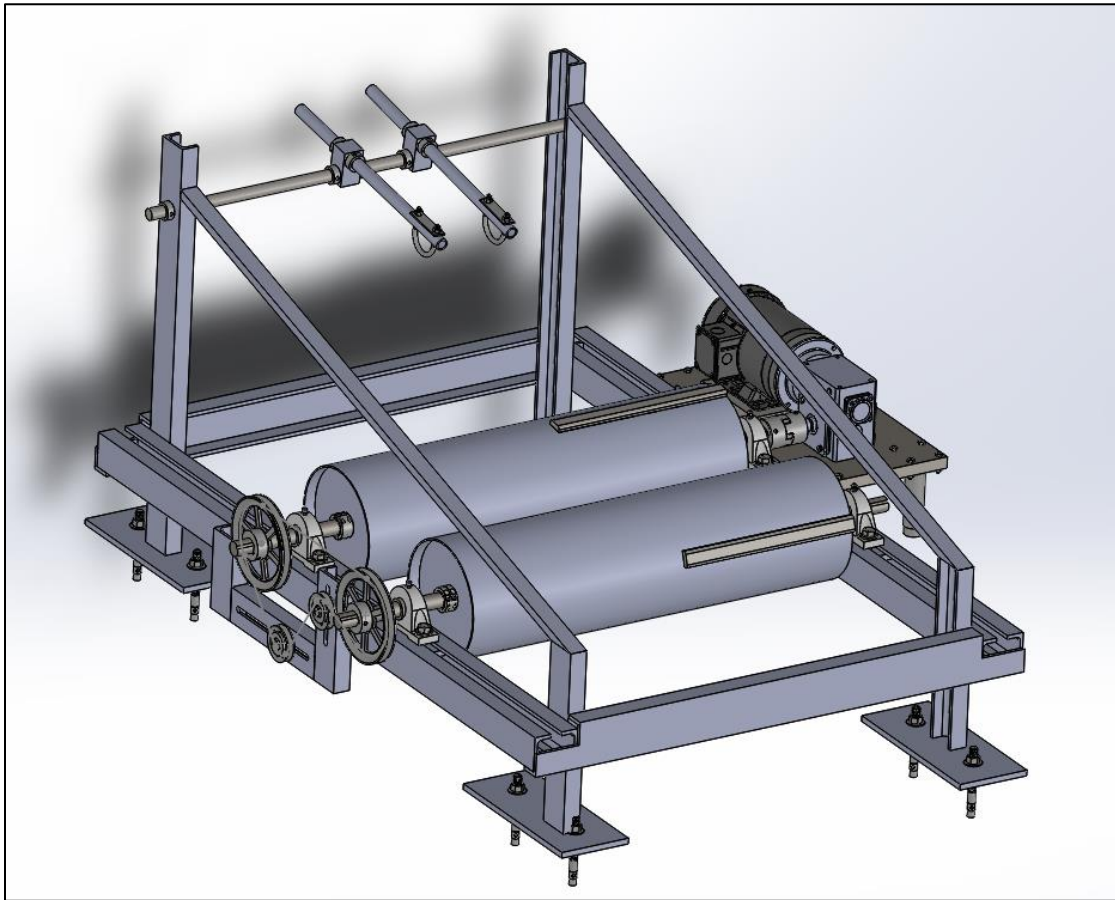


# ISWP Wheelchair Double Drum Test Version 1.3

## Assembly Instructions



Double Drum Test designed to meet RESNA WC-1/ISO 7176 Standards



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

### **Design of an ISWP Wheelchair Double Drum Test**

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University of Pittsburgh scientists are working with the U.S. Agency for International Development (USAID) under a multi-year sub-award to develop the International Society of Wheelchair Professionals, a global network to ensure a level of standardization, certification and oversight, to teach and professionalize wheelchair services, and to build affiliations to put better equipment in the right hands. Since 2002, USAID has granted more than \$45 million to improve wheelchairs and wheelchair services worldwide. This sub-award – Agreement No. APC-GM-0068 – was presented by Advancing Partners & Communities, a cooperative agreement funded through USAID under Agreement No. AID0AA-A-12-00047, beginning Oct. 1, 2012.

For further information on use of the ISWP Wheelchair Double Drum Test assembly instructions, contact the University of Pittsburgh's Innovation Institute at 412-383-7670 or the International Society of Wheelchair Professionals at [intlsocietywheelchairprof@gmail.com](mailto:intlsocietywheelchairprof@gmail.com).



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## A. Mechanical Assembly Instructions

The following instructions will outline the proper assembly protocol for the ISWP Wheelchair Double Drum Testing Machine in compliance with RESNA WC-1/ISO 7176 Standards.

### 1. Notes

Assembly instructions may only show or dictate one item, but welding and placement directions apply to all parts of the same name unless specifically stated otherwise.

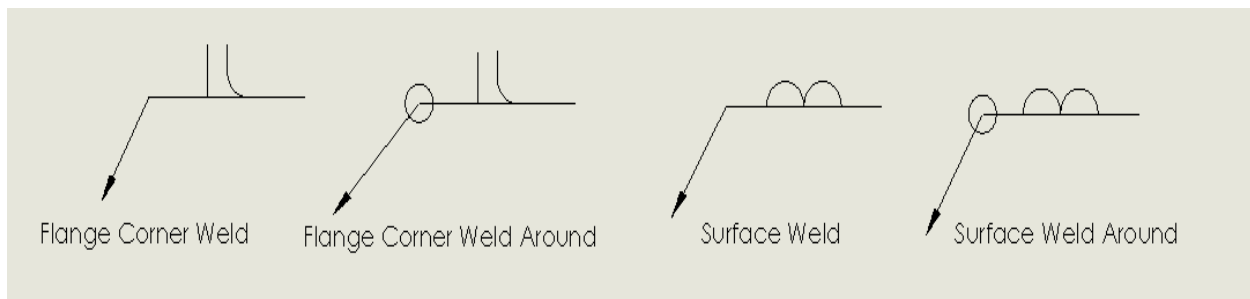
These instructions are to be paired with the dimensioned and assembly drawings for part names and details about each part or assembly.

1/2 -13 and 5/8 -11 hardware are used for the assembly, however, M12-1.75 and M15-1.50 are acceptable alternatives.

5/16 -18 and 3/8 – 16 hardware are used for the motor mount, however, M8-1.25 and M10-1.50 are acceptable alternatives.

All dimensions within this set of instructions are given in units of inches and millimeters.

### 2. Legend



### 3. Required Tools

- Wrench Set
- Socket Set
- Welder (ARC or MIG)
- Tape Measure
- Grinder
- 3 Axis Mill (suggested for drilling holes)
- Metal Drill Press
- Metal Saw
- Turning Center (helpful but assembly can be completed without it)

## 4. Building the Drum Assembly

### Cutting notes:

All parts should be cut before assembly is started. Some parts may be able to be longer or shorter depending on the function. Please follow the tolerances listed on the dimensioned drawings. Furthermore, all holes should be drilled before assembly begins to ensure they are placed correctly.

### Assembly Start

First, obtain all pieces required based on the bill of materials including the hardware.

This part of the assembly requires welding the double shaft collars to Part 2, then welding to both ends of Part 1. After using a flange corner around weld to mount the shaft collars concentric to the 1.25 inch (31.75 millimeter) holes in Part 2, place Part 2 inside of Part 1 so that the shaft collars of Part 2 are facing outward. The larger face of Part 2 should be 1 inch (25.4 millimeter) from the outside face of Part 1. Then, use a flange corner weld around to connect the two pieces together as shown in Figure 1. This process should be repeated on the other open side of Part 1 to cap off the drum.

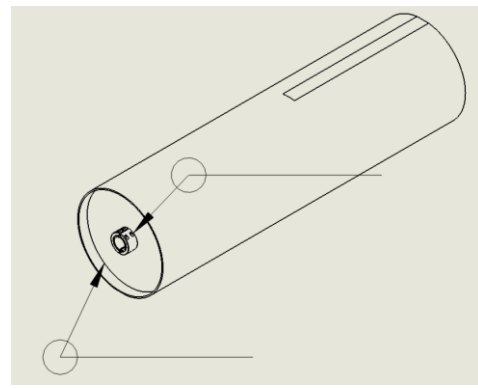


Figure 1

Once Parts 1 and 2 are connected, add the slats to the pre-sanded down surfaces of Part 1, using a surface weld as shown in Figure 2 to connect them. The surface of Part 1 should be pre-sanded before adding the slats. The slats should lie horizontally along the body of Part 1 with the slat edges flush with the edges of Part 1. The two slats should be located on opposite ends and opposite sides of Part 1 as shown in Figure 1. Another drum should then be created using the same method so that there are two fully assembled drums with capped off ends.

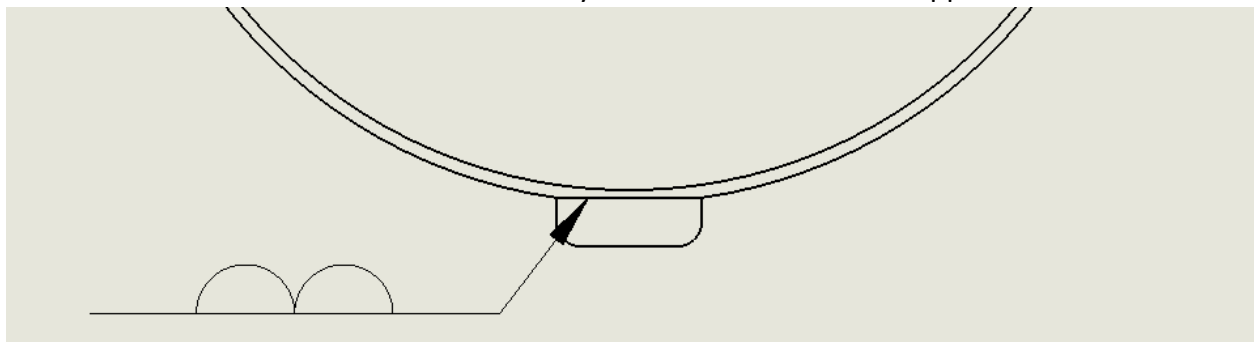


Figure 2

## 5. Building the Frame Assembly

### Cutting notes:

All parts should be cut before assembly is started. Some parts may be able to be longer or shorter depending on the function. Please follow the tolerances listed on the dimensioned drawings. Furthermore, all holes should be drilled before assembly begins to ensure they are placed correctly.

### Assembly Start

To begin, obtain all pieces required based on the bill of materials including the hardware.

### Leg Assembly

The first step in assembling the frame is to build the four legs that support the entire assembly. The legs can be assembled in two pairs – one long pair and one short pair. To assemble the short set of legs, begin by placing Part 13 on top of one of the anchor plates. The outside edge of Part 13 should be 2 inches (50.8 millimeters) from the outside edge of the anchor plate. The front edge of Part 13 should be 6.000 inches (152.4 millimeters) from the front edge of the anchor plate. The proper orientation of these two parts is shown in Figure 3. Once the parts are oriented correctly, a flange corner weld around can be used to secure them in place as shown in Figure 4. This process should be repeated for the opposite leg, in which the channel is facing the opposite way.

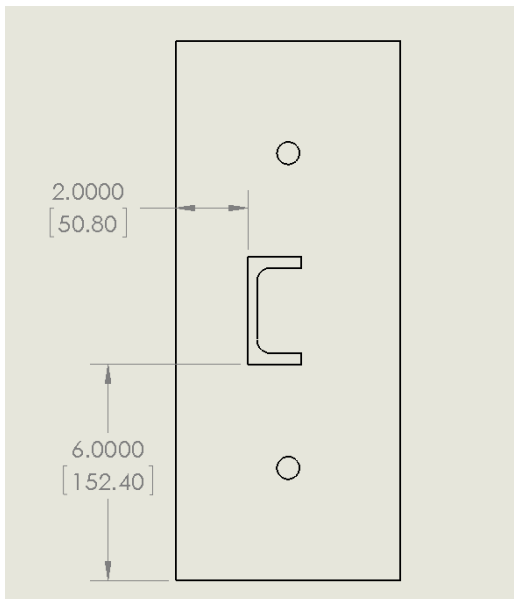


Figure 3

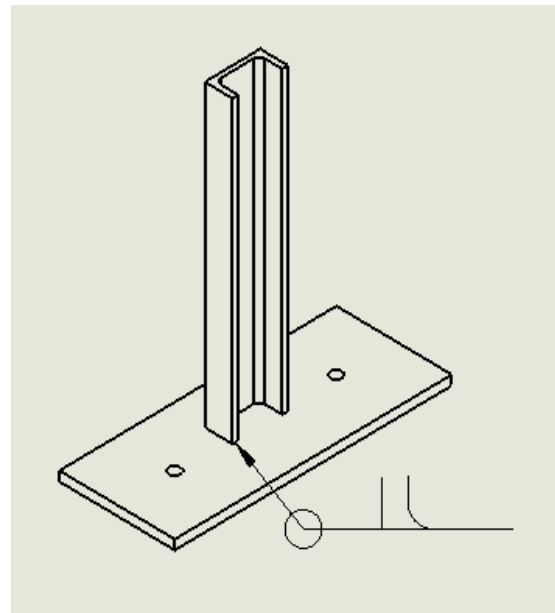


Figure 4

For the set of long legs in the frame assembly, the builder should obtain Part 12 and another anchor plate. The outside edge of Part 12 should be 2 inches (50.80 millimeters) from the outside edge of the anchor plate. The front edge of Part 12 should be 6.000 inches (152.4 millimeters) from the front edge of the anchor plate. The proper orientation of these two parts is shown in Figure 5. Once the parts are oriented correctly, a flange corner weld around can be used to secure them in place as shown in Figure 6. This process should be repeated to assemble the opposite leg, in which the channel is facing the opposite way so that both channel face inward.

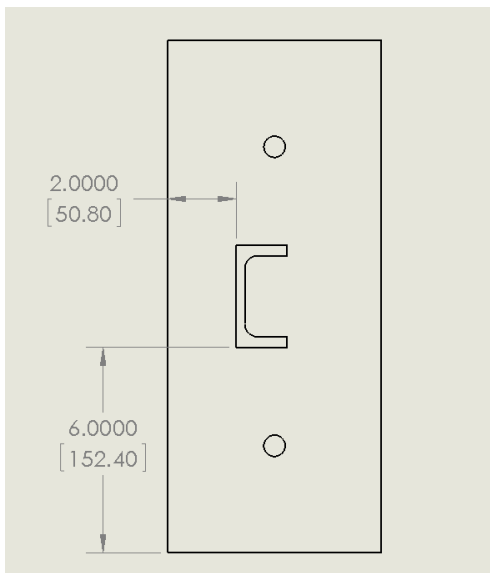


Figure 5

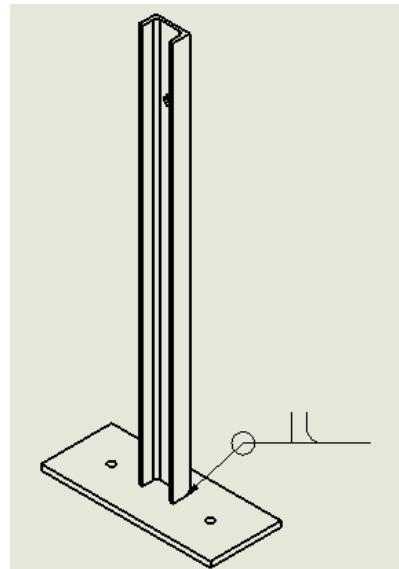
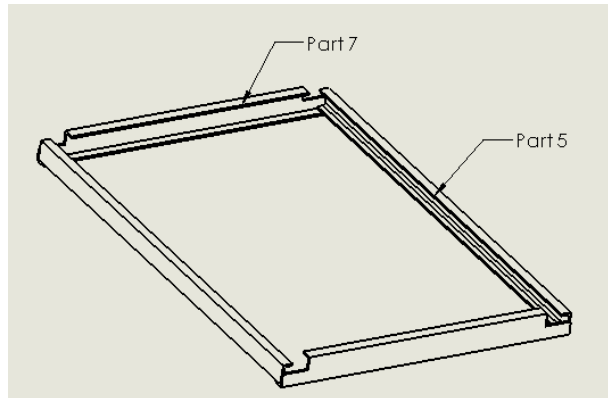


Figure 6

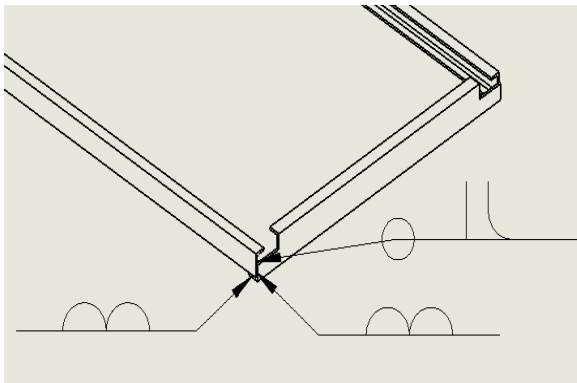
## Channel Assembly

The next step is to create the channels that the bearings run along to adjust the position of the drums. Place Part 7 so that the cut out edges are facing upward. Do the same thing with the second piece of Part 7 and place it a distance away from the other piece such that the open sides of the channels face each other. Take the first piece of Part 5 and place it so that the outside edge is flush with the corner of both pieces of Part 7. Another piece of Part 5 should be placed on the opposite side to create a rectangular frame. The assembly of these four parts is shown in Figure 7.

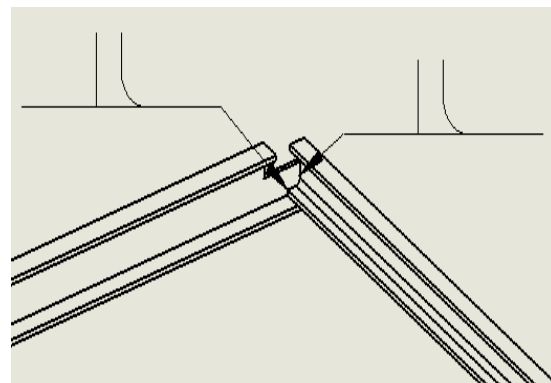


**Figure 7**

Surface welds should be used on the outside and flange corner welds should be used on the inside to hold the pieces together. These welds are shown in Figures 8 and 9.



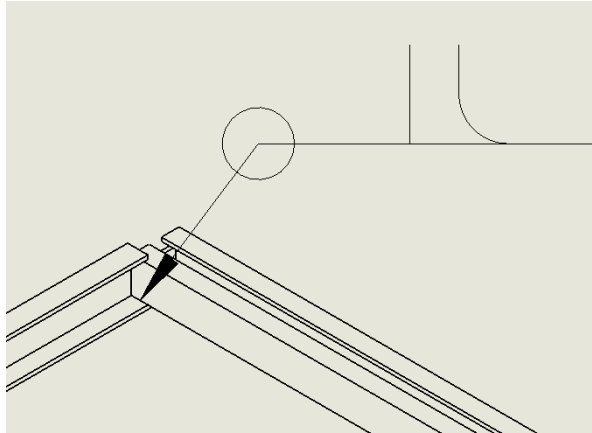
**Figure 8**



**Figure 9**

The next two pieces of Part 5 should be added inside the square that the builder has created. The channel of the pieces should face the channel of the previously placed Part 5. Both should be flush with the end of the cut out section of Part 7. The spacing between the top edges of the two channels on each side should be 1 inch (25.40 millimeters). A flange corner weld around the inside of Part 7 should be added to hold these two channel pieces in place as shown in Figure 10. There should now be two channels on each side of the rectangle.

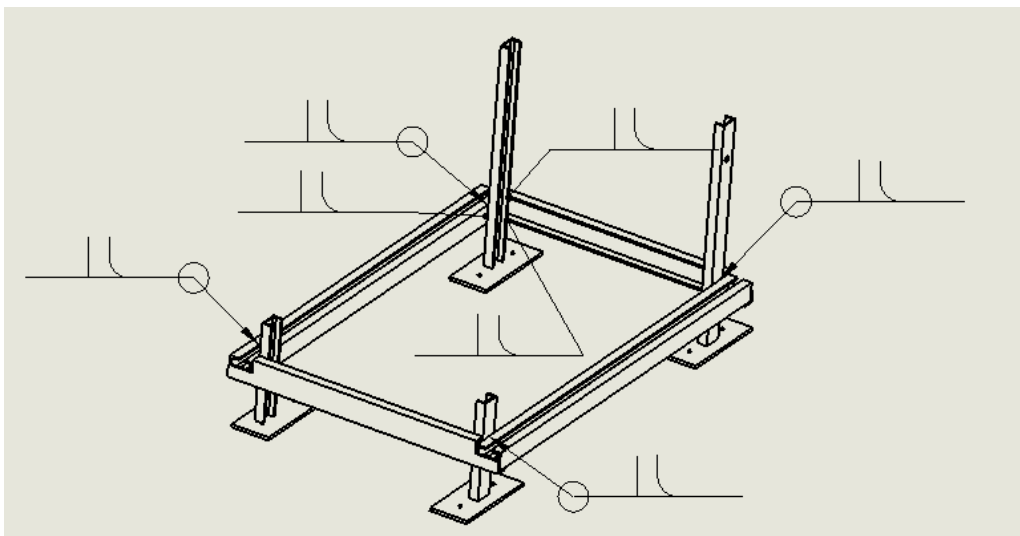




**Figure 10**

Now, the legs need to be attached to the rest of the channel frame to complete the next part of the assembly. The leg assemblies connect to the inside of the rectangle channel frame that was created in the previous steps. This is done by aligning the outside corners of the legs with the inside corners of the channel assembly. Between the bottom of the anchor plate and the bottom of the channel square there should be 6.50 inches (165.1 millimeters) of clearance. The welds for the assembly are shown in Figure 11. Note that although not shown in the figure, the internal welds depicted in the top left corner should be applied to all inside corners of the assembly.

**Note:** Wedge anchors can be used to permanently fix the assembly in place on concrete.



**Figure 11**

Connecting the foot assemblies to each other is the next task for assembling the frame of the multi-drum testing machine. Connect the sharper angled end of Part 22 to the leg that is assembled using Part 13. Once the pieces are welded then the assembler should connect the free end of Part 22 approximately 3.5 inches (88.9 millimeters) below the top edge of Part 12. The pieces should be welded as shown in Figure 12. This should be done for both sets of legs so each pair has one leg made from Part 13 that is connected to one leg made from Part 12.

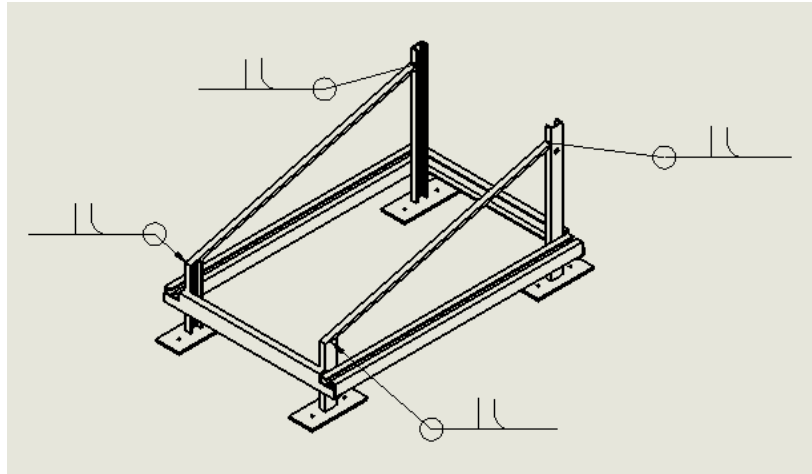


Figure 12

### Cane Post Holder Assembly

This assembly involves designing the cane post holders that help to secure the wheelchair and prevent it from moving during operation. Two identical holders should be created however, the following instructions only outline the steps for creating one. This set of instructions should be repeated to create the second holder. Begin by taking Part 10 and sliding Part 8 through the top hole of Part 10. Then, slide one shaft collar onto each end of Part 8 to secure Part 10 inches (254 millimeters) away from the edge of the tube of Part 8 without the holes. A 3/8"-16 Thread Size U-bolt should then be added by aligning the screws with the holes in Part 8. A mounting plate should be placed on the opposite side of the tube and held in place by a nut on each end of the U-bolt. All of these steps are shown in Figure 13.

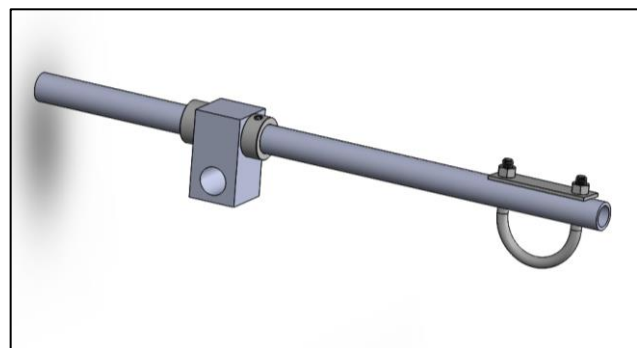
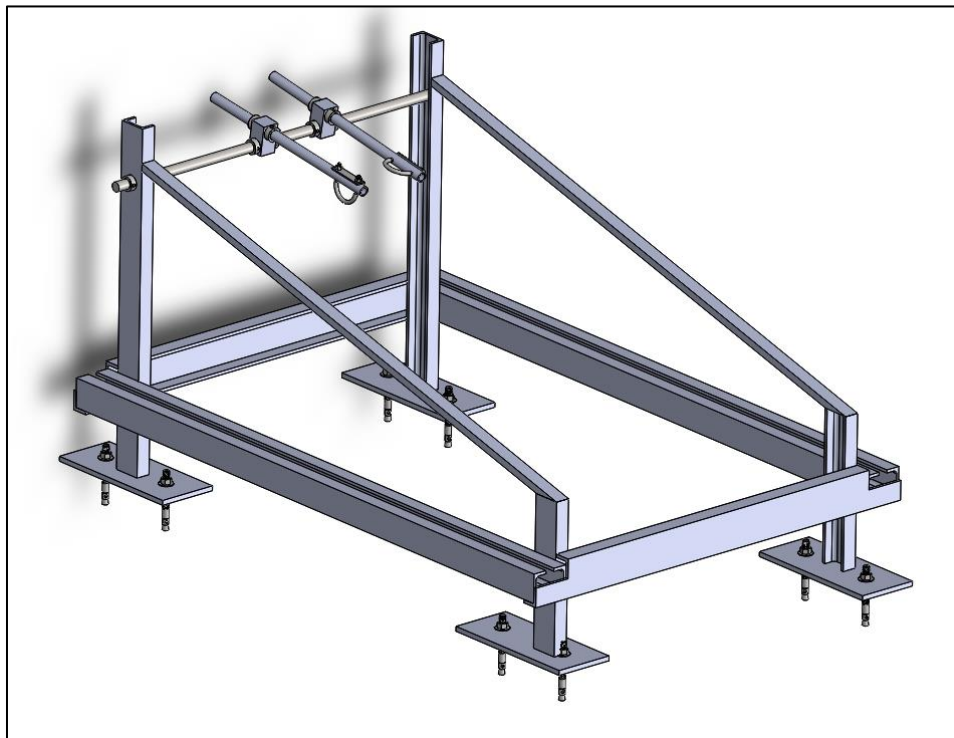


Figure 13

Once both of the cane post holders have been assembled then they are ready to be added to the rest of the frame assembly. Put four of the shaft collars and the two cane post holder assemblies between the two legs made from Part 12. Align the parts so that each of the cane post holder assemblies is between two shaft collars. Then slide Part 11 through the two holes in Part 12 making sure to also slide it through the holes of the shaft collars and in the holes in Part 10 of the cane post holder assemblies. Then the remaining two shaft collars should be placed on the outside of the legs of Part 12 to hold Part 11 in place. The final frame assembly is shown in Figure 14.



