

KidneyLoop: A Modular DIY Water Sanitation System

Open Source | CC0 License | Community-Modifiable

Overview

KidneyLoop is an open-source, modular water recirculation and sanitation system designed for DIY builders, off-grid users, and innovators seeking affordable, sustainable water purification solutions. Built from accessible parts like aquarium UV-C lights, food-grade tubing, rain barrels, and solar power options, it provides a flexible approach to filtering and sanitizing water using the principle of repeated cycling—just like kidneys.

Project Goals

Affordability: Use parts anyone can order online or buy locally.

Modularity: Supports upgrades, part swaps, and scaling.

Simplicity: Clear build path using off-the-shelf components.

Effectiveness: Designed to kill pathogens and remove particulates.

Community ownership: Released under CC0 to be used, sold, improved, or redistributed.

Core Concept

Water is pumped from a "dirty" barrel through:

Micron filter to remove physical debris.

UV-C sterilizer to kill bacteria and viruses.

Micron filter again to remove any remaining particulates or byproduct debris.

Into a clean water barrel.

Then it loops:

A pump on the clean side returns water to the dirty side.

Each loop further clarifies and sterilizes the water.

Run 3–6 loops or more depending on clarity, source, and intent.

Key Components (Examples Listed)

Rain Barrels: Famirosa 50 gal PVC Barrel

Pumps: HiLetgo 240 L/hr 12V micro pumps (2 pack)

Tubing: 1/4" ID food-grade PVC tubing

Sterilizer: 12W Coospider UV-C inline sterilizer (rated to 500 gal)

Solar Panel: 20W 12V SOLPERK panel + controller

Optional: Carbon filter block, micron filter housing (x2)

Assembly Steps

Drill or punch 2 ports on each barrel (inlet/outlet).

Mount barbed fittings to seal tubes into place.

Route dirty barrel → pump → micron filter → UV-C unit → micron filter → clean barrel.

Second pump routes clean barrel → back to dirty barrel (or to tap).

Connect solar panel to 12V battery/controller or plug directly (AC adapter).

Begin recirculation. Observe clarity, test if needed.

Notes

Total cost: Under ~\$150–200 USD depending on configuration.

Run time depends on volume. For 10 gal, 3 passes may take 30–60 min.

Shield UV lights from moisture if using DIY enclosures.


Not currently tested for fluoride/chlorine removal unless carbon filter added.

Best for rainwater, stream water, or basic tap clarification.

Legal & Safety

This is a proof-of-concept design using publicly available parts. It is not certified for drinking water in any country. Use at your own risk. Always test water before consumption. This document and design are released under CCO 1.0 Universal. No rights reserved. Fork it, improve it, sell it, or build on it.

GitHub & Community

Please contribute improvements, test results, or new part suggestions.GitHub:
[ GitHub - Polymath8/KidneyLoop-Water-Filtration]Contact:
[kidneyloopdiy@gmail.com]

"Water purification belongs to everyone."