

Thermo Scientific EPD TruDose Electronic Dosimeter

Radiological performance information



Neutron/Gamma NG

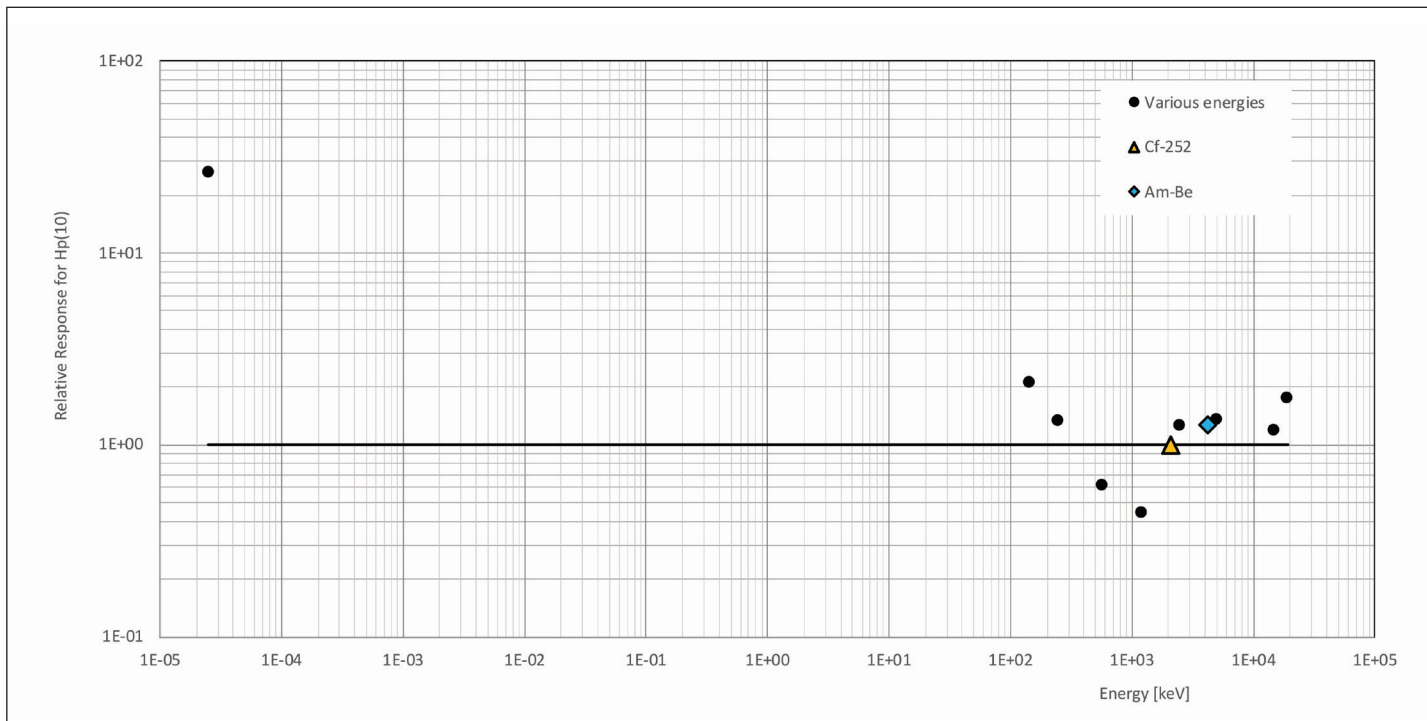


Gamma G



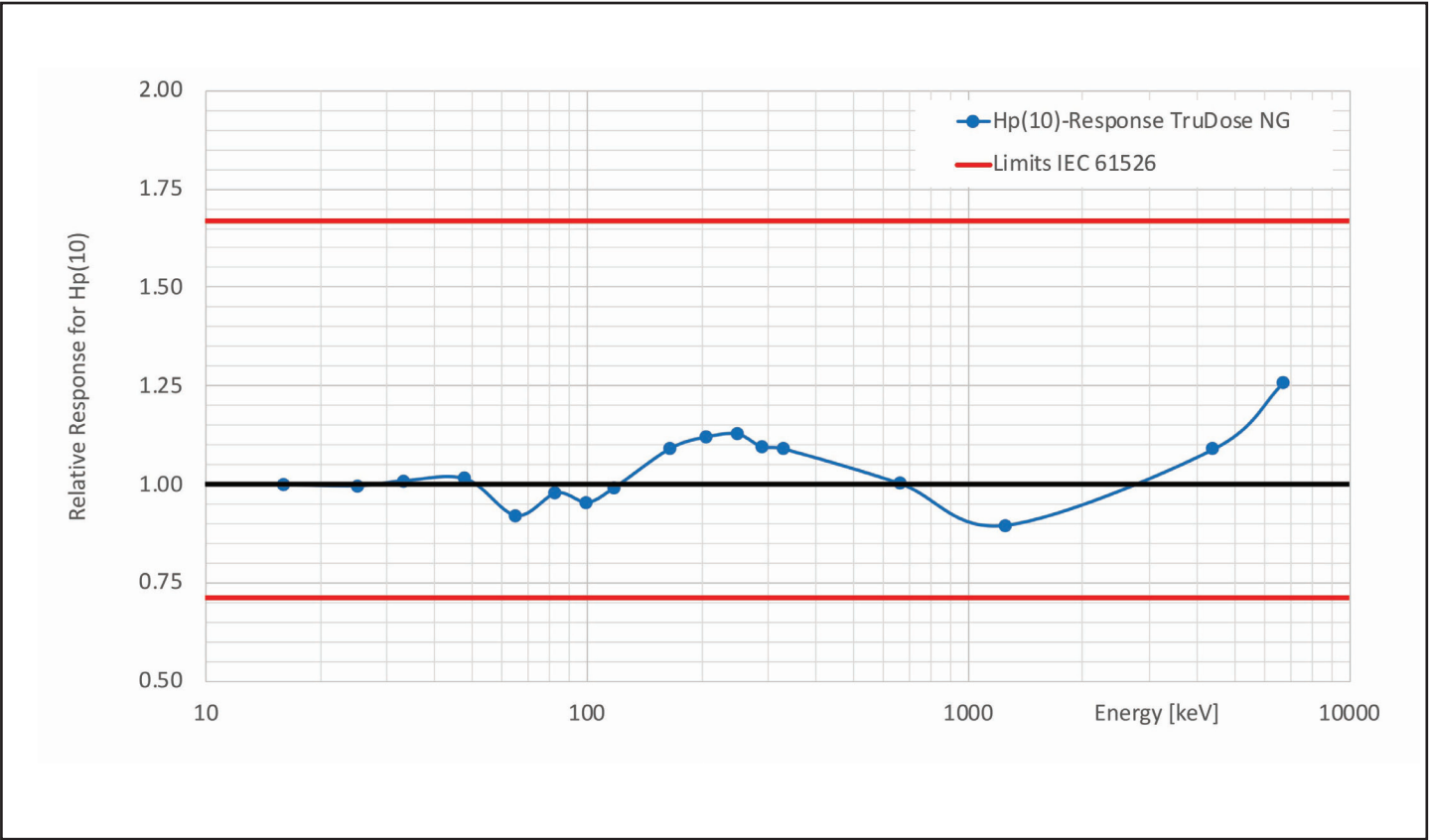
Beta/Gamma BG

EPD TruDose NG Neutron Radiological Properties



Note: For real life neutron workplace fields the overresponse for thermal neutrons (by a factor of ~27) typically results in only a small additional contribution to the measured dose due to the small thermal dose contribution of the neutron spectrum. For workplace fields with a high thermal neutron flux the weighing factors for albedo and fast neutrons can be adjusted by an experienced supervisor.

