COMECER spa SIT n. 065/R CALIBRATION CENTRE FOR IONIZING RADIATIONS
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SIT SERVIZIO DI TARATURA IN ITALIA

X and gamma reference radiation qualities beams available at Calibration Centre SIT n. 065/R
Air Kerma /ambient dose equivalent* H*(10) *and directional dose equivalent* H'(0.07,) *conversion factors

HIGH RATE X QUALITIES (1)

Comecer beam code	ISO 4037 code	Rx tube voltage (kV)	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV)	Air kerma rate (mGy/h) min.	max.	HVL (mm)	Additional filtration (mm) (°)			
									Al	Cu	Sn	Pb
A3	H-30	30	-	1.02	19			0.08 Cu	0.52			
A4	H-60	60	1.15	1.26	37	9	1700	0.08 Cu	3.0			
A5	H-100	100	1.57	1.49	57	10	1700	0.30 Cu	3.9	0.15		
A6	H-200	200	1.61	1.51	102	20	2600	1.70 Cu	4.00	1.20		
A7	H-250	250	1.54	1.45	122	30	3500	2.47 Cu	4.00	1.60		
A8	H-300	300	1.48	1.40	147	40	4500	3.40 Cu	4.00	2.50		

WIDE SPECTRA X QUALITIES (1)

Comecer beam code	ISO 4037 code	Rx tube voltage (kV)	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min.	max.	HVL (mm)	Additional filtration (mm) (°)			
									Al	Cu	Sn	Pb
L1	W-60	60	1.49	1.43	45	1,5	240	0.18 Cu	3.85	0.26		
L2	W-80	80	1.66	1.54	58	2,5	360	0.35 Cu	4.00	0.47		
L3	W-110	110	1.71	1.59	79	1,5	270	0.94 Cu	4.00	1.90		
L4	W-150	150	1.62	1.53	104	3,5	500	1.90 Cu	4.00		1.00	
L5	W-200	200	1.52	1.44	134	6	800	3.11 Cu	4.00		2.00	
L6	W-250	250	1.44	1.37	169	7	800	4.30 Cu	4.00		4.00	
L7	W-300	300	1.39	1.34	202	8	1000	5.00 Cu	4.00		6.50	

BIPM X QUALITIES (2)

Comecer beam code	BIPM code	Rx tube voltage (kV)	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min.	max.	HVL (mm)	Additional filtration (mm) (°)			
									Al	Cu	Sn	Pb
P3	P3	30			15.4		6600	0.18 Al	0.26			
P4	P4	50			29.4	110	3300	1.02 Al	1.07			
P5	P5	50			34.3	20	700	2.26 Al	4.72			
P6	P6	100			44	20	3500	4.00 Al	3.47			
P7	P7	135			68	20	3000	0.50 Cu	4.00	0.20		
P8	P8	180			93	20	3300	1.00 Cu	4.00	0.47		
P9	P9	250			139	30	3500	2.50 Cu	4.00	1.63		

ATTENUATED DIAGNOSTIC X QUALITIES (3)

Comecer beam code	IEC 61267 code	Rx tube voltage (kV)	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min.	max..	HVL (mm)	Additional filtration (mm) (°)			
									Al	Cu	Sn	Pb
QAR3	RQAR	50			38			3.40 Al	12.5			
QAR5	RQAR	70			52			6.20 Al	23.5			
QAR7	RQAR	90			63			9.00 Al	32.5			
QAR9	RQAR	120			76			11.5 Al	42.5			
QAR10	RQAR	150			92			12.9 Al	50.0			

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SIT SERVIZIO DI TARATURA IN ITALIA

Caratteristiche delle Radiazioni di riferimento X e gamma del Centro di Taratura SIT n. 065/R
*Fattori di conversione kerma in aria/**equiv. di dose ambientale** ed **equiv. di dose direzionale***

NON-ATTENUATED DIAGNOSTIC X QUALITIES (3)

