



Measurements International  
Standards Calibration Laboratory

CERTIFICATE NO.:  
C1171109

# Certificate of Calibration

**CUSTOMER NAME**  
Belarusian State Institute of Metrology

**CUSTOMER ADDRESS**  
Starovilenskiy Trakt 93, Minsk 220053, Belarus

**MEASURAND**  
MODEL NO.: 9210B/1K S/N.: 1104079  
MFG.: Measurements International DESCRIPTION: 1,000 Ohm Oil Resistor

<b>CALIBRATION RANGE(S) OR POINTS COVERED BY THIS CERTIFICATE</b> The measurement was performed with a test current of 1 mA.	<b>CALIBRATION PROCEDURE</b> CAL-11-15-04
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**REFERENCE STANDARD:**  
MODEL NO.: 9210A/1R S/N.: 1031203  
MFG.: Measurements International DESCRIPTION: Primary 1 Ohm Standard Oil Resistor  
CALIBRATION DATE: March 7, 2017 CERTIFICATE NO.: ES-2017-0004-01

**ENVIRONMENTAL CONDITIONS:**

<b>AMBIENT:</b> TEMPERATURE: <u>23</u> °C ± <u>2</u> °C HUMIDITY: <u>22</u> % ± <u>10</u> % BAROMETRIC PRESSURE: <u>101</u> kPa	<b>OF MEASURAND:</b> TEMPERATURE: <u>25.00</u> °C ± <u>0.01</u> °C HUMIDITY: <u>    </u> % ± <u>    </u> %
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**UNCERTAINTY OF MEASUREMENT**  
THE UNCERTAINTY OF MEASUREMENT IS ESTIMATED TO BE:  
THE REPORTED UNCERTAINTY OF MEASUREMENT IS STATED AS THE COMBINED STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR OF K = 2. THE MEASURED VALUE (y) AND THE ASSOCIATED UNCERTAINTY (U) REPRESENT THE INTERVAL (y±U) WHICH CONTAINS THE MEASURED QUANTITY WITH A PROBABILITY OF APPROXIMATELY 95%. THE UNCERTAINTY WAS ESTIMATED USING ISO GUIDE TO THE EXPRESSION OF UNCERTAINTY IN MEASUREMENT (GUM) GUIDELINES. THE ESTIMATED UNCERTAINTY CONTAINS CONTRIBUTIONS ORIGINATING FROM THE MEASUREMENT STANDARD CALIBRATED BY A NATIONAL LABORATORY, FROM THE CALIBRATION METHOD, FROM THE ENVIRONMENTAL CONDITIONS AND FROM THE MEASURAND BEING CALIBRATED. THE LONG TERM BEHAVIOUR OF THE MEASURAND IS NOT INCLUDED.

<b>CALIBRATED BY (SIGNATURE)</b> 	<b>DATE OF CALIBRATION</b> November 22-28, 2017	<b>AUTHORIZING SIGNATURE</b>  <b>DATE OF ISSUE</b> Nov. 28, 2017
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The reported measurements are traceable to national standards and thus to the SI units.



The Calibration Laboratory Assessment Services (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation (ISO/IEC 17025:2005) granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

SCC Registrant No.: 536



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## TEST RESULTS

The resistor (UUT) was calibrated by using a Direct Current Comparator Resistance Bridge, Model 6010, to compare it with a calibrated 1Ω resistor in an oil bath maintained at 25.000°C +/- 10mk.

The UUT was allowed to stabilize for minimum 48 hours. The measurement current was 1mA with a reversal rate of 12 seconds. Thirty-five (35) measurements with 25 measurements for statistics were taken. This was repeated 6 times, the type A uncertainty for the standard deviation of each measurement and the spread of values being inserted into the Uncertainty Analysis worksheet. The type B uncertainty for the measurement comes from the uncertainty of the 1Ω resistor. The type B and type A uncertainties are root sum squared and doubled to give expanded uncertainty.

The reported value of resistance is based on the results found when the UUT was in circulating oil at 25.000°C +/- 10mk.

Resistance (KOhms)	Uncertainty (μΩ/Ω)
0.99999571	0.25

The Alpha and Beta are reported as being -1.61495E-08 and -2.77618E-10 respectively @ 25C.

MEAN DATE OF MEASUREMENT: November 26, 2017