

Sprayer Device Streamlines Sodium Hypochlorite Cleanup BY KEN BUMBALEK

Personnel at the Linnwood Water Treatment Plant in Milwaukee faced a lengthy and water-intensive task each time they cleaned sodium hypochlorite (NaOCl) concentrations from the plant's four 17,750-gal storage tanks. The tanks are used to accept and store NaOCl when it's delivered to the plant. The product is subsequently transferred to day tanks supplying metering pumps for application.

When we performed routine maintenance and inspection on tank interiors, we encountered 12 percent NaOCl concentrations (120,000 mg/L), which presented an unsafe work environment. To remedy the hazardous situation, plant staff reduced the chlorine residual to 2 mg/L by filling

a tank with tap water to the 10-ft level and draining it 6–10 times. This time-consuming procedure added labor, chemical, water, and electrical pumping costs to the process. But the maintenance staff and operators knew there was a more efficient way to handle the rinsing process, so we collaborated to find a solution.

Each horizontally mounted tank—approximately 12 ft in diameter and 22 ft long—is fitted with a 1-ft-diameter port on top, which allows for inspection when necessary. Plant personnel thought they could spray and rinse tank interiors, monitor the discharge, and reduce the amount of water needed to reach the 2 mg/L endpoint. By mounting a vertical rotating spray device to a modified inspection port on each tank and using a standard garden hose to supply the sprayer, the staff surmised that the device could operate with reduced monitoring to rinse a tank's lining.

and found a compatibly sized mounting flange. We glued chlorinated polyvinyl chloride (CPVC) piping to the flange along with fittings and a ball valve. A commercially manufactured gear drive rotor sprayer—the kind typically used for residential lawn watering—was attached to the end of the CPVC piping, and the device was mounted on top of the tank. With a garden hose attached to the device, we sprayed water inside the tank to wash down the tank's internal surface.

OPERATION AND BENEFITS

Based on the manufacturer's specifications, we knew the volume delivered by the spray, as well as our house water pressure—approximately 65 psi. Based on those numbers, we knew the spraying operation would use about 4.37 gpm. We initially filled the tank to the 10-ft level (about 15,826 gal) and drained and quenched it, rinsing away the high NaOCl residual as we drained. The residual after the first fill and drain was approximately 340 mg/L.

MATERIALS

Spray head	\$ 25
4-in. CPVC blind flange	40
¾-in. CPVC ball valve	6
¾-in. CPVC pipe nipples	5
¾-in. cam lock	20
TOTAL	\$96

CONSTRUCTION

The maintenance staff measured the required insertion length into one tank



The rotating sprayer device uses a standard garden hose for a water supply and runs with minimal monitoring to rinse down the lining of a sodium hypochlorite storage tank.

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We then hooked up the spray device and initiated the flow and spraying action. The sprayer continued to run until the residual dropped to the safe 2-mg/L level. Water usage was reduced from 95,000–150,000 gal to 19,000 gal. Also, the time required was reduced from 6–10 days to 3 days. Each of the four storage tanks is now fitted with the device.

“There had to be a smarter, safer way to do this, and our maintenance staff and operators found it,” says Carrie Lewis, superintendent, Milwaukee Water Works. “Congratulations to the team for inventing the winning gadget.”

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