



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

### **AG Metrology S.r.l.**

**Strada San Faustino, 155 N, Modena (MO), 41124 Italy**

*(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:*

### **ISO/IEC 17025:2017**

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

***Electrical, Mechanical, and Thermodynamic Calibration***  
*(As detailed in the supplement)*

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen  
President

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
755 W. Big Beaver, Suite 1325  
Troy, Michigan 48084

*Initial Accreditation Date:*

May 08, 2020

*Issue Date:*

June 06, 2024

*Expiration Date:*

July 31, 2026

*Accreditation No.:*

108949

*Certificate No.:*

L24-422

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: [www.pjilabs.com](http://www.pjilabs.com)*



# Certificate of Accreditation: Supplement

## AG METROLOGY S.r.l.

Strada San Faustino, 155 N, Modena (MO), 41124 Italy  
Contact Name: Sig.ra Giorgia Calzolari Phone: 335-705-4933

Accreditation is granted to the facility to perform the following Calibration:

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Equipment to Measure DC Voltage <sup>F</sup>	Up to 1 mV	0.66 $\mu$ V	Agilent 34420A Datron 1271 Datron 4700 Meatest M143	Euramet cg-15
	1 mV to 10 mV	0.002 5 % of reading + 0.67 $\mu$ V		
	10 mV to 100 mV	0.001 3 % of reading + 0.98 $\mu$ V		
	0.1 V to 1 V	0.001 3 % of reading + 2.0 $\mu$ V		
	1 V to 10 V	0.000 92 % of reading + 12 $\mu$ V		
	10 V to 100 V	0.001 2 % of reading + 0.18 mV		
	100 V to 1 000 V	0.000 34 % of reading + 14 mV		
Equipment to Measure DC Current <sup>F</sup>	Up to 100 $\mu$ A	0.007 1 % of reading + 10 nA		
	0.1 $\mu$ A to 1 mA	0.007 3 % of reading + 18 nA		
	1 mA to 10 mA	0.007 3 % of reading + 0.14 $\mu$ A		
	10 mA to 100 mA	0.015 % of reading + 1.4 $\mu$ A		
	0.1 mA to 1 A	0.021 % of reading + 48 $\mu$ A		
	1 A to 10 A	0.11 % of reading		
	10 A to 20 A	0.099 % of reading + 0.21 mA		
Equipment to Measure Resistance <sup>F</sup>	Up to 1 $\Omega$	0.008 0 % of reading + 8.9 $\mu\Omega$	Agilent 34420A Datron 1271 Valhalla Scientific 2724A	
	1 $\Omega$ to 10 $\Omega$	0.007 5 % of reading + 15 $\mu\Omega$		
	10 $\Omega$ to 100 $\Omega$	0.002 1 % of reading + 45 $\mu\Omega$		
	0.1 k $\Omega$ to 1 k $\Omega$	0.002 0 % of reading + 0.67 m $\Omega$		
	1 k $\Omega$ to 10 k $\Omega$	0.002 0 % of reading + 5.6 m $\Omega$		
	10 k $\Omega$ to 100 k $\Omega$	0.002 2 % of reading + 0.38 $\Omega$		
	0.1 M $\Omega$ to 1 M $\Omega$	0.003 4 % of reading + 0.45 $\Omega$		
	1 M $\Omega$ to 10 M $\Omega$	0.005 3 % of reading + 0.19 k $\Omega$		
	10 M $\Omega$ to 100 M $\Omega$	0.035 % of reading + 20 k $\Omega$		
0.1 G $\Omega$ to 1 G $\Omega$	0.40 % of reading + 1.9 M $\Omega$			
Equipment to Output DC Voltage <sup>F</sup>	Up to 1 mV	0.24 $\mu$ V	Agilent 34420A Datron 1271 Fluke Y5020	CEM EL-010
	1 mV to 10 mV	0.003 4 % of reading + 0.22 $\mu$ V		
	10 mV to 100 mV	0.001 2 % of reading + 0.53 $\mu$ V		
	0.1 V to 1 V	0.000 96 % of reading + 1.5 $\mu$ V		
	1 V to 10 V	0.000 72 % of reading + 8.9 $\mu$ V		
	10 V to 100 V	0.000 89 % of reading + 92 $\mu$ V		
	100 V to 1 000 V	0.000 23 % of reading + 11 mV		



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Equipment to Output DC Current <sup>F</sup>	Up to 100 $\mu$ A	0.005 0 % of reading + 8.1 nA	Agilent 34420A Datron 1271 Fluke Y5020	CEM EL-010
	0.1 mA to 1 mA	0.005 7 % of reading + 12 nA		
	1 mA to 10 mA	0.005 8 % of reading + 83 nA		
	10 mA to 100 mA	0.012 % of reading + 0.78 $\mu$ A		
	0.1 A to 1 A	0.017 % of reading + 16 $\mu$ A		
	1 A to 10 A	0.006 0 % of reading + 24 $\mu$ A		
	1 A to 20 A	0.006 5 % of reading		
Equipment to Output Resistance <sup>F</sup>	Up to 1 $\Omega$	0.006 4 % of reading + 6.3 $\mu\Omega$	Agilent 34420A Datron 1271	
	1 $\Omega$ to 10 $\Omega$	0.005 9 % of reading + 12 $\mu\Omega$		
	10 $\Omega$ to 100 $\Omega$	0.001 5 % of reading + 23 $\mu\Omega$		
	0.1 k $\Omega$ to 1 k $\Omega$	0.001 4 % of reading + 0.45 m $\Omega$		
	1 k $\Omega$ to 10 k $\Omega$	0.001 4 % of reading + 3.4 m $\Omega$		
	10 k $\Omega$ to 100 k $\Omega$	0.001 6 % of reading + 0.16 $\Omega$		
	0.1 M $\Omega$ to 1 M $\Omega$	0.002 7 % of reading		
	1 M $\Omega$ to 10 M $\Omega$	0.004 9 % of reading + 62 $\Omega$		
	10 M $\Omega$ to 100 M $\Omega$	0.035 % of reading + 7.6 k $\Omega$		
	0.1 G $\Omega$ to 1 G $\Omega$	0.39 % of reading + 0.72 M $\Omega$		
Equipment to Measure DC Voltage <sup>O</sup>	Up to 100 mV	0.011 % of reading + 7.1 $\mu$ V	Agilent 34420A Datron 1271 Meatest M143	Euramet cg-15
	0.1 V to 1 V	0.006 1 % of reading + 11 $\mu$ V		
	1 V to 10 V	0.006 1 % of reading + 51 $\mu$ V		
	10 V to 100 V	0.006 1 % of reading + 1.1 mV		
	100 V to 1000 V	0.011 % of reading + 21 mV		
Equipment to Measure DC Current <sup>O</sup>	Up to 200 $\mu$ A	0.051 % of reading + 22 nA		
	0.2 to 2 mA	0.026 % of reading + 0.13 $\mu$ A		
	2 to 20 mA	0.019 % of reading + 1.5 $\mu$ A		
	20 to 200 mA	0.022 % of reading + 25 $\mu$ A		
	0.2 to 2 A	0.016 % of reading + 0.16 mA		
	2 to 20 A	0.11 % of reading + 2.1 mA		



