

# 8 Radiation Detection and Monitoring Equipment

## Scope

1. This Chapter describes the procurement, selection, testing, maintenance, repair and support of Radiation Detection and Monitoring Equipment (RDME). Additional guidance on non-ionising RDME is within Chapter 35.
2. Sufficient RDME shall be provided to meet the requirements of a Radiation Monitoring programme. The approved routes for the procurement / selection of appropriate RDME to meet the requirements are shown in the Selection, Use and Procurement sections (paragraphs 12 – 19) of this Chapter.
3. Advice must be sought from the Radiation Protection Adviser (RPA) for the selection and installation requirements of permanently installed RDME in areas of elevated radiation levels.
4. All equipment provided for the purpose of carrying out radiation detection and monitoring of ionising radiation for personal protection is required to be properly maintained, thoroughly examined and tested annually. Additionally, its performance must be established in tests before it is taken into use for the first time.
5. JSP 425 - Examination and Testing of Ionising Radiation Monitoring (Including Protection) Instruments - details the minimum requirements for examination and testing of ionising RDME.
6. Defence Standard 05-055 Part 1. Measurement and Calibration System Requirements for Ministry of Defence Test and Measurement Equipment – Ministry of Defence Calibration Laboratories Operation and Management - sets out the requirements that apply to all contracts, for the management and calibration of Test and Measurement Equipment (TME) items and requirements for Calibration Laboratories. It applies to TME sent to a contractor for calibration, repair, calibration after repair, and when the contractor is required to travel to the TME to conduct the work. It also applies to those contracts, which include a combination of TME, and other equipment such as parts of a main system; in such contracts it is important that the requirements for the TME are identified and listed in the contract.
7. Defence Standard 05-055 Part 3. Measurement and Calibration System Requirements for Ministry of Defence Test and Measurement Equipment – Subcontract of Calibration - sets out the requirements that apply to all Ministry of Defence (MOD) contracts, for the Examination and Testing of Ionising RDME items. It applies for RDME sent to a contractor for repair, calibration after repair, calibration and when the contractor is required to travel to the TME to conduct the work.

## Statutory Requirements

8. In addition to the general requirements of the Health and Safety at Work etc. Act 1974, the following specific legislation applies directly:
  - a. Ionising Radiations Regulations 2017 (IRR17); and

- b. Ionising Radiation (Medical Exposure) Regulations 2017 (IRMER2017).

## **Duties**

9. Duties as detailed in Chapter 39 apply. In addition, the following duties also apply.

### **Radiation Safety Officer (RSO)**

10. The Radiation Safety Officer (RSO) is to ensure that all areas holding RDME (including instrument check sources) comply with the requirements of JSP392. In particular, that appropriate risk assessments and contingency plans are in place (see Chapters 2 and 40). The RSO may be required to liaise with the Radiation Protection Supervisor (RPS) / Workplace Supervisor (WPS), Delivery / Project Team (DT / PT), RPA and other stakeholders in obtaining suitable and sufficient risk assessment coverage.

### **Qualified Person (QP)**

11. The CO / HoE of an establishment operating a Radiation Calibration Facility is to appoint in writing one or more QPs to carry out or supervise the testing of RDME in accordance with the requirements of JSP425 and Defence Standard 05-055 Part 3.

12. The qualification and training requirements for Qualified Persons are given in JSP 425 and Defence Standard 05-055 Part 3.

13. The appointment of a QP is to be notified to the Chair of the MOD Radiation Calibration Qualified Persons (MRCQP) Committee.

## **Selection**

14. Radiation Detection and Monitoring Equipment (RDME) is split into three categories:

- a. RDME used for Health and Safety (H&S) which includes the Nuclear Emergency Response Organisation (NERO) is identified in this Chapter as RDME(H&S);

- b. RDME used in support of medical, dental and veterinary equipment testing is identified in this Chapter as RDME (MED and DENT) and should be managed in accordance with JSP473 Joint Service Regulations for The Engineering Support of Medical, Dental and Veterinary Equipment. JSP473 outlines the policies and procedures to be adopted in the inspection and maintenance of medical equipment used by the UK Armed Forces and its Agencies; and

- c. RDME used to meet operational war fighting requirements is identified in this Chapter as RDME (OP).

## **RDME (H&S)**

15. The MOD Radiation Protection Instrumentation Committee (RPIC) is the centralised body that co-ordinates the standardisation of RDME (H&S) across the Ministry of Defence. Procurement of RDME (H&S) is undertaken by CBRN DT on behalf of the RPIC.

16. The selection of suitable RDME (H&S) must be made on the advice of the RPA.

17. General and specific advice on RDME may be obtained from either the RPA or the equipment sponsor.

18. The approved list of RDME (H&S) is limited to a range of instrumentation adequate for (MOD) defined radiation and detection monitoring purposes. Utilisation of RDME (H&S) from the approved list provides users with the assurance of through life support for the equipment.

