



Airswift
HSE Management System
Hydrogen Sulfide (H2S)

Important Notice:

1. This procedure is a Controlled Document and shall not be amended without the authority of the Operations Manager – North America.
2. Any queries or feedback concerning the contents of this document should be addressed to the Operations Manager – North America.

Prepared	Reviewed	Approved	Effective Date	Issue Number
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INDEX

- 1.0 PURPOSE**
- 2.0 SCOPE**
- 3.0 DEFINITION**
- 4.0 REFERENCES**
- 5.0 RESPONSIBILITIES & REQUIREMENTS**

HYDROGEN SULFIDE (H₂S) AWARENESS TRAINING PROGRAM

1.0 PURPOSE

The purpose of this program is to make employees aware of H₂S hazards.

1. Identify the hazards of working around H₂S.
2. Select the proper PPE/respiratory protection.
3. Ensure that each individual is properly trained.

2.0 SCOPE

Workers who may come in contact with H₂S including: individuals in oil and gas operations, mining, sewage and sewage treatment, laboratories and public utilities.

3.0 DEFINITION/CHARACTERISTICS

Hydrogen Sulfide is known as sulfureted hydrogen, hepatic gas, sulfur hydride, rotten-egg gas and stink damp. Hydrogen Sulfide is a gas by-product formed when organic matter decays. Inhalation is the route of entry, which presents the highest hazard. This gas is poisonous, explosive and invisible. It is very dangerous to work near or around.

4.0 REFERENCES

None

5.0 RESPONSIBILITIES & REQUIREMENTS

5.1 Management Commitment

The initial job assessment will be based on the Client completion of a workplace assessment to determine the selection of PPE/respiratory protection.

Each individual hired in the above capacities will be required to undergo the same in-house safety orientation as required of the field employees. Completion of this training will enable company management to make intelligent decisions toward the selection of PPE/respiratory equipment to protect workers from hazards which cannot be controlled by engineering practices.

5.2 Hazard Assessments

Hazard assessments, assisted by the information from the initial job and workplace assessments, must consider the following potential hazards:

- H₂S is colorless and heavier than air, it settles in low lying areas
- H₂S can spontaneously ignite in air.
- Highly corrosive to certain metals, creating a potential fall hazard around metal stairs
- H₂S has the odor of rotten eggs in low concentrations, and it rapidly deadens the sense of smell.

- Burning H₂S emits another dangerous chemical, sulfur dioxide (SO₂). This gas can severely irritate your eyes, nose, throat and respiratory system.

5.3 Symptoms of Overexposure

- 1 ppm - Minimum perceptible odor.
- 10 ppm - Permissible exposure limit (PEL) the beginning of eye irritation.
- 100 ppm - Coughing, headaches, burning eyes, respiratory irritation and/or loss of smell after 2 - 15 minutes.
- 100 ppm – Severe eye and throat irritation; possible pulmonary edema (lungs filled w/fluid), respiratory paralyzes. Immediate danger to life and health (IDLH).
- 500 - 700 ppm - Loss of consciousness and probable death in 30 minutes to one hour.
- 1000 - 2000 - Unconsciousness at once. Death may occur even if removed to fresh air at once.

5.4 Air Monitoring

Direct reading gas detectors with audible alarm will be used to monitor the atmosphere for H₂S where it has been identified as a possible contaminant. Monitors must be bump tested at a minimum as required by manufacturer, if monitor fails a bump test a full calibration is required. Monitors must be calibrated according to manufacturer's recommendations. These gas detectors are set by the manufacturer to alarm at 10 ppm H₂S in air. Any alarm will require an immediate evacuation of the area at which time hazard reassessment must occur prior to continuing work. The client must ensure that a worker's exposure to H₂S is kept as low as reasonably achievable. An employer must ensure that a worker's exposure to H₂S does not exceed its occupational exposure limit of 10 ppm over an 8-hour time period.

The gas detection equipment must be calibrated and recorded at the frequency outlined by the manufacturer or per client requirements (e.g. every 1 or 3 months). Cylinders of H₂S calibration gas must not be used if they exceed one year shelf life (1 year beyond mfg. date stamped on H₂S calibration gas cylinder). H₂S cylinders must be discarded if over 1 year old.

