



SOFTENING SYSTEMS



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General Description and Intended Use

Softening systems are used for removing the hardness of raw water. Softening systems are used commonly since there is a need for soft water in many production processes. Softening systems are important because the plumbing needs to be protected against hard water during domestic use as well as industrial plants.

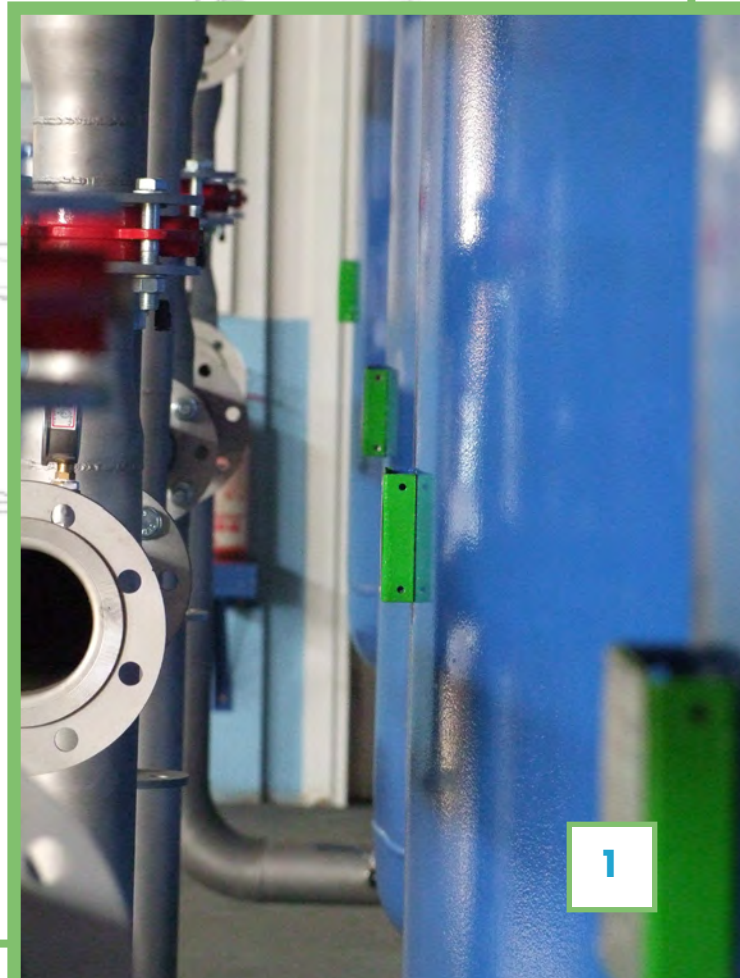
Softening systems are equipment functioning in the way of grit filter and active carbon filter with the softening raw water ability of cationic resin.

Working Principle Of Equipment

There are mineral deposits sorted as varied layers in the filter of softening systems. Mineral deposit is graded from rough grain size to fine grain size from filter base to top side. Resin mineral is spread on mineral deposit consisting of sand and gravel mixture in regard to grain size. Resin mineral is on the topping layer. Raw water to be softened enters into system so as to be homogeneously distributed from top layer of the filter to whole mineral deposit. Raw water passing through the mineral deposit contacts with resin mineral and hardness is removed by means of ion exchange during this contact. Softened water leaves the system from the bottom of the filter. Mushroom type nozzle system is used at the bottom part of the filters, at the undermost part of the mineral deposit.

Sodium ions in cationic resins that are used in softeners replace with calcium and magnesium ions that induce hardness in water and in this way the hardness is removed. Resin that saturated in terms of hardness in specific operating time is regenerated by back flushing with salt water. During the regeneration procedure, resin this time releases hardness ions, which it incorporated during service time and becomes unsaturated in terms of hardness ions.

Regeneration procedure of the resin consists of operation, backwash, salt suction, fast rinse, slow rinse, salt tank filling respectively.

