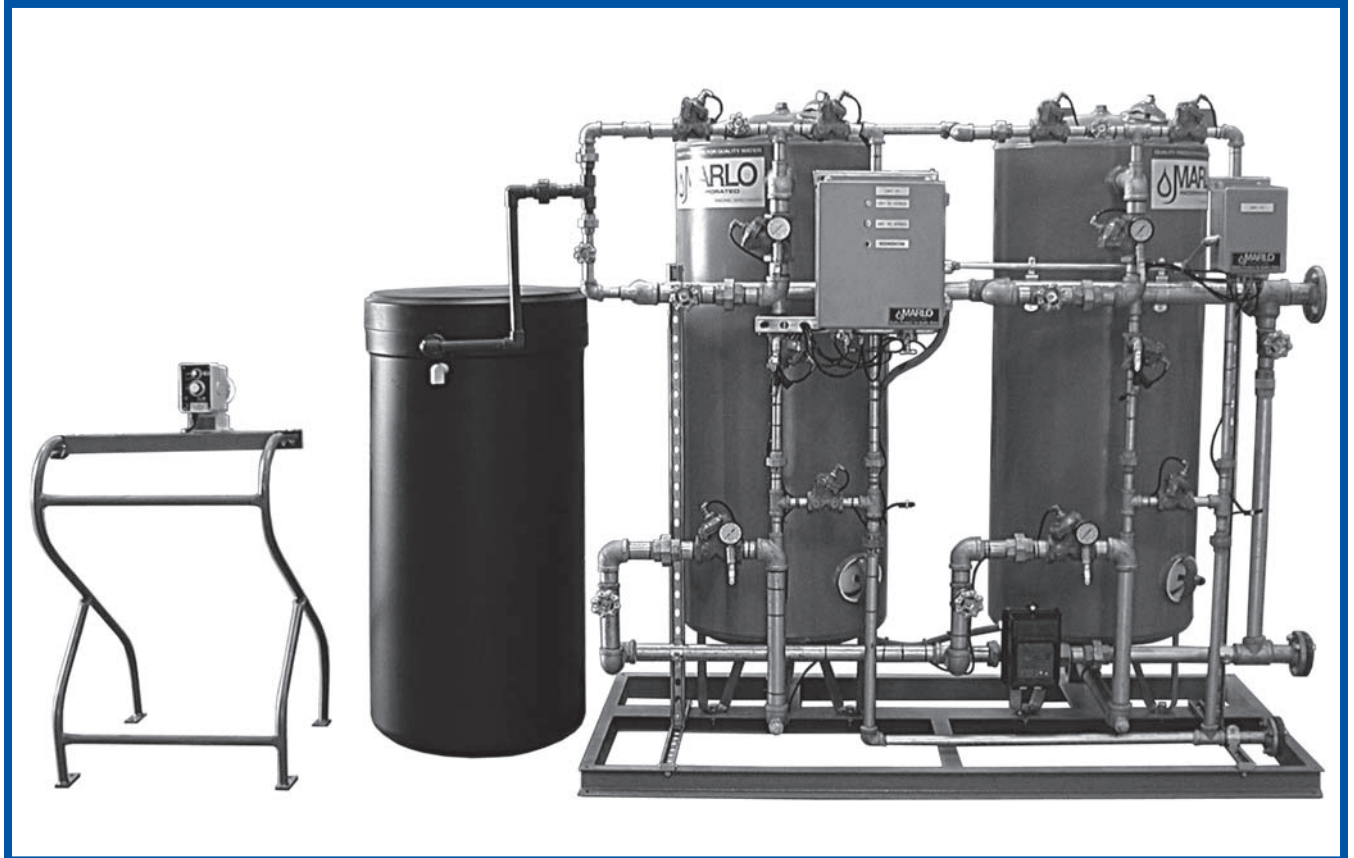


CHLORIDE CYCLE DEALKALIZERS



Twin Alternating Dealkalizer System (shown with skid mounted option)

For Commercial / Industrial Applications Such As

Boiler Feedwater Treatment - Cooling Tower Feedwater Treatment
Process Water Treatment

Quality Products for Quality Water



SYSTEM DESIGN

MARLO "MDAS" dealkalizers utilize a system of integrated components selected for optimum performance and reliability. Ease of field service and availability of parts are also important criteria in the selection of components.

