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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 15053-2008

Replacing GB/T 15053-1994

**Standard method for using radio chromic film and
polymethylmethacrylate dosimetry system to measure
absorbed dose**

使用辐射显色薄膜和聚甲基丙烯酸甲酯剂量测量系统测量吸收剂量的标准方法
(English Translation)

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Foreword

This standard corresponds to ISO/ASTM51275:2004 "the use of radiation color film dosimetry system standards" (in English) and ISO/ASTM51276:2002 "using polymethylmethacrylate dosimetry system standards" (in English), and ISO/ASTM51275:2004 and ISO/ASTM51276:2002 non-equivalent.

The technical differences between the standards with international standards as follows.

- a) The ISO/ASTM51275 and ISO/ASTM51276 merge the contents of two international standards for our country standard;
- b) In the ISO/ASTM51276:2002 standard Information Appendix A of the original content, based on the increase of the radiation dosimeter color film Relevant content (see Appendix A).

For ease of use, this standard also made the following editorial changes.

- c) according to the Chinese custom for some formatting has been modified.
- d) In the second chapter, "normative references", the referenced ISO and ASTM standards, who have converted to our standards (including meter the amount of test regulations), the reference to our standards.

This standard replaces GB/T 15053-1994 "use of radiation color film and polymethyl methacrylate absorbed dose measurement system Standard Method "dose.

Compared with the standard GB/T 15053-1994 The main changes are as follows.

- Redefined the dosimeters used for radiant energy and the irradiation temperature range (see 1994 edition of 1.2.1,1.2.2; Excerpts 1.2.1,1.2.2);
- Added "Normative references" (see Chapter 2 of this edition);
- In the "Terms and definitions" clause added some terminology, and some of the terms of the original redefined (see 1994 edition Excerpts of chapter 3); Chapter 2;
- The title of "equipment" chapter to "dose measurement system" (see the 1994 version of

Chapter 4; Chapter 5 of this edition);

--- Added "equipment performance check" the technical content (see Chapter 6 of this edition, 6.1, 6.2);

--- On the "Calibration of dosimetry systems" chapters made big adjustment, and added, "is calibrated dosimeter share volume in the radiation field Changes in dose rate should be less than $\pm 1\%$ (range $\leq 2\%$) "requirements (see the 1994 version of Chapter 5; Chapter 7 of this edition);

--- Added "Batch dosimeters characterization" of the technical content (see Chapter 9 edition);

--- Increased "dose measurement system application" of technical content (see edition Chapter 10);

--- Use the "Measurement Uncertainty" in chapter headings and related technical content replaces the 1994 version of the "Error Analysis" technical content (see 1994 version of Chapter 8; first edition Chapter 12);

Appendix A of this standard is an informative annex.

The standard proposed by China National Nuclear Corporation.

This standard by the National Standardization Technical Committee of nuclear energy.

This standard was drafted. China Institute of Metrology.

1 Scope

1.1

standard specifies the use of radiation color film and polymethyl methacrylate (PMMA) dosimetry systems for measuring absorbed dose of exercise for and measurement procedures. This standard applies to both dosimetry systems measure the photon or electron irradiation dose absorbed water is expressed according to the material the absorbed dose. Both dose measurement system is as working-level dose measuring system (see GB/T 16640).

1.2

This standard specifies two doses of the measurement system applicable conditions are as follows.

1.2.1 Radiation color film dosimetry system

a) absorbed dose range. $1\text{Gy} \sim 100\text{kGy}$.

b) absorbed dose rate range. $1 \times 10^{-2}\text{Gy} \cdot \text{s}^{-1} \sim 1 \times 10^{13}\text{Gy} \cdot \text{s}^{-1}$.

c) radiation energy range. 0.1MeV ~ 50MeV (photons and electrons).

d) irradiation temperature range. -78 °C ~ 60 °C.

1.2.2 Polymethyl methacrylate (PMMA) dosimetry systems

a) absorbed dose range. 0.1Gy ~ 100kGy.

b) absorbed dose rate range. $1 \times 10^{-2} \text{Gy} \cdot \text{s}^{-1} \sim 1 \times 10^7 \text{Gy} \cdot \text{s}^{-1}$.

c) radiation energy range. 0.1MeV ~ 50MeV (photon);

3MeV ~ 50MeV (electrons).

d) irradiation temperature range. -78 °C ~ 50 °C.

1.3 This standard does not involve safety problems associated with its use (if it exists).

Users of this standard is responsible for establishing the applicable safety and health Standards, and prior to use to determine the applicable limits.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 15446 doses of radiation processing of academic language GB/T 15447 X,
gamma-rays and electron beams of different materials absorbed dose conversion method
GB/T 16509 doses of radiation processing Uncertainty Evaluation Guidelines GB/T 16510
radiation processing dosimetry calibration laboratory competency requirements Selection
and calibration of the guide GB/T 16640 dosimetry systems for radiation processing is
ICRU Report No. 60 of ionizing radiation and the amount of the basic unit

3 Terms and Definitions

GB/T 15446 and ICRU Report No. 60 and established the following terms and definitions apply to this standard.

Spectrophotometer or photometer instrument for measuring the absorbance of the solution or a film selected wavelength.