Economy Neutralization System (ENSP)

The Economy Neutralization System (ENSP) is a single stage pH neutralization system. The ENSP system is designed primarily for final pH adjustment. The system has the capability of regulating effluent pH levels from a variety of industrial waste streams. The typical influent wastewater pH range for treatment is from four to eleven. Effluent from the ENSP is generally between six and nine.

This basic neutralization system configuration includes HDPE-constructed tank and is equipped with a mixer, two chemical metering pumps, one pH probe, an out of specification alarm and a pH controller. Modules are configurable to meet the standard continuous flowthrough mode, or optional manual and semi-automatic batch modes. Additional options include: chart recorder, gasket material and an effluent diversion valve (only available on the flow-through systems).

The frame supports the mixer, probe and chemical pumps. A rolling steel warehouse ladder is supplied for models where operator access to the system is needed.

PROCESS DESCRIPTION

Flow-Through

The Economy pH Neutralization System (ENSP) is designed to adjust the effluent pH to the required conditions for discharge. The flow-through neutralization system is sized to receive and treat non-metal bearing waste streams. The neutralization tank is sized for approximately ten to twelve minutes retention time at a continuous flow rate.

A mechanical mixer is mounted on a support bridge to ensure a proper homogeneous mixture.

Acid and caustic chemical metering pumps are provided to inject the neutralization reagents. The chemical metering pumps are automatically operated by the controller. Acid and/or caustic is added as needed to maintain the pH level within the designated parameters.

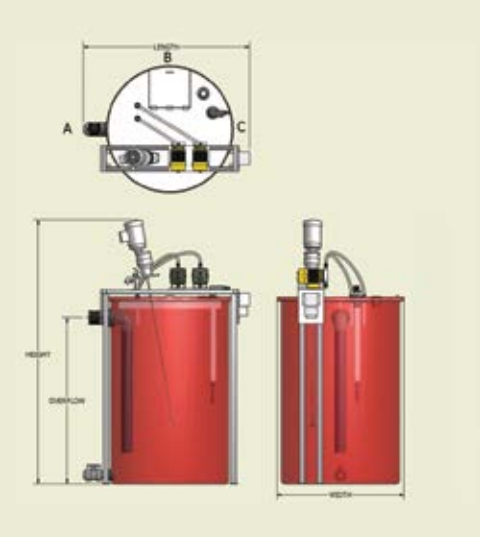
The controller is equipped to monitor/display pH, adjust chemical additions and alarm during out-of-specification conditions.

Optional Manual Batch Mode

The optional manual batch mode neutralization tank is filled manually; no level control is supplied to stop the filling of the tank. Once the pH adjustment is completed, the operator manually opens the pump suction valve and turns the air valve to start the air operated diaphragm pump.

Optional Semi-Automatic Batch Mode

The optional semi-automatic batch mode neutralization tank is filled manually; no level control is supplied to stop the filling of the tank. Once the pH adjustment is completed, the operator manually opens the pump suction valve. The operator pushes a button on the panel to start the pump. Once the water level reaches low level, the pump will stop. The low level float is set to leave some water in the tank.



ENSP PRODUCT LINE NUMBERING SYSTEM

ENSP – – – – –

Effluent Control Valve (Flow-Through)
0 = No Diversion Valve
1 = 3" 3-way Electric Valve (250 model only)
2 = 4" 3-way Electric Valve (500 & 1000 models only)

Chart Recorder
0 = No Chart Recorder
1 = One Pen Circular Chart Recorder

Effluent Orientation
A =
B = (see diagram at left for details)
C =

Flow Type
0 = Flow-Through (gravity)
1 = Batch, Manual Pump Down (no level control)
2 = Batch, Semi-Automatic Pump Down (level control)

Size (Flow-Through)
0250 = 250-gallon, 20 gpm
0500 = 500-gallon, 40 gpm
1000 = 1,000-gallon, 80 gpm

