Shower Head

Initially on the top plane, the parts to be revolved like the shower head and the end of handle are sketched according to measurements. These 2 parts were designed and set as guidance before sketching the curvature paths for the handle. The curves were sketched using splines tool to join the end of handle and shower head part. Afterwards, more reference planes were added to ensure smoother and nicer curvature formed. For this, tools like boundary extrude, mirroring, surface trim and knit surface were applied. Threading part which is located at the very end of the handle is formed using the helix and spiral tool. With this the outline of thread-path was sketched by giving information on number of revolutions, number pitches and degree of revolution. Another plane at the end of helical is added to draft the shape of the thread before applying swept boss/bass. After that, for designing circular pattern of holes on the bottom surface of shower head, additional planes with varying offset distances were created and sketched sample patterns to make the circular holes using extrude cut tool, so after the holes were created then the circular pattern mode applied. For the hemisphere cut at the edge of shower head, initially hemisphere shape is sketched on the new reference plane and revolution cut is applied. Thereafter, with circular pattern mode again the desired pattern created around the shower head edge.

Soap Holder

Firstly, right plane was used to sketch a rectangle for the outline of the soap holder. Next, curve lines were used to modify the previously drawn rectangle into desired soap holder shape. All dimensions are measured onto the lines and curves before extruding it. Once the dimensions are fully defined, the extra lines were trimmed using entities trimmer. After trimming the unnecessary lines, the remaining shape was extruded to get the whole picture of the soap stand. Once satisfied with the shape, extruded cut was used to cut off the inner part of the soap stand to create a holder look. Afterwards, top plane was used to sketch the decoration part of the soap stand. After drawing two squares at both sides and filleted it with the radius of 2 cm, circles were drawn, and the tangent of the circles are connected to the fillet part of the squares, and it was extruded. The circles drawn were extruded 0.1mm taller than the squares so they look protruding. One side of the circle was cut with the depth of 2cm for inserting the stick later. Next, 4 longed-oval shaped were cut in the middle of the soap holder.

Soap Stand Stick Top

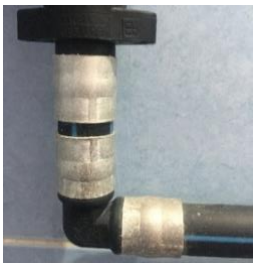
At first, a circle with 4cm diameter was drawn on the top plane. Next, the circle was extruded into a cylinder shape with the height of 8.3cm. Later, the top part of the cylinder was filleted using 3cm fillet to create the rounded head. After that, right plane was used to sketch a circle in the middle of the shape, and it was extruded with the depth of 2cm for the stick to insert.

Soap Stand Stick

A circle was sketched with the radius of 1 cm and was later extruded into a long cylinder shape with the height of 48cm.

Tap-like Connector, PVC pipe and Metal Pipe Connector

The basic shape of the tap-like connector is first drawn on top plane before using extruded boss. The straight PVC pipes are drawn with simple circles and extruded boss. As for 90-degree PVC pipe, it is drawn using one circle as the profile and 90-degree line as the path to perform swept boss. Metal Pipe Connector is drawn by sketching out the cross-sectional look first, then later apply revolve boss to obtain its final look.



Water Heater

This serves as the main part of our model, which covers water heater body, temperature roller and other switches. Boss extrude of the top view is firstly made to obtain a rough appearance of the water heater body. Cut extrude of the solid bodies is highly utilized to perform the shape of the model more accurately. The same goes to the slot for the mating of switches and roller. Projection of curve followed by cut extrude is used to create precise hole on the curvature of the solid body. Besides, a cylinder with screw nut is created at the bottom part to connect the piping of shower head. Helix curve is created to make thread features of the nut.

Temperature Roller

The roller is made using boundary extrude of two curves created by projection. A hole is made on the connecting section of the roller so it can well match with the connecting cylinder on the water heater body.

Switches

These include HLB checker placed at left side and power on and off switch located at middle-bottom of the body. Both checker and power switch are connected to spring when they are assembled to the water heater, indicating the push effect of these switches. Also, hole wizard is used to create the necessary small holes on the power on and off switch.

Water Volume Knob, Filter Knob and Pipe for Valves

A 2D layout is drawn on the front plane before applying extruded boss to make the water volume knob. The 2D pattern of the filter knob is first drawn on front plane, later with circular sketch plane feature to finish the whole 2D layout. Extruded boss is then applied to obtain the final look. Pipe for Valves is mainly drawn by sketching out the 2D shape and pattern on different plane first, then apply extruded boss to get the result.

Soap Stand Holder and Shower Head Holder

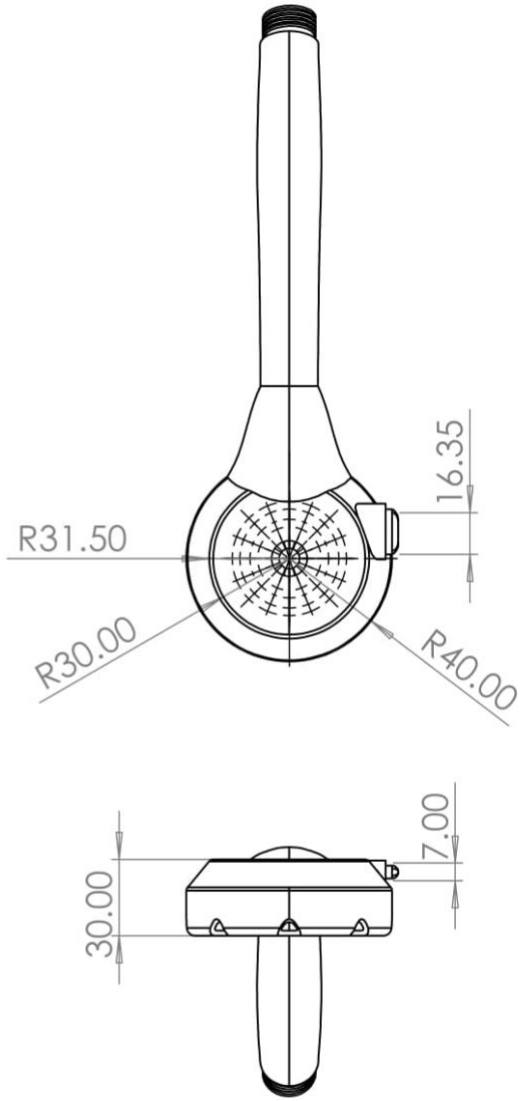
The soap stand holder is connected to the soap stand stick, whereas the shower head holder is connected to the soap stand holder. When assembling both parts, an ISO7045 - M2 X 20 - Z - 20N nail is used to connect both parts and the shower head holder is rotatable around the nail as axis.

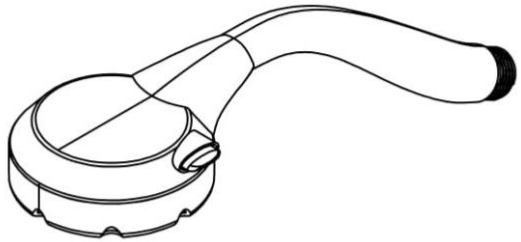
Water Heater – Pipe – Shower Head Joint

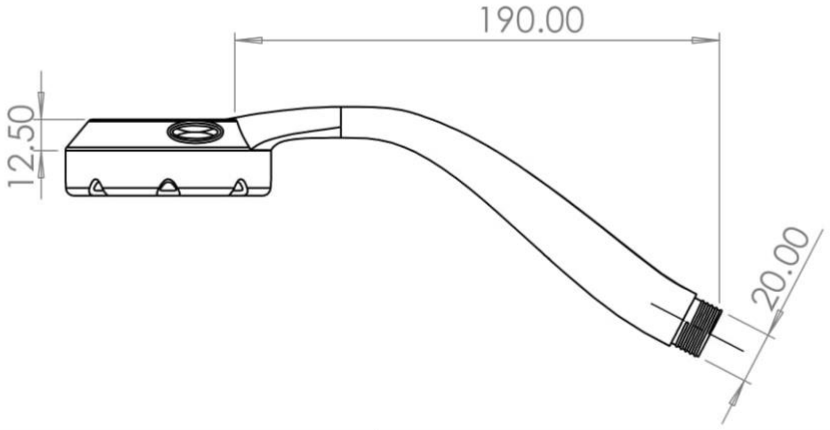
The joint that connects the pipe to the water heater and the shower head joint. When creating the model in SOLIDWORKS, helix curve is used to create the pattern of screwing inside the joint to connect with other parts.

Water Heater – Shower Head Pipe

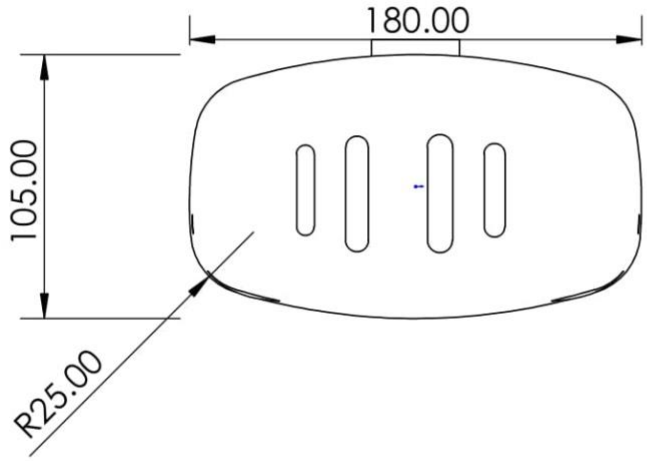
The pipe that joins the water heater to let water flow to the shower head. When creating the model in SOLIDWORKS, spline is used to create the guide curve and swept boss/base is used to create the hose like pattern.

