

Leaflet 19

Gaseous Tritium Light Sources (GTLs) and Gaseous Tritium Light Devices (GTLDs)

CONTENTS

Paragraph

- 1 Scope
- 4 What is a GTLS?
- 5 Statutory requirements and parallel arrangements
Duties
 - 6 Commanding Officer and Head of Establishment (CO/HoE)
 - 7 Radiation Safety Officer (RSO)
 - 8 Radiation Protection Supervisor (RPS)
 - 9 Workplace Supervisor (Radioactive Materials) (WPS) (RAM)
- 10 Employees
- 11 Classification of GTLSs or GTLDs
- 16 Markings of GTLSs or GTLDs
- 18 Tritium monitoring and detection
- 20 Risk assessments for GTLSs and GTLDs
- 21 Handling of GTLSs and GTLDs
- 22 Breakage of GTLSs and GTLDs
- 25 Legal and MOD mandatory requirements

Table

- 1 Hazards associated with GTLSs and GTLDs
- 2 Radioactive Waste Disposal Limits
- 3 Legal and MOD mandatory requirements for GTLSs and GTLDs

Figure

- 1 Tritium marking.....
- 2 Standard radiation trefoil. Colour of symbol: black on yellow or white background

Annex

- A SA80 blade sight assembly – example of a summary radiation risk assessment
- B SUSAT sight light assembly – example of a summary radiation risk assessment
- C Silva Compass – example of a summary radiation risk assessment
- D Specific guidance for GTLD repair workshops

Scope

1 A gaseous tritium light source (GTLs) is a sealed glass container filled with radioactive tritium gas. GTLSs may be referred to as betalights, trilux or nuclear lamps and are used to provide illumination.

2 A gaseous tritium light device (GTLD) is equipment containing one or more GTLS. There are many types of GTLDs in service use, including prismatic compasses, defile markers and SUSAT weapon sights.

3 This Leaflet describes the radiological requirements for keeping, using and disposing of such equipments. Summaries of the radiation risk and regulatory requirements for examples of GTLSs and GTLDs are provided at the Annexes to this leaflet. Summary risk assessments for a comprehensive range of GTLSs and GTLDs are available from the RPA who may also be consulted for further advice regarding the hazards and requirements for these items.

What is a GTLS?

4 A GTLS is a glass capsule coated internally with a phosphor and filled with tritium gas, a radioactive isotope of hydrogen. Low energy beta particles, which are emitted during the radioactive decay of tritium, react with the phosphor to produce a continuous emission of light. If a capsule is broken, the escape of tritium could result in a health risk, particularly if the breakage occurs in a confined space. When a GTLS is broken, provided that the area is reasonably well ventilated, the tritium gas will disperse relatively quickly, however some activity will remain bonded to the phosphor and shards. The sources also contain small quantities of tritiated water, which also tend to remain associated with the phosphor and fragments of glass for a considerable time following breakage.

Statutory Requirements

5 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:

- Ionising Radiations Regulations 1999 (IRR99) (apply directly);
- Environmental Permitting (England & Wales) Regulations 2010 (EPR10) (as amended) (parallel arrangements);
- Radioactive Substances Act 1993 (Scotland & Northern Ireland) (as amended) (RSA93) (parallel arrangements);

Carriage of Dangerous Goods and Transportable Pressure Equipment Regulations 2009 (apply directly).

Duties

Commanding Officer and Head of Establishment (CO/HoE)

6 The CO/HoE has a duty to the Secretary of State, and a personal responsibility, to protect the environment and secure the health, safety and welfare of their staff at work. The CO/HoE is also required to protect persons not in MOD employment (e.g. members of the public) against risks to their health and safety arising from the MOD work activities. This includes radiation safety. The CO/HoE's authority (but not responsibility) for radiation safety management arrangements may be delegated to appropriate personnel, such as a Radiation Safety Officer (RSO).

Radiation Safety Officer (RSO)

7 The Radiation Safety Officer (RSO) is to ensure that:

- They are familiar with the specific radiation hazards at their unit or establishment and that an appropriate risk assessment has been carried out;
- Local orders include the requirements for keeping, using and disposing of GTLSs or GTLDs containing radioactive material as detailed in this Leaflet;
- Staff are appointed, instructed and trained in their duties relating to this Leaflet;
- The requirements stemming from this Leaflet are subject to audit.

