



To: Licensed public pool operators; state and local health department pool inspectors

Safeguards for Public Pools to Prevent Chemical Release Events

This update is a reminder about current state laws regarding public pool operations. The Wisconsin Department of Agriculture, Trade and Consumer Protection's (DATCP) goal is to protect and promote the health and safety of Wisconsin pool patrons by preventing their exposure to hazardous chemicals.

What is a chemical release event?

A chemical release is an event caused by the introduction of a hazardous liquid or gas into a pool basin and pool enclosure. It is usually caused by the mixture of chlorine and acid which creates deadly chlorine gas. These events can occur when there is accidental mixing of chemicals from spilled storage containers, deliberate mixing of chemicals, handfeeding chemicals into the pool basin, adding the improper amount of chemicals, and back siphoning of the chemicals, but the most common situation occurs when chemical feeders continue to feed chlorine and acid into the circulation system when the water circulation has stopped.

The loss of water circulation can occur two ways - when either the power to the pump is lost or when the pump has lost prime. The loss of power to the pump can be caused by a short circuit, power failure or outage, an operator manually shutting down the system, or mechanical damage to the pump or electrical system. The other cause of lost water circulation is loss of prime to the pump. This can happen when air is introduced into the circulation system from the skimmers or by damaged gaskets or loose fittings of the circulation pump basket lid. Loss of prime can also be caused by a damaged or corroded pump impeller that cannot produce adequate water flow. When either of these events occur, the water flow is lost or significantly decreases and water is no longer circulating through

the system to consistently distribute chemicals safely into the system.

Why are chemical releases a concern for Wisconsin pool operators?

More than 460 death, injury, and illness forms submitted by Wisconsin pool operators over several years were analyzed by the Centers for Disease Control and Prevention (CDC) in 2015. This analysis showed that chemical releases accounted for over half of the reported pool-related injuries since 2008. Chemical releases have been an ongoing imminent health and safety hazard as evidenced by the large number of hospitalizations of large groups of people and the severity of the health conditions caused by these events. Exposure to a large quantity of chemicals can cause serious health effects, including symptoms of burning and irritation to the skin, eyes, nose, throat and lungs. It can also cause coughing, wheezing and vomiting and also dizziness, headache and fainting. The amount of chemicals and how long a person is exposed to the chemicals will impact the severity of the symptoms. Short-term or permanent long-term side effects, and even death, can occur.

What are safeguards?

Safeguards are operational design features and devices associated with chemical feeding systems that are the primary effective means for the prevention of overfeeding of chemicals when there is no water flow through the circulation system. Safeguards include antisiphon devices, electrical interlock of the circulation pump with the chemical feeders with a separate disconnect switch, and also flow sensors.

How do safeguards protect a pool from a chemical release event?

Depending on the type of chemical feed that is present, all safeguards will prevent the event of a chemical release. The electronic interlock of the pump with the chemical feeder prevents feeding of chemicals when the pump has lost power. The flow sensor prevents the chemical feeder from feeding chemicals when there is a significant decrease or loss of water flow. Antisiphon safeguards prevent the back siphoning of chemicals into the system when there is a loss of water flow.

What are the required safeguards that must be present and operational?

Pools are required to comply with state law (Wis. Admin. Code § ATPC 76 and § SPS 309) which states the following:

“ATCP 76.13 Disinfectant feeders and filter aid equipment. (1) General. All disinfectant feeders shall be installed according to the manufacturer's directions and used only with the disinfectant recommended by the manufacturer and meet all of the following requirements:

- (a) Feeders shall be automatic, easily adjustable, capable of providing the required chemical residuals, equipped with flow control valves upstream and downstream from the feeder, easily disassembled for cleaning and maintenance, durable, and capable of accurate feeding.
- (b) Feeders shall be properly vented and incorporate antisiphon safeguards to prevent disinfectant feeding in the event of the failure of recirculation equipment.
- (c) Feeder pumps shall be electrically connected to the recirculation pump control circuit and have a separate disconnect switch.”

In addition to ATPC 76, pools with a plan review completed in February 2009 and thereafter, must also comply with the additional safeguard requirements of SPS 390.17 which states the following:

“SPS 390.17(2) Sanitizing equipment.

- (b) An automatic controller for controlling the sanitizing equipment shall be installed on all public swimming pools and water attractions.

(c) The automatic controller shall include a flow sensor installed so that the chemical feed pump will not operate without a return flow to disburse the chemical.

(d) The automatic controller shall be electrically interlocked with the circulation pump control circuit.

(e) The automatic controller and circulation pump shall have separate disconnect switches.”

How must an operator demonstrate safeguards?

State and local health department sanitarians will require the operator to demonstrate that the safeguard operational design features and devices are present and operational. The operator must demonstrate the following:

1. Verify the circulation pump and chemical feeder pumps are electronically interlocked or interconnected:
 - Action: Manipulate the automatic controller for the chlorine and acid feeders to feed chemical. Once the feeders are operating, turn off the power to the circulation pump. You may have to perform this step one chemical feeder at a time.
 - Required result: The disinfection and acid feeder pumps should stop feeding chemicals and all sensors and light indicators on the displays will indicate a power loss.
 - Action: Promptly turn the circulation pump back on.
 - Enforcement action: If the required result is not achieved, the inspector will note the pool does not comply with state law [ATCP 76.13 (1)(c)]. This is an imminent public health hazard that requires pool closure [ATCP 76.30 (1)]. The pool will remain closed until the operator achieves compliance and the inspector conducts a reinspection.
2. Verify the flow sensor can detect the lack of water flow (for pools built in February 2009 and thereafter):
 - Action: Manipulate the automatic controller for the chlorine and acid feeders to feed chemical. Once the feeders are operating, while the recirculation system is operating,

turn off the flow of water leading to the flow sensor.

- Required result: The flow sensor will detect the lack of water flow and will signal the disinfectant feeder to stop feeding.
- Further action: If this step cannot be successfully performed, the inspector will make a referral to the Wisconsin Department of Safety and Professional Services (DSPS). It is well advised to remediate the situation immediately. Voluntary closure is suggested but not mandated.

Note: Flow sensors have been mandated in SPS 390 for pools built in February 2009 and thereafter but are not addressed in ATPC 76 directly. It is strongly suggested that operators install and maintain a flow sensor in an operational condition. The absence or nonoperation of this safeguard feature has been the cause of numerous chemical release events at Wisconsin pools.

Where can I learn more about chemical releases?

A training video that demonstrates steps 1 and 2 listed above, can be viewed at <https://youtu.be/jysrOdaxM6Q> and <https://www.elementofsurprise.org/pool-interlock-safety/>

This update is a source of program policy information administered by the Division of Food and Recreational Safety at the Wisconsin Department of Agriculture, Trade and Consumer Protection.

For questions, contact your inspector or:

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Additional resources are available at https://datcp.wi.gov/Pages/Programs_Services/WaterRecreation.aspx.