

ABOUT US

The Research and Production Enterprise POLYTECHFORM-M was founded in 1991 and today is one of the market leaders in the development, manufacture and supply of equipment for the gas control and radiation monitoring.

POLITEHFORM-M is a member of the Coordinating Council of the Federal Center for Civil Defense and Emergency Situations of the Ministry of Emergency Situations and participate in projects of The Ministry of Defence of the Russian Federation.

The quality system of the enterprise has been certified in accordance with GOST R ISO 9001-2008.

MKS-07N SURVEY METER

■ Purpose

Measurement of ambient equivalent dose rate and ambient equivalent dose of gamma photon radiation, measurement of alpha and beta particles flux density.

The survey meter is used for operative grounds inspection for radiation (for example during radiation mapping) as well as for detecting and monitoring clothes, equipment and facilities for radioactive contamination.

■ Features

The design of the survey meter includes Control Unit and remote alpha, beta particles and X-, gamma-rays detection units. A modular design provides flexibility making the survey meter easier to suite customer's needs by choosing proper detection modules.

The Control Unit has built-in GM counter, large illuminated LED display, external battery compartment for operation in extremely cold environment (below -30°C).

All the units have metallic enclose cases. They are supposed to operate in the environmental conditions with ambient temperature from **-40°C** to **+55°C** and up to 98% humidity at 35°C. The Control Unit has ingress protection **IP66**.

The survey meter provides sound and light alarms triggered by radiation when exceeding some preset thresholds, it is capable to keep in memory up to 500 results of measurements, it has a screen backlight.

The precision of output data can be evaluated by using the estimated random error being provided along with the measurement results.

The device has RS-232 serial interface for data transfer.

The survey meter can be used on board of a vehicle in move for both manual measurements and automated data acquisition.

Detection units can be changed by spare or same type parts without additional calibration and verification.



Attention! Sound adapter for MKS-07H is intended for direct transfer to the operator of audio-visual information about the count rate on the detectors of the remote detection unit BDKS-07 with the help of headphones and a bright led. This allows effective, convenient and quick search of radioactive anomalies; and makes it possible to control audially small changes of gamma radiation (background). The adapter can be used both in normal and search modes (see section *** of the OM), that enables the operator to measure the dose rate of gamma radiation or fluence density of beta-particles at the points of anomalies without switching the modes.

MKS-07N SURVEY METER

Accessories

1. Control Unit MKS-07N
2. Detection Units BDPA-07
3. Detection Units BDPB-07
4. Detection Units BDBG-07
5. Detection Units BDKS-07
6. External battery compartment
7. Adapter and Power adapter
8. Telescopic pole
9. Case for storage and transportation
10. Sounds adapter for MKS-07N



Specifications



1. Control Unit MKS-07N

Control Unit with built-in GM counter for measurement of ambient equivalent dose rate of gamma radiation

Dose rate measurement range	10 ⁻⁷ ... 10 Sv/h
Dose measurement range	10 ⁻⁶ ... 100 Sv
Energy range	50...3000 keV
Energy response within energy range (relative to Cs-137) in the energy range from 60 to 3000 keV	± 25%
Maximum permissible Intrinsic error	±(15+3,5/H*) %
Alarms and indications	visual, audible
Power supply:	
AC:	
Voltage / Frequency	187.....242 V / 47....53 Hz
DC:	
Voltage	9.....33 V
2 batteries, type R14	
Voltage	2,0.....2,6 V
Overall dimensions, weight	148mm x 72mm x 163 mm, 1,35 kg
Ambient conditions:	
Pressure	840 to 1067 mbar
Temperature	-40°C to + 55°C
Humidity	to 98 % at 35°C

2. Detection Unit BDPA-07

Detection units BDPA-07 for measurement of alpha particles flux density under gamma background conditions up to 300 mSv/h



Alpha energy range	4,1 ... 7,0 MeV (Pu-239, U-234, U-238)
Alpha particles flux density measurement range	0,01...1700 s ⁻¹ .cm ⁻²
Overall dimensions, weight	Ø60mm x 160mm, 0,35 kg

* H is a non-dimensional quantity numerically equal to dose rate in µSv/h

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3. Detection units BDPB-07

Detection units BDPB-07 for measurement of beta particles flux density with automatic gamma background compensation.

Beta particles flux density measurement range	0,10 ... 1700 s ⁻¹ · cm ⁻²
Beta energy range	0,2...3,5 MeV
Overall dimensions	102 mm x 34mm x 192mm
weight	0,55 kg



4. Detection units BDKS-07

Detection units BDKS-07 for measurement of ambient equivalent dose rate of gamma photon radiation and beta particles flux density with automatic gamma background compensation.