Comecer beam code	IEC 61267 code	Rx tube voltage (kV))	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min. max..	HVL (mm)	Additional filtration (mm)) (°)			
								Al	Cu	Sn	Pb
QR3	RQR3	50			32		1.80 Al	2.5			
QR5	RQR5	70			39		2.45 Al	2.5			
QR7	RQR7	90			46		3.10 Al	2.5			
QR9	RQR9	120			54		4.30 Al	2.5			
QR10	RQR10	150			64		5.40 Al	2.5			

NARROW SPECTRA X QUALITIES (1)

Comecer beam code	ISO 4037 code	Rx tube voltage (kV)	H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min. max.		HVL (mm)	Additional filtration (mm) (°)			
									Al	Cu	Sn	Pb
S6	N-40	40	1.18	1.25	33	0,2	60	0.09 Cu	4.00	0.21		
S7	N-60	60	1.59	1.48	48	0,5	90	0.24 Cu	4.00	0.59		
S8	N-80	80	1.73	1.60	65	0,2	35	0.59 Cu	3.33	2.04		
S9	N-100	100	1.71	1.60	83	0,1	18	1.16 Cu	4.00	5.00		
S10	N-120	120	1.64	1.55	100	0,1	19	1.73 Cu	4.00	5.00	1.0	
S11	N-150	150	1.58	1.50	118	0,8	100	2.46 Cu	4.52		2.5	
S12	N-200	200	1.46	1.39	161	0,3	40	3.90 Cu	4.00	2.00	3.0	1.0
S13	N-250	250	1.39	1.34	205	0,3	35	5.20 Cu	4.00		2.0	3.0
S14	N-300	300	1.35	1.31	248	0,2	25	6.20 Cu	4.00		3.0	5.5

(°) Rx tube inherent filtration: 5 mm Be

GAMMA RADIONUCLIDES QUALITIES (1)

Comecer beam code	ISO 4037 code		H*(10)/Ka Sv/Gy	H'(.07,0)/Ka Sv/Gy	Mean energy (keV	Air kerma rate (mGy/h) min. max.					
Am-241	S-Am		1.74	1.59	60	0,003	0,02				
Cs-137	S-Cs		1.20	-	660	0,001	2,6				
Co-60	S-Co		1.16	-	1250	0,1	600				

Note- Fattori di conversione da kerma in aria a dose equivalente secondo le Norme ISO 4037-1. Distanza di riferimento : 2 m.
Se non riportati in tabella, i fattori non sono disponibili nelle Norme ISO 4037.

RIFERIMENTI:

1) ISO 4037-1 (1996): X and gamma reference radiation for calibrating dosemeters and doserate meters and for determining their response as a function of photon energy. Part 1: Radiation characteristics and production methods.
2) BIPM (1972): Qualitès de rayonnements, CCEMRI (Section I), 1972,2, R15.
3) IEC 61267 (1994-10): Medical diagnostic X-ray equipment – Radiation conditions for use in the determination of characteristics.

EXTENDED RADIOACTIVE SOURCES (100 cm^2) FOR CONTAMINATION MONITORS

Alfa	Beta	Gamma
Am-241 (5.48; 5.44 MeV)	**C-14** (Emax = 158 keV)	**I-129** (32 keV)
	Sr-90 (0,5; 2,2 MeV)	**Cs-137** (660 keV)
	Tc-99 (85,4; 294 keV)	**Co-57** (124 keV)

..... On arrival:

1) X qualities (attenuated and non-attenuated mammography qualities ENEA MO2 – MO3 up to ISO IEC 61367 and 61223) based on W-anode and Mo-filtration with energies of 28 and 35 kV.

2) X qualities (attenuated and non-attenuated mammography qualities PTB up to ISO IEC 61267) based on Mo-anode and Mo-filtration with energies ofi 25 – 28 – 30 and 35 kV.