German University in Cairo

Mechatronics Lab (MCTR704)

Metro Slinding Doors

Project No. [49]

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Name: …Omar Montasser Ahmed…… I.D. #:52-14724…Group: .T-32.

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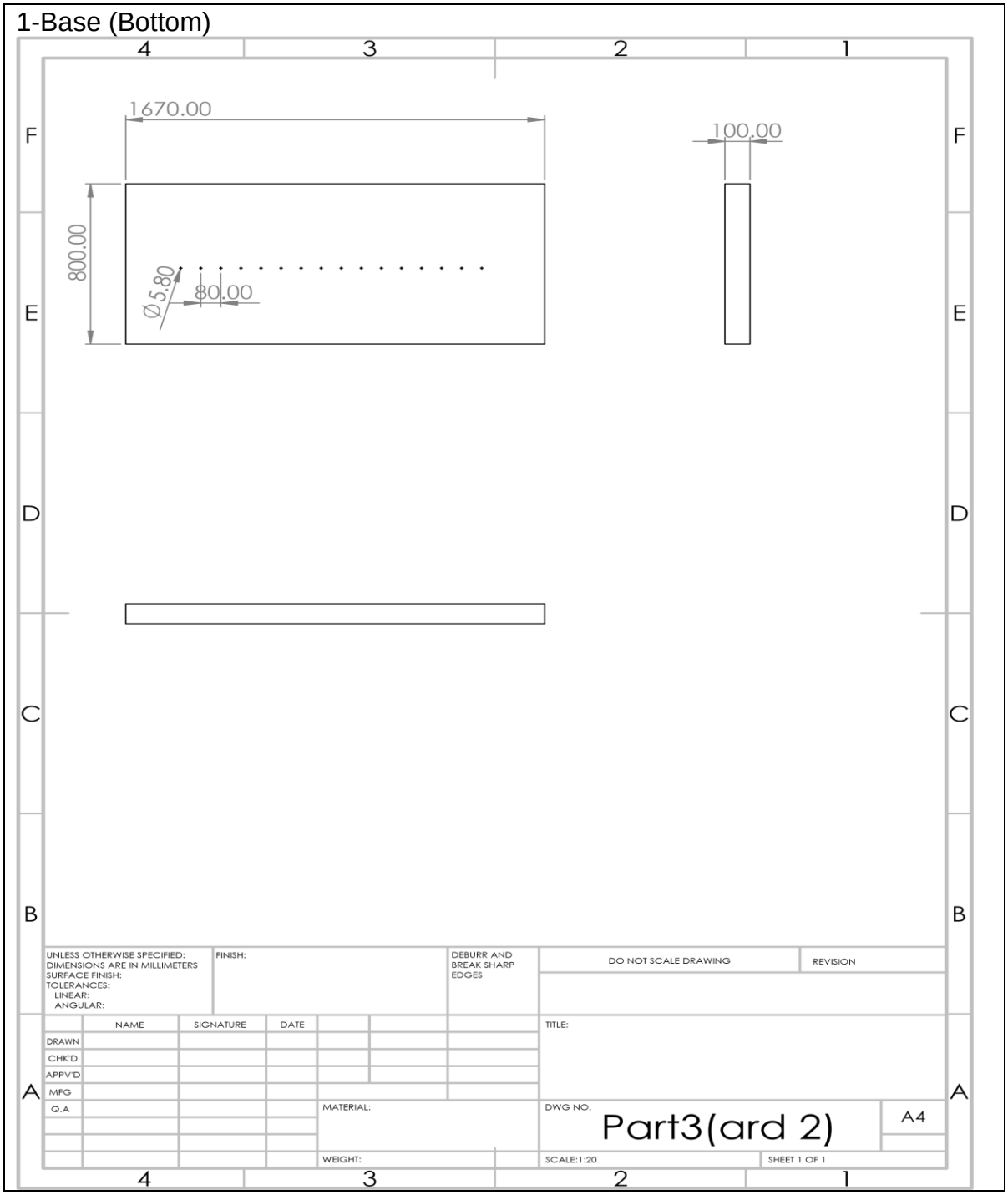
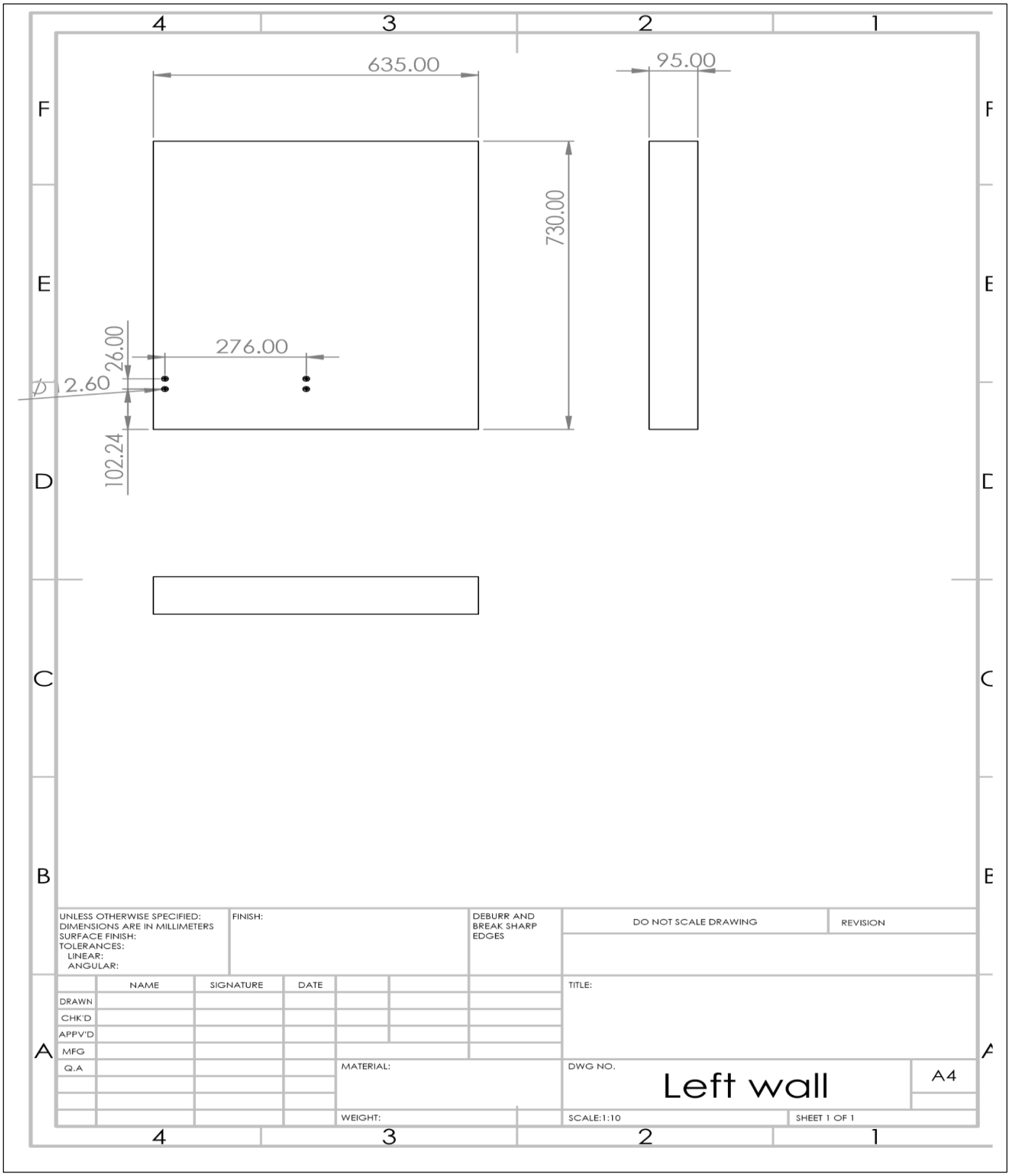
Mechanical Components 2D Projections with Dimensions

1-Base (Bottom)



2-Left Wall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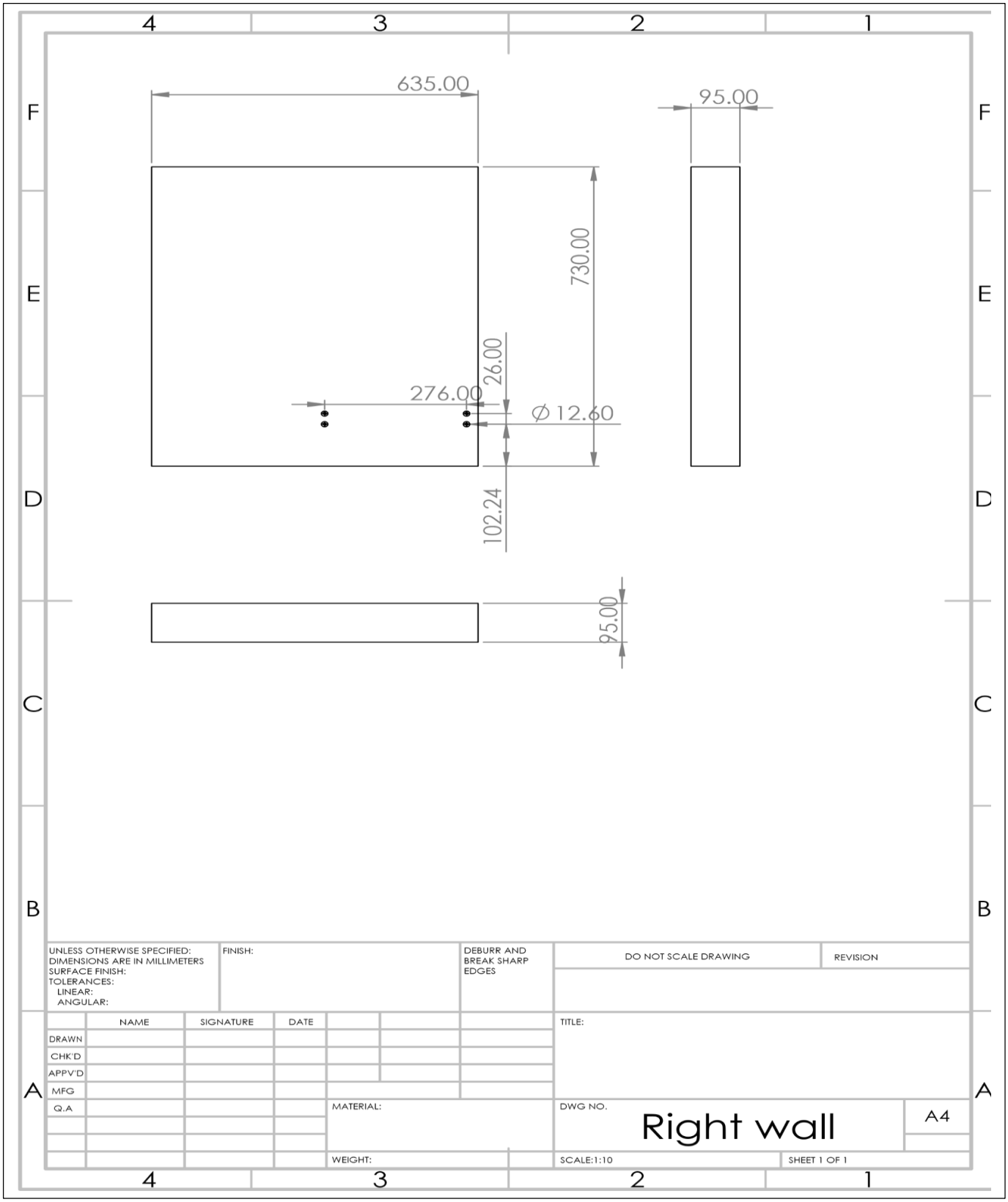
TOLERANCES:
LINEAR:
ANGULAR:
FINISH:
DEBURR AND BREAK SHARP EDGES
DO NOT SCALE DRAWING
REVISION
NAME
SIGNATURE
DATE
DRAWN
CHK'D
APPV'D
MFG
Q.A
TITLE:
MATERIAL:
DWG NO.
Left wall
A4
WEIGHT:
SCALE:1:10
SHEET 1 OF 1

