

FAQ for Brightwater Pasteurizer

What does the Brightwater Pasteurizer do?

The Brightwater Pasteurizer sanitizes source-separated urine or high strength wastewater to levels sufficient for agricultural application.

How does the Brightwater Pasteurizer work?

The Brightwater Pasteurizer uses electricity to efficiently heat source-separated urine or high strength wastewater and hold it above 80°C for approximately 90 seconds, after which it is cooled back down and pumped into the holding tank of your choice. Small pumps, running continuously, allow treatment to occur in a flow-through process. About 80% of the heat used to treat the high strength wastewater is recovered by an embedded heat exchanger.

Why would I want to pasteurize wastewater?

The wastes that we excrete on a daily basis are rich in the same nutrients (nitrogen, phosphorus, and potassium) that fertilize plant growth. Collecting these nutrients keeps them from causing water pollution and allows them to be used as an agricultural resource. However, in their excreted state, “toilet resources” can contain pathogens and should be sanitized prior to use as a fertilizer. The Brightwater Pasteurizer uses heat, in accordance with EPA standards, to kill pathogens and create a safe, locally-sourced, sustainable fertilizer product.

We designed the Brightwater Pasteurizer to comply with the [US EPA 503 \(section D. 503.32\)](#) sludge rules for pathogen destruction. These are the same rules which are used by the [VT Department of Environmental Conservation](#) to regulate the land application of urine-derived fertilizers in Vermont. This is a practice pioneered by the Rich Earth Institute [starting in 2012](#).

How much does the Brightwater Pasteurizer cost?

Contact kim@brightwatertools.com if you would like to get a price quote, place an order, or inquire about our current lead time.

Are there pertinent changes to urine during/after pasteurization?

Pasteurized urine can be considered to have the same fertilizer value (i.e., NPK content) as unpasteurized urine. The big benefit, of course, is that pasteurized urine is much safer to handle than urine that has not been treated, due to its lower pathogen risk. Pasteurizing urine or other human waste also satisfies US EPA recommendations and WHO guidelines for its use as an agricultural amendment, thereby clearing a pathway for the use of urine as a fertilizer for publicly-consumed food crops, and potentially assisting in certain local permitting processes.

Will pasteurization alter the concentration and speciation of the nutrients in the high strength wastewater?

The dominant species of nitrogen in fresh urine (which contributes ~80% of nitrogen to domestic wastewater) is urea; however, due to a naturally occurring, biologically-mediated reaction the dominant species of nitrogen in stored urine are ammonium (NH_4^+) and ammonia (NH_3). The latter form is prone to evaporation (or volatilization).

Based on independent laboratory TKN testing of source-separated, stored urine, nitrogen losses through NH_3 volatilization during our pasteurization process are so low that they are negligible (i.e. within 0.03 % TKN, which is within the lab's range of analytical error).

Furthermore, our system provides a method to recapture some NH_3 by "bubbling" gas outfeed back into the relatively cool infeed liquid, giving NH_3 a chance to cool and re-condense.

Can the unit process wastewaters other than urine (Leachate, Mixed liquor from septic, greywater, sewage, etc)?

Yes, the Brightwater Pasteurizer can process any coarse-filtered, liquid-form human waste product. Source-separated urine will generally have the highest NPK concentration, which makes it an ideal candidate for use as a fertilizer.

The Brightwater Pasteurizer is designed to treat liquid wastewater only; it has not been tested with any other liquids and should not be considered for use with them. The Brightwater Pasteurizer is not "food grade" and is not designed to pasteurize cow's milk, for example.

What are the corrosion resistant elements of the design?

The Brightwater Pasteurizer is constructed primarily of stainless steel, with silicone gasketing and hoses wherever urine or wastewater will be in direct contact with the unit.

What is the general maintenance required?

Detailed instructions for general maintenance can be found in the [Manual](#).

In general, we recommend a periodic flush of the system with clean tap water or a dilute citric acid solution, which is easy to mix from readily available, off-the-shelf items.

The peristaltic pump hoses, which are part of the pumps that pump liquid through the pasteurizer, need to be rotated or replaced periodically. We ship the pasteurizer with extra pump hose, and when needed additional hose can be purchased from Brightwater Tools.

Brightwater Tools sells other replacement parts as needed.

What is the typical kW/gallon electric demand?

In operation, we typically achieve an efficiency of about 15 Wh/L, which translates to approximately 0.06 kWh/gallon.

This figure can vary with your use environment, as we have found while operating the Pasteurizer year-round in our VT research facility. Since we are applying heat to kill pathogens, colder ambient conditions will require more power to get the Pasteurizer up to operating temperature (150-200W during operation at our facility in the winter, when ambient temperatures are near 0-15°C). In warmer climates and seasons, we see power consumption around 100W during normal operation.

During the initial startup and “pre-heat” phase of operation, power use can spike to about 350W for a short time.

Can this be trailer mounted for mobility?

Yes! The Brightwater Pasteurizer can be mounted virtually anywhere, provided it can be mounted in a vertical orientation during use.

Does the Brightwater Pasteurizer require a climate controlled space?

The Brightwater Pasteurizer will operate best in a climate controlled space. It can be operated outdoors, but it should not be exposed to direct sun/rain. It is helpful to have adequate ventilation and air circulation.

What is required to install the Brightwater Pasteurizer?

Please see our [Specifications Sheet](#) for further information.
More detailed information can be found in our [Manual](#).

Does the purchase price include support and assistance with troubleshooting/repairs?

Yes, up to 5 hours of technical assistance per pasteurizer per year during our warranty period is included with your purchase. See our [Manual](#) for more information.

Does the purchase price include a warranty?

Yes, the Brightwater Pasteurizer comes with a 2 year warranty.
See our [Manual](#) for more details.

How do I buy one?

Please contact kim@brightwatertools.com with order inquiries.
Each pasteurizer is built to order.