

Technical Data



452R

Radiation Survey Meter

Fabricado para resistir y diseñado para rendir

El Fluke Biomedical 452R combina la precisión de confianza del modelo 452 original con un nuevo diseño resistente, fabricado para satisfacer las exigencias industriales más exigentes. Con su mayor durabilidad, certificación de resistencia a caídas y una clasificación IP65 mejorada, el 452R está preparado para abordar una amplia gama de aplicaciones, desde ensayos no destructivos y mediciones de contaminación hasta escaneo por rayos X y control de procesos. Tanto si está ayudando a garantizar la seguridad en el lugar de trabajo, realizando inspecciones críticas o supervisando la radiación, el Fluke Biomedical 452R ofrece resultados fiables, rápidos y precisos, independientemente de dónde se lleve a cabo el trabajo.



Un dispositivo para cada situación. Posibilidades infinitas.

Tecnología

La tecnología de medición del Fluke Biomedical 452R se basa en una combinación de un conjunto de sensores de silicio y un detector Geiger-Müller tipo "pancake". El instrumento cuenta con dos tapas intercambiables (dependiendo del modelo) para alternar entre Kerma en aire, dosis equivalente ambiental y cuentas. Este diseño lo convierte en un instrumento versátil con una respuesta energética amplia y plana, junto con una alta sensibilidad y un tiempo de respuesta rápido.

Modelos

El 452R está disponible en tres modelos diferentes.

	R / Gy / rad	Sv / rem	cps / cpm
452R	✓	✓	✓
452R Kerma aire	✓		
452R Ambiental		✓	

Aplicaciones típicas

- Fuga en tubos de rayos X
- Fuga de rayos X en paredes
- Mediciones de contaminación
- Radiación ambiental
- Ensayos no destructivos
- Radiación dispersa en la sala

Características principales

- Amplia gama de aplicaciones
- Cumple con la norma IEC 60846-1
- IP65 (resistente al polvo y al agua pulverizada a baja presión)
- Almacenamiento automático de datos
- Conectividad con software para PC
- Carga por USB
- Mide los tipos de radiación alfa, beta, gamma y rayos X
- Ajuste a umbrales de alarma
- Diseñado para aplicaciones en interiores y exteriores

General Specifications

Safety standard	Complies with IEC 61010-1:2010, pollution degree 2
Radiation meter standard	Complies with IEC 60846-1:2009, except EMC which complies with EN 61326:2013, and except alarm sound level
Dimensions	252 x 130 x 90 mm (9.9 x 5.1 x 3.5 inches)
Weight	0.9 kg (2.1 pounds)
Display	240 x 400 pixel color LCD, sunlight readable, backlit
Rate alarm	65 dB(A) at 30 cm (12 inches)
Operating temperature	-20 - +50 °C (-4 - +122 °F)
Storage temperature	-30 - +70 °C (-22 - +158 °F)
Battery charging temperature	+10 - +40 °C (+50 - +104 °F)
Atmospheric pressure	70 - 107 kPa, altitude up to 3000 m (10,000 ft)
IP code	IP65 (dust proof and water resistant) according to IEC 60529:1989-2013, with lid mounted, seals intact and nothing connected to USB connector
Humidity, without lid	< 90 % relative humidity, non-condensing
Battery life	Up to 100 h
Battery	Built-in rechargeable lithium-ion, 2550 mAh
Connector	USB micro (5 V DC, 1.3 A), for communication and charging
Mounting	Standard 1/4" tripod thread on handle
Data storage	4000 stored measurements and 10 days of dose rate log with 1 s resolution
Software	RaySafe View (for remote control, analysis and data export)

