

Equipment Calibration and Verification

Reference Standards	Minimum Action	Frequency	Justification
Weights (Mass) Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Accredited Calibration Laboratory with endorsed certificate or T9 with appropriate records. - Should do Intermediate Check 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every 5 years - Intermediate Check should be done annually (See ILAC G24/OIML D10 for Guidance) 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
Thermometer Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Accredited Calibration Laboratory for Initial Calibration (Purchase) or Recalibration - Endorsed Certificate - T9 OK With Certificate - Should do Intermediate Check at Ice-Point or Boiling Point or at Temperature of Use (versus Reference Thermocouple) 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every 5 years - Intermediate Check should be done annually 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
Thermocouple - Reference Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Accredited Calibration Laboratory for Initial Calibration (Purchase) or Recalibration - Endorsed Certificate - T9 OK With Certificate - Should do Intermediate Check at Ice-Point or Boiling Point 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every 5 years - Intermediate Check should be done annually 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
Reference Gauge Block Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Accredited Calibration Laboratory for Initial Calibration (Purchase) or Recalibration - Endorsed Certificate - T9 OK With Certificate - Intermediate Checks 	<ul style="list-style-type: none"> - Usually Every Two Years - Intermediate Check should be done Monthly 	<ul style="list-style-type: none"> - Potential significant component of overall uncertainty of measurand (e.g., cigarette length and circumference)
Stage Micrometer Support Equipment not Listed on Scope (Used for calibration checks of ocular micrometers and reticles for optical microscopy)	<ul style="list-style-type: none"> - Accredited Calibration Laboratory for Initial Calibration (Purchase) or Recalibration - Endorsed Certificate - T9 OK with Certificate 	<ul style="list-style-type: none"> - As defined by the laboratory, but usually Annually - Usually only Initial Calibration 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI

Working Standards			
Working Weights (Mass) Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Compare to Reference Weights - Measurement of Mass is Within Acceptance Criteria 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every year 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty - Already part of test method uncertainty
Working Thermometers Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Compare to Reference Thermometer - Measurement of Temperature is Within Acceptance Criteria or Correction Factor Applied 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every year 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty - Already part of test method uncertainty
Working Thermocouples Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Compare to Reference Thermocouple - Measurement of Temperature is Within Acceptance Criteria or Correction Factor Applied - 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every year - Would also apply to computerized systems 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty - Already part of test method uncertainty
Working Gauge Block Support Equipment Not Listed on Scope	<ul style="list-style-type: none"> - Compare to Reference Gauge Blocks or similar reference standards - T9 OK With Certificate - Intermediate checks 	<ul style="list-style-type: none"> - Annually - Intermediate Check should be done Daily 	<ul style="list-style-type: none"> - Potential significant component of overall uncertainty of measurand (e.g., cigarette length and circumference)
Reference Materials			
Trace Metals	<ul style="list-style-type: none"> - Accredited Reference Material Producer (e.g. Inorganic Ventures and SPEX) 	<ul style="list-style-type: none"> - Upon Purchase 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
Trace Organics (Volatiles, Semi-Volatiles, Pesticides)	<ul style="list-style-type: none"> - Accredited Reference Material Producer (e.g. SPEX) – See also the COMAR Site (http://www.comar.bam.de/home) 	<ul style="list-style-type: none"> - Upon Purchase 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
Anions & Cations	<ul style="list-style-type: none"> - Accredited Reference Material Producer (e.g. Inorganic Ventures and SPEX) – See also the COMAR Site (http://www.comar.bam.de/home) 	<ul style="list-style-type: none"> - Upon Purchase 	<ul style="list-style-type: none"> - Requires traceability at least to an NMI
pH Buffers	<ul style="list-style-type: none"> - Considered to be Category II - Could be Radiometer, VWR, Fisher, etc. 	<ul style="list-style-type: none"> - Upon Purchase 	<ul style="list-style-type: none"> - Obtained from an authoritative source

