Experts for Safe Onboard Drinking Water

KEMPER Shipbuilding & Offshore (KSO)

We keep potable water systems hygienic for a healthy crew

KEMPER

Quality is our standard · since 1864

KEMPER Shipbuilding & Offshore (KSO)

The Company Profile

The experience and know-how of Gebr. Kemper GmbH + Co. KG, German specialist manufacturer for valves and building services engineering, has been built up for decades in onshore projects like hospitals, hotels and nursing homes.

Around 2005, KEMPER started business activities in the shipbuilding and offshore industry. Nowadays, KEMPER has a dedicated worldwide operating team for this market, called KEMPER Shipbuilding & Offshore (KSO). We offer a holistic service to offshore customers worldwide. We provide all necessary information, know-how and various product solutions that fi t any demand.

Our aim is to help creating safe potable water installations for shipbuilding and offshore projects. Therefore we give technical and normative advice, make a design for the potable water system and supply the valves and other components for the system.

Your Contact Persons

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Offshore
Vessels and Platforms

KEMPER Shipbuilding & Offshore (KSO)

Overall Competence in Potable Water Systems

Risks

Potable Water Installation - Potential Infection Reservoir!

Most people open a tap or shower and expect clean & hygienic water. Thinking about the risks is not common to most people. Regulations and rules therefore help to avoid the majority of risks! But people and companies have their own responsibility to design and maintain a potable water system in the right manner. If you design a potable water system, knowledge of the rules and risks is highly important.

What we hear quite often is:
We do not drink the water, we drink out of bottles. We only take a shower. The mistake is the malefactor if you take the risk of Legionella. When the water is in aerosol form (small drops), it can reach your lungs while breathing. A shower is the most well-known example. Experts say: you better can drink Legionella infected water than take a shower with it.

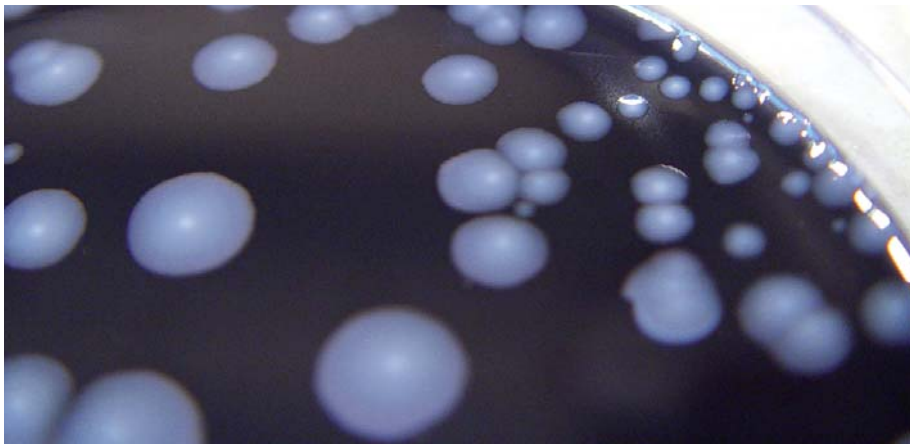
The challenge is to avoid high contamination with Legionella. To avoid more then 90 % off the risk we recommend:

> **keep your cold water cold**
> **keep your hot water warm**
> **avoid stagnation**
> **use the right materials**

Potable water installations keep a risk of stagnant water. Reasons for stagnation can be old, unused pipework or periodically unused cabins or other taps. The main problem, a result from stagnant water in the pipes, is the dangerous temperature between 25-55 °C! Hygienists recommend: Cold drinking water may not exceed 20 °C, the operating temperature in hot drinking water should begin at 55 °C and above. The critical temperature range 25-55 °C unfortunately offers best conditions for bacterial growth such as Legionella and Pseudomonas Aeruginosa. In order to avoid that danger, the prevention of stagnation and maintenance of the right temperatures of drinking water cold is obligatory.

Beware: Legionella!

Legionella is the name of the bacteria that can cause legionellosis (Legionnaires' Disease). Legionella bacteria will be found in many potable water systems. Low counts reduce a health risk. But especially between 25 and 55 °C the growth will increase. Stagnant water accelerates this growth. High counts increase a potential health risk seriously. The amount of bacteria is given in Colony Forming Units per liter, CFU/L.



Rules

Different Regulations and Standards Worldwide

Different countries, different standards!

