The fast-acquisition breath analysis configuration of the MAX300-LG was designed in collaboration with leaders in the field of respiratory research.

Breath Analyzer Features:
- Quantitative Analysis of O₂, CO₂, N₂, H₂O, and trace volatiles
- Measurement Rates up to 5 milliseconds per compound
- Minimum Sample Flow < 0.04 atm cc/sec
- Sample Transit as fast as 0.1 seconds

Mass spectrometry is the ideal gas analysis technique for many respiratory applications. The MAX300-LG™ measures all compounds in a sample, requires minimal sample flow, and delivers rapid data updates¹.

Researchers focusing on the physiological or biomedical study of respiration and metabolism can use breath analysis data to reveal underlying processes within complex biological systems (Fig. 1).

The high repeatability provided by the MAX300-LG ensures that calculated metabolic parameters derived from the gas analysis, like the respiratory quotient (RQ), are accurate and precise (Table 1).

Reference:
The sample inlet of the MAX300-LG is optimized for breath analysis. Configurations exist for sampling from high pressure (hyperbaric) conditions, or sub-atmospheric pressures, such as those found at high altitudes. Regardless of sample pressure, the inlet is designed to automatically adjust, and maintain peak analytical performance (Fig. 3).

The MAX300-LG, laboratory gas analyzer, features a fast acquisition software and inlet configuration designed specifically to produce the full breath-to-breath quantitative profile. It provides high precision measurements of all components in the breath sample, with up to 50 updates for each compound per second. The complete sample composition allows the researcher to calculate metabolic parameters, like the RQ, without the need for integrating additional flow measurements (Eq. 1).

**Equation 1.** The Respiratory Quotient (RQ). Nitrogen is not absorbed during respiration, so the ratio of the volumetric % of N₂ in the inspired and expired sample is used to develop an RQ equation in which measured sample flow is not necessary. All O₂, CO₂, and N₂ terms above are measurements of volume %.

\[
RQ = \frac{\text{CER}}{\text{OUR}} = \frac{\left( \frac{\text{CO}_2\text{ out}}{\text{N}_2\text{ out}} \right) - \frac{\text{CO}_2\text{ in}}{\text{N}_2\text{ in}}} {\text{O}_2\text{ in} - \left( \frac{\text{CO}_2\text{ out}}{\text{N}_2\text{ out}} \right) \frac{\text{N}_2\text{ in}}{\text{N}_2\text{ out}}}
\]

**Table 1.** Typical MAX300-LG breath analysis performance. The mass spectrometer analyzes all compounds in the sample with very high precision. In addition to the components listed here, the analyzer has the flexibility to measure trace volatiles such as formaldehyde, acetic acid, ammonia, and hydrocarbons for the purpose of diagnostic evaluation.

![Graph showing the concentration of N₂, O₂, Ar, and CO₂ at different altitudes with STD values for each concentration.](image)

**Figure 3.** Air analysis at sub-atmospheric pressures. High altitude conditions were simulated at the MAX300-LG inlet. The system automatically adjusts and delivers uniform, high precision data regardless of sample pressure.

**Replacement for MGA1100 and MGA1200.**

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