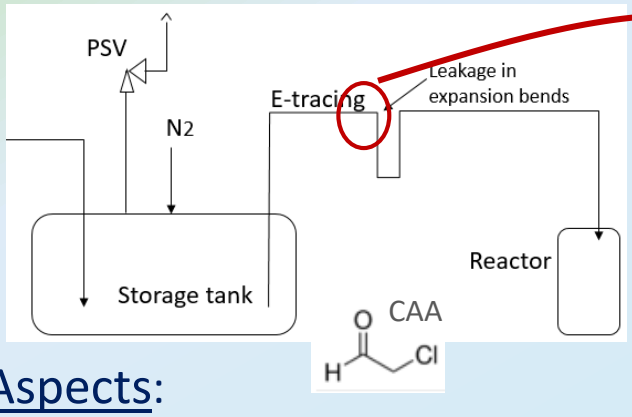
Run Away in a storage tank

EPSC Learning Sheet , June 2018

EPSC

What Happened:

At a pharma production location a storage tank with 45% chloro-acetaldehyde (CAA) released an HCl cloud after the CAA polymerised in an exothermic reaction. The pressure increase ruptured piping.



Aspects:

- A failing tank tracing caused an initial temperature rise
- 45% CAA in water can polymerise exothermic as of 60 °C
- The reaction plugged the line and continued in the tank
- The PSV was not sized for this scenario, high pressure damaged gaskets and caused a hole in the piping (picture)
- It is essential to understand the chemistry under normal and all foreseeable abnormal conditions (quote from CSB)
- Contaminants sometimes act as catalyst and start a reaction
- The SDS did not mention the exothermic polymerisation specifically. Indicated storage conditions can be important.
- Determine thermal stability and safe storage conditions using lab tests, DTA (Thermal Analysis) and modelling

Avoid reactions in stored chemicals