

OTC Replacement in Restaurants

The term Once-through cooling (OTC) refers to cooling equipment that transfers waste heat to water, which passes only once through the equipment before being discharged to a drain. The process requires a substantial volume of water, and is considered by today's standards to be expensive, wasteful and inefficient. Among the most common uses of OTC are restaurant refrigeration systems, including condensing units for walk-in coolers and freezers and other refrigerated cases, ice makers and soft-serve ice cream machines.

Most restaurants do not have any OTC systems, and those that do often only have one OTC appliance that will cost a few thousand dollars to replace with an air cooled system. The water and sewer cost savings usually pay for the full cost of eliminating OTC within a few years, and these cost savings continue afterward. In cases where a facility has multiple OTC systems, or a system requires an engineered solution where ventilation is inadequate for direct replacement with air cooled systems, the initial investment may be substantial, but often includes opportunities to recover energy from the waste heat. In these cases, the payback is typically short and reliable, and the ongoing savings can significantly improve the business's profitability.

The actual cost to eliminate OTC in a 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. Based on many retrofits that have been completed in recent years in Greater Vancouver and Greater Victoria, retrofit costs and utility cost savings are typically in the ranges shown in the table below.

Retrofit Scenario	Typical Retrofit Cost	Typical Annual Cost Savings	Typical Simple Payback Period
Replace a OTC condensing unit with an air-cooled equivalent for a walk-in cooler (3/4 to 1 hp)	\$2,500 to \$4,000	\$1,000 to \$3,000	1 to 3 years
Replace a OTC condensing unit with an air-cooled equivalent for a walk-in freezer (1 to 2 hp)	\$3,000 to \$5,000	\$1,500 to \$4,000	1 to 3 years
Replace a OTC condensing unit with an air-cooled outdoor equivalent for a walk-in cooler or freezer (3/4 to 2 hp)	\$5,000 to \$7,000	\$1,000 to \$3,000	2 to 5 years
Replace a OTC condensing unit with an air-cooled equivalent for a refrigerated case (1/3 hp)	\$1,500 to \$2,500	\$300 to \$1,000	3 to 7 years
Replace a OTC ice maker with an air-cooled equivalent	\$3,500 to \$12,000	\$1,000 to \$4,000	3 to 7 years
Replace a OTC ice maker with an air-cooled equivalent with a remote refrigeration condenser	\$5,000 to \$15,000	\$1,000 to \$4,000	5 to 10 years
Install a closed-loop chilled water system with an outdoor chiller to serve existing water-cooled equipment	\$20,000 to more than \$100,000	Varies depending on scope of retrofit	
Install a closed-loop chilled water system and connect to a heat exchanger set up to preheat domestic hot water	\$20,000 to more than \$100,000	Varies depending on scope of retrofit – but paybacks also include significantly reduced energy costs	

Refrigeration experts understand that the operating conditions for restaurant refrigeration systems can be very demanding, including hot ambient air, and oily particles in the air that can clog heat exchangers. Without regular maintenance, these conditions can cause premature failure of air cooled systems. However, properly installed, adequately ventilated and regularly serviced equipment will provide several years of reliable service in most restaurant environments.

The information provided in this info sheet is intended to assist the owners of restaurants and food service facilities with planning for replacement or retrofitting of existing OTC systems to comply with regulations that will come into effect January 1, 2019 in the CRD. The CRD will not be liable for the accuracy of the information presented in this document.