Labour

# HAZARD ALERT

## Legionella in heating, ventilation and air conditioning systems

### Background

Many workplaces under federal jurisdiction use water-cooled industrial and commercial air conditioners. The water contained in these units and in the cooling towers can contain *Legionella* bacteria and is an environment where these bacteria can grow under certain conditions. *Legionella* bacteria grows best at warm temperatures: it grows vigorously between 25°C and 45°C; temperatures above 60°C kill it. The bacteria can be transmitted to people through inhaled water droplets.

Legionnaires' disease is a severe form of pneumonia or lung inflammation usually caused by the *Legionella* bacterium. Most people get Legionnaires' disease from inhaling the bacteria. The most susceptible people are the elderly, smokers, and those with weakened immune systems. The disease cannot be transmitted from one person to another. The most common symptoms include: fever, chills and a cough. Some people may also have a muscle aches, headaches, tiredness, loss of appetite, loss of coordination, chest pain, or diarrhea and vomiting.

For more information on *Legionella* bacteria and its associated infections, please visit the Public Health Agency of Canada website.

### Hazards

Factors that can lead to an exposure to *Legionella* from a Heating, Ventilation and Air Conditioning (HVAC) system cooling tower include:

- Not following the manufacturer's instructions for use and maintenance of cooling towers and air conditioners;
- Inadequate work place procedures for using, maintaining, inspecting, and servicing the HVAC system.

### Eliminating and controlling the hazard

The most effective way to prevent excessive *Legionella* growth in the water of HVAC evaporative cooling towers is proper maintenance of the water coolant systems, especially during spring and summer. This includes testing on a regular basis of the cooling tower water, and the use of disinfectants. To avoid possible exposure, it is recommended that every person taking water samples for analysis wear respiratory protection, as per the CSA Z94.4 Selection use, and care of respirators standard requirements.

### Regulatory requirements

The Canada Occupational Health and Safety Regulations (COHSR), Part II, Division III entitled 'HVAC Systems' contains requirements in respect of HVAC systems, such as standards, records, operation, inspection, cleaning, testing, maintenance, and investigations.

Some highlights include:

- Instructions for operation, inspection, testing, cleaning and maintenance of HVAC systems must be written and reviewed by a qualified person who shall take into account CSA Guideline Z204-94, entitled Guideline for Managing Air Quality in Office Buildings, dated June 1994.

- The employer must then appoint a qualified person to put the instructions into action and to complete a written report about each inspection, cleaning, testing, and maintenance event.
- Employers must have a qualified person develop an investigation procedure for events where a worker's health or safety may be harmed by the air quality, such as an exposure to *Legionella*.
- The qualified person shall take into account the Health Canada publication 93-EHD-166, Indoor Air Quality in Office Buildings: A Technical Guide when writing an investigation procedure.

## Additional resources

It is also recommended that the qualified person consult the following publications:


- American Society of Heating, Refrigeration and Air-conditioning Engineer (ASHRAE), *Prevention of Legionellosis Associated with Building Water Systems*. BSR/ASHRAE Standard 188P, Third Public Review, January 2013
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), *Minimizing the Risk of Legionellosis Associated with Building Water Systems*. ASHRAE Guideline 12-2000, February 2000.
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Atlanta, GA (404-636-8400). *Legionellosis Position Paper*, 1998.
- Cooling Technology Institute, Legionellosis Guideline: Best Practices for Control of *Legionella* (CTI Guidelines WTP-148), July 2008
- Flanders, W.D., Morris, G.K. and Shelton, B.G. (1994). *Legionnaires' Disease Outbreaks and Cooling Towers with Amplified Legionella Concentrations*. Current Microbiology 28, 359-363.
- Millar, J.D., Morris, G.K. and Shelton, B.G. (1997) *Legionnaires' Disease: Seeking Effective Prevention.* ASHRAE Journal, 22-29
- OSHA Technical Manual, Section III, *Chapter 7: Legionnaires' Disease.* Occupational Safety and Health Administration, Department of Labor, Washington, D.C.
- *Legionella* 2003: An update and statements published by the Association of Water Technologies (AWT)


**Additional web-based resources include:**

- United States Environnemental Protection Agency (EPA) - *Legionella*
- HC Info
- United States Department of Labor - Occupational Safety and Health Administration
- Centers for Disease Control and Prevention (CDC)
- American Society of Heating and Air-Conditioning Engineers (ASHAE)
- Cooling Technology Institute (CTI)
- Legionella.org

For further information, please contact the ESDC Labour Program office at 1-800-641-4049. The Labour Program website provides information on occupational health and safety topics such as: Right to Know, Right to refuse dangerous work, and Health and Safety Committees.

The Canadian Centre for Occupational Health and Safety provides more information on Legionnaires' disease on their website.