

Experts confirm: Ultrasonic humidifiers are perfectly hygienic in operation

Those who suspect ultrasonic humidifiers of being unhygienic and expensive can now finally lay their suspicions to rest. Expert reports confirm that when ultrasonic humidifiers are properly installed and maintained, they pose no risk to hygiene. And although they cost more than steam humidifiers, low running costs mean that they pay for themselves after just two years, at the latest.

For many decades, ultrasonic humidifiers have been used with great success to regulate humidity in rooms with maximum precision and simultaneously low running costs. However, at the same time, they are repeatedly accused of being unhygienic because, unlike in steam humidifiers, the water is not heated to 100°C. Yet these high temperatures alone are no guarantee of freedom from bacteria. Now, an expert report from the Hamburger hygiene laboratory Dr. Brill + Partner GmbH refutes this allegation: the multiplication of germs in the water tank of ultrasonic humidifiers, with an associated risk to hygiene, is extremely improbable.

STULZ UltraSonic put to the hygiene test: Effect of ultrasound actually reduces the number of bacteria

The STULZ UltraSonic SCA2000X ultrasonic atomiser was put to the test. With its UltraSonic systems, STULZ Klimatechnik GmbH leads the German market for ultrasonic humidifiers. The Hamburg-based air-conditioning experts have included this type of air humidifier in their portfolio for 25 years. In a model test, the hygiene laboratory Dr. Brill + Partner examined whether the bacterial count in the water of the humidifier and in the humidified air changed while the device was in operation. Water samples were taken throughout the test period.

And the result is that the viable count of bacteria did not increase, but was in fact reduced – by 65 % in the water and by around 90 % in the air. The report states that “due to the effect of the ultrasound, and because the replenishing flow of demineralised water brings in scarcely any bacteria, the number of bacteria was reduced during the test”.

Water must not remain in the tank too long

For ultrasonic humidifiers to work hygienically, according to hygienists, the following is crucial for operation of the system: before the water reaches the humidifier, it should be demineralised through a process of reverse osmosis, and disinfected by UV light. Water must not be allowed to remain in pipes or in the humidifier for long periods. The water tank must be automatically drained at regular intervals and during longer periods without operation.

If these points are complied with, the system naturally also satisfies the specifications of VDI 6022 Sheet 1.

Then, ultrasonic devices and the STULZ “UltraWater” reverse osmosis system satisfy all hygienic requirements. A safety valve opens automatically after 24 hours without operation, thereby preventing the water from remaining in the UltraSonic humidifier for longer periods, and the STULZ UltraWater reverse osmosis system supplies demineralised, UV light-disinfected water.

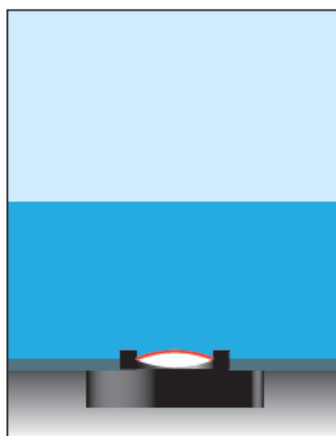
Installation and maintenance are vital for hygiene

According to the report, regular maintenance and service work is another prerequisite for the hygienic operation of all types of air humidifier. What is important is correct installation and checking of the entire system, including ducts and other components. Expert Dr. Holger Brill explains: “In the matter of hygiene, we have to think in terms of systems, not just of the humidifier on its own. Even the best humidifier brings no benefit if the system is incorrectly installed.” And STULZ knows this better than anyone: “We train our sales partners and fitters, who install our devices, on proper use, so that hygienic operation is guaranteed,” says head of Product Management, Markus Trautwein.

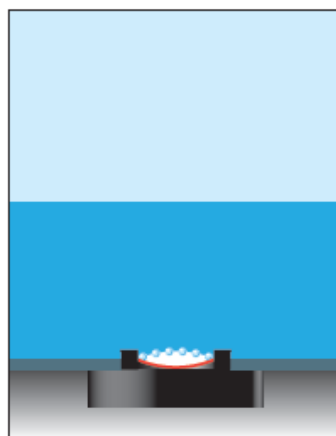
Ultrasonic humidifiers reduce electricity costs by up to 93 %

Many industrial enterprises and branches of industry are reliant upon air with constant moisture values. Humidifiers are used in hospitals and laboratories, print works and manufacturers of electronics, warehouses and fresh food counters. Users are increasingly switching to ultrasonic humidifiers for reasons of efficiency. The purchase cost may be higher than that of steam humidifiers, but ultrasonic atomisers are more cost-efficient in operation. They need less energy because they do not heat the water to 100 degrees, but use mechanical atomisation instead.