**Figure 14**

## 6. Building the Gear Assembly

### Cutting Notes:

All parts should be cut before assembly is started. Some parts may be able to be longer or shorter depending on the function. Please follow the tolerances listed on the dimensioned drawings. Furthermore, all holes should be drilled before assembly begins to ensure they are placed correctly.

### Assembly Start

The assembler should obtain all pieces required based on the bill of materials including the hardware.

The main part of the gear assembly is the channels that the gears run along. Begin by setting Part 17 horizontal so that the inside channel is facing away from the assembler. Then slide Part 17 into the cut out part of Part 16 so that Part 16 is to the left of Part 17. Surface welds and flange corner welds can then be added to connect the parts as shown in Figure 15.

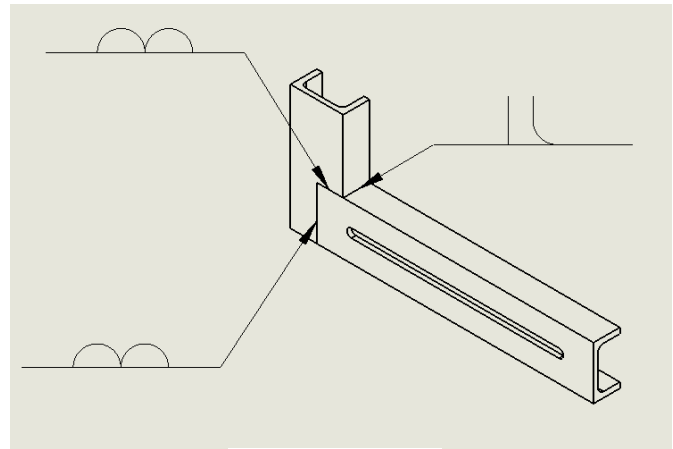


Figure 15

Part 17 can then slide into the cut out piece of Part 18. Part 18 should be oriented so the slit in it is vertical. Surface welds and flange corner welds can then be added to connect the parts as shown in Figure 16.

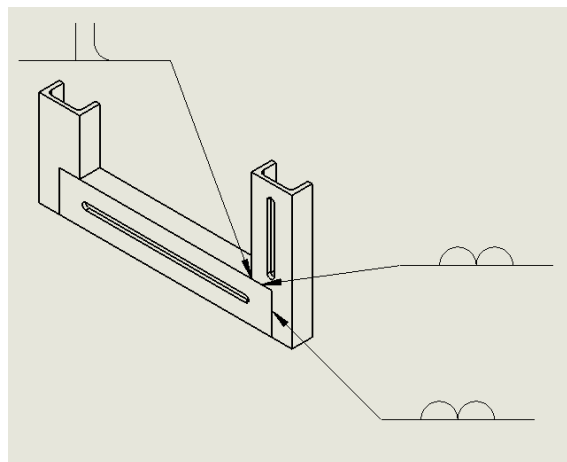
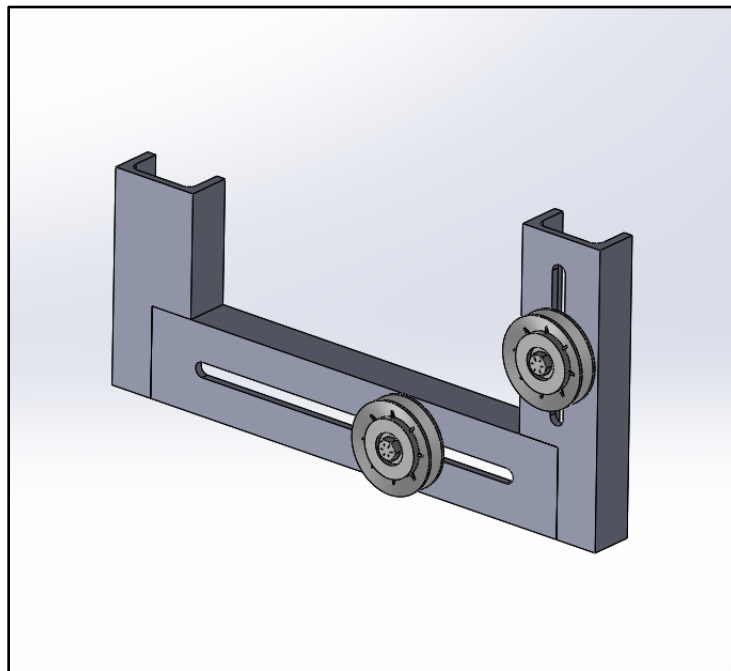


Figure 16

Once the frame of the gear assembly is finished, the builder can now add in two of the ½ inch (127 millimeters) idler pulleys. They both have ball bearings inside them so they can be fastened to the frame. Begin by aligning the hole in the pulley with the hole in the track. Then, use a ½" -13 by 1-1/2 inch (38.1 millimeters) hex head screw to fasten each pulley onto parts 17 and 18. 3 washers and a 0.5 – 13 hex nut should be used to secure the screw in place. One pulley should be on each track with one on each track. An accompanying lock nut fastens the pulley in place on the inside of the channel. The pulleys can be repositioned by loosening the nuts and moving the part along the channel. The fully assembled gear train is shown in Figure 17.



**Figure 17**

## 7. Completing the Assembly

The assembler should obtain all pieces required based on the bill of materials including the hardware.

Set up the frame assembly so that all the legs are on the ground to start the complete assembly. The wedge anchors may be added here to permanently fix the frame assembly in place on concrete. Then the builder should add all the pillow block bearings by sliding them along the channel. Start by placing the pillow block bearing on top of the channel so that the holes in the bearings line up with the hole in the channel. Next, the builder should take Part 6 and slide it into the channel. Align the holes in Part 6 with the holes in the bearings. Secure the bearings to Part 6 using one 1/2" screw size washer and the one 5/8" -11 by 2-1/2 inch (63.5 millimeter) by screwing the hex head screw into the tapped holes of Part 6. The head of the hex head screw should lie atop the washer located atop the slot on the bearing. Two bearings are located in each channel as shown in Figure 18. These bearings can be moved anywhere along the channel by loosening the screw and sliding it. The only condition is that two bearings must line up on both sides of the frame assembly

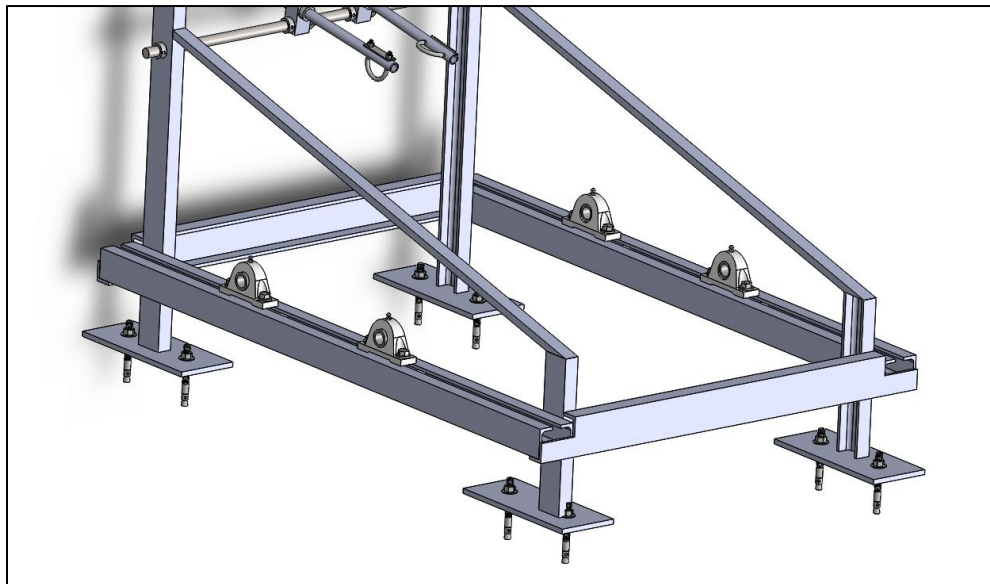
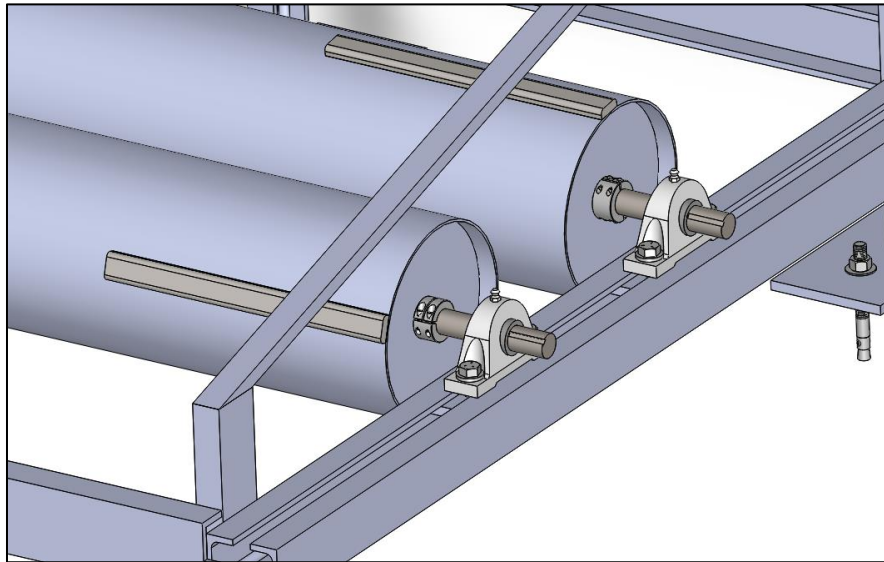
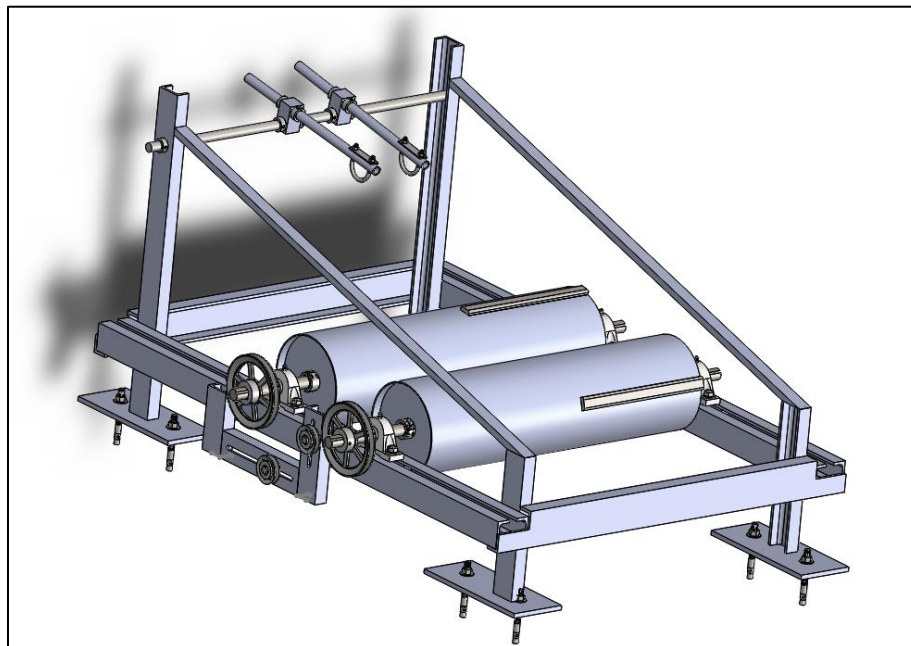


Figure 18



**Figure 19**

The next step is to add in the drum assemblies. Line up the drums with the holes in the bearings, and then slide Part 3 into the bearings so that it goes through the drum. On the one side of the assembly the builder should add in the two 1-1/4 inch (31.75 millimeters) pulleys. These connect to the ends of Part 3 and lock in place with a set screw built into the pulley. This, along with the keyway in Part 3, should cause the pulley to rotate when the shaft rotates. This assembly is shown in Figures 19 and 20.



**Figure 20**



The final step is to weld the gear assembly to the frame of the double drum test. It should be connected to the same side as the other pulleys. The top of Part 16 should be aligned with the top of the channel on the pulley side. The outside edge of Part 16 should be 20 inches (508 millimeters) from the back of the frame assembly. A corner flange weld around should be added anywhere the gear assembly touches the frame assembly as shown in Figure 21. All pulleys should be oriented with each other so that a v-belt could be added to them.

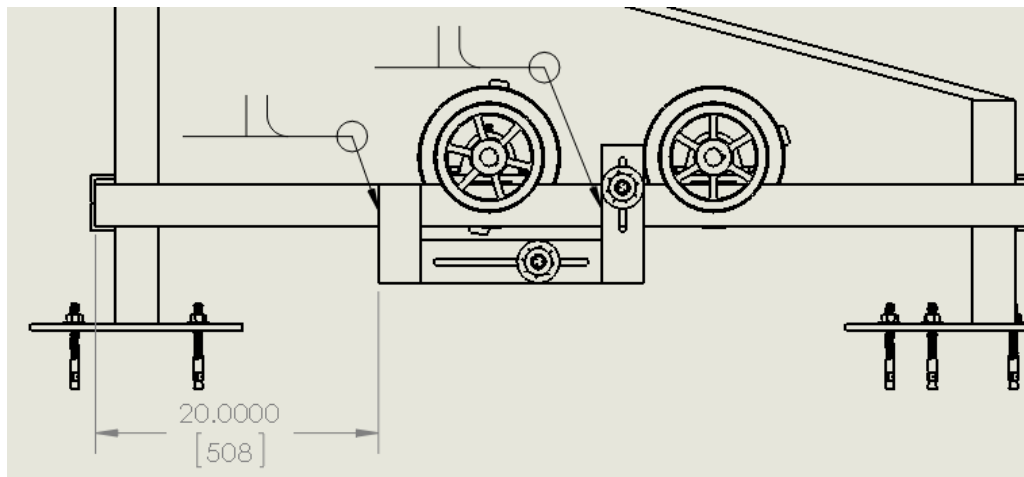


Figure 21

## 8. Adding the Motor

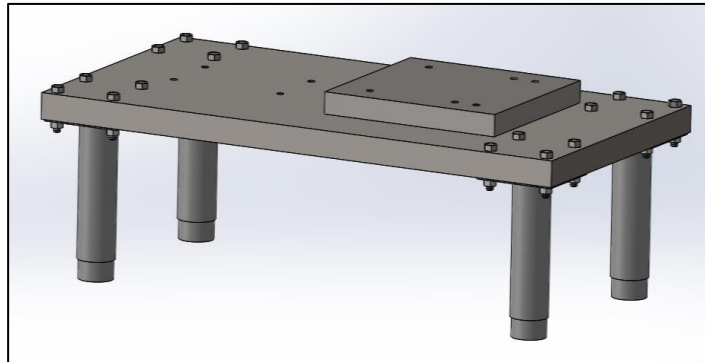
Please note that these motor mounting instructions are subject to change depending on the motor and/or gear reducer be used. This section can be reconfigured to fit different drive units; however, the top plate for the mount must be adjusted accordingly. Please see drawings to view proper hole placement for this particular gear box and motor.

### Building the Motor Mount Plate

The motor mount is made out of a 1 inch thick steel plate that is connected to four legs with leveling inserts and matching mounts. Each of the legs has an initial height of 11 inches (25.4 millimeters) but can be adjusted by lifting and lowering the leveling mounts. Begin by welding the legs onto the four outside corners of the mounting plate, then insert the leveling mount inserts and leveling mounts into each of the legs.



In order to accommodate for the height difference between the gear box and the motor and to

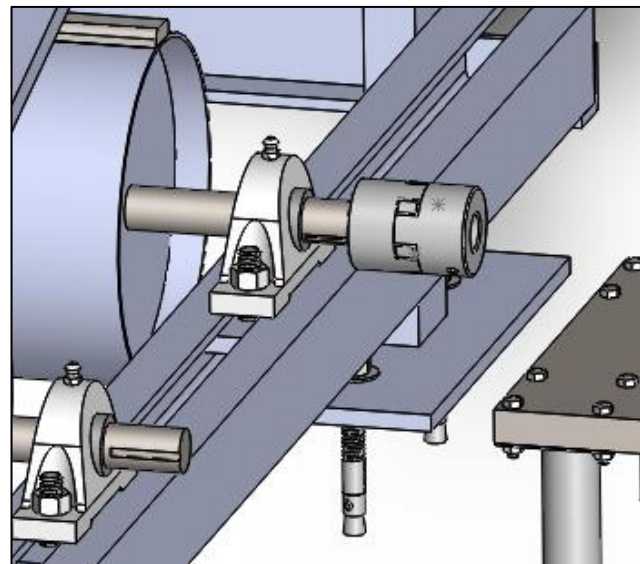


**Figure 22**

ensure they are both properly aligned, a spacer plate must be placed under the motor. Place the spacer plate atop the motor mounting plate, aligning the 3/8" holes in the motor spacing plate with the 3/8" holes on the motor mounting plate. The final motor mounting plate assembly is shown in Figure 22. The next step is to add the motor and gear box to the assembly.

### Installing the Motor and Gearbox

A three-phase AC motor is used with 1 hp and a maximum frequency of 1760 RPM. The motor is combined into a VARIDRIVE assembly that includes a gearbox for reducing the speed and increasing the torque. The motor is mounted by aligning the holes of the motor with the predrilled holes in the motor mount plate and using 3/8" – 16 by 2.5 inch (63.5 millimeters) screws to fasten it in place. The motor should be attached to the gear box and aligned at the back drum of the assembly to drive the motion of the tester. To connect the shaft of the gearbox to the shaft of the drum you will use the included Lovejoy shaft couplings. The coupling with the correct clearance size should be connected to each of the shafts and a rubber spider should then be used to connect the two couplings. An image of the Lovejoy coupling with the rubber spider is shown in Figure 23.



**Figure 23**

The motor should sit atop the motor spacing plate and the gear box should rest on the mounting plate. The gear box should be secured using 9/16"-18 socket head screws that are inserted from the bottom of the motor mount plate into the tapped holes located at the bottom of the gear box. The motor shall be secured using 3/8"-16 socket head screws that are inserted from the bottom of the motor mounting plate and through the holes in motor spacer

plate and motor. A 3/8" washer and hex head screw are used to securely fasten the motor to the mounting and spacer plates. These components can be adjusted to assure that the shafts line up correctly. A sample orientation of the gear box, motor, and shaft assemblies are shown in Figure 24.

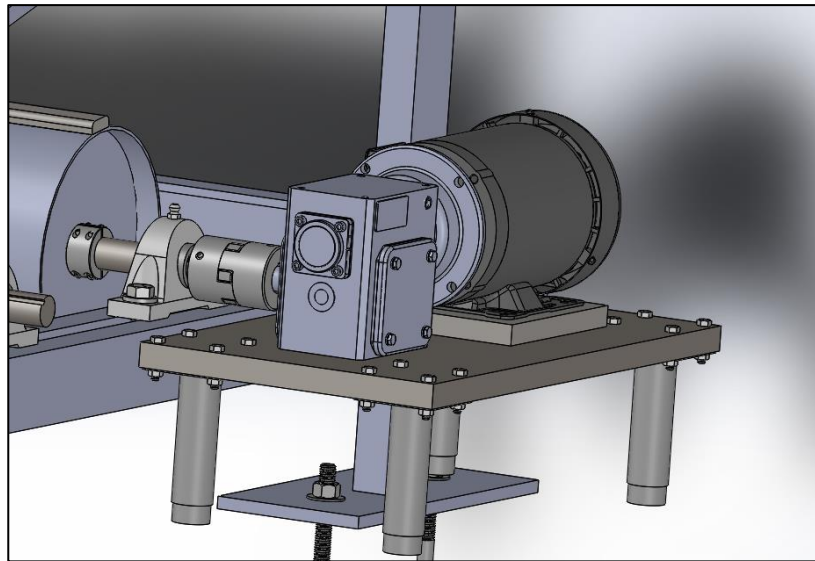


Figure 24

### Completing the Pulley System

The V-belt should then be added to the associated pulley system of the double drum tester. The idler pulleys should be used to keep the belt in tension during operation. Multiple belt sizes may be needed if testing different wheelbases of wheelchairs is necessary. However, the belt included in the bill of materials will work for most standard manual meant to be used with this tester. The correct orientation of the belt is shown in Figure 25.

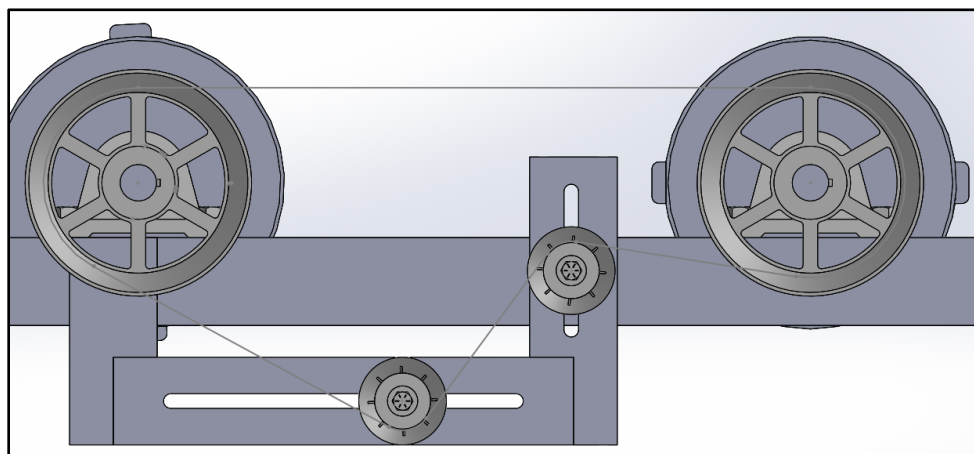


Figure 25

This completes the mechanical assembly of the double drum test for RESNA WC-1/ISO 7176 standards. The final assembly is shown in Figure 26.

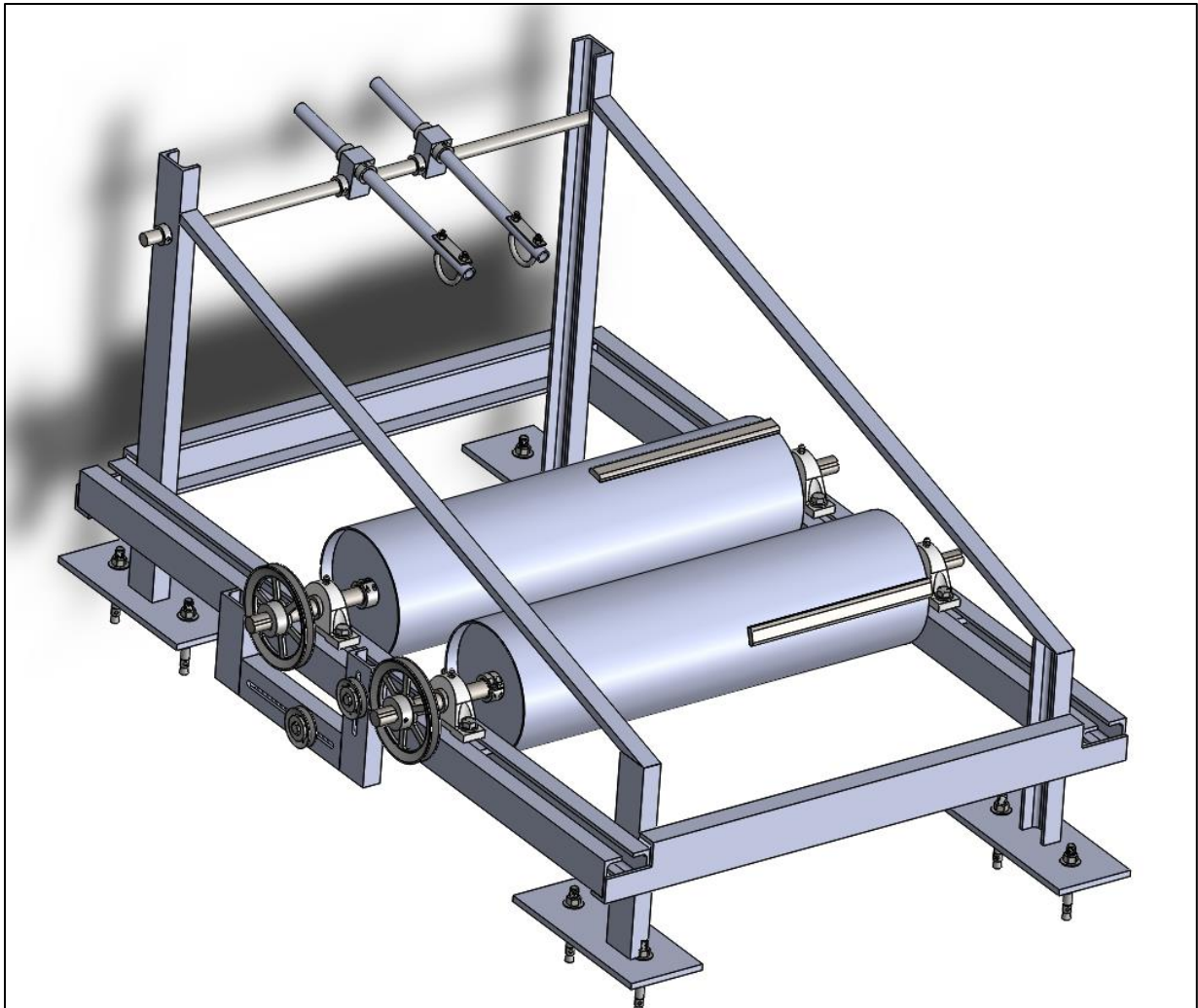
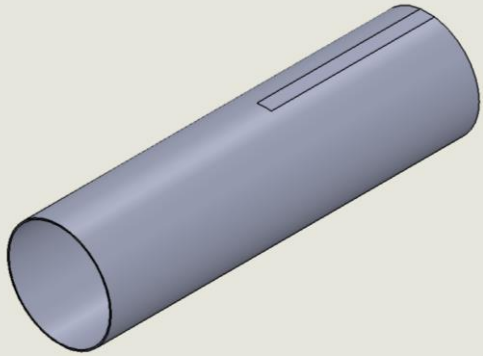
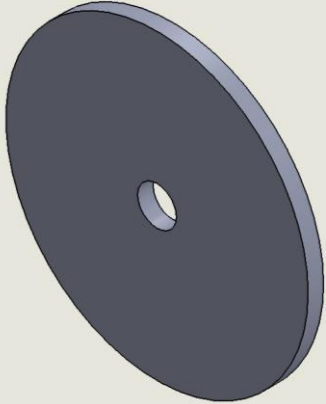