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Equipment to Measure DC Resistance <sup>o</sup>	Up to 10 $\Omega$	0.004 5 % of reading + 0.41 m $\Omega$	Agilent 34420A Datron 1271 Meatest M143 Valhalla Scientific 2724A	Euramet cg-15
	10 to 100 $\Omega$	0.003 2 % of reading + 4.1 m $\Omega$		
	0.1 to 1 k $\Omega$	0.002 4 % of reading + 41 m $\Omega$		
	1 to 10 k $\Omega$	0.002 7 % of reading + 0.41 $\Omega$		
	10 to 100 k $\Omega$	0.002 6 % of reading + 4.1 $\Omega$		
	1 M $\Omega$	56 $\Omega$		
	10 M $\Omega$	1.3 k $\Omega$		
Equipment to Output DC Voltage <sup>o</sup>	Up to 100 mV	0.005 2 % of reading + 3.8 $\mu$ V	Agilent 34420A Datron 1271 Agilent 34401A Fluke Y5020	CEM EL-10
	0.1 V to 1 V	0.004 2 % of reading + 7.4 $\mu$ V		
	1 V to 10 V	0.003 6 % of reading + 52 $\mu$ V		
	10 V to 100 V	0.004 7 % of reading + 0.64 mV		
	100 V to 1 000 V	0.004 7 % of reading + 11 mV		
Equipment to Output DC Current <sup>o</sup>	Up to 100 $\mu$ A	0.007 3 % of reading + 2.8 nA		
	0.1 mA to 1 mA	0.007 3 % of reading + 20 nA		
	1 mA to 10 mA	0.051 % of reading + 2.1 $\mu$ A		
	10 mA to 100 mA	0.052 % of reading + 5.5 $\mu$ A		
	0.1 A to 1 A	0.11 % of reading + 0.12 mA		
Equipment to Output DC Resistance <sup>o</sup>	Up to 100 $\Omega$	0.012 % of reading + 4.1 m $\Omega$		
	0.1 to 1 k $\Omega$	0.011 % of reading + 12 m $\Omega$		
	1 to 10 k $\Omega$	0.011 % of reading + 0.12 $\Omega$		
	10 to 100 k $\Omega$	0.011 % of reading + 1.2 $\Omega$		
	0.1 to 1 M $\Omega$	0.011 % of reading + 12 $\Omega$		
	1 to 10 M $\Omega$	0.041 % of reading + 0.23 k $\Omega$		
	10 to 100 M $\Omega$	0.81 % of reading + 11 k $\Omega$		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>F</sup>			Datron 1271 Datron 4700	Euramet cg-15
40 Hz to 2 kHz	Up to 100 mV	0.034 % of reading + 18 $\mu$ V		
2 kHz to 20 kHz	Up to 100 mV	0.046 % of reading + 27 $\mu$ V		
20 kHz to 100 kHz	Up to 100 mV	0.18 % of reading + 46 $\mu$ V		



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Equipment to Measure AC Voltage At the Listed Frequencies <sup>F</sup>			Datron 1271 Datron 4700	Euramet cg-15
40 Hz to 2 kHz	0.1 V to 1 V	0.029 % of reading + 0.11 mV		
2 kHz to 20 kHz	0.1 V to 1 V	0.030 % of reading + 0.11 mV		
20 kHz to 100 kHz	0.1 V to 1 V	0.12 % of reading + 0.41 mV		
100 kHz to 300 kHz	0.1 V to 1 V	1.5 % of reading + 21 mV		
300 kHz to 1 MHz	0.1 V to 1 V	2.1 % of reading + 41 mV		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	1 V to 10 V	0.029 % of reading + 1.1 mV		
2 kHz to 20 kHz	1 V to 10 V	0.029 % of reading + 1.1 mV		
20 kHz to 100 kHz	1 V to 10 V	0.12 % of reading + 4.1 mV		
100 kHz to 300 kHz	1 V to 10 V	1.1 % of reading + 0.21 V		
300 kHz to 1 MHz	1 V to 10 V	2.1 % of reading + 0.41 V		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	10 V to 100 V	0.025 % of reading + 11 mV		
2 kHz to 20 kHz	10 V to 100 V	0.025 % of reading + 11 mV		
20 kHz to 100 kHz	10 V to 100 V	0.11 % of reading + 41 mV		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	100 V to 1 000 V	0.037 % of reading + 0.16 V		
2 kHz to 20 kHz	100 V to 1 000 V	0.035 % of reading + 0.25 V		
20 kHz to 100 kHz	100 V to 1 000 V	0.17 % of reading + 0.45 V		
Equipment to Output AC Voltage At the Listed Frequencies <sup>F</sup>			Datron 1271	CEM EL-010
40 Hz to 2 kHz	Up to 100 mV	0.026 % of reading + 15 $\mu$ V		
2 kHz to 20 kHz	Up to 100 mV	0.041 % of reading + 13 $\mu$ V		
20 kHz to 100 kHz	Up to 100 mV	0.17 % of reading + 45 $\mu$ V		
Equipment to Output AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	0.1 V to 1 V	0.021 % of reading + 0.11 mV		
2 kHz to 20 kHz	0.1 V to 1 V	0.030 % of reading + 53 $\mu$ V		
20 kHz to 100 kHz	0.1 V to 1 V	0.11 % of reading + 0.41 mV		
100 kHz to 300 kHz	0.1 V to 1 V	1.1 % of reading + 11 mV		
300 kHz to 1 MHz	0.1 V to 1 V	2.1 % of reading + 41 mV		



