



Technical Standard

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 Revision 1.0: This new procedure will help in the LSR implementation.
 Revision 2.0: Document extended for one year to facilitate the release of new nine Life-Saving Rules before full document review and to implement expiration staggering of Safe Operations documents in MSDP

Life Saving Rules:



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| | | | Corporate Element 2 Process Steward | Health & Safety Lead, HOG Operations E2 Steward Representative | Process Performance Improvement Advisor | Corporate Element 2 Process Owner |
| Rev. | Issue Code | Issue Date (YYYY/MM/DD) | Originator | Checker | QA Reviewer | Approver |
| Document Use Disclaimer: | | | To ensure you are using the approved and current revision of this document, please confirm the Revision field contains a whole number (i.e. "1.0" or "2.0" etc.), the Issue Code contains IFU (Issued for Use), and the approved field contains the signature or system approval timestamp of the authority. | | | |
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1.0 Purpose

This Technical Standard defines the requirements for portable gas detection and or monitoring.

2.0 Scope

This Technical Standard applies to works involving gas detection and or monitoring performed by Husky employees and their delegates and contractors within Husky Energy.

This standard does not cover the use of area gas testing equipment used for continuous environmental monitoring.

3.0 Portable Gas Detection/Monitoring Overview

Portable gas detection and or monitoring requirements are designed to help prevent personnel from potential exposure or injury, property damage or adverse environmental impact from hazardous atmospheres that may exist in the workplace. See Section 5.0 for definitions and differences between personal gas monitors and portable gas detectors.

Business Units may adapt this Technical Standard; any revisions must meet the minimum expectation of this corporate Technical Standard. Business Units are required to develop BU- or Site-Specific procedure(s) which would include roles and responsibilities based on the content of this standard, local regulatory requirements and industry best practices.

3.1. Requirements

1. Anticipate, Recognize, Evaluate, Control and Communicate (ARECC) Model must be followed at all times when implementing this standard as contained in Safe Operations Procedure.
2. Gas testing is required when there is a potential for any hazardous atmosphere including, but not limited to: oxygen deficient or enriched environments, flammable/explosive materials, immediately dangerous to life or health (IDLH) atmospheres, toxic atmospheres above permissible exposure limits.
3. If required, perform gas testing in accordance with the Work Authorization and Permitting Technical Standard (see Section 6.1).
4. Portable gas testing must be performed and evaluated by a competent gas tester.
5. The use of personal gas monitors is required during the following activities when there is a danger of a potentially hazardous atmosphere:
 - a. Gas testing
 - b. Confined space entry.
 - c. Emergency response activities (e.g. response to leaks, spills, etc.).
 - d. Excavation and trenching activities.
 - e. Hot work activities.
 - f. During isolation of hazardous energy activities.
 - g. Process and production operations (e.g. manufacturing facility operations, drilling & production operations, etc.).
 - h. Handling or storage of hazardous materials or cargo (e.g. storage tanks, ships/shipyards, tank cars, hazardous waste sites, etc.).
 - i. Other activities or conditions as defined by the business unit/facility.
6. Personal gas monitors must be worn in accordance with the manufacturer's instructions.
7. Atmosphere must be tested for:
 - a. Oxygen content.
 - b. Flammable/explosive gases and vapors.
 - c. Toxic gases and vapors (e.g. hydrogen sulfide (H₂S), benzene).

