Attachment 21

Analytical Instrument Verification Process

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1.0 Overview

1.1 Purpose

Analytical Instrument verification must follow the requirements of XYZ, Analytical Instrument and Lab Equipment Qualification Process.

This document describes activities for analytical instrument verification including recommendations for tolerances for specific parameters for calibration, and frequencies for calibration, testing, preventive maintenance and qualification.

1.2 Scope

The scope of this document is defined in the Scope section of XYZ.

1.3 Implementation

Implementation is in accordance with Effective Date.

Laboratory instrument qualification prior to the effective date of this policy may be executed according to the documents in effect at that time.

Existing laboratory instrument qualifications will be updated, as appropriate, through the periodic review as documented in the Validation Master Plan.

1.4 Responsibility

The owner organizations of the qualified analytical instruments in the scope of this document and the associated Validation Review Boards (VRBs) are responsible for assuring compliance with xyz's qualification policy and process document requirements.

2.0 Requirements

2.1 Verification Activities

Some instruments require periodic verification of their functionality on an annual or time of use basis. This verification is a confirmation by examination and provision of objective evidence that the specified analytical instrument requirements have been fulfilled. Verification of some parameters may be performed during installation or operational qualification. A qualified individual should perform these activities, e.g., vendor service representative, qualified in-house instrument repair shop personnel, etc. No VCR is required for the calibration or maintenance portions of the instrument verification. A VCR is required when any elements of qualification or requalification are executed. Refer to Attachment A for specific activities and recommended schedules and tolerances for instrument verification.

2.2 Analytical Instrument Templates

Templates related to the qualification of analytical instruments may be found on xyz. Templates specific to xyz are indexed with xyz.

ATTACHMENT A
HPLC Verification Table Part I

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Column Heater								
• Temperature Accuracy		X		Y		X		+/– 5 Deg. C
Pump								
• Flow Rate Verification		X	Y			X		Test point at 1 mL +/– 10%
• Proportion valve check			Y					
Injector/ Autosampler								
• Volume Consistency	Verify Precision	X	Y			X	Method Specific. System suitability accounts for volume consistency during injection reproducibility testing. Verification/Preventive Maintenance performed for injector.	
	Verify Accuracy					X	For methods where low volume errors are a concern, method specific sensitivity controls are utilized. High volume errors would be detected by method specific system suitability controls such as resolution.	
• Carry Over	Gross or Trace Analysis					X	For potency assays, the injection repeatability system suitability parameter would detect any significant carryover. For trace, analysis the use of blanks in the design of the method is used to account for unwanted carryover. In general, modern HPLC equipment is designed to minimize significant carry over.	
• Sample Cooler Temperature	Verify Accuracy	X		Y		X		+/– 3 Deg. C

ATTACHMENT A
HPLC Verification Table Part II

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Detector								
• UV/Vis, DAD	Wavelength Accuracy	X	Y	Y	X	X	Preventive maintenance: check flow cell lamps and perform instrument general cleaning. User Standardization: Must minimally comply with policies for laboratory chemical reference standards and calibration.	+/– 3 nm
	Linearity Accuracy	X				X		Correlation Coef. NLT 0.991
Refractive Index (RI)	Linearity Accuracy	X			X	X	User Standardization: Must minimally comply with policies for laboratory chemical reference standards and calibration.	Correlation Coef. NLT 0.991
Electrochemical Detector (ECD)	Linearity Accuracy	X			X	X	User Standardization: Must minimally comply with policies for laboratory chemical reference standards and calibration.	Correlation Coef. NLT 0.991

Notes:
General Rationale: Catastrophic issues will be detected based on the current lab practices of system suitability, user standardization and lab incident investigations and evaluation.
Note a: Also know as operational check or functional test; adjustment or acceptance limits may be specified but will not necessarily be related to traceable measurement standards.
Note b: Calibration classification (class A – critical calibration or class B- non-critical calibration) dependent upon intended use.
Note c: Calibration performed by the equipment user / owner, typically at an increased frequency or prior to each use due to known or suspected instability of the equipment.
Note d: Method specific. System suitability requirements demonstrate the lab instrument performs per the intended use.
X: Frequency determined by the user. Certain aspects of qualification may be addressed through calibration.
Y: Frequency is at least once per year.

