

# Perfect weighing for pollution monitoring

## Full traceability with LabX at TÜV SÜD

**TÜV SÜD (Germany) and METTLER TOLEDO have jointly developed a weighing system to measure emission particles in air.**

As far as air pollution is concerned, diesel particle filters are currently a hot topic. The exhaust gas standards for diesel vehicles has been tightened in 2005 and the German federal states and communities are required to comply with lower emission limits for particles up to 10  $\mu\text{m}$ . In addition to other pollutants, the Federal Government has monitored the concentration of these particles for many years through a nationwide network of air measuring stations. In Saxony, TÜV SÜD is in charge of carrying out pollutants measurements.

### The challenge for TÜV SÜD

The particle concentration is mainly determined by a gravimetric method. For this sensitive weighing process, initial and back weighing must be performed under identical temperature and moisture conditions. Concentrations of only 5 - 50mg dust require maximum accuracy and repeatability for balance and method. The impending penalties for violating the EU limit values are a key reason for these stringent requirements. The portion of particle-type emissions smaller than 2.5  $\mu\text{m}$  is considered more dangerous for the health. They are suspected to have a cancerogeneous

„This sensitive weighing process requires maximum accuracy and repeatability for balance and method.“



The filter elements are given identification numbers and inserted in standard frames.

effect. Moreover, recent findings indicate particles that enter the lungs increase the risk of heart diseases.

The samples are collected in special filter cartridges. These are prepared by conditioning for 72 hours. The dust-free filters are then given a six-digit number for subsequent identification, and weighed. Next they leave TÜV and are sent to the Federal Environment Association where they are employed in air measuring stations. Sampling is performed for 24 hours with an average flow rate of 720 m<sup>3</sup>. Back at TÜV, the samples are again conditioned for 72 hours at constant temperature and relative humidity, and weighed. The dust mass is calculated on the basis of the weight differential.

Special attention is paid to the weighing chamber. Air supply must be absolutely draught-free. The temperature requirement is 20°C at a relative humidity of 50%. These values are controlled and recorded permanently.



Important for the filter elements: touch is strictly prohibited!

The standard DIN EN ISO/IEC 17025 prescribes a daily routine check with calibrated weights. Furthermore, the zero point must be checked after every measurement.

#### The METTLER TOLEDO weighing solution

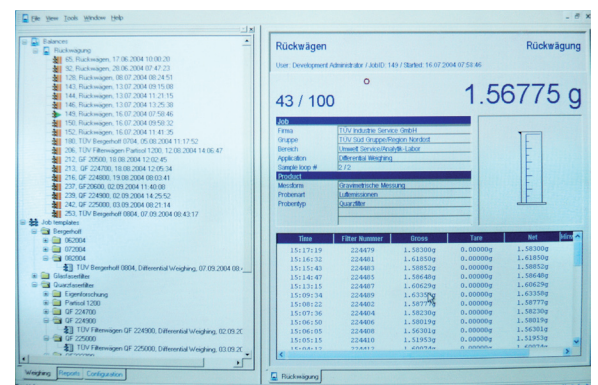
- For weighing, TÜV SÜD uses an AX205/M with a weighing range up to 220g and an accuracy of 0.01 mg. Thanks to the automatic doors, which open fully backwards, the 150mm filters can be introduced easily into the weighing chamber and weighed a safe distance from the walls without using your hands.
- The new LabX light balance software perfectly fits TÜV's requirements. It performs the complete data and equipment monitoring, supports the work procedure and ensures measuring reliability. Internal calibration occurs as a daily routine without a special command. If the deviation from the prescribed value is too high, the balance can be blocked automatically to prevent systematic measuring errors. Even the regular external inspection is documented by TÜV SÜD and reflects the high balance stability.
- The balance is activated from the connected PC. For back weighing, the recorded weighing data are

assigned according to the six-digit filter identification number, which has been entered before, the weight differential is calculated and all values are saved.

- Through the network, all data are directly available to connected computers. The specific adjustment of the complete weighing system to the work procedure and the computer-aided data handling ensure excellent reliability. With approximately 600 filter samples per month, the data management system simplifies work considerably. The results are submitted by e-mail to the customer, i. e. the Saxonian Office for Environment and Geology.

„The main benefits are high measuring accuracy, traceability and efficient data management with integrated quality assurance.“

For Dr. Harald Bittner, head of the TÜV SÜD laboratory, the main benefits of the system are high measuring accuracy, traceability and efficient data management with integrated quality assurance. Dr. Bittner is particularly enthusiastic about the quality of cooperation. The high product quality has long been appreciated at the Dresden laboratory. However, the extent and commitment of the software adaption was, in his opinion, extraordinary.



LabX software assigns the measured data, calculates the weight differential and provides data in the network.



Quality certificate ISO9001  
 Environment certificate ISO14001  
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 Worldwide service

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