

Personnel Monitors: Radiation Dosimeters



Pictures Courtesy of Landauerinc.com

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Q: What does a radiation badge do?

A: A radiation dosimeter or badge does not protect the worker from radiation, but passively detects and measures radiation to which you have been exposed. The badge will detect high-energy beta, gamma or x-ray radiation. These dosimeters cannot detect low energy beta radiation from some isotopes, including carbon-14, tritium (H-3) or sulfur-35.

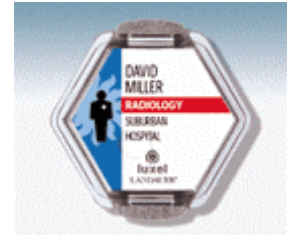
**In order to minimize your exposure to radioactive materials or radiation-producing devices, always practice ALARA measures (minimize time near a source, maximize distance and shielding between you and the source).*

Q: Are there different types of dosimeters available?

A: NCSU uses two badges for most employees, Luxel by Landauer (aluminum oxide dosimeter) and TLDs (thermoluminescent dosimeter). The Luxel badge measures whole body dose from x-radiation, gamma radiation and beta radiation. The TLD measures extremity dose (finger, hands etc.) from x-radiation, gamma radiation and high-energy beta radiation. The TLD chip is housed in a plastic ring to be worn on your dominant hand on the most applicable digit. Other types of dosimeters exist and may be used in special circumstances.

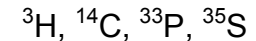
Q: Who needs a dosimeter?

A: All workers must attend Radiation Safety Training prior to obtaining a badge. Radiation workers who operate x-ray machines, fluoroscopy units, certain unsealed and sealed radioisotopes or are exposed to other sources of gamma or high energy beta radiation are generally required to wear one or more dosimeters. The following table provides general badging guidelines for those who handle radiation sources or equipment.



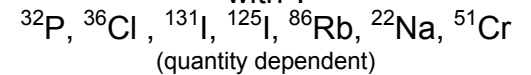
Dosimetry Requirements@ NCSU

No badge is required if you use:



A Badge is required if you use or work

with*:



X-ray, Fluoroscopy, Nuclear Medicine
PULSTAR Reactor
Environmental Health and Safety

Q: How do I get a dosimeter?

A: New personnel working with radiation sources or radiation-producing devices must complete the RS-3 Form for Dosimetry during the Radiation Safety Class. Once Radiation Safety reviews the form, a dosimeter will be issued if needed.

Q: Do pregnant radiation workers get a special dosimeter?

A: Pregnant Radiation Workers may receive an additional badge during pregnancy. Current occupational radiation control rules impose a special dose limit specifically for the unborn child (embryo/fetus) of any radiation worker who formally declares her pregnancy. This dose limit during pregnancy is 500 mrem; otherwise, the dose limit for a non-pregnant radiation worker is 5000 mrem per year.



A pregnant radiation worker is not required to declare her pregnancy. However, in order for the Radiation Safety Division to implement any control measures or dosimetry for monitoring, the pregnancy must be declared *in writing* to the Radiation Safety Division. Dosimetry is not always necessary for a pregnant radiation worker.

Q: How do I wear my ring dosimeter?

A: The ring badge should be worn on a finger with the label (white plate) facing the radiation source, i.e. toward the palm of the hand where the highest exposure occurs. Protect the ring badge from contamination by wearing it inside a glove. Survey the badge as part of your routine instrument survey for personal contamination. Ring badges are available in small, medium and large sizes; if your ring doesn't fit, please let us know.



When your ring badge is not being worn, store it in a location free from radiation and excess heat, as exposures from these sources could cause a false reading.

Q: How do I wear my whole body dosimeter?

A: Radiation workers who are issued whole body badges should wear them on their collar, mid-torso or waist with the label facing out. The intent is to wear the badge in the area most likely to receive exposure. Badges should be worn on the outside of lead aprons.

When your whole body badge is not being worn, store it in a location free from radiation and excess heat.

Q: When do I return my dosimeter?

A: Dosimeters are issued four times a year, or quarterly. The wear dates are printed on the front of the badge, under your name, as a reminder of when to wear them. Once the wear period ends, Radiation Safety will deliver and replace the old badge with a new one for the next quarter. At the end of the quarter, dosimeters must be returned to the badging company by Radiation Safety for processing as promptly as possible. All badges are processed according to [NVLAP](#) accreditation standards.

Q: What do the results of the dosimeter mean?

A: The primary occupational whole body dose limit is 5,000 millirems per year, effective dose equivalent. The dose limit to the extremities (hands, fingers etc.) is 50,000 millirems per year.

Q: How do I terminate a dosimeter?

A: When a Radiation worker leaves the University or changes work locations, please complete the RS-5 Form and mail to Radiation Safety (Box 8007) or call the Radiation Safety Division to update the records.