

# PUBLIC COMPANY ORLEN LIETUVA

APPROVED BY  
Director of Quality, Labour Safety  
and Environmental Control

18 June 2019  
Order No TV1(1.2-1)-286

## OCCUPATIONAL HEALTH AND SAFETY PROCEDURE BDS-12 USE OF PORTABLE GAS ANALYZERS

### I. GENERAL

#### Purpose and Scope of Application

1. The purpose of Occupational Health and Safety Procedure BDS-12 *Use of Portable Gas Analyzers* (hereinafter – Procedure) is to define procedure of use of portable gas analyzers for the measurement of hazardous substances prior to proceeding with hazardous (hot, depressurization, etc.) works and use of the same for personal protection at Public Company ORLEN Lietuva (hereinafter – the Company).

2. This Procedure shall apply to each employee of the Company as well as to each employee of contracting organization (hereinafter – contractor), if respective works fall within the scope of contract concluded with the Company, who uses portable gas analyzers.

### II. REFERENCES

3. This Procedure has been developed with the account of effective revisions of the following legal regulations and other documents:

3.1. Safety Regulations for Employees Working in Potentially Explosive Atmospheres approved by the Minister of Social Security and Labor of the Republic of Lithuania;

3.2. Lithuanian Hygiene Norm HN 23:2011 'Limit Values of Occupational Exposure to Chemicals. General Requirements for Measurements and Exposure Assessments' approved by the Minister of Health and Minister of Social Security and Labor;

3.3. List of Measuring Instrument Groups Assigned to Legal Metrology and Time Intervals between Verifications approved by the Minister of Economy of the Republic of Lithuania;

3.4. LST EN 60079-29-2:2008 'Explosive Atmospheres. Part 29-2. Gas detectors. Selection, installation, use and maintenance of detectors for flammable gases and oxygen' (IEC 60079-29-2:2007);

3.5. PKN ORLEN Standard S9 'Measurements of Hazardous Substances'.

### III. TERMS AND DEFINITIONS

4. Terms used herein are defined as follows:

**Portable gas analyzer (gas analyzer)** – an instrument carried by an employee designed to measure the concentration of combustible and toxic gases and oxygen in air, and warn by means of an audible or visual signal about danger when hazardous concentration is reached. Gas analyzers may be used to measure hazardous substances before proceeding with hazardous (hot, depressurization, etc.) works and for personal safety.

**Lower explosive limit (LEL) or lower flammability limit (LFL)** – the lowest concentration of a gas or a vapor in air capable of producing a flash of fire in presence of an

ignition source. LEL is measured in percent by volume and appears in the monitor of gas analyzer as % LEL.

**Bump test** – periodical functionality check of gas analyzer in accordance with manufacturer's requirements.

**Work environment** – space surrounding an employee where exposure to hazardous and/or dangerous factors is likely.

**User** – an employee of the Company or contractor using gas analyzer in cases and as prescribed by the Company.

**Reset** – resetting of the sensors of gas analyzer to zero using clean air in accordance with manufacturer's requirements.

**Pump test** – gas analyzer pump testing in accordance with manufacturer's requirements to check whether the pump is working properly (e.g. closing the air inlet).

**MFRB** – Mažeikiai Fire and Rescue Board for Protection of Facilities.

**Potentially explosive atmosphere** – an atmosphere which may become explosive due to in-situ or operational conditions; entries into such territories within the Company are marked with Ex signs.

**Head of organizational unit** – head of organizational unit (division, department, group, operations subdivision, complex, shop, process unit, section, etc.) at any managerial level of the Company.

#### IV. DUTIES AND RESPONSIBILITIES OF EMPLOYEES

5. The head of organizational unit shall be responsible for:

5.1. Arrangement of procurement of required number of gas analyzers and training of employees how to use them;

5.2. Establishment of cases (work places, works, crafts, etc.) when gas analyzers must be used for personal protection;

5.3. Arrangement of presentation of gas analyzers for testing (metrological verification, bump test) and repair.

6. Before operation, the users of gas analyzers must get familiar with the requirements for use established herein and prescribed by manufacturers and comply with such.