2-Right Wall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APPV'D
MFG
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MATERIAL:
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Right wall
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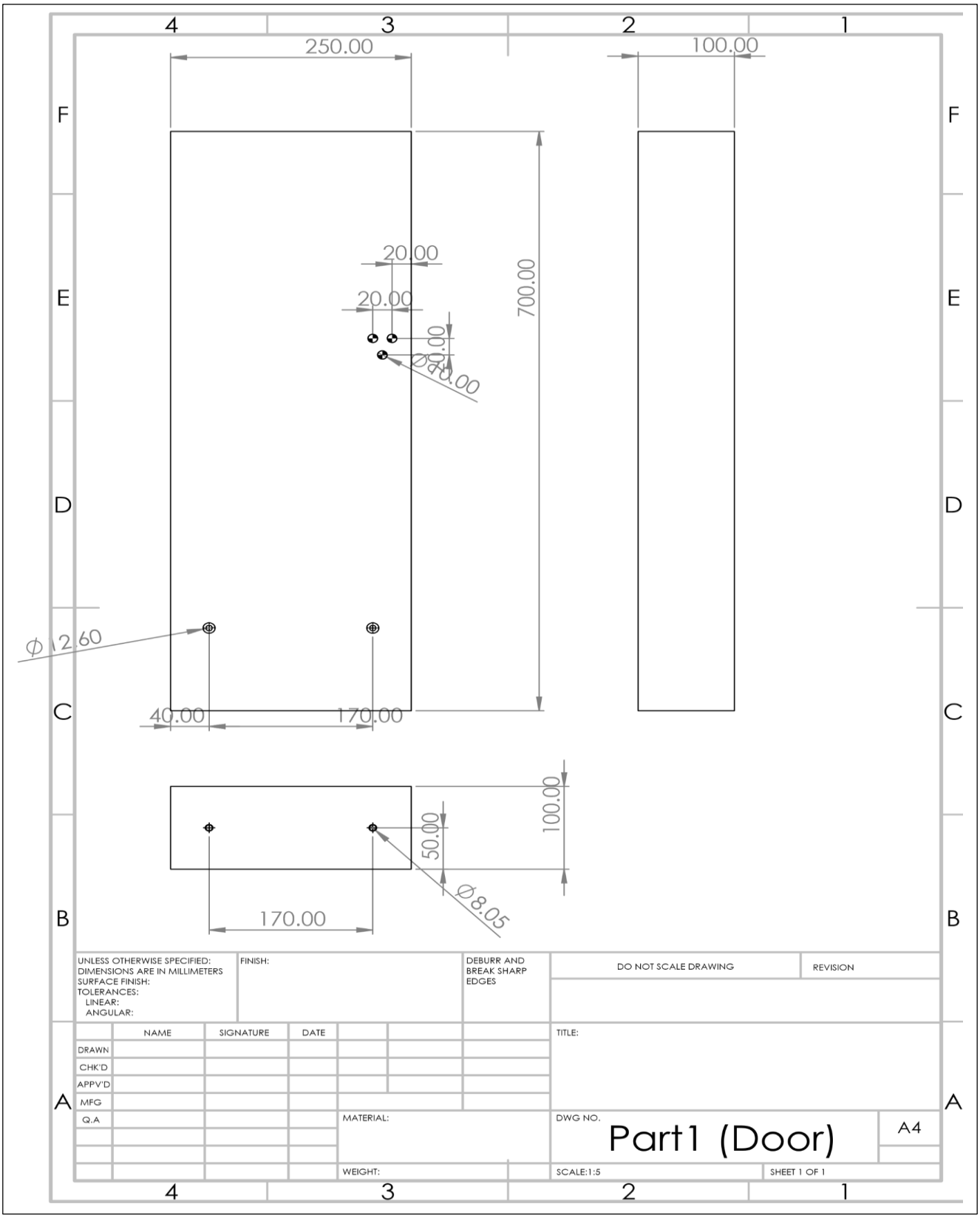
WEIGHT:
SCALE:1:10
SHEET 1 OF 1

3-Door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DATE
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CHK'D
APPV'D
MFG
Q.A
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DWG NO.
Part1 (Door)
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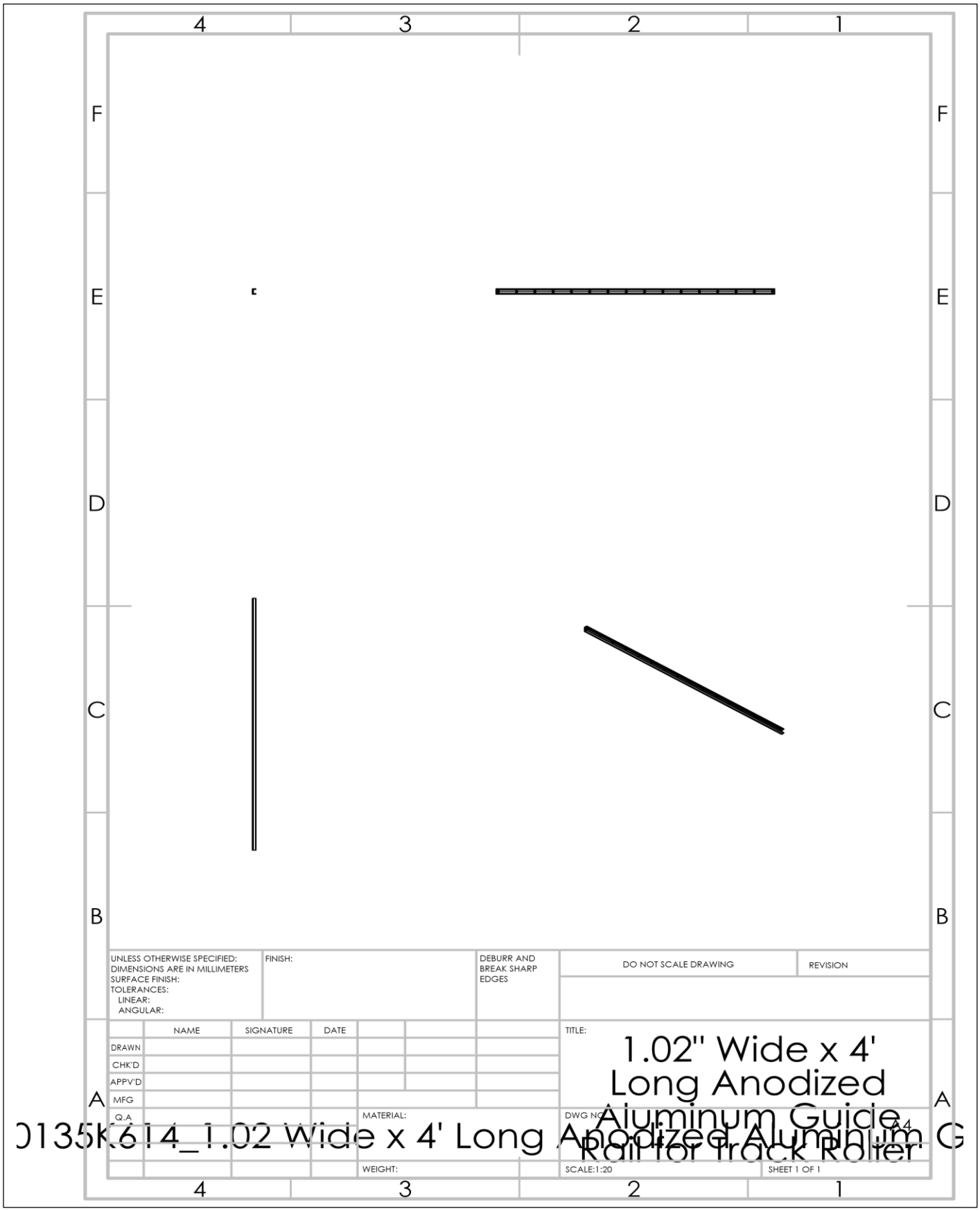
SCALE:1:5
SHEET 1 OF 1

4-Rail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REVISION
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DRAWN
CHK'D
APPV'D
MFG
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MATERIAL:
WEIGHT:
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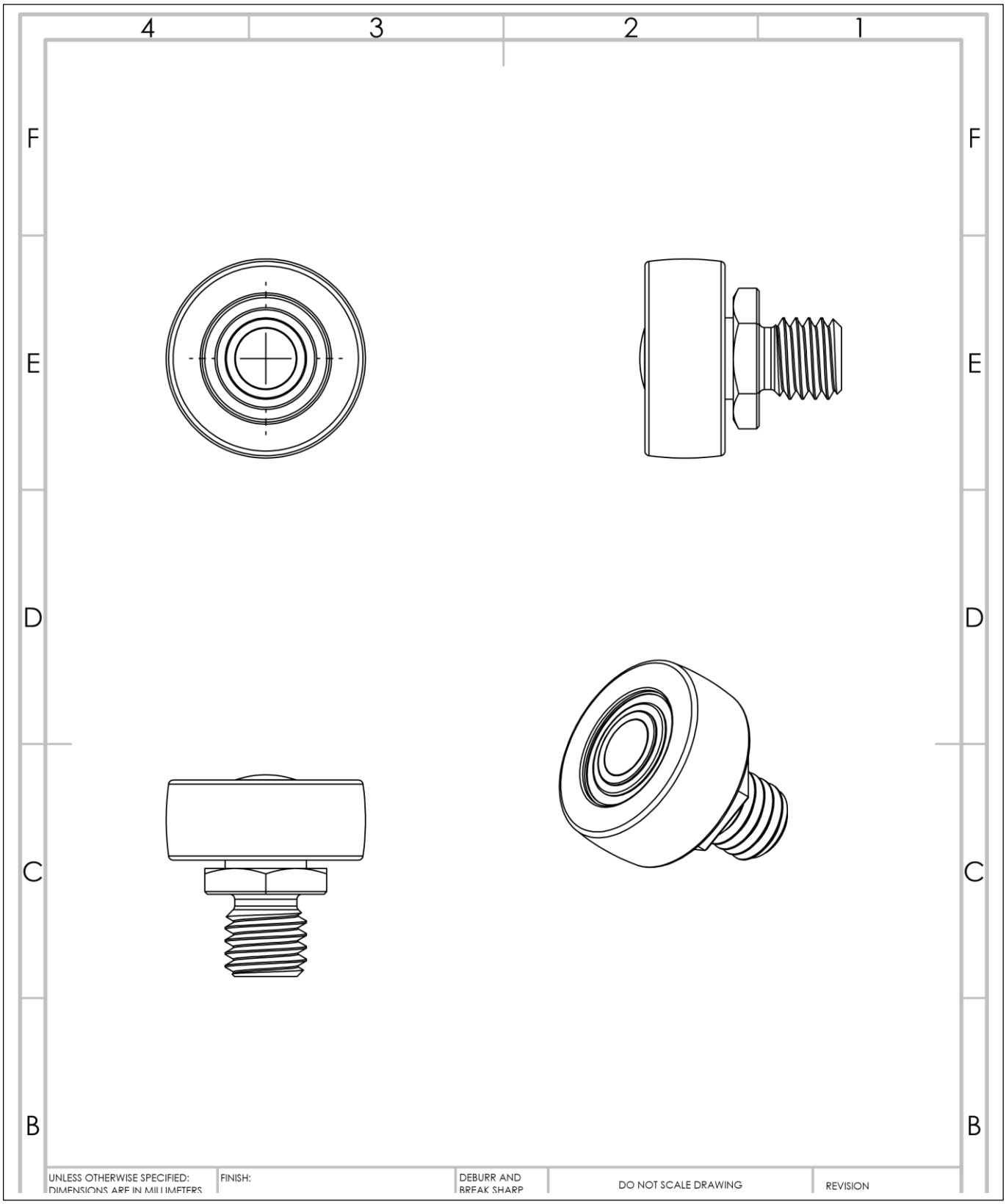
DWG NO.
SCALE:1:20
SHEET 1 OF 1
0135K614_1.02 Wide x 4' Long Anodized Aluminum G

