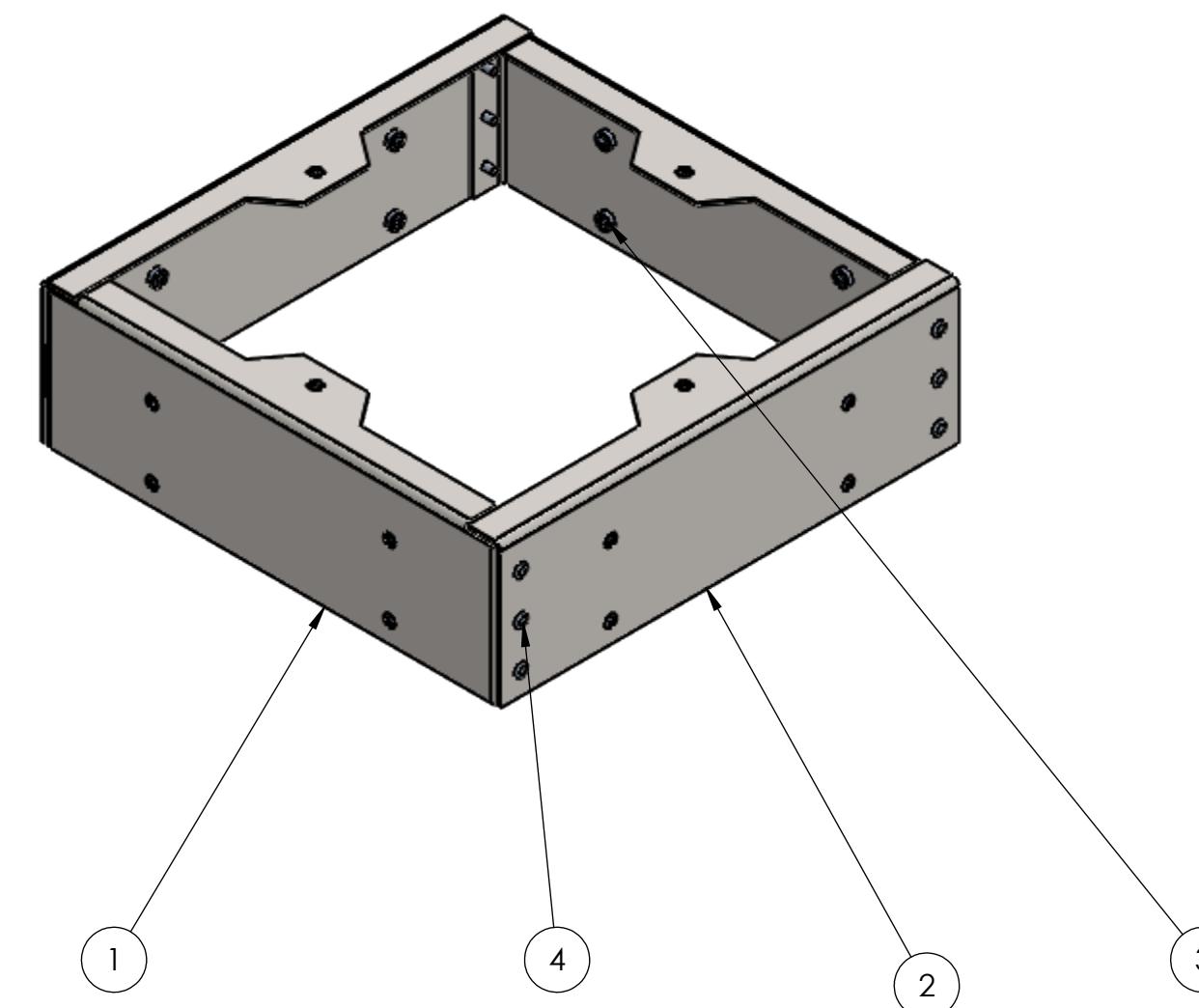
Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	6/17/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 ga. Pre-Plated Steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner			
TITLE: Hub Angle Bucket			
SIZE	DWG. NO.	REV	
C	GE-22301		
SCALE: 2:1	SHEET 1 OF 1		

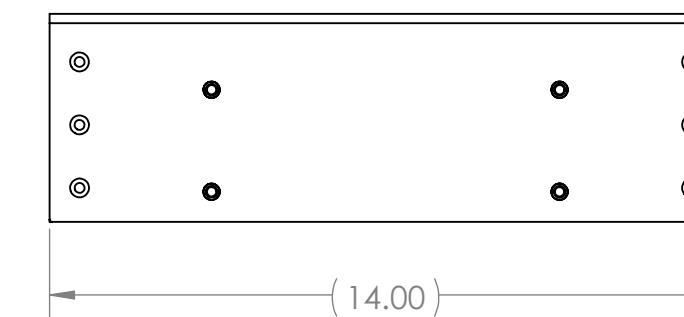
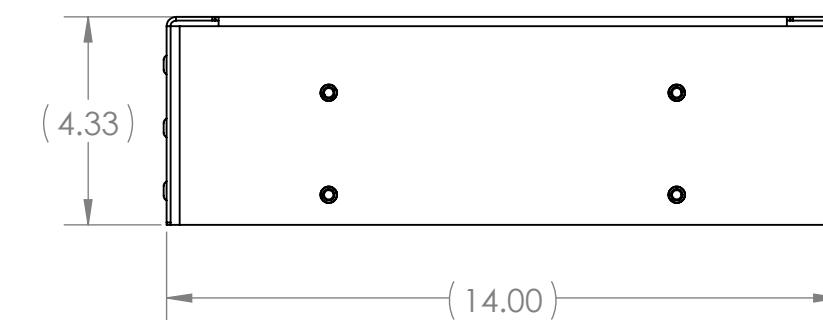
D



C



B



A

Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22302-01	14 Ga. Pre-plated steel	2
2	GE-22302-02	14 Ga. Pre-plated steel	2
3	pem_clinchnut_.25_20_.054	1/4-20 self-clinching nut, .054 shank	20
4	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	12

UNLESS OTHERWISE SPECIFIED:		BEND	NAME	DATE
		DRAWN	CO	7/20/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:				
REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING				

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Leg to Upper Hub Box

SIZE DWG. NO. REV

C GE-22302

SCALE: 1:4 SHEET 1 OF 3

4

3

2

1

D

D

C

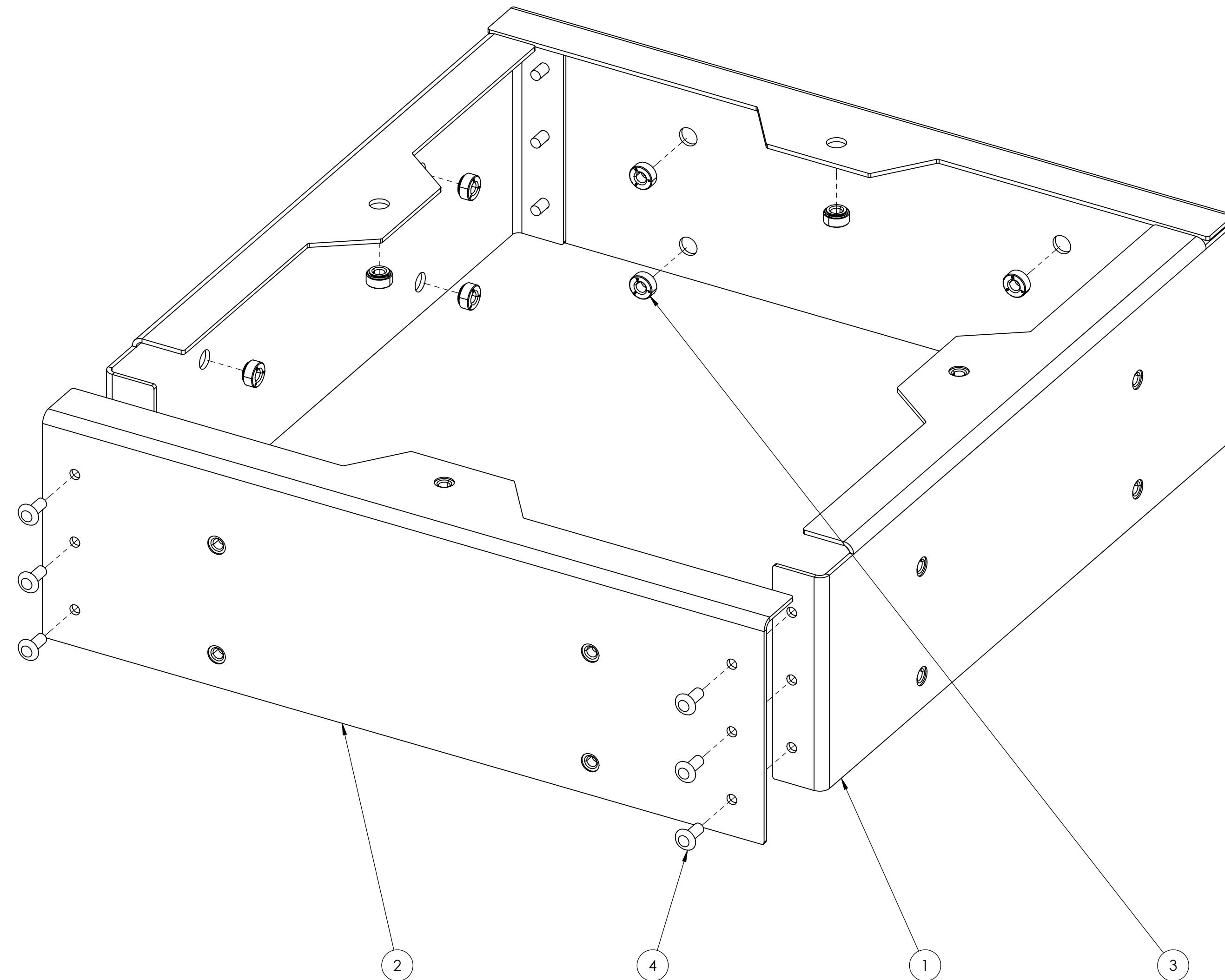
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING

BEND

DRAWN

NAME

CO

DATE

7/20/2021



TITLE:

Leg to Upper
Hub Box

SIZE

DWG. NO.

REV

C

GE-22302

SCALE: 2:3

SHEET 2 OF 3

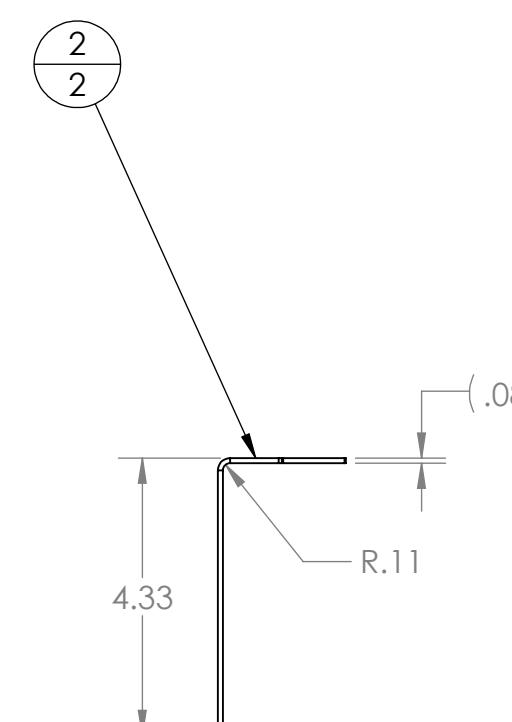
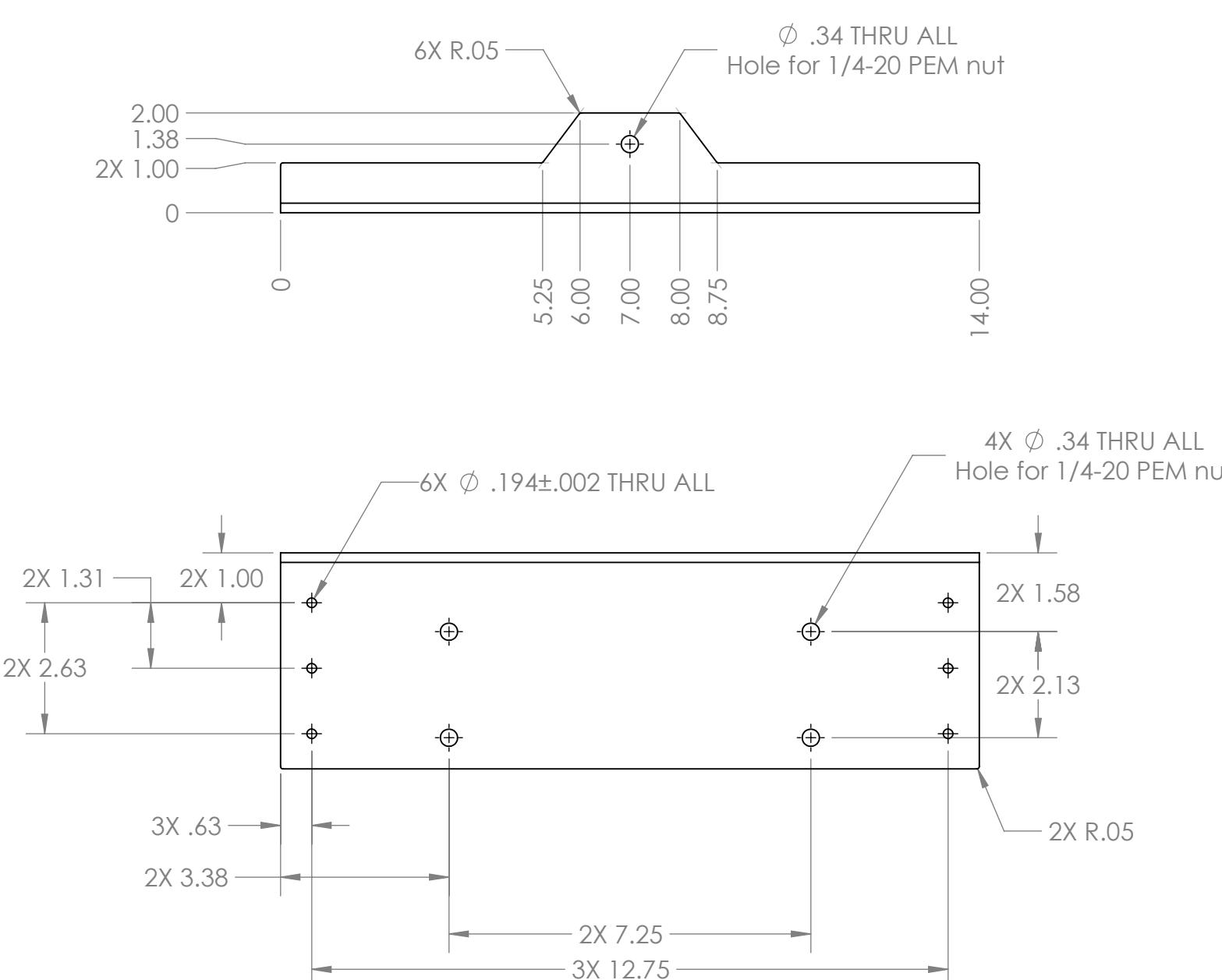
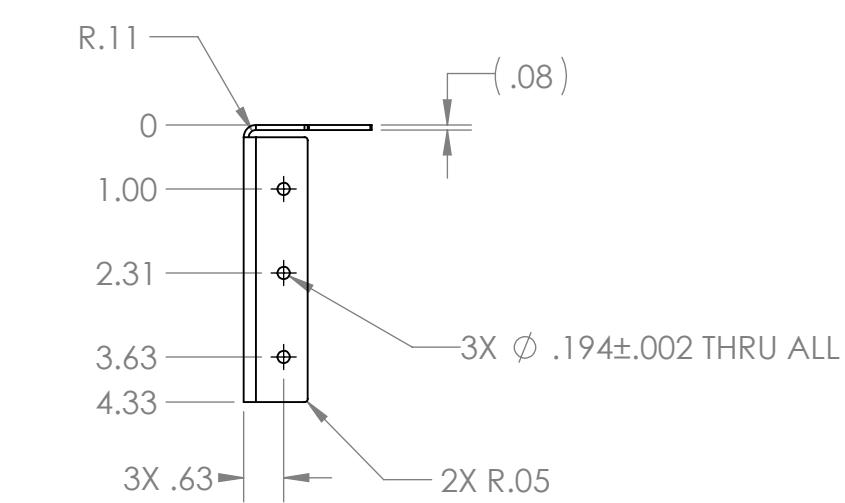
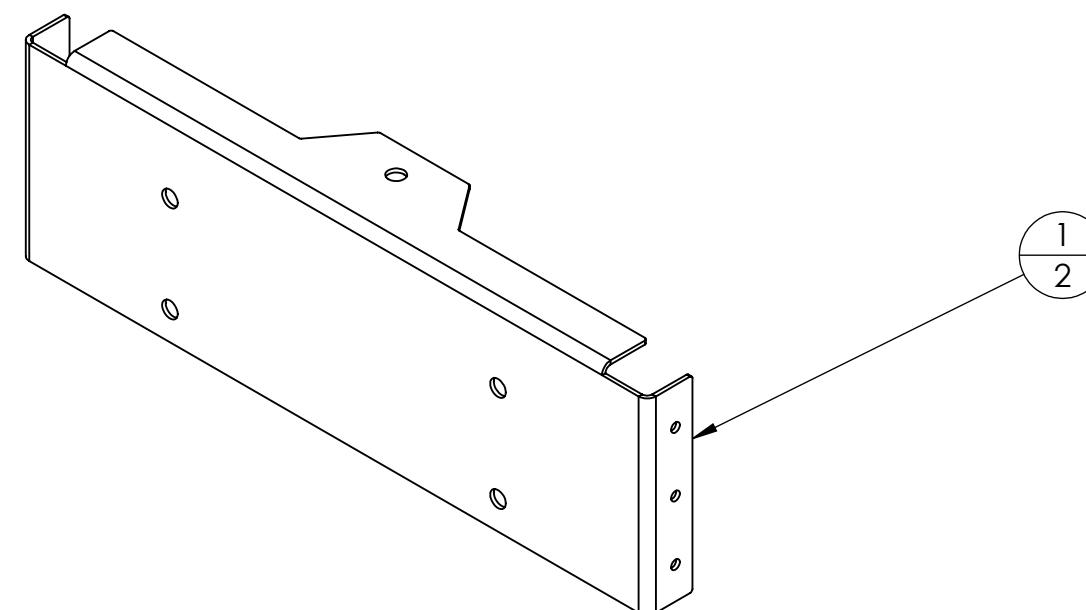
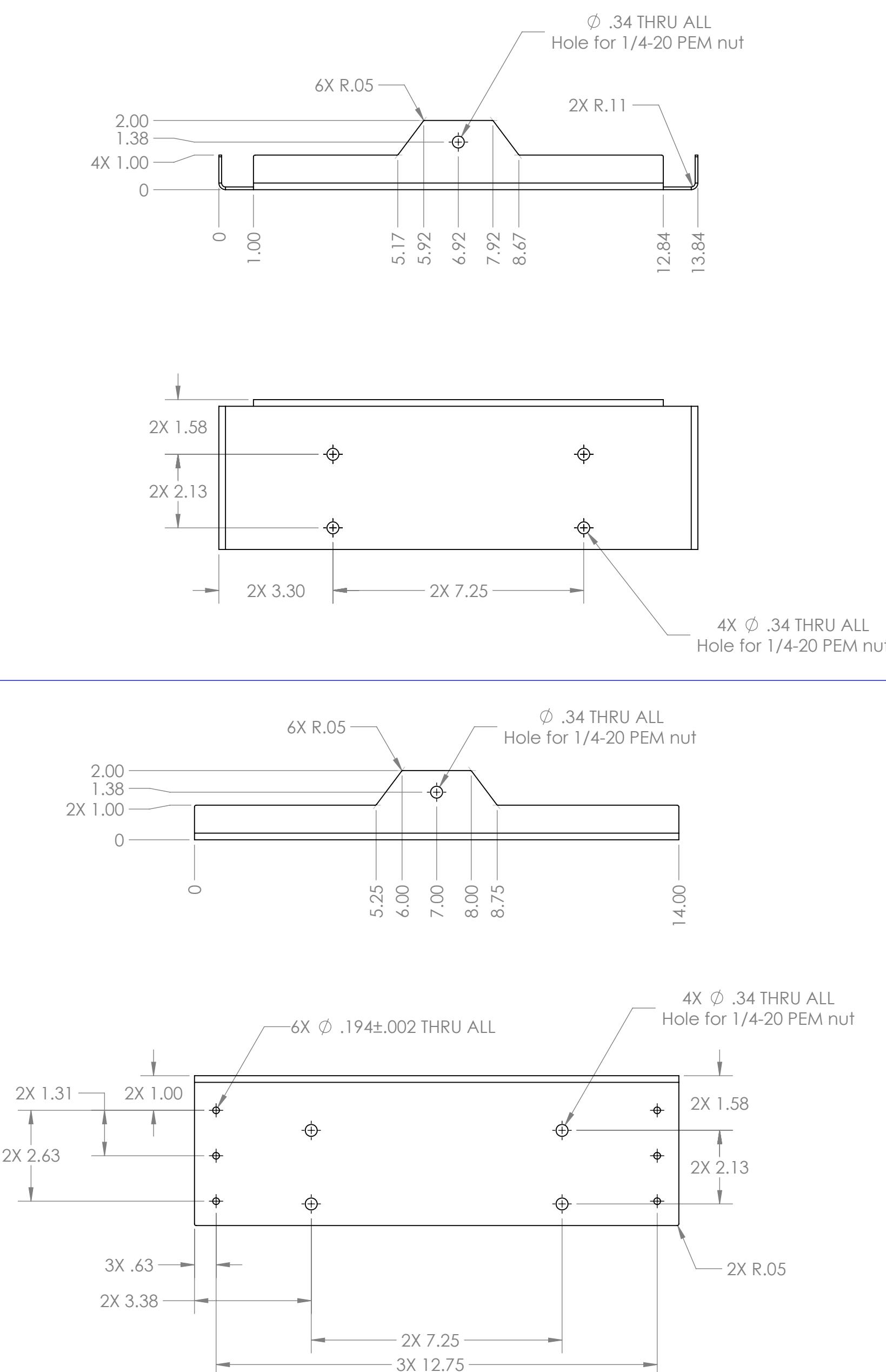
4

3

2

1

D



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	CO	7/20/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
REMOVE ALL BURRS AND SHARP EDGES.			
COMMENTS:			
DO NOT SCALE DRAWING			

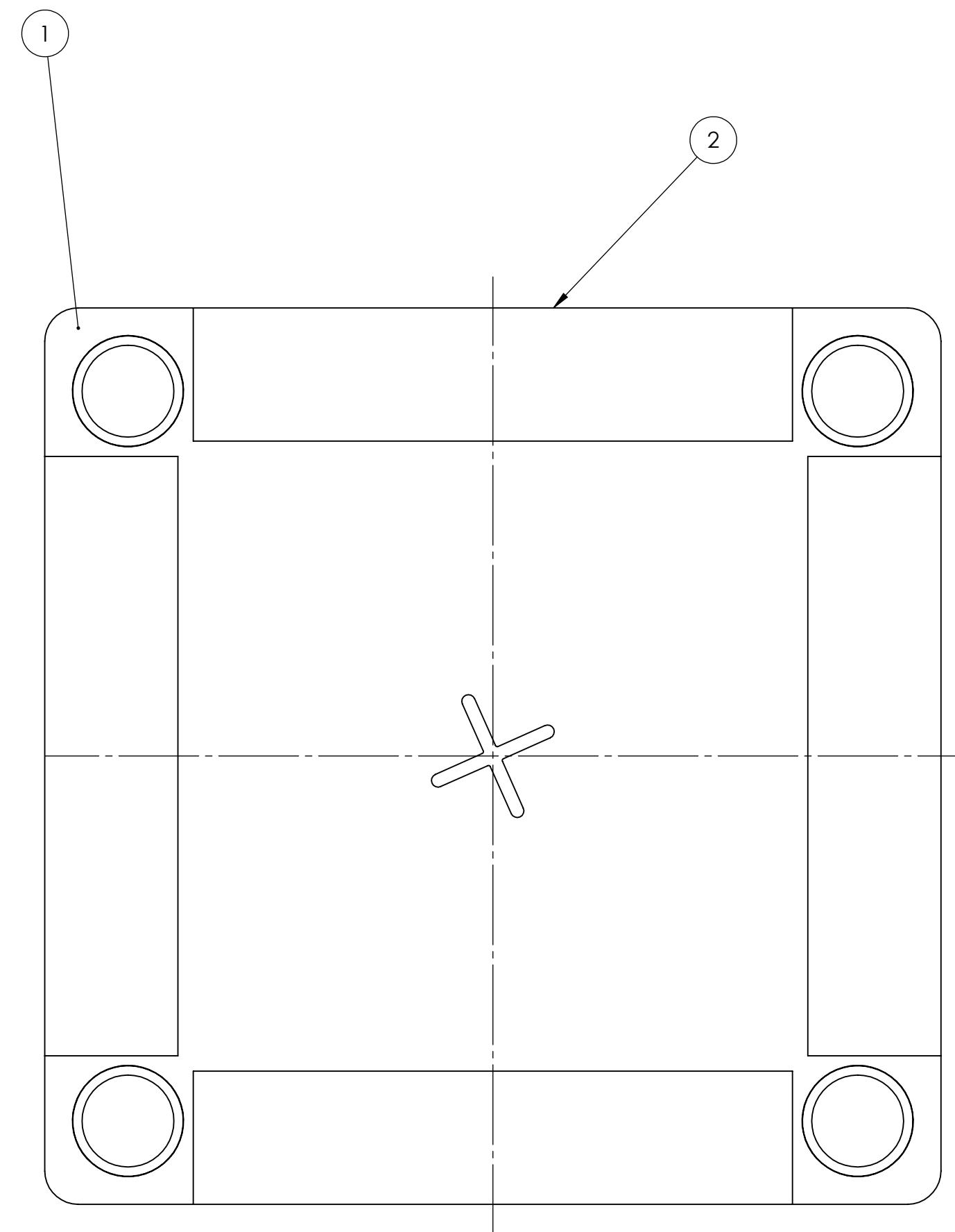
FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE: Leg to Upper Hub Box

SIZE	DWG. NO.	REV
C	GE-22302	

SCALE: 1:3 **SHEET** 3 OF 3

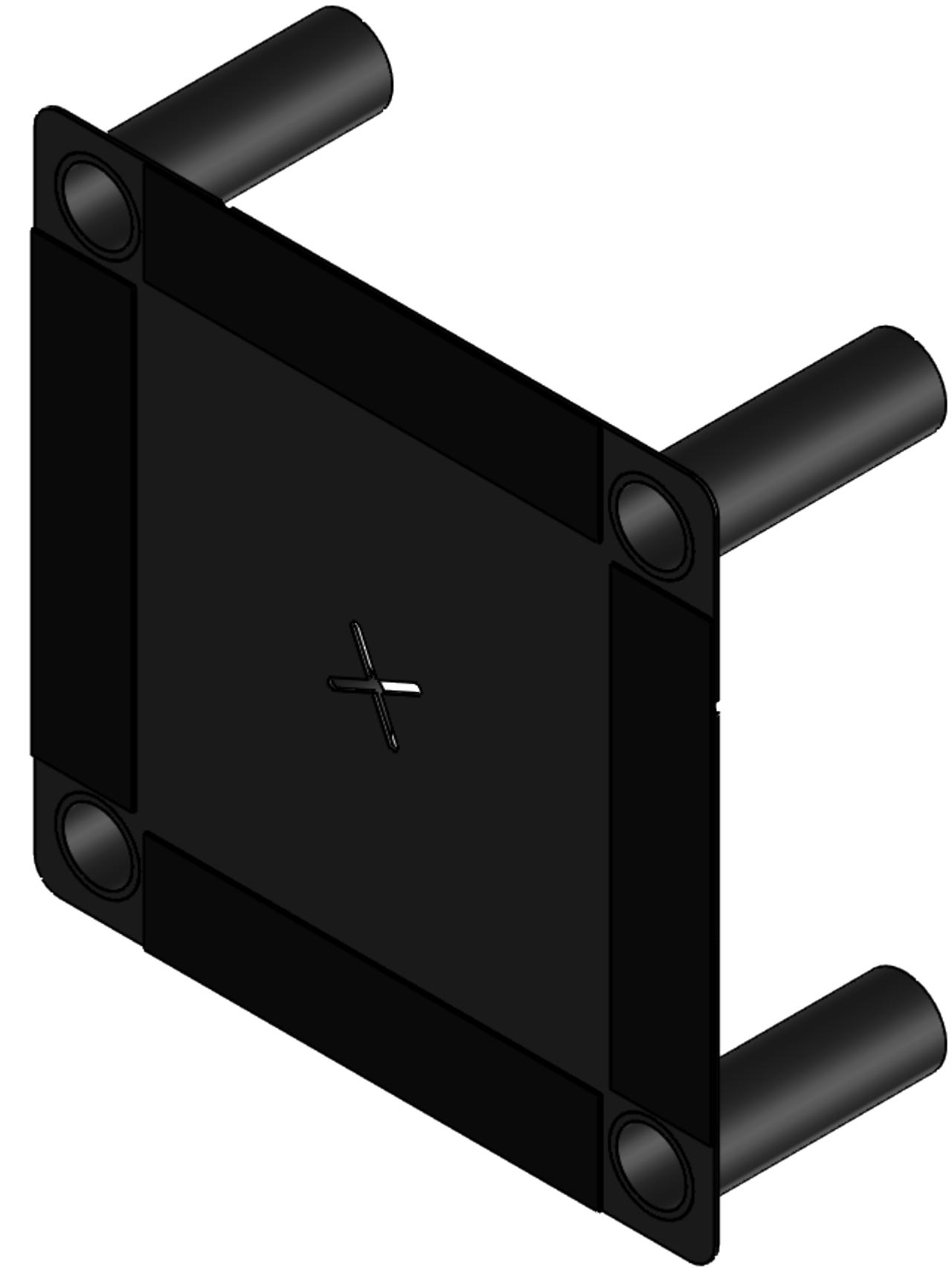
D



Notes:

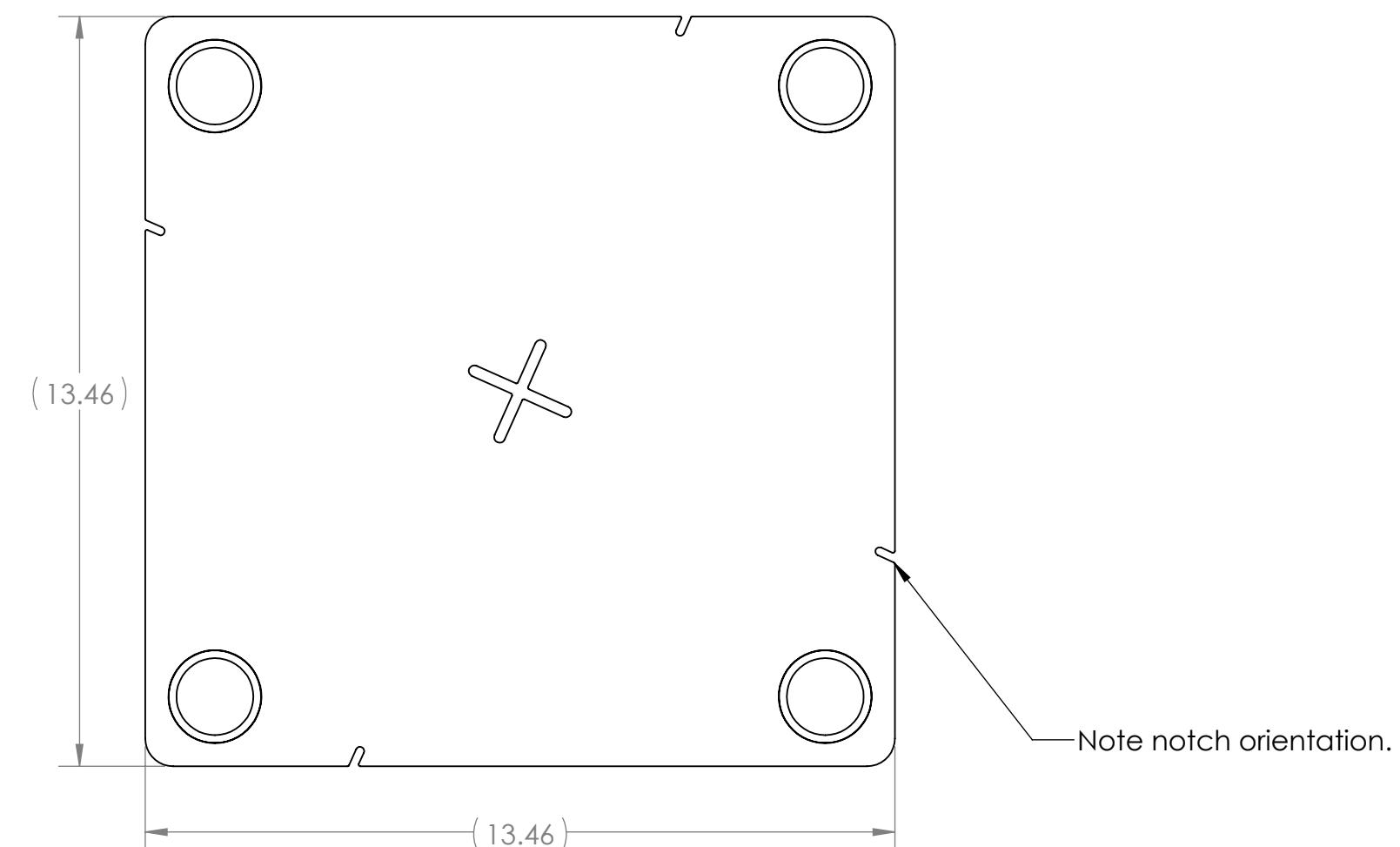
1. Ensure surface of is clean prior to hook application.
2. Attach to in locations shown.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22304	Hub Base	1
2	Hook_2_9	2" x 9" Hook, Adhesive Backed	4



UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE		
DIMENSIONS ARE IN INCHES			DRAWN	CO	12/14/2021		
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$							
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$							
PROPRIETARY AND CONFIDENTIAL							
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.							
MATERIAL/FINISH:			COMMENTS:				
			REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING			SCALE: 1:2				
TITLE: Hub Base with Hook							
SIZE			DWG. NO.		REV		
C			GE-22303				
SOLIDWORKS Modeling Solutions Partner							
FIRST® ROBOTICS COMPETITION							

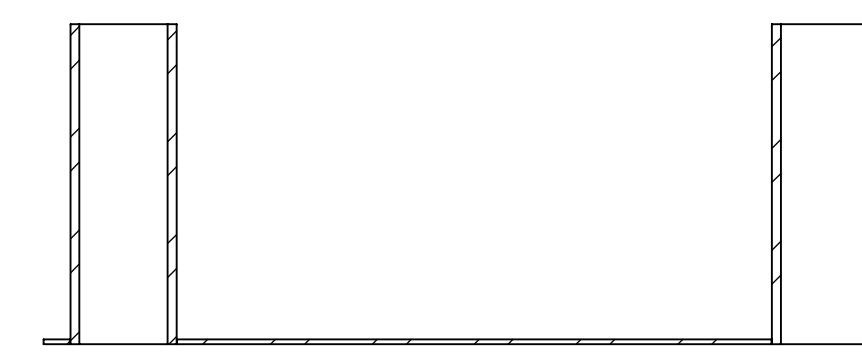
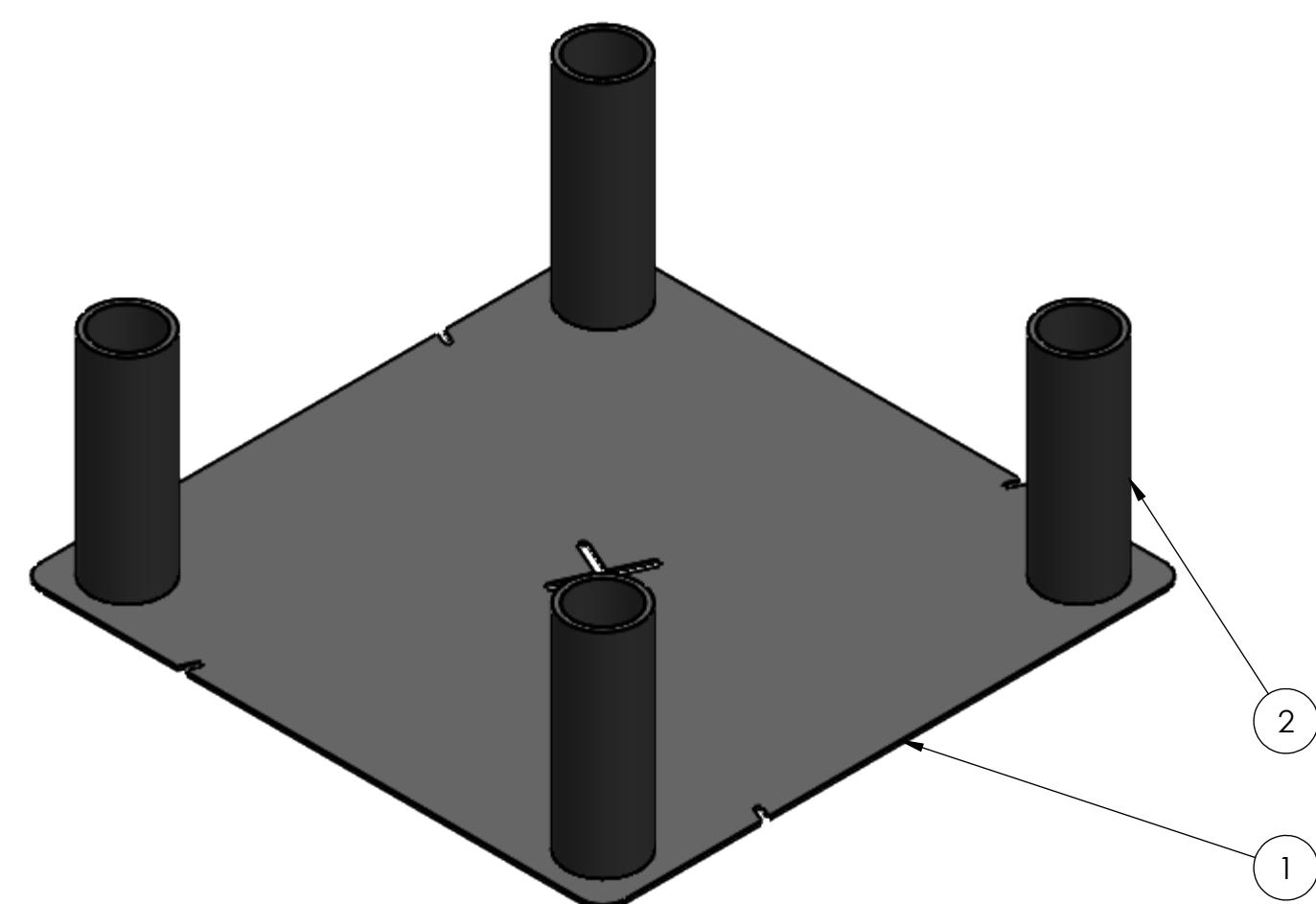
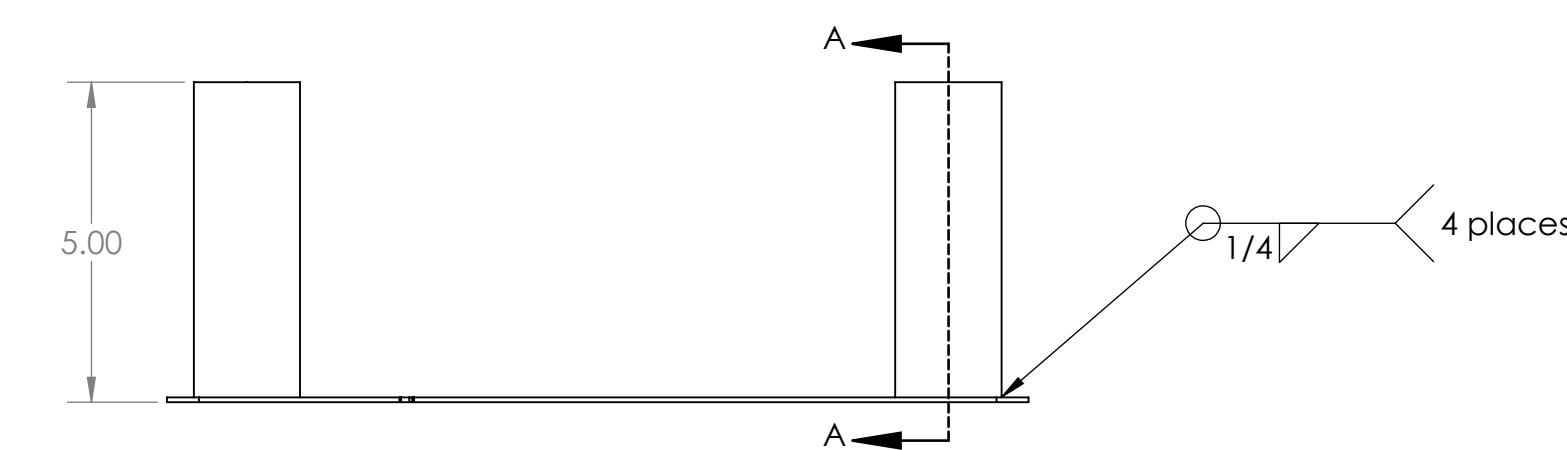
D



C

B

A



Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22304-01	14 Ga. A-366/1008 Cold Roll Steel	1
2	GE-22304-02	1.25" Schedule 40 Pipe, A500 Steel	4

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
	DRAWN	CO	7/19/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Powder Coated Black			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Hub Base

SIZE DWG. NO. REV
C GE-22304

SCALE: 1:3 SHEET 1 OF 3

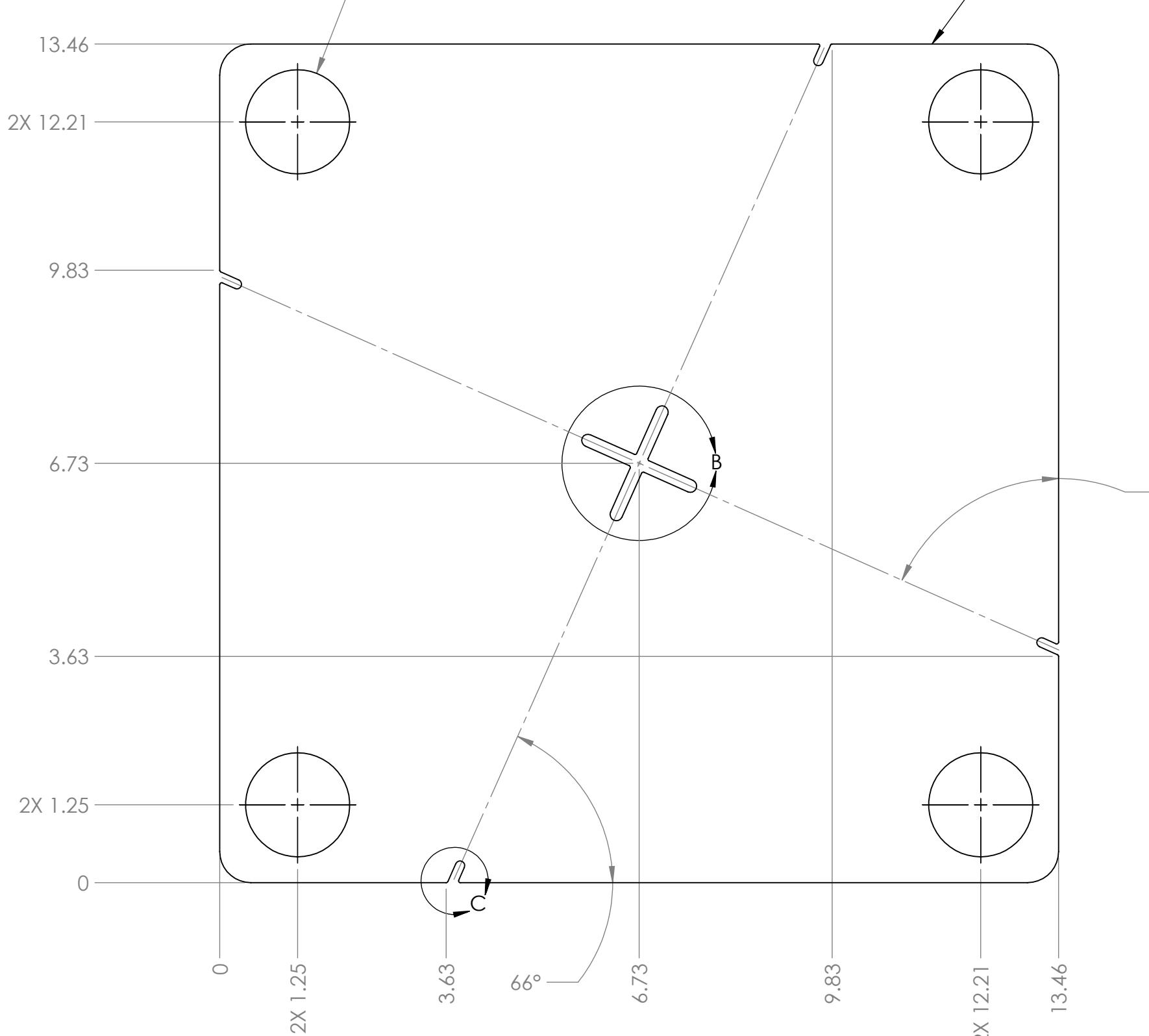
4

3

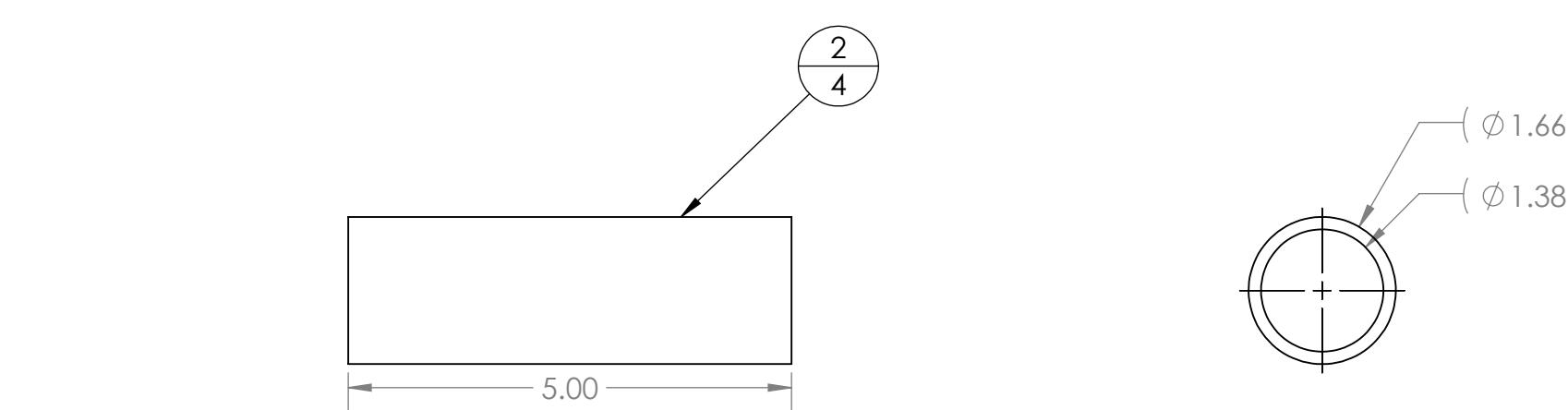
2

1

D



C



A

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	7/19/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Powder Coated Black			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Hub Base

SIZE DWG. NO. REV
C GE-22304

SCALE: 1:2 SHEET 2 OF 3

4

3

2

1

4

3

2

1

D

D

C

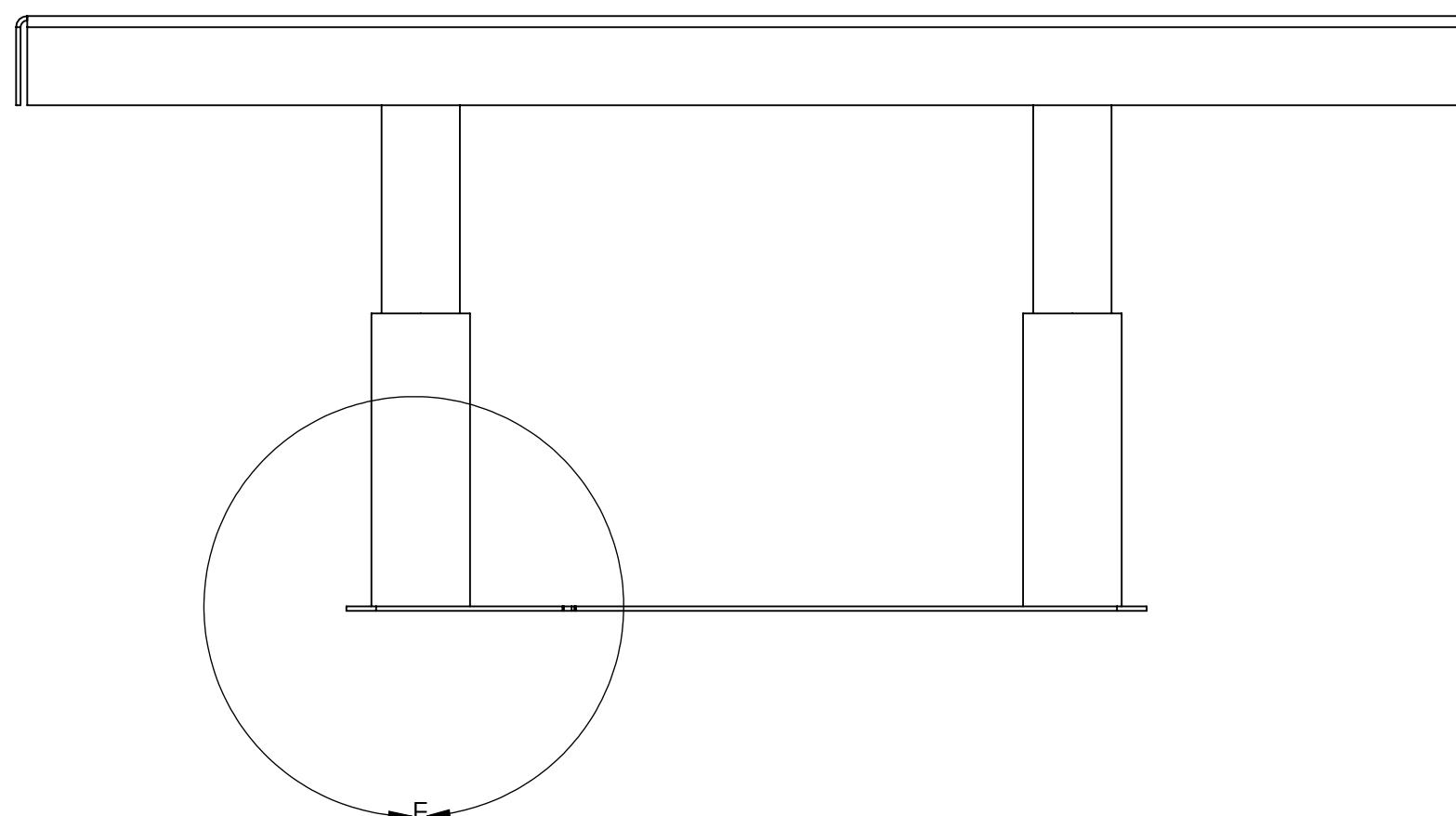
C

B

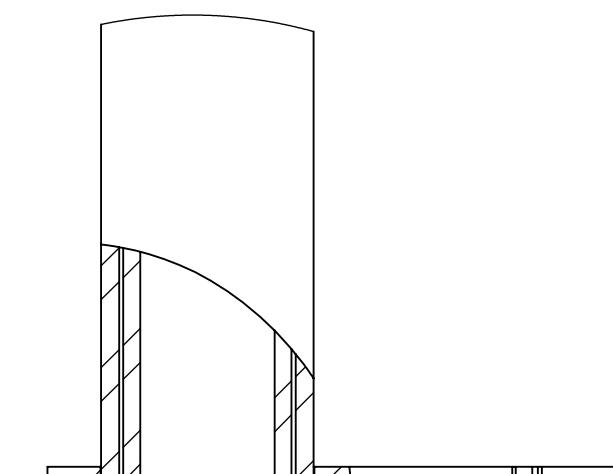
B

A

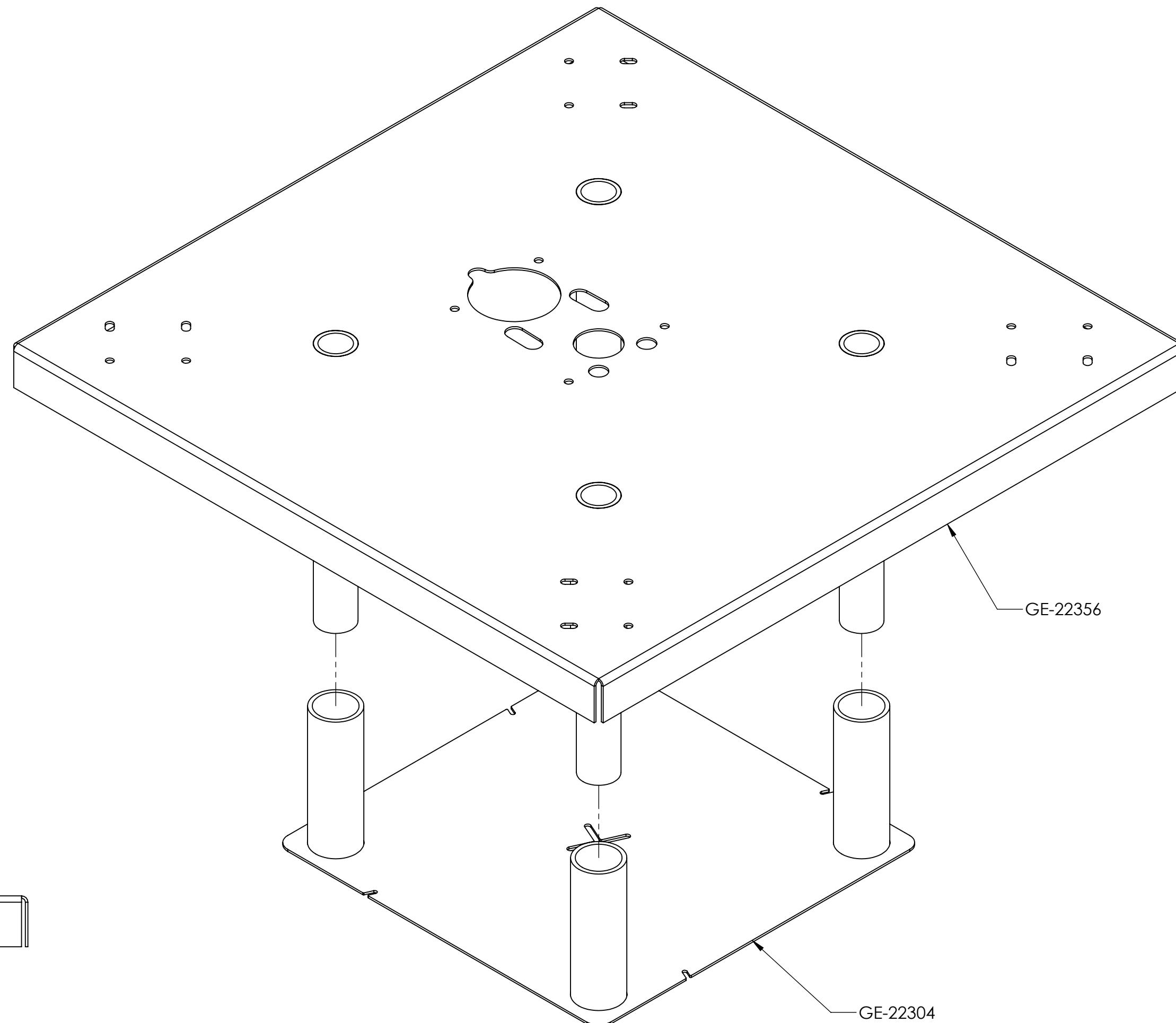
A



Notes:
1. For reference only: designed interface of GE-22304 with mating part.



DETAIL E
SCALE 2 : 3
Bottom of two assemblies coincident.



UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	7/19/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Powder Coated Black			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Hub Base

SIZE DWG. NO. REV
C GE-22304

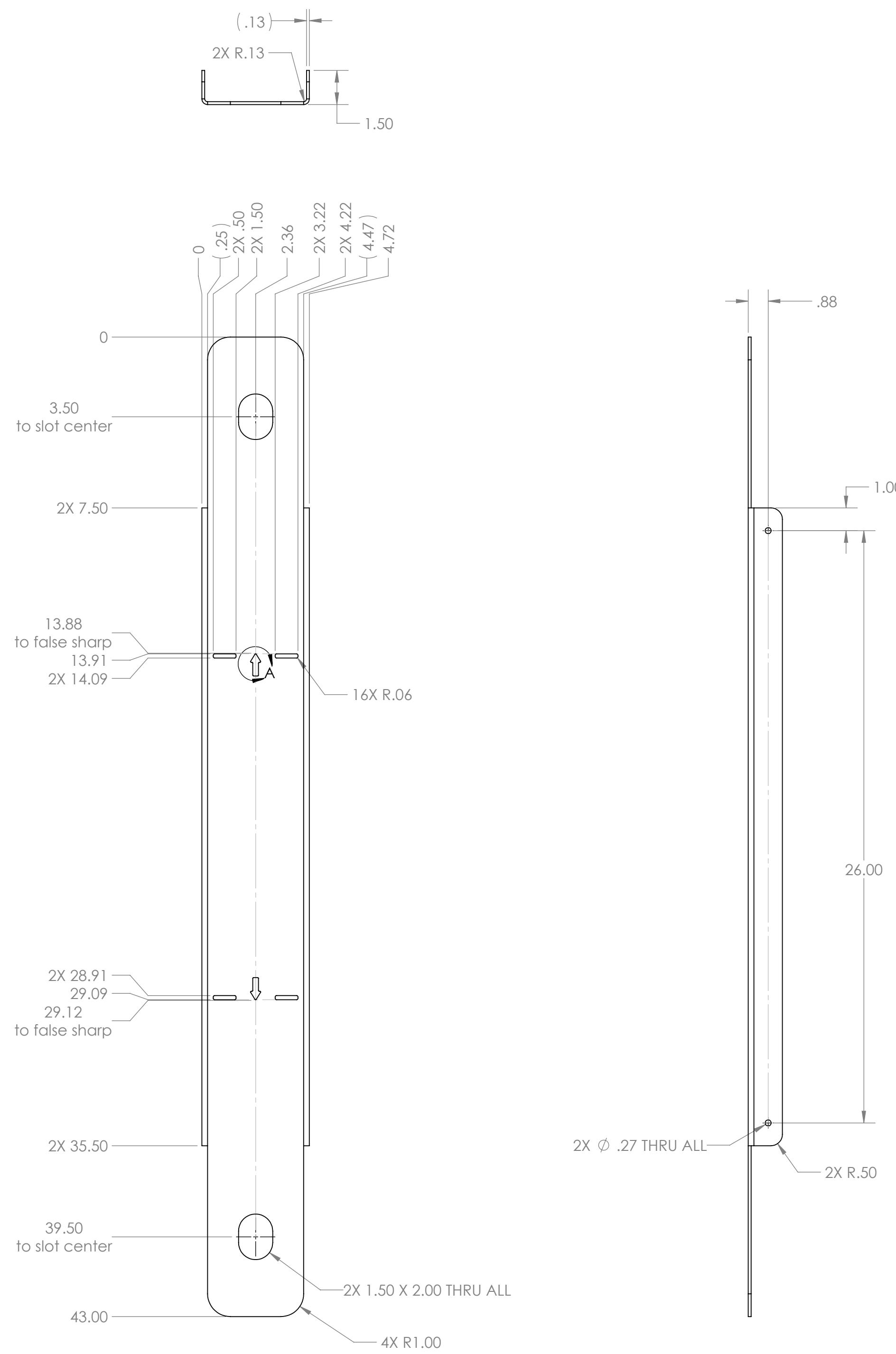
SCALE: 1:3 SHEET 3 OF 3

4

3

2

1



UNLESS OTHERWISE SPECIFIED:		BEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet				
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING				

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE: Leg Vertical Channel Cover

SIZE DWG. NO. REV
C GE-22305

SCALE: 1:4 SHEET 1 OF 1

4

3

2

1

D

D

C

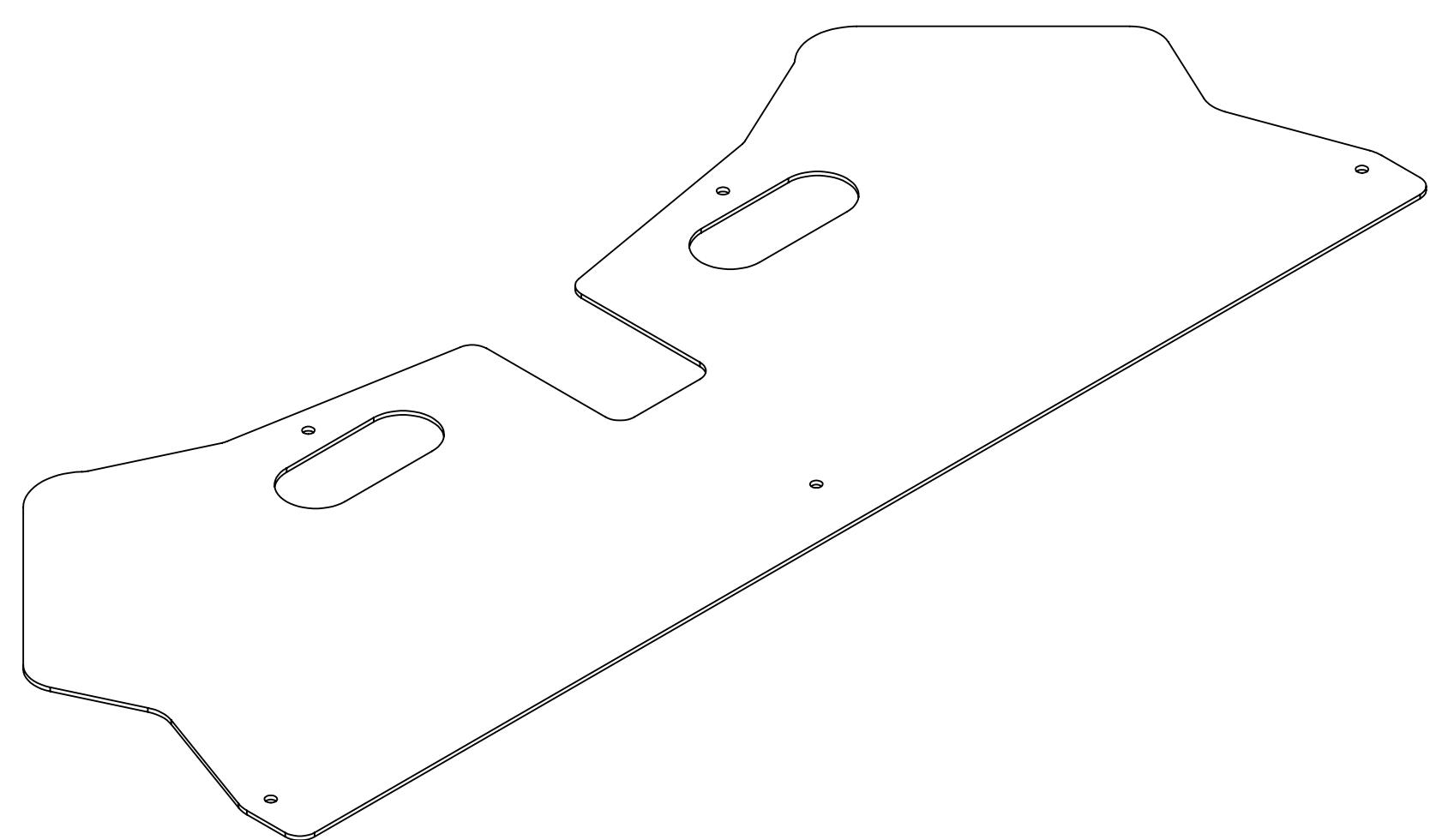
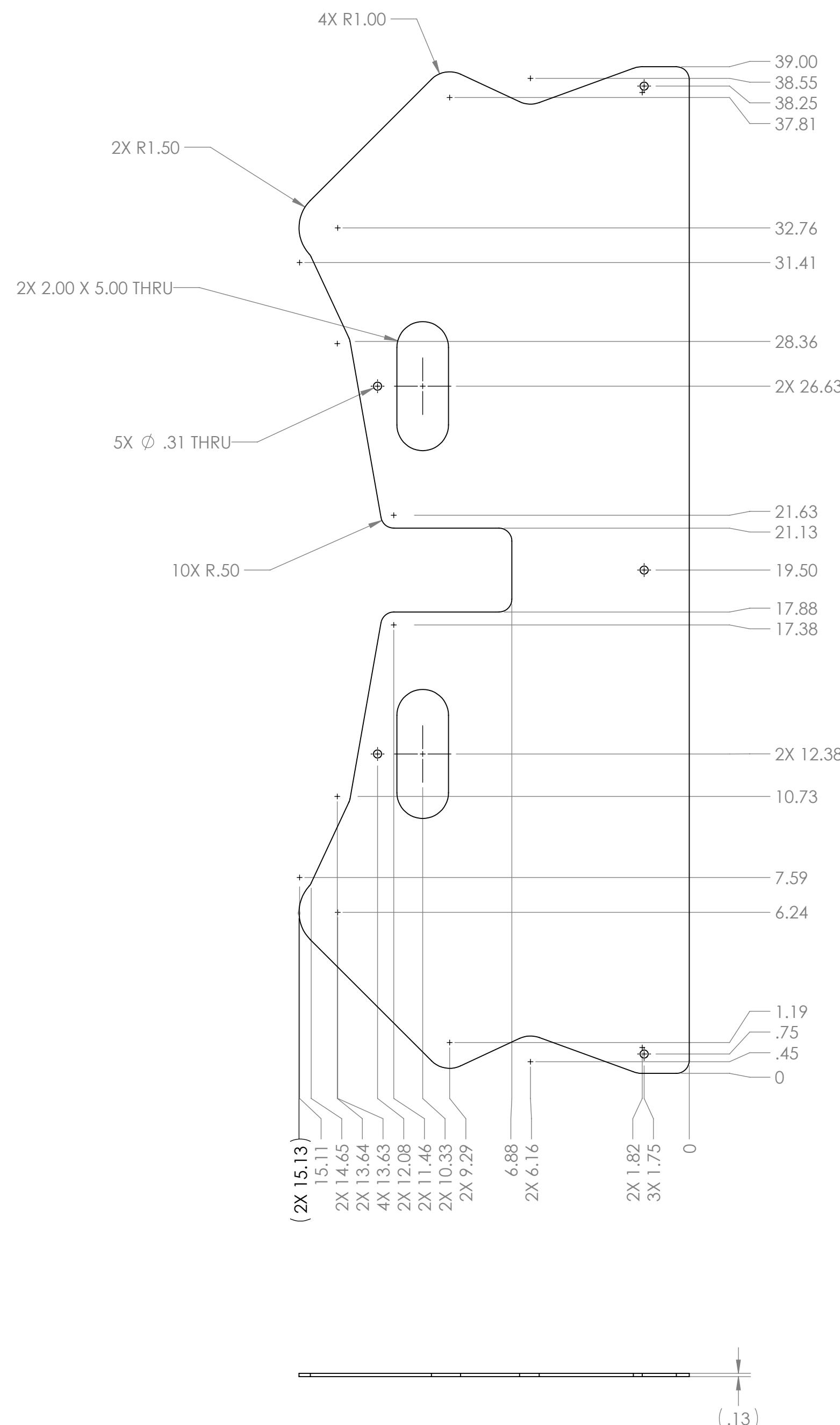
C

B

B

A

A



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/13/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
1/8" Polycarbonate, Clear			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

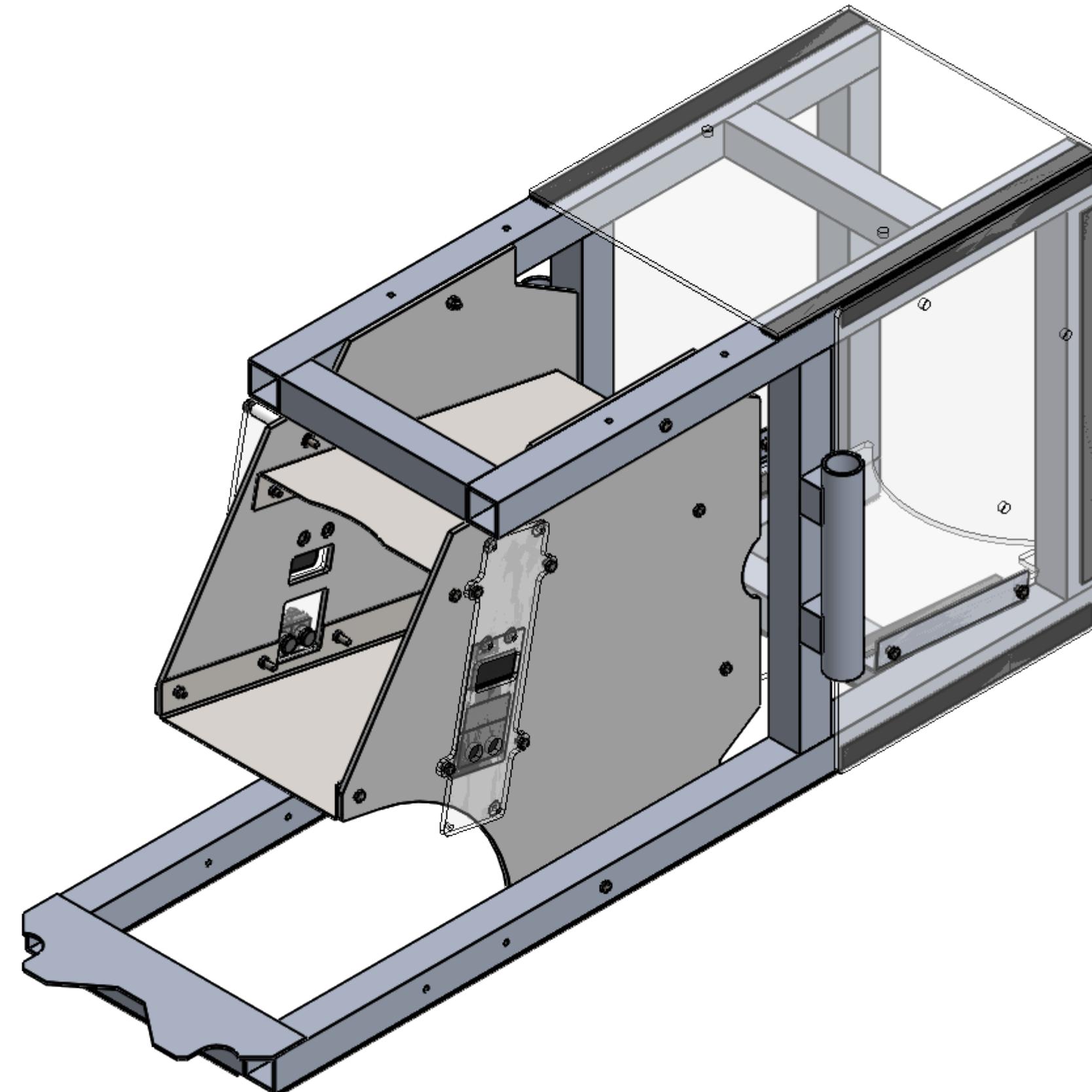
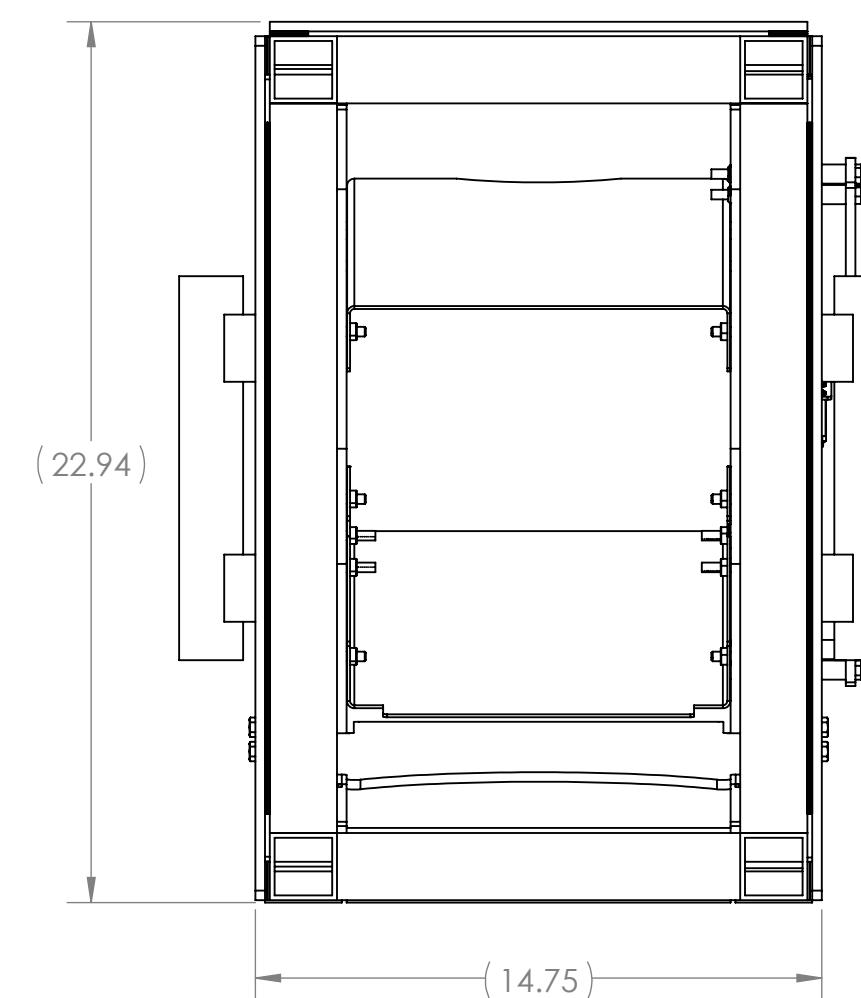
FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Hub Fender Skirt

SIZE DWG. NO. REV
C GE-22306

SCALE: 1:4 SHEET 1 OF 1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22326	Lower Exit Left Polycarbonate Assembly	1
2	GE-22327	Lower Exit Right Polycarbonate Assembly	1
3	GE-22329	Lower Exit Front Roof with Loop	1
4	GE-22331	Lower Exit Front Ramp with Loop	1
5	GE-22332	Lower Exit HDPE Wall	2
6	GE-22333	Lower Exit Back Ramp	1
7	GE-22334	Lower Exit Back Roof	1
8	GE-22336	Lower Exit Frame with Hook	1
9	GE-22461	Sensor Box Assembly	1
10	GE-22466	Sensor Light Shield	1
11	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	8
12	hex_.25_20_1.25_partial	Steel Hex Head Bolt, 1/4-20 x 1.25", partially threaded	8
13	hex_.25_20_2.5_partial	Steel Hex Head Screw, 1/4"-20 x 2-1/2" long, partially threaded	4
14	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/14/2021
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL		
MATERIAL/FINISH:	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

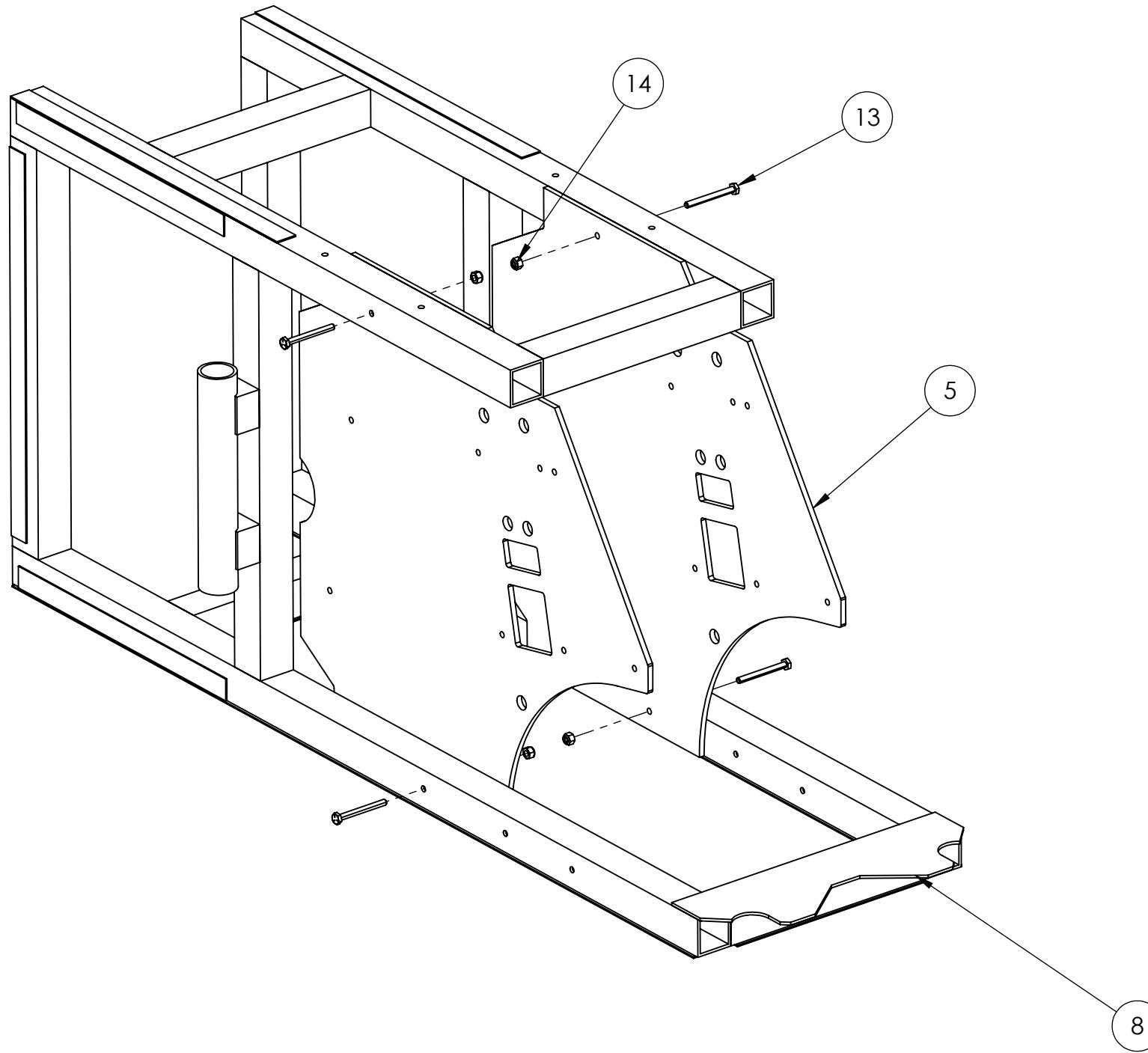
FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

Lower Exit Assembly

SIZE DWG. NO. REV
C GE-22311

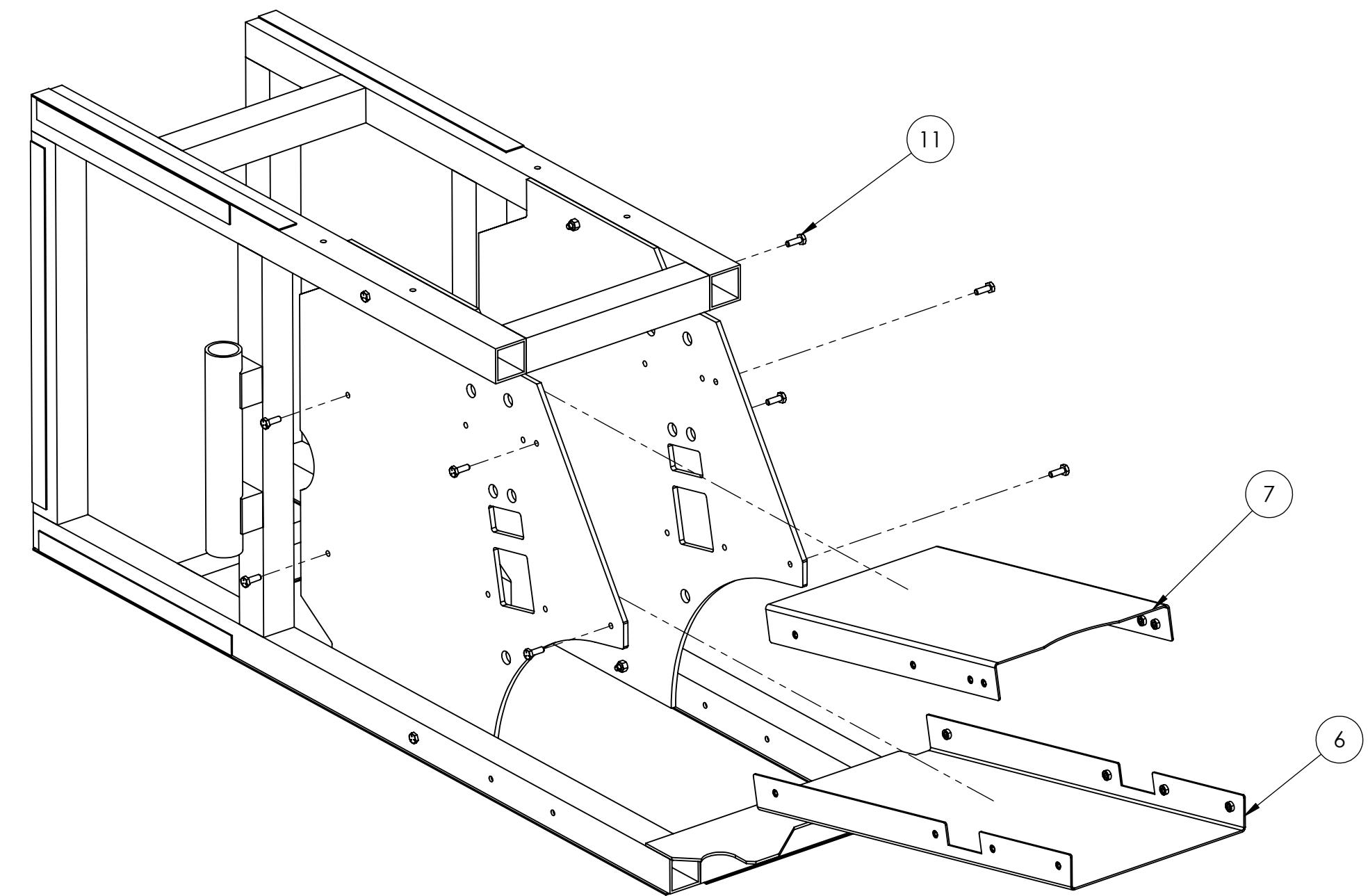
SCALE: 1:5 SHEET 1 OF 4

D



Notes:

1. Slide ⑤ into place inside of ⑧ .
2. Fasten in place using ⑬ and ⑭ .



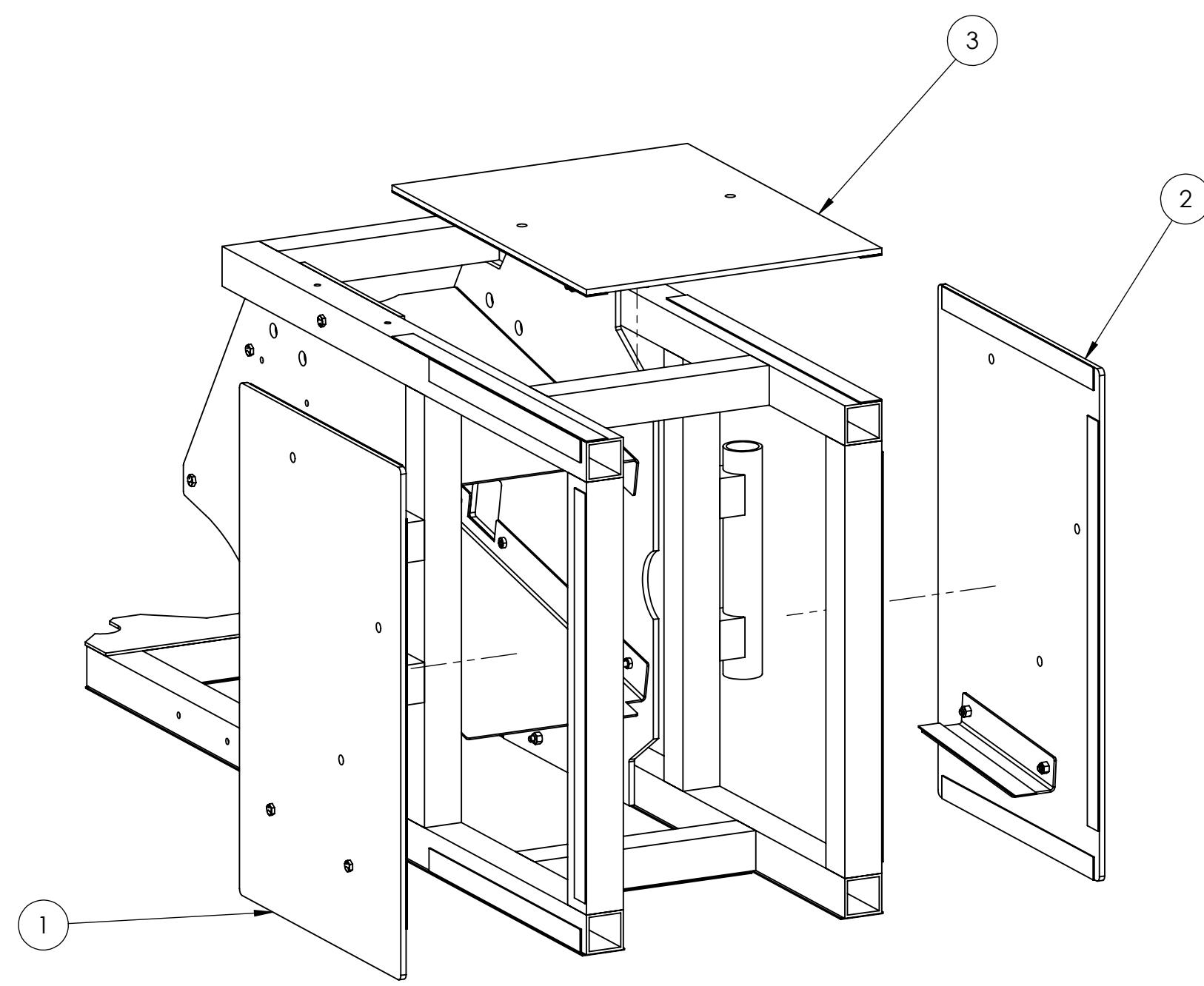
Notes:

1. Slide ⑥ and ⑦ into assembly as shown.
2. Fasten in place in locations shown using ⑪ .

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/14/2021
TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$			
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	COMMENTS:	SIZE	DWG. NO.
	REMOVE ALL BURRS AND SHARP EDGES.	C	GE-22311
		SCALE: 1:6	SHEET 2 OF 4

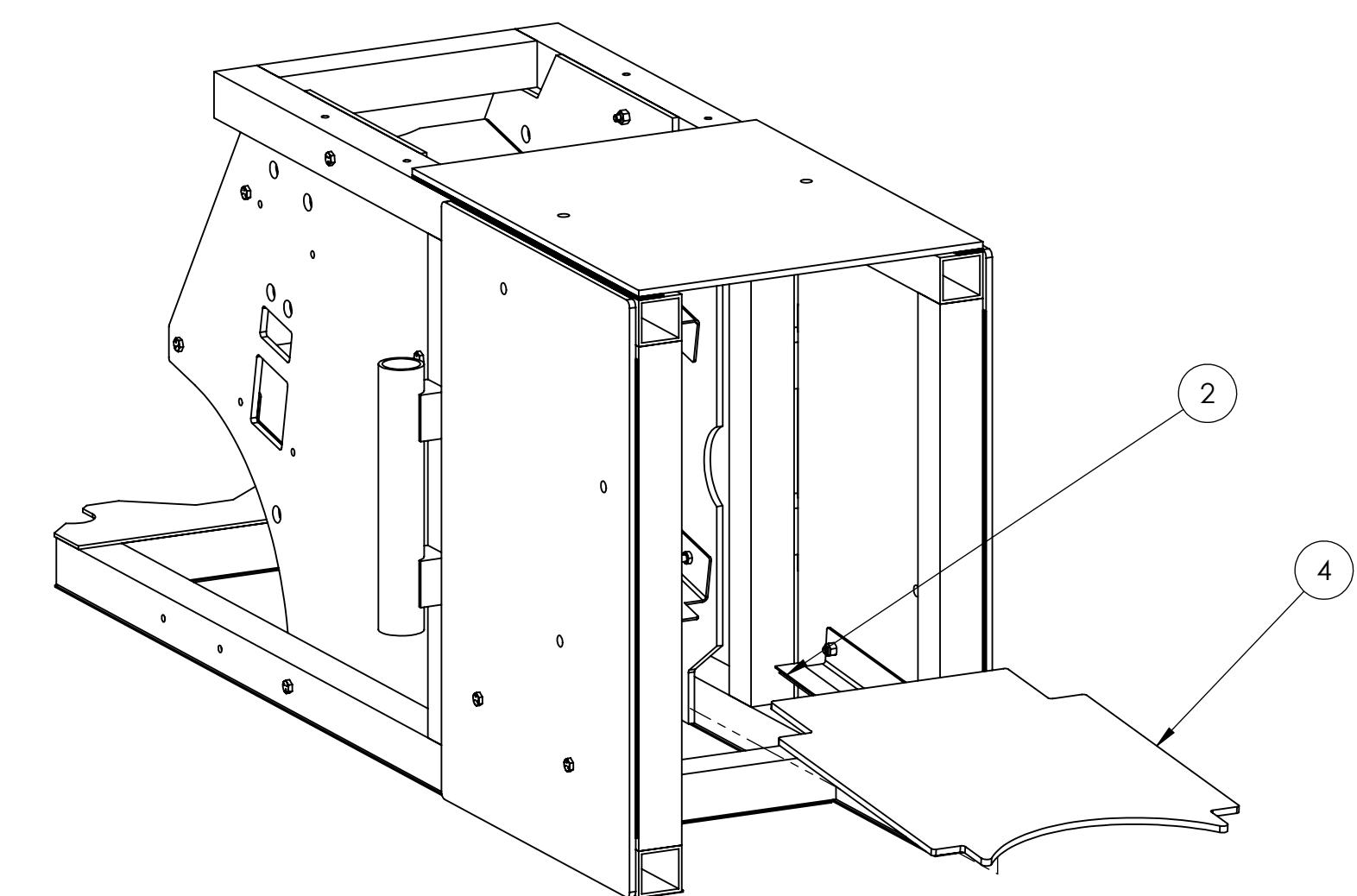
D

D



Notes:

1. Attach (1), (2), and (3) to assembly as shown using hook and loop and cable ties.



Notes:

1. Insert (4) into assembly and attach via fastening hook and loop on (2).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/14/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

	FIRST ROBOTICS COMPETITION		SOLIDWORKS Modeling Solutions Partner
TITLE: Lower Exit Assembly			
SIZE	DWG. NO.	REV	C GE-22311
SCALE: 1:6		SHEET 3 OF 4	

4

3

2

1

D

D

C

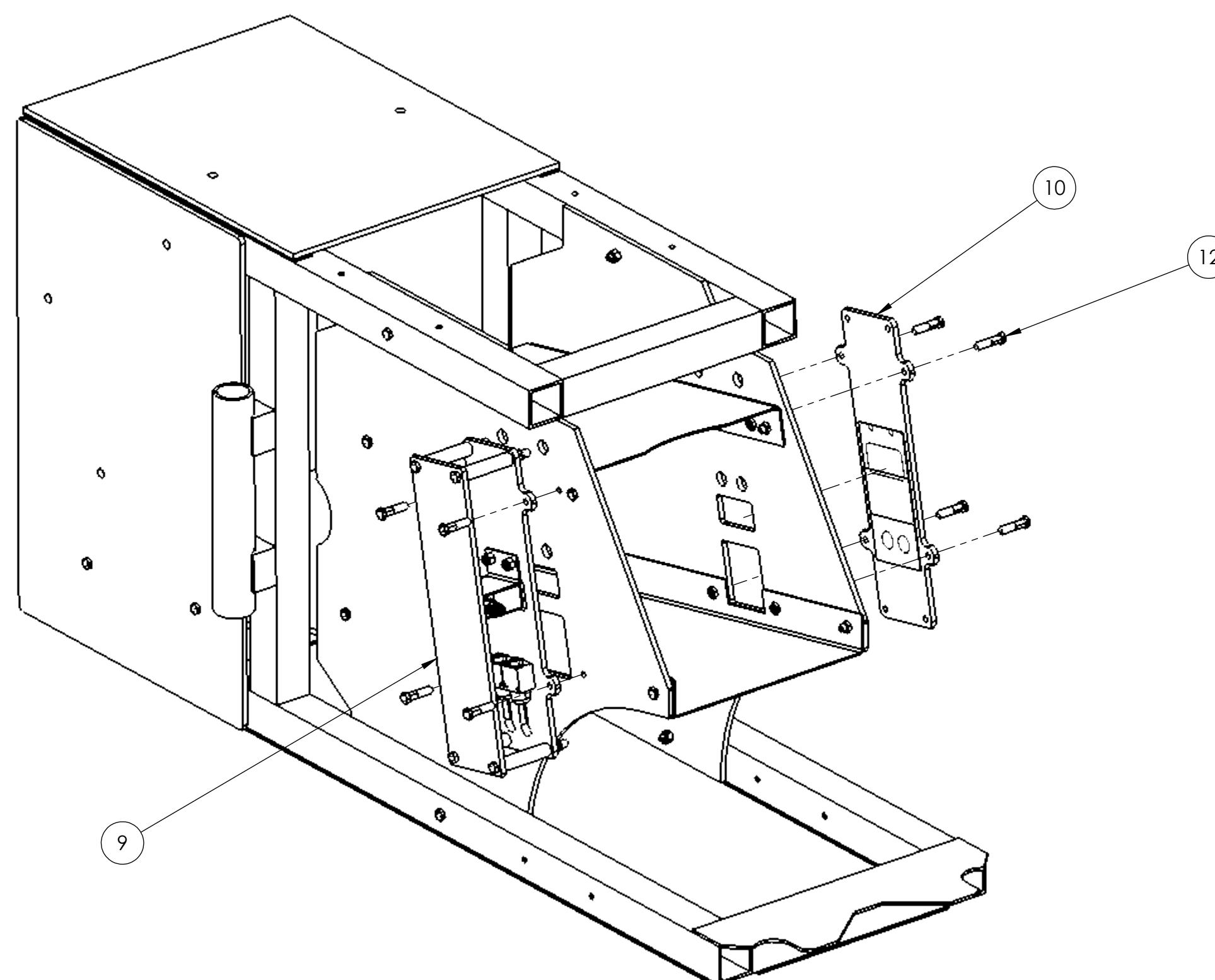
C

B

B

Notes:

1. Attach (9) and (10) to assembly using (12).



UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	DRAWN	CO	12/14/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Lower Exit
Assembly**

SIZE DWG. NO. REV
C GE-22311

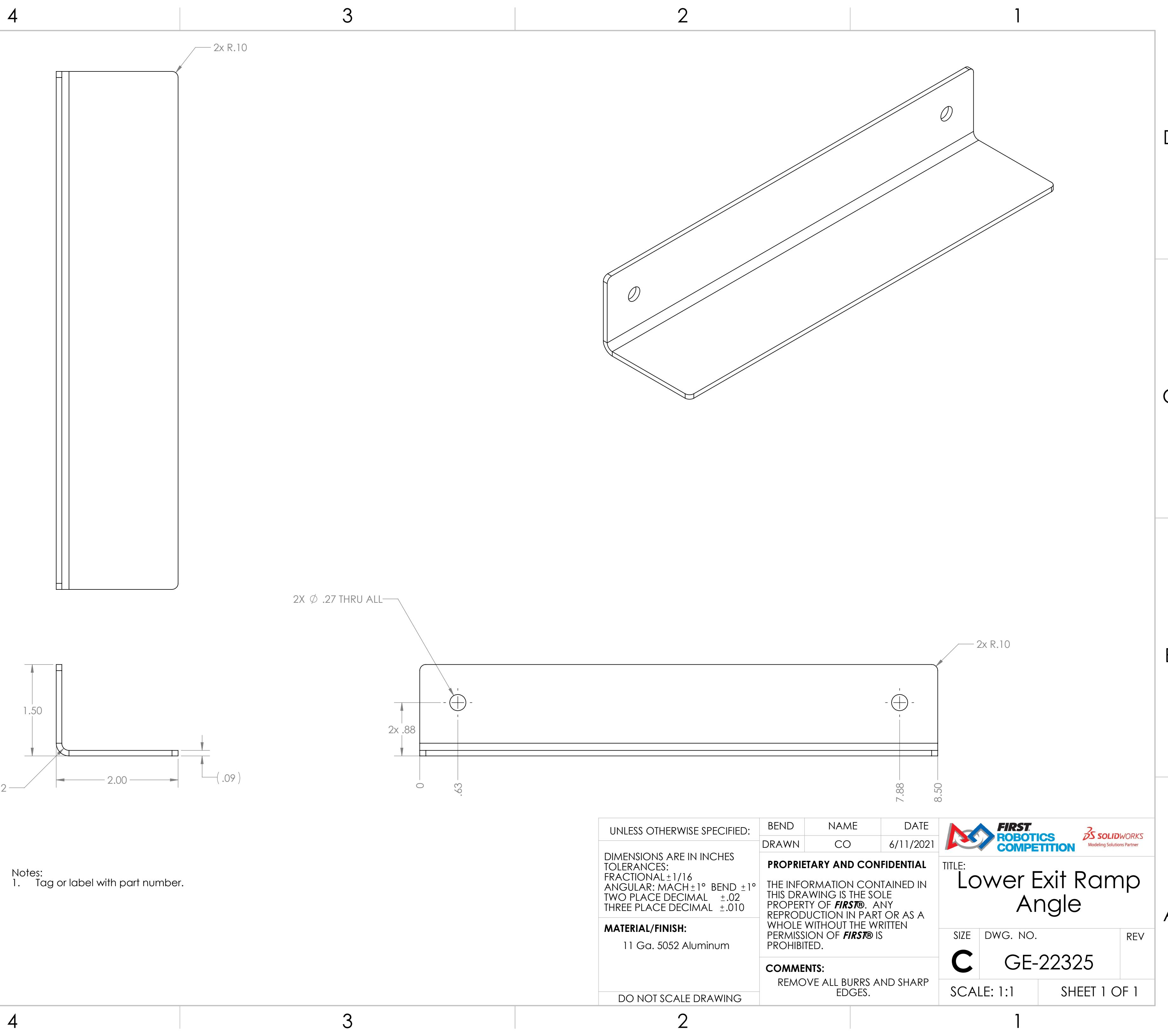
SCALE: 1:5 SHEET 4 OF 4

4

3

2

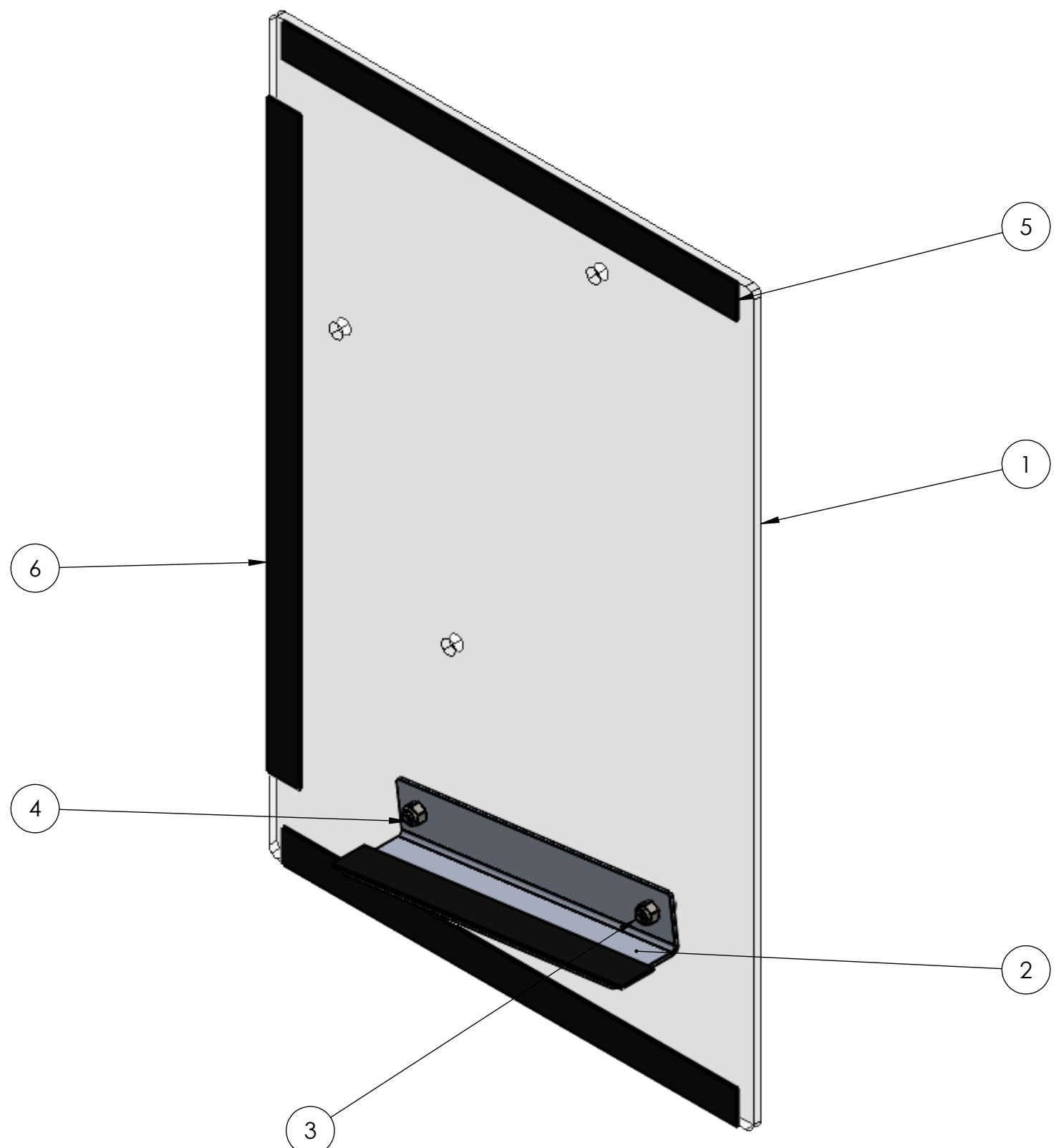
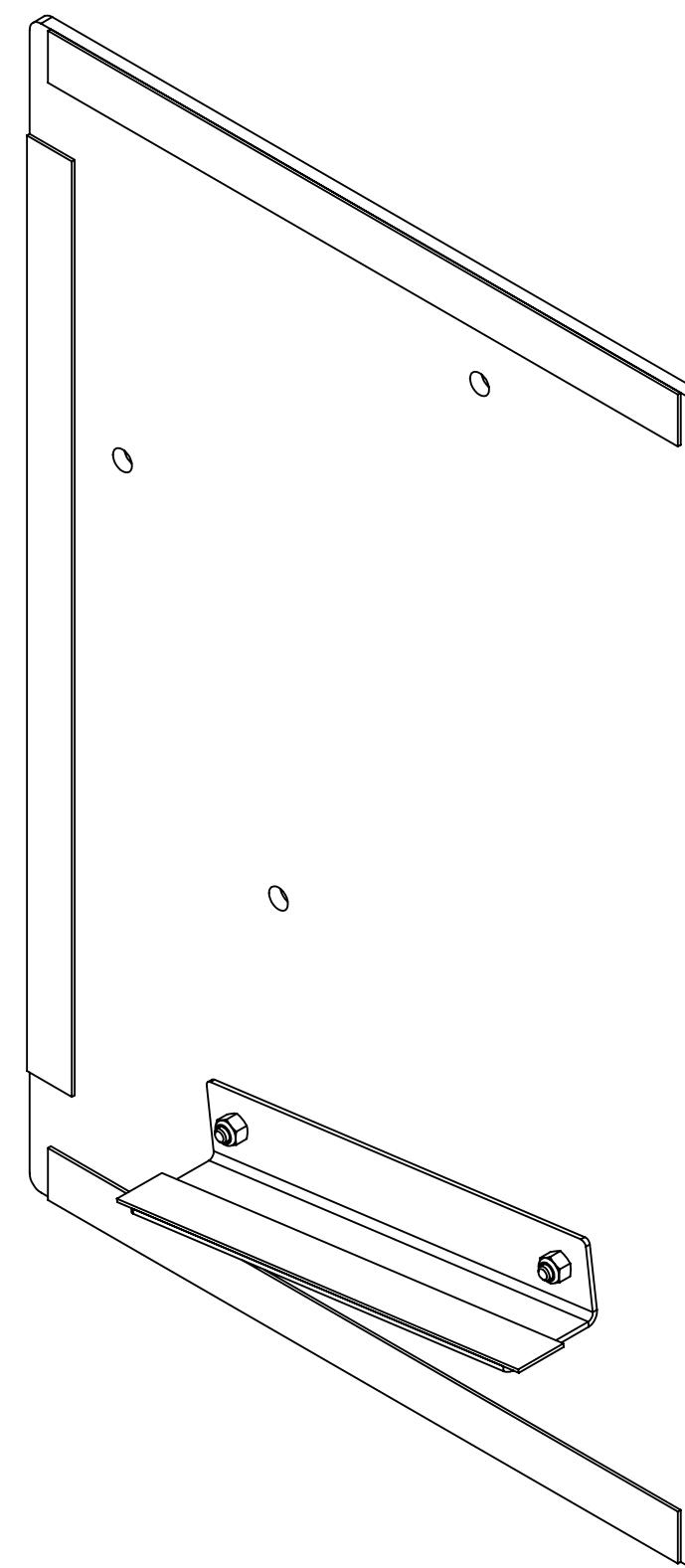
1



REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
2-C4	A	Added note to reflect update to GE-22324 done to mount ramp at a steeper angle.	1/11/2022	CPO

D



C

B

A

ITEM NO.	PART NUMBER	DESCRIPTION	Qty.
1	GE-22324	Lower Exit Side Polycarbonate	1
2	GE-22337	Lower Exit Ramp Angle with Hook	1
3	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	2
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	2
5	Loop_1_14	1"x 14" Loop, Adhesive Backed	2
6	Loop_1_18	1"x 18" Loop, Adhesive Backed	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$

VEND NAME DATE

DRAWN CO 10/27/2021



TITLE: Lower Exit Left
Polycarbonate
Assembly

SIZE DWG. NO. REV

C GE-22326 A

SCALE: 1:3 SHEET 1 OF 2

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

MATERIAL/FINISH:

DO NOT SCALE DRAWING

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

4

3

2

1

D

D

C

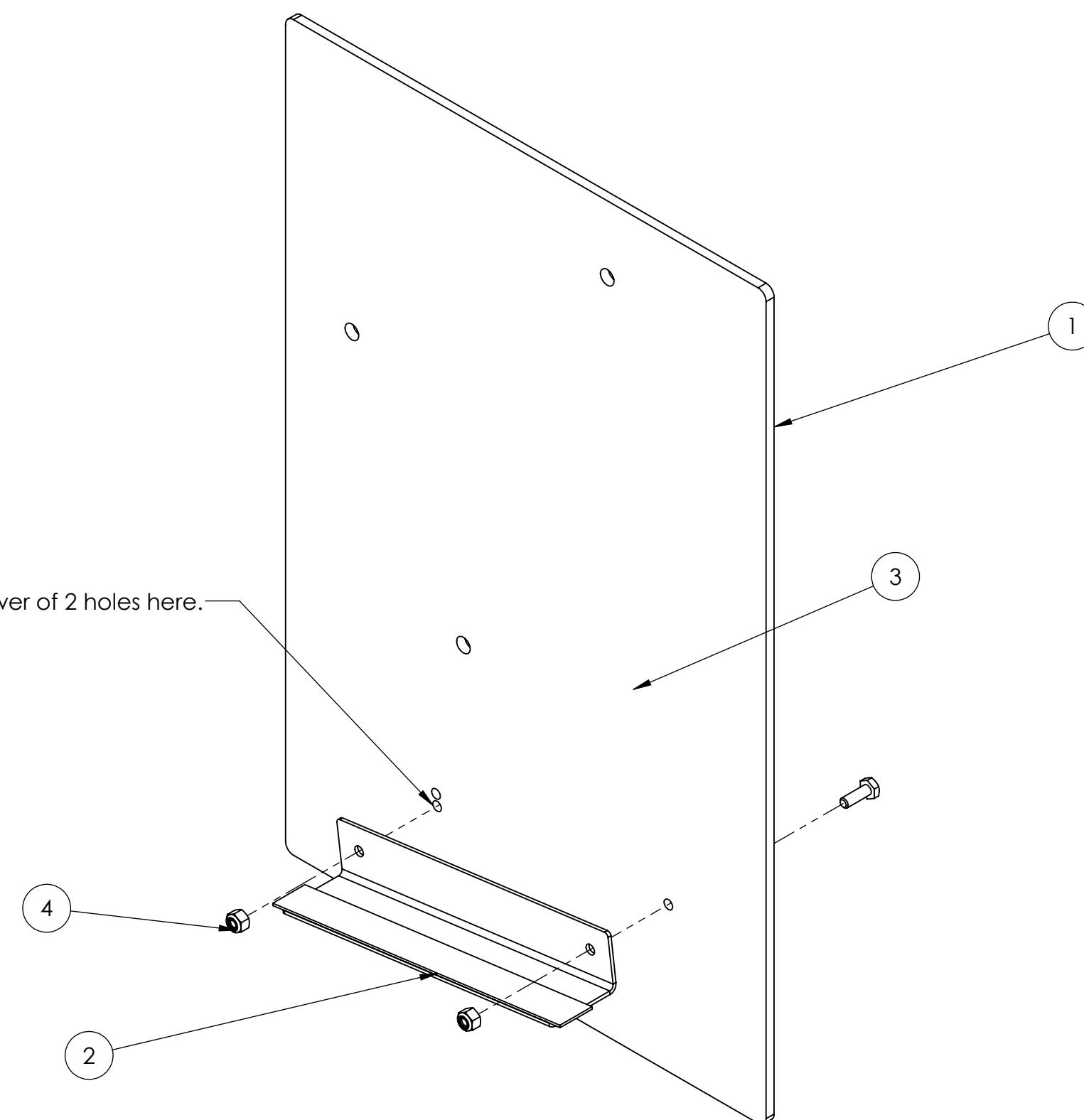
C

B

B

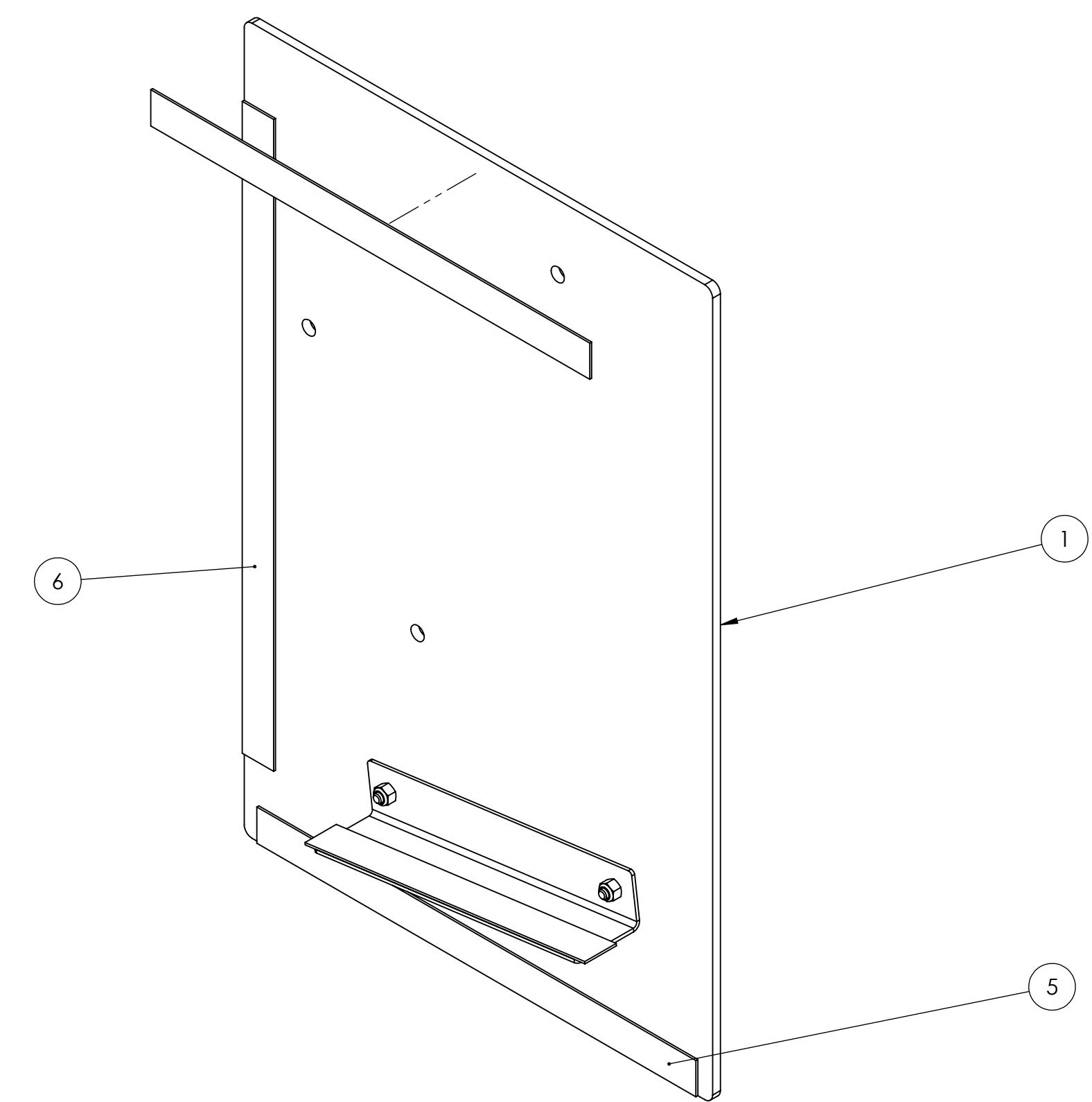
A

A



Notes:

1. Attach (2) to (1) using (3) and (4). Note hole orientation of (1).



Notes:

1. Clean and prep (1).
2. Attach (5) and (6) to (1) in positions shown.

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	CO	10/27/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$				
MATERIAL/FINISH:	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING				

FIRST
ROBOTICS
COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE: Lower Exit Left Polycarbonate Assembly

SIZE DWG. NO. REV
C GE-22326 **A**

SCALE: 1:3 SHEET 2 OF 2

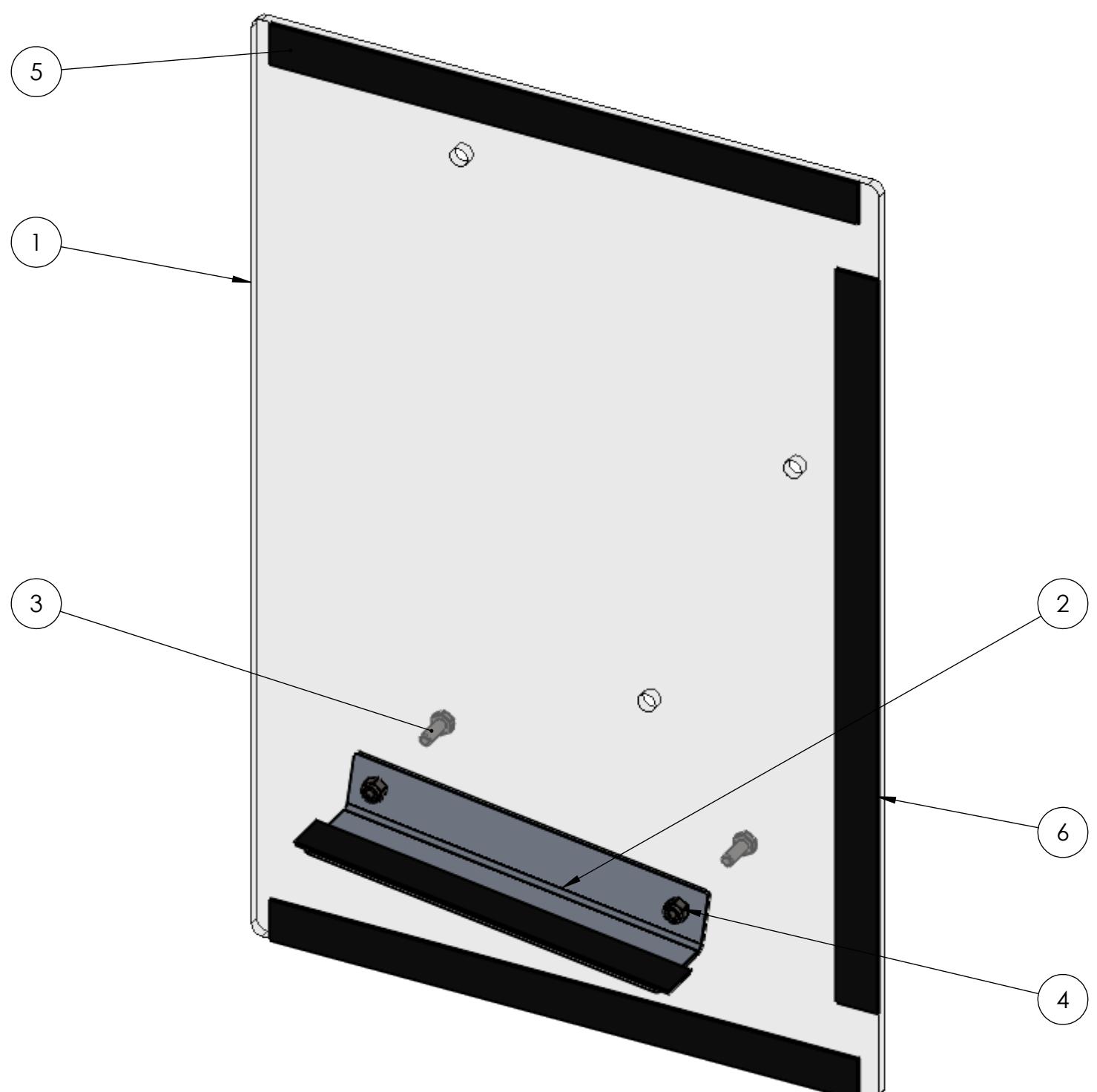
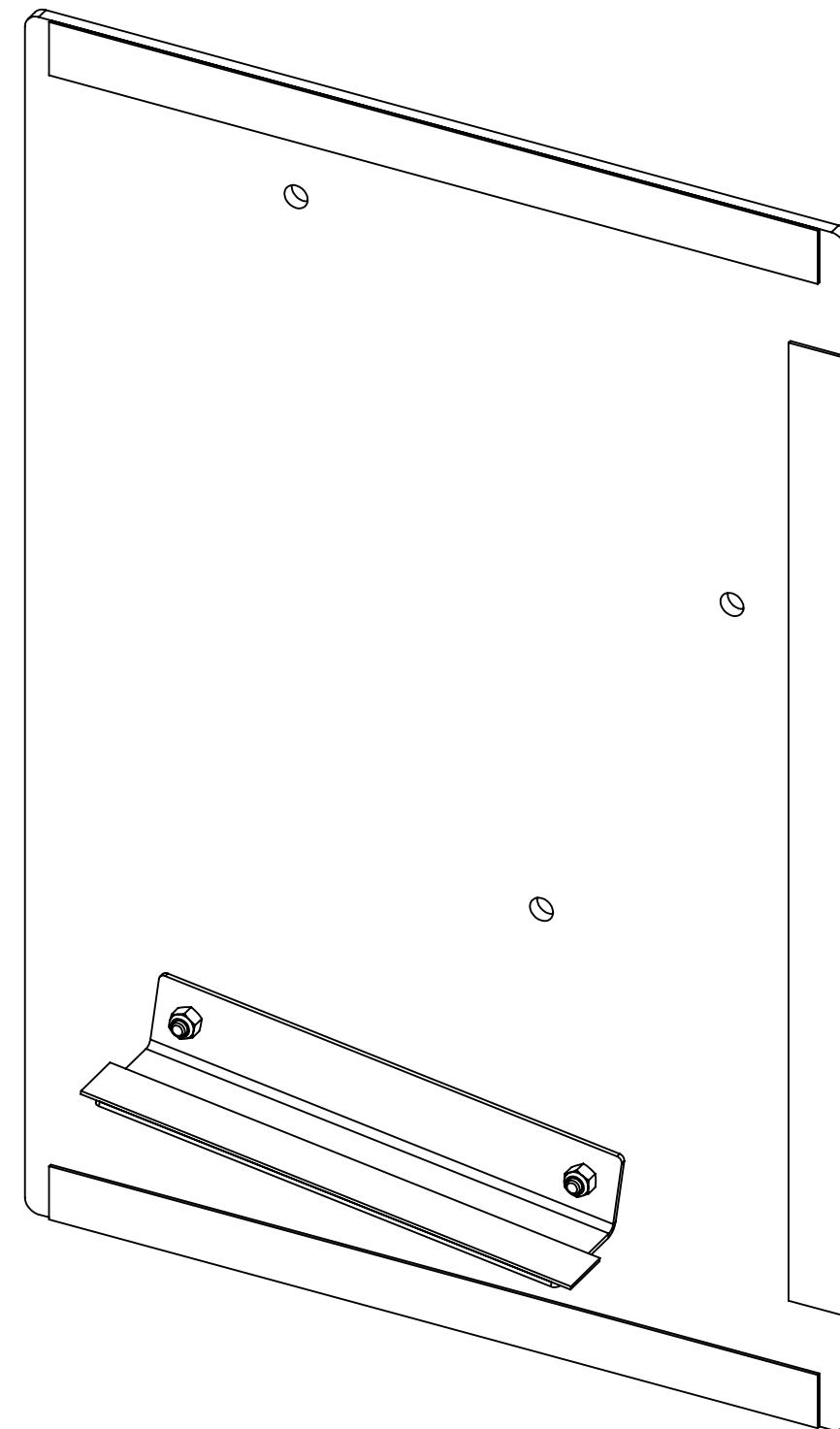
4

3

2

1

D



ITEM NO.	PART NUMBER	DESCRIPTION	Qty.
1	GE-22324	Lower Exit Side Polycarbonate	1
2	GE-22337	Lower Exit Ramp Angle with Hook	1
3	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	2
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	2
5	Loop_1_14	1"x 14" Loop, Adhesive Backed	2
6	Loop_1_18	1"x 18" Loop, Adhesive Backed	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm\frac{1}{16}$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

DO NOT SCALE DRAWING

VEND NAME DATE

DRAWN CO 10/27/2021



TITLE: Lower Exit Right Polycarbonate Assembly

SIZE DWG. NO. REV

C GE-22327 A

SCALE: 1:3 SHEET 1 OF 2

4

3

2

1

D

D

C

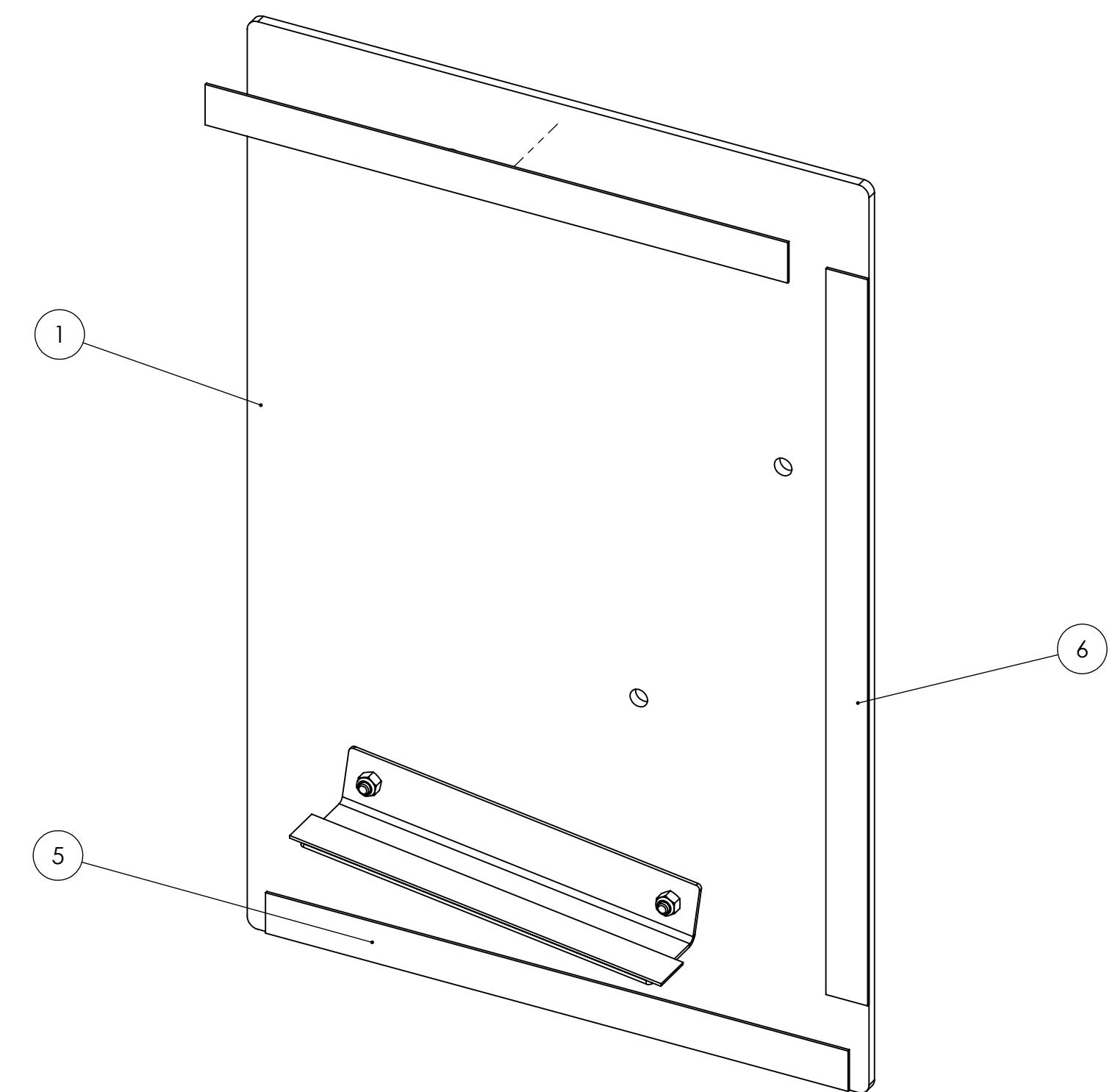
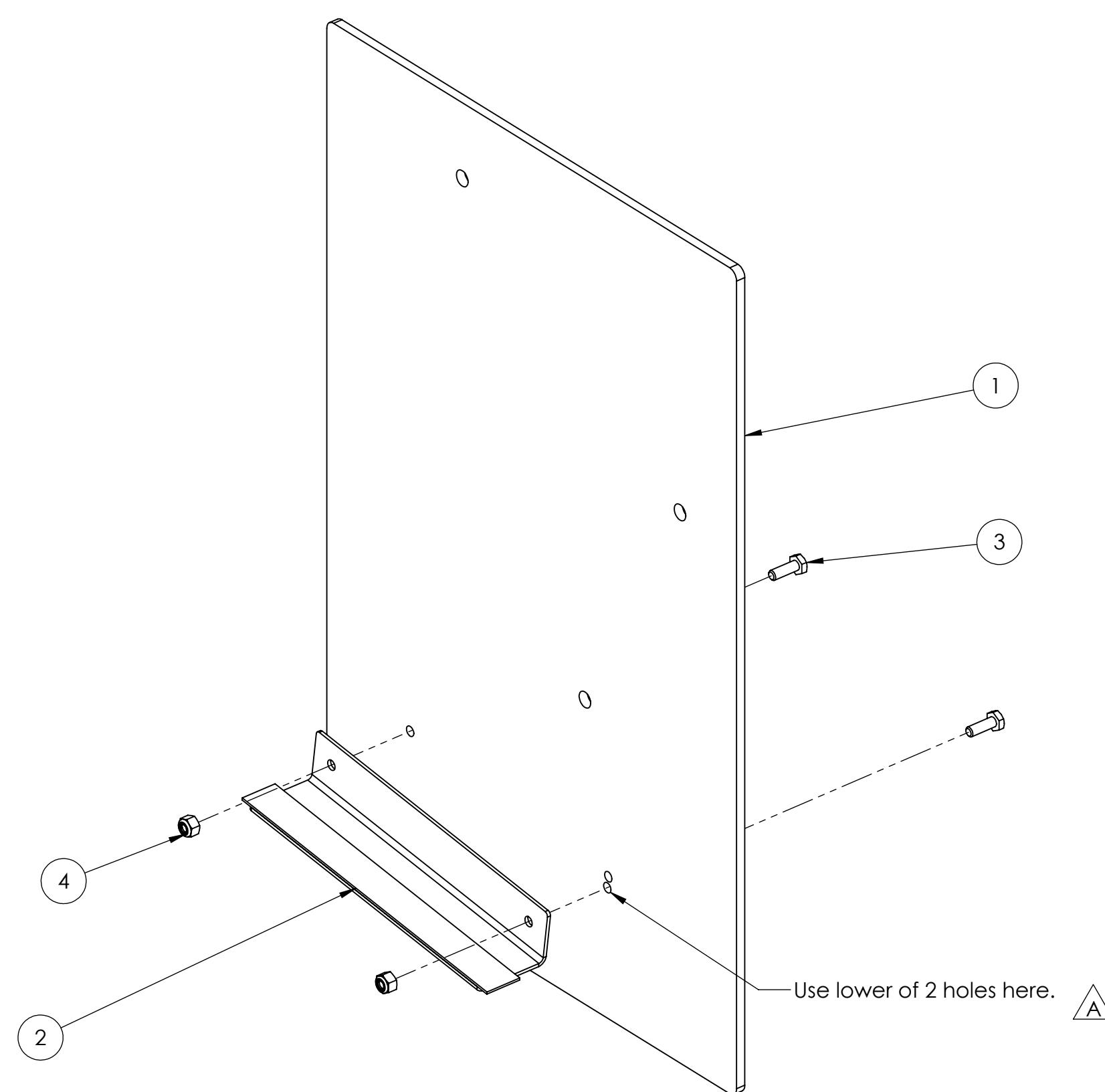
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	10/27/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22327	A
DO NOT SCALE DRAWING	SCALE: 1:3 SHEET 2 OF 2		

4

3

2

1

4

3

2

1

D

D

18.00

2x 8.00

0

2.06

11.94

14.00

Notes:
1. Tag or label with part number.

2X Ø .42 THRU ALL

(.25)

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

1/4" thk. Polycarbonate,
Clear

DO NOT SCALE DRAWING

VEND

NAME

DATE

DRAWN

CO

6/11/2021

PROPRIETARY AND CONFIDENTIALTHE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.**COMMENTS:**REMOVE ALL BURRS AND SHARP
EDGES.