It is not always easy to understand and to find out which rules apply for which project in which area around the world. KEMPER has a broad knowledge and is common with the most standards, rules and guidelines. It seems that more and more operators want to work with the standard that has the most strict regulations worldwide to avoid problems in the future.

The NIPH (Norwegian Institute for Public Health) is considered as one of the most strict standards worldwide. KEMPER offers a product that meets requirements in different countries, so that we can offer the right solution for any project.

KEMPER is common with the most international standards, recommendations and regulations such as WRAS, KIWA, DVGW, NIPH, and others.

The rules for potable and drinking water on vessels and offshore platforms can be very misty. In general, one can consider:

1. If a ship is working outside territorial waters, you have the rules from the flagstate.
2. If a ship is working in territorial waters, you have the rules from the coast state with exceptions.
3. For offshore units you have (almost) always the local rules plus... **> KSO will inform you!**

Material
Valves made of Gunmetal and Stainless Steel

KEMPER valves:
Protection and maintenancefree for decades

KEMPER does not construct products for only one year. KEMPER creates for a lifetime. Due to this job, we keep on working with the best materials. Especially in the shipbuilding and offshore sector, we often recognize the choice of a bad material for the application. Beside decreasing the lifetime, it can be a dangerous material in human's basic needs, the drinking water.

Numerous manufacturers promise protection for years. But only a few guarantee protection for decades. Starting immediately, you can specify KEMPER protection in your delivery specification texts: „... With selflubricating EPDM lip seals that can be replaced under pressure as a maintenance-free spindle sealing".

Example 1:
A ship designed with good materials in accommodation area but with black steel pipes for the warm water circulation lines in the engine rooms.
Result: corrosion and a shutdown of the circulation. Hot water temperature will decrease and a high amount of legionella will grow.

Example 2:
Valves made of improper material. At this picture you see dezincification. Many people think, the lime comes out of the yellow brass, but in reality it's the zinc that comes out. Problem number one is, your valve does not work any longer. You can't open or close it. But problem number 2 is even worse. What happened on the outside will even happen in the inside; corroded zinc will get in the potable water and corroded zinc is a serious danger for people's health.

Antipollution and Backflow Preventing Valves

Safe Connection of Outlets to Drinking Water Systems

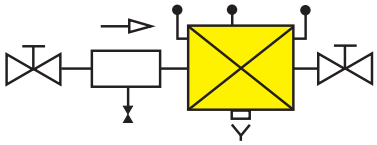
The „forgotten valves"

All outlets and systems that are connected to the potable water system need to be connected in a safe way. This depends on the health risk category of the water inside the connected outlet or system. If the color, taste, temperature or purity changes, the correct way of connection needs to be selected. Some examples are: potable water connection to oil separator, waste water treatment, window wash system, etc.

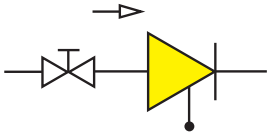
Shipbuilding engineers have a challenging task in keeping water safe for crews and passengers. The "NIPH Water Report 120-Safe, Sufficient and Good Potable Water Offshore" refers to the EN 1717, that classifies five water categories which describe the quality of the water that is present in different types of outlets and connected systems. Category 1 is water for human consumption direct from the potable water system.
Category 2 is water suitable for human consumption but treated like heating or cooling (coffee maker, icu cube maker). The higher the category, the higher the risks and the requested protection. Category 5 is a fluid, representing a health hazard to humans through the presence of microbiological or viral pathogens of transmittable disease (infection, mortal danger). A toilet cistern is a well-known example for category 5. Due to the construction, it is not possible that the water from the toilet can flush back into the potable water system. The cistern is filling from above a level the fluid can reach in the tank.

The most common protections are the EA and the BA. The EA (antipollution check valve) is allowed till category 2 and the BA (backflow preventer) till 4. EN 1717 has to be followed for correct installation.

In practice we see that these protections are not engineered or not the right one. KEMPER Shipbuilding & Offshore will help to optimize the potable water installations.



