

Manufacturing Specifications for

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

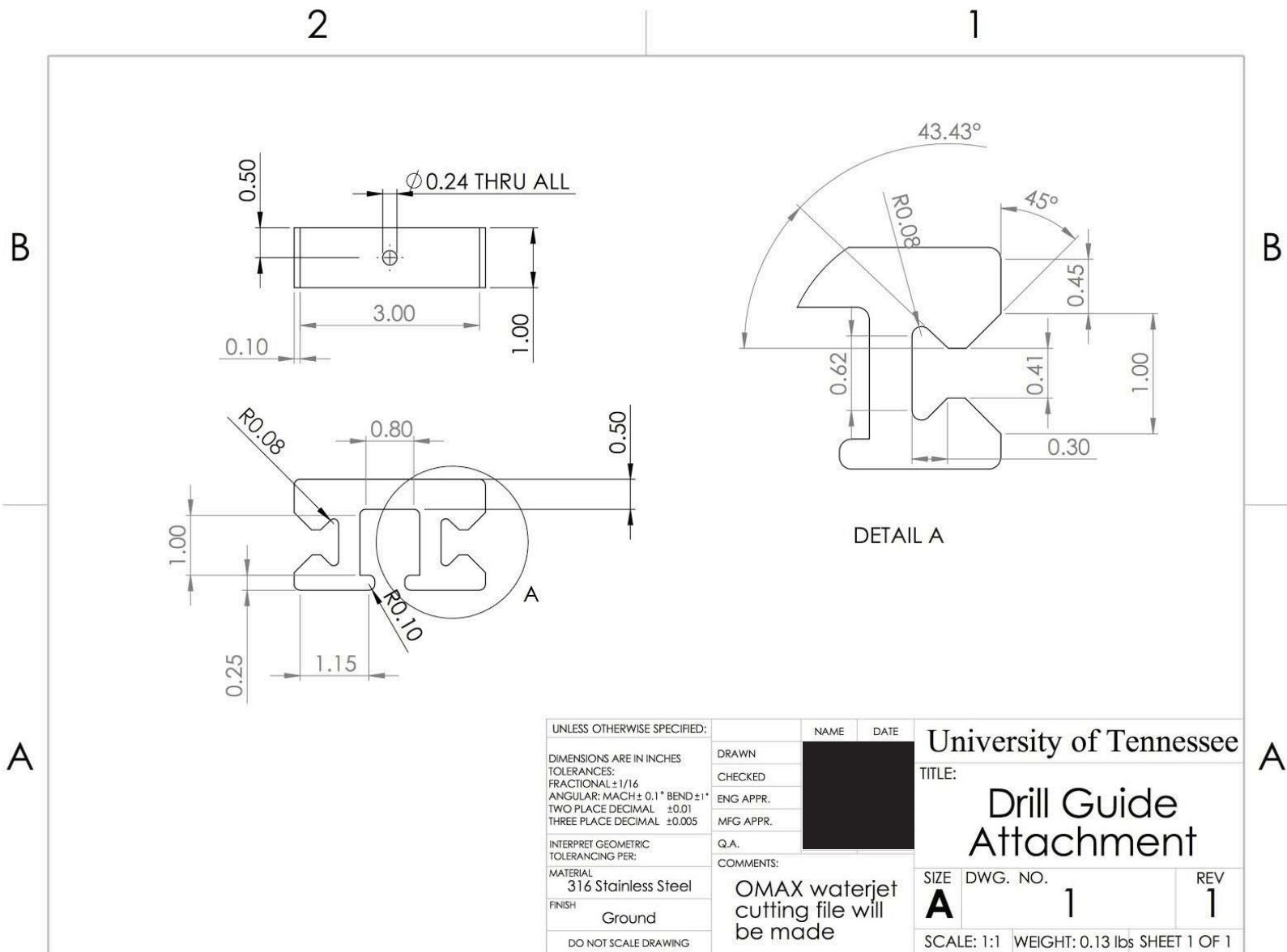
