Automated Scavenging System

Problem statement:

The major problem in recent days is cleaning large tunnels and pipes used for a sewage system in cities. Normally this kind of large tunnel is cleaned by humans they may be suffered from various infections and health disorders. Nearly 45% of sewage manual workers die due to the toxic gas emitted from the damped wastes and their lifespan becomes too short. Apart from death issues, they were also affected by deadly diseases commonly asthma, water-borne diseases, etc.

The objective of the project:

The main objective of our project is to provide a simple yet innovative technology to overcome the major problems faced by sewage cleaning workers. To clear and inspect the pipeline with advanced technology. The manufacturing of the pipeline sewage port (PSB) should be lesser when compared to other existing devices and it should be user-friendly to the workers.

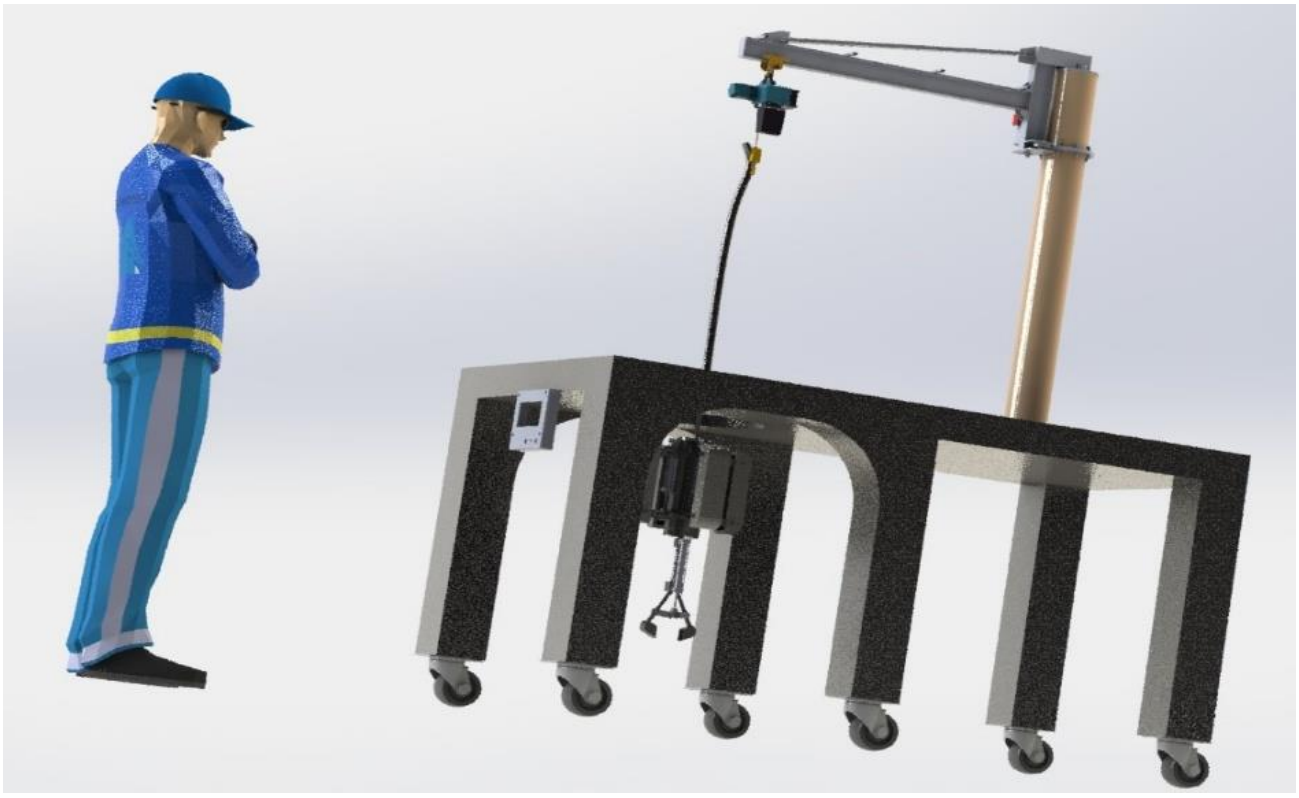
Solutions:

Designing a portable manhole cleaning machine. The machine will serve as a good alternative for the manhole cleaning workers. The device contains various kinematic linkages and pneumatic cylinders which can be operated with minimal power requirement. It will help to save the lives of many sewage workers.

Basic Survey:

On surveying about the manhole cleaning, it was found that the damped wastes release highly toxic gases, and the overall mass of the blockage to be cleared is comparatively larger. Thus high power tools are required for the cleaning process. The materials used are required to have high corrosion resistance and large load handling capacities.

Product Design:



Bill of Materials:

S no	Part name	Quantity
1	Centre holding arm	1
2	Back plate	5
3	Cylinder	5
4	Connecting rod	5
5	Front plate	5
6	Side rods	20
7	Sliding rod	16
8	gripper	4
9	Junction box	1
10	buckets	2
11	studs	8
12	Studs 2	12
13	Sliding rod 2	2
14	Connector	1
15	Stud cap	8
16	Table	1
17	Roller	6

Raw material details

This section will clearly explain about the raw materials used for the pipeline sewage bort(PSB)

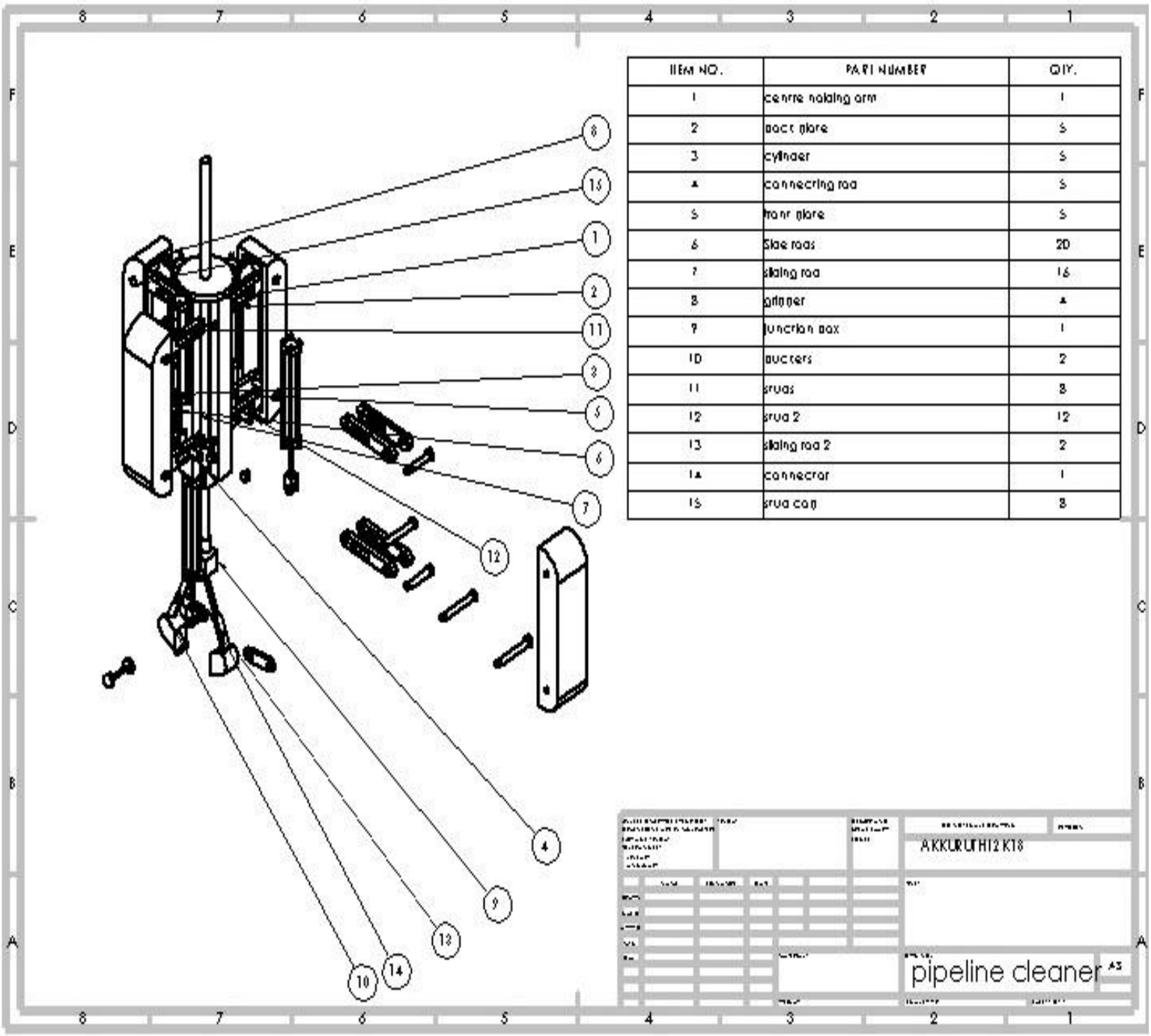
S No.	Assembly name	Part name	Material and grade
1	Pneumatic cylinder	Front plate	Stainless steel 304
		Back plate	Stainless steel 304
		Connecting rod	Stainless steel 304
		Side rods	Stainless steel 304
		Cylinders	Stainless steel 304
2	Center locating arm	Centre holding arm	Stainless steel 304
		Gripper	Polyurethane rubber
		Sliding rod	Stainless steel 304
		Stud	Stainless steel 304
		Stud 2	Stainless steel 304
		Stud cap	Stainless steel 304
		Junction box	Stainless steel 304
		Bucket	Stainless steel 304
		Connector	Stainless steel 304
		Sliding rod 2	Stainless steel 304
		Rope	Steel wire
		Table	Stainless steel 304
		Roller	