1 Cut-off valve | 2 Strainer | 3 Backflow preventer | 4 Cut-off valve



PROTECT Systemtrenner BA Figur 360 OG

KEMPER check valve with shut-off function (KRV) for protecting and stopping with maintenance free lip seals Figure 145

Circulation Balancing Valves

The Right Material Helps keeping Potable Water Durable Clean

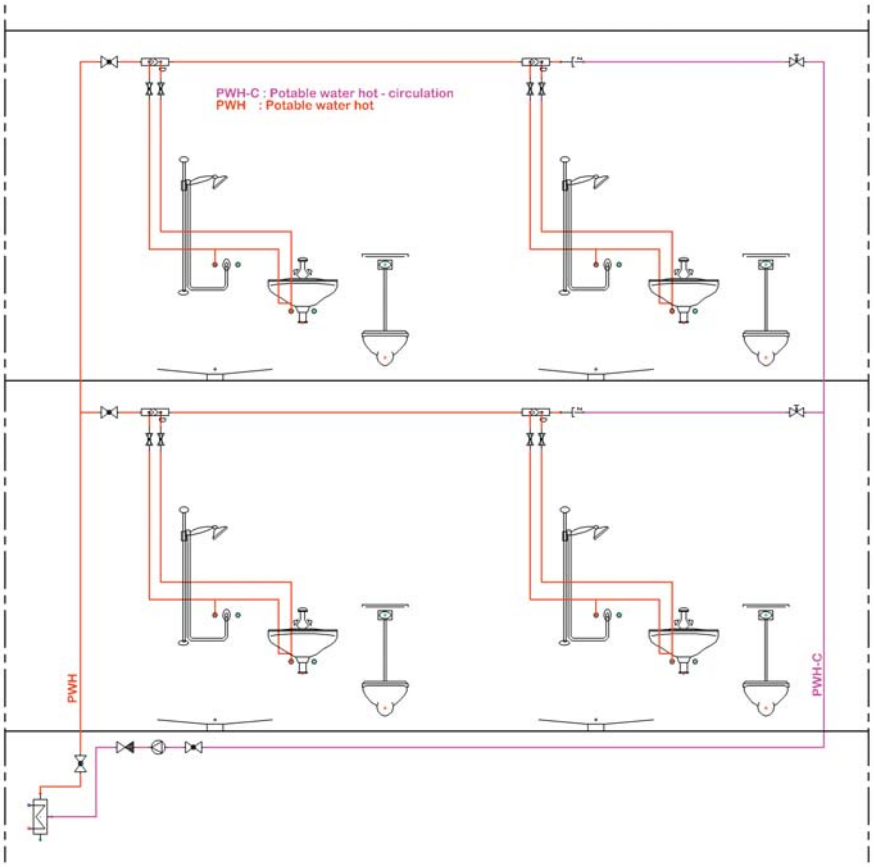
For water hygiene issues it is necessary to keep the hot water temperature above 55 °C to avoid bacteria growth. To maintain this temperature throughout the whole hot water system, hydraulic balancing valves must be installed in the hot water circulation system.

The KEMPER circulation balancing valves are designed to ensure a hydraulically balanced hot water circulation system. There are automatic balancing valves available that regulate the circulation flow based on the local water temperature, or static regulating valves can be used that have to be preset to a specific kv-value from a proper design calculation with the KEMPER Dendrit Software.

The NIPH recommends a hot water temperature in the distribution system from minimum 60 °C. This temperature is required for reasons of convenience, water saving and water hygiene. To achieve this, a hot water circulation system is necessary. The temperature at an outlet should reach 60 °C after maximum one minute, so that the user does not have to flush water for a long time till it gets warm.

KEMPER MULTI-FIX PLUS Figure 150 2G

KEMPER MULTI-THERM Figure 141 0G



KEMPER Hygiene System KHS®

The Innovative Solution for Maintaining Potable Water Hygiene at any Time

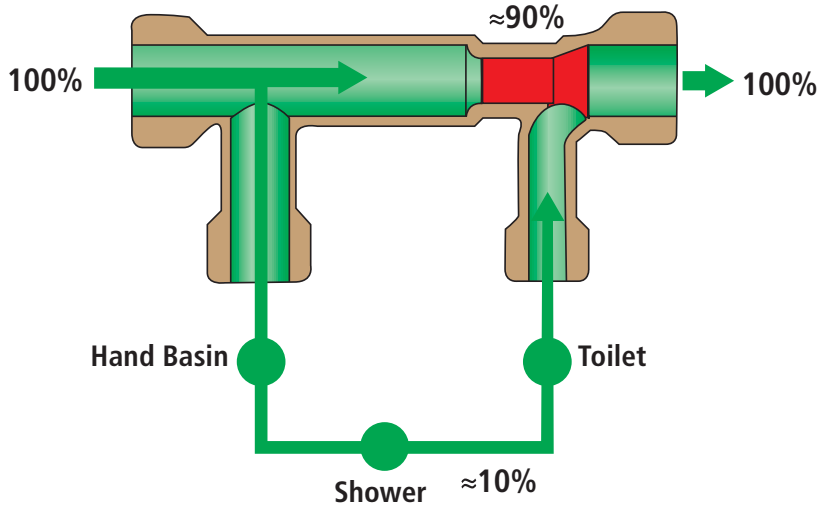
How it started:

