Water softening

Softened water not leads to a rapid clogging of every steam boiler with calcium. Therefore, a water softening plant is required.

The water to be softened by flowing a resin filling in a pressure tank (bottle softening). The hardness-forming calcium and magnesium ions are absorbed by the resin and "soft" sodium ions are released into the water. Therefore, we speak of an ion exchange process. The previously hard water by replacing the hardness components to soft water.

If the exchange capacity is exhausted, the resin with concentrated sodium chloride solution must be regenerated. During the regeneration, the resin takes sodium ions and releases the previously accumulated calcium and magnesium ions to the rinsing water. This rinse water is correspondingly hard and is usually discarded.

Simple plants regenerate timed always the same, adjustable time. Regeneration is not daily, but only when a predetermined amount of water is flowed, and the remaining capacity is not sufficient presumably for another day.
During regeneration can be removed for approximately 120 minutes no soft water.

Double-pendulum-softening systems consist of two Enthärtungsflaschen and provide uninterrupted soft water is available. Regenerates a bottle, the other bottle is in operation each. The regeneration is controlled in this case based on consumption in the available space.

The salt consumption per regeneration is about 0.24kg per liter of resin (eg VEA25 at 6 kg / regeneration). The Water consumption per regeneration is about 10 liters per liter of resin (eg VEA 25 at 250 liters / regeneration).

Plant Selection

The design of the water softening depends on the hardness of the fresh water, the required amount of fresh water, the plant utilization. The capacity of the water softening systems are given in liters * 1 ° dH. This allows you to calculate the flow rate before the system has to regenerate.

Example: Water hardness 20 ° dH; VEA25 with a capacity of 100, 000 liters * 1 ° dH

100, 000 liters * 1 ° dH / 20 ° dH = 5.000 liters

The Jumag softening systems are available in sizes (other sizes on request):

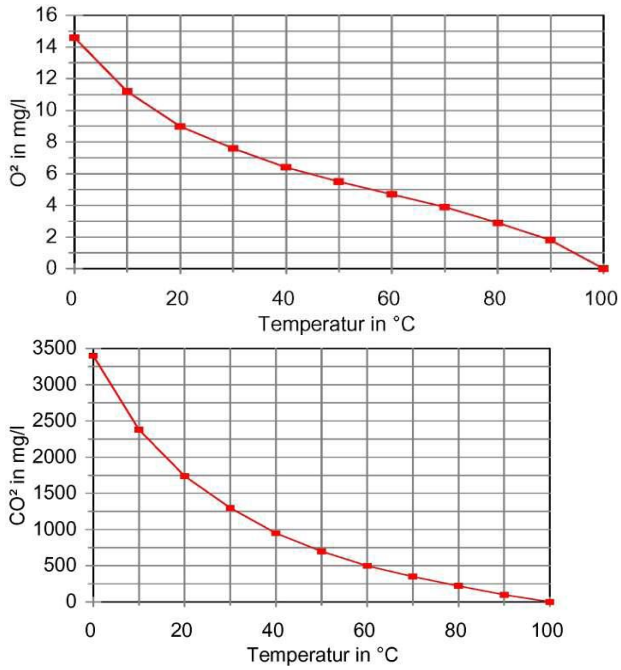
Annex	Of plant	Throughput	Capacity before regeneration	Amount of resin
VEA25	Single unit	1.000 Liter/h	100, 000 kg / 1 ° dH	25 liters
VEA45	Single unit	1, 800 Liter	180, 000 kg / 1 ° dH	45 liters
VEA60	Single unit	2, 400 Liter	240, 000 kg / 1 ° dH	60 liters
VDA30	Double conditioning	1.200 Liter/h	(120.000kg / 1 ° dH)	2 x 30 Liter
VDA45	Double conditioning	1.800 Liter/h	(180.000kg / 1 ° dH)	2 x 45 Liter
VDA60	Double conditioning	2.400 Liter/h	(240.000kg / 1 ° dH)	2 x 60 Liter
VDA70	Double conditioning	2.800 Liter/h	(280.000kg / 1 ° dH)	2 x 70 Liter
VDA100	Double conditioning	4.000 Liter/h	(400.000kg / 1 ° dH)	2 x 100 Liter

Pressure degassing

In water is mostly oxygen and carbon dioxide contained. Both result in the steam network to corrosion. The concentration of oxygen and carbon dioxide decreases with increasing temperature. This effect is exploited in the feed water container to degas the feed water. In non-pressurized containers, where the temperature is usually at 90 ° C to 95 ° C, a large portion of oxygen and carbon dioxide from the water is already being driven. However, not all escape gasses, which can still cause damage quickly, as long as they are not bound with dosing agents.