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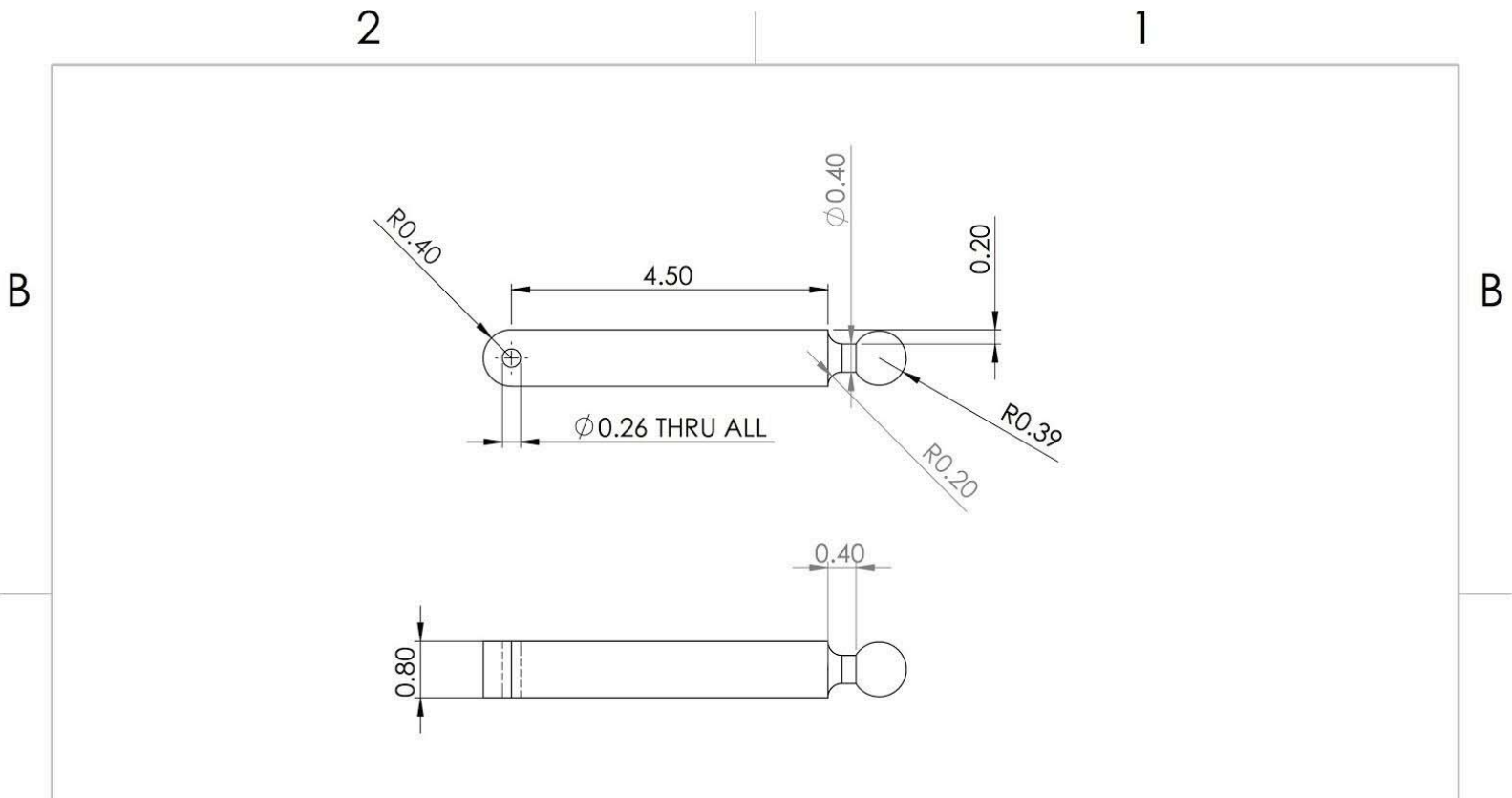
[REDACTED]


