



# Effluent Decontamination Systems

Liquid Biokill Systems for Biopharm Research & Manufacturing





# Systems Designed for Every Phase

Liquid Biokill for Lab Scale or R&D, to Pilot Scale and Production

We offer a complete line of effluent decontamination systems for many different applications such as research laboratories, high containment facilities, and biopharmaceutical manufacturing. For the biopharm industry, space is a premium, which is why we have designed a variety of systems that optimize the space and throughput of the system, while balancing costs and allowing the effluent treatment system to scale with your business needs.



## **Lab Scale or R&D:** Small to Medium Sequential Batch

For the initial phases of drug development, we offer small-to-medium sized sequential batch systems that collect a batch of liquid and treat it, while collecting the next batch. We measure these systems in daily cycles, and can treat anywhere from as small as 75 Liters per day, to between 500 Liters to 4,000 Liters per day.



## **Pilot Scale & Production:** Continuous Flow or Large Batch

For pilot production and full scale manufacturing, we offer high throughput continuous flow systems, as well as large-scale traditional batch kill tank systems which can be sized for any flow volume. Our continuous flow systems are designed to heat liquid to target temperature as it flows through a series of heat exchangers, where the liquid never stops flowing, allowing for a large volume in a small footprint. We measure these systems in hourly rates, and can range from 500 Liters per hour to over 6,000 Liters per hour.



# AutoFlow™ CF

Continuous flow sterilization, from 500 to 6,000 L per hour or more.

MODEL	HOURLY CAPACITY	WIDTH	DEPTH	HEIGHT	HEAT
AFc-500	500 L (132 Gal)	1981 mm (78 in)	1295 mm (51 in)	2070 mm (81.5 in)	Steam/Electric
AFc-1000	1000 L (264 Gal)	1981 mm (78 in)	1295 mm (51 in)	2070 mm (81.5 in)	Steam/Electric
AFc-2000	2000 L (528 Gal)	2133 mm (84 in)	1500 mm (59 in)	2223 mm (87.5 in)	Steam
AFc-4000	4000 L (1057 Gal)	3860 mm (152 in)	2440 mm (96 in)	3050 mm (120 in)	Steam
AFc-6000	6000 L (1585 Gal)	3860 mm (152 in)	2440 mm (96 in)	3050 mm (120 in)	Steam

Custom Models Are Available to Meet Client Requirements



LIQUIDS



<150 °C

THERMAL



CONTINUOUS



BSL 1-3

# AutoFlow™ SB

Sequential batch sterilization, from 500 to 4,000 L per day.

MODEL	DAILY CAPACITY	WIDTH	DEPTH	HEIGHT	HEAT
AFs-500	500 L (132 Gal)	1651 mm (65 in)	864 mm (34 in)	2159 mm (85 in)	Electric
AFs-1000	1000 L (264 Gal)	1828 mm (72 in)	1168 mm (46 in)	2438 mm (96 in)	Electric
AFs-2000	2000 L (528 Gal)	2438 mm (96 in)	1701 mm (67 in)	2438 mm (96 in)	Electric or Steam
AFs-4000	4000 L (1057 Gal)	2692 mm (106 in)	1701 mm (67 in)	2438 mm (96 in)	Electric or Steam



LIQUIDS



<150 °C

THERMAL



BATCH



BSL 1-3

# ThermoBatch™ Low Temp Series

Batch, atmospheric temp, low-to-medium volume decontamination.

Compact, energy efficient, simple, low cost effluent decontamination system. Designed for use in small laboratories, virology, vaccine, GMO, CMO research facilities, forensic labs, or mobile clinics.

- Cost effective – low acquisition cost and power consumption
- Compact design – modular, easy to install, fits through doorway
- Electricity only – no air, no steam, no water needed (water recommended)
- CIP chemical injection port, gravity discharge
- Highly configurable – scalable, redundant, feature-rich options
- Suitable for BSL-1 through BSL-3 containment facilities
- Sterile filter modules available
- Easily validatable with widely accepted protocols



LIQUIDS + SOLIDS



96 °C

THERMAL



BATCH



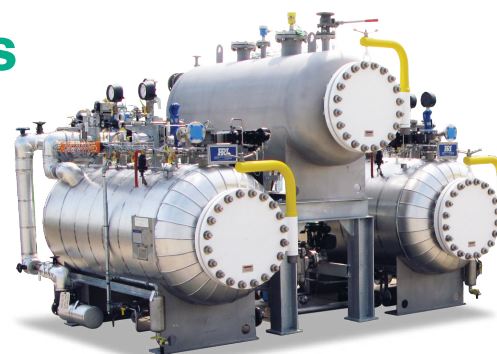
BSL 1-3

# ThermoBatch™ High Temp Series

Max flexibility batch sterilization of complex biowaste streams.

