

Ecological Laboratories, Inc.
2525 N.E. 9th Avenue
Cape Coral, FL

Performance Test (Removal of Hydrogen Sulphide
and Ammonia) of Liquid Deodorant Microbe Lift
IND/ACF-32

Test Report

January 2008

Approved By

Mark J. Krupka

(Technical Director)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

TABLE OF CONTENTS

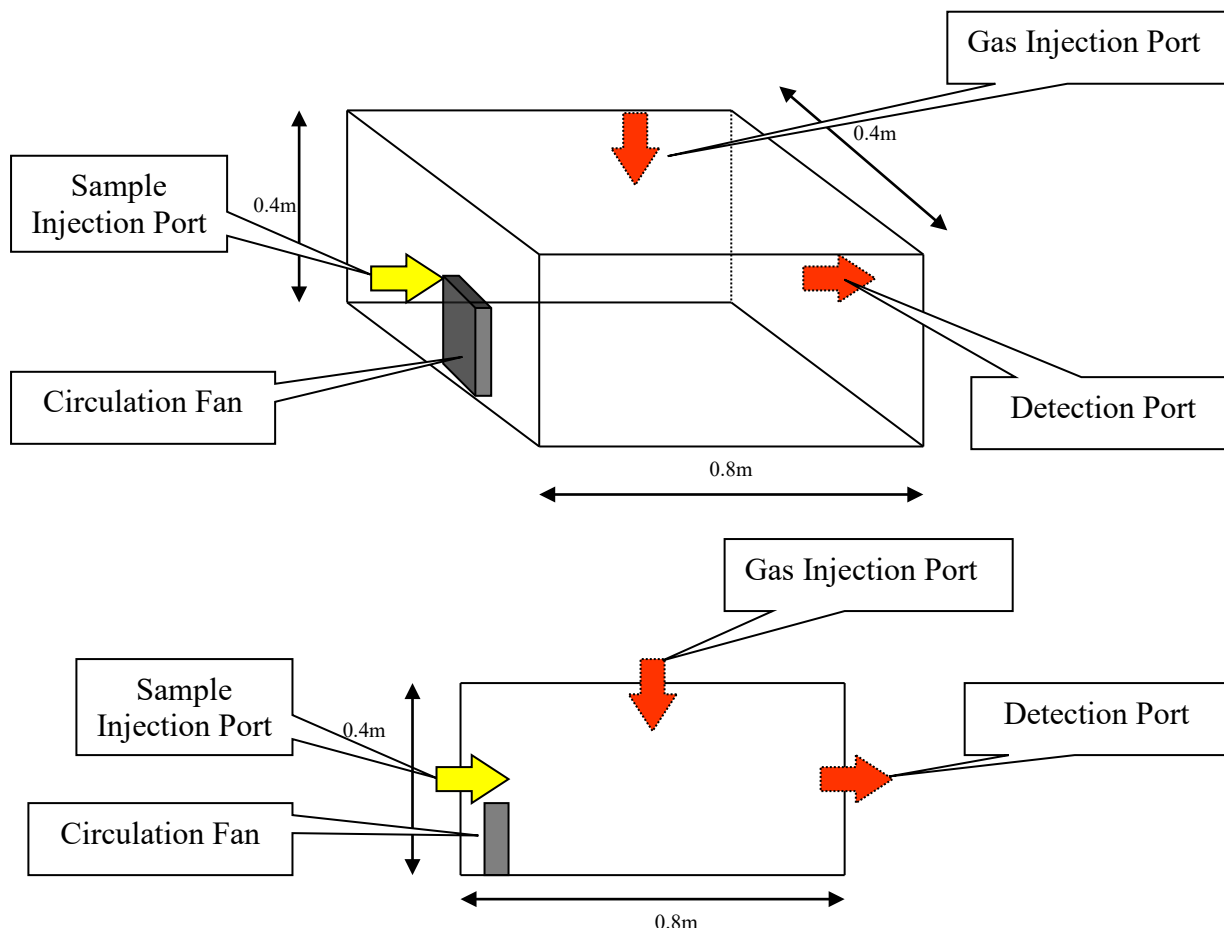
	Page
1 OBJECTIVE.....	1
2 THE REACTION CHAMBER	2
3 TESTING PROCEDURES.....	4
4 TEST RESULTS.....	5
5 CONCLUSION	5

1 OBJECTIVE

- 1.1 The test was performed by Wellab Limited on 8th January 2008 and the objective of the test was to determine the removal efficiency of a liquid deodorant called Microbe Lift IND/ACF-32 provided by Cinotech Solution Limited.
- 1.2 On 8th January 2008, the liquid deodorants were delivered to Wellab for testing its efficiency in removing hydrogen sulphide and ammonia gas of a known concentration.

2 THE REACTION CHAMBER

2.1 An air-tight reaction chamber was established with size 0.4m x 0.4m x 0.8m. A schematic drawing is shown in the following diagram:



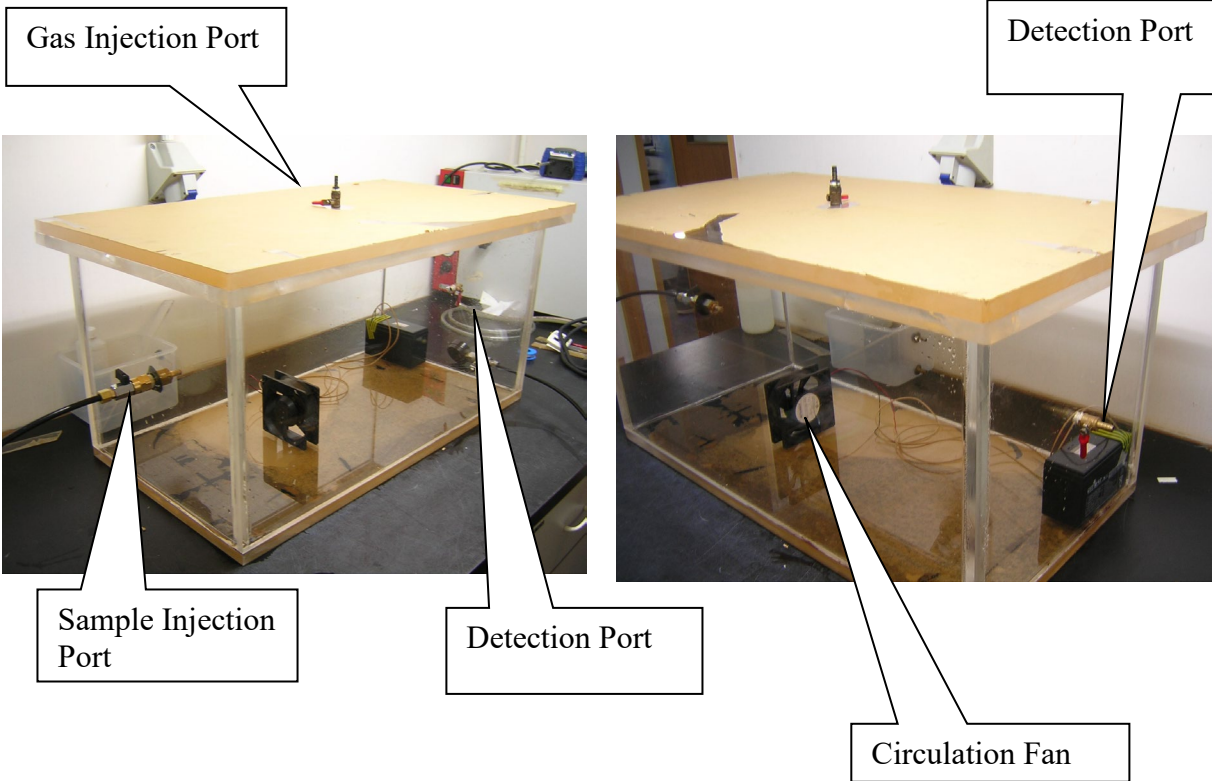
2.2 In the chamber, a circulation fan has been installed near the sample injection port to disperse the liquid deodorant sample.

2.3 The reaction chamber has one sample injection port, which is centrally located on the side for the application of liquid deodorant sample. The sample injection port was equipped with a 0.3 mm orifice diameter nozzle.

2.4 The reaction chamber also has a separate gas injection port, which is located at the top of the chamber, for introducing hydrogen sulphide (H₂S) and ammonia (NH₃) gas to fill the chamber.

2.5 A detection port was set directly opposite to the sample injection port, in the reaction chamber. The detection port was used for collecting air sample inside the chamber by an air pump for H₂S/ NH₃ gas measurement.

2.6 The following photos show the set-up of the reaction chamber:



3 TESTING PROCEDURES

- 3.1 During the test, the reaction chamber was filled with standard testing gas (H₂S or NH₃) through the gas injection port and allow for mixing/stabilization after introduction of the standard gas by operating the circulation fan. The reaction chamber was stabilized at normal laboratory room temperature/relative humidity and without any pH adjustment. This initial H₂S concentration within the chamber should be at the targeted level of $25 \pm 5 \text{ mg/m}^3$. This initial NH₃ concentration within the chamber should be at the targeted level of $5 \pm 2.5 \text{ mg/m}^3$
- 3.2 After mixing/stabilization, an air sample from the chamber through the detection port was collected and measured its H₂S/NH₃ gas according to ISC 3rd ed. 701 and 401¹. The rate of air sampling rate was suitably adjusted such that the air sampling time was at least 1 minute while the minimum detection level of 1 mg/m^3 can be attained for the H₂S/ NH₃ measurement. The temperature and relative humidity within the reacting chamber were recorded as well.
- 3.3 A specified volume (21mL) of liquid deodorant sample through the sample injection port was applied at an appropriate injection rate (in mL/min).
- 3.4 An air sample was collected from the chamber through the detection port after application of the liquid deodorant sample for 1 hour and 5 hours. The H₂S/ NH₃ gas concentration in the air sample was measured. The temperature and relative humidity within the reaction chamber were also recorded.

¹ All gas measurements in this project refer to Intersociety Committee, Methods of Air Sampling and Analysis, 3rd edition 1989, James P. Lodge, Jr. editor, Lewis publishers, USA.

4 TEST RESULTS

4.1 The performance test was conducted on 8th January 2008. The test results are shown below:

Condition of the Reaction Chamber

Volume of the Chamber	0.128 m ³ (0.4 m x 0.8 m x 0.4 m)
Temperature (°C)	20.3
Relative Humidity (%)	56

Deodorant Sample Test

Injection Rate (mL/min)	42
Volume of Deodorant Sample (mL)	21
Dilution Factor (F)	2

Test Parameter	Initial concentration	Concentration after	
		1 hour	2 hours
H ₂ S, mg/m ³	28.48	11.08	2.80
Removal efficiency, %	N/A	61%	90%

Test Parameter	Initial concentration	Concentration after	
		1 hour	2 hours
NH ₃ , mg/m ³	18.82	2.33	1.31
Removal efficiency, %	N/A	88%	93%

5 CONCLUSION

5.1 The test results show that the liquid deodorant, Microbe Lift IND/ACF-32, could reduce both hydrogen sulphide and ammonia gas content.