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Equipment to Output AC Voltage At the Listed Frequencies <sup>F</sup>			Datron 1271	CEM EL-010
40 Hz to 2 kHz	1 V to 10 V	0.021 % of reading + 1.1 mV		
2 kHz to 20 kHz	1 V to 10 V	0.021 % of reading + 0.51 mV		
20 kHz to 100 kHz	1 V to 10 V	0.11 % of reading + 4.1 mV		
100 kHz to 300 kHz	1 V to 10 V	1.1 % of reading + 0.11 V		
300 kHz to 1 MHz	1 V to 10 V	2.1 % of reading + 0.41 V		
Equipment to Output AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	10 V to 100 V	0.021 % of reading + 11 mV		
2 kHz to 20 kHz	10 V to 100 V	0.021 % of reading + 5.1 mV		
20 kHz to 100 kHz	10 V to 100 V	0.11 % of reading + 41 mV		
Equipment to Output AC Voltage At the Listed Frequencies <sup>F</sup>				
40 Hz to 2 kHz	100 V to 1 000 V	0.026 % of reading + 0.15 V		
2 kHz to 20 kHz	100 V to 1 000 V	0.031 % of reading + 0.13 V		
20 kHz to 100 kHz	100 V to 1 000 V	0.17 % of reading + 0.45 V		
Equipment to Measure AC Current At the Listed Frequencies <sup>F</sup>				
10 Hz to 5 kHz	Up to 100 $\mu$ A	0.069 % of reading + 33 nA		
10 Hz to 5 kHz	0.1 mA to 1 mA	0.048 % of reading + 0.30 $\mu$ A		
10 Hz to 5 kHz	1 mA to 10 mA	0.048 % of reading + 2.7 $\mu$ A		
10 Hz to 5 kHz	10 mA to 100 mA	0.048 % of reading + 27 $\mu$ A		
10 Hz to 5 kHz	0.1 A to 1 A	0.17 % of reading + 0.84 mA		
10 Hz to 5 kHz	1 A to 20 A	0.36 % of reading + 15 mA		
Equipment to Output AC Current At the Listed Frequencies <sup>F</sup>			Datron 1271 Fluke Y5020	CEM EL-010
10 Hz to 5 kHz	Up to 100 $\mu$ A	0.041 % of reading + 33 nA		
10 Hz to 5 kHz	0.1 mA to 1 mA	0.032 % of reading + 0.24 $\mu$ A		
10 Hz to 5 kHz	1 mA to 10 mA	0.032 % of reading + 2.2 $\mu$ A		
10 Hz to 5 kHz	10 mA to 100 mA	0.032 % of reading + 21 $\mu$ A		
10 Hz to 5 kHz	0.1 A to 1 A	0.16 % of reading + 0.81 mA		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>O</sup>			Datron 1271 Meatest M143	Euramet cg-15
40 Hz to 400 Hz	Up to 100 mV	0.11 % of reading + 0.053 mV		
400 Hz to 10 kHz	Up to 100 mV	0.16 % of reading + 0.072 mV		



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Equipment to Measure AC Voltage At the Listed Frequencies <sup>o</sup>			Datron 1271 Meatest M143	Euramet cg-15
40 Hz to 400 Hz	0.1 V to 1 V	0.055 % of reading + 0.13 mV		
400 Hz to 10 kHz	0.1 V to 1 V	0.077 % of reading + 0.12 mV		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>o</sup>				
40 Hz to 400 Hz	1 V to 10 V	0.055 % of reading + 1.3 mV		
400 Hz to 10 kHz	1 V to 10 V	0.074 % of reading + 3.1 mV		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>o</sup>				
40 Hz to 400 Hz	10 V to 100 V	0.055 % of reading + 0.015 V		
400 Hz to 10 kHz	10 V to 100 V	0.074 % of reading + 0.031 V		
Equipment to Measure AC Voltage At the Listed Frequencies <sup>o</sup>				
40 Hz to 400 Hz	100 V to 1000 V	0.075 % of reading + 0.26 V		
400 Hz to 10 kHz	100 V to 1000 V	0.11 % of reading + 0.33 V		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	Up to 200 $\mu$ A	0.26 % of reading + 0.25 $\mu$ A		
200 Hz to 1 kHz	Up to 200 $\mu$ A	0.21 % of reading + 0.32 $\mu$ A		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	0.2 mA to 2 mA	0.11 % of reading + 2.3 $\mu$ A		
200 Hz to 1 kHz	0.2 mA to 2 mA	0.11 % of reading + 2.3 $\mu$ A		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	2 mA to 20 mA	0.077 % of reading + 22 $\mu$ A		
200 Hz to 1 kHz	2 mA to 20 mA	0.11 % of reading + 22 $\mu$ A		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	20 mA to 200 mA	0.18 % of reading + 0.82 mA		
200 Hz to 1 kHz	20 mA to 200 mA	0.19 % of reading + 0.82 mA		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	0.2 A to 2 A	0.11 % of reading + 1.4 mA		
200 Hz to 1 kHz	0.2 A to 2 A	0.16 % of reading + 1.7 mA		
Equipment to Measure AC Current At the Listed Frequencies <sup>o</sup>				
20 Hz to 200 Hz	2 A to 20 A	0.26 % of reading + 3.3 mA		
200 Hz to 1 kHz	2 A to 20 A	0.21 % of reading + 11 mA		
Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>			Datron 1271 Agilent 34401A Fluke Y5020	CEM EL-010
40 Hz to 2 kHz	Up to 100 mV	0.069 % of reading + 44 $\mu$ V		
2 kHz to 20 kHz	Up to 100 mV	0.076 % of reading + 49 $\mu$ V		
20 kHz to 100 kHz	Up to 100 mV	0.63 % of reading + 93 $\mu$ V		



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Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>			Datron 1271	CEM EL-010	
40 Hz to 2 kHz	0.1 V to 1 V	0.067 % of reading + 0.32 mV	Agilent 34401A		
2 kHz to 20 kHz	0.1 V to 1 V	0.070 % of reading + 0.32 mV	Fluke Y5020		
20 kHz to 100 kHz	0.1 V to 1 V	0.62 % of reading + 0.90 mV			
100 kHz to 300 kHz	0.1 V to 1 V	1.9 % of reading + 24 mV			
Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>					
40 Hz to 2 kHz	1 V to 10 V	0.067 % of reading + 3.2 mV			
2 kHz to 20 kHz	1 V to 10 V	0.067 % of reading + 3.2 mV			
20 kHz to 100 kHz	1 V to 10 V	0.62 % of reading + 9.0 mV			
100 kHz to 300 kHz	1 V to 10 V	1.5 % of reading + 0.24 V			
Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>					
40 Hz to 2 kHz	10 V to 100 V	0.066 % of reading + 32 mV			
2 kHz to 20 kHz	10 V to 100 V	0.066 % of reading + 32 mV			
20 kHz to 100 kHz	10 V to 100 V	0.62 % of reading + 90 mV			
Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>					
40 Hz to 2 kHz	100 V to 750 V	0.071 % of reading + 0.28 V			
2 kHz to 20 kHz	100 V to 750 V	0.070 % of reading + 0.34 V			
20 kHz to 100 kHz	100 V to 750 V	0.63 % of reading + 0.76 V			
Equipment to Output AC Current At the Listed Frequencies <sup>o</sup>					
10 Hz to 5 kHz	Up to 1 A	0.20 % of reading + 0.94 mA			
Equipment to Output AC Voltage At the Listed Frequencies <sup>o</sup>					
10 Hz to 5 kHz	1 A to 20 A	0.030 % of reading + 1.6 mA			
DC Clamp meter <sup>FO</sup>	20 A to 500 A	0.40 % of reading + 18 mA	Datron 1271 Meatest M143 Meatest 140-50 Coil		CEM EL-007
	500 A to 1 000 A	0.38 % of reading + 0.10 A			
AC Clamp meter At the Listed Frequencies <sup>FO</sup>					
10 Hz to 100 Hz	20 A to 500 A	0.44 % of reading + 23 mA			
10 Hz to 100 Hz	500 A to 1 000 A	0.44 % of reading			
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type Pt/Pd <sup>F</sup>	0 °C to 1 500 °C With 0 °C RJ With internal RJ	0.080 °C - 0.003 1 % of reading 0.28 °C	Agilent 34420A Datron 1271 Datron 4700	Euramet cg-11	