5-Roller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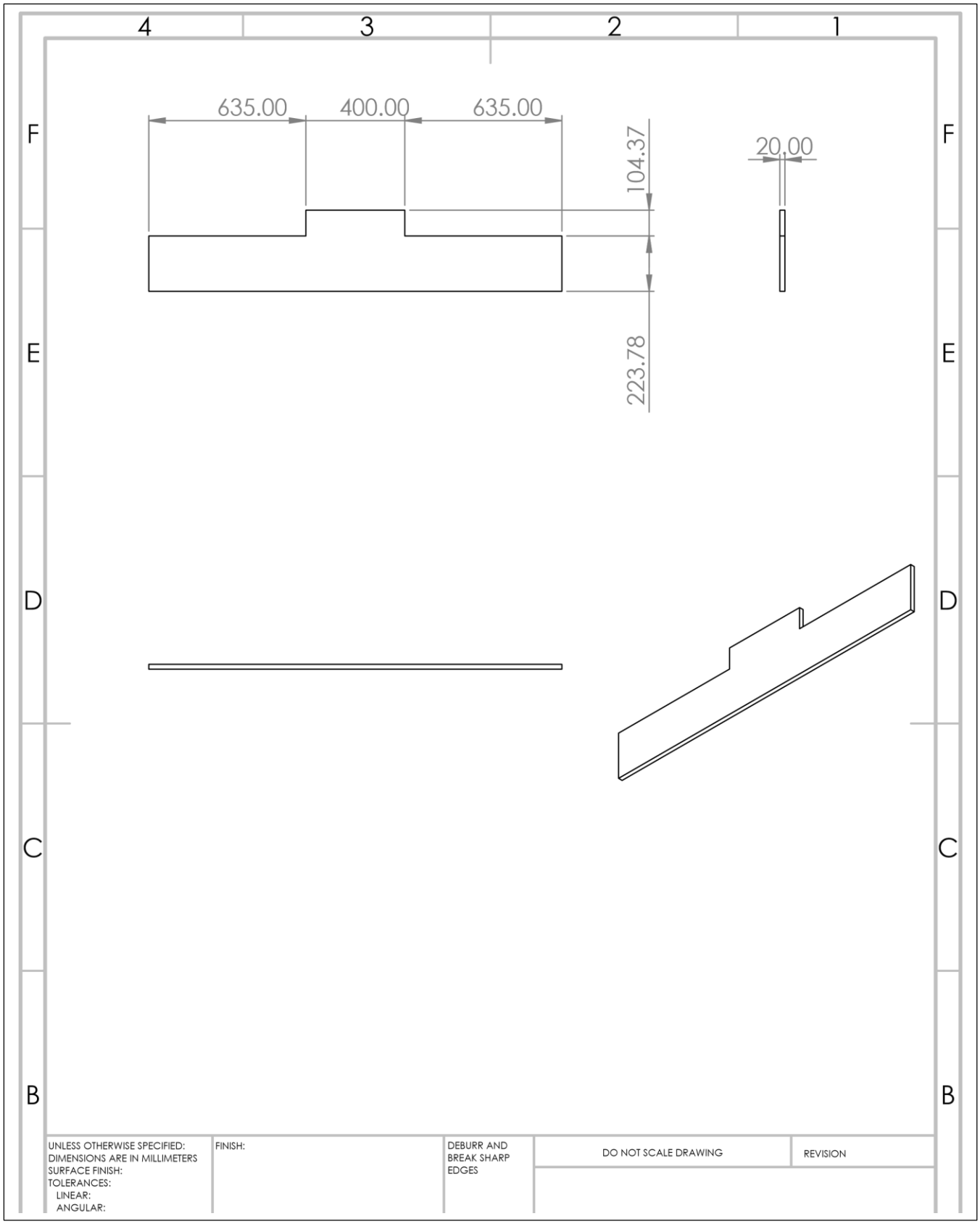
BREAK SHARP
DO NOT SCALE DRAWING
REVISION

6-Base(Top)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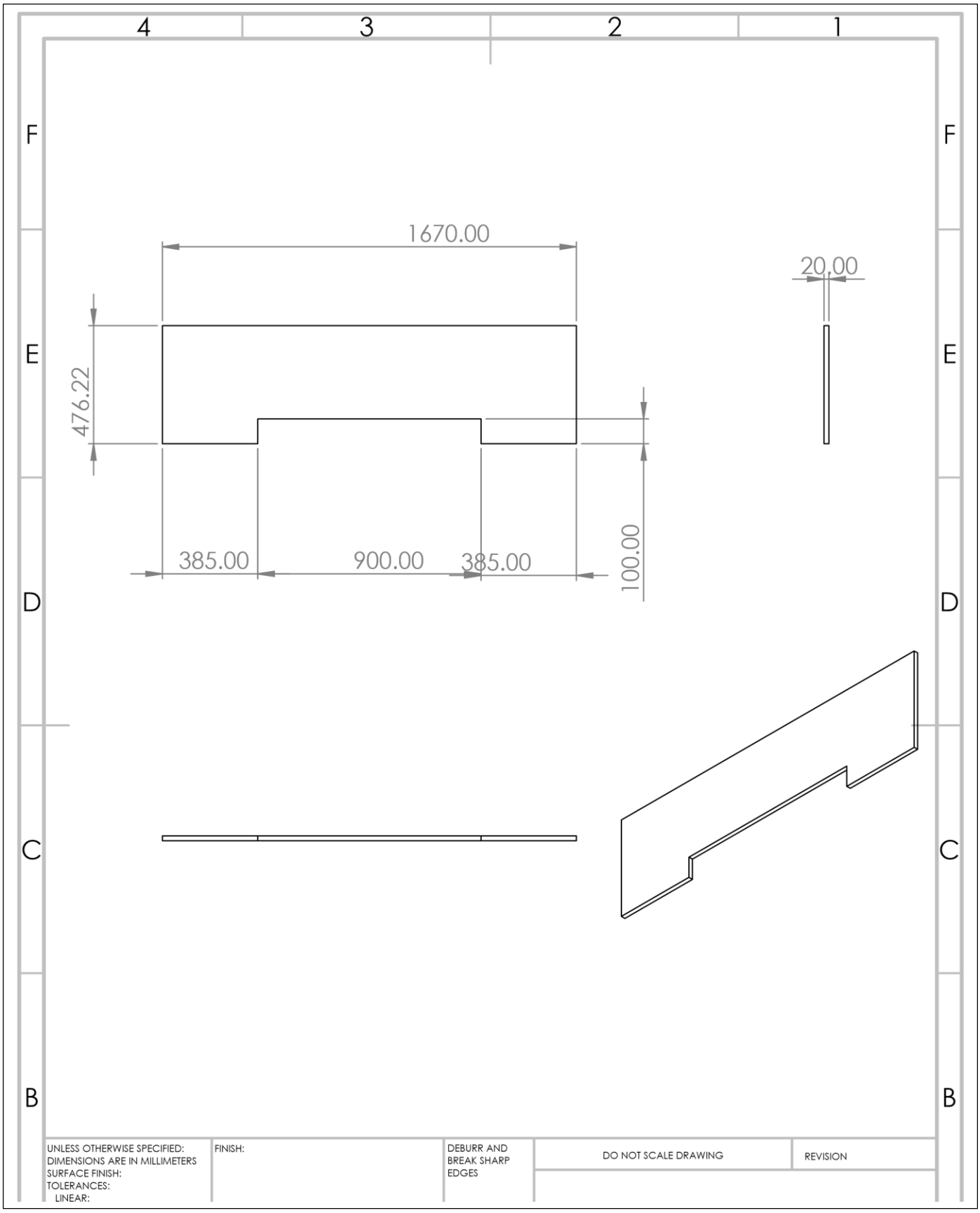
DEBURR AND
BREAK SHARP
EDGES
DO NOT SCALE DRAWING
REVISION

6-Base(Top)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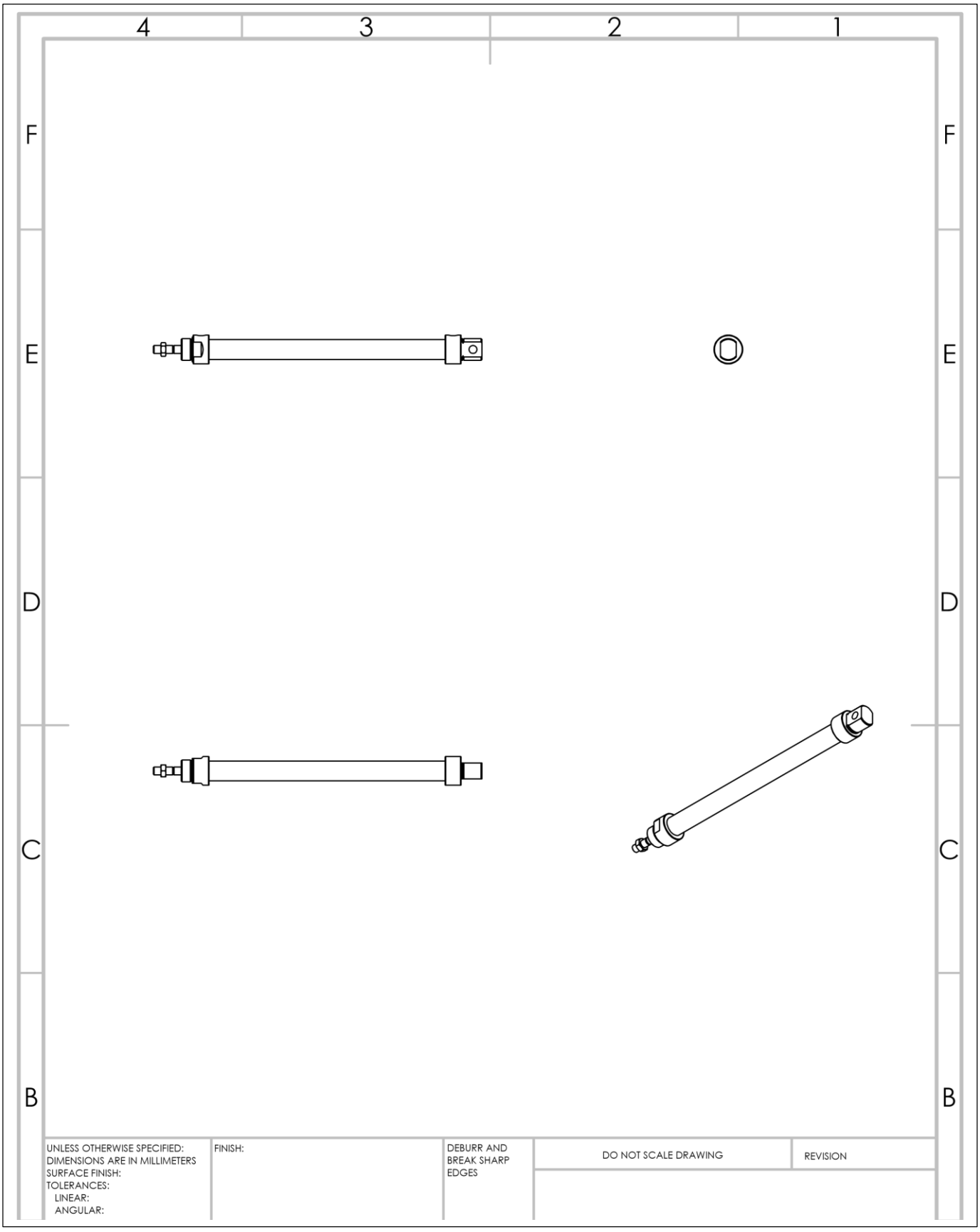
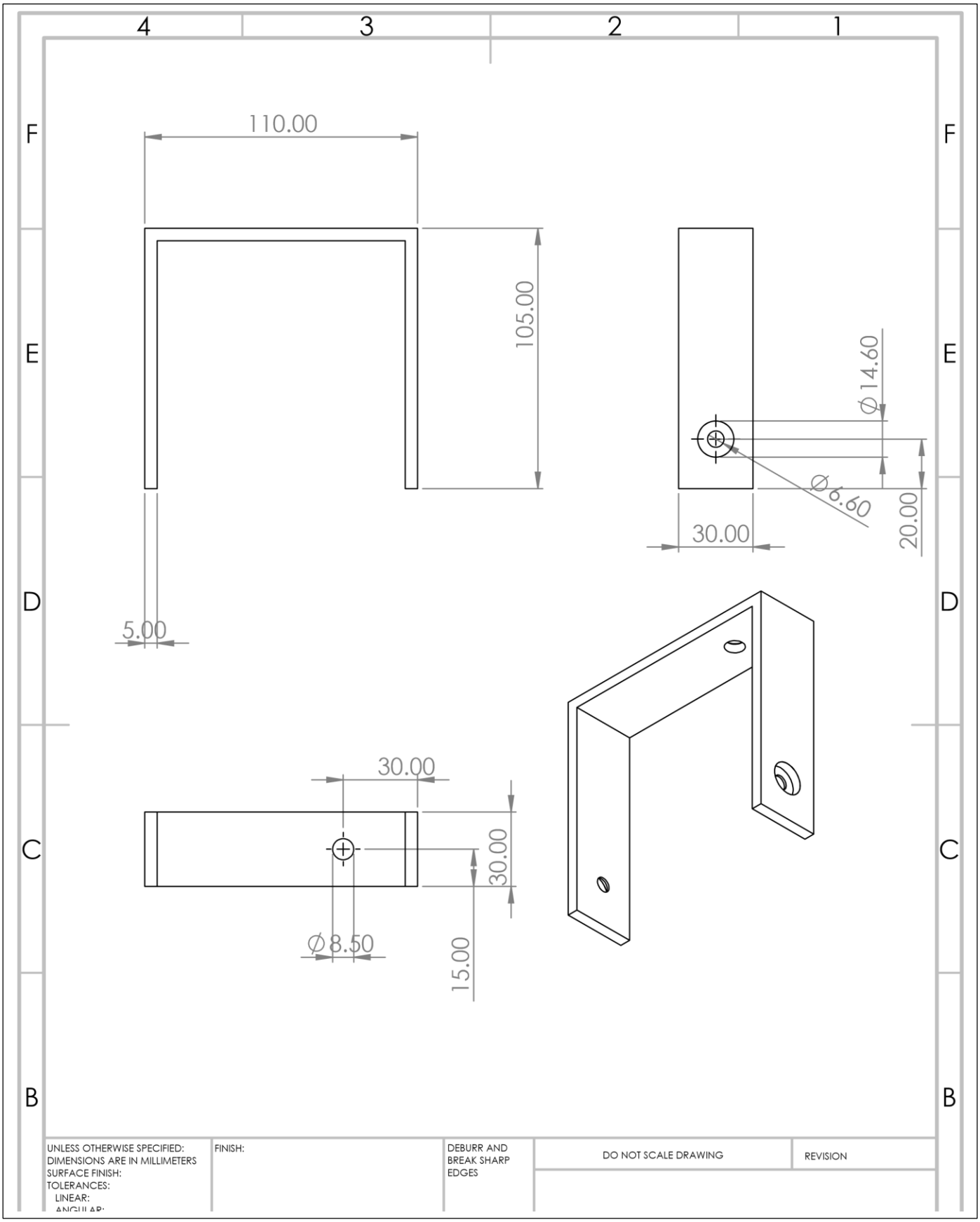
TOLERANCES:
LINEAR:
FINISH:
DEBURR AND
BREAK SHARP
EDGES
DO NOT SCALE DRAWING
REVISION

