# AT3509, A, B, C Personal Dosimeters

***Monitoring of individual exposure doses from X-ray and gamma radiation with energy range from 15 keV to 10 MeV***



Pocket-size wide-range intelligent devices, ideally matching accuracy, functionality, user friendliness, reliability and price.

Dosimeter with reader, which is connected to PC, and software suite make an efficient automatic system for staff radiation exposure monitoring.

## Operating principle

Primary dosimeter function is to measure Hp(10), Hp(0.07) individual dose equivalent, and the secondary one is to measure $\dot{H}p(10)$, $\dot{H}p(0.07)$ dose rate of continuous X-ray and gamma radiation.

Dosimeters provide dose range measurement in 7.5-order range and have individual sound and LED alarm function.

Microprocessor operation mode management, data processing, display on TFT screen and self-check function.

Accumulated dose data and dose accumulation history is saved in non-volatile memory when the device is powered off.

| *Measuring* | *AT3509 AT3509A* | *AT3509B AT3509C* |
|---|---|---|
| Hp(10) continuous x & γ | + | + |
| $\dot{H}p(10)$ continuous x & γ | + | + |
| Hp(0.07) continuous x & γ | - | + |
| $\dot{H}p(0.07)$ continuous x & γ | - | + |

## Applications

- Radiation protective measures in case of nuclear disasters
- Roentgenology
- Therapeutic radiology
- Nuclear medicine
- Electronics (Ion implanters)
- Accelerating installations
- Nuclear research activities
- X-ray Crystallography and X-ray fluorescence spectroscopy, electronic microscopy

## Features

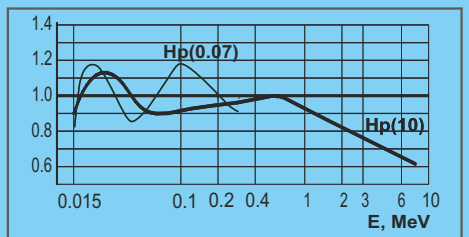
- Silicone planar detector
- Zero intrinsic background
- Simultaneous measurement of visceral radiation exposure Hp(10) and skin radiation exposure Hp(0.07) - AT3509B and AT3509C in wide range of dose rates
- Compensating filter and electrical energy dependence correction
- Resistance to impacts and vibration, dust-and-moisture-proof, tolerance to electromagnetic interference
- Repeating impact protection (so called "Microphone effect")
- Parameter self-check
- Can be integrated into a system or used separately
- Low weight and small size
- Calibrated with water phantom ISO 30x30x15 cm
- Dosimeter-to-PC communication via IR-transmitter in reader

# AT3509, A, B, C Personal Dosimeters

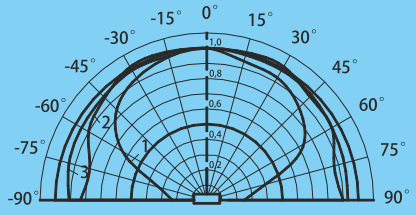
## Specification

| | |
|---|---|
| **Measurement range for:** | |
| Individual dose equivalent | |
| AT3509, AT3509A Hp(10) | 1 μSv...10 Sv |
| AT3509B Hp(10), Hp(0.07) | 1 μSv...10 Sv |
| AT3509C Hp(10), Hp(0.07) | 1 μSv...10 Sv |
| Individual dose equivalent rate | |
| AT3509, AT3509A Ḣp(10) | 0.1 μSv/h...1 Sv/h |
| AT3509B Ḣp(10), Ḣp(0.07) | 0.1 μSv/h...1 Sv/h |
| AT3509C Ḣp(10), Ḣp(0.07) | 0.1 μSv/h...5 Sv/h |
| **Intrinsic relative error** of dose measurement without associated beta radiation | ±15% max. |
| **Intrinsic relative error** of dose rate measurement | |
| 0.1 μSv/h...1 μSv/h | ±30% max. |
| 1 μSv/h...1 Sv/h | ±15% max. |
| 1 Sv/h...5 Sv/h (AT3509C) | ±(15 + 0.001Ḣp)% max., where Ḣp is dose rate in μSv/h |
| **Calibration error** for $^{137}$Cs | ±5% |
| **Energy range** | |
| AT3509, AT3509B,C | 15 keV...10 MeV |
| AT3509A | 30 keV...10 MeV |
| **Energy dependence** relative to 662 keV ($^{137}$Cs) | |
| Hp(10) in the following energy range | |
| 15 keV...1.5 MeV | ±25% |
| 1.5 MeV...10 MeV | ±60% |
| Hp(0.07) in the following energy range (AT3509B,C) | |
| 15 keV...300 keV | ±30% |
| **Alarm thresholds** | 1 of 8 independent dose thresholds, 1 of 8 independent dose rate thresholds |
| **Anisotropy** in angular spacing ±60° | |
| For $^{137}$Cs and $^{60}$Co | ±20% |
| For $^{241}$Am | ±50% |
| **Response time** for dose rate measurement (for dose rate ≥10 μSv/h) | ≤5 s |
| **Radiation overloading** | ≤10 Sv/h |
| **Burn-up life** | ≥100 Sv |
| **Power** | 2 x AAA type batteries; rechargeable cells can be used |
| **Continuous run time** | ≥500 h |
| **Working temperature range** | -10°C...+40°C |
| **Relative air humidity** with temperature ≤35°C without moisture condensation | ≤90% |
| **Drop protection** | From ≤1.5 m to hard surface |
| **Protection class** | IP54 |
| **Connection to PC** | USB (via Reader) |
| **Overall dimensions, weight** | 105x58x23 mm, 100 g |

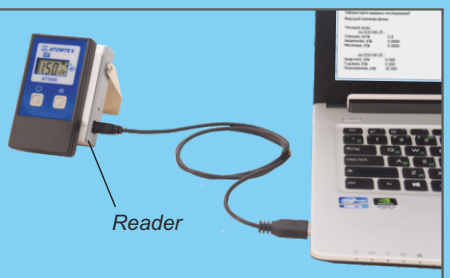
Design and specifications are subject to change without notice




Normal energy relationship between AT3509B Dosimeter sensitivity and $^{137}$Cs gamma radiation energy of 662 keV




Normal AT3509 Dosimeter anisotropy for vertical position
1 – $^{241}$Am; 2 – $^{137}$Cs; 3 – $^{60}$Co




Dosimeter-to-PC connection via reader

The personal dosimeters meet International standard requirements:
IEC 61526:2005 (confirmed by tests IAEA-EURADOS, IAEA-TECDOC-1564)
Safety standard requirements:
IEC 61010-1:1990
EMC requirements:
EN 55022:1998+A1:2000+A2:2003
EN 55024:1998+A1:2001+A2:2003
IEC 61000-4-2:2001
IEC 61000-4-3:2008

The personal dosimeters have the pattern approval certificates of Republic of Belarus, Russian Federation, Ukraine, Kazakhstan and Lithuania.


ATOMTEX®
http://www.atomtex.com
5, Gikalo st.,220005 Minsk,
Republic of Belarus
**Tel./fax:** +375 17 2928142
**E-mail:** info@atomtex.com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CE

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