Laboratory Testing: Microbe-Lift® Technology's Efficacy Improving Gas Capture in Biofilters in Seoul, Korea

Location: **This testing was conducted at LG Twin Towers, Seoul, Korea**

Background: MICROBE-LIFT®/HOG was designed for use in manure pits where it has been used successfully for over thirty years. One of the major benefits provided by this technology is substantial reduction in sulfur-containing odors.

Objective: Based on years of successful treatment controlling sulfide odors, the goal of this testing was to determine the potential for utilizing MICROBE-LIFT® technology in biofilters to improve removal of sulfur-containing odors in a wide variety of applications.
LG set up testing in their biofilters units as specified in the following charts:

Condition	Temperature: 30 Degrees C Pressure: 760 mm
Bio-Filter Reactor	Microorganism: **MICROBE-LIFT®**/HOG Bio Filter: Fiber Bio-Filter Thickness: 10 Cm Reactor Diameter: 3.2 Cm Reactor Size: 8.04 Cm^2 Reactor Volume: 80.4 Cm^3 HRT: 10.49
Input Gas Conc	GAS: DMS **(Di Methyl Mercaptan)** Inlet Conc.: 140 - ppm Flow Speed: 0.95 cm/s Flow Rate: 460 Cm^3/min
Output Gas Conc.	Temperature: 30 Degrees C Outlet Conc.: 0 - 1 ppm

Fig. 1:

This test was set up to determine the potential degradation of methyl mercaptan.

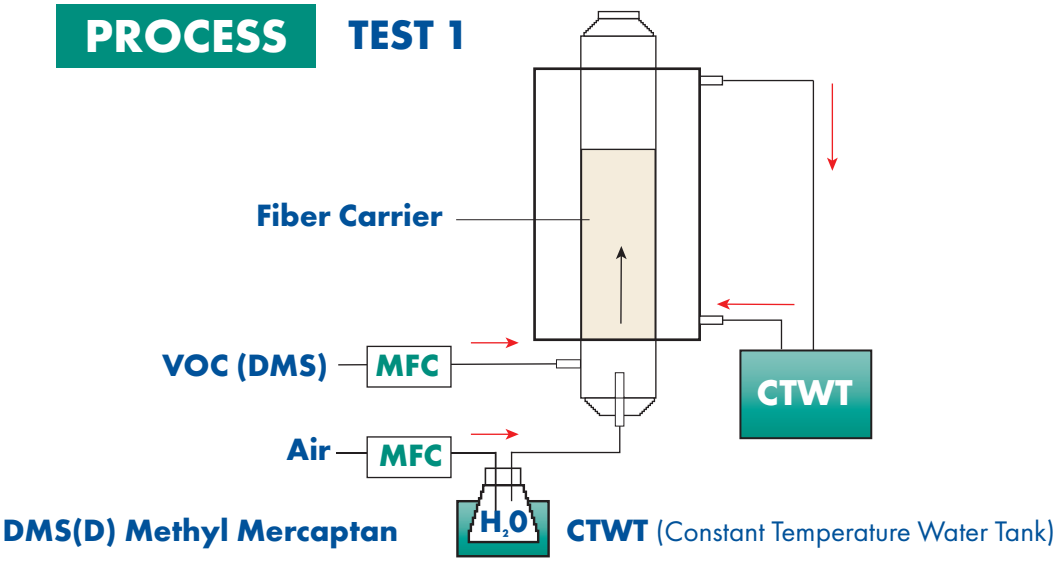

Fig. 2: *This schematic shows the design of the experiment whereby gas was passed through the filter along with humidified, temperature controlled air. Exhaust was recycled establishing a given reaction time.*