Capable of handling liquid and liquid/solid mixtures, making it the most versatile effluent treatment system. ThermoBatch™ easily adapts to the requirements of your waste stream and program changes. ThermoBatch™ sterilizes biologically active wastewater and provides “proof of process” documentation, ensuring that steps are being taken to protect public safety and the environment.

- Maximum flexibility – any capacity, flow profile, or treatment process
- High level sterilization – greater than 6Log10 reduction
- Highly configurable – scalable, redundant, feature-rich options
- Suitable for BSL-1 through BSL-4 containment facilities
- Sterile filter modules available
- Easily validatable with widely accepted protocols



LIQUIDS + SOLIDS



<150 °C

THERMAL



BATCH



BSL 1-4, AG



# Biological Validation by Design™


PRI Bio understands that validation should not be an afterthought, and we have made it a critical element to the design of our biowaste systems from the beginning.


Our validation design features are intended to achieve the following goals:


- **Cost Effective** – affordable enough to be done on a routine basis.
- **Easy to Implement** – not complex or requiring special equipment, facility downtime or long hours to complete.
- **Routine** – capable within normal facility schedules, without burdening or requiring special accommodations from the upstream operations.
- **Accurate** – a proven, tested, well-thought, repeatable validation plan that can be performed by a variety of staff members, delivering consistent results.
- **Documented** – can be archived for future reference. PRI offers a Batch Report system that provides a constant log of critical thermal data during a cycle, creates a table and graph, and auto-archives it for future reference.




## PRI Bio's Unique Validation by Design™ Methodologies:





 **Biowells:** For thermal treatment systems we incorporate biowells, a small port/chamber built into the treatment zone that allows for a Bioindicator (SCBI) or a Spore Strip to be placed inside. Biowells allow the bio-indicator to be isolated from the material being treated, but mirror the same thermal temperature curve, allowing for an accurate result. Users can simply place the bio-indicator inside, run a normal cycle, and remove it for testing once complete.

 **Spore Tank/Inlet:** All effluent decontamination systems can be validated using spore suspensions if desired. But for continuous flow systems, in order to make this process easier and less expensive, we incorporate a combination of a specially-designed spore suspension tank and an inlet port and valve prior to the treatment zone. This method allows users to validate to a 6 log reduction. Users can fill the small spore tank, and “hot switch” directly to it while the system is running normal operation, and test at the discharge.

 **Direct Immersion:** Spore strips offer an accurate method to validate treatment efficacy, because they allow the bacteria on the strips to have direct contact with the treatment chemicals. For chemical systems, we offer a port on the treatment tank where a porous spore strip holder can be lowered into the system. Once a treatment cycle is complete, the spore strip holder can be retrieved, and testing can be done to confirm efficacy.

 **Data Logging:** All systems are engineered with instrumentation to monitor critical components such as temperature, pressure, flow, level, and mechanical components such as valve positioning, pumps and more, which provide feedback to a controller. We also offer a reporting software (called Batch Report) that displays a constant log of critical thermal data during a cycle, creates a table and graph, and auto-archives it for future reference. The control system also provides alarms and fail-safes if the target is not achieved.

The chart below indicates which validation method is recommended for each biowaste treatment system:

	AutoFlow™ (continuous or sequential batch)	ThermoBatch™ High Temp (thermal batch)	ThermoBatch™ Low Temp (thermal batch atmospheric)	ChemFix™ (chemical)
 <b>Biowell</b>	✓	✓	✓	
 <b>Spore Tank/Inlet</b>	✓			
 <b>Direct Immersion</b>				✓
 <b>Data Logging</b>	✓	✓	✓	✓



Biowaste Sterilization | Solvent Wash & Recovery | Custom Process Skids | Service

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