SPECIFICATIONS

Model Number	ENSP 250	ENSP 500	ENSP 1000
Tank	250-gallon; HDPE 0.95 m^3	500-gallon; HDPE 1.89 m^3	1,000-gallon; HDPE 3.85 m^3
Recommended Flow Rate	20 gpm 4.5 m^3/hr	40 gpm 9.08 m^3/hr	80 gpm 18.16 m^3/hr
Mixers	0.25 HP, 115/208-230 V, 1-Phase; 60-Hz, 3-6 Amps	0.33 HP, 115/208-230 V, 1-Phase; 60-Hz, 4-7 Amps	0.75 HP, 115/208-230 V, 1-Phase; 60-Hz, 7-14 Amps
Overflow Connection	3" (76.2 mm) Flex Connection	4" (101.6 mm) Flex Connection	4" (101.6 mm) Flex Connection
Influent Connection	2" (50.8 mm) Bulkhead Fitting	2" (50.8 mm) Bulkhead Fitting	2" (50.8 mm) Bulkhead Fitting
pH Controller/Probe	LMI	LMI	LMI
Dimensions (Flow-Through)	58" Dia x 80" H 1,473 x 2,032 mm	62" Dia x 100" H 1,574 x 2,540 mm	90" Dia x 120" H 2,286 x 3,048 mm
Overflow Height	42.0" 1,067 mm	65.25" 1,581 mm	84.0" 2,134 mm
Shipping Weight	275 lbs 125 kg	400 lbs 181 kg	860 lbs 390 kg
Operating Weight	2,500 lbs 1,134 kg	5,000 lbs 2,268 kg	9,200 lbs 4,173 kg
Rolling Stairs (Optional - Recommended for Servicing Equipment)	Not Applicable	26" L x 20" W x 60" H 660 x 508 x 1,524 mm	31" L x 30" W x 71" H 787 x 762 x 1,803 mm

EVOQUA WATER TECHNOLOGIES

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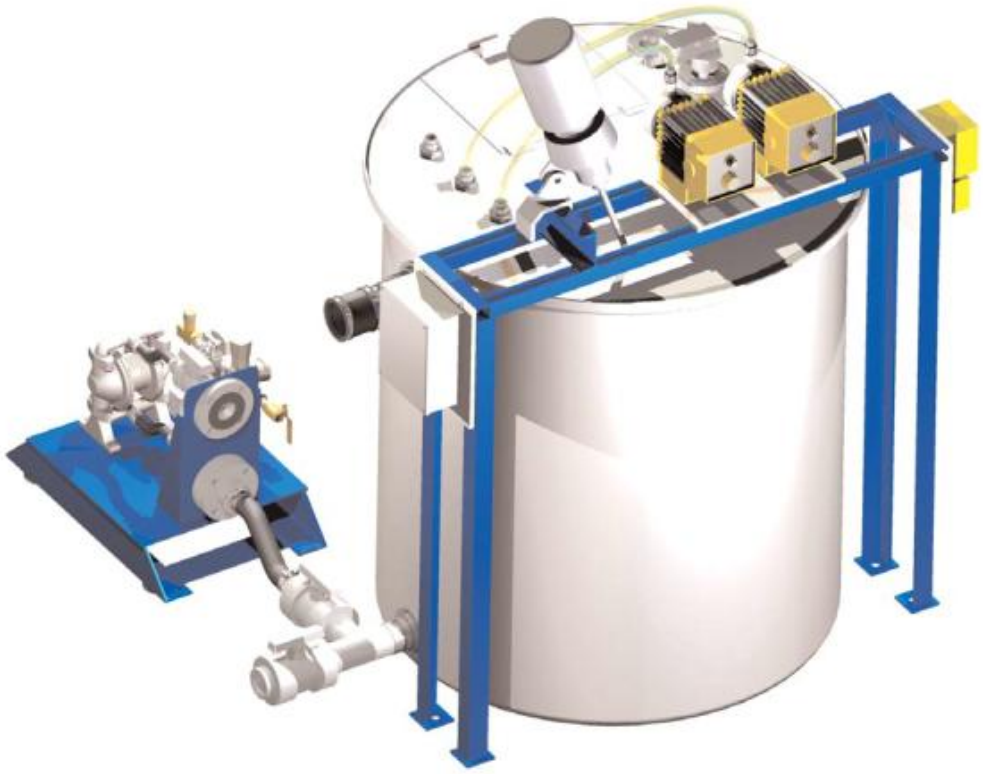
Product Description/Equipment Specifications
Economy Neutralization System (ENSP)



Typical Economy Neutralization System (ENSP)

General Description:
The Economy Neutralization System (ENSP) is a single stage neutralization system. The ENSP system is designed primarily for final pH adjustment. The system has the capability of regulating effluent pH levels from a variety of industrial waste streams. The typical influent wastewater pH range for treatment is from 4 to 11. Effluent from the ENSP is generally between 6 and 9.