Dose rate measurement range	10 ⁻⁷ ... 2*10 ⁻³ Sv/h
Beta particles flux density measurement range	0,10 ... 1700 s ⁻¹ ·cm ⁻²
Gamma energy range	50...3000 keV
Beta energy range	0,2...3,5 MeV
Overall dimensions	102 mm x 34 mm x 192 mm
weight	0,55 kg



5. Detection units BDBG-07

Detection units BDPG-07 for measurement of ambient equivalent dose rate of gamma photon radiation

Dose rate measurement range	10 ⁻⁷ ... 10 Sv/h
Energy range	50...3000 Kev
Overall dimensions	102 mm x 34 mm x 192 mm
weight	0,60 kg

6. External battery compartment



External battery compartment for extremely cold environment below -30°C

Overall dimensions	37 mm × 145 mm
weight	0,20 kg

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7. External power adapter and Main power adapter



8. Telescopic pole



9. Case for storage and transportation



10. Sound adapter for MKS-07H



External power adapter for powering and charging batteries from the automobile DC power supply – 9 ÷ 33 V

Dimensions	102 mm x 32 mm x 192 mm
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weight	0,5 kg
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Main power adapter for powering and charging batteries from the wall outlet 220±22 V, 50±1 Hz

Dimensions	88 mm x 82 mm x 68 mm
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weight	0,5 kg
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Dimensions	87 mm x 42 mm x 388 mm
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weight	0,3 kg
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Full length (open)	865 mm
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Overall dimensions / weight

for 1,2 SET	411 mm x 323 mm x 166 mm / 2,3 kg
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for 3,4 SET	462 mm x 354 mm x 170 mm / 2,7 kg
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Dimensions	82 mm x 59 mm x 38 mm
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weight	0,16 kg
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Basic complete set

1. control unit MKS-07N
2. control unit's belt
3. external power adapter
4. main power adapter
5. batteries R14
6. external battery compartment
7. case for storage and transportation
8. operation manual, passport, logbook

Optional equipment

1. telescopic pole
2. software
3. cable 1,5 – 100m
4. detection unit BDPA-07, BDPB-07, BDPG  BDKS-07;
5. Sound adapter for MKS-07H

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■ **Equipment testing**



The regions around the North Pole



Chernobyl nuclear Power Plant



Testing in vehicle

MKS-07N SURVEY METER



SET #1
 β -, γ - radiation



SET #2
 α -, β -, γ - radiation

Package includes:

1. control unit MKS-07N with belts
2. external power adapter
3. main power adapter
4. batteries R14
5. external battery compartment
6. case for storage and transportation
7. telescopic pole
8. software
9. cable 1,5m
10. detection unit BDKS-07
11. operation manual, passport, logbook

Package includes:

1. control unit MKS-07N with belts
2. external power adapter
3. main power adapter
4. batteries R14
5. external battery compartment
6. case for storage and transportation
7. telescopic pole
8. software
9. cable 1,5m
10. detection unit BDPA-07
11. detection unit BDKS-07
12. operation manual, passport, logbook



SET #3
 α -, β -, γ - radiation



SET #4
 α -, β -, γ - radiation

Package includes:

1. control unit MKS-07N with belts
2. external power adapter
3. main power adapter
4. batteries R14
5. external battery compartment
6. case for storage and transportation
7. telescopic pole
8. software
9. cable 1,5m
10. detection unit BDPA-07
11. detection unit BDPG-07
12. detection unit BDKS-07
13. operation manual, passport, logbook

Package includes:

1. control unit MKS-07N with belts
2. external power adapter
3. main power adapter
4. batteries R14
5. external battery compartment
6. case for storage and transportation
7. telescopic pole
8. software
9. cable 1,5m
10. detection unit BDPA-07
11. detection unit BDPB-07
12. detection unit BDPG-07
13. detection unit BDKS-07
14. operation manual, passport, logbook

DRBP-03 SURVEY METER



DRBP-03 SURVEY METER

■ **Purpose**

Measurement of ambient equivalent dose rate and ambient equivalent dose of gamma photon radiation, measurement of alpha and beta particles flux density.

