

Compressed gas laboratories are now able to benefit from the connectivity and automated big data analysis features of the 4th Industrial Revolution. Afrox's Hans Strydom explains.

Gas analysis and the 4th industrial revolution

The 4th Industrial Revolution is coming to the compressed gas laboratory in the form of connected analysers. Locally collected information from any sample and any laboratory can now be sent for comparative analysis online via a common central computer.

There are hundreds of applications for gas analysis: determining the emission levels from industrial stacks, the health of a patients, the constituents and impurities levels in petrochemical product, the quality and purity of medicines from the pharmaceutical industry, the purity and accuracy of Afrox's medical and industrial gas product ranges, and many more.

Many different types of gas analysers are used, depending on the specific sample and the information required about the constituents – oxygen, nitrogen, hydrogen, argon, helium, sulphur dioxide, carbon dioxide and hydrocarbons such as methane – as well as their physical factors such as flow rate, pressure and temperature.

Gas analysers can now be set up to pass or fail a product sample without the intervention of a laboratory technician. They can be programmed to capture samples and record the analysis simultaneously and with certainty. This level of automation for industrial, medical and specialty gas filling plants brings significant benefits in terms of costs, efficiency, reaction times to problems, the safety of personnel and the quality of products.

Gas analysis at filling plants

Embedded software in the modern gas analysers used at gas filling plants, for example, can deal with more than 15 samples at a time taken to the lab from fill racks and bulk tanks all over the plant to provide consistent analysis on a repetitive basis. Results from gas chromatographs (GCs) can also be made available over the network and the software to control these analysers can reside on a networked server anywhere in the world.

This approach can significantly increase analyses throughput without impacting operator friendliness and ease of use. Remote support from the instrumentation supplier is available and software updates, changes, training for new personnel or trouble-shooting can all be achieved over the network.

Additional features include the ability to create and edit profiles for the different analysis types and the ability to enter test specifications and fail criteria. Multiple samples can be sent to multiple instruments simultaneously and automatically to reduce analysis time. The systems also offer automatic purge routines between samples. For each successful test, a Certificate of Analysis can be directly created via a touchscreen before being stored and/or printed along with captured records and analysis results. The same applies to calibration documents and records for the analysis instruments and for any equipment being calibrated by the instrument. Test histories and calibration logs can be digitally saved and, for quick reference, the operator screen shows when the analyser was last used, who the operator was and the instrument's calibration status.

For any gas analysis requirement, Afrox supplies gas reticulation systems, regulators, gases and third party connectivity capacity. Afrox connects all the pipework with regulators to the instrument with automated sample valves.

This enables the data required to be cost effectively collected and analysed by the instruments and automatically processed, with the added functionality of automatic decision making via artificial intelligence from a centrally located global server.

“Laboratories are expensive operations. Today’s connected technology enables us to engineer gas analysis and calibration systems to be far more automated, accurate and reliable, which ultimately helps to make these essential services far more cost efficient,” Strydom concludes.

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