Radiation Protection Supervisor (RPS)

8 Where an RPS is appointed, they are to ensure that work is carried out in accordance with the local orders for radiation safety which are to include the requirements of this Leaflet. Further information on the requirements for appointment of an RPS is given in Table 2.

Workplace Supervisor (Radioactive Materials) (WPS) (RAM)

9 In units holding GTLSs or GTLDs but where it is unnecessary to appoint an RPS, a WPS (RAM) is to be appointed with duties to ensure that work is carried out in accordance with the local orders for radiation safety which are to include the requirements of this Leaflet.

Employees

10 It is the responsibility of all employees to ensure that they are familiar with the relevant parts of local orders to ensure that these items are handled safely and correctly. Any incidents are to be reported to the appropriate supervisor or line manager.

Markings of GTLSs or GTLDs

16 The following markings may be found on GTLSs or GTLDs.

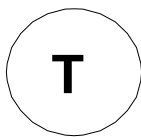


Figure 1 Tritium marking.

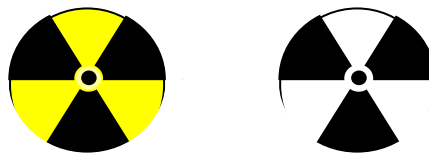


Figure 2 Standard radiation trefoil radioactive valves. Colour of symbol: black on yellow or white background.

17 Where possible GTLSs and GTLDs in storage are to be kept in their original containers or packaging and are to be marked with the following information:

- NATO stock number;
- Number of GTLSs/GTLDs in package;
- Total activity of GTLSs/GTLDs in package;
- The word 'radioactive' and the trefoil symbol.

Hazards

Table 1 Hazards associated with GTLSs and GTLDs

Radiation type		Emitted	Comments
Alpha		✘	
Beta	Direct	✓	Low energy beta radiation is emitted from GTLSs and GTLDs, but the energy of the beta is insufficient to penetrate beyond the casing. Tritium can present a hazard internal to the body if taken in by ingestion, inhalation, or absorption through the skin or through cuts in the skin. Of the two forms of tritium, tritiated water presents the far greater health hazard due to its more significant ability to enter the body both by inhalation and by rapid absorption through the skin.
	Bremsstrahlung	✓	Low levels of Bremsstrahlung radiation (X-rays) are emitted from valves containing beta emitters.
Gamma		✘	
X-rays		✘	
Neutrons		✘	

Tritium Monitoring and Detection

18 The radiation dose rate from a GTLS or GTLD will be low due to the very low energy beta radiation emitted and will therefore generally be less than 1 $\mu\text{Sv/hr}$. It is very difficult to detect tritium contamination without the use of specialised monitoring instrumentation. Tritium surveys are therefore generally carried out by indirect means involving the taking and analysis of smears of the surfaces to be monitored.

19 It is also difficult to monitor for tritium in the air and thus assess the internal hazard following a release of tritium into the atmosphere. Therefore, for workers who have potentially been exposed to tritium, it may be necessary to carry out tritium-in-urine monitoring to assess the amount of tritium taken into the body and the resulting radiation dose.

Risk Assessments for GTLSs and GTLDs

20 The number of GTLSs and GTLDs in service within MOD is too large to list in this publication. Similarly, it is not possible to include risk data for all items. However, summary risk assessments for an example are reproduced at Annexes A to C of this Leaflet. These summary risk assessments may be used to scope the hazard and control requirements for a wider range of GTLSs and GTLDs and may be used, where appropriate, as input to the risk assessments and local orders required in accordance with Leaflets 2 and 16 respectively. Specific risk assessments would be required where large quantities (> 1000 GBq) of GTLSs and GTLDs are stored. Advice on further detail and assessments may be sought from the RPA.

Handling of GTLSs and GTLDs

21 No protective clothing is required for the routine handling of GTLSs and GTLDs. Specific advice for those involved in repairing GTLSs or GTLDs is given in Annex D.