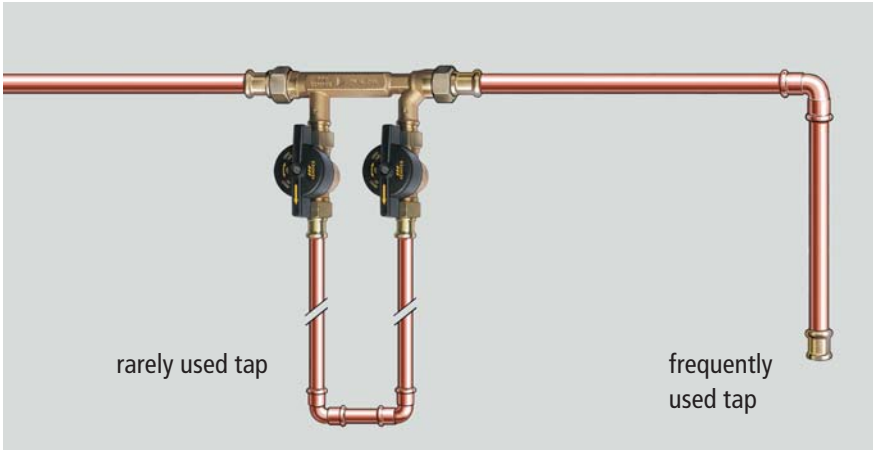
As a summary of the previous topics, we can conclude that the main issues are: Keeping cold water cold, hot water hot and avoiding stagnation. The various rules describe for example manual flushes. Since we know that the time of the people is limited and expensive, KEMPER has developed the hygiene system KHS. Here we keep the entire potable water system "in motion" without manual operation. Next to cost reduction, we can write about benefits like minimum failure, logbook registration of any events in the installation etc.

The essential fitting of our KHS system is the KHS Venturi Flow Splitter.
The KHS Flow splitter's function is based on the principle of the Venturi nozzle. The minimum pressure difference between Supply line A and Return line B causes an induced flow in the branch. The drive comes from water usage behind the KHS Flow Splitter Unit. The entire water content in the branch is thus changed, stagnation is prevented and the water temperature is kept low.

When does it make sense to use a KHS Flow Splitter Unit?

The KHS Flow Splitter unit always makes sense when a rarely used tap can be driven by a frequently used tap.





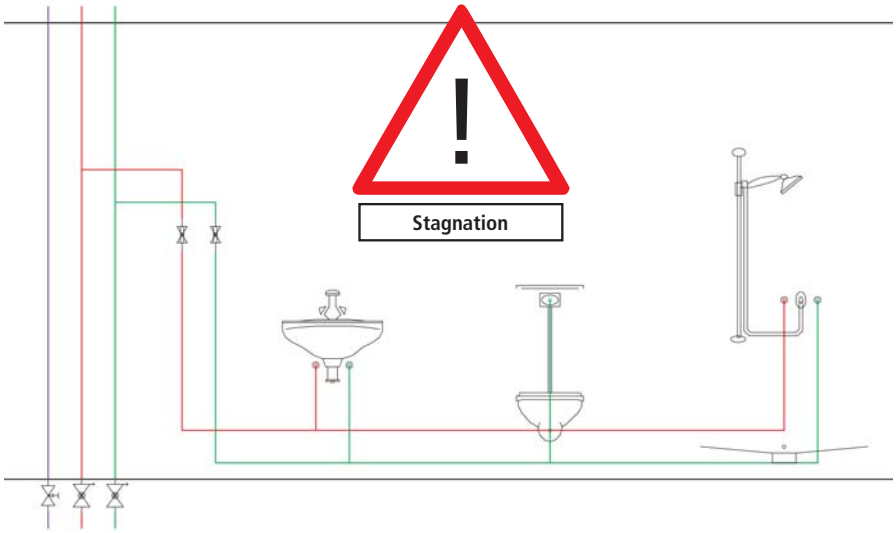
Giovanni Battista Venturi
Simply ingenious - ingeniously simple. The principle discovered by Giovanni Battista Venturi still meets all requirements even today. In his productive period (*1746 in Bibbiano † 1822 in Reggio nell´Émilia) he also developed the venturi pump and the venturi nozzle.