■ **Specifications**

Energy range of detected ionizing photon radiation	0,05–3,0 MeV
Energy range alpha radiation	by Pu-239
Energy range beta radiation	0,15–3,5 MeV
Dose rate measurement range	0,10–3*10 ⁶ μSv/h
Dose measurement range	0,001–9999 mSv
Particles flux density	0,10–700 s ⁻¹ cm ⁻²
Maximum permissible Intrinsic error	±15%
Alarms and indications	visual, audible
Ambient conditions:	
Pressure	84 to 106,7 kPa
Temperature	-20°C to +50°C
Humidity at t 35°C	95 %
Power supply	9V
Weight	3 kg

■ **Compared characteristics of the MKS-07N and DRBP-03 radiometers dosimeters in terms of their ability to meet the key requirements of JSS 55555:2000 and MIL-STD 461C/462**

No	Technical requirements	MKS-07N	JSS 55555:2000	MIL-STD 461C /462	MKS-07N: compliance	DRBP-03
1	Resistance to low and high temperatures (operation)	−40°C ... +55°C (for two hours at each of the extreme temperatures), in accordance with GOST RV 20.57.306 and GOST 27451	If the device is not exposed to direct sunlight and not placed in a small closed space with high temperature, it undergoes Test 17 "High temperature," Procedure 5, Test condition G: the device is stored at +55°C for 16 hours, turned on and tested during the last hour.	–	The device meets the requirements of JSS 55555 regarding the combination of Test 17 "High temperature," Procedure 5, Test condition G and Test 25 "Solar radiation."	−20°C ... +50°C (for two hours at each of the extreme temperatures).
2	Durability to low and high temperatures (storage)	−50°C ... +55°C (for 24 hours at −50°C and six hours at +55°C), in accordance with GOST RV 20.57.306	If the device was exposed to solar radiation and the heating temperature is unknown, it undergoes Test 25 "Solar radiation" as an additional test. If the device is placed in a closed small space with high temperature or exposed to direct sunlight, it undergoes Test 17 "High temperature," Procedure 6, Test condition K (or M): the device is stored at +55°C for 16 hours, turned on and tested during the last hour, then stored at +70°C (or +85°C, depending on the expected solar heating) for 16 hours. Note: Devices mounted on tracked and wheeled vehicles (classes L2J and L2H correspondingly) should undergo Procedure 6, Test condition M (storage at +85°C). Test 20 "Low temperature," Test condition J: the device is stored at −20°C for 16 hours, optionally turned on and tested during the last hour.	–		−50°C ... +50°C (for six hours at each of the extreme temperatures), in accordance with GOST 12997.
3	Resistance and durability to high ambient humidity	Relative air humidity is maintained below 98% with a temperature of +35°C and with water condensation. The test is carried out under GOST RV 20.57.306, shortcut method No. 1: four 24-hour cycles with the temperature going up to +55°C and down to +25°C while the humidity remains 95% and higher; the device is kept for 12 hours under +55°C and 93% humidity (this is equivalent to ten 24-hour cycles of heating to +40°C).	Test 10 "Damp heat": the device is stored under +40°C and a humidity of no less than 95% for 16 hours, turned on and tested during last 30 minutes.	–	The device successfully passed Test 10 "Damp heat" (a total of 36 hours at +55°C instead of 16 hours at +40°C).	Relative air humidity is up to 95% with the temperature at +35°C and without water condensation (the device is stored for two days, turned on and tested at the end of the period), in accordance with GOST 12997.

■ **Compared characteristics of the MKS-07N and DRBP-03 radiometers dosimeters in terms of their ability to meet the key requirements of JSS 55555:2000 and MIL-STD 461C/462**

