Regulation Implementation

Implementation of drinking water microbiological analyses required by German law for those ships flying the German flag without access to a German port because of their remote area of operation

According to the German Drinking Water Regulations (Trinkwasser-Verordnung, TrinkwV), the operator of a drinking water system is required to perform regular quality tests of the drinking water.
The DIN 2001 Part 2 "Drinking water from small systems and mobile equipment" published in April 2009 goes beyond these regulations to include the responsibilities of the operator for the monitoring of a mobile drinking water system.
According to §14 of the TrinkwV, the water supply facilities in accordance with §3 section 2b (mobile systems) require at least the following microbiological parameters to be assessed:

Escherichia coli (*E. coli*) Threshold: 0 / 100 ml (Appendix 1, Part I)

Enterococci Threshold: 0 / 100 ml (Appendix 1, Part I)

Coliform bacteria Threshold: 0 / 100 ml (Appendix 1, Part I)

Colony count (CFU) at 22°C Threshold depends on
analysis method used (Appendix 4, Part I)

Colony count (CFU) at 36°C Threshold depends on
analysis method used (Appendix 4, Part I)

Also according to DIN 2001 Part 2, samples must be taken from taps and other water dispensing outlets for analysis of:

Pseudomonas aeruginosa No defined threshold / (DIN 2001 Part 2)
For levels > 0 / 100 ml,
Advice from presiding health authority must be obtained.

In addition to the German Drinking Water Regulations, which stipulate a general examination frequency of once per year (performed by the health authority), the DIN 2001 Part 2 stipulates appropriate inspection frequencies for:

☐ Watercraft providing less than 3 m³ water/day: examination once per year.

☐ Watercraft with their own water production: examination every 6 months.

☐ Watercraft providing more than 3 m³ water/day: examination every 3 months.

The German Drinking Water Regulations, §15 section 4, determine that only accredited laboratories may test the drinking water samples. The presiding Supreme State Department in each federal state publishes a list of accredited test laboratories.

Vessels flying the German flag that call at German ports are obliged to perform the statutory drinking water analysis in a German port using an accredited laboratory. In addition, the Port Health Authority is entitled to order or to undertake additional sampling at any time.

Since many vessels under the German flag never enter a German port because of their area of operations, analyses must be performed by a suitable foreign laboratory. An up-to-date list of suitable foreign laboratories cannot be guaranteed by any of the German federal states. For the selection of a suitable laboratory, the following information is to be applied: the laboratory abroad should be accredited for the analysis of drinking water samples according to ISO 17025 "General requirements for the competence of testing and calibration laboratories" according to local legislation for collection and analysis (for example, in Australia: AS / NZS ISO 17025:2005).

An international recognition agreement is now in force for the testing laboratories and accreditation bodies that have been amalgamated into the International Laboratory Accreditation Cooperation (ILAC). The German Accreditation Council (DAR) also provides a list of links to the respective national accreditation bodies on its website. A ship operator or agency only needs to contact the national accreditation body responsible for a particular port and the contact details of a suitable laboratory can be supplied.

The homepage of the ILAC can be found at: http://www.ilac.org
The homepage of the DAR can be found at: http://www.dar.bam.de/link/a.html
The taking of a sample can only be performed by a person authorized by the laboratory. The microbiological sampling must conform to DIN EN ISO 19458 and only a sterile container specially designed for microbiological analysis can be used. A drinking water sample taken by a crew member or in an unsuitable container cannot be used for analysis and is to be classified as contaminated.
The shipment of a drinking water sample to Germany from abroad is not permissible because the duration and conditions of the transport cannot be controlled.
To promote the adequate assessment of drinking water facilities on board, it is recommended in accordance with DIN EN ISO 19458 to consider the scope for which the testing is performed:
Scope a: quality of water in the main distribution system (the quality of tanks and of drinking water treatment and storage)
Scope b: quality of water in the local distribution system (influence of the ship's drinking water installations)
Scope c: quality of water in use and in consumption (influence of the complete drinking water installations, including the taps and dispensers)
and to select sampling points appropriately, see below for examples, but with the specific sampling points fully documented.

Sampling of tanks used for drinking water (scope a:)

☐ Selection of a sampling tap as close to the storage tank as possible (one flameresistant sampling tap must be installed directly on the tank. If this is not the case, the installation of a suitable sampling tap can be decreed by the appropriate health department)

- ☐ Remove any existing aerators and seals on the sampling tap
- ☐ Fully open and close the sampling tap several times
- ☐ Flame the tap with a gas burner
- ☐ Vent water until the temperature is stable
- ☐ Regulate the water flow to a medium rate
- ☐ Fill the sterile sample container to 5/6 full and close it gently

Sampling at the most distant tap from the storage tank (scope b)

- Selection of a suitably distant tap (e.g. wheelhouse wash-basin)
- Remove any existing aerators and seals on the sampling tap
- Perform mechanical cleaning of the tap if necessary
- Fully open and close the sampling tap several times
- Flame the tap with a gas burner
- Vent 2-3 liter of water
- Regulate the water flow to a medium rate
- Fill the sterile sample container to 5/6 full and close it gently
- **Sampling at a medically relevant tap (scope c)**
- Selection of a suitable tap in the medical area (e.g. washbasin in the first-aid room)
- Do **not** remove aerators and seals on the sampling tap
- Do **not** flame or disinfect the tap
- Do **not** vent any water, but immediately fill the sterile sample container to 5/6 full
- Close sample container gently
- Also analyse sample for *Pseudomonas aeruginosa*

DIN 2001 Part 2 specifies the additional investigation of the sampling point for the infectious agent *Pseudomonas aeruginosa*. Because infection with these pathogens can cause serious wound infections and other disorders, the taps in medical treatment rooms and hospital areas should be examined.
Where *Pseudomonas aeruginosa* has been identified, it is usually contamination of the aerator that is responsible, implying that due care and regular flushing, cleaning and disinfection of taps is necessary.

Sampling at a shower (cabin; related to scope c)

An investigation of hot or cold water for contamination with *Legionella sp.* should be carried out if the cold water temperature at the tap is above 25°C or if the hot water temperature at the tap is under 55°C or it is suspected that there are structural deficiencies in the water

system. When in doubt, at least two samples (cold and hot water) should be taken. A combined sample is not allowed because it cannot be interpreted.

- Selection of a suitable shower-head
- Do **not** remove the shower-hose or shower-head
- Do **not** flame or disinfect the shower-head
- First, take a **cold water sample**
- Run **the cold water** and discard maximally 1 liter of water, before filling the
- sterile sample container to 5/6 full
- Close sample container gently
- Immediately measure and record the water temperature
- Run the water for another 5 minutes then measure and record the water
- temperature again
- Second, take a **warm water sample**
- Run **the warm water** and discard maximally 1 liter of water, before filling the
- sterile sample container to 5/6 full
- Close sample container gently
- Immediately measure and record the water temperature
- Run the water for another 5 minutes then measure and record the water temperature again
- Sample also to be analysed for *Legionella sp*.

At least the following parameters must also be assessed on site and documented for each and every site where a sample is taken:

1. pH
2. water temperature in °C
3. concentration of free chlorine if water is chlorinated or a chlorine dispenser system is used (specify in ppm or mg/l)
4. conductivity: on-site if possible, otherwise a laboratory measurement (expressed in µS/cm)

The results of laboratory tests, description of sampling points and the determined on-site parameters must be documented and communicated as quickly as possible to the Port Health Authority of the port of registry.