

**K L UNIVERSITY**  
**FRESHMAN ENGINEERING DEPARTMENT**  
**A Project Based Lab Report**  
**On**  
**USING 3D PRINTING MASK RESPIRATOR**

**SUBMITTED BY:**

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## DEPARTMENT OF BASIC ENGINEERING SCIENCES



### CERTIFICATE

This is to certify that the project based laboratory report entitled “USING 3D PRINTING MASK RESPIRATOR” submitted by Mr. BONDILI SRI HARSHA SAI SINGH bearing Regd. No. 2000031795 to the **Department of Basic Engineering Sciences, KL University** in partial fulfillment of the requirements for the completion of a project based Laboratory in “Technical Skills-I(Coding)” course in I B Tech I Semester, is a bonafide record of the work carried out by him/her under my supervision during the academic year 2020 – 2021.

PROJECT SUPERVISOR

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## ACKNOWLEDGEMENTS

It is great pleasure for me to express my gratitude to our honorable President **Sri. Koneru Satyanarayana**, for giving the opportunity and platform with facilities in accomplishing the project-based laboratory report.

I express the sincere gratitude to our Director **Dr. A. Jagdeesh** for his administration towards our academic growth.

I express sincere gratitude to our Coordinator and HOD-BES **Dr. M. Sridhar** for her leadership and constant motivation provided in successful completion of our academic semester. I record it as my privilege to deeply thank for providing us the efficient faculty and facilities to make our ideas into reality.

I express my sincere thanks to our project supervisor <name> for his/her novel association of ideas, encouragement, appreciation and intellectual zeal which motivated us to venture this project successfully.

Finally, it is pleased to acknowledge the indebtedness to all those who devoted themselves directly or indirectly to make this project report success.

Name: BONDILI SRI HARSHA SAI SINGH

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# ABSTRACT

## Respirator mask:

**Respirator masks** are a form of **respiratory** protection PPE that protects the wearer from inhaling harmful airborne particles, gases or vapours that are present in the environment.

The **respirator mask** allows workers to carry out tasks safely in an environment that would otherwise be deemed as a too higher risk to perform tasks.

## Software Tools:

This Respirator mask file is taken from Thingiverse website and by using Ultimaker cura software it is converted into stl.file format.

## Advantages:

The use of respirator mask is one of the many practices used today to try to reduce exposure and risks of infectious disease transmission through airborne pollutants as this is among the most popular method of infection for individuals.

## Applications:

Now a days we are using this Respirator mask in our daily life. Because of this pandemic situation Corona has affected on so many people so all are using this mask.

## KEY WORDS

3D-PRINTING: 3D printing, or additive manufacturing, is the construction of a three-dimensional object from a CAD model or a digital 3D model. The term "3D printing" can refer to a variety of processes in which material is deposited, joined or solidified under computer control to create a three-dimensional object.

ULTIMAKER CURA: Ultimaker Cura is an open source slicing application for 3D printers.

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## INTRODUCTION

The current Global Covid-19 pandemic is causing shortages of personnel protection equipment and many new companies are looking to address this situation by starting to manufacture and test PPE equipment. There have also been instances where PPE has been supplied that upon testing failed to meet the required performance standards potentially putting medical staff at risk hence there is an increased focus on improving the supply of quality, tested PPE.

This document aims to give an overview of the relevant test standards covering respiratory protective devices and masks, the equipment used to test against these standards and, where applicable, how ATI instruments can be used to carry out this testing.

All Respiratory protective devices are classified using the level of protection that they give to the user when tested under the specified conditions in the relevant standard. The critical parameters that will be detailed in the standard will include: Challenge aerosol – what is it, particle size (expressed as Count Mean Diameter (CMD) or Mass Mean Diameter (MMD)), particle size distribution (expressed by the Geometric Standard Deviation (GSD) and the concentration of aerosol Flowrate in litres/min Maximum Filter Penetration

## **AIM**

### **Advantages :-**

The use of respirator mask is one of the many practices used today to try to reduce exposure and risks of infectious disease transmission through airborne pollutants as this is among the most popular method of infection for individuals. Good filtering effect of bacteria and virus, comfortable, clean and sanitary.

### **Disadvantages:-**

Poor sealing. when we choose, we should choose the mask with a smooth or soft surface. This mask can be used in haze weather and flu season all year round. Breathing is not very comfortable after use. If the product is used many times, it is easy to cause pollution or bacterial infection and unsanitary.