8. Acceptable atmospheric working conditions must conform with applicable Husky and regulatory requirements
9. Work cannot begin until gas testing results are within acceptable limits defined in requirement #8 (above).
10. All gas testing results must be documented and attached to permits in accordance with the Work Authorization and Permitting Technical Standard (see Section 6.1).
11. Initial gas tests must be performed before work can begin.
12. Confined space gas testing requirements must be done as stipulated in the Confined Space Entry Technical Standard (see Section 6.1).
13. Excavation and trenching gas testing requirements as stipulated in the excavation technical standard.
 - a. Initial gas testing must be performed upon detection of:
 - i. Unexpected odors (e.g. exhaust fumes, H₂S odors, etc.).
 - ii. Unexpected subsurface structures (e.g. pipelines, drums, tanks, etc.).
 - iii. Unexpected discharges.
 - b. Excavation activities must resume no more than 30 minutes after the qualified gas tester has tested the area and cleared it for work.
 - i. If excavation activities begin more than 30 minutes after the area has been cleared for work by the qualified gas tester, the gas test must be redone before excavation activities can resume.
 - c. The qualified gas tester will determine the frequency for follow-up gas testing based on the potential hazards identified and will document this on the Work Authorization
14. Hot work gas testing requirements must be done as stipulated in the Hot Work Technical Standard (see Section 6.1).
15. Potentially stratified atmospheres must be gas tested in accordance with applicable legal requirements, Husky procedures and/or accepted industry best practices.
16. When an area is suspected of being contaminated, gas detection readings must be taken during the approach to the area (e.g. hazardous material spill/release, etc.).
17. Follow up gas testing must be performed:
 - a. In accordance with confined space gas testing requirement 12 (above) when performing confined space work.
 - b. In accordance with hot work gas testing requirement 14 (above) when performing hot work.
 - c. As determined by the qualified gas tester when performing all other types of work in potentially flammable/explosive conditions, immediately dangerous to life or health (IDLH) atmospheres, toxic atmospheres above permissible exposure limits or other hazardous atmospheres.
 - d. After each work break lasting longer than 30 minutes.
 - e. Prior to beginning work after a shift change occurs.
 - f. Anytime there are changes in work conditions (e.g. emergencies, ambient temperature changes, work disruptions, etc.).
 - g. At any other time specified by the reporting unit/facility.
18. If gas testing results exceed the acceptable limits (defined in requirement 8 above), the following actions must be executed in the order listed below:
 - a. Stop work immediately.
 - b. Evacuate workers from the hazardous area.
 - c. Assess the atmospheric hazards and identify mitigation solutions.
 - d. Implement and communicate mitigation solutions.
 - e. Retest the atmospheric conditions.

- f. Revalidate work permits.
19. Portable gas testing instruments and equipment must:
 - a. Be intrinsically safe and approved for use in potentially hazardous atmospheres by a recognized testing organization.
 - b. Be appropriate for use in the environment being monitored (e.g. sensitivity, specificity, temperature, moisture, inert environments and susceptibility of sensor to poisoning or inhibition by other gasses present).
 - c. Be capable of measuring oxygen content, combustible/flammable limits and toxic gasses and vapors accurately to the lowest concentration at which the material becomes hazardous. It is not mandatory to have all-in-one portable gas testing equipment.
 - d. Have both audible and visual functioning alarms.
 - e. Have established alarm set points.
20. Gas testing equipment and supplies (e.g. colorimetric tubes, calibration gases, etc.) must not be used if they have been altered, damaged or have expired beyond the designated service life.
21. Gas testing instruments and equipment must be maintained, inspected and stored in accordance with manufacturer's instructions.
22. Gas testing instruments and equipment must be field verified for accuracy (e.g. functional/bump test, etc.)
 - a. At the start of each shift (i.e. test prior to use). When an instrument does not pass a functional/bump test, it must be removed from service and recalibrated by the manufacturer or authorized technician.
 - b. Monthly (not to exceed 30 days) for instruments and equipment not used regularly.
 - c. At additional intervals in accordance with manufacturer's instructions based on environmental conditions (e.g. exposure to sensor poisons, etc.).
23. Gas testing instruments and equipment must be calibrated with certified calibration gases of known concentration per manufacturer's instructions.
 - a. When an instrument does not pass a field full calibration test, it must be removed from service and recalibrated by the manufacturer or authorized technician.
 - b. Manufacturer calibration of instruments must occur at intervals specified in the manufacturer's instructions.
24. All personnel involved in work activities that require gas testing must be allowed to observe initial and all subsequent gas tests.
25. Personnel assigned responsibilities in gas detection roles and workers using personal gas monitors must be trained and competent.
 - a. Training requirements must be documented.
 - b. Competency assessments must be documented.