Breakage of GTLSs and GTLDs

22 All reasonable practical steps are to be taken to prevent any GTLS or GTLD being damaged. Wherever there are reasonable grounds to believe that the glass has been cracked or broken, the GTLS breakage routine as described in Leaflet 40 should be enforced.

23 A broken GTLS or GTLD is potentially hazardous because loose radioactive material can enter the body by a variety of means including inhalation of gaseous material (if present), inhalation of radioactive dust and absorption through cuts or scratches in the skin.

24 Because GTLSs and GTLDs contain gaseous tritium (H-3), it is important that the room or compartment where the breakage has occurred is vacated for 1 hour to ventilate before dealing with the broken fragments wearing suitable personal protective equipment. Detailed guidance on the procedure for dealing with a broken GTLS or GTLD can be found in Leaflet 40.

25 Liquid leaking out of compasses containing tritium should be dealt with as a broken GTLS.

Loss or Theft of GTLSs and GTLDs

26 GTLSs of more than 10 GBq are reportable to the HSE via the RPA in the event of any loss or theft. Further guidance can be found in Leaflet 14.

Disposal of Damaged GTLSs and GTLDs

27 Within the UK, the disposal of GTLS fragments and associated waste arisings may be undertaken using the normal refuse route. The disposal container is to be securely sealed and not have any visible markings to indicate the presence of radioactive material. Advice should be sought from the Dstl Radiation Waste Advisor (RWA) or Radiation Protection Adviser (RPA).

28 Disposal of broken GTLSs and GTLDs must comply with waste Category A limits (Table 2).

Table 2 Radioactive waste disposal limits

Waste category	Radioactive waste	Maximum activity per dustbin load (0.1 m ³ of non radioactive waste)	Annual limit
A	Individual sealed source	20 GBq of tritium (H-3)	10000 GBq
B	Solid radioactive waste containing tritium only with no single item > 400 kBq	4 MBq	2 GBq
C	Luminised article with no single item containing > 4	4 GBq of tritium	100 GBq of tritium

	GBq of tritium		
--	----------------	--	--

29 Details of the broken GTLSs or GTLDs material disposed of and the disposal route should be entered on the radioactive source list and the Dstl Annual Holdings Return.

30 These disposal arrangements cover non-routine occurrences and should not be used for situations where a continuous waste stream is being generated. Unless otherwise advised, intact GTLSs and GTLDs should be returned through stores for re-cycling.

Legal and MoD Mandatory Requirements

31 Table 3 below summarises the legal and MOD mandatory requirements for GTLSs and GTLDs. In cases of doubt, the RPA is to be consulted for advice.

Table 3 Legal and MOD mandatory requirements for GTLSs and GTLDs

Requirement	Applicable	Comments	Related Leaflet*
HSE authorisation	✗		
HSE notification	✓	The HSE is to be notified in accordance with Leaflet 3, if there are any GTLSs or GTLDs on the site having a cumulative activity of greater than 1 GBq.	3
Notification to environmental regulators**	✗ (but see comment)	Most holders of GTLSs or GTLDs containing tritium will be exempt from notification. Consult RPA.	3
Risk assessment	✓	See summaries at annexes to this Leaflet. Further specific risk assessments or prior risk assessments may be required, especially where large quantities (> 5000 GBq) are stored (see Leaflet 2).	2
Restriction of exposure	✓	Observe manufacturer's instruction and guidance. Also, see Leaflet 4.	4
PPE	✗	Not required except when dealing with a breakage (see Leaflet 40).	
Maintenance of radiation engineering controls	✗ (but see comment)	For very large quantities (> 5000 GBq) of GTLSs or GTLDs it may be appropriate to ventilate the storage areas, depending on the outcome of the risk assessment. These ventilation systems are to be maintained on a regular basis in accordance with manufacturer's instructions.	
Contingency plans	✓	See Leaflet 40 breakage and fire	40
Designated areas	✗ (but see comment)	The presence of GTLSs and GTLDs in equipment does not usually, lead to a requirement for area designation. Stores holding quantities of electronic GTLSs or GTLDs may require designation if they meet the criteria detailed in Leaflet 4. Note: small stores which people cannot enter (e.g. drawers or cupboards) do not require designation but must be appropriately marked.	
Monitoring	✗ (but see comment)	Indirect monitoring may be required in areas where maintenance or repair on GTLSs or GTLDs is carried out.	
Training for users	✓	Information and instruction only.	15
Local orders	✓	See Leaflet 16 for guidance.	16