No	Technical requirements	MKS-07N	JSS 55555:2000	MIL-STD 461C /462	MKS-07N: compliance	DRBP-03
4	Resistance to atmospheric condensed moisture (dew)	Relative air humidity is maintained below 98% with a temperature of +35°C and with water condensation. The test is carried out under GOST RV 20.57.306, shortcut method No. 1: four 24-hour cycles with the temperature going up to +55°C and down to +25°C while the humidity remains 95% and higher; the device is kept for 12 hours under +55°C and 93% humidity (this is equivalent to ten 24-hour cycles of heating to +40°C).	Test 27 "Tropical exposure," Test condition B (wheeled vehicles or an air conditioned cabin), or Test condition C (tracked vehicles or a cabin without air conditioning), or Test condition D (outside the cabin):14, 28, or 56 cycles (for B, C and D correspondingly), each lasting 24 hours with the temperature going up to +35°C and down to +20°C while the humidity remains at 95% and higher; the device is kept for 12 hours under +55°C and 93% humidity.	—	Assuming that four cycles at +55°C are equivalent to 14 cycles at +35°C, the device successfully passed Test 27 "Tropical exposure", Test condition B.	—
5	Resistance and durability to atmospheric pressure	60 ... 106.7 kPa (60 minutes under 60 kPa and normal temperature), in accordance with GOST 27451.	Test 3 "Altitude," Procedure 5, Test condition L2 A2:the device is stored at -40°C and the pressure of 60 kPa for 16 hours, turned on and tested during the last hour (this is equivalent to working conditions at an altitude of 4,160 m).	—	The requirements are met in terms of pressure, and they are not met in terms of test duration and the temperature in the process.	84 ... 106.7 kPa
6	Resistance and durability to mechanical shocks	3,400 bumps with an acceleration of up to 150 m/s ² (15g) and bump duration of 5...15 ms, in accordance with GOST RV 20.57.305.	Test 5 "Bump":if driving on roads is simulated, the device is exposed to 4,000 bumps with an acceleration of up to 100 m/s ² (15g) and bump length of 16 ms; if driving on rugged terrain is simulated, the device is exposed to 4,000 bumps with an acceleration of up to 250 m/s ² (25g) and bump duration of 6 ms. During the tests the device can be turned on if this is stipulated in the requirements, but that is done optionally.	—	The requirements are met for road simulation and not met for rugged terrain simulation (the acceleration should be 25g instead of 15g).	1,000 bumps with an acceleration of up to 98 m/s ² (10g) and bump duration of 8...50 ms, in accordance with GOST 12997.
7	Resistance and durability to sinusoidal vibration	5...500 Hz with an acceleration of 60 m/s ² (6g) (testing in three axes using the fixed frequency method, two minutes for each of the following frequencies: 16, 20, 25, 31,5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400 and 500 Hz), in accordance with GOST RV 20.57.305.	Test 28 "Vibration": sinusoidal vibration is created at 5...500 Hz with an acceleration of 40 m/s ² (4g) for tracked vehicles and 15 m/s ² (1.5g) for wheeled vehicles. The test has the following duration: two hours for every 1,600 km of simulated distance or 20 hours;two hours for every 8,000 km of simulated distance.Note: For devices that are not fixed in a vehicle (jumping up and down during transportation), Test 28 "Vibration" can be replaced with Test 4 "Bounce."	—	The requirements are met in terms of pressure and not met in terms of frequency band and acceleration. The requirements are not met in terms of duration.	10...150 Hz with an acceleration of up to 49 m/s ² (5g), in accordance with GOST 12997.

■ **Compared characteristics of the MKS-07N and DRBP-03 radiometers dosimeters in terms of their ability to meet the key requirements of JSS 55555:2000 and MIL-STD 461C/462**

No	Technical requirements	MKS-07N	JSS 55555:2000	MIL-STD 461C/462	MKS-07N: compliance	DRBP-03
8	Durability to mechanical factors during transportation	The device is tested for one hour using the SIT-2M transportation simulation testbench with an acceleration of 30 m/s ² (3g) (this is equivalent to the device's transportation by a truck at a speed of 20...40 km/h on a dirt track to a distance of 250 km), in accordance with GOST RV 20.57.305.	Test 4 "Bounce" (this is equivalent to having the device shake in the rear part of the body of an empty truck moving on a very bad road at 10...15 km/h): performed for 15, 60 or 180 minutes. Note: Test 4 "Bounce" is not obligatory and can be applied instead of Test 28 "Vibration" to items that are not fixed in a vehicle (jumping up and down during transportation).	—	The requirements are met.	The device is tested for one hour using the SIT-2M transportation simulation testbench with an acceleration of 30 m/s ² (3g) (this is equivalent to the device's transportation by a truck at a speed of 20...40 km/h on a dirt track to a distance of 250 km).
9	Resistance to exposure to variable magnetic field of industrial frequency	40 A/m, in accordance with GOST 27451.	—	No requirements are imposed when using the device on the ground.	No requirements are imposed.	—
10	Resistance to brief exposure to variable magnetic field of industrial frequency	400 A/m, in accordance with GOST 27451.	—		No requirements are imposed.	—
11	Durability to outgassing and decontamination solutions and mixtures	Decontamination solution No. 2 BShch, RD outgassing solution, outgassing solution based on the SF-2U powder, alcohol gasoline blend, in accordance with GOST RV 20.57.307. Dichloroethane-based solutions are prohibited.	Test 9 "Corrosion (salt)": the device is exposed to salt spray and then stored in humid conditions for a long time. The test is not obligatory. Test 21 "Mould growth": mould spores are applied to the device, and then it is stored for 28 days at a temperature of +29°C and humidity of 90%.	—	The requirements are not met: resistance to corrosion and mould is not tested. No requirements are imposed regarding decontamination solutions.	—