KEMPER Hygiene System KHS®

The Innovative Solution for Maintaining Potable Water Hygiene at any Time

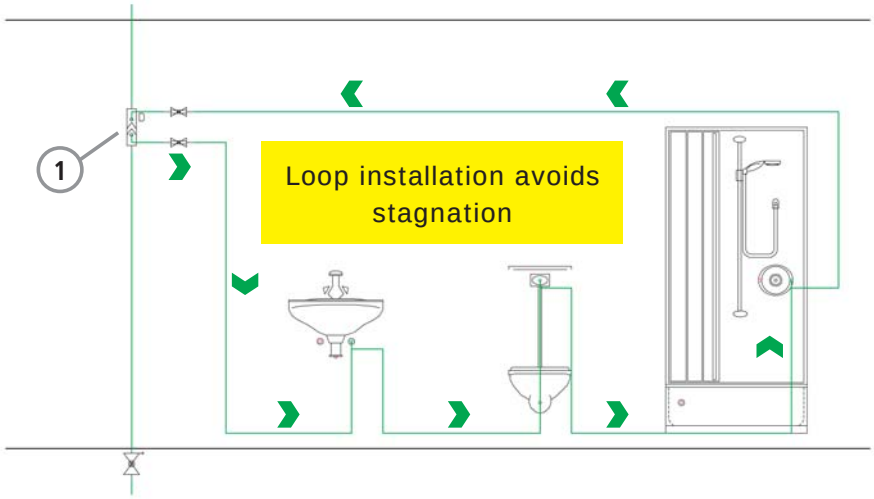
The common method of installation

The fight against pathogens in hot and cold water is of prime importance for operators. So far, the T-installation is the common practice for potable water installations. The result is potential stagnant pipework to the single taps. For a frequent water change, extensive and costly manual measures are performed.
These flushing measures are ineffective because they are neither monitored nor comprehensive. The flushing measures are defined by the technical and hygiene personnel and are carried out by employees. Therefore they have to open and close several valves and outlets manually. This causes high operating and labour costs.



Professional prevention of stagnation!

To avoid ineffective and cost intensive measures against stagnation, the shown type of installation should be considered in the design of potable water installations. The innovative pipe installation in combination with the KHS Flow Splitter creates a frequent water change in the loop pipework when water is used at a subsequent outlet at the riser – even if there is no frequent use of water in the regarded loop.



Hygienically safe water installation for cold water that is realized by installation of KEMPER KHS Flow Splitter and a loop pipe in the room.

1 KHS Flow Splitter Unit -dynamic-

KEMPER Dendrit *STUDIO*

Innovative Software supports Planning with KHS

Powerful software is needed to be able to design, simulate and calculate complex systems. In cooperation with the software producer Dendrit and in collaboration with additional competent market partners, KEMPER has developed a unique software that meets all the challenges resulting from the technology.

KEMPER Dendrit *STUDIO* offers an efficient and time saving design of drinking water installations according to the relevant standards and includes specific KEMPER applications like the KEMPER Hygiene System KHS and the required antipollution and backflow preventing devices.

Advantages at a glance

- Standalone software with special CAD-surface for design of MEP systems
- Time saving by usage of the intelligent functions and the scheme generator
- Plumbing design calculations acc. EN 806 and/or DIN 1988-300
- Increased planning reliability by simulation of KEMPER Hygiene System KHS and hot water circulation
- Design module for the instantaneous hot water heating system KEMPER ThermoSystem KTS
- Calculation of heatin loads acc. DIN EN 12831 by usage of floor plan gripper for floors, roof shapes in 3D