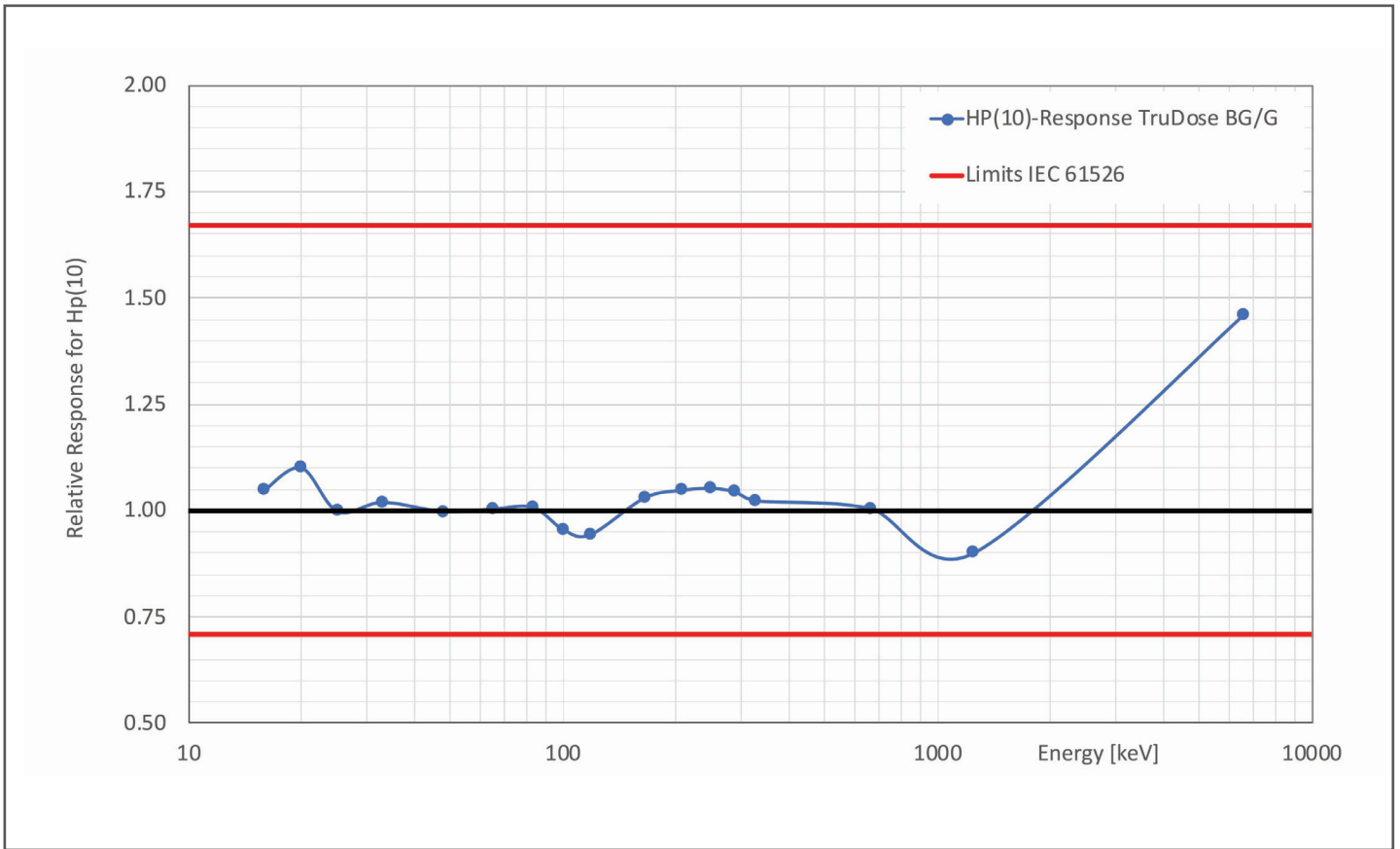
EPD TruDose NG Gamma Radiological Properties



