EXPANSION VESSELS CAN REDUCE LEGIONELLA RISK

With recorded cases of legionella on the increase, *Gary Wilde*, BPMA Technical Services Officer, looks at the role expansion vessels can play in minimising the risk of bacterial infection in water systems.

Health and Safety Executive (HSE) guidance, HSG274 Part2: 2014, has identified expansion tanks as a potential legionella risk due to low water flows or stagnation issues in hot and cold-water systems.

There are a number of different types of expansion vessels on the market ranging from diaphragm, bladder or flow through versions. Most are made with EPDM (ethylene propylene diene monomer), a type of synthetic rubber. These materials can encourage the growth of micro-organisms including legionella unless approved against BS 6920: 2014.

Two of the methods used to minimise the risk of legionella are keeping water flowing and avoiding or minimising any dead legs within a system.

Under the HSE's approved code of practice, L8, 'designers, manufacturers, importers, suppliers and installers of water systems that may create a risk of exposure to legionella bacteria must ensure, so far as is reasonably practicable, that the water system is so designed and constructed that it will be safe and without risk to health when used at work.' Also, adequate information about the risk and measures necessary to ensure that the water systems will be safe and without risk must be provided to the user.

Legionellosis is a collective term for diseases caused by the legionella bacteria, including the most serious legionnaires' disease, as well as the similar but less serious conditions of Pontiac fever. Legionnaires' disease is normally contracted by inhaling small droplets of water containing the bacteria which are suspended in the air.

Legionella requires certain conditions which include warm water between 20 and 45°C, (the bacteria do not survive above 60°C) low flow or stagnant water and deposits being present that can support bacterial growth, this may include organic matter, sludge, rust, sediment, or scale.

According to the latest data supplied by Public Health England, the number of confirmed cases of legionnaires' disease since 1 January 2019 is 311 and is on the increase.

Commenting on the risk, Duncan Smith, HM Principal Specialist Inspector, said: "Designers and installers must ensure that the water systems they provide are safe and without risks to health. Some types of expansion vessels can be a source of water stagnation, increasing the risk of legionella bacteria growth. Increased awareness of these risks will assist designers and installers to make informed product selections that reduce the risks to the service users and also to discharge their own legal duties under the Health and Safety at Work Act 1974."

So, what is an expansion vessel? An expansion vessel, or tank, is a pressurised container that normally incorporates a replaceable bladder or fixed diaphragm in its design. It is installed in heating, cooling, boosted water, and solar heating systems. They can also be referred to as pressure vessels and hydraulic accumulators and can be found in many commercial and industrial buildings.

Under HSE (HSG274 Part 2), if you operate a business you have a legal responsibility to identify potential risks in the workplace and minimise risks to protect staff and the public. There are two options available to reduce water stagnation within the vessels, these are flow through valves or flow through vessels.

A flow through valve works by circulating a portion of the flow back into the vessel when there is demand on the system and the vessel is depleted of water. The internal design of the vessel encourages circulation within it, to prevent water stagnation, so, it is also advisable to install a specially designed vessel which aids correct circulation when fitting these valves.

> *"The number of confirmed cases of legionnaires' disease since 1 January 2019 is 311 and, on the increase."*

Flow through vessels are designed in a similar way to potable vessels and they allow a larger proportion of water through. But they have a higher cost because of the additional construction.

Expansion vessels should be mounted as close to the incoming water supply as possible and in cool areas on cold flowing pipes. They should be installed vertically on pipework to minimise any trapping of debris and fitted with an isolation valve and drain valve to aid flushing and sampling.

The vessels should be flushed through and purged, and bladders should be changed, according to the manufacturers guidelines or as indicated by a risk assessment. Also, instead of air, nitrogen should be used when topping up the pressure as this improves the lifespan and permeates through the membrane at a slower rate than oxygen. Nitrogen is also a dry Inert gas so it will not lead to corrosion from inside-out.