MSL Proficiency Test MSL-PT-O01-2019

Benchtop Spectrophotometer

Technical Protocol

1. Introduction

The purpose of the proficiency test is to verify the calibration capabilities of participants in the field of calibration of spectrophotometers for transmittance or absorbance, over the wavelength range 200 nm to 1000 nm (or part thereof). The instrument to be calibrated is a benchtop type spectrophotometer. This instrument will initially be calibrated by MSL. Participants will then perform their calibration of the instrument on site at MSL. Between different participants' measurements, MSL will perform a stability and damage check. Finally, MSL will recalibrate the instrument after all participants' measurements are complete to determine any possible drift.

2. Equipment and handling

Artefact: ThermoScientific Evolution 220 UV-Visible Spectrophotometer, model number 840-210600, serial number 5A2W 360108.

Location

Callaghan Innovation
Measurement Standards Laboratory
69 Gracefield Road
Gracefield
Lower Hutt

3. Measurements to be carried out

Participants must NOT attempt to perform any maintenance of the instrument or calibration adjustments within the software settings.

Participants must NOT discuss results with other participants before the final report is issued.

Each participant should calibrate the spectrophotometer, on site at MSL, using their own reference filter sets. Measurements should include assessment of wavelength and photometric accuracy and stray light. The measurement range for each property should be selected by the participant and should cover as wide a range of their Scope of Accreditation as possible. For the purposes of this proficiency test, it is acceptable to report results outside the range of the measurand on your scope of accreditation.

4. Documents to be submitted

A copy of initial measurement results obtained on the day shall be given to MSL before leaving the site.

Within one week of completion of the measurements, participating laboratories are required to submit their results to MSL in the form of a calibration report as routinely provided to customers. Results should also be reported in the attached results sheet and submitted to MSL (these documents can be sent by email – see *Contact Information* below).

Uncertainties should be calculated using your usual method, which should be consistent with the method in the ISO *Guide to the Expression of Uncertainty in Measurement.* Uncertainties must be reported as expanded uncertainties at the 95% level of confidence.

Note: *It is acceptable for the purposes of this proficiency test to report an uncertainty below that on your scope of accreditation or to report results outside the range of the measurand on your scope of accreditation.*

5. Further Information

Schedule

The proficiency test is scheduled to start in October 2019. Each laboratory will be required to book a date to carry out their measurements, on site at MSL, during November 2019 or February 2020.

Analysis

Results from all participating laboratories will be compared to the values measured by MSL. The results will be reported as a table of normalised error (E_n) values, which are given by

$$E_\mathrm{n} = \frac{\mathrm{LAB}-\mathrm{REF}}{\sqrt{U_\mathrm{LAB}^2+U_\mathrm{REF}^2}},$$

where: LAB = participating laboratory's correction, REF = reference laboratory's correction, U_LAB = participating laboratory's expanded uncertainty, U_REF = reference laboratory's expanded uncertainty.

Reporting

Your laboratory will receive a customised interim report containing the calculated E_n values with respect to the most recent reference laboratory's calibration results and feedback on your submitted calibration report. The interim report will be available within four weeks of your results being submitted to MSL.

A draft final report will be compiled once all participating laboratories have completed their calibrations. The report will list all participants but will identify results only by a laboratory number, which will be communicated to each participant when registrations are complete. The same report will be issued to all participants. Laboratories will be given two weeks to comment on the draft final report, after which a final report will be issued.

Note: If any participant makes changes to submitted data between the interim and final reports, this will be noted in the final report.

Contact information

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MSL Proficiency Test-O01-2019
Benchtop Spectrophotometer

RESULTS SHEET (Wavelength Calibration)
ThermoScientific Evolution 220 UV-Visible Spectrophotometer,
model number 840-210600, serial number 5A2W 360108.

Laboratory Name:

Report Number:

Ambient Temperature:

Calibrated Date:

Calibrated By:

Filter Type(s):

Bandwidth:

Wavelength Correction(s) (Reference – Measured)	Expanded Uncertainty(s)	Coverage Factor	Wavelength Range of Applicability

MSL Proficiency Test-O01-2019
Benchtop Spectrophotometer

RESULTS SHEET (Optical density)
ThermoScientific Evolution 220 UV-Visible Spectrophotometer,
model number 840-210600, serial number 5A2W 360108.

Laboratory Name:

Report Number:

Ambient Temperature:

Calibrated Date:

Calibrated By:

Filter Type(s):

Bandwidth:

Absorbance or Transmittance Correction (Reference – Measured)	Expanded Uncertainty	Coverage Factor	Wavelength Range of Applicability	Absorbance or Transmittance Range of Applicability

MSL Proficiency Test-O01-2019
Benchtop Spectrophotometer

RESULTS SHEET (Optica)
ThermoScientific Evolution 220 UV-Visible Spectrophotometer,
model number 840-210600, serial number 5A2W 360108.

Laboratory Name:

Report Number:

Ambient Temperature:

Calibrated Date:

Calibrated By:

Stray Light Assessment Type i.e. Heterochromatic or Isochromatic	Filter / Artefact Used	Wavelength (nm)	Measured Stray Light