National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 200862-0**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3,5	Remarks
DIMENSIONAL			
ANGULAR (20/D01)			
Angles Field calibrations available Note 4	0° to 360°	66 arc sec	
ELECTROMAGNETICS – DC/LOW FREQUENCY			
AC RESISTORS and CURRENT (20/E02)			
AC Current (50 Hz to 1.2 kHz)	100 µA to 3.0 A 3.0 A to 10.0 A 10 A to 20 A	0.17 % 0.25 % 0.13 %	Agilent 34411A Agilent 34411A/34330A
DC RESISTANCE and CURRENT (20/E05)			
DC Current Field calibrations available Note 4	2 pA to 2 nA 2 nA to 20 nA 20 nA to 100 µA 100 µA to 3.0 A 3.0 A to 10 A 10.0 A to 30.0 A	0.36 % + 0.47 pA 0.24 % 0.19 % 0.047 % 0.013 % 0.26 %	Keithley 6487A Agilent 34411A Agilent 34411A/ Isotek RUG-Z-R100-0.1-TK1 Agilent 34411A/34330A
DC Resistance Field calibrations available Note 4	1 Ω to 50 GΩ	0.16 %	Keithley 6487A

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3,5	Remarks
DC VOLTAGE (20/E06)			
DC Voltage Field calibrations available Note 4	0.1 V to 1000 V	0.005 %	Agilent 34411A
LF AC VOLTAGE (20/E09)			
LF AC Voltage Field calibrations available Note 4	0.1 V to 750 V (50 Hz to 1.2 kHz)	0.18 %	Agilent 34411A
LF POWER and ENERGY (20/E12)			
Power (45 Hz to 1 kHz)	1 W to 300 W 300 W to 1.5 kW	0.37 % 0.64 %	Yokogawa WT210
OPTICAL RADIATION			
PHOTOMETRIC (20/O02)			
Luminous Intensity – Bench	0.5 mcd to 25 000 cd	0.65 %	
Luminous Intensity – Goniometer	0.5 mcd to 10 000 000 cd	0.67 %	See Specification Ref. 1.
Illuminance	0.001 lx to 10 000 lx	0.76 %	
Illuminance Responsivity for 2856 K Source	1.0 fA to 10.0 A/lx 100 μV to 10.0 V/lx	1.4 % 1.4 %	For other sources a photometric color correction is required.
Luminance	2 cd/m^2 to 70 000 cd/m^2	0.85 %	See Specification Ref. 2.
Luminance Responsivity for 2856 K Source	1.0 fA to 10.0 A/(cd/m^2) 100 μV to 10.0 V/(cd/m^2)	0.84 % 0.84 %	For other sources a photometric color correction is required.
Total Luminous Flux	0.001 lm to 100 000 lm	0.65 %	See Specification Ref. 3.

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Notes 3,5	Remarks
Correlated Color Temperature			
Incandescent	2300 K to 3200 K	9 K to 12 K	
Non-incandescent	~ 6500 K	56 K	
Chromaticity Coordinates	x	0.0010	See Specification Ref. 4.
Field calibrations available Note 4	y	0.0010	
	u’	0.0006	
	v’	0.0005	
Photometric Color Correction	Amber	0.68 %	See Specification Ref. 5.
Field calibrations available Note 4	Red	1.0 %	
	Deep-red	1.5 %	
	Blue	3.4 %	
	Green	0.53 %	
	Customer supplied source	1.9 %	
Photometric Detector Linearity		0.53 %	See Specification Ref. 5.
Field calibrations available Note 4			

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Wavelength Range	Range	Uncertainty (k=2) Note 3,5	Remarks
RADIOMETRIC (20/O03)				
Spectral Irradiance				
1000 W FEL Lamp	350 nm to 450 nm	0 to 3000 W/m^2/nm	1.3 %	
	450 nm to 555 nm	0 to 3000 W/m^2/nm	1.0 %	
	555 nm to 1000 nm	0 to 3000 W/m^2/nm	0.88 %	
Customer submitted source	350 nm to 450 nm	0 to 3000 W/m^2/nm	2.3 %	Signal less than 10 % of the peak will have a larger uncertainty.
	450 nm to 555 nm	0 to 3000 W/m^2/nm	2.1 %	
	555 nm to 1000 nm	0 to 3000 W/m^2/nm	2.0 %	

