

# 451B

## Ion Chamber Survey Meter with Beta Slide

### Key features

- High sensitivity measurement of rate and dose simultaneously, with the capability to record peak rate
- Auto-ranging and auto-zeroing
- RS-232 communications interface with optional Windows-based Excel add-in for data logging
- 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
- Available with dose equivalent energy response (SI units)



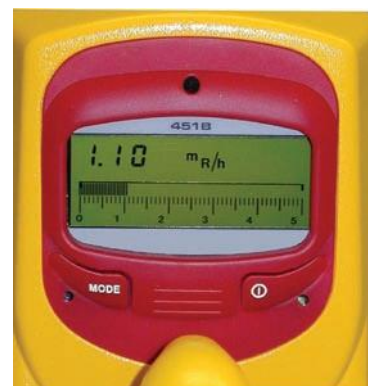
The auto-ranging 451B measures radiation rate and accumulated dose from beta, gamma and x-ray radiation sources. The 451B's site surveying capabilities make it well-suited for a wide range of end users, including: police and fire departments, x-ray manufacturers, government agencies, state inspectors, emergency response and HAZMAT teams, nuclear medicine labs, hospital radiation safety officers, and nuclear power workers.



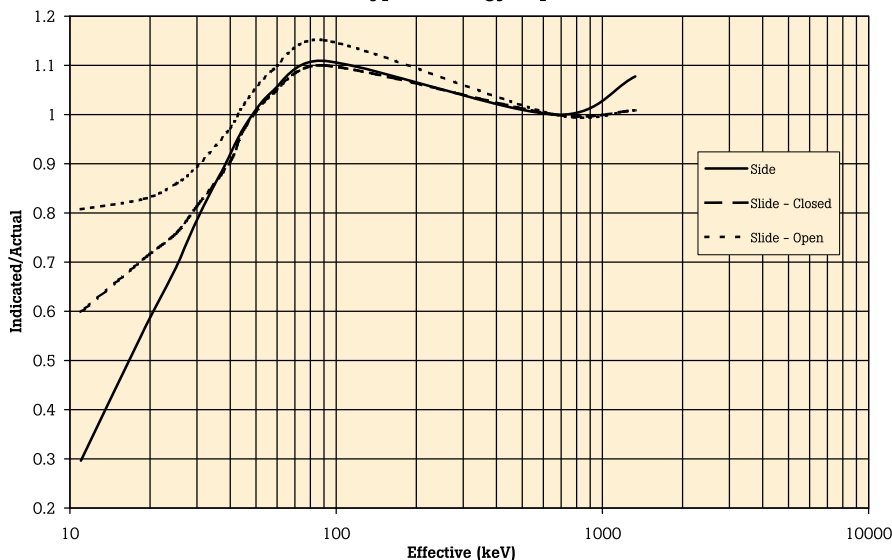
The ion chamber detector allows for a fast response time to radiation from leakage, scatter beams and pinholes. Additionally, the low noise chamber bias supply provides for fast background settling time. A sliding beta shield serves as an equilibrium thickness for photon measurements and enables beta discrimination.

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.

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451B typical energy dependence



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### Specifications

<b>Radiation detected</b>	Alpha above 7.5 MeV, Beta above 100 keV, and Gamma above 7 keV	
<b>Operating ranges</b>		
	0 to 5 mR/h or 0 to 50 µSv/h	
	0 to 50 mR/h or 0 to 500 µSv/h	
	0 to 500 mR/h or 0 to 5 mSv/h	
	0 to 5 R/h or 0 to 50 mSv/h	
	0 to 50 R/h or 0 to 500 mSv/h	
<b>Accuracy</b>	Within 10 % of reading between 10 % and 100 % of full scale indication on any range, exclusive of energy response. Calibration source is <sup>137</sup> Cs.	
<b>Detector</b>		
<b>Chamber</b>	349 cc volume air ionization	
<b>Chamber wall</b>	246 mg/cm <sup>2</sup> thick phenolic	
<b>Chamber window</b>	6.6 mg/cm <sup>2</sup> mylar, protected by steel mesh, 46 cm <sup>2</sup> detection area	
<b>Beta slide</b>	440 mg/cm <sup>2</sup>	
<b>451B-DE-SI</b>	In order to achieve energy response consistent with measurements of H*(10) as required by ICR4-47, aluminum has been added to the back wall, 38 % of the side wall area, and to the beta slide. With the Beta Shield open, the 451B can measure skin dose at 10*(0.07), and Deep Dose H*(10) with Beta Shield closed.	
<b>Controls</b>	ON/OFF and MODE	
<b>Automatic features</b>	Auto-zeroing, auto-ranging, and auto-backlight	
<b>Response time</b>	<b>Range</b>	<b>Response</b>
	0 to 5 mR/h (0 to 50 µSv/h)	8 seconds
	0 to 50 mR/h (0 to 500 µSv/h)	2.5 seconds
	0 to 500 mR/h (0 to 5 mSv/h)	2 seconds
	0 to 5 R/h (0 to 50 mSv/h)	2 seconds
	0 to 50 R/h (0 to 500 mSv/h)	2 seconds
<b>Display LCD analog/digital with backlight</b>		
<b>Analog</b>	100 element bar graph 6.4 cm long. Bar graph is divided into 5 major segments, each labeled with the appropriate value for the range of the instrument.	
<b>Digital</b>	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 6.4 mm (0.25 in) high. Low battery and freeze indicators are also provided on the display.	
<b>Modes</b>		
<b>Integrate mode</b>	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.	
<b>Freeze mode</b>	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.	
<b>Environmental</b>		
<b>Power requirements</b>	Two 9 V alkaline, 200 hours operation	
<b>Warm-up time</b>	One minute	
<b>Temperature range</b>	-20 °C to 70 °C (-4 °F to 158 °F)	
<b>Relative humidity</b>	0 to 100 %, @ 60 °C	
<b>Geotropism</b>	Less than 1 %	
<b>Dimensions (WxDxH)</b>	10 cm x 20 cm x 15 cm (4 in x 8 in x 6 in)	
<b>Weight</b>	1.11 kg (2.5 lb)	

### Optional accessories

**451EXL** 451 Assistant for Excel, includes RS-232 interface cable

**190HPS** Single Unit Carrying Case

**450UCS** Check Source, <sup>238</sup>Uranium, 0.064 µCi, impregnated 2 x 2 in yellow card

### Ordering information

**451B-RYR** Ion Chamber Survey Meter with Beta Slide and standard chamber

**451B-DE-SI-RYR** Ion Chamber Survey Meter with Beta Slide and dose equivalent chamber