

# RaySafe Xi Classic

## Specifications



## RAYSAFE Xi GENERAL

<b>EMC TESTED</b>	According to EN 61000-6-1:2007 and EN 61000-6-3:2007
<b>EXPOSURE NEEDED</b>	One
<b>RESET</b>	Automatic
<b>TEMP. RANGE</b>	15 – 35 °C (59 – 95 °F)
<b>DETECTOR CABLE LENGTH</b>	2 and 10 m (6.5 and 33 ft)
<b>SOFTWARE</b>	RaySafe Xi view for recording measured data and waveforms. RaySafe Xi view also exports data to Microsoft Excel.
<b>DATA TRANSFER</b>	RS-232 or Bluetooth
<b>DATA FORMAT</b>	XML
<b>PATENT</b>	Germany DE69430268.6-08, UK 0758522, Japan 3449721, Sweden 9302909-8, France 075822, USA 5761270
<b>PTB APPROVAL</b>	<u>23.04</u> <u>08.02</u>

## RAYSAFE Xi BASE UNIT, CLASSIC

<b>SIZE</b>	28 x 74 x 142 mm (1.1 x 2.9 x 5.6 in)
<b>WEIGHT</b>	250 g (9 oz)
<b>POWER OFF</b>	Never, or after 5, 20 or 60 min of inactivity
<b>POWER SOURCE</b>	Rechargeable 7.4 V Li-ion battery
<b>BATTERY TIME</b>	20 – 40 hours (depending on detector and if Bluetooth is used)
<b>READ OUT</b>	Three row alphanumeric backlit display with four digits numerical resolution

## RAYSAFE Xi mA/mAs DETECTOR

<b>RANGE mA</b>	0.2 – 2000 mA
<b>UNCERTAINTY mA</b>	1 % or ± 0.02 mA
<b>RANGE mAs</b>	0.05 – 9999 mAs
<b>UNCERTAINTY mAs</b>	1 % or ± 0.02 mAs
<b>MAX LOAD</b>	< 200 mA continuously, 500 mA < 1 s, 1000 mA < 0.5 s
<b>REPRODUCIBILITY</b>	< 0.5 %
<b>OVER VOLTAGE PROTECTION</b>	70 V
<b>EXPOSURE TIME</b>	
<b>RANGE</b>	1 ms – 999 s
<b>UNCERTAINTY</b>	0.5 % or 0.2 ms
<b>PULSE</b>	
<b>RANGE</b>	1 – 9999 pulses
<b>PEAK TRIG LEVEL</b>	> 8 mA
<b>FRAME RATE</b>	
<b>RANGE</b>	1/6 – 120 frames/s
<b>mAs PER FRAME</b>	
<b>RANGE</b>	0.001 – 2000 mAs/frame
<b>WAVEFORM</b>	
<b>BANDWIDTH</b>	1 kHz
<b>MEMORY DEPTH</b>	1200 ms

# RAYSAFE Xi R/F DETECTOR, CLASSIC

<b>SIZE</b>	12 x 22 x 117 mm (0.5 x 0.9 x 4.6 in)
<b>WEIGHT</b>	50 g (2 oz)
<b>DOSE (R/F LOW)</b>	
<b>RANGE</b>	10 nGy – 9999 Gy (1 $\mu$ R – 9999 R)
<b>TRIG LEVEL</b>	200 nGy/s (1.4 mR/min)
<b>UNCERTAINTY</b>	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al <sup>(1)</sup> , Active Compensation) or $\pm$ 10 nGy (1 $\mu$ R)
<b>DOSE (R/F HIGH)</b>	
<b>RANGE</b>	10 $\mu$ Gy – 9999 Gy (1 mR – 9999 R)
<b>TRIG LEVEL</b>	100 $\mu$ Gy/s (0.7 R/min)
<b>UNCERTAINTY</b>	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al <sup>(1)</sup> , Active Compensation) or $\pm$ 10 $\mu$ Gy (1 mR)
<b>DOSE RATE (R/F LOW)</b>	
<b>RANGE</b>	10 nGy/s – 1 mGy/s (70 $\mu$ R/min – 7 R/min)
<b>MIN. PEAK TRIG LEVEL</b>	200 nGy/s (1.4 mR/min)
<b>UNCERTAINTY</b>	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al <sup>(1)</sup> , Active Compensation) or $\pm$ 10 nGy/s (70 $\mu$ R/min)
<b>DOSE RATE (R/F HIGH)</b>	
<b>RANGE</b>	20 $\mu$ Gy/s – 1000 mGy/s <sup>(2)</sup> (140 mR/min – 7000 R/min)
<b>MIN. PEAK TRIG LEVEL</b>	100 $\mu$ Gy/s (0.7 R/min)
<b>UNCERTAINTY</b>	5 % (40 – 150 kVp, HVL: 1.5 – 14 mm Al <sup>(1)</sup> , Active Compensation) or $\pm$ 10 $\mu$ Gy/s (70 mR/min)
<b>kV/kVp</b>	
<b>RANGE</b>	35 – 160 kV/kVp (for up to 0.5 mm Cu or equivalent) 60 – 130 kV/kVp (for 0.5 – 1 mm Cu or equivalent)
<b>UNCERTAINTY</b>	2 % (for up to 0.5 mm Cu or equivalent, Active Compensation) 3 % (for 0.5 – 1 mm Cu or equivalent, Active Compensation)

