Hot Particle Dosimetry System (HPDS)

Calculates the skin dose delivered by a hot particle of unknown radionuclide composition

The Hot Particle Dosimetry System (HPDS) is a user friendly instrument for the determination of skin dose received from a hot particle of unknown radionuclide composition. The fully automated HPDS delivers quick, accurate, on site measurements of skin dose which conform to standard definitions for hot particle dosimetry (70 µm depth over areas of 1 cm^2 or 10 cm^2).

Hot particles are small (1 mm down to 100 µm), high specific activity beta emitters or ^{60}Co-contaminated particulates. They may be specks of spent fuel, inadvertently released during power plants operations or particles contaminated by nuclear accidents. When in contact with the skin, they deliver a concentrated radiation dose to a relatively small area due to their small size and high activity. The determination of the skin dose from these particles is therefore of paramount concern for effected radiation/nuclear workers.

What makes the HPDS system unique?

- **No need to determine radionuclide composition of hot particle.**
- **Fast, accurate, on site measurement of skin dose.**
- **Usable in a variety of contamination scenarios.**

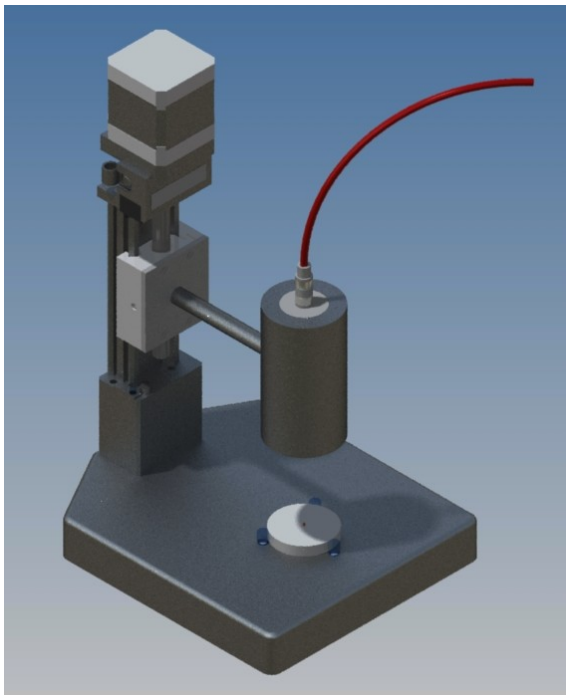
After a contamination incident involving a hot particle, the estimation of the skin dose rate to a worker is not simple task. At the moment, all radionuclides, present in the hot particle, must be identified and their activity quantified. The health physics professional then makes a dose assessment using the available information and dose conversion factors. Needless to say, this is a complex task that calls upon precious laboratory resources and the intervention of a specialist.

The HPDS can measure the skin dose in a variety of different contamination scenarios that may be encountered in the workplace. These include hot particles directly on the skin, or from clothing of various thicknesses. The HPDS completes the procedure within approximately 5 minutes.

The HPDS system and concept have been rigorously tested by both laboratory measurements and Monte Carlo simulations.

32, avenue Gatineau, Gatineau, QC, Canada J8T 4J1, Tel: 819-777-1926, Fax: 819-777-6659, Email: info@detec-rad.com

Specifications

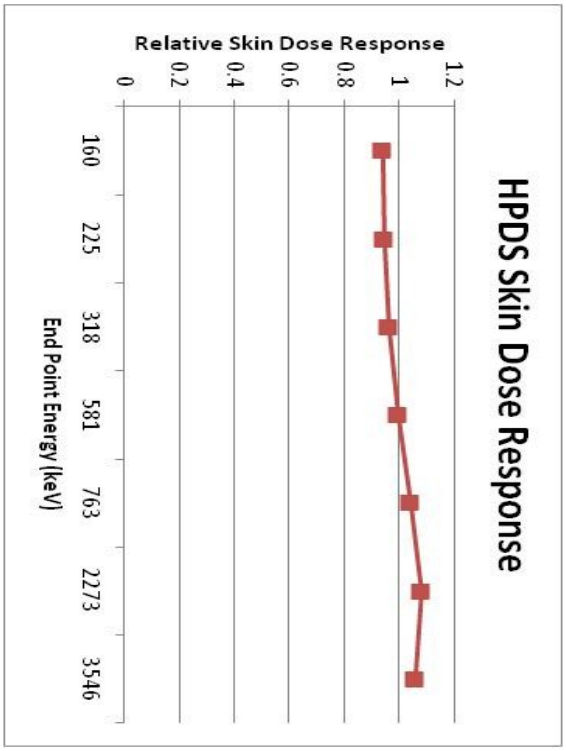


Included in HPDS package:

- 2 detectors of different window sizes to accommodate a wide range of hot particle activities.
- Automated stand and detector holder used to make count rate measurements at specific distances.
- Digital Scaler/Ratemeter.
- Automated analysis software.
- Particle sample holders

Technical Specifications:

- Sensitive to hot particles beta particle end point energies in the range of 160 keV to 3.54 MeV.
- Not susceptible to gamma interference.
- Dose accuracy between 8% and 37% depending on contamination scenario (better knowledge of scenario improves accuracy)
- Time required for measurement approximately 5 minutes depending on activity of hot particle.



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