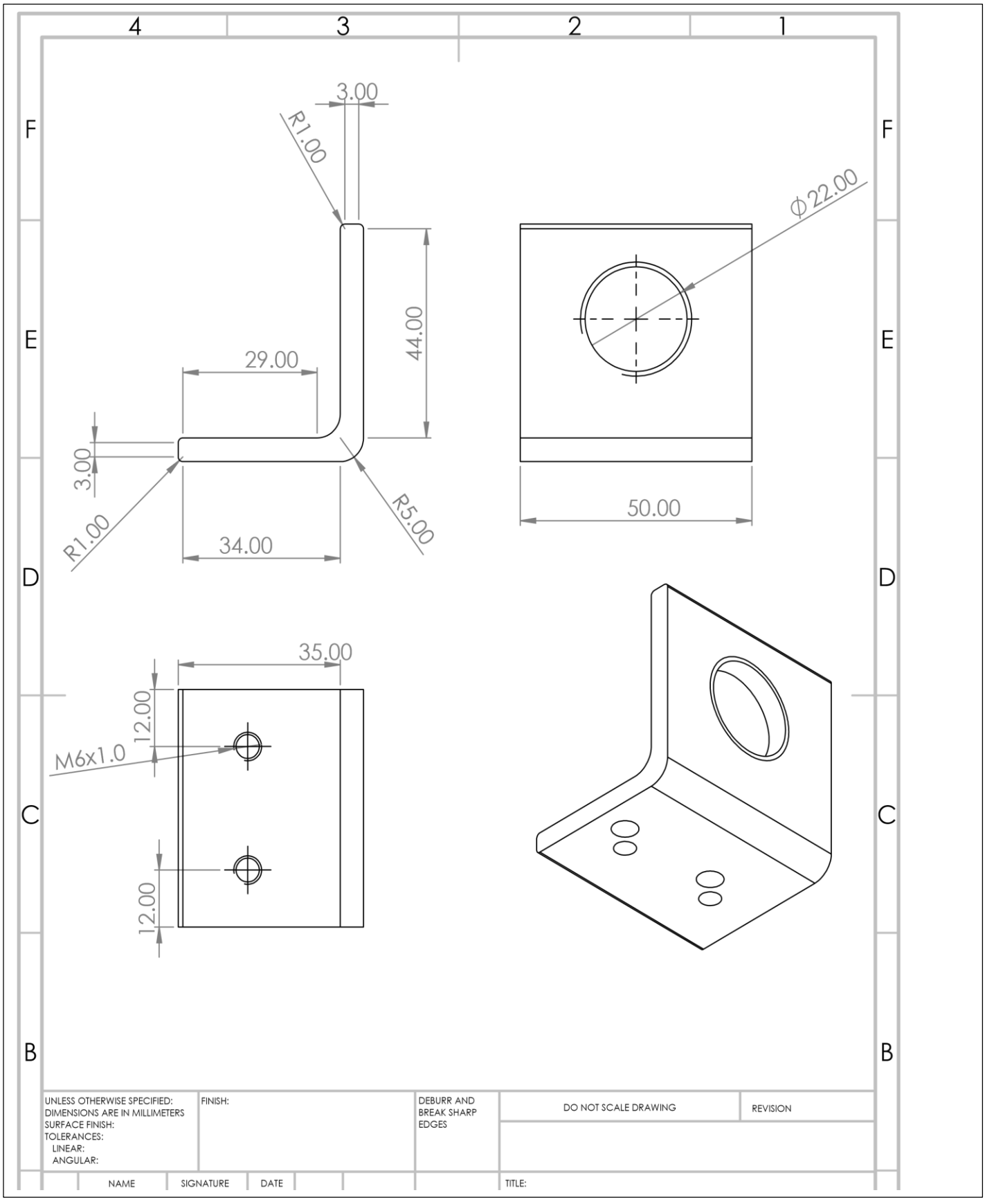
7-Pneumatic Cylinder with stroke (MAL 20*200-S)



