

## Axetris LGD F200-NH<sub>3</sub> successfully integrated and tested at Harper Adams University Ammonia monitoring of livestock requires new solutions

Researchers at Harper Adams University, Shropshire, United Kingdom, built and tested a multi-channel ammonia monitoring system by integrating the Axetris LGD F200 with the goal of developing a system which would provide substantially higher measurement performance, while being cost-efficient and robust for real-world use. Extensive tests were conducted over the span of multiple years, and the LGD F200 was shown to fulfill all major requirements.

### Ammonia Monitoring for Environment and Animal Health

According to various estimates, livestock farming accounts for up to 90% of atmospheric ammonia (NH<sub>3</sub>). A number of regulations worldwide have taken aim at the reduction and management of ammonia emissions for environmental protection and for promotion of animal health. In Europe, the NEC Directive, 2001/81/EC, sets standards for controlling and managing ammonia emissions from livestock farms.

### Cost-Effective and Reliable Solutions Needed

Ammonia monitoring solutions are needed to design effective scrubbing and ventilation systems, but must also be cost-effective in order to provide real-world feasibility for the livestock industry. The monitoring solution should be extremely robust, and designed for use in a difficult measurement environment, with no cross-sensitivity to a number of gaseous components, while also displaying high repeatability, even during continuous use. Existing solutions are mostly based on electrochemical sensing technologies, which are extremely prone to sensor poisoning, which can lead to false results, and suffer from a short lifetime.

### Axetris LGD F200 scores high on a number of criteria

Researchers at Harper Adams University, UK (<http://www.harper-adams.ac.uk/>) decided to build a multi-channel ammonia monitor by integrating the Axetris LGD F200, which was found to provide an excellent fit with performance requirements from such a system (Exemplary test results overleaf).

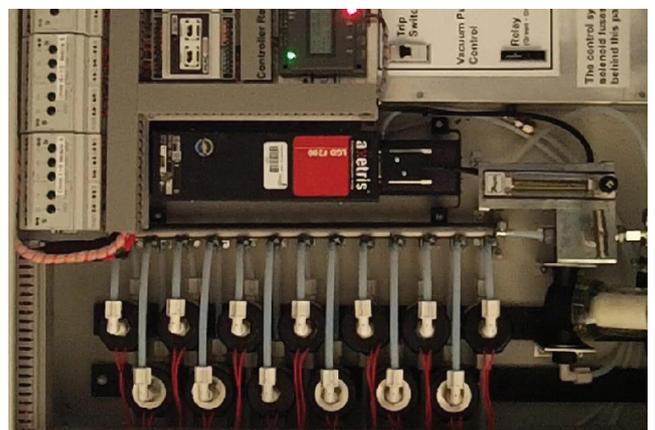


Livestock farming contributes 80 to 90 percent of the total atmospheric ammonia (NH<sub>3</sub>).

*"The Axetris LGD F200 offered an excellent alternative to existing ammonia monitoring solutions. Over the three-phase project that we undertook, we found the LGD F200 to provide extremely reliable and repeatable values. The product is suitable to build a cost-efficient and robust ammonia measurement system for livestock applications"*

**Dr. Tomas Norton**

**Project Lead, Harper Adams University**



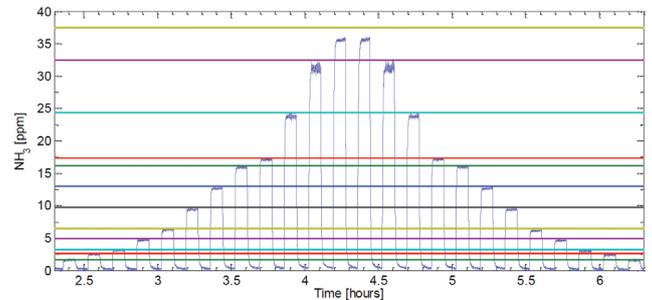
Axetris LGD F200 integrated into the multipoint ammonia measurement system at Harper Adams University.

#### Axetris Laser Gas Detection OEM Modules Ammonia Measurement using TDLS

The Axetris LGD F200 uses Tunable Diode Laser Spectroscopy (TDLS or TDLAS) for ammonia measurement, and provides an excellent fit for livestock applications:

- ✓ Low ppm limit of detection (LoD)
- ✓ Excellent accuracy and repeatability
- ✓ High robustness for real-world continuous use
- ✓ Easy integration by OEMs according to customer requirements
- ✓ Outstanding cost-effectiveness
- ✓ Compact size

The Laser Gas Detection (LGD) products from Axetris are available for gases such as ammonia (NH<sub>3</sub>), methane (CH<sub>4</sub>), hydrochloric acid (HCl) and carbon dioxide (CO<sub>2</sub>), in both ambient and heated (190°C) versions.



The LGD F200 showed excellent results for accuracy and repeatability over the 0-35 ppm NH<sub>3</sub> concentration range.

#### Links:

Project Phase Report from Harper Adams University, UK: <http://pork.ahdb.org.uk/media/74349/monitoring-gases-from-pig-buildings-field-experiment.pdf>

EU statistics on livestock ammonia emissions: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental\\_indicator\\_-\\_ammonia\\_emissions](http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_ammonia_emissions)

#### Credits/Acknowledgement:

Dr. Tomas Norton and Mr. David Clare at Harper Adams University, UK



#### Laser Gas Detection Modules for OEM Integration

Axetris' Laser Gas Detection (LGD) modules are self-contained, ready-to-use devices for the measurement of gases such as NH<sub>3</sub>, HCl, CH<sub>4</sub>, CO<sub>2</sub>, (H<sub>2</sub>O). The modules are designed for integration by OEMs, active in the field of gas detection and monitoring in diverse industries.

The high sensitivity and the large dynamic range of the TDLS detection technology enables measurement from sub-ppm level to high percentage concentration without physical adaptation of the device. The design of the LGD F200 enables a tailor-made application fit for a wide range of gases and applications, including process control, environmental compliance research and medical.

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