

Once-Through Cooling

FREQUENTLY ASKED QUESTIONS

Capital Regional District | 2019



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At a glance

Recent changes to the Province of British Columbia *Building Act* have affected CRD's *Water Conservation Bylaw* (Bylaw 4099).

Due to these changes the bylaw is being amended to rescind the sections that relate to the Once-Through Cooling (OTC) ban.

Businesses that voluntarily replace their OTC equipment will benefit through water savings.

1. What is once-through cooling (OTC) equipment?

Once-through cooling (OTC) technology (also known as single-pass cooling systems) are systems that use clean potable water from a municipal source for the purpose of removing heat before discharging the water directly to the sewer.

Typical examples of OTC equipment may include:

- Refrigeration compressor units for walk-in coolers and freezers
- Ice-making machines
- Wok stoves
- Server room cooling systems
- Air conditioners
- Heat pumps
- X-ray machines
- Hydraulic equipment
- Degreasers
- Welding equipment
- Other industrial or laboratory type equipment

2. What kinds of businesses use OTC equipment?

OTC equipment can be found in a wide variety of businesses.

Typically, it's found in:

- Restaurants and bars
- Food wholesale/retail/processing facilities
- Universities, colleges, and schools
- Hotels and motels
- Office buildings
- Medical facilities
- Laboratories
- Industrial facilities
- Other industrial, commercial or institutional facilities.

3. What does it cost to replace OTC equipment with air-cooled equipment?

The actual cost to replace OTC equipment in a restaurant or food service facility can vary widely depending on numbers, sizes and types of OTC systems currently operating, and conditions that may prevent or complicate direct replacement with equivalent air-cooled systems.

For example, remote air-cooled condensers (outdoor) are more expensive than those located inside the building; similarly, heat loading affects costs (walk-in coolers are less expensive to cool than walk-in freezers); also, the complexity of the system affects cost (chilled-loop systems are considerably more expensive than straight air-cooled condensers).

A simple replacement, where no additional engineering work is required, of an OTC unit in a restaurant with an equivalent air-cooled unit (located inside the building) can cost between \$3,000—\$5,000 dollars. The average payback period for a straightforward replacement of a 1-tonne OTC refrigeration-condensing unit with an air-cooled equivalent is approximately two years. The water bill savings then continue each year for the lifetime of the equipment (approximately 15 years).

For buildings with multiple OTC systems, combining a recirculating system with a heat exchanger to preheat domestic hot water will significantly reduce the payback period due to the additional energy bill savings.

4. How much water does an OTC unit use and how much is that in water utility costs?

A typical small-medium OTC unit (1 ton, 12,000 BTU/hour, roughly 1 hp), with no maintenance issues uses approximately 6L/minute for an average of \$5,000/year. These would typically run about 12 hours per day, which adds up to approximately 1,600 cubic meters per year per unit (enough to fill half an Olympic-sized swimming pool). By switching to an air-cooled unit, a facility can save about \$3.14 per cubic meter (CRD water rate + CRD sewer rate) of water saved for a total annual savings of approximately \$5,000.

5. Would switching to air increase energy costs?

While replacing a single air-cooled condenser with a similarly sized water-cooled condenser would cause a marginal increase in energy use, the water utility cost savings vastly outweigh the slight increase. In fact, ice-machines with the Energy Star seal of approval are all air-cooled and are also more energy efficient than similar water-cooled machines.

6. We've got so much water, why do we need to save it?

While the reservoir may fill up quickly during rainy periods, drinking water usage doubles in the summer—primarily due to more intensive irrigation demands with lawn and garden watering. Population growth and increasing per-capita water consumption will eventually require expansion of our water supply system. Costly expansion can only be deferred through ongoing water conservation.

7. What is the CRD's plan for phasing out OTC equipment?

CRD staff continue to work with the refrigeration and air conditioning industry and business using OTC equipment to address concerns, and strategize ways of transitioning from OTC equipment to air-cooled or re-circulating equipment. CRD staff will provide business sectors with informational resources and water use estimates including voluntary water audits.

8. I heard there was a rebate for replacing this equipment. Is this rebate still available?

The CRD is no longer offering rebates for replacement of OTC equipment. The CRD offered rebate incentives from 2007 to 2014, issuing businesses over \$260,000 in rebates to help replace over 200 OTC units with air-cooled units.

9. What do I do with my OTC equipment once it is decommissioned?

De-commissioned OTC equipment may be disposed of at scrap metal recycling facilities within the region. In many cases, the service providers doing the replacing or retrofitting will take care of this, as they are obligated by code to provide decommissioning services when installing a new unit.

All refrigeration units are required to be decommissioned by law, *Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* (CEPA 1999), before being sent to a scrap metal recycling yard (metal recycling depots will take them once decommissioned). Professionally decommissioned units will be tagged and have paperwork as proof of decommissioning. This will need to accompany the unit when dropping off. Most scrap metal recycling yards can also provide this service for a fee.

As of February 2017, the following depots accept OTC units:

- **Ellice Recycling Ltd.** (524 David Street, Victoria, BC); 250.386.4342 or www.ellicerecycle.com
- **Schnitzer Steel Industries Inc.** (307 David Street, Victoria, BC); 250.381.5865 or www.schnitzersteel.com
- **Hartland Landfill** (1 Hartland Avenue, Victoria, BC); 250.360.3030 or www.crd.bc.ca/hartland
- **A&P Garbage Disposal & Recycling** (6220 Marilyn Road, Sooke, BC); 250.642.4456 or www.aandpdisposal.com

10. How many OTC units are there in Victoria?

It's estimated that there are still over 200 OTC units in operation, however this number is based on industry consultation done in 2007 and has not been verified. CRD staff are frequently discovering new OTC units in operation through other programs inspections.

11. My OTC unit is in a small space with limited ventilation. How will other technologies address space restrictions?

An air-cooled unit requires ample cool air in order to operate effectively. Small, confined spaces particularly close to hot kitchens can cause excessive strain on an air-cooled system.

If your existing OTC unit is in a confined space, potential solutions include:

- Improved ventilation to enable direct replacement with air-cooled equipment
- Relocating the heat pump to a suitable location with adequate ventilation within the building
- Installing a closed-loop cooling system (where municipal water is used multiple times (i.e. re-circulated) before being discharged)
- Installing a chilled-water system where a chiller is installed on a rooftop or other exterior location. This is the most costly solution, typically applied when there are several OTC units located in a common area
- For optimal utility savings where there are several OTC units, a closed loop or chilled water system can be combined with a heat exchanger to preheat domestic hot water for significant reductions in water *and* energy costs

For more information, please contact CRD staff at **250.360.3103** or www.crd.bc.ca/OTC.