#### V. REQUIREMENTS FOR USE AND INSPECTION

7. Threshold values for gas analyzers must be set according to type of work and established requirements. Usually for gas analyzers these threshold values are set: LEL – 2%, UEL – 5%; oxygen – lower limit 19.5%, upper limit 23.5%; hydrogen sulfide (H<sub>2</sub>S) 7 mg/m<sup>3</sup> (5ppm); carbon monoxide (CO) 40 mg/m<sup>3</sup> (35ppm).

8. At least once every 6 months gas analyzers that are in use must be inspected according to requirements of relevant legal acts effective in the Republic of Lithuania. Gas analyzer cannot be used if it does not have a sticker with effective date of inspection on it.

9. At least once per month gas analyzers used by employees of the Company must undergo bump test at MFRB.

10. For measurement of concentrations of specific substances gas analyzers designed for respective substance must be used, e.g. hydrogen concentration must be measured with a hydrogen gas analyzer.

11. Before measurements, the user must turn gas analyzer on in a clean work environment (office, control room, outside the limits of a process unit) and, if so prescribed by the manual, reset it and perform pump test.

12. Use of gas analyzers with visible damages and/or malfunctions (e.g. if body or display is cracked, the readings do not reset to the set values when work environments change, audible or visual alert signals are out of order, etc.) is prohibited.

13. User of gas analyzer must make sure that work or personal protective equipment do not cover air suction inlet as well as audible and visual alarms of the analyzer.

14. During sampling, air suction inlet of operated gas analyzer must be protected from entry of petroleum products and water. Furthermore, analyzer must be protected against direct physical factors such as welding sparks, hot surfaces, mechanical impacts, etc.

15. After end of use, gas analyzer must be turned off and its battery charged.

16. Analyzer must be kept with battery fully charged therefore it is recommended to keep it in desktop charging station.

## **VI. MEASUREMENTS OF HAZARDOUS SUBSTANCES**

### **General requirements for hazardous substance measurements**

17. Cases when it is required to perform measurements of hazardous substances, including hazardous concentrations, are established in these Occupational Health and Safety (OHS) Procedures of the Company: OHS Procedure BDS-6/1 *Equipment Depressurization and Maintenance Works*; OHS Procedure BDS-6/2 *Works in Confined Spaces*; OHS Procedure BDS-7 *Hot Works*; OHS Procedure BDS-8 *Sampling*; OHS Procedure BDS-10 *Use of Work Equipment in Potentially Explosive Atmospheres*; OHS Procedure BDS-31 *Earthworks*.

18. Gas analyzers for personal protection must be used in all cases when release or emission of hazardous substances or mixtures is likely, in particular:

18.1. When hazardous substances are drained and sampled for laboratory tests;

18.2. When petroleum products are loaded or unloaded;

18.3. When burners of process heaters are ignited;

18.4. When process equipment is depressurized, blinds are installed and demounted.

19. Before proceeding with and during hazardous work, personal protection equipment (PPE) prescribed by the issuer of work permit according to substances and other hazards existing in respective process unit must be worn.

### **Requirements for hazardous substance measurements for hot works**

20. Before proceeding with category 1 hot works:

20.1. At least 11 meter radius around the place of hot works must be checked;

20.2. Concentrations of hazardous substances must be measured in hazardous areas (at flanged connections, drain valves, valve packing glands, industrial sewer wells, etc.);

20.3. For works at height, hazardous substance concentrations must be additionally measured in lower work platforms and at zero level.

21. During sampling operation, employee must stand with back turned to the wind to avoid inhalation of vapors hazardous to health. It is forbidden to perform sampling operations during lightning, to perform sampling from the top of storage tanks, drums during storm (heavy rain or snowfall when wind speed is 20 m/s and higher).