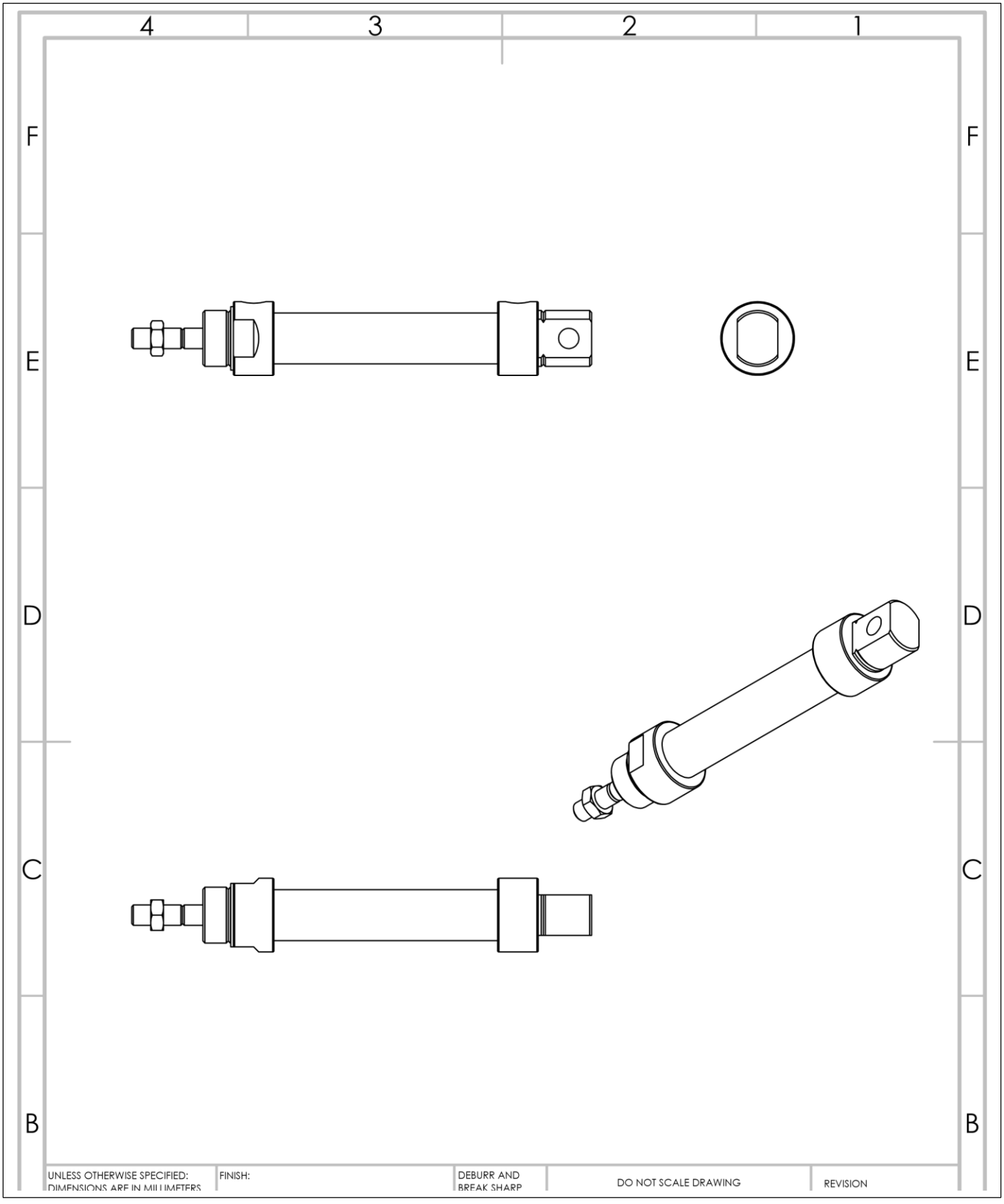
8-Clevis Rod ends



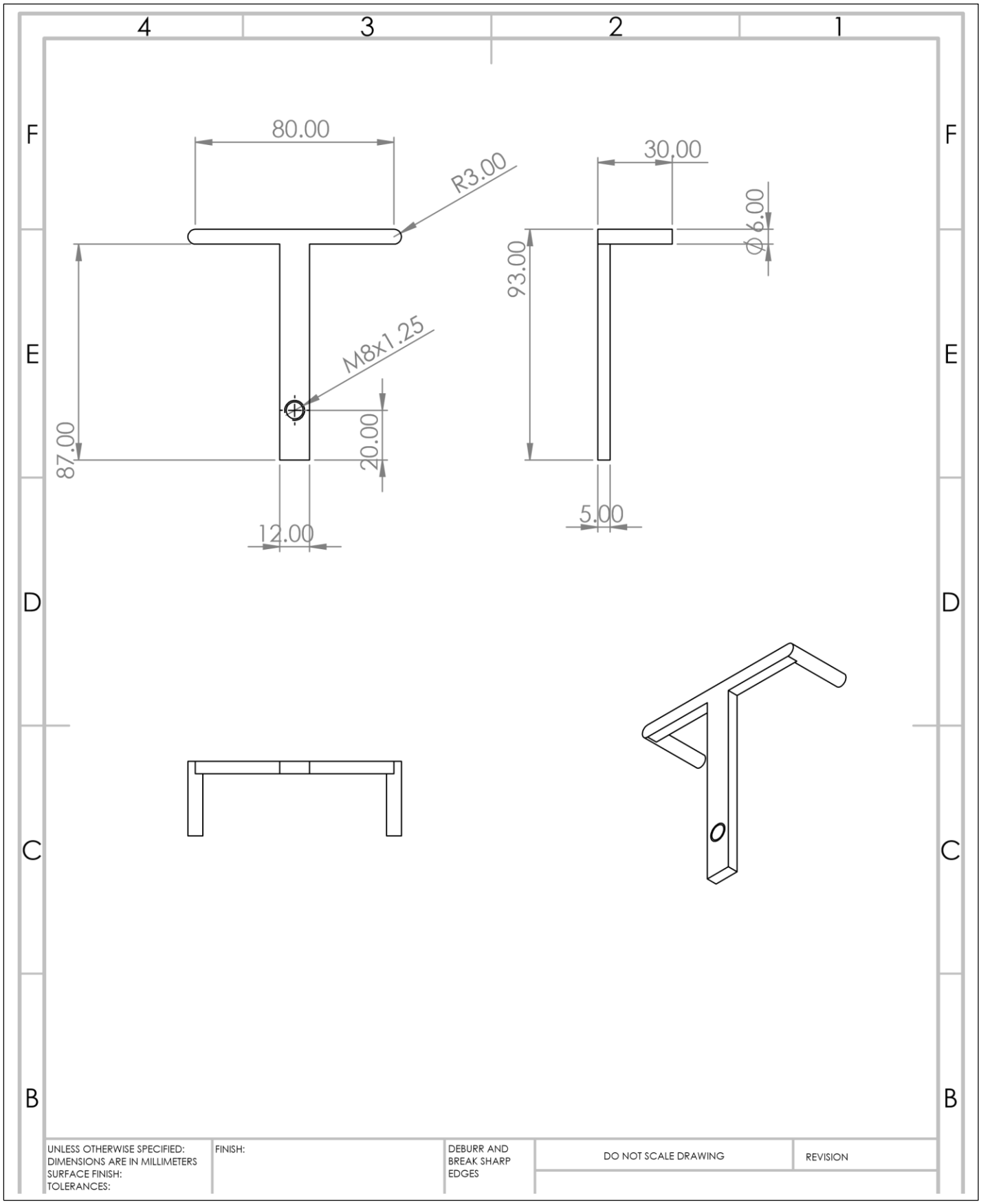
9-Cylinder Fixers



10-Pneumatic Cylinder with stroke (TGM 20*50-S)



11-Lock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93.00
M8x1.25
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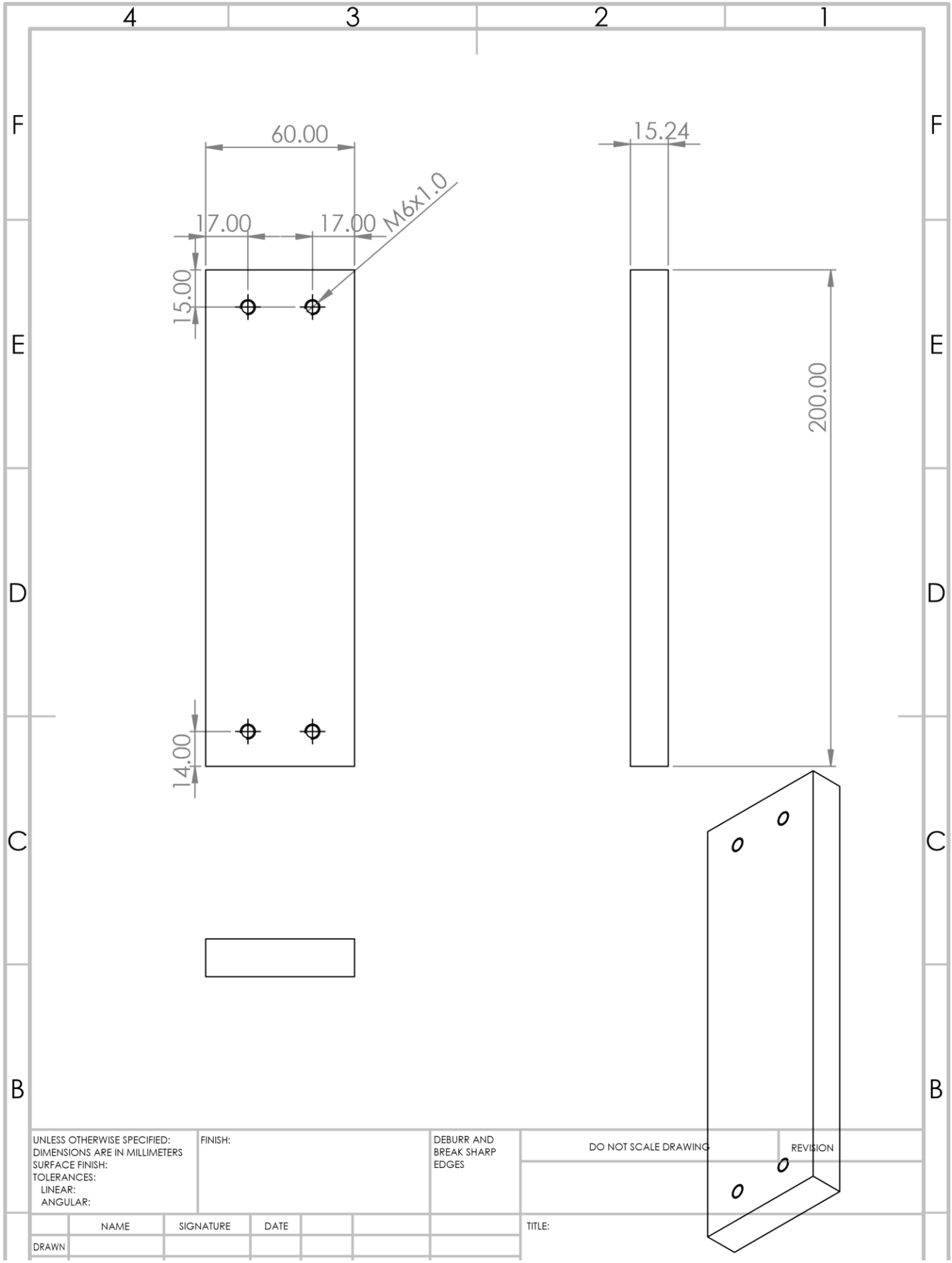
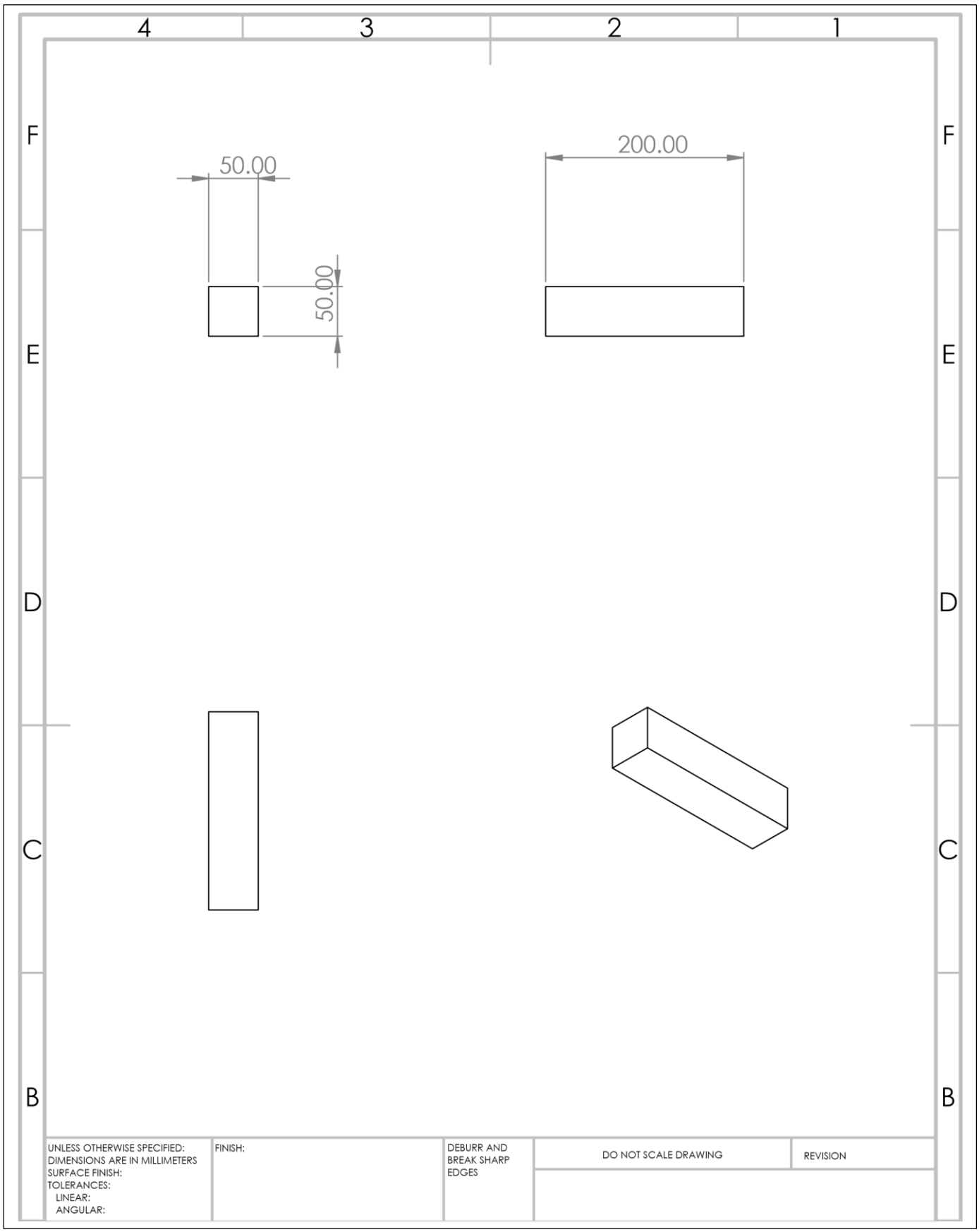
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
FINISH:
DEBURR AND
BREAK SHARP
EDGES
DO NOT SCALE DRAWING
REVISION