Assembly details

This section will show how to assemble each part and subassemblies of the pipeline sewage bort (PSB)

Main assembly drawing

S No	Part name	Quantity
1	Centre holding arm	1
2	Gripper	4
3	Sliding rod	16
4	Junction box	1
5	stud	8
6	Stud 2	12
7	Stud cap	20



ITEM NO.	PART NUMBER	QTY.
1	centre raising arm	1
2	back plate	5
3	cylinder	5
4	connecting rod	5
5	front plate	5
6	Side rods	20
7	sliding rod	16
8	gripper	4
9	junction box	1
10	buckets	2
11	struts	8
12	strut 2	12
13	sliding rod 2	2
14	connector	1
15	strut cap	8

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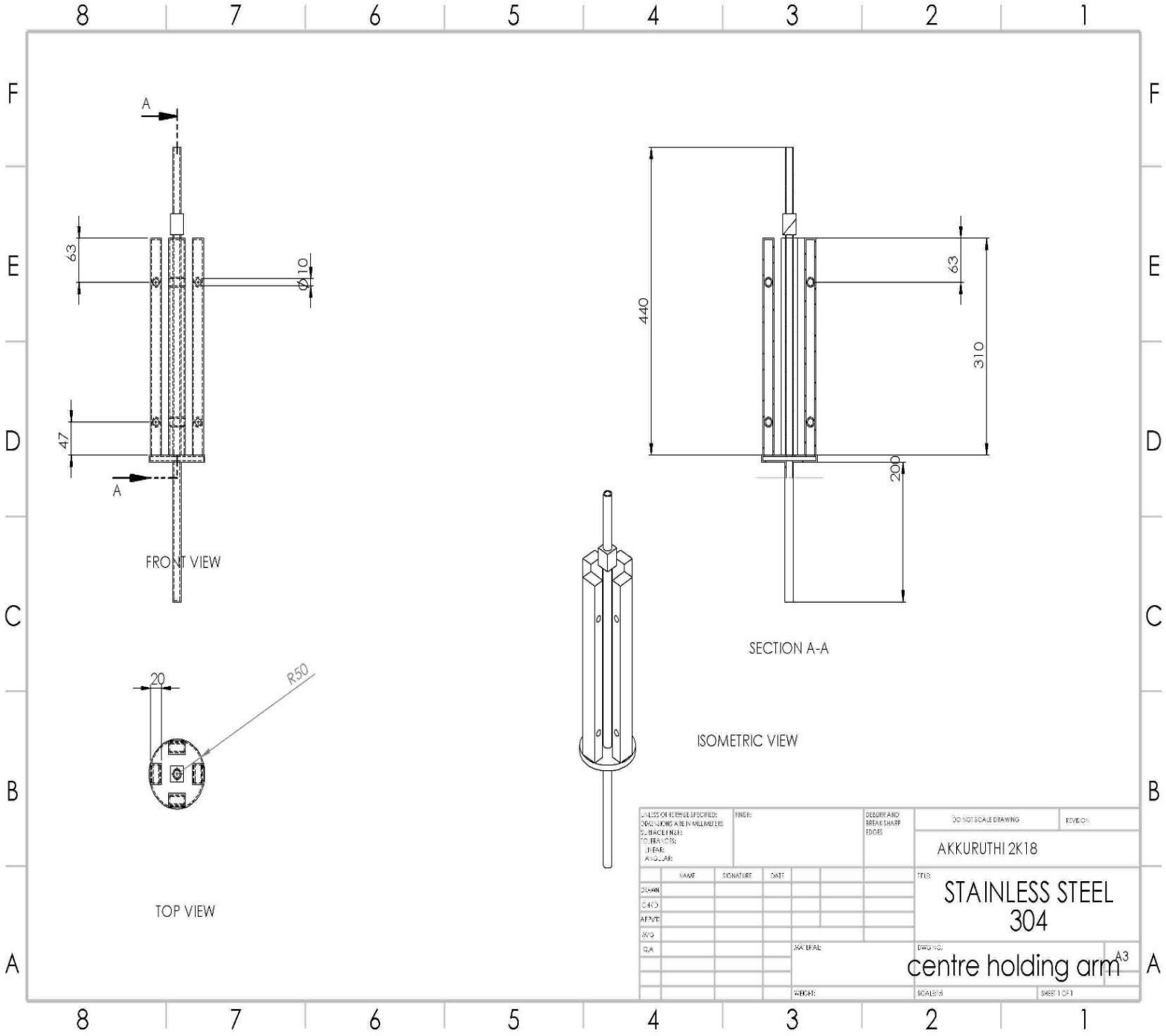
pipeline cleaner A3

1. Center holding arm

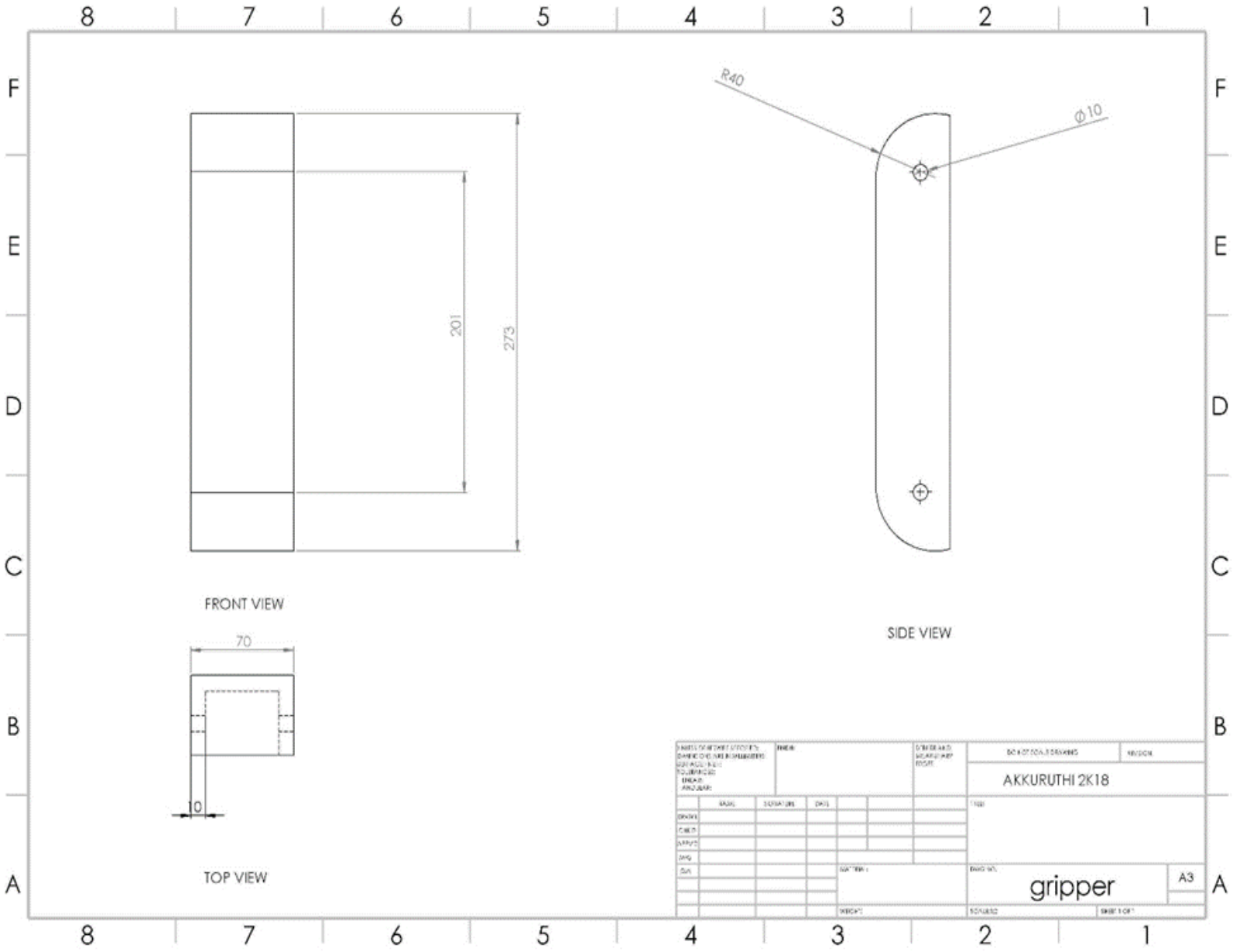
S no	Part name	Material description	Quantity
1	Centre holding arm	Stainless steel 304	1

2.