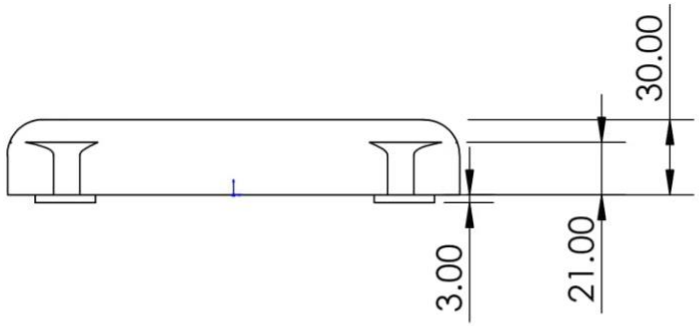


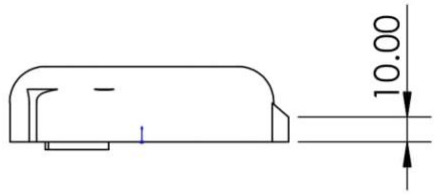




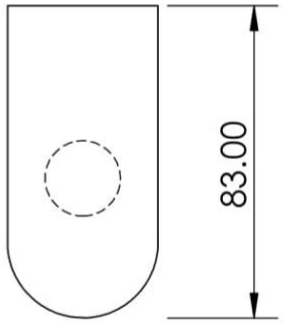
UNLESS STATES OTHERWISE ALL DIMENSION IN mm		DRAWN BY GEETTA SUBRAMANIAN ID: 1906570 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL STAINLESS STEEL	CHECK BY	SHOWER HEAD
	FINISH AS MACHINE		SCALE 1:3 | DWG NO 1 | SHEET 1 OF 1

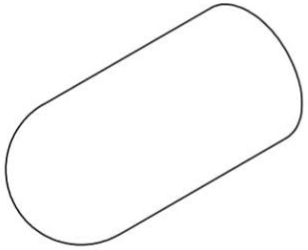


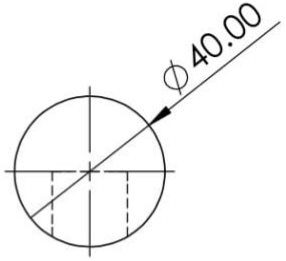


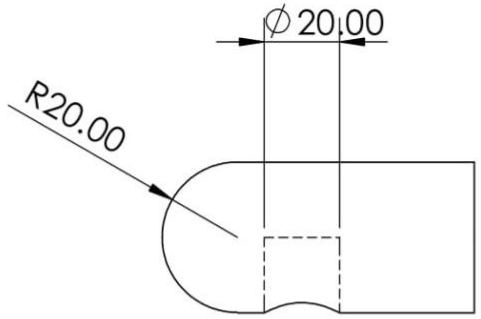


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY JEE PEI QI 1805656 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECK BY	SOAP HOLDER
	FINISH AS MACHINE		SCALE 1:3 | DWG NO 1 | SHEET 1 OF 1

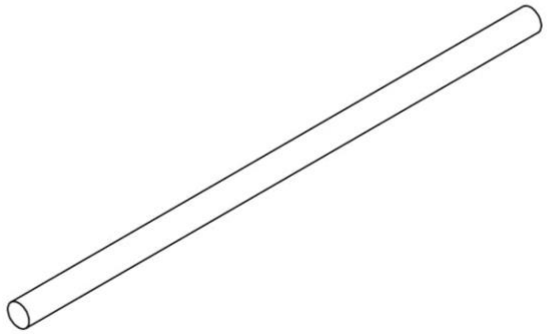


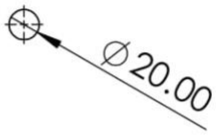




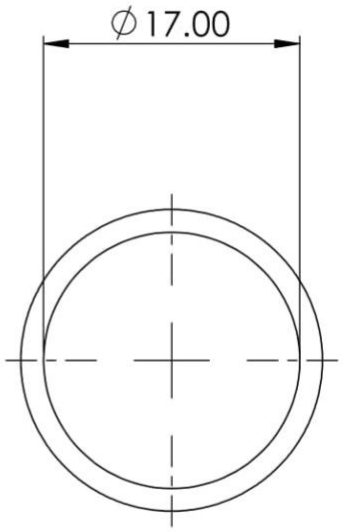


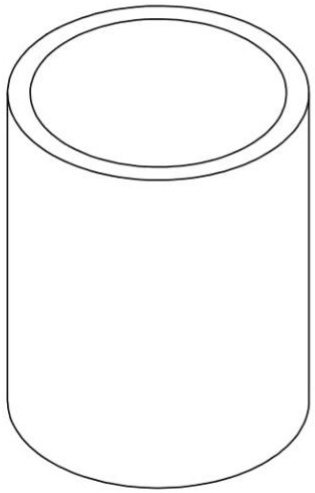
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY JEE PEI QI 1805656 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL AISI 304	CHECK BY	SOAP STAND STICK TOP
	FINISH AS MACHINE		SCALE 1:2 | DWG NO 1 | SHEET 1 OF 1

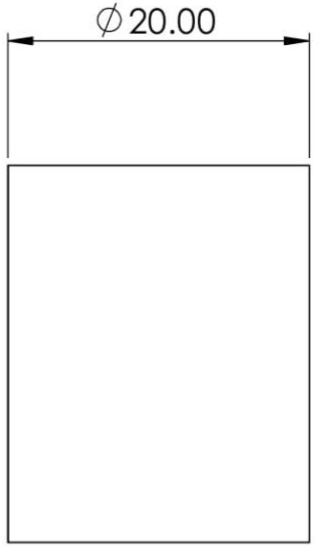


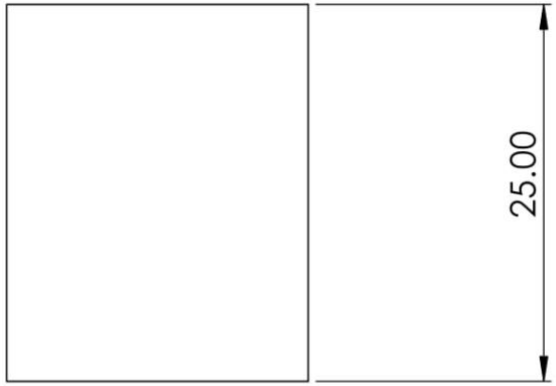


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY JEE PEI QI 1805656 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL AISI 304	CHECK BY	SOAP STAND STICK
	FINISH AS MACHINE		SCALE 1:5 | DWG NO 1 | SHEET 1 OF 1