**SENSITIVITY (R/F LOW)** 0.4 mA, 40 kV, 40 cm (15.7 in),  
no added filtration

**SENSITIVITY (R/F HIGH)** 0.8 mA, 70 kV, 50 cm (19.7 in),  
no added filtration

## EXPOSURE TIME

**RANGE** 1 ms – 999 s

**UNCERTAINTY** 0.5 % or 0.2 ms

## PULSE

**RANGE** 1 – 9999 pulses

**PEAK TRIG LEVEL (R/F LOW)** > 3  $\mu$ Gy/s

**PEAK TRIG LEVEL (R/F HIGH)** > 1 mGy/s

## FRAME RATE

**RANGE** 1/6 – 120 frames/s

## DOSE PER FRAME

**RANGE** 1.0 nGy – 9999 Gy (0.10  $\mu$ R – 9999 R)  
per frame

## HVL

**RANGE** 1.0 – 14.0 mm Al

**UNCERTAINTY** 10 % (at signal levels above 1/1000 of max dose  
rate for selected sensor)

## TOTAL FILTRATION

**RANGE** 1.5 – 35 mm Al (60 – 120 kV)

**UNCERTAINTY** 10 % or  $\pm$ 0.3 mm Al (at signal levels above 1/1000  
of max dose rate for selected sensor)

## WAVEFORM

**BANDWIDTH (R/F LOW)** 0.1 kHz

**BANDWIDTH (R/F HIGH)** 2.5 kHz

**MEMORY DEPTH** 1 200 ms

<sup>(1)</sup> 45 mm Al added filtration at 145 kVp gives a HVL of  $\sim$ 13 mm Al.

<sup>(2)</sup> 1000 mGy/s up to 70 kVp, 400 mGy/s at 100 kVp, 250 mGy/s at 140 kVp.

# RAYSAFE Xi MAM DETECTOR, CLASSIC

**SIZE** 12 x 22 x 117 mm (0.5 x 0.9 x 4.6 in)

**WEIGHT** 50 g (2 oz)

## DOSE

**BEAM QUALITIES** Basic: Mo/Mo, Mo/Al, Mo/Rh, Rh/Rh, Rh/Al, W/Rh

Options: M-Pro: W/Rh, Mo/Rh, W/Ag

M-Pro Plus: W/Rh, Mo/Rh, W/Ag,

W/Al, Combo

Scanning: W/Al

**RANGE** 5  $\mu$ Gy – 9999 Gy (0.5 mR – 9999 R)

**TRIG LEVEL** 10  $\mu$ Gy/s (70 mR/min)

**UNCERTAINTY** 5 % or  $\pm$  5  $\mu$ Gy (0.5 mR)

(20 – 40 kV: Mo/Mo

22 – 49 kV: Mo/Al, Rh/Rh, Rh/Al

22 – 40 kV: Mo/Rh, W/Rh, W/Ag,

20 – 49 kV: W/Al, Combo

0 – 2.5 mm Al added filtration,

Active Compensation

Combo: 0–0.1 mm Al added filtration,

Active Compensation)

**UNCERTAINTY (W/AL SCANNING)** 5 % or  $\pm$  5  $\mu$ Gy (0.5 mR)  
(22 – 40 kV, 0.5 mm Al total filtration)

## DOSE RATE

**RANGE** 10  $\mu$ Gy/s – 100 mGy/s  
(70 mR/min – 700 R/min)

**TRIG LEVEL** 10  $\mu$ Gy/s (70 mR/min)

**UNCERTAINTY** 5 % or  $\pm$  5  $\mu$ Gy/s (35 mR/min)

(20 – 40 kV: Mo/Mo

22 – 49 kV: Mo/Al, Rh/Rh, Rh/Al

22 – 40 kV: Mo/Rh, W/Rh, W/Ag,

20 – 49 kV: W/Al, Combo

0 – 2.5 mm Al added filtration, Active

Compensation

Combo: 0–0.1 mm Al added filtration, Active

Compensation)

