

# AT3509, AT3509A AT3509 B, AT3509 C

## PERSONAL DOSIMETER

Measuring	AT3509 AT3509A	AT3509B AT3509C
Hp(10) continuous x и γ	+	+
Ḣp(10) continuous x и γ	+	+
Hp(0.07) continuous x и γ	-	+
Ḣp(0.07) continuous x и γ	-	+

Hp(0.07), Ḣp(0.07) 15 keV - 300 keV  
Hp(10), Ḣp(10) 15 keV - 10 MeV  
1 μSv - 10 Sv 0.1 μSv/h - 5 Sv/h

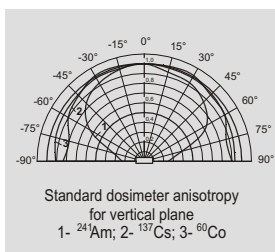
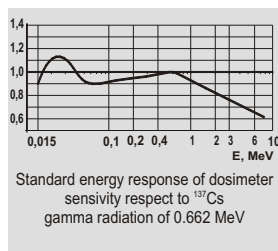
### Features

- Silicon flat detector
- No proper background
- Simultaneous dose burden measuring on the inward parts of the body Hp(10), skin and mucous membranes Hp(0.07) - AT3509B and AT3509C
- Compensative filter and electronic energy response correction by 4-channel analog processor
- Proof against the microphonic effect
- Self-testing mode
- Possibility to use separately or in a system



### Application

- Radiology
- Radiotherapy
- Nuclear medicine
- Accelerators
- Nuclear research
- Electronic equipment
- Special x-ray equipment



The dosimeters are intended to measure personal dose equivalent and dose equivalent rate x-ray and gamma radiation. They measure dose rate in a wide range and have separate audible and visual alarm. The microprocessor controls operation modes over, calculates, outputs data on a backlit LCD and performs self-testing. The nonvolatile memory keeps the accumulated dose and its accumulation history when the dosimeter is off. The dosimeter is calibrated on a water phantom of 30 x 30 x 15 cm meeting ISO4037-3 International standard requirements. The instruments are watertight, electromagnetic and shock-proof (fall from 1.5 m).



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INSTRUMENTS AND TECHNOLOGIES FOR  
NUCLEAR MEASUREMENTS AND RADIATION MONITORING

The dosimeter can operate stand-alone or in a dosimetry control system: dosimeter - reader - PC. The dosimeter connects to the reader via IR channel, and the reader connects to PC via RS232. The dosimeter software is intended to:

- Read/setup personal and serial dosimeter numbers;
- Change dose and dose rate thresholds;
- Disable/enable to change dosimeter thresholds by the dosimeter button;
- Change the dose accumulation interval in the range from 1 to 255 min and evaluate accumulated dose for each time interval within a work shift;
- Save automatically up to 800 dose values in the nonvolatile memory accumulated for the selected accumulation interval;
- Reset accumulated dose;
- Disable/enable to reset accumulated dose by the dosimeter button;
- Save automatically data in the data base and print them.

The operation modes are "Dose", "Dose rate", "Economical", "Menu", "Reset dose", "Dose threshold", "Dose rate threshold", "data exchange with PC".

## Specification

### Measuring range

personal dose equivalent (in increment of 0.1  $\mu\text{Sv}$ )  
 AT3509, AT3509A: Hp(10) ..... 1  $\mu\text{Sv}$  - 10 Sv  
 AT3509B: Hp(10), Hp(0,07) ..... 1  $\mu\text{Sv}$  - 10 Sv  
 AT3509C: Hp(10), Hp(0,07) ..... 1  $\mu\text{Sv}$  - 10 Sv

personal dose equivalent rate  
 AT3509, AT3509A: Hp(10) ..... 0.1  $\mu\text{Sv/h}$  - 1 Sv/h  
 AT3509B: Hp(10), Hp(0,07) ..... 0.1  $\mu\text{Sv/h}$  - 1 Sv/h  
 AT3509C: Hp(10), Hp(0,07) ..... 0.1  $\mu\text{Sv/h}$  - 5 Sv/h

### Intrinsic dose measurement

error with no accompanying  
 beta radiation .....  $\pm 15\%$

### Intrinsic dose rate measurement error

from 0.1 to 1  $\mu\text{Sv/h}$  .....  $\pm 30\%$   
 from 1  $\mu\text{Sv/h}$  to 1 Sv/h .....  $\pm 15\%$   
 from 1 Sv/h to 5 Sv/h (AT3509) .....  $\pm (15 \cdot 0.0001 \cdot \text{Hp})\%$

Calibration error on  $^{137}\text{Cs}$  .....  $\pm 5\%$

### Energy range

AT3509, AT3509B and  
 AT3509C ..... 15 keV - 10 MeV  
 AT3509A ..... 30 keV - 10 MeV

### Energy sensitivity response

Hp(10)  
 from 15 keV to 1.5 MeV .....  $\pm 25\%$   
 from 1.5 MeV to 10 MeV .....  $\pm 60\%$   
 Hp(0.07) AT3509B, AT3509C  
 from 15 keV to 300 keV .....  $\pm 30\%$

### Anisotropy within 75° angle

for  $^{137}\text{Cs}$  and  $^{60}\text{Co}$  .....  $\pm 20\%$   
 for  $^{241}\text{Am}$  .....  $\pm 50\%$

### Alarm thresholds (independent)

dose 30  $\mu\text{Sv}$ ; 200  $\mu\text{Sv}$ ; 1 mSv; 4.2 mSv; 12.5 mSv;  
 50 mSv; 100 mSv; 1 Sv  
 dose rate 0.3  $\mu\text{Sv/h}$ ; 3  $\mu\text{Sv/h}$ ; 30  $\mu\text{Sv/h}$ ; 300  $\mu\text{Sv/h}$ ;  
 3 mSv/h; 30 mSv/h; 300 mSv/h; 1 Sv/h  
 customized thresholds

### Response time to dose rate change

when Hp(10) > 10  $\mu\text{Sv/h}$  ..... 5 s

Radiation overload ..... up to 10 Sv/h

### Operating conditions:

operating temperature range .....  $-10^\circ$   $+40^\circ$  C  
 relative humidity at  
 temperature of  $+35^\circ\text{C}$  ..... up to 90 %  
 stability to drop from 1.5 m height

Protection class ..... IP54

Power requirements 2 cells type AAA (LR03) or  
 accumulators

Continuous operation time from one cells' set  
 when Hp(10) < 100  $\mu\text{Sv/h}$  ..... not less than 500 h

### Electromagnetic compatibility

EN 61000-4-2:1995  
 EN 61000-4-3:2002

Dimensions ..... 105x58x23 mm

Weight (without batteries) ..... 100 g

**Complete set:** personal dosimeter, batteries, chain with a clamp, plastic boxes for easy decontamination, manual and package.

The reader and applied software are options and they are supplied **on additional order.**

All modifications of the personal dosimeter AT3509 have pattern approval certificates of Republic of Belarus, Russian Federation, Kazakhstan and Lithuania, and modifications AT3509, AT3509A have pattern approval certificate of Ukraine.

They comply with IEC 61526 International standard requirements. They also conform with the 89/33/EEC directive complying with EN 55022 B:1998 and EN 55024 B:1998 standard requirements.

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