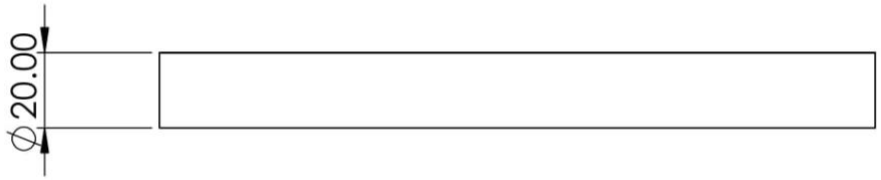


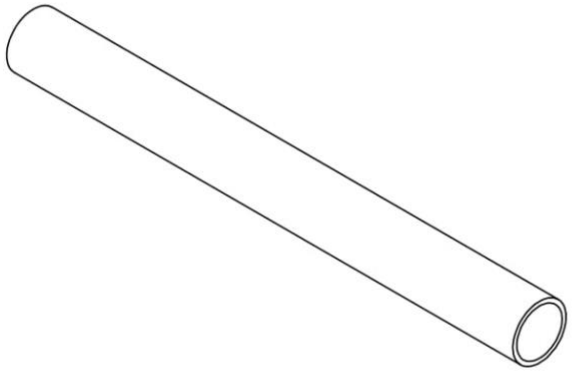


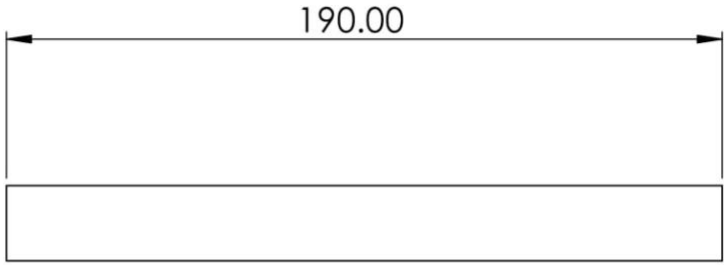




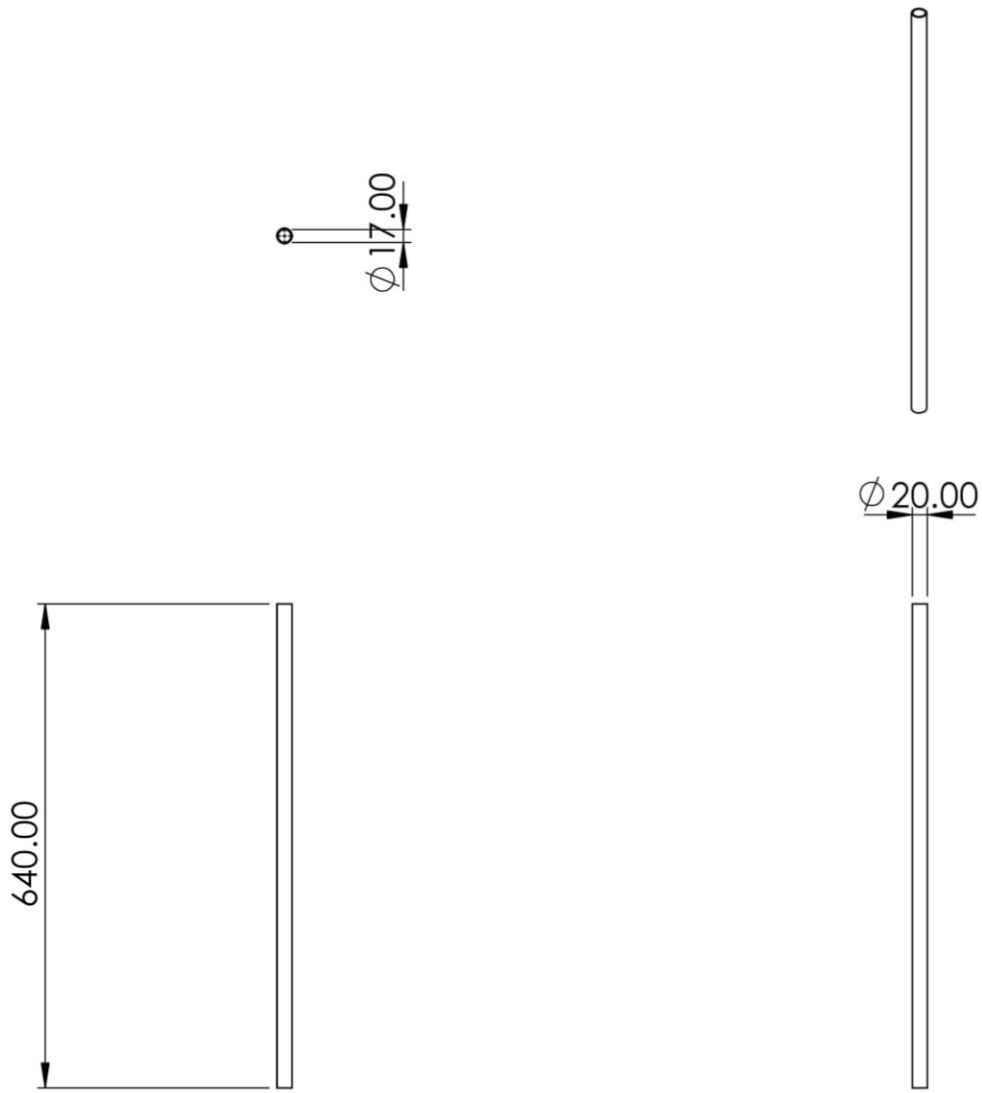
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	2.5cm BLACK HOSE
	FINISH AS MACHINE		SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1



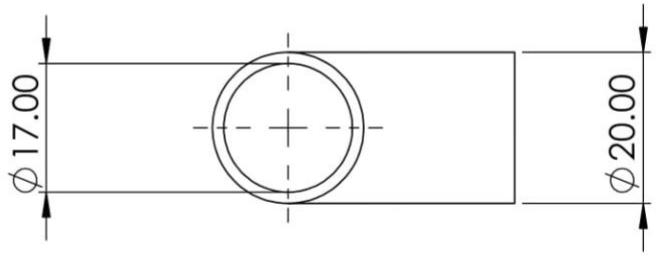


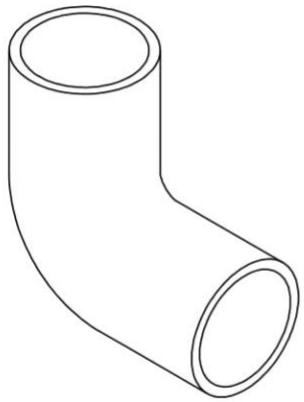


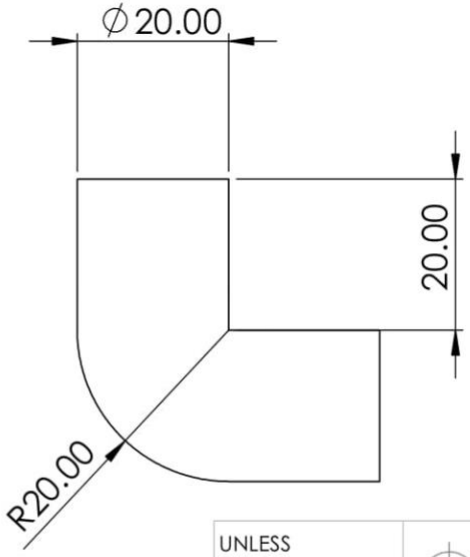
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	19cm BLACK HOSE
	FINISH AS MACHINE		SCALE 1:2 | DWG NO. 1 | SHEET 1 OF 1

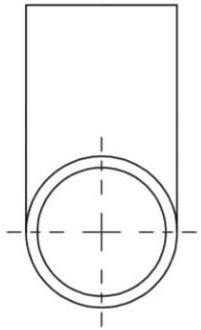


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	64cm BLACK HOSE
	FINISH AS MACHINE		SCALE 1:10 | DWG NO. 1 | SHEET 1 OF 1

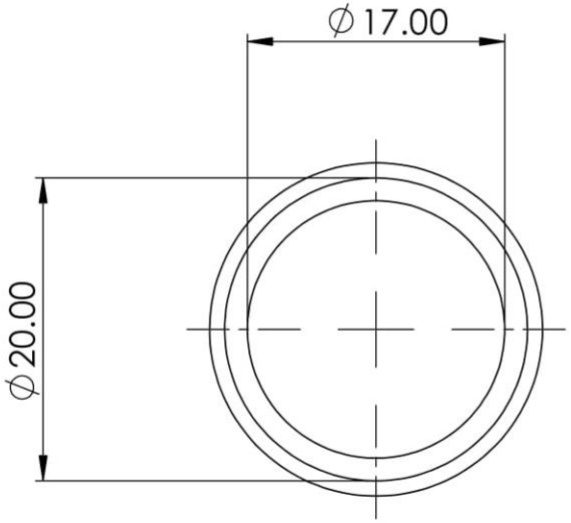


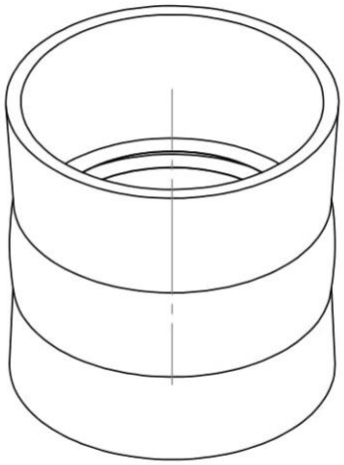


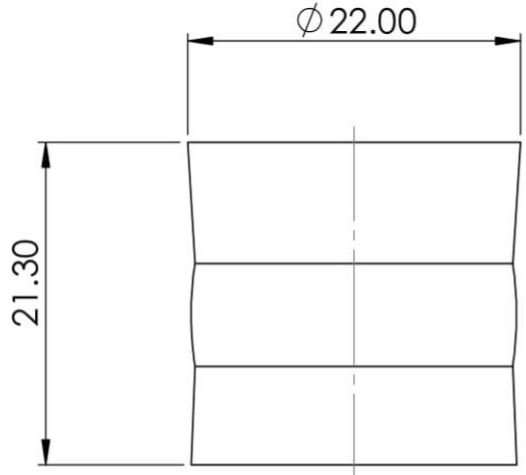


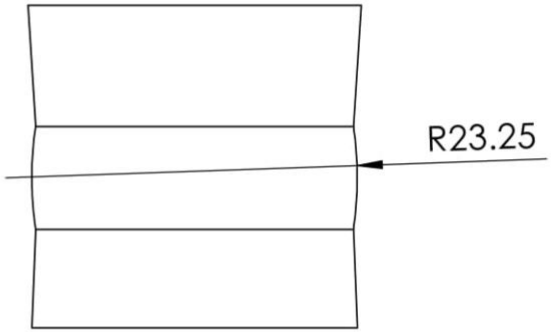


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	90 DEGREE BLACK HOSE
	FINISH AS MACHINE		SCALE 1:1 | DWG NO. 1 | SHEET 1 OF 1

