Water temperature

Is the water heated in hot summer weather?

Water has a very high specific heating capacity. In other words, water is an excellent heat transfer medium. This is why it is also used to transport heat in heating systems. The amount of energy that can be transported with water is enormous. This means that the water tanks inside the building act as cool sinks in the summer and heat sinks in the winter. Thanks to very effectively insulated, wind-proof building envelopes, a constant room temperature is maintained indoors at all times.

If the water stopped moving for months, temperature equalisation would slowly occur in this case too. Water tanks are used, however, and at least 50 to 70% of the water content is renewed daily. This means that temperature changes are, in effect, not detectable.

In underground tanks, the soil acts as an insulation layer and thus protects drinking water from temperature fluctuations.

Condensation

Does condensation form on the surfaces?

Condensation occurs when hot, humid air makes contact with cold surfaces and the temperature in the air falls below dew point.

A building's thermal insulation keeps the indoor temperature inside the building constant and approximately the same as the surface temperature of the stainless steel tanks. Moreover, dehumidifiers maintain air humidity in the building below 75% relative humidity. As a result, condensation does not form on the tank surfaces and pipelines during normal operation.

During maintenance work, inspection visits and similar, doors should not be kept open for long periods of time, especially in summer. This is to prevent highly humid warm air entering and to keep the operating time short for the dehumidifiers.

Corrosion

Can stainless steel corrode?

The corrosion resistance of stainless steel is attributable to the presence of chromium as an alloy component, the necessary proportion being at least 12%. Chromium forms an extremely fine but highly resistant chromium oxide layer on the surface of the steel. This oxide layer protects the iron molecules against oxidation and makes the steel passive to a certain degree. This is why this layer is also referred to as the passive layer.

In simple terms, it can be said that the actual stainless steel has absolutely no direct contact with fluids, but is separated from the fluids by a thin skin. Molybdenum also forms an oxide layer and thus also increases corrosion resistance.

Corrosion is essentially the process of metal removal. In aqueous solutions, corrosion is always attributable to basic electrochemical processes, with the metal serving as an electron conductor and the solution as an ionic conductor. A prerequisite for corrosion occurring is therefore direct contact between a liquid and the metal and a corresponding electrochemical potential. Otherwise, a corrosion process cannot take place.

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If external influences damage the passive layer, corrosion may also occur on stainless steel. Causes may include mechanical damage, high salt content (especially critical chloride ions) or chemical attack caused by acids. Hydrochloric acid, for example, must not be used to clean stainless steel surfaces due to the presence of chloride.

Acid treatment is used in a targeted way to pickle a stainless steel component. The pickling agent is completely flushed off the component after the pickling process has been completed. A protective oxide layer forms on the cleaned, uncoated surface again thanks to atmospheric oxygen.

Base design

How do you construct a tank base with a slope and low-point draining?

HydroSystemTanks® are flat bottom tanks with a defined slope (around 1%) towards a tapping point. The tapping point is generally positioned in the base to make use of the available volume and ensure tanks are completed emptied of residues. In the case of two tanks, a recessed pipe basement is usually provided in the middle between the tanks, which holds the system's piping. In this case, the slope in the tanks points down towards the pipe basement as the lowest point. Suitable specifications should be included during the design stage and agreed between the individual different trades in advance.
The flat stainless steel base must rest completely flat on the building floor so that loads are transferred. Different designs can be used for the tank base.

Tank base as an adhesive base:
The building's concrete floor slab is constructed with a suitable slope to the lowest point in the tanks and the concrete surface is smoothed out with a machine. The stainless steel tank base, prefabricated in the factory and delivered to the construction site, is then mounted and glued flat to this smoothed concrete surface, impermeable to air.

Tank base with slope or welded pool securing rails
Hydro-Elektrik installs the stainless steel slope rails on the building's concrete floor slab. These rails are fitted with an appropriate slope to the tank's lowest point. Once the slope rails are fitted, the building contractor pours screed into the building and skims it using the slope of the rails as a guide so that a level floor surface is created with the slope down to the removal point, which can transfer loads into the concrete floor slab. Once the screed has dried, the tank base parts cut in the factory are delivered to the construction site, assembled as required and welded to the slope/welded pool securing rails.
In the case of tanks with large diameters, the concrete floor slab should already be installed with a suitable slope if possible; otherwise, there will be wide differences in the screed heights, which need to be taken into account during the drying times.

Other custom versions to build a base are conceivable but need to be agreed in advance.

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Chlorine dioxide

What needs be taken into account when using chlorine dioxide for the HydroSystemTanks® design?

Chlorine dioxide is used as an oxidative disinfectant in drinking water treatment. If the use of chlorine dioxide cannot be avoided, it should be added downstream from the stainless steel drinking water tanks if at all possible. If it is not possible and the chlorine dioxide is dosed upstream of the stainless steel tanks, this must be taken into account beforehand when selecting the grade of the stainless steel. Suitable precautionary measures must be adopted to ensure that the chlorine dioxide does not have a negative impact on the materials. If chlorine dioxide or other disinfectants containing chlorine are used, there may be a high concentration of chlorides in the water, meaning higher-grade stainless steel must be used, such as W 1.4404/316L, 1.4571/316Ti, 1.4362/S32304 or 1.4162/S32101.

Chlorine dioxide also tends to emit gases. To prevent an impermissible concentration in the air or on the stainless steel surface above the maximum water level, drinking water tanks with chlorine dioxide added to the water upstream should be equipped with forced ventilation (e.g. exhaust fan in corrosion-resistant version).

No chlorine dioxide treatment is required upstream of the tank if the drinking water quality is adequate in the water supply to the tank. If the drinking water requires treatment before storage, due to inadequate microbiological quality, for example, no chlorine dioxide needs be added thanks to the time-tested chlorine-free treatment methods used in HydroGroup® technologies. Adverse effects on stainless steel materials due to disinfectants containing chlorine can be ruled out when HydroGroup® processes are used.

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