Requirement	Applicable	Comments	Related Leaflet*
Appointed person	✓	RPS not required except for storage areas required to be designated as controlled or supervised. Where an RPS is not required, a WPS (RAM) needs to be appointed in accordance with Leaflet 15.	15
Storage	✓	In a segregated secure store/container/cupboard marked with radiation trefoil warning sign and stored in accordance with Leaflet 9. May require ventilation for large quantities (> 5000 GBq) depending on outcome of risk assessment. GTLs and GTLDs are not to be removed from their cartons until required.	9
Accounting	✓	Recorded on a source list (retained for 2 years) and mustered in accordance with Leaflet 9. Recorded on Dstl Annual Holdings Return, copy retained for 1 year.	9
Leak testing	✗	Leak testing is not appropriate for GTLs or GTLDs.	
Personal dosimetry	✗		
Reporting procedures	✓	All losses & certain other incidents must be reported to MOD authorities. Losses of more than 10 GBq are reportable to the HSE. Reporting to other external regulatory authorities may also be required. Consult the RPA. See Leaflet 14 for details.	14
Transport	✓	Generally transported as Excepted Packages if activity per GTLs is <800 GBq & total activity per package < 8000GBq (see JSP800 Vol 4a or 4b)	JSP800 Volumes 4a & 4b
Marking	✓	All GTLs, GTLD, equipment containers & stores are to be marked in accordance with this Leaflet	-
Sale/transfer	✓	See Leaflet 11	11
Disposal of redundant items	✓	Unbroken GTLs and GTLDs should be returned via stores. Broken GTLs should be placed in a suitable sealable container (e.g. a paint tin) following the approved cleanup procedure. In the UK the disposal of the tin, GTLs fragments, cloths, gloves etc, is into a normal refuse route, provided the activity of the item is not greater than 20 GBq and not more than 1 item is disposed of in any 0.1m ³ of non-radioactive waste. The disposal container should have all markings that indicate the presence of radioactive material removed. Disposal must not be to a tip on the establishment site. Overseas, broken GTLs are to be returned via stores. Where surplus MOD stocks are sold at auction, it is particularly important that sales items are checked for the presence of radioactive materials, including GTLs. Further advice may be sought from the RPA as necessary. Records following a stores return are to be kept for 2 years and following a disposal indefinitely. Leaflets 11 and 12 also refer.	

*JSP 392, unless otherwise stated **Environment Agency (EA) for England and Wales, Scottish Environment Protection Agency (SEPA) for Scotland and Environment and Heritage Service for Northern Ireland (EHSNI).

This page is intentionally blank

Leaflet 19 Annex A

SA80 Blade Sight Assembly – Example of a Summary Radiation Risk Assessment


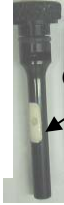

SA80 Blade Sight Assembly B4	
Description	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>The GTLS aperture is about the size of a pinhead seen at the rear of the blade near the top. The whole sight containing the Blade 1005-99-967-0508 is 1005-99-967-0506 * Note Cadet Version 1005-99-967-4839 does not contain GTLS.</p> </div> </div> <p>Equipment carries no manufacturer "T" or trefoil warning symbol</p>
Use	Sight illumination (Gaseous Tritium Light Source).
Supplier	British Aerospace.
NSN	1005-99-967-0508.
IPT Details	Combat Support.
Radionuclide	Tritium (H-3)
Ionising Radiation	Beta (0.019 MeV).
Half Life	12.3 years.
Original Activity	259 MBq.
Hazard	<p>Tritium is a form of Hydrogen and in GTLSs and GTLDs in the form of gas. If destroyed in a fire, the tritium is rapidly converted to tritiated water. The escape of tritium could result in a health risk particularly in a confined space. Of the two forms of tritium, tritiated water presents the greater hazard due to its ability to enter the body both by inhalation and rapid absorption through the skin.</p> <p>Radiation levels on contact are <math><0.1 \mu\text{S/hr}</math>.</p>
Risk Assessment	<p>All components containing tritium leak. The degree of risk from tritium leaking out of this component is negligible. The likelihood of accidental damage to this component to such a degree that tritium escapes is low. A more severe accident, for example, crushing, could possibly result in the release of tritium. Internal dose will be dependent on the duration of exposure and concentration of tritium. An adult in a 30 m³ room breathing an atmosphere with 259 MBq of tritium dispersed in it for an hour could receive an internal dose of around 7 μSv. (DRPS Report 289/2004 dated 10/12/04).</p>