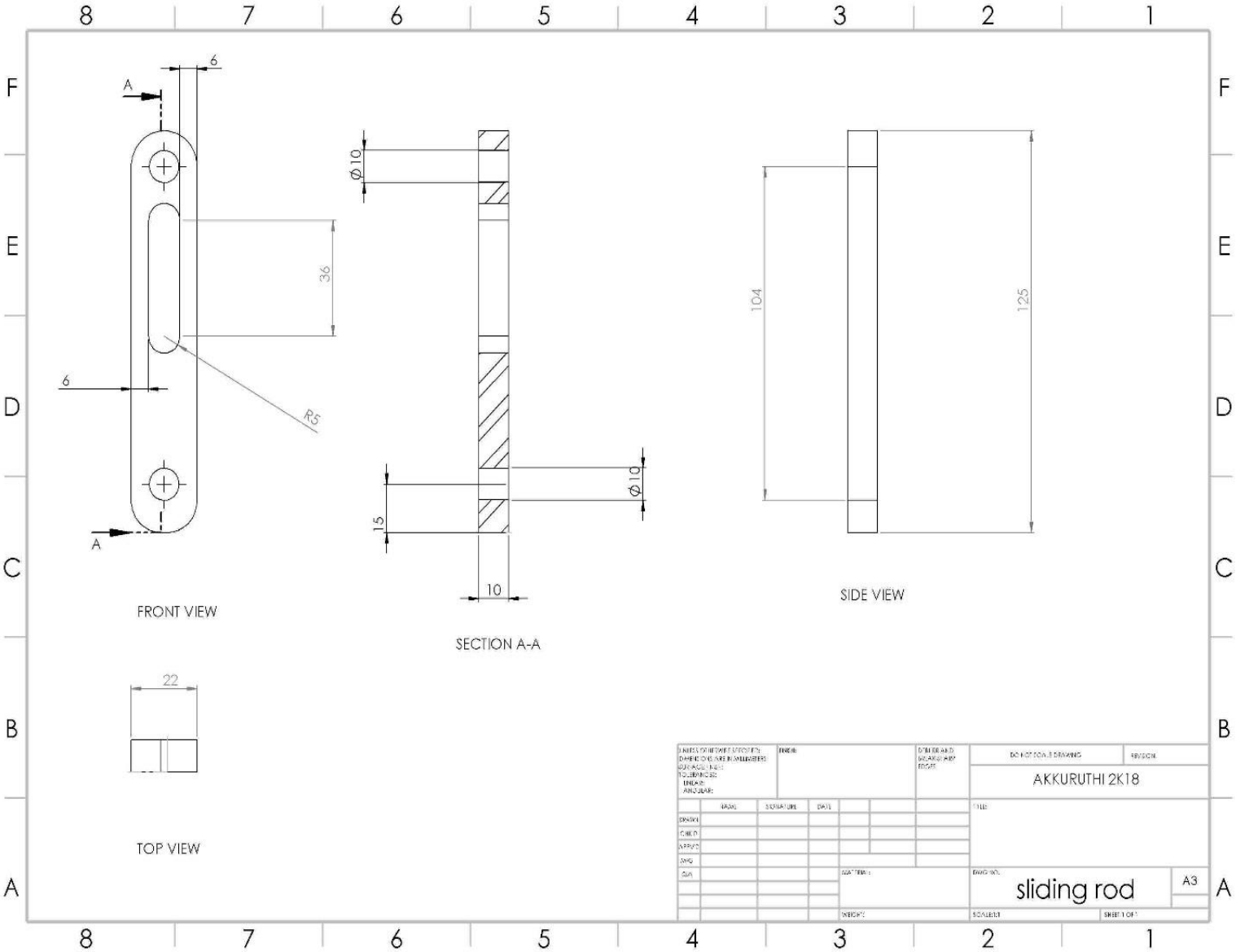
2. Gripper

S no	Part name	Material description	Quantity
1	Gripper	Polyurethane	4



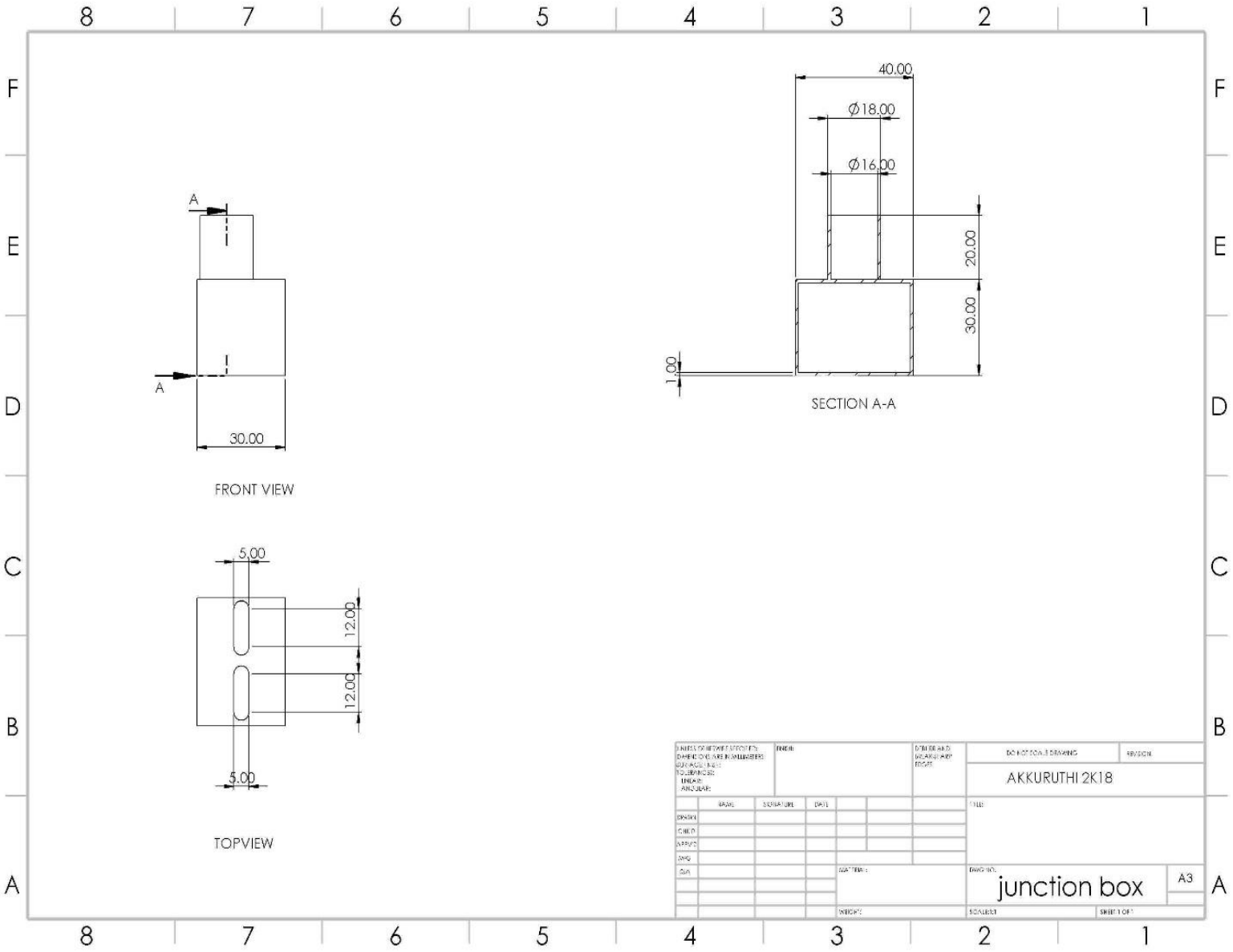
3. Sliding rod

S no	Part name	Material description	Quantity
1	Sliding rod	Stainless steel 304	16