TITLE:
**Lower Exit Front
Roof**

SIZE DWG. NO. REV

C GE-22328

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

C

C

B

A

D

D

C

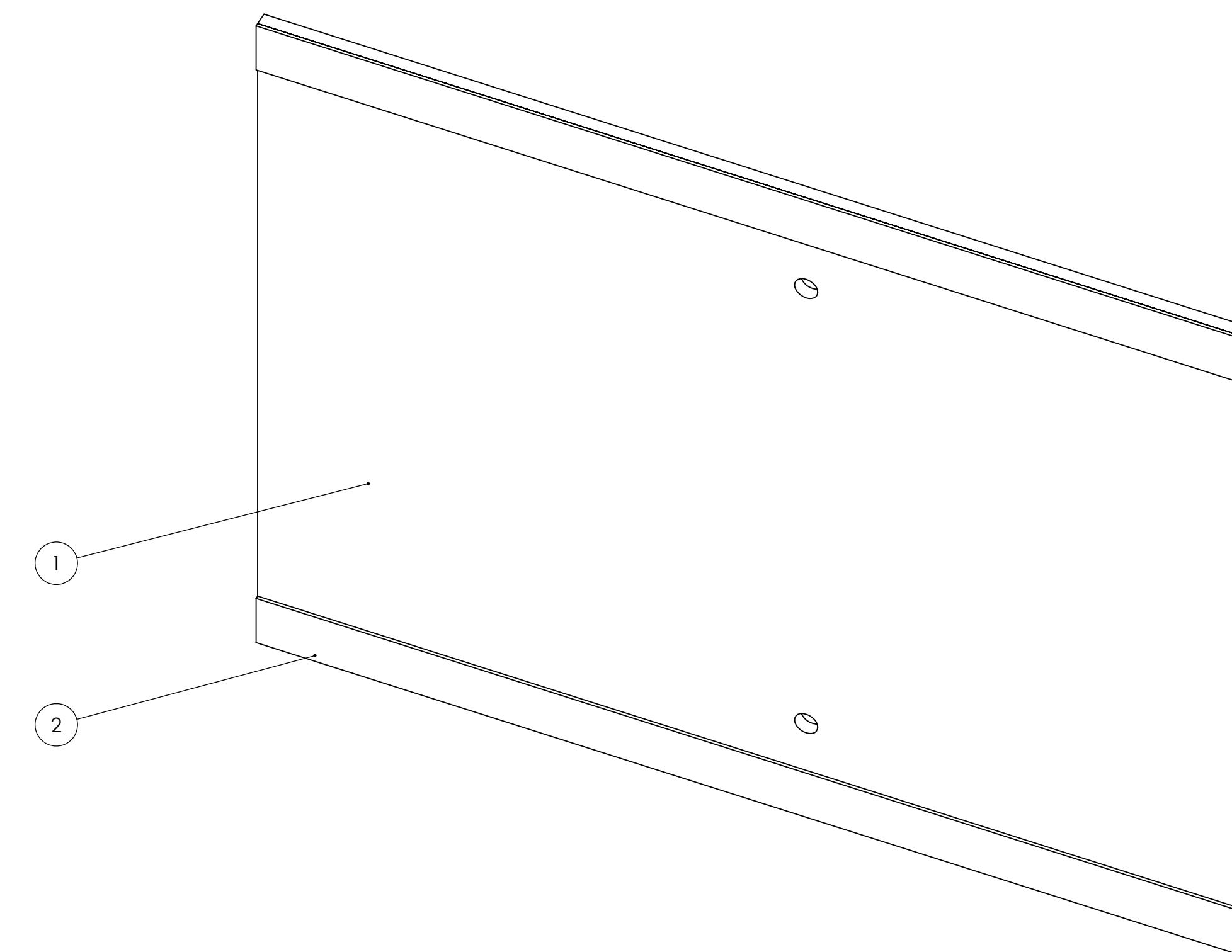
C

B

B

A

A



Notes:

1. Make sure surface of is clean prior to hook application.
2. Attach to in locations shown, flush to edges of part.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22328	Lower Exit Front Roof	1
2	Loop_1_18	1" x 18" Loop, Adhesive Backed	2

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	10/27/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL		
MATERIAL/FINISH:	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

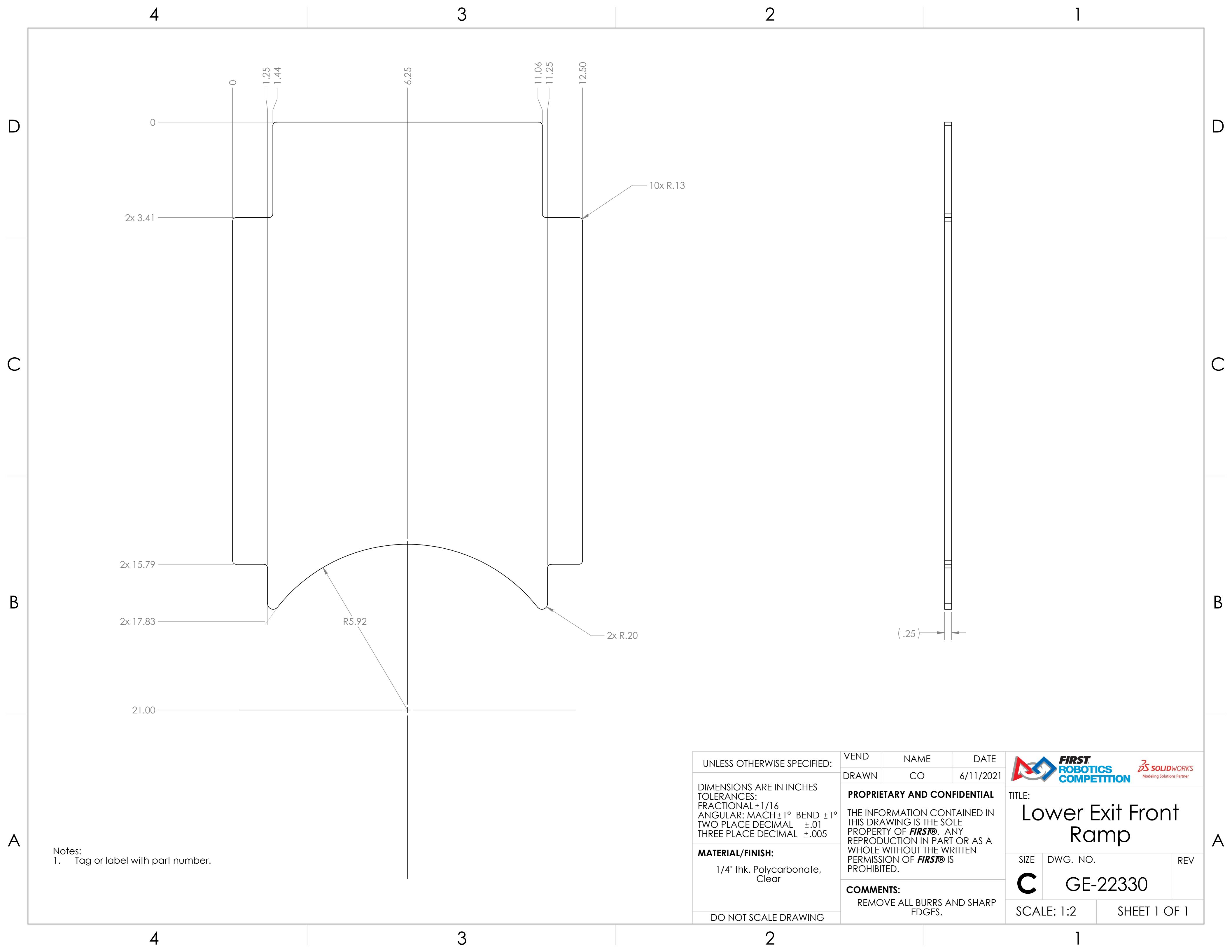
FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Lower Exit Front Roof with Loop

SIZE DWG. NO. REV

C GE-22329

SCALE: 1:2 SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/11/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
1/4" thk. Polycarbonate, Clear			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION			
SOLIDWORKS Modeling Solutions Partner			
TITLE:	Lower Exit Front Ramp		
SIZE	DWG. NO.	REV	
C	GE-22330		
SCALE: 1:2	SHEET 1 OF 1		

D

D

C

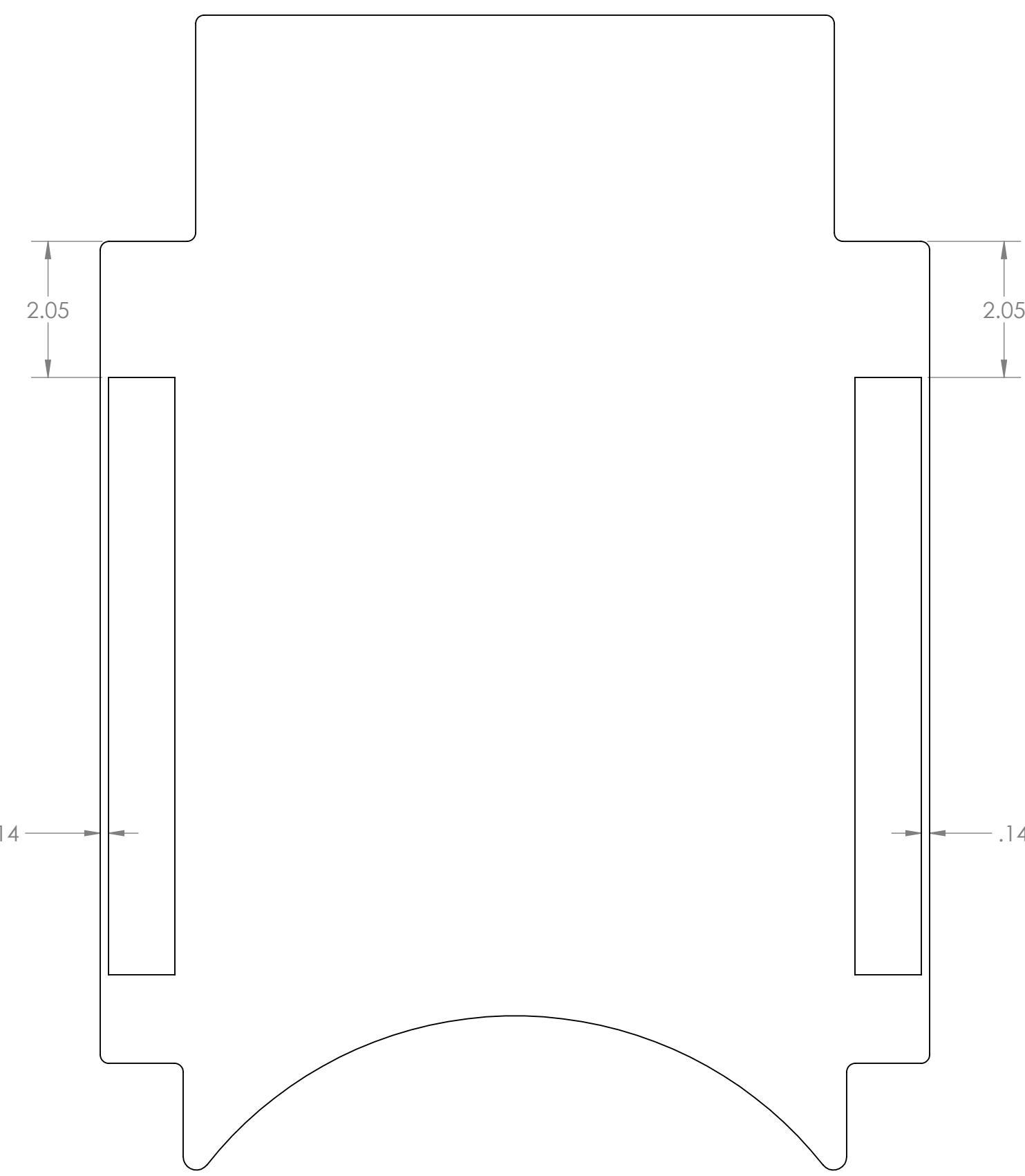
C

B

B

A

A



Notes:

1. Make sure surface of (1) is clean prior to hook applicaton.
2. Attach (2) to (1) in locations shown.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22330	Lower Exit Front Ramp	1
2	Loop_1_9	1" x 9" Loop, Adhesive Backed	2

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	10/27/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

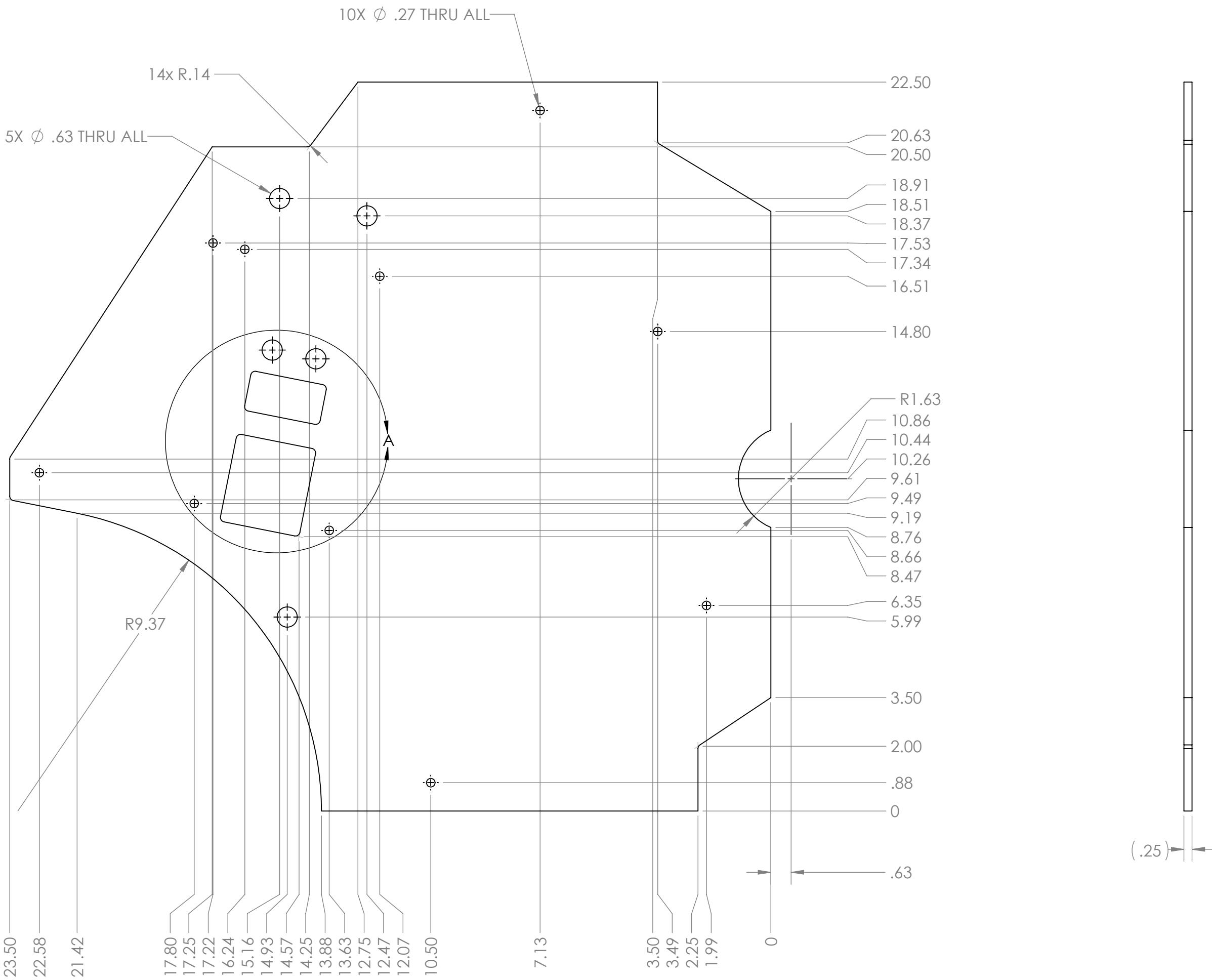
FIRST ROBOTICS COMPETITION Modeling Solutions Partner

Lower Exit Front Ramp with Loop

GE-22331

SCALE: 1:2 SHEET 1 OF 1

D



Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/11/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	1/4" thk. HDPE, natural		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

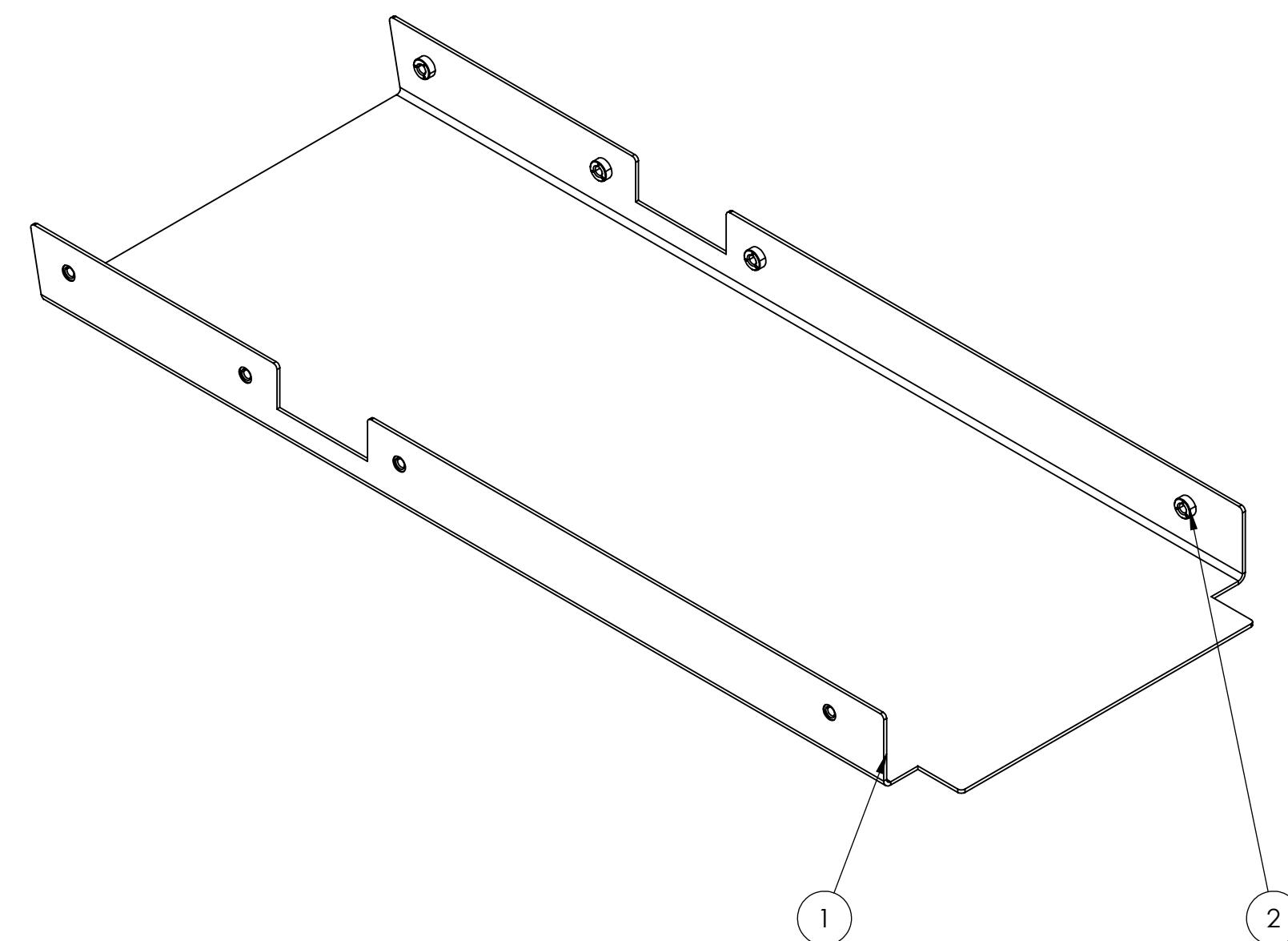
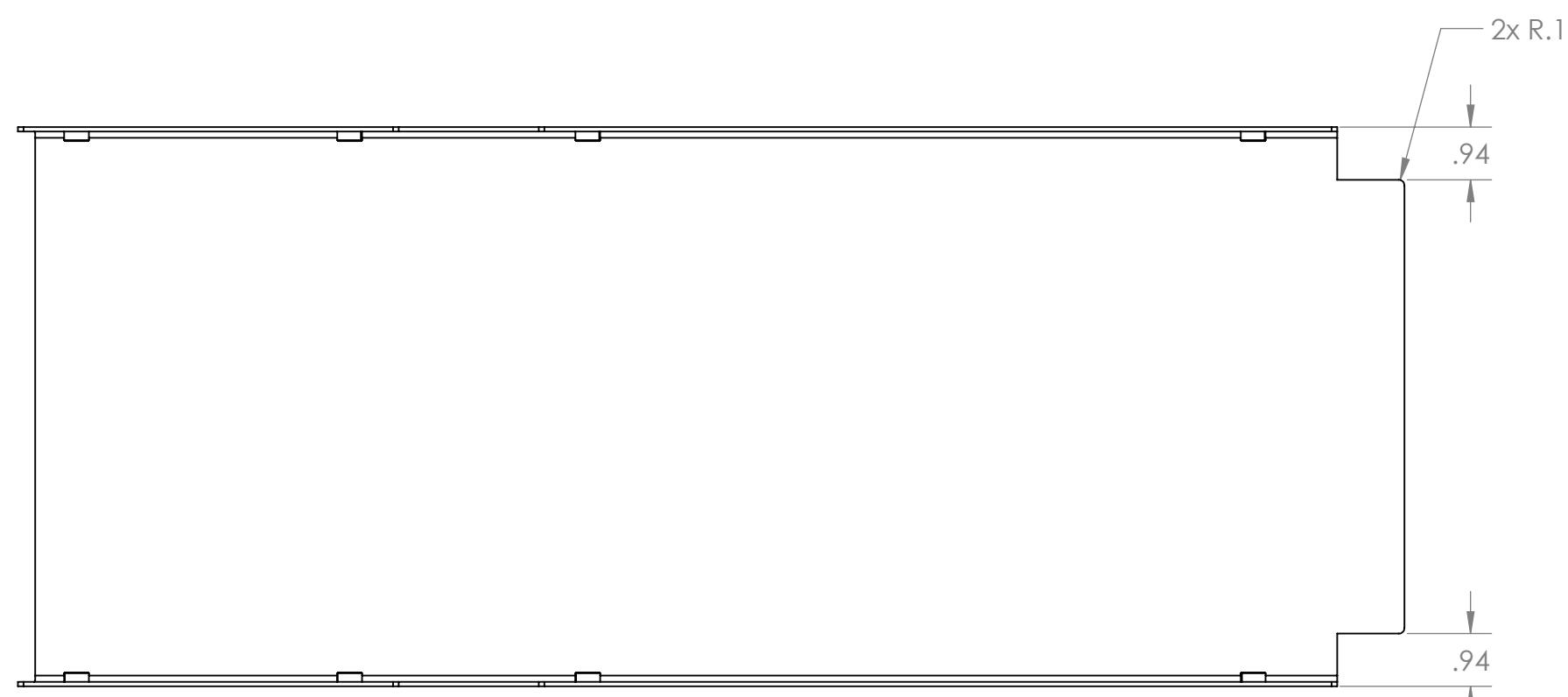
TITLE:
Lower Exit HDPE Wall

SIZE DWG. NO. REV

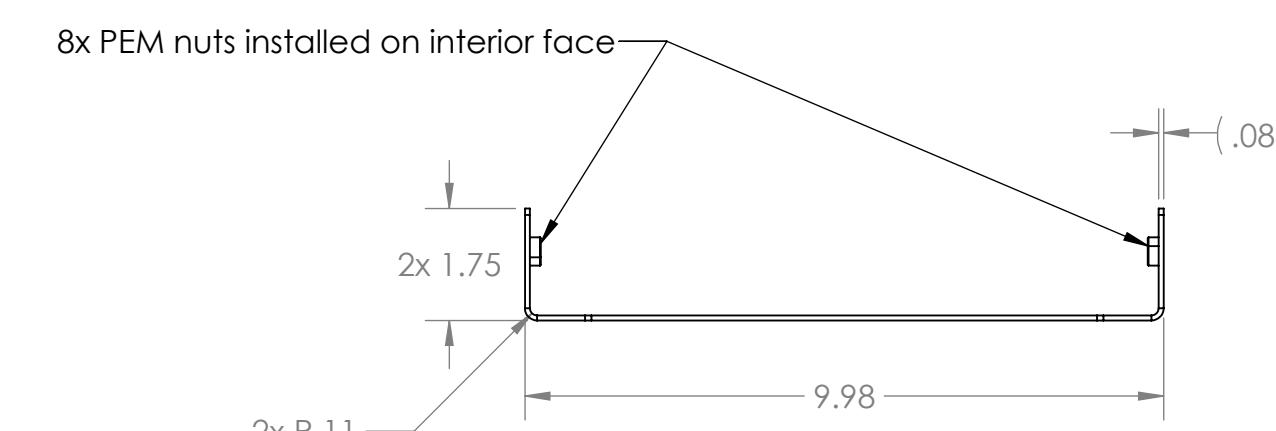
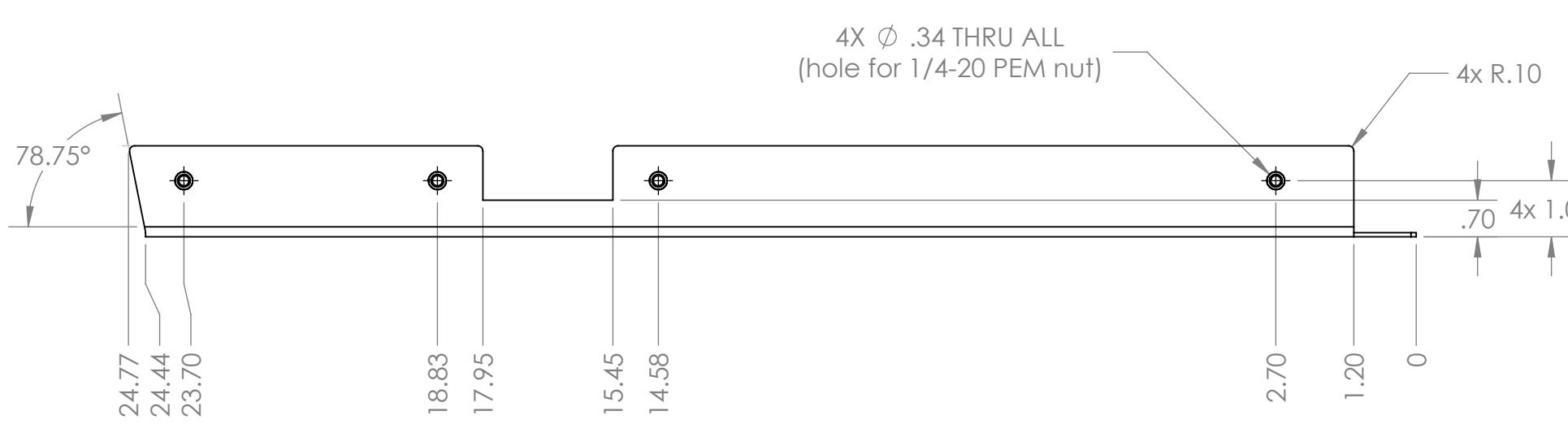
C GE-22332

SCALE: 1:3 SHEET 1 OF 1

D



C



B

Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22333-01	14 Ga. Preplated Steel	1
2	pem_clinchnut_.25_20_.054	1/4-20 self-clinching nut, .054 shank	8

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
	DRAWN	CO	6/11/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 Ga. Preplated Steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION			
SOLIDWORKS Modeling Solutions Partner			
TITLE:		Lower Exit Back Ramp	
SIZE		DWG. NO.	REV
C		GE-22333	
SCALE: 1:3		SHEET 1 OF 1	

4

3

2

1

D

D

C

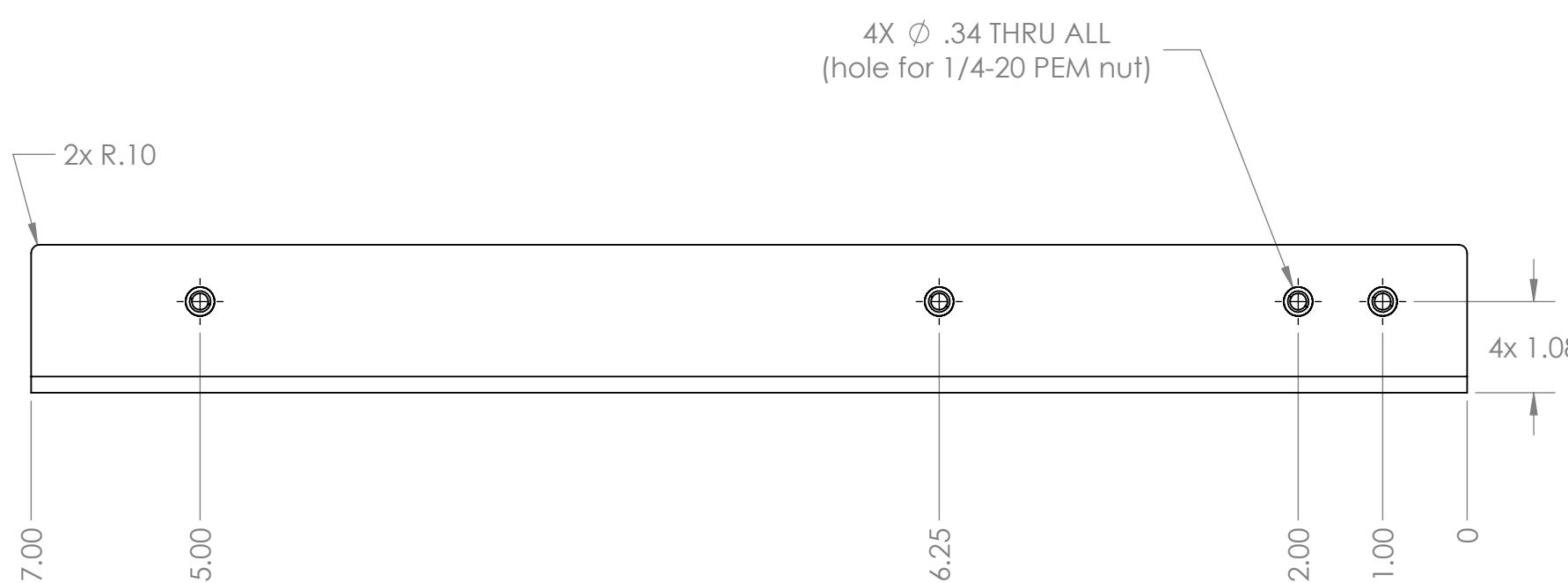
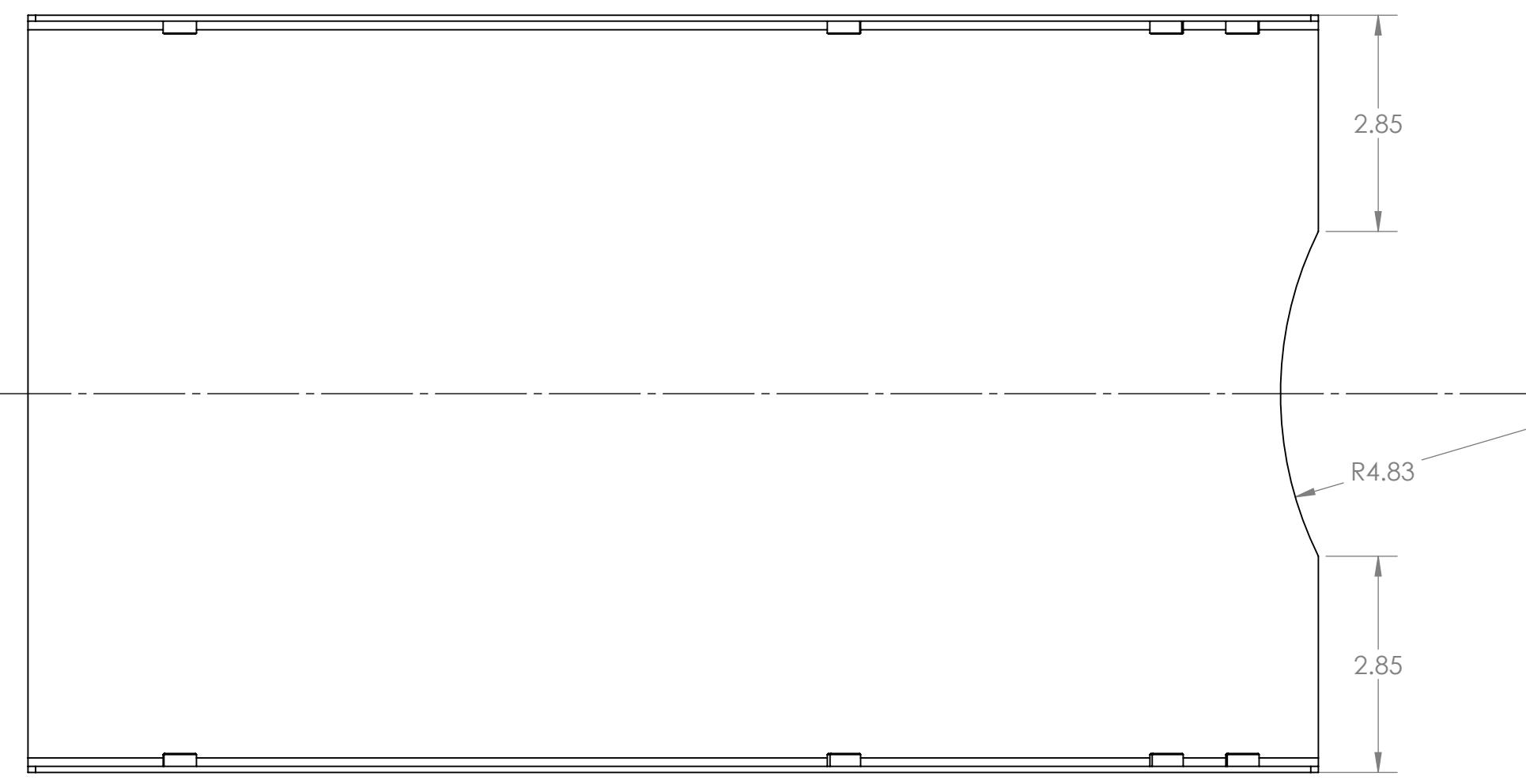
C

B

B

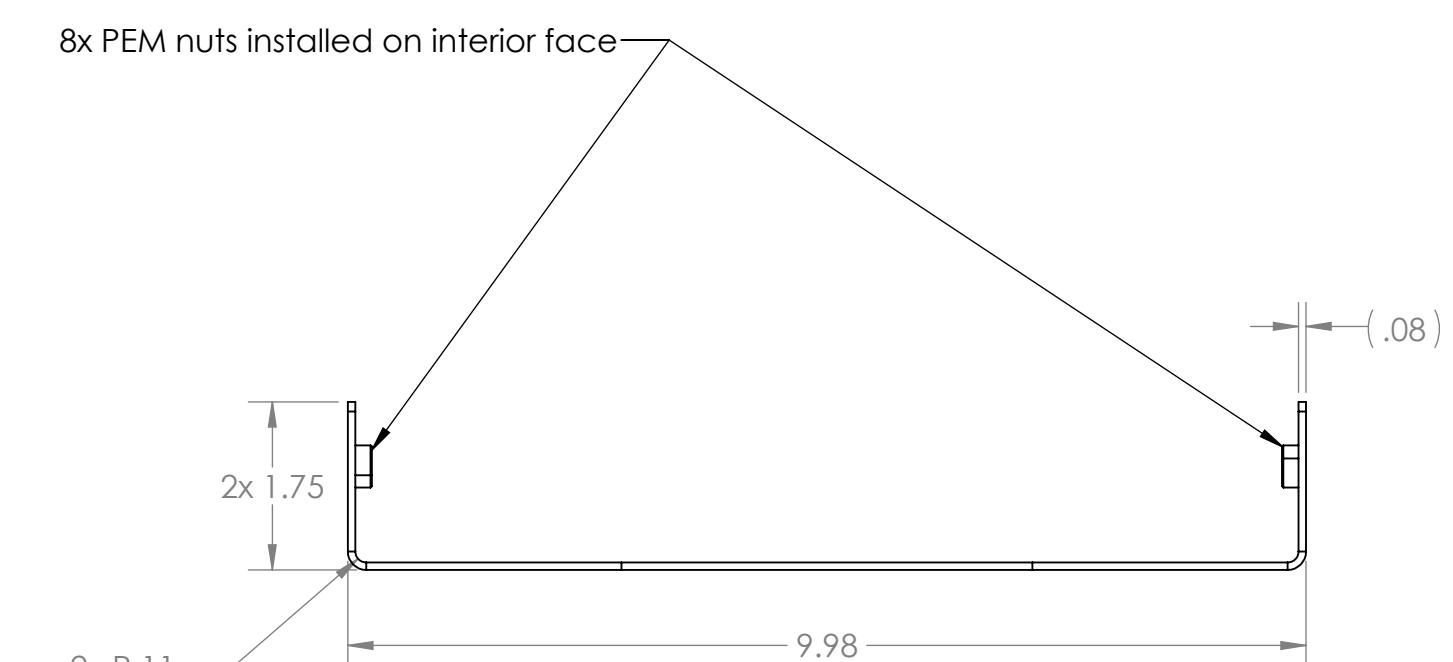
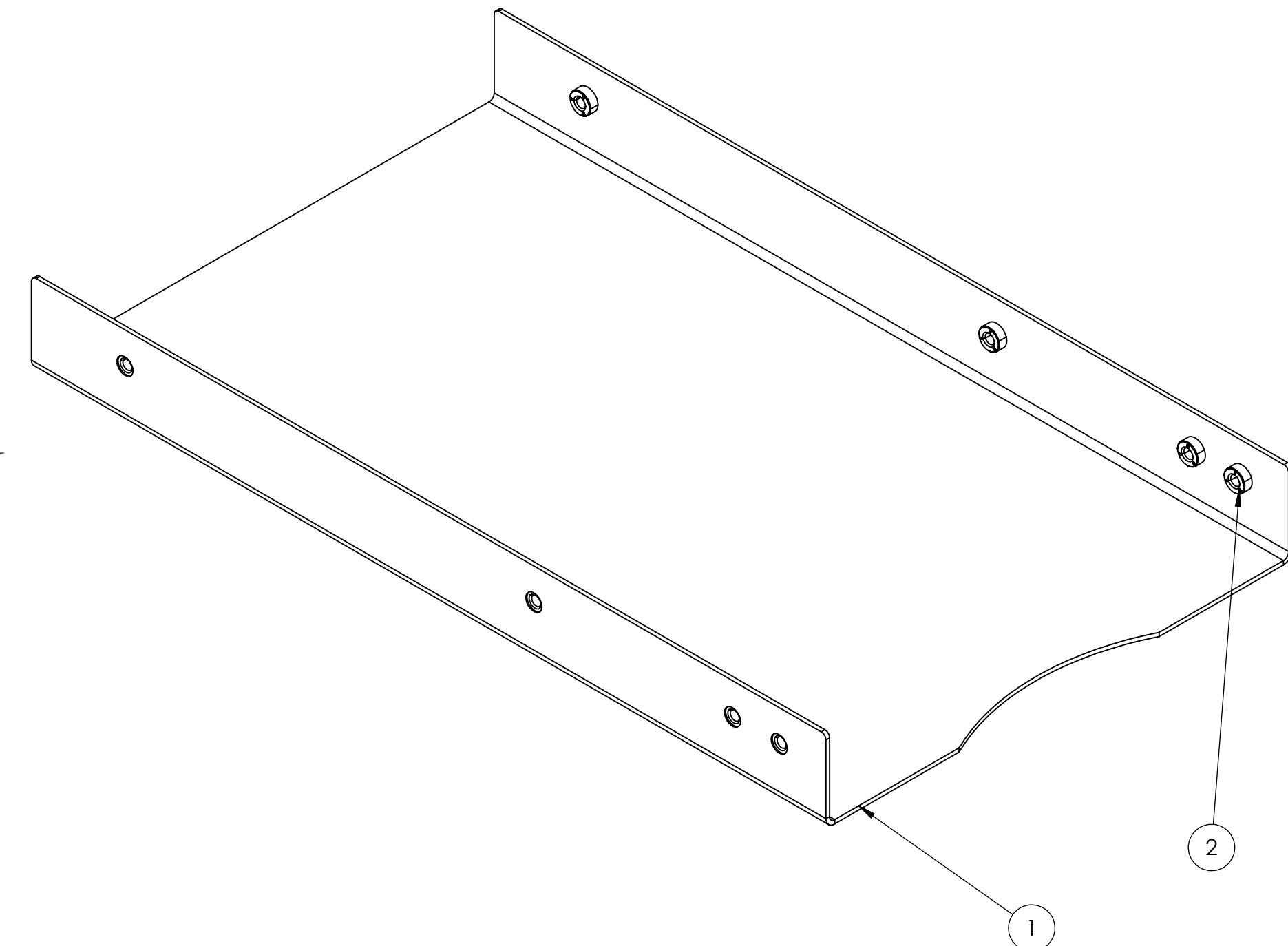
A

A



Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22334-01	14 Ga. Preplated Steel	1
2	pem_clinchnut_.25_20_.054	1/4-20 self-clinching nut, .054 shank	8



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
	DRAWN	CO	6/11/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 Ga. Preplated Steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Lower Exit Back
Roof**

SIZE DWG. NO. REV
C GE-22334

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

D

D

C

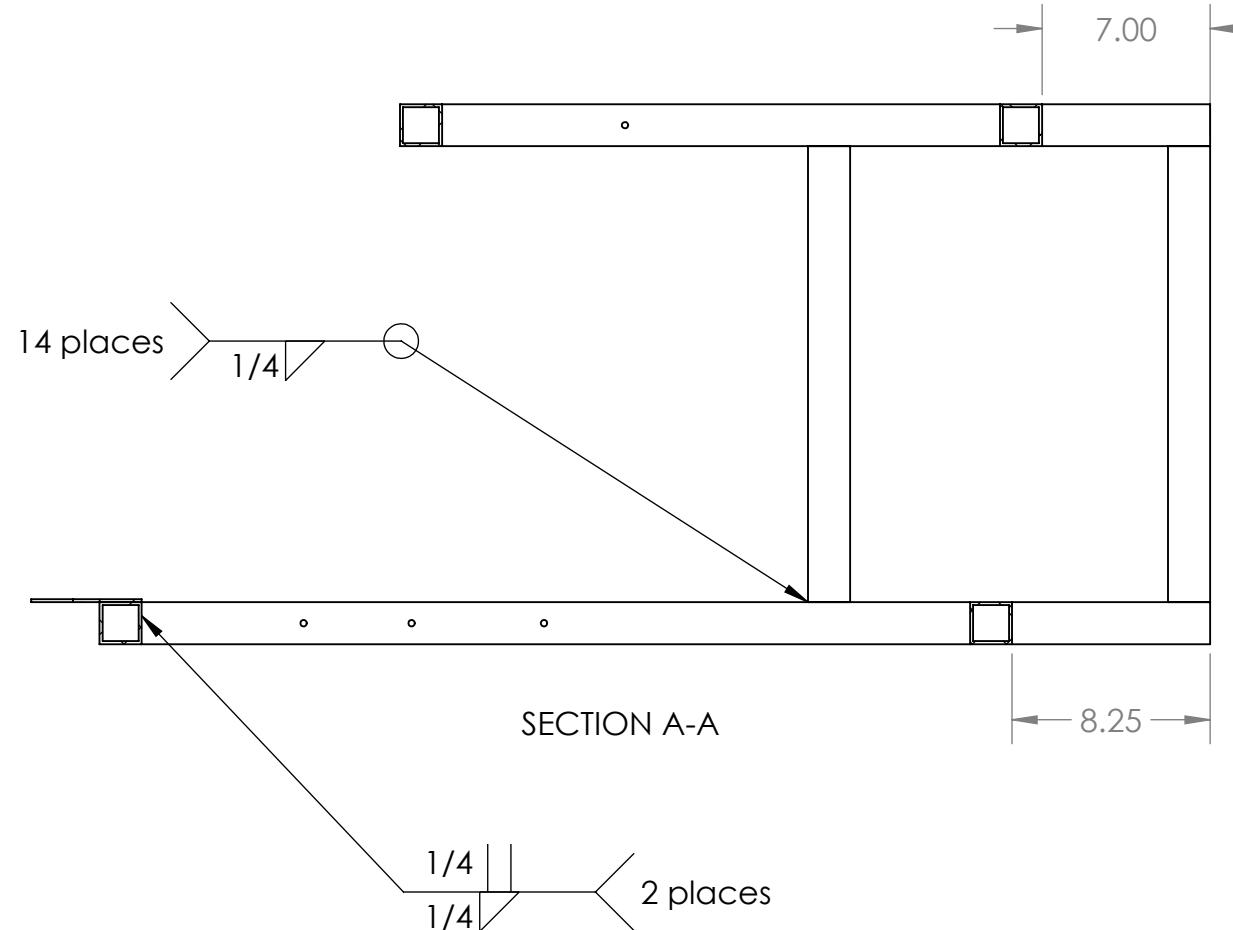
C

B

B

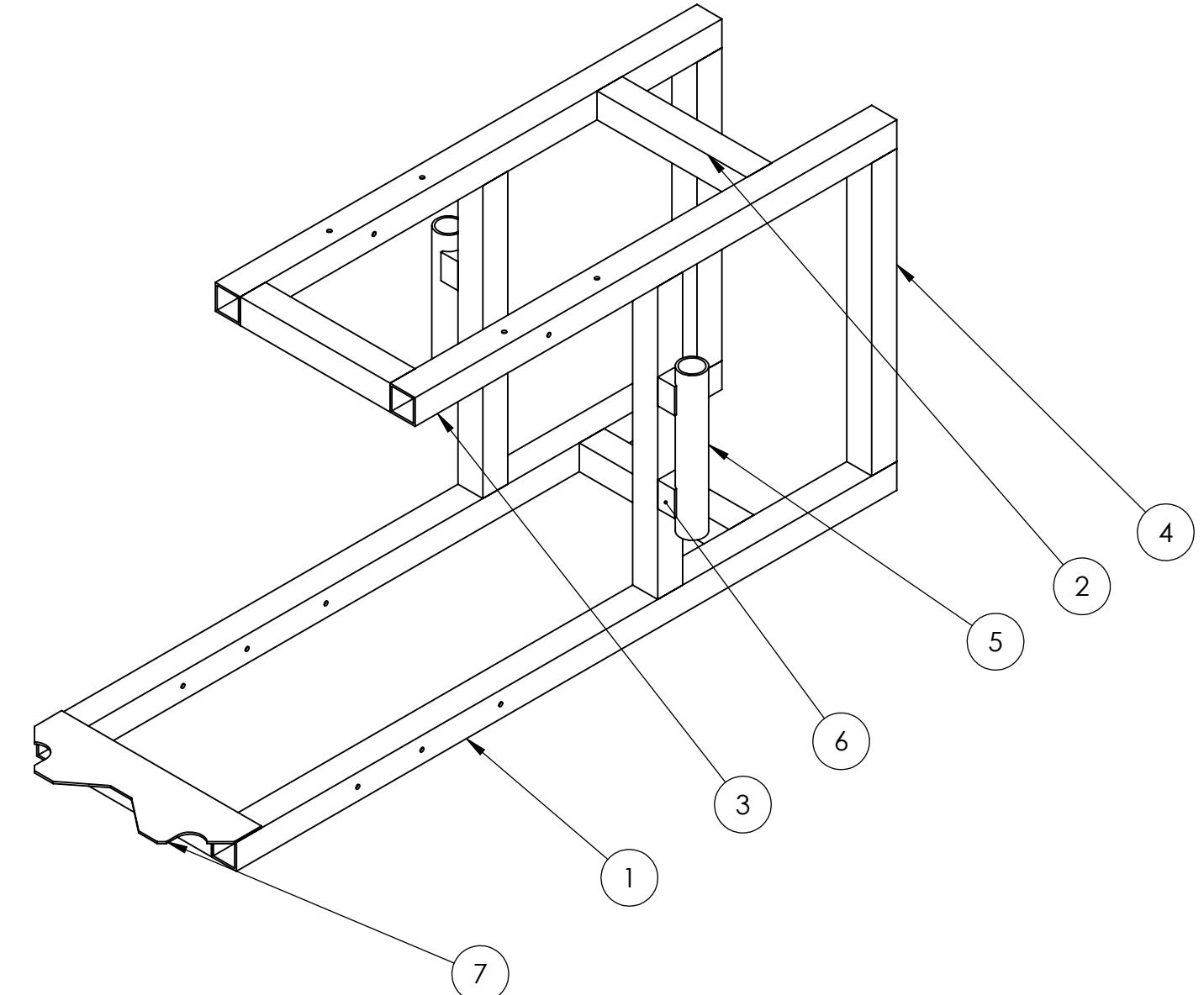
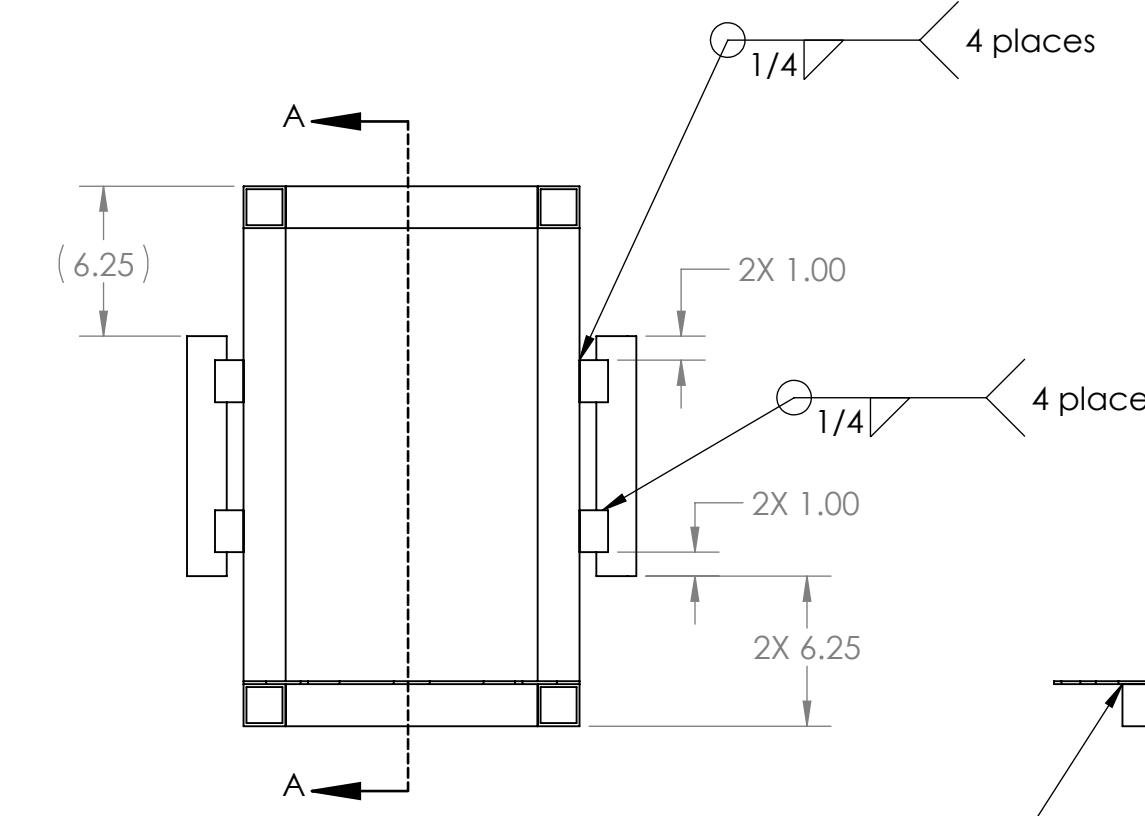
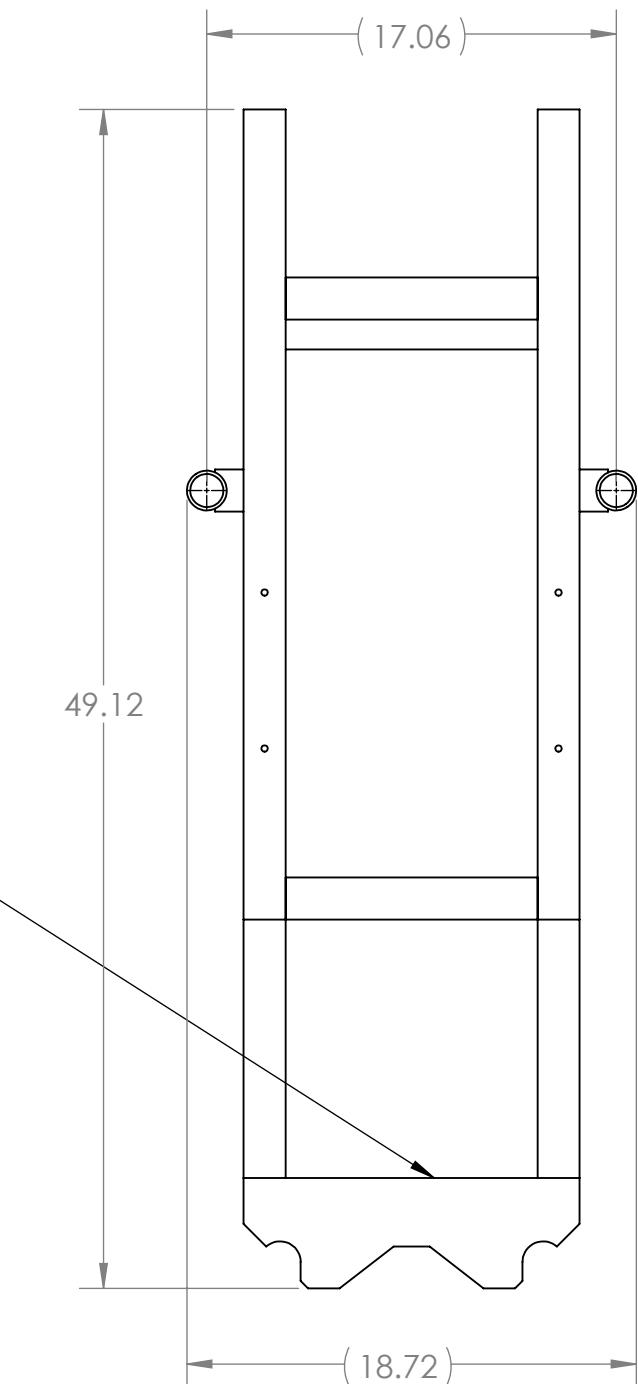
A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22335-01	1.75" x .125" thk. Square Tubing, 6061 Aluminum	2
2	GE-22335-02	1.75" x .125" thk. Square Tubing, 6061 Aluminum	4
3	GE-22335-03	1.75" x .125" thk. Square Tubing, 6061 Aluminum	2
4	GE-22335-04	1.75" x .125" thk. Square Tubing, 6061 Aluminum	4
5	GE-22335-05	1.25" Schedule 40 Pipe, 6061 Aluminum	2
6	GE-22335-06	1.75" x .125" thk. Square Tubing, 6061 Aluminum	4
7	GE-22335-07	8 Ga. 5052 Aluminum	1

Notes:
1. Tag or label with part number.



UNLESS OTHERWISE SPECIFIED:		WELD	NAME	DATE
		DRAWN	CO	7/26/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:				
REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING				

FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE: Lower Exit Frame

SIZE DWG. NO. REV

C GE-22335

SCALE: 1:8 **SHEET 1 OF 3**

4

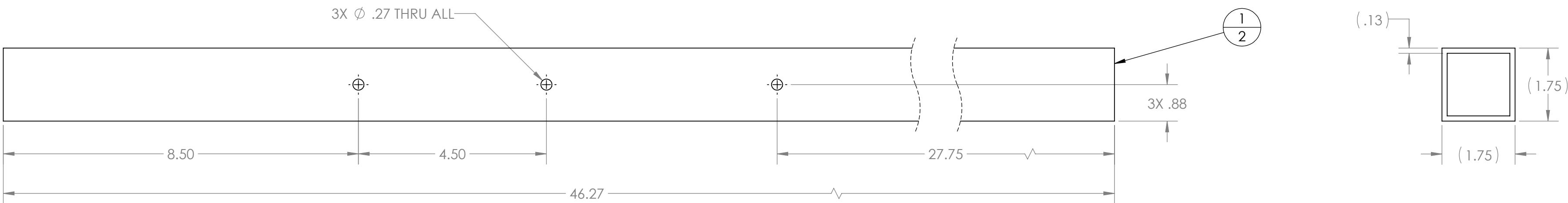
3

2

1

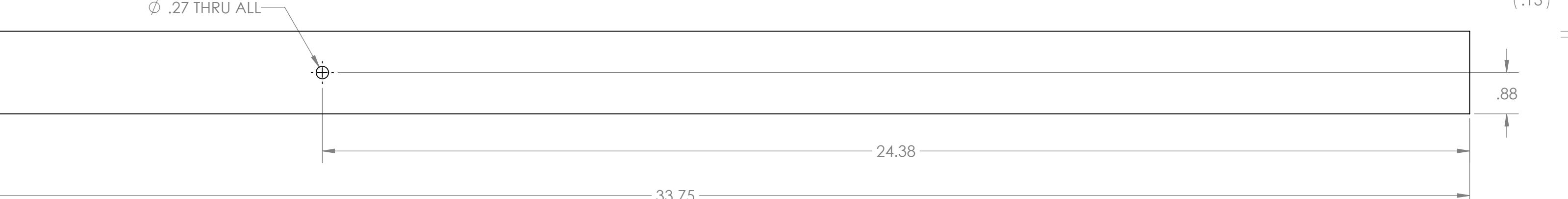
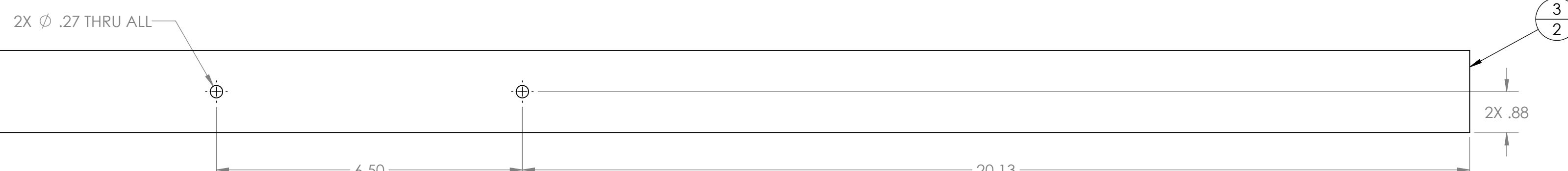
D

1



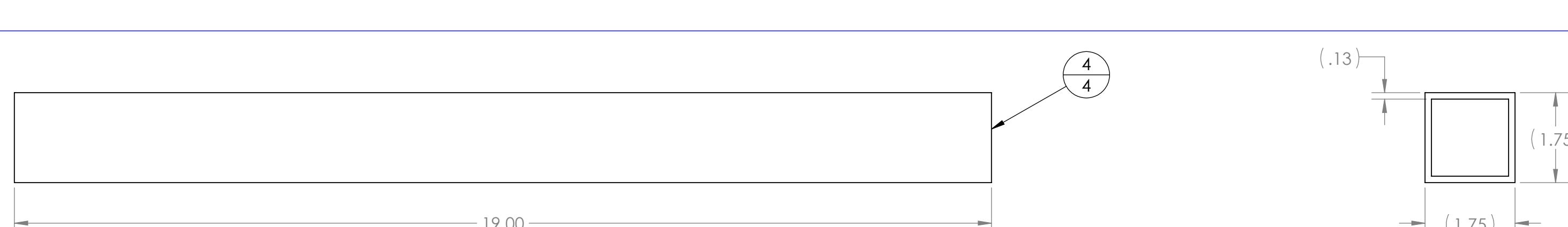
C

1



B

1



A

1

UNLESS OTHERWISE SPECIFIED:			WELD	NAME	DATE
			DRAWN	CO	7/26/2021
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:					
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Lower Exit Frame

SIZE DWG. NO. REV
C GE-22335

SCALE: 1:2 SHEET 2 OF 3

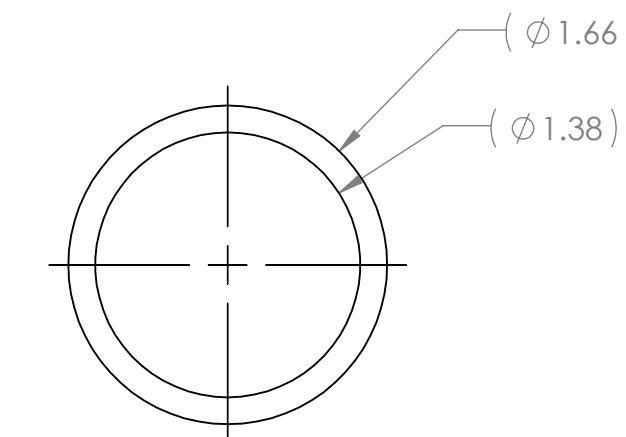
4

3

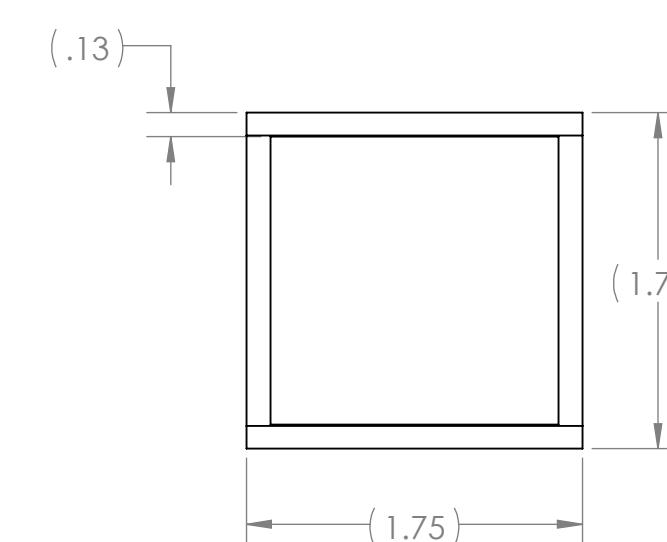
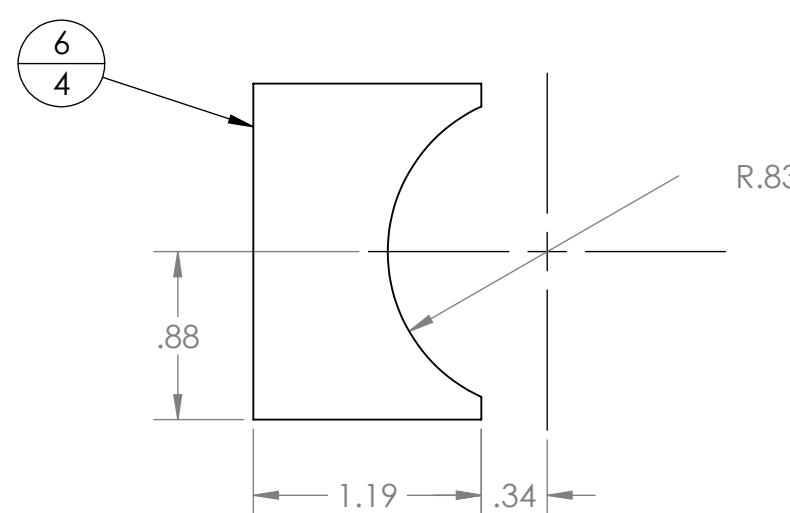
2

1

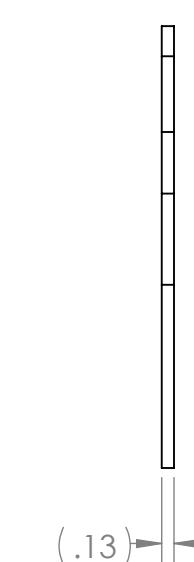
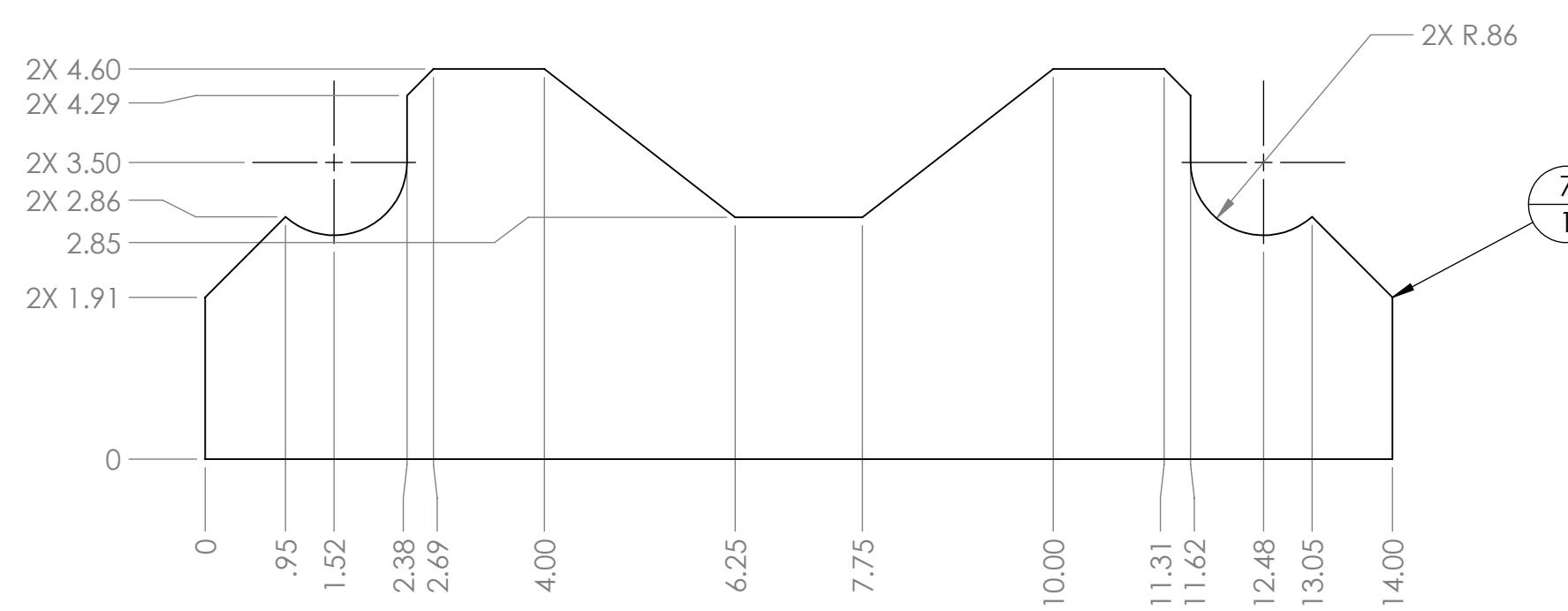
D



C



B



Notes:
1. Scale: 1:2

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	7/26/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Lower Exit
Frame**

SIZE DWG. NO. REV
C GE-22335

SCALE: 1:1 SHEET 3 OF 3

4

3

2

1

D

D

C

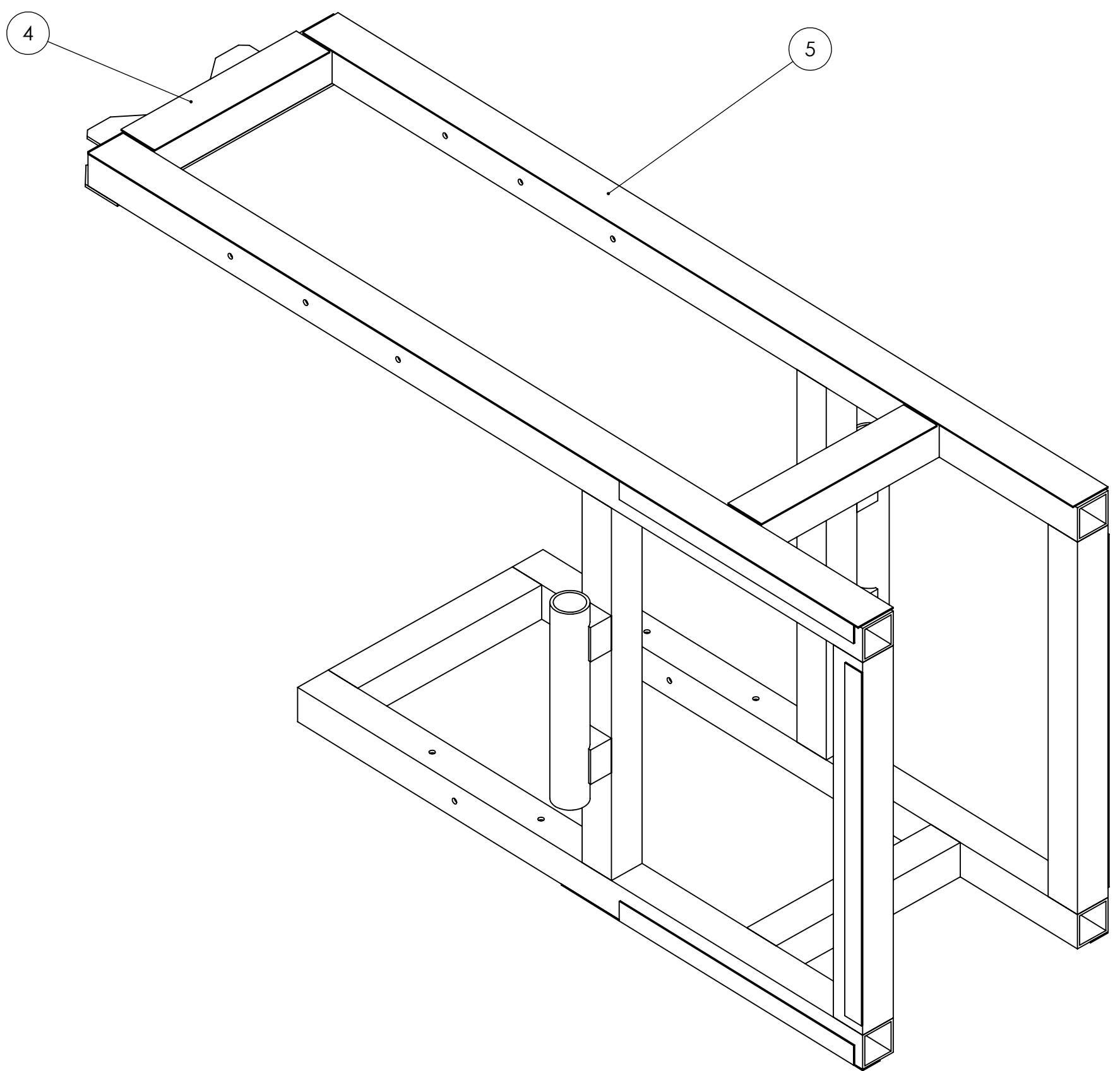
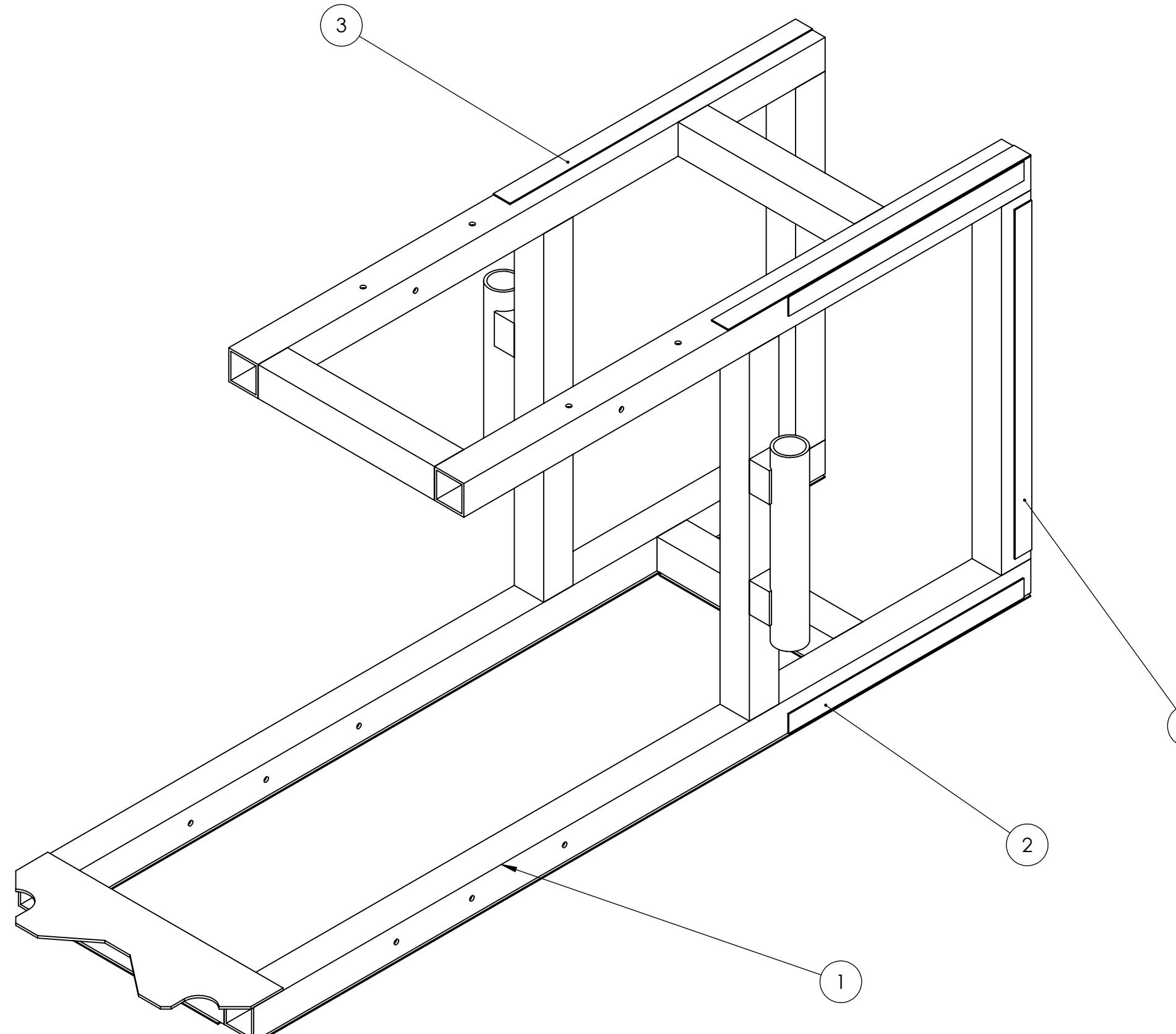
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22335	Lower Exit Frame	1
2	Hook_1_14	1" x 14" Hook, Adhesive Backed	4
3	Hook_1_18	1" x 18" Hook, Adhesive Backed	4
4	Hook_2_10	2" x 10" Hook, Adhesive Backed	2
5	Hook_2_46	2" X 46" Hook, Adhesion Backed	2

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	10/27/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$			
MATERIAL/FINISH:	TITLE: Lower Exit Frame with Hook		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	SIZE	DWG. NO.	REV
	C	GE-22336	
DO NOT SCALE DRAWING	SCALE: 1:5	SHEET 1 OF 2	

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

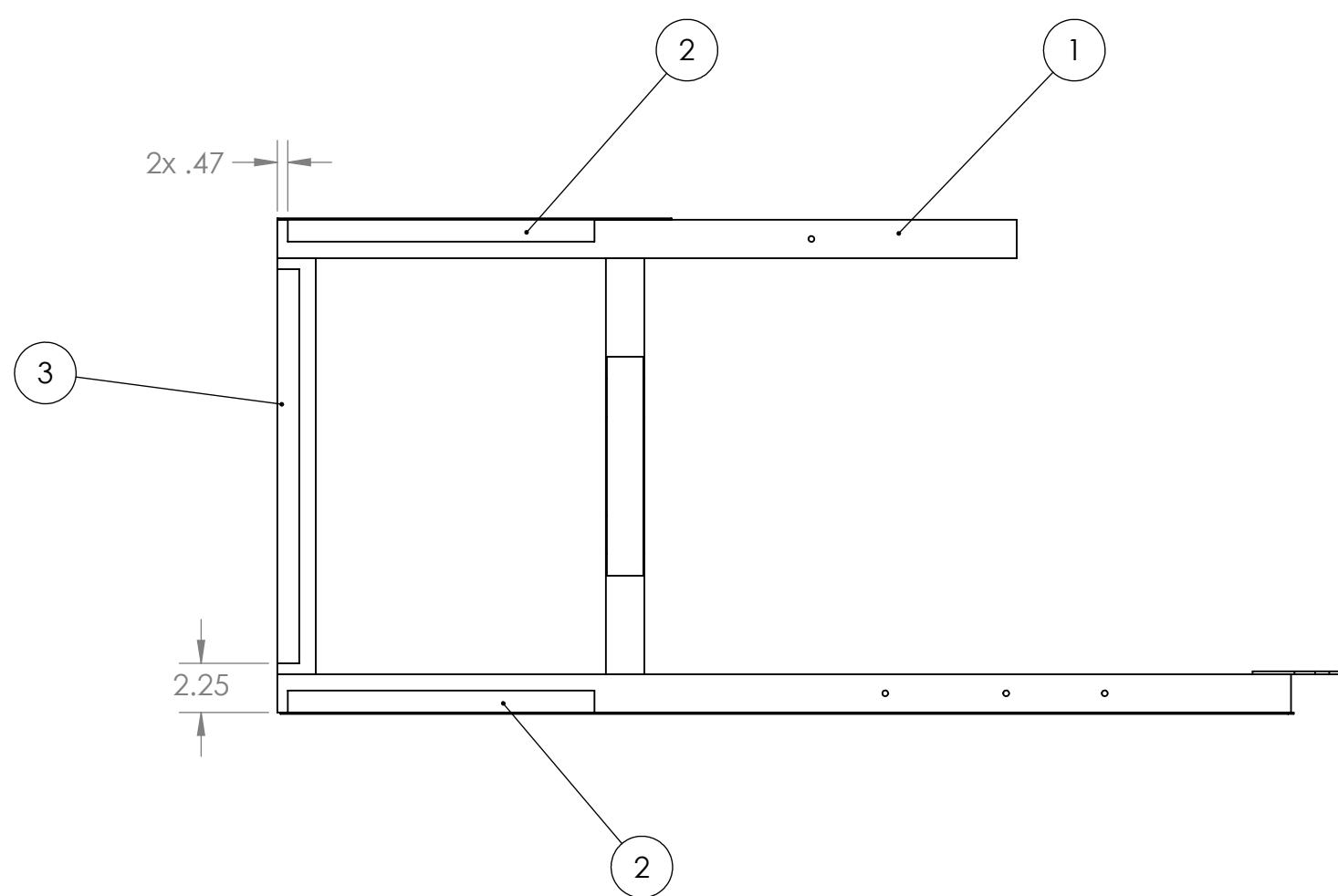
4

3

2

1

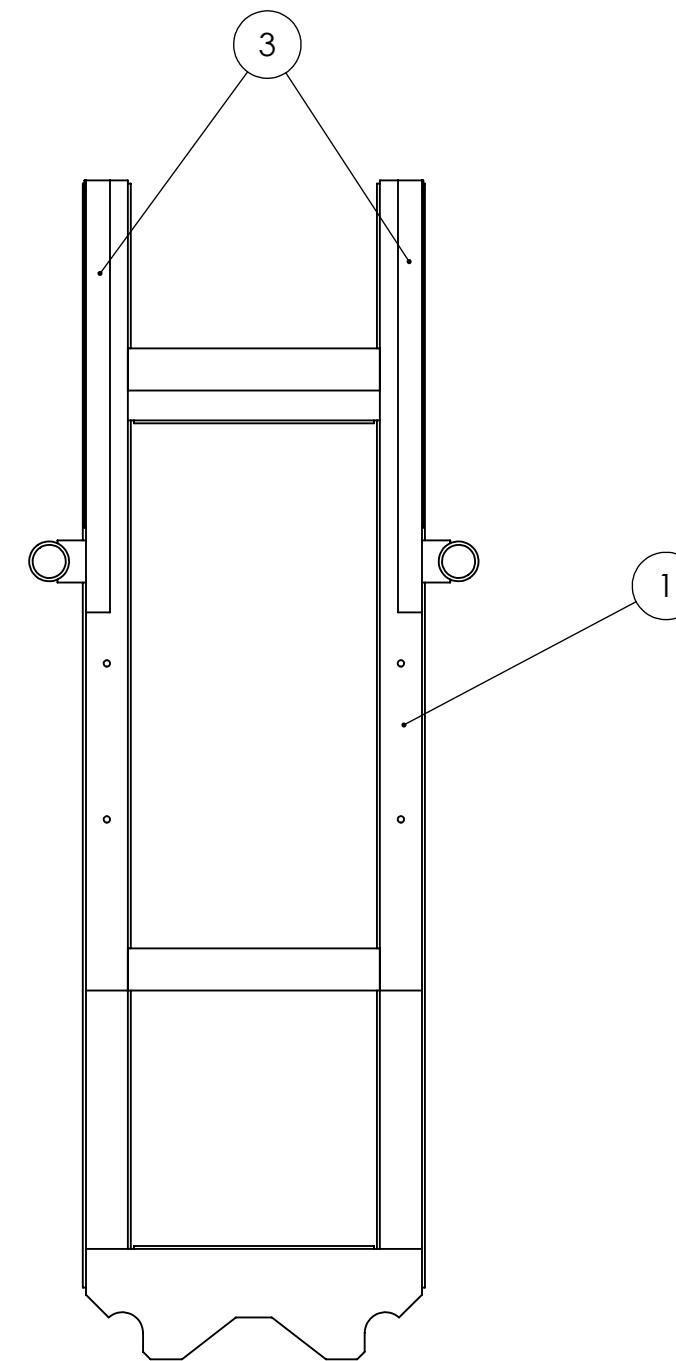
D



Notes:

1. Make sure surface of ① is clean prior to hook application.
2. Attach ② and ③ in locations shown.
3. Repeat process for opposite side of weldment.

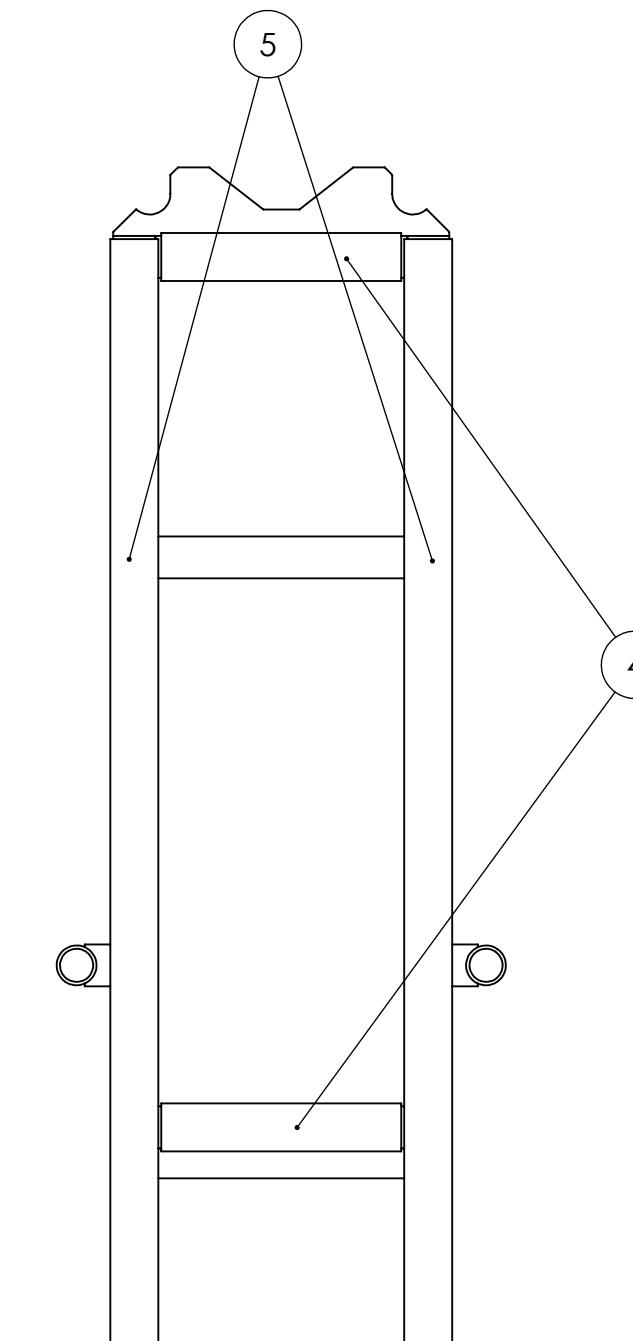
3



Notes:

1. Make sure surface of ① is clean prior to hook application.
2. Attach ③ in locations shown.

2



Notes:

1. Make sure surface of ① is clean prior to hook application.
2. Attach ④ and ⑤ in locations shown.
3. Repeat process for opposite side of weldment.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	10/27/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
TITLE: Lower Exit Frame with Hook			
SIZE DWG. NO. REV			
C GE-22336			
SCALE: 1:8 SHEET 2 OF 2			

D

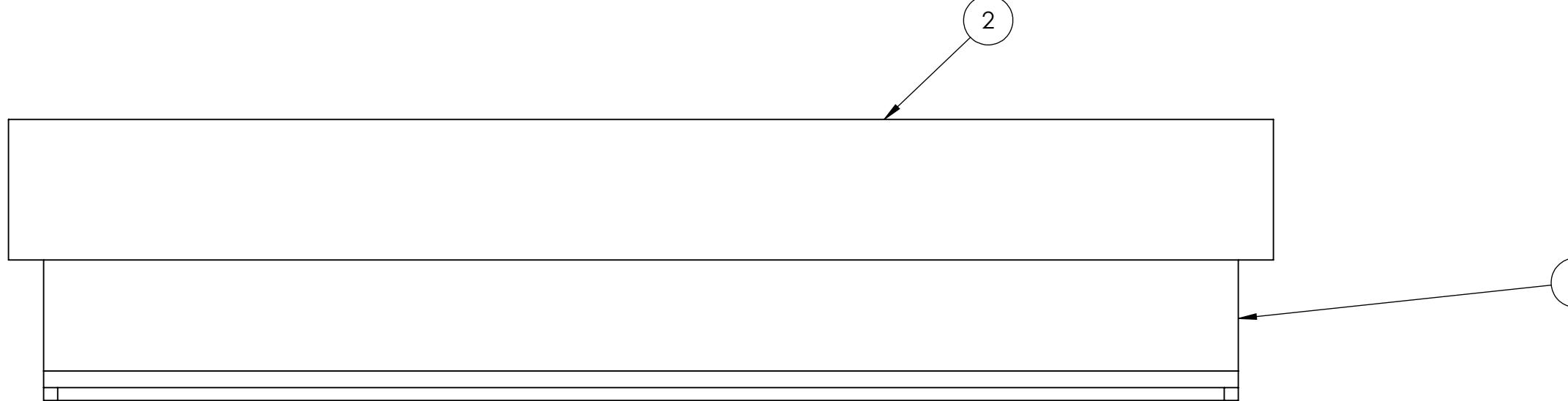
D

C

C

B

B

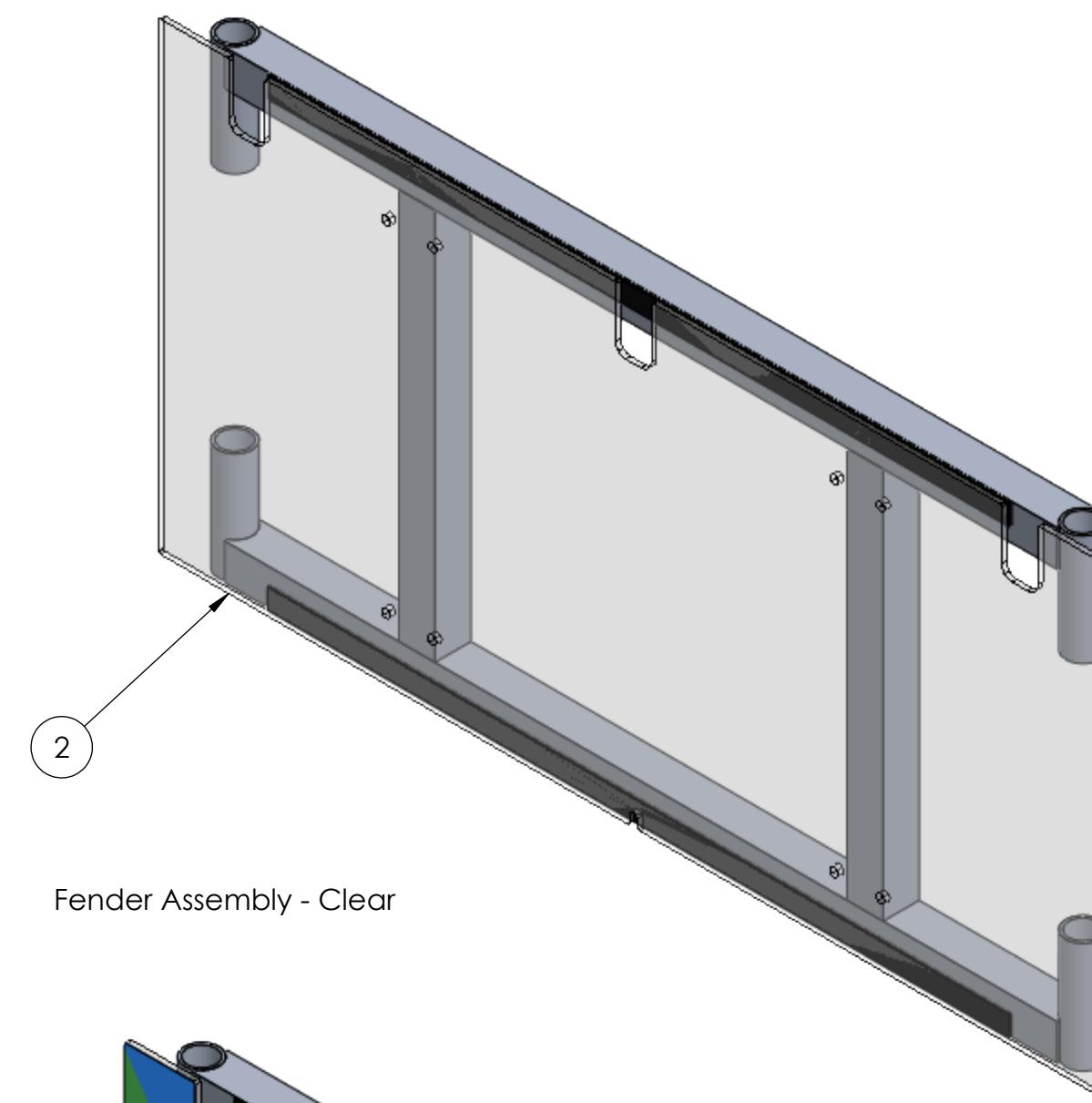
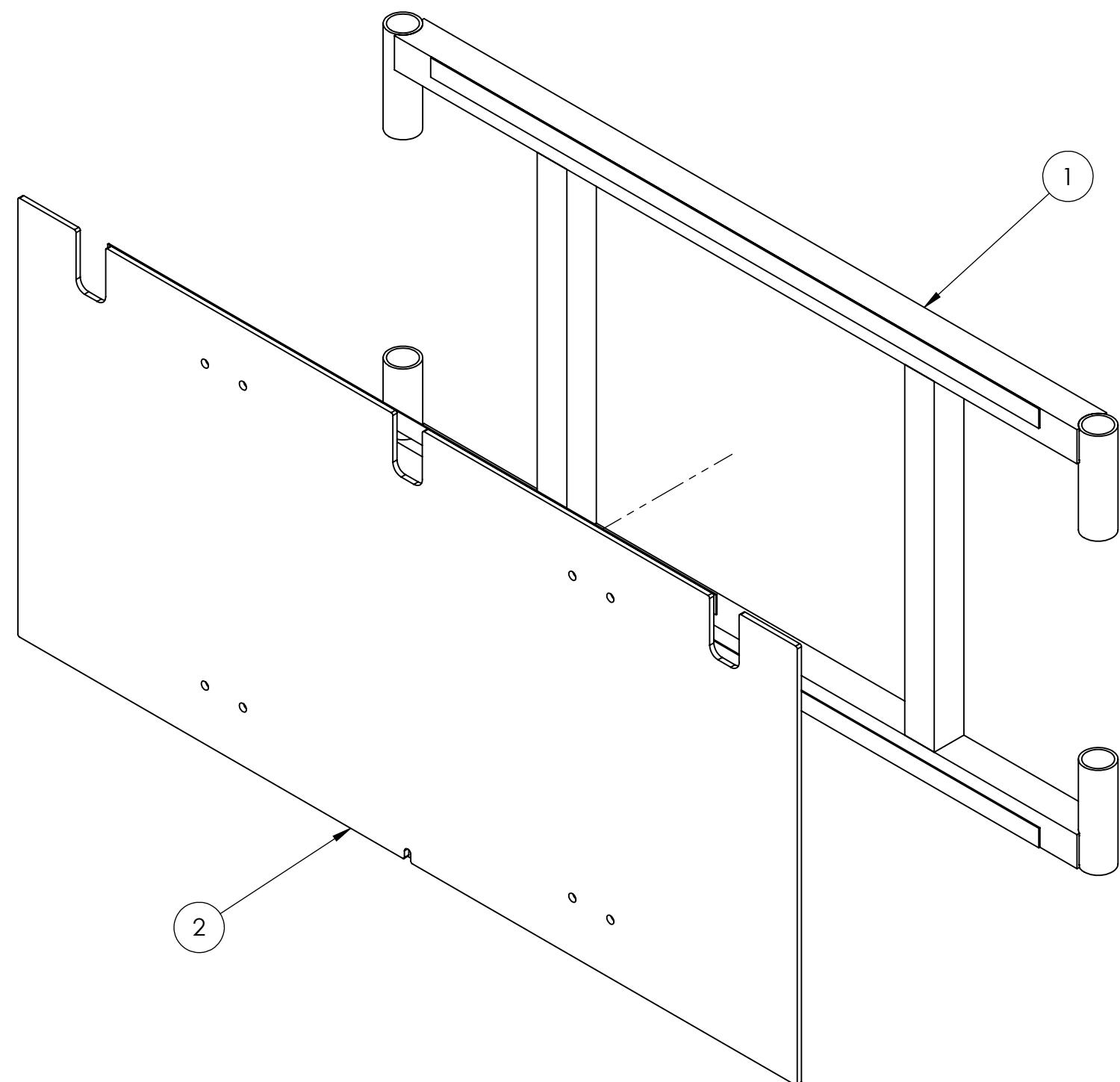
**Notes:**

1. Make sure surface of **1** is clean prior to hook application.
2. Attach **2** to **1** in location shown. **2** should be centered along the edge of **1**.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22325	Lower Exit Ramp Angle	1
2	Hook_1_9	1" x 9" Hook, Adhesive Backed	1

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/14/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$			
MATERIAL/FINISH:	TITLE: Lower Exit Ramp Angle with Hook		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	SIZE	DWG. NO.	REV
DO NOT SCALE DRAWING	C	GE-22337	
	SCALE: 1:1	SHEET 1 OF 1	

D



Notes:

1. Attach (2) or (3) to (1) using hook and loop.
2. Assembly exists in Vinyl and clear configurations.

ITEM NO.	PART NUMBER	DESCRIPTION	Fender Assembly - Clear QTY.	Fender Assembly - Vinyl QTY.
1	GE-22343	Fender Frame with Hook	1	1
2	GE-22345	Fender Front Polycarbonate with Loop	1	-
3	GE-22349	Fender Vinyl Polycarbonate with Loop	-	1

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/14/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

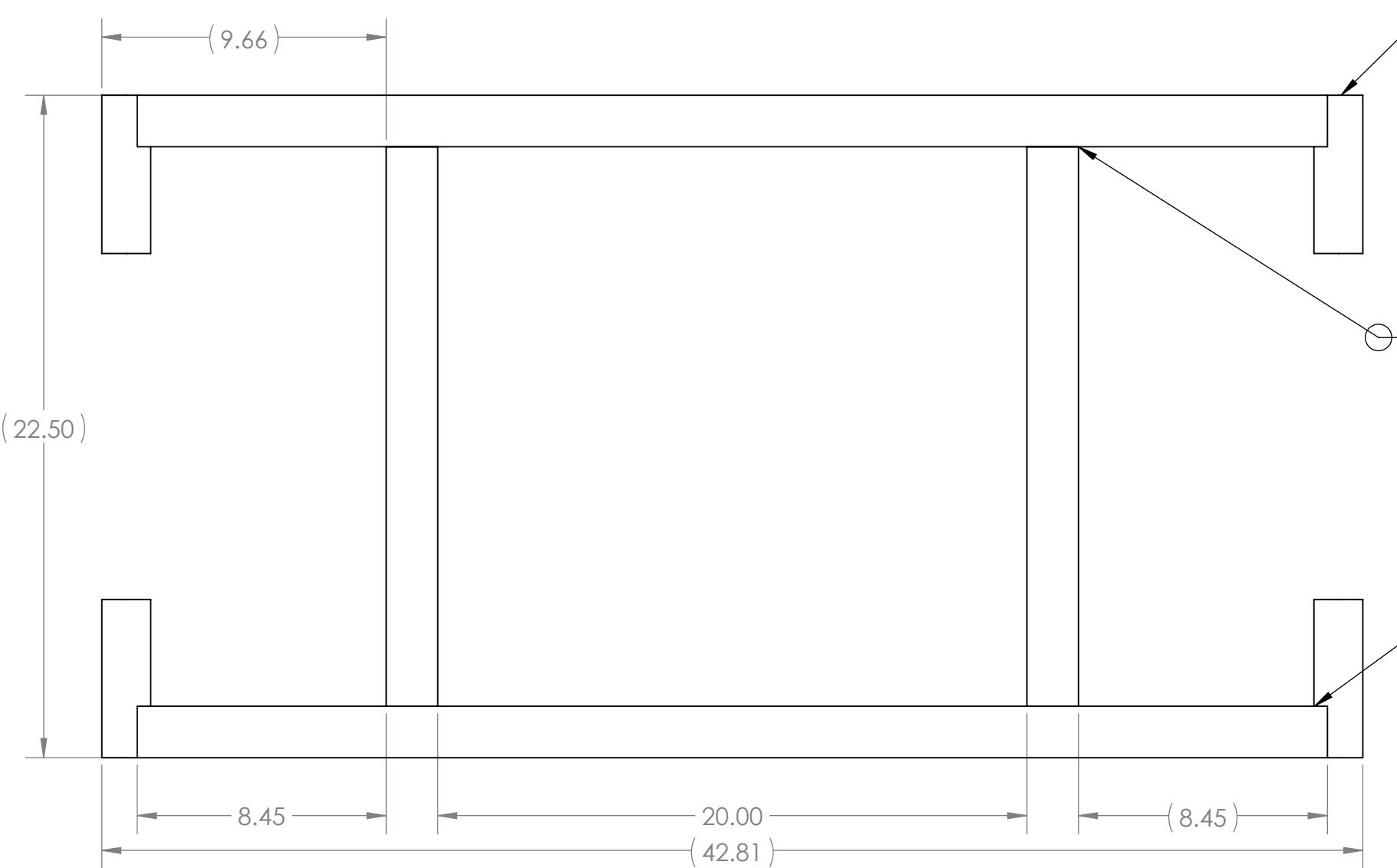
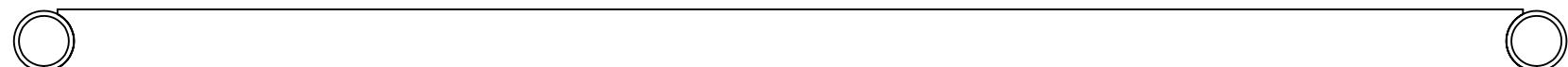
Title: Fender Assembly

Size: DWG. NO. **REV:**

C GE-22341

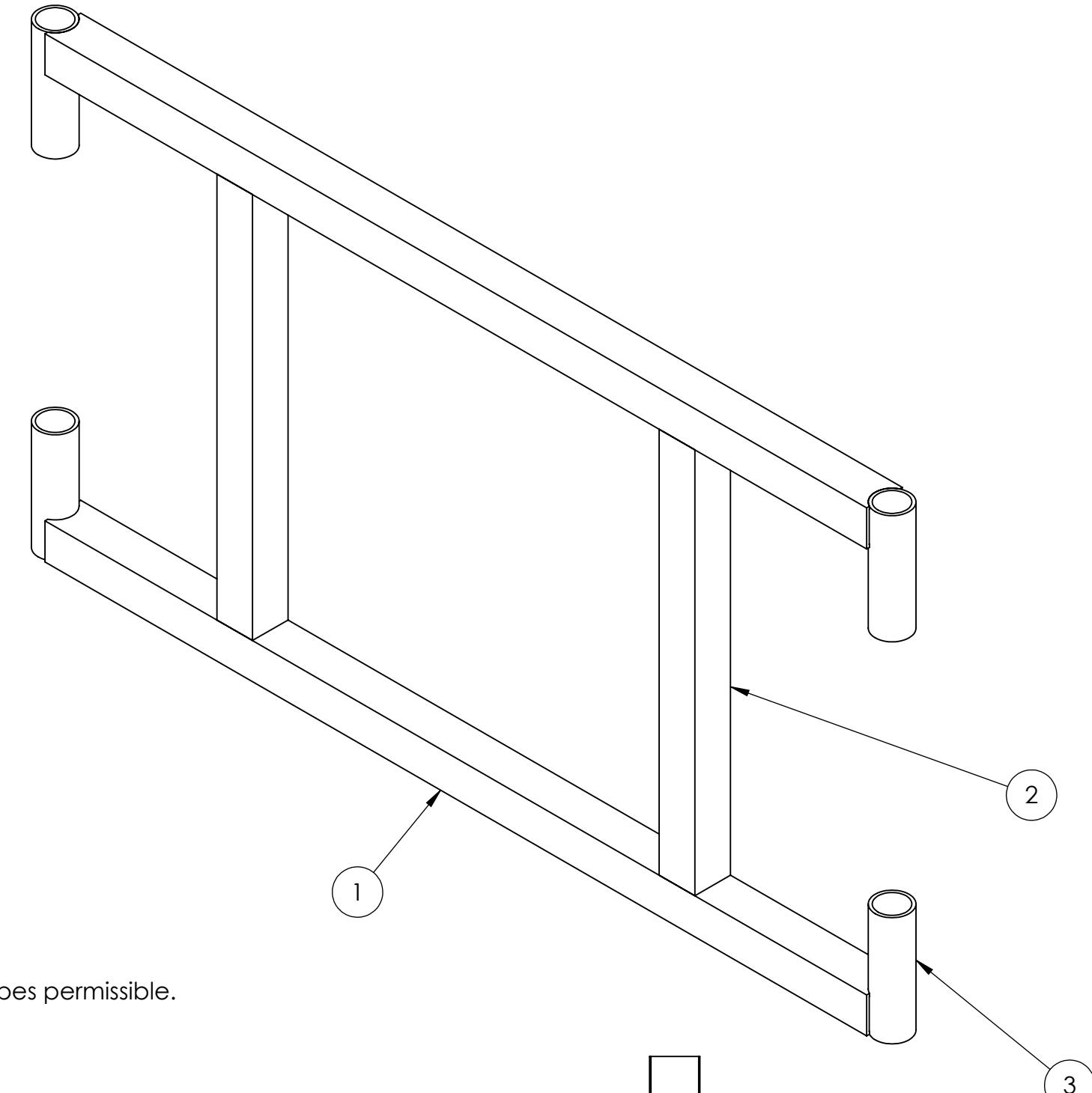
Scale: 1:6 **Sheet:** 1 OF 1

D



Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22342-01	1.75" x .125" tk. Square Tube, 6061 Aluminum	2
2	GE-22342-02	1.75" x .125" tk. Square Tube, 6061 Aluminum	2
3	GE-22342-03	1-1/4" Schedule 40 Pipe, 6061 Aluminum	4



UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	6/17/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Fender Frame

SIZE DWG. NO. REV

C GE-22342

SCALE: 1:5 SHEET 1 OF 2

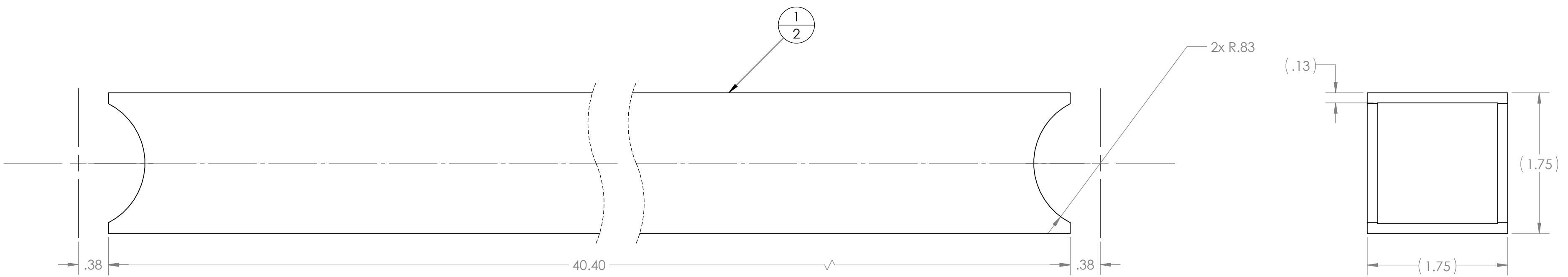
4

3

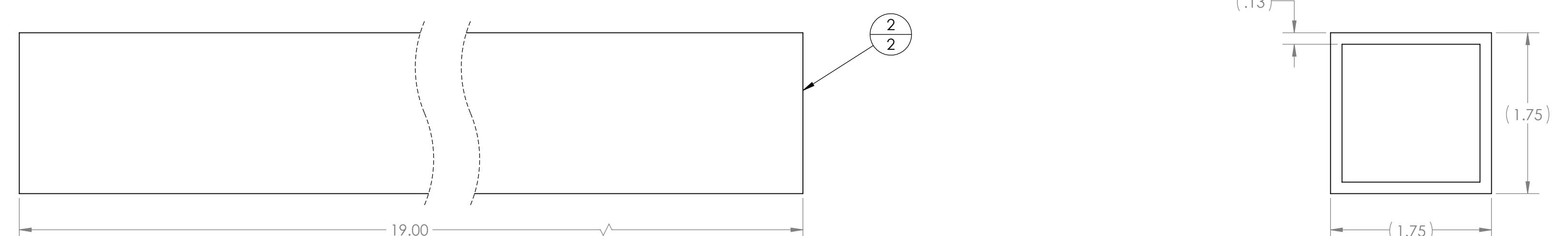
2

1

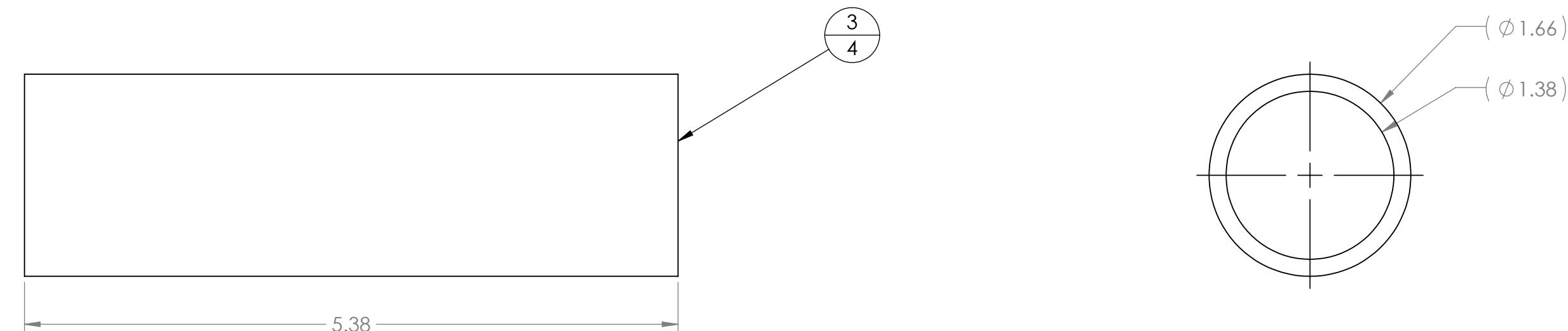
D



C



B



A

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	6/17/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner			
TITLE: Fender Frame			
SIZE	DWG. NO.	REV	
C	GE-22342		
SCALE: 1:1	SHEET 2 OF 2		

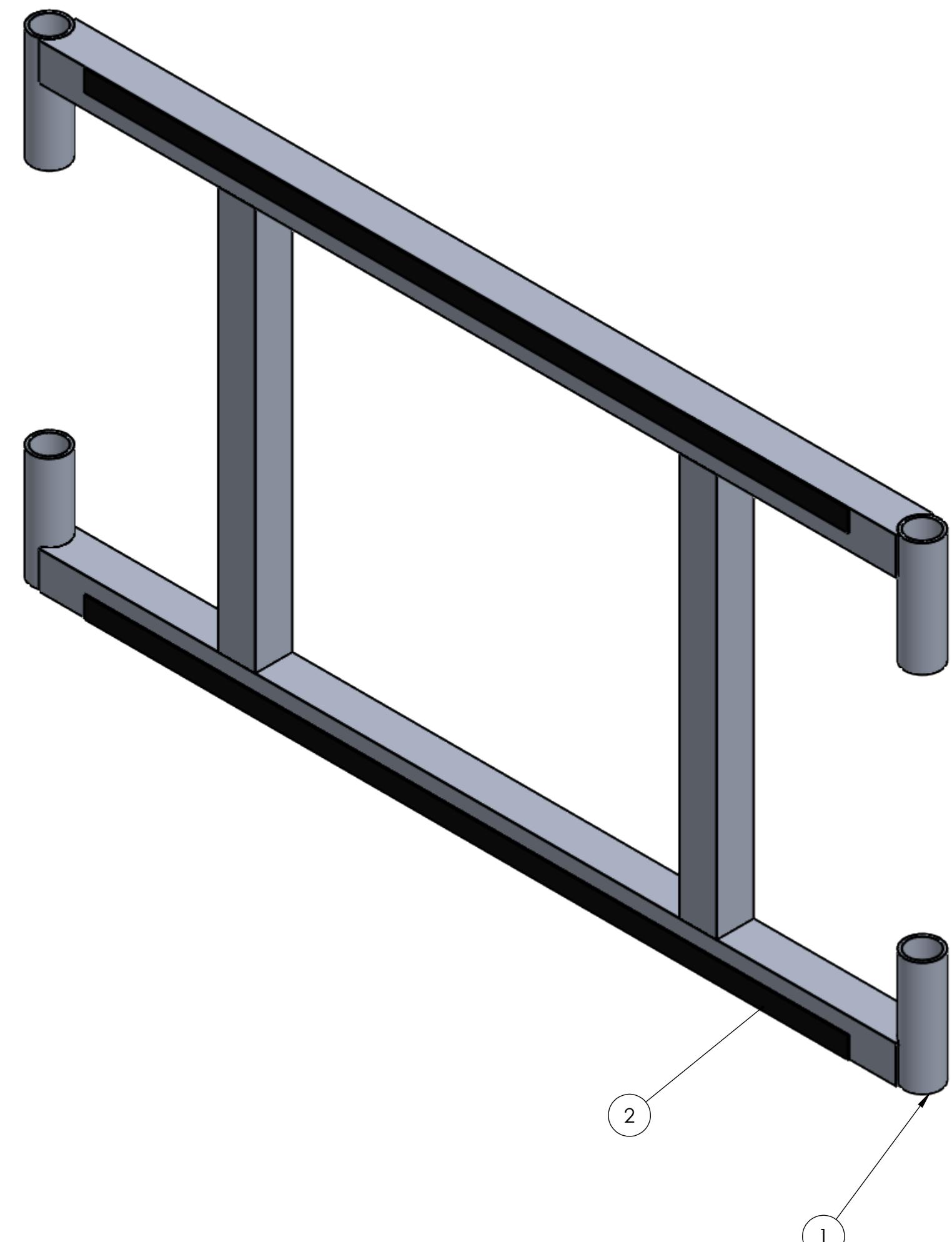
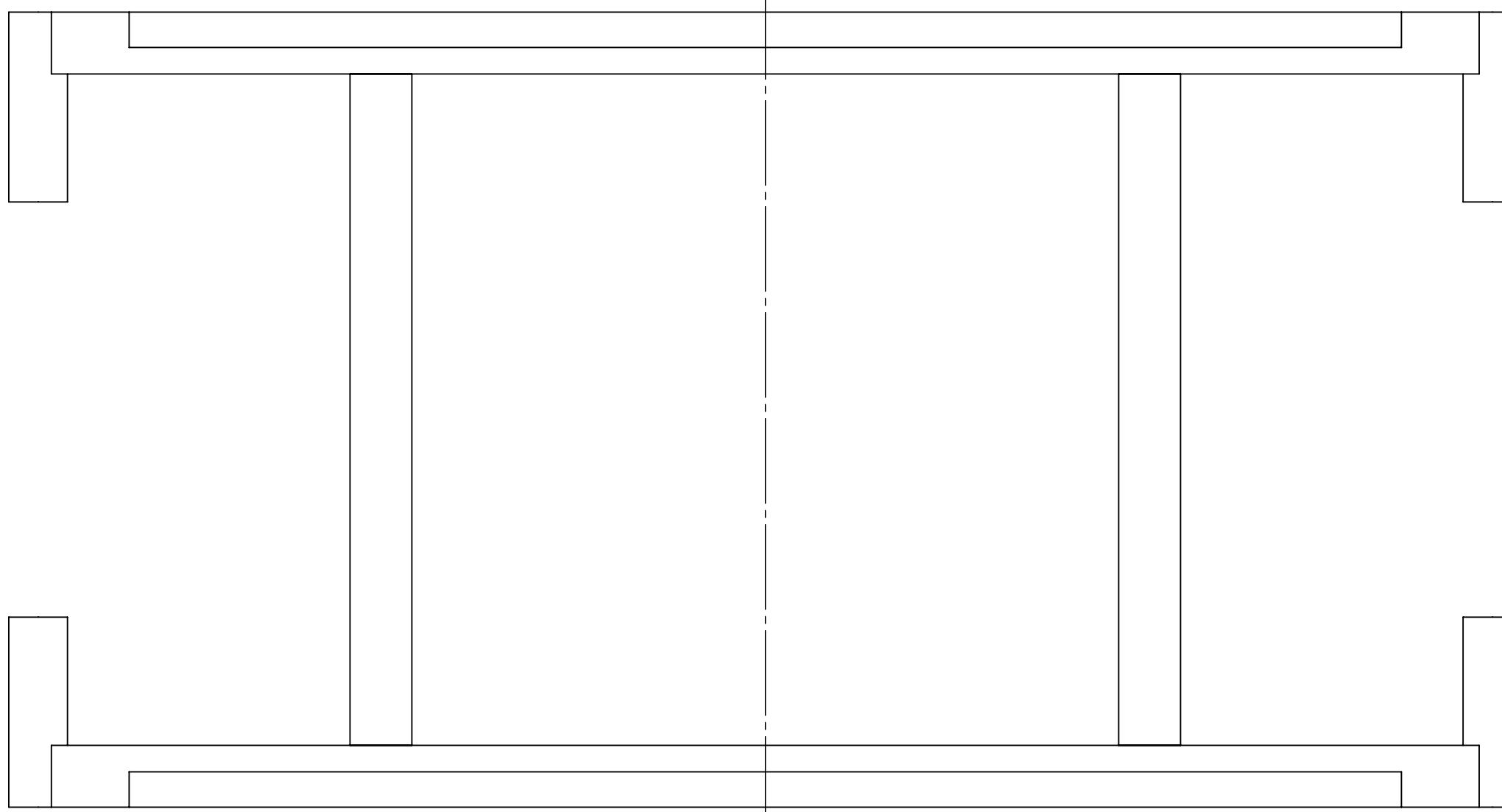
4

3

2

1

D



Notes:

1. Make sure surface of (1) is clean prior to hook application.
2. Attach (2) to (1) in locations shown.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22342	Fender Frame	1
2	Hook_1_36	1" x 36" Hook, Adhesive Backed	2

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	11/2/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Fender Frame with Hook

SIZE DWG. NO. REV

C GE-22343

SCALE: 1:4 SHEET 1 OF 1

4

3

2

1

D

D

C

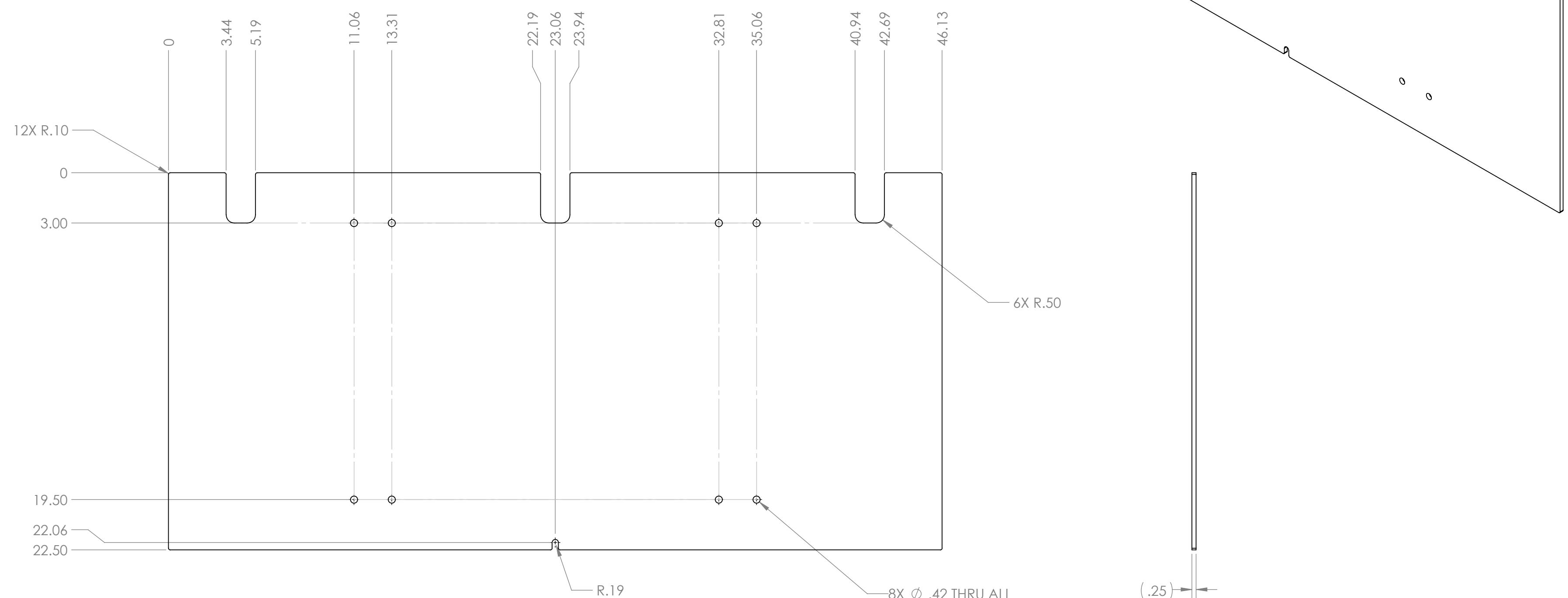
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	6/11/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/4" thk. Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



TITLE:
**Fender Front
Polycarbonate**

SIZE DWG. NO. REV
C GE-22344

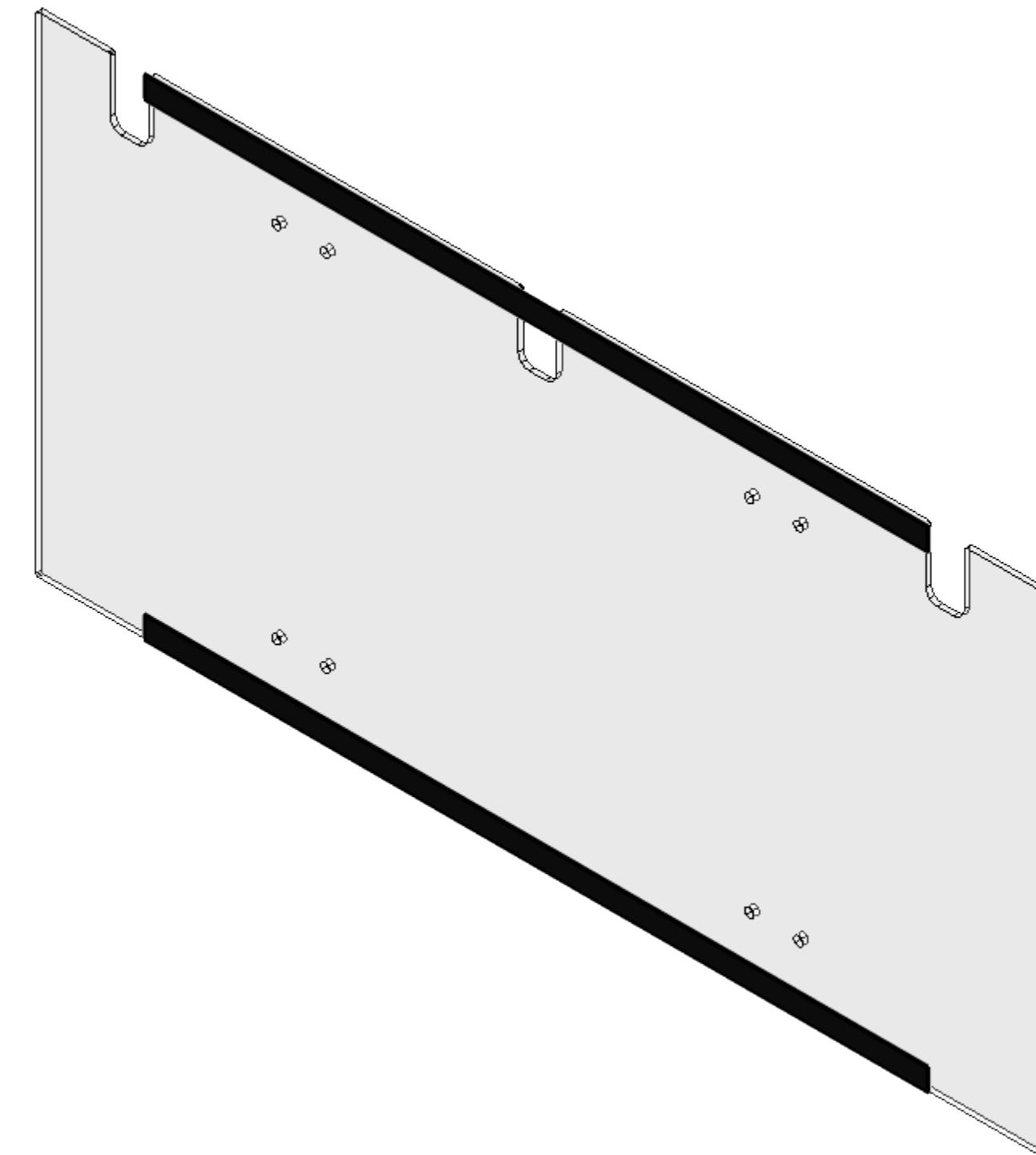
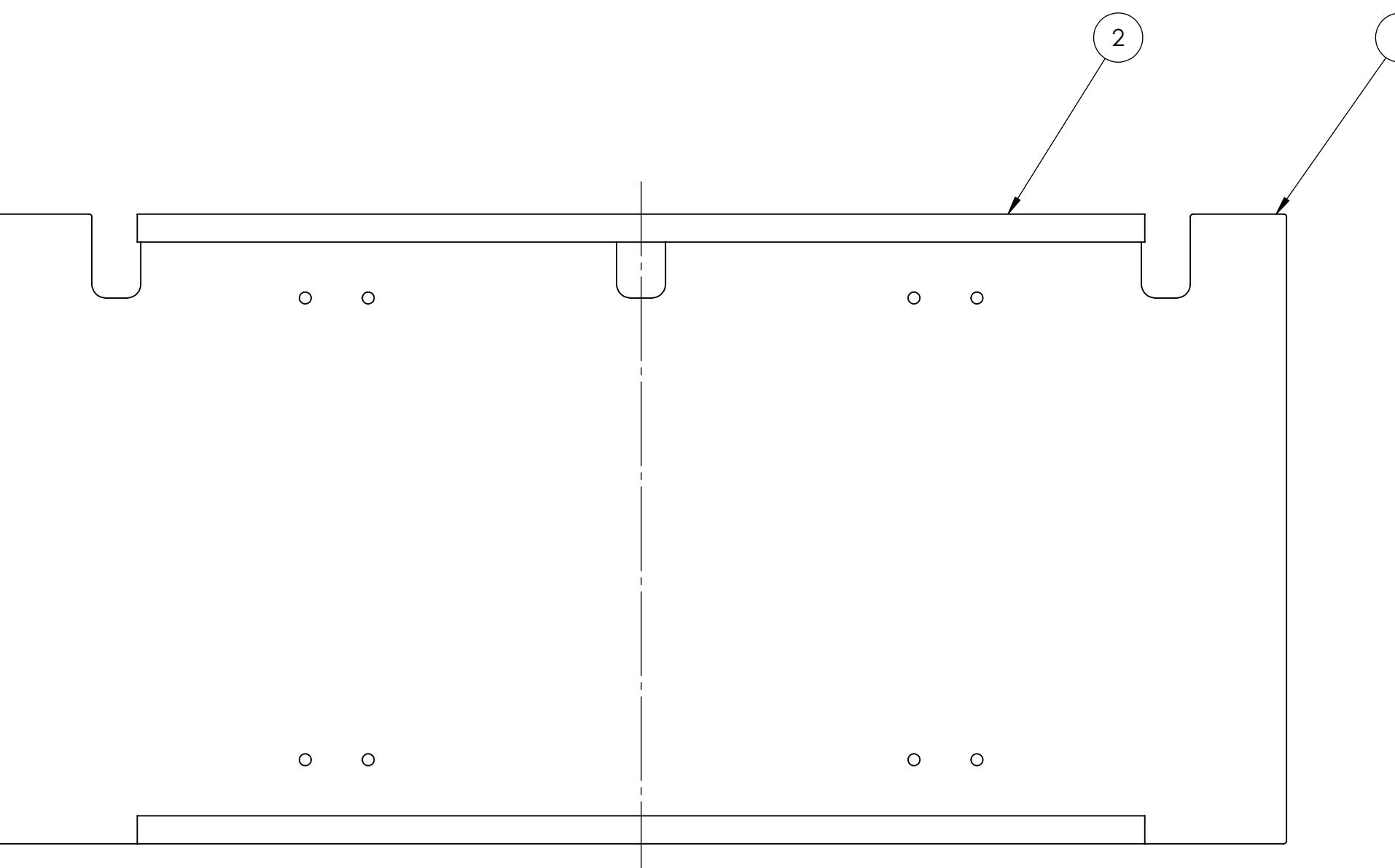
SCALE: 1:5 SHEET 1 OF 1

4

3

2

1



Notes:

1. Make sure surface of is clean prior to loop application.
2. Attach to in locations shown.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22344	Fender Front Polycarbonate	1
2	Loop_1_36	1" x 36" Loop, Adhesive Backed	2

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	11/3/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$					
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$					
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:			COMMENTS:		
			REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			SIZE	DWG. NO.	REV
			C	GE-22345	
			SCALE: 1:5	SHEET 1 OF 1	

 FIRST
ROBOTICS
COMPETITION  SOLIDWORKS
Modeling Solutions Partner

TITLE: Fender Front
Polycarbonate
with Loop

4

3

2

1

D

D

C

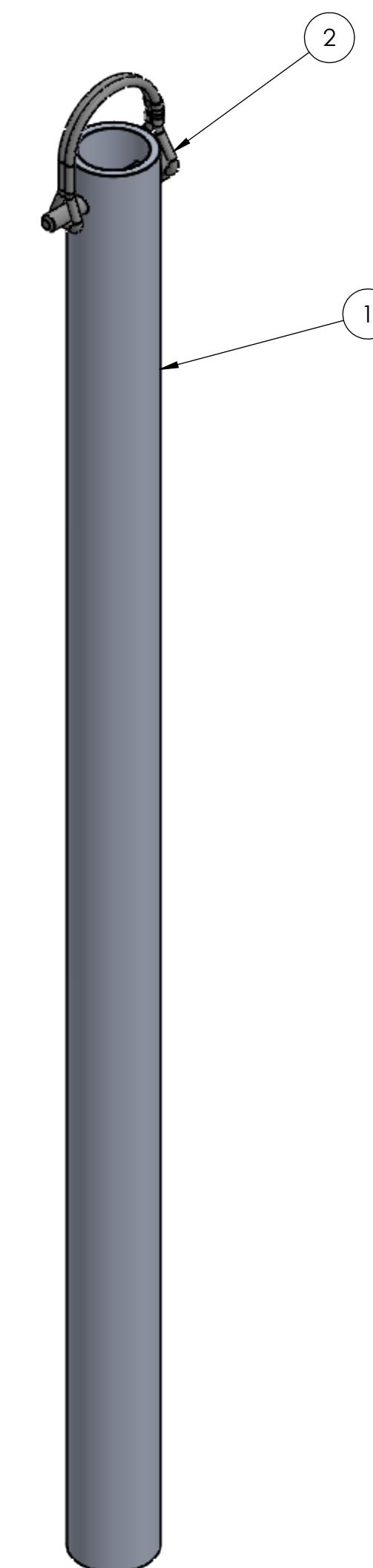
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22347	Fender Pipe	1
2	pin_25_2.375_wireloc_kclevis	Wire-Lock Clevis Pin	1

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/7/2021	
PROPRIETARY AND CONFIDENTIAL			

DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
MATERIAL/FINISH:	
DO NOT SCALE DRAWING	



TITLE:

Fender Pipe Assembly

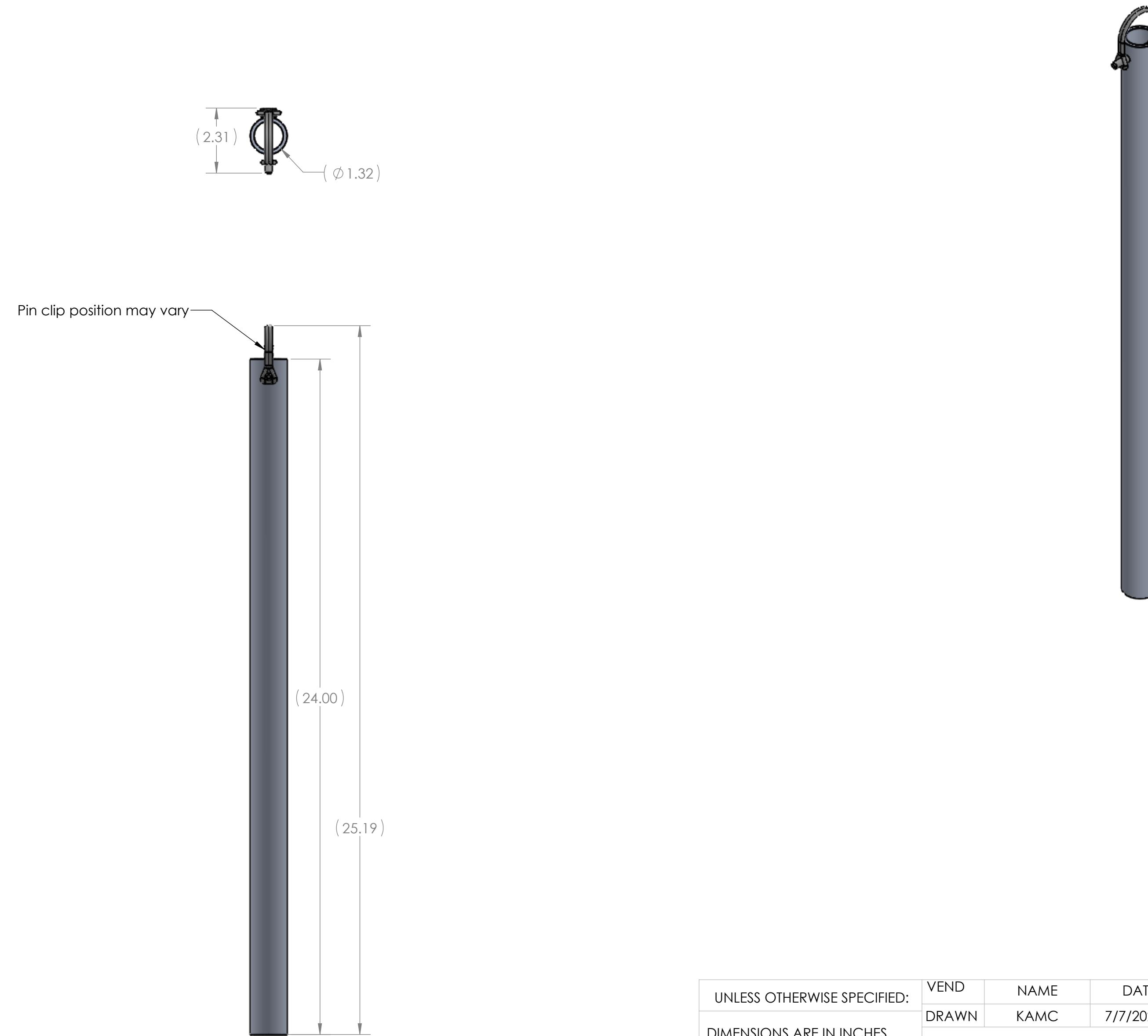
SIZE DWG. NO. REV

C GE-22346

SCALE: 1:2 SHEET 1 OF 2

D

D



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/7/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION** 