Local orders	Details of the control measures taken from this Leaflet are to be included in the local orders for radiation safety (Leaflet 16 refers).
Control measures during use	No protective clothing or special precautions required.
Inspection	Annually as well as during routine maintenance. Check to be made for signs of damage.
Leak Testing	Leak testing is not required for this component.
Accounting	This item is to be accounted for on a Radioactive Source List. Leaflet 9 refers. All radioactive material is to be mustered monthly. Any change of location is to be entered in the Source Movement Log together with any change in custodian.
EPR10/RSA93	Although exempt from formal notification to the relevant environment agencies, this item is to be included in the Annual Holdings Return to Dstl – Leaflet 3 refers.
Storage and Labelling	If uninstalled, this item is to be stored in a dedicated area for radioactive materials – see Leaflet 9. The equipment is to display the recognised radiation hazard trefoil warning label on it. The storage/installed area is also to have a sign showing 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 in appropriate languages “ Items contain radioactive material. No radiation hazard from intact item. Radioactive contamination hazard if item is damaged. ”
Contingency Plans Spills/ Loss	If a breakage occurs the area is to be evacuated and ventilated. Tritium gas will disperse relatively quickly; however some may remain bonded to the component. Once a suitable amount of ventilation time (one hour) has passed, the broken item can be cleaned up using a breakage kit, see Leaflet 40. See below for disposal; if in doubt, seek RPA advice. Reporting of loss and certain other incidents is to be carried out in accordance with procedures described in Leaflet 14.
Transport	This item may be transported within an excepted package provided the total package activity does not exceed 8000 GBq.
Disposal	Units and Establishments are to return this item, unbroken, through the stores organisation. Broken items are to be disposed of in accordance with Leaflets 12 and 40.

This page is intentionally blank

Leaflet 19 Annex B

SUSAT Sight Light Assembly – Example of a Summary Radiation Risk Assessment

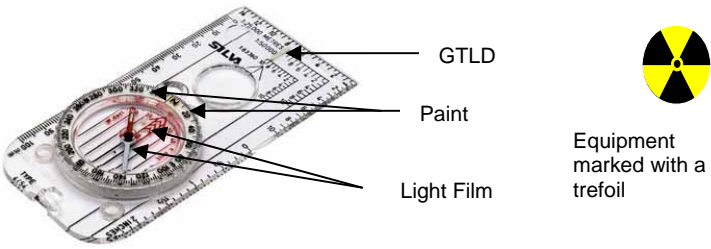
SUSAT Sight Light Assembly B4	
Description	<div style="display: flex; align-items: center;">    <div style="flex-grow: 1;"> <p>The GTLS light assembly 1240-99-967-0477 is a rod, which is screwed into the Susat sight 1240-99-967-0947 for internal illumination.</p> </div> </div> <p style="text-align: center; margin-top: 10px;"> SUSAT Sight GTLS Equipment marked with trefoil </p>
Use	Sight internal illumination (Gaseous Tritium Light Device).
Supplier	RO Notts.
NSN	1240-99-967-0477
IPT Details	Combat Support.
Radionuclide	Tritium (H-3)
Ionising Radiation	Beta (0.019 MeV)
Half Life	12.3 years.
Original Activity	4.07 GBq.
Hazard	<p>Tritium is a form of Hydrogen and in GTLSs and GTLDs, in the form of gas. If destroyed in a fire, the tritium is rapidly converted to tritiated water – a more hazardous form of tritium. The escape of tritium will result in an internal radiation dose if taken into the body by inhalation, ingestion or absorption through the skin.</p> <p>Of the two forms of tritium, tritiated water presents the greater hazard due to its ability to enter the body both by inhalation and rapid absorption through the skin. Radiation levels on contact <math><0.1 \mu\text{Sv/hr}</math>.</p>
Risk Assessment	<p>All components containing tritium leak. The degree of risk from tritium leaking out of this component is negligible. The likelihood of accidental damage to this component to such a degree that tritium escapes is low. A more severe accident, for example, crushing, could possibly result in the release of tritium. Internal dose will be dependent on the duration of exposure and concentration of tritium.</p> <p>An adult in a 30m³ room breathing an atmosphere with 4.0 GBq of tritium dispersed in it for an hour could receive an internal dose of around 100 μSv. (DRPS Report 289/2004 dated 10/12/04).</p>

