
DAP-TM-20

Quality Assurance Measures for Measuring and Test Equipment Laboratory and Sampling

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Modifications as compared to the previous edition are marked in grey.

Control actions for functional tests of measuring and test equipment

Laboratory and sampling

Scope

This DAP internal technical note shall ensure a harmonization of requirements in the Sector Committee Chemistry (SK-C) assessing the quality assurance measures for measuring and test equipment in the laboratory and during sampling activities.

It applies for information and training purposes of lead and technical assessors.

In addition, till the approval of a vertical checklist, the technical note is an orientation checklist for the assessors in the documentation of the assessment according to QM-VA 9.3.

During on-site assessments, this note may be given to the assessed bodies for their internal information to establish an own control model for the functional test of the measuring and test equipment.

The complete evidence of the selection of test equipment, their correct function and appropriate use is the task of a systematically documented control of test equipment.

In general, all test equipment shall be checked before the first use and after each repair.

During the routine operation, the checking should be done in fixed test intervals.

DAP has given recommendations to harmonize the requirements for the test intervals to be shown in the following tables.

Time limits listed in standards, legal texts or other official regulations are not affected.

A) Measuring and test equipment traceable to derived measurement characteristics and SI-units

1. Mass

Measuring equipm., Instrument	Control Action/Testing	Time Limit
Chemical balances	Calibration by an external calibration laboratory with DKD certificate or metrology by the Board of Weights and Measures Alternatively Visual inspection and multipoint calibration by the laboratory with a calibrated set of mass pieces	According to the validity of the calibration certificate or Standardization Act Annually
	Condition and functional test with an external mass set	Every day a measurement is done
	Precision balances	Visual inspection and multipoint calibration by the laboratory with a calibrated set of mass pieces within the working range Condition and functional test with an external set of mass pieces
Set of calibrated mass pieces or appropriate balance weight		Official calibration or calibration with a DKD certificate

2. Temperature

Test thermometer (resolution 0,1 °C)	Calibration (by an authority)	According to the validity
Working thermometer (glass thermometer)	Temperature comparison with calibrated (by an authority) thermometer	Once
Working thermometer (electronic thermometer)	Temperature comparison with calibrated (by an authority) thermometer	Annually

3. Time

Measuring equipm., instrument	Control Action/Testing	Time Limit
Stop-watches	Comparison with radio clock	Annually

4. Pressure

Measuring equipm., instrument	Control Action/Testing	Time Limit
Manometer	Comparison measurement with calibrated (by an authority) manometer (Hg manometer)	Annually
Barometer	Comparison measurement with calibrated (by an authority) barometer	Annually

5. Volume

Measuring equipm., instrument	Control Action/Testing	Time Limit
Mechanical pipettes ≥ 20 – 1000 µL	Gravimetric or photometric method according to DIN 12650-Part 1-7 5 - 10 measurements depending on the field of application	Every 3 months
Mechanical pipettes 10 – <20 µL	Photometric method according to DIN 12650- Part 1-7 5 - 10 measurements depending on the field of application	Every 3 months
Piston burettes (e.g. automatic piston burettes)	Gravimetric method	Every 6 months
Flasks	If manufactured according to DIN	No control
One-mark pipettes,	If manufactured according to DIN	No control
Sampling device for soil air	Comparison measurements with calibrated (by an authority or not) instruments	6 months
Coring sleeves	Optical testing	Before each sampling