**UNCERTAINTY (W/AL SCANNING)** 5 % or  $\pm$  5  $\mu$ Gy/s (35 mR/min)  
(22 – 40 kV, 0.5 mm Al total filtration)

## kV

### BEAM QUALITIES

Basic: Mo/Mo

Options: M-Pro: Mo/Rh, W/Rh

M-Pro Plus: Mo/Rh, W/Rh, W/Al

Scanning: W/Al

### RANGE (MO/MO)

20 – 40 kV

### UNCERTAINTY (MO/MO)

2 % or 0.5 kV (no paddle)

2 % or 0.7 kV (paddle)

(Active Compensation for inherent Mo filtration

of 25 – 35  $\mu$ m. User selectable paddle

compensation.)<sup>(3)</sup>

### RANGE (MO/RH)

25 – 40 kV

### UNCERTAINTY (MO/RH)

2 % or 0.5 kV

(Active Compensation for inherent Rh filtration of

25 – 30  $\mu$ m.)

### RANGE (W/RH)

20 – 40 kV

### UNCERTAINTY (W/RH)

2 % or 0.5 kV (no paddle)

2 % or 0.7 kV (paddle)

(Active Compensation for inherent Rh filtration

of 50 – 60  $\mu$ m. User selectable paddle

compensation.)<sup>(3)</sup>

### RANGE (W/AL)

20 – 49 kV

(Measuring 40 – 49 kV requires an

R/F detector)

### UNCERTAINTY (W/AL)

2 % or 0.5 kV (no paddle)

2 % or 0.7 kV (paddle)

(Active Compensation for inherent Al filtration

of 0.65–0.75 mm. User selectable paddle

compensation.)<sup>(3)</sup>

### RANGE (W/AL SCANNING)

20 – 40 kV

### UNCERTAINTY (W/AL SCANNING)

2 % or 0.7 kV

(0.5 mm Al total filtration)

### SENSITIVITY

10 mA, 28 kV, 65 cm (25.6 in),

no added filtration

<sup>(3)</sup> Definition: Paddle = 0.1 mm Al

Note! Variation in paddle thickness and homogeneity may affect kV results.

To achieve the most accurate result, kV measurements without paddle is

recommended.

## HVL

### BEAM QUALITIES

Basic: Mo/Mo, Mo/Al, Mo/Rh, Rh/Rh,  
Rh/Al, W/Rh

Options:

M-Pro: W/Rh, Mo/Rh, W/Ag

M-Pro Plus: W/Rh, Mo/Rh, W/Ag,  
W/Al

Scanning: W/Al

### RANGE

0.2 – 1.2 mm Al, depending on beam quality

### UNCERTAINTY

5 %

(for up to 2.5 mm Al added filtration to each beam  
quality)

### RANGE

0.32 – 0.58 mm Al

### (W/AL SCANNING)

### UNCERTAINTY

5 %

### (W/AL SCANNING)

(with 0.5 mm Al total filtration)

## EXPOSURE TIME

### RANGE

1 ms – 999 s

### UNCERTAINTY

0.5 % or 0.2 ms

## WAVEFORM

### BANDWIDTH

2.4 kHz

### MEMORY DEPTH

1200 ms

## RAYSAFE Xi TRANSPARENT DETECTOR

<b>SIZE</b>	200 x 20 x 12 mm (7.9 x 0.8 x 0.5 in)
<b>WEIGHT</b>	40 g (1.5 oz)
<b>DOSE</b>	
<b>RANGE</b>	10 nGy – 9999 Gy (1 $\mu$ R – 9999 R)
<b>TRIG LEVEL</b>	1 $\mu$ Gy/s (7 mR/min)
<b>UNCERTAINTY</b>	5 % (60 – 150 kVp, HVL: 2 – 10 mm Al <sup>(4)</sup> )
<b>DOSE RATE</b>	
<b>RANGE</b>	100 nGy/s – 20 mGy/s (0.7 mR/min – 140 R/min)
<b>MIN. PEAK TRIG LEVEL</b>	1 $\mu$ Gy/s (7 mR/min)
<b>UNCERTAINTY</b>	5 % (60 – 150 kVp, HVL: 2 – 10 mm Al <sup>(4)</sup> )
<b>EXPOSURE TIME</b>	
<b>RANGE</b>	1 ms – 999 s
<b>UNCERTAINTY</b>	0.5 % or 0.2 ms
<b>PULSE</b>	
<b>RANGE</b>	1 – 9999 pulses
<b>PEAK TRIG LEVEL</b>	> 3 $\mu$ Gy/s
<b>UNCERTAINTY</b>	1 pulse
<b>FRAME RATE</b>	
<b>RANGE</b>	1/6 – 120 frames/s
<b>DOSE PER FRAME</b>	
<b>RANGE</b>	1.0 nGy – 9999 Gy (0.10 $\mu$ R – 9999 R) per frame