■ **Compared characteristics of the MKS-07N and DRBP-03 radiometers dosimeters in terms of their ability to meet the key requirements of JSS 55555:2000 and MIL-STD 461C/462**

No	Technical requirements	MKS-07N	JSS 55555:2000	MIL-STD 461C/462	MKS-07N: compliance	DRBP-03
12	Durability to solar radiation	With the integrated density of heat flow being up to 1,120 W/m ² and that of ultraviolet emission being up to 68 W/m ² , the device is exposed to: either five days of continuous emission with an ambient temperature of +45°C; or three day cycles with a maximum ambient temperature of +55°C (6 hours each), in accordance with GOST RV 20.57.306.	Test 25 "Solar radiation": with the total density of light maintained at 1,200 W/m ² (including 540...775 W/m ² of infra-red 40...75 W/m ² of ultraviolet emissions), the device is tested for one day cycle with a maximum ambient temperature of +55°C (5 hours). <i>Note:</i> Test 25 "Solar radiation" is carried out in addition to Test 17 "High temperature," Procedure 5, Test condition G for devices, which are subject to direct sunlight during their operation; both tests can replace Test 17 "High temperature," Procedure 6, Test condition K (or M).	—	An accelerated test cycle (three day cycles at a temperature of +55°C) is equivalent to Test 25 "Solar radiation."	—
13	Durability to sand and dust	The device is tested for two hours with dust concentration being 5 g/m ³ , size of particles being 50 µm and air speed being 1 m/s, in accordance with GOST RV 20.57.306. <i>Note:</i> The static dust exposure test may not be held if the device has successfully passed the water immersion test.	Test 4 "Dust": held for one hours with the size of particles at 150 µm.	—	The requirements are met.	—
14	Durability to drops	The device is dropped from an altitude of 0.75 m to the ground (concrete with a felt cover) to fall on its facets, edges and angles, in accordance with GOST RV 20.57.305.	Test 13 "Drop": the device is dropped to concrete ground with a felt cover from an altitude of 25...1,000 mm, depending on the test severity requirements. The device is off during the test. The test is optional, it is applied only to systems that have a chance of being dropped. Test 26 "Toppling": turned off and standing on an edge, the device falls on a wood plank. The test is optional and applied to equipment, which is not fixed all the time.	—	There are no specific requirements to the altitude, in any case, felt cover is not equivalent to steel.	—

■ **Compared characteristics of the MKS-07N and DRBP-03 radiometers dosimeters in terms of their ability to meet the key requirements of JSS 5555:2000 and MIL-STD 461C/462**

No	Technical requirements	MKS-07N	JSS 5555:2000	MIL-STD 461C/462	MKS-07N: compliance	DRBP-03
15	Durability to brief immersion in water	Up to 15 minutes to a depth of 1 m, in accordance with GOST RV 20.57.306.	Test 19 "Immersion": the device is put for two hours to a depth of 0.15...265 m, depending on the requirements. The test is optional (for ground on-board equipment).	—	There are no specific requirements regarding the depth. The duration requirement is not met.	—
16	Resistance to acoustic noise	50...10,000 Hz with a sound pressure level of 130 dB, in accordance with GOST RV 20.57.305.	—	—	—	—
17	Resistance to radiation	The device is exposed to 100 Sv/h of X-ray or gamma-ray radiation for five minutes, in accordance with GOST 25935.	—	—	—	—
18	Maximum radiation dose	Not less than 100 Gy, in accordance with GOST 25935.	—	—	—	—
19	Intensity levels of emitted radio noise	Quasipeak value: not more than 50.5 dB (µV/m) in the 30...230 MHz band, not more than 57.5 dB (µV/m) in the 230...1,000 MHz, in accordance with GOST R 50746.	—	Requirement RE102 "Radiated Emission, Electric Field 10 kHz to 18 GHz": Root mean square (RMS) in the 2...100 MHz band is no more than 24 dB (µV/m), while in the 100 MHz... 18 GHz the border shows linear growth (on a logarithmic scale) with a coefficient of 20 dB (µV/m) per decade and, for example, at a frequency of 1 GHz it amounts to 44 dB (µV/m).	When the band is below 230 MHz, the requirements are not met (the quasipeak value of 50.5 dB is higher than the RMS value of 31 dB at 230 MHz and the 24dB at frequencies below 100 MHz). The frequency range below 30...1,000 MHz does not correspond to the 2MHz... 18 Hz band. According to article 6.2.1 of GOST 30805.22-2013 "Industrial radio noise," testing is not carried out in the band above 1 GHz if the device has no chains with frequencies above 108 MHz.	—