- 10 ppm – OSHA PEL (Permissible Exposure Limit)
Level you can safely breathe over an 8 hour work day, 5 day work week.
- 15 ppm - OSHA STEL (Short Term Exposure Limit)
Level you can safely breathe average over a 15 minute period; monitoring to be completed four (4) times per day at peak exposure periods.

A worker may not be exposed to H₂S at a concentration exceeding its ceiling limit of 15 ppm at any time. In the event of an H₂S release, all Airswift contractors are required to follow all client emergency evacuation procedures and move upwind out of the area immediately. Airswift Employees should participate and be included in client site emergency evacuation drills to be familiar with routes and alarms.

5.5 Respiratory Protection

- Air purifying respirators are not approved for continuous use in an environment containing hydrogen sulfide. Air purifying respirators supplied with appropriate cartridges are approved for "escape only" use when dealing with a hydrogen sulfide exposure.

- Full-face industrial gas mask w/chest mounted canister is rated for continuous use in atmospheres containing up to 100 ppm of Hydrogen Sulfide. The H₂S canister has a color change indicator which identifies the end of the life of the canister.
- Supplied air respirator w/escape bottle or SCBA in positive pressure mode is the only acceptable respiratory protection in atmospheres containing over 100 ppm of H₂S (IDLH level).

5.6 Employee Training

This safety awareness training presentation will be reviewed with employees who may have exposure to H₂S. The presentation covers hazards associated when working around H₂S monitoring for H₂S respiratory protection and informing the employees of the hazard of H₂S and actions to take in case of contact with H₂S.

Airswift employees must be trained prior to working in H₂S environments with a minimum of 3-4 hours of training. Training programs must adhere to the ANSI/ASSE Z390.1-2017 Accepted Practices for Hydrogen Sulfide (H₂S) Training Programs. Airswift employees are required to refresh training annually.

5.7 Safe Work Practices

- Maintain compliance with permit requirements of Airswift and any requirements by the client.
- Verify the proper safety equipment is available, functioning properly and utilized.
- Check and remain aware of wind conditions and direction.
- Perform a thorough check of the downwind area prior to the start of any potentially hazardous work activity.
- Check for other personnel and ignition sources.
- Ventilate work areas by venting and purging lines and vessels prior to beginning any work activities.
- Keep all non-essential personnel away from work areas.
- Immediately vacate the area when any H₂S monitor alarms sound and do not re-enter
- When working in a confined space refer to the confined space work policy and procedures to eliminate potential hazards of Hydrogen Sulfide (H₂S).

5.8 Evacuation Procedures

In the event of an H₂S release, all Airswift contractors are required to follow all client emergency evacuation procedures and move upwind out of the area immediately.

If no procedure is available, Airswift employees will follow the below steps to evacuate the area.

1. Evacuate immediately. An H₂S alarm indicates that there may be hazardous concentrations in the building or area. Get to a safe new area immediately by moving upwind or crosswind from the release. Move to higher ground in possible.
2. Sound the alarm. Immediately notify someone that there is an H₂S release, relay any information you may have and that you may require assistance.

