

GENERAL INFORMATION

ANNUAL RADIATION EXPOSURE LIMITS

Whole body, blood forming organs, gonads: 5,000 mrem/year

Lens of eye: 15,000 mrem/year

Extremities and skin: 50,000 mrem/year

Fetal: 500 mrem/gestation period

General Public: 100 mrem/year

Based on USNRC Regulations, Title 10, Part 20, Code of Federal Regulations and adopted by many states. Certain states and other regulatory agencies may adhere to different limits.

Control Dosimeter: A control dosimeter (master control and/or series control) is included with each shipment of dosimeters for monitoring radiation exposure received during transit. At the customer's facility, store the control in a radiation free area during the wear period.

Minimal Dose Equivalent Reported: Dose equivalents below the minimum measurable quantity for the current monitoring period are recorded as "M." The minimal reporting levels vary according to the dosimeter type and radiation quality.

Photon (x or gamma ray): 1 mrem

Beta: 10 mrem

Neutron: 20 mrem fast, 10 mrem thermal

Fetal: 1 mrem

Ring: 30 mrem

"SL" is an elective option for the minimal dose equivalent reported for the Luxel dosimeter for photon (x and gamma ray). Exposures less than 10 mrem report as "SL," and exposures at or more than 10 mrem begin reporting at 10 mrem and report in increments of 10 mrem.

Ring Dosimeter Reading: Ring dosimeter readings report as a shallow dose.

Special Calculations: Special dose calculations can be applied to radiation workers who wear lead aprons.

1. EDE 1 - two dosimeters: one dosimeter is worn at the waist level under a lead apron and one dosimeter is worn at the collar level outside the lead apron.

$$1.5 (\text{Waist DDE}) + 0.04 (\text{Collar DDE}) = \text{Assigned Deep Dose Equivalent}$$

2. EDE 2 - one dosimeter: one dosimeter is worn outside the lead apron.

$$0.30 (\text{Collar DDE}) = \text{Assigned Deep Dose Equivalent}$$

The "ASSIGNED" line follows all of the original whole body dosimeter doses with the EDE 1 or EDE 2 calculation results or Landauer's standard dose assessment protocol (deep and shallow whole body dose from the highest reading whole body dosimeter, lens dose from the dosimeter closest to the eye).

Fetal Dosimeter: A declared pregnant worker will possess a fetal exposure on an extra page of the report based upon the whole body dosimeter worn closest to the fetus. The fetal dose is reported for the current wear period, plus the estimated dose from conception to declaration (if provided by customer), and the total dose from declaration to present.

DOSIMETRY REPORT INFORMATION

Information for each participant is reported in two or more lines as follows:

FIRST LINE EXPLANATION

Participant Number: Unique number assigned by Landauer.

Name: To whom the dosimeter is assigned.

Dosimeter: Badge type according to radiation monitoring needs:

Luxel:

P, Pa: Photon (x or gamma ray), beta

J, Ja: Photon (x or gamma ray), beta, fast neutron

T, Ta: Photon (x or gamma ray), beta, fast and thermal neutron

Ring:

U: Photon (x or gamma ray), beta

P, J, and T dosimeters contain a filter pack with tin and copper filters, and an open window. Pa, Ja, and Ta dosimeters contain a filter pack with aluminum, copper/aluminum, and plastic filters, and an open window. A dosimeter with a "+" is an elective option that contains a filter pack with lead, copper/aluminum, and plastic filters, and an open window.

Use: Refers to the use or location of the body for which the dose is given.

Use	Location	Use	Location
AREA	Area Monitor	OEXTRM	Other Extremity
CHEST	Chest	OWHBDY	Other Whole Body
CNTRL	Control	RANKLE	Right Ankle
COLLAR	Collar	RFINGR	Right Ring
EYE	Eye	RUARM	Right Upper Arm
FETAL	Fetal	RULEG	Right Upper Leg
LANKLE	Left Ankle	RWRIST	Right Wrist
LFINGR	Left Ring	SPECL	Special Purpose
LUARM	Left Upper Arm	UPBACK	Upper Back
LULEG	Left Upper Leg	WAIST	Waist
LWBACK	Lower Back	WHBODY	Whole Body
LWRIST	Left Wrist		

Radiation Quality: Types and energies of radiation contributing to whole body dose equivalent.

B: beta

BH: beta high energy, e.g., strontium, phosphorus

BL: beta low energy, e.g., thallium, krypton

BN: beta, neutron mixture

BS: strontium beta

BT: thallium beta

BU: uranium beta
NF: neutron fast
NT: neutron thermal
P: photon (x or gamma ray)
PB: photon, beta mixture
PBN: photon, beta, neutron mixture
PH: photon high energy greater than 200 keV
PL: photon low energy less than 40 keV
PM: photon medium energy 40 keV to 200 keV
PN: photon, neutron mixture

Deep, Eye And Shallow Dose Equivalents:

Deep dose equivalent (DDE) applies to external whole body exposure at a tissue depth of 1 cm (1000 mg/cm²). Eye dose equivalent (LDE) applies to external exposure of the lens at a tissue depth of 0.3 cm (300 mg/cm²). Shallow dose equivalent (SDE) applies to the external exposure of the skin or extremity at a tissue depth of 0.007 cm (7 mg/cm²) averaged over an area 1 cm².

Deep, eye and shallow dose equivalents report for the time frame indicated by "For Monitoring Period." Individual radiation component results and combined totals report in separate lines.

Quarterly accumulated results total dose received within the calendar 3-month time frame. (Note: Quarterly accumulated columns are eliminated for bimonthly service or display "Not applicable.") Year-to-date accumulation totals dose received from the beginning of the current year to present wear date. Lifetime accumulation totals all dose received from inception date of dosimeter service to present reported wear date.

Internal exposure, if applicable, is summed with Landauer external dose equivalents. Total effective dose equivalent is the sum of both deep dose equivalent (external exposure) and committed effective dose (internal exposure).

Records For Year: The number of times that a participant's name has appeared on Landauer reports during the current year, including absentee reports and corrections.

Inception Date: The date Landauer began keeping dosimeter records for a given dosimeter for a participant on the current account.

SECOND LINE EXPLANATION

Participant's personal information consisting of ID number, birth date and sex. This information can be suppressed on "Duplicate Reports" for privacy and/or posting needs.

Notes: Text messages explaining any abnormalities or comments. The note with message will appear on a separate line below all dosimeter exposure information.

U.S. PATENTS

6,127,685
5,892,234
6,316,702
5,272,348
5,569,927

No NVLAP accreditation is available from NVLAP for thermal neutron dosimeters.

- ** When exposure results are reported for thermal neutrons, this report contains data that are not covered by the NVLAP accreditation.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.