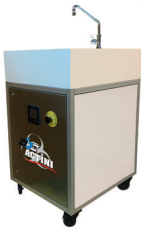




EFFLUENT DECONTAMINATION
Δ COMPLETE RANGE OF THERMAL SYSTEMS
FOR LABS & BIOPRODUCTION SITES

MADE IN USA





Located in Lewis Run, PA, ABC Actini enjoys over **100 years of combined experience** and has a superb reputation as a designer and manufacturer of heat treatment equipment.

Expert in effluent decontamination, ABC ACTINI offers a complete range of standard and custom-made systems designed to meet the needs of contained laboratories, vaccines makers and biofacilities.

OUR EXPERTISE

DESIGN

- System design as per customers' needs
- Equipment specifications
- Process Flow Diagram
- 3D Design
- System layout

FABRICATION

- Manufacturing
- Assembly
- Automation
- Documentation
- Inspection & testing (FAT)

FIELD SERVICES

- Shipment
- Installation & Commissioning
- Testing (SAT)
- Training

SUPPORT

- Qualification
- Maintenance
- Troubleshooting
- Audit & upgrade

An Experience of more than **hundreds of operational units** installed in vaccine manufacturing facilities, biotech sites, research centers and laboratories worldwide.

DECONTAMINATION PRODUCTLINE

BSL 1 - BSL 2 - BSL 3 - BSL 4

STANDARD SYSTEMS WITH OPTIONS

produced in series & short delivery times



MODELS		DAILY CAPACITIES* in gallon	DAILY CAPACITIES* in liter	TECHNOLOGIES	UTILITIES
KUBE patented system		26	100	Batch	Electricity
SINK patented system		26	100	Batch	Electricity
MICRO patented system		80	300	Batch	Electricity
MICROSTEAM patented system		260	1,000	Batch	Tangential steam injection
MICRO30 patented system		395 or 790	1,500 or 3,000	Batch	Electricity
ULTIBATCH patented system	BATCH - single	470	1,800	Batch	Tangential steam injection
	BATCH - double	950	3,600	Batch	Tangential steam injection
ULTIMATE	ULT-1000	1,300 to 4,200	5,000 to 16,000	Continuous	Steam
	ULT-3000	2,600 to 12,700	10,000 to 48,000	Continuous	Steam
ULTIMATE PLUS	ULT-3000 + EXT3000 ^(x1)	7,900 to 25,400	30,000 to 96,000	Continuous	Steam
	ULT-3000 + EXT3000 ^(x2)	13,200 to 38,000	50,000 to 144,000	Continuous	Steam
	ULT-3000 + EXT3000 ^(x3)	37,000 to 50,700	140,000 to 192,000	Continuous	Steam

PRE-ENGINEERED SOLUTIONS WITH CUSTOMIZATIONS

designed as per your specifications



MODELS		DAILY CAPACITIES* in gallon	DAILY CAPACITIES* in liter	TECHNOLOGIES	UTILITIES
CYCLOBATCH SYSTEMS patented systems	BDS-30	26 to 260	100 to 1,000	Batch	Tangential steam injection
	BDS-300	260 to 920	1,000 to 3,500	Batch	Tangential steam injection
	BDS-750	920 to 2,000	3,500 to 7,500	Batch	Tangential steam injection
	BDS-1600	2,000 to 3,200	7,500 to 12,000	Batch	Tangential steam injection
	BDS-2200	3,200 to 4,200	12,000 to 16,000	Batch	Tangential steam injection
CONTINUOUS SYSTEMS patented systems	FDS-500	660 to 2,100	2,500 to 8,000	Continuous	Electricity
	FDS-1000	1,300 to 4,200	5,000 to 16,000	Continuous	Steam
	FDS-3000	4,000 to 12,700	15,000 to 48,000	Continuous	Steam
	FDS-6000	7,900 to 25,400	30,000 to 96,000	Continuous	Steam
	FDS-12000	15,800 to 50,700	60,000 to 192,000	Continuous	Steam
	FDS ^{PLUS}	Over 50,200	Over 190,000	Continuous	Steam

Specific design for BSL 4 containment & ATEX requirements

* Continuous daily capacity based on a 16-hours-a-day operation. Our continuous systems can operate up to 24 hours a day depending on operating conditions.

