

CALIBRATION CERTIFICATE

No. 241229301



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Calibration Object

Radiation Detector

Detector [REF] TL30009 [SN] 001514
Detector Type Ionization Chamber

Manufacturer PTW Freiburg GmbH, Germany

Customer S.C. Alarad
No. 1 Molocanilor Str.
MD - 2019 Chisinau

Order No. R242417
Order Date 2024-09-13



Calibration Results

Measuring Quantity	Air Kerma Length Product			
Detector Calibration Factor	$N_K = 7.996 \cdot 10^7 \text{ Gy} \cdot \text{cm} / \text{C}$ (for RQT 9)			
Beam Quality Correction	Beam Quality	KV	Correction Factor k_Q	Uncertainty
	RQT 10	150	1.01	1.2 %
	RQT 9	120	1.00	1.2 %
	RQT 8	100	0.99	1.2 %

Calibration Date **2024-09-24**

Freiburg, 2024-09-24

PTW Freiburg GmbH
Physikalisch-Technische
Werkstätten Dr. Pychlau GmbH

Rolf-Dieter Eckert

(Signature)

Reference Conditions	Temperature:	293.2 K (20°C)
	Air Pressure:	1013.25 hPa
	Relative Humidity:	50 %
	Chamber Voltage/Polarity:	- 100 V
	Saturation Correction Factor	$k_s = 1.000$

Calibration Conditions and Set-up

Climatic Conditions	Temperature Range:	(294.2 ± 3) K / (21 ± 3) °C
	Air Pressure Range:	(1000 ± 50) hPa
	Rel. Humidity Range:	(40 ± 20) %

Beam Quality and Geometry	Quality	Filter [mm]	HVL [mm]	SDD [cm]	Size [cm]
	RQT 10	4.03 Al + 0.31 Cu		10.3 Al	80
RQT 9	3.40 Al + 0.25 Cu		8.5 Al	80	8.0 x 8.0
RQT 8	3.02 Al + 0.2 Cu		7.0 Al	80	8.0 x 8.0

Quality:	Beam qualities according to IEC 61267
Filter:	Total filtration (inherent and additional filters)
HVL:	Half value layer at the point of measurement
SDD:	Distance between radiation source and reference point
Size:	Field size at reference point, diam. = Field Diameter

Detector Arrangement	Chamber axis was perpendicular to radiation beam axis Reference point position at stated distance to the radiation source (For further information see manual and data sheet of detector)
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Dose Rate	Air kerma rate : min.: 0.01 mGy/min / max.: 300 mGy/min
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Leakage	Negligible during calibration
Condition of calibration object	detector repaired and calibrated

Remarks

1. The uncertainty stated corresponds to the double standard deviation ($k=2$). The standard deviation was calculated according to EA-4/02 M: 2022 from the partial uncertainties arising from the standard used, the calibration procedure, the environmental conditions and short time effects of the object of measurement. The uncertainties stated are composed of the uncertainties of the calibration procedure and those of the specimen during calibration. A share for the long term instability of the object under calibration is not included.
2. The calibration is traceable to national standards of the German National Laboratory, PTB, Braunschweig. This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. This certificate is valid only with the ionisation chamber showing the intact sticker with the certificate number. The calibration factors of chambers having been opened for repair are not comparable to previous calibrations. Test certificates without signature are not valid.
3. An air density correction has to be applied in case of an ionization chamber that is vented to atmospheric communication. Please note that some electrometers have a built-in air density correction.
4. The calibration object fully complies with the respective specifications given in the data sheet and user manual.
5. Please take note of the polarity definition by the electrometer manufacturer. For PTW electrometers the voltage and polarity to be set on the device corresponds to the value of the chamber voltage specified in the calibration certificate.