DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-18737-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 19.12.2019

Date of issue: 19.12.2019

Holder of certificate:

Vistec Electron Beam GmbH
Ilmstraße 4, 07743 Jena

Calibration in the fields:

Dimensional Quantities

Length

- **Line scales, Distances**

Coordinate measuring technology

- **Application coordinate measuring machines**

Abbreviations used: see last page

The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
https://www.dakks.de/en/content/accredited-bodies-dakks

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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1)]	Remarks
Length				
Positions and distances of rectified edges (unidirectional) and middle positions of structures on flat substrates (hard mask layer)	to 150 mm	AA-002 from 18.01.2018 Measurement in reflected and transmitted light	0,035 µm	Calibration with optical mask meter LMS IPRO4
Deviations from nominal positions of structures on flat substrates (hard mask layer)	Measuring area 150 mm x 150 mm	AA-002 from 18.01.2018 Measurement in reflected and transmitted light		
2D- grid		AA-002 from 18.01.2018 Measurement in reflected and transmitted light in the 4-orientations-method	0,01 µm	
Roundness deviations Local roundness deviations (*LRD*)	to 2 µm	AA-002 from 18.01.2018 Measurement in reflected and transmitted light	0,035 µm	
Root mean square deviation of roundness (*RON*q)			0,035 µm	
Total roundness deviations (*RON*t)			0,05 µm	
Angle	360°	AA-002 from 18.01.2018 up to 150 mm side length	0,07''	
Positions of non-rectified (bidirectional) edges on flat substrates (Chrome hard mask layer)	Measuring area 150 mm x 150 mm	AA-002 from 18.01.2018 Measurement in transmitted light		
Position	to 150 mm	for unspecified layer thickness (between 30 nm and 190 nm) by model calculation	0,12 µm	
Linewidths at half height structure	5 µm to 150 mm		0,24 µm	
Diameter at half height structure	10 µm to 150 mm	≥ 25 Measuring points	0,23 µm	

[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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement [1]	Remarks
Positions of non- rectified (bi-directional) edges on flat sub-strates (Chrome hard mask layer)	Measuring area 150 mm x 150 mm	AA-002 from 18.01.2018 Measurement in transmitted light		Calibration with optical mask comparator LMS IPRO4
Position	to 150 mm	for unspecified layer thickness (between 30 nm and 190 nm) by model calculation	0,05 µm	
Linewidths at half height structure	5 µm to 150 mm		0,08 µm	
Diameter at half height structure	10 µm to 150 mm	≥ 25 Measuring points	0,075 µm	
Positions of non-rectified (bi-directional) edges on flat sub-strates (Chrome hard mask layer)	Measuring area 150 mm x 150 mm	AA-002 from 18.01.2018 Measurement in transmitted light		
Position	to 150 mm	based on a transfer of bidirectional measurements on the measuring object (NMI reference calibration)	0,045 µm	
Linewidths at half height structure	5 µm to 150 mm		0,06 µm	
Diameter at half height structure	10 µm to 150 mm	≥ 25 Measuring points	0,055 µm	

Abbreviations used:

CMC	Calibration and measurement capabilities
DIN	Deutsches Institut für Normung e.V.
AA	Instruction of Vistec Electron Beam GmbH
LMS IPRO4	Optical mask comparator

[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.