

Flashing of Hydrocarbons

EPSC Learning Sheet , November 2018



EPSC

What Happened:

A carbon steel heat-exchanger reached $-40\text{ }^{\circ}\text{C}$ due to flashing of propylene. It was depressurized after a trip, and restarted (pressurized). It ruptured open and an explosion and a serious fire took place.



Aspects:

- Depressurising (flashing) of C₂, C₃ hydrocarbons can result in low temperatures, where plain carbon steel becomes brittle
- Never pressurise equipment when being below its design temperature: due to the stress of the brittle steel at low temperature it can break catastrophically (see picture)
- Include flashing scenarios in the PHA and define measures
- Measure impact strength at low temperature of the specific steel batch used (in design phase), in case the equipment can auto-refrigerate by flashing
- Validate the mechanical integrity by an inspection expert when equipment has gone below its design temperature, before using it again
- Train auto-refrigeration scenarios with operators

Avoid brittle steel due to flashing