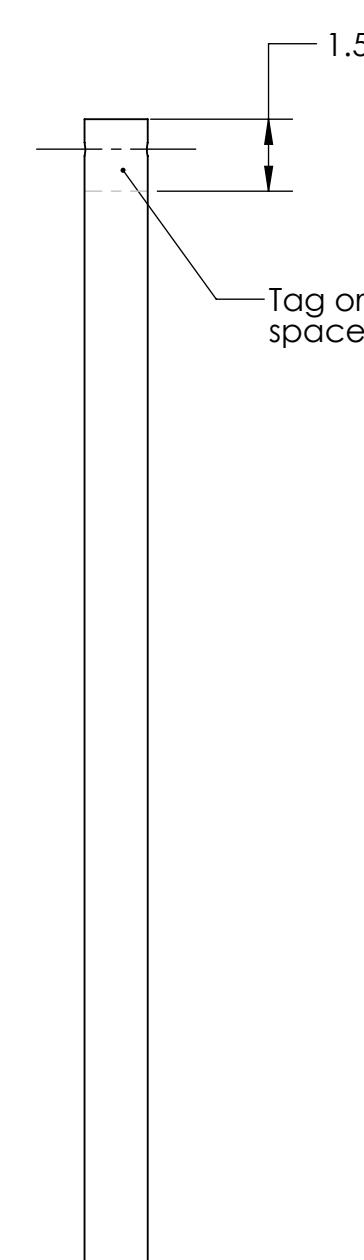
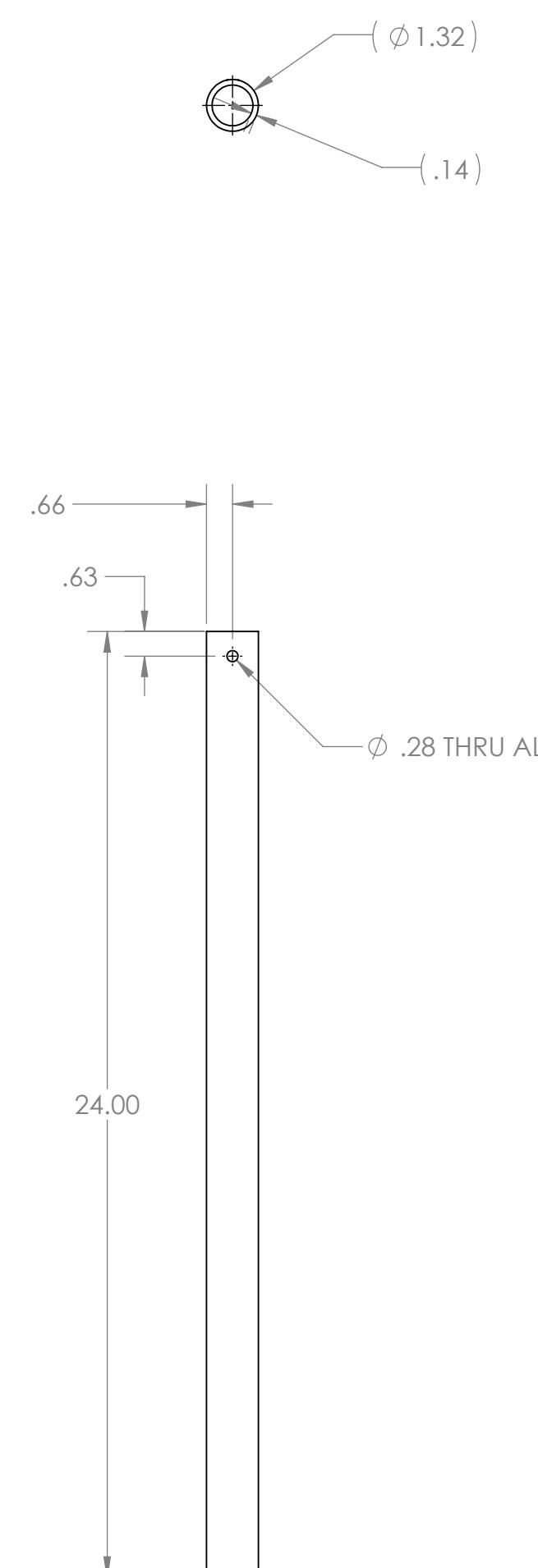
TITLE:
**Fender Pipe
Assembly**

SIZE DWG. NO. REV
C GE-22346

SCALE: 1:3 SHEET 2 OF 2

D

D



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	DRAWN	KAMC	7/7/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
Schedule 40, 1 in. 6061 Aluminum Pipe	C	GE-22347	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 1 OF 1	

 **FIRST ROBOTICS COMPETITION**  SOLIDWORKS Modeling Solutions Partner

TITLE:
Fender Pipe

4

3

2

1

D

D

C

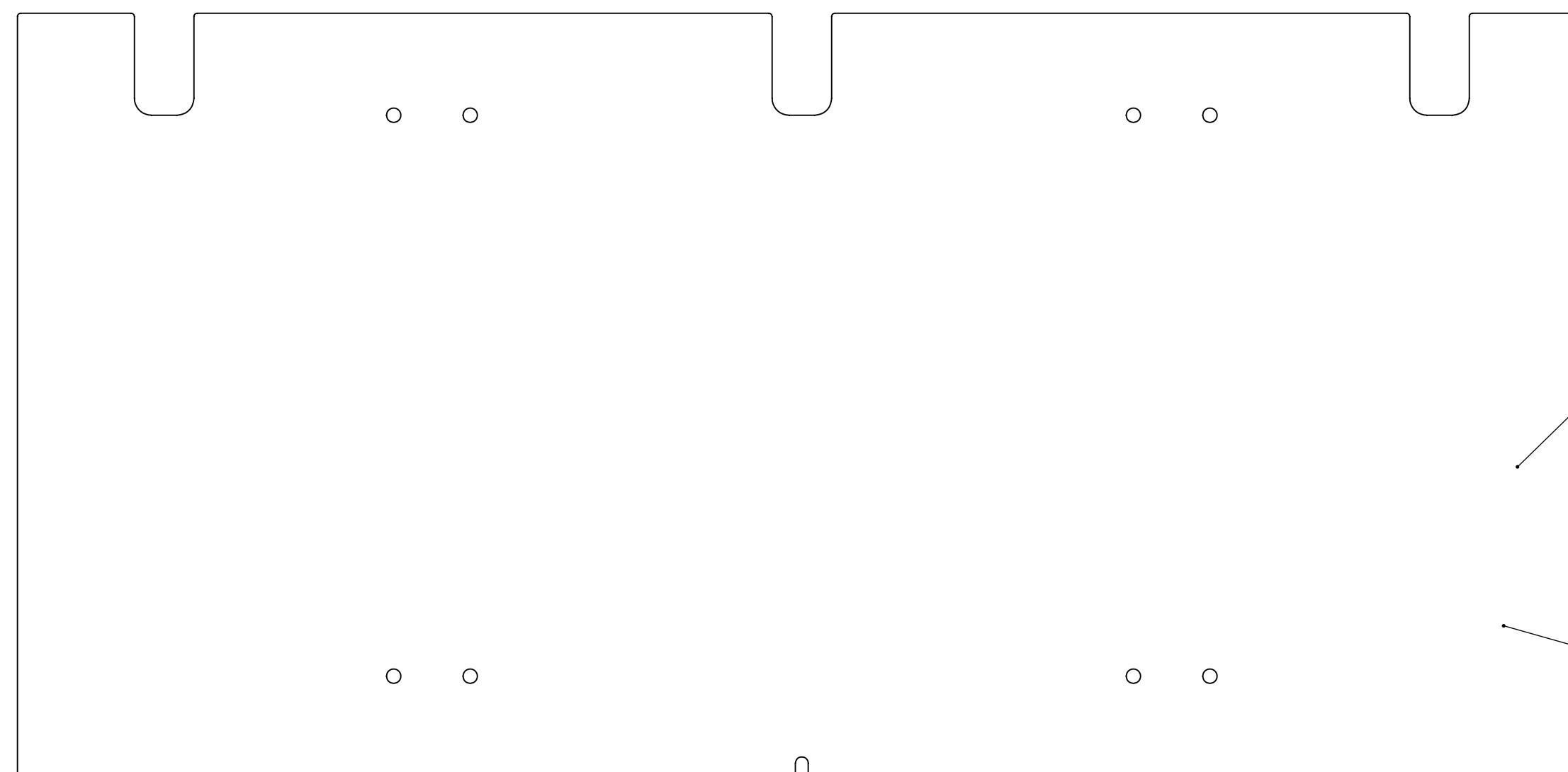
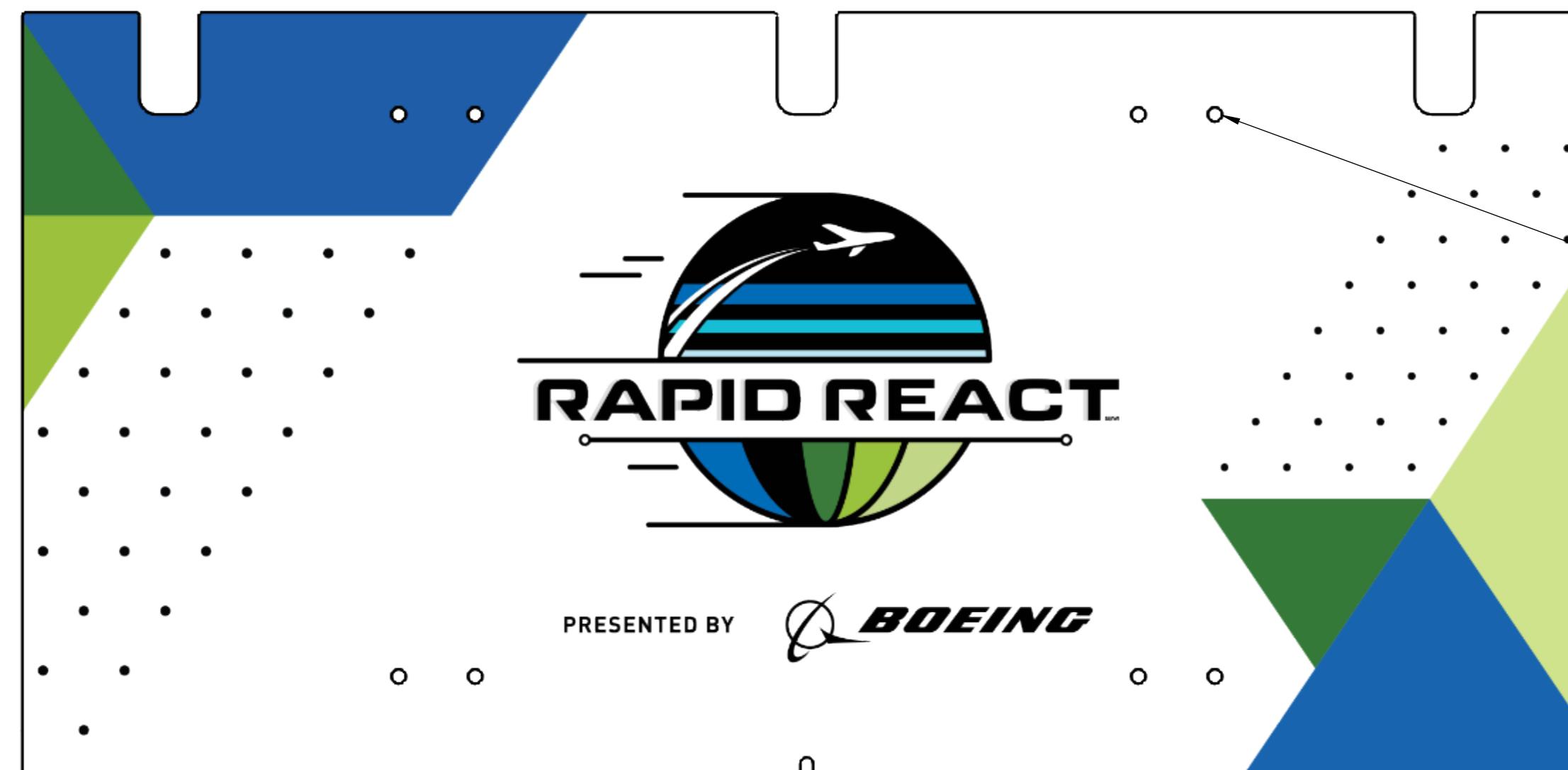
C

B

B

A

A



- Notes:
1. Tag or label with part number
 2. Standard vinyl (not mesh)

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	9/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
Polycarbonate/Vinyl			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

TITLE:
Fender Front
Polycarbonate with
Vinyl

SIZE DWG. NO. REV
C GE-22348

SCALE: 1:4 SHEET 1 OF 1

4

3

2

1

D

D

C

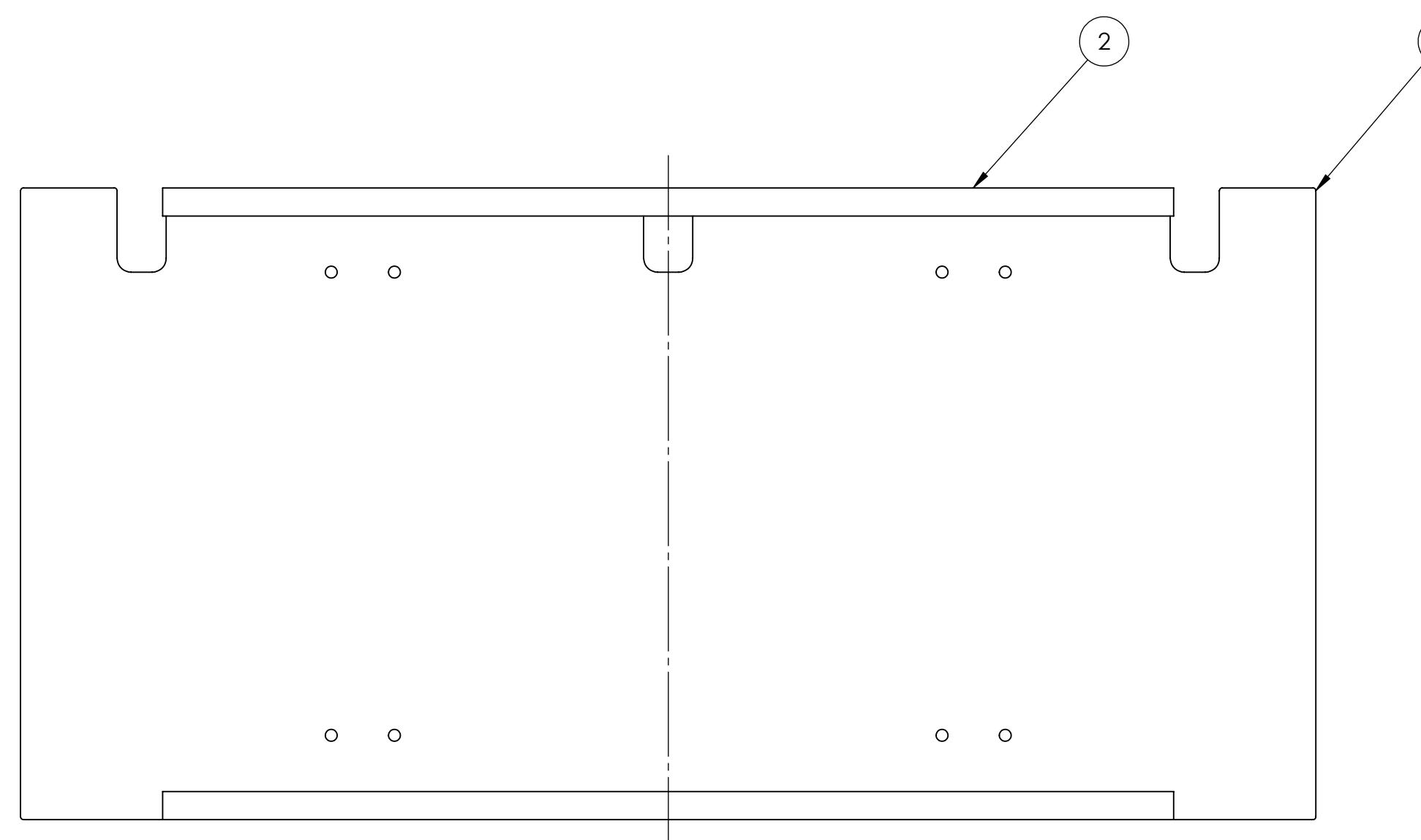
C

B

B

A

A



Notes:

1. Make sure surface of (1) is clean prior to loop application.
2. Attach (2) to (1) in locations shown. (2) should be attached on side of (1) without vinyl.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22348	Fender Front Polycarbonate with Vinyl	1
2	Loop_1_36	1" x 36" Loop, Adhesive Backed	2

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	11/3/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL		
MATERIAL/FINISH:	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

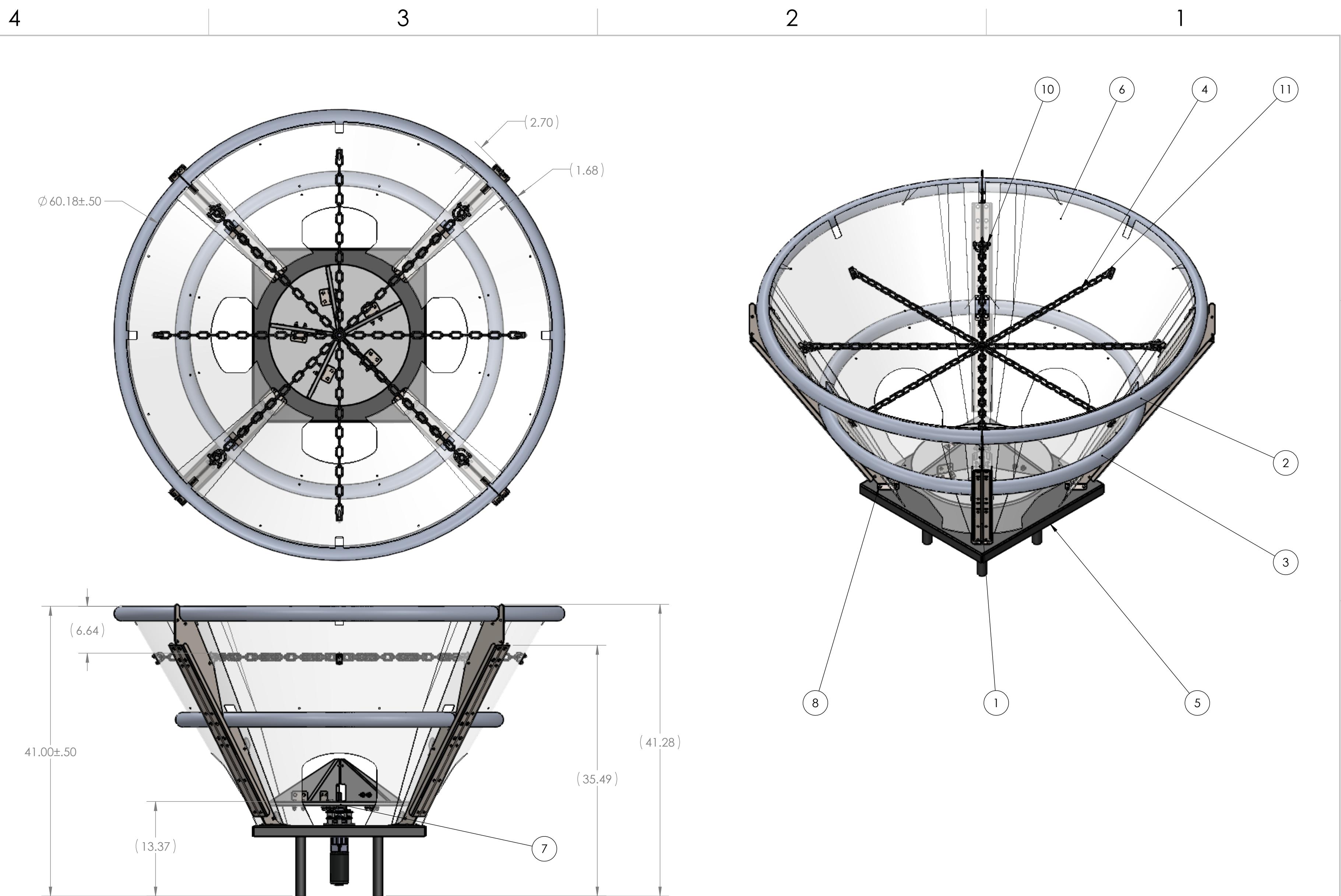
FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Fender Vinyl Polycarbonate with Loop

SIZE DWG. NO. REV

C GE-22349

SCALE: 1:5 SHEET 1 OF 1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22352	Lower Hub Ring Support Assembly	4
2	GE-22353	Lower Hub Top Ring	1
3	GE-22354	Lower Hub Bottom Ring	1
4	GE-22355	Lower Hub Chain	4
5	GE-22356	Lower Hub Base	1
6	GE-22357	Lower Hub Panel	4
7	GE-22431	Low Agitator Assembly	1
8	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	20
9	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	20
10	pin_.25_2.375_wirelockclevis	Wire-Lock Clevis Pin	4
11	Ubolt_.25_.75_1.25	U-Bolt 1/4-20 x 3/4 ID x 1-1/4 height	4

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/29/2021
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	FIRST ROBOTICS COMPETITION		
PROPRIETARY AND CONFIDENTIAL	SOLIDWORKS Modeling Solutions Partner		
MATERIAL/FINISH:	TITLE: Lower Hub		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	SIZE	DWG. NO.	REV
	C	GE-22351	
DO NOT SCALE DRAWING	SCALE: 1:10	SHEET 1 OF 4	

4

3

2

1

D

D

C

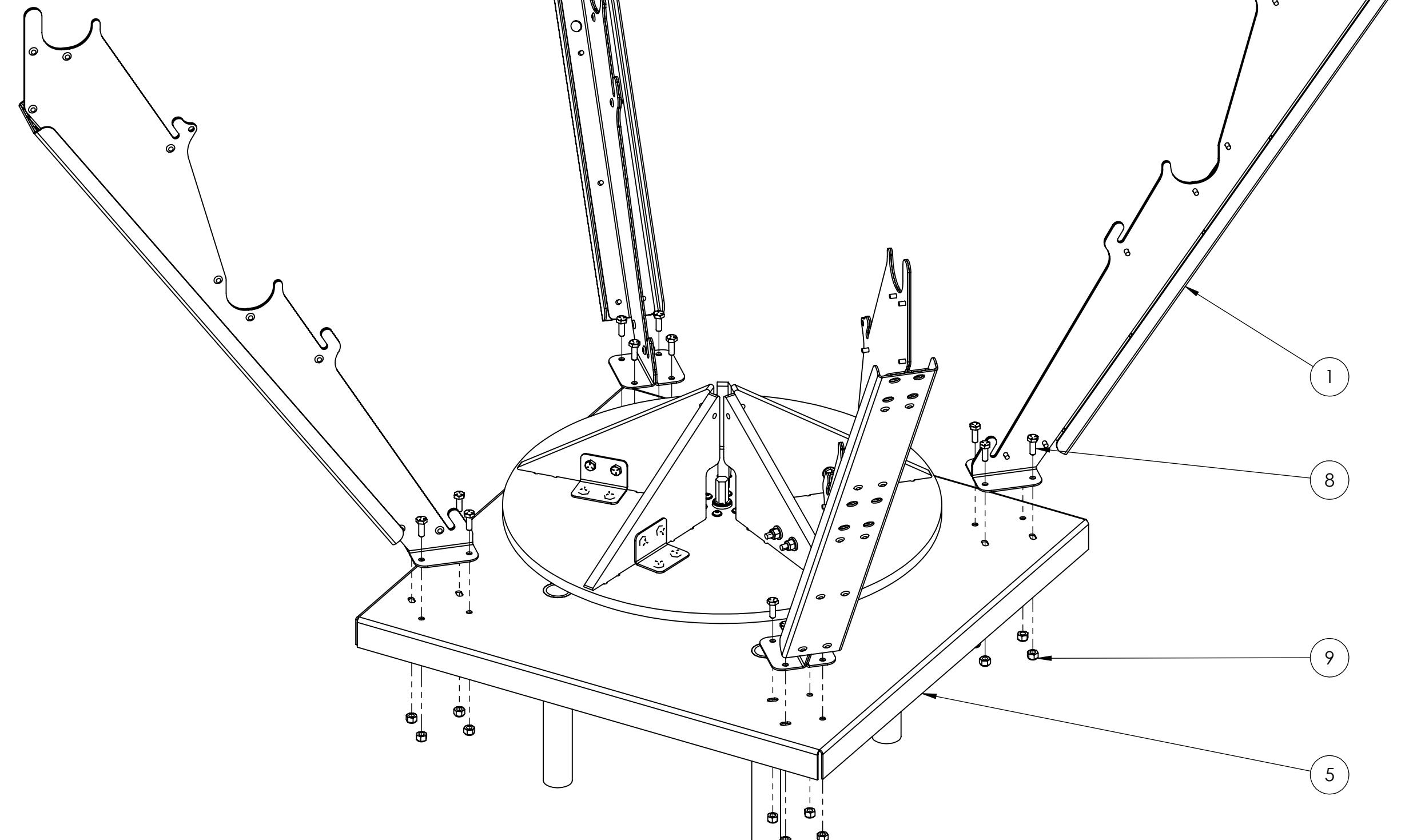
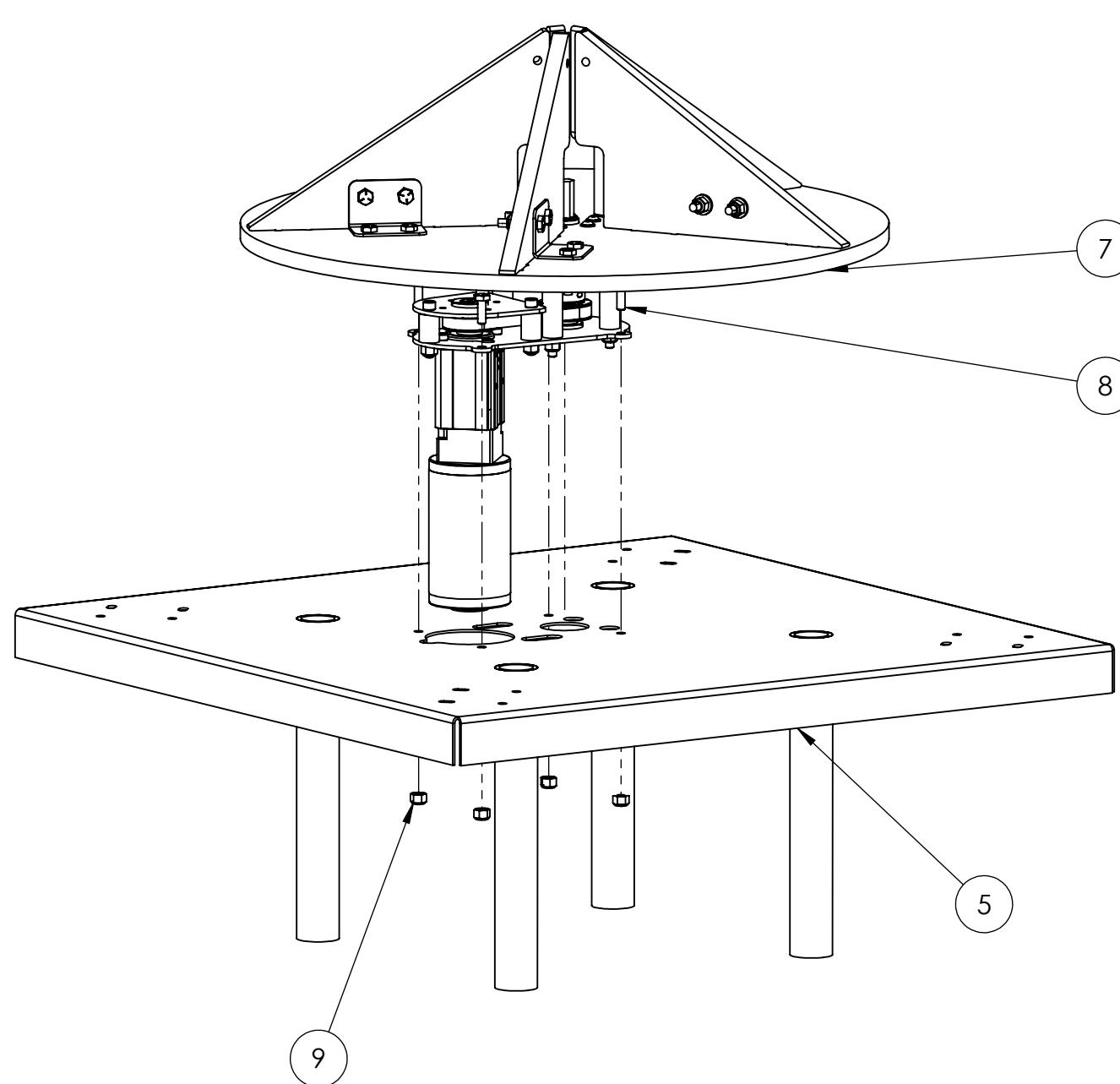
C

B

B

A

A



Notes:

1. Attach (1) to (5) using (8) and (9).

Notes:

1. Attach (7) to (5) as shown using (8) and (9).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/29/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Lower Hub

SIZE DWG. NO. REV

C GE-22351

SCALE: 1:5 SHEET 2 OF 4

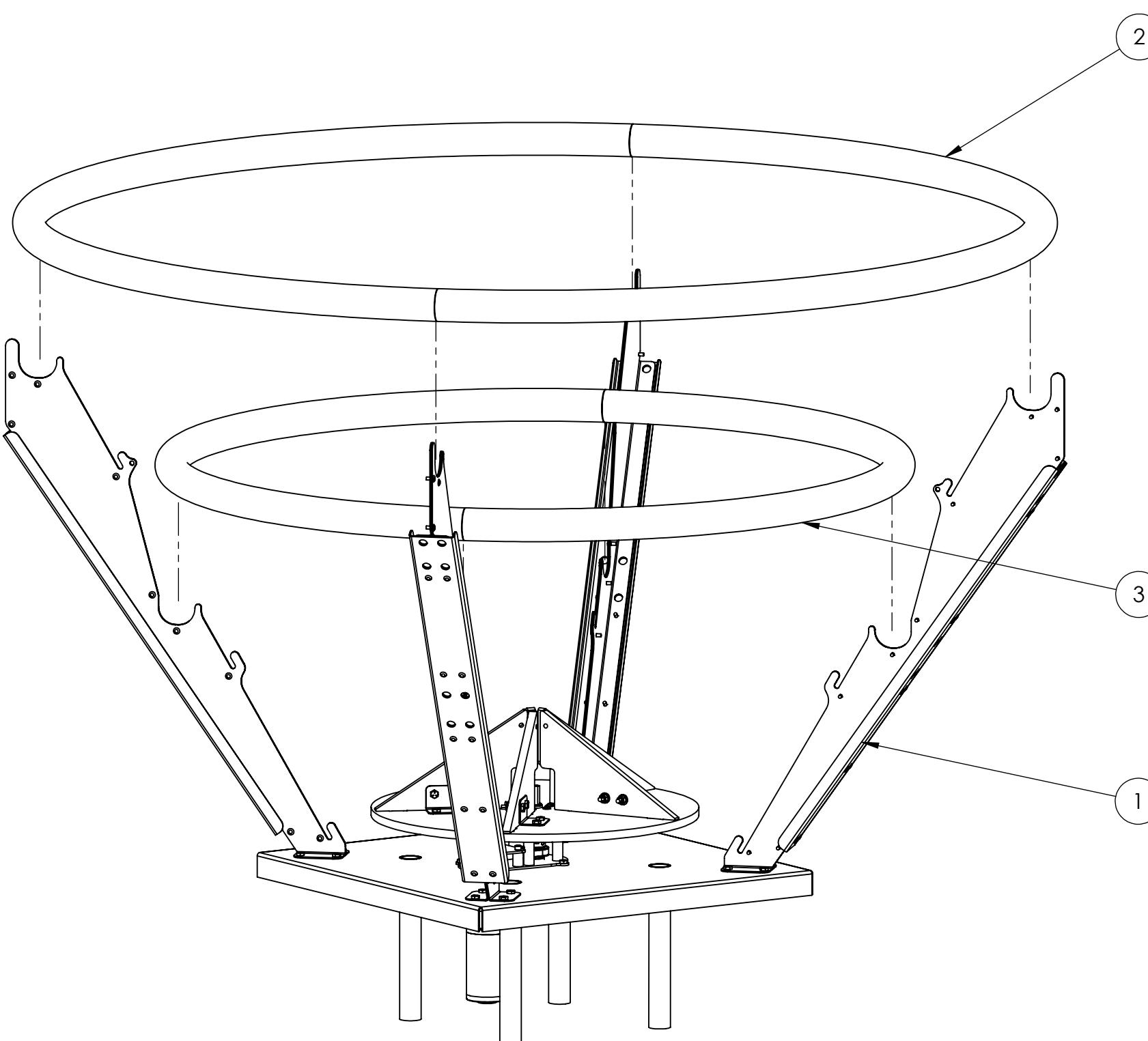
4

3

2

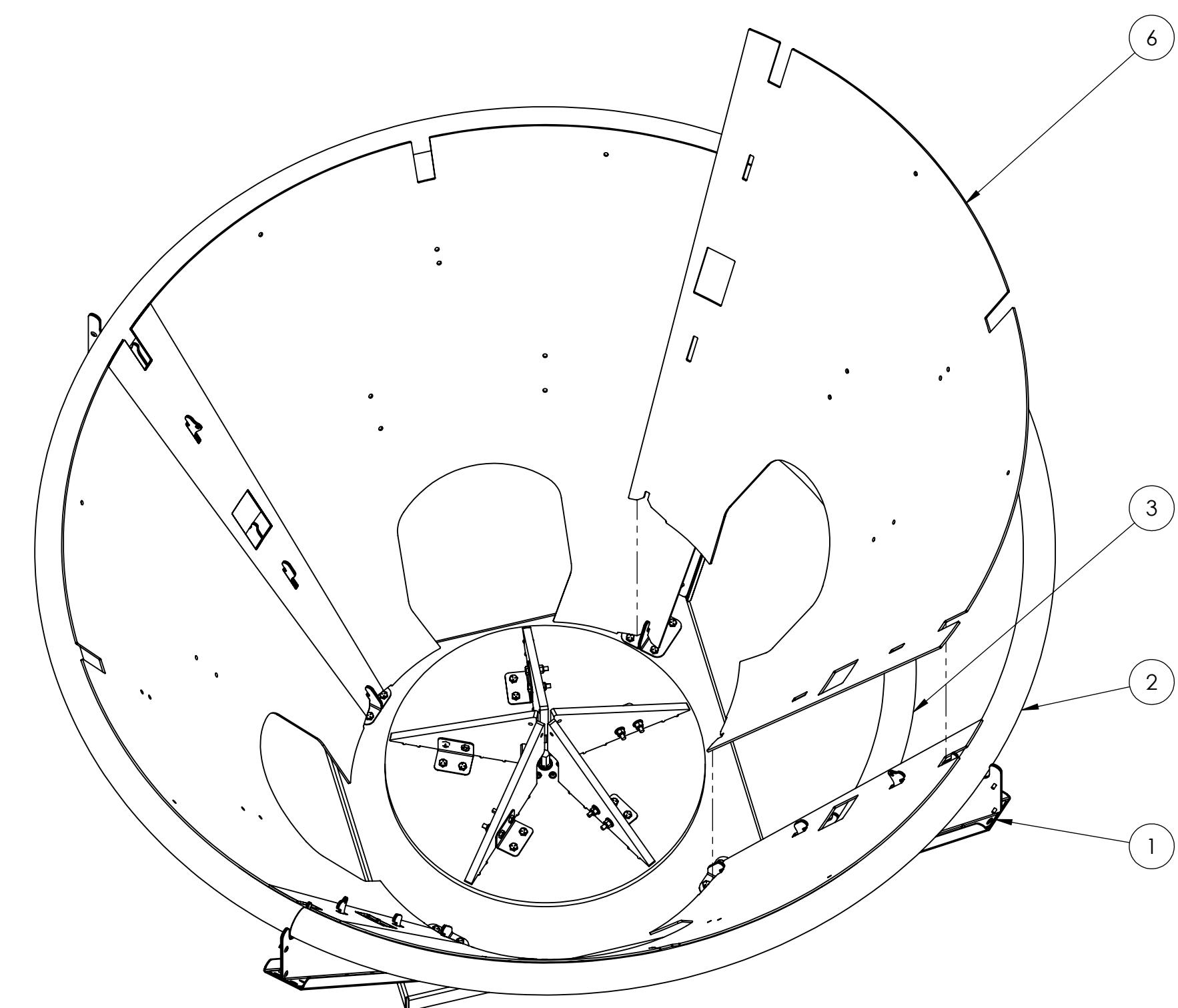
1

D



C

B



A

Notes:

1. Attach (3) and (2) to each (1) using 120 lb. cable ties.

Notes:

1. Insert all (6) into the assembly, bending into place and aligning with the hooks on (1).
2. Cable tie (6) to (2) and (3).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION			
TITLE: Lower Hub			
SIZE DWG. NO. REV			
C GE-22351			
SCALE: 1:8 SHEET 3 OF 4			

4

3

2

1

D

D

C

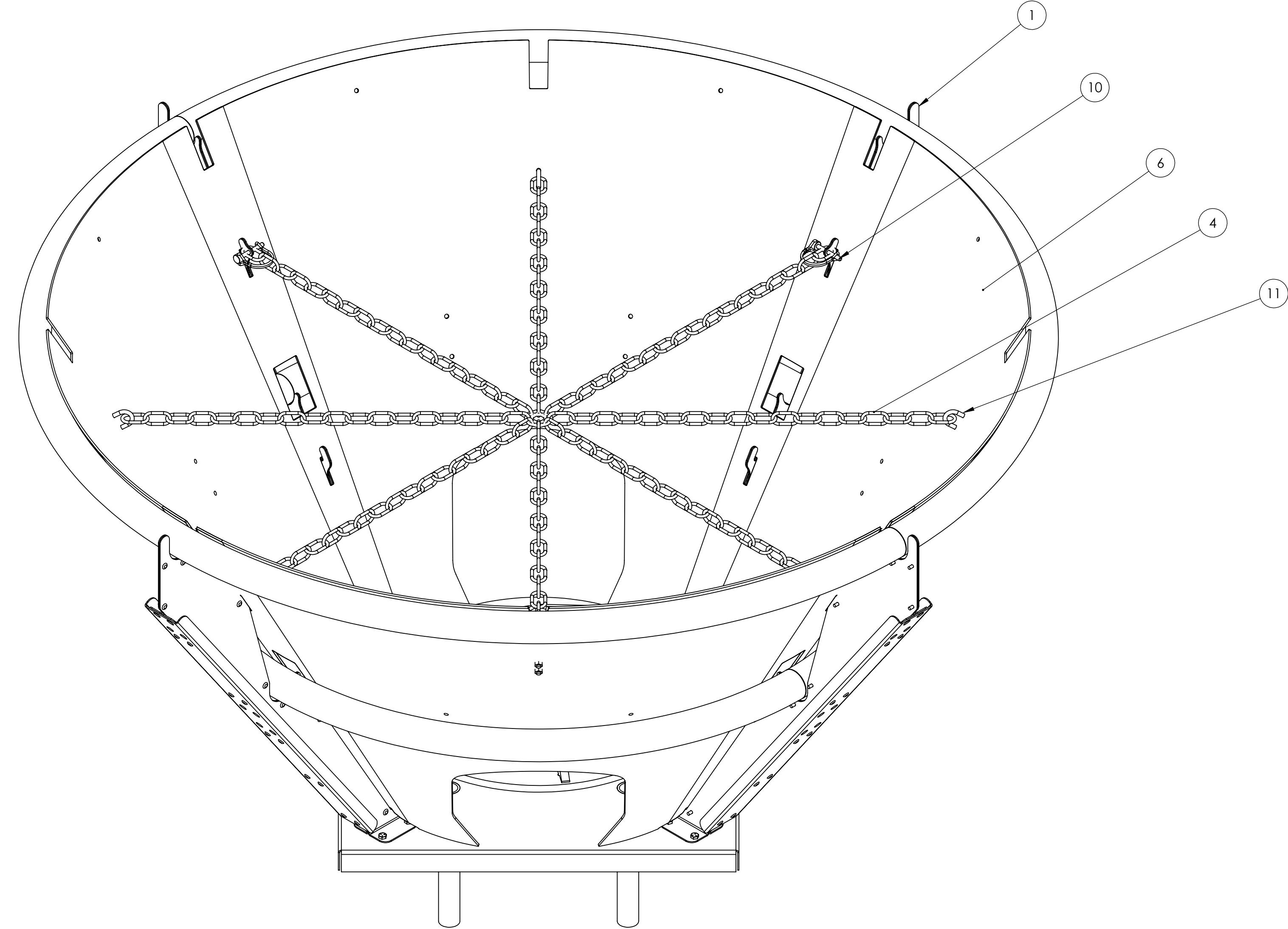
C

B

B

A

A



Notes:

1. Attach (4) to (1) using (10) as shown.
2. Attach (4) to (6) using (11) as shown.

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE:
Lower Hub

SIZE DWG. NO. REV
C GE-22351

SCALE: 1:5 SHEET 4 OF 4

4

3

2

1

4

3

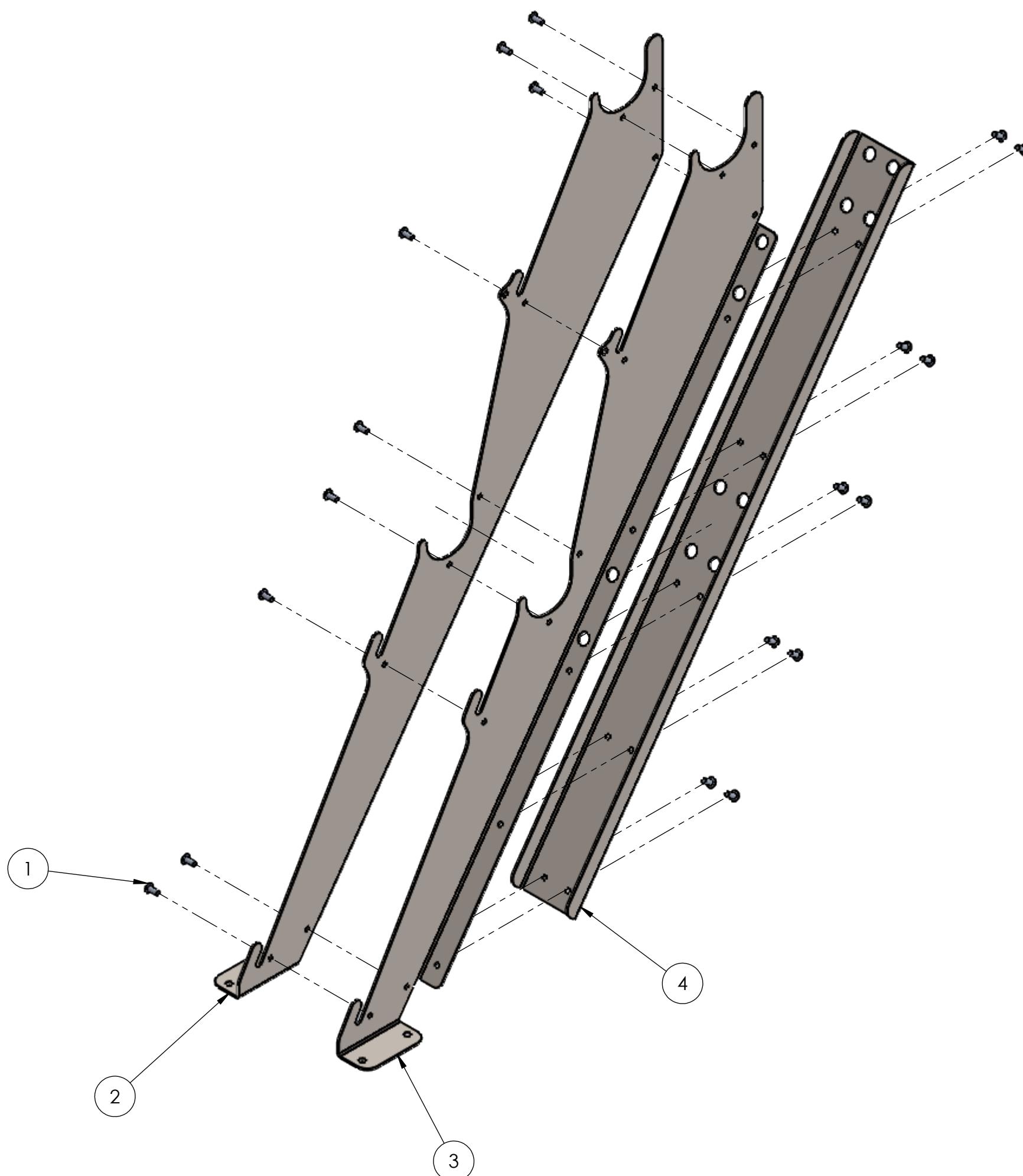
2

1

D

D

EXPLODED VIEW



A technical line drawing of a long, thin metal beam or plate, likely made of steel, oriented vertically. The beam has a slightly irregular profile with several small notches or cutouts along its length. It is secured at the bottom by a U-shaped base plate that is bolted to a larger, rectangular foundation plate. The entire assembly is shown against a plain white background.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	19
2	GE-22352-01	Ring Support Left Side	1
3	GE-22352-02	Ring Support Right Side	1
4	GE-22352-03	Ring Support Back	1

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .001$

MATERIAL/FINISH:

DO NOT SCALE DRAWING

The image contains two logos. On the left is the official logo for the FIRST Robotics Competition, which features a red triangle and a blue square forming a stylized 'F' shape. To its right is the SolidWorks logo, consisting of a red 'DS' monogram followed by the word 'SOLIDWORKS' in a bold, black, sans-serif font, with the tagline 'Modeling Solutions Partner' in a smaller, gray font below it.

SIZE	DWG. NO.	REV
C	GE-22352	
SCALE: 1:4	SHEET 1 OF 2	

D

D

C

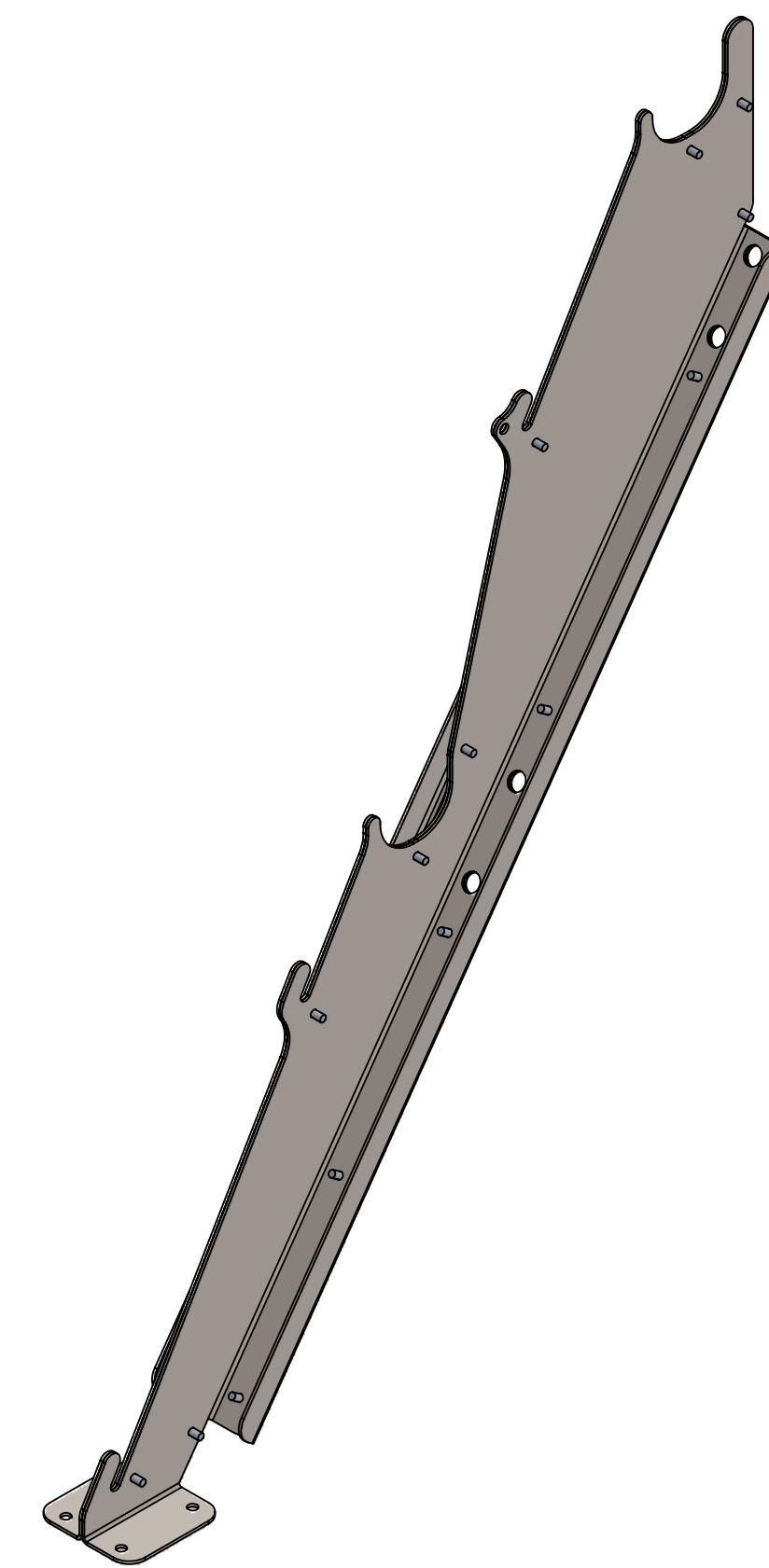
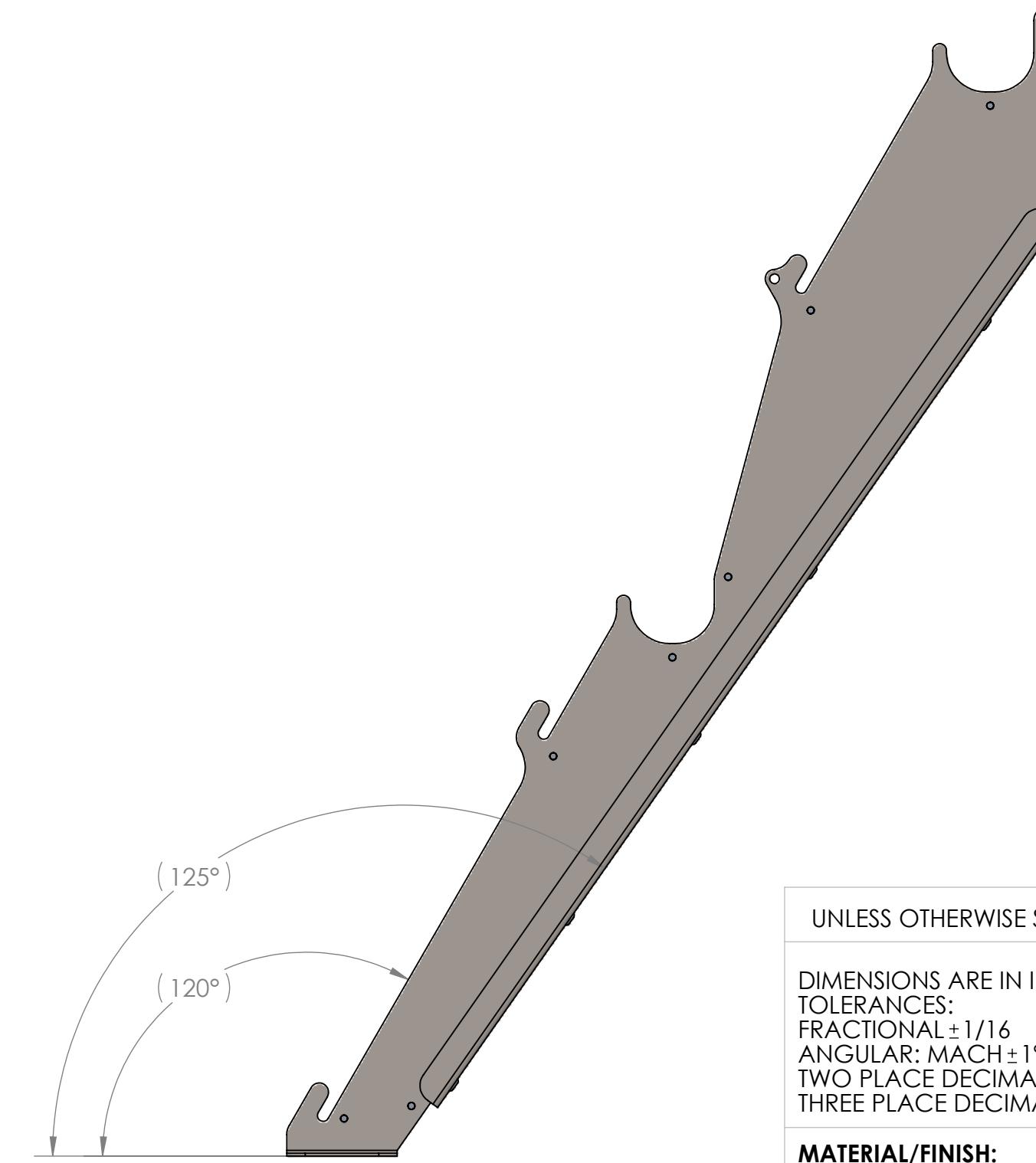
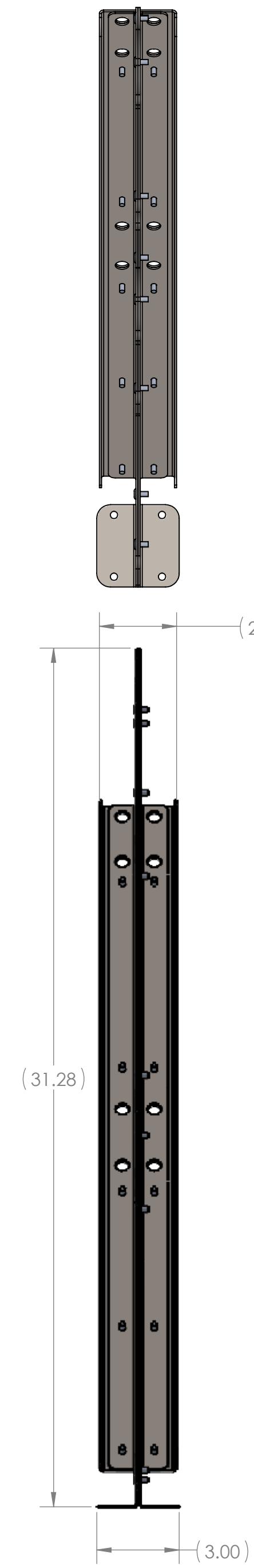
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$ **MATERIAL/FINISH:**

Rivets should be plated or
stainless steel. Tag or label
with part number.

DO NOT SCALE DRAWING

VEND

NAME

DATE

DRAWN

KAMC

6/16/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST®. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST® IS
PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP
EDGES.

TITLE:

Lower Hub Ring
Support Assembly

SIZE

DWG. NO.

REV

C GE-22352

SCALE: 1:4

SHEET 2 OF 2

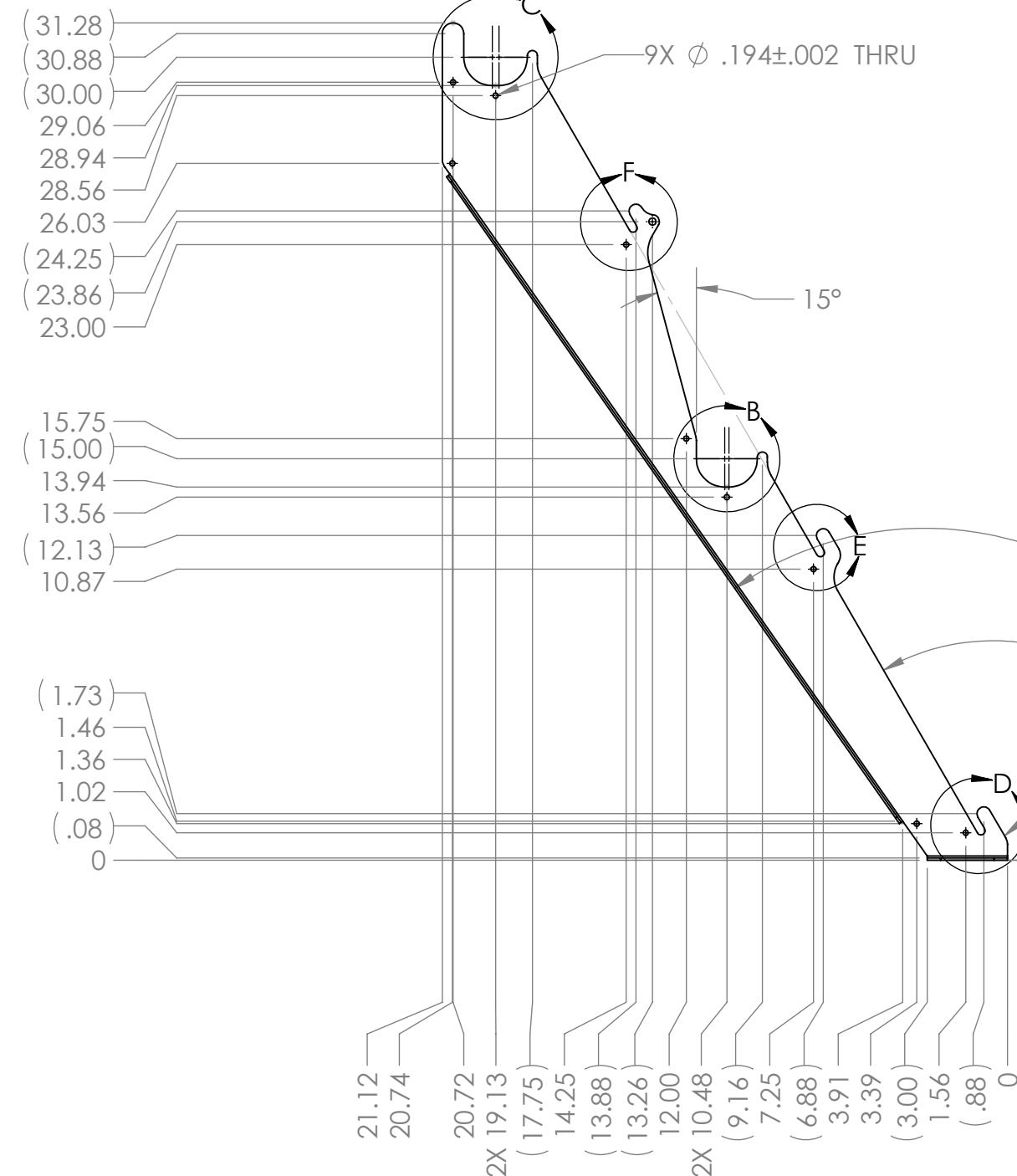
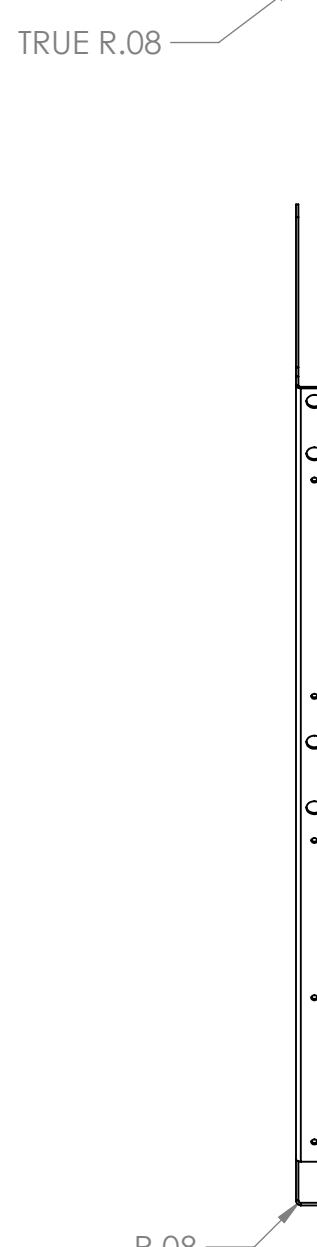
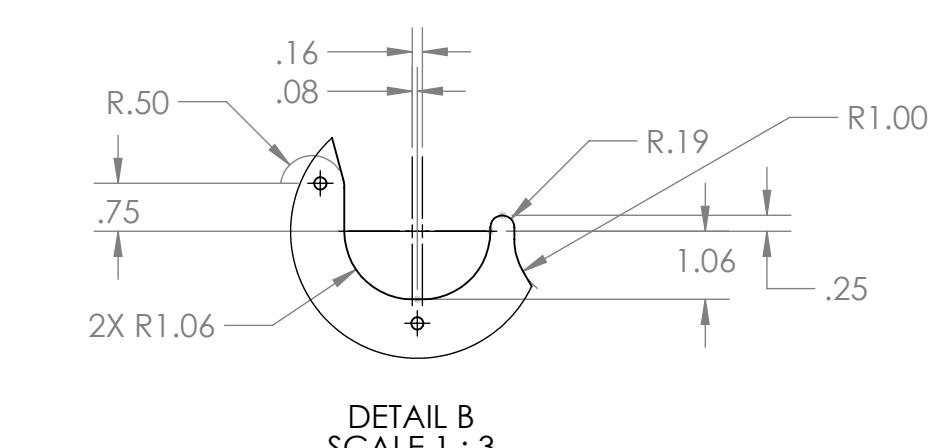
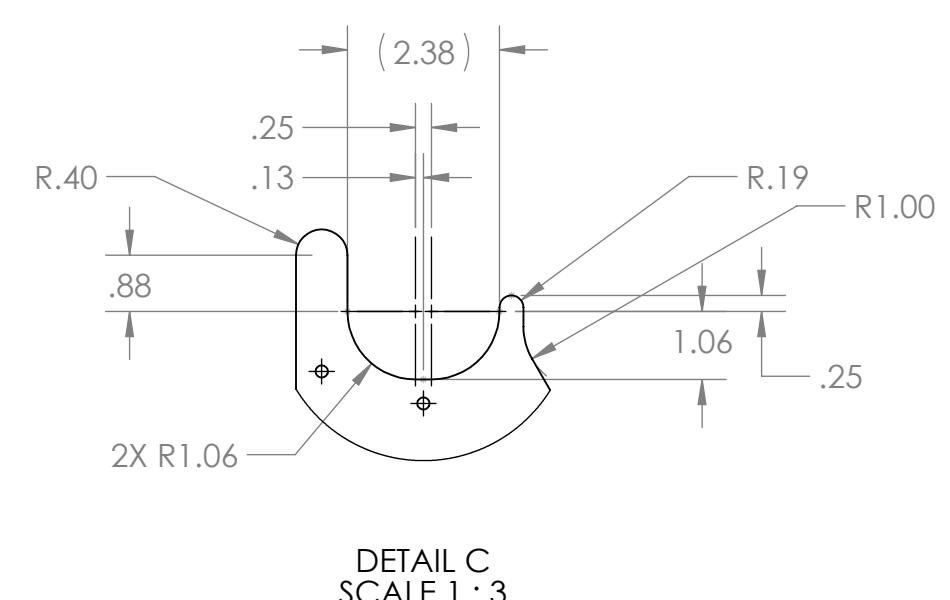
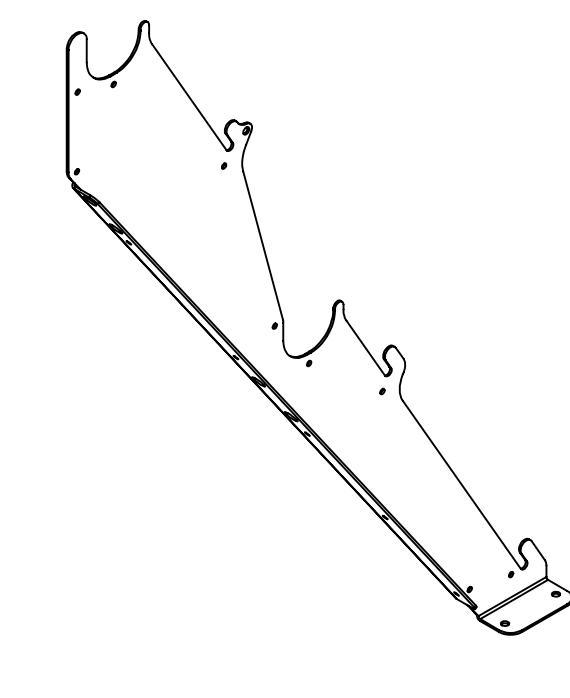
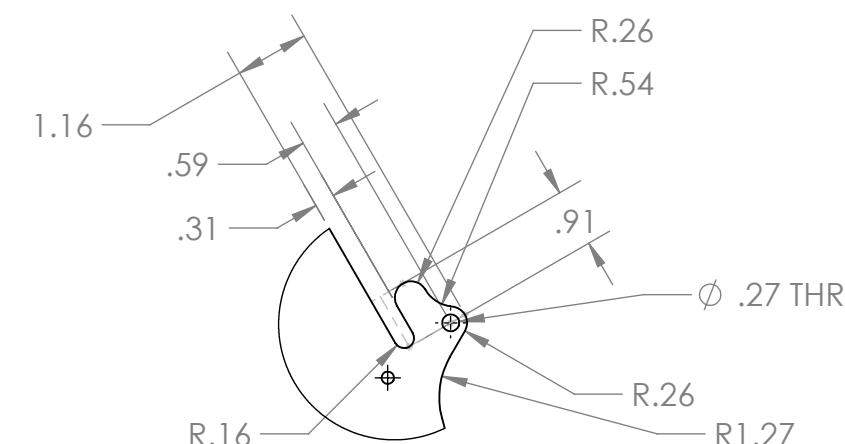
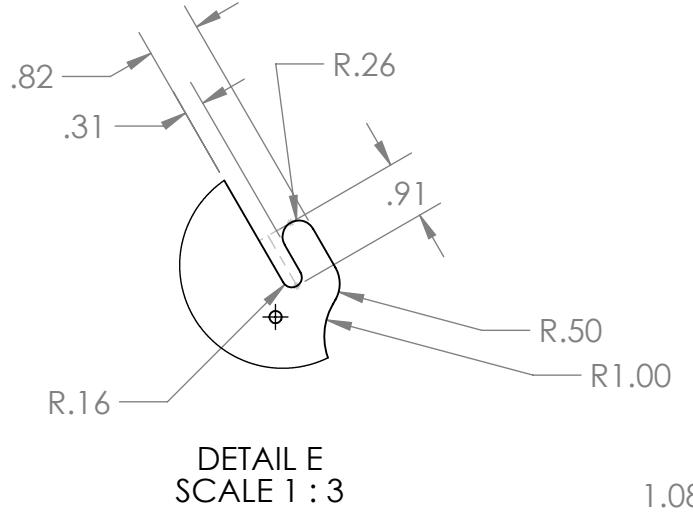
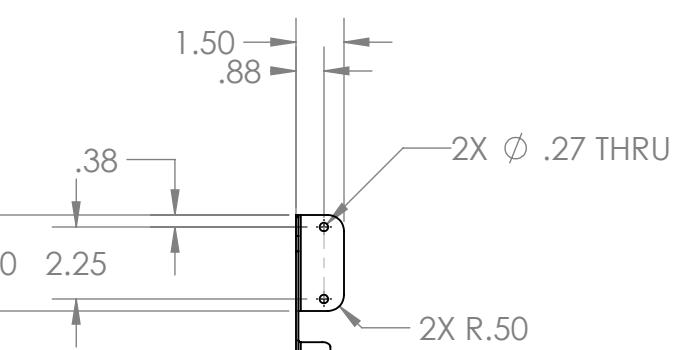
4

3

2

1

D



3

2

4

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	6/16/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	14 Gauge Pre-Plated Steel		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

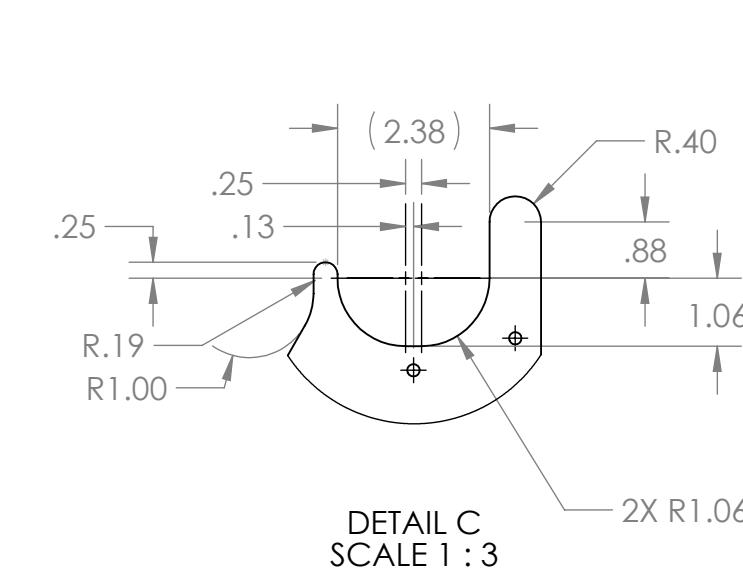
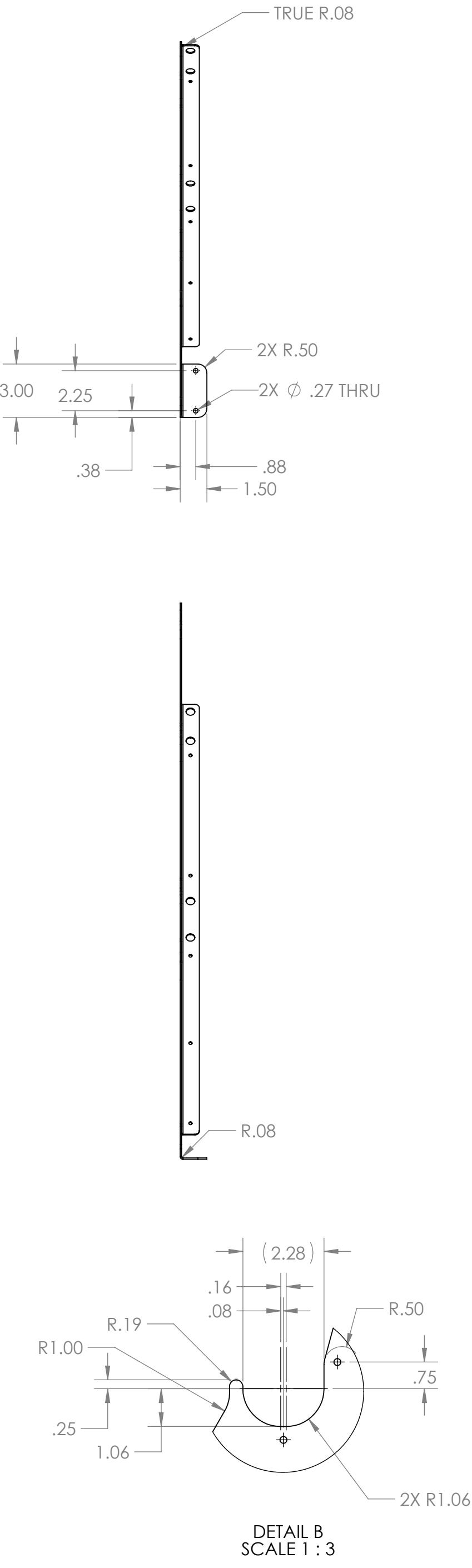
Note: This part is a mirror of GE-22352-02



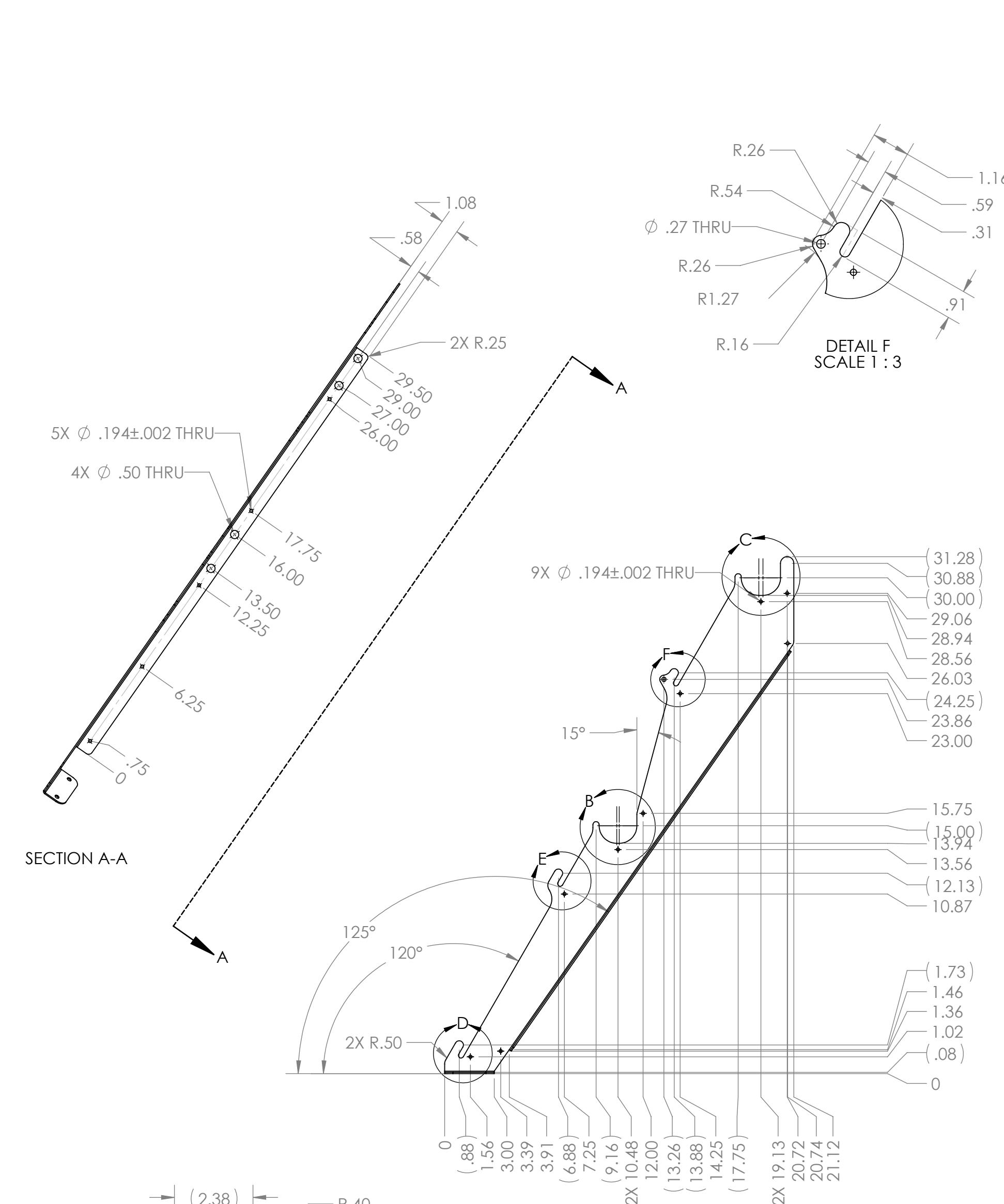
TITLE: Ring Support Left Side

SIZE DWG. NO. REV
C GE-22352-01

SCALE: 1:6 SHEET 1 OF 1



DETAIL C
SCALE 1:3



Note: This part is a mirror of GE-22352-01



TITLE:

Ring Support Right Side

UNLESS OTHERWISE SPECIFIED:		BEND	NAME	DATE			
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$		DRAWN	KAMC	7/7/2021			
MATERIAL/FINISH: 14 Gauge Pre-Plated Steel		PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST® . ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
DO NOT SCALE DRAWING		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
					SIZE	DWG. NO.	REV
					C	GE-22352-02	
					SCALE: 1:6	SHEET 1 OF 1	

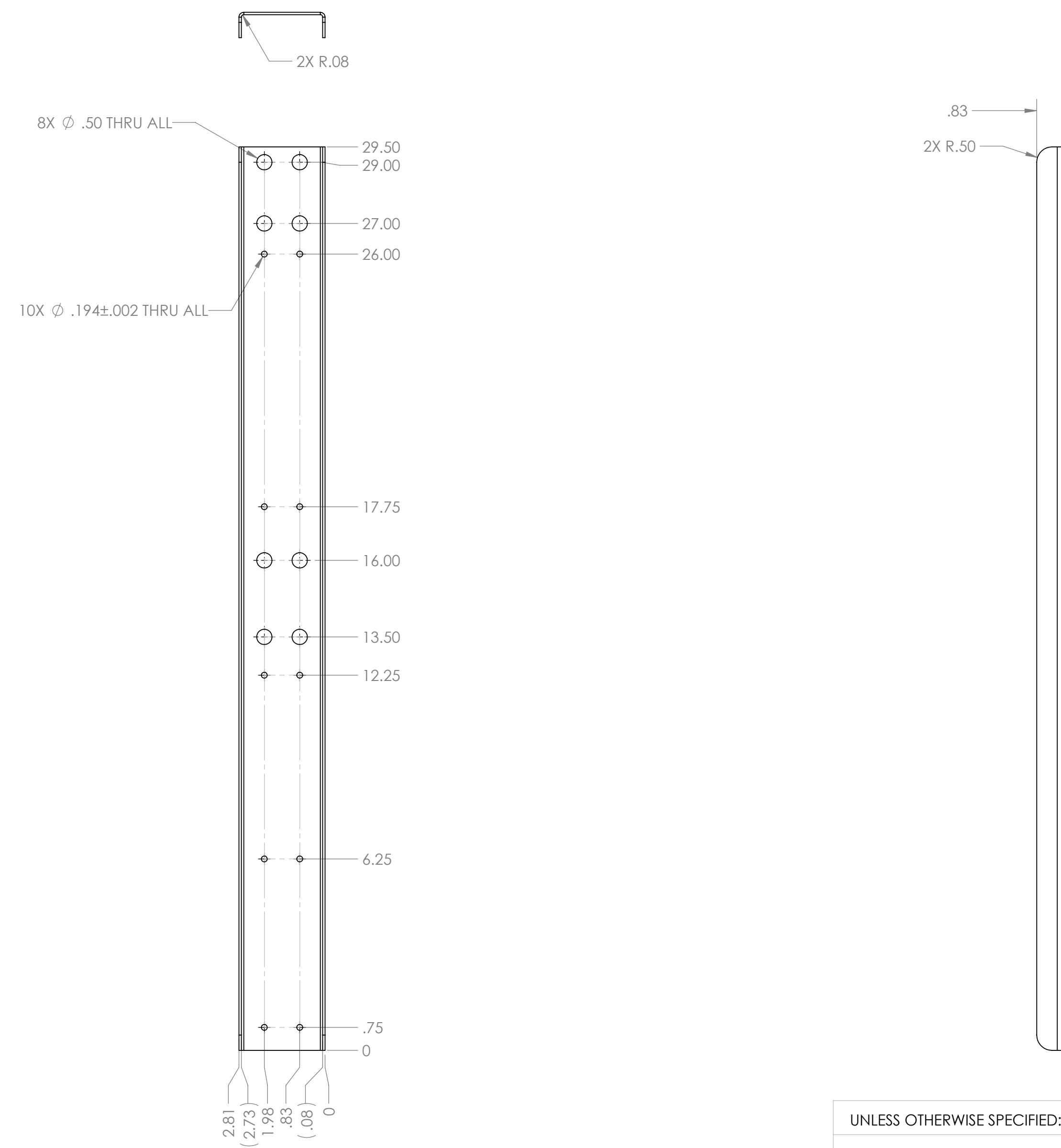
4

3

2

1

D



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	6/16/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 Gauge Pre-Plated Steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



TITLE:
Ring Support Back

SIZE DWG. NO. REV
C GE-22352-03

SCALE: 1:3 SHEET 1 OF 1

4

3

2

1

D

C

B

A

4

3

2

1

D

D

C

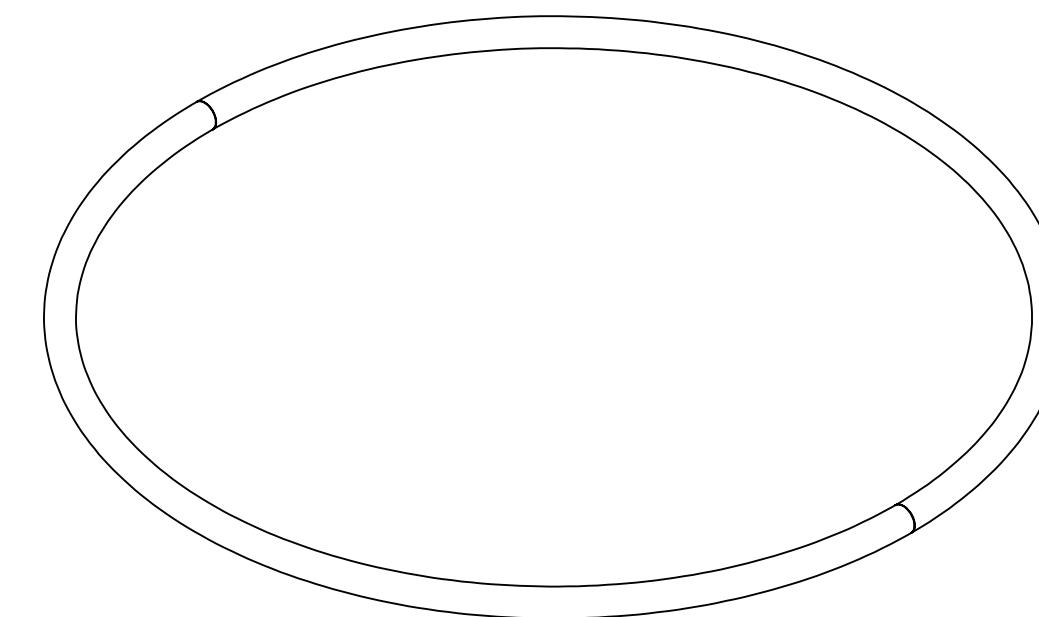
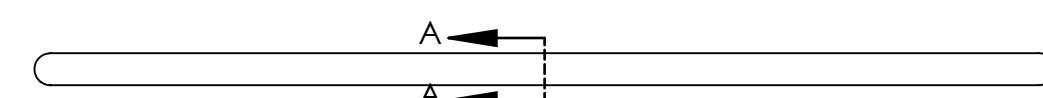
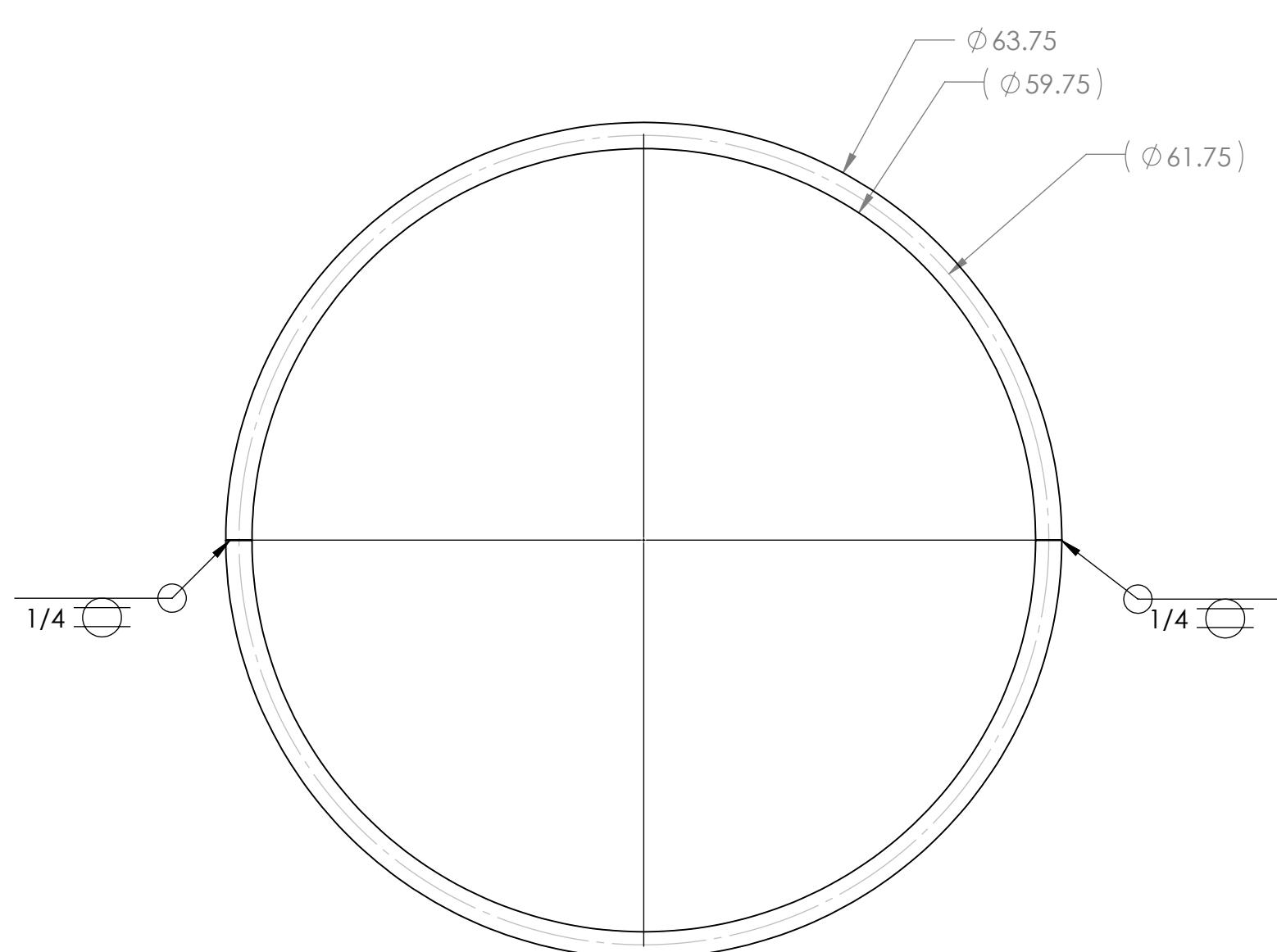
C

B

B

A

A



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	KAMC	12/11/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 2" diameter x .125" wall, 6061 Aluminum, Round Tube			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Lower Hub Top
Ring**

SIZE DWG. NO. REV
C GE-22353

SCALE: 1:12 SHEET 1 OF 1

4

3

2

1

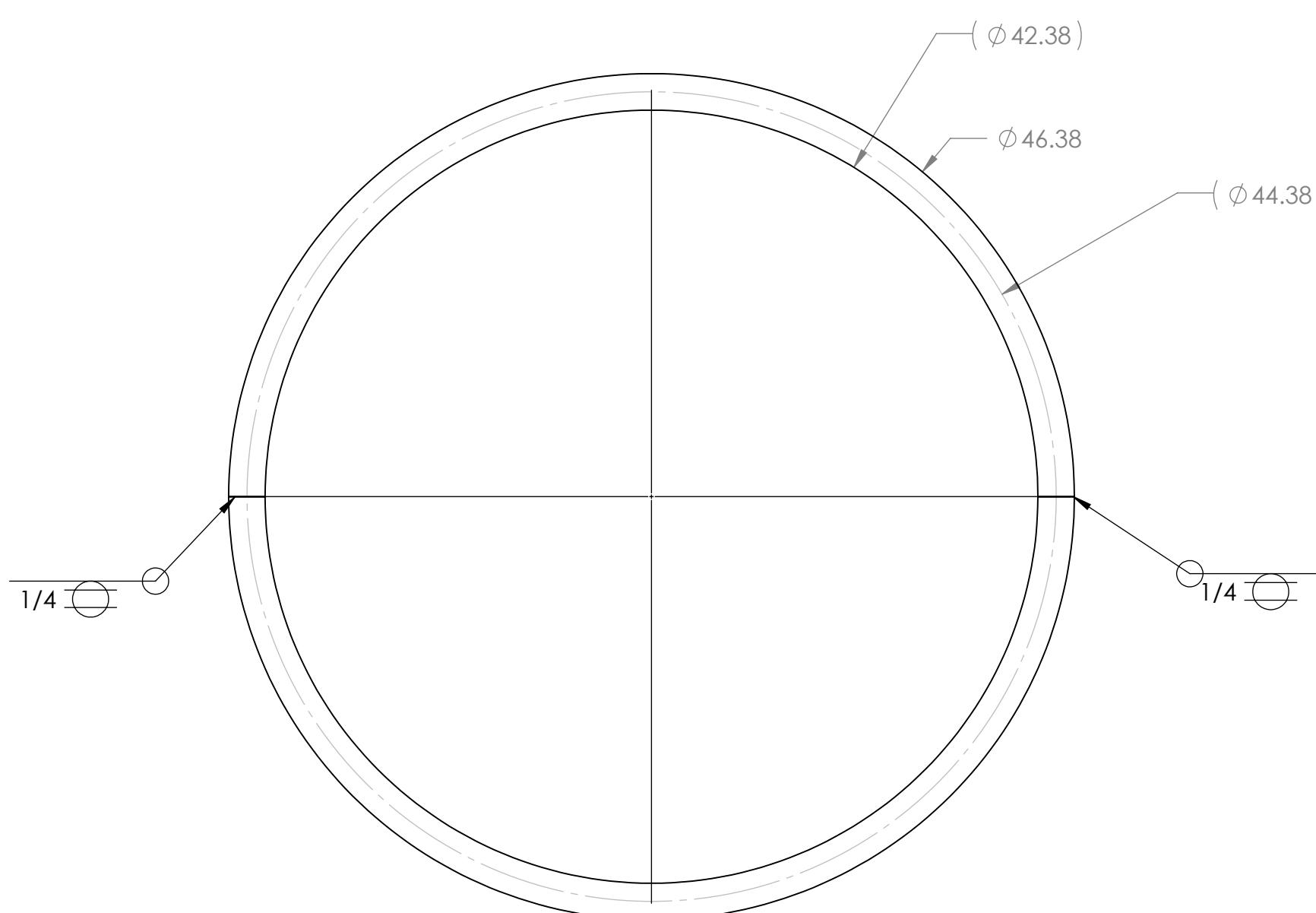
4

3

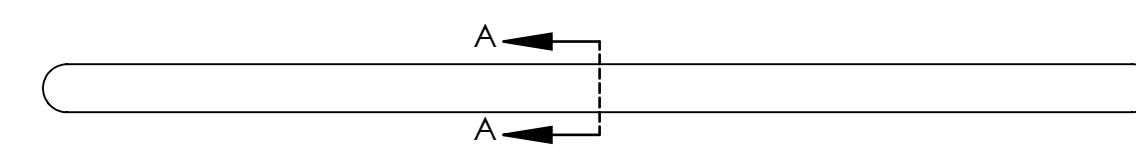
2

1

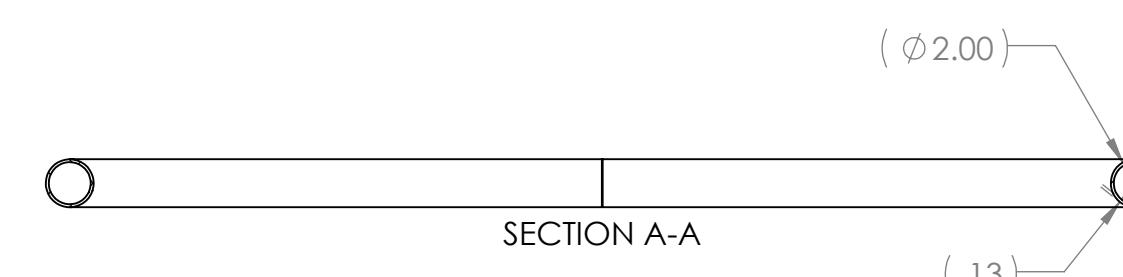
D



C



B



SECTION A-A

- Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	KAMC	12/11/2020	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
2" diameter x .125" wall, 6061 Aluminum, Round Tube			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Lower Hub
Bottom Ring**

SIZE DWG. NO. REV
C GE-22354

SCALE: 1:8 SHEET 1 OF 1

4

3

2

1

D

C

B

A

D

D

C

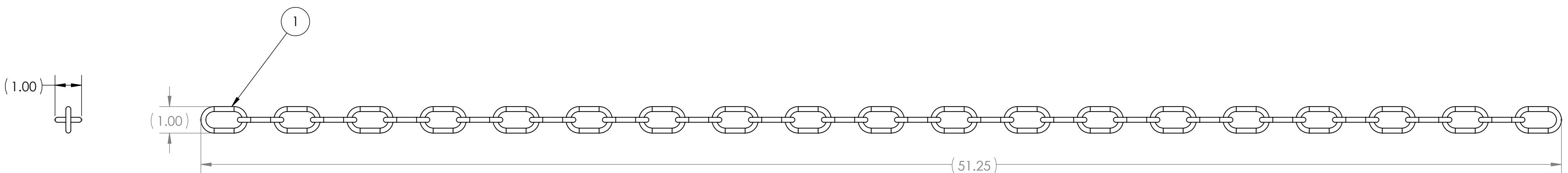
C

B

B

A

A



Description: CHAINBOSS Plastic Chain: US Weight 2 in., Black

Vendor: The Home Depot

Part Number: [internet] 315968945

Substitutions allowed with permission from FIRST HQ.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22355-01	Individual Chain	37

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
	DRAWN	KAMC	6/21/2021

DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH: Black	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING	TITLE: Lower Hub Chain		



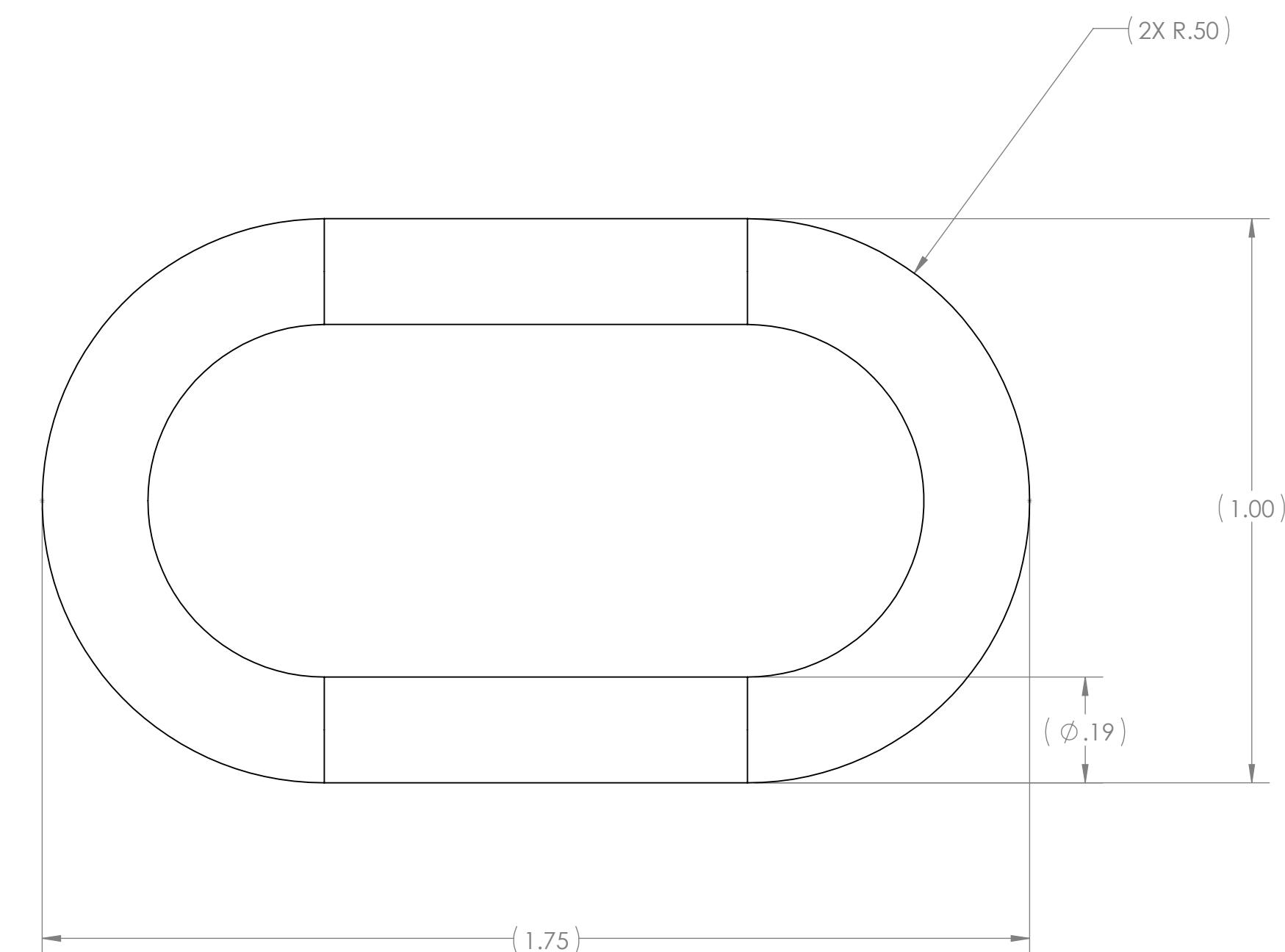
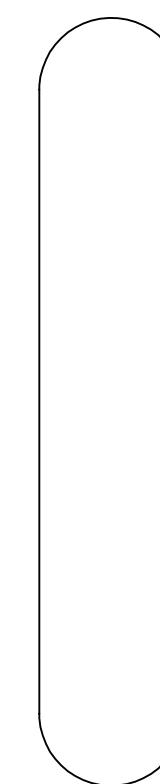
TITLE: Lower Hub Chain

SIZE DWG. NO. REV
C GE-22355

SCALE: 1:3 SHEET 1 OF 2

D

GE-22355-01



C

B

A

D

C

B

A

Note: Description, Vendor, and Part Number from GE-22355 applicable to GE-22355-01

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE	
DRAWN	KAMC	6/21/2021		
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:	SIZE	DWG. NO.	REV	
Black	C	GE-22355		
DO NOT SCALE DRAWING	SCALE: 4:1	SHEET 2 OF 2		

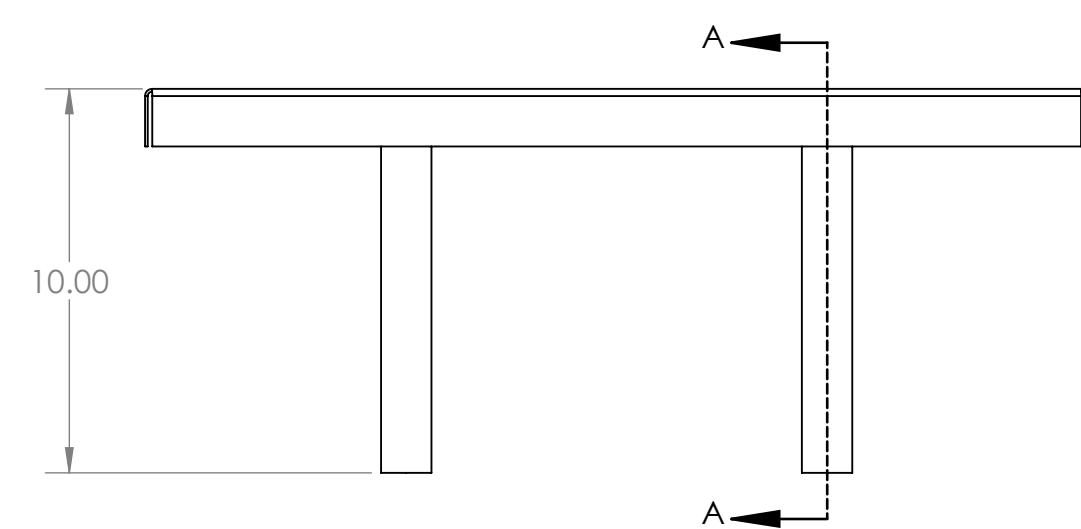
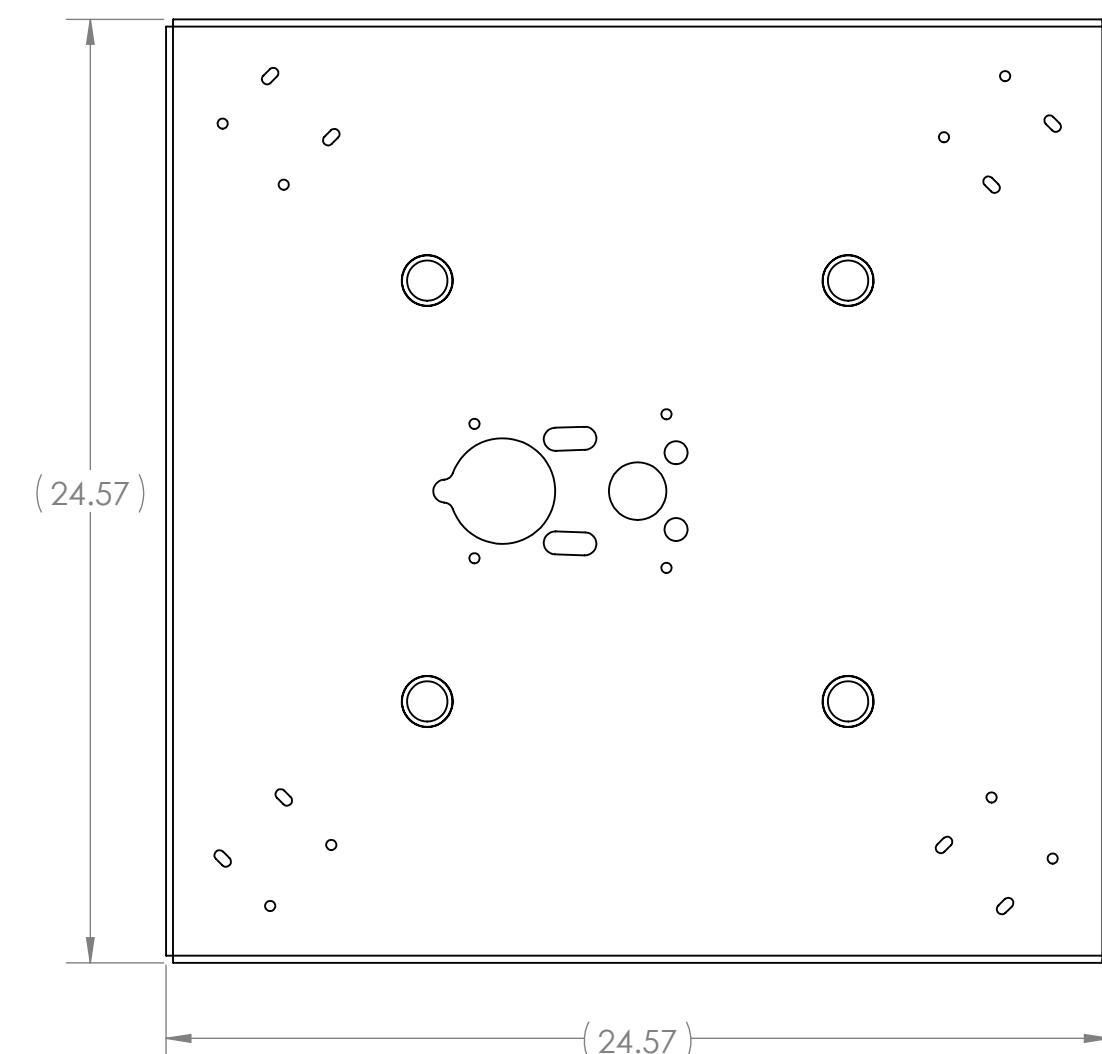
4

3

2

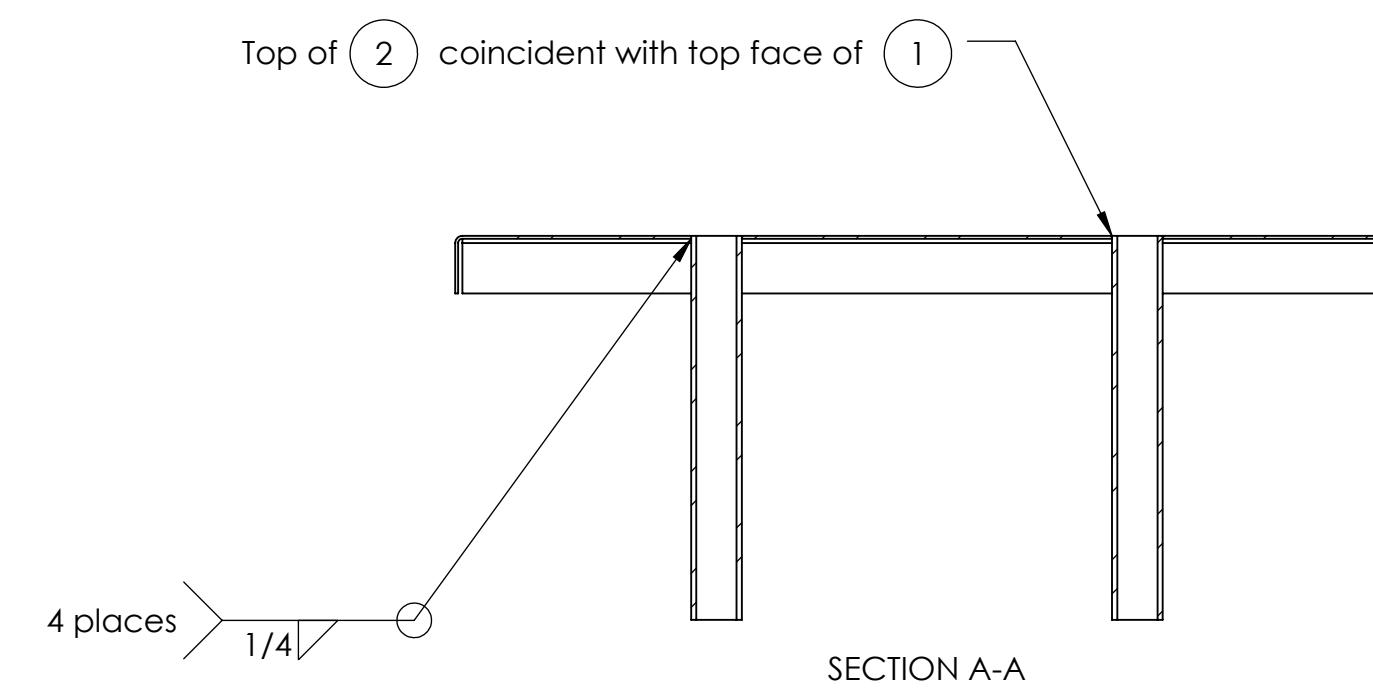
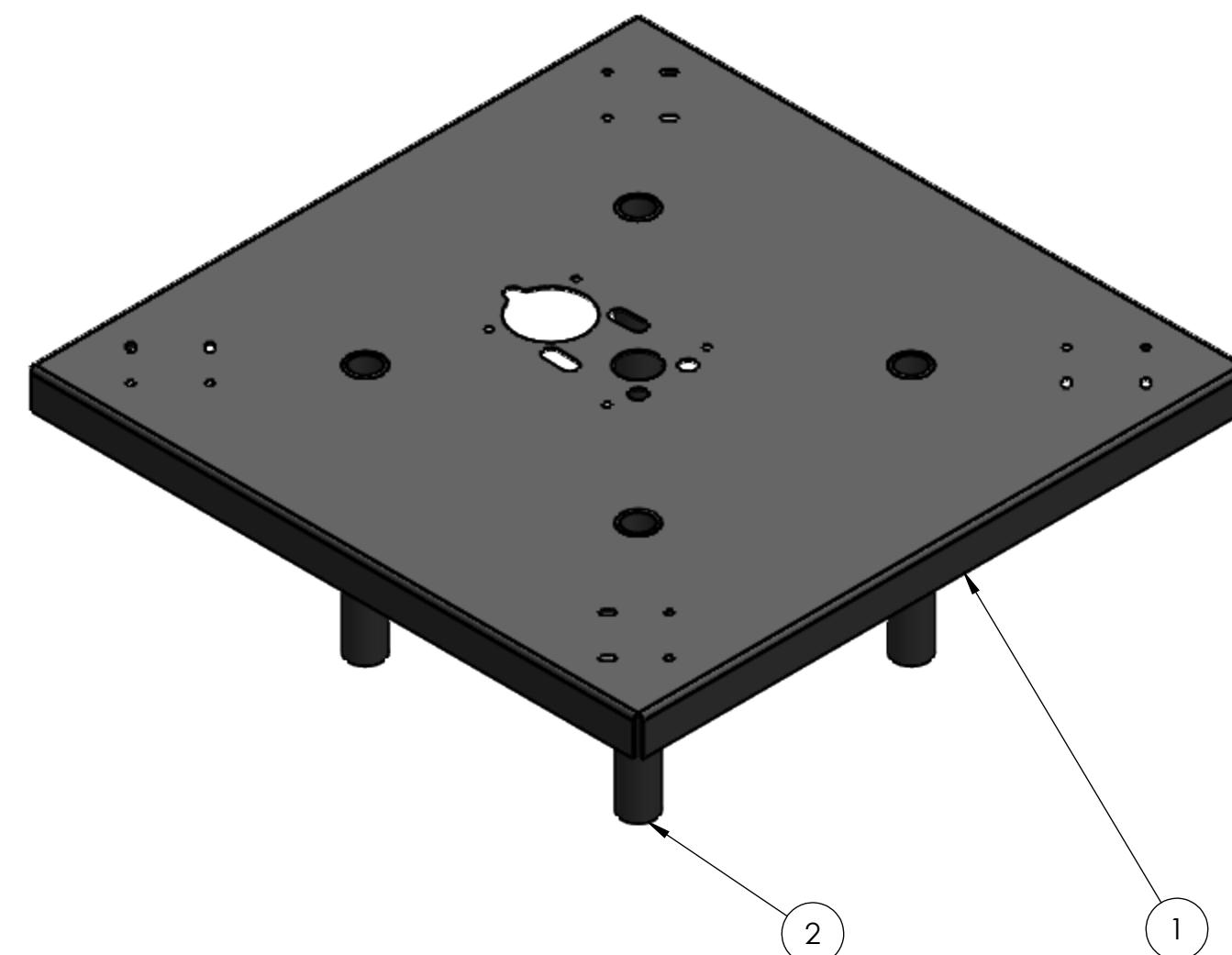
1

D



Notes:
1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22356-01	14 Gauge A-366/1008 Cold Roll Steel	1
2	GE-22356-02	1" Schedule 40 A500 Steel	4



UNLESS OTHERWISE SPECIFIED:			WELD	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	7/22/2021
TOLERANCES: FRACTIONAL $\pm\frac{1}{16}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$					
TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .015$					
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:			COMMENTS:		
Powder Coat Black			REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING					

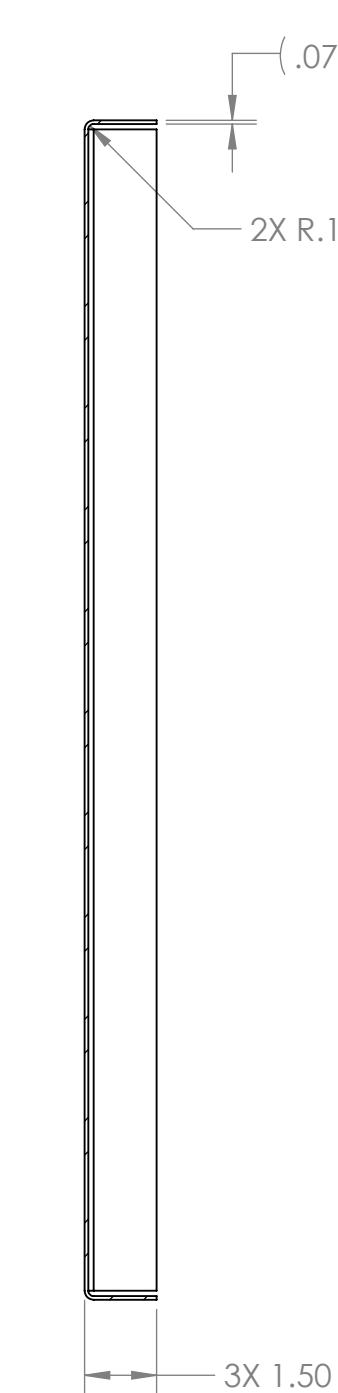
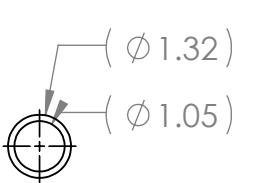
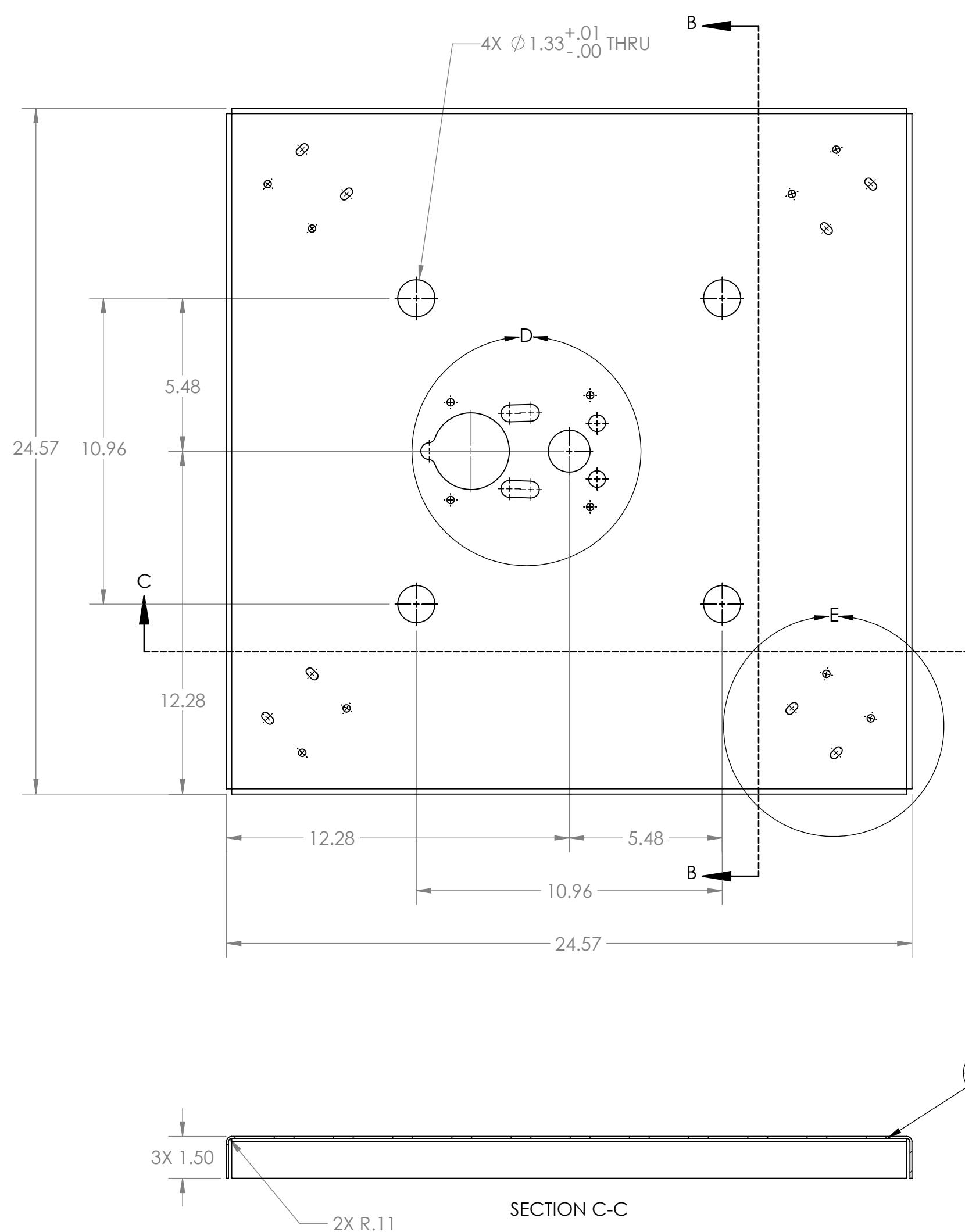
FIRST
ROBOTICS
COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE: Lower Hub Base

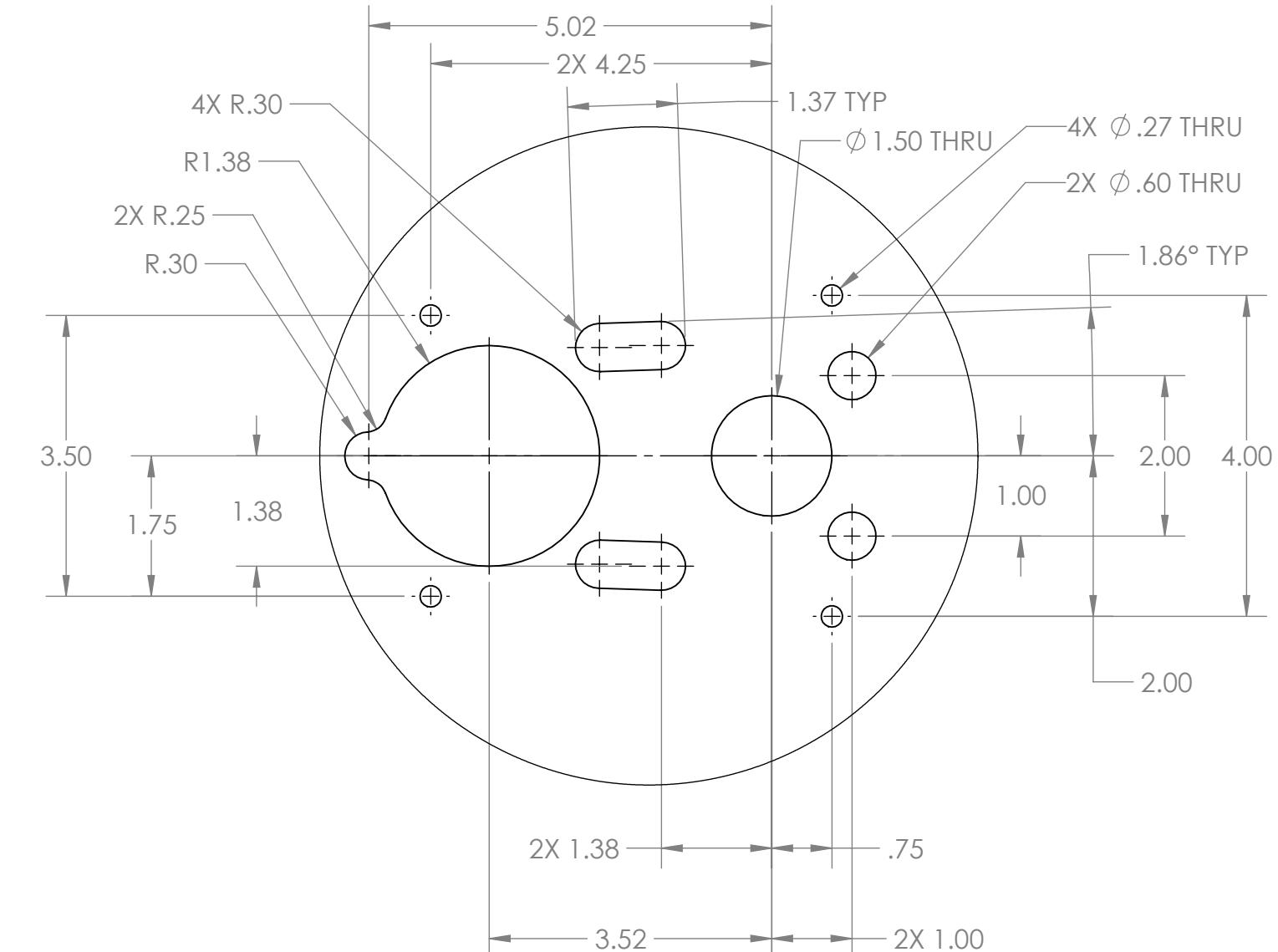
SIZE DWG. NO. REV

C GE-22356

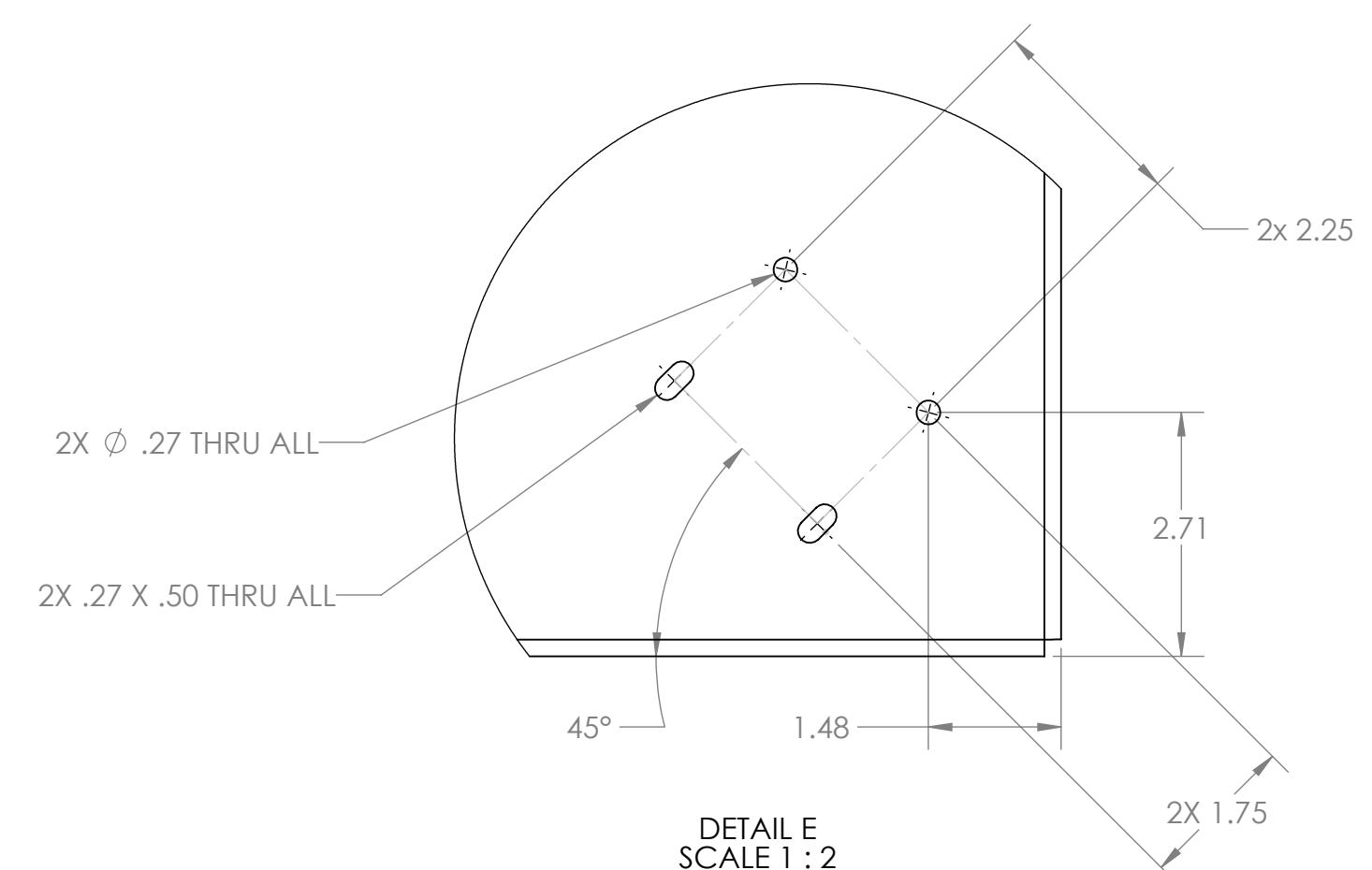
SCALE: 1:5 SHEET 1 OF 3



SECTION B-B



DETAIL D
SCALE 1 :



DETAIL E
SCALE 1 : 2
4 places

UNLESS OTHERWISE SPECIFIED:		WELD	NAME	DATE
		DRAWN	CO	7/22/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .015$		PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH: Powder Coat Black		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING		SIZE DWG. NO. REV C GE-22356		
		SCALE: 1:4		SHEET 2 OF 3

4

3

2

1

D

D

C

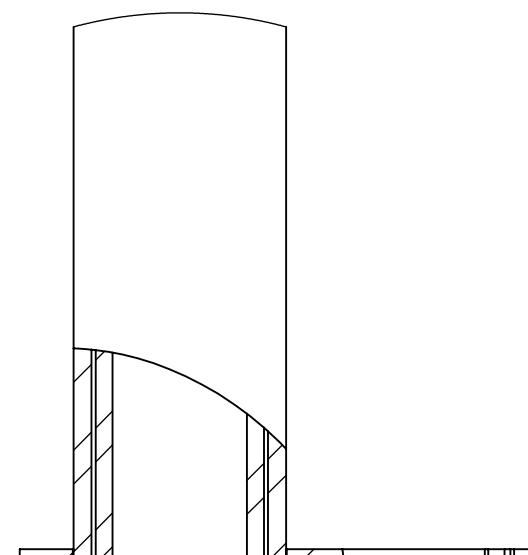
C

B

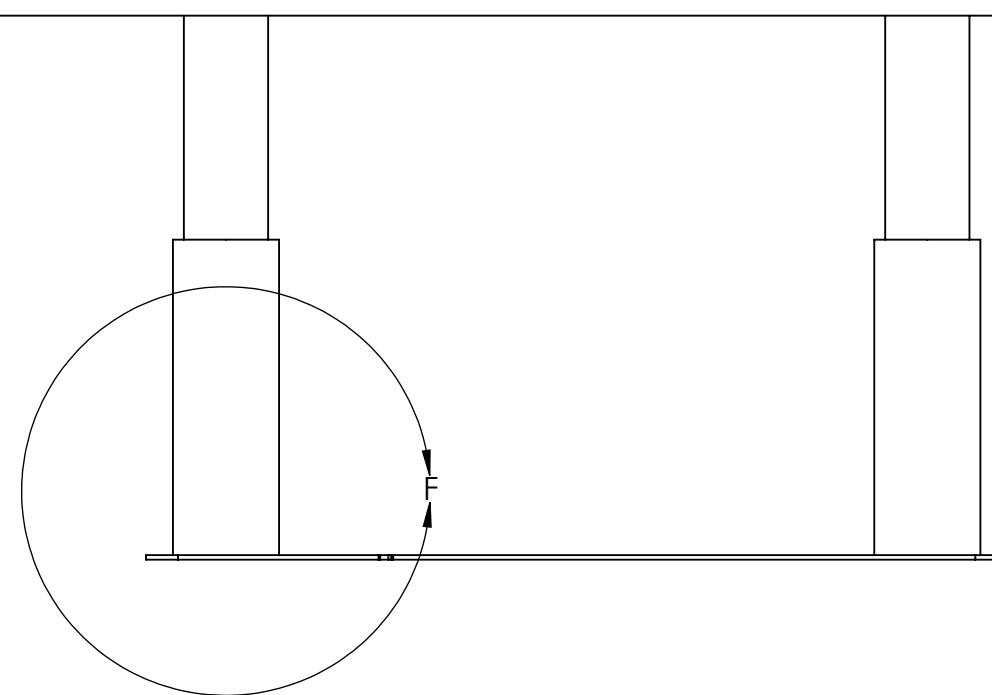
B

A

A

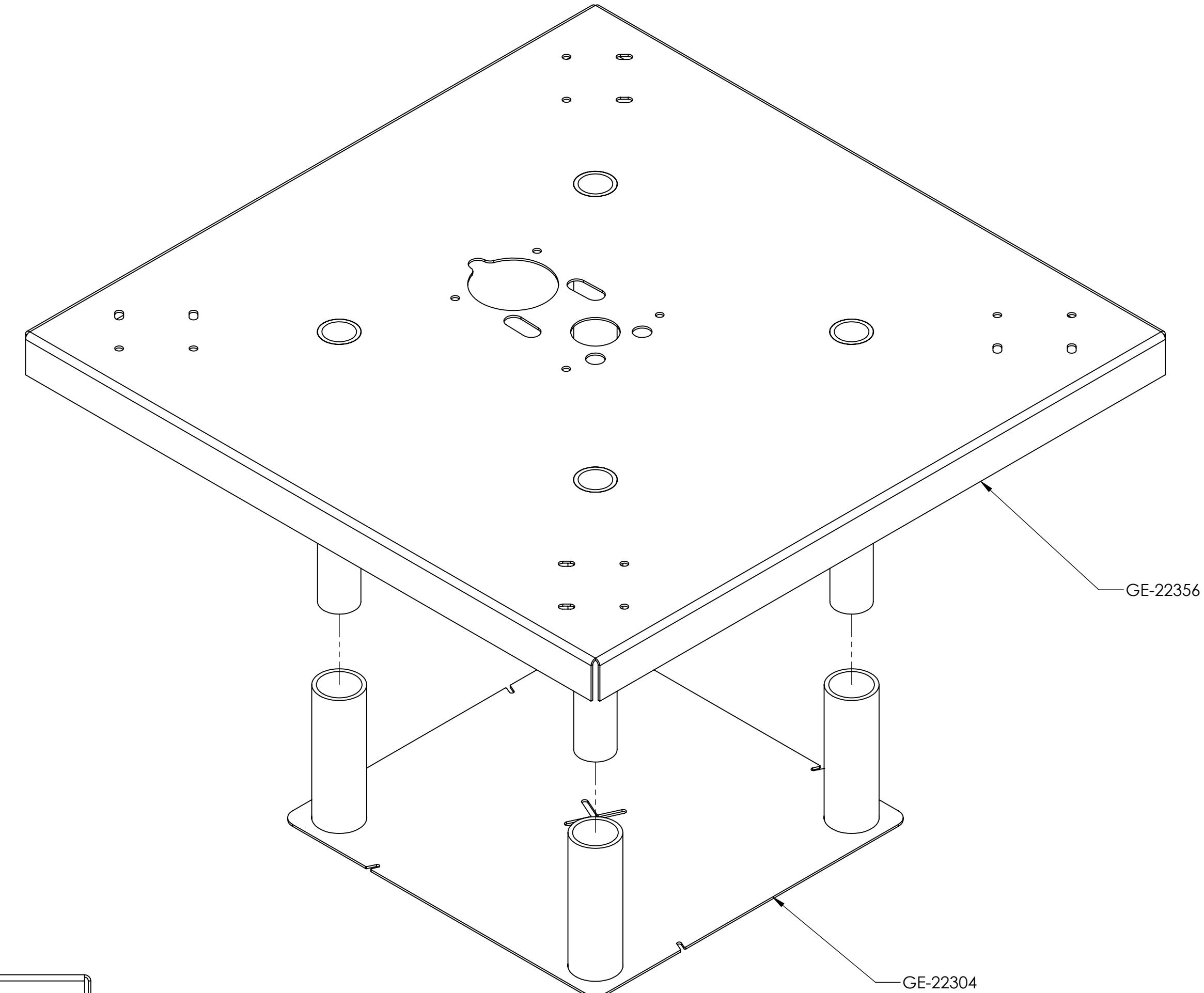


DETAIL F
SCALE 2 : 3
Bottom of two assemblies coincident.



Notes:

- For reference only: designed interface of GE-22356 with mating part.