## RAYSAFE Xi CT DETECTOR

<b>SIZE</b>	200 x 20 x 12 mm (7.9 x 0.8 x 0.5 in)
<b>SIZE <math>\emptyset</math></b>	7.5 mm (0.30 in)
<b>SIZE <math>\emptyset</math> PHANTOM ADAPTER</b>	12.5 mm (0.49 in)
<b>EFFECTIVE LENGTH</b>	100 mm (3.94 in)
<b>WEIGHT</b>	50 g (1.75 oz)
<b>RANGE</b>	10 $\mu$ Gy – 9999 Gy (1 mR – 9999 R) 20 $\mu$ Gy/s – 100 mGy/s (140 mR/min – 680 R/min)
<b>UNCERTAINTY</b>	5 % (at reference point RQT9; 120 kV, 3.7 mm Al and 0.25 mm Cu)
<b>ENERGY DEPENDENCE</b>	< 5 % (at 80 kV to 150 kV; RQA, RQR and RQT qualities)
<b>RADIAL UNIFORMITY</b>	$\pm$ 2 %
<b>AXIAL UNIFORMITY</b>	$\pm$ 3 %, within rated length
<b>INFLUENCE OF RELATIVE HUMIDITY</b>	< 0.3 % (for RH < 80 %)
<b>UNCERTAINTY IN TEMP. AND PRESSURE CORRECTION</b>	2 %
<b>PRESSURE RANGE</b>	80.0 – 106.0 kPa
<b>INTERNATIONAL STANDARD</b>	Fulfills requirements in IEC 61674

RaySafe Xi CT detector comes with a phantom adapter to fit a standard head and/or body phantom.

---

<sup>(4)</sup> 13 mm Al added filtration at 145 kVp gives a HVL of  $\sim$ 10 mm Al.

# RAYSAFE Xi LIGHT DETECTOR

<b>WEIGHT</b>	170 g (6 oz)
<b>RELATIVE AIR HUMIDITY RANGE</b>	< 80 %
<b>UNCERTAINTY ILLUMINANT A</b>	3 %
<b>DETECTOR MEMORY</b>	30 measurements per sensor
<b>CLASSIFICATION</b>	Class B (according to DIN 5032, part 7)
<b>MAX. DEVIATION FROM THE CIE CURVE FOR THE HUMAN EYE (<math>V(\lambda)</math>)</b>	4 % (see figure Photopic Response)

## SIZE

<b>LIGHT DETECTOR</b>	30 x 104 x 21 mm (1.2 x 4.1 x 0.83 in)
<b>LUMINANCE TUBE</b>	$\varnothing = 29$ mm (1.1 in) L = 84 mm (3.3 in)
<b>SHADOW RING</b>	$\varnothing = 50$ mm (2 in)

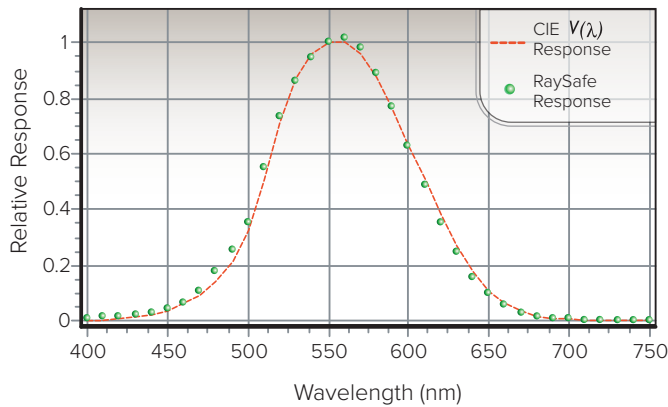
## LUMINANCE

<b>RANGE (AUTO)</b>	0.05 – 50 000 $\text{cd/m}^2$
<b>RESOLUTION</b>	0.01 $\text{cd/m}^2$
<b>LUMINANCE DETECTOR OPTICS</b>	$\varnothing 10$ mm (0.4 in) measuring field. Contact measurement focusing lens 1:1.

