Topic 1.3 part 4
«Working with chemical and radiation reconnaissance instruments»

1. Chemical reconnaissance devices

ПХР-МВ


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ПРИБОР
ХИМИЧЕСКОЙ РАЗВЕДКИ
ВОЙСКОВОЙ
(ВПХР)
ТЕХНИЧЕСКОЕ ОПИСАНИЕ
И ИНСТРУКЦИЯ ПО ЭКСПЛУАТАЦИИ


ПРИБОР
химической разведки
медицинской
и ветеринарной служб
(ПХР-МВ)
Паспорт
ПХР-МВ

indicator tubes

RHM - C

BRDM - 2 RHB

UAZ - 469 RHB

RHM - 4 – 01

Events	Contents of the practical part
Familiarization with chemical reconnaissance devices PKhR-MV and VPKhR	PHR-MV - a chemical reconnaissance device for medical and veterinary services is designed to determine organophosphorus toxic substances, mustard gas, hydrocyanic acid, cyanogen chloride, phosgene, diphosgene and hydrogen arsenous in the air, on the ground and in equipment; in water – organophosphorus toxic substances, mustard gas, hydrocyanic acid; in fodder - organophosphorus poisonous substances, mustard gas, hydrocyanic acid, cyanogen chloride, phosgene, diphosgene. The PHR-MV device also allows you to take samples of water, soil and other materials to send them to the laboratory to determine the type of infectious disease agent. The PHR-MV device consists of: - a housing with a lid; - a collector pump that allows air to be pumped simultaneously through 2 – 5 indicator tubes; - a set of indicator tools; - sampling kit. To determine toxic substances and poisons in water, chemical reagents are used that change color when interacting with toxic substances. Toxic substances in feed and food samples are determined by pumping contaminated air through the sample or water and determining the toxic or toxic substances in them
	VPHR is a device designed to determine chemical warfare agents in the air, on the ground and on equipment: sarin, soman, mustard gas, phosgene, diphosgene, hydrocyanic acid, cyanogen chloride, as well as V-gas vapors in the air. The principle of operation of the VPHR is as follows: when pumping the analyzed air through the indicator tubes, in the presence of toxic substances, the color of the tube filler changes, from which the concentration of toxic substances is approximately determined. The VPHR device consists of a housing and a pump housed in it, paper cassettes with indicator tubes, smoke filters, a pump attachment, protective caps, a heating pad and cartridges for it, and a flashlight. In addition, the device includes a spatula and instructions for determining sarin, soman, and VX gases.

Example	
Determination of sarin, soman, VX gases	Tube – one red ring and one red dot Open two indicator tubes. Break the upper ampoules and, taking the tubes by the ends, shake vigorously 1-2 times. Insert one of the tubes (the experimental one) with the unmarked end into the pump socket and perform 50-60 swings. Do not pump air through the other tube (control tube). After 2-3 minutes of exposure, also break the lower ampoules of the test and control tubes, and shake them backhand 1-2 times so as to wet the filler layer. Observe the color transition of the control and experimental tubes from red to yellow. The preservation of the red color of the upper layer of the filler of the test tube at the time of the formation of a yellow color of the upper layer of the filler of the control tube indicates the presence of a toxic substance in dangerous concentrations; a color change to yellow or no color change at all – the absence of a toxic substance in dangerous concentrations.
Multilayer tube The top layer from the marking is phosgene The bottom layer of the marking is hydrocyanic acid	Pipe – three green rings Open the tube, break the ampoule, insert the tube into the pump, do 15...20 pumpings. Compare the color of the corresponding layers with the color of the standards on the cassette.
Mustard gas	Tube with one yellow ring Open the tube, insert it into the pump, pump the pump 60 times and after 1 minute compare the color of the tube filler with the standard on the cassette.

2. Radiation reconnaissance devices

X-ray radiometer DP-5 V

Preparing devices for operation is carried out in the following order:

- **- remove the device from the storage box, open the cover of the case, carry out an external inspection, fasten the waist and shoulder belts to the case;**
- **-set a mechanical zero on the microammeter scale using a corrector;**
- **- connect power supplies;**
- **-connect your phone;**
- **- turn on the device by placing the sub-range switch knobs in the position: "Mode." DP-5A and "▲" (mode control) DP-5V (the device needle should be set in the regime sector);**
- **in DP-5A, using the potentiometer knob, set the instrument arrow in the regime sector to "▼"**
- **If the microammeter arrows are not included in the regime sectors, it is necessary to replace the power sources.**

The performance of the devices is checked on all subbands, except the first ("200"), using control sources, for which the screens of the probe and the detection unit are installed in positions "B" and "K", respectively, and telephones are connected.

In the DP-5A device, open the control beta source, install the probe with its supporting protrusions on the cover of the case so that the source is located opposite the open window of the probe.

Then, sequentially moving the subrange switch to the positions "x 1000", "x 100", "x 10", "x 1" and "x 0.1", observe the readings of the device and listen to clicks in the phones.

Microammeter needles should go off scale in the VI and V subranges, deviate in IV, and in III and II they may not deviate due to insufficient activity of the control beta sources.

After this, set the switch knobs to the "Off" position. DP-5A and "▲" - DP-5V; press the "Reset" buttons; turn the screens to the "G" position. The devices are ready for use

Radiation reconnaissance of the area, with radiation levels from 0.5 to 5 R/h, is carried out in the second sub-band (the probe and detection unit with the screen in the "G" position remain in the instrument casings), and above 5 R/h - in the first sub-band. When measuring, the device should be at a height of 0.7-1 m from the ground surface.

The degree of radioactive contamination of the skin of people, their clothing, farm animals, machinery, equipment, transport, etc. is determined in the following sequence. The gamma background is measured in the place where the degree of infection of the object will be determined, but not less than 15-20 m from the object being examined. Then the probe (detection unit), with its stops forward, is brought to the surface of the object at a distance of 1.5-2 cm and slowly moved above the surface of the object (probe screen in position "D"). The gamma background is subtracted from the maximum exposure dose rate measured on the surface of the object. The result will characterize the degree of radioactive contamination of the object. To detect beta radiation, it is necessary to install the probe screen in position "B", bring it to the surface to be examined at a distance of 1.5-2 cm. The sub-range switch knob is sequentially set to the positions "x 0.1", "x 1", "x 10" until the microammeter needle deflects within the scale. An increase in instrument readings in the same sub-band compared to the gamma measurement indicates the presence of beta radiation.

If you need to find out on which side the surface of tarpaulin awnings, walls and partitions of buildings and other objects transparent to gamma radiation is contaminated, then two measurements are made in the position of the probe “B” and “D”. The surface is contaminated on the side from which the instrument readings in probe position “B” are noticeably higher.

When determining the degree of radioactive contamination of water, two samples with a total volume of 1.5-10 liters are taken. One - from the upper layer of the water source, the other - from the bottom layer. Measurements are made with a probe in position “B”, placing it at a distance of 0.5-1 cm from the surface of the water, and readings are taken on the upper scale. The nameplates on the covers of the cases provide information about the permissible standards of radioactive contamination and indicate the subranges at which they are measured.