Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15201-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 03.09.2020

Date of issue: 03.09.2020

Holder of certificate:

Hirschmann Laborgeräte GmbH & Co. KG
Hauptstraße 7 - 15, 74246 Eberstadt

Calibration in the fields:

Chemical analysis, reference materials
– **Volume of liquids**

Abbreviations used: see last page

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Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Piston-operated volumetric apparatuses Piston pipettes	3 µL	Gravimetric method according to DIN EN ISO 8655-6:2009 and DKD-R 8-1:2011	0.024 µL	Adjusted to deliver. Best measurement capabilities refer to nominal volume. To ensure best measurement capabilities the reference temperature shall be set equal to the temperature of the test liquid.
	5 µL		0.04 µL	
	10 µL		0.04 µL	
	20 µL		0.06 µL	
	25 µL		0.075 µL	
	50 µL		0.15 µL	
	100 µL		1.3 µL	
	200 µL		1.3 µL	
	250 µL		1.3 µL	
	500 µL		1.4 µL	
	1000 µL		1.6 µL	
	2000 µL		3 µL	
	5000 µL		7.5 µL	
	10000 µL		15 µL	
Dispensers	1 mL		1.5 µL	
	2 mL		1.8 µL	
	5 mL		3.5 µL	
	10 mL		6.6 µL	
	20 mL		13 µL	
	25 mL		16 µL	
	30 mL		19 µL	
	50 mL		32 µL	
	60 mL		39 µL	
	100 mL		64 µL	
Piston burettes	10 mL		3.7 µL	
	20 mL		6.9 µL	
	25 mL		8.6 µL	
	30 mL		10 µL	
	50 mL		17 µL	
	60 mL		20 µL	

[1)] The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 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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Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Volumetric instruments	1 mL	Gravimetric method	5 µL	
made of glass	2 mL	according to	5 µL	
adjusted to contain	5 mL	DIN EN ISO	6 µL	
Volumetric flasks	10 mL	4787:2011	6 µL	
	20 mL		9 µL	
	25 mL		10 µL	
	50 mL		14 µL	
	100 mL		20 µL	
	200 mL		32 µL	
	250 mL		36 µL	
	300 mL		43 µL	
	330 mL		46 µL	
	350 mL		48 µL	
	500 mL		66 µL	
	700 mL		92 µL	
	750 mL		98 µL	
	1000 mL		0.13 mL	
	2000 mL		0.24 mL	
	5000 mL		0.63 mL	
	10000 mL		1.2 mL	
Graduated cylinders	1 mL		5 µL	
	2 mL		6 µL	
	5 mL		9 µL	
	10 mL		13 µL	
	20 mL		21 µL	
	25 mL		26 µL	
	50 mL		44 µL	
	100 mL		62 µL	
	200 mL		90 µL	
	250 mL		0.12 mL	
	500 mL		0.23 mL	
	1000 mL		0.35 mL	
	2000 mL		0.56 mL	
	5000 mL		1.1 mL	

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Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Volumetric instruments	0.5 µL	Gravimetric method	0.009 µL	
made of glass	1 µL	according to	0.011 µL	
Pipettes	2 µL	DIN EN ISO	0.017 µL	
adjusted to contain	5 µL	4787:2011	0.045 µL	
	10 µL		0.045 µL	
	20 µL		0.052 µL	
	50 µL		0.059 µL	
	100 µL		0.092 µL	
	200 µL		0.21 µL	
Pipettes	0.5 mL		0.2 µL	
adjusted to deliver	1 mL		0.4 µL	
	2 mL		0.5 µL	
	3 mL		0.6 µL	
	4 mL		0.8 µL	
	5 mL		1.0 µL	
	6 mL		1.2 µL	
	7 mL		1.4 µL	
	8 mL		1.7 µL	
	9 mL		1.9 µL	
	10 mL		2.2 µL	
	15 mL		2.7 µL	
	20 mL		3.2 µL	
	25 mL		3.7 µL	
	30 mL		4.1 µL	
	40 mL		5.4 µL	
	50 mL		6.6 µL	
	100 mL		13 µL	
	150 mL		19 µL	
	200 mL		25 µL	

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Calibration and Measurement Capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Burettes	2 mL		0.8 µL	
	5 mL		1.6 µL	
	10 mL		2.5 µL	
	25 mL		6.5 µL	
	50 mL		13 µL	
	100 mL		23 µL	

Abbreviations used:

CMC	Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
DIN	Deutsches Institut für Normung e.V.
DKD-R	Richtlinie des Deutschen Kalibrierdienstes (DKD), herausgegeben von der Physikalisch-Technischen Bundesanstalt

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