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Establishing Standard X-ray Narrow-beam Radiation Qualities for CNESTEN Calibration Laboratory

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For radiation protection purposes, the narrow-beam series (N-series) radiation qualities are of great importance, for the definition of the reference fields which are standardized for all secondary calibration laboratories by the ISO 4037 standard, indeed this beams qualities are defined by their photon energy distributions. Determining this energy distribution usually requires complicated spectrometry procedures, that's why it is more convenient to define radiation qualities by using the X-ray tube voltage and the first and second half-value layer (HVL).

in this work, the validation of different beams qualities is based on HVL measurements performed with X80-225kV X-ray generator at CNESTEN calibration laboratory (National Centre for Nuclear Energy, Science and Technology)

The experiments were performed using the reference chamber used is PTW TN320058, positioned at 100 cm from the focal point of the X-ray tube and connected to an electrometer SUPERMAX, the values of the HVL measured by applying the attenuation law, including their uncertainties. The experimental obtained values were compared with the HVL values defined by ISO 4037 standard, by checking the maximum absolute deviation.

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