Liquefied Gas Fire Hazard Management — study guide

Liquefied gas is carried as a liquid precisely because that is compact, but it burns as a gas — and an unignited cloud can be deadlier than a fire. This guide covers the fire triangle, the products and the response.[1]

The fire pyramid

The four elements of the fire pyramid are **fuel, oxygen, heat and chain reaction**. Remove any one and the fire cannot exist.

Products

The majority of liquefied gas transported by gas carriers consists of hydrocarbons, and is therefore extremely combustible and inherently hazardous. **Liquefied Petroleum Gases (LPG)** are a flammable mixture of hydrocarbon gases such as propane and butane that exist in a liquefied form. **Liquefied Natural Gases (LNG)** come from a natural source and consist predominantly of methane, ethane, propane and a small amount of butane.

Reducing the risk

Crew can reduce fire risk by never smoking outside designated smoking areas, recording near misses so lessons can be learned, and always following the Permit to Work system — especially for hot-work activities. During product transfer operations the crew must ensure precautions are in place to control potential ignition sources, comply with product handling procedures, and familiarise themselves with the product's Safety Data Sheet.

If a fire is discovered

On discovering a fire, crew should notify the bridge, stop all work, and evacuate all non-essential personnel. The **fire wallet** must contain an up-to-date crew list, a cargo plan, and a fire plan identifying the type and location of firefighting equipment.

Key terms and hazards

BLEVE stands for **Boiling Liquid Expanding Vapour Explosion**. Unignited gas can form an explosive vapour cloud, which is more dangerous than the fire itself. Water spraying is typically used to create a barrier to prevent fire from spreading, to disperse gas, and to protect pipes and valves.

Key facts to remember

- Fire pyramid: fuel, oxygen, heat, chain reaction.
- Risk reduction: no smoking outside designated areas, record near misses, follow

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Permit to Work (hot work).

- LPG: propane/butane liquefied. LNG: natural source, mainly methane/ethane/propane.
- Transfer: control ignition sources, follow procedures, read the SDS.
- On fire: notify the bridge, stop work, evacuate non-essential personnel.
- Fire wallet: crew list, cargo plan, fire plan (equipment type/location).
- BLEVE = Boiling Liquid Expanding Vapour Explosion. Unignited gas clouds are more dangerous than fire.

Sources

1. IMO International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) and SOLAS Chapter VII.
2. International Safety Guide for Oil Tankers and Terminals (ISGOTT) — fire hazards and safe transfer on gas tankers.