The temperature of the feed water container increased to 103 ° C, the concentration of oxygen and carbon dioxide is negligible. It must be added significantly less dosing. The reduced salt content of the dosage this also has a positive effect on the purge frequency.

In order to achieve a water temperature of about 103 ° C, the water must be under pressure. This is called a Pressure degassing or full deaeration - in contrast to the partial degassing at below 100 ° C in non-pressurized containers.



Oxygen / carbon dioxide content in relation to water temperature. Source language: WABAG manual water / TÜV Nord

Pressure degassing at Jumag

Jumag offers a Pressure degassing for all Jumag feed water containers in combination with the latest boiler control.

By means of a resistance thermometer, the temperature measured in the feed water container and held by the steam supply in the water area at the desired temperature (usually 100 ° C).

By means of a pressure sensor measuring the pressure in the feed water container and the steam supply to the steam range at the desired pressure (usually about 0.1 bar) held.

By a Magnet valve which in dependence on the supply of fresh water (and thus the delivery of O_2 and CO_2) Is opened clocked, the harmful gases are expelled, together with a small amount of steam from the feed water receptacle.

The feed water container comes complete with a safety valve that limits the pressure to a maximum of 0.5 bar. Thus, the feed water container remains TÜV monitoring and approval. The safety valve must be designed according to the power of the connected steam boiler.

In much of the condensate return pressure in the feed water container can often rise above 0.5 bar. Therefore Jumag Pressure degassing is equipped with a relief valve which opens at a pressure between 0.2 bar and 0.5 bar in order to avoid a frequent opening of the safety valve.

In case of overfilling of the feed water container sends a mounted at the overflow level meter sends a signal to a flow valve that is opened accordingly.

If in the container a negative pressure, opens a Magnet valve and a mechanical check valve.

The attached under the feed water container Magnet valve takes over the functions of the vent, pressure relief, overflow and under pressure limit.

benefits of Jumag desalination function

The savings of Pressure degassing are especially at a lower consumption of dosing, and a much lower risk of corrosion of the steam pipes and the steam boiler. In addition, in a high proportion of condensate return because of the higher water temperature is up to 1.6% (with a DG560 corresponds to 6, 5kW) Energy savings.

The patented Jumag control the vent valve saves compared to other systems much energy, since the venting occurs only when oxygen is present in the system.

Interpretation of Jumag Pressure degassing

The safety valve must be designed for the maximum expected amount of condensate and the maximum steam supply.

If no condensate is returned, the performance of the safety valve should be geared to power the steam supply valves for preheating. This is about 101kg / h depending on the pre-heating in the vapor space and for preheating of the water of the aperture size between 182kg / h with a 6mm aperture and 596kg / h at any aperture.

In addition, the possible condensate return comes from the steam dryer or the track drainage.

If condensate is returned to the feed water container, the performance of the safety valve should be oriented to the installed boiler capacity.

A safety valve should be based on the following variables:

Input 1 ¼ ' ➔ Maximum discharge capacity 260kg / h

Input DN40 ➔ Maximum discharge capacity 500kg / h

Input DN50 ➔ Maximum discharge capacity 750kg / h

Input DN65 ➔ Discharge capacity up to 1.400kg / h

Input DN80 ➔ Discharge capacity up to 2.120kg / h

These values, however, vary depending on the manufacturer of the safety valve and should be checked.

A clue may apply, but must be checked in particular cases:

Plant size	Without condensate return	With condensate return
Easy installation to DG260	1 ¼‘‘ (260kg/h)	1 ¼‘‘ (260kg/h)

Easy installation to DG460	DN40 (500kg/h)	DN40 (500kg/h)
Easy installation to DG560	DN50 (750kg/h)	DN50 (750kg/h)
Two compartment system to 2xDG560	DN65 (1.400kg/h)	DN65 (1.400kg/h)
Triple system to 3xDG560	DN65 (1.400kg/h)	DN80 (2.120kg/h)
Four compartment system to 4xDG560	DN65 (1.400kg/h)	2xDN65 (2.800kg / h) or DN100