Laboratorium Pomiarowe „MUTECH”
Tadeusz Mucha i Wspólnicy Spółka Jawna
99-400 Łowicz, ul. Nowy Rynek 26
firma@mutech.pl tel. centr. 46 837 04 44

Calibration laboratory accredited by
Polish Centre for Accreditation, a signatory to EA MLA and ILAC MRA
that include recognition of calibration certificates.
Accreditation No AP 106

AP 106

CALIBRATION CERTIFICATE

Date of issue: 14 April 2014. Certificate No.: 0217/AC/14

OBJECT OF CALIBRATION	Barometer, Producer: RADWAG, identification no. T-196/10, type: TH-1, measuring range (850 ÷ 1050) hPa, resolution 1 hPa.
APPLICANT	RADWAG WAGI ELEKTRONICZNE Laboratorium Pomiarowe ul. Bracka 28, 26-600 Radom.
USER	Ruprechter Glasbläserei - Laborbedarf e. U. Schonau 3, A-6252 Breitenbach/Tirol
CALIBRATION METHOD	Calibration procedure used: PA-C-01 „Calibration of standard needle pressure gauges, control pressure gauges with spring element, electronic pressure gauges and atmospheric pressure gaues” issue 8 of 05 March 2013.
ENVIRONMENTAL CONDITIONS	Ambient temperature: (19,5 ÷ 20,3) °C, Ambient humidity: (37,7 ÷ 41,3) %,
DATE OF CALIBRATION	14 April 2014.
TRACEABILITY	Calibration results were referred to reference measurement standard of the pressure, maintained in the GUM with the application of electronic pressure gauges: type: DPI 142, factory no.: 3254956.
CALIBRATION RESULTS	The results have been presented on page 2 of this certificate including uncertainty of measurement
UNCERTAINTY OF MEASUREMENT	Uncertainty of measurement has been evaluated in compliance with EA-4/02. The expanded uncertainty assigned corresponds to a coverage probability of 95 % and the coverage factor $k = 2$.

AP 106

KIEROWNIK
Laboratorium Pomiarowego
mgr inż. Sławomir Wróbel

CALIBRATION RESULTS Calibration results are the following:

pressure reference	instrument reading	error of measurement	expanded uncertainty
hPa	hPa	hPa	hPa
980	981	+ 1	2
990	991	+ 1	2
1000	1001	+ 1	2
1010	1011	+ 1	2
1020	1021	+ 1	2
1030	1031	+ 1	2

Error of measurement sign +(-) means that the instrument readings are too high (or too low)

Authorized by: Specjalista Metrolog
Piotr Tomanik

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firma@mutech.pl tel. centr. 046 837 04 44

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AP 106

CALIBRATION CERTIFICATE

Date of issue: 17 April 2014. Certificate No.: 1144/AT/14

OBJECT OF CALIBRATION	Thermometer, Producer: RADWAG, identification no. T-196/10 type: TH-1, measuring range (- 10 ÷ 85) °C, resolution 0,1 °C
APPLICANT	RADWAG WAGI ELEKTRONICZNE Laboratorium Pomiarowe, ul. Bracka 28, 26-600 Radom.
USER	Ruprechter Glasbläserei - Laborbedarf e. U. Schonau 3, A-6252 Breitenbach/Tirol.
CALIBRATION METHOD	Calibration procedure used: PA-T-05 „Calibration of electric thermometers (within electronic thermometers)" issue 8 of 03 June 2013.
ENVIRONMENTAL CONDITIONS	Ambient temperature: (19,7 ÷ 20,4) °C, Ambient humidity: (36,2 ÷ 39,3) %.
DATE OF CALIBRATION	17 April 2014.
TRACEABILITY	Calibration results were referred to national measurement standard of the temperature, maintained in the GUM with the application of: a platinum resistance thermometer, type 5187SA, factory no. 280401, made by Tinsley.
CALIBRATION RESULTS	The results have been presented on page 2 of this certificate including uncertainty of measurement
UNCERTAINTY OF MEASUREMENT	Uncertainty of measurement has been evaluated in compliance with EA-4/02. The expanded uncertainty assigned corresponds to a coverage probability of 95 % and the coverage factor k = 2,0.

Laboratorium Pomiarowe AP 106

Zastępca Kierownika Laboratorium:
mgr inż. Marek Wróbel

CALIBRATION RESULTS Calibration results are the following:

Lp.	standard temperature	instrument reading	error of measurement	expanded uncertainty
	tp	*tw*	*Δt*	*U*
	°C	°C	°C	°C
1	18,0	18,0	0,0	0,1
2	25,0	25,0	0,0	0,1
3	35,0	35,0	0,0	0,1

Immersion depth of the resistance thermometer sensor 100 mm

Error of measurement Δt is calculated with formula:

$$\Delta t = tw - tp$$

Specified temperature is compared with the International Temperature Scale of 1990 (ITS – 90).

Authorized by: Specjalista Metrolog

mgr inż Marek Wróbel

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Accreditation No AP 106

AP 106

CALIBRATION CERTIFICATE

Date of issue: 22 April 2014. Certificate No.: 0636/AH/14

OBJECT OF CALIBRATION	Hygrothermometer, Producer: RADWAG, identification no. T-196/10, type: TH-1.
APPLICANT	RADWAG WAGI ELEKTRONICZNE Laboratorium Pomiarowe, 28 Bracka St., 26-600 Radom.
USER	Ruprechter Glasblaserei – Laborbedarf e.U., Shonau 3, A-6252 Breitenbach/Tirol.
CALIBRATION METHOD	Calibration procedure used: PA-T-10 „Calibration of hygrometers and hygrothermometers for measurement of relative humidity and air temperature with cooled mirror dew-point hygrometer" issue 3 of 02 January 2012.
ENVIRONMENTAL CONDITIONS	Ambient temperature: (21,1 ÷ 22,4) °C, Ambient humidity: (43,7 ÷ 49,8) %,
DATE OF CALIBRATION	22 April 2014.
TRACEABILITY	Calibration results are compared with reference standard of the humidity unit and reference standard of the temperature unit, maintained by the GUM with chilled mirror dew-point hygrometer type Optidew Vision, factory no. 140456 and with reference standard of the temperature unit standard, maintained by the GUM with electronic thermometer type Optidew Vision, factory no. 140456
CALIBRATION RESULTS	The results have been presented on page 2 of this certificate including uncertainty of measurement
UNCERTAINTY OF MEASUREMENT	Uncertainty of measurement has been evaluated in compliance with EA-4/02. The expanded uncertainty assigned corresponds to a coverage probability of 95 % and the coverage factor k = 2,0.

Laboratorium Pomiarowe AP 106

KIEROWNIK
Laboratorium Pomiarowego
mgr inż. Arkadiusz Wróbel

CALIBRATION RESULTS Calibration results are the following:

Symbols:

RH_w – the relative humidity reference,

t_w – the value of the reference temperature,

RH_m – relative humidity indicated by the calibrated instrument,

t_m – temperature indicated by the calibrated instrument ,

ΔRH – correction for mean humidity indicated by the calibrated instrument ,

$$\Delta RH = RH_w - RH_m$$

Δt – correction for mean temperature indicated by the calibrated instrument ,

$$\Delta t = t_w - t_m$$

URH – extended measurement uncertainty for determined relative humidity correction,

Ut - extended measurement uncertainty for determined temperature correction .

Lp.	RH_w %	t_w °C	RH_m %	t_m °C	ΔRH %	URH %	Δt °C	Ut °C
1	45	18,0	45	17,8	0	2	+ 0,2	0,3
2	25	25,0	25	24,8	0	2	+ 0,2	0,3
3	45	25,0	44	24,8	- 1	2	+ 0,2	0,3
4	60	25,0	61	24,8	- 1	2	+ 0,2	0,3
5	45	35,0	43	34,8	+ 2	2	+ 0,2	0,3

Specified temperature is compared with the International Temperature Scale of 1990 (ITS – 90)

Authorized by: Specjalista Metrolog Piotr Tomanik

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