■ High Capacity Resin

MARLO Type 2, chloride-form anion resin is of uniform bead size possessing high exchange capacity and low pressure loss combined with excellent stability over a wide range of operating conditions.

■ Regeneration Module

Individually sized cast iron bodied diaphragm valves arranged in a galvanized steel piping module according to the flow pattern of each mode of regeneration ensure reliable and efficient operation. Flexibility of design is possible without the use of auxiliary service valves associated with multiport control valves. Automatic by-pass during regeneration is provided on single units.

■ Regeneration Control

The regeneration modes are automatically controlled by a sequence timer signaling a staging pilot which in turn actuates the diaphragm valves. The sequence timer is fully adjustable for regeneration step duration. Time clock initiated regeneration with means for manual operation is provided as standard. Meter initiation is suggested to provide the maximum efficiency. (See meter options).

SYSTEM PERFORMANCE

■ Efficient Alkalinity Reduction

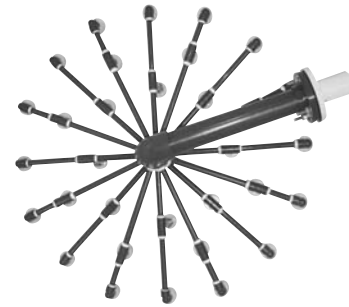
Removes alkalinity on the order of 90-95% by exchanging with chloride. Also reduces sulfate and nitrate levels.

■ Improved Boiler Performance

Lower alkalinity levels will reduce boiler blowdown rates leading to reduced chemical consumption and fuel costs.

■ Reduced Condensate Line Corrosion

Eliminates the formation carbon dioxide (CO₂) in the steam - a major source of corrosion in steam and condensate lines.



APPLICATION DATA

■ Inlet Water Requirements

A continuous softened feedwater supply is required for proper operation and to prevent resin fouling from hardness deposits.

■ Pressure Range

30 psi minimum inlet water pressure required to ensure proper brining. 100 psi maximum pressure with standard units. Equipment available for higher pressures.

■ Temperature

Standard equipment is suitable for water up to 120° F. Custom fitted equipment is available for higher temperatures and special applications.

■ Electrical

110 volt, 60 hertz, 1 phase AC power is standard. MARLO controls are available for other electric requirements. Electrical enclosures are NEMA 12 rated as standard. Other NEMA ratings are available on request.

RESIN TANK

Standard Construction

The resin tank is fabricated of heavy gauge carbon steel, electrically welded and epoxy lined (10-12 mil) over a sand blasted surface to ensure proper adhesion and complete coverage. Exterior surfaces are primer coated for finish painting after installation. 4" x 6" handhole access openings in both upper head and lower sidewall are provided on 20" thru 30" diameter sizes; a 11" x 15" manway in the upper head is provided on 36" diameter and larger sizes.

ASME Code Option

The resin tank is available fabricated in accordance with ASME code, certified, and stamped with standard pressure rating 100 psi working pressure - 150 psi test, with other pressure ratings available.

Linings/Exterior Finish Coatings

Tank exterior finish paint coatings are available. Marlo "Safety Blue" epoxy (4-6 mil) is available upon request. Contact factory for other exterior coating requirements.

UNDERDRAIN

The MARLO hub-radial distribution system ensures utilization of the entire bed area during all flow rates and also minimizes channeling during periods of low flow.

The underdrain design features non-clogging strainers arranged in a hub-radial network. The strainers are molded from polypropylene and the radial pipes are fabricated from heavy duty PVC pipe. This construction provides the ultimate in corrosion resistance and long trouble-free service. The system uses a single layer of fine washed gravel to avoid intrusion of resin fines and eliminate wasted capacity in the bottom area of the resin bed.

Upper Distributor

An inlet baffle type distributor is provided to properly distribute the inlet water and collect the backwash water.

... DESIGNED FOR PERFORMANCE

OPTIONS

■ Water Meters

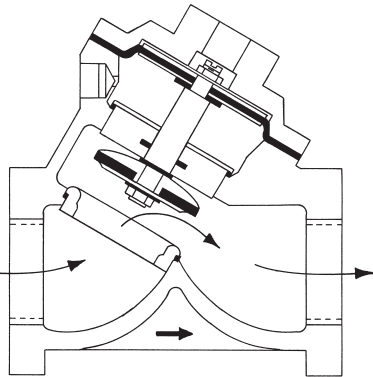
A water meter increases the efficiency of operation where demand is variable. Often times capital costs can be reduced by installing smaller multiple tank meter controlled dealkalizers capable of regenerating several times daily.