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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type Au/Pt <sup>F</sup>	0 °C to 1 000 °C With 0 °C RJ With internal RJ	0.070 °C - 0.004 0 % of reading 0.28 °C	Agilent 34420A Datron 1271 Datron 4700	Euramet cg-11
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R <sup>F</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.11 °C - 0.002 2 % of reading 0.18 °C - 0.001 7 % of reading		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S <sup>F</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.11 °C - 0.001 6 % of reading 0.17 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B <sup>F</sup>	420 °C to 1 820 °C With 0 °C RJ With internal RJ	0.11 °C - 0.002 3 % of reading 0.41 °C - 0.003 6 % of reading		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J <sup>F</sup>	-200 °C to 1 200 °C With 0 °C RJ With internal RJ	0.028 °C 0.14 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T <sup>F</sup>	-200 °C to 400 °C With 0 °C RJ With internal RJ	0.029 °C - 0.003 3 % of reading 0.13 °C - 0.008 3 % of reading		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E <sup>F</sup>	-200 °C to 1 000 °C With 0 °C RJ With internal RJ	0.026 °C 0.14 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K <sup>F</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.037 °C 0.14 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N <sup>F</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.049 °C - 0.001 3 % of reading 0.14 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C <sup>F</sup>	0 °C to 2 310 °C With 0 °C RJ With internal RJ	0.033 °C + 0.003 8 % of reading 0.20 °C + 0.001 3 % of reading		



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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type A <sup>F</sup>	0 °C to 2 500 °C With 0 °C RJ With internal RJ	0.037 °C + 0.004 1 % of reading 0.20 °C + 0.003 2 % of reading	Agilent 34420A Datron 1271 Datron 4700	Euramet cg-11
Temperature simulation use with Thermocouple Type PtPd <sup>F</sup>	0 °C to 1 500 °C With 0 °C RJ With internal RJ	0.027 °C 0.27	Agilent 34420A Datron 1271	
Temperature Simulation use with Thermocouple Type AuPt <sup>F</sup>	0 °C to 1 000 °C With 0 °C RJ With internal RJ	0.027 °C 0.27		
Temperature Simulation use with Thermocouple Type R <sup>F</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.033 °C + 0.000 90 % of reading 0.14 °C		
Temperature Simulation use with Thermocouple Type S <sup>F</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.032 °C + 0.001 2 % of reading 0.14 °C		
Temperature Simulation use with Thermocouple Type B <sup>F</sup>	420 °C to 1 820 °C With 0 °C RJ With internal RJ	0.039 °C 0.33 °C		
Temperature Simulation use with Thermocouple Type J <sup>F</sup>	-200 °C to 1 200 °C With 0 °C RJ With internal RJ	0.017 °C + 0.001 5 % of reading 0.14 °C		
Temperature Simulation use with Thermocouple Type T <sup>F</sup>	-200 °C to 400 °C With 0 °C RJ With internal RJ	0.015 °C 0.13 °C - 0.006 7 % of reading		
Temperature Simulation use with Thermocouple Type E <sup>F</sup>	-200 °C to 1 000 °C With 0 °C RJ With internal RJ	0.017 °C - 0.001 3 % of reading 0.14 °C		
Temperature Simulation use with Thermocouple Type K <sup>F</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.020 °C + 0.001 8 % of reading 0.15 °C		
Temperature Simulation use with Thermocouple Type N <sup>F</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.021 °C + 0.001 2 % of reading 0.14 °C		
Temperature Simulation use with Thermocouple Type C <sup>F</sup>	0 °C to 2 310 °C With 0 °C RJ With internal RJ	0.010 °C + 0.004 4 % of reading 0.22 °C		
Temperature Simulation use with Thermocouple Type A <sup>F</sup>	0 °C to 2 500 °C With 0 °C RJ With internal RJ	0.011 °C + 0.004 4 % of reading 0.23 °C		



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### Electrical

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Temperature Calibration, Indication and Control Equipment used with RTD <sup>F</sup>	-200 °C to 850 °C	0.002 0 % of reading + 0.005 °C	Agilent 34420A Datron 1271 Valhalla Scientific 2724A	Euramet cg-11
Temperature Simulation use with Resistance thermometer <sup>F</sup>	-200 °C to 850 °C	0.001 9 % of reading + 0.005 °C	Agilent 34420A Datron 1271	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type Pt/Pd <sup>0</sup>	0 °C to 1 500 °C With 0 °C RJ With internal RJ	0.44°C 0.54°C	Agilent 34420A Datron 1271 GE Druck DPI 620-CE	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type Au/Pt <sup>0</sup>	0 °C to 1 000 °C With 0 °C RJ With internal RJ	0.38°C 0.49°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R <sup>0</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.56°C 0.68°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S <sup>0</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	0.54°C 0.66°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B <sup>0</sup>	420 °C to 1 820 °C With 0 °C RJ With internal RJ	0.54°C 0.65°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J <sup>0</sup>	-200 °C to 1 200 °C With 0 °C RJ With internal RJ	0.15°C 0.24°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T <sup>0</sup>	-200 °C to 400 °C With 0 °C RJ With internal RJ	0.16°C 0.24°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E <sup>0</sup>	-200 °C to 1 000 °C With 0 °C RJ With internal RJ	0.13°C 0.22°C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K <sup>0</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.19°C 0.27°C		



