All in One Food and Fluid Measuring Tool

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Abstract— To measure the quantity of food and fluids in our kitchens we use different measurements and objects to make the food. It makes the measurement wrong and also take different tools to make measurement without any perfection. Our main objective is to make an all-in-one3d printed measurement tool to measure food items as well as fluid items which makes the work easy and perfect. In these tools all measurement is available in one cube with a semi cylindrical shape container on one side that makes the measurement easy.

Index Terms— Food item measurement, water and milk measurement, pulse measurement, Kitchen essential.

1 INTRODUCTION

If one like to cook, it's important that you measure your ingredients properly. It's especially critical for baking. That said, every kitchen needs a set of measuring spoons and cups. Here's a design for a kitchen gadget which combines a variety of measurement sizes into a single cube.

It can replace pretty much all your measuring cups and spoons thanks to its unpatented six-sided design (available in imperial and metric measurements or both combined). The printer files are free for download HERE if you have a 3-D printer and want to print one yourself. I wouldn't mind one, but I don't have a 3-D printer, plus I generally just eyeball all my cooking measurements anyways. "And the last time you cooked everyone got sick."

We make the tool using 3d printing or Additive Manufacturing technology which is very popular and reliable in present days.3D printing service reduces the time and effort of the manufacturer to create a prototype, much more emphasis can be done on the research and design of a product. The manufacturers can invest their time in making a flawless product as the production cycle time is reduced.

Advantages of 3d printed tool:

Flexible Design. 3D printing allows for the design and print of more complex designs than traditional manufacturing processes
Rapid Prototyping, Print on Demand, Strong and Lightweight Parts, Fast Design and Production, Minimizing Waste
Cost Effective, Ease of Access

2 GEOMETRIES

2.1 Shape

The shape of the tool is cubical with one side added hollow semi cylindrical container. The 3D-printable Baker cube measures everything from a 1/2 teaspoon up to a full cup of ingredients, depending on which side you place it on, and which cubby you fill in.

2.2 Measures and Units

The 3D-printable Baker cube measures everything from a 1/2 teaspoon up to a full cup of ingredients, depending on which side you place it on, and which cubby you fill in.

The 3.5″ cube can be printed in imperial or metric versions, and the current version offers all the following measurements:

Cups: 1 cup, 1/2 cup, 1/3 cup, 1/4 cup, 1cup

Metric: 240 mL, 120 mL, 60 mL, 30 mL, 250ml

As shown in fig

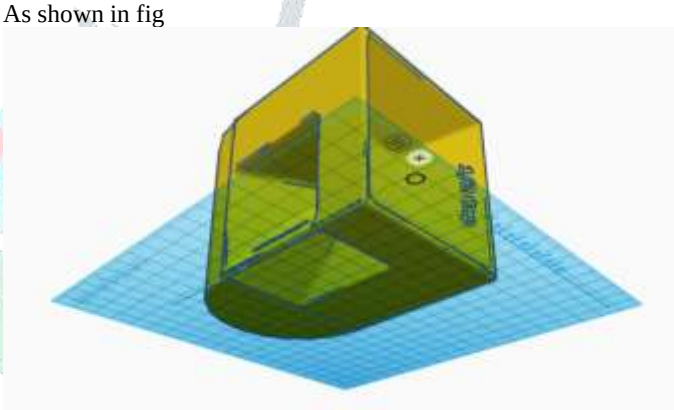

Fig 1.1

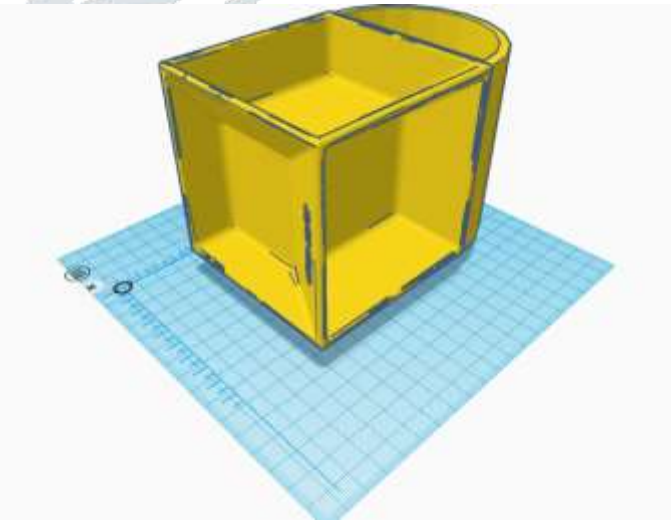

Fig 1.2

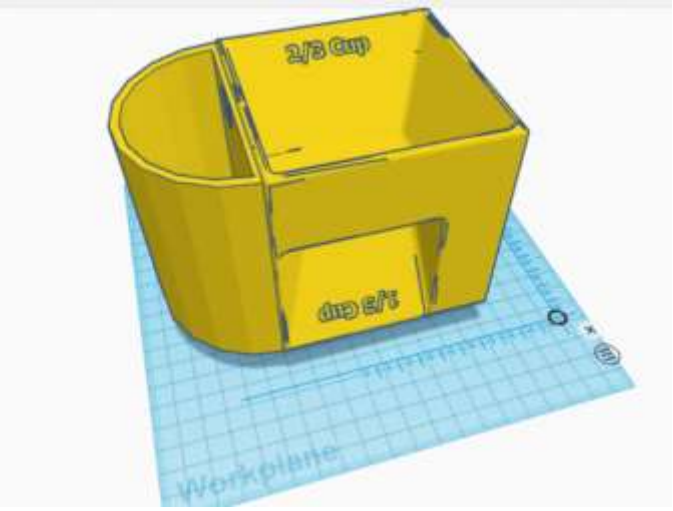

Fig 1.3

3 MANUFACTURING

3d printing gives us extra benefits for the manufacturing such as:

1. Flexible Design
3d-printed-object

3D printing allows for the design and print of more complex designs than traditional manufacturing processes. More traditional processes have design restrictions which no longer apply with the use of 3D printing.

