

Advanced Portable Graphene Water Purifier With Solar

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Abstract: *The Advanced Portable Graphene Water Purifier with Solar System is an innovative solution designed to address the global need for clean and safe drinking water, especially in remote and off-grid locations. Integrating advanced materials and smart technology, this purifier utilizes a multi-stage filtration system comprising a pre-filtration mechanism, an activated charcoal layer, a graphene oxide membrane, and a UV-C sterilization tube to ensure comprehensive removal of physical, chemical, and biological contaminants. The graphene oxide membrane offers superior filtration efficiency, selectively blocking heavy metals, bacteria, viruses, and pharmaceutical residues while maintaining high water flow rates due to its hydrophilic nature. Activated charcoal adsorbs organic pollutants, chlorine, and unpleasant odors, while the UV tube provides chemical-free disinfection through germicidal irradiation. The system is further enhanced with real-time monitoring through a TDS sensor and a smart display, providing users with immediate feedback on water quality, filter status, and system alerts. Powered by solar energy and equipped with a rechargeable battery, the device ensures sustainable operation even in off-grid scenarios. The integration with IoT via the Blynk platform allows remote tracking and control, enhancing usability. Compact, portable, and eco-friendly, this system is ideal for emergency situations, outdoor activities, and everyday use in water-scarce regions, offering a reliable and advanced method for safe drinking water access.*

Keywords: Graphene oxide membrane, Solar-powered purifier, UV-C sterilization, Portable water filtration, Smart water monitoring