Mechanical Description:
The basic neutralization system configuration includes an HDPE-constructed tank and is equipped with a mixer, two chemical metering pumps, one pH probe, an out of specification alarm and a pH controller. Modules are configurable to meet the standard continuous flow-through mode, or optional manual and semi-automatic batch modes. Additional options include: chart recorder, gasket material and an effluent diversion valve (only available on the flow-through systems).

The frame supports the mixer, probe, instruments and chemical feed pumps. A rolling steel warehouse ladder is supplied for models where operator access to the system is needed.

Electrical Description:
To control the operational sequences of the Economy Neutralization Systems, a reliable solid-state LMI pH controller is employed that monitors and controls the process. The LMI pH controller is provided with a power cord plug that can be directly plugged into a 120 volt outlet. If desired, a single power drop can be wired directly into the LMI pH controller. The two chemical metering pumps power cords are plugged into the two power cords supplied with the LMI pH controller.

The mixer is supplied with an on/off toggle switch and a 6 foot power cord that can be directly plugged into a 120 volt outlet. If desired, a single power drop can be wired directly into the mixer.

Operational Description:
Flow-Through
The Economy pH Neutralization System (ENSP) is designed to adjust the effluent pH to the required conditions for discharge. The flow-through neutralization system is sized to receive and treat non-metal bearing waste streams. The neutralization tank is sized for approximately 10 to 12 minutes retention time at a continuous flow rate. A mechanical mixer is mounted on a support bridge to ensure a proper homogeneous mixture.

Acid and caustic chemical treatment pumps are provided to inject the neutralization agents. The chemical metering pumps are automatically operated by the pH controller. Acid or caustic is added as needed to maintain the pH level within the designed pH parameters.

The pH controller is equipped to monitor/display pH, adjust chemical additions and alarm during out-of-specification conditions.

Optional Manual Batch Mode
The optional manual batch mode neutralization tank is filled manually; no level control is supplied to stop the filling of the tank. Once the pH adjustment is completed, the operator manually opens the pump suction valve and turns the air valve to start the air operated diaphragm pump.

Optional Semi-Automatic Batch Mode
The optional semi-automatic batch mode neutralization tank is filled manually; no level control is supplied to stop the filling of the tank. Once the pH adjustment is completed, the operator manually opens the pump suction valve. The operator pushes a button on the panel to start the pump. Once the water level in the tank reaches low level, the pump will stop. The low level float is set to leave some water in the tank.

Product Offering Overview:

Model	ENSP0250	ENSP0500	ENSP1000
Maximum Flow Rate (GPM)	20	40	80

Model	ENSP0250	ENSP0500	ENSP1000
Maximum Batch Size (Gallons)	216	470	950

Feed Water Requirements:

Parameter:		
	Maximum Specific Gravity	1.05
	Operating Temperature, ^{0}F (^{0}C)	35 – 105 (1.7 – 40.6)
	pH	4 – 11

*****If any of the feed water parameters are not within the limits given, consult the factory for application assistance.

Design Parameters

Configuration	Flow-through, Batch, Semiautomatic Batch
Inlet Pressure Requirements	Gravity - 50 PSIG
Feed Water Temperature	35 - 105°F (1.7 – 40.6 ^{0}C)
Feed Water Source	Non-metal bearing wastewater
Influent pH	4 - 11
Effluent pH	6 – 9; or as required

Recommended Operating Limits:

Feed Temperature	50 – 100°F
System Inlet Pressure	Gravity to 50 PSIG

Parameters Not to Exceed:

Inlet Temperature	35°F Minimum - 105°F Maximum
Specific Gravity	>1.05
pH	<4 or >11

Environment Parameters:*

Temperature	35°F Minimum – 105°F Maximum
Humidity	95%, Non-condensing
Seismic Zone Rating	2
Elevation	<3,000 feet above sea level; if above 3,000 feet, please consult factory
Location	Protect from sunlight and other UV sources (Indoor installation only)

*Direct exposure to light or heat sources that increase the surface temperature of the Controller above 120°F will lead to LCD failure.