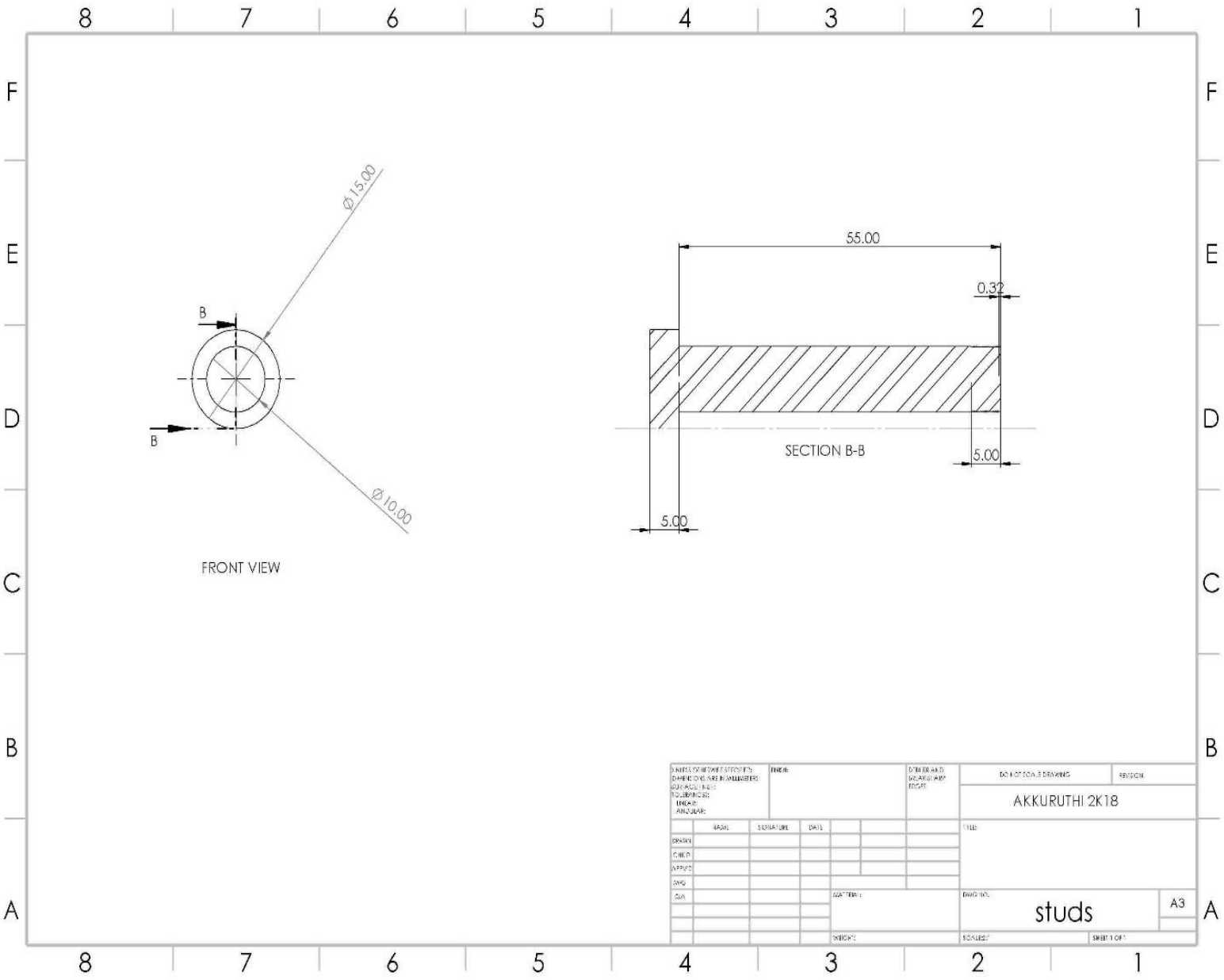
4. Junction box

S no	Part name	Material description	Quantity
1	Junction box	Stainless steel 304	1



