Technical Data Sheet
Marlo Salt Recycling System (SRS)

The **Marlo Salt Recycling System (SRS)** is a hardware modification available for both new and existing water softeners that immediately reduces the amount of salt needed to regenerate a softener by 25% without any loss of capacity or water quality. This significant improvement in efficiency is achieved by recycling a portion of the salt used for one regeneration and reusing it in a subsequent regeneration.

The Salt Recycler regeneration process is enhanced by including an additional step called “Salt Recovery”. During Salt Recovery a select portion of the used dilute salt brine flow is diverted from waste and routed back to the Brinemaker where it is stored and resaturated for later use saving both salt and water. A salt savings occurs because, make-up water returned to the Brinemaker contains approximately 25% of the salt needed for the next regeneration. Therefore, it will take only 75% “new” salt to re-saturate the recovered salt brine. A water savings occurs because the recycled liquid brine is not discharged to waste during each regeneration but is in fact used to make up the saturated brine solution or the next regeneration.

Neither soft water quality nor resin exchange capacity are diminished because the effective salt dosage of the resin is not changed in this process. As a result, the published exchange capacity of a softener equipped with the Marlo Salt Recycling System is maintained. The Salt Usage data published in the softener operating specifications, reflects the 25% salt savings for both maximum and minimum salting levels.

Virtually any water softening system using a diaphragm valve nest or a multi-port diaphragm valve to control regeneration can be easily adapted to benefit from the Marlo Salt Recycling System. The system hardware package consists of a Regeneration Sequence Controller incorporating an additional regeneration step for Salt Recovery, a drain line flow diverter valve network to route the recycled brine to the Brinemaker and a single tank Salt Recycler Brinemaker capable of both storing salt and accepting recovered salt brine.

A water softener operates through two basic cycles: the Service cycle which produces soft water for use, and the Regeneration cycle which restores resin capacity at exhaustion. When the softener is exhausted, it must be regenerated by introducing a salt brine solution into the resin tank. The salt brine solution is made and stored in a separate tank defined as the “Brinemaker”.

There are two factors which determine how much salt (sodium chloride, NaCL), as liquid brine, is transferred between the Brinemaker and Resin Tank:

1. **Resin Quantity** - water hardness and flow demand at the facility determines the cubic feet of softening resin required to provide a sufficient quantity of treated water.

2. **Salt Dosage** - each cubic foot of resin in the softener requires between 6-15 lbs. of salt per regeneration. The salt dosage is site adjustable and ultimately determines the actual capacity rating of the softener. Typically a 15Lb./Ft ^{3} salt dosage yields both higher softening capacity and water quality with a compromise in regeneration efficiency while a 6Lb./Ft^3 salt dosage results in both reduced softening capacity and water quality with an increase in Regeneration Efficiency.

Regeneration Efficiency is the relationship between Grains of Hardness removed and actual Salt Usage stated as Kilo-Grains removed per Pound of Salt (KGR./Lb.). The following table shows a 25% reduction in Actual New Salt Usage, the result of salt recycling, and a corresponding increase in Regeneration Efficiency.

