

5/29/2021

CADA ASSIGNMENT

B.E Mechanical_2nd Year

Online Test 1 on Modelling of a Feed
Pump



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ACKNOWLEDGMENT

I would like to express my special thanks to my senior Professors who gave me this ask on preparing a project on, **Modelling of Feed Pump** which helped me to increase my, thinking, analysing and writing skills. Through this work I came to know about so many new things. I am really thankful to them.

Introduction

A Force pump is a Pump with a solid piston for drawing and forcing through valves a liquid (such as water) to a considerable height above the pump or under a considerable pressure.

In a force pump, the upstroke of the piston draws water, through an inlet valve, into the cylinder. On the downstroke, the water is discharged, thorough an outlet valve, into the outlet pipe. A feed pump is a type of pump that supplies water to a boiler to produce steam. For industrial purposes, a feed pump supplies a liquid for further processing.



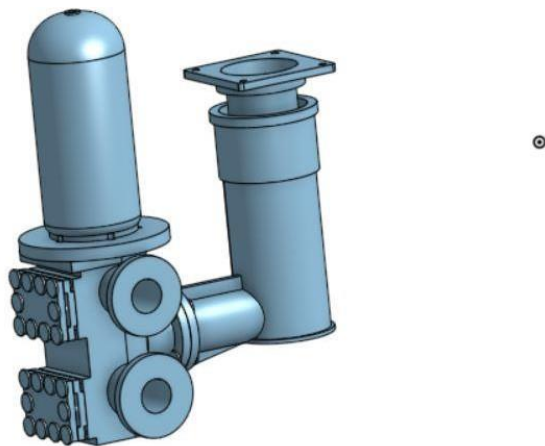
Figure 1- Type Of Feed Pump

In this report we will come across the Feed Pump designed using CADA software i.e. Onshape.

Modelling

The steps involved in the modelling of the feed pump are as follows:

1. First the design of the feed pump was made using the provided dimensions by the extrude command available
2. Then the other features were made using the provided dimensions by extrude and revolve command available.
3. Later all the parts that we created were assembled into the final feed pump
4. This led to the following being made:



The Various Parts:

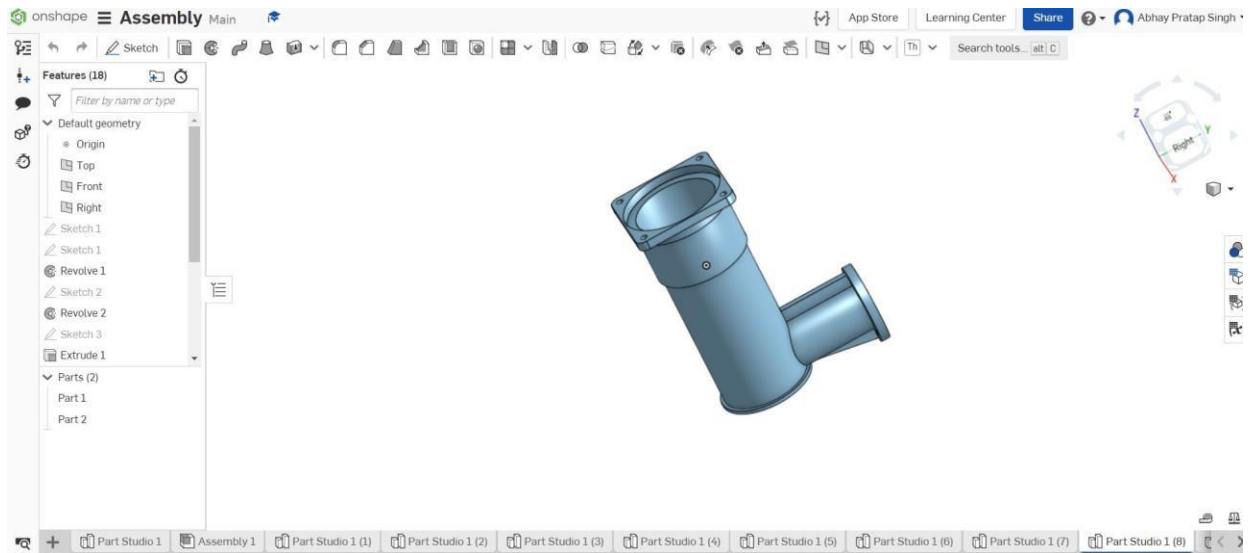


Figure 3-Barrel Body

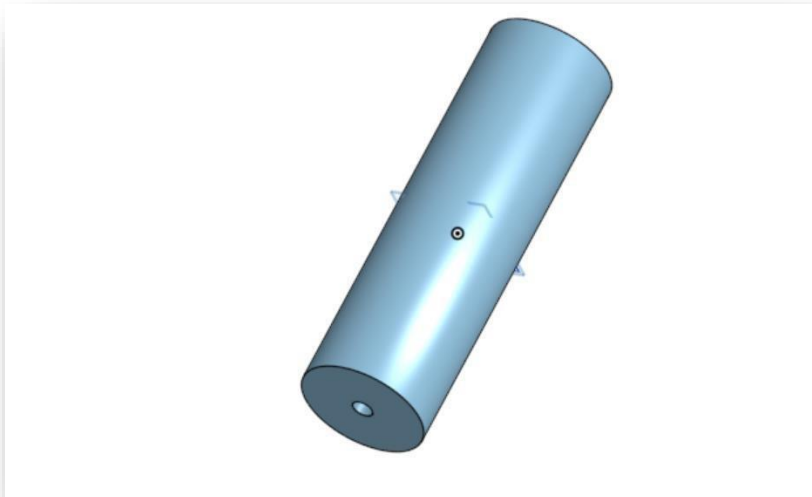


Figure 4-Plunger

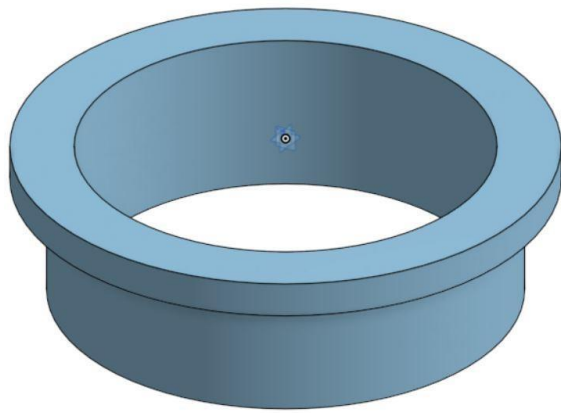


Figure 5-Barrel Liner

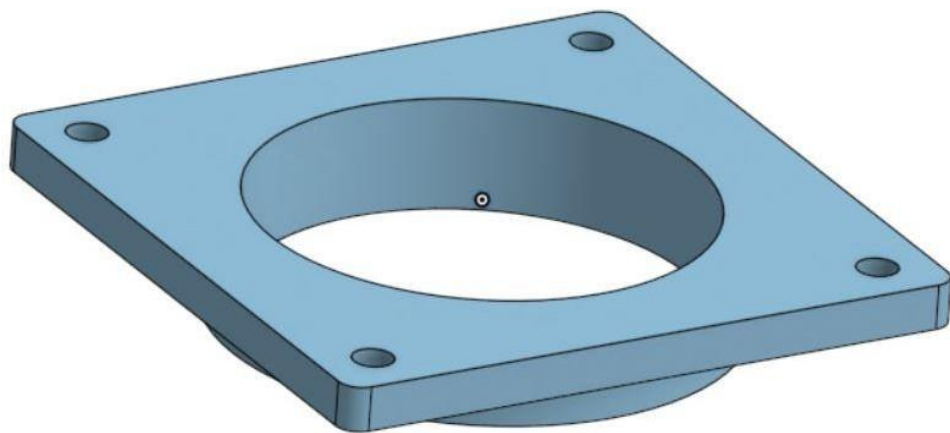


