

# Thermowell Crack

EPSC Learning Sheet November 2023



## What Happened:

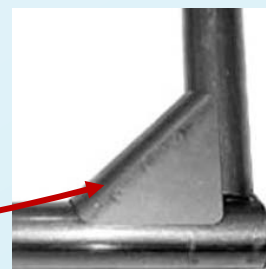
At an off-shore gas plant a leak from a high-pressure pipe occurred at the location of a thermowell, starting a fire in the insulation.

The velocity in a gas cooler heat exchanger was increased, resulting in resonant vibration of the thermowell, causing a fatigue crack.



## Aspects:

- Hydrate formation in a cooler, caused a blockage and doubled the gas flow in the parallel cooler.
- High flows around a thermowell caused vibration that resulted in a fatigue failure.
- Small bore tubing (< 1 inch) is sensitive for fatigue cracks. Examples: thermowell in a high flow system, pressure sensor near a compressor, drain near a chattering PSV.
- “Resonance” or “Fatigue” can be useful guideword in a HAZOP or design review
- Fixation and Gussets can help to strengthen design



**Prevent Resonant Fatigue Failures**