* Cyclobatch daily capacity based on a 20-hours-a-day operation



KUBE & SINK

up to 26 gal/day (100 l/day)



Capacity: **Up to 26 gallons per day (100 l/day)**
Effluent: **Water-like**
Storage capacity: **6.6 gallons (25 liters)**



Utilities: **Electricity**
Single-phase 110 V - 60 Hz - 1.1 kW - 5 A



Treatment program: 275°F (135°C) for 2 minutes (adjustable)
Decontamination: F_0 50



Fully automatic operation with monitored cycles
Remote control available & Batch report



No use of chemicals
Safe for the workers and for the environment



Kube model:

Layout: **24" x 28"** (600 x 700 mm) - with connections
Height: **32"** (820 mm)

Model with Containment option:

Layout: **25" x 31"** (640 x 800 mm) with connections
Height: **48"** (1,220 mm)

Sink model:

Layout: **24" x 28"** (600 x 700 mm)
Height: **51"** (1,300 mm)



Stop autoclaving liquids, using bleach or paying for off-site treatment!

- Guaranteed decontamination
- Validation of the treatment efficiency by sensors
- Automatic and monitored cycles

Kube model - connection to:

- Biosafety cabinets to collect & treat effluent directly
- Emergency showers
- Beneath existing sinks

Sink model - stand alone unit

- Automatic water release
- Large Varicor® sink to discard research materials or wash

KUBE & SINK MODELS

Patents: FR1355689 /
EP14738747.6 / CA2915774

1 Faucet and Varicor® sink

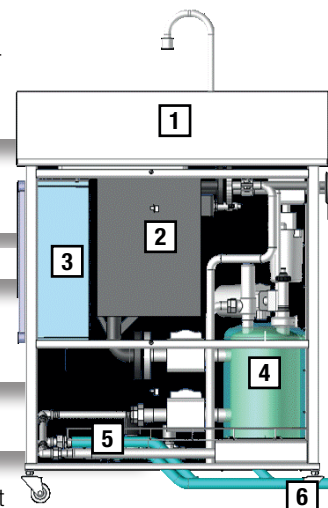
2 Effluent collecting tank

3 PLC

4 Decontamination tank

5 Cooling section

6 Decontaminated effluent outlet



MICRO

up to 80 gal/day (300 l/day)



Capacity:
Effluent:

Up to 80 gallons per day (300 l/day)
Water-like

Storage capacity:

66 gallons (250 liters)
Option: **106 gallons** (400 liters)



Utilities:

Electricity
Single-phase 110 V - 50-60 Hz - 3 kW - 32 A
With energy recovery section
No chilled water required



Treatment program: 275°F (135°C) for 2 minutes (adjustable)
Decontamination: F₀ 50



Layout:
Height:

35" x 43" (880 x 1,100 mm)
82" (2,100 mm) - for a 66-gallon storage capacity
88" (2,240 mm) - for a 106-gallon storage capacity

MICRO MODEL

Patents: FR1355689 / EP14738747.6 / CA2915774

- Specifically designed for placement in very tight spaces
- «Plug and Play» electricity operated system with energy recovery section
- Tested in our workshops before shipment
- Fully operational as soon as plugged

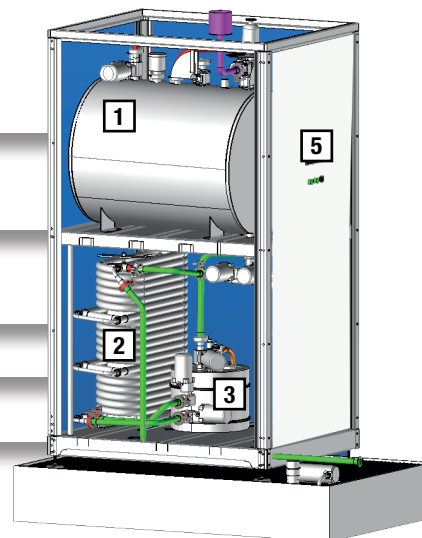
Automatic operation

- Do not require any manual intervention
- Fully automated, the PLC controls and monitors all the cycles for a safe operation

Affordable solution

- Produced in series, this unit has been designed to fit in the budgets of research centers and university laboratories

- 1 Effluent collecting tank
- 2 Energy recovery section (preheating and cooling)
- 3 Decontamination tank
- 4 Decontaminated effluent outlet
- 5 PLC for automatic management



MICROSTEAM

up to 260 gal/day (1,000 l/day)

STANDARD DECONTAMINATION SYSTEMS WITH OPTIONS



Capacity:
Effluent:

Up to 260 gallons per day (1,000 l/day)
Water-like

Storage capacity:

185 gallons (700 liters)
Option: **260 gallons (1,000 liters)**



Utilities:

Steam
Single-phase 110 V - 60 Hz - 1 kW - 9.5 A
(excluding steam generator)
Steam: 65 psig 4.5 barg - 24 kW - 30 kg/h
With energy recovery section
No chilled water required



Treatment program: 275°F (135°C) for 2 minutes (adjustable)
Decontamination: F₀ 50



Layout:
Height :

52" x 76" (1,320 x 1,930 mm)
87" (2,220 mm) - for a 185-gallon storage capacity
95" (2,420 mm) - for a 260-gallon storage capacity

Including vent filter

- Specifically designed for placement in very tight spaces, this system is very easy to install in existing rooms
- Tested in our workshops before shipment, it will be fully operational as soon as plugged
- If no steam available on site, a steam generator can be integrated with the skid as an option.