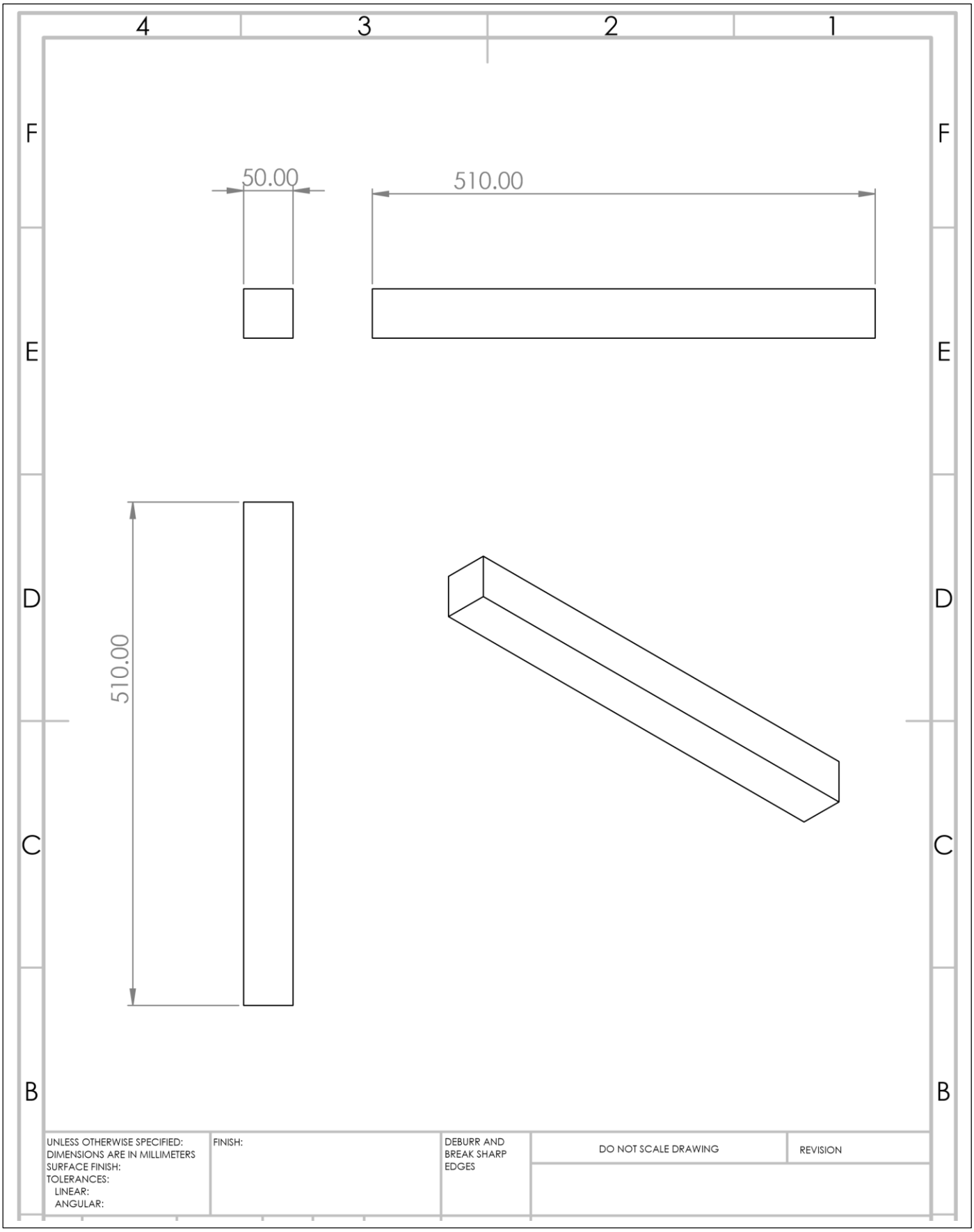
12-Support To Fix the cylinder



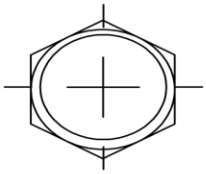
13-Small Fixing block

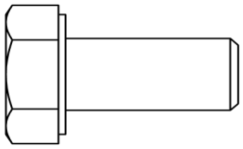


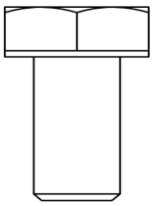
14-Fixing Block

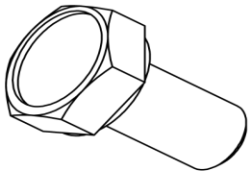


15-Bolts(M6)



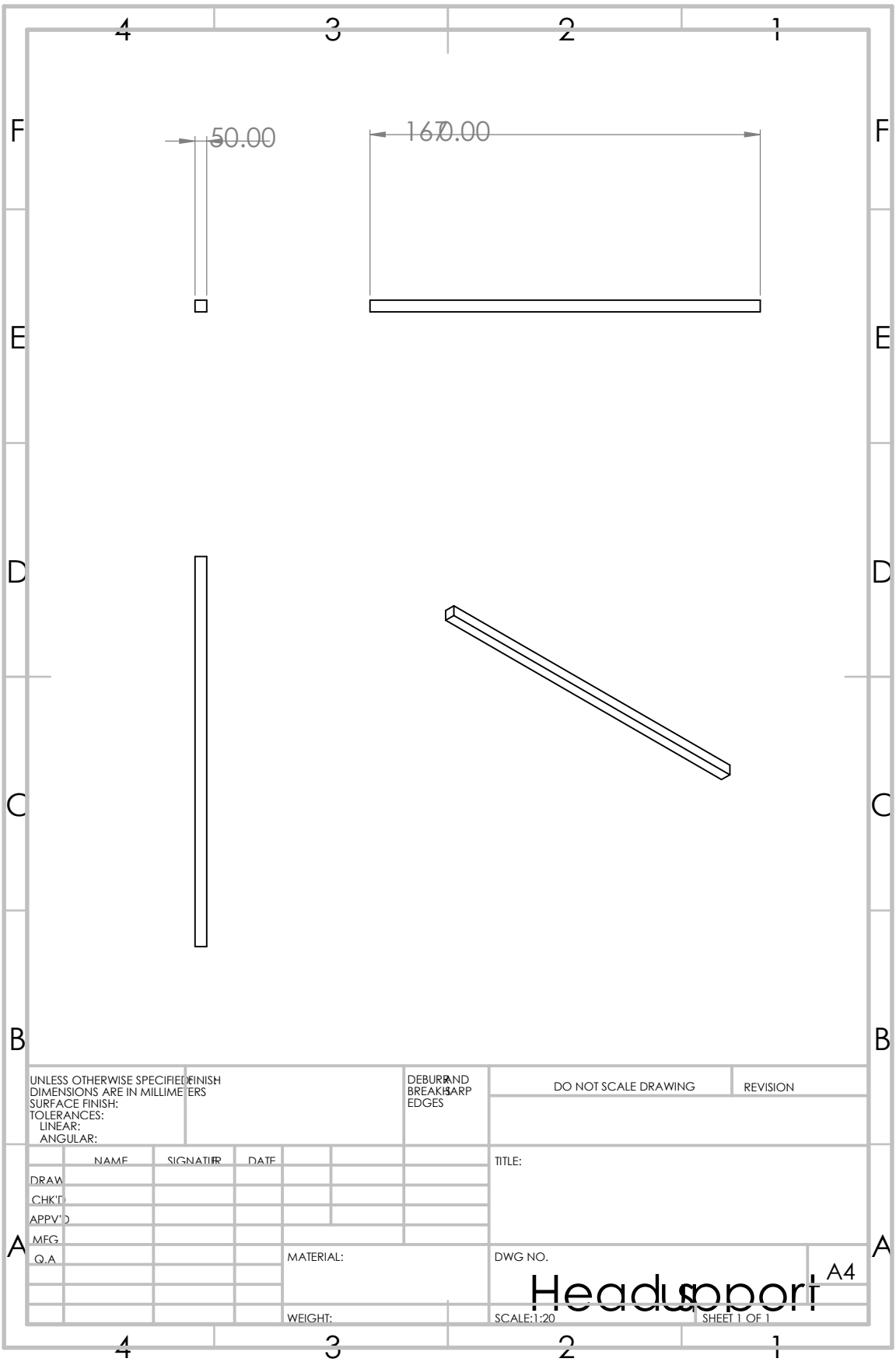




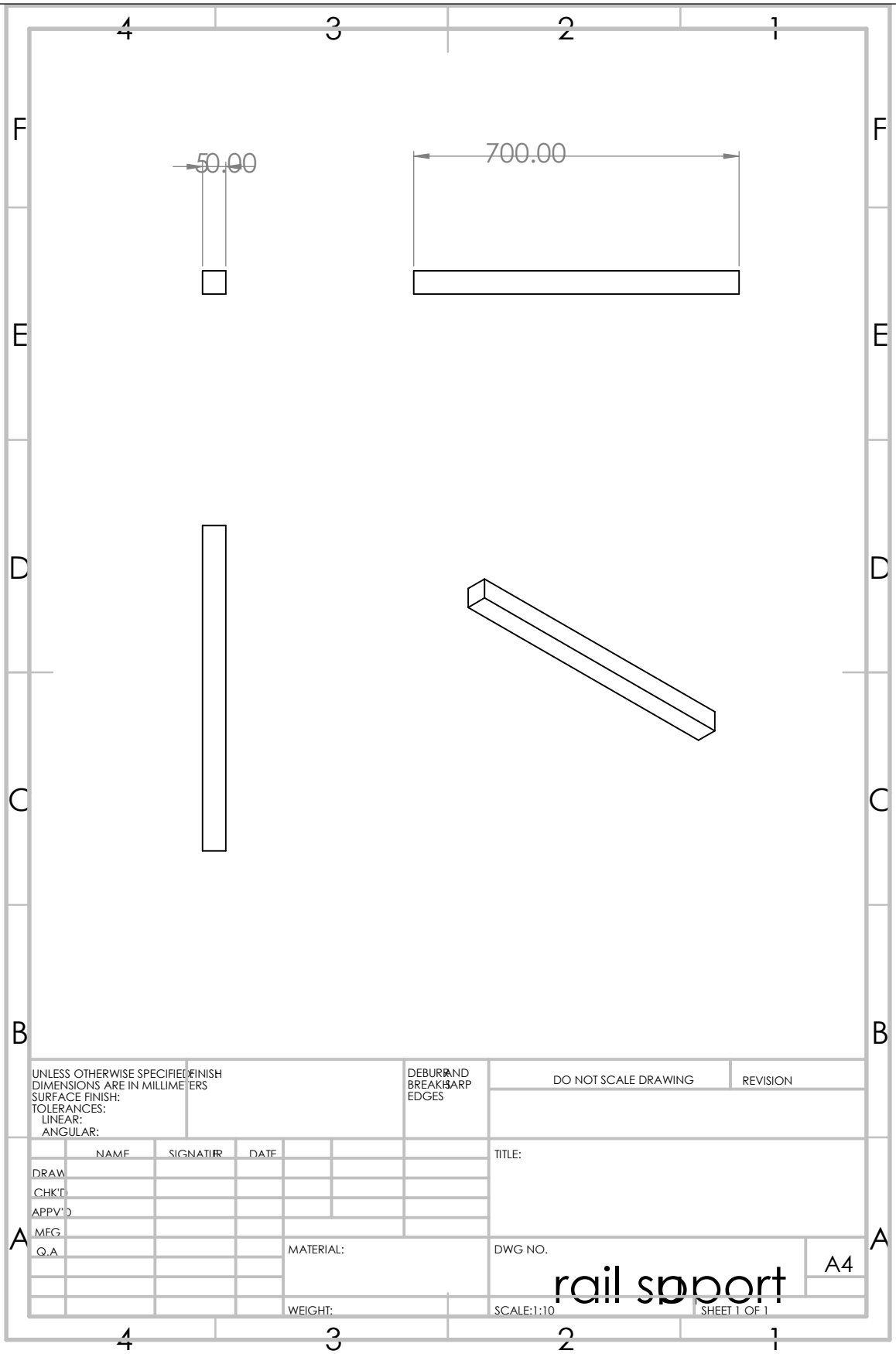


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN							
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO.	A4
						B18.2.3.2M - Formed hex screw, M6 X 1.0	
				WEIGHT:		SCALE:2:1	SHEET 1 OF 1