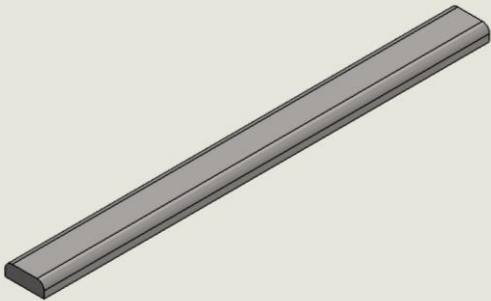
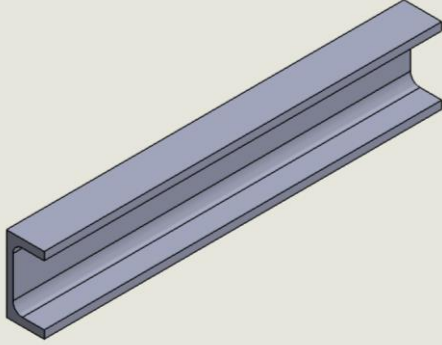
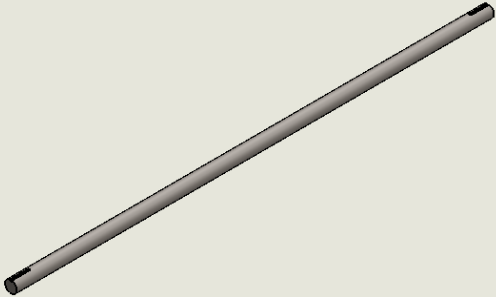
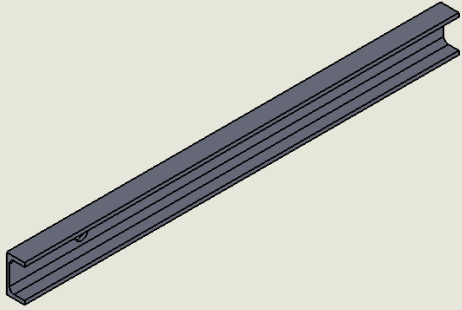
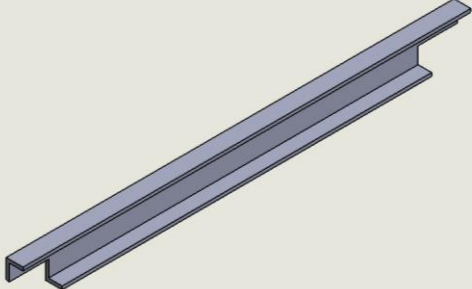


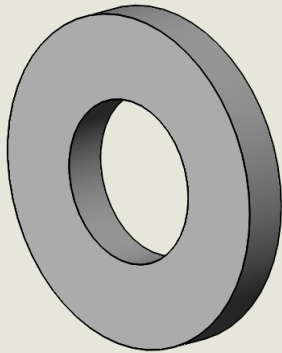
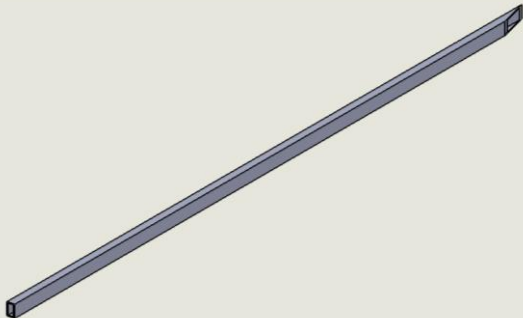
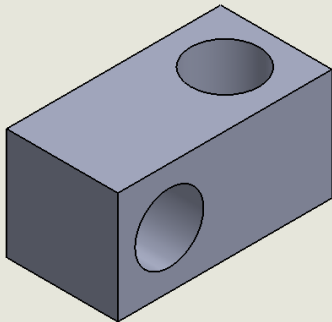
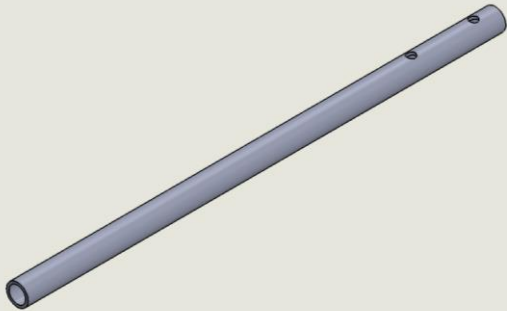
Figure 26

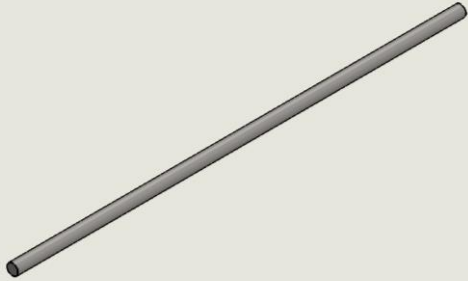
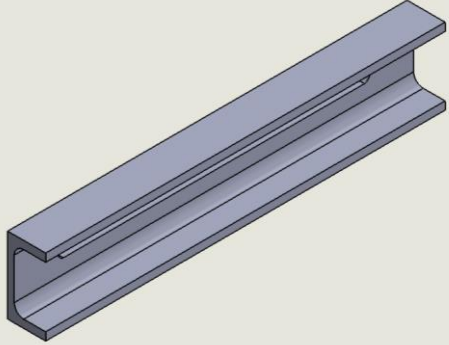
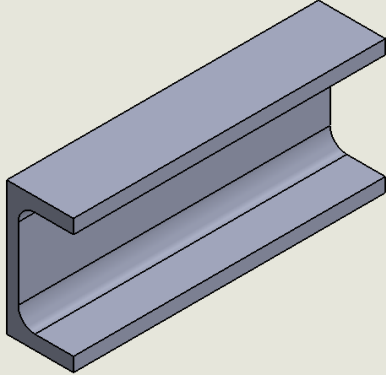
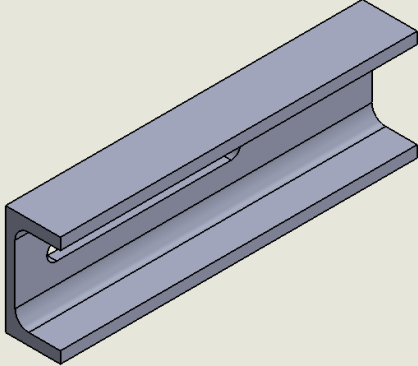
## 9. Reference Table of Parts

DRUM ASSEMBLY			
Part 1			
Part 2			
Double Shaft Collars			
Slats			

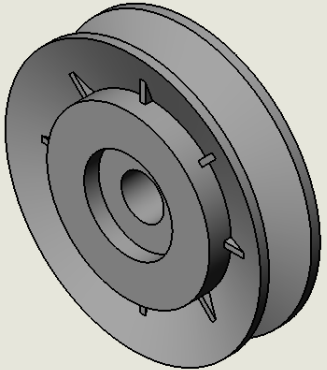
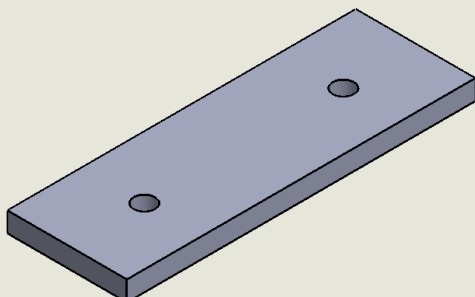
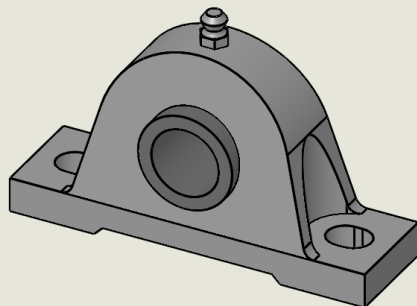
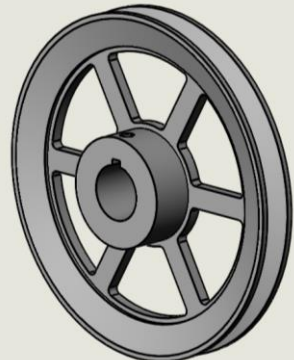
FRAME ASSEMBLY			
Part 13			
Part 3			
Part 12			
Part 7			



Part 5	
Part 22	
Part 10	
Part 8	

Part 11			
<b>GEAR ASSEMBLY</b>			
Part 17			
Part 16			
Part 18			



0.5" pulley			
<b>COMPLETE ASSEMBLY</b>			
Part 6			
Pillow Block Bearing			
1.25" pulley			





## **B. Operation and Electrical Assembly Recommendations**

### **1. Electrical Requirements and Recommendations**

The following section outlines electrical requirements and recommendations for proper function of the Double Drum Testing Machine. All operating instructions allow for successful completion of the double drum test as required by RESNA WC-1/ISO 7176 standards.

The motor selected for this machine should have at least a 1 horsepower rating, 3 phases, and a 220 voltage rating. The motor is to be combined with a gear box to allow for proper drum rotation. The gear box should be chosen with a gear ratio that allows the drum to turn with a speed of about 1800 RPM. A single phase output programmable logic controller should be used to control the machine along with limit switches, a relay, and a counter to keep track of drum rotations. Metallic proximity sensors, located at a distance far enough to ensure no test interference, can be used to count the rotations. The drum speed can be verified using a noncontact tachometer. A circuit breaker may be used to prevent power surges. Push buttons should be added as necessary to perform the commands that will dictate the motion of the motor including the starting and stopping of the motor to begin and finish the test. Additional push button functions may reverse the direction of the motor to pause the test and perform a jog which runs the motor at approximately 10% speed for adjustment and positioning of the wheelchair. The electrical components should be fit into an appropriate electrical enclosure, and the buttons should be mounted to the outside panel of the enclosure.

A limit switch should be used to make sure that if a wheelchair being tested fails that it will not damage the testing equipment. A combination of limit switches can be used to stop the machine. The switch should be wired directly to the logic controller to open the circuit if the switch is activated. The mounting location for the switch is left up to the builder of the device as long as it is still wired to the logic controller. One option is to mount the switch to the outside frame of the tester and have a string that connects the switch to some part of the chair. If this option is used be sure that the string is not in tension to avoid accidental flipping of the switch.

A 220V AC power supply is assumed to be accessible for the factory being set up, but if this is not true then a separate power supply must be obtained as it is required for operation of the equipment. If 3 phase power is not available, use a 220V single phase power supply and a motor controller that up-converts to 3 phase.

Organization of the wires within the control box is up to the user and can be done in any way they find the most effective.

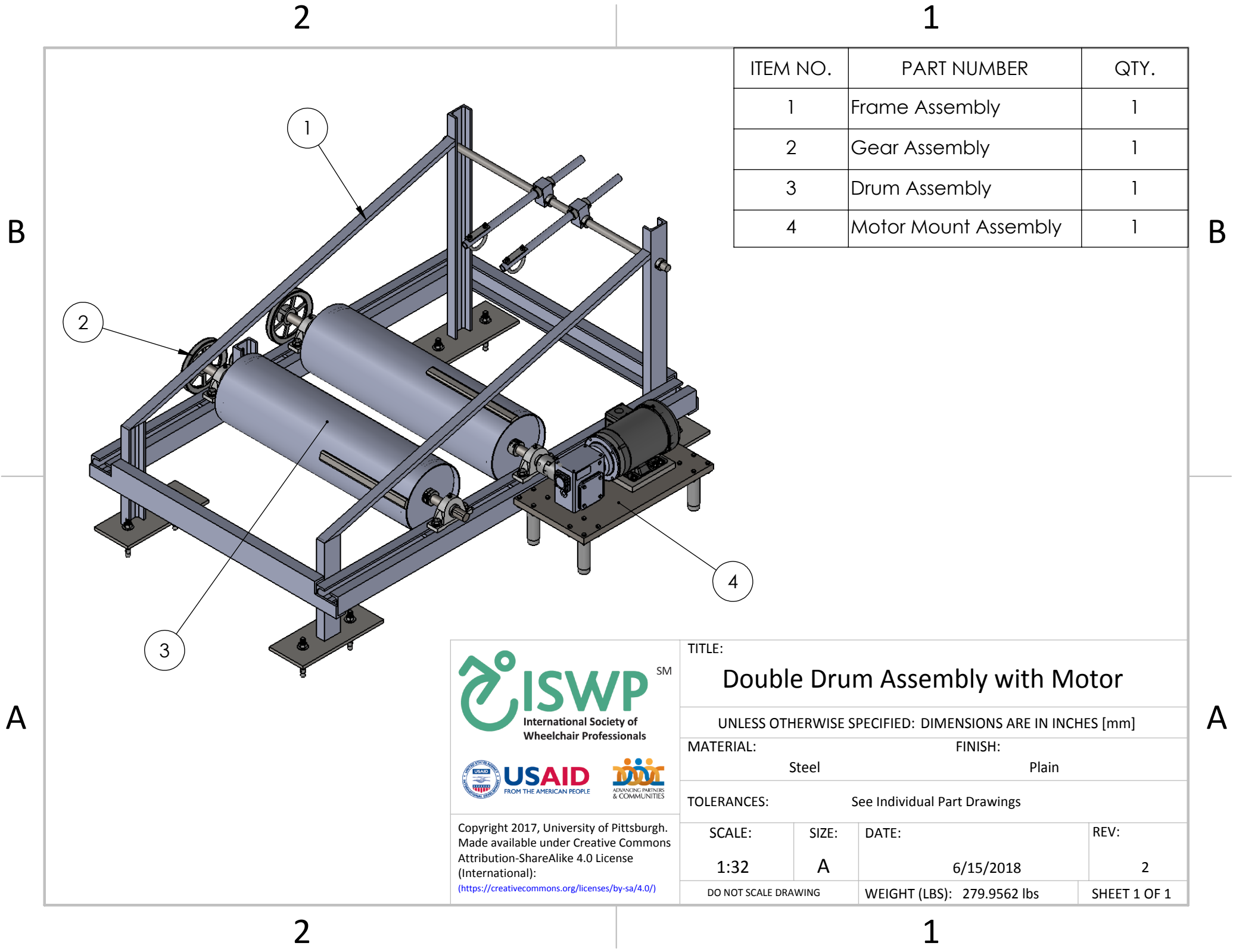
## 2. Verifying RESNA Standards

For the proper completion of RESNA approved Double Drum Testing the tester must meet certain specifications. These include performing 200,000 revolutions at a speed of 1 m/s +/- 0.1 m/s. In order to verify this certain equipment will be used to count the number of revolutions as well as to verify the speed that the drums are rotating at. To count the rotations of the drum a metallic proximity sensor will be used. A metallic object will be connected to the back drum so that it does not impede with the testing of the wheelchair. The proximity sensor will be placed a certain distance away to scan the object without affecting the test. The sensor's maximum sensing distance is 4 millimeters so it must be placed close to the metallic object. To count the rotations, the proximity sensor is wired directly into the logic controller.

For verifying the speed of the drum a noncontact tachometer will be used. This tachometer uses stroboscopic technology to measure the speed of the back drum. To read the speed a piece of reflective tape must be placed on the back drum and then point the tachometer at the drum to read the speed. Use the motor controller to adjust the speed of the drum until it is within the required range and then continue with the test.

Material	Amount Needed	Units	Source	Part Number	Size to Order	Qty to Order	Cost	Total Cost	Parts for which Material is used
3" x 1.498" x .258" A-36 Steel Channel	402.5	in	Metals Depot	C2350	20'	2	\$99.00	\$198.00	Part 5(66.5**4), Part 12(35.5**2), Part 13(16**2), Part 16(7.5"), Part 17(16"), Part 18(10")
4" x 1.721" x .321" A-36 Steel Channel	92	in	Metals Depot	C24725	7' 8"	1	\$88.34	\$88.34	Part 7(46**2)
1-1/4" Hot Rolled A-36 Steel Round	103	in	Metals Depot	R1114	8' 7"	1	\$69.05	\$69.05	Part 3(51.5**2),
1/2" x 3-1/2" Hot Rolled A-36 Steel Flat	36	in	Metals Depot	F212312	3'	1	\$36.05	\$36.05	Part 6(9**4)
2" x 2" Hot Rolled A-36 Steel Square	7	in	Metals Depot	SQ12	7"	1	\$32.89	\$32.89	Part 10(3.5**2)
1" OD x .065" wall x .870" ID 1020 DOM A513 Round Steel Tube	41.5	in	Metals Depot	T21065	3' 5-1/2"	1	\$18.33	\$18.33	Part 11(41.5")
1-1/2" x 3/4" x 11 GA (.120" wall) A513 Rectangle Steel Tube	63	in	Metals Depot	T11123411	5' 3"	1	\$32.09	\$32.09	Part 22(63")
10" OD x .125" wall A513 HREW Round Steel Tube	72	in	Metals Depot	T2W10125	3'	2	\$263.00	\$526.00	Part 1
1-3/4" thick A36 Steel Plate	7	in	Metals Depot	P1134	9-3/4" x 9-3/4"	4	\$121.94	\$487.76	Part 2(4*1.75)
1" OD x .120" wall A512 HREW Round Steel Tube	22.5	in	Metals Depot	T2W1120	1' 10-1/2"	2	\$10.78	\$21.56	Part 8(22.5*2)
1/2" x 1-1/2" Hot Rolled A-36 Steel Flat	64	in	Metals Depot	F212112	1' 4"	4	\$9.64	\$38.56	bump
Oversized Steel Machine Key Stock, Zinc-Plated, 12" long	8	in	McMaster-Carr	98491A136	1/4" x 1/4"	1	\$1.44	\$1.44	Part 3
1" thick A36 Steel Plate	182	in^2	Metals Depot	P11	14" x 13"	1	\$107.43	\$107.43	motor mount plate
1/2" thick A36 Steel Plate	187.5	in^2	Metals Depot	P112	6-1/4"x15"	4	\$41.33	\$165.32	Anchor Plate
7/8" thick A36 Steel Plate	64	in^2	Metals Depot	P178	1' x 1'	1	\$90.01	\$165.32	Motor spacer plate
1-1/2 OD x .083 wall x 1.334 ID 1020 DOM A513 Round Steel Tube	44	in	Metals Depot	T2112083	4'	1	\$39.68	\$165.32	Motor Assembly -- mounting plate legs
							Shipping	\$93.86	UPS Freight
							Parts	\$2,153.46	
						Metals Depot	Total	\$2,247.32	
Hardware	Qty Needed		Source	Part Number	Package Size	Qty to Order	Cost	Total Cost	Parts for which Material is used
Cast Iron V-Belt Pulley 7.75" OD, 1-1/4" Bore Size	2		McMaster-Carr	6204K397	1	2	\$53.27	\$106.54	Final Assembly
Nylon Idler Pulley with Ball Bearings 3" OD 1/2" Bore Size	2		McMaster-Carr	6234K53	1	2	\$11.25	\$22.50	Final Assembly
U-Bolt with Mount Plate, Zinc-Plated Steel, 3/8"-16 thread size, 2-1/2" ID	2		McMaster-Carr	3043T82	1	2	\$2.13	\$4.26	Frame assembly
Medium-Strength Grade 5 Steel Hex Nut 1/2" -13 thread size, zinc-plated	2		McMaster-Carr	95462A033	100	1	\$13.77	\$13.77	Gear Assembly
Medium-Strength Grade 5 Steel Hex Head Screw Zinc-Plated, 1/2"-13 Thread Size, 2" Long, Partially Threaded	2		McMaster-Carr	91247A720	10	1	\$6.33	\$6.33	Gear Assembly
Zinc Yellow-Chromate Plated Grade 8 Steel Washer for 1/2" Screw Size, 0.531" ID, 1.062" OD	6		McMaster-Carr	98023A033	25	1	\$6.73	\$6.73	Gear Assembly
Set Screw Shaft Collar for 1" Dia, Black-Oxide 1215 Carbon Steel	10		McMaster-Carr	9414T19	1	10	\$2.55	\$25.50	Frame assembly
Ball Bearing with Nickel-Plated Cast Iron Housing 1-1/4" Shaft Dia	4		McMaster-Carr	6494K16	1	4	\$61.83	\$247.32	Pillow Block Bearing
Alloy Steel Shoulder Screw 1/2" Diameter 1-1/2" Long Shoulder, 3/8"-16 Thread	8		McMaster-Carr	91259A716	1	8	\$2.13	\$17.04	Final Assembly pillow blocks
Steel Stud Anchor for Concrete 5/8" Dia 6" long	8		McMaster-Carr	91578A209	10	1	\$25.70	\$25.70	Frame Assembly
Buna-N Rubber Spider for 2-35/65" OD Flexible Shaft Coupling Iron Hub	1		McMaster-Carr	6408K77	1	1	\$16.19	\$16.19	final assembly with motor
Medium-Strength Grade 5 Steel Hex Head Screw, Zinc-Plated, 5/16" -18 x 1.5"	16		McMaster-Carr	92865A587	50	1	\$8.83	\$8.83	motor mount assembly

Medium-Strength Grade 5 Steel Hex Nut, Zinc-Plated, 5/16" -18	16		McMaster-Carr	95462A030	100	1	\$6.44	\$6.44	motor mount assembly
Grade 9 Steel Washer Zinc Yellow-Chromate Plated, 5/8" Screw Size, 1.342" OD	8		McMaster-Carr	90850A350	10	2	\$9.38	\$18.76	final assembly with motor
Extra-Wide Clamping Two-Piece Shaft Collar for 1-1/4" Diameter, Black-Oxide 1215 Carbon Steel	2		McMaster-Carr	8389K23	1	2	\$83.26	\$166.52	drum assembly
Zinc Yellow-Chromate Plated Grade 8 Steel Washer for 3/8" Screw Size, 0.406" ID, 0.812" OD	6		McMaster-Carr	98023A031	50	1	\$64.10	\$64.10	Motor assembly -- motor
High-Strength Steel Hex Nut Grade 8, 3/8"-16 Thread Size	14		McMaster-Carr	90499A031	100	1	\$6.61	\$6.61	Motor assembly -- motor
Black-Oxide Alloy Steel Socket Head Screw 3/8"-16 Thread Size, 2-1/2" Long, Partially Threaded	6		McMaster-Carr	91251A634	10	1	\$5.93	\$5.93	Motor assembly -- motor
Black-Oxide Alloy Steel Socket Head Screw 5/16"-18 Thread Size, 1-1/2" Long	4		McMaster-Carr	91251A587	50	1	\$12.28	\$12.28	Motor assembly -- gear box
High-Capacity Leveling Mount Insert for Tubular Leg; for 1-1/2" OD and 1-3/8" ID, 1/2"-13 Thread	4		McMaster-Carr	60945K14	1	4	\$7.93	\$31.72	Motor assembly -- mounting plate legs
Vibration-Damping Leveling Mount with 1/2"-13 Threaded Stud, 450 lbs. Capacity	4		McMaster-Carr	6167K13	1	4	\$20.54	\$82.16	Motor assembly -- mounting plate legs
Grade 8 Steel Washer Black Ultra-Corrosion-Resistant, 7/16" Screw Size, 1.25" OD	8		McMaster-Carr	98026A114	5	2	\$7.47	\$14.94	Final Assembly -- pillow blocks
High-Strength Steel Hex Nut Grade 8, Zinc Yellow-Chromate Plated, 3/8"-16 Thread Size	8		McMaster-Carr	94895A031	100	1	\$7.77	\$7.77	Final Assembly -- pillow blocks
							Shipping	unknown	
							Hardware	\$917.94	
						McMaster-Carr	Total	\$917.94	
							Final Total	\$3,165.26	



ITEM NO.	PART NUMBER	QTY.
1	Frame Assembly	1
2	Gear Assembly	1
3	Drum Assembly	1
4	Motor Mount Assembly	1



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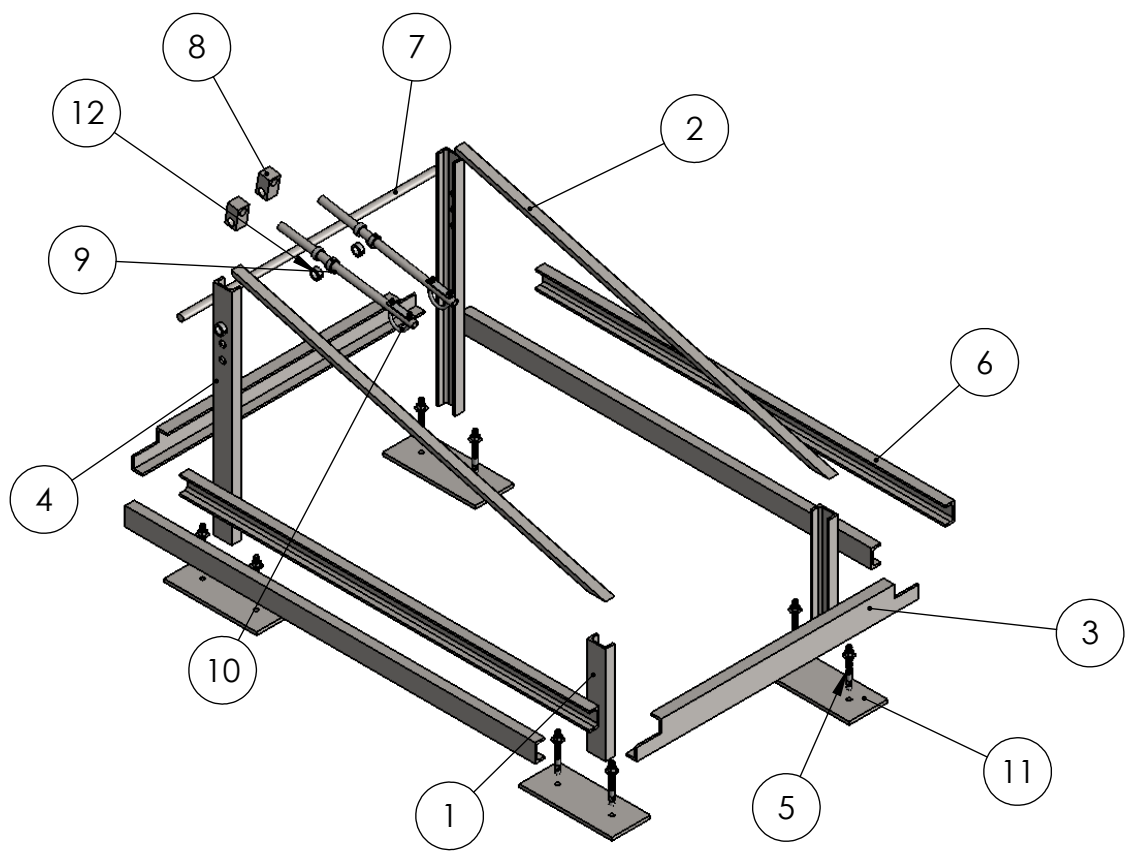


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TITLE: Double Drum Assembly with Motor			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]			
MATERIAL: Steel		FINISH: Plain	
TOLERANCES:		See Individual Part Drawings	
SCALE: 1:32	SIZE: A	DATE: 6/15/2018	REV: 2
DO NOT SCALE DRAWING		WEIGHT (LBS): 279.9562 lbs	SHEET 1 OF 1