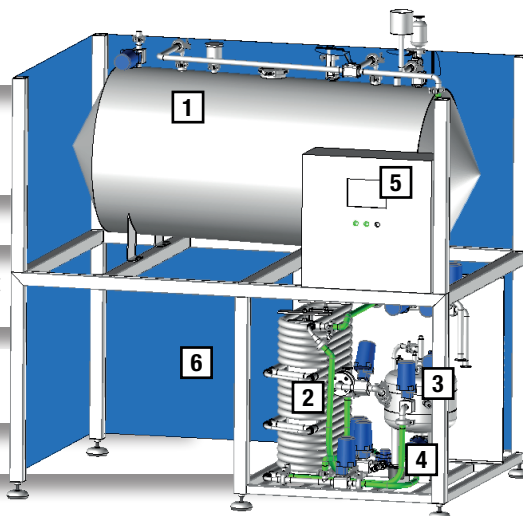
Automatic operation

- Fully automated, the PLC controls and monitors all the cycles for a safe operation

MICROSTEAM MODEL

Patent: FR1363330

- 1 Effluent collecting tank
- 2 Energy recovery section (preheating and cooling)
- 3 Decontamination tank
- 4 Decontaminated effluent outlet
- 5 PLC for automatic management
- 6 Manual CIP





MICRO30

up to 790 gal/day (3,000 l/day)

STANDARD DECONTAMINATION SYSTEMS WITH OPTIONS



Capacity:

Up to 395 gallons per day (1,500 l/day) with standard unit
Up to 790 gallons per day (3,000 l/day) with double batch option
Water-like

Effluent:



Energy (standard unit): **Electricity**

With energy recovery section
No chilled water required



Treatment program: 275°F (135°C) for 2 min.

(adjustable) - F₀ 50

or 250°F (121°C) for 20 min. - F₀ 20



Layout:

Height:

53" x 79" (1,350 x 2,000 mm)

81" (2,050 mm)

- Designed for placement in very tight spaces
- «Plug and Play» electricity operated system with energy recovery section
- Tested in our workshops before shipment
- Fully operational as soon as plugged

Automatic operation

- Reduced manual intervention
- Fully automated, the PLC controls and monitors all the cycles for a safe operation

Upgradability

- Version #1 (standard): one decontamination tank
- Version #2 (option): two decontamination tanks
- Possibility to add an external storage tank

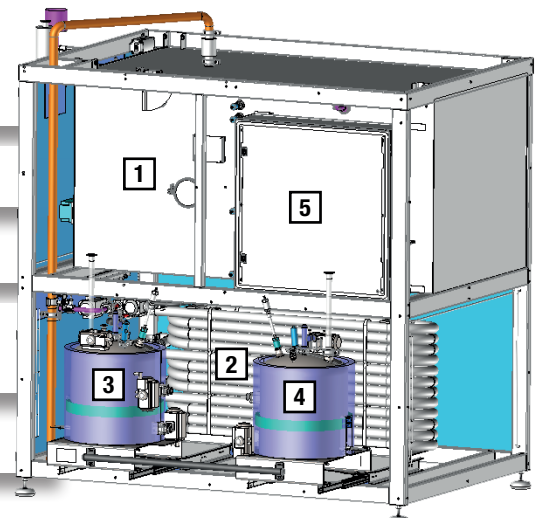
Easy maintenance

- The decontamination tank (or the 2 decontamination tanks if the option is selected) is built on racks that can be pulled out to carry out maintenance

MICRO30 MODEL

Patents: FR1355689 / EP14738747.6 / CA2915774

- 1 Effluent collecting tank (60 gallons - 1,500L)
- 2 Energy recovery section (preheating and cooling)
- 3 Decontamination tank (1.2 gallon - 30L)
- 4 Double batch option (2nd decontamination tank (1.2 gallon - 30L)
- 5 PLC for automatic management



ULTIBATCH

up to 950 gal/day (3,600 l/day)

The ULTIBATCH decontamination system has been designed to offer a standard batch solution configurable with options. This compact and cost-effective model can be provided with one or two kill tanks.

