

SAFETY MEMO

November 2nd, 2020 – Peracetic Acid (2 of 2)



Did you know?

Introduction

Peracetic Acid (PAA) is a combination of acetic acid, hydrogen peroxide, peracetic acid and water. PAA is a colorless liquid producing a pungent odor.

PAA fumes are harmful if inhaled and may irritate the respiratory tract. According to the Committee on Standards, Equity, Health and Safety at Work (CNESST), the Short-Term Exposure Limit (STEL) for inhalable dust is set at 0.4 ppm.

PAA is increasingly used in the factory for disinfectant, sterilant, water treatment, aseptic packaging, bleach and polymerization initiator.

Chemical Decomposition

PAA is a product which decomposes and degasses. For this reason, the PAA should never be confined, for example, between two valves, between a non-return valve and a valve, inside the cavity of a ball valve, in a sealed tank, etc..



Figure 1: Chemical Decomposition of Peracetic Acid

The rate of decomposition will be accelerated in the presence of organic or inorganic impurities, such as metals. This is particularly true for the first row of transition metals (Cr, Mn, Fe, Co, Ni, Cu), and if the storage temperature is high (> 30 °C); the decomposition of PAA doubles for every 10 °C above 30 °C¹.

Chemical Release of PAA

In the event that the liquid is confined, the decomposition of the PAA would cause a rise in pressure and possible rupture of the components. A major leak can cause a factory evacuation.

Design Considerations for a PAA Distribution Network

There are a variety of design or system elements to **consider** when designing a PAA distribution network including the following:

- Install **welded** SS316L piping.
- Pump the PAA container through the top nozzle to reduce the risk of a major leak.
- Install padlocked **drainage** valves at low points.
- **Dilute** the PAA in the chemical room and distribute it at low concentration.
- Install ball valves allowing **depressurization** through a vent and install adequate **ventilation**:
 - Air intakes close to the ground - PAA is heavier than air;
 - Pressure balanced - maintains negative pressure relative to surrounding rooms;
 - Air intakes at the source - changing the PAA container releases vapors.
- Use materials **compatible** with PAA: SS316L (piping and tanks), PTFE (valves), PVDF (seals).
- Install **safety valves** in all places where there is the possibility of containment.



Typical Aspiration Hose Mechanism

There are a number of design elements to **avoid** when designing a PAA distribution network:

- Do not use material **incompatible** or with limited compatibility with PAA: EPDM, Viton, PP, Buna-N, PVC, aluminum and copper.
- Do not use **threaded** joints (high probability of producing a leak at this type of connection).
- Do not use **tri-clamp** connections (except in the case of high pressure tri-clamp connections with two screw bolts).
- Avoid **heating** PAA (heat accelerates chemical decomposition).
- Avoid PAA **contamination** (organic/inorganic impurities accelerate chemical decomposition).
- Do not **confine** PAA (confinement leads to a rise in pressure and possible rupture of the components).

For more details on the PAA, you can consult the last report issued in LAP-22 (P :) or consult Olivier Petitclerc at the Quebec City Office.

¹ PeroxyChem, Peracetic acid safety & handling, Powerpoint, file: PeroxyChem_PAA_Safety_15_10_REV1 (002).pptx, Author: Ali Doucette, creation: 2014-02-26