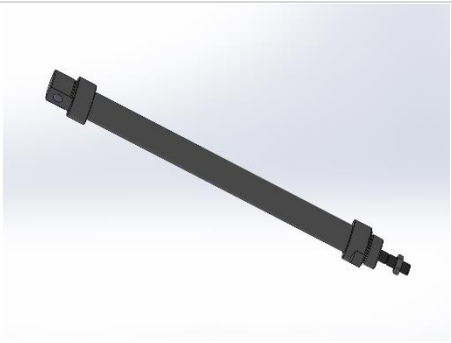
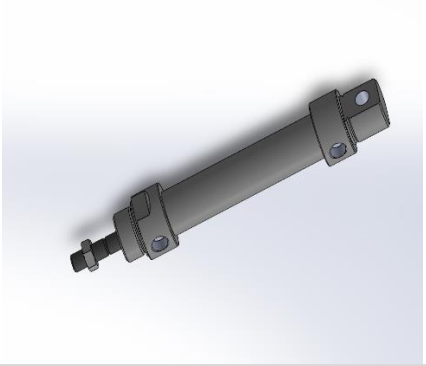
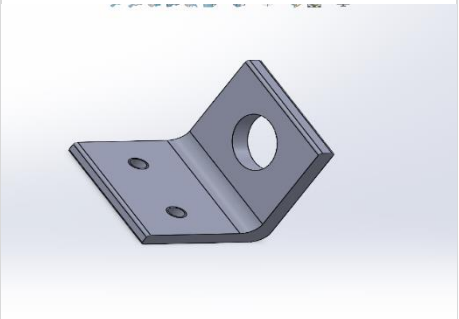
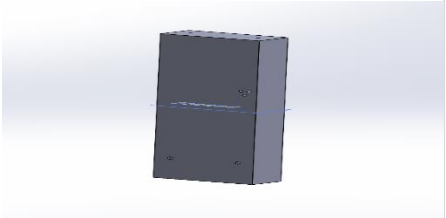
16-Head support

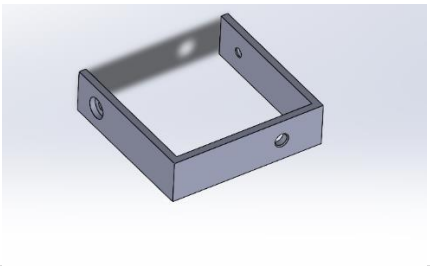
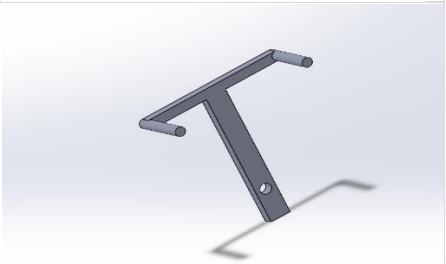
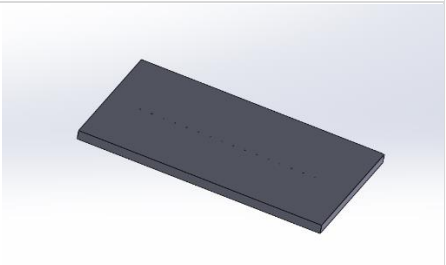
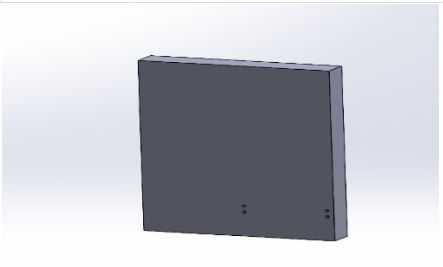
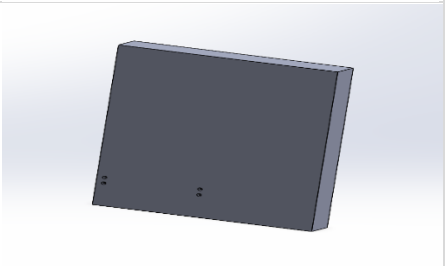


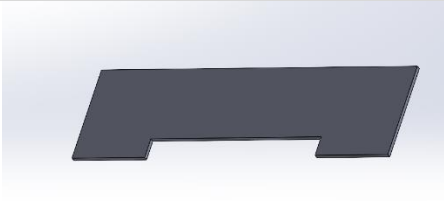
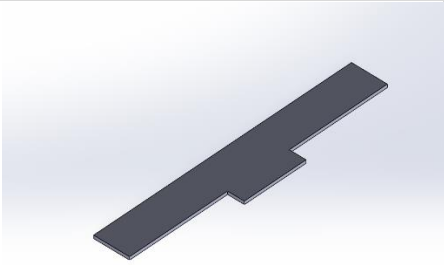
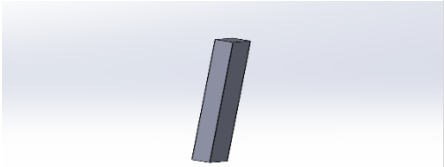
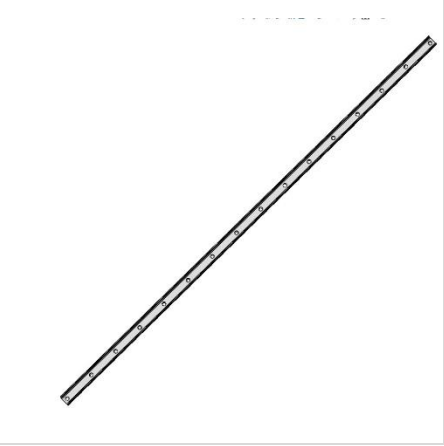
17-Rail Support



Project Components list and PDF Description

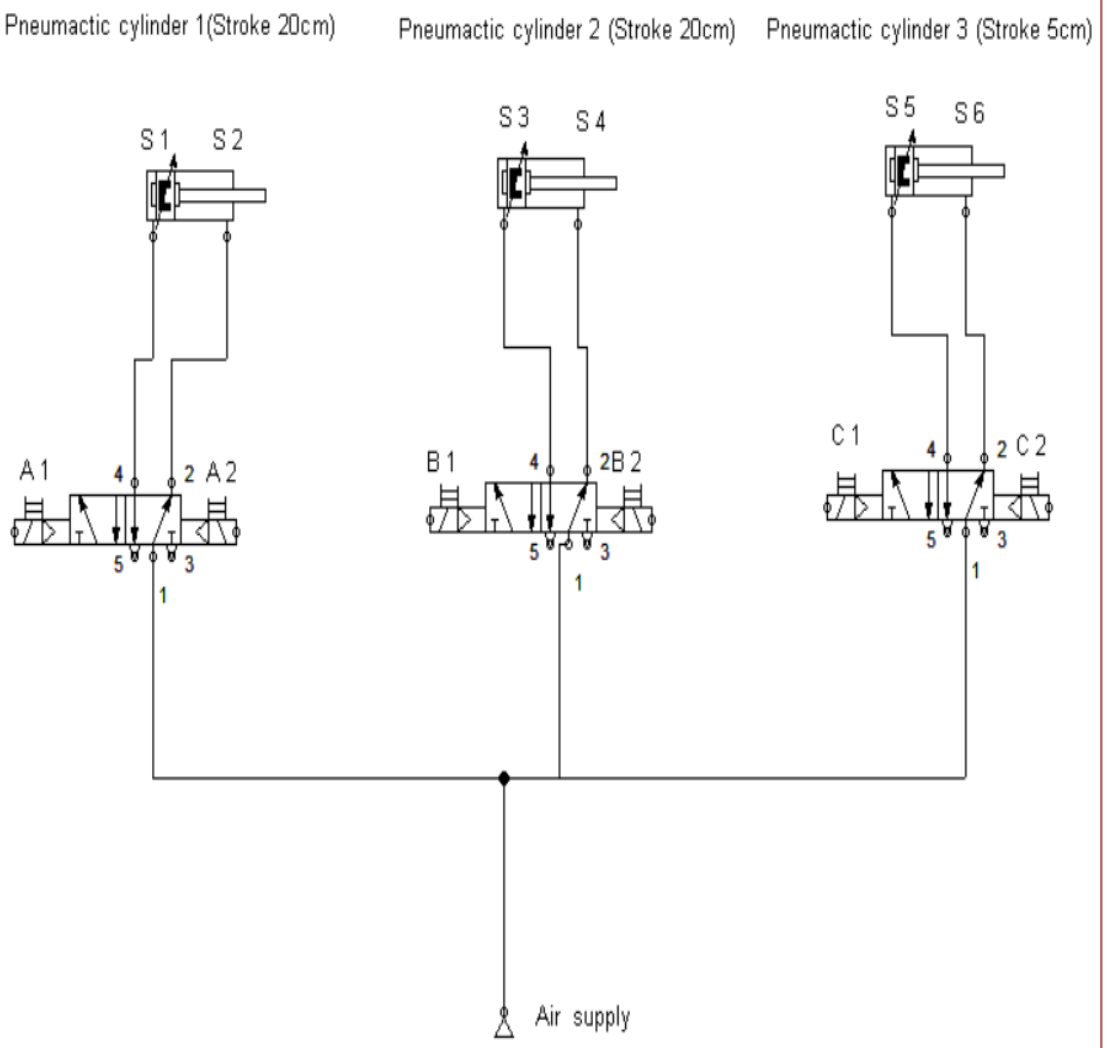
	Name	Description	Quantity	Photo
1	Pneumatic cylinder (MAL 20*200-S)	The pneumatic cylinder, with a 20 cm stroke, is instrumental in powering the automated sliding metro doors. It provides the force needed to open and close the doors swiftly and securely. When extended, it closes the doors, and when retracted, it opens them, ensuring smooth and safe operation. This precise motion control, combined with integrated reed switches, guarantees accurate positioning and enhances the overall reliability of the system.	2	
2	Pneumatic cylinder (TGM 20*50-S)	The pneumatic cylinder with a 5 cm stroke is strategically positioned on the base, operating in a horizontal motion. This cylinder is equipped with an end effector that extends the full 5 cm stroke, providing a secure lock for the doors. This enhances the security of the system by firmly holding the doors in place during operation.	1	
3	Cylinder support	The support mounts are integral components designed to securely affix each pneumatic cylinder in place. With two dedicated support mounts for each cylinder, they provide stable and robust anchoring, ensuring the cylinders' proper function	6	
4	Door	The door, operated by the pistons, is a key element in the automated system. The pistons exert force to smoothly open and close the door, ensuring efficient transit. With this mechanism, passengers can enter or exit the metro securely and seamlessly.	2	

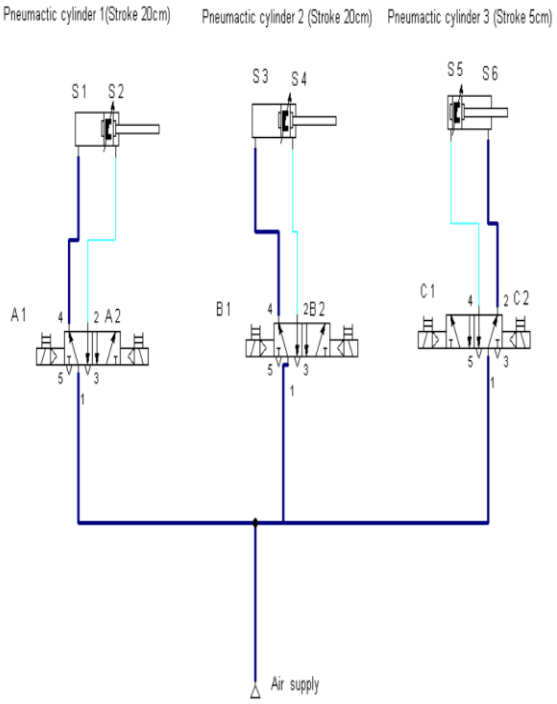
5	Door Holder	The clevis rod end door holder securely fix the piston to the door, enabling precise operation. This mechanism ensures smooth and controlled door movement, enhancing safety and convenience for passengers ""	2	
6	End effector (Lock)	The end effector serves as an extension of the 5cm piston cylinder, providing a locking function for the door. It ensures the door remains securely closed unless activated by the driver's push button signal, adding an extra layer of safety and control to the system.	1	
8	Base Bottom	The base acts as the anchor for all components, securely affixing them in place. It provides stability and support for the entire system. Additionally, the rail is fixed onto the base, providing a guided path for smooth and precise movement of the components along its track.	1	
9	Left wall	The wall serves as a secure fixture for the other end of the cylinder with mounts. It provides a stable support, ensuring proper positioning and function	1	
10	Right Wall	Same as the left wall	1	