Figure 6-Barrel Cover

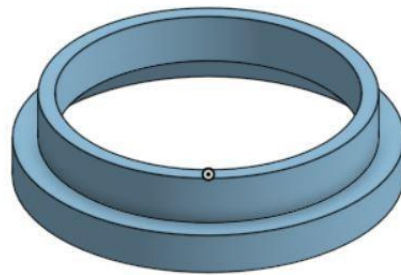


Figure 7-Cover Liner

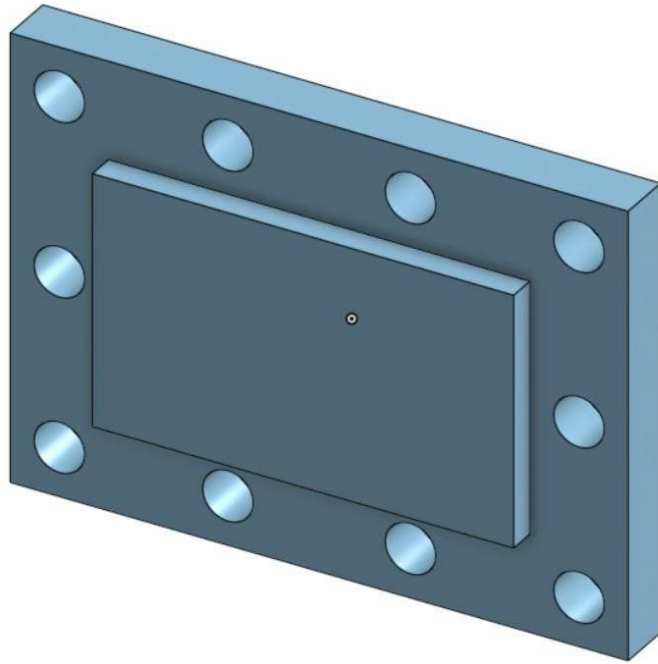


Figure 8-Chest Cover

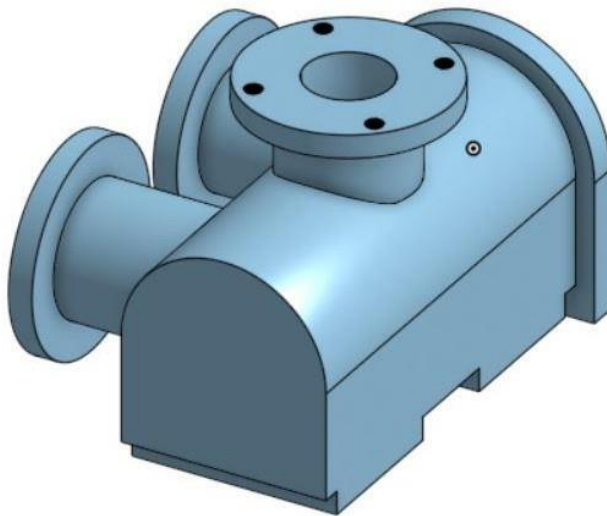


Figure 9-Valve Chest

