

Cutting-Edge Calibration Lab in Göttingen, Germany, Ensures the Best Possible Results



Last year marked the official opening of the Metrology Center in Göttingen, Germany, that joined the advanced facilities on the ground floor of the new manufacturing building on Sartorius Campus. Together with staff on the Sartorius construction project committees, Thomas Fehling, Manager of the Mechatronic Solutions Group, provided technical advice and support throughout the engineering and construction work phases. The result is a cutting-edge calibration center with DAkkS-accredited laboratories that couldn't be better for weight calibration. In an interview, Mr. Fehling reports on the challenges and highlights the special features of the facility design.



Thomas Fehling is the Manager of the Mechatronic Solutions Group at Sartorius and helped plan and oversee the construction of the new facility for the Metrology Center as part of the planning group.

He has been working at Sartorius for 30 years and primarily takes care of development and manufacturing of mass comparators and their servicing worldwide as well as of customer-specific product solutions and small-lot manufacture of weighing instruments in the Special Solutions unit.



The building foundations and the block foundations for the anti-vibration weighing tables used for calibration were separately cast.

Mr. Fehling, which challenges and requirements did building this facility entail?

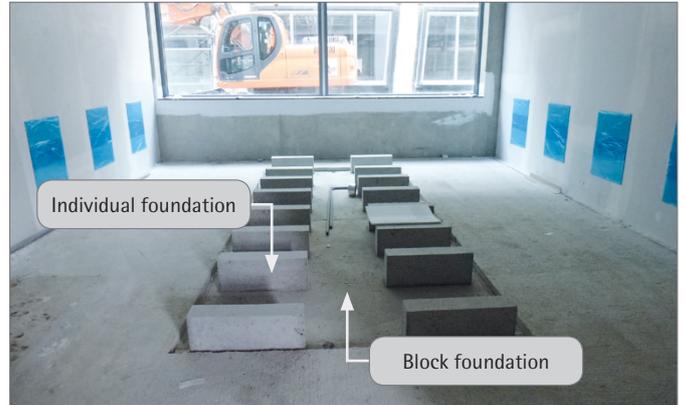
There were quite a few: As the Metrology Center is part of our manufacturing facility, the sensitive laboratory area had to be constructed as a unit structurally separate from the main building, i.e., the assembly area. To ensure perfect calibration results, all rooms feature a cavity floor to ensure that the surfaces walked upon are completely decoupled from the block foundations on which the individual weighing table foundations rest. This is achieved by a suspended substructure of the floor. In turn, the block foundations are completely separate from the building foundations. In this way, vibration cannot affect the calibration procedure at all, whether such vibration is caused by people walking nearby or trucks driving on the adjacent street.

Which role does room climate play during a calibration procedure?

A substantial role. The temperature and humidity significantly affect measurement results and are our greatest enemy when it comes to precise calibration. For highly accurate mass determination, our laboratories meet the climate requirements of the International Recommendation OIML R 111-1. This means that for the highest accuracy class, the temperature may differ by no more than $\pm 0.3^\circ\text{C}$ per hour and the moisture by only five percentage points within four hours.

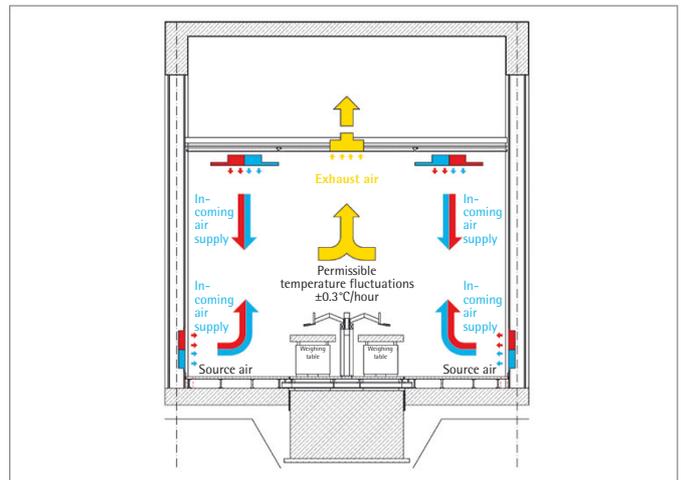
And how can we make sure these conditions are maintained?