B




ITEM NO.	PART NUMBER	QTY.
1	Part 13 Double Drum	2
2	Part 22 Double Drum	2
3	Part 7 Double Drum	2
4	Part 12 Double Drum	2
5	5/8" Diameter, 6" Long Steel Stud Anchor	8
6	Part 5 Double Drum	4
7	Part 11 Double Drum	1
8	Part 10 Double Drum	2
9	Part 8 Double Drum	2
10	3/8" - 16 Thread, 2-1/2" ID U-Bolt	2
11	Anchor Plate	4
12	1" Diameter Shaft Collar	10

B


A



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TITLE:

**Double Drum Frame Assembly Exploded**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: Steel FINISH: Plain

TOLERANCES:

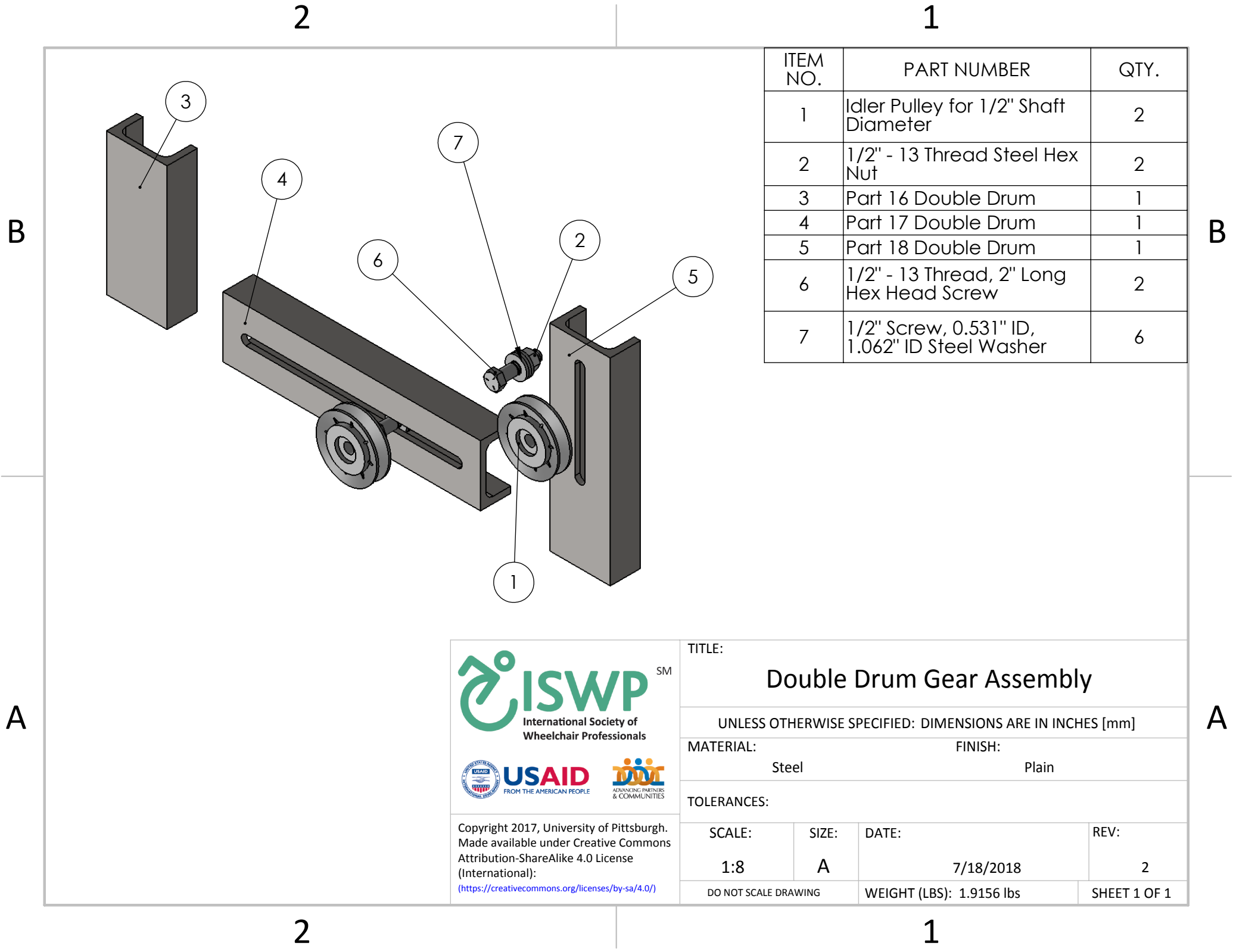
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DO NOT SCALE DRAWING WEIGHT (LBS): 95.4514 lbs SHEET 1 OF 1

A

2

1



ITEM NO.	PART NUMBER	QTY.
1	Idler Pulley for 1/2" Shaft Diameter	2
2	1/2" - 13 Thread Steel Hex Nut	2
3	Part 16 Double Drum	1
4	Part 17 Double Drum	1
5	Part 18 Double Drum	1
6	1/2" - 13 Thread, 2" Long Hex Head Screw	2
7	1/2" Screw, 0.531" ID, 1.062" ID Steel Washer	6



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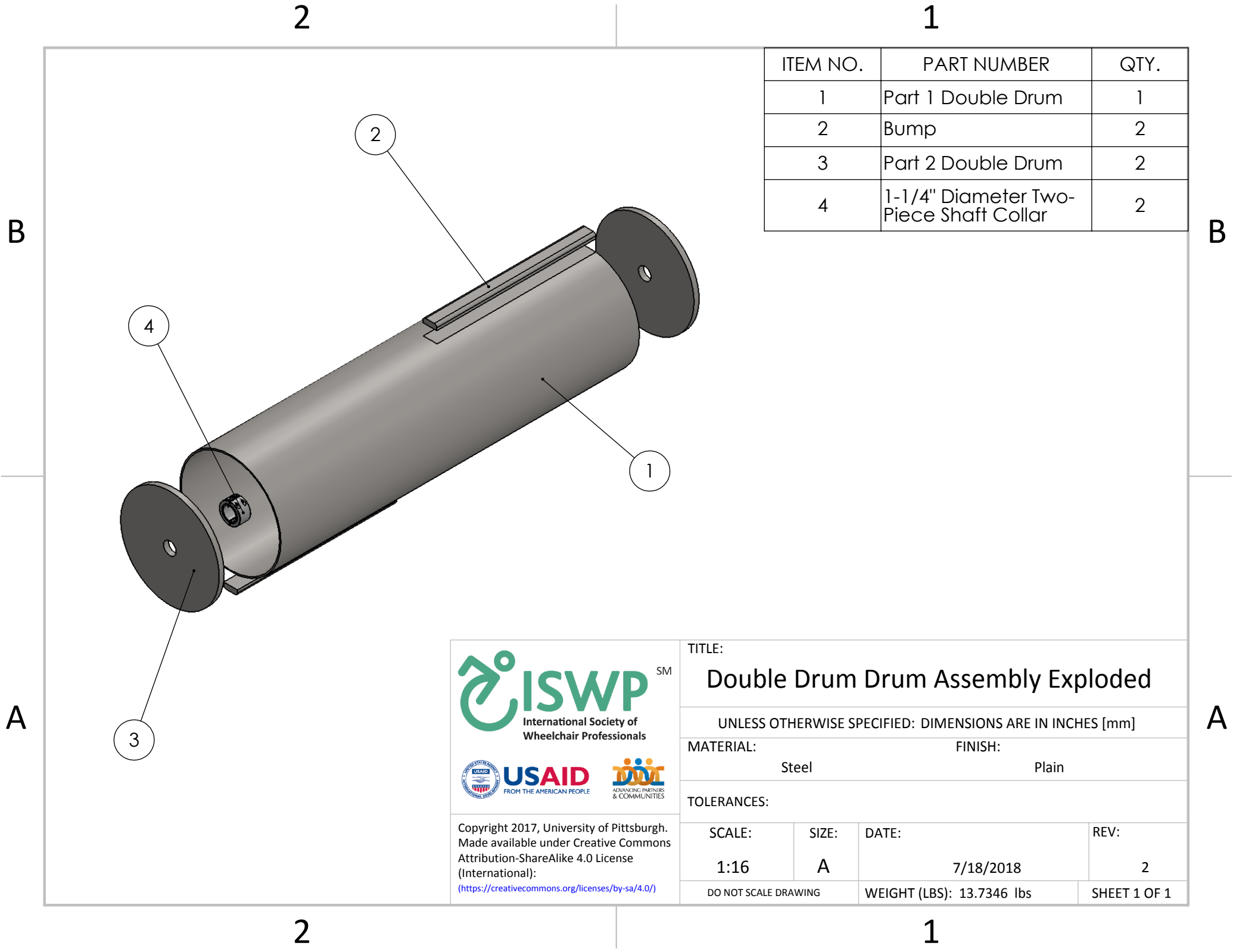


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TITLE:			
Double Drum Gear Assembly			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]			
MATERIAL:		FINISH:	
Steel		Plain	
TOLERANCES:			
SCALE:	SIZE:	DATE:	REV:
1:8	A	7/18/2018	2
DO NOT SCALE DRAWING		WEIGHT (LBS): 1.9156 lbs	SHEET 1 OF 1




ITEM NO.	PART NUMBER	QTY.
1	Part 1 Double Drum	1
2	Bump	2
3	Part 2 Double Drum	2
4	1-1/4" Diameter Two-Piece Shaft Collar	2



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TITLE:  
**Double Drum Drum Assembly Exploded**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL: Steel FINISH: Plain

TOLERANCES:

SCALE: 1:16	SIZE: A	DATE: 7/18/2018	REV: 2
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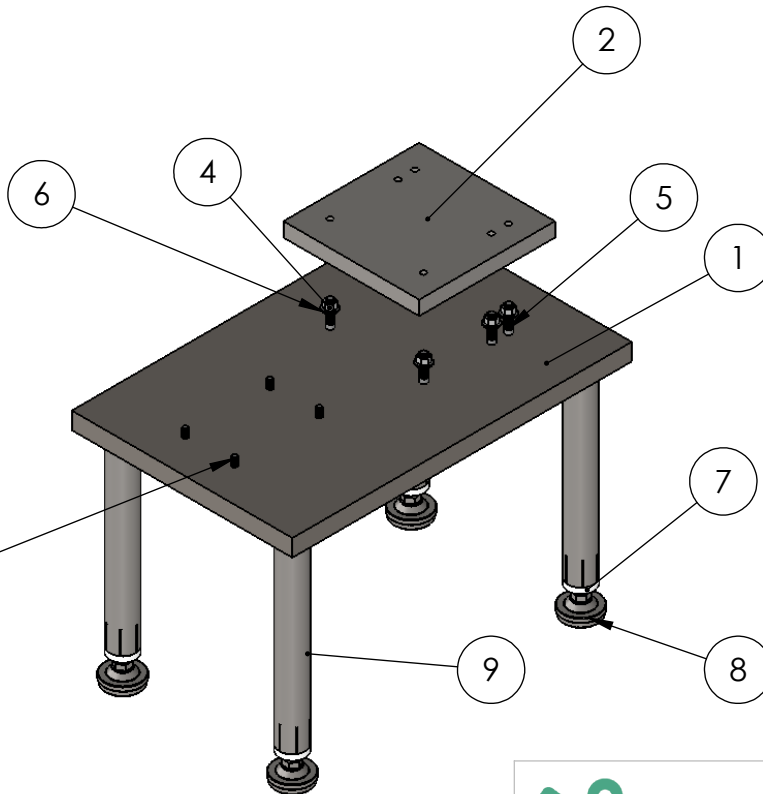
DO NOT SCALE DRAWING WEIGHT (LBS): 13.7346 lbs SHEET 1 OF 1



2

1

Note: This drawing is subject to change depending on the motor used.



ITEM NO.	PART NUMBER	QTY.
1	Motor Mounting Plate	1
2	Motor Spacing Plate	1
3	5/16"-18 Thread, 1-1/2" Long Steel Socket Head Screw	4
4	3/8" - 16 Hex Nut	6
5	3/8" - 16 Thread, 2-1/2" Long Steel Socket Head Screw	6
6	3/8" Screw, 0.406" ID, 0.812" OD Steel Washer	6
7	1-1/2" OC, 1-3/8" ID, 1/2" - 13 Thread Leveling Mount Leg InsertsB2	4
8	1/2" - 13 Threaded Leveling Mount	4
9	motor mount legs	4



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TITLE:

## Double Drum Motor Mount Assembly

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

SCALE:

1:8

SIZE:

A

DATE:

7/20/2018

REV:

2

DO NOT SCALE DRAWING

WEIGHT (LBS): 113.1667 lbs

SHEET 1 OF 1

2

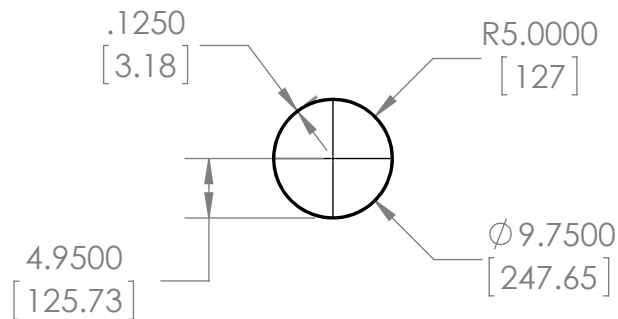
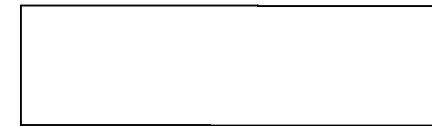
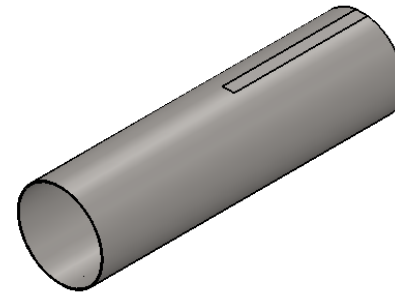
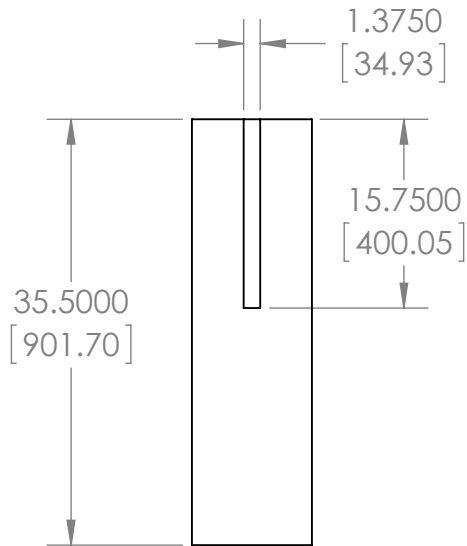
1

2

1

# 10" OD, 9.75" ID Hollow Steel Drum

Quantity: 2



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TITLE:

## Part 1 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:16

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 4.9222 lbs

SHEET 1 OF 1

2

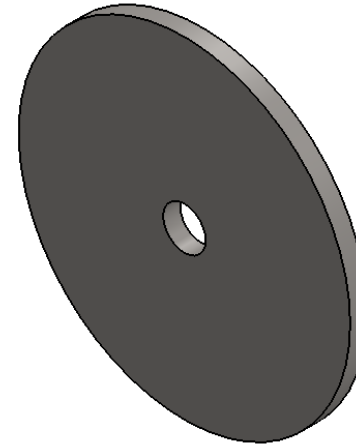
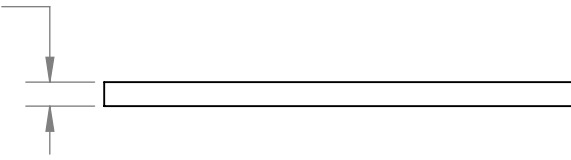
1

2

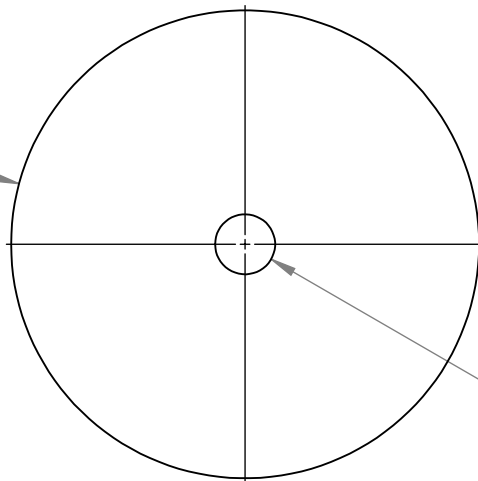
1

0.5" Thick Steel Plate  
Quantity: 4

.5000  
[12.70]



Ø 9.7500  
[247.65]



Ø 1.2500  
[31.75]

B

B

A

A



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TITLE:

**Part 2 Double Drum**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.0050

-0.0050

SCALE:

1:4

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 1.3948 lbs

SHEET 1 OF 1

2

1

2

1

1-1/4" dia Steel Precision Rod  
Quantity: 2

B

B

2.0000  
[50.80]

.1124  
[2.85]

Ø 1.2500  
[31.75]

.2500  
[6.35]

49.2500  
[1250.95]

A

A



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TITLE:

**Part 3 Double Drum**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.0050

-0.0050

SCALE:

1:24

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 17.8022 lbs

SHEET 1 OF 1

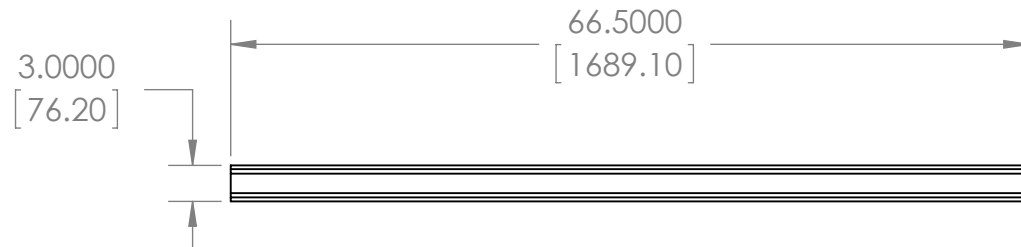
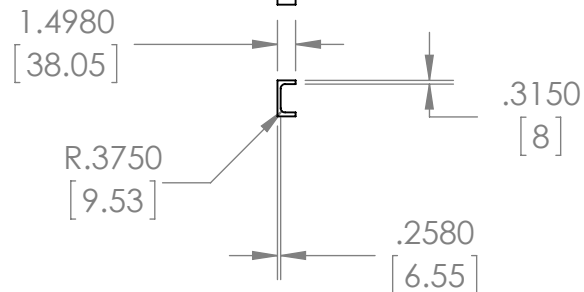
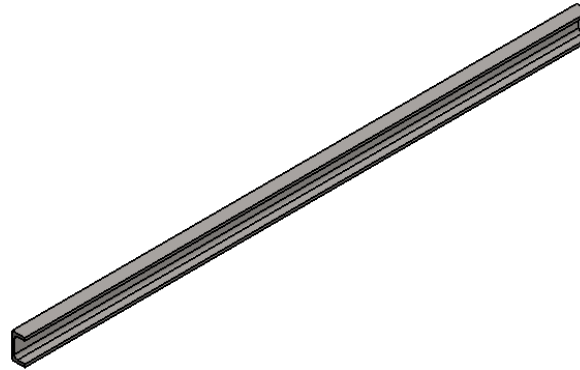
2

1

2

1

3" x 1.498" x .258" Steel Channel  
Quantity: 4



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TITLE:

Part 5 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:32

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 3.8811 lbs

SHEET 1 OF 1

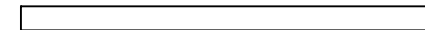
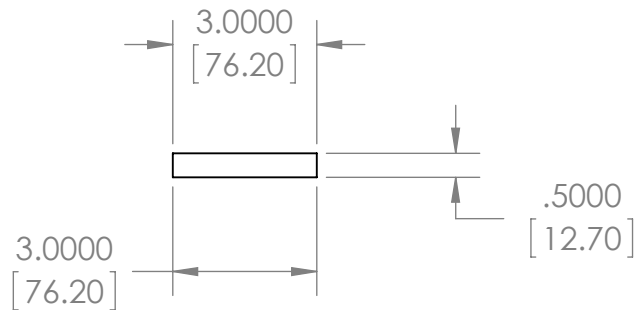
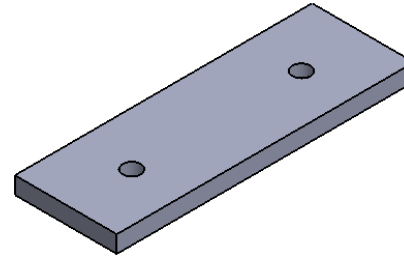
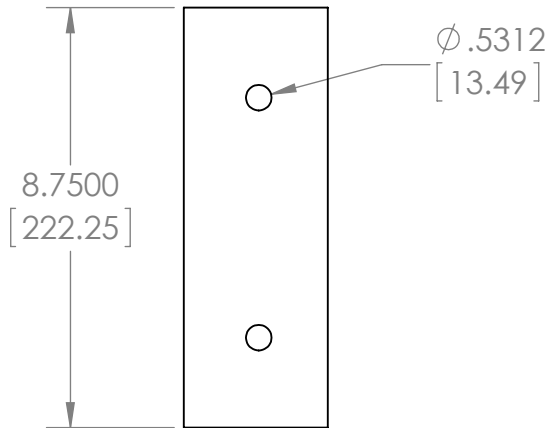
2

1

2

1

1/2" thick Steel Flat Bar  
Quantity: 4



Note: these are 5/8" - 11 tapped holes



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TITLE:

Part 6 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:4

SIZE:

A

DATE:

5/23/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.4318

SHEET 1 OF 1

2

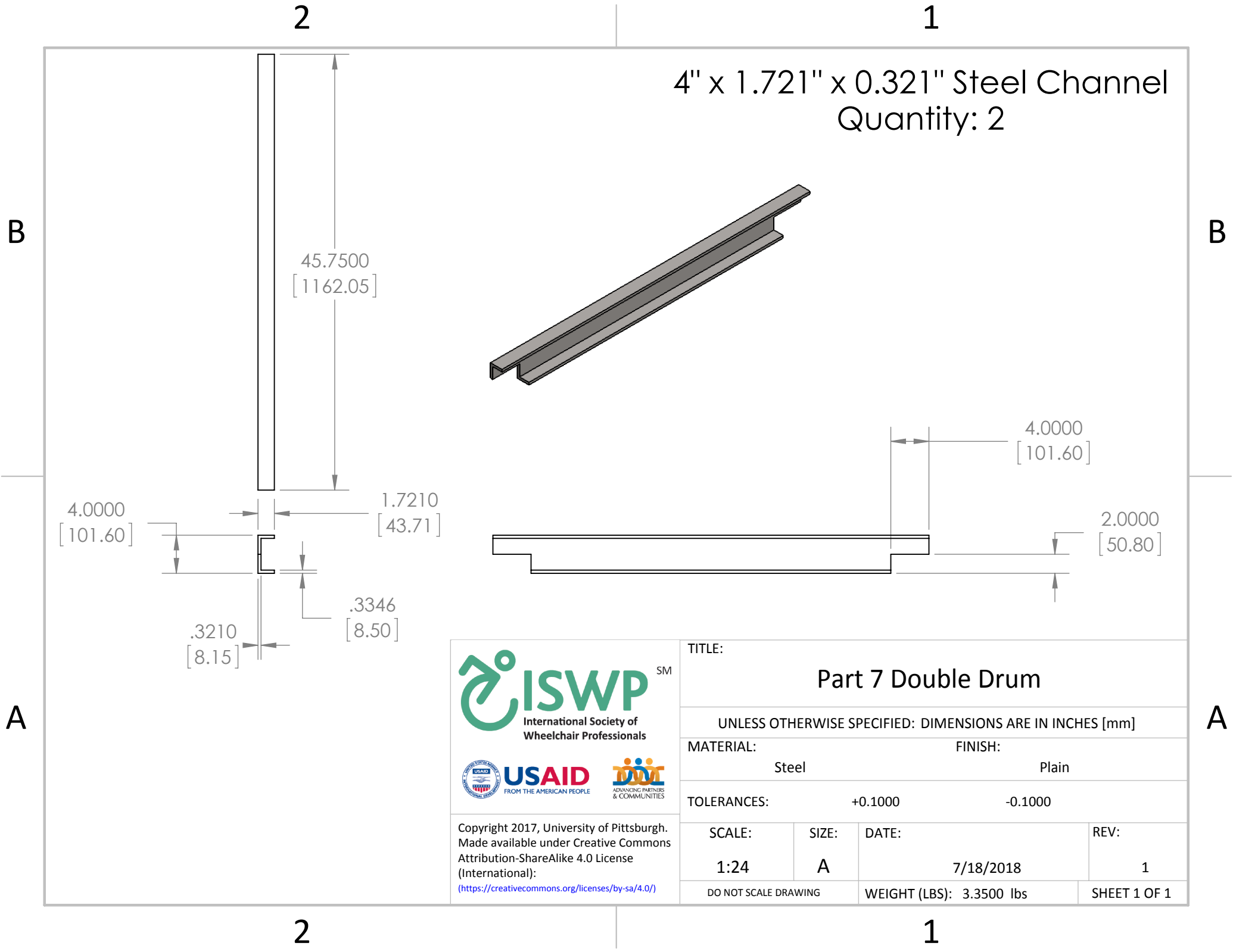
1

B

B

A

A



4" x 1.721" x 0.321" Steel Channel  
Quantity: 2



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TITLE: <b>Part 7 Double Drum</b>			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]			
MATERIAL: Steel		FINISH: Plain	
TOLERANCES:		+0.1000	-0.1000
SCALE: 1:24	SIZE: A	DATE: 7/18/2018	REV: 1
DO NOT SCALE DRAWING		WEIGHT (LBS): 3.3500 lbs	SHEET 1 OF 1

2

1

1" OD 0.75" ID Hollow Steel Tube  
Quantity: 2

$\phi .7500$   
[19.05]

$\phi 1.0000$   
[25.40]

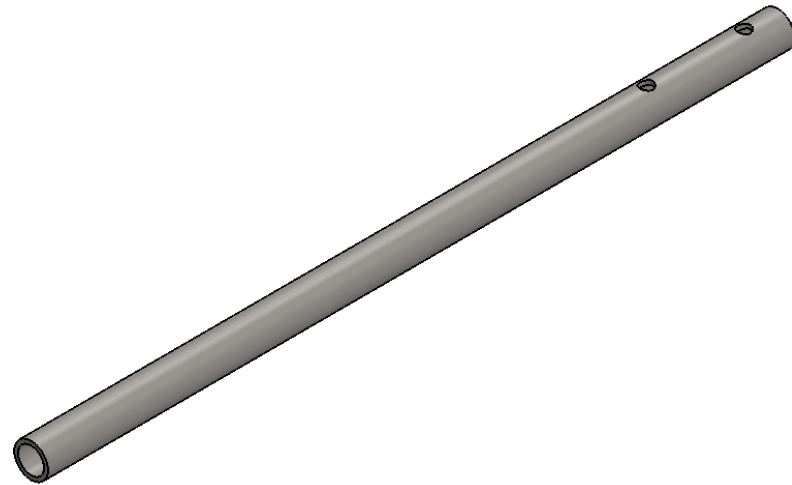
22.0000  
[558.80]

1.0000  
[25.40]

2 x  $\phi .3750$   
[9.53]

3.8750  
[98.43]

.5000  
[12.70]



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TITLE:

