

ICS 17.240
CCS A 58

JJF

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

JJF 1606-2016

**Program of Pattern Evaluation of Dosimeters with Ionization
Chambers as Used in Radiotherapy
(English Translation)**

Issued on: November 30, 2016

Implemented on: February 28, 2017

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

Table of Contents

Introduction (VII)	
1 Scope (1)	
2 Normative references (1)	
3 Terms (1)	
3.1 Radiotherapy dosimeter (1)	
3.1.1 Ionization chamber components (1)	
3.1.2 Measurement components (2)	
3.1.3 Stability test device (2)	
3.2 Indicating value (3)	
3.3 Reference conditions (3)	
3.4 Standard test value (3)	
3.4.1 Standard test conditions (3)	
3.5 Performance Parameters (3)	
3.5.1 Response (3)	
3.5.2 Resolution (3)	
3.5.3 Balance time (3)	
3.5.4 Response Time (3)	
3.5.5 Stable time (3)	
3.5.6 Ionization Chamber Component Leakage Current (3)	
3.5.7 Zero drift of measuring components (3)	
3.5.8 Measuring component zero displacement (3)	
3.5.9 Nonlinearity (4)	
3.6 Variation (4)	
3.7 Variation Limits (4)	
3.8 Indicative value of the effective range (4)	
3.9 Rated use (4)	
3.9.1 Minimum rated range (4)	
3.10 Ionization chamber reference point (4)	
3.11 Power Supply Network (4)	
3.12 Calibration factor (4)	
3.13 Reference indication value (4)	
3.14 Reference Scale Readings (5)	

3.15 Working level dosimeter	(5)
3.16 Reference level (standard) dosimeter	(5)
3.17 Water absorbed dose	(5)
3.17.1 Water Absorption Dose Rate	(5)
3.18 Air kerma	(5)
3.18.1 Air kerma rate	(5)
4 Overview	(5)
5 Legal Management Requirements	(6)
5.1 Unit Requirements	(6)
5.2 Accuracy (uncertainty/maximum allowable error) requirements	(6)
5.3 Metering legal signs and marking requirements of measuring instruments	(6)
5.3.1 Measurement of legal signs	(6)
5.3.2 Measuring equipment logo	(6)
6 Measurement requirements	(6)
6.1 Ionization Chamber Component Performance Requirements	(6)
6.1.1 Leakage current	(6)
6.1.2 Long-term stability	(6)
6.1.3 Minimum rated or effective dose rate	(6)
6.1.4 Maximum rated or effective dose rate	(7)
6.1.5 Radiation field geometry	(7)
6.1.6 Polarization effect	(7)
6.1.7 Energy Response	(7)
6.1.8 Ionization chamber orientation	(8)
6.1.9 Shell ionization chamber rod leakage	(9)
6.2 Measurement Component Performance Requirements	(9)
6.2.1 Effective range	(9)
6.2.2 Repeatability	(9)
6.2.3 Long-term stability	(9)
6.2.4 Stable time	(9)
6.2.5 Zero drift	(9)
6.2.6 Zero point shift	(9)
6.2.7 Nonlinearity	(10)
6.2.8 Dosimeter Gauging Component Leakage Charge	(10)
6.2.9 Dosimetry dose rate response of the measurement module	(10)
6.2.10 Range Conversion	(10)

6.2.11	Dead time for dosimeter measuring unit	(11)
6.2.12	Dose rate meter response time of the measuring unit	(11)
7	General technical requirements	(11)
7.1	Appearance and Structure	(11)
7.1.1	Appearance	(11)
7.1.2	Marking	(11)
7.1.3	Indication and display	(11)
7.1.4	Display or data output terminal resolution	(11)
7.2	Function check	(11)
7.2.1	Battery indication and compensation	(11)
7.2.2	Response time	(12)
7.2.3	Input Current Threshold	(12)
7.2.4	Automatic termination of measurement in dose mode	(12)
7.3	Environmental Adaptability	(12)
7.3.1	Temperature	(12)
7.3.2	Humidity	(12)
7.3.3	Atmospheric pressure changes	(12)
7.3.4	Vibration, free fall and roll test	(13)
7.3.5	Electromagnetic compatibility (EMC)	(13)
7.3.6	Network Power Measurement Module	(13)
8	Type Evaluation Item List	(13)
9	To provide the number and use of prototypes	(15)
9.1	Provide the number of prototypes	(15)
9.2	Provide prototype use	(15)
10	Test methods and conditions of test items and data processing and acceptance criteria	(16)
10.1	Test conditions	(16)
10.1.1	Standard test conditions	(16)
10.1.2	Component Test	(17)
10.1.3	Nominal or effective range of dose (or kerma) rate	(18)
10.1.4	Measurement Uncertainty	(18)
10.1.5	Test adjustments	(18)
10.1.6	Special Test Conditions for Ionization Chamber Components	(18)
10.1.7	Special test conditions for measuring components	(18)
10.1.8	Stability test device specific test conditions	(19)

10.2 Appearance and function check (19)

10.2.1 Test Purposes (19)

10.2.2 Test conditions (19)

10.2.3 Test Procedure (20)

10.2.4 Pass judgment (20)

10.3 Measurement Performance Check (20)

10.3.1 No radiation leakage (20)

10.3.2 Leakage after irradiation (20)

10.3.3 Long-term stability of ionization chamber components (21)

10.3.4 Minimum rated or effective dose rate (21)

10.3.5 Maximum rated or effective dose rate (22)

10.3.6 Radiation field size (23)

10.3.7 Polarization effect (23)

10.3.8 Energy response of the shell ionization chamber for measuring the kinetic energy of mid-energy X-ray air in air (24)

10.3.9 Shell ionization chamber energy used to measure the kinetic energy of mid-energy X-ray and gamma-ray air in air

8 Type Evaluation Item List (13)

9 to provide the number and use of prototypes (15)

10.3.7 Polarization effect (23)

10.3.8 Energy response of the shell ionization chamber for measuring the kinetic energy of mid-energy X-ray air in air (24)

10.3.9 Shell ionization chamber energy used to measure the kinetic energy of mid-energy X-ray and gamma-ray air in air Response (25)

10.3.10 Photon-irradiated water used to measure the energy range of mid-energy X-rays to ⁶⁰Co-gamma rays in the phantom Shell ionization chamber energy response to absorbed dose (25)

10.3.11 Shell Ionization Chamber Energy Response for Measuring the Absorbed Dose of High-Energy Photon Radiation Water in a Mold (26)

10.3.12 Shell ionization chamber energy response for measuring absorbed dose of high-energy electron-emitting water in phantoms (26)

10.3.13 For the measurement of air soft X-ray (tube voltage not greater than 100kV) air ratio of the release Energy Response of Parallel Plate Ionization Chamber (27)