January 18, 2017

Drawings

All tolerances and dimensions are specified in each drawing. All dimensions are given in inches. For dimensions that are displayed with 2 decimal places, a ± 0.01 inch tolerance is used. For dimensions that are displayed with 3 decimal places, a ± 0.005 inch tolerance is used. All of the following parts will be created using the OMAX Premium waterjet cutting software.





UNLESS OTHERWISE SPECIFIED:		NAME	DATE	University of Tennessee		
DIMENSIONS ARE IN INCHES				TITLE:		
TOLERANCES:				Buttress Arm 1		
FRACTIONAL: ± 1/16				SIZE	DWG. NO.	REV
ANGULAR: MACH ± 0.1° BEND ± 1°				A	2	1
TWO PLACE DECIMAL ± 0.01				SCALE: 1:2 WEIGHT: 0.12 lbs SHEET 1 OF 1		
THREE PLACE DECIMAL ± 0.005						
INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:				
MATERIAL		316 Stainless Steel				
FINISH		Ground				
DO NOT SCALE DRAWING						

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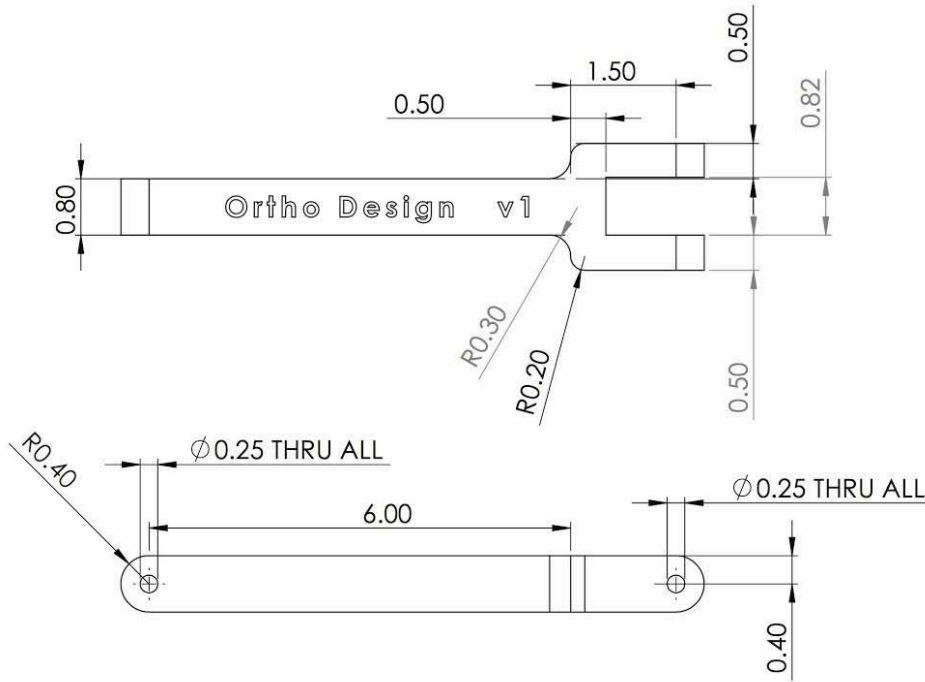
MACHINING NOTE: Sphere will be sanded down to ensure smoothness.

