

JIS

JAPANESE INDUSTRIAL STANDARD

Source container of
measuring instrument
utilizing ionizing radiation

JIS Z 4614-1993

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1. Scope This Japanese Industrial Standard specifies the requirements of the container which is used to storage the sealed radioisotope source over 3.7 MBq, which has the fire resistant structure and is used for the measuring instruments utilizing ionizing radiation (hereafter referred to as "source container").

Remarks 1. The measuring instruments utilizing ionizing radiation mentioned here means thickness meter, level meter, density meter, sulphur content meter for hydrocarbons, moisture meter, gamma-rays relay, etc. but gas chromatograph is excluded.

2. The following standards are cited in this Standard.

JIS C 0021-1987 Basic environmental testing procedures Part 2: tests, Test B: Dry heat

JIS C 0040-1987 Basic environmental testing procedures Part 2: tests, Test Fc and guidance: Vibration (sinusoidal)

JIS C 0041-1987 Basic environmental testing procedures Part 2: tests, Test Ea: Shock

JIS C 1602-1981 Thermocouples

JIS Z 4001-1991 Glossary of terms used in nuclear energy

JIS Z 4333-1990 Portable photon ambient dose equivalent ratemeters for radiation protection

JIS Z 8103-1990 Glossary of terms used in instrumentation

2. Definitions For the purposes of this Standard, the definitions given in JIS Z 4001, JIS Z 8103 and the following definitions apply:

- (1) outmost shell of source container A part of the outmost shell of source container.
- (2) radiation shield A generic term of the parts which are used to shield leakage, from the source container to outside, of radiation caused to source stored in the source container.
- (3) source holder Device which is used to directly hold radiation source.
- (4) window of source container A irradiation hole of the outmost shell of source container used for irradiation of radiation.
- (5) shutter A mechanism which is used for irradiation of radiation from the window of source container and its stop by remote or manual operation.

3. Performance

3.1 Vibration resistance The performance of source container should meet 3.3 and 3.4 without any damages and troubles when the test is performed in accordance with 6.2.

3.2 Shock resistance The performance of source container should meet 3.3 and 3.4 without any damages and troubles when the test is performed in accordance with 6.3.

3.3 Endurance of shutter The performance of source container should meet 3.4 under the condition where its shutter is closed when the test is performed in accordance with 6.4.

Also, its function should not receive any damages by this test.

3.4 Shielding power of radiation The shielding power of radiation should meet the following requirements.

- (1) The leak dose equivalent rate of the source container which is used for storage of beta-rays source should not exceed $6 \mu\text{Sv/h}$ at the point of 0.5 m from the surface of source container, when the test is performed in accordance with 6.5.
- (2) The leak dose equivalent rate of the source container which is used for storage of X-rays source, gamma-rays source and neutron source should not exceed 2 mSv/h at the surface of source container and $100 \mu\text{Sv/h}$ at the point of 1 m from the surface of source container, when the test is performed in accordance with 6.5.

3.5 Fire resistance The source holder and shutter of the source container should not drop out from the outmost shell of source container, when the test is performed in accordance with 6.6.

Also, remarkable deformation of the source container including its outmost shell should not be caused by this test.

4. Structure The structure is as follows.

- (1) The source container consists of outmost shell of source container, shutter, source holder (hereafter called the main components) and radiation shield. However, shutter is not required in case where source container has no window.

Also, it is allowable that the exclusive shield is equipped in place of radiation shield in the case where it is necessary to separate the radiation shield from the main components in the principle of measurement.

Remarks: The exclusive shield mentioned here means the shield which is exclusively prepared and can be mechanically separated from source container in some density meter or moisture meter and so on.

- (2) Diaphragm, plate, net, etc. should be prepared to the window of source container.
- (3) The shutter of remote operation type should certainly act and have a device which can detect its open or close condition, in addition, automatically close in case of a power failure, a fire, etc.
- (4) The shutter of manual operation type should certainly act and have a function which can check its open or close condition, and be able to lock under its close condition to prevent change to its open condition without permission.