WS No. 19 Mark III

This file has been down loaded from The Wireless-Set-No19 WEB site.

All files from this WEB site are free of charge. If you have been charged for this file then please contact the person you obtained it from as he/she has illegally obtained both the file and money they have charged you.....

CONDITIONS OF RELEASE

(Applicable to copies supplied with War Office approval to Commonwealth and Foreign Governments)

1. This document contains classified UK information.

2. This information is disclosed only for official use by the recipient Government and (if so agreed by HM Government) such of its contractors, under seal of secrecy, as may be engaged on a defence project. Disclosure or release to any other Government, national of another country, any unauthorized person, the Press, or in any other way would be a breach of the conditions under which the document is issued.

3. This information will be safeguarded under rules designed to give the same standard of security as those maintained by HM Government in the UK.

CONSTRUCTION AND PRECAUTIONS IN THE USE OF RADIOACTIVE CALIBRATION SOURCES

WARNING

The radioactive sources described in this EMER are to be treated as integral units. IN NO CIRCUMSTANCE WILL THE USER INTERFERE WITH A SEALED RADIOACTIVE SOURCE.

GENERAL

1. This regulation describes the construction of radioactive sources provided for testing and calibrating radiac instruments, and details the precautions to be taken when using them.

2. Particulars of the radioactive calibration sources and the existing radiac instruments with which they are used are listed in Table 1. Due to the method of containing the radioactive material the sources may be considered as gamma-ray emitters.

Instrument	Calibration source				
	EMER Tels	Type	VAOS No Z8/6665-	Source intensity	Radioactive material
Meter, water contamination, No 1	V 650-659	-	11097	less than 0.01 µc	radium
* Meter, survey, radiac, No 3	V 320-329	Built-in	-	less than 0.5 µc	strontium
Meter, contamination, No 1	V 670-679	Source-H	11099	100 µc	radium
Meter, survey, radiac, No 2	V 660-669	Source G No 1	11098	5 mc	cobalt 60

* Note: As the sealed source is an integral component of the instrument the source is not described in this regulation. The strontium 90 content is one-half of the maximum permissible body burden.

Table 1 - Calibration sources for radiac instruments

PRECAUTIONS

3. All units using these sources will comply with the following EMERs:-

(a) General K 021 - Medical and physical supervision of persons exposed to ionising radiations.

(b) General K 022 - Precautions in respect of ionising radiations.

CONSTRUCTION AND HAZARDS

Calibration source and jig - Meter, water contamination, No 1

Construction of source

4. The radioactive material, radium, is sealed by rolling between layers of silver foil. The 'sandwich' is then formed into a tube.

Hazards due to the use of a single source

5. The intensity of the source contained in the calibration jig is too low to constitute a hazard to health as the radium content is one-tenth of the maximum permissible body burden ie the amount that can be carried in the body without risk of injury. Due to the method of construction the radium cannot separate from the silver foil and the risk of ingestion, from a damaged unit, is negligible. Note that if this source is the only one handled, para 3 will not apply.

Hazards due to a concentration of sources

6. In the unlikely event of say, 100 such sources being concentrated within 2 ft of a working position the whole body dose will still be negligible.

Calibration source H and jig - Meter, contamination, No 1

Construction of Source H

7. The radioactive material, powdered radium sulphate, is contained in a platinum tube 1 mm in diameter by 7 mm long, which is sealed by gold 'solder'. This tube is inserted in a close fitting Monel metal tube, 0.3 mm wall thickness, which is sealed with silver solder. The double-walled assembly is finally secured in an aluminium alloy tube which has the ends rolled over aluminium discs to seal the assembly.

