

## Petroleum and Petrochemical Bulletin

### Upper limit for H<sub>2</sub>S in the breathing zone (when using SCBA)

**Bulletin 17-02**  
**Rev. 0**

### Introduction

IFIA member companies have identified the need to set an upper limit for H<sub>2</sub>S in the breathing zone for personnel wearing Self Contained Breathing Apparatus (SCBA). IFIA members will not expose their inspectors to levels at or above 500ppm by working in locations where H<sub>2</sub>S concentration is at or above this level. This is to ensure escape and survival should the SCBA fail for any reason.

It must also be noted that SCBA should not be used or be necessary for regular or routine activities and that, apart from emergency use, situations where SCBA may be needed should be subject to a risk assessment and the work carried out under permit to work arrangements. Further, it is the responsibility of the terminal or vessel concerned to ensure that H<sub>2</sub>S levels are adequately monitored and remain within the limits specified.

### Toxic Effects of Hydrogen Sulfide

Hydrogen sulfide is a very dangerous and deadly gas - it is colorless and heavier than air. It can accumulate in low places and is hazardous in small concentrations. Exposure to H<sub>2</sub>S can cause serious injury or death.

The US Occupational Safety and Health Administration (OSHA) publish the following table which summarises the health effects of H<sub>2</sub>S exposure.

Concentration (ppm)	Symptoms/Effects
0.01-1.5	Odor threshold (when rotten egg smell is first noticeable to some). Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor described as sweet or sickeningly sweet.
2-5	Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep. Airway problems (bronchial constriction) in some asthma patients.
20	Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.
50-100	Slight conjunctivitis ("gas eye") and respiratory tract irritation after 1 hour. May cause digestive upset and loss of appetite.
100	Coughing, eye irritation, loss of smell after 2-15 minutes (olfactory fatigue). Altered breathing, drowsiness after 15-30 minutes. Throat irritation after 1 hour. Gradual increase in severity of symptoms over several hours. Death may occur after 48 hours.
100-150	Loss of smell (olfactory fatigue or paralysis).
200-300	Marked conjunctivitis and respiratory tract irritation after 1 hour. Pulmonary edema may occur from prolonged exposure.
500-700	Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes.

#### Revisions/Reaffirmations

Rev. 0 February 2018

700-1000	Rapid unconsciousness, "knockdown" or immediate collapse within 1 to 2 breaths, breathing stops, death within minutes.
1000-2000	Nearly instant death

## Effects of single exposure

The current IDHL (Immediately Dangerous to Life or Health) limit for H<sub>2</sub>S exposure is 100 ppm <sup>[1]</sup> and clinical data has shown that short term single exposures to concentrations of 500 ppm and above may be fatal.

## References

IFIA Bulletins:

- 12-02 - Bunker Sampling for H<sub>2</sub>S
- 16-05 - H<sub>2</sub>S Monitoring and Measurement
- 16-06 - Safety notice - H<sub>2</sub>S in Bitumen/Asphalt
- 16-01 - Stop Work Authority (SWA)

SOLAS (Safety of Life at Sea), ISM (International safety management), ISGOTT (International Safety Guide for Oil Tankers and Terminals)

IFIA (International Federation of Inspection Agencies) IFIA Code of Practice Petroleum and Petrochemicals Committee Section 3 - Health Safety and the Environment

OSHA (Occupational Safety and Health Administration) Regulations

Reference should also be made to any local or national regulations which may apply in the region concerned.

[1] US National Institute for Health and Safety (NIOSH)

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