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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N <sup>o</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.24°C with 0 °C RJ 0.30°C with internal RJ	Agilent 34420A Datron 1271 GE Druck DPI 620-CE	Euramet cg-11
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C <sup>o</sup>	0 °C to 2 310 °C With 0 °C RJ With internal RJ	0.53°C with 0 °C RJ 0.56°C with internal RJ		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type A <sup>o</sup>	0 °C to 2 500 °C With 0 °C RJ With internal RJ	0.59°C with 0 °C RJ 0.62°C with internal RJ		
Temperature Calibration, Indication and Control Equipment used with RTD <sup>o</sup>	-200 °C to 850 °C	0.17 °C	Agilent 34420A Datron 1271 GE Druck DPI 620-CE	
Temperature simulation use with Thermocouple Type PtPd <sup>o</sup>	0 °C to 1 500 °C With 0 °C RJ With internal RJ	0.82 °C 0.88 °C	Agilent 34420A Datron 1271 Agilent 34970A	
Temperature Simulation use with Thermocouple Type AuPt <sup>o</sup>	0 °C to 1 000 °C With 0 °C RJ With internal RJ	0.72 °C 0.78 °C		
Temperature Simulation use with Thermocouple Type R <sup>o</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	1.1 °C 1.1 °C		
Temperature Simulation use with Thermocouple Type S <sup>o</sup>	-50 °C to 1 768 °C With 0 °C RJ With internal RJ	1.1 °C 1.1 °C		
Temperature Simulation use with Thermocouple Type B <sup>o</sup>	420 °C to 1 820 °C With 0 °C RJ With internal RJ	1.1 °C 1.1 °C		
Temperature Simulation use with Thermocouple Type J <sup>o</sup>	-200 °C to 1 200 °C With 0 °C RJ With internal RJ	0.20 °C 0.27 °C		
Temperature Simulation use with Thermocouple Type T <sup>o</sup>	-200 °C to 400 °C With 0 °C RJ With internal RJ	0.28 °C 0.34 °C		
Temperature Simulation use with Thermocouple Type E <sup>o</sup>	-200 °C to 1 000 °C With 0 °C RJ With internal RJ	0.18 °C 0.26 °C		
Temperature Simulation use with Thermocouple Type K <sup>o</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.29 °C 0.34 °C		



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### Electrical

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Temperature Simulation use with Thermocouple Type N <sup>o</sup>	-200 °C to 1 300 °C With 0 °C RJ With internal RJ	0.44 °C 0.48 °C	Agilent 34420A Datron 1271 Agilent 34970A	Euramet cg-11
Temperature Simulation use with Thermocouple Type C <sup>o</sup>	0 °C to 2 310 °C With 0 °C RJ With internal RJ	0.51 °C 0.54 °C		
Temperature Simulation use with Thermocouple Type A <sup>o</sup>	0 °C to 2 500 °C With 0 °C RJ With internal RJ	0.60 °C 0.63 °C		
Temperature Simulation use with Resistance Thermometer <sup>o</sup>	-200 °C to 850 °C	0.17 °C	Agilent 34420A Datron 1271 Agilent 34970A	

### Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Absolute Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	Up to 172 kPa	0.006 3 % of reading + 0.41 Pa	Ruska 2465	Euramet Calibration Guide No. 17
	172 kPa to 7 MPa	0.004 4 % of reading + 2.1 Pa		
Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	Atm to 172 kPa	0.006 5 % of reading + 0.12 Pa		
	172 kPa to 7 MPa	0.004 4 % of reading + 2.0 Pa		
Vacuum Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	-95 kPa to Atm	0.31 Pa - 0.006 5 % of reading		
Absolute Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	Up to 103 kPa	0.011 % of reading + 2.2 Pa	Ruska 2465	
	103 kPa to 2 MPa	0.012 % of reading + 1.1 Pa	Ruska 2400	
	2 MPa to 7 MPa	0.012 % of reading + 11 Pa	Druck DPI 515	



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### Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	Atm to 103 kPa	0.011 % of reading + 2.1 Pa	Ruska 2465	Euramet Calibration Guide No. 17
	103 kPa to 2 MPa	0.012 % of reading + 1.0 Pa	Ruska 2400	
	2 MPa to 7 MPa	0.012 % of reading + 11 Pa	Druck DPI 515	
	7 MPa to 21 MPa	0.014 % of reading		
Vacuum Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>F</sup>	-95 kPa to Atm	2.1 Pa - 0.011 % of reading		
Gage Oil Pressure transducers, pressure transmitters, manometers <sup>F</sup>	Up to 16 MPa	0.007 9 % of reading + 77 Pa	Ruska 2400	
	16MPa to 100 MPa	0.006 5 % of reading + 0.21 kPa		
Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>O</sup>	Atm to 1 MPa	0.020 % of reading + 61 Pa	Ruska 2465	
	1 MPa to 10 MPa	0.030 % of reading	Ruska 2400 Ge Druck DPI 620-CE Ge Druck PM 620	
Vacuum Gage Pneumatic Pressure transducers, pressure transmitters, manometers <sup>O</sup>	-95 kPa to Atm	0.020 % of reading + 61 Pa		
Gage Oil Pressure transducers, pressure transmitters, manometers <sup>O</sup>	Atm to 10 MPa	0.026 % of reading + 88 Pa		
	10 MPa to 100 MPa	0.027 % of reading + 64 Pa		

### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature measurement Thermocouple Pt/Pd <sup>F</sup>	50 °C to 300 °C	0.23 °C	Fluke 7380	ASTM E220 Euramet Calibration Guide No. 8
	300 °C to 450 °C	0.20 °C	East Tester ET3875-300	
	450 °C to 600 °C	0.22 °C	Pond Engineering K34XR	
	600 °C to 1 000 °C	0.62 °C	Nabertherm RD30/200/13 SPRT Rosemount 162CE	
	1 000 °C to 1 300 °C	1.3 °C	PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	



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### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature measurement Thermocouple AuPt <sup>F</sup>	50 °C to 300 °C	0.23 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8
	300 °C to 450 °C	0.20 °C		
	450 °C to 600 °C	0.22 °C		
	600 °C to 1 000 °C	0.62 °C		
Temperature measurement Thermocouple R <sup>F</sup>	-50 °C to 50°C	0.32 °C		
	50 °C to 300 °C	0.23 °C		
	300 °C to 450 °C	0.20 °C		
	450 °C to 600 °C	0.22 °C		
	600 °C to 1 000 °C	0.62 °C		
Temperature measurement Thermocouple S <sup>F</sup>	1 000 °C to 1 300 °C	1.3 °C		
	-50 °C to 50 °C	0.32 °C		
	50 °C to 300 °C	0.23 °C		
	300 °C to 450 °C	0.20 °C		
	450 °C to 600 °C	0.22 °C		
Temperature measurement Thermocouple B <sup>F</sup>	600 °C to 1 000 °C	0.62 °C		
	1 000 °C to 1 300 °C	1.3 °C		
	50 °C to 300 °C	0.46 °C		
	300 °C to 450 °C	0.20 °C		
	450 °C to 600 °C	0.22 °C		
Temperature measurement Thermocouple J <sup>F</sup>	600 °C to 1 000 °C	0.62 °C		
	1 000 °C to 1 300 °C	1.3 °C		
	50 °C to 300 °C	0.23 °C		
	300 °C to 450 °C	0.27 °C		
	450 °C to 600 °C	0.32 °C		
	600 °C to 1 000 °C	1.1 °C		
Temperature measurement Thermocouple T <sup>F</sup>	1 000 °C to 1 200 °C	1.6 °C		
	-80 °C to 50 °C	0.13 °C		
	50 °C to 300 °C	0.13 °C		
Temperature measurement Thermocouple T <sup>F</sup>	300 °C to 400 °C	0.27 °C		