4.0 Document Accountability and Responsibility

If you have questions, comments or suggestions regarding this document please contact one of the positions identified below, which is held by the related person identified on the coversheet.

| Role | Position title | Coversheet approval role |
|-----------------------------------|---|--------------------------|
| Corporate Element 2 Process Owner | VP, Process & Occupational Safety | Approver |
| Quality Assurance | HOIMS Process Performance Improvement Advisor | QA Reviewer |

| Role | Position title | Coversheet approval role |
|--|--------------------------------------|--------------------------|
| E2 Steward Representative | Health & Safety Lead, HOG Operations | Checker |
| Author / Document Owner/ Corporate Element 2 Process Steward | Corporate Element 2 Process Steward | Originator |

5.0 Definitions and Acronyms

The table below provides terminology used in this document that needs a more thorough definition.

| Term | Definition |
|---|---|
| Competent Gas Tester | Personnel with requisite knowledge and skill to perform gas testing properly while utilizing approved and available gas testing equipment |
| Gas Testing (Continuous / intermittent) | <p>The process of detecting flammable or hazardous gases in an atmosphere that could impact personnel, asset or environment.</p> <p>Continuous gas testing refers to gas detection on a continuous basis while intermittent gas testing is periodic gas detection at specified intervals.</p> |
| Initial Gas Test | Gas test performed before work can begin |
| Intrinsically Safe | The use of an instrument which will not produce any spark or thermal effects under normal or abnormal conditions that will ignite a specified gas mixture. |
| Personal Gas Monitors | Gas detectors designed to be worn in the users breathing zone and monitor the concentration of flammable gases or vapors, oxygen levels and toxic gases. These detectors are battery powered, safe for use in classified areas, display concentration levels, and alarm (audible & visual) if an unsafe level is detected. |
| Portable Gas Detector | <p>Hand held instruments designed to monitor the concentration of flammable gases or vapors, oxygen levels and toxic gases. These detectors are battery powered, safe for use in classified areas, display concentration levels, and alarm (audible & visual) if an unsafe level is detected. Portable gas detectors depending on their type can be used for, but not limited to:</p> <ul style="list-style-type: none"> • Personal gas monitoring • Testing atmospheres for combustible gas prior to hot work • Testing confined spaces for combustible gas, oxygen deficiency/enrichment, carbon monoxide, and H₂S (hydrogen sulfide) prior to entry, • Monitoring areas suspected of containing or known to contain H₂S gas • Responding to emergencies where combustible gas, carbon monoxide, or H₂S might present a hazard. |
| Portable Gas Testing | This is the process of using portable gas detectors |
| Work | Work is defined as an activity that involves operating facilities, drilling and completions, equipment, construction, demolition, maintenance, inspection, and other similar activities that have the potential to |

| Term | Definition |
|------|---|
| | impact the health, environmental, safety aspects of personnel, the environment and/or a facility. |

Table 1: Terms and Definitions

6.0 Governing and Reference Documents

6.1. Governing Documents

The following documents should be referenced to provide internal governing and external regulatory context for the content of this document.

| Governing Document | Document Title |
|---------------------|------------------------------------|
| Policy | 1.04 Health Safety and Environment |
| Corporate Standard | Safe Operations |
| Corporate Procedure | Safe Operations |
| Technical Standard | Control of Hazardous Energy |
| Technical Standard | Hazard Assessment |
| Corporate Procedure | Ground Disturbance |
| Technical Standard | Confined Space Entry |
| Technical Standard | Work at Height |
| Technical Standard | Hot Work |

Table 2: Governing Documents

6.2. Reference Documents

No reference documents identified.

Appendix - A Versioning History

| Revision Number | Date (drop down pick list) | Reason for Change – highlight what changed in document |
|-----------------|----------------------------|---|
| 0.1 | 25 February 2015 | Issued for network review |
| 0.2 | 25 March 2015 | <ul style="list-style-type: none"> • Changed document type from procedure to technical standard • Updated document as per comments from review session • Issued for approval |
| 1.0 | 10 April 2015 | <ul style="list-style-type: none"> • Issued for use (IFU) • Coversheet and section 4.0 to include VP, P&OS as approver and corporate E2 element owner • Document updated to incorporate comments from approver |
| 1.1 | 29 September 2015 | Added links of referenced Technical Standards |
| 2.0 | 8 August 2018 | Issued for Use: reissued with no significant changes from 1.1. Refer to the notice on the cover page. |

Table 3: Versioning History