

ICS 13.280
CCS C 57

WS

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

WS 582-2017

**Specifications for testing of quality control in X and γ ray
stereotactic radiotherapy system
(English Translation)**

Issued on: October 27, 2017

Implemented on: May 1, 2018

**Issued by: National Health and Family Planning Commission of the
People's Republic of China**

Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Requirements	
5 Testing equipment and phantom	
5.1 Dose detector	
5.2 Film and scanner	
5.3 Phantom	
6.2 Focus dose rate	
6.4 Dimensional deviation of irradiation field	
6.5 Penumbra width of the irradiation field	
7 Ray stereotactic radiotherapy system detection method	
7.1 Isocentric deviation	
7.2 Treatment positioning deviation	
7.4 Penumbra width of irradiation field	
7.5 Relative deviation between planned dose and measured dose at isocenter	

Foreword

Chapter 4 of this standard is mandatory, and the rest are recommended.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard consists of the quality control part of GBZ 168-2005 "X, gamma-ray head stereotactic surgery radiological protection standards" Transformed. Compared with the quality control part of GBZ 168-2005, the main technical changes are as follows.

--The scope is expanded to the items, methods and technical requirements of quality control testing of body X and gamma-ray stereotactic radiotherapy systems;

--Modified the item name of "the maximum deviation of the irradiation field size from the nominal value" in the test items of the gamma-ray stereotactic radiotherapy system and testing and judging methods;

-The term "(gamma-knife positioning) mechanical center" is modified to "positioning reference point";

--Added an informative appendix for the quality control test phantom of the body X and gamma-ray stereotactic radiotherapy system.

Drafting organizations of this standard. Institute of Radiation Medicine, Shandong Academy of Medical Sciences, Institute of Radiation and Radiation Medicine, Academy of Military Medical Sciences, Guangzhou Eastern Province Occupational Disease Prevention Hospital.

1 Scope

This standard specifies the requirements and methods for quality control testing of X and gamma-ray stereotactic radiotherapy systems.

This standard applies to gamma-ray stereotactic radiotherapy system (hereinafter referred to as "therapeutic system") and X-ray stereotactic radiotherapy System (hereinafter referred to as "X-knife") quality control inspection.

This standard does not apply to quality control testing of robotic radiotherapy devices.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GBZ 126 Radiation Protection Requirements for Electron Accelerator Radiotherapy

3 Terms and definitions

The following terms and definitions apply to this document.

X and gamma ray stereotactic radiotherapy system Using stereotactic equipment, X-ray computed tomography equipment (hereinafter referred to as "CT") and other imaging equipment and radiotherapy planning system System (hereinafter referred to as "TPS"), to determine the exact position and range of the diseased tissue and adjacent important organs, using X-rays or gamma-rays to focus on A device that targets radiotherapy.

Focus

In the treatment system, the intersection of all beam axes.

Reference localization point in the treatment system, when the system is in the predetermined irradiation position, the calibration points of the treatment bed and the stereotaxic device are used to indicate the treatment system Position the center.

Center of radiation field in the treatment system, the focal point is perpendicular to and

parallel to the multi-beam symmetry axis or the central axis of rotation in the plane, and the 50% isodose curve the center point of the defined area.

4 Requirements

4.1

See Appendix A for the quality control test items and technical requirements of X and gamma-ray stereotactic radiotherapy systems. For the model used in Appendix A for the inspection items completed by the body, the head model should be used for head treatment; the phantom should be used for body treatment; at the same time, the head the body treatment should be done separately using a head model and a phantom.

4.2

The selection of inspection items for acceptance inspection and status inspection shall be carried out in accordance with Appendix A. The selected item does not meet the corresponding requirements in Appendix A when required, it shall be stated in the test report.

4.3

The content of the report of acceptance inspection and status inspection shall at least include. basic information of the inspected unit, basic information of the inspected equipment, inspection items, Test conditions, test results and test conclusions.

4.4

Acceptance testing and status testing results are equal to or better than the corresponding requirements in Appendix A as qualified.

4.5

The items of stability testing should include at least the items indicated in Appendix A, and the testing frequency should not be less than the period indicated in Appendix A. Make the user unit shall record and archive relevant information such as the date of stability test, test personnel, test results, etc.

5.1 Dose detector

5.1.1

The ionization chamber detector is suitable for measuring the absorbed dose of X and gamma-ray stereotactic radiotherapy systems.

5.1.2

The external dimensions of the effective collection volume of the ionization chamber detector should meet the measurement requirements.

5.2 Film and scanner

5.2.1

The film scanner shall meet the technical requirements for scanning film. Before use, the scanner should be sized. When scanning, you should Select the scanning light channel and scanning direction as required.

5.2.2

The film should have low energy dependence, close to human tissue density and sufficient spatial resolution (at least 10lp/mm).

5.2.3

Regular maintenance of the film and scanner. When changing different types and batches of film, the dose-gray curve should be re-established. with when a batch of film is used for a long time, the dose-gray curve should be updated regularly (generally not more than 3 months).

5.3 Phantom

5.3.1

The phantom should be made of homogeneous materials with a density similar to that of human tissues. Solid water materials are recommended. There are slots in the mold, Used to insert film inserts or detector inserts.

5.3.2

The head mold should use a spherical phantom, and the phantom should use a cylindrical phantom with an oval cross section. For the recommended shape and size of the phantom, see Appendix B.

5.3.3

The gap between the insert plate and the slot of the phantom, between the insert plate and the film, and between the detector and the socket should be as small as possible, so that the measurement is not Prone to displacement.

5.3.4

There should be positioning holes on the film insert. The cross-sectional diameter of the positioning hole should not exceed 1.0mm. The recommended positioning hole distribution is shown in the attachment Record B.

5.3.5

When the phantom is at an ambient temperature of 15°C~35°C, atmospheric pressure of 80kPa~110kPa, and a relative humidity of 30%~75%, no size change should occur.