General Specifications:

Frame:	
Materials	Welded structural carbon steel
Paint	PPG Epoxy
Color	Evoqua blue
Mixer:	
Manufacturer	Lightnin
Model ENSP0250	EV5P25
Model ENSP0500	EV5P33
Model ENSP1000	EV6P75
Materials	304 SS
Mixer Motor:	
Type	TEFC
Mixer Shaft:	
Manufacturer	Lightnin
Material	Stainless steel
Mixer Impeller:	
Manufacturer	Lightnin
Material	Stainless steel
Tank:	
Manufacturer	ChemTainer

Model ENSP0250	TC-4248AA
Model ENSP0500	TC-4872AA
Model ENSP1000	TC-6090AA
Materials	High density polyethylene
Cover	FH Series
Piping Valve:	
Type	Ball valve: PVC
Size	2”
Piping Systems:	
Influent	Bulkhead; schedule 80 PVC
Effluent	Pipe, 90^0 elbow, bulkhead; schedule 80 PVC
Chemical Metering Pump:	
Manufacturer	LMI Milton Roy
Model ENSP0250	B131-465SI
Model ENSP0500	B141-15S
Model ENSP1000	C141-36S
Chemical Injection Assembly:	
Size	½”
4-function valve	Yes
Effluent Diversion Valve (Flow-through Mode)	
Manufacturer	Hayward, Spears Mfg Co
Valve	Three-way, PVC
Model	Spears - 21201A111-030, Hayward – HCTN1400SV
Manufacturer	Hayward, Spears Mfg Co
Actuator	Electric
Model	Spears – 21201A111-030, Hayward - EPM3-120
Discharge Pump Skid (Batch Mode)	
Frame:	
Materials	Welded structural carbon steel
Paint	PPG Epoxy
Color	Evoqua blue
Pump:	
Manufacturer	ARO
Type	Air operated diaphragm
Number	1
Flow rate	
Model ENSP0250	PD05P-ARS-PAA-B, 14 GPM @ 50’ TDH
Model ENSP0500	PD10P-YPS-PAA, 40 GPM @ 50’ TDH
Model ENSP1000	PD15P-YPS-PAA, 70 GPM @ 50’ TDH
Air Requirement	
Model ENSP0250	70 psi @ 20 SCFM
Model ENSP0500	120 psi @ 50 SCFM
Model ENSP1000	100 psi @ 70 SCFM
Pump Inlet/Outlet Sizes	
Model ENSP0250	½”
Model ENSP0500	1”
Model ENSP1000	1-½”

Level Control	
Manufacturer	Kari
Model	1H
Type	Standard Float, Float switch, tilt type with cable
pH Chart Recorder	
Manufacturer	Honeywell
Model	DR4300, Portable
Type	2 pen, 10” circular

Controls Specifications:

pH Monitor/Control	
Manufacturer	LMI
Model	DP5000-1A-1
pH Probe	
Manufacturer	LMI
Model	LM32819
Alarm	pH out-of-specification If equipped with a diversion valve, valve will activate

Regulations and Standards:

Controller	UL, CUL and CE certified
Frame Welding	Plant standard, AWS D1.1
Electrical	National Electrical Code (NEC), UL508A
Seismic Rating	None

Documentation Package:

Documents	Installation procedures, start-up procedures, operation procedures, functional description, flow rate chart, specifications, Spare parts list, Technical Service and Support services
Drawings	Process and Instrumentation (P&ID), General Arrangement (GA) and electrical layouts / schematics

System Flow Rate Specifications for the Model, gpm:*

Model Number	ENSP0250	ENSP0500	ENSP1000
Influent Feed	20	40	80
Effluent	20	40	80

* Based on flow-through system.

Skid Process Connection Specifications:

Model Number	ENSP0250	ENSP0500	ENSP1000
Feed Inlet	2” Bulkhead Fitting	2” Bulkhead Fitting	2” Bulkhead Fitting
Outlet*	3” Flex Connection	4” Flex Connection	4” Flex Connection
Batch pump skid outlet	2” flange	2” flange	2” flange

* Based on flow-through system.