By an intelligent air supply and exhaust system. It ensures that climate-controlled air enters from the bottom through source air outlet ducts and is enriched with fresh air at a height well above the weighing tables so that air is circulated. Exhaust air is suctioned off at the room ceiling and recirculated. We call this principle a pool effect as the room is flushed from below with climate controlled air. This results in highly constant climate conditions at the weighing table; in other words, right at the point where our equipment is located for weight calibration. Two combined temperature | moisture sensors are used in each room for monitoring the climate parameters.

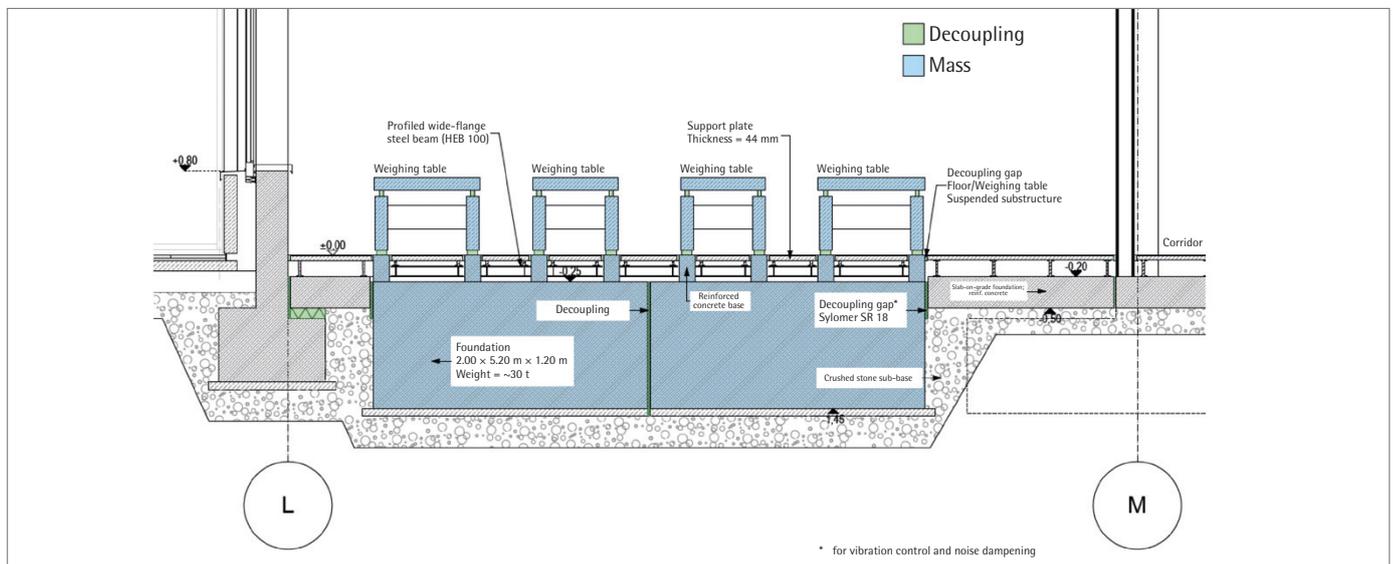


Vibration is ruled out: Individual foundations for the weighing tables rest on the block foundations.

» To ensure perfect calibration results, all rooms feature a cavity floor.



A pool effect is created for controlling the room air climate by an intelligent air supply and exhaust system.



Cross section of a laboratory room: Shown here are the two large block foundations (blue-green) that are decoupled from the building foundations and that each have a mass of 15 t. The individual foundations for the weighing table slabs are cast on the block foundations. The floor is supported on the sides by the slab-on-grade foundation and is suspended over the block foundations.

When did construction on the Metrological Center and the DAkKS Mass Laboratory begin?

The planning phase began in the autumn of 2012, and I joined the construction planning group in 2013. Then in March 2015, the first foundations were cast, and we could successively move in at the beginning of 2017. We have meanwhile settled in so we feel right at home now. Our visitors never cease to be impressed by how large our premises are and by all the technical details that this facility houses, such as the temperature and humidity sensors linked to the computer system. If the temperature and humidity fluctuate in an excessive range, the system blocks calibration until the conditions return to the acceptable tolerance levels.

