



## STANDARD OPERATING PROCEDURE

<b>Department:</b> Quality Control	<b>SOP No.:</b>
<b>Title:</b> Procedure for Compressed Air Analysis	<b>Effective Date:</b>
<b>Supersedes:</b> Nil	<b>Review Date:</b>
<b>Issue Date:</b>	<b>Page No.:</b>

### 1.0 OBJECTIVE:

To lay down a procedure for Compressed Air Analysis.

### 2.0 SCOPE:

This procedure is applicable to Compressed Air Analysis.

### 3.0 RESPONSIBILITY:

Officer, Executive – Quality Control.

Head of Department – Quality Control.

### 4.0 PROCEDURE:

#### 4.1 Handling of Gastec tube:

4.1.1 Select the specific Gastec tube. Carefully break both the ends of the detector tube.

4.1.2 Then insert the detector tube into the sampling MCAS sampler with the arrow **G▶** on the tube pointing toward the pump.

4.1.3 Use this tube within the temperature range of 0-40°C & relative humidity range of 0-90%

4.1.4 Wait until the sampling time has elapsed.

4.1.5 Remove the tube from MCAS sampler. Then read and record the indication at end of the color change layer.

#### 4.2 Chemical Analysis of compressed air.

##### 4.2.1 Determination of Carbon Dioxide:

4.2.1.1 Select the specific Gastec tube for the testing of carbon dioxide.

4.2.1.2 Carefully break both the ends of the detector tube.

4.2.1.3 Then insert the detector tube into MCAS sampler with the arrow **G▶** on the tube pointing towards the sampler of the color change layer.

4.2.1.4 Pass Compressed air through a carbon monoxide detector tube and take the flow on sampler on 100 ml/ min and sampled for two minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer



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.The indicator change should not correspond to more than 500 ppm.

### **4.2.2 Determination of Carbon monoxide:**

4.2.2.1 Select the specific Gastec tube for the testing of carbon monoxide.

4.2.2.2 Carefully break both the ends of the detector tube.

4.2.2.3 Then insert the detector tube into MCAS sampler with the arrow **G▶** on the tube pointing towards the sampler of the color change layer.

4.2.2.4 Pass Compressed air through a carbon monoxide detector tube and take the flow on sampler on 100.0 ml/min and sampled for 4 minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer

.The indicator change should not correspond to more than 5 ppm.

### **4.2.3 Determination of Water vapour:**

4.2.3.1 Select the specific Gastec tube for the testing of water vapour.

4.2.3.2 Carefully break both the ends of the detector tube.

4.2.3.3 Then insert the detector tube into MCAS sampler with the arrow **G▶** on the tube pointing towards the sampler of the color change layer

4.2.3.4 Pass Compressed air through a water vapour detector tube and take the flow on sampler on 100 ml /min and sampled for 5 minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer .The indicator change should not correspond to more than 880 mg/m<sup>3</sup>.

### **4.2.4 Determination of Oil:**

4.2.4.1 Select the specific Gastec tube for the testing of oil mist.

4.2.4.2 Carefully break both the ends of the detector tube.

4.2.4.3 Then insert the detector tube into MCAS sampler with the arrow **G▶** on the tube pointing towards the sampler of the color change layer.

4.2.4.4 Pass Compressed air through oil mist Gastec tube and take the flow on sampler on 1 litre/minute and sampled for 20 minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer .The indicator change should not correspond to more than 0.2 mg/m<sup>3</sup>.



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**4.2.5 Determination of Nitrogen monoxide and Nitrogen dioxide:**

- 4.2.5.1 Select the specific Gastec tube for the testing of Nitrogen monoxide & nitrogen dioxide.
- 4.2.5.2 Carefully break both the ends of the detector tube.
- 4.2.5.3 Then insert the detector tube into MCAS sampler with the arrow **G** on the tube pointing towards the sampler of the color change layer.
- 4.2.5.4 Pass Compressed air through Nitrogen monoxide & nitrogen dioxide gastec tube and take the flow on sampler on 100 ml/min and sampled for 2 minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer .The indicator change should not correspond to more than 2 ppm.

**4.2.6 Determination of Sulphur dioxide:**

- 4.2.6.1 Select the specific Gastec tube for the testing of Sulphur dioxide.
- 4.2.6.2 Carefully break both the ends of the detector tube.
- 4.2.6.3 Then insert the detector tube into MCAS sampler with the arrow **S** on the tube pointing towards the sampler of the color change layer.
- 4.2.6.4 Pass Compressed air through Sulphur dioxide gastec tube and take the flow on sampler on 100 ml/min at and sampled for 2 minute as per manufacturer recommendation. Remove the tube from the sampler. Then read and record the indication at end of the color change layer. The indicator change should not correspond to more than 1 ppm.
- 4.2.6.5 All Gastec tube result record in Annexure-I

**4.2.7 GASTEC TUBE CODE DETAILES**

**4.2.7.1**

S.No	Name of Gastec Tube	Code No.
1.	Carbon Dioxide	2 LC
2.	Carbon monoxide	1LC
3.	Oil Mist	109 AD
4.	Water Vapour	6A
5.	Sulphur Dioxide	5La
6.	Nitrogen Oxides	11L



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**4.3.7 Determination of Oxygen content(Assay):**

4.3.7.1 The concentration of oxygen is determined using an Oxymeter. Refer to SOP.

4.3.7.2 Record the value as % v/v and the assay should be within 20.4-21.4 % v/v

**4.4.8 Frequency:**

Validation: Consecutive three days.

Revalidation: Once in Six Month for one days.

**5.0 ANNEXURE (S):**

Annexure-I: Sample Inward Register for Compressed Air.

Annexure-II: Gastec Tube Sampling log sheet.

Annexure-III: Test Report of Compressed Air.

**6.0 REFERENCE (S):**

SOP for Operation and calibration of Oxymeter

SOP for Cleaning and Operation of MCAS ECO Compressed Air /Nitrogen Gas Sampler

SOP for Preparation, approval, distribution, control, revision and destruction of Standard Operating Procedure (SOP).

**7.0 ABBREVIATION (S)/ DEFINITION (S):**

PPM- Parts Per Million

V/V- Volume/Volume

SOP- Standard Operating Procedure

**REVISION CARD**

S.No.	REVISION No.	REVISION DATE	DETAILS OF REVISION	REASON (S) FOR REVISION	REFERENCE CHANGE CONTROL No.
1	00	----	----	New SOP	----







**PHARMA DEVILS**  
QUALITY CONTROL DEPARTMENT

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**ANNEXURE III**  
**TEST REPORT OF COMPRESSED AIR**

<b>Date:</b>	<b>Sampling Point:</b>
<b>A.R.No.:</b>	<b>Sampled by:</b>
<b>MCAS ID. No.:</b>	<b>Oxymeter ID. No.:</b>

**CHEMICAL TEST**

<b>Test</b>	<b>Observation</b>	<b>Limits</b>
Carbon Dioxide		Not More than 500 ppm
Carbon Monoxide		Not More than 5 ppm
Water Vapour		Not More than 880(mg/m <sup>3</sup> )
Oil		Not More than 0.2 (mg/m <sup>3</sup> )
Nitrogen Monoxide and Nitrogen dioxide		Not More than 2 ppm
Sulphur dioxide		Not More than 1 ppm
Determination of Assay (Oxygen Content)		20.4-21.4 % v/v

**Remarks:** The above sample complies / Does not Comply as per above limit.

**Analyzed By**  
(Signature & Date)

**Checked By**  
(Signature & Date)

**Approved By**  
(Signature & Date)