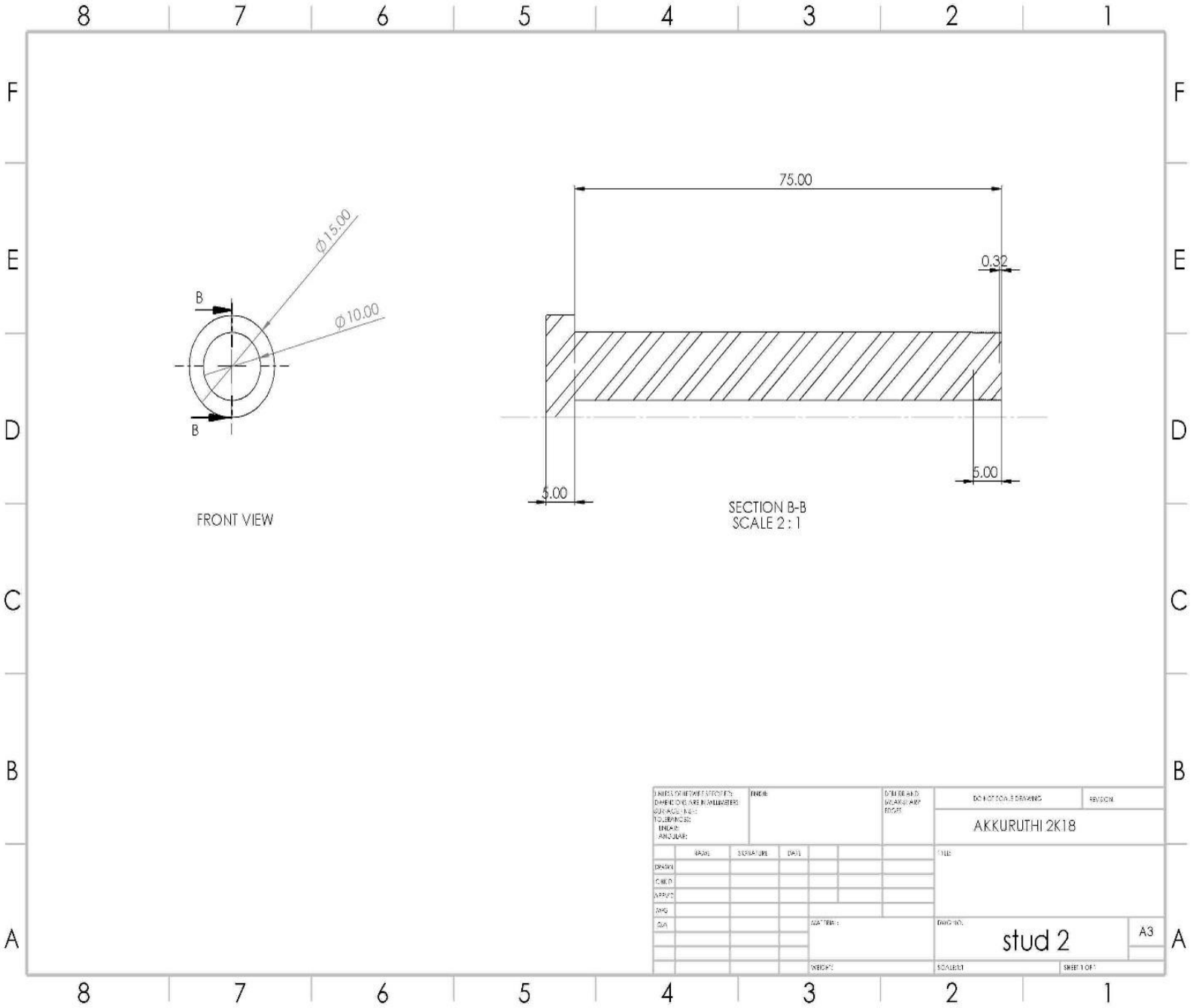
5. Stud

S no	Part name	Material description	Quantity
1	Studs	Stainless steel 304	8



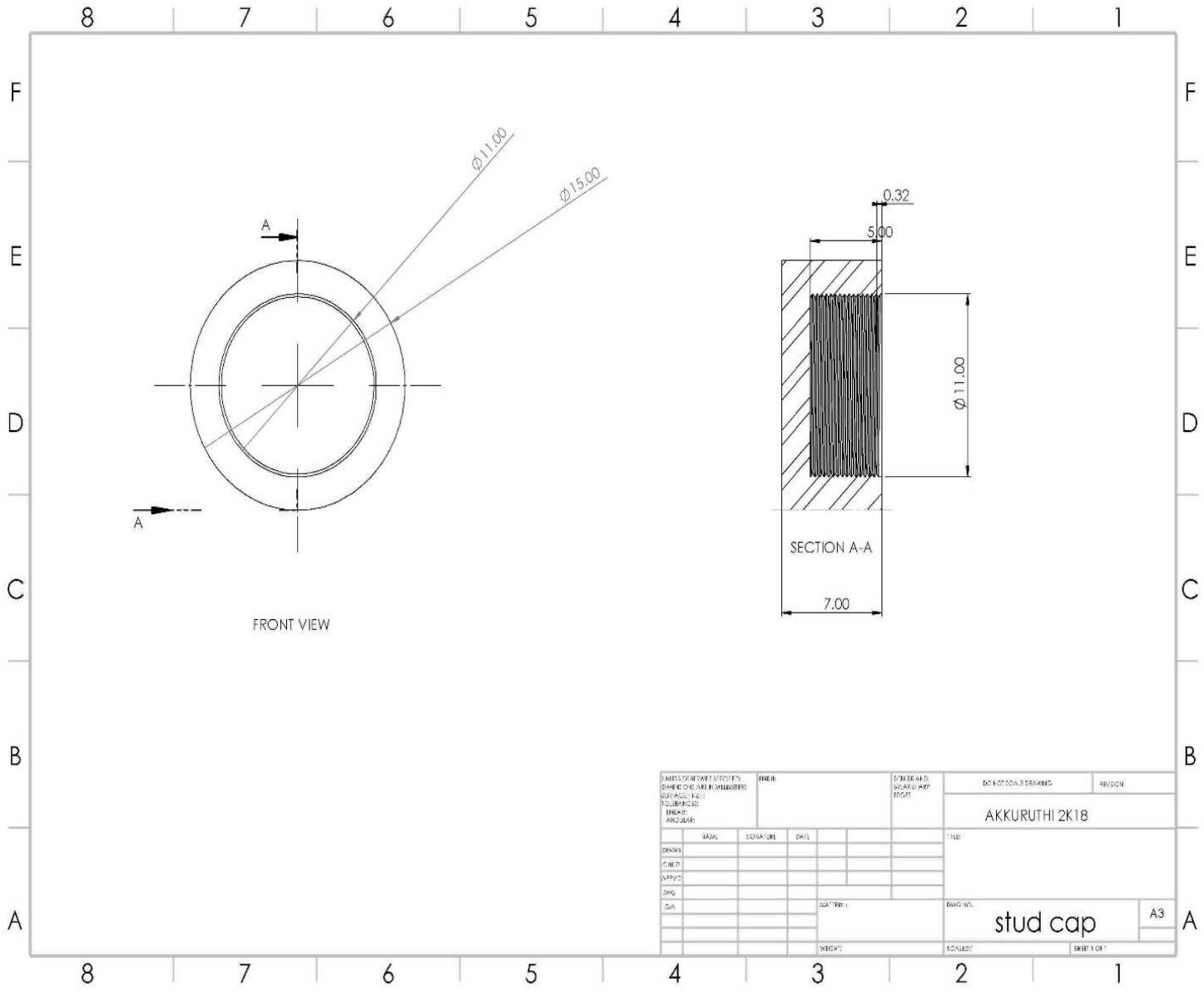
6. Stud 2

S no	Part name	Material description	Quantity
1	Studs 2	Stainless steel 304	12

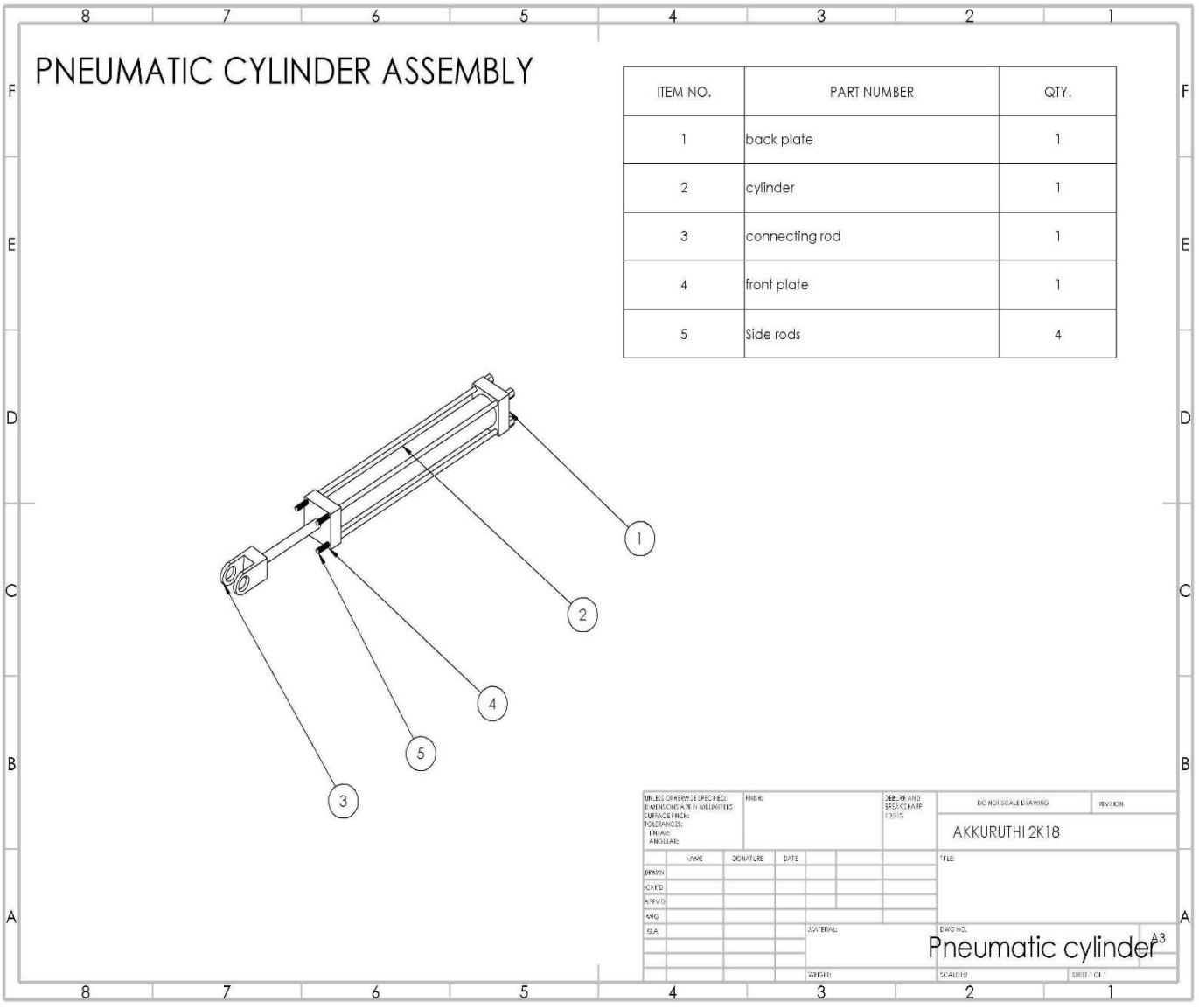


