Stability of Biogas/Landfill Gas in FlexFoil Bags (245 Series)

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Introduction

SKC conducted a study to test the stability of biogas/landfill gas (LFG) in FlexFoil® sample bags with single stainless steel valves. These gases are found typically in landfills and are produced by organic waste decomposition under anaerobic conditions.

Common gases found in landfills are methane, carbon dioxide, carbon monoxide, nitrogen, hydrogen, hydrogen sulfide, and oxygen. Other VOCs are found, but typically at much lower levels than the listed compounds.

Method

FlexFoil Bags were filled with various concentrations of gases and analyzed using different techniques. Concentration levels and test methods used are listed in Table 1. All samples were analyzed with detector tubes except methane, which was analyzed using a portable Quest LEL gas detector.

Results

The data are summarized in Table 2. All the biogases were stable for at least two days or longer in single stainless steel fitted FlexFoil bags. Nitrogen, commonly found in landfill gases, was not tested due to the lack of a suitable analytical technique to test stability. The data indicate that hydrogen and oxygen are stable, therefore, it is likely that nitrogen would be stable as well.

Table 1. Test Compounds and Methods

Compound	Test Level	Test Method
Methane	50 ppm in air	Quest® MultiLog LEL Gas Detector
Oxygen	20% in nitrogen	Dräger® tubes 800-03261
Hydrogen sulfide	9.2 ppm in air	Dräger tubes 800-01961
Carbon dioxide	1000 ppm in air	Dräger tubes 800-01811
Carbon monoxide	100 ppm in nitrogen	Dräger tubes 800-20601
Hydrogen	100%	Dräger tubes 800-01511

Table 2. Analyte Recovery

Compound	% Recovery of Analyte				
	Day 1	Day 2	Day 3	Day 4	Day 5
Hydrogen	100	93.2	NT	NT	NT
Carbon Dioxide	100	100	NT	NT	100
Carbon Monoxide	100	100	NT	NT	100
Methane	99	100	98	100	NT
Oxygen	104	99.7	95.4	NT	NT
Hydrogen Sulfide	100	96.7	96.7	NT	NT
NT-Not tested					