Part 8 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:12

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.2617 lbs

SHEET 1 OF 1

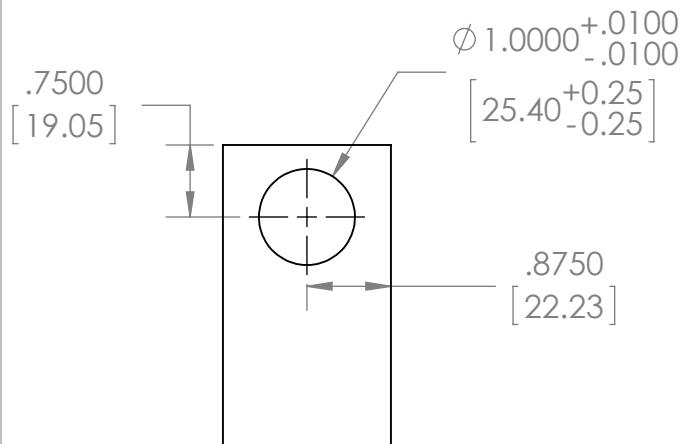
2

1

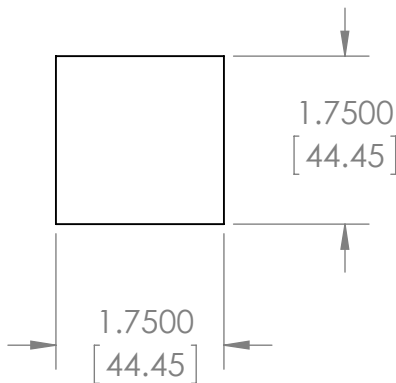
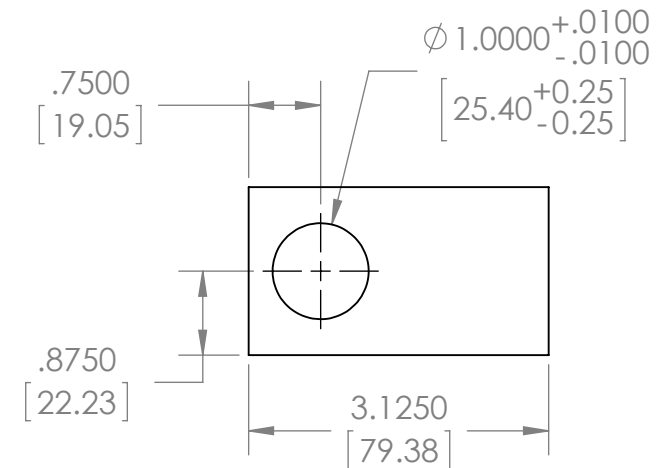
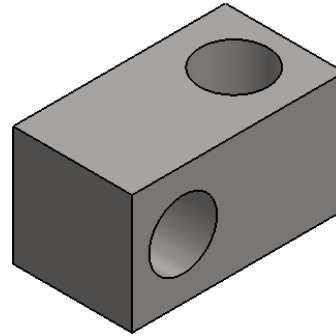


2

1



1.75" x 1.75" x 3.125" Steel Bar  
Quantity: 2



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TITLE:

Part 10 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:2

SIZE:

A

DATE:

7/18/2018

REV:

1

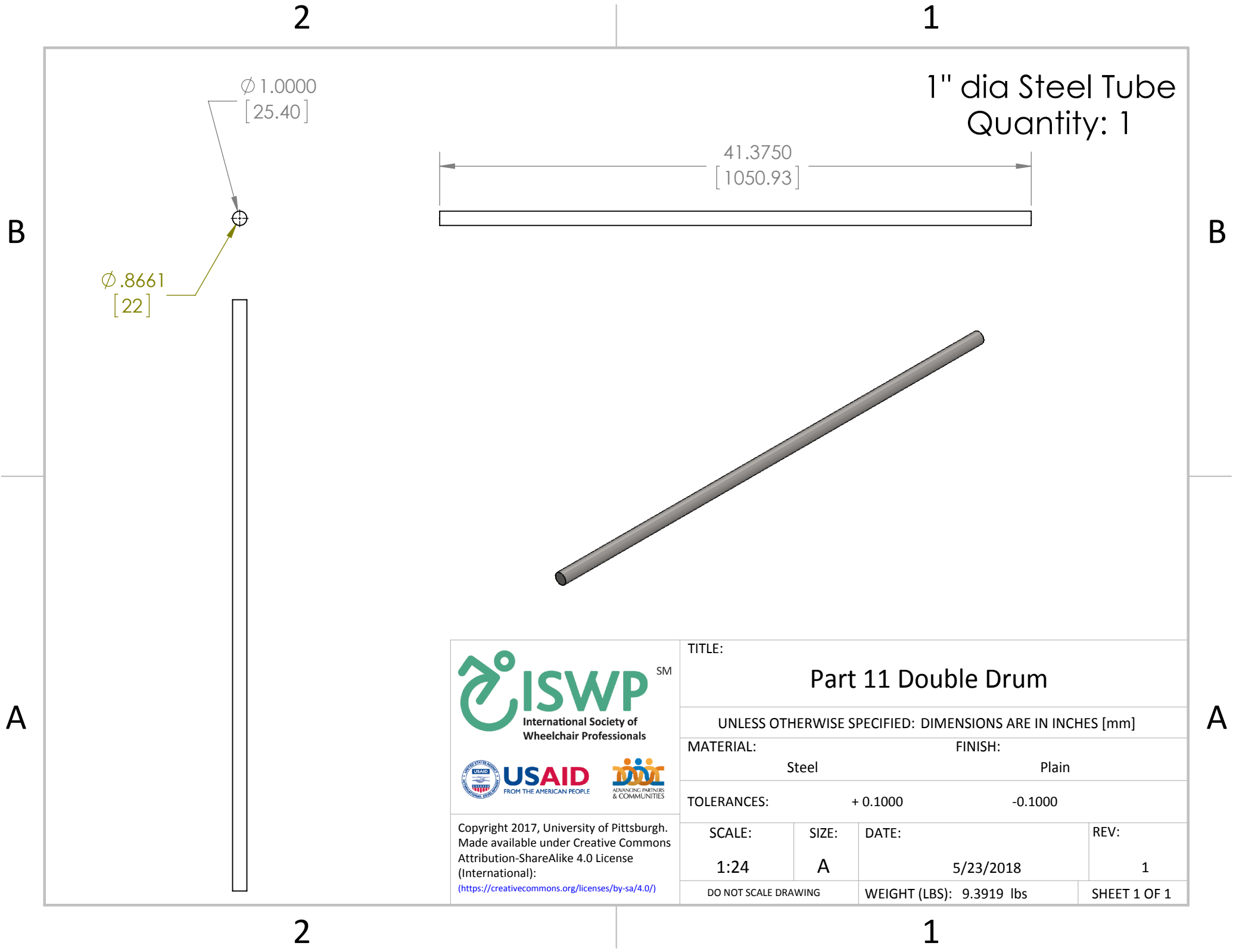
DO NOT SCALE DRAWING

WEIGHT (LBS): 0.2058 lbs

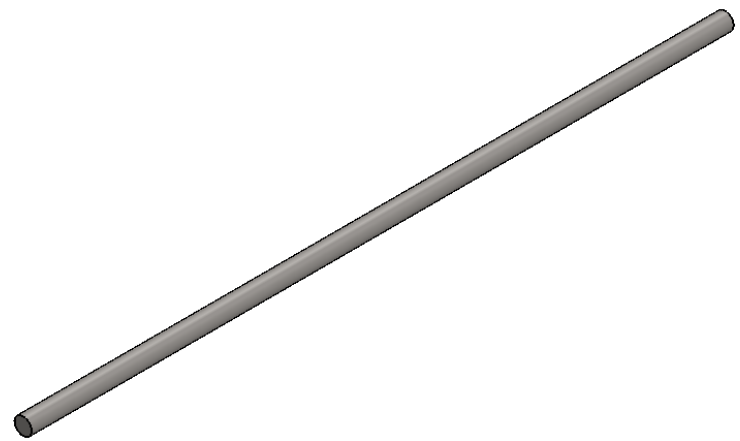
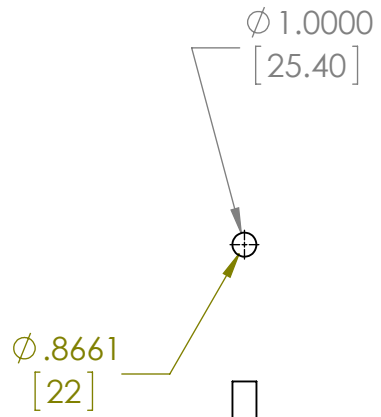
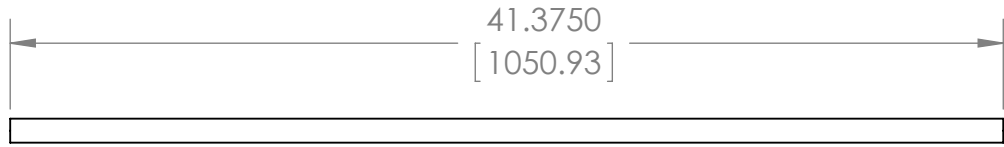
SHEET 1 OF 1




2

1



1" dia Steel Tube  
Quantity: 1



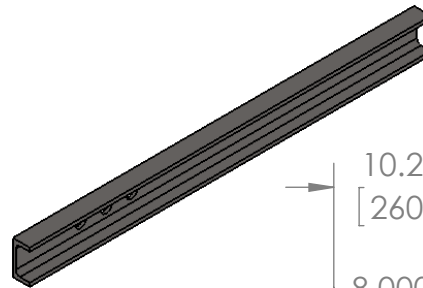
 International Society of Wheelchair Professionals  USAID FROM THE AMERICAN PEOPLE  ADVANCING PARTNERS & COMMUNITIES	TITLE:  Part 11 Double Drum			
	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]			
	MATERIAL:  Steel		FINISH:  Plain	
	TOLERANCES:  + 0.1000			

2

1

3" x 1.498" x 0.258" Steel Channel  
Quantity: 2

35.5000  
[901.70]



10.2500  
[260.35]

8.0000  
[203.20]

5.7500  
[146.05]

.3150  
[8]

1.4980  
[38.05]

R.3750  
[9.53]

.2580  
[6.55]

1.5000  
[38.10]

3.0000  
[76.20]

$\phi 1.0000^{+0.0100}_{-0.0100}$   
[25.40<sup>+0.25</sup><sub>-0.25</sub>]



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TITLE:

Part 12 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:16

SIZE:

A

DATE:

7/17/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 2.0645 lbs

SHEET 1 OF 1

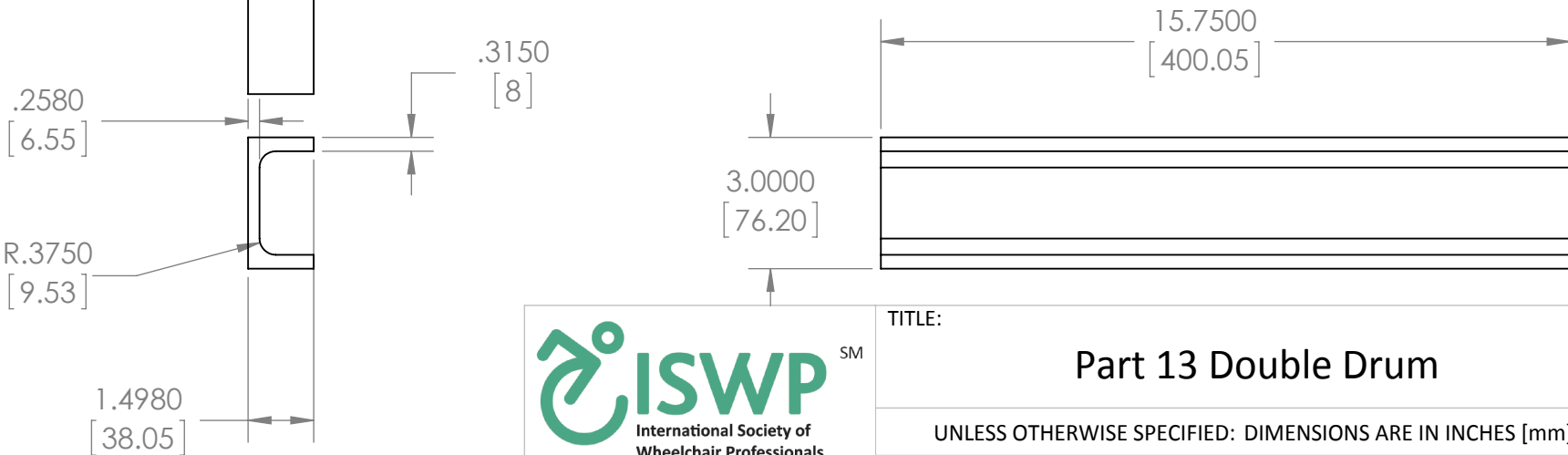
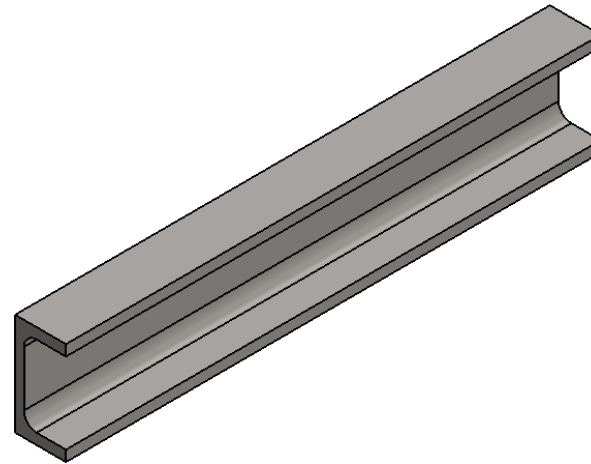
2

1

2

1

3" x 1.498" x 0.258" Steel Channel  
Quantity: 2



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TITLE:

Part 13 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:8

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.9192 lbs

SHEET 1 OF 1

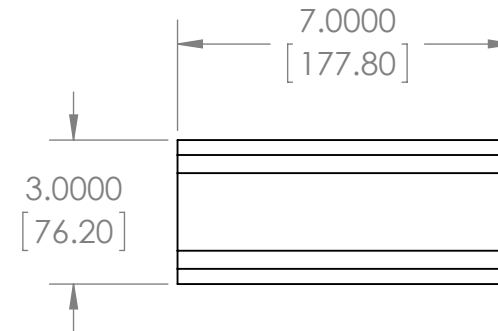
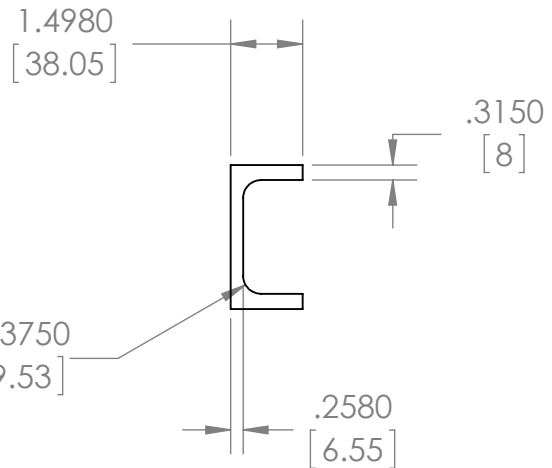
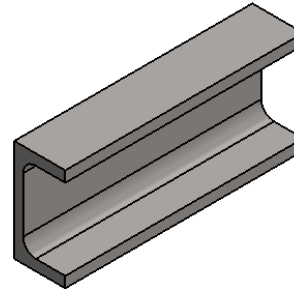
2

1

2

1

3" x 1.498" x 0.258" Steel Channel  
Quantity: 1



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TITLE:

Part 16 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:4

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.3210 lbs

SHEET 1 OF 1

2

1

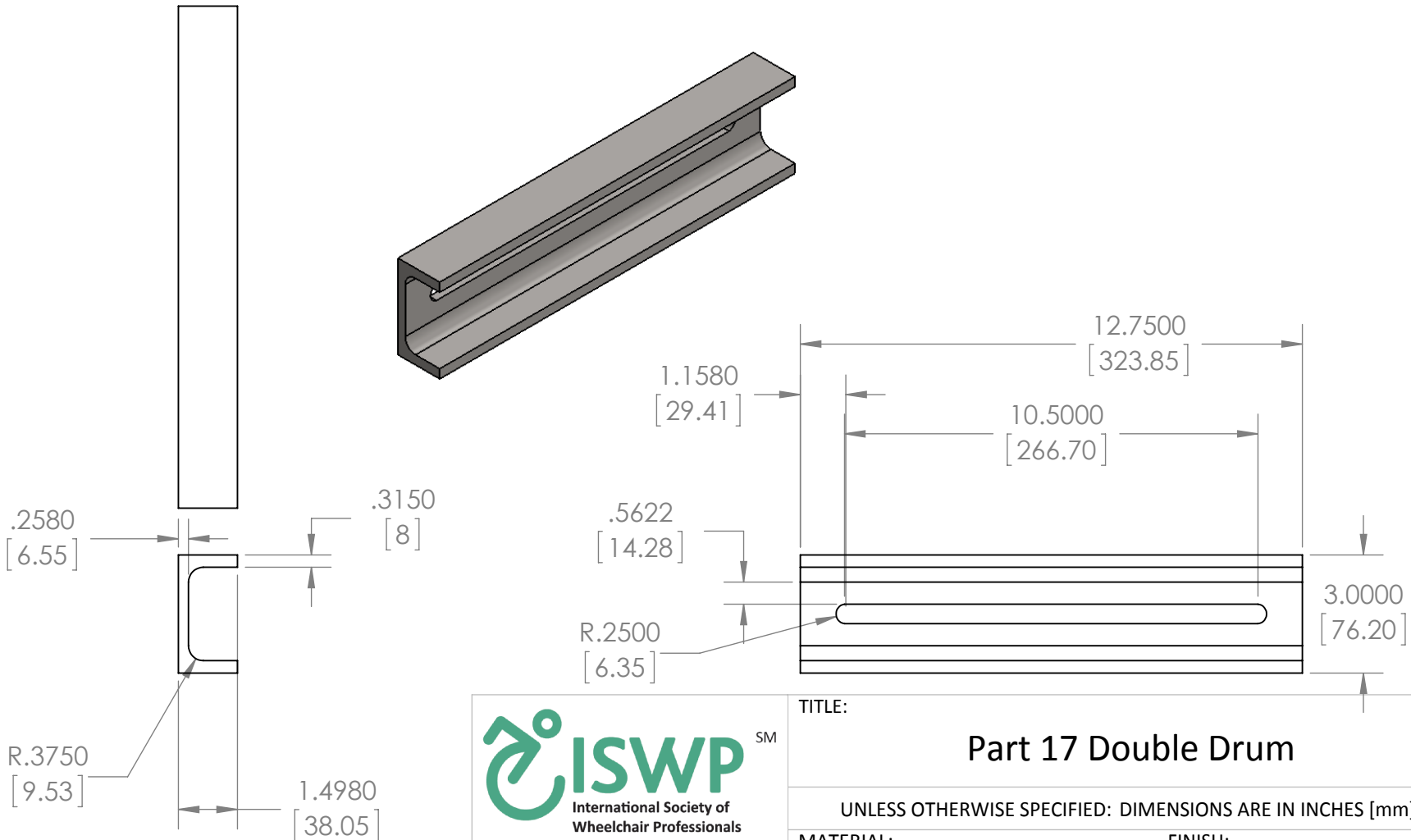
2

1

3" x 1.498" x 0.258" Steel Channel  
Quantity: 1

B

B



A

A



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TITLE:

**Part 17 Double Drum**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:8

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.8628 lbs

SHEET 1 OF 1

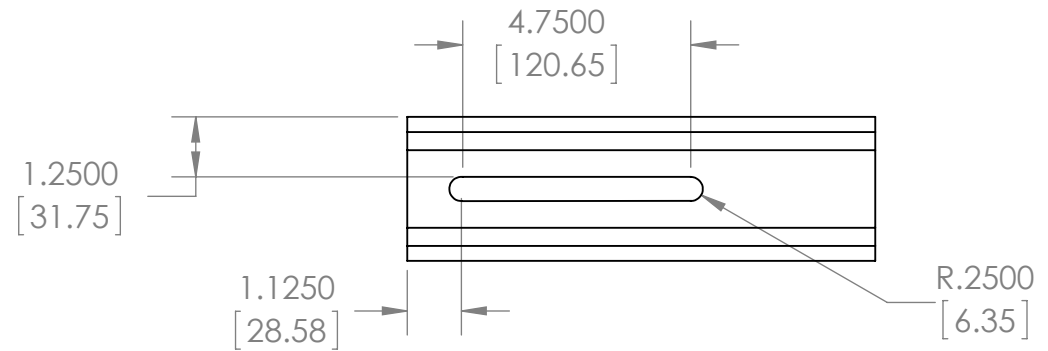
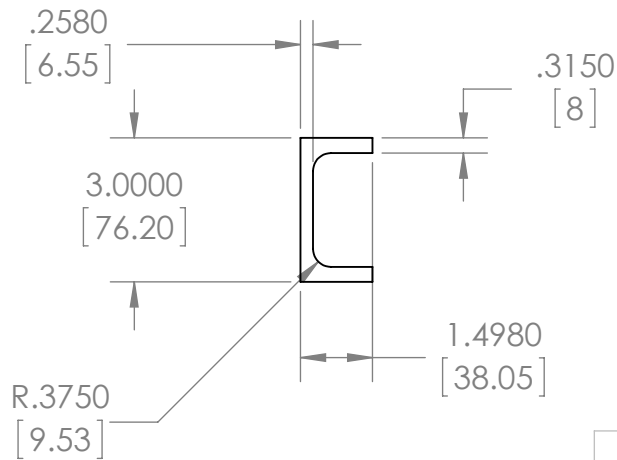
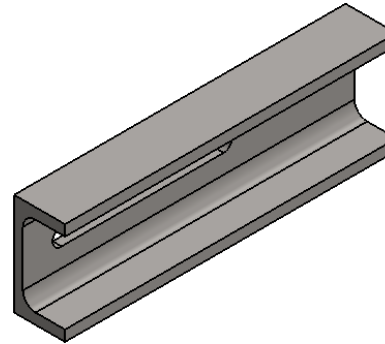
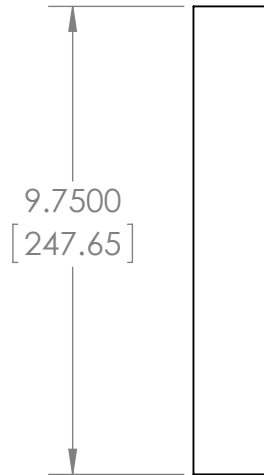
2

1

2

1

3" x 1.498" x 0.258" Steel Channel  
Quantity: 1



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TITLE:

Part 18 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:4

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.4646 lbs

SHEET 1 OF 1

2

1

2

1

1.5" x 0.76" x 62.75" Rectangular Tube  
Quantity: 2

.1200  
[3.05]

1.5000  
[38.10]

.7500  
[19.05]

165.0000°

62.7500  
[1593.85]

105.0000°



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TITLE:

Part 22 Double Drum

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:32

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

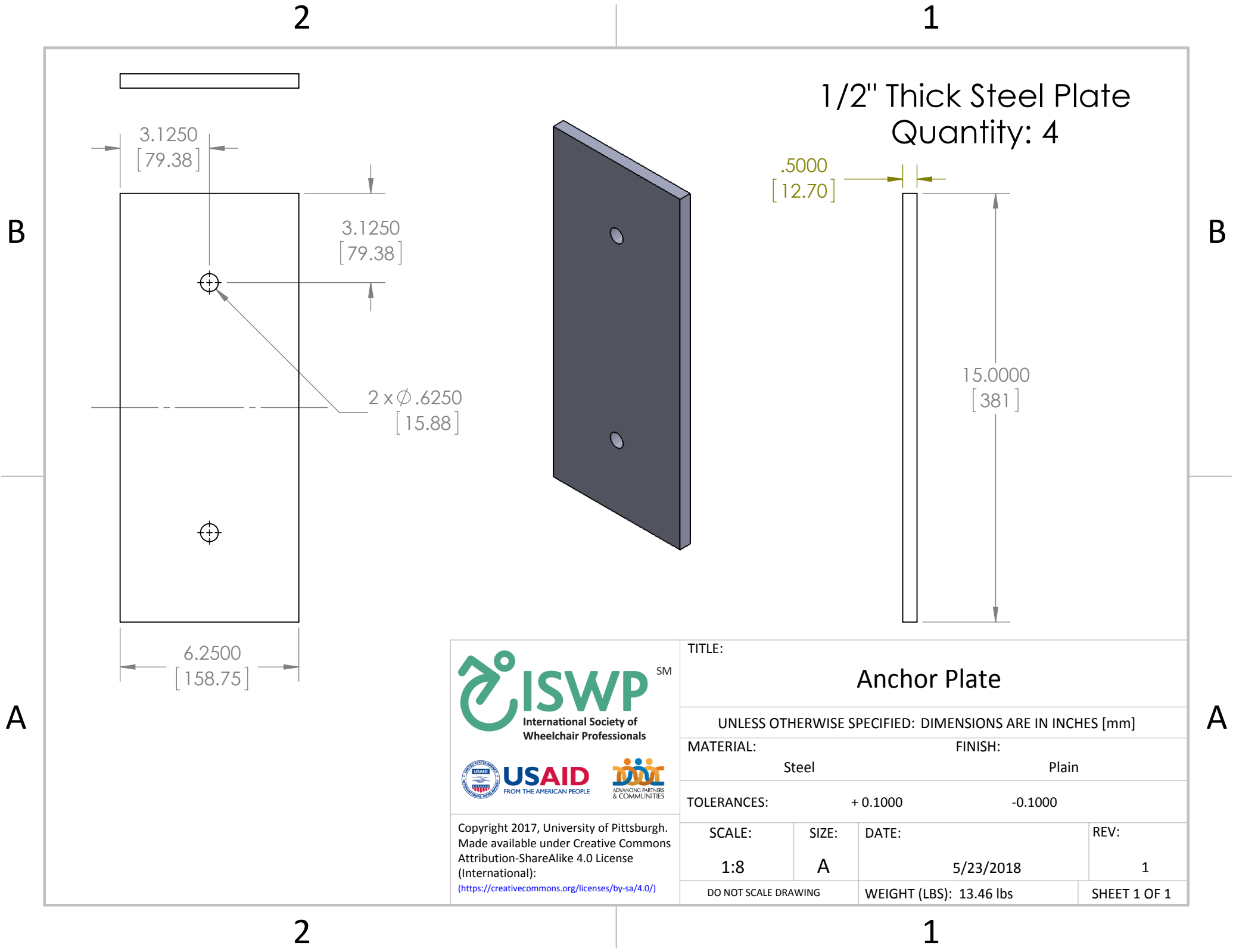
WEIGHT (LBS): 1.0675 lbs

SHEET 1 OF 1

2

1





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TITLE:

## Anchor Plate

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:8

SIZE:

A

DATE:

5/23/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 13.46 lbs

SHEET 1 OF 1

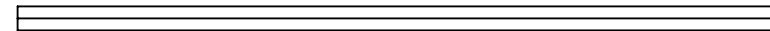
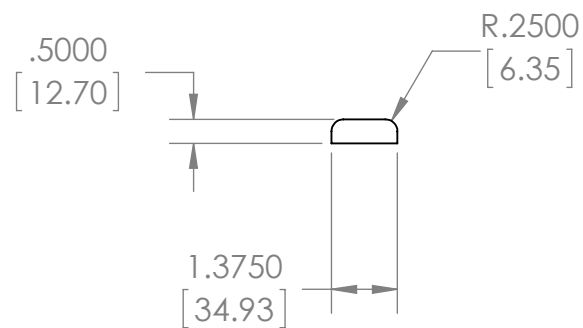
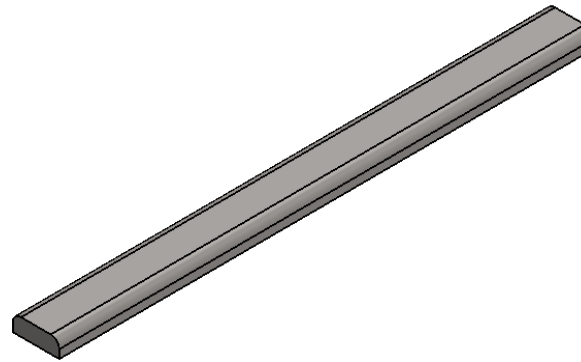
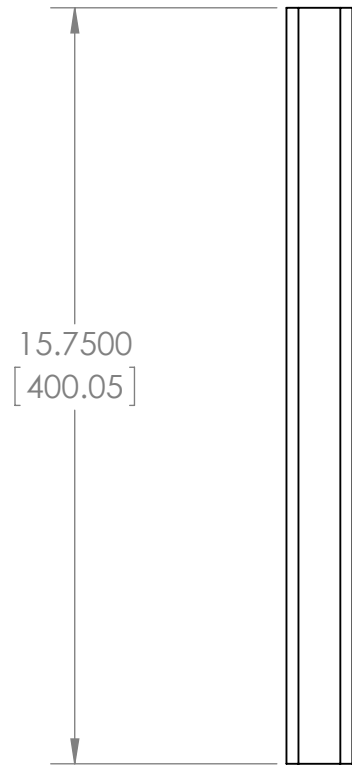
2

1

1/2" Thick Steel Flat Bar  
Quantity: 4

B

B



A

A



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TITLE:

Bump

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:8

SIZE:

A

DATE:

5/23/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 3.0072 lbs

SHEET 1 OF 1

2

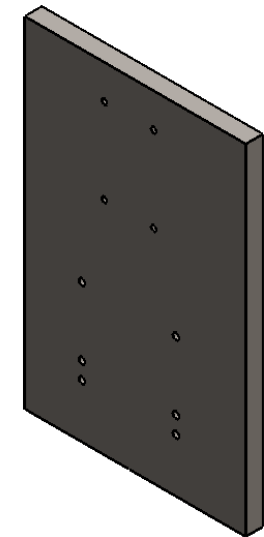
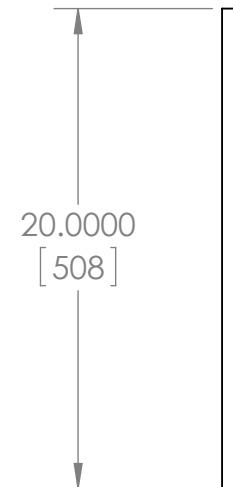
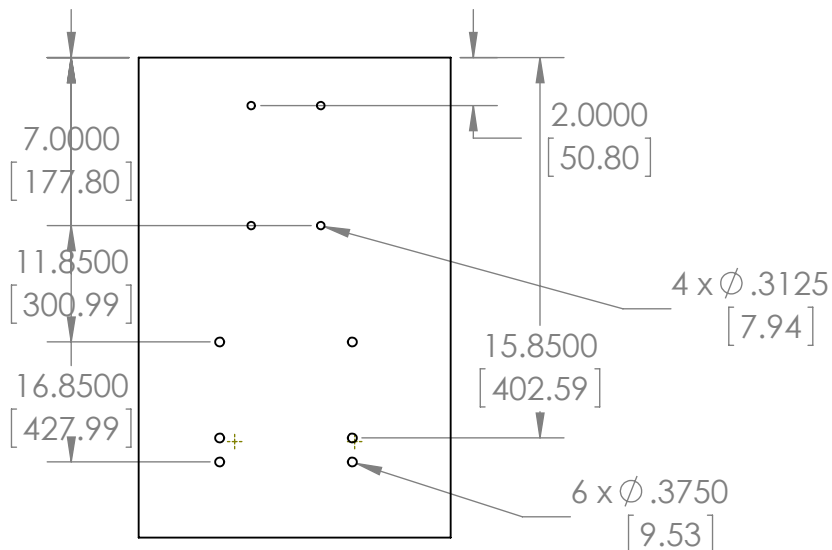
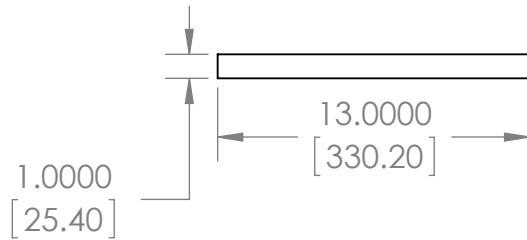
1

2

1

1" Thick Steel Plate  
Quantity: 1

Note: This drawing is subject  
to change depending on  
the motor used.



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TITLE:

Motor Mounting Plate

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+ 0.1000

-0.1000

SCALE:

1:8

SIZE:

A

DATE:

7/18/2018

REV:

2

DO NOT SCALE DRAWING

WEIGHT (LBS): 87.9874 lbs

SHEET 1 OF 1

2

1

B

A

2

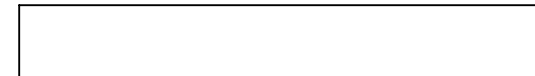
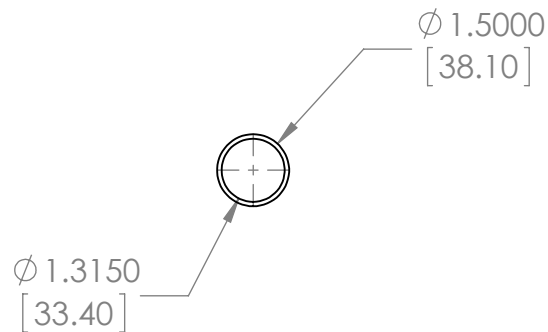
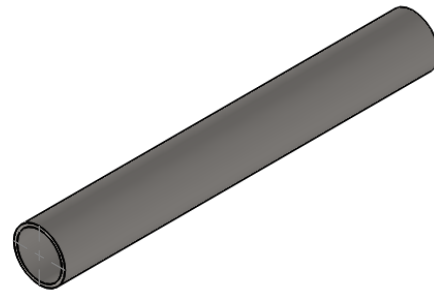
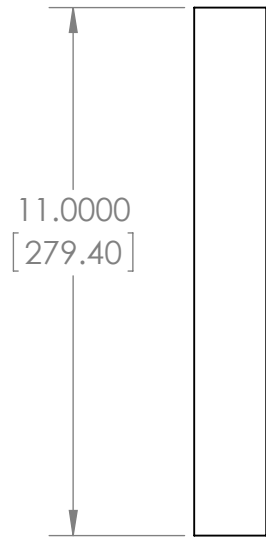
1

1-1/2" OD Hollow Steel Tube  
Quantity: 4

Note: This drawing is subject to  
change depending on the  
motor used.

B

B



A

A



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TITLE:

Motor Mount Legs

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

+0.1000

-0.1000

SCALE:

1:4

SIZE:

A

DATE:

7/20/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 1.3003 lbs

SHEET 1 OF 1

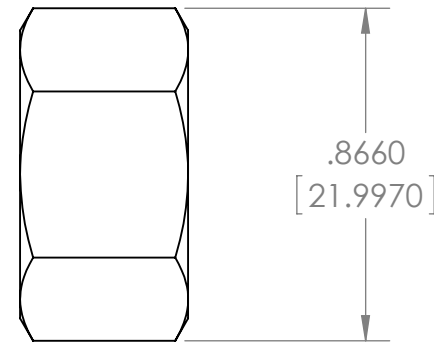
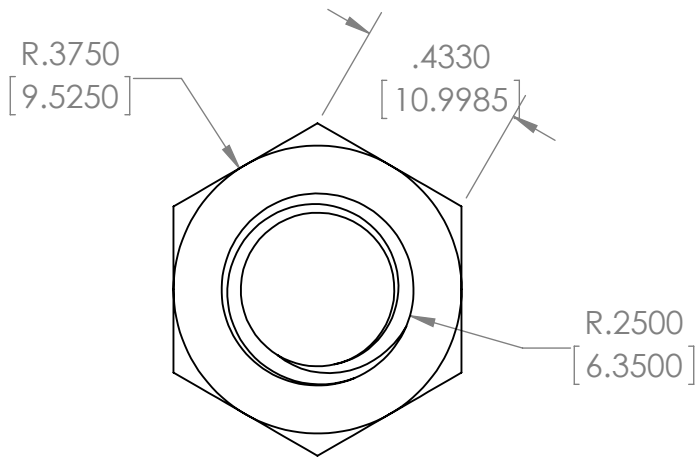
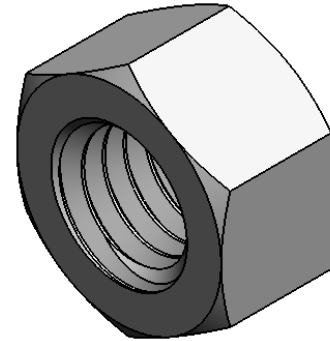
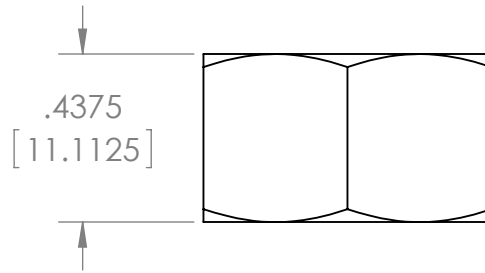
2

1

2

1

1/2" Hex Nut  
Quantity: 54



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TITLE:

**0.5 - 13 Hex Nut (95462A033)**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

2:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0051 lbs

SHEET 1 OF 1

2

1

B

B

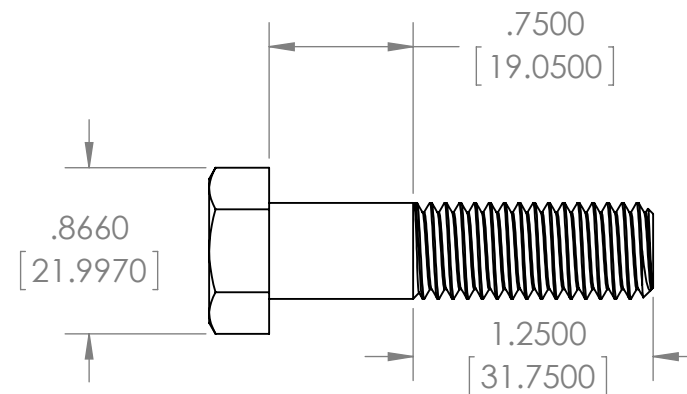
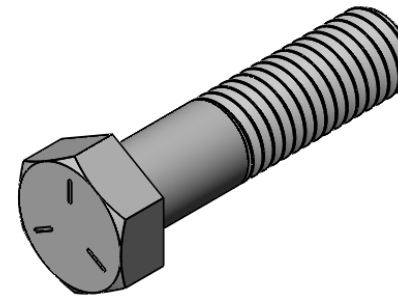
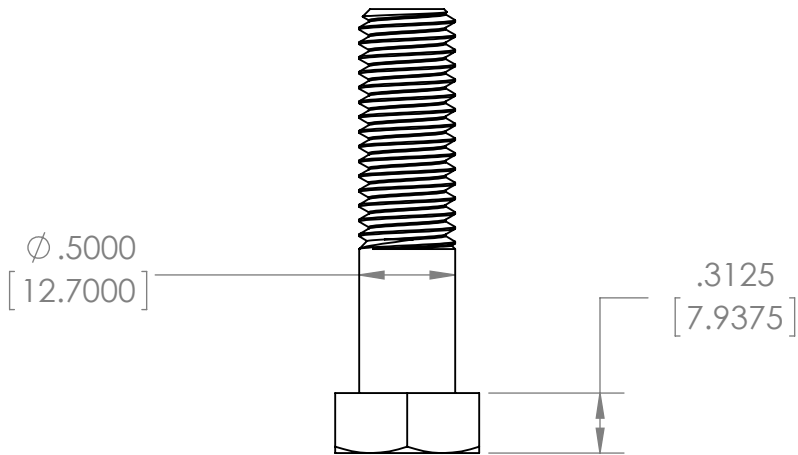
A

A

2

1

1/2" -13 Hex Head Screw  
Quantity: 2



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TITLE:

0.5"-13 x 2 Hex Head Screw  
(91247A720)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0180 lbs

SHEET 1 OF 1

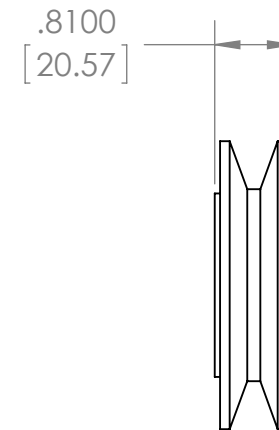
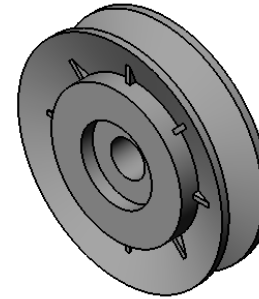
2

1

2

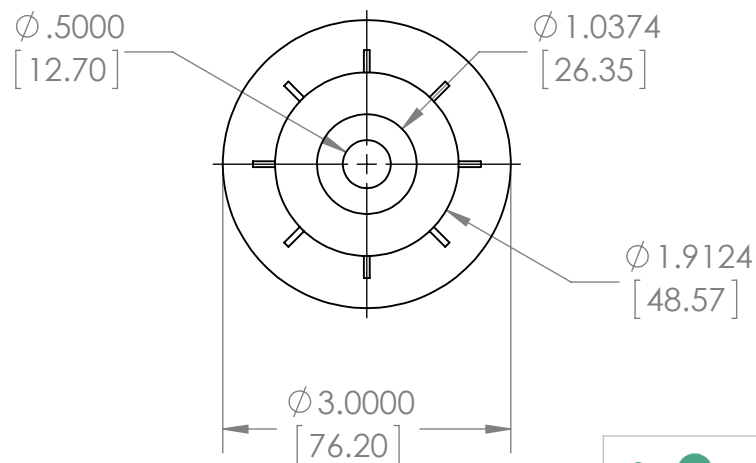
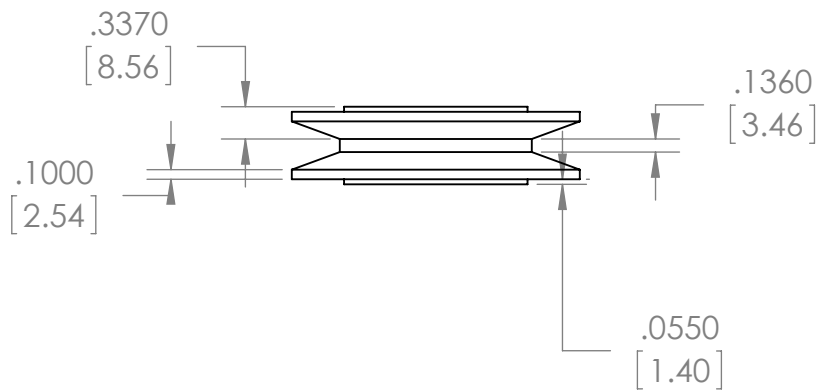
1

1/2" Pulley  
Quantity: 2



B

B



A

A



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TITLE:

**0.5in Idler V-Belt Pulley (6234K53)**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:2

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.1022 lbs

SHEET 1 OF 1

2

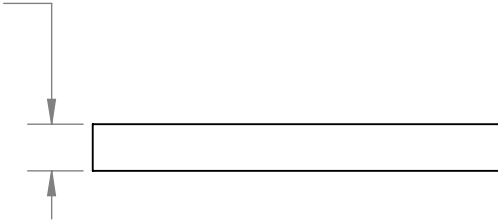
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2

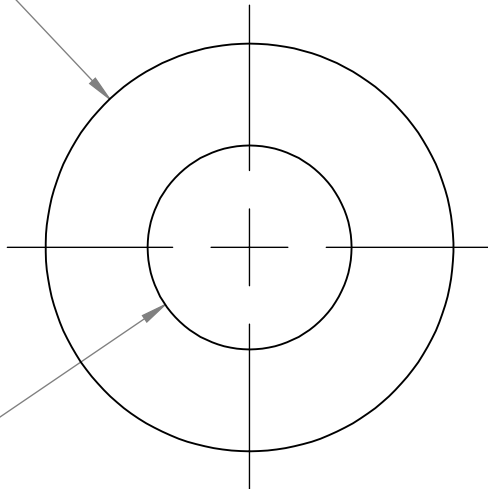
1

1/2", 0.531" ID, 1.062" OD Washer  
Quantity: 6

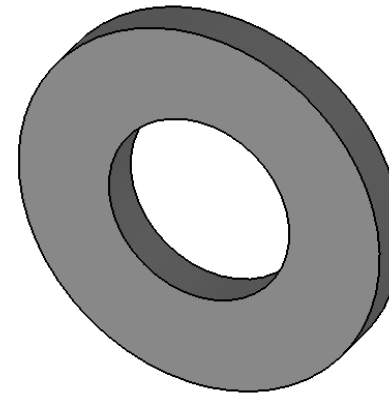
.1210  
[3.0734]



Ø 1.0620  
[26.9748]



Ø .5310  
[13.4874]



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TITLE:

0.5", 0.531" ID, 1.062" OD Washer

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

2:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0029 lbs

SHEET 1 OF 1

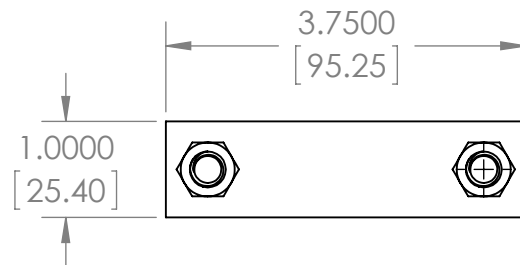
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1

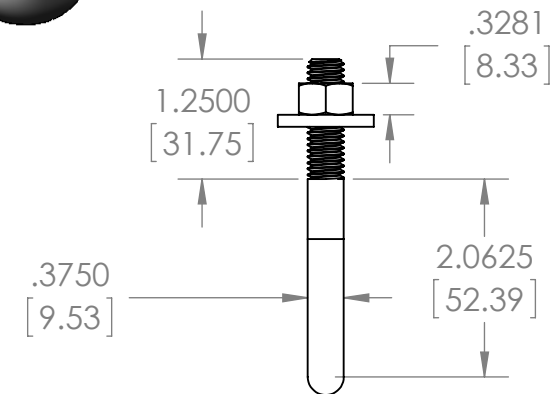
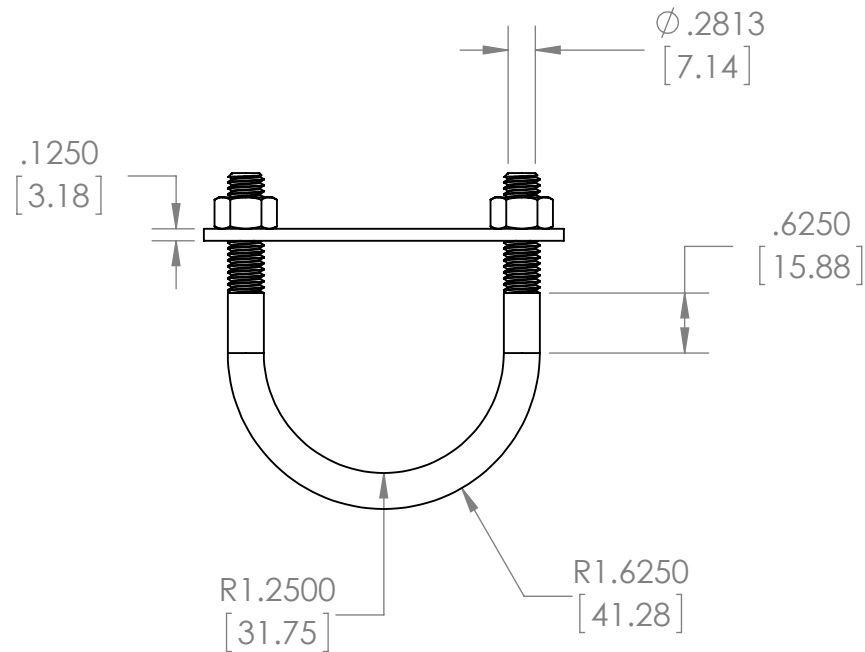
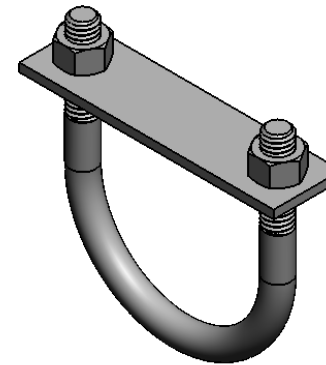


2

1



U-Bolt  
Quantity: 2



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TITLE:

0.375 -16 x 2.5 ID U-bolt (3043T82)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:2

SIZE:

A

DATE:

6/13/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0509 lbs

SHEET 1 OF 1

2

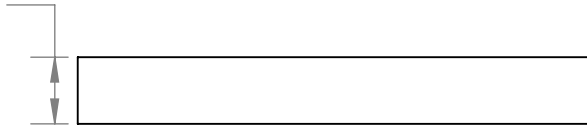
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2

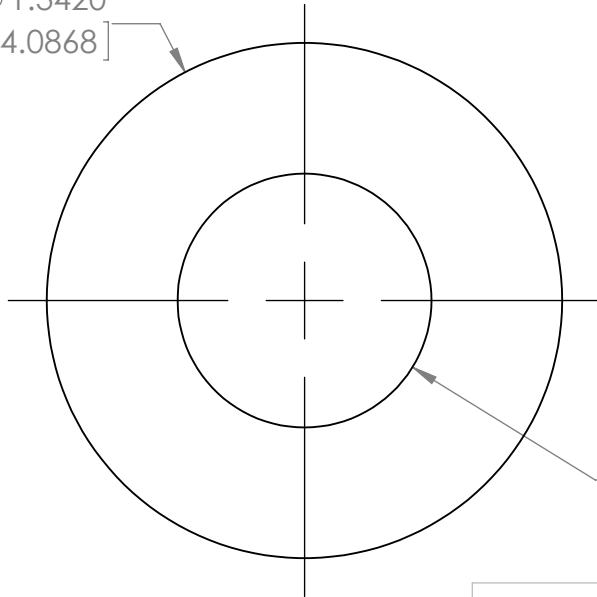
1

0.625", 1.342" OD Washer  
Quantity: 16

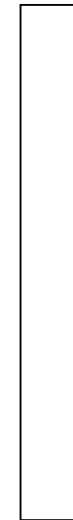
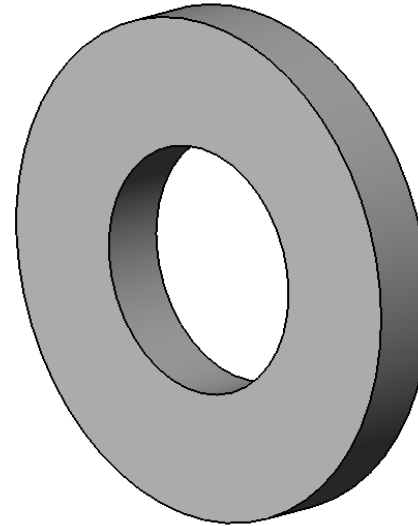
.1740  
[4.4196]



Ø 1.3420  
[34.0868]



Ø .6610  
[16.7894]



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TITLE:

0.625", 1.342" OD Washer

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

2:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0067 lbs

SHEET 1 OF 1

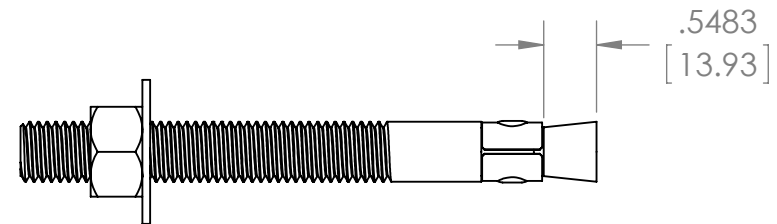
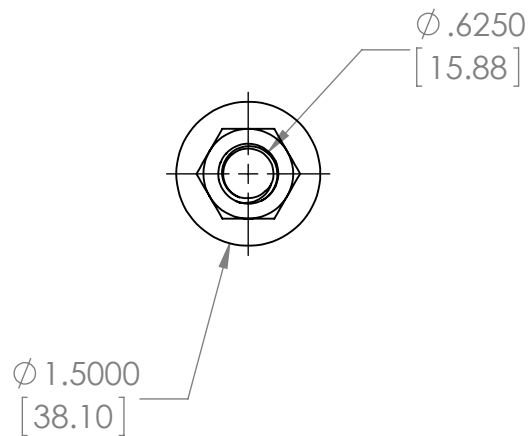
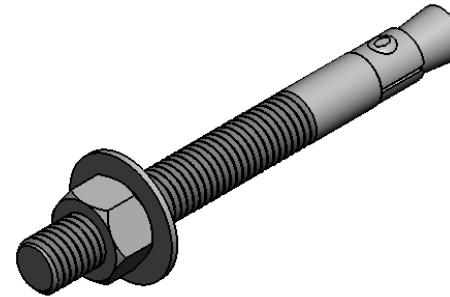
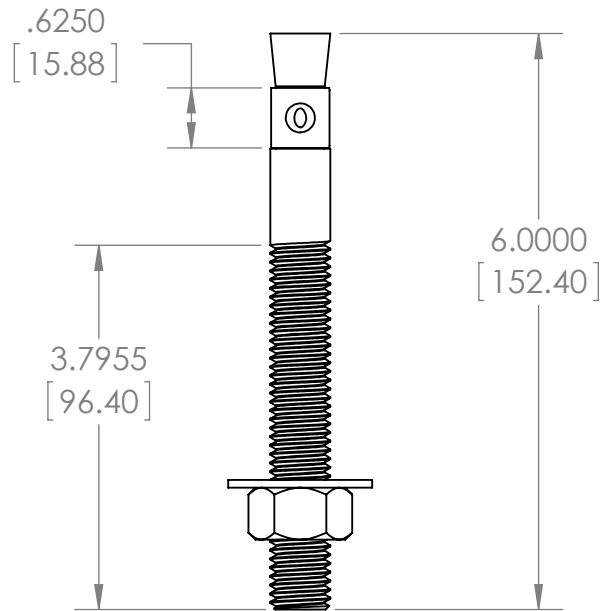
2

1

2

1

Concrete Anchor  
Quantity: 8



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TITLE:

0.625 x 6 Concrete Anchor

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:2

SIZE:

A

DATE:

6/15/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0658 lbs

SHEET 1 OF 1

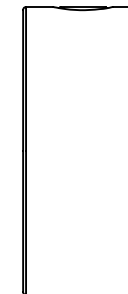
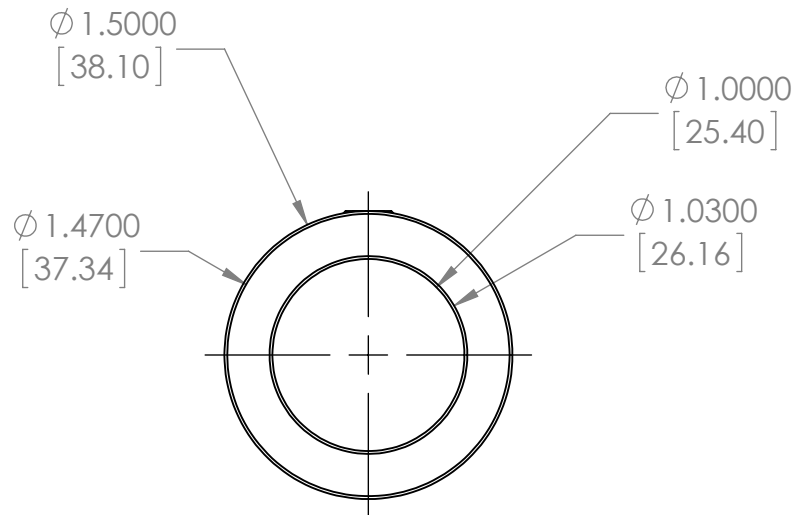
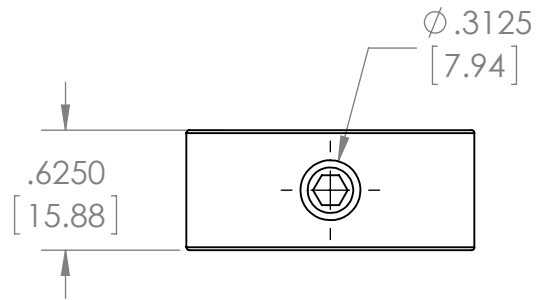
2

1

2

1

Set Screw Shaft Collar  
Quantity: 8



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TITLE:

1in Shaft Collar (9414T19)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

6/13/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0220 lbs

SHEET 1 OF 1

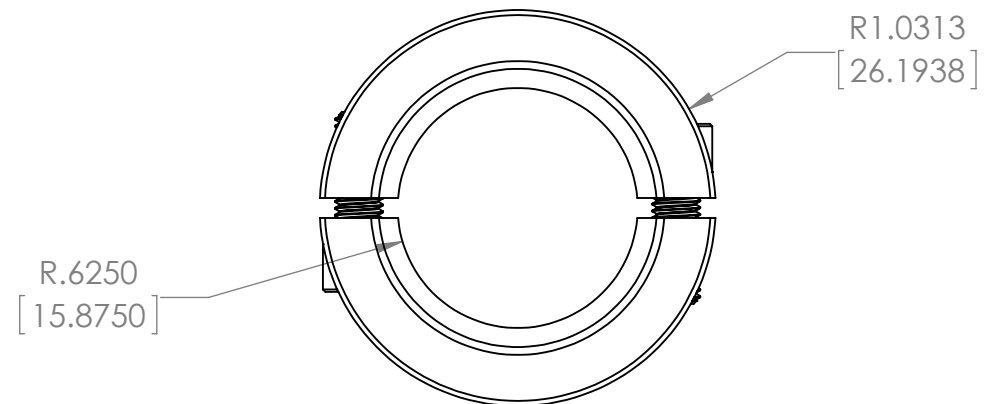
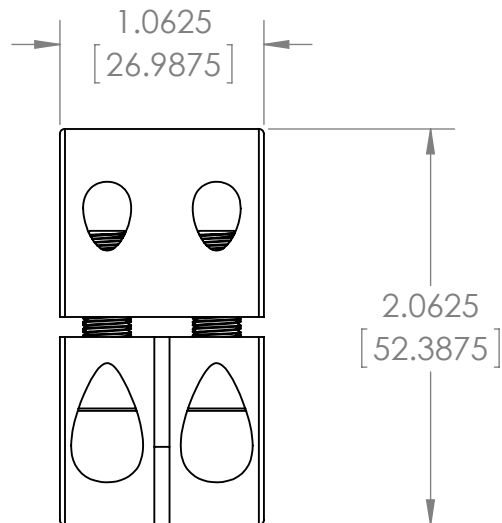
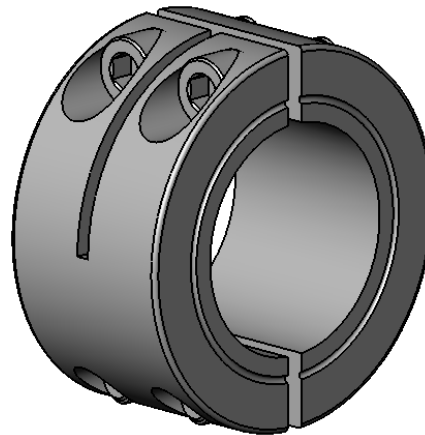
2

1

2

1

# 1.25" Shaft Collar Quantity: 2



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TITLE:

**1.25" dia Shaft Collar (8389K230)**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0723 lbs

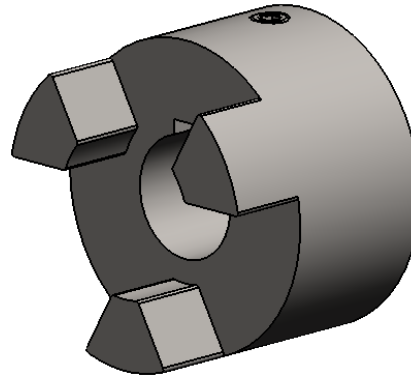
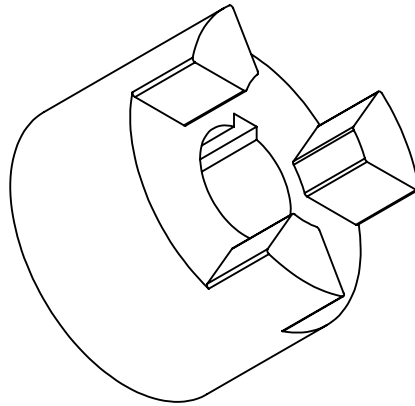
SHEET 1 OF 1

2

1

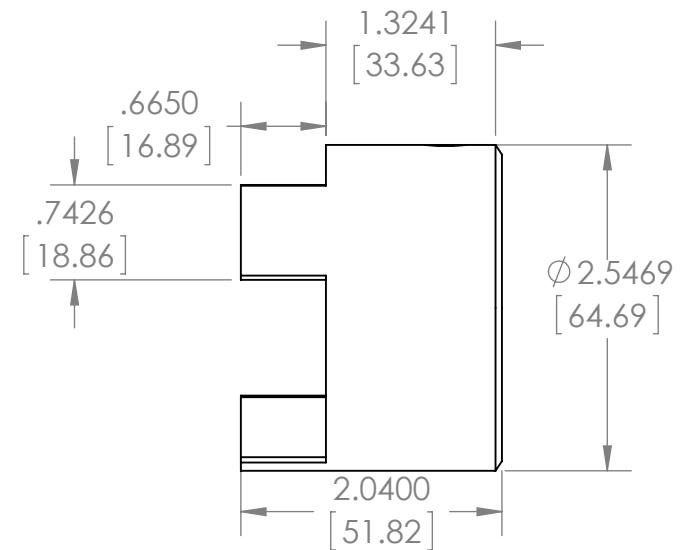
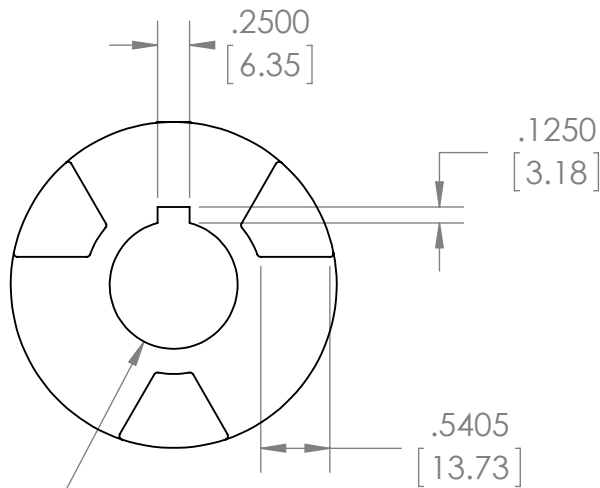
2

1



# 1" Lovejoy Couple Quantity: 1

Note: This drawing is subject to change depending on the motor used.



R.5000  
[12.70]



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TITLE:

1 in shaft dia lovejoy coupling  
(6408K16 - 6408K179)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

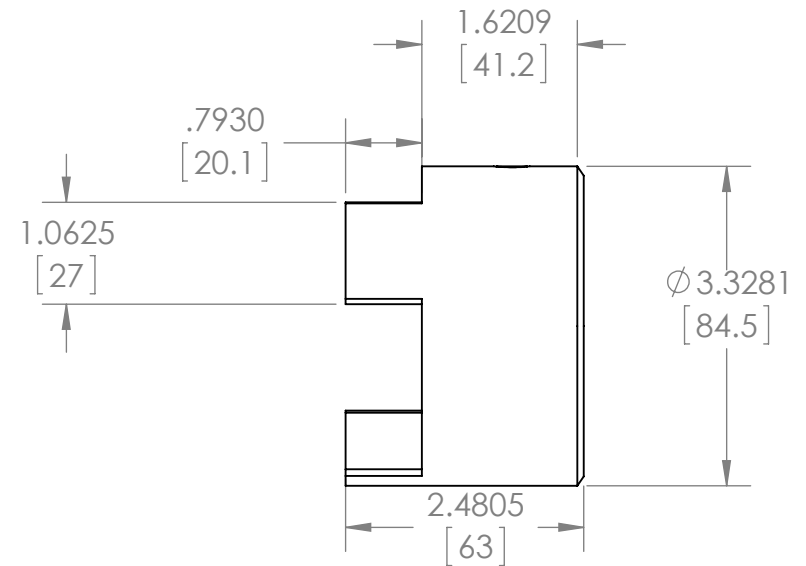
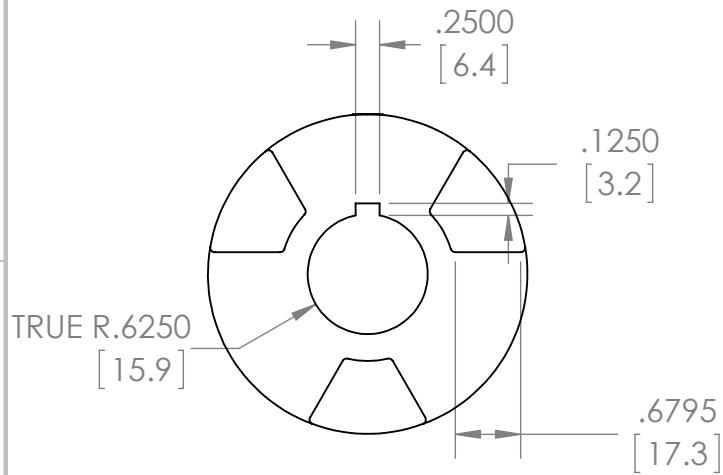
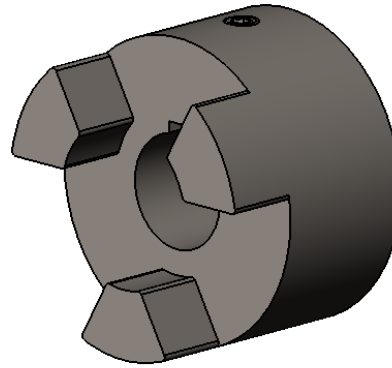
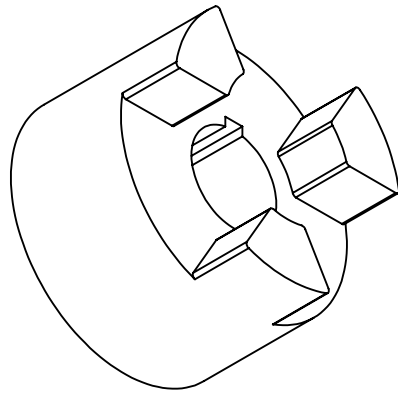
WEIGHT (LBS): 3.8832 lbs

SHEET 1 OF 1

2

1

B



1.25 in Lovejoy Couple  
Quantity: 1

Note: This drawing is subject  
to change depending on the  
motor used.

B

A



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TITLE:

1.25 in shaft dia lovejoy coupling  
(6408K18 - 6408K291)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:2

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 3.9876 lbs

SHEET 1 OF 1

2

1

A

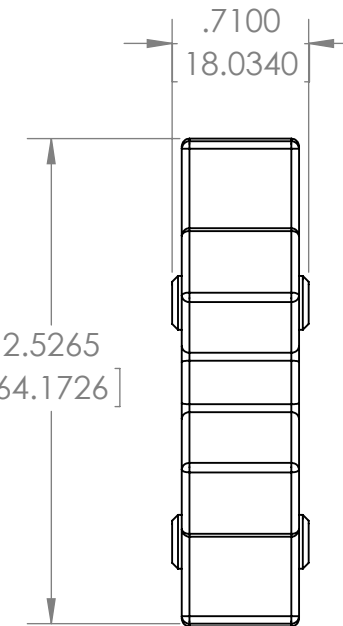
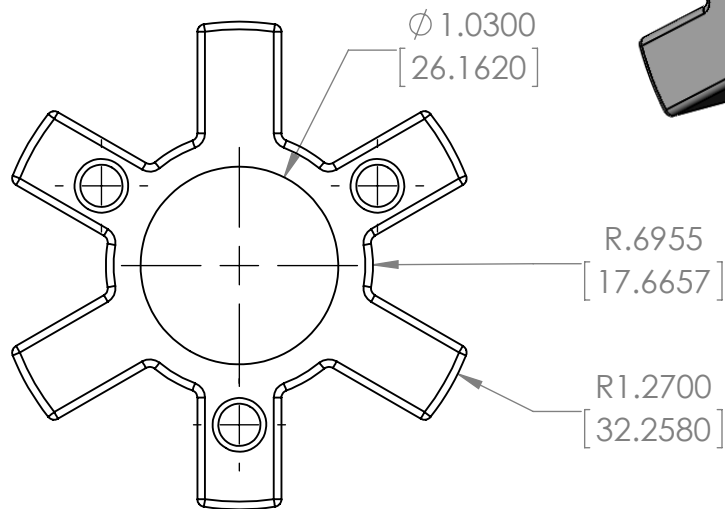
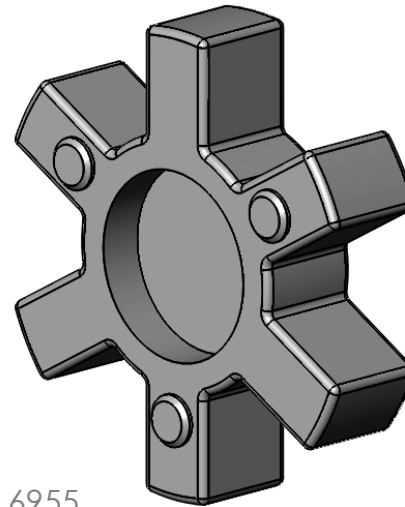
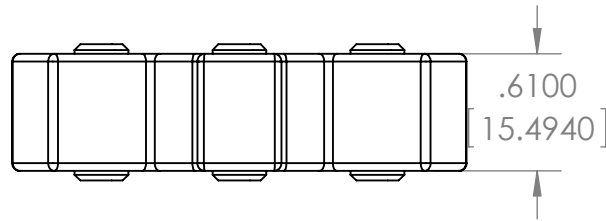
2

1

# Rubber Spider

Quantity: 1

Note: This drawing is subject to change depending on the motor used.



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TITLE:

Rubber Spider (6408K77)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

7/20/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0542 lbs

SHEET 1 OF 1

2

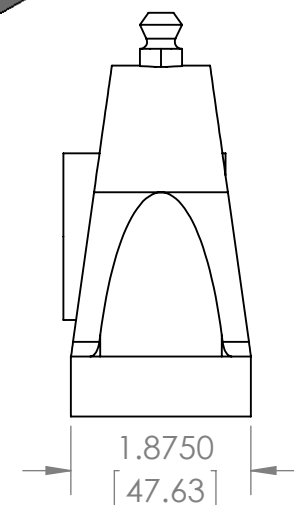
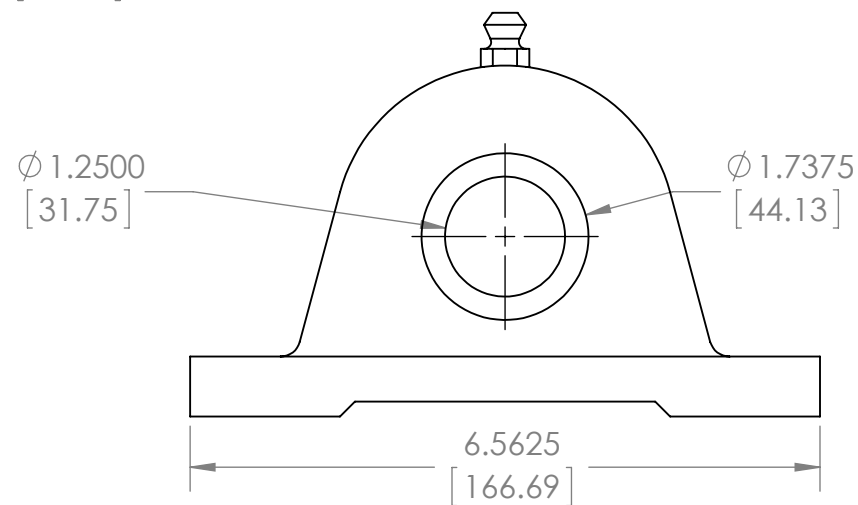
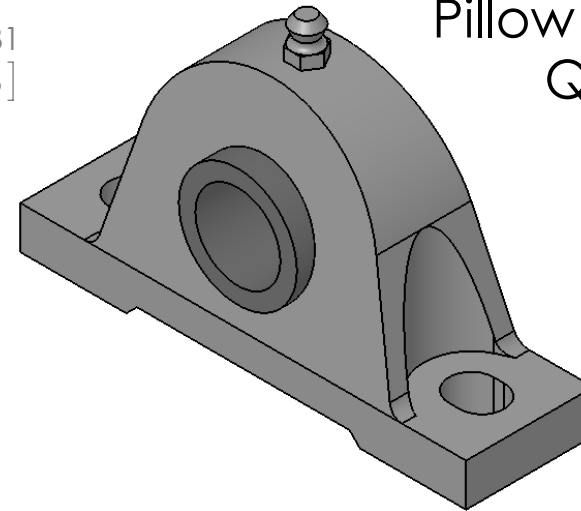
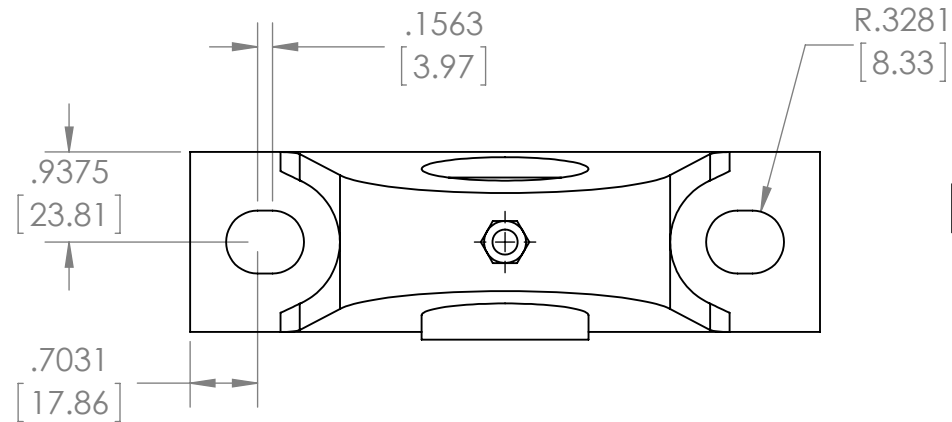
1



2

1

# Pillow Block Bearing Quantity: 4



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TITLE: 1.25 in shaft dia pillow block bearing  
(6494K16) u

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:4

SIZE:

A

DATE:

6/15/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.6892 lbs

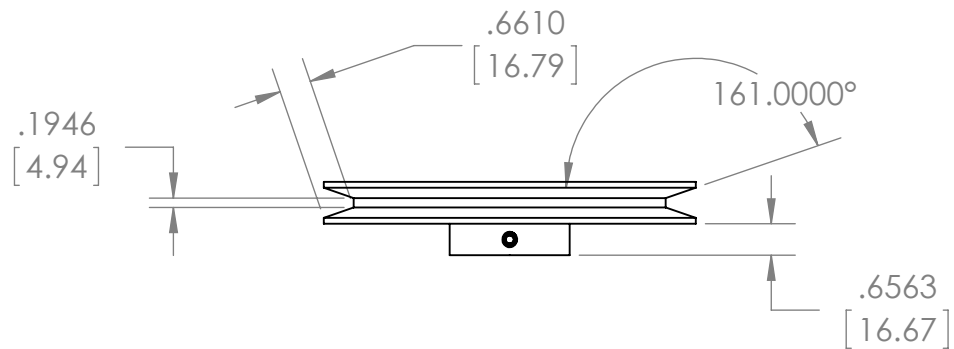
SHEET 1 OF 1

2

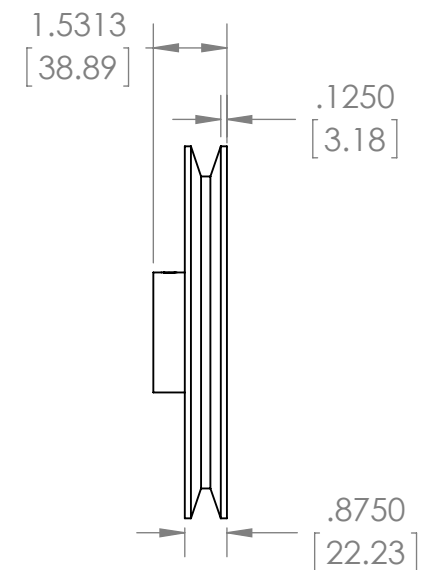
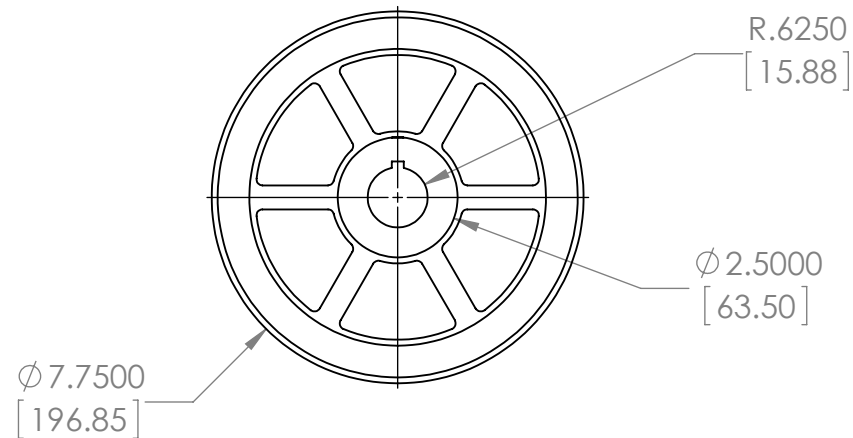
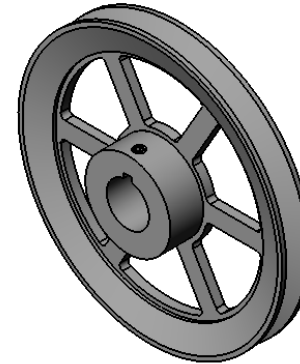
1

2

1



1-1/4" Pulley  
Quantity: 2



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TITLE:

1.25in V-Belt Pulley (6204K397)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:4

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.4485 lbs

SHEET 1 OF 1

2

1

B

B

A

A

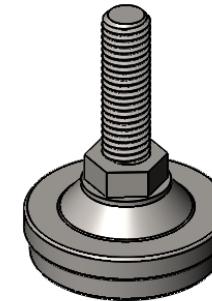
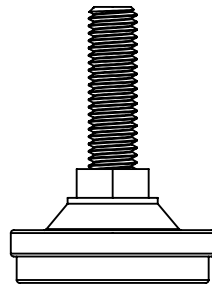
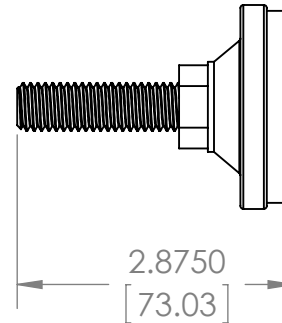
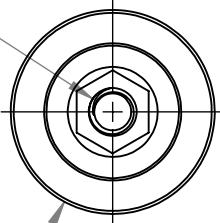
2

1

# 1/2" - 13 Threaded Vibration Damping Leveling Mount Quantity: 4

Ø .5000  
[12.70]

Ø 2.1250  
[53.98]



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TITLE: 1/2" - 13 Vibration Damping Leveling Mount (6167K13)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:2

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.7492 lbs

SHEET 1 OF 1

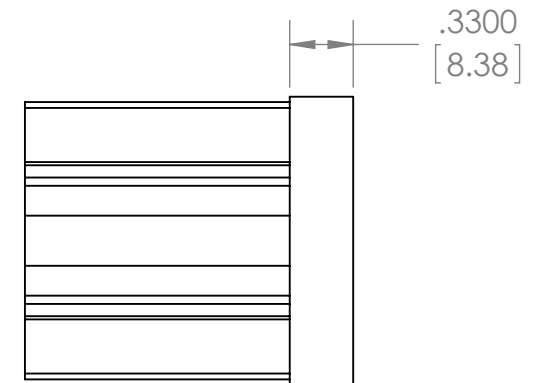
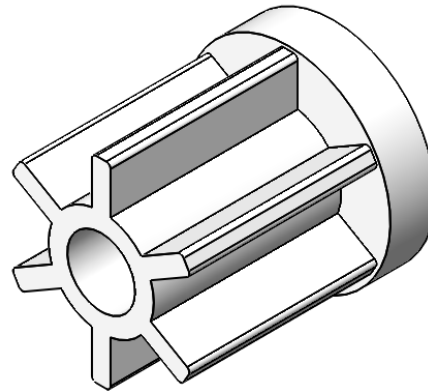
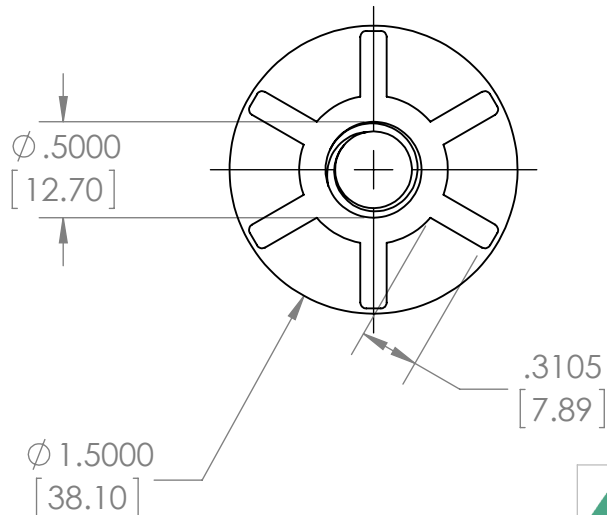
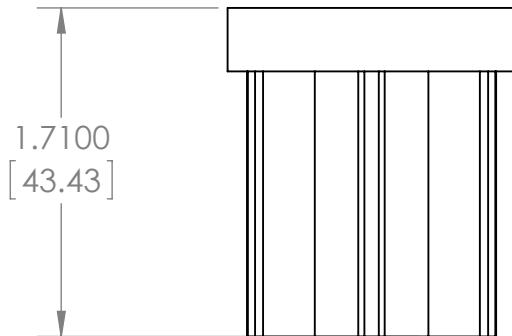
2