## **SYSTEM REQUIREMENTS**

➤ **SOFTWARE REQUIREMENTS:** Ultimaker Cura

➤ **HARDWARE REQUIREMENTS:**

➤ RAM : 8GB

➤ Processor : Intel core to duo

➤ Hard Disc : 100



## IMPLEMENTATION

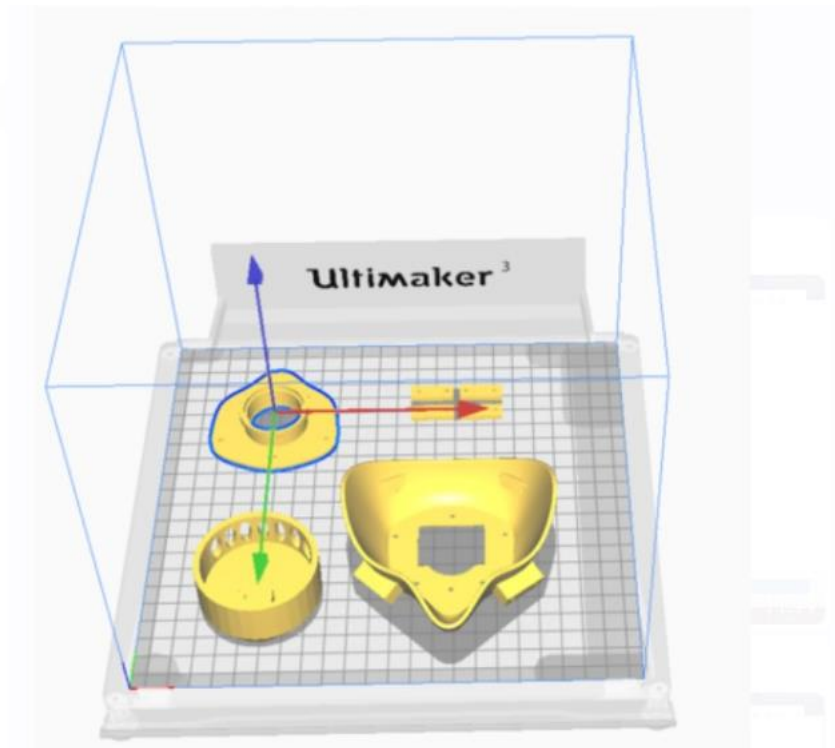
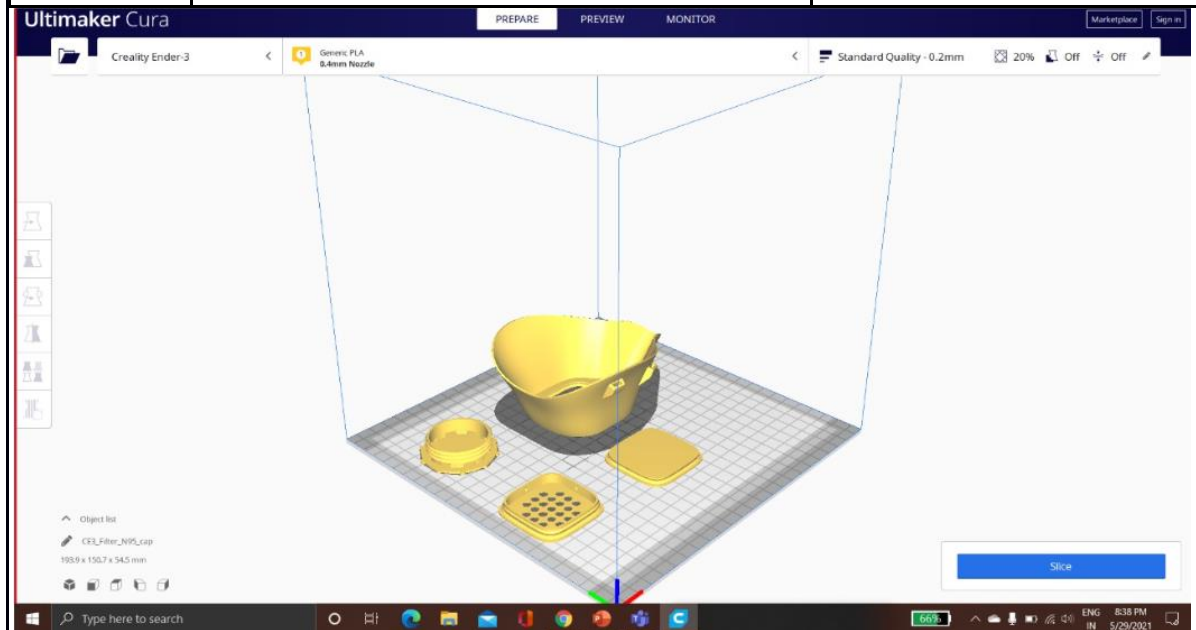
### PROCEDURE

