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Synopsis

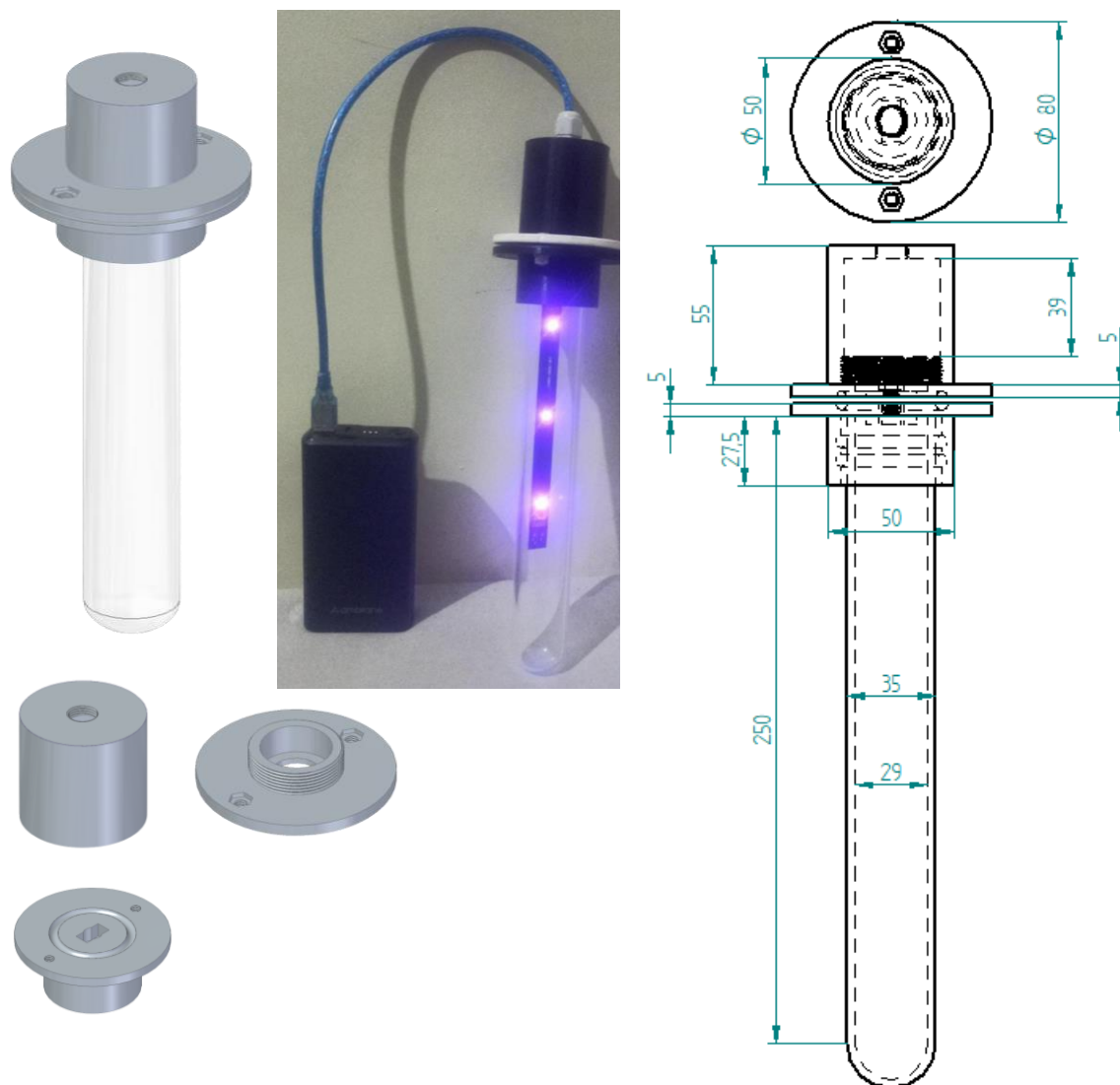
1.	Project Reference No: 46S_BE_3069
2.	Project Title: Dip Pure (Portable Potable Water Purifier)
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6	Keywords: potable, portable, water purifier, Quartz tube, UV LED strip, cable gland, USB cable, O ring, Battery
7	Introduction: Presently, water purification methods have significantly evolved to address the growing challenges of population growth, urbanization, and pollution.

