

Closed-Type Biodegradation Tester



NEO Biogas Quantification Technology

- Pressure-based direct quantitative biogas analysis
 - Simultaneous CO₂ / CH₄ monitoring system
 - High-precision closed anaerobic analysis platform
 - Intelligent automatic control algorithm
 - Independent operation & data protection system
 - Real-time biodegradation monitoring & analysis
 - Advanced sensor protection technology
 - Modular & expandable architecture
- ** Optional volumetric measurement mode available**

Analytical Considerations in Biogas Measurement

In **anaerobic digestion**, organic matter in wastewater is decomposed in the absence of oxygen to produce methane (CH₄) and carbon dioxide (CO₂).

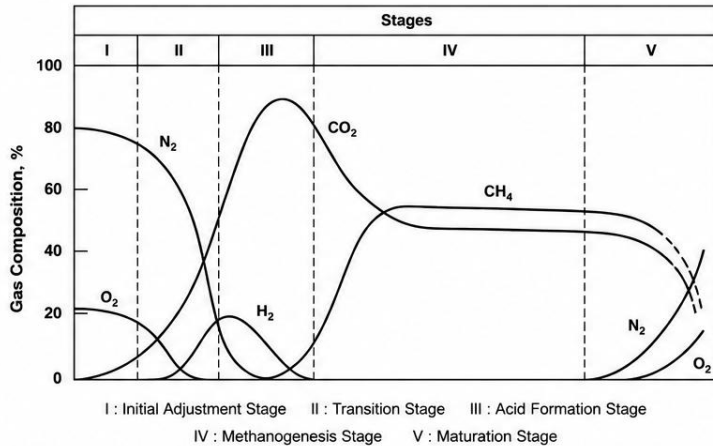


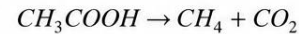
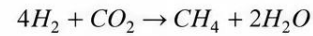
Figure 1-1. Typical Stages of LFG Generation

Since gas composition changes over time during anaerobic digestion, even if methane is not produced in the initial stage, **the gas volume increases** due to CO₂ and H₂, **resulting in a rise in pressure.**

■ Feature 1: Structure of Stage-wise Reactions

- In anaerobic digestion, acidogenesis occurs first, followed by methanogenesis.

☞ Methane is not generated in the initial stage.



■ Feature 2: Time-dependent Change in Gas Composition

- Early stage: CO₂ is dominant
- Later stage: CH₄ increases

☞ Gas types vary over time.

■ Feature 3: Mixed Gas System

- In addition to CH₄ and CO₂,
- N₂ and H₂ may also be present

☞ The gas is not a single component but a mixed gas.

Therefore, when interpreting gas based solely on total pressure, **the initial gas increase may be misinterpreted as methane production.**

Advanced Biogas Quantification Approach

■ Limitations of Conventional Gas Measurement Methods

- ☞ Measurement based on total gas quantity (volume/pressure)
- ☞ Initial CO₂-dominant gas generation may be misinterpreted as methane production
→ Limitation in identifying actual gas generation timing and kinetics analysis
- ☞ Quantity-based interpretation without distinguishing gas composition (CH₄ / CO₂)
- ☞ In circulation-type measurement systems, purge processes during circulation may cause
 - Gas dilution
 - Disturbance of gas composition
 → Difficulty in maintaining stable anaerobic conditions

■ Solution Principle

- ☞ Simultaneous measurement of gas composition and generation timing
- ☞ Analysis based not simply on total quantity, but on “**what gas was generated and when it was generated**”
- ☞ Independent structure for preserving stable anaerobic conditions

■ Solution Method

- ☞ Real-time measurement using dedicated CO₂ / CH₄ sensors
- ☞ Quantitative analysis combining volume (pressure) + gas concentration
- ☞ Real-time gas acquisition through natural gas release + active extraction structure

► **Accurate analysis reflecting both gas composition and generation timing without misinterpretation from the initial stage onward**