

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15059-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 27.09.2021

Date of issue: 27.09.2021

Holder of certificate:

PTW - Freiburg

**Physikalisch-Technische Werkstätten Dr. Pychlau GmbH
Lörracher Straße 7. 79115 Freiburg im Breisgau**

Calibration in the fields:

High frequency and radiation quantities

Ionizing radiation and radioactivity

- **Dosimetry**
- **Radiation protection**

The management system requirements in DIN EN ISO/IEC 17025 are written in language relevant to operations of calibration laboratories and operate generally in accordance with the principles of DIN EN ISO 9001.

*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>*

Abbreviations used: see last page

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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
Dosimetry Air kerma		X-ray tube voltage, radionuclide resp. radiation quality		During gamma radiation indicated dose rates are indications for July 1987, May 2008 and/or April 2014 according to the assigned sources. These are reduced in consequence of the source strength decrease with the appropriate radioactive half-lives and increased if necessary with source change. z ₀ : Phantom surface z ₅ : Phantom depth 5 cm
	5 mGy to 10 Gy	15 kV to 70 kV	2.1 %	
	2 mGy to 10 Gy	70 kV to 280 kV	1.9 %	
	100 µGy to 10 mGy	20 kV to 50 kV (Mammography)	2.5 %	
	100 µGy to 100 mGy	40 kV to 150 kV (RAD)	2.5 %	
	1 µGy to 3 Gy	¹³⁷ Cs	1.9 %	
2 µGy to 5 Gy	⁶⁰ Co	1.2 %		
Air kerma rate	50 mGy/min to 500 mGy/min	15 kV to 70 kV	2.1 %	
	20 mGy/min to 500 mGy/min	70 kV to 280 kV	1.9 %	
	200 µGy/s to 50 mGy/s	20 kV to 50 kV (Mammography)	2.5 %	
	5 µGy/s to 50 mGy/s	40 kV to 150 kV (RAD)	2.5 %	
	500 µGy/h to 250 mGy/min	¹³⁷ Cs	1.9 %	
	1 mGy/h to 500 mGy/min	⁶⁰ Co	1.2 %	
Ambient equivalent dose	10 µSv to 2 mSv	30 kV to 300 kV	3.6 %	
	3 mSv to 3 Sv	¹³⁷ Cs	4.6 %	
	2 µSv to 5 Sv	⁶⁰ Co	4.4 %	
Ambient equivalent dose rate	1 mSv/h to 400 mSv/h	30 kV to 300 kV	3.6 %	
	25 mSv/h to 400 mSv/h	¹³⁷ Cs	4.6 %	
	350 µSv/h to 5 mSv/h	¹³⁷ Cs	5.3 %	
	0.5 µSv/h to 10 µSv/h	¹³⁷ Cs	7.5 %	
	500 µSv/h to 12 mSv/h	⁶⁰ Co	4.4 %	
Air kerma length product	700 µGy · cm to 700 mGy · cm	70 kV to 150 kV	2.7%	
Air kerma length product rate	35 µGy · cm/s to 350 mGy · cm/s	70 kV to 150 kV	2.7%	
Absorbed dose to water	10 mGy to 10 Gy	10 kV to 100 kV. z ₀	3.4 %	
	10 mGy to 10 Gy	100 kV to 280 kV. z ₅	2.9 %	
	50 mGy to 5 Gy	⁶⁰ Co. z ₅	1.1 %	
Absorbed dose rate to water	50 mGy/min to 300 mGy/min	10 kV to 100 kV. z ₀	3.4 %	
	50 mGy/min to 300 mGy/min	100 kV to 280 kV. z ₅	2.9 %	
	50 mGy/min to 300 mGy/min	⁶⁰ Co. z ₅	1.1 %	
	> 40 kV to 150 kV		1.2 %	

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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Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾	Remarks
DC voltage	20 kV bis 40 kV	IEC 61676:2002	1.4 %	For invasive calibration of non-invasive measurement-gadgets
	>40 kV bis 150 kV		1.2 %	

Abbreviations used:

CMC Calibration and measurement capabilities (Kalibrier- und Messmöglichkeiten)
IEC International Electrotechnical Commission

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.