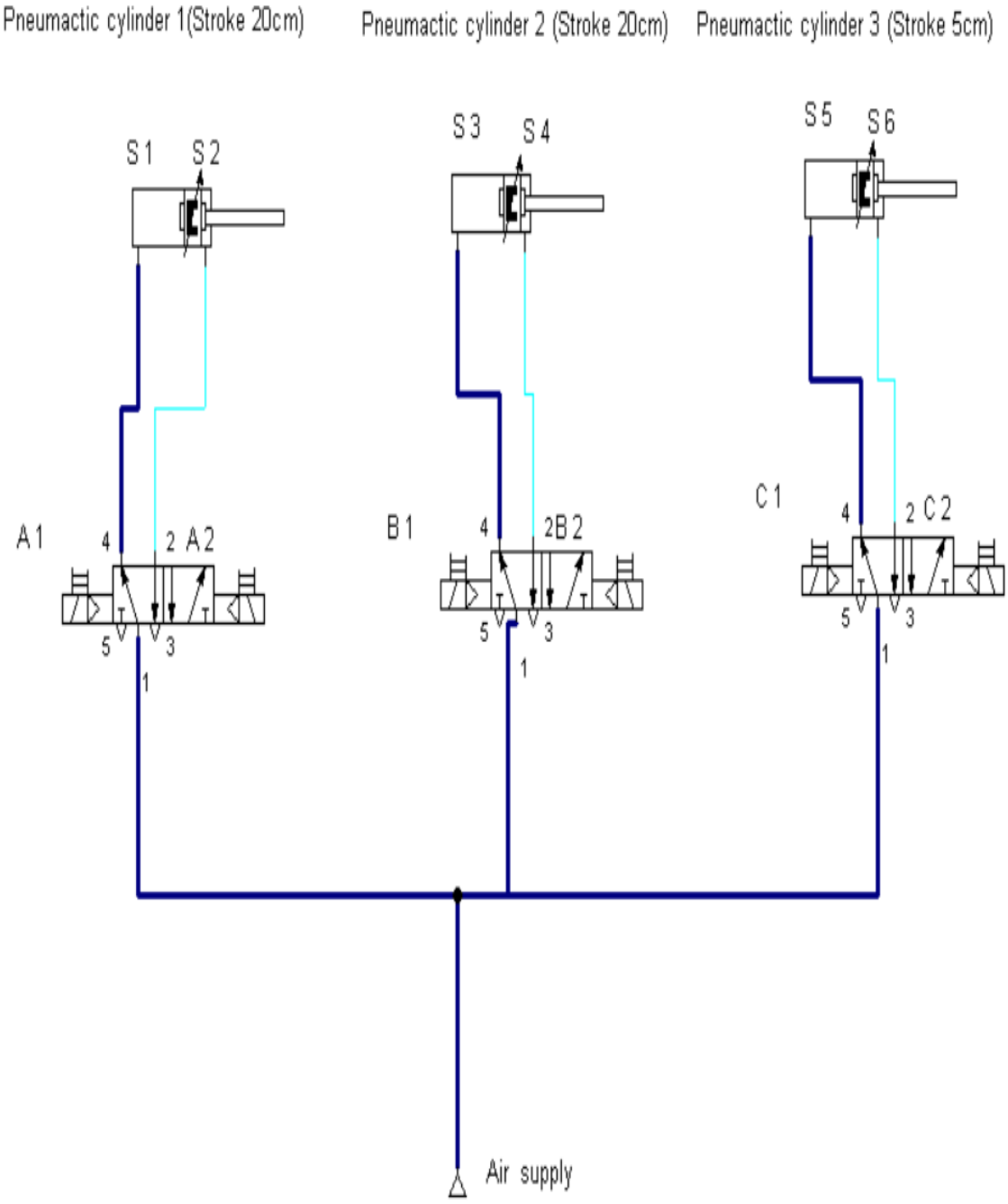
11	Base(Top)	The top of the base serves a dual purpose, acting as both a crucial support and contributing to the system's overall aesthetic. It provides stable support for all components.	1	
12	Base(Top)		1	
13	Fixing Blocks	The fixing blocks are essential for stabilizing and structurally reinforcing the project, ensuring its stability and durability.		
14	Rail support	The fixing blocks stabilize and secure the rail, ensuring its structural integrity within the project.	2	
15	Rail	The rail serves as the designated pathway for the sliding doors, utilizing a dual approach with one positioned at the base and the other at the top. This configuration ensures smooth and controlled movement of the doors, enhancing the overall functionality and efficiency of the system.	2	

16	Roller	The roller serves a dual purpose in the system. Firstly, it facilitates the smooth sliding motion of the doors along the rail, reducing resistance and ensuring efficient movement. Secondly, it effectively minimizes friction, thereby enhancing the overall ease of operation and prolonging the lifespan of the components involved.	8	

Pneumatic Circuit






Pneumactic cylinder 1(Stroke 20cm)
Pneumactic cylinder 2 (Stroke 20cm)
Pneumactic cylinder 3 (Stroke 5cm)
S1
S2
S3
S4
S5
S6
A1
4
2 A2
5
3
1
B1
4
2B 2
5
3
1
C1
4
2 C2
5
3
1
Air supply

Pneumatic Step Diagram and Description

The sequence is as follows:

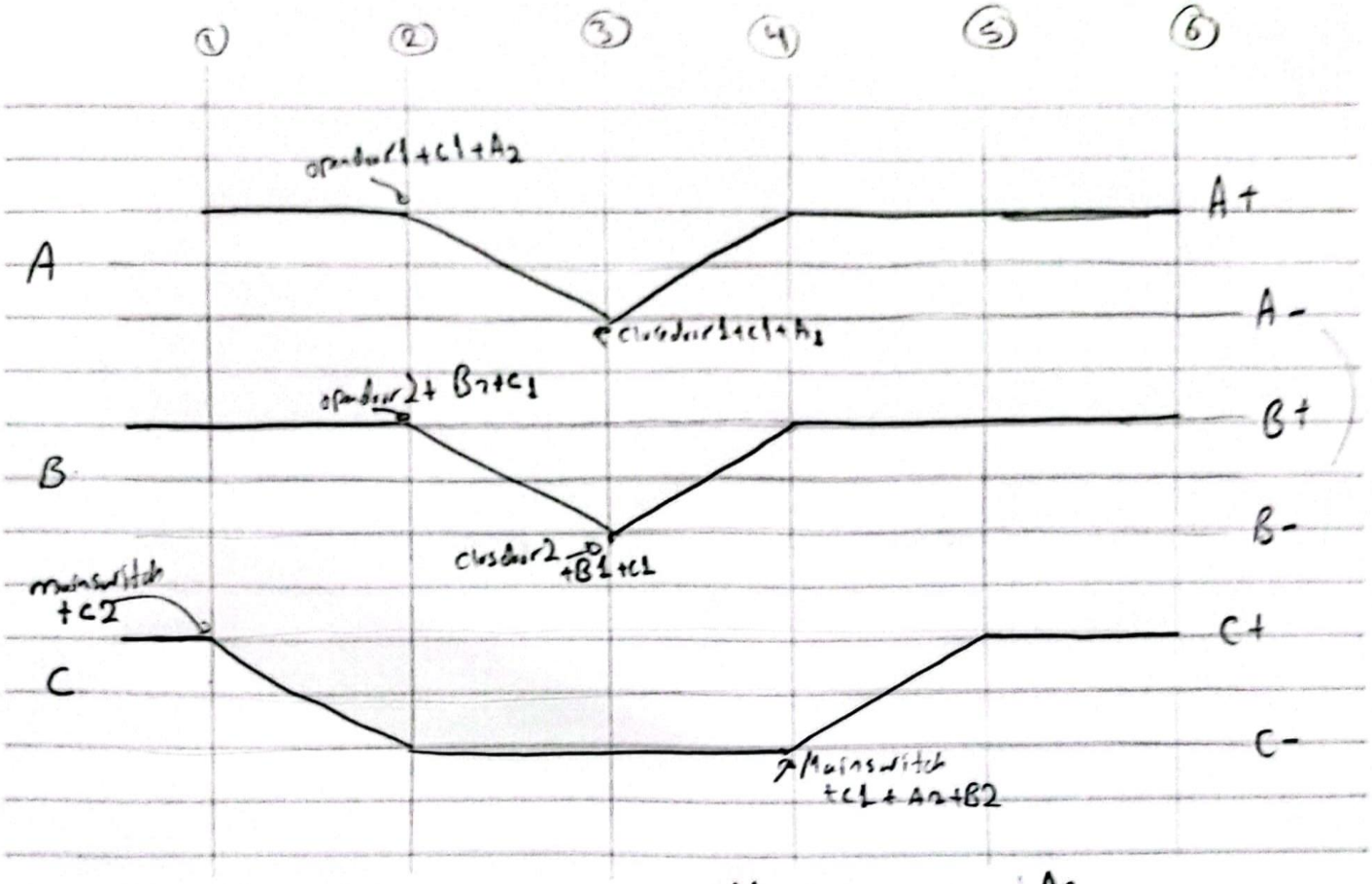
At t1: Main switch button is pressed with closed and locked doors (means fully extended pistons A , B , C (c2 is active)) so doors will be unlocked and ready to be opened.

At t2: open door buttons are pressed for both doors and since lock is already opened doors will be opened through retraction for both Piston A & B.

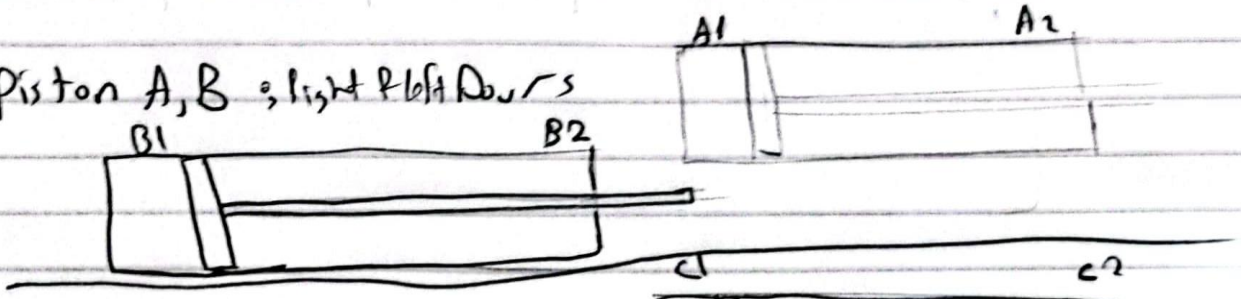
At t3: Having doors are opened and so the lock pressing the closing doors button will cause extension for both piston A &B.

At t4: Having the doors closed (fully extended A&B with active A2&B2) and opened lock (C1 active) pressing the Main switch again will extend piston C locking the doors.

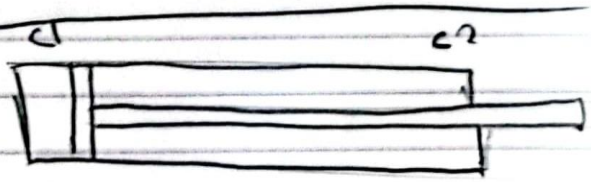
Project operation: opening through t1, t2 and closing with lock t3, t4 .



Piston A, B ; light Pilot Doors



piston C for lock Mechanism



Mainswitch: for lock

Opendoor 1 closedoor 1	: for A
opendoor 2 closedoor 2	; for B