ATTACHMENT A
GC Verification Table Part I

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Column Oven								
• Temperature	Verify Accuracy	X		Y		X		+/– 5 Deg. C or 4% of RDG whichever is greater
Carrier Gas								
• Flow Rate	Verify Flow Rate	X				X		+/– 10% of desired flow rates
Injector/Headspace								
• Volume Consistency	Verify Precision	X	Y			X	Method Specific. System suitability accounts for volume consistency during injection reproducibility testing. Verification/Preventive Maintenance performed for injector.	Injection repeatability is a method defined parameter
	Verify Accuracy					X	For methods where low volume errors are a concern, method specific sensitivity controls are utilized. High volume errors would be detected by method specific system suitability controls such as resolution.	
• Carry Over	Gross or Trace Analysis					X	For potency assays, the injection repeatability system suitability parameter would detect any significant carryover. For trace, analysis the use of blanks in the design of the method is used to account for unwanted carryover. In general, modern GC equipment is designed to minimize significant carry over.	

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ATTACHMENT A
GC Verification Table Part II

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Injector/Headspace								
• Temperature		X	Y			X		+/– 5 Deg. C or 4% of RDG whichever is greater
Detector								
• Temperature		X	Y			X		+/– 5 Deg. C or 4% of RDG whichever is greater
• Flame Ionization Detector	Linearity Accuracy	X				X		Correlation Coef. NLT 0.991
• Thermal Conductivity Detector (TCD)	Linearity Accuracy	X				X		Correlation Coef. NLT 0.991
• Electron Capture Detector	Linearity Accuracy	X				X		Correlation Coef. NLT 0.991

Notes:
General Rationale: Catastrophic issues will be detected based on the current lab practices of system suitability, user standardization and lab incident investigations and evaluation.
Note a: Also know as operational check or functional test; adjustment or acceptance limits may be specified but will not necessarily be related to traceable measurement standards.
Note b: Calibration classification (class A – critical calibration or class B- non-critical calibration) dependent upon intended use.
Note c: Calibration performed by the equipment user / owner, typically at an increased frequency or prior to each use due to known or suspected instability of the equipment.
Note d: Method specific. System suitability requirements demonstrate the lab instrument performs per the intended use.
X: Frequency determined by the user. Certain aspects of qualification may be addressed through calibration.
Y: Frequency is at least once per year.

ATTACHMENT A
Flame Photometer Verification Table

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Flame Photometer								
	Linearity	X	Y					Correlation Coef. NLT 0.991
	Detector Accuracy	X			X		Method specific calibration (user standardized) using sodium and potassium chloride standard preparations are performed before use. Must minimally comply with policies for laboratory chemical reference standards and calibration.	
	Aspiration Flow Rate	X				X	Aspiration rate to be verified prior to each use.	

Notes:
General Rationale: Catastrophic issues will be detected based on the current lab practices of system suitability, user standardization and lab incident investigations and evaluation.
Note a: Also know as operational check or functional test; adjustment or acceptance limits may be specified but will not necessarily be related to traceable measurement standards.
Note b: Calibration classification (class A – critical calibration or class B- non-critical calibration) dependent upon intended use.
Note c: Calibration performed by the equipment user / owner, typically at an increased frequency or prior to each use due to known or suspected instability of the equipment.
Note d: Method specific. System suitability requirements demonstrate the lab instrument performs per the intended use.
X: Frequency determined by the user. Certain aspects of qualification may be addressed through calibration.
Y: Frequency is at least once per year.

ATTACHMENT A
Osmometer Verification Table

Component	Activity	Qualification	Verification/ Preventive Maintenance (See note "a" below)	Calibration (See note "b" below)	User Standardized Calibration (See note "c" below)	System Suitability (See note "d" below)	General Comments	Tolerance (Applies to qualification, calibration and verification)
Osmometer		X			X		Method specific calibration (user standardized) using potassium chloride standard preparations before each routine use. Must minimally comply with policies for laboratory chemical reference standards and calibration.	
	Linearity	X	Y					Correlation Coef. NLT 0.991
	Probe Inspection		Y					

Notes:
General Rationale: Catastrophic issues will be detected based on the current lab practices of system suitability, user standardization and lab incident investigations and evaluation.
Note a: Also know as operational check or functional test; adjustment or acceptance limits may be specified but will not necessarily be related to traceable measurement standards.
Note b: Calibration classification (class A – critical calibration or class B- non-critical calibration) dependent upon intended use.
Note c: Calibration performed by the equipment user / owner, typically at an increased frequency or prior to each use due to known or suspected instability of the equipment.
Note d: Method specific. System suitability requirements demonstrate the lab instrument performs per the intended use.
X: Frequency determined by the user. Certain aspects of qualification may be addressed through calibration.
Y: Frequency is at least once per year.

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