Local Orders	Details of the control measures taken from this leaflet are to be included in the local orders for radiation safety (Leaflet 16 refers).
Control measures during use	No protective clothing or special precautions required. Item not to be carried on the person.
Inspection	Annually as well as during routine maintenance. Check to be made for signs of damage.
Leak Testing	Leak testing is not required for this component.
Accounting	This item is to be accounted for on a Radioactive Source List. Leaflet 9 refers. All radioactive material is to be mustered monthly. Any change of location is to be entered in the Source Movement Log together with any change in custodian.
EPR10/RSA93	Although exempt from formal notification to the relevant environment agencies, this item is to be included in the Annual Holdings Return to Dstl – Leaflet 3 refers.
Storage and Labelling	If uninstalled, this item is to be stored in a dedicated area for radioactive materials – see Leaflet 9. The equipment is to display the recognised radiation hazard trefoil warning label on it. The storage/installed area is also to have a sign showing 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 in appropriate languages “Items contain radioactive material. No radiation hazard from intact item. Radioactive contamination hazard if item is damaged.”
Contingency Plans Breakage/Loss/ Incident	If a breakage occurs the area is to be evacuated and ventilated. Tritium gas will disperse relatively quickly; however some may remain bonded to the component. Once a suitable amount of ventilation time (one hour) has passed, the broken item can be cleaned up using a breakage kit, see Leaflet 40. RPA advice is to be sought regarding disposal of the fragments. Reporting of loss and certain other incidents is to be carried out in accordance with procedures described in Leaflet 14.
Transport	This item may be transported within an excepted package provided the total package activity does not exceed 8000 GBq.
Disposal	Units and Establishments are to return this item, unbroken, through the Stores Organisation. Broken items are to be disposed of in accordance with Leaflets 12 and 40.
Local Orders	Details of the control measures taken from this leaflet are to be included in the local orders for radiation safety (Leaflet 16 refers).