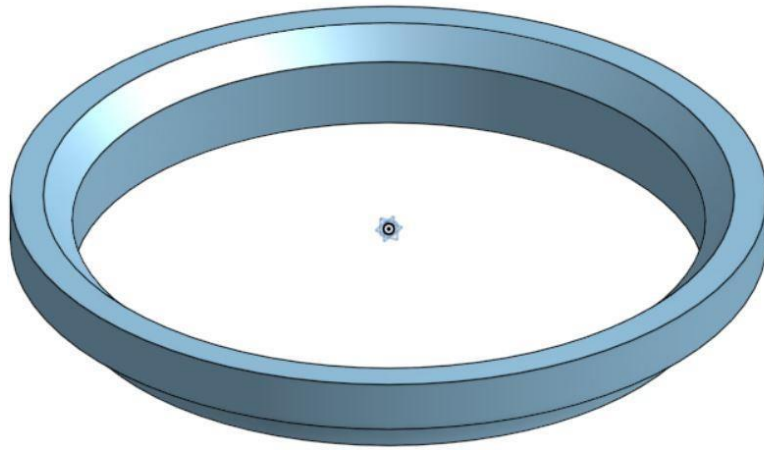


Figure 10-Valve Seat

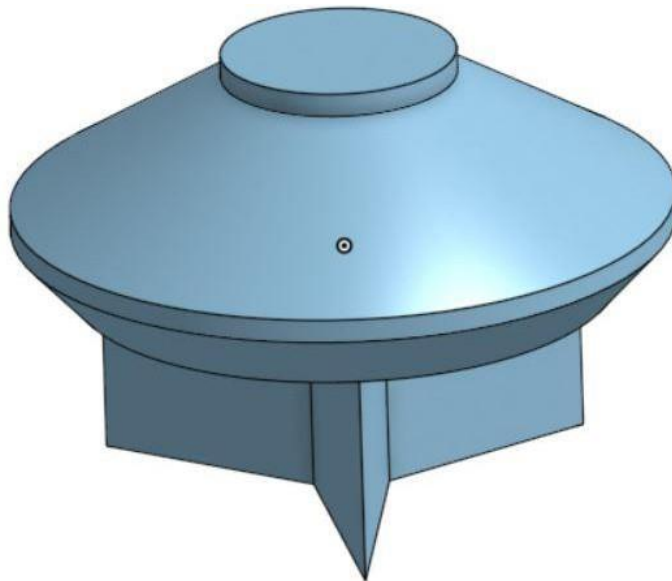


Figure 11-Valve

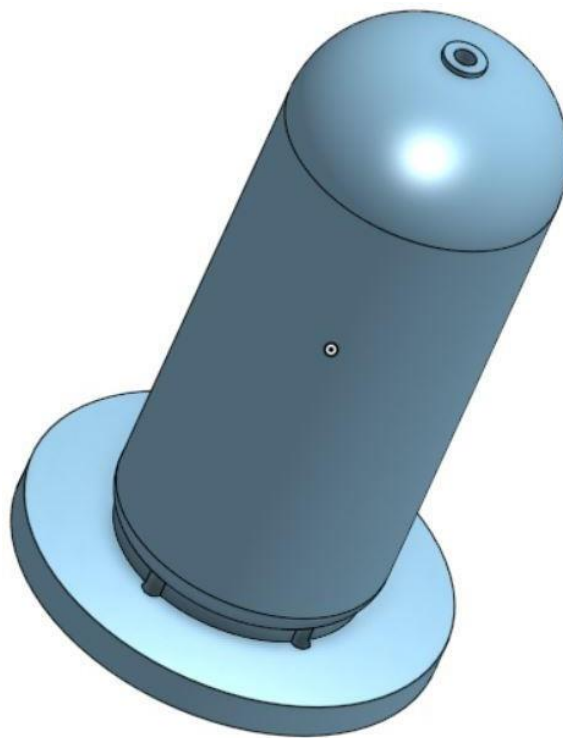


Figure 12-Air Vessel

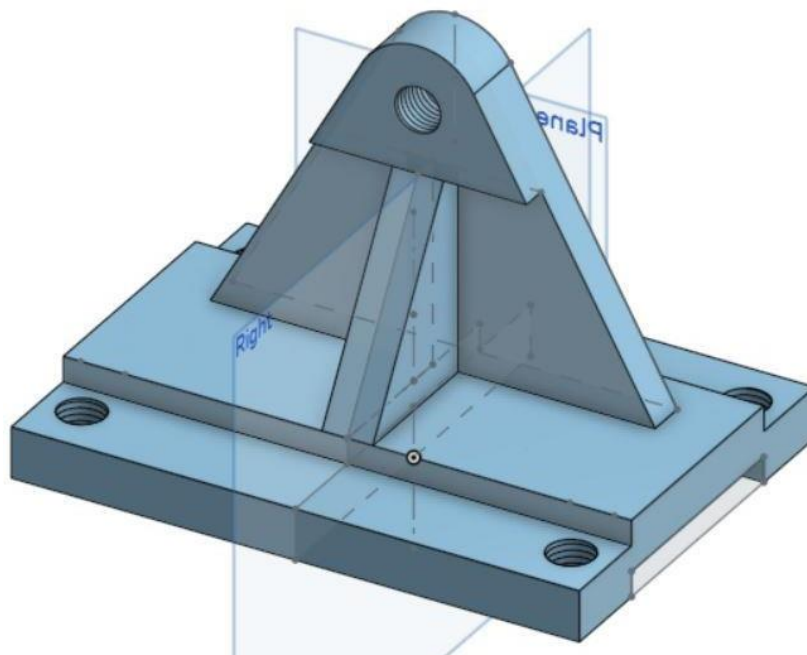