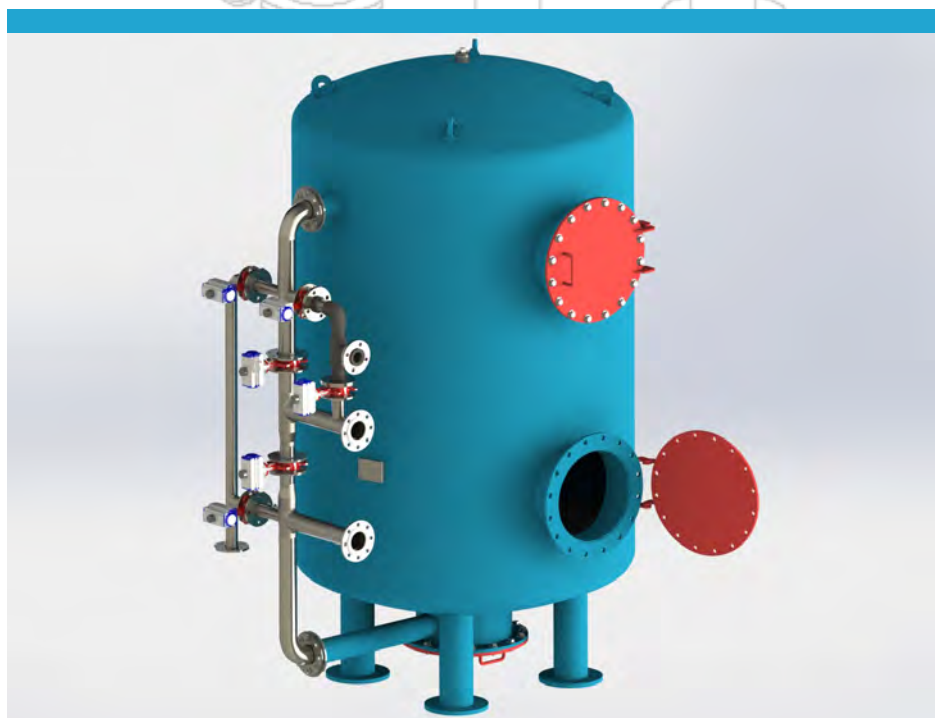


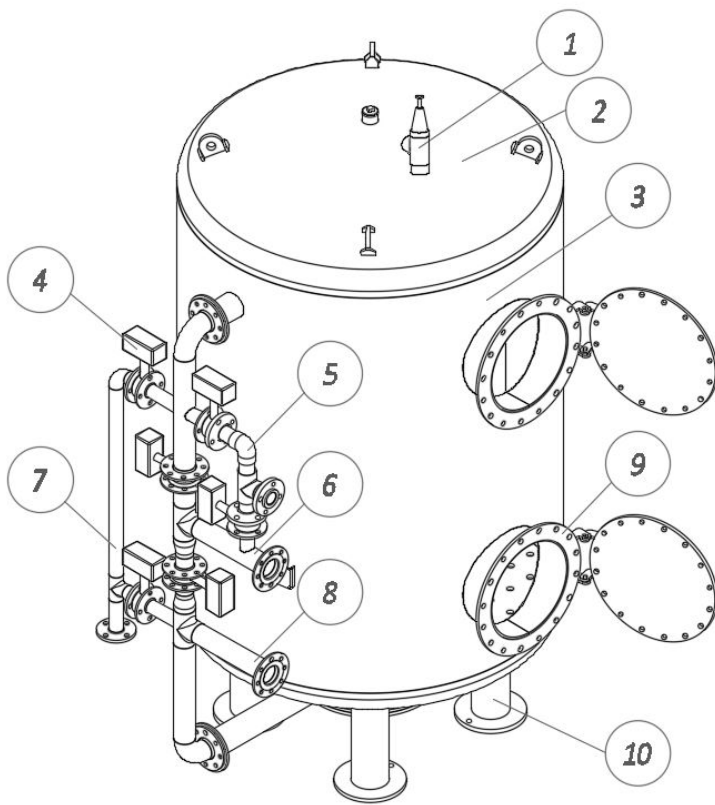
TECHNICAL SPECIFICATIONS

- Even though it varies in accordance with pollution loads and process selection, softener systems are generally manufactured in a way to have 20–30 m/h section speed.
- All resistance calculations are made while sizing of the system is being conducted and the thickness of metal sheets are selected accordingly.
- Each softening tank is certainly tested under pressure 1,5 times more than designing pressure after manufacturing.
- Robotic welding is used during manufacturing.
- Mirror and mineral deposit placed at the base of the softener tank are designed as to carry raw water load. Filter mirror is supported by means of coupling it to the special design filter lugs. Load of the mirror is shared by lugs.
- It is equipped with mushroom-type diffusers on the mirror.
- A suitable number of diffuser is used in the system by calculating all operation conditions.
- The camber wall thickness is always selected more than side wall thickness.
- Lateral upper distribution structure is used to provide homogeneous distribution and prevent resin leakages during backwash at the section raw water enters into softening tank.
- Manholes are used at the suitable points. Manhole points are selected so as to facilitate interference and maintenance procedures.
- While clarifying manhole directions, pre-piping directions and other details, the design is made special to the area where the softening tank to be used in each project.
- During backwashes considering the swelling conditions of mineral deposit the height of the deposit is manufactured in a way to be 60%–70% of the sidewall height of the softening tank.
- Butterfly valves with electrical or pneumatic actuators are generally preferred for pre-piping of the system.



- Softening systems are provided with PLC controlled electric panels. Electrical system is designed to provide the most easy operation conditions.
- It can be operated as time and flow rate controlled in accordance with process selection.
- More efficient backwash procedure can be provided by aerating softening tank by means of a blower during backwash in accordance with process selection.
- During the regeneration procedure, venturi principle salt suction system operated with venturi principle is used for conducting necessary salt suction. Salt suction is done without using an additional pump.
- Salt tank to be used in regeneration is automatically filled due to automatisation.
- While building system automation, effects of possible water-hammer are foreseen and all valves prevent the effect of the water-hammer.
- It is used with grit filter system for the resin in the tank to be protected.
- Pre-piping system is equipped with manometers through which pressure difference can be monitored, and with valves providing sampling from system inlet and outlet at any time.
- Safety valve should be used to prevent any damage to the system in case of any overpressure in the system.
- Resin amount to be used is calculated considering whole characterization of the raw water to be softened before manufacturing. Hydraulic capacities of the system are selected in accordance with resin amount.
- As a standard, double side manhole cover is used to provide easier and safer filling mineral replacement procedure.