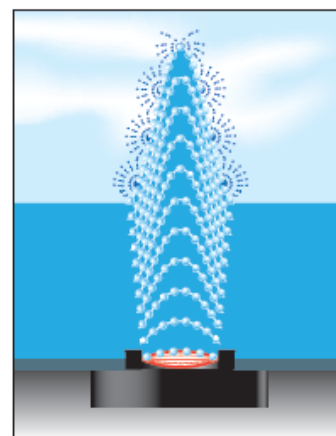
In this way, up to 93 % of electricity costs can be saved. “In addition, ultrasonic humidifiers require less maintenance. They only need to be checked once a year,” explains Trautwein. With steam humidifiers, on the other hand, the steam cylinders need to be replaced every two to three months because of chalk deposits. All these advantages concerning maintenance mean that investment in an ultrasonic atomiser is paid off after two years, at the latest.



The humidifier is switched on. The oscillator amplitude is positive.



The oscillator amplitude is negative. The inertia of the water creates a vacuum.



After approx. 10 amplitudes, the ultrasonic humidifier reaches 100 % of its output.

Info box

The advantages of ultrasonic humidifiers at a glance

- Low energy consumption: Ultrasonic humidifiers consume up to 93 % less electricity than steam humidifiers with the same output.
- Hygienic operation: Ultrasound has a cleaning effect, and the use of demineralised water prevents the build-up of deposits.
- Immediate availability: Once the device is switched on, full humidifier output is available without delay.
- Simultaneous cooling: With the ultrasound method, evaporation of the water simultaneously cools the room air. This allows the output of the air-conditioning system to be reduced.
- Very fine mist: The water particles have an average size of just 0.001 millimetres. This mist is absorbed by the air straight away.
- Long service life: If high-quality stainless steel or plastic is used, as is the case with STULZ, ultrasonic humidifiers have a long service life.
- Minimal maintenance: Ultrasonic humidifiers require less maintenance than their steam counterparts, because they use demineralised water and do not calcify.
- Rapid ROI: Due to their far lower running costs, ultrasonic humidifiers achieve a return on investment after two years at the latest, even though they cost more to purchase than steam versions.

Info box

Ultrasound generates the tiniest droplets

The ultrasound principle is simple and effective: in an ultrasonic humidifier, electrical energy is converted into mechanical energy with the aid of an oscillator. Due to inertia, the oscillator on the floor of the water tank produces a column of water above itself when switched on. Furthermore, cavitation gives rise to bubbles that are “catapulted” to the edge of this water column. There, they impact with one another and are atomised at the edge of the water column in an especially fine mist. Due to their tiny diameter of just 0.001 mm, these droplets can be absorbed especially quickly by the air.

Interview

“Taking a shower is more dangerous than breathing in air humidified by ultrasound”

Dr. Holger Brill from the Dr. Brill + Partner hygiene laboratory about the hygienic operation of air humidifiers

Are ultrasonic humidifiers unhygienic?

Brill: This is not the case with UltraSonic humidifiers from STULZ, at any rate. In the device that we tested, conditions neither encourage the multiplication of bacteria in the water tank nor result in major microbiological changes to the air quality. However, ultrasonic devices, like all other humidifiers, must be properly installed and maintained, if they are truly to work hygienically.

Are steam humidifiers better than ultrasonic devices from a hygiene point of view?

Brill: No. Ultrasonic humidifiers from STULZ have very good hygiene characteristics. This is partly due to the fact that ultrasonic humidifiers make use of demineralised reverse osmosis water, disinfected by UV light. Thanks to the process of reverse osmosis, this is virtually free from bacteria.

All humidifiers, whether ultrasonic or steam, can become unhygienic as the result of incorrect installation or maintenance. With steam humidifiers, the belief that “it heats, so everything’s OK” leads people to throw caution to the wind. What’s more, bacteria that are killed by heating in the steam cylinder are conveyed along with the steam and enter the duct system or air filter. There, they form a “biomass” that provides a source of nutrition for other bacteria or fungi that enter via the ambient air. Therefore, the same applies to humidifying systems as to humans: prevention is better than cure. So, with humidification it is better to prevent a build-up of bacteria in the water than trying to get rid of it later on.

Is the water quality in Germany harmful from a hygienic perspective?

Brill: No, not at all. The quality of the tap water in Central Europe is the best in the world. Cases where someone has become ill due to tap water are almost non-existent. The risk of legionella getting into a humidifier is extremely minimal – especially as cold tap water is used, and legionella multiply in warm water.