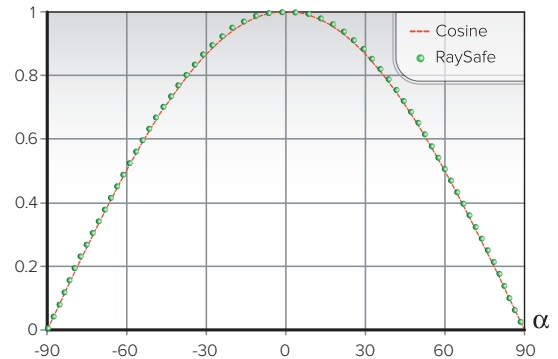
## ILLUMINANCE

<b>RANGE (AUTO)</b>	0.05 – 50 000 lux
<b>RESOLUTION</b>	0.01 lux
<b>MAX. DEVIATION FROM COSINE ANGULAR RESPONSE</b>	1.7 % (see figure Cosine Response)

Photopic Response



Cosine Response

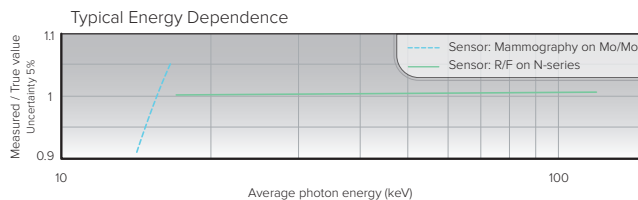


# RAYSAFE Xi SURVEY DETECTOR

<b>SIZE</b>	13 x 66 x 175 mm (0.5 x 2.6 x 6.9 in)
<b>DIAMETER</b>	65 mm (2.6 in)
<b>WEIGHT</b>	65 g (2.3 oz)
<b>TRIG</b>	Manual, no threshold
<b>AVERAGE PHOTON ENERGY</b>	13 keV – 1.25 MeV
<b>MINIMUM RESPONSE TIME</b>	0.5 s
<b>SOUND TICKER FREQUENCY</b>	0.5 – 2000 Hz
<b>INTERNATIONAL STANDARD</b>	Fulfills requirements in IEC 60601-1-3
<b>MAX. RESOLUTION</b>	0.001 $\mu$ Sv

## DOSE

<b>RANGE</b>	0 $\mu$ Sv – 9999 Sv (0 $\mu$ Gy – 9999 Gy) (0 nR – 9999 R)
<b>UNCERTAINTY (MAMMOGRAPHY)</b>	10 % (< 25 keV)



**UNCERTAINTY (R/F)** 10 %  
(25 – 120 keV)

**UNCERTAINTY (NUCLEAR MED.)** 20 %  
(> 120 keV)

## DOSE RATE

**RANGE** 0  $\mu$ Sv/h – 0.15 Sv/h  
(0  $\mu$ Gy/h – 0.1 Gy/h)  
(0 nR/h – 11 R/h)

**UNCERTAINTY (MAMMOGRAPHY)** 10 % or 0,3  $\mu$ Sv/h  
(> 1  $\mu$ Sv/h, < 25 keV)

**UNCERTAINTY (R/F)** 10 % or 0,3  $\mu$ Sv/h  
(> 1  $\mu$ Sv/h, 25 – 120 keV)

**UNCERTAINTY (NUCLEAR MED.)** 20 % or 0,3  $\mu$ Sv/h  
(> 1  $\mu$ Sv/h > 120 keV)

# RAYSAFE Xi VIEW

**COMPATIBLE WITH** Windows 10, Windows 8, Windows 8.1,  
Windows 7, Windows Vista,  
Windows XP, Windows 2000

**FILE FORMAT** XML

**COMMUNICATION** RS-232 (115200/8-N-1) or Bluetooth

## BLUETOOTH

**CONNECTOR** 9-pin D-SUB, pre-configured for communication  
with Xi View

**OPERATING DISTANCE** 100 m nominal (actual performance depends on  
environment and receiving Bluetooth module)

## RAYSAFE UNCERTAINTY DEFINITION

The expanded uncertainty is stated as the combined uncertainty of measurement multiplied by the coverage factor  $k=2$ , which assuming a normal distribution has a coverage probability of 95 % (complies with GUM by ISO (1995, ISBN 92-67-10188-9)).

Instrument specifications are subject to purchased configuration.  
All specifications may change without notice.