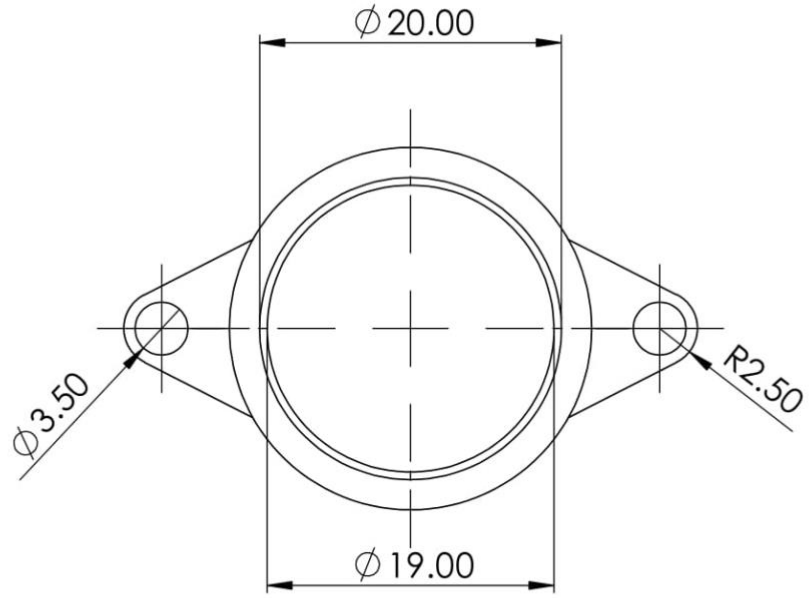


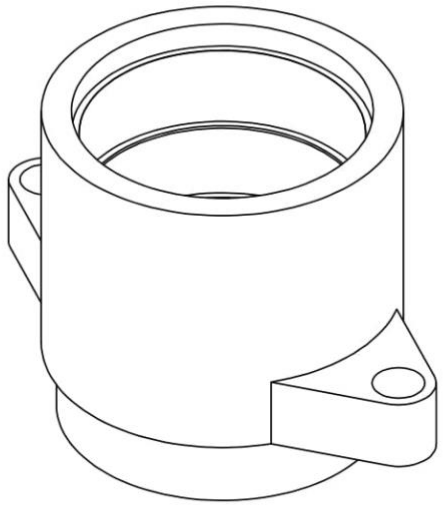


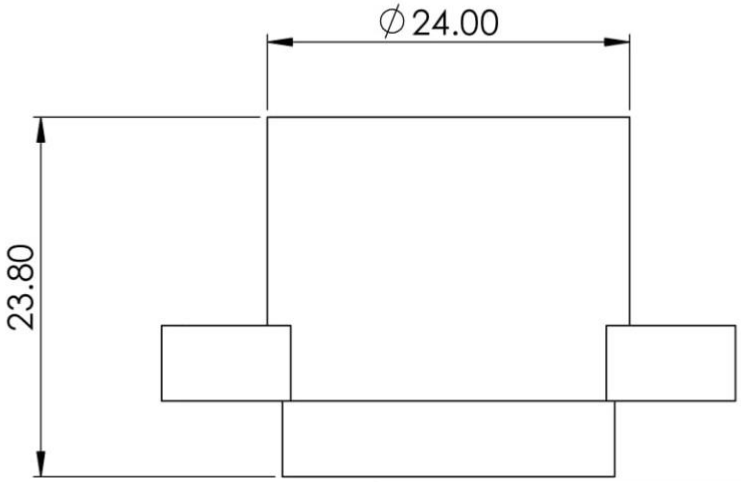


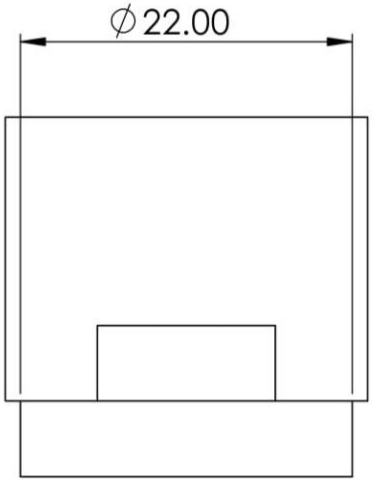


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL STAINLESS STEEL (FERRITIC)	CHECKED BY:	SILVER CONNECTOR
	FINISH AS MACHINE		SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1

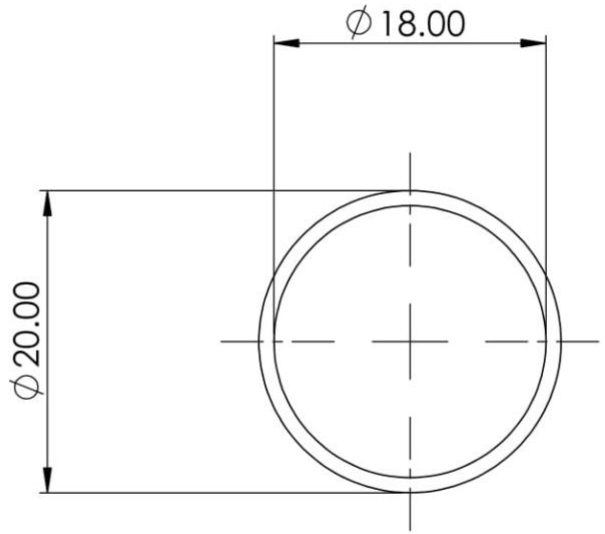


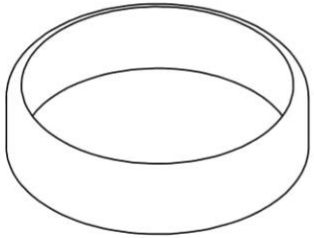


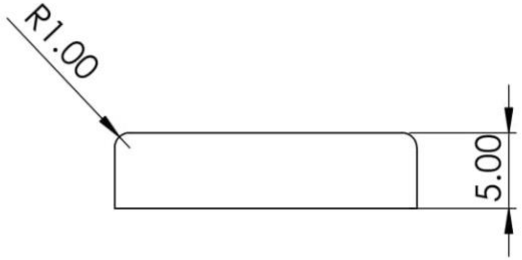




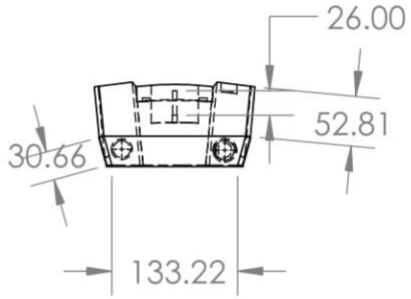
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	TAP-LIKE CONNECTOR
	FINISH AS MACHINE		SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1

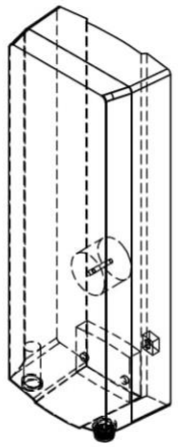


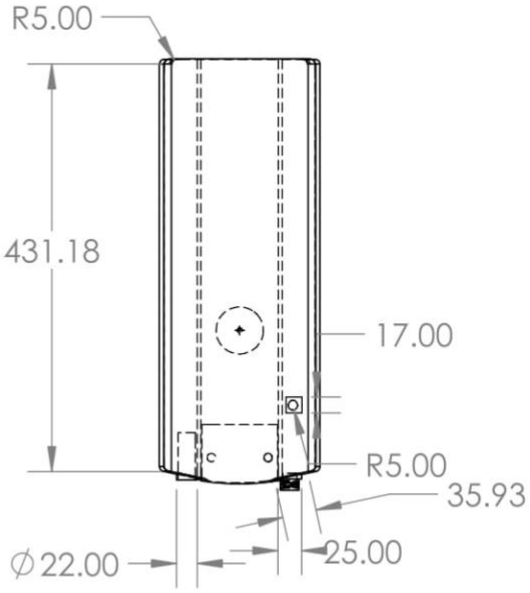


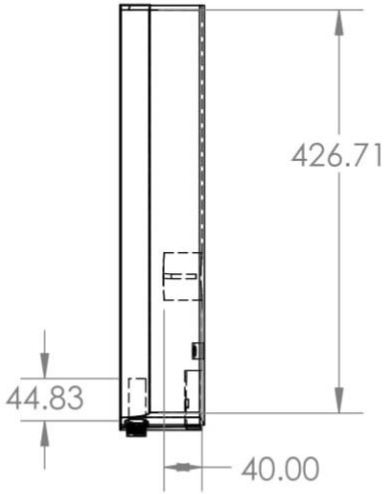


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL NATURAL RUBBER	CHECKED BY:	LATEX STOPPER
	FINISH AS MACHINE		SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1

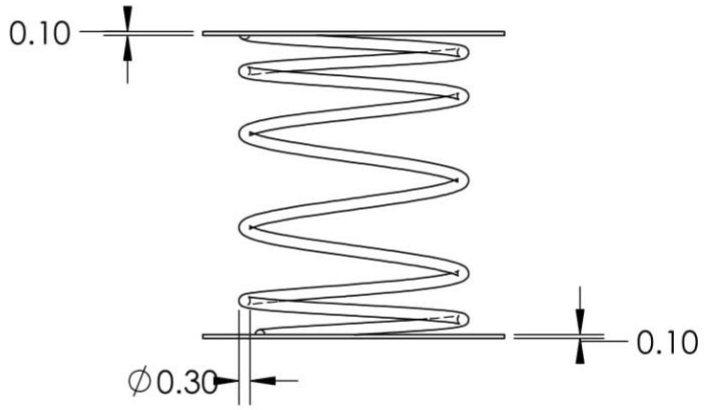


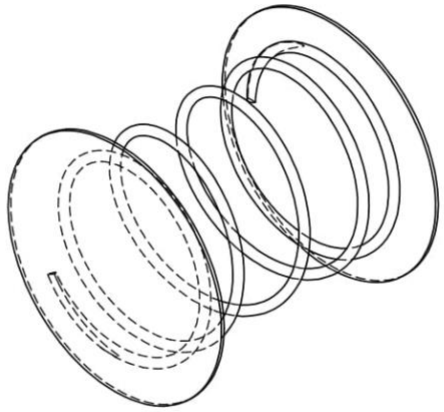


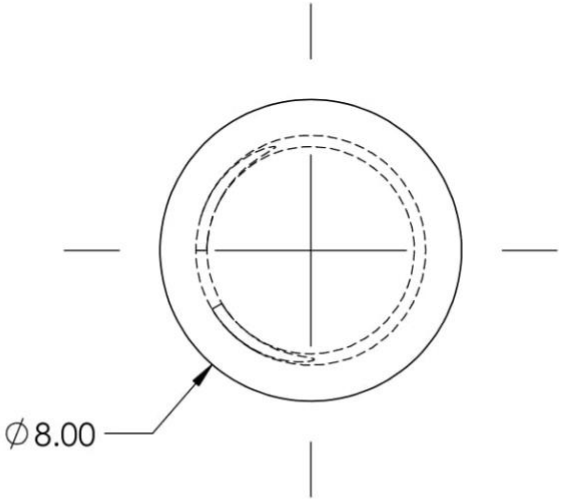


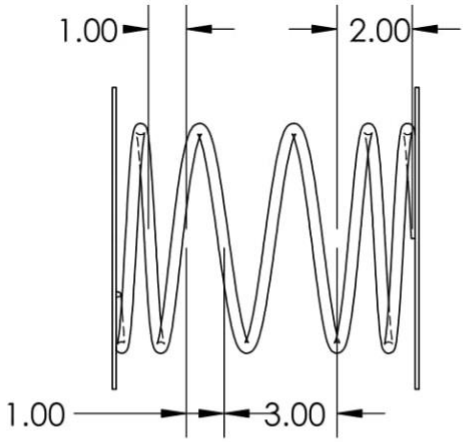


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 20UEB05971 GROUP 15 DATE: 30 AUG 2021	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL STAINLESS STEEL	CHECK BY	Water Heater Body
	FINISH AS MACHINE		SCALE 1:8 | DWG NO 1 | SHEET 1 OF 1

