

# Radiological Film Badge

The film holders were developed by the National Radiological Protection Board (NRPB).

The design of the holder is based on a six filter system which satisfies the requirement that the filters are large enough to minimize edge effects, as well as leakage, and that there are sufficient number of filters to enable a detailed and accurate dose assessment to be made.

The six filters are:

- 1 An open window which allows all incident radiation that can penetrate the film wrapping to interact with the film. This window also allows for the film serial number to be displayed. Note that on the badges supplied by djb microtech there is no film.
- 2 A thin plastic filter which attenuates beta radiation but passes all other radiation.
- 3 A thick plastic filter which passes all but the lowest energy photon radiation and absorbs all but the highest energy beta radiation.
- 4 A dural filter which progressively absorbs photon radiation at energies below 65 keV as well as beta radiation.
- 5 A tin/lead filter of a thickness which allows an energy independent dose response of the film over the photon energy range 75 keV to 2 MeV.
- 6 A cadmium/lead filter where the capture of neutrons by cadmium produces gamma rays which blacken the film thus enabling assessment of exposure to neutrons.

In addition a strip of indium foil may be housed in a recess in some types of badge (but not in the white spot type supplied). This foil becomes radioactive after exposure to neutrons and can be used to identify exposed personnel in the event of a criticality accident.

## Specification

**Detection:** X, beta and gamma-ray personal dose equivalents at depths of 10 mm [written as  $H_p(10)$  or body dose] and 0.07 mm [written as  $H_p(0.07)$  or skin dose]. These quantities give estimates of the effective dose equivalent and the dose equivalent to the skin, respectively, which are the quantities incorporated into the Ionising Regulations 1985.

**Dose Range:** 0.1 mSv to 10 Sv for beta and hard gamma-rays. 0.1 mSv to 400 mSv for X-rays.

**Energy Range:** Photons - 20 keV to 7 MeV for  $H_p(10)$ , 10 keV to 7 MeV for  $H_p(0.07)$ :  
Beta - 0.5 to 3.5 Mev ( $E_{max}$ ) for  $H_p(0.07)$

**Period of Use:** Suitable for wear periods of up to eight weeks.

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