2

1

B

B



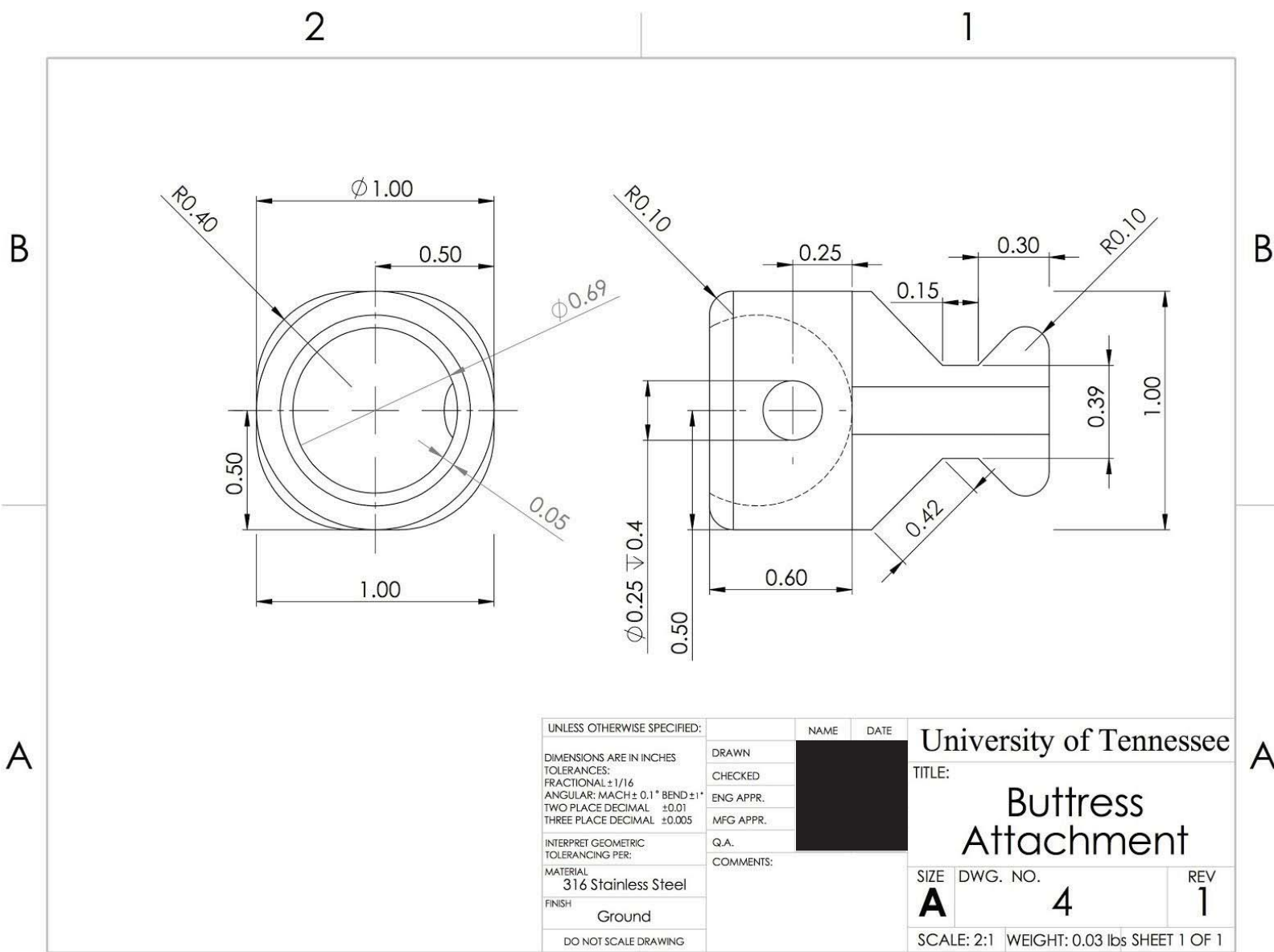
A

A

UNLESS OTHERWISE SPECIFIED:		NAME	DATE	University of Tennessee		
DIMENSIONS ARE IN INCHES		[REDACTED]		TITLE:		
TOLERANCES:				Buttruss Arm 2		
FRACTIONAL ±1/16				SIZE	DWG. NO.	REV
ANGULAR: MACH ± 0.1° BEND ±1°				A	3	1
TWO PLACE DECIMAL ±0.01		SCALE: 1:2 WEIGHT: 0.20 lbs SHEET 1 OF 1				
THREE PLACE DECIMAL ±0.005						
INTERPRET GEOMETRIC TOLERANCING PER:						
MATERIAL						
316 Stainless Steel						
FINISH						
Ground						
DO NOT SCALE DRAWING						

