



# Neutron ambient dose equivalent rate meters - Expérience in developing and using IEC 61005

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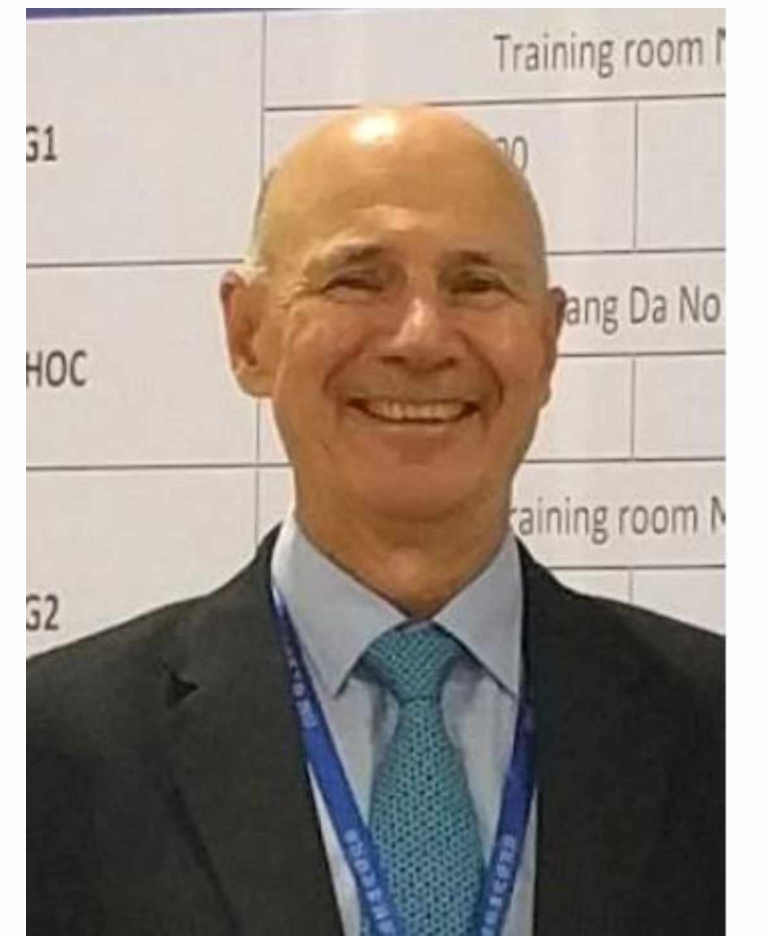


# Neutron ambient dose equivalent rate meters - Experience in developing and using IEC 61005

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## 1. IEC 61005 Ed. 3 “Radiation protection instrumentation - Neutron ambient dose equivalent (rate) meters”

- Developed: by WG 8 of IEC/SC45B, Project Leader: Dr Radoslav Radev (LLNL, US)
- IEC Ed. 3 publication: 2014 (Ed. 2 publication: 2003), CENELEC EN transposition: 2017

