



Title:
ATTACHMENT B

Effective Date:
10-01-03
Revised: 05/25/10

Table 2. Equipment Calibration or Verification Requirements

NOTE 1: Documentation is required for annual calibration or verification. NOTE 2: Daily refers to measurements when in use.

CALIBRATION OF EQUIPMENT

Equipment	Requirement	Minimum Frequency
Balances	1. Recognized mass standard	1. Annually
Freezers and Refrigerators	1. Stability and uniformity of temperature 2. Accuracy of temperature sensing unit	1. At installation & annually 2. At installation & annually
Dispensing equipment for microbiological media	1. Volume	1. At installation & daily
Glassware, Non-Class A, Volumetric: pipets, burets and volumetric flasks	1. Accuracy and precision using mass of water	1. Upon receipt
Hydrometer, Reference	1. One point calibration to standard of known specific gravity	1. Every two years
Hydrometer, Working	1. One point calibration to reference hydrometer	1. Annually
Incubators	1. Accuracy of temperature sensing system, uniformity and stability of temperature	1. At installation & 2. Annually
Microscopes	1. Calibrate stage micrometer	1. At installation
Ovens, Furnaces, Autoclaves, and Waterbaths	1. Accuracy of temperature sensing system, uniformity and stability of temperature	1. At installation & 2. Annually
Thermometer, Reference	1. Critical points on scale	1. Annually
Thermocouple, Reference	1. Calibration std. verification	1. Annually
pH meters, ion selective and conductivity equipment	1. pH reading with standard buffers or other known and standardized ionic solutions	1. Each use
Volumetric delivery devices; mechanical pipets and burets	1. Accuracy and precision	1. Every 6 months
Timers	1. National time standard	1. Annually
Weights, reference	1. Re-certification for accuracy from recognized national or international calibration units	1. Every 5 years
Weights, working	1. Verify against reference weights	1. Annually
Pipettes	1. Volume	1. Each lot (manufacturer's certification fulfills requirement)



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VERIFICATION OF EQUIPMENT

Equipment	Requirement	Minimum Frequency
Spectrophotometers and Spectrometers (AA, UV/Vis fluorometric, ICP, Mass etc.)	1. Overall systems check: Wavelength (accuracy, precision, stability), source stability, detector performance (resolution, selectivity, stability, linearity, accuracy, precision), signal-to-noise (mass, ppm, wavelength, frequency, absorbance, transmittance, bandwidth, intensity), as applicable	1. Annually
Chromatographs	1. Overall system checks, column performance (resolution, capacity, retention), detector performance (output, response, noise, drift, selectivity, linearity), automatic sampler (accuracy and precision of time routines, reproducibility of injections), as applicable	1. Annually
Thermocouple, Working	Calibration versus reference thermocouple	Annually
Thermometer, Working	Specific points against reference thermometer	Annually
Freeze dryers, Vacuum ovens	1. Ability to achieve and sustain vacuum 2. Gauges calibrated and verified	1. Annually 2. Annually
Water activity meter	1. Water activity of known solutions	1. Each use