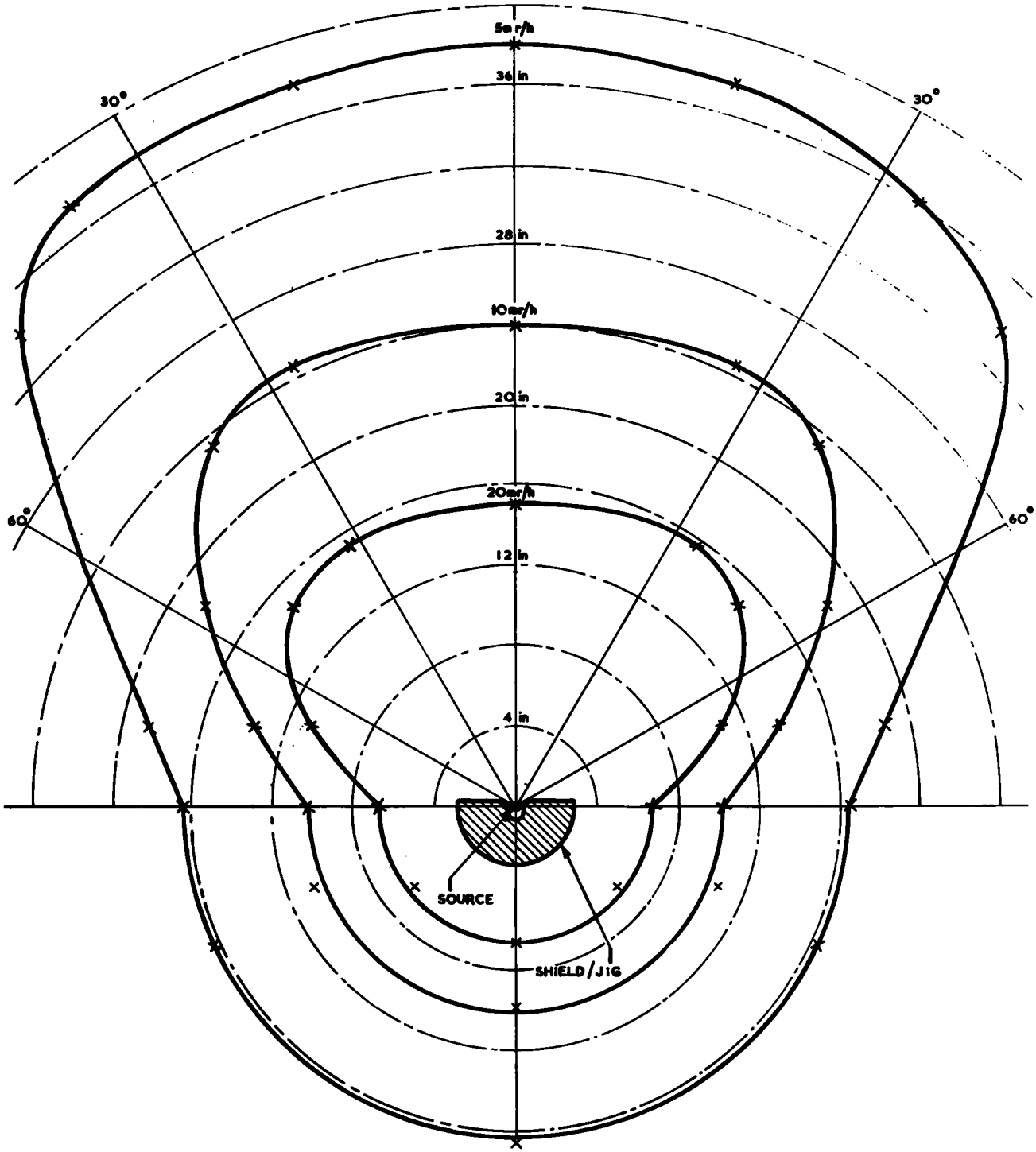
Hazards due to the use of a single source

8. Source H produces a dose rate of 3 to 4 mr/hr at a separation of 6 in. which is the standard calibration level for the Meter, contamination, No 1. Working at this distance from the source the maximum weekly dose would be 0.16 r, which would be received by the hands and forearms. The whole-body dose at a working distance of 1 ft would be some 0.04 r per week.

Handling

9. The dose rate at the surface of the container with the jig closed is some 60 mr/hr. If such a source were placed in contact with the body eg by carrying in a pocket of an overall, the quarterly permissible dose would be reached in a few days.

10. When erecting the radioactive source to the calibrating position in the jig, the red painted end, which contains the radium sulphate, will not be handled. The intensity of radiation at the surface of the red painted end of the source is about 3 r/hr.



T V.002
1-1

SOURCE G (3 MILLI CURIES) AT DATE OF MEASUREMENT
RADIATION MEASURED WITH METER SURVEY RADIAC N° 3
SOURCE ON CONCRETE SLAB WITH RADIATION MEASURED IN HORIZONTAL PLANE

Fig 1 - Polar diagram of Source G

Calibration source G and jig, No 1 - Meter, survey, radiac, No 2

Construction of Source G, No 1

11. Source G consists of a cylindrical slug of metallic cobalt 60 (half-life 5.1/4 years), 5 mm in diameter, which is of 5 mc intensity when processed. This 5 mm slug is contained in a aluminium alloy tubular element, 3.3/4 in. long, with the ends rolled over alunimium discs to seal the tube. At the end of the element, opposite to that containing the radioactive source, is a male-screw section which secures the element in the jig.

12. The active element is stored and handled in a split spherical cast-iron shielding container of mean diameter 5.3/4 in. This spherical container is split off-centre in two sections. The larger section is the jig and the smaller is the removable shield. They are fastened together by two screws. Note that the shield is only to be removed when the source is required for calibration.

13. On the plane surface of the shield are secured the time-decay curve and data of processing of the serially numbered radioactive element fitted in the jig, together with calibration instructions for the Meter, survey, radiac, No 2. The larger section of the shielding container has a radial hole drilled into a 3/4 in. diameter central cavity. Into this hole is screwed the active element so that the source of radiation is located in the central cavity. Protruding from the plane face of the jig are two cylindrical dowels, tapped to receive the shield securing screws. These dowels locate the Meter, survey, radiac, No 2 in the calibration position when the jig is placed on a flat working surface.

Hazards due to the use of a single source

14. The dose-rate produced by a new Sourge G at various distances with jig open and closed, are listed in Table 2.

Handling

15. As instructed on the 'decay graph' plate secured to the jig shield, the operator will work from behind the jig. This precaution will reduce the radiation received by the operator's body to a quarter of that received when the unshielded jig is directed at the operator from the same distance. Fig 1 illustrates the polar diagram of Sourge G with shield removed.

Distance from source (inches) 'd'	Maximum dose-rate at 'd' (mr/hr)	
	Jig - open	Jig - closed
36	8	2
24	17	4
20	25	6
16	40	9
12	70	17
6	280	66
2.7/8	1200	290
3/8	70400	Not applicable

Table 2 - Dose-rate - Source G

END