

Uncertainties in workplace external dosimetry - An analytic approach

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Abstract

The uncertainties in workplace external dosimetry depend on the type of dosimeter used for the measurement together with its performance characteristics and the information available on the measurement conditions. The performance characteristics were determined in the course of a type test, e. g. according to European (EN) or international (IEC, ISO) standards. The information about the measurement conditions can either be general, e. g. “research”, “medicine”, or specific, e. g. “X-ray testing equipment for aluminium wheel rims”.

The presentation explains an analytical approach to determine the measurement uncertainty using all the given knowledge. It is based on an upcoming IEC Technical Report “Radiation protection instrumentation – Determination of uncertainty” and the aim of both can best be summarized by taking selected text from the Technical Report.

This Technical Report shall serve as a practical introduction to the GUM with special emphasis on measurements in radiation protection. It explains the principles of the GUM at an example taken from individual dosimetry of external radiation, i.e. the daily measurement of the dose to the individual. Informative annexes contain further examples.

This report cannot overcome the fact that the determination of the uncertainty requires a larger effort than performing the measurement itself. As a counterbalance the process of determining the uncertainty results not only in a numerical value of the uncertainty but it also produces the best estimate of the quantity to be measured which may differ from the indication of the instrument. Thus it improves also the result of the measurement.