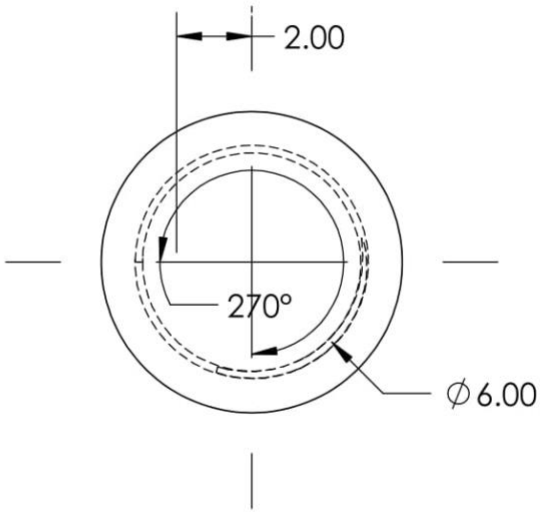


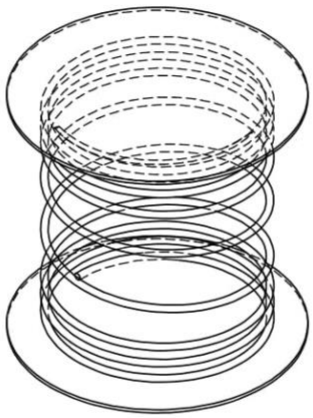


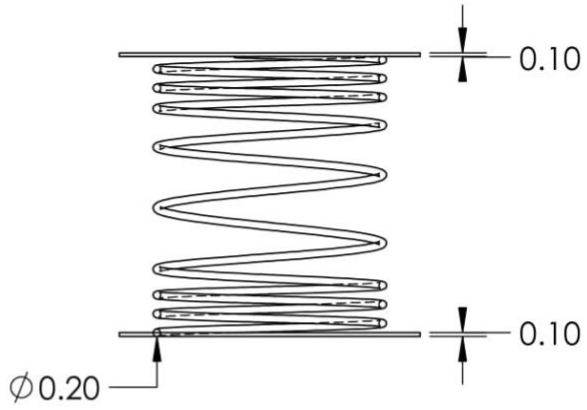


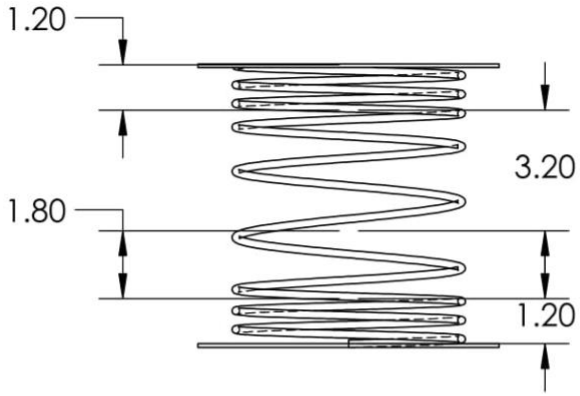


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 20UEB05971 GROUP 15 DATE: 30 AUG 2021	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL CARBON STEEL	CHECK BY	Spring (for push on and off button)
	FINISH AS MACHINE		SCALE 5:1 | DWG NO 1 | SHEET 1 OF 1

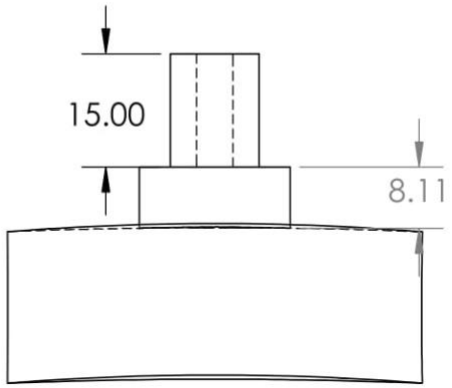


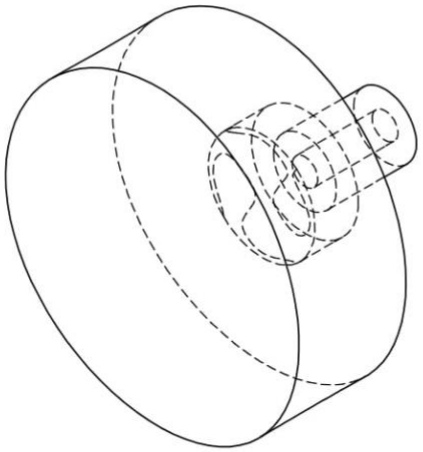


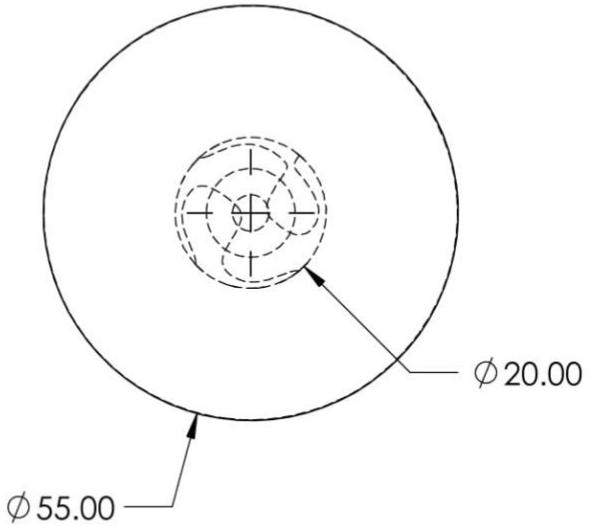


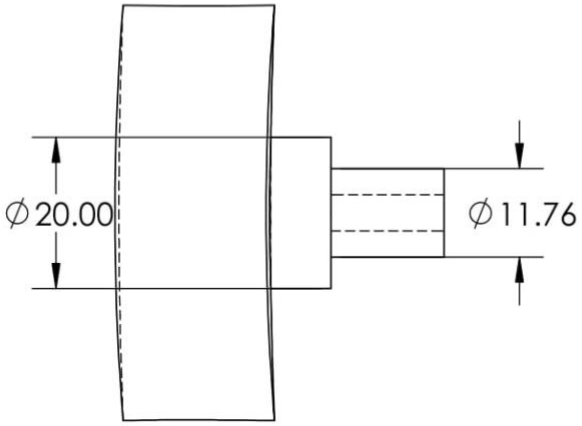


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 20UEB05971 GROUP 15 DATE: 30 AUG 2021	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL CARBON STEEL	CHECK BY	Spring (for checker)
	FINISH AS MACHINE		SCALE 5:1 | DWG NO 1 | SHEET 1 OF 1

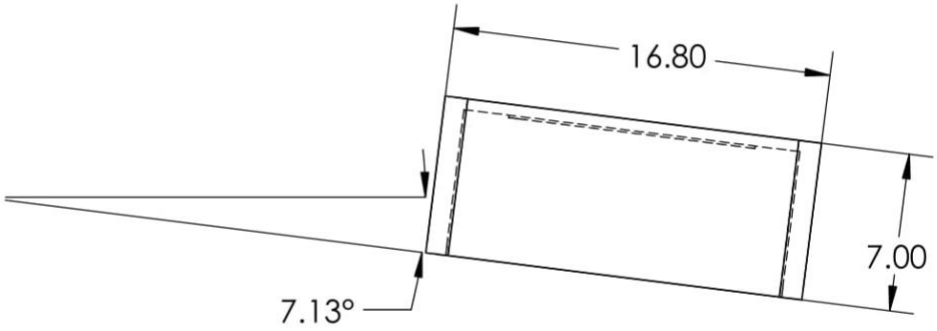


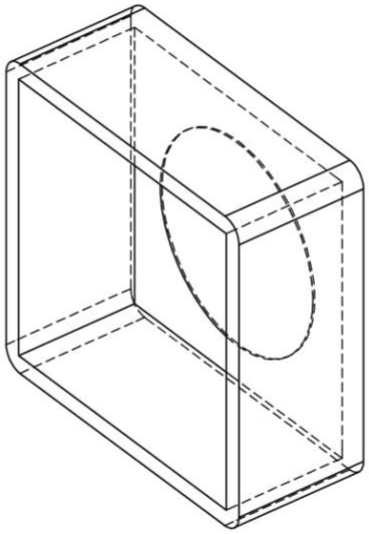


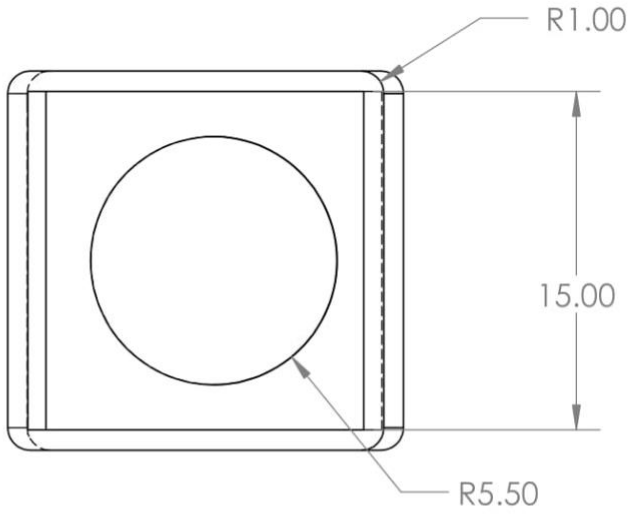


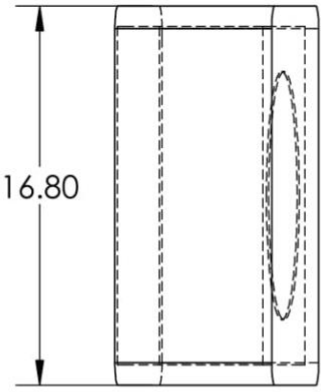


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 20UEB05971 GROUP 15 DATE: 30 AUG 2021	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL 1060 ALLOY	CHECK BY	Temperature Roller
	FINISH AS MACHINE		SCALE 1:1 | DWG NO 1 | SHEET 1 OF 1

