



HYDROGEN SULPHIDE (H₂S) IN BITUMEN EMISSIONS

The purpose of this card is to identify the main hazards associated with H₂S in bitumen emissions, the likely exposure scenarios and potential risks associated with it, in the context of bitumen loading, discharge, storage, transport and use.

Health and Safety laws impose duties on all relevant stakeholders and on all involved parties to provide safe systems of work.

This guidance is intended to help comply with responsibilities during the loading, delivery, storage, transport and use of bitumen products and is not intended to vary the legal responsibility of any party. A specific risk and exposure analysis must be completed by the responsible party before any operation or new installation and reviewed if any modification is undertaken.

HAZARDS ASSOCIATED WITH H₂S IN BITUMEN EMISSIONS

H₂S is a naturally occurring gas that can be released from hot bitumen. It is probably best known for its recognizable “rotten eggs” smell that is detectable in very low concentrations:

- H₂S is toxic, acting on the nervous system
- H₂S can deaden the sense of smell, so odour is not a reliable way to detect its presence
- H₂S is highly flammable
- H₂S can react with iron oxide (rust) on the walls and ceilings of tanks to form pyrophoric iron sulphide, a known ignition source in the presence of oxygen.

WHAT ARE THE RISKS?

The risks associated with H₂S in bitumen are:

- Intoxication leading to loss of consciousness which can, in extreme circumstances, be fatal
- Fire or explosion in enclosed, or partially enclosed spaces (e.g. tank vapour spaces above hot bitumen)
- Pyrophoric Iron Sulphide formation in enclosed, or partially enclosed vapour spaces above hot bitumen creating an ignition source.

EXPOSURE POTENTIALS

Exposure to high levels of H₂S can occur when:

- Opening a manlid, or hatch of a storage tank or delivery vehicle
- Releasing pressure from vents or valves
- Inspecting or cleaning empty tanks – remember H₂S is heavier than air and so may be more concentrated in the lower part of the tank.

EXPOSURE LIMITS

Exposure limits are country specific, please refer to national legislation. In most European countries the following limits exist:

The Short-term Occupational Exposure Limit (Time Weighted Average over 15 minutes) = 10 ppm.

The Long-term Occupational Exposure Limit (Time Weighted Average over 8 hours) = 5 ppm.

MANAGING THE RISK

The following measures should be considered depending upon the outcome of the risk assessment:

- Keep storage temperatures as low as reasonably practical
- Identify areas where H₂S may be present, including provision of warnings and access control where necessary
- Provision of adequate ventilation or extraction
- Provision of monitoring /detection equipment
- Use of appropriate respiratory protection
- Education of personnel about H₂S
- Use of permits to control entry to confined spaces
- Legislation concerning explosive atmospheres in storage tanks
- Storage tank maintenance programme.

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