

20 Instruments Containing Ni-63

Scope

1. This Chapter covers instruments containing nickel-63 (Ni-63), and describes the requirements for keeping, using and disposing of such equipment. Summaries of the radiation risks and regulatory requirements for common MOD equipment containing Ni-63 are included in the annexes of this Chapter. This is not a comprehensive catalogue of all equipment containing Ni-63. If equipment used by the unit or establishment is not included, contact the RPA for further information. The summaries of the radiation risks satisfy the requirement for the radiological aspects of a risk assessment for normal operation and use and form the basis of information for input into the local orders.

Statutory Requirements

2. In addition to the general requirements of the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, the following specific legislation applies directly or is applied indirectly through parallel arrangements designed to achieve equivalent standards:

- a. Ionising Radiations Regulations 2017 (IRR17) (apply directly);
- b. Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR16) (parallel arrangements);
- c. Environmental Authorisations (Scotland) Regulations 2018 (EASR18) (parallel arrangements);
- d. Radioactive Substances Act 1993 (Northern Ireland) (as amended) (RSA93) and associated Exemption Orders; and
- e. Carriage of Dangerous Goods and Transportable Pressure Equipment Regulations 2009 (as amended) (apply directly).

Duties

3. Duties as detailed in Chapter 39 apply.

Hazard

4. Nickel-63 emits low energy beta radiation that will not penetrate the instrument casing. Undamaged equipment does not present an external hazard during routine use. A leaking Ni-63 source will cause contamination that could lead to an internal hazard if Ni-63 enters the human body.

5. Bremsstrahlung X-rays are absorbed by the casing and no significant radiation dose rates will be measured on the outside surface of the instrument.

Summary Radiation Risks and Regulatory Requirements for CAMs

Chemical Agent Monitor (CAM)	
Description	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Monitor</p> </div> <div style="text-align: center;">  <p>Marking</p> </div> <div style="text-align: left;"> <p>A Nickel 63 electro-plated radioactive source is used by the Sensor Cell enclosed within the instrument. NSN 6665-99-225-3836 is the complete set with case. NSN 6665-99-051-1388 is the old version and looks identical.</p> </div> </div>
Use	Chemical Agent Monitor
Supplier	Smiths Detection Ltd, Watford. UK
NSN	6665-99-225-3521 / 6665-99-225-4126
IPT details	Combat Support Equipment (CSE) IPT
Radionuclide	Nickel-63 (Ni-63)
Ionising radiation	Beta (67 keV maximum)
Half life	100.1 years
Original activity	370 MBq
Hazard	The beta particles are of low energy and are absorbed by the casing. Bremsstrahlung X-rays are absorbed by the casing and no significant radiation dose rates will be measured on the outside surface of the instrument. Consequently, the undamaged equipment does not present an external radiation hazard during routine use.
Risk assessment	The likelihood of accidental damage to this instrument so that Ni-63 could escape is low. There is no external radiation hazard presented by the undamaged open source. A severe incident, for example, crushing or significant internal corrosion, could possibly result in the spread of Ni-63 if the source were damaged. In some highly unlikely circumstances, there is a potential for an internal dose to be received. For further advice contact the RPA.
Local orders	Details of the control measures taken from this chapter are to be included in the local orders for the use of CAM. JSP 392, Chapter 16 gives guidance to the content of local orders.
Control measures during use	No special precautions are required when handling this equipment.
Inspection	Annually as well as during routine maintenance. A check is to be made for signs of damage.
Leak test	There is no requirement to leak test a CAM whilst it is hermetically sealed and stored in Method II packaging. Otherwise testing is required for this component on a 24-month basis. See Table 2 of this chapter and JSP 392, Chapter 9.