### **Requirements for hazardous substance measurements prior to issue of permit for depressurization works and works in confined spaces**

22. Airborne concentrations of substances in confined spaces must be measured through existing process openings (hatches, air vents, connecting pipes, etc.) using special gas analyzers with suction and sampling probes.

23. Hazardous substances in process vessels with oxygen-free environment (e.g., filled with nitrogen) must be measured using gas analyzers with infrared LEL sensors.

24. While sampling from confined spaces the construction of the container has to be taken into consideration, e.g., whether there are any parts enclosed with walls where hazardous gases or vapors may accumulate. Additional samples have to be taken from these places.

25. Before and during measurements of hazardous substances in a confined space, mechanical ventilation of confined space (if any) must be turned off - ventilation must be turned off at least 10 minutes prior to measurement.

26. Before proceeding with works, air samples from the inside of tower must be taken from every open hatch and works inside of tower must be covered by continuous air monitoring using gas analyzer for uninterrupted analysis of selected parameters of work environment and audible warning of deviations from set values.

27. At least 3 vertical samples have to be taken from the inside of tanks and vessels: from the bottom of tank/vessel or immediately above the level of liquid in the tank/vessel (around 0.5 - 1 m from the surface), from the middle and top (under the roof) of tank/vessel. Sampling points have to be as far from existing openings (hatches, air vents, connecting pipes, etc.) as possible.

28. In confined space concentrations of oxygen, substances hazardous in terms of explosion and harmful substances must be measured.

## **VII. MAINTENANCE AND SERVICING OF GAS ANALYZERS**

29. If gas analyzer gets into water/dirt, falls from height over 1 m on a hard surface or shows incorrect readings, it must undergo ad hoc inspection (bump test).

30. Excess gas concentrations (above measurement range) may damage the sensors of gas analyzer. If process unit (pipeline, vessel, tank, etc.) was not prepared as prescribed by OHS procedures of the Company and contains high concentrations of hazardous vapors or gases, measurements with gas analyzer are forbidden.

31. If analyzer reads concentrations higher than 50 ppm for CO and H<sub>2</sub>S or higher than 50% LEL, measurements must be stopped immediately and sensors must be ventilated in fresh air (reset).

32. If gas analyzer is out of use for longer than one month, its battery must be fully charged (at least once a month).

33. It is prohibited to charge the battery of gas analyzer in a potentially explosive atmosphere.

34. Vapors of silicon, alcohol and other solvents as well as aerosols (e.g., dyes, detergents, lubricants, sealing materials, etc.) have negative effect on the sensors of analyzer. Therefore it is prohibited to operate and keep gas analyzers in places where such substances are handled or stored.

## **VIII. ACTIONS IN CASE OF DANGER**

35. If alarm of personal protection gas analyzer activates and work environment becomes hazardous, employee must:

35.1. Suspend the works immediately;

35.2. Switch off all electrified, battery-powered or electronic equipment used, turn off the engine/motor of vehicle or any other work machinery;

35.3. Leave the site of work going perpendicularly to the direction of wind;

35.4. Immediately call ambulance, if unwell;

35.5. Inform immediate superior.

36. In case of necessity to perform works in such atmosphere, the head of organizational unit of the Company or contractor's work manager in charge for works must assess potential risks arising from concentrations of hazardous substances, select appropriate PPE and authorize execution of works with the use of selected PPE.

## **IX. EMPLOYEE TRAINING**

37. Employees performing air tests must be trained how to use gas analyzers and interpret their readings properly, be familiar and comply with analyzer operation manual.

## **X. FINAL PROVISIONS**

38. This Procedure shall be amended accordingly whenever new normative legal acts or internal documents of the Company containing requirements to be taken into account come into effect or existing ones are amended or modified accordingly.

39. Responsibility for periodic review and updating of this Procedure, if needed, shall lie with Director of Quality, Labour Safety and Environmental Control.

---

Prepared by  
Process Safety Specialist  
Vytautas Stonkus

---

2019- -

AGREED WITH:  
Director of Quality, Labour Safety and Environmental Control  
Saulius Pocevičius