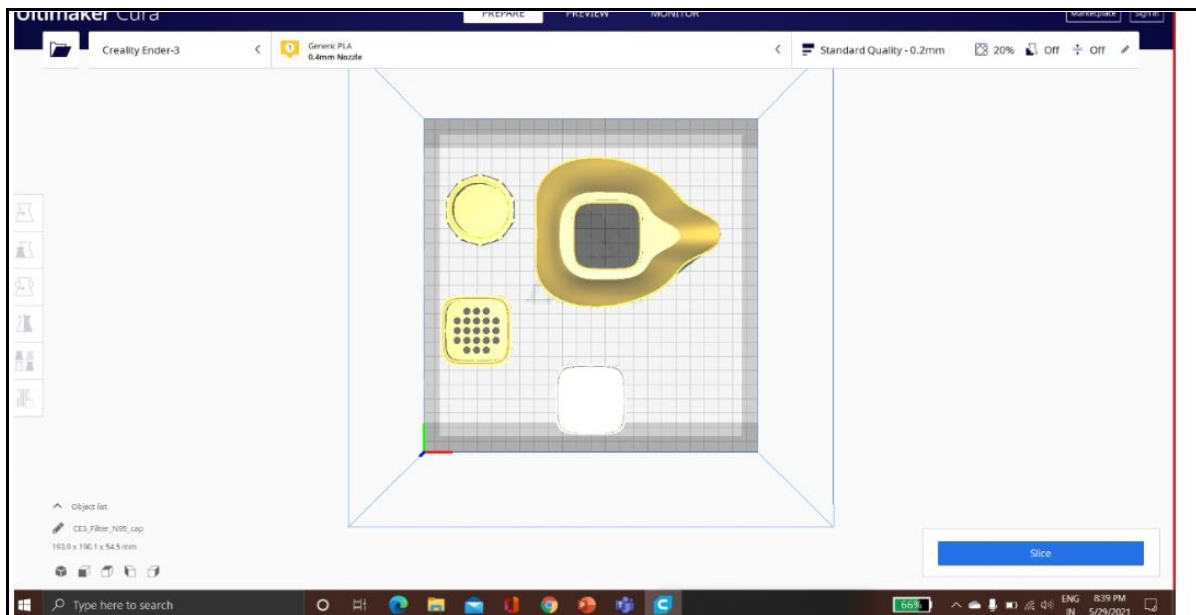
1. Firstly, design a 3D model using Autodesk Fusion 360 which is in .f3d format. Now convert it to .stl format using export option in Autodesk.
2. Now convert that .f3d format into .stl format.
3. Now open ultimaker cura software and select the file which you want to be converted.
4. After selecting the file and we have to set the dimensions before printing.
5. In scaling we have to keep the axis correctly according to our picture.
6. After that we have to give temperature according to material and we have to give skirt option in build plate adhesion.
7. Now in standard quantity option we have to give in fill as 30 and enable support option.
8. After you completed all changes and save the file.
9. Now it is ready to slice after clicking slice button.
10. Now the ultimate cura can convert your .stl file into .gcode format.
11. We have to copy the gcode file into a card reader and should insert the memory card in FDM.
12. Now we have to arrange the nasal in such a way that it comes to origin position by selecting Auto home.
13. After the bed reaches 50°C temperature. Our model will start to print by FDM.

Cura parameters

S.NO	CURA PARAMETER NAME	VALUE
1	Nozzle dia	0.4mm
2	Material and quantity	19 grams 6.23m

3	Printing duration	2hr 53mins
4	Bed Temperature	60degrees
5	Nozzle temp	250degrees
6		
7		





## **CONCLUSION**

- We came to know that this Mask Respirator is very useful for us.
  - We have observed that how the .stl file is converted into .gcode in Ultimaker Cura for Slicing.
  - 3d printer has printed the material layer by layer from bottom to top.
  - We have observed that the design 3d model has printed by using the 3d printer (Crealty Ender).