

Eye Contact is more than Enough: The new GM32 Analyses Corrosive Gases Direct Inside the Duct. Tested to EU Standards.

In emission monitoring sulphur dioxide and nitrogen oxides are the tricky candidates to measure. The focus of SICK's new GM32 in-situ gas analyser, however, is not just on these measurements. The analyser also takes on a key role in process gas monitoring, additionally measuring ammonia in raw and scrubbed gas. The quick and precise measurements enable optimum regulation of flue gas scrubbers even when there are high levels of dust. The GM32 fulfills high demands in terms of measuring ease, is low in maintenance and takes on very difficult measurement conditions.

All of these gases have one thing in common: they are reactive. While being transported through dirty filters or through extraction lines that are not optimally heated, the gases can react or become bonded with other concomitant substances. This results in memory effects and reduced measuring values. Depending on the length of the extraction lines, the transport to an extractive analyser can also cause significant delays. Therefore, the measured value is shown after the fact. This dead time can very soon be up to around a minute.

This is where the concept of in-situ measurement wins the day.

The GM32 utilises the gas duct as a measuring path and takes measurements within the UV range directly within the flowing gas – with no need to take samples or transport the gas anywhere. Another plus point is that by using probe or cross-duct analysis a much more representative measurement is achieved than from a single spot sampling. As a result of doing away with any delays or undesired reactions during transport, the gases are analysed quickly, precisely and with no distortion.



GM32 – Tough as they come

This analysis strategy naturally also means that the analyser has to be installed right at the spot where measurements are to be taken. "As pioneers in in-situ technology we put the focus of our development work on the uncompromising technical configuration of our analysis devices," says Dr Volker Wilke, Head of Process Automation Development, reinforcing SICK's product philosophy. "It is only in this way that we can guarantee our clients a reliable analysis." The GM32 is therefore equipped with automatic self-alignment in order to keep the analysis beam optimal on the detector – even when faced with unsteady flues or changes caused by thermal movements. Particularly impressive was the vibration test performed as part of suitability testing.

This was performed on the oscillation test bench at the TÜV Rheinland testing institute. The GM32 was tested in the 10 to 150Hz frequency range. Additional stress tests were carried out at the resonance frequencies that were found. In these tests acceleration speeds were recorded at the analyser of up to 12g. The result: in the comparative measurements that were subsequently taken the only deviations shown by the GM32 were of less than 0.9% from the measurement range. The test was thus passed with flying colours, confirming that the GM32 is as tough as they come!

When it has to be quick

For DeNO_x plants in particular the NO content is used for setting the NH₃ injection levels and other parameters. Measurements are taken on the raw gas side in the 1,500ppm range and on the clear gas side in around the 100ppm range. Fast measurements are needed. However, the measuring conditions of a DeNO_x plant are not particularly helpful. High temperatures and dust load levels of over 30g/m³ are the norm. It is here that SICK employs probe-based analysis equipment. A measuring probe perfectly shaped for gas flows and with a built-in optical analysis section is inserted from one side into the duct. Just a small measuring gap in the probe is enough to record the gas concentration levels. For applications with high dust content the measuring gap is shielded with a ceramic filter. This keeps the measurement section free of dust and allows measurements to be taken even where dust concentration levels are extremely high. Probe-based measurement achieves response times of just a few seconds. Ideal for regulating DeNO_x plants.

Optimum accuracy – even with extremely different measurement ranges

The signal analysis is done across a very broad range. Using the DOAS principle (differential optical absorption spectroscopy), SICK's optimised analysis procedure seeks out in each case the best spectral lines for the measurement range and components concerned. This achieves a very high degree of measuring precision. It is thus possible to measure both small and large measurements extremely accurately using a totally identical device. In this way the GM32 can also record higher measured values, e.g. in the event of a purification facility failing.

The device is equipped with a maximum of four gas components and can optionally also measure temperature and pressure. All in all, 16 outputs can be serviced. You can map the required emission measurement ranges for components and at the same time use other, differently scaled ranges for control purposes.



Tested to the latest EU directives

The GM32 is the first UV in-situ analyser for SO₂ and NO to have been fully tested to the new European quality directive EN15267-3. The key factor here is that for the regularly required QAL3 tests the analyser needs no test gas. An integrated filter wheel automatically tests drift and function. During the suitability testing SICK was able to prove the effectiveness of this procedure. Further evidence of the high quality of the optical and electrical components is provided by the fact that during the 3-month field test there was not a single instance of excess drift. The test recorded outstanding stability under difficult conditions.

"Built-in QAL3! For users that means genuine savings on operating costs: no test gas, no test gas handling, no logistics and no operational errors during the test itself," notes Ralf Zorbach, GM32 Product Manager.

A new era – including in communication

The GM32 makes use of the most modern communications capabilities. The greatest benefit that this brings is the ability to check the device from almost anywhere on earth. This is made possible by the built-in Ethernet interface. All of the most important data, status reports and measurements can be accessed over the operator network or via modem and portal. While this does not repair the device, it quickly provides data in order that the correct action can be taken. Service technicians can thus check before setting off whether a site visit is needed at all, as the operational personnel can often do what is required locally themselves. And should it indeed come to a site visit by the service technicians, they have the right spares in their case.

A tradition continues

The GM32 replaces the previous GM30 and GM31 models. In the ongoing development of this product SICK has had a strict policy of changing its optical and mechanical concept only with great caution. "However, we always make improvements where fine-tuning is possible based on our years of practical experience," says Frank Hehl, Head of Product Management, explaining the new highlights. These include the new modular concept for fast on-site servicing and also improved technical support by means of remote diagnosis: two genuine innovations that bring major customer benefits. "We were the benchmark before and with the GM32 we're going to be the benchmark again!"

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