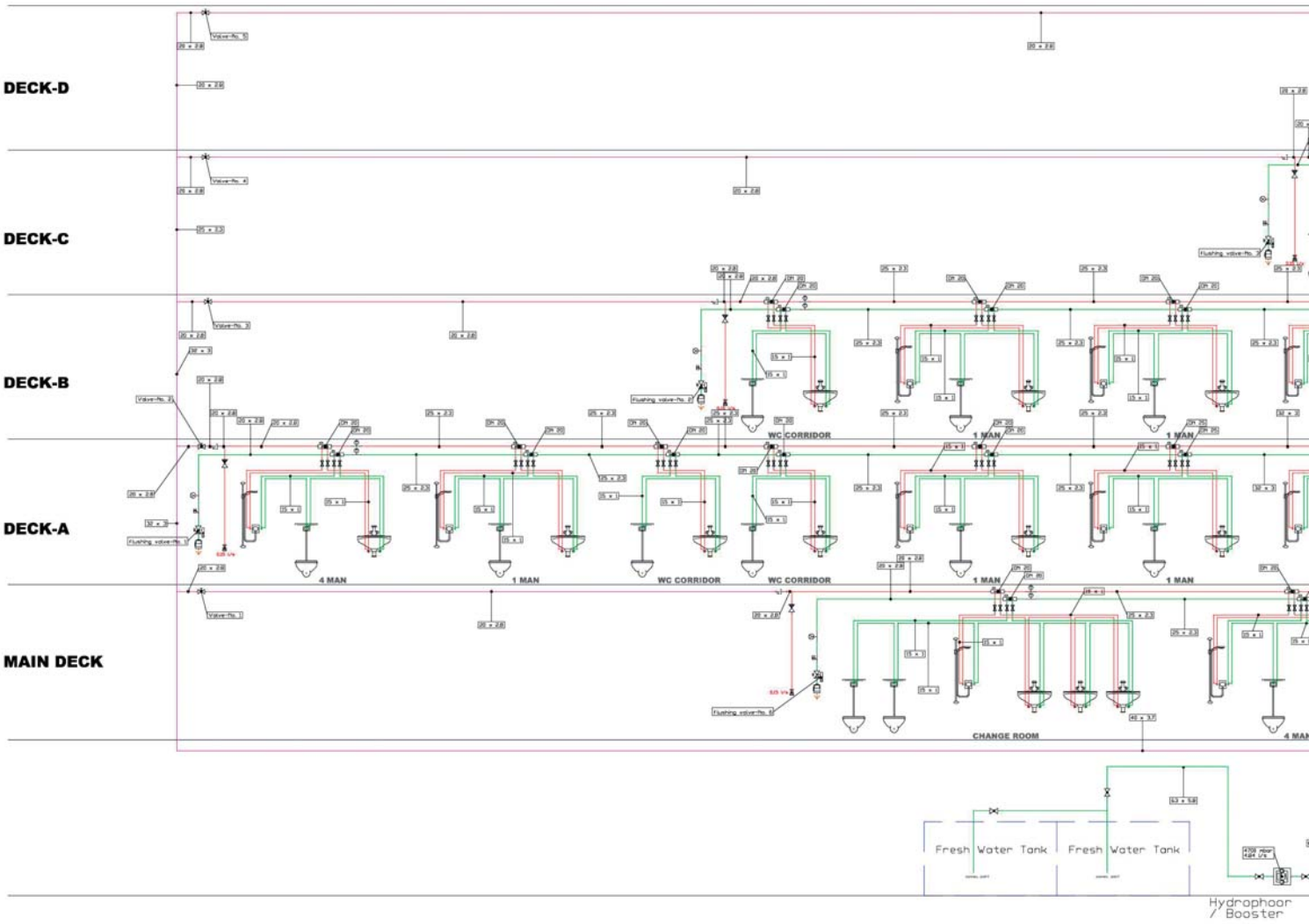
KEMPER Dendrit *STUDIO*

Innovative Software supports Planning with KHS

Example Potable Water Schematic

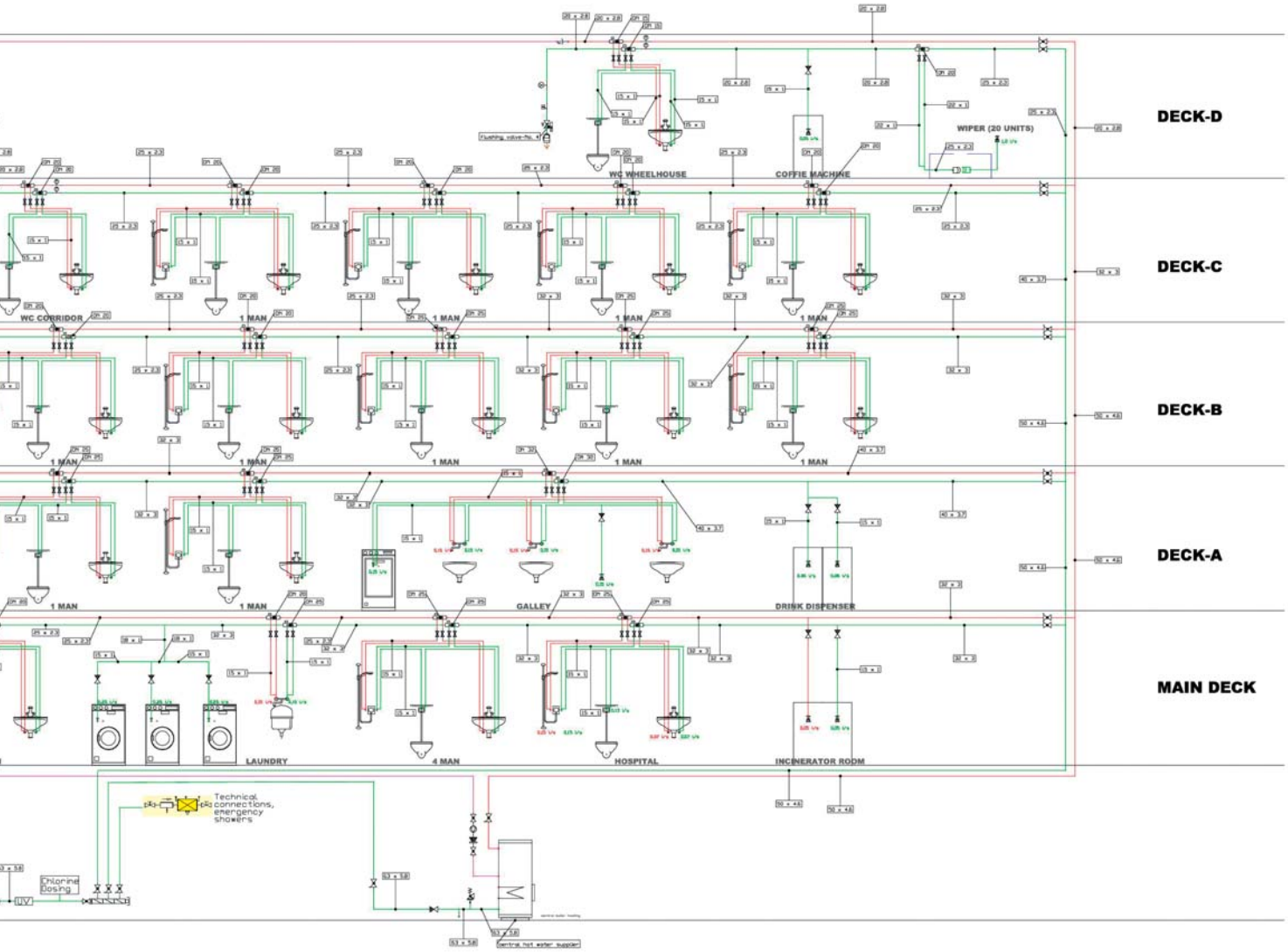
This is an example from a design made with the Dendrit software. In this design the three main aspects for a safe potable water system are taken into account.

First aspect is flow in the entire system. Each tappoint is connected by a flow splitter. This splitter provides flow in this pipe-sections, so the risks with stagnant water, are deceased to a minimum.
Beside of that; whatever your water treatment will be, on this way, your treatment will reach every part of the installation. The second issue is to keep hot water above the 55 degrees Celsius, in each part of the installation. With above combination from flow splitters and the right regulation valves per deck, the result is a stable temperature with an acceptable delta T.



The third and maybe most important item is to refresh the cold water on a, minimum, weekly basis and to control the cold water temperature. The KHS Master Control box can be configured to do scheduled water changes to refresh the whole potable water installation on that deck. Keeping the cold water temperature below 25 °C is a must and is integrated in this design.

Per deck we control the temperature by a PT1000 (sensor) and if the water temperature of the cold water is too high, the flush valve will perform a water change till the water has the right temperature gain. If a ship or rig works in warmer climates, the cold water can be installed as a circulation line over a small chiller, as well. One of the biggest advantages is that this will even work when the cabin or deck is unmanned!



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