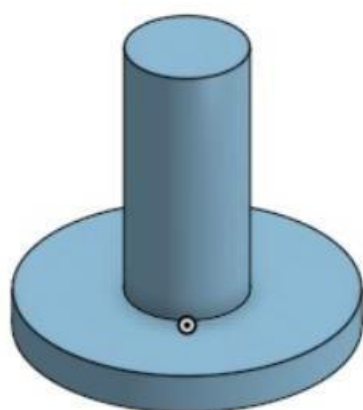
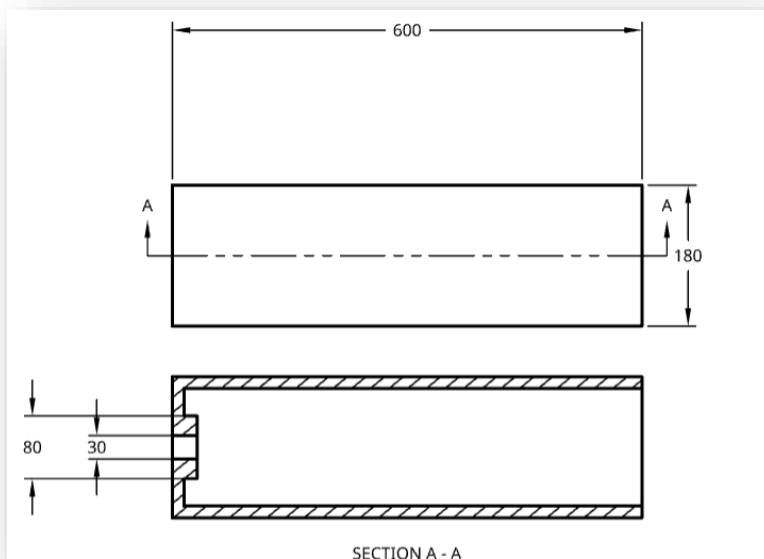
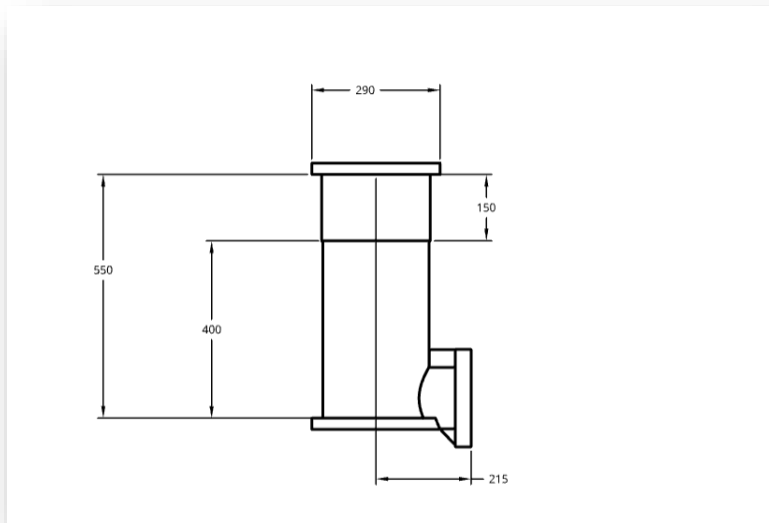
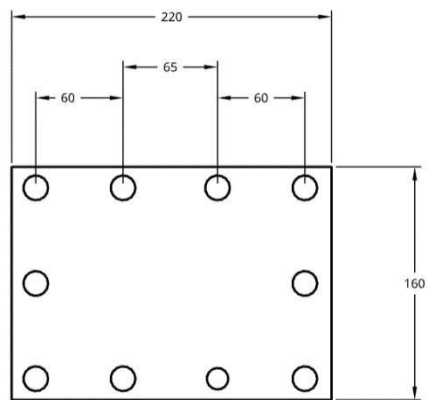
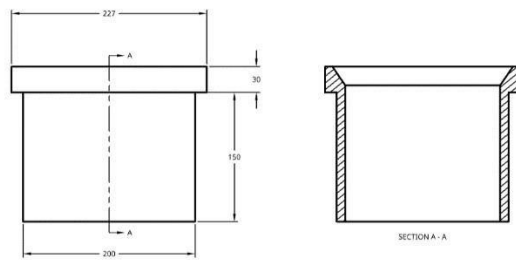
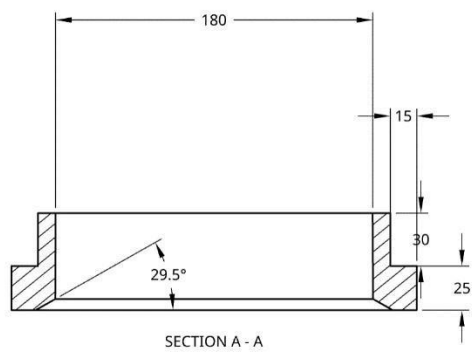


