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PAPER TITLE Dose Measurements in Mixed (n,gamma)-Radiation Fields with TLDs Under
... Consideration of the Peak Height Ratio

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For dose measurements in unknown mixed (n, γ)-fields the neutron energy dependence of the TL-response was measured using TLDs embeded in spheres of 25 cm diameter (ICRU sphere). For this purpose the pair-method using ^6Li (TLD-600) and ^7Li (TLD-700) was approached. For optimizing the neutron shielding of TLD-700 and TLD-200 a special arrangement of the TLDs inside the spheres was considered.

The irradiation was performed with several neutron sources (thermal, Pu-Be, Am-Be and 14 MeV neutrons) with known equivalent doserates. Using the peak 5 maximum of TLD-600 glowcurves a neutron energy dependent calibration factor was calculated. It is further shown that the analysis of the peak height ratio of the neutron glow-curves of TLD-600 gives information about neutron energy dependent effects in material with different LET. The results were applied for measurements in aircrafts.

For determination of the equivalent dose the neutron spectrum is of great importance. To estimate the neutron spectrum a neutron spectrometer consisting of Bonner spheres with different diameters is used. This spectrometer was tested with known spectra of several neutron sources. The theoretical response of the spheres were calculated using the neutron spectrum and the energy dependent response and were compared with the measured values. The method was applied for determination of the equivalent dose in aircrafts.