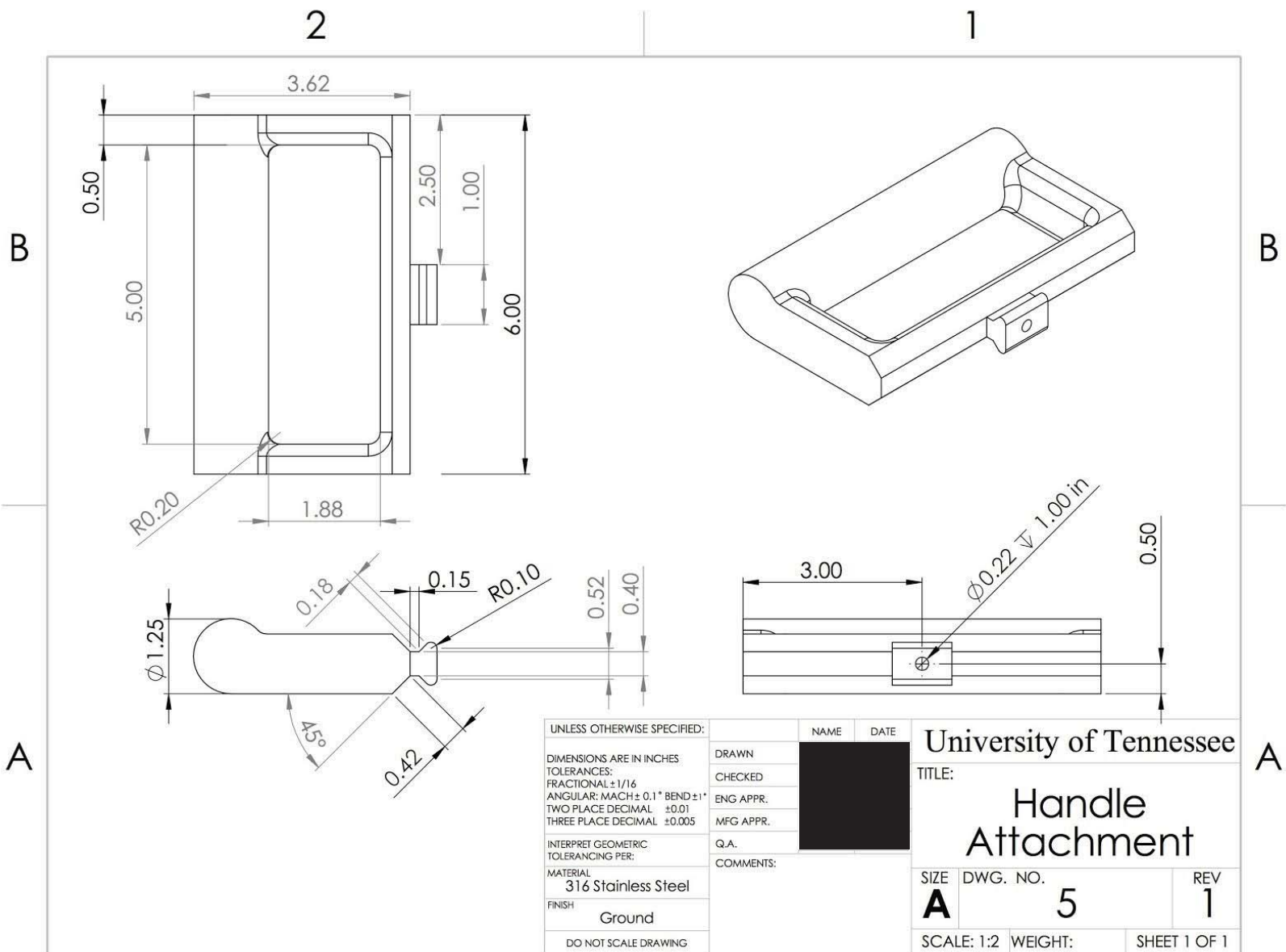
2

1



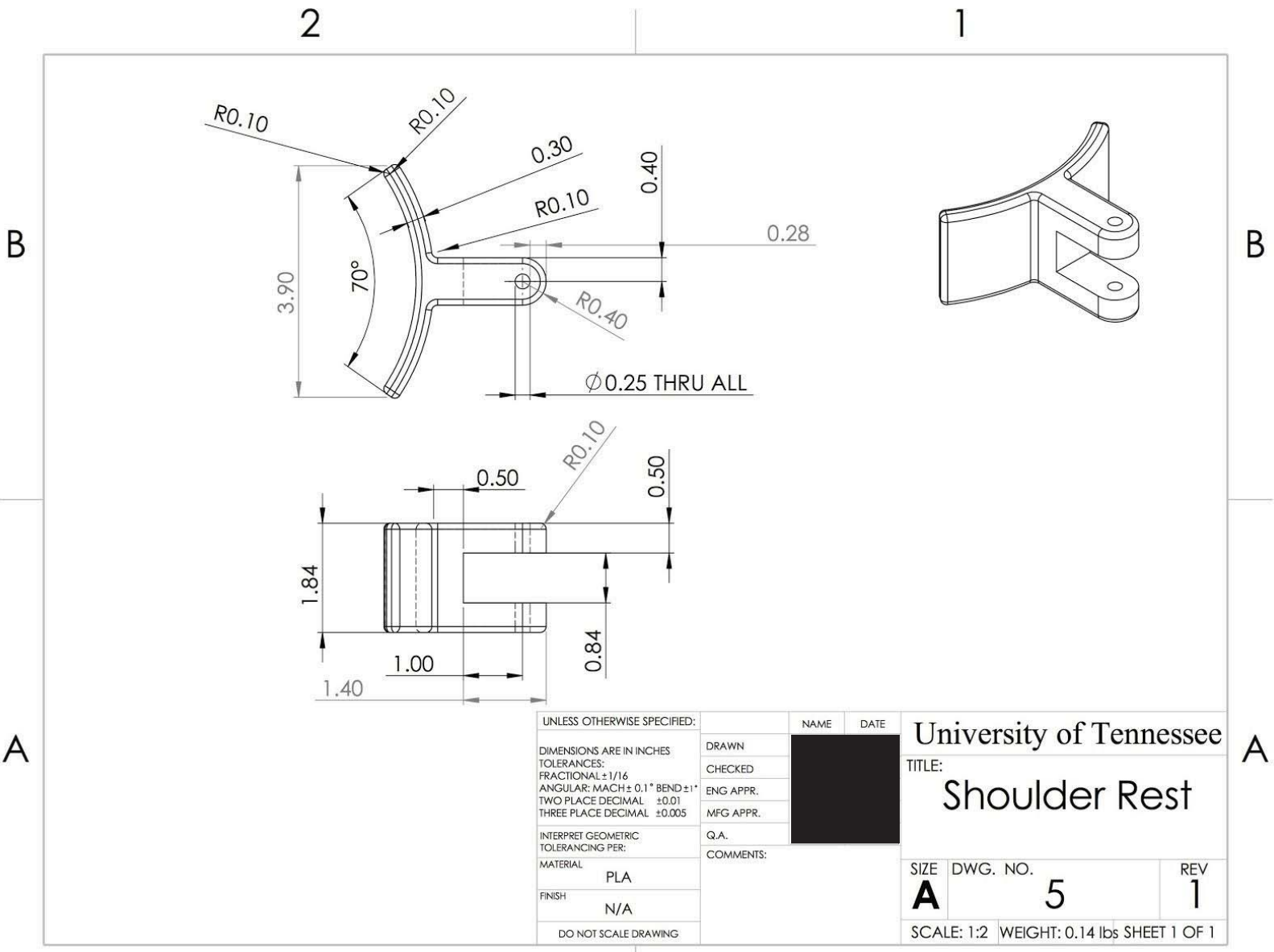
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MACHINING NOTE: Side view will be cut via waterjet cutting; interior hole will be cut using a lathe.



