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CENTRAL INTELLIGENCE AGENCY

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COUNTRY	East Germany/USSR	REPORT	
SUBJECT	Production of New Types of Dosimeters at VEB Entwicklung- und Fertigung elektrischer Messinstrumente (EFEM) for the USSR	DATE DISTR.	1 March 1956
DATE OF INFO.		NO. OF PAGES	3
PLACE ACQUIRED		REQUIREMENT NO.	RD
DATE ACQUIRED		REFERENCES	

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1. The MO and KL instruments built by VEB EFEM to Russian specifications (and which have been the subject of previous reports) will not be made in the same form during 1956.¹
2. As previously reported, the original program was for the supply of 2,500 MO and 1,500 KL instruments, with 300 ionization chambers for each MO instrument.² By the middle of January 1956, 800 MO and 1,000 KL instruments will have been delivered to the USSR. Production of these two sets will now cease, as they have been further developed by EFEM technicians with such success that the production of sets of new types can now start. The new equipment will be manufactured with the following designations:

K5/49-1 - Integral dosimeter (formerly MO)

K5/49-2 - Pocket dosimeter (formerly KL)

3. K5/49-1 Integral Dosimeter

Technical specifications for the further development of the integral dosimeter were as follows:

a. Task

Development of an integral dosimeter to observe the health of persons in areas exposed to the dangers of radiation. The equipment is for measuring roentgen and gamma rays, and works on the principle of ionization chamber discharge. It is to indicate the amount of radiation and to measure the voltage. Static electrometers will be used as the measuring instruments. The instrument to be developed is for mass observation; it is to consist of a conveniently large number of simple portable ionization chambers and a measuring desk for registering their charges.

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(Note: Washington distribution indicated by "X"; Field distribution by "#")

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b. Technical Specification:

- (1) The equipment is to consist of
 - (a) a charge metering desk (Lademesspult), standing during use on a firm horizontal base; and
 - (b) a large number of light ionization chambers carried during work by those under observation. The chambers must not impede their movements.
- (2) The equipment is to register radiations up to 50 r and, with the admissible dose 0.3 r, provide a clearly legible deflection. (1 roentgen = r, corresponding to a charge of $0.33 \cdot 10^{-9}$ A/sec in 1 cu.cm. air).
- (3) It must provide for successive observations with approximately 300 measurements per hour. It must be easy to handle for taking measurements and suitable for issuing on loan. Charging of the ionization chambers must be effected without a mains or battery power supply.
- (4) The charge metering desk must operate perfectly in temperatures ranging from -10° to $+40^{\circ}\text{C}$, and the ionization chambers down to -25°C .

c. Margin of Permissible Error

At temperatures ranging from $20 \pm 5^{\circ}\text{C}$, and relative atmospheric humidity of 80%, the permissible error must not be more than 10% and should be substantially less. With changes of temperature in the ionization chambers up to $+40^{\circ}\text{C}$, the additional measurement error must not exceed 0.5% per $^{\circ}\text{C}$. With changes down to -25°C , the additional error must not exceed 1% per $^{\circ}\text{C}$. The equipment must remain serviceable after being exposed to temperatures between $20^{\circ} \pm 5^{\circ}\text{C}$, and to relative atmospheric humidity of 98%. The ionization chambers must be able to withstand without damage a fall to the ground from a height of 1.50 m. The automatic discharge of the ionization chambers from insulation losses should not exceed 3% per 24 hours (i.e., a minimum time constant of 10^0 seconds).

4. K5/49-2 Pocket Dosimetera. Task:

Development of an instrument for use during special work in irradiated areas. This instrument is to combine the charging and measuring equipment and the ionization chambers in one piece. The old Soviet KL instrument had to be carried with a support and was strapped on to the chest. The new instrument is approximately 20 mm. in diameter and 80 mm. in length, and is carried in the coat pocket like a fountain pen. The advantages of the new equipment lie in the fact that it is considerably smaller, easier to handle, and, at the same time, more robust. The principle of the set is similar to

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that of a gold leaf electroscope. The measuring mechanism consists of a copper wire loop containing a silvered quartz thread about 7 μ thick. Static electricity is produced by friction on the body or some other organic substance. A field is thus created in the loop, which repels the quartz thread. If this instrument, in a charged condition, is exposed to irradiated air, the air in the chambers is ionized and the displaced quartz thread takes up its initial position. From maximum deflection to the original position a measurement is produced, which may be read on a scale calibrated in roentgens. The telescopic principle is used for the apparatus on account of its small size and the small quantity of light.

b. Technical Specification:

The apparatus must need no additional equipment for charging and measurement. It must be possible to read off measurement values in very poor light. The measurement ranges will be from 0 to 0.3 r and 0 to 20 r; one type of instrument is envisaged for each range.

c. Margin of Permissible Error

The margin of permissible error on the indicator must not exceed ± 10% and should be substantially less. The instrument must work perfectly in a relative, atmospheric humidity of 98%, under air pressure between 500 and 800 Torr (Torricelli unit = mm. of mercury), and at temperatures between -30° and +50°C. The instrument must be able to withstand a fall from a height of 1.50 m. to the ground or a wooden floor. The automatic discharge of the ionization chambers from insulation losses must not exceed 3% in 24 hours.

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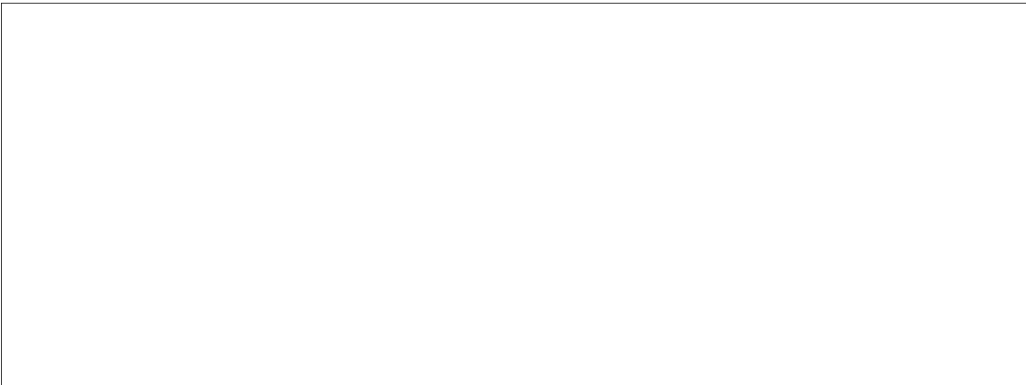
2.

Comment: 1,500 RT dosimeters were ordered by the USSR and 100 by East Germany; 500 MC dosimeters were ordered by the USSR, and 100 by East Germany; and 30,000 ionization chambers were ordered by East Germany for the KVP.

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1,000 KL dosimeters and 500 MO dosimeters were to be delivered to the USSR.

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