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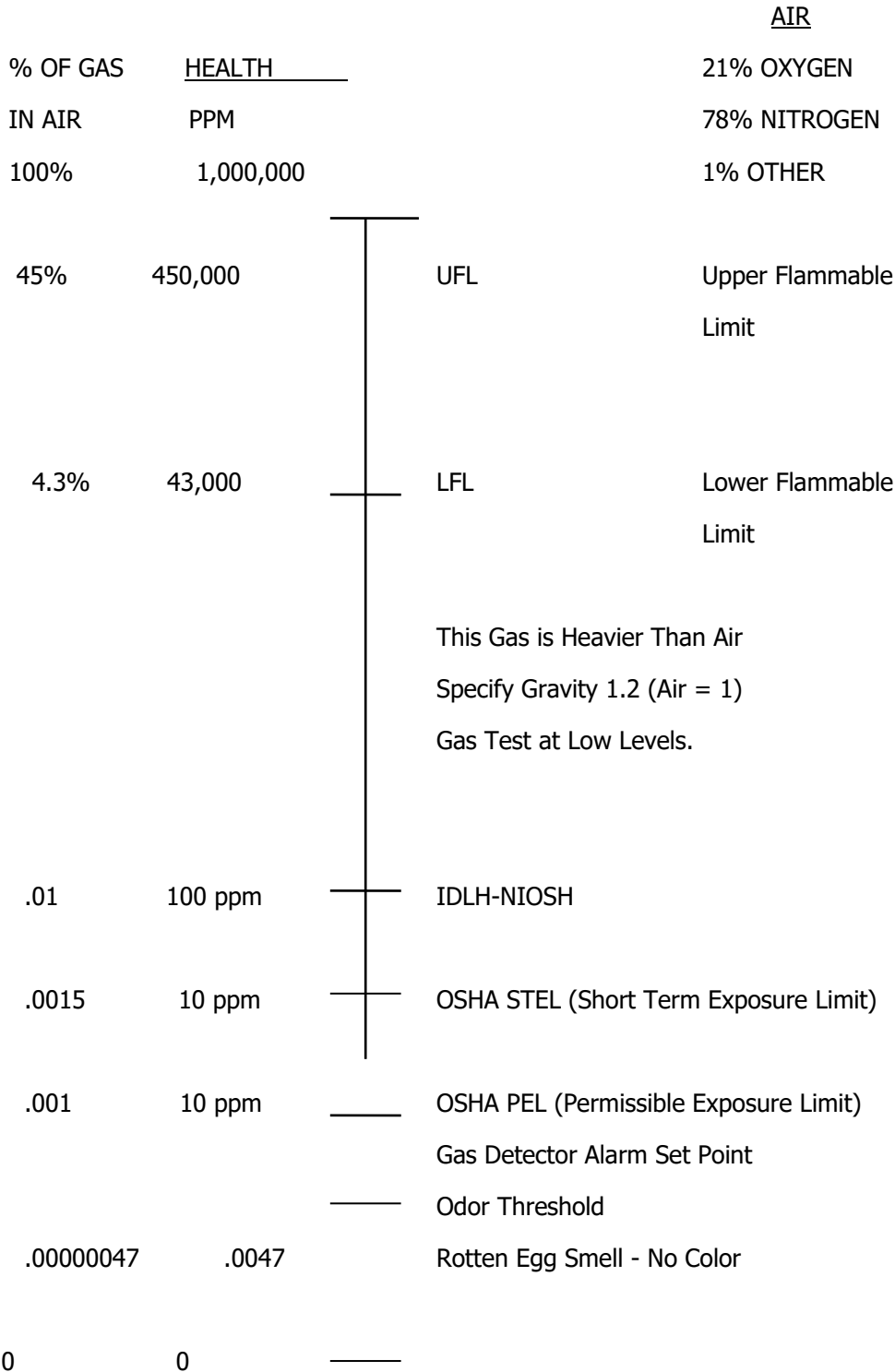
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3. Assess the situation. Do a head count and consider other hazards.
4. Protect rescue personnel. Put on SCBA/SABA to protect rescue personnel. If necessary, shut down the plant.
5. Rescue victim. Start by ventilating the building with fans or by opening all doors. If safe, you may perform the rescue by yourself with backup or with assistance. Enter the area and remove the victim to fresh air (upwind if possible).
6. Revive victim. Apply artificial respiration or CPR on the victim until the victim revives or until help arrives. Only qualified personnel may use mechanical resuscitators or oxygen.
7. Get medical aid. All H2S victims require medical attention. Even if they revive quickly, there is still a possibility that the lungs may collect fluid some hours after exposure. Arrange a transport of the victim to medical aid and provide the necessary information to Emergency Medical Services.



HYDROGEN SULFIDE
CONCENTRATION LINE



NOT TO SCALE

Document Control – Revisions and Amendments

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6	06.05.2018	Jessica Hernandez		Update
7	05.29.2019	Carol Stallworth		Update
8	07.31.2021	Kellie Tetley		Update
9	08.08.2022	Kellie Tetley	Update Evacuation procedures	Update