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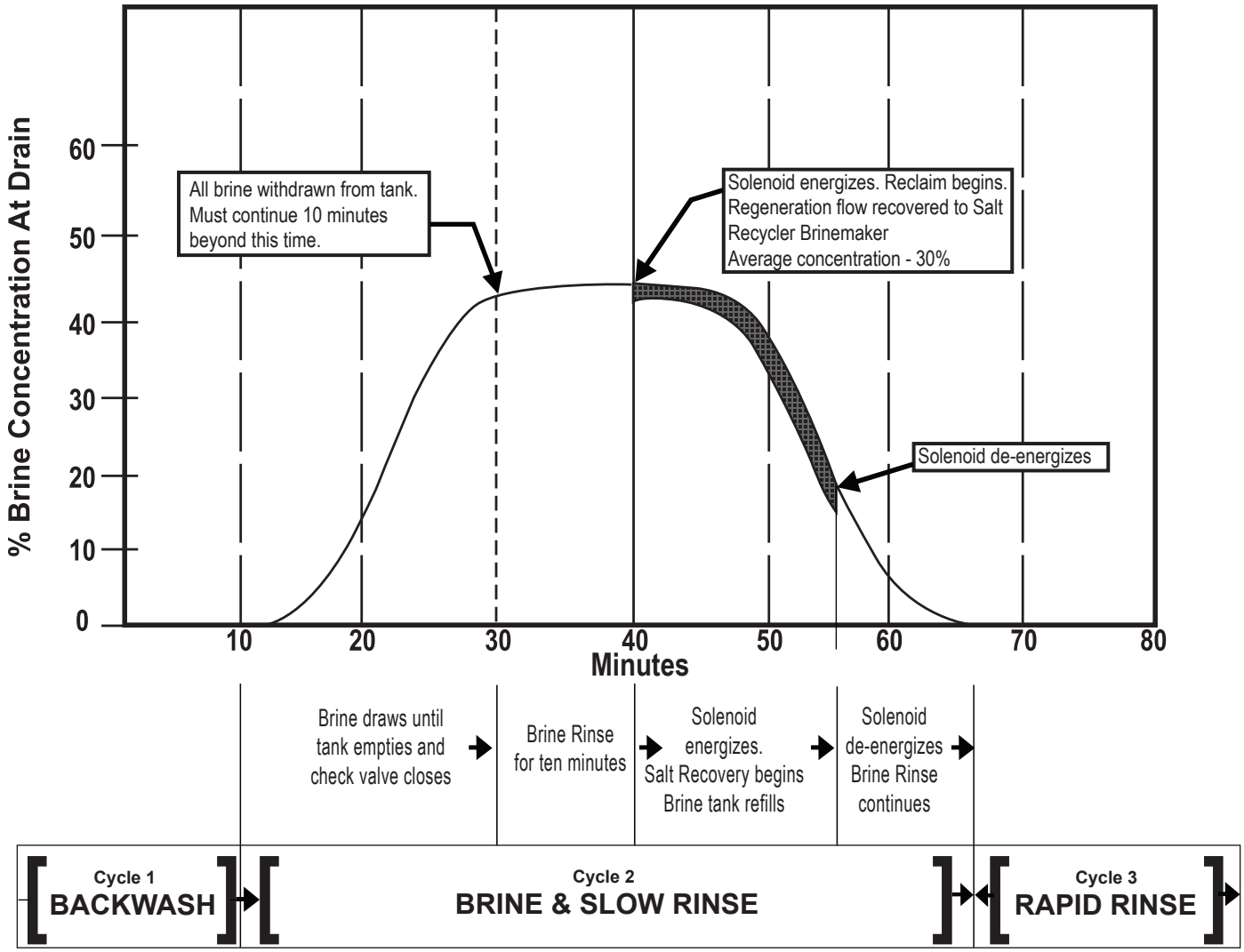
COMPARISON TABLE

Water Softener Type	Effective Salt Dosage (lbs)	Actual Salt Usage		Resulting Excange Capacity (KGr)	Regeneration Efficiency Index* (KGr/lb)
		New	Recycled		
Softener Equipped with Traditional Brine System	15	15	0	30	2
	6	6	0	20	3.3
Softener Equipped with Salt Recycling System	15	11.25	3.75	30	2.6
	6	4.5	1.5	20	4.4

* A higher efficiency index value indicates higher operating efficiency

BRINE RECLAIM REGENERATION SEQUENCE



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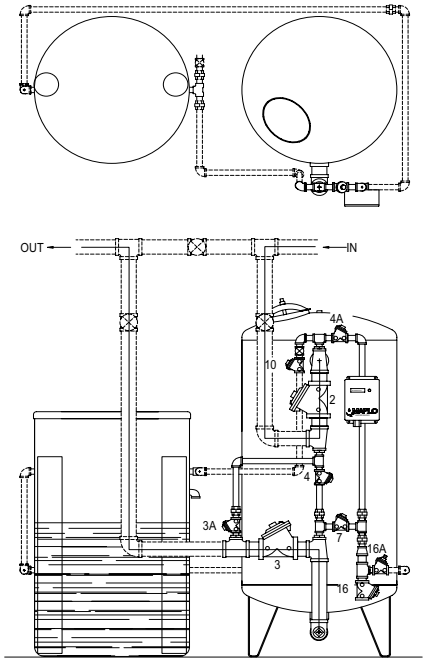
WATER SOFTENER CYCLES & VALVE CONFIGURATIONS