7. Stud cap

S no	Part name	Material description	Quantity
1	Studs cap	Stainless steel 304	20

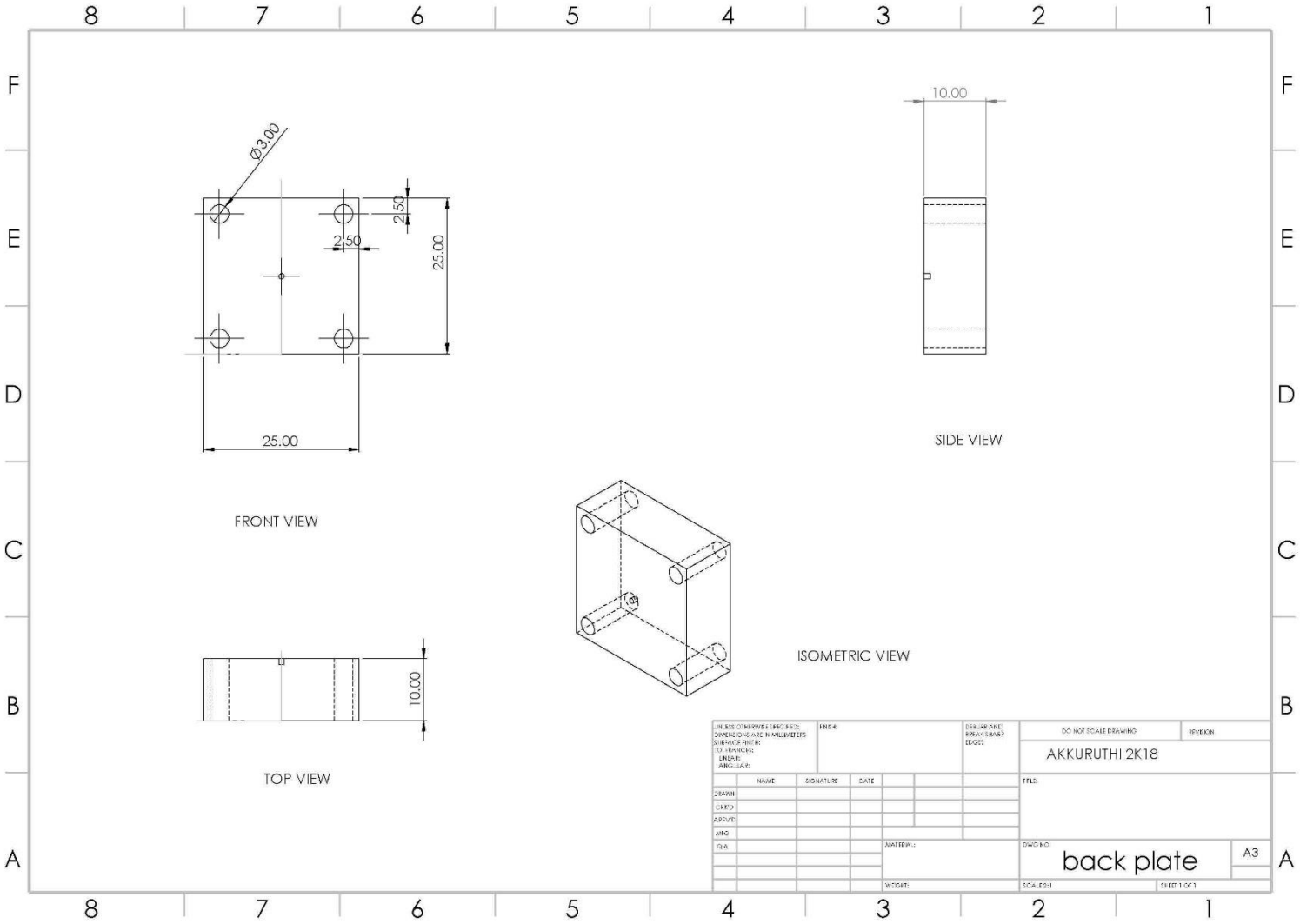


Pneumatic cylinders



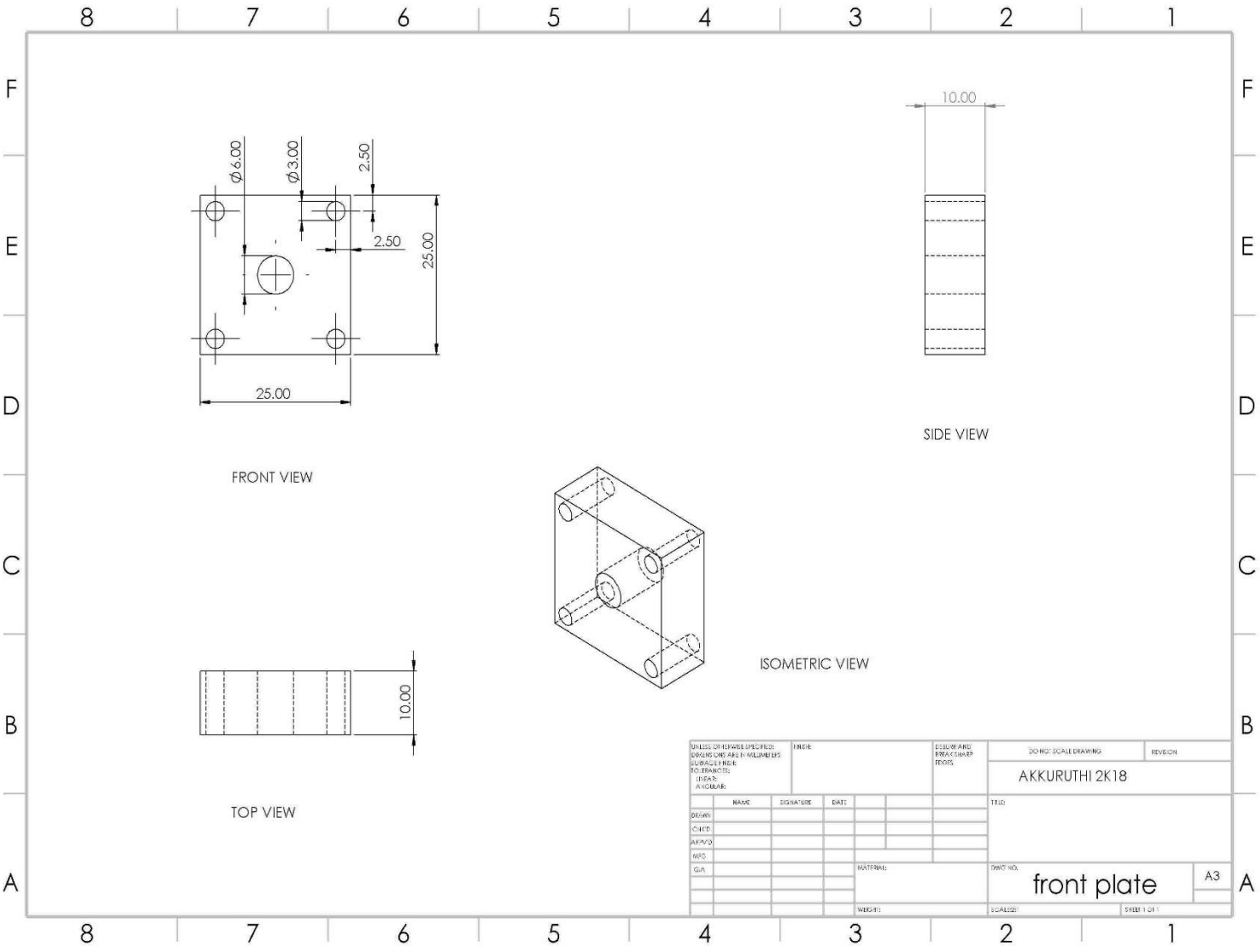
1. Back plate

S no	Part name	Material description	Quantity
1	Back plate	Stainless steel 304	5



