Brieser CONSTRUCTION

Section 37
Safety Health and Environmental Manual

2025

Hydrogen Sulfide

Hydrogen Sulfide (H_2S)

PURPOSE

This standard will outline the protective measures needed when working inside oil refineries or other sites that have the potential for exposure to Hydrogen Sulfide. Section 26 of the Brieser SH&E Manual will detail the procedures for assessing risk for health issues such as Hydrogen Sulfide exposure.

SCOPE

To define the requirements, responsibilities, and procedures necessary to reduce the risk of our employees to Hydrogen Sulfide gas exposure.

RESPONSIBILITIES

The Program Administrator: Brieser Safety Director

This person is responsible for:

- Issuing and administering this program and making sure that it satisfies all applicable federal, state, and local requirements.
- Ensuring that employees have available to them initial and refresher training on the use of this policy.
- Maintaining training records for all employees included in the training sessions.

Project Managers, Superintendents and Foremen

These people are responsible for:

- Ensuring that all employees working at site that has the potential for exposure to Hydrogen Sulfide gas be trained in this standard.
- Providing training in the signs and symptoms of H2S exposure to workers on site
- Ensure employees are familiar with project site alarms for Hydrogen Sulfide.
- Ensure all personal monitors and testing equipment is functioning properly, calibrated and assigned a competent user.
- Ensure that all supervision is trained in emergency procedures when an employee exhibits symptoms consistent with possible overexposure to H_2S.

Employees

- Understanding common signs and symptoms of H2S exposure
- Review the H2S Safety Data Sheet before work commences.
- Understand the routes of entry and exposure to H2S.
- Report any rotten egg smells while at jobsite.
- Be aware that each client or customer has their own set of emergency plans. Consult the Brieser site specific safety plan before working at new facility.
- If a H_2S personal monitor alarms, evacuate the area, notify a representative from the customer facility, and call your supervisor.

GENERAL

Hydrogen sulfide (H2S) is the chemical compound with the formula H2S. It is a colorless gas; it is heavier than air, very poisonous, corrosive, flammable, and explosive. In concentrations less than 100 ppm, H2S has an offensive odor like rotten egg, but at approximately 100 ppm, loss of the sense of smell occurs.

Hydrogen sulfide is introduced into the refinery by sour crude and may be found throughout most of the operating areas. Hydrogen sulfide is normally handled in closed systems with exposure occurring only when opening process equipment for gauging, sampling, repairs, draining process water from vessel accumulator boots, or draining petroleum tank bottoms.

Brieser construction will employ the American Conference of Governmental Industrial Hygienists (ACGIH) values. The permissible exposure over an 8-hour workday is defined as the TLV TWA or Threshold Limit Value Time Weighted Average. The TLV TWA for H2S is 1 ppm. The STEL or Short-Term Exposure Limit is defined as a 15-minute exposure. The STEL for H2S is 5 ppm. All Brieser H2S personal monitors are set to alarm at 5 ppm for both STEL and TWA as the limit of detection on current models of gas meters cannot meet the 1 ppm TWA limit. If either the TLV TWA or the STEL are expected to be met or exceeded, additional monitoring requirements, medical surveillance, and annual employee training will be needed.

HEALTH HAZARDS

Vapors are extremely hazardous and are absorbed through the mucous membranes of the respiratory tract causing respiratory paralysis and suffocation. Symptoms of overexposure include headache, fatigue, irritability, and gastrointestinal problems. Causes strong eye irritation and some skin irritation. Loss of sense of smell at 100 ppm, drowsiness, loss of consciousness, respiratory failure, or death can result from exposure above 100 ppm.

EMERGENCY FIRST AID

Eye Contact – Flush eyes thoroughly with water for at least 15 minutes. Call Fire and Safety for immediate medical assistance.

Skin Contact – Wash contact areas with soap and water.

Inhalation – Remove the victim from further exposure. Rescuer must wear properly fitted self-contained breathing apparatus before attempting rescue. If breathing has stopped, use artificial respiration, administer supplementary oxygen if available, and call Fire and Safety for immediate medical assistance.

EXPOSURE LIMITS

TLV TWA: 1 ppm
STEL: 5 ppm

PERSONAL MONITORING

- Every Brieser employee wears a personal monitor that measures the concentration of H2S gases if in areas that have the potential for exposure to H2S gas. Each monitor is bumped/calibrated every day against a primary calibration gas. All bumps and calibrations are recorded onto a flash drive located in each calibration unit. These flash drives are downloaded into an excel spreadsheet from each individual calibration unit at least quarterly by the Brieser Safety Department. A checkmark √ must be verified on the personal monitor before the employee can use it.

- Each monitor is set to be calibrated every 30 days or if a monitor fails a daily bump test.

- Personal H2S monitors must be worn in the users breathing zone (collar or outside shirt pockets). NOTE: H2S MONITORS MAY NOT BE WORN ON THE BACKSIDE A SHIRT COLLAR OR CLIPPED ONTO THE HARDHAT AS THE HARDHAT CAUSES THE CLIP TO WEAR OUT LOSE THE ABILITY TO GRIP ONTO CLOTHING/OBJECTS WHICH CAUSES MONITORS TO FALL OFF. Personal H2S monitors should not be used to conduct gas checks.

