CALIBRATION CERTIFICATE
No. 20040xxxx

PTW CALIBRATION LAB

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Calibration Object

Array Detector	**OCTAVIUS Detector 1600 SRS [REF] T10056 [SN] 191xxx**		
Detector Type	Ionization Chamber (liquid-filled)		
Manufacturer	PTW-Freiburg		
Customer	Customer name + address	Order No. :	AU200xxxx
		Order Date :	2020-09-11

Calibration Results

Measuring Quantity	Absorbed Dose to Water (D_w)	
Response	**$R_{D,w}$ = 1.499 · 10^{-8} C / Gy**	(Chamber No. 761, $N_{D,w} = 1 / R_{D,w}$)
Calibration File	20040xxxx_OCTAVIUS1600SRS_191xxx.cal	
Uncertainty of Calibration	ε = 1.5 % for chamber No. 761	
	ε = 0.5 % all chambers with regard to chamber No. 761	

Reference Conditions		
	Beam Quality:	^{60}Co
	Temperature:	293.2 K (20°C)
	Air Pressure:	1013 h Pa
	Relative Humidity:	50 %
	Chamber Voltage/Polarity:	- 1000 V
	Ion Collection Efficiency:	100 %

Calibration Date: 2020-09-31

Freiburg, 2021-01-13

PTW-Freiburg
Physikalisch-Technische
Werkstätten Dr. Pychlau GmbH

(Signature)

Calibration Results cont...

Array Parameters	Gain :	3.128		
	Capacity Low [1] :	$2.719 \cdot 10^{-10}$ F	Capacity High [1] :	-
	Capacity Low [2] :	$2.689 \cdot 10^{-10}$ F	Capacity High [2] :	-
	Capacity Low [3] :	$2.699 \cdot 10^{-10}$ F	Capacity High [3] :	-
	Capacity Low [4] :	$2.679 \cdot 10^{-10}$ F	Capacity High [4] :	-

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	SDD [cm]	Size [cm x cm]
^{60}Co	100	10 x 10

SDD: Distance between radiation source and reference point
Size: Field size at reference point

Detector Arrangement: Printed surface showed towards the radiation source (see manual)

Build-up Material: 38 mm PMMA

Reference Point: 9.0 mm behind the entrance surface

Reference point position at stated measuring depth / distance to the radiation source (For further information see manual and data sheet of detector.)

Leakage: Negligible during calibration

Remarks

1. The chambers are liquid-filled. An air density correction is obsolete.
2. The uncertainty stated corresponds to the double standard deviation ($k = 2$). The standard deviation was calculated according to ISO GUM 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.
3. 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 detector array showing the intact sticker with the certificate number. Calibration factors of detector arrays having been opened for repair are not comparable to previous calibrations. Calibration certificates without signature are not valid.
4. The components of the calibration object fully comply with the respective specifications given in the data sheet and user manual.