UNLESS OTHERWISE SPECIFIED:	WELD	NAME	DATE
DRAWN	CO	7/22/2021	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .02$
THREE PLACE DECIMAL $\pm .015$

MATERIAL/FINISH:
Powder Coat Black

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

DO NOT SCALE DRAWING

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Lower Hub Base

SIZE DWG. NO. REV
C GE-22356

SCALE: 1:3 SHEET 3 OF 3

4

3

2

1

4

3

2

1

D

D

C

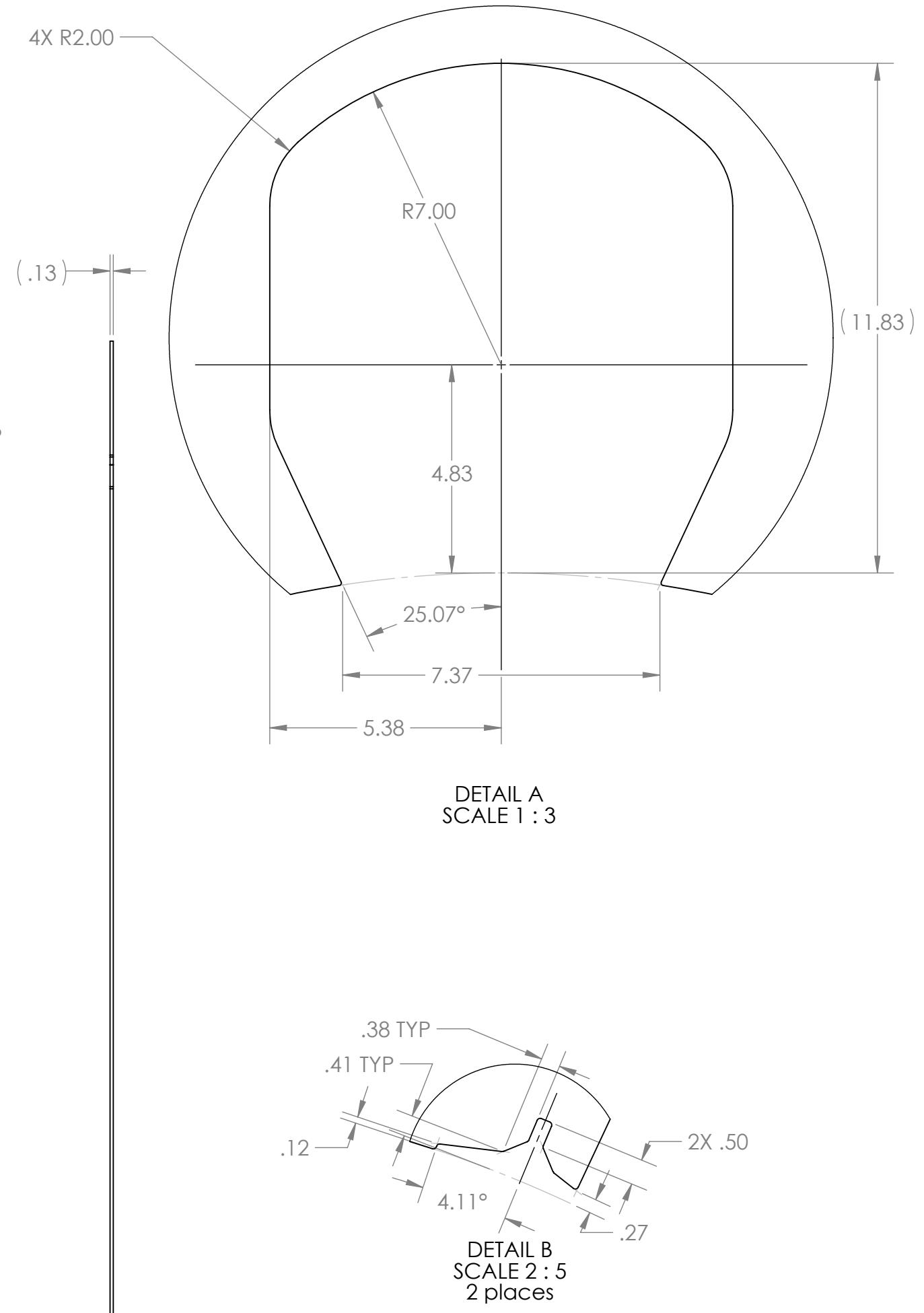
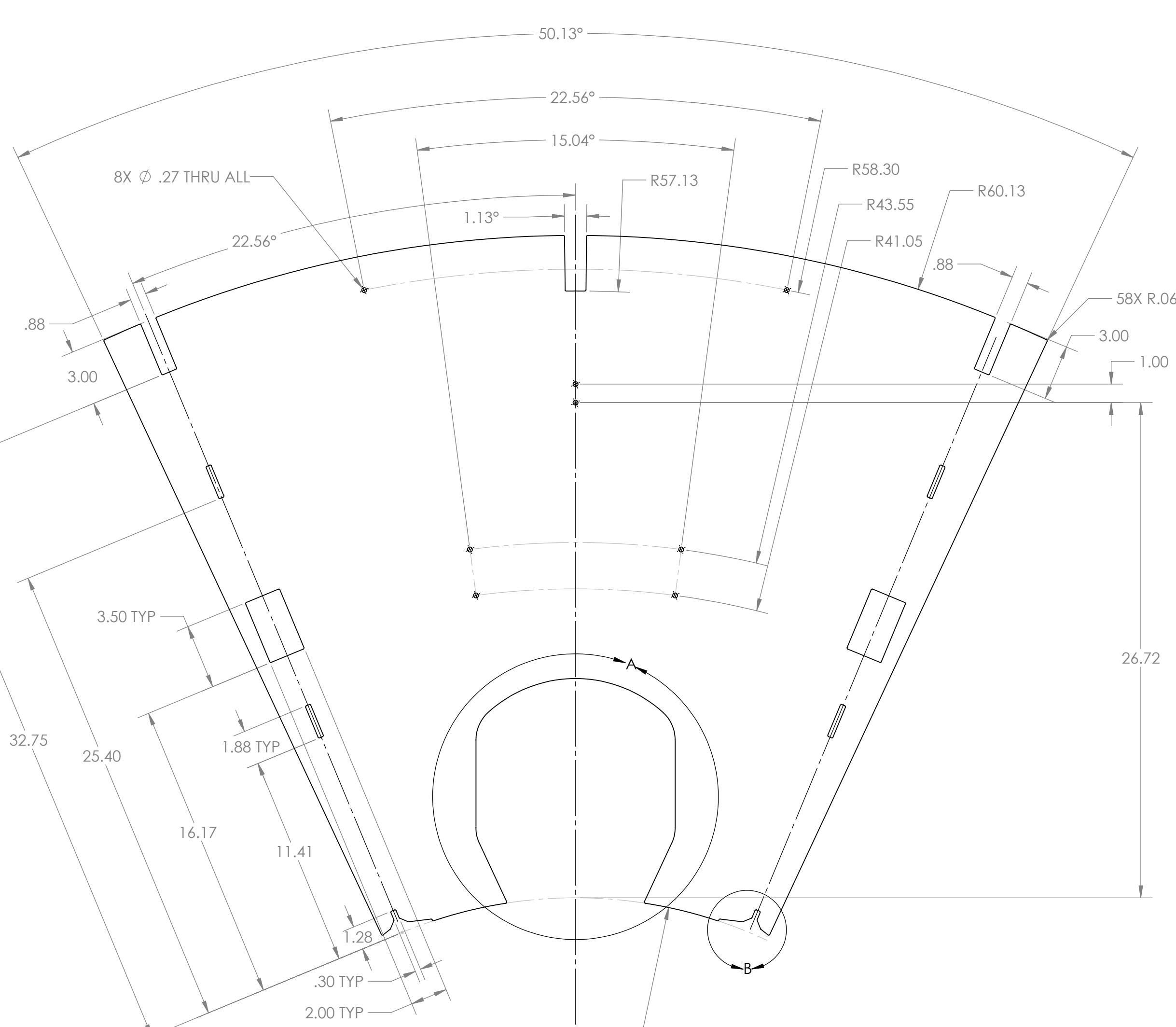
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	7/26/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/8" thk. Polycarbonate, Clear	C	GE-22357	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING		SCALE: 1:5	SHEET 1 OF 1

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Lower Hub
Panel**

SIZE DWG. NO. REV

C GE-22357

SCALE: 1:5 SHEET 1 OF 1

4

3

2

1

D

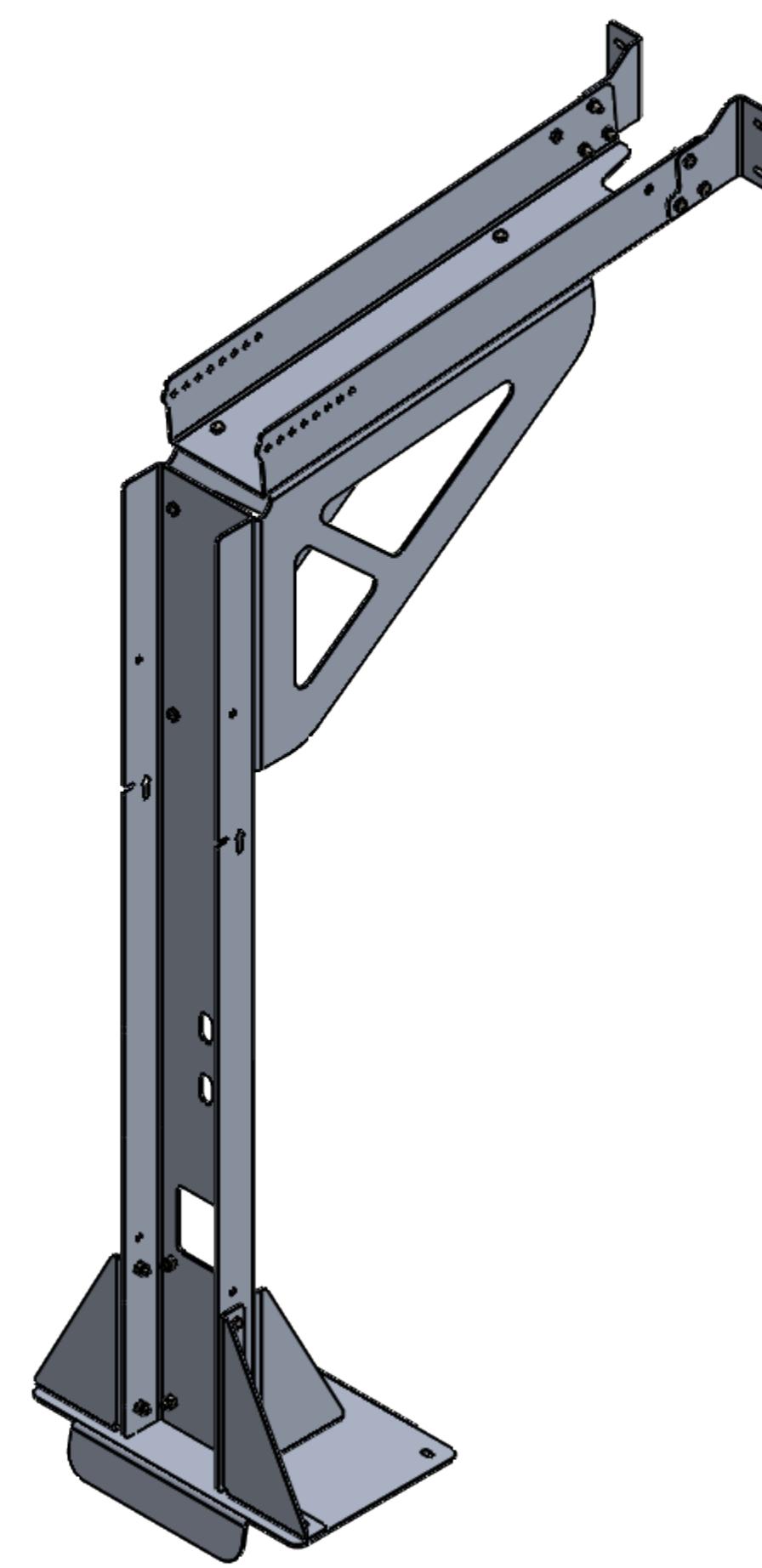
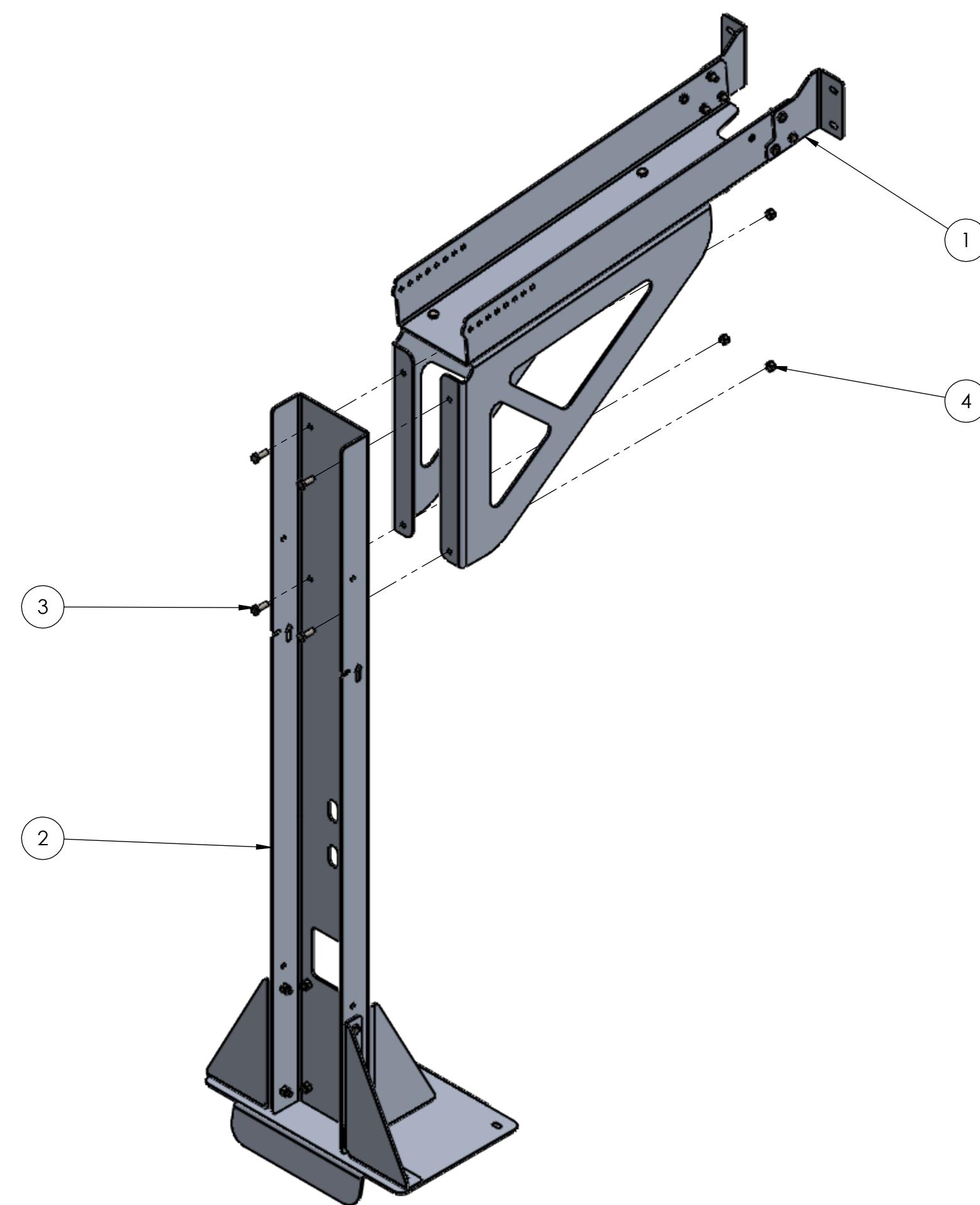
D

C

C

B

B



Notes:

1. Attach (2) to (1) using (4) and (3).

ITEM NO.	PART NUMBER	DESCRIPTION	
1	GE-22382	Upright Top	1
2	GE-22383	Upright Bottom	1
3	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	4
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.				
MATERIAL/FINISH:		SIZE	DWG. NO.	REV
		C	GE-22371	
DO NOT SCALE DRAWING		SCALE: 1:6	SHEET 1 OF 1	

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE: **Hub Leg Assembly**

SIZE DWG. NO. REV
C GE-22371

SCALE: 1:6 SHEET 1 OF 1

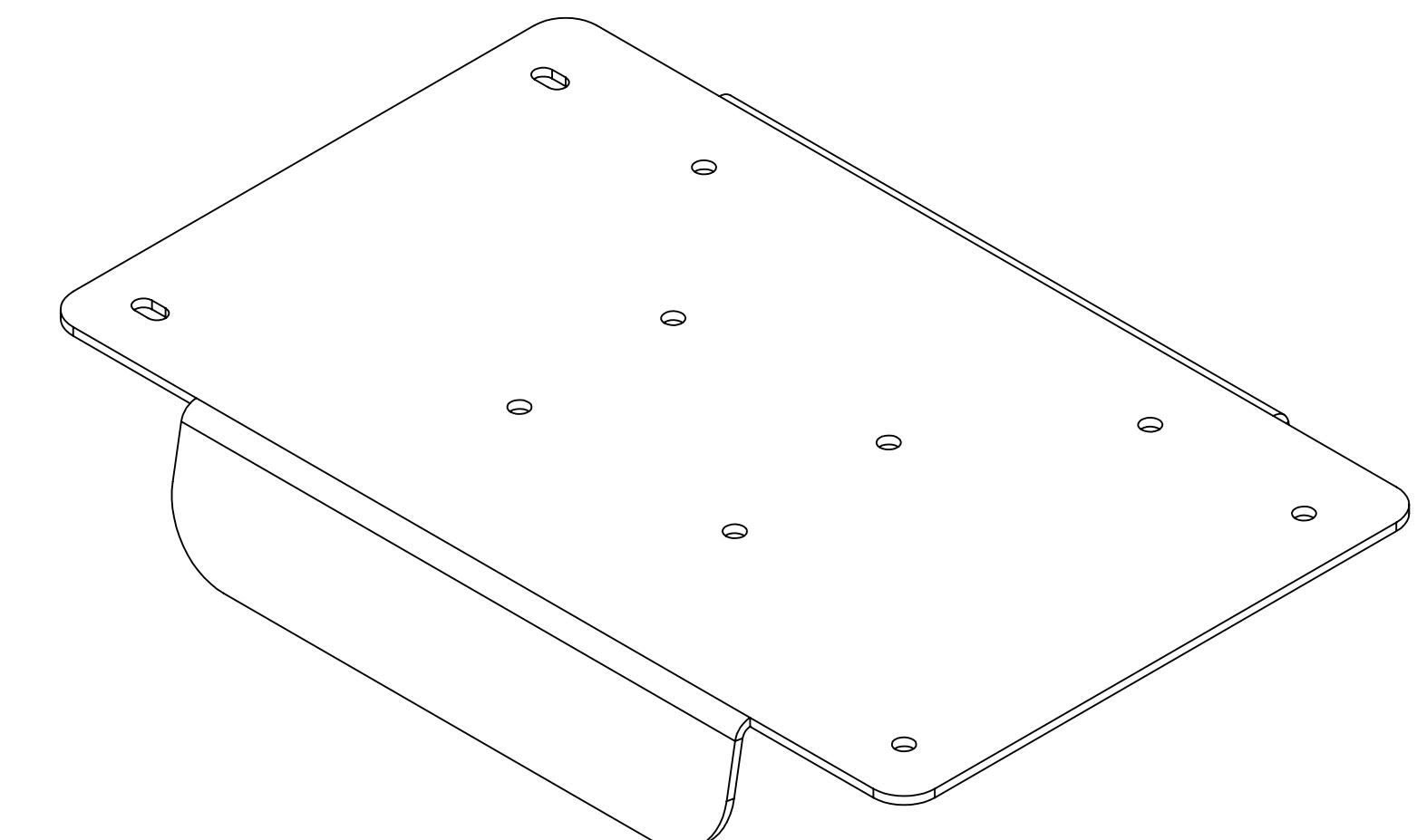
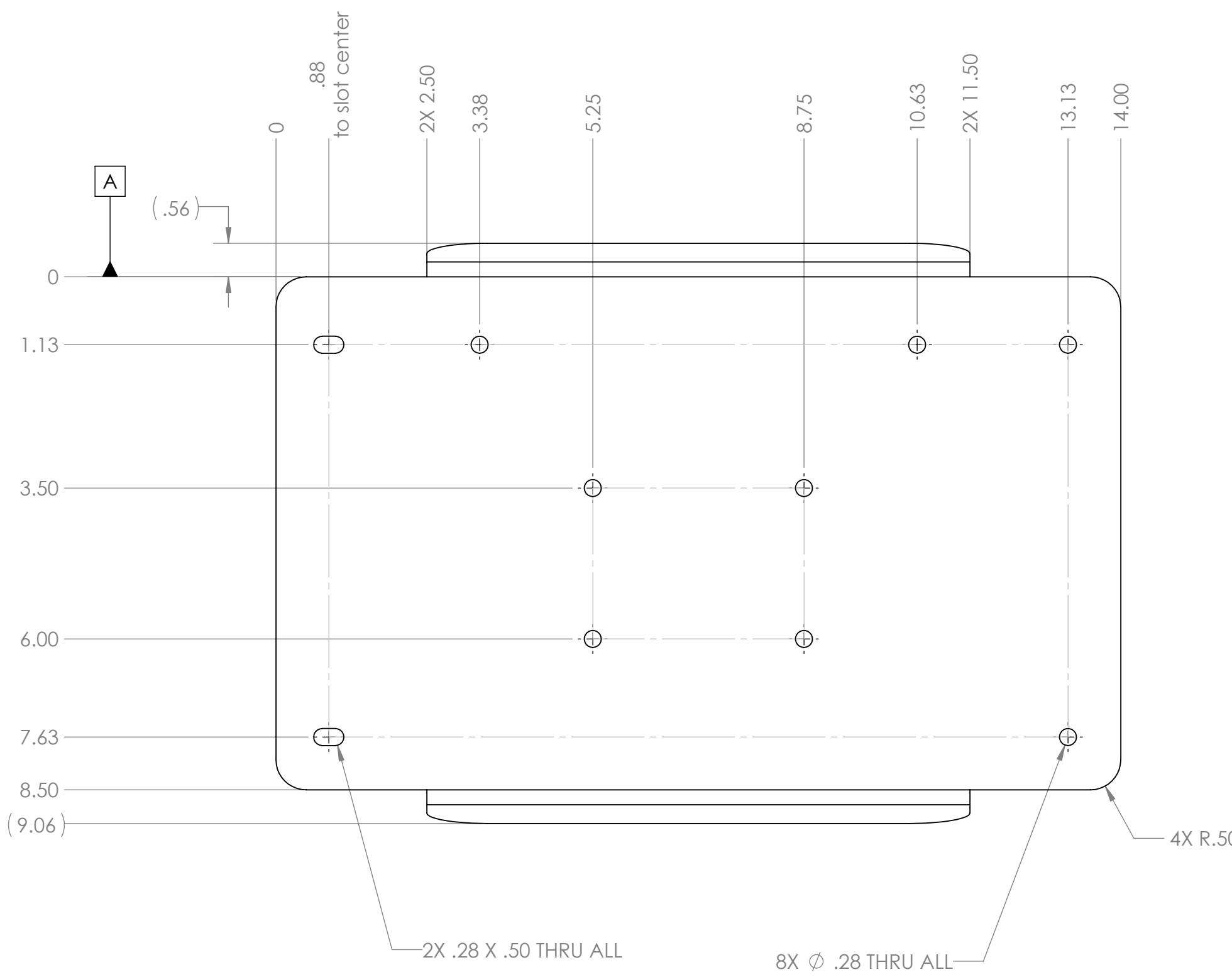
4

3

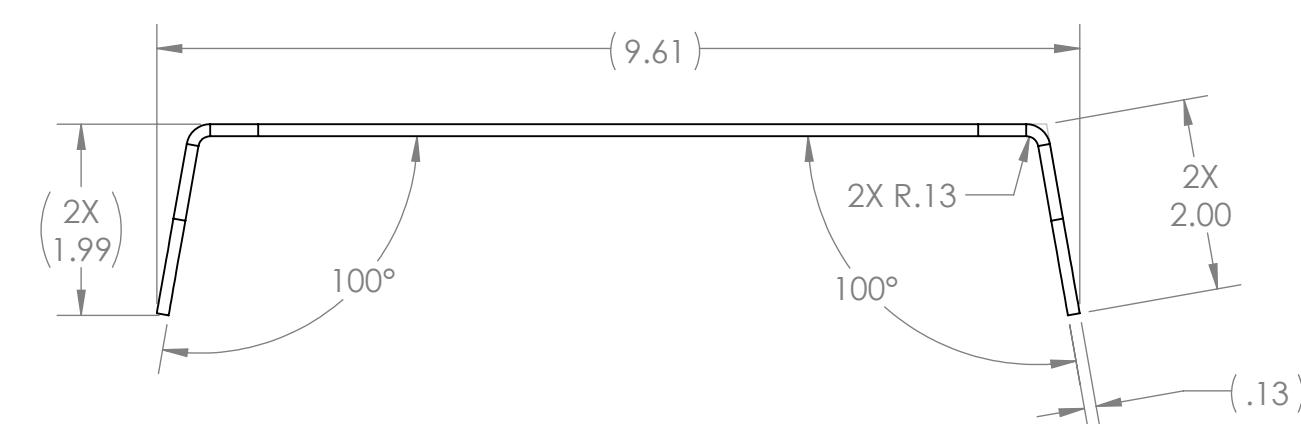
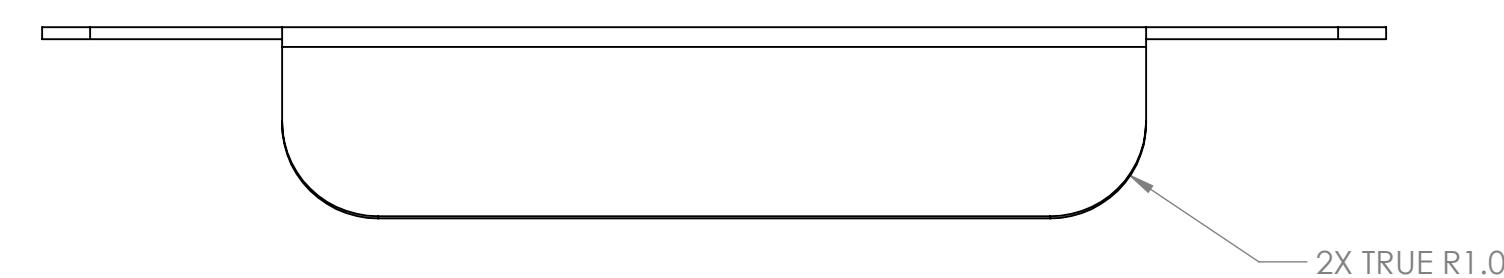
2

1

D



C



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION			
SOLIDWORKS Modeling Solutions Partner			
TITLE: Leg Base			
SIZE DWG. NO. REV			
C GE-22372			
SCALE: 1:2 SHEET 1 OF 1			

4

3

2

1

4

3

2

1

D

D

C

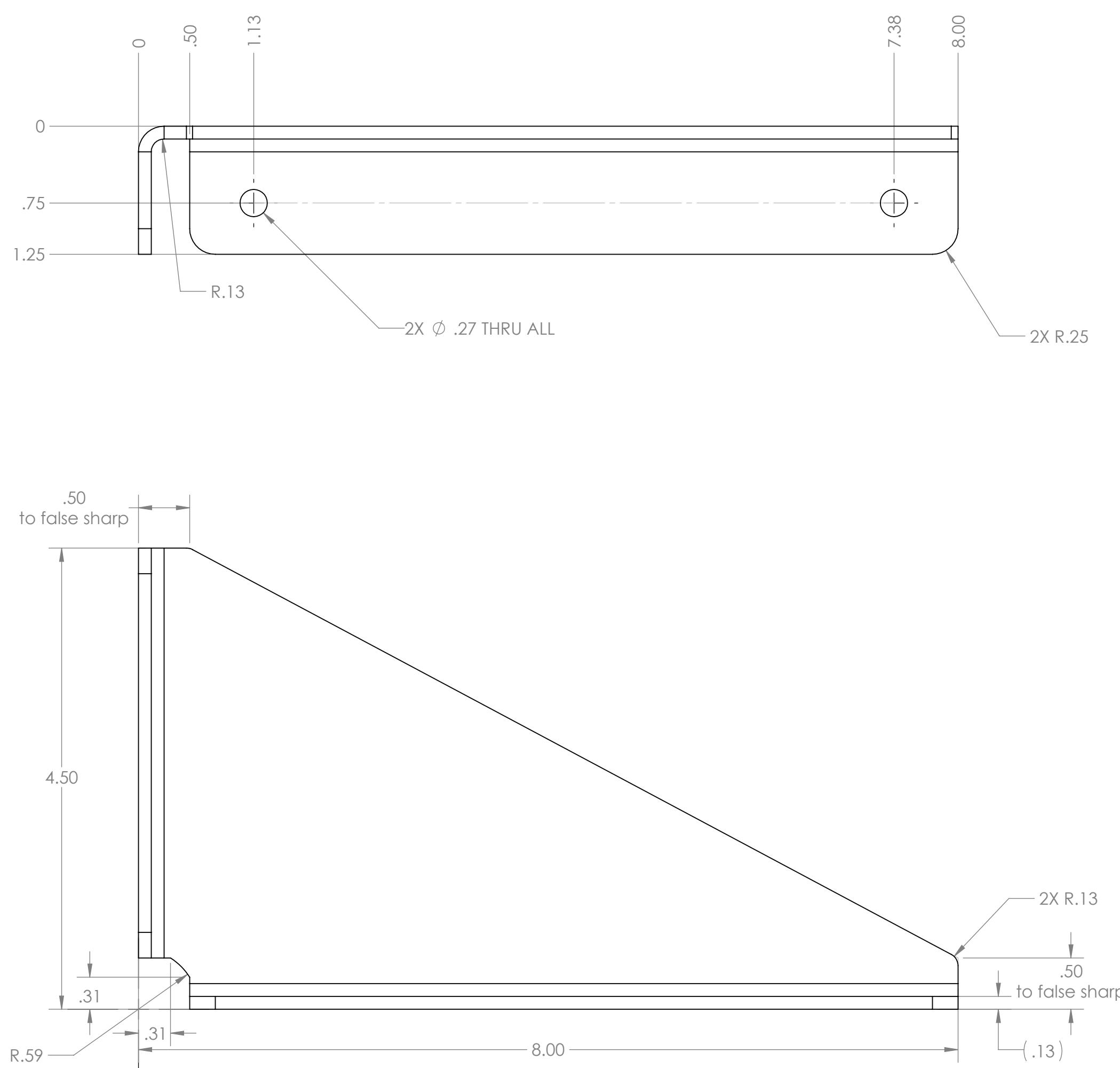
C

B

B

A

A



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Leg Support
Bracket Right**

SIZE DWG. NO. REV
C GE-22373

SCALE: 1:1 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

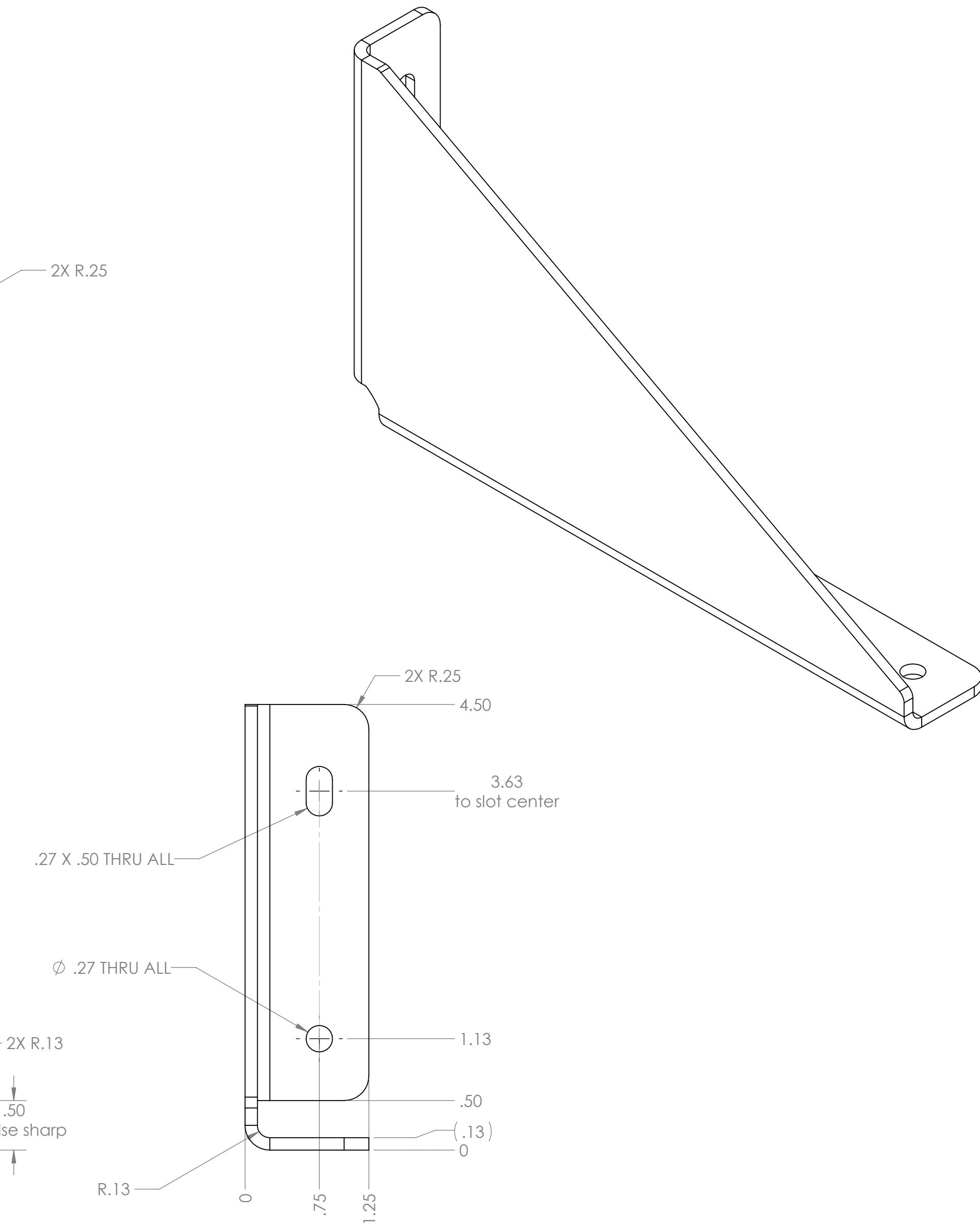
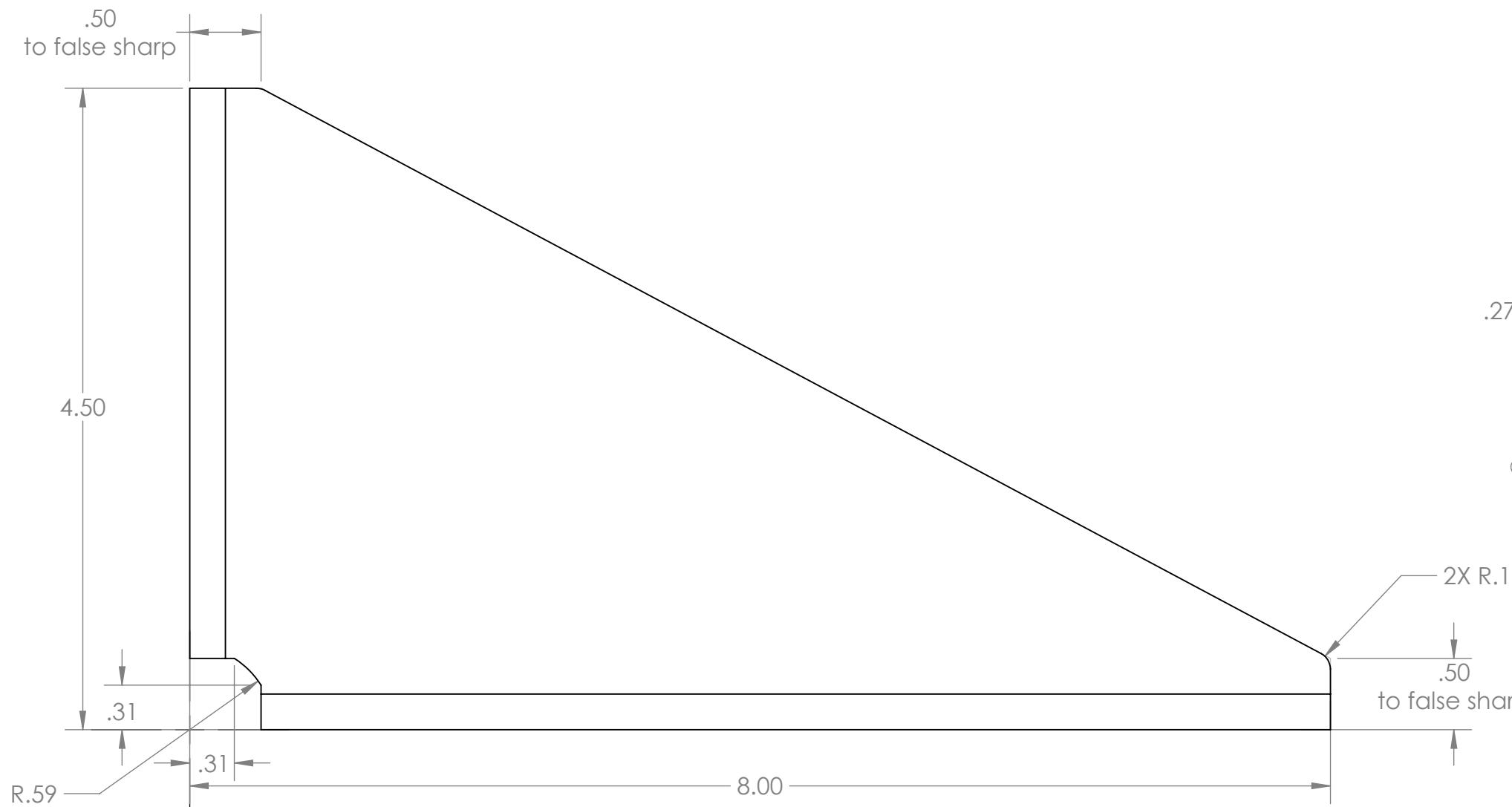
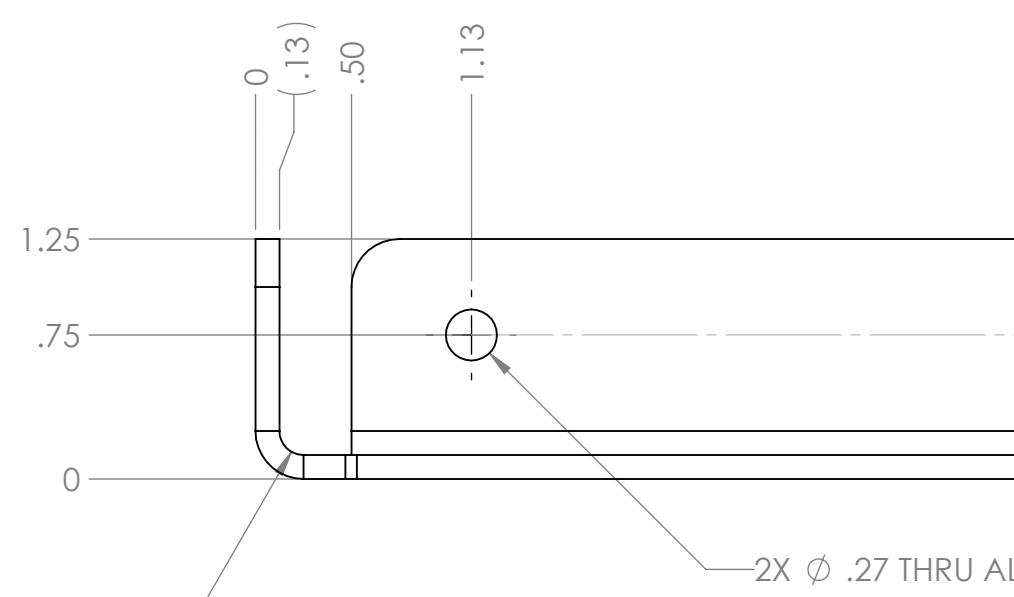
C

B

B

A

A



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Leg Support
Bracket Left**

SIZE DWG. NO. REV
C GE-22374

SCALE: 1:1 SHEET 1 OF 1

4

3

2

1

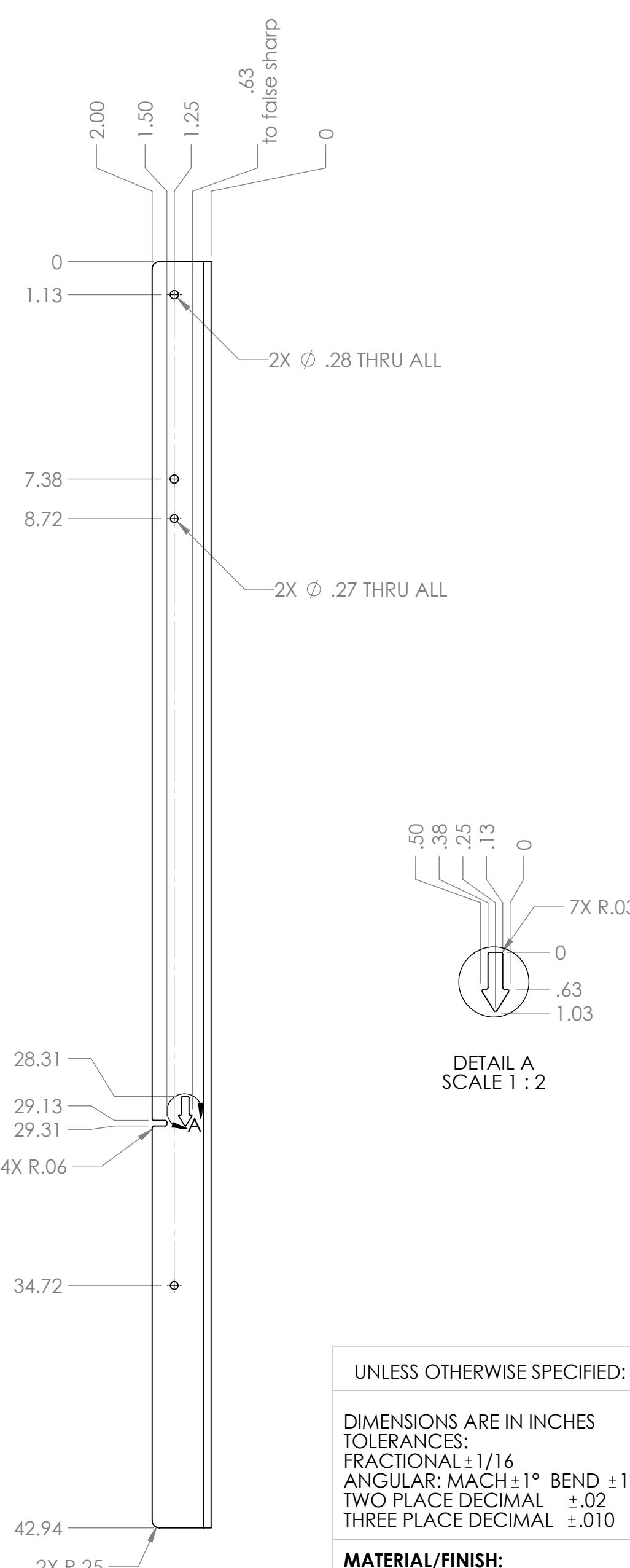
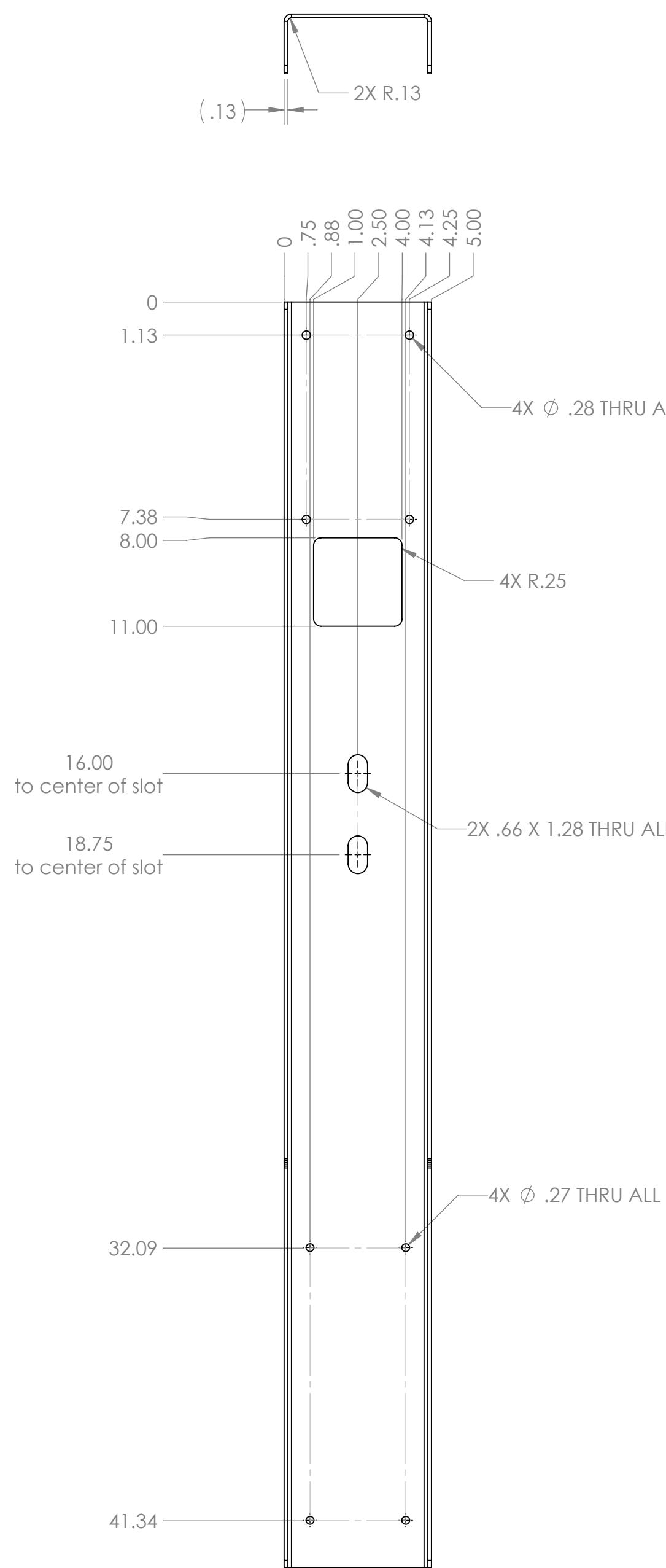
4

3

2

1

D



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Leg Vertical
Channel**

SIZE DWG. NO. REV

C GE-22375

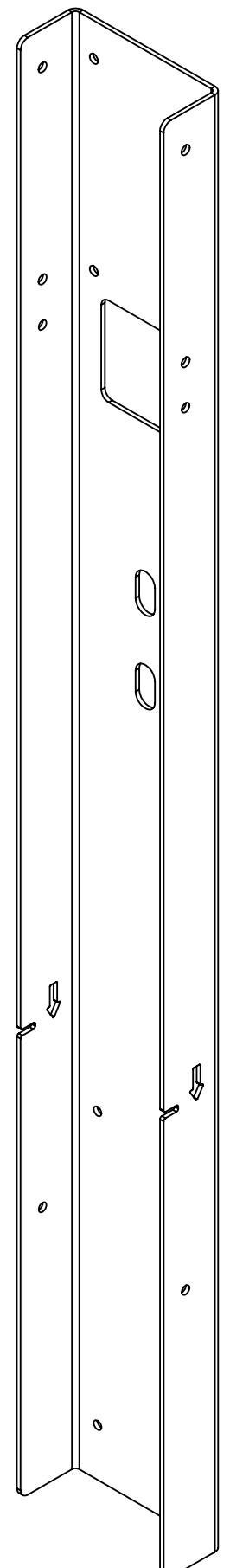
SCALE: 1:4 SHEET 1 OF 1

4

3

2

1



D

C

B

A

4

3

2

1

D

D

A technical drawing of a cylindrical component. The top part has a height of 0.63 and a top feature labeled $\phi .27$ THRU ALL. A vertical dimension of 8.88 is shown from the top of this feature down to a horizontal line. From this line, a vertical dimension of 11.25 extends further down to a base feature. The top edge of the cylinder is labeled with a radius of 1.50. A callout indicates a TRUE R.1 radius at the very bottom. There are two small circular features with a diameter of 0.08 each located on the side wall, one near the top and one near the bottom.

This technical drawing illustrates the dimensions and features of a mechanical component. The vertical axis is labeled with values: 0, .75, 2.00, 2.50, 2.68, 6.49, 7.31, 14.57, 17.43, 17.65, 9.49, 10.23, 11.03, 11.25, 11.27, 12.00, 12.07, 13.53, R.81, and A. The horizontal axis shows a profile with several key features: a top slot at 0, a central slot at approximately 2.68, a bottom slot at approximately 11.27, and a bottom curve labeled 'A' at approximately 13.53. An angle of 85° is indicated between the bottom curve and the horizontal baseline. Arrows point to specific features: one arrow points to the bottom curve labeled 'A', and another arrow points to the bottom slot area. Labels '6X R.50' and '2X R2.50' are located on the right side of the drawing.

This technical drawing shows a perspective view of a component labeled 'VIEW A-A'. The drawing includes the following dimensions:

- TRUE R.13 (radius)
- 16.75 (length)
- 15.38 (width)
- .63 (width)
- 0 (depth)
- .88 (width)
- 1.50 (width)
- 2X R.50 (radii)

A note at the bottom indicates a hole with a diameter of $\phi .27$ that is present through all layers.

Notes:

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$	BEND	NAME	DATE
	DRAWN	KAMC	7/6/2021
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet	PROPRIETARY AND CONFIDENTIAL		
	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
DO NOT SCALE DRAWING	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
	SCALE: 1:3		SHEET 1 OF 1

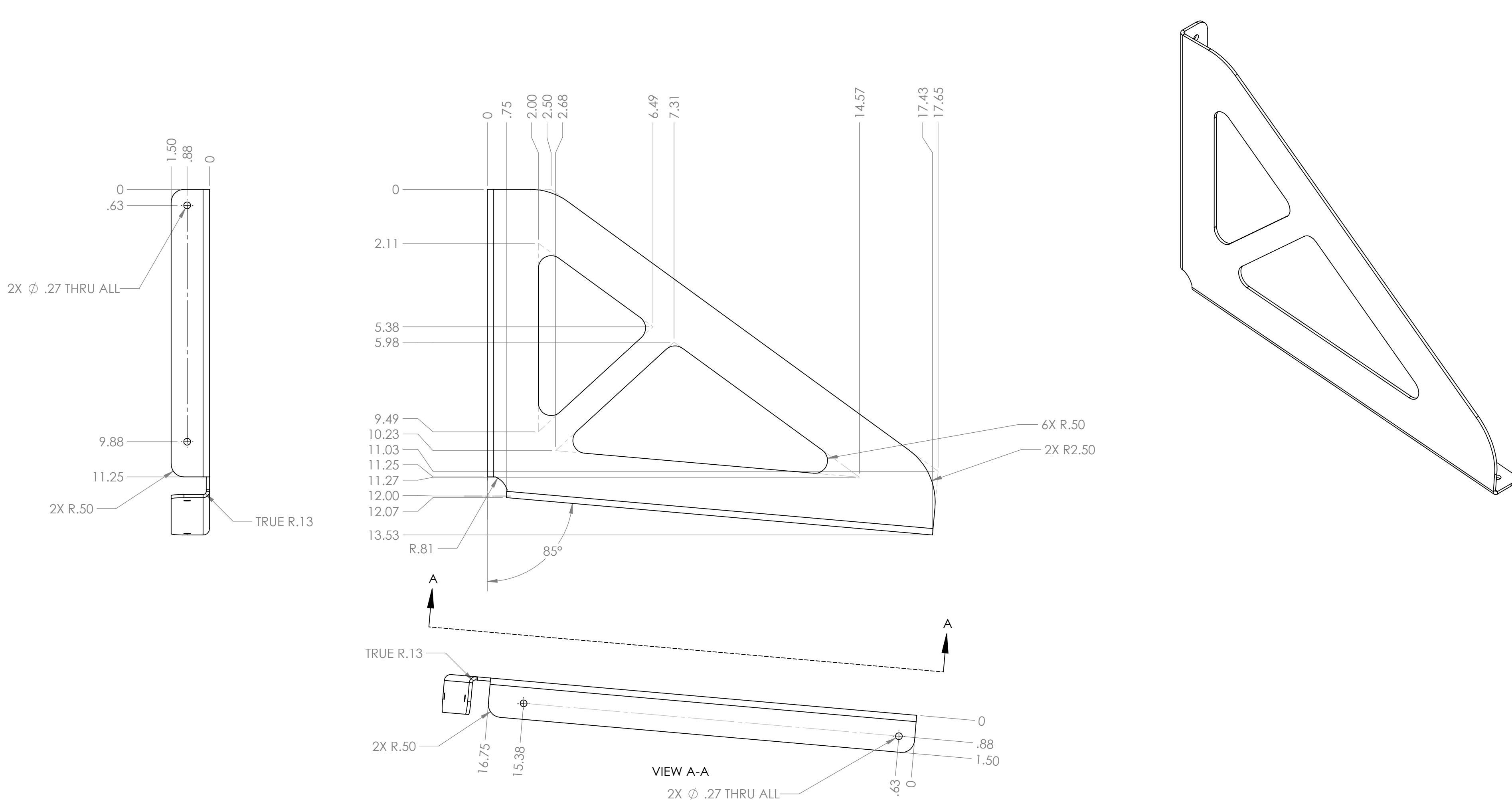
4

3

2

1

D



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Leg to Upper
Exit Gusset Left**

SIZE DWG. NO. REV
C GE-22378

SCALE: 1:3 SHEET 1 OF 1

4

3

2

1

D

C

B

A

4

3

2

1

D

D

C

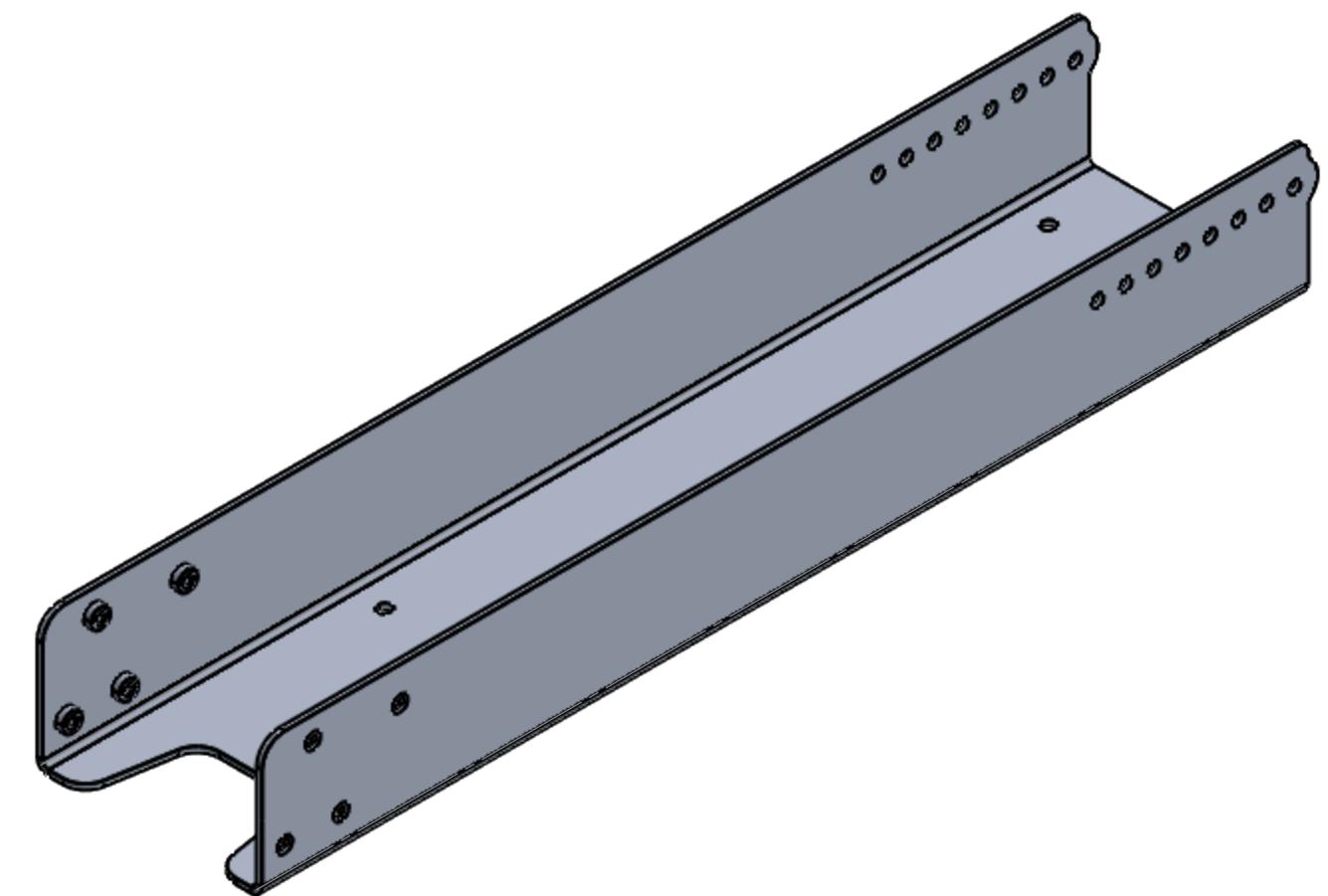
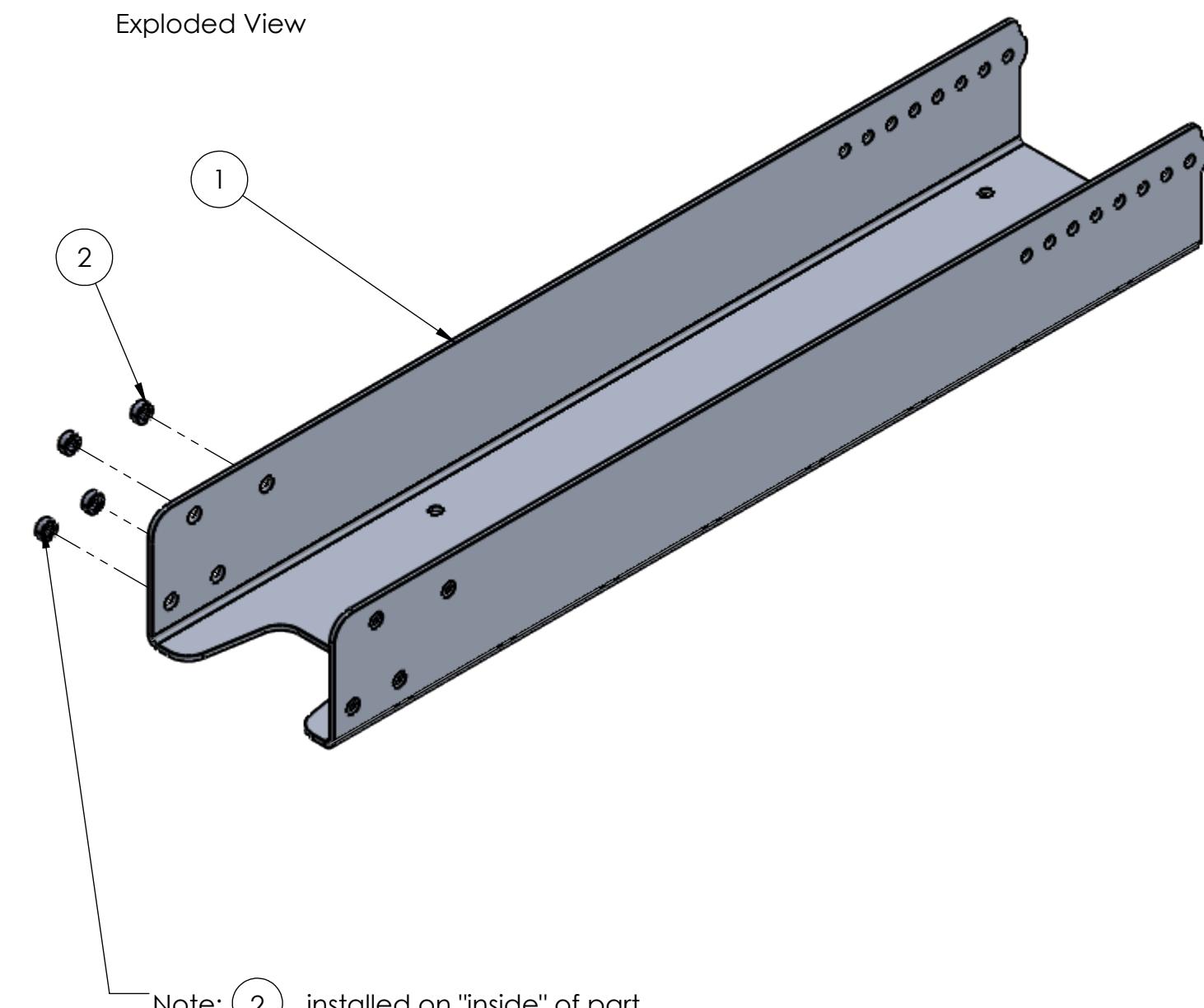
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22379-01	Leg to Upper Exit Channel	1
2	pem_clinchnut_.25_20 .054	1/4-20 self-clinching nut, .054 shank	8

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	KAMC	7/6/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$					
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$					
MATERIAL/FINISH:	PROPRIETARY AND CONFIDENTIAL				
Tag or label with part number	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING			SIZE	DWG. NO.	REV
			C	GE-22379	
			SCALE: 1:3	SHEET 1 OF 2	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

4

3

2

1

4

3

2

1

D

D

C

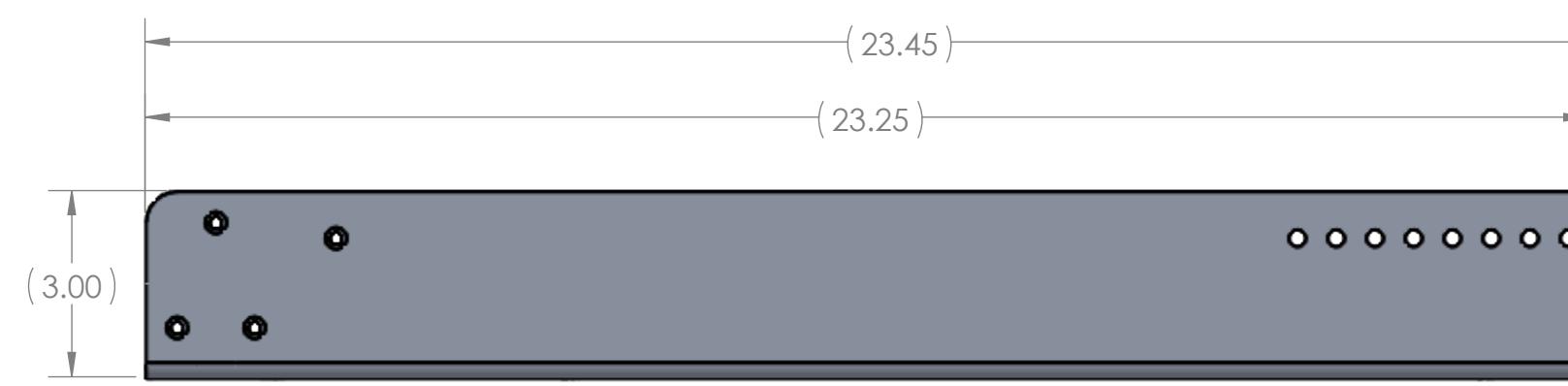
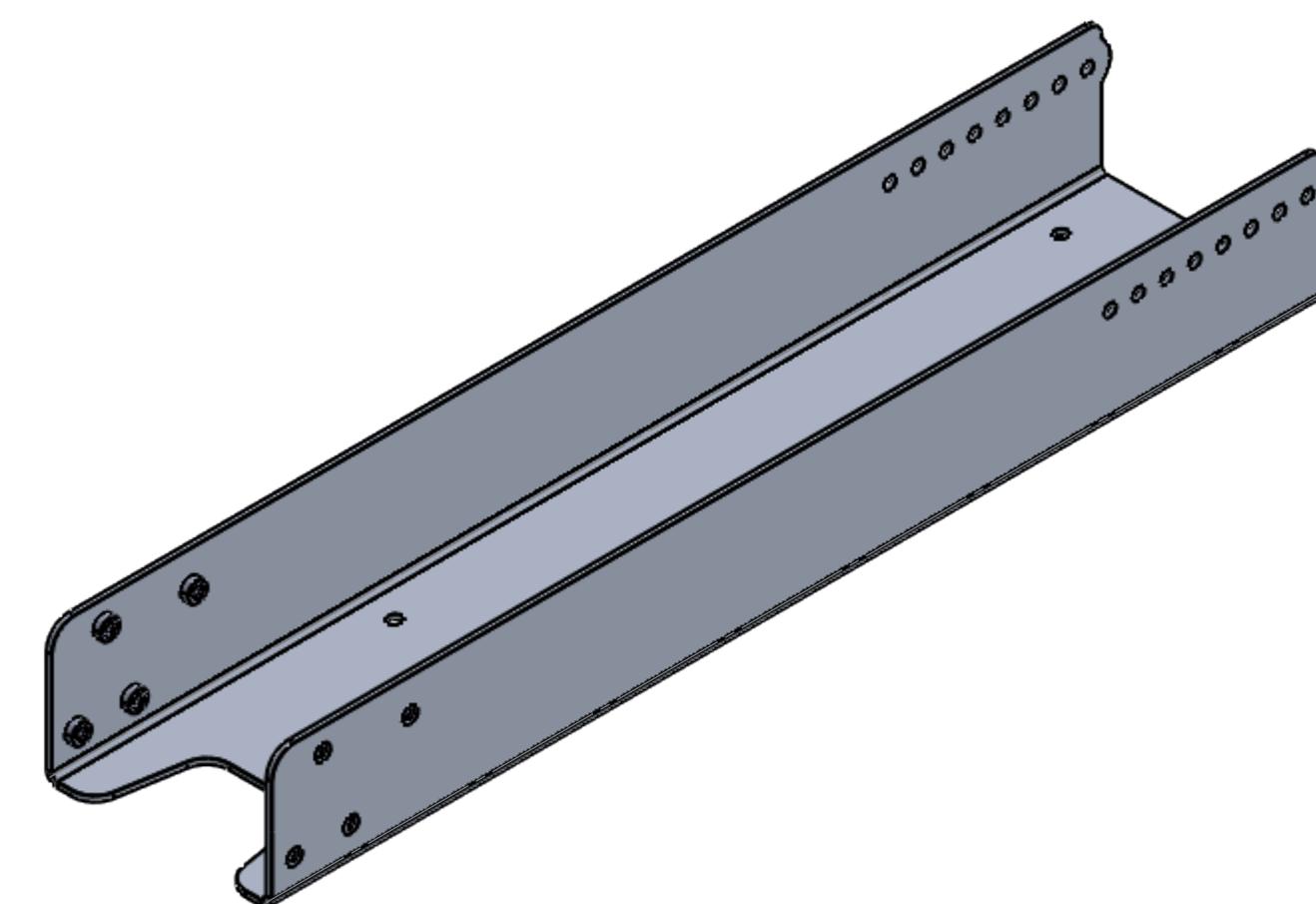
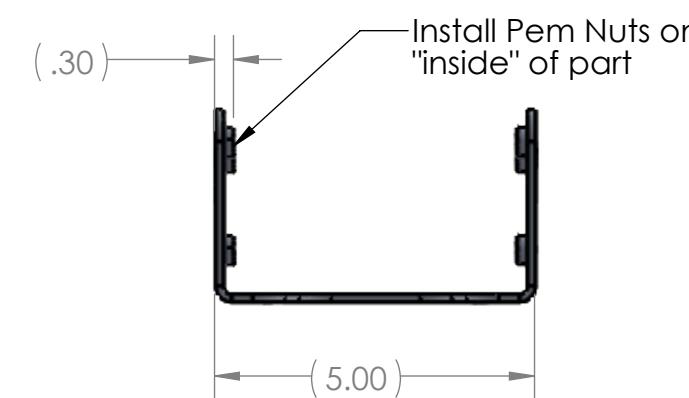
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:

VEND _____ NAME _____ DATE _____

DRAWN _____ KAMC 7/6/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.

MATERIAL/FINISH:

Tag or label with part
number

DO NOT SCALE DRAWING

 FIRST
ROBOTICS
COMPETITION

 SOLIDWORKS
Modeling Solutions Partner
TITLE: Leg to Upper Exit
Channel with Pem
Nuts

SIZE DWG. NO. REV

C GE-22379

SCALE: 1:3 SHEET 2 OF 2

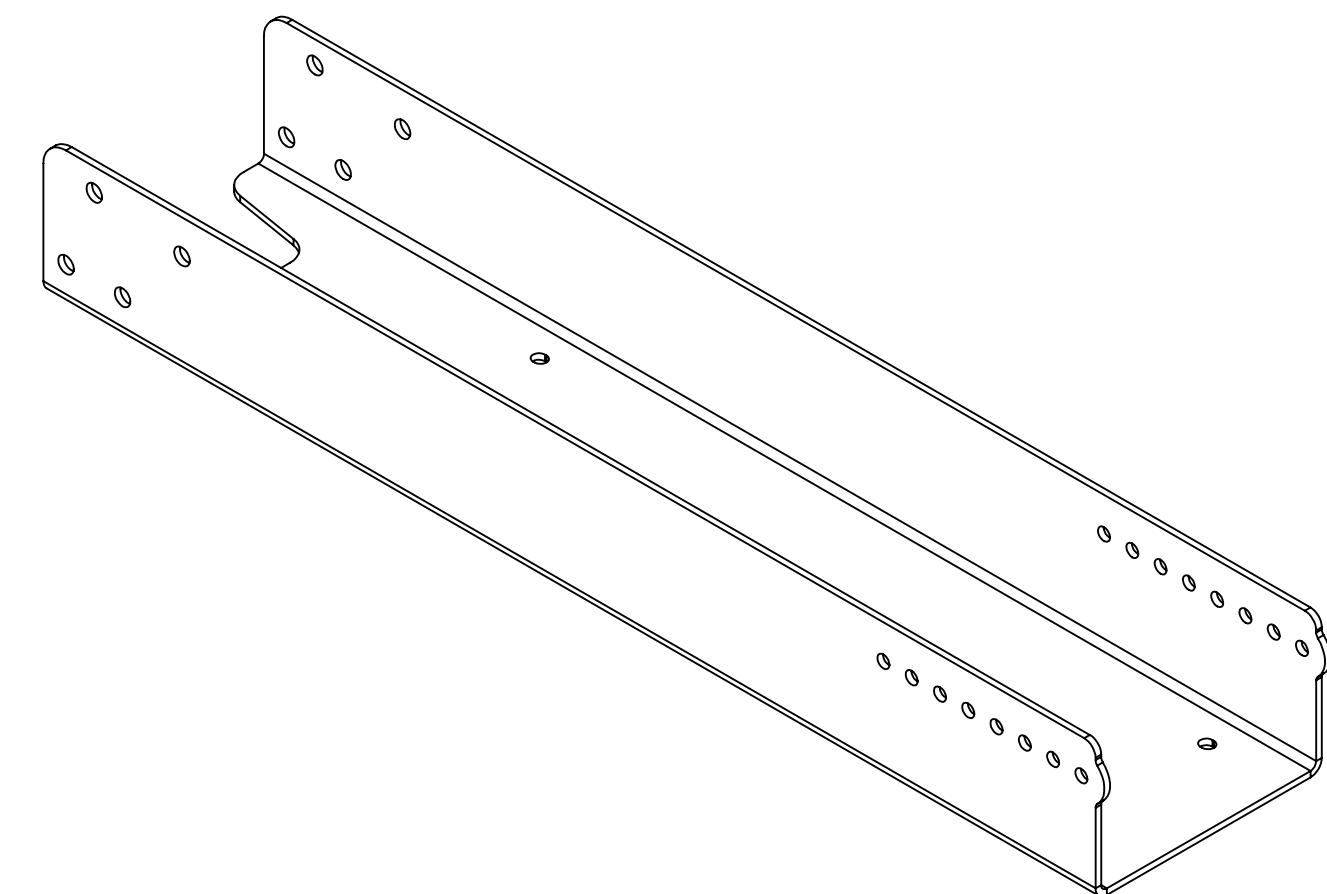
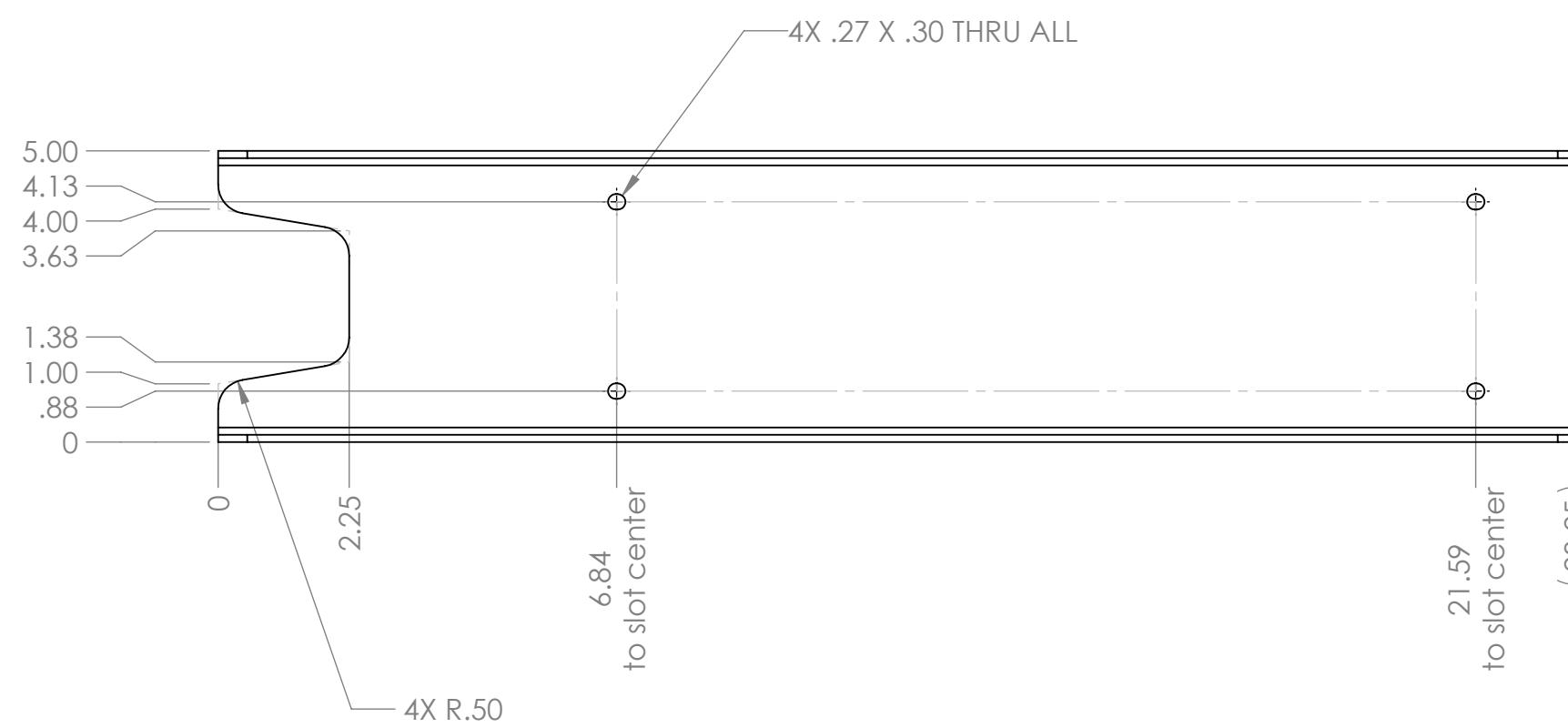
4

3

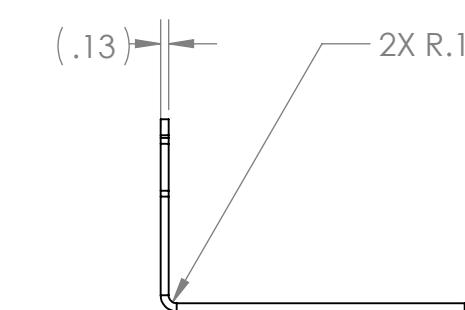
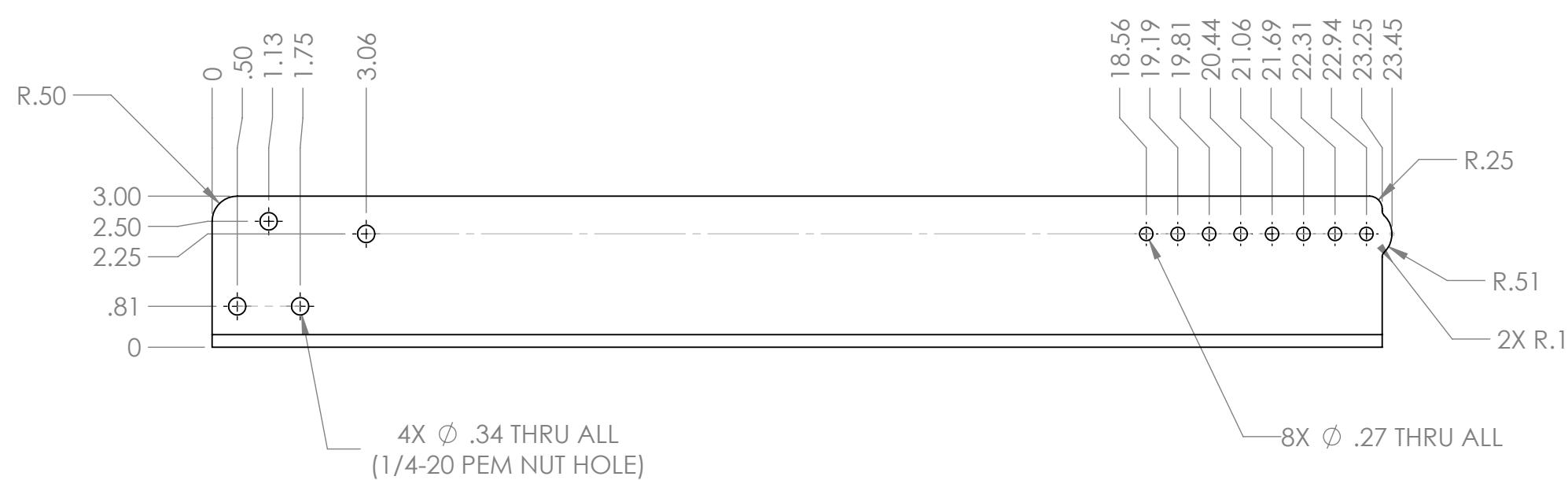
2

1

D



C



B

Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
1/8" 5052 Aluminum Sheet			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
SCALE: 1:3		SHEET 1 OF 1	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Leg to Upper
Exit Channel**

SIZE DWG. NO. REV
C GE-22379-01

4

3

2

1

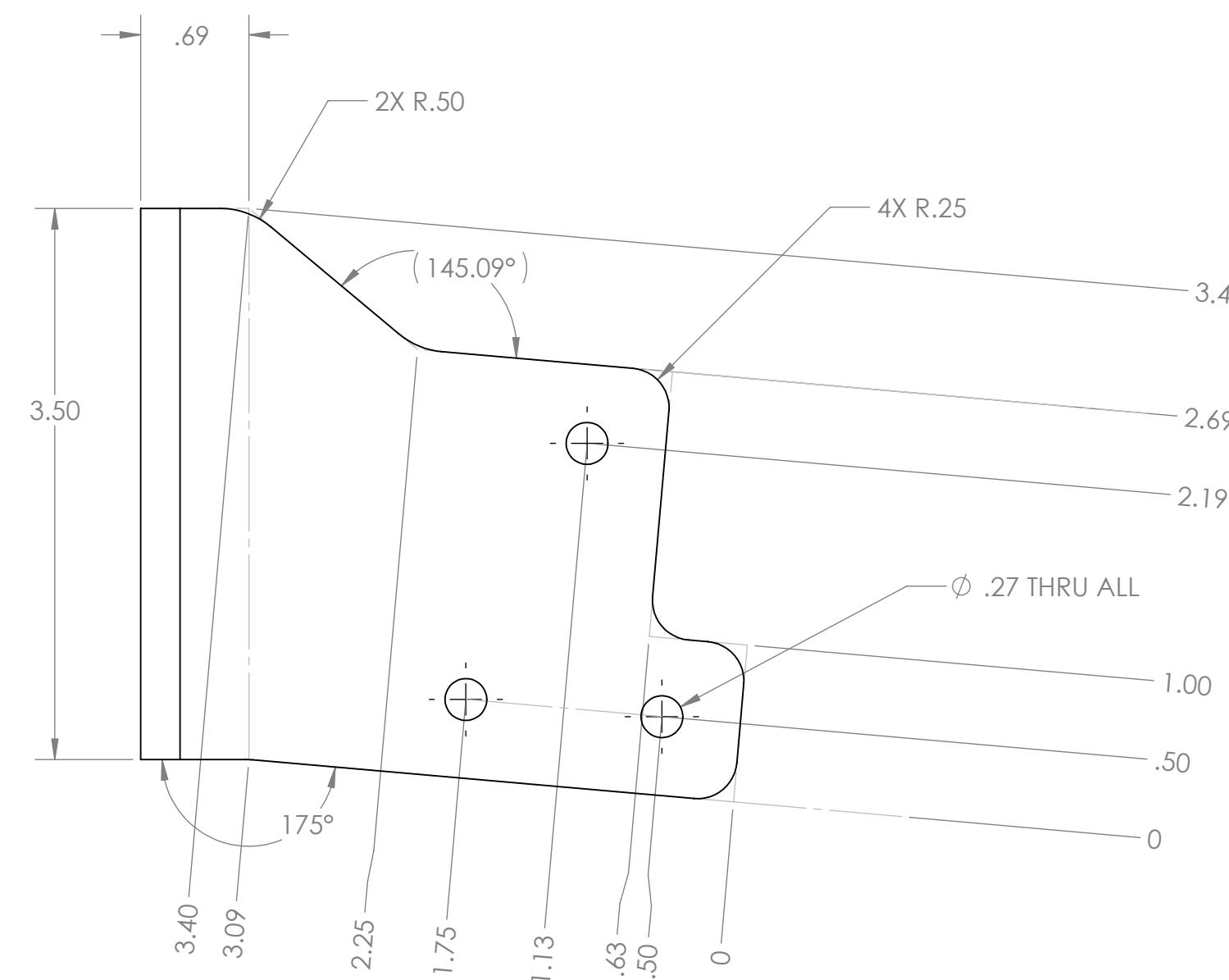
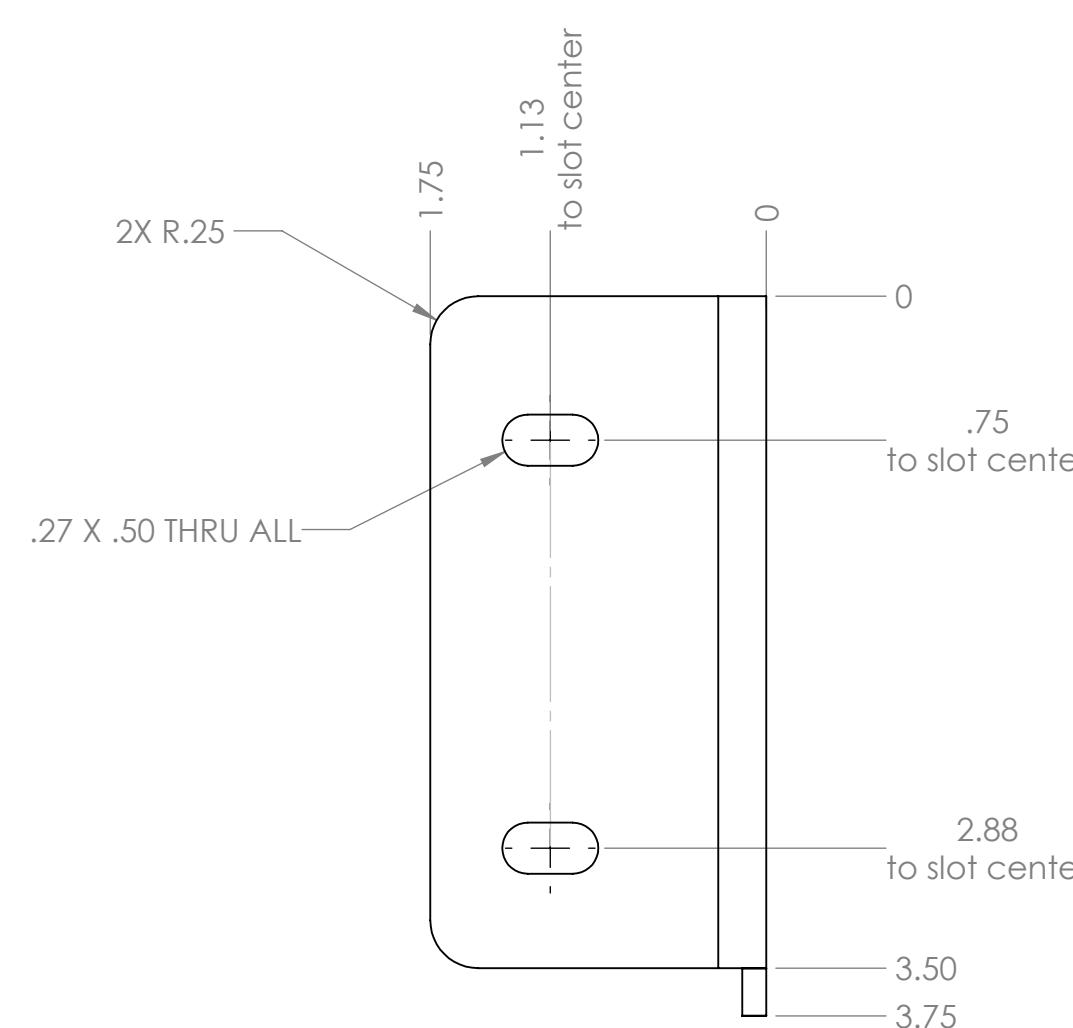
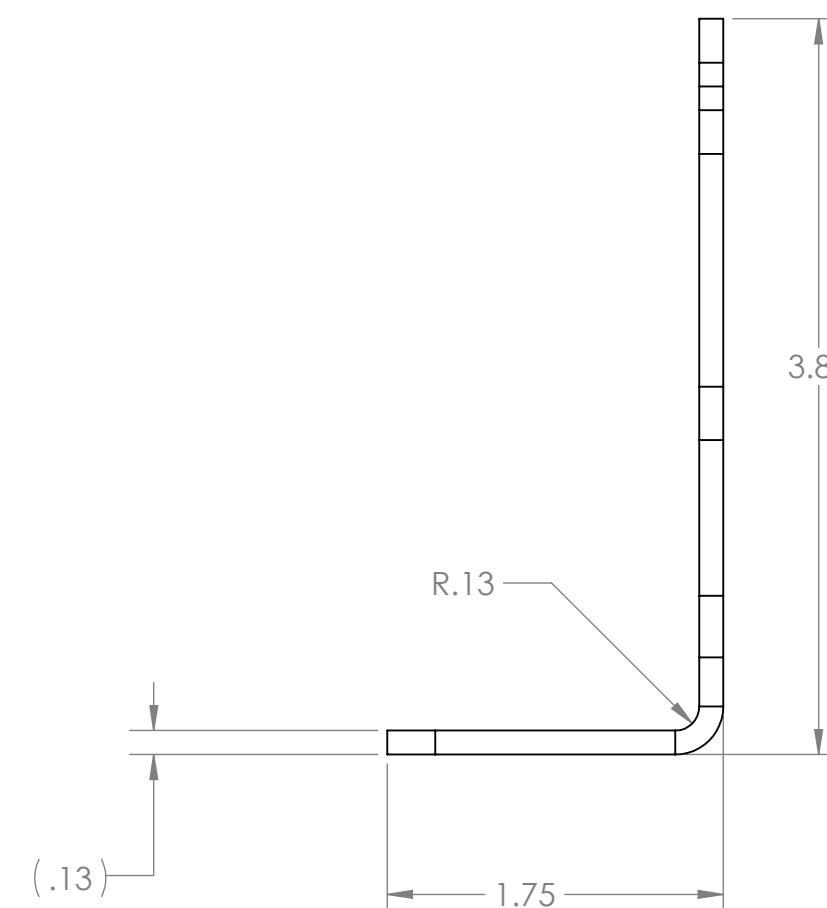
4

3

2

1

D



Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Leg to Upper Hub
Connection Right

SIZE DWG. NO. REV

C GE-22380

SCALE: 1:1 SHEET 1 OF 1

4

3

2

1

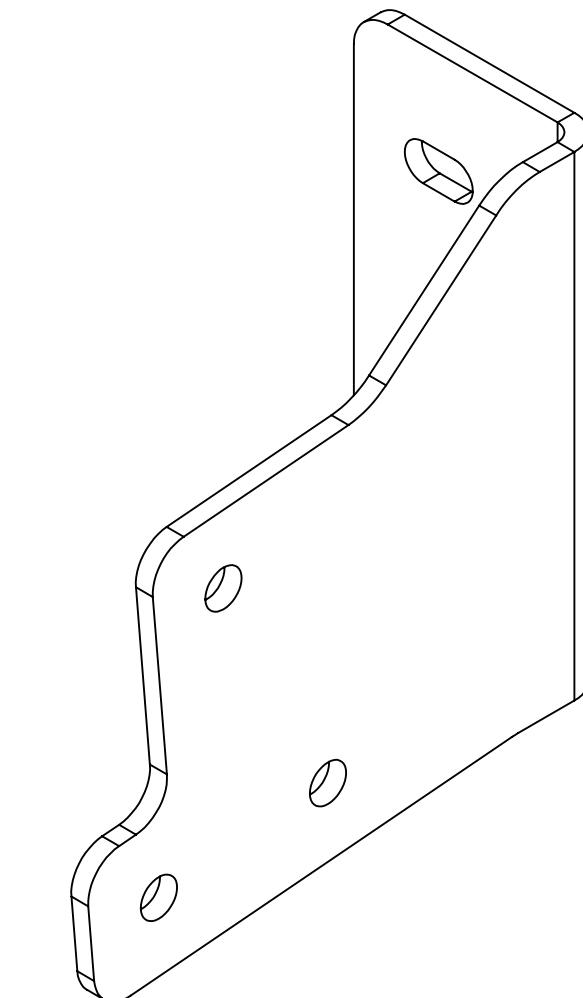
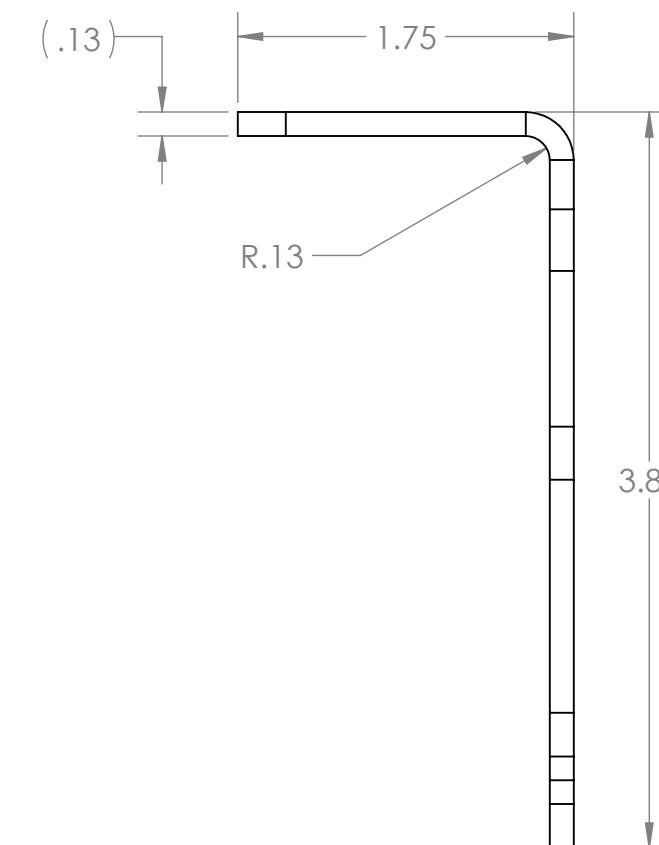
4

3

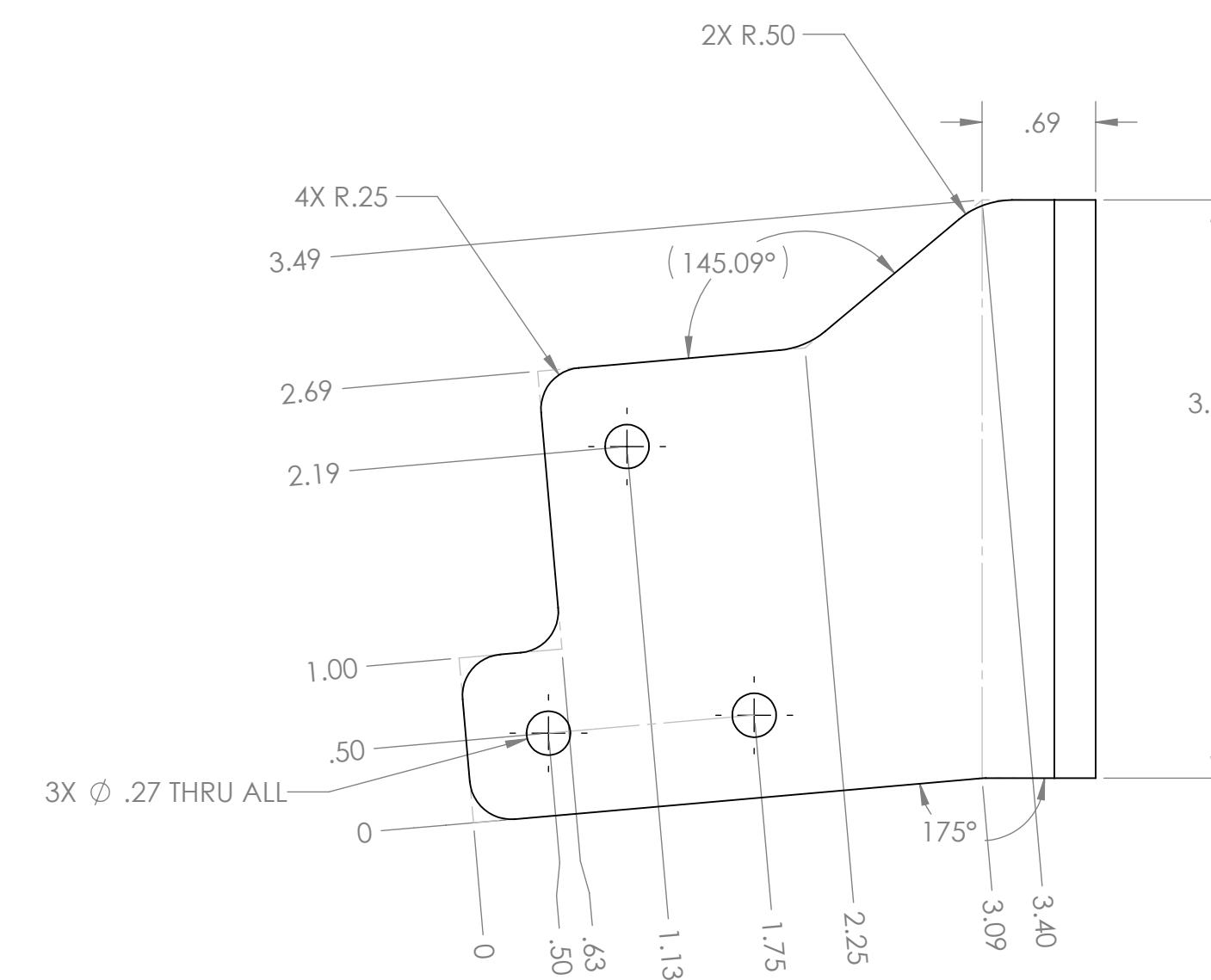
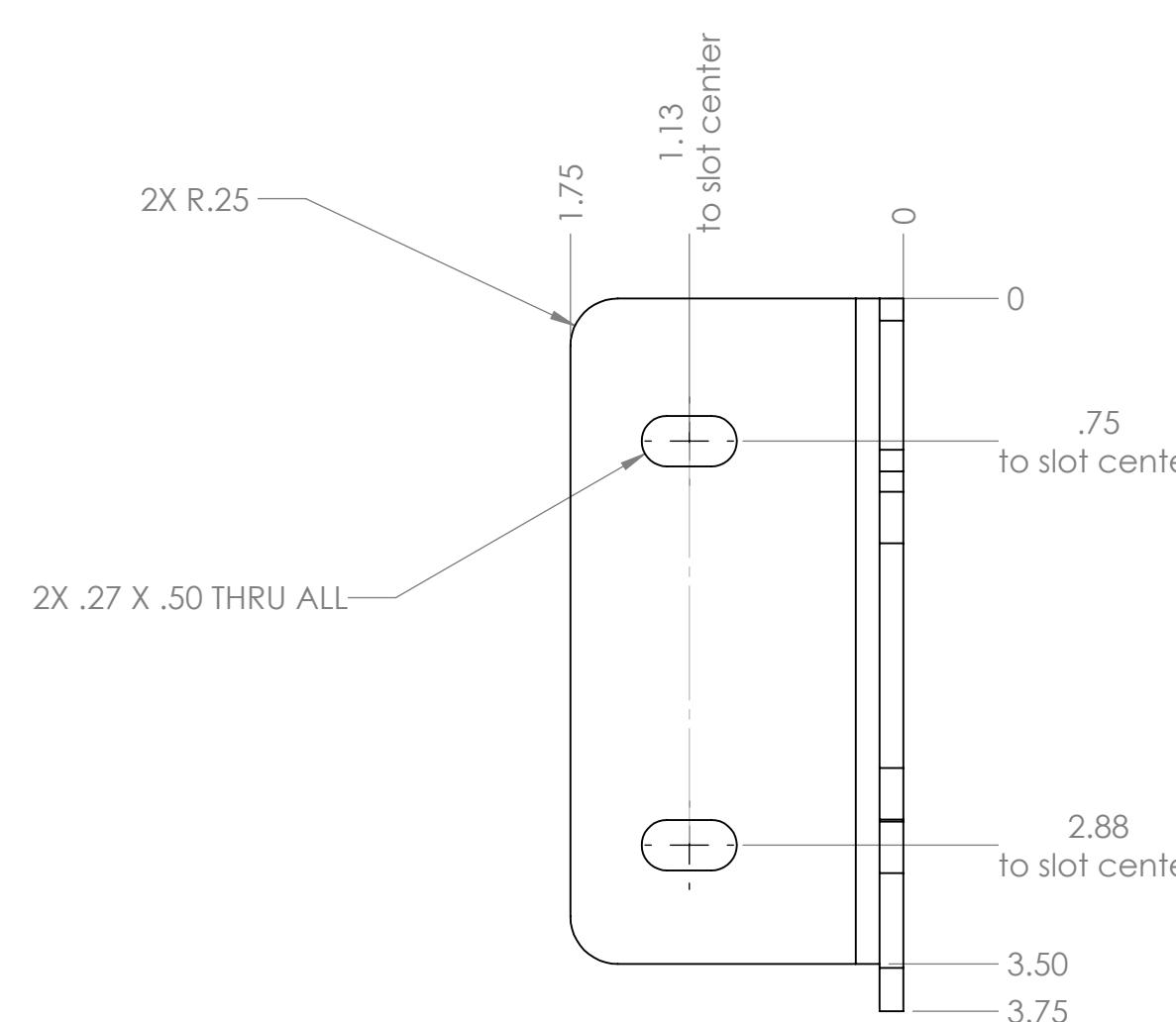
2

1

D



C



B

A

- Notes:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Leg to Upper Hub
Connection Left**

SIZE DWG. NO. REV

C GE-22381

SCALE: 1:1 SHEET 1 OF 1

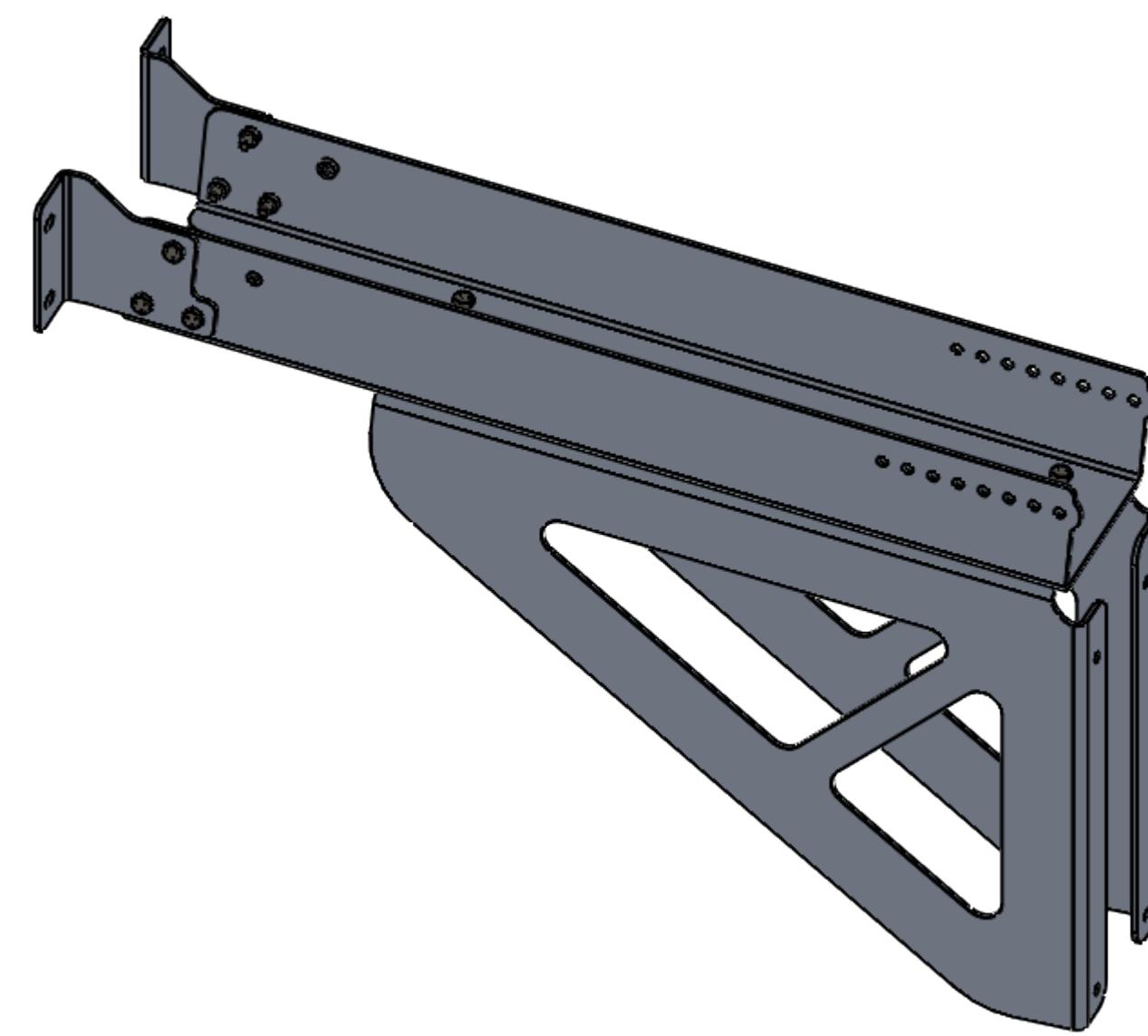
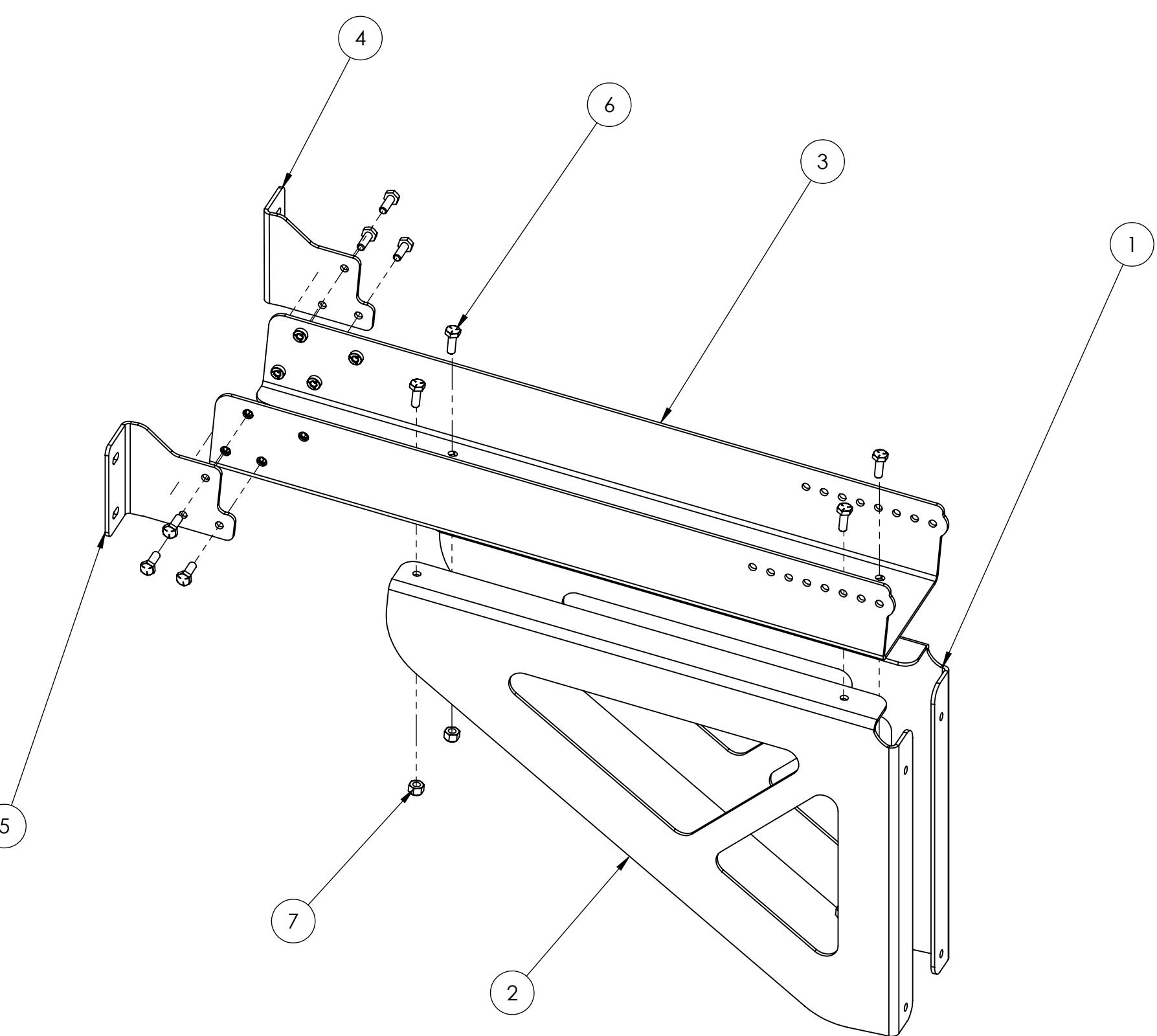
4

3

2

1

D



Notes:

1. Attach (1) and (2) to (3) using (6) and (7).
2. Attach (4) and (5) to (3) using (6).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22377	Leg to Upper Exit Gusset Right	1
2	GE-22378	Leg to Upper Exit Gusset Left	1
3	GE-22379	Leg to Upper Exit Channel with Pem Nuts	1
4	GE-22380	Leg to Upper Hub Connection Right	1
5	GE-22381	Leg to Upper Hub Connection Left	1
6	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	10
7	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE		
DRAWN		CO	12/29/2021			
PROPRIETARY AND CONFIDENTIAL						
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.						
MATERIAL/FINISH:	SIZE	DWG. NO.	REV			
	C	GE-22382				
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING		SCALE: 1:4	SHEET 1 OF 1			

FIRST ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

Title: Upright Top

4

3

2

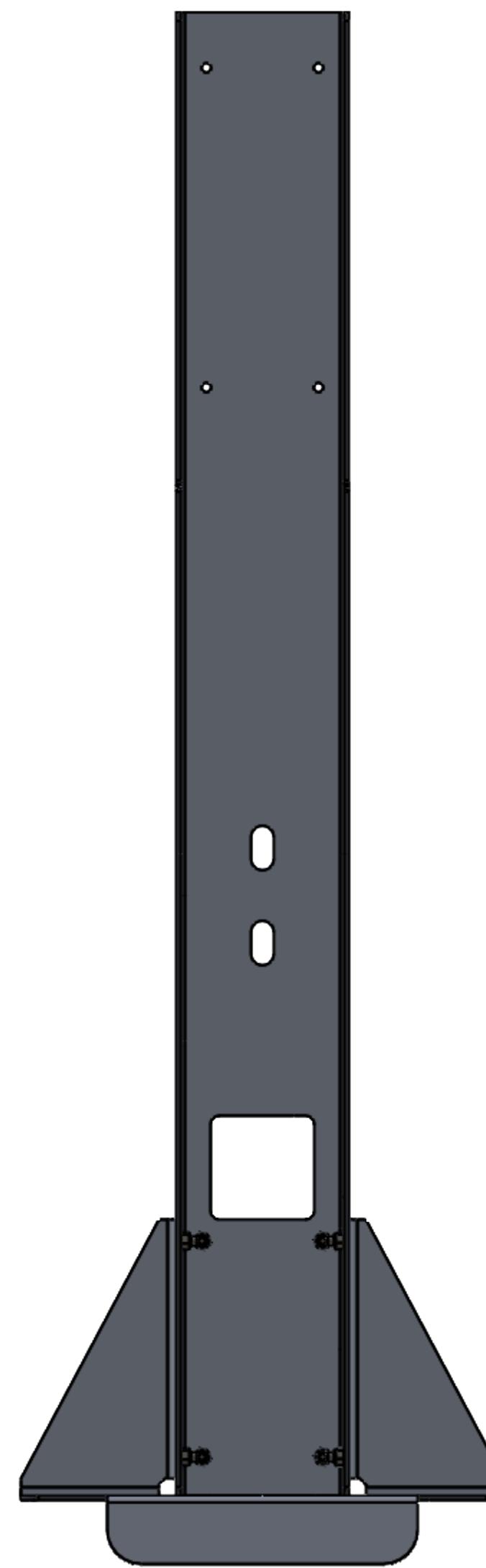
1

D

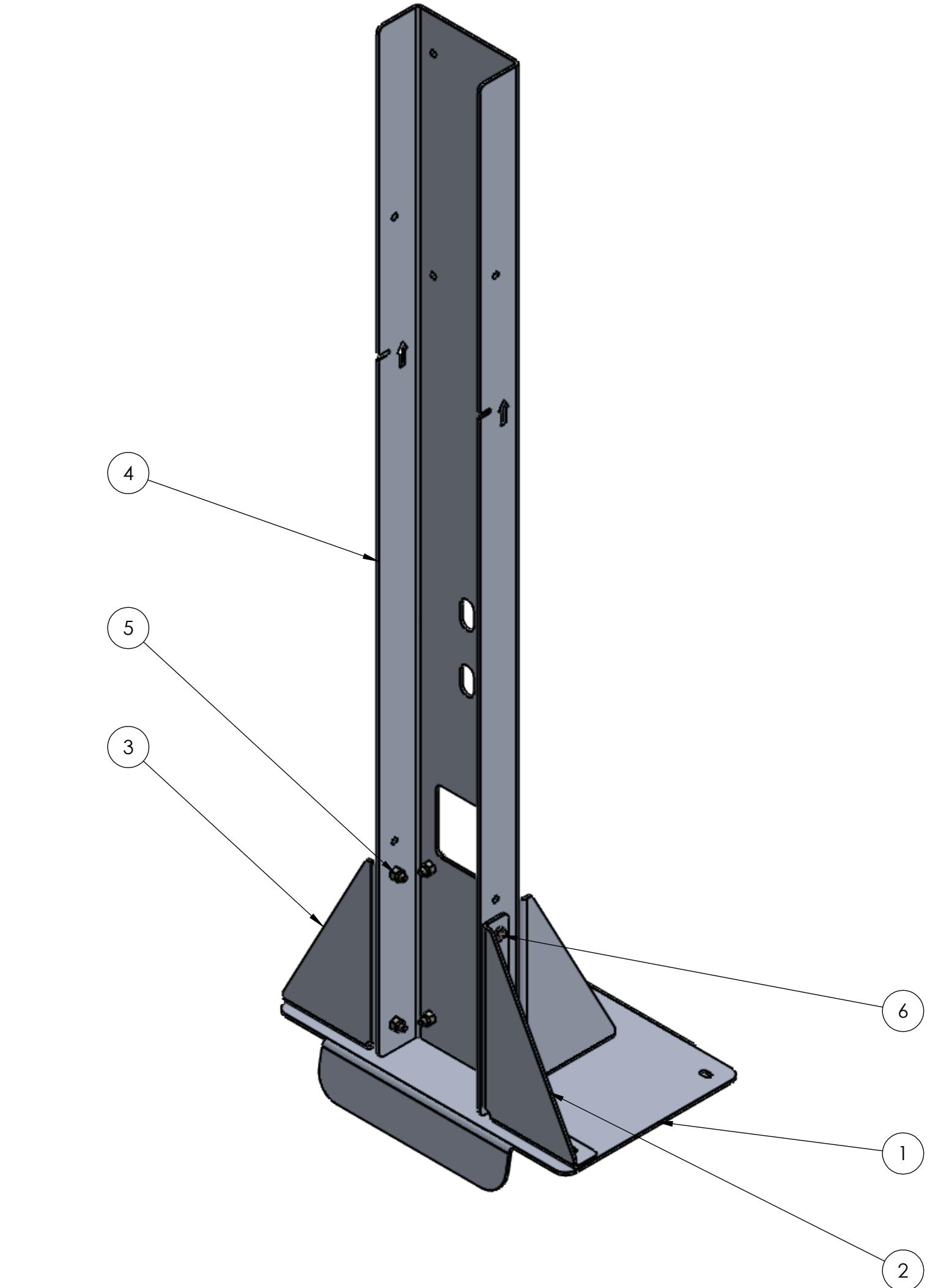
C

B

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22372	Leg Base	1
2	GE-22373	Leg Support Bracket Right	2
3	GE-22374	Leg Support Bracket Left	2
4	GE-22375	Leg Vertical Channel	1
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	14
6	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	14



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$

VEND NAME DATE

DRAWN CO 12/29/2021



TITLE:
Upright Bottom

SIZE DWG. NO. REV
C GE-22383

SCALE: 1:4 SHEET 1 OF 2

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

MATERIAL/FINISH:

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

4

3

2

1

D

D

C

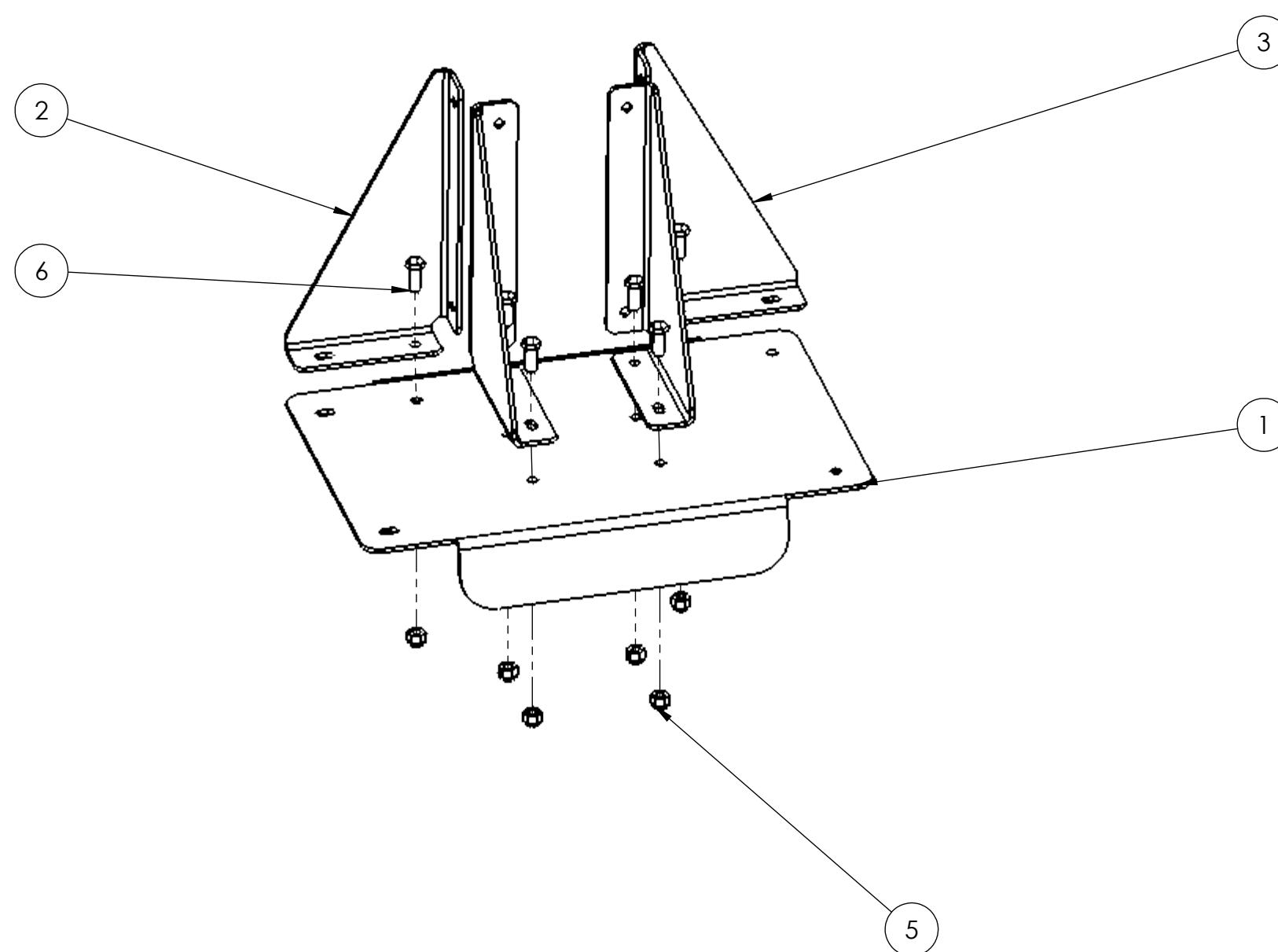
C

B

B

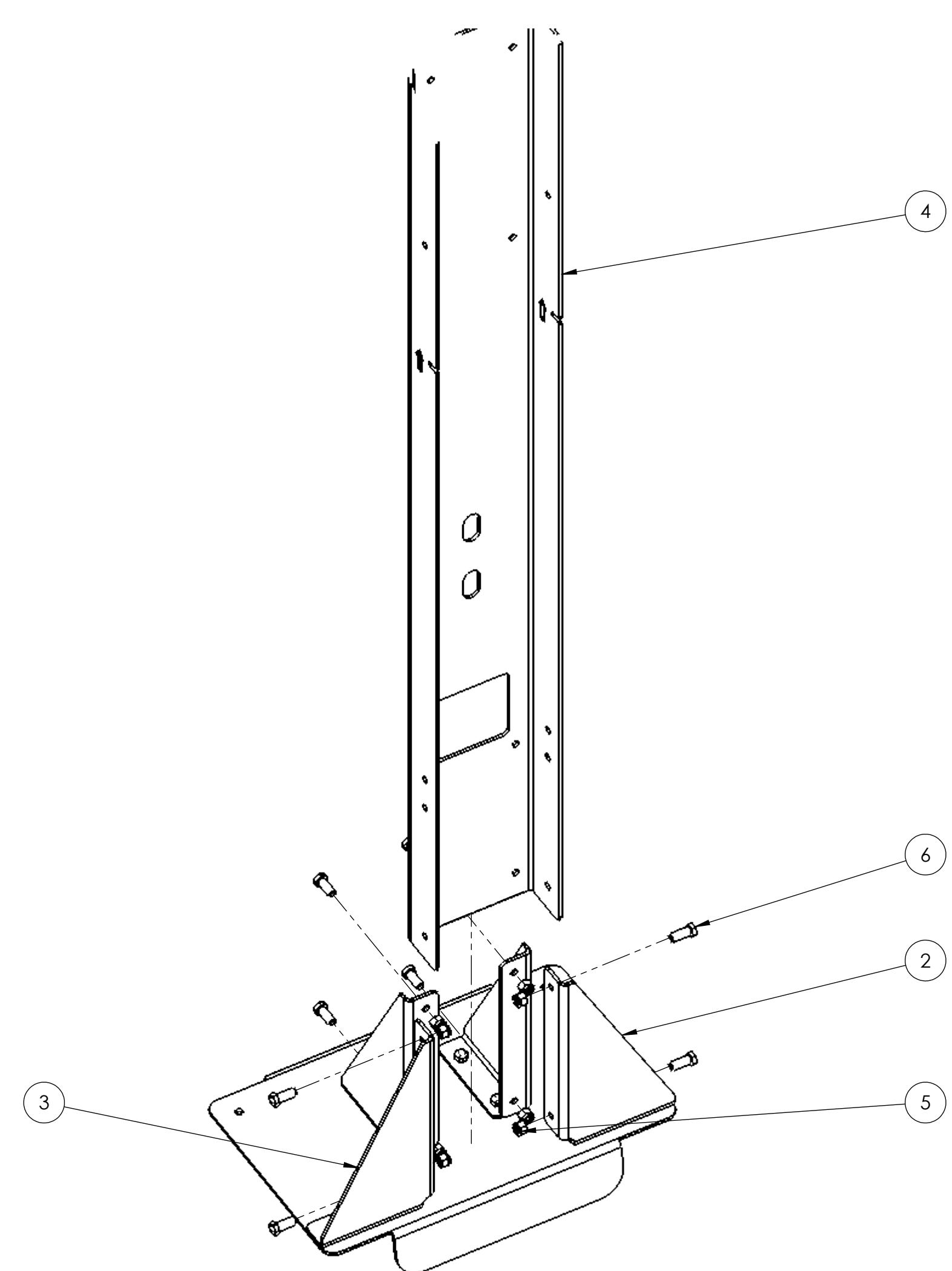
A

A



Notes:

1. Attach (2) and (3) to (1) using (6) and (5).



Notes:

1. Attach (4) to assembly using (5) and (6) to connect to (2) and (3) as shown.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	12/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22383	
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 2 OF 2	

4

3

2

1

4

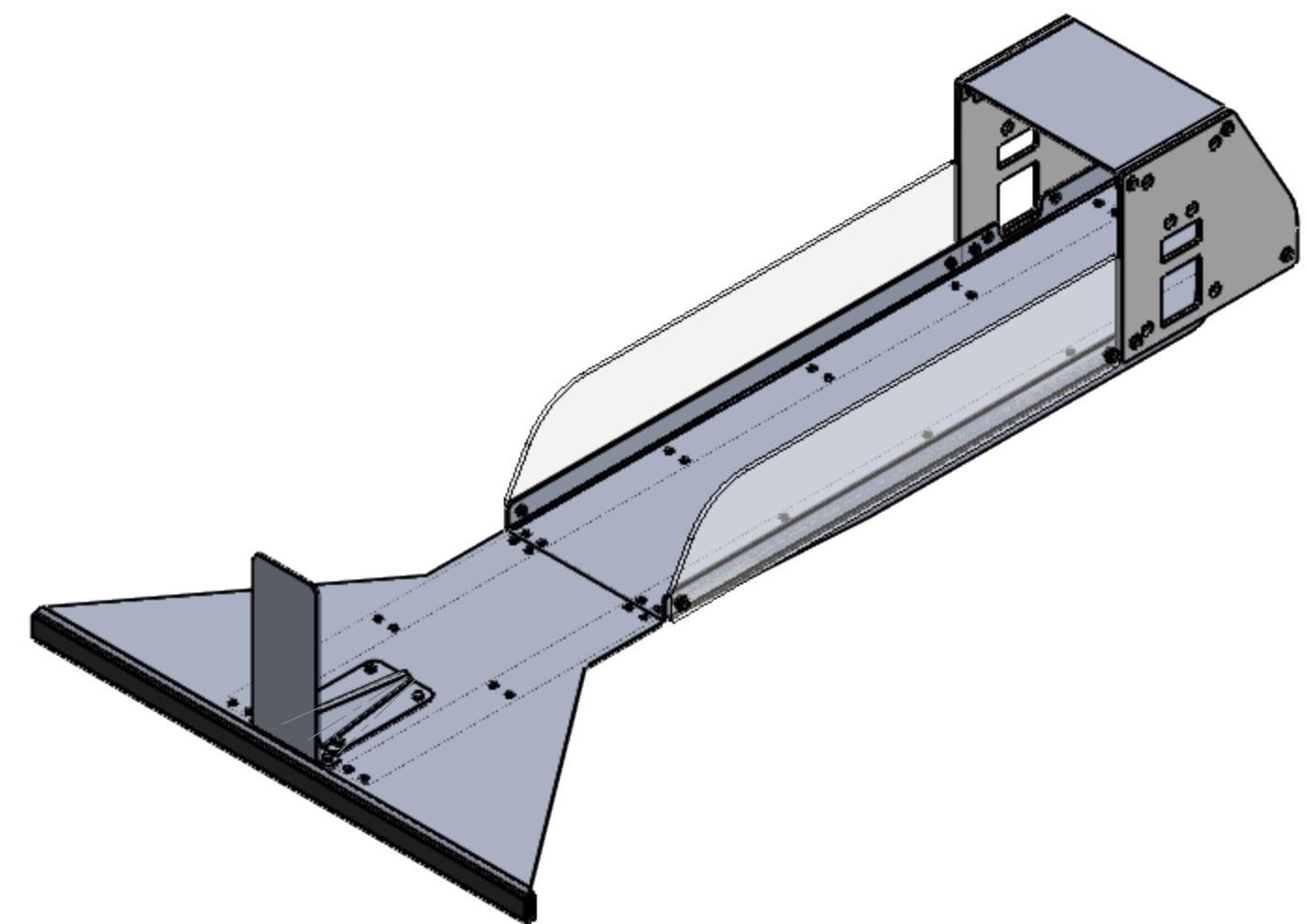
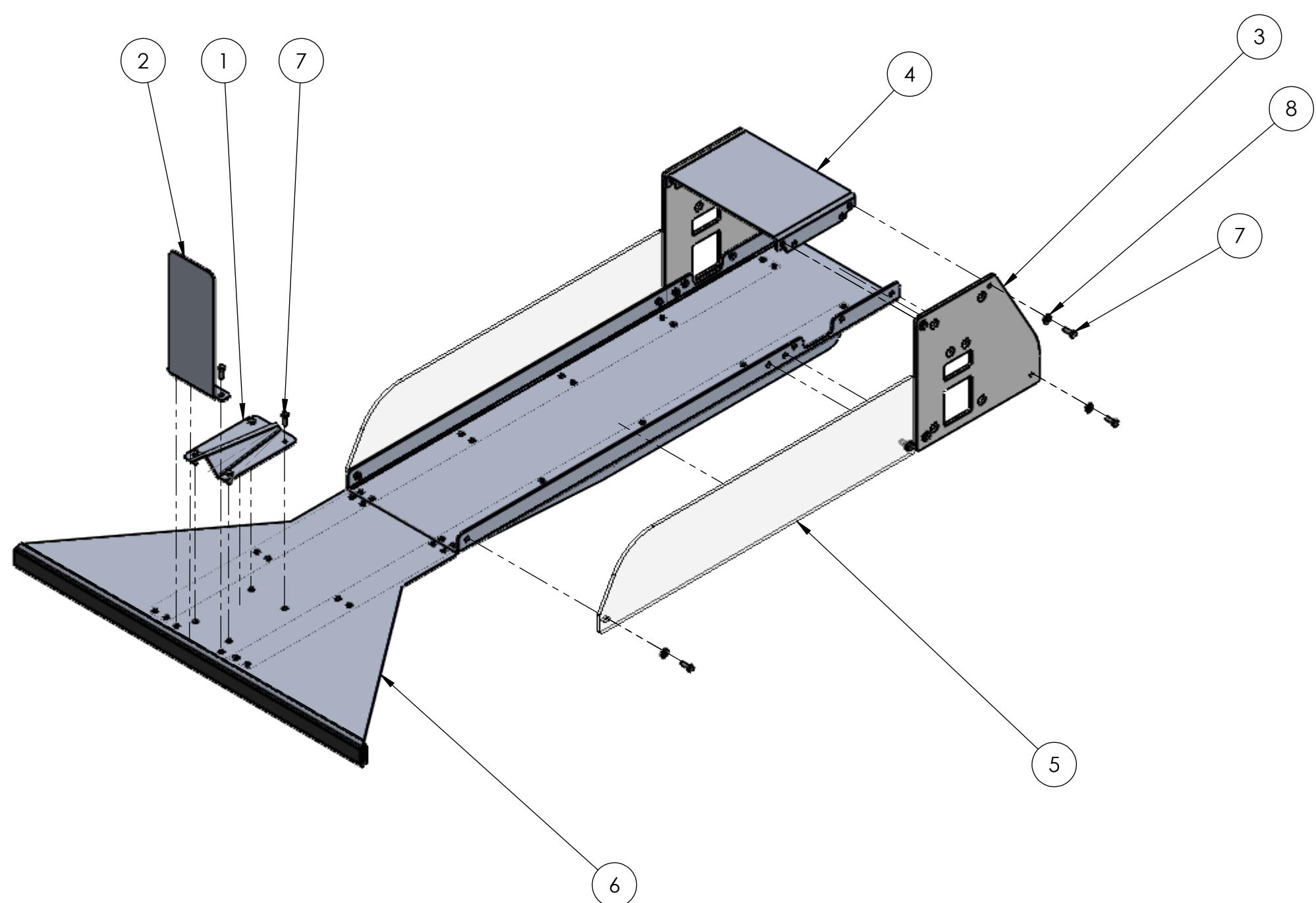
3

2

1

D

Exploded View



C

D

B

C

A

B

ITEM NO.	PART NUMBER	DESCRIPTION	
1	GE-22392	Horn	1
2	GE-22393	Horn Bounce Plate	1
3	GE-22398	Upper Exit Sensor Wall	2
4	GE-22399	Upper Exit Top with Pem Nuts	1
5	GE-22400	Upper Exit Side Wall	2
6	GE-22406	Upper Exit Sheet Metal with Foam	1
7	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	18
8	washer_flat_.25	Flat Washer for 1/4" Screw	12

UNLESS OTHERWISE SPECIFIED:

VEND NAME DATE

DRAWN KAMC 7/6/2021



TITLE: Upper Exit Assembly

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

MATERIAL/FINISH:

Tag or label with part number

DO NOT SCALE DRAWING

SIZE DWG. NO. REV
C GE-22391
SCALE: 1:8 SHEET 1 OF 2

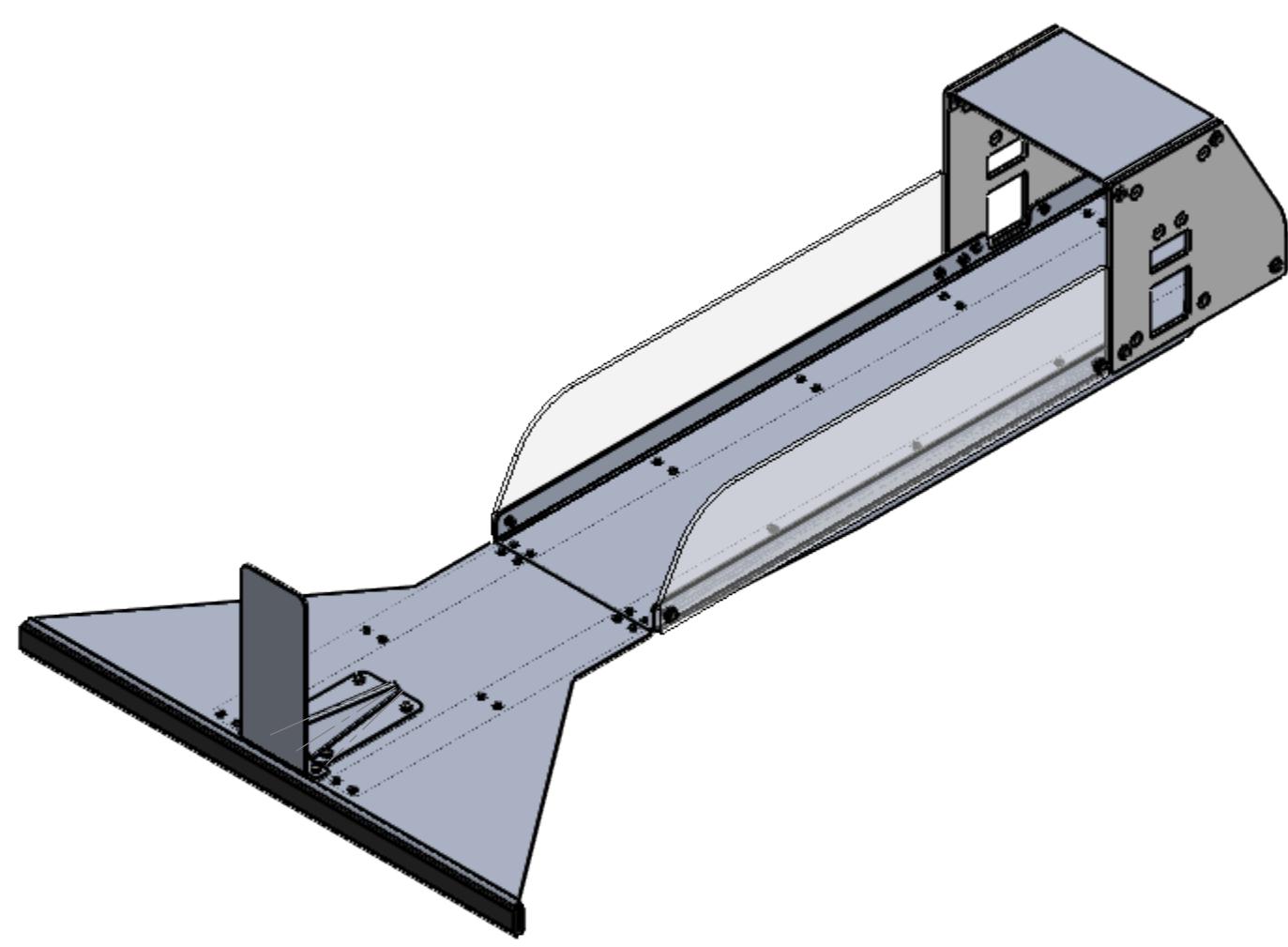
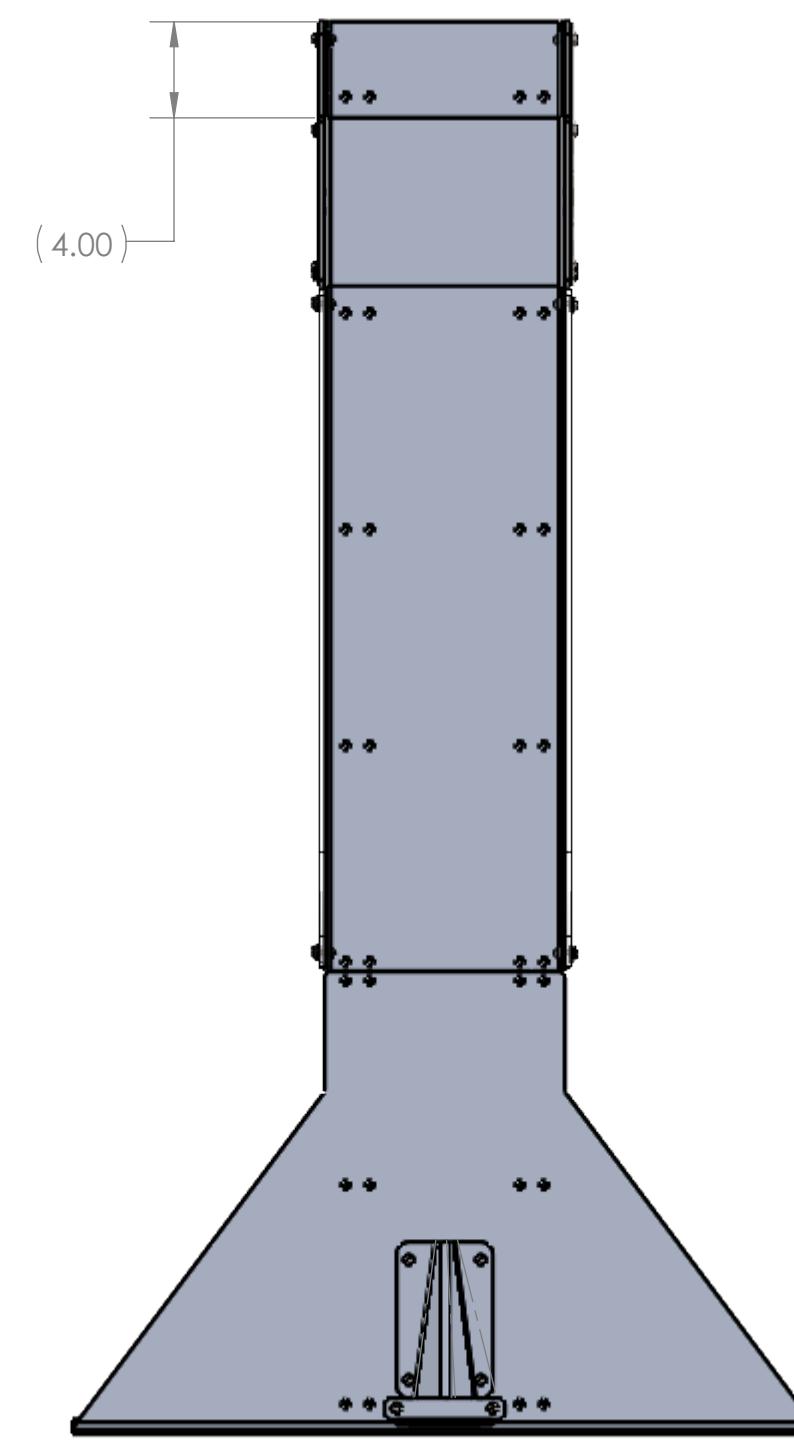
4