MF Series

- Electromechanical auto-reset with dial volume indicator.
- E. T. electronic digital display register is also available.
- Operates 1 to 2 dealkalizers in single, alternating or parallel configurations.
- Utilizes full diameter brass turbine meter from 1" to 3".

MO Series

- Electronic programmable with digital volume and flow display.
- Operates 1 to 2 dealkalizers in single, alternating or parallel configurations.
- Utilizes insertion type paddlewheel flow sensor from 1" through 4".



DIAPHRAGM VALVES

The diaphragm valves used are of the "Y" pattern design allowing for higher flow rates at lower pressure drops. The valves use a guided stem design and are operated hydraulically with the system water pressure, or pneumatically with plant air pressure.

■ Backwash Controller

An automatic flow controller maintains the proper backwash flow rate over wide variations in operating pressure, utilizing a variable orifice concept requiring no field adjustments.

■ Timer/Stager

The timer uses a calendar clock for flexibility in regeneration scheduling, with a means for manual initiation as standard.

A motor driven multiport stager is coupled with the timer to automatically control each step of the regeneration cycle. The stager can be manually operated in the event of electrical power failure. The sequence timer is adjustable to allow for variations in operation conditions.



■ MB Series

- Electronic programmable with digital data display.
- Electromechanical auto reset register is also available.
- Operates 1 to 2 dealkalizers in single, alternating or parallel configurations.
- Utilizes full diameter bronze disc or turbine meter from 1" to 4" with AWWA listing.

■ MX Series

- Electronic programmable with digital volume remaining, flow rate, totalizer and regeneration cycle indicators.
- Operates 1 to 3 dealkalizers in single, alternating, parallel or additive flow configurations.
- Utilizes insertion type paddlewheel flow sensor from 1" through 4".



BRINE SYSTEM

MARLO's dry salt storage system allows maximum salt storage using a high salt platform for minimum water contact minimizing salt bridging. The system in essence provides two tanks in one with the lower compartment for saturated brine storage and the upper for dry salt storage. Brine maker tanks are constructed of rigid polyethylene with cover of the same material, and contain a separate well for housing the brine valve. The brine maker allows salt to be added at any time without brine overflow and waste.

■ Injector

A PVC pressure compensating hydraulic injector is used to convey brine to the softener at the correct brine rate and concentration.

■ Brine Valve

Precise volumetric control of both refill and brine draw is provided by a single float operated brine valve. An integral air check assures positive brine shutoff. On site adjustment of salt dosage without disassembly of the brine maker is easily accomplished by adding or deleting brine valve riser pipe segments.

■ Lockouts

Lockout circuitry and components are provided to prevent simultaneous regeneration of multiple unit configurations.

■ Alternator

To provide one or more units in service with one or more units in a standby mode. This assures a constant supply of treated water without interruption.

■ SCH 80 PVC Manifolds

Piping and valves are supplied with SCH 80 PVC materials in place of standard steel piping with cast iron bodied operation valves. This will provide corrosion free exterior surfaces.

■ Skid Mount Option

Resin tanks mounted on a common structural steel skid. Prewired with single power connections. Piped interconnecting piping supplied with inlet, outlet and drain single point customer connections.



CAUSTIC SYSTEM

In order to achieve the highest resin capacity and the most optimal effluent quality, it is desired to inject a small amount of liquid caustic soda into the brine solution during regeneration. This allows any incoming carbon dioxide (CO₂) to also be removed thereby preventing a drop in pH in the dealkalized effluent. A caustic injection system is provided as standard equipment that consists of an electronic metering pump and a mounting stand.





■ Metering Pump

The caustic pump is an electronic driven, positive-displacement metering pump that is sized to deliver the proper rate and volume of caustic during the regeneration. The pump operates on 120 volt, single-phase electrical power and includes all suction/discharge valves and tubing.