Accounting	<p>This item is to be accounted for on a Radioactive Source List. JSP 392, Chapter 9 refers.</p> <p>Mustering is to be at a frequency determined by the potential for loss. A muster and associated records are to be undertaken at least monthly.</p> <p>Any change of location or custodian is to be entered in the Source Movement Log.</p>
EPR16/EASR18/RSA93	<p>Exempt provided storage and disposal arrangements are adhered to. For premises in Scotland a notification must be submitted to SEPA for the management (other than the disposal) of an electrodeposited source.</p> <p>This item must be included in the Annual Holdings Return to Dstl. See Chapter 3.</p>
Storage and labelling	<p>This item is to be stored in a dedicated area for radioactive materials. JSP 392 Chapter 9 refers.</p> <p>The equipment is to display the recognised radioactive warning trefoil label.</p> <p>The storage area is also to display a sign indicating the presence of radioactive material within i.e. a radiation warning trefoil including the contact name and telephone number of the RPS or WPS and stating the nature of the radiological hazard - Items containing radioactive material. No radiation hazard from intact equipment. Radioactive contamination hazard if equipment is damaged.</p>
Contingency plans Spills Loss	<p>If a breakage occurs the area is to be cordoned off. The broken source fragments item can be cleaned up using a breakage kit. Chapter 40 refers.</p> <p>Broken fragments to be disposed of as directed by the RPA.</p> <p>If this item is involved in any unusual occurrence, follow Chapter 14. Contact the RPA.</p>
Transport	<p>This item is to be transported as an Excepted Package; Dangerous Goods Manual refers.</p>
Disposal	<p>Ships, Units and establishments are to return this item to the Stores Organisation.</p>

Summary Radiation Risks and Regulatory Requirements for MK10NHA

Mk10NHA	
Description	<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p style="text-align: center; margin-top: 5px;">Mk 10NHA unit Ni-63 Source Markings</p> <p>A Nickel-63 check source is found within the detector. It is held in place on plastic supports in the twin-drift tube sensor cell</p>
Use	Ship Installed Chemical Agent Detector check source
Supplier	Smith Detection Ltd, Watford. UK
NSN	6665-99-037-0455 or 6665-99-591-3031
IPT details	Marine Environment Survivability and Habitability – Chemical Biological Radiological Nuclear (MESH) IPT
Radionuclide	Nickel-63 (Ni-63)
Ionising radiation	Beta (67 keV maximum)
Half life	100.1 years
Original activity	370 MBq
Hazard	The beta particles are of low energy and are absorbed by the casing. Bremsstrahlung X-rays are absorbed by the casing and no significant radiation dose rates will be measured on the outside surface of the instrument. Consequently, the equipment does not present an external radiation hazard during routine use.
Risk assessment	The likelihood of accidental damage to this source when installed to such a degree that Ni-63 escape is low. A more severe accident, for example, crushing, could possibly result in the spread of Ni-63 if the source were damaged. In some highly unlikely circumstances there is a potential for an internal dose to be received. For further advice contact the RPA.
Local orders	Details of the control measures taken from this chapter are to be included in the local orders for the use of this source. JSP 392, Chapter 16 gives guidance to the content of local orders.
Control measures during use	During normal use no special precautions are required. During maintenance, undertaken only by recognised calibration facilities, it is recommended that the maintainer wear waterproof gloves when opening the detector.
Inspection	Annually as well as during routine maintenance. Checks are to be made for signs of damage.
Leak testing	A leak test is required every year . The leak test certificate must be retained for at least 2 years. See Table 2 of this chapter and JSP 392, Chapter 9.

Accounting	<p>The source must be accounted for on a Radioactive Source List under the care of an appointed RPS or WPS (RAM) (see Chapter 9). All radioactive material is to be mustered at least monthly. Any change of location is to be entered in the Source Movement Log together with any change in custodian.</p>
EPR16/EASR18/ RSA93	<p>This item is exempt from notification subject to storage and disposal arrangements being adhered to. For premises in Scotland a notification must be submitted to SEPA for the management (other than the disposal) of an electrodeposited source. This must be included in the Annual Holdings Return to Dstl. JSP 392, Chapter 3 refers.</p>
Storage and labelling	<p>If not installed, this item is to be stored in a dedicated area for radioactive materials. JSP 392, Chapter 9 refers. The equipment is to have the recognised radioactive trefoil on it. The storage / installed area is also to have a sign showing radioactive material within i.e. a trefoil including the contact name and telephone number of the RPS or WPS (RAM) and stating the nature of the radiological hazard - Items containing nickel-63. No radiation hazard from intact equipment. Radioactive contamination hazard if equipment damaged.</p>
Contingency plans Spills Loss	<p>If a breakage occurs the area is to be cordoned off. The broken source fragments item can be cleaned up using a breakage kit. Chapter 40 refers. Broken fragments are disposed of as directed by the RPA. If this item is involved in any unusual occurrence, follow JSP 392, Chapter 14 refers. Contact the RPA</p>
Transport	<p>This item may be transported as an excepted item. Dangerous Goods Manual refers.</p>
Disposal	<p>Units and establishments are to return this item to the Stores Organisation.</p>

