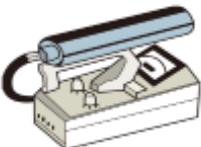


Instruments for Measuring External Exposure

Type		Purpose	
GM counter survey meter (ionization)		Contamination detection	Has a thin entrance window and can detect β -particles efficiently; Suitable for detecting surface contamination
Ionization chamber survey meter (ionization)		γ -ray ambient dose rate	Accurate but unable to measure low dose rates like a scintillation type can
Nal (Tl) scintillation survey meter (excitation)		γ -ray ambient dose rate	Accurate and very sensitive; Suitable for measuring γ -ray ambient dose rates from the environment level up to around $10\mu\text{Sv/h}$
Personal dosimeter (light-stimulated luminescence dosimeter, luminescent glass dosimeter, electronic dosimeter, etc.) (excitation)		Personal dose Cumulative dose	Worn on the trunk of the body to measure personal dose equivalent of the relevant person's exposure while it is worn; A direct-reading type and types with alarm functions are also available.

Survey meters are either for inspecting body surface contamination or for measuring ambient dose rates. Geiger Muller (GM) tube-type survey meters are highly sensitive to β (beta)-particles and are thus suitable for inspecting body surface contamination. They are relatively affordable and useful in locating contamination and confirming the effects of decontamination.

Ionization chambers are most suited for measuring high-level ambient dose rates but cannot measure very low dose rates. Therefore, a scintillation type is most suited for measuring ambient dose rates in the general environment.

Nal (Tl) scintillation survey meters can also measure the radioactivity intensity, but measurement results vary depending on the level of radiation at the measuring location and the way of measurement. Since calibration at a facility with a radioactive source that serves as a reference is required before converting the measurement results into becquerels, expert assistance is required to implement the measurements.

Personal dosimeters provide cumulative exposure dose readings. An electronic direct-reading type allows a person to confirm the degree of exposure at certain time intervals or after every operation.

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