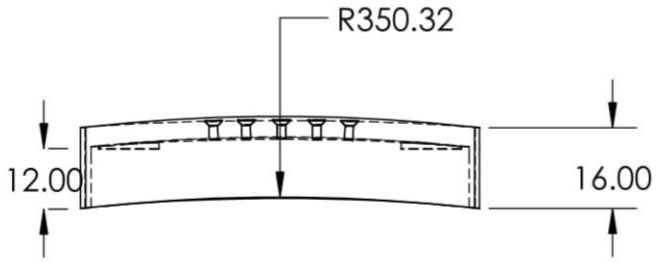


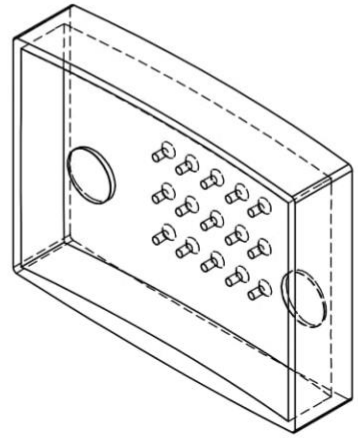


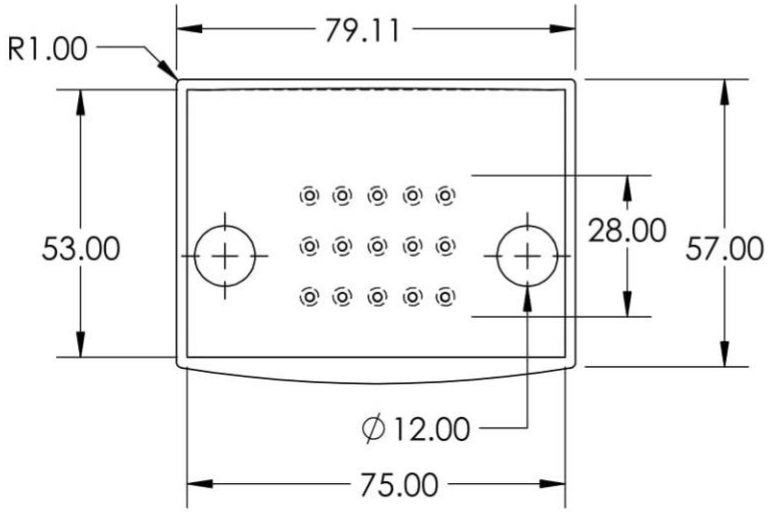


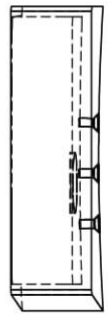


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 20UEB05971 GROUP 15 DATE: 30 AUG 2021	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL SILICON RUBBER	CHECK BY	Checker
	FINISH AS MACHINE		SCALE 3:1 | DWG NO 1 | SHEET 1 OF 1

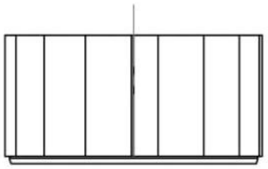


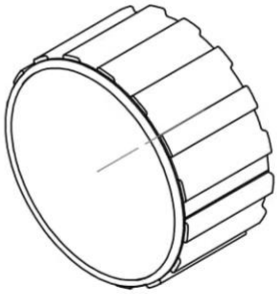


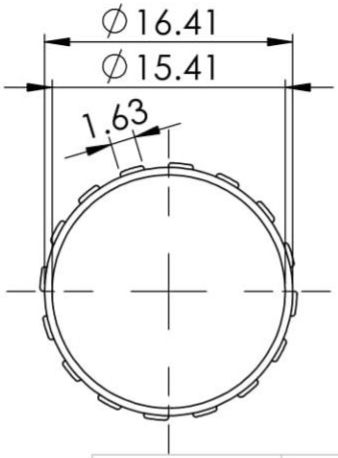


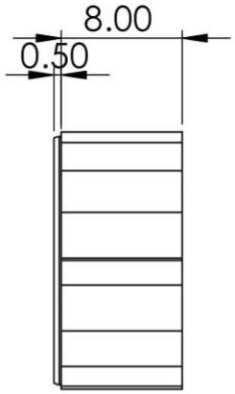


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY LIM JIN QIAN 2005971 GROUP 15 DATE:	UNIVERSITI OF TUNKU ABDUL RAHMAN
	MATERIAL 1060 ALLOY	CHECK BY	Push On and Off Button
	FINISH AS MACHINE		SCALE 1:1.5 | DWG NO 1 | SHEET 1 OF 1

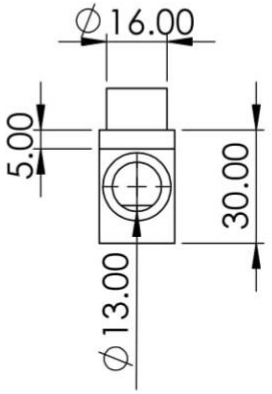


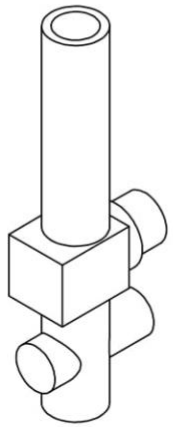


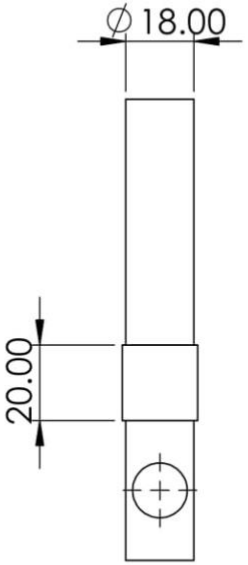


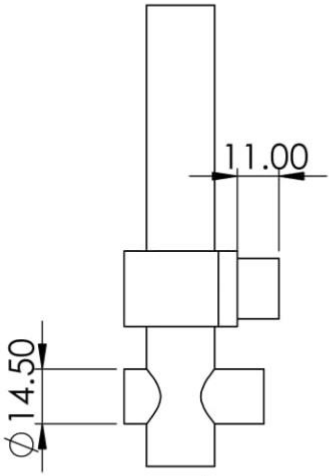


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC 0.007 PLASTICIZED	CHECKED BY:	FILTER KNOB
	FINISH AS MACHINE		SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1

