

SOUTHGATE

Dual Mixers Overcome Stratification and Prevent Ice Formation in Concrete Tank with Baffles

OVERVIEW

The Township of Southgate is located in the Canadian province of Ontario, approximately 90 miles northwest of Toronto, with a population of just over 2,000 people. The township is located in a rural, agricultural region tucked between Lake Huron to the north and Lake Ontario to the south. The climate is considered cold and temperate with significant rainfall throughout the year. Temperatures in winter average around -10°C and can drop as low as -30°C to -40°C for brief periods of time, which can wreak havoc on the local water storage tanks and distribution piping.

Operators in Southgate struggled with thermal and chemical stratification in their 1,364 cubic meter (360,000 gallon) Dundalk Well Tank. Built in 1973, the partially-buried concrete tank features a separate inlet and outlet located approximately 25 feet opposite one-another. In an effort to eliminate the potential for “short-circuiting” of the inlet water, a series of floor-to-ceiling vinyl curtains were installed in the center of the tank to act as a baffle, forcing the water to flow in a variety of paths from one side of the tank to the other.

Over the years, operators observed declining residual levels and opted to boost the chlorine residual by climbing the tank and manually dumping sodium hypochlorite into the water. On numerous occasions, operators observed a thick covering of ice on the surface of the water inside the tank. Ice is a problem, as it means less water available for emergencies, potential for damage to the interior of the tank, and it severely limits the ability to add chemicals directly to the water to boost residual levels in the tank. Operators were sometimes forced to break holes in the ice in order to add the liquid sodium hypochlorite to the water.

Water department officials began looking for ways to keep their tanks free from ice buildup. They researched submersible mixing systems for water storage tanks, spoke with neighboring water agencies and enlisted the help of engineering consultants. The consensus was that they needed to install two mixers, one for each side of the tank, given the baffle curtain in the center. Furthermore, they needed mixers that could mix vigorously enough to inhibit ice formation at the upper levels of the tank. All agreed that PAX Mixers were the correct equipment to achieve the process goals.



In 2013, the town installed two PAX PWM200 submersible mixers, one on each side of the baffle curtain. Each mixer was powered by a ½ horsepower motor with a control center outside the tank. Once the mixers were powered up and running for several days, operators observed steadier chlorine residual levels in the water quality samples. Residual levels continued to improve over time. The PAX Mixers were clearly overcoming the thermal stratification inside the tank and helping to distribute the incoming water (and fresh residual disinfectant) throughout the tank. The increased residual levels eliminated the need to climb the tank and manually boost residual.

Adding PAX Mixers to the 40-year-old tank proved to be a smart and easy retrofit with multiple benefits. The PAX Mixers reduced thermal stratification and improved residual levels. In addition, the mixers kept ice from forming at the top of the tank. Best of all, operators no longer need to climb the tank to manually add sodium hypochlorite, saving considerable time and freeing them up to tackle other projects.

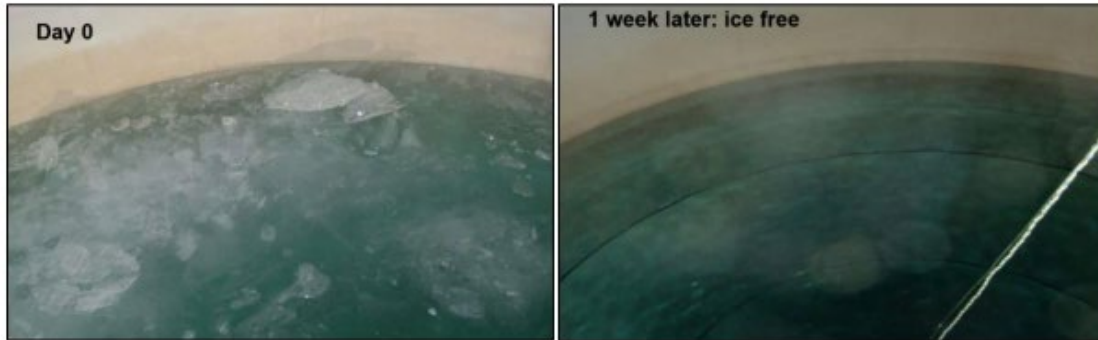


Photo on left shows ice inside a tank without a mixer. Photo on right shows the same tank one week after installation of a PAX Mixer.

“The PAX Mixers have kept our tanks free from ice and we have seen an improvement in our disinfectant residual levels, all thanks to the thorough mixing.”

**Jim Ellis, Public Works Manager, Township of Southgate,
Ontario**

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