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- > [Directory of accredited calibration laboratories](#)

CLAS Certificate Number 2002-04

From: [National Research Council Canada](#)

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Clients served	• All interested parties • The Type III services are available on-site. • On-site calibration services are available for the capabilities for which it is indicated in the remarks column.
Fields of calibration	• Electrical • Thermometry • Pressure • Frequency and time

SCC accreditation (ISO/IEC 17025)	- Accredited Laboratory N° 461 - First issued 2002-08-15 - Issue 8.2e 2022-04-07
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i This CLAS Certificate is published by the CLAS program of the National Research Council of Canada (NRC) in cooperation with the laboratory accreditation program of the Standards Council of Canada (SCC), Canada's accreditation body for calibration and testing laboratories. The SCC accredits the capability of the named laboratory for being able to perform calibrations as per the listed Calibration and Measurement Capabilities with metrological traceability to the International System of Units (SI) or to standards acceptable to the CLAS program.
See **supplementary notes**.

Electrical

Measured Quantity & Range or Instrument	Frequency	Calibration Measurement Capability expressed as an Uncertainty ($\pm$) (See <u>supplementary notes</u>)	Type of Service	Remarks
Current, AC				
1 mA to 1 A	3 Hz to 5 Hz	1 % + 0.4 mA	II	For the calibration of current
1 mA to 1 A	5 Hz to 10 Hz	0.3 % + 0.4 mA		

1 mA to 1 A	10 Hz to 5 kHz	0.1 % + 0.4 mA	generating devices and equipment using a digital multimeter.
1 A to 3 A	3 Hz to 5 Hz	1.1 % + 1.8 mA	
1 A to 3 A	5 Hz to 10 Hz	0.35 % + 1.8 mA	
1 A to 3 A	10 Hz to 5 kHz	0.15 % + 1.8 mA	
			On-site calibration services available.

Voltage, AC

1 mV to 100 mV	3 Hz to 5 Hz	1 % + 40 μV	II	For the calibration of voltage sources using digital multimeters.
1 mV to 100 mV	5 Hz to 10 Hz	0.35 % + 40 μV		
1 mV to 100 mV	10 Hz to 20 kHz	0.06 % + 40 μV		
1 mV to 100 mV	20 kHz to 50 kHz	0.12 % + 50 μV		
1 mV to 100 mV	50 kHz to 100 kHz	0.6 % + 80 μV		
1 mV to 100 mV	100 kHz to 300 kHz	4 % + 0.5 mV		
1 V to 750 V	3 Hz to 5 Hz	1 % + 0.23 V		
1 V to 750 V	5 Hz to 10 Hz	0.35 % + 0.23 V		
1 V to 750 V	10 Hz to 20 kHz	0.06 % + 0.23 V		
1 V to 750 V	20 kHz to 50 kHz	0.12 % + 0.38 V		
1 V to 750 V	50 kHz to 100 kHz	0.6 % + 0.6 V		
1 V to 750 V	100 kHz to 300 kHz	4 % + 3.8 V		
				On site calibration services available.

High voltage AC

0.1 kV to 6 kV	60 Hz	1.2 % of reading	II	Measure using a high voltage divider. On site calibration services available.
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Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty (±) (See <u>supplementary notes</u>)	Type of Service	Remarks
Current, DC			
10 mA to 100 mA	0.05 % + 5 µA	II	For the calibration of current generating devices and equipment using a digital multimeter.
100 mA to 1 A	0.1 % + 0.1 mA		
1 A to 3 A	0.12 % + 0.6 mA		On-site calibration services available.
Voltage, DC			
1 mV to 100 mV	0.005 % + 3.5 µV	II	For the calibration of voltage sources using digital multimeters.
100 mV to 1 V	0.004 % + 7 µV		
1 V to 10 V	0.0035 % + 50 µV		

Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty (±) (See <u>supplementary notes</u>)	Type of Service	On site calibration services available.
			Remarks
10 V to 100 V	0.0045 % + 0.6 mV		
100 V to 1000 V	0.0045 % + 10 mV		
High voltage DC			
0.1 kV to 6 kV	1 % of reading	II	Measure using a high voltage divider. On site calibration services available.
Resistance			
1 Ω to 100 Ω	0.01 % + 4 mΩ	II	For the calibration of resistors and resistance devices over a wide range of resistance and conditions using a digital multimeter. On site calibration services available.
100 Ω to 1 kΩ	0.01 % + 10 mΩ		
1 kΩ to 10 kΩ	0.01 % + 0.1 Ω		
10 kΩ to 100 kΩ	0.01 % + 1 Ω		
100 kΩ to 1 MΩ	0.01 % + 10 Ω		
1 MΩ to 10 MΩ	0.04 % + 0.1 kΩ		
10 MΩ to 100 MΩ	0.8 % + 10 kΩ		