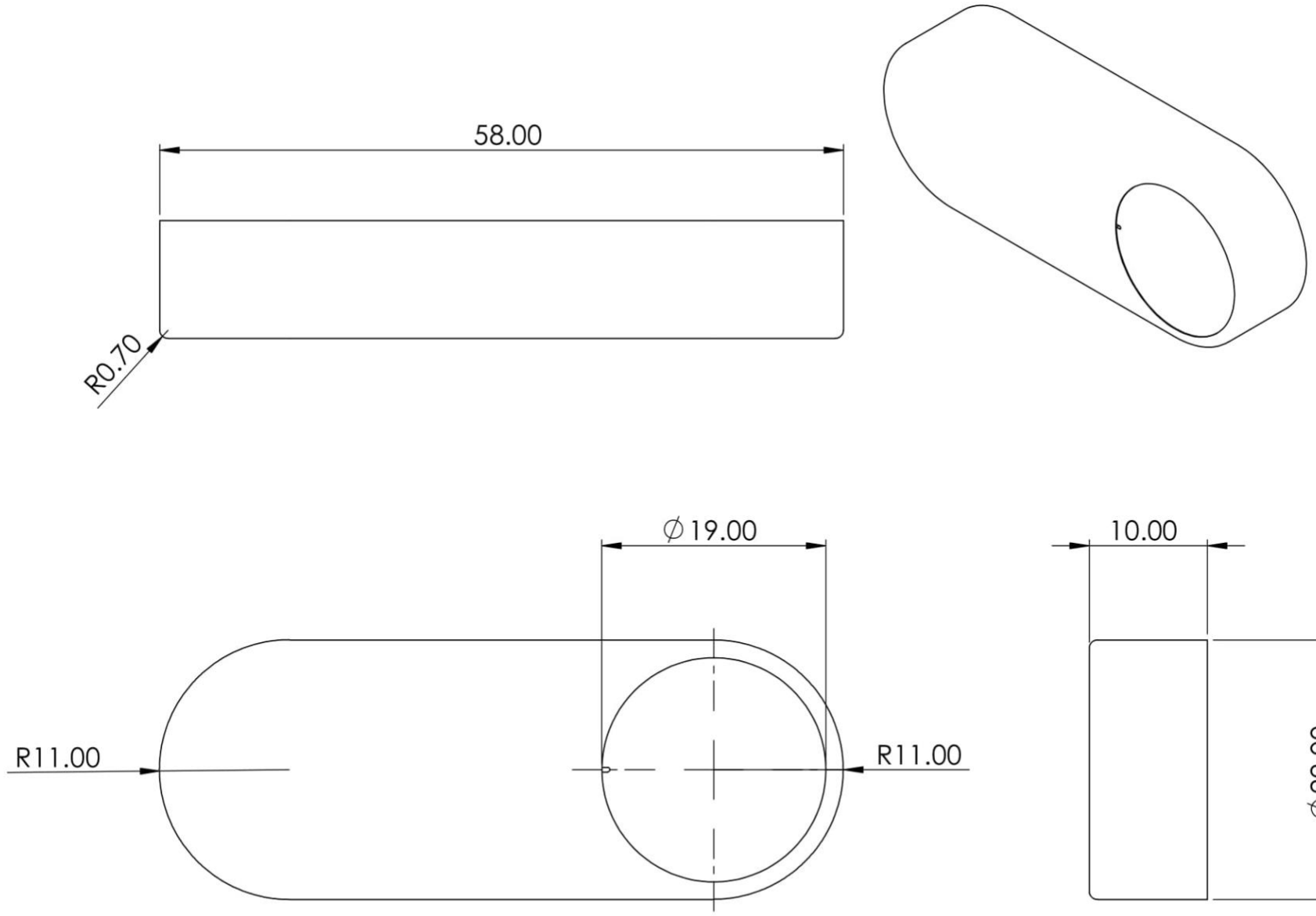




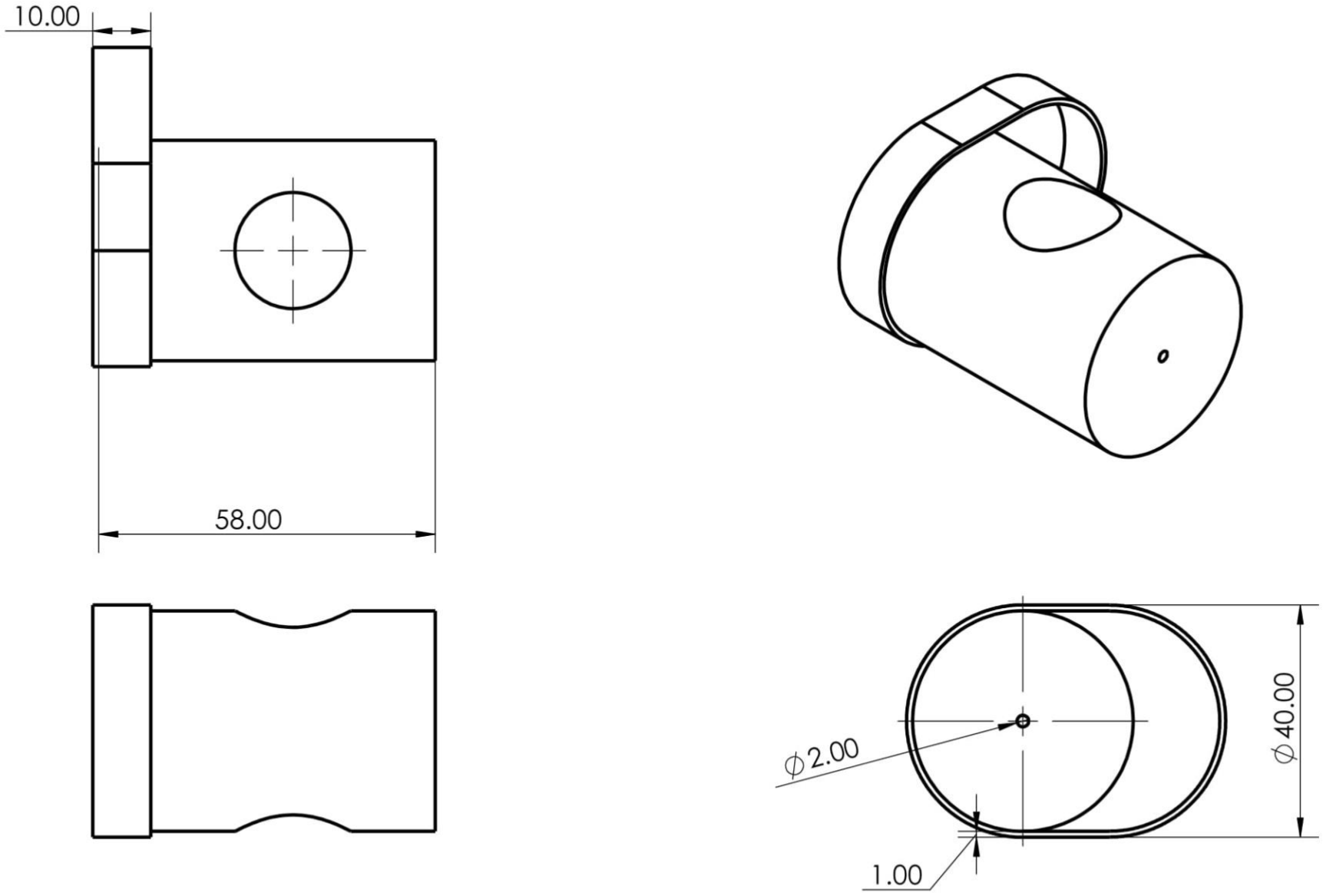




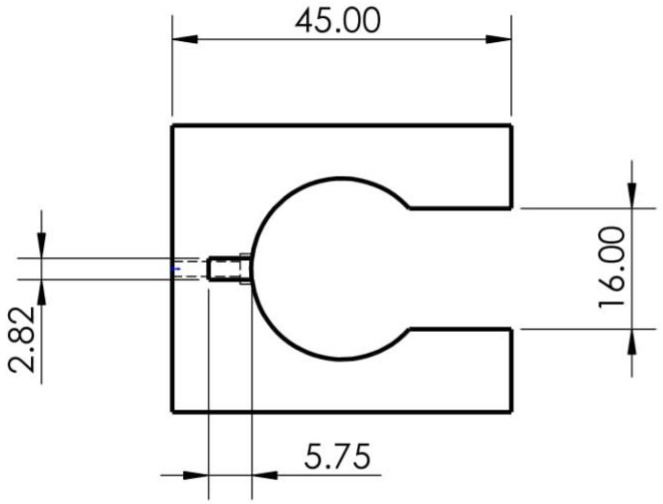
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC RIGID	CHECKED BY:	TUBE FOR VALVES
	FINISH AS MACHINE		SCALE 1:2 | DWG NO. 1 | SHEET 1 OF 1

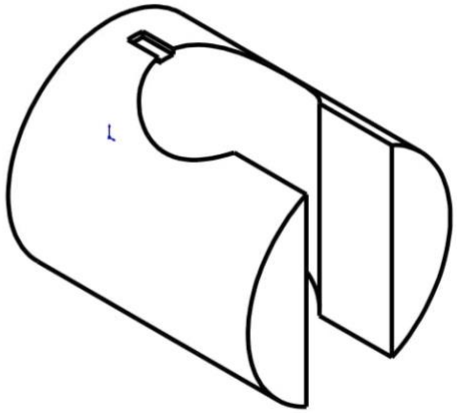


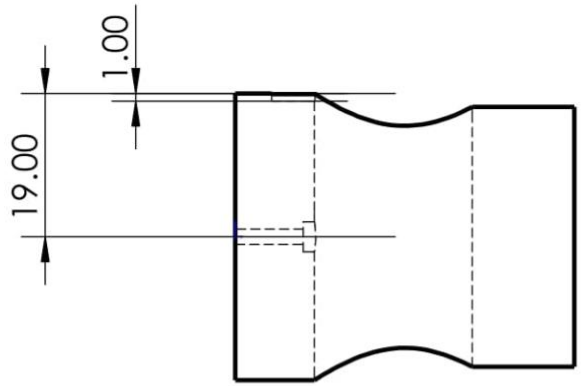
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY TAN KE KENG 2100647 P3 DATE: 30 August 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC 0.007 PLASTICIZED FINISH AS MACHINE	CHECKED BY:	WATER VOLUME KNOB
			SCALE 2:1 | DWG NO. 1 | SHEET 1 OF 1

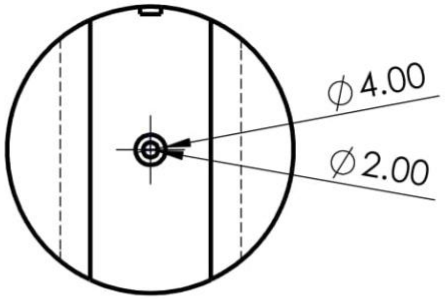


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY THIEN E HUNG 2004830 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL AISI 304	CHECK BY	SOAP STAND HOLDER
	FINISH AS MACHINE		SCALE 1:1 | DWG NO 1 | SHEET 1 OF 1

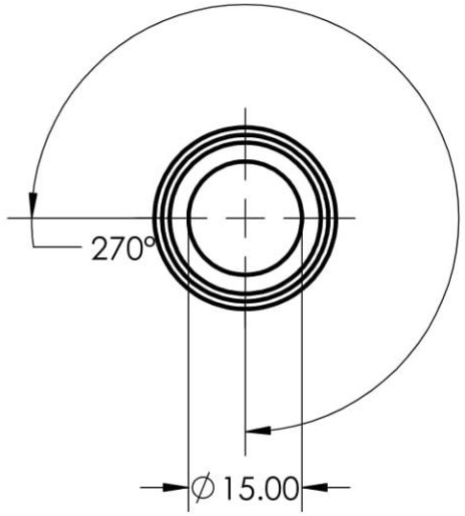


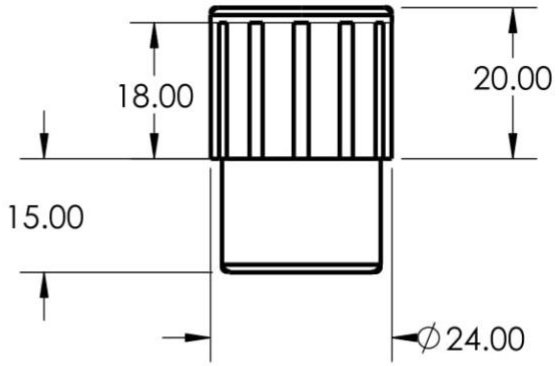


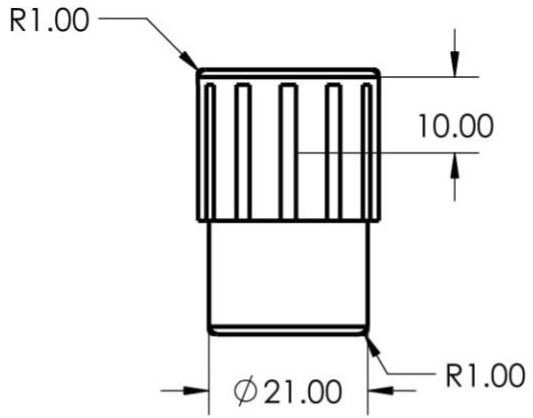




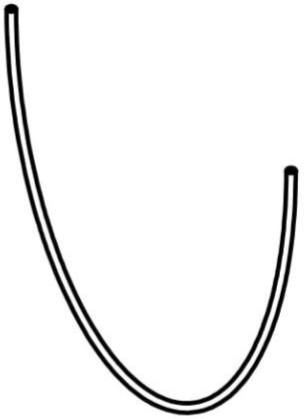
UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY THIEN E HUNG 2004830 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL AISI 304	CHECK BY	SHOWER HEAD HOLDER
	FINISH AS MACHINE		SCALE 1:1 | DWG NO 1 | SHEET 1 OF 1

