

SAFETY MEMO

September 19, 2022 – Purified Water Spill



Incident

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As part of the commissioning of a purified water (PW) distribution system, the proper functioning of the automatic point-of-use (POU) valves had to be tested. The test consisted of verifying that the valves open when a water request is sent to the PW system, and that the valve status is correctly displayed on the latter and on the HMI.

Normally, each of the automatic valves is connected to an equipment/skid which it supplies with PW. However, several skids were not yet installed at the time of the test. To be able to carry out the test, temporary hoses were installed from the POU valves to the nearest drains. Since there was no hose long enough to reach the drain, two hoses were connected in the case of one particular POU.

When testing the opening of this valve, the purified water request was sent to the PW system. Once the request was sent, the valve opened, and water began to flow down the drain. Moments after the valve opened, the pressure in the system caused the failure of the connection between the two hoses. The fitting was projected, and water then poured into the hall, which at the time was an active construction site.

As soon as water began to flow, the PW request was withdrawn, the compressed air supply to the valve was shut off, and the analog signal cable from the valve was disconnected. The valve then closed, thus stopping the release. Although the flow lasted less than a minute, the flow rate was high enough to cause considerable damage. Fortunately, no one was injured during the incident. Cleanup was required, however, which caused some construction activities on the site to be delayed.

Human factor issue

- The type of Tri-Clamp connection required between the two flexible piping's was not specified to the technician responsible for installing the pipes
- The connection between the two hoses was not checked before performing the test



Image 1: barbed fitting with clamp

Design issues

- The connection between the hoses was a barbed fitting with a clamp, not suitable for the operating pressures of the system (see photo)
- No manual valve at valve outlet to control flow

Possible consequences

The hose barb could have hit someone during the spill. The latter was thrown through the air uncontrollably due to the high pressure. If the test had run during a POU sanitization cycle or on a hot water for injection loop, someone could have been scalded by water over 80°C.

Lessons learned

- Use adapted tri-clamp type connections to connect flexible hoses
- Secure the hoses to prevent whipping effect in case of rupture
- Install a manual valve directly at the outlet of the automatic valve so that the flow can be controlled or stopped completely if necessary
- Specify the type of connection required if the installation is carried out by someone else
- Always check each connection before starting a test
- When a valve is tested for the first time, be sure to use a medium to low temperature