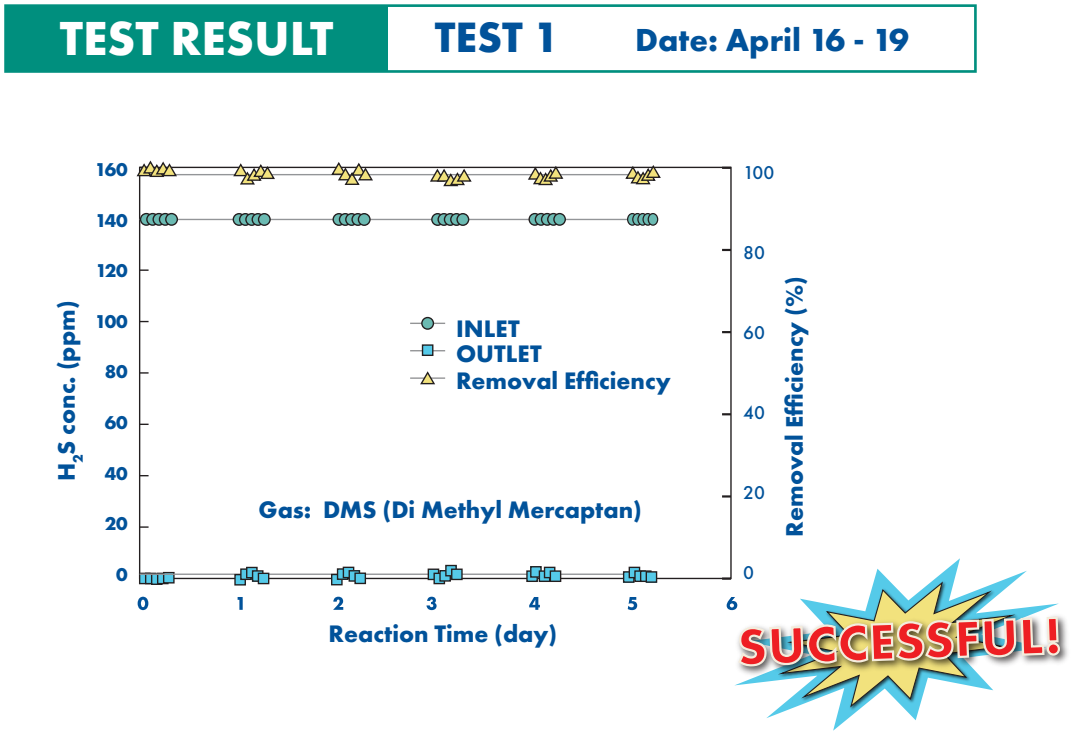

Fig. 3: *This test was considered successful with close to 100% removal of the odor causing gas with as little as one day reaction time.*

Condition	Temperature: 30 Degrees C Pressure: 760 mm
Bio-Filter Reactor	Microorganism: **MICROBE-LIFT®**/HOG Bio Filter: **MICROBE-LIFT®** Filter Thickness: 10 Cm Reactor Diameter:10 Cm Reactor Size: 78.5 Cm^2 Reactor Volume: 785 Cm^3 HRT: 11.785
Input Gas Conc	GAS: H_2S Inlet Conc.: 140 - 600 ppm Flow Speed: 0.85 cm/s Flow Rate: 4,000 Cm^3/min
Output Gas Conc.	Temperature: 30 Degrees C Outlet Conc.: 0 - 30 ppm

Fig. 4: *This test utilized* MICROBE-LIFT® *biofilters with* MICROBE-LIFT® */HOG to degrade* H_2S.

