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Speedcal-M4: Fast Calibration for Multi-Channel Pipettes

How to Measure 12-Channel Pipettes on Speedcal-M4

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Abstract

The Speedcal Mobile system was developed to meet the specific requirements for calibrating multi-channel pipettes. Its innovative design and sophisticated technology simplify the entire calibration process. Parallel measurement of up to 12 weighing modules, which simultaneously determine the dispensed volumes , make Speedcal Mobile the fastest and most effective system on the market for gravimetric pipette calibration of multichannel pipettes. The integrated Web Service interface enables Speedcal Mobile to be connected to various pipette calibration software. Speedcal Mobile is suitable for long-term use in laboratories and, thanks to its practical carrying case, also for use in mobile service on site.

Introduction

In this Application Note we investigate the possibility to use the Speedcal-M4, with 4 parallel connected weighing modules, for a calibration of a 12-channel pipette.

Focus:
- Efficient calibration with a Speedcal-M4
- Innovative handling of excess test liquid
- ISO 8655-6 compliant method
- Cost-effective alternative to a Speedcal-M8|12

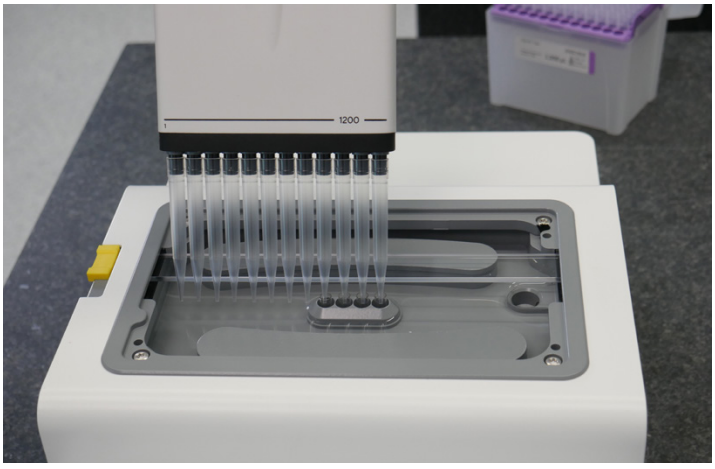

Figure 1: *Demonstration of the calibration process for a 12-channel pipette using the Speedcal-M4*

Why Do You Need a Multi-Channel Pipette Calibration Balance?

Calibrating multichannel pipettes in accordance with DIN EN ISO 8655-6 can be challenging — particularly when only a basic pipette calibration balance is available. The process is especially time-consuming for 12-channel pipettes, as each channel must be calibrated individually. Additionally, all non-measured channels must still aspirate and dispense the test liquid during each cycle. While a 12-channel Speed cal Mobile system offers a faster calibration workflow, it requires a significantly higher investment. A cost-efficient alternative is the 4-channel Speed cal Mobile, which enables reliable and standard-compliant calibration in line with ISO 8655-6:2022.

Speedcal Mobile balances are equipped with multiple parallel built-in weighing modules. This unique design allows for the simultaneous measurement of all channels of a multichannel pipette in full compliance with ISO 8655-6:2022. As a result, Speedcal Mobile balances offer a significant time advantage over conventional systems, which typically feature only a single weighing module.

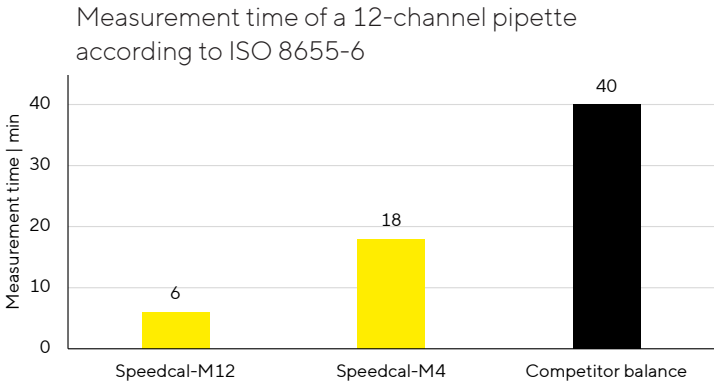

Figure 2: *Measurement time comparison between a Speedcal-M12, Speedcal-M4 and the competitor balance for a calibration of a 10-µL 12-channel pipette.*

For example, calibrating a 12-channel pipette (volume < 20 µL) takes approximately 2 minutes using the Speedcal-M12, which integrates 12 individual weighing modules. The Speedcal-M4, equipped with 4 modules, requires about 6 minutes. In contrast, competitor balances — limited to just one weighing module — require over 40 minutes for the same task (see Figure 2 and Table 1).