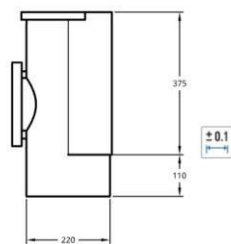
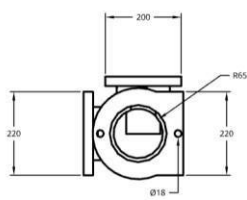
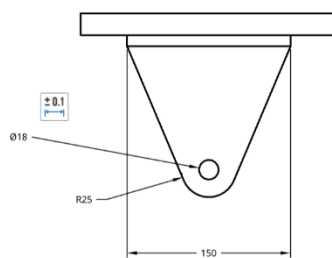
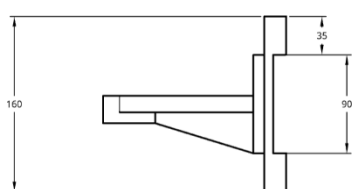
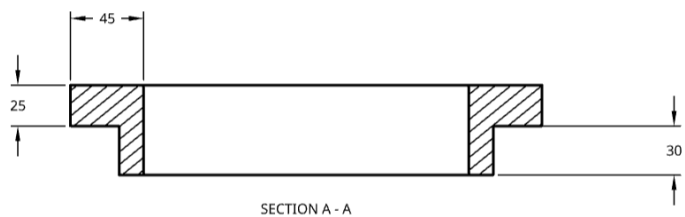
Figure 13-Bracket

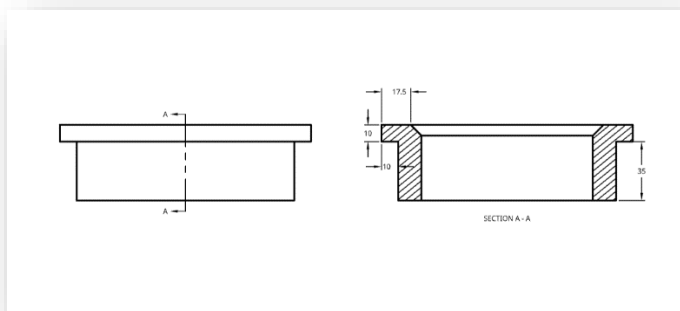
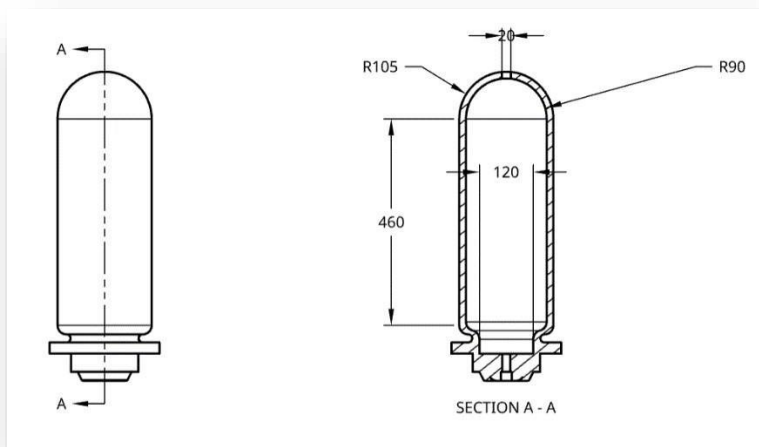


