

ISO 28057:2019 (E)

Clinical dosimetry — Dosimetry with solid thermoluminescence detectors for photon and electron radiations in radiotherapy

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Rules for the TLD measurement procedure
4.1	Principle of measurement
4.2	Measured quantity
4.3	Measurement cycle
4.3.1	General requirements
4.3.2	Sequence of measurement cycles
4.3.3	Common passing of the measurement cycles
4.3.4	Handling of TL detectors
4.3.4.1	General remarks
4.3.4.2	Tweezers
4.3.4.3	Casings for thermal treatment (annealing casings)
4.3.4.4	Cleaning
4.3.5	Pre-irradiation annealing
4.3.6	Irradiation
4.3.7	Post-irradiation annealing
4.3.8	Reading
4.3.8.1	General remarks
4.3.8.2	Heating procedure for generating glow curves
4.3.8.3	Determination of the TL reading
4.4	Measurement of the absorbed dose to water
4.4.1	Basic formula for the determination of the absorbed dose to water
4.4.2	Determination of the background value, M_0
4.4.3	Determination of the indicated value, M_i
4.4.4	Determination of the individual calibration coefficients, N_i
4.4.4.1	Calibration with ^{60}Co -gamma radiation
4.4.4.2	Calibration by means of other radiation qualities
4.4.4.3	Determination of individual calibration coefficients by means of repeated calibration irradiation
4.4.5	Determination of the correction factors, k_v
4.4.5.1	General remarks
4.4.5.2	Correction factor k_N for nonlinearity
4.4.5.3	Correction factor k_M for alterations of the response during successive measurement cycles
4.4.5.4	Correction factor k_F for fading
4.4.5.5	Correction factors k_Q and k_E for the consideration of radiation type and radiation quality
4.5	Uncertainty of measurement of the absorbed dose
4.6	Reusability
4.7	Stability check
4.8	Staff
5	Requirements for the TLD system
5.1	General information

- 5.1.1 Classification of the requirements
- 5.1.2 Requirements for operation characteristics
- 5.2 Completeness of the TLD system
 - 5.2.1 Technical components
 - 5.2.2 Hardware and software components
 - 5.2.3 Operating instructions
 - 5.2.3.1 General requirements
 - 5.2.3.2 Imperative information about technical data
 - 5.2.3.3 Imperative information about the radioactive stability check device
 - 5.2.4 Access to a calibration irradiation device
 - 5.3 Requirements for TL detectors
 - 5.3.1 Characteristics of TL materials
 - 5.3.2 Tailoring of TL materials
 - 5.3.3 Reusability of TL detectors
 - 5.3.4 Individual variation
 - 5.3.4.1 Individual variation of the response
 - 5.3.4.2 Individual variation of the nonlinear behaviour
 - 5.3.4.3 Individual variation of fading
- 5.4 Requirements for TL-indicating instruments
 - 5.4.1 General remarks
 - 5.4.2 Mechanical setup
 - 5.4.3 Warm-up time
 - 5.4.4 Indication and indication range
 - 5.4.5 Background value
 - 5.4.6 Overflow indication and effects during evaluation of high doses
 - 5.4.7 Test light source
 - 5.4.8 Changes in the response
 - 5.4.9 Mechanical construction
 - 5.4.10 Light shielding
 - 5.4.11 Climatic influences
 - 5.4.12 Electrical requirements
 - 5.4.12.1 Power supply
 - 5.4.12.2 Line frequency
 - 5.4.12.3 Electromagnetic disturbances
 - 5.4.12.4 Moving connection cables
 - 5.4.12.5 Feedback from connected instruments
 - 5.4.12.6 Electrical safety
 - 5.4.13 Operational safety and detection of function failure
 - 5.4.13.1 Detection of function failure
 - 5.4.13.2 Data backup
 - 5.4.13.3 Automatic TL-indicating instruments
 - 5.4.13.4 Indication of the operating status
 - 5.4.13.5 Frequency of function failures
 - 5.4.13.6 Failure of technical supply
 - 5.4.13.7 Failure of a connected instrument
 - 5.4.14 Data output and data backup
 - 5.4.14.1 General information
 - 5.4.14.2 Measurement data
 - 5.4.14.3 Glow curve
- 5.5 Requirements for auxiliary instruments (pre-irradiation annealing device)
 - 5.5.1 Pre-irradiation annealing
 - 5.5.2 Construction
 - 5.5.3 Electrical requirements
 - 5.5.4 Operation safety
 - 5.5.5 Detection of function failure
 - 5.5.6 Indication of the operating state
- 5.6 Requirements for the entire TLD system
 - 5.6.1 Minimum measuring ranges
 - 5.6.2 Minimum rated ranges of use
 - 5.6.2.1 General remarks
 - 5.6.2.2 Photon energy
 - 5.6.2.3 Electron energy
 - 5.6.2.4 Direction of radiation incidence
 - 5.6.3 Ranges of test parameters

- 5.6.3.1** General remarks
- 5.6.3.2** Ambient temperature and humidity
- 5.6.3.3** Short-time stability
- 5.7** Requirements for the calibration irradiation device
- 5.8** Requirements for the accompanying papers
- 5.9** Acceptance tests
- 5.9.1** General requirements
- 5.9.2** Number of TL detectors used
- 5.9.3** Type of TL detectors used

Page count: 41