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Temperature measurement Thermocouple E <sup>F</sup>	-80 °C to 50 °C	0.15 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8		
	50 °C to 300 °C	0.23 °C				
	300 °C to 450 °C	0.24 °C				
	450 °C to 600 °C	0.32 °C				
	600 °C to 1 000 °C	1.1 °C				
Temperature measurement Thermocouple K <sup>F</sup>	-80 °C to 50 °C	0.15 °C			Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8
	50 °C to 300 °C	0.23 °C				
	300 °C to 450 °C	0.24 °C				
	450 °C to 600 °C	0.26 °C				
	600 °C to 1 000 °C	1.1 °C				
Temperature measurement Thermocouple N <sup>F</sup>	-80 °C to 50 °C	0.15 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8		
	50 °C to 300 °C	0.23 °C				
	300 °C to 450 °C	0.24 °C				
	450 °C to 600 °C	0.26 °C				
	600 °C to 1 000 °C	1.1 °C				
Temperature measurement Thermocouple C <sup>F</sup>	50 °C to 300 °C	0.23 °C			Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8
	300 °C to 450 °C	0.25 °C				
	450 °C to 600 °C	0.27 °C				
	600 °C to 1 000 °C	1.1 °C				
	1 000 °C to 1 300 °C	1.7 °C				
Temperature measurement Thermocouple A <sup>F</sup>	50 °C to 300 °C	0.23 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple Pt/Pd Agilent 34420A Fluke 1590	ASTM E220 Euramet Calibration Guide No. 8		
	300 °C to 450 °C	0.25 °C				
	450 °C to 600 °C	0.27 °C				
	600 °C to 1 000 °C	1.1 °C				
	1 000 °C to 1 300 °C	1.7 °C				
Thermocouple Reference Junction Probe R <sup>F</sup>	0 °C to 50 °C	0.068 °C			Fluke 7380 East Tester ET3875-300 SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Fluke 1590	ASTM E2730
Thermocouple Reference Junction Probe S <sup>F</sup>	0 °C to 50 °C	0.068 °C				





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MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Thermocouple Reference Junction Probe J <sup>F</sup>	0 °C to 50 °C	0.054 °C	Fluke 7380 East Tester ET3875-300 SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Fluke 1590	ASTM E2730
Thermocouple Reference Junction Probe T <sup>F</sup>	0 °C to 50 °C	0.072 °C		
Thermocouple Reference Junction Probe E <sup>F</sup>	0 °C to 50 °C	0.056 °C		
Thermocouple Reference Junction Probe K <sup>F</sup>	0 °C to 50 °C	0.070 °C		
Thermocouple Reference Junction Probe N <sup>F</sup>	0 °C to 50 °C	0.053 °C		
Temperature measurement Thermocouple Pt/Pd <sup>o</sup>	0 °C to 150°C	0.79 °C		
	150 °C to 420 °C	0.67 °C		
	420 °C to 600 °C	0.48 °C		
	600 °C to 1 050 °C	0.96 °C		
	1 050 °C to 1 300 °C	1.3 °C		
Temperature measurement Thermocouple AuPt <sup>o</sup>	0 °C to 150°C	0.70 °C		
	150 °C to 420 °C	0.67 °C		
	420 °C to 600 °C	0.36 °C		
	600 °C to 1 000 °C	0.96 °C		
Temperature measurement Thermocouple R <sup>o</sup>	-40 °C to 150°C	1.1 °C		
	150 °C to 420 °C	0.55 °C		
	420 °C to 600 °C	0.46 °C		
	600 °C to 1 050 °C	0.99 °C		
	1 050 °C to 1 300 °C	1.3 °C		
Temperature measurement Thermocouple S <sup>o</sup>	-40 °C to 150°C	0.99 °C		
	150 °C to 420 °C	0.56 °C		
	420 °C to 600 °C	0.50 °C		
	600 °C to 1 050 °C	1.0 °C		
	1 050 °C to 1 300 °C	1.3 °C		



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### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature measurement Thermocouple B °	150 °C to 420 °C	2.7 °C	Additel 875-155	ASTM E220 Euramet Calibration Guide No. 8
	420 °C to 600 °C	0.96 °C	Additel 875-660	
	600 °C to 1 050 °C	1.1 °C	Nabertherm RD30/200/13 SPRT Rosemount	
	1 050 °C to 1 300 °C	1.3 °C	162CE PRT Fluke 5628	
Temperature measurement Thermocouple J °	-40 °C to 150 °C	0.18 °C	Thermocouple Pt/Pd	
	150 °C to 420 °C	0.27 °C	Agilent 34420A	
	420 °C to 600 °C	0.34 °C	Agilent 34970A	
	600 °C to 1 050 °C	1.3 °C		
Temperature measurement Thermocouple T °	-40 °C to 150 °C	0.19 °C		
	150 °C to 400 °C	0.27 °C		
Temperature measurement Thermocouple E °	-40 °C to 150 °C	0.17 °C		
	150 °C to 420 °C	0.27 °C		
	420 °C to 600 °C	0.34 °C		
	600 °C to 1 000 °C	1.3 °C		
Temperature measurement Thermocouple K °	-40 °C to 150 °C	0.19 °C		
	150 °C to 420 °C	0.28 °C		
	420 °C to 600 °C	0.35 °C		
	600 °C to 1 050 °C	1.3 °C		
Temperature measurement Thermocouple N °	1 050 °C to 1 300 °C	1.7 °C		
	-40 °C to 150 °C	0.19 °C	Additel 875-155	
	150 °C to 420 °C	0.28 °C	Additel 875-660	
	420 °C to 600 °C	0.35 °C	Nabertherm RD30/200/13 SPRT Rosemount	
	600 °C to 1 050 °C	1.3 °C	162CE PRT Fluke 5628	
Temperature measurement Thermocouple C °	1 050 °C to 1 300 °C	1.7 °C	Thermocouple Pt/Pd Agilent 34970A	
	0 °C to 150 °C	0.34 °C		
	150 °C to 420 °C	0.34 °C		
	420 °C to 600 °C	0.40 °C		
	600 °C to 1 050 °C	1.4 °C		
Temperature measurement Thermocouple A °	1 050 °C to 1 300 °C	1.7 °C		
	0 °C to 150 °C	0.34 °C		
	150 °C to 420 °C	0.34 °C		
	420 °C to 600 °C	0.40 °C		
	600 °C to 1 050 °C	1.4 °C		



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## AG METROLOGY S.r.l.

Strada San Faustino, 155 N, Modena (MO), 41124 Italy  
 Contact Name: Sig.ra Giorgia Calzolari Phone: 335-705-4933

Accreditation is granted to the facility to perform the following Calibration:

### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Temperature measurement RTD and thermistor <sup>F</sup>	-80 °C to 50 °C	0.031 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Fluke 1590	ASTM E2593
	50 °C to 300 °C	0.042 °C		
	300 °C to 450 °C	0.095 °C		
	450 °C to 600 °C	0.15 °C		
	0.01 °C	0.013	Tempens TPW cell Agilent 34420A Fluke 1590	ASTM E1750
Temperature measurement RTD and thermistor <sup>O</sup>	-40 °C to 150 °C	0.18 °C	Additel 875-155 Additel 875-660 SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Agilent 34970A	ASTM E2593
	150 °C to 420 °C	0.25 °C		
	420 °C to 600 °C	0.36 °C		
Digital thermometer used with Thermocouple PtPd <sup>F</sup>	50 °C to 300 °C	0.24 °C	Fluke 7380 Additel 875-155 Additel 875-660 Nabertherm RD30/200/13 SPRT Rosemount 162CE Fluke 5628 Thermocouple PtPd Datron 1271 Fluke 1590	ASTM E2877
	300 °C to 450 °C	0.21 °C		
	450 °C to 600 °C	0.23 °C		
	600 °C to 1 000 °C	0.61 °C		
	1 000 °C to 1 300 °C	1.3 °C		
Digital thermometer used with Thermocouple AuPt <sup>F</sup>	50 °C to 300 °C	0.24 °C		
	300 °C to 450 °C	0.21 °C		
	450 °C to 600 °C	0.30 °C		
	600 °C to 1 000 °C	0.61 °C		
Digital thermometer used with Thermocouple R <sup>F</sup>	-50 °C to 50°C	0.35 °C		
	50 °C to 300 °C	0.27 °C		
	300 °C to 450 °C	0.24 °C		
	450 °C to 600 °C	0.26 °C		
	600 °C to 1 000 °C	0.62 °C		
	1 000 °C to 1 300 °C	1.3 °C		
Digital thermometer used with Thermocouple S <sup>F</sup>	-50 °C to 50°C	0.36 °C		
	50 °C to 300 °C	0.28 °C		
	300 °C to 450 °C	0.26 °C		
	450 °C to 600 °C	0.27 °C		
	600 °C to 1 000 °C	0.63 °C		
	1 000 °C to 1 300 °C	1.3 °C		



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### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Digital thermometer used with Thermocouple B <sup>F</sup>	50 °C to 300 °C	0.31 °C	Fluke 7380 Additel 875-155 Additel 875-660 Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Datron 1271 Fluke 1590	ASTM E2877
	300 °C to 450 °C	0.29 °C		
	450 °C to 600 °C	0.30 °C		
	600 °C to 1 000 °C	0.64 °C		
	1 000 °C to 1 300 °C	1.3 °C		
Digital thermometer used with Thermocouple J <sup>F</sup>	-80 °C to 50 °C	0.11 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	50 °C to 300 °C	0.21 °C		
	300 °C to 450 °C	0.23 °C		
	450 °C to 600 °C	0.25 °C		
	600 °C to 1 000 °C	1.1 °C		
Digital thermometer used with Thermocouple T <sup>F</sup>	1 000 °C to 1 200 °C	1.6 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	-80 °C to 50 °C	0.12 °C		
	50 °C to 300 °C	0.12 °C		
	300 °C to 400 °C	0.23 °C		
Digital thermometer used with Thermocouple E <sup>F</sup>	-80 °C to 50 °C	0.11 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	50 °C to 300 °C	0.21 °C		
	300 °C to 450 °C	0.22 °C		
	450 °C to 600 °C	0.25 °C		
	600 °C to 1 000 °C	1.1 °C		
Digital thermometer used with Thermocouple K <sup>F</sup>	1 000 °C to 1 300 °C	1.6 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	-80 °C to 50 °C	0.12 °C		
	50 °C to 300 °C	0.21 °C		
	300 °C to 450 °C	0.23 °C		
	450 °C to 600 °C	0.25 °C		
Digital thermometer used with Thermocouple N <sup>F</sup>	600 °C to 1 000 °C	1.1 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	1 000 °C to 1 300 °C	1.6 °C		
	-80 °C to 50 °C	0.12 °C		
	50 °C to 300 °C	0.21 °C		
	300 °C to 450 °C	0.23 °C		
Digital thermometer used with Thermocouple N <sup>F</sup>	450 °C to 600 °C	0.25 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	600 °C to 1 000 °C	1.1 °C		
	1 000 °C to 1 300 °C	1.6 °C		
	-80 °C to 50 °C	0.12 °C		
	50 °C to 300 °C	0.21 °C		
Digital thermometer used with Thermocouple N <sup>F</sup>	300 °C to 450 °C	0.23 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	450 °C to 600 °C	0.25 °C		
	600 °C to 1 000 °C	1.1 °C		
	1 000 °C to 1 300 °C	1.6 °C		
	-80 °C to 50 °C	0.12 °C		
Digital thermometer used with Thermocouple N <sup>F</sup>	50 °C to 300 °C	0.21 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Fluke 1590	ASTM E2877
	300 °C to 450 °C	0.23 °C		
	450 °C to 600 °C	0.25 °C		
	600 °C to 1 000 °C	1.1 °C		
	1 000 °C to 1 300 °C	1.6 °C		



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### Thermodynamic

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Digital thermometer used with Thermocouple C <sup>F</sup>	50 °C to 300 °C	0.24 °C	Fluke 7380	ASTM E2877
	300 °C to 450 °C	0.25 °C	East Tester ET3875-300	
	450 °C to 600 °C	0.27 °C	Pond Engineering K34XR	
	600 °C to 1 000 °C	1.1 °C	Nabertherm RD30/200/13	
	1 000 °C to 1 300 °C	1.6 °C	SPRT Rosemount 162CE	
Digital thermometer used with Thermocouple A <sup>F</sup>	50 °C to 300 °C	0.24 °C	PRT Fluke 5628	
	300 °C to 450 °C	0.25 °C	Thermocouple PtPd	
	450 °C to 600 °C	0.27 °C	Agilent 34420A	
	600 °C to 1 000 °C	1.1 °C	Fluke 1590	
	1 000 °C to 1 300 °C	1.6 °C		
Digital thermometer used with Thermocouple PtPd <sup>O</sup>	0 °C to 150 °C	0.29 °C	Additel 875-155	
	150 °C to 420 °C	0.30 °C	Additel 875-660	
	420 °C to 600 °C	0.35 °C	Nabertherm RD30/200/13	
	600 °C to 1 050 °C	0.94 °C	SPRT Rosemount 162CE	
	1 050 °C to 1 300 °C	1.3 °C	PRT Fluke 5628	
Digital thermometer used with Thermocouple AuPt <sup>O</sup>	0 °C to 150 °C	0.29 °C	Thermocouple PtPd	
	150 °C to 420 °C	0.30 °C	Agilent 34420A	
	420 °C to 600 °C	0.35 °C	Agilent 34970A	
	600 °C to 1 000 °C	0.94 °C		
Digital thermometer used with Thermocouple R <sup>O</sup>	-40 °C to 150 °C	0.36 °C		
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.35 °C		
	600 °C to 1 050 °C	0.94 °C		
	1 050 °C to 1 300 °C	1.3 °C		
Digital thermometer used with Thermocouple S <sup>O</sup>	-40 °C to 150 °C	0.36 °C		
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.35 °C		
	600 °C to 1 050 °C	0.94 °C		
	1 050 °C to 1 300 °C	1.3 °C		
Digital thermometer used with Thermocouple B <sup>O</sup>	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.35 °C		
	600 °C to 1 050 °C	0.94 °C		
	1 050 °C to 1 300 °C	1.3 °C		