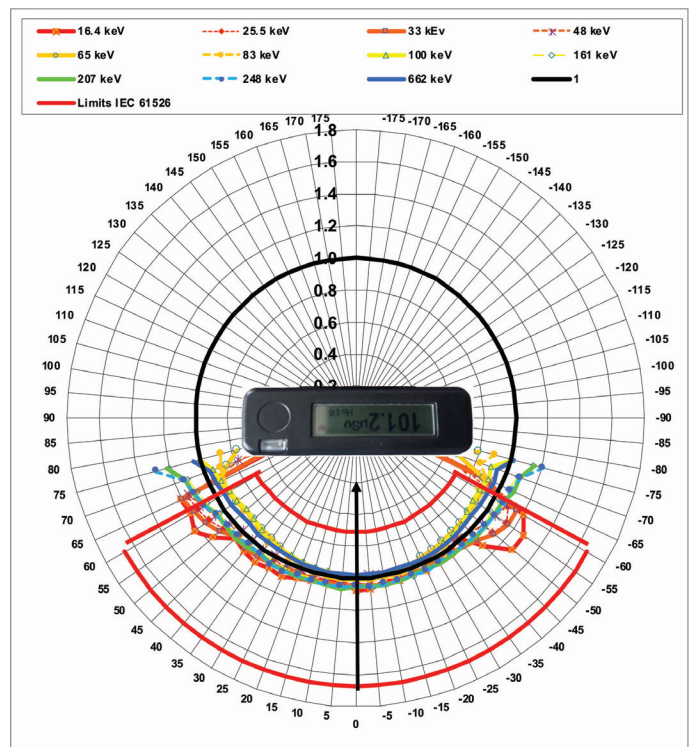
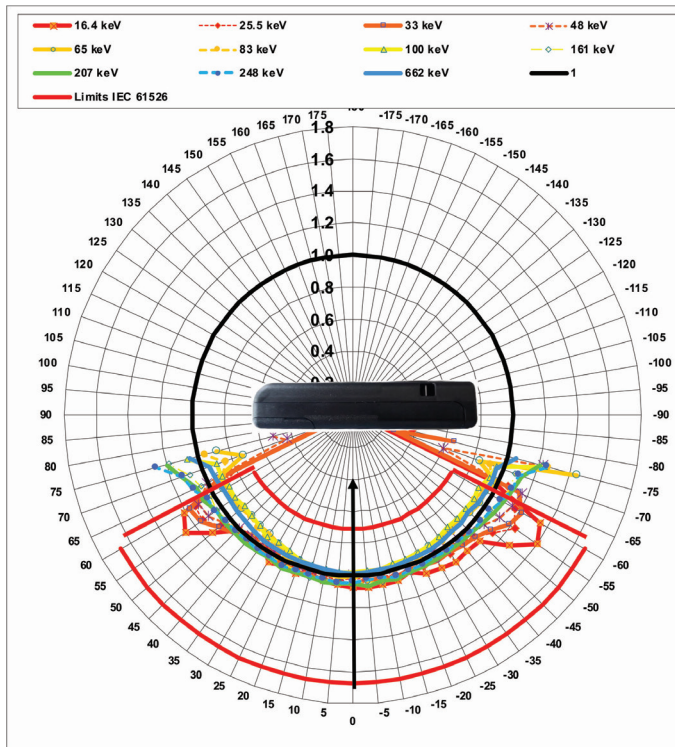
Notes:

- 1) EPD TruDose NG can detect and measure pulsed gamma radiation.
- 2) For pulsed LINACs, an alarm is triggered in case of excessive prompt photon radiation (direct beam)

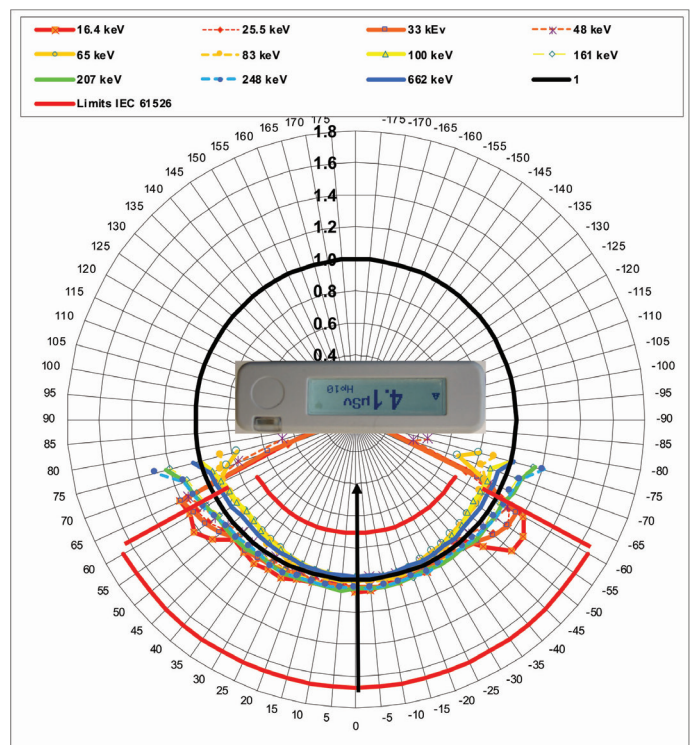
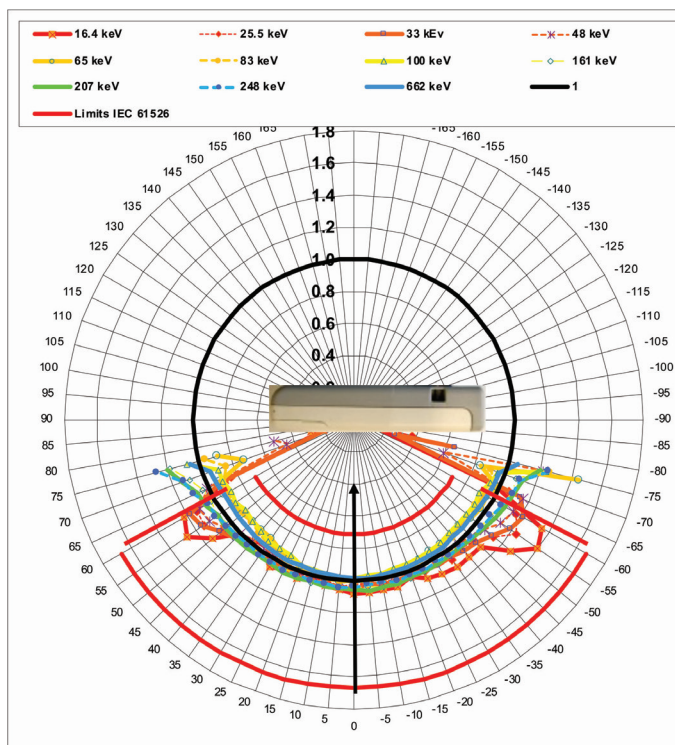
EPD TruDose BG and G Gamma Radiological Properties