1

2

1

1-1/2" OD, 1-3/8" ID, 1/2" - 13 Leveling Mount Insert  
Quantity: 4



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TITLE:  
**1-1/2" OD 1/2" - 13 threaded leveling  
mount inserts (60945K14)**

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Plastic

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0499 lbs

SHEET 1 OF 1

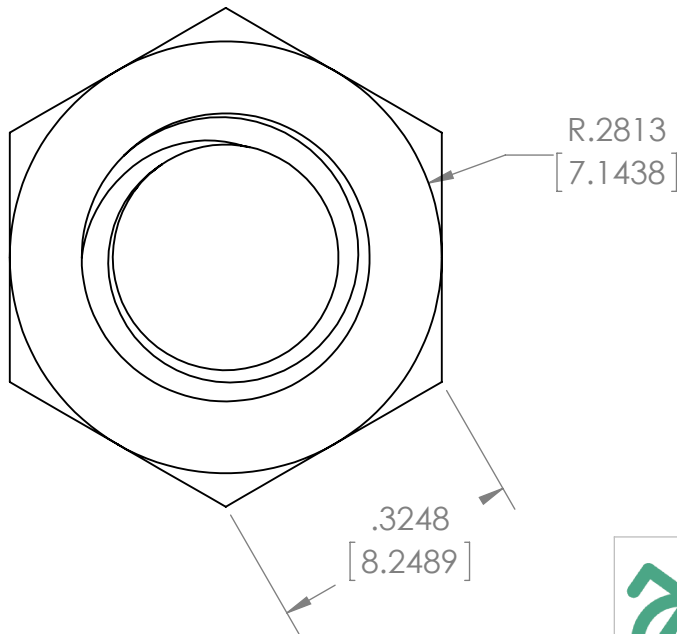
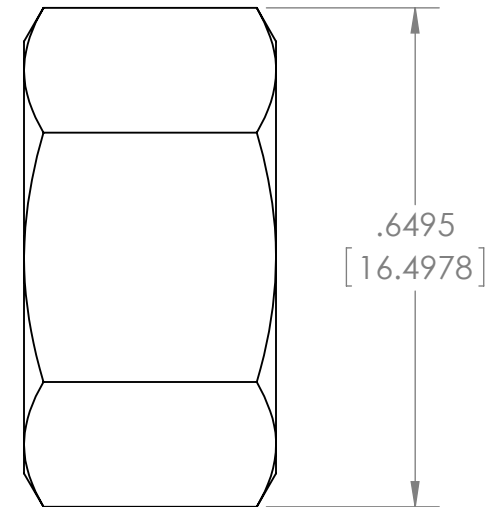
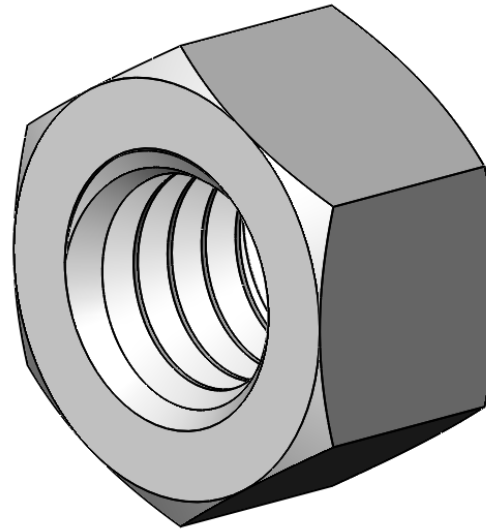
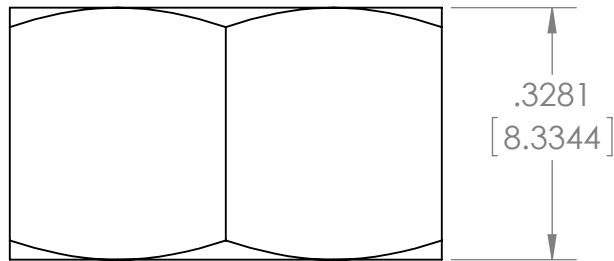
2

1

2

1

3/8" - 16 Steel Hex Nut  
Quantity: 6



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TITLE:

3/8" - 16 Hex Nut (90499A031)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

4:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0022 lbs

SHEET 1 OF 1

2

1

B

B

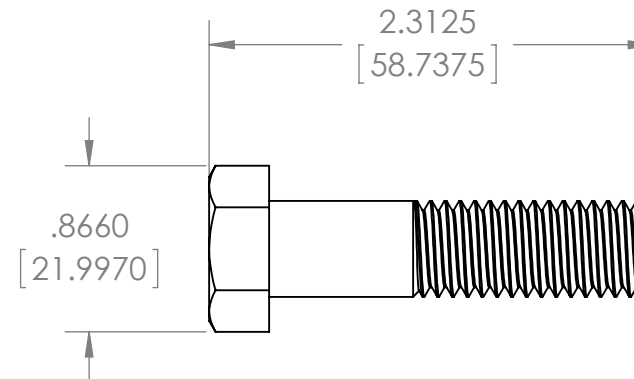
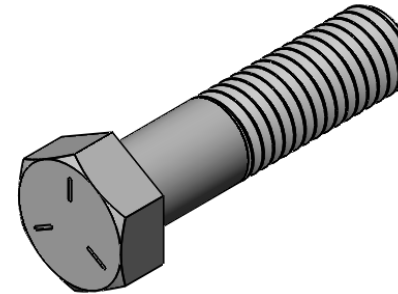
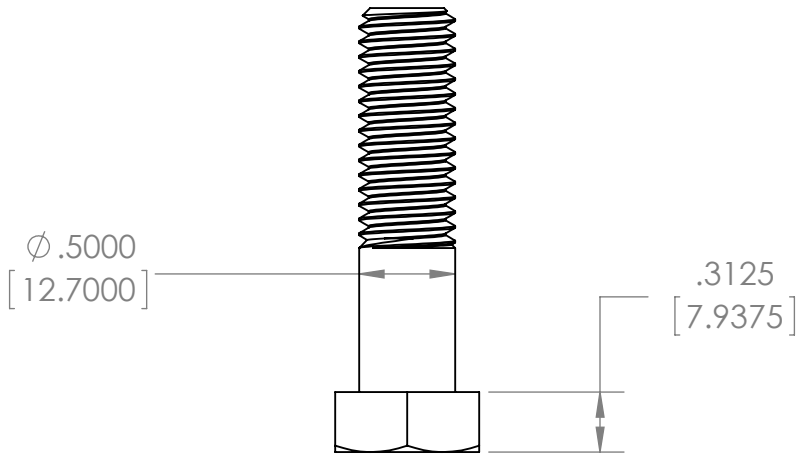
A

A

2

1

1/2" -13 Hex Head Screw  
Quantity: 2



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TITLE:  
1/2" - 13 Thread, 2" Long Hex Head Screw  
(91247A720)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0180 lbs

SHEET 1 OF 1

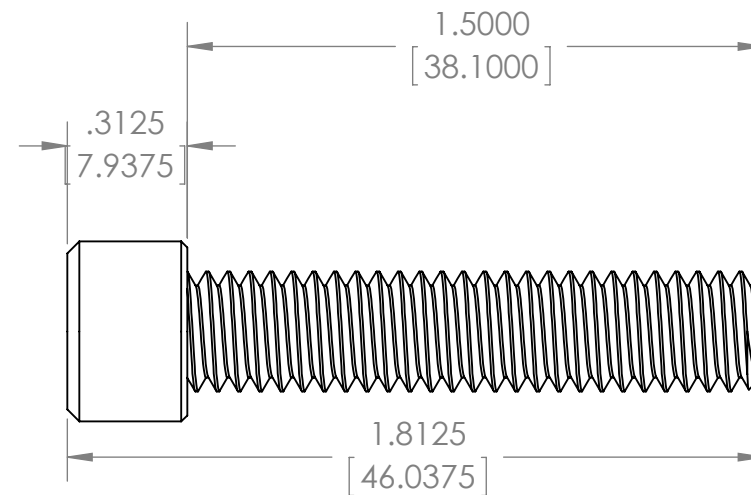
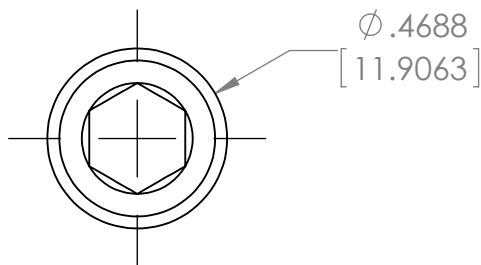
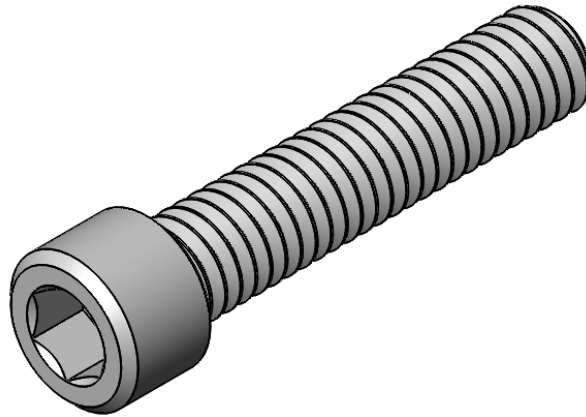
2

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1

5/16" - 18 Thread 1-1/2" Long  
Steel Socket Head Screw  
Quantity: 4



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TITLE:  
5/16" - 18 Thread 1-1/2" Long Steel Socket  
Head Screw (91251A587)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

2:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0048 lbs

SHEET 1 OF 1

2

1

B

B

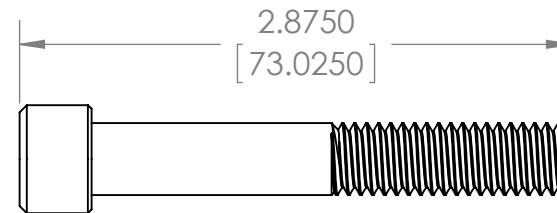
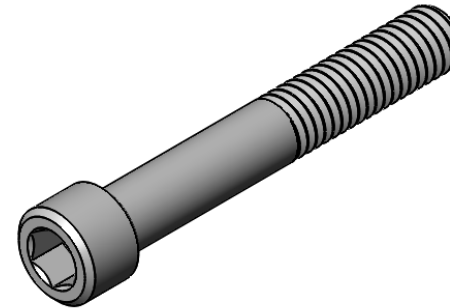
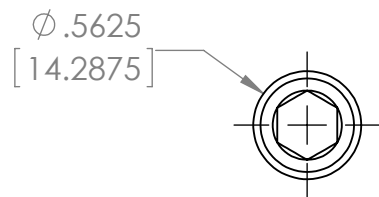
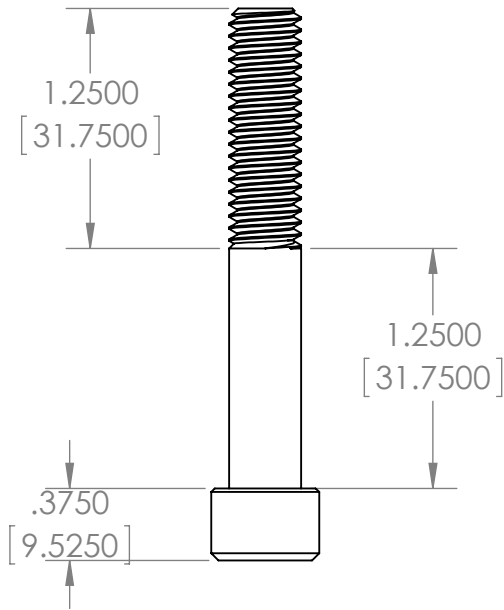
A

A

2

1

# 3/8" - 16 Thread 2-1/2" Socket Head Screw Quantity: 6



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TITLE: 3/8"-16 Thread 2-1/2" Long Steel Set  
Screw (91251A634)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0116 lbs

SHEET 1 OF 1

2

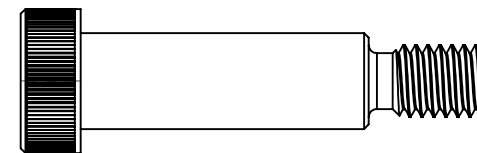
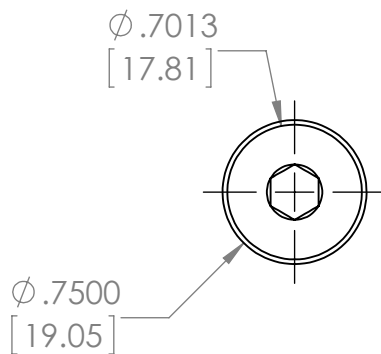
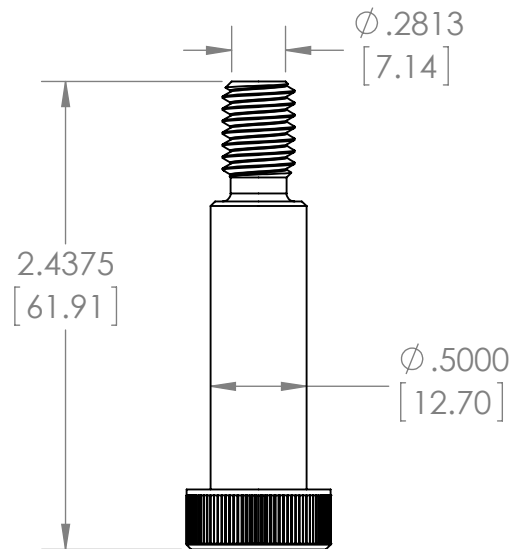
1



2

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1/2" dia 1-1/2" long 3/8"-16  
thread Shoulder Screw  
Quantity: 8



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TITLE:  
0.5" dia, 1-1/2" long, 3/8"-16 thread  
shoulder screw (91259A716)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

1:1

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.1357 lbs

SHEET 1 OF 1

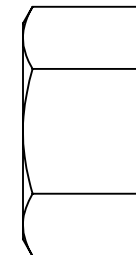
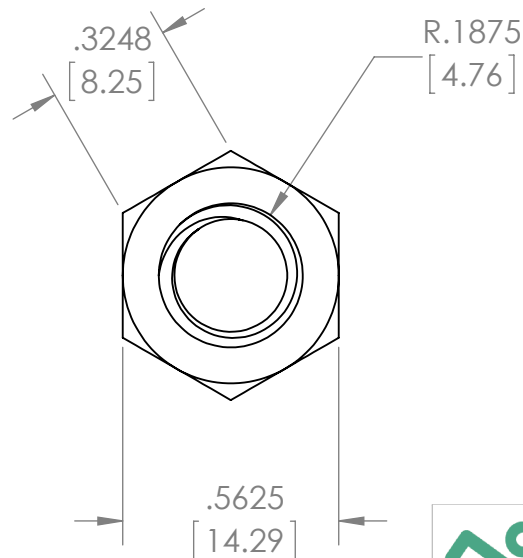
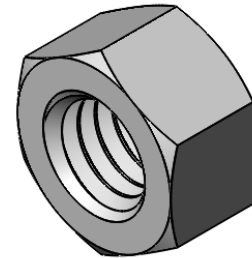
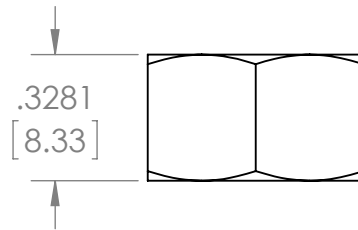
2

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2

1

3/8" - 16 Hex Nut  
Quantity: 8



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TITLE:

0.375 - 16 hex nut (94895A031)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

4:1

SIZE:

A

DATE:

7/18/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0022 lbs

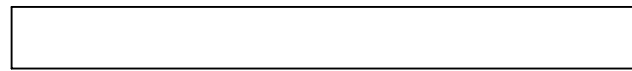
SHEET 1 OF 1

2

1

2

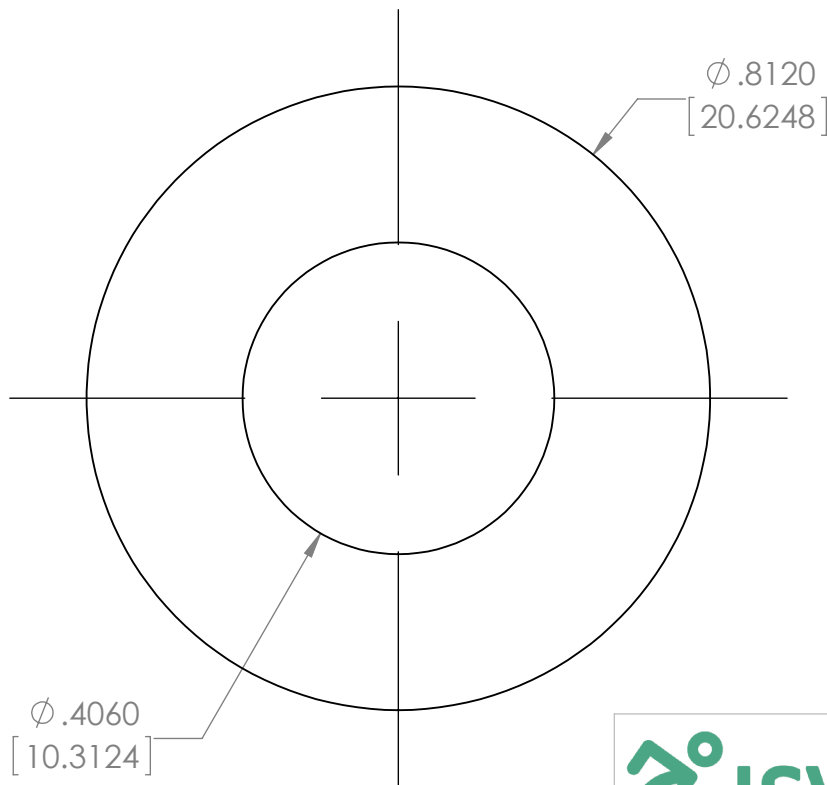
1



.0800  
[2.0320]

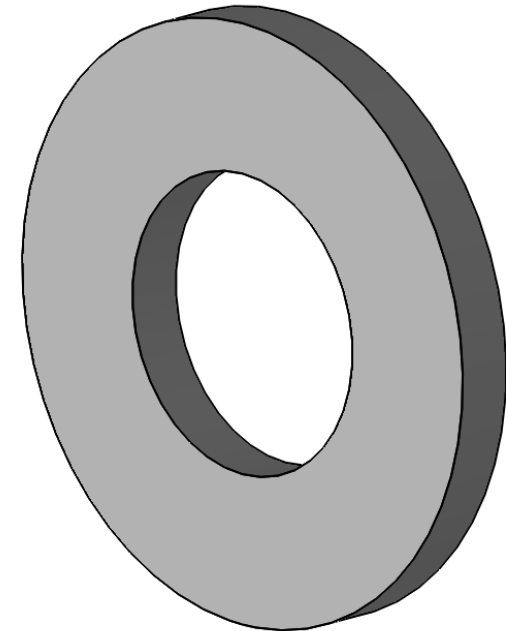
3/8" Screw Size, 0.406" ID, 0.812" OD  
Quantity: 6

B



Ø .8120  
[20.6248]

Ø .4060  
[10.3124]



B

A



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TITLE: 3/8" 0.406"ID 0.812"OD Steel Washer  
(98023A031)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

4:1

SIZE:

A

DATE:

6/14/2018

REV:

1

DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0011 lbs

SHEET 1 OF 1

A

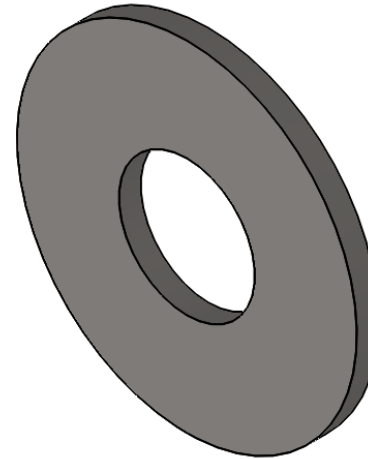
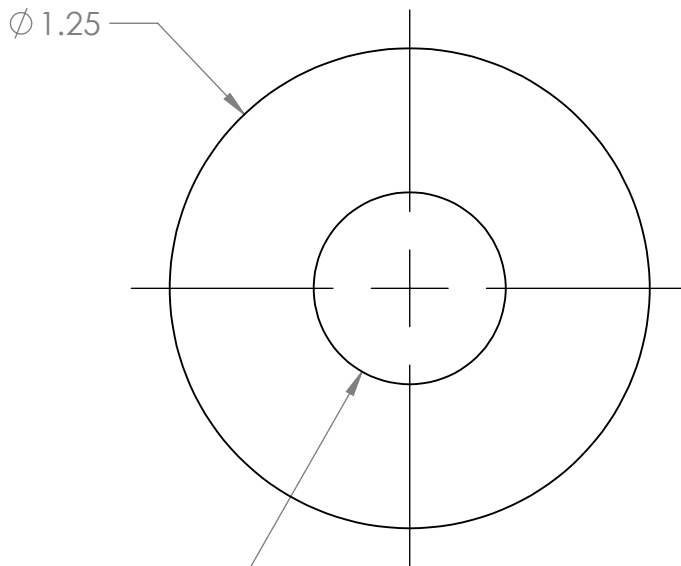
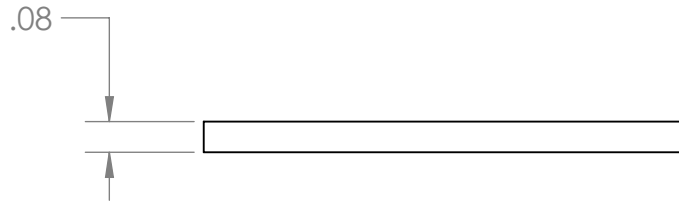
2

1

2

1

7/16" Screw Size, 1.25" OD Washer  
Quantity: 8



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TITLE:

0.4375 in washer (98026A114)

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]

MATERIAL:

Steel

FINISH:

Plain

TOLERANCES:

See Manufacturer Specifications

SCALE:

2:1

SIZE:

A

DATE:

7/18/2018

REV:

1

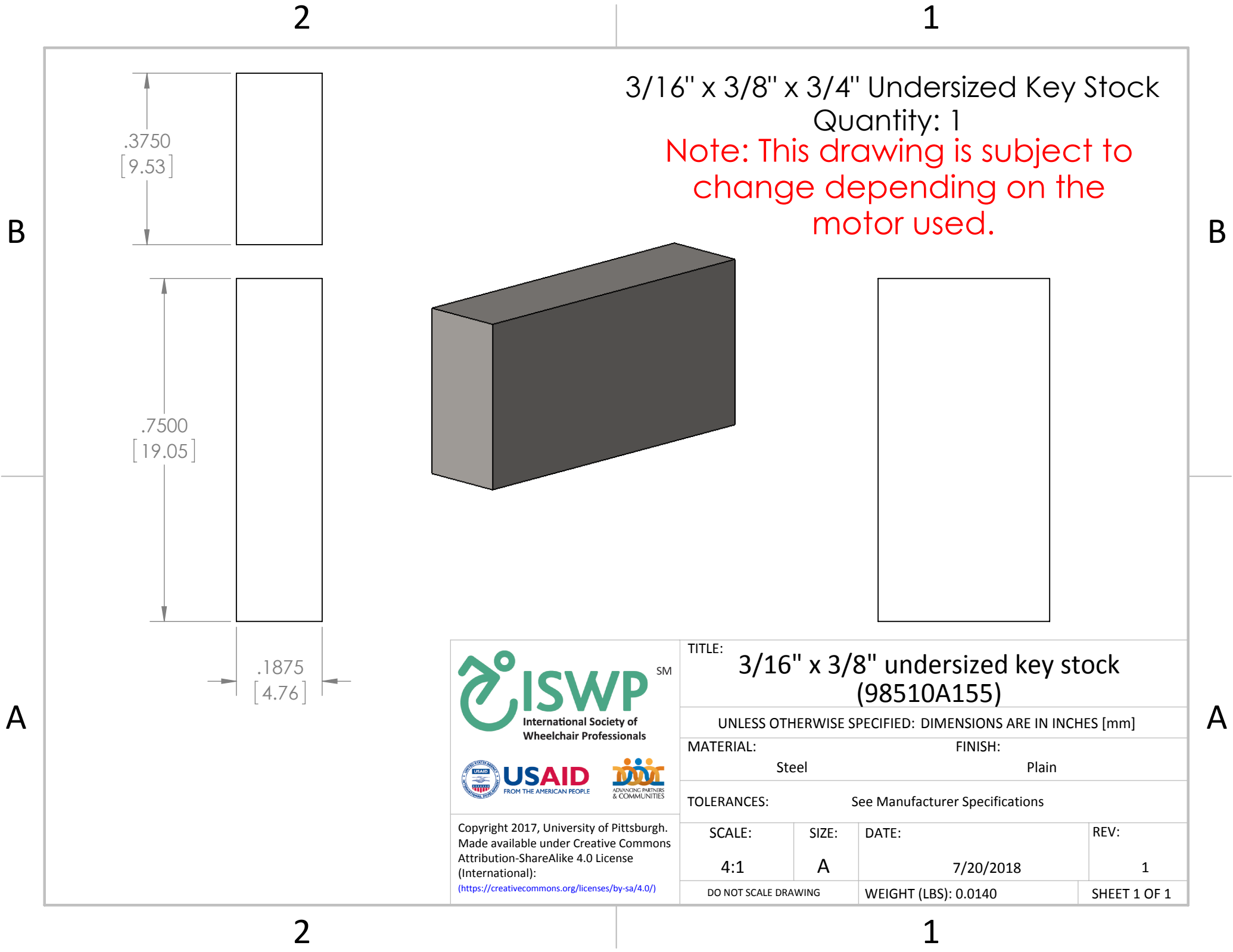
DO NOT SCALE DRAWING

WEIGHT (LBS): 0.0238 lbs

SHEET 1 OF 1

2

1



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TITLE: 3/16" x 3/8" undersized key stock (98510A155)			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [mm]			
MATERIAL: Steel		FINISH: Plain	
TOLERANCES: See Manufacturer Specifications			
SCALE: 4:1	SIZE: A	DATE: 7/20/2018	REV: 1
DO NOT SCALE DRAWING		WEIGHT (LBS): 0.0140	SHEET 1 OF 1