Radiology Specifications

Ambient dose equivalent, H*(10)		
Range	0 µSv/h – 1 Sv/h (0 µrem/h – 100 rem/h)	
Rate resolution	0.01 µSv/h (1 µrem/h) or 3 digits	
Dose resolution	0.1 nSv (0.01 µrem) or 3 digits	
Energy range	16 keV – 7 MeV	
Energy response ¹	> 20 µSv/h (2 mrem/h) and T < 30 °C (86 °F)	±15 %, 20 keV – 5 MeV ±25 %, < 20 keV or > 5 MeV
	otherwise	±20 %, 20 keV – 1 MeV -25 % – +150 %, < 20 keV or > 1 MeV
Minimum X-ray pulse length ²	5 ms at T < 30 °C (86 °F)	
Minimum linac frequency ^{2,3}	100 Hz at T < 30 °C (86 °F)	
Rate response time	~2 s to detect a step from 0.2 to 2 µSv/h (20 to 200 µrem/h)	
IEC 60846-1 energy range ⁴	20 keV – 2 MeV, angle of incidence ±45°	
IEC 60846-1 dose rate range ⁴	1 µSv/h – 1 Sv/h (100 µrem/h – 100 rem/h), non-linearity < ±10 %	
IEC 60846-1 dose range ⁴	1 µSv – 24 Sv (100 µrem – 2.4 krem), coefficient of variation < 3 %	
Units	Sv rem (1 rem = 1/100 Sv)	
Air kerma, Kair		
Range	0 µGy/h – 1 Gy/h (0 µR/h – 114 R/h)	
Rate resolution	0.01 µGy/h (1 µR/h) or 3 digits	
Dose resolution	0.1 nGy (0.01 µR) or 3 digits	
Energy range	30 keV – 7 MeV	
Energy response ¹	> 20 µSv/h (2 mrem/h) and T < 30 °C (86 °F)	±15 %, 30 keV – 5 MeV ±25 %, 5 MeV – 7 MeV
	otherwise	±30 %, 30 keV – 1 MeV -25 % – +120 %, 1 MeV – 7 MeV
Minimum X-ray pulse length ²	5 ms at T < 30 °C (86 °F)	
Minimum linac frequency ^{2,3}	100 Hz at T < 30 °C (86 °F)	
Rate response time	~2 s to detect a step from 0.2 to 2 µGh/h (23 to 230 µR/h)	
Units	Gy rad (1 rad = 1/100 Gy) R (1 R = 1/114.1 Gy)	

1. The instrument uses a Geiger-Müller pancake at low rates and a cluster of fully engaged gradually increases with temperature, for temperatures above 30 °C (86 °F).
2. Limit where the response is within ±20 % of the response at continuous radiation. Above 30 °C (86 °F) the instrument's ability to handle low linac pulse rates and short X-ray pulses gradually declines with increasing temperature.
3. Refers to the microwave pulse repetition frequency of typical medical linear accelerators. Each pulse has a typical duration of a few µs.
4. Ranges where the instrument fulfills IEC 60846-1:2009.

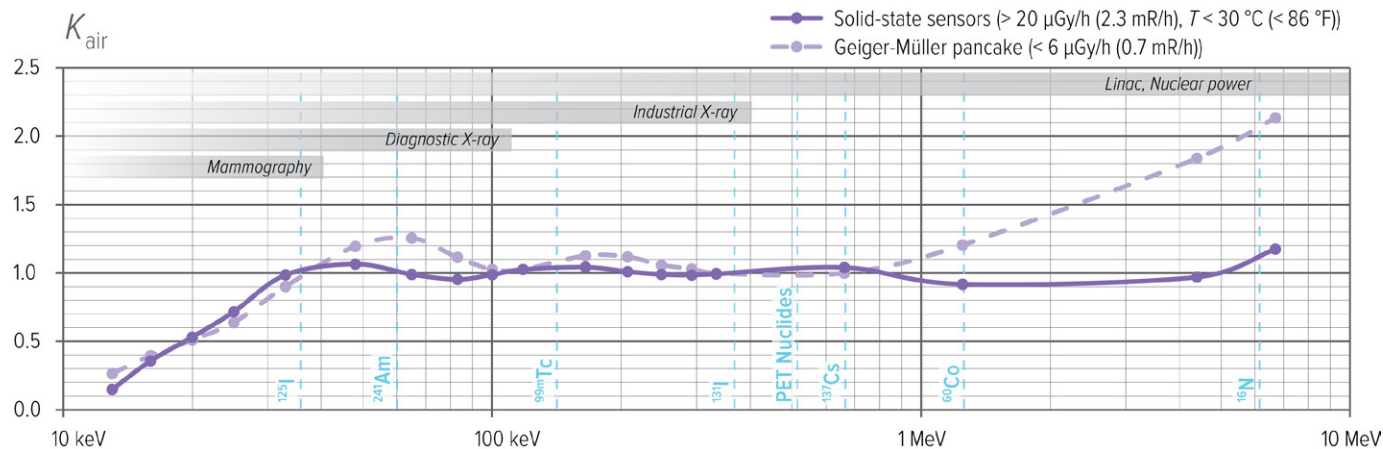
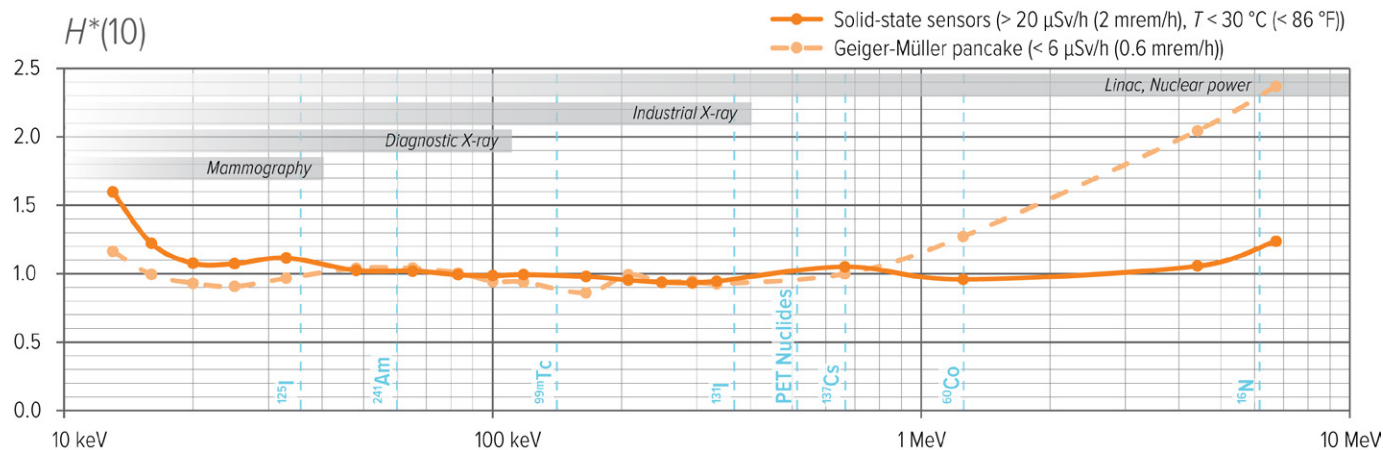
Radiology Specifications (continued)