■ Pump Stand

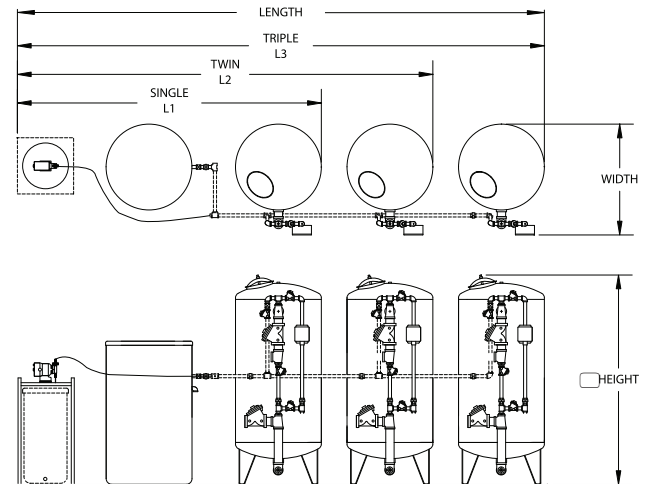
The caustic system also includes an epoxy coated steel frame/stand for the mounting of the metering pump. Designed to work with the owner supplied caustic drum or carboy to eliminate the direct handling and transfer of caustic.

SPECIFICATIONS MDAS SERIES

Model Number Automatic	Pipe/Meter Size In.	Resin Cu. Ft.	Capacity Grains 	Resin Tank Size In.	Flow Rate Normal GPM 	Flow Rate Maximum GPM 	Backwash Rate GPM	Brine Tank Size	Salt Cap. Briner Lbs.	Salt/ Regn. Lbs.	Caustic/ Regn. Lbs. 
MDAS-50-1	1	5	50,000	20 x 54	12.5	25	5.5	18x40	325	25	1.65
MDAS-80-1 1/2	1 1/2	8	80,000	24 x 54	20	40	8	24x40	550	40	2.65
MDAS-140-1 1/2	1 1/2	14	140,000	30 x 60	35	70	12	24x50	700	70	4.60
MDAS-200-2	2	20	200,000	36 x 60	50	100	18	24x50	700	100	6.60
MDAS-250-2	2	25	250,000	36 x 72	65	125	18	24x60	850	125	8.25
MDAS-330-2 1/2	2 1/2	33	330,000	42 x 72	85	165	25	24x60	850	165	10.9
MDAS-440-2 1/2	2 1/2	44	440,000	48 x 72	105	210	30	30x60	1100	210	13.85
MDAS-550-3	3	55	550,000	54 x 72	140	275	40	39x60	1900	275	18.15
MDAS-680-3	3	68	680,000	60 x 72	170	340	50	39x60	1900	340	22.45
MDAS-830-4	4	83	830,000	66 x 72	210	420	60	50x60	2300	415	27.40
MDAS-980-4	4	98	980,000	72 x 72	245	490	70	50x60	2300	490	32.35

MDAS DIMENSIONS

CATALOG NUMBER	HEIGHT 	WIDTH	LENGTH		
			SINGLE/L1	TWIN/L2	TRIPLE/L3
MDAS-50-1	5'-8"	2'-5"	6'-2"	9'-4"	12'-6"
MDAS-80-1 1/2	5'-9"	2'-8"	7'-0"	10'-6"	14'-0"
MDAS-140-1 1/2	6'-7"	3'-2"	7'-6"	11'-6"	15'-6"
MDAS-200-2	7'-0"	4'-0"	8'-0"	12'-6"	17'-0"
MDAS-250-2	8'-0"	4'-0"	8'-0"	12'-6"	17'-0"
MDAS-330-2 1/2	8'-4"	4'-7"	8'-6"	13'-6"	18'-6"
MDAS-440-2 1/2	8'-11"	5'-2"	9'-6"	15'-2"	19'-2"
MDAS-550-3	9'-4"	5'-10"	10'-9"	16'-11"	23'-1"
MDAS-680-3	9'-10"	6'-4"	8'-9"	17'-11"	24'-7"
MDAS-830-4	10'-0"	7'-2"	12'-8"	19'-10"	24'-6"
MDAS-980-4	10'-2"	7'-8"	13'-2"	20'-10"	28'-6"



NOTES

- Capacity based on 10,000 grains per cubic foot of resin when regenerated with 5 lbs. salt and 0.33 lbs. caustic. Capacity decreases as chloride levels exceed 10% of the total anions.
- At pressure loss not exceeding 10 psi.
- At pressure loss not exceeding 25 psi.
- Recommended liquid caustic is 50% Rayon grade.
- Allow a minimum of 24 inches above HEIGHT dimension for loading tanks. Add 10" to height dimension for A.S.M.E. tank construction.



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