

451P

Pressurized μ R Ion Chamber Survey Meter

Key features

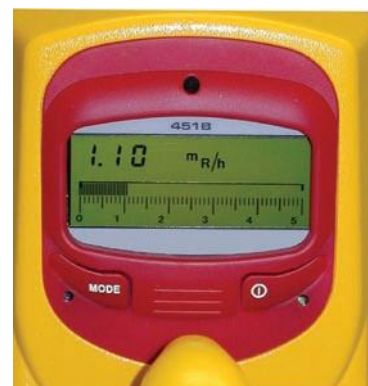
- High sensitivity μ R measurements of rate and dose simultaneously, with the capability to record peak rate
- Ergonomic, anti-fatigue handle with replaceable grip, wrist strap and tripod mount
- Programmable flashing LCD display and audible alarm
- Easily-accessible battery door (operated by two 9-volt alkaline batteries) on the outside of the bottom case
- RS-232 communications interface with optional Windows-based Excel add-in for data logging
- Available with dose equivalent energy response (SI units)



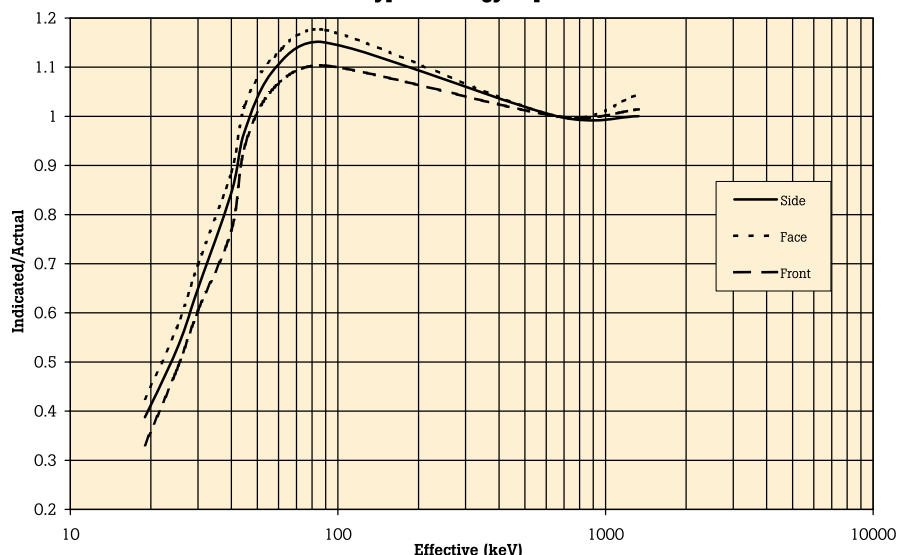
The auto-ranging 451P features a pressurized ion chamber, providing enhanced sensitivity (μ R resolution) and improved energy response to measure radiation rate and dose from x-ray and gamma sources. Originally designed to measure leakage and scatter around diagnostic x-ray and radiation therapy suites, the 451P's site surveying capabilities make it well-suited for a wide range of end users, including: x-ray manufacturers, government agencies, state inspectors, biomedical technicians, and maintenance technicians for airport baggage scanners.

The ion chamber detector allows for a fast response time to radiation from leakage, scatter beams and pinholes. Additionally, the low noise chamber bias supply provides for fast background settling time.

The digital display features an analog bar graph, 2.5 digit digital readout, low battery and freeze ("peak hold") mode indicators, and an automatic backlight function. User controls consist of an ON/OFF button and a MODE button. The case is constructed of lightweight, high strength materials and is sealed against moisture. The RS-232 interface can be connected directly to a computer for use with the Excel add-in for Windows (451EXL), enhancing the functionality of the instrument. This software allows for data retrieval, user parameter selection and provides a virtual instrument display with audible (requires sound card) and visual alarm indication.



451P typical energy dependence



Typical energy dependence

¹⁶Nitrogen gamma rays are 110 % to 120 % of indicated readings as determined at the University of Lowell

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Specifications

Radiation detected	Beta above 1 MeV, Gamma and x-rays above 25 keV	
Operating ranges		
	0 to 500 μ R/h or 0 to 5 μ Sv/h	
	0 to 5 mR/h or 0 to 50 μ Sv/h	
	0 to 50 mR/h or 0 to 500 μ Sv/h	
	0 to 500 R/h or 0 to 5 mSv/h	
	0 to 5 R/h or 0 to 50 mSv/h	
Accuracy	Within 10 % of reading between 10 % and 100 % of full scale indication on any range, exclusive of energy response. Calibration source is ^{137}Cs	
Detector		
Chamber	230 cc volume pressurized air ionization chamber to 8 atmospheres or 125 psi	
Controls	ON/OFF and MODE	
Automatic features	Auto-zeroing, auto-ranging, and auto-backlight	
Response time Analog response time from 10 % to 90 % of reading for a full scale step increase is dependent on operating range. Response time for a step increase in radiation exposure rate from background:	Step increase, background to	Time to reach 90 % of final value
	400 μ R/h	4.8 sec
	4 mR/h	3.3 sec
	10 mR/h	4.3 sec
	40 mR/h	4.5 sec
	100 mR/h	2.7 sec
	1 R/h	2 sec
	4 R/h	2.7 sec
This table shows time measured from 10 % to 90 % of final value for a step increase or decrease in exposure rate such that a range change does not occur. These values are the response times for the various ranges:	Range	10 % to 90 %
	0 to 500 μ R/h (5 μ Sv/h)	5 sec
	0 to 5 mR/h (50 μ Sv/h)	2 sec
	0 to 50 mR/h (500 μ Sv/h)	1.8 sec
	0 to 500 mR/h (5 mSv/h)	1.8 sec
	0 to 5 R/h (50 mSv/h)	1.8 sec
Analog/Digital display LCD with backlight		
Analog	100 element bar graph 6.4 cm (2.5 in) long. Bar graph is divided into five major segments, each labeled with the appropriate value for the range of the instrument.	
Digital	2.5 digit display is followed by a significant zero digit depending on the operating range of the instrument. The units of measurement are indicated on the display at all times. Digits are 0.25 inches (6.4 mm) high. Low battery and freeze indicators are also provided on the display.	
Modes		
Integrate mode	Operates continuously 30 seconds after the instrument has been turned on. Integration is performed even if the instrument is displaying in mR/h or R/h.	
Freeze mode	Will place a tick mark on the bar graph display to hold on the peak displayed value. The unit will continue to read and display current radiation values.	
Environmental		
Power requirements	Two 9 V alkaline, 200 hours operation	
Warm-up time	Less than two minutes for initial operation when the instrument is in equilibrium with ambient temperature.	
Temperature range	-20 °C to 50 °C (-4 °F to 122 °F)	
Relative humidity	0 to 100 %	
Geotropism	Negligible	
Dimensions (WxDxH)	10 cm x 20 cm x 15 cm (4 in x 8 in x 6 in)	
Weight	1.07 kg (2.4 lb)	

Optional accessories

451EXL 451 Assistant for Excel, includes RS-232 interface cable
190HPS Single Unit Carrying Case

62-103 Check Source, ^{137}Cs , 10 μ Ci. Flat disc, 1 inch diameter

Ordering information

451P-RYR Pressurized μ R Ion Chamber Survey Meter with standard chamber

451P-DE-SI-RYR Pressurized μ R Ion Chamber Survey Meter with dose equivalent chamber

Note: Due to the pressurized ion chamber, the 451P is considered U.S. Department of Transportation (DOT) "Dangerous Goods" and must be shipped via IAW DOT special permit DOT-SP 13187.