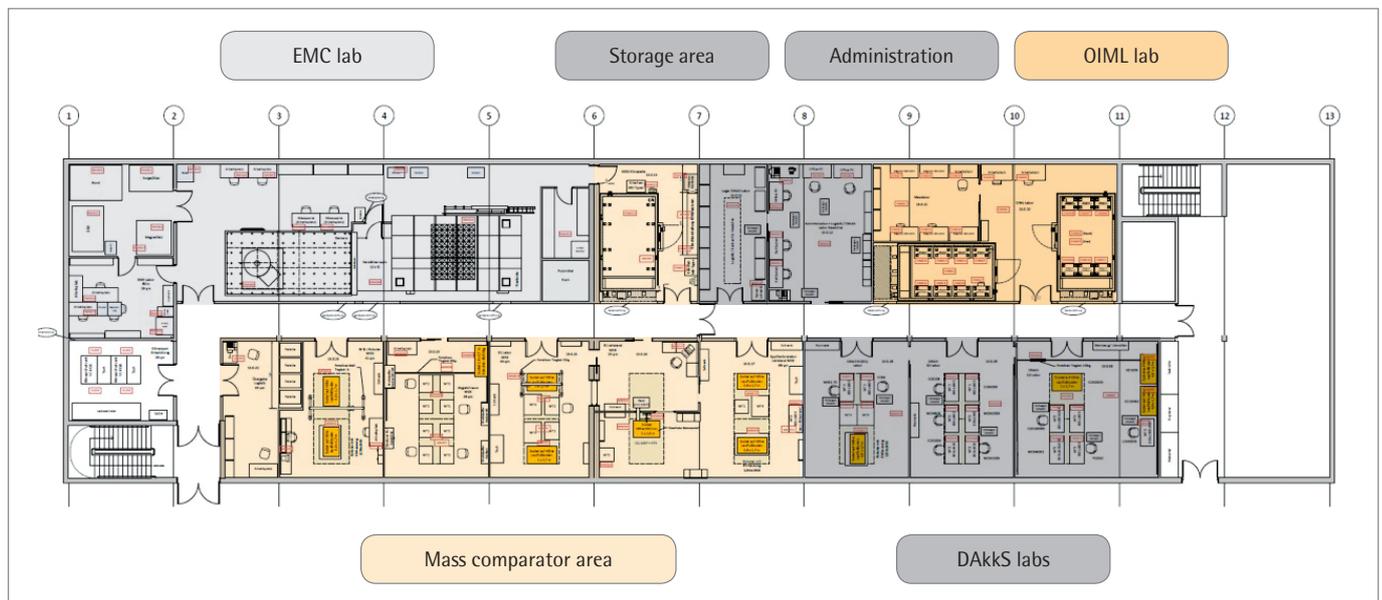
How many people work inside your laboratories for calibration of weights?

Five people currently work inside our DAkKS laboratory to ensure the quality of calibration every day. Incidentally, we also have a further highlight for our visitors:

» A highlight for visitors is our application laboratory for mass comparators.

A part of the Metrology Center is our application laboratory for mass comparators, in which our customers can work with the products on display, such as manual and automatic mass comparators (MCM series), and can exactly test the way these instruments operate. Inside the lab is also our CCR10-1000 robot system, which metrologically covers the entire mass range from 1 kg down to 1 mg. Cast concrete that is completely free of iron is also installed, which is designed to support our CCL1007 prototype mass comparator that we use to measure 1 kg to an accuracy of 0.1 µg. With this instrument, we perform measurements in the "Formula 1 world" of weighing technology.

Thank you very much for your information and our interesting conversation.



Floor plan of the entire Metrology Center

Mass Comparator Area:

This is where the climate parameters are monitored and technical acceptance testing is performed in the various laboratories, as well as where demonstrations for customers are held in the application laboratory.

DAkKS Laboratories:

There are three accredited laboratory rooms for calibrating weights for customers and for Sartorius service technicians who work with weights and calibrate laboratory balances.

OIML Laboratory:

Laboratory with two climate chambers for type evaluation and examination testing according to OIML R76 and for prototype testing of verifiable instruments to be used later in legal metrology, as well as for in-process quality control testing during manufacture.

EMC Laboratory:

This is where CE conformity assessment of all newly developed products is carried out and tests for type approval certification are performed in special testing chambers, among others.

Would you like to have your weights, pipettes or weighing instruments calibrated by Sartorius?

Just get in touch with us using our contact form available at www.sartorius.com/service.