PERSONAL MONITORING continued

- If a personal H2S / a customer's Fixed alarm sounds:
  - Notify personnel in the surrounding area.
  - Immediately leave the area, exiting upwind or crosswind. Report all occurrences per site regulations.
  - Notify supervisor of alarm and the peak reading on the meter,
  - Notify Fire and Safety if needed to investigate.
  - Return to area only when determined to be safe to do so or with proper respirator.
  - Frequent alarms from the same activity are to be reported and investigated to evaluate the need for control measures.
  - Ensure all meter alarms are reported as Near Misses.
  - Should a worker experience a valid personal alarm exceeding 50 ppm (OSHA peak) and was not wearing respiratory protection at the time of the alarm, he/she must be removed from any other H2S exposure for the remaining of the work shift, unless respiratory protection is to be worn.

TRAINING

All Brieser employees who work inside facilities that have the potential for H2S exposures shall have H2S Awareness training.

1. Initial training shall include awareness of H2S safety and its health effects, emergency response procedures, and proper use of personal protective equipment (when applicable). This is satisfied by completing Brieser's Orientation I.
2. Annual H2S awareness training shall be provided by completing an annual Three Rivers computer-based training module or site orientation training for the facility the employee will be working in.
3. Refresher training may also be satisfied by completing the section 37 test located at the end of this policy.

METHODS OF COMPLIANCE

Where feasible, H2S exposure must be controlled through engineering controls and work practices in preference to respiratory protection. Respirators can and should be used to control exposures that are intermittent or caused by emergency conditions and while awaiting engineering controls.

In cases of exposure levels above the limit, a written plan to reduce that exposure will be prepared. This plan will be explained in the monitoring results letter sent to the exposed employee. The area superintendent will receive a copy of this notice and will be responsible for the prompt implementation of this plan.

RESPIRATORY PROTECTION

Respirators shall be provided at Company expense and used by the employee in the following circumstances:

- During the time necessary to install and/or implement feasible engineering controls
- Where feasible engineering controls and work practices by themselves are not sufficient to reduce employee exposure to or below the PEL.
- During intermittent or limited duration work operations where engineering controls and work practices are not feasible or required
- In emergencies.

The Brieser SH&E Manual Section 7 Respiratory Protection shall be referenced if the use of respirators will be used to control H2S exposure on the jobsite.

Generally, for exposures in atmospheres between 1 and 5 ppm, the appropriate respirator will be a negative pressure respirator with organic vapor cartridges. Filter elements must be changed at the end of the service life or at the beginning of each shift, whichever comes first.

PERSONAL PROTECTIVE EQUIPMENT

Brieser does not open any process equipment therefore the exposures to H2S will most likely be from impacted soils or from process leaks. If a situation arises that a Brieser employee will be working in an area contaminated with H2S gas, a specific plan will be developed and approved by the Safety Department.

BRIESER CONSTRUCTION
SAFETY & HEALTH MANUAL
SECTION 37
H2S EXPOSURE
SUB-SECTION TRAINING

Hydrogen Sulfide Exercise
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Score: _____ **%**

Employees Name:		**Date:**	
Company:		**Instructor:**	
Employee #:		**Job Title:**	

Answer the following questions "True" or "False" by circling the appropriate letter.

T	**F**	1. H2S is heavier than air?
T	**F**	2. H2S gas always smells like rotten eggs?
T	**F**	3. Exposure to H2S gas may cause respiratory paralysis & suffocation?
T	**F**	4. Symptoms of overexposure may include: headache, fatigue, irritability, and gastrointestinal problems?
T	**F**	5. If H2S contaminated liquid got into your eyes, you should flush with water for 5 minutes?
T	**F**	6. All Brieser personal monitors must be bumped or calibrated against a primary calibration gas before use daily?
T	**F**	7. The ACGIH TLV TWA for H2S is 1 ppm?
T	**F**	8. A checkmark √ must be verified on the personal monitor before the employee can use it?
T	**F**	9. If my personal H2S monitor alarms I must evacuate the area upwind?
T	**F**	10. If my personal H2S monitor alarms I must tell my supervisor and complete a Near Miss report?

Hydrogen Sulfide Learning Exercise

Brieser Construction

Answers are in bold type.

T	F	1. H2S is heavier than air?
T	**F**	2. H2S gas always smells like rotten eggs? **>100 ppm loss of the sense of smell occurs. The gas deadens your sense of smell**
T	F	3. Exposure to H2S gas may cause respiratory paralysis & suffocation?
T	F	4. Symptoms of overexposure may include: headache, fatigue, irritability, and gastrointestinal problems?
T	**F**	5. If H2S contaminated liquid got into your eyes, you should flush with water for 5 minutes? **15 minutes or longer is the correct timeframe**
T	F	6. All Brieser personal monitors must be bumped or calibrated against a primary calibration gas before use daily?
T	F	7. The ACGIH TLV TWA for H2S is 1 ppm?
T	F	8. A checkmark √ must be verified on the personal monitor before the employee can use it?
T	**F**	9. If my personal H2S monitor alarms I must evacuate the area upwind? **Crosswind and then upwind.**
T	F	10. If my personal H2S monitor alarms I must tell my supervisor and complete a Near Miss report?