2. Rapid Prototyping
3D printing can manufacture parts within hours, which speeds up the prototyping process. This allows for each stage to complete faster. When compared to machining prototypes, 3D printing is inexpensive and quicker at creating parts as the part can be finished in hours, allowing for each design modification to be completed at a much more efficient rate.

3. Print on Demand
Print on demand is another advantage as it doesn't need a lot of space to stock inventory, unlike traditional manufacturing processes. This saves space and costs as there is no need to print in bulk unless required.

The 3D design files are all stored in a virtual library as they are printed using a 3D model as either a CAD or STL file, this means they can be located and printed when needed. Edits to designs can be made at very low costs by editing individual files without wastage of out of date inventory and investing in tools.

4. Strong and Lightweight Parts
selective-laser-melting-slm

The main 3D printing material used is plastic, although some metals can also be used for 3D printing. However, plastics offer advantages as they are lighter than their metal equivalents. This is particularly important in industries such as automotive and aerospace where light-weighting is an issue and can deliver greater fuel efficiency.

Also, parts can be created from tailored materials to provide specific properties such as heat resistance, higher strength or water repellency.

5. Fast Design and Production
Depending on a part's design and complexity, 3D printing can print objects within hours, which is much faster than moulded or machined parts. It is not only the manufacture of the part that can offer time savings through 3D printing but also the design process can be very quick by creating STL or CAD files ready to be printed.

6. Minimizing Waste
The production of parts only requires the materials needed for the part itself, with little or no wastage as compared to alternative methods which are cut from large chunks of non-recyclable materials. Not only does the process save on resources but it also reduces the cost of the materials being used.

7. Cost Effective
3d-printing-laser-direct-deposition

As a single step manufacturing process, 3D printing saves time and therefore costs associated with using different machines for manufacture. 3D printers can also be set up and left to get on with the job, meaning that there is no need for operators to be present the entire time. As mentioned above, this manufacturing process can also reduce costs on materials as it only uses the amount of material required for the part itself, with little or no wastage. While 3D printing equipment can be expensive to buy, you can even avoid this cost by outsourcing your project to a 3D printing service company.

8. Ease of Access
3D printers are becoming more and more accessible with more local service providers offering outsourcing services for manufacturing work. This saves time and doesn't require expensive transport costs compared to more traditional manufacturing processes produced abroad in countries such as China.

9. Environmentally Friendly
As this technology reduces the amount of material wastage used this process is inherently environmentally friendly. However, the environmental benefits are extended when you consider factors such as improved fuel efficiency from using lightweight 3D printed parts.

4 FABRICATION

To print a 6 inch cube with 60% infill. It will take 4 days to print.

You will require 2.7 kg filament spool.
Taking the printing cost to be 10 INR / .15$ per gram

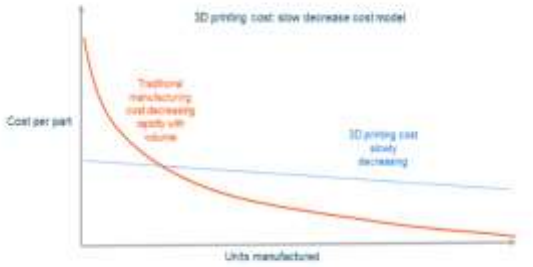

Fig 2.1

Polymer	Abbreviation	Price (Rs./Kg.)
Unplasticized PVC	UPVC	48
Plasticized PVC	FPVC	60
Low Density Polyethylene	LDPE	70
High Density Polyethylene	HDPE	67
Polypropylene Homopolymer	PP	68
Polypropylene Copolymer	PPCO	70
Polystyrene	PS	80
High Impact Polystyrene	HIPS	82
Acrylonitrile Butadiene Styrene	ABS	85

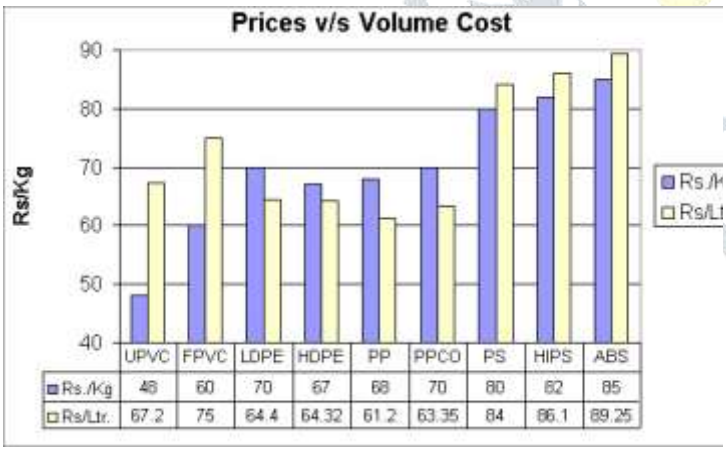

Fig 2.2

5 CONCLUSIONS

In every home to measure food items like pulses, water, milk etc. we all use different measurements and tools. And that's why All in one food measuring cube is the best option.

With the help of additive manufacturing process, the manufacturing of the product become very easy, cost effective and reliable. And the size of the tools is very good i.e. it takes less space and become easy to use.

6 ACKNOWLEDGMENT

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