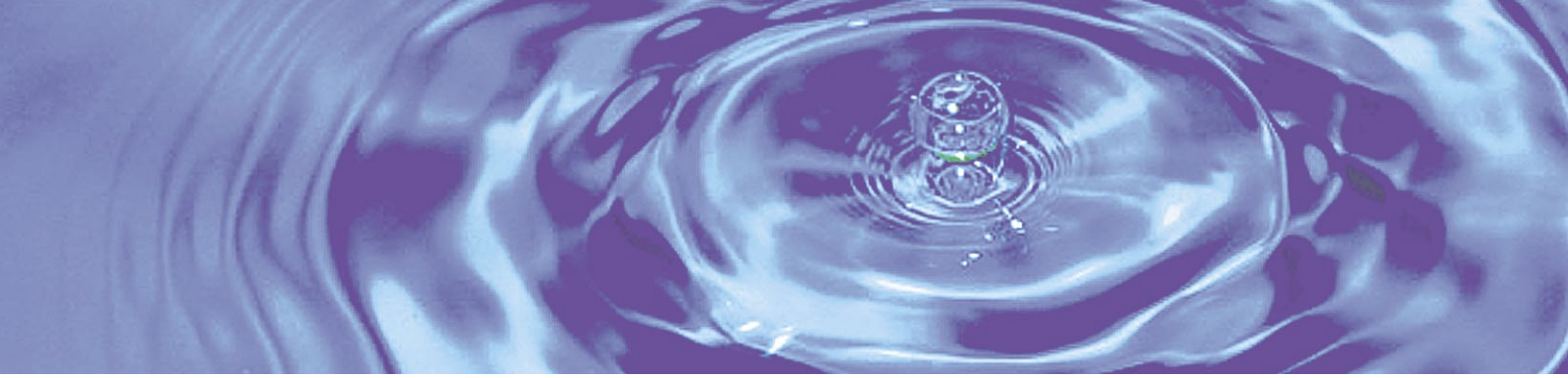

Legionella in Drinking Water Systems

- an issue that does not depend on the pipe material used!

*Results of an **ofi** study on the incidence of Legionella in existing pipe systems of various materials.*

*The Austrian Research Institute for Chemistry and Technology (**ofi**) investigated the influence of pipe materials on the occurrence of Legionella in established Austrian drinking water systems.*

The study

ofi scrutinized pipe systems in Austrian public buildings - hospitals, retirement homes and schools - for the incidence of Legionella. The study covered the period from November 2004 to June 2006. For the first time, such a study comprised not only potable water, but also the biofilm in the pipes.

A biofilm is a symbiosis of a variety of microorganisms and comes into being when bacteria attach to surfaces. Even perfectly hygienic potable water contains bacteria and the nutrients fuelling their growth. Bacteria attach to any kind of surface, which is why biofilms develop in all water-conveying systems, irrespective of the material used.

The result

The study made one thing obvious: the development of Legionella does not depend on the material used for the pipes. This means that in practice the pipe material does not demonstrably influence the incidence of Legionella.

The widely held assumption in connection with Legionella, that plastic pipes are disadvantageous compared to copper or other metal pipes could not be substantiated in this practically oriented study. Whenever Legionella were found in a building, they existed in pipes of all materials. It should be emphasised that only in a few individual cases the species *Legionella pneumophila*, the type of Legionella that can cause a difficult-to-treat type of pneumonia, was found.

Legionella of this kind were detected only in 5% out of a total of 188 water and biofilm samples.

Other species of Legionella were, however, more frequent (in pipes of all material types).

Legionella are a natural element in fresh water, even potable water can contain minor quantities of these bacteria. Since they multiply particularly fast at temperatures between 20°C and 50°C, hot and cold water supply systems have to meet high requirements.

Particular potential hazards are unfavourable environmental influences and faulty installation that could have been avoided through expert design and implementation of the supply systems.

The cognitions

Given these results, neither scaremongering nor playing down the Legionella topic is appropriate. The point at issue is rather to find measures to keep the Legionella risk as low as possible, irrespective of any disinfection procedures.

The following factors are particularly important in this context:

- temperature of hot and cold water
- water stagnation time within the drinking water system
- cleanliness during installation and start-up

What does this mean in practice?*

1) **Correct sizing of the pipes**
Guideline: „as small as possible, as large as necessary“. Pipes have to be sized according to the respective effective standards, without any unnecessary reserves or safety margins in order to provide hygienic flow rates and sufficient replacement of water in the drinking-water pipes. Particular attention should be paid to water circulation.

2) **Insulation of pipes in the riser shafts**
Should it be impossible to divide hot and cold water pipes to form separate shafts, sufficient insulation of hot and cold water pipes is absolutely necessary. The water temperature in the cold-water pipe should not exceed 20°C.

3) **Separation of rarely used outlets from the central water-heating unit**
In order to prevent water form remaining stagnant in the pipe for long periods, the use of de-centralised water heaters is advisable for rarely used outlets.

4) **Avoidance of dead leg pipes**
Separate any shutdown pipe sections from the hot/cold water system.

5) Ensure **cleanliness** of the system components at the time of delivery, storage and installation.

6) **Installation of test elements**
It is advisable to install several test elements at easily accessible points of the system. The facilitate subsequent checking and evaluation of the bio film development.

7) **Pressure testing**
Drinking water systems which are not put into operation immediately after their installation should be checked for leaks with oil-free compressed air on nitrogen. The presssure test with absolutely hygienic potable water should be carried out immediately before putting the system into service.

8) **Rinsing and start-up**
During start-up the entire drinking-water network has to be thoroughly rinsed with absolutely hygienic drinking water. Furthermore, a sample of the drinking water should be taken from the service line for analysis.

9) **Exact system documentation**
Record not only the original drawings, but also any layout modification, additional shut-off devices or control fittings, as well as pressure tests, rinsing procedures and temperature levels.

10) **Pay attention to the certification of the pipe system**
Only plastic pipe systems are subject to the ÖVGV certification procedure and strictly tested with regard to their suitability for conveying hygienic potable water (e.g. microbiological growth).

* **Also read the ÖNORM standard B5019 „Hygienic aspects of planning, construction, operation, maintenance, surveillance and rehabilitation of central heating installations for drinking water“ (provisional version).**

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