

# LANDAUER®

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## RADIATION DOSIMETRY REPORT

|              |            |                       |                         |                           |                             |          |
|--------------|------------|-----------------------|-------------------------|---------------------------|-----------------------------|----------|
| ACCOUNT NO.  | SERIAL NO. | ANALYTICAL WORK ORDER | REPORT DATE<br>DD/MM/YY | RECEIVED DATE<br>DD/MM/YY | REPORT TIME<br>IN WORK DAYS | PAGE NO. |
| DEPARTAMENTO |            |                       |                         |                           |                             |          |

| PARTICIPANT NUMBER | NAME  |                     |     | DOSIMETER         | USE                    | RADIATION QUALITY    | DOSE EQUIVALENT (mSv) FOR PERIODS SHOWN BELOW |         |                    | QUARTERLY ACCUMULATED DOSE EQUIVALENT (mSv) |         |                    | YEAR TO DATE DOSE EQUIVALENT (mSv) |         |                    | LIFETIME DOSE EQUIVALENT (mSv) |         |                    | RECORDS FOR YEAR   | INITIAL DATE (MM/YY)   |  |  |  |  |
|--------------------|---|---------------------|-----|-------------------|------------------------|----------------------|---|---------|--------------------|---|---------|--------------------|------------------------------------|---------|--------------------|--------------------------------|---------|--------------------|--------------------|------------------------|--|--|--|--|
|                    | ID NUMBER                                   | BIRTH DATE DD/MM/YY | SEX |                   |                        |                      | DEEP DDE                                      | EYE LDE | SHALLOW SDE        | DEEP DDE                                    | EYE LDE | SHALLOW SDE        | DEEP DDE                           | EYE LDE | SHALLOW SDE        | DEEP DDE                       | EYE LDE | SHALLOW SDE        |                    |                        |  |  |  |  |
|                    | PERIODO DE LECTURA                          |                     |     |                   |                        |                      | ACUMULADO TRIMESTRAL                          |         |                    | ACUMULADO ANUAL                             |         |                    | ACUMULADO HISTORICO                |         |                    |                                |         |                    |                    |                        |  |  |  |  |
| NUMERO DE USUARIO  | NOMBRE DEL USUARIO, NUMERO DE CEDULA Y SEXO |                     |     | TIPO DE DOSIMETRO | LOCALIZACION DOSIMETRO | CALIDAD DE RADIACION | TEJIDO PROFUNDO                               | OJO     | TEJIDO SUPERFICIAL | TEJIDO PROFUNDO                             | OJO     | TEJIDO SUPERFICIAL | TEJIDO PROFUNDO                    | OJO     | TEJIDO SUPERFICIAL | TEJIDO PROFUNDO                | OJO     | TEJIDO SUPERFICIAL | NUMERO DE REPORTES | DEFINICION DE SERVICIO |  |  |  |  |
|                    |   |                     |     |                   |                        |                      |   |         |                    |   |         |                    |                                    |         |                    |                                |         |                    |                    |                        |  |  |  |  |
|                    |   |                     |     |                   |                        |                      |   |         |                    |   |         |                    |                                    |         |                    |                                |         |                    |                    |                        |  |  |  |  |

QUALITY CONTROL RELEASE:

**GENERAL INFORMATION**

**ANNUAL RADIATION EXPOSURE LIMITS**

Whole body, blood forming organs, gonads: 50 mSv/year or 20 mSv/year  
 Lens of eye: 50 mSv/year  
 Extremities and skin: 500 mSv/year  
 Fetal: 5 mSv/gestation period or 1 mSv/30 day period  
 General Public: 1 mSv/year

Different regulatory agencies adhere to different exposure limits. Check the regulations appropriate in your area for compliance requirements.

Control Dosimeter: These dosimeters control and/or series control to include in each shipment of dosimeters for monitoring radiation exposure received during transit. At the customer's facility, they are used 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): .01 mSv  
 beta: .03 mSv  
 neutron: .2 mSv fast, .1 mSv thermal  
 fetal: .04 mSv  
 ring: .3 mSv  
 "SL" is an elective option for the minimal dose equivalent reported for the Luxel dosimeter for photon (x and gamma ray). Exposures less than .1 mSv report as "SL," and exposures at or more than .1 mSv begin reporting at .1 mSv and report in increments of .1 mSv.

**DOSIMETRO DE ANILLO, CALCULOS ESPECIALES**

Special Calculations: Special dose calculations can be applied to radiation workers who wear lead aprons.  
 1) EDE 1 - two dosimeters: 1 dosimeter worn at waist level under lead apron and 1 dosimeter worn at collar level outside lead apron.  $1.5 \text{ (Waist DDE)} + 0.04 \text{ (Collar DDE)} = \text{Assigned Deep Dose Equivalent}$   
 2) EDE 2 - one dosimeter: 1 dosimeter worn outside lead apron.  $0.3 \text{ (Collar DDE)} = \text{Assigned Deep Dose Equivalent}$   
 The "ASSIGNED" line will follow 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 dosimeter closest to the eye).

Fetal Dosimeter: A declared pregnant worker will possess a fetal exposure dosimeter to track the radiation dose to the fetus. The lens dose is reported for the current wear period, plus the estimated dose from conception to declaration (if provided by customer), and 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 monitoring needs:  
**Luxel:**  
 P, Pn: Photon (x or gamma ray), beta  
 J, Jn: Photon (x or gamma ray), fast neutron  
 T, Tn: Photon (x or gamma ray), beta, fast/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. Pn, Jn and Tn dosimeters contain a filter pack with aluminum, copper, titanium 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   | DEXTRM | Other Extremity |
| CHEST  | Chest          | WHBODY | Whole Body      |
| CNTRL  | Control        | ANKLE  | Right Ankle     |
| COLLAR | Collar         | RFRNGR | Right Ring      |
| EYE    | Eye            | RUARM  | Right Upper Arm |
| FETAL  | Fetal          | RULEG  | Right Upper Leg |
| LANKLE | Left Ankle     | RWRIST | Right Wrist     |
| LFNGR  | Left Hand      | SPCLP  | 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 kytpton
- 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 applies to external whole body exposure at a tissue depth of 1 cm (1000 mg/cm<sup>2</sup>). Eye dose equivalent applies to external exposure of the lens at a tissue depth of 0.3 cm (300 mg/cm<sup>2</sup>). Shallow dose equivalent applies to the external exposure of the skin or extremity at a tissue depth of 0.007 cm (7 mg/cm<sup>2</sup>) average over a 30 cm<sup>2</sup> area.

Deep, eye and shallow dose equivalents report for the time frame indicated by "Reporting Period." Individual radiation component results and combined totals report in separate lines. Quarterly accumulated results total dose received within the calendar year. Note: Quarterly accumulated columns will either be eliminated for monthly 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 the report for the current year, including absentee reports and corrections.

Inception Date: The date Landauer began keeping dosimeter records for the participant. For monthly service, it is 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 notes messages appear in 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.