## 2. Examples of instruments covered by IEC 61005



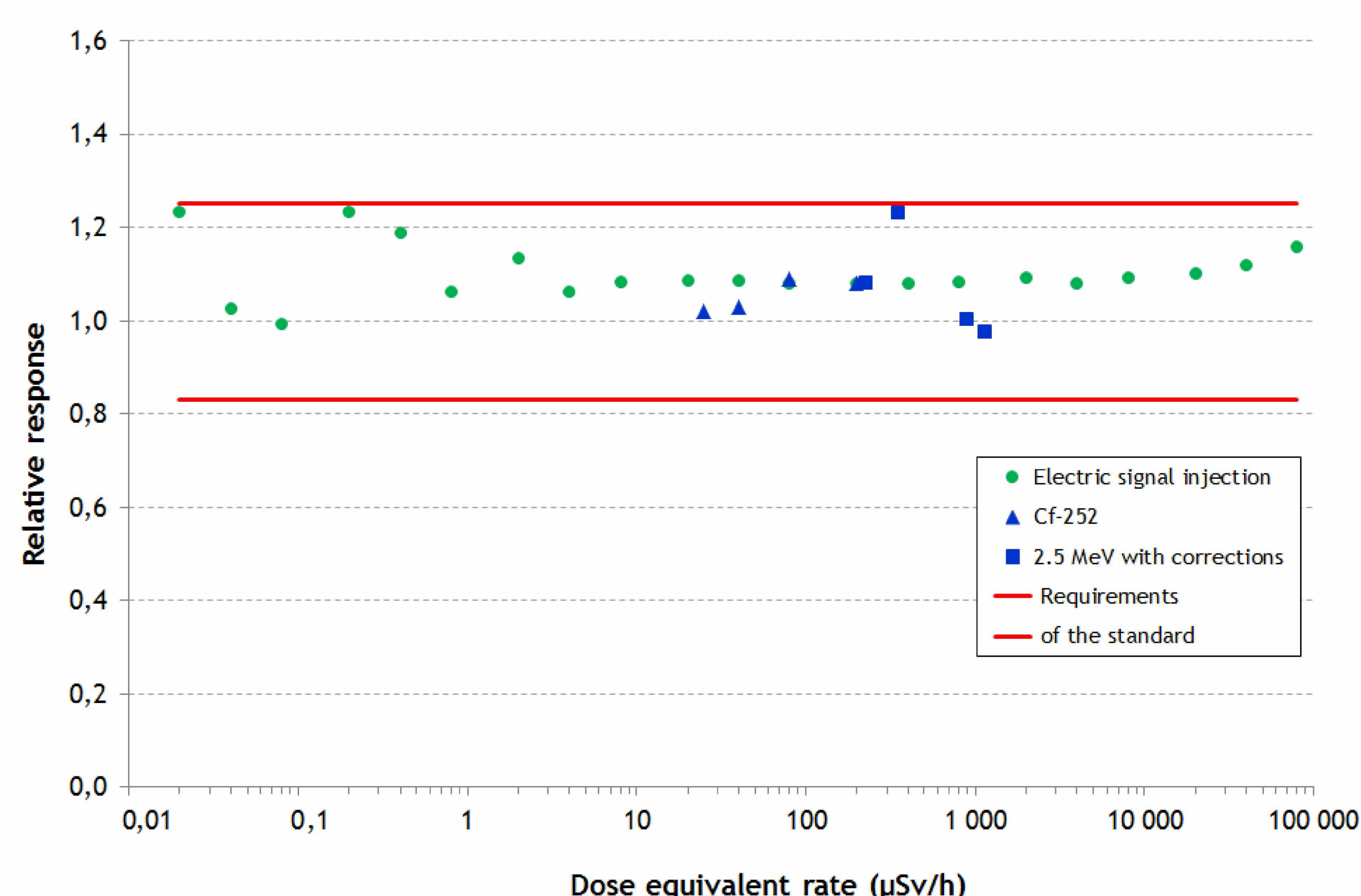
## 3. Scope of IEC 61005 Ed. 3

- Applicable to assemblies designed to measure the ambient dose equivalent (rate) due to **neutron radiation** in fields that contain neutrons with energies below 20 MeV, and which comprise at least **a detection assembly** and **a measuring assembly**.
- Instruments with energy range up to 20 MeV are covered by this standard. If the instrument also provides indication of the neutron dose, it should meet the neutron dose requirements stated in this standard.
- **No tests** are specified in this standard for performance requirements of assemblies **in pulsed radiation fields**