Main Features

- Kill tank(s) with tangential steam injection
- Treatment section with energy recovery system (only with double kill tanks model)
- Tubular cooling section
- Fully instrumented system for an automatic operation



Capacity for single batch: **470 gallons per day** (1,800 l/day)
double batch: **950 gallons per day** (3,600 l/day)
Effluent: **Water-like / small particles and viscous products**



Utilities: **Steam**
Chilled water required
Energy recovery section



Treatment program: **275°F (135°C) for 2 minutes**
or **257°F (125°C) for 20 minutes***
**will impact daily capacity*

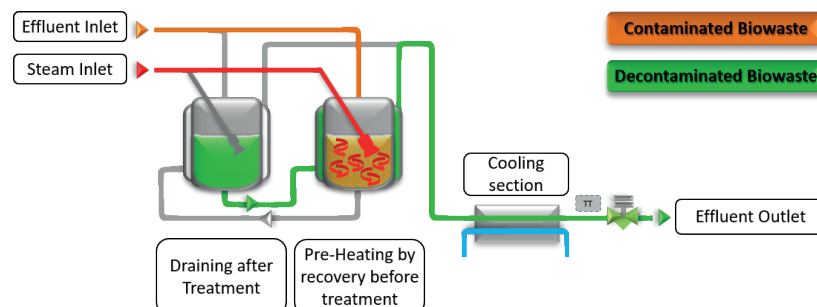
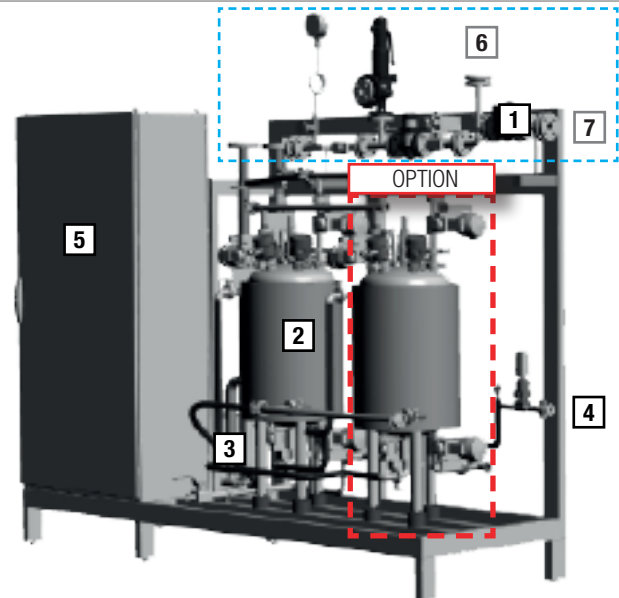


Decontamination: **F₀ 50**
Layout: **83" x 35"** (2,100 x 900 mm)
Height: **80"** (2,030 mm)

ULTIBATCH MODEL

Patent: FR1363330

- | | |
|--------------------------------------------------------|--------------------------------|
| 1 | Effluent inlet |
| 2 | Main kill tank |
| 3 | Cooling section |
| 4 | Decontaminated effluent outlet |
| 5 | Electrical cabinet |
| OPTION: Additional kill tank & Energy recovery section | |
| Steam management section | |
| 6 | Steam inlet |
| 7 | Condensate outlet |



CYCLOBATCH

up to 4,200 gal/day (16,000 l/day)



Effluent: **Particularly effective for solids decontamination and high viscosity products**



Utilities: **Steam**
Technology: **Patented batch system**

Heating: **Direct steam injection**
Also available with an indirect heating technology (high containment option)

MODELS	USEFUL CAPACITIES gallon / liter	BATCH VOLUMES gallon / liter	AVERAGE DAILY CAPACITIES depending on temperature /time /available steam and cooling water (based on a 20-hour-a-day operation)
BDS-30	8 gal / 30 l	15 gal / 60 l	26 to 260 gal / 100 to 1,000 l
BDS-300	80 gal / 300 l	130 gal / 510 l	260 to 920 gal / 1,000 to 3,500 l
BDS-750	200 gal / 750 l	330 gal / 1,250 l	920 to 2,000 gall / 3,500 to 7,500 l
BDS-1600	420 gal / 1,600 l	660 gal / 2,500 l	2,000 to 3,200 gal / 7,500 to 12,000 l
BDS-2200	580 gal / 2,200 l	920 gal / 3,500 l	3,200 to 4,200 gal / 12,000 to 16,000 l

Features of a unique design

- Steam tangential injection (core treatment)
- No vent filter on the kill tank
- Drained by the pressure generated during the heating cycle
- Reduced noise emission: 75 dBA (vs. 100 dBA for classic batch systems)
- Possible redundancy with 2 kill tanks
- Compact footprint
- No foaming