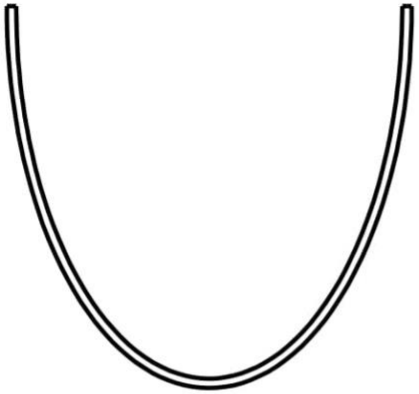




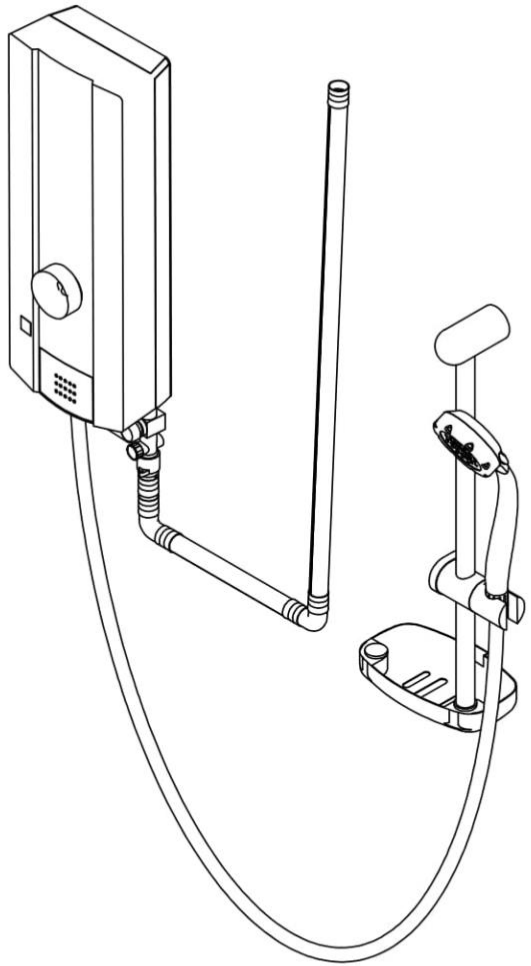


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY THIEN E HUNG 2004830 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC 0.007 PLASTICIZED	CHECK BY	WATERHEATER-PIPE-SHOWERHEAD JOINT
	FINISH AS MACHINE		SCALE 1:1 | DWG NO 1 | SHEET 1 OF 1



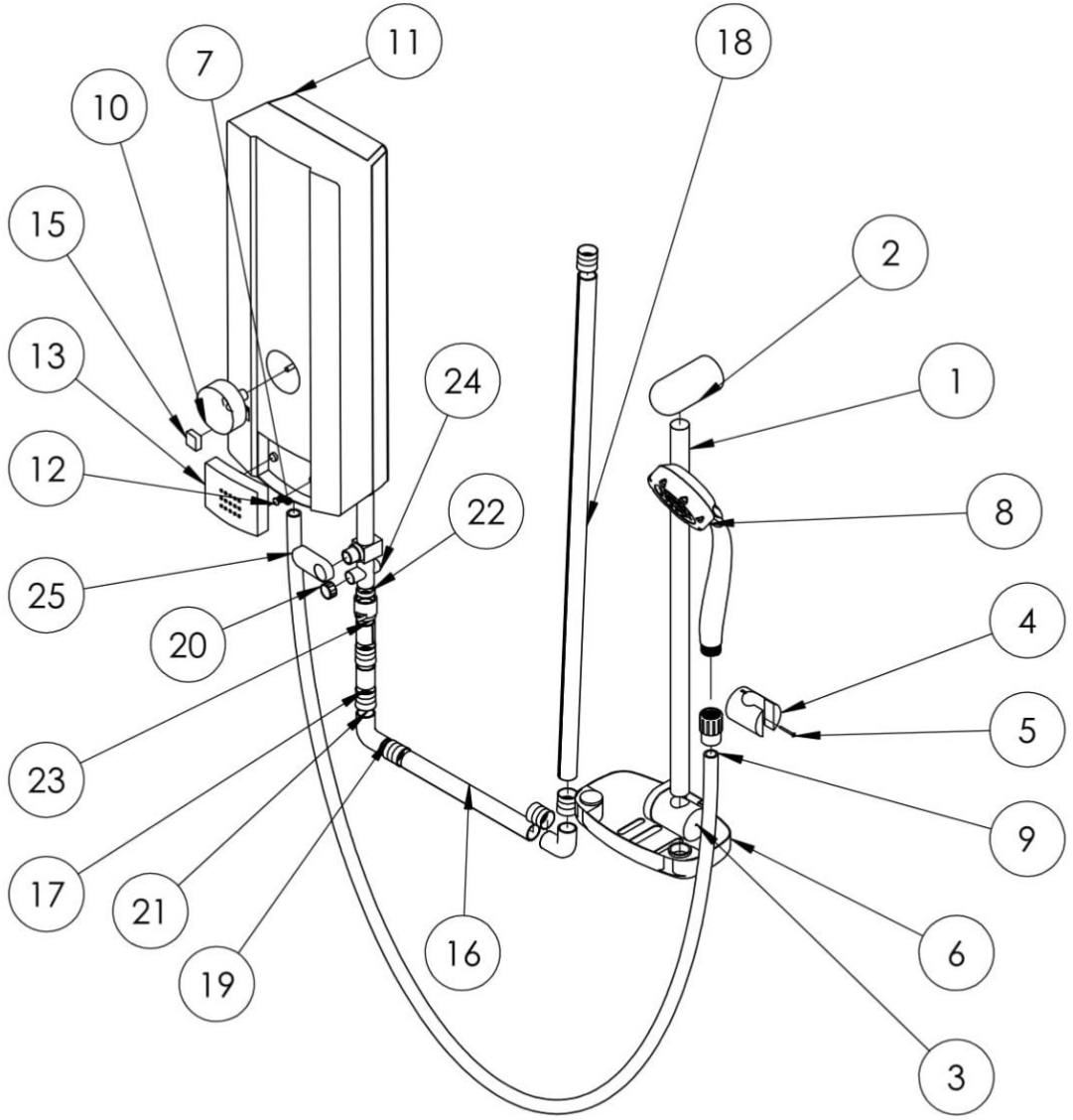


UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY THIEN E HUNG 2004830 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL PVC 0.007 PLASTICIZED	CHECK BY	WATER HEATER-SHOWERHEAD PIPE
	FINISH AS MACHINE		SCALE 1:12 | DWG NO 1 | SHEET 1 OF 1



UNLESS STATED OTHERWISE ALL DIMENSION IN mm		DRAWN BY THIEN E HUNG 2004830 CL DATE: 30 AUGUST 2021	UNIVERSITI TUNKU ABDUL RAHMAN
	MATERIAL	CHECK BY	WATER HEATER ASSEMBLY
	FINISH AS MACHINE		SCALE 1:8 | DWG NO 1 | SHEET 1 OF 1

ITEM NO.	PART NUMBER	QTY.
1	SOAP STAND STICK	1
2	SOAP STAND STICK TOP	1
3	SOAP STAND HOLDER	1
4	SHOWERHEAD HOLDER	1
5	ISO 7045 - M2 X 20 - Z - 20N	1
6	SOAP HOLDER	1
7	WATER HEATER-PIPE-SHOWERHEAD JOINT	2
8	SHOWER HEAD	1
9	WATERHEATER-SHOWERHEAD PIPE	1
10	TEMPERATURE ROLLER	1
11	WATER HEATER BODY	1
12	SPRING (BUTTON)	2
13	ON AND OFF BUTTON	1
14	SPRING (CHECKER)	1
15	CHECKER	1
16	19cm BLACK HOSE (25cm)	1
17	2.5cm BLACK HOSE	2
18	64cm BLACK HOSE (70cm)	1
19	90 DEGREE BLACK HOSE (17mm INNER R, 20mm OUTER R)	2
20	FILTER (OUTER D 17mm)	1
21	SILVER CONNECTORS	6
22	STOPPER	1
23	TAP	1
24	TUBE	1
25	WATER VOLUME KNOB (INNER CIRCLE 19mm OUTER CIRCLE 22mm 10mm DEEP)	1



UNLESS STATED OTHERWISE

ALL DIMENSION IN mm

MATERIAL

FINISH AS MACHINE

DRAWN BY
THIEN E HUNG
2004830 CL
DATE: 30 AUGUST 2021

CHECK BY

UNIVERSITI TUNKU ABDUL RAHMAN

EXPLODED VIEW

SCALE 1:8 | DWG NO 1 | SHEET 1 OF 1