Mean photon energy, $\bar{E}$			
Range	20 keV – 600 keV		
Uncertainty	10 % at < 100 keV, 20 % otherwise		
Defining standard	ISO 4037-1:2019		
Minimum dose rate ¹	20 μ Sv/h (2 mrem/h) or 20 μ Gy/h (2.3 mR/h),		
Counter (α , β , γ)			
Detector type	Geiger-Müller pancake		
Window	Mica, 1.5 – 2 mg/cm ²		
Sensitive area	15.55 cm ² , behind 79 % open steel grid		
Range	0 cps – 20 kcps (0 cpm to 1.2 Mcpm)		
Rate resolution	0.1 cps (1 cpm) or 3 digits		
Counter resolution	1 count or 3 digits		
Dead time correction	Automatic, linearity within -10 % to +30 %		
Typical background at 0.1 μ Sv/h	0.5 cps (30 cpm)		
Typical gamma sensitivity, 137Cs	6 cps / μ Gy/h (3000 cpm / mR/h)		
Rate response time	~2 s to detect a step from 1 to 10 cps (60 cpm to 600 cpm)		
Units	cps cpm (1 cpm = 1/60 cps)		
2 π emission sensitivity ²	Radionuclide	Decay (E _{max})	Typ ca efficiency
	¹⁴ C	β^- (0.16 MeV)	15 %
	⁶⁰ Co	β^- (0.32 MeV)	31 %
	³⁶ Cl	β^- (0.71 MeV)	43 %
	⁹⁰ Sr / ⁹⁰ Y	β^- (0.55 / 2.28 MeV)	49 %
	²³⁹ Pu	α (5.16 MeV)	26 %
	²⁴¹ Am	α (5.49 MeV)	26 %

1. Above 30 °C (86 °F) the minimum dose rate gradually increases with increasing temperature.

2. Measured at 3 mm distance between instrument housing (without lid) and wide area class 2 sources according to ISO 8769:2010.

Typical Energy Response



Ordering Information

The system includes

Instrument with mounted lids (depending on model). Power supply + plugs, 5 m USB cable, Printed user manual and quick guide, calibration certificate, cardboard box with fitted foam.

Optional accessories

Heavy duty case with fitted foam

Protect+ Service Program

The Protect+ Service Program helps ensure a predictable, annual expense to keep your instrument performing and looking new. This optional service program will keep your Fluke Biomedical 452R Survey Meter working accurately and efficiently through annual checks and calibrations and extends the instrument hardware warranty.

Fluke Biomedical regulatory commitment

As a test device manufacturer and distributor, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 and ISO 13485 certified.

Visit flukebiomedical.com for more information.

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Fluke Biomedical

*We empower our everyday heroes
to focus only on protecting lives.*

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