

Annotation: Certifications of manufacturers/suppliers according to ISO 9001 cannot replace calibrations and do not influence the scheduling! Actual calibration periods will have to be varied due to the frequency and conditions of use, set-up characteristics, etc. Evidence is to be given to the assessor by the laboratory for justified deviations from the required time limits.

Part 1: General Requirements

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
1.a	Scales	1. Levelling, zero balance and integrated one-point calibration (if no self-calibration), if applicable one-point calibration at >5 ° C temperature change and 0.1 mg scaling, with vibrations, etc. 2. Multiple-point calibration with calibrated set of weights (according to use and ambiance influences, resolution and weighing range)	Daily when used Do. Do. Every 6 months
1.b	Scales for public and expert tasks according to § 42 LFBG (Act on Food and Commodity Goods) Only for German laboratories	Like 1.a, in addition Official verification	According to the German Standardization Act
1.c	Calibration weights	Retraceable calibration	Every 5 years
1.d	Testing weights	Comparison with calibration weight or scales just calibrated	Annually
2.a	Liquid expansion thermometers made of glass	Comparison with thermometers officially verified or calibrated with a scale smaller or equal to the thermometer to be calibrated within the measurement range	Once before use (annually for minimum, maximum thermometers)

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
2.b	Electronic thermometers / T Loggers	Comparison with thermometers officially verified or calibrated with a scale smaller than the thermometer to be calibrated within the measurement range	12 months
2.c	Reference thermometers	Liquid expansion thermometers: official calibration Electronic thermometers / T Loggers: official verification/calibration	According to the German Standardization Act: 15 years According to the German Standardizaion Act: 2 years
3.	Areometers, butyrometers	Gravimetric	Once before use and / or manufacturer's certificate
4.	Barometers	For pressure-relevant processes against trimmed Hg manometer	Annually
5.	Manometers	For pressure-relevant processes against a certified manometer	Annually
6	Mechanical clocks	For time-relevant processes against a quartz (stop) clocks or a radio controlled clock	Annually
7.a	Digital burettes	E.g. using a photometric, gravimetric or stoichometric determination	Every 3 months
7.b	Mechanical pipettes greater than 50 µl	Gravimetric testing for precision and correctness (DIN ISO 8655 or manufacturer's specification)	Every 3 months
7.c	Mechanical pipettes smaller than/equal to 20 µl	Photometric or external testing for precision and correctness (DIN ISO 8655 or manufacturer's specification)	Every 3 months

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
8	Volumetric instruments made of glass	If manufactured according to DIN or ISO	None
9	Pipette machines, including microtitre plates	Volumetric accuracy and constancy	Semiyearly
10	Photometers	Holmium and grey filters with certificate, accuracy and linearity or e.g. $K_2Cr_2O_7$ solution (purity >99,98%) and saccharose concentration series or self-calibration	Annually
11	ELISA readers	Use of a validation plate (device-specific)	Annually
12	Plastic optical cells (enzymology)	Layer thickness – measurement against quartz optical cell If not manufactured according to DIN or ISO	At least 1 specimen of every supply of the same batch number Every package
13	Drying cabinets	If applicable thermal history, including phase hysteresis (if applicable with loggers) Actual temperature at temperature level to be kept	Annually Daily when used
14	Annealing furnaces	Using an appropriate thermometer or reference material if applicable	Annually
15	PH meters	Calibration with 2 pH buffers (and cross-check by a third buffer with specified measurement uncertainty +/- 0,02 pH)	Daily when used
16	Conductance meters	KCl standards at 25°C (EN 27888-1993:09)	Daily when used

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
17	Water bath with thermometer	Thermometer officially verified/calibrated to be used for the calibration of the thermometer If applicable phase hysteresis with e.g. T loggers Actual temperature with temperature level to be kept	See 2a/2b Semiyearly Daily
18	Refrigerators / cooling chambers	Verifying stability and course of temperature (Thermometer officially verified/calibrated, T loggers) Actual temperature for refrigerators / cooling chambers with defined temperature	Annually Daily when used
19	Sieve sets	Reference grain sizing	Annually
20	GC Detectors: PN ECD FID MSD MS/MS	Standards/reference substances in the test run, determination sensitivity/blank (control chart), if applicable X-chart	Every test run
21	TLC	Standards/reference substances in the test run and others	Every test run

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
22	HPLC detectors: λ ions fluorescence diode array MS/MS	Like GC	Every test run
23	AAS	Standards/reference substances Determination of sensitivity (control chart), if applicable recovery control chart, if applicable blank control chart, and others	Every test run If practical
24	ICP	Standards/reference substances Determination of sensitivity (control chart, if applicable recovery control chart, if applicable blank control chart, and others	Every test run If practical
25	Fourier TIR	Standards/reference substances in the test run, blank control chart	Every test run
26	NIR	Standards/reference substances in the test run, blank control chart verification against reference method	Every test run

Part 2: Microbiology

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
1	Oven	Thermometer officially verified/certified, T logger Actual temperature at precisely defined temperature level	Annually Daily when used
2	Incubator/incubator room	Like refrigerator in addition, in case of anaerobic incubators: Testing of anaerobic conditions	Every test run
3	Diluters	Gravimetric Dispensed volume / dilution checking	Daily when used Daily when used
4	Plate casting machines	Filled volume, visually with appropriate volumetric instrument	Semiyearly
5	Hot air sterilizers	Performance check (sterility check) using bio-indicators Indicators for hot air sterilizers, if applicable T-recorder or logger	Semiyearly Per batch
6	Gravimetric autoclaves	Performance check (sterility check) using bio-indicators Autoclave indicators	Semiyearly Per batch

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
7	Displacement autoclaves	Performance check (sterility check) using bio-indicators Autoclave indicators or recorders for T/p/t	Semiyearly Per batch
8	Sterile work benches	Microbiological check, airborne germ plates sedimentation according to ISO 7218	Weekly or result-related
9	Working spaces microbiology	Airborne germ measurement according to ISO 7218	Weekly
10	Spiral plater	Checking of dispensed volume	Monthly
11	Airborne germ collector	Calibration referring to the suction volume	Annually
12	Electrophoresis equipment	Levelling Cooling constancy	Daily when used
13	Colony counters	Check for plausibility	Daily when used

Part 3: PCR

No.	Type of equipment, object	Calibration, official verification and monitoring activities	Period of time
1	Heating blocks	Temperature distribution and gradient heating-up time	Annually 3 temperature ranges for all cavities
2	Thermocycler/blockcycler	Homogen temperature distribution and determination of the temperature time gradient Indirect performance tests e.g. using an appropriate reference strain or material Checking by manufacturers' kits	Annually Daily when used (annually for all cavities) Semiyearly or annually
3	Robot: Nuclein acid isolation and cleanup system with automatic PCR sample preparation	Checking by manufacturers' kits or reference strain or material	Extent and time interval according to manufacturers' specification
4	Pipette machines	Volumetric accuracy and constancy	Semiyearly
5	Photometer with self-calibration	Holmium and grey filters with certificate, accuracy and linearity or e.g. $K_2Cr_2O_7$ solution (purity >99,98%) and saccharose concentration series or self-calibration	Annually

^{*)} Translation for information purposes only. The German version is authoritative.