Reliability

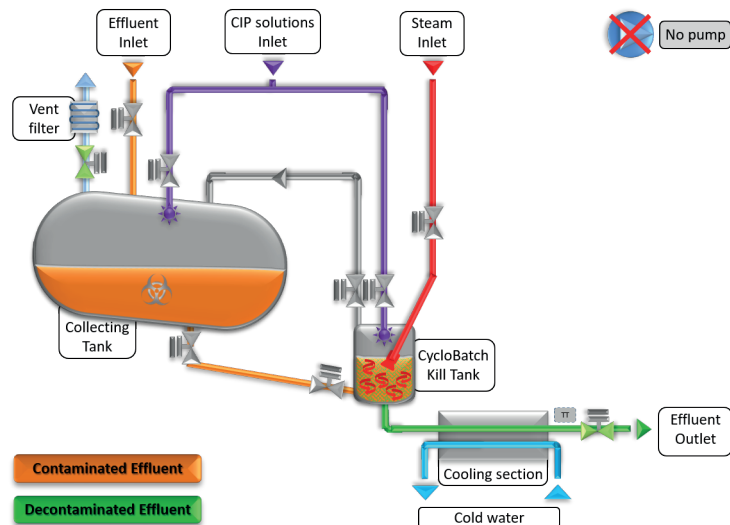
- No vent clogging
- No gaseous discharge
- No pump protects against possible leakage

Cost optimization

- Lower capital investment
- Low maintenance

BDS MODEL

Patent: FR1363330



ULTIMATE

up to 4,200 gal/day (16,000 l/day)



Capacity: **4,200 gallons per hour** (1,000 l/hour)
Recommended daily operation: Up to **16 hours per day**
Effluent: **Water-like**



Utilities: **Steam**
No chilled water required



Treatment program: 176°F to 275°F (80°C to 135°C) for 1 minute
Decontamination: F₀ 25



Layout: **32" x 56"** (820 x 1,400 mm)
Height: **87"** (2,200 mm)



CUSTOM-MADE DECONTAMINATION SOLUTIONS

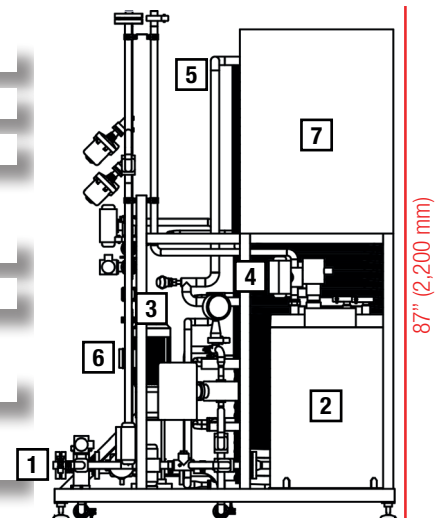
Main Features

The ULT-1000 decontamination system has been designed to meet the needs of both laboratories and production units. This very cost-effective model gathers all the important basic functions to decontaminate and release your effluent safely.

- CIP tanks for CIP solutions storage
- Pumping system secured by a filter
- Treatment section with energy recovery system
- Fully instrumented system for an automatic operation
- Possible fast-track delivery

ULT MODEL

- 1 Contaminated effluent inlet
- 2 Starting tank
- 3 Process pump
- 4 Energy recovery & Heating exchangers
- 5 Holding exchanger
- 6 Decontaminated effluent outlet
- 7 Electrical cabinet





ULTIMATE PLUS

up to 50,700 gal/day (192,000 l/day)

CUSTOM-MADE DECONTAMINATION SOLUTIONS



Configuration ULT3000 + EXT3000



Capacity: **Main skid: 790 gallons per hour (3,000 l/hour)**
Each add-on: 790 gallons per hour (3,000 l/hour)
 Possibility to connect 3 add-ons of 790 gal/hour
 Capacity up to 3,160 gal/h (12,000 lph)

Recommended daily operation: Up to **16 hours per day**
 Effluent: **Water-like**



Utilities: **Steam**
 No chilled water required



Treatment program: 176°F to 275°F (80°C to 135°C) for
 1 minute (2 minutes as option)
 Decontamination: F₀ 25 (F₀ 50 as an option)