3

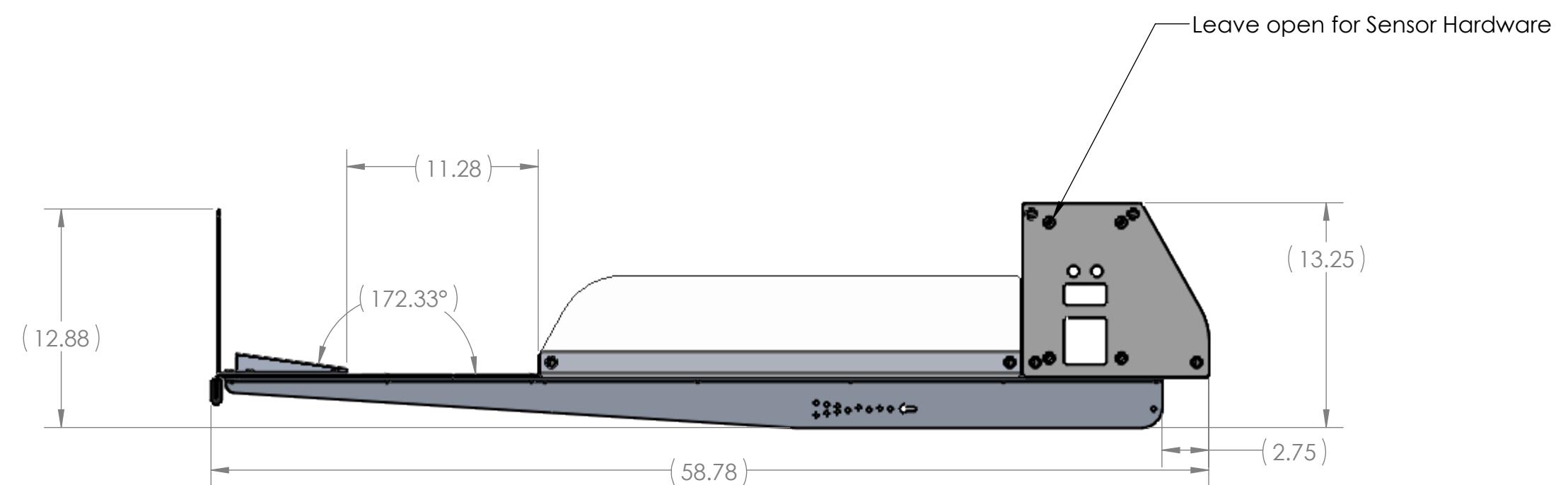
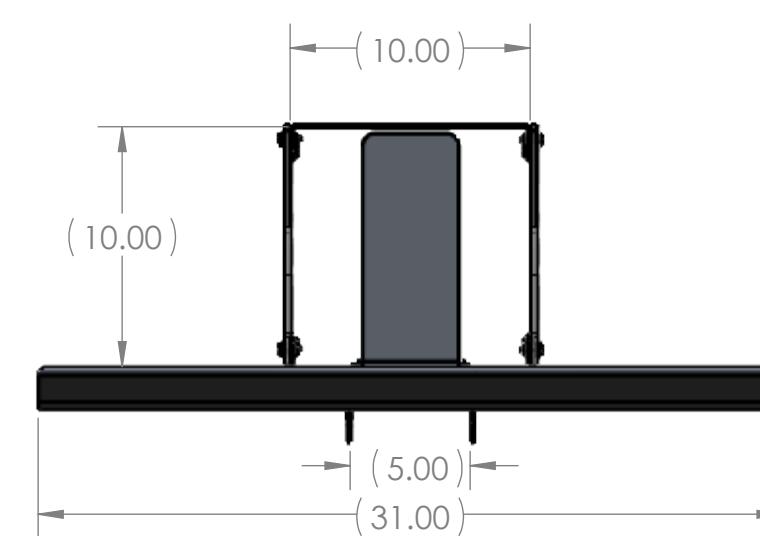
2

1

D



C



B

A

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Tag or label with part number			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner
TITLE: Upper Exit Assembly	
SIZE	DWG. NO.
C	GE-22391
REV	
SCALE: 1:8	SHEET 2 OF 2

4

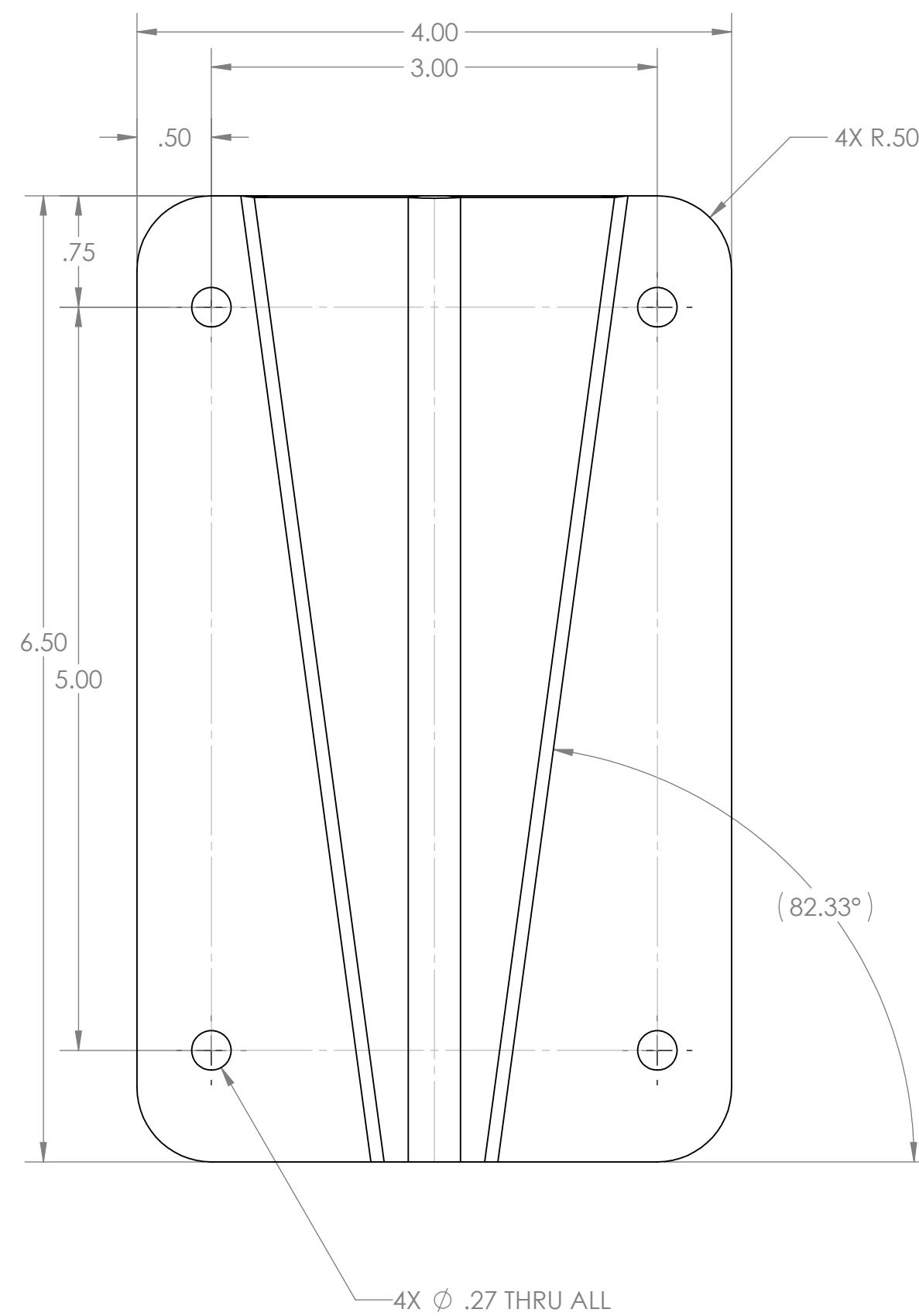
3

2

1

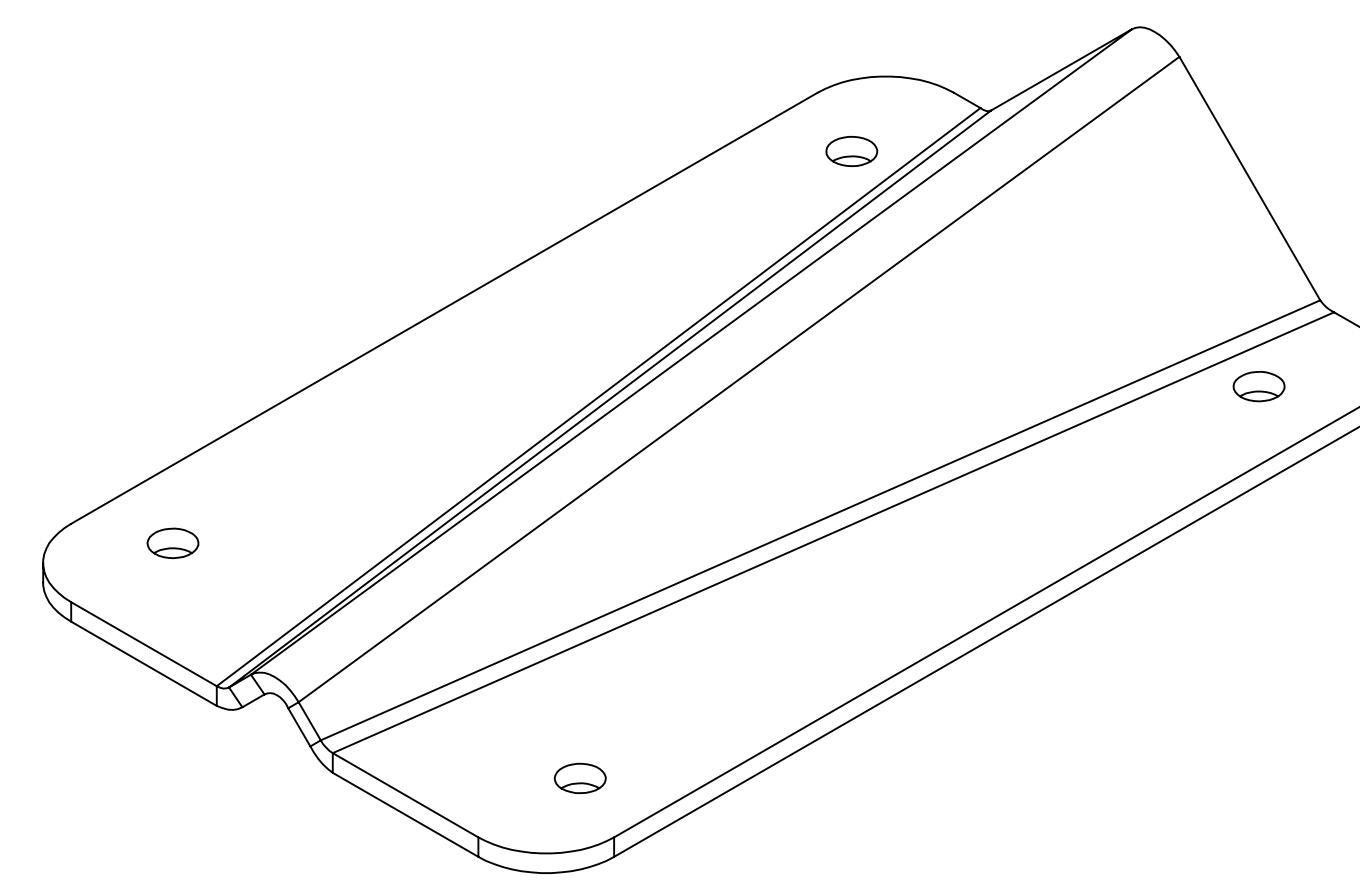
D

D



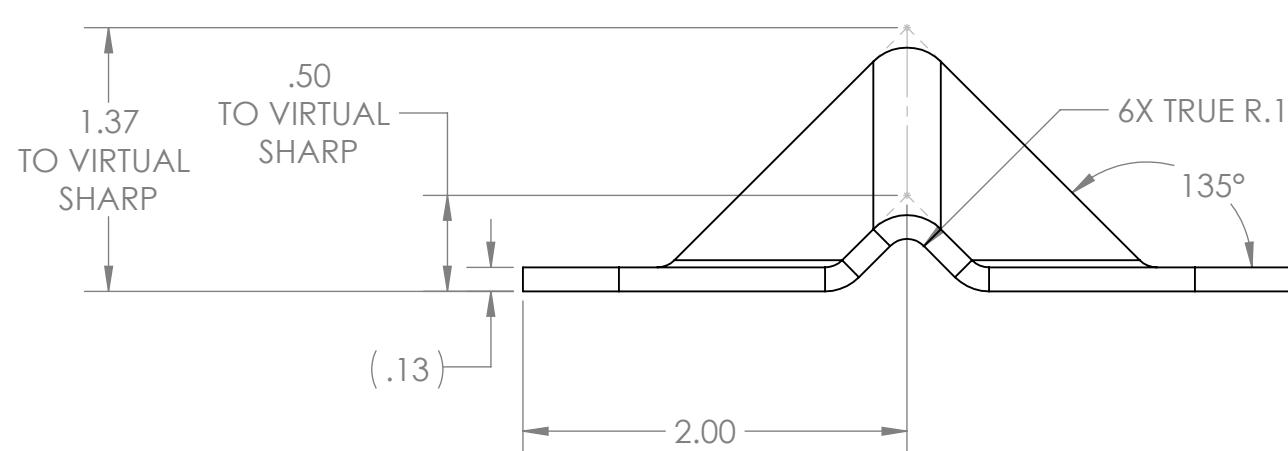
C

C



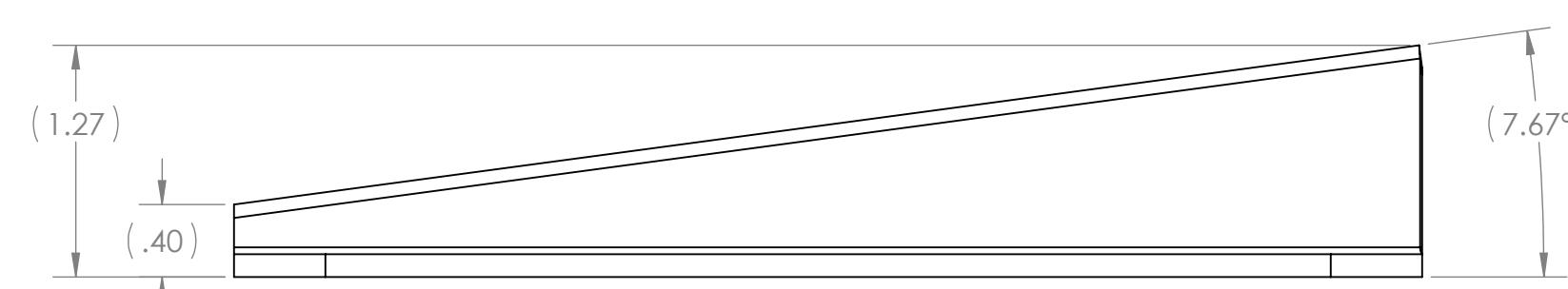
B

B



A

A



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	6/9/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE: **Horn**

SIZE DWG. NO. REV
C GE-22392

SCALE: 1:1 SHEET 1 OF 1

D

D

C

C

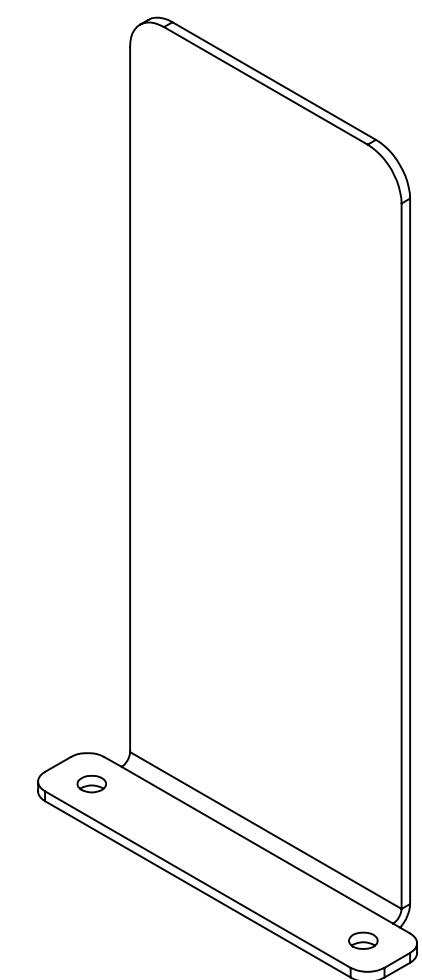
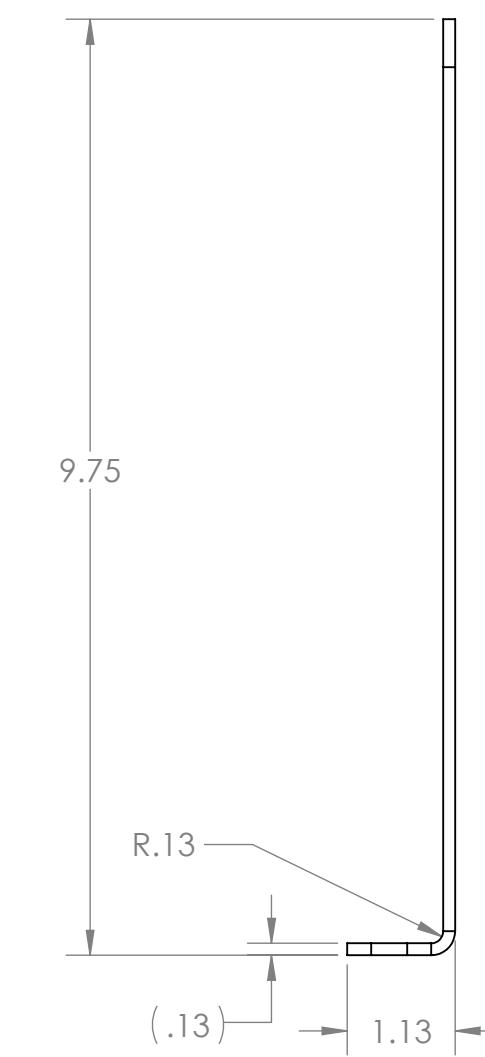
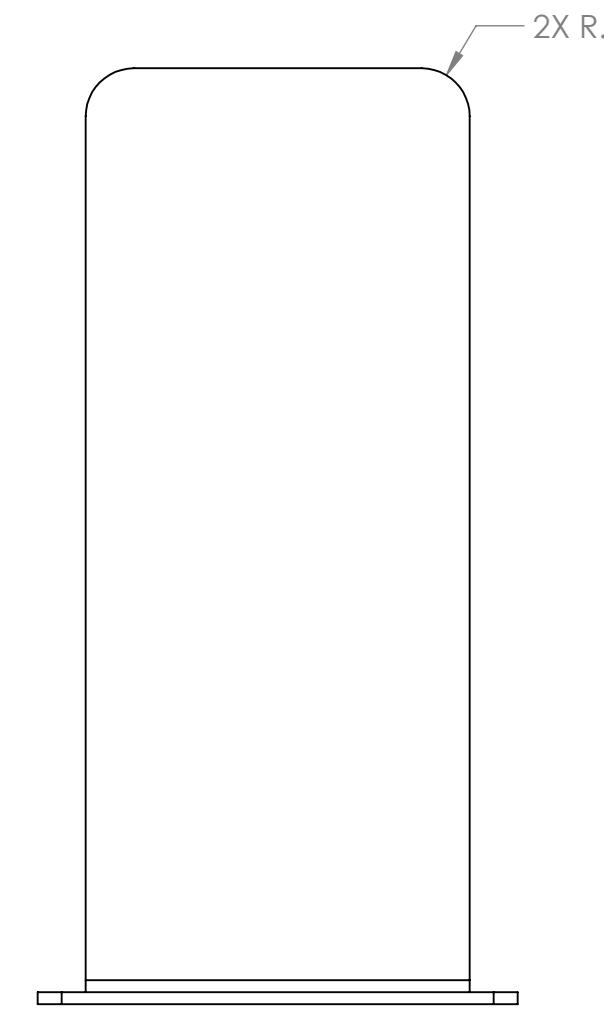
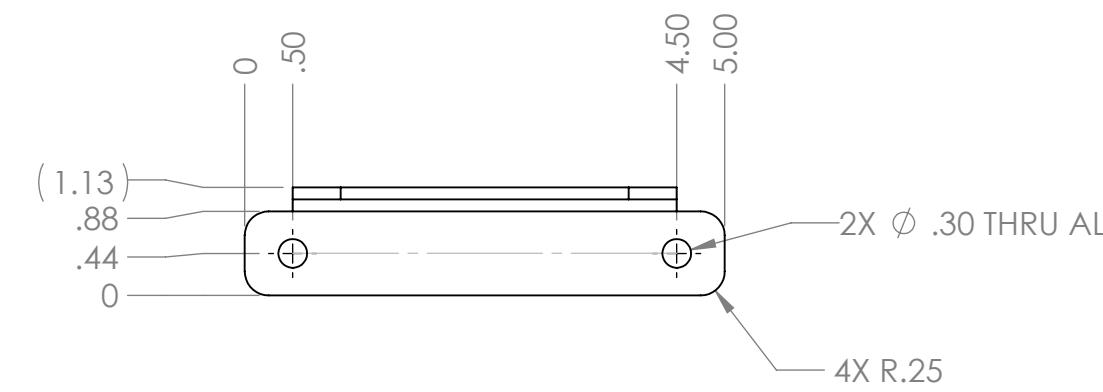
B

B

A

A

Notes:
1. Tag or label with part number



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Horn Bounce
Plate**

SIZE DWG. NO. REV
C GE-22393

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

D

D

C

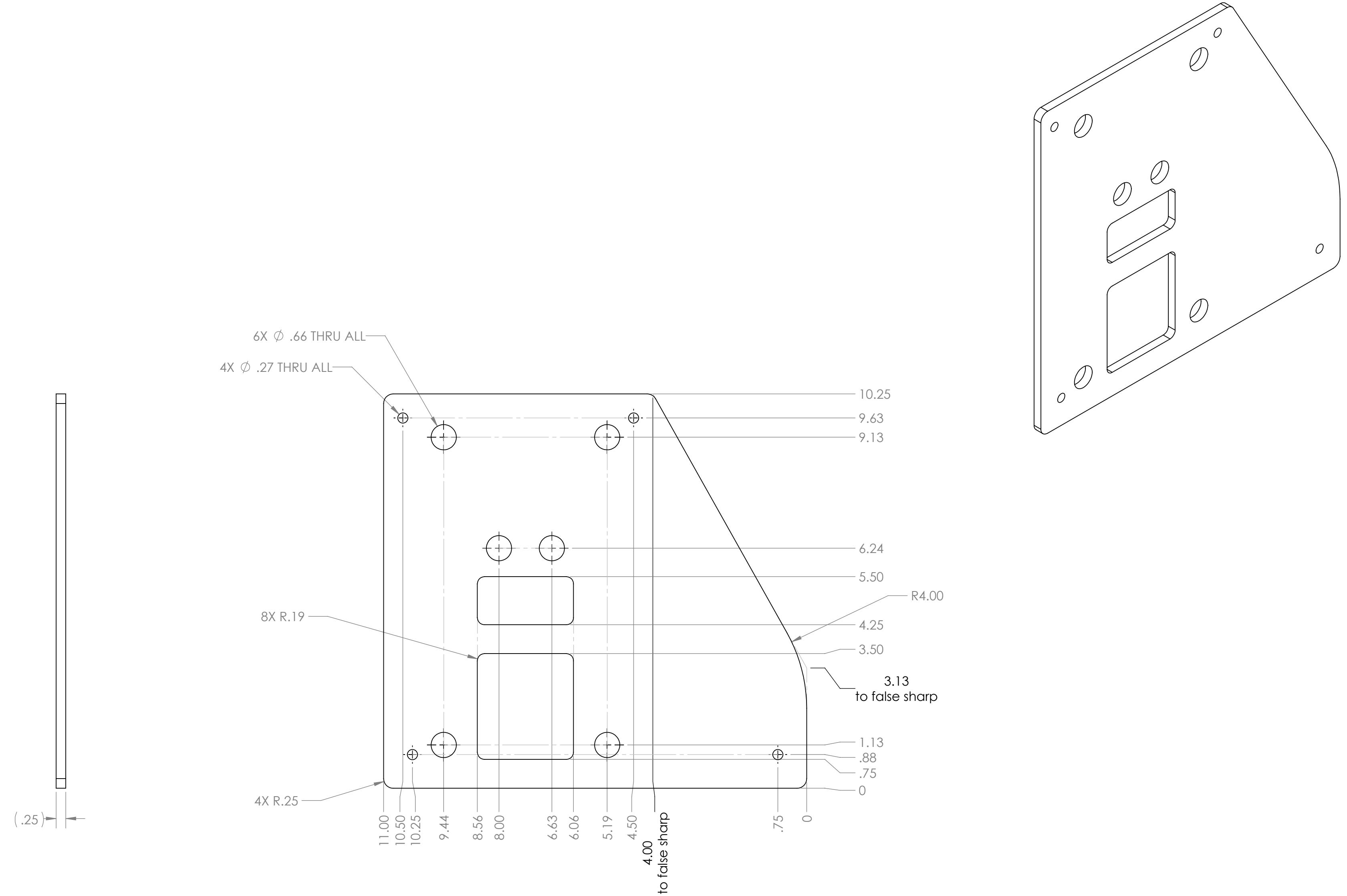
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/4" HDPE, Smooth, White/Natural			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			



TITLE:
**Upper Exit
Sensor Wall**

SIZE DWG. NO. REV
C GE-22398

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

D

D

C

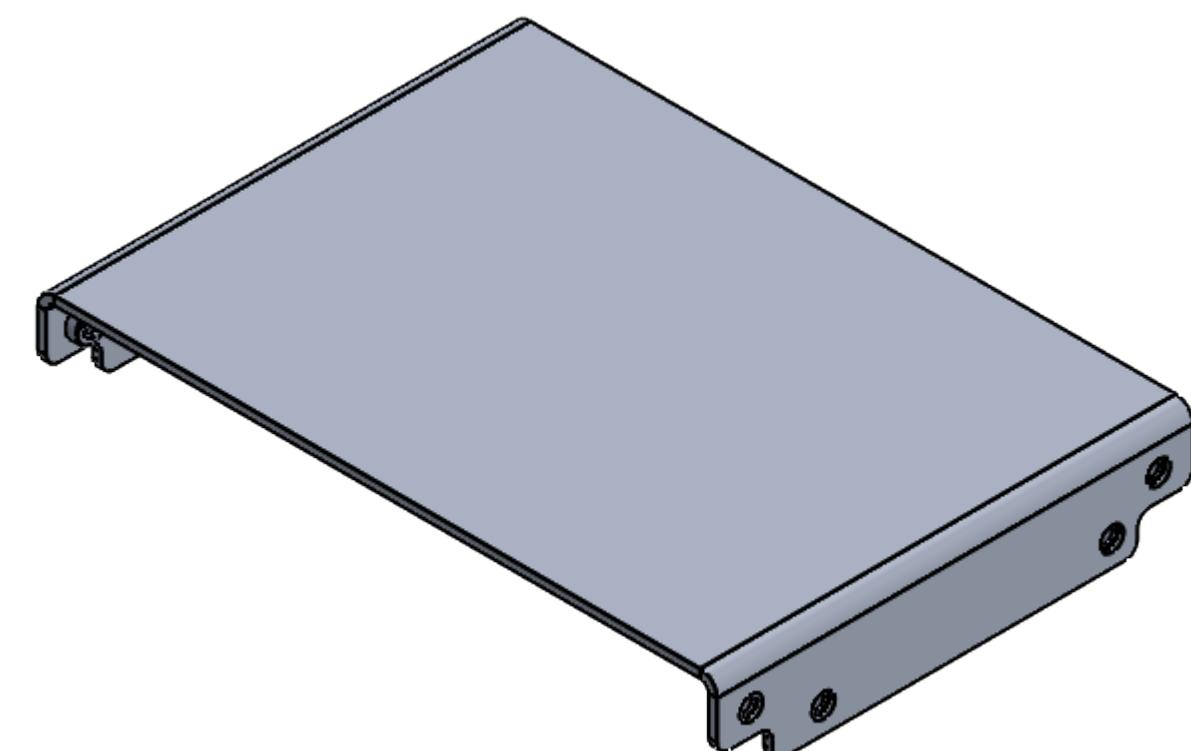
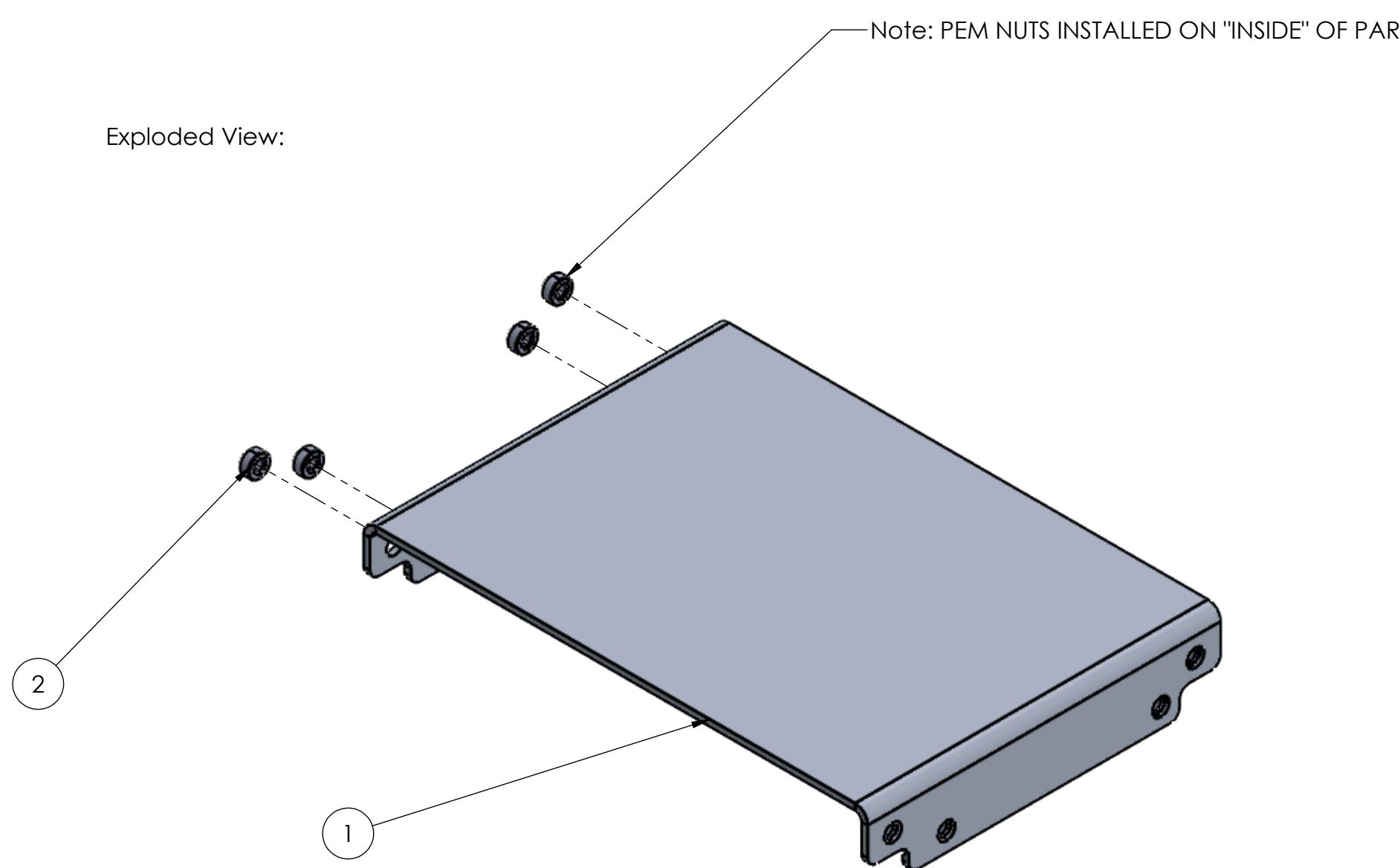
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22399-01	Upper Exit Top	1
2	pem_clinchnut_.25_20 .054	1/4-20 self-clinching nut, .054 shank	8

UNLESS OTHERWISE SPECIFIED:

VEND NAME DATE

DRAWN KAMC 7/6/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

Tag or label with part number

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

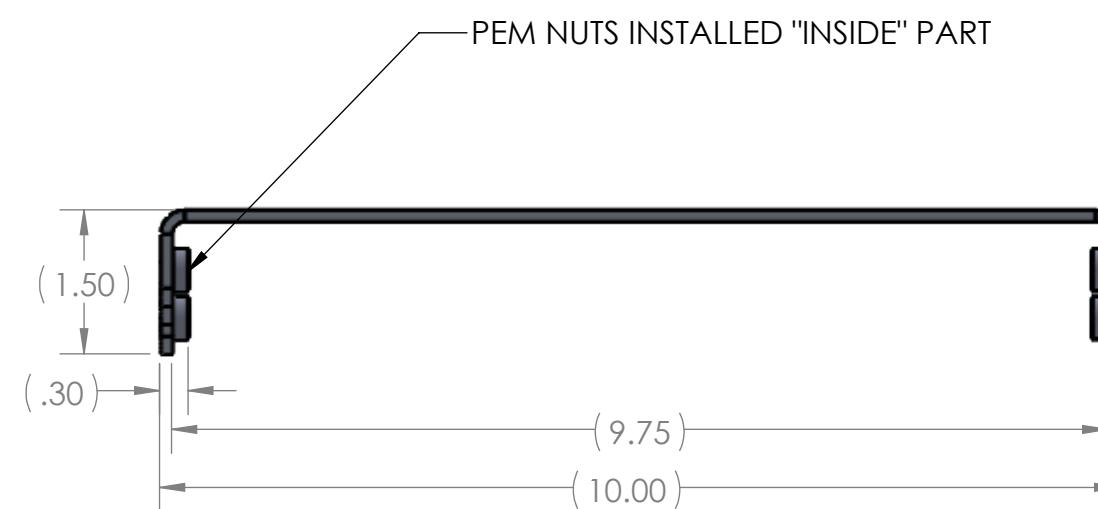
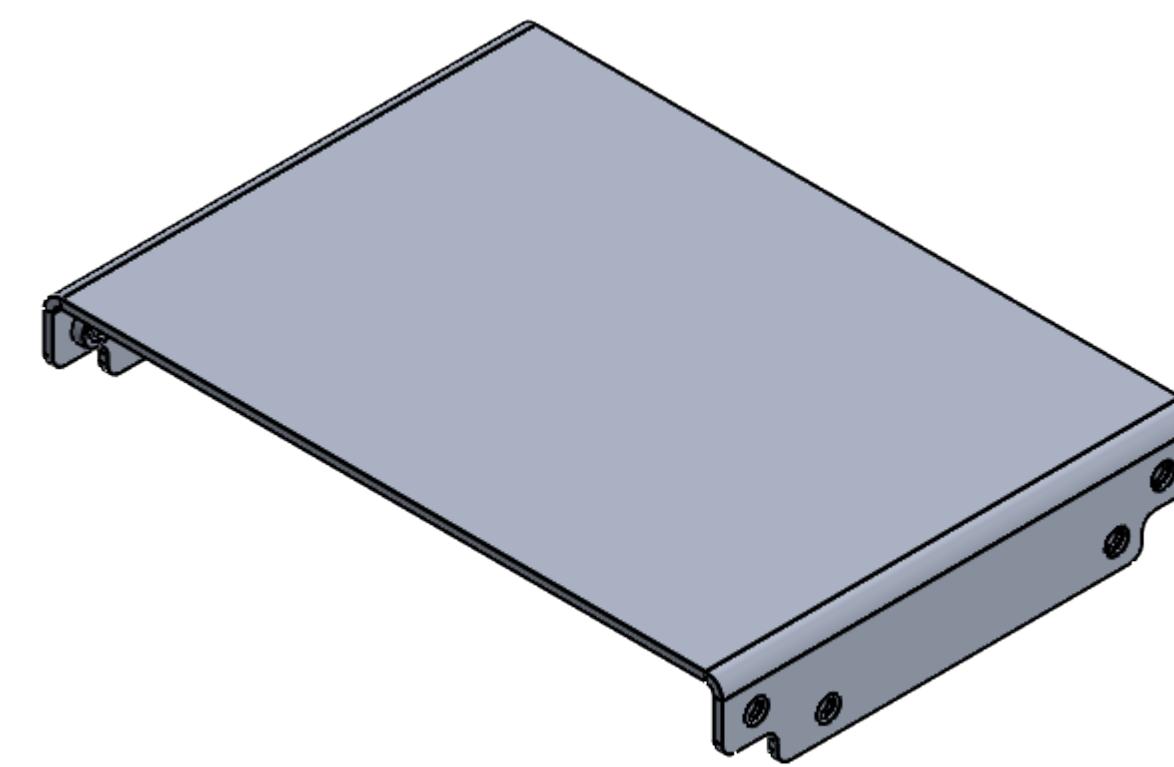
TITLE:
Upper Exit Top with Pem Nuts

SIZE DWG. NO. REV

C GE-22399

SCALE: 1:2 SHEET 1 OF 2

D



B

C

A

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
Tag or label with part number	C	GE-22399	
COMMENTS:		SCALE: 1:2	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 2 OF 2	
DO NOT SCALE DRAWING			

D

C

B

A

4

3

2

1

D

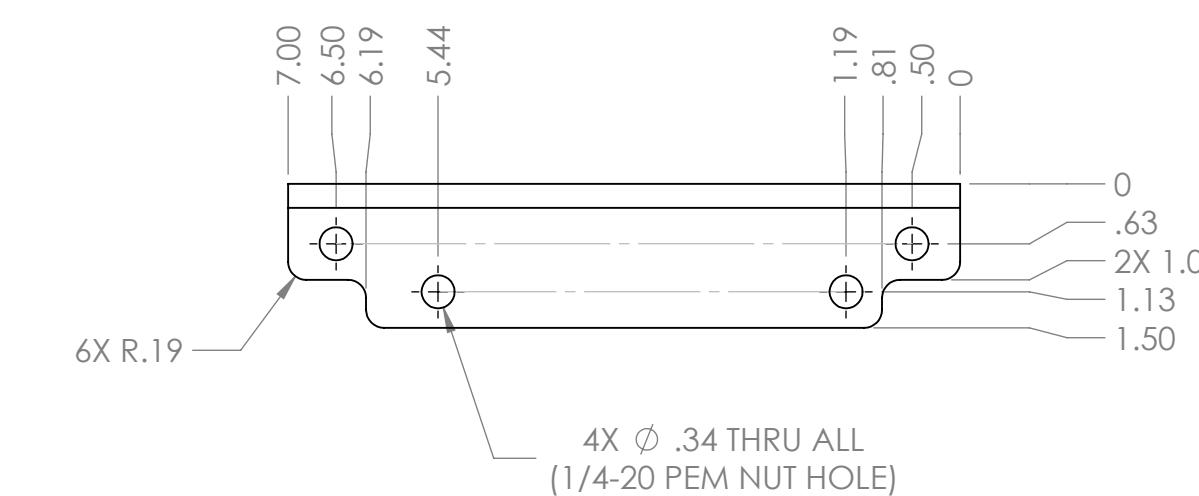
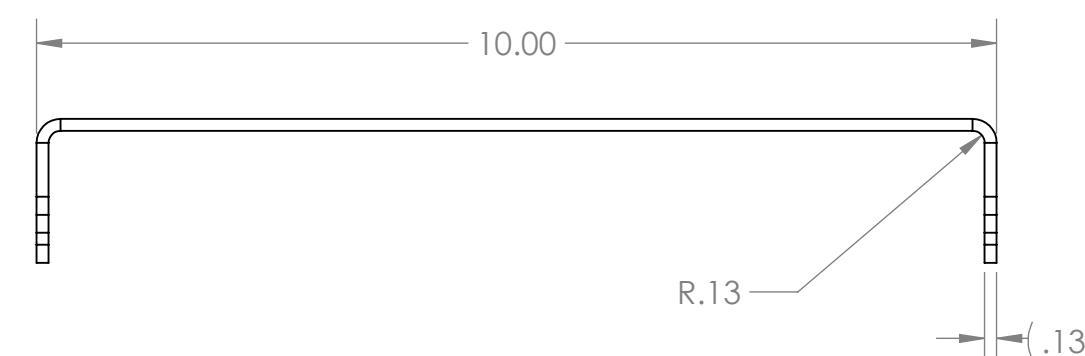
D

C

C

B

B



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/8" 5052 Aluminum Sheet	C	GE-22399-01	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:2	SHEET 1 OF 1	

 **FIRST
ROBOTICS
COMPETITION** 
Modeling Solutions Partner

TITLE: **Upper Exit Top**

4

3

2

1

4

3

2

1

D

D

C

C

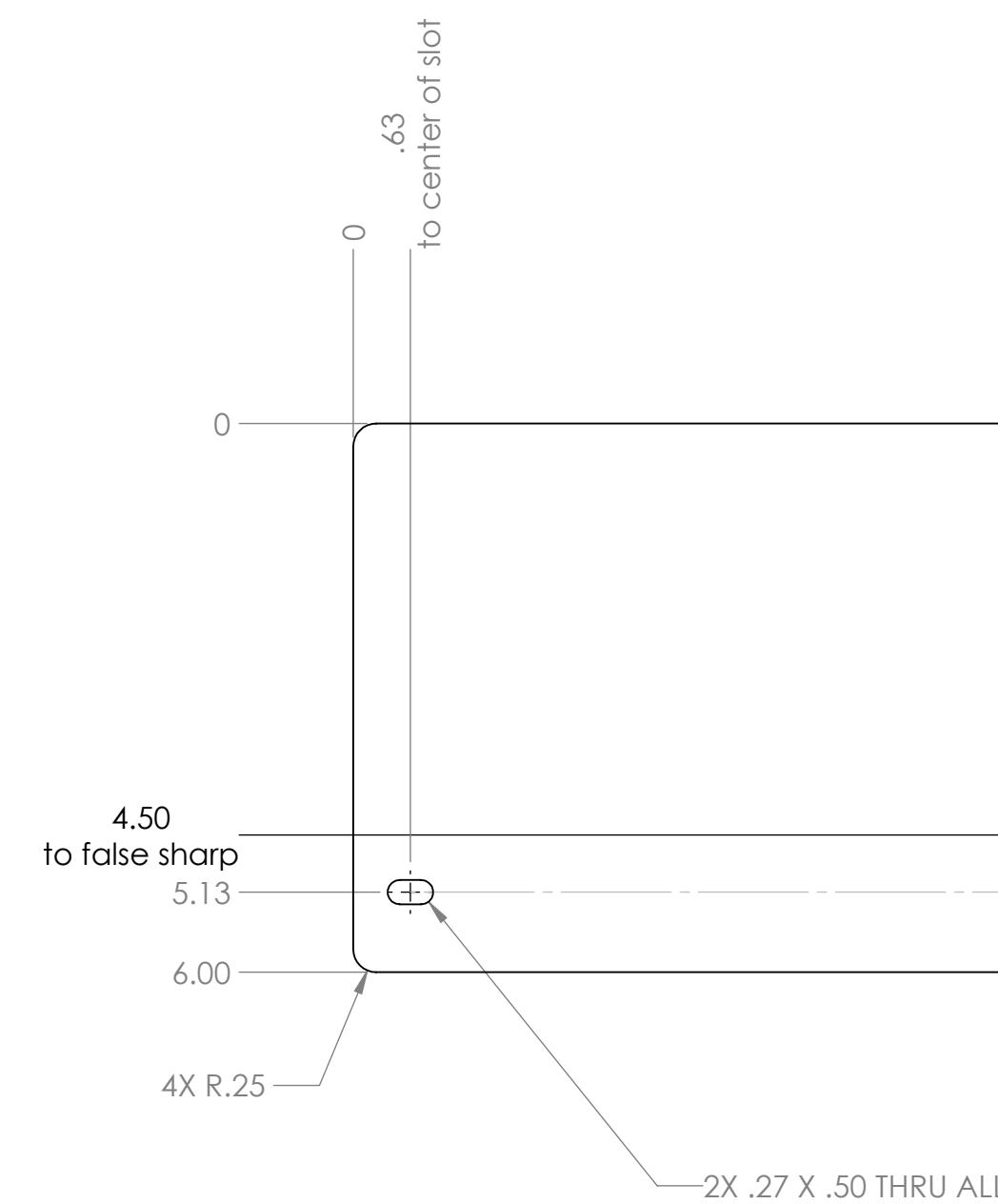
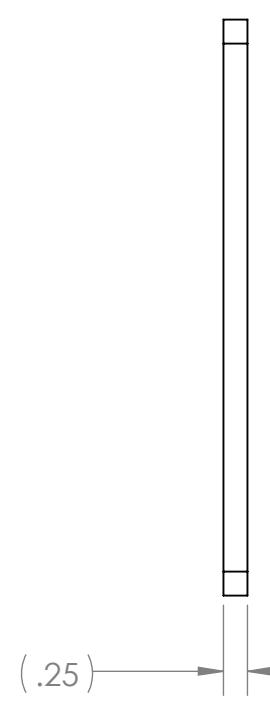
B

B

A

A

Notes:
1. Tag or label with part number



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/4" Poly, Clear	C	GE-22400	
COMMENTS:		REMOVE ALL BURRS AND SHARP EDGES.	
DO NOT SCALE DRAWING		SCALE: 1:2	SHEET 1 OF 1

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Upper Exit Side Wall

SIZE DWG. NO. REV
C GE-22400

4

3

2

1

4

3

2

1

D

D

C

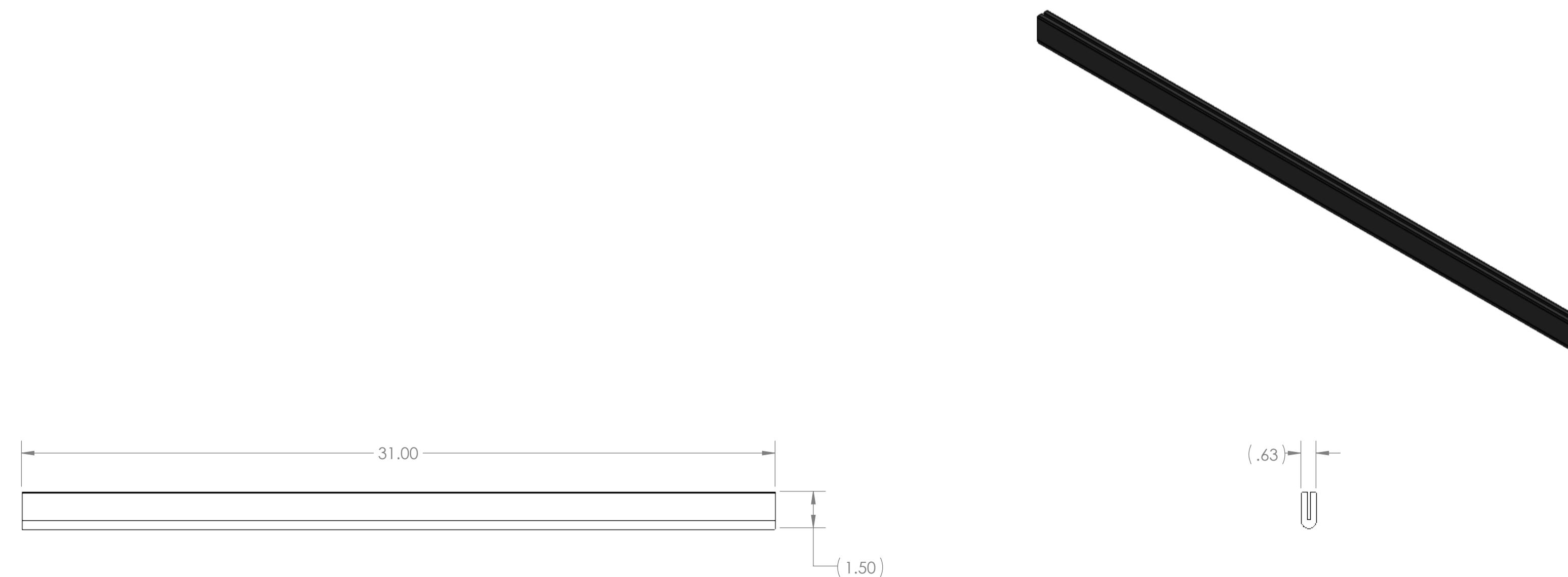
C

B

B

A

A



DESCRIPTION: U SHAPE EDGE PROTECTORS

VENDOR: M2CBRIDGE VIA AMAZON

COLOR: BLACK

PACKAGE QUANTITY: 1 - 6.5 FEET

NOTES:

1. SUBSTITUTIONS ALLOWED
2. CUT TO LENGTH

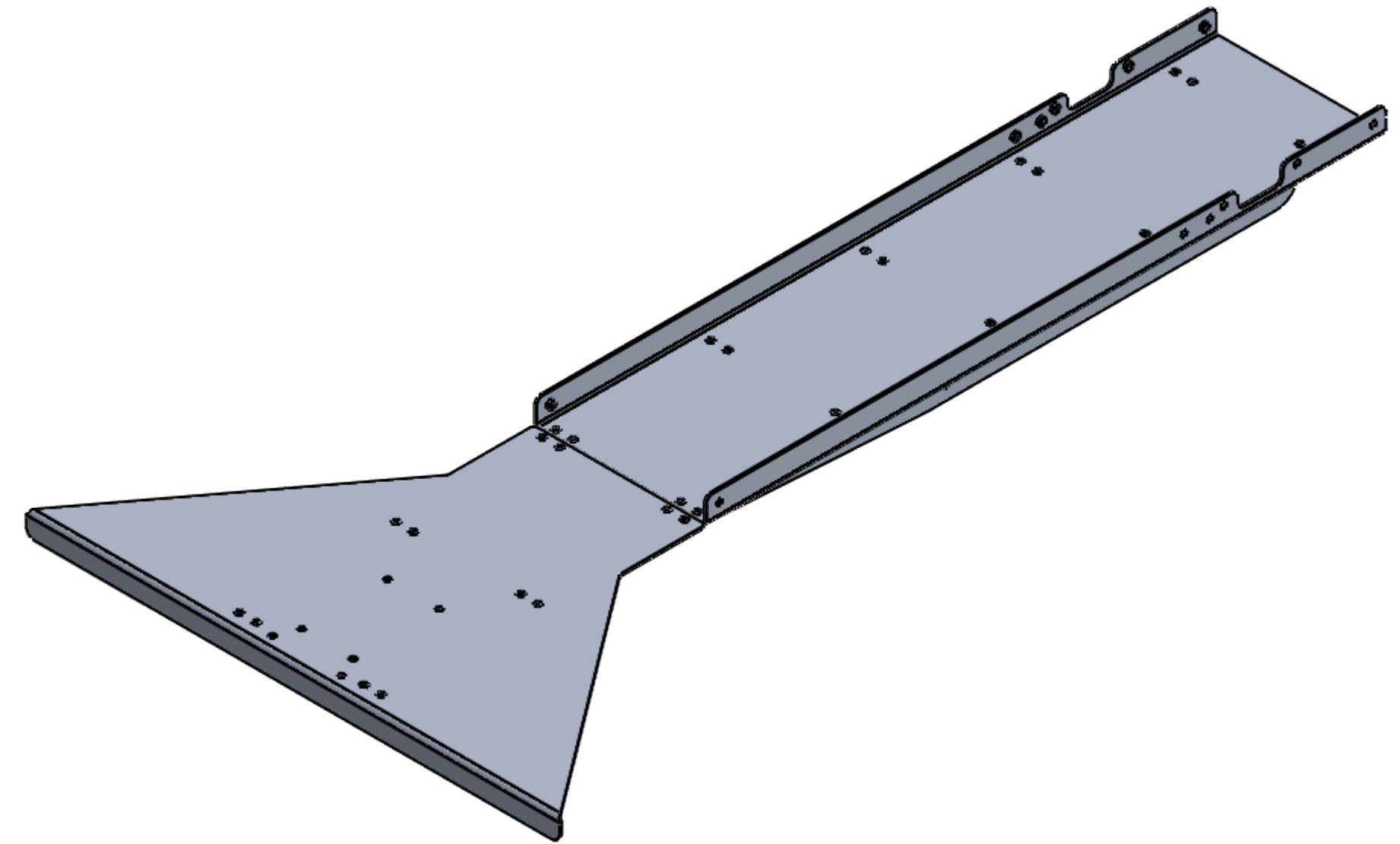
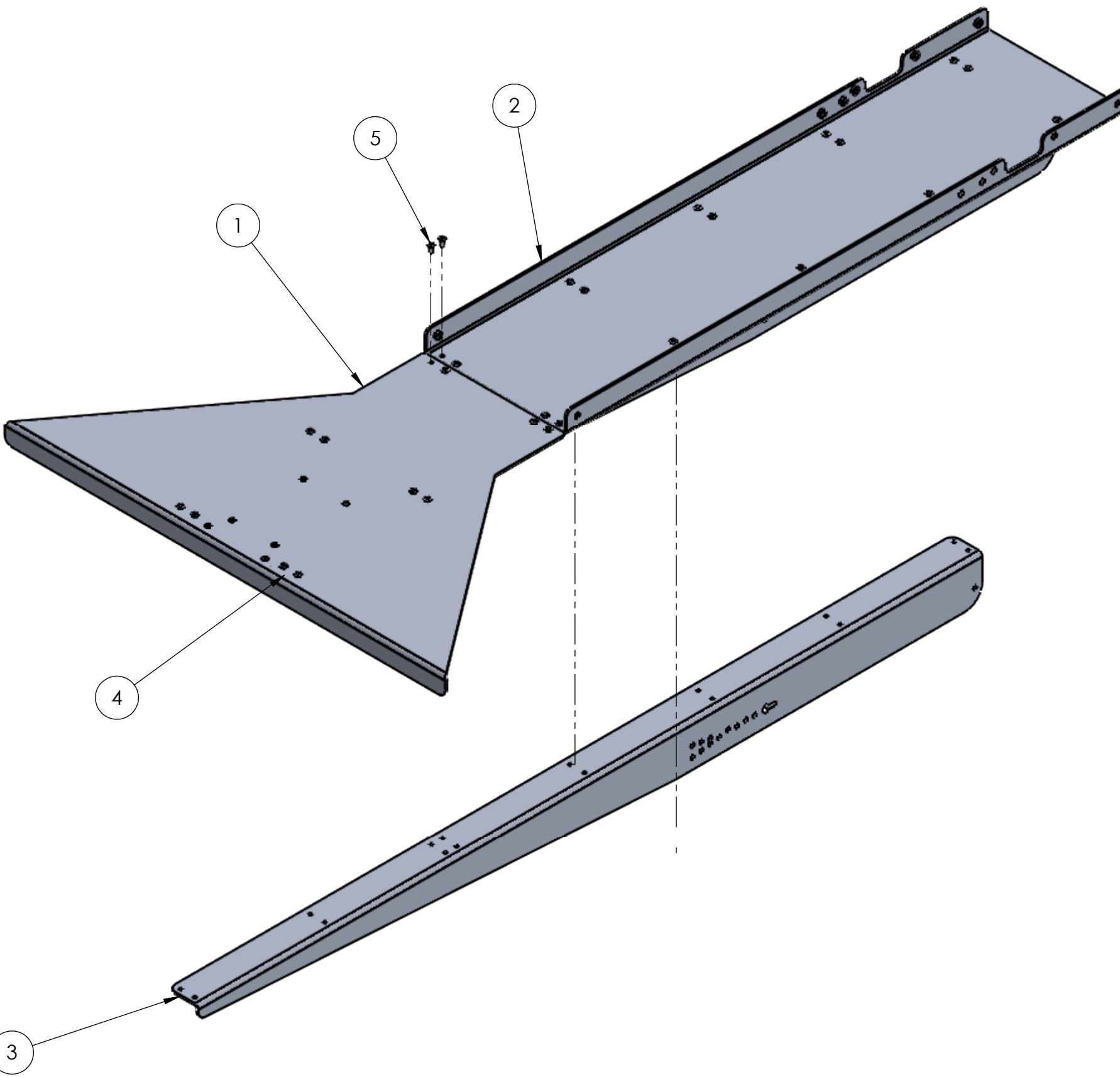
UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner			
TITLE: Upper Exit Foam Edge SIZE DWG. NO. REV C GE-22401			
SCALE: 1:4 SHEET 1 OF 1			

4

3

2

1



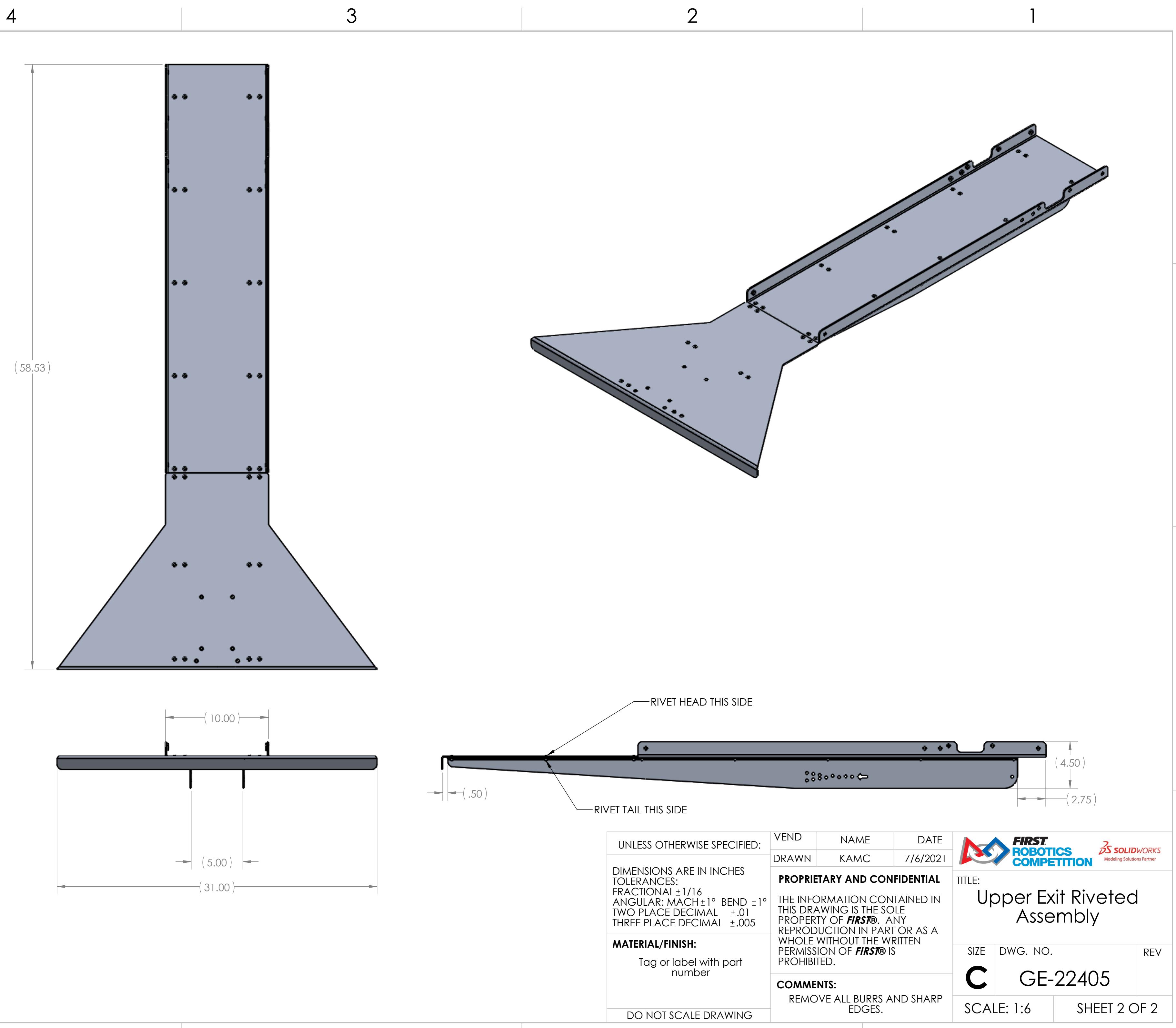
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22394	Upper Exit Exit with Pem Nuts	1
2	GE-22395	Upper Exit Base Channel with Pem Nuts	1
3	GE-22397	Upper Exit to Leg Connection Left	1
4	GE-22396	Upper Exit to Leg Connection Right	1
5	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	33

UNLESS OTHERWISE SPECIFIED:		
VEND	NAME	DATE
DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH: Tag or label with part number		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING		REV
SIZE	DWG. NO.	REV
C	GE-22405	
SCALE: 1:6		SHEET 1 OF 2

 FIRST
ROBOTICS
COMPETITION

 SOLIDWORKS
Modeling Solutions Partner

TITLE:
Upper Exit Riveted
Assembly



4

3

2

1

D

D

C

C

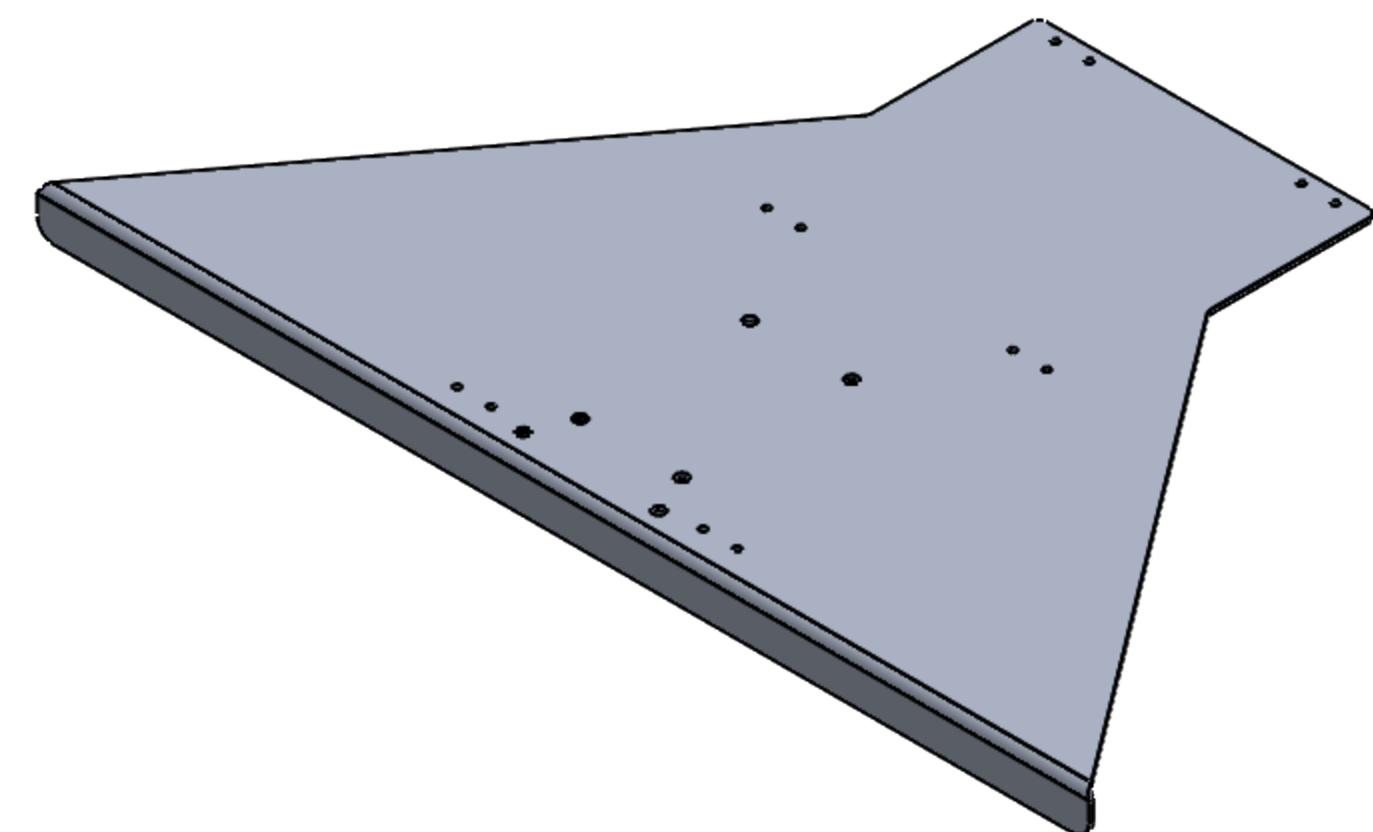
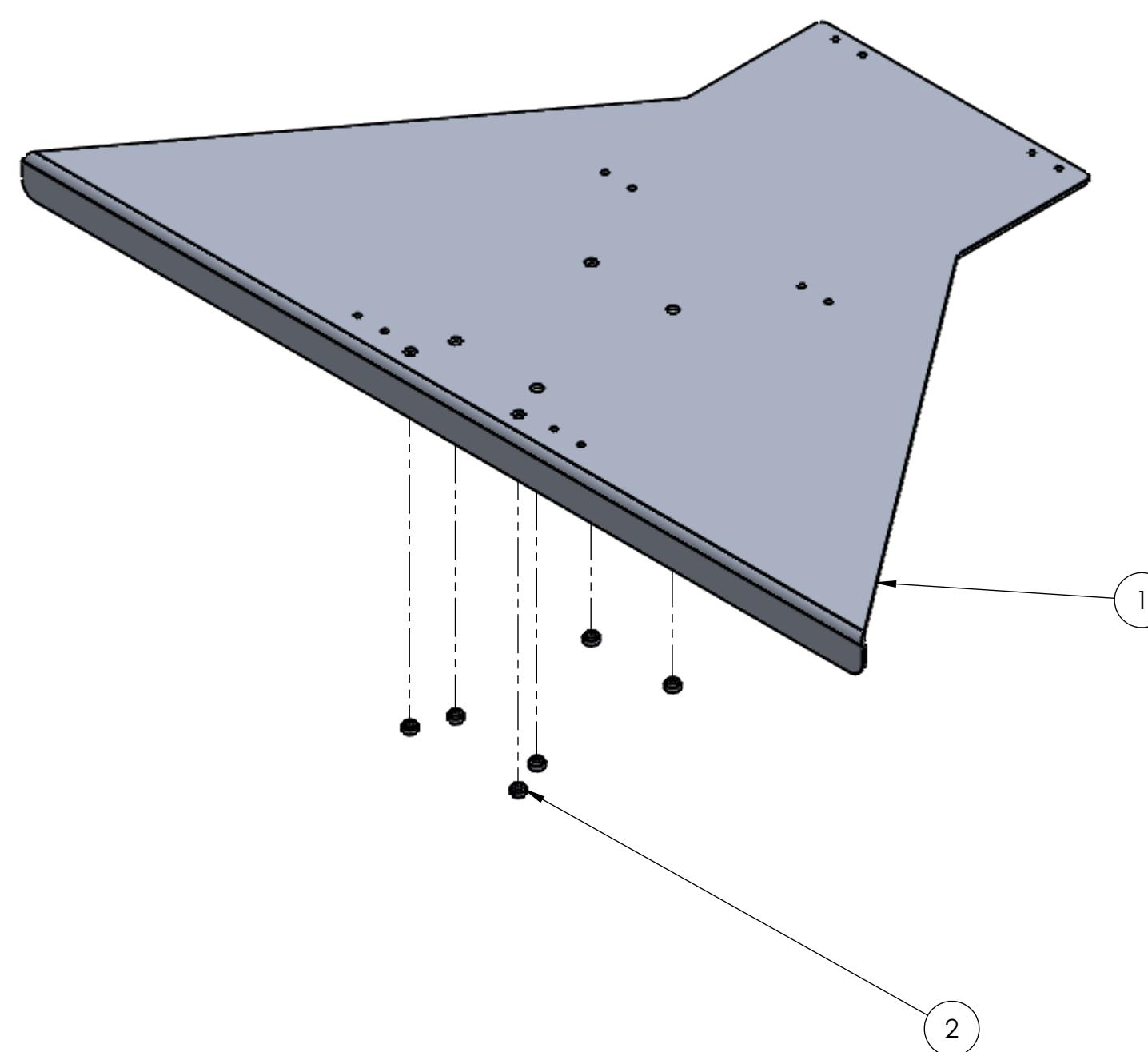
B

B

A

A

Exploded View:



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22394-01	Upper Exit Exit	1
2	pem_clinchnut_.25_20 .054	1/4-20 self-clinching nut, .054 shank	6

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm\frac{1}{16}$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

Tag or label with part number

DO NOT SCALE DRAWING

VEND	NAME	DATE
DRAWN	KAMC	7/6/2021

**FIRST
ROBOTICS
COMPETITION** DS SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Upper Exit Exit
with Pem Nuts**

SIZE	DWG. NO.	REV
C	GE-22394	

SCALE: 1:4	SHEET 1 OF 2
------------	--------------

4

3

2

1

4

3

2

1

D

D

C

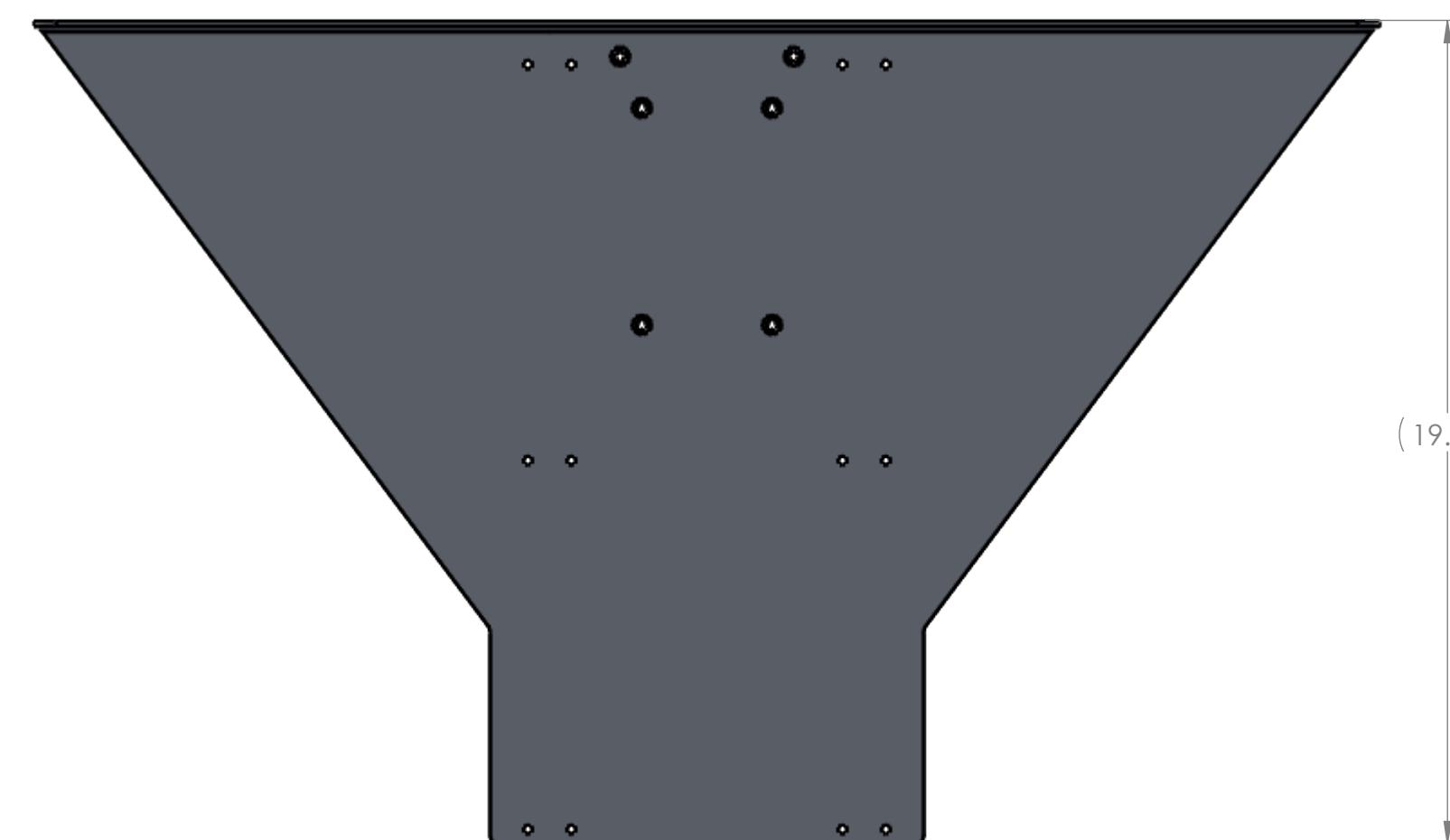
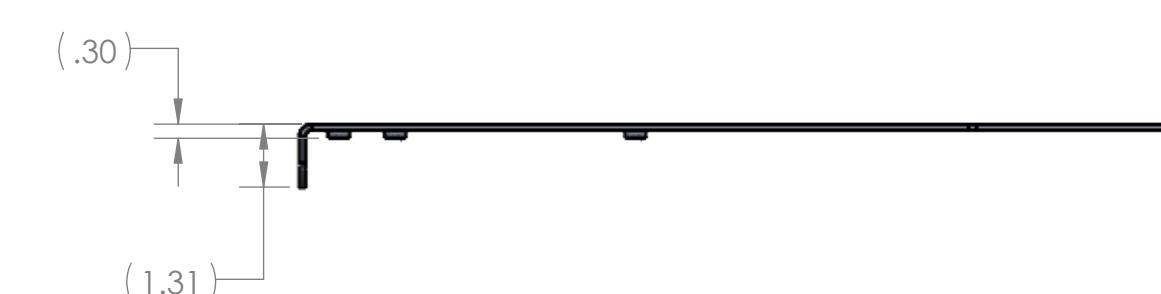
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	7/6/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
Tag or label with part number	C	GE-22394	
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 2 OF 2	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

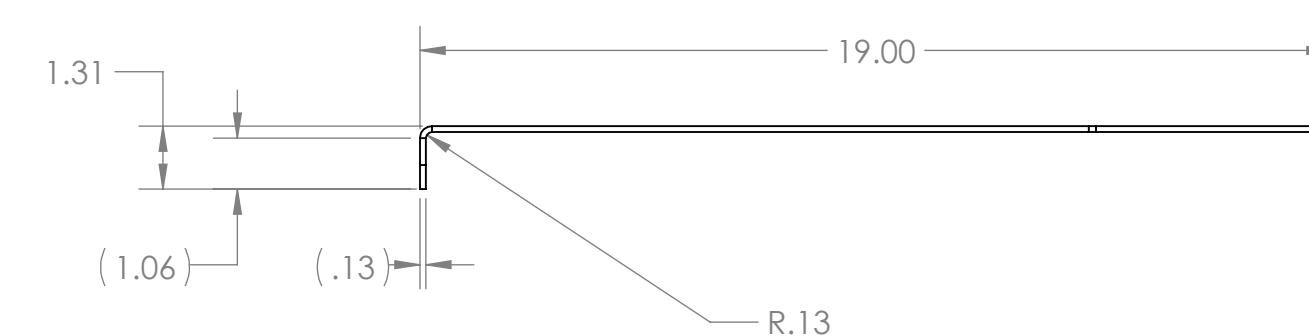
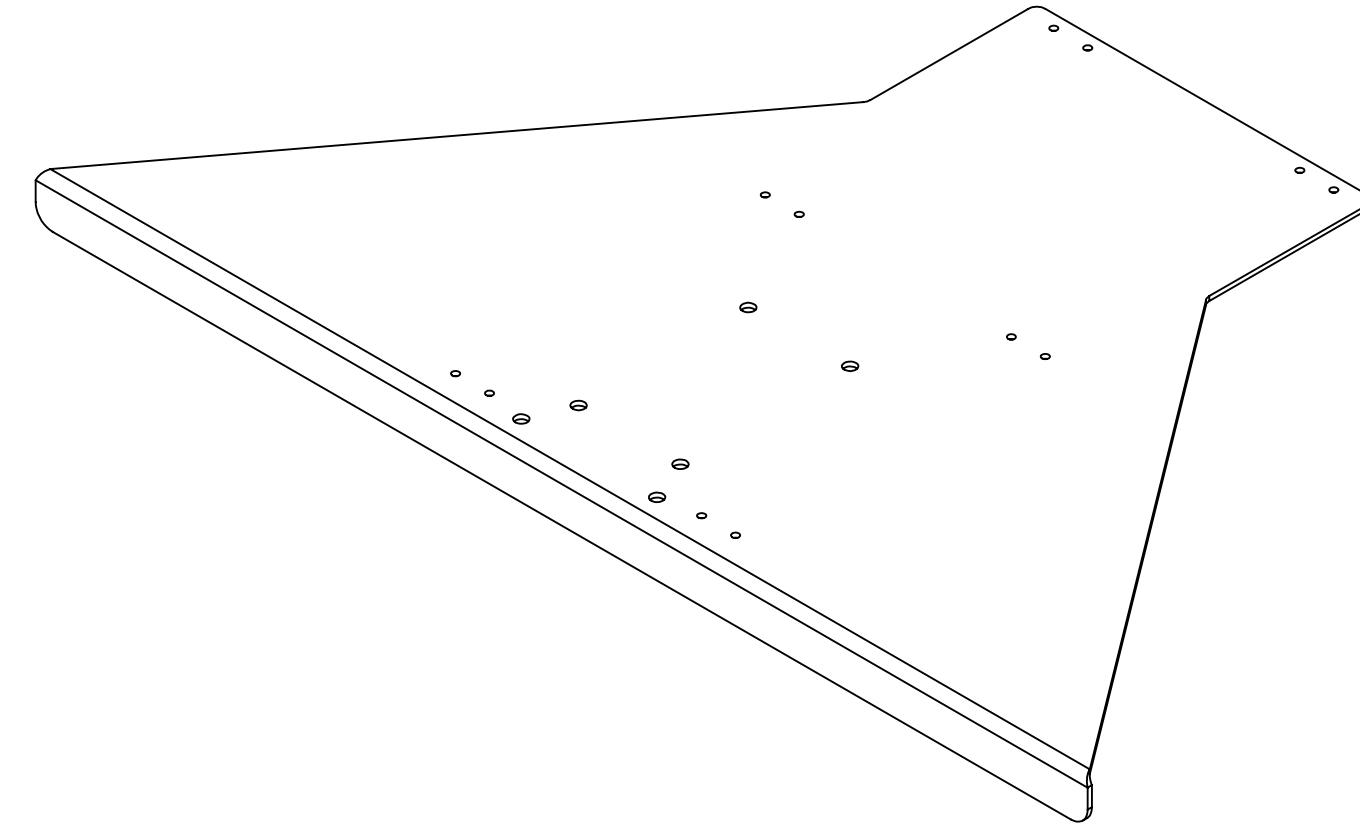
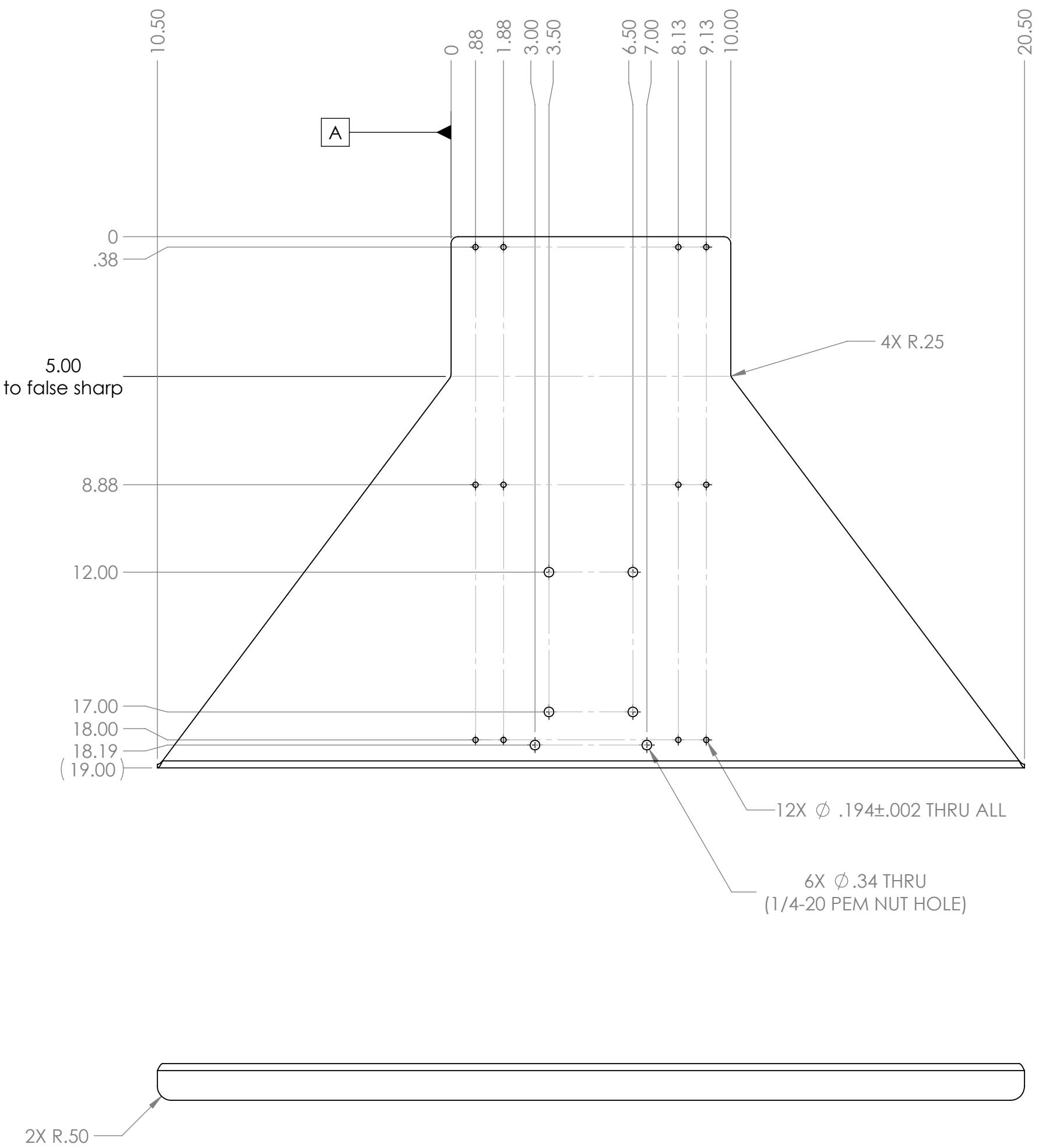
**Upper Exit Exit
with Pem Nuts**

4

3

2

1



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/8" 5052 Aluminum Sheet	C	GE-22394-01	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE: Upper Exit Exit

SIZE DWG. NO. REV

C GE-22394-01

SCALE: 1:4 SHEET 1 OF 1

4

3

2

1

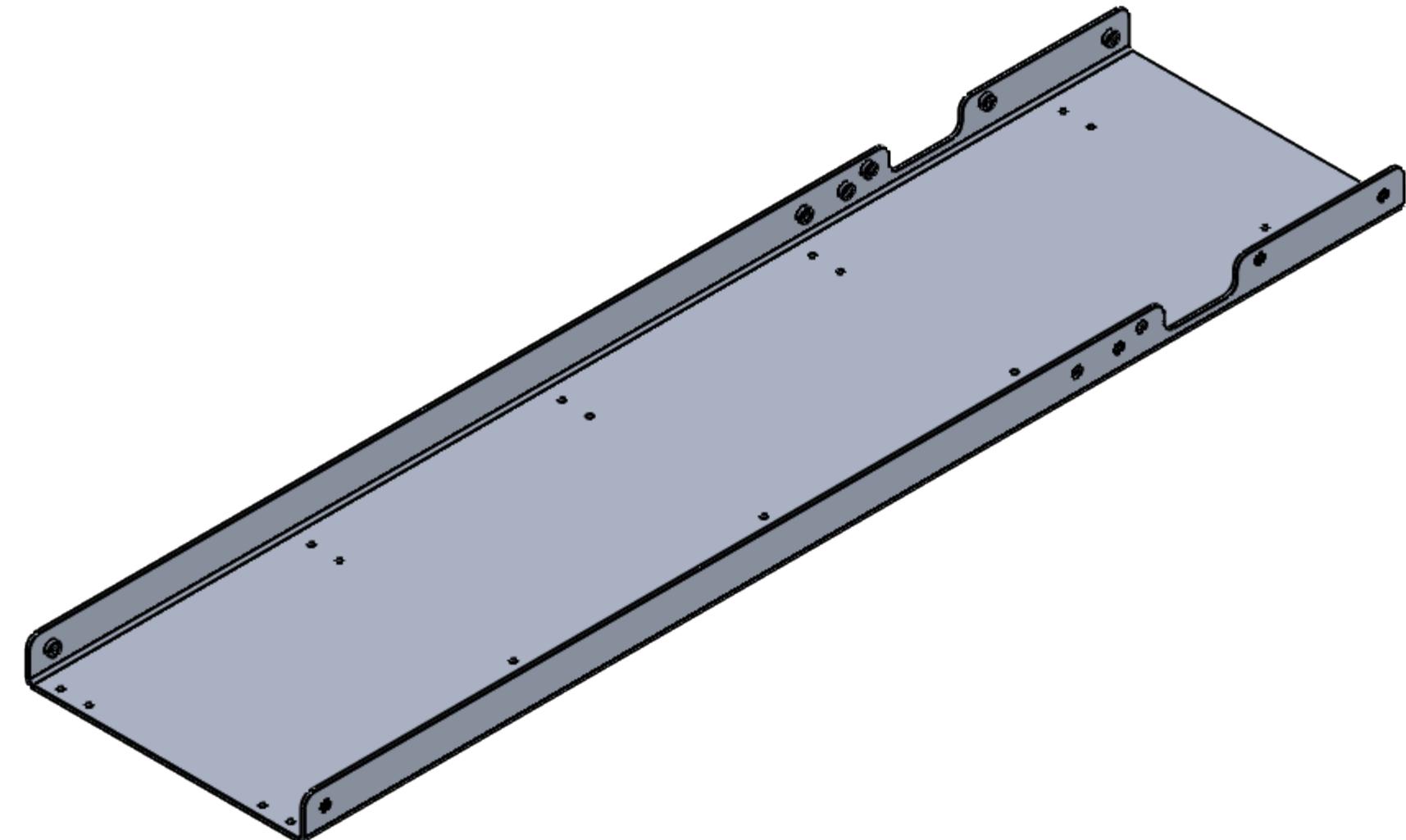
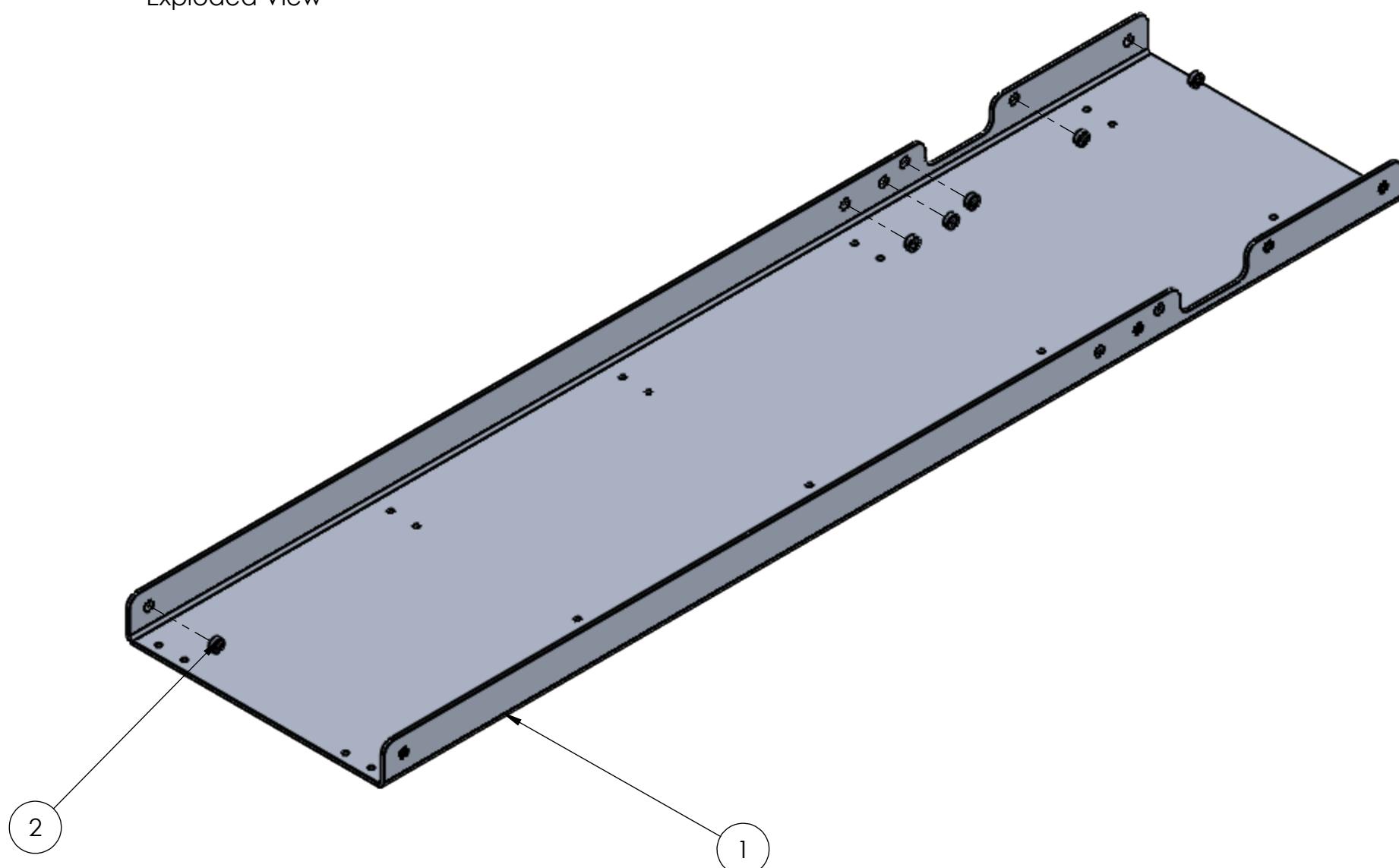
D

D

C

C

Exploded View



4

3

2

1

DO NOT SCALE DRAWING

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22395-01	Upper Exit Base Channel	1
2	pem_clinchnut_.25_20 .054	1/4-20 self-clinching nut, .054 shank	12
UNLESS OTHERWISE SPECIFIED:		VEND	NAME DATE
		DRAWN	KAMC 7/6/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$		PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.	
MATERIAL/FINISH: Tag or label with part number		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	
		TITLE: Upper Exit Base Channel with Pem Nuts	
		SIZE	DWG. NO. REV
		C	GE-22395
		SCALE: 1:4	SHEET 1 OF 2

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

4

3

2

1

D

D

C

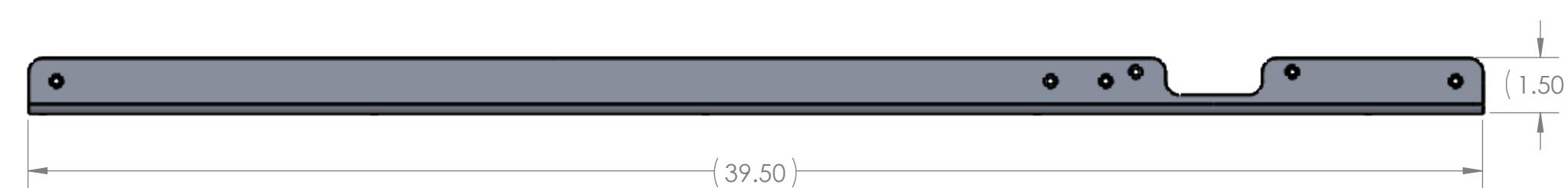
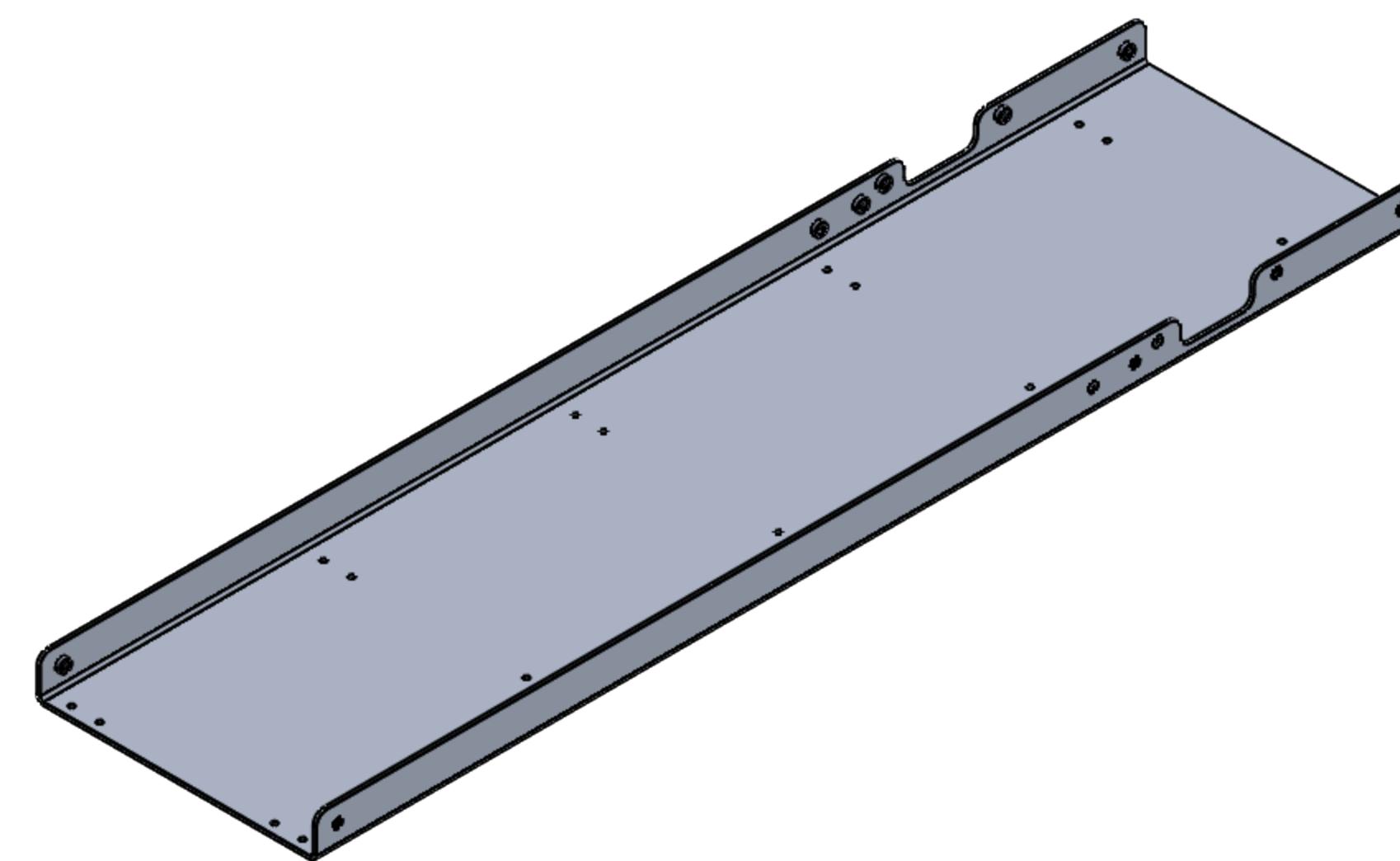
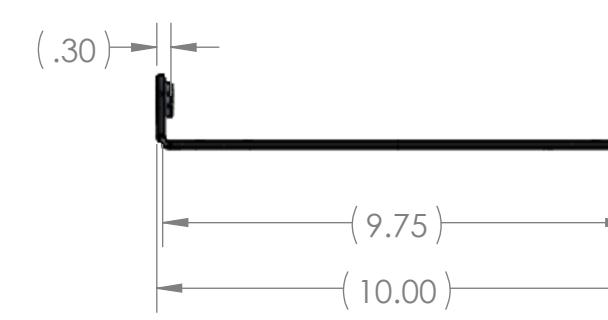
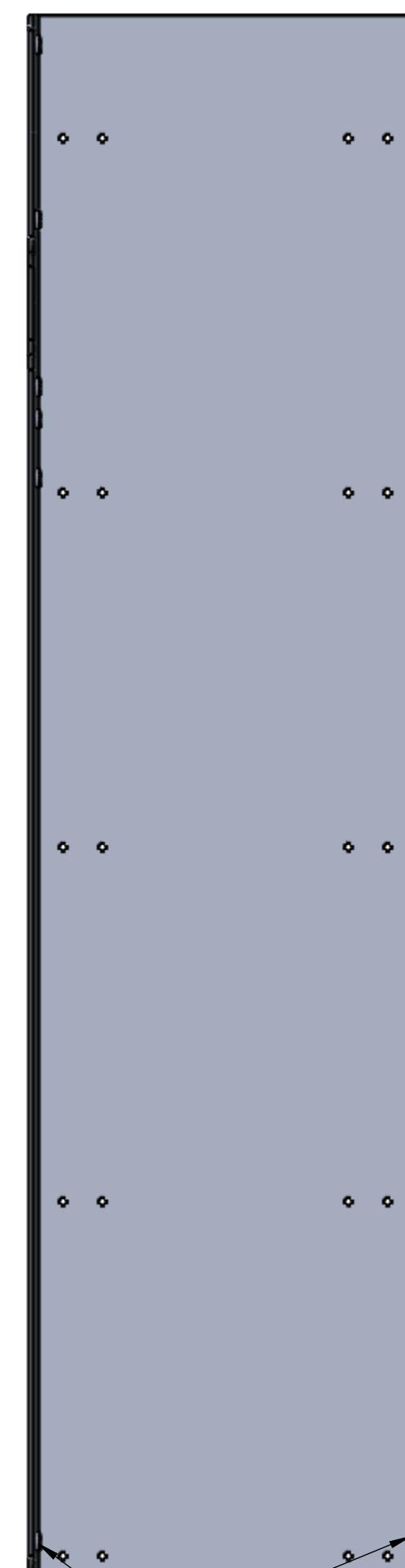
C

B

B

A

A



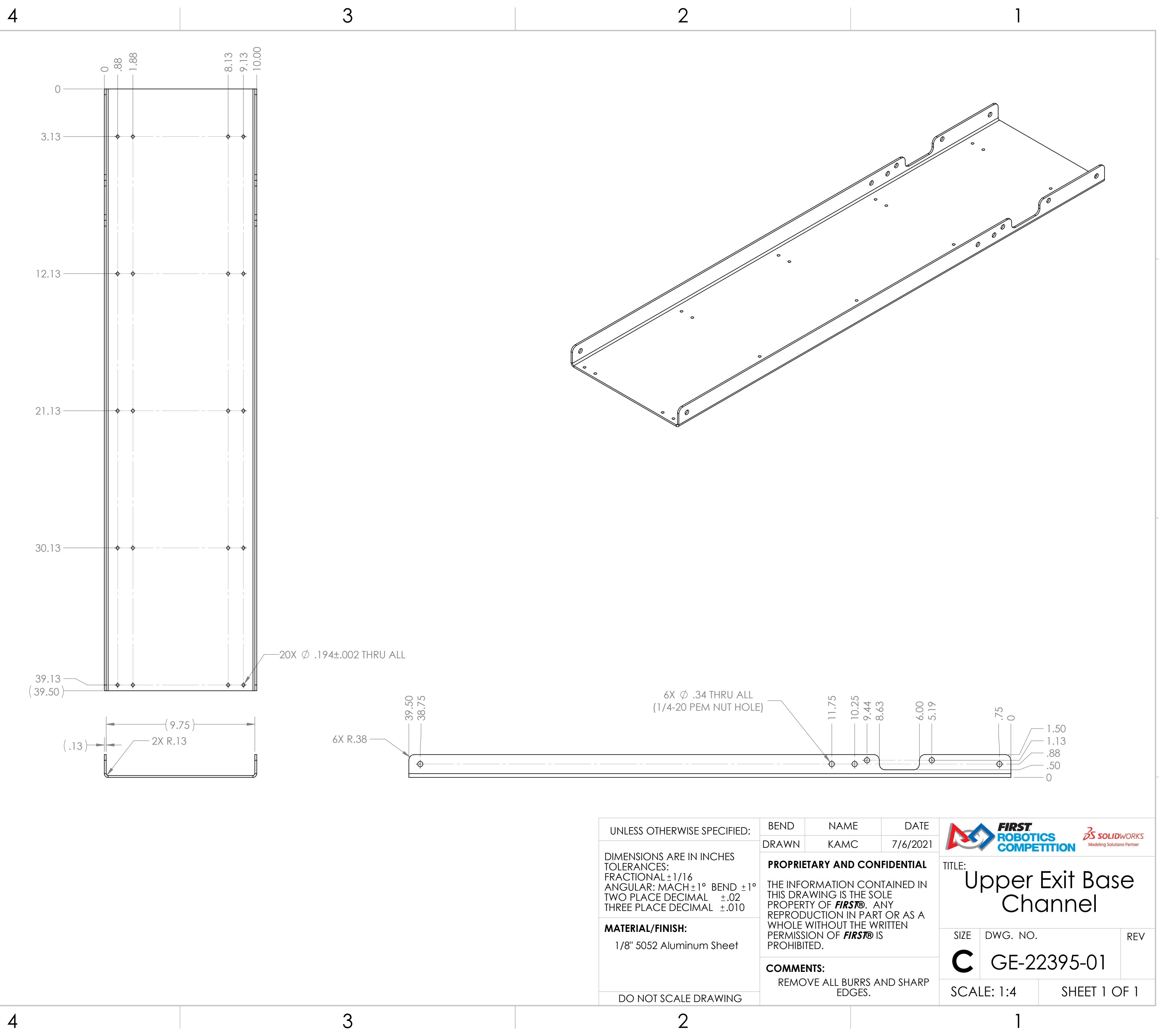
UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: Tag or label with part number			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

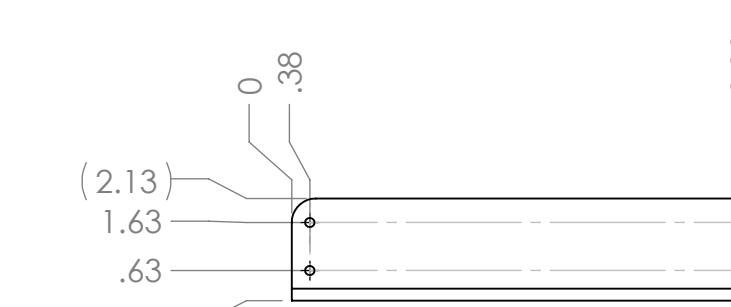
Upper Exit Base Channel with Pem Nuts

SIZE DWG. NO. REV
C GE-22395

SCALE: 1:4 SHEET 2 OF 2



D

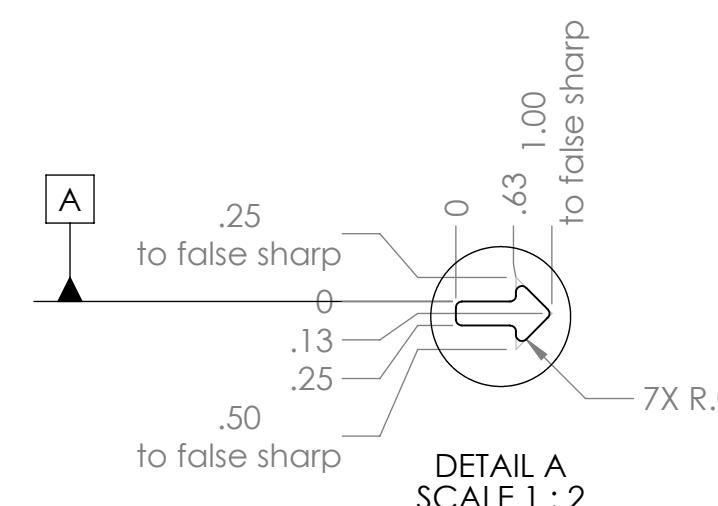
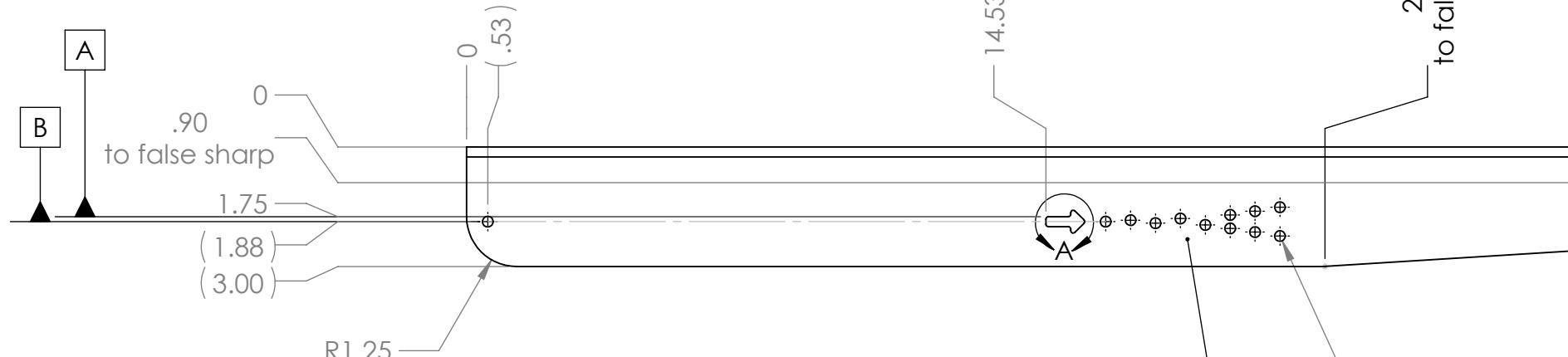


18.38
27.38

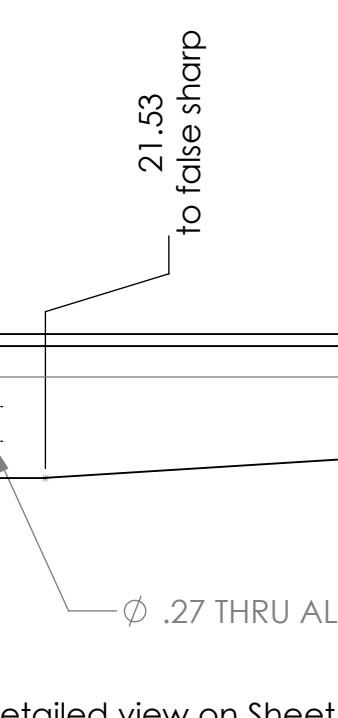
36.38
37.16

45.66
54.78

55.16
2X R.50
∅ .19 THRU ALL



Note:
1. Tag or label with part number



Detailed view on Sheet 2

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$

ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$

TWO PLACE DECIMAL $\pm .02$

THREE PLACE DECIMAL $\pm .010$

BEND NAME DATE

DRAWN KAMC 7/6/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST[®]. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST[®] IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Upper Exit to Leg Connection Right

SIZE DWG. NO. REV

C GE-22396

SCALE: 1:4 SHEET 1 OF 2

4

3

2

1

D

D

C

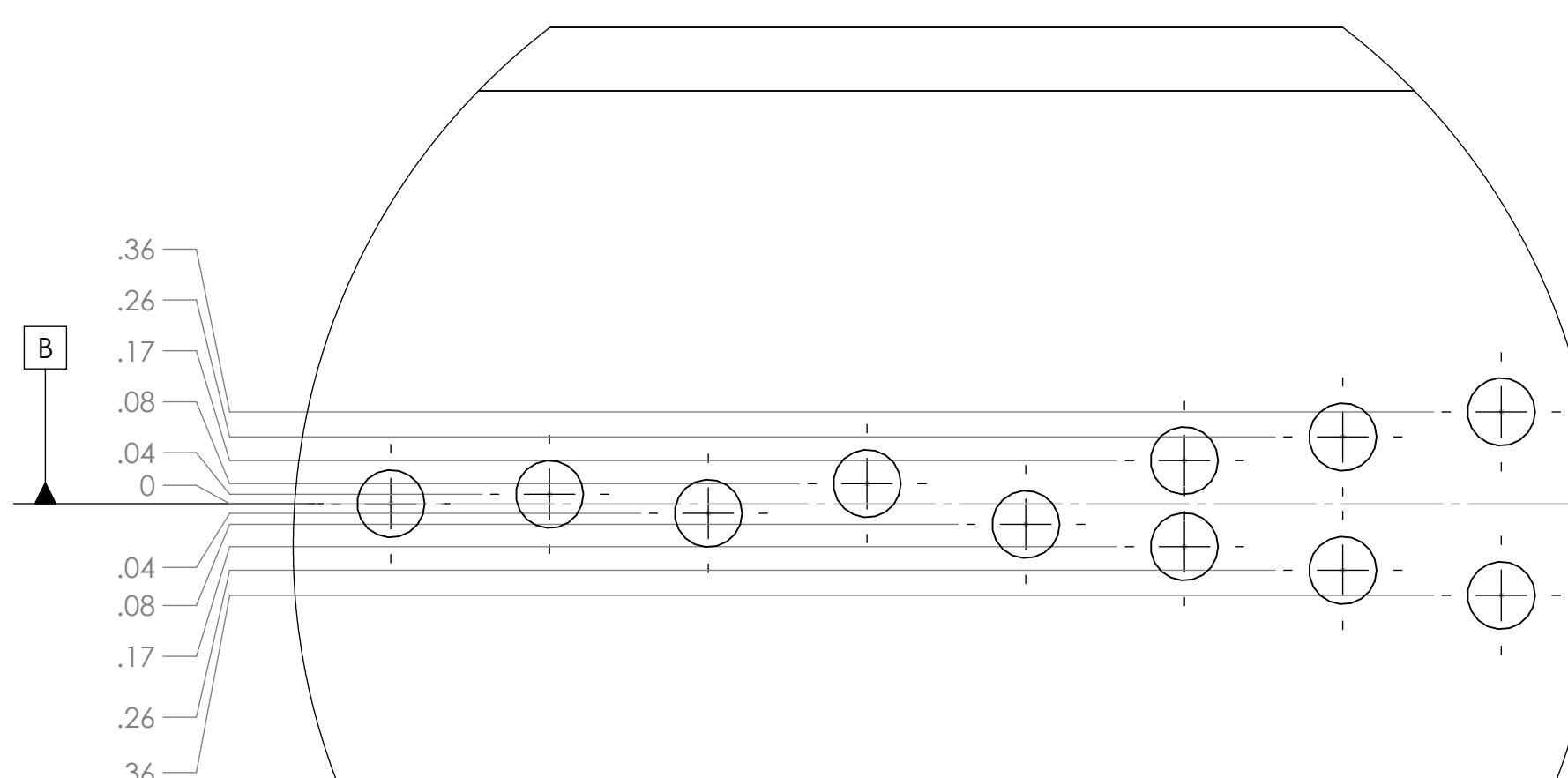
C

B

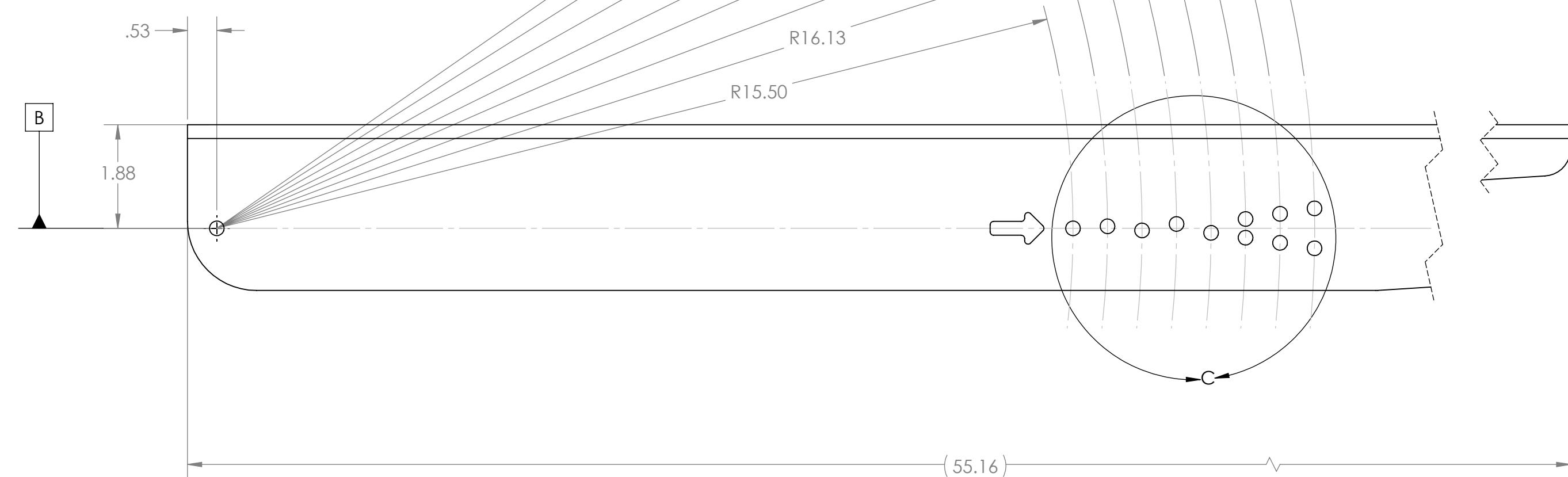
B

A

A



DETAIL C
SCALE 3 : 2



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Upper Exit to Leg
Connection Right

SIZE DWG. NO. REV

C GE-22396

SCALE: 1:2 SHEET 2 OF 2

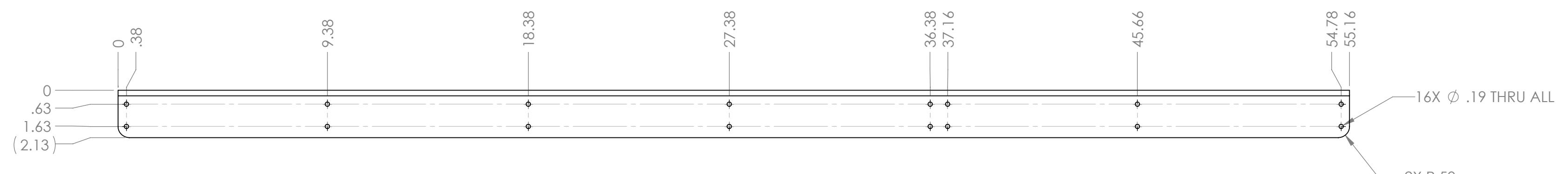
4

3

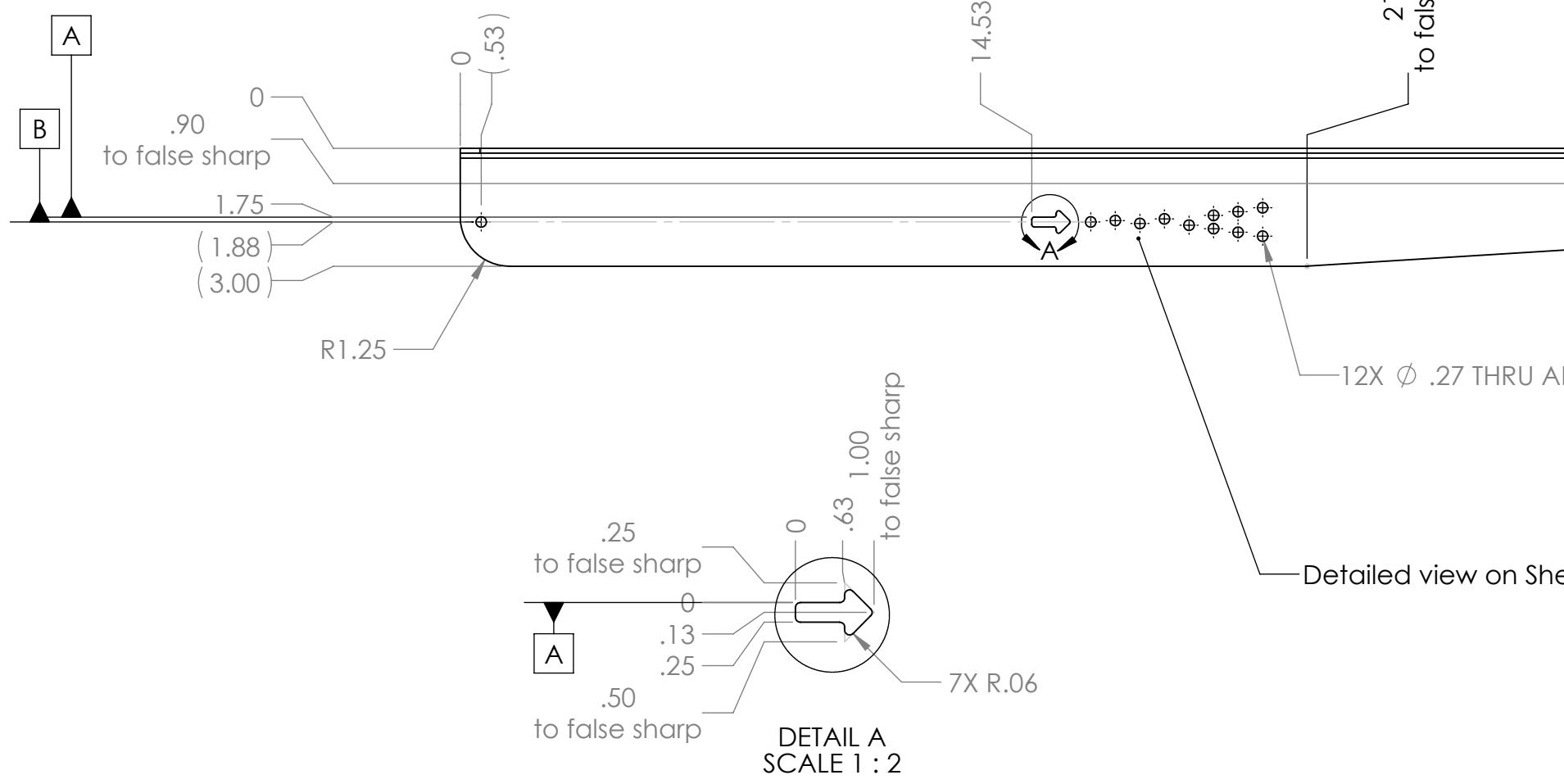
2

1

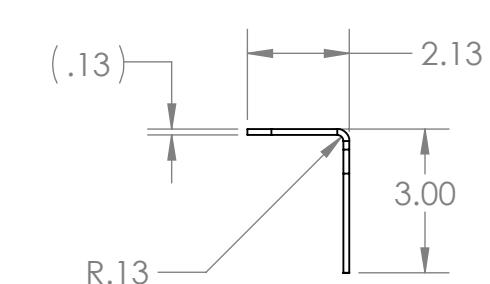
D



C



B



A

Note:
1. Tag or label with part number

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Upper Exit to Leg
Connection Left

SIZE DWG. NO. REV

C GE-22397

SCALE: 1:4 SHEET 1 OF 2

D

D

C

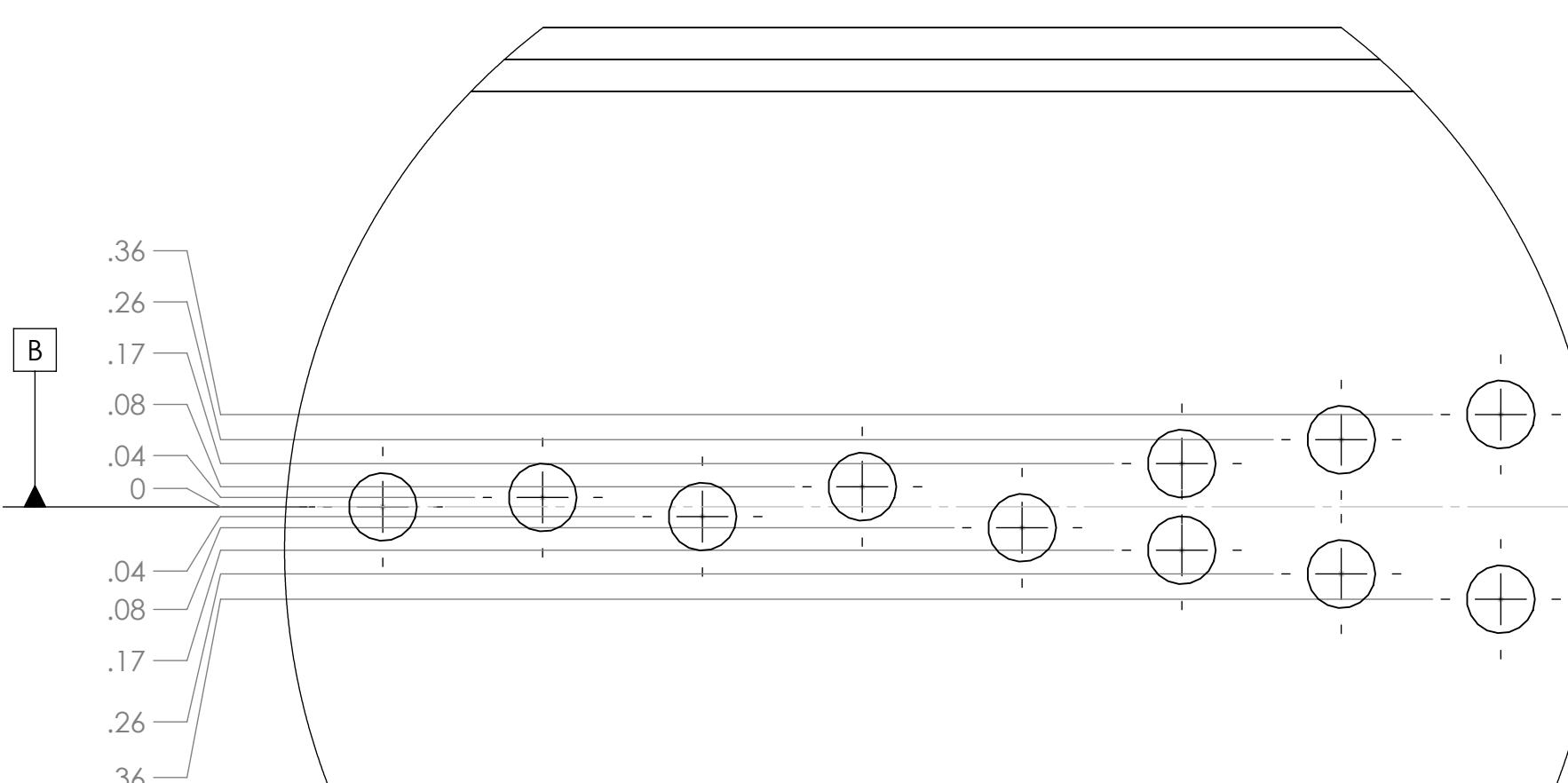
C

B

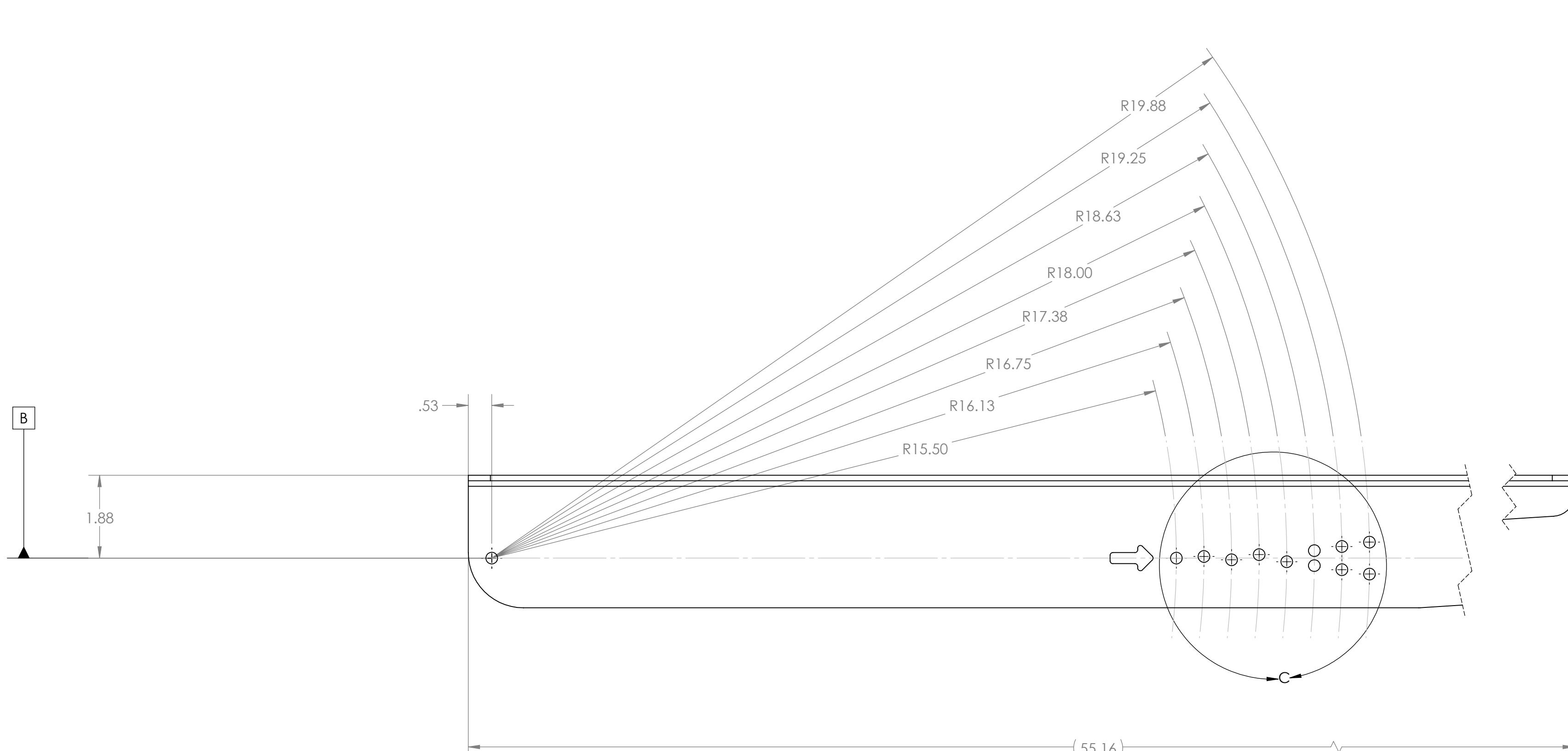
B

A

A



DETAIL C
SCALE 3 : 2



UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	KAMC	7/6/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" 5052 Aluminum Sheet			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner
TITLE: Upper Exit to Leg Connection Left	
SIZE	DWG. NO.
C	GE-22397
REV	
SCALE: 1:2	SHEET 2 OF 2

4

3

2

1

D

D

C

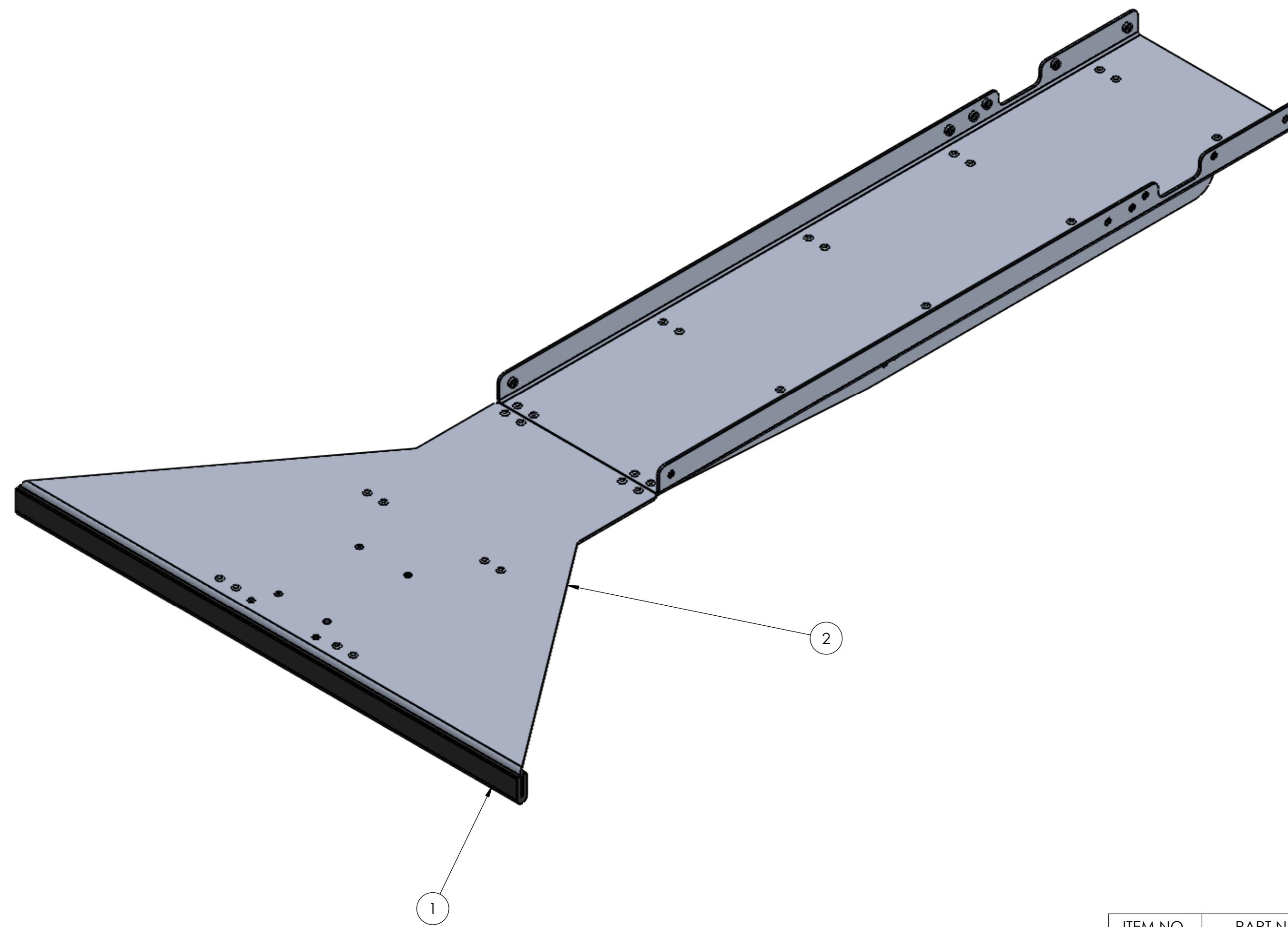
○

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22401	Upper Exit Foam Edge	1
2	GE-22405	Upper Exit Riveted Assembly	1

UNLESS OTHERWISE SPECIFI

DRAWN	KAMC	7/6/2021
-------	------	----------

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF **FIRST®**. ANY REPRODUCTION IN PART OR AS A

MATERIAL/FINIS

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.