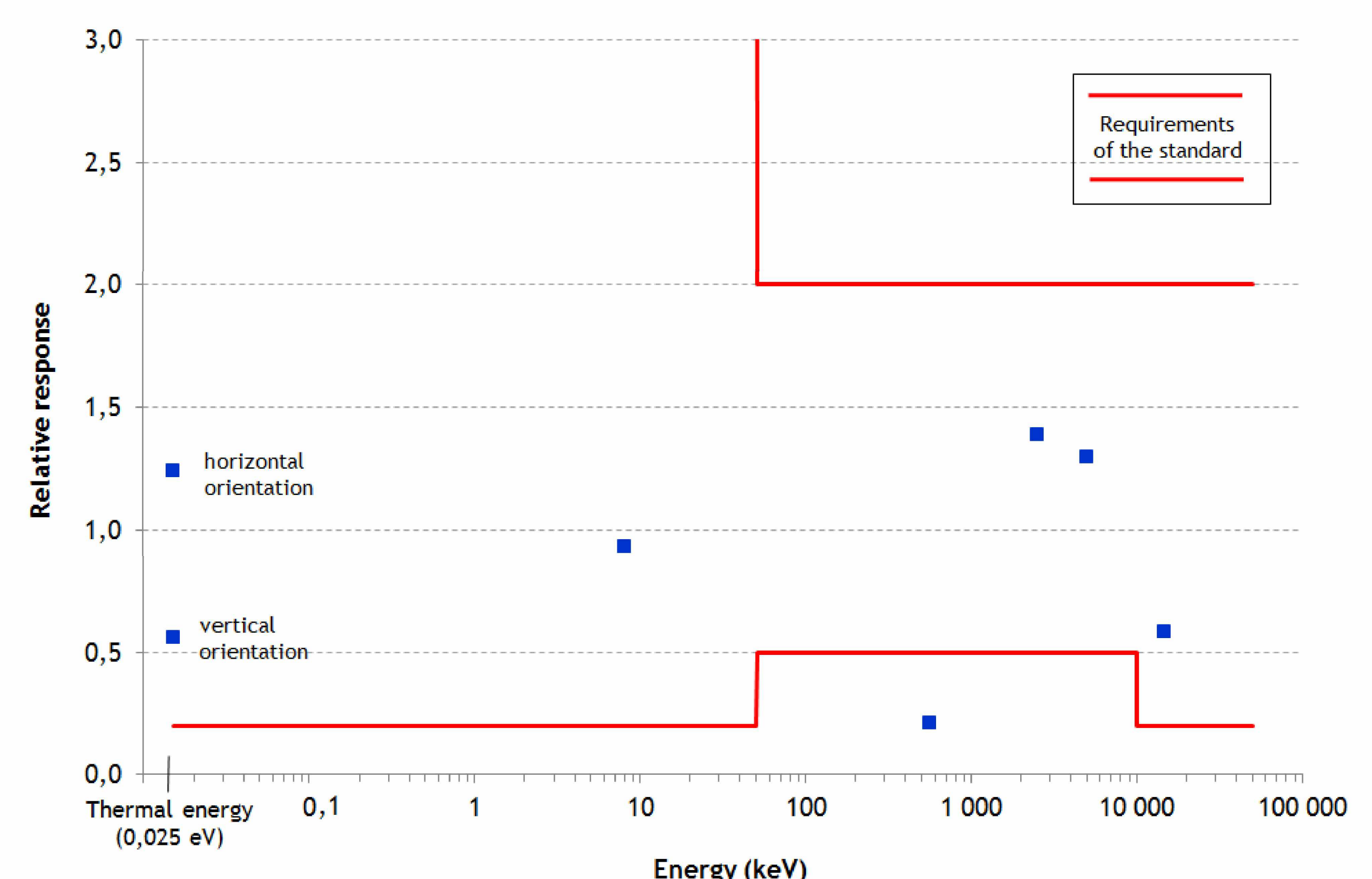
## 4. Radiation requirements

- Constancy of the dose rate response: from -17% to +25% over the whole effective range of measurement
- Variation of the response due to neutron energy:
  - thermal - 50 keV: **from 0.2 to 8.0**
  - 50 keV - 10 MeV: **from 0.5 to 2.0** (at least 3 energies + <sup>252</sup>Cf or <sup>241</sup>Am-Be )
  - 10 MeV - 20 MeV: **from 0.2 to 2.0**
- Variation of the response due to angle of incidence: from 0° to ± 90°: **± 25%** , from ± 90° to ± 180: **stated**
- Overload: **read off-scale/overload** for doses > maximum measuring range
- Response time for an increase/decrease: < 0.1 mSv/h: **30 s**; between 0.1 mSv/h and 1 mSv/h: **10 s**; > 1 mSv/h: **4 s**
- Response to photon radiation, Dose (rate) alarms, Warm-up time

## 5. Constancy of the dose rate response



## 6. Variation of the response due to neutron energy



## 7. Other tests: Electromagnetic disturbances, Temperature, Vibrations, IP classification, Battery, Drop...