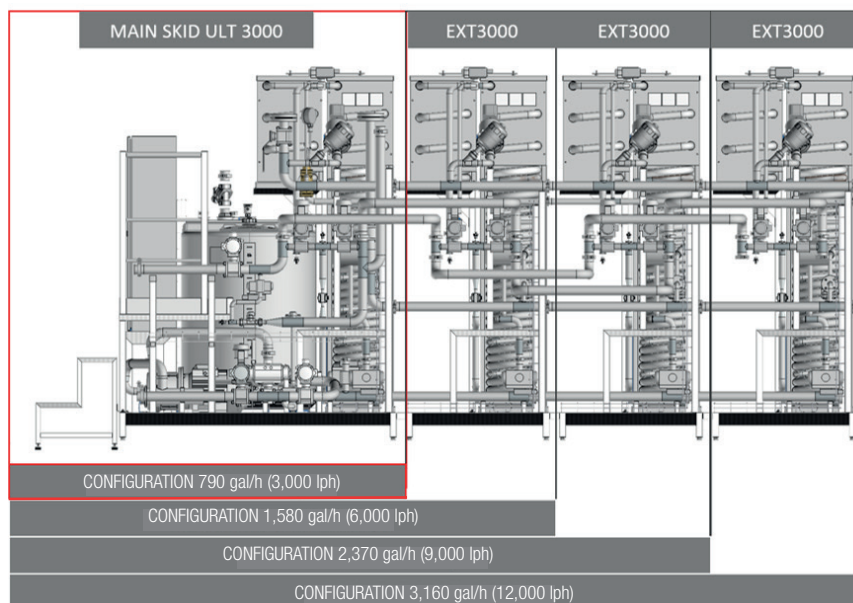


Height: **93"** (2,350 mm)
 Layout: Main skid ULT3000: **27" x 98"** (1,700 x 2,480 mm)
 Extension EXT3000 : **37" x 100"** (940 x 2,530 mm)

Main Features

- Modular system
- Capacity upgrade easy to implement in connecting 790-gal/hour (3,000-lph) modules
- Really compact add-ons
- Automatic operation controlled from the main skid. No automation study required when connecting add-ons.
- Possibility to double the pumping system for redundancy.

ULT+ MODEL



CONTINUOUS EFFLUENT DECONTAMINATION SYSTEM

up to 92,500 gal/day (350,000 l/day)...
& more



Effluent: **Water-like**
Recommended daily operation for dimensioning:
16 hours per day



Utilities: **Electricity or Steam**
Integrated energy recovery system



Technology: **All-welded tubular exchanger**

Very compact design
(for example, less than 9 sqm to treat 26,400 gal/day
i.e. 100,000 l/day)

MODELS	HOURLY FLOW RATES gallon / liter	DAILY CAPACITIES gallon / liter	UTILITIES
FDS-500	130 gal / 500 l	660 to 2,100 gal / 2,500 to 8,000 l	Electricity - Actijoule®
FDS-1000	260 gal / 1,000 l	1,300 to 4,200 gal / 5,000 to 16,000 l	Steam - Tube in Tube
FDS-3000	790 gal / 3,000 l	4,000 to 12,700 gal / 15,000 to 48,000 l	Steam - Tube in Tube
FDS-6000	1,600 gal / 6,000 l	7,900 to 25,400 gal / 30,000 to 96,000 l	Steam - Tube in Tube
FDS-12000	3,200 gal / 12,000 l	15,800 to 50,700 gal / 60,000 to 192,000 l	Steam - Tube in Tube
FDS ^{PLUS}	Designed as per needs	Over 50,200 gal / Over 190,000 l	Steam - Tube in Tube

Design

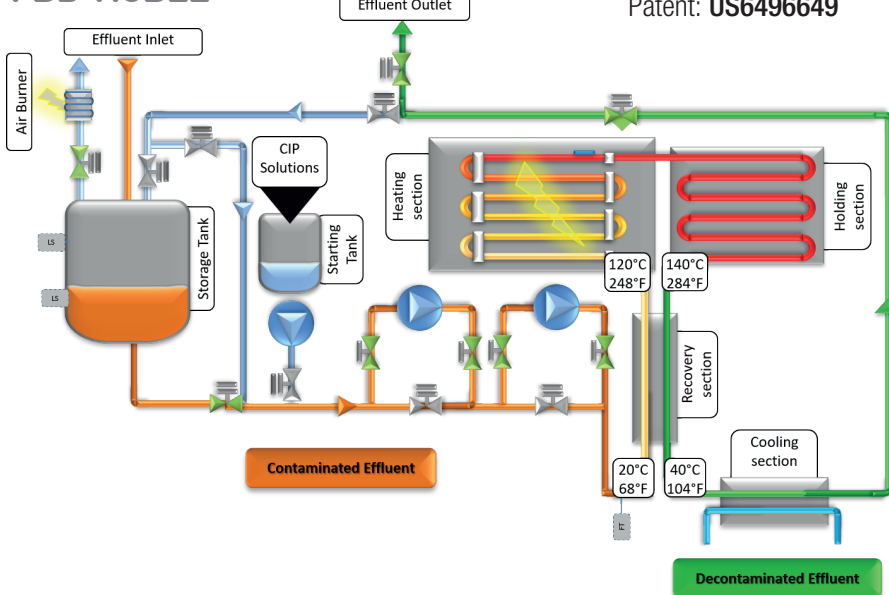
- All-welded tubular design to avoid any risk of leakage and cross-contamination
- Choice of the construction materials based on the aggressiveness of the agents present in the effluent (high chloride resistant)

