

Incorrectly selected oxygen welding gas hose bursts & catches fire

Safety Flash Published on 9 May 2018 Generated on 24 January 2025 IMCA SF 10/18

The ship's welder opened the Oxygen and Acetylene gas bottle valves in order to do a cutting job on deck.

What happened?

These gas bottles were attached to the vessel's integrated welding gas system. Opening the valve on the Oxygen bottle had the immediate effect of causing an explosion to a short, high pressure hose delivering oxygen from the bottle to the oxygen gas regulator. The end of the hose caught fire and was quickly extinguished by turning off the oxygen bottle. Nobody was injured and the only damage was to the hose that completely separated.

IOGP Life Saving Rules:



Bypassing safety controls



Energy isolation



Hot work



What went wrong?

Investigation found the following:

- The hose had been recently replaced, but the replacement hose was a hydraulic oil service hose with oxygen fittings. The replacement hose was not compliant with the ISO 14113 specification required by the manufacturer, although the pressure rating was suitable.
- The non-compliant hose was supplied from a non-preferred supplier (the required hose length was not available from original supplier).

- The onboard team did not adequately check that the hose was of the correct specification.



What was the cause?

Based on detailed investigation into a similar incident, it was suggested that the cause of the incident was due to adiabatic compression heating within the hose which caused the inner lining to auto-ignite due to residual oil within the hose. Our member notes that there are numerous incidents recorded by industry due to this issue.

What actions were taken? What lessons were learned?

Welding hoses should be compliant with ISO 14113. For oxygen hoses, the material should have an auto-ignition temperature suitable for the service (typically $> 400^{\circ}$), and cleaned for oxygen service.

- Do not assume that because a hose is sufficiently pressure rated it is fit for a specific purpose.
- Always ensure correct specification hoses are ordered and received.

IMCA notes that in order to avoid adiabatic compression:

- Use only original equipment and spares when handling/servicing oxygen equipment.
- Work clean – no oil or any other hydrocarbon impurities must contaminate the parts (your hands, tools etc.).
- Open oxygen cylinder top valves slowly.

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