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Measured Parameter or Device Calibrated	Wavelength Range	Range	Uncertainty (k=2) Note 3,5	Remarks
Spectral Radiance				
Sphere Source	350 nm to 450 nm	0 to 3000 W/sr/nm	1.5 %	
	450 nm to 555 nm	0 to 3000 W/sr/nm	1.2 %	
	555 nm to 1000 nm	0 to 3000 W/sr/nm	1.1 %	
Customer submitted source	350 nm to 450 nm	0 to 3000 W/sr/nm	2.3 %	Signal less than 10 % of the peak will have a larger uncertainty.
	450 nm to 655 nm	0 to 3000 W/sr/nm	2.2 %	
	655 nm to 1000 nm	0 to 3000 W/sr/nm	2.1 %	
Total Spectral Radiant Flux				
Incandescent or Halogen Source	350 nm to 450 nm	0 to 3000 W/nm	2.5 %	
	450 nm to 555 nm	0 to 3000 W/nm	1.9 %	
	555 nm to 1000 nm	0 to 3000 W/nm	2.0 %	
Radiance Coefficient				
Diffuse Plaque	350 nm to 1000 nm	0 to 5.0 sr^{-1}	0.85 %	0°/45° Geometry
Wavelength	350 nm to 1000 nm		1.0 nm	Hg (Ar) Spectral Lamp

NOTE: Measured values within the range of this scope of accreditation would be applicable to other standards as well as the ones listed below. These specifications are for reference only and the lab is not accredited to any of the listed items.

Specification Ref. 1:SAE J95, SAE J96, SAE J99, SAE J131, SAE J186, SAE J222, SAE J278, SAE J279, SAEJ280, SAE J292, SAE J387, SAE J572, SAE J575, SAE J581, SAE J582, SAE J583, SAE J584, SAE J585, SAE J586, SAE J588, SAE J591, SAE J592, SAE J593, SAE J594, SAE J595, SAE J598, SAE J759, SAE J774, SAE J845, SAE J852, SAE J887, SAE J914, SAE J943, SAE J974, SAE J975, SAE J1029, SAE J1133, SAE J1306, SAE J1318, SAE J1319, SAE J1330, SAE J1373, SAE J1383, SAE J1395, SAE J1398, SAE J1424, SAE J1432, SAE J1577, SAE J1623, SAE J1735, SAE J1889, SAE J1957, SAE J1967, SAE J2009, SAE J2039, SAE J2040, SAE J2041, SAE J2042, SAE J2087, SAE J2139, SAE J2261, SAE J2282, SAE J2320, SAE J2560, SAE J2595, SAE J2560, SAE J2382, SAE J2650; FMVSS 108; CMVSS 108; ECE Reg. 3, ECE Reg 5, ECE Reg 6, ECE Reg 7, ECE Reg 19, ECE Reg 23, ECE Reg 31, ECE Reg 38, ECE Reg 50, ECE Reg 65, ECE Reg 77, ECE Reg 87, ECE Reg 91, ECE Reg 98, ECE Reg 112, ECE Reg 113; FAA AC 150/5345-5, FAA AC 150/5345-10, FAA AC 150/5345-12, FAA AC 150/5345-26, FAA AC 150/5345-27, FAA AC 150/5345-28, FAA AC 150/5345-39, FAA AC 150/5345-42, FAA AC 150/5345-43, FAA AC 150/5345-44, FAA AC 150/5345-46, FAA AC 150/5345 -47, FAA AC 150/5345-50, FAA AC 150/5345-51, FAA AC 150/5345-52, FAA AC 150/5345-54; FAA Engineering Brief No. 67; ASTM-E809, E810, D4956, ICAO/CARC AN14-1-APP.2

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Specification Ref. 2:SSAE J587;ECE Reg 4
Specification Ref. 3:SAE J573;ECE Reg 37
Specification Ref. 4:SAE J578c, J578; FMVSS 108; CMVSS 108; ECE Reg. 3, ECE Reg 4, ECE Reg 5, ECE Reg 6, ECE Reg 7, ECE Reg 19, ECE Reg 23, ECE Reg 31, ECE Reg 38, ECE Reg 50, ECE Reg 65, ECE Reg 77, ECE Reg 87, ECE Reg 91, ECE Reg 98, ECE Reg 112, ECE Reg 113; FAA AC 150/5345,-12, FAA AC 150/5345-27, FAA AC 150/5345-28, FAA AC 150/5345-43, FAA AC 150/5345 -46, FAA AC 150/5345-50, FAA AC 150/5345-51, FAA AC 150/5345-52
Specification Ref. 5:SAE J578, SAE J1330
END

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of $k = 2$. However, laboratories may report a coverage factor different than $k = 2$ to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions.* However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.1.h. of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

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