Operation

- Redundant control of the decontamination parameters
- PLC-controlled cycles and records
- Automatic self-sanitation cycle

FDS MODEL

Patent: US6496649



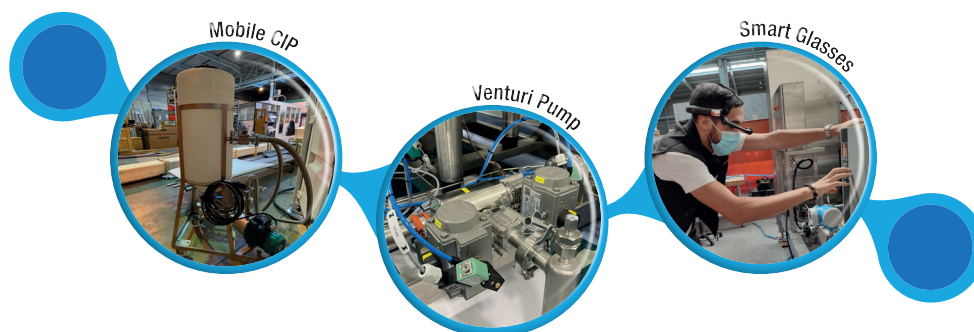


ADD-ONS & SERVICE PACKAGES

SERVICE PACKAGES

Add-ons

ADD-ONS	DESCRIPTION
STORAGE TANK	Integrated to your decontamination process
CIP	Convenient cleaning of your equipment (fixed and mobile solutions)
NEUTRALIZATION	Integrated pH measurement & adjustment (for batch & continuous decontamination systems)
VENTURI TRANSFER	Steam pumping system for safer transfer - No maintenance required



Service packages

SERVICE PACKAGES	DESCRIPTION
FAST TRACK DELIVERY	Expedited manufacturing upon request
VIRTUAL FAT	Organization of virtual FAT to limit travel needs (possibility of using Smart Glasses)
QUALIFICATIONS	FAT and SAT based on our protocols. Qualification services can be made upon request
MAINTENANCE CONTRACT	For periodic maintenance and controls
SPARE PARTS KIT	Emergency, one-year operation and critical spare parts kits
PERFORMANCE AUDIT	Possibility to check the equipment for OPEX optimization
RETROFIT REVIEW	For capacity, BSL, automation upgrades or equipment replacement

NEUTRALIZATION

Single or Double Batch Systems

NEUTRALIZATION SYSTEMS



ABC ACTINI Batch Neutralization Systems (BNS) is a pH adjustment system specially designed to neutralize effluent from batch decontamination systems. With various options, these systems can be modulated into full flexible equipment able to handle process wastewaters from other sources.

Standard features

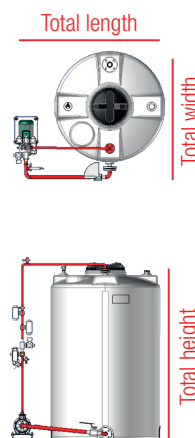
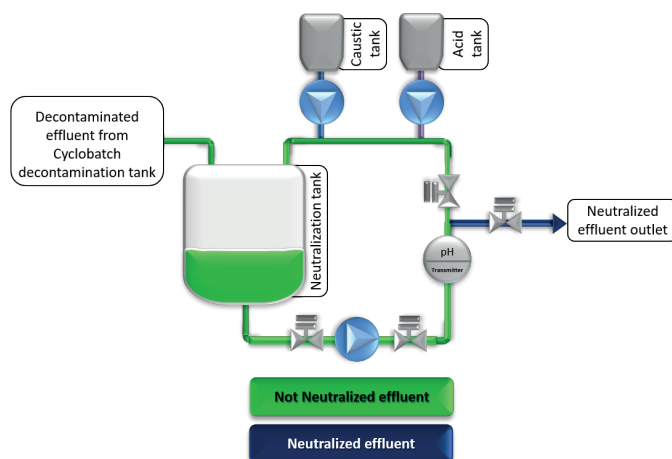
- Fully automatic neutralization system
- Polyethylene (PE) tanks - Pumping skid - Centrifugal high flow pump

Optional features

- Neutralization tanks redundancy
- Cooling plate exchanger for effluent over 140°F (60°C)
- Dedicated electrical cabinet with HMI & dedicated chemical drums