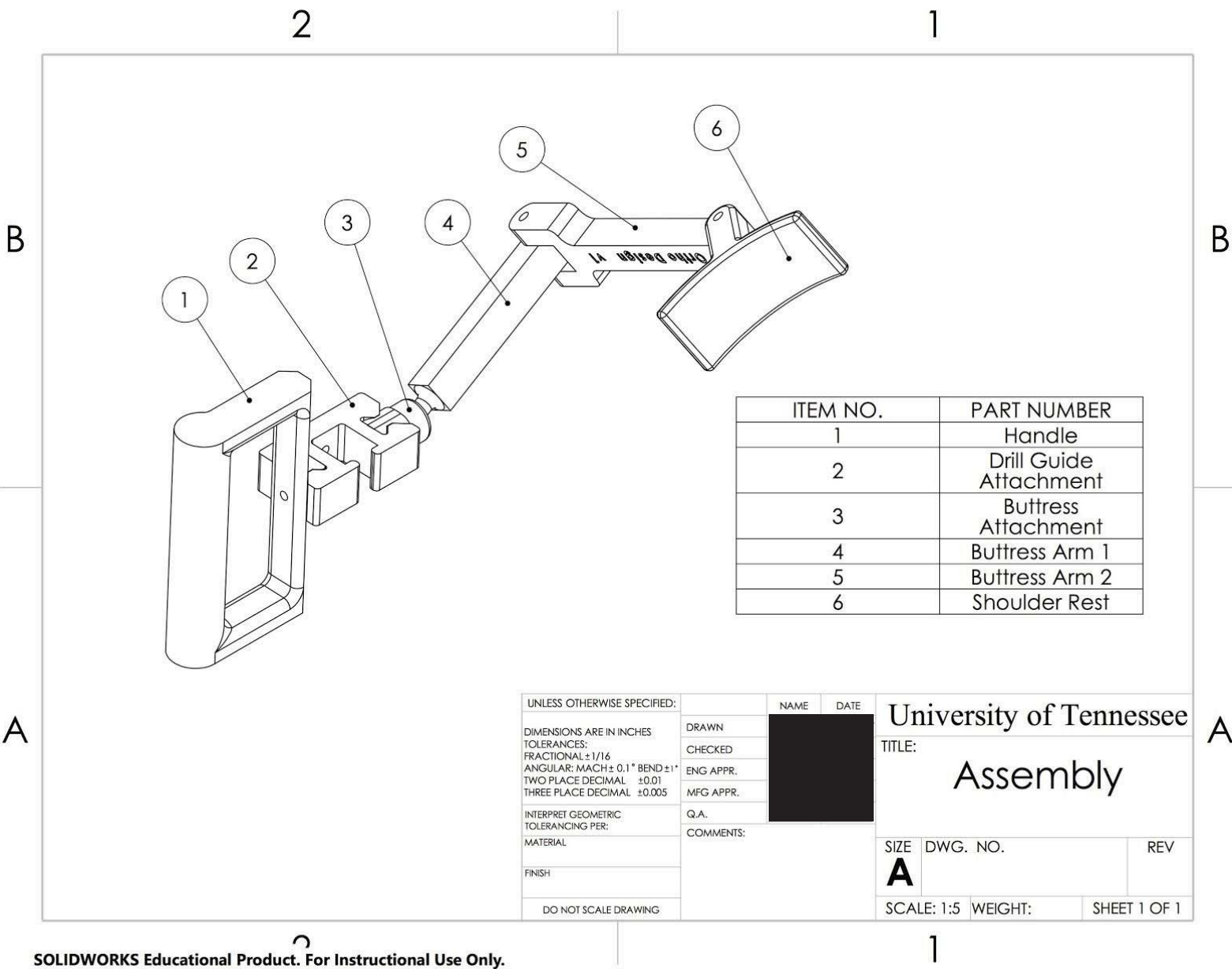
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MACHINING NOTE: Top view will be made using a waterjet cutter; details of the curves and diameter of the handle will be sanded down while the attachment on the side will be milled using the Maker Lab's Bridgeport Knee Mill.



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MACHINING NOTE: Top view will be made view waterjet cutting; the 0.84" slot in the front view will be milled down using the Maker Lab's Bridgeport Knee Mill.



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Parts/Cutting Lists

All parts will be fabricated using the Maker Lab's OMAX 2626 Jetmaching center, the Bridgeport Knee Mill with Centroid Controller and the HAAS TL1 Lathe. All of the stock materials used to manufacture the system can and will be ordered through

McMaster-Carr. The ball joint of the buttress attachment will have a Running Fit in accordance with the ANSI system and the slide-on attachments for the handle and buttress attachment that slide into the slots on the drill guide attachment will have a Clearance Locational Fit with the ANSI system.

Materials

In order to satisfy the needs and requirements of the project stakeholder, all parts fabricated will be made from 316 Stainless Steel in order to create a strong device that can easily be autoclaved. Four 6" x 2' x 1" stainless steel blocks (~\$150/block) will be ordered through the McMaster-Carr website and delivered to the University of Tennessee, Knoxville for pickup. Other parts that might be added from design changes/updates may include plastic parts that could be ordered. These parts will need to be made from polycarbonate to ensure biocompatibility, sterilizability and strength. Ultimately, it is desired that all parts be made from stainless steel to allow for proper strength and homogeneity of the assembly for manufacturing.

Processes and Tools

Once blank stainless steel bars are received, training for using the Maker Lab's equipment will begin. The two buttress arms, the buttress attachment, the drill guide attachment, the shoulder rest and the outline for the handle will be created first using the OMAX 2626 jetmachining center. Spherical details found in the buttress attachment and buttress arm 1 will be refined using the HAAS Lathe. Holes found in all parts will then be used to be created by utilizing the Bridgeport Knee Mill; the mill will also be used to file down the space between the two forks found in the shoulder rest.