CYCLE #0
SERVICE

VALVES OPEN: 2,3,16

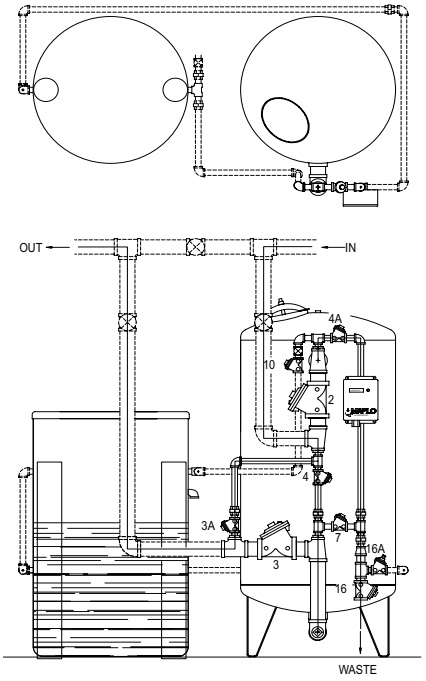
VALVES CLOSED: 3A,4,4A,7,10,16A



CYCLE #1
BACKWASH

VALVES OPEN: 3A,4,4A,16

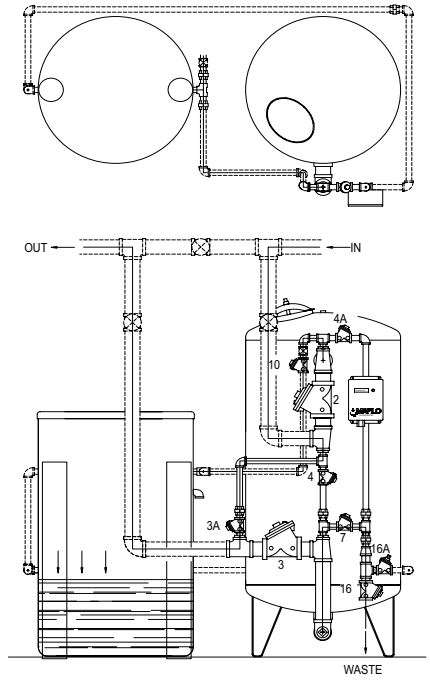
VALVES CLOSED: 2,3,7,10,16A



CYCLE #2
BRINE DRAW

VALVES OPEN: 3A,7,10,16

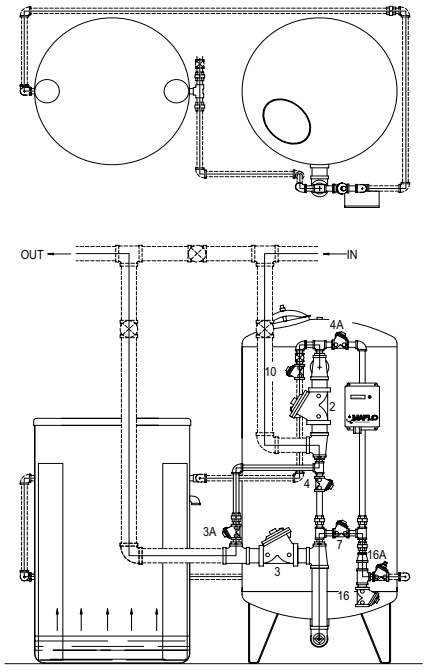
VALVES CLOSED: 2,3,4,4A,16A



CYCLE #3
SALT RECOVERY

VALVES OPEN: 3A,7,10,16A

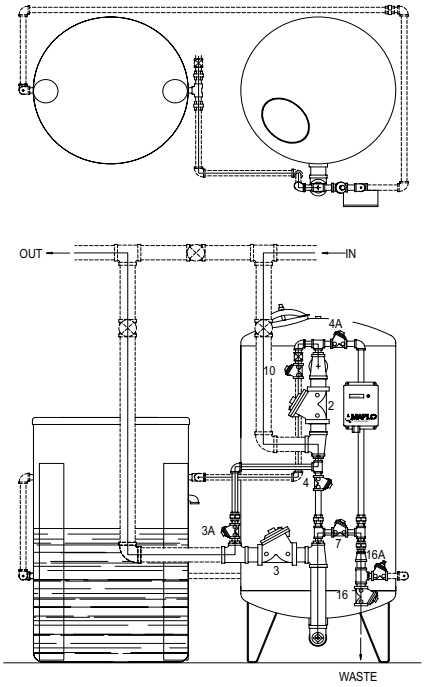
VALVES CLOSED: 2,3,4,4A,16



CYCLE #4
SLOW RINSE

VALVES OPEN: 3A,7,10,16

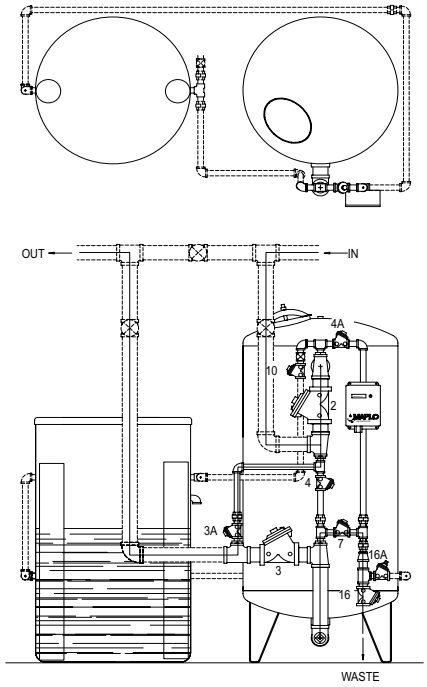
VALVES CLOSED: 2,3,4,4A,16A



CYCLE #5
FAST FLUSH

VALVES OPEN: 2,3A,7,16

VALVES CLOSED: 3,4,4A,10,16A



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