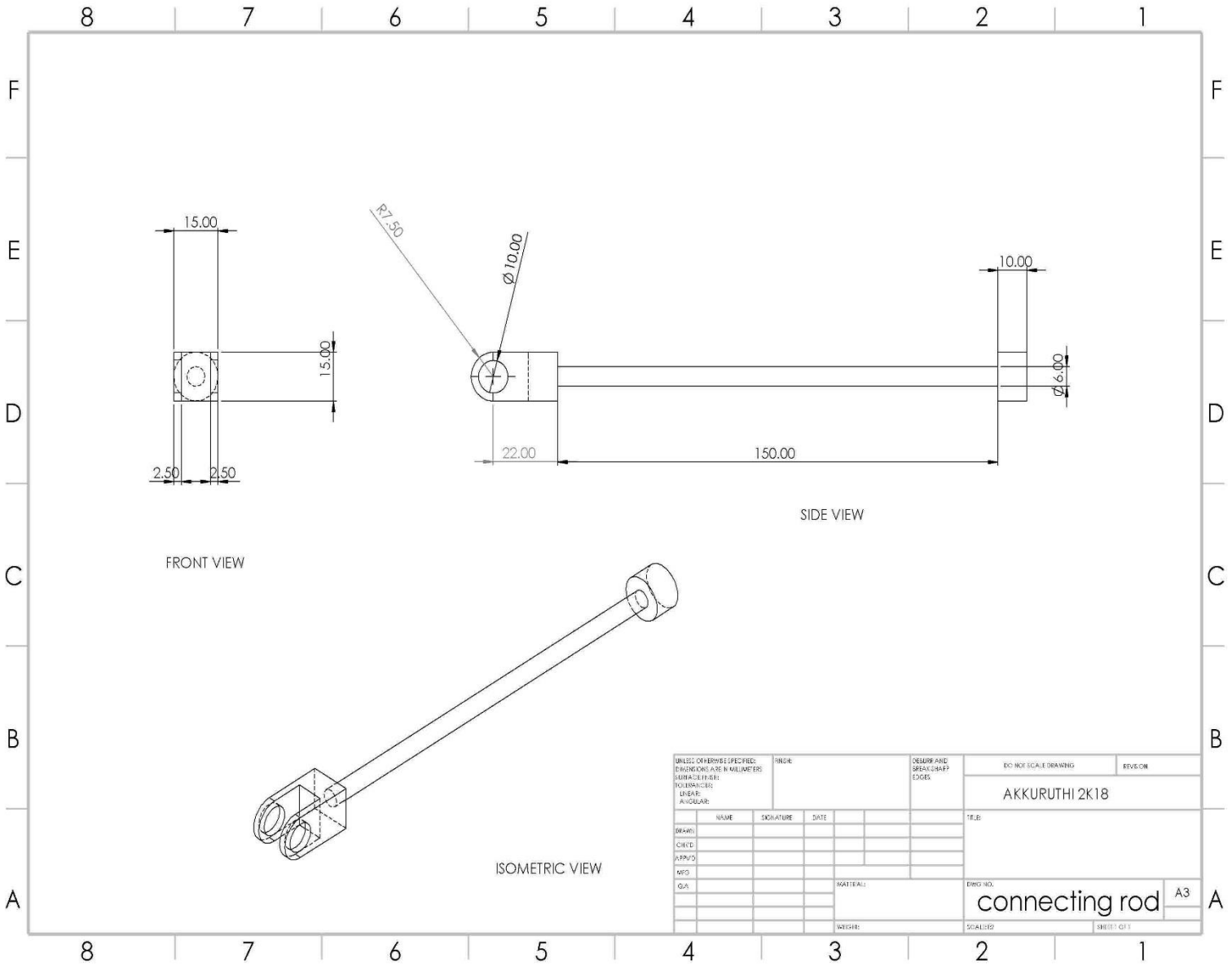
2. Front plate

S no	Part name	Material description	Quantity
1	Front plate	Stainless steel 304	5



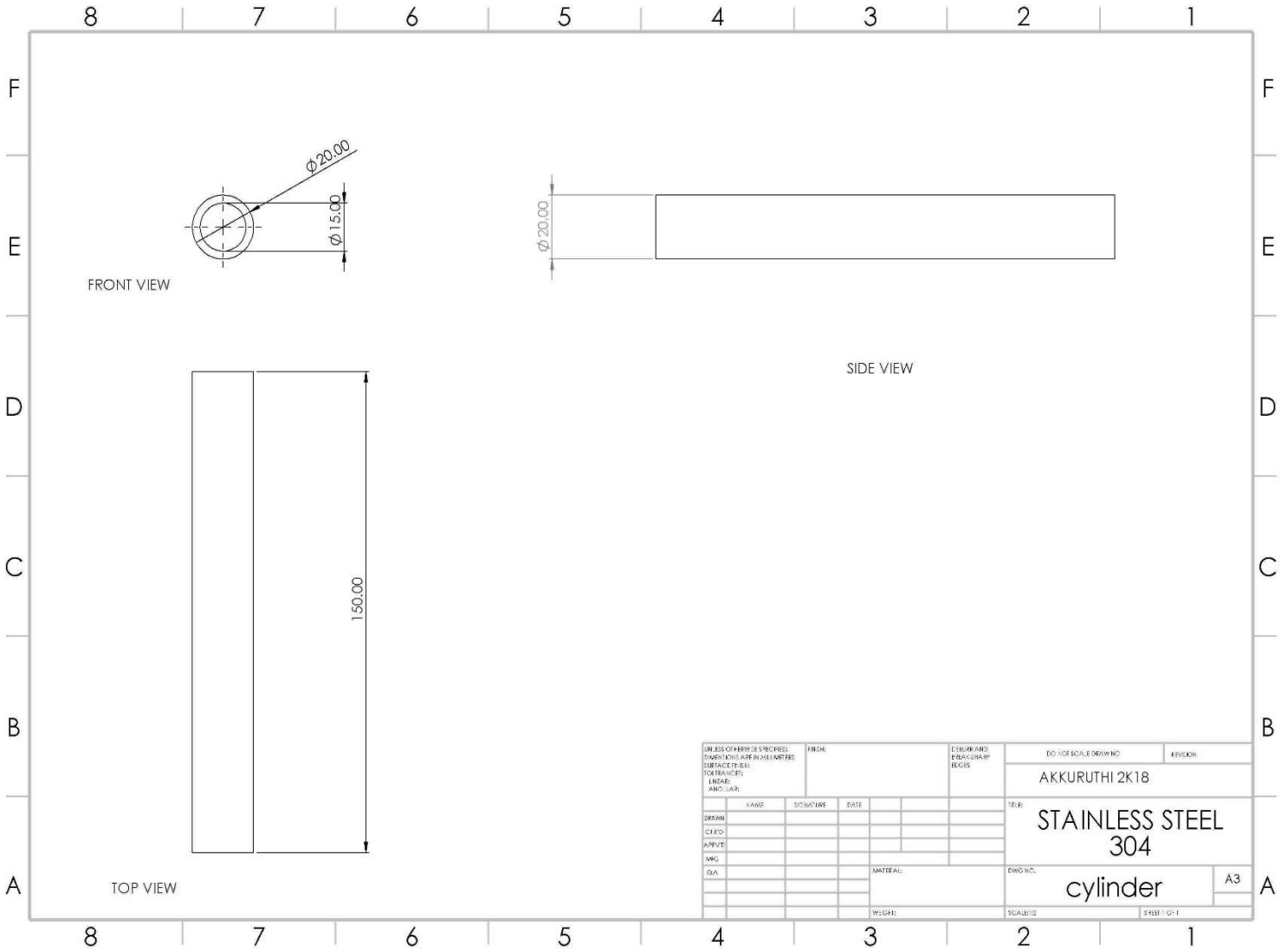
3. Connecting rod

S no	Part name	Material description	Quantity
1	Connecting rod	Stainless steel 304	5



