



Hygiene is the top priority when testing drinking water quality for Legionnaire's disease

For German hospitals, nursing homes, public swimming pools and other public institutions strong criteria apply for hygiene and a germ-free drinking water supply.

Therefore regular **water analysis** by a certified **laboratory** of **drinking water** for **Legionnaire's disease** is prescribed. A part of the water samples taken in the Nuremberg conurbation arrive at the team led by Peter Daum in the Municipal Water Treatment and Environmental Analysis **Laboratory** Nuremberg, Germany.

Regular water analysis against Legionnaire's disease

In 1999 the Environmental Analysis **Laboratory** Nuremberg put into operation the first Memmert **CO₂ incubator** for growing **legionellae** in order to test **water quality**. Almost 10 years later it was joined by an appliance of the latest **INCO** generation – and with good reason. With the increased awareness of the danger of these bacteria in warmed up **drinking water**, with which humans come into



Strong criteria regarding water quality and hygiene apply to warm water supply and drinking water supply in public swimming

trained up drinking water, that when humans come into contact through drinking, bathing, showering or for medical applications, the number of samples taken and tested has also increased. Coming into contact with the bacteria is not in itself dangerous; it is rather the breathing in of droplets of water, or aerosols, containing the bacteria, into the lungs that can lead to the life-threatening **Legionnaire's disease**. **Legionellae** prefer water temperatures between 25 °C and 45 °C and prosper in quiet places where there is no movement and turbulence. Numerous types can be found everywhere in natural lakes and rivers and get into the **drinking water supply** through ground water, but it is only our rising standard of living that has turned Legionella pneumophila in particular, which is responsible for an estimated 90% of all cases of **Legionnaire's disease**, into a worldwide hazard. Because where **hygiene** standards are poor, or where there are structural flaws in technical systems for the supply of warm water, it can find ideal conditions to propagate. **Legionnaire's disease**, a form of pneumonia, is therefore a genuine disease of affluence, the name of which goes back to an epidemic in 1976 in which 182 former American soldiers were taken ill, of whom 29 died.

pools, nursing homes and hospitals

Absolutely germ-free: sterilization of CO₂ incubator protects employees and samples

Benedikt Schaefer from the German Federal Environmental Office in Bad Elster, a proven expert on **drinking water** and a member of the Water Standards Committee, points out the need for extremely careful **hygiene** measures during the **legionellae** tests. Two reasons are crucial for this recommendation: The health of employees should not be exposed to even the slightest risk of contaminated aerosols, at the same time the sample quality is ensured over the long incubation period of up to 10 days. Help in the form of being absolutely **germ-free** can only be provided in this situation by **sterilization**. The chamber of the **CO₂ incubator**, including the ventilation system, the water trays and all the sensors, can be sterilised in a 4-hour programme at 160 °C. The infra-red sensor for the CO₂ measurement was designed by the engineers specially so that it can withstand these high temperatures without problem, and is thus sterilised.

100% quality control across the entire process

About one thousand water samples reach the Environmental Analysis **Laboratory** Nuremberg every year. An estimated 25% of these contain **legionellae**, whereby the DVGW spreadsheet W551, in which the procedure for taking samples is regulated, only suggests, outside high-risk

areas in **hospitals**, that the test intervals should be more frequent if the **legionellae** concentration is more than 100 CFU (colony-forming units) per 100ml, and stipulates further measures and tests only when the concentration is more than 1000 CFU. For 7 to 10 days the samples are incubated at 36 °C (± 2 °C), 2.5 % CO₂ and 95% relative humidity. Once samples have been taken, they can no longer be reproduced, of course, and for this reason the safety and reliability of the appliances is the highest priority. In the nine years in which the **CO₂ incubator** has been running for Peter Daum and his team, almost non-stop, there has not been a single breakdown, and the test of temperature precision, performed twice a year by the internal quality assurance team, always yielded optimal values.

Not only sterile, but also 100% safe

All Memmert **CO₂ incubators** have an acoustic alarm, and this clearly audible warning signal is set off if the door is opened for too long or if there is a failure of the central supply, such as CO₂ gas, power supply, etc. One of the numerous safety functions allowing the employees in Nuremberg to quietly concentrate on their work. Just like the clear presentation of the current states for humidity and temperature in the display, which continuously shows the correct progression of the incubation in the **laboratory** – down to the level of the water container. To ensure that the samples do not dry out, the electronic control of the INCO regulates not only temperature and CO₂ content, but also the relative humidity. Ideally the humidity content in the chamber should always be between 90% and 95% relative humidity.

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