



# Gas Accumulation and Ignition Risk

An accidental release of flammable gas into an enclosure or into the atmosphere can present a potential fire or explosion hazard. Studies of gas dispersion and accumulation can help to specify preventative measures or hazard ranges which will either prevent gas accumulation to flammable levels or ensure protection of personnel from the consequences. Germanischer Lloyd (GL) at its Spadeadam test site has extensive facilities enabling the controlled release of pressurised gas (or volatile liquids, such as LNG) into the atmosphere or into enclosures. The resulting gas cloud accumulation can be measured to determine concentration levels.

## Gas Build up in Enclosures

For reasons of weather protection, compliance with planning regulations or noise reduction it is sometimes necessary to house gas processing plant within enclosures, leading to the potential for gas accumulation and an explosion risk. Enclosures can be constructed to suit customers' requirements and during the experiments gas concentration levels can be determined with time providing information on the gas build up process. The effect of dispersion techniques such as the use of water deluge or ventilation, whether mechanical or forced, can be studied.

A full scale test rig representing an offshore module also provides the opportunity to study major gas releases at high pressure with monitoring of gas concentrations throughout the testing.

## Gas Dispersion in the Atmosphere

The high pressure storage and pipework system at Spadeadam (40tonnes at 140bar) enables controlled releases of pressurised gas from any geometry designed to suit the customers' requirements, including from above or below ground pipework.

Other storage vessels allow volatile flammable liquids, such as LNG, LPG etc to be released under pressure to form dispersing dense gas clouds. Instrumentation deployed on suitable supports can provide measurements of gas concentration in the dispersing cloud.

## Scientific Measurements

Spadeadam has a wide range of instrumentation available for studying the accumulation or dispersion of gas.

Typical scientific measurements would include:

- Fuel release rate
- Measurements of the gas concentration by direct sampling or intrinsically safe detectors to provide continuous measurement
- Effect of dispersion techniques such as water deluge
- Effect of ventilation, mechanical or natural
- Meteorological conditions



## Ignition Risk

In order to assess the risks to personnel it is important to study any potential ignition sources to determine if they could cause ignition of a flammable gas air mixture. Spadeadam has facilities to test items of equipment that may be present in a hazardous area to determine if they can act as an ignition source.

The items of equipment can be tested under normal operation or in the event of failure of the equipment such as a short circuit.



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