EPD TruDose NG Gamma Angular Response



EPD TruDose G and BG Angular Response



EPD TruDose NG Radiological Properties According to IEC61526 Ed. 3

Specifications		
	Neutron Hp(10)	Gamma Hp(10)
Detector	PIN Silicon Diode	PIN Silicon Diode
Measurement Range	Dose: 100 µSv - 10 Sv Dose Overload: 10 Sv - 50 Sv Dose Rate: 0.5 mSv/h - 10 Sv/h Dose Rate for Dose Measurement: 1 µSv/h - 10 Sv/h Dose Rate Overload: 10 Sv/h - 50 Sv/h	Dose: 1 µSv - 10 Sv Dose Overload: 10 Sv - 50 Sv Dose Rate: 1 µSv/h - 2 Sv/h Dose Rate for Dose Measurement: 0.05 µSv/h - 2 Sv/h Dose Rate Overload: 2 Sv/h - 50 Sv/h
Accuracy	Dose: ±10% (AmBe ^{a)})	Dose: ±5% (Cs-137 ^{b)})
Dose Rate Linearity	Dose Rate : ±15% (AmBe ^{a)})	Dose Rate: ±10% (Cs-137 ^{b)})
Energy Response	See diagram.	-15%...+25% for energies up to 1.5 MeV
Angular Response	-35% to +122% for AmBe; 0° to ±60°	-29% to 67% for 16.4 keV to 1.5 MeV 0° to ±60°

a) AmBe dose response at 0° is 129%.

b) Cs-137 dose response at 0° is 100%.

c) Cf-252 dose response at 0° is 100%.

EPD TruDose NG Neutron Radiological Properties (Improved High Energy Response)

Reduced overresponse for high neutron energies (>10MeV);

Energy [MeV]	Overresponse TruDose NG	Overresponse EPD N2
14.8	26%	100%
19	52%	> 300%

Reduced background reading compared to EPD N2:

1µSv/d versus 2.5µSv/d measured in Erlangen Germany @ 280 m altitude.*

*Theoretical real cosmic neutron background app. 0.5 µSv/d.

EPD TruDose G and BG Specifications According to IEC61526 Ed. 3

Dose Range, IEC61526 Ed. 3 (Display & Measurement)

Hp(10)	Hp(0.07)
<ul style="list-style-type: none"> • Effective Range of Dose: 1 μSv to $\geq 10 \text{ Sv}$ (0.1 mrem to $\geq 1000 \text{ rem}$) • Overload Indication: 10 Sv/h to $>50 \text{ Sv/h}$ (1000 rem/h to $>5000 \text{ rem/h}$) • Display Resolution: 0.1 μSv to 10.00 Sv (0.01 mrem to 1000 rem), up to four decimal places 	<ul style="list-style-type: none"> • Effective Range of Dose: <ul style="list-style-type: none"> - 500 μSv to 10 Sv, BG (50 mrem to 1000 rem) - 50 μSv to 10 Sv, G (5 mrem to 1000 rem) • Overload Indication: 10 Sv/h to $>50 \text{ Sv/h}$ (1000 rem/h to $>5000 \text{ rem/h}$) • Display Resolution: 0.1 μSv to 10.00 Sv (0.01 mrem to 1000 rem), up to four decimal places