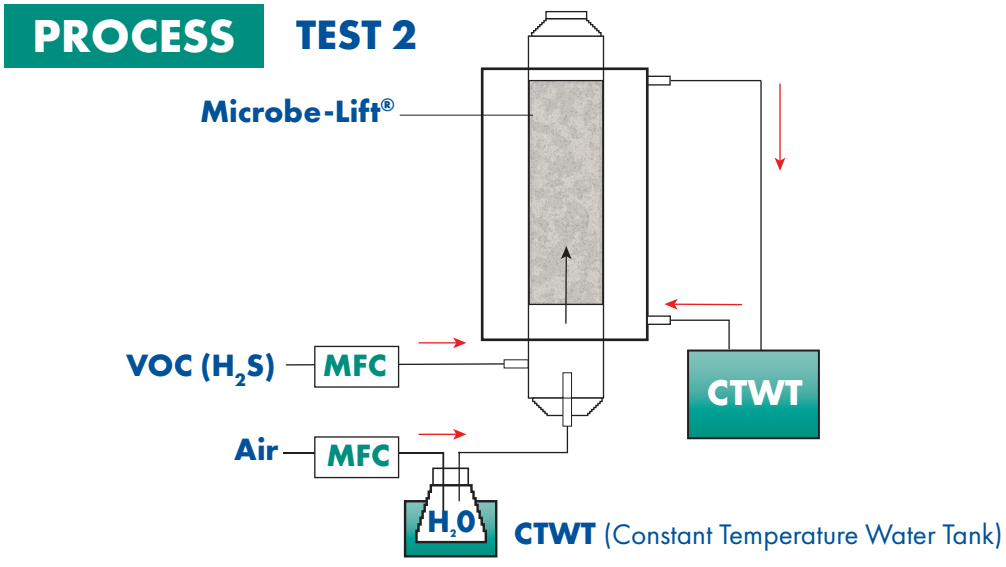

Fig.5: *The test format was the same as the first test except different pacing material* MICROBE-LIFT® *was used.*

TEST RESULT	TEST 2	Date: April 16 - 19

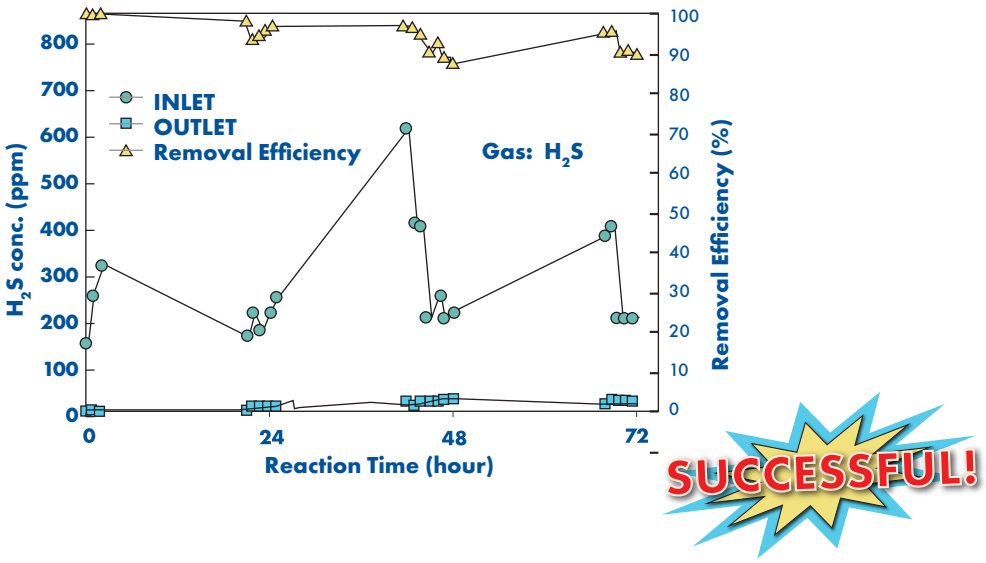

Fig. 6: *Again results were successful with control of H_2S ranging from 75% to 90%.*

Condition	Temperature: 30 Degrees C Pressure: 760 mm
Bio-Filter Reactor	Microorganism: **MICROBE-LIFT®**/HOG Bio Filter: Fiber Bio-Filter Thickness: 11 Cm Reactor Diameter: 5.3 Cm Reactor Size: 22.06 Cm^2 Reactor Volume: 242.7 Cm^3 HRT: 4.8 sec
Input Gas Conc	GAS: **Styrene Monomer** Inlet Conc.: 400 - 500 ppm Flow Speed: 10 cm/s Flow Rate: 3.000 Cm^3/min
Output Gas Conc.	Temperature: 30 Degrees C Outlet Conc.:25 - 28 ppm

Fig. 7: *The third test attempted to degrade styrene monomer with a fiber-based biofilter.*

