The Personal Dosimetry Service of Public Health England provides eye dosimetry based on alternative forms of thermoluminescence dosemeter (TLD): the whole body TLD and the headband dosemeter. The dosemeters are designed to measure doses from gamma and X-radiations to the lens of the eye in terms of the radiation quantity $H_p(3)$, the dose equivalent at a depth of 3 mm, as required by the Health & Safety Executive (HSE). In addition, the headband type measures doses from beta radiations.

The dosemeters are issued as part of the PHE TLD dosimetry service, which is approved by the HSE under Regulation 36 of the Ionising Radiations Regulations 2017. For both types, the dosemeter elements are produced by Harshaw TLD™, part of Thermo Fisher Scientific, and are individually bar coded.

**Whole body TLDs** for measuring doses to the whole body and skin are described in a separate data sheet. They can also measure doses to the lens of the eye if:

- they are worn on the collar and
- the radiation field is known to be the same at the collar as it is at the eyes and
- doses are only from photons (gamma and X-radiations)

**Headband dosemeters** are provided in a single, adjustable format which will accommodate a range of head sizes.

The dosemeter element is of the Harshaw EXTRAD™ type, and is enclosed behind a 1.5 mm PTFE filter in a sealed PVC pocket. The headband is fastened by means of Velcro™ strips which can be trimmed to length. The headband dosemeter measures $H_p(3)$ from both photons and betas and should be preferred if:

- the radiation field in the vicinity of the eyes is not well known or
- doses may arise from beta radiations

Thermoluminescent materials store the energy they absorb from ionising radiation until they are heated – in this case to about 250°C – when the energy is released as light. The amount of light released is proportional to the radiation dose. When the dosemeters are returned for processing, they are fed into an automated TLD reader which identifies the dosemeter, heats it to the required temperature and measures the light output.

The dosemeters must be used facing in the correct direction: in the case of the whole body TLD, the open windows should face the predominant radiation source, and in the case of the headband dosemeter, the white PTFE filter (not the bar code) should face the source.
Eye dosemeters are provided as part of the range of approved dosimetry services offered by Public Health England. Our dose measurement services are linked to our dose record keeping service via an automated system. The processing laboratory is based at our centre at Chilton. For further information or to place an order please contact us on the numbers below.

Personal Dosimetry Service
Centre for Radiation, Chemical and Environmental Hazards
Public Health England
Chilton, Didcot, Oxon OX11 0RQ

E: personaldosimetry@phe.gov.uk
T: (+44) (0)1235 825240
F: (+44) (0)1235 825564
https://www.phe-protectionservices.org.uk/pds

Technical Specification

<table>
<thead>
<tr>
<th>Material</th>
<th>$^7$LiF (Mg,Cu,P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change interval</td>
<td>Standard periods of 1, 2 or 3 months</td>
</tr>
<tr>
<td></td>
<td>Periods of 2, 4, 8 or 13 weeks also available</td>
</tr>
<tr>
<td>Radiation types</td>
<td>$\gamma$ (gamma) and X-radiations</td>
</tr>
<tr>
<td></td>
<td>$\gamma$, $\beta$ (beta) and X-radiations</td>
</tr>
<tr>
<td>Dose range</td>
<td>0.05 mSv to 10 Sv</td>
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<tr>
<td>Energy range (photons)</td>
<td>16 keV to at least 662 keV</td>
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<tr>
<td>Energy range (betas, $E_{max}$)</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>1.7 MeV to at least 3.5 MeV</td>
</tr>
<tr>
<td>Angle of incidence range</td>
<td>0° to 60° from normal</td>
</tr>
<tr>
<td></td>
<td>0° to 45° from normal</td>
</tr>
</tbody>
</table>

Energy response

Environmental effects

The dosemeters may be worn in all normally encountered environments. In tests, no effect was found for 48 hours’ exposure at 40°C and 90% relative humidity. Prolonged exposure to strong ultraviolet light (including sunlight) should be avoided.

Size to suit all

The headband dosemeter is adjustable, to suit a wide range of users.

Measurement uncertainties

The dosemeters are subject to measurement uncertainties which comply with the recommendations given in European Commission report