Summary Radiation Risks and Regulatory Requirements for Man Portable Chemical Agent Detectors

Man Portable Chemical Agent Detector	
Description	 <p>A portable monitor which is used to detect nerve blister and blood agents.</p> <p>It contains two electrodeposited Nickel-63 sources of 370 and 185 MBq (Total 555 MBq). The Nickel-63 is electroplated onto stable nickel and then onto a brass substrate</p>
Use	Chemical Agent Monitor
Supplier	Smiths Detection Ltd, Watford. UK
NSN	6665-99-809-0326
IPT details	CSE IPT
Radionuclide	Ni-63
Ionising radiation	Beta (67 keV maximum)
Half life	100.1 years
Original activity	555 MBq
Hazard	The beta particles are of low energy and are absorbed by the casing. Bremsstrahlung X-rays are absorbed by the casing and no significant radiation dose rates will be measured on the outside surface of the instrument. Consequently, the undamaged equipment does not present an external radiation hazard during routine use.
Risk assessment	The likelihood of accidental damage to this instrument so that Ni-63 could escape is low. The following internal doses have been estimated using pessimistic assumptions: A severe incident, for example, crushing or significant internal corrosion, could possibly result in the spread of Ni-63 if the source were damaged. In some highly unlikely circumstances, there is a potential for an internal dose to be received. For further advice contact the RPA. The equipment does not present an external radiation hazard if undamaged.
Local orders	Details of the control measures taken from this chapter are to be included in the local orders for the use of this source. JSP 392, Chapter 16 gives guidance to the content of local orders.
Control measures during use	No special precautions are required when handling this equipment.
Inspection	Annually as well as during routine maintenance a check is to be made for signs of damage.

Leak test	There is no requirement to leak test a CAM whilst it is hermetically sealed and stored in Method II packaging. Otherwise testing is required for this component on a 24-month basis. See Table 2 of this chapter and JSP 392, Chapter 9.
Accounting	The source must be accounted for on a Radioactive Source List under the care of an appointed RPS or WPS (RAM) (see JSP 392 Chapter 9). All radioactive material is to be mustered at least monthly. Any change of location is to be entered in the Source Movement Log together with any change in custodian.
EPR16/EASR18/ RSA93	This item is exempt subject to storage and disposal arrangements being adhered to. For premises in Scotland a notification must be submitted to SEPA for the management (other than the disposal) of an electrodeposited source. This must be included in the Annual Holdings Return to Dstl. JSP 392, Chapter 3 refers.
Storage and labelling	This item is to be stored in a dedicated area for radioactive materials. JSP 392, Chapter 9 refers. The equipment is to display the recognised radioactive warning trefoil label. The storage area is also to display a sign indicating the presence of radioactive material within i.e. a radiation warning trefoil including the contact name and telephone number of the RPS and stating the nature of the radiological hazard - Items containing radioactive material. No radiation hazard from intact equipment. Radioactive contamination hazard if equipment is damaged.
Contingency plans Spills Loss	If a breakage occurs the area is to be cordoned off. The broken source fragments item can be cleaned up using a breakage kit. Chapter 40 refers. Broken fragments to be disposed of as directed by the RPA. If this item is involved in any unusual occurrence, follow JSP 392, Chapter 14. Contact the RPA.
Transport	This item is to be transported as an Excepted Package. Dangerous Goods Manual refers.
Disposal	Units and establishments are to return this item to the Stores Organisation.