19. Suitable RDME (H&S) is defined by the appropriate RPA and endorsed by the relevant Chief Environment and Safety Officer (CESO) or other suitable person. The approved scales and allowances for RDME (H&S) are detailed in the RDME Approved List of Test Equipment (RDME (H&S)-ALTE) which is maintained on behalf of the MOD Radiation Protection Instruments Committee (RPIC) by the CBRN Delivery Team.

20. Where a platform, unit or establishment requires a change to the type or number of RDME allocated amendment to the RDME (H&S) ALTE must be made. The specific service amendment routes are shown below:

- a. for RN units S130 procedures are to be followed for change in RDME scaling;
- b. for RAF units a RDME (H&S) ALTE amendment form is to be completed and passed through the station TMEC; and
- c. for Army units a RDME (H&S) ALTE amendment form is to be completed and passed through the unit QM (Tech).

21. The amendment request must provide reasons for the change in allocation and must be endorsed by the relevant RPA on behalf of CESO. Following endorsement, the requirement should be submitted to CBRN Delivery Team such that RDME-ALTE amendment action may be initiated.

## **RDME (OP)**

22. RDME (OP), formerly identified as RADIAC equipment, is scaled in centi Gray (cGy) and should not be used for radiation protection purposes, unless advised by the RPA.

23. The capability for operational use is defined by HOC SP and CBRN. The tables of scales and allowances to support operations detailed in JSP 886 and specifically for the Royal Navy Surface Fleet in BR 2170(3) and Royal Navy Submarine Fleet in BR2170(4).

## **Use**

24. RDME shall only be operated by personnel who have been specifically trained in their operation and are aware of the capabilities and limitations of the equipment.

## **Procurement**

### **General Requirements**

25. During the procurement phase, the following requirements shall be incorporated into the contract of purchase by the sponsoring Project Team. It is the Project Team's responsibility to ensure all of the requirements are met:

- a. Type Test data is available;

- b. before First Use certificate is completed in accordance with JSP 425 and Defence Standard 05-055 Part 3;
- c. details of the equipment's performance, limitations and accuracy relevant to its proposed use, are provided;
- d. a calibration protocol in accordance with JSP 425 is included in the MRCQP Protocol Manual; and
- e. a Users Operation Information Chapter is included in the Portable RDME Operating Information AESP-6665-L-118-201 or Installed RDME Operating Information AESP 6665-L-119-201 as appropriate.

26. It is the responsibility of the sponsoring Project Team or equipment manager to provide newly procured RDME with the following:

- a. spares to support repair;
- b. jigs and sources (if special items are required) for testing and operational checks;
- c. test procedures (usually obtained from instrument suppliers);
- d. suitable instrument check sources. If an instrument check source is to be supplied a radiation risk assessment is also to be provided (see Chapter 2) and relevant details published in JSP 515 – Hazardous Stores Information System; and
- e. Initial Training Package for training the trainers and / or a reusable training package as necessary dependant on the complexity of the RDME.

### **RDME (H&S) Equipment Requirements**

27. With the exception of site-specific special monitoring equipment, RDME (H&S) is managed by the DE&S CBRN Delivery Team with approval of the RPIC and in consultation with the relevant CESO and RPA.

28. Where there is a specific requirement for equipment not on the approved list, a request for new equipment is to be submitted to the relevant RPA for consideration and approval. The request is then forwarded to the relevant CESO for endorsement. CESO will arrange procurement with the equipment sponsor via the RPIC and CBRN Delivery Team.

29. If a site-specific requirement cannot be met through the RPIC / CBRN DT, a MOD unit or establishment with an RPA may, in exceptional circumstances, purchase special / specific to type RDME. In such instances the procuring unit / RPA will become the equipment sponsor and must ensure provision for subsequent support activities is maintained in line with guidance detailed in this Chapter.

### **RDME (OP) Equipment Requirements**

30. New RDME (OP) requirements are managed by DE&S (CBRN Delivery Team), as directed by HOC SP and CBRN capability branch.

## Examination and Testing

31. RDME testing shall be carried out in accordance with JSP425 and Defence Standard 05-055 Part 3 Examination and Testing of Ionising Radiation Detection and Monitoring Equipment.

32. Examination and testing shall be undertaken by a Defence approved calibration facility as detailed in JSP425.

Specific arrangements for RAF and Army units are in place via central RDME support tasking sponsored by CBRN DT:

- a. annual testing is carried out through the Dstl Calibration Facility where a pool of RDME and appropriate spares is held. The work is carried out under the CBRN Delivery Team RDME Support contract;
- b. the Tri-Service RDME Support contract utilises MOD Form 1773 for the notification of equipment due for calibration. The calibration facility will raise MOD Form 1773 against the list of RDME held by the unit or establishment in accordance with their database; and will then issue the MOD Form 1773 to the unit or establishment four weeks prior to the month of calibration;
- c. the unit or establishment will receive the completed Form which includes an Urgency of Need (UON) and Direct Exchange Return code. These will have been predetermined by the calibration facility dependent upon current availability and status of equipment held within the pool and will normally be UON or ROUTINE with a maximum turnaround time of 14 days. Units or establishments wishing to amend the UON or Direct Exchange Return codes are to notify the Support Authority stating the reasons for change, authorised by the unit's Authorised Person;
- d. other than the exception stated above then the standard MOD Form 1773 procedure applies. Both Direct Exchange and Loan Cal equipment is to be returned to the Calibration Facility as detailed on the MOD Form 1773. Units or establishments should not return their instruments until a replacement has been received; and
- e. the maintenance policy for RAF units and establishments RDME (H&S) is contained in AP100B-01 Order 2.1.13.

