

THE ELEMENTAL

Placing Safety at the Center of Hydrogen



Safety Considerations for Electrolyzer Outlet Process Streams

Water electrolyzers with aqueous process streams, produce aqueous waste streams that contain dissolved hydrogen or oxygen gas. Examples of electrolyzer waste streams with dissolved gases include:



- Water condensed and periodically drained from wet waste gas vent systems
- Water periodically drained from product gas dryers
- Water or electrolyte drained from systems during maintenance
- When a system releases these waste streams, dissolved gases escape the solution. While initial volumes of gas may seem small, these streams should be disposed with great care to prevent the released hydrogen or oxygen from collecting in enclosed drains or areas. Over time, these gases can accumulate and present a hazard if not properly vented and diluted.

Best practices when draining gas dryer condensate from any electrolyzer, as well as water waste streams from PEM and AEM electrolyzers, include the following:

- Use an open drain that allows de-gassing into a well-ventilated space away from ignition sources
- Use dedicated drains; avoid connecting to other water drains where escaping hydrogen gas could accumulate or migrate to unintended areas

It is important that users are aware of the outlet stream compositions during all use scenarios and that installation locations for vent outlets are considered carefully. Remember that during startup and shutdown, air will also be in the vent lines, which results in short-duration flammable mixtures in the hydrogen vent.

Waste caustic electrolyte from AE systems is typically drummed and disposed in accordance with hazardous waste regulations. Best practice includes a period to release de-gassing hydrogen to a safe location where it can be diluted and exercising caution when managing waste drum bungs, including operating in a well-ventilated space and use of non-sparking tools.

For more in depth information regarding Electrolyzer Safety see our [eLearning Course](#) and [Webinar](#) on the topic or visit the [H2Tools](#) site for further reading.

Photo courtesy of Nel Hydrogen

Please contact us at chs@aiche.org if you have a suggestion for a future topic.