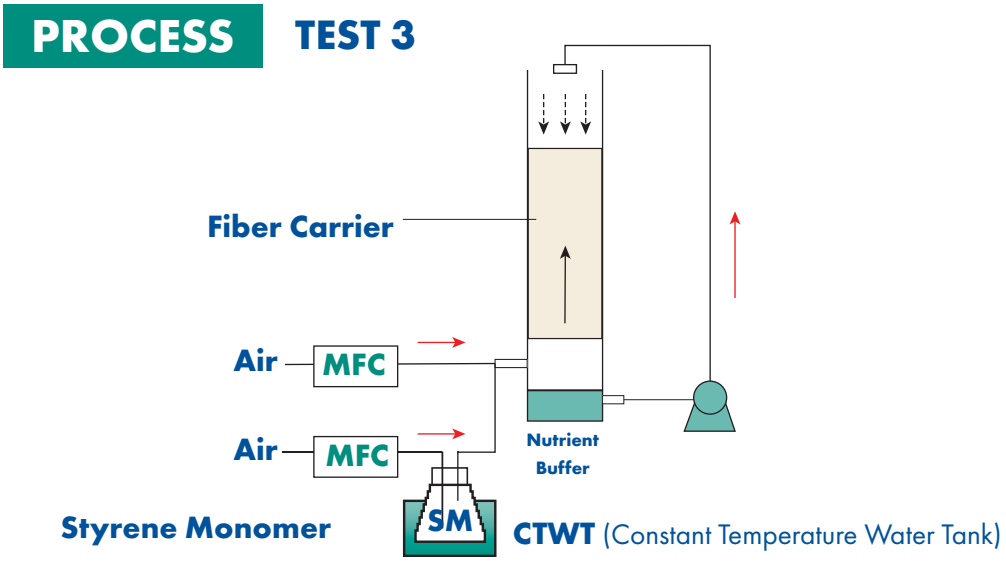

Fig. 8: *In this case a nutrient buffer was added*

TEST RESULT **TEST 3** **Date: April 20 - 26**

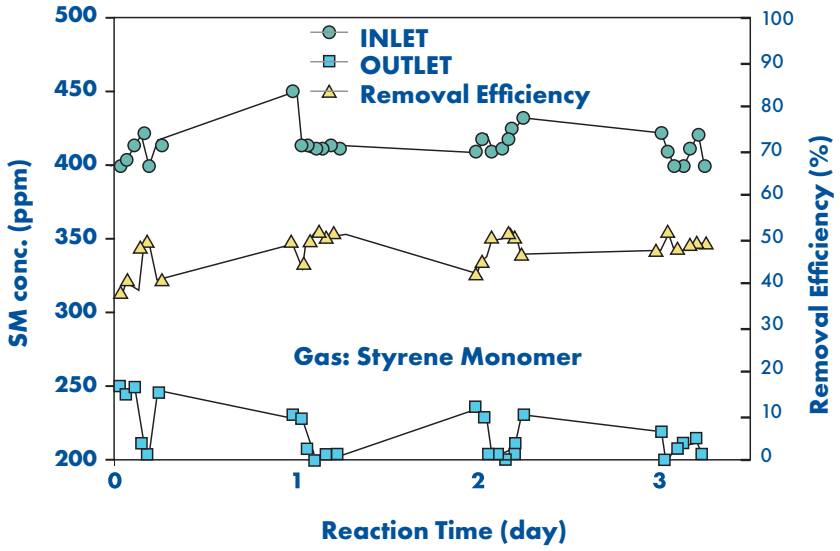

Fig. 9: *MICROBE-LIFT did not degrade the styrene monomer under the conditions supplied.*

Results Achieved:

MICROBE-LIFT®/HOG successfully degraded the mercaptan and H_2S in the LG designed biofilters. This testing supports the use of MICROBE-LIFT® technology in biofilters. It also confirms its efficacy in controlling these gases in manure applications.

MICROBE-LIFT®/HOG did not show any degradation of the styrene monomer in the conditions of the test. While it may be possible to improve performance under different conditions, this test did not show any potential for the use of MICROBE-LIFT® in these biofilters. However, the negative result for the styrene monomer can be utilized as a negative control supporting the positive effects of test #1 and test #2.

For more information on MICROBE-LIFT® Technology contact
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