Monitoring sulfuric acid and oleum strength with only one measuring device

**Inline measurement with real-time data**

In various industries, monitoring sulfuric acid and oleum concentration is vital for a preventive quality management, sustainable resource efficiency and increased safety. Additionally, a need for high accuracy and long-term stability in measurements places great demands on the analytics. Manual sampling and laboratory measurements are time-consuming, risky and provide only information during random checks. Monitoring sulfuric acid and oleum strength (wt%) directly in the process enhances the safety and efficiency of the plant. For the concentration determination, sonic velocity meters have proven to be ideal, as sonic velocity forms a strong and unambiguous function to the concentration of H$_2$SO$_4$ and oleum in the production-relevant concentration ranges.

With the LiquiSonic® analyzer by SensoTech, the concentration of sulfuric acid and oleum is continuously monitored in real time. The robust construction and Hastelloy C-2000 as sensor material make the sensor completely maintenance-free. The analysis of sonic velocity (figure 1) generates a clear signal in the concentration range of 80 to 100 wt% H$_2$SO$_4$ and provides reliable process information. The LiquiSonic® technology is based on sonic velocity and provides clear and stable measuring results with an accuracy of up to 0.03 wt%.

It is often necessary to measure sulfuric acid and oleum (SO$_3$ in H$_2$SO$_4$) at the same measuring point, i.e. in the production of oleum. Here, SO$_3$ gas is absorbed by highly-concentrated sulfuric acid. For this measuring task, SensoTech provides an appropriate solution. Apart from H$_2$SO$_4$ monitoring with LiquiSonic® sonic velocity analyzers, the oleum strength can be monitored by incorporating a second measurement technology, such as a density measurement. Figure 2 shows the dependence of sonic velocity and density on the sulfuric acid and oleum concentration. By analyzing both measuring parameters, the sulfuric acid and oleum strength can be monitored inline with only one single measuring device: LiquiSonic® 40. Equipped with the newest high-tech microprocessor and touch display, the controller even copes with complex concentration calculations, displays the H$_2$SO$_4$ or
oleum strength and stores all real-time information. Via 4-20 mA signal, digital outputs, serial interfaces, fieldbus or Ethernet, the controller can be integrated into the network and control system.

The analyzer monitors the acid concentration, for example, in processes of sulfuric acid production, including the double contact double absorption (DCDA) process and the wet sulfuric acid (WSA) process. Moreover, LiquiSonic® analyzers are used in synthesis gas drying, fertilizer production, alkylation, oil refining, decomposing ore mining or in etching and pickling baths of the chemical and steel industry.

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Image subtitles
Figure 1: The LiquiSonic® analyzer by SensoTech monitors precisely the sulfuric acid and oleum strength providing the data online and in real-time.
Figure 2: Monitoring sulfuric acid and oleum strength with only one measuring system, trough combination of sonic velocity and density.

Attachment
Image files
Figure 1: G2522_01_orig.jpg
Figure 2: G1923_01_02.jpg
SensoTech:
For more than 25 years SensoTech has been focused on the development, manufacturing and sales of inline analysis systems for process liquids. With worldwide installed, highly precise and innovative measuring systems for monitoring of concentrations, compositions and reactions directly in the process, SensoTech has significantly contributed to the enhancement of the state of the art. In addition to the measurement of concentration and density, the phase interface detection as well as the monitoring of chemical reactions like polymerization and crystallization are typical applications. SensoTech inline analyzers set standards in the technological and qualitative valence, user friendliness and reproducibility of process values. Special calculation methods and sophisticated sensor technologies enable reliable and precise measuring results even under difficult process conditions. The knowledge and experience of highly motivated and committed SensoTech staff are the result of various applications with well-known customers from the chemical and pharmaceutical industry, food technology, semiconductor technology, automotive and metal industry as well as many other industries. In addition, this experience also opens up unimagined solution possibilities for new measuring challenges.

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