MODELS	DAILY NEUTRALIZED VOLUME gallon / liter	NEUTRALIZATION TANK VOLUME gallon / liter	DIMENSIONS		
			LENGTH inch / mm	WIDTH inch / mm	HEIGHT inch / mm
BNS-300	260 to 920 gal / 1,000 to 3,500 l	140 gal / 530 l	51 / 1,290	39 / 990	46 / 1,180
BNS-750	920 to 1,980 gal / 3,500 to 7,500 l	320 gal / 1,200 l	59 / 1,500	47 / 1,200	66 / 1,690
BNS-1600	1,980 to 3,170 gal / 7,500 to 12,000 l	750 gal / 2,850 l	76 / 1,920	58 / 1,470	80 / 2,040
BNS-2200	3,170 to 4,230 gal / 12,000 to 16,000 l	1,100 gal / 4,200 l	83 / 2,120	72 / 1,820	94 / 2,390

BNS MODEL



NEUTRALIZATION

Continuous Systems



ABC ACTINI Continuous Neutralization System (CNS) is a pH adjustment system specially designed to neutralize effluent from continuous decontamination systems. Our CNS is also able to handle wastes from various sources as CIP drainage, cleaning drainage and other alkaline or acid process wastewaters. This cost-effective equipment, able to neutralize high flow rate, is designed to fit in a minimum space area thanks to its small footprint.

Standard features

- Fully automatic neutralization system
- Polyethylene (PE) tanks - Pumping skid - Centrifugal high flow pump
- Single-stage neutralization: inlet pH between 2 & 12 / outlet pH between 5.5 & 9.5

Optional features

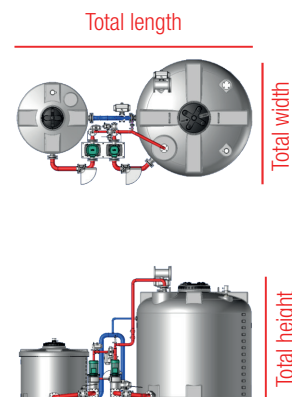
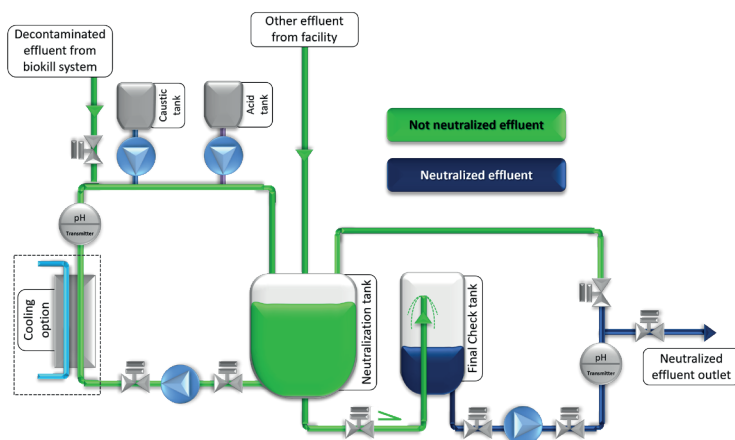
- Cooling plate exchanger for effluent over 140°F (60°C)
- Dedicated electrical cabinet with HMI & dedicated chemical drums
- Two-stage neutralization: inlet pH between 0 & 14 / outlet pH between 6.5 & 8

MODELS	HOURLY AVERAGE FLOW ¹ gallon / liter	HOURLY PEAK MAXIMUM FLOW ² gallon / liter	NEUTRALIZATION TANK VOLUME gallon / liter	CHECK TANK VOLUME gallon / liter	DIMENSIONS		
					LENGTH inch / mm	WIDTH inch / mm	HEIGHT inch / mm
CNS-1000	260 gal / 1,000 l	400 gal / 1,500 l	260 gal / 1,000 l	30 gal / 115 l	89 / 2,250	47 / 1,190	74 / 1,870
CNS-3000	790 gal / 3,000 l	1,320 gal / 5,000 l	750 gal / 2,850 l	82 gal / 310 l	116 / 2,945	66 / 1,670	92 / 2,340
CNS-6000	1,600 gal / 6,000 l	2,640 gal / 10,000 l	1,680 gal / 6,350 l	210 gal / 810 l	145 / 3,690	87 / 2,200	111 / 2,815
CNS-9000	2,400 gal / 9,000 l	3,170 gal / 12,000 l	2,170 gal / 8,200 l	260 gal / 1,000 l	159 / 4,040	96 / 2,450	108 / 2,755
CNS-12000	3,170 / 12,000 l	4,760 gal / 18,000 l	2,640 gal / 10,000 l	350 gal / 1,320 l	184 / 4,665	106 / 2,685	114 / 2,890

¹ Average flow rate for 60 minutes

² Peak flow rate for less than 10 minutes

CNS MODEL





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