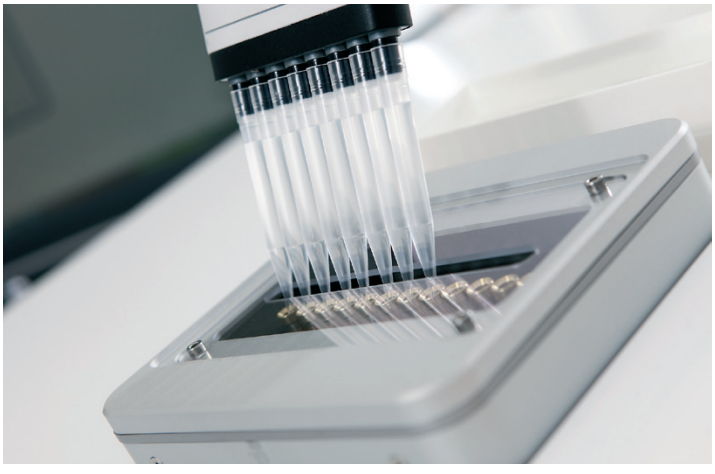

Figure 3: *Application image of a 12-channel Speedcal-M12 and an 8-channel pipette.*

Balance	Weighing Modules	Measurement time for 12-channel pipette per ISO 8655-6
Speedcal-M12	12	6 min
Speedcal-M4	4	18 min
Competitor Balance	1	40 min

Table 1: *List of weighing modules, measurement and handling time for a 12-channel pipette calibration per ISO 8655-6.*

12-Channel Pipette on Speedcal-M4 – Is It Possible?

Yes, a Speedcal-M4 can be used to calibrate 12-channel pipettes.

The 4-channel Speed Cal mobile offers a significant time advantage for calibrating 12-channel pipettes. By enabling all pipette tips to be filled and dispensed simultaneously with the test liquid, the calibration process is considerably accelerated. The 12-channel pipette is divided into three groups of four channels each. In each calibration step, one group dispenses the test liquid into the weighing vessels, while the remaining eight channels discharge their liquid into the device's integrated moisture trap (see Figure 4).

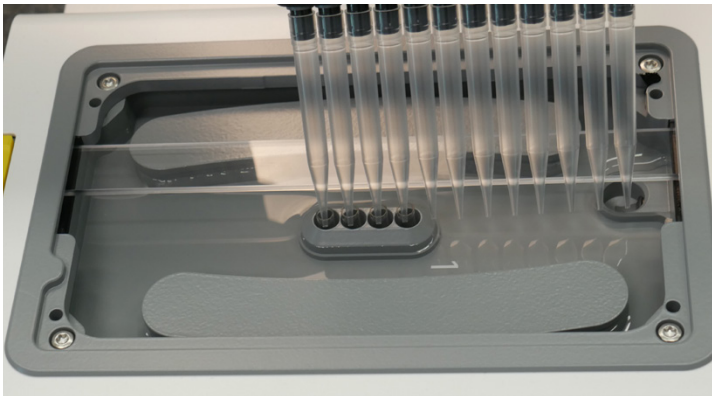

Figure 4: *The moisture trap of the Speedcal-M4 is filled by the water of the remaining channels. Once the water reaches a certain level the water will flow into the water drainage (right side of the picture).*

The moisture trap includes an overflow mechanism that safely collects the dispensed liquid in a designated waste container, ensuring a clean and efficient workflow (see Figure 4).

Figure 5 shows the handling of a 12-channel pipette on the Speedcal-M4. In the left and right side of figure 4 one can clearly see that there is enough room for the 12-channel pipette even when the outer channels of the pipette are tested.

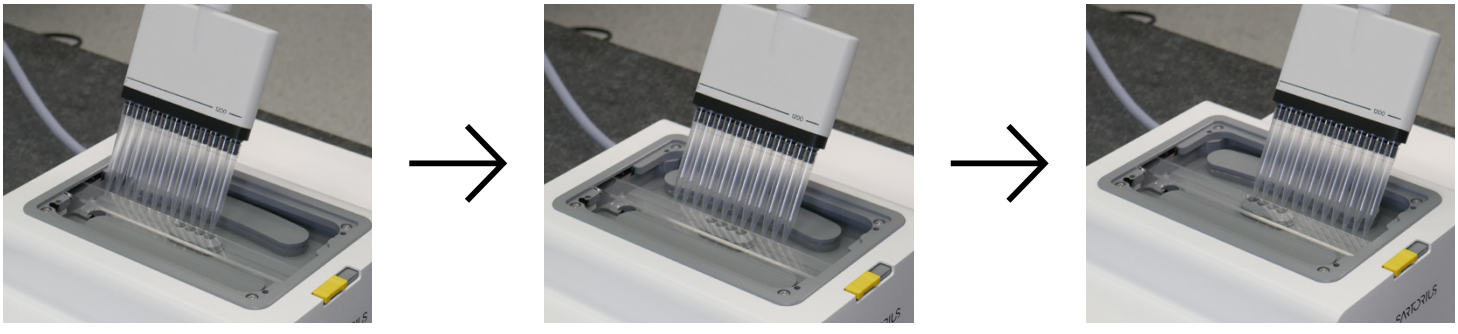

Figure 5: *A 12-channel pipette fits easily in the Speedcal-M4. Every channel can be measured without any trouble.*

Conclusion

Using the 4-channel Speedcal Mobile for the calibration of 12-channel pipettes provides a cost-effective and time-saving solution. The innovative channel grouping combined with the integrated moisture trap allows for an optimized calibration process — eliminating the need for a more expensive 12-channel system. This method ensures precise and efficient calibration in full compliance with the requirements of ISO 8655-6:2022.

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