

eGAS Data Collection System

Mobile Test Rig for lead-acid batteries



Side reactions in modern lead-acid batteries are complex especially under dynamic conditions. But knowing about the behavior and condition of the battery is very important in the development of lead acid batteries for today's vehicles with start-stop systems or micro-hybrid solutions.

measX now offers a new portable method for rapid measurement of water loss in advanced lead batteries.

Current measurement of water loss

Advanced lead batteries (EFB and AGM) have far superior Dynamic Charge Acceptance (DCA) compared to lead batteries of the past. However, a side effect of the improved DCA is the observed accelerated water loss at high temperature due to hydrogen evolution. This needs to be measured quantitatively by weight (g/Ah) (with a precise balance) or by volume (ml/minute) and gas composition (% hydrogen, oxygen, carbon dioxide-using a specialised device such as measX) to understand the processes.

The weight change measurements is the most common method but it is imprecise and lacks time resolution.

The volumetric measurement is available but not widely used and limited to the laboratory.

As third option gassing rate and gas composition evaluation techniques are used but they are complicated, time consuming, and only available in specific R&D laboratories and can't be used for field measurements.

The eGas Solution

In-situ real-time measurement of gas flow and composition is straightforward with modern sensors. (Figure 1). They can accurately detect the amount of produced gas.

Compact and portable

eGAS provides a unique solution for measuring water loss in high DCA lead batteries

Your benefits

- **x** Portable, compact and inexpensive
- In-situ measurement of water loss and evolved gas composition.
- **x** Can be conducted both in field and in the laboratory.
- eGAS will have revolutionary impact on quantity and quality of collected battery failure data.

eGAS Data Collection System

Mobile Test Rig for lead-acid batteries



as a portable, compact and inexpensive device. In-situ measurement of water loss and evolved gas composition now can be conducted both in field and in the laboratory.

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Developed by Experts

eGAS has been developed by measX through extensive collaboration with European car companies and co-funded by the Advanced Lead-Acid Battery Consortium (ALABC). The system is designed for flexible standalone operation in a laboratory or a vehicle and will record gas flow rates (up to 100 ml/min), concentrations of hydrogen, oxygen, and carbon-dioxide, along with battery voltage and temperature as well as ambient pressure and temperature. It is recommended for all investigations of side reactions in EFB and EFB+C, for example Tafel characterization, water consumption/gasing under laboratory or driving conditions, oxygen cycle in flooded and valve-regulated systems, as well as additive selection for high DCA. Additional parameters such as battery voltage and temperature are also logged by the system. Figure 2 shows an examples of gas flow collected from urban drive cycle and technical specifications of the system.

powered by ALABC



15 Voltage in V 12 13 14 13 11 24 48 c flow in ml/min 60 40 20 Gas 0 24 48 72 100 80 60 40 20 Gas concentrations H2+02 H₂ 02 24 72 time in h 15 > ⊑ 14 LL LL LL Voltage i 13 11 0.2 0.4 0.6 0.8 1.2 1.4 0 1.6 uim/lm ui / ∦ 20 Gas 0 0.2 0.4 0.6 0.8 1.2 1.4 1.6 0 ŝ time in h Figure 2: Examples of gas flow collected from urban drive cycle

Technical Specifications

Gas Sensors:	Pewatron O2 PO2ES-103P gas sensor Pewatron H2 VQ546M thermal conductivity sensor Pewatron CO2 INIR-CD5.0% gas sensor
Flowmeter:	Bronkhorst flowmeter F-101D-AGD-00-V
Temperature:	2 temperature sensors (internal and at battery)
Voltage:	battery voltage sense tightness test adapter
Data Acquisition:	Micro Controller with SD card and USB
Data Interface:	USB
Software:	windows-based, developed by measX
Dimensions	27 x 18 x 14.5 cm, seaworthy carrying case
Weight	4,2 kg
Others:	2,8 inch TFT-display, AC power supply, DC (12V) connection external battery with loader

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