This page is intentionally blank

Leaflet 19 Annex C

Silva Compass – Example of a Summary Radiation Risk Assessment

3	Silva Compass NATO 4B	
Description		<p>GTLD = 0.74 GBq (end of direction arrow). Paint = 0.33 GBq (Inside capsule – 2 dots, 1 each side of red arrow) Light Film = 0.22GBq (needle and scale). Note: Silva Compass Type 4 NSN 6605-99-188-5146 is not radioactive</p> <p>Equipment marked with a trefoil</p>
Use	Luminous dial for Compass (Gaseous Tritium Light Device)	
Supplier	Silva Sweden AB, BOX 998, 191 29 Sollentuna, SWEDEN	
NSN	0691-99-529-3731 or 6605-99-582-5812	
NAV CAT Details	Combat support IPT	
Radionuclide	Tritium H-3	
Ionising Radiation	Beta (0.019 MeV)	
Half Life	12.3 years	
Original Activity	1.29 GBq	
Hazard	Tritium is the radioactive form of hydrogen and is a highly flammable gas. Tritium within the compass is in the form of gas and solid. If destroyed in a fire, the tritium is rapidly converted to tritiated water. Tritiated water presents the greater hazard due to its ability to enter the body both by inhalation and rapid absorption through the skin. In an enclosed space this constitutes an extra risk to personnel in the immediate vicinity. The face of the compass is sufficient to attenuate the beta radiation to ~0.4µSv/hour, an acceptable HPA RPD level.	
Risk Assessment	The likelihood of accidental damage to this compass is low, because it would require a strong and directional force to break the face. There is a low probability of release of tritium. If broken and 10% was removed and 1% of that were ingested a committed effective dose of 10 µSv, could be received, which is less than two days natural daily background radiation in the UK. (Ref DSTL Report 289/2004 dated 10/12/04).	
Control measures	Follow the local rules for the use of a GTLD under appointed WPS/RSO supervision. JSP 392 Chapter 2 and Leaflet 16 refers.	
During Use	No special precautions are required when handling this component.	
Inspection	Annually as well as during routine maintenance. Check should be made for signs of damage.	
Leak Test	Leak testing is not required for this component.	
Accounting	Each item is to be accounted for on a Radioactive Source List under the care of an appointed Radiation Protection Supervisor. See JSP 392 Leaflet 9. All radioactive material is to be mustered at least monthly. Any change of location should be entered in the Source Movement Log together with any change in custodian.	
EPR10/RSA93	This item is subject to EPR10/RSA93 and should be included in the annual holding return to Dstl. JSP 392 Leaflet 9.	

Storage and Labelling	This item is to be stored in a dedicated area for radioactive materials. JSP392 Leaflet 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 WPS/RSO and stating the nature of the radiological hazard "Items contain radioactive material. No radiation hazard from intact item. Radioactive contamination hazard if item damaged".
Contingency Plans Spills/ Loss	If a breakage occurs the area is to be evacuated and ventilated. Tritium gas will disperse relatively quickly. However some will remain bonded to the component. Once an hour has passed the broken item can be cleaned up using a Breakage Kit. JSP 392 Leaflet 19 refers. If this item is involved in any unusual occurrence JSP 392 Leaflets 14 and 40 refer. Personnel exposed to leaking Tritium should report to the radiation protection supervisor.
Transport	This item may be transported as an excepted item provided the total package does not exceed 8000 GBq and the surface dose rate of the package is less than 5 μ Sv/h JSP 800 Vol 4b Ch3 Leaflet 4 refers.
Disposal	Ships and Establishments should return this item to the Stores Organisation.

This page is intentionally blank

Leaflet 19 Annex D

Specific Guidance for GTLD Repair Workshops

1 In workshops where GTLDs are repaired, the number of radioactive items held in the work area is to be kept to a workable minimum. Equipments held in temporary storage within the workshop pending completion of repair are to be stored on fire proof racking marked with a radioactive warning trefoil and a suitable legend (e.g. RADIOACTIVE ITEMS CONTAINING TRITIUM). The number of spare GTLSs held within the room is to be kept to the minimum required for the work in hand, stocks being replenished from the main store on a daily basis. Where practicable, all items containing a GTLS are to display a radiation hazard trefoil, the symbol "T" or T and the activity of the GTLS.

2 Doors providing access to the building and to the workshop area are to display a radiation warning trefoil which are available through the appropriate service channels or obtained locally and should be in relevant foreign languages.

3 The fire officer is to be kept fully informed of the quantity and locations of all radioactive materials within the workshop. These locations are to be described in local radiation safety rules, preferably as a diagram.

4 In order to prevent the accumulation of tritium contamination, areas where equipment containing GTLSs/GTLDs are repaired/maintained or stored are to be cleaned at regular intervals. Bench tops are to be of a non-permeable material (e.g. Formica) with sealed edges and joints or covered in a non-permeable material (e.g. polythene sheet). Work surfaces are to be wiped down with damp tissues at the end of each work period. The tissues may be disposed of with domestic wastes. Once per month bench tops are to be thoroughly cleaned using a detergent solution.

5 Large stores or workshops which occasionally have to deal with broken GTLSs, are to seek specific advice from their RPA in relation to the procedures and control measures that they need to adopt with regard to monitoring work areas for tritium. A GTLS breakage kit (put together locally), with instructions for its use (Leaflet 40) is to be available in each work area. These instructions are to be included in local radiation safety orders.

This page is intentionally blank