33. Platforms, units and establishments not covered by the CBRN DT sponsored RDME support tasking are responsible for the management of their own RDME and must ensure compliance with the requirements of this Chapter.

34. RDME sent to calibration facilities must include all accessories, individual instrument check sources and leads. They must be:

- a. accompanied by the appropriate instrument log form: RN – S / D 1956; RAF / Army RAF Form 4021 R / 1;
- b. certified as not being contaminated above levels that would require radiation protection controls to be implemented as agreed with the RPA and calibration facility; and

c. transported in accordance with Chapter 10 and meet the surface contamination requirements, where an instrument check source is included as part of the equipment (Nat-U check source type 1623A are not generally included as part of equipment and should not be returned unless otherwise instructed).

35. Technical queries about RDME should be directed in the first instance to the Equipment Sponsor or the RPA.

36. Testing difficulties arising from the design of RDME are to be referred initially to the Equipment Sponsor.

### **Examination and Test Categories**

37. The examination and testing of RDME is broken down into three categories. These categories are fully detailed in JSP425 and Defence Standard 05-055 Part 3. The agreed minimum examination and testing required for each category and each type of RDME is detailed in the MOD Radiation Calibration Qualified Persons (MRCQP) Calibration Protocol Manual. The MRCQP protocol manual is circulated to all RPIC members for ratification.

38. Operating instructions for users which include 'before each use' testing requirements are detailed in the Portable RDME Operators Information AESP-6665-L-118 or Installed RDME Operators Information AESP 6665-L-119 as relevant.

### **Defence Approved MOD / Contractor Radiation Calibration Facilities**

39. For the purposes of this Chapter a Defence Approved MOD / Contractor Calibration Facility will be referred to as an approved calibration facility.

40. The minimum facilities, equipment and standards to be achieved by an approved calibration facility are fully defined in JSP425 and Defence Standard 05-055 Part 3.

41. A list of approved calibration facilities can be found at Annex A.

42. The RPA and CBRN Delivery Team are to be informed prior to work being undertaken at non-approved calibration facilities.

## **Documentation**

### **Certificate of Calibration**

43. A certificate of calibration for each instrument shall be raised by the approved calibration facility. The certificate layout and contents are detailed in JSP425 and Defence Standard 05-055 Part 3.

44. A copy of the current certificate of calibration shall be available to the user.

### **Instrument Log**

45. A log containing the particulars of every test and repair for each instrument is to be kept by a Qualified Person:

- a. Form S / D 1956 is to be used by Navy and Army units and establishments. RAF Form 4201 R / I is to be used by Air Force units and establishments; and

- b. the instrument log for equipment managed under the CBRN Delivery Team Tri-Service RDME Support Contract, e.g. RAF and Army units and establishments, will be maintained and retained by Dstl Calibration Facility.

## **Operating Instruction Guides**

46. The user operating instructions for all RDME managed by CBRN DT can be found in the two following documents;
- a. Portable RDME Operating Information 6665-L-118-201; and
  - b. Installed RDME Operating Information 6665-L-119-201.

## **Records**

47. Records of past calibrations are to be maintained by the Qualified Person for the life of the equipment and retained until at least 2 years after last use / disposal.
48. The instrument logs are to be held for a period of at least 2 years from date of last entry by the unit or establishment.
49. The document retention periods mentioned are a requirement of IRR17. At the end of the above periods, an assessment on the relevance of retaining the document should be made in conjunction with the requirements of JSP392 Volume 1 Chapter 3 and JSP441 Information, Knowledge, Digital and Data in Defence.

## **Contact Details**

50. RDME(H&S), RDME(OP) Equipment Sponsor  
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## Radiation Detection and Monitoring Equipment

### Approved MOD / Defence Contractor Radiation Calibration Facilities

#### Secondary Standard Facilities

Calibration Facility, Dstl CBR Division, Alverstoke

Calibration Facility, AWE Ltd, Aldermaston

#### Tertiary Standard Facilities

Calibration Facility, Dstl Environmental Sciences Department, Alverstoke

Calibration Facility, BAE Surface Fleet Ltd, HMNB Portsmouth

Babcock Marine, Calibration Facility, Devonport Royal Dockyard

Babcock Marine, Calibration Facility, Rosyth Royal Dockyard

Babcock Marine, Nucleonic Calibration Facility, HM Naval Base Clyde

Instrumentation Development and Services, BAE Systems Submarines, Barrow-in-Furness

Nucleonic Calibration Facility, Vulcan NRTE

Calibration Facility, James Fisher Nuclear Ltd.

VT Nuclear Services, Calibration Facility, Berkeley