Specifications for Compressed oxygen gas

Guyana National Bureau of Standards

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## Contents

Foreword i

Members of the Technical Committee- Chemicals ii

Standard

1. Scope 1

2. Normative reference 1

3. Definitions 1

4. Requirements 1

5. Sampling 2

6. Test methods 2

Appendix A 3

Appendix B 4
Foreword

This Guyana standard was revised by the Technical Committee-Chemicals of the Guyana National Bureau of Standards in 2022.

This standard was originally developed using the Indian Standard IS 309. It was developed to provide guidelines for manufacturing and testing of compressed oxygen gas. The standard was revised to update the methods of tests for the manufacture of compressed oxygen gas.

This standard is intended to be used by manufacturers, suppliers and consumers of compressed oxygen gas.
# Members of the Technical Committee – Chemicals

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Specification for compressed oxygen gas

1. Scope
This standard prescribes requirements, and the methods of sampling and test for compressed oxygen gas for industrial and medical use. The standard does not cover aviation/aircraft oxygen.

2. Normative reference
The Guyana Standards given below contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

*GYS 9-14, Specification for labelling of commodities- Part 14: Labelling of hazardous chemicals*

*GYS 453, Specification for the storage, handling and transport of steel compressed gas cylinder*

*ISO2859-1, Sampling procedures for inspection by attributes —Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

3. Definitions

3.1. compressed oxygen gas
95 percent or higher pure oxygen gas that has been stored within a tank or cylinder.

3.3. cylinder
High pressure, non-reactive seamless tempered steel container used for the storage of compressed gas.

3.4. industrial use
Purpose relating for use in the manufacturing industry.

3.5. lot/batch/consignment
A definite amount of some product, material or service, collected together.

3.6. pure chemicals
Chemicals that do not contain impurities which affect the results of analysis.

4. Requirements

4.1. Percentage
Oxygen in compressed gas shall be minimum 99.5 percent by volume, when tested by the methods
4.2. **Labelling**

Cylinders shall be labelled according to ‘GYS 9-14: Specification for labelling of commodities- Part 14: Labelling of hazardous chemicals’.

4.3. **Storage**

Storage of compressed gas cylinders shall be performed according to ‘GYS 453: Specification for the storage, handling and transport of steel compressed gas cylinder’.

5. **Sampling**

The method of drawing representative samples of the material and criteria of finding the conformity of the material for the requirements of this specification shall be as prescribed in Appendix A.

6. **Test methods**

6.1 **Purity of oxygen**

The method of test to determine the purity of the material shall be performed by an oxygen analyzer. A general method of operation of an oxygen analyzer is given in Appendix B.

6.2 **Leak test**

6.2.1 This test shall be performed using a soapy solution to determine any visible leak.

6.2.2 This test shall be performed twice for each batch of oxygen gas manufactured. The first test may be performed during filling at 1000 psi and 2000 psi on the valve. The second test may be performed after filling each cylinder.

6.3 **Pressure test**

This test shall be conducted on every cylinder to determine the final approved pressure before the cylinder is sealed.
Appendix A

A1 Sampling of compressed oxygen cylinders

A1.1 Samples shall be selected at random from the batch, lot or consignment.

A1.2 Sample size shall be determined according to Table 1.

<table>
<thead>
<tr>
<th>Lot size</th>
<th>Sample size</th>
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<tbody>
<tr>
<td></td>
<td>Industrial oxygen</td>
</tr>
<tr>
<td>2 to 8</td>
<td>2</td>
</tr>
<tr>
<td>9 to 15</td>
<td>3</td>
</tr>
<tr>
<td>16 to 25</td>
<td>5</td>
</tr>
<tr>
<td>26 to 50</td>
<td>8</td>
</tr>
<tr>
<td>51 to 90</td>
<td>13</td>
</tr>
<tr>
<td>91 to 150</td>
<td>20</td>
</tr>
<tr>
<td>151 to 280</td>
<td>32</td>
</tr>
</tbody>
</table>
Appendix B

B.1 Determination of the purity of oxygen

B.1.1 Scope

The method relies on a portable digital oxygen analyzer. It uses an advanced electrochemical galvanic fuel cell type sensor and is able to efficiently gauge the purity of oxygen cylinders.

B.1.2 Principle

The analyzer relies on an electrochemical galvanic fuel sensor to measure the partial pressure of oxygen from low ppm to 100% levels. This is measured in inert gases, gaseous hydrocarbons, helium, hydrogen, mixed gases, acid gas streams and ambient air. The oxygen, which acts as the fuel for the electrochemical transducer, diffuses into the sensor and reacts chemically at the sensing electrode to produce an electrical current output, proportional to the oxygen concentration in the gas phase. The sensor’s signal output is linear over all ranges and remains virtually constant over its useful life.

B.1.3 Apparatus/Materials

- Battery
- Sensor
- Gas sample
- Gas scrubber
- Flow indicator
- Span gas
- Sample gas

B.1.4 Procedure

1. Power on the device by pushing the on/off button. If stored for an extended period before use, charge before operating.

2. Access the MAIN MENU by pressing the MENU key.

3. Advance the reverse shade cursor using the ARROW keys to highlight CALIBRATION.

4. Press the ENTER key to select the highlighted menu option and advance the cursor using the ARROW keys to highlight the specific calibration (Span, zero.)

5. Allow approximately 60 seconds for the calibration process while the processor determines whether the signal output or reading has stabilized within 60% of the full-scale low range.

6. Following calibration, the portable oxygen purity analyzer returns to the SAMPLE mode after 30 seconds.

7. Select the desired sampling mode if applicable.
8. Use metal tubing to transport the sample gas to the portable oxygen purity analyzer. Assure there are no restrictions in the sample line.

9. If the analyzer is equipped with an optional sampling pump and is intended for use in both positive and atmospheric/slightly negative pressure applications where a flow meter valve is involved – ensure the valve is completely open when operating the sampling pump. Assure the sample is adequately vented for optimum response and recovery – and safety.

10. Allow the oxygen reading to stabilize for approximately 10 minutes at each sample point.

11. After use, store the portable oxygen purity analyzer with the power OFF.

12. Calibration intervals for devices shall be approximately three months.

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