TITLE:

Upper Exit Sheet Metal with Foam

SIZE	DWG NO	REV
------	--------	-----

C GE-22406

SCALE: 1:4

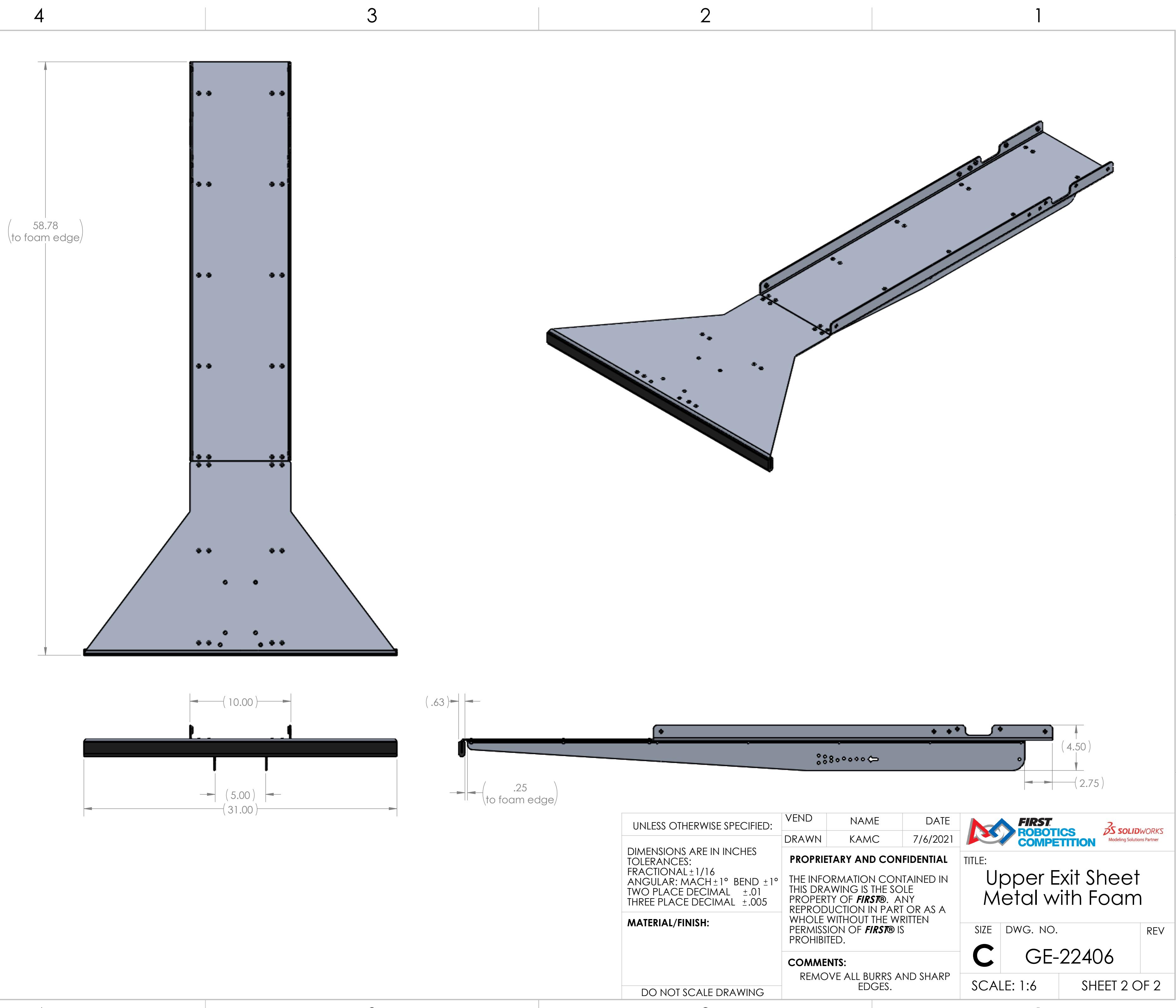
SHEET 1 OF 2

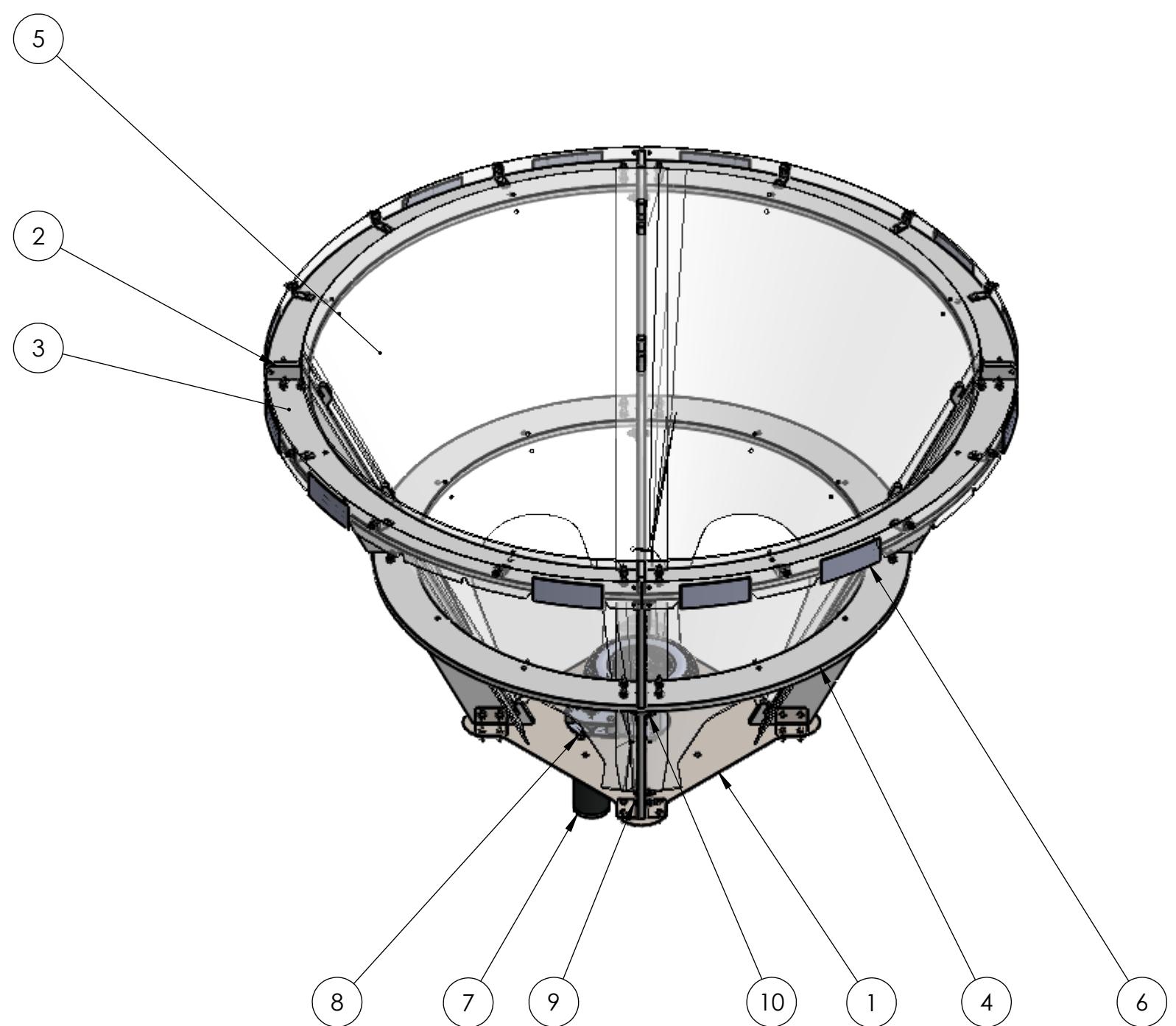
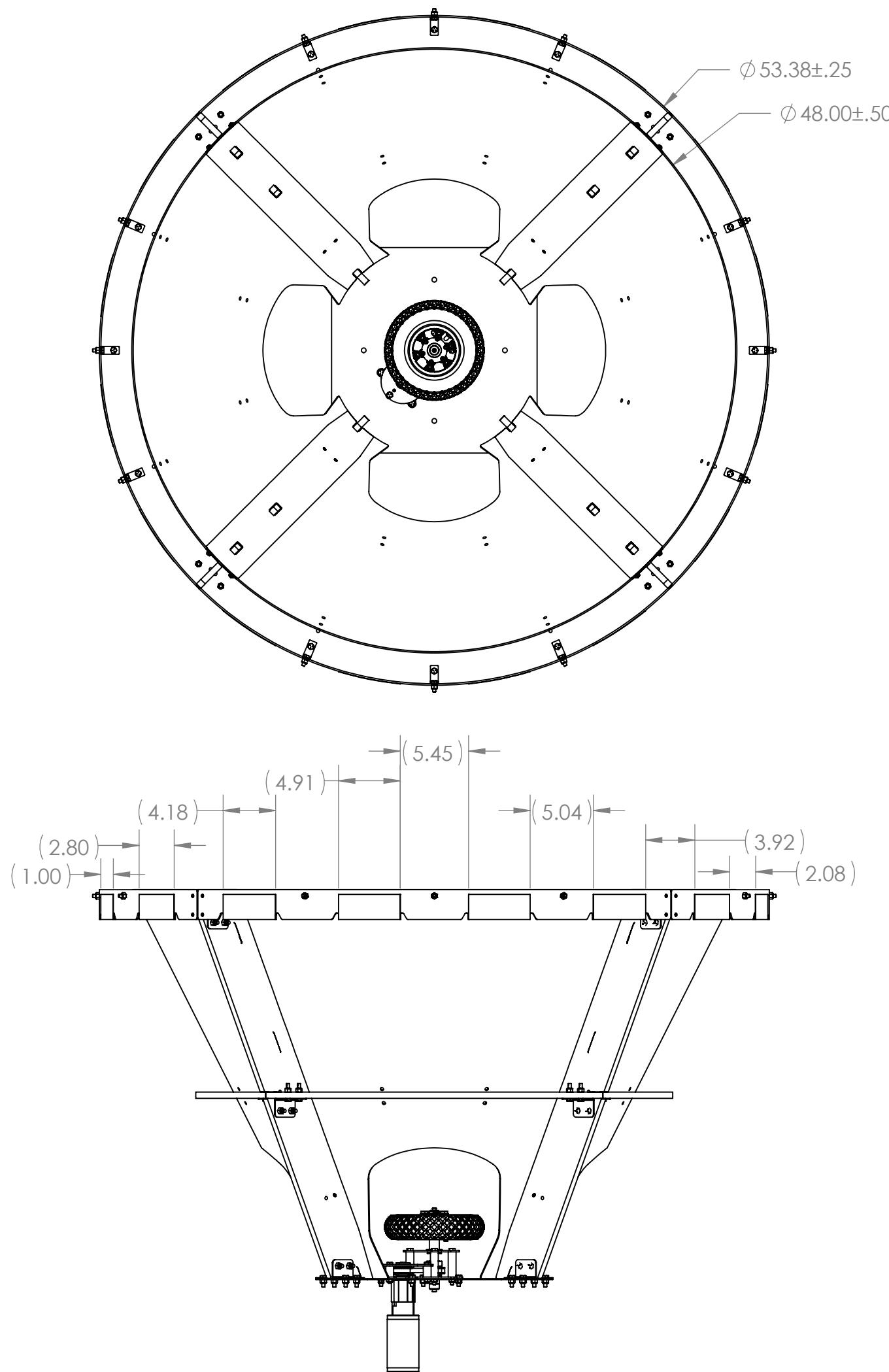
4

3

2

1





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22413	Upper Hub Baseplate Assembly	1
2	GE-22414	Upper Hub Vertical Rib	4
3	GE-22416	Upper Hub Large Rib Assembly	4
4	GE-22418	Upper Hub Small Rib Assembly	4
5	GE-22419	Upper Hub Panel	4
6	GE-22420	Upper Hub Vision Assembly	4
7	GE-22432	High Agitator Assembly	1
8	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	4
9	hex_.25_20_1.25_partial	Steel Hex Head Bolt, 1/4-20 x 1.25", partially threaded	36
10	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	40
11	washer_flat_.25	Flat Washer for 1/4" Screw	12

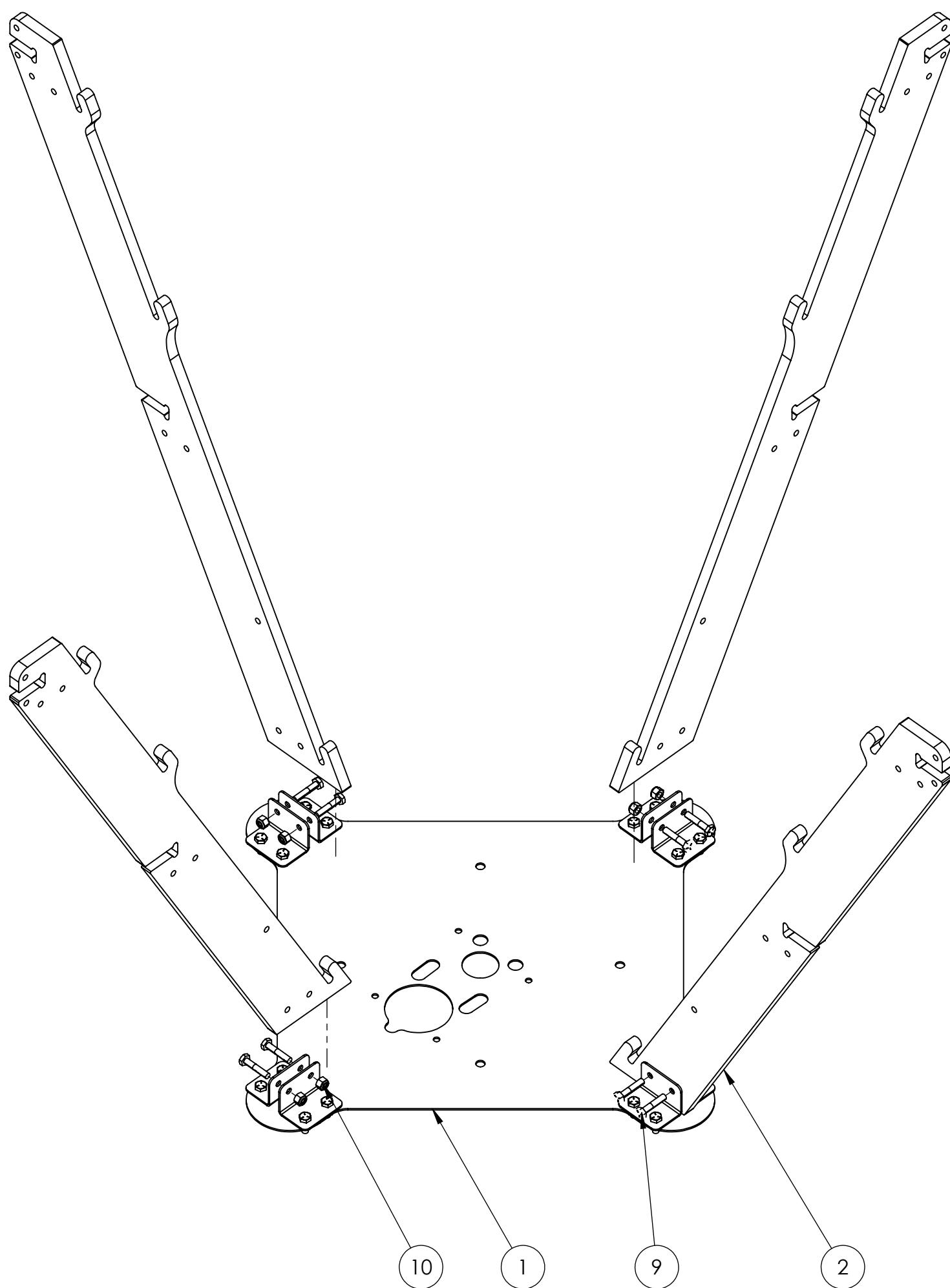
UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/16/2021
TOLERANCES: FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	PROPRIETARY AND CONFIDENTIAL		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION DS SOLIDWORKS Modeling Solutions Partner

Upper Hub

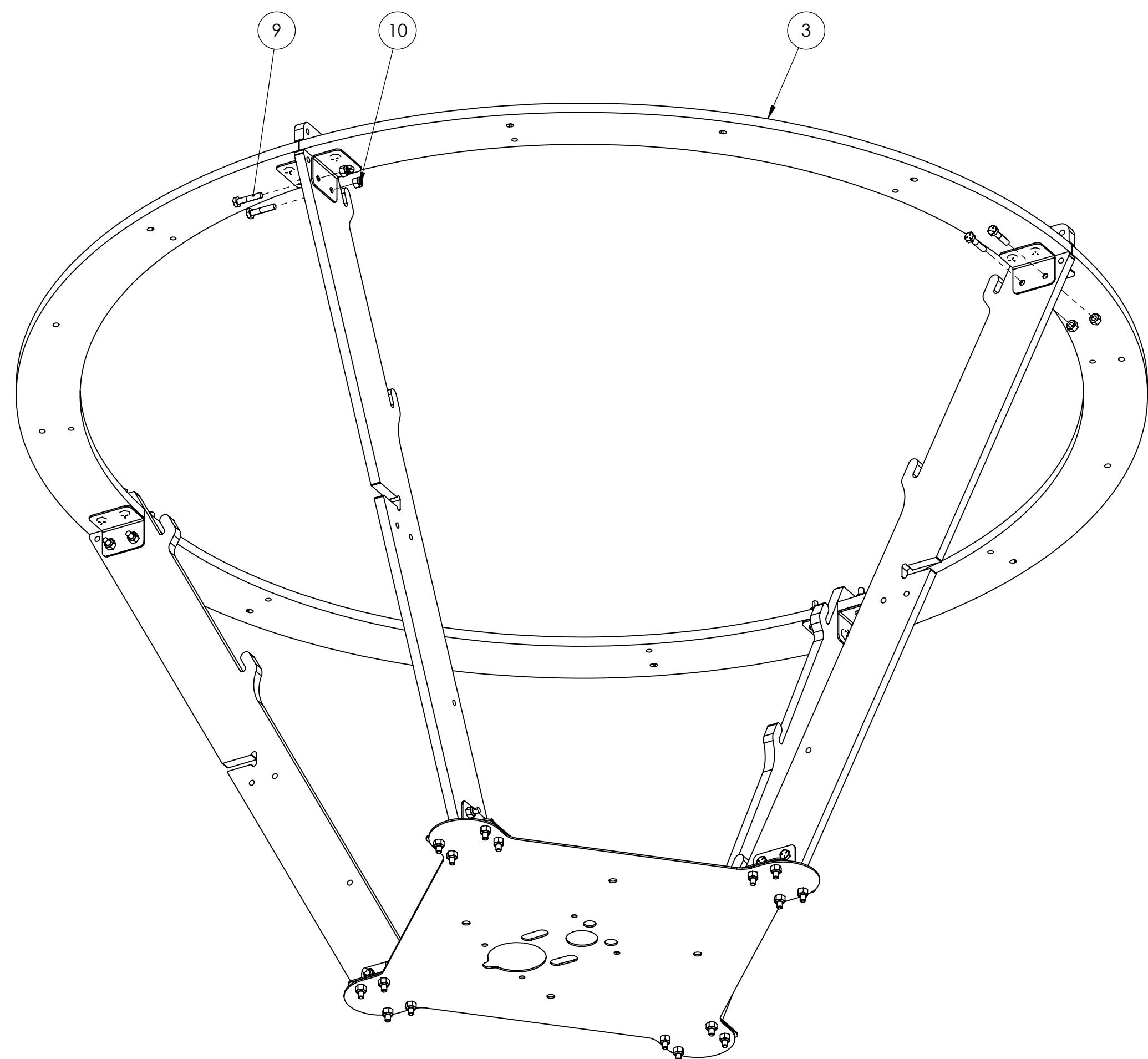
C GE-22411

SCALE: 1:10 SHEET 1 OF 4



Notes:

1. Attach (1) to (2) using (9) and (10).



Notes:

1. Attach (3) to the assembly using (9) and (10).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$	DRAWN	CO	12/16/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE: **Upper Hub**

SIZE DWG. NO. REV

C GE-22411

SCALE: 1:5 SHEET 2 OF 4

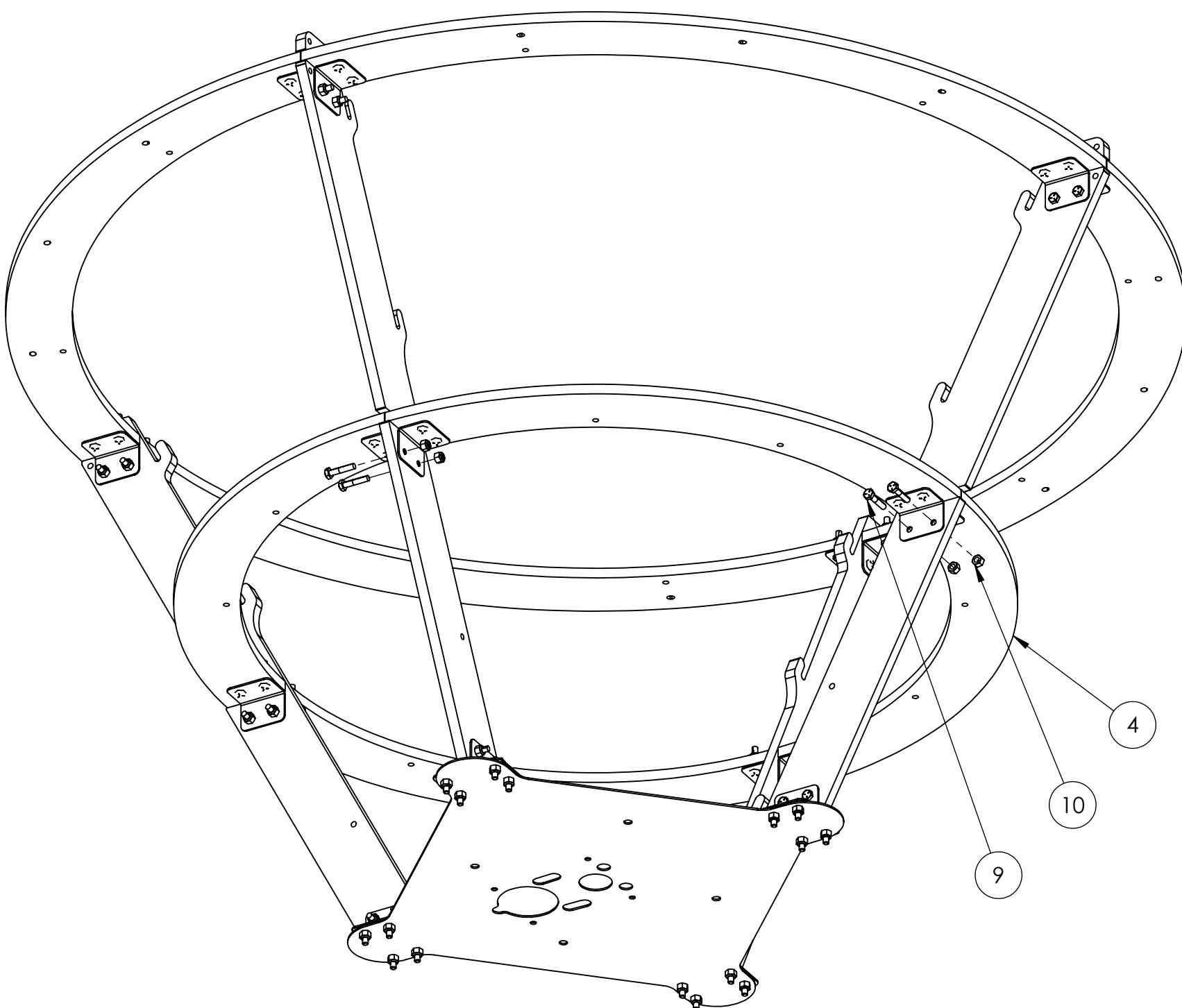
4

3

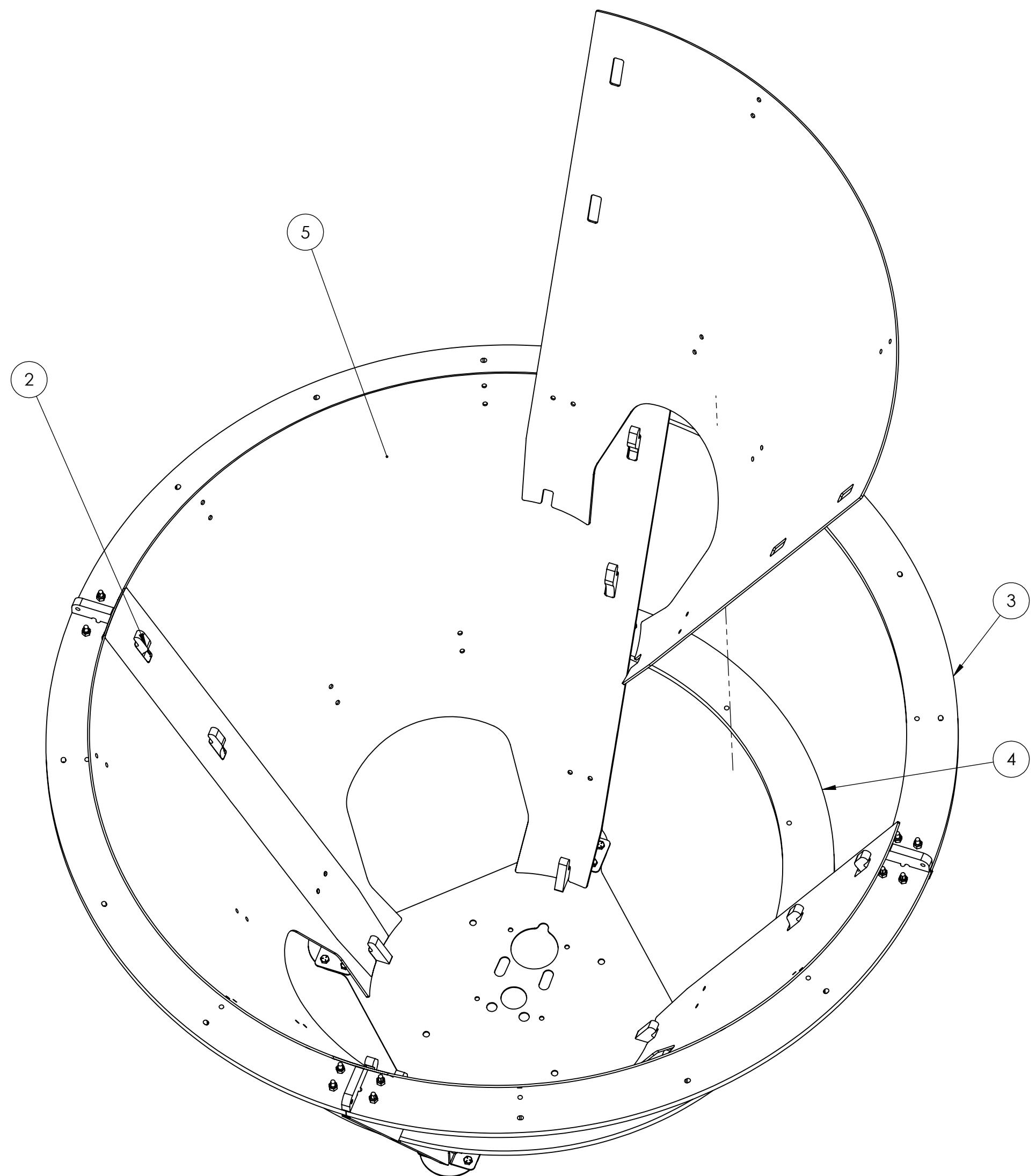
2

1

D

**Notes:**

1. Attach (4) to assembly using (9) and (10).

**Notes:**

1. Insert all (5) into the assembly, bending and aligning with the hooks on (2).
2. Cable tie (5) to (2), (3), and (4).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DRAWN	CO	12/16/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

Upper Hub

SIZE DWG. NO. REV

C GE-22411

SCALE: 1:6 SHEET 3 OF 4

4

3

2

1

4

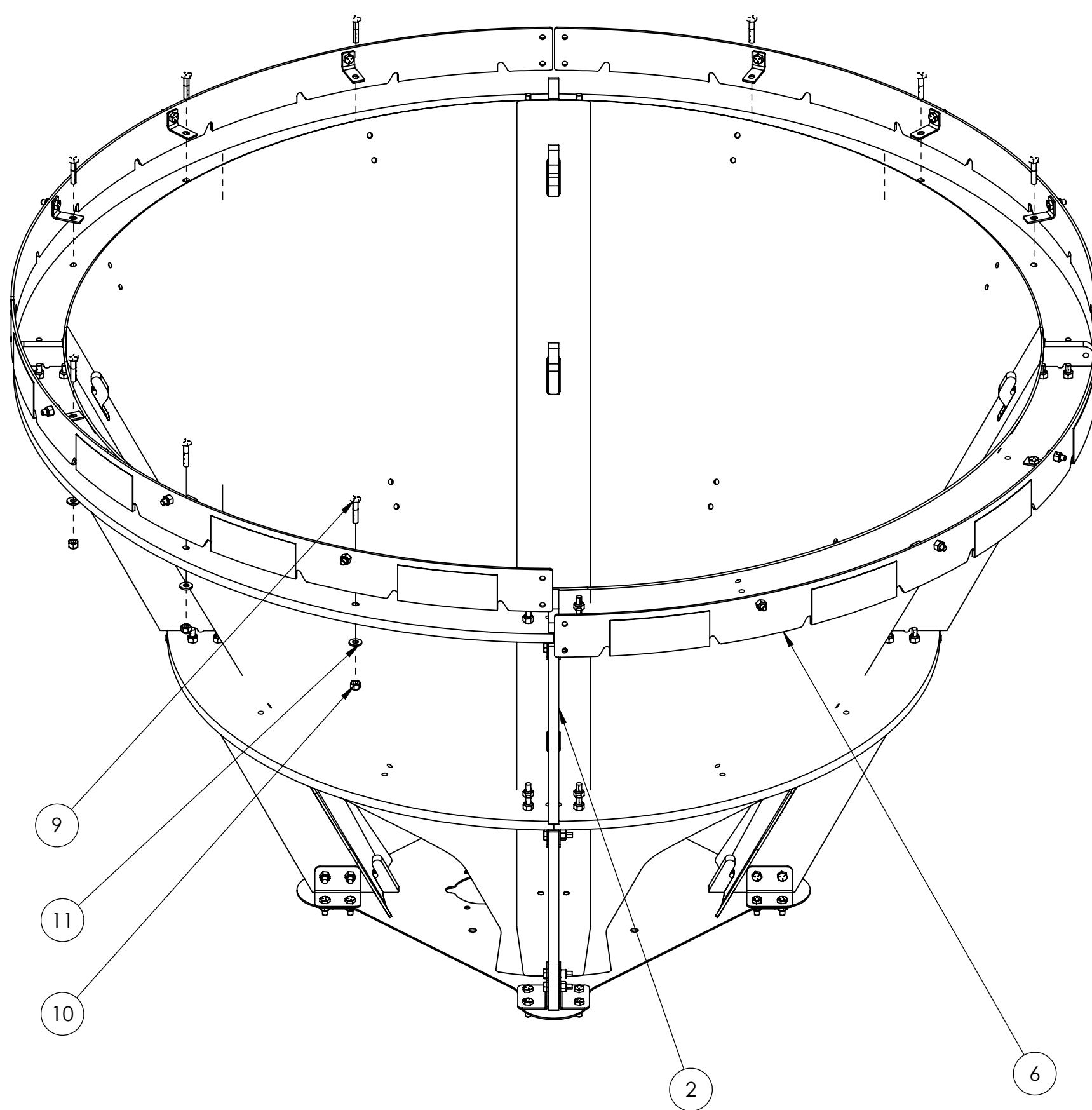
3

2

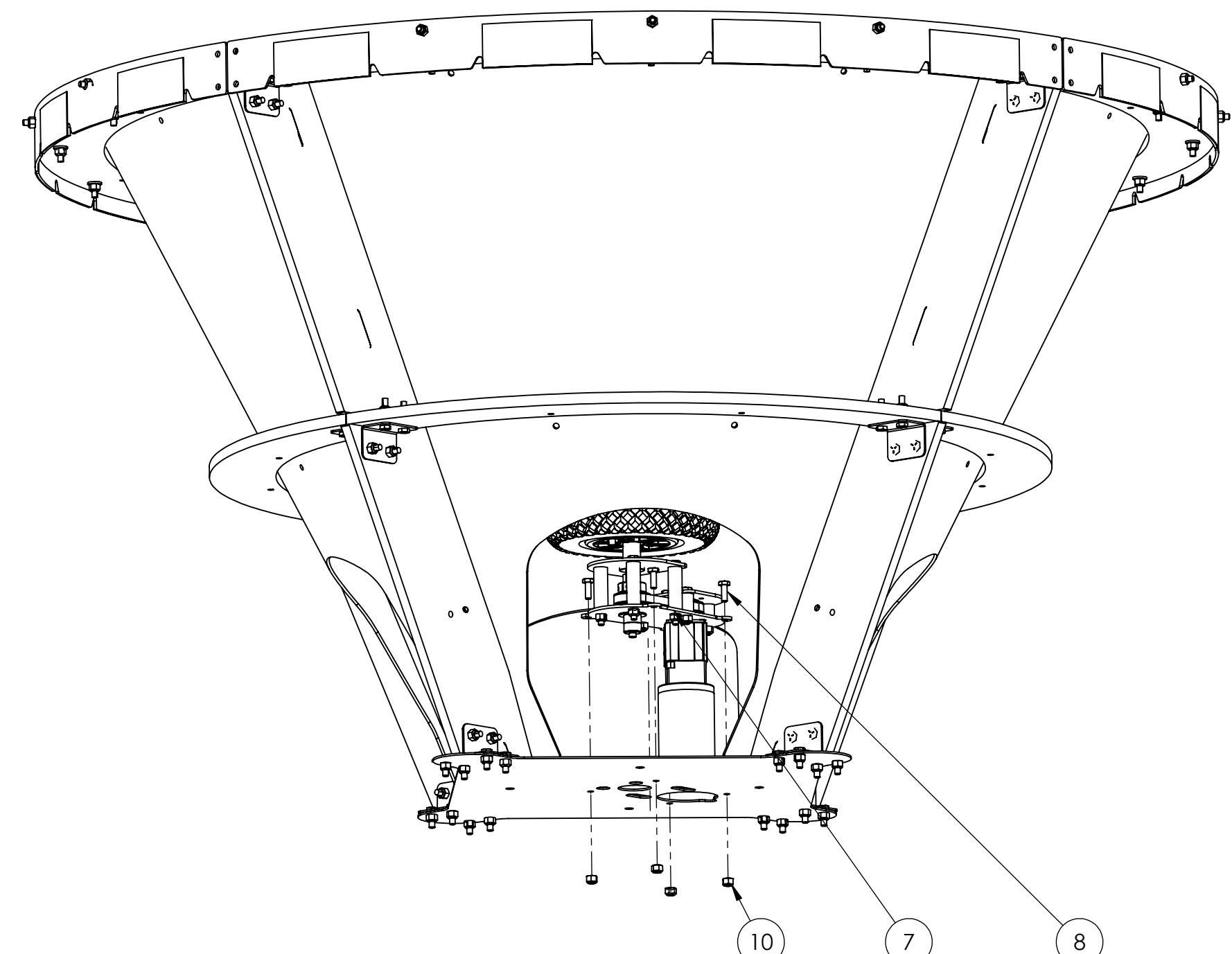
1

D

D

**Notes:**

1. Attach (6) to assembly using (9), (11), and (10) as shown.
2. Cable tie adjacent (6)'s to each other and (2).

**Notes:**

1. Attach (7) to assembly using (8) and (10).

UNLESS OTHERWISE SPECIFIED:	FIELD	NAME	DATE
DIMENSIONS ARE IN INCHES			
TOLERANCES: FRACTIONAL $\pm\frac{1}{2}$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$			
PROPRIETARY AND CONFIDENTIAL	DRAWN	CO	12/16/2021
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Upper Hub

SIZE DWG. NO. REV

C GE-22411

SCALE: 1:6 SHEET 4 OF 4

4

3

2

1

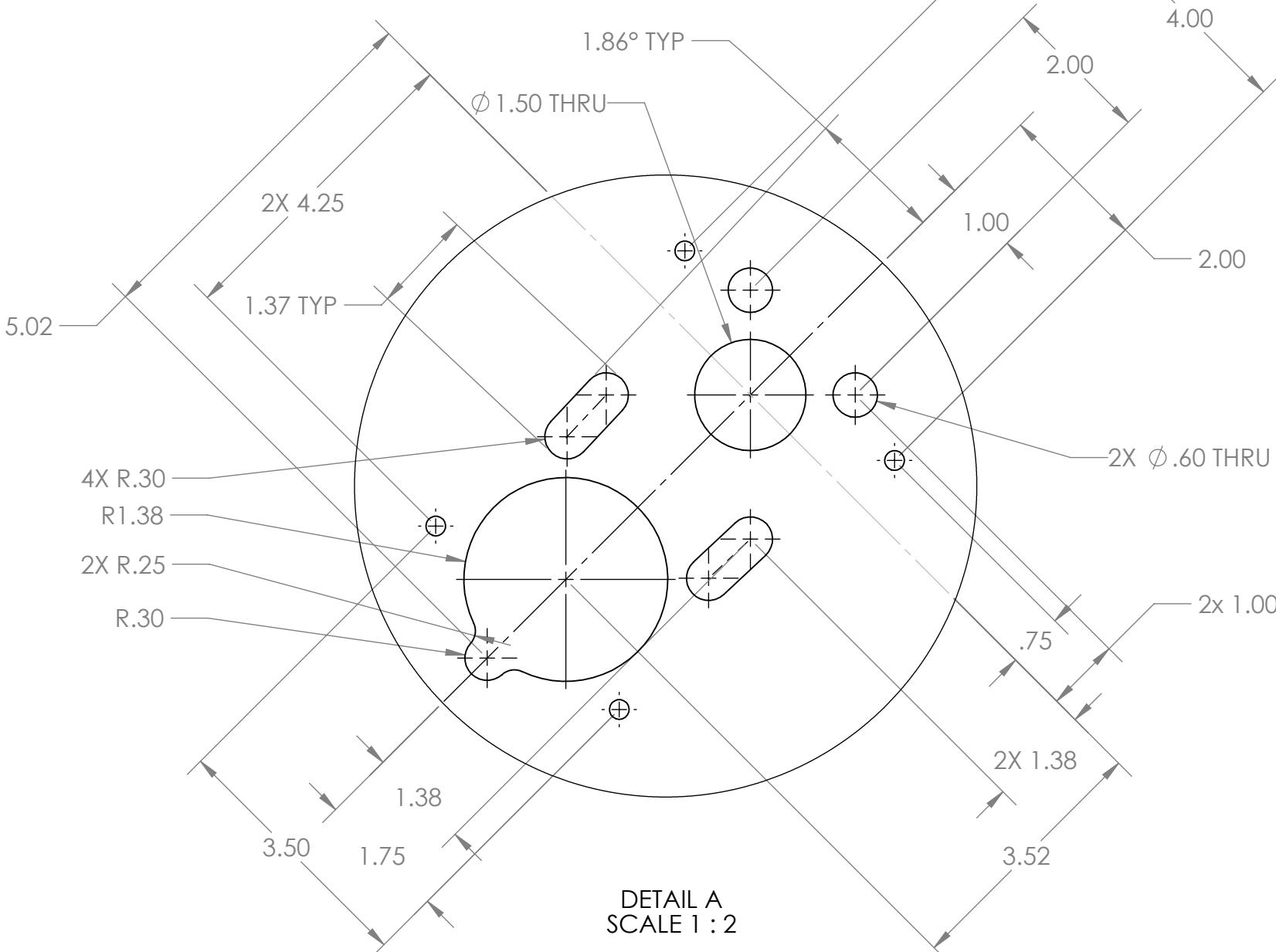
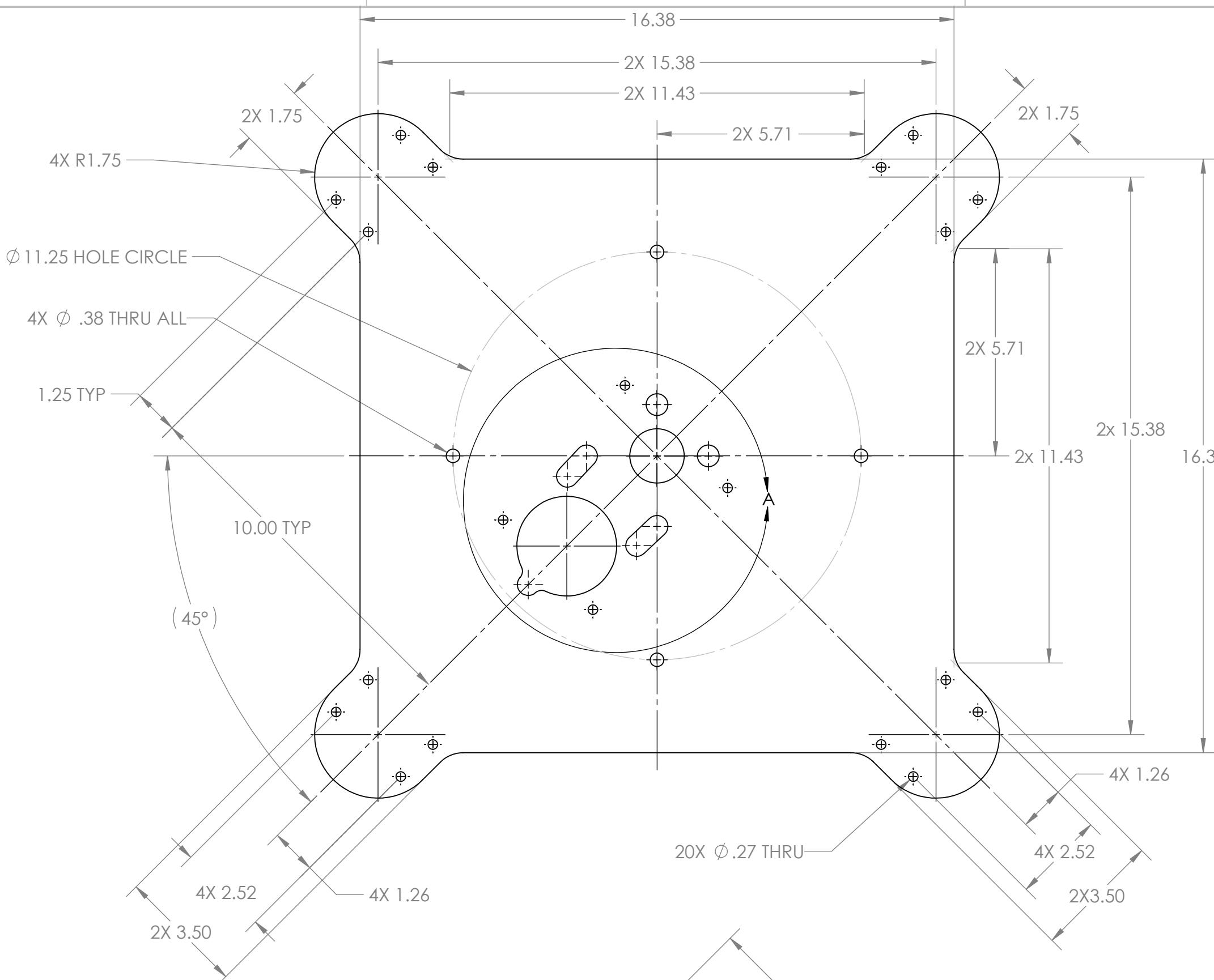
4

3

2

1

D

DETAIL A
SCALE 1 : 2

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

14 Ga. Preplated Steel

DO NOT SCALE DRAWING

VEND DATE
DRAWN CO 6/28/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST[®]. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST[®] IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

 FIRST[®] ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner

TITLE:
**Upper Hub
Baseplate**

SIZE DWG. NO. REV
C GE-22412

SCALE: 1:3 SHEET 1 OF 1

4

3

2

1

D

C

B

A

4

3

2

1

D

D

C

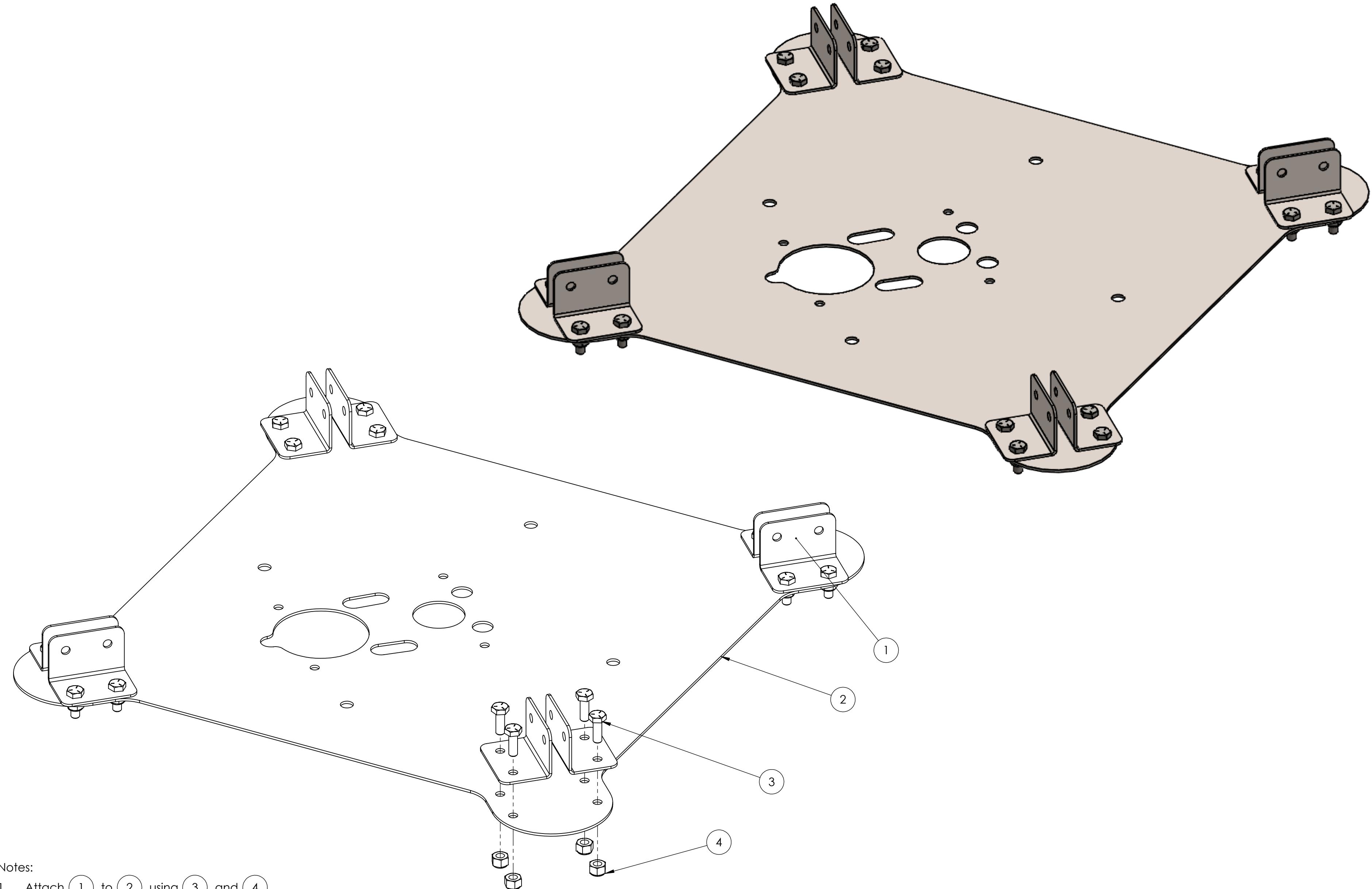
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22301	Hub Angle Bracket	8
2	GE-22412	Upper Hub Baseplate	1
3	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	16
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	16

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	11/3/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

Upper Hub Baseplate Assembly

C GE-22413

SCALE: 1:2 SHEET 1 OF 1

4

3

2

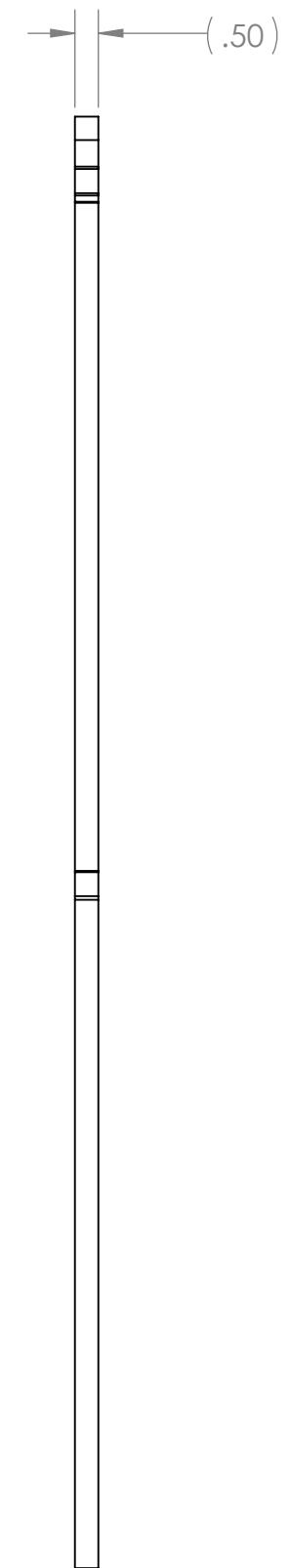
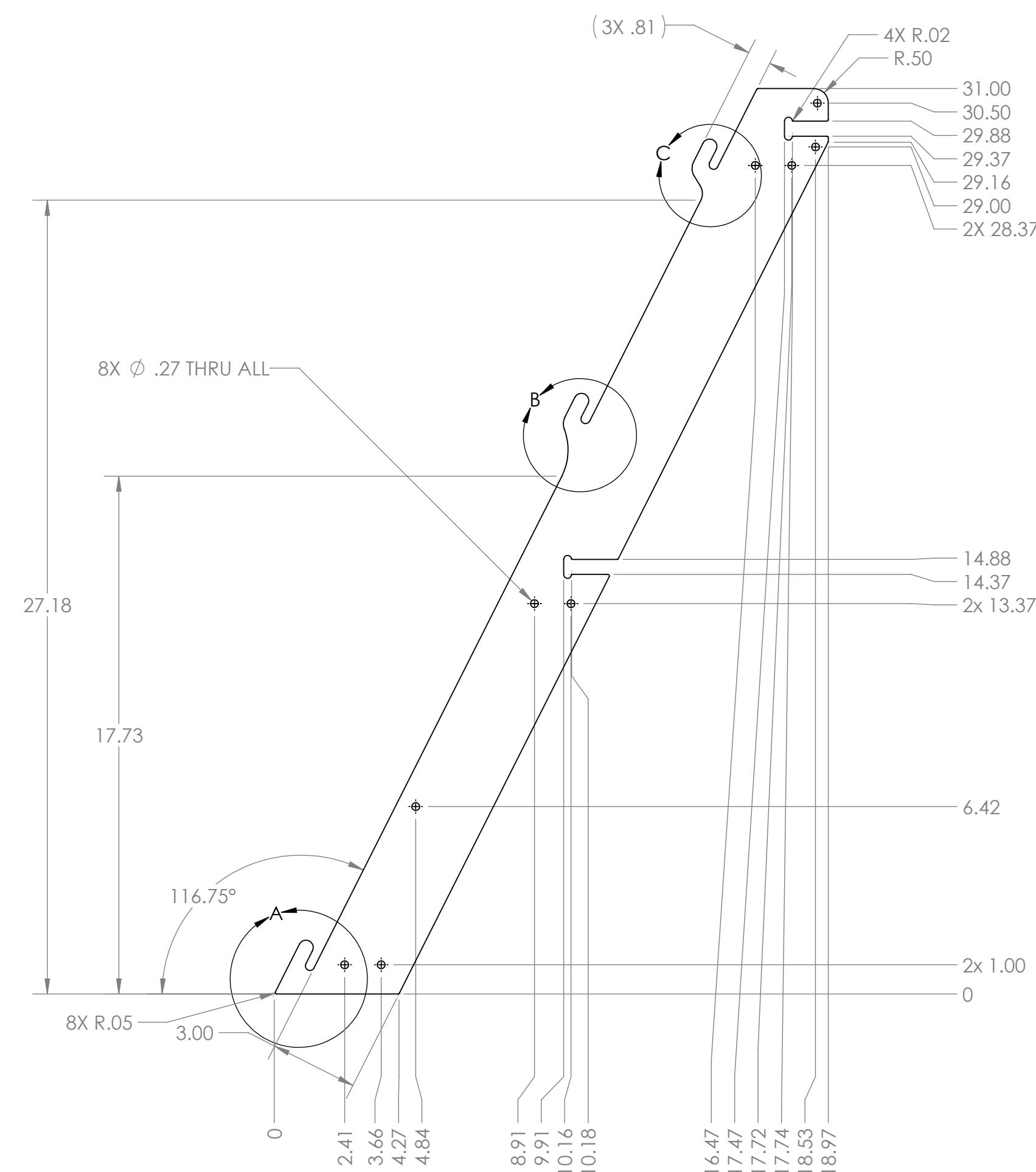
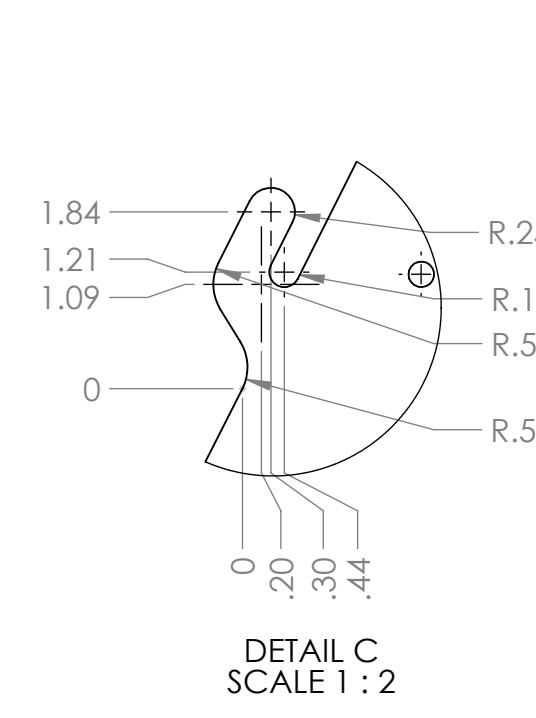
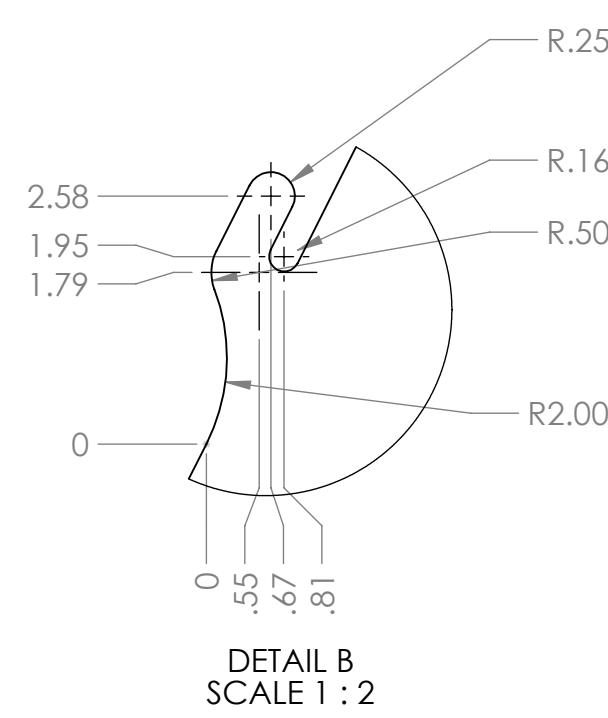
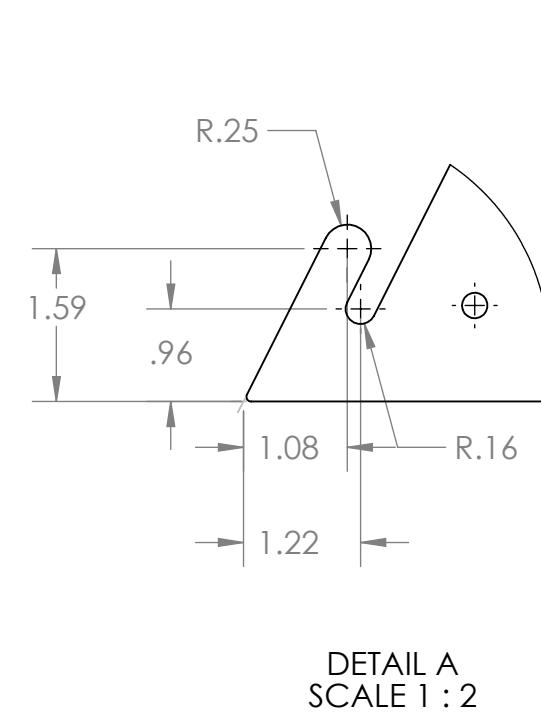
1

D

C

B

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	6/28/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/2" HDPE, natural/smooth			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE:
Upper Hub Vertical Rib

SIZE DWG. NO. REV
C GE-22414

SCALE: 1:4 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

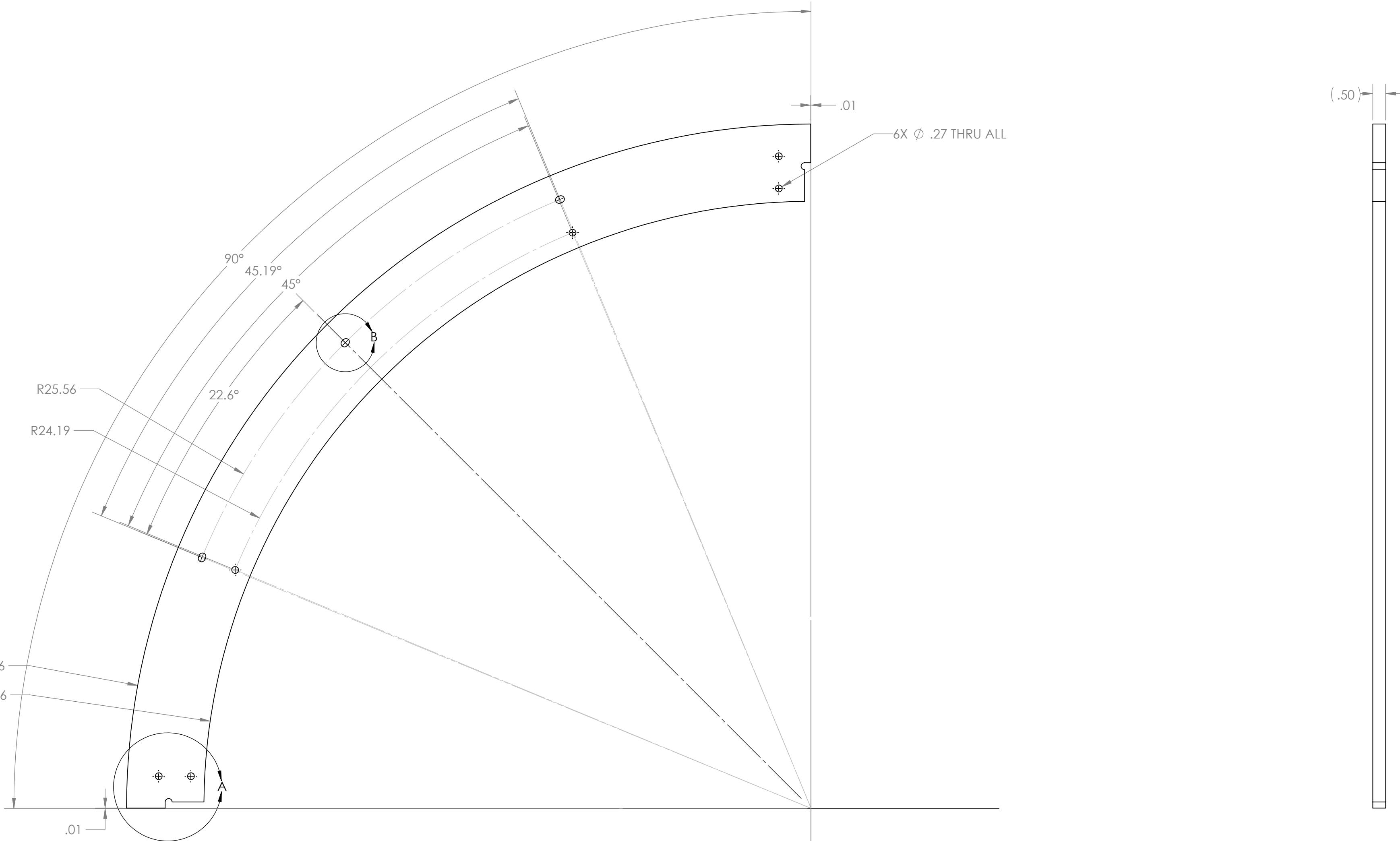
C

B

B

A

A



DETAIL A
SCALE 2 : 3
2 places

DETAIL B
SCALE 2 : 3
3 places

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
			DRAWN	CO	6/28/2021
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH: 1/2" natural HDPE, smooth					
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE: Upper Hub Large Rib

SIZE DWG. NO. REV
C GE-22415

SCALE: 1:3 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

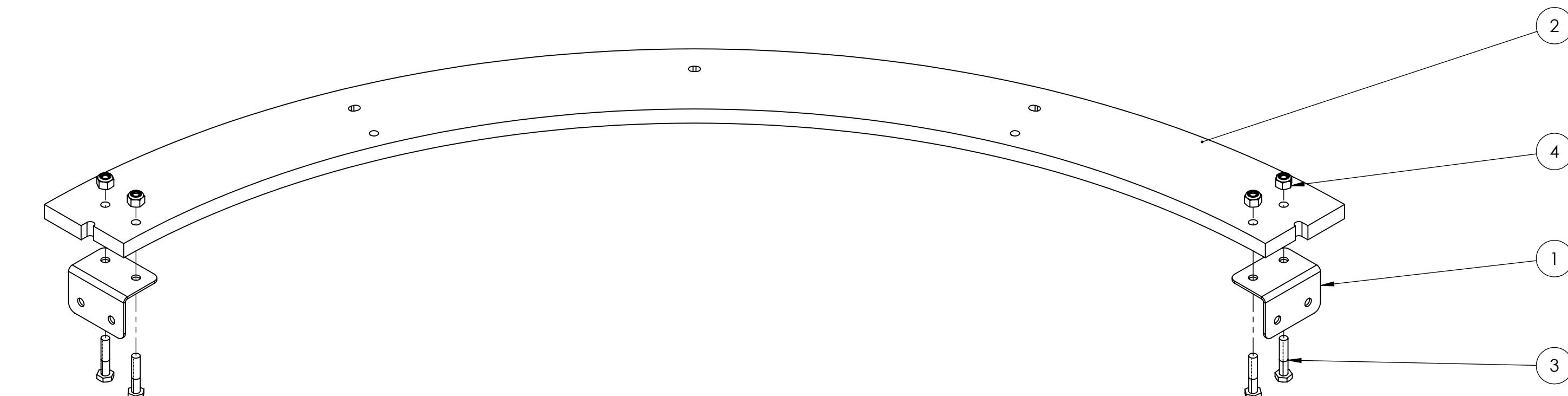
D

C

C

B

B



Notes:

1. Attach (1) to (2) using (3) and (4).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22301	Hub Angle Bracket	2
2	GE-22415	Upper Hub Large Rib	1
3	hex_.25_20_1.25_parti al	Steel Hex Head Bolt, 1/4-20 x 1.25", partially threaded	4
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

4

3

2

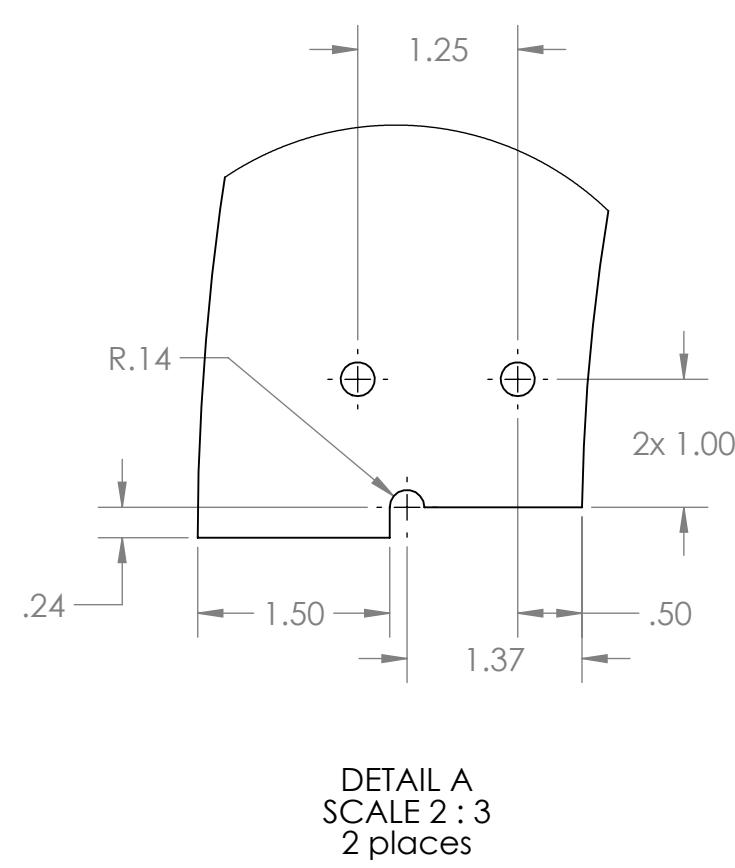
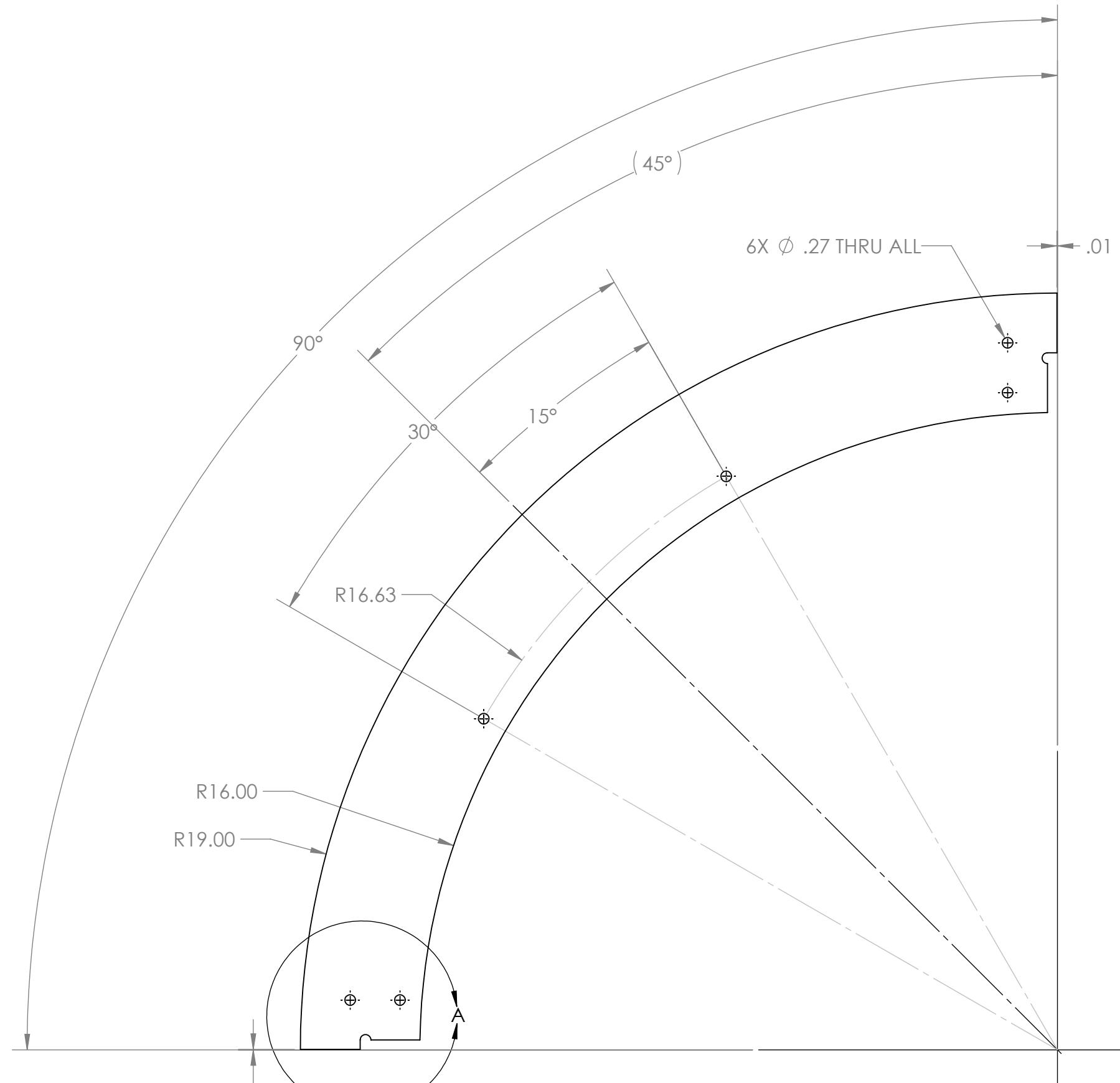
1

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	CO	11/3/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:	COMMENTS:	SIZE	DWG. NO.	REV
	REMOVE ALL BURRS AND SHARP EDGES.	C	GE-22416	
		SCALE: 1:3	SHEET 1 OF 1	
DO NOT SCALE DRAWING				

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE: Upper Hub
Large Rib
Assembly

SIZE DWG. NO. REV
C GE-22416
SCALE: 1:3 SHEET 1 OF 1



Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	6/28/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST [®] . ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST [®] IS PROHIBITED.		
MATERIAL/FINISH: 1/2" HDPE, natural/smooth	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST [®] ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner	
TITLE: Upper Hub Small Rib		
SIZE	DWG. NO.	REV
C	GE-22417	
SCALE: 1:3		SHEET 1 OF 1

D

D

C

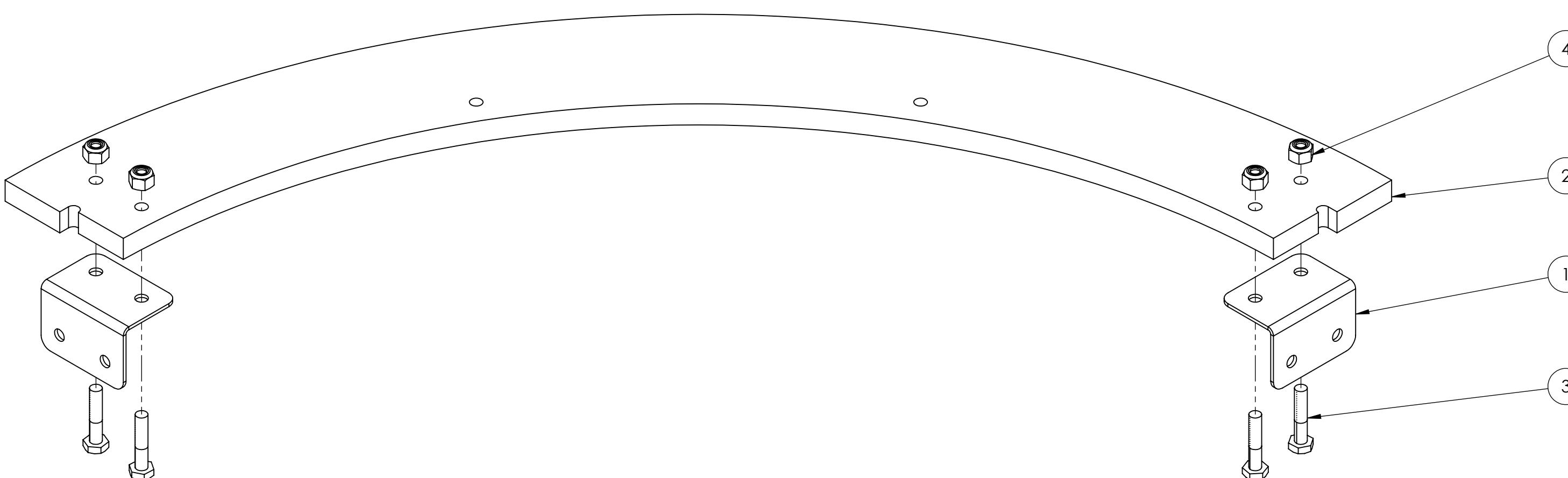
C

B

B

A

A



Notes:

1. Attach (1) to (2) using (3) and (4).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22301	Hub Angle Bracket	2
2	GE-22417	Upper Hub Small Rib	1
3	hex_.25_20_1.25_parti al	Steel Hex Head Bolt, 1/4-20 x 1.25", partially threaded	4
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

UNLESS OTHERWISE SPECIFIED:

VEND

NAME

DATE

DRAWN

CO

11/3/2021

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING


**FIRST
ROBOTICS
COMPETITION**
SOLIDWORKS
Modeling Solutions Partner
TITLE: Upper Hub
Small Rib
Assembly
SIZE DWG. NO. REV
C GE-22418

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

D

D

C

C

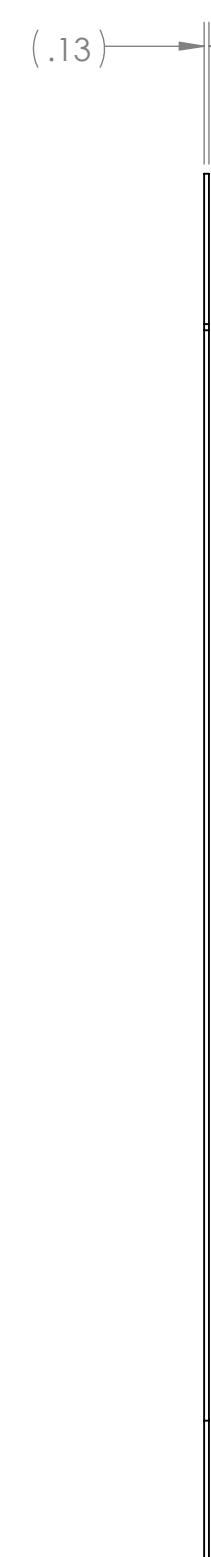
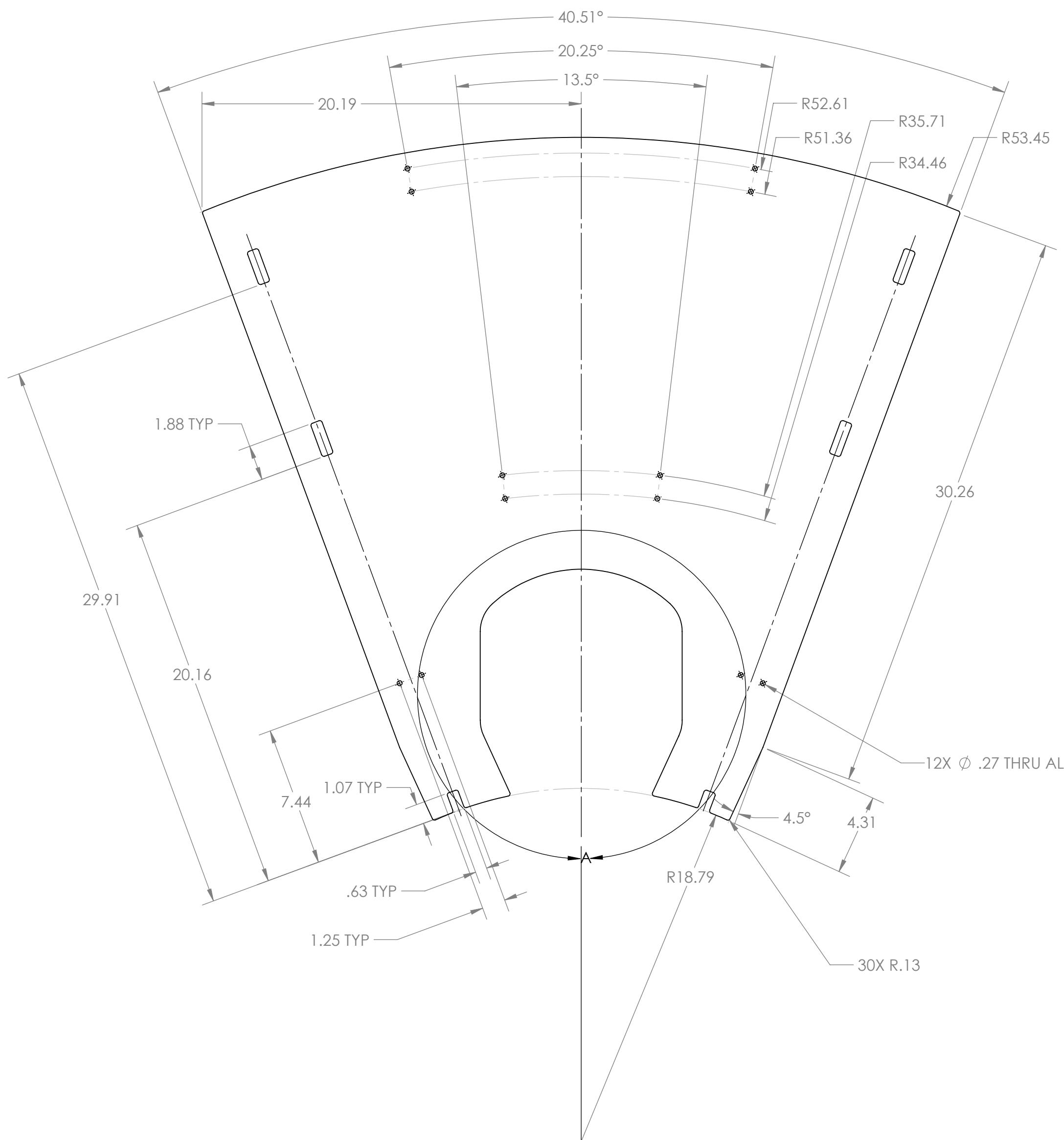
B

B

A

A

Notes:
1. Tag or label with part number.



DETAIL A
SCALE 1 : 3

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/28/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/8" thk. Polycarbonate, Clear			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Upper Hub
Panel**

SIZE DWG. NO. REV
C GE-22419

SCALE: 1:5 SHEET 1 OF 1

4

3

2

1

D

D

C

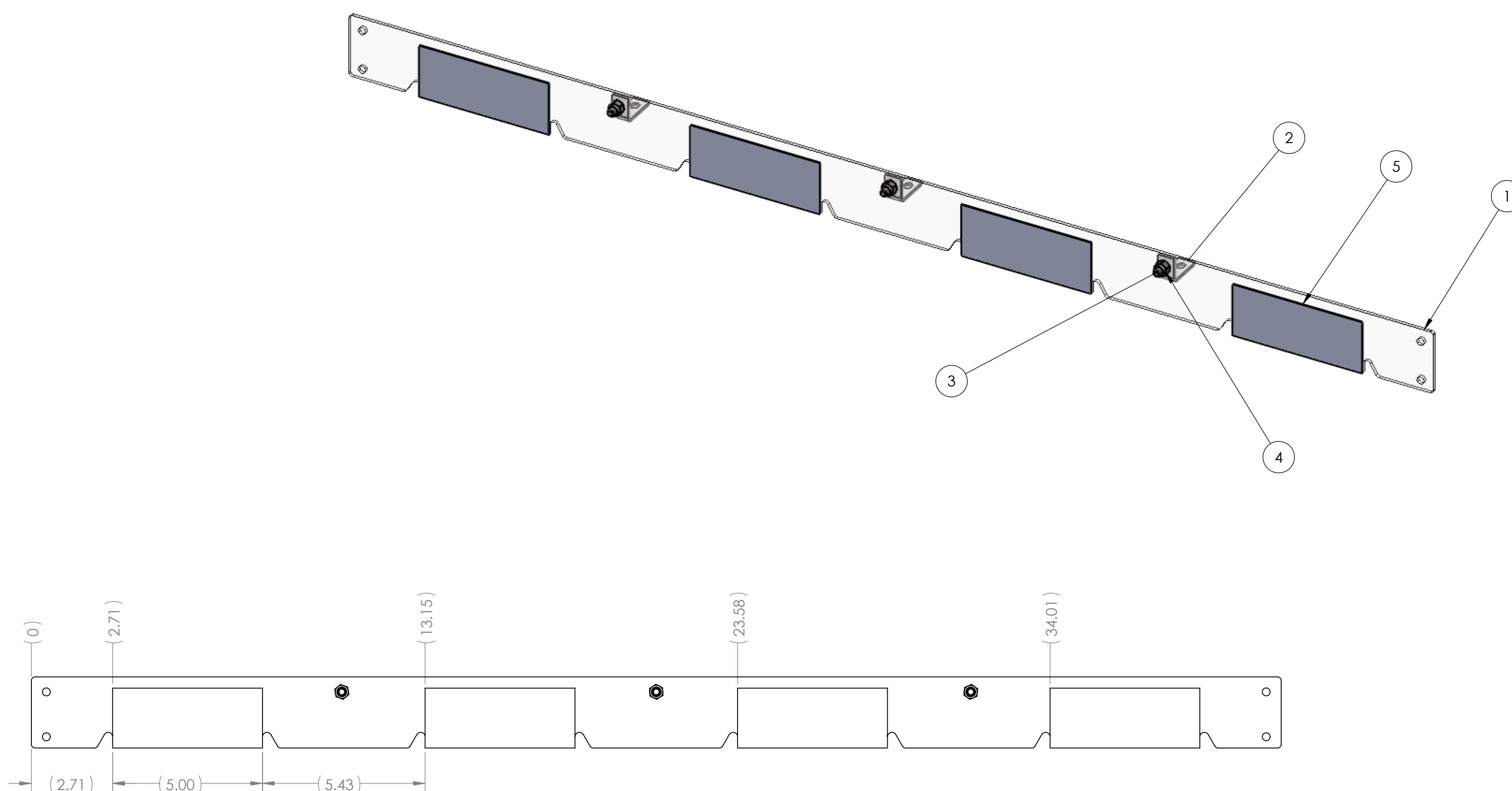
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22421	Upper Hub Vision Plastic	1
2	GE-22422	Upper Hub Vision Angle	3
3	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	3
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	3
5	tape_VISIONTARGET	2" Wide, 5" Long 3M 8830 Scotchlite Reflective Material	4

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	11/3/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE: **Upper Hub
Vision Assembly**

SIZE DWG. NO. REV
C GE-22420

SCALE: 1:3 SHEET 1 OF 2

4

3

2

1

D

D

C

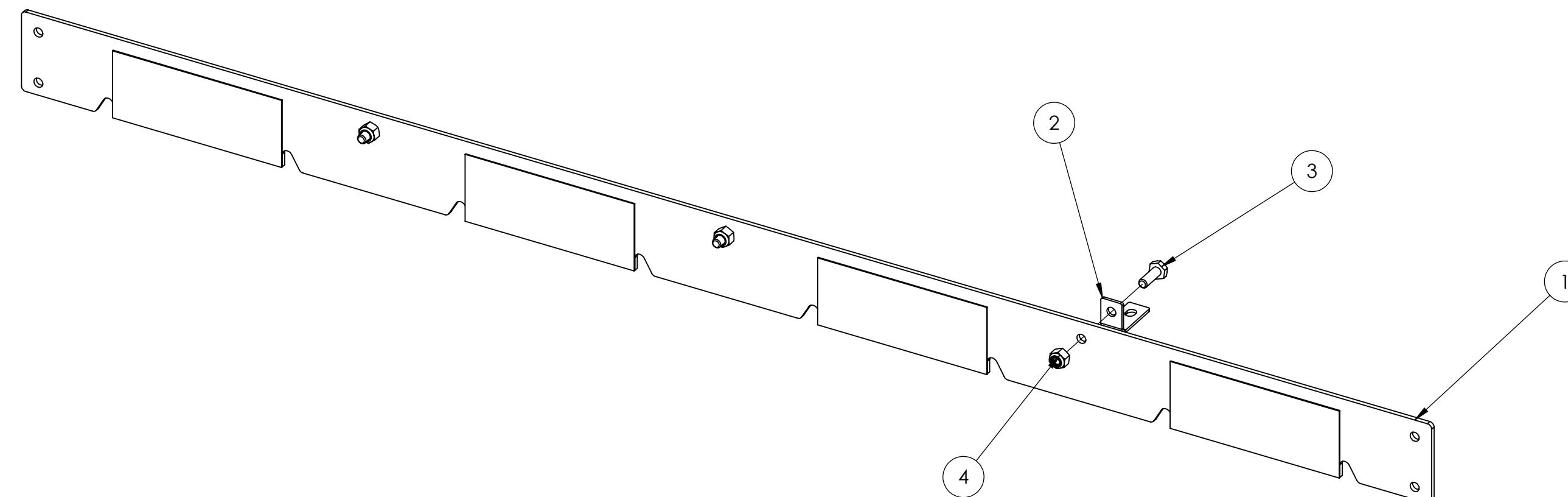
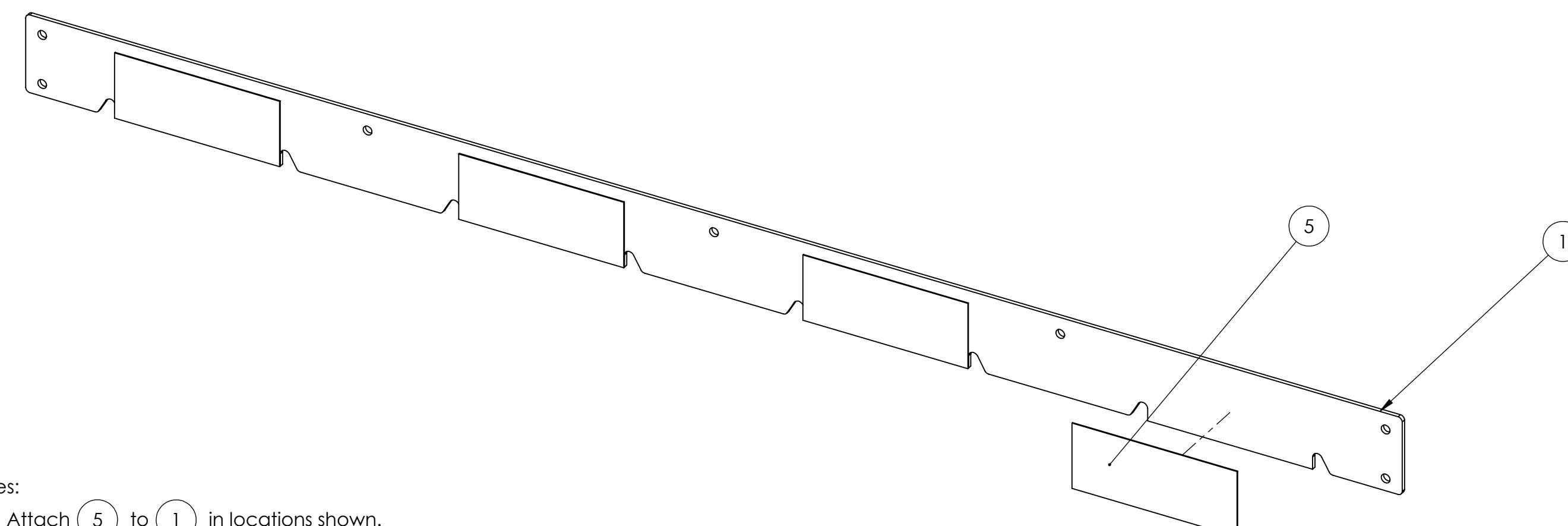
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	11/3/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
DO NOT SCALE DRAWING	C	GE-22420	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Upper Hub
Vision Assembly**

SIZE DWG. NO. REV

C GE-22420

SCALE: 1:3 SHEET 2 OF 2

4

3

2

1

4

3

2

1

D

D

C

C

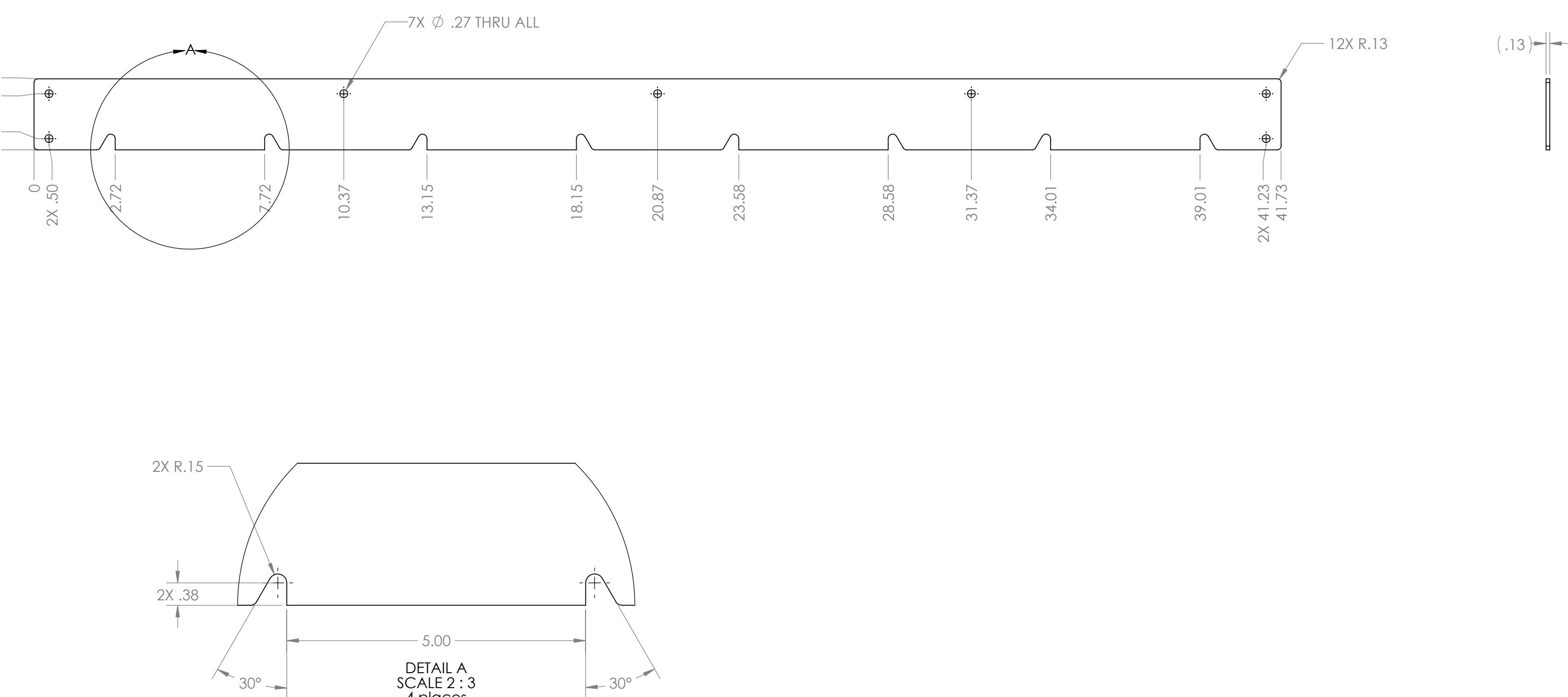
B

B

A

A

- Notes:
1. Tag or label with part number.



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	7/27/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/8" thk. Polycarbonate, Clear	C	GE-22421	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:3	SHEET 1 OF 1	

4

3

2

1

D

D

C

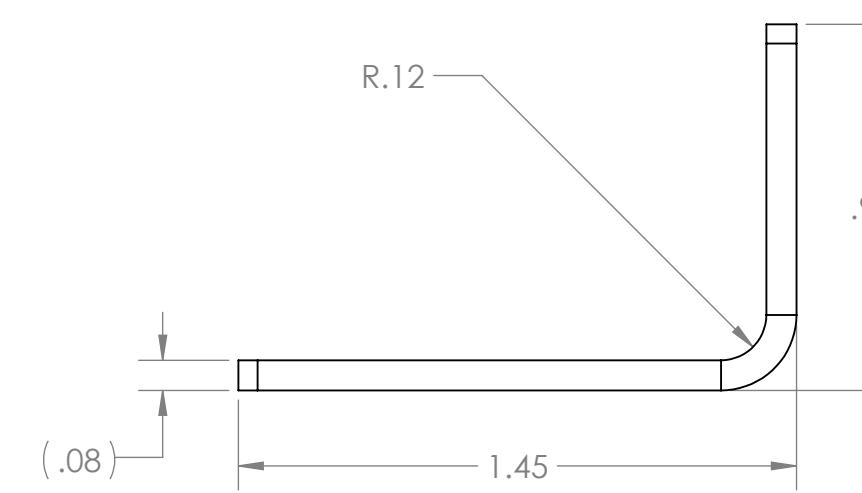
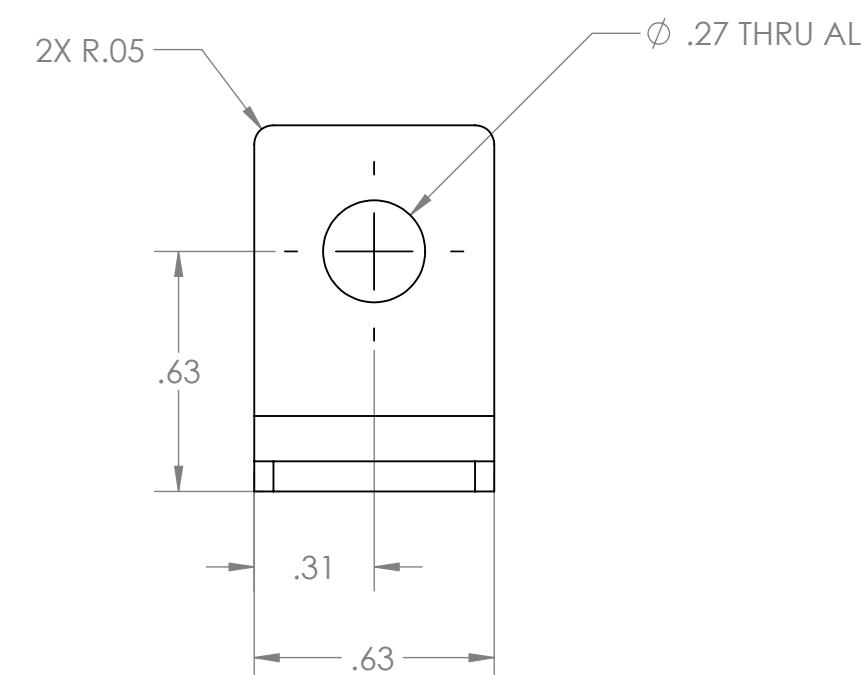
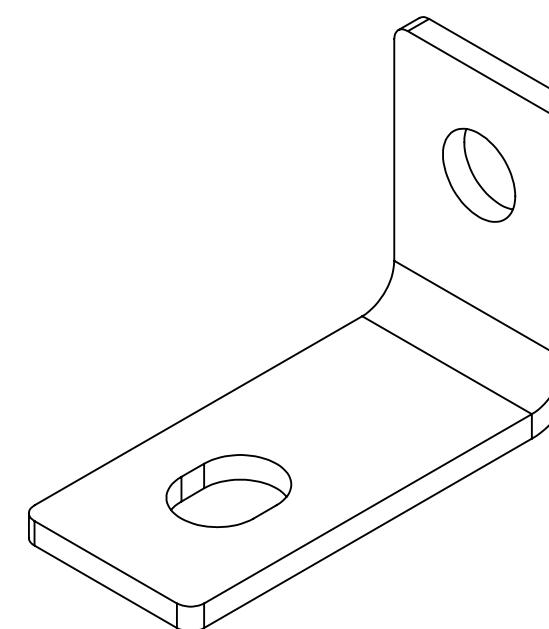
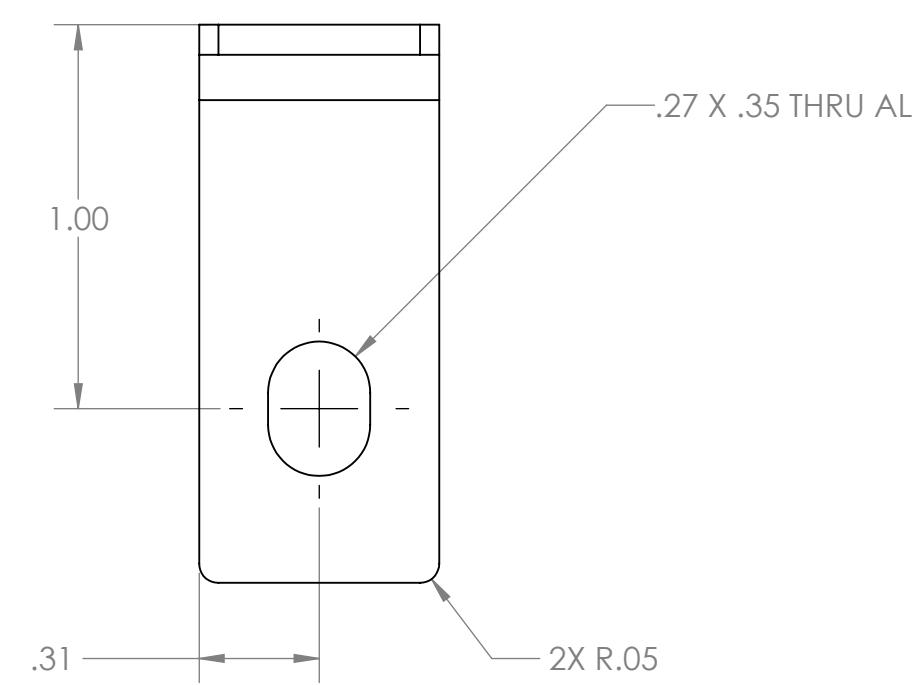
C

B

B

A

A



Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	CO	7/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 Ga. preplated steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

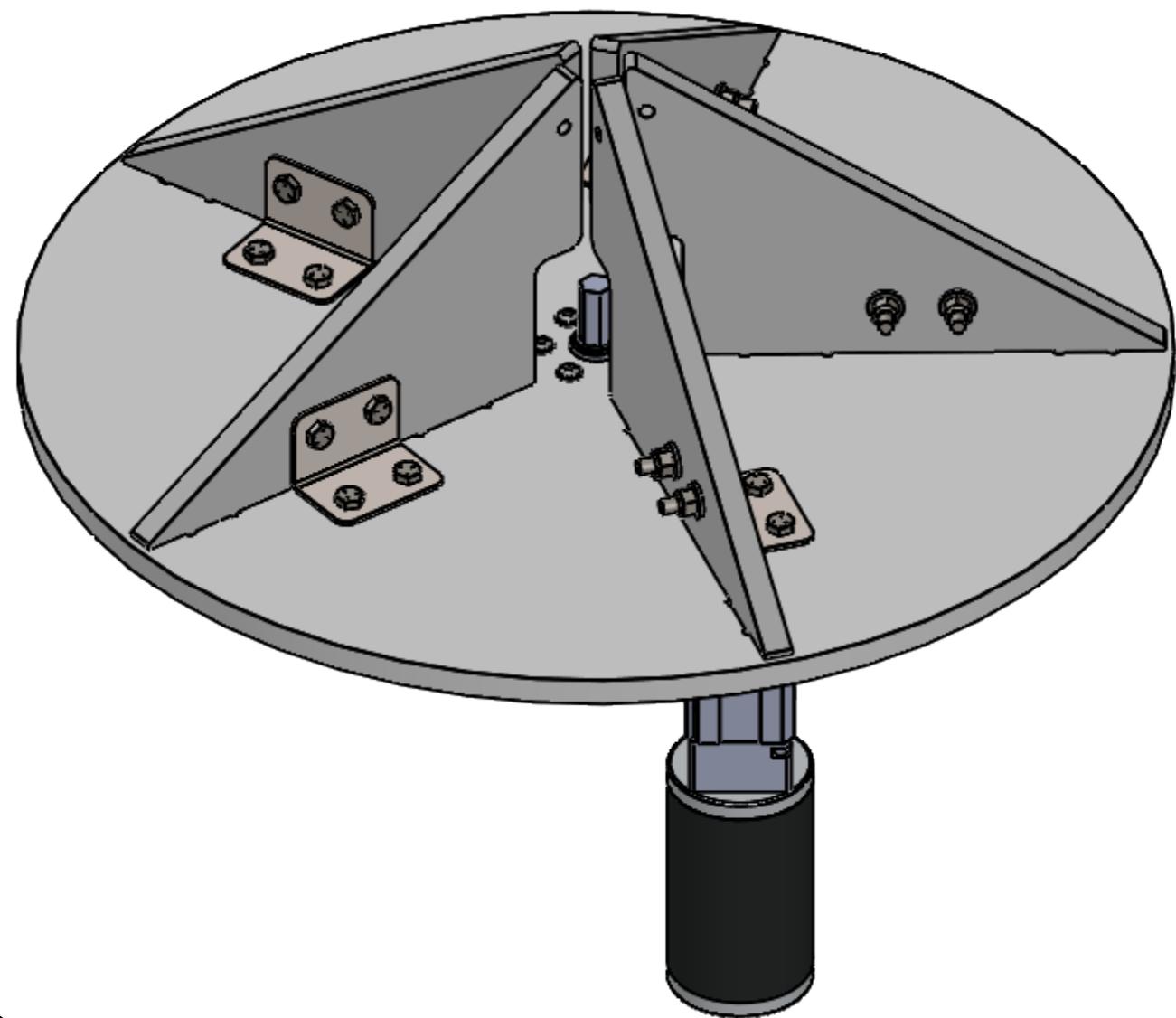
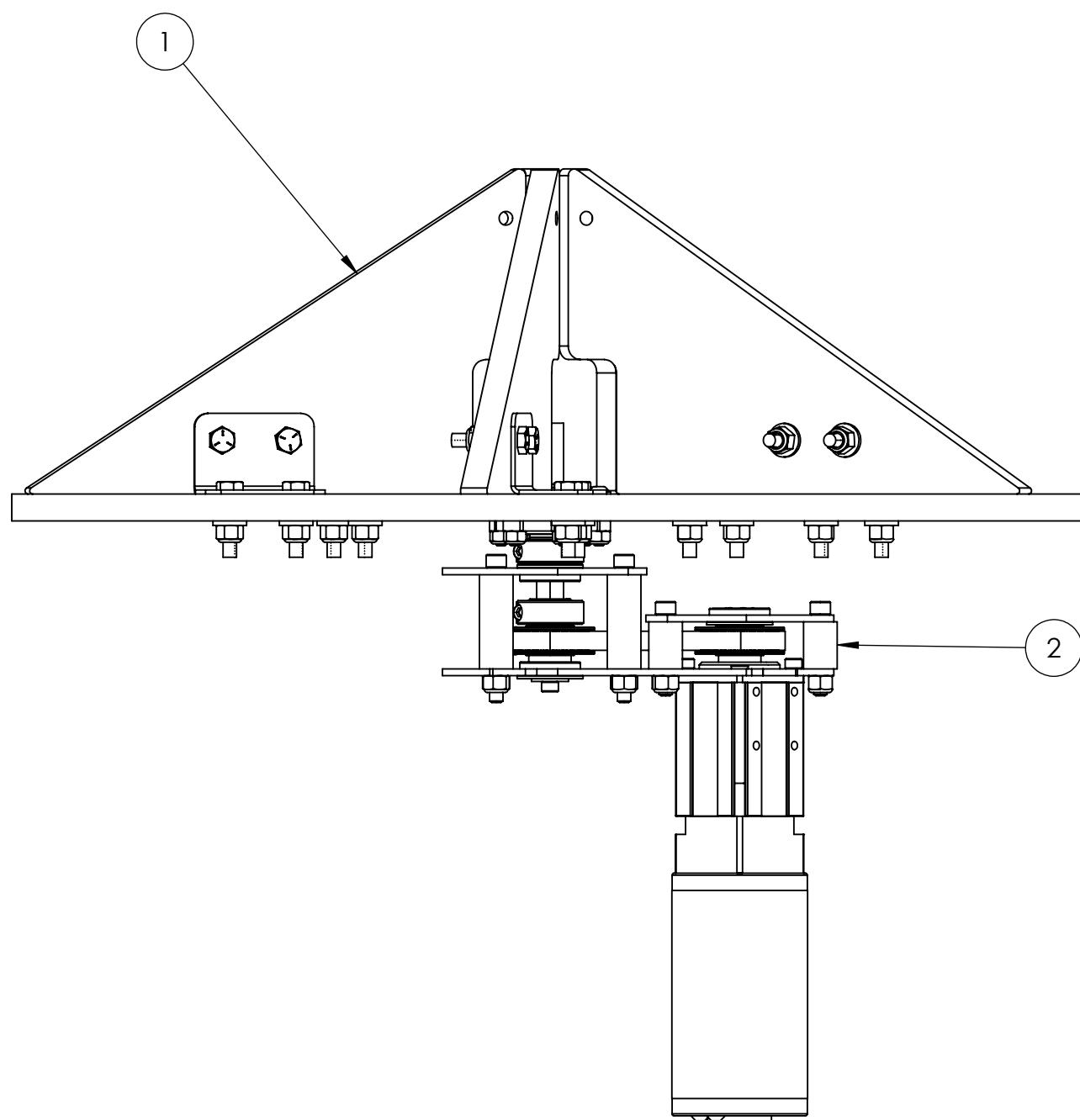
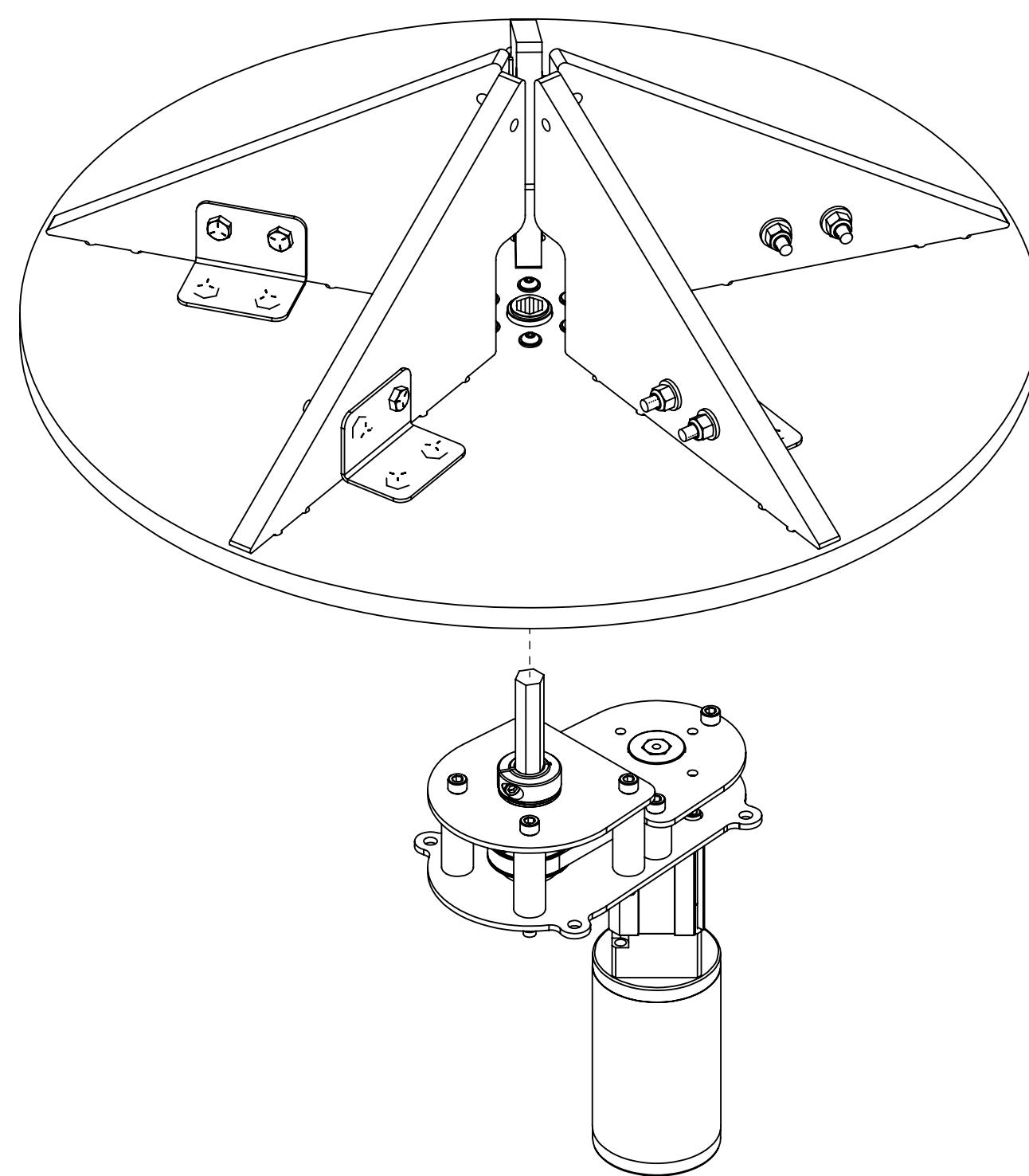
SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Upper Hub
Vision Angle**

SIZE DWG. NO. REV

C GE-22422

SCALE: 2:1 SHEET 1 OF 1



Notes:

1. Mount (1) on the exposed hex shaft of (2).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22433	Low Agitator Wheel Assembly	1
2	GE-22450	Low Agitator Drive Assembly	1

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/16/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

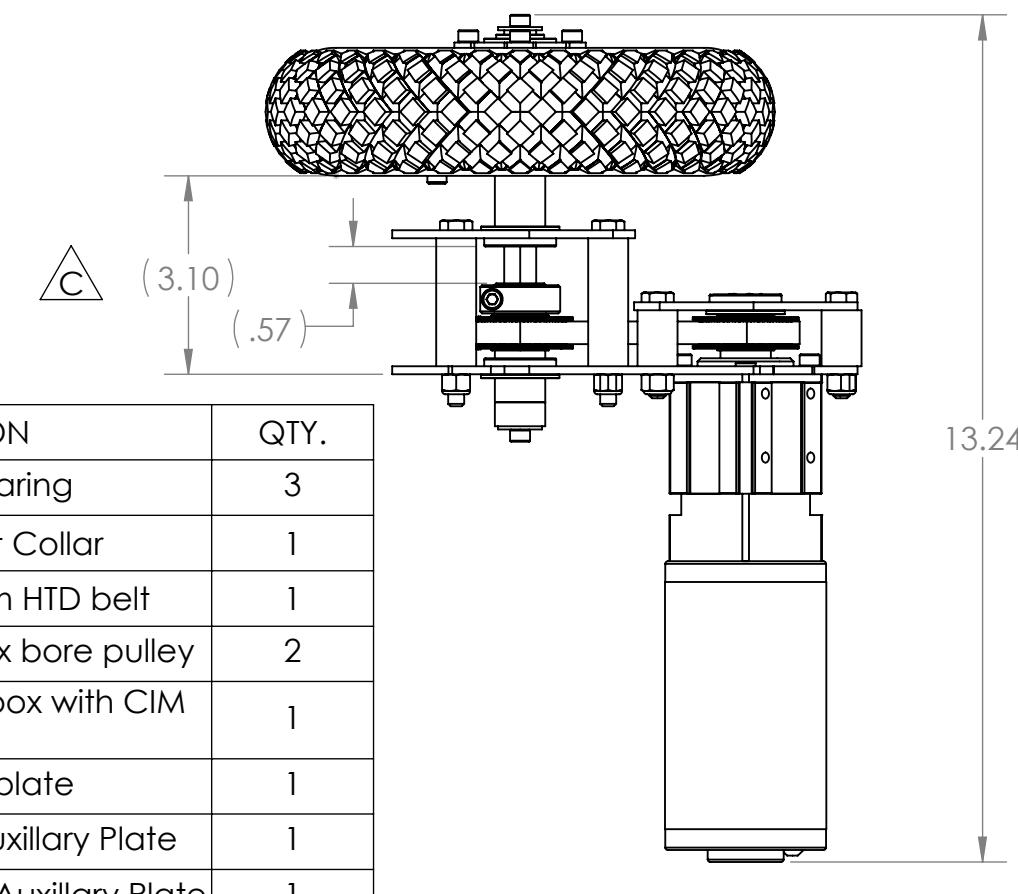
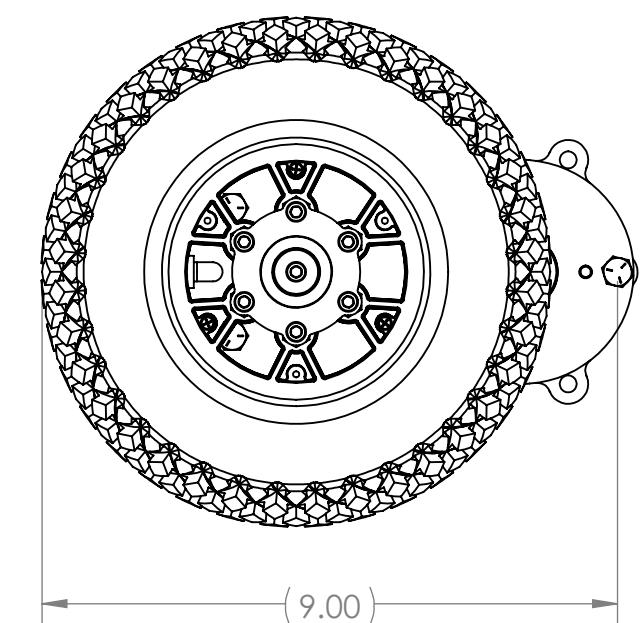
FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

Low Agitator Assembly

SIZE DWG. NO. REV
C GE-22431

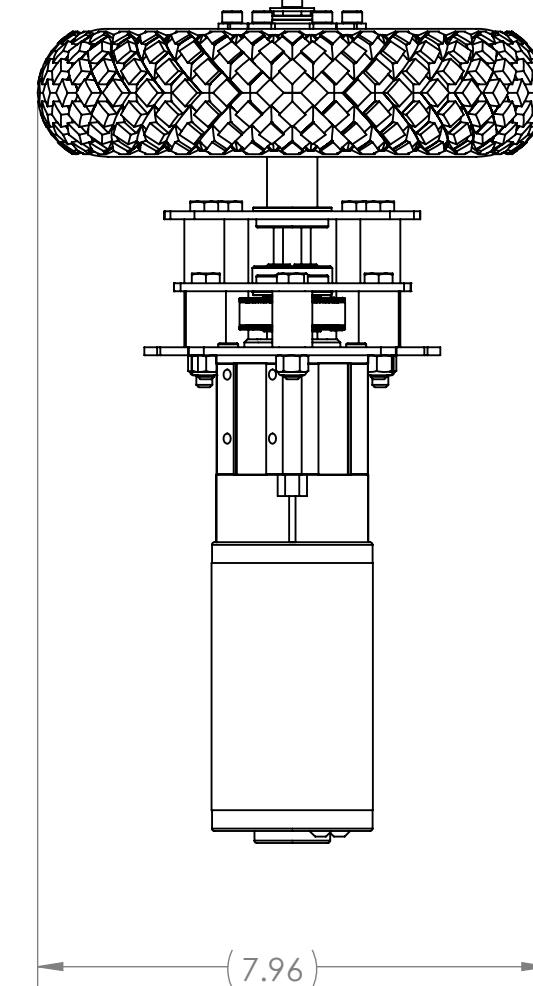
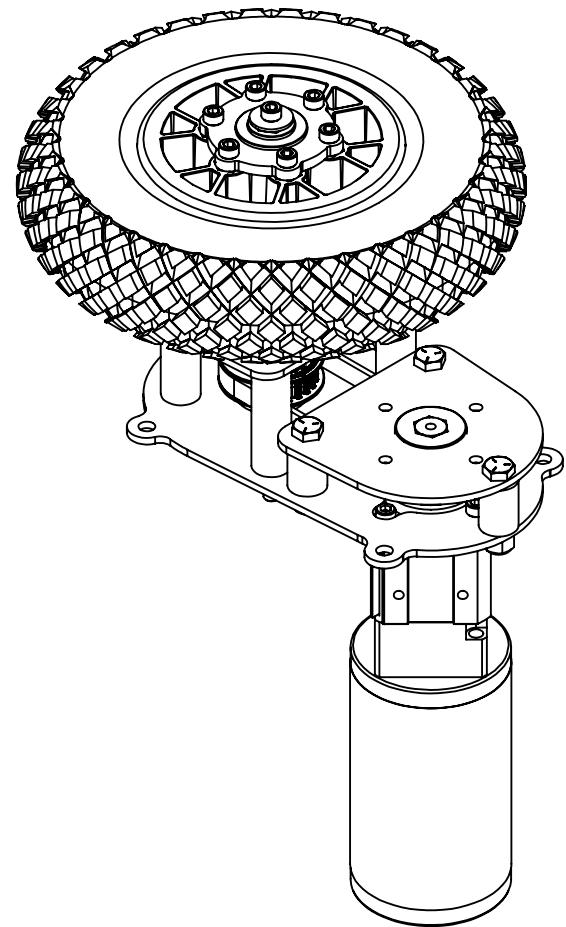
SCALE: 1:3 SHEET 1 OF 1

D



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22437	1/2 in. Hex Bearing	3
2	GE-22438	1/2 in. Hex Shaft Collar	1
3	GE-22439	60t 9mm wide 5mm HTD belt	1
4	GE-22440	24 tooth 5mm HTD hex bore pulley	2
5	GE-22441-012	12:1 CIM Sport Gearbox with CIM Motor	1
6	GE-22442	Agitator Baseplate	1
7	GE-22443	Agitator Gearbox Auxiliary Plate	1
8	GE-22444	Agitator Output Shaft Auxiliary Plate	1
9	GE-22445-125	1/2 in. hex molded spacer, 1/8 in. long	2
10	GE-22445-1000	1/2 in. hex molded spacer, 1 in. long	2
11	GE-22447	High Agitator Wheel with Hub	1
12	GE-22448	High Agitator Drive Hex Shaft	1
13	hex_.25_20_1.5_partial	Steel Hex Head Screw, 1/4"-20 x 1-1/2" long, partially threaded	3
14	hex_.25_20_2.75_partial	Steel Hex Head Screw, 1/4"-20 x 2-3/4" long, partially threaded	4
15	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	7
16	socket_hex_10_32_.5_nylon	Socket Head Screw, 10-32 x 0.5" long, with nylon patch	4
17	spacer_.252_.625_.875	Spacer, .252 ID, .625 OD, .875 long	3
18	spacer_.255_.625_2	Spacer, .252 ID, .625 OD, 2 long	4
19	washer_flat_10_oversized	Oversized flat Washer for #10 Screw	2
20	GE-22445-375	1/2 in. hex molded spacer, 3/8 in. long	2

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
2-D4, 3-D4	A	Added notes for use of glue on pulleys. Updates made to geometry of GE-22442, GE-22443, GE-22444	8/17/2021	CPO
A3	B	Two fasteners changed from hex head to socket head bolts.	10/27/2021	CPO
A3, B3, 3-A4	C	Changed fasteners back to hex head. Changed length of bolts and spacers to reduce wheel height. Spacers added to capture extra hex shaft. Assembly instructions modified to include new spacers.	11/23/2021	CPO



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
	DRAWN	CO	6/25/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22432	C
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING		SCALE: 1:3 SHEET 1 OF 4	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

High Agitator Assembly

4

3

2

1

D

D

C

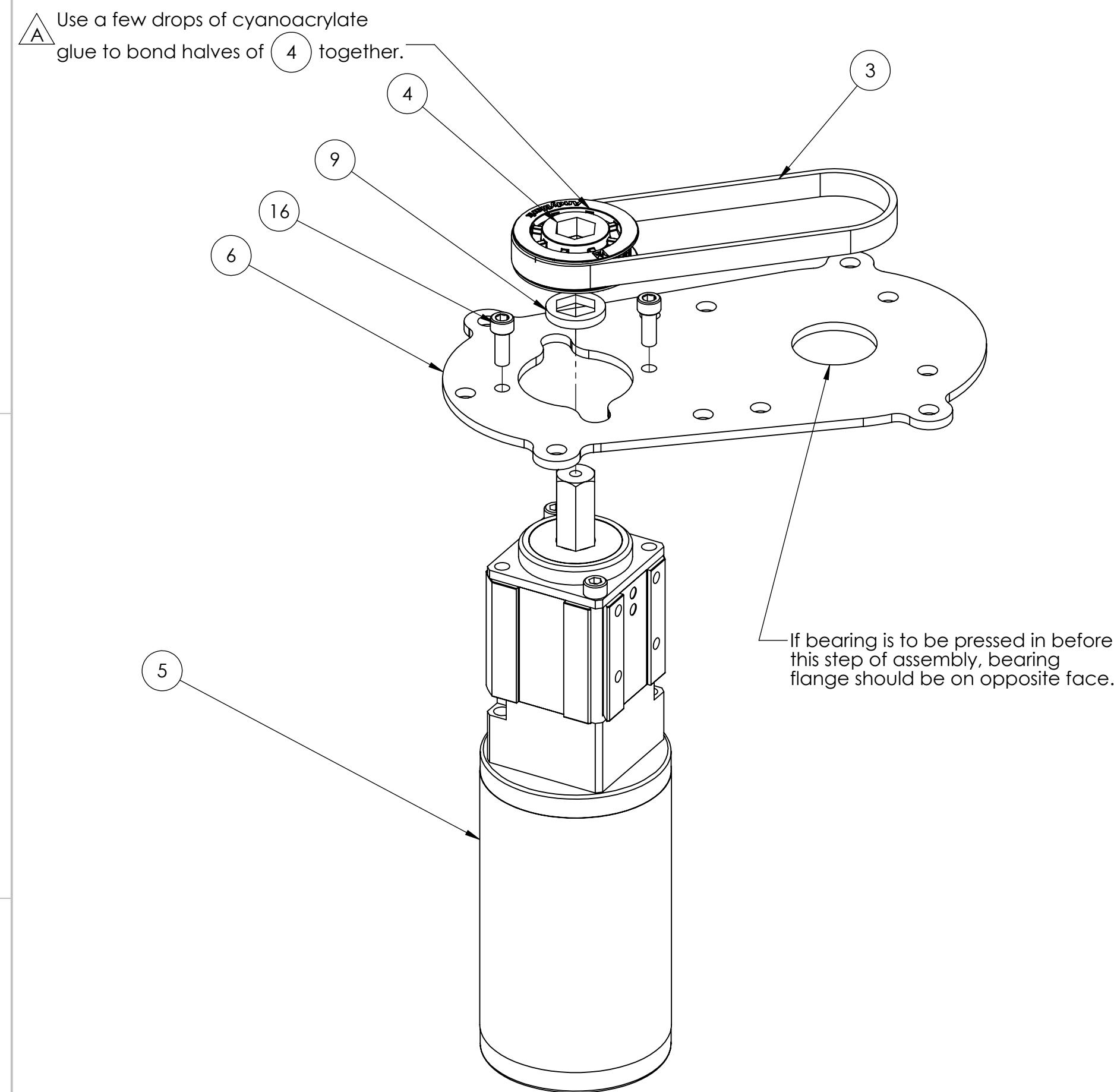
C

B

B

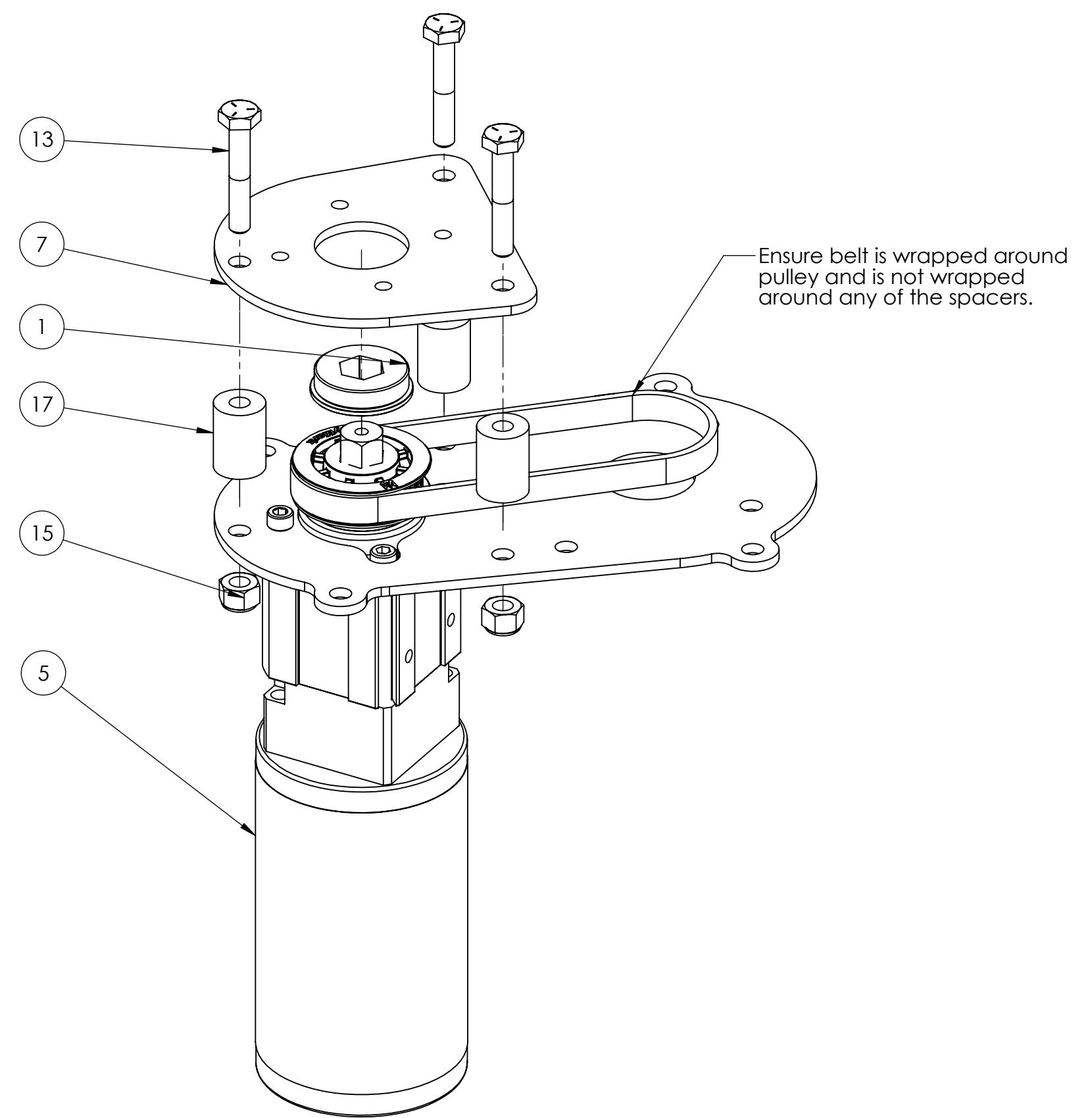
A

A



Notes:

1. Attach (5) to (6) using (16).
2. Slide (9) and (4) in order onto the shaft of (5).
3. Place (3) on (4).



Notes:

1. Insert or press (1) into (7).
2. Slide (1) (7) onto the shaft of (5), noting flange orientation.
3. Attach (1) (7) to the assembly using (17) to space the plates and (13) and (15) to fasten. Be careful of belt routing.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/25/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22432	C
DO NOT SCALE DRAWING		SCALE: 2:3	SHEET 2 OF 4

FIRST ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

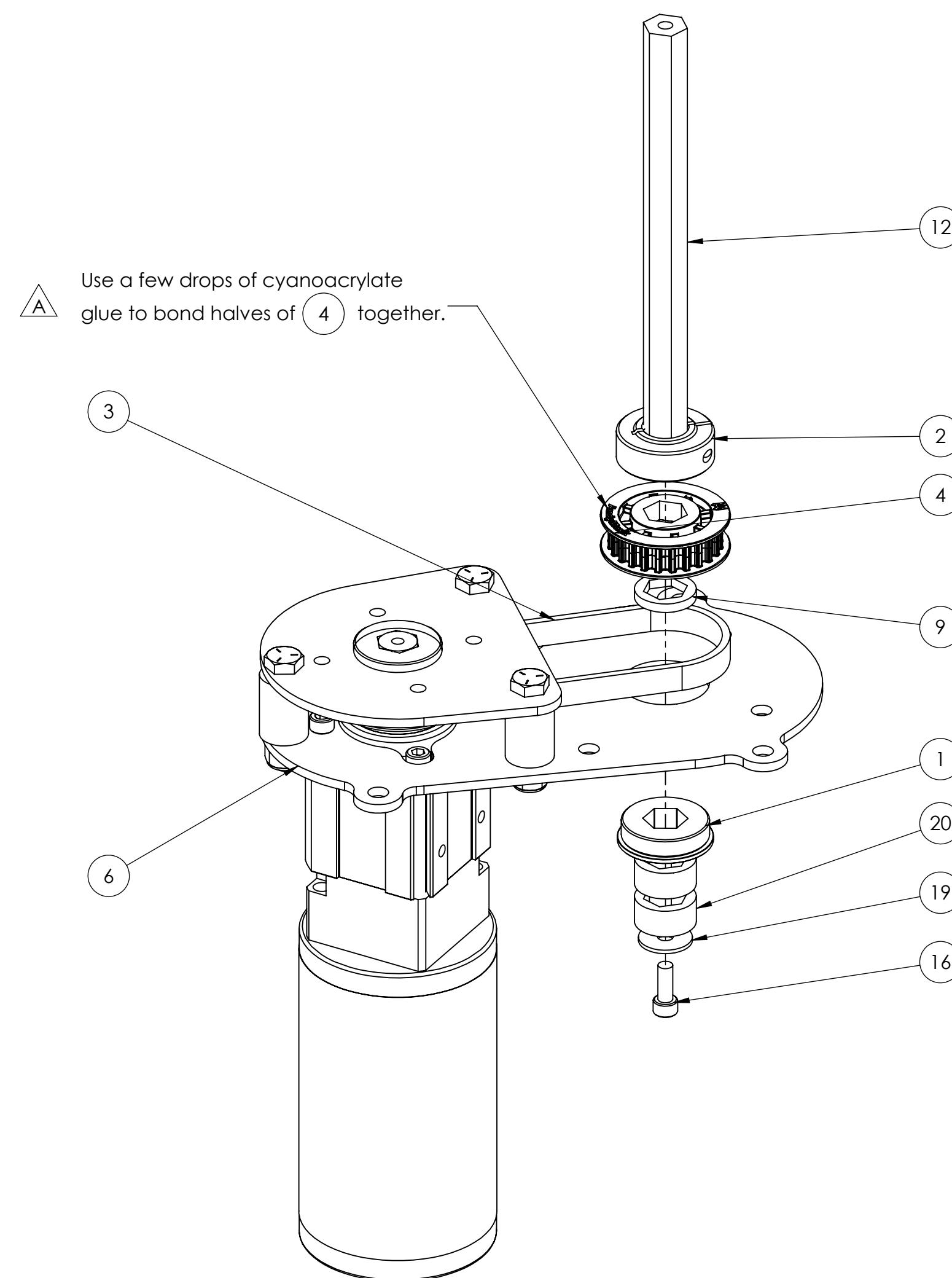
High Agitator Assembly

4

3

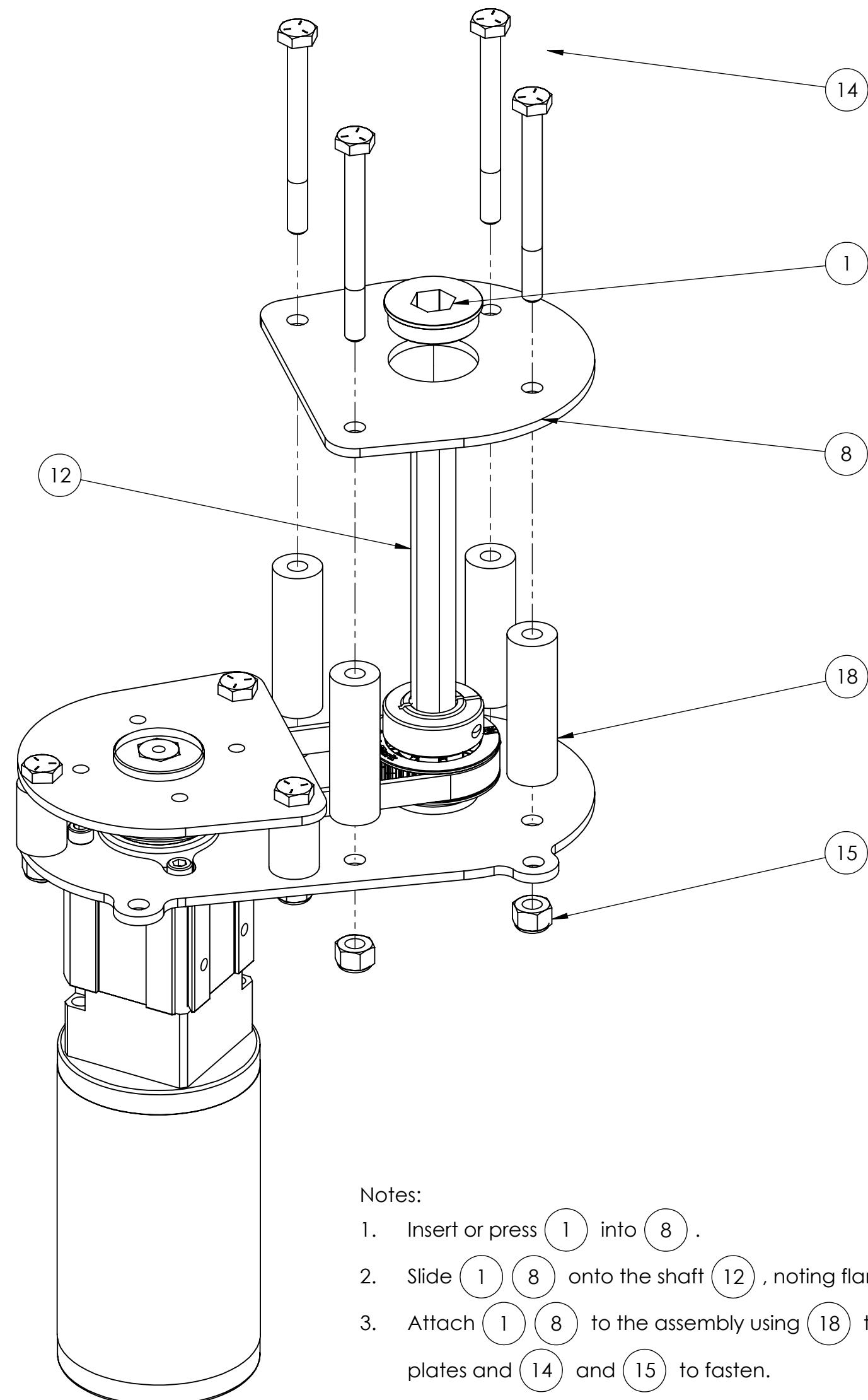
2

1



Notes:

1. If not already done, press or insert 1 into 6, noting flange orientation.
2. Slide items 2, 4, and 9 onto 12, being careful of order.
3. Slide shaft into place, aligning 3 onto 4, then aligning 12 with 1.
4. Slide 20 (qty 2) onto 12.
5. Attach 16 and 19 to 12. 19 must be large enough diameter to prevent shaft being pulled past spacer.
6. With 20 flush to each other and 1, 12 flush to the bottom of 20, and 2 4 9 all flush to each other and 1, tighten set screw on 2.