Electrical calibration of temperature indicators

Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty (±) (See <u>supplementary notes</u>)	Type of Service	Remarks
Thermocouple temperature indicators			
-200 °C to 200 °C	0.3 °C	II	Source simulated temperature for types J, K, N and T thermocouples using multifunction calibrator. Suitable for the calibration of temperature indicators by electrical simulation. The calibration measurement capability does not include the uncertainty of the device under test or the thermocouple error. ITS-90 or IPTS-68 temperature scales available. On site calibration services available.
200 °C to 400 °C	0.6 °C		
400 °C to 1370 °C	0.8 °C to 1.3 °C		
Resistance thermometer temperature indicators			

-195 °C to 815 °C	0.4 °C	II	Source simulated temperature for RTDs. Suitable for the calibration of temperature indicators by electrical simulation. The calibration measurement capability does not include the uncertainty of the device under test or the sensor error. ITS-90 or IPTS-68 temperature scales available. On-site calibration services available.
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Frequency and Time

Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty ($\pm$) (See <u>supplementary notes</u>)	Type of Service	Remarks
Timers			

0 h to 24 h	0.25 s	II	For the calibration of manually-activated time interval measurement devices, including stopwatches and timers, by direct comparison with a reference timer. On-site calibration services available.
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Pressure

Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty (±) (See <u>supplementary notes</u>)	Type of Service	Remarks
Pressure indicators and gauges (gauge pressure)			
0 to 5 inch H ₂ O	0.06 inch H ₂ O	II	For the calibration of pressure indicators and gauges using a reference pressure transducer or dead weight tester. On-site calibration services available.
0 to 20 inch H ₂ O	0.21 inch H ₂ O		
0 to 2000 inch H ₂ O	1.0 inch H ₂ O		
10 to 10000 psi	0.1 % of reading		
Vacuum gauges			

0 to 28 inch Hg	0.07 inch Hg	II	For the calibration of vacuum gauges using a reference pressure transducer.
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Thermometry

Measured Quantity & Range or Instrument	Calibration Measurement Capability expressed as an uncertainty (±) (See <u>supplementary notes</u>)	Type of Service	Remarks
Liquid in glass thermometers			
-77 °C	0.24 °C	II	Dry ice and liquid bath Calibrations are made in accordance with a laboratory developed calibration procedure, which is based in part on ASTM E 77-98, 'Standard Test Method for Inspection and Verification of Thermometers'.
-35 °C to 0 °C	0.20 °C		
0 °C to 200 °C	0.15 °C		
200 °C to 400 °C	0.43 °C		
Thermocouples/thermocouple thermometers (type J, K, T, N)			
-77 °C	0.3 °C	II	Dry ice and liquid bath Individual thermocouples are calibrated using the laboratory's measuring devices. It is the client's responsibility to
-50 °C to 0 °C	0.3 °C		
0 °C to 200 °C	0.3 °C		

200 °C to 400 °C	0.6 °C		evaluate any additional uncertainties introduced by the client's measurement system. Thermocouple thermometers consisting of a temperature indicator and thermocouple(s) are calibrated as a system. On site calibration services available.
400 °C to 1100 °C	0.8 °C to 1.3 °C		

Thermocouples/thermocouple thermometers (type R & S)

0 °C to 200 °C	0.8 °C	II	Individual thermocouples are calibrated using the laboratory's measuring devices. It is the client's responsibility to evaluate any additional uncertainties introduced by the client's measurement system. Thermocouple thermometers consisting of a temperature indicator and thermocouple(s) are calibrated as a system. On site calibration services available.
200 °C to 400 °C	0.8 °C		
400 °C to 1100 °C	1.1 °C to 1.5 °C		

Thermistor thermometers

-40 °C to 140 °C	0.2 °C	II	Liquid bath. For the calibration of thermistor thermometers.
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Resistance temperature devices

-77 °C	0.26 °C	II	Dry ice and liquid bath. Individual RTDs are calibrated
-50 °C to 0 °C	0.20 °C		

0 °C to 200 °C	0.19 °C		using the laboratory's measuring devices. It is the client's responsibility to evaluate any additional uncertainties introduced by the client's measurement system. RTD thermometers consisting of a temperature indicator and RTD(s) are calibrated as a system. On site calibration services available.
200 to 400 °C	0.40 °C		

Temperature uniformity surveys

-80 °C to 1100 °C	0.4 °C to 1.3 °C	II	Using a thermocouple based temperature measurement system. On site calibration services available.
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Radiation Thermometry

0 °C	0.6 °C	II	For the calibration of infrared thermometers at emissivity 0.9 to 1.0 with spectral band of 8 to 14 µm. Using a blackbody source. On site calibration services available.
50 °C to 150 °C	2.8 °C		
150 °C to 300 °C	2.8 °C		For the calibration of infrared thermometers at emissivity 0.9 to 1.0 with spectral band of 0.9 to 5 µm or 8 to 14 µm. Using a blackbody source. On site calibration services available.
300 °C to 1000 °C	2.8 °C to 3.7 °C		

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