Up to 50% of the hot water consumption can be reduced by installing energy and water saving showers and water taps. However, some people avoid buying water saving showers or aerators due to rumours saying that these products can spread Legionella. We have carried out a survey and did not find research confirming this theory.

One of the researchers that know most about Legionella is professor, Ph.D. Y. Eason Lin. He has graduated from the Department of Civil and Environmental Engineering, University of Pittsburgh. He is currently an assistant professor at the Graduate Institute of Environmental Education, National Kaohsiung Normal University, Taiwan. He was a research assistant professor at Division of Infectious Disease, Department of Medicine, University of Pittsburgh. His professional expertise is in the area of disinfection of emerging waterborne pathogens, including Legionella and Mycobacterium avium, from hospital and residential water distribution systems. He has produced numerous journal articles and conference presentations on Legionella disinfection modalities. Dr. Y. Eason Lin has answered some questions about Legionella as follows:

1. What organism causes Legionnaires’ disease?
“Legionnaires’ disease is caused by bacteria that belong to the family Legionellaceae. Legionella species are small (0.3 – 0.9 µm in width and approximately 2 µm in length) faintly staining Gram-negative rods with polar flagella (except L. oakridgensis).”

2. How do people contract Legionella?
“The most popular theory is that the organism is aerosolized in water and people inhale the droplets containing Legionella. However, new evidence suggests that another way of contracting Legionella is more common. “Aspiration” is the most common way that bacteria enter into the lungs to cause pneumonia. Aspiration means choking such that secretions in the mouth get past the choking reflexes and instead of going into the esophagus and stomach, mistakenly, enter the lung. The protective mechanisms to prevent aspiration are defective in patients who smoke or have lung disease. Aspiration now appears to be the most common mode of transmission. Legionella can also enter by inhalation of aerosols, although we believe that this mode of transmission is overemphasized.”

3. Can Legionella be transmitted via showers?
“Showers are not important disseminators for Legionella. Our view has credibility since Dr. Victor L. Yu was a co-author of the article published in the Annals of Internal Medicine 1981 that suggested Legionella might be transmitted via showers. Subsequent case-control studies showed our original conclusion was erroneous, although no retraction has ever been published. Subsequent studies from Belgium, Netherlands, University of Virginia, Wadsworth VA Medical Center, University of Iowa, Lackland Air Force Base, University of Pittsburgh, and University of Arizona also showed this conclusion was erroneous. The article by Sabria in Lancet Infectious Disease 2002 on the Home Page gives an overview of the studies. Studies also show that disinfection of showerheads by chemicals or cleaning is ineffective long term given the fact that Legionella recolonizes the showerheads from existing biofilms in the pipes of the plumbing system.”
Facts about *ELLESS®* water saving showers

As stated by Dr- Y. Eason Lin above, the Legionella species are between 0,3 and 0,9 µm = 0,003 – 0,009 mm in width and approximately 2 µm = 0,002 mm in length. Legionella is transported in water and is not dangerous if it is swallowed. If water already infected with Legionella enters the lungs, it can develop lung disease particularly if the person’s immune system is weak.

**To people with weak immune systems, we would like to give the following advice:**

If the shower hasn’t been used for a couple of days, hold it close to and point it towards the floor and let the water flow for a couple of minutes. Try to keep away during this time. Than ventilate the bathroom.

Only very small water drops, aerosols, that are at least 5 µm = 0,005 mm and up to maximum 20 µm = 0,020 mm, are possible to inhale. If the aerosols are smaller than 5 µm, then the Legionella species are too heavy and the aerosols cannot transport them. Consequently only aerosols of a certain size are Legionella carriers.

Aerosols are produced when water is pushed through the shower strainer. Thus, all showers produce aerosols. To reach a level of almost zero aerosols, one would have to shower by simply using the hose alone, or even avoid showering at all. The *ELLESS®* water saving showers do **not** produce more aerosols than other traditional showers. On the contrary, maybe even less.

The *ELLESS®* water saving showers have big holes in order to reduce the risk of too small aerosols that can be inhaled. The water drops coming out from the *ELLESS®* showerhead holes are of 800 µm = 0,80 mm and expand to a bigger size as they fall.
How to avoid Legionella

--- Keep the hot water hot and the cold water cold
At 20°C the bacteria are dormant and do not multiply. Between 20°C and 45°C they multiply and they thrive at around 38°C. The most effective remedy against Legionella is to keep the cold water cold and the hot water hot, above 55°C.

-- Keep the water temperature high in the system
In calorifiers and other containers where hot water is stationary, the temperature should not be less than 60°C.

- Let the shower water run
Let the shower water run freely with hot water – stay away the first five minutes – if the shower hasn’t been used for a while (for example showers in holiday houses, camping sites or when you have been away from the house).

More information about Legionella available on: www.legionella.org