Notes:

1. Insert or press 1 into 8.
2. Slide 1 8 onto the shaft 12, noting flange orientation.
3. Attach 1 8 to the assembly using 18 to space the plates and 14 and 15 to fasten.

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	6/25/2021
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:			COMMENTS:		
			REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			SIZE	DWG. NO.	REV
			C	GE-22432	C
			SCALE: 2:3	SHEET 3 OF 4	

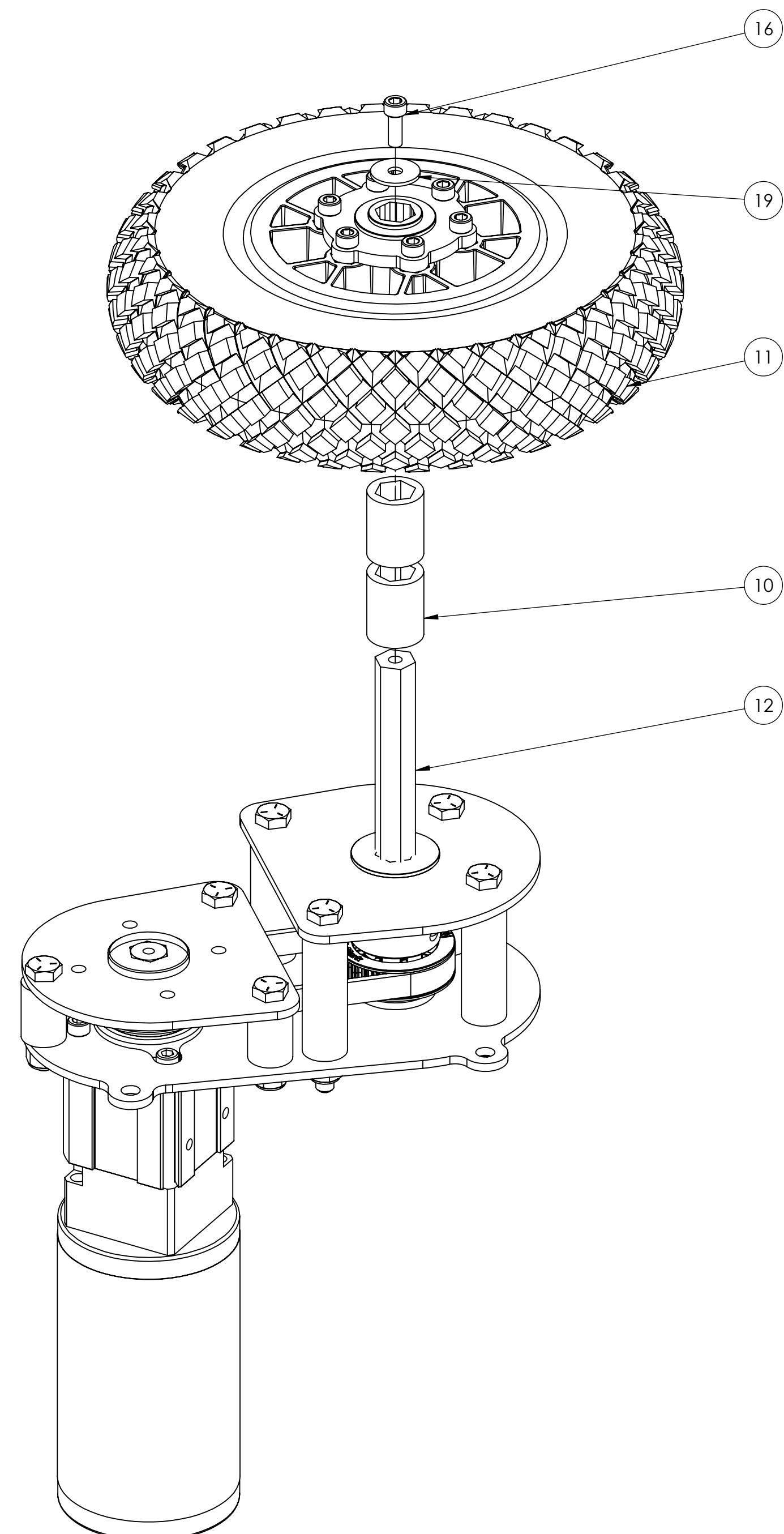
4

3

2

1

D

**Notes:**

1. Slide (10) x 2 onto (12).
2. Slide (11) onto (12), noting wheel orientation.
3. Fasten using (19) and (16). (19) must be large enough diameter to prevent shaft being pulled past hub.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/25/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22432	C
DO NOT SCALE DRAWING		SCALE: 2:3	SHEET 4 OF 4

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

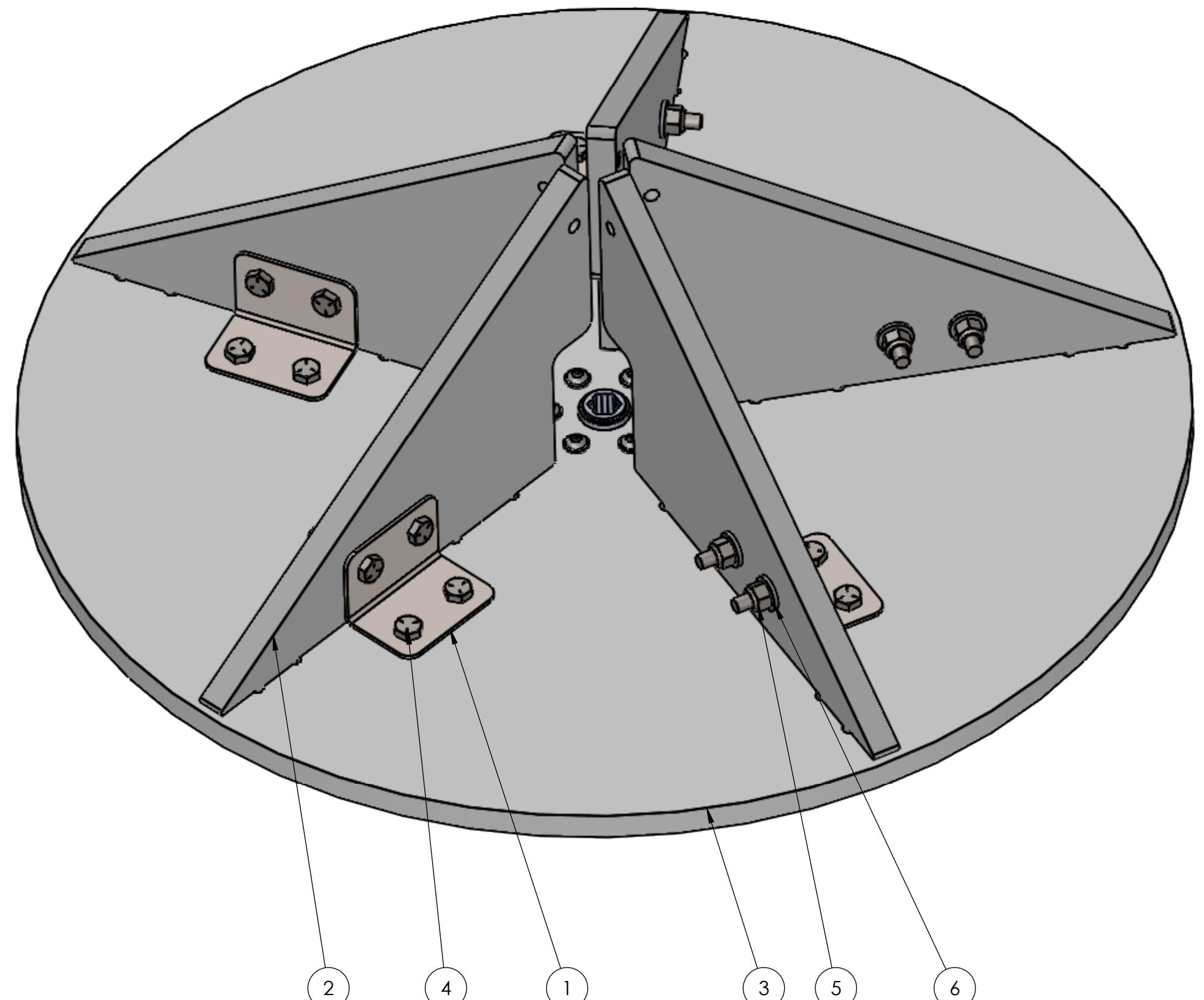
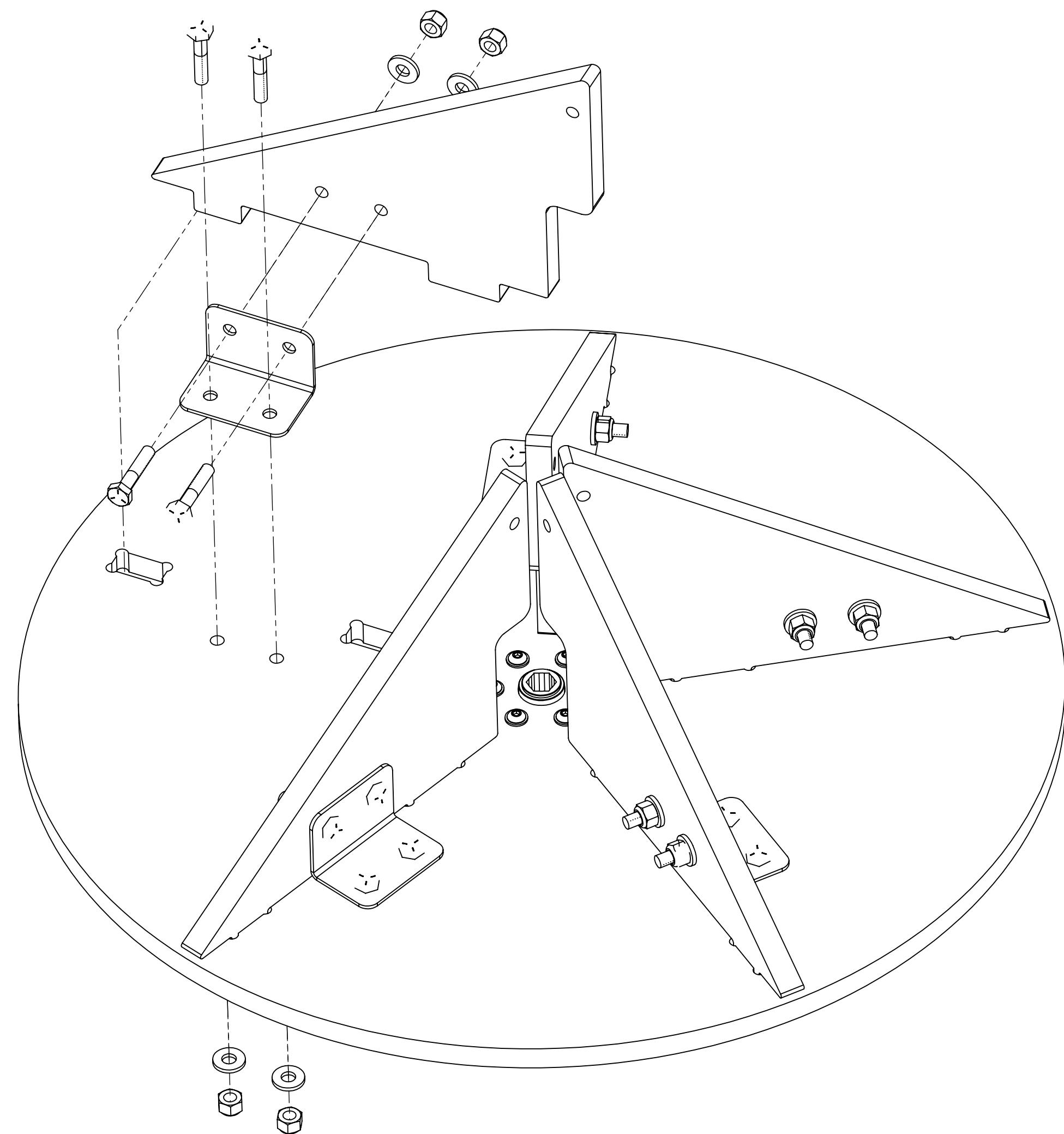
TITLE:
**High Agitator
Assembly**

4

3

2

1



Notes:

1. Attach (2) to (1) using (4), (5), and (6).
 2. Attach the previous step to (3) using (4), (5), and (6). Tabs on (2) should insert into slots in (3).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22301	Hub Angle Bucket	5
2	GE-22435	Low Agitator Triangle	5
3	GE-22451	Low Agitator Wheel Base Assembly	1
4	hex_.25_20_1.25_partial	Steel Hex Head Bolt, 1/4-20 x 1.25", partially threaded	20
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	20
6	washer_flat_.25	Flat Washer for 1/4" Screw	20

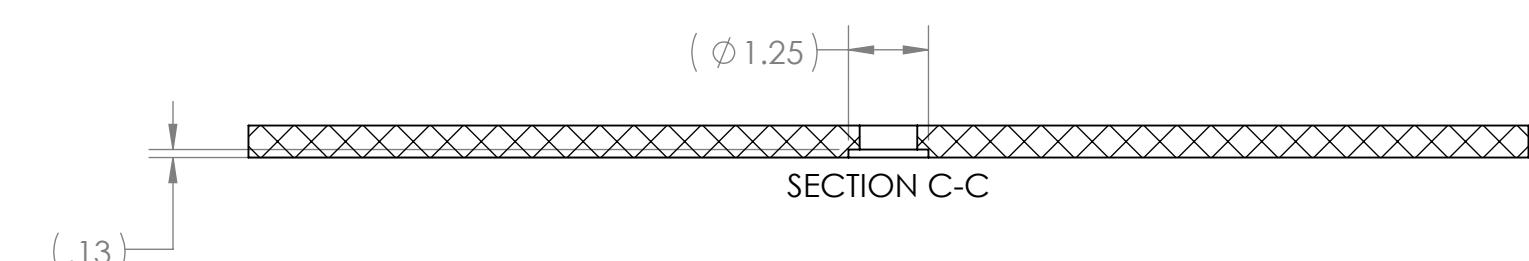
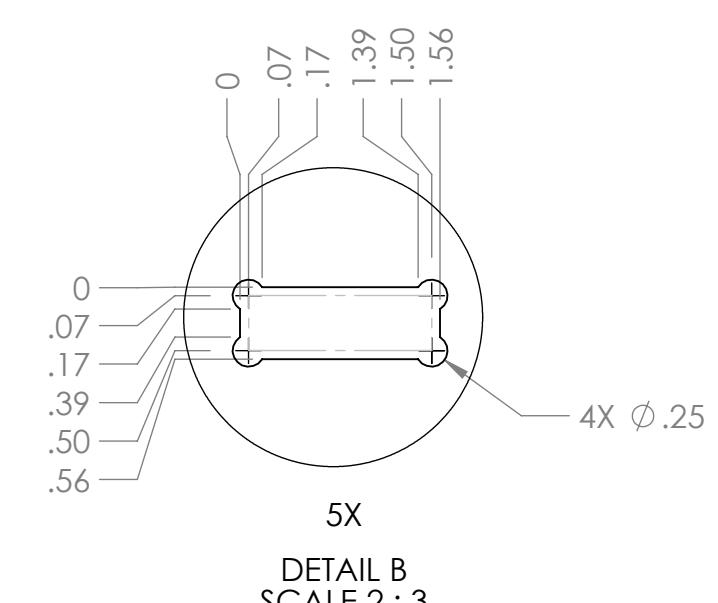
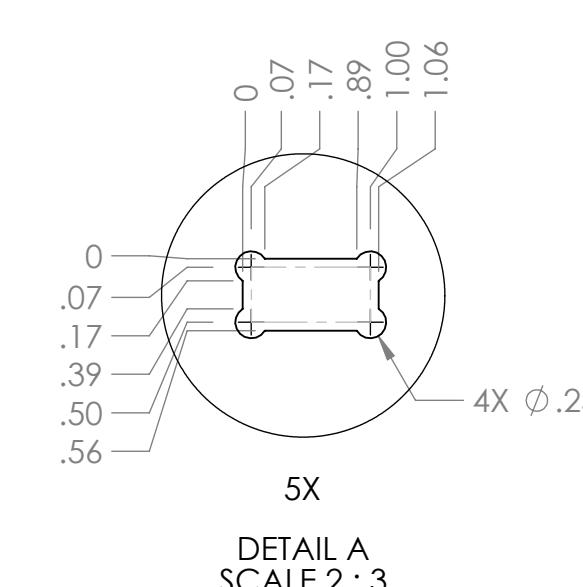
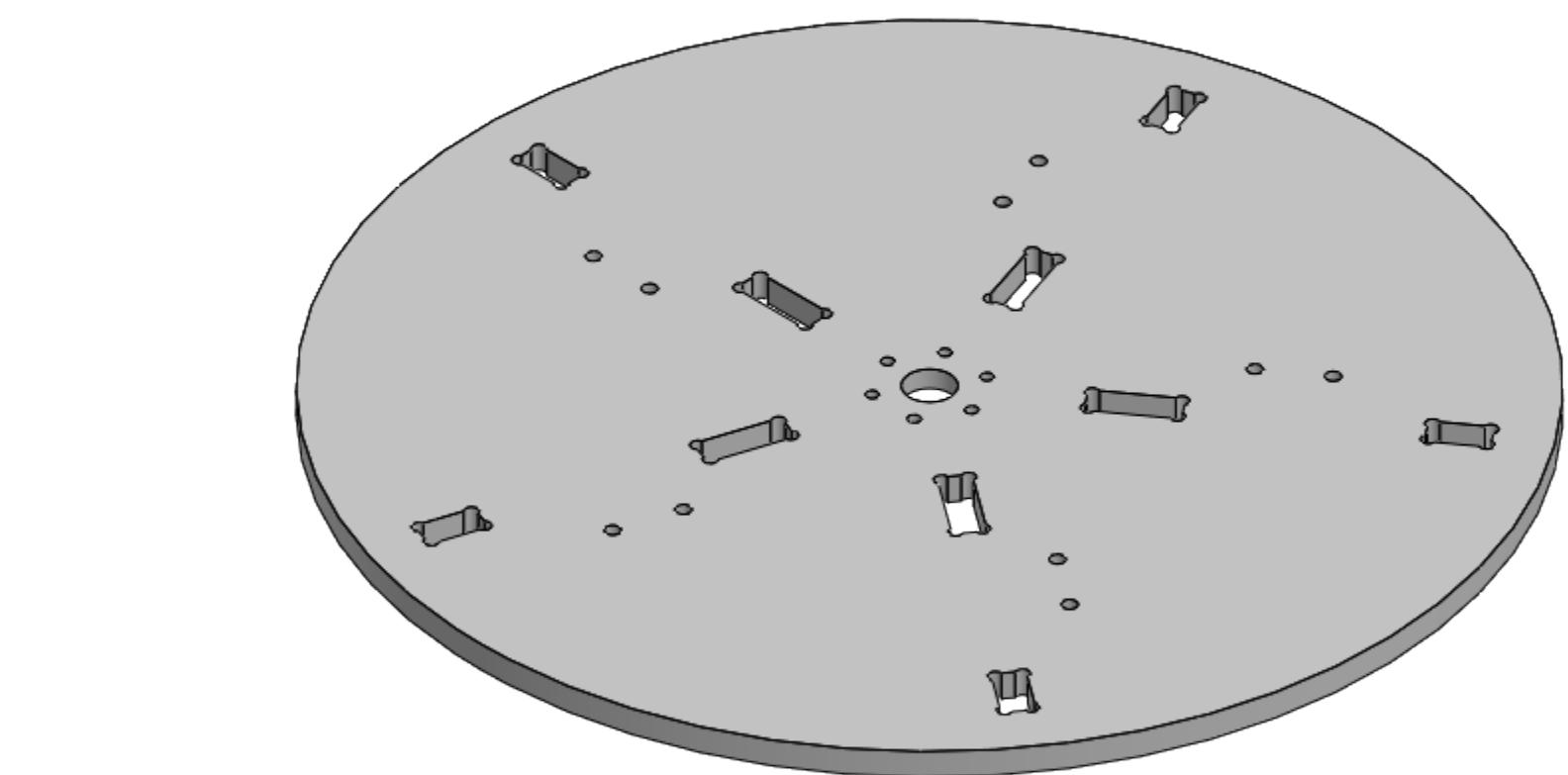
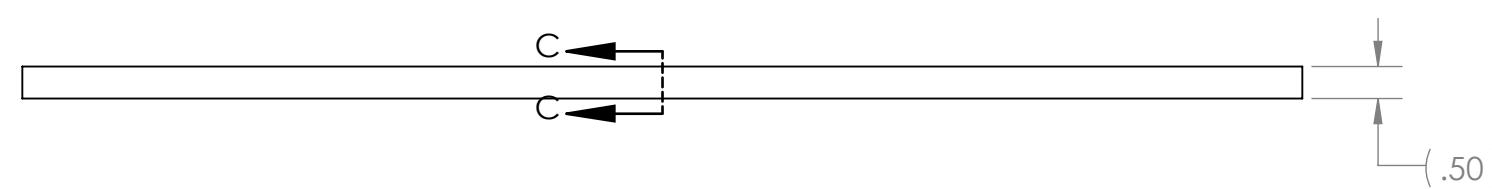
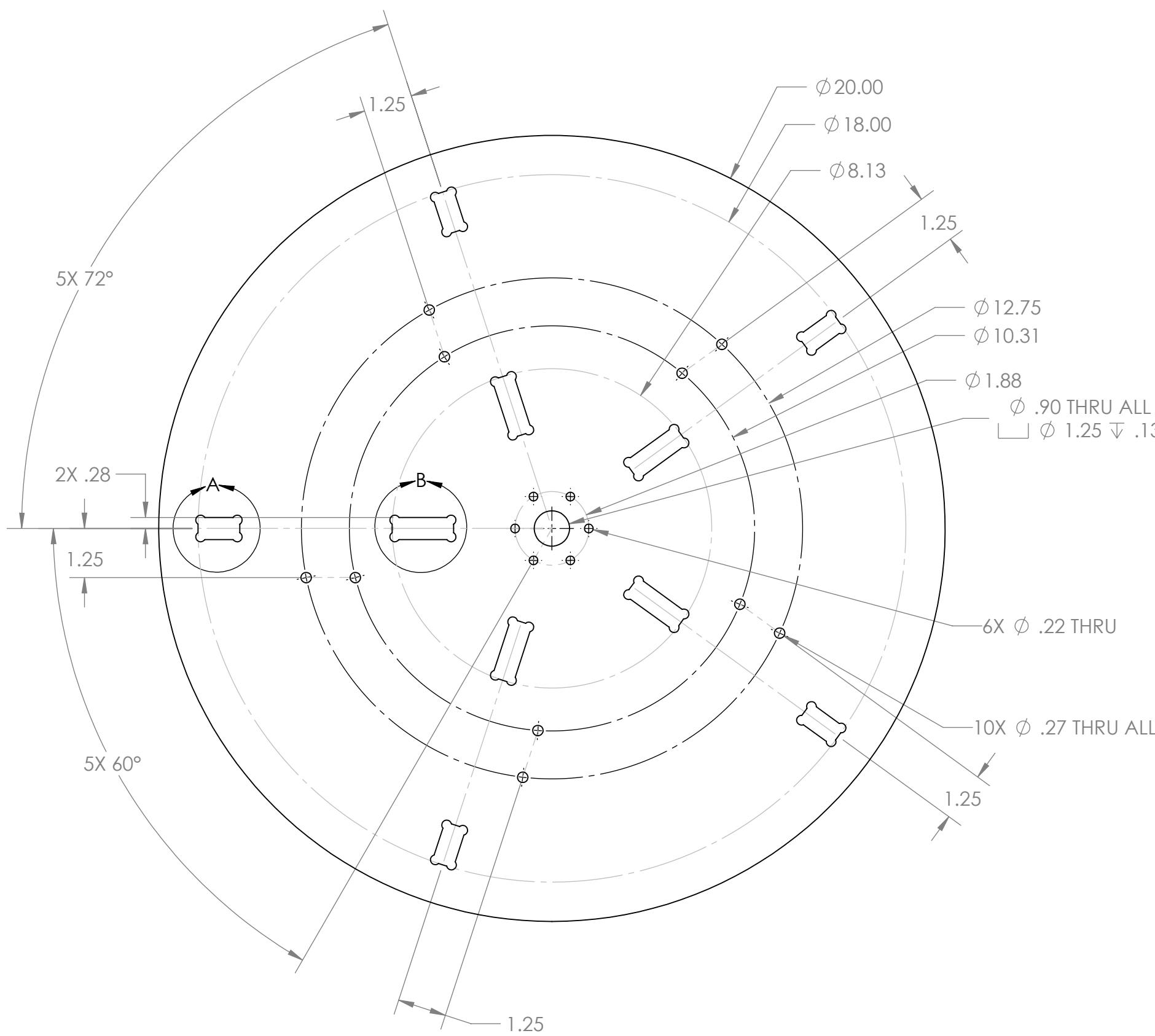
UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
		DRAWN	CO	12/29/2021
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$		PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST® . ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH: Tag or label with part number		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING		SIZE	DWG. NO.	REV
		C	GE-22433	
		SCALE: 1:2	SHEET 1 OF 1	

4

3

2

1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	VEND	NAME	DATE
	DRAWN	KAMC	5/13/2021
MATERIAL/FINISH: 1/2" HDPE, Natural. Tag or label with part number.	PROPRIETARY AND CONFIDENTIAL		
	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
DO NOT SCALE DRAWING	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
		TITLE:	
		Low Agitator Wheel Base	
		SIZE	DWG. NO.
		C	GE-22434
		SCALE: 1:3	SHEET 1 OF 1

4

3

2

1

D

C

B

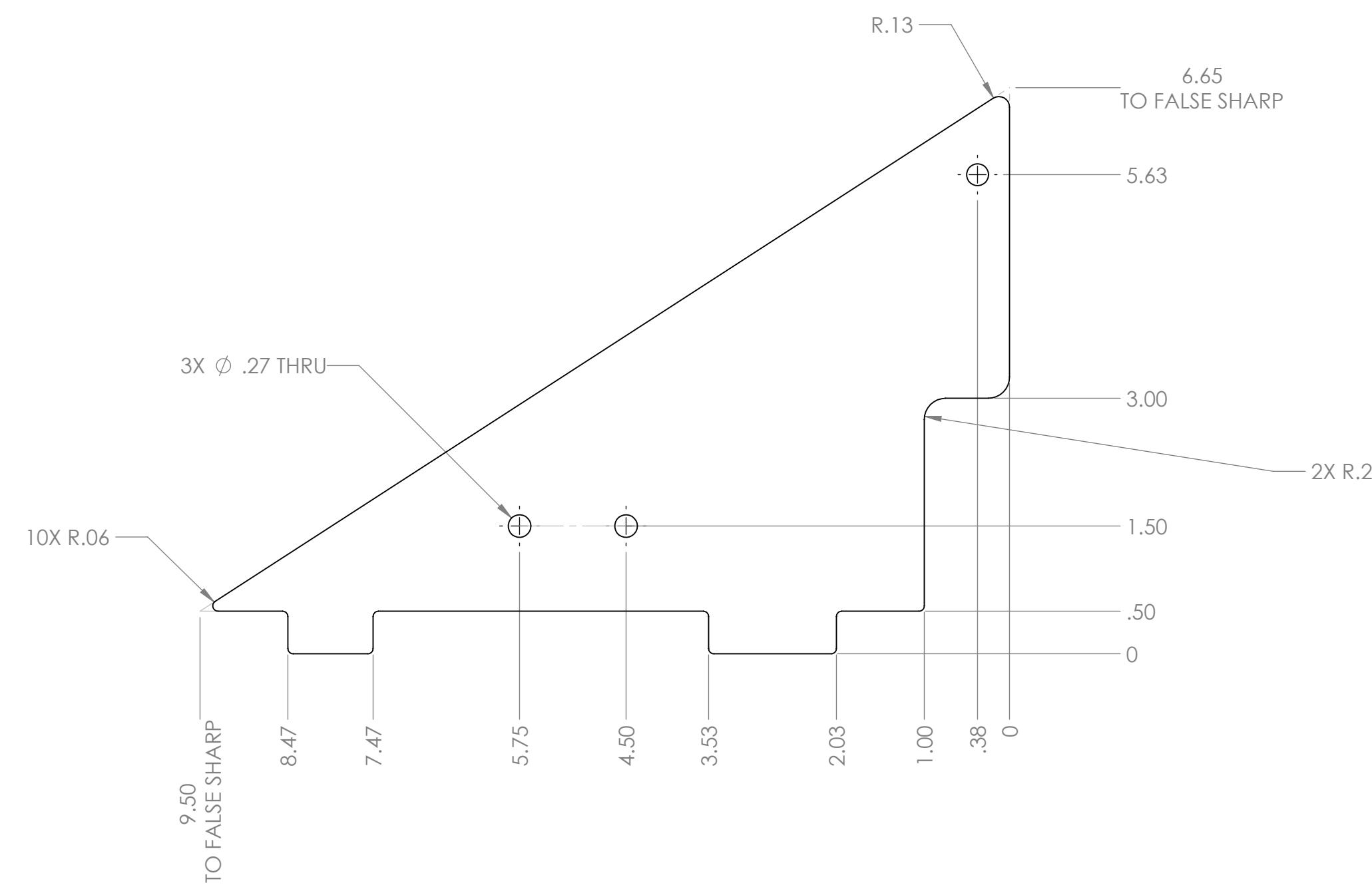
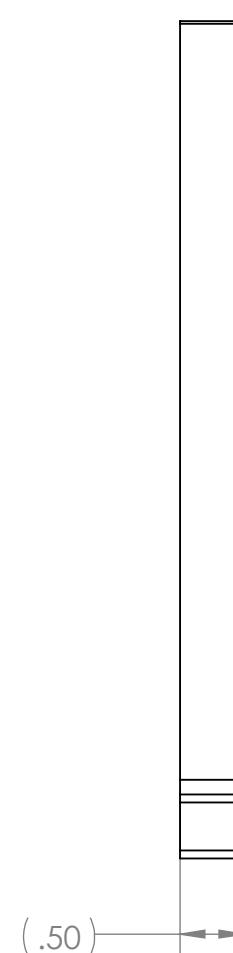
A

D

C

B

A



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:
1/2" HDPE, Natural, tag or
label with part number

DO NOT SCALE DRAWING

VEND NAME DATE
DRAWN KAMC 6/16/2021

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN
THIS DRAWING IS THE SOLE
PROPERTY OF FIRST[®]. ANY
REPRODUCTION IN PART OR AS A
WHOLE WITHOUT THE WRITTEN
PERMISSION OF FIRST[®] IS
PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP
EDGES.

FIRST[®] ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

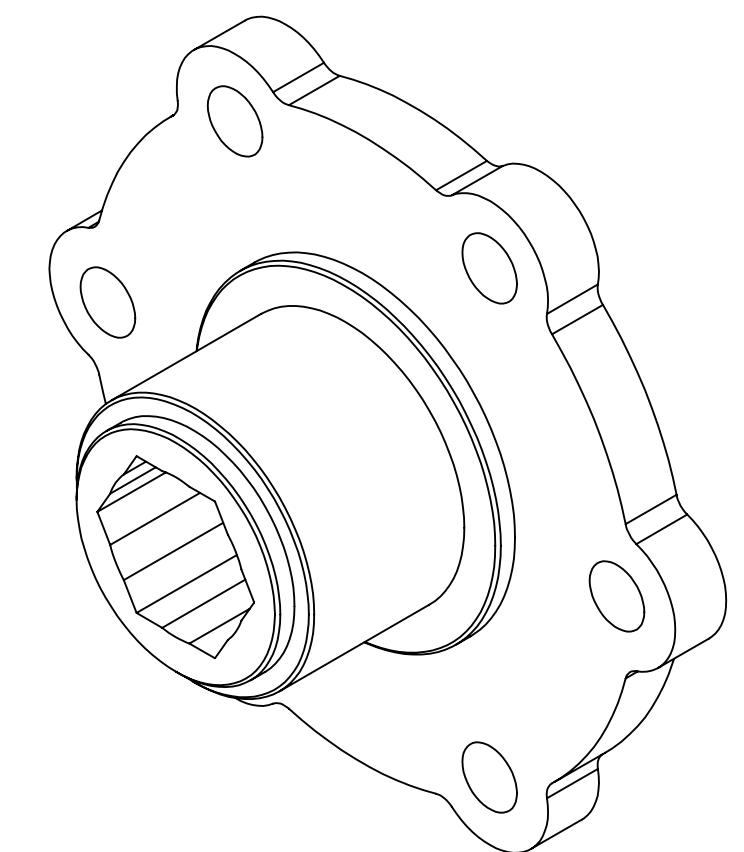
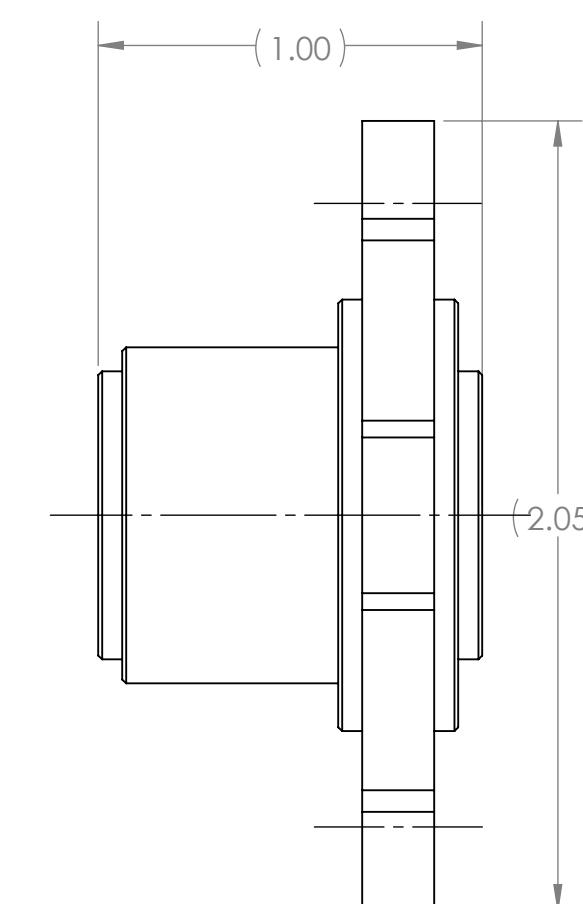
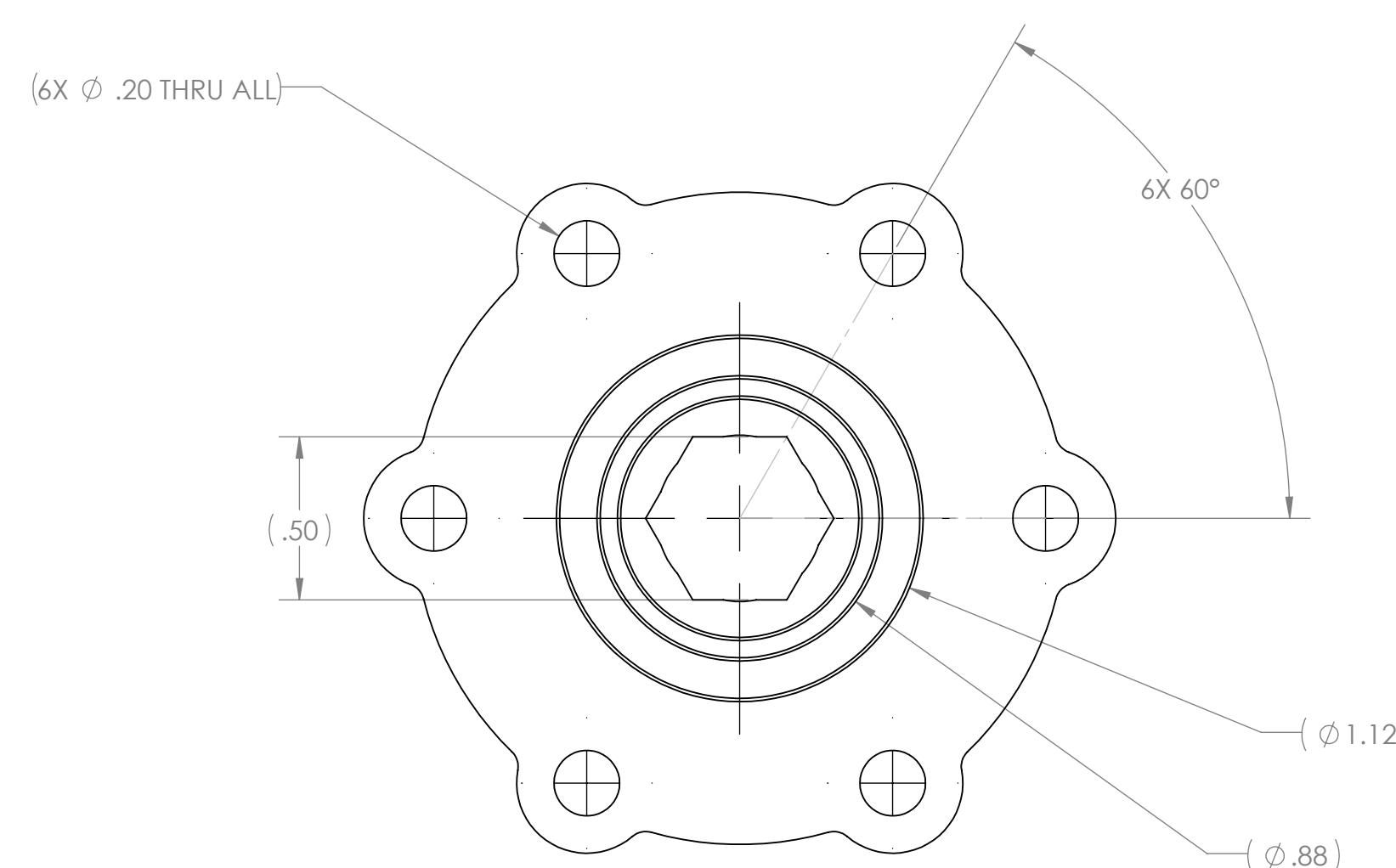
TITLE: Low Agitator Triangle

SIZE	DWG. NO.	REV
C	GE-22435	

SCALE: 2:3 SHEET 1 OF 1

D

D



C

C

B

B

A

A

Description: Hex Hub
Vendor: AndyMark
Part Number: am-4124

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	KAMC	6/21/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**AndyMark 1/2
in. Hex Hub**

SIZE DWG. NO. REV
C GE-22436

SCALE: 2:1 SHEET 1 OF 1

4

3

2

1

D

D

C

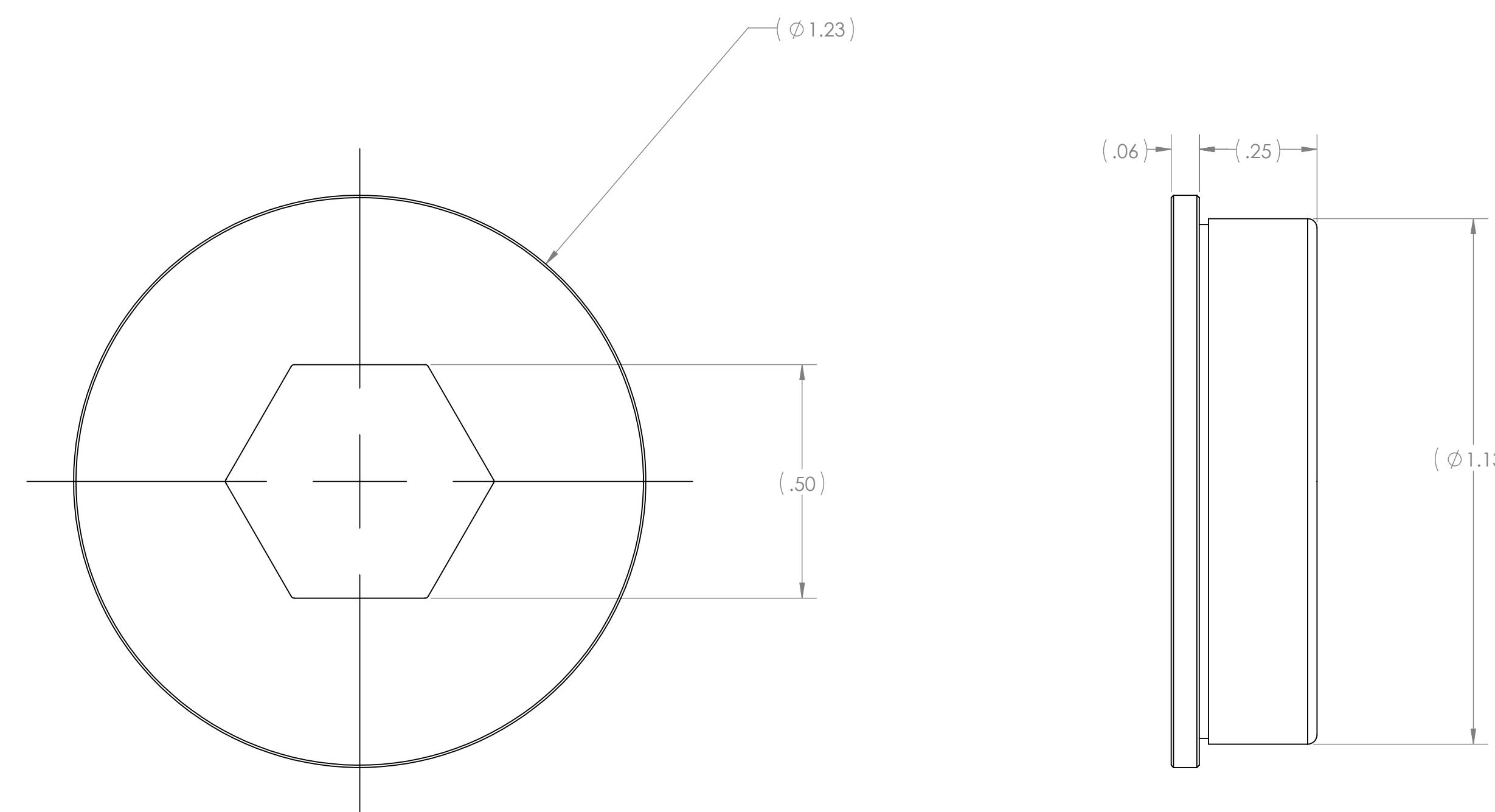
C

B

B

A

A

**Notes:**

1. Description: 1/2 in. flanged hex bearing
2. Source: AndyMark
3. Item #: am-2986
4. Equivalent substitutions allowed

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	VEND	NAME	DATE
	DRAWN	CO	6/22/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SIZE	DWG. NO.	REV
C	GE-22437		
SCALE: 4:1	SHEET 1 OF 1		

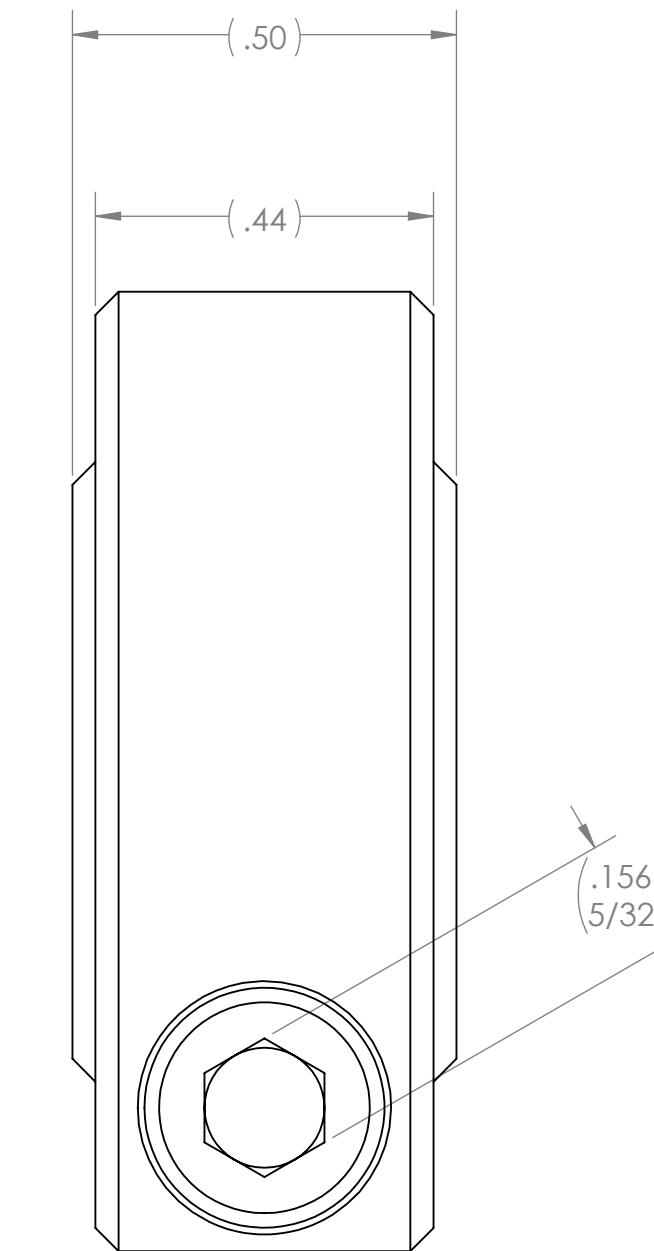
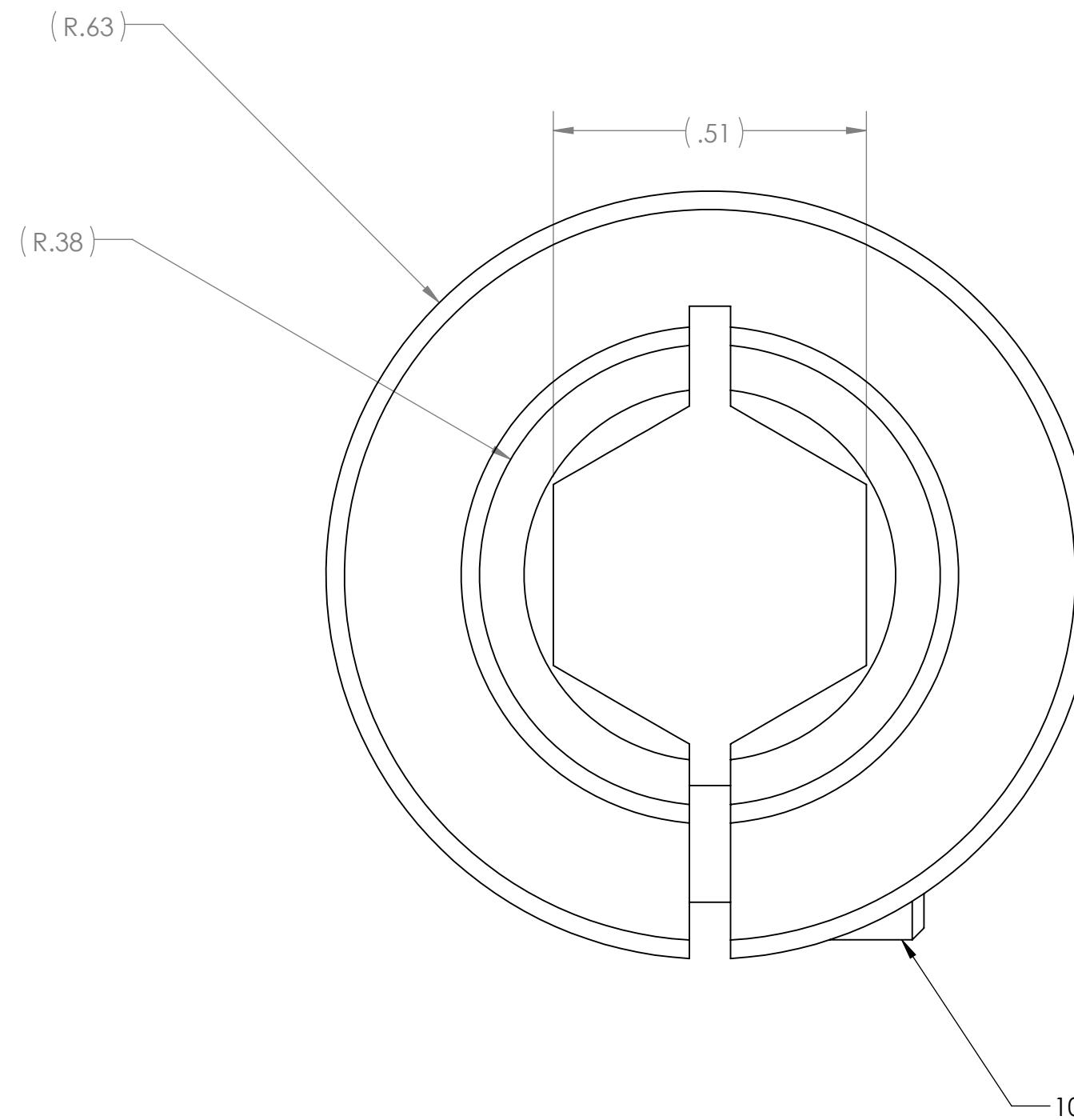
4

3

2

1

D



- Notes:
1. Description: 1/2 in. Hex HD Split Collar Clamp
 2. Source: AndyMark
 3. Item #: am-1526
 4. Equivalent substitutions allowed

UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	6/22/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$					
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
COMMENTS:					
REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING					

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**1/2 in. Hex Shaft
Collar**

SIZE DWG. NO. REV
C GE-22438

SCALE: 4:1 SHEET 1 OF 1

4

3

2

1

D

D

C

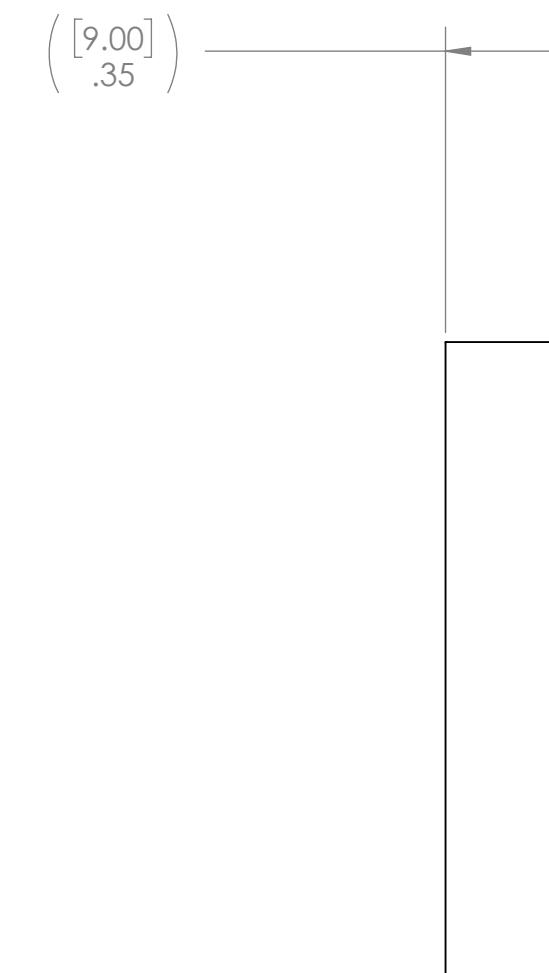
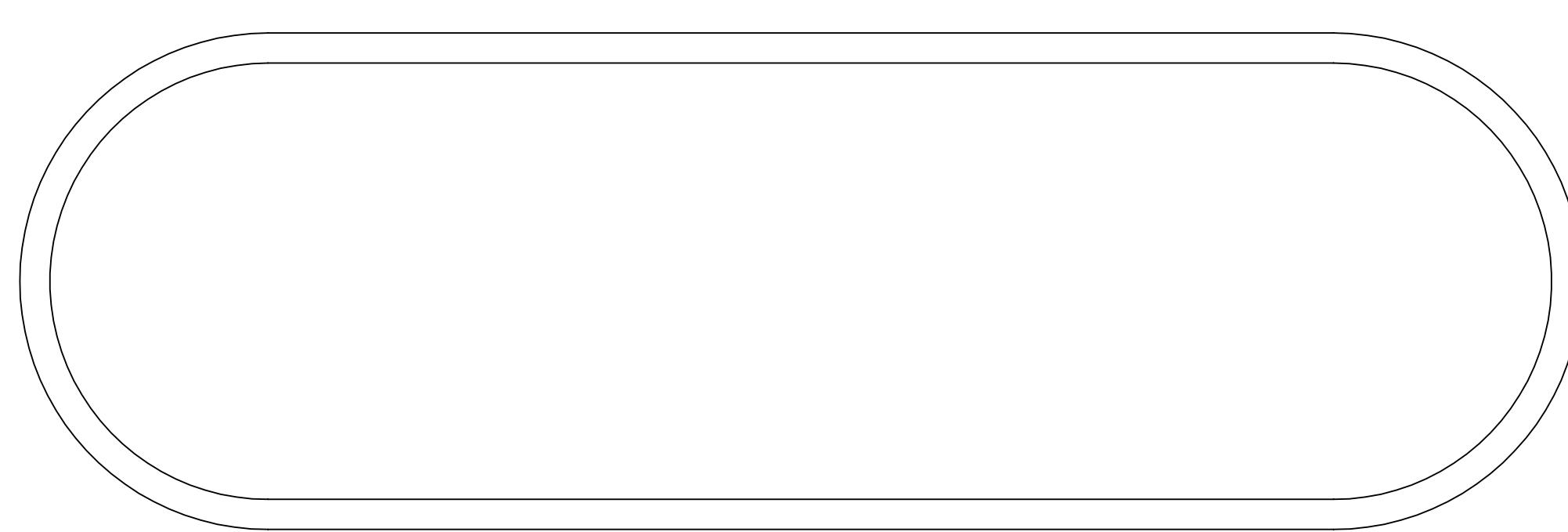
C

B

B

A

A



- Notes:
1. Description: 60 tooth, 9mm wide, 300 mm long, 5mm HTD timing belt
 2. Source: Gates
 3. Item #: 300-5M-09
 4. Equivalent substitutions allowed

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/22/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  <small>SOLIDWORKS Modeling Solutions Partner</small>			
TITLE: 60t 9mm wide 5mm HTD belt			
SIZE DWG. NO. REV			
C GE-22439			
SCALE: 2:1 SHEET 1 OF 1			

4

3

2

1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	Added note about use of glue to fasten halves together.	8/17/2021	CPO

D

D

C

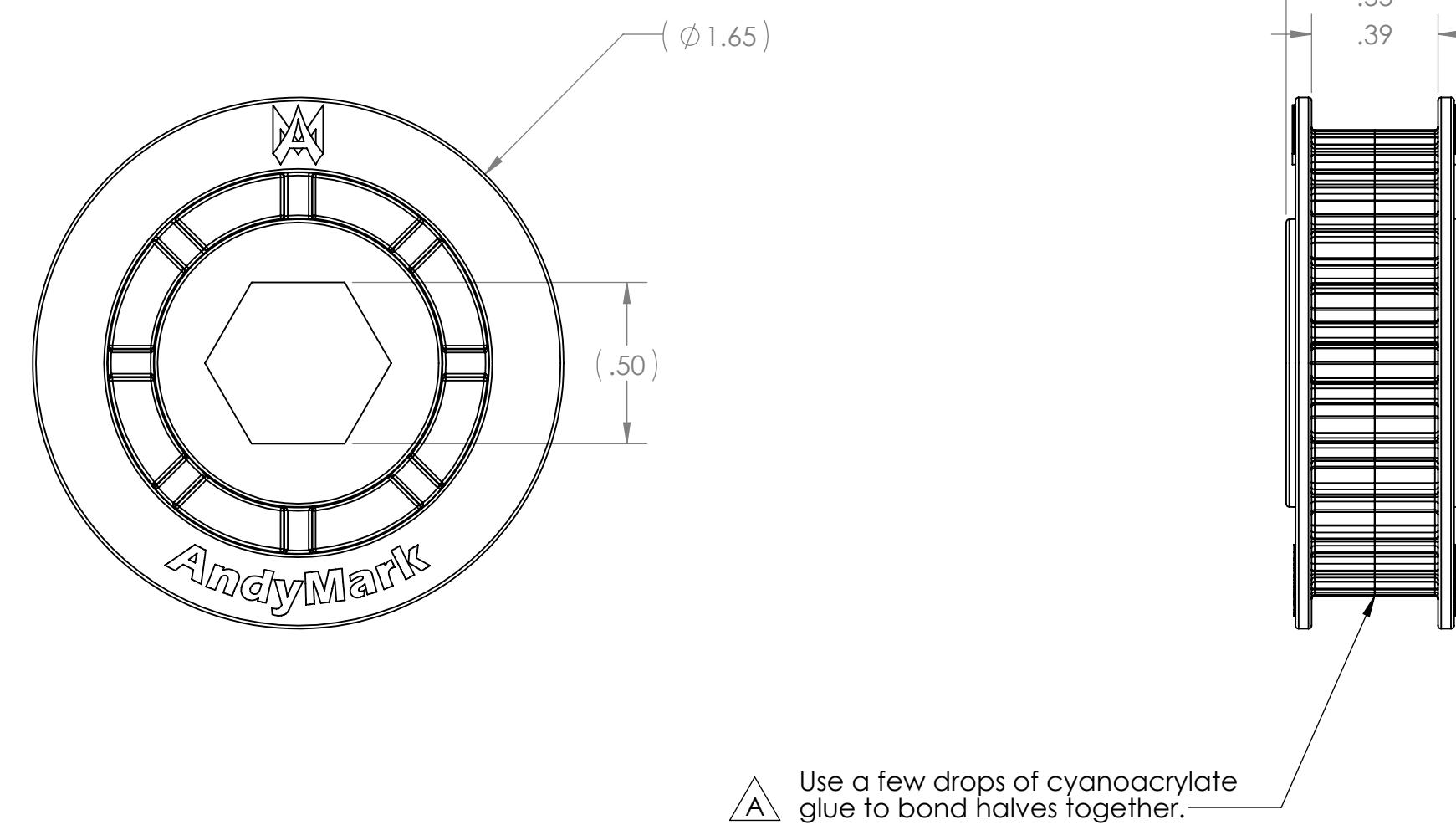
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/22/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

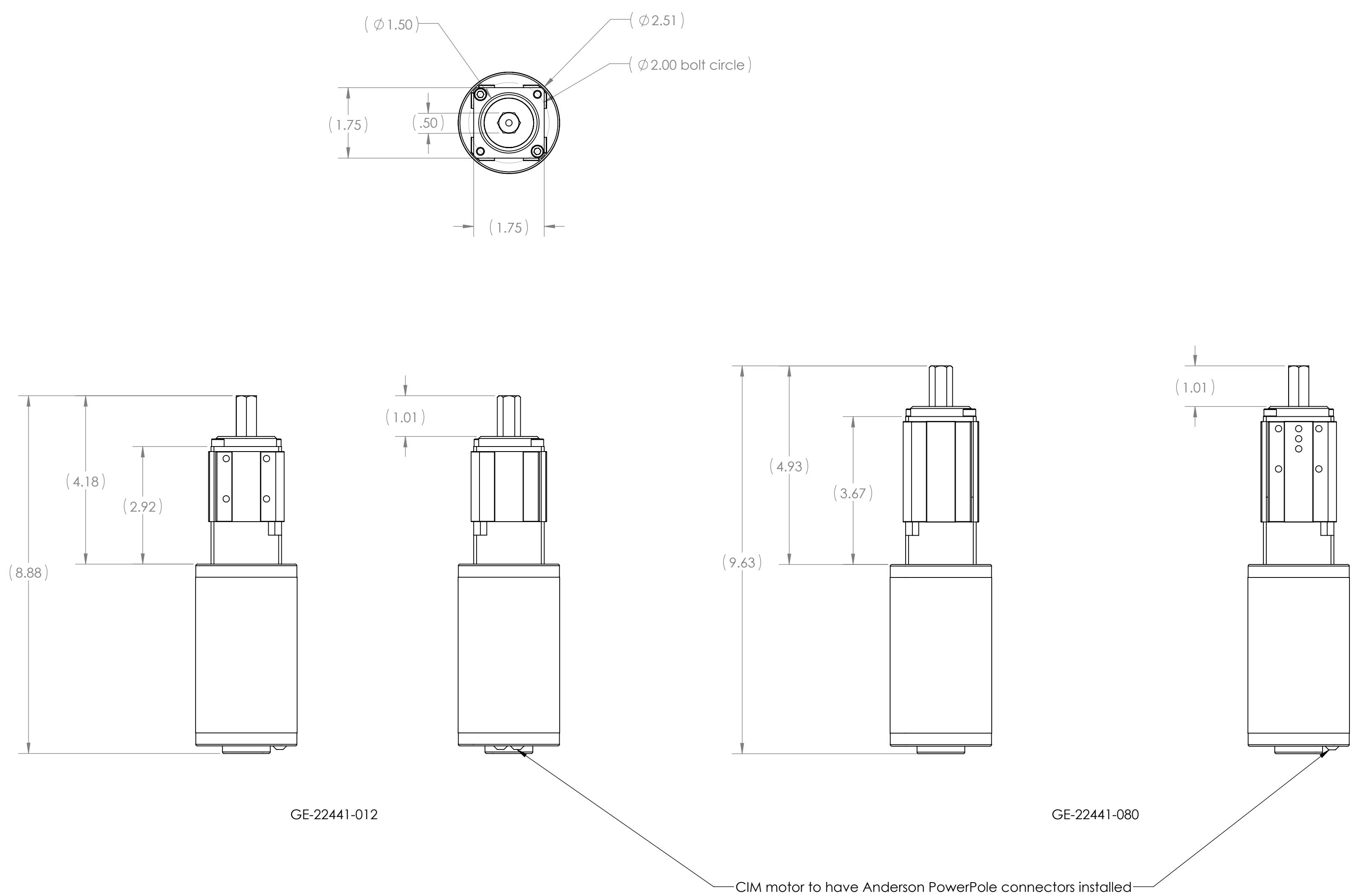
TITLE:
**24 tooth 5mm HTD
hex bore pulley**

SIZE DWG. NO. REV
C GE-22440 A

SCALE: 2:1 SHEET 1 OF 1

D

D



- Notes:
- Fasteners should be installed with loctite or other threadlocker.
 - Source: AndyMark

Part Number	Description	Gearbox Manufacturer PN	Motor Manufacturer PN
GE-22441-012	12:1 CIM Sport Gearbox with CIM Motor	am-4007_012	am-0255_16T
GE-22441-080	80:1 CIM Sport Gearbox with CIM Motor	am-4008_080	am-0255_16T

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: AndyMark CIM Sport with CIM Motor

SIZE DWG. NO. REV

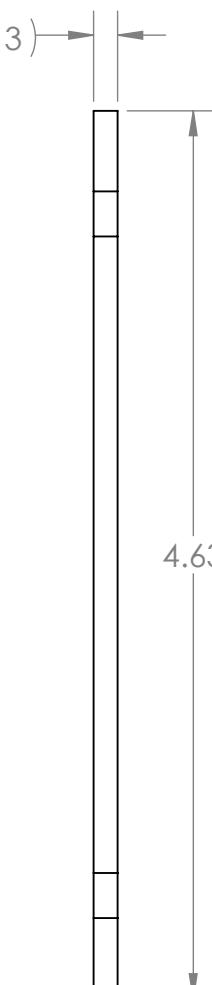
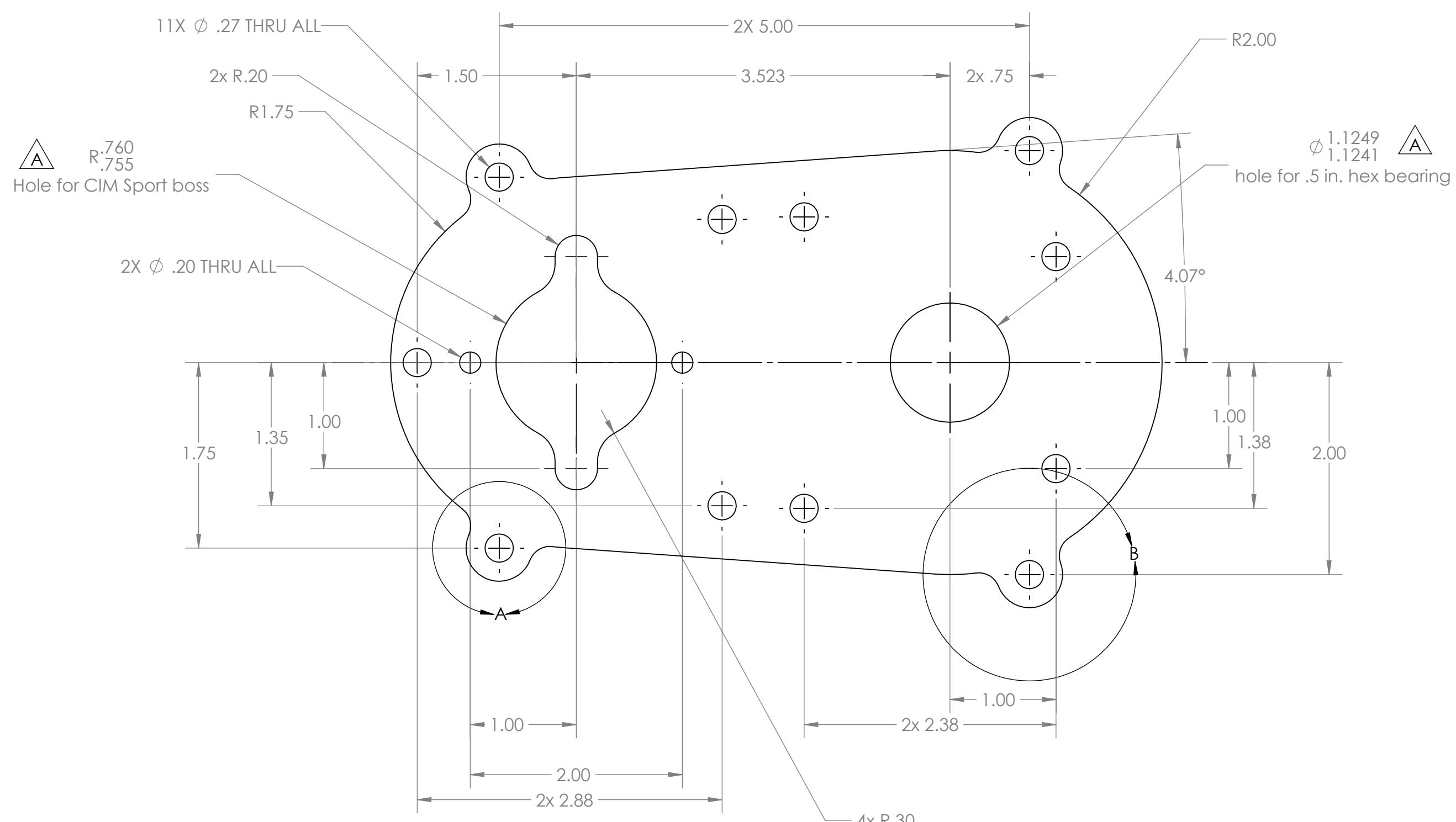
C GE-22441

SCALE: 1:2 SHEET 1 OF 1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
D2, D4	A	Adjusted hole size and tolerance for bearing and gearbox cutouts.	8/17/2021	CPO

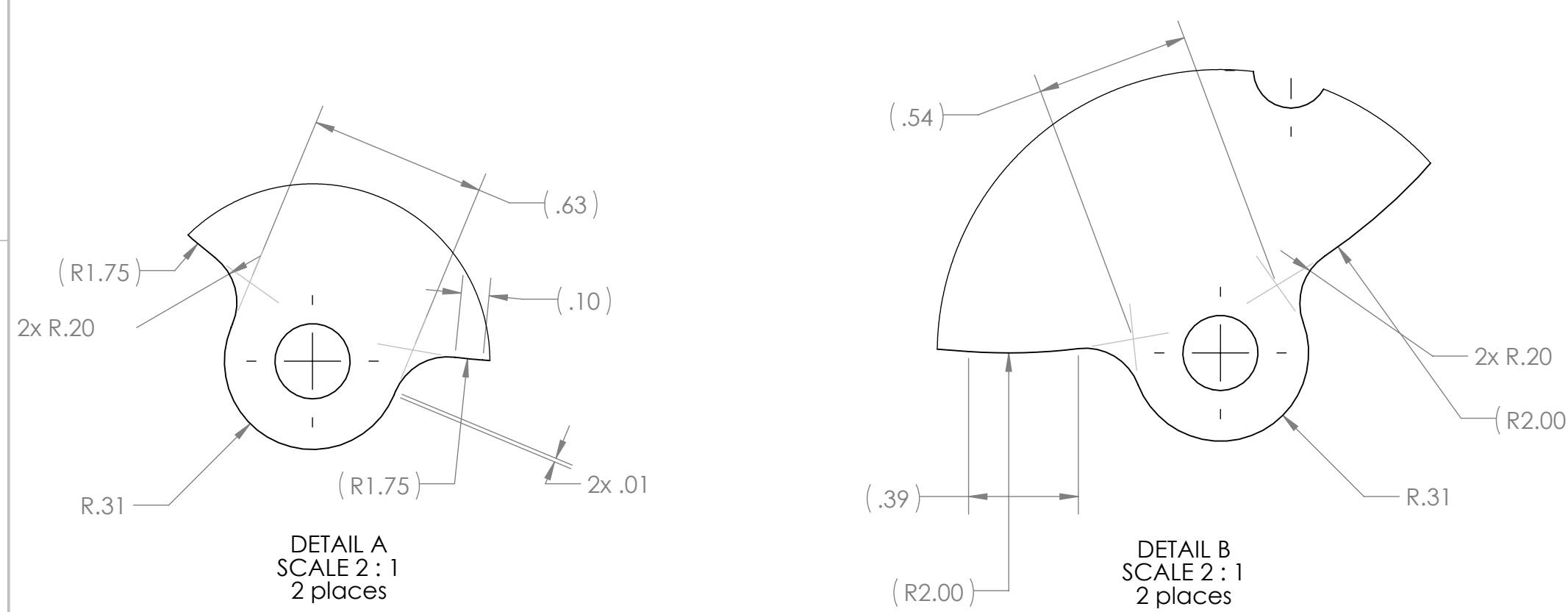
D



C

B

A



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

VEND NAME DATE
DRAWN CO 6/22/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.

MATERIAL/FINISH:
1/8 thk. 5052 Aluminum Sheet

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

FIRST ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE: Agitator Baseplate

SIZE DWG. NO. REV
C GE-22442 **A**

SCALE: 1:1 SHEET 1 OF 1

4

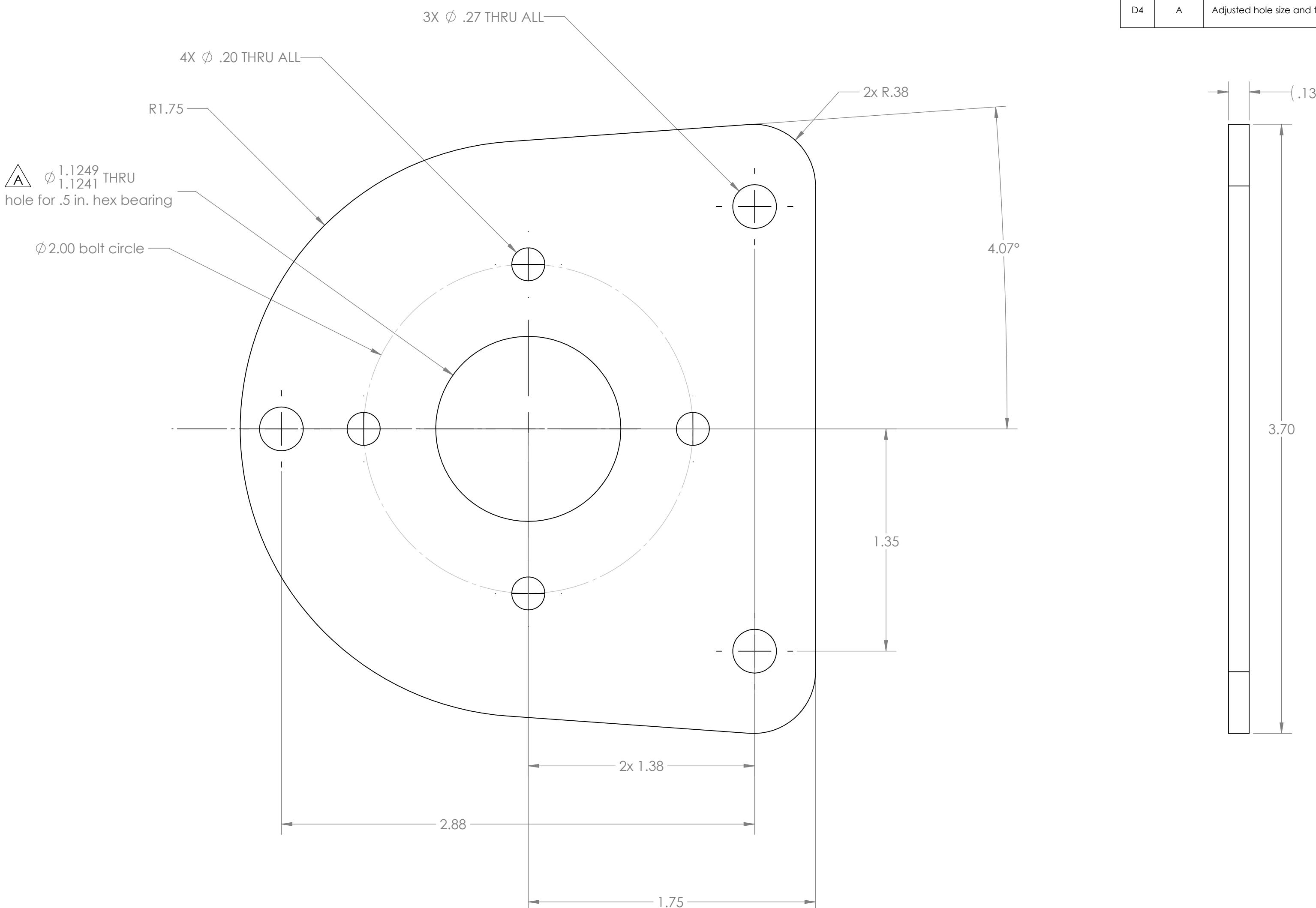
3

2

1

D

D



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
D4	A	Adjusted hole size and tolerance for bearing cutout.	8/17/2021	CPO

C

C

B

B

A

A

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:

1/8 thk. 5052 Aluminum Sheet

DO NOT SCALE DRAWING

VEND

DRAWN

NAME

CO

DATE

6/23/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



TITLE:
**Agitator Gearbox
Auxillary Plate**

SIZE DWG. NO. REV
C GE-22443 A

SCALE: 2:1 SHEET 1 OF 1

4

3

2

1

4

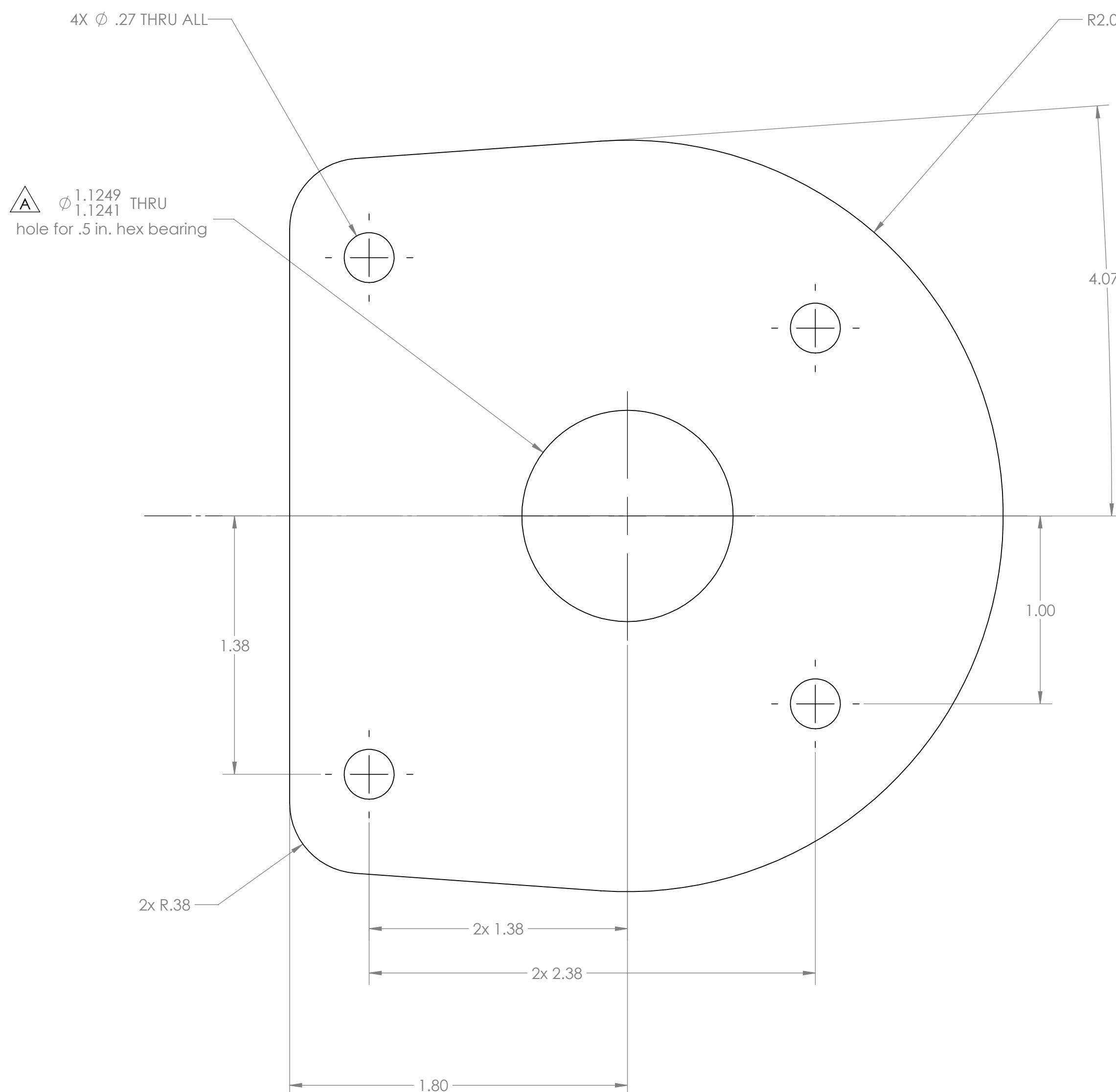
3

2

1

D

D



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
D4	A	Adjusted hole size and tolerance for bearing cutout.	8/17/2021	CPO

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/16$
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$
TWO PLACE DECIMAL $\pm .01$
THREE PLACE DECIMAL $\pm .005$

MATERIAL/FINISH:
1/8 thk. 5052 Aluminum Sheet

DO NOT SCALE DRAWING

VEND NAME DATE
DRAWN CO 6/23/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

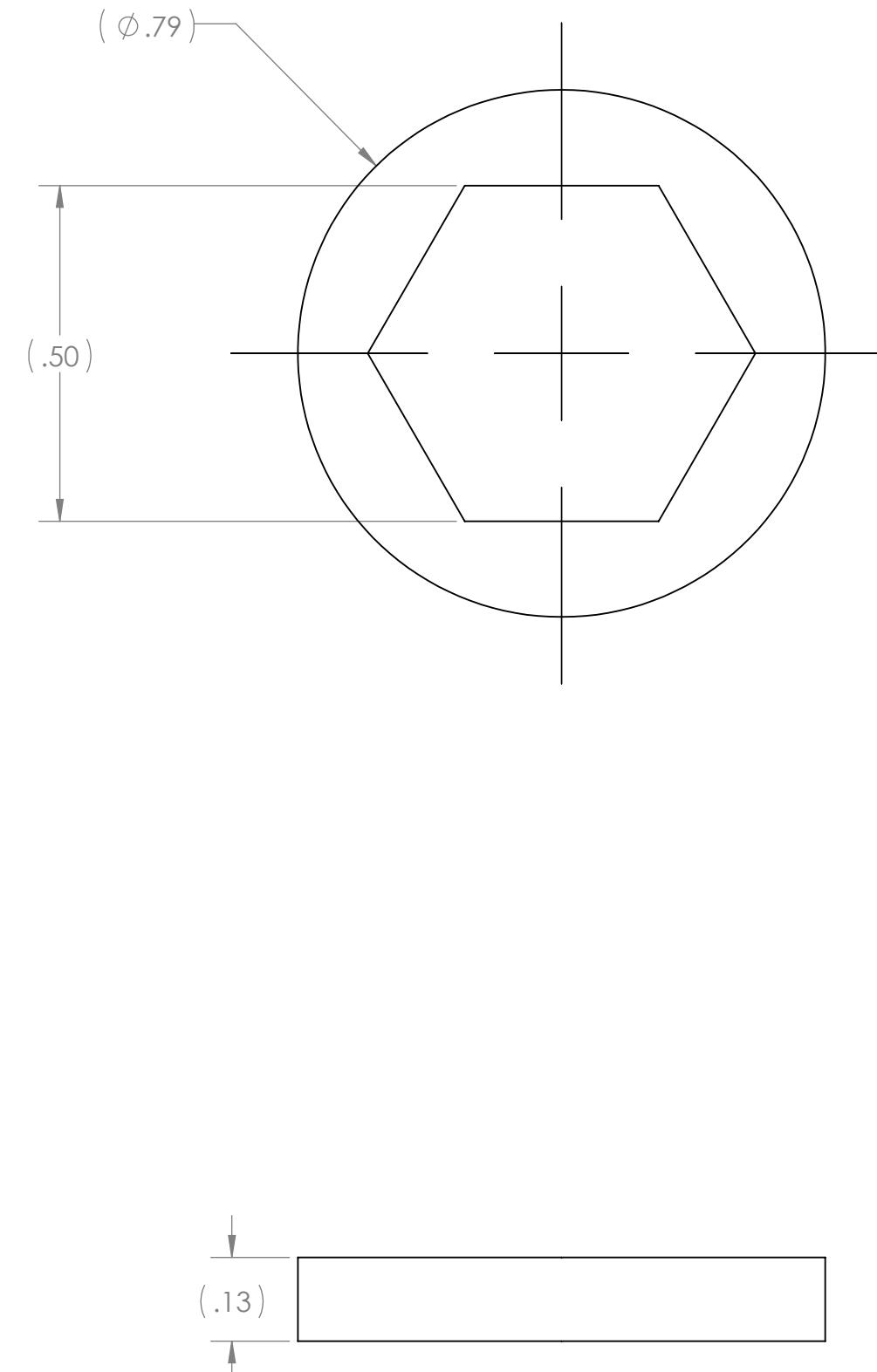
FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

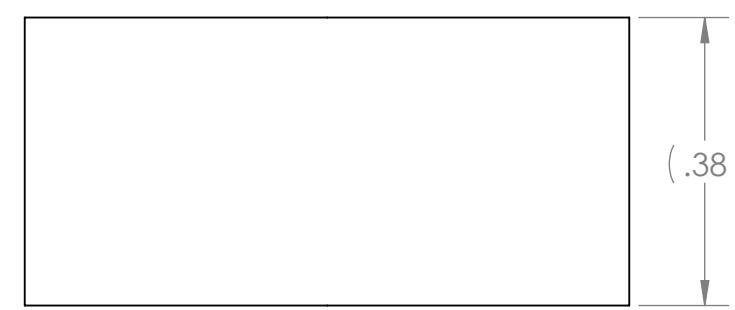
TITLE:
Agitator Output
Shaft Auxiliary Plate

SIZE DWG. NO. REV
C GE-22444 A

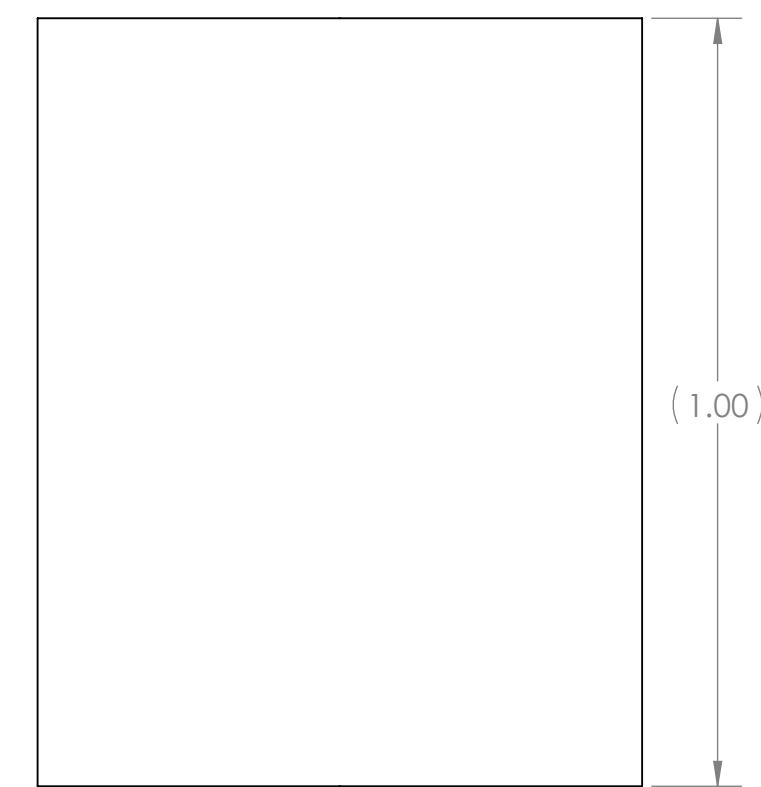
SCALE: 2:1 SHEET 1 OF 1



GE-22445-125



GE-22445-375 ▲A



GE-22445-1000

Notes:
1. Source: AndyMark
2. Equivalent substitutions allowed

Part Number	Description	Manufacturer PN
GE-22445-125	1/2 in. hex molded spacer, 1/8 in. long	am-3948-125
GE-22445-375	1/2 in. hex molded spacer, 3/8 in. long	am-3948-375
GE-22445-1000	1/2 in. hex molded spacer, 1 in. long	am-3948-1000

▲A

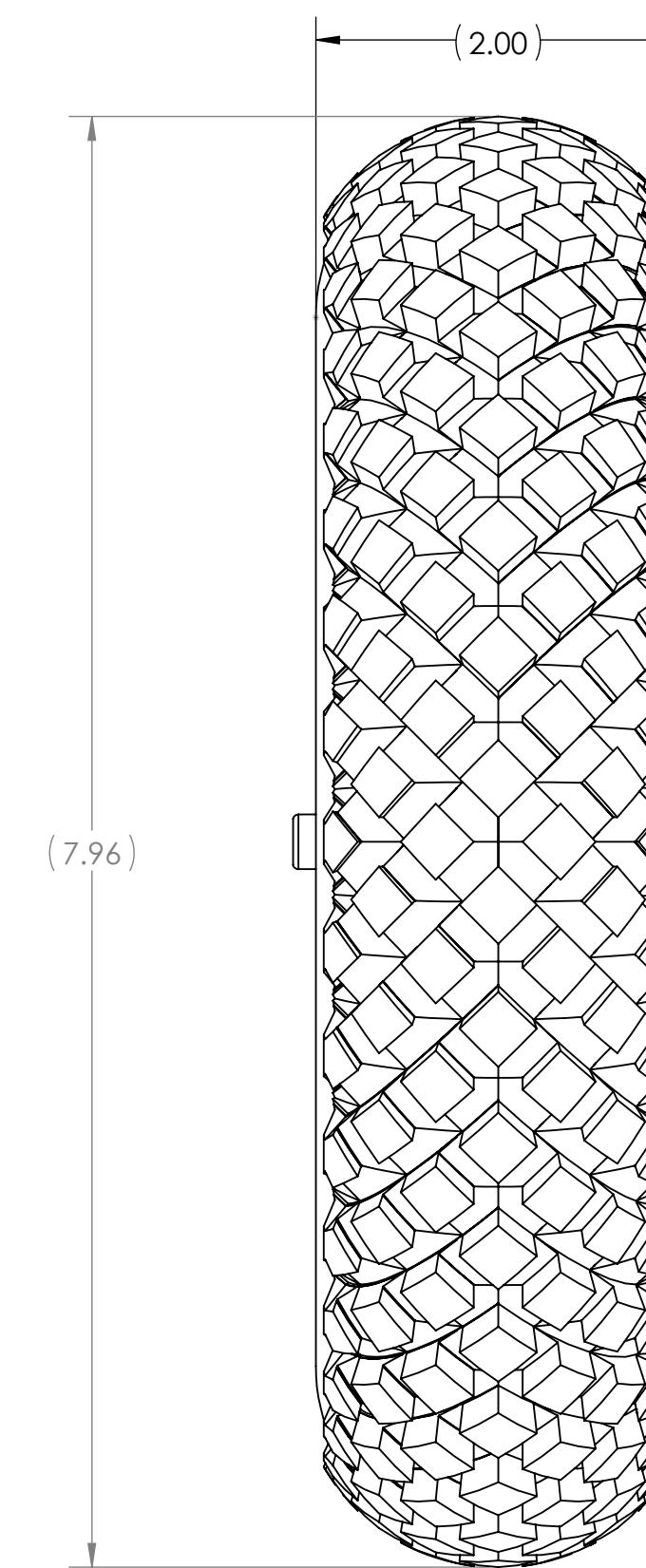
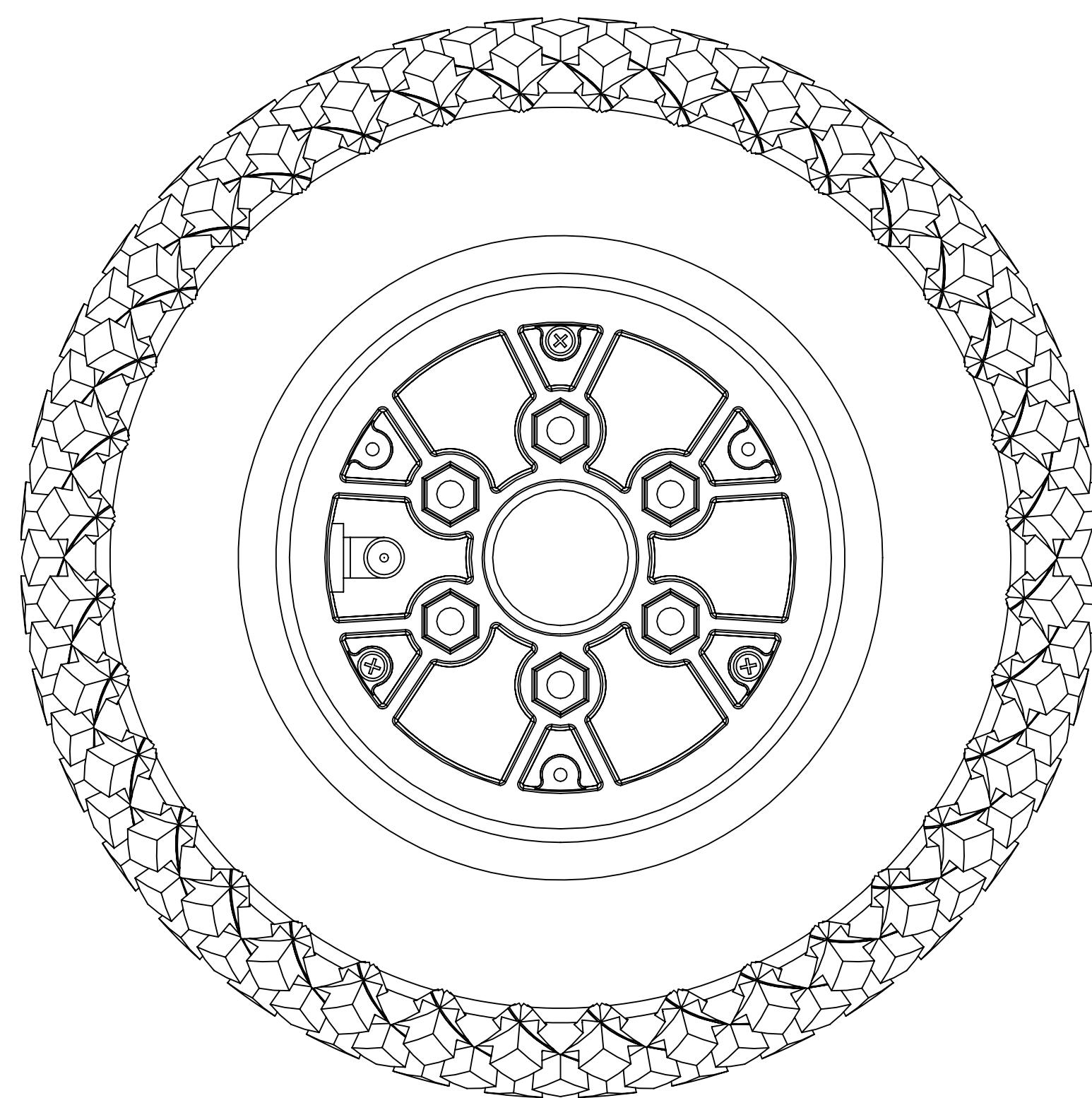
UNLESS OTHERWISE SPECIFIED:			VEND	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	CO	6/24/2021
PROPRIETARY AND CONFIDENTIAL					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
MATERIAL/FINISH:	Black PC	REV			
COMMENTS:			REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			SCALE: 4:1	SHEET 1 OF 1	

FIRST ROBOTICS COMPETITION
SOLIDWORKS
Modeling Solutions Partner

TITLE:
**1/2 in. hex
molded spacer**

SIZE DWG. NO. REV
C GE-22445 A

D



C

B

A

- Notes:
1. Description: 8 in. Pneumatic Wheel Kit
 2. Source: AndyMark
 3. Item #: am-0970
 4. Equivalent substitutions allowed

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
TITLE: 8 in. Pneumatic Wheel			
SIZE DWG. NO. REV			
C GE-22446			
SCALE: 1:1 SHEET 1 OF 1			

D

C

B

A

D

D

C

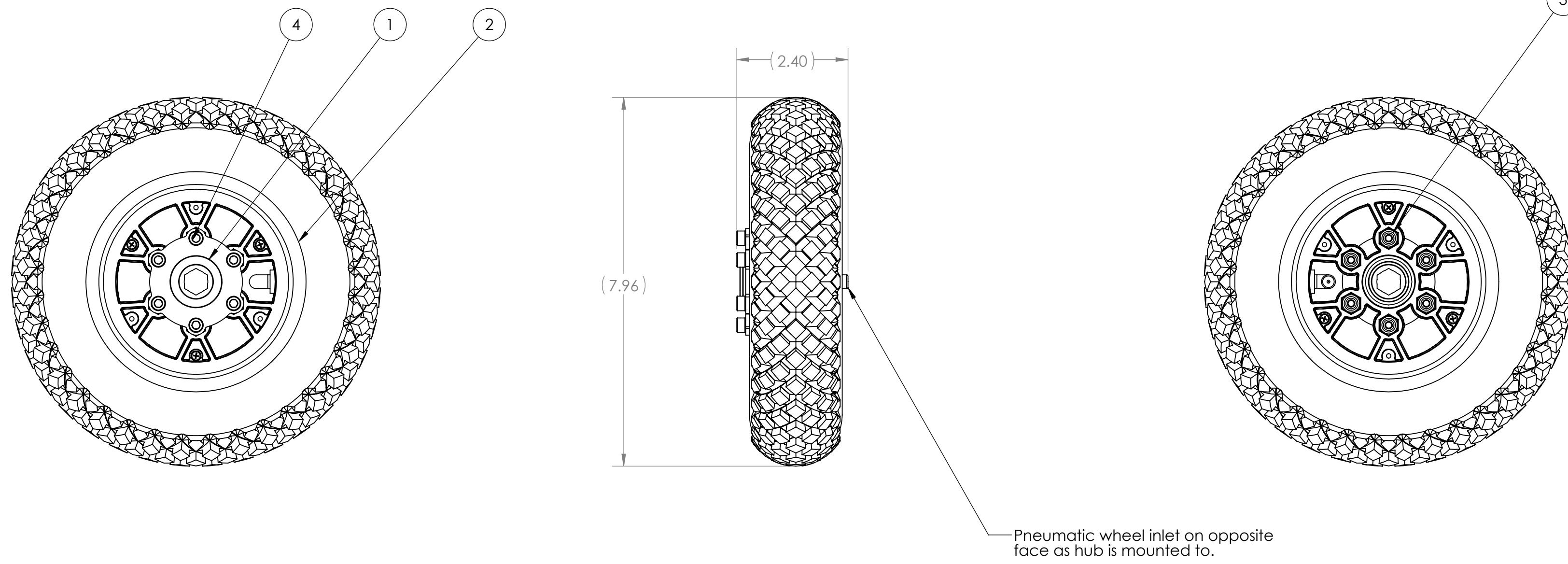
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22436	AndyMark 1/2 in. Hex Hub	1
2	GE-22446	8 in. Pneumatic Wheel	1
3	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	6
4	socket_hex_10_32_2_partial	Socket Head Screw, 10-32 x 2" long, partially threaded	6

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	CO	6/24/2021
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:				
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING				

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**High Agitator
Wheel with Hub**

SIZE DWG. NO. REV
C GE-22447

SCALE: 1:2 SHEET 1 OF 1

4

3

2

1

D

D

C

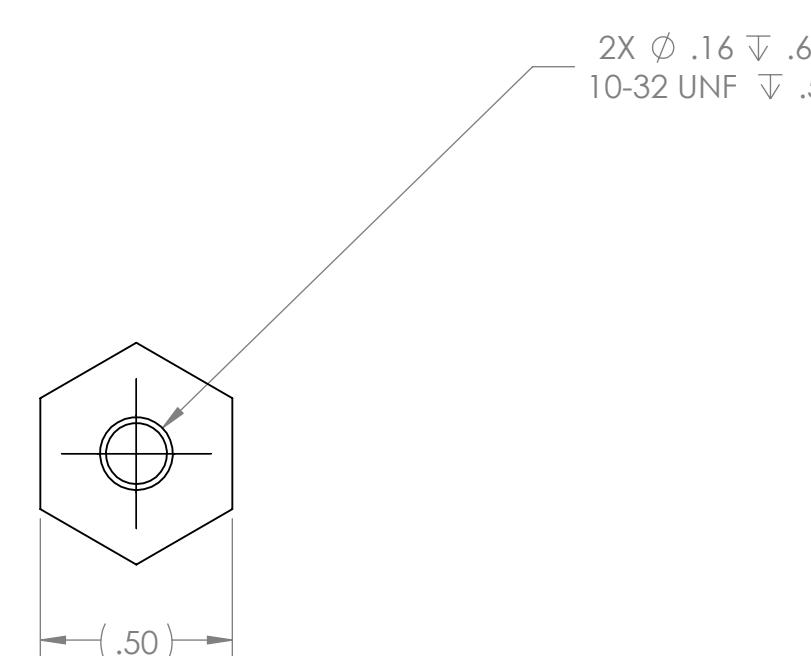
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 1/2" Hex shaft, 7075 aluminum			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**High Agitator
Drive Hex Shaft**

SIZE DWG. NO. REV
C GE-22448

SCALE: 2:1 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

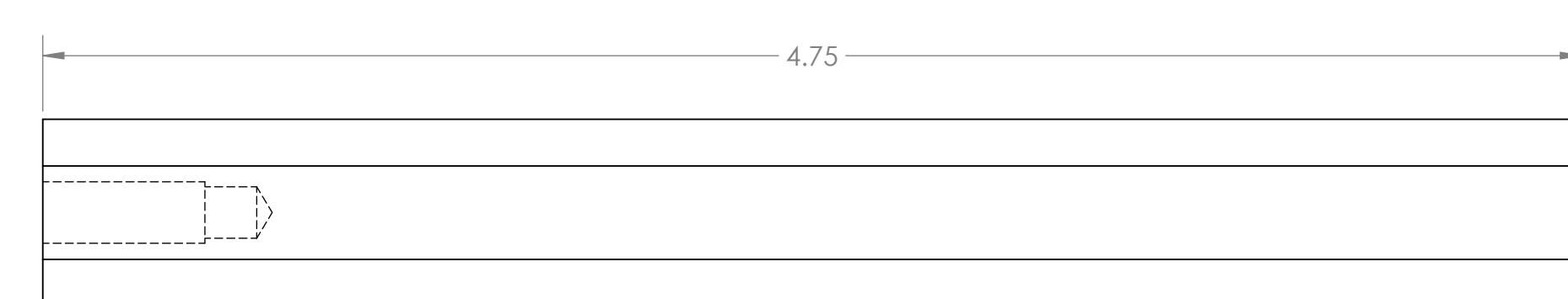
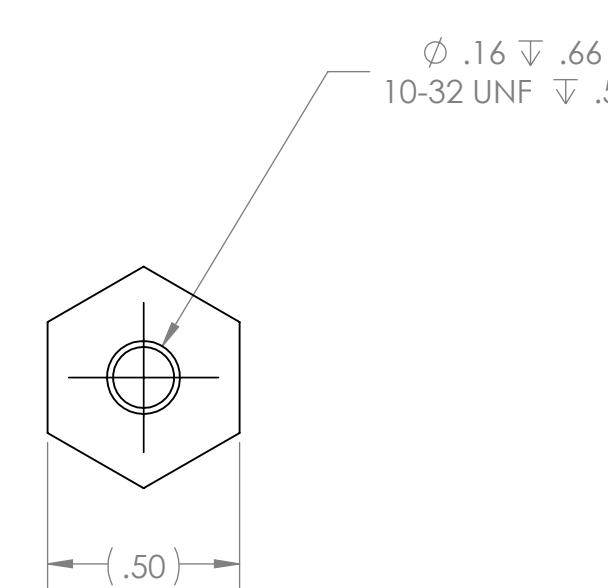
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	6/24/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/2" Hex shaft, 7075 aluminum	C	GE-22449	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 2:1	SHEET 1 OF 1	

 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Low Agitator
Drive Hex Shaft**

SIZE DWG. NO. REV
C GE-22449

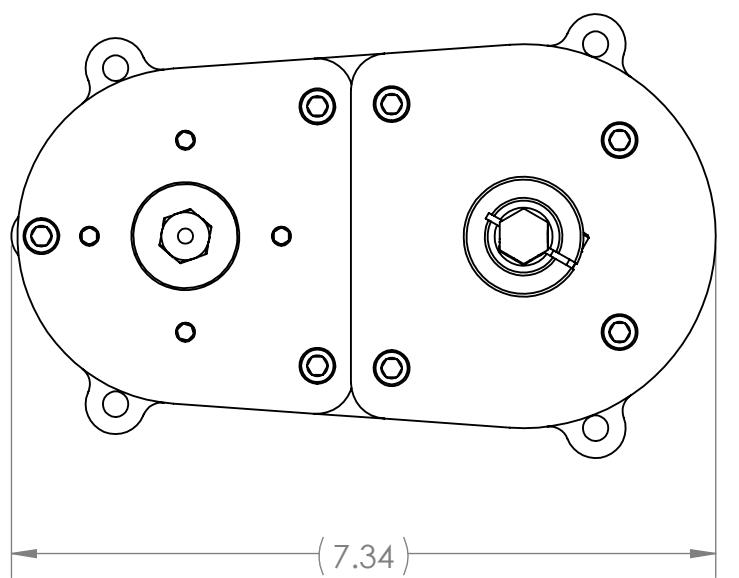
SCALE: 2:1 SHEET 1 OF 1

4

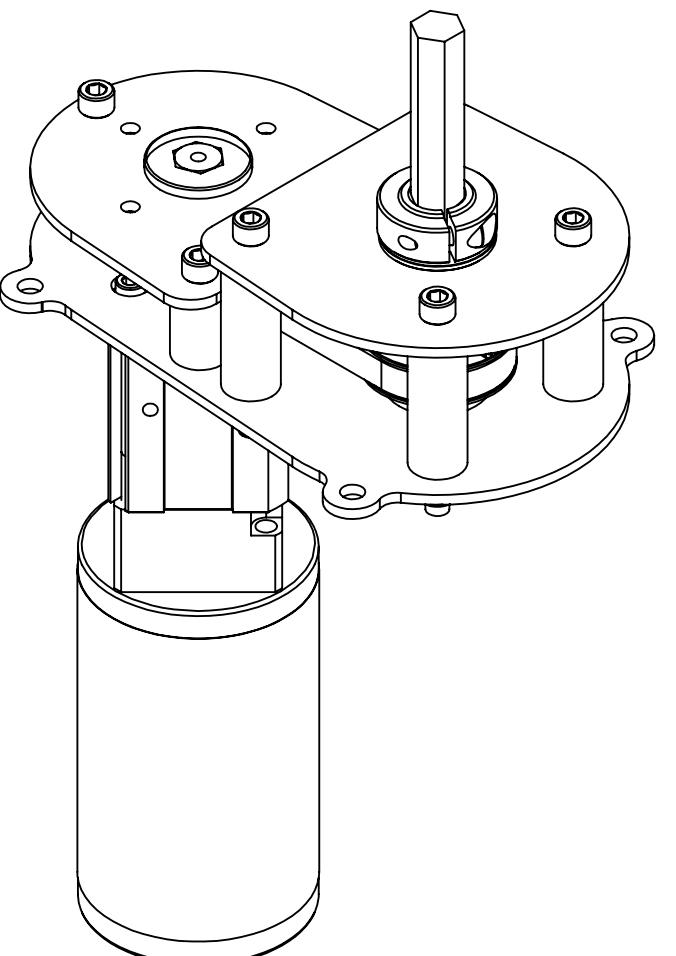
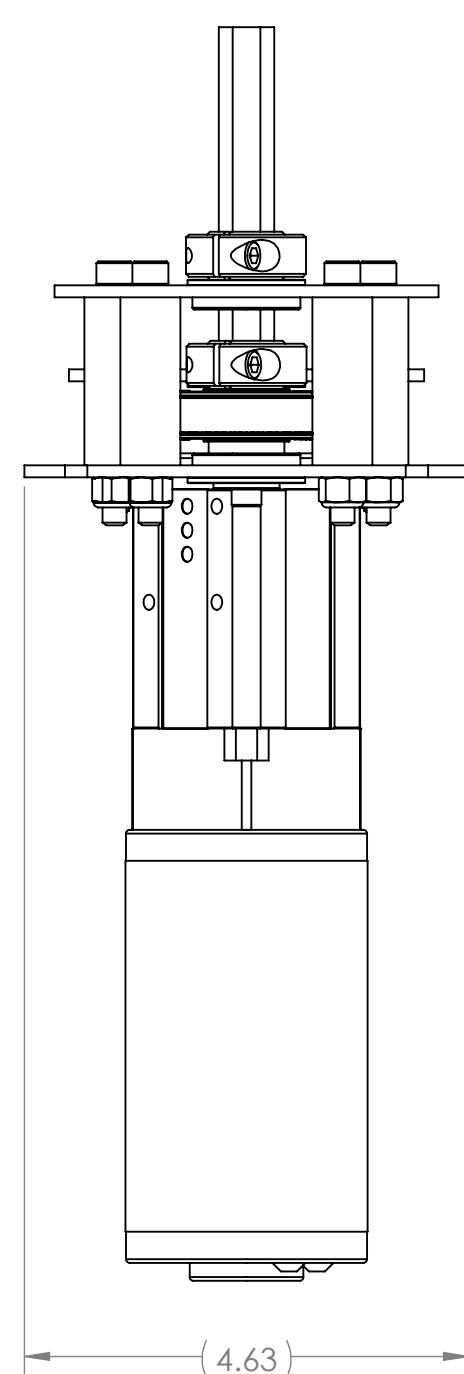
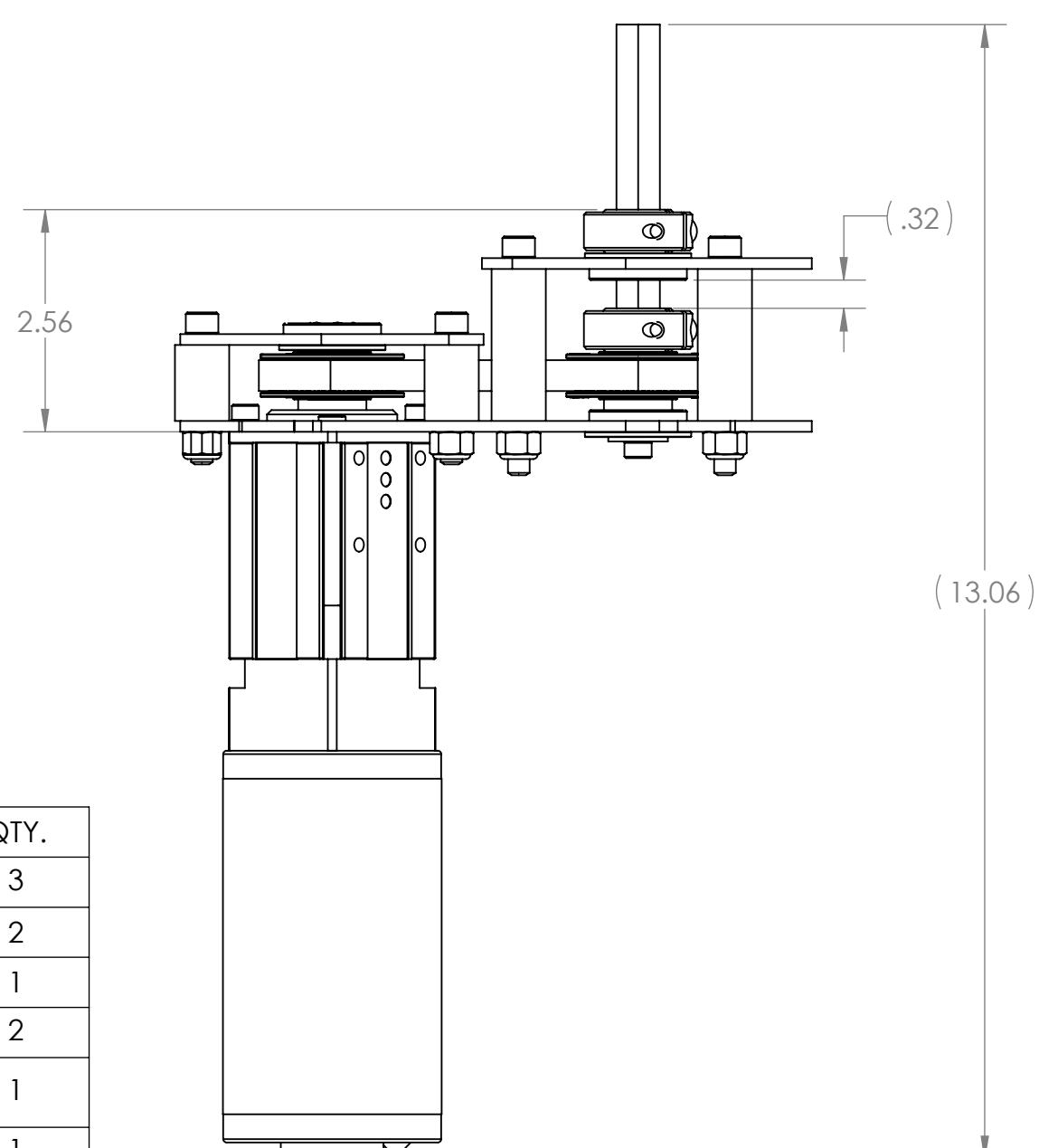
3

2

1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
2-D4, 3-D4	A	Added notes for use of glue on pulleys. Updates made to geometry of GE-22442, GE-22443, GE-22444	8/17/2021	CPO
A3	B	Two fasteners changed from hex head to socket head bolts.	10/27/2021	CPO



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22437	1/2 in. Hex Bearing	3
2	GE-22438	1/2 in. Hex Shaft Collar	2
3	GE-22439	60t 9mm wide 5mm HTD belt	1
4	GE-22440	24 tooth 5mm HTD hex bore pulley	2
5	GE-22441-080	80:1 CIM Sport Gearbox with CIM Motor	1
6	GE-22442	Agitator Baseplate	1
7	GE-22443	Agitator Gearbox Auxiliary Plate	1
8	GE-22444	Agitator Output Shaft Auxiliary Plate	1
9	GE-22445-125	1/2 in. hex molded spacer, 1/8 in. long	2
10	GE-22449	Low Agitator Drive Hex Shaft	1
11	socket_hex_.25_20_1.5_partial	Socket Head Screw, 1/4-20 x 1.5" long, partially threaded	3
12	socket_hex_.25_20_2.5_partial	Socket Head Screw, 1/4-20 x 2.5" long, partially threaded	4
13	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	7
14	socket_hex_10_32_.5_nylon	Socket Head Screw, 10-32 x 0.5" long, with nylon patch	3
15	spacer_.252_.625_1.75	Spacer, .252 ID, .625 OD, 1.75 long	4
16	spacer_.252_.625_.875	Spacer, .252 ID, .625 OD, .875 long	3
17	washer_flat_10_oversized	Oversized flat Washer for #10 Screw	1

B

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:			
REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Low Agitator Drive Assembly

SIZE DWG. NO. **REV**

C GE-22450 **B**

SCALE: 1:2 **SHEET 1 OF 4**

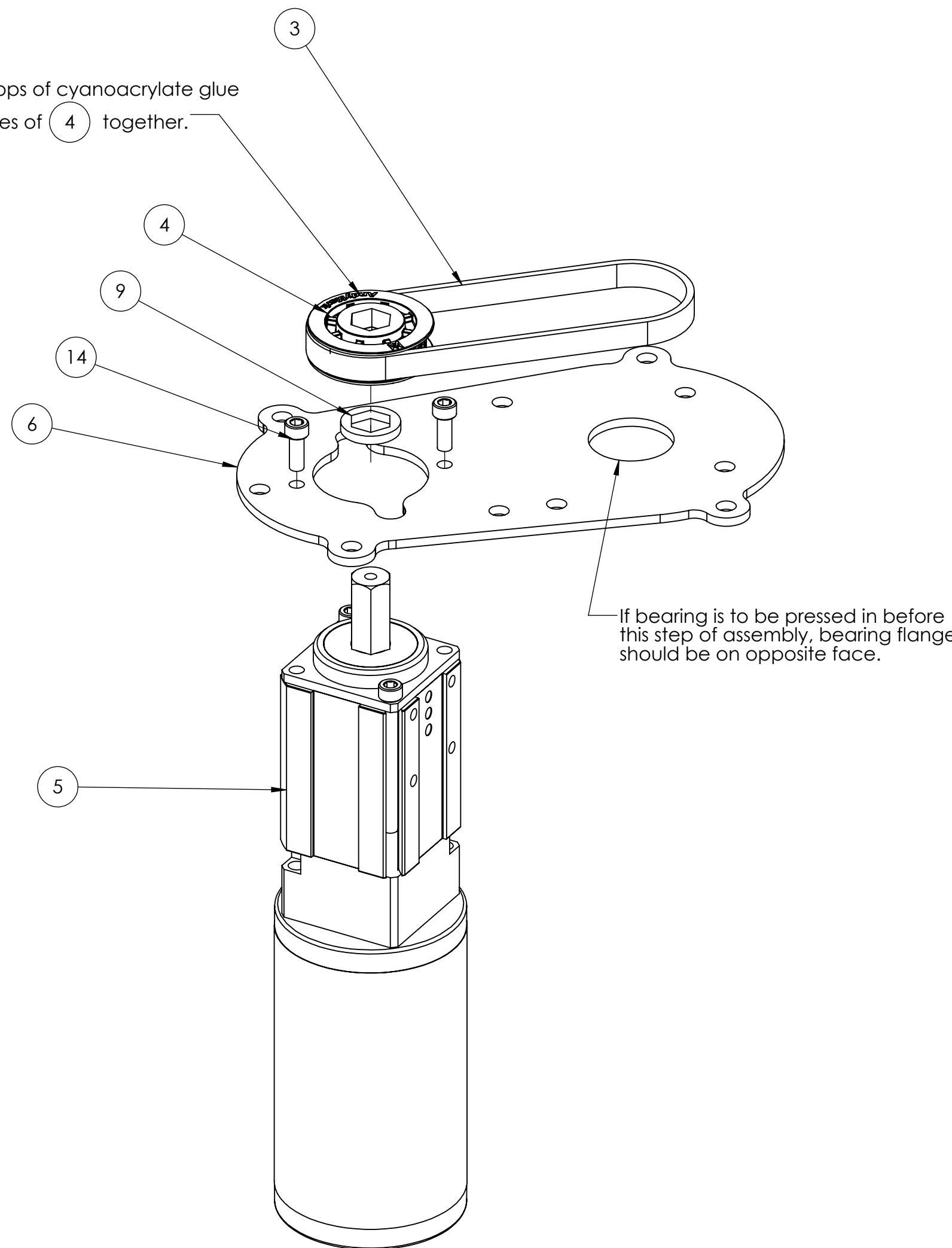
4

3

2

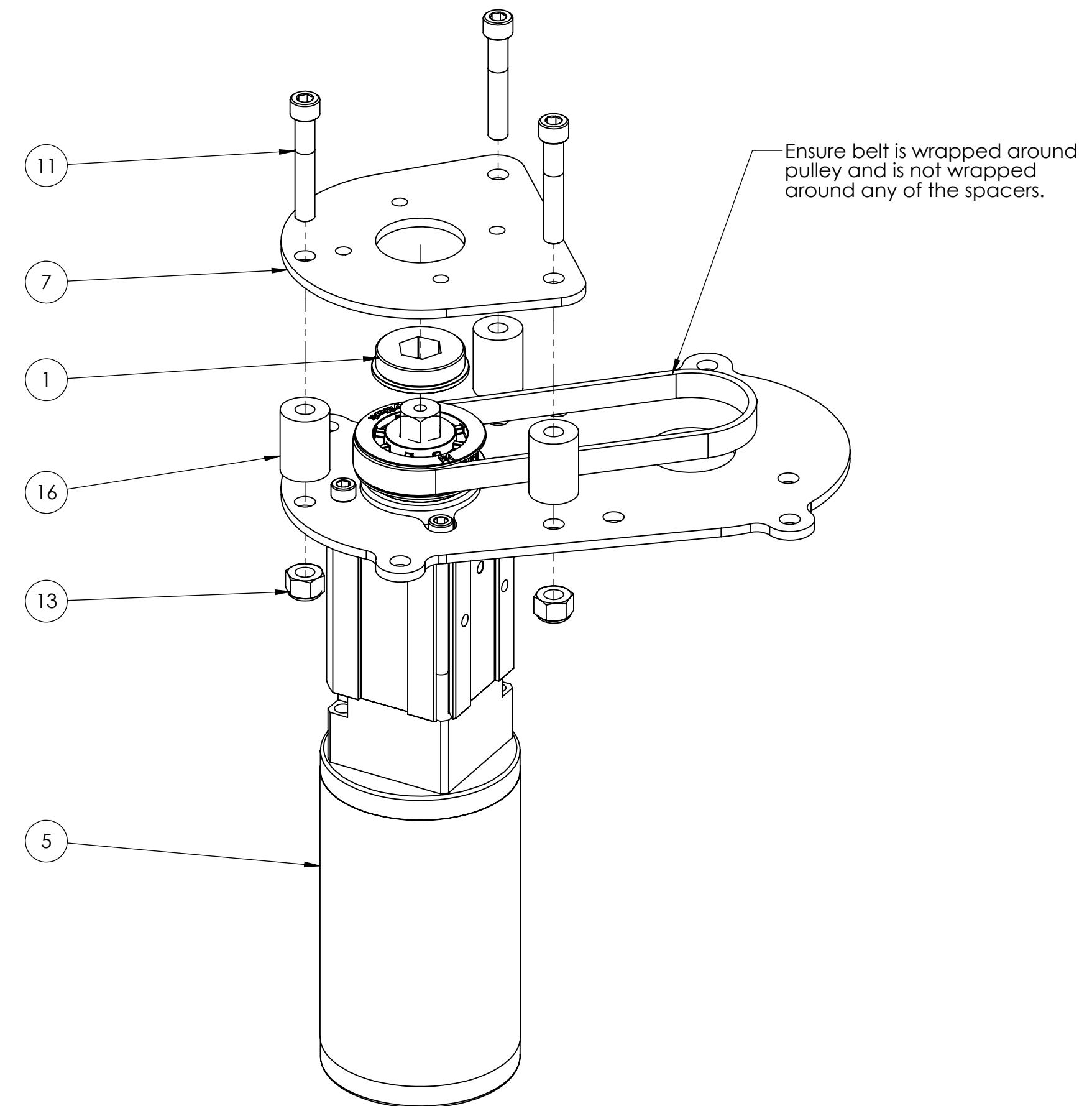
1

D



Notes:

1. Attach (5) to (6) using (14).
2. Slide (9) and (4) in order onto the shaft of (5).
3. Place (3) onto (4).



Notes:

1. Insert or press (1) into (7).
2. Slide (1) (7) onto the shaft of (5), noting flange orientation.
3. Attach (1) (7) to the assembly using (16) to space the plates and (11) and (13) to fasten. Be careful of belt routing.

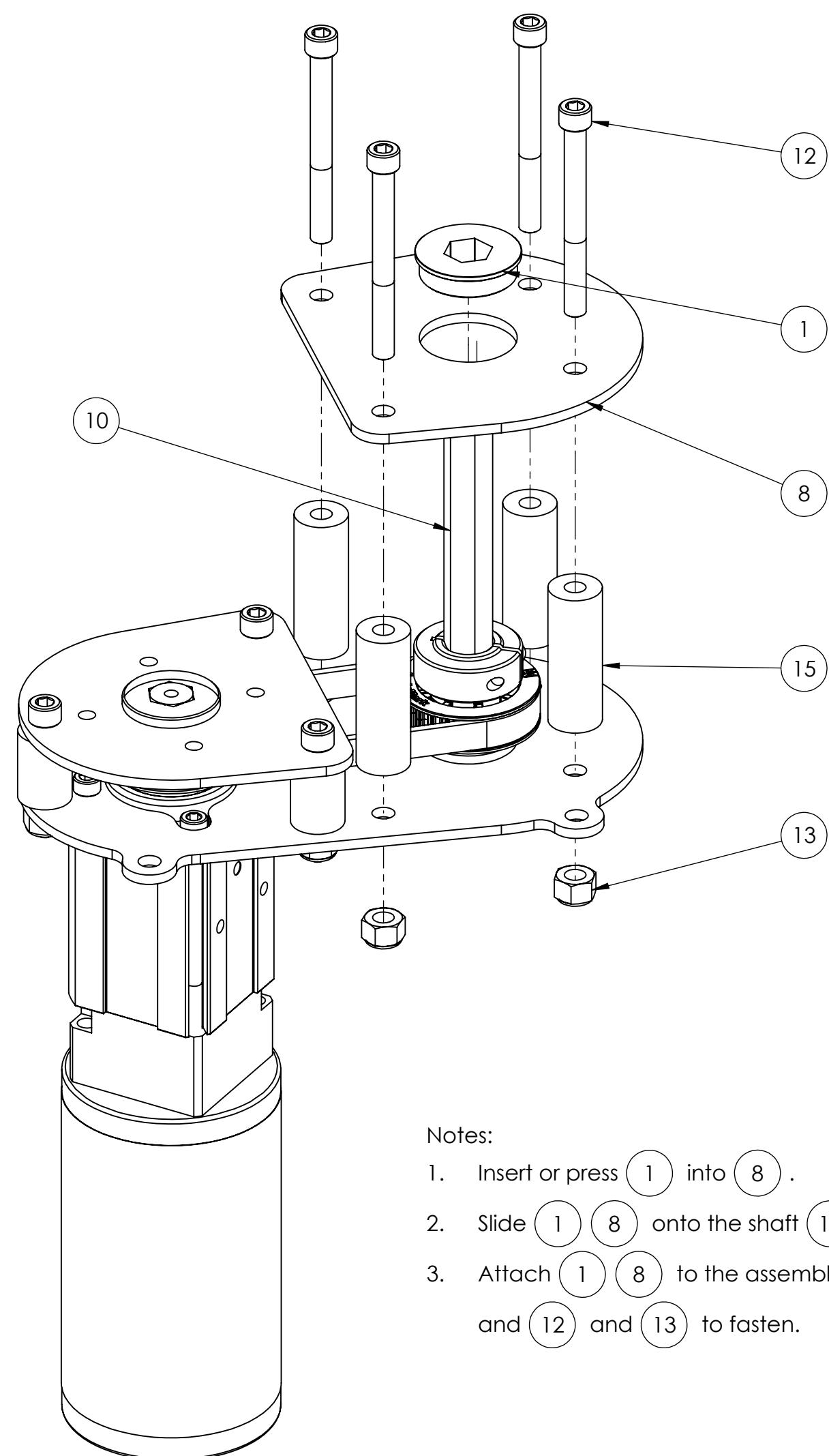
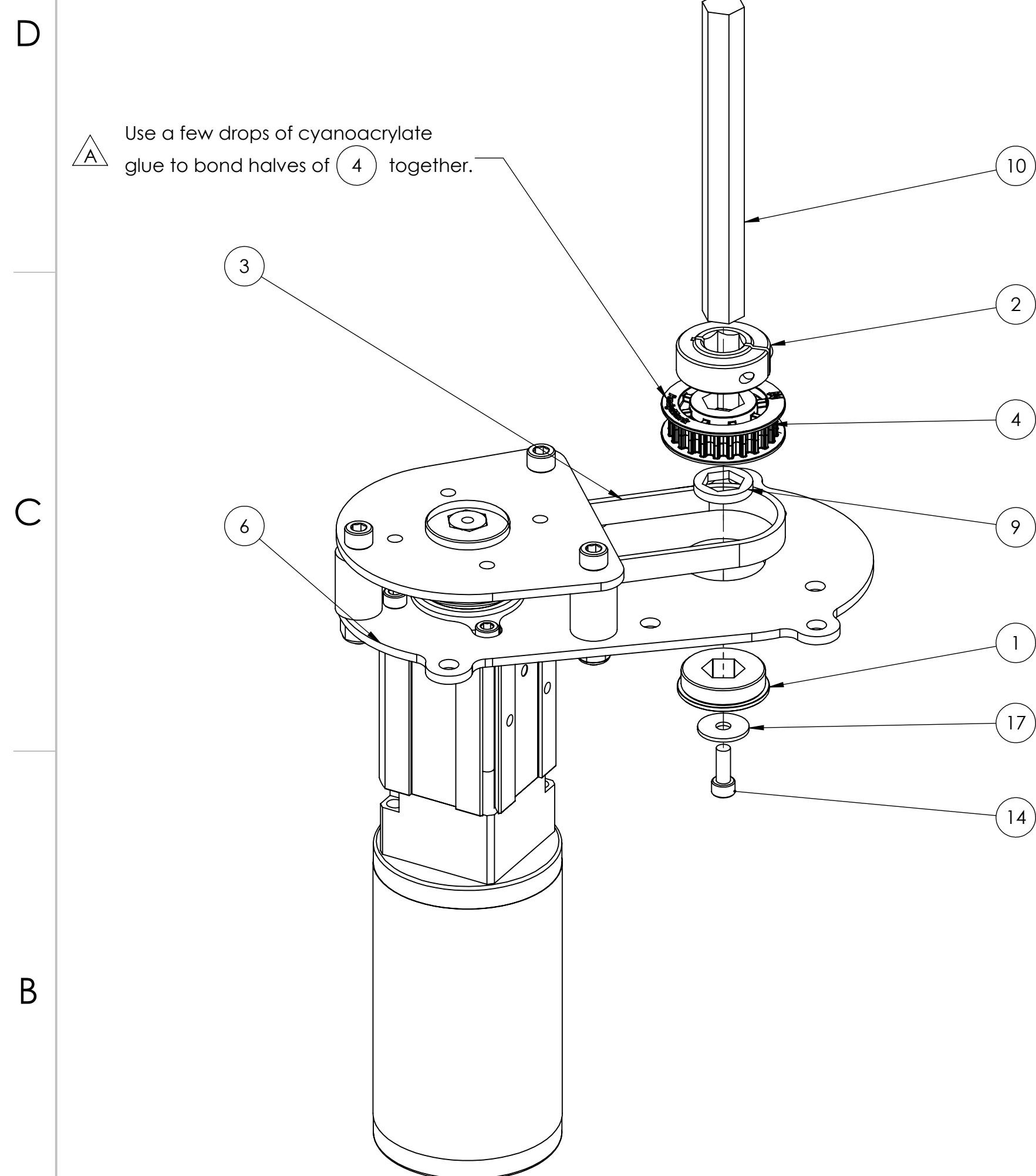
UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22450	B
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING	SCALE: 2:3	SHEET 2 OF 4	

4

3

2

1



Notes:

1. Insert or press 1 into 8 .
2. Slide 1 8 onto the shaft 10 , noting flange orientation.
3. Attach 1 8 to the assembly using 15 to space the plates and 12 and 13 to fasten.

Notes:

1. If not already done, press or insert 1 into 6 , noting flange orientation.
2. Slide items 2 , 4 , and 9 onto 10 , being careful of order, and note orientation of 10 as only one side is tapped.
3. Slide shaft into place, aligning 3 onto 4 , then aligning 10 with 1 .
4. Attach 14 and 17 to 10 . 17 must be large enough diameter to prevent shaft being pulled past bearing.
5. With bottom of 10 coincident with bottom of 1 , and 2 4 9 all flush to each other and 1 , tighten set screw on 2 .