Measuring Instruments - Not in Scope of Accreditation			
Balances	<ul style="list-style-type: none"> - Compare to Reference Weights: Can be done with Accredited Calibration Laboratory (T1) or In-House with T9 - Measurement of Mass is Within lab's Acceptance Criteria - Should do Intermediate Check with Working Weights 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually every year - Intermediate Check should be done on day of use 	<ul style="list-style-type: none"> - Can be an insignificant component of overall uncertainty of measurement - Already part of test method uncertainty
Pipetors and Other Volumetric Delivery Devices	<ul style="list-style-type: none"> - In-House "Calibration" (T9) or Intermediate Check - Weight of Water or Spectrophotometric - Should do Intermediate Check 	<ul style="list-style-type: none"> - As defined by the laboratory - Intermediate Check should be done every 3-6 months 	<ul style="list-style-type: none"> - Potentially significant component of overall uncertainty of measurand - Already part of test method uncertainty.
pH Meter/Electrode	<ul style="list-style-type: none"> - Response Comparison with Category II pH Buffers Traceable (e.g. Sold by VWR, Fisher) - Certificates Not Required - Acceptance Criteria for Buffer or Slope Required - No Separate Uncertainty Needed 	<ul style="list-style-type: none"> - Usually Each Day of Use 	<ul style="list-style-type: none"> - Small component of overall uncertainty of measurand - Already part of test method uncertainty
Measuring Instruments - In Scope of Accreditation			
pH Meter/Electrode	<ul style="list-style-type: none"> - Response Comparison with Category II pH Buffers Traceable (e.g. Sold by Radiometer, VWR, Fisher) - Certificates Required - Acceptance Criteria for Buffer or Slope Required - Measurement Uncertainty Determined with LCS Data 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty
Gas Chromatograph	<ul style="list-style-type: none"> - Response Comparison with Reference Materials (Standards) Traceable (to NIST, NMI, RMP if possible) - Measurement Uncertainty Determined with LCS Data 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty
Liquid Chromatograph	<ul style="list-style-type: none"> - Response Comparison with Reference Materials (Standards) Traceable (to NIST, NMI, RMP if possible) - Measurement Uncertainty Determined 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty

	with LCS Data		
Atomic Absorption Spectrophotometer	<ul style="list-style-type: none"> - Response Comparison with Reference Materials (Standards) Traceable (to NIST, NMI, RMP if possible) - Measurement Uncertainty Determined with LCS Data 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty
Inductively Coupled Plasma	<ul style="list-style-type: none"> - Response Comparison with Reference Materials (Standards) Traceable (to NIST, NMI, RMP if possible) - Measurement Uncertainty Determined with LCS Data 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty
UV/VIS Spectrophotometer	<ul style="list-style-type: none"> - Response Comparison with Reference Materials (Standards) Traceable (to NIST, NMI, RMP if possible) - Measurement Uncertainty Determined with LCS Data 	<ul style="list-style-type: none"> - As defined by the laboratory - Usually Each Day of Use - Intermediate Check should be done daily 	<ul style="list-style-type: none"> - Major component of overall uncertainty of measurand - Already part of test method uncertainty
Support Equipment/Apparatus			
Refrigerators, Freezers, Incubators, Water Baths, Ovens, Muffle Furnaces, etc.	<ul style="list-style-type: none"> - None Required, Unless the device has its own temperature sensing device, in which case it needs to be checked annually - Using appropriate and calibrated working thermometers or working thermocouples is expected. 	<ul style="list-style-type: none"> - As defined by the laboratory or relevant Program Requirements 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty of measurand - Already part of test method uncertainty
Autoclaves	<ul style="list-style-type: none"> - None Required, Unless the autoclave has its own temperature sensing device, in which case it needs to be checked every 6 months (laboratory or service provider) - Using appropriate and calibrated working thermometers or working thermocouples is expected. 	<ul style="list-style-type: none"> - As defined by the laboratory or relevant Program Requirements 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty of measurand - Already part of test method uncertainty
Safety Cabinets, Fume Hoods, Laminar Flow Hoods, Centrifuges	<ul style="list-style-type: none"> - None Required 	<ul style="list-style-type: none"> - As defined by the laboratory or relevant Program Requirements 	<ul style="list-style-type: none"> - Insignificant component of overall uncertainty of measurand - Already part of test method uncertainty

Updated - 05/22/08