Skid Utility Requirements:

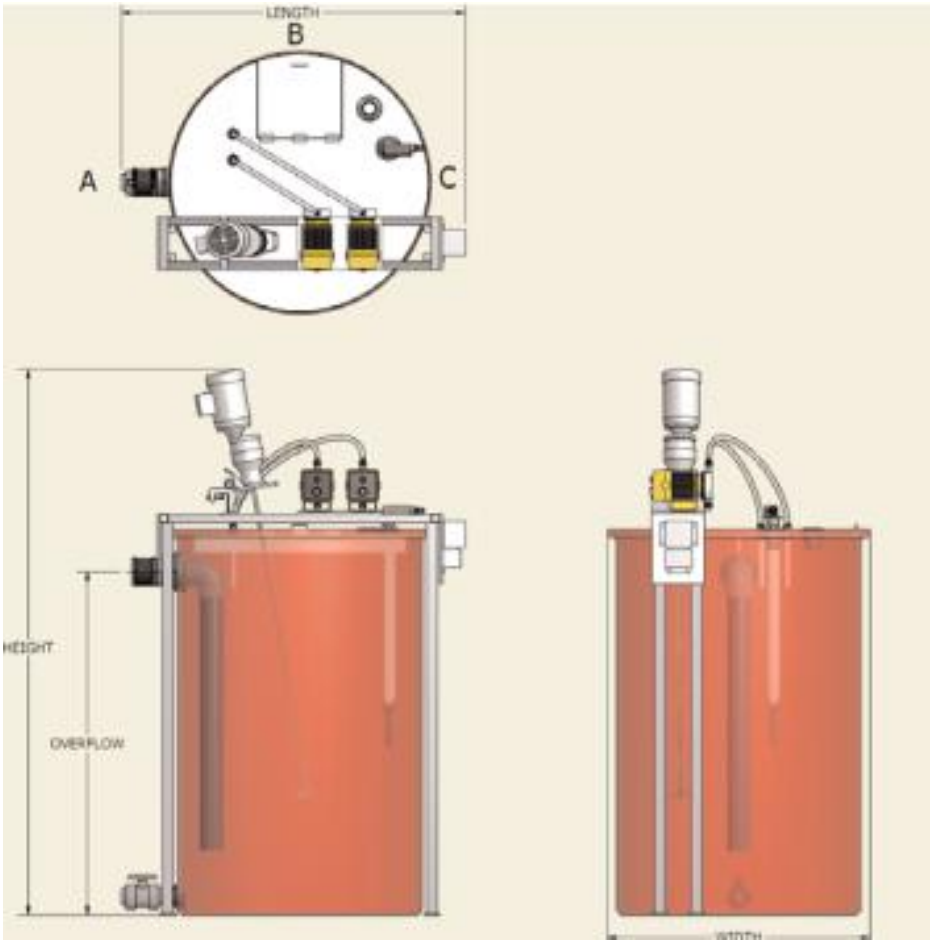
Model Number	ENSP0250	ENSP0500	ENSP1000
Voltage service	115/208 VAC. 1-Phase, 60-Hz		
Voltage amp draw	3 - 6	4 - 7	7 - 14
Motor HP (ref.)	0.25	0.33	0.75
Air Requirement*	20 scfm, 70 psi	50 scfm, 120 psi	70 scfm, 100 psi

* Based on batch system options.

Physical Dimension Specifications:*

Model Number	ENSP0250	ENSP0500	ENSP1000
Diameter (in)	42	48	60
Overflow height (in)	42	65	84
Height (in)	72	97	120
Shipping weight (Approx.lb.)	275	680	1150
Operating weight (Approx. lb.)	2500	5,000	9,200
Rolling Stairs	Not Applicable	26”L x 20”W x 60”H	31”L x 30”W x 71”H
Pump skid, when used (L x W x H, in.)	38”x 20”x 25.5”	38”x 25”x 28.5”	38”x 25”x 28.5”

*****Does not include operating space requirements or code clearance requirements.



Standard Product Ordering Information: