

Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Annex to the Accreditation Certificate D-K-17296-01-00
according to DIN EN ISO/IEC 17025:2005

Period of validity: 27.03.2012 to 26.03.2017

Holder of certificate:

Instituto Nacional de Metrologia
National calibration laboratory – mass, balances and pressure
Avenida Carrera 50 N° 26-55, Interior 2, Bogotá D. C., Colombia

Head: Mr. Carlos Eduardo Porras Porras
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Mr. Leonor Gómez Barrera

Accredited since: 23.08.2007

Calibrations in the fields:

Mechanical quantities

- **Mass (mass standards)**
- **Weighing instruments**
- **Pressure**

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Abbreviations used: see last page

Permanent Laboratory

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Conventional Mass	1 mg		0,002 mg	For weight pieces according to OIML R 111-1, Class E ₂ .
	2 mg		0,002 mg	
	5 mg		0,002 mg	
	10 mg		0,003 mg	
	20 mg		0,003 mg	
	50 mg		0,004 mg	
	100 mg		0,005 mg	
	200 mg		0,006 mg	
	500 mg		0,008 mg	
	1 g		0,010 mg	
	2 g		0,012 mg	
	5 g		0,016 mg	
	10 g		0,020 mg	
	20 g		0,025 mg	
	50 g		0,030 mg	
	100 g		0,05 mg	
	200 g		0,10 mg	
	500 g		0,25 mg	
	1 kg		0,5 mg	
	2 kg		1 mg	
5 kg	2,5 mg			
10 kg	5 mg			
20 kg	10 mg			
	50 kg		250 mg	For weight pieces according to OIML R 111-1, Class F ₂ .
Conventional Mass	1 mg to 100 mg		0.005 mg	For free nominal values m _c = conventional mass
	> 100 mg to 200 mg		0.006 mg	
	> 200 mg to 500 mg		0.008 mg	
	> 500 mg to 1 g		0.010 mg	
	> 1 g to 2 g		0.012 mg	
	> 2 g to 5 g		0.015 mg	
	> 5 g to 10 g		0.020 mg	
	> 10 g to 20 g		0.025 mg	
	> 20 g to 50 g		0.030 mg	
	> 50 g to 100 g		0.05 mg	
	> 100 g to 20 kg		$5 \cdot 10^{-7} \cdot m_c$	
> 20 kg to 50 kg	$5 \cdot 10^{-5} \cdot m_c$			

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 95% and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Pressure Absolute pressure p_{abs}	>8.0 kPa to 350 kPa >0.35 MPa to 1.75 MPa >1.75 MPa to 7.0 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02	$2.5 \cdot 10^{-5} \cdot p_{abs} + 0.55 \text{ Pa}$ $2.8 \cdot 10^{-5} \cdot p_{abs} + 1.0 \text{ Pa}$ $4.1 \cdot 10^{-5} \cdot p_{abs} + 5.2 \text{ Pa}$	The uncertainty of the measured residual pressure has to be added. Pressure medium: Gas
Absolute pressure p_{abs}	>0.24 MPa to 7.1 MPa >7.1 MPa to 70.1 MPa >70.1 MPa to 140.1 MPa >140.1 MPa to 280.1 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$3.8 \cdot 10^{-5} \cdot p_{abs} + 4.5 \text{ Pa}$ $4.0 \cdot 10^{-5} \cdot p_{abs} + 57 \text{ Pa}$ $4.8 \cdot 10^{-5} \cdot p_{abs} + 120 \text{ Pa}$ $7.2 \cdot 10^{-5} \cdot p_{abs} + 280 \text{ Pa}$	Principle of measurement: $p_{abs} = p_e + p_{amb}$ The uncertainty of the measured atmospheric pressure is taken into account. Pressure medium: Oil
Gauge pressure p_e	-100 kPa to -1.5 kPa -1.0 kPa to 1.5 kPa >1.5 kPa to 5.0 kPa > 5.0 kPa to 350 kPa >0.35 MPa to 1.75 MPa >1.75 MPa to 7.0 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$7.0 \cdot 10^{-5} \cdot p_e + 0.70 \text{ Pa}$ $3.0 \cdot 10^{-4} \cdot p_e$, but not lower than 0.3 Pa $7.0 \cdot 10^{-5} \cdot p_e + 0.70 \text{ Pa}$ $2.5 \cdot 10^{-5} \cdot p_e + 0.55 \text{ Pa}$ $2.8 \cdot 10^{-5} \cdot p_e + 1.0 \text{ Pa}$ $4.1 \cdot 10^{-5} \cdot p_e + 5.2 \text{ Pa}$	Pressure medium: Gas
Gauge pressure p_e	>0.14 MPa to 7.0 MPa >7.0 MPa to 70 MPa >70 MPa to 140 MPa >140 MPa to 280 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$3.8 \cdot 10^{-5} \cdot p_e + 4.5 \text{ Pa}$ $4.0 \cdot 10^{-5} \cdot p_e + 57 \text{ Pa}$ $4.8 \cdot 10^{-5} \cdot p_e + 120 \text{ Pa}$ $7.2 \cdot 10^{-5} \cdot p_e + 280 \text{ Pa}$	Pressure medium: Oil

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 95% and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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On-site calibration

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability ¹⁾	Remarks
Weighing instruments	up to 12 kg	EURAMET/cg-18/v.02 (previously EA 10/18) SIM MWG7:2009 (identical to the original EURAMET/cg-18/v.02)	$2 \cdot 10^{-6}$	With weights class E ₂
Pressure Absolute pressure p_{abs}	>8.0 kPa to 350 kPa >0.35 MPa to 1.75 MPa >1.75 MPa to 7.0 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02	$3.2 \cdot 10^{-5} \cdot p_{abs} + 0.69 \text{ Pa}$ $3.5 \cdot 10^{-5} \cdot p_{abs} + 1.2 \text{ Pa}$ $5.2 \cdot 10^{-5} \cdot p_{abs} + 6.5 \text{ Pa}$	The uncertainty of the measured residual pressure has to be added. Pressure medium: Gas
Absolute pressure p_{abs}	>0.24 MPa to 7.1 MPa >7.1 MPa to 70.1 MPa >70.1 MPa to 140.1 MPa >140.1 MPa to 280.1 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$4.8 \cdot 10^{-5} \cdot p_{abs} + 5.7 \text{ Pa}$ $5.0 \cdot 10^{-5} \cdot p_{abs} + 72 \text{ Pa}$ $6.0 \cdot 10^{-5} \cdot p_{abs} + 150 \text{ Pa}$ $9.0 \cdot 10^{-5} \cdot p_{abs} + 350 \text{ Pa}$	Principle of measurement: $p_{abs} = p_e + p_{amb}$ The uncertainty of the measured atmospheric pressure is taken into account. Pressure medium: Oil
Gauge pressure p_e	-100 kPa to -1.5 kPa -1.0 kPa to 1.5 kPa >1.5 kPa to 5.0 kPa > 5.0 kPa to 350 kPa >0.35 MPa to 1.75 MPa >1.75 MPa to 7.0 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$8.8 \cdot 10^{-5} \cdot p_e + 0.88 \text{ Pa}$ $3.8 \cdot 10^{-4} \cdot p_e$, but not lower than 0.38 Pa $8.8 \cdot 10^{-5} \cdot p_e + 0.88 \text{ Pa}$ $3.2 \cdot 10^{-5} \cdot p_e + 0.69 \text{ Pa}$ $3.5 \cdot 10^{-5} \cdot p_e + 1.2 \text{ Pa}$ $5.2 \cdot 10^{-5} \cdot p_e + 6.5 \text{ Pa}$	Pressure medium: Gas
Gauge pressure p_e	>0.14 MPa to 7.0 MPa >7.0 MPa to 70 MPa >70 MPa to 140 MPa >140 MPa to 280 MPa	DAKKS-DKD-R 6-1 Euramet/cg-3/v.01 Euramet/cg-17/v.02 DIN EN 837-1:1997	$4.8 \cdot 10^{-5} \cdot p_e + 5.7 \text{ Pa}$ $5.0 \cdot 10^{-5} \cdot p_e + 72 \text{ Pa}$ $6.0 \cdot 10^{-5} \cdot p_e + 150 \text{ Pa}$ $9.0 \cdot 10^{-5} \cdot p_e + 350 \text{ Pa}$	Pressure medium: Oil

Abbreviations used:

DAKKS-DKD-R 6-1 Guideline on „Calibration of Pressure Gauges”

¹⁾ The best measurement capabilities are stated according to EA-4/02. These are expanded uncertainties of measurement with a coverage probability of 95% and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.