Drawings:









Section View:

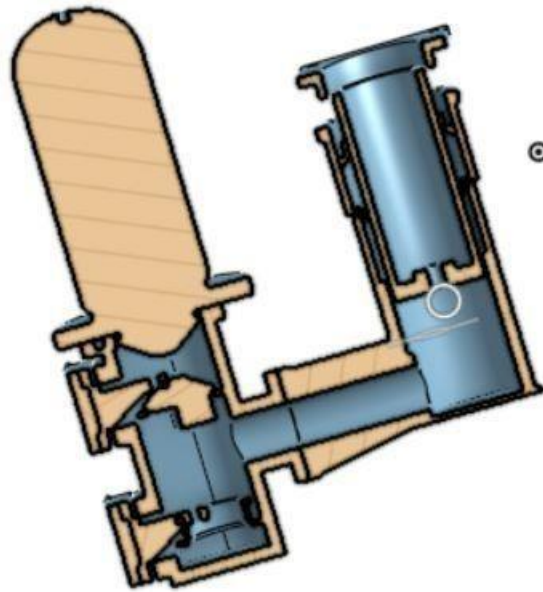


Figure 19-Section View Of Assembly

Reflection:

This project helped to understand how the work is in the industry and how to proceed with it and ultimately come to the conclusion of the report.

The main learning from the project is to explore the PTC-Onshape software and also self-design parts of pump and improve it to an extent that it can be taken up professionally.

As stated earlier it helped in gaining some industrial knowledge and experience therefore it fully helped in the gaining experience as an design engineer.

Also some dimensions in the design needed to be changed and taken with our own understanding this helped in better thinking and logical implementation of the project.

2. The Role of:

- I. A barrel liner is an external covering that envelops the plunger of the pump, to prevent unwanted direct contact with the barrel body (e.g. accidental collision with surrounding objects, or the wear and tear can be caused).
The lining is intended to improve the durability of the barrel by making it more resistive to the wear and tear.
- II. In pumps, the cover liner is basically used to seal it to prevent leakage and sometimes retain pressure.
- III. Barrel Cover is to prevent both leakage and wear and tear.

Valve Seat: Support and seal the valve when the valve closes, cool the valve, and it must resist wear, provide a certain amount of dampening to help cushion the valve when it closes at high rpm

Screw: It is used to control volume in the valve chest.

3. Functioning of Pump: The plunger makes pressure in the barrel and make the water flow towards the valve chest. Their then are two valves namely inlet valve and waste valve.

When water is stopped the water puts in pressure on the waste valve and at this time the inlet valve opens and thus saves the pipe from wear and tear caused by pressure.

Also, the air vessel is used to absorb the pressure created by the sudden stoppage of water.

Design Of Air Vessel: The air vessel had some design complications. As the bottom part which needed to be inserted in the Valve chest was bit broader. Hence it dimension were

altered. Also the length of the vessel had to be altered as the dimensions were not in compliance with the bracket and screw.

References:

- **Starting information on Page 4:**
<https://science.howstuffworks.com/transport/engines-equipment/question318.htm#:~:text=The%20basic%20idea%20behind%20a,small%20amount%20of%20water%20uphill.&text=The%20pump%20has%20a%20valve,speed%2C%20this%20valve%20slams%20shut.>
 - <https://youtu.be/zFdyqTGx32A>