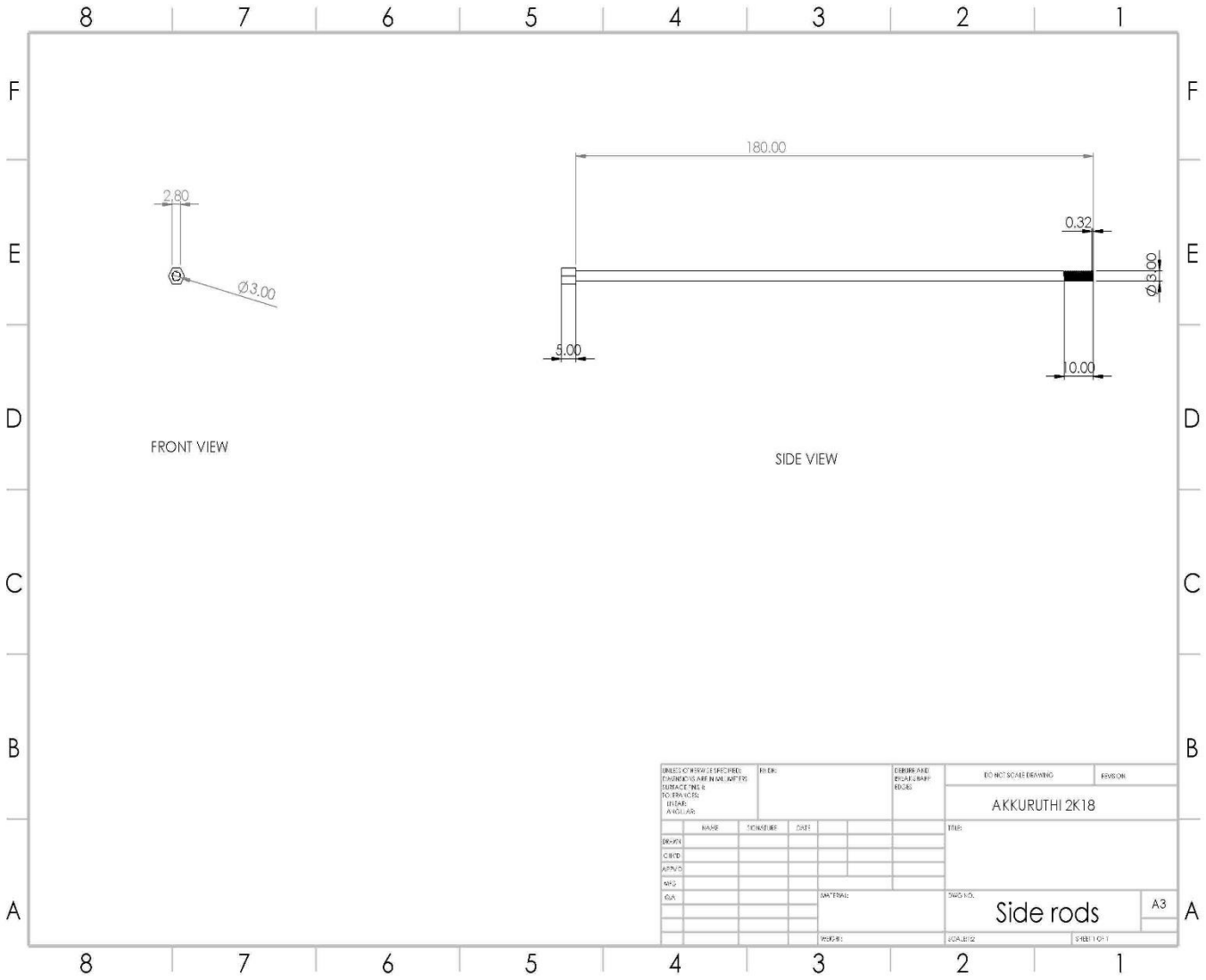
4. Cylinder

S no	Part name	Material description	Quantity
1	Cylinder	Stainless steel 304	5



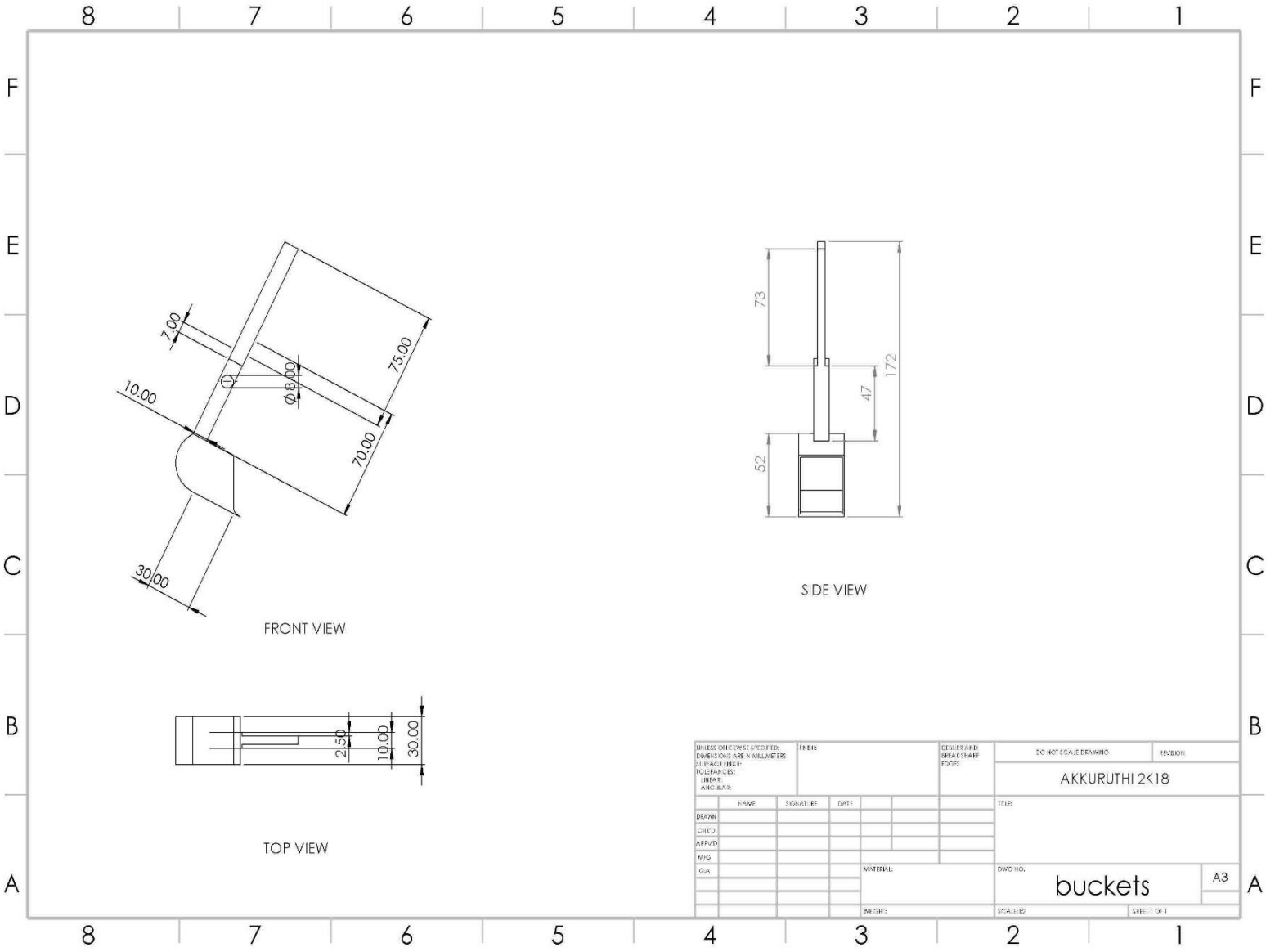
5. Side rods

S no	Part name	Material description	Quantity
1	Side rods	Stainless steel 304	20



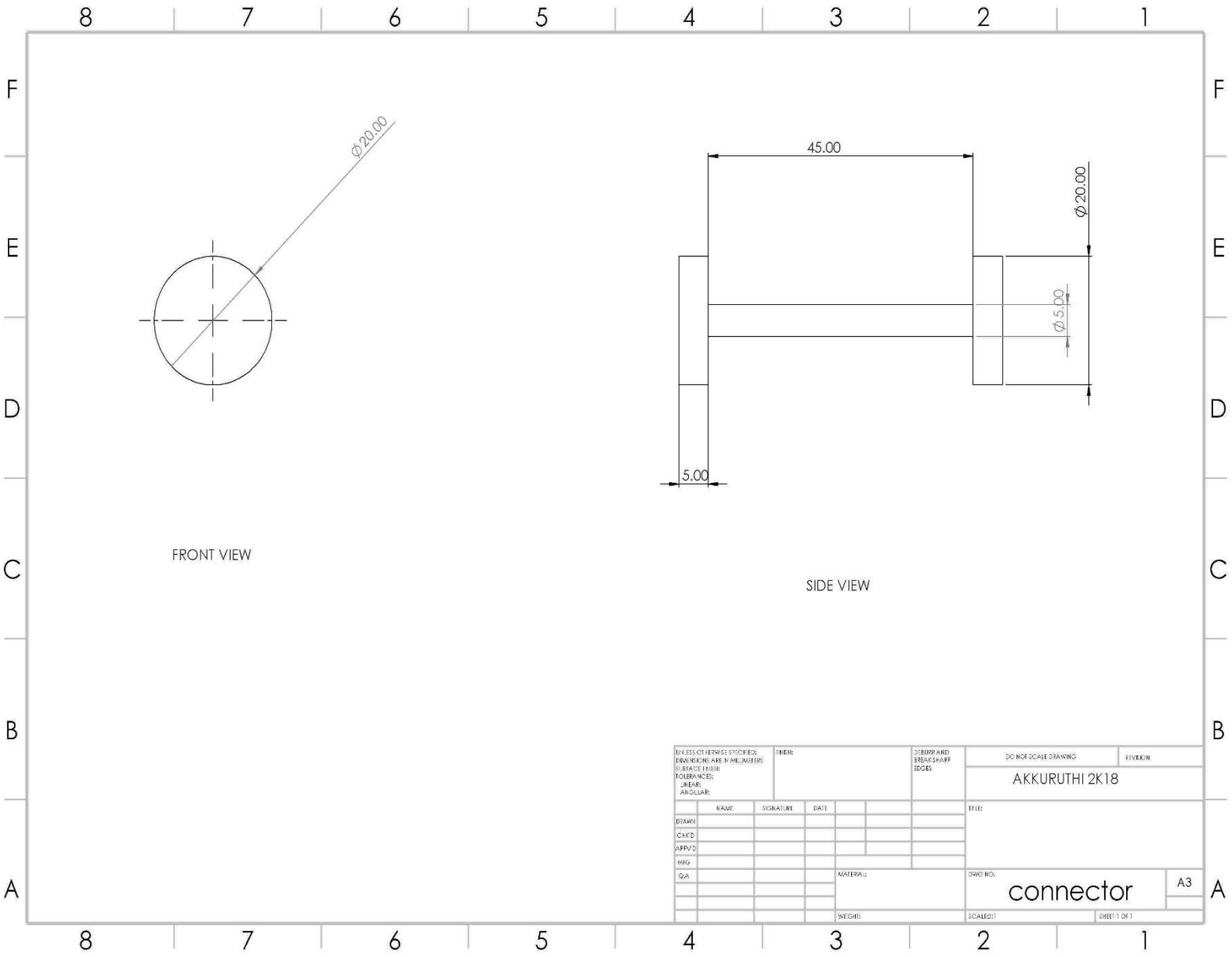
Bucket

S no	Part name	Material description	Quantity
1	Bucket	Stainless steel 304	2



Connector

S no	Part name	Material description	Quantity
1	Connector	Stainless steel 304	1



Sliding rod 2

S no	Part name	Material description	Quantity
1	Sliding rod 2	Stainless steel 304	2