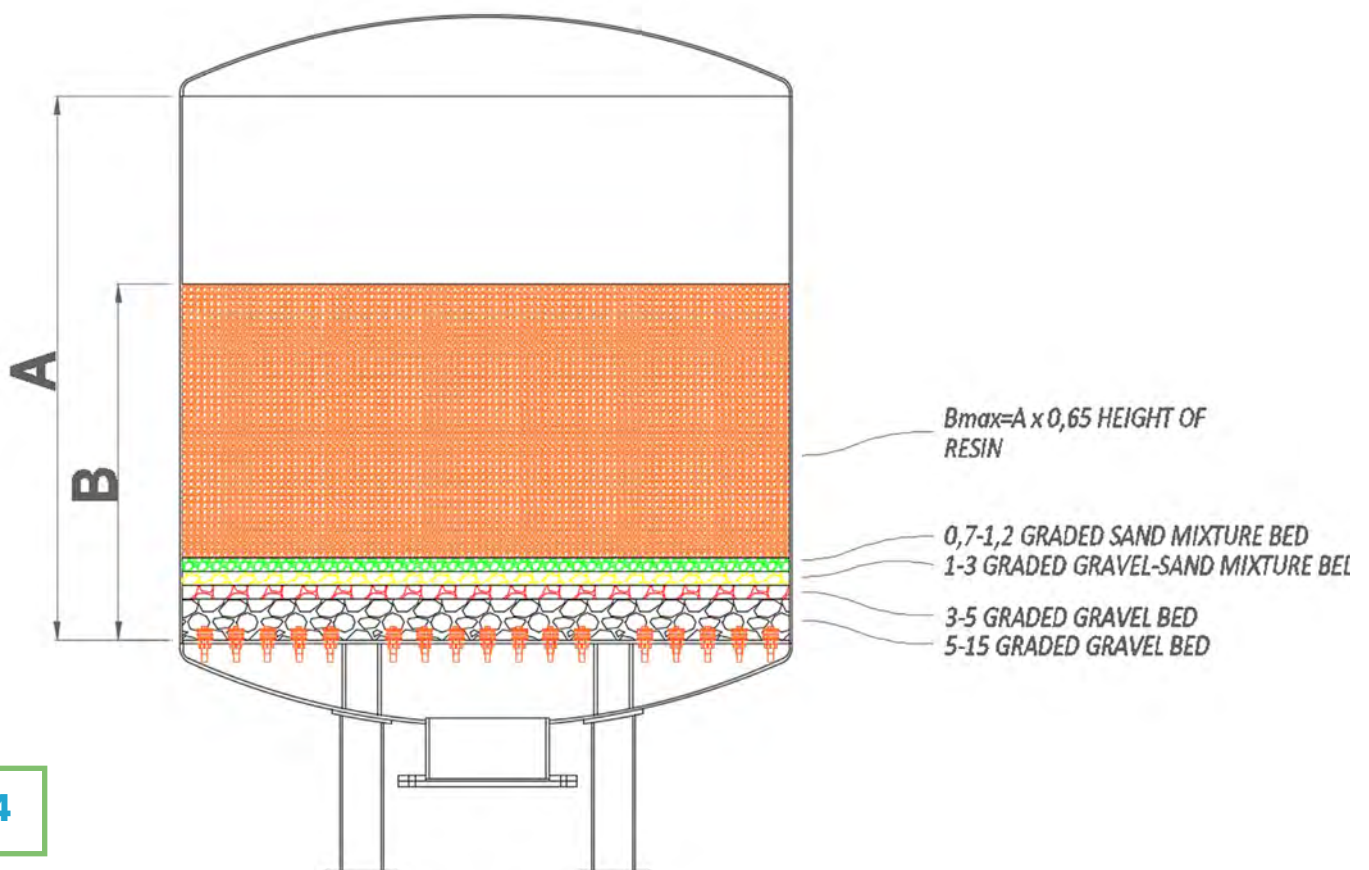


No	Part Name
1	Relief Valve
2	Camber
3	Side Wall
4	Check Valves
5	Salt Suction Line
6	Raw Water Inlet Line
7	Backwash and Rinsing Outlet Line
8	Soft Water Outlet Line
9	Manhole
10	Lugs

Material Details

- Tank: They can be manufactured as S235JR (St52) + Epoxy Paint, S235JR + Hot Dipping Galvanized Coating, DIN 1.4301 (AISI 304) or DIN 1.4401 (AISI 316).
- Pre-Piping: They can be manufactured as DIN 1.4301 (AISI 304), DIN 1.4401 (AISI 316) or PVC.

"Different materials can be preferred in accordance with the request of the customer."



Advantages

- Easy Transportation and Mounting,
- Low Operation and Maintenance Costs,
- Long Operation Life,
- Easy Intervention,
- Possibility to Control and Follow the System Operation over SCADA,
- Simple and Operable Process,
- High Softening Performance,
- Salt Suction System that Does't Need Additional Equipment,
- Salt Tank Filling System without Requiring Additional Equipment.

Accessories

- Safety Valve
- Sampling Plug
- Lateral Upper Distribution Structure
- Inlet and Outlet Line Manometer
- Pre-Piping
- Stainless Flap Check Valves with Pneumatic Actuators
- Discharge Valve
- Pulse Output Flow Rate Measuring Switch
- Mirror + Nozzle Type Upper Distribution Structure*
- Pipe + Nozzle Type Upper Distribution Structure*
- Inner Paint in Accordance with Food Codex*
- Flow Rate Measuring System in Salt Suction
- Sight Glass*
- Venturi Flow Rate Control*
- Electromagnetic Flow Meter*
- Check Valves with Electrical Actuator*

* Optional accessories are defined.





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