Dose Rate Range (Display & Measurement)

Hp(10)	Hp(0.07)
<ul style="list-style-type: none"> • Effective Range of Dose Rate (IEC60846-1): 1 $\mu\text{Sv/h}$ to 10 Sv/h (0.1 mrem/h to 1000 rem/h) • Dose Rate Range of Dose (IEC61526 Ed.3): 0.05 $\mu\text{Sv/h}$ to 10 Sv/h (0.005 mrem/h to 1000 rem/h) • Display Resolution: 0.1 $\mu\text{Sv/h}$ to 10 Sv/h (0.01 mrem/h to 1000 rem/h), up to three decimal places • Overload Indication: 10 Sv/h to $>50 \text{ Sv/h}$ (1000 rem/h to $>5000 \text{ rem/h}$) 	<ul style="list-style-type: none"> • Effective Range of Dose Rate (IEC60846-1): <ul style="list-style-type: none"> 10 $\mu\text{Sv/h}$ to 10 Sv/h, G (1 mrem/h to 1000 rem/h) 1 mSv/h to 10 Sv/h, BG (100 mrem/h to 1000 rem/h) • Dose Rate Range of Dose (IEC61526 Ed.3): 1 $\mu\text{Sv/h}$ to 10 Sv/h (0.1 mrem/h to 1000 rem/h) • Display Resolution: 0.1 $\mu\text{Sv/h}$ to 10 Sv/h (0.01 mrem/h to 1000 rem/h), up to three decimal places • Overload Indication: 10 Sv/h to $>50 \text{ Sv/h}$ (1000 rem/h to $>5000 \text{ rem/h}$)

On-axis Energy Response

Photon Hp(10) (Ref. ^{137}Cs)	Photon Hp(0.07) (Ref. ^{137}Cs)	Beta Hp(0.07) (Ref. ^{90}Sr)
$\pm 15\%$ 16keV to 1.5MeV -15% to +50% 1.5MeV to 10MeV	$\pm 30\%$ 20keV to 1.5MeV -15% to +50% 1.5MeV to 10MeV	$\pm 30\%$ 200keV to 1.5MeV Detection of Pm-147 starts below 20cm distance

Combined Energy and Angular Response

Photon Hp(10) (Ref. ^{137}Cs)	Photon Hp(0.07) (Ref. ^{137}Cs)	Beta Hp(0.07) (Ref. ^{90}Sr)
-29% to +67% for 17keV to 6MeV, 0° to 60°	-29% to 67% for 24keV to 6MeV, 0° to 60°	-29% to 67%, 200keV to 1.5MeV, 0° to 45°

Accuracy

Photon Hp(10) (Ref. ^{137}Cs)	Photon Hp(0.07) (Ref. ^{137}Cs)	Beta Hp(0.07) (Ref. $^{90}\text{Sr}^c$)
$\pm 5\%$	G $\pm 5\%$ / BG $\pm 10\%$	$\pm 15\%$

c) Sr-90 dose response at 0° is 95%.

Dose Rate Linearity

Photon Hp(10) (Ref. ^{137}Cs)	Photon Hp(0.07) (Ref. ^{137}Cs)	Beta Hp(0.07) (Ref. ^{90}Sr)
$\pm 10\%$ from 10 $\mu\text{Sv/h}$ to 10 Sv/h, (1 mrem/h to 1000 rem/h) Between 10Sv/h (1000rem/h) and 50Sv/h (5000 rem/h) accumulates dose at a rate $>10\text{Sv/h}$ ($>1000\text{rem/h}$)		

Characteristic for Pulsed Radiation

Characteristic	Rated range	Relative response
Medical X-Ray, pulse width $> 2\text{ms}$, medical pulse mode		
Max pulse dose rate	0.05 $\mu\text{Sv/h}$ to 10 Sv/h	+/-20% for pulse width $>2\text{ms}$ (-60% at 10Sv/h in normal mode)
Max pulse dose	No limit	
Dose rate overload for dose measurement	10 Sv/h to 1000 Sv/h	Indication greater as at 10 Sv/h
Industrial X-Ray, pulse width $< 1\mu\text{s}$		
Max pulse dose rate	No limit	
Max pulse dose	0.01 μSv	
Dose overload	Each pulse $> 0.01 \mu\text{Sv}$ and $< 1 \mu\text{s}$ (industrial pulse mode only)	

Find out more at thermofisher.com/epdtrudose