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### Thermodynamic

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Digital thermometer used with Thermocouple J °	-40 °C to 150 °C	0.19 °C	Additel 875-155	ASTM E2877
	150 °C to 420 °C	0.30 °C	Additel 875-660	
	420 °C to 600 °C	0.37 °C	Nabertherm RD30/200/13 SPRT Rosemount 162CE	
	600 °C to 1 050 °C	1.3 °C	PRT Fluke 5628	
	1 050 °C to 1 200 °C	1.6 °C	Thermocouple PtPd	
Digital thermometer used with Thermocouple T °	-40 °C to 150 °C	0.19 °C	Agilent 34420A	
	150 °C to 400 °C	0.30 °C	Agilent 34970A	
Digital thermometer used with Thermocouple E °	-40 °C to 150 °C	0.19 °C	Additel 875-155 Additel 875-660 Nabertherm RD30/200/13 SPRT Rosemount 162CE PRT Fluke 5628 Thermocouple PtPd Agilent 34420A Agilent 34970A	
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.37 °C		
	600 °C to 1 000 °C	1.3 °C		
Digital thermometer used with Thermocouple K °	-40 °C to 150 °C	0.19 °C		
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.37 °C		
	600 °C to 1 050 °C	1.3 °C		
	1 050 °C to 1 300 °C	1.6 °C		
Digital thermometer used with Thermocouple N °	-40 °C to 150 °C	0.19 °C		
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.38 °C		
	600 °C to 1 050 °C	1.3 °C		
	1050 °C to 1 300 °C	1.6 °C		
Digital thermometer used with Thermocouple C °	0 °C to 150 °C	0.18 °C		
	150 °C to 420 °C	0.30 °C		
	420 °C to 600 °C	0.37 °C		
	600 °C to 1 050 °C	1.3 °C		
	1 050 °C to 1 300 °C	1.6 °C		
Digital thermometer used with Thermocouple A °	0 °C to 150 °C	0.20 °C		
	150 °C to 420 °C	0.31 °C		
	420 °C to 600 °C	0.38 °C		
	600 °C to 1 050 °C	1.3 °C		
	1 050 °C to 1 300 °C	1.6 °C		



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Digital thermometer used with RTD and thermistor <sup>F</sup>	-80 °C to 50 °C	0.030 °C	Fluke 7380 East Tester ET3875-300 Pond Engineering K34XR SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Fluke 1590	ASTM E2877
	50 °C to 300 °C	0.042 °C		
	300 °C to 450 °C	0.095 °C		
	450 °C to 600 °C	0.15 °C		
Digital thermometer used with RTD and thermistor <sup>O</sup>	-40 °C to 150 °C	0.14 °C	Additel 875-155 Additel 875-660 SPRT Rosemount 162CE PRT Fluke 5628 Agilent 34420A Agilent 34970A	
	150 °C to 420 °C	0.20 °C		
	420 °C to 600 °C	0.31 °C		
Equipment to measure IR Temperature <sup>FO</sup>	-40 °C to 150 °C	0.23 °C	CI Systems SR-800-7D- LT IR-463 blackbody Agilent 34420A Agilent 34970A Resistance thermometer Thermocouple type S	ASTM E2847
	150 °C to 420 °C	1.2 °C		
	420 °C to 600 °C	1.4 °C		
	600 °C to 1 050 °C	2.3 °C		
Temperature: Dew point hygrometer <sup>F</sup>	-25 °C to 50 °C	0.19 °C	General Eastern Optica General Eastern D2 General Eastern SIM-12H Sansel HCAL 1104U	ASTM D4230
Temperature: Dew point hygrometer <sup>O</sup>	-20 °C to 50 °C	0.31 °C	General Eastern Optica General Eastern D2 General Eastern SIM-12H Kaymont 2000	
Temperature: measuring of temperature environmental conditions in air <sup>F</sup>	0 °C to 60 °C	0.16 °C	Agilent 34420A Fluke 1590 Resistance thermometer Sansel HCAL 1104U	CEM TH - 007
Temperature: measuring of temperature environmental conditions in air <sup>O</sup>	10 °C to 50 °C	0.32 °C	Agilent 34420A Agilent 34970A Resistance thermometer Kaymont 2000	



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Temperature: controlled temperature enclosures <sup>FO</sup>	-80 °C to 150 °C	0.21 °C	Agilent 34420A Resistance thermometer Thermocouple N Agilent 34970A	Euramet Calibration Guide No. 13 Euramet Calibration Guide No. 20 AMS 2750 CQI-9 DKD-R 5-7 IEC 60068
	150 °C to 420 °C	0.63 °C		
	420 °C to 600 °C	1.2 °C		
	600 °C to 1 050 °C	2.9 °C		
	1 050 °C to 1 300 °C	3.8 °C		
Relative humidity: measuring of relative humidity environmental conditions in air <sup>F</sup>	10 % RH to 90 % RH	1.4 % of reading + 0.37 % RH	General Eastern Optica General Eastern D2 General Eastern Sim 12H Sansel HCAL 1104U	CEM TH – 007 DKD-R 5-8
Relative humidity: measuring of relative humidity environmental conditions in air <sup>O</sup>	10 % RH to 90 % RH	2.6 % of reading + 0.32 % RH		
Relative humidity: controlled humidity enclosures <sup>FO</sup>	10 % RH to 90 % RH	3.2 % RH	General Eastern Optica General Eastern D2 General Eastern Sim 12H Resistance thermometer Agilent 34970A	Euramet Calibration Guide N. 20 DKD-R 5-7 IEC 60068

The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor  $k$  (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

1. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
2. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location.
3. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations.





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*Accreditation is granted to the facility to perform the following Calibration:*

4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.