	<p>Modern water treatment systems now include advanced technologies including reverse osmosis, ultraviolet (UV) disinfection, activated carbon filtration, and ozone treatment. Numerous pollutants, such as germs, viruses, chemicals, heavy metals, and pharmaceutical residues, can be successfully removed using these techniques.</p> <p>In many fields, including business, agriculture, public water supply, and healthcare, water filtration is essential. Public water treatment facilities uphold strict standards and laws to provide communities with a safe and dependable supply of drinking water.</p> <p>All the above methods require overhead storage tanks for the treatment. But even today villages purely depend on tap water or borewell water and store in pots for drinking. Wherein they cannot use any water purifier since they are not stored in overhead tanks. Also, remote villages are deprived of electricity for days together. Further for some of the chemical industries, pharmaceutical and fish farming industries water cannot be treated with chemicals.</p> <p>This issue can be addressed by a Portable potable water purifier.</p> <p>This water purifier will help to purify the water from bacteria and other microbial contaminants present in the tap water as well as stored water and works on power bank.</p>
<p>8</p>	<p>Objective</p> <p>The objective of the proposed work is to design and fabricate a compact, cost-effective, portable potable water purifier which works on a power bank or mobile charging adaptor.</p> <p>Fabricated water purifier – Dip Pure is a portable water purifier which kills the bacteria and harmful germs found in the water and makes it potable. The Dip Pure portable potable water purifier kills bacteria, viruses, protozoa, and other pathogenic microorganisms that are present in water. It is a water germ sterilizer device. Pathogenic microorganisms are eliminated by this gadget using ultraviolet radiation. The quartz tube protects the U.V strip from water when it is dipped inside the water and also allows the U.V rays to penetrate through the tube without any radiation absorbed by the quartz tube. The aim of the project is to make the drinking water free from pathogens, to make this project at a very affordable cost, and to make the design of the germ purifier design simple which can be used and carried anywhere. This equipment requires no maintenance, & uses extremely little electricity, which can be supplied by a mobile adapter, or a power bank used for a phone.</p>
<p>9</p>	<p>Methodology:</p> <p>The dip pure water purifier consists of a Holder, O - ring, Quartz tube, U.V strip and a connector cable to the power source. The quartz tube encloses the U.V strip and this tube is supported by the holder. The holder encloses the circuit which connects the U.V strip and the power cable. The O ring is</p>

used to fill up the gap between the quartz tub and the holder which prevents the leakage of water into the tube when it is dipped inside the water. The holder is designed specifically for this project using the 3D Modelling software. Polylactic Acid material was used to 3d print the components.

Working: The quartz tube section is immersed inside the water. The U.V strip is powered by the means of either a power bank or phone's charger adapter. The U.V strip emits U.V radiation which passes through the quartz tube and interacts with the micro-organisms present in water and destroys them. The pure quartz tube ensures that the U.V radiation is not absorbed by the tube which is a medium present in between the U.V strip and the water, where the efficiency of germ sterilization is maintained without absorbing and reflecting the U.V rays. The O ring between the tube and the holder ensures that there will be no leakage of water to the inside of the device which affects the U.V strip from contact of water from the outside surroundings.

The design of the outer tube holder, The Holder for Quartz, is shown below.



Work Carried out: Materials required for the fabrication such as Quartz

	<p>tube, O ring, UV Strip, Strip to USB connector cable and power supply adaptor/ power bank have been procured. The holder has been specifically designed and made according to the requirements. The device is built by assembling all the parts. Fabrication has been finished and is operational.</p>
10	<p>Results and conclusion:</p> <p>The project aims to fabricate a compact portable water purifier which can be used in every home / apartment / restaurant & during other outdoor activities. This helps in purifying the stored water at ground level and does not require any overhead tank for water filtering like commonly used water filters. This apparatus helps to sterilize the bacteria and pathogens present in the water, making the water germ-free, uncontaminated, and drinkable. Any type of water container can be used to submerge the device and purify the water inside.</p> <p>Currently fabricated water purifier is portable, potable, cost effective, protects the people living in villages from water contamination with bacteria and germs and keeps them healthy. Further people can use this as travel kit for travelling and use it whenever required.</p>
11	<p>Innovation in the project:</p> <p>Fabricated water purifier (Dip Pure) is a compact, cost-effective, portable potable and chemical free, working on a power bank or mobile charging adaptor.</p>
12	<p>Scope for Future work:</p> <p>Further, this eco-friendly device can be fabricated with larger size and well-designed with casing for:</p> <ul style="list-style-type: none"> ○ Treating large amount of stored water without any chemical treatment. ○ Increasing the quality of sterilization to kill bacteria, viruses, protozoa, and other pathogenic microorganisms using more UV strips ○ protection cap can be added to protect the glass tube while carrying the device from place to place.