B) Measuring and test equipment

Measuring equipm., instrument	Control Action/Testing	Time Limit
Drying cabinet	Temperature comparison with calibrated (by an authority or not) test thermometer, constancy of temperature	Annually
Incubator	Temperature comparison with calibrated (by an authority or not) test thermometer, constancy of temperature	Annually
Controlled-atmosphere rooms	Comparison of the temperature and humidity with calibrated (by an authority or not) thermometers and hygrometers Registration of temperature and humidity	Annually During use
Emission test chamber	Comparison of the temperature and humidity with calibrated (by an authority or not) thermometers and hygrometers Registration of temperature and humidity	Annually During measurements
Muffle furnace	Temperature overshoot behaviour temperature constancy	Annually
PH measurement circuits	2-point-calibration in the measurement range and independent control buffers in the field of application	Every day a measurement is done
Refrigerated cabinets and freeze cabinets	Temperature comparison with test thermometer Check for cleanness and purity	Monthly
Conductivity measuring instrument with measuring cells	Check with KCl solution at 25°C	Every day a measurement is done
Test sieves to determine the grain size	Visual inspection and screening of standard sand according to DIN 3310 Test sieves > 2 mm mesh size visual inspection and measurement	Before sieving and new charge, first runnings or test sieving depending on the number of tests
Thermostats	Temperature comparison before the measurement with test thermometer Check of the actual temperature	Annually Every day a measurement is done
Water meters	Comparison measurements with calibrated (by an authority or not) instruments	Annually
Gas meters	Comparison measurements with calibrated (by an authority or not) instruments	Annually
Microscopes, including accessories	Cleaning, visual inspection Maintenance (Cleaning of internal parts) When the microscope has complementary devices (e.g. scalings, filters or light sources) the performance tests shall be ensured by retraceability (e.g. calibration of scaled objects using certified object micrometers). Microscopes in conjunction with analyzers shall be controlled/tested according to the instructions of the analyzer.	Every day a measurement is done Every 2 years

C) Analyzers

Measuring equipm., instrument	Control Action/Testing	Time Limit
AAS-instrument	After calibration, measurement of independent control solutions to test the functions: QA control charts	Every day a measurement is done or before each series of analysis
ICP-OES instrument	After calibration, measurement of independent control solutions to test the functions: QA control charts	Every day a measurement is done or before each series of analysis
ICP-MS instrument	After calibration, measurement of independent control solutions to test the functions: QA control charts Inspection of the vacuum and gas flows. Inspection of the mass tune	Every day a measurement is done or before each series of analysis
Photometer	Absorption test: e.g. using the certified grey wedge, certified filters, potassium dichromate solutions	Annually
Ion chromatograph	After calibration, measurement of independent control solutions to test the functions: QA control charts System control for leakages, control of pressure ratio, basis line and separation efficiency	Every day a measurement is done or before each series of analysis
Gas chromatograph (WLD/ECD/FID/NPD/PID)	After calibration measurement of one control standard at least Inspection of the gas flows, temperature programme and detector signal parameter	Every day a measurement is done or before each series of analysis
GC-MS	After calibration, measurement of independent control solutions to test the functions: QA control charts Inspection of the vacuum and gas flows. Inspection of the mass tune	Every day a measurement is done or before each series of analysis
GC Headspace	Inspection of gas flows and heating bath temperature	Every day a measurement is done
GC Purge&Trap	Inspection of gas flows	Every day a measurement is done
HPLC	Measurement of one independent control standard at least, QA control charts, System control for leakages, control of pressure ratio, basis line and separation efficiency	Every day a measurement is done or before each series of analysis
LC-MS	Measurement of one independent control standard at least, QA control charts, Inspection of the vacuum, gas flows and tune (response ratio)	Every day a measurement is done or before each series of analysis
IR spectrometer	Inspection of the IR band length and intensity using polystyrene films, Signal and noise inspection	Annually Every day a measurement is done
Portable FID/PID	Calibration with calibration gas	Every day a measurement is done

D) Sampling equipment

Measuring equipm., instrument	Control Action/Testing	Time Limit
Sampling of soil	Visual inspection, performance check, cleaning	Before each soil exploration
Sampling ground water	Visual inspection, performance check, cleaning Detection that the cleaning has been successful	Before each sampling Blind value checks after work in contaminated areas
Sampling soil air	Visual inspection, performance check, cleaning, leak tests	Before each sampling
Portable FID/PID	Calibration with calibration gas	Every day a measurement is done

Note:

In the DIN 32937 „Control of inspection, measuring and test equipment“ reference is made to the fact that a mark should be made on the test equipment at the next due test date. Exceptions shall be documented by the organisation.

In the DIN EN ISO/IEC 17025:2005 „General requirements for the competence of testing and calibration laboratories“ reference is made to the fact that notes shall be made on the date for the next calibration of items of equipment used for testing. Exceptions shall be documented by the organisation.