UNLESS OTHERWISE SPECIFIED:		VEND	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	CO	6/24/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$				
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:		COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING				

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Low Agitator
Drive Assembly**

SIZE DWG. NO. REV
C GE-22450 B

SCALE: 2:3 SHEET 3 OF 4

D

D

C

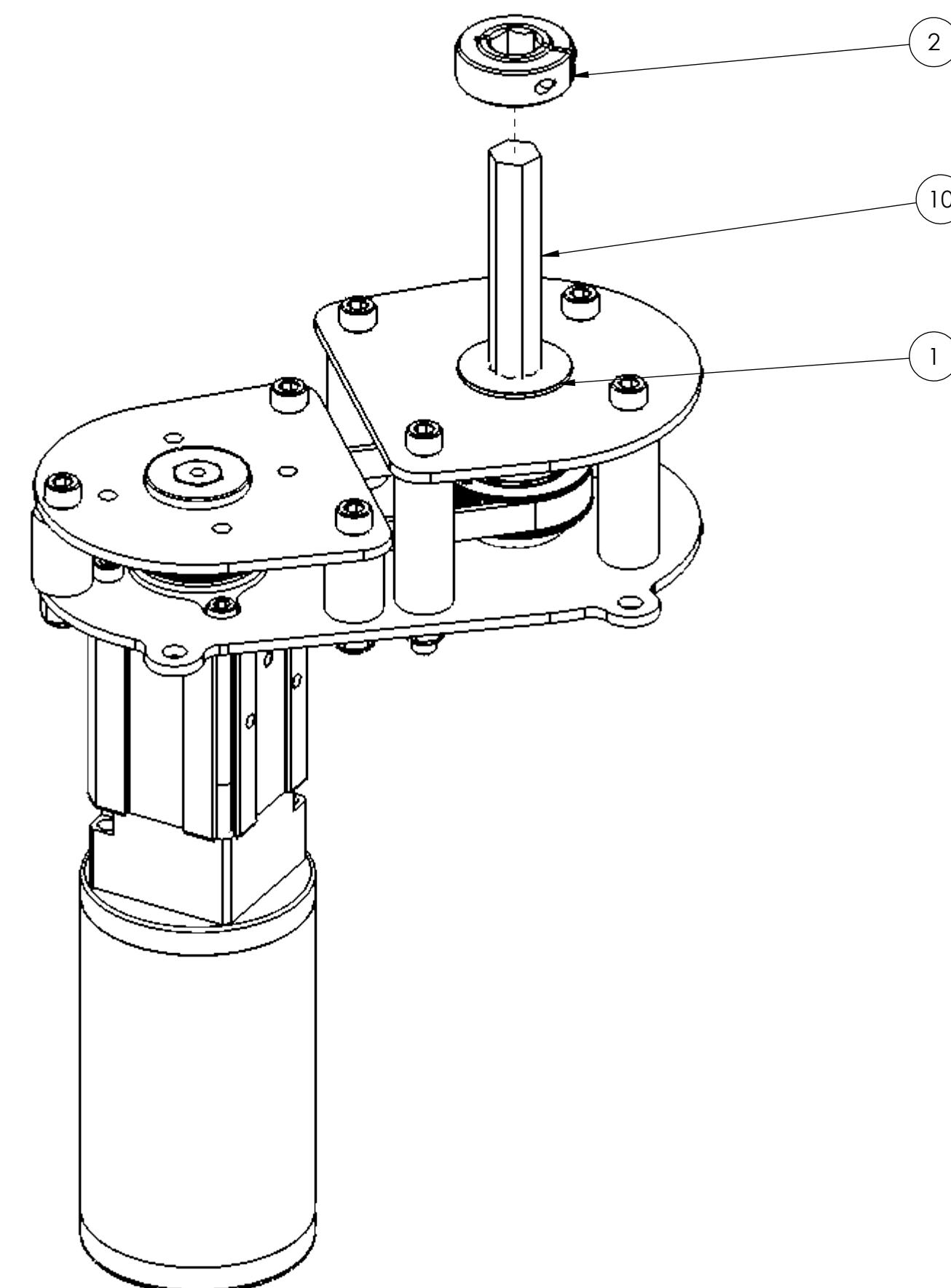
C

B

B

A

A



Notes:

1. Slide (2) onto (10).
2. Ensuring (2) is flush with (1), tighten set screw on (2).

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/24/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION** 

TITLE:
**Low Agitator
Drive Assembly**

SIZE DWG. NO. REV
C GE-22450 B

SCALE: 2:3 SHEET 4 OF 4

4

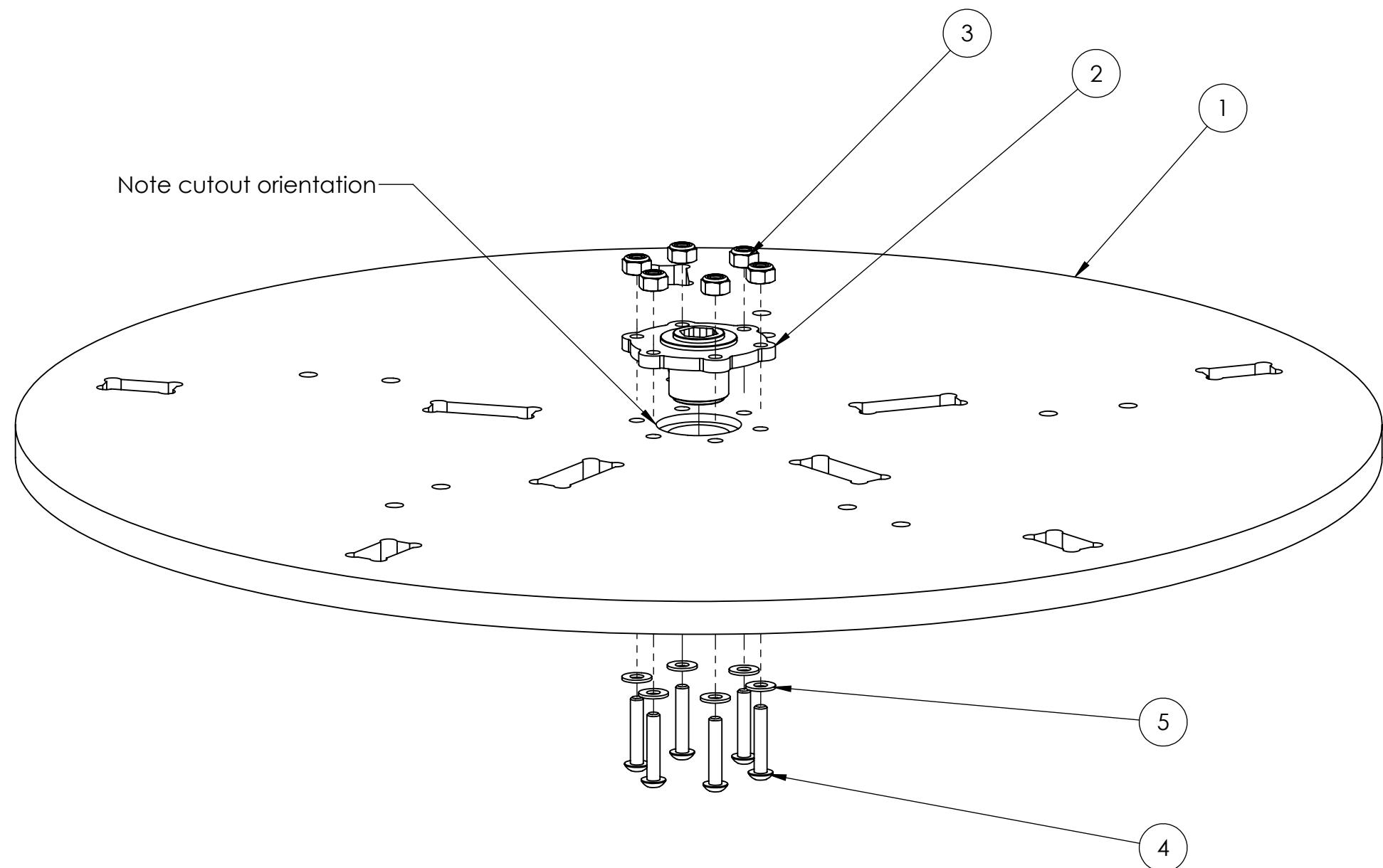
3

2

1

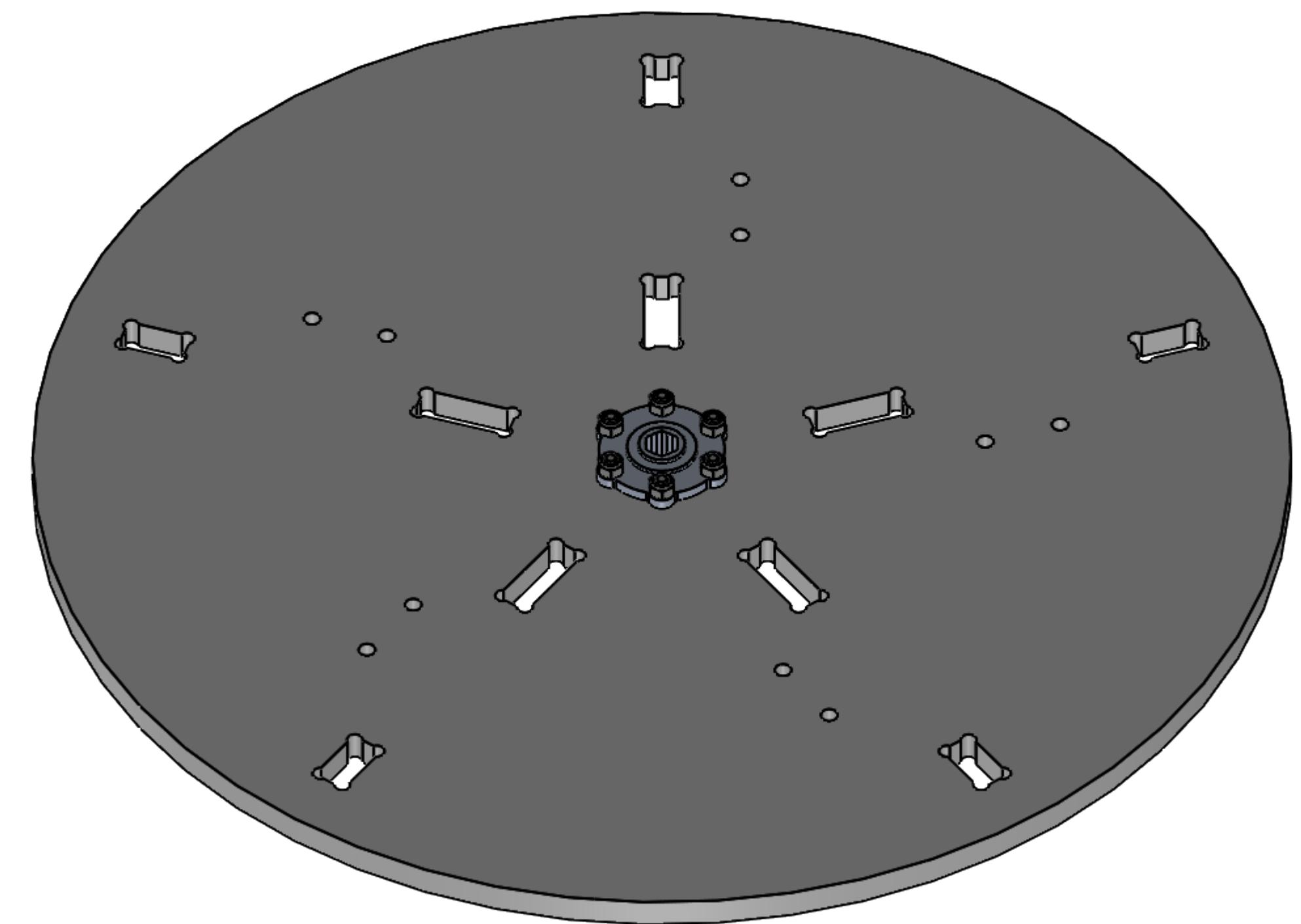
D

D



- Notes:
1. Attach (2) to (1) as shown using (4), (5), and (3).

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22434	Low Agitator Wheel Base	1
2	GE-22436	AndyMark 1/2 in. Hex Hub	1
3	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	6
4	round_hex_10_32_1_full	Round Head Hex, 10-32 x 1.00" long, fully threaded	6
5	washer_flat_10	Flat Washer for #10 Screw	6



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	12/29/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Low Agitator Wheel Base Assembly

SIZE DWG. NO. REV

C GE-22451

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

SCALE: 1:2 SHEET 1 OF 1

D

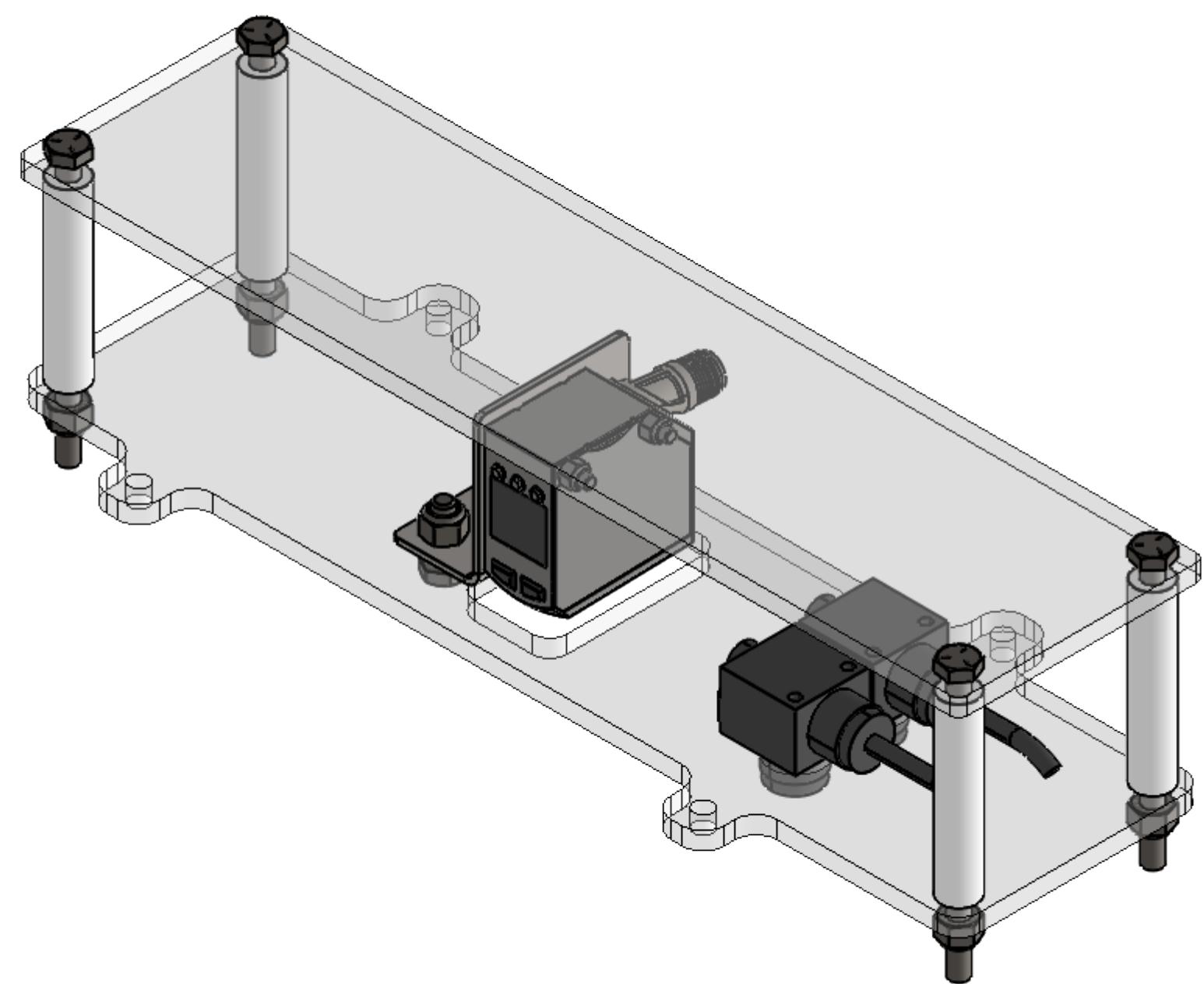
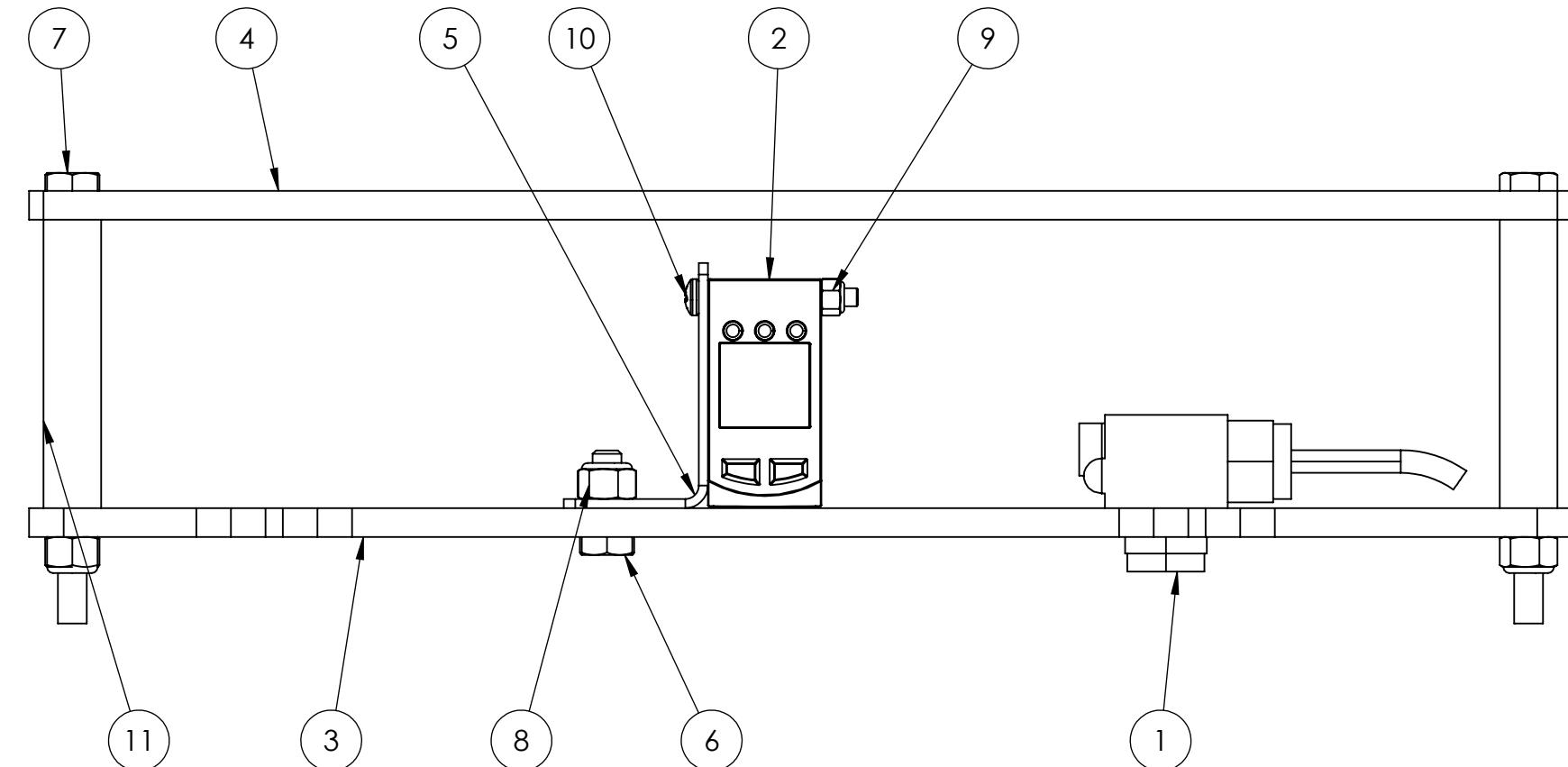
D

C

C

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	42ef_dc	RightSight Sensor	2
2	46CLR	46CLR	1
3	GE-22462	Sensor Plate	1
4	GE-22463	Sensor Shield	1
5	GE-22464	Color Sensor Bracket	1
6	hex_.25_20_0.75	Steel Hex Head Screw, 1/4"-20 x 0.75" long, fully threaded	2
7	hex_.25_20_3.75_partial	Steel Hex Head Bolt, 1/4-20 x 3.75", partially threaded	4
8	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	6
9	nylock_M4	Nylock M4	2
10	Pan_phil_M4_35	Pan Head Phillips Drive, M4 x 35mm Long, Fully Threaded	2
11	spacer_.252_.5_2.5	Spacer, .252 ID, .5 OD, 2.5 long	4

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/16/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	TITLE: Sensor Box Assembly		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	SIZE	DWG. NO.	REV
C	GE-22461		
SCALE: 2:3		SHEET 1 OF 2	
DO NOT SCALE DRAWING			

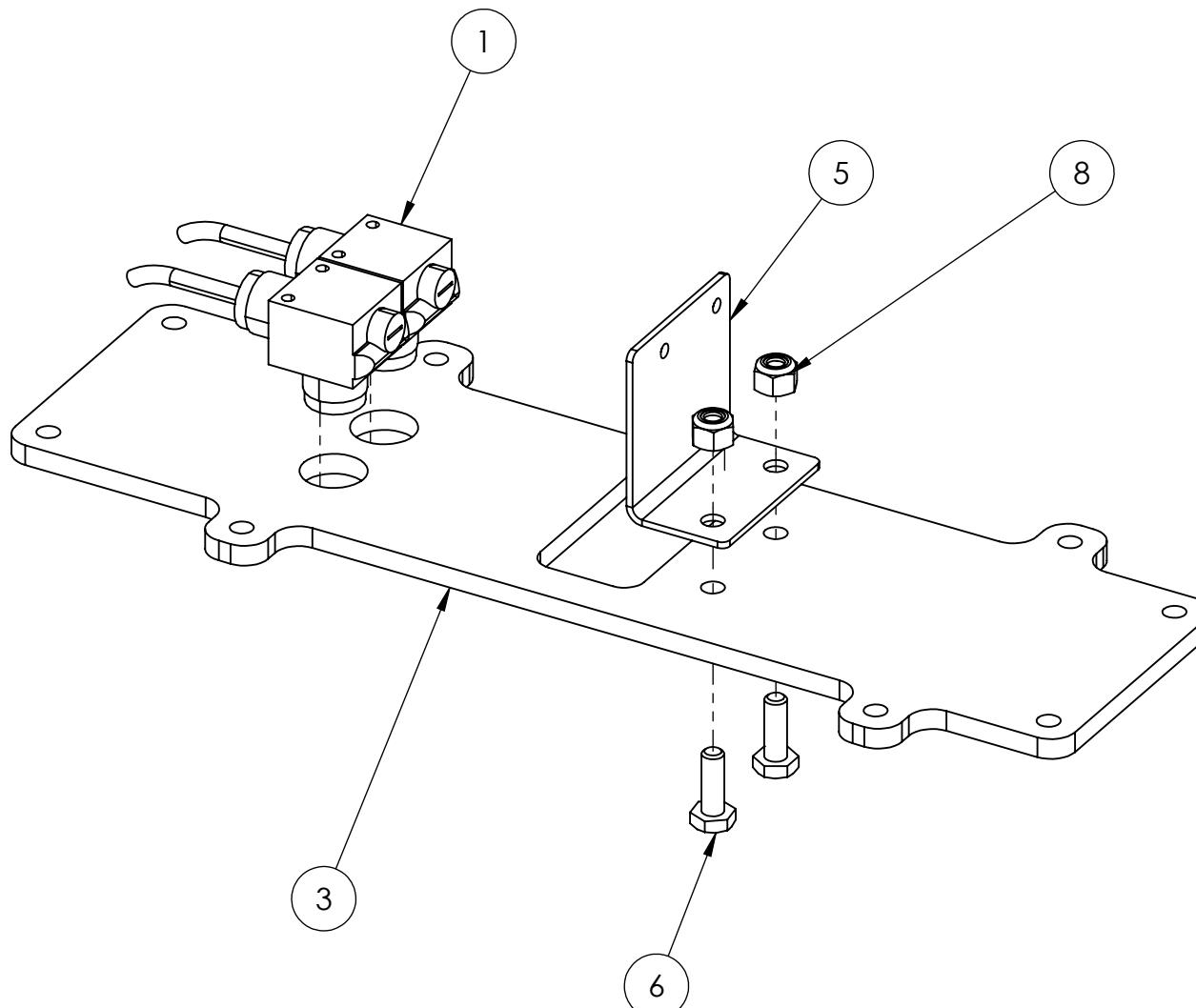
 **FIRST
ROBOTICS
COMPETITION**  SOLIDWORKS
Modeling Solutions Partner

4

3

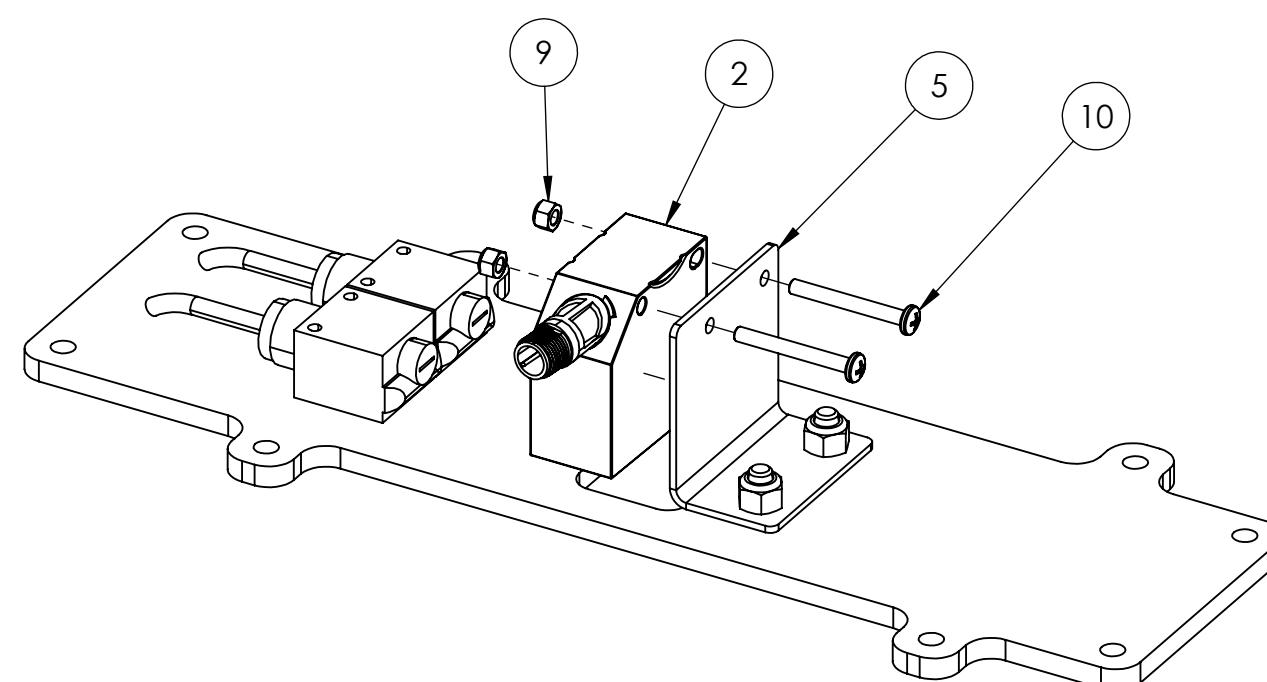
2

1



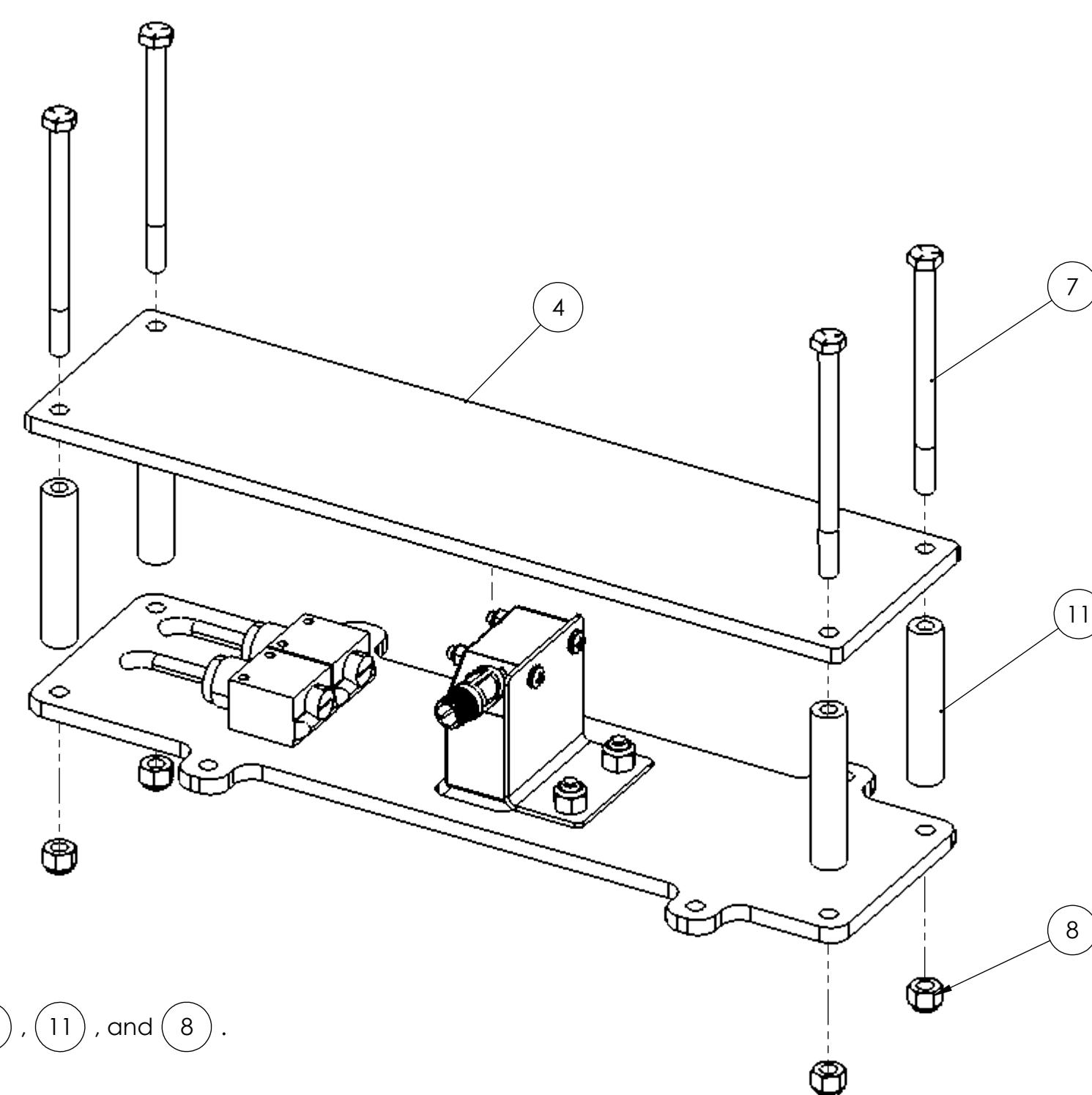
Notes:

1. Attach **5** to **3** using **6** and **8**.
2. Attach **1** to **3**.



Notes:

1. Attach **2** to **5** in orientation shown using **9** and **10**.



Notes:

1. Attach **4** to assembly using **7**, **11**, and **8**.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$

VEND _____ NAME _____ DATE _____

DRAWN CO 12/16/2021



TITLE:

Sensor Box
Assembly

SIZE DWG. NO.

C GE-22461

REV

MATERIAL/FINISH:

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.

DO NOT SCALE DRAWING

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.

SCALE: 1:2 SHEET 2 OF 2

4

3

2

1

4

3

2

1

D

D

C

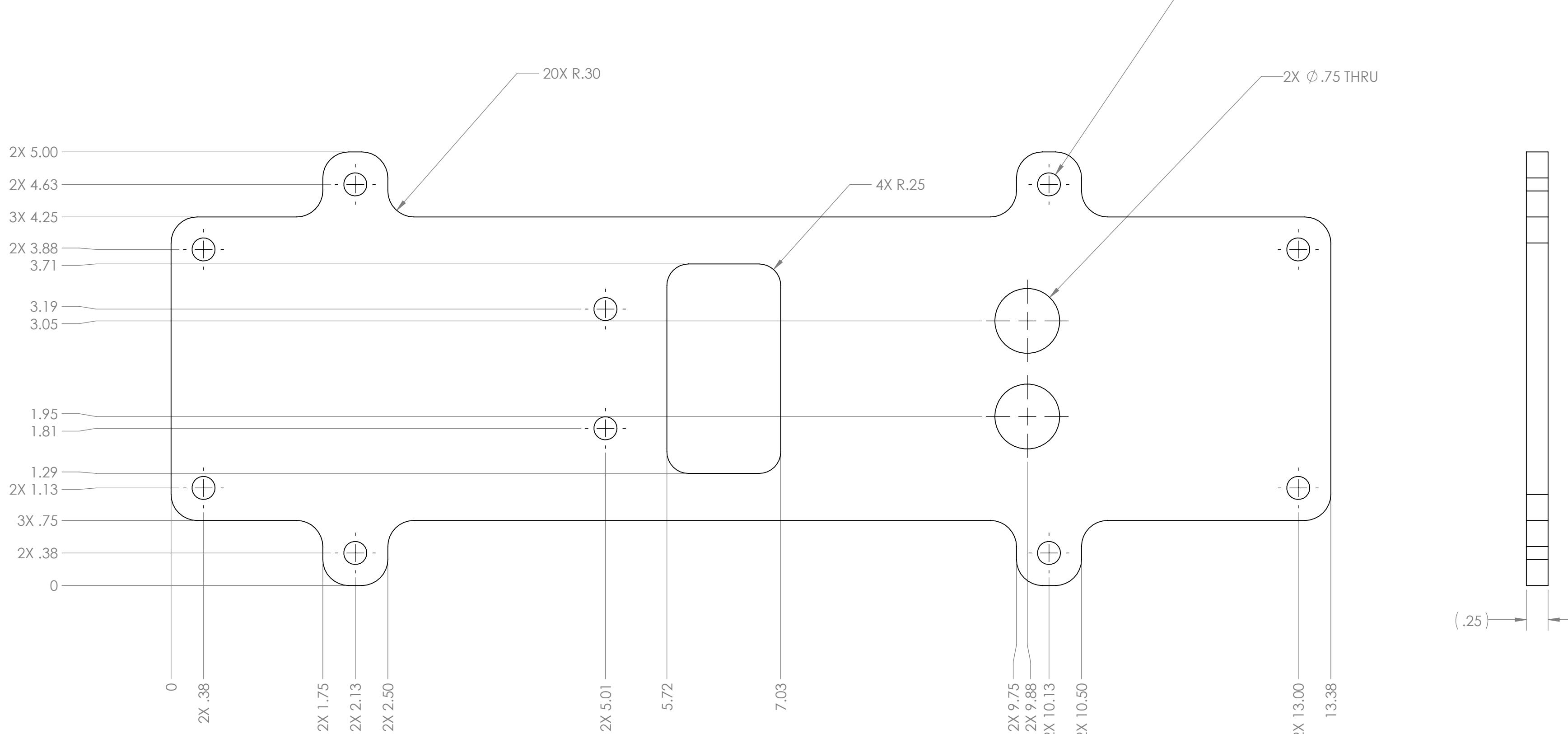
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/28/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/4" thk. Polycarbonate, Clear	C	GE-22462	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

4

3

2

1

4

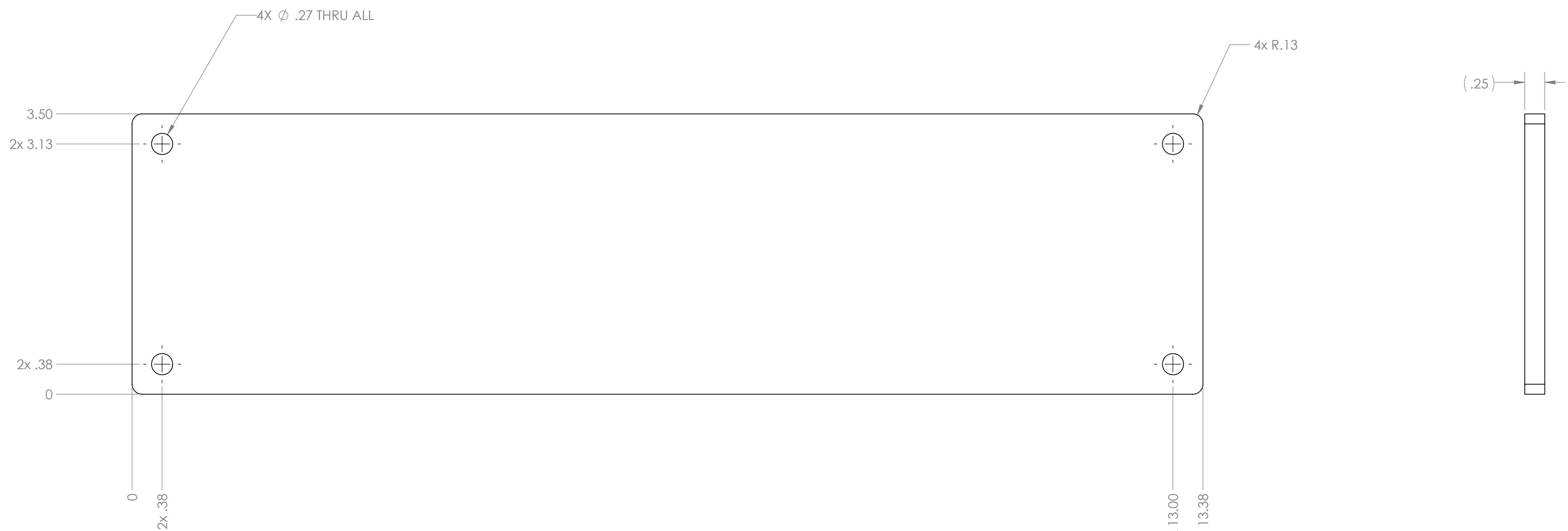
3

2

1

D

D



C

C

B

B

A

A

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	6/28/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
1/4" thk. Polycarbonate, Clear	C	GE-22463	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

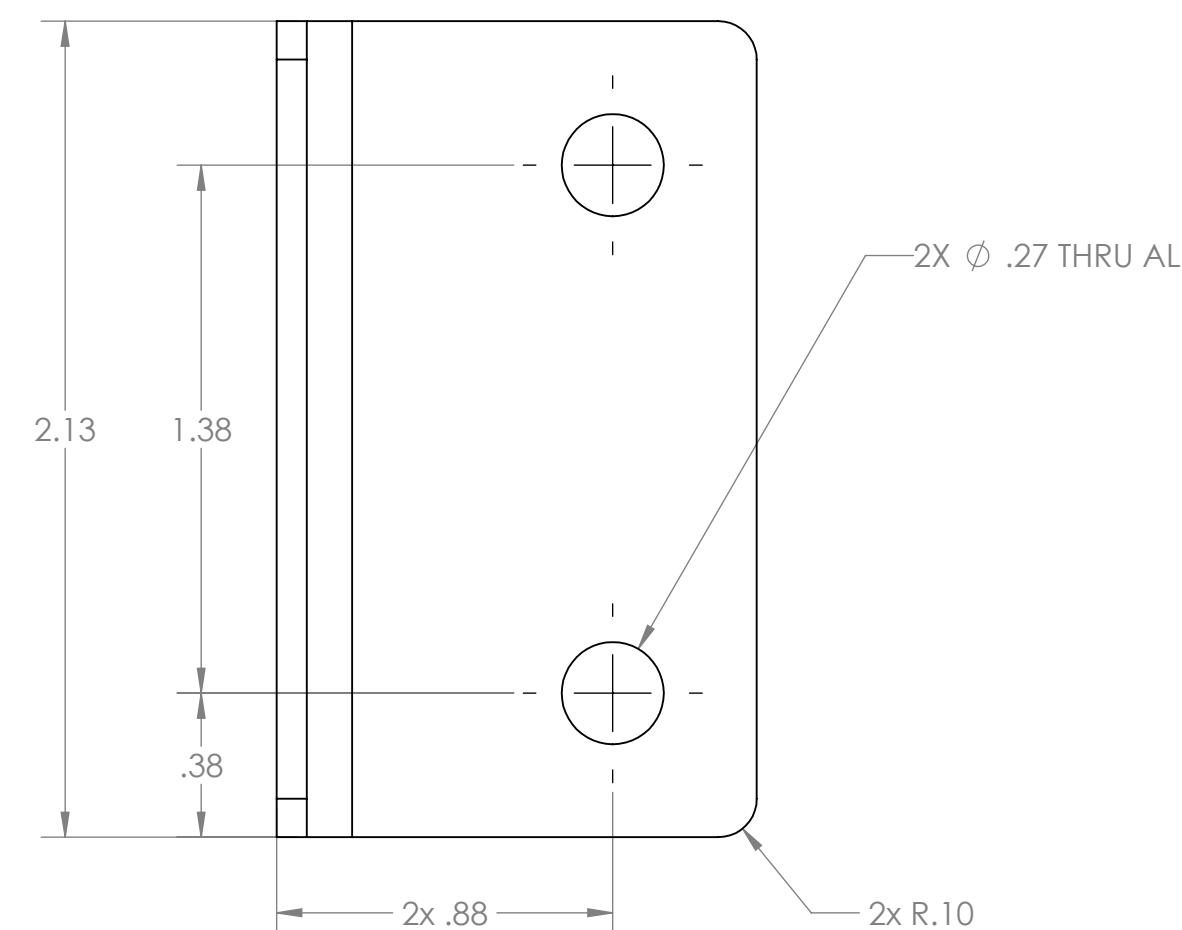
4

3

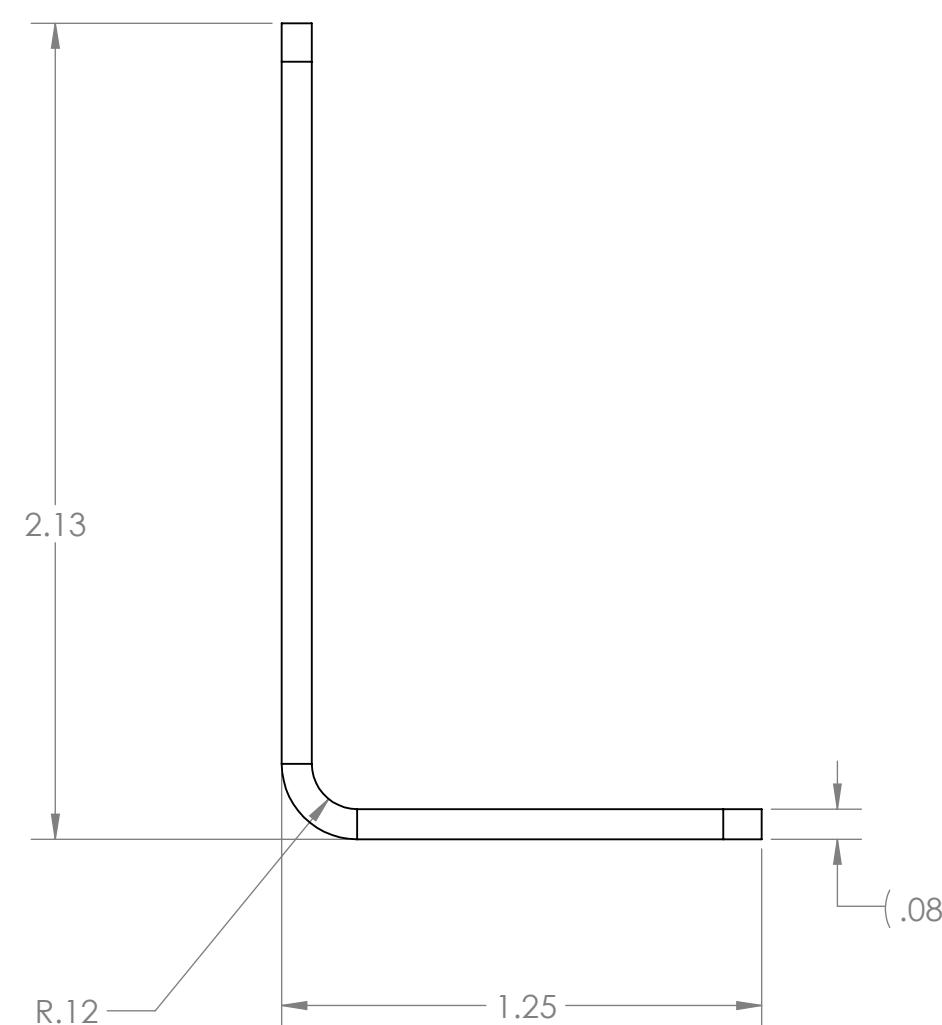
2

1

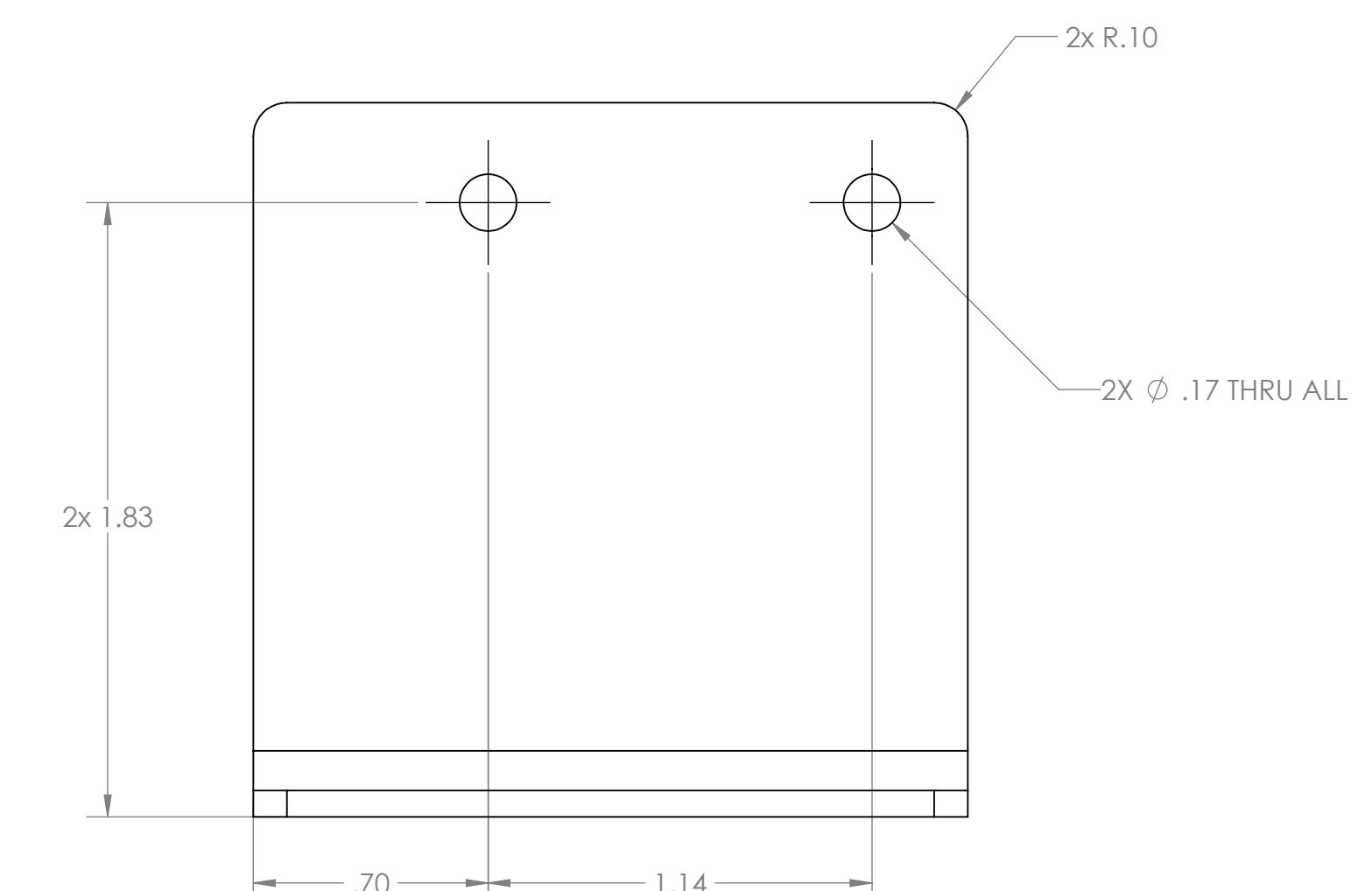
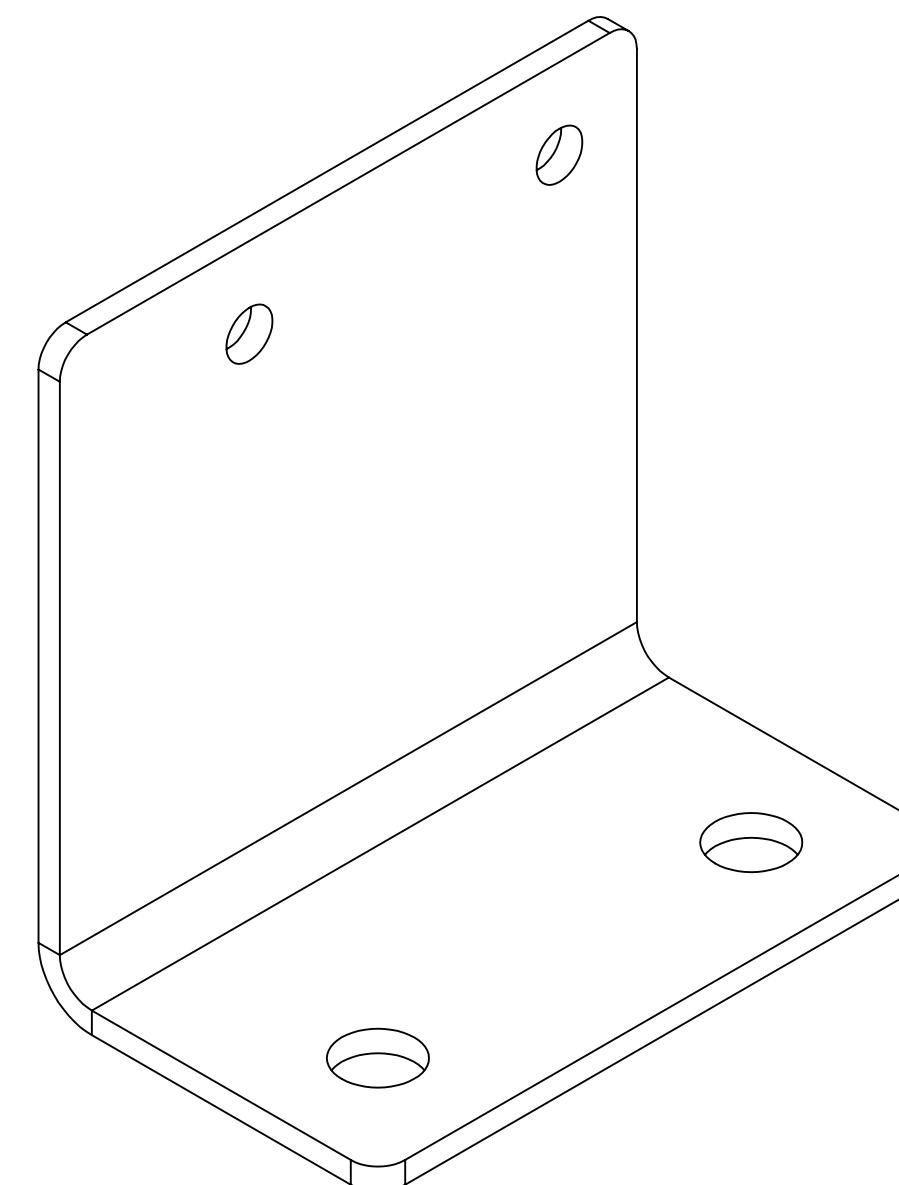
D



C



B



A

Notes:
1. Tag or label with part number.

UNLESS OTHERWISE SPECIFIED:	BEND	NAME	DATE
DRAWN	CO	6/28/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 14 Ga. Preplated steel			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

TITLE:
**Color Sensor
Bracket**

SIZE DWG. NO. REV

C GE-22464

SCALE: 2:1 SHEET 1 OF 1

D

D

C

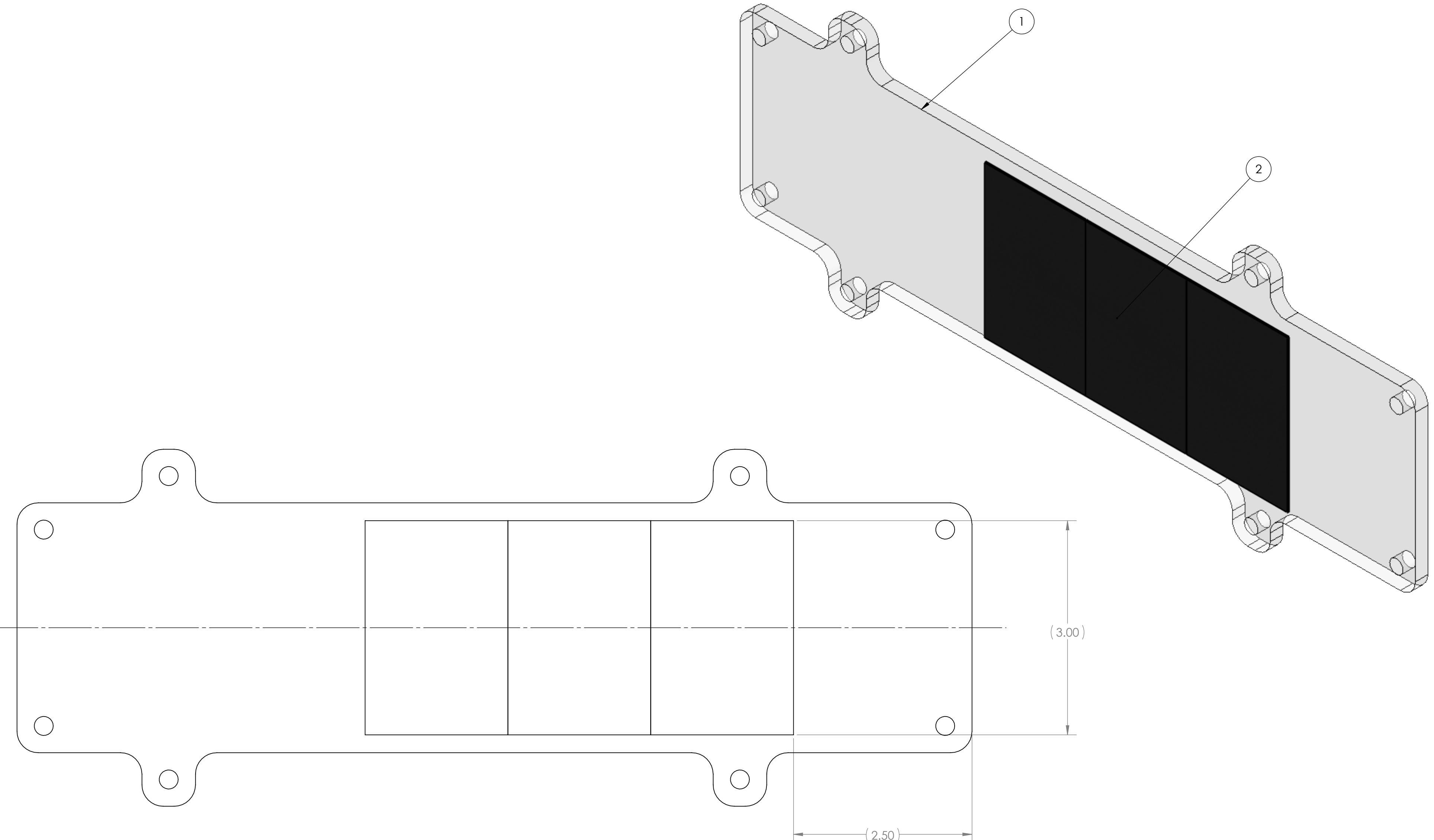
C

B

B

A

A



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-22462	Sensor Plate	1
2	tape_SENSORDIFFUSER	2" wide x 3" long black gaff tape	3

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	CO	12/16/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	PROPRIETARY AND CONFIDENTIAL		
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
MATERIAL/FINISH:	COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

FIRST ROBOTICS COMPETITION Modeling Solutions Partner

Sensor Light Shield

SIZE DWG. NO. REV
C GE-22466

SCALE: 1:1 SHEET 1 OF 1

4

3

2

1

D

D

C

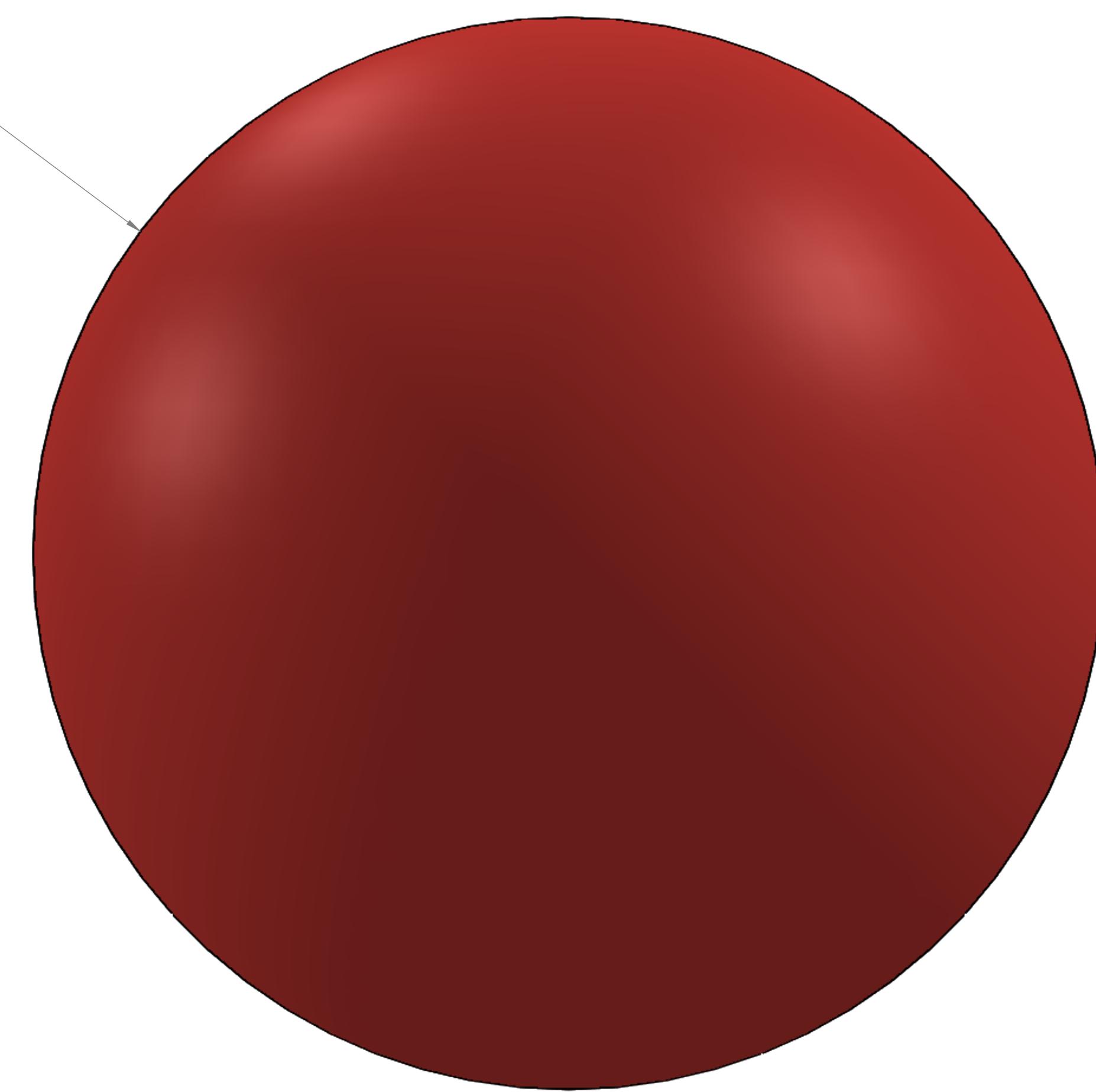
C

B

B

A

A

 $(\phi 9.44)$ 

- Notes:
1. Description: 9.5 inch oversized tennis ball, red
 2. Source: AndyMark
 3. Item#: am-4600_red
 4. To be inflated to 3.5 PSI

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	12/30/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner			
TITLE: Cargo - Red			
SIZE DWG. NO. REV			
C GE-22497			
SCALE: 1:1 SHEET 1 OF 1			

4

3

2

1

4

3

2

1

D

D

C

C

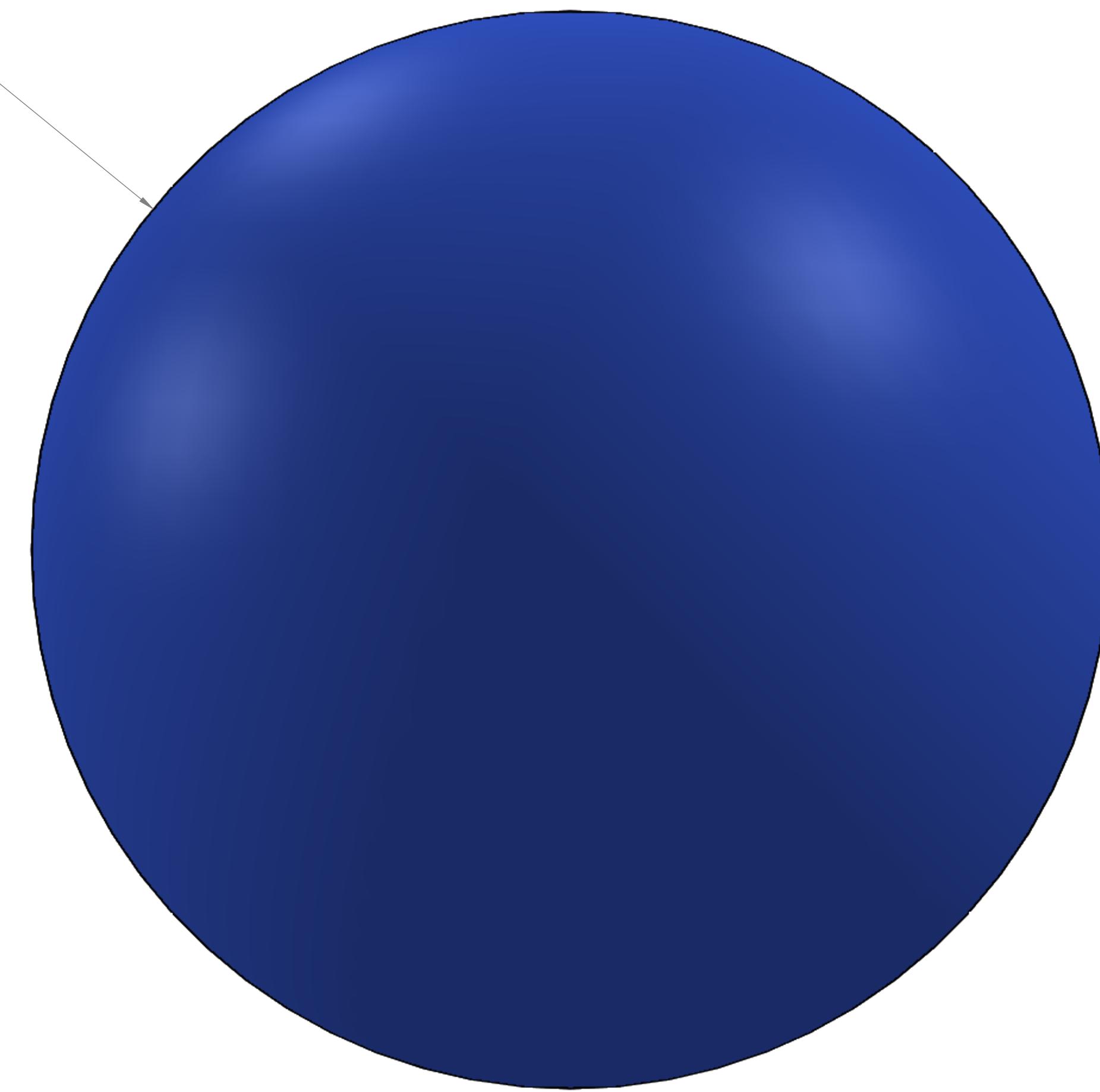
B

B

A

A

(Ø 9.44)



- Notes:
1. Description: 9.5 inch oversized tennis ball, blue
 2. Source: AndyMark
 3. Item#: am-4600_blue
 4. To be inflated to 3.5 PSI

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	CO	12/30/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	GE-22498	
COMMENTS:		REMOVE ALL BURRS AND SHARP EDGES.	
DO NOT SCALE DRAWING		SCALE: 1:1	SHEET 1 OF 1

4

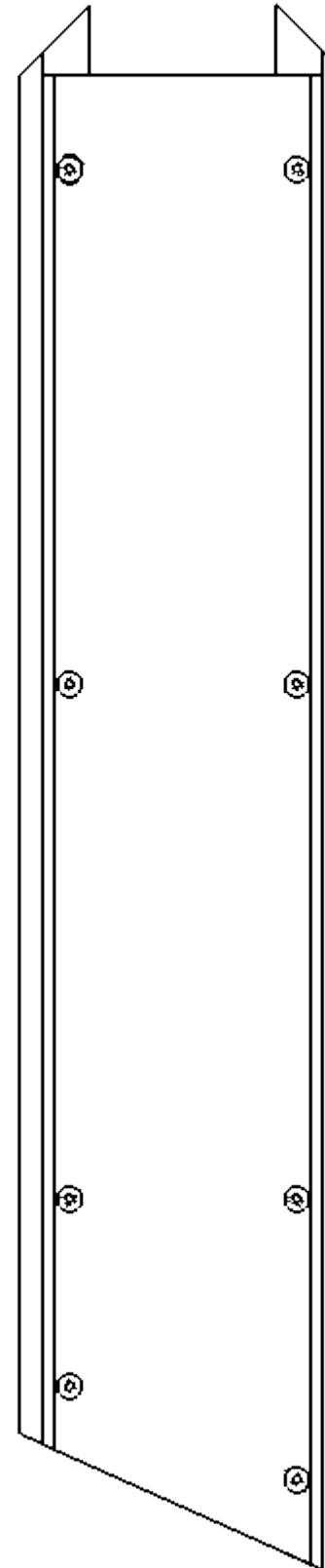
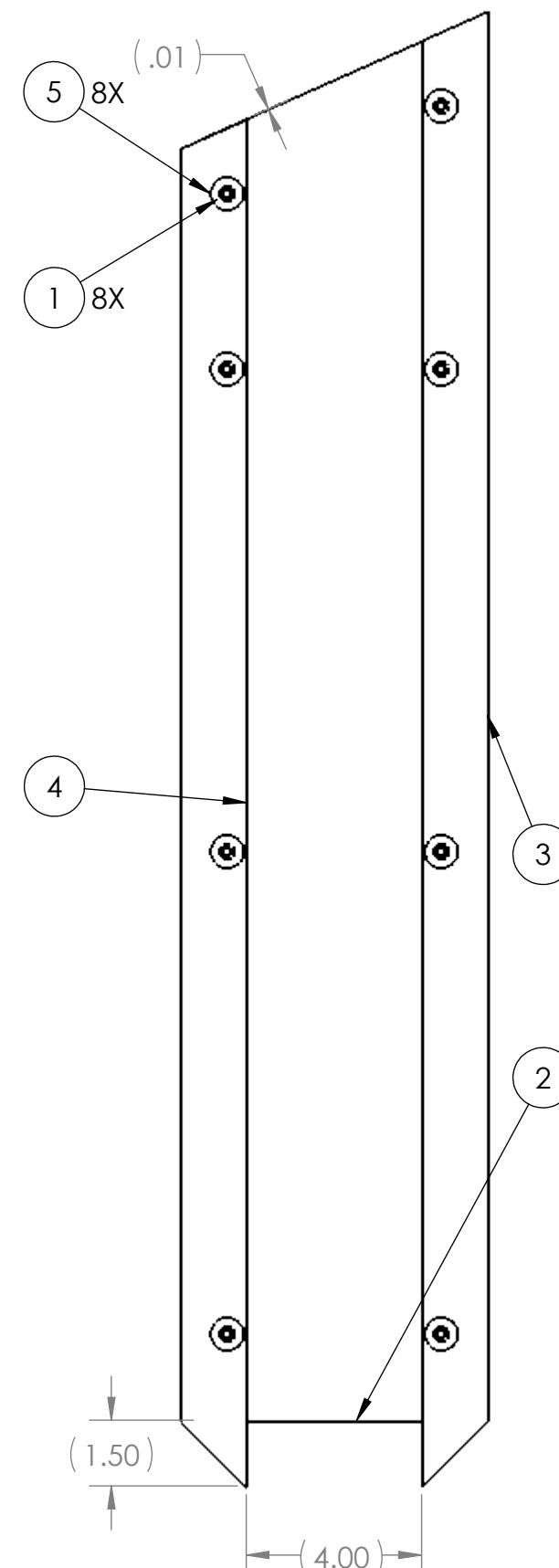
3

2

1

ITEM NO.	PART NUMBER	DESCRIPTION	
1	Flat Hex .25_20_.75	Flat Hex .25_20_.75	8
2	GE-22601	Cable protector top angled	1
3	GE-22602	Cable protector side right angled	1
4	GE-22603	Cable protector side left angled	1
5	TeeNut_ultra_split_rst_.25_20	.25-20 TeeNut ultra split resistant	8

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Added sheet 2	1/5/2022	DAF



Notes:

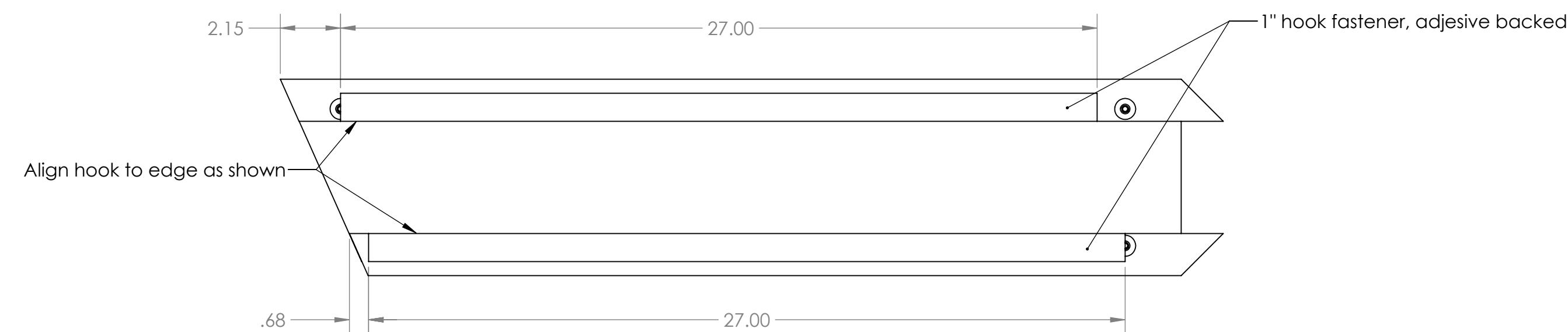
1. Insert (5) 8X to (4) and (3).
2. Attach (2) to (4) and (3) with (1) 8X.

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	7/29/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	PROPRIETARY AND CONFIDENTIAL		
MATERIAL/FINISH:	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING			

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
 Modeling Solutions Partner

TITLE: Angled cable protector
SIZE DWG. NO. REV
C GE-22600 **A**
SCALE: 1:4 **SHEET 1 OF 2**

Post Manufacturing Instructions



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$	DRAWN	NW	7/29/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST [®] . ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST [®] IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
DO NOT SCALE DRAWING	C	GE-22600	A
SCALE: 1:4		SHEET 2 OF 2	

FIRST[®] ROBOTICS COMPETITION DS SOLIDWORKS Modeling Solutions Partner

TITLE:
Angled cable protector

D

D

C

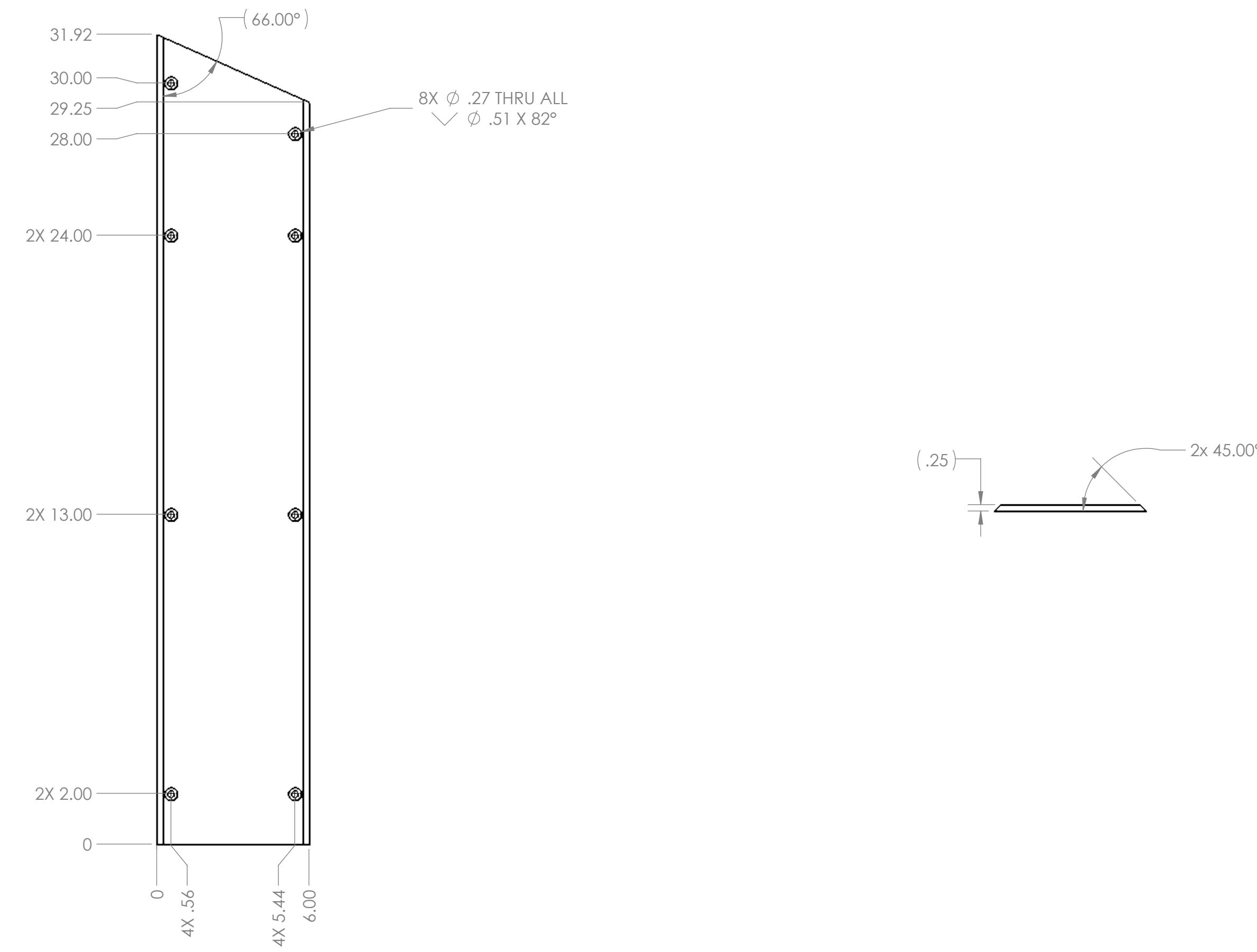
C

B

B

A

A



Notes:

1. Material: 0.25" HDPE, Black high gloss smooth
2. Remove burrs and sharp edges.
3. Label with part number

UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	6/7/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			
TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .005$			
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: HDPE Black, Smooth high gloss finish			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE: Cable protector top angled

SIZE DWG. NO. REV

C GE-22601

SCALE: 1:8 SHEET 1 OF 1

D

D

C

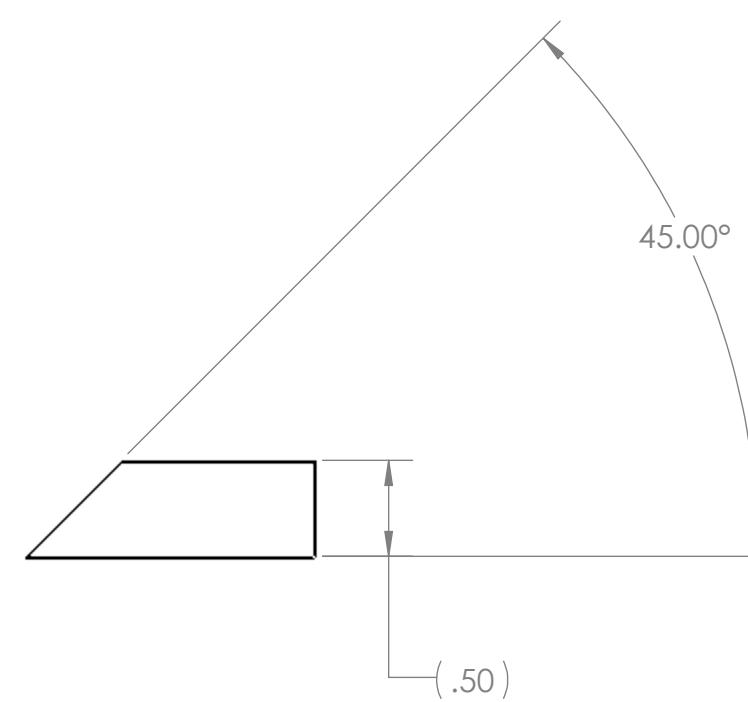
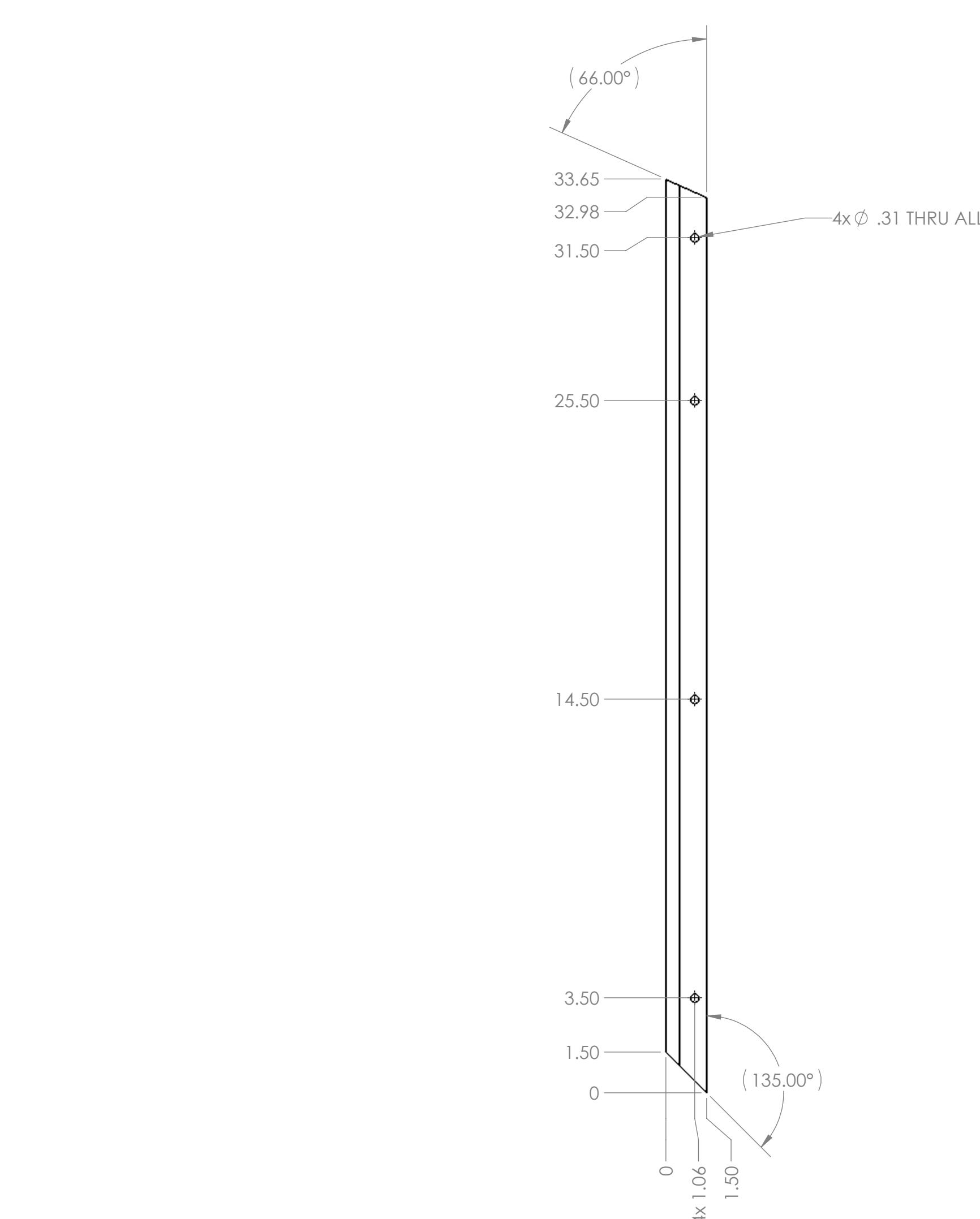
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NW	6/8/2021
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: HDPE Black high gloss smooth			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
Cable protector
side right angled

SIZE DWG. NO. REV
C GE-22602

SCALE: 1:8 SHEET 1 OF 1

D

D

C

C

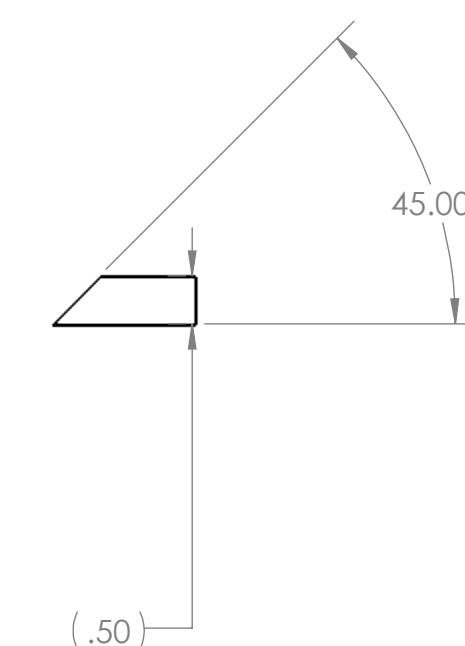
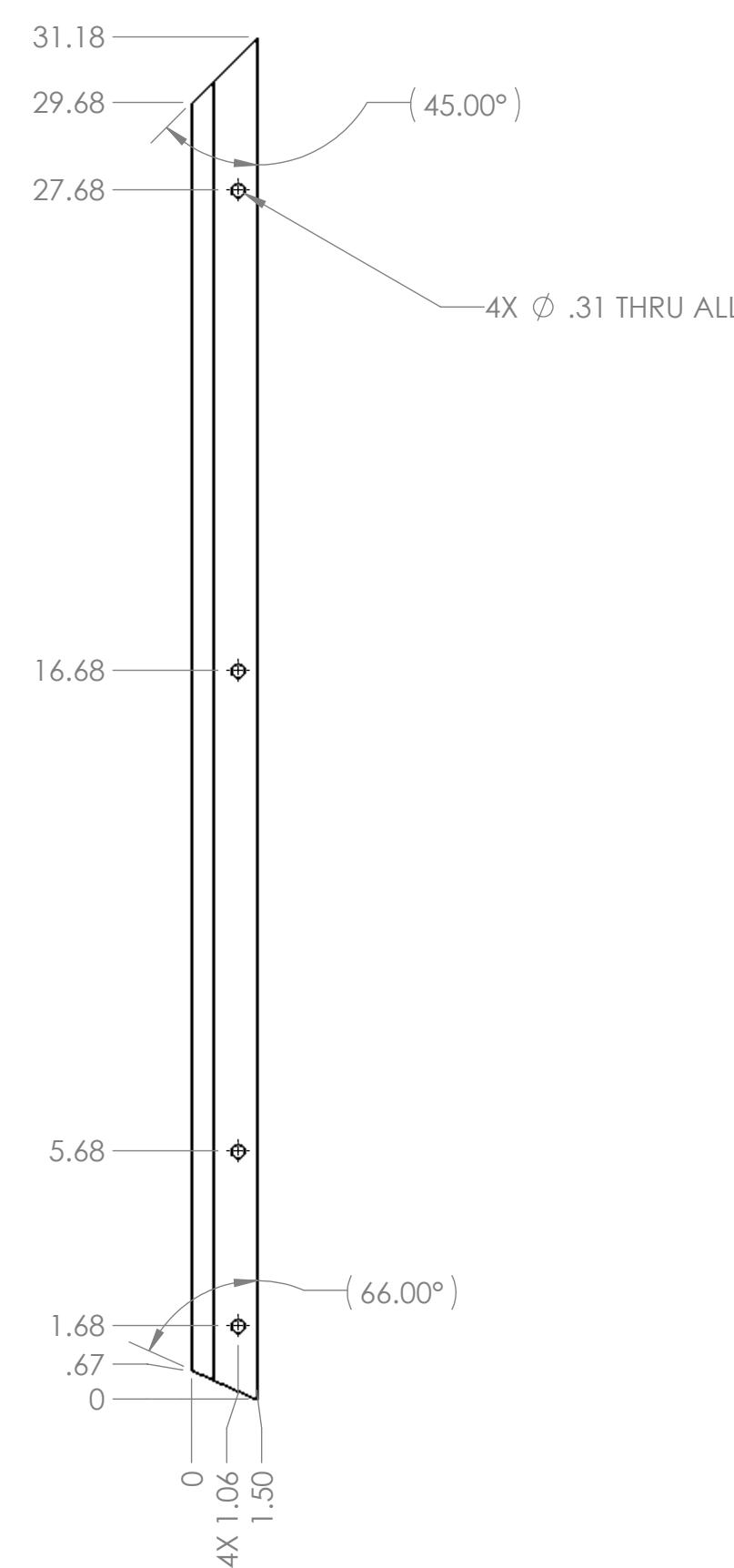
B

B

A

A

Notes:
 1. Material: 0.5" HDPE, Black high gloss smooth.
 2. Remove all burrs and sharp edges
 3. Label with part number



UNLESS OTHERWISE SPECIFIED:	VEND	NAME	DATE
DRAWN	NW	6/7/2021	
PROPRIETARY AND CONFIDENTIAL			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
HDPE Black high glass smooth	C	GE-22603	
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:8	SHEET 1 OF 1	

FIRST
ROBOTICS
COMPETITION

SOLIDWORKS
Modeling Solutions Partner

TITLE:
**Cable protector
side left angled**

SIZE DWG. NO. REV
C GE-22603

SCALE: 1:8 SHEET 1 OF 1

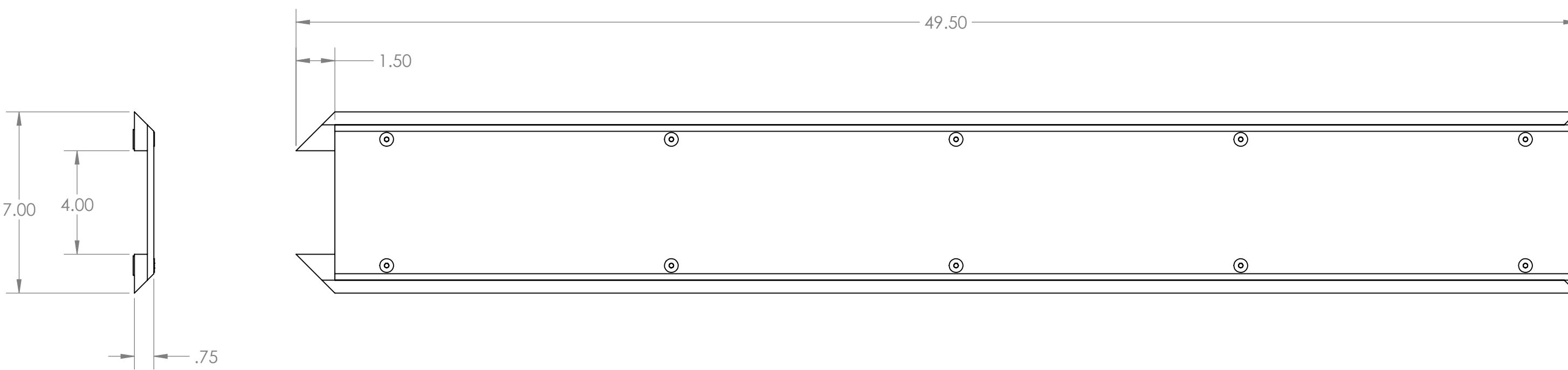
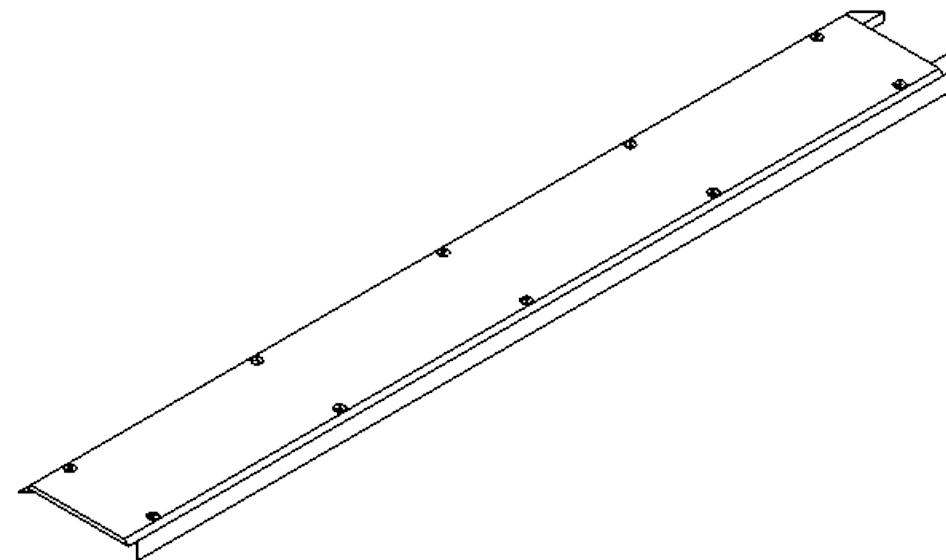
4

3

2

1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FE-00301	Side angle left	1
2	FE-00303	Side angle right	1
3	FE-00302	Cable protector top	1
4	Flat Hex .25_20_.75	Flat Hex .25_20_.75	10
5	TeeNut_ultra_split_rst_.25_20	.25-20 TeeNut ultra split resistant	10



PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST®. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST®** IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
SCALE: 1:12		WEIGHT:	SHEET 1 OF 2		
SIZE		DWG. NO.	REV		
B		FE-00300			

4

3

2

1

4

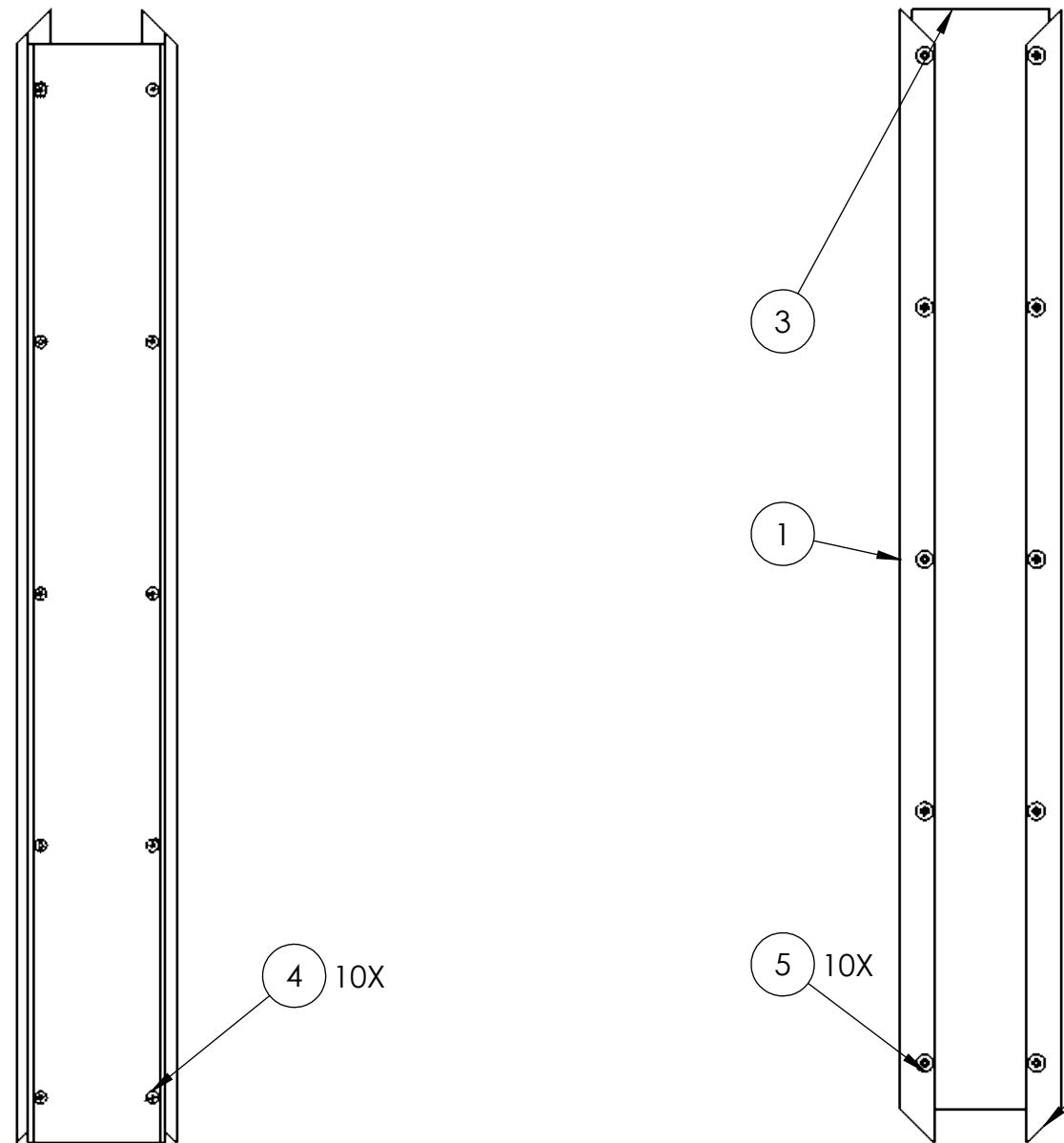
3

2

1

B

B



- Notes:
1. Insert **5** 10X in to the bottom of **1** and **2**.
 2. Attach **3** to **1** an **2** with **4** 10X .

A

A

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST®. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST®** IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE: HDPE Cable Protector

B	FE-00300	REV
SCALE: 1:12	WEIGHT:	SHEET 2 OF 2

4

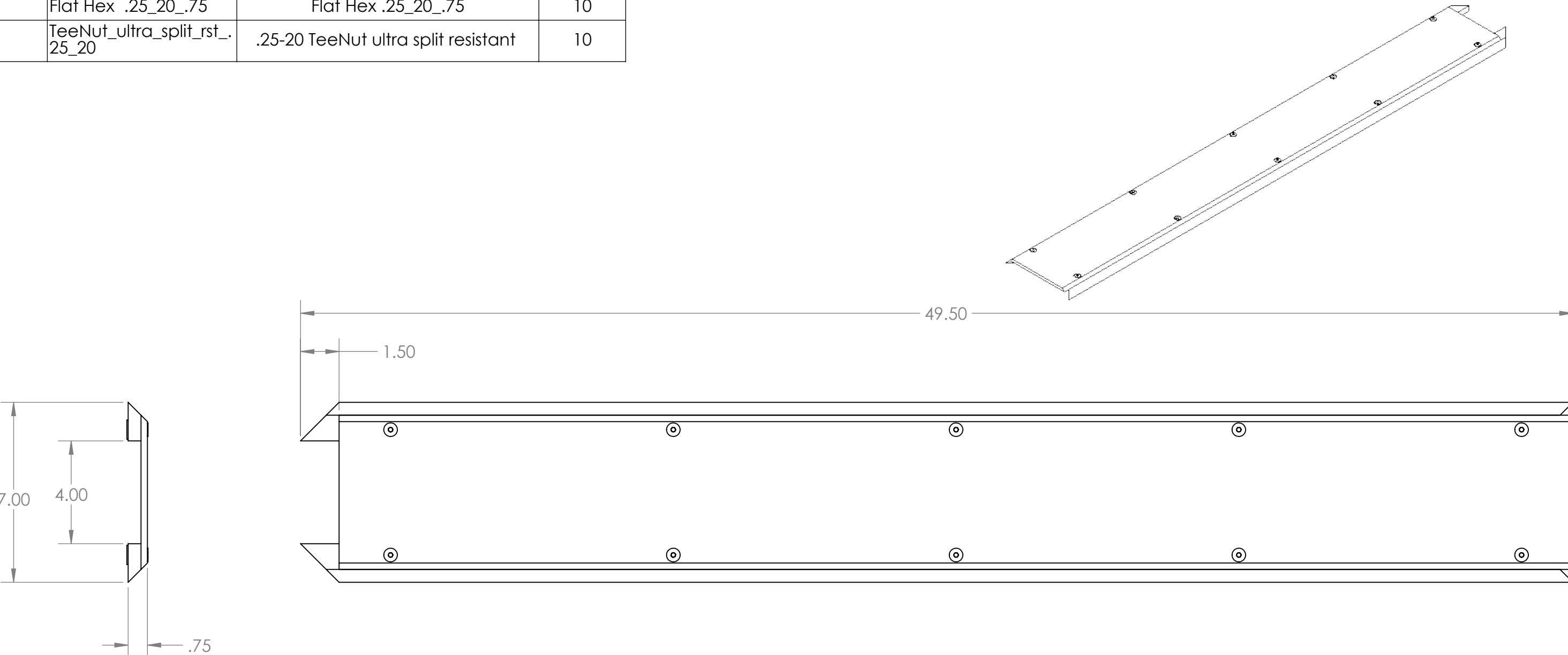
3

2

1

ITEM NO.	PART NUMBER	DESCRIPTION	
1	FE-00301	Side angle left	1
2	FE-00303	Side angle right	1
3	FE-00302	Cable protector top	1
4	Flat Hex .25_20_.75	Flat Hex .25_20_.75	10
5	TeeNut_ultra_split_rst_.25_20	.25-20 TeeNut ultra split resistant	10

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Added sheet 3	1/5/2022	DAF



PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
SIZE	DWG. NO.	REV			
B	FE-00300	A			
SCALE: 1:12	WEIGHT:	SHEET 1 OF 3			

4

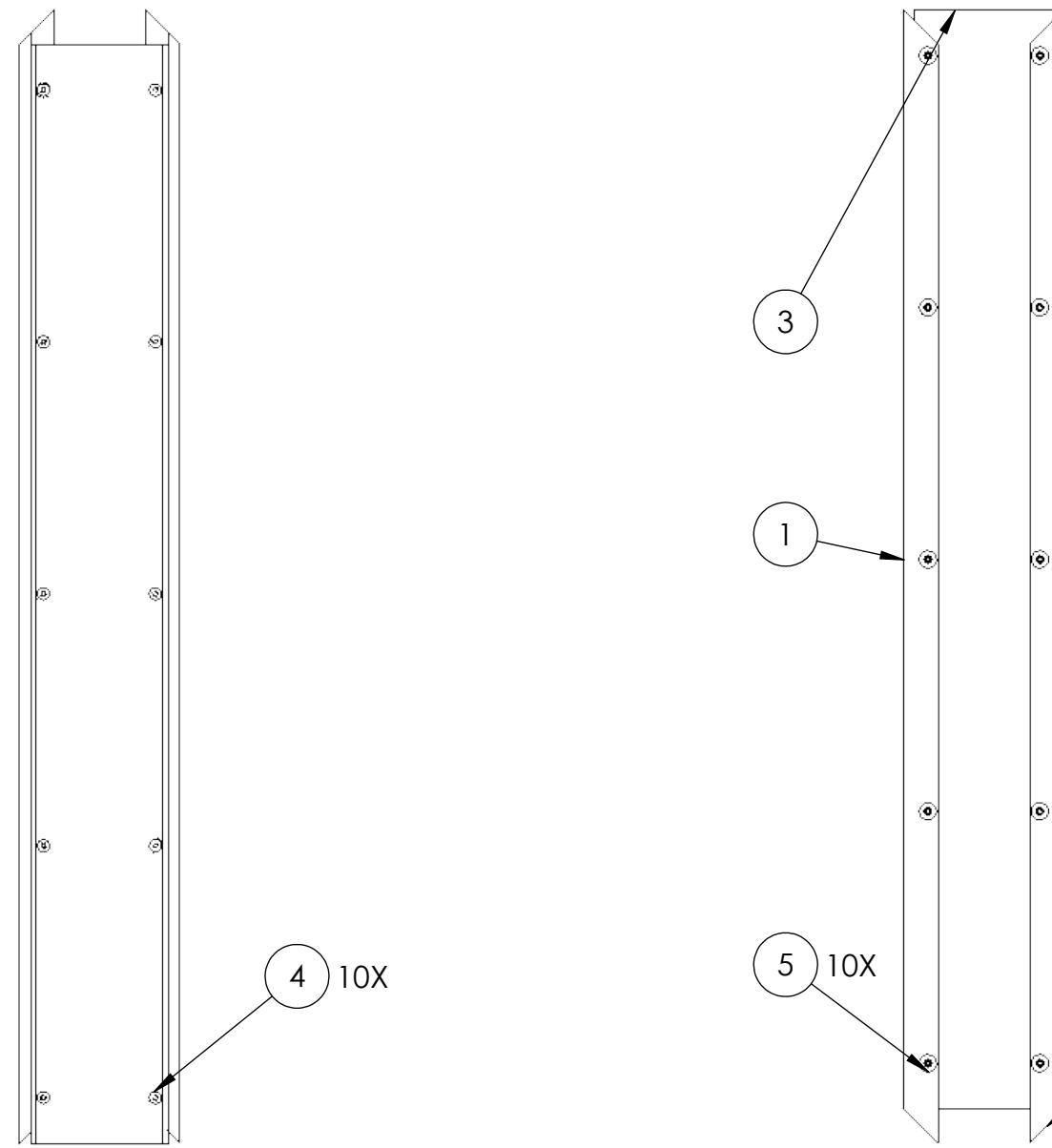
3

2

1

B

B



- Notes:
1. Insert **5** 10X in to the bottom of **1** and **2**.
 2. Attach **3** to **1** an **2** with **4** 10X .

A

A

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST®. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST®** IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE: HDPE Cable Protector

SIZE	DWG. NO.	REV
B	FE-00300	A

SCALE: 1:12 WEIGHT: SHEET 2 OF 3

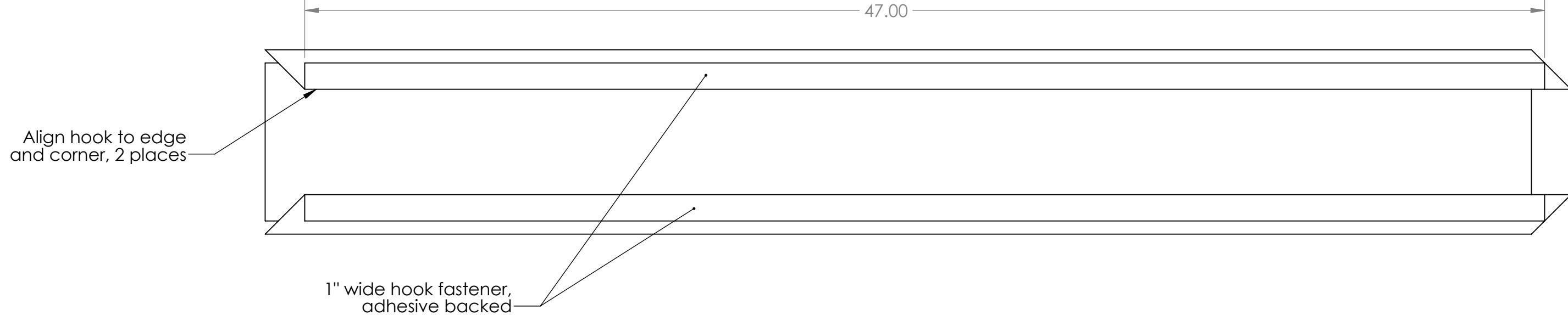
4

3

2

1

Post Manufacturing Instructions



PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

FIRST ROBOTICS COMPETITION **SOLIDWORKS**
Modeling Solutions Partner

TITLE: HDPE Cable Protector

SIZE DWG. NO. REV
B FE-00300 **A**

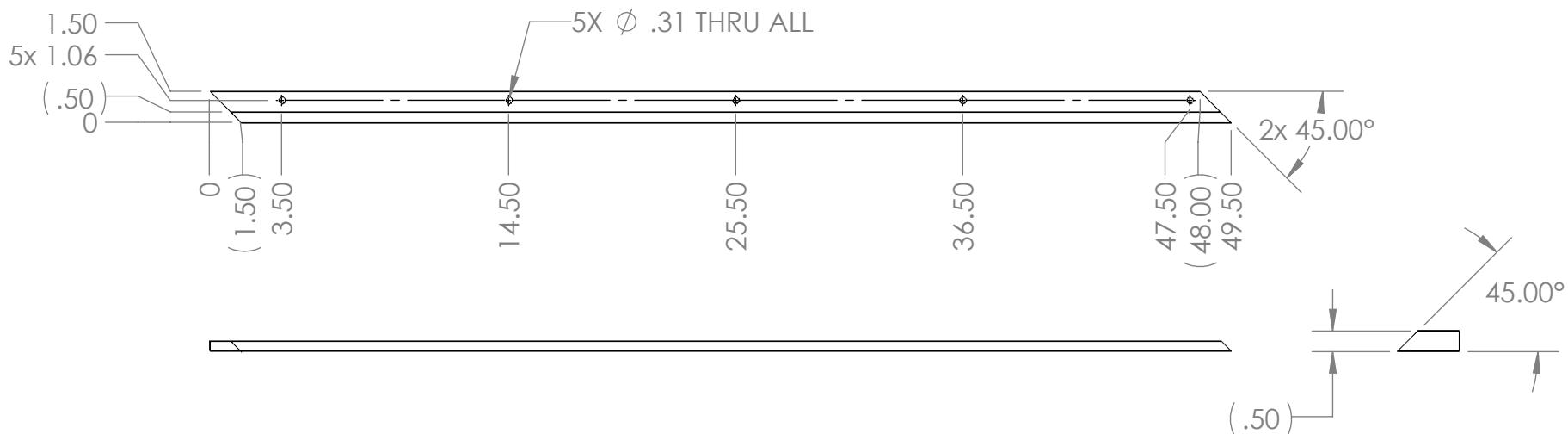
SCALE: 1:12 WEIGHT: SHEET 3 OF 3

2

1

B

B



A

A

		UNLESS OTHERWISE SPECIFIED:				
		DIMENSIONS ARE IN INCHES		DRAWN	NAME	DATE
		TOLERANCES:		CHECKED		
		FRACTIONAL $\pm 1/16$		ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$		Q.A.		
		THREE PLACE DECIMAL $\pm .001$		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:				
		MATERIAL				
		HDPE Black				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST[®]. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST[®] IS PROHIBITED.



SOLIDWORKS
Modeling Solutions Partner

TITLE: Side angle left

SIZE DWG. NO. REV
A FE-00301

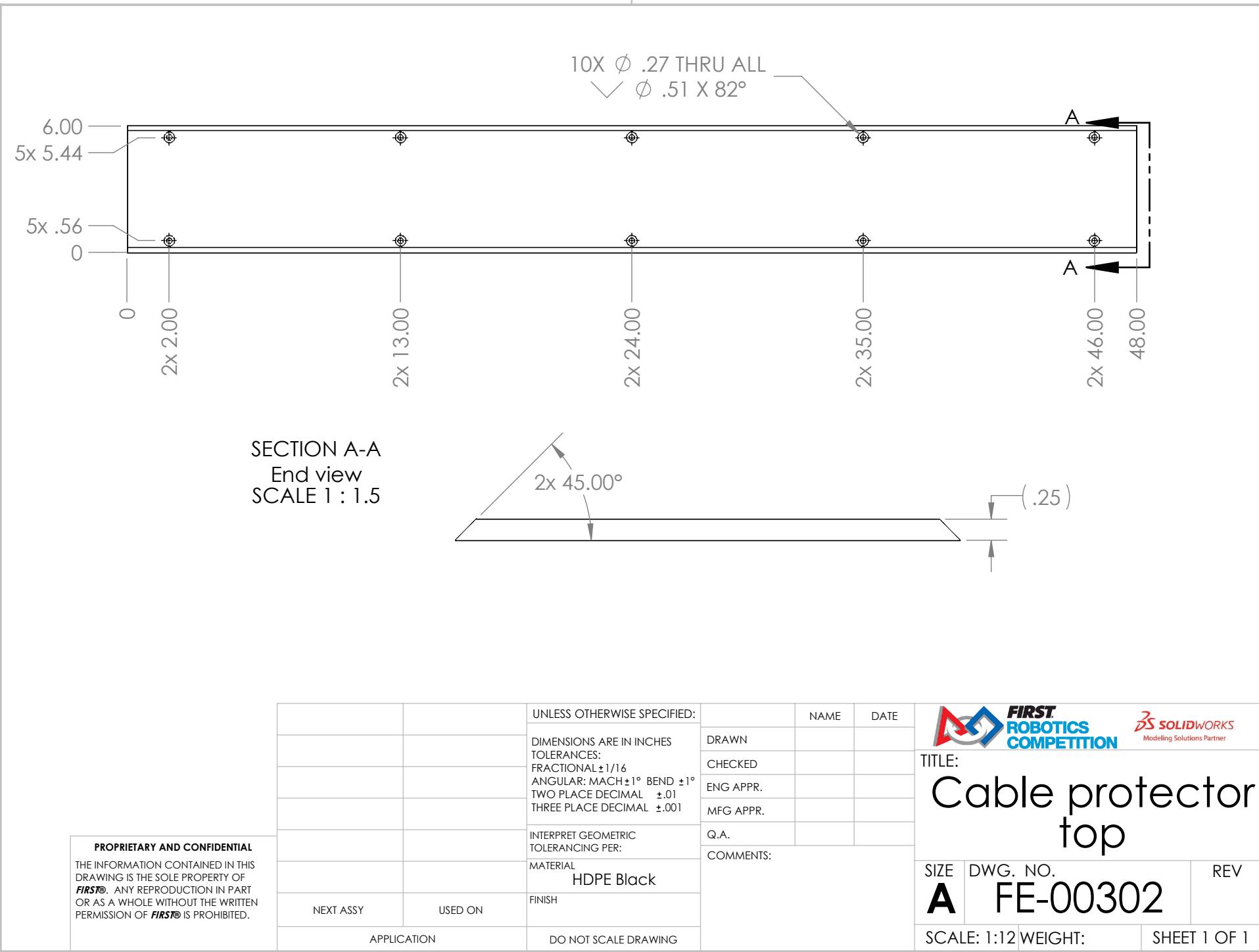
SCALE: 1:12 WEIGHT: SHEET 1 OF 1

2

1

2

1



2

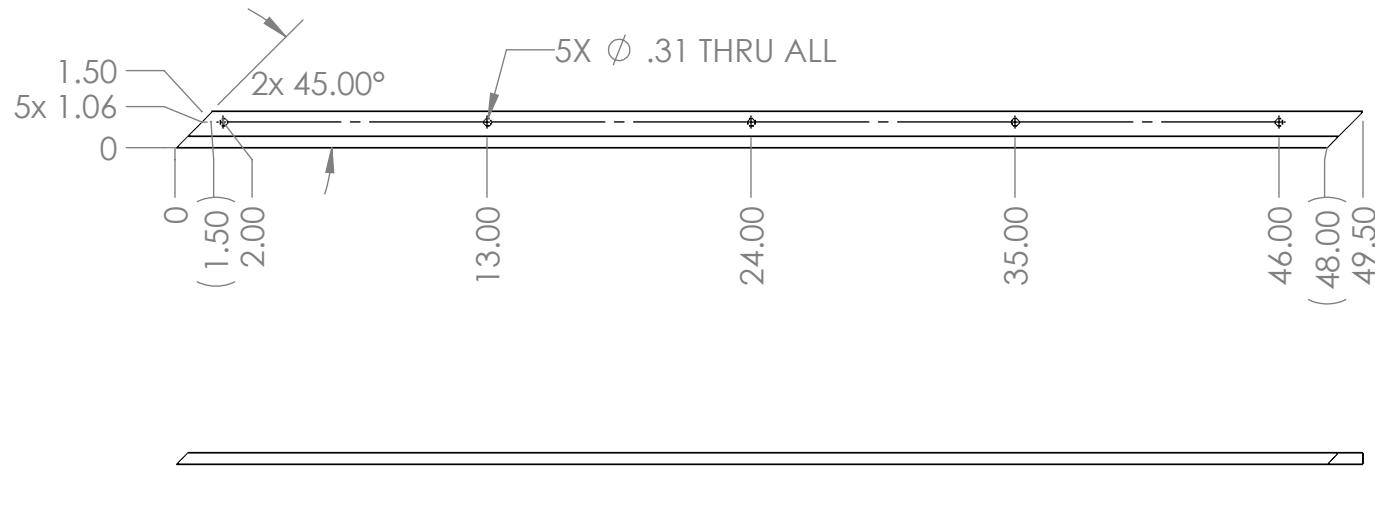
1

2

1

B

B



A

A

		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED	ENG APPR.	MFG APPR.
		MATERIAL HDPE Black		Q.A.	COMMENTS:	
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS
DRAWING IS THE SOLE PROPERTY OF
FIRST[®]. ANY REPRODUCTION IN PART
OR AS A WHOLE WITHOUT THE WRITTEN
PERMISSION OF **FIRST[®]** IS PROHIBITED.

 **FIRST
ROBOTICS
COMPETITION**  **SOLIDWORKS**
Modeling Solutions Partner

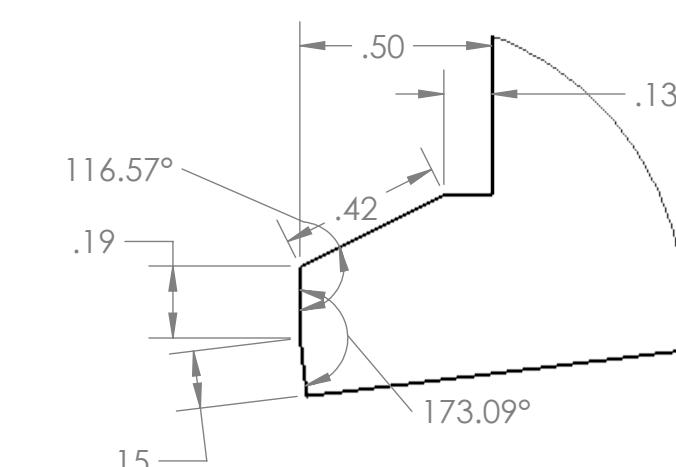
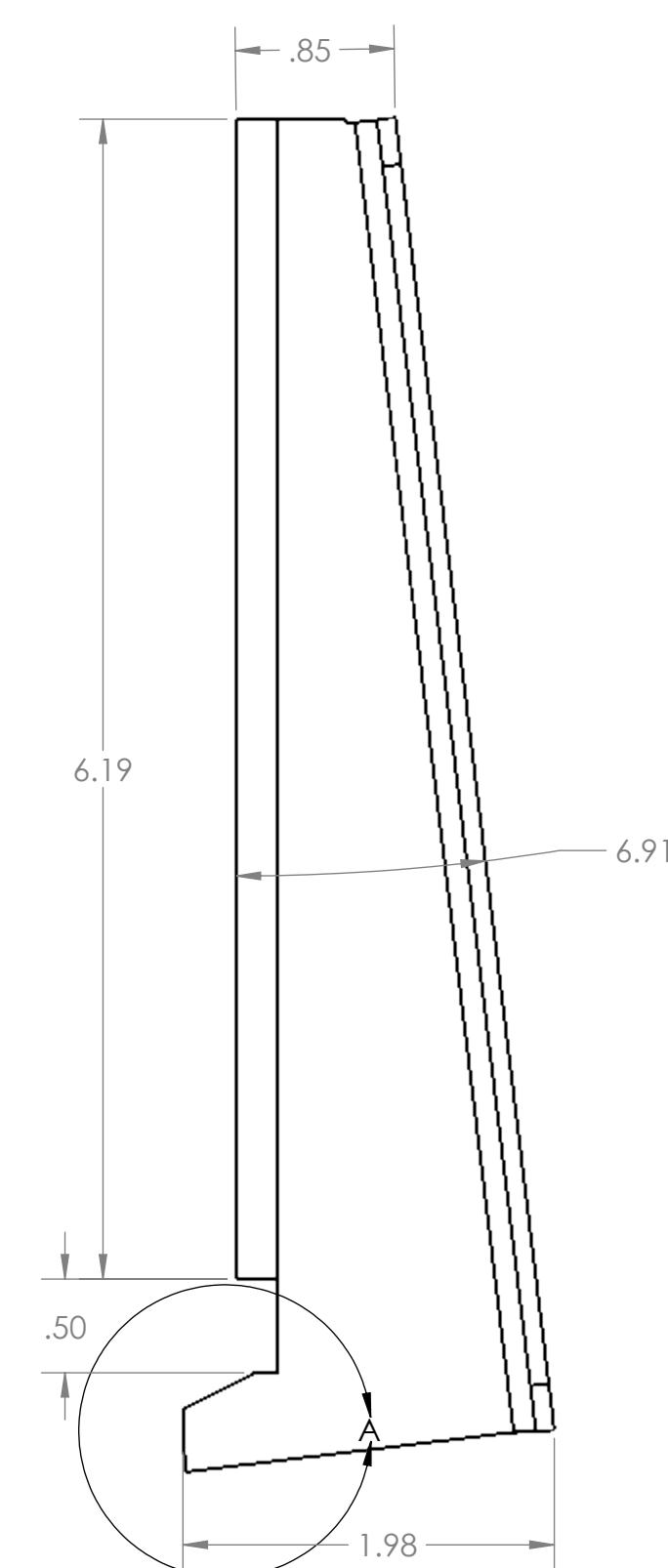
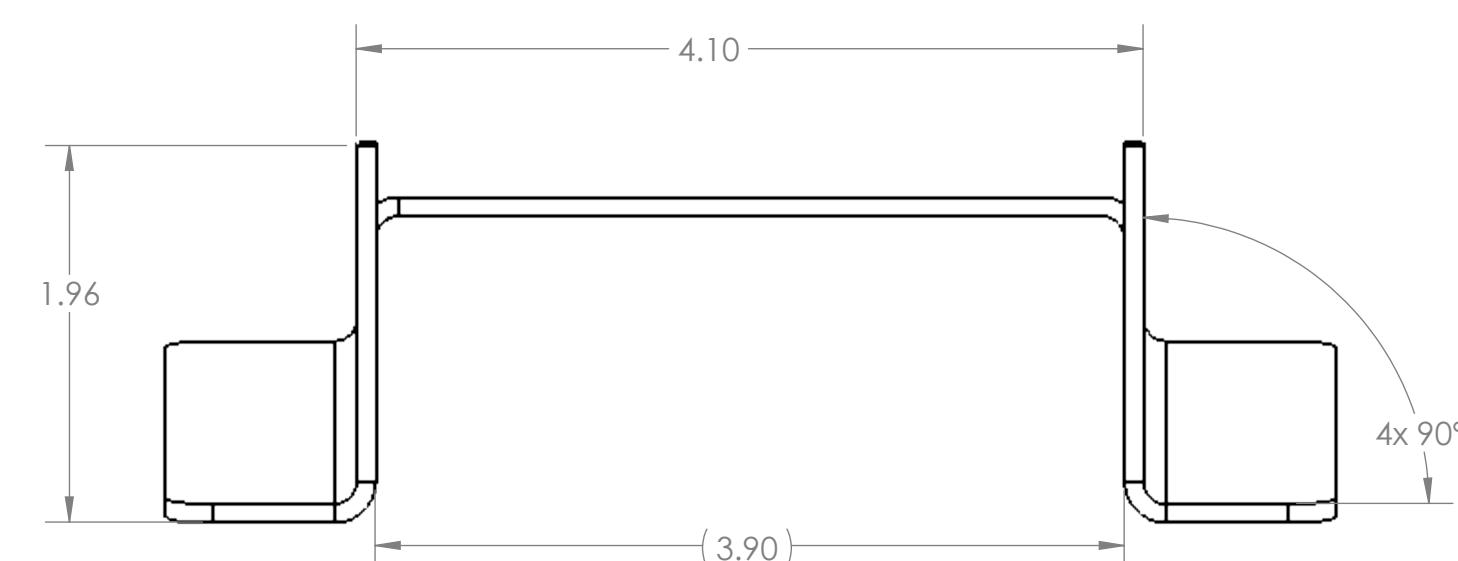
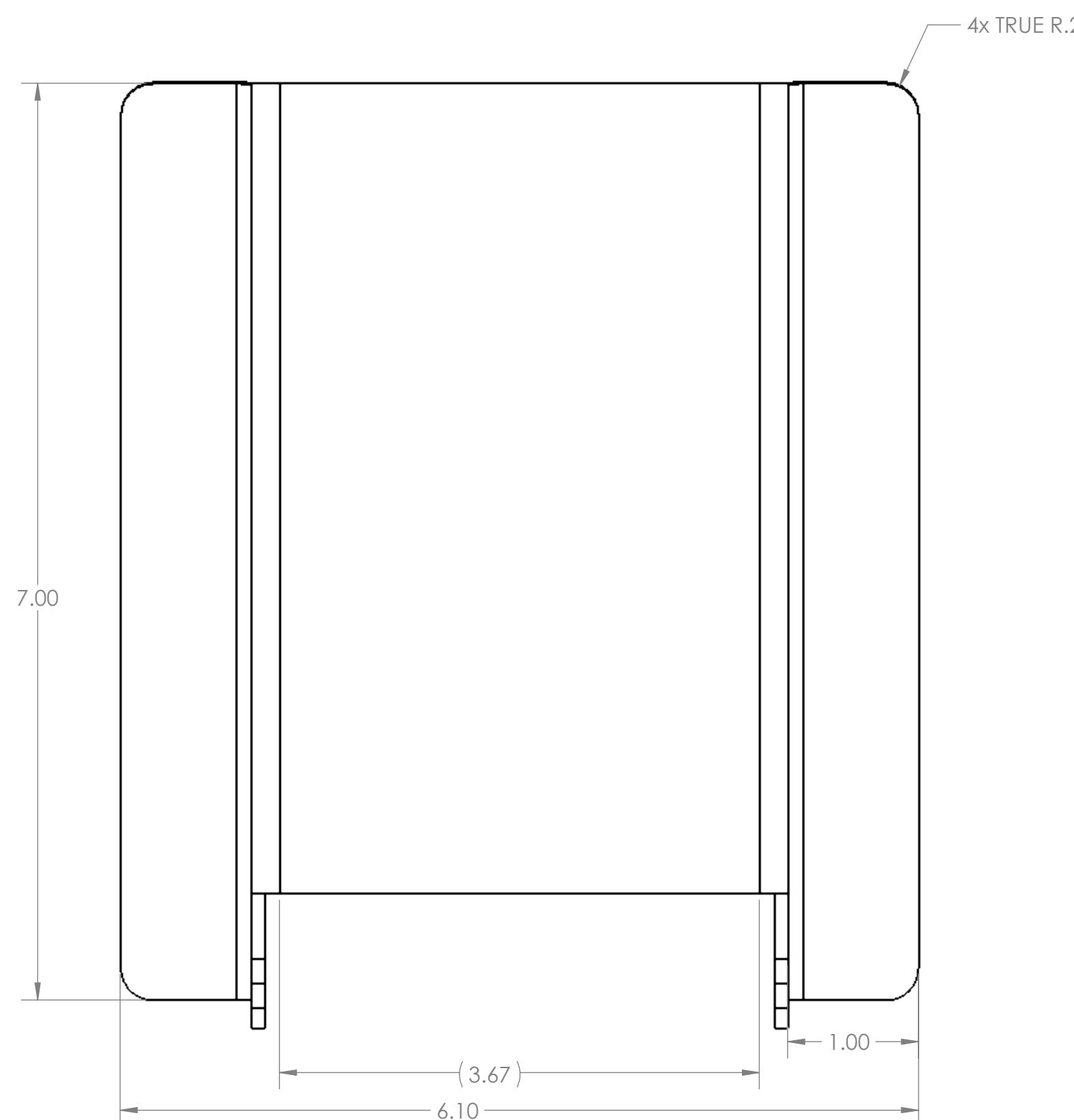
TITLE: Side angle right

SIZE	DWG. NO.	REV
A	FE-00303	
SCALE: 1:12	WEIGHT:	SHEET 1 OF 1

2

1

D



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .02$ THREE PLACE DECIMAL $\pm .010$

MATERIAL/FINISH:

12 gau steel powder coated black

DO NOT SCALE DRAWING

BEND

DRAWN

NAME

NW

DATE

7/8/2021

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

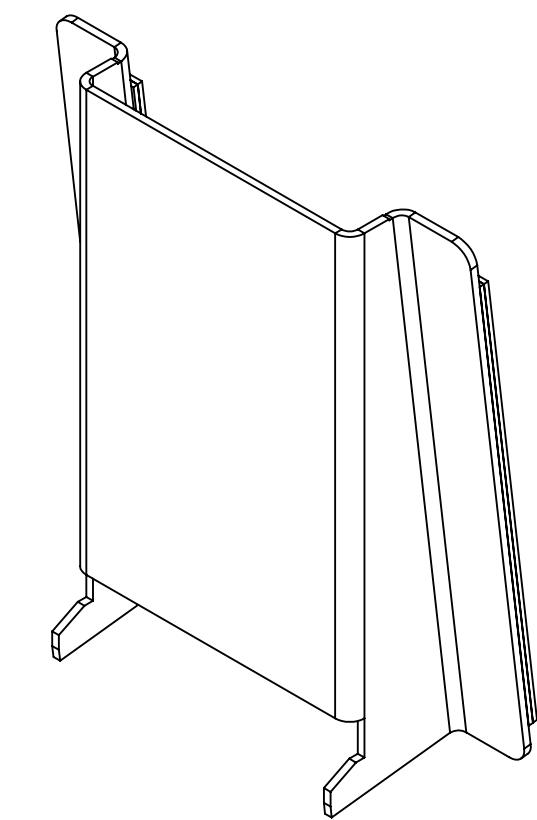
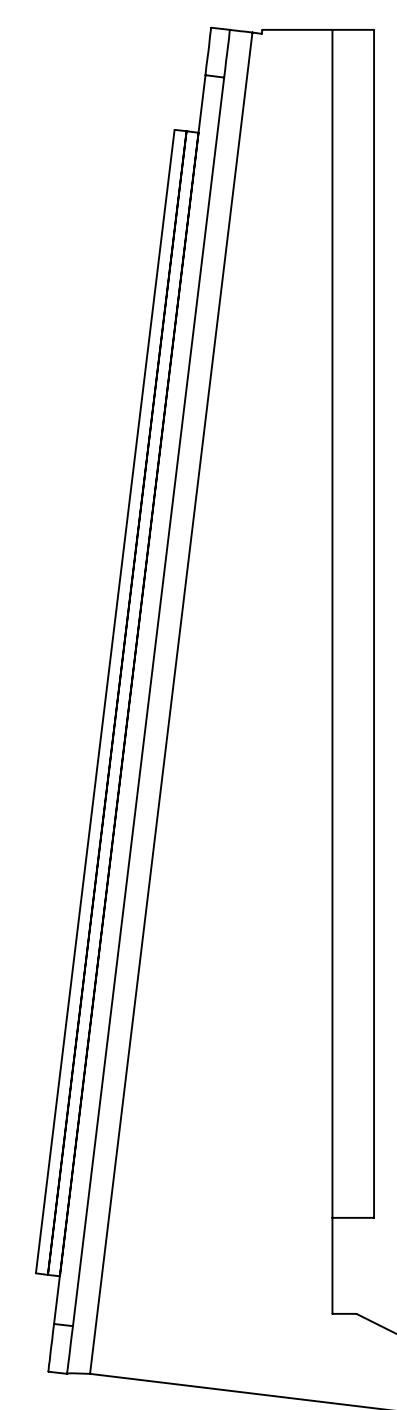
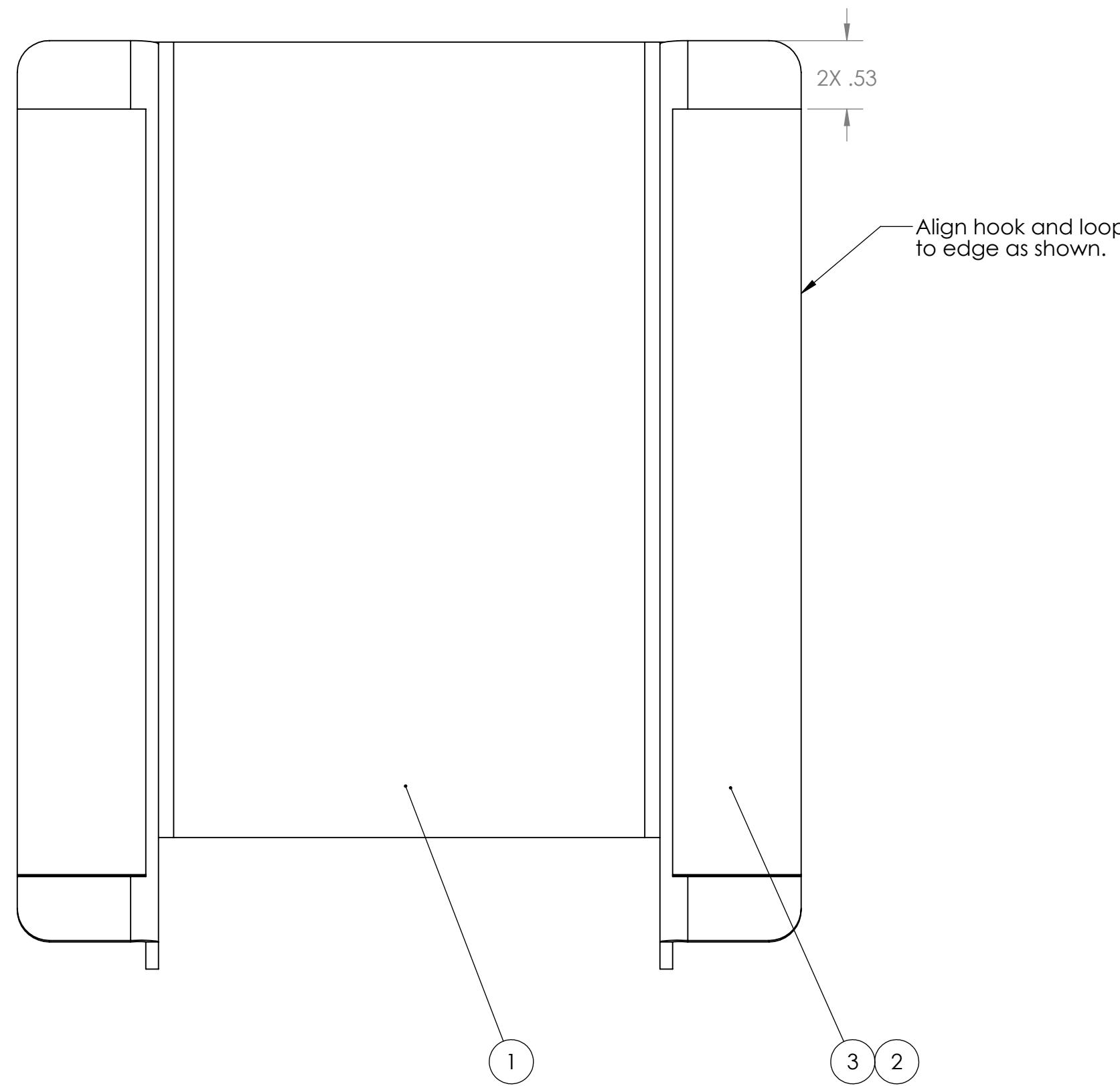
REMOVE ALL BURRS AND SHARP EDGES.



TITLE: Cable protector exit segment

SIZE DWG. NO. REV
C FE-00304

SCALE: 1:1 SHEET 1 OF 1



Assembly Notes:

1. Apply hook fastener to FE-00304.
2. Apply loop fastener to the hook fastener, but leave the plastic backing on the adhesive until assembly on the field

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL $\pm 1/2$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .50$

MATERIAL/FINISH:

DO NOT SCALE DRAWING

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FE-00304	Cable protector exit segment	1
2	Hook_1_6	1" x 6" Hook, Adhesive Backed	2
3	Loop_1_6	1" x 6" Loop, Adhesive Backed	2

FIELD	NAME	DATE
DRAWN	DF	1/5/2022

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



TITLE: Cable protector exit segment with hook

SIZE DWG. NO. REV

C FE-00305

SCALE: 1:1 SHEET 1 OF 1