



CIX-MS1000 10-GPM Metal Scavenger

SYSTEM COMPONENTS

Feed Tank (Optional)
Recommended Size 500 Gal
Tank Materials..... HDPE
Chemical Pumps 12-GPH
Mixer ½-HP Gear drive

Feed Pump
Number 1
Horsepower..... 1.5
Materials 316 SS

Carbon Tanks – Off-Skid
Tank Size 12" x 52"
Number of Carbon Tanks 2
Materials of Construction..... PE Lined Fiberglass
Media Type Granular Activated Carbon
Media Volume/Tank 1.5 Ft³

Bag Filter Housings
Number of Housings..... 2
Bag Micron Rating..... 5µ

Lead/Lag Cation Exchangers
Tank Size 13" x 54"
Number of Tanks..... 4
Materials of Construction..... PE Lined Fiberglass
Media Type MR Chelating Resin
Media Volume/Tank 2.5 Ft³

Controls
Flow transmitter..... Signet 2536
PLC..... A-B CompactLogix
Touchscreen..... A-B 6" Color Panel View Plus
Motor Starters Allen-Bradley
Enclosures NEMA 4X
Acid & Caustic Level Sensors..... One Each
Frame 304 Stainless Steel
Piping..... Schedule 80 PVC

UTILITIES AND SYSTEM CONNECTIONS

Electrical Supply Voltage 208-230/460
Full Load Amps..... 20/10
Carbon Backwash Inlet..... 1.25"
Carbon Backwash Outlet 1.25"
Inlet to Feed Pump 1.5"
Return to Feed Tank..... 1"
Acid Inlet..... 1/2" Tube
Cation Waste Outlet..... 1"

INLET WATER QUALITY

Temperature..... 55°F-105°F
pH 3 SU-10 SU
TSS, mg/L <5
TDS, mg/L <10,000
Cyanide, mg/L Non-detect
EDTA or NTA, mg/L..... <0.05
Oil and Grease, mg/L..... <0.05

OPERATING SPECIFICATIONS

Flow Rate..... ≤10 gpm
Effluent Water Quality <0.5 mg/L Metal
Flow Configuration Lead/Lag
Nominal Capacity per Regen (lbs. of metal) >2.5

REGENERATION SPECIFICATIONS

Cation Exchanger
Regeneration Type Countercurrent
Waste Flow Rate 1-7 gpm
Regeneration Time 75 Minutes
Acid Used/Regeneration (gallons)..... 4
Waste Volume 85 gal

PHYSICAL DATA

Skid Dimensions (L X W X H).... .36"W x 102"L x 90" H
Approx. Shipping/Operating Wt (lbs.) 1000/1750

Operating Profile

The system will remove heavy metal ions from process water through a two-stage, chelating ion exchange process to a concentration of less than 0.5 mg/L when the equipment is operated within parameters as listed. The ion exchanger provides a near continuous flow of de-metallized water through the use of a duplex (two-tank) configuration operating with 50% of the resin in reserve or regeneration.

System Controls

The system uses a programmable controller (PLC) to control the start of resin regeneration. The PLC monitors the flow rate being processed by the system. Regenerations of the Lead vessel are initiated once the accumulated flow exceeds the pre-set value in the PLC. System operations and alarms can be set at the system's 6" Color touch screen for Human Machine Interface (HMI) which provides for system control, monitoring, and operating history for a minimum of 3 days. All system adjustments can be modified, through a password-protected section of the touchscreen. System controls include a flow transmitter and pH control for the feed tank as well as a pH control for the pH adjustment tank following the metal scavenger.

System Components

Feed Tank

As an option, the feed tank would be constructed of HDLPE with Four-point level control is provided for automatic water make-up, high level alarm, and to prevent the pump from running dry. Also required is a gear-drive mixer and a pH transmitter for chemical pumps control.

Chemical Pumps

As an option, acid & caustic feed pumps rated for a minimum of 12 gallons per hour would be required with the system to control the feed pH, drawing chemicals directly from a customer-supplied drum.

Feed Pump

The CIX-MS includes a feed pump with wetted parts made of 316 SS, Viton® and ceramic rated at >15 gpm @ >75 psi.

Carbon Filter

The CIX-MS includes on-skid duplex carbon tanks piped in parallel hydraulically capable of >12 gpm flow rate. The tanks are constructed of fiberglass with a polyethylene liner and rated for service at less than or equal to 120° Fahrenheit and 125 psi. Each tank is individually valved for manual isolation and backwash of one tank while the other tank remains in service.

Bag Filter

The CIX-MS includes on-skid duplex bag filter housings located on-skid and rated for >12 gpm. The housing is constructed of reinforced polypropylene. Filter bags are made of polypropylene and have a nominal rating of 5 microns.

Lead Cation Exchangers

The CIX-MS includes on-skid a Lead Duplex Cation Exchanger with a single control valve mechanism. The tanks are constructed of fiberglass with a polyethylene liner and rated for service at less than or equal to 120° Fahrenheit and 125 psi. One tank is in downflow service and the other tank is either in regeneration or standby mode. The Lead vessels will remove greater than 95% of the feed water soluble copper and would typically be regenerated at a pre-set interval based upon the volume of water treated, as automatically initiated by the PLC. Regenerations are up-flow (countercurrent) for both chemical and rinse water.

Lag Cation Exchangers

The CIX-MS includes on-skid a "Lag" Duplex Cation Exchanger with a single control valve mechanism. As with the Lead vessels, one tank is in downflow service and the other tank is either in regeneration or standby mode. Because determining the rate of resin loading would require periodic sample collection to determine copper leakage, regeneration would typically be initiated by the PLC by manual initiation at the Operator Interface Panel.

Ion Exchange Media

Each ion exchange tank includes 2.0 cubic feet of high-capacity, chelating, macroporous cation resin, with an exchange capacity of >1 lb. of copper per cubic foot when regenerated with >4.5 pounds of hydrochloric acid per cubic foot of resin. Inert plastic beads are used to pack the resin tanks, while still allowing the resin minimum space for expansion and contraction.

Chemical Draw System

The control valve will draw regeneration chemicals from a standard 55 gallon chemical drum. The system will provide adjustable valving, allowing the flow of chemical to be regulated from 0-10 pounds per cubic foot. The chemical draw assembly will be compatible with the corrosive chemicals being educted.

System Skid

Each system is skid mounted and prewired. Installation hook-ups are limited to plumbing and electrical connections. Skid construction is from 304 grade stainless steel with a polyurethane protective coating for corrosion resistance. Approximate skid dimensions are 102" long x 36" wide x 90" high. Skid design includes feet for securing skid to the floor. The skid includes lugs for proper electrical grounding for skid-mounted electrical components.

Piping

Piping is primarily Schedule 80 PVC with both solvent welded and threaded connections. Chemical lines from the customer-supplied 55 gallon drums to the skid are polyethylene tubing.

System Controls

Housed in a skid-mounted NEMA 4X polycarbonate enclosure